CITY OF NORTH PORT

FLOODPLAIN MANAGEMENT PLAN (FMP)

Updated

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PREPARED BY

Elizabeth Wong, P.E.

Stormwater Manager

Department of Public Works

1100 N. Chamberlain Boulevard

North Port Fl 34286

Office: (941) 240-8321

Mobile: (941) 628-1475

Email: ewong@cityofnorthport.com

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PREFACE

Background

The City of North Port City was incorporated in 1959 with only 23 residents and has grown over the last 60 years to become a vibrant community with a population of 77,561 as of April 2020. North Port has an incorporated area of approximately 104 square miles and is located in southeast Sarasota County.

The City is a participant in the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP) administered Community Rating System (CRS) program since 1992. CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from meeting FEMA's three goals of the Community Rating System:

- Reduce flood damage to insurable property
- Strengthen and support the insurance aspects of the National Flood Insurance Program
- Encourage a comprehensive approach to floodplain management

There are many community benefits to joining the CRS in addition to reduced flood insurance rates. CRS floodplain management activities provide enhanced public safety, a reduction in damage to property and public infrastructure, avoidance of economic disruption and losses, reduction of human suffering and the protection of the environment.

CRS Classification structure is based on credit points earned and is comprised of a Class rating scale of 10 to 1, with Class 10 being the worst and Class 1 being the best for flood insurance discount. A Class 10 will have 0% flood insurance reduction in the high risk flood zone AE, whereas a Class 1 rating will result a maximum of 45% flood insurance reduction in high risk flood zone AE.

The City of North Port has undergone several CRS audits to improve its CRS rating. The City's continual efforts in flood protection activities has resulted in improved CRS rating each audit. The most recent 2019 audit resulted in an improvement of the City's Class 6 rating to a Class 5 rating. The Class 5 rating became effective on May 1, 2020. The change from a Class 6 to the better Class 5 rating resulted in a change from 20% (Class 6) to 25% (Class 5) flood insurance discount for high risk flood zone AE areas. The flood insurance discount will be 10% in low risk flood zone X areas.

CRS Class	% Insurance Discount for Flood Zone AE	% Insurance Discount for Flood Zone X	Total Savings to North Port Residents as of September 10, 2020
6	20%	10%	$34,870
5	25 %	10%	$42,635

Purpose of Floodplain Management Plan

A requirement in the CRS program is the preparation and annual update of the Floodplain Management Plan (FMP) to address the following:

- Identify existing and future flood-related hazards and their causes;
- Ensure a comprehensive review of all possible activities and mitigation measures are conducted so that the most appropriate solutions will be implemented to address the hazard;
- Ensure the recommended activities meet the goals and objectives of the City, are in coordination with land use and comprehensive planning, do not create conflicts with other activities and are coordinated so the costs of implementing individual activities are reduced;
- Ensure the criteria used in community land use and development programs account for the hazards faced by existing and new development;

- Educate residents and property owners about the hazards, loss reduction measures and the natural and beneficial functions of floodplains;
- Build public and political support for activities and projects that prevent new problems, reduce losses and protect the natural and beneficial functions of floodplains;
- Build a constituency that wants to see the plan's recommendations implemented.

The FMP summarizes flood control projects, stormwater management activities, flood map revision, floodplain management ordinance revisions and public outreach conducted. The Plan also proposes future continuation of flood preventative activities. The FMP shall be used in conjunction with the latest edition of the City's Comprehensive Emergency Management Plan (CEMP) Base Plan and Hazard Specific Annexes included as Attachment A. The FMP is incorporated as an annex to Sarasota County's multi-jurisdictional Unified Local Mitigation Strategy (LMS) Plan. This FMP is organized into the ten (10) planning steps as given in the 2017 CRS Manual.

1. FLOODPLAIN MANAGEMENT COMMITTEE ORGANIZATION

The City of North Port's CRS Committee is formed by City Resolution 2016-R-02 (Exhibit 1-1) to review the FMP to meet the above mentioned purposes of the FMP. The FMP Committee will meet sufficient number of times to involve the members in the FMP plan steps 4 through 8. The FMP Committee is comprised of the City of North Port Staff listed below. Public sector representatives on this committee will be discussed in the next section. All meetings are publicly noticed and posted on the City website and social media to encourage public participation. During the year 2020 Covid-19 pandemic, these meetings were held virtually. Input from the CRS committee was received at the beginning of the planning process in a publicly advertised meeting and again in another publicly advertised meeting when the updated draft FMP was prepared.

A meeting was held on September 17, 2020 at the beginning of the FMP update process and another meeting was held on December 3, 2020 to discuss the updated draft FMP. A list of invitees, their roles and attendees to the CRS Committee meetings and meeting minutes are all included in Exhibit 1-2. Exhibit 1-3 lists the expertise of the City Staff in implementing the following six categories of mitigation measures: 1. Preventative Activity, 2. Property Protection, 3. Natural Resource Protection, 4. Emergency Services, 5. Structure Projects, and 6. Public Information.

The Stormwater Manager coordinates the CRS meetings, serves as the chairperson of the CRS Committee and prepares and updates the FMP. The Senior Planner from the Neighborhood Development Services (NDS) Planning Division will be the alternate.

City Staff in CRS Committee

1. Neighborhood Development Services (NDS) Planning Division – Senior Planner
   NDS is the department responsible for the City's Land use and Comprehensive planning. The NDS Planner coordinates with the Stormwater Manager on the update of the City's Floodplain Management Ordinance.
2. NDS Building Division - Building and Code Enforcement staff
   The Building staff oversees all building construction within the City to meet the Florida Building code and Floodplain Management Ordinance requirements to minimize impacts of flooding to structures. NDS formed a Floodplain Task force in early 2020. The primary mission of the Floodplain Task Force to support the City of North Port's CRS program through information, education and outreach activities. Exhibit 1-4 gives the Floodplain Task Force Work Plan. The Floodplain Task force is headed by the Building Official who is the City's designated Floodplain Administrator. Participants in the Floodplain Task force include NDS zoning staff, NDS planning Analysis and the Stormwater Manager. With the departure of the Building Official in August 2020, a Certified Floodplain Manager (CFM) from CAPGOV was retained to serve as the Building Official.

3. Public Works Stormwater Manager
   The Stormwater Manager is the City's CRS coordinator and prepares the FMP and CRS program elements with input from City staff and the public. The Stormwater Manager assists with Public Works Operations/Maintenance projects that prevent or reduce flooding, coordinates flood map updates, provides Special Flood Hazard Area (SFHA) information to the public, performs development review to minimize adverse impacts to the floodplain, revises the City's stormwater regulations, provides input to the revision of the Floodplain Management Ordinance and performs public outreach activities to educate the public on flood protection, SFHA information and natural floodplain functions. The Stormwater Manager also oversees the environmental protection of wetlands and is a member of the LMS work group.
4. Public Works Engineering Division – Engineering Manager (Project Engineer as alternate)
   The Public Works Engineering Manager and Project Engineer oversees engineering design and construction projects, coordinates all stormwater design and floodplain impact issues with the Stormwater Manager, and provides input to the revision of the Floodplain Management Plan.
5. Public Works Administration Division – Community Outreach Coordinator
   The Community Outreach Coordinator assists in public outreach for the CRS program and updates the City's website and social media on flood information.
6. City Manager Office – Grant Writer and Community Outreach Coordinator
   The Grants Writer coordinates the City's grant applications and is also a Certified Floodplain Manager (CFM) and has experience with the CRS program. The Community Outreach Coordinator coordinates all public outreach programs for the entire City and sends preparedness messages and alerts on approaching storm events.
7. Finance Department – Management Analyst
   The Management Analysis coordinates the City's capital improvement program.
8. Fire Rescue – Emergency Manager
   The Emergency Manager updates the City's Comprehensive Emergency Response Plan, coordinates the City's flood warning system, performs public outreach on flood protection information and is member of the LMS work group.
9. Department of Parks and Recreation – Parks and Recreation Manager
   The Parks and Recreation Manager coordinates a diverse year-round recreational opportunity through the preservation of open space, park settings, recreational facilities, and programs that meet the physical, mental, cultural and social needs of our residents, while enhancing the overall quality of life. Parks and Recreation is a division within the Department of General Services.
10. Utilities Department – Utilities Engineer
    The Utilities staff oversees the water and wastewater service to the City and monitors water quality.

City Participation in Sarasota County LMS and CRS work Group Meetings

The City of North Port has three representatives, the Stormwater Manager, the Emergency Manager and the Grant Writer, who participate in the Sarasota County LMS work group. This work group includes representatives from the Cities of Sarasota and Venice, Town of Longboat Key, Sarasota County, Sarasota County Schools and Sarasota Memorial Hospital. Each jurisdiction's FMP is included as an annex to the multi-jurisdictional LMS Plan. The LMS Work Group, which has met on a quarterly basis since December of 2007, participates in the five-year update to the LMS plan and annually revises the LMS projects list. The meeting is publicly noticed, and agendas, minutes and advertisement may be found in Appendix of Sarasota County Unified Local Mitigation Strategy. The City Stormwater Manager also attends and provide input in the Sarasota County CRS committee meetings.

2. PUBLIC INVOLVEMENT

The FMP Committee includes the below public sector members. All meetings are publicly noticed and posted on the City website and social media to encourage public participation. Representatives of various public sectors were invited to the CRS committee meetings as shown on Exhibit 1-2. Input from the CRS committee

was received at the beginning of the planning process in a publicly advertised meeting and again in another publicly advertised meeting when the updated draft FMP was prepared.

Public Sector Members

1. Chamber of Commerce Representative
2. North Port Librarian
3. HOA Representatives
4. Building Industry Association (BIA) Representative
5. Developers
6. Engineering Consultants
7. Flood Insurance Representatives
8. Realtor Representatives
9. Commercial facility Representatives
10. Lending Institute Representatives
11. Civic Association Representative
12. North Port Contractors Representative
13. Sarasota County CRS Coordinator

3. COORDINATION WITH OTHER AGENCIES

Unified Local Mitigation Strategy Work Group

The City of North Port Stormwater Manager, Emergency Manager and Grants Writer participate in the Sarasota County Local Mitigation Strategy (LMS) work group. Local hazard mitigation strategy planning is the process of organizing community resources, identifying and assessing hazard risks and determining how to best minimize or manage those risks. This process culminates in a hazard mitigation plan that identifies specific mitigation actions designed to achieve both short-term planning objectives and a long-term community vision. They City staff provides input into the multi-jurisdictional LMS plan including the five-year update . Annually City staff revises the LMS projects list (Exhibit 3-1).

Flood Map Update Coordination with FEMA, SWFWMD and Sarasota County

The City of North Port coordinated extensively with representatives from FEMA, Southwest Florida Water Management District (SWFWMD) and Sarasota County in updating the City's Flood Insurance Rate Maps (FIRMs) and Flood Insurance Study (FIS) which became effective on November 4, 2016. The City is currently coordinating with FEMA and providing comments in the release of the preliminary coastal risk FIRMs dated December 31, 2019. This map update effort is discussed more in later sections of the FMP. The interactions include preparation and comments on the flood maps, public outreach efforts, hosting of open houses and comments/appeals on the draft FIRMs.

Coordination with Sarasota County on CRS Program and Development Review

City of North Port staff closely coordinates the following activities with the County:

- Participate with Sarasota County CRS coordinator in general public outreach activities such as flood mitigation workshops and dissemination of flood information at the North Port Library staffed by Sarasota County.
- Participate in the Unified Program for Public Information (PPI) along with the City of Venice, City of Sarasota and Town of Longboat Key. The PPI allows participating communities to coordinate public outreach messages vital to floodplain management.
- As part of the PPI Committee, the City also participate in the development of the Flood Insurance Promotion Plan expected to be finalized early 2021.
- The Stormwater Manager coordinates with the Sarasota County Engineer in the review of development projects within the West Villages Improvement District (WVID) area that was annexed into North Port. WVID is within the Sarasota County's Lower Myakka River Watershed, and the coordinative effect is to

avoid adverse flooding effects to the County from any new projects proposed within that watershed. The Stormwater Manager reviews the development engineering consultant's update of the County's hydraulic model to evaluate the impact of the proposed development within the development and effects of the discharge into the surrounding County.

- The City's Emergency Manager participates closely with the Sarasota County's Emergency Operations Center staff in the event of oncoming Tropical Storms and Hurricanes.

Coordination with Charlotte Harbor National Estuary Program

The City of North Port Stormwater Manager is a member of the Charlotte Harbor National Estuary Program (CHNEP) Management Committee. A City Commissioner represents North Port on the CHNEP Policy Committee. The CHNEP addresses water quality and environmental benefits related to restoration of Charlotte Harbor and protection of the estuaries. The City also hosts a booth at the CHNEP Annual Environmental Festival and disseminates information to the public on water quality protection, flood information and low impact development (LID) methods.

Coordination with Myakka River Management Coordinating Council

The City of North Port Stormwater Manager is a member of the Myakka River Management Coordinating Council (MRMCC) which was established in 1985, by the Myakka River Wild and Scenic Designation and Preservation Act (Section 258.501, Florida Statutes) (Designation Act) to provide interagency and intergovernmental coordination in the management of the river. The Florida Department of Environmental Protection (Department) coordinates the MRMCC. The MRMCC holds three meetings per year to review and make recommendations on all proposals for amendments to the Designation Act, Myakka Wild and Scenic River Management Plan, Chapter 62D-15, Florida Administrative Code, Myakka River Wild and Scenic River Rule. They also review other matters that affect the water quality, quantity issues and wildlife in the protected areas along the Myakka River. The City of North Port Stormwater Manager provides input on new development projects with discharges to the Myakka River Protection Zone.

Coordination with SWFMWD in the Environmental Resource Permit Program

The City of North Port schedules Environmental Resource Permit (ERP) pre-application meetings with the SWFWMD to solicit input on the design of new/replacement flood control projects, new city developments, dredging vegetation control projects within the City's stormwater conveyance system. The City also obtains all required ERPs and performs the SWFMWD required stormwater system recertifications.

Coordination with FDEP in the National Pollutant Discharge Elimination System Program

The City of North Port is one of 6 co-permittees (North Port, Sarasota and Venice, Town of Longboat Key, Sarasota County, and Florida Department of Transportation) in the National Pollutant Discharge Elimination System (NPDES) permit. An annual NPDES permit is submitted that documents all NPDES permit requirements relating to stormwater system inventory inspection and maintenance, water quality monitoring and pollutant load modeling, flood control projects, development review and water quality treatment and attenuation requirements, construction inspection for proper best management practices, proactive and reactive inspections and public outreach. The City has been audited several times by FDEP and found to be compliant.

Permitting with U.S. Army Corp of Engineers

The City of North Port has contacted and obtained all needed permits for new construction projects from the U.S. Army Corp of Engineers (USACOE) . An example is the permit obtained to replace water control structure No. 101 on the Myakkahatchee Creek. The concern over the impact this replacement structure on the small tooth sawfish was resolved in the permitting effort.

Permitting with the US Fish and Wildlife Service and Florida Fish and Wildlife Conservation Commission

The City of North Port has contacted and obtained all needed permits for the impact of new construction projects on protected species from both Fish and Wildlife Service (FWS) and Florida Fish and Wildlife

Conservation Commission (FWC) . An example is the permit obtained to replace water control structure No. 101 on the Myakkahatchee Creek. There were existing gopher tortoise burrows within the access easement to the structure. A gopher tortoise survey was done and a FWC relocation permit was obtained and the gopher tortoises relocated prior to start of construction.

4. HAZARD ASSESSMENT

Storm Types and Flood Hazard

Tropical storms and hurricanes are large cyclonic storms with counterclockwise winds of 39 mph or greater. They are often accompanied by heavy rains and storm surge that can cause flooding. In addition, fallen trees and debris can obstruct water flow, contributing to structure damage. Hurricanes are categorized according to the below Saffir-Simpson Hurricane Wind Scale which is based on estimates of potential property damage. Hurricanes rated Category 3 and higher are considered major hurricanes because of their potential for significant damage and loss of life. While less devastating, Category 1 and 2 hurricanes are still dangerous, and they too, require preventative measures.

Category	Sustained Winds	Potential Damage
Tropical Storm	39 – 73 mph	Some
1	74 – 95 mph	Some
2	96 – 110 mph	Extensive
3	111 – 130 mph	Devastating
4	131 – 155 mph	Catastrophic
5	156 mph or higher	Catastrophic

NOAA Damage Potential for Each Category:

- **Category 1:** Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding, and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last several days.
- **Category 2:** Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
- **Category 3:** Devastating damage will occur: Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
- **Category 4:** Catastrophic damage will occur: Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
- **Category 5:** Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas.

Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

A detailed description of the flood hazard assessment is given in the Sarasota County Unified LMS plan and the FEMA FIS Study number 12115CV001A. The LMS plan can be accessed on the Sarasota County Website at https://www.scgov.net/government/emergency-services/local-mitigation-strategy. The FEMA FIS study can be accessed on the FEMA website here: https://hazards.fema.gov/femaportal/prelimdownload/. The City's CEMP Base Plan and Hazard Specific Annex D (Attachment A) gives a detailed flood history and the City's emergency management response to flood events.

Map of Special Flood Hazard Areas

Original 1981 and 1984 FIRMs

The original FEMA FIRMs with Special Flood Hazard Areas (SFHA) are dated September 2, 1981 and available for only a portion of North Port east of the Myakka River. The FEMA FIRMs for the City's West Villages Improvement District (WVID) annexed area that is west of the Myakka River are dated May 1, 1984. These FIRM maps are available at the City of North Port Public Works Department, the NDS department and at the North Port Library. Pdfs of the maps are available on the City website at https://www.cityofnorthport.com/government/city-services/public-works/flood-information/1981-1984-fema-flood-maps. These 1981 and 1984 FIRMs are no longer effective.

Current Effective November 4, 2016 FIRMS

The 1992 and 2003 storm event are close to a 100-year storm event and the extent of flooding is much more expansive than the SFHA shown in the 1981 FEMA FIRMs. Consequently, a cooperatively funded project with SWFWMD named the Big Slough Watershed Study was initiated in 2003 and completed in 2014 (see Attachment C) to update the FIRMs and evaluate options to reduce flooding. This study is detailed in later sections of this FMP. Data is available from the study which shows the depth of flooding, velocities and peak times corresponding to peak flows. A Big Slough hydraulic model was used to evaluate the flood risk and update the SFHA. This model was calibrated with flood water elevation data determined from a video recording by North Port Fire Rescue during the June 2003 flood. Also, during public outreach efforts prior to the May 22, 2012 model approval, much input was obtained from the residents including documentation of localized highwater marks. The elevations corresponding to the high-water marks were surveyed and used to verify the hydraulic model.

The SWFWMD Governing Board approved the Big Slough hydraulic model used for preparing the FIRMs on May 22, 2012. The updated FIRMS became effective on November 4, 2016. As the FEMA FIRMs are just pdfs of the SFHA overlaid on old 2007 aerial, the City has made available on the City website a user-friendly searchable web application to view the effective FIRMs overlaid on the most current 2020 aerial with visible property lines and information links. This web application is available at the City's "FEMA Flood Map Updates Webpage" at http://www.cityofnorthport.com/flood provides instructions on how to assess this effective November 4, 2016 FIRMs. An overview map of the SFHA with affected parcels is given in Exhibit 4-1. An overview map of the SFHA with affected building structures is given in Exhibit 4-2.

Preliminary December 31, 2019 Coastal Flood Risk FIRMS

North Port has tidally influenced areas south of US 41 and east of the Myakka River. The West Villages annexed area west of the Myakka River is also tidally influenced. In the November 4, 2016 FIRMs, The SFHA in these tidally affected areas were prepared, by just remapping the 1981 and 1984 FIRM coastal Base Flood Elevations (BFEs) of 7ft NAVD88 on 2007 LiDAR topography. This effort resulted in major portions of North Port developments removed from the SFHA that was in 1981 and 1984 SFHA. The coastal BFE of 7ft NAVD88 was not reevaluated. Consequently, in February 2014, FEMA started an effort

to identify, assess, and update coastal flood hazard risk to incorporate storm surge, high tides, wave action in addition to freshwater flooding input. On December 31, 2019, FEMA released preliminary coastal risk maps for Sarasota County which included the City of North Port. The status of this current map update effort, impact of the SFHA changes, City's comments and timeline for adoption is discussed in later Section 8. The web application available at the City's "FEMA Flood Map Updates Webpage" at http://www.cityofnorthport.com/flood provides instructions on how to assess this interactive preliminary December 31, 2019 FIRMs.

Historic Flooding

The City of North Port is located on the southwest side of Florida in the southernmost part of Sarasota County, which is bordered on the south by Charlotte County, on the east by Desoto County and to the north by Sarasota County. The City is comprised of 104 square miles and is the third largest land area city in the state.

North Port started as a planned community in 1959 with 70,608 platted residential lots. An extensive stormwater infrastructure network was constructed by General Development Corporation (GDC) consisting of 132 miles of manmade retention ditches (R-Ditches), 1,613 miles of roadside swales and 79.1 miles of major wet waterways with 64 water control structures (WCS) and stormwater conveyance piping to support its residential, commercial and light industrial developments. The WCSs is used to control water flow in the interconnected system R-ditches, waterways and Myakkahatchee Creek (also known as the Big Slough Canal). Twenty-eight (28) of the WCSs are equipped with gates which are opened or closed to allow flood relief or release of water in a stepwise design to the downstream southerly section of Myakkahatchee Creek and the westerly end of the Cocoplum Waterway. The City's water plant is located at the confluence of the Myakkahatchee Creek with the west end of the Cocoplum Waterway and withdraws potable water source from both water bodies.

The portion of the City that is east of the Myakka River is located within the southernmost downstream end of the 196 square miles of the Big Slough/Myakkahatchee Creek watershed boundary (Exhibit 4-3) and consequently is inundated with surface water runoff from this extremely large watershed, even during the mean annual storm event. A map of the City stormwater conveyance systems is given in Exhibit 4-4.

The City has experienced severe flooding from unnamed storms, tropical depressions, tropical storms and hurricanes as follows.

Date	Inches of Rain	Storm Magnitude	Storm
March 23-31, 1987	5.4 to 9.1	10 to 25-year storm	Unnamed storm
September 5-9, 1988	8.2 to 8.9	25-year storm	Unnamed storm
June 23 - July 2, 1992	16.2 to 20.7	500-year storm	Tropical Depression One
September 14-23, 2000	4.7	5-year storm	Unnamed storm
July 20-26, 2001	4.6 to 6.9	10-year storm	Unnamed storm
September 6-14, 2001	10.0 to 11.0	100-year storm	Tropical Storm Gabrielle
June 17-22, 2003	13.6 to 14.3	100-year storm	Unnamed storm
August 12-19, 2004	3.0 to 4.5	5-year storm	Hurricane Charlie
September 10-15, 2017	9.8	25 to 100-year storm	Hurricane Irma
November 8-12, 2020	3.5	Mean annual storm	Hurricane Eta

Map of Known Flood Hazards

During the 1992, 2003 and 2004 storms, extensive street flooding was experienced in the North Port Estates area and in areas within about 1.5 miles reach near the I-75 corridor crossing of the Myakkahatchee Creek and within the Jockey Club area. A map of these historically flood prone areas is provided in Exhibit 4-5. The flooding is due to a mix of factors including:

- Watershed location and lack of topographic relief.

- Periodic excesses of rainfall associated with cyclic and seasonal storm events.
- The Community's infrastructure, constructed in the 1960s, is designed for a 10-year storm event of 5-day duration, which is before the definition of the 100-year floodplain and the State's stormwater management regulations.
- Construction of the I-75 corridor in 1977 which redirected natural drainage patterns.
- Population growth and corresponding residential and commercial land development.
- Long-term increases in peak stormwater discharge rates and runoff volumes in upstream areas of the watershed in Sarasota, Manatee and Desoto Counties.
- Silt and vegetative debris accumulated in the stormwater conveyance system.

Recent Storms and Flooding

Hurricane Irma

The September 2017 Hurricane Irma with 9.8 inches of rain brought widespread street flooding typically experienced in the North Port Estates area and in area near the I-75 corridor crossing of the Myakkahatchee Creek. Exhibit 4-6 gives a map of the flooded locations during site reconnaissance on two separate days. The depth of flooding is also shown on the map.

The Jockey Club area streets that are typically inundated during such as storm event, were not flooded during Hurricane Irma. This is due to the City's prior efforts on R-ditch rehabilitation, major conveyance pipe replacements and the installation of swale liners in the Jockey Club area.

However, extensive flooding occurred in the "Dorothy Avenue" area located west of the Myakkahatchee Creek and just north of US 41. This is caused by freshwater run-off coupled with storm surge into tidally affected canals at high tide conditions. This caused water to back up onto the streets. Street flood retreated quickly when high tide conditions receded, and rainfall ended.

Additionally, during Hurricane Irma, the streets in the Orlando Boulevard area in the south east end of North Port was flooded due to a downstream replacement of a weir water control structure constructed by Charlotte County. This weir was constructed with an opening that was too restrictive. After the 2017 Hurricane Irma, Charlotte County widened the weir opening and no major flooding in the Orlando area has been reported during the later November 2020 Hurricane Eta, but this was a much lesser storm event.

Hurricane Eta

The November 2020 Hurricane Eta was a lesser storm event with 3.5 inches of rainfall. Historically, such a rain event would have caused some street flooding along the creek and in the North Port Estates area. However, no street flooding occurred, and this can be attributed to the City's on-going efforts in road swale regrading, pipe cleaning/replacements and removing debris and blockages in the Myakkahatchee Creek and City R-ditches.

Assessment of Less Frequent Flood Hazards –

Water Control Structures Failure

The City has an inventory and map of the 64 water control structures (WCSs) which function as dams or levees to retain water in the Cities interconnected system canals with the Myakkahatchee Creek. Twenty-eight (28) of the structures are equipped with gates that can be opened to allow flood relief or release of water in a stepwise design to the downstream southerly section of Myakkahatchee Creek and the westerly end of the Cocoplum Waterway. The City's water plant is located at the confluence of the Myakkahatchee Creek with the west end of the Cocoplum Waterway and can withdraw potable water source from either water bodies. As part of the Big Slough Watershed Study completed in 2014 (Attachment C), a best management practice analysis was conducted to determine the extent of flooding if the WCSs failed, i.e., removed in the hydraulic model. The analysis showed reduction in flooding in some areas north of Price Boulevard and east of Toledo Blade Boulevard but increased flooding in the west boundary of the City,

areas along the Creek and widespread flooding of populated areas just north of Cocoplum Waterway and west of Toledo Blade Boulevard. In this area, building structures are constructed at lower elevations (Exhibit 4-7) and are flood prone. In some of these areas, building structures are built low due to the availability of central sewer and the finished floor elevation was not raised as in homes built higher to accommodate a septic system drain field.

Localized Flooding due to Pipe Failures and Conveyance System Blockages

A considerable portion of the City's stormwater infrastructure was constructed in the late 1960's to 1970's and needs replacement. Much of the work done in the past has been reactive, many times due to collapsed pipes or frequent complaints. In fiscal year 2018, Public Works began taking a comprehensive, vigorous proactive approach to scheduling and budgeting for the maintenance, rehabilitation and replacement of the stormwater system. Details of the below drainage program improvement elements are given in the Department of Public Works Stormwater Management Plan for Fiscal Years 2020-2030 (Attachment B).

- Neighborhood Rehabilitation by Grid
- Road Crossing Pipe Replacement
- Outfall Replacement
- Retention Ditch Rehabilitation
- Targeted Projects

Impact of Future Development on Flood Hazards

In the City's Site Development Review process (SDR), per the City's Unified Land Development Code Chapter 18 Stormwater Regulations, the Stormwater Manager reviews all developments, other than single family platted lots, for floodplain impacts and required floodplain compensation and to ensure the finished floor elevation is higher than the regulatory base flood elevation. Thus, these new developments are not anticipated to worsen the floodplain.

The NDS Building division reviews proposed structures for all single-family platted lots. If a building is proposed within the SFHA footprint of the existing effective FIRM, then an elevation certificate will be required to show the building lowest floor elevation is constructed above the based flood elevation. However, floodplain compensation is not required for fill brought into the SFHA within these single-family platted lots so cumulatively, the floodplain can increase in these areas.

Hazards Other than Flood

The City's CEMP Base Plan and Hazard Specific Annexes (Attachment A) the Sarasota County LMS plans both describes the severity, history and probability of future events for other natural hazards such as earthquakes, wildfires or tornados. The LMS plan is available on the Sarasota County Website at https://www.scgov.net/government/emergency-services/local-mitigation-strategy.

5. PROBLEM ASSESSMENT

Vulnerability to Various Hazards

A tabulation of "Hazard Analysis" summarizing the City's vulnerability to each hazard excerpted from the City's CEMP Base Plan (Attachment A) is given in Exhibit 5-1. The anticipated frequency of occurrence, the City's vulnerability, exposure and potential for loss are addressed for the following categories of hazards, Hazardous Materials Spills, Commercial Nuclear Power Plant Incidents, Civic Disturbance, Mass Immigration, Coastal Oil Spill, Extreme Temperatures, Brush, Wildfires and Forest Fires, Thunderstorms and Tornadoes, Drought, Sinkholes and Subsidence, Terrorism, Exotic Pests and Diseases, Diseases and Pandemic Outbreaks, Critical Infrastructure Disruption, Special Events and Dam Failure, Major Transportation Incidents.

Life Safety Warnings and Evacuations
The City has a responsibility to warn the public on impending floods and the need for evacuation when necessary. The City's CEMP Base Plan Section V addresses life safety issues and response activities including evacuations (Attachment A). The CEMP Hazard Annex D details the flood warning and response activities.

The City of North Port has an Alert Sarasota County Emergency Notification System to quickly notify residents and business of an emergency or urgent situation. Residents can sign up to receive Alert Sarasota County alerts on their phone or email.

The Department of Public Works shares the cost of available USGS gages on the Myakkahatchee Creek at intersections with Tropicaire Boulevard, Price Boulevard and at Water Control Structure No. 101 at the downstream end of the Creek next to the City's Water Treatment Plant. The City's "Flood Warning" webpage at https://www.cityofnorthport.com/government/city-services/public-works/flood-information/flood-warning has a link to the USGS gage on the Myakkahatchee Creek at Tropicaire Boulevard. The webpage also provides a correlation of the anticipated flooding on streets correlated with USGS gage water level readings.

Public Health Hazards from Flood Waters
Flood waters may not only cause physical structure damage to buildings but can also cause associated health risks in the following forms:

- Mold and mildew
- Contaminated drinking and washing water
- Mosquito borne diseases
- Poor sanitation from loss of water and sewer services, overflowing/plugged septic systems
- Loss of electricity, air conditioning, natural gas, phone and internet services
- Animal invasion of property, in particularly, fire ants seeking higher ground, water snakes and alligators
- Mental stress and fatigue

Due to these associated hazards, residents should have a plan on how to deal with the aftermath of a flood and seek assistance from professional sources or the public safety officials.

Protection of Critical Facilities and Infrastructure
The City of North Port's Emergency Management maintains a Critical Facilities Inventory (CFI) for the City. Given the sensitive nature of the facilities, they are protected under Florida Statutes Chapter 119 and the locations of which are not included in this Plan. The City's Comprehensive Emergency Management Plan (CEMP) Annex D Section V.B describes the City's Fire Rescue response to Critical Facilities (see Attachment A page D20 on pdf page 142). Protection of Critical Facilities is described in detail in in the CEMP Annex F Section IV.C (see Attachment A page F8 on pdf page 184). Protection efforts in the face of a threat of flooding, facilities may be protected by constructing dikes, sand-bagging, or using pumps to prevent water from entering the facility. Critical facilities that require back-up electrical power such as City Hall and Police Station, Public Work/Fleet Facilities, Utilities building, Fire Stations, Water and Wastewater Plants all have appropriate back up power generation equipment on site.

The proper operation of the wastewater lift stations is necessary to avoid sewage over flow. During power outages, portable generators are readily available to supply power to wastewater lift stations. Sewage bypass pumping at the lift stations is another method to keep the flow moving in the collection system. Portable generators are also available to operate the gates at the City's water control structures to lower the water levels in the waterways in anticipation of a large rain event and to close the gates after the passing of the storm in order to retain water in the waterways which is a source of potable water for the City.

Mitigation activities relating to the critical facilities can be found in the Sarasota County Unified Local Mitigation Strategy Plan. Maps of shelters and surge/evacuation zones and routes on the Sarasota County Emergency Management website are linked from the City of North Port's website. Most of the critical facilities are built to withstand hurricane category 3 storm events.

The City's Utilities Department has an inventory of the water and wastewater infrastructure and the Department of Public Works has an inventory of the road and drainage infrastructure. These infrastructure systems are carefully checked before and after a hazard event for proper functioning.

Hazard effects on Community Economy and Major Employers

The City's more than 77,561 population (Bureau of Economics & Business Research April 2020) boast a median age of 40 and is one of the youngest in the Southwest Florida region. Youth is found in more than just the nearly 10,000 school children who attend the 6 elementary, 3 middle and 2 high schools within North Port. The population provides a work force to Sarasota, Manatee, Charlotte, Lee and even as far as Collier and Pinellas Counties. The major private employers within North Port are mostly commercial establishments along the US 41, and the Toledo Blade Boulevard corridor, with light industrial employers situated within the industrial park area on the west side of Toledo Blade Boulevard and in the Pan American Boulevard/Trott Circle area.

The City has acquired Warm Mineral Springs which is a main tourist attraction. Other main employers are the Sarasota Memorial Hospital and King Plastics on Toledo Blade Boulevard, USF College at Pan American Boulevard just north of US 41 and State College of Florida in the WVID Thomas Ranch annexed area. Despite the young population, there is also a large population of retirees in several large residential developments in Island Walk and Gran Paradiso in the Wellen Park area where there are currently many homes under construction. Other developments include Heron Creek along Sumter Boulevard, Bobcat Trail and developments along Toledo Blade Boulevard. Flood and other hazard events will cause extensive property damage, negatively impact the work force in North Port by restricting access to job sites and by loss of economy from businesses and tourism.

Buildings affected by Flood Hazard

Exhibit 4-2 shows the parcels with structures affected by the SFHA in the November 4, 2016 effective FIRMs. Below is a comparison of how many properties or portions of the properties were moved into the higher-risk SFHA and how many were moved out.

Parcel Status	No. of Affected Parcels (as of 12/05/16)	No. of Affected Parcels with Insurable Structures* (as of 12/05/16)	No. of Parcels with Insurable Structures* touching the SFHA (Using 12/05/16 Sarasota County GIS Structures Layer)
<u>Parcels Added</u> Parcels not in the 1981 FIRM floodplain, but any portion(s) of the parcel are touching the November 4, 2016 FIRM SFHA	14325	5531	276
<u>Parcels Removed</u> Parcels that are in the 1981 FIRM SFHA and were removed from the November 4, 2016 FIRM SFHA	1828	921	
Parcels that are in the 1981 FIRM SFHA and are still in the November 4, 2016 FIRM SFHA	2630	720	211

* An insurable structure is a structure with at least two load-bearing walls and a roof. It must be affixed to land, and at least 51% of its value must be above ground. This definition includes almost all residential and commercial structures, as well as ancillary buildings such as garages and barns. Storage facilities such as silos and grain storage buildings are also covered. The rules do not cover structures such as gazebos, pavilions, pole barns, and storage tanks, as these buildings do not have at least two load-bearing walls and a roof. If they did not have roofs, then they would not qualify as insurable structures. Otherwise, flood insurance is required. The issue is not habitability.

Exhibit 5-2 shows at total of 2,901 flood insurance policies in North Port as of September 10, 2020 and include 211 properties in the SFHA. Exhibit 5-3 is excerpted from the City's CEMP (Attachment A) Base Plan describes the vulnerabilities to the population, and economic loss if a hurricane with sufficient storm surge or flooding in a FEMA Special Hazard Flood Area was to affect the City of North Port.

Historic Damage to Buildings, Repetitive Loss and Insurance Claims

The City of North, as of September 10, 2020, does not have Repetitive Loss properties. A Repetitive Loss property is any insurable building for which two or more claims of more than $1,000 were paid by the National Flood Insurance Program (NFIP) within any rolling ten-year period, since 1978. Flood insurance data about private property, including repetitive loss properties, are protected under the Privacy Act. The locations of flood insurance claims within North Port were reviewed. A generalized map of these areas is provided in Exhibit 4-5. The claims are mostly single family residential homes (Exhibit 5-2) and mostly located in the following areas near the Myakkahatchee Creek:

1. North Port Estates area near the Myakkahatchee Creek
2. Areas near the Myakkahatchee Creek north and south of Interstate 75
3. Jockey Club area north of US 41 and west of the Myakkahatchee Creek
4. Area subject to tidal inundation south of US 41 near the Myakkahatchee Creek

The City has completed a detailed flood reduction study in fiscal year 2016 to evaluate methods to reduce flooding in the above first three areas. This is discussed in greater detail in Section 8. The data included in Exhibit 5-2 shows that of the 60 paid losses, only 28 are in the SFHA flood zone AE. The remaining paid losses are in the lower risk flood zone X. This shows the importance of flood insurance coverage as SFHA in flood maps do not always predicts which homes will be flooded. The number and value of losses in pre-FIRM homes and post FIRM homes are also given in Exhibit 5-2.

Natural and Beneficial Functions within the Floodplain

Floodplain areas are recognized as having an intrinsic value of their own as a part of the interconnected ecosystem and an influential role in increasing a community's quality of life. The recognized benefits of a naturally functioning floodplain include the storage and conveyance of flood waters, the recharging of groundwater; the maintenance of surface water quality, and the provision of habitats for fish and wildlife. These areas also provide diverse recreational opportunities, scenic value, and a source of community identity and pride. The existing floodplain along the City's Myakkahatchee Creek, provides a habitat for all forms of fish and wildlife. The City has acquired and continues to acquire property in this floodplain to preserve the habitat and protect the watershed from pollutants entering the Myakkahatchee Creek, the City's primary drinking water supply.

Wetlands as defined in 373.019(27), Florida Statutes are "areas that are inundated or saturated by surface or groundwater at a frequency and a duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soils". There is an abundance of wetlands in the City in particularly in the North Port Estates area north of I-75, along the Myakkahatchee Creek slough system, northeast annexed quadrant north of Snover Waterway and east of Toledo Blade and the annexed WVID area. Wetlands are strictly protected, and during the City's Site Development Review (SDR) process, the proposed development must avoid destruction of the wetland and wetland 25 ft buffer to the maximum extent possible. Destruction of wetlands require proof of state (SWFWMD or FDEP) and federal (USACE) permit approvals. Wetland mitigation will be required through purchase of mitigation credits from a wetland mitigation bank or reconstruction of an equivalent wetland near the destroyed wetland site. Wetlands are

typically part of a floodplain and serve the aforementioned beneficial functions of a floodplain. Wetlands provide treatment for surface runoff pollutants such as turbidity through settlement. Nitrogen and phosphorus nutrients and organics can be assimilated by the vegetation in the wetlands.

Development, Redevelopment and Population Trends Impact on the Watershed and Natural Resources

The City of North is not built-out and has large amounts of undeveloped property particularly in the North Port Estates area and areas east of Toledo Blade, the northeast annexed quadrant area north of Snover Waterway and east of Toledo Blade, and the annexed WVID area. There is minimal redevelopment occurring in North Port as most new developments are on areas not previously devloped. As mentioned in Section 4, all new major development and redevelopment (single family platted lots excluded) must be reviewed through the City's Site Development Review (SDR) process, for floodplain impacts and required floodplain compensation. Stormwater attenuation is required so the new development peak runoff flow rate does not exceed the pre-development peak runoff flow rate. The pre-development condition allows stormwater recharge of the groundwater over a large surface area. This will be greatly reduced with the new development due to increased impervious areas which will prevent ground water recharge. Single family platted lots building on property that has wetlands will need to provide mitigation for any destruction of wetland and its flood waters storage capacity.

The City has strict water quality treatment requirements in the Unified Land Development Code (ULDC). For example, in the design of dry retention stormwater ponds, the City's regulation requires 100% more treatment volume than SWFWMD. The ULDC requires the low impact development methods such as use of pervious pavements to be evaluated for all new developments, as the pervious nature will assist in the recharge of groundwater and reduce runoff volume. The City has an aggressive public outreach program that will be discussed in later sections to minimize the developmental impact of surface water quality and quantity on the watershed and natural resources. All these regulatory requirements and public outreach efforts should help minimize the effects of new developments on the watershed and the City's natural resources.

In the building boom years during 2006 to 2009, the population trend increased at a rapid rate in North Port. Increased population can generally affect the natural resources such as increase in pollutant generation, increase potable water supply needs and additional stormwater runoff from constructed impervious areas. The City of North Port has one of the lowest per-capita water use rates in the region. This can be attributed to an extensive conservation program which includes a tiered rate structure, reuse water program, irrigation enforcement, and a comprehensive public education and outreach program that promotes water conservation, protection of City and regional resources, and encourages public participation in flood control efforts. The City's water conservation efforts and other sustainable development activities earned North Port the Florida Green Building Coalition's "Gold" level local government certification in 2011 and a "Silver" level upon recertification in July 2017.

Future Flooding Impact on People, Property and Natural Floodplain Functions

Due to the City of North Port being located at the most downstream end of the Big Slough Watershed, a severe storm event over North Port and the upstream reaches of the Big Slough watershed with several inches of heavy rains over a prolonged period during the rainy summer months, when the ground is already saturated, can cause street flooding and possible property and infrastructure damage. Flooding will cause severe economic impact on the community.

The Public Works staff has gained experience on correlating rainfall predictions with rise of flood waters in the Myakkahatchee Creek. The existing USGS rain gages are constantly monitored even after normal work hours. Staff is on standby to open gates well in advance of pending storms to lower canal water levels to provide additional attenuation storage volume and reduce the chance of flooding. This has worked well during the rainy season in which minimal street flooding occurred. A localized event with heavy rains may only result in flooding in a limited area of the City and would have relatively little long-term economic impact.

Future catastrophic storms that last over several days can cause widespread flooding even with the above gate opening activities performed. Cost to repair property damages must be borne by the owner or the NFIP flood insurance if in place. Subsequently, widespread NFIP flood insurance rates may increase. Property values can decline severely following such a storm which not only affects the property owner but will reduce the City's property tax revenue.

The City reserve funds would need to be drawn upon to pay for damages to City infrastructure which can include storm pipe failures, severe bank erosion, road collapse, damage to City buildings and equipment, and damages to the City's Water and Wastewater Treatment Plant, pump stations and utilities infrastructure. The infrastructure downtime and inconveniences to the public will cost lost revenues to businesses and lost wages to workers.

Also, the extensive property damage can severely affect the City financially due to the recent conversion to being self-insured. Tourism can be expected to decline. The sales tax revenue generated from purchases of supplies and replacement goods may offset in part the loss of sales tax revenue from a drop in tourism and visitors to the City due to the storm.

6. FLOODPLAIN MANAGEMENT PROGRAM GOALS

1. Reduce Flooding of Roadways and Existing Properties

- Complete structural projects that can minimize flooding of roadways and properties
- Evaluate the feasibility of localized and regional projects to reduce flooding
- Adopt updated flood maps that reflect the SFHA more accurately

2. Acquire Properties and Avoid Building in the SFHA

- Increase publicly owned natural areas within flood prone areas and jointly creates recreational opportunities if possible.
- Protect buildings from flooding by raising lowest flood elevation above the base flood elevation, incorporate flood proofing techniques
- Continue to enforce regulatory measures that ensure that new development will not increase flood threats to existing properties
- Relocate flood-prone buildings where warranted

3. Protect Public Lives and Health from Dangers of Natural Hazards

- Educate the public on flood protection methods availability of flood insurance, and flood protection methods
- Provide warning system for rising flood waters and other natural disasters
- Have a flood response plan ready prior to flood threat and implement plan during floods events
- Minimize standing water to prevent mosquitoes breeding.
- Adopt updated flood map that reflect the SFHA more accurately so buildings can be built above an accurate base flood elevation

4. Minimize Cost to The City and Property Owners

- Prioritize mitigation projects, starting with those sites facing the greatest threat to life, health, and property.
- Maximize the use of outside sources of funding such grants from SWFMWD, FEMA, FDEP, EPA
- Educate the owner in mitigation efforts to protect their own properties.
- Encourage property owner to acquire flood insurance.

5. **Protect our Environmental Resources**
   - Implement LID practices to the maximum practicable.
   - Educate the public on the beneficial functions of the wetlands and floodplains
   - Improve water quality and habitat.
   - Maintain an attractive parks and other open spaces such as wetlands

7. REVIEW OF POSSIBLE ACTIVITIES

Preventative activities through Zoning, and Development Regulations

Preventive activities keep flood problems from getting worse. The current comprehensive planning, stormwater and floodplain regulations are effective in preventing an increase of SFHA areas. They are administered by Department of Public Works and NDS Building and Planning Divisions.

- The NDS Planning Division coordinates input from the various departments to update the existing Comprehensive Plan. Future Land use and Zoning is a key element in the Comprehensive Plan and NDS planning staff updates the land use and zoning as needed with consideration for environmental protection.
- The Florida Building Code (FBC) was adopted by the City of North Port per City Ordinance 2015-10 on April 13, 2015 which amends the North Port, Florida – Administrative Code Chapter 14 which can be viewed at https://library.municode.com/fl/north_port/codes/code_of_the_city?nodeId=PTIICOOR_CH14BUCORE
- Per Section 14-20 (a) "*The Florida Building Code, as adopted by the Florida Building Commission, (excluding Chapter 1, Administration) including all appendices and/or amendments thereto, and all such revisions, recodification, appendices and/or amendments as may be hereafter promulgated by the Florida Building Commission, is hereby adopted as the North Port Building Code in and for the City of North Port and shall be construed to be an integral part hereto*".
- The NDS Building Division reviews all building permits to be in compliance with the FBC. The NDS Building Division also offers information on building retrofitting for flood protection. Workshops on Building mitigation to withstand floods and hurricane are held for the public jointly with Sarasota County staff.
- Each City Department is represented in a Site Development Review (SDR) process to ensure all new developments meet the City's Unified Land Development Code (ULDC) regulations and intent of the Comprehensive planning. The City's ULDC is available on Municode website at https://library.municode.com/fl/north_port.
- The ULDC Chapter 18 – Stormwater Regulations was adopted by City Commission in 2010. These regulations give clear design criteria for water quality treatment and attenuation requirements, and floodplain compensation requirements for all new major developments. The City is currently working on the revision of the entire ULDC including Chapter 18. This effort is anticipated to be completed in 2021. Proposed revisions to stormwater regulations provide for permit fast track incentives to encourage Low Impact Development (LID) implementation in new developments. LIDs are stormwater management practices, non-structural techniques, and better site planning to mimic natural hydrologic runoff characteristics and minimize the impact of land development on water resources. In the proposed regulations, all proposed parking above the minimum City required amount is preferred to be constructed of pervious pavement. A lower coefficient of runoff or curve number can be allowed for the pervious pavement. The City have had much success with new developments incorporating LIDs. This is discussed further under Section 8.
- The ULDC Chapter 37 Section 37-14 and Chapter 53 Section 53-113 (B) give Open Space requirements for developments. Policy 1.5 of the Recreation and Open Space Element of the City's adopted Comprehensive Plan specifies minimum criteria for determining that adequate capacity exists for recreation/open space facilities impacted by a proposed development.
- Annually, the ULDC is evaluated on whether revisions are needed. The Comprehensive Plan is updated every 5 years.

Floodplain Management Regulatory Standards

- The NDS Planning Division, Public Works Stormwater Manager and Engineering Manager, City Attorney have revised the State model floodplain ordinance per comments from the State. This modified State Floodplain Ordinance has been adopted by the City in May 2016 and is currently the ULDC Chapter 17 Flood Damage Prevention Regulations.
- The ULDC Chapter 18 – Stormwater Regulations include requirements for floodplain compensation to be provided if a new major development impacts the floodplain. These regulations are effective at preventing new development from adversely affecting the floodplain and neighboring properties.
- The City is adhering to the latest edition of the Florida Building Code (FBC) which has minimum freeboard requirement for the finished flood elevation (FFE) for all types of structures. Freeboard is a margin of safety added to the base flood elevation to account for waves, debris, miscalculations, lack of data, or changes in climate. The FBC follows the requirements of ASCE 24 Standard which provides minimum requirements for flood-resistant design and construction of structures located in flood hazard areas. For residential homes, the FFE must be at least 1 ft higher than the BFE.
- For all commercial, industrial, institutional, residential subdivisions developments any filling impact of the SFHA will required floodplain compensation However, floodplain compensation is not required for fill brought into the SFHA within single family platted lots, so cumulatively; the floodplain can increase in these areas. The City is evaluating large regional projects to reduce flooding, so this issue may be addressed through those projects.
- City is currently working with FEMA on updating the coastal flood risk FIRMs with correct information and will adopt the updated FIRMs within six months of FEMA approval. Due to the large increase in affected properties, there will be a significant economic impact. The availability of more accurate FIRMS will help homeowners in their decision on whether to purchase flood insurance and to avoid the SFHA and build more responsibly.

Property Protection Activities

- Increasing publicly owned natural areas within flood prone areas is an extremely effective way to limit building in the SFHA. The City has already purchased much of the properties along both sides of the Myakkahatchee Creek and is in the process of acquiring more land by direct purchase or by land swapping.
- In the City's aggressive public outreach efforts in the public open houses and other community events to discuss the impacts of the new draft FIRMs on affected parcels; flood insurance experts are available to discuss the protection offer by flood insurance. The City website and the City's flood information flyer also encourage the purchase of flood insurance.

Natural and Beneficial Function of Floodplain and Wetlands Protection

- Wetland protection is required in ULDC Chapter 49. All new developments are reviewed through the SDR process and building permitting review to limit impacts to wetlands and if impacts are unavoidable, wetland mitigation are required together with the required State and Federal permits. Protecting wetlands not only protect the wildlife habitat but also preserves flood water storage capacity and provides water quality treatment for nitrogen and phosphorus nutrients and organics through assimilation by the vegetation in the wetlands.
- In the City's public outreach program, efforts are made to educate the public on the beneficial functions of a floodplain for water quantity storage to lessen the effects of flooding. Developers and residents are advised to not build within the floodplain.

Emergency Services Activities

- There is a need to provide a flood warning and hazards notification to the general public. The Emergency Manager provides emergency services to including activating the Alert Sarasota County Emergency Notification System warning system when needed. The Alert Sarasota County telephone system quickly

notifies residents and business of an emergency or urgent situation. The Emergency Manager also performs public outreach disseminating information on flood protection and flood warning.

Structural projects

- Flood reduction can be achieved by keeping the City's stormwater conveyance system clear of debris and restrictive vegetation and ensuring the 64 water control structures are operable. The City has an ongoing program of structural projects such as water control structure rehabilitation/replacement, clearing R-ditches and canals, swale regrading and pipe replacement. These efforts have already shown a reduction in the frequency and extent of flooded streets in the recent summer rains.
- The Big Slough Watershed hydraulic model can be used to evaluate large regional improvement projects such as diversion of flood waters, retention storage reservoirs, bypassing flood water around the City and staging up of flood waters north of the City boundaries. These types of project will require large amounts of funding and the permitting effort will be challenging. The City has plans in the next year to evaluate the feasibility of these types of projects.

Public Information Activities

- Increasing public awareness of known flood hazard areas and availability of draft FIRMs will reduce building in the SFHA both in the existing 1981/1984 FIRMs and in the draft FIRMS. This knowledge can encourage early purchase of flood insurance.
- A large number of the public is not aware of the beneficial functions of wetlands and floodplain and related regulations against destruction. Sharing this information with the Public will result in greater protection of the wetland and floodplains.

8. ACTION PLAN AND REVIEW OF CURRENT ACTIVITIES

Preventative Activities

- Public Works shall continue the program of major water control structure improvements and minor water control structure repairs for increased reliability.
- Public Works has improved and will continue to schedule proactive (rather than reactive) increased maintenance efforts such as retention ditch/swale regrading and culvert cleaning, aquatic vegetation management and failing drainage pipe replacement. This will eliminate or reduce localized street flooding.
- With the completion of the Big Slough watershed study in September 2014, the City had coordinated with FEMA on the updating of the FIRMs and adopt the new flood maps which became effective in November 4, 2016. These maps are available on the City website.
- Public Works has performed a subsequent Flood Reduction study which was completed in 2019. This study evaluated feasible projects to relieve localized and regional flooding.

Regulatory Activities

- Public Works and Neighborhood Development Services continue to coordinate the development review process per the City's ULDC, to minimize the amount of fill brought into a flood prone area. The Stormwater Manager shall continue reviewing new development project to make sure the design does not cause adverse on-site or off-site flooding. The ULCD Chapter 18 Stormwater Regulations shall be updated as needed, in addition to Stormwater elements in the City's Comprehensive Plan.
- Through active participation in the Site Development Review process, The City will continue to encourage developers and consulting engineers to provide site designs that will minimize impervious areas, and to evaluate implementing LIDs design to the maximum extent practicable such as use of pervious pavement, green roofs, rain cisterns, reuse of stormwater for irrigation, direct runoff to bioretention/biotreatment vegetated swale areas prior to discharge stormwater pond, Florida friendly native landscaping, and other surface water quality improvement controls and devices.

Property Protection Activities
The City Manager's office in cooperation with the Department Parks and Recreation is continuing the acquisition of parcels along the Myakkahatchee Creek Corridor to prevent building in the floodplain, creation of open space park land and protection of wetlands. The land on each side of the creek will also serve to protect the water quality of the creek as this is a major potable water supply for the City.

The ULDC regulations and NDS Building Division permitting process prevent new homes proposed at a higher elevation from flooding adjacent existing homes built at a lower elevation. Elevation certificates are required for houses built in the SFHA. NDS staff and Stormwater Manager provide advice to home builders to avoid building in SFHA and requirement to set lower floor elevations above the effective FIRMs BFEs and preferably also above new draft FIRMs base flood elevations even before the FIRMs are effective.

Natural Resource Protection Activities
The City shall continue to acquire properties along the Myakkahatchee Creek which will protect these environmentally sensitive flood prone lands from development. The public outreach program shall include educating the public on the beneficial functions of floodplains and wetlands.

Emergency Services Activities
The Emergency Manager shall coordinate public warning on impending floods and evacuation when necessary. The City's Comprehensive Emergency Management Plan (CEMP) Base Plan Section V (Attachment A) addresses life safety issues and response activities including evacuations. The City's CEMP Hazard Annex D details the flood warning and response activities.

The City of North Port has a Alert Sarasota County telephone system to quickly notify residents and business of an emergency or urgent situation. Residents can register their phone number in the Alert Sarasota County system at the City website link https://www.cityofnorthport.com/government/city-services/fire-rescue/emergency-management.

Structural Projects
Over the last several years the City has implemented a proactive program of water control structure (WCS) rehabilitation/replacement. The City has received several sources of grant funding such as the Community Budget Issue Requests (CBIRS) grant and SWFWMD Cooperative Funding Initiative (CFI). Grant applications to secure supplemental funding for WCS replacements are also submitted to funding sources such as FEMA's Hazard Mitigation Grant Program, (HMGP) and the Community Development Block Grant. The City plans to continue the program of performing at least one major water control structure rehabilitation/replacement each year. Minor repairs to remaining water control structures shall be implemented each year to prolong the life of the structure.

The Big Slough Watershed study has provided an extremely useful hydraulic model that can be used to determine effective flood reduction improvement projects. The following sections discuss upcoming flood reduction feasibility study to relieve regional flood and historic flooding in localized areas.

The Public Works Department has a program of drainage pipe replacements to avoid pipe failure. The adequacy of pipe conveyance capacity is checked and adjusted as needed.

Public Outreach Activities
The City shall continue participating in disseminating flood protection information through the various community events, civic organizations, newspaper and TV media, flyer mail outs and City website. The City shall continue to public outreach activities to disseminate information the new draft FIRMs.

Specific Action Plan Items

Following are description of action items and accomplishments that meets the City's floodplain management goals. These action items are summarized in Table 8-1 and lists the Floodplain Management Activities 1 through 6 that are met by the action items.

	Table 8-1 Action Items, Goals and Compliance with Floodplain Management Activities								
	Action Item	Priority	Goal 1. Reduce Flooding of Roadways and Existing Properties	Goal 2. Acquire Properties & Build Responsibly in the SFHA	Goal 3. Protect Public Lives and Health from Dangers of Natural Hazards	Goal 4. Minimize Cost to City and Property Owners	Goal 5. Protect our Environ. Resources	Flood-plain Mgt Activities met by Action *	**Deadline**
	Administrative Action Items								
	Plan Adoption		X	X	X	X	X		Feb 2021
	Monitoring and Reporting		X	X	X	X	X		May 1 each year
	Community Rating System		X	X	X	X	X		CRS Verification. Visit
	Program Action Items								
8.1	Major Water Control Structures Improvements	High	X		X			5	Ongoing
8.2	Minor Water Control Structure Repairs	Med	X		X			5	Ongoing
8.3	Retention (R) - Ditches and Major Canal Dredging	Med	X		X	X	X	1, 2, 3	Ongoing
8.4	Grid System for Stormwater Conveyance System, Rehabilitation	Med	X		X	X	X	1, 2, 3	Ongoing
8.5	Drainage Pipe Replacement	High	X		X	X	X	1, 2, 3	Ongoing
8.6	Blockage Removal in Stormwater Conveyance	High	X		X	X	X	1, 2, 3	
8.7	FEMA Flood Map Updates	Med		X	X			1, 2, 6	Ongoing
8.8	Big Slough Flood Reduction Study	Low	X	X	X	X		1, 2, 5	Completed 2019
8.9	Review and Implementation of Stormwater Regulations	Med	X		X		X	1, 3	Ongoing
8.10	Incorporation of Low Impact Development (LID) Design in Developments	High	X		X		X	1,3	Ongoing
8.11	Grant Funding of Projects	High				X		5	Ongoing
8.12	Property Acquisition in the SFHA & Open Space Areas	Med		X				1, 2, 3	Ongoing
	Public Information Items								
8.13	Public Outreach Meetings and Open Houses	Med	X		X	X	X	1,2,3,4,6	Ongoing
8.14	Presentations at Seminars and Workshops	Med	X		X	X	X	1,2,3,4,6	Ongoing
8.15	Brochure Handouts at Community Events	Med	X		X	X	X	1,2,3,4,6	Ongoing
8.16	Newsletter/News Releases, Television and Social Media Public Outreach	High	X		X	X	X	1,2,3,4,6	Ongoing
8.17	City Website	High	X		X	X	X	1,2,3,4,6	Ongoing
8.18	FIRM Information Available to The Public	High	X		X	X	X	1,2,6	Ongoing
8.19	Flood Warning, Response and Evacuation	High	X		X	X	X	1,2,4,6	Ongoing
8.20	Participant in Sarasota County PPI Program	High	X		X	X	X	1,2,3,4,6	

8.1 Major Water Control Structures (WCS) Improvements

Responsible Department for Action: Public Works Department, Engineering Division
Schedule for Completion of Action: Ongoing
Funding Source: Road and Drainage District and Surtax

The City's waterway system is designed to accommodate several needs: a source for potable water supply, water quality treatment, and stormwater conveyance and attenuation. The waterways form a grid pattern and are interconnected with each other and with the Myakkahatchee Creek. There are 64 water control structures (WCS) of which 28 are gated.

Age, function and structural integrity conditions vary between WCSs and many are in dire need of rehabilitation or complete replacement. Delays in the rehabilitation/replacement schedule increase the possibility and risk for a potential massive failure of the deteriorated structures especially during a severe storm event. Water control structure failures could trigger other catastrophic mishaps such as downstream flooding and washout of roads and bridges.

All WCSs are inspected annually and prioritized for replacement. The priority is re-evaluated each year as rate of structure deterioration differs over time. A ranking system was developed based on condition of the key components of the structure and the location of the structure. In addition, the potential extent of flooding and population affected should a massive failure occurs, is also considered in the ranking system. The results of the 2020 inspection of WCS are given in Exhibit 8-1. The WCSs that received major rehabilitation or were replaced are listed on pdf page 7 of Exhibit 8-1. The proposed 5-year Capital Improvement Projects (CIP) budget for WCS replacement is in Exhibit 8-2. Depending on available funding, the annual plan each year is to design the replacement of one structure, while constructing the structure that was designed the previous year. Attachment B also give the 10-year Stormwater Management plan for rehabilitation and maintenance.

8.1.1 Construction of WCS No. 106 Replacement

WCS No. 106 is a gated weir structure on the Cocoplum Waterway just west of North Port Boulevard. The Cocoplum Waterway discharges to the Myakkahatchee Creek. The existing WCS is equipped with six gates, which in the closed position, allow storage of water like a reservoir. In anticipation of pending rainstorm events and as the water level rises, the gates are opened as needed to reduce the potential for flooding. The water in the Cocoplum Waterway and the Myakkahatchee Creek serves as a raw water supply for the City's Water Treatment Plant. Thus, the proper functioning of these gates and structure is critical to the City's ability to control water levels, minimize adverse impacts from a storm event, and supplement the City's potable water supply. WCS No. 106 was constructed in 1959. Over time, the concrete supports for the gates and catwalk have severely deteriorated and extensive corrosion has developed in the sheet metal weir, gates and catwalk.

A new replacement WCS No. 106 was proposed to be completed in fiscal year 2019-2020. The new WCS will include a coated sheet metal weir with reinforced concrete cap; catwalk; eight automated gates with the capability of manual or remote gate operation via telemetry control; cameras; a lighting system; and riprap for erosion control. Work will include dewatering, flow by-passing, and removal and disposal of all demolished material of the existing WCS. The upstream kayak portage will be relocated further east on the Cocoplum Waterway to accommodate the construction of the new WCS.

Summary of Accomplishments

Construction of the new replacement weir structure has been completed in August 2020 within budget and schedule.

Budget and Schedule for Completion

Activity	Costs	Time of Completion
Consultant for design, permitting and construction engineering services	$168,000.00	Design Completed November 2018
Project Construction	$2,304,436.58	August 11, 2020
Total	**$2,472,436.58**	

8.1.2 Design of WCS No. 108 Replacement

WCS No. 108 is located on the Cocoplum canal just west of Collingswood Boulevard in the City of North Port. The structure is equipped with six gates which are operated in the closed position in order to allow storage of water similar to a reservoir. In anticipation of pending rainstorm events and as the water level rises, the gates are opened as needed to reduce flooding and discharge water into downstream segments of Cocoplum waterway which ultimately discharge into the Myakkahatchee Creek. The water in the Cocoplum canal serves as a raw water supply for the City's Water Treatment Plant. Thus, the proper functioning of these gates and structure is critical to the City's ability to control water levels, minimize adverse impacts from a storm event and supplement the City's potable water supply. This structure was constructed in the 1950's. Over time, extensive corrosion has developed in the sheet metal weir piling, concrete supports, gates and catwalk. Design of a new replacement WCS No. 108 was proposed to be completed in fiscal year 2020-2021.

Summary of Accomplishments

A Consultant was selected for design, permitting and construction engineering services for the WCS No. 108 replacement Structure. Four of the existing gates will be replaced with manually operated stainless steel pull-up type gates. The two center gates will be replaced with manually operated stainless steel push-down type gates. Design will include all hydraulic modeling needed to receive approved permits from the Southwest Florida Water Management District (SWFWMD) and the US Army Corps of Engineers (USACOE).

Budget and Schedule for Completion

Activity	Costs	Time of Completion
Consultant for design, permitting and construction engineering services	$142,006.12	FY 2020-2021
Project Construction	To be determined	FY 2021-2022

8.2 Minor Water Control Structure Repairs

Responsible Department for Action: Public Works Department, Operations and Maintenance Division
Schedule for Completion of Action: Ongoing
Funding Source: Road and Drainage District

During the annual inspection of all water control structures, a list of needed minor repairs is compiled to extend the life of the structure until it is completely replaced. Repairs consist of welding new sections or replacement of corroded horizontal and vertical I-beams, tie rods, repair or replacements of gates, gate tracks, catwalk, gear boxes and patching of corroded sections of weir sheet piling. Bank erosion near the structures is also inspected and repaired as needed.

Summary of Accomplishments

To be more cost efficient, a full time City Welder was hired to join the Public Works team. The welder will prioritize and perform the minor repairs described starting on pdf page 9 of Exhibit 8-1. All current and historic repairs for each structure are included in this exhibit.

8.3 Retention (R) - Ditches and Major Canal Dredging

Responsible Department for Action: Public Works Department, Operations and Maintenance Division
Schedule for Completion of Action: Ongoing
Funding Source: Road and Drainage District and Surtax

The City has an aggressive program of clearing R-ditches and canals of vegetation and silt deposits. Several segments of R-ditches and canals require annual maintenance dredging due to their location, surrounding development and need to restore flow conveyance capacity.

Summary of Accomplishments
Exhibit 8-3 provides a monthly reporting of length of R-ditches and canals which have been rehabilitated. The silt and vegetation removal effort will continue each year.

8.4 Grid System for Stormwater Conveyance System, Rehabilitation

Responsible Department for Action: Public Works Department, Operations and Maintenance Division
Schedule for Completion of Action: Ongoing
Funding Source: Road and Drainage District and Surtax

Silt debris and vegetation accumulation in roadside swales affect drainage flow. Most of the drainage pipes installed by General Development Corporation (GDC) in the 1970's were corrugated metal pipes which have corroded and deteriorated over time. Over the past several years, Public Works staff has vastly increased the maintenance activities on the roadside drainage system to include swale regrading, pipe replacement and roadside mowing.

A work management system (WMS) has also been implemented to efficiently track drainage issues reported by residents. The public can contact Public Works customer service at (941)240-8050 to report any drainage issues. The information received is then entered in the WMS and the issue is addressed.

With many different components making up the stormwater drainage system, it is difficult to effectively maintain the system by continually operating in a reactionary mode. A proactive approach that better utilizes resources is to rehabilitate an entire neighborhood system of swales, road crossing pipes, outfalls and retention ditches. Neighborhoods are divided into grids as shown in Exhibit 8-4. The prioritization of grids for rehabilitation is based on the following criteria: known flooding, impact on other infrastructure (roads, waterways, etc.), present condition of system, residential density and impact to community facilities (schools, parks, etc.).

Summary of Accomplishments
Within the last 12 months, Grid 205 rehabilitation was completed, and Grid 407 rehabilitation was started and on schedule to be completed in December 2020. Grid 307 rehabilitation has started and is anticipated to be completed by March 2021. Rehabilitation of the east section of Grid 204 is proposed for FY2021. The budget for Grid 407 rehabilitation is $985,240 and the budget for Grid 307 rehabilitation is $469,500, which covers pipes, catch basins, asphalt, rip rap, concrete, sod, hydroseed and surveying.

8.5 Drainage Pipe Replacement

Responsible Department for Action: Public Works Department, Engineering, and Operations and Maintenance Divisions
Schedule for Completion of Action: Ongoing
Funding Source: Road and Drainage District and Surtax

The quality of the City's roads was one of the largest issues facing North Port. Originally paved in the 1960s, many of North Port's neighborhood streets had fallen into severe disrepair. On November 6, 2012, nearly 60 percent of the voters approved a referendum authorizing the City to obtain a $46 million bond to upgrade 266 miles of substandard roads in the City. The City began this road rehabilitation program in 2014 and completed the project in 2019. As with all roadwork done in the City, road related drainage improvements are included in the rehabilitation of the roadway. Corrugated metal pipe (CMP) was typically used by General Development Corporation in the 1960s for drainage pipes. Over time, many of these CMPs have corroded and the City's road rehabilitation program includes replacing failing drainage pipe with reinforced concrete pipe (RCP). RCP culvert pipes crossings are also installed to replace the "Texas swales" to allow stormwater to cross under the road instead of just sheet flowing over the asphalt and causing deterioration.

Summary of Accomplishments
Exhibit 8-3 includes the monthly reporting of pipes replaced. This effort will continue each year.

8.6 Blockage Removal in Stormwater Conveyance

Responsible Department for Action: Public Works Department, Engineer, and Operations and Maintenance Division
Schedule for Completion of Action: Ongoing
Funding Source: Road and Drainage District

8.6.1 Aquatic Vegetation Management

It is vital to control excessive growth of nuisance vegetation which impedes flow in the extensive system of R-ditches and canals in the City. A team of licensed and well-trained City staff perform aquatic vegetation control. Spraying herbicides for aquatic vegetation control is conducted only under calm weather conditions. Windy conditions are avoided to prevent over-spraying. Staff closely monitors the effects of spraying. Typically, the lower end of the manufacturer's recommended dose is used. The herbicide is reapplied only if needed. Record keeping of the date and time of spraying, licensed applicator, size of treatment area, type and amount of herbicide used, and application method is carefully documented.

Summary of Accomplishments
Operations has developed a systematic method of controlling the nuisance vegetation by applying herbicides to the young developing plants before maturity. This minimizes the number of mature plants reproducing at a rapid rate. A planned stretch of waterway is sprayed rather than scattered reactive treatment of vegetative blooms. This systematic method has reduced the number of herbicides used. Exhibit 8-3 includes the monthly reporting of the aquatic vegetation control performed. This maintenance effort will continue each year. Additionally, in 2019, an amphibious machine was acquired to remove vegetation and minimize the use of herbicide.

8.6.2 Myakkahatchee Creek Blockage Removal

Historic extensive flooding is experienced in the areas adjacent to the Myakkahatchee Creek (creek) near I-75. Debris in the creek can cause the following adverse effects:

- Debris blockages can restrict flow and contribute to upstream flooding.
- Debris can be washed down into the City's Water Control Structure No. 101 and can damage the gates and structure. Opening of the gates are critical to flood control and closing of the gates is vital for storage of potable water supply.

During the dry season in 2017 and 2018, Public Work staff conducted detailed inspections of the extent of debris blockages in the creek. In 2017, a 3,615 feet segment of the creek was inspected from Price Boulevard to the creek intersection with Snover Waterway. In 2018, a 5,500 ft segment of the creek was

inspected from the intersection with Snover Waterway to Sensation St. Exhibit 8-5 is a map of the creek segments. Severe blockages were found and include:

- Overgrown Brazilian Peppers trees that created an almost impenetrable barrier across the entire creek at multiple locations.
- Several huge fallen trees including root balls, lying in and across the entire creek channel.
- Branches and fallen trees trapping other debris including hot water heater, wooden planks, tires, truck bedliner, etc. These in turn trap and create sand bars which adds to the blockage.

The City had obtained a written approval of Permit Exemption #648689 from Southwest Florida Water Management District (SWFWMD) to remove blockages in the creek with the following conditions:

- All work within the creek shall be performed by manual labor utilizing chainsaws and other hand-held tools.
- Invasive Brazilian Pepper trees within or directly adjacent to the creek shall be cut no less than 12 inches above natural grade. Stumps shall remain in place to minimize erosion.
- All cutting and debris shall be removed from the creek with the assistance of machinery which must be located on uplands adjacent to the creek.
- The City of North Port shall implement effective erosion, sediment and turbidity control measures within the proposed work zones where applicable.

Summary of Accomplishments

Operations Staff cleared all creek blockages in the inspected sections during the 2017 and 2018 dry seasons, while adhering to the conditions of the SWFMWD approval. The success of creek blockage removal projects was evident in the subsequent rainy seasons by evaluating the data from the upstream United States Geological Society (USGS) water level gage that is located on the creek at the Tropicaire Boulevard bridge, upstream of the creek blockage removal projects. The positive results are as follows:

- Before the 2017 and 2018 creek blockage removal projects, one inch of rainfall resulted in a 0.75ft rise in creek level. After the 2017 and 2018 creek blockage removal projects, one inch of rainfall resulted in a 0.4ft rise in creek level. This is a 47% improvement.
- Before the 2017 and 2018 creek blockage removal projects, a USGS gage water level reading of 21.35ft resulted in street flooding in areas near the Myakkahatchee Creek north of Kumquat Ave to just south of Tropicare Blvd. After the 2017 and 2018 creek blockage removal projects, there was no street flooding in the areas indicated above during the 2018 rainy season with USGS gage readings of over 21.35ft. Even during an unusually large rainstorm event in December 2018, when the USGS gage water level reading was 22.15ft, there was still no street flooding in the areas indicated above. Exhibit 8-5 includes a graph of the USGS gage readings for rain events after the 2018 creek clearing.

Based on the success of the 2017 and 2018 creek blockage removal projects, the City continued inspecting the creek for blockage in 2019 and 2020 and found several more blockages in the creek. These locations are shown in pdf page 2 of Exhibit 8-5. In preparation to clear these and future blockages, the following activities will include:

- A Cultural Resources Assessment Survey (CRAS) dated August 1, 2019, was conducted for the City of North Port, on a 4.92 mile corridor including Myakkahatchee Creek and extending 50 feet from the top of the creek banks on the east and west sides. The project corridor extends northward from Price Boulevard to the northern City boundary. The CRAS concluded that the City's ongoing maintenance efforts along the creek should have no adverse effects on sites eligible for the National Register of Historic Places and recommends no additional archaeological investigation within the project area.
- Access paths for maintenance vehicles and machinery access will be delineated from the nearest roadway so as to minimize the amount of land disturbance.
- A wetland and wildlife survey will be conducted along these access paths.

- Approvals will be obtained from Southwest Florida Water Management District (SWFWMD) for clearing these access path(s).

8.7 FEMA Flood Map Updates

Responsible Department for Action: Public Works Department, Engineering Division
Schedule for Completion of Action: Ongoing
Funding Source: Road and Drainage District

8.7.1 Effective FEMA Flood Insurance Rate Maps Dated November 4, 2016

The FEMA flood insurance rate maps (FIRMs) with an effective date of November 4, 2016, have been in use since the City Commission approved Ordinance 2016-21 on September 13, 2016 to adopt the FIRMs. These maps can be viewed on the City Web page at http://www.cityofnorthport.com/flood.

8.7.2 Preliminary FEMA Coastal Flood Risk FIRMS Dated December 31, 2019

In February 2014, FEMA started a new Coastal Risk Mapping, Assessment and Planning (Risk Map) effort to identify, assess, and update coastal flood hazard Risk Maps that incorporate storm surge, high tides, wave action in addition to freshwater inputs.

On December 31, 2019, FEMA released preliminary Coastal Risk Maps for Sarasota County which included the City of North Port. The maps can be viewed through the City interactive map application at https://www.cityofnorthport.com/government/city-services/public-works/flood-information/fema-flood-map-updates. These maps show major portions of North Port developments that were removed from the high-risk AE zone in the November 4, 2016 effective FIRMs, will again be in a high-risk flood zone AE if the maps become effective. In some areas, the base flood elevations increased from 7ft NAVD88 to as much as 9ft NAVD88. Exhibit 8-6 gives a tabulation of the number of parcels added ("1% increase") to the SFHA and number of parcels taken out ("1% decrease") of the SFHA for North Port and other municipalities within Sarasota County. In North Port, there are 3,601 affected parcels in which all or a portion of the parcel is impacted by the SFHA. Fifty (50) North Port parcels are removed from the SFHA. Following are general description of the North Port areas that are affected by the SFHA in these preliminary maps:

Areas West of Myakka River

- Portions of Gran Paradiso, The Preserve, Renaissance, Oasis, Lake Geraldine
- Village D, E and G in West Villages

Areas East of Myakka River

- Talon Bay
- Duck Key
- Residential and Commercial area South of US41
- Couple streets in Dorothy Ave. area

Summary of Accomplishments

Public outreach conducted by the City of North Port, Sarasota County and FEMA included three public open house events in early March 2020. Due to the 2020 Covid-19 pandemic, FEMA has delayed the 90-day period for Public comments and appeals. Meanwhile, the City has reviewed the preliminary Coastal Risk Maps and has sent FEMA a letter on September 15, 2020 with an extensive list of comments (Exhibit 8-7).

8.8 Big Slough Flood Reduction Study

Responsible Department for Action: Public Works Department, Engineering Division
Schedule for Completion of Action: Completed December 31, 2019
Funding Source: Road and Drainage District, Surtax and Southwest Florida Water Management District (SWFWMD) Cooperative Funding Initiative Grant

In October 2016, the City received a SWFWMD Cooperative Funding of up to $125,000 of the $300,000 budgeted for a flood reduction study. A Consultant was retained to evaluate alternatives to accomplish the following:

1. Reduce historic flooding in the following two localized areas in the City:
   - Area near the Myakkahatchee Creek just north and south of interstate I-75.
   - Area near Dorothy Avenue west of Biscayne Drive and north of US 41.
2. Complete a regional stormwater study to reduce the extensive floodplain that is delineated in the new FEMA FIRMs.

Existing site conditions were evaluated, and the Big Slough Watershed model used to model flood reduction projects also known as Best Management Practices (BMPs). A BMP implementation plan was developed with prioritized recommendations and probable costs for implementation of selected BMPs. The Consultant's recommended flood reduction plan had the following phased BMP components:

- Widen and deepen the existing retention ditch/conveyance system and upsizing road crossing culverts in the Dorothy Avenue area.
- Construction of a new bypass canal parallel to the Myakkahatchee Creek within a portion of the City's Tier I lots that are located north of Price Boulevard.
- Increasing the conveyance capacity through widening and upsizing pipe culverts in the R-36 retention ditch/conveyance system that runs along the northern and western boundaries of the City.
- Inflow Reduction Option - Restriction/reduction of high flow into Myakkahatchee Creek near the north City Boundary by constructing inflow reduction devices north of the City Boundary. This will cause additional storage of stormwater on the Carlton Tract which is jointly owned by the SWFWMD and Sarasota County

The draft Report, conceptual drawings and checklist were received in February 2019. A City Commission Workshop was held on March 4, 2019, to review the Study recommendations. City Commission consensus was received to submit the Consultant's recommended plan for SWFWMD Conceptual Environmental Resource Permit application with minor changes. Consensus was also received on the following staff recommendations:

- Continue Debris/Vegetation Blockage Removal Project.
- Evaluate localized drainage improvements in the Dorothy Avenue area upstream of the retention ditches.
- Do not proceed with researching grant fund to acquire flooded properties, but to schedule a future workshop with Commission on recommended flooded property acquisition.
- Continue reaching out to the SWFWMD and Sarasota County on viability of the Inflow Reduction Option.

<u>Summary of Accomplishments</u>

Final Flood Reduction Study Reports

The Consultant's recommended May 2019 flood reduction plan is provided in Attachment D. In an email on October 28, 2019, the SWFMWD Bureau Chief Environmental Resource Permit Bureau, Regulation Division indicated that SWFWMD "*does not support installation of improvements and/or resultant changes in hydrology on District property*". In an email on November 14, 2019, the Interim Senior Manager of Sarasota County's Stormwater Environmental Utility, indicated the additional storage of stormwater on the Carlton Tract is "*inconsistent with the objective of the purchase and preservation*" of the land. As the inflow reduction option is no longer viable, the Consultant prepared an update to the plan in November 2019 to remove the inflow reduction option (Exhibit 8-8). The key elements of the final recommendation are:

- Improvements to the existing retention ditch/conveyance system and upsizing road crossing culverts in the Dorothy Avenue area.

- Construction of a new bypass canal parallel to the Myakkahatchee Creek within a portion of the City's Tier 1 lots from south of Tropicaire Boulevard to north of Price Boulevard.
- Increasing conveyance capacity through canal widening and upsizing pipe culverts in the R-36 retention ditch/conveyance system along the northern and western boundary of the city.

Flooded Property Acquisition

A workshop was held on December 2, 2019 to present the recommended parcels for acquisition which are at least 50% or more inundated by a 10-year storm and parcels along flooded streets and the cost of the acquisition. Exhibit 8-9 is a presentation to City Commission. The City Commission request an estimate of the revenue that will be lost if these properties are acquired by the City. The financial impact of removal of parcels from tax roll is provided in a subsequent memo on September 4, 2020 to the City Commission (Exhibit 8-10).

SWFWMD Conceptual Environmental Resource Permit

As a result of the decisions by SWFWMD and Sarasota County, the inflow reduction option was removed from the application to SWFWMD for a Conceptual Environmental Resource Permit. The SWFWMD Conceptual Environmental Resource Permit No. 49044123.000 was approved on December 27, 2019 and includes the following future conceptual drainage system improvements:

1. Future widening and dredging of existing Channel R36 (approximately 43,000 LF) with bottom widths ranging from 30 to 66 feet.
2. Future modification of existing Water Control Structure WCS-162 including the addition of operable gates. Water Control Structure WCS-162 is located within existing Channel R36 just north of Tropicaire Boulevard.
3. Addition of future dual 48" diameter culverts at the existing Channel R36 crossing of Interstate I-75.
4. Replacement/upsizing of the existing culverts with future quadruple 60" culverts at the existing Channel R36 crossing of Tropicaire Boulevard.
5. Future widening and dredging of existing Channel R70 (approximately 2,800 LF) with bottom widths ranging from 10 to 20 feet.
6. Future widening and dredging of existing Channel R69 (approximately 2,500 LF) with bottom widths ranging from 10 to 20 feet.
7. Replacement/upsizing of the existing culverts with future triple 6'x4' box culverts at the existing Channels R69 and R70 crossings of Trionfo Avenue, Porto Bello Avenue, Herbison Avenue, Eager Street, Allen Road, and South Biscayne Drive.
8. Future removal of the existing Channel R69 weir structure (located at the downstream end of existing Channel R69).
9. Future creation of four (4) proposed trapezoidal bypass channels (approximately 13,500 LF in total length with bottoms approximately 50 feet wide) located parallel to Myakkahatchee Creek. The upstream and downstream ends of each of the four (4) future Bypass Channels will connect to Myakkahatchee Creek via broad-crested weirs at elevations approximately 2 feet above the Myakkahatchee Creek bottom.

8.9 Review and Implementation of Stormwater Regulations

Responsible Department for Action: Public Works Department, Engineering Division, in cooperation with Planning Division of the Neighborhood Development Services (NDS) Department
Schedule for Completion of Action: Ongoing
Funding Source: Road and Drainage District

All major site developments in North Port, whether on private or City property, must go through pre-application meeting in the City's Site Development Review (SDR) process. Key City staff members from all relevant departments provide site specific input, so that the development meets the City's Unified Land Development Code (ULDC) requirements in the formal submittal. During the mandatory SDR pre-

application process, the City Stormwater Manager reiterates the stormwater treatment, attenuation and floodplain mitigation requirements in the City's ULDC. A stormwater checklist is available on the City website to assist the developer's consultant with a complete submittal that meets all stormwater treatment, attenuation and floodplain analysis and compensation requirements. Specific attention is paid in the review to check that new developments do not adversely affect or cause flooding onto adjacent properties.

The Stormwater Manager also reviews and addresses all Environmental Wetland and Wildlife protection issues and all stormwater and environmental construction issues.

ULDC Chapter 17 Flood Damage Prevention Regulations
Responsible Department for Action: Public Works, Stormwater Manager, NDS Building Official
Schedule for Completion of Action: Complete

The City's ULDC Chapter 17 provides flood damage prevention regulations. The Florida Building Code (FBC), that was effective on March 2012, incorporates the flood provisions from the model International Code Series. Therefore, changes to floodplain management regulations were implemented to properly coordinate with the FBC and meet requirements of the National Flood Insurance Program (NFIP).

The City revised ULDC Chapter 17 flood damage prevention regulations using the State Model Floodplain Management Ordinance and obtained approval from the Florida Division of Emergency Management Contractor. The revised ULDC Chapter 17 flood damage prevention regulations were adopted by the City of North Port Commission on May 10, 2016.

Summary of Accomplishments
In the development review process, the City continues to implement the ULDC Chapter 17 Flood Damage Prevention Regulations.

ULDC Chapter 18 Stormwater Regulations and Chapter 49 Wetlands Protection Regulations
Responsible Department for Action: Public Works, Stormwater Manager
Schedule for Completion of Action: Ongoing
Funding Source: Road and Drainage District

On June 14, 2010, the City of North Port adopted a complete revision of the ULDC which included consolidating all stormwater regulations into one new Chapter 18. Chapter 49 Wetlands Protection Regulations were also revised to meet State regulations. In 2011, all City departments reviewed the ULDC code that was adopted on June 14, 2010 and proposed needed revisions. On January 30, 2012, ULDC Chapter 18 – Stormwater Regulations, Section 18-10 (C)(2) was amended to require the proposed length and material of the pipe to be submitted with the permit application. ULDC Chapter 33 – Minor and Major Site Development Regulations, Sections 33-6 and 33-8 were amended to provide additional requirements for survey, site and drainage design, driveway culverts and swale piping requirements. As the City's stormwater swales/ditch/canals/creek system serves not only as a stormwater conveyance system, stormwater also is the main raw water supply for the City's Water Treatment Plant, thus the need for greater water quality treatment and protection. The ULDC Chapter 18 – Stormwater Regulations was revised in June 2010 to incorporate additional water quality improvement requirements. These requirements exceed, or are in addition, to those required by SWFMWD.

Summary of Accomplishments
In November 2019, a draft list of proposed stormwater and environmental regulations changes to the ULDC was submitted. The changes include clarifications of regulations, need to evaluate and use of Low Impact Development methods, improvement to design of stormwater treatment and attenuation and

conveyance system to improve water quality, reduce flooding, reduce erosion and added protections for the environmental and protected wildlife species.

8.10 Incorporation of Low Impact Development (LID) Design in Developments

Responsible Department for Action: Public Works Department, Engineering Division
Schedule for Completion of Action: Ongoing
Funding Source: Road and Drainage District

In the Site Development Review (SDR) review process, developers are encouraged to implement Low Impact Development (LID) design to the maximum extent practicable such as minimization of impervious areas, use of pervious pavement, green roofs, rain cisterns, reuse of stormwater for irrigation, direct runoff to bioretention/biotreatment vegetated swale areas prior to discharge stormwater pond, Florida friendly native landscaping, and other surface water quality improvement controls and devices.

Summary of Accomplishments
Exhibit 8-11 provides a detailed list of LIDs implemented to date to reduce stormwater impact from new development for both City projects and Developer projects.

8.11 Grant Funding of Projects

Responsible Department for Action: Public Works Department, Engineering Division and City Manager's Office
Schedule for Completion of Action: Ongoing
Funding Source: Road and Drainage District

The City has pursued several sources of grant funding such as the Community Budget Issue Requests (CBIRS) grant and has received a total grant allocation of $1,600,000. Southwest Florida Water Management District (SWFWMD) and the City have cooperatively funded the construction of the new replacement Water Control structure (WCS) No. 101 located on the Myakkahatchee Creek near the Water Treatment Plant. The City has received reimbursements from SWFWMD for $658,630.75 of the $1,317,261.50 spent on the replacement structure.

The City Public Work Department shall continue to apply for grant funding from agencies such as SWFWMD, Federal Emergency Management Agency, Environmental Protection Agency, Florida Department of Environmental Protection Agency, and CBIRS to offset the cost of the flood reduction projects to the City and its residents.

Summary of Accomplishments

- SWFMWD awarded the City a cooperative grant funding up to $125,000 of the $300,000 budgeted for the afore mentioned Big Slough Flood Reduction Study. As of December 2019, the study is completed, and the City received the maximum grant reimbursements totaling $125,000.

- A request for FEMA Hazard Mitigation Grant Program (HMGP) funding for the design and construction of the replacement of WCS 113 has been submitted for $3,118,500 in March 2020. A similar application of funding for this project has also been submitted for a Community Development Block Grant in August 2020. Status and timeline of grant award from these two sources is unknown as of this writing.

8.12 Property Acquisition in the SFHA and Open Space Areas

Responsible Department for Action: City Manager's Office and Parks and Recreation Department
Schedule for Completion of Action: Ongoing
Funding Source: General Fund

Over the last sixteen years, the City has applied for and received grant funding and with supplemental City funding, has acquired a significant portion of the lands immediately adjacent to Myakkahatchee Creek from Price Boulevard north to the City limits. The Tier I lots are the strip of lots immediately adjacent to on both sides of the creek and the Tier II are the next nearest strip of lots. Most of these properties are in the 100-year floodplain.

Summary of Accomplishments

Exhibit 8-12 provides a map of the Tier I and Tier II properties acquired. The City is currently continuing this effort of land acquisition.

8.13 Public Outreach Meetings and Open Houses

Responsible Department for Action: Public Works Department, Engineering Division and Neighborhood Development Services Department
Schedule for Completion of Action: Ongoing
Funding Source: Road and Drainage District

Extensive public outreach has been conducted in response to FEMA's December 31, 2019, release of the preliminary Coastal Flood Risk FIRMs for Sarasota County which included the City of North Port.

Summary of Accomplishments

FEMA, in coordination with the City of North Port and Sarasota County staff, conducted three public outreach open houses on the preliminary Coastal Flood Risk FIRMs. These meetings occurred on March 4-5, 2020, in Sarasota, Venice and North Port. FEMA will designate a 90-day public comment and appeal period after publishing a notice in two local newspapers and a notice in the Federal Register. The start of this 90-day period has not be established as of this writing.

In addition to the three FEMA public outreach open houses, the City of North Port had planned the following three additional City of North Port Public Open Houses:

- Morgan Family Center – March 26, 2020 5pm to 8pm
- Talon Bay HOA meeting – March 18, 2020 4pm to 6pm (only for Talon Bay Residents)
- Gran Paradiso HOA meeting – March 19, 2020 5pm to 8pm (only for Gran Paradiso Residents)

The additional three public outreach open houses scheduled by the City of North Port to be held in March 2020 had to be cancelled due to the Covid-19 pandemic.

Following are other forms of public outreach implemented by the City of North Port on the preliminary Coastal Flood Risk FIRMs:

- Posted City News Releases
- Updated City web page "FEMA Map Updates" at https://www.cityofnorthport.com/government/city-services/public-works/flood-information/fema-flood-map-updates
- Created a user friendly, searchable interactive online City Flood web application with a link from the FEMA Map Updates web page.
- Created of a user friendly, searchable side by side comparison of the new preliminary FEMA Dec 31st, 2019, flood maps with the current FEMA Nov 4, 2016, flood map, with a link from the FEMA Map Updates web page.
- Sent mailer invitations to affected properties to attend public open houses.
- Sent Facebook and Twitter notices of the Public Open House events
- Established new telephone hotline (941-429-1052) to handle resident's inquiries
- Communicated information with the Homeowners Associations (HOA) representatives at the City's HOA meeting.

- Gave presentation at a local Peace River Engineering Society meeting.
- Sent email correspondence with the design Engineering Consultants, developers and HOA representatives.

8.14 Presentations at Seminars and Workshops

Responsible Department for Action: Public Works Department, Engineering Division
Schedule for Completion of Action: Ongoing
Funding Source: Road and Drainage District

Public Works staff spoke at many seminars and workshops on topics that included flood map updates and flood prevention, stormwater issues, environmental protection, green development, fertilizer use, and pollution prevention. Annually, the Fire Rescue Emergency Manager also conducts multiple public outreach activities on Hurricane preparedness with Homeowners' Associations and civic groups. A list of these activities is included in Exhibit 8-13, Items highlighted in yellow are directly related to flood protection.

8.15 Brochure Handouts at Community Events

Responsible Department for Action: Public Works Department, Engineering and Administration Divisions
Schedule for Completion of Action: Ongoing
Funding Source: Road and Drainage District

City staff volunteers at many community events and host booths with displays of the City's stormwater system, flood maps and offers an array of free brochures and education material. The City 10 CRS Topics flyer on Flood Information produced in-house by the City staff is distributed at these public events and at the afore mentioned seminars and workshops. This brochure is also available in kiosks at the three floors on City Hall and at Public Works building. Examples of community events are included in Exhibit 8-13.

8.16 Newsletters/New Releases, Television and Social Media Public Outreach

Responsible Department for Action: Public Works Department, Engineering and Administration Divisions
Schedule for Completion of Action: Ongoing
Funding Source: Road and Drainage District

Flood Information is disseminated through various forms of news media and social media. Exhibit 8-14 provides a listing and range of distribution. Items highlighted in yellow are directly related to flood protection and includes:

- North RePort Newsletter mailed to every home in North Port
- Facebook and Twitter message releases
- North Port Sun and Herald Tribune Newspapers articles
- City Website News Releases
- Flood Awareness Week Social Media Postings
- Utility bill message
- Youtube Videos

8.17 City Website

Responsible Department for Action: Public Works Department, Engineering and Administration Divisions
Schedule for Completion of Action: Ongoing
Funding Source: Road and Drainage District

The City of North Port posts the most current information concerning stormwater and flooding potential on the City's website. The City has added a Flood Information page that provides information on FEMA

flood map Updates, flood warning, CRS program and available flood elevation certificates at http://www.cityofnorthport.com/flood.

The City provides a link to a searchable user-friendly web application to view flood zones and obtain base flood elevations on the new FEMA FIRMs through the City's FEMA Flood Map Updates webpage at https://www.cityofnorthport.com/government/city-services/public-works/flood-information/fema-flood-map-updates.

Elevation Certificates are also available on the City webpage at:
http://www.cityofnorthport.com/government/city-services/public-works/flood-information/elevation-certificates-3188

The City's Emergency Management webpage "Hazards We Face" provides useful information on storm preparation and dealing with hazards:
http://www.cityofnorthport.com/government/city-services/fire-rescue/emergency-management/hazards-we-face

Links are provided to related websites such as National Flood Insurance Program, Floodsmart, Florida Disaster, Sarasota County Library Catalog on Flood information, Sarasota CRS webpage and FEMA site on FIRM maps.

8.18 FIRMs Available to The Public

Responsible Department for Action: Public Works Department, Engineering Division and Neighborhood Development Services Department
Schedule for Completion of Action: Ongoing
Funding Source: Road and Drainage District

The November 4, 2016, FEMA FIRMs panels are available on the FEMA website, but these map panels are not currently searchable with an address and the underlying aerial is from early 2007. Homes built after the aerial date are not be visible. The pdfs of the new preliminary FIRMS panels are available from the FEMA website at: https://hazards.fema.gov/femaportal/prelimdownload/.

The City has subsequently released a user-friendly web map application that allows searching the new FIRMS by Address, Parcel Identification Number, or Name. The map is also overlaid on the 2018 aerial to allow easy location of houses. Flood zones, property lines and base flood elevations are easily visible on this web application which can be accessed from the City's FEMA Flood Map Updates webpage at: https://www.cityofnorthport.com/government/city-services/public-works/flood-information/fema-flood-map-updates.

Since the release of the December 31, 2019, preliminary Coastal Flood Risk FIRMs the City Stormwater Manager and Neighborhood Development Services Department staff have responded to multiple requests for flood information. Anyone who desires a written determination of the existing and proposed flood zones, can submit a Flood Information Request form to the City's Stormwater Manager. The request form can be downloaded from the City's website at:
https://www.cityofnorthport.com/home/showdocument?id=15195

Annually, the City mails letters offering flood protection and mapping information services to Insurance Companies, Realtors, Financial Institutions, and Abstract and Title companies that are registered with the City of North Port. The letter is also mailed to the President of North Port Realtors Board and to President of the North Port Chamber of Commerce.

8.19 Flood Warning, Response and Evacuation

Responsible Department for Action: Public Works Department, Operations Division and Fire Rescue Department
Schedule for Completion of Action: Ongoing
Funding Source: Road and Drainage District and Fire and Rescue District

The City has funded two United States Geological Survey (USGS) gages, in the Myakkahatchee Creek, one at Tropicaire Boulevard and the other at WCS 101 located further south near the City's Water Treatment Plant. These USGS gages monitor the water level in the creek and precipitation and provide real time data. The City has correlated the levels in the Creek at the Tropicaire gage with known areas of flooding and this information, together with a link to the USGS gage, is available on the City website at: https://www.cityofnorthport.com/government/city-services/public-works/flood-information/flood-warning.

The Emergency Manager (EM) and Public Works Operations staff monitors weather conditions and the Myakkahatchee Creek USGS gages during rain events. Public Works Operations staff will raise/lower gates at water control structures to move, retain, or redirect water flow to avoid flooding. Once water levels have reached an action stage, warnings are provided to the public through door-to-door contact, advisories through the City web site, advisories through local and cable broadcast media, and/or National Oceanic and Atmospheric Administration weather alert radios. If the situation is severe, the City has the ability to release a geographically targeted telephonic and text message to affected individuals through the new Mass Notification software system provided through the Florida Dept of Emergency Management. The alert is known as "Alert Sarasota County" and will utilize geo-fencing technology to distribute flooding, flash flooding, and evacuation notices to residents. In 2019, the City of North Port was fortunate not to experience a storm event that required Alert Sarasota County Community Emergency Notification System.

The City of North Port has worked with the Peace River/Manasota Regional Water Supply Authority (PRMRWSA) in the development of the Emergency Action Plan (EAP) for the new Peace River Reservoir #2. Computer modeling has shown that failure of the reservoir embankment can affect the City of North Port, particularly in the eastern areas of the City. The City has participated in the Statewide Hurricane exercise in a tabletop exercise on August 27, 2019. as part of a simulation of a breech at the PRMRWSA reservoir. Notification was received from PRMRWSA and maps were reviewed to determine impacts to City. The City receives an updated hard copy of (PRMRWSA) EAP each year near the beginning of the year. The updated January 2020 EAP is available from the Emergency Manager.

The City was recognized on July 28, 2014, by the National Weather Service as the third municipality in the State of Florida to achieve the designation of Storm Ready. This designation is reserved for locations which go above and beyond to protect their citizens from the impacts of hazardous weather. This program helps citizens feel safer knowing that our Emergency Management and the National Weather Service are working together through enhanced planning, education and awareness programs. The Storm Ready designation that was renewed on November 18, 2019, is valid until July 8, 2023 (Exhibit 8-15).

The City has become in 2019 a Weather-Ready Nation (WRN) Ambassador. The Weather-Ready Nation Ambassador initiative is the National Oceanic and Atmospheric Administration's (NOAA) effort to formally recognize NOAA partners who are improving the nation's readiness, responsiveness, and overall resilience against extreme weather, water, and climate events. As a WRN Ambassador, partners commit to working with NOAA and other Ambassadors to strengthen national resilience against extreme weather. In effect, the WRN Ambassador initiative helps unify the efforts across government, non-profits, academia, and private industry toward making the nation more ready, responsive, and resilient against extreme environmental hazards. The hyperlink to the WRN Ambassador initiative site can be assessed from the

North Port Fire Rescue web page https://www.cityofnorthport.com/government/city-services/fire-rescue This program is accessible to the public and helps to warn and educate residents on developing flood conditions and hazards.

The City of North Port Emergency Management Division of the Fire Rescue Department has installed four-inch, reflective vinyl collars (traffic-grade reflective yellow tape with zone labels) on street-sign posts to mark hurricane evacuation zones A and B. The zones represent a storm surge threat to a neighborhood. The "A" zone (including manufactured housing communities) is at most risk and will be advised to evacuate first, while zones marked by other letters (B through E) are less likely to see floodwaters from the Gulf of Mexico or the Myakka River.

8.20 Participant in Sarasota County PPI Program

Responsible Department for Action: Public Works Department, Operations Division and Fire Rescue Department
Schedule for Completion of Action: Ongoing
Funding Source: Road and Drainage District and Fire and Rescue District

The City has adopted on July 23, 2019 a Resolution 2019-R-06 (Exhibit 8-16) to join the Sarasota County Program for Public Information (PPI) Committee formed under the Sarasota County's CRS program. The PPI is a FEMA planning tool, to effectively coordinate public outreach. The PPI Committee is comprised of a cross-section of employees and community stakeholder members from Sarasota County Government, the City of Sarasota, the City of Venice, the City of North Port, the Town of Longboat Key, the Sarasota Bay Estuary Program, Mote Marine, and local business representatives such as Realtors, Insurance Agents, and Mortgage Lenders, is open for participation by all interested parties including private citizens, and is chaired by the Sarasota County Stormwater Department Director or designee.

The City's Stormwater Manager is the City's coordinate on the PPI committee and the North Port stakeholders to the committee include the City Senior Planner, Insurance agents, surveyor and volunteer from the North Port Canal Watch Group and previous Environmental Advisory Board member.

Post Disaster Mitigation Policies and Procedures

Post-disaster actions, mitigation policies and procedures are intended to help guide redevelopment in a pre-planned and more sustainable manner. The City's post-disaster recovery plan is given in CEMP Annex A (given in Attachment A pdf pages 97 -108). Per CEMP Annex A Section I. A (Attachment page A1, pdf page 97), the North Port Emergency Manager is part of the Sarasota County's team in post-disaster recovery efforts. Sarasota County's has a Post-Disaster Redevelopment Plan (PDRP) which can be assessed from the Sarasota County's website at:
https://www.scgov.net/government/planning-and-development-services/planning-and-zoning/-folder-225#docan7171_11681_7055

The City reviews and provides feedback to on Sarasota County's PDRP which is currently being updated. After a disaster has occurred, Staff will establish or revise post-disaster redevelopment and mitigation policies and procedures as needed. The anticipated worst hit areas of damage by floods are most likely the same areas described in earlier Section 4 - Historic flooding.

Policies are established in Annex A Section III.B (Attachment page A8, pdf page 104) to determine whether structures will be rebuilt if substantially damaged. Annex A Section III.B specifies "*Once the damage assessment process is complete, the City of North Port Neighborhood Development Services Department conducts the post-disaster habitability inspections. The purpose of these inspections is to ensure that all structures are safe for entry and that water, electric, and gas services may be reconnected to the structure. These inspections are not conducted until the damage assessment process has been completed. All buildings*

damaged must be permitted for rebuilding or restoration and all new work must be up to current codes. Condemnation of severely damaged buildings and structures will be accomplished when they become public safety issues. Annex A provides responsibilities for public information, code enforcement, planning, and other efforts that encourage, mandate, and/or fund loss reduction activities. "

Action Items to Mitigate other Hazards

The above Sections 8.1 through 8.19 includes action items other than public information activities, to mitigate the effects of natural hazards which are mostly from flooding and storm damage. Additional action items will be developed as needed in coordination with the City's post-disaster recovery plan given in CEMP Annex A Section (given in Attachment A pdf pages 97 -108). Staff will review the policies and procedures of this Annex, as well as mitigation activities, for other hazards listed in Exhibit 5-1 that was excerpted from the CEMP Base Plan.

9. PLAN ADOPTION

The multi-jurisdictional Unified Local Mitigation Strategy (LMS) Plan is prepared by Sarasota County with input from the various jurisdictions including Cities of North Port, Sarasota and Venice, Town of Longboat Key, Sarasota County, Sarasota County Schools and Sarasota Memorial Hospital. The FMPs from the various jurisdictions are incorporated as annexes to the LMS Plan. After the Board of Sarasota County Commission adopts the LMS and associated FMPs in Spring 2021, the City of North Port Commission will adopt the LMS Plan and associated North Port FMP.

10. PLAN IMPLEMENTATION AND EVALUATION

Five year FMP Update

No plan is perfect. As FMP implementation proceeds, flaws will be discovered, and changes may be needed. Hazard conditions, goals and objectives may change. Implementation, evaluation and updates of the City's FMP will be coordinated by the Department of Public Works Stormwater Manager with input from the CRS committee which include members from various City Departments and public sectors as described in earlier Section 1. Input from the CRS committee will be solicited at the beginning of the planning process in a publicly advertised meeting and again in another publicly advertised meeting when the updated draft FMP was prepared. The previous November 2015 FMP together with the 2016 Sarasota Unified Local Mitigation Strategy (LMS) was adopted by City Resolution 2016-R-02 (Exhibit 1-1) on February 9, 2016. The FMP will be updated every 5 years and will be attached as annex to the Sarasota County 2021 LMS. The 2021 LMS with the updated FMP annex, is anticipated to be adopted by City of North Port Commission by resolution in Spring 2021.

Annual FMP Action Plan Update

The department(s) listed in the Section 8 Action Plan shall be responsible for overseeing implementation of the Action Plan. The FMP and Section 8 Action Plan items shall be evaluated annually by the City Department representatives in the CRS Committee and recommendations for changes will be included in the CRS Section 510 FMP progress report required as part of the annual CRS recertification. The Action Plan accomplishments over the previous 12 months will be included. The report will be submitted to the City Manager for approval and copied to City Commission prior to May 1 each year. The FMP will be made available to the public at the North Port Library, on the City of North Port Website and will be released to the media.

City of North Port

RESOLUTION NO. 2016-R-02

A RESOLUTION OF THE CITY OF NORTH PORT, FLORIDA, ADOPTING THE 2016 SARASOTA COUNTY UNIFIED LOCAL MITIGATION STRATEGY, WITH THE NORTH PORT FLOODPLAIN MANAGEMENT PLAN ANNEX, AS THE FORMAL GUIDE FOR THE CITY OF NORTH PORT'S HAZARD MITIGATION AND FLOODPLAIN MANAGEMENT ACTIVITIES IN ACCORDANCE WITH PUBLIC LAW 106-390, THE FEDERAL DISASTER MITIGATION ACT 2000 (44 CFR §201.6), AND THE FLORIDA ADMINISTRATIVE CODE RULE 9-G22; PROVIDING FOR CONFLICTS; PROVIDING FOR SEVERABILITY; AND PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, City of North Port is subject to hazards including, severe weather, hurricanes, tornadoes, floods and wildfires and the City faces potential damage to life, property, natural resources and the local economy; and

WHEREAS, the Sarasota County Unified Local Mitigation Strategy Work Group is comprised of staff of Sarasota County Government; the Cities of North Port, Sarasota, and Venice; the Town of Longboat Key; Sarasota County School Board; and Sarasota Memorial Hospital, and community members is open for participation to any and all interested parties; and

WHEREAS, a City of North Port Community Rating System Work Group has also been formed to review and update the Floodplain Management Plan and is comprised of key City Department and community representatives, with the City's Stormwater Manager as the work group coordinator (City planner as an alternate) and those meetings are open for participation to any and all interested parties; and

WHEREAS, the Work Groups have identified these local hazards and have assessed County- and City-wide vulnerability and risk to these hazards, ultimately identifying and prioritizing mitigation initiatives that would reduce local vulnerability; and

WHEREAS, The Sarasota County Unified Local Mitigation Strategy and the North Port Floodplain Management Plan annex represents the City of North Port's commitment to reduce vulnerability and risks from all hazards, while it serves as a policy guide as resources are committed toward reducing the effects of all hazards, and is required of all communities

participating in the Community Rating System program through which provides flood insurance discounts through the National Flood Insurance Program; and

WHEREAS, initiatives identified, based upon established and accepted criteria, on the Unified Local Mitigation Strategy Project Lists are given greater consideration by State-managed funding programs, including but not limited to the Hazard Mitigation Grant program, the Flood Mitigation Assistance Program, the Pre-Disaster Mitigation Competitive Grant Program, Communities Trust, Community Development Block Grant, Coastal Partnerships Initiative; and

NOW THEREFORE, BE IT RESOLVED BY THE CITY COMMISSION OF THE CITY OF NORTH PORT, FLORIDA, THAT:

SECTION 1

1.01 The foregoing "WHEREAS" clauses above are hereby ratified as true and correct, and incorporated herein by reference.

1.02 The Sarasota County Unified Local Mitigation Strategy, with the North Port Floodplain Management Plan Annex, is adopted as the formal guide for the City of North Port's hazard mitigation and floodplain management activities.

1.03 The City Manager or his designee is authorized to apply for funding to support these activities.

SECTION 2 CONFLICTS

2.01 If there is any conflict between this Resolution and any other Resolution or Ordinance, or portions thereof, the provisions of this Resolution shall prevail to the extent of such conflict.

SECTION 3 SEVERABILITY

3.01 If any section, subsection, sentence, clause, phrase or portion of this Resolution is for any reason held invalid or unconstitutional by any court of competent jurisdiction, such portion shall be deemed a separate, distinct, and independent provision and such holding shall not affect the validity of the remaining portions.

SECTION 4 EFFECTIVE DATE

4.01 This Resolution shall take effect immediately upon execution by the Chair.

PASSED AND DULY ADOPTED by the City Commission of the City of North Port, Florida this 9th day of February, 2016

CITY OF NORTH PORT

By: Jacqueline Moore
Jacqueline Moore
Mayor

ATTEST:

By: Helen M. Raimbeau
Helen Raimbeau, MMC
City Clerk

Approved as to form and legal sufficiency:

By: MP
Mark Moriarty
City Attorney

CRS Committee Meeting Invitees List

Full Name	Organization	Title	Dept	Division
Valerie Malingowski	City of North Port	Grant Writer	City Manager Office	Administration
Josh Taylor	City of North Port	Community Outreach Coordinator	City Manager Office	Community Outreach
Michael Fear	City of North Port	Alternate Community Outreach Coordinator	City Manager Office and Public Works	Administration
Angela Hollister	City of North Port	Accountant III	Finance	Accounting Services
Eric Tiefenthaler	City of North Port	Div Chief -Emergency Manager	Fire Rescue	Administration
Peter Marietti III	City of North Port	Fire Marshall	Fire Rescue	Administration
Alexander Bahorski	City of North Port	Planning Analyst	Neighborhood Development Services (NDS)	Planning and Zoning
Savannah White	City of North Port	Environmental Tech	NDS and PW	Planning and Zoning, Engineering
Josh Thurmer	City of North Port	Chief Plans Examiner	NDS	Building
Tommy Lasprogato	City of North Port	Building Division Manager	NDS	Building
Kevin Raducci	City of North Port	Code Encforcement Manager	NDS	Building Code Encforcement
Alison Christie	City of North Port	Senior Planner	NDS	Planning and Zoning
Rhea Lopes	City of North Port	Senior Planner	NDS	Planning and Zoning
Sherry Willette	City of North Port	Planner	NDS	Planning and Zoning
Sandy Pfundheller	City of North Port	Director	Parks and Recreation	Administration
Monica Bramble	City of North Port	Acting Public Works Director	Public Works	Administation
Benjamin E. Newman	City of North Port	Project Engineer	Public Works	PW Engineering
Elizabeth Wong	City of North Port	Stormwater Manager	Public Works	PW Engineering
Colleen Hibbitts	City of North Port	Community Outreach Coordinator	Utilities	Community Outreach
Jennifer Fehrs	City of North Port	Utilities Engineer	Utilities	Utilities Engineering
Michael Acosta	City of North Port	Engineering Manager	Utilities	Utilities Engineering
Justin Box	Allstate Insurance	insurance Company Owner		
Bobbi Claybrooke	AM Engineering	Consultant Engineer		
Kimberley Quigley	BB&T	Lending Institution		
Todd Mathes	Benderson	Developer		
Kevin Feuser	Brightway insurance	insurance Company Owner		
Jon Mast	Building Industria Assoc.	Builder		
Bridget Spence	Casey Management	Developer		
Matthew Dill	Chamber of Commerce	Commerce		
Manager	Charlotte Desoto Building Industria Assoc.	Building Industria Rep		
Deborah Snowden	Coldwell Banker Sunstar Realty	Realtor		
Fred Koenig	Duck Key	HOA member		
Terrence Kirschner	Gran Paradiso - Lennar Homes	Developer		
Matthew Koratich	Gran Paradiso Development	HOA Manager		
Grant Gorski	Gran Paradiso Management	HOA Manager		
Strickland Smith	Heidt Engineering	Consultant Engineer		
Bruce Henry	Keller Williams Realty	Broker Associate/Realtor		
Peter Van Buskirk	Kimley-Horn Associates	Consultant Engineer		
Ty Gremaux	Kimley-Horn Associates	Consultant Engineer		
Matther Koratich	Lennar Homes - Gran Paradiso	Developer		
Brad Soule	Matty Corporation	Developer		
Bill Murray	MQ Partners	Developer		
Paul Morgan	NP Contractor Association and Past PZAB Member	Contractor		
Mellisa Ginn	Presto Air	Contractor		
Linda Pizzaro	Realtor Association	Realtor		
Lex van Brero	Resident of Gran Paradiso	Resident		
Donna Bailey	Sarasota County	CRS Coordinator	Public Works	Stormwater
Janita Wisch	Sarasota County	Librarian for City of North Port		
Doug Brauer	Stantec Engineering	Consultant Engineer		
Markowitz, Rachel	Stantec Engineering	Consultant Engineer		
Dean McConville	State Farm insurance	insurance Company Owner		
Mary Foster	State Farm insurance	Insurance agent		
John Shope	Suncoast Credit Union	Lending Institution		
Ralph Bienne	Suncoast Credit Union	Lending Institution		
Darryl Denson	Sundance Builder	Builder		
Richard Ives	Talon Bay HOA	HOA member		
Ron Carroll	Talon Bay HOA	HOA member		
Alan Fish	VBF Surveying	Surveyor		
Lisa Haseley	Wells Fargo	Lending Institution		
Clint Cuffle	WRA Egnineering, LLC	Consultant Engineer		
Clint Cuffle	WRA Engineering	Consultant Engineer		

Attendees List at CRS Committee Meetings

					FMP Review Meeting Attendance	
Full Name	**Organization**	**Title**	**Dept**	**Division**	**9/17/2020**	**12/3/2020**
Valerie Malingowski	City of North Port	Grant Writer	City Manager Office	Administration	x	
Michael Fear	City of North Port	Community Outreach Coordinator	City Manager Office and Public Works	Administration	x	x
Angela Hollister	City of North Port	Accountant III	Finance	Accounting Services	x	x
Eric Tiefenthaler	City of North Port	Div Chief -Emergency Manager	Fire Rescue	Administration	x	x
Peter Marietti III	City of North Port	Fire Marshall	Fire Rescue	Administration	x	x
Kevin Raducci	City of North Port	Code Encforcement Manager	Neighborhood Development Services (NDS)	Building Code Encforcement	x	
Alexander Bahorski	City of North Port	Planning Analyst	NDS	Planning and Zoning		x
Alison Christie	City of North Port	Senior Planner	NDS	Planning and Zoning	x	x
Rhea Lopes	City of North Port	Senior Planner	NDS	Planning and Zoning	x	x
Savannah White	City of North Port	Environmental Tech	NDS and PW	Planning and Zoning, Engineering	x	
Sandy Pfundheller	City of North Port	Director	Parks and Recreation	Administration	x	
Elizabeth Wong	City of North Port	Stormwater Manager	Public Works	PW Engineering	x	x
Benjamin E. Newman	City of North Port	Project Engineer	Public Works	PW Engineering	x	x
Jennifer Fehrs	City of North Port	Utilities Engineer	Utilities	Utilities Engineering	x	x
Michael Acosta	City of North Port	Engineering Manager	Utilities	Utilities Engineering	x	x
Donna Bailey	Sarasota County	CRS Coordinator	Public Works	Stormwater	x	x
Bruce Henry	Keller Williams Realty	Broker Associate/Realtor			x	x
Clint Cuffle	WRA Egnineering, LLC	Engineer , Vice President			x	
Grant Gorski	Gran Paradiso Development	General Manager			x	
Justin Box	Allstate Insurance	insurance Company Owner			x	x
Kevin Feuser	Brightway insurance	insurance Company Owner			x	x
Lex van Brero	Resident of Gran Paradiso	Resident			x	
Markowitz, Rachel	Stantec Engineering	Civil Engineer			x	x
Mary Foster	State Farm insurance	Insurance agent			x	x
Matthew Koratich	Gran Paradiso Development	HOA Operations Manager			x	x
Ronnie Carroll	Talon Bay Development	HOA Representative			x	
Terrence Kirschner	Gran Paradiso - Lennar Homes	Developer			x	
Bobbi Claybrooke	AM Engineering	Civil Engineer				x
Gremaux, Ty	Kimley-Horn and Assoc	Civil Engineer				x
Strackbein, Trenton	Kimley-Horn and Assoc	Civil Engineer				x

Noth Port Staff Role in 6 Mitigation Measures

Full Name	Title	Dept	Division	Role in 6 Migation Measure *					
				1. Preventative	2. Property Protection	3. Natural Resource Protection	4. Emergency Services	5. Structural Projects	6. Public Information
Alison Christie Rhea Lopes Alexander Bahorski	Senior Planner Planning Analyst	Neighborhood Development Services (NDS)	Planning	• Floodplain mapping and data • Planning and zoning • Open space preservation • Building codes	• Building elevation • Insurance				• Map information • Real estate disclosure
Angela Hollister	Accountant III	Finance	Accounting Services		• Property Acquisition				
Benjamin E. Newman	Project Engineer	Public Works	Engineering	• Building codes • Planning and zoning		• Wetlands protection	• Post-disaster mitigation actions	• Storm drain improvements	• Outreach projects
Elizabeth Wong	Stormwater Manager	Public Works	Engineering	• Floodplain mapping and data • Planning and zoning • Open space preservation • Stormwater management • Floodplain regulations • Drainage system maintenance • Erosion setbacks • Building codes	• Property Acquisition • Building elevation • Insurance	• Wetlands protection • Water quality improvement • Erosion and sediment control • Natural area preservation • Environmental corridors • Natural area restoration • Natural functions protection	• Hazard warning • Health and safety maintenance • Post-disaster mitigation actions	• Reservoirs • Channel modifications • Levees/floodwalls • Storm drain improvements • Diversions	• Map information • Library • Outreach projects • Technical assistance • Real estate disclosure • Environmental education
Eric Tiefenthaler Peter Marietti III	Div Chief - Emergency Manager, Fire Marshall	Fire Rescue	Administration				• Hazard threat recognition • Critical facilities protection • Hazard warning • Health and safety maintenance • Hazard response operations • Post-disaster mitigation actions		• Outreach projects
Michael Acosta Jennifer Fehrs	Engineering Manager Utilities Engineer	Utilities	Engineering		• Sewer backup protection		• Critical facilities protection • Health and safety maintenance • Hazard response operations • Post-disaster mitigation actions	• Reservoirs • Levees/floodwalls	• Outreach projects
Kevin Raducci Tommy Lasprogato Josh Thurmer	Code Encforcement Manager, Building Division Manager, Chief Plans Examiner	Neighborhood Development Services (NDS)	Building	• Planning and zoning • Erosion setbacks • Building codes	• Building elevation	• Wetlands protection			• Map information • Real estate disclosure
Michael Fear	Alternate Community Outreach Coordinator	City Manager Office and Public Works	Administration						• Outreach projects
Sandy Pfundheller	Director	Parks and Recreation	Administration			• Natural area preservation • Environmental corridors • Natural area restoration • Natural functions protection			
Savannah White	Environmental Tech	NDS and PW	Planning, Operations	• Floodplain mapping and data		• Wetlands protection • Water quality improvement • Erosion and sediment control • Natural area preservation • Environmental corridors • Natural area restoration • Natural functions protection			• Map information • Outreach projects • Real estate disclosure • Environmental education
Valerie Malingowski	Grant Writer	City Manager Office	Administration		• Property Acquisition				• Map information • Outreach projects

* 6 mitigation Measures as defined in CRS 2017 Manual page 510-20

Neighborhood Development Services

Floodplain "Task Force" Work Plan

1. Overview

The primary mission of the Floodplain Task Force to support the City of North Port's Community Rating System (CRS) through information, education and outreach activities to develop multiple knowledgeable Certified Floodplain Managers. Historically, the City's CRS Coordinator has provided significant input on the CRS Program and flood insurance rules and guidelines propagated by FEMA. The Task Force will also be very active in ASFPM membership and Florida Floodplain Mangers membership to stay informed of upcoming changes to the NFIP and potential effects these changes could have.

The committee will be headed by the Building Official who is designated the Floodplain Administrator listed below.

Anthony Warren CBO, CFM, Building Official/Floodplain Administrator

The membership is composed of interested employees within Neighborhood Development Services. The Floodplain Administrator will use an initial selected group of members who are interested in continuing education, on the job work experience and essential personnel that are already involved in different aspects of Floodplain Management. The CRS Coordinator will serve as an outside source but will work in a collective effort.

Initial Members are listed below.
Melissa McThenia, Zoning Plans Examiner
Kyla Guilbault, Development Tech II
Justin Bryde, GIS Analyst Addressing Specialist

Outside Source
Elizabeth Wong P.E., Stormwater Manager/CRS Coordinator

Neighborhood Development Services: 941.429.7044, 4970 City Hall Boulevard, North Port, FL 34286

Achieve Anything
www.cityofnorthport.com

2. Task Outline

2020 – Initial Work Items

Task Name	Task Leader	Task Duration	Task Description
Self-Studies	Floodplain Administrator	Ongoing Until Complete	Complete EMI Self Studies as assigned by Floodplain Administrator
Annual Conference	Floodplain Administrator	4 days Annually	(2-3) Members should be prepared to attend for networking, continuing education and new industry standards
Elevation Certificates	Zoning/Permit Supervisor	Ongoing/As Needed	Verify Elevation Certificates for completeness prior to submitting to CRS Coordinator
Prepare assigned CRS sections	Floodplain Administrator/CRS Coordinator	Prior to Annual Renewal and Prior to 5 Year Cycle	Each member will be selected for preparing information to submit to the CRS Coordinator.
Information Log(s)	Floodplain Administrator	Ongoing/As Needed	Documenting phone calls, emails and walk ins for any items related to floodplain management.
Public Outreach	Floodplain Administrator/Outreach Personnel	Ongoing	Provide Public Outreach through social media, pamphlets, utility bill mailouts, onsite speaking engagements
ASFPM/FLFLOODS Committees	Floodplain Administrator	Ongoing	Actively participate in the Florida and National Floodplain Committees

3. Floodplain Courses

*A. FEMA EMI Independent Self Study (introductury courses)*Free Online*

IS-1100 Increased Cost of Compliance, IS-1102 Theory of Elevation Rating, IS-1103 Elevation Certificate for Surveyors, IS-1105a Elevation Certificate Made Easy, IS-1106a FEMA Mapping, IS-1113 Coastal Barrier Resources Act

*B. One Day Class (Face To Face and more in depth) *Fee*

Fundamentals In Floodplain Management, Elevation Certificate Basics

*C. CFM Courses (4 day classes followed my CFM Test. Only 1 is needed) *Fee*

E-0273, L-0273, G-0273

*D. FEMA EMI Independent Self Study (follow up courses)*Free Online*

IS-I62 Hazard Mitigation Floodplain Management, IS-279a Introduction to Retrofitting, IS-280 Engineering Principles, IS-321 Hurricane Mitigation, IS-322 Flood Mitigation, IS-727 Floodplain Management and Protecting Wetlands

Primary	Description of Project	Agency Responsible for Implementation	Priority	Estimated Cost	Funding Source	Hazard Mitigation Strategy	Hazards Mitigated	Jurisdiction Project #	Jurisdiction Project Owner	Jurisdiction Project Benefit	Mitigation Goals Achieved	Timeframe for Project Completion	Project Status (COMPLETED)	Project Status (DEFERRED)	Project Status (DELETED)	Project Status (IN PROGRESS)	Project Status (NEW)	If Deferred; Why?	Mitigate New or Existing	Comments
Purchase lots along the Myakkahatchee Creek	Purchase lots to reduce flood vulnerability	CM, NDS, PW	High	$3.5M	FDEP Grants	1	All	N/A	NP	1 4	2, 4	As funding is available		TRUE				Funding	E (Existing)	
Deer Prairie Creek Bridge	Install bridge in order to decrease response time	Fire Rescue	High	$1M	CIP Grants Infrastructure Surtax III	5	All	N/A	NP	1 5	5	2024		TRUE				Funding	E (Existing)	
City EOC/Fire Rescue HQ/Data Center/PD 911 Dispatch/Property Evidence Building	Build a new facility to accomodate emergency operations center to include showers, and back-up emergency power to entire bldg	Public Works, FM	High	$6M	Grants HMGP Other City Funds	2	All	N/A	NP	ALL	5	As funding is available		TRUE				Funding	E (Existing)	100% of Plans received, Plans in NP SDR review, and moving into the permitting phase. Pegasus filed a PoP extension that has been approved but is still in processing with the state. The state also requested a SOW environmental review, but we anticipate no issues with approval. A cost increase was also submitted to the state and is currently going through a CBA.
North Port Utilities Admin/Field Operations	Replace buildings with hardened structures	Utilities	High	$13.2M	Revenue Bonds User Rates	2 3	All	N/A	NP	ALL	5	2023				TRUE			E (Existing)	Planning started.
North Port Utilities construction of additional source for R/O	To add additional wells to the current wellfield to increase drought tolerance and protect the existing system	Utilities	Medium	$4.5M	Capacity Fees	5	4	N/A	NP	ALL	1 4 5					TRUE			E (Existing)	
Hardening of water & sewer utility structures	Upgrade utility structures at bridge crossings, etc.	Utilities	Medium	$600K	User Rates	5	All	N/A	NP	ALL	5	2020				TRUE			E (Existing)	
Additional emergency water interconnect	12" Potable water emergency inter-connect between Sarasota and NP	Utilities	Medium	$32K	County User Rates	5	All	N/A	NP	1 4	5	2021		TRUE					E (Existing)	
Replacement of shallow depth water and wastewater lines at Lazy River		Utilities	High	$150K	User Rates	5	4	N/A	NP	1 2 4	1 2 5		TRUE						E (Existing)	
Inflow & Infiltration in identified areas of the City		Utilities	High	$300K	User Rates	2 5	10	N/A	NP	1 5	1 4 5					TRUE			E (Existing)	
Vault style master pumping lift station #12 rehabilitation to ground level		Utilities	High	$370K	User Rates	2 5 7	All	N/A	NP	1	1 2 4 5	2021				TRUE			E (Existing)	
Phase 1 Water Treatment Plant rehabilitiation of Flocculation #1		Utilities	High	$575K	User Rates	2 5	All	N/A	NP	1 5	2 4 5	2021	TRUE						E (Existing)	
Distribution line installation to serve the Western reaches of the City based on hydraulic modeling		Utilities	High	$3.5M	Capacity Fees	5	4	N/A	NP	1 4 5	1 4	2021				TRUE			N (New)	
Rehabilitiation of lift stations that are 30 plus years old that have been identified in need		Utilities	High	$150K	User Rates	2 5 7	All	N/A	NP	1 5	1 2 5	2021				TRUE			E (Existing)	
VFDs installed on current raw water intake structures at the Water Treatment Plant		Utilities	High	$30K	User Rates	2 5	All	N/A	NP	1 4 5	1 4	2021				TRUE			E (Existing)	
Installation of additional analyzers and integration to SCADA to achieve 24 hour operations at the Water Treatment Plant		Utilities	High	$48K	User Rates	2	All	N/A	NP	1 4 5	1 2 4	2021				TRUE			E (Existing)	
Upgrade the 14 year old control panel at the Wastewater Treatment Plant to improve operational efficiency		Utilities	High	$35K	User Rates	2	All	N/A	NP	1 4 5	1 2 5		TRUE						E (Existing)	
Public Works Administration Building	Replace buildings with hardened structures	Public Works	Medium	$6.28M	RDA	2 3	All	N/A	NP	ALL	5	As funding is available		TRUE				Funding	N (New)	
Pipe Lining on major outfalls	CMP pipes that are difficult to replace can be lined. Only those that are deemed structurally sufficient can be lined. All others will need to be replaced.	Public Works	High	$1M	RDA	2 5 6 7	All	N/A	NP	1 4	1 2 5	As funding is available		TRUE				Funding	E (Existing)	
Design 4 Lane Price Blvd Sumter to Toledo Blade	Four-lane and elevate roadway.	Public Works	NA	$2.2M	Surtax III	5	All	N/A	NP	ALL	5	2020			TRUE				E (Existing)	
Construct 4 Lane Price Blvd Sumter to Toledo Blade	Four-lane and elevate roadway.	Public Works	NA	$43M	Grants Other City Funds Surtax III	5	All	N/A	NP	ALL	5	2022				TRUE			E (Existing)	
Design 4 Lane Price Blvd Sumter to West of North Port High School	Four-lane and elevate roadway.	Public Works	High	$7M	Grants Other City Funds Surtax III	5	All	N/A	NP	ALL	5	As funding is available		TRUE				Funding	E (Existing)	
Construct 4 Lane Price Blvd Sumter to West of North Port High School	Four-lane and elevate roadway.	Public Works	High	$33M	Grants Other City Funds Surtax III	5	All	N/A	NP	ALL	5	As funding is available		TRUE				Funding	E (Existing)	
Design 4 Lane Price Blvd Toledo Blade to Haberland	Four-lane and elevate roadway.	Public Works	High	$5.6M	Surtax III	5	All	N/A	NP	ALL	5	As funding is available		TRUE				Level of Service	E (Existing)	

Primary	Description of Project	Agency Responsible for Implementation	Priority	Estimated Cost	Funding Source	Hazard Mitigation Strategy	Hazards Mitigated	Jurisdiction Project #	Jurisdiction Project Owner	Jurisdiction Project Benefit	Mitigation Goals Achieved	Timeframe for Project Completion	Project Status (COMPLETED)	Project Status (DEFERRED)	Project Status (DELETED)	Project Status (IN PROGRESS)	Project Status (NEW)	If Deferred; Why?	Mitigate New or Existing	Comments
Construct 4 Lane Price Blvd Toledo Blade to Haberland	Four-lane and elevate roadway.	Public Works	High	$30.7M	Surtax III	5	All	N/A	NP	ALL	5	As funding is available		TRUE				Level of Service	E (Existing)	
Design 4 Lane Price Blvd Haberland to Veterans	Four-lane and elevate roadway.	Public Works	High	$6.7M	Surtax III	5	All	N/A	NP	ALL	5	As funding is available		TRUE				Level of Service	E (Existing)	
Construct 4 Lane Price Blvd Haberland to Veterans	Four-lane and elevate roadway.	Public Works	High	$34M	Surtax III	5	All	N/A	NP	ALL	5	As funding is available		TRUE				Level of Service	E (Existing)	
Toledo Blade Blvd Extension, Tropicaire Blvd to SR72	Roadway extension	Public Works	High	$16M	Revenue Bonds	2	9	N/A	NP 4	1	1	As funding is available					TRUE		N (New)	
Big Slough Flood Reduction Study	Consultant to recommend solutions to reduce flooding in 2 areas	Public Works	High	$300K	RDA	2 5 6 7	2 7	N/A	NP	1 4	1 2 5	2020	TRUE						E (Existing)	Funded by SWFWMD
Design replacement for flood control structure #115	Corroded Structure Need to rehab, replace for flood protection	Public Works	High	$109K	RDA	2 5 6 7	2 3 6 7 9 11	N/A	NP	1 4	1 2 5	2017	TRUE						E (Existing)	
Construct replacement for flood control structure #115	Corroded Structure Need to rehab, replace for flood protection	Public Works	High	$165K	RDA	2 5 6 7	2 3 6 7 9 10	N/A	NP	1 4	1 2 5	2018	TRUE						E (Existing)	
Design replacement for flood control structure #106	Corroded Structure Need to rehab, replace for flood protection	Public Works	High	$168K	RDA	2 5 6 7	2 3 6 7 9 10	N/A	NP	1 4	1 2 5	2018	TRUE						E (Existing)	
Construct replacement for flood control structure #106	Corroded Structure Need to rehab, replace for flood protection	Public Works	High	$2.274M	RDA	2 5 6 7	2 3 6 7 9 10	N/A	NP	1 4	1 2 5	2020	TRUE						E (Existing)	
Design replacement for flood control structure #108	Corroded Structure Need to rehab, replace for flood protection	Public Works	High	$192K	RDA	2 5 6 7	2 3 6 7 9 10	N/A	NP	1 4	1 2 5	2020				TRUE			E (Existing)	
Construct replacement for flood control structure #108	Corroded Structure Need to rehab, replace for flood protection	Public Works	High	2.48M	RDA	2 5 6 7	2 3 6 7 9 10	N/A	NP	1 4	1 2 5	2021		TRUE				Funding	E (Existing)	
Design replacement for flood control structure #113	Corroded Structure Need to rehab, replace for flood protection	Public Works	High	$308K	HMGP RDA Surtax III	2 5 6 7	2 3 6 7 9 10	N/A	NP	1 4	1 2 5	As funding is available		TRUE				Funding	E (Existing)	
Construct replacement for flood control structure #113	Corroded Structure Need to rehab, replace for flood protection	Public Works	High	$3.85M	HMGP RDA Surtax III	2 5 6 7	2 3 6 7 9 10	N/A	NP	1 4	1 2 5	As funding is available		TRUE				Funding	E (Existing)	
Design replacement for flood control structure #114	Corroded Structure Need to rehab, replace for flood protection	Public Works	High	$300K	RDA	2 5 6 7	2 3 6 7 9 10	N/A	NP	1 4	1 2 5	As funding is available		TRUE				Funding	E (Existing)	
Construct replacement for flood control structure #114	Corroded Structure Need to rehab, replace for flood protection	Public Works	High	$3.6M	RDA	2 5 6 7	2 3 6 7 9 10	N/A	NP	1 4	1 2 5	As funding is available		TRUE				Funding	E (Existing)	
Design replacement for flood control structure #157	Corroded structure. Needs rehabilitated and replaced for flood protection.	Public Works	High	$175K	Grants RDA Surtax III	2 5 6 7	2 3 6 7 9 10	N/A	NP	1 4	1 2 5									
Construct replacement for flood control structure #157	Corroded structure. Needs rehabilitated and replaced for flood protection.	Public Works	High	$1.8M	Grants RDA Surtax III	2 5 6 7	2 3 6 7 9 10	N/A	NP	1 4	1 2 5									
Design replacement for other flood control structures	Corroded Structure Need to rehab, replace for flood protection	Public Works	Medium	$500K	RDA	2 5 6 7	2 3 6 7 9 10	N/A	NP	1 4	1 2 5	As funding is available		TRUE				Funding	E (Existing)	

Primary	Description of Project	Agency Responsible for Implementation	Priority	Estimated Cost	Funding Source	Hazard Mitigation Strategy	Hazards Mitigated	Jurisdiction Project #	Jurisdiction Project Owner	Jurisdiction Project Benefit	Mitigation Goals Achieved	Timeframe for Project Completion	Project Status (COMPLETED)	Project Status (DEFERRED)	Project Status (DELETED)	Project Status (IN PROGRESS)	Project Status (NEW)	If Deferred; Why?	Mitigate New or Existing	Comments
Construct replacement for other flood control structures	Corroded Structure Need to rehab, replace for flood protection	Public Works	Medium	$3M	RDA	2 5 6 7	2 3 6 7 9 10	N/A	NP	1 4	1 2 5	As funding is available		TRUE				Funding	E (Existing)	
Drainage System Improvements	Rehab and replacement of swales, ditches, pipes, outfalls and canals	Public Works	Medium	$1.5M	RDA Surtax III	5 6 7	2 7 9 11	N/A	NP	1	1 2	As funding is available					TRUE		E (Existing)	
Bridge Rehabilitation and Repairs	Repairs to evacuation route bridges	Public Works	Medium	$1.5M	RDA Surtax III	3	2 9	N/A	NP	1 4	1	As funding is available					TRUE		E (Existing)	
Big Slough Flood Reduction Projects	Implementationo of projects to reduce flooding	Public Works	Medium	$43M	RDA	2 5 6 7	2 3 6 7 9 10	N/A	NP	1 4	1 2 5	As funding is available		TRUE				Funding	E (Existing)	
Property Maintenance Yard	Replace buildings with hardened structures	Parks and Rec	High	$7M	CIP HMGP	2 3	All	N/A	NP	ALL	5	As funding is available		TRUE			TRUE	Funding	E (Existing)	
Generator for City Hall	Add emergency power to entire building	Public Works FM	High	$1M	CIP HMGP	2 3	All	N/A	NP	ALL	5					TRUE			E (Existing)	
Lift station bypass pump project	Upgrade existing lift stations to include bypass pumps at all major stations.	Utilities	High	$5M	User Rates	2 3 5	All	N/A	NP	1	All	2029					TRUE		E (Existing)	
North Port THIRA Update	Update to the THIRA Plan	Fire	Medium	$30K	General Revenues Grants	All	All	N/A	NP	1	All						TRUE			
Public Outreach	Public outreach programs for all jurisdictions	LMS Work Group	High	$10K	NA	All	All	NA	LBK NP Sarasota County Sarasota Hospital Board SRQ Venice	ALL	3	Continuous				TRUE			E (Existing)	

Parcels Touching SFHA with Structures in November 4, 2016 and in existing 1981 & 1984 FIRMs

Parcel Status	No. of Affected Parcels (as of 12/05/16)	No. of Affected Parcels with Insurable Structures* (as of 12/05/16)	No. of Parcels with Insurable Structures* touching the SFHA (Using 12/05/16 Sarasota County GIS Structures Layer)
Parcels Added Parcels not in the 1981 FIRM floodplain, but any portion(s) of the parcel are touching the November 4, 2016 FIRM SFHA	14325	5531	276
Parcels Removed Parcels that are in the 1981 FIRM SFHA and were removed from the November 4, 2016 FIRM SFHA	1828	921	
Parcels that are in the 1981 FIRM SFHA and are still in the November 4, 2016 FIRM SFHA	2630	720	211

* An insurable structure is a structure with at least two load-bearing walls and a roof. It must be affixed to land, and at least 51% of its value must be above ground. This definition includes almost all residential and commercial structures, as well as ancillary buildings such as garages and barns. Storage facilities such as silos and grain storage buildings are also covered. The rules do not cover structures such as gazebos, pavilions, pole barns, and storage tanks, as these buildings do not have at least two load-bearing walls and a roof. If they did not have roofs, then they would not qualify as insurable structures. Otherwise, flood insurance is required. The issue is not habitability.

Legend

- Parcels in SFHA with Structures
- Parcels in SFHA in 1981 & 1984 maps with Structures
- Parcels with Structures Removed from SFHA in 1981 & 1984
- FEMA Zone AE
- I-75
- Major Roads
- Local Roads
- Water

N

0 0.25 0.5 1 Miles

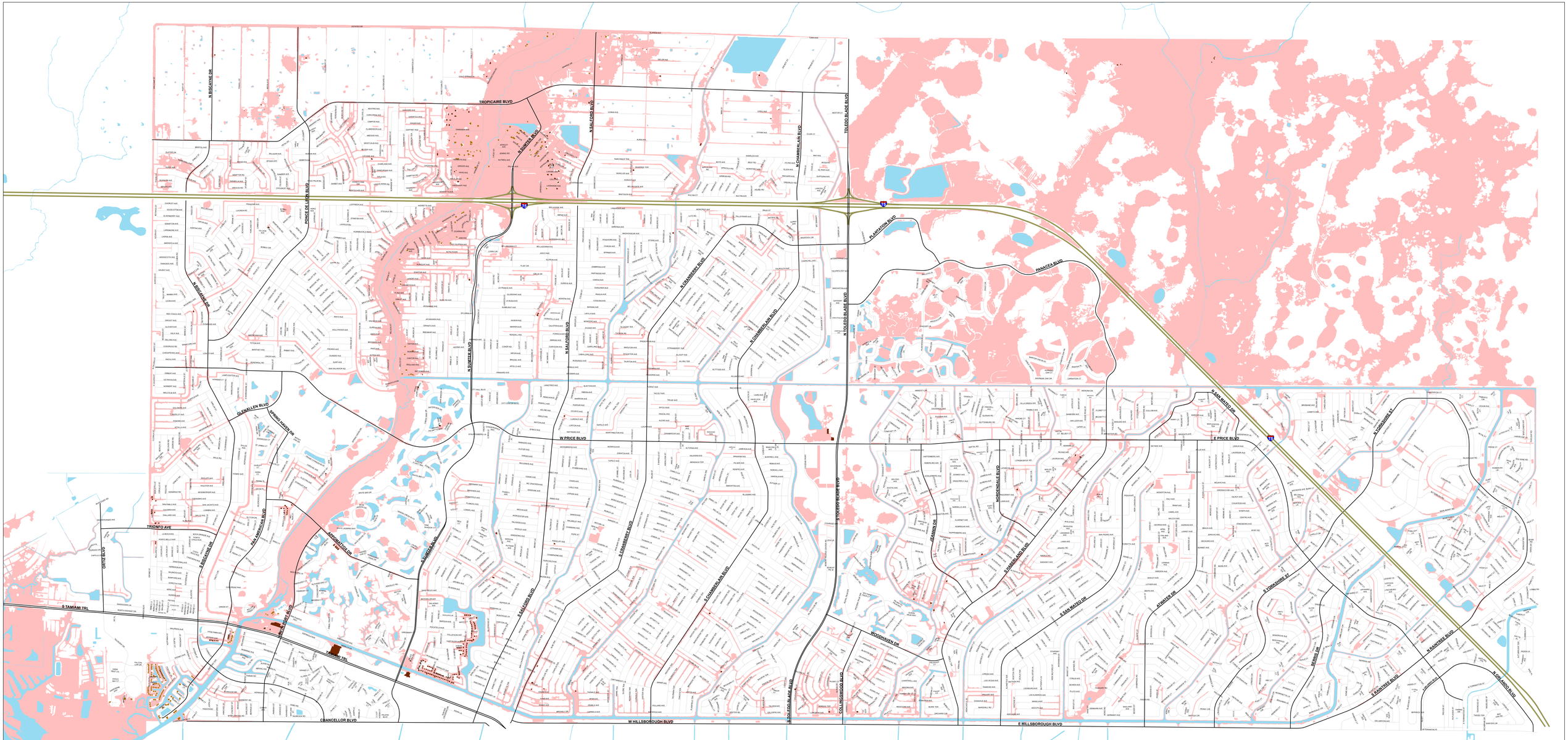
North Port FLORIDA

Prepared by GIS Services
December 7, 2016

Disclaimer: This map is for reference purposes only and is not to be construed as a legal document. Any reliance on the information contained herein is at the user's risk. The City of North Port and its agents assume no responsibility for any use of the information contained herein or any loss resulting therefrom.

M:\Departments\Public\Works\Engineering\FEMA\2016\104\Parcels Touching SFHA\NR\Structures20160126.mxd

Exhibit 4-1



Structures Touching SFHA in November 4, 2016 and in existing 1981 & 1984 FIRMs

Parcel Status	No. of Affected Parcels (as of 12/05/16)	No. of Affected Parcels with Insurable Structures* (as of 12/05/16)	No. of Parcels with Insurable Structures* touching the SFHA (Using 12/05/16 Sarasota County GIS Structures Layer)
Parcels Added Parcels not in the1981 FIRM floodplain, but any portion(s) of the parcel are touching the November 4, 2016 FIRM SFHA	14325	5531	276
Parcels Removed Parcels that are in the 1981 FIRM SFHA and were removed from the November 4, 2016 FIRM SFHA	1828	921	
Parcels that are in the 1981 FIRM SFHA and are still in the November 4, 2016 FIRM SFHA	2630	720	211

* An insurable structure is a structure with at least two load-bearing walls and a roof. It must be affixed to land, and at least 51% of its value must be above ground. This definition includes almost all residential and commercial structures, as well as ancillary buildings such as garages and barns. Storage facilities such as silos and grain storage buildings are also covered. The rules do not cover structures such as gazebos, pavilions, pole barns, and storage tanks, as these buildings do not have at least two load-bearing walls and a roof. If they did not have roofs, then they would not qualify as insurable structures. Otherwise, flood insurance is required. The issue is not habitability.

Legend

- Structures Touching SFHA - Added
- Structures touching SFHA in 1981 & 1984
- FEMA Zone AE
- I-75
- Major Roads
- Local Roads
- Water

N

0 0.25 0.5 1

Miles

North Port FLORIDA

Prepared by GIS Services
December 7, 2016

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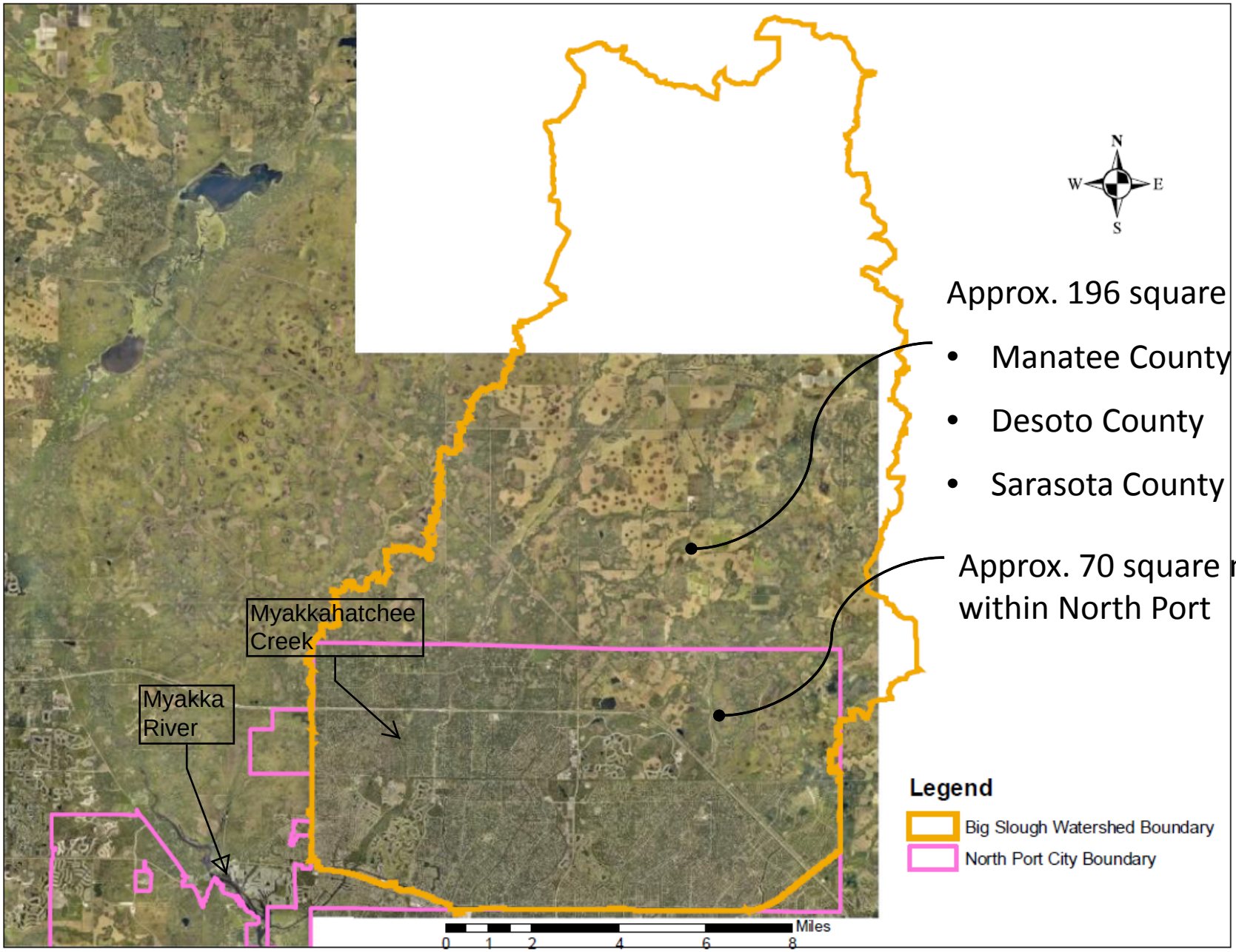
M:\Departments\Public Works\Engineering\FEMA\20161104\Structures Touching\SFHA20161105.mxd

Exhibit 4-2



Big Slough Watershed Boundary (196 square miles)

City of North Port
Stormwater Structures

Bridges
Bridge_Number, Bridge_Location
175000, North Port over coco Plum
175001, Pan American over Coco Plum
175002, S Sumter over Coco Plum
175003, Collingswood over Coco Plum
175004, S Chamberlain over coco Plum
175005, S Cranberry over Coco Plum
175006, S Salford over Cocoplum
175007, S Biscayne over Myakkahatchee
175008, S San Mateo over coco Plum
175009, Atwater over coco Plum
175010, N Cranberry over Snover
175011, N Chamberlain over snover
175012, N Salford over Snover
175013, Sumter over Snover
175014, W Price over Myakkahatchee Creek
175018, Appomattox over Myakkahatchee Creek
175019, Appomattox over Myakkahatchee Canal
175020, Elyton over R226
175022, W Price over Blue Ridge
175023, E Price over Bethlehem
175024, Sentis over Coco Plum
175025, S Yorkshire over Coco Plum
175026, Tropicaire over Myakkahatchee creek/canal
175027, E Price over Amnesty
175028, E Price over Coco Plum
175029, E Price over Newman
175030, Inkwood over Littlefield
175031, Yorkshire over Bethlehem
175032, N Yorkshire over Bethlehem
175033, N Yorkshire over Coco Plum
175034, Yorkshire over Newman
175035, Price over Maccaughy
175036, S Haberland over coco Plum
175037, Woodhaven over Bass Point
175038, Starview over Starview
175039, Bullard over R36
175040, S Biscayne over R36

Water Control Structures (WCS)
Grid, Structure Number
A2, WCS-162
B7, WCS-101
B7, WCS-106
C4, WCS-113
C6, WCS-118
C7, WCS-117
D4, WCS-114
D6, WCS-121
D6, WCS-125
D7, WCS-124
D8, WCS-107
E4, WCS-115
E6, WCS-128
E7, WCS-127
F7, WCS-131
F7, WCS-137
F8, WCS-108
F8, WCS-130
G6, WCS-136
G8, WCS-109
H6, WCS-140
H8, WCS-110
I7, WCS-111

Fixed Weirs (FW)
Grid, Structure Number
D4, DS-120
D4, DS-123
D5, WCS-122
E5, WCS-129
E8, DS-506
E8, DS-507
F4, WCS-136
F4, WCS-151
F4, WCS-152
F4, WCS-153
F5, DS-135
G4, WCS-154
G4, WCS-155
G4, WCS-156
G8, WCS-180
G8, WCS-181
H4, WCS-157
H4, WCS-158
H8, WCS-182
H8, WCS-183
I4, WCS-159
I8, WCS-185
J4, WCS-160
J4, WCS-161
J8, WCS-186

Ditch Blocks (DB)
Grid, Ditch Block Number
C3, DB-305
C3, DB-306
C5, DB-301
C5, DB-302
C5, DB-303
C5, DB-304
E1, DB-308
E2, DB-307
F1, DB-311
F2, DB-309
G6, DB-310

Gated DropStructures (GDS)
Grid, Structure Number
B7, ST-GDS-1
B7, ST-GDS-2
C7, ST-GDS-3
F8, DS-512CB
H4, WCS-116
I5, WCS-141
I5, WCS-142
I6, WCS-112
J7, WCS-143

Drop Structures (DS)
Grid, Structure Number
B8, DS-501
C5, DS-119CB
C8, DS-503
C8, DS-504
E5, DS-126CB
E5, WCS-129
F5, WCS-136
F6, DS-132
F8, DS-508CB
F8, DS-510CB
G5, DS-133
G5, DS-139
Waterway Flow

NP_Streets
Interstate
Major Roads
Local Roads

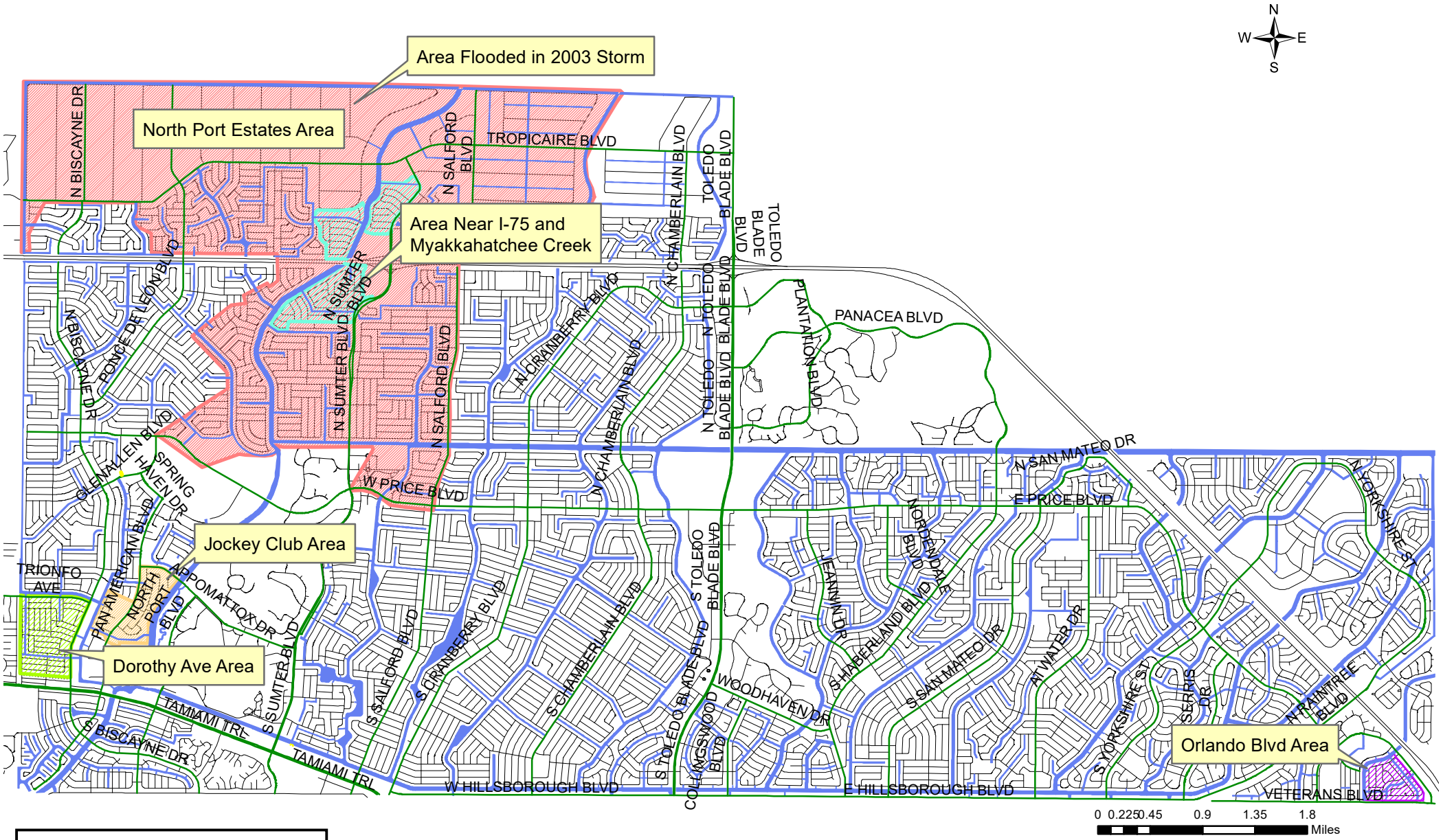
N
W E
S

0 0.5 1 2 3
Miles

Prepared by
Infrastructure Management Division
Public Works
City of North Port

Disclaimer: This map is for reference purposes only and is not to be construed as a legal document. Any reliance on the information contained herein is at the user's risk. The City of North Port and its agents assume no responsibility for any use of the information contained herein or any loss resulting there from.

S:\DataAnalyst\PublicWorks\Rd_Drain\Projects2007\R-Ditches_WaterControlStructures\R_Ditches.mxd



Legend

- Waterways and R-Ditches
- Jockey_Club
- Area Near I-75 and Myakkahatchee Creek
- North Port Estates Area Flooded in Storm 2003
- Orlando Blvd Area
- Dorothy Ave Area

City of North Port Flood Prone Areas

Exhibit 4-5

North Port Estates Area - Flooding due to back up from Myakkahatchee Creek

Area near Myakkahatchee Creek prone to flooding

Orlando Area - Flooding due to back up from new Water Control Structure in Charlotte County sized too restrictive

Dorothy Area - Flooding due to back up from high tide conditions in tidal R-Ditch R-69

City of North Port Flooded Areas

Legend

Flood Water

Day after Hurricane Irma Surveyed 9/11/17 am

*Areas are still being assessed for flood water.

North Port Estates Area - Flooding due to back up from Myakkahatchee Creek

Dry Spots @ 1315

1307 -3'

1313 - 4 "

1319 - 3'7"

1318 - 2'2"

1341 - 3'

1344 - 4'

1347 - 3'

Day after Hurricane Irma Passed North Port Surveyed 9/11/17 am

1405 - 3'3"

1410- 1'9" w/dry spots

1357 - 2'3"

1355 - 3'

1352 - 2'10"

1350 - 2'4"

1415-1'4"

Area near Myakkahatchee Creek prone to flooding

Orlando Area - Flooding due to back up from new Water Control Structure in Charlotte County sized too restrictive

City of North Port Flooded Areas

Legend

Depth

- > 1FT
- < 1FT

4 Days after Hurricane Irma Surveyed 9/14/17

*Updates reflect 9-14-17 @ 9:00 am.

*Areas are still being assessed for flood water.

FIGURE 3-1

564000 576000 588000 600000 612000 624000 636000

1028000 1016000 1004000 992000 980000

Big Slough

Big Slough

N I75 S I75

WCS-162 Removed

CUN-001 Removed

WCS-101

WCS-106

WCS-113 Removed

WCS-120 Removed

DS-119 Removed

WCS-114 Removed

WCS-123 Removed

WCS-115 Removed

DS-122 Removed

DS-126 Removed

DS-129 Removed

DS-135 Removed

DS-136 Removed

DS-133 Removed

DS-139 Removed

WCS-121 Removed

WCS-125 Removed

WCS-128 Removed

DS-132 Removed

WCS-124 Removed

WCS-131 Removed

WCS-111 Removed

WCS-127 Removed

WCS-117 Removed

WCS-107 Removed

WCS-108 Removed

WCS-130 Removed

WCS-109 Removed

WCS-110 Removed

N

W E

S

0 3,000 6,000

Feet

Scale: 1" = 6000'

Legend

- WCS
- Removed Structures
- New Connections
- Subwatershed
- Existing Condition Floodplain
- Flood Area Reduction
- Flood Area Increase

City of North Port, Florida

Southwest Florida Water Management District

Project: 03-065	Projection: Florida East West	
Prepared: 10-11-07	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\03-065\ArcGIS_ArcLayouts\20140909 - Final BMP Figures\BMP1.mxd		

NORTH PORT / BIG SLOUGH WMP

BMP ALTERNATIVE 1 - 1 DAY 100 YEAR EVALUATION

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants
Phone: 407-855-3860 Fax: 407-859-8121
8008 South Orange Avenue
Orlando, Florida 32809

Exhibit 4-7

II. SITUATION

A. Hazard Analysis

The City of North Port has exposure to numerous and diverse types of hazards. This Section will attempt to identify the threat posed by each to assist planners in anticipating future needs. The hazards are listed in the sequence identified by the Florida Division of Emergency Management (FDEM) CEMP Review Criteria.

Table 1: Hazard Analysis

Hazard Category	Hazard Evaluation				
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)	
High Winds from Tropical Cyclone Events	The City of North Port has only been indirectly affected by a tropical cyclone event. However, The City of North Port (Port Charlotte statistical area) has been exposed to 54 hurricanes/tropical storms since 1871[1]. The hurricanes of the 2004 and 2005 seasons had some minimal to moderate impact on the City. The City was included in the Presidential Declarations for Hurricanes Charley, Frances, Ivan, Jeanne (2004) and Wilma (2005); and Tropical Storm Gabrielle (2001). In 2008, the City activated for TS Fay, but quickly demobilized when the storm turned in a southerly direction missing the City. A comparable situation occurred in 2012 with Tropical Storm Isaac.	Injured and/or entrapped persons and the loss of life. Mass traffic congestion and other evacuation-related issues. Temporary and long-term sheltering needs. Private property loss. Damage to City infrastructure. Lost business revenue, with accompanying unemployment and loss of tax revenue. Fire, hazardous materials releases, search and rescue operations related to storm activity. Looting and increased crime due to economic conditions created by long-term recovery. Potential loss of water and/or sewer service.	A Gulf Coast landfall is one of the three most likely Florida hurricane tracks based on planning models. Among the hazards analyzed in this section, hurricane activities pose the greatest threat to the broadest population in North Port.	Frequency	Low to Moderate
				Vulnerability	Low to Moderate
				Exposure	Moderate
				Risk	Moderate

[1] http://www.hurricanecity.com/city/portcharlotte.htm.

Hazard Category	Hazard Evaluation				
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)	
	In September 2017, the City experienced minor disruptions because of Hurricane Irma. Power outages, localized flooding and vegetative debris were among the key impacts.				
Storm Surge from Tropical Cyclone Events (See Figure 1 Hurricane Evacuation Level, which are built from SLOSH models)	The City of North Port has never been affected by storm surge from a tropical cyclone; however, areas adjacent to the tributaries of the Myakka River are subject to tidal influences, which themselves are affected by storm surge.	Injured and/or entrapped persons and the loss of life. Mass traffic congestion and other evacuation-related issues. Temporary and long-term sheltering needs. Private property loss. Damage to City infrastructure. Lost business revenue, with accompanying unemployment and loss of tax revenue. Fire, hazardous materials releases, search and rescue operations related to storm activity. Looting and increased crime due to economic conditions created by long-term recovery. Potential loss of water and/or sewer service.	Since the updated storm surge maps in 2017, all North Port is still in at least one storm surge zone. Areas west of I-75 are most susceptible; and the risk of storm zone increases in proximity to the Myakka River, and to the Gulf of Mexico. The Holiday Park Mobile Home community is in Evacuation Level B. Several City-owned critical infrastructures are also located in the storm surge areas: B Zone - Utilities' Water Treatment Plant, Utilities' Wastewater Treatment Plant, Fire Station 82 and Police Department's District 2 substation, Family Service Center, Property Maintenance Yard (fueling station) C Zone – Utilities' Hillsborough and Southwest water booster stations. D Zone - Municipal Complex (City Hall, Fire Station 81, Police Department and Mullen's Center), Fire Stations 83, 84 and 85, Utilities' central office, Utilities' Northeast water booster station, Public Works Complex (fueling station)	Frequency	Low to Moderate
				Vulnerability	Low to High
				Exposure	Moderate
				Risk	Moderate
Floods (See Figure 2)	At least 750 residences were affected for more than a week in the City due to continued major flooding on the Myakka River and Myakkahatchee Creek from the Spring Flooding Event of 2003.	Possible evacuation of residents. Temporary sheltering and congregate feeding. Evacuation traffic and traffic related to road closures. Property and infrastructure damage. Loss of business revenue. Possible search and rescue operations. Possible shutdown of water treatment facilities. Possible contamination of water systems. Possible waste water system overload.	Seasonal flooding is a re-occurring issue in Florida, most specifically for those areas which are near the Florida coast, adjacent to bays or inlets, or which contain river systems. Per the risk analysis of the Sarasota County Emergency Management, increased development causes an increase in flooding risk due to the interruption of the natural swamp	Frequency	Moderate to High
				Vulnerability	Low to High
				Exposure	Moderate
				Risk	Moderate

Hazard Category	Hazard Evaluation				
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)	
			and marsh systems ability to mitigate the excess water. The City of North Port fits all the criteria of a flood prone area. The Community Rating System (CRS) is a set of flood mitigation initiatives set forth by the National Flood Insurance Program (NFIP), which allows participating communities to participate in and initiate programs which reduce the flood hazard in the community. For each initiative, there are points that can be awarded, which equate to a Class when enough points are gained by the community. The City of North Port is an active member of the Community Rating System under the National Flood Insurance Program. At this writing, the City of North Port stands at a Class 6 in the Community Rating System under the National Flood Insurance Program. This equates to a 15% saving on flood insurance for policy holders in the Special Flood Hazard Area (SFHA) in both the City and the County.		
Hazardous Material Spills	On February 2, 2004, a gasoline tanker traveling on I-75 exploded over the Myakkahatchee Creek bridge. An unknown amount of gasoline and diesel fuel entered the creek but was contained prior to reaching the main drinking water intake at the Water Treatment Plant. Two nearly identical gasoline tanker accidents occurred in 2016 on I75. Contamination was limited to the local area, however a threat to the City's drinking supply resulted in closure of the Water Treatment Plant and purchase of water from the Peace River system.	Area evacuation and related traffic issues. The possibility of significant numbers of people being injured or becoming ill due to the hazardous materials release. Temporary sheltering of evacuated residents. Adequate equipment and trained personnel for hazardous materials containment and disposal. Adequate disposal facilities. Possible contamination of surface water, and source water for the water treatment plant.	There are few end users of large amounts of industrial or agricultural chemicals and other hazardous materials in North Port. The only fixed facilities using Extremely Hazardous Substances (EHS), as defined by the US Environmental Protection Agency (EPA), are owned and operated by the City of North Port Utilities Department. Other fixed facilities subject to federal reporting have been identified and maintained in Fire Rescue's records' management system. Significant amounts of a wide variety of hazardous materials are transported on I-75. It is considered the leading risk area for hazardous materials incidents in the County. Significant amounts of hazardous materials transit through North Port on US 41. The Sarasota County Fire Department is first responding to hazardous materials incidents in the City of North Port.	Frequency Vulnerability Exposure Risk	Low Moderate Moderate Moderate
Commercial Nuclear Power Plant Incidents	North Port is not within the Emergency Planning Zone or Ingestion Pathway Zone of a	North Port may receive a request to assist in furnishing mutual aid under provisions of the Florida Statewide Mutual Aid Agreement. Should an incident be of such magnitude as to require the evacuation of Tampa Bay,	Evacuees from a mishap at Florida Power Corporation nuclear generating facility at Crystal River, might arrive in Sarasota County seeking shelter.	Frequency Vulnerability Exposure	Low Low Low

Hazard Category	Hazard Evaluation				
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)	
	nuclear generating facility, thus is not considered at risk.	traffic control could be an issue.		Risk	Low
Civil Disturbance	The City of North Port has no history of civil disturbance.	The vulnerability of businesses on US 41 to looting. The possibility that North Port might be requested to furnish mutual aid.	The City does not face some of the challenges present in other Florida communities where conflict exists between cultural groups. Similarly, Sarasota County has had no recent incident of civil disorder of any significance.	Frequency	Low
				Vulnerability	Low
				Exposure	Low
				Risk	Low
Mass Immigration	There is no evidence that concerns caused by mass immigration has impacted the City of North Port. However, recent events along the Southwest coast of Florida indicate the potential for an event. In July 2007, 30 refugees from Cuba landed on Little Gasparilla Island; June 2007, 33 migrants from Cuba arrived on Sanibel Island; and in December 2006, 25 Cuban refugees landed on Longboat Key.	The City of North Port does not have a coastline for landings. However, if the refugees boated up the Myakka River or Myakkahatchee Creek, the City would be directly impacted. Otherwise, the City may provide mutual aid support to Charlotte and/or Sarasota counties for medical and/or law enforcement assistance.	While mass immigration to Florida from the Caribbean, Central America and South America has increased dramatically since 1980, the City is too far north and inland to directly receive arriving "boat people," and is not a likely settlement site.	Frequency	Low
				Vulnerability	Low
				Exposure	Low
				Risk	Low
Coastal Oil Spill	The City of North Port does not include any portion of the Gulf of Mexico's coast. However, given the tidal influence on the Myakka River, if a spill were to occur in the Gulf, there exists a potential for product to flow up the Myakka River towards the City. The City of North Port was not impacted by the Deepwater Horizon oil spill in 2010 which affected numerous interests to the north of Sarasota County in the Gulf of Mexico.	Economic impact due to temporary loss of recreational activities in Charlotte Harbor. Furnishing mutual aid support to communities on Charlotte Harbor. Regarding proposed drilling off the Gulf coast of Florida, the US Department of the Interior's Minerals Management Service (MMS) states "[f]or the foreseeable future any proposed development operations within 100 miles of the coast of Florida would be only for the development of natural gas fields. Even if a blowout were to occur, no oil would be released. Any pipelines proposed would carry only dry natural gas." They do indicate one potential for a worse case situation would be if the supply vessel carrying diesel oil to the drilling rig lost all its diesel during transfer operations - this could result in a spill of about 1,800 bbl. The MMS can and has required mitigation	Traffic exists along Florida's Gulf Coast which could allow for a mishap to occur. The hazardous materials release could enter parts of Charlotte Harbor, but it is more likely that existing currents would move the release past the Harbor. A hazardous materials release in the Gulf would be responded to by Federal and State authorities. Public Works may receive mutual aid requests or be involved in environmental damage response to properties located on the Charlotte Harbor shoreline, City of Venice or unincorporated Sarasota and/or Charlotte counties.	Frequency	Low
				Vulnerability	Low
				Exposure	Low
				Risk	Low

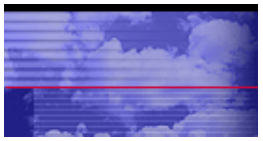
Hazard Category	Hazard Evaluation				
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)	
		during past drilling operations to minimize this remote possibility.			
Extreme Temperatures	Freeze conditions in Florida are seasonal and relatively predictable. Florida Severe Freeze 2000 for which Sarasota County was included in the declared counties. The last significant winter storm to occur in Sarasota County was the "no name" storm in March 1993.	Temporary sheltering of lower income persons whose homes may lack adequate heating capability. Increased utility costs to the City of North Port in maintaining City facilities with adequate heating for workers and the public. In 2012, a coalition of services for the homeless began to establish freezing weather shelters at local churches. These facilities open when the National Weather Service posts a freeze watch for our area.	There are few agriculture interests within the City which might suffer economic loss. Some temporary shortages of utility resources might take place. Potable water lines have frozen in past years causing a water service disruption to some houses.	Frequency Vulnerability Exposure Risk	Low Low Low Low
Brush, Wildfires and Forest Fires	Brush or forest fires are generally seasonable during late winter to spring and predictable based on weather conditions. Sarasota County was included in the declared counties for the Florida Extreme Fire Hazard in 1998. The largest wildfire in the City was experienced in May 2017 during which more than 1000 acres with the City's boundaries were burned and an additional 4000 acres just outside the City limits.	Wildland-Urban interface fuel loading is high, as compared to normal. Area evacuation and traffic control. Temporary sheltering of evacuees. Mutual aid support to other impacted communities, or requests for assistance to North Port. See Tables 3 and 4 Seasonal KBDI Values for Florida Forest Service's South Region and Sarasota County as a measure that conditions are favorable for the occurrence and spread of wildfires.	As the population density increases, the probability factor will decrease, but the impact factor will increase. The scattered development within the City, and the lack of land clearance, creates an environment in which many residences are grouped in relatively isolated areas surrounded by forested land. There is a history of arsonist activity in South Sarasota County. The possibility of an accidental fire caused by construction equipment, or controlled burning by contracts is a possibility. The City of North Port Fire Rescue participates in the Firewise program to mitigate the effects of wildfires. Four communities Harbor Isles, La Casa, Riverwalk Mobile Home Village, and Woodland Estates have met the requirements of the program.	Frequency Vulnerability Exposure Risk	Moderate to High Moderate to High Moderate to High Moderate to High
Thunder Storms and Tornadoes	Heavy rains, winds and storm action are common in Florida. On May 24, 2012, an EF-0 tornado affected residences in the Highland Ridge Community of North Port. No injuries were	Possible area evacuation. Road blockage from debris. Temporary sheltering of small numbers of persons whose residences became significantly damaged by the storm or winds. The possible loss of water and/or sewer service.	North Port is not located in an area with a high incident of tornado activity. Tornadoes are common occurrences with thunderstorms. Florida has the second highest record of tornadoes in the United States.	Frequency Vulnerability Exposure	Low Low to Moderate Moderate

Hazard Category	Hazard Evaluation				
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)	
	reported, but an estimated $50,000 in damages was recorded. In January 2015, a Myakka State Forest Ranger reported tornado damage to a ranger station and a mobile home trailer at around 3:50 a.m. A subsequent NWS storm survey classified the tornado as an EF-0.		Given the number of mobile homes in the City and adjoining areas, there exists significant exposure should a tornado move through the region.	Risk	Low to Moderate
Drought	Droughts are occurring with frequency in Southwest Florida. The Keetch-Byram drought index typically indicates a severe value during the spring season. The US Drought Monitor indicates the State ranges from Abnormally to Exceptionally Dry, with Sarasota County on the upper scale of drought conditions.	Necessary slow-down in planned city projects due to water restrictions. Assistance to residents on well-water supply systems. Increased responses to wildfire events. Potential damage to residential and commercial structures, and City infrastructure.	Droughts generally impact the most on agricultural-based communities. Water restrictions and enforcement might be required. Droughts have an impact on wildfires. The Florida Forest Service has analyzed weather data over a 35-year period was examined to determine average Keetch-Byram drought index (KBDI) values for each region of Florida on a seasonal basis. These average KBDI values are given in the following table as the "NORMAL" classification. Departures from this average value were related to fire activity to determine the breakpoints for the other classes. (See tables 2 and 3).	Frequency	Moderate to High
				Vulnerability	Moderate to High
				Exposure	Moderate to High
				Risk	Moderate to High
Sinkholes and Subsidence	Sinkholes of a significant magnitude are an infrequent occurrence. Since July of 1981, Sarasota County and the jurisdictions within have recorded seven sinkhole events, all less than ten feet in diameter, and each was centered on a specific property. Of the seven Subsidence Incident Reports in Sarasota County, only one occurred in the last seven years. Reported on July 7, 2013 several small holes were reported after heavy rainfall. The	Property loss. Damage to the infrastructure. Area evacuation, closure, traffic control and security.	Allowing for the vastness of the City limits, the probability of a sinkhole development threatening property is very significant. Sinkhole development could require area security to prevent members of the public from risk.	Frequency	Low
				Vulnerability	Low to Moderate
				Exposure	Low
				Risk	Low

Hazard Category	Hazard Evaluation				
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)	
	maximum dimensions were 2-8' wide with no property damage.				
Terrorism	There is no specific reason to believe that a terrorist type of occurrence is anticipated.	Potential mass casualties. Public panic. Environmental concerns.	One tactic of terrorists is to target "innocent" person rather than a specific group for which hostility exists. The news media would inundate the City should it be the focal point of an incident. The City does not possess targets of interest to an international terrorist; however, an individual with a hatred of local government, or a disgruntled employee may pose a greater risk to the security of City facilities, staff and visitors.	Frequency Vulnerability Exposure Risk	Low Moderate to High Low Low
Exotic Pests and Diseases	The City of North Port has not had any known reports of such diseases or pests, but the threat exists on a consistent basis.	Infectious disease control. Quarantine for livestock or people. Need for many treatment agents. Disposal of deceased animals.	Exotic threats and diseases are a pervasive threat to the agricultural interests in the City. This biological hazard is associated with any insect, animal, or pathogen that could pose an economic or health threat. The Mediterranean fruit fly and citrus canker are two examples of this threat. There is also a possibility for the importation of pathogens that could have a negative effect on the livestock industry.	Frequency Vulnerability Exposure Risk	Low Low Low Low
Disease and Pandemic Outbreaks	The City of North Port has not had any known reports of such diseases or outbreaks, but the threat exists on a consistent basis. The City of North Port was not significantly impacted by the H1N1 Pandemic in 2009 or the Ebola event of 2014.	Economic loss. Mass casualty/fatality. Infectious disease control. Disproportionate effects on elderly and children. Disposal of diseased livestock/agricultural stock. Need for mass feeding. Mass care. Quarantine of people and/or livestock. Large number of treatment agents	The City is vulnerable to epidemic on a constant basis. Although the threat is minimal, an epidemic is still possible. With tourists coming in from all over the world during the months of October through April, there is an increased vulnerability during this time. The environment is regularly monitored for diseases and pathogens by local and state agencies.	Frequency Vulnerability Exposure Risk	Low Moderate Low Low
Critical Infrastructure Disruption	Utility disruptions are an infrequent event, typically arising from a severe weather event, an accidental cutting through of a transmission line by a contractor or nesting bird. On January 12, 2015 components of an osprey next contacted high voltage wires which started a fire at the top of an electrical pole on Greenwood Avenue between	Evacuation. Sheltering. Mass feeding. Mass casualty. Large scale contamination. Contamination of water supply. Decontamination. Economic loss. Agricultural loss. Inability of public safety officials to communicate. Civil unrest. Inability to provide critical support functions at medical facilities.	This technological hazard is a consistent threat in the City. This hazard may become present through an accident, sabotage, or terrorism. This hazard includes, but is not limited to, utility disruptions and communications system failures. This hazard can cause other hazardous incidents to occur. These may include, but are not limited to, hazardous material spills, delay of medical operations, and loss of ability to provide power or communications, and loss of ability to provide utility services.	Frequency Vulnerability Exposure Risk	Low Moderate Low Low

Hazard Category	Hazard Evaluation				
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)	
	Greenway Drive and S. Sumter Boulevard in North Port. The fire caused damage to the feeder lines resulting in a secondary emergency – that of a power outage impacting 3,510 FPL customers including traffic lights at several intersections and the City of North Port municipal complex. Telephone lines to Sarasota County 9-1-1 were overwhelmed and callers were unable to reach the North Port Police dispatch center.				
Special Events	The City of North Port has no history of dignitary visits, cultural events, or a significant impact from spring break.	Public safety resources overwhelmed. Potential for terrorism, mass casualty, civil unrest.	With Special Events, the need for additional logistics and manpower to handle the possibility of large crowds increases significantly. The possibility for acts of terrorism or civil disobedience in these events also increase. The North Port High School's Performing Arts Center is the second largest theater in Sarasota County. With 1,023 seats, it presents unique challenges during an emergency. The City-sponsored July 4th celebration attracts more than 5,000 attendees. A spring training complex for the Atlanta Braves will be situated in the West Villages-section of the City. The stadium will have 6,200 fixed seats and 2,200 berm seating along with suites.	Frequency	Low
				Vulnerability	Low
				Exposure	Low
				Risk	Low
Dam Failure	The Peace River Manasota Regional Water Supply Authority has constructed a 6-billion-gallon reservoir adjacent to their water treatment plant on US 17 in Desoto County. As this is a relatively new facility, there is no history of incidents; however,	Possible evacuation of residents. Temporary sheltering and congregate feeding. Evacuation traffic and traffic related to road closures. Property and infrastructure damage. Loss of business revenue. Possible search and rescue operations. Possible shutdown of water treatment facilities. Possible contamination of water systems. Possible waste water system overload.	Based on the construction of the retention walls and the distance from the reservoir, the effects on the City of North Port may be minimal.	Frequency	Low
				Vulnerability	Low
				Exposure	Low
				Risk	Low

Hazard Category	Hazard Evaluation				
	Frequency	**Vulnerability**	**Exposure**	**Risk (Potential for Loss)**	
	similar type reservoirs have experienced retention wall cracks, but no failures.				
Major Transportation Incidents	Motor vehicle accidents are a frequent occurrence on the roadways in North Port. However, most which are minor in nature, and have minimal impact on the City.	Traffic rerouting issues. Environmental impacts from release of hazardous materials.	In the City of North Port, I-75 extends from mile marker 171 (Charlotte County line) to 185 in an east to west direction. Exits are at mile marker 179 (Toledo Blade Blvd.), and mile marker 182 (Sumter Blvd.). This is a two-lane roadway in each direction, with a posted speed limit of 70 mph. US 41 extends from Cranberry Blvd. (Charlotte County line) to Ortiz Blvd. This is a two-lane roadway, with a posted speed limit of 45 mph. Significant amounts of a wide variety of hazardous materials are transported on I-75. It is considered the leading risk area for hazardous materials incidents in the County. Significant amounts of hazardous materials transit through North Port on US 41.	Frequency	Moderate
				Vulnerability	Moderate
				Exposure	Moderate
				Risk	Low to Moderate



Community Information System

CRS What-If

Community: NORTH PORT, CITY OF
County: SARASOTA COUNTY
State: FLORIDA
CID: 120279

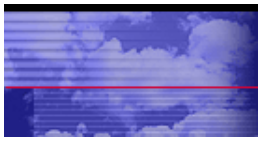
Current CRS Class = 5 *[Printable Version]*

CRS Class		TOTAL	SFHA *	X-STD/AR/A99 **	PRP ***
	PIF	2,901	211	66	2,624
	PREMIUM	$1,122,810	$116,486	$34,258	$972,066
	AVERAGE PREMIUM	$387	$552	$519	$370
09	Per Policy	$3	$37	$29	$0
	Per Community	$9,669	$7,766	$1,903	$0
08	Per Policy	$6	$74	$29	$0
	Per Community	$17,435	$15,531	$1,903	$0
07	Per Policy	$9	$110	$29	$0
	Per Community	$25,201	$23,297	$1,903	$0
06	Per Policy	$12	$147	$58	$0
	Per Community	$34,870	$31,063	$3,806	$0
05	Per Policy	$15	$184	$58	$0
	Per Community	$42,635	$38,829	$3,806	$0
04	Per Policy	$17	$221	$58	$0
	Per Community	$50,401	$46,595	$3,806	$0
03	Per Policy	$20	$258	$58	$0
	Per Community	$58,167	$54,361	$3,806	$0
02	Per Policy	$23	$294	$58	$0
	Per Community	$65,933	$62,126	$3,806	$0
01	Per Policy	$25	$331	$58	$0
	Per Community	$73,698	$69,892	$3,806	$0

* SHFA (Zones A, AE, A1-A30, V, V1-V30, AO, and AH): Discount varies depending on class.

** SFHA (Zones A99, AR, AR/A, AR/AE, AR/A1-A30, AR/AH, and AR/AO): 10% discount for Classes 1-6; 5% discount for Classes 7-9.

*** Preferred Risk Policies are not eligible for CRS Premium Discounts.



Community Information System

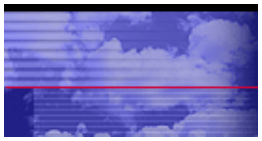
Insurance Occupancy

As of 09/02/2020

Community:	NORTH PORT, CITY OF	**State:**	FLORIDA
County:	SARASOTA COUNTY	**CID:**	120279

	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	$ of Closed Paid Losses	Adjustment Expense
Single Family	2,826	$1,077,149	$866,308,900	87	$992,284.74	$46,011.85
2-4 Family	45	$16,837	$11,580,000	0	$0.00	$0.00
All Other Residential	17	$5,414	$4,638,000	1	$0.00	$95.00
Non Residential	13	$23,410	$5,225,000	0	$0.00	$0.00
Total	2,901	$1,122,810	$887,751,900	88	$992,284.74	$46,106.85

	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	$ of Closed Paid Losses	Adjustment Expense
Condo	40	$13,488	$7,435,000	1	$0.00	$95.00
Non Condo	2,861	$1,109,322	$880,316,900	87	$992,284.74	$46,011.85
Total	2,901	$1,122,810	$887,751,900	88	$992,284.74	$46,106.85



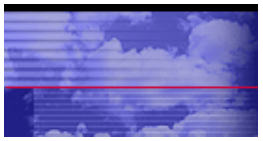
Community Information System

Insurance Zone

As of 09/02/2020

Community:	NORTH PORT, CITY OF	**State:**	FLORIDA
County:	SARASOTA COUNTY	**CID:**	120279

	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	$ of Closed Paid Losses	Adjustment Expense
A01-30 & AE Zones	165	$99,720	$39,746,400	24	$88,191.55	$6,860.00
A Zones	1	$531	$350,000	0	$0.00	$0.00
AO Zones	5	$4,652	$992,300	4	$3,881.50	$1,915.00
AH Zones	0	$0	$0	0	$0.00	$0.00
AR Zones	0	$0	$0	0	$0.00	$0.00
A99 Zones	0	$0	$0	0	$0.00	$0.00
V01-30 & VE Zones	0	$0	$0	0	$0.00	$0.00
V Zones	0	$0	$0	0	$0.00	$0.00
D Zones	0	$0	$0	0	$0.00	$0.00
B, C & X Zone						
Standard	66	$34,258	$17,198,800	7	$31,883.44	$2,175.00
Preferred	2,624	$972,066	$818,600,000	25	$147,952.69	$12,365.00
Total	2,861	$1,111,227	$876,887,500	60	$271,909.18	$23,315.00



Insurance Pre/Post FIRM

As of 09/02/2020

Community:	NORTH PORT, CITY OF	**State:**	FLORIDA
County:	SARASOTA COUNTY	**CID:**	120279

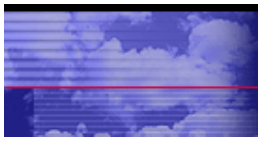
Pre-FIRM

	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	$ of Closed Paid Losses	Adjustment Expense
A01-30 & AE Zones	61	$56,393	$12,354,600	23	$88,191.55	$6,735.00
A Zones	0	$0	$0	0	$0.00	$0.00
AO Zones	1	$1,042	$350,000	0	$0.00	$0.00
AH Zones	0	$0	$0	0	$0.00	$0.00
AR Zones	0	$0	$0	0	$0.00	$0.00
A99 Zones	0	$0	$0	0	$0.00	$0.00
V01-30 & VE Zones	0	$0	$0	0	$0.00	$0.00
V Zones	0	$0	$0	0	$0.00	$0.00
D Zones	0	$0	$0	0	$0.00	$0.00
B, C & X Zone	236	$86,083	$60,221,000	19	$39,660.41	$4,965.00
Standard	32	$15,268	$8,292,000	7	$31,883.44	$2,175.00
Preferred	204	$70,815	$51,929,000	12	$7,776.97	$2,790.00
Grand Total	298	$143,518	$72,925,600	42	$127,851.96	$11,700.00

Post-FIRM

	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	$ of Closed Paid Losses	Adjustment Expense
A01-30 & AE Zones	104	$43,327	$27,391,800	1	$0.00	$125.00

A Zones	1	$531	$350,000	0	$0.00	$0.00
AO Zones	4	$3,610	$642,300	4	$3,881.50	$1,915.00
AH Zones	0	$0	$0	0	$0.00	$0.00
AR Zones	0	$0	$0	0	$0.00	$0.00
A99 Zones	0	$0	$0	0	$0.00	$0.00
V01-30 & VE Zones	0	$0	$0	0	$0.00	$0.00
V Zones	0	$0	$0	0	$0.00	$0.00
D Zones	0	$0	$0	0	$0.00	$0.00
B, C & X Zone	2,454	$920,241	$775,577,800	13	$140,175.72	$9,575.00
Standard	34	$18,990	$8,906,800	0	$0.00	$0.00
Preferred	2,420	$901,251	$766,671,000	13	$140,175.72	$9,575.00
Grand Total	2,563	$967,709	$803,961,900	18	$144,057.22	$11,615.00



Community Information System

Insurance Overview

As of 09/02/2020

Community:	NORTH PORT, CITY OF	**State:**	FLORIDA
County:	SARASOTA COUNTY	**CID:**	120279

Total by Community

Total Number of Policies:	2,901
Total Premiums:	$1,122,810
Insurance in Force:	$887,751,900
Total Number of Closed Paid Losses:	88
$ of Closed Paid Losses:	$992,285

Group Flood Insurance

Total Number of Policies:	0
Total Premiums:	$0
Insurance in Force:	$0
Total Number of Closed Paid Losses:	0
$ of Closed Paid Losses:	$0

Post Firm Minus Rated Policies

Total Number of Minus Rated Policies:	0
A Zone Minus Rated Policies:	0
V Zone Minus Rated Policies:	0

Manufactured Homes

Total Number of Policies:	12
Total Number of Closed Paid Losses:	0
$ of Closed Paid Losses:	$0

ICC

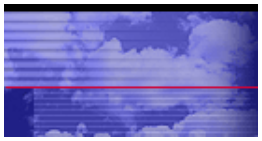
Total Number of ICC Closed Paid Losses:	0
$ of ICC CLosed Paid Losses:	$0

1316

Number of Properties by Community:	0

Substantial Damage Losses

Number of Substantial Damage Closed Paid Losses:	7



Community Information System

Community Overview

Community:	NORTH PORT, CITY OF	**State:**	FLORIDA
County:	SARASOTA COUNTY	**CID:**	120279

Program:	Regular	**Emergency Entry:**	08/27/1974	**Regular Entry:**	09/02/1981
Status:	PARTICIPATING			**Status Effective:**	09/02/1981
Current Map:	11/04/2016	**Study Underway:**	NO	**Level of Regs:**	D
FIRM Status:	ORIGINAL			**Initial FIRM:**	09/02/1981
FHBM Status:	SUPERCEDED BY FIRM			**Initial FHBM:**	06/10/1977

Probation Status:			
Probation Effective:		**Probation Ended:**	
Suspension Effective:		**Reinstated Effective:**	
Withdrawal Effective:		**Reinstated Effective:**	

CRS Class / Discount:	05 / 25%		
Effective Date:	05/01/2020		
CAV Date:	12/13/2018	**Workshop Date:**	03/04/2020
CAC Date:	11/07/2017	**GTA Date:**	07/20/2020
		Community Website:	http://www.cityofnorthport.com

☐ **Tribal Community**

☐ **Upton Jones Claims**

☐ **ICC Claims**

☐ **HMGP Projects**

☐ **FMA Projects**

Policies in Force:	2,901
Insurance in Force:	$887,751,900.00
No. of Paid Losses:	88
Total Losses Paid:	$992,284.74
Sub. Damage Claims Since 1978:	7

Table 10: Vulnerabilities by Population and Property Loss

Residential Non-Residential / Population / Valuation Information in Storm Evacuation Zones and FEMA Hazardous Zones

Evacuation Zones	Non-Residential Units	Potenial Property Value Loss	Residential Units	Potenial Property Value Loss	Total Units	Total Potenial Property Value Loss	Residential Population (Units *2.65)
A	4	$2,800,300	289	$47,415,800	293	$50,216,100	766
B	209	$245,514,000	4,394	$364,506,800	4,603	$610,020,800	11,644
C	11	$12,962,000	8,777	$1,277,681,000	8,788	$1,290,643,000	23,259
D	95	$269,482,000	12,693	$1,948,933,600	12,788	$2,218,415,600	33,636
E	137	$74,981,300	2,629	$482,517,900	2,766	$557,499,200	6,967
Grand Total	**456**	**$605,739,600**	**28,782**	**$4,121,055,100**	**29,238**	**$4,726,794,700**	**76,272**

FEMA Zone	Non-Residential Units	Potential Property Value Loss	Residential Units	Potential Property Value Loss	Total Units	Total Potential Property Value Loss	Residential Population (Units *2.65)
FEMA AE Zone	92	$384,014,800	6,122	$968,199,400	6,214	$1,352,214,200	16,223

Notes:
Known units not currently on 2017 taxroll is estimated values and included in unit counts.
Residential Units include individual Condo Units.
Residential Units only count one per apartment complex.
Total Value Loss includes total value of apartment complex.

Non-Residential includes individual Business Condo Units.
Centers under one ownership is counted as one unit and includes total value complex.

All data is based on GIS Data (August 2017): Surge Zones, FEMA A / AE Zone, Sarasota County Property Apprasier Parcels and Attribute tables.
The 2.65 multipler is the average household size.
The valuation is from the JUST value from the Preoprty Appraisers Office data (2017 Tax Role).

D. Economic Characteristics

1. Economic Profile

a. Employment by Major Sector. Most residents are employed in the service sector or government – 32% are retired.

b. Unemployment Rate. Per the US Bureau of Labor Statistics, the unemployment rate for the North Port-Bradenton-Sarasota Metropolitan Statistical Area (MSA) in the spring of 2018 was 3.6%.

c. Average Property Value. $192,800

d. Median Income. $49,465

2020 Water Control Structures Inspection

Metal, Gates, Pipes and Risers: 1 = No Corrosion, 2 = Surface Rust, 3 = Some Rot, 4 = Major Corrosion Overall: 1 = Good, 2 = Fair, 3 = Poor, 4 = Bac
Concrete: 1 = Good, 2 = Few chips/cracks, 3 = Some Spalling, 4 = Major Chips/Cracks Deterioration Bank Condition: 1 = Good, 2 = Fair, 3 = Poor, 4 = Bac
Structure Location: Replaced or Rehabilitated = 0, Structure located in undeveloped areas (1), east of Toledo Blade (2), west of Toledo Blade (3), developed areas Snover & Cocoplum (4

Structure #	Waterway	Date	Metal			Gates				Pipes	Risers	Concrete		Bank Condition	Overall	Structure Location	Replacement Priority Score	Other Observations	Previous Repairs Completed
			Sheet Pilings	I - Beams	Cat walk	# of Gates	Gate	Hard ware	Operational (yes, no, list#)			Columns	Cap						
WCS 108	Cocoplum	3/18/20	4	3	1	6	1.5	1.5	No			4		2.5	4	4	**14**	Holes in sheet pile, concrete pillars bad shape, gates do not open all of the way. Needs replacement.	4/2011 - Replaced 3 Gates Nos.1, 2 and 5 9/7/12 - Replace corroded horizontal I-beams and corroded sections of vertical I-beams, and repair holes in sheet metal pile. 12/17/15 - Replaced 3 more Gates (including the existing electric gate). Use an existing actuator (from the old WCS 101). Needed two new left hand threaded rods, fabricate 3 new gates #3, 4, and 6 and tracks, minor concrete and sheet pile repair. 1/30/19 PO #047665 - Fixed catwalk grate rusted through in one location.
WCS 113	Snover	3/16/20	3	2	2	4	2	2	Yes			4		2.5	3	4	**12**	Hole in sheet pile by I beam on walkway, top of sheet pile is rotted out, needs more rip rap, rebar is showing in concrete pillar 3.	7/28/14 - Repaired erosion below existing concrete slab on the northwest side of WCS No. 113 by injecting flowable fill (cementitious grout) to fill all voids
WCS 114	Snover	3/16/20	2	2	2	4	2	2	Yes			4		2	3	4	**10.5**	Holes in catwalk I beam, concrete columns chipped.	5/12 - Replaced all 4 gates with new steel gates epoxy coated, replace all gate supports, gate slide frameworks, both horizontal I-beams and replaced corroded section of vertical I-beams, rebuilt corroded sections of all 4 lift rods 9/30/15 - Troubleshoot why gates nos. 1 and 2 not opening easily, replace corroded or bent sections of lift rods as needed; if needed, remove and replace 1 gear box with existing gear box at the public works facility; remove corroded first 14 feet long sections of two-strand horizontal and vertical catwalk railing(both sides of railing) and weld on new galvanized steel two-strand horizontal and vertical railing and paint. 12/2016 - Repaired damage to gate, tracks and gear 1/30/19 Fixed PO #047665 - Fixed hole in S. side sheet piling. Repaired Gate #2 as it does not close all the way down, need to physically hammer gate down
FW 157	Snover	3/24/20	4	4									4	2	4	2	**8**	Needs to be dug out and replaced.	
FW 158	Snover	3/25/20	1	1									1.5	2	4	2	**8**	Washout high side, concrete separated form sheet pile.	
WCS 121	MacCaughey	3/16/20	2	4	2	4	3	3	1&4 Yes 2&3 No			3	2	2	2.5	3	**7.5**	Washout on low side, I beams rotted out on low side, concrete slab is chipped, support bars rotted at water level.	
WCS 128	Creighton	3/17/20	2.5	1.5	1	2	3	2	Gate 1 No Gate 2 yes			2		1	2	3	**6**	Hole in gate 1, chips in concrete, hole in sheet pile by support bar	9/14/12 - Replace corroded horizontal cap and corroded sections of vertical I-beams
WCS 127	Creighton	3/17/20	2.5	1	2	2	2	2	Yes			2		2	2	3	**6**	Washouts on low side, concrete pillars chipped and cracked, some hardware rusted.	1/30/19 PO#047665 - Repaired hole in Vertical I beams and repaired hole in sheet piling by support bar

2020 Water Control Structures Inspection

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Structure #	Waterway	Date	Metal			Gates				Pipes	Risers	Concrete		Bank Condition	Overall	Structure Location	Replacement Priority Score	Other Observations	Previous Repairs Completed
			Sheet Pilings	I - Beams	Cat walk	# of Gates	Gate	Hard ware	Operational (yes, no, list#)			Columns	Cap						
WCS 124	Lagoon	3/16/20	2	2	3	4	2	2	1 No 2,3,4 Yes			3		2	**2**	3	**6**	Washout on low side, walkway I beam rotting out, gate 1 needs track and door.	6/13/12 - Remove gate sill bottoms as these are corroded and prevent gate from closing and replace angles welded to gate bottoms 11/6/15 - Replace track guide systems for 3 gates and change anchors in track guide systems; clean and lubricate all 3 lift rods for gates; for all 3 tie rods, weld new equivalent 3 ft sections; replace 3 ft corroded sections of weir vertical I-beams at both side banks and encase new sections of I-beam in concrete; repair hole in sheet piling, install 3 new gates. 1/30/19 PO #047665 - Repaired holes in east side sheet piling and repaired vertical I-Beam. Retrofit surplus actuator in place of non-working actuator
WCS 118	Blueridge	3/16/20	2	4	2	2	2	2	Yes			2		1	2	3	**6**	Both I beams rotted out, gate 1 needs door and track.	9/12/13 - Replace corroded sections of horizontal and vertical railing 6/4/18 - Replaced I Beam, inspect gear box, clean rod, maintain tracks, maintain gate 1/30/19 PO #047588 - Replaced both horizontal I-beam webs that had holes. Repaired tracks for Gate #2 as it does not close all the way down. Maintained gear box and rod.
WCS 117	Blueridge	3/16/20	2	3	2	2	2	2	Yes			2		1	2	3	**6**	Missing 2 nuts on track.	
WCS 138	New Castle	3/19/20	3	1.5	1	2	1.5	1.5	Yes			2.5		1.5	3	2	**6**	Sheet pile rotted out all along top, concrete slab broken from washout, support bars are bent.	8/07 - Replace gates and corroded members. Washout by walkway fixed
WCS 110	Cocoplum	3/20/20	3	3	1	6	2.5	2.5	Yes			1.5		2	3	2	**6**	Hole in sheet pile.	1/30/19 PO #047665 Fixed top bars in gate frames very corroded, one hole behind I-beam
FW 160	Snover	3/25/20	2	1									4	2	3	2	**6**	Concrete separated form sheet pile, cement cracked.	
FW 155	Snover	3/24/20	2	4									2	2	3	2	**6**	Cracks in concrete, concrete slab broken, I beam rusted and rotted, needs to be cleared of vegetation	
FW 159	Snover	3/25/20	1	2									2	1	3	2	**6**	Washout, concreted separated from sheet pile.	

2020 Water Control Structures Inspection

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Structure #	Waterway	Date	Metal			Gates				Pipes	Risers	Concrete		Bank Condition	Overall	Structure Location	Replacement Priority Score	Other Observations	Previous Repairs Completed
			Sheet Pilings	I - Beams	Cat walk	# of Gates	Gate	Hard ware	Operational (yes, no, list#)			Columns	Cap						
WCS 130	Bass Point	3/19/20	3	1.5	1	2	2	2	Yes			2		4	2.5	2	**5**	Washout on low side	8/07 - Replaced gates and corroded horizontal channels. 6/4/18 - Replaced I-Beam, inspect gear box, clean rod, maintain tracks, maintain gate 1/30/19 PO #047588 - Replaced I-beam webs that had holes. Repaired tracks. Maintained gear box and rod.
WCS 131	Bass Point	3/19/20	2.5	1	1	2	4	4	1 No 2 Yes			3		1	2.5	2	**5**	Ok besides gate 2 not working.	9/25/13 Replaced corroded horizontal support beams and corroded sections of tie rods and vertical I-beams on both west and east sides of the structure, patched a small leak in the sheet metal piling and welded new boxes for both gate stems. 8/07 - Weld boxes on gate stems on each gate.
WCS 137	New Castle	3/19/20	2.5	1	1	2	1	1	Yes			2		2	2.5	2	**5**	All good	8/07 - Replace gates and corroded members. 6/4/18 - Replace I Beam, Inspect Rod, clean and repair any bad threads, Gear box- open, replace any bad bearings, check key ways in gear drives. Check brass lifting bushing. Tracks, replace spacer bars as needed or tracks as needed. Adjust, clean and inspect door for proper operation. 1/30/19 PO #047588 - Replaced both horizontal I-beams which have rotted off.
WCS 111	Cocoplum	3/26/20	2.5	2	1	4	2	2	Yes			1.5		4	2.5	2	**5**		9/12/12 - Replaced corroded horizontal I-beam and corroded sections of vertical support for "cat walk" 1/30/19 PO #047665 - Fixed top bars in gate frames that was corroded
FW 122	MacCaughey	3/17/20	2										1	1	1.5	3	**4.5**	Cracked concrete	1/30/19 - Fixed W. downstream bank minor erosion.
FW 506	Crestwood	3/20/20	2							1			1	2	1.5	3	**4.5**	All good	
FW 507	Flamingo	3/20/20	2							2			1	1	1.5	3	**4.5**	All good	
FW 123	MacCaughey	3/17/20	1.5										1	1.5	1.5	3	**4.5**	Broke off concrete due to washout.	
FW 120	Blueridge	3/17/20	1.5	1.5										1.5	1.5	3	**4.5**	2 washouts 1 each high and low side, no concrete cap, sheet pile rusted, I beam rotted.	

2020 Water Control Structures Inspection

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Structure #	Waterway	Date	Metal			Gates				Pipes	Risers	Concrete		Bank Condition	Overall	Structure Location	Replacement Priority Score	Other Observations	Previous Repairs Completed
			Sheet Pilings	I - Beams	Cat walk	# of Gates	Gate	Hard ware	Operational (yes, no, list#)			Columns	Cap						
DS 119	Blueridge	3/25/20								1	1.5	1.5	1.5	1	1.5	3	**4.5**	Pipe downstream rotted.	1/30/19 - Fixed sidewalk washing out.
DS 126	Lagoon	3/17/20								1	1	1	1	2	1.5	3	**4.5**	Guardrail damaged, starting to washout.	1/30/19 - Fixed erosion of rip rap bank near guardrail
WCS 106	Cocoplum		1	1	1	8	1	1				1	1	1	1	4	**4**		Replacement under construction April 2019 to May 2020
FW 154	Snover	3/24/20	2	4									2	2	2	2	**4**	Cracks in concrete, I beam rotted out, needs to be cleared of vegetation.	
FW 161	Snover	3/25/20	1	1									3	1	2	2	**4**	Concrete separated form sheet pile, cement cracked.	4-16-19 - Dead cabbage palm removed
DS 508	Auburn	3/18/20								1		1	1	1	2	2	**4**	Needs new grate	4/5/19 Ureteck chemical foam grout seal used to repair wash out under fabriform and hole near roadway guardrail
GDS 116	Snover	3/25/20			2	1	4	4	No	4	4			4	4	1	**4**	Need replaced, gate rotted, holes in pipe.	
GDS 141	Bethlehem	3/23/20			1	1	1	4	No	4	4			1	4	1	**4**	Holes in pipe, grate in the mud.	
GDS 142	Littlefield	3/23/20			1	1	4	4	No	4	4			4	4	1	**4**	Needs replaced, walkway good.	1/30/19 - Removed massive amount of dead willows and debris clogging structure. Repaired bank erosion. Remove toy car in upstream
GDS 143	Newman	3/25/20			2	1	1	2	Yes	4	4			1	4	1	**4**	Holes in pipes, handrail corroded, washout on bank.	
WCS 125	Lagoon	3/16/20	2	2	3	4	2	2	1&4 Yes 2&3 No			2		3	1	3	**3**	Washout on low side, I beam on walkway rusted out.	6/13/12 - Remove gate sill bottoms as these are corroded and prevent gate from closing and replace angles welded to gate bottoms
FW 129	Creighton	3/18/20	1							3.5		1	1	1	1	3	**3**	Pipes corroded and sheet pile rusted	1/30/19 Fixed - Remove fabric and debris over downstream pipes
WCS 162	R - 36	3/16/20	1		1	1	1	1	Yes	1		1	1	2	1	3	**3**	Washout far side of structure and beside pipe	6/4/15 Repaired erosion below existing concrete slab on the northwest side of WCS No. 113 by injecting flowable fill (cementitious grout) to fill all voids 1/30/19 - Removed willows in R-36 and fixed rip
FW 136	Blue Waters	3/18/20	1.5							2		1	1	1	1.5	2	**3**	Downstream pipes corroded, need to be replaced.	
WCS 140	Bethlehem	3/23/20	3.5	1	1	2	1	1	Yes			1.5		1	3	1	**3**	Hole in sheet pile, washout on low side.	12/2017 - Repair one horizontal I beam, Repair one Vertical I beam, Replace gate #1, Replace gate #2 1/30/19 - Fixed Horizontal I-beam that has fallen

2020 Water Control Structures Inspection

Metal, Gates, Pipes and Risers: 1 = No Corrosion, 2 = Surface Rust, 3 = Some Rot, 4 = Major Corrosion Overall: 1 = Good, 2 = Fair, 3 = Poor, 4 = Bac
Concrete: 1 = Good, 2 = Few chips/cracks, 3 = Some Spalling, 4 = Major Chips/Cracks Deterioration Bank Condition: 1 = Good, 2 = Fair, 3 = Poor, 4 = Bac
Structure Location: Replaced or Rehabilitated = 0, Structure located in undeveloped areas (1), east of Toledo Blade (2), west of Toledo Blade (3), developed areas Snover & Cocoplum (4

Structure #	Waterway	Date	Metal			Gates				Pipes	Risers	Concrete		Bank Condition	Overall	Structure Location	Replacement Priority Score	Other Observations	Previous Repairs Completed
			Sheet Pilings	I - Beams	Cat walk	# of Gates	Gate	Hard ware	Operational (yes, no, list#)			Columns	Cap						
FW 151	Snover	3/24/20	1	1									1	1	1	2	**2**	Minor crack in concrete upstream	
FW 152	Snover	3/24/20	1	1									1	1	1	2	**2**	Crack in concrete, concrete separating from sheet pile, needs to be cleared of heavy vegetation and trees.	
FW 153	Snover	3/24/20	1	1									1	1	1	2	**2**	Concrete separated for sheet piling, sheet pile rusted in the middle of structure, needs to be cleared of vegetation.	
FW 156	Snover	3/24/20	1	1									1	1	1	2	**2**	Cracks in concrete, I beam rotted out, needs to be cleared of vegetation.	
DS 510	Courtland	3/18/20								1		1	1	1	1	2	**2**	All good	1/30/19 - Small "island" downstream in Charlotte County removed.
GDS 512	Pellam	3/18/20			1	2	1	1	Yes			1		2	1	2	**2**	All good	
FW 180	Lion Heart	3/20/20	2							1.5		1	1	2	1.5	1	**1.5**	Sheet pile rusted, pipes are good, island on Charlotte County side.	
FW 181	Sunset	3/20/20	2							1		1	1	1	1.5	1	**1.5**	Island on Charlotte County side.	
FW 183	Morning Star	3/20/20	1.5							2.5			1	1	1.5	1	**1.5**	Pinhole in sheet pile	
FW 182	Dorchester	3/20/20	1.5							1		1	1	1.5	1	1	**1**	Sheet pile rusting	
FW 185	Elkcam	3/24/20	1							1			1	1	1	1	**1**	All good	
FW 186	Fordham	3/25/20	1							1			1	1	1	1	**1**	All good	
WCS 101	Myakkahatchee	3/16/20	1	1	1	6	1	1	Yes			1	1	1	1	0	**0**	Hydraulic leak on gate 2.	5/9/14 - Completed replacement of existing structure with new structure, two additional gates for a total of 6 gates, gate automation and telemetry
WCS 107	Cocoplum	3/17/20	1	1	1	6	1	1	Yes			1	1	1	1	0	**0**	All good	Jan 2011 - Retrofitted with concrete weir wall, 6 new stainless steel gates, concrete spillway and large revetment.
WCS 109	Cocoplum	3/18/20	1	1	1	6	1	1	Yes			1	1	1	1	0	**0**	All good	12/17/2015

2020 Water Control Structures Inspection

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Structure Location: Replaced or Rehabilitated = 0, Structure located in undeveloped areas (1), east of Toledo Blade (2), west of Toledo Blade (3), developed areas Snover & Cocoplum (4

Structure #	Waterway	Date	Metal			Gates				Pipes	Risers	Concrete		Bank Condition	Overall	Structure Location	Replacement Priority Score	Other Observations	Previous Repairs Completed
			Sheet Pilings	I - Beams	Cat walk	# of Gates	Gate	Hard ware	Operational (yes, no, list#)			Columns	Cap						
WCS 115	Snover	3/16/20	1	1	1	4	1	1	Yes			1	1	1	1	0	**0**	Missing Light.	8/31/18 - Completed replacement of existing structure with new structure, 4 automated gates with remote telemetry control
FW 132	Bass Point	3/19/20	1							1		1	1	1	1	0	**0**	All good	5/2011 - Severely corroded corrugated metal pipes CMP, erosion and undermining of side banks. Replace with open concrete weir and RCP culvert pipes.
FW 133	Bass Point	3/19/20	1							1		1	1	1	1	0	**0**	All good	11/2014 - Severely corroded corrugated metal pipes CMP, erosion and undermining of side banks. Replace with open concrete weir and RCP culvert pipes.
FW 135	Twin Lakes	3/17/20	1							1			1	1	1	0	**0**	All good	8/2009 Replaced concrete drop structure with concrete open weir replaced as part of the Toledo Blade widening projec
FW 139	New Castle	3/19/20	1							1			1	1	1	0	**0**	Washout by structure, pipe separated from other pipe.	4/2012 Severely corroded corrugated metal pipes CMP, erosion and undermining of side banks. Replaced with open concrete weir and RCP culvert pipes.
DS 503	Apollo	3/17/20								2		1	1	1	1	0	**0**	All good	9/2009 Corroded Triple 72" Diameter CMP drop pipes structure and culvert replacement with concrete box structure with fiberglass skimmer and triple 72" concrete RCP and headwall.
DS 504	Jupiter	3/17/20								2		1	1	1	1	0	**0**	Skimmer down, needs to be placed back up.	8/2009 Corroded Triple 72" Diameter CMP drop pipes structure and culvert replacement with concrete box structure with fiberglass skimmer
DS 501	Cheshire	3/17/20								1					1	0	**0**	All good	7/2009 Rebuilt covered concrete structure and replaced corroded 60' diameter CMP pipe with 60" RCP.
GDS 112	Cocoplum	3/25/20			none	none	none	none	No	none	none			4	4	1		No catwalk, no gate.	Drop structure with 1 gate destroyed in storm in 9/13/16 and removed in 2017. Only horizontal culvert pipes left in place . Will need perform hydraulic modeling and obtain approval from SWFWMD not to replace structure.
CRE 5.09		3/18/20	None							1		1	1	1	4	2		2 box Culverts with deteriorated weir connecting Cocoplum with Charlotte County Crestville Waterway. **No work**	Was weir replacement done? Not fixed.

Structure priority for replacement is based on the following in order with the largest score:
Column R - Replacement Priority Score
Column Q - Structure Location
Column D - Sheet Pilings condition
Column M - Concrete Column condition
Column N - Concrete Cap condition
Column E - I-Beams condition
Column A - Structure No.

Water Control Structures (WCS) Completely Rehabilitated or Replaced

As of 11/30/20

Item	Water Control Structures	Waterway	Location	Rehab Issues	Project Start Date	Engineering / Permitting/Other non-Construction Costs	Actual Construction Costs Includes Contingency Spent	Total Final Design and Construction Cost Spent	Engineering Consultant / P.E.	Contractor / Supervisor	Project Status	City Project Manager	Comments
1	WCS 109	Cocoplum	East of San Mateo	Severe metal sheet piling corrosions, gates, two gates will not open. Retrofit with concrete weir wall and 6 new stainless steel gates and concrete spillway and large revetment.	Started Design in 2007	$49,594.36	$311,650.00	$361,244.36	KHA / Nathan Lee Seth Schmid	Keesling Construction Inc. / Klint Keesling	Completed Sept 2009	Elizabeth Wong	
2	DS 501	Cheshire	Chancellor Between Sumter and North Port Blvd	Rebuilt covered concrete structure and replaced corroded 60' diameter CMP pipe with 60" RCP.	Started Design in 2006	$16,622.67	$77,488.37	$94,111.04	DRMP / Scott Garth	Southwest Utilities Systems Inc / Rick Mauch	Completed July 2009	Elizabeth Wong	Charlotte County and City of North Port split cost 50/50. John elias is Charlotte County Project manager
3	DS 504	Jupiter	Chancellor Just east of Salford	Corroded Triple 72" Diameter CMP drop pipes structure and culvert replacement with concrete box structure with fiberglass skimmer and triple 72" concrete RCP and headwall.	Started Design in 2006	$16,622.67	$203,833.09	$220,455.76	DRMP / Scott Garth	Armadillo / Keith Richmond	Completed August 2009	Elizabeth Wong	
4	DS 503	Apollo	Chancellor Just east of Sumter	Corroded Triple 72" Diameter CMP drop pipes structure and culvert replacement with concrete box structure with fiberglass skimmer and triple 72" concrete RCP and headwall.	Started Design in 2006	$16,622.67	$193,938.85	$210,561.52	DRMP / Scott Garth	Dave Foote Environmental / George Foote	Completed Sept 2009	Elizabeth Wong	
5	WCS 135	Twin Lakes	Price East of Toledo Blade	Replace concrete drop structure with concrete open weir replaced as part of the Toledo Blade widening project	2009	Included in umbrella project of Toledo Blade Wideing	$134,860.00	$134,860.00	Wilson Miller Prime	Apac is prime, Lovin Construction built structure	Completed August 2009	Ben Newman	Design Cost unknown as it was included in the Toledo Blade Widening contract
6	WCS 107	Cocoplum	Just west of Chamberlain	Severe metal sheet piling corrosions, gates, two gate will not open. Retrofit with concrete weir wall and 6 new stainless steel gates and concrete spillway and large revetment.	Start Design in 9/30/09	$43,783.16	$545,267.26	$589,050.42	KHA / Nathan Lee Seth Schmid	Coral Sands	Completed January 2011	A. Carrasquillo	Costs include a large Emergency Change Order of $125,000 due to unforseen concrete in canal bottom downstream of structure.
7	DS 132 and culverts	Bass Point	At Jeannin Dr	Severely corroded corrugated metal pipes CMP, erosion and undermining of side banks. Replace with open concrete weir and RCP culvert pipes.	Design Start 10/09	$40,987.22	$436,615.82	$477,603.04	DMK / Mary Ann Lind	Thomas Marine/Mark Mabee	Completed May 2011	Angel Carrasquillo	
8	DS 139 and culverts	Snover	East of Haberland	Severely corroded corrugated metal pipes CMP, erosion and undermining of side banks. Replace with open concrete weir and RCP culvert pipes.	Design Start 10/09, construction start 1/4/12	$40,987.22	$488,104.70	$529,091.92	DMK / Mary Ann Lind	GCS/John Matz	Completed April 2012	A. Carrasquillo (design & permitting) E. Wong (construction)	
9	WCS 101	Cocoplum	Myakkahatchee Creek near WTP	Design, permitting and construction services for the replacement of WCS 101	5/29/2012	$127,754.00		$1,317,261.50	AIM Engineering / Lee Flynn and Tim Denger		Design 3/26/13 (USACOE Permit), construction 4/18/14	Elizabeth Wong	This is a SWFWMD cooperatively funded project. Engineering/Permitting cost include land and easement purchase and Gopher Tortoise relocation
				Gopher Tortoise Relocation	5/2/2013	$4,400.00			Ian Vincent & Associates		Completed 5/22/13		
				Land/Easement Acquisition	8/9/2012	$13,860.00			American Acquisition Group		Complete 4/6/13		
					8/9/2012	$21,776.50			American Government Services		Complete 4/6/13		
				Complete replacement of existing structure with new structure, two additional gates for a total of 6 gates, gate automation and telemetry	Started construction May 28, 2013		$1,149,471.00			Shoreline Foundation Inc/Charles Diveto/Neil Davis	Completed 5/9/14		
10	DS 133 and culverts	Snover	West of Haberland	Severely corroded corrugated metal pipes CMP, erosion and undermining of side banks. Replace with open concrete weir and RCP culvert pipes.	Design start 10/09, construction start 5/20/14	$49,355.60	$549,796.80	$599,152.40	DMK / Mary Ann Lind and Kreg Maheu	Olympus Painting Contractors Inc. Ed Freeman	Completed 11/20/14	A. Carrasquillo (design & permitting) Elizabeth Wong (construction)	
11	WCS 115	Snover	East of Chamberlain Blvd	Severe corrosion of metal sheet piling corrosions and gates. Water level could not be retained upstream by structure. Will either replace or rehabilitate entire structure.	Start design in FY 2016	$108,081.00	$1,064,496.00	$1,172,577.00	AIM Engineering / Lee Flynn	V & H Construction, Inc. (Rade Vujaklija and Joe Martin)	Completed 8/31/18	Elizabeth Wong	

Water Control Structures (WCS) Completely Rehabilitated or Replaced

As of 11/30/20

Item	Water Control Structures	Waterway	Location	Rehab Issues	Project Start Date	Engineering / Permitting/Other non-Construction Costs	Actual Construction Costs Includes Contingency Spent	Total Final Design and Construction Cost Spent	Engineering Consultant / P.E.	Contractor / Supervisor	Project Status	City Project Manager	Comments
12	WCS 106	Cocoplum	West of North Port Blvd Near WTP	Severe deterioration of concrete columns that support the gates and catwalk. Corrosion of sheet pilings	Start design in 8/8/17 Construction start 4/7/19	$168,000.00	$2,304,436.58	$2,472,436.58	KHA / Peter Vanbuskirk, Seth Schmid	ZEP Construction, Inc (Jamie Booth, Kirk Scribner)	Completed 8/11/20	Elizabeth Wong	
13	WCS 108	Cocoplum	West of Collingswood	Severe deterioration of entire structure	Start design in 11/2/20	$143,006.12			KHA / Peter Vanbuskirk, Ty Gremaux		Ongoing		
	Total					**$861,453.19**	**$7,459,958.47**	**$8,178,405.54**					

Minor Repairs to Water Control Structures

As of 11/30/20

Item	Water Control Structures	Waterway	Location	Rehab Issues	Project Start Date	Engineering / Permitting/Other non-Construction Costs	Actual Construction Costs Includes Contingency Spent	Engineering Consultant / P.E.	Contractor / Supervisor	Project Status	City Project Manager	Comments
1	WCS137	Newcastle	Between Diamond Ave and Napa Ln	Replace gates and corroded members.	May-07	None	$55,500	PBSJ / Tony Russo	Pittsfield Construction Inc. / Sam Mattews	Completed August 2007	Elizabeth Wong	Due to inoperable gates, obtained an emergency order and award the contract to Pittsfiled
2	WCS138	Newcastle	At Monterey Ln	Replace gates and corroded members.	May-07	None	$55,500	PBSJ / Tony Russo	Pittsfield Construction Inc. / Sam Mattews	Completed August 2007	Elizabeth Wong	
3	WCS 130	Bass Point	Near Cocoplum	Replace gates and corroded horizontal channels.	May-07	In house	$77,500	PBSJ / Tony Russo	Pittsfield Construction Inc. / Sam Mattews	Completed August 2007	Elizabeth Wong	
4	WCS 131	Bass Point	Just downstream of the Twin Lakes intersection	Weld boxes on gate stems on each gate.	May-07	In house		PBSJ / Tony Russo	Pittsfield Construction Inc. / Sam Mattews	Completed August 2007	Elizabeth Wong	
5	WCS 108	Cocoplum	Just west of Collingwood	Replaced 3 Gates Nos.1, 2 and 5	Apr-11	In house	$9,350.00	PW staff	MS Welding. Mark Spalding	Completed April 2011	Angel Carrasquillo	Gates were so deteriorated, could not wait until future complete WCS replacement.
6	WCS 101	Cocoplum	Myakkahatchee Creek near WTP	Replaced 3 Gates	Sep-11	In house	$13,245.00	PW staff	MS Welding. Mark Spalding	Completed Sept 2011	Angel Carrasquillo	Gates were so deteriorated, could not wait until future complete WCS replacement.
7	WCS 124	Lagoon	North of Cocoplum Near Parlay Ln	Remove gate sill bottoms as these are corroded and prevent gate from closing and replace angles welded to gate bottoms	May-12	In house	$2,000.00	PW staff	MS Welding. Mark Spalding	Completed 6/13/12	Elizabeth Wong/Rick St Louis	These are minor repairs. Angles on gate bottoms found in good condition and not replaced
8	WCS 125	Lagoon	South of Price near Thomas Ln	Remove gate sill bottoms as these are corroded and prevent gate from closing and replace angles welded to gate bottoms	May-12	In house	$2,000.00	PW staff	MS Welding. Mark Spalding	Completed 6/13/12	Elizabeth Wong/Rick St Louis	These are minor repairs. Angles on gate bottoms found in good condition and not replaced
9	WCS 114	Snover	Just west of Salford Blvd	Replace all 4 gates with new steel gates epoxy coated, replace all gate supports, gate slide frameworks, both horizontal I-beams and replaced corroded section of vertical I-beams, rebuilt corroded sections of all 4 lift rods	May-12	In house	$18,000.00	PW staff	MS Welding. Mark Spalding	Completed 7/17/12	Elizabeth Wong/Rick St Louis	These are minor repairs
10	WCS 108	Cocoplum	Just west of Collingwood	Replace corroded horizontal I-beams and corroded sections of vertical I-beams, and repair holes in sheet metal pile	Aug-12	In house	$18,400.00	PW staff	MS Welding. Mark Spalding	Completed 9/7/12	Elizabeth Wong/Rick St Louis	These are minor repairs
11	WCS 128	Newcastle	South of Price Blvd, near Oregon Ln	Replace corroded horizontal cap and corroded sections of vertical I-beams	Aug-12	In house	$9,500.00	PW staff	MS Welding. Mark Spalding	Completed 9/14/12	Elizabeth Wong/Rick St Louis	These are minor repairs
12	WCS 111	Cocoplum	South of Price Blvd, near Newmand Dr.	Replace corroded horizontal I-beam and corroded sections of vertical support for "cat walk"	Aug-12	In house	$6,600.00	PW staff	MS Welding. Mark Spalding	Completed 9/12/12	Elizabeth Wong/Rick St Louis	These are minor repairs
13	WCS 106	Cocoplum	Near WTP	Disassemble Gear box at one gate to evaluate repairs needed	11/5/2012	In house	$300.00	PW staff	MS Welding. Mark Spalding	Completed 12/11/12	Elizabeth Wong/Rick St Louis	Gear box defective
14		Cocoplum	Near WTP	Provide a reconditioned gear box and all necessary parts and labor with 1 year warranty on one gate	3/1/2013	In house	$4,550.00	PW staff	MS Welding. Mark Spalding	Completed 3/12/13	Elizabeth Wong/Rick St Louis	
15	WCS 118	Blueridge	Cuthbert Ave	Replace corroded sections of horizontal and vertical railing	9/1/13	In house	$2,457.00	PW staff	Raber Industries Inc.	Completed 9/12/13	Elizabeth Wong/Rick St Louis	
16	WCS 131	Bass Point	Johannesberg Rd	Replaced corroded horizontal support beams and corroded sections of tie rods and vertical I-beams on both west and east sides of the structure, patched a small leak in the sheet metal piling and welded new boxes for both gate stems.	9/1/13	In house	$8,557.00	PW staff	Raber Industries Inc.	Completed 9/25/13	Elizabeth Wong/Rick St Louis	
17	WCS 113	Snover	Just East of Myakkahatchee Creek	Repaired erosion below existing concrete slab on the northwest side of WCS No. 113 by injecting flowable fill (cementitious grout) to fill all voids	7/25/14	In house	$14,000.00	PW staff	Thomas Marine Construction, Inc.	Completed 7/28/2014	Elizabeth Wong/Rick St Louis	
18	WCS 162	Snover	Van Camp/Tropicaire	Repaired erosion between weir and MES. Demo concrete adjacent to MES, install filter fabric, install morrow over fabric and install 12-inch diameter rip rap.	5/21/15	In house	$7,000.00	PW staff	Genesis Construction Group sub'd to Charlotte County Seawalls Zac Extait	Completed 6/4/15	Elizabeth Wong/Rick St Louis	Ed Freeman of Genesis subcontractor entire job to Charlotte County Seawalls

Minor Repairs to Water Control Structures

As of 11/30/20

Item	Water Control Structures	Waterway	Location	Rehab Issues	Project Start Date	Engineering / Permitting/Other non-Construction Costs	Actual Construction Costs Includes Contingency Spent	Engineering Consultant / P.E.	Contractor / Supervisor	Project Status	City Project Manager	Comments
19	WCS 124	Lagoon	South of Coldwater Ln	Replace track guide systems for 3 gates and change anchors in track guide systems as needed for workable gates; clean and lubricate all 3 lift rods for gates; for all 3 tie rods to dead men, weld new equivalent 3 ft sections of tie rods to reinforce corroded sections near water surface; replace 3 ft corroded sections of weir vertical I-beams at both side banks, chip concrete to existing solid metal beam, cut out corroded section of the I-beams and re-weld new vertical sections of I-beams onto solid metal, repair chipped concrete and encase new sections of I-beam in concrete; repair hole in sheet piling by welding or applying two-part epoxy grout, an 18" x 18" patch comprising a minimum 3/16" steel plate onto existing cleaned solid sheet metal piling; all dewatering costs as needed. Emergency procurement fabrication and installation of 3 new gates. PO# 046481	9/30/15	In house	$23,500.00	PW staff	MS Welding. Mark Spalding	Completed 11/6/15	Elizabeth Wong/Rick St Louis	
20	WCS 125	Lagoon	North of Thomas Lane	Replace track guide systems for 2 gates and change anchors in track guide systems as needed for workable gates; clean and lubricate 2 lift rods for gates; for all 3 tie rods to dead men, weld new equivalent 3 ft sections of tie rods to reinforce corroded sections near water surface; replace 3 ft corroded sections of weir vertical I-beams at both side banks, chip concrete to existing solid metal beam, cut out corroded section of the I-beams and re-weld new vertical sections of I-beams onto solid metal; repair chipped concrete and encase new sections of I-beam in concrete; all dewatering costs needed. PO# 046481	9/30/15	In house	$7,000.00	PW staff	MS Welding. Mark Spalding	Completed 9/28/15	Elizabeth Wong/Rick St Louis	
21	WCS 114	Snover		Troubleshoot why gates nos. 1 and 2 not opening easily, replace corroded or bent sections of lift rods as needed; if needed, remove and replace 1 gear box with existing gear box at the public works facility (contractor to pick up and transport equipment from public works to work site); remove corroded first 14 feet long sections of two-strand horizontal and vertical catwalk railing(both sides of railing) and weld on new galvanized steel two-strand horizontal and vertical railing to match the diameter of the rest of the adjacent catwalk railing; ensure all new welded joints are smooth; on all welded joints and new railing, apply zinc chromate primer and paint the replacement railing with at least two coats of 2-part epoxy Sherwin Williams marine grade green paint to match adjacent catwalk railing color. PO# 046481	9/30/15	In house	$5,200.00	PW staff	MS Welding. Mark Spalding	Completed 9-30-15	Elizabeth Wong/Rick St Louis	Cost less than anticipated once Mark got into project
22	WCS 108	Cocoplum	Just west of Collingwood	Replaced 3 more Gates (including the existing electric gate). Use an existing actuator (from the old WCS 101). Needed two new left hand threaded rods, fabricate 3 new gates #3, 4, and 6 and tracks, flat bars and spacers as needed, minor concrete and sheet pile repair. This was an emergency order job. PO #046626	12/1/15	In house	$34,900.00	PW staff	MS Welding. Mark Spalding	Completed 12-17-15	Elizabeth Wong/Rick St Louis	Gates were so deteriorated, could not wait until future complete WCS replacement.
23	WCS 106	Cocoplum	Near WTP	Replaced all six Gates. This was an emergency order job as 3 of the 6 gates were not working and the other three are the same age. Replaced corroded sections of all tie rods. The existing concrete sill at the bottom of the gates are in bad condition. The structure is planned for complete replacement in 2018. PO# 046747	4/4/16	In house	$68,000.00	PW staff	MS Welding. Mark Spalding	Completed 4/8/2016	Elizabeth Wong/Rick St Louis	Gates were so deteriorated, could not wait until future complete WCS replacement.
24	WCS 101	Myakkahatchee Creek		Excessive rains and debris cause sand bar formation on upstream side of WCS 101 blocking push-down gate operation and bent two rods. MS removed bend section of rod, pumped out sand and welded new rod so gate remains functional until permanent repair can be made. Meanwhile Tom McCluin of Golden Harverst gates provided 2 new stainless steel rods (free) as he had determined that the clutch on the actuator was not set correctly to shut off the motor if there is too much torque on the stems. SS rods are on the floor in the RO building.	11/8/16	In house	$7,500.00	PW staff	MS Welding. Mark Spalding	Completed End of 2016	Rick St Louis	Emergency Procurement
25	WCS 114	Snover		Excessive rains and debris caused damage to gate, tracks and gear. Emergency repairs make to make gates functional until a permanent repair can be made	11/8/16	In house	$5,500.00	PW staff	MS Welding. Mark Spalding	Completed End of 2016	Rick St Louis	Emergency Procurement

Minor Repairs to Water Control Structures

As of 11/30/20

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26	GDS 112			2016 storm broke off riser, gate and portion of catwalk and eroded bank. All broken parts removed in March 2017. Only horizontal pipes left in place and part of catwalk, banks stabilized. Need to get SWFWMD approval to not replace structure in kind.	March 2018	In house						
27	WCS 140	Bethlehem		Repair one horizontal I beam, Repair one Vertical I beam, Replace gate #1, Replace gate #2. PO# 047293	Last week in Sept 2017	In house	$25,000.00	PW staff	MS Welding. Mark Spalding	Completed End of 2017	Chuck Speake	
28	WCS 137	New Castle	Near Laredo Ave	Replace I Beam- with painted with 2 part apoxy coating Inspect Rod, clean and repair any bad threads Gear box- open, replace any bad bearings, check key ways in gear drives. Check brass lifting bushing. Tracks, replace spacer bars as needed or tracks as needed.Adjust, clean and inspect door for proper operation. Minor repairs if needed. Inspect concrete and base of structure (under water) PO# 047588	3/23/2018	In house	$9,000.00	PW staff	MS Welding. Mark Spalding	Completed 6/4/18	Chuck Speake	
29	WCS130	Bass Point	Just north of Cocoplum	Replace I Beam -with painted with 2 part apoxy coating Inspect Rod, clean and repair any bad threads Gear box- open, replace any bad bearings, check key ways in gear drives. Check brass lifting bushing. Tracks, replace spacer bars as needed or tracks as needed. Adjust, clean and inspect door for proper operation. Minor repairs if needed Inspect concrete and base of structure (under water)	3/23/2018	In house	$8,000.00	PW staff	MS Welding. Mark Spalding	Completed 6/4/18	Chuck Speake	
30	WCS 118	Blueridge	at Ridgewood Dr	Replace I Beam- with painted with 2 part apoxy coating Inspect Rod, clean and repair any bad threads Gear box- open, replace any bad bearings, check key ways in gear drives. Check brass lifting bushing. Tracks, replace spacer bars as needed or tracks as needed.Adjust, clean and inspect door for proper operation. Minor repairs if needed. Inspect concrete and base of structure (under water)	3/23/2018	In house	$8,000.00	PW staff	MS Welding. Mark Spalding	Completed 6/4/18	Chuck Speake	
31	WCS 108	Cocoplum	West of Collingswood Blvd	Fixed catwalk grate rusted through in one location	6/27/2018	In house	$7,500.00	PW staff	MS Welding. Mark Spalding	Completed 1/30/19	John Hodge	
32	WCS 110	Cocoplum	West of Yorshire St	Fixed top bars in gate frames very corroded, one hole behind I-beam	6/27/2018	In house	$8,000.00	PW staff	MS Welding. Mark Spalding	Completed 1/30/19	John Hodge	
33	WCS 111	Cocoplum	Near Newman Dr.	Fixed top bars in gate frames that was corroded	6/27/2018	In house	$8,500.00	PW staff	MS Welding. Mark Spalding	Completed 1/30/19	John Hodge	
34	WCS 114	Snover	West of Salford Blvd	Fixed hole in S. side sheet piling. Repaired Gate #2 as it does not close all the way down	6/27/2018	In house	$9,000.00	PW staff	MS Welding. Mark Spalding	Completed 1/30/19	John Hodge	
35	WCS 124	Lagoon	North of Cocoplum Near Parlay Ln	Repaired holes in east side sheet piling and repaired vertical I-Beam. Retrofit surplus actuator in place of non-working actuator	6/27/2018	In house	$8,000.00	PW staff	MS Welding. Mark Spalding	Completed 1/30/19	John Hodge	
36	WCS 127	Creighton	Near Alabelle Ln	Repaired hole in Vertical I-beams and repaired hole in sheet piling by support bar	6/27/2018	In house	$8,500.00	PW staff	MS Welding. Mark Spalding	Completed 1/30/19	John Hodge	
37	WCS 101	Myakkahatchee Creek	At WTP	Telemetry malfunction, replace part no, NL120 CSI Ethernet Interface	9/5/2018	In house	$446.00	PW staff	Locher Enviromental Technology (mike Vega)	9/5/2018	Chuck Speake	
38	WCS 143	Newman	Fielders Rd	Washout on the bank of the Gated Drop Structure. WO# 20-005616	8/27/2020	In house	$879.00	PW staff	PW Operations	Completed 8/27/20	Menelik Roberts	
39	WCS 158	Snover	Joewood Cir	Washout on the highside. WO# 20-005607	8/27/2020	In house	$879.00	PW staff	PW Operations	Completed 8/27/20	Menelik Roberts	
40	WCS 130	Bass Point	Hightower Rd	Washout on Low side. WO# 20-005614	8/28/2020	In house	$1,640.00	PW staff	PW Operations	Completed 8/28/20	Menelik Roberts	
41	DS 120	Blueridge	Tripoli St	Washout on both the High and Low side. Erosion repair. WO#20-005615	8/31/2020	In house	$901.00	PW staff	PW Operations	Completed 8/31/20	Menelik Roberts	
42	DS 139	New Castle	E Price Blvd & Brewsterrd	Washout by structure. Erosion repair. WO# 20-005620	8/31/2020	In house	$401.00	PW staff	PW Operations	Completed 8/31/20	Menelik Roberts	
43	WCS 125	Blueridge	Petunia Ter	Washout on Low side. Erosion repair. WO# 20-005619	8/31/2020	In house	$707.00	PW staff	PW Operations	Completed 8/31/20	Menelik Roberts	
44	WCS 127	Blueridge	Malinda Ter	Washout on both the High and Low side. WO# 20-005612	8/31/2020	In house	$901.00	PW staff	PW Operations	Completed 8/31/20	Menelik Roberts	

Minor Repairs to Water Control Structures

As of 11/30/20

Item	Water Control Structures	Waterway	Location	Rehab Issues	Project Start Date	Engineering / Permitting/Other non-Construction Costs	Actual Construction Costs Includes Contingency Spent	Engineering Consultant / P.E.	Contractor / Supervisor	Project Status	City Project Manager	Comments
45	WCS 121	Mac Caughey	Nimbus Dr	Washout on the low side. Erosion repair. WO#20-005609	9/3/2020	In house	$1,970.00	PW staff	PW Operations	Completed 9/3/20	Menelik Roberts	
46	WCS 124	Lagoon	Parade Ter	Washout on Low side. Erosion repair. WO# 20-005613	9/4/2020	In house	$881.00	PW staff	PW Operations	Completed 9/4/20	Menelik Roberts	
	Total						**$565,164.00**					

WCS Replacement Plan

The priority for the replacement of the major WCS's is updated annually (Figure 3-2). Since 2006, 11 major WCS's have been completely replaced or rehabilitated, one is in construction, and one is being designed (Attachment C). The current Public Works plan is to annually design and permit one WCS replacement while constructing a previously designed and permitted WCS.

The rehabilitation of WCS 106 on the Cocoplum Waterway just west of North Port Boulevard is underway with completion expected in Spring of 2020. Design for WCS 108 on the Cocoplum Waterway west of Collingswood Boulevard is anticipated to be completed in Fall of 2020 and will be followed by construction budgeted for fiscal year 2021.

Beyond the 5-year budget projections shown, WCS 124, WCS 127, WCS 138, WCS 118, WCS 121 and WCS 125, are anticipated to be constructed in years 2025, 2026, 2027, 2028, 2029 and 2030 respectively. Budget amounts will be proposed when the structure is within the 5-year replacement window.

WCS Repair Plan

Preventative maintenance and minor repairs prolong the life of the WCS's and keep them in good working order. Minor repairs include repair or replacement of: gates, gate actuators, gate stems, gate tracks, tie backs, catwalk deck/railing, vertical and horizontal I-beams, weir sheet metal erosion, and adjacent bank erosion.

The WCS's that have not been replaced are at a vulnerable age when unforeseen component failures can occur. Due to the significant expense and time needed to design, permit and construct replacement WCS's, significant repairs may need to be done on a WCS that is scheduled to be replaced in the near future. Generally, components such as gates, actuators and stems that are in good condition can be salvaged and become spares for use in other failing WCS's.

Public Works Operations staff perform annual inspection of all structures and prioritize major and minor WCS repairs or replacements (Attachment B). Figure 3-3 reflects the fiscal year 2020 repair budget for WCS's.

Figure 3-2

5-year WCS Replacement Budget Plan

	2020	2021	2022	2023	2024
Design	WCS 108	WCS 113	WCS 114	FW 157	WCS 124
Costs	$199,000	$308,000	$203,000	$234,000	$241,000
Construction	WCS 106	WCS 108	WCS 113	WCS 114	FW 157
Costs	$2,500,000	$2,480,000	$3,850,000	$2,540,000	$2,920,000

	WCS 106	WCS 108	WCS 113	WCS 114	FW 157
Total Costs	2,668,000	$2,679,000	$4,158,000	$2,743,000	$3,154,000

WCS 106 Is currently being rebuilt

Figure 3-3

Fiscal Year 2020 WCS Repair Budget Plan

Structure	Description	Budget Estimate
WCS 108	Repair holes in sheet piling	$10,000
WCS 113	Repair holes in sheet piling, repair gate stem attachment points, evaluate for gate replacement	$15, 000-$30,000
WCS 118	Replace #1 gate and track, evaluate for gate replacement	$15,000-$20,000
WCS 124	Replace #1 gate and track, evaluate for gate replacement	$15,000-$20,000
WCS 125	Replace actuator	$20,000

Water Control Structure Locations

WCS 106	North Port Blvd and Cocoplum Waterway
WCS 108	Collingswood Blvd and Cocoplum Waterway
WCS 113	Snover Waterway and Myakkahatchee Creek
WCS 114	N Salford Blvd and Snover Waterway

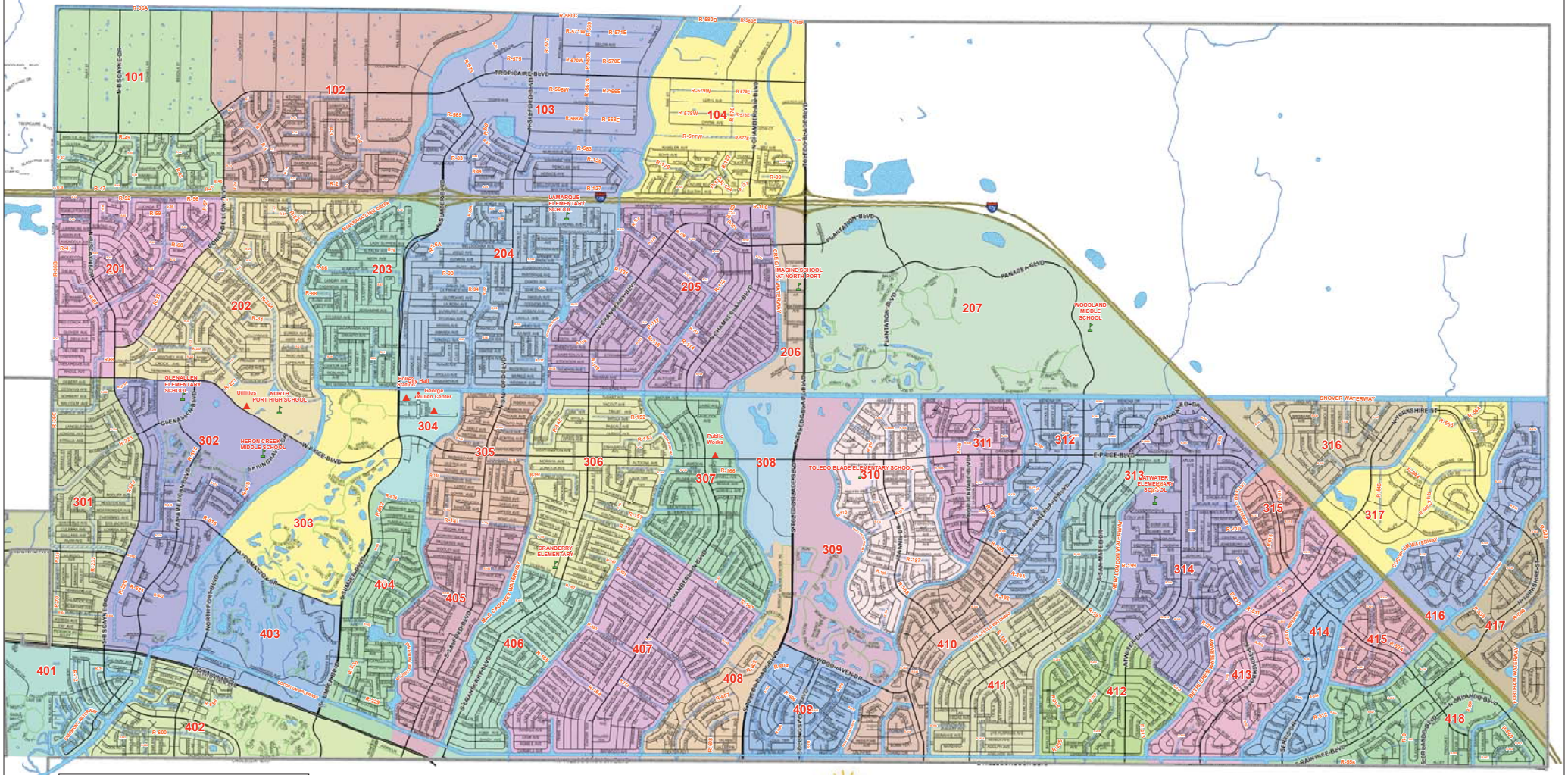
WCS 118	Abbotsford St and Blueridge Waterway
WCS 124	Parade Terrace and Lagoon Waterway
WCS 125	Parkmount Terrace and Lagoon Waterway
FW 157	Panacea Blvd and Snover Waterway

Exhibit 8-2

2019 Activities

2019 Maintenance Activities in Monthly Reports to Commission

TYPE	January	February	March	April	May	June	July	August	September	October	November	December	**Total**
Retention (R) Ditches and Canals Rehabilitated (*linear miles)*	2.509	2.278	2.569	2.420	1.503	2.658	1.900	2.662	2.447	2.911	1.026	1.688	**26.57**
Swales Rehabilitated (*linear miles)*	5.407	5.244	5.714	5.898	6.195	5.890	5.386	5.506	5.359	6.613	5.506	4.826	**67.544**
Asphalt Placed – Pothole Repairs (*tons*)	19	12	16	12	15	16	18	22	15	8	4.71	10.25	**168**
Roadside Mowing (*acres*)	1283	447	1336	2187	2878	2243	2000	2400	2000	1800	2435	800	**21,809**
Drainage Right of Way (ROW) Mowing (*acres*)	0	167	0	251	230	195	0	20	80	65	70	0	**1,078**
Aquatic Spraying (*acres*)	49	42	65	55	32	40	46	26	22	22	22	16	**437**
Boom Mowing R-Ditch Bottoms (linear miles)	4.87	1.34	19	25.8	14.5	10.8	9.5	11	13.7	9.36	14	6.4	**140**
Pipes Installed (*linear miles)*	0.215	0.118	0.199	0.205	0.207	0.121	0.176	0.094	0.164	0.157	0.147	0.130	**1.932**
Catch Basins/Culvert Boxes Installed	2	12	8	11	9	8	6	3	1	9	5	7	**81**
Drainage pipe cleaning (each)	73	91	151	182	174	113	101	61	64	78	114	165	**1,367**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PLANTATION BLVD
PANAMA CANAL BLVD
W. PRICE BLVD
E. PRICE BLVD
GLENALLEN AVE
SPRINGVIEW AVE
SNOVER WATERWAY
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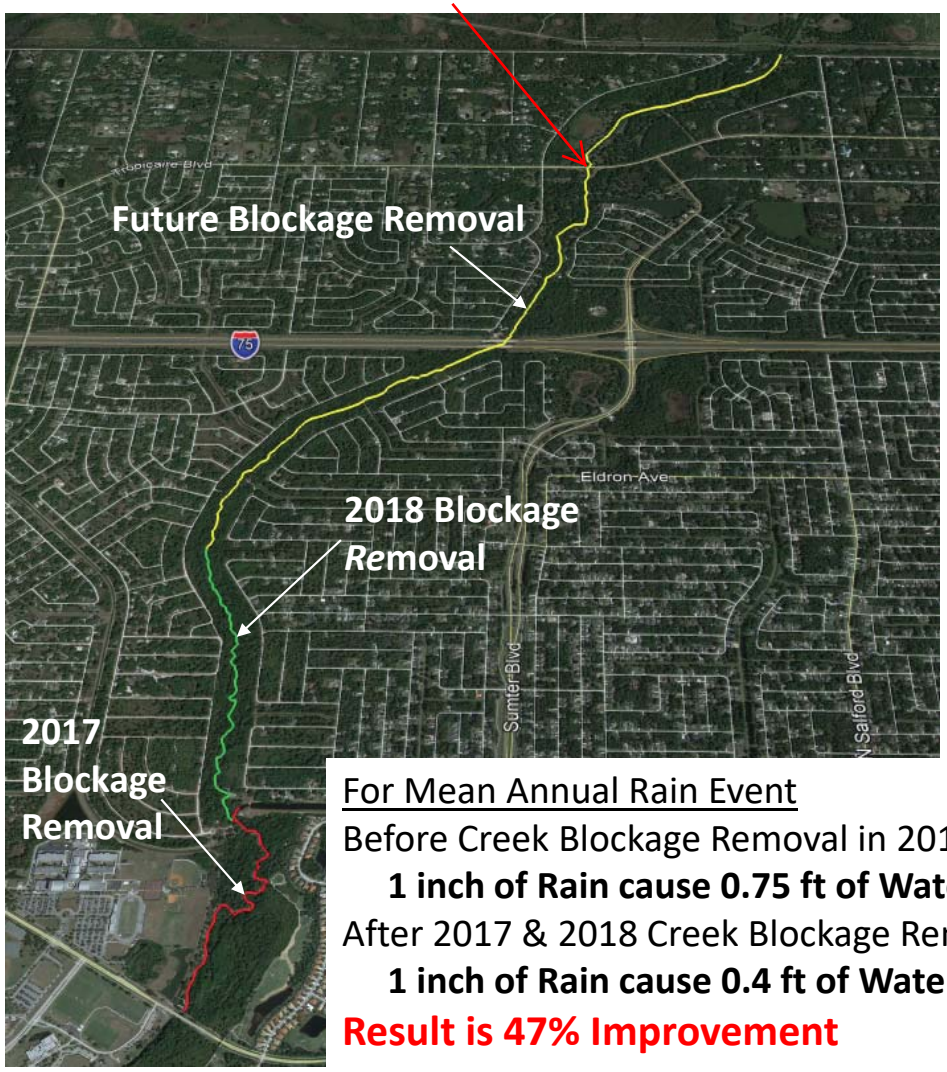
USGS Rain Gage
at Tropicaire Blvd

After 2017 - 2018 Creek Blockage Removal



For Mean Annual Rain Event

Before Creek Blockage Removal in 2016 =

1 inch of Rain cause 0.75 ft of Water Rise

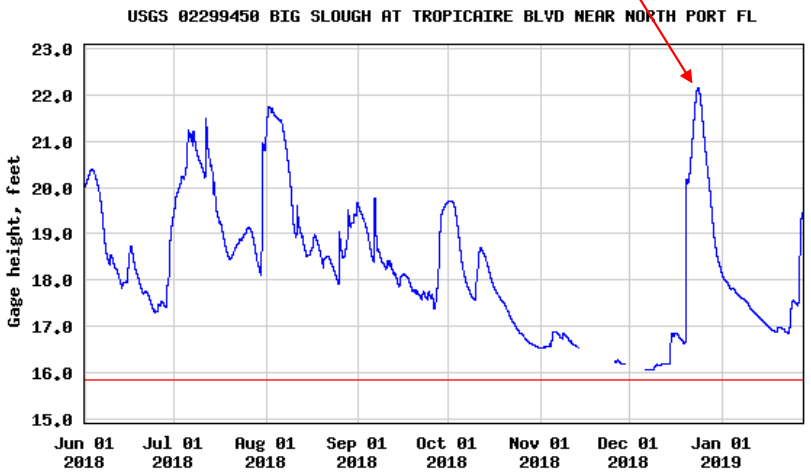
After 2017 & 2018 Creek Blockage Removal =

1 inch of Rain cause 0.4 ft of Water Rise

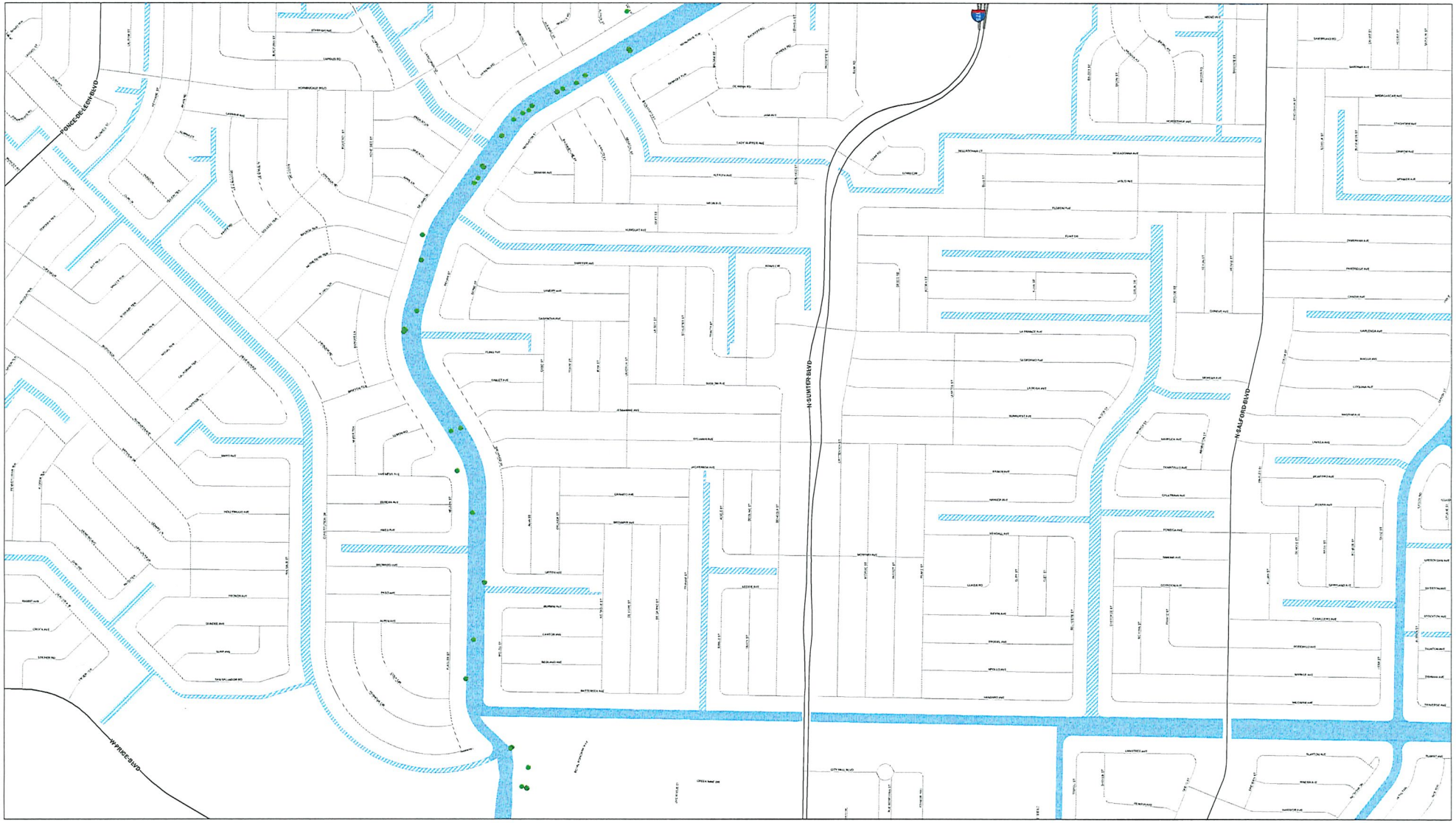
Result is 47% Improvement

No street flooding after
2017 - 2018 project
Tropicaire Blvd USGS gage at **22.15'**

Gage height, feet
Most recent instantaneous value: 19.45 01-28-2019 12:00 EST



Future Blockages to Remove



City of North Port
Myakkahatchee Creek Blockages

Disclaimer: This map is for reference purposes only and is not to be construed as a legal document. Any reliance on the information contained herein is at the user's risk. The City of North Port and its agents assume no responsibility for any use of the information contained herein or any loss resulting there from.

Document Path: W:\Infrastructure\2020\Brian\B_Creek\Blockages\CreekBlockages.mxd

Changes Between the FEMA Preliminary Coastal Flood Risk FIRMS Dated 12/31/19 and Existing Effective FIRMs dated 11/4/16

Address List Parcels (Centroids)	*1% Increase*	*1 % Decrease*	*1% Increase Exclusively*	*1 % Decrease Exclusively*	*Share Both*	*TOTAL*
Countywide Total	*27,284*	*20,891*	*25,087*	*18,694*	*2,197*	*45,978*
Town of Longboat Key		373	0	373	0	373
City of Sarasota	672	1,697	640	1,665	32	2,337
City of Venice	47	1,231	17	1,201	30	1,248
City of North Port	3,601	50	3,588	37	13	3,638
Unincorporated	22,964	17,540	20,842	15,418	2,122	38,382
BBC Districts Total (Centroids)	*27,284*	*20,891*	*25,087*	*18,694*	*2,197*	*45,978*
Michael A. Moran - 1	7,704	3,128	7,068	2,492	636	10,196
Christian Ziegler - 2	1,806	2,760	1,630	2,584	176	4,390
Nancy C. Detert - 3	5,652	4,501	4,709	3,558	943	9,210
Alan Maio - 4	6,722	5,211	6,526	5,015	196	11,737
Charles D. Hines - 5	5,400	5,291	5,154	5,045	246	10,445
Buildings (Intersected)	***1% Increase***	***1 % Decrease***	***1% Increase Exclusively***	***1 % Decrease Exclusively***	***Share Both***	***TOTAL***
Countywide Total	*7,750*	*16,360*	*7,619*	*16,229*	*131*	*23,979*
Town of Longboat Key	0	376	0	376	0	376
City of Sarasota	206	1,396	201	1,391	5	1,597
City of Venice	7	1,152	6	1,151	1	1,158
City of North Port	1,495	3	1,495	3	0	1,498
Unincorporated	6,042	13,433	5,917	13,308	125	19,350

"Exclusively" means parcels that only have one type of change. Some parcels include both areas added to the one-percent annual chance flood and areas removed from the one-percent annual chance flood.

"Share Both" means a parcel crossed both the increase and decrease layers of the CSLF layer from FEMA. The floodplain was essentially reshaped on those parcels

G:\ENG - Elizabeth Wong\FEMA FIRMs Coastal 2020\Impacted parcels\Updated Flood RIsk Assessment\All\4/16/2020\10:51 AM

City of North Port

Office of the City Manager
4970 City Hall Boulevard
North Port, Florida 34286

www.cityofnorthport.com (941)429-7077 Fax: (941) 429-7079

September 15, 2020

Mark A. Vieira, P.E.
Senior Civil Engineer
FEMA Region IV
Mitigation Division, RA Branch
US Department of Homeland Security
770-220-5450

Re: City of North Port Review of the December 31, 2019, Preliminary Coastal Risk Flood Insurance Rate Maps and Flood Insurance Study

Dear Mr. Vierra:

The City of North Port appreciates the cooperative efforts by the Federal Emergency Management Agency (FEMA) to revise the City's November 4, 2016, Flood Insurance Rate Maps (FIRMs) for the coastal area. Attached are the City's concerns and recommendations on the December 31, 2019, Preliminary Coastal Risk FIRMs and Flood Insurance Study (FIS). The City would appreciate a response to these comments prior to FEMA finalizing the FIRMs and FIS. Any questions or comments should be directed to Elizabeth Wong, P.E., City of North Port Stormwater Manager via email to ewong@cityofnorthport.com or by phone at (941) 240-8321 or (941) 628-1475.

Sincerely,

Jason Yarborough, ICMA-CM
Acting City Manager

c. by email
Cari Branco, Assistance City Manager
Juliana B. Bellia, Director, Department of Public Works
Rick Newkirk, Utilities Director
Scott Titus, Fire Chief
Eric Tiefenthaler, Emergency Manager
Monica Bramble, Assistant Director, Department of Public Works
Gerardo Traverso, P.E., PMP, Engineering Manager, Department of Public Works
Elizabeth Wong, P.E. Stormwater Manager, Department of Public Works
Mike Taylor, P.E. Project Manager, AECOM

CITY OF NORTH PORT COMMENTS ON
PRELIMINARY RISK FIRMS DATED DECEMBER 31, 2019

1. **2007 LiDAR Topographic Data Should be Updated to Prepare the Preliminary Risk FIRMs –**

   Concern: In a 2/13/20 email response from Mark Vierra, he indicated *"The coastal portion of Sarasota County is using LiDAR flown in 2015. However, for inland areas of Sarasota County including the City of North Port, 2007 LiDAR is the most current that we have."* The 2007 LiDAR topography done over 13 years ago, is very outdated. Most of Florida has experienced a huge building boom after 2007 and many structures are built higher than the elevations in 2007. These higher elevations are not reflected in the new flood maps as they are based on outdated 2007 topography.

   Proposed Solution:
   a. It is recommended that FEMA acquire up to date LiDAR data before revising the flood maps.

2. **Properties already Built higher than the proposed BFEs –**

   Concern: The City and FEMA's consultant AECOM, have received much input from many property owners in areas west of the Myakka River in the West Villages area (Gran Paradiso, The Preserve, Renaissance, Oasis) and in Talon Bay east of the Myakka River. A large portion of these properties were in flood zone AE per the 1981 and 1984 FIRMs, then remapped as flood zone X in the 2016 FIRMs, and now remapped back into flood zone AE in the December 31, 2019 preliminary Risk FIRMs.

   Many of these properties were built higher than the proposed BFE, but the lower elevations corresponding to undeveloped conditions in the 2007 LiDAR data were used for the December 31, 2019 preliminary Risk FIRMs. The 2007 LiDAR data show these properties remapped into Flood zone AE. Mark Vierra had indicated that these properties cannot qualify for a no-fee letter of map amendment (LOMA) as the very first 1984 FIRM shows them to be in AE. Consequently, they will have to pay FEMA to file for a letter of map revision based on fill (LOMR-F). Many properties were built after the flood zone changed from Zone AE in 1984, to Zone X in the 11/4/16 FIRMs. Thus, these properties were not required to obtain Elevation Certificates. Now to file for a LOMR-F they will have to pay for both an elevation certificate (about $300) and the FEMA LOMR-F filing fee ($425 per lot or $800 for multiple lots).

   Proposed Solution:
   a. A list of these developments is provided in Attachment A. The corresponding Southwest Florida Water Management District (SWFMWD) permitted plans, record drawings and several elevations certificates are available. Due to the large file sizes, pdfs of these documents are sent separately in an email to the FEMA's Project Manager and FEMA's Consultant AECOM to access files through "One Drive ".

b. It is recommended that FEMA download and review this data. Properties that are already built higher than the new BFEs should be removed out of the zone AE before finalizing the FIRMs.

c. For properties already built higher than the revised BFEs before the new FIRMs effective date, FEMA should consider waiving the LOMR-F filing fee for MT-1 applications and process application as a no-fee LOMA.

d. Property owners that sent FEMA's consultant as-built surveys and elevation certificates before and during or the 90-day Public Comment period should also have their properties removed out of the zone AE before FEMA finalizes of the new FIRMs.

3. **Three Myakka River Bridge Effects** –

Concern: FEMA's consultant AECOM indicated that the modeling used to prepare the Preliminary Risk FIRMs did not include the storm surge and wave action dampening effects of the following three (3) parallel bridges that spans the mouth of the Myakka River near El Jobean. Only the bridge approaches were in the model.

I. Old railroad trestle bridge that is a fishing pier
II. North-bound State Road 776 Bridge
III. South-bound State Road 776 Bridge

On a typical windy day with winds that frequently come out of the southeast, there is a huge visible difference in wave action heights and between the upstream and downstream sides of these bridges. The very tightly spaced railroad trestle pilings, the deck stringers (elevation 8ft NAVD88) and the hand railing (elevation 11.5ft NAVD88) will likely dampen the storm surge and wave action and may lower the BFE of 11 ft NAVD88 in the preliminary Risk Maps.

Proposed Solution:
The three bridges need to be incorporated into the modeling used to prepare the Preliminary Risk FIRMs

- A pdf copy of the old railroad trestle bridge plans named "*EL JOBEAN BRIDGE REHAB 6-9-15*" is available. These plans correspond with the current day condition of the north half of the old railroad trestle bridge that is now a fishing pier, and shows elevation of the deck, stringers and railing. The south half of the old railroad trestle bridge is similar to the north.
- Florida Department of Transportation provided plans for the north and south bound concrete bridges. All available plans, photos and videos of these three bridges are sent separately in an email to the FEMA's Project Manager and FEMA's Consultant AECOM to access files through "One Drive ".

4. **Model Validation in North Port area** - In the model validation report file name "R4_SWFL_IDS2_Feb2017.pdf", please clarify what is used to validate the proposed flood elevations in the Myakka River that affects North Port.

5. **500-Year Model Results**

a. There are many areas where the 0.2% risk is increased. Was the 500-year storm (0.2% risk) modeled? Where can the 500-year storm flood elevations be found?

6. **Other comments on Flood Insurance Study**

   a. Flood Insurance Study FIS Vol 2 Pdf page 29 - Table 22 Topo Elev - the year the topographic elevation is used to prepare the maps needs to be specified.

7. **Other comments on Preliminary Risk Firms Dated December 31, 2019**

   a. The notes on all the FIRM panels referenced year 2017 for the ortho imagery aerial. This is misleading flood data as flood data does not match the 2007 LiDAR topography used in risk mapping. Suggest either using a corresponding 2007 ortho imagery aerial for the FIRM panels or adding another note that indicates 2007 topography was used in the special flood hazard area mapping.

   b. Wrong street name Panel 12115C0362G –Road south of US 41 on the west side of the State College of Florida, is misnamed "*S. Tamiami Trl*". This should be "*West Villages Parkway South*".

MEMORANDUM

To: Elizabeth Wong, P.E. (City of North Port)
From: Dave DeLoach, P.E.; Trillian Baldassari, P.E.

File: 16-00400-00

Subject: Update to Conceptual Plan

November 13, 2019

Update to Conceptual Plan

On October 29, 2019, the City of North Port directed Deloach Engineering Science, PLLC (DES) to remove the Inflow Reduction element of the conceptual design from the set of planned improvements. The conceptual-level design drawings and corresponding models were updated to reflect this change, and the conceptual plan now includes the following major project components:

- Improvements to the existing retention ditch/conveyance system and upsizing road crossing culverts in the Dorothy Avenue area.
- Construction of a new bypass canal parallel to the Myakkahatchee Creek within a portion of the City's Tier 1 lots from south of Tropicaire Boulevard to north of Price Boulevard.
- Increasing conveyance capacity through canal widening and upsizing pipe culverts in the R-36 retention ditch/conveyance system along the northern and western boundary of the city.

Engineer's Opinion of Probable Cost

Estimated project costs were updated to reflect the removal of the inflow reduction element of the conceptual plan. As discussed in the Stormwater Management Plan Report (May 2019), estimated costs, including engineering design, permitting, and construction, are based on RS Means 2017 Heavy Construction Costs with national average values adjusted to the Ft Myers/Sarasota County area. Estimates include a 30% contingency and were projected to future years (up to 2035) assuming 4% inflation. Combined costs for each of those projections were annualized over 50 years at 7%.

Engineer's Opinion of Probable Construction Cost					
	2017	2020	2025	2030	2035
Dorothy (Triple Box Culvert)	$ 5,628,495	$ 6,331,291	$ 7,702,984	$ 9,371,858	$ 11,402,298
R-36 Improvements	$ 15,379,020	$ 17,299,306	$ 21,047,251	$ 25,607,199	$ 31,155,073
Bypass	$ 17,121,876	$ 19,259,782	$ 23,432,470	$ 28,509,182	$ 34,685,779
Estimated Combined Cost	$ 38,129,391	$ 42,890,379	$ 52,182,704	$ 63,488,239	$ 77,243,150
Estimated Annualized Cost*	$ 2,762,850	$ 3,107,830	$ 3,781,151	$ 4,600,348	$ 5,597,027

* Combined cost annualized over 50 years at 7%, 13.8 PV Annuity Factor (capital cost only, excludes O&M)

Benefits and Benefit to Cost Ratio (BCR)

Benefits are based upon flood reduction achieved across a range of simulated storm events compared to the existing condition. For roadway removed from floodplain, benefits reflect avoidance of repair costs at a rate of $50,000 per mile. For parcels removed from the floodplain, benefits reflect avoidance of $6,300 per occurrence, based on historical NFIP claims statistics reduced by 85 percent to account for lot vacancy.

	With Inflow Reduction Element			Without Inflow Reduction Element		
	Flood Reduction (acres)	*Road Flood Reduction (miles)*	*Parcels Reduction (centroid*)*	Flood Reduction (acres)	Road Flood Reduction (miles)	Parcels Reduction (centroid*)
2.33-year	*244*	*8*	*234*	223	8	234
5-year	*359*	*13*	*405*	333	12	402
10-year	*460*	*18*	*538*	427	17	515
25-year	*495*	*21*	*542*	448	18	515
50-year	*518*	*21*	*562*	466	18	509
100-year	*557*	*24*	*558*	489	22	505

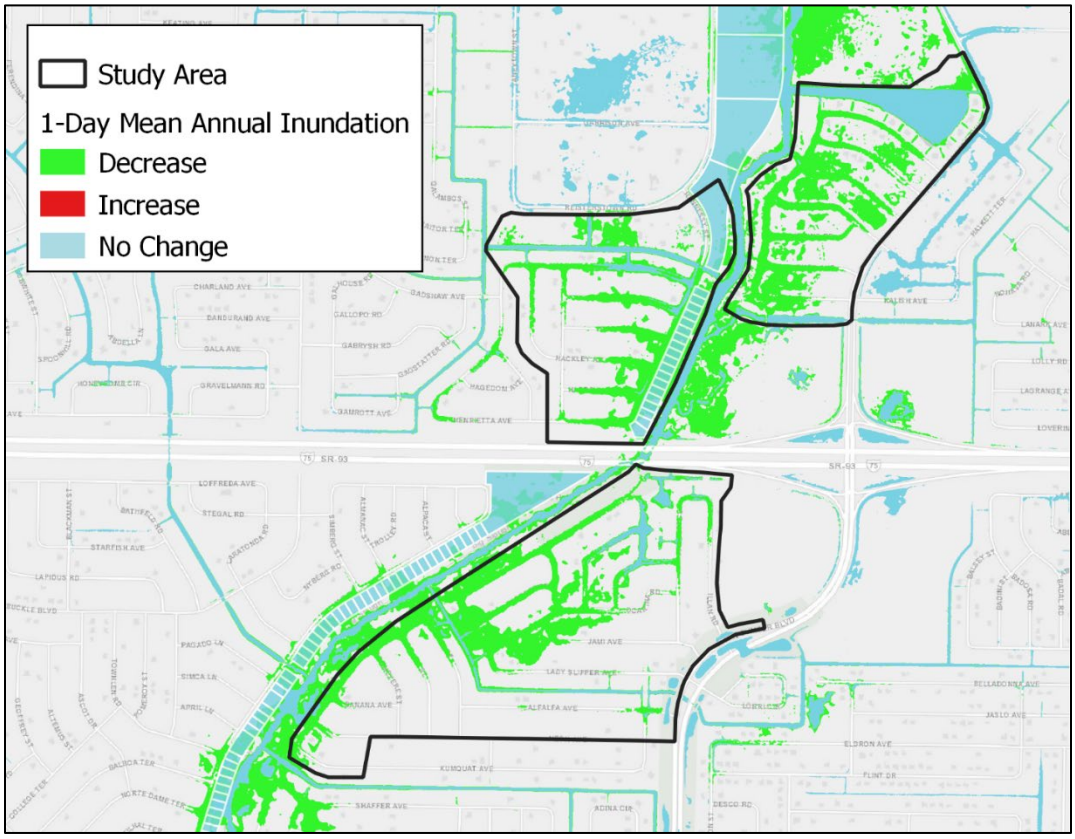
* number of parcels where the center of the parcel is no longer inundated

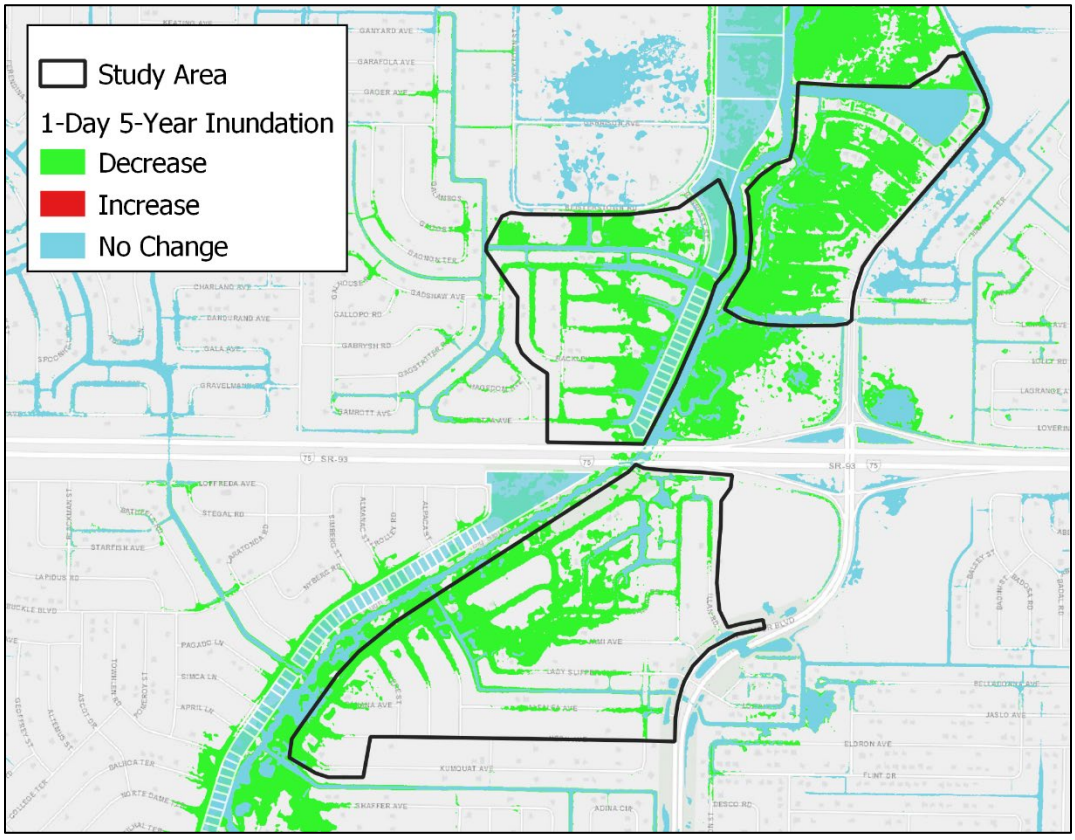
Annual benefit is calculated by multiplying total project benefits for a storm event simulation by the event probability then summing across events simulated. In the case of the revised stormwater management plan, annualized benefits accrue to $1,909,295 with a BCR of 69 percent (calculations included in Appendix A).

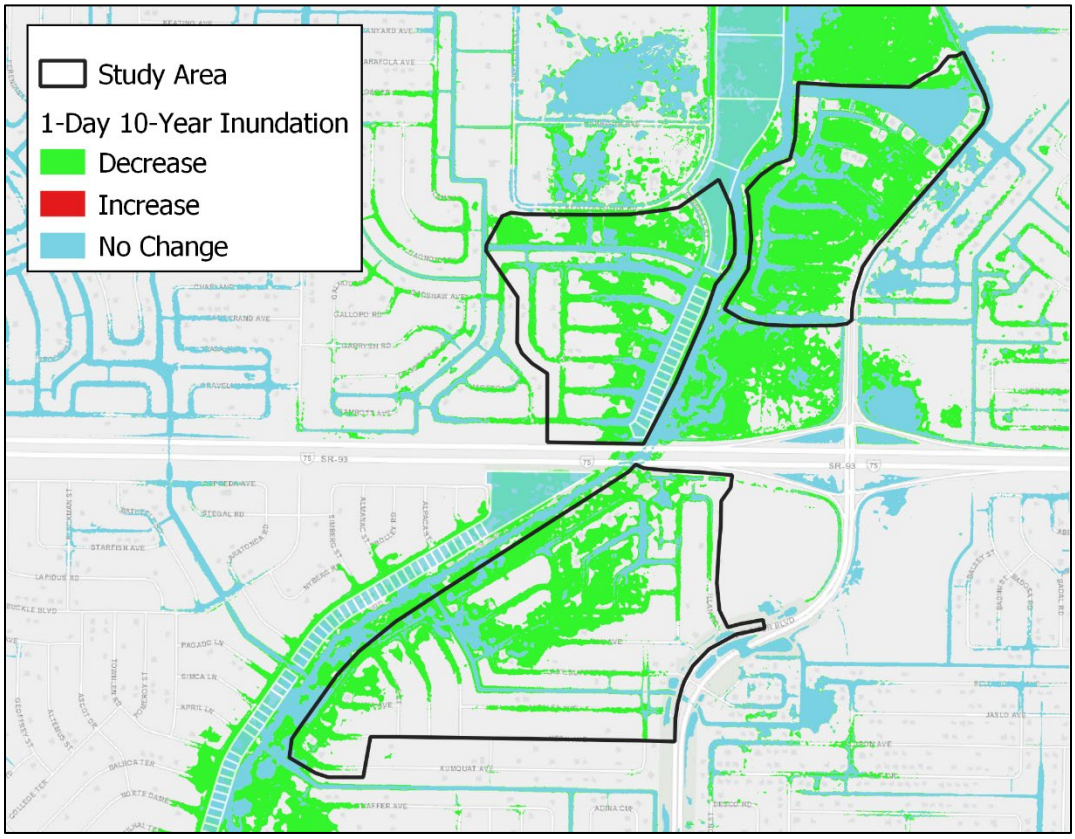
Flood Area Reduction in the I-75 Study Area

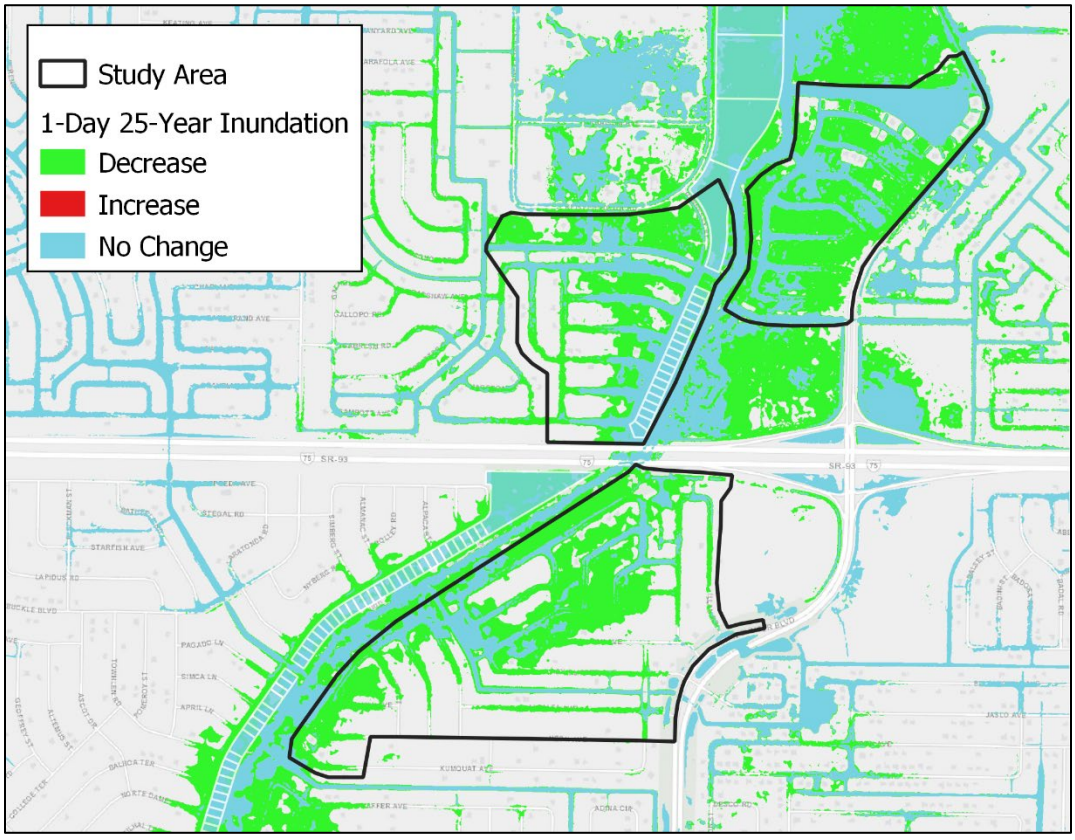
The following figures illustrate the reduced extent of inundation in the I-75 study area for Mean Annual through 100-year storm events for the updated stormwater management master plan model, excluding the inflow reduction option.

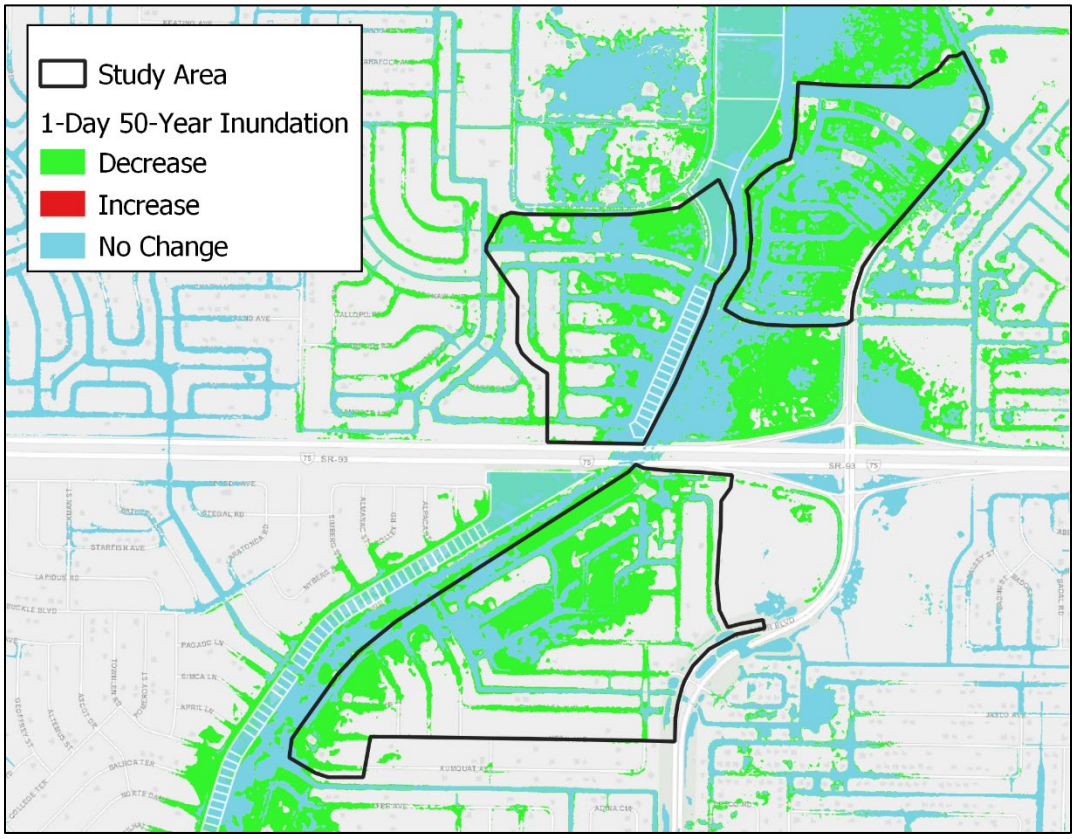
The conceptual plan focuses on improvements to primary components of the stormwater management system to reduce large-scale regional flooding in the City of North Port. Adjacent areas where minor increases may result from primary system improvements have been identified. Appurtenant facilities may be required to eliminate local increases in some isolated areas. It is understood that design of additional facilities (not yet specified) may be included in future applications for phased construction, including, but not limited to, addition of flap gates, local collection system modifications, and/or construction of storage areas to eliminate local impacts from small stage increase in the primary system, if any.

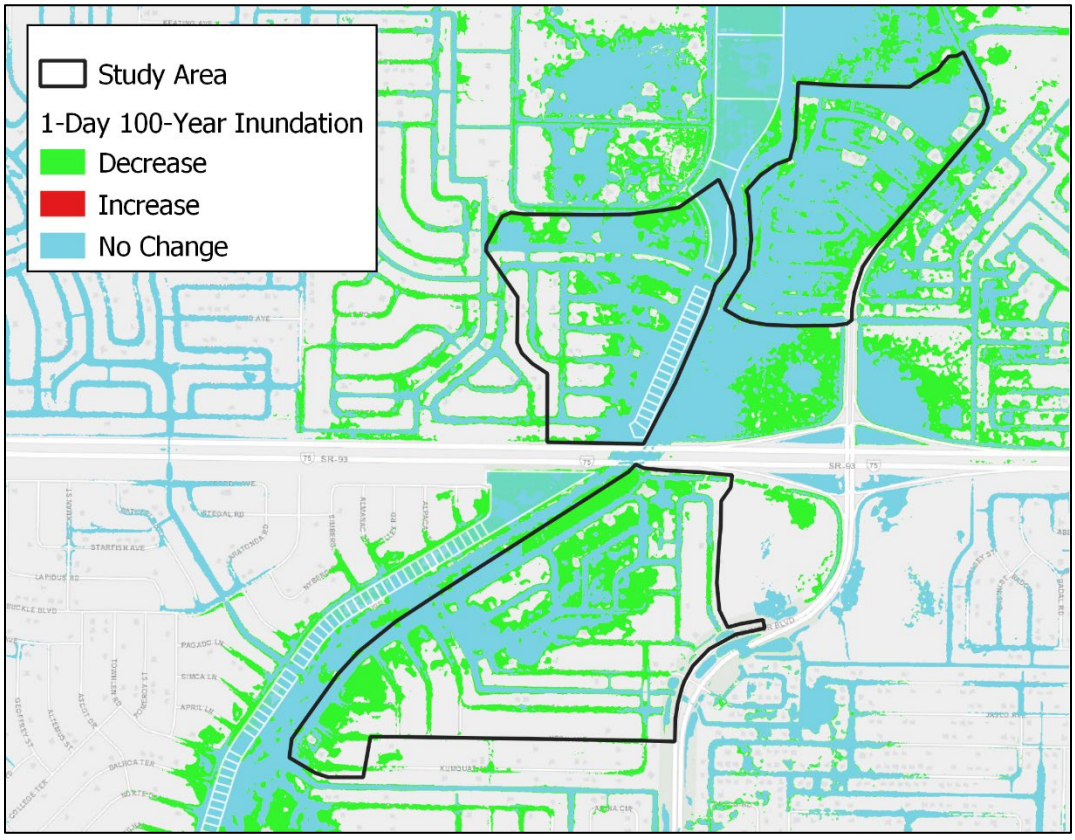

Study Area
1-Day Mean Annual Inundation
Decrease
Increase
No Change


Study Area
1-Day 5-Year Inundation
Decrease
Increase
No Change


Study Area
1-Day 10-Year Inundation
Decrease
Increase
No Change


Study Area
1-Day 25-Year Inundation
Decrease
Increase
No Change

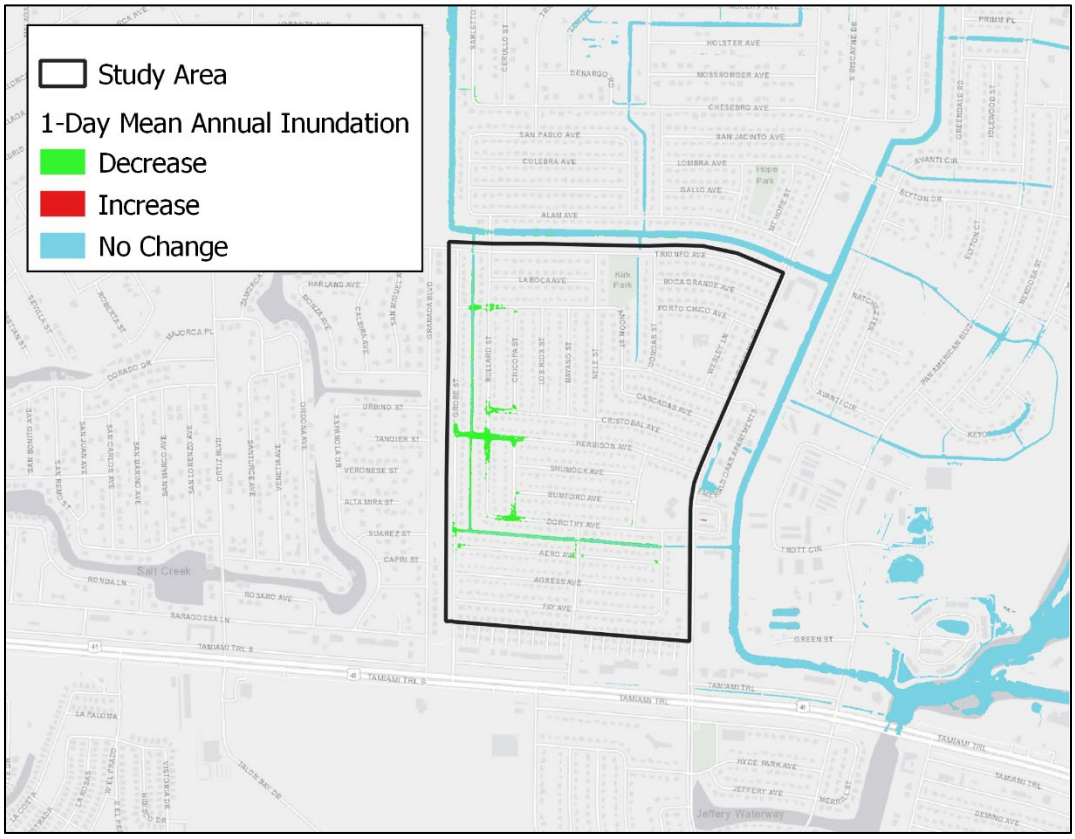

Study Area
1-Day 50-Year Inundation
Decrease
Increase
No Change

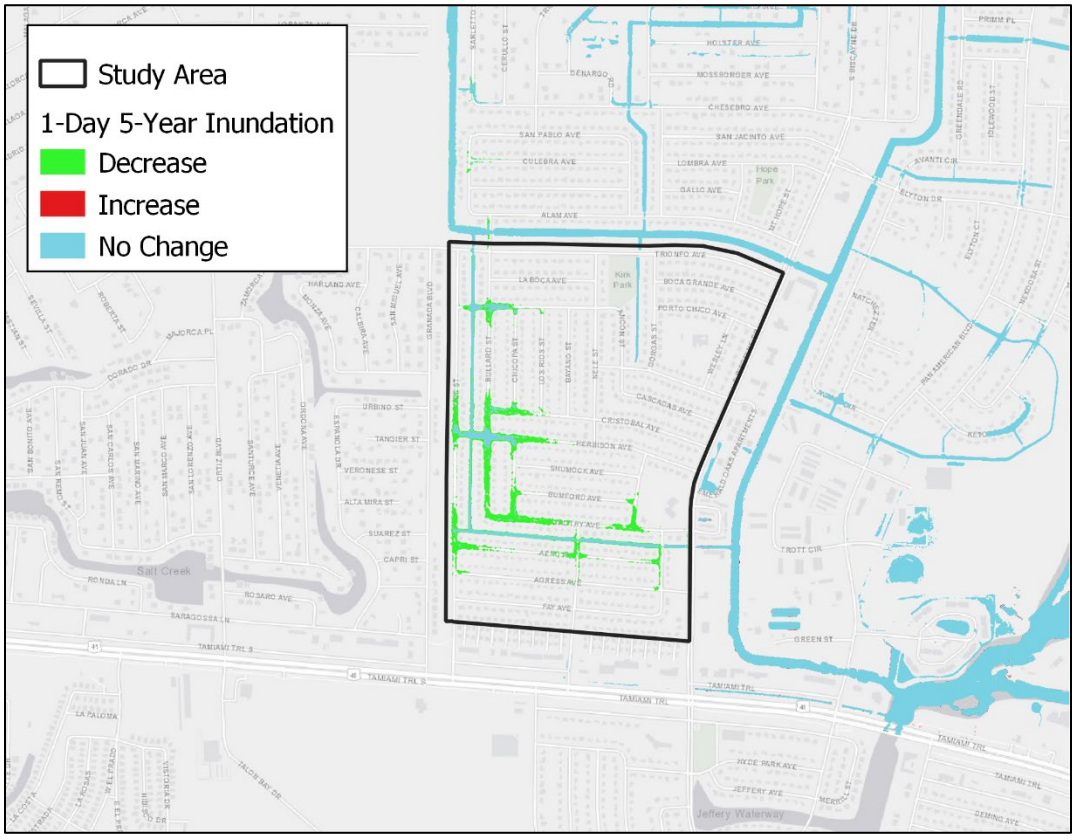

Study Area
1-Day 100-Year Inundation
Decrease
Increase
No Change

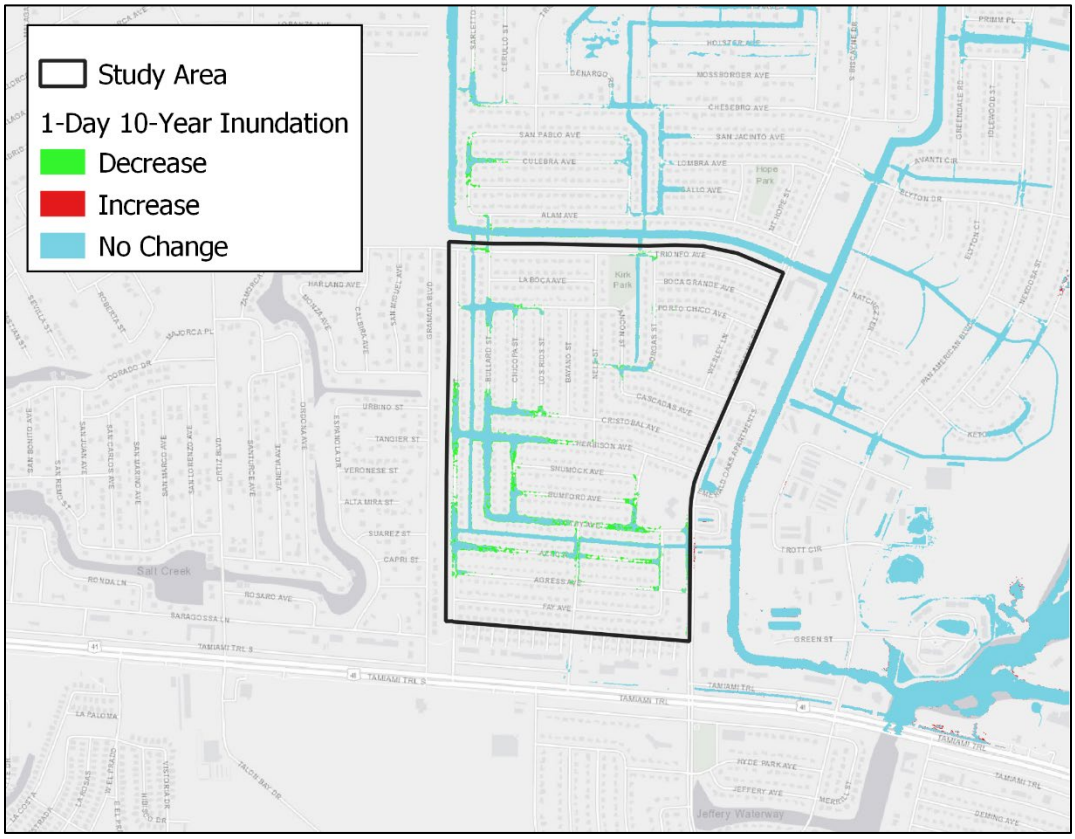
Flood Area Reduction in the Dorothy Avenue Study Area

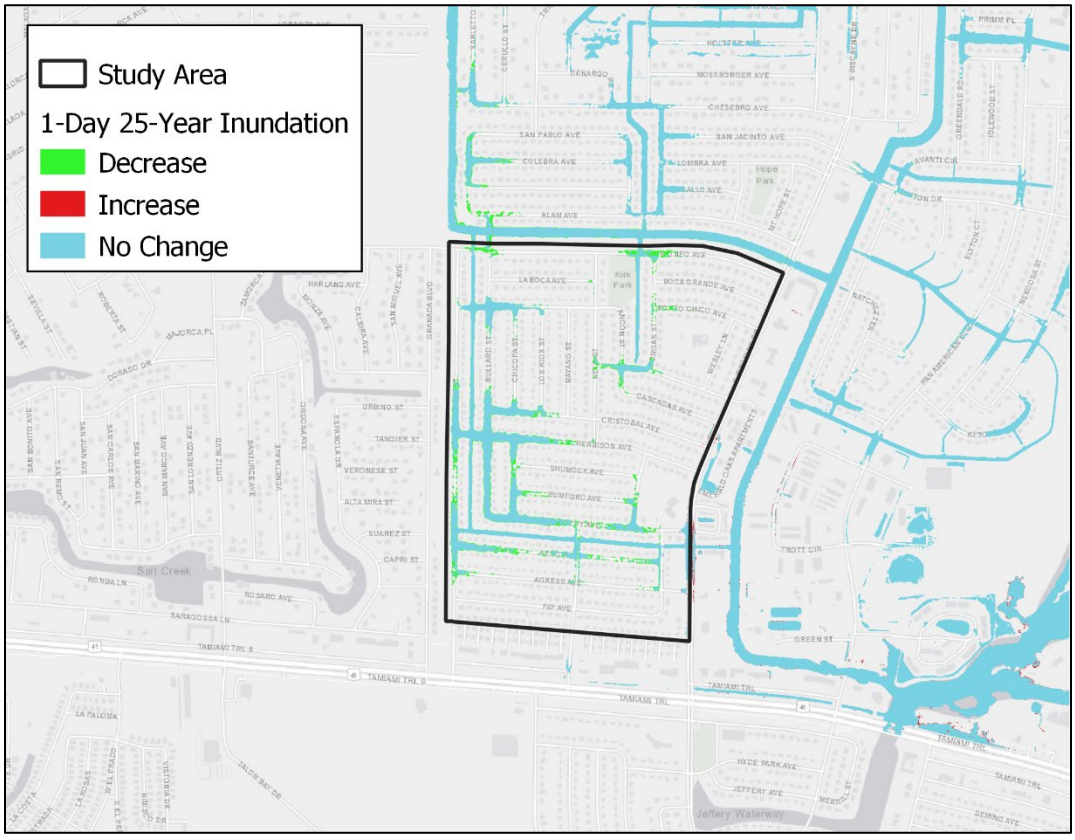
The following figures illustrate the reduced extent of inundation in the Dorothy Avenue study area for Mean Annual through 100-year storm events for the updated stormwater management master plan model, excluding the inflow reduction option.

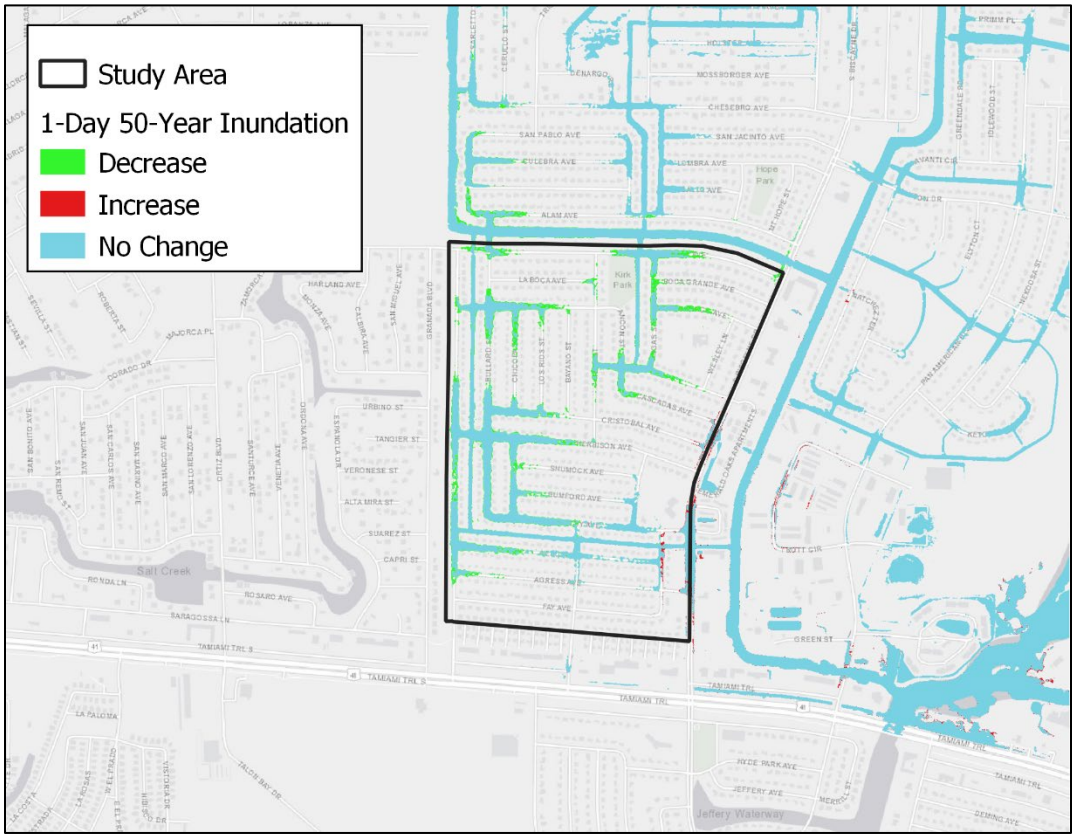
The conceptual plan focuses on improvements to primary components of the stormwater management system to reduce large-scale regional flooding in the City of North Port. Adjacent areas where minor increases may result from primary system improvements have been identified. Appurtenant facilities may be required to eliminate local increases in some isolated areas. It is understood that design of additional facilities (not yet specified) may be included in future applications for phased construction, including, but not limited to, addition of flap gates, local collection system modifications, and/or construction of storage areas to eliminate local impacts from small stage increase in the primary system, if any.

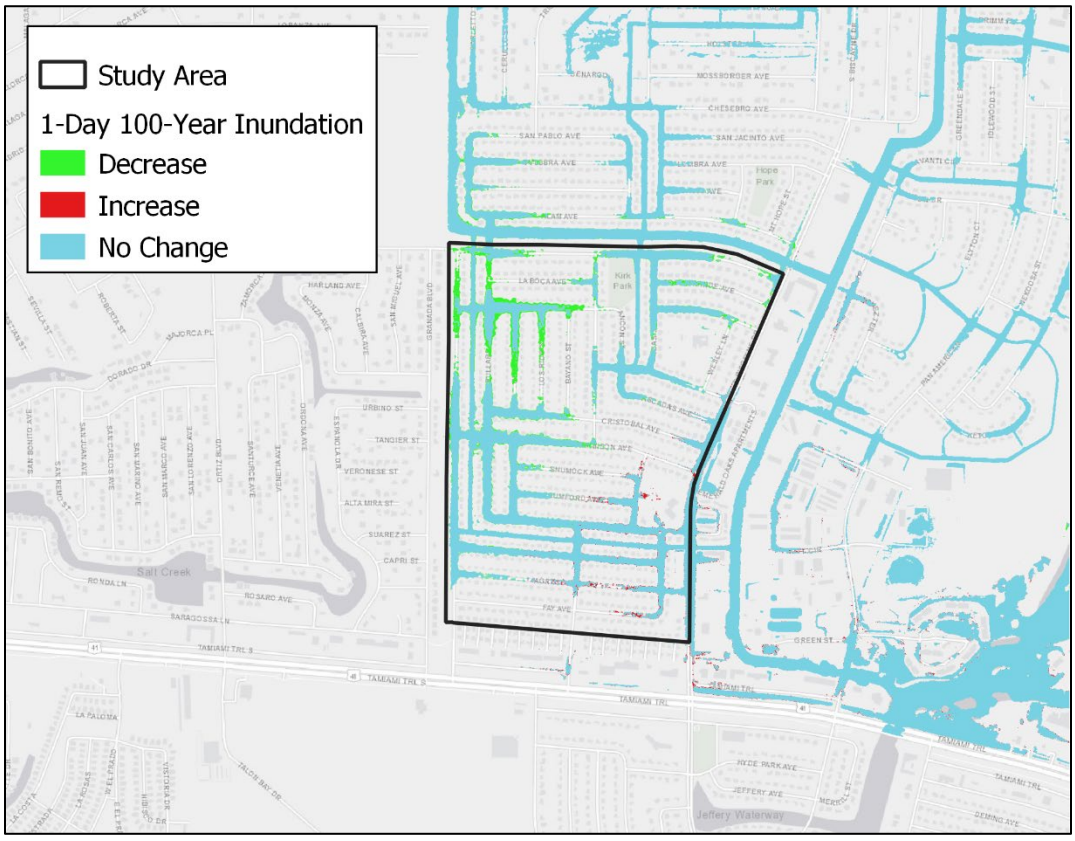

Study Area
1-Day Mean Annual Inundation
Decrease
Increase
No Change


Study Area
1-Day 5-Year Inundation
Decrease
Increase
No Change


Study Area
1-Day 10-Year Inundation
Decrease
Increase
No Change


Study Area
1-Day 25-Year Inundation
Decrease
Increase
No Change


Study Area
1-Day 50-Year Inundation
Decrease
Increase
No Change


Study Area
1-Day 100-Year Inundation
Decrease
Increase
No Change

Appendix A

Benefit Cost Ratio Calculations

Drainage Improvement Components and Probable Construction Costs

Project Components	Existing 101	Full Plan 104B
Existing Condition*	x	x
Dorothy (Single Box Culvert)	-	-
Dorothy (Triple Box Culvert)	-	x
R-36 Improvements	-	x
Bypass (flowway, n = 0.040)	-	x
Bypass (wetland, n = 0.150)	-	-
Reduce Northern Inflows	-	-
Other Planned Improvements	-	-

Estimated Combined Cost	$ -	$ **38,129,391**
Estimated Annualized Cost		$ **2,762,850**

eer's Estimate of Probable Construction Cost (by Commpe

Existing Condition	$ -
Dorothy (Single Box Culvert)	$ 1,299,000
Dorothy (Triple Box Culvert)	$ 5,628,495
R-36 Improvements	$ 15,379,020
Bypass (flowway, n = 0.040)	$ 17,121,876
Bypass (wetland, n = 0.150)	$ 20,546,251
Other Planned Improvements	$ 2,000,000

1.2 = multiplier on Bypass cost to create wetland

7% Interest Rate
50 Number of Years

13.800746 Present Value Annuity Factor
(Considers capital cost only, no annual maint., etc.)

Flood Area Reduction and Cost ($1000 per acre removed)

Flood Area (acres)	2.33-year	7891	7668
	5-year	9076	8744
	10-year	10342	9915
	25-year	11094	10647
	50-year	11898	11432
	100-year	13366	12877
Flood Reduction (acres)	2.33-year	-	223
	5-year	-	332
	10-year	-	427
	25-year	-	447
	50-year	-	466
	100-year	-	489
Cost $1000/ac removed	2.33-year	-	$171
	5-year	-	$115
	10-year	-	$89
	25-year	-	$85
	50-year	-	$82
	100-year	-	$78

Estimates of Benefits and BCR - Road Flood Reduction

Flooded Road (feet)	2.33-year	83668	43056
	5-year	196065	131741
	10-year	417032	326657
	25-year	597989	501959
	50-year	828185	730820
	100-year	1246274	1130254
Road Flood Reduction (miles)	2.33-year	-	7.7
	5-year	-	12.2
	10-year	-	17.1
	25-year	-	18.2
	50-year	-	18.4
	100-year	-	22.0
Cost $1000/mi removed	2.33-year	-	$4,957
	5-year	-	$3,130
	10-year	-	$2,228
	25-year	-	$2,096
	50-year	-	$2,068
	100-year	-	$1,735

Est. Annualized Benefit (A)	$ **364,339**
Est Benefit/Cost Ratio (BCR)	**0.13**

Lit Review

North Port Bond	Miles	$/mile	$/LF	$/LF 2-Ln Rd
$ 46,000,000.00	266	$ 172,932	$ 32.75	$ 65.50

(RS Means vs Bond)

RS Means	planing and cleansing	$ 1.53	32 01 16.71 5200	
RS Means	grooving	$ 1.01	32 01 16.71 5350	
RS Means	paving	$ 19.00	3212 16.19 0200	

width	SY	$/SY	Cost	$/mile
15	2340800	$ 21.54	$ 50,420,832.00	$ 189,552.00

other sources for range

$ 120,000	per mile asphalt repaving	$ 23 per LF
$ 350,000	per mile asphalt repaving	$ 66 per LF

USE:

$200,000	per mile flood removed	4 no. flood events between repair
$50,000	Average benefit (or damages averted) per mi of 2-ln roadway	
0	Est revenue revenue generated by change in property's flood frequency status	

Assume:
$50,000 Roadway Benefit per mile per Flood Avoided

Estimates of Benefits and BCR - Parcels Flooded Reduction (touch)

Flooded Parcels (touch)	2.33-year	7780	6960
	5-year	12373	11303
	10-year	18134	17073
	25-year	21844	20817
	50-year	25887	24788
	100-year	32011	30836
Parcels Reduction (touch)	2.33-year	-	820
	5-year	-	1070
	10-year	-	1061
	25-year	-	1027
	50-year	-	1099
	100-year	-	1175
Cost $1000/parcel removed	2.33-year	-	$46
	5-year	-	$36
	10-year	-	$36
	25-year	-	$37
	50-year	-	$35
	100-year	-	$32

Est. Annualized Benefit (B)	$ **148,337**
Est Benefit/Cost Ratio (BCR)	**0.05**

Assume: *(For partially impacted lots)*
$ 250.00 Per Parcel Benefit per Flood Avoided

250 Average benefit (or damages averted) per parcel per event
0 Est TAX revenue generated by change in property's flood frequency status

Estimates of Benefits and BCR - Parcels Flooded Reduction (centroid)

Flooded Parcels (centroid)	2.33-year	783	549
	5-year	1091	689
	10-year	1399	884
	25-year	1580	1065
	50-year	1799	1290
	100-year	2408	1903
Parcels Reduction (centroid)	2.33-year	-	234
	5-year	-	402
	10-year	-	515
	25-year	-	515
	50-year	-	509
	100-year	-	505
Cost $1000/parcel removed	2.33-year	-	$163
	5-year	-	$95
	10-year	-	$74
	25-year	-	$74
	50-year	-	$75
	100-year	-	$76

Est. Annualized Benefit (C)	$ **1,396,620**
Est. Benefit/Cost Ratio (BCR)	**0.51**
Estimated Annualized Benefit	$ **1,909,295**
Est. Benefit/Cost Ratio (BCR)	**0.69**

Assume: *(For fully inundated lots)*
$ 6,300.00 Average Per Parcel Benefit per Flood Avoided

42000 Ave Flood Claim 2008-2012 (FEMA, 2017)

15% Adj down from Ave Flood Claim
Adjust down to account for vacant lots

6300 Addt'l average benefit (or damages averted) per parcel per event for Centroid Inundated
0 Est tax revenue revenue generated by change in property's flood frequency status

Typ Home Value: 0 > 0 assumes conversion to occupied lot
Millage: 15.4017 Total (0 or $150,000)
11.9947 Countywide NPT
3.407 NPT

0 est. non-ad velorem (0 or$ 540)

	Flood Reduction (acres)	Road Flood Reduction (miles)	Parcels Reduction (centroid)
2.33-year	223	7.7	234
5-year	333	12.2	402
10-year	427	17.1	515
25-year	448	18.2	515
50-year	466	18.4	509
100-year	489	22.0	505

4.0% 13.800746

Engineer's Estimate of Probable Construction Cost
(Based on RS Means 2017, with costs projected at 4% inflation)

	2017	2020	2025	2030	2035
Dorothy (Triple Box Culvert)	$ 5,628,495	$ 6,331,291	$ 7,702,984	$ 9,371,858	$ 11,402,298
R-36 Improvements	$ 15,379,020	$ 17,299,306	$ 21,047,251	$ 25,607,199	$ 31,155,073
Bypass (flowway, n = 0.040)	$ 17,121,876	$ 19,259,782	$ 23,432,470	$ 28,509,182	$ 34,685,779
Estimated Combined Cost	$ 38,129,391	$ 42,890,379	$ 52,182,704	$ 63,488,239	$ 77,243,150
Estimated Annualized Cost*	$ 2,762,850	$ 3,107,830	$ 3,781,151	$ 4,600,348	$ 5,597,027

** Combined construction cost annualized over 50 years at 7%, 13.8 PV Annuity Factor (capital cost only, excludes O&M)*

Preliminary Estimate of Acquisition Cost

	2019	2020	2025	2030	2035
Estimated Property Value*	$ 4,325,200	$ 4,498,208	$ 5,472,758	$ 6,658,447	$ 8,101,018
Estimated Annualized Cost**	$ 313,403	$ 325,939	$ 396,555	$ 482,470	$ 586,999

* Combined "Just Value" of properties inundated 50% or more by flooding from the 10-year 24-Hour Storm Event

ACQUISITION OF FLOODED PROPERTIES IN BIG SLOUGH FLOOD STUDY AREA

City of North Port

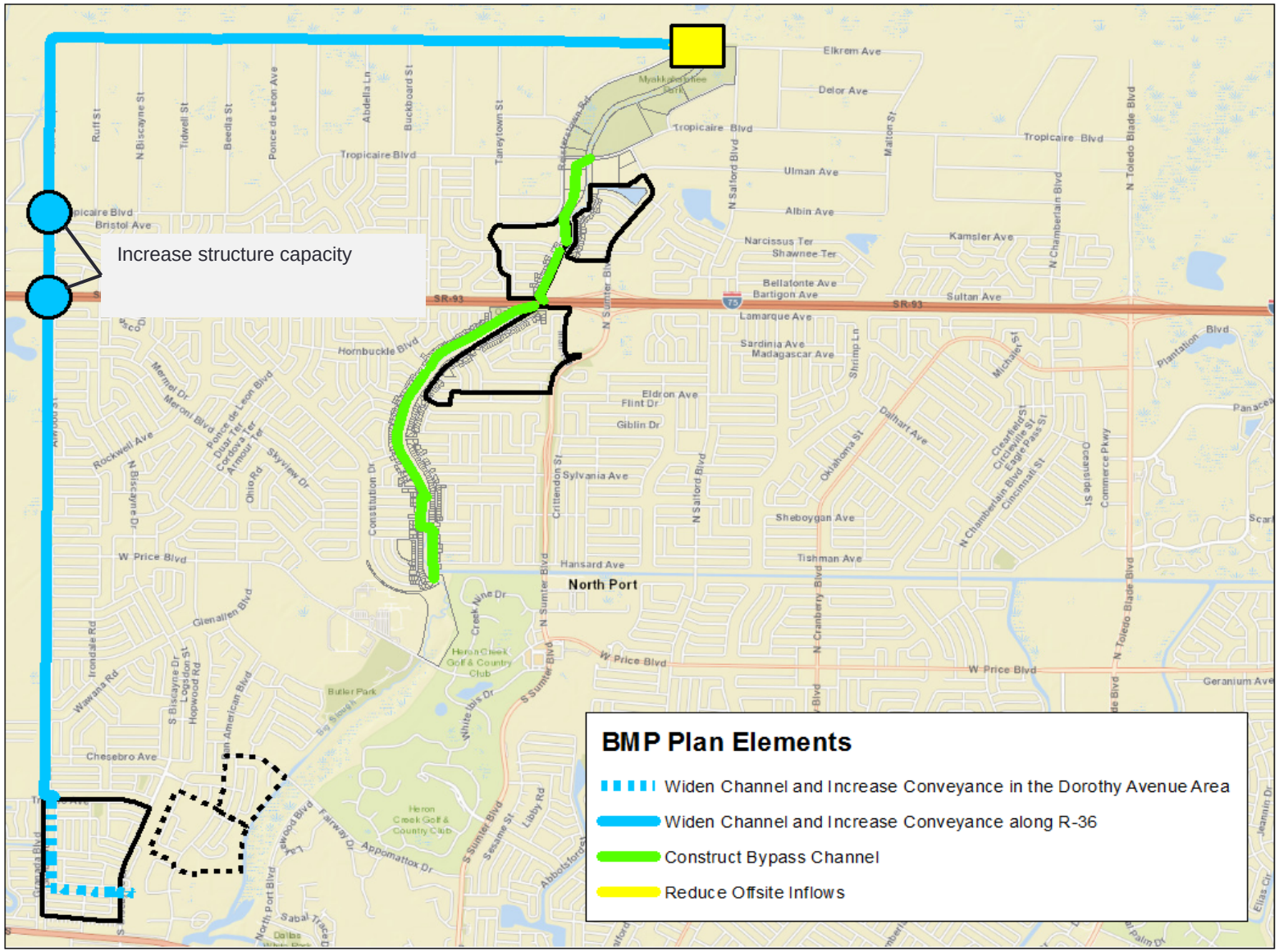
Commission Workshop

December 2, 2019

Purpose of Workshop

- Review Commission direction from the March 4, 2019, Commission Workshop on Big Slough Flood Reduction Study.
- Discuss acquisition of flooded properties.
- Discuss available grant funding.
- Discuss priorities of property acquisition.

Recap of Consultant's Recommended Plan Components in March 4, 2019, Workshop

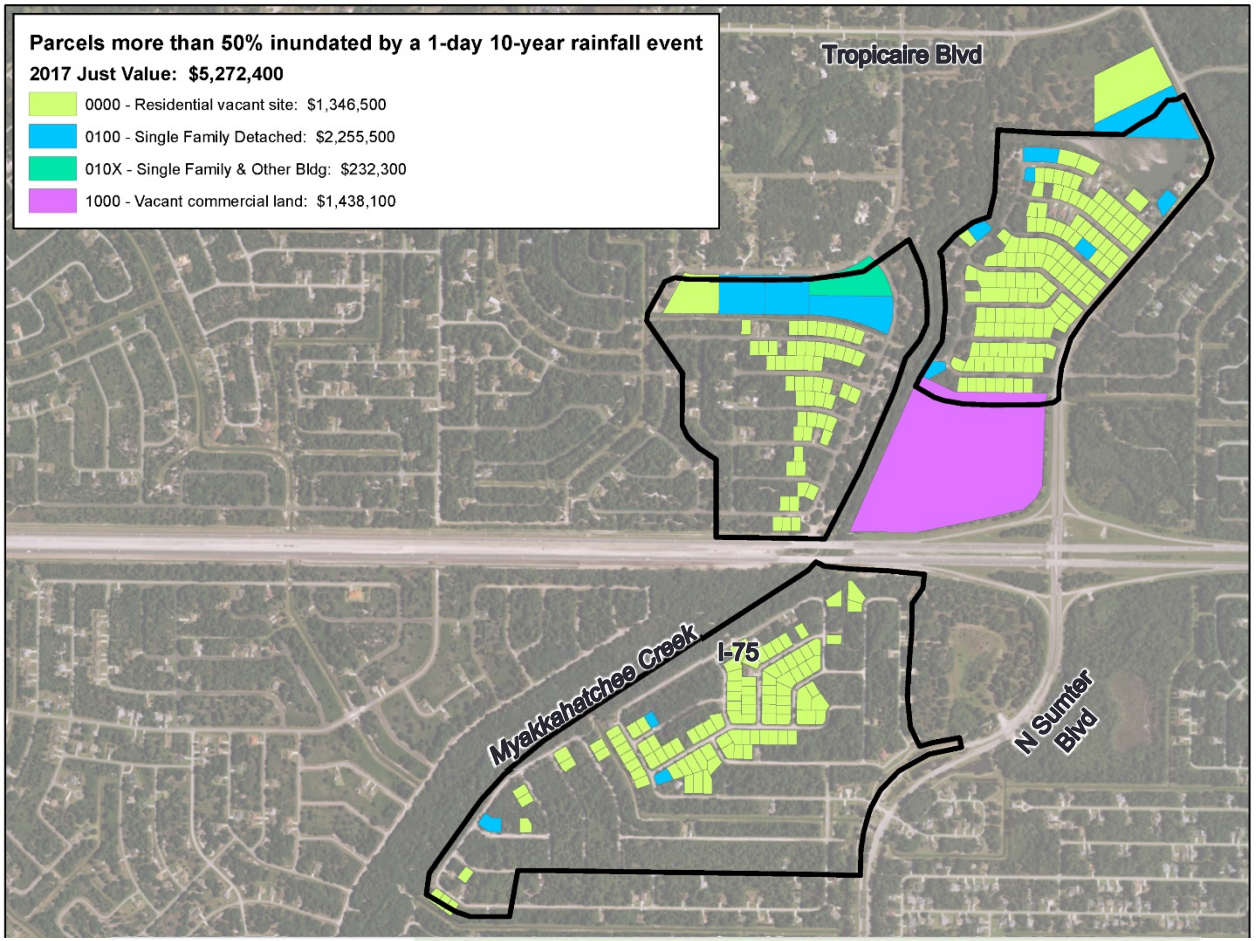


Recap of Consultant's Engineer's Opinion of Probable Cost in March 4, 2019, Workshop

	Engineer's Estimate of Probable Construction Cost (Based on RS Means 2017, with costs projected at 4% inflation)				
	2017	2020	2025	2030	2035
Dorothy (Triple Box Culvert)	$ 5,628,495	$ 6,331,291	$ 7,702,984	$ 9,371,858	$ 11,402,298
R-36 Improvements	$ 15,379,020	$ 17,299,306	$ 21,047,251	$ 25,607,199	$ 31,155,073
Bypass (flowway, n = 0.040)	$ 17,121,876	$ 19,259,782	$ 23,432,470	$ 28,509,182	$ 34,685,779
Reduce Northern Inflows	$ 2,575,105	$ 2,896,643	$ 3,524,209	$ 4,287,739	$ 5,216,690
Estimated Combined Cost	$ 40,704,496	$ 45,787,022	$ 55,706,913	$ 67,775,978	$ 82,459,840
Estimated Annualized Cost*	$ 2,949,442	$ 3,317,721	$ 4,036,515	$ 4,911,037	$ 5,975,028
** Combined construction cost annualized over 50 years at 7%, 13.8 PV Annuity Factor (capital cost only, excludes O&M)*					

RS Means Heavy Construction Costs, adjusted to Ft Myers/Sarasota County area, for engineering design, permitting and construction with 30% contingency.

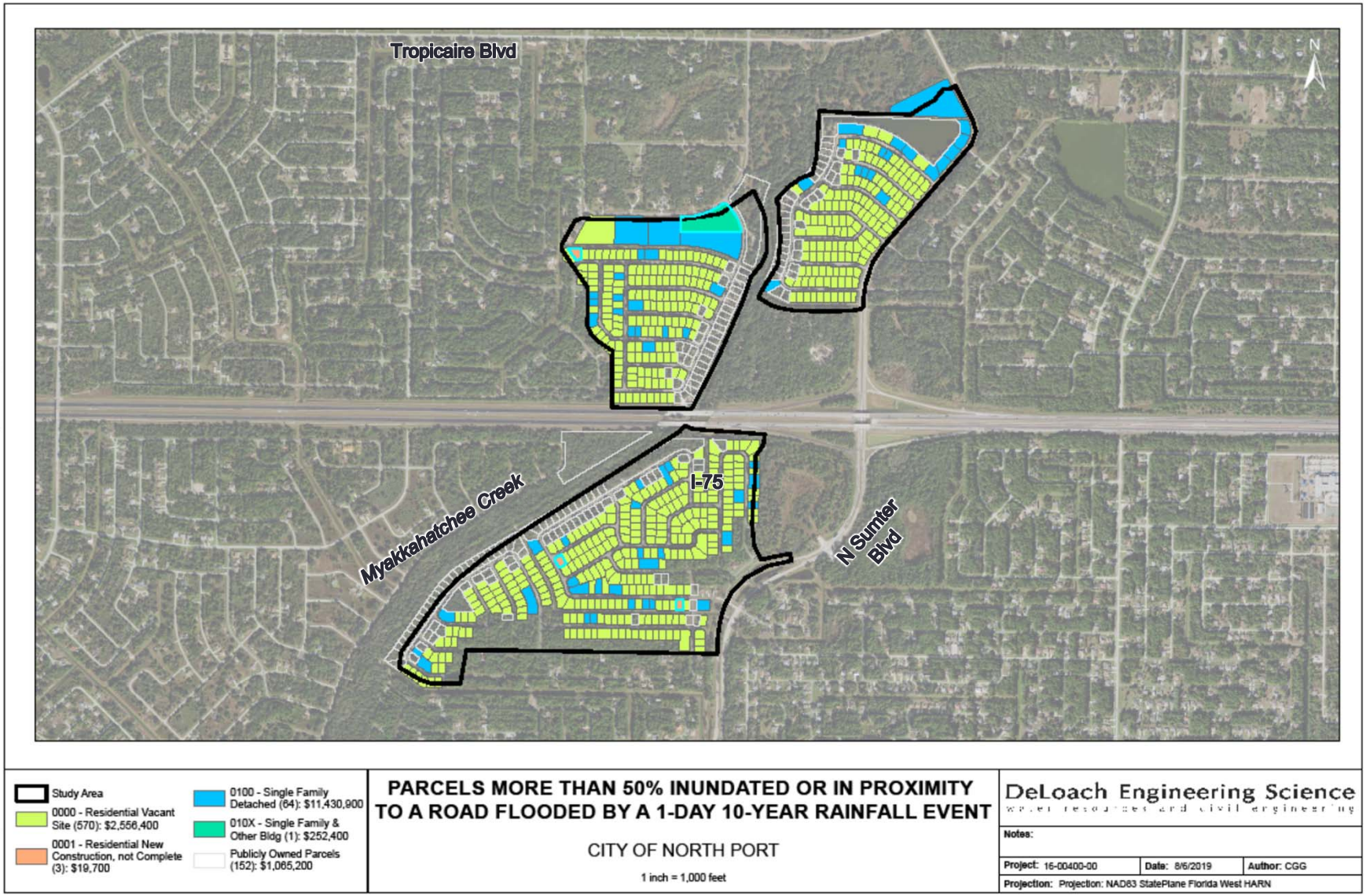
March 4, 2019, Workshop – Flooded Properties Based on 50% Inundated by a 1-day 10-year Rainfall



	Preliminary Estimate of Acquisition Cost (Based on Sarasota County Property Appraiser 2017, projected at 4% inflation)				
	2017	2020	2025	2030	2035
Estimated Property Value*	$ 5,272,400	$ 5,930,733	$ 7,215,643	$ 8,778,934	$ 10,680,915
Estimated Annualized Cost**	$ 382,037	$ 429,740	$ 522,844	$ 636,120	$ 773,937

* Combined "Just Value" of properties inundated 50% or more by flooding from the 10-year 24-Hour Storm Event
** Cost annualized over 50 years at 7%, 13.8 PV Annuity Factor (estimated acquisition cost only)

Update Based on Flood Properties 50% Inundated by a 1-day 10-year Rainfall and Include Parcels Along Flooded Streets



Flooded Properties Acquisition Costs

April 4, 2019 - Just Values of Properties

- 50% flooded in a 1-day 10-year Storm Event.
- Along flooded roadway.

Legend	Parcel Type	No. of Parcels	April 4, 2019 Just Value
	Residential Vacant	570	$2,556,400
	Residential Single Family Home	64	$11,430,900
	Residential New Construction, Not Complete	3	$19,700
	Single Family & Other Building	1	$252,400
	Total	**638**	**$14,259,400**

Consultant Cost for Acquisition

- Include property information reports (title searches) and appraisals for the single family homes.
- Does not include eminent domain condemnation efforts.

Consultant Activity	Cost Estimate August 2019
Property Information Reports (Title Searches)	$319,000
Land Acquisition Negotiations	$2,552,000
Appraisal	$100,000
Closings	$200,000
Total	**$3,171,000**

Grant Funding

- Florida Communities Trust (FCT)

  https://floridadep.gov/lands/land-and-recreation-grants/content/fct-florida-communities-trust-home

  - FDEP administered program with funding from Florida Forever proceeds.
  - Provides funding to local governments and eligible nonprofit organizations to acquire land for parks, open space, greenways.

- Trust for Public Lands (TPL)

  https://www.tpl.org/

  - TPL helps structure, negotiate, and complete land transactions that create parks, playgrounds, and protected natural areas.
  - TPL buy land from willing landowners and then transfers it to public agencies, land trusts, or other groups for permanent protection.

- Federal Emergency Management Agency Hazard Mitigation Grant Program (HMGP)

  https://www.fema.gov/hazard-mitigation-grant-program

  - Following Presidential Major Disaster Declaration, HMGP grants may be available to individuals, businesses and private nonprofits via local governments to purchase property that has been subject to or is in danger of repetitive damage.

Discussion / Recommendations

- Continue with the Myakkahatchee Creek blockage removal efforts.
- After completing creek blockage removal project, re-evaluate the need to acquire properties after two or three rainy seasons.
- Continue flow channel maintenance efforts of creek, canals, retention ditches and roadside swales.
- Install "**Road Subject to Flooding**" signs at key locations.
- Prioritize acquisition of vacant lots within Study area.
    1. Vacant parcels nearest to Myakkahatchee Creek along flooded streets. Negotiate first with willing sellers.
    2. Vacant parcels 50% inundated in 1-day 10-year storm.
- Same priority as above except add acquisition of parcels with constructed homes ?
- Pursue grant funding for property acquisition.

City of North Port
DEPARTMENT OF PUBLIC WORKS
Office: 941.240.8050
Fax: 941.240.8063

MEMORANDUM

TO: Jason Yarborough, ICMA-CM, Acting City Manager

THROUGH: Cari Branco, Assistant City Manager

FROM: Juliana B. Bellia, Director

SUBJECT: Item No. 246: Financial Impact of Removing Suggested Purchase Properties with the Big Slough Flood Study Area from Tax Roll

DATE: September 4, 2020

During the City Commission Workshop held on December 2, 2019, staff was directed to provide the financial impact of removing suggested purchased properties within Big Slough Flood Study area from tax roll, provide map of locations along creek where our Operations personnel will be removing creek blocks, and investigate available property for possible "property swap."

FINANCIAL IMPACT TO THE TAX ROLL OF REMOVED LOTS

The Big Slough Flood Reduction Study identified a total of 647 properties/lots within the Study area near the Myakkahatchee Creek and I-75 bridge that will be subject to flooding for the 10-year, 25-year and 100-year storm events. The following provides a breakdown of the 647 affected properties:

- Vacant single-family lots: 579
- Lots developed with single family residences: 65
- Lots in the construction process for single-family residences: 3

The financial impact of removing these lots from the tax roll was determined utilizing 2019 data from the websites of the Sarasota County Tax Collector and the Sarasota County Property Appraiser. The financial impacts only include the City of North Port mileage portion and the Non-Ad Valorem Assessments for the Fire Rescue District, Road and Drainage District, Solid Waste District and Capital Road Bond.

Based on the 2019 data included in the Sarasota County Tax Collector's website, the financial impact of removing all the lots subject to flooding and highlighted by the Big Slough Flood Reduction Study will total approximately $272,500.00 per year. *(See Attachment 1).*

MAP DELINEATING MYAKKAHATCHEE CREEK BLOCKAGES

The Myakkahatchee Creek Blockage Removal Project typically takes place in the dry season between the months of December and May. The blockages have been identified and are delineated on a map. *(See Attachment 2).*

The direct pathway to each blockage has not yet been determined and therefore are not delineated on the attached map. Staff is currently evaluating potential pathways/access points to determine the alternatives that will have the least environmental impact.

Prior to the start of the Myakkahatchee Creek Blockage Removal Project, environmental surveys of the selected pathways/access points will be completed, and the entire Project Plan will be presented to the Commission.

AVAILABLE CITY-OWNED PROPERTY FOR POTENTIAL "PROPERTY SWAP"

The City of North Port currently owns a total of 554 single family residential lots within the City limits that can be considered for a property swap with the vacant single family lots included in the Big Slough Flood Reduction Study.

Should you have any questions, or desire any additional information, please do not hesitate to contact me.

JBB/jbb

Attachments:

1) Spreadsheets for Breakdown of Taxes and Assessments
2) Map Delineating Myakkahatchee Creek Blockages

Cc: PW Electronic File
Gerardo Traverso, P.E., P.M.P., Engineering Manager
Chuck Speake, Operations and Maintenance Manager
Frank Miles, MPA, Director, Department of Neighborhood Development Services

Attachment 1

RESIDENTIAL LOTS

CONSTRUCTION STARTED BUT NOT COMPLETED TO DATE

	Account	Owner Name	2019 Ad-Valorem			2019 Non Ad-Valorem				Total
			Ass/Tax Value	Milllage Rate-City	Total Tax	Fire & Rescue	Road & Drainage	Capital Road Bond	Solid Waste	
1	954142463	MAKSIMCHUK VASILIY	$4,246.00	3.8735	$16.45	$85.66	$171.56	$46.00	$245.00	$564.67
2	953152605	HOMES MADE POSSIBLE HOMES LLC	$3,171.00	3.8735	$12.28	$85.66	$171.56	$46.00	$0.00	$315.50
3	954142701	TERRA CORAL LLC	$4,392.00	3.8735	$17.01	$85.66	$171.56	$46.00	$245.00	$565.23
					$45.74	$256.98	$514.68	$138.00	$490.00	
								Totals	$1,445.40	$1,445.40

Total all Properties. **$265,635.69**

SINGLE DETACHED HOMES

	Account	Owner Name	2019 Ad-Valorem			2019 Non Ad-Valorem				Totals
			Ass/Tax Value	Milllage Rate-City	Total Tax	Fire & Rescue	Road & Drainage	Capital Road Bond	Solid Waste	
1	942153204	FOLLMER RAYMOND	$175,299.00	3.8735	$679.02	$310.28	$171.56	$46.00	$245.00	$1,451.86
2	942080003	PARFENCHUK RUTH A	$188,691.38	3.8735	$730.90	$333.98	$171.56	$46.00	$245.00	$1,527.44
3	954142913	SCHIAU SERGHEI	$173,787.77	3.8735	$673.17	$307.60	$171.56	$46.00	$245.00	$1,443.33
4	942080002	HARRIS DEWEY R	$211,473.86	3.8735	$819.14	$374.31	$171.56	$46.00	$245.00	$1,656.01
5	954142926	HAYES CORY ALLEN	$118,662.30	3.8735	$459.64	$210.03	$171.56	$46.00	$245.00	$1,132.23
6	942153307	NEW VISTA RESIDENCES INC	$153,768.96	3.8735	$595.62	$272.17	$171.56	$46.00	$245.00	$1,330.36
7	954141738	KING BOBBY G	$135,655.44	3.8735	$525.46	$240.11	$171.56	$46.00	$245.00	$1,228.13
8	954143217	ANGOTTI SONDRA CHARISLE	$168,909.00	3.8735	$654.27	$298.97	$171.56	$46.00	$245.00	$1,415.80
9	954142459	HOWETT RICHARD R	$43,997.28	3.8735	$170.42	$267.16	$171.56	$46.00	$245.00	$900.14
10	953151931	FITZNER KENNETH ROBERT	$0.00	3.8735	$0.00	$223.16	$171.56	$46.00	$245.00	$685.72
11	954143221	YORK JOSHUA	$210,422.70	3.8735	$815.07	$372.45	$171.56	$46.00	$245.00	$1,650.08
12	954142437	COMPERDA MICHAEL G	$133,965.29	3.8735	$518.91	$237.12	$171.56	$46.00	$245.00	$1,218.59
13	955153218	DE CLERCQ JEFFREY	$118,438.65	3.8735	$458.77	$232.70	$171.56	$46.00	$245.00	$1,154.03
14	954142522	CHAPMAN BYRON JAMES	$34,055.51	3.8735	$131.91	$235.00	$171.56	$46.00	$245.00	$829.47
15	954142467	IAFRATE JOSEPH C	$148,485.50	3.8735	$575.16	$262.82	$171.56	$46.00	$245.00	$1,300.54
16	954142930	FORREST CHRISTOPHER D	$173,748.36	3.8735	$673.01	$307.53	$171.56	$46.00	$245.00	$1,443.11
17	942080008	WAGNER ANA C	$137,444.64	3.8735	$532.39	$243.28	$171.56	$46.00	$245.00	$1,238.23
18	954143329	KELLEY TRACY L	$92,587.91	3.8735	$358.64	$238.95	$171.56	$46.00	$245.00	$1,060.15
19	954142128	ANDERSON DEBBIE A	$191,983.29	3.8735	$743.65	$339.81	$171.56	$46.00	$245.00	$1,546.02
20	942080004	BORER ELIZABETH	$277,853.18	3.8735	$1,076.26	$491.80	$171.56	$46.00	$245.00	$2,030.62
21	942080001	WIERSMA VERNON L	$191,130.23	3.8735	$740.34	$338.30	$171.56	$46.00	$245.00	$1,541.20
22	954142456	MAKSIMCHUK DMITRY	$102,600.00	3.8735	$397.42	$239.66	$171.56	$46.00	$245.00	$1,099.64
23	942080011	PORTER SHARON F	$202,626.90	3.8735	$784.88	$358.65	$171.56	$46.00	$245.00	$1,606.08
24	954142925	PAUL ALAN & PAMELA JUNE LUTZ REVOCABLE TRUST	$165,707.61	3.8735	$641.87	$293.30	$171.56	$46.00	$245.00	$1,397.73
25	942080007	LA CROIX FREDERICK R	$130,189.86	3.8735	$504.29	$230.44	$171.56	$46.00	$245.00	$1,197.29
26	953152217	BRENTWOOD NP LLC	$169,628.94	3.8735	$657.06	$300.24	$171.56	$46.00	$245.00	$1,419.86
27	954141810	OSBORNE JOHN R	$50,397.93	3.8735	$195.22	$267.16	$171.56	$46.00	$245.00	$924.94
28	953151934	KOSZ MONIKA	$90,768.89	3.8735	$351.59	$223.00	$171.56	$46.00	$245.00	$1,037.15
29	942153205	HINGER RICHARD	$80,060.31	3.8735	$310.11	$254.00	$171.56	$46.00	$245.00	$1,026.67
30	954142518	POLOVICH PHILIP	$132,805.50	3.8735	$514.42	$235.07	$171.56	$46.00	$245.00	$1,212.05
31	954142605	FORTH CHARLES A	$62,128.91	3.8735	$240.66	$238.00	$171.56	$46.00	$245.00	$941.22
32	953152214	GLENRIDGE ESTATES LLC	$131,128.13	3.8735	$507.92	$232.10	$171.56	$46.00	$245.00	$1,202.58
33	942153301	ATKINSON CURTIS M	$55,979.60	3.8735	$216.84	$278.00	$171.56	$46.00	$245.00	$957.40
34	953141113	MORNINGSTAR JOSEPH H	$235,078.52	3.8735	$910.58	$416.09	$171.56	$46.00	$245.00	$1,789.23
35	953152103	MATHIEU PAUL	$292,555.50	3.8735	$1,133.21	$517.82	$171.56	$46.00	$245.00	$2,113.60
36	942080005	NEWHALL SUSAN RAE	$258,688.50	3.8735	$1,002.03	$457.88	$171.56	$46.00	$245.00	$1,922.47
37	944152728	KAPPELMANN KEITH D	$26,625.00	3.8735	$103.13	$215.00	$171.56	$46.00	$245.00	$780.69
38	953152222	TILLMAN DAVID S	$164,968.50	3.8735	$639.01	$291.99	$171.56	$46.00	$245.00	$1,393.56
39	954143311	EDWARDS LENA E	$86,487.59	3.8735	$335.01	$256.00	$171.56	$46.00	$245.00	$1,053.57

SINGLE DETACHED HOMES

40	954142520	THOMPSON DAVID L (CO-TTEE)	$238,879.50	3.8735	$925.30	$422.82	$171.56	$46.00	$245.00	$1,810.68
41	954143215	RIVERA LEONARDO JR	$61,695.45	3.8735	$238.98	$243.00	$171.56	$46.00	$245.00	$944.54
42	953152324	WINTER MARTIN D	$26,092.50	3.8735	$101.07	$217.89	$171.56	$46.00	$245.00	$781.52
43	953152614	MAIGRET STEPHEN	$101,481.72	3.8735	$393.09	$223.00	$171.56	$46.00	$245.00	$1,078.65
44	942153206	MANNING LAWRENCE W	$54,960.39	3.8735	$212.89	$239.76	$171.56	$46.00	$245.00	$915.21
45	942153308	NEW VISTA RESIDENCES INC	$131,504.07	3.8735	$509.38	$232.76	$171.56	$46.00	$245.00	$1,204.70
46	954142458	WILLIAMS ANNIE M	$186,481.50	3.8735	$722.34	$330.07	$171.56	$46.00	$245.00	$1,514.97
47	953152628	ABAJIAN ANN	$75,010.08	3.8735	$290.55	$234.00	$171.56	$46.00	$245.00	$987.11
48	967060743	MERRING AUSTIN	$159,111.00	3.8735	$616.32	$281.63	$171.56	$46.00	$245.00	$1,360.50
49	953152515	KLEIN ANNA	$161,880.00	3.8735	$627.04	$286.53	$171.56	$46.00	$245.00	$1,376.13
50	953152518	HOWETT KRISTIN	$68,909.76	3.8735	$266.92	$265.90	$171.56	$46.00	$245.00	$995.38
51	954141739	ADORNA TOM	$86,689.94	3.8735	$335.79	$254.80	$171.56	$46.00	$245.00	$1,053.15
52	953141110	THURSTON JEFFREY M	$115,047.69	3.8735	$445.64	$203.63	$171.56	$46.00	$245.00	$1,111.83
53	954142627	WJHFL LLC	$131,600.00	3.8735	$509.75	$232.93	$171.56	$46.00	$245.00	$1,205.24
54	954142515	CSMA FT LLC	$113,422.50	3.8735	$439.34	$200.76	$171.56	$46.00	$245.00	$1,102.66
55	954142630	SUTTER JOHN	$149,600.00	3.8735	$579.48	$264.79	$171.56	$46.00	$245.00	$1,306.83
56	967060701	MULLEN MARK F	$194,469.00	3.8735	$753.28	$344.21	$171.56	$46.00	$245.00	$1,560.05
57	942041904	SCOTT JOSEPH W	$111,701.46	3.8735	$432.68	$243.00	$171.56	$46.00	$245.00	$1,138.24
58	953152415	MC MILLAN MICHAEL	$143,624.84	3.8735	$556.33	$254.22	$171.56	$46.00	$245.00	$1,273.11
59	953152221	LONG JR DAVID L	$26,625.00	3.8735	$103.13	$254.67	$171.56	$46.00	$245.00	$820.36
60	953152513	CABRERA ROLANDO	$130,462.50	3.8735	$505.35	$230.92	$171.56	$46.00	$245.00	$1,198.83
61	953151933	MINA CYNTHIA G	$81,642.90	3.8735	$316.24	$256.00	$171.56	$46.00	$245.00	$1,034.80
62	954142803	GAILLARD CHELSEA	$142,446.95	3.8735	$551.77	$252.13	$171.56	$46.00	$245.00	$1,266.46
63	953152713	DE CLERQ JR DONALD H	$26,625.00	3.8735	$103.13	$247.98	$171.56	$46.00	$245.00	$813.67
64	953141111	TRUST AGREEMENT DATED 02/09/1999	$230,892.00	3.8735	$894.36	$408.68	$171.56	$46.00	$245.00	$1,765.60
65	953141112	UTT KEITH V	$111,656.73	3.8735	$432.50	$265.00	$425.26	$46.00	$245.00	$1,413.76
					$33,239.66	$18,333.01	$11,405.10	$2,990.00	$15,925.00	
								Totals	$81,892.77	$81,892.77

VACANT LOTS

	Account	Owner Name	2019 Ad-Valorem			2019 Non Ad-Valorem				Total
			Ass/Tax Value	Milllage Rate-City	Total Tax	Fire & Rescue	Road & Drainage	Capital Road Bond	Solid Waste	
1	942153207	RE & C INVESTMENT LLC	$3,800.00	3.8735	$14.72	$85.66	$171.56	$46.00	$0.00	$317.94
2	942153326	NEW VISTA PROPERTIES INC	$3,400.00	3.8735	$13.17	$85.66	$171.56	$46.00	$0.00	$316.39
3	942080009	NORMAN WILLIAM	$18,041.10	3.8735	$69.88	$85.66	$171.56	$46.00	$0.00	$373.10
4	942153324	ABREU VICTOR A	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
5	954142808	RIVERSIDE LAND HOLDINGS LLC	$4,252.55	3.8735	$16.47	$85.66	$171.56	$46.00	$0.00	$319.69
6	955153007	GMINDER RUSSELL	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
7	954142717	IVANENKO PETER	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
8	942153208	SILVER FROND INVESTMENTS LLC	$3,727.50	3.8735	$14.44	$85.66	$171.56	$46.00	$0.00	$317.66
9	953152011	AIEL INVESTMENT LLC	$3,969.26	3.8735	$15.37	$85.66	$171.56	$46.00	$0.00	$318.59
10	942153323	CRONKEY JOSEPH E	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
11	953152117	CAMPBELL CARL G	$3,969.26	3.8735	$15.37	$85.66	$171.56	$46.00	$0.00	$318.59
12	942153310	NEW VISTA PROPERTIES INC	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
13	954141727	PHAM DUC M	$4,252.55	3.8735	$16.47	$85.66	$171.56	$46.00	$0.00	$319.69
14	955152912	WILLIAMS WALTER E JR	$3,301.50	3.8735	$12.79	$85.66	$171.56	$46.00	$0.00	$316.01
15	954142528	MONTALVO EDUARDO R	$4,961.84	3.8735	$19.22	$85.66	$171.56	$46.00	$0.00	$322.44
16	954142233	JIMENEZ HERBERT	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
17	954142221	PHILLIPS ANDREW	$14,458.44	3.8735	$56.00	$85.66	$171.56	$46.00	$0.00	$359.22
18	954142457	NEVIS FOUR LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
19	953152322	HALE ROBERT D	$3,621.00	3.8735	$14.03	$85.66	$171.56	$46.00	$0.00	$317.25
20	953152201	BURKE DARCI L	$3,969.26	3.8735	$15.37	$85.66	$171.56	$46.00	$0.00	$318.59
21	955153128	PROVIDENT TRUST GROUP LLC	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
22	955153214	MC GRATH JOSEPH P	$3,301.50	3.8735	$12.79	$85.66	$171.56	$46.00	$0.00	$316.01
23	954142224	PURFEERST JOSEPH E (TTEE)	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
24	954142236	CHEN QIAN	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
25	954142625	HEIVA HOLDINGS USA LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
26	954142403	EQUITY TRUST COMPANY CUST	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
27	953152316	NEW VISTA PROPERTIES INC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
28	954143216	FICHTENBERG RONALD	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
29	955153107	CHADWICK REI6 LLC	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
30	955153010	PLANAS TEOBALDO	$3,621.00	3.8735	$14.03	$85.66	$171.56	$46.00	$0.00	$317.25
31	954141804	OVERSEAS INVESTMENT LLC	$4,899.00	3.8735	$18.98	$85.66	$171.56	$46.00	$0.00	$322.20
32	954142602	SMITH WILLARD J	$4,394.19	3.8735	$17.02	$85.66	$171.56	$46.00	$0.00	$320.24
33	954143114	MOORE EDWARD M JR	$5,670.06	3.8735	$21.96	$85.66	$171.56	$46.00	$0.00	$325.18
34	954143115	LOY WILLIAM M	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
35	954142811	PAJUNAR AMOR G (TTEE)	$4,819.13	3.8735	$18.67	$85.66	$171.56	$46.00	$0.00	$321.89
36	954142920	DAGUE RICK JOSEPH	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
37	953152302	DELVILLAR ANGELO R	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
38	954143318	NORTH PORT LOTS AND REAL PROPERTY LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
39	954143205	HAUBER EDWARD R (TTEE)	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14

VACANT LOTS

40	955153115	SYNERGIC INVESTMENTS INC	$3,195.00	3.8735	$12.38	$85.66	$171.56	$46.00	$0.00	$315.60
41	955153110	EPPS MONTE (TTEE)	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
42	955153003	BURKE CHRISTOPHER P	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
43	954142804	ANTOSH WAYNE	$4,252.55	3.8735	$16.47	$85.66	$171.56	$46.00	$0.00	$319.69
44	954141729	SHABURA VLADIMIR	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
45	955153004	NEW VISTA PROPERTIES INC	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
46	954142801	PERCIAL MARTHA A	$4,899.00	3.8735	$18.98	$85.66	$171.56	$46.00	$0.00	$322.20
47	954142917	VEREMCHUK ALEKSANDR	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
48	954143214	PICKETT KENNETH	$4,639.14	3.8735	$17.97	$85.66	$171.56	$46.00	$0.00	$321.19
49	954142120	KRACHKO ANDREY	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
50	954142526	NOLAND JASON	$5,245.13	3.8735	$20.32	$85.66	$171.56	$46.00	$0.00	$323.54
51	954142439	ZEIS ERNEST	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
52	954143317	AMBURGEY TOMMY W	$3,827.61	3.8735	$14.83	$85.66	$171.56	$46.00	$0.00	$318.05
53	954141736	HERCHENHAHN JEAN	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
54	953152107	SUNBELT SALES & DEVELOPMENT CORP	$3,827.61	3.8735	$14.83	$85.66	$171.56	$46.00	$0.00	$318.05
55	954143110	ADAMS GERALD (TTEE)	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
56	954143314	HOFER CHRISTOPHER F	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
57	953151932	SUSAN CAROL FITZPATRICK REVOC LIVING TRUST	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
58	953152401	RAZZAQUE ANJUMAN J	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
59	953152313	DENIS SILVIA M	$3,969.26	3.8735	$15.37	$85.66	$171.56	$46.00	$0.00	$318.59
60	942153306	Q SMITH HOMES LLC	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
61	955152707	PRIVATE EQUITY SOLUTIONS LLC	$3,727.50	3.8735	$14.44	$85.66	$171.56	$46.00	$0.00	$317.66
62	955152704	NANDIGAM KOUSHALYA	$3,727.50	3.8735	$14.44	$85.66	$171.56	$46.00	$0.00	$317.66
63	955152811	NORTH PORT LOTS AND REAL PROPERTY LLC	$2,875.50	3.8735	$11.14	$85.66	$171.56	$46.00	$0.00	$314.36
64	955153108	MARINA LUPYAN TRUST	$3,301.50	3.8735	$12.79	$85.66	$171.56	$46.00	$0.00	$316.01
65	955153111	LANGE BARBARA	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
66	954141748	PORCO DOMENICO	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
67	954142228	RODRIGUEZ WAYNE	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
68	954143202	POWELL MICHAEL J	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
69	954141723	DE LEON OSCAR	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
70	954142902	SMITH DAN	$4,677.48	3.8735	$18.12	$85.66	$171.56	$46.00	$0.00	$321.34
71	955152916	NORTH PORT LOTS AND REAL PROPERTY LLC	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
72	954142907	COGOLLOS ANGELA	$4,252.55	3.8735	$16.47	$85.66	$171.56	$46.00	$0.00	$319.69
73	954141751	LOURO PHILIP	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
74	954142910	CHU WANG LING	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
75	955152706	MYERS DAVID C	$3,727.50	3.8735	$14.44	$85.66	$171.56	$46.00	$0.00	$317.66
76	953151638	PAUYO CASSANDRA	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
77	954143011	OVERSEAS INVESTMENT LLC	$4,579.50	3.8735	$17.74	$85.66	$171.56	$46.00	$0.00	$320.96
78	955153113	GROZA DELIA M	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
79	954142443	BALIUS GENE	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
80	955153013	VIRNAN NADIA	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
81	955153212	VINNIK IGOR	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
82	955153127	PROVIDENT TRUST GROUP LLC	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83

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83	954142517	QUEEN VIRGINIA P	$5,528.42	3.8735	$21.41	$85.66	$171.56	$46.00	$0.00	$324.63
84	954141744	BURNS JOHN J	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
85	954142802	MORGAN JEFFREY C	$4,252.55	3.8735	$16.47	$85.66	$171.56	$46.00	$0.00	$319.69
86	955153125	SUSAN CAROL FITZPATRICK REVOC LIVING TRUST	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
87	955152908	SLABAUGH GLEN	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
88	954142906	HOMA GINA L	$4,252.55	3.8735	$16.47	$85.66	$171.56	$46.00	$0.00	$319.69
89	955153124	NEW VISTA PROPERTIES INC	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
90	953151639	NORTH PORT LOTS AND REAL PROPERTY LLC	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
91	954142601	SMITH WILLARD J	$4,394.19	3.8735	$17.02	$85.66	$171.56	$46.00	$0.00	$320.24
92	954142122	KRACHKO ANDREY	$4,394.19	3.8735	$17.02	$85.66	$171.56	$46.00	$0.00	$320.24
93	955153216	MAGGIO RONALD J	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
94	955152806	KOBEL KATHRYN	$3,727.50	3.8735	$14.44	$85.66	$171.56	$46.00	$0.00	$317.66
95	955152701	UB PROPERTIES LLC	$2,343.00	3.8735	$9.08	$85.66	$171.56	$46.00	$0.00	$312.30
96	955153105	SNYDER DEVELOPMENT CORP	$4,047.00	3.8735	$15.68	$85.66	$171.56	$46.00	$0.00	$318.90
97	955153112	GOGREEN PROPERTY MGMT LLC	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
98	954142511	CHUNG WINIFRED C	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
99	954142301	BARNETT JERRY A	$4,677.48	3.8735	$18.12	$85.66	$171.56	$46.00	$0.00	$321.34
100	955152921	KOSTESKI SIMON	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
101	954142805	PAIK SON K	$4,252.55	3.8735	$16.47	$85.66	$171.56	$46.00	$0.00	$319.69
102	954143010	ALEXSOFF DEAN	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
103	954143009	KOSTESKI SIMON	$4,677.48	3.8735	$18.12	$85.66	$171.56	$46.00	$0.00	$321.34
104	942153311	MANNELL ROBERT A	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
105	953152208	SERFOZO STEVE	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
106	954142530	KARR MARTIN PALMER	$5,005.50	3.8735	$19.39	$85.66	$171.56	$46.00	$0.00	$322.61
107	954142451	VERENCHUK IGOR	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
108	954142461	ESTANDA FIDEL	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
109	954142464	GMINDER RUSSELL	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
110	954142444	BALIUS GENE	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
111	955152812	PEDRIQUEZ VIRGILIO V	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
112	942153304	MOLTER GREGORY	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
113	955152805	GULF COAST CONSULTING LLC	$3,727.50	3.8735	$14.44	$85.66	$171.56	$46.00	$0.00	$317.66
114	953152113	BERRYHILL TIMOTHY	$3,969.26	3.8735	$15.37	$85.66	$171.56	$46.00	$0.00	$318.59
115	954142523	BARJUCA OCTAVIAN	$4,535.84	3.8735	$17.57	$85.66	$171.56	$46.00	$0.00	$320.79
116	954142524	BEACHY FREEMAN	$4,961.84	3.8735	$19.22	$85.66	$171.56	$46.00	$0.00	$322.44
117	953151633	DOWDEN SR CURLL C	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
118	954142237	DAVIS LEWIN	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
119	954143320	KOLANEK IRENA (E LIFE EST)	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
120	954143204	MAKSIMCHUK VLADISLAV	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
121	954143313	HOFER CHRISTOPHER F	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
122	953152205	BRISSETT BERYL M	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
123	942153314	NORTH PORT LOTS AND REAL PROPERTY LLC	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
124	953152102	FLORIDA RESERVE HOMES LLC	$4,047.00	3.8735	$15.68	$85.66	$171.56	$46.00	$0.00	$318.90
125	955152702	NICHOLS MEGAN	$3,727.50	3.8735	$14.44	$85.66	$171.56	$46.00	$0.00	$317.66

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126	955152817	CANINO JOHN A JR	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
127	953152114	CAMPBELL CARL G	$3,969.26	3.8735	$15.37	$85.66	$171.56	$46.00	$0.00	$318.59
128	954142021	BRIAN W BRANCH AND DEBORAH A HUNT TRUST	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
129	954143321	SANJEF ENTERPRISES LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
130	954142404	ILLSLEY RICHARD R	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
131	955152705	DIANGSON TEODORO M	$3,727.50	3.8735	$14.44	$85.66	$171.56	$46.00	$0.00	$317.66
132	954143103	MACKE JOHN E	$3,827.61	3.8735	$14.83	$85.66	$171.56	$46.00	$0.00	$318.05
133	953151635	NEW VISTA PROPERTIES INC	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
134	954142904	ROMANS REMODELING LLC	$4,899.00	3.8735	$18.98	$85.66	$171.56	$46.00	$0.00	$322.20
135	953141109	KINNARD ALAN F	$74,277.36	3.8735	$287.71	$85.66	$171.56	$46.00	$0.00	$590.93
136	954141747	HEIVA HOLDINGS USA LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
137	954142514	PARKHILL GARY	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
138	954142624	EVANS JOAN	$4,899.00	3.8735	$18.98	$85.66	$171.56	$46.00	$0.00	$322.20
139	955153126	AGMA INTERNATIONAL LLC	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
140	954141904	LAMKIN DOLORES	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
141	954142007	Q SMITH HOMES LLC	$4,252.55	3.8735	$16.47	$85.66	$171.56	$46.00	$0.00	$319.69
142	954143325	SANFORD STANLEY	$4,899.00	3.8735	$18.98	$85.66	$171.56	$46.00	$0.00	$322.20
143	954142448	MAO ALICE	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
144	942153320	LI-CHUAN CHUANG	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
145	953152105	CHRISTOPHER ALEXANDER	$4,047.00	3.8735	$15.68	$85.66	$171.56	$46.00	$0.00	$318.90
146	942153222	WERNER FAMILY TRUST	$3,940.50	3.8735	$15.26	$85.66	$171.56	$46.00	$0.00	$318.48
147	942153305	CILLEY KATHERINE E	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
148	955153219	KARELLA ANTHONY H	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
149	954141914	HUMMEL DAVID M	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
150	954143220	HILAIRE JEAN MICHEL	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
151	942153318	AMERICAN ESTATE AND TRUST	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
152	954142447	Q SMITH HOMES LLC	$4,961.84	3.8735	$19.22	$85.66	$171.56	$46.00	$0.00	$322.44
153	954142004	BACCHUS ALBAN	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
154	954141746	GRAY JASON	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
155	954141737	HORIZON TRUST COMPANY	$5,857.50	3.8735	$22.69	$85.66	$171.56	$46.00	$0.00	$325.91
156	954142709	MARTIN FAMILY TRUST	$4,535.84	3.8735	$17.57	$85.66	$171.56	$46.00	$0.00	$320.79
157	954142525	HEIVA HOLDINGS USA LLC	$4,961.84	3.8735	$19.22	$85.66	$171.56	$46.00	$0.00	$322.44
158	954142705	LEWIS MIKE	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
159	954141807	MILLS ERIC M	$4,535.84	3.8735	$17.57	$85.66	$171.56	$46.00	$0.00	$320.79
160	954142702	ADAMS GERALD	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
161	954141903	LAMKIN DOLORES	$4,252.55	3.8735	$16.47	$85.66	$171.56	$46.00	$0.00	$319.69
162	954141725	RAMSUBHAG OMA A	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
163	954142631	AGUAMARINA OF FLORIDA LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
164	954141724	RAMSUBHAG OMA A	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
165	955153109	EPPS MONTE (TTEE)	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
166	954141808	OSBORNE JOHN	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
167	954141915	SALAZAR J OCTAVIO	$4,819.13	3.8735	$18.67	$85.66	$171.56	$46.00	$0.00	$321.89
168	954143222	LYNCH MICHAEL	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14

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169	954143309	BALIUS GENE	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
170	954143330	NGUYEN THUYLINH N	$4,252.55	3.8735	$16.47	$85.66	$171.56	$46.00	$0.00	$319.69
171	954142103	PROTOS INC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
172	953152402	MC LAIN KURT	$3,621.00	3.8735	$14.03	$85.66	$171.56	$46.00	$0.00	$317.25
173	954142617	FARRELL KEVIN M	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
174	942153202	SUN PROPERTY VENTURES LLC	$3,940.50	3.8735	$15.26	$85.66	$171.56	$46.00	$0.00	$318.48
175	954143003	BEACHY FREEMAN	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
176	954143106	PHAM DUC M	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
177	954142718	HOWARD ANNA V	$4,394.19	3.8735	$17.02	$85.66	$171.56	$46.00	$0.00	$320.24
178	954143211	NELSON MARVIN D	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
179	953152005	BOUNDS BARBARA A	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
180	954143312	HOFER CHRISTOPHER F	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
181	954143319	DAWSON PETERGAY	$4,579.50	3.8735	$17.74	$85.66	$171.56	$46.00	$0.00	$320.96
182	954141802	JACOB MANOJ	$4,252.55	3.8735	$16.47	$85.66	$171.56	$46.00	$0.00	$319.69
183	953152010	CHANG TE CHUAN	$3,401.61	3.8735	$13.18	$85.66	$171.56	$46.00	$0.00	$316.40
184	942153317	LORUSSO JOSEPH J	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
185	953151920	SWIFT CLEAR INVESTMENT LLC	$3,544.32	3.8735	$13.73	$85.66	$171.56	$46.00	$0.00	$316.95
186	954142408	BERKHOFF-HORNIG JURGEN	$6,603.00	3.8735	$25.58	$85.66	$171.56	$46.00	$0.00	$328.80
187	954143308	CHU WANG LING	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
188	953152215	NORTH PORT LOTS AND REAL PROPERTY LLC	$3,962.87	3.8735	$15.35	$85.66	$171.56	$46.00	$0.00	$318.57
189	953152116	CAMPBELL CARL G	$3,969.26	3.8735	$15.37	$85.66	$171.56	$46.00	$0.00	$318.59
190	953152203	MIRRIONE JAMES	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
191	953152101	MALDONADO RADAMES	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
192	954142706	HARRIS INA P TTEE	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
193	954142512	THE KINGDOM TRUST COMPANY (CUST)	$4,899.00	3.8735	$18.98	$85.66	$171.56	$46.00	$0.00	$322.20
194	954142708	COGOLLOS ANGELA	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
195	953152820	ANDERS JEFFREY L	$3,301.50	3.8735	$12.79	$85.66	$171.56	$46.00	$0.00	$316.01
196	954143111	ADAMS GERALD (TTEE)	$4,535.84	3.8735	$17.57	$85.66	$171.56	$46.00	$0.00	$320.79
197	954143213	ZORO PROPERTIES LLC	$5,927.79	3.8735	$22.96	$85.66	$171.56	$46.00	$0.00	$326.18
198	954143109	BROWN A EARL	$3,969.26	3.8735	$15.37	$85.66	$171.56	$46.00	$0.00	$318.59
199	954142932	MUYOT JOSEFINO F	$4,535.84	3.8735	$17.57	$85.66	$171.56	$46.00	$0.00	$320.79
200	954143113	MOORE EDWARD M JR	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
201	955153014	HUNT CHRISTOPHER	$10,224.00	3.8735	$39.60	$85.66	$171.56	$46.00	$0.00	$342.82
202	954143207	CHELNOKOV VLADIMIR	$4,381.41	3.8735	$16.97	$85.66	$171.56	$46.00	$0.00	$320.19
203	953152323	THOMPSON TIMOTHY A	$3,621.00	3.8735	$14.03	$85.66	$171.56	$46.00	$0.00	$317.25
204	953152003	FELIX MILHOUSE	$3,401.61	3.8735	$13.18	$85.66	$171.56	$46.00	$0.00	$316.40
205	954143019	JOHANNSEN LINDA K	$4,252.55	3.8735	$16.47	$85.66	$171.56	$46.00	$0.00	$319.69
206	953152312	KOWLESSAR DEOMATTIE	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
207	953152209	MALLEY JOSEPH A	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
208	954143006	HEIVA HOLDINGS USA LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
209	953151937	GUTIERREZ REYNALDO D	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
210	955152907	ANDREWS ELIZABETH	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
211	953151634	ATCHISON THOMAS J	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50

VACANT LOTS

212	955153114	WOODS ISAAC H	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
213	955153118	RESTREPO JULIANA	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
214	953151640	COMIAN X TAX LIEN FUND LLC	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
215	954143002	CID DEMETRIO	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
216	954142908	HEIVA HOLDINGS USA LLC	$3,969.26	3.8735	$15.37	$85.66	$171.56	$46.00	$0.00	$318.59
217	954142931	WALLS DIANE R	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
218	954143112	CRUM CATHY	$4,961.84	3.8735	$19.22	$85.66	$171.56	$46.00	$0.00	$322.44
219	954142022	WRIGHT GREGORY P	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
220	954142006	LEWIS MIKE	$4,252.55	3.8735	$16.47	$85.66	$171.56	$46.00	$0.00	$319.69
221	954142020	HUNT-BRANCH AARON	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
222	955152703	HERNANDEZ JIMMY	$3,727.50	3.8735	$14.44	$85.66	$171.56	$46.00	$0.00	$317.66
223	954143315	L I CHOICE INC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
224	955152917	SANDEEP GO LLC	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
225	954142922	HEIVA HOLDINGS USA LLC	$3,827.61	3.8735	$14.83	$85.66	$171.56	$46.00	$0.00	$318.05
226	954143102	QUEEN GALEN K S	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
227	954143017	DE ANGELIS ELENA M	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
228	954142806	DONN THUY VAN	$4,252.55	3.8735	$16.47	$85.66	$171.56	$46.00	$0.00	$319.69
229	953151938	ABONADO CARLITO	$3,827.61	3.8735	$14.83	$85.66	$171.56	$46.00	$0.00	$318.05
230	942153328	CHARLETTA RICHARD J	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
231	942153312	ZACZEK ELIZABETH J	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
232	953152014	GILBERT THOMAS J	$3,827.61	3.8735	$14.83	$85.66	$171.56	$46.00	$0.00	$318.05
233	954143203	POWELL MICHAEL J	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
234	955152804	DILENDICK BRIAN	$3,727.50	3.8735	$14.44	$85.66	$171.56	$46.00	$0.00	$317.66
235	953152220	MARTIN URSULA	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
236	955153008	JOVE JOSE I	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
237	955152815	WEXLER DONNA	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
238	953152308	HAGGERTY DENICE	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
239	953152115	CAMPBELL CARL G	$3,969.26	3.8735	$15.37	$85.66	$171.56	$46.00	$0.00	$318.59
240	953152006	BOUNDS BARBARA A	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
241	955152918	HENDRICKS JR BERNARD D	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
242	954142713	LANGSTON LEROY	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
243	955152920	WRIGHT ROBERT PHILIP	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
244	954143201	COGOLLOS ANGELA	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
245	954142914	RUSSELL RICHARD	$4,896.87	3.8735	$18.97	$85.66	$171.56	$46.00	$0.00	$322.19
246	942153325	WOLFE CLAUDINE	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
247	954143008	EDGERTON FAMILY LIVING TRUST	$4,677.48	3.8735	$18.12	$85.66	$171.56	$46.00	$0.00	$321.34
248	954143107	NORTH PORT LOTS AND REAL PROPERTY LLC	$4,579.50	3.8735	$17.74	$85.66	$171.56	$46.00	$0.00	$320.96
249	953152503	GREEN JR MICHAEL B	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
250	954143208	MAYFIELD CAMELLIA	$5,541.20	3.8735	$21.46	$85.66	$171.56	$46.00	$0.00	$324.68
251	954142714	REALIZA BONG	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
252	954143016	GADEN ROGER C	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
253	954142401	TORRANCE BARBARA J	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
254	954142238	DEWAR EDWARD W	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14

VACANT LOTS

255	954142513	DABANDAN EDGARDO	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
256	954142240	EIGHT HOLDINGS LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
257	954143212	NORTH PORT LOTS AND REAL PROPERTY LLC	$4,768.01	3.8735	$18.47	$85.66	$171.56	$46.00	$0.00	$321.69
258	954143206	WATT MONTE	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
259	954142232	CHUNG WINIFRED C	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
260	954142127	CHALMERS GEOFFREY T	$4,394.19	3.8735	$17.02	$85.66	$171.56	$46.00	$0.00	$320.24
261	955152913	JEVRIC VERA	$3,195.00	3.8735	$12.38	$85.66	$171.56	$46.00	$0.00	$315.60
262	954143013	NORTH PORT LOTS AND REAL PROPERTY LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
263	954143108	JOSEPH MARJORIE NELSON	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
264	954142453	SURAPANENI SRINIVAS	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
265	954142225	JOSEPH E PURFEERST REVOCABLE TRUST	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
266	953152218	SARASOTA CAPITAL LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
267	953152321	ADAMS GERALD I	$3,621.00	3.8735	$14.03	$85.66	$171.56	$46.00	$0.00	$317.25
268	942153302	DE HAVEN MARY C B	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
269	954142510	HEIVA HOLDINGS USA LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
270	954142507	CLEARE DELONE Y	$8,930.03	3.8735	$34.59	$85.66	$171.56	$46.00	$0.00	$337.81
271	953152310	GOETZE LORALEE J	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
272	954142126	CHALMERS GEOFFREY T	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
273	955153117	GEIST JAMES S (TTEE)	$3,195.00	3.8735	$12.38	$85.66	$171.56	$46.00	$0.00	$315.60
274	954142227	PURFEERST JAMES M	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
275	954142531	HEIVA HOLDINGS USA LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
276	954142519	BUSER CHRISTOPHE	$5,103.48	3.8735	$19.77	$85.66	$171.56	$46.00	$0.00	$322.99
277	955153211	ROTH GUENTER (TTEE)	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
278	955153009	HABITAT FOR HUMANITY SOUTH SARASOTA COUNTY INC	$3,195.00	3.8735	$12.38	$85.66	$171.56	$46.00	$0.00	$315.60
279	954142239	DEWAR EDWARD W	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
280	955152904	LOPEZ MONICA	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
281	953152802	GEORGIEV ZORNITSA	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
282	953152106	CHRISTOPHER ALEXANDER	$4,047.00	3.8735	$15.68	$85.66	$171.56	$46.00	$0.00	$318.90
283	953152004	BOUNDS BARBARA A	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
284	954142455	VEMULAPALLI SUSHMA	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
285	954142450	FIRST CHOICE HOME BUILDERS LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
286	954142460	FALNESS DAVID E	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
287	954143322	HEIVA HOLDINGS USA LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
288	953152118	NP 11 LLC	$3,969.26	3.8735	$15.37	$85.66	$171.56	$46.00	$0.00	$318.59
289	953153001	NARDINI-CALLAHAN DAWN	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
290	954142618	FARRELL BRIAN J	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
291	953151936	MILLER DARRELL J	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
292	954142302	BARNETT JERRY A	$5,005.50	3.8735	$19.39	$85.66	$171.56	$46.00	$0.00	$322.61
293	955152911	WHITEHOUSE JOHN F	$3,301.50	3.8735	$12.79	$85.66	$171.56	$46.00	$0.00	$316.01
294	954142912	MEANS RICHARD T	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
295	942080010	NORMAN WILLIAM	$25,453.50	3.8735	$98.59	$85.66	$171.56	$46.00	$0.00	$401.81
296	942153203	OVERSEAS INVESTMENT LLC	$3,834.00	3.8735	$14.85	$85.66	$171.56	$46.00	$0.00	$318.07
297	967060946	LAWRENCE STEVE	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14

298	955152903	NEW VISTA PROPERTIES INC	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
299	953152002	BOUNDS BARBARA A	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
300	953152404	SANIXAY CHANSAMONE	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
301	954141752	SHERMAN OFELIA TTEE	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
302	953152210	DASCZYNSKI WARREN	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
303	955153005	AMERICAN ESTATE AND TRUST	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
304	953152607	BIRA HOLDINGS LLC	$3,940.50	3.8735	$15.26	$85.66	$171.56	$46.00	$0.00	$318.48
305	955152922	VAZIRI HOSHMAND	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
306	954143101	PEREIRA JOSE C J	$3,969.26	3.8735	$15.37	$85.66	$171.56	$46.00	$0.00	$318.59
307	954142905	DEMONTEVERDE MARIE H	$4,252.55	3.8735	$16.47	$85.66	$171.56	$46.00	$0.00	$319.69
308	954143018	BEACHY FREEMAN	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
309	954141755	LANG WILLIE L	$4,394.19	3.8735	$17.02	$85.66	$171.56	$46.00	$0.00	$320.24
310	954143007	I DREAMS ESTATES LLC	$4,639.14	3.8735	$17.97	$85.66	$171.56	$46.00	$0.00	$321.19
311	953152609	NGUYEN THU	$3,940.50	3.8735	$15.26	$85.66	$171.56	$46.00	$0.00	$318.48
312	953152508	NEW VISTA PROPERTIES INC	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
313	944152727	KAPPELMANN KEITH	$4,366.50	3.8735	$16.91	$85.66	$171.56	$46.00	$0.00	$320.13
314	954142807	VERO ATLANTIC 2 LLC	$4,899.00	3.8735	$18.98	$85.66	$171.56	$46.00	$0.00	$322.20
315	954141809	HENRY MARIE C	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
316	942153223	COLONIAL RESTORATION LLC	$3,727.50	3.8735	$14.44	$85.66	$171.56	$46.00	$0.00	$317.66
317	955152919	WOOD PETER	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
318	955152807	BOWSER WILLIAM T	$3,727.50	3.8735	$14.44	$85.66	$171.56	$46.00	$0.00	$317.66
319	954142509	HEIVA HOLDINGS USA LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
320	953152623	SPRINGCROFT PROPERTIES LLC	$3,940.50	3.8735	$15.26	$85.66	$171.56	$46.00	$0.00	$318.48
321	953152216	OLIVIERI WILLIAM M	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
322	955153104	SNYDER DEVELOPMENT CORP	$3,301.50	3.8735	$12.79	$85.66	$171.56	$46.00	$0.00	$316.01
323	955152906	GEORGIOU TASOS	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
324	954142440	BOUNDS RAYMOND	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
325	954142303	OVERSEAS INVESTMENT LLC	$5,005.50	3.8735	$19.39	$85.66	$171.56	$46.00	$0.00	$322.61
326	954142445	NORTH PORT LOTS AND REAL PROPERTY LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
327	942153220	CARLOS DOMINGOS	$3,727.50	3.8735	$14.44	$85.66	$171.56	$46.00	$0.00	$317.66
328	953151926	BINGLE CHRIS	$4,792.50	3.8735	$18.56	$85.66	$171.56	$46.00	$0.00	$321.78
329	953152317	BRANCH ADINA M	$3,827.61	3.8735	$14.83	$85.66	$171.56	$46.00	$0.00	$318.05
330	967060947	CATENA JENNIFER	$4,252.55	3.8735	$16.47	$85.66	$171.56	$46.00	$0.00	$319.69
331	954142441	COMPERDA FRANK M	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
332	954142119	CHUNG WINIFRED C	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
333	954142452	SURAPANENI SRINIVAS	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
334	955153123	HENDERSHOT BRUCE D	$3,621.00	3.8735	$14.03	$85.66	$171.56	$46.00	$0.00	$317.25
335	955153210	SILVER FROND INVESTMENTS LLC	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
336	954143105	HEIVA HOLDINGS USA LLC	$5,103.48	3.8735	$19.77	$85.66	$171.56	$46.00	$0.00	$322.99
337	954142918	HASTINGS KENNETH R	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
338	953152013	FLUBACHER RONALD	$3,827.61	3.8735	$14.83	$85.66	$171.56	$46.00	$0.00	$318.05
339	954142234	ADORNA THOMAS M	$8,930.03	3.8735	$34.59	$85.66	$171.56	$46.00	$0.00	$337.81
340	954142712	LANGSTON LEROY	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14

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341	953152408	OVERSEAS INVESTMENT LLC	$3,940.50	3.8735	$15.26	$85.66	$171.56	$46.00	$0.00	$318.48
342	953152307	BELLS REALTY INVESTMENTS	$4,047.00	3.8735	$15.68	$85.66	$171.56	$46.00	$0.00	$318.90
343	954142230	LOURO ALEX T	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
344	954142229	VOGT JORGE	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
345	953152819	NEW VISTA PROPERTIES INC	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
346	955153106	AMERICAN ESTATE AND TRUST	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
347	953152511	LAU CHI-HO A	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
348	955153011	BECERRA ELPIDIO L	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
349	953152710	WESTON MICHAEL	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
350	953152419	SILVA ROBERT L	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
351	967060740	MULLEN MARK F	$5,154.60	3.8735	$19.97	$85.66	$171.56	$46.00	$0.00	$323.19
352	953152622	SPRINGCROFT PROPERTIES LLC	$3,940.50	3.8735	$15.26	$85.66	$171.56	$46.00	$0.00	$318.48
353	953152510	LAU CHI-HO A	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
354	954142018	GIFFONE MICHAEL F	$4,677.48	3.8735	$18.12	$85.66	$171.56	$46.00	$0.00	$321.34
355	953152624	K & N PROPERTY INVESTMENTS LLC	$3,940.50	3.8735	$15.26	$85.66	$171.56	$46.00	$0.00	$318.48
356	942153321	OVERSEAS INVESTMENT LLC	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
357	954142454	GUGLIELMO MATTHEW	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
358	954143326	PAPE EDWARD	$4,899.00	3.8735	$18.98	$85.66	$171.56	$46.00	$0.00	$322.20
359	953152407	CONNELL JERRY L	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
360	953152219	KORELL LINDSEY ROTH IRA F/B/O	$3,834.00	3.8735	$14.85	$85.66	$171.56	$46.00	$0.00	$318.07
361	942153319	LI-CHUAN CHUANG	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
362	953152119	GRECO KATHLENE	$3,827.61	3.8735	$14.83	$85.66	$171.56	$46.00	$0.00	$318.05
363	955152909	TYNDALE RICARDO ANTHONY	$4,047.00	3.8735	$15.68	$85.66	$171.56	$46.00	$0.00	$318.90
364	953151901	VAN TRUONG JIMMY L	$3,969.26	3.8735	$15.37	$85.66	$171.56	$46.00	$0.00	$318.59
365	953152509	PIZZARIELLO VITO	$3,969.26	3.8735	$15.37	$85.66	$171.56	$46.00	$0.00	$318.59
366	967060945	BASTANTE JOSEPH	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
367	953151636	NELIGAN DEAN A	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
368	953152504	ERWIN DAVID	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
369	942153313	GOGREEN PROPERTY MGMT LLC	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
370	954141749	LOURO MARCELLO	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
371	953152403	TAYLOR DUANE	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
372	954142019	KARAM ROSE	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
373	954141913	PEDERSON KAREN	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
374	954142506	THOMAS GERHARDT A TTEE	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
375	955152810	CABRERA VIRGILIO D	$3,195.00	3.8735	$12.38	$85.66	$171.56	$46.00	$0.00	$315.60
376	954142231	WEISS JOSEPH G	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
377	953152007	BOUNDS BARBARA A	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
378	942153209	SILVER FROND INVESTMENTS LLC	$3,834.00	3.8735	$14.85	$85.66	$171.56	$46.00	$0.00	$318.07
379	953152619	KUBACKA JOLANTA	$3,834.00	3.8735	$14.85	$85.66	$171.56	$46.00	$0.00	$318.07
380	954141735	CHOUDHURI SANTANU	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
381	955152910	ALEXSOFF NAUMCE	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
382	953151902	MADISON ANNA C	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
383	954141750	LOURO MICHAEL	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14

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384	953152015	CORNERSTONE PROPERTIES OF SARASOTA INC	$3,827.61	3.8735	$14.83	$85.66	$171.56	$46.00	$0.00	$318.05
385	953152512	HEINKE STEPHAN	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
386	954142916	HEIVA HOLDINGS USA LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
387	953152309	GOETZE LORALEE J	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
388	953151641	NEW VISTA PROPERTIES INC	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
389	954143219	GOODWIN DAVID	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
390	954142921	JEANNINE ELIZABETH BELL REVOCABLE TRUST	$3,969.26	3.8735	$15.37	$85.66	$171.56	$46.00	$0.00	$318.59
391	954143210	KRACKOVIC DANNE	$4,252.55	3.8735	$16.47	$85.66	$171.56	$46.00	$0.00	$319.69
392	954142704	ADAMS GERALD	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
393	953152610	ETTLIN DOMINIK	$3,940.50	3.8735	$15.26	$85.66	$171.56	$46.00	$0.00	$318.48
394	954142005	ZANCA HEDWIG I	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
395	953152202	AEG INVESTMENTS LP	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
396	954142707	PRIVATE EQUITY SOLUTIONS LLC	$4,899.00	3.8735	$18.98	$85.66	$171.56	$46.00	$0.00	$322.20
397	967060738	RIBEIRO ANTONIO A	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
398	955153213	OVERHOLSER MERLE W	$3,301.50	3.8735	$12.79	$85.66	$171.56	$46.00	$0.00	$316.01
399	954142534	JOHNSON SCOTT	$4,899.00	3.8735	$18.98	$85.66	$171.56	$46.00	$0.00	$322.20
400	954142105	HEIVA HOLDINGS USA LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
401	954143104	FIRST REALTY CONSULTING LLC	$5,927.79	3.8735	$22.96	$85.66	$171.56	$46.00	$0.00	$326.18
402	954142810	CADIENTE SAMSON S	$4,819.13	3.8735	$18.67	$85.66	$171.56	$46.00	$0.00	$321.89
403	954141742	BROUSSARD JR LAWLESS	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
404	955153121	FITZPATRICK CHRISTINA	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
405	955153116	STOJAK BARBARA	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
406	953152620	ALPHA FLORIDA REAL ESTATE LLC	$3,940.50	3.8735	$15.26	$85.66	$171.56	$46.00	$0.00	$318.48
407	954143316	NORTH PORT LOTS AND REAL PROPERTY LLC	$3,544.32	3.8735	$13.73	$85.66	$171.56	$46.00	$0.00	$316.95
408	953152409	BURGOS IRIS	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
409	954141741	Q SMITH HOMES LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
410	953152426	EL SHADDAI BIBLE MINISTRIES	$3,621.00	3.8735	$14.03	$85.66	$171.56	$46.00	$0.00	$317.25
411	954143012	COMPARETTO ANTONIO J	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
412	955153012	VIRNAN NADIA	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
413	954141803	OVERSEAS INVESTMENT LLC	$4,899.00	3.8735	$18.98	$85.66	$171.56	$46.00	$0.00	$322.20
414	953152301	GRAY WALTER	$3,544.32	3.8735	$13.73	$85.66	$171.56	$46.00	$0.00	$316.95
415	955153120	CHAMBERLAIN ALFRED C	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
416	954143001	HEIVA HOLDINGS USA LLC	$3,969.26	3.8735	$15.37	$85.66	$171.56	$46.00	$0.00	$318.59
417	954141743	SHABURA VLADIMIR	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
418	955153122	UNDERWOOD PAT	$3,727.50	3.8735	$14.44	$85.66	$171.56	$46.00	$0.00	$317.66
419	953152204	DAVIS AUDREY H V M	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
420	942153309	OVERSEAS INVESTMENT LLC	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
421	953151637	NEW VISTA PROPERTIES INC	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
422	953152501	HEARN ANASTASIA	$3,544.32	3.8735	$13.73	$85.66	$171.56	$46.00	$0.00	$316.95
423	953152428	AMERICAN ESTATE AND TRUST	$3,727.50	3.8735	$14.44	$85.66	$171.56	$46.00	$0.00	$317.66
424	953152613	YAREMCHUK VOLODYMYR	$3,940.50	3.8735	$15.26	$85.66	$171.56	$46.00	$0.00	$318.48
425	954142125	CHALMERS GEOFFREY T	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
426	954142462	BALIUS GENE	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14

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427	953152608	NGUYEN PROPERTY MANAGEMENT LLC	$3,940.50	3.8735	$15.26	$85.66	$171.56	$46.00	$0.00	$318.48
428	953152606	BIRA HOLDINGS LLC	$3,940.50	3.8735	$15.26	$85.66	$171.56	$46.00	$0.00	$318.48
429	953152618	MALLOY SHARON (TTEE)	$3,834.00	3.8735	$14.85	$85.66	$171.56	$46.00	$0.00	$318.07
430	953152818	HERNANDEZ JIMMY	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
431	953152420	SALAM ELIZABETH C	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
432	953152621	MUNZ MIKE	$3,940.50	3.8735	$15.26	$85.66	$171.56	$46.00	$0.00	$318.48
433	953152626	ASKEW ASHLEY LYNN	$3,621.00	3.8735	$14.03	$85.66	$171.56	$46.00	$0.00	$317.25
434	954141728	HEIVA HOLDINGS USA LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
435	954143015	JAEN RUBEN	$4,677.48	3.8735	$18.12	$85.66	$171.56	$46.00	$0.00	$321.34
436	954142924	BROWN JOE W	$4,381.41	3.8735	$16.97	$85.66	$171.56	$46.00	$0.00	$320.19
437	954142532	ALAVERDYAN SUREN	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
438	954142505	MAYS RONALD L	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
439	953152405	MASTRATI JOHN A	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
440	954141740	Q SMITH HOMES LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
441	953152412	CABRERA EDELMIRA	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
442	953152617	ATINA ENTERPRISES LLC	$3,834.00	3.8735	$14.85	$85.66	$171.56	$46.00	$0.00	$318.07
443	953151923	WORMER LESLIE A	$3,969.26	3.8735	$15.37	$85.66	$171.56	$46.00	$0.00	$318.59
444	953152612	YAREMCHUK VOLODYMYR	$3,940.50	3.8735	$15.26	$85.66	$171.56	$46.00	$0.00	$318.48
445	953152902	PORTER ROBERT C	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
446	953152517	AMERICAN ESTATE AND TRUST	$4,260.00	3.8735	$16.50	$85.66	$171.56	$46.00	$0.00	$319.72
447	955152915	ADAMS GERALD	$2,662.50	3.8735	$10.31	$85.66	$171.56	$46.00	$0.00	$313.53
448	953152709	NEW VISTA PROPERTIES INC	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
449	953152505	ROSELAND LEO J	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
450	955152809	SHAW PATRICIA A	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
451	954142529	KARR MARTIN PALMER	$5,740.35	3.8735	$22.24	$85.66	$171.56	$46.00	$0.00	$325.46
452	954142623	OVERSEAS INVESTMENT LLC	$5,218.50	3.8735	$20.21	$85.66	$171.56	$46.00	$0.00	$323.43
453	953153002	K4K LLC	$3,195.00	3.8735	$12.38	$85.66	$171.56	$46.00	$0.00	$315.60
454	954142710	DIH TAX PARTNERS LLC	$5,005.50	3.8735	$19.39	$85.66	$171.56	$46.00	$0.00	$322.61
455	953153017	VOJNIKA MAZLUM	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
456	953152213	OVERSEAS INVESTMENT LLC	$3,940.50	3.8735	$15.26	$85.66	$171.56	$46.00	$0.00	$318.48
457	967060704	CRUZ ALBERTO	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
458	954142619	JONES DONALD F JR	$4,535.84	3.8735	$17.57	$85.66	$171.56	$46.00	$0.00	$320.79
459	953152611	TEREMBES MICHAEL	$3,940.50	3.8735	$15.26	$85.66	$171.56	$46.00	$0.00	$318.48
460	953151935	DOWNING GERALD B	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
461	954141905	LIVITS LEONARD	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
462	967060944	SILVA NANCIANCENA D	$4,819.13	3.8735	$18.67	$85.66	$171.56	$46.00	$0.00	$321.89
463	953151927	SZAFARZ MARY K (TTEE)	$3,969.26	3.8735	$15.37	$85.66	$171.56	$46.00	$0.00	$318.59
464	954142711	COGOLLOS ANGELA	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
465	953152708	NANDIGAM SINDHURA	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
466	954142715	MOORE LISA	$4,899.00	3.8735	$18.98	$85.66	$171.56	$46.00	$0.00	$322.20
467	953151928	MACHADO-CUNHA HUGO M	$3,827.61	3.8735	$14.83	$85.66	$171.56	$46.00	$0.00	$318.05
468	954143223	MORROW BARTLEY E	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
469	954142003	PRIVATE EQUITY SOLUTIONS LLC	$4,899.00	3.8735	$18.98	$85.66	$171.56	$46.00	$0.00	$322.20

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470	953152410	FARRELL MARK V	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
471	967060741	MULLEN MARK F	$4,896.87	3.8735	$18.97	$85.66	$171.56	$46.00	$0.00	$322.19
472	942153316	LORUSSO JOSEPH J	$3,195.00	3.8735	$12.38	$85.66	$171.56	$46.00	$0.00	$315.60
473	942153221	WERNER FAMILY TRUST	$3,940.50	3.8735	$15.26	$85.66	$171.56	$46.00	$0.00	$318.48
474	953152418	MOSELEY STARLA	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
475	954142446	LEE HILTON	$5,798.93	3.8735	$22.46	$85.66	$171.56	$46.00	$0.00	$325.68
476	954142449	TURGEON JR JOHN L	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
477	954142402	TORRANCE BARBARA J	$3,969.26	3.8735	$15.37	$85.66	$171.56	$46.00	$0.00	$318.59
478	953152506	FERNANDEZ MARGARITA	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
479	953152001	DE VANEY WILLIAM B	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
480	953152306	PERNA III MANUEL	$4,047.00	3.8735	$15.68	$85.66	$171.56	$46.00	$0.00	$318.90
481	953152421	RICKETTS ELIZABETH A	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
482	955153006	CALVERT MICHAEL K	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
483	967060703	HUYNH KIM T T	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
484	967060943	VARNER III ARCHIE D	$4,535.84	3.8735	$17.57	$85.66	$171.56	$46.00	$0.00	$320.79
485	955153215	MAGGIO RONALD J	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
486	967060739	TRAN TUNG V	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
487	953152305	DEITZ SANDRA N CO-TTEE	$3,621.00	3.8735	$14.03	$85.66	$171.56	$46.00	$0.00	$317.25
488	953152304	KERESTES PAUL A	$3,621.00	3.8735	$14.03	$85.66	$171.56	$46.00	$0.00	$317.25
489	953151924	ESTEVES JOSE	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
490	953152320	PROSPER TERRANCE	$3,621.00	3.8735	$14.03	$85.66	$171.56	$46.00	$0.00	$317.25
491	954142629	WJHFL LLC	$4,899.00	3.8735	$18.98	$85.66	$171.56	$46.00	$0.00	$322.20
492	954142632	GILBERT DIANE L	$4,819.13	3.8735	$18.67	$85.66	$171.56	$46.00	$0.00	$321.89
493	942080006	AXLINE JUDITH J (CO-TTEE)	$18,041.10	3.8735	$69.88	$85.66	$171.56	$46.00	$0.00	$373.10
494	953152424	HOLINKO BRIAN J	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
495	954142604	COGOLLOS ANGELA	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
496	954142703	ADAMS GERALD	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
497	953152422	JOHN E AND LORRAINE M KUHN REVOCABLE LIVING TRUST	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
498	953152319	SGD INVESTMENTS LLC	$3,621.00	3.8735	$14.03	$85.66	$171.56	$46.00	$0.00	$317.25
499	953152311	GRIGGS AVENUE LAND TRUST	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
500	954142533	JOHNSON SCOTT	$4,899.00	3.8735	$18.98	$85.66	$171.56	$46.00	$0.00	$322.20
501	954142104	BUCCELLATO GIOVANNA	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
502	954142716	MOORE LISA	$4,899.00	3.8735	$18.98	$85.66	$171.56	$46.00	$0.00	$322.20
503	953152016	BECKER STEPHEN	$3,827.61	3.8735	$14.83	$85.66	$171.56	$46.00	$0.00	$318.05
504	954141726	HEIVA HOLDINGS USA LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
505	954143005	UNDERHILL WILLIAM R	$5,103.48	3.8735	$19.77	$85.66	$171.56	$46.00	$0.00	$322.99
506	954142405	NEW VISTA PROPERTIES INC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
507	954142121	KRACHKO ANDREY	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
508	954142123	JACKSON EMMA D	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
509	954142809	HEIVA HOLDINGS USA LLC	$5,103.48	3.8735	$19.77	$85.66	$171.56	$46.00	$0.00	$322.99
510	953152519	SCHOELICH RONNIE IRA F/B/O	$4,366.50	3.8735	$16.91	$85.66	$171.56	$46.00	$0.00	$320.13
511	954143327	ESTRADA DAVID	$4,899.00	3.8735	$18.98	$85.66	$171.56	$46.00	$0.00	$322.20
512	955152816	NEW VISTA PROPERTIES INC	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83

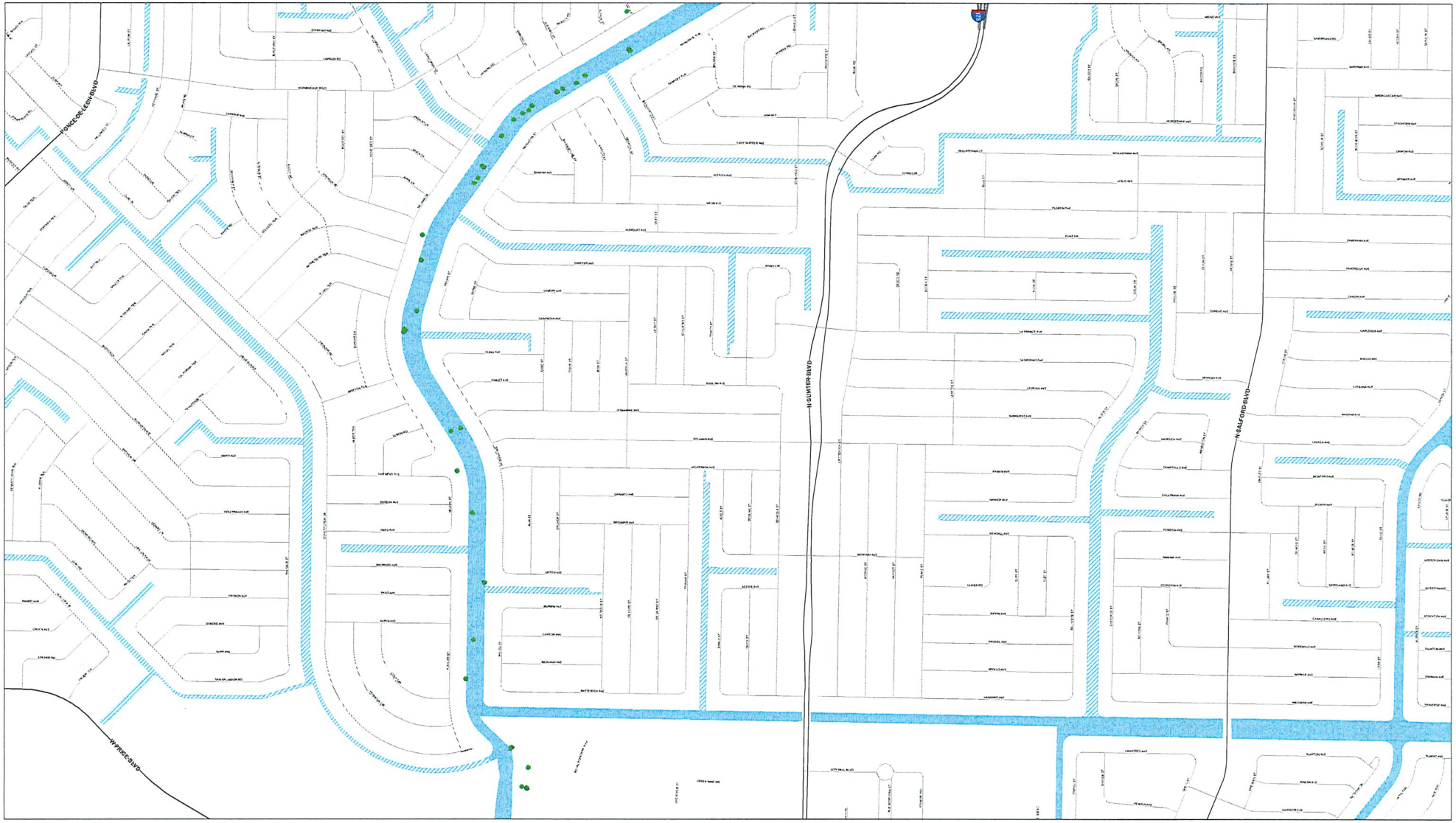
VACANT LOTS

513	954143324	SANFORD STANLEY	$4,579.50	3.8735	$17.74	$85.66	$171.56	$46.00	$0.00	$320.96
514	954142911	COOK JOYCE R	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
515	954141730	KRACHER EDITH M	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
516	955152814	MARY ACCOUNTING INC	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
517	954143323	DRES JUANITO T	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
518	954141805	EZER TOSIA	$4,252.55	3.8735	$16.47	$85.66	$171.56	$46.00	$0.00	$319.69
519	954142603	COGOLLOS ANGELA	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
520	953152008	HENRY BRYAN	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
521	954143004	OVERSEAS INVESTMENT LLC	$5,218.50	3.8735	$20.21	$85.66	$171.56	$46.00	$0.00	$323.43
522	954142903	ARSENAULT CHRISTINE	$4,819.13	3.8735	$18.67	$85.66	$171.56	$46.00	$0.00	$321.89
523	953152411	ROWE STUART J TTEE	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
524	954142909	CHU WANG LING	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
525	953152514	GREENHALGH DAVID L	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
526	954142626	JACKSON MARYBETH ANN	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
527	953151925	BINGLE CHRIS	$4,047.00	3.8735	$15.68	$85.66	$171.56	$46.00	$0.00	$318.90
528	942153322	COOGAN NANCY E	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
529	953152803	NORTH PORT LOTS AND REAL PROPERTY LLC	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
530	954142622	BURTON JAMES R	$7,455.00	3.8735	$28.88	$85.66	$171.56	$46.00	$0.00	$332.10
531	953152516	DESROCHERS PATRICIA I	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
532	953152423	GRINDSTONE PARTNERS LLC	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
533	954142608	PHAM PHUONG LAN T	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
534	954142442	RICHARDSON KARIN B	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
535	954142620	DELL PAMELA D	$10,347.54	3.8735	$40.08	$85.66	$171.56	$46.00	$0.00	$343.30
536	953152427	AMERICAN ESTATE AND TRUST	$3,621.00	3.8735	$14.03	$85.66	$171.56	$46.00	$0.00	$317.25
537	953152604	LIN XIAOYING	$5,103.48	3.8735	$19.77	$85.66	$171.56	$46.00	$0.00	$322.99
538	953152413	PEREZ MOSES	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
539	967060942	DIODATI FRANCESCO (CO-TTEE)	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
540	953152314	LONGO RICHARD B	$4,394.19	3.8735	$17.02	$85.66	$171.56	$46.00	$0.00	$320.24
541	955152905	MOSES GAYLE	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
542	955153119	GEIST LOWELL K	$3,408.00	3.8735	$13.20	$85.66	$171.56	$46.00	$0.00	$316.42
543	954142226	PURFEERST JAMES M	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
544	953151922	SEGUIN JEANNETTE	$3,827.61	3.8735	$14.83	$85.66	$171.56	$46.00	$0.00	$318.05
545	953152318	MC RAE CHRISTINE	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
546	953152303	KERESTES PAUL A	$3,621.00	3.8735	$14.03	$85.66	$171.56	$46.00	$0.00	$317.25
547	953152206	POLISHCHUK GRIGORY	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
548	954142527	GIBSON DOROTHEA	$4,961.84	3.8735	$19.22	$85.66	$171.56	$46.00	$0.00	$322.44
549	954141906	HOUNG IRENE	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
550	954143014	LIM RONNIE B	$4,819.13	3.8735	$18.67	$85.66	$171.56	$46.00	$0.00	$321.89
551	954142915	ORKNEY BERTHA A C (TTEE)	$4,394.19	3.8735	$17.02	$85.66	$171.56	$46.00	$0.00	$320.24
552	955152813	SPANO WILLIAM A	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
553	954142628	WJHFL LLC	$4,899.00	3.8735	$18.98	$85.66	$171.56	$46.00	$0.00	$322.20
554	953152502	ENLIGHTENING INVESTMENT LLC	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
555	953152625	K & N PROPERTY INVESTMENTS LLC	$3,940.50	3.8735	$15.26	$85.66	$171.56	$46.00	$0.00	$318.48

VACANT LOTS

556	953152923	BARTOLOME DELILAH	$3,088.50	3.8735	$11.96	$85.66	$171.56	$46.00	$0.00	$315.18
557	953152425	BATHORY STEVE	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
558	955152808	NEW VISTA PROPERTIES INC	$3,727.50	3.8735	$14.44	$85.66	$171.56	$46.00	$0.00	$317.66
559	954142124	HEIVA HOLDINGS USA LLC	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
560	953151921	SWIFT CLEAR INVESTMENTS LLC	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
561	953152507	SINCLAIR M A	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
562	953152417	KALLOO JOAN A (TTEE)	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
563	953152207	BRESA LINO	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
564	942153315	BRAINERD III HAROLD W	$3,301.50	3.8735	$12.79	$85.66	$171.56	$46.00	$0.00	$316.01
565	953151903	KOSTESKI SIMON	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
566	953151929	SCHMIDT ROBERT R	$4,110.90	3.8735	$15.92	$85.66	$171.56	$46.00	$0.00	$319.14
567	942153224	TODARO PHILLIP S	$3,727.50	3.8735	$14.44	$85.66	$171.56	$46.00	$0.00	$317.66
568	953152406	MASTRATI JOHN A	$3,685.97	3.8735	$14.28	$85.66	$171.56	$46.00	$0.00	$317.50
569	942153303	NEW VISTA PROPERTIES INC	$3,514.50	3.8735	$13.61	$85.66	$171.56	$46.00	$0.00	$316.83
570	955152914	NEW VISTA PROPERTIES INC	$3,088.50	3.8735	$11.96	$85.66	$171.56	$46.00	$0.00	$315.18
					$9,462.11	$48,826.20	$97,789.20	$26,220.00	$0.00	
								Totals	$182,297.51	$182,297.51

Attachment 2



City of North Port
Myakkahatchee Creek Blockages

Disclaimer: This map is for reference purposes only and is not to be construed as a legal document. Any reliance on the information contained herein is at the user's risk. The City of North Port and its agents assume no responsibility for any use of the information contained herein or any loss resulting there from.

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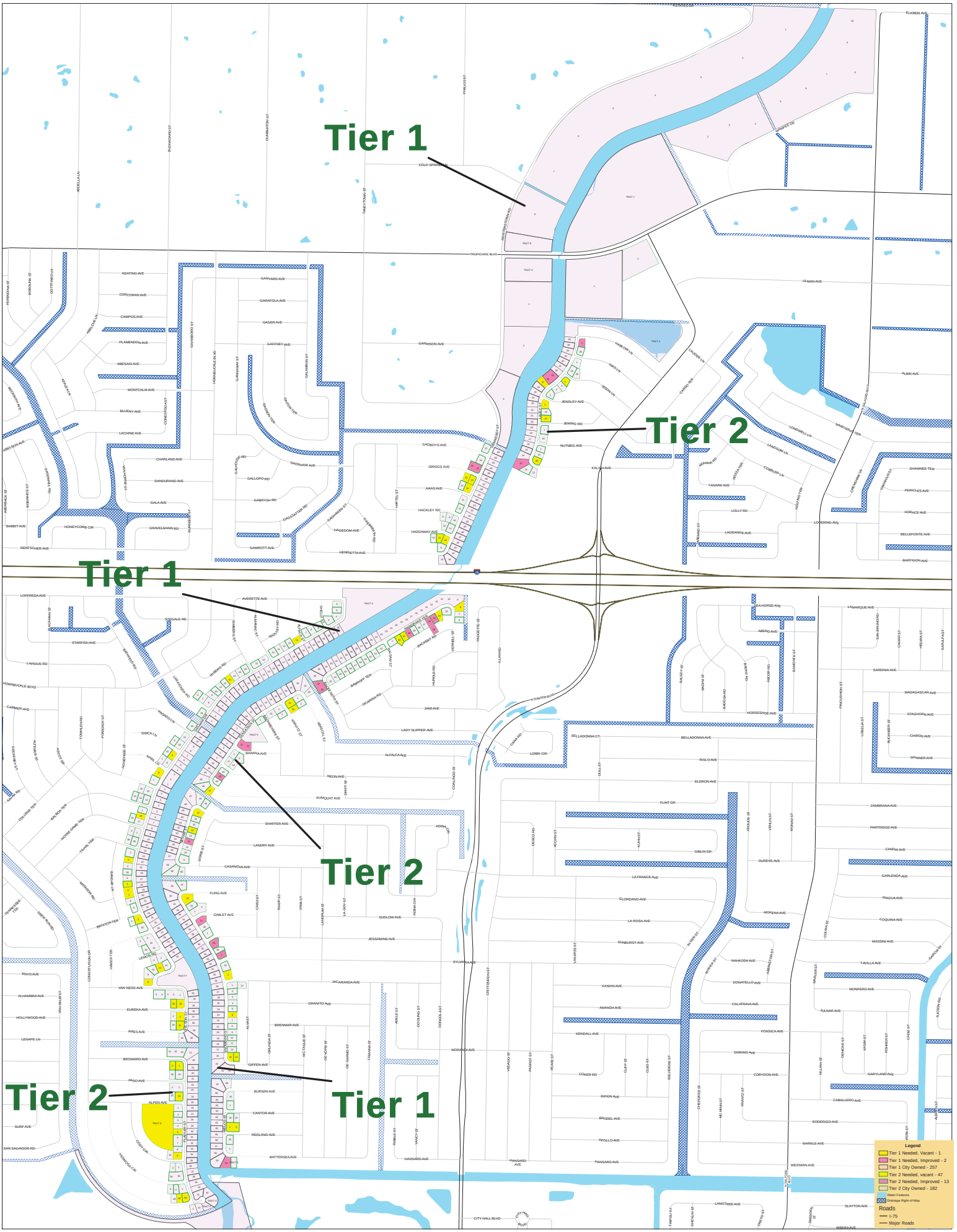
CITY OF NORTH PORT
LOW IMPACT DEVELOPMENT (LID) PROJECTS AND CITY "GREEN ACHIEVEMENTS"
as of 11/30/20

Year Installed	Project number	Project Name	Description
~2007		Public Works Site	Use stormwater from Creighton Waterway for irrigation. Use of grass swales for pretreatment prior to entiering master stormwater pond system.
2005 and continuing		Islandwalk @ The West Villages all phases	Stormwater harvesting for irrigation
2007		Fertilizer Ordinance	Adopted a City-wide Fertilizer Ordinance which prohibited a fertilization of lawns during the wet season period between June 1 and September 30. Required 50% slow release fertilizer if used in the allowable periods.
2008		North Port Medical Specialist facility on US 41 near Espanola Ave.	Developer installed 7 pervious asphalt parking spaces at a new North Port Medical Specialist facility along US 41.
2009		Sumter Boulevard Phase 2 widening project	City installed 3 aeration fountains in wet detention ponds and planted non-invasive littoral zone plants as part of the Sumter Boulevard Phase 2 widening project
2009		Lowes store	Stormwater harvesting for irrigation. A shallow well recharges the wet pond during the dry periods.
2009		PBSJ Study North Port Enhancement Project Report	City study cooperatively funded with SWFWMD indicated that the total nitrogen levels within North Port waterways are "lower than the reference levels for natural Florida Streams gnerated in the 1996 FDEP 305(b) report". This is due to the extensive grass swales system in North Port.
2010		SWFWMD Community Education Grant for $1,761.94	Grant funded purchase 100 stormdrain markers which were installed with assistance from the Community and kids. Conducted public education on water quality protection and installed two educational signs
2010		City of North Port Unified Land Development Code (ULDC) New Stormwater Regulations	City adopted new ULDC Chapter 18 - Stormwater Regulations in June 2010 which required all developments to incorporate LIDs to the maximum extent practicable. City water quality regulations required treatment volume of 1-inch of runoff for any systems, wet or dry. This is above the SWFWMD requirement for 1/2" of runoff for dry systems. City required aeration systems in wet ponds and planted littoral zone with non-invasive aquatic plants with 85% survival rate.
2010		Grass parking at Morgan Family Center/Butler Park	Many parking spaces at these facilities were installed as grass parking.
2010	MAS-08-093	Cocoplum Village Shoppes on US 41 near Salford Blvd	Stormwater harvesting for irrigation.
2010		Toledo Blade Boulevard Widening Project	City planted littoral zones and entire pond periphery with cord grass (Spartina Bakeri) at two stormwater ponds.
2011		City Hall near Post Office	City installed an aeration fountain in a wet detention pond.
2011		Florida Green Building Coalition Gold Rating	City received the FGBC Gold Rating which is the highest rating achieved at that time in Florida for good environmental practices in "green" development
2011		Kingdom Hall Church	Kingdom Hall new church facility incorpated 10 pervious concrete parking spaces
2011		City's Atwater Park	Stormwater harvesting for irrigation with recharge well. Also installed an aeration fountain in a wet detention pond.
2012		SWFWMD Community Education Grant for $4136	Grant funded planting of non-invasive aquatic plants around the periphery area of the North Port Library pond, Public workshops on proper fertilizer usage and aquatic planting benefits, two major City clean up events and six educational signs installed throughout the City to encourage protection of waterways.
2012		Sarasota County Area Transit at City Center	City coordinated with SCAT to install 15 pervious concrete parking spaces, along with a bioswale between parking spaces.
2012	MAS-08-093	Cocoplum Village Shoppes on US 41 new Salford Blvd	Developer installed aeration fountains in two wet detention ponds
2014		City Center George Mullen Activity Center (GMAC)	City installed a new section of Pervious Concrete sidewalk as part of the Phase 1 GMAC improvements
2014		Sarasota County Area Transit (SCAT) at City Center	An electric car charging station was added in June 2014.
2014	MAS-13-141	Turnberry Trace Recreation Center	Installed 7 parking spaces with Pervious Concrete
2014	MAS-14-032	Gran Paradiso Amenity Center Phase 2	Brick pavers on sand for sidewalks and decking, grassed swales for conveyance before entering inlets and ponds, FF landscaping, oversized stormwater pond, aeration in Lake 34. Project completed in March 2016
2015	MAS-13-137	Aldi food Store on US 41/Salford Blvd	Constructed 11 pervious concrete parking spaces
2015		City Center George Mullen Activity Center (GMAC)	City installed a new section of Pervious Concrete sidewalk as part of the Phase 2 GMAC improvements
2016	MAS 14-105	Goodwill	* 8 Pervious parking stalls - 2.36" thick "Aquaflow" Pavers on 2" thick 1/4" diameter clean crushed stone, over 140N Mirafi over 6" FDOT #57 stone 95% Modified Proctor, over 140N Mirafi, 12" Subgrade 98% Modified Proctor. Grass swales before inlets.
2017	MAS-15-129	Lowes Outparcel	Stormwater harvesting for irrigation.
2017	MAS-16-070	Autozone at Toledo Creek (S of Price, west side of Toledo Blade	20 pervious concrete parking spaces, grass retention area before master stormwater pond, deep sump at several inlets
2017	INF-15-089	Toledo Creek	Floguard inlet inserts installed on 9 Type 9 Index 214 inlets
2018	MAS-15-180	Circle K at Heron Creek Town Center	Less impervious than allowable, 77.88% vs 94.0%
2017	MAS-16-055	7-Eleven Store #37298 at Toledo Creek	70% impervious compared with allowable 95% impervious. Pervious concrete sidewalks adjacent to store
2017	INF-14-149	Gran Paradiso Phase 3	All of the driveways for the paired villa (duplex) units are pavers on sand. There are swales along the rear of lots 687-734 which will provide open flow contact time / pre-treatment prior to discharging to lake 29. There is also a 1,000± LF swale outfalling a portion of Renaissance Boulevard prior to draining into lake 68. This swale will also provide some open flow contact time / pre-treatment prior to discharging to the lake

Year Installed	Project number	Project Name	Description
2017	INF-16-122	Gran Paradiso Phase 7	• Minumize impervious area - The overall Gran Paradiso property (± 1 ,068.09 acres) will consist of approximately±231.36 acres of conservation areas, including wetland and gopher tortoise preserves. There will also be approximately± 222.84 acres of lake area and± 135.72 acres of additional open space. Thus, as a percentage of the total development there will be 21.7% conservation area, 20.9% lake area, and 12.7% open area. • Overland flow areas Where achievable, stormwater runoff is allowed to sheet flow across areas of vegetation prior to flowing into on-site retention areas or wetland areas. • Minimizing of sidewalk widths in areas with lower pedestrian traffic In strategic areas of the community (e.g. along Prestigio Boulevard), sidewalk widths were decreased, thus decreasing impervious area. This was done in order to minimize the amount of required disturbance of native vegetation and habitats. • Inclusion of aerators in lakes Aerators have been added to lakes throughout the development, with 3 included in the Phase 7 project. • Use of pavers throughout the development Where possible, pavers have been used in lieu of concrete pavement. This is most prevalent at the entrance I clubhouse area and driveways of home sites throughout
2017	INF-16-022	Islandwalk Phase 5	Stormwater reuse for irrigation
2017	MAS-16-172	Gran Paradiso, Coach Homes-2 and Mass Grading	• Limiting the footprint of improvements on the property. The overall Gran Paradiso property (± 1 ,068.09 acres) will consist of approximately ± 231.36 acres of conservation areas, including wetland and gopher tortoise preserves. There will also be approximately± 222.84 acres of lake area and± 135.72 acres of additional open space. Thus, as a percentage of the total development there will be 21.7% conservation area, 20.9% lake area, and 12.7% open area. • Overland flow areas Where achievable, stormwater runoff is allowed to sheet flow across areas of vegetation prior to flowing into on-site retention areas or wetland areas. • Minimizing of sidewalk widths in areas with lower pedestrian traffic In strategic areas of the community (e.g. along Prestigio Boulevard), sidewalk widths were decreased, thus decreasing impervious area. This was done in order to minimize the amount of required disturbance of native vegetation and habitats. • Inclusion of aerators in lakes Aerators have been added to lakes throughout the development, with 3 included in the Phase 7 project. • Use of pavers throughout the development Where possible, pavers have been used in lieu of concrete pavement. This is most prevalent at the entrance / clubhouse area and driveways of home sites throughout
2017	INF-14-089	Suncoast Plaza	Long Bioswales for additional treatment along roadways, fountains in wet ponds
1/24/18	MAS-17-013	Heartland Dental	Runoff into two grass retention swales prior to discharge into the master stormwater piping/pond system. Impervious area is 68% compared to allowable 95%
1/24/18	MAS-16-020	Jiffy Lube	Runoff into three grass retention swales prior to discharge into the master stormwater piping/pond system. Ditch bottom inlets in the grass retention swales are set 0.5' higher than swale bottom. 41.7% impervious compared with allowable 95% impervious .
1/24/18	GEN-15-172	North Port Library Parking Expansion	23 Pervious Concrete parking stalls for this parking expansion
2/9/18	MAS-15-179	Sherwin Williams	Long linear rrass swales before entering dry retention pond
2/26/18	MAS-17-001	7-11 at Cranberry	3 Pervious Pavers parking stalls
2/27/18	MAS-16-131	Heron Creek Animal Hospital	Impervious area reduced by 20% from allowable
3/3/18	MAS-14-053	Pine Park Walking Trails	4ft wide Pervious path 1.5" Flexipave HD 1500 over 4" #57 stone over Filter Fabric US160NW over Stabilized Subgrade max 95% modified Proctor Density ASTM D-1557
5/2/18	MAS-17-030	O Reilly Auto Parks	Runoff into two grass retention swales prior to discharge into the master stormwater piping/pond system. . Minimized impervious from 70% to 58.73%
5/16/18	INF-15-174	Oasis	Stormwater reuse for irrigation, 3 fountains for aeration in wet ponds, 684 sf (4 parking spaces) in pervious concrete at Amenity Center.
5/17/18	MAS-16-191	Tract C North Port Industrial Park (MTI)	8 Pervious Concrete Stalls, less impervious than allowed
Oct 2018	INF-15-153	Dog Park under included Renaissance	Stormwater Harvesting from Lake 3-2
12/7/2018	MAS-17-218	Taco Bell at Heron Creek Town Center	Less impervious than allowable, 63.8% vs 94.0%. Florida Friendly Landscaping used
5/23/19	INF-15-153	Renaissance At West Villages	Stormwater Harvesting for irrigation from Lake 5 with recharge well, Impervious area reduced by 8% from allowable
5/23/19	MAS-17-075	Braves Stadium	Stormwater Harvesting for irrigation with recharge from existing borrow pit, grass bioswales, grass parking >2000 spaces, fountains
12/4/19	MAS-17-107	Waffle House at Heron Creek Town Center	Less impervious than allowable, 60.6% vs 94.0%. Two grass pretreatment areas before entering master system.
3/25/20	MAS-18-186	Heartland Dental West Villages	3 Turf block pavers, small grass swale pretreatment area
7/6/20	MAS-18-081	Lakeside Medical Building	Grass pretreatment swales, 7 pervious concrerte parking stalls
9/11/20	CIP-19-218	Garden of 5 Senses Walking Trail	Pervious Walking Trail 1.5" KBI Flxi-oave HD2000 on 4: of #57 stone on stablized sub base LBR40. Two KBI Permadrive Parking Stalls 1.5-inch Permadrive with 4" #57 stone on stablized sub base LBR40
11/3/20	INF-17-093	Gran Paradiso Phase 5B	• Inclusion of aerators in lakes • Use of pavers on driveways • Preservation of Native and wetlands vegetation where possible • Use of Florida Friendly landscaping • Rear yards swales for extra treatment
11/3/20	INF-17-217	Gran Paradiso Phase 8	Use of pavers on driveways to minimize amount of impervious coverage, preservation of native vegetation where possible, the use of aerators to increase dissolved oxygen in lakes, implementation of rear yard swales to promote additional treatment prior to discharge, and the use of Florida Friendly Landscaping throughout the development.
Under Construcion	MAS -18-015	Oasis Amenity Center	Grass Swales before entering wet detention pond, 2728 sf pervious pavers
Under Construcion	MAS-18-127	Tire Kingdom / Coastal Car Wash	Runoff into two grass retention swales prior to discharge into the master stormwater piping/pond system
Under Construcion	INF-17-111	The Preserve Phase 3	Stormwater harvesting for irrigation from Pond 5-1P with recharge well, grass bioswale, fountain
Under Construcion	MAS-18-078	Kenvil Apartments	Multiple grass swale pre-treatment and 10 grass parking
Under Construcion	MAS-18-064	Hampton Inn & Suites @5664 Tuscola Blvd	Less impervious than allowable, 77.65% vs allowable 90%. Florida Friendly Landscaping used, stormwater harvesting.
Under Construcion	MAS-19-035	West Villages Welcome Center	Pavers proposed at the entrance are set on sand as a pervious pavement.
Under Construcion	MAS-19-140	Experience Living at North Port	Major Grass Swale discharges before entering stormwater pond. Only 20.23% percent impervious proposed when 69% is allowed.

Year Installed	Project number	Project Name	Description
Under Construcion	MAS-19-282	Chase Bank at West Villages Marketplace	15 parking stalls in pervious pavers Pave Drain. Runoff to grass swales for pretreatment prior to entering master stormwater system
Under Construcion	INF-20-051	West Villages Downtown Phase 1 Wellen Park	1. Stormwater harvesting for irrigation. 2 Use of pervious pavers that are set on shell material rather than concrete (In total, project proposes 25,660 SF of pervious pavers)
Under Construcion	INF-19-017	Tortuga	Stormwater harvesting for irrigation and paver driveways
Under Construcion	INF-20-19	Gran Park	Utilize paver driveways. Irrigation will be supplied through reuse provided by the WVID
Under Construcion	MAS-19-318	Palm Port Apartments	Stormwater harvesting for irrigation from 2 wet ponds with recharge well. 19 turf block parking stalls.
Under Construcion	MAS-20-091	Florida Cancer Specialists	Several large grass retention pretreatment swales prior to master stormwater system.
Future	MAS-17-003	Villas of Holly Brook	According to OPI (Office Professional Institutional) zone district, Section 5394-Maximum lot coverage; Buildings can cover up to 50% of available lot area. The current site design has a total impervious coverage of 55% (including building, parking, and sidewalks) so impervious area was kept at a minimum. Two landscaped gardens are provided between the building and the Cocoplum Waterway. The garden's runoff travels through yard drains which are all located in grassed depressions. The larger garden drains to the yard drains which then flow into a dry grassed swale before ultimately meeting the dry retention pond. The northwest parking lot quadrant was also regraded so the area flows into a grassed depression before draining to the dry pond.
Future	MAS-17-038	Wawa - Toledo Blade & Price	Modification of previous Bioswale #3 plus 2 more bioswales increase bioswale volume from 0.03 ac-ft to 0.086 ac-ft. impervious area is 74.2% compared to allowable 85%. 9 pervious pavement parking stalls
Future	MAS-18-047	Checkers only formerly included Fuzzy Taco at Shoppes of North Port	Redevelopment of existing shopping center reduce the impervious area from 39,525.29 SF to 35,962.46 SF. Impervious area under traffic is reduce by 13,530.00 SF.
Future	MAS-17-221	Gateway at Cocoplum Phase 2 part 1 Texas Road House	27 Pervious concrete parking spaces, 5" pervious concrete over 4" #57 stone
Future	MAS-18-289	Racetrac At Talon Bay MAS-18-289	Less impervious than allowable, 65% vs allowable 70%. Run off to long grass swales.
Future	INF-19-116	Oasis Phase 3	Grass swales for 8 lots before pond
Future		Kenvil Park Apartments MAS-19-090	The development has been designed to be as compact as possible, minimizing impervious areas. Large portions of the roofs are directed to green areas, to disconnect impervious areas. In addition, treated stormwater from the site is discharged through the proposed floodplain compensation pond, such that the discharge must travel through the entire length of the pond prior to leaving the site, which provides additional sediment settling capacity and nutrient assimilation beyond the treatment provided by the effluent filtration system. We have also included a floating fountain/aerator in the floodplain compensation pond to supplement the available dissolved oxygen supply and to provide an aesthetically pleasing visual amenity.
Future	PRE-19-203	US41 Linear Parking on Zagrobelny Way on north side of US41 between North Port Blvd and Espanoloa Ave.	76 pervious concrete parking between North Port Blvd and Espanola on the US 41 North access road
Future	MAS-20-055	North Port Village	Grass pretreatment swales.
Future	MAS-20-094	FIRESTONE STORE #912085 - NORTH PORT	Site approved max 85% impervious, only 64.75% impervious proposed. Vegetated treatment swale used prior to master stormwater system
Future	MAS-20-034	BISCAYNE SQUARE	Stormwater Reuse
Future	INF-20-120	West Villages - Village F-1 Phase 1	Stormwater harvesting for irrigation
Future	INF-20-218	Playmore Drive Extension	Master irrigation system which uses a combination of reuse, stormwater, and groundwater sources for its irrigation water



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0 0.1 0.2 0.4 Miles

Myakkahatchee Creek Land Acquisition Program

Prepared by GIS Services
June 4, 2019

Disclaimer: This map is for reference purposes only and is not to be construed as a legal document. Any reliance on the information contained herein is at the user's risk. The City of North Port and its agents assume no responsibility for any use of the information contained herein or any loss resulting therefrom.

Exhibit 8-12

Public Outreach Activities

Flood Information Related

Event	Brochure Type	Date of Event	Amount Available	Date Remaining Brochures Counted	Amount Remaining	Amount of Flyers Given	Water Quality Protection Flyers	Flood Info. Flyers	No. of Participants (flood Related)	No. of Participants (Water Quality Related)	Neighborhood Presentation	Public Displays on Water Quality	School Presentation on Water Quality	Seminar/ Workshop on Water Quality	Special Event on Water Quality
Sumter Pond Clean up - Keep Sarasota beautiful Great American Cleanup, brought display of stormwater system		09/25/10							50	50		1			
Kiwanis Harvest Festival at Mullen Center	Know where your drinking water comes from (approved by Robin Grantham at SWFWMD)	10/16/10	3	10/16/10	0	3			300	300		1			
	Fertilizer Fact Sheet		12		0	12									
Jockey Club HOA presentation on Stormwater and Fertilizer Ordinance, brought display of stormwater system and draft flood map	Know where your drinking water comes from (approved by Robin Grantham at SWFWMD)	10/21/10	28	10/21/10	0	28			50	50	1				
	Fertilizer Fact Sheet		37		0	37	6								
Jeffery Waterway nearby Residents	letter mailer to not pollute	10/27/10				153									
Glenallen Elementary School, stormwater presentation to three classes for Government week	Fertilizer Fact Sheet	10/26/10	80	10/26/10	0	80			100	100			1	1	
North Port Newcomer's Day at North Port Library	Know where your drinking water comes from (approved by Robin Grantham at SWFWMD)	10/30/10	10	10/30/10	0	10			500	500					1
	Fertilizer Fact Sheet		10		0	10									
Charlotte County Green Expo	Know where your drinking water comes from (approved by Robin Grantham at SWFWMD)	11/13/10	15	11/13/10	9	6			300	300		1			1
	Fertilizer Fact Sheet		45		39	6									
CHNEP Nature Festival	Know where your drinking water comes from (approved by Robin Grantham at SWFWMD)	11/20/10	50	11/20/10	46	4			500	500		1			1
	Fertilizer Fact Sheet		50		45	5									
E. Wong gave a powerpoint presentation Noon Kiwanis at Family Table Restaurant	Fertilizer Fact Sheet	01/05/11	46	1/5/11	36	10				16			1	1	
	Know Where Your Drinking Water Comes From		45	1/5/11	33	12									
Commission/Public Meeting on Big Slough Watershed Flood Maps Model and Peer Review		01/26/11							38				1	1	
E. Wong gave a powerpoint presentation and training on NPDES to Utilities Operators trianees		02/26/11							4	4			1	1	
E. Wong gave a powerpoint presentation and training on NPDES to Utilities Operators trianees		02/27/11							6	6			1	1	
Ecofest at Warm Mineral Springs - City Booth	Fertilizer Fact Sheet and floodmap on easel	3/19/2011 to 3/20/11				25			500	500		1			1
	Know Where Your Drinking Water Comes From					10									
City Hall 2nd Floor table display	Fertilizer Fact Sheet	03/22/11	50	8/9/11	5	45									
City Hall 3rd Floor PZE Front Waiting area	Fertilizer Fact Sheet	03/22/11	50	8/9/11	49	1									
Great American Cleanup		04/02/11							18	18		1			
North Port Library Flood Awareness Seminar - Sarasota County CRS Coordinator Des Companion hosted	FEMA Brochures	04/14/11							12	12					1
Tree Festival	Fertilizer Fact Sheet	04/30/11	50	4/30/11	49	1			250	250		1			1
	Know Where Your Drinking Water Comes From														
North Port Newcomer's Day at North Port Library	Fertilizer Fact Sheet and floodmap on easel	05/07/11				1						1			1
North Port Environmental Festival	Fertilizer Fact Sheet	05/14/11	25	5/14/11	2	23			200	200		1			1
	Know Where Your Drinking Water Comes From		10	5/14/11	5	5									
	Flood Information 10 Topics Flyer and floodmap on easel		25	5/14/11	4	21		21							
North Port Library Flood Awareness Seminar - Des Companion hosted	Flood Information 10 Topics Flyer	05/26/11	20						2						1
City Hall 1st Floor Kiosk	Flood Information 10 Topics Flyer	05/27/11	100	8/9/11	85	15		15							
City Hall 2nd Floor table display	Flood Information 10 Topics Flyer	05/27/11	50	8/9/11	38	12		12							
City Hall 3rd Floor PZE Front Waiting area	Flood Information 10 Topics Flyer	05/27/11	30	8/9/11	27	3		3							
City Hall 1st Floor Kiosk	Know Where Your Drinking Water Comes From	05/27/11	50	8/9/11	42	8									

Public Outreach Activities

Flood Information Related

Event	Brochure Type	Date of Event	Amount Available	Date Remaining Brochures Counted	Amount Remaining	Amount of Flyers Given	Water Quality Protection Flyers	Flood Info. Flyers	No. of Participants (flood Related)	No. of Participants (Water Quality Related)	Neighborhood Presentation	Public Displays on Water Quality	School Presentation on Water Quality	Seminar/ Workshop on Water Quality	Special Event on Water Quality
City Hall 2nd Floor table display	Know Where Your Drinking Water Comes From	05/27/11	50	8/9/11	24	26									
City Hall 3rd Floor PZE Front Waiting area	Know Where Your Drinking Water Comes From	05/27/11	50	10/3/11	29	21									
Presentation to the Planning Zoning and Advisory Board on Flood map update and stormwater maintenance discussions		06/16/11							11	11			1	1	
Mullen Center, City of North Port Summer Camp Kids, taught 4 x 1hr sessions of summer camp kids for a total of 120 kids on Don't Pollute and Flood Information. Kids range from 5yr to 13yr old	Fertilizer Fact Sheet	7/20/11 to 7/21/11	100	7/20/11 to 7/21/11	4	96			120	120			4	4	
	Know Where Your Drinking Water Comes From		100		1	99									
	Flood Information 10 Topics Flyer and floodmap on easel		100		2	98		98							
International Coastal Cleanup		09/24/11													1
Charlotte County Green Expo	Fertilizer Fact Sheet	10/01/11	47	7/20/11 to 7/21/11	35	12			1000	1000		1			1
	Know Where Your Drinking Water Comes From		49		22	27									
	Flood Information 10 Topics Flyer and floodmap on easel		27		4	23		23							
City Hall 3rd Floor Lobby area	Fertilizer Fact Sheet	10/10/11	25	3/5/11	0	25									
	Know Where Your Drinking Water Comes From		16	3/5/11	0	16									
	Flood Information 10 Topics Flyer		21	3/5/11	0	21		21							
North Port Community Garden at Warm Mineral Springs	Fertilizer Fact Sheet	10/10/11	20	10/10/11	10	10			11	11			1	1	
	Know Where Your Drinking Water Comes From		20		8	12									
	Flood Information 10 Topics Flyer		20		11	9		9							
North Port Democratic Club	Fertilizer Fact Sheet	10/17/11	5	10/17/11	0	5			35	35	1				
CHNEP Nature Festival	Fertilizer Fact Sheet	11/19/11	50		40	10			3000	3000		1			1
	Know Where Your Drinking Water Comes From		22		14	8									
	Flood Information 10 Topics Flyer and floodmap on easel		50		38	12		12							
North Port Library Flood Awareness Seminar - Des Companion hosted	Flood Information 10 Topics Flyer	12/1/2011	38		38	0		0	2	2					1
SWFWMD Public Open House on Draft Flood Maps	Flood Information 10 Topics Flyer and floodmap on easel	12/6/2011	50	12/7/11	45	5		5	523				1	1	
Wood Haven Estates HOA new Draft Floodmaps	Flood Information 10 Topics Flyer and floodmap on easel	1/17/2012	30	1/17/2012	27	3		3	36	36	1				
Jockey Club HOA Stormwater System and Pollution Prevention	Fertilizer Fact Sheet	01/19/12	40	01/19/12	30	10	10		50	50	1				
	Know Where Your Drinking Water Comes From		14		6	8	8								
	Flood Information 10 Topics Flyer and floodmap on easel		27		26	1		1							
	Grandfathering insurance FEMA brochure		30		30	0		0							
Warm Mineral Springs Open House	Fertilizer Fact Sheet	01/21/12	30		23	7			50	50		1			1
	Flood Information 10 Topics Flyer and floodmap on easel		20		15	5		5							
	Know Where Your Drinking Water Comes F		6		1	5									
Warm Mineral Springs Open Forun	Fertilizer Fact Sheet	1/26/12 and 2/2/12	30	2/10/12	21	9			40	40					
City Hall 1stFloor Lobby area	Fertilizer Fact Sheet	03/06/12	30		0	30									
	Know Where Your Drinking Water Comes From		30		0	30									
	Flood Information 10 Topics Flyer		30		0	30		30							
City Hall 2nd Floor Lobby area	Fertilizer Fact Sheet	03/06/12	37		37	0									
	Know Where Your Drinking Water Comes From		30		11	19									
	Flood Information 10 Topics Flyer		30		28	2		2							
City Hall 3rd Floor Lobby area	Fertilizer Fact Sheet	03/06/12	30		0	30									

Public Outreach Activities

Flood Information Related

Event	Brochure Type	Date of Event	Amount Available	Date Remaining Brochures Counted	Amount Remaining	Amount of Flyers Given	Water Quality Protection Flyers	Flood Info. Flyers	No. of Participants (flood Related)	No. of Participants (Water Quality Related)	Neighborhood Presentation	Public Displays on Water Quality	School Presentation on Water Quality	Seminar/ Workshop on Water Quality	Special Event on Water Quality
	Know Where Your Drinking Water Comes From		30		15	15									
	Flood Information 10 Topics Flyer		30		0	30		30							
Warm Mineral Springs Ecofest	Fertilizer Fact Sheet	03/17/12	25		20	5			300	300		1			1
	Know Where Your Drinking Water Comes From		25		20	5									
	Flood Information 10 Topics Flyer		25		20	5		5							
Great American Cleanup	Fertilizer Fact Sheet	04/07/12	20		14	6			9	9					1
	Know Where Your Drinking Water Comes From		20		14	6									
	Flood Information 10 Topics Flyer							0							
North Port Second Nature Environmental Festival	Fertilizer Fact Sheet	05/12/12	30		27	3			200	200		1			1
	Know Where Your Drinking Water Comes From		30		27	3									
	Flood Information 10 Topics Flyer		14		12	2		2							
Commission Presentation of the Improved CRS Rating		05/29/12							50						
Fertilizer and Aquatic plants Workshop	Fertilizer Fact Sheet	06/23/12	60		52	8			8	8			1	1	
	Know Where Your Drinking Water Comes From		60		52	8									
	Flood Information 10 Topics Flyer		60		52	8		8							
Commission Public Meeting Presenting NPDES Year 4 (2011) Report		7/10/2012							50	50			1	1	
Mullen Center, City of North Port Summer Camp Kids, taught 2 x 1.5hr sessions of summer camp kids for a total of 77 camp kids and 6 City staff on Fertilizers, Aquatic plants, Don't Pollute and Flood Information. Kids range from 5yr to 13yr old	Fertilizer Fact Sheet	08/13/12	120		77	43	43		83	83			2	2	
	Flood Information 10 Topics Flyer		120		82	38		38							
City Hall 1stFloor Lobby area	Fertilizer Fact Sheet	08/31/12	30	9/12/13	0	30	30								
	Know Where Your Drinking Water Comes From		30		0	30	30								
	Flood Information 10 Topics Flyer		30		0	30		30							
City Hall 2nd Floor Lobby area	Fertilizer Fact Sheet	08/31/12	37	9/12/13	0	37	37								
	Know Where Your Drinking Water Comes From		30		0	30	30								
	Flood Information 10 Topics Flyer		30		8	22		22							
City Hall 3rd Floor Lobby area	Fertilizer Fact Sheet	08/31/12	30	9/12/13	0	30	30								
	Know Where Your Drinking Water Comes From		27		0	27	27								
	Flood Information 10 Topics Flyer		30		0	30		30							
2012 International Coastal Cleanup	Fertilizer Fact Sheet	09/15/12	30		18	12	12		17	17			1	1	
	Know Where Your Drinking Water Comes From		30		18	12	12								
	Flood Information 10 Topics Flyer		30		19	11		11							
Public Works Office	Fertilizer Fact Sheet	09/17/12	30	9/12/13	20	10	10								
	Know Where Your Drinking Water Comes From		25		22	3	3								
	Flood Information 10 Topics Flyer		30		24	6		6							
Newcomers Day	Fertilizer Fact Sheet	11/03/12	18		0	18	18		256	256					1
	Know Where Your Drinking Water Comes From		18		0	18	18								
	Flood Information 10 Topics Flyer		19		0	19		19							
CHNEP Nature Festival	Fertilizer Fact Sheet	11/17/12	50		24	26	26		3000	3000		1			1
	Know Where Your Drinking Water Comes From		50		36	14	14								
	Flood Information 10 Topics Flyer and		14		7	7		7							
North Port Second Nature Environmental Festival	Fertilizer Fact Sheet	02/09/13	54		43	11	11		500	500		1			1
	Know Where Your Drinking Water Comes From		66		54	12	12								

Public Outreach Activities

Flood Information Related

Event	Brochure Type	Date of Event	Amount Available	Date Remaining Brochures Counted	Amount Remaining	Amount of Flyers Given	Water Quality Protection Flyers	Flood Info. Flyers	No. of Participants (flood Related)	No. of Participants (Water Quality Related)	Neighborhood Presentation	Public Displays on Water Quality	School Presentation on Water Quality	Seminar/ Workshop on Water Quality	Special Event on Water Quality
	Flood Information 10 Topics Flyer and floodmap on easel		37		33	4		4							
FDEP Public Workshop	Fertilizer Fact Sheet	03/07/13	43		41	2	2		50	50		1			1
	Know Where Your Drinking Water Comes From		54		52	2	2								
	Flood Information 10 Topics Flyer and		33		31	2		2							
Great American Cleanup	Fertilizer Fact Sheet	04/27/13	41		30	11	11		20	20		1			1
	Know Where Your Drinking Water Comes From		52		40	12	12								
	Flood Information 10 Topics Flyer and floodmap on easel		31		19	12		12							
Newcomers Day	Fertilizer Fact Sheet	05/04/13	30		24	6	6		20	20					1
	Know Where Your Drinking Water Comes From		40		32	8	8								
	Flood Information 10 Topics Flyer and floodmap on easel		19		13	6		6							
Green Tour of North Port - hosted by E.Wong for Lisa Beever, Director CHNEP and other citizens									6	6					1
Mullen Center, City of North Port Summer Camp Kids, taught 50 summer camp kids 3 City staff on Fertilizers, Aquatic plants, Don't Pollute and Flood Information. Kids range from 5yr to 8yr old	Fertilizer Fact Sheet	07/19/13	30		2	28	28		50	50					1
	Know Where Your Drinking Water Comes From		30		0	30	30								
	Flood Information 10 Topics Flyer and floodmap on easel		30		1	29		29							
City Hall 1stFloor Lobby area	Fertilizer Fact Sheet	09/12/13	30	9/11/14	0	30	30								
	Know Where Your Drinking Water Comes From		30		0	30	30								
	Flood Information 10 Topics Flyer		30		0	30		30							
City Hall 2nd Floor Lobby area	Fertilizer Fact Sheet	09/12/13	30	9/11/14	0	30	30								
	Know Where Your Drinking Water Comes From		30		14	16	16								
	Flood Information 10 Topics Flyer		30		7	23		23							
City Hall 3rd Floor Lobby area	Fertilizer Fact Sheet	09/12/13	30	9/11/14	0	30	30								
	Know Where Your Drinking Water Comes From		30		0	30	30								
	Flood Information 10 Topics Flyer		30		0	30		30							
Public Works Office	Fertilizer Fact Sheet	09/12/13	30	9/11/14	0	30	30								
	Know Where Your Drinking Water Comes From		30		1	29	29								
	Flood Information 10 Topics Flyer		30		11	19		19							
2013 International Coastal Cleanup	Fertilizer Fact Sheet	09/20/13	30			30	30		30	30			1	1	
	Know Where Your Drinking Water Comes From		24			24	24								
	Flood Information 10 Topics Flyer		30			30		30							
North Port Cub Scouts	Fertilizer Fact Sheet	11/19/13	15		0	15	15								1
	Know Where Your Drinking Water Comes From		15		10	5	5								
	Sustainability		15		6	9		9							
CHNEP Nature Festival	Fertilizer Fact Sheet	11/23/13	50	11/25/13	41	9	9		3500	3500		1			1
	Know Where Your Drinking Water Comes From		50		38	12	12								
	Flood Information 10 Topics Flyer and		50		35	15		15							
Public Works Road-eo	Fertilizer Fact Sheet	01/25/14	50	01/25/14	36	14	14		600	600		1			1
	Know Where Your Drinking Water Comes From		50		38	12	12								
	Flood Information 10 Topics Flyer and		50		42	8		8							
North Port Second Nature Environmental Festival	Fertilizer Fact Sheet	02/08/14	36	02/08/14	24	12	12		400	400		1			1
	Know Where Your Drinking Water Comes From		38		22	16	16								
	Flood Information 10 Topics Flyer and		42		28	14		14							
Newcomers Day	Fertilizer Fact Sheet	02/01/14					0		20	20					1
	Know Where Your Drinking Water Comes From					10	10								

Public Outreach Activities

Flood Information Related

Event	Brochure Type	Date of Event	Amount Available	Date Remaining Brochures Counted	Amount Remaining	Amount of Flyers Given	Water Quality Protection Flyers	Flood Info. Flyers	No. of Participants (flood Related)	No. of Participants (Water Quality Related)	Neighborhood Presentation	Public Displays on Water Quality	School Presentation on Water Quality	Seminar/ Workshop on Water Quality	Special Event on Water Quality
	Flood Information 10 Topics Flyer and					10		10							
Great American Cleanup	Fertilizer Fact Sheet	03/15/14	28	03/15/14		28	28		65	65	1				
	Know Where Your Drinking Water Comes From		28			28	28								
	Flood Information 10 Topics Flyer and		28			28		28							
Make Mitigation Happen Community Workshop held at North Port Library	Make Mitigation Happen Community Powerpoint	05/20/14							5	5					
Woodland Middle School Speaker, spoke to 6th, 7th and 8th graders on pollution prevention and pervious pavement use at STEM program	Fertilizer Fact Sheet	03/21/14	34	3/21/14	30	4	4		20	20			1		
Mullen Center, City of North Port Summer Camp Kids, taught 2 sessions 1.5hr to 41 summer camp kids 2 City camp counseller on Fertilizers, Aquatic plants, Don't Pollute and Flood Information. Kids range from 5yr to 13yr old	Fertilizer Fact Sheet	08/08/14	60	08/08/14	32	28	28		43	43				2	
	Know Where Your Drinking Water Comes From		30		9	21	21								
	Flood Information 10 Topics Flyer and floodmap on easel		30		20	10		10							
City Hall Three Floors Lobby area	Fertilizer Fact Sheet	9/11/14	90	9/14/15	0	90	90								
	Know Where Your Drinking Water Comes From		90		21	69	69								
	Flood Information 10 Topics Flyer		90		11	79		79							
International Coastal Cleanup		9/20/14							61	61	1				
Commission Workshop on Big Slough Watershed study and draft Flood map		9/25/14							14	14					
Public Works Office	Fertilizer Fact Sheet	9/29/14	29	9/14/15	0	29	29								
	Know Where Your Drinking Water Comes From		30		19	11	11								
	Flood Information 10 Topics Flyer		50		36	14		14							
2014 International Coastal Cleanup	Fertilizer Fact Sheet	9/27/14	30	9/27/14	0	30	30		65	65	1				
	Know Where Your Drinking Water Comes From		30		0	30	30								
	Flood Information 10 Topics Flyer		30		0	30		30							
GIS Day at North Port Library - New draft flood map on display	Flood Information 10 Topics Flyer	11/19/14	50		48	2		2	2	2					
CHNEP Nature Festival	Fertilizer Fact Sheet	11/22/14	50	11/22/14	0	50	50		2500	2500		1			1
	Know Where Your Drinking Water Comes From		50		0	50	50								
	Flood Information 10 Topics Flyer and floodmap on easel		50		0	50		50							
Flood Map Changes Stakeholder Meeting	Sarasota County Organized with North Port coordination	1/9/15							90						
Sarasota County/FEMA 1st Public Open House on Draft FIRMs		1/20/15							140						
Venice/Sarasota County/FEMA 1st Public Open House on Draft FIRMs		1/21/15							503						
North Port/Sarasota County/FEMA 1st Public Open House on Draft FIRMs		1/22/15							452						
Public Works Road-eo	Fertilizer Fact Sheet	01/24/15	50	01/26/15	45	5	5		700	700					1
	Know Where Your Drinking Water Comes From		50		49	1	1								
	Flood Information 10 Topics Flyer and floodmap on easel		50		39	11		11							
Ecofest City Hall	Fertilizer Fact Sheet	02/07/15	45		33	12	12		1000	1000		1			1
	Know Where Your Drinking Water Comes From		49		46	3	3								
	Flood Information 10 Topics Flyer and floodmap on easel		50		35	15		15							
Sarasota County/FEMA 2nd Public Open House on Draft FIRMs		2/24/15							18						
Venice/Sarasota County/FEMA 2nd Public Open House on Draft FIRMs		3/4/15							60						

Public Outreach Activities

Flood Information Related

Event	Brochure Type	Date of Event	Amount Available	Date Remaining Brochures Counted	Amount Remaining	Amount of Flyers Given	Water Quality Protection Flyers	Flood Info. Flyers	No. of Participants (flood Related)	No. of Participants (Water Quality Related)	Neighborhood Presentation	Public Displays on Water Quality	School Presentation on Water Quality	Seminar/ Workshop on Water Quality	Special Event on Water Quality
North Port/Sarasota County/FEMA 2nd Public Open House on Draft FIRMs	Fertilizer Fact Sheet	3/12/15	33			33	33		105						
	Know Where Your Drinking Water Comes From		46	3/12/15	45	1	1								
	Flood Information 10 Topics Flyer and floodmap on easel		75	3/12/15	65	10		10							
	Flood Insurance Premium Comparisons		25	3/12/15	22	3		3							
Public Works Office	Flood Insurance Premium Comparisons	3/12/15	21		10	11		11							
	Effect of Map Changes on Insurance		25	9/14/15	0	25		25							
	Electronic LOMA		25		0	25		25							
Great American Cleanup	Fertilizer Fact Sheet	03/28/15	28	03/28/15		28	28		50	50					1
	Know Where Your Drinking Water Comes From		28			28	28								
	Flood Information 10 Topics Flyer and floodmap on easel		28			28		28							
Charlotte County Board of Realtors, 3320 Loveland Blvd, Port Charlotte, FL 33980	Flood Information 10 Topics Flyer and floodmap on easel	04/09/15	21	04/09/15	0	21		21	80	80	1				
	Flood Insurance Premium Comparisons		19		18	1		1							
North Port Business Club	Flood Information 10 Topics Flyer and draft floodmap on easel	04/21/15	20	04/21/15	17	3		3	13	13	1				
TIGER Bay Club Monthly - Flood map updates		05/08/15							40						
Hurricane Exercise, and distribution of water and flyer at Atwater Park	Hurricane Disaster Planning Guide	05/20/15				100		100	100						
Utility Bill Mailer with Pet Waste Message June 2 to July 1st, 2015	Utilities Bill mailer included message "Keep our waterways and drinking water supply clean. Please collect your pet's waste and dispose in garbage."	06/01/15				20000	20000								
Lions Club meeting Speaker on new draft flood maps	Flood Information 10 Topics Flyer and draft floodmap on easel	06/02/15	17	06/02/15	0	17		17	20	20				1	
July 4th Fireworks Festival	Fertilizer Fact Sheet	07/04/15	45	07/07/15		45	45		5000	5000					1
	Know Where Your Drinking Water Comes From		45		44	1	1								
	Flood Information 10 Topics Flyer and floodmap on easel		45			45		45							
Mullen Center, City of North Port Summer Camp Kids, taught 2 sessions 1hr each to summer camp kids and City camp counseller on Fertilizers, Don't Pollute and Flood Information. Kids range from 5yr to 13yr old	Fertilizer Fact Sheet	08/03/15	60	08/03/15	0	60	60		103	103			2		
	Know Where Your Drinking Water Comes From		60		0	60	60								
	Flood Information 10 Topics Flyer and floodmap on easel		60		21	39		39							
City Hall Three Floors Lobby area	Fertilizer Fact Sheet	9/16/15	90		0	90	90								
	Know Where Your Drinking Water Comes From		90		6	84	84								
	Flood Information 10 Topics Flyer		90		6	84		84							
Public Works Office	Fertilizer Fact Sheet	9/16/15	30		0	30	30								
	Know Where Your Drinking Water Comes From		30		10	20	20								
	Flood Information 10 Topics Flyer		30		23	7		7							
International Coastal Cleanup - ulie Bellia discussed water qualilty and flood info		09/19/15			0	0			65	65					1
CRS first quarterly meeting City Staff and Public Sector Representatives	Fertilizer Fact Sheet	10/30/15	30	10/30/15	10	20	20		21	21				1	
	Know Where Your Drinking Water Comes From		30		11	19	19								
	Flood Information 10 Topics Flyer and floodmap on easel		30		11	19		19							
CHNEP Nature Festival	Fertilizer Fact Sheet	11/21/15	33	11/23/15	22	11	11		1500	1500		1			1

Public Outreach Activities

Flood Information Related

Event	Brochure Type	Date of Event	Amount Available	Date Remaining Brochures Counted	Amount Remaining	Amount of Flyers Given	Water Quality Protection Flyers	Flood Info. Flyers	No. of Participants (flood Related)	No. of Participants (Water Quality Related)	Neighborhood Presentation	Public Displays on Water Quality	School Presentation on Water Quality	Seminar/ Workshop on Water Quality	Special Event on Water Quality
	Know Where Your Drinking Water Comes From		44		39	5	5								
	Flood Information 10 Topics Flyer and floodmap on easel		37		30	7		7							
North Port Library Flood Zone Workshops	Flood Information 10 Topics Flyer and floodmap on easel	01/13/16				2		2	2						
2016 Public Works Road-E-O	Fertilizer Fact Sheet	01/30/16	50		35	15	15		900	900		1			1
	Know Where Your Drinking Water Comes From		50		30	20	20								
	Flood Information 10 Topics Flyer and floodmap on easel		50		30	20		20							
Newcomer Day	Fertilizer Fact Sheet	02/06/16	35		0	35	35		300	300					1
	Know Where Your Drinking Water Comes From		30		0	30	30								
	Flood Information 10 Topics Flyer and floodmap on easel		30		0	30		30							
North Port Library Flood Zone Workshops	Flood Information 10 Topics Flyer and floodmap on easel	02/08/16				2		2	3						
Roadways & Waterways Celebration @ McKibben Park	Fertilizer Fact Sheet	02/27/16	50		30	20	20		150	150					1
	Know Where Your Drinking Water Comes From		50		35	15	15								
	Flood Information 10 Topics Flyer and floodmap on easel		50		30	20		20							
North Port Library Flood Zone Workshops	Flood Information 10 Topics Flyer and floodmap on easel	03/15/16				2		2	3						
City Commission Meeting on Status of FEMA Draft Flood Maps		03/22/16							20						
HOA Presentation @ Talon Bay	Fertilizer Fact Sheet	03/23/16	65		0	65	65		65	65				1	
	Know Where Your Drinking Water Comes From		65		0	65	65								
	Flood Information 10 Topics Flyer and floodmap on easel		65		0	65		65							
Great American Cleanup	Fertilizer Fact Sheet	04/16/16	30	04/16/16	28	2	2		35	35	1				
	Know Where Your Drinking Water Comes From		30		26	4	4								
	Flood Information 10 Topics Flyer and floodmap on easel		30		28	2		2							
Public Works Office	Fertilizer Fact Sheet	4/21/16	30	12/31/16	0	30	30								
	Know Where Your Drinking Water Comes From		30		10	20	20								
	Flood Information 10 Topics Flyer		30		23	7		7							
6th Annual Regional Reverse Trade Show & Conference in Sarasota	Fertilizer Fact Sheet	04/22/16	28	04/22/16	28	0	0		322	322					1
	Know Where Your Drinking Water Comes From		26		26	0	0								
	Flood Information 10 Topics Flyer and floodmap on easel		28		28	0		0							

Public Outreach Activities

Flood Information Related

Event	Brochure Type	Date of Event	Amount Available	Date Remaining Brochures Counted	Amount Remaining	Amount of Flyers Given	Water Quality Protection Flyers	Flood Info. Flyers	No. of Participants (flood Related)	No. of Participants (Water Quality Related)	Neighborhood Presentation	Public Displays on Water Quality	School Presentation on Water Quality	Seminar/ Workshop on Water Quality	Special Event on Water Quality
City Hall Three Floors Lobby area	Fertilizer Fact Sheet	4/25/16	90	12/31/16	24	66	66								
	Know Where Your Drinking Water Comes From		96		58	38	38								
	Flood Information 10 Topics Flyer		96		31	65		65							
Lamarque Elementary Earth Night	Fertilizer Fact Sheet	03/24/16	50	03/24/16	27	23	23		25	25			1		
	Know Where Your Drinking Water Comes From		50		22	28	28								
	Flood Information 10 Topics Flyer and floodmap on easel		50		20	30		30							
Newcomer Day	Fertilizer Fact Sheet	05/07/16	50	05/07/16	30	20	20		50	50					1
	Know Where Your Drinking Water Comes From		50		26	24	24								
	Flood Information 10 Topics Flyer and floodmap on easel		50		30	20		20							
Toledo Blade Elementary Spring Showcase	Fertilizer Fact Sheet	05/12/16	50	05/12/16	35	15	15		50	50			1		
	Know Where Your Drinking Water Comes From		50		40	10	10								
	Flood Information 10 Topics Flyer and floodmap on easel		50		42	8		8							
Heron Creek HOA - Head from each Block	Flood Information 10 Topics Flyer and floodmap on easel	06/09/16	30		0	30		30	20	20				1	
Final FEMA flood map Public Open Houses 6/20/16, 6/21/16 6/23/16, 6/27/16 6/28/16, 6/29/16	Fertilizer Fact Sheet	06/23/16	50	06/24/16	48	2	2		155						
	Know Where Your Drinking Water Comes From		50		43	7	7								
	Flood Information 10 Topics Flyer and floodmap on easel		50		38	12		12							
North Port Commission Meeting on Ordinance 2016-21 to revise ULDC Chapter 17 to adopt new FIRMs		07/26/16					0		30						
North Port Library Flood Zone Workshops	Flood Information 10 Topics Flyer and floodmap on easel	08/23/16					0		8						
North Port Commission Meeting on Ordinance 2016-21 to revise ULDC Chapter 17 to adopt new FIRMs		09/13/16					0		30						
International Coastal Cleanup	Fertilizer Fact Sheet	09/17/16	100	09/17/16			0		125	150	1				
North Port GIS Day at the North Port Library	Flood Information 10 Topics Flyer	11/16/16	38		38	0	0	0	50						
CHNEP Nature Festival	Fertilizer Fact Sheet	11/19/16	43	11/19/16	32	11	11		2000	2000		1			1
	Know Where Your Drinking Water Comes From		43		31	12	12								
	Flood Information 10 Topics Flyer and floodmap on easel		38		20	18		18							
Leadership North Port Tour	Fertilizer Fact Sheet	01/13/17	25	01/13/17	0	25	25		25	25				1	
	Know Where It Flows		25		0	25	25								
	Flood Information Sheet		25		0	25		25							
Meeting with Canal Watch Program Volunteers	Fertilizer Fact Sheet	01/17/17	32	01/17/17	22	10	10			7	1				
	Know Where Your Drinking Water Comes From		31		25	6	6								
Public Works Road-E-O	Fertilizer Fact Sheet	01/28/17	50	01/28/17	38	12	12		2000	2000		1			1
	Know Where Your Drinking Water Comes From		50		37	13	13								
	Flood Information 10 Topics Flyer and floodmap on easel		50		43	7		7							
Newcomer Day	Fertilizer Fact Sheet	02/04/17	300	02/04/17	50	250	250		300	300		1		1	
	Know Where It Flows		300		47	253	253								
	Flood Information 10 Topics Flyer and floodmap on easel		300		0	300		300							
Lamarque Elementary Earth Night	Fertilizer Fact Sheet	02/14/17	75	02/14/17	10	65	65		100	100			1		
	Know Where It Flows		75		13	62	62								

Public Outreach Activities

Flood Information Related

Event	Brochure Type	Date of Event	Amount Available	Date Remaining Brochures Counted	Amount Remaining	Amount of Flyers Given	Water Quality Protection Flyers	Flood Info. Flyers	No. of Participants (flood Related)	No. of Participants (Water Quality Related)	Neighborhood Presentation	Public Displays on Water Quality	School Presentation on Water Quality	Seminar/ Workshop on Water Quality	Special Event on Water Quality
	Flood Information 10 Topics Flyer and floodmap on easel		75		17	58		58							
Great American Cleanup	Fertilizer Fact Sheet	04/22/17	38	4/23/17	17	21	21		50	50					1
	Know Where Your Drinking Water Comes From		37		17	20	20								
	Flood Information 10 Topics Flyer		43		24	19		19							
Newcomer Day	Fertilizer Fact Sheet	05/06/17	200	05/06/17	53	147	147		200	200		1		1	
	Know Where It Flows		200		45	155	155								
	Flood Information 10 Topics Flyer		200		48	152		152							
Toledo Blade Elementary Spring Showcase	Fertilizer Fact Sheet	05/18/17	150	05/18/17	101	49	49		150	150			1		
	Know Where It Flows		150		97	53	53								
	Flood Information 10 Topics Flyer		150		86	64		64							
Public Works Office	Fertilizer Fact Sheet	6/15/17	42			42	42					1			
	Know Where Your Drinking Water Comes From		30			30	30								
	Flood Information 10 Topics Flyer		30			30		30							
City Hall Three Floors Lobby area and Planning Dept	Fertilizer Fact Sheet	6/16/17	120	10/19/17	25	95	95					1			
	Know Where Your Drinking Water Comes From		120		80	40	40								
	Flood Information 10 Topics Flyer		120		100	20		20							
SKYWARN® spotter training class on June 28, 2017		06/28/17							76						
Radio interview with WKDW FM Radio		9/14/17							500						
City Hall Three Floors Lobby area and Planning Dept	Fertilizer Fact Sheet	10/19/17	25		0	25	25					4			
	Know Where Your Drinking Water Comes From		80		29	51	51								
	Flood Information 10 Topics Flyer		40		2	38		38							
Utilities Office	Fertilizer Fact Sheet	10/20/17	20		0	20	20					1			
	Know Where Your Drinking Water Comes From		19		0	19	19								
	Flood Information 10 Topics Flyer		20		0	20		20							
International Coastal Cleanup	Fertilizer Fact Sheet	10/28/17	30	10/28/17	12	18	18		21	21					1
	Know Where Your Drinking Water Comes From		30		12	18	18								
	Flood Information 10 Topics Flyer		30		12	18		18							
Newcommer Day brochures - for Edie Driest to distribute	Fertilizer Fact Sheet	11/4/17	30			30	30		30	30					
	Know Where Your Drinking Water Comes From		30			30	30								
	Flood Information 10 Topics Flyer		30			30		30							
Newcomer Day - Public Works Customer Service handed out	Fertilizer Fact Sheet	11/3/17	50			42	42		35	42		1		1	
	Know Where Your Drinking Water Comes From		50			37	37								
	Flood Information 10 Topics Flyer		50			35		35							
Newcomer Day	Fertilizer Fact Sheet	11/04/17	200		0	200	200		300	300		1		1	1
	Know Where Your Drinking Water Comes		200		0	200	200								
	Flood Information 10 Topics Flyer		200		0	200		200							
CHNEP Nature Festival	Fertilizer Fact Sheet	11/18/17	50		0	50	50		2000	2000		1			1
	Know Where Your Drinking Water Comes From		50		41	9	9								

Public Outreach Activities

Flood Information Related

Event	Brochure Type	Date of Event	Amount Available	Date Remaining Brochures Counted	Amount Remaining	Amount of Flyers Given	Water Quality Protection Flyers	Flood Info. Flyers	No. of Participants (flood Related)	No. of Participants (Water Quality Related)	Neighborhood Presentation	Public Displays on Water Quality	School Presentation on Water Quality	Seminar/ Workshop on Water Quality	Special Event on Water Quality
	Flood Information 10 Topics Flyer and floodmap on easel		50		48	2		2							
Leadership North Port Tour	Drainage System Tips	1/12/18	20				20	20	20	20				1	
	Flood Information 10 Topics Flyer		20					20							
Newcomer Day - Public Works Customer Service	Drainage System Tips	2/3/18	200	2/3/18	0	200	200	300	300	200				1	
	Flood Information 10 Topics Flyer		200		0	200		150							
Public Works Road-eo	Fertilizer Fact Sheet	02/24/18	50	02/24/18	38	12	12		2200	2200		1			1
	Know Where Your Drinking Water Comes From		50		43	7	7								
	Flood Information 10 Topics Flyer and		50		27	23		23							
Gran Paradiso Coach Homes HOA Pres Vlad Basch	Flood Information 10 Topics Flyer	03/13/18	27		0	27		27	1						
Florida Native Plant Society Mangrove Chapter	Fertilizer Fact Sheet	03/13/18	38	03/13/18	20	18	18			23				1	
	Know Where Your Drinking Water Comes From		38		19	19	19								
West Villages Town Hall	Fertilizer Fact Sheet	03/15/18	50	03/15/18	0	50	50		400	400	1				
	Know Where Your Drinking Water Comes From		50		0	50	50								
	Flood Information 10 Topics Flyer		50		0	50		50							
Earth Night - Lamarque Elementary	Fertilizer Fact Sheet	03/22/18	50	03/22/18	0	50	50		75	75			1		
	Know Where Your Drinking Water Comes From		50		0	50	50								
	Flood Information 10 Topics Flyer		50		0	50		50							
Great American Cleanup		03/24/18		4/23/17					23	23					1
Peace River Engineering Society	Flood Information 10 Topics Flyer	04/10/18	20	4/10/18	13	7		7	12	12				1	
Oscar Scherer Park for the Earth Day celebration	Flood Information 10 Topics Flyer	04/27/19	200	04/21/18	0	200		200	200						
Toledo Blade Elementary Spring Fling	Fertilizer Fact Sheet	05/10/18	50	05/10/18	0	50	50		400	400			1		
	Know Where Your Drinking Water Comes From		50		0	50	50								
	Flood Information 10 Topics Flyer		50		0	50		50							
Atwater Elementary School Earth Day	Fertilizer Fact Sheet	05/11/18	43		21	22	22		200	200			1		
	Know Where Your Drinking Water Comes From		43		21	22	22								
	Flood Information 10 Topics Flyer		43		21	22		22							
July 4th Freedom Festival	Fertilizer Fact Sheet	07/04/18	30	07/09/18	27	3	3		5	5					1
	Know Where Your Drinking Water Comes From		30		25	5	5								
	Flood Information 10 Topics Flyer		30		26	4		4							
City of North Port Summer kids camp	Fertilizer Fact Sheet	07/19/18	30	07/19/18	3	27	27		150	150			1		
	Know Where Your Drinking Water Comes From		30		5	25	25								
	Flood Information 10 Topics Flyer		30		5	25		25							
Canal Watch Group members + outreach	Fertilizer Fact Sheet	07/19/18	30	08/02/18	44	16	16		7	7				1	
	Know Where Your Drinking Water Comes From		30		11	19	19								
	Flood Information 10 Topics Flyer		30		32	7		7							

Public Outreach Activities

Flood Information Related

Event	Brochure Type	Date of Event	Amount Available	Date Remaining Brochures Counted	Amount Remaining	Amount of Flyers Given	Water Quality Protection Flyers	Flood Info. Flyers	No. of Participants (flood Related)	No. of Participants (Water Quality Related)	Neighborhood Presentation	Public Displays on Water Quality	School Presentation on Water Quality	Seminar/ Workshop on Water Quality	Special Event on Water Quality
Water Control Structure No. 115 Ribbon Cutting Ceremony									55	55					1
International Coastal Cleanup	Fertilizer Fact Sheet	09/15/18	30		0	30	30		100	100					1
	Know Where Your Drinking Water Comes From		30		0	30	30								
	Flood Information 10 Topics Flyer		30		0	30		30							
Canal Watch Group members + outreach + WTP tour	Know Where Your Drinking Water Comes From	10/25/218	80		0	80	80			10				1	
CHNEP Nature Festival	Fertilizer Fact Sheet	11/17/18	30	11/19/18	25	5	5		1750	1750		1			1
	Know Where Your Drinking Water Comes From		30		18	12	12								
	Flood Information 10 Topics Flyer		30		26	4		4							
Public Works Road-E-O	Fertilizer Fact Sheet	01/25/19	39	01/25/19	0	39	39		2400	2400		1			1
	Fertilizer Resolution Sheet		91		0	91	91								
	Know Where Your Drinking Water Comes From		49		0	49	49								
	Flood Information 10 Topics Flyer and floodmap on easel		47		46	1		1							
Flood Reduction Study Public Outreach Meeting	Fertilizer Fact Sheet	02/13/19	50	02/13/19	0	50	50		47						
	Know Where Your Drinking Water Comes From		29		0	29	29								
	Flood Information 10 Topics Flyer and floodmap on easel		46		0	46		46							
Clean up of Myakkahatchee Canal using kayaks		02/23/19							6	6					1
Fertilizer Regulation for HOAs and subcontractors	Fertilizer Fact Sheet	03/12/19	2		0	2	2			2	1				
NP Friends of Wildlife Seminar	Fertilizer Fact Sheet	03/20/19	20		0	20	20			20				1	
Fertilizer Regulation for HOAs and subcontractors and Illicit Discharge	Fertilizer Fact Sheet	03/26/19	20		4	16	16			9	1				
Clean up of Myakkahatchee Canal using kayaks		03/30/19							9	9					1
Fertilizer Regulation for Gran Paradiso HOA manager Landscape Management subcontractor	Fertilizer Fact Sheet	04/11/19	2		0	2	2			2				1	
Great American Cleanup		04/13/19							14	14					1
Canal Watch Group Meeting	Fertilizer Fact Sheet	04/23/19	50	04/23/19	0	50	50		8	8				1	
	Know Where Your Drinking Water Comes From		50		0	50	50								
	Flood Information 10 Topics Flyer		50		0	50		50							

Public Outreach Activities

Flood Information Related

Event	Brochure Type	Date of Event	Amount Available	Date Remaining Brochures Counted	Amount Remaining	Amount of Flyers Given	Water Quality Protection Flyers	Flood Info. Flyers	No. of Participants (flood Related)	No. of Participants (Water Quality Related)	Neighborhood Presentation	Public Displays on Water Quality	School Presentation on Water Quality	Seminar/ Workshop on Water Quality	Special Event on Water Quality
Atwater Elementary School Earth Day	Know Where Your Drinking Water Comes From	04/26/19	20		0	20	20		160	160			1		
Earth Day Celebration at Oscar Scherer	Flood Information 10 Topics Flyer	04/27/19	250		0	250		250	1783						
City Hall Three Floors Lobby area and Planning Dept	Fertilizer Fact Sheet	5/10/19	120	5/13/20	78	42	42					4			
	Know Where Your Drinking Water Comes From		120		55	65	65								
	Flood Information 10 Topics Flyer		120		50	70		70							
Water Quality Public Outreach Workshop by IFAS		05/16/19								16				1	
City of North Port Hurricane Preparedness Training		05/22/19							13						
July 4th Celebration at Braves Stadium	Fertilizer Fact Sheet	7/4/19	30		0	30	30		30	30					1
	Know Where Your Drinking Water Comes From		30		0	30	30								
	Flood Information 10 Topics Flyer		30		0	30		30							
ERA Advantage Realty associates Presentation on Flood Information, Flood Insurance CRS and Water/Sewer	Fertilizer Fact Sheet	7/4/19	30		0	30	30		25	25					1
	Know Where Your Drinking Water Comes From		30		0	30	30								
	Flood Information 10 Topics Flyer		30		0	30		30							
Hurricane / Flooding Preparedness Presentation to City Staff		7/8/19	26						26						
Annual Summer Camp at George Mullens Activity Center	Fertilizer Fact Sheet	7/12/19	30	7/12/19	2	28	28		120	120			2		1
	Know Where Your Drinking Water Comes From		30		2	28	28								
	Flood Information 10 Topics Flyer		30		2	28		28							
Hurricane Preparedness Exercise		7/17/19							108						
City Hall Three Floors Lobby area and Planning	Fertilizer New Flyer (CHNEP funded)	8/5/19	120	5/13/20	36	84	84								
Environmental Advisory Board (EAB)	Fertilizer New Flyer (CHNEP funded)	09/09/19	48		0	48	48			4				1	
Commissioner McDowell	Fertilizer New Flyer (CHNEP funded)	09/16/19	1		0	1	1			1					
International Coastal Cleanup	Fertilizer New Flyer (CHNEP funded)	09/21/19	30		30	0	0		70	70					
	Flood Information 10 Topics Flyer		30		30	0	0								
Halloween at City Hall	Fertilizer Fact Sheet	10/25/19	50	7/12/19	49	1	1		2000	2000		1			1
	Fertilizer New Flyer (CHNEP funded)		500		499	1	1								
	Know Where Your Drinking Water Comes From		83		82	1	1								
	Flood Information 10 Topics Flyer		50		49	1		1							
CHNEP Nature Festival	Fertilizer New Flyer (CHNEP funded)	11/16/19	300	11/16/19	0	300	300		1000	1000		1			1
NWS Skywarn Severe Weather Spotter Class		11/18/19							42						
Public Works Road-e-O	Fertilizer Fact Sheet	2/22/20	20	2/22/20	19	1	1		2000	2000		1			1
	Fertilizer New Flyer (CHNEP funded)		17		17	0	0								
	Know Where Your Drinking Water Comes From		20		15	5	5								
	Flood Information 10 Topics Flyer		16		14	2		2							
FEMA new Preliminary 12/31/19 Coastal Risk Maps One on One Meetings with Commissioner		2/7/20							5						

Public Outreach Activities

Flood Information Related

Event	Brochure Type	Date of Event	Amount Available	Date Remaining Brochures Counted	Amount Remaining	Amount of Flyers Given	Water Quality Protection Flyers	Flood Info. Flyers	No. of Participants (flood Related)	No. of Participants (Water Quality Related)	Neighborhood Presentation	Public Displays on Water Quality	School Presentation on Water Quality	Seminar/ Workshop on Water Quality	Special Event on Water Quality
FEMA new Preliminary 12/31/19 Coastal Risk Maps HOA reps meeting with CM		2/19/20							15						
FEMA new Preliminary 12/31/19 Coastal Risk Maps Venice Public Outreach Meeting		3/4/2020 4pm to 7pm							315						
FEMA new Preliminary 12/31/19 Coastal Risk Maps SCF Public Outreach Meeting	Fertilizer Fact Sheet	3/5/2020 9am to 12n	19	3/6/20	19	0	0		191						
	Fertilizer New Flyer (CHNEP funded)		17		17	0	0								
	Know Where Your Drinking Water Comes From		15		13	2	2								
	Flood Information 10 Topics Flyer		39			39		39							
FEMA new Preliminary 12/31/19 Coastal Risk Maps SCTI Public Outreach Meeting		3/5/2020 4pm to 7pm							272						
City Hall Three Floors Lobby area and Planning Dept	Fertilizer Fact Sheet	5/13/20	78			78	78					4			
	Know Where Your Drinking Water Comes From		55			55	55								
	Flood Information 10 Topics Flyer		50			50		50							
	Fertilizer New Flyer (CHNEP funded)		36			36		36							
2020 Hurricane Preparedness in the Age of Covid-19	Presentation to Gran Paradiso	7/14/20	28			28		28	28						
2020 Hurricane Preparedness in the Age of Covid-19	Presentation to Gran Paradiso	7/29/20	21			21		21	21						
Hurrican Preparedness email to all City Employees	2 FEMA brochures (1)FEMA How To Prepare for a Hurricane - Before During After (2)create-your-family-emergency-communication-plan	8/7/20							600						
Annual Summer Camp at George Mullens Activity Center		8/6/20							50	50			50		
Virutal CRS meeting for City staff and Stake holders and General Public to encourage Participation	Virtual TEAMs meeting	9/17/20													
Radio WKDW 97.5 Talk Show with John Rawlings - DiscussED Canal / Creek system for potable water supply and Flood protection, fertilizer usage, flood mapping efforts, CRS flood insurance discounts.		9/28/20							2						1
Total from 9/25/10 to 10/27/20							**26743**	**4415**	**57100**	**50475**	**15**	**53**	**82**	**40**	**65**

News, Newsletters, Social Media Public Outreach

Date	Description	No. of Distribution	Water Quality	Flood Related
Sept 2010 and Oct 2010	Message on the Utility bills is: "Help keep our drinking water clean. Prevent domestic animal waste from reaching our swales, canals and the Myakkahatchee Creek. Pick up after your animals."	36000	36000	
Oct-10	City Insight Newsletter Article "25th Annual International Coastal Cleanup"	569	569	
Oct-10	City Insight Newsletter Article "Drainage Project Programs"	569	569	
Oct-10	City	7400	7400	
Mar-11	City Insight Newsletter Article on Neighborhood Clean-up on 2/12/11 and 2/19/11	580	580	
Jun-11	Journal for Surface Water Quality Professionals - E.Wong contribution to article on "Public Outreach and Education"	26000	26000	
Jun-11	Journal for Surface Water Quality Professionals - E.Wong contribution to article on "Pollution Prevention and Good Housekeeping"	26000	26000	
Jun-11	CHNEP Charlotte Harbor Happenings - City of North Port Rainwater Harvesting	13700	13700	
6/14/11	Ad in North Port Sun Herald Newspaper on Flood Information 10 CRS topic flyer	7400	7400	7400
Aug-11	City Insight Newsletter Article Camp Kids workshop on Don't Pollute and Hurricane Flood Preparedness	580	580	580
Sep-11	City Insight Newsletter Article on Learning about Stormwater	580	580	
Dec-11	North Port Presents" TV show on draft Flood Maps in run every Monday in January 2012	59,231	59,231	59231
5/31/12	North Port Sun Herald Newspaper Article - Flood Insurance Discount from North Port's CRS Program	4,192	4,192	4192
Spring 2012	CHNEP article on "The City of North Port's environmental stewardship is golden	13700	13700	
5/30/12	Ad in North Port Sun Herald Newspaper on Flood Information 10 CRS topic flyer	4,192	4,192	4192
June-12	North Port Presents" TV show on Proper Fertilizer usage in run every Monday in July 2012	59,231	59,231	
6/12/13	Ad in North Port Sun Herald Newspaper on Flood Information 10 CRS topic flyer	4,192	4,192	4192
6/4/14	Ad in North Port Sun Herald Newspaper on Flood Information 10 CRS topic flyer	4,192	4,192	4192
8/25/14	North Port Sun Herald Newspaper Article - Help Keep Drinking Water Clean	4,192	4,192	
9/10/14	North Port Currents Newsletter (27,580 mailers) on Flood info.	30,652	30,652	30652
December 2014	City Insight news article on Promoting Environmental Protection (sent to all City Employees)	591	591	
12/22/14	North Port Website News Release - Learn more about Flood Maps and changes to North Port	3,500	3,500	3500
12/31/14	Federal Register - FEMA placed Ad on preliminary FIRMS	Unknown	Unknown	Unknown
Jan-15	Utility Billing message on FEMA Public Outreach 1/22/15 meeting	12,908	12,908	12908
Jan-15	City Insight Newsletter Article "New Flood Maps for the City"	567	567	567
1/20/15	North Port Website News Release on First Preliminary Flood Map Open House Hosted by FEMA - Learn more about Flood Maps and changes to North Port	3,500	3,500	3500
1/20/15	ABC Website New - FEMA's Update Flood Map Workshops heading next to Venice, North Port	Unknown	Unknown	Unknown
1/21/15	Englewood Sun Herald Newspaper - Flooded with questions	Unknown	Unknown	Unknown
1/21/15	North Port Sun Herald Newspaper - Flood map may cause real estate 'crisis'	4,192	4,192	4192
1/23/15	FEMA placed Ad on preliminary FIRMS in North Port Sun Herald, Sarasota Herald Tribune and other Newspapers - see Mike Taylor email 1/29/15	4,192	4,192	4192
1/30/15	FEMA placed Ad on preliminary FIRMS in North Port Sun Herald, Sarasota Herald Tribune and other Newspapers - see Mike Taylor email 1/29/15	4,192	4,192	4192
1/23/15	Sarasota Herald-Tribune - FEMA placed Ad on preliminary FIRMS	2,106	2,106	2106
1/30/15	Sarasota Herald-Tribune - FEMA placed Ad on preliminary FIRMS	2,106	2,106	2106
1/23/15	North Port Sun Herald Newspaper - FEMA placed Ad on preliminary FIRMS	4,192	4,192	4192
1/30/15	North Port Sun Herald Newspaper - FEMA placed Ad on preliminary FIRMS	4,192	4,192	4192
2/4/15	North Port Sun Herald Newspaper - Flood map appeal process begins	4,192	4,192	4192
2/10/15	North Port Sun Herald Newspaper - User-friendly maps released	4,192	4,192	4192
2/11/15	Herald Tribune -$20 Million expected for flood control	2,106	2,106	2106
2/24/15	North Port Sun Herald Newspaper - Chamber to discuss updated FEMA flood maps	6,298	6,298	6298
2/27/15	North Port Currents Newsletter	30,652	30,652	
3/3/15	Mailed 758 postcards inviting property owners of all building structures affected by the new draft FIRMs to the March 12, 2015 public outreach open house in North Port.	758	758	758
3/6/15	North Port Website Second News Release on Second Preliminary Flood Map Open House Hosted by Sarasota County/CNP - Learn more about Flood Maps and changes to North Port	3,500	3,500	3500
3/6/15	Email Blast of News Release for Second Open House on draft FEMA Flood Maps	4,702	4,702	4702
3/12/15	City Calendar for 3/12/16 Public Open House	Unknown	Unknown	Unknown
April 2015	North Port Magazine Article on Flood map changes April 2015	6,500	6,500	6500
4/17/15	North Port Website News Release on Appeals Period on FEMA Preliminary FIRMs	3,500	3,500	3500
9/14/14	North Port Sun Herald Newspaper Article - New floodplain maps await final approval	4,192	4,192	4192
4/26/15	Sarasota Herald-Tribune - Flooding Classification for area FEMA maps Questioned	3,388	3,388	3388
5/24/15	Hurricane Season Preparation Week topical message to residents on hurricane hazards and preparedness tips	1,074	1,074	1074
6/3/15	Ad in North Port Sun Herald Newspaper on Flood Information 10 CRS topic flyer	4,192	4,192	4192
12/1/15	North Port Website News Release on Second draft of FIRMs	3,500	3,500	3500

News, Newsletters, Social Media Public Outreach

Date	Description	No. of Distribution	Water Quality	Flood Related
3/16/16	Sun Herald Newspaper Article on Changes in Flood Maps Coming Soon	4,192		4,192
6/1/16	North Port Facebook News Release on FIRMs Will Become Effective Nov 4, 2016 and 6 more open houses in June 2016	2,099		2,099
6/1/16	North Port Website News Release on FIRMs Will Become Effective Nov 4, 2016 and 6 more open houses in June 2016	1,401		1,401
6/8/16	Ad in North Port Sun Herald Newspaper on Flood Information 10 CRS topic flyer and June Open Houses on Flood Maps, 10 topics include water quality protection	4,192	4,192	4,192
6/3/16	Sarasota Herald-Tribune - Article on 28K more properties deemed high-risk	2,106		2,106
6/3/16	ABC and SNN TV news on new Flood Maps. Julie Bellia was interviewed, E. Wong assisted	unknown		unknown
6/16/16	City fo North Port Facebook News Release - Reminder of Open houase	2,341		2,341
6/16/16	City Website News Release - Reminder of Open houase	2,659		2,659
6/16/16	City Email to All Employees on 6/23/16 Final FIRMs Open House	300		300
June 2016	Sarasota County mailed on behalf of the City of North Port 483 flyers on June, 2016 inviting property owners of all building structures affected by the new draft FIRMs to the June 23, 2016 public outreach open house in North Port	483		483
7/18/16	Sun Article - Managing Local Systems 7-18-16	4,192		4,192
7/22/16	City of North Port mailed 472 letters on July 22, 2016 inviting property owners of all building structures affected by the new draft FIRMs to the March 12, 2015 public outreach open house in North Port	472		472
7/29/16	Charlotte Sun - Get an Insurance Checkup	unknown		unknown
9/20/16	North Port Website News Release - New Flood Maps approved by Commission and will become effective on November 4, 2016	3,500		3,500
11/10/16	North Port Facebook News Release - New Flood effective on November 4, 2016.	4,514		4,514
11/10/16	North Port Website News Release - New Flood effective on November 4, 2016.	6,500		6,500
Summer 2017	North RePort Newsletter to all Every Home in North Port with Flood Protection Tips	30,000		30,000
1/11/18	New pervious concrete installed by the NP Library on Facebook	6,457		6,457
1/12/18	NBC and WBBH news "North Port introducing new material to help with flooding"	unknown		unknown
3/15/18	Facebook Posting of Annual Household Hazardous Waste Collection	1,505	1,505	
3/20/18	Flood Zone Workshops North Port Sun Newspaper	4,192		4,192
4/28/18 to 5/5/18	For flood awareness Week, North Port Facebook and Twitter messages on 8 Topics related Flood Protection, one topic per day	16,000		16,000
8/30/18	North Port Environmental Board Kicks Off Sun Newpaper Article	4,192	4,192	
9/10/18	Facebook Posting - Recyle Plastic Bags	9,911	9,911	
10/17/18	ABC News on Canal Neighborhood Watch and water quality protection	unknown	unknown	
10/23/18	News Release City encouraging the voluntary non-use 10-23-18	11,000	11,000	
10/24/18	Utlity Bill Message encouraging Fertilizer non-use	22,000	22,000	
11/1/18	Herald Tribune Newspaper Article 11-1-18 Local officials unite in fight against red tide	2,106	2,106	
12/18/18	We are more than Garbage Man Christmas Video Sun Newspaper Article	4,192	4,192	
Holiday 2018	North RePort Newsletter to all Every Home in North Port with Flood Protection	30,000		30,000
2018	Disaster Planning Guide	1,000		1,000
1/29/19	City Web News Release Household Hazardous Waste Collection Event	38	38	
2/25/19	Clean up of the Myakkahatchee Creek Facebook news release	3,200	3,200	3,200
3/1/2019 - 4/1/19	Utility Billing message on Flood Awareness "Flood Awareness Week March 11-17. Be prepared. Look up your flood zone and buy flood insurance if needed because it only takes one storm. For more information, visit Cityofnorthport.com (keyword flood information) or call 941-240-8050." to send 03/01/19 to 4/1/19. 17,724 people via paper cycle bills, 7,331 e-bills	25,055		25,055
3/9-16/2019	Flood Awareness message on Facebook and Twitter	6,976		16,000
4/5/19	Annual CRS mailer to Real Estate Broker, Financial Institutions, Insurance Agency, Insurance Company and Abstract & Title Co.	187		187
5/16/19	Water Quality Education Outreach Team Meeting message on Facebook	16,000	16,000	
7/18/19	Facebook Post - Water Quality Protection Fertilizers, Pet Waste	9,911	9,911	
7/18/19	Facebook North Port Friends of Wildlife - Edie Driest Posts 7-18-19	14	14	
8/1/19	North RePort Newsletter to all Residents with Flood Information	70,631		70,631
9/16/19	Herald Tribune Article - Water Control structures and North Port Canals	2,106	2,106	2,106
2/26/20	City Webpage "FEMA Flood Map Updates Updated re FEMA new Preliminary 12/31/19 Coastal Risk Maps	4329		4329
2/26/20	News Release re FEMA new Preliminary 12/31/19 Coastal Risk Maps	161		161
2/26/20	Facebook postings re new Preliminary 12/31/19 Coastal Risk Maps	3,800		3,800
2/26/20	Twitter postings re new Preliminary 12/31/19 Coastal Risk Maps	3,682		3,682
3/4/20	Facebook News Release to encourage attendance at 3/5/20 FEMA meeting on new Preliminary 12/31/19 Coastal Risk Maps	3,294		3,294
3/4/20	Twitter News Release to encourage attendance at 3/5/20 FEMA meeting on new Preliminary 12/31/19 Coastal Risk Maps	3,682		3,682
3/5/20	Facebook News Release of 3/5/20 FEMA morning meeting on new Preliminary 12/31/19 Coastal Risk Maps and encourage attendance at the next 3/26/20 meeting	2,196		2,196

News, Newsletters, Social Media Public Outreach

Date	Description	No. of Distribution	Water Quality	Flood Related
3/5/20	Twitter News Release of 3/5/20 FEMA morning meeting on new Preliminary 12/31/19 Coastal Risk Maps and encourage attendance at the next 3/26/20 meeting	3,682		3,682
5/1/20	Posted on Facebook, Twitter, Instagram and Nextdoor - North Port Receives Increased Discount on Flood Insurance Effective May 1, 2020	11353		11353
5/1/20	City News Release - North Port Receives Increased Discount on Flood Insurance Effective May 1, 2020	546		546
5/28/20	Facebook Post reminding residents of the Fertilizer Ban that starts June 1st	3764	3764	
6/30/20	Utility bill message "*To protect the water quality in our waterways, no fertilizers containing nitrogen and/or phosphorus can be applied to lawns during the rainy season from June 1 – Sept 30. However, we are encouraging residents to voluntarily avoid using fertilizer year-round.*"	26,595	26,595	
7/2/20	Facebook post by Colleen Hibbitts in Utilities reminding resident to refrain from Fertilizer year round and fertilizing restriction June 1 to Sept 30	7,508	7,508	
7/31/20	Utilities bill message "*Rainy season is here. Please access the City's website at www.cityofnorthport.com/flood for flood protection information. Know your flood zone and purchase flood insurance if needed.*"	26,595		26,595
8/29/20	Virutal CRS meeting posted on City Calendar of Events to encourage Public Participation			
9/28/20	Facebook and City's North RePort podcast and the WKDW Radio 97.5 Talk Show with John Rawlings - Discuss Canal / Creek system for potable water supply and Flood protection, flood mapping efforts, CRS flood insurance	983	983	983
Total as of 10/27/20		**845,440**	**561,353**	**515,964**

Youtube

Date	Youtube Videos	Date of Views recorded	No. of Views	Flood Related Info.	Water Quality	Flood Related
6/20/19	Hurricane Season Solid Waste Tips	4/16/20	1,300		1,300	
6/25/19	Plastic Bags Not Accepted	4/16/20	5,300		5,300	
7/31/19	Concrete poured at Water Control structure (WCS) #106	4/16/20	1,200	1		1,200
8/21/19	WCS #106 Update	4/16/20	2,000			2,000
9/23/19	Imagine a Day Without Water	4/16/20	853		853	
11/27/19	Recycling Center Update	4/16/20	2,000		2,000	
12/6/19	Recycling Tips	4/16/20	6,700		6,700	
12/20/19	NP Solid Waste Let It Go	4/16/20	53,500		53,500	
12/23/19	Amphibious Vehicle Video for clearing City Waterways for flood prevention and water quality	4/16/20	3,100,000		3,100,000	3,100,000
3/20/20	Help Utilities By Only Flushing the 3 P's	4/16/20	8,300		8,300	
3/31/20	Solid Waste starting COVID-19 precautions on April 6	4/16/20	3,500		3,500	
Total for 2019			**3,184,653**		**3,181,453**	**3,103,200**

2019 Web hits

Webpage Name	Web page URL	No of Hits 1/1/19 - 12/31/19	Water Quality	Flood Related
Flood Information	http://www.cityofnorthport.com/index.aspx?page=956	1581		1581
FEMA Flood Map Updates	http://www.cityofnorthport.com/index.aspx?page=1004	4950		4950
Is My Property in a Flood Zone?	http://www.cityofnorthport.com/index.aspx?page=217	2902		2902
1981/1984 FEMA Flood Maps	http://www.cityofnorthport.com/index.aspx?page=1271	409		409
Elevation Certificates	http://www.cityofnorthport.com/index.aspx?page=1269	533		533
Community Rating System (CRS) & Flood Insurance	http://www.cityofnorthport.com/index.aspx?page=1264	174		174
Flood Warning	http://www.cityofnorthport.com/index.aspx?page=1513	189		189
Environmental Services	http://www.cityofnorthport.com/index.aspx?page=1508	829	829	
Storm Water Management	http://www.cityofnorthport.com/index.aspx?page=1044	652	652	652
Total		**12219**	**1481**	**11390**

November 18, 2019

Eric Tiefenthaler
Chief of Emergency Management
City of North Port
4980 City Center Blvd
North Port, FL 34286

Dear Eric,

Congratulations on the successful *StormReady* application for North Port. The recognition is valid until July 8, 2023 at which time the City will have the opportunity to renew. North Port has been recognized as StormReady since 2014. Your efforts, and those of your team, will better prepare North Port to protect life and property from the onslaught of hazardous weather through better planning, education, and awareness. No community is storm proof, but *StormReady* can help save lives.

Sincerely,

Daniel Noah

Daniel Noah
Warning Coordination Meteorologist
National Weather Service – Tampa Bay Area
(813) 645-2323

Cc: *StormReady* Advisory Board

StormReady
NATIONAL WEATHER SERVICE

The West Central and Southwest Florida Storm Ready Advisory Board has Recognized

North Port

as a

STORM READY COMMUNITY

until July 8, 2023

NATIONAL WEATHER SERVICE

Daniel Noah

Daniel Noah, Warning Coordination Meteorologist

National Weather Service, Ruskin, FL

Exhibit 8-15 Page 2

City of North Port

RESOLUTION NO. 2019-R-06

A RESOLUTION OF THE CITY COMMISSION OF THE CITY OF NORTH PORT, FLORIDA, ADOPTING THE SARASOTA COUNTY PROGRAM FOR PUBLIC INFORMATION; PROVIDING FOR CONFLICTS; PROVIDING FOR SEVERABILITY; AND PROVIDING AN EFFECTIVE DATE.

WHEREAS, the City of North Port, Florida, is a participant in the National Flood Insurance Program Community Rating System ("CRS"), a national program developed by the Federal Emergency Management Agency ("FEMA") to provide flood insurance premium reductions to participating communities; and

WHEREAS, the reductions in flood insurance premiums are based on a community's floodplain management programs, which include public information outreach activities; and

WHEREAS, in accordance with the 2018 CRS audit results, the City of North Port received a CRS rating of 6, which corresponds to a twenty percent (20%) flood insurance discount for structures within the Special Flood Hazard Area ("SFHA") and a ten percent (10%) flood insurance discount for structures outside of the SFHA; and

WHEREAS, Sarasota County initiated the Program for Public Information ("PPI"), a FEMA planning tool, to coordinate such outreach; and

WHEREAS, Sarasota County's PPI has a number of ongoing outreach efforts with goals to increase flood hazard awareness, encourage flood insurance coverage, protect people from the flood hazard, protect property, build responsibly, protect the natural functions of floodplains, encourage hurricane preparations, educate people about flood economics and inform people about how sea level rise will affect the community; and

WHEREAS, the Sarasota County Program for Public Information ("PPI") Committee is comprised of a cross-section of employees and community stakeholder members from Sarasota County Government, the City of Sarasota, the City of Venice, the City of North Port, the Town of Longboat Key, the Sarasota Bay Estuary Program, Mote Marine, and local business representatives such as Realtors, Insurance Agents, and Mortgage Lenders, is open for participation by all interested parties including private citizens, and is chaired by the Sarasota County Stormwater Department Director or designee; and

WHEREAS, by adopting Sarasota County's PPI, the City of North Port may achieve a CRS rating of 5, which will increase the City's flood insurance discount for structures within the SFHA to twenty-five percent (25%); and

WHEREAS, the City Commission of the City of North Port, Florida finds that it serves the public health, safety, and welfare of the citizens of the City to adopt Sarasota County's Program for Public Information.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COMMISSION OF THE CITY OF NORTH PORT, FLORIDA:

SECTION 1 – INCORPORATION OF RECITALS

1.01 The above recitals are hereby ratified and confirmed as being true and correct and are incorporated herein by reference.

SECTION 2 – RESOLUTION

2.01 The City Commission hereby adopts the Sarasota County Program for Public Information.

2.02 The City Commission directs the City Manager to assign a coordinator on the Sarasota County Program for Public Information Committee.

SECTION 3 – CONFLICTS

3.01 In the event of any conflict between the provisions of this resolution and any other resolution or portions thereof, the provisions of this resolution shall prevail to the extent of such conflict.

SECTION 4 – SEVERABILITY

4.01 If any section, subsection, sentence, clause, or phrase of this resolution is held invalid or unconstitutional by any court of competent jurisdiction, such provision shall be deemed a separate, distinct, and independent provision and such holding shall not affect the validity of the remaining portions hereof.

SECTION 5 – EFFECTIVE DATE

5.01 This resolution shall take effect immediately upon adoption by the City Commission of the City of North Port, Florida.

PASSED and DULY ADOPTED by the City Commission of the City of North Port, Florida this 23rd day of July 2019.

THE CITY OF NORTH PORT, FLORIDA

CHRISTOPHER HANKS
MAYOR

ATTEST

for KATHRYN WONG
CITY CLERK

APPROVED AS TO FORM AND CORRECTNESS

AMBER L. SLAYTON
CITY ATTORNEY

City of North Port
City Manager's Office

Interoffice Memorandum

To: **Cari Branco, Assistant City Manager**
Jason Yarborough, Assistant City Manager
Julie Bellia, Public Works Director
Kimberly Ferrell, Finance Director
Todd Garrison, Police Chief
Christine McDade, Human Resources Director
Frank Miles, Neighborhood Development Services Director
Rick Newkirk, Utilities Director
Sandy Pfundheller, Parks & Recreation Director
Scott Titus, Fire Chief
Katy Wong, City Clerk
Amber Slayton, City Attorney

From: **Peter D. Lear, City Manager**

Date: **July 26, 2019**

RE: **Sarasota County Program for Public Information**

Pursuant to Resolution 2019-R-06, the City will be participating in the Sarasota County Program for Public Information (PPI) and I am designating Elizabeth Wong to be the City's Coordinator on the PPI Committee.

PDL/amd

Elizabeth Wong

From: Elizabeth Wong
Sent: Thursday, October 4, 2018 4:28 PM
To: Donna Bailey
Cc: Dean McConville (dean.mcconville.p6je@statefarm.com); Mary Foster (mary.foster.hzp4 @statefarm.com); Barbara Lockhart (bml3220@gmail.com); Alan Fish (landsurveyor@vbfainc.com); Heather Hansen - Clatsop County (hhansen@co.clatsop.or.us); Craig Carpenter - CRS Specialist (BCarpenter@iso.com); Gerardo Traverso; Julie Bellia
Subject: City of North Port Joining the County's PPI program for CRS Program

Hello Donna, thank you so much for letting us join your Sarasota County Program for Public Information (PPI) program to share information with the public on flood protection. Following are the North Port Team staff and stakeholder members to add to your PPI plan. Can you please send our team (cc'd on this email) a copy of your PPI plan when finalized?

Craig, I am copying you so you know we are on track hopefully towards the better rating of CRS 5.

Name	Affiliation	Email	Telephone
Elizabeth Wong, P.E. (Prime City Staff)	City of North Port Stormwater Manager	ewong@cityofnorthport.com	941-240-8321 office 941-628-1475 Cell
Heather Hansen (Alternate City Staff)	City of North Port Senior Planner	hhansen@cityofnorthport.com	941-429-7022 office
Dean McConville (Prime Stakeholder)	State Farm Insurance	dean.mcconville.p6je@statefarm.com	(941) 429-3326 office
Mary Foster (Alternate Stakeholder)	State Farm Insurance	mary.foster.hzp4@statefarm.com	(941) 429-3326 office
Alan Fish (Alternate Stakeholder)	VBF Surveying	landsurveyor@vbfainc.com	(941) 426-0681 office
Barbara Lockhart (Alternate Stakeholder)	North Port Canal Watch Group and Environmental Advisory Board	bml3220@gmail.com	(941) 218-9775 cell

Elizabeth Wong P.E.
Stormwater Manager
City of North Port
Department of Public Works
1100 N. Chamberlain Blvd
North Port, FL 34286
Phone 941.240.8321
Fax 941.240.8063
ewong@cityofnorthport.com
www.cityofnorthport.com

A City where you can "Achieve Anything."

The City of North Port, Florida

Comprehensive Emergency Management Plan

A STRATEGIC GUIDE FOR A CITYWIDE PREVENTION OF, PREPARATION FOR, RESPONSE TO, AND RECOVERY FROM MAJOR EMERGENCIES AND DISASTERS

Revised
2019

Prepared By:

City of North Port Fire Rescue
Division of Emergency Management

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F. City of North Port Resolution 2018-R-31 adopting the Comprehensive Emergency Management Plan as the Formal Guide for the City of North Port's Emergency Management Activities
G. Crisis Communication and Public Information
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i. DISTRIBUTION

1 each	North Port City Commissioners
3	North Port City Manager
1	North Port City Attorney
2	North Port City Clerk
1	North Port Emergency Manager
1 each	North Port City Department Directors
1	North Port Public Library
2	Sarasota County Emergency Management
1	Florida Division of Emergency Management

ii. RECORD OF CHANGES (within review cycle)

Change Number	Date	Page	Comments

iii. EXECUTIVE SUMMARY

The City of North Port is vulnerable to a variety of natural, man-made and technological hazards that can potentially threaten the citizens, businesses, and environment. The *City of North Port Comprehensive Emergency Management Plan* (CEMP) establishes the framework to ensure that the City will be adequately prepared to deal with these hazards. The CEMP outlines the general roles and responsibilities of City departments when preparing for, responding to, or recovering from a large-scale emergency or disaster. The CEMP also coordinates emergency and disaster activities with volunteer organizations and businesses that serve the City of North Port. To ensure consistency between the City's CEMP and Sarasota County's CEMP (as well as State guidelines), much of the language contained in this Plan is drawn from the County's Plan, which is then adapted to meet the City's specific needs.

The CEMP addresses all four phases of emergency management: mitigation, preparedness, response, and recovery. These phases parallel activities set forth in three key documents: the Sarasota County CEMP, State of Florida CEMP and the National Response Framework (NRF). The City of North Port CEMP also describes how resources from local, State, Federal, national and other sources will be coordinated to supplement City resources for disaster response.

The CEMP is divided into three sections: The Base Plan, Hazard-Specific Annexes, and Appendices. The following is a brief description of the CEMP.

1. The Base Plan - The Base Plan describes, in general terms, how the City of North Port will mitigate, prepare for, respond to, and recover from the impacts of a large-scale emergency or disaster. The Base Plan contains sections that address specific operations and planning areas such as: an analysis of the hazards which the City may encounter, the responsibilities of the City government, method of operations, and financial policies that will be adhered to during times of emergency or disaster.

2. The Hazard Specific Annexes - The CEMP contains annexes that are specific to hazards that require special action.

3. The Appendices - These are sample documents, guidelines, or procedures which support the CEMP.

BASE PLAN

I. INTRODUCTION

A. Purpose. The CEMP establishes a framework for an effective system of comprehensive emergency management for:

1. Reducing loss of life, injury and property damage and loss resulting from natural or man-made emergencies;

2. Preparing for prompt and efficient response and recovery activities to protect lives and property impacted by emergencies;

3. Responding to emergencies with the effective use of all relevant plans and resources deemed appropriate;

4. Recovering from emergencies by providing for the rapid and orderly implementation of restoration and rehabilitation programs for persons and properties affected by emergencies; and

5. Assisting in awareness, recognition, education, prevention and mitigation of emergencies that may be caused or aggravated by inadequate planning for, and regulation of, public and private facilities and land use.

B. Scope.

1. The CEMP establishes the basic policies, assumptions and strategies for a comprehensive all-hazards Citywide emergency management program.

2. The CEMP is Citywide in scope and encompasses coordination with its municipal jurisdictions and other special.

3. The CEMP provides an all-hazard organizational structure to emergency operations.

4. The CEMP establishes basic direction and control for all levels of disasters creating a consistent unified approach to emergency management.

5. The CEMP is functional in a multi-jurisdictional setting where cross coordination is required.

6. The CEMP assigns specific functional responsibilities to appropriate local departments and agencies, as well as private sector groups and volunteer

organizations, and defines means of prioritizing and coordinating with municipal, state, and federal partners to maximize resource utilization.

7. The CEMP prioritizes protection of human life as a priority, with the preservation and protection of property being the second priority.

8. The CEMP provides a format for the shift of focus of the EOC from Response to Recovery and Mitigation. Long-range recovery and mitigation is addressed by the ability of the EOC to continue operations in a modified form, after the response phase has been terminated.

9. The CEMP establishes an effective format for emergency management by identifying the types of hazards that can occur within the City; determining the City's vulnerability to diverse types of disasters, and identifying the most threatening so that appropriate preparedness, mitigation and planning steps can be taken and addressing each phase of the emergency management cycle:

    a. **Preparedness**: Preparedness actions utilize lessons learned and best practices from previous disasters, locally and elsewhere, to determine what is likely to occur during types of and intensity of disasters. Typical community needs can be identified and prioritized. Adequate planning pre-determines the best utilization of resources in responding to needs. Identification and training of personnel for roles and responsibilities during the disaster is included in this phase. It involves working with the private sector, residents and volunteer organizations to assist them in pre-disaster education and planning activities to lessen the impact of disasters.

    b. **Response**: The response phase is the operational implementation of the CEMP. The county responds to emergencies by activating its plan, incrementally increasing response as needed, giving direction and control to the emergency management effort and looking ahead to recovery. Response actions are conducted in accordance with the National Incident Management System. During response, decision-making will be implemented utilizing the City's emergency response organizational structure found in the Method of Operations in this Plan.

    c. **Recovery**: The recovery phase begins after life safety and property preservation have been addressed. Recovery actions can occur simultaneously during the response phase. The emergency management organization initiates procedures to assess needs and resources, establish priorities, review state and federal aid criteria

and coordinate with representatives from both levels of government. Once the extent of the recovery effort is determined, the appointed recovery team members determine how best to manage the specific activities, what resources and personnel will be required and what other actions are needed to return the impacted areas to normal operations as quickly as possible. Assessment of both short and long-term mitigation measures takes place during this phase and the "after action" evaluation process is conducted.

d. **Mitigation**: This phase involves identifying preventative and/or corrective measures and actions to prevent or limit bodily injury, loss of life or property damage from disasters. It includes policy issues as well as structural projects within government and the private sector. A separate Local Mitigation Strategy serves as the guidance document for both pre-disaster mitigation planning and post-disaster recovery.

C. Methodology.

1. Planning Process

The CEMP is a dynamic document that adapts to changes in local policies, state and federal guidance, and after-action recommendations from exercises and real-world incident. The City of North Port considers the CEMP to be a living document and as such the plan is to be regularly updated to reflect these changes and to ensure compliance with the State of Florida and the National Incident Management System. ~~The City Manager shall determine whether changes to the plan reach a level of significance to require Commission review and approval.~~ The CEMP will be presented to the City Commissioners for approval at every update cycle required by the Florida Division of Emergency Management which are typically every four years. Local ordinances, state and federal statutes, regulations and priorities provide the foundation for the CEMP. Development is further guided by best practices and lessons learned.

2. Implementation Process:

Implementation of the CEMP involves the following actions:

a. A promulgation letter from the ~~Mayor of the~~ North Port City Commission displayed at the front of this document.

b. Signed Concurrence acknowledging and accepting plan responsibilities displayed at the front of this document.

c. A distribution list of the Comprehensive Emergency Management Plan is displayed at the front of this document.

d. The Emergency Manager is responsible for ensuring that all changes have been distributed to recipients of the CEMP. The distribution list displayed at the front of this document is used to verify that all appropriate persons/offices are copied.

e. A Record of Changes Log displayed at the front of this document is used to record all published changes as those holding copies of the CEMP receive them. The holder of the copy is responsible for making the appropriate changes and updating the Log.

f. A master copy of the CEMP, with a master Record of Changes Log, is maintained in Emergency Management. A comparison of the master copy with any other will allow a determination to be made as to whether the copy in question has been posted to it with all appropriate changes.

II. SITUATION

A. Hazard Analysis

The City of North Port has exposure to numerous and diverse types of hazards. This Section will attempt to identify the threat posed by each to assist planners in anticipating future needs. The hazards are listed in the sequence identified by the Florida Division of Emergency Management (FDEM) CEMP Review Criteria.

Table 1: Hazard Analysis

Hazard Category	Hazard Evaluation				
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)	
High Winds from Tropical Cyclone Events	The City of North Port has only been indirectly affected by a tropical cyclone event. However, The City of North Port (Port Charlotte statistical area) has been exposed to 54 hurricanes/tropical storms since 1871[1]. The hurricanes of the 2004 and 2005 seasons had some minimal to moderate impact on the City. The City was included in the Presidential Declarations for Hurricanes Charley, Frances, Ivan, Jeanne (2004) and Wilma (2005); and Tropical Storm Gabrielle (2001). In 2008, the City activated for TS Fay, but quickly demobilized when the storm turned in a southerly direction missing the City. A comparable situation occurred in 2012 with Tropical Storm Isaac.	Injured and/or entrapped persons and the loss of life. Mass traffic congestion and other evacuation-related issues. Temporary and long-term sheltering needs. Private property loss. Damage to City infrastructure. Lost business revenue, with accompanying unemployment and loss of tax revenue. Fire, hazardous materials releases, search and rescue operations related to storm activity. Looting and increased crime due to economic conditions created by long-term recovery. Potential loss of water and/or sewer service.	A Gulf Coast landfall is one of the three most likely Florida hurricane tracks based on planning models. Among the hazards analyzed in this section, hurricane activities pose the greatest threat to the broadest population in North Port.	Frequency	Low to Moderate
				Vulnerability	Low to Moderate
				Exposure	Moderate
				Risk	Moderate

[1] http://www.hurricanecity.com/city/portcharlotte.htm.

Hazard Category	Hazard Evaluation				
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)	
	In September 2017, the City experienced minor disruptions because of Hurricane Irma. Power outages, localized flooding and vegetative debris were among the key impacts.				
Storm Surge from Tropical Cyclone Events (See Figure 1 Hurricane Evacuation Level, which are built from SLOSH models)	The City of North Port has never been affected by storm surge from a tropical cyclone; however, areas adjacent to the tributaries of the Myakka River are subject to tidal influences, which themselves are affected by storm surge.	Injured and/or entrapped persons and the loss of life. Mass traffic congestion and other evacuation-related issues. Temporary and long-term sheltering needs. Private property loss. Damage to City infrastructure. Lost business revenue, with accompanying unemployment and loss of tax revenue. Fire, hazardous materials releases, search and rescue operations related to storm activity. Looting and increased crime due to economic conditions created by long-term recovery. Potential loss of water and/or sewer service.	Since the updated storm surge maps in 2017, all North Port is still in at least one storm surge zone. Areas west of I-75 are most susceptible; and the risk of storm zone increases in proximity to the Myakka River, and to the Gulf of Mexico. The Holiday Park Mobile Home community is in Evacuation Level B. Several City-owned critical infrastructures are also located in the storm surge areas: B Zone - Utilities' Water Treatment Plant, Utilities' Wastewater Treatment Plant, Fire Station 82 and Police Department's District 2 substation, Family Service Center, Property Maintenance Yard (fueling station) C Zone – Utilities' Hillsborough and Southwest water booster stations. D Zone - Municipal Complex (City Hall, Fire Station 81, Police Department and Mullen's Center), Fire Stations 83, 84 and 85, Utilities' central office, Utilities' Northeast water booster station, Public Works Complex (fueling station)	Frequency	Low to Moderate
				Vulnerability	Low to High
				Exposure	Moderate
				Risk	Moderate
Floods (See Figure 2)	At least 750 residences were affected for more than a week in the City due to continued major flooding on the Myakka River and Myakkahatchee Creek from the Spring Flooding Event of 2003.	Possible evacuation of residents. Temporary sheltering and congregate feeding. Evacuation traffic and traffic related to road closures. Property and infrastructure damage. Loss of business revenue. Possible search and rescue operations. Possible shutdown of water treatment facilities. Possible contamination of water systems. Possible waste water system overload.	Seasonal flooding is a re-occurring issue in Florida, most specifically for those areas which are near the Florida coast, adjacent to bays or inlets, or which contain river systems. Per the risk analysis of the Sarasota County Emergency Management, increased development causes an increase in flooding risk due to the interruption of the natural swamp	Frequency	Moderate to High
				Vulnerability	Low to High
				Exposure	Moderate
				Risk	Moderate

Hazard Category	Hazard Evaluation				
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)	
			and marsh systems ability to mitigate the excess water. The City of North Port fits all the criteria of a flood prone area. The Community Rating System (CRS) is a set of flood mitigation initiatives set forth by the National Flood Insurance Program (NFIP), which allows participating communities to participate in and initiate programs which reduce the flood hazard in the community. For each initiative, there are points that can be awarded, which equate to a Class when enough points are gained by the community. The City of North Port is an active member of the Community Rating System under the National Flood Insurance Program. At this writing, the City of North Port stands at a Class 6 in the Community Rating System under the National Flood Insurance Program. This equates to a 15% saving on flood insurance for policy holders in the Special Flood Hazard Area (SFHA) in both the City and the County.		
Hazardous Material Spills	On February 2, 2004, a gasoline tanker traveling on I-75 exploded over the Myakkahatchee Creek bridge. An unknown amount of gasoline and diesel fuel entered the creek but was contained prior to reaching the main drinking water intake at the Water Treatment Plant. Two nearly identical gasoline tanker accidents occurred in 2016 on I75. Contamination was limited to the local area, however a threat to the City's drinking supply resulted in closure of the Water Treatment Plant and purchase of water from the Peace River system.	Area evacuation and related traffic issues. The possibility of significant numbers of people being injured or becoming ill due to the hazardous materials release. Temporary sheltering of evacuated residents. Adequate equipment and trained personnel for hazardous materials containment and disposal. Adequate disposal facilities. Possible contamination of surface water, and source water for the water treatment plant.	There are few end users of large amounts of industrial or agricultural chemicals and other hazardous materials in North Port. The only fixed facilities using Extremely Hazardous Substances (EHS), as defined by the US Environmental Protection Agency (EPA), are owned and operated by the City of North Port Utilities Department. Other fixed facilities subject to federal reporting have been identified and maintained in Fire Rescue's records' management system. Significant amounts of a wide variety of hazardous materials are transported on I-75. It is considered the leading risk area for hazardous materials incidents in the County. Significant amounts of hazardous materials transit through North Port on US 41. The Sarasota County Fire Department is first responding to hazardous materials incidents in the City of North Port.	Frequency Vulnerability Exposure Risk	Low Moderate Moderate Moderate
Commercial Nuclear Power Plant Incidents	North Port is not within the Emergency Planning Zone or Ingestion Pathway Zone of a	North Port may receive a request to assist in furnishing mutual aid under provisions of the Florida Statewide Mutual Aid Agreement. Should an incident be of such magnitude as to require the evacuation of Tampa Bay,	Evacuees from a mishap at Florida Power Corporation nuclear generating facility at Crystal River, might arrive in Sarasota County seeking shelter.	Frequency Vulnerability Exposure	Low Low Low

Hazard Category	Hazard Evaluation				
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)	
	nuclear generating facility, thus is not considered at risk.	traffic control could be an issue.		Risk	Low
Civil Disturbance	The City of North Port has no history of civil disturbance.	The vulnerability of businesses on US 41 to looting. The possibility that North Port might be requested to furnish mutual aid.	The City does not face some of the challenges present in other Florida communities where conflict exists between cultural groups. Similarly, Sarasota County has had no recent incident of civil disorder of any significance.	Frequency	Low
				Vulnerability	Low
				Exposure	Low
				Risk	Low
Mass Immigration	There is no evidence that concerns caused by mass immigration has impacted the City of North Port. However, recent events along the Southwest coast of Florida indicate the potential for an event. In July 2007, 30 refugees from Cuba landed on Little Gasparilla Island; June 2007, 33 migrants from Cuba arrived on Sanibel Island; and in December 2006, 25 Cuban refugees landed on Longboat Key.	The City of North Port does not have a coastline for landings. However, if the refugees boated up the Myakka River or Myakkahatchee Creek, the City would be directly impacted. Otherwise, the City may provide mutual aid support to Charlotte and/or Sarasota counties for medical and/or law enforcement assistance.	While mass immigration to Florida from the Caribbean, Central America and South America has increased dramatically since 1980, the City is too far north and inland to directly receive arriving "boat people," and is not a likely settlement site.	Frequency	Low
				Vulnerability	Low
				Exposure	Low
				Risk	Low
Coastal Oil Spill	The City of North Port does not include any portion of the Gulf of Mexico's coast. However, given the tidal influence on the Myakka River, if a spill were to occur in the Gulf, there exists a potential for product to flow up the Myakka River towards the City. The City of North Port was not impacted by the Deepwater Horizon oil spill in 2010 which affected numerous interests to the north of Sarasota County in the Gulf of Mexico.	Economic impact due to temporary loss of recreational activities in Charlotte Harbor. Furnishing mutual aid support to communities on Charlotte Harbor. Regarding proposed drilling off the Gulf coast of Florida, the US Department of the Interior's Minerals Management Service (MMS) states "[f]or the foreseeable future any proposed development operations within 100 miles of the coast of Florida would be only for the development of natural gas fields. Even if a blowout were to occur, no oil would be released. Any pipelines proposed would carry only dry natural gas." They do indicate one potential for a worse case situation would be if the supply vessel carrying diesel oil to the drilling rig lost all its diesel during transfer operations - this could result in a spill of about 1,800 bbl. The MMS can and has required mitigation	Traffic exists along Florida's Gulf Coast which could allow for a mishap to occur. The hazardous materials release could enter parts of Charlotte Harbor, but it is more likely that existing currents would move the release past the Harbor. A hazardous materials release in the Gulf would be responded to by Federal and State authorities. Public Works may receive mutual aid requests or be involved in environmental damage response to properties located on the Charlotte Harbor shoreline, City of Venice or unincorporated Sarasota and/or Charlotte counties.	Frequency	Low
				Vulnerability	Low
				Exposure	Low
				Risk	Low

Hazard Category	Hazard Evaluation				
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)	
		during past drilling operations to minimize this remote possibility.			
Extreme Temperatures	Freeze conditions in Florida are seasonal and relatively predictable. Florida Severe Freeze 2000 for which Sarasota County was included in the declared counties. The last significant winter storm to occur in Sarasota County was the "no name" storm in March 1993.	Temporary sheltering of lower income persons whose homes may lack adequate heating capability. Increased utility costs to the City of North Port in maintaining City facilities with adequate heating for workers and the public. In 2012, a coalition of services for the homeless began to establish freezing weather shelters at local churches. These facilities open when the National Weather Service posts a freeze watch for our area.	There are few agriculture interests within the City which might suffer economic loss. Some temporary shortages of utility resources might take place. Potable water lines have frozen in past years causing a water service disruption to some houses.	Frequency Vulnerability Exposure Risk	Low Low Low Low
Brush, Wildfires and Forest Fires	Brush or forest fires are generally seasonable during late winter to spring and predictable based on weather conditions. Sarasota County was included in the declared counties for the Florida Extreme Fire Hazard in 1998. The largest wildfire in the City was experienced in May 2017 during which more than 1000 acres with the City's boundaries were burned and an additional 4000 acres just outside the City limits.	Wildland-Urban interface fuel loading is high, as compared to normal. Area evacuation and traffic control. Temporary sheltering of evacuees. Mutual aid support to other impacted communities, or requests for assistance to North Port. See Tables 3 and 4 Seasonal KBDI Values for Florida Forest Service's South Region and Sarasota County as a measure that conditions are favorable for the occurrence and spread of wildfires.	As the population density increases, the probability factor will decrease, but the impact factor will increase. The scattered development within the City, and the lack of land clearance, creates an environment in which many residences are grouped in relatively isolated areas surrounded by forested land. There is a history of arsonist activity in South Sarasota County. The possibility of an accidental fire caused by construction equipment, or controlled burning by contracts is a possibility. The City of North Port Fire Rescue participates in the Firewise program to mitigate the effects of wildfires. Four communities Harbor Isles, La Casa, Riverwalk Mobile Home Village, and Woodland Estates have met the requirements of the program.	Frequency Vulnerability Exposure Risk	Moderate to High Moderate to High Moderate to High Moderate to High
Thunder Storms and Tornadoes	Heavy rains, winds and storm action are common in Florida. On May 24, 2012, an EF-0 tornado affected residences in the Highland Ridge Community of North Port. No injuries were	Possible area evacuation. Road blockage from debris. Temporary sheltering of small numbers of persons whose residences became significantly damaged by the storm or winds. The possible loss of water and/or sewer service.	North Port is not located in an area with a high incident of tornado activity. Tornadoes are common occurrences with thunderstorms. Florida has the second highest record of tornadoes in the United States.	Frequency Vulnerability Exposure	Low Low to Moderate Moderate

Hazard Category	Hazard Evaluation				
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)	
	reported, but an estimated $50,000 in damages was recorded. In January 2015, a Myakka State Forest Ranger reported tornado damage to a ranger station and a mobile home trailer at around 3:50 a.m. A subsequent NWS storm survey classified the tornado as an EF-0.		Given the number of mobile homes in the City and adjoining areas, there exists significant exposure should a tornado move through the region.	Risk	Low to Moderate
Drought	Droughts are occurring with frequency in Southwest Florida. The Keetch-Byram drought index typically indicates a severe value during the spring season. The US Drought Monitor indicates the State ranges from Abnormally to Exceptionally Dry, with Sarasota County on the upper scale of drought conditions.	Necessary slow-down in planned city projects due to water restrictions. Assistance to residents on well-water supply systems. Increased responses to wildfire events. Potential damage to residential and commercial structures, and City infrastructure.	Droughts generally impact the most on agricultural-based communities. Water restrictions and enforcement might be required. Droughts have an impact on wildfires. The Florida Forest Service has analyzed weather data over a 35-year period was examined to determine average Keetch-Byram drought index (KBDI) values for each region of Florida on a seasonal basis. These average KBDI values are given in the following table as the "NORMAL" classification. Departures from this average value were related to fire activity to determine the breakpoints for the other classes. (See tables 2 and 3).	Frequency	Moderate to High
				Vulnerability	Moderate to High
				Exposure	Moderate to High
				Risk	Moderate to High
Sinkholes and Subsidence	Sinkholes of a significant magnitude are an infrequent occurrence. Since July of 1981, Sarasota County and the jurisdictions within have recorded seven sinkhole events, all less than ten feet in diameter, and each was centered on a specific property. Of the seven Subsidence Incident Reports in Sarasota County, only one occurred in the last seven years. Reported on July 7, 2013 several small holes were reported after heavy rainfall. The	Property loss. Damage to the infrastructure. Area evacuation, closure, traffic control and security.	Allowing for the vastness of the City limits, the probability of a sinkhole development threatening property is very significant. Sinkhole development could require area security to prevent members of the public from risk.	Frequency	Low
				Vulnerability	Low to Moderate
				Exposure	Low
				Risk	Low

Hazard Category	Hazard Evaluation				
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)	
	maximum dimensions were 2-8' wide with no property damage.				
Terrorism	There is no specific reason to believe that a terrorist type of occurrence is anticipated.	Potential mass casualties. Public panic. Environmental concerns.	One tactic of terrorists is to target "innocent" person rather than a specific group for which hostility exists. The news media would inundate the City should it be the focal point of an incident. The City does not possess targets of interest to an international terrorist; however, an individual with a hatred of local government, or a disgruntled employee may pose a greater risk to the security of City facilities, staff and visitors.	Frequency Vulnerability Exposure Risk	Low Moderate to High Low Low
Exotic Pests and Diseases	The City of North Port has not had any known reports of such diseases or pests, but the threat exists on a consistent basis.	Infectious disease control. Quarantine for livestock or people. Need for many treatment agents. Disposal of deceased animals.	Exotic threats and diseases are a pervasive threat to the agricultural interests in the City. This biological hazard is associated with any insect, animal, or pathogen that could pose an economic or health threat. The Mediterranean fruit fly and citrus canker are two examples of this threat. There is also a possibility for the importation of pathogens that could have a negative effect on the livestock industry.	Frequency Vulnerability Exposure Risk	Low Low Low Low
Disease and Pandemic Outbreaks	The City of North Port has not had any known reports of such diseases or outbreaks, but the threat exists on a consistent basis. The City of North Port was not significantly impacted by the H1N1 Pandemic in 2009 or the Ebola event of 2014.	Economic loss. Mass casualty/fatality. Infectious disease control. Disproportionate effects on elderly and children. Disposal of diseased livestock/agricultural stock. Need for mass feeding. Mass care. Quarantine of people and/or livestock. Large number of treatment agents	The City is vulnerable to epidemic on a constant basis. Although the threat is minimal, an epidemic is still possible. With tourists coming in from all over the world during the months of October through April, there is an increased vulnerability during this time. The environment is regularly monitored for diseases and pathogens by local and state agencies.	Frequency Vulnerability Exposure Risk	Low Moderate Low Low
Critical Infrastructure Disruption	Utility disruptions are an infrequent event, typically arising from a severe weather event, an accidental cutting through of a transmission line by a contractor or nesting bird. On January 12, 2015 components of an osprey next contacted high voltage wires which started a fire at the top of an electrical pole on Greenwood Avenue between	Evacuation. Sheltering. Mass feeding. Mass casualty. Large scale contamination. Contamination of water supply. Decontamination. Economic loss. Agricultural loss. Inability of public safety officials to communicate. Civil unrest. Inability to provide critical support functions at medical facilities.	This technological hazard is a consistent threat in the City. This hazard may become present through an accident, sabotage, or terrorism. This hazard includes, but is not limited to, utility disruptions and communications system failures. This hazard can cause other hazardous incidents to occur. These may include, but are not limited to, hazardous material spills, delay of medical operations, and loss of ability to provide power or communications, and loss of ability to provide utility services.	Frequency Vulnerability Exposure Risk	Low Moderate Low Low

Hazard Category	Hazard Evaluation				
	Frequency	Vulnerability	Exposure	Risk (Potential for Loss)	
	Greenway Drive and S. Sumter Boulevard in North Port. The fire caused damage to the feeder lines resulting in a secondary emergency – that of a power outage impacting 3,510 FPL customers including traffic lights at several intersections and the City of North Port municipal complex. Telephone lines to Sarasota County 9-1-1 were overwhelmed and callers were unable to reach the North Port Police dispatch center.				
Special Events	The City of North Port has no history of dignitary visits, cultural events, or a significant impact from spring break.	Public safety resources overwhelmed. Potential for terrorism, mass casualty, civil unrest.	With Special Events, the need for additional logistics and manpower to handle the possibility of large crowds increases significantly. The possibility for acts of terrorism or civil disobedience in these events also increase. The North Port High School's Performing Arts Center is the second largest theater in Sarasota County. With 1,023 seats, it presents unique challenges during an emergency. The City-sponsored July 4th celebration attracts more than 5,000 attendees. A spring training complex for the Atlanta Braves will be situated in the West Villages-section of the City. The stadium will have 6,200 fixed seats and 2,200 berm seating along with suites.	Frequency	Low
				Vulnerability	Low
				Exposure	Low
				Risk	Low
Dam Failure	The Peace River Manasota Regional Water Supply Authority has constructed a 6-billion-gallon reservoir adjacent to their water treatment plant on US 17 in Desoto County. As this is a relatively new facility, there is no history of incidents; however,	Possible evacuation of residents. Temporary sheltering and congregate feeding. Evacuation traffic and traffic related to road closures. Property and infrastructure damage. Loss of business revenue. Possible search and rescue operations. Possible shutdown of water treatment facilities. Possible contamination of water systems. Possible waste water system overload.	Based on the construction of the retention walls and the distance from the reservoir, the effects on the City of North Port may be minimal.	Frequency	Low
				Vulnerability	Low
				Exposure	Low
				Risk	Low

Hazard Category	Hazard Evaluation				
	Frequency	**Vulnerability**	**Exposure**	**Risk (Potential for Loss)**	
	similar type reservoirs have experienced retention wall cracks, but no failures.				
Major Transportation Incidents	Motor vehicle accidents are a frequent occurrence on the roadways in North Port. However, most which are minor in nature, and have minimal impact on the City.	Traffic rerouting issues. Environmental impacts from release of hazardous materials.	In the City of North Port, I-75 extends from mile marker 171 (Charlotte County line) to 185 in an east to west direction. Exits are at mile marker 179 (Toledo Blade Blvd.), and mile marker 182 (Sumter Blvd.). This is a two-lane roadway in each direction, with a posted speed limit of 70 mph. US 41 extends from Cranberry Blvd. (Charlotte County line) to Ortiz Blvd. This is a two-lane roadway, with a posted speed limit of 45 mph. Significant amounts of a wide variety of hazardous materials are transported on I-75. It is considered the leading risk area for hazardous materials incidents in the County. Significant amounts of hazardous materials transit through North Port on US 41.	Frequency	Moderate
				Vulnerability	Moderate
				Exposure	Moderate
				Risk	Low to Moderate

Figure 2: Sarasota County Hurricane Evacuation Levels

(2017 Revision)

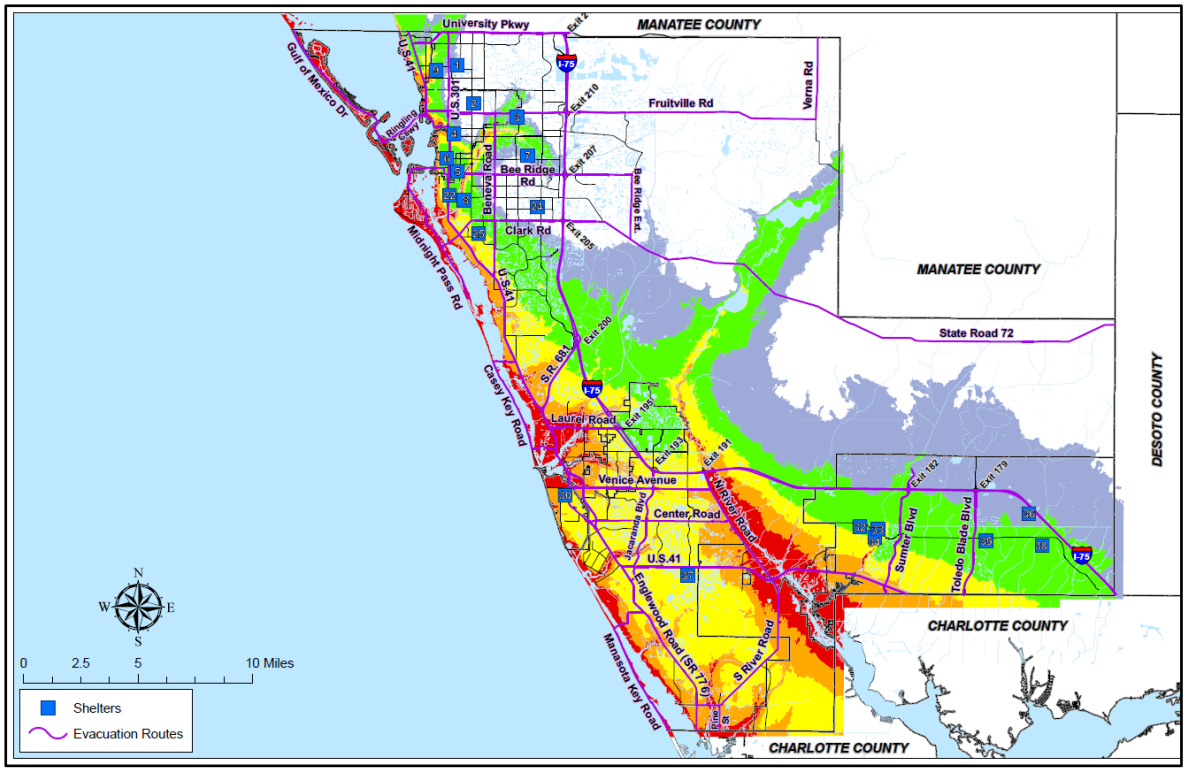


Table 3: Seasonal KBDI Values in the Southern Region of Florida[2]

	Winter	Spring	Summer	Fall
Very low	0-230	0-260	0-150	0-220
Low	231-300	261-340	151-200	221-270
Normal	301-490	341-550	201-350	271-420
Moderate	491-630	551-700	351-450	421-510
Severe	631-800	701-800	451-800	511-800

[2] Florida Forestry Service, http://www.freshfromflorida.com/Divisions-Offices/Florida-Forest-Service/Wildland-Fire/Keetch-Byram-Drought-Index-KBDI/Regional-Seasonal-Drought-Classification

Table 4: Seasonal KBDI Values for Sarasota County[3]
Monthly Average from 2014 to 2017

Year	Winter	Spring	Summer	Fall
2014				295
2015	454	537	339	413
2016	291	445	340	493
2017	375	453	179	411

[Note regarding Tables 5 and 6: The Keetch-Byram drought index (KBDI) is a continuous reference scale for estimating the dryness of the soil and duff layers. The index increases for each day without rain (the amount of increase depends on the daily high temperature) and decreases when it rains. The scale ranges from zero (no moisture deficit) to 800. The range of the index is determined if there is eight inches of moisture in a saturated soil that is readily available to the vegetation.

For different soil types, the depth of soil required to hold 8 inches of moisture varies (loam = 30", clay = 25" and sand = 80"). A prolonged drought (high KBDI) influences fire intensity largely because more fuel is available for combustion (i.e. fuels have a lower moisture content). In addition, the drying of organic material in the soil can lead to increased difficulty in fire suppression.

High values of the KBDI are an indication that conditions are favorable for the occurrence and spread of wildfires, but drought is not by itself a prerequisite for wildfires. Other weather factors, such as wind, temperature, relative humidity and atmospheric stability, play a significant role in determining the actual fire danger.[4]

North Port Fire Rescue references the KBDI when making operational decisions on staffing, resource availability, dispatch procedures, etc.

B. Geographic Information

1. Area in Square Miles. The City of North Port occupies 104 square miles of southeast Sarasota County midway between the cities of Sarasota and Fort Myers, east of the Gulf of Mexico.

2. Topography of the Land. Sarasota County consists of a lying coastal plain. The City of North Port is generally consistent with the County at large.

3. Land Use Patterns. The City of North Port is a predominant low density

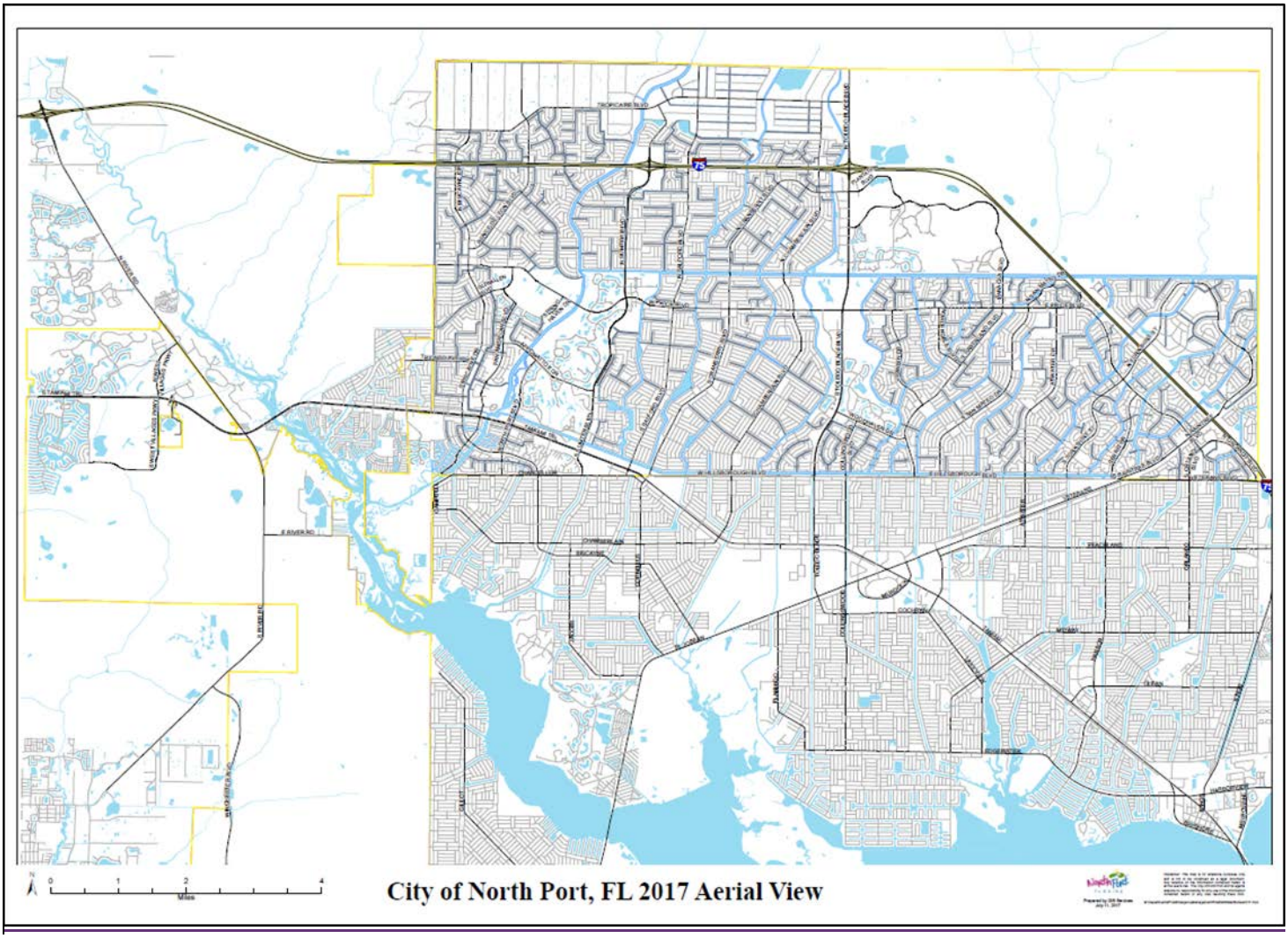
[3] Florida Forestry Service. Pre-Fall 2014 data not available.

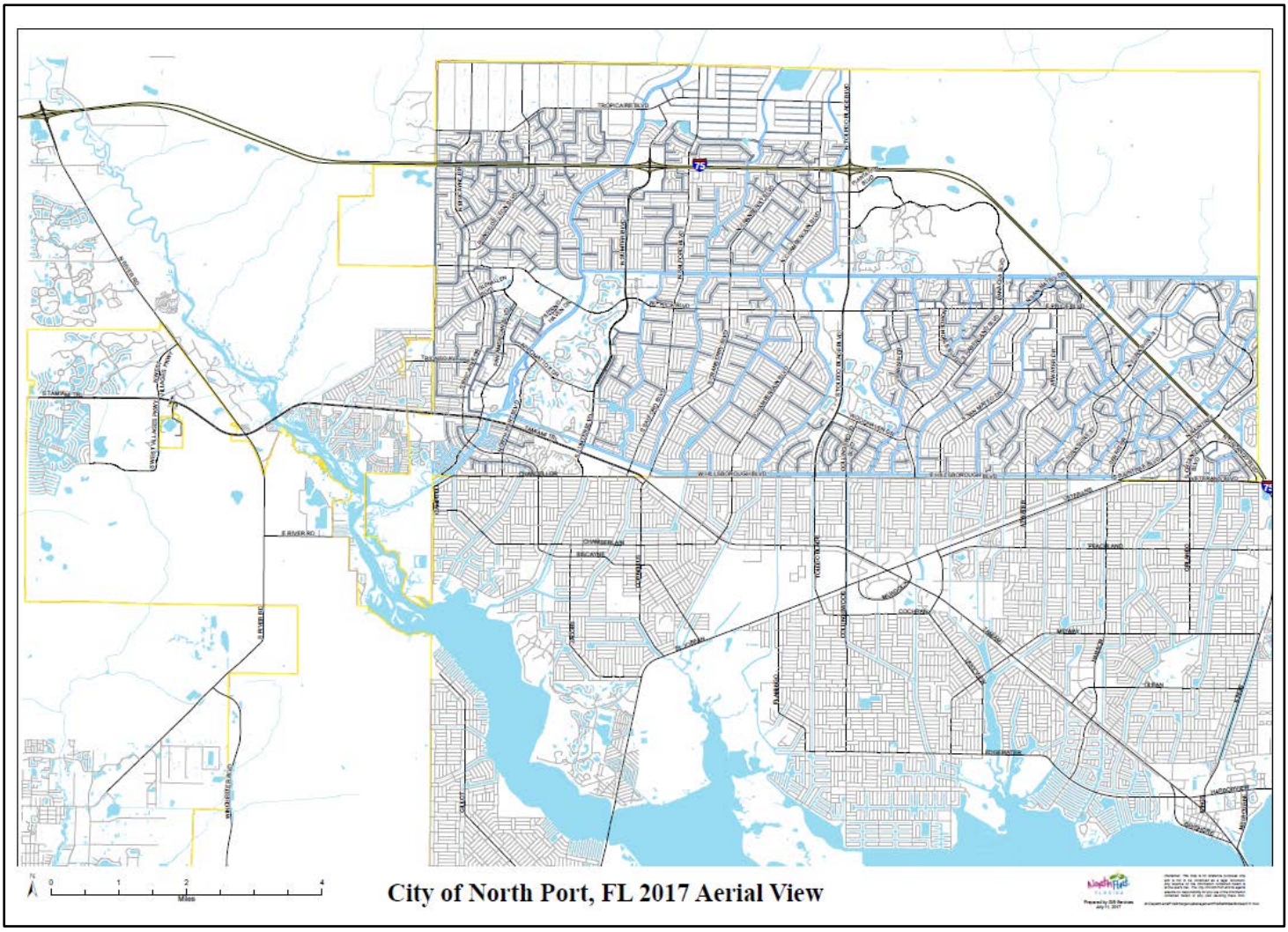
residential community. Medium and high-density development is planned, primarily for the southwestern portion of the City, north-central areas, and extreme eastern part of North Port. Agricultural/estates are planned for the areas north of the I-75 corridor. Commercial, industrial and professional developments are generally co-located along major roads.

Recreational/open space, public land and activity centers are generally adjacent to medium and high-density areas. Two portions of the City consist of approximately 10,000 acres of the Myakka River State Forest.

4. Water Area. Total area not available, see Figure 5 for map.

Figure 5: City of North Port Water Bodies





5. Drainage Patterns. Generally, drainage takes place into the Myakkahatchee Creek (Big Slough), Myakka River and toward the swamps and marshes located along Charlotte Harbor. A concern of emergency planners is the disruption of normal drainage caused by development and the reliance on controlled canal and lock systems.

6. Environmentally Sensitive Areas. All Federal and State lands are considered environmentally sensitive by the Florida Department of Environmental Protection, as are areas continuous with river systems, bays and harbors.

   i. Little Salt Spring is an archaeological and paleontological site located at 6701 West Price Boulevard. On July 10, 1979, it was added to the U.S. National Register of Historic Places. The

Rosenstiel School's Division of Marine Affairs manages an underwater archeological and ecological preserve. Donated to the University in 1982, the spring is surrounded by undisturbed native hydric hammock containing several rare and endangered plant and animal species.

During early prehistoric times (12,000–7,000 years ago) the sinkhole was an oasis in the peninsula that attracted seasonal hunters and gatherers. The site has produced the second-oldest dated artifact ever found in the southeast United States — a sharpened wooden stake some 12,000 years old. Little Salt Spring contains some of the oldest cultural remains in the United States.

The unique anoxic water that fills most of the sinkhole (below 5 meters/16 feet depth) has preserved a great range of organic materials including wood, textile fragments, hair, skin and brain tissue dating back to the Late Paleoindian and Early Archaic stages of Florida's prehistory, ca. 9,500–7,000 radiocarbon years ago. Archaeological remains exist both in the spring basin and the "27 meters/90 feet ledge," a natural cavern at that depth below the spring surface.[5]

ii. Immediately to the west of 6664 West Price Boulevard (roughly across the road from Little Salt Spring), exists a Native American burial ground for the Timucuan peoples dating back 12,000 to 40,000 years. The platted property is owned by the School Board of Sarasota County and Sarasota County government.

iii. Warm Mineral Springs, 12200 San Servando Ave, is listed in the National Register of Historic Places, as one of the most important underwater archaeological sites in America. As for the buildings and cyclorama, these are recommended by the State of Florida that they are eligible to list on the State Register and may also be eligible for the National Register (but neither is completed as of this update). The City of North Port did add the entire Warm Mineral Springs property (water and buildings) to the City's historic register in 2017.

Warm Mineral Springs is considered a health spa, visited by thousands of people seeking the warm soothing mineral waters believed to be helpful in healing many ailments. Fifty years ago, William Royal, the first diver to ever venture below the surface,

[5] http://www.rsmas.miami.edu/groups/little-salt-spring

discovered extinct animal bones, stalactite formations, and human remains. The archaeological world initially dismissed his findings as a farce because, according to fossil records, it was believed that man arrived in Florida no earlier than seven thousand years ago. For the last forty years, several archaeological projects have been conducted in and around Warm Mineral Springs resulting in many outstanding discoveries. The most astonishing was the discovery of a ten-thousand-year-old human skull still containing brain matter.

When the Indians arrived, Warm Mineral Springs was a giant pit surrounded by a huge forest. This giant pit dropped quickly from the surrounding forest vegetation. Water trickled down the walls and into the pit below. This is revealed today by the water channels sculpted into the walls at depths from 40 to 55 feet. At 32 feet, the walls undercut themselves making a natural shelter from the outside elements. These early Paleo Indians must have considered Warm Mineral Springs a sacred place because they buried their dead along the walls at 35 feet. Human remains and primitive tools dating from three to ten thousand years old have been excavated from the sink and the surrounding lands over the last forty years.

Geologically, Warm Mineral Springs is a solution hole descending into one of the deepest Florida aquifers. The water flowing from this spring is anaerobic (low in oxygen) and is believed to have been trapped underground for over thirty thousand years at depths exceeding 7000 feet. Under these great pressures, the water is geothermally heated to 97º degrees Fahrenheit and flows from several small caves located on the northern wall at depths from 195 to 210 feet. As the water rises towards the surface, it mixes with cooler water from colder vents. When it reaches the surface, the temperature drops to 85º degrees Fahrenheit. Eight million gallons of water a day flow down a natural run on the surface and eventually into the Gulf of Mexico.[6]

iv. The Myakkahatchee Creek Environmental Park, located at 6968 Reisterstown Road, is a publicly-owned natural resource conservation and outdoor recreation area that includes approximately 160 acres. The park provides an Old Florida nature experience with winding rustic paths, footbridges, wooded trails, overlook, pavilion, primitive camping site (by permit only) and restroom. The park is owned by the City of North Port and is operated by Sarasota County through an interlocal agreement

[6] http://www.warmmineral.com/

adopted in 1993. Activities at the park include birding, hiking, horseback riding, and biking. The park is also home to the Myakkahatchee Creek Connector Bridge which connects the park to Sarasota County's Carlton Reserve.[7]

v. Myakka State Forest was purchased in 1995 as part of the Myakka Estuary Conservation and Recreation Lands project. The purchase was made using Preservation 2000 and Save Our Rivers funds.

The Florida Forest Service manages the forest for multiple uses, including timber, outdoor recreation, wildlife, and ecological and hydrological restoration. The Southwest Water Management District provided funding to purchase half of the state forest and is an important cooperator in the management of the property, especially regarding hydrological management.

Most the forest falls within the city limits of North Port. Access is available off River Road, about 11 miles south of I-75.

Myakka State Forest is made up primarily of mesic flatwoods with a mixture of longleaf pine and slash pine overstory with a palmetto understory. Numerous depression marshes are scattered throughout the flatwoods, providing many opportunities for viewing wading birds and other wildlife. The forest includes approximately 2.5 miles of frontage on the Myakka River, which is designated as an Outstanding Florida Water and a Wild and Scenic River. The Myakkahatchee Creek flows through the forest for 1.5 miles and provides an additional water resource.[8]

1. Flood-Prone Areas. Flood Prone Areas in Sarasota County are identified as those areas within the 100-year floodplain, and other areas subject to repetitive flooding along the rivers and creeks (Figure 5).

Figure 6: City of North Port FEMA Flood Zones

[7] http://www.cityofnorthport.com/government/city-services/parks-recreation/parks/myakkahatchee-creek-environmental-park

[8] https://www.freshfromflorida.com/Divisions-Offices/Florida-Forest-Service/Our-Forests/State-Forests/Myakka-State-Forest

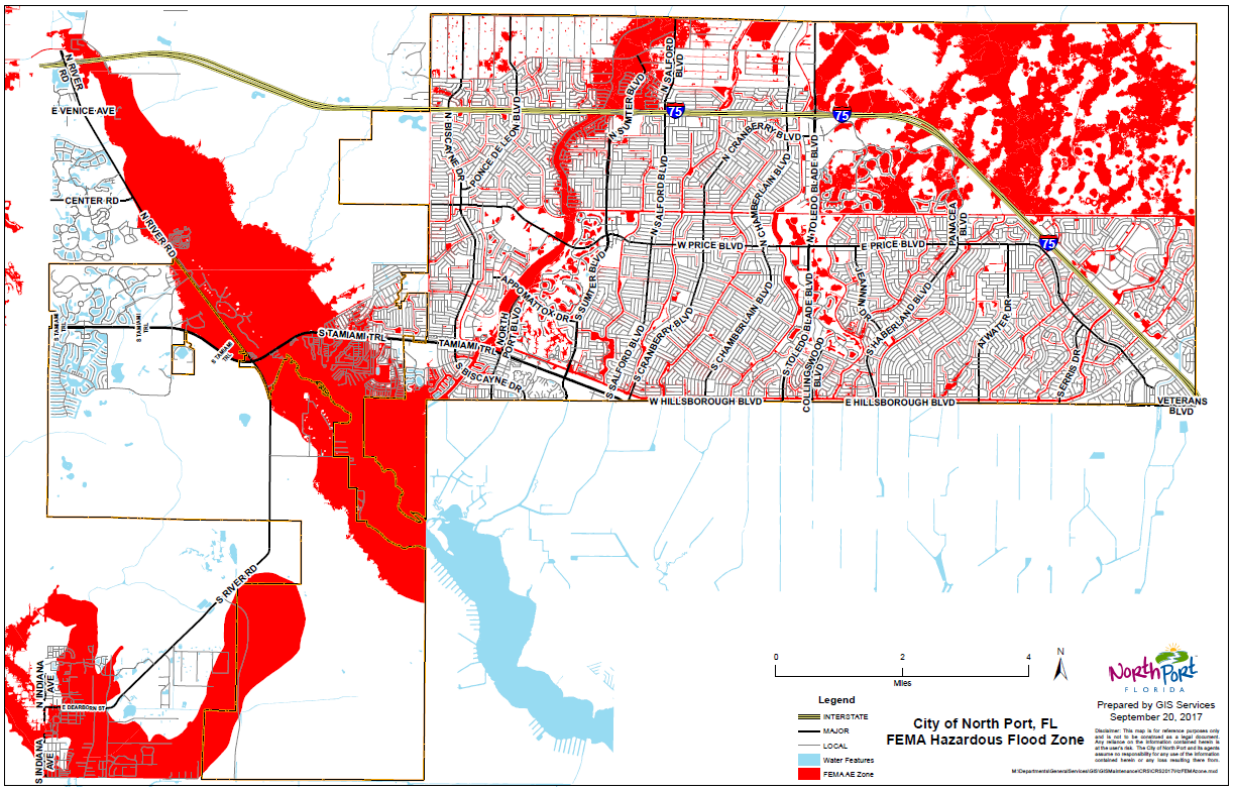
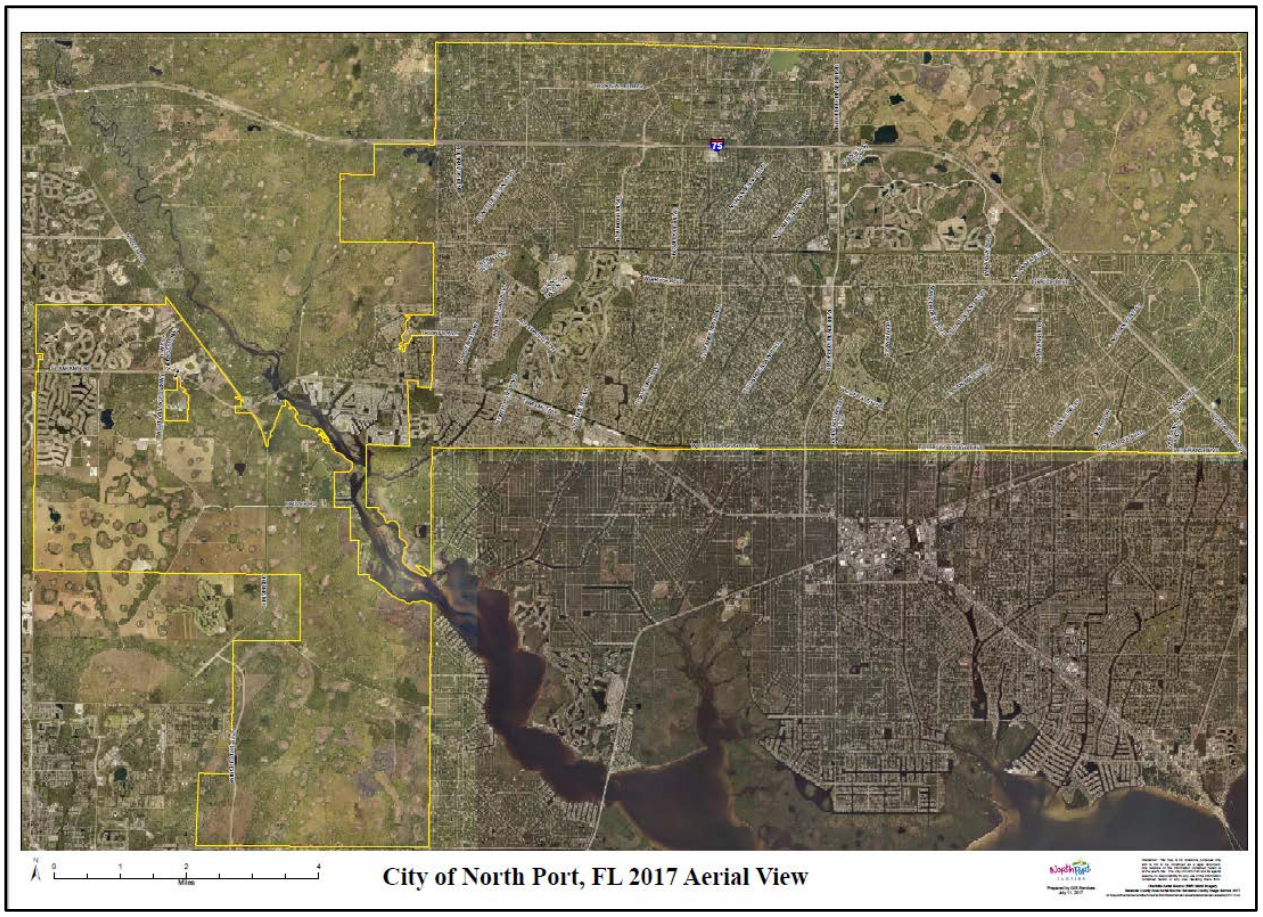


Figure 7: City of North Port Aerial View



C. Demographic Information

1. Population of the City

a. Total Population (2018).[9] 67,235

b. Population Density and Distribution (2018). Approximately 650 persons per square mile, less the State forest. The greatest population will continue to be in the western and northern portions of the city.

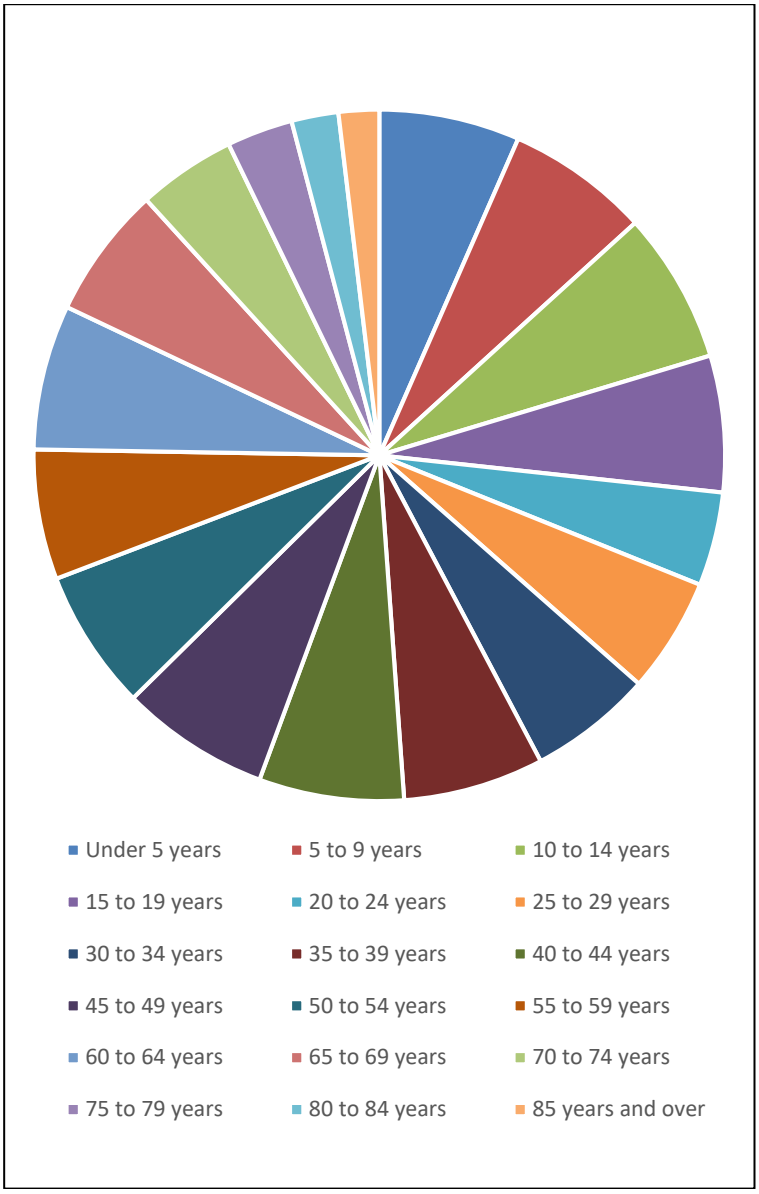
c. Distribution of Population by Age.

[9] Bureau of Economic and Business Research.

Table 8a: Distribution of Population by Age

Population by Age	Number	Percent
Under 5 years	3,531	6.6
5 to 9 years	3,869	6.7
10 to 14 years	4,079	7.1
15 to 19 years	3,673	6.4
20 to 24 years	2,511	4.4
25 to 29 years	3,069	5.4
30 to 34 years	3,351	5.8
35 to 39 years	3,811	6.6
40 to 44 years	3,895	6.8
45 to 49 years	4,035	7.0
50 to 54 years	3,811	6.6
55 to 59 years	3,526	6.1
60 to 64 years	3,909	6.8
65 to 69 years	3,549	6.2
70 to 74 years	2,613	4.6
75 to 79 years	1,760	3.1
80 to 84 years	1,237	2.2
85 years and over	1,085	1.9
Median Age	40.9	

Figure 8b: Distribution of Population by Age



d. Medically Dependent Population. For the 2018 Hurricane Season, Sarasota County Emergency Management is reporting 228 individuals are registered as Medically Dependent Persons with North Port's area of responsibility.

e. Farm Workers. The City of North Port has no commercial agricultural operations which use migrant farm workers.

f. Areas of Large Tourist Population (including annual tourist and seasonal population). Season population may represent an

increase of 30% over resident population. There is no specific area where the seasonal population resides.

The City of North Port has no major hotels, but a single tourist attraction. Warm Mineral Springs, which is believed to be the "Original Fountain of Youth" sought by the Spanish explorer Ponce de Leon, is located just within the City's northern boundary at 12200 San Servando Avenue.

g. Non-English-Speaking Populations (including persons when English is not the first language) and persons with hearing impairment or loss. Figures for the City of North Port are not available; however, per the 2010 US Census, approximately 11% of the respondents reported speaking language other than English. It should also be noted that among the "other" languages being reported, a large population of Ukrainian immigrants and/or descendants live in the City, an estimate of which is between eight and 10% of the City's population. The City addresses language barrier by making Spanish-language versions of the annual Hurricane Guide available and creating a Ukrainian-language version of the "Stay-or-Go?" literature. All of them are available from either Fire Rescue headquarters or Fire Rescue's Emergency Management website.

No figures are available for persons with hearing impairment or loss and will be handled by the dispatch center through the Telecommunications Device for the Deaf (TDD) equipment as needed.

h. Transient Populations. The City of North Port has no recognizable issue with transient populations.

i. Manufactured Housing Parks and Population. The City of North Port has only one mobile home park within its limits (Holiday Park). However, there are four additional mobile home parks for which the City of North Port Fire Rescue provides fire protection and emergency medical services. For hurricane evacuation purposes, all manufactured housing is in "A" zone. For property risk purposes, the Surge Zone column represents the actual zone in which the park is located. (See Table 10: Mobile Home Communities Served by North Port Fire Rescue)

Table 9: Mobile Home Communities Served by North Port Fire Rescue

Name	Office Address	Units	Surge Zone
Holiday Park	5401 Holiday Park Blvd	865	B
Harbor Cove	499 Imperial Drive	805	A/B
La Casa Mobile Home Park	300 El Prado	974	A/B
Lazy River Village Inc	10500 Tamiami Trail South	356	A/B
Riverwalk Mobile Home Village	150 Riverwalk Drive	223	A/B

j. Inmate Population. There are no correctional facilities within the City of North Port.

2. Vulnerable Populations

Table 11 describes the potential effects to the population, and economic loss if a hurricane with sufficient storm surge, or flooding in a FEMA Special Hazard Flood Area were to affect the City of North Port.

Assisted Living Facilities (ALF). Per the Florida Agency for Health Care Administration (AHCA), five ALFs are registered within the City of North Port:

Name and AHCA Registration Number	Street Address	Licensed Beds	Evacuation Level
Gardens of North Port (The) - 11966640	4900 S Sumter Blvd	50	C
Joy of Living, Inc - 11966162	8548 Alam Avenue	6	C
La Belle La Vie, LLC - 11968629	3973 Lubec Avenue	3	D
North Port Retirement Center - 11912071	4950 Pocatella Ave	50	C
The Springs at South Biscayne - 11968855	6235 Hoffman St	147	B

Nursing Homes. According to the Florida Agency for Health Care Administration, One Nursing Home Is Registered Within the City of North Port:

Name and AHCA Registration Number	Street Address	Licensed Beds	Evacuation Level
Quality Health Care of North Port - 85810	6940 Outreach Way	120	B

Table 10: Vulnerabilities by Population and Property Loss

Residential Non-Residential / Population / Valuation Information in Storm Evacuation Zones and FEMA Hazardous Zones

Evacuation Zones	Non-Residential Units	Non-Residential Potenial Property Value Loss	Residential Units	Residential Potenial Property Value Loss	Total Units	Total Potenial Property Value Loss	Residential Population (Units *2.65)
A	4	$2,800,300	289	$47,415,800	293	$50,216,100	766
B	209	$245,514,000	4,394	$364,506,800	4,603	$610,020,800	11,644
C	11	$12,962,000	8,777	$1,277,681,000	8,788	$1,290,643,000	23,259
D	95	$269,482,000	12,693	$1,948,933,600	12,788	$2,218,415,600	33,636
E	137	$74,981,300	2,629	$482,517,900	2,766	$557,499,200	6,967
Grand Total	**456**	**$605,739,600**	**28,782**	**$4,121,055,100**	**29,238**	**$4,726,794,700**	**76,272**

FEMA Zone	Non-Residential Units	Non-Residential Potential Property Value Loss	Residential Units	Residential Potential Property Value Loss	Total Units	Total Potential Property Value Loss	Residential Population (Units *2.65)
FEMA AE Zone	92	$384,014,800	6,122	$968,199,400	6,214	$1,352,214,200	16,223

Notes:
Known units not currently on 2017 taxroll is estimated values and included in unit counts.
Residential Units include individual Condo Units.
Residential Units only count one per apartment complex.
Total Value Loss includes total value of apartment complex.

Non-Residential includes individual Business Condo Units.
Centers under one ownership is counted as one unit and includes total value complex.

All data is based on GIS Data (August 2017): Surge Zones, FEMA A / AE Zone, Sarasota County Property Apprasier Parcels and Attribute tables.
The 2.65 multipler is the average household size.
The valuation is from the JUST value from the Preoprty Appraisers Office data (2017 Tax Role).

D. Economic Characteristics

1. Economic Profile

a. Employment by Major Sector. Most residents are employed in the service sector or government – 32% are retired.

b. Unemployment Rate. Per the US Bureau of Labor Statistics, the unemployment rate for the North Port-Bradenton-Sarasota Metropolitan Statistical Area (MSA) in the spring of 2018 was 3.6%.

c. Average Property Value. $192,800

d. Median Income. $49,465

2. Potential Property Value Loss

See Figure 11: Vulnerabilities by Population and Property Loss (above).

E. Emergency Management Support Facilities

1. Critical Facilities. North Port Emergency Management maintains a Critical Facilities Inventory (CFI) for the City. Given the sensitive nature of the facilities, they are protected under Florida Statutes Chapter 119, the locations of which are not included in this Plan.

2. Logistical Staging Areas. Potential staging areas should have adequate space to store palletized resources, maneuver and service vehicles and stock end use items. Some site security should be possible. Pre-identified sites may include:

   a. Utilities Department Work Yard
   b. Public Works Department Complex
   c. Municipal Complex – City Center
   d. George Mullen's Activity Center
   e. Morgan Family Community Center
   f. Property Maintenance Yard

3. Neighborhood Points of Distribution. Neighborhood Points of Distribution (NPOD) is a County-led operation for the establishment and operation of sites at which the public may acquire emergency commodities in a post-disaster environment. If, due to power outages or road closures, the public is unable to procure food, water, ice or tarps, NPODs will be established at pre-identified locations throughout the City. However, consistent with State policy, no NPOD shall be opened within five miles of an operating retail store selling these commodities. Emergency Management's Standard Operating Procedure 200.001 details how NPODs will be established and managed.

4. Emergency Helispots. The City of North Port has registered two helistops with the Florida Department of Transportation and the Federal Aviation Administration located at the Fire Stations 81 and 84.

III. METHOD OF OPERATIONS

A. Organization

1. Emergency Management Organization

a. The City Manager is responsible for appointing an Emergency Manager (EM). The EM is responsible for day-to-day planning and operations.

b. The EM is responsible for preparedness and training coordination during normal or "blue skies" conditions. The EM will be responsible for:

i. Maintaining ongoing coordination with County and State counterparts.

ii. Advising the City Manager and department directors of training and exercise opportunities as well as coordinating the City's involvement in such.

iii. Coordinate the development of internal training programs.

iv. Maintain and update the CEMP, approve and make changes to the CEMP and distribute copies of updates or changes to copy holders of the CEMP.

v. Maintain the EOC and supporting supplies in a state of readiness.

vi. Coordinate public awareness and education campaigns.

c. The City of North Port has adopted the National Incident Management System (NIMS), to include the Incident Command System (ICS) as the standard by which "no-notice events/incidents and pre-planned events will be organized and managed (See Appendix C). Based on ICS guidance, and City protocols, ICS may be implemented at any level of emergency, for any situation, and by any qualified individual. The use of ICS includes all the standardized forms approved by the National Wildfire Coordinating Group, or the NIMS Integration Center of the US Department of Homeland Security.

i. ICS implementation must include the consistent application

of Incident Action Planning, and Common Communications Plans, as appropriate.

d. When the ICS has been instituted to manage a current emergency, the EMD's position will be suspended, and the EMD will assume a position with the ICS structure as assigned by, or, if selected by the City Manager, as the Incident Commander.

i. The Incident Management Team, comprised of the City Manager, Assistant City Manager, Police and Fire Chiefs, Public Works Director and Emergency Manager is responsible, and has the authority to manage the incident or disaster under the direction of the Incident Commander.

ii. The City Manager will function as the coordinator and communication link from the Incident Management Team to the ~~Mayor and the assembled board of Commissioners of the North Port~~ City Commission.

iii. The City Manager will continue to oversee non-emergency operations of the City.

iv. The City ~~of North Port Mayor and~~ Commission~~ers~~ may give guidance and recommendations to the City Manager but will not give specific direction to the Incident Management Team or attempt themselves to assume management of the incident or disaster.

e. All employees are required to assist in the City's disaster response and recovery efforts. The City has instituted an Employee Disaster Role Registration program. As supported by the City Manager, all City employees will be designated as one of the following:

i. Department Essential for their Continuity of Operations (COOP). Each department is responsible for designating their employees COOP- or EOC-essential. Department essential employees are required to report to their regular work assignment to assist with the department's role in the response and recovery effort.

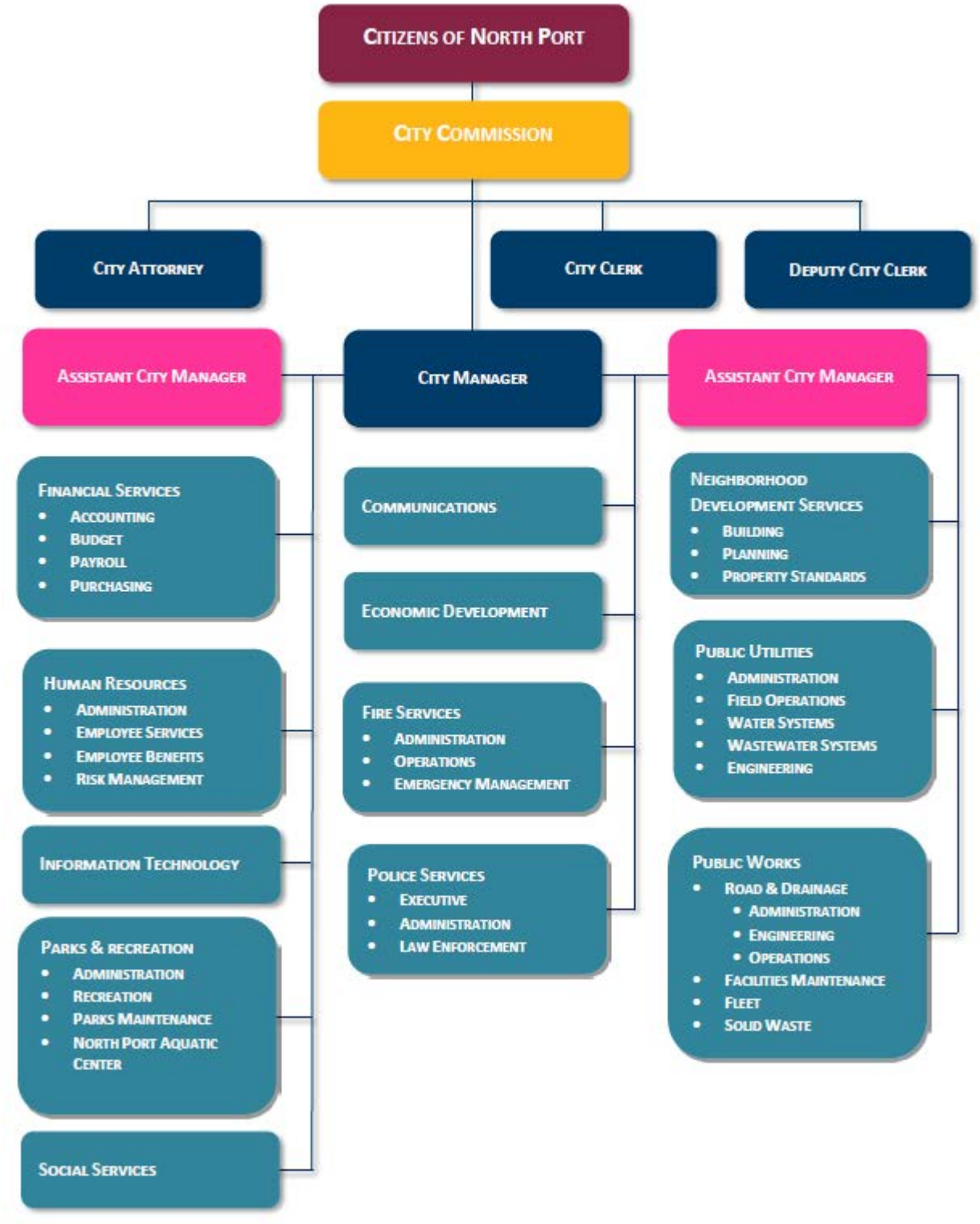
ii. Emergency Operations Center (EOC) Essential. Employees designated as EOC-essential are required to report to their EOC work assignment to assist with the Emergency Management's role in the response and recovery efforts.

iii. Support role. All employees not previously designated.

All new employees will complete the Employee Disaster Role Registration form on arriving at their workplace for orientation.

The forms will be maintained by the Emergency Management Division and EOC managers during a disaster.

Figure 11: Organizational Chart of the City of North Port Government



2. Lines of Succession[SB1]

a. The Line of Succession from the City Commission Mayor is to the Vice-Mayor.

b. The Line of Succession from the City Manager is ~~to the Assistant City Manager~~ as provided in the Department COOP.

c. Each department director shall identify two alternates as successors as outlined in the Department COOP. Realizing that some departments may not have such depth, plans will be established to utilize supervisors or managers from other departments as appropriate.

3. ICS and CEMP Activation. The North Port CEMP will be activated, and ICS implemented, under the following conditions:

a. On the issuance of a declaration of a State of Emergency by the President of the United States for a geographic area which includes the City of North Port, or

b. On the issuance of a declaration of a State of Emergency by the Governor of the State of Florida, for a geographic area that includes the City of North Port, or

c. On the issuance of a declaration of a Local State of Emergency by the Sarasota County Board of County Commissioners, or

d. On notification of the Sarasota County Emergency Management, or the Sarasota County EOC, that Sarasota County has implemented its CEMP, or

e. On a declaration by the City of North Port Commissioners, or the City of North Port City Manager, that a Local State of Emergency exists, or

f. The senior employee present from any department of the City of North Port, who is responsible for management of an emergency, may activate the City of North Port CEMP and initiate the Incident Command System, if in the best judgment of the employee in-charge of the incident, circumstances necessitate such action. The senior employee present will serve as Incident Commander until the City Manager selects a permanent Incident Commander.

4. Actions by the City Manager. On activation of the CEMP and initiation of the ICS, the City Manager will notify the various department directors, and City Commissioners, regarding the situation and identifying the Incident Commander.

   a. The Incident Commander will be selected by the City Manager from a pool of qualified individuals within the City staff or he may assume the role himself. The Incident Commander will have overall responsibility for management of the disaster.

      i. The choice of Incident Commander and management structure may be made on the nature of the event. The City Manager may select an individual with subject matter expertise (e.g., Police Chief for a terrorist attack, or Fire Chief for wildfire, Utilities director for a drinking water emergency, etc.).

      ii. The City Manager may decide to implement a Unified Command structure, by which each department providing resources to the incident may provide a director or senior division manager to share in command decision-making.

   b. The Operations Section Chief will be appointed by the Incident Commander from a pool of qualified individuals within the City staff. The Operations Section Chief may be selected based on the nature of the incident. For instance, the Deputy Fire Chief may be appointed as Operations Section Chief for firefighting and hazardous materials, or the Superintendent of the Water Treatment Plant for a water contamination issue. This selection process will apply to other incident categories.

   c. The Finance Section Chief will be the selected by the Incident Commander from a pool of qualified individuals within the City staff.

   d. The Logistics Section Chief will be selected by the Incident Commander from a pool of qualified individuals within the City staff.

   e. The Plans Section Chief will be selected by the Incident Commander from a pool of qualified individuals within the City staff.

   f. The Public Information Officer shall be filled by individual holding

that role during blue skies.

g. Other staff will be selected and appointed by the Incident Commander as he/she deems necessary. The staff may include, but not limited to: Safety Officer and Liaison Officer.

5. Coordination from City EOC to County, State or Federal counterparts.

a. Coordination with County, State and Federal emergency management organizations will be conducted through the City EOC.

b. Direct coordination between departments of City government with their County counterparts may be authorized at the discretion of the Incident Commander (e.g., City police to the County Sheriff's office).

c. The City will furnish liaisons to County, State and Federal entities as resources permit.

d. The City will encourage County, State and Federal authorities to furnish liaison personnel to the City EOC.

6. Emergency Operations Center.[10] The Emergency Operations Center is a site selected by the Incident Commander from which he/she deems is most suitable for managing the incident. The site may be mobile or fixed.

a. Mobile EOC. This is most likely the site from which the incident is first managed. It may be a vehicle from the Fire or Police Department, or it could be a service truck from the Public Works or Utilities Department.

b. Mobile Command Vehicle. This vehicle serves as the City's mobile command post and back-up 9-1-1 dispatch center.

c. Primary EOC. The City of North Port City Hall room 244 will serve as the Primary EOC for the City. The Incident Commander may select to use it or to continue operations from a more mobile position.

d. Alternate EOC. Alternate EOCs may be selected by the Incident

[10] See the City of North Port Emergency Operations Center, Standard Operating Guidelines (SOG) for details of the EOC operations.

Commander based on the nature of the incident, and the capability of the building. They include, but are not limited to:

i. Municipal Complex – Fire Rescue Headquarters or Police Headquarters

ii. Morgan Family Community Center or George Mullen Activity Center

7. Public Information System. The Incident Commander/Unified Command will establish a Joint Information Center (JIC) to disseminate public information. Information released by the JIC must be pre-approved by the Incident Commander/Unified Command members. The JIC will be composed of Public Information Officer (PIO) elements from each responding department/agency to include but not limited to City, State and Federal. This center will release public preparedness, response, recovery, and mitigation information, as well as certain information on the disaster or emergency at hand such as evacuation center information, danger zones, and open or closed businesses. The JIC will establish a schedule for press briefings and release other information as needed.

B. Levels of Emergencies and Disasters

1. The City of North Port closely follows the definitions of "emergency" and the various levels of "disasters" provided in Florida Statutes §252.34. Those definitions and their relationship to EOC activation levels are as follows:

a. Level III - Minor Emergency (EOC Monitoring)

i. Defined. Any unexpected occurrence that can be met with a single department's normally available resources. "Normally available resources" may include the response of other City departments in a routine capacity.

ii. Responsibility. The department that would normally handle the situation is responsible for the decision making to properly resolve the incident.

iii. Notifications. None

iv. Action. The responsible department may set up an on-site command post if it so desires. No City-wide action is required. Press relations will be handled by the responsible

department. Needed logistical support, additional personnel, or other resources will be the responsibility of the responsible department.

b. Level II - Major Disaster (EOC Partial Activation)

i. Defined. Any unexpected occurrence that requires response by two or more City departments above a routine capacity, or where outside agencies have responded to render such assistance. Such emergencies require a cooperative effort and a commitment of personnel, equipment, or resources of personnel, and equipment from many departments.

ii. Responsibility. The primary decision-making responsibility rests with the department which would normally handle the situation, but a cooperative effort with departments that are responding in support is required. The cooperative efforts should be designed to properly resolve the incident.

iii. Notifications. The City Manager and the Emergency Manager~~rment Director~~ should be notified to the situation by the department(s) involved.

iv. Action. An on-site command post should be set up by the responsible department and all responding departments should be notified of its location. The responsible department may also set up an administrative command post (usually at its main facility or possibly the City EOC). The City Manager and the Emergency Manager~~rment Director~~ should be notified of its location. Press relations will be handled by the responsible department.~~-~~ Needed logistical support, additional support, or other resources will be the added responsibility of the responsible department.

c. Level I - Catastrophic Disaster (EOC Full Activation)

i. Defined. Any extraordinary occurrence of such magnitude that all City departments and resources must be utilized or where the combination of City departments and outside agencies has been mobilized to handle the situation.

ii. Responsibility. The primary responsibility for decision making rests with the Incident Commander or Unified

Command. The on-site commanders may make those decisions necessary to protect life and property and to stabilize the situation. Decisions designed to properly resolve the entire emergency shall be the responsibility of the Incident Commander. This level of emergency usually results in an "Ordinance of a State of Local Emergency" by the Commission of the City of North Port, who invokes the emergency powers of the office.

iii. Notifications. The following personnel will be notified (or, in their absence, an alternate from their department): City Manager, Emergency Manager, Fire Chief, Police Chief, and all other department directors as seen necessary for primary EOC activation. The initiating department shall have the responsibility for making the above notifications. The initiating departments may get assistance in any instance by notifying dispatch or the City Emergency Manager~~rment Director~~ of the need for such assistance.

iv. Action. The senior representative of the initiating department shall establish an on-site command post and notify all departments of the location. The City EOC shall be activated. All members of the Incident Management Team and support staff will report to the EOC. Press Relations will be assumed by the EOC. The further acquisition of personnel, equipment, or other resources will become the duty of the EOC. The City EOC will assume the incident-related communications functions during a Level I activation. All other department heads and those with designated responsibilities elsewhere in this plan should report to their regular areas of business (other instructions may be given at time of mobilization).

2. Full activation of the EOC does not occur in every emergency event. Even situations with multi-discipline and mutual aid involvements are often managed effectively in the field using the Incident Command Systems' principles practiced by responders in the County.

a. The EOC may be activated simply to provide support to the Incident Commander(s) in the field.

b. Any incident may escalate from a field command emergency to one managed from the EOC.

C. Department Roles and Responsibilities

1. General

a. Elected officials and other governmental authorities of the City operate essentially the same during normal and emergency times. Non-emergency activities may be suspended, and resultant uncommitted personnel reallocated to the City EOC.

b. The scene of decision-making may shift from the normal City Commission conference rooms and Department offices to the City EOC and/or other special facilities.

c. The City of North Port's organization for disaster management commits all units of local government to provide the service and assistance for which they are best trained and most experienced. Those organizations that have no inherent emergency management roles will make their personnel available to support disaster operations as may be directed.

2. The ~~Mayor of the~~ City Commission's Responsibilities:

~~a. Provide the City Manager with a listing of the Commissioners specifying their succession in authority to exercise the emergency powers of the Mayor in his absence or inability to function.~~

a.~~b.~~ Analyze the Citywide social and economic impact of the situation and provide policy and guidance as requested.

b.~~c.~~ Prepare to participate in public information presentations and media briefings.

c.~~d.~~ Delegate policy and direction, including authority to declare a Citywide emergency/disaster, to the City Manager ensuring continuity of government, one-voice decisions and unified community support as requested.

d.~~e.~~ Convene ~~the Commission to continuous~~ emergency session as soon as is practicable. ~~Exercise all essential emergency functions of the Commission unilaterally until the full Commission can be convened.~~

3. The City Manager's Responsibilities:

   a. Proclaim/declare State of Local Emergency declarations pursuant to F.S. 252.38(3)(a)(5). Extend or terminate disaster declarations as required.

   b. Provide to Emergency Management a line of succession, naming the two officials in sequence authorized to act with his authority in his absence.

   c. Function as the coordination point between the Commission ~~Mayor~~ and the City department and office heads and private and volunteer sector representatives.

   d. Provide the City EOC with an empowered representative to assist in coordination of City-County emergency operations.

   e. Ensure participation throughout the event on the part of City police, fire, public works and other City government offices in coordination with the overall City's operations.

   f. Ensure the establishment of Standard Operating Guidelines (SOG) for all elements in City government as needed to implement this Plan. Establish readiness procedures that ensure the availability of trained personnel and requisite equipment and facilities in time of emergency.

4. The City Attorney's Responsibilities:

   a. Provide a two-person successor list to the Emergency Manager ~~Management Director.~~

   b. Provide legal counsel as required throughout the emergency with emphasis on SLE/disaster declarations, curfew, sales restrictions, and re-entry issues.

5. The Police Chief's Responsibilities:

   a. Provide a two-person successor list to the Emergency Manager ~~Management Director.~~

b. Staff the City EOC on request.

c. Provide professional advice and expertise as well as resources to the City Commission, City Manager and other elements of City government operations particularly in support of evacuations, public warnings and notifications, physical security activities, and movement control.

d. Request, coordinate and control all other law enforcement resources brought in to assist the City.

e. Draft and coordinate requests for "Military Support of Civil Authority" in coordination with the City EOC for forwarding to the County EOC.

f. Operate a central 9-1-1 and police dispatch system and center throughout the emergency.

g. Provide field incident commanders upon request.

h. Maintain mutual aid agreements with State-wide and adjacent law enforcement agencies.

i. Provide resources to the Tactical First-In Team Task Force.

j. Provide security for the City EOC, each shelter, and incident facilities.

6. The Fire Rescue Chief's Responsibilities:

a. Provide a two-person successor list.

b. Staff the City EOC on request.

c. Coordinate the activities of all fire rescue organizations used in the City throughout the emergency with overall City operations.

d. Submit requests for mutual aid and other forms of external aid through the City EOC to the County EOC.

e. Assist in the evacuation of Medically Dependent Persons.

f. Provide resources to the Tactical First-In Team Task Force.

g. If requested, Provide an EMT or Paramedic or fully-staffed rescue to each hurricane evacuation center for medical assistance.

7. The Director of the Neighborhood Development Services Department's Responsibilities:

a. Provide a two-person successor list to Emergency Manager. ~~Management Director.~~

b. Be prepared to perform normal functions at routine locations, situation allowing, or at alternate locations, as necessary.

c. Provide input to the City EOC regarding the need to suspend or modify ordinances or other City rules due to an emergency or disaster.

d. Conduct damage assessment of public infrastructure in coordination with the Utilities, Public Works and Building Departments.

e. Provide trained personnel to conduct public infrastructure damage estimation and assessment tasks by both land vehicle and aircraft in coordination with City/County damage assessment operations.

f. Effect contractor pre-registration and other preparations for expedited issue of building permits and contractor licensing as may be necessary to rebuilding of the community in the aftermath of a disaster.

8. The Director of the Finance Department's Responsibilities:

a. Provide a two-person successor list to Emergency Manager ~~Management Director.~~

b. Staff the City EOC on request.

c. Manage the City-wide tracking of disaster-related costs.

d. Act as primary point of contact for financial matters with County, State and Federal agents during disaster recovery and reimbursement processes.

e. Provide emergency procurement support for supplies and equipment needed by City agencies under authority of the Sec. 2-408, Emergency Procurement, of the Code of the City of North Port.

f. Develop and promulgate emergency procurement procedures to be used by departments and offices funded by City government that are compatible with State and Federal financial reporting requirements.

9. The Director of the Public Works Department's Responsibilities:

a. Provide a two-person successor list to Emergency Manager ~~Management Director.~~

b. Staff the City EOC on request.

c. Conduct damage assessment of public infrastructure in coordination with the Utilities and Neighborhood Development Services Departments.

d. Provide maintenance services as needed to keep evacuation routes open, flooded or otherwise blocked road areas barricaded, and traffic rerouting coordinated with law enforcement agencies.

e. Monitor water flow in the waterway system and adjust water control facilities.

f. Implement the Debris Management Plan though management of post-disaster debris clearance, removal, monitoring, transportation and disposal.

g. Provide resources to the Tactical First-In Team Task Force.

h. Provide for emergency fueling and repairs of City vehicles.

i. Ensure that all City buildings are prepared/protected during emergency and disaster events.

j. Provide servicing and repair of governmental buildings to ensure operational ability and prevention of damage if needed.

j. Work with Emergency Management to identify projects that could reduce damage to government buildings.

k. Provide for on-site facility maintenance and janitorial duties in City Hall during disaster operations.

l. Coordinate facility closings with the EOC and PIO.

m. Provide facility technicians to resolve problems related to mechanical, plumbing, electrical, or otherwise for the City EOC.

10. The Public Information Officer Responsibilities:

a. Provide a two-person successor list to Emergency Manager ~~Management Director.~~

b. Establish and operate a Joint Information Center (JIC) and Call Center near the EOC, collecting information in the EOC, and from field unit Public Information Officer (PIO). The JIC will be composed of PIO elements from each responding department/agency to include but not limited to City, State and Federal.

c. Activate the Crisis Communication and Public Information appendix.

d. Organize, schedule and manage media briefings regarding actual emergency preparedness, response and recovery operations.

e. Prepare and disseminate emergency public information materials incidental to an emergency operation.

f. During and following an emergency, serve as the single official point of contact between City government and all media representatives.

g. Coordinate public information releases and rumor items with representatives of County, State and Federal governmental agencies as may be on scene in any official capacity.

h. Assist the essential services in developing and disseminating post-disaster health and safety instructions for the reoccupation of evacuated areas and storm damaged homes.

11. The Director of Parks and Recreation Department's Responsibilities:

a. Provide a two-person successor list to Emergency Manager ~~Management Director.~~

b. Staff the EOC as requested.

c. Staff the Morgan Center's employee dependent shelter

d. Provide the availability of park facilities (structures and land) for disaster preparedness, response, sheltering and recovery operations as needed by the City.

12. The City Clerk's Responsibilities:

a. Provide a two-person successor list to Emergency Manager ~~Management Director.~~

b. Staff the City EOC on request.

c. Draft the Emergency Ordinance of a State of Local Emergency (SLE) declaration for the City Commission or City Manager.

d. Schedule the City Commission to continuous emergency session as soon as is practicable.

e. Provide administrative staff support for maintenance of an official operations log in the City EOC when activated to Level I, maintain the City official log of situations and events encountered, decisions rendered, and actions taken.

f. Provide technical advice and assistance to the activated EOC regarding records for each specific disaster or emergency.

13. The Director of the Utilities Department's Responsibilities:

a. Provide a two-person successor list to Emergency Manager ~~Management Director.~~

b. Staff the City EOC as requested.

c. Issue any precautionary notices as required.

d. Provide support to other emergency response agencies as needed.

e. Provide resources to the Tactical First-In Team Task Force.

f. Conduct damage assessment of public infrastructure in coordination with the Public Works and Neighborhood Development Services Departments.

g. Provide emergency supplies of potable water, when required.

14. The Director of the Human Resources' Department's Responsibilities:

a. Provide a two-person successor list to Emergency Manager ~~Management Director.~~

b. Maintain insurance records and support the Workers' Compensation program.

c. Conduct damage assessment of City facilities in conjunction with Facilities Maintenance.

d. Provide staff for the Call Center.

e. Develop and maintain a roster of government employees who have foreign language or sign language capability.

15. The Office of Information Technology's Responsibilities:

a. Provide Geographic Information Systems staffing for the EOC following an event for mapping and plotting of damage, areas of concern, and other items as required.

b. Provide on-site computer technicians to resolve problems related to computers, printers, networking, or otherwise for the City EOC.

c. Provide network systems' technical support for all City departments to ensure continuity of operations.

16. The Office of Economic Development's Responsibilities:

a. The Economic Development Manager, within the City Manager's Office, shall serve as point of contact for business/industry related issues in pre- and post-disaster scenarios, and assist in identification of and collection of information from businesses that have been affected by a disaster event.

D. Emergency Support Function to City Department Crosswalk

The City of North Port's Emergency Operations Center (EOC) is organized by the standards of the Incident Command System (ICS). This is to ensure consistency with the Sarasota County EOC and State of Florida EOCs. Given there is some difference in the way other EOCs are organized, the below table (12) and organizational chart (Figure 13) crosswalks the traditional Emergency Service Functions to the ICS organizational component or department found in the City of North Port EOC.

Table 12: Emergency Support Function to City Department Crosswalk

ESF	Discipline	ICS Position (CNP Lead Agency)
ESF-1	Transportation	Sarasota County
ESF-2	Communications	Verizon
ESF-3	Public Works and Engineering	Operations (CNP Public Works)
ESF-4	Firefighting	Operations (CNP Fire Rescue)
ESF-5	Information and Planning	Planning (CNP Neighborhood Development Services)
ESF-6	Mass Care	Sarasota County
ESF-7	Resource Support	Finance (CNP Purchasing)
ESF-8	Health and Medical	Operations (CNP Fire Rescue)
ESF-9	Search and Rescue	Operations (CNP Fire Rescue)
ESF-10	Hazardous Materials	Sarasota County
ESF-11	Food and Water	Sarasota County
ESF-12	Energy	FP&L
ESF-13	Military Support	Florida National Guard
ESF-14	Public Information	PIO (CNP City Manager)
ESF-15	Volunteers and Donations	Operations (CNP Social Services)
ESF-16	Law Enforcement and Security	Operations (CNP Police)
ESF-17	Animal Protection	Sarasota County Sheriff's Office
n/a	Damage Assessment	Operations (CNP Neighborhood Development Svcs.)
n/a	Environmental Protection	Sarasota County
n/a	Community Relations	CNP City Manager
n/a	Disaster Recovery Centers	Sarasota County
n/a	Infrastructure / Public Assistance	As identified by the City
n/a	Unmet Needs Coordination	Sarasota County
n/a	Emergency Housing	Sarasota County
n/a	Debris Management	Operations (CNP Public Works)
n/a	Disaster Field Office	Sarasota County
n/a	Mitigation Assessment	CNP Public Works
n/a	Business Recovery	CNP City Manager
n/a	Others	As identified by the City

E. Demobilization of the City EOC. The release of personnel from the EOC and the ultimate closure of the EOC should be preplanned and conducted in an orderly method. The Incident Commander and general staff should determine when and how such draw down and closure will be accomplished. Considerations include, but are not limited to:

1. Determining which positions are no longer required to operate on a continuous 24-hour basis and reducing their hours of operation.

2. Determining which positions can be consolidated to release some personnel.

3. Determining which personnel should be released first due to fatigue, family and personal needs, or the requirement for them to return to their normal duty positions.

4. Determining if some new personnel should be integrated into the EOC to allow for others to be released, or if the release can take place without the infusion of new personnel.

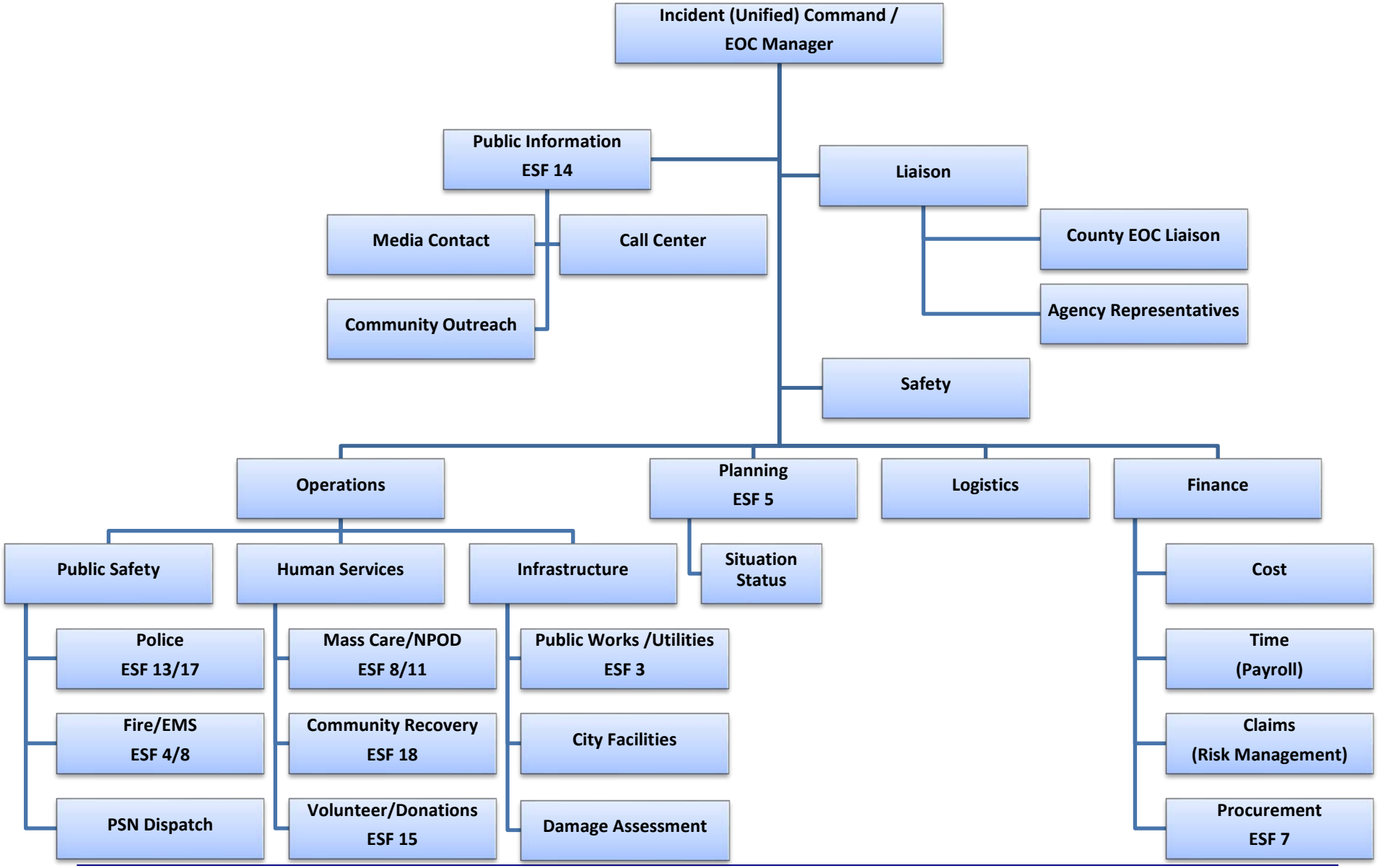
5. Ensuring all financial records are completed and collected by the EOC Cost Unit.

6. Verifying that historical documentation is transferred to the City Clerk for custodial care.

7. Appointing a person or persons to assure that all EOC supplies, forms, displays and equipment are returned to the City Emergency Manager for future utilization.

8. Notifying the City Manager of the intention to close the EOC with an estimated effective time.

Figure 13: Organization Chart of the City of North Port Emergency Operations Center



IV. PREPAREDNESS ACTIVITIES

A. General Issues

1. The Emergency Manager~~ment Director~~ is responsible for updating the City CEMP and assuring that changes are distributed to copy holders of the CEMP. Department directors are responsible for furnishing necessary updated information to the Emergency Manager~~ment Director~~ for inclusion in revision. Each City department shall develop and annually maintain its own procedures to address its preparedness and response to a disaster.

2. The City Clerk is responsible for assuring that vital records are maintained. The City Manager may task department directors with the responsibility for capturing and maintaining department specific information and furnish appropriate information to the Clerk for preservation.

3. Sarasota County Emergency Management is statutorily-responsible for the registration of persons with special needs. The City's Emergency Manager will provide information on the program during preparedness talks.

B. Public Awareness and Education

1. Throughout the year, Public Service Announcements are submitted to local broadcast, cable, print and social media on topics relevant to current events, time of year, or special programs.

2. Dissemination of recovery information is primarily the responsibility of Sarasota County. The City of North Port will supplement their information with advisories to local media, the City of North Port web site, social media and, if electricity is out, use of variable message boards strategically placed around the City.

3. Maps of centers and surge/evacuation level and routes on the Sarasota County Emergency Management website are linked from the City of North Port's website.

4. City-produced brochures on emergency preparedness, pet-friendly centers and medically-dependent persons are made available from Fire Rescue Headquarters. Additionally, the County-sponsored annual disaster preparedness guides are also available from Fire Rescue, City Hall, community centers, and distributed to homeowner/condominium/mobile home park associations, and other locations as requested.

C. Exercise

1. Exercise Opportunities

a. The City of North Port will develop and conduct emergency management-oriented exercises.

b. The City of North Port will participate in similar exercises conducted by other government entities.

c. The Emergency Manager~~ment Director~~ will seek out exercise opportunities by coordinating with regional, State and Federal entities which offer such.

2. City-wide exercises will be coordinated by the Emergency Manager~~ment~~. Department directors will participate in coordination meetings with the Emergency Manager~~ment Director~~ in planning such exercises.

3. All exercises will incorporate NIMS/ICS principles.

4. There is no formal exercise schedule established. The City may participate in exercises scheduled by other agencies, such as Florida Division of Emergency Management, or Sarasota County Emergency Management.

5. Exercise Evaluation

a. When conducting internal exercises, the Emergency Manager~~ment Director~~ may select one or more non-involved third parties to observe and evaluate the process.

b. The evaluators should be versed in emergency management and have subject matter expertise the disaster being exercised.

c. Evaluators will prepare their reports in a format consistent with the Homeland Security Exercise and Evaluation Program (HSEEP), or a more appropriate format as selected by the Emergency Manager~~ment Director~~, based on recommendations from the City Manager and department directors.

d. The City Manager will conduct a post-exercise meeting with the Emergency Manager~~ment Director~~ and other department directors or individuals, to critique the exercises. The meeting will determine what types of corrective actions are needed, if any. It will also be determined if modifications are required of the CEMP, departmental SOPs or other guidance.

e. An After-Action Report will be created to document corrective actions and lessons learned from the exercise and present a schedule and mechanism for their implementation and monitoring.

D. Training

1. General

a. The Emergency Manager~~ment Director~~ is responsible for identifying and coordinating subject-related training opportunities.

b. The Emergency Manager~~ment Director~~ will give notice to the department directors relative to available training opportunities.

c. Individual department directors will advise the Emergency Manager~~ment Director~~ of training opportunities for the possible inclusion of other departments.

d. Department directors will designate Emergency Coordinators within their organization.

2. Training Levels. Whether conducted in-house, or whether available through other sources, consideration should be given to the differing needs of employee/community functions. Levels may include:

a. Responder Training for the response workers which focuses of their immediate actions and safety.

b. Supervisor Training focuses on the needs of the first line supervisors, with emphasis on prioritizing response needs, safety of personnel and record/time keeping.

c. Management Training for those with a broad range of authorities and responsibilities. Emphasis will be on fiscal management, resource utilization, inter-government dynamics and recovery and mitigation concerns.

d. Community-based awareness, self-help, population protection procedures, and public awareness training for the public.

3. Training by Emergency Management Function

a. Mitigation/Preparedness Training

i. Department directors and Emergency Coordinators will participate in risk assessment and plans development training to better prepare their organizations for responding to emergencies/disasters.

b. Response Training

i. The Florida Division of Emergency Management provides on-site training for law enforcement, medical, fire services, utilities and emergency management personnel, as well as local appointed officials and their staffs.

ii. Resident training at the Emergency Management Institute and other US Department of Homeland Security facilities, is encouraged for response groups from the jurisdiction to better understand the Integrated Comprehensive Emergency Management concept and the local Plan.

iii. The objectives of Emergency Management training are to develop team skills for the City of North Port Emergency Operations Center, field operations, information systems, technical information related to hazard mitigation, preparedness, response and recovery, and roles and responsibilities of all levels of government and the private sector in the face of emergencies or disasters.

iv. Group training is encouraged for the City of North Port Emergency Operations Center staff, Incident Management Team, individuals, information officers, all department directors and their Emergency Coordinators, damage assessment teams, etc.

v. Internal training consists of the concepts of field operations and key components of the City of North Port Comprehensive Emergency Management Plan.

vi. Internal training should be done on-site, and in-groups.

vii. Community awareness programs are provided to train citizens as to what actions are expected of them before, during and after an emergency/ disaster.

viii. Preparing citizens for protective action and self-help practices immediately following a disaster is part of the Emergency Management training program, through the Community Emergency Response Team program.

c. Recovery Training

i. This training would include planning for the long-term recovery, financial reimbursement, assistance to the public and businesses, etc.

4. Required Basic Levels of NIMS and ICS Training

a. All City personnel are deemed essential and shall complete Incident Command System training per their role in the response/recovery organization.

The following is consistent with Department of Homeland Security (DHS) recommendations for NIMS and ICS training.

i. All employees shall complete the Introduction to the Incident Command System (ICS-100) and Introduction to the National Incident Management System (IS-700).

ii. First line supervisors, single resource leaders, field supervisors, and other emergency management/response personnel shall complete Basic Incident Command (ICS-200).

iii. Mid-level management including strike team leaders, task force leaders, unit leaders, division/group supervisors, branch directors, and EOC staff shall complete the Intermediate Incident Command System for Expanding Incidents (ICS-300).

iv. Executives, command and general staff, select department heads with multi-agency coordination system responsibilities, area commanders, and emergency managers shall complete the Advanced Incident Command System (ICS-400).

v. City Commissioners should receive the Incident Command System (ICS) Overview for Executives/Senior Officials (ICS-402).

vi. The Emergency Manager~~ment Director~~ and Emergency Management Division staff shall complete the Introduction to the National Response Framework course (IS-800).

b. City personnel will receive additional ICS and subject matter training on their specific role and responsibility within the ICS organization.

E. Continuity of Operations Planning. It is the intent of City of North Port to have in place a comprehensive program to ensure continuation of essential functions under all circumstances. COOP is defined as the activities of individual departments and agencies to ensure that their essential functions are performed. This includes plans and procedures that delineate essential functions, specify emergency delegation of authority, provide for safekeeping of vital records/resources, identify alternate facilities, provide interoperable communications, and validate these operations through tests, training, and exercises.

COOP is a "good business practice" – part of the fundamental mission of agencies as responsible and reliable public institutions. Due to the changing threat environment, and the potential for "no notice" emergencies (i.e., acts of nature, accidents, technological emergencies, terrorist incidents), the need for COOP capabilities that enable agencies to continue their essential functions has increased. This environment has emphasized the criticality to ensure the continuity of essential government functions.

The Continuity of Operations (COOP) Plan establishes policy and guidance to ensure the continued execution of City of North Port mission-essential functions. This may be required if an emergency threatens or incapacitates operations, and the relocation of selected personnel/functions is required.

The COOP Plan is composed of two parts:

1. A Base Plan which serves as a City-wide policy guide
2. Individual plans specific to the needs of each City department

This Plan is designed to:

1. Ensure that the City will provide critical services in an environment that is threatened, diminished, or incapacitated.

2. Provide a means of information coordination to the City of North Port government to ensure uninterrupted communications within the internal organization of the City and externally to all identified critical customers.

3. Provide timely direction, control, and coordination to the City leadership and other critical customers before, during, and after an event or upon notification of a credible threat.

4. Establish and enact time-phased implementation procedures to activate various components of the "Plan" to provide sufficient operational capabilities relative to the event or threat thereof to the City of North Port.

5. Facilitate the return to normal operating conditions as soon as practical, based on circumstances and the threat environment.

6. Ensure that the City of North Port COOP Plan is viable and operational and is compliant with all guidance documents.

7. Ensure that the City of North Port COOP Plan is fully capable of addressing all types of emergencies, or "all hazards" and that mission-essential functions can continue with minimal or no disruption during all types of emergencies.

F. Resource Management. The Emergency Manager~~ment Director~~ will inventory City of North Port assets to conform to US Department of Homeland Security resources' typing standards.

To the extent possible, the City's acquisition program incorporates the Standard Equipment List (SEL) and other Federal equipment standards data when purchasing interoperable equipment.

V. RESPONSE ACTIVITIES

A. General Issues

1. The City Manager and Emergency Manager~~ment Director~~ will, when deemed necessary, begin the process of requesting an Emergency Ordinance of a State of Local Emergency using the following measures:

   a. Solicit draft Emergency Ordinance of a State of Local Emergency (document) input from City departments, including recommendations to modify, suspend, or cancel enforcement of ordinances and other rules in which they have an interest or responsibility.

   b. With the assistance of the City Attorney and City Clerk, draft the Emergency Ordinance of a State of Local Emergency document.

   c. Request for an Emergency Ordinance of a State of Local Emergency before the City of North Port Commission at a duly-convened Commission meeting

      i. Under Section 2-54 of the Code of the City of North Port, "[t]he city manager and any one commissioner may call an emergency meeting. An emergency meeting shall be called only when the conditions and circumstances indicate that emergency measures must be taken."

   d. Disseminate the original, and all subsequent ordinances to all department directors, County and State emergency management, other affected entities, and the media. [A sample Emergency Ordinance of a State of Local Emergency Document may be found as Appendix A to the CEMP.]

2. Closing of Schools and Businesses

   a. The decision for the closing of schools will be made by the School Board of Sarasota County School, with the advice of the Sarasota County Emergency Operations.

   b. Businesses will close using the decision of their owners/managers, and under recommendations from the City EOC.

3. Requesting State Assistance

a. All requests for County and State assistance from City agencies will follow this protocol:

i. The requesting department will forward its request to their respective liaison in the City EOC.

ii. The message will then be analyzed and forwarded to the City Liaison Officer at the County EOC as seen necessary once all local resources have been exhausted.

b. Departments shall not initiate resource requests directly to the County or State. All requests for County or State Assistance must be made through the City of North Port City EOC.

4. Departmental Pre-Storm Checklists

A department/office-specific checklist has been developed to serve as job aid for tasks which should be either reviewed or completed within certain time-frames relative to the onset of Tropical Storm-force winds. When directed, department directors will initiate the checklist and report status during director- and EOC operational-briefings.

B. Evacuation Routes

Through the City of North Port, River Road, Sumter Boulevard, Toledo Blade Boulevard, Tamiami Trail (US 41) and I-75 are designated as primary evacuation routes. Although all routes can be considered primary, citizens are urged to use I-75 and US 41 as a last resort. The reason for this is that most people are familiar with I-75 and US 41, and therefore use of these roads during an evacuation will be high. However, since these routes run along the coast, and, historically, these roads are normally crowded in an evacuation, people are urged to use US 17, County Road 74, and Kings Highway to evacuate North Port. These roads will take people inland, away from the high wind and storm surge threat.

C. Medically Dependent Persons Program. Sarasota County is mandated under Florida Statutes §252.355 to register all persons who have special transportation or medical needs during an evacuation situation. The process for registration is as follows:

1. The presence of the Medically Dependent Person (MDP) registration is advertised in many different formats throughout the year.

2. People are urged not to register unless it is needed. If people have friends or family that can transport them and/or take care of them, then they need to use those options. The reason for this is that the City of North Port, as of Summer 2018, has 228 people registered in this program. City resources to transport and shelter this population is extremely limited.

3. Once interest is shown in the program, a form is sent to this person, or their caregiver, to fill out. The form requests information such as name, address, special needs, and how many people they are to bring with them.

4. Once Sarasota County Emergency Management is in receipt of this returned form and eligibility is confirmed, the name is then entered their database, which is maintained by Sarasota County.

5. Once a storm threatens, and evacuation orders are imminent, the persons on the list which are residing in the potentially threatened area are called by a phone bank, which has been staffed and trained by Sarasota County Emergency Management and managed from the County EOC. The people are notified that they are about to be picked up, and that they need to get their personal effects together.

6. The list is given to the MDP Operations at the County EOC which develops routes to pick up these people via school bus with hydraulic lift, the Sarasota County Area Transit (SCAT) via buses with hydraulic lift, and North Port Fire Rescue for transport of non-ambulatory clients.

7. These individuals and their caregivers will then be picked up and brought to a designated facility in county, if the situation allows for it, or out of county, for larger incidents.

D. Facilities Needing Attention During Evacuation. Lists of facilities needing special attention during the evacuation process may be found in the City EOC.

E. Re-entry. Re-entry to evacuated areas is a controlled activity for residents, people who work in the area and for contractors, and others seeking work in the evacuated area. Re-entry will be permitted only during daylight hours.

1. The Police Department will manage appropriate Traffic Control Points (TCP), as identified by number and intersection on the TCP maps maintained in the EOC.

2. Proof of residency in the area or area employment must be presented at the TCP to gain re-entry.

a. For residents, a driver license listing an address in the evacuated area is acceptable for re-entry. Lacking that specific documentation of residency in the evacuated area can be established by photo ID along with a utility bill addressed to the bearer at the area address, or a lease or proof of building ownership.

b. Employees of businesses in the evacuated area must present a photo ID issued by that business for the address in the evacuated area, or a photo ID along with other proof of employment at the business address in the evacuated area such as a paycheck stub.

3. Re-entry to evacuated areas will begin and will be only during daylight hours, and as damage assessment, debris removal and the status of utilities restoration permits. When the evacuated area is large or involves multiple sectors, re-entry is likely to take place in phases. Local radio broadcasts will be used to announce which areas are open for re-entry, and when re-entry will commence.

4. Persons evacuated under the PSN program will be returned to their homes after their homes are determined to be habitable.

F. Sheltering

1. Within the City of North Port are six hurricane evacuation centers and two medical dependent persons' centers which are operated by the Sarasota County Health Department and School Board of Sarasota County. The City of North Port will support those centers with fire inspection, law enforcement and emergency medical personnel as needed.

2. Sheltering of Emergency Worker Families

The City of North Port has draft a plan for an emergency worker family center program. At the inception of an event, City department heads are to poll their employees to find out how many spaces their employees' families might need should they need to work in the EOC (or elsewhere in the County) during a disaster.

3. Refuges of Last Resort

The Emergency Manager~~rment Director~~, based on the authority granted in the Governor's declaration, will authorize that identified facilities be commandeered for use as refuges of last resort. Refuges of Last Resort are structures/buildings designated as the best possible accommodation for

people who cannot or do not evacuate in time to reach safe public evacuation centers. Refuges provide no special accommodations such as food, water, security, first aid, or parking. These structures are not guaranteed to be structurally sound in strong hurricane situations; however, they are deemed better than persons trapped on the road in their vehicle during strong winds and rising waters. Refuges are viewed as a last resort until the hurricane or other disaster passes.

G. Mutual Aid Agreements and Memoranda of Understanding

1. The City of North Port is a signatory to the Florida Statewide Mutual Aid Assistance program (see Appendix D) and the Florida Fire Chiefs Association's Statewide Emergency Response Plan. When resource needs beyond the capabilities of the City are identified, all mutual aid requested will be processed through the Sarasota County Emergency Operations Center.

2. Given availability of resources, City of North Port assets may respond to requests for assistance, received through the appropriate channels. Requests for mutual aid will be directed to the appropriate signatory of the inter-local mutual aid agreement. If mutual aid is required for which no agreement has been pre-established, the request will be forwarded to Sarasota County Emergency Management.

3. Various municipal departments may enter mutual aid agreements specific to their needs. All mutual aid agreements, whether called letters of agreement, memoranda of understanding, or other designation will be reviewed by the City Attorney prior to the City becoming a signatory.

4. If Florida Statutes so requires, or the City Attorney believes it appropriate, a specific mutual aid agreement may be required to have the approval of the City Commission prior to the City becoming a signatory.

5. When appropriate, the City will seek financial reimbursement from the requesting agency.

6. The North Port EOC is the coordination point (i.e., agency dispatch) for mutual aid activities for assets of the City when the CEMP has been activated.

H. Communications

1. Establishment of Plain Language Communications

   a. During disaster operations when mutual aid resources are operating, personnel will use common terms and definitions that can be understood by individuals from all responder disciplines. When communicating with others, all personnel shall employ "plain speak" or "clear text" language. The use of 10-codes, signals or other jargon is prohibited.

   b. Personnel will also use commonly accepted language that is consistent will policies, plans or procedures in the NIMS, NRF, or CEMP (State, County or City) to facilitate multi-agency, multi-disciplinary or multi-jurisdictional communications during an incident.

   c. Standardized terminology will also be used in all publications.

2. Telephone

   a. All command and supervisory personnel are issued cellular smartphones.

   b. The City EOC has landline telephone and facsimile services.

   c. Prior to full activation of the EOC, a listing of all key personnel and their contact numbers shall be widely distributed.

   d. In the event of a loss of landline and cellular telephone communication, two satellite telephones are available from the Police Department. Additional satellite-based telephone units are available from the Sarasota County EOC.

3. Radio

   a. All Fire Rescue and Police Department units and some Public Works' and Utilities vehicles have the capability to communicate on the County's 800 MHz radio system, on their respective talkgroups. Fire Rescue also maintains a VHF system for communications with the Florida Forest Service and as a back-up to the 800 MHz system.

   b. During an emergency or disaster, units on the 800 MHz system may operate off the County's "wide-area" talkgroups (A-10 to A-15) for mutual aid or mission-specific purposes. In addition, units may

operate on the State Mutual Aid channel (Fire Rescue talkgroup B-10) and the National Public Safety Radio channels (Fire Rescue talkgroups B-11 to B-15) to communicate with out-of-county resources.

c. In the event of an 800 MHz system failure, units shall switch to the talk-around channels (Fire Rescue talkgroups B-7, B-8 or B-9), and relay information to Dispatch via Command.

d. Combination satellite radio/telephone units are available from the Sarasota County EOC should all land-based communications fail. Two satellite phones are available from the North Port Police Department.

4. Data

a. The City has internet functionality provided by Verizon FIOS, Comcast cable access and broadband wireless connections.

b. The City EOC has wired and wireless network/internet capability.

c. When requested to report to the EOC, City personnel shall bring their City-issued laptop and smartphone (which may be tethered to provide a last-resort measure of internet connectivity).

I. Fuel

1. Availability During Normal Conditions

a. During normal operations, the City of North Port may purchase motor vehicle fuel from local service stations using a fleet credit card.

b. Fleet Management maintains a supply of 10,000 gallons of gasoline and 20,000 gallons of diesel fuel at the facility at 1100 N. Chamberlain Blvd and 5455 Pan American Blvd.

c. Road and Drainage has vehicles with 100-gallon L-tanks with diesel fuel. They also have a portable fuel trailer with the capability of holding 500 gallons of fuel. This unit would be topped off and if necessary driven out of the City of North Port until the effective scope of the storm until the storm passes.

2. Availability During Emergency Conditions

a. During the preparatory stages of an event, Fleet will ensure the tanks are full and their generator functional.

b. Prior to a storm, an email would be issued by Fleet reminding all employees to immediately top-off their tanks at the local gas stations.

c. If, during an emergency, City vehicles are unable to obtain fuel from a commercial source, they will be permitted to fuel at the Fleet Management facility.

d. The City has a fuel supplier who can obtain fuel from any refinery and has multiple contracts with almost every fuel shipping vendor in the state. They also give priority to local governments over retail establishment.

e. If necessary, the City may request the fuel truck from Sarasota County.

J. Community Emergency Response Team. The City of North Port Emergency Management is the primary liaison to the North Port Community Emergency Response Team and neighborhood-based teams at Islandwalk and Cypress Falls. Membership consists of individuals who have completed the 21-hour CERT training program and have applied to become a member.

There are three levels of membership:

- Level 1-Trained but inactive: Applies to those who have completed CERT basic training to gain knowledge about preparing for and surviving a disaster and responding to the post disaster needs of their family and neighbors. These are individuals who do not want to be part of the North Port CERT organization and will not be part of the NP CERT City response plan.

- Level 2-Trained with basic skills: Applies to those who have completed CERT basic training and meet the membership eligibility requirement of the North Port CERT organization. These individuals will, after taking care of their families and neighbors, respond to other neighborhoods as members of a district team if necessary. To qualify as a Level 2 a person must be certified in CPR/AED and Advanced First Aid per either the American Heart Association or the

Red Cross curriculum [SB2]and must have completed ICS100 and ICS700 training.

- Level 3-Trained with advanced skills: Applies to those who have completed CERT basic training, training in more advanced skills and meet the membership eligibility requirements of the North Port CERT organization. These individuals will be part of the North Port CERT response plan. To qualify as a Level 3 a person must have been a Level 2 for a minimum of six months and must have completed the recommended training protocols and agreed to abide by the guidelines outlined in the organization's standard operation procedures (SOPs) and standard operating guidelines (SOGs) in any of the six emergency response and community support disciplines outlined below.

  i. Communications - Includes Amateur Radio licensure and/or communications equipment training in accordance with the communications needs of NP CERT and the City of North Port. Members of this team might be called upon to provide communications links between NP CERT teams and the City of North Port Emergency Operations Center (NPEOC) or the NPEOC and other disaster response agencies.

  ii. Damage Assessment - Includes training in the County's and City's damage assessment process in accordance with the needs of the City of North Port. Members of this team are assigned as scribes and ride along as part of a three-member team assessing the damage to properties throughout the City.

  iii. Grid Search - Includes pattern search training. Training to be provided by an agency approved/recognized by the City of North Port. Members of this team would participate as part of a large-scale search rescue operation under the direction of a law enforcement or fire rescue agency.

  iv. Medical Operations - Includes an acceptable level of medical response training to include applicable American Heart Association, Red Cross, Sarasota County Department of Health or other recognized current first responder training programs, including EMT/Paramedic. Members of this team would provide stand-alone first aid/medical

services in times of overwhelming community need exceeding CERT basic training skills.

v. Neighborhood Point of Distribution (NPOD) - Includes training in establishing and managing a NPOD per the City of North Port's Comprehensive Emergency Management Plan and North Port Emergency Management SOP 200.001. Members of this team would lead/assist in the operations of a NPOD which includes handing out water, ready-to-eat meals, tarps and ice to citizens, keep track of inventory, ordering more inventory, managing the NPOD rehab area, assigning duties to on-site personnel, overseeing the safety and wellbeing of on-site personnel, and working with other agencies such as North Port Police, North Port Fire Rescue, other City departments, etc.

vi. Center Support - Includes training by Red Cross for emergency center management and operations in times of community or disaster deployment. Members of this team would provide support to the center management or medical staff as appropriate.

Organization, management and operation of CERT will be under the direction of the CERT Volunteer Coordinator from each team with support provided by City Emergency Management. CERT members shall follow the policies and procedures described in the CERT Operations Manual. In no cases, will a CERT member self-deploy to a mission within or outside of the City of North Port.

K. Public Emergency Notification.

The ability to save lives and protect property during an emergency activation depends upon rapid, accurate, and coordinated information distribution to all segments of the population utilizing all available distribution mechanisms. The City's Management Team, comprised of directors of each of the City's departments, will meet periodically before, during and after an emergency to minimize conflicting information being disseminated to the public. A Crisis Communication Plan has been developed and attached to the Plan as Appendix G. The Plan outlines the roles, responsibilities and protocols that will guide the City in promptly sharing information with all of City's audiences during an emergency or crisis.

1. Media Releases. The PIO prepares and distributes regular press releases, schedules press briefings and media interviews. All press releases must be reviewed and approved by the Incident Commander prior to distribution.

2. Emergency Alert System (EAS). The Emergency Alert System (EAS) is a national public warning system that requires TV and radio broadcasters, cable television systems, wireless cable systems, satellite digital audio radio service (SDARS) providers, direct broadcast satellite (DBS) service providers and wireline video service providers to offer to the President the communications capability to address the American public during a national emergency. The system also may be used by state and local authorities to deliver important emergency information such as AMBER (missing children) alerts and emergency weather information targeted to a specific area.

   a. Primary and Back-Up Warning Systems - During periods of County Emergency Operation Center activations, WMTX 100.7 FM (the LP1 and LP2A stations), WWRM 94.9 FM (the LP2B station), WHPT 102.5 FM (the LP2C station) and local government access (Comcast cable channel 19, Verizon FIOS channel 32) may broadcast directly from Sarasota County. Other EAS Operational Stations in Sarasota County include:

WKXY AM 930	WJIS FM 88.1
WFLA AM 970	WLTQ FM 92.1
WTMY AM 1280	WKZM FM 104.3
WDDV AM 1320	WCTQ FM 106.5
WSDV AM 1450	WSRZ FM 107.9

   b. All other media sources will be fed information from the City EOC via facsimile or email.

   c. Television customers will see the warning as a "crawl" at the bottom of the TV screen. The Weather Channel (Comcast cable channel 31 and 522, Verizon FIOS channel 119) routinely transmits all warnings for this area on receipt.

   d. The National Weather Service Office in Tampa Bay will activate the EAS on request of the City EOC.

   e. A low-wattage radio station serving the North Port-area, WKDW at 97.5 FM and live internet stream via ~~http://kdwradio.com/~~http://kdwradio.com/ may provide City-specific information during emergencies.

3. Interpreter for the Deaf and Foreign Language Translators. During activations, the EOC may be staffed by an interpreter for the hearing

impaired and translators for the Spanish and Ukrainian speaking population of the City. The Sarasota County Public Safety Communication's Center and City of North Port Police Department dispatch use TDD equipment for providing information to the hearing impaired.

4. Internet Website. An Internet website containing City of North Port emergency management information that would be of interest to the public and official agencies is available. This information is regularly updated, especially when the EOC is activated.

5. Direct Notification. If necessary due to a nighttime threat or a quickly escalating threat to residents, sirens and loudspeakers from police and fire vehicles may be utilized to warn the public of impending flood conditions, tornado potential, or hazard materials spill. Vehicles with sirens will pass through the threatened neighborhood to awaken the public with instructions to tune into local media stations for further information on the impending dangers.

6. City Contact Center. During an emergency/disaster that may affect parts of the City, a team of telephone operators will be assembled near the EOC to provide information to the public. At least one of the operators may be bilingual (to include Spanish and Ukrainian).

7. Telephone Notification System. Emergency Management operates the North Port Community Notification System (CodeRED®) which is an emergency notification system for recorded messages, text and email.

8. Social Media. The City of North Port provides routine and emergency information via Twitter and Facebook.

VI. FISCAL MANAGEMENT

A. It is the practice of City of North Port employees to use the same process to fill-out and file financial reports in daily activities as it is during emergency situations. These procedures are compatible with State and Federal financial procedures. City and County finance agents work together to ensure continuity in financial procedures during emergency and disaster events; however, FS §252.38(2) states a municipality is not required to coordinate requests for reimbursement under Federal public disaster assistance programs.

B. The City's Finance Department will work as a team to support preparedness, response, recovery, and mitigation activities on an everyday basis. This includes any training and guidance as needed. All disaster costs will be captured and handled through a Disaster/Emergency Account established by the Finance Department.

C. The City's Purchasing Division will provide procurement support for supplies, facilities, equipment, and supplies needed by City agencies. Items that may be included are meals, vehicle repair parts, construction materials, and rental equipment. Under Section 2-408, Emergency Procurement, of the Code of the City of North Port, the normal competitive process is waived, and the purchase of certain equipment and contracts is authorized with the approval of the department director, City Manager or City Commission, depending on the cost.

D. City emergency operations are initially funded by the budgeted allocations of each department engaged in emergency operations.

E. The City may allocate and expend funds as appropriate for local emergency operations in accordance with FS §252.37. As a rule, funding availability may be assumed for all emergency response efforts.

F. Close expenditure controls must be exercised during any emergency operation. The City Manager, operating from the EOC, is the screen point for expense authorization. The City Purchasing Manager will provide technical overview of this area. No emergency staff shall make funding commitments without the coordination of the Finance Department director and City Manager.

G. Complete and accurate accounts of emergency expenditures and obligations, including personnel and equipment costs, must be maintained. Accounting is required on a daily (sometimes more regular) basis to identify and document personnel costs, supplies and materials used, and equipment hours committed to each specific preparation, response and recovery task. Equipment use charges must be associated with an equipment operator. All personnel hours must be identified with a specific and definable task. When responding to another

jurisdiction for mutual aid, the responding party must obtain a mission number or tracking number which will be used to identify costs. Once costs are figured at the end of the event, the department head shall forward all costs to the Cost Unit Leader, who shall then forward any costs to the hosting jurisdiction. In cases of mutual aid requests from the State, City Finance shall forward costs, along with the appropriate paperwork to the Florida Division of Emergency Management (FDEM). Required forms may be obtained from City Emergency Management.

H. Following an event, the City Emergency Manager~~ment~~ will coordinate with all departments and volunteers to compile costs and proper documentation needed for reimbursement under Public Assistance procedures. A member of the City Finance Department, Emergency Management, and pertinent department officials will be present during the reimbursement application process with FEMA and/or FDEM.

I. When Federal Public Assistance is provided under the Stafford Act, local projects approved by the FEMA are subject to both State and Federal audit (except small projects approved under Section 419 of Public Law 92-288 which require only Federal inspection).

J. There are several funding agreements that are made available to counties and other local jurisdictions during peacetime, as well as disasters. Most of these agreements come in the form of grants. The following is a list of examples of funding agreements that can and/or will assist the City of North Port in emergency and disaster mitigation, preparedness, response, and recovery:

1. Emergency Management Preparedness and Assistance (EMPA) Competitive Grant. This is a competitive grant for which municipalities may opt to apply for each year. This competitive grant, sponsored by the Florida Division of Emergency Management, awards monies to communities who submit projects that will enhance emergency management capabilities on local, regional, and state levels. Submitted projects can consist of mitigation activities, preparedness activities, response capability upgrades, and recovery needs. Once projects are submitted, they are reviewed for consistency with State and local plans and awarded points to establish a priority of projects. Each year, the City reviews its list of projects and decides on sufficiency and rationality of submitting a project to this grant process.

2. Program/Technical Funding. On occasion, funding becomes available from the State to implement programs on the local level. The City of North Port uses monies from these funding sources as necessary to enhance its program capabilities.

3. Mitigation Program Funding. This category includes programs such as the Flood Mitigation Assistance Program (FMAP) and the Hazard Mitigation Grant Program (HMGP). The City reviews its situation annually to determine if there are any outstanding projects which might qualify for these types of programs. Once identified, the City works with the property owners to fill out an application for these programs and submits the application on behalf of the property owner. If the application is approved, the City enters an agreement with the State of Florida to oversee and manage the project and reimbursement process. The City of North Port works with the Florida Division of Emergency Management to identify funding sources that can be used to implement programs and enhance already-existing programs. Any programs that are made available are reviewed by the City Emergency Management and used as needed to enhance emergency mitigation, preparedness, response, and recovery capabilities in the City of North Port.

IX. AUTHORITIES AND REFERENCES

A. Primary Enabling Legislation

1. Florida Statutes, Chapter 252 which delineates specific local responsibilities regarding emergency management.

B. Applicable Laws, Ordinances, Rules and other Regulations

1. Federal Statutes, Regulations and Directives

a. Homeland Security Presidential Directive 8

b. Public Law 93-234, Flood Disaster Protection Act of 1973

c. Public Law 106-390, Disaster Mitigation Act of 2000

d. Public Law 99-499, Community Right to Know Act of 1986

e. Public Law 95-510, Comprehensive Emergency Response, Compensation and Liability Act of 1980

f. Public Law 84-99, Flood Emergencies (1976)

g. Public Law 89-665, National Historic Preservation Act (1966)

h. National Flood Insurance Act of 1968

i. 44 CFR Parts 59-76, National Flood Insurance Program

j. 44 CFR Part 206, Federal Disaster Assistance

k. National Response Framework

2. *Constitution of the State of Florida*

a. Article VIII S.2(b), Municipal Powers

3. State of Florida Statutes

a. Chapter 23, Florida Mutual Aid Act (1998)

b. Chapter 119, Public Records

c. Chapter 125, County Government

d. Chapter 252, Emergency Management

4. State of Florida References

a. State of Florida Comprehensive Emergency Management Plan and Administrative Rules, Chapter 9G-2

b. Southwest Florida Regional Planning Council, Local Emergency Planning Committee Plans and Standard Operating Procedures

c. State of Florida Hazard Mitigation Plan

d. Florida Fire Chiefs Association's Statewide Emergency Response Plan

5. Sarasota County References

a. Sarasota County Comprehensive Emergency Management Plan, and accompanying Standard Operating Procedures

b. Sarasota County Unified Local Mitigation Strategy 2015

6. City of North Port References

a. Charter and Code of the City of North Port

b. ~~General Services~~Human Resources Department, Risk Management Manual

c. Human Resources Department, Personnel Rules and Regulations

d. Finance Department, Claims Handling Procedures

e. Fire Rescue, Standard Operations Guidelines

f. Police Department, Emergency Operations

g. Utility Department, Standard Operating Procedures

7. Other References

   a. U.S. Coast Guard, Tampa, Area Contingency Plan for Oil and Hazardous Materials Substance Pollution Response

   b. National Response Framework

   c. National Wildfire Coordinating Group, Incident Command System forms

X. GLOSSARY

- A -

After Action Report (AAR). The AAR documents the performance of exercise related tasks and makes recommendations for improvements. The Improvement Plan outlines the actions that the exercising jurisdiction(s) plans to take to address recommendations contained in the AAR.

Assembly Site. A pre-identified temporary field site.

- B -

- C -

Call Tree. A matrix of people and their telephone numbers, with instructions on who should call whom, and in what order.

Common Communication Plan (CCP). An interoperable communications plan designed to be utilized for multi-agency and multi-jurisdictional incident management operations. All entities involved in managing the incident will utilize common terminology, prescribed by the NIMS, for communications.

Comprehensive Emergency Management (CEM). An integrated approach to the management of emergency programs and activities for all four emergency phases (mitigation, preparedness, response, and recovery), for all types of emergencies and disasters (natural, manmade, and attack), and for all levels of government (local, state, and Federal) and the private sector. A CEM program supports the mission, vision, and strategic goals of the organization to ensure the safety of patients, staff, and resources, and provides for COOP in the event of a disaster or emergency that affects the organization. The overall goal of CEM is the prevention or minimization of the loss of life and injuries, and the provision for the continuity of the organization's critical operations.

Contingency. A future event that is likely but not certain to happen. The consequences of the occurrence are such that one must prepare for the event.

Contingency Plan. Describes how an agency intends to respond to events, which disrupts normal operations. It provides instructions on how to perform recovery tasks to continue essential functions.

Continuity of Operations (COOP). An internal effort within an organization to assure that the capability exists to continue essential business functions across a wide range of potential emergencies, including localized acts of nature, accidents, and technological and/or attack/terrorist-related emergencies. In addition to the CEM phase of mitigation, preparedness,

response and recovery, COOP planning includes resumption and restoration phases. The goal of COOP is that an effective CEM process would guarantee that critical business functions would continue without interruption. COOP adds a resumption phase that identifies efforts that are directed to restoring the organization's critical operations if a disaster or emergency disrupts essential functions.

Continuity of Operations Plan. Describe activities that will enable an agency to continue to perform essential functions after a disruption has occurred.

Corrective Actions. Improved procedures that are based on lessons learned from actual incidents or from training and exercises.

Critical Infrastructure. Systems and assets, whether physical or virtual, so vital to the United States that the incapacity or destruction of such systems and assets would have a debilitating impact on security, national economic security, national public health or safety, or any combination of those matters.

- D -

Damage Assessment. An appraisal or determination of the effects of the disaster on human, physical, economic, and natural resources.

Direction, Control and Coordination. Development of the capability for the chief executive and key staff to direct, control and coordinate response and recovery operations.

Disaster. Accidental or uncontrollable events, actual or threatened, that are concentrated in time and space, in which a society undergoes severe danger and incurs such losses to its members and physical appurtenances that the social structure is disrupted and the fulfillment of all or some of the essential functions of the society is prevented.

Disaster Levels.

- Minor

  An occurrence which may be managed by the resources of the City with some inter-local mutual aid support.

- Major

  An occurrence of such magnitude that the County Board of Commissioners has declared a Local State of Emergency. All County resources are utilized and mutual aid from other counties, or the State of Florida, are likely. The Governor may have issued a Disaster Declaration.

- Catastrophic

  An occurrence of such magnitude that several counties have been impacted. The Governor has most likely issued a Disaster Declaration. Federal resources may have been requested and a Disaster Declaration may have been issued by the President.

- E -

Education, Training and Exercises. Assessment, development, and implementation of a training or educational program and evaluation of emergency response plans and capabilities through a program of regularly scheduled tests and exercises.

Emergency. An unexpected, serious occurrence or situation urgently requiring prompt action.

Emergency Management. The discipline and the profession of applying science, technology, planning, and management to deal with extreme events that can injure or kill large numbers of people, do extensive damage to property and disrupt community life.

Emergency Management Program. A program that implements the mission, vision, and strategic goals and objectives as well as the management framework of the program and organization.

Emergency Management Team. Individuals that are authorized to declare a disaster and activate the Continuity of Operations Plan (COOP). The purpose of this team is to provide immediate and ongoing coordination of the contingency and recovery processes during an interruption in service.

Entry-level First Responders. Entry-level first responders are defined as any responders who are not a supervisor or manager.

Essential Functions. Functions that must occur to enable a department or agency to perform services.

Exercise. Exercises are a planned and coordinated activity allowing homeland security and emergency management personnel—from first responders to senior officials—to demonstrate training, exercise plans, and practice prevention, protection, response, and recovery capabilities in a realistic but risk-free environment. Exercises are a valuable tool for assessing and improving performance, while demonstrating community resolve to prepare for major incidents.

Evaluations. Tools used after exercises or actual events to document strengths and weaknesses in a jurisdiction's preparedness, e.g., Lessons learned or after-action reports.

- F -

Finance and Administration. Development of fiscal and administration procedures to support

emergency measures before, during, and after disaster events and to preserve vital records.

- G -

- H -

Hazard. Natural, technological, or civil threats to people, property, and the environment.

Hazard Identification and Risk Assessment. The process of identifying situations or conditions that have the potential of causing injury to people, damage to property, or damage to the environment, and the assessment of the likelihood, vulnerability and magnitude of incidents that could result from exposure to hazards.

Hazard Management. Systematic management approach to eliminate hazards that constitute a significant threat to the entity or to reduce the effects of hazards that cannot be eliminated through a program of hazard mitigation.

Homeland Security Exercise and Evaluation Program (HSEEP). A capability- and performance-based exercise program that provides a standardized policy, methodology, and language for designing, developing, conducting, and evaluating all exercises. HSEEP also facilitates the creation of self-sustaining, capabilities-based exercise programs by providing tools and resources such as guidance, training, technology, and direct support

- I -

Incident Action Plan (IAP). An oral or written plan containing general objectives reflecting the overall strategy for managing an incident.

Incident Command System (ICS). A standardized organizational structure used to command, control, and coordinate the use of resources and personnel that have responded to the scene of an emergency. The concepts and principles for ICS include common terminology, modular organization, integrated communication, unified command structure, consolidated action plan, manageable span of control, designated incident facilities, and comprehensive resource management. It's sometimes referred to as the National Incident Management System.

Information Technology (IT). Applied computer systems - both hardware and software, and often including networking and telecommunications, usually in the context of a business or other enterprise.

Interoperable. A principle of the NIMS that holds that systems must be able to work together and should not interfere with one another if the multiple jurisdictions, organizations, and functions that come together under the NIMS are to be effective in domestic incident management. Interoperability and compatibility are achieved through the use of such tools as common communications and data standards, digital data formats, equipment standards, and

design standards.

- J -

Joint Information Center (JIC). A facility established to coordinate all incident-related public information activities. It is the central point of contact for all news media at the scene of the incident. Public information officials from all participating agencies should collocate at the JIC.

Joint Information System (JIS). Integrates incident information and public affairs into a cohesive organization designed to provide consistent, coordinated, timely information during a crisis or incident operations. The JIS provides a structure for developing and delivering coordinated interagency messages; developing, recommending, and executing public information plans and strategies on behalf of the Incident Commander (IC); advising the IC concerning public affairs issues that could affect a response effort; and controlling rumors and inaccurate information that could undermine public confidence in the emergency response effort.

- K -

- L -

Laws and Authorities. Federal, state, and local statutes and any implementing regulations that establish the legal authority for the development and maintenance of the emergency management program and organization, and define the emergency powers, authorities and responsibilities of the chief executive official and the emergency program manager.

Lessons Learned. Knowledge gained through operational experience (actual events or exercises) that improve performance of others in the same discipline.

Logistics and Facilities. Identification, location, acquisition, distribution, and accounting for services, resources, materials and facilities to support emergency management.

- M -

Multi-Agency Coordination System (MACS). A MACS is a combination of facilities, equipment, personnel, procedures, and communications integrated into a common system with responsibility for coordinating and supporting domestic incident management activities**.**

Mitigation. Activities taken to eliminate or reduce the degree of risk to life and property from hazards, either prior to or following a disaster or emergency.

- N -

National Response Framework (NRF). A planning tool mandated by HSPD-5 that integrates National domestic prevention, preparedness, response, and recovery plans into one all-discipline, all-hazards plan.

NIMS Compliance Assistance Support Tool (NIMSCAST). The NIMSCAST will be a self-assessment instrument for State, territorial, tribal, local, private sector, and non-governmental organizations to evaluate and report their jurisdiction's achievement of all NIMS implementation activities.

No-Notice Event/ Incident. An occurrence or event, natural or human-caused, that requires an emergency response to protect life or property (i.e., terrorist attacks and threats, wild land and urban fires, floods, hazardous materials spills, nuclear accident, aircraft accident, earthquakes, hurricanes, tornadoes, public health and medical emergencies etc.)

- O -

Operations and Procedures. Development, coordination, and implementation of operational policies, plans, and procedures.

- P -

Planning. The collection, analysis, and use of information, and also the development, promulgation, and maintenance of the organizational comprehensive emergency management plan, action plans and mitigation plans.

Plain Language. Common terms and definitions that can be understood by individuals from all responder disciplines. The intent of plain language is to ensure the clear and accurate communication of information during an incident.

Preparedness. Activities, programs, and systems developed prior to a disaster or emergency that are used to support and enhance mitigation of, response to, and recovery from disasters or emergencies.

Preplanned Event. A non-emergency activity. ICS can be used as the management system for a wide range of events, e.g., parades, concerts, or sporting events.

Public Information. Procedures to disseminate and respond to requests for pre-disaster, disaster, and post-disaster information involving employees, the public and the media. Also, an effective public education program regarding hazards affecting the jurisdiction.

- Q -

- R -

Records Management. The planning, controlling, directing, organizing, training, promoting, and other managerial activities involved with respect to records creation, records maintenance and use, and records disposition in order to achieve adequate and proper documentation of the policies and transactions of the Federal government and effective and economical management of agency operations.

Recovery. Activities and programs designed to return the entity to an acceptable condition.

Resource Management. Systematic development of methodologies to assure the prompt and effective identification, distribution, accounting, and use of personnel and major items of equipment for essential emergency functions.

Resource Typing. Resource typing is the categorization of resources that are commonly exchanged through mutual aid during disasters. Resource typing definitions help define resource capabilities for ease of ordering and mobilization during a disaster.

Response. Activities designed to address the immediate and short-term effects of the disaster or emergency.

Response Asset Inventory. An inventory of the jurisdiction's resources that have been identified and typed according to NIMS Resource Typing Standards. Development of a Response Asset Inventory requires resource typing of equipment, personnel, and supplies identified in the inventories of City resources.

Response Assets/Resources. Response Resources are defined as assets that include equipment, personnel and supplies that are available for use during an incident.

Risk. The probability that a hazard will occur.

- S -

Saffir-Simpson Scale. The Saffir-Simpson Hurricane Scale is a 1-5 rating based on the hurricane's present intensity. This is used to give an estimate of the potential property damage and flooding expected along the coast from a hurricane landfall. Wind speed is the determining factor in the scale, as storm surge values are highly dependent on the slope of the continental shelf and the shape of the coastline, in the landfall region. Note that all winds are using the U.S. 1-minute average.

> **Category One Hurricane:** Winds 74-95 mph (64-82 knot or 119-153 km/hour). Storm surge generally 4-5 feet above normal. No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Some damage to poorly constructed signs. Also, some coastal road flooding and minor pier damage.

Category Two Hurricane: Winds 96-110 mph (83-95 knot or 154-177 km/hour). Storm surge generally 6-8 feet above normal. Some roofing material, door, and window damage of buildings. Considerable damage to shrubbery and trees with some trees blown down. Considerable damage to mobile homes, poorly constructed signs, and piers. Coastal and low-lying escape routes flood 2-4 hours before arrival of the hurricane center. Small craft in unprotected anchorages break moorings.

Category Three Hurricane: Winds 111-130 mph (96-113 knot or 178-209 km/hour). Storm surge generally 9-12 feet above normal. Some structural damage to small residences and utility buildings with a minor amount of curtain-wall failures. Damage to shrubbery and trees with foliage blown off trees and large trees blown down. Mobile homes and poorly constructed signs are destroyed. Low-lying escape routes are cut by rising water 3-5 hours before arrival of the center of the hurricane. Flooding near the coast destroys smaller structures with larger structures damaged by battering from floating debris. Terrain continuously lower than 5 feet above mean sea level may be flooded inland 8 miles (13 km) or more. Evacuation of low-lying residences with several blocks of the shoreline may be required.

Category Four Hurricane: Winds 131-155 mph (114-135 knot or 210-249 km/hour). Storm surge generally 13-18 feet above normal. More extensive curtain-wall failures with some complete roof structure failures on small residences. Shrubs, trees, and all signs are blown down. Complete destruction of mobile homes. Extensive damage to doors and windows. Low-lying escape routes may be cut by rising water 3-5 hours before arrival of the center of the hurricane. Major damage to lower floors of structures near the shore. Terrain lower than 10 ft above sea level may be flooded requiring massive evacuation of residential areas as far inland as 6 miles (10 km).

Category Five Hurricane: Winds greater than 155 mph (135 knot or 249 km/hour). Storm surge generally greater than 18 feet above normal. Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. All shrubs, trees, and signs blown down. Complete destruction of mobile homes. Severe and extensive window and door damage. Low-lying escape routes are cut by rising water 3-5 hours before arrival of the center of the hurricane. Major damage to lower floors of all structures located less than 15 feet above sea level and within 500 yards of the shoreline. Massive evacuation of residential areas on low ground within 5-10 miles (8-16 km) of the shoreline may be required.

Standardized Equipment List (SEL). A list issued annually to promote interoperability and standardization across the response community at the local, state, and Federal levels by offering a standard reference and a common set of terminology. It is provided to the responder community by the Interagency Board for Equipment Standardization and Interoperability (IAB). The SEL contains a list of generic equipment recommended by the IAB to organizations in preparing for and responding to all-hazards.

Standard Operating Procedures or Guidelines (SOP or G). A complete reference document that details the procedures or guidelines for performing a single function or several interdependent functions.

Standardized Terminology. Commonly accepted language that is consistent with policies, plans, or procedures in the NIMS and NRP to facilitate multi-agency, multi-disciplinary or multi-jurisdictional communications during an incident.

- T -

Task. An action that is performed to complete an essential function.

- U -

- V -

Vulnerability. The susceptibility to injury and damage from hazards.

- W - X - Y - Z -

XI. ACRONYMS

This list is not designed to be an authoritative source, merely a handy reference. Certain organizations and terms listed herein are obsolete but are included because they may still appear in publications and other correspondence.

AAR	After Action Report
ALF	Assisted Living Facility
ARES	Amateur Radio Emergency Services
CAP	Civil Air Patrol
CCP	Crisis Communications Plan
CEMP	Comprehensive Emergency Management Plan
CERT	Community Emergency Response Team
CISD	Critical Incident Stress Debriefing
CNP	City of North Port
COG	Continuity of Government
COOP	Continuity of Operations
CRS	Community Rating System
DACS	[FL] Department of Agriculture and Consumer Services
DBPR	[FL] Department of Business and Professional Regulations
DEM	[FL] Division of Emergency Management
DEP	[FL] Department of Environmental Protection
DFO	Disaster Field Office
DHS	[US] Department of Homeland Security
DMAT	Disaster Medical Assistance Team
DMORT	Disaster Mortuary Response Team
DMS	[FL] Department of Management Services
DOC	[FL] Department of Corrections
DOH	[FL] Department of Health
DOT	[FL] Department of Transportation
DRM	Disaster Recovery Manager
DSCO	Deputy State Coordinating Officer
DST	Damage Survey Team
EAS	Emergency Alert System
ECO	Emergency Coordination Officer
EHS	Extremely Hazardous Substance
EM	Emergency Manager
EMAC	Emergency Management Assistance Compact
EMPA	Emergency Management Preparedness and Assistance
EMS	Emergency Medical Services
EMT	Emergency Medical Technician
EOC	Emergency Operations Center
EPA	[US] Environmental Protection Agency
ERT	Emergency Response Team

ESATCOM	Emergency Satellite Communications System
ESF	Emergency Support Function
F-SERT	Forward State Emergency Response Team
FAC	Florida Administrative Code
FBI	Federal Bureau of Investigation
FCO	Federal Coordinating Officer
FDLE	Florida Department of Law Enforcement
FEMA	Federal Emergency Management Agency
FEPA	Florida Emergency Preparedness Association
FFCA	Florida Fire Chiefs Association
FHP	Florida Highway Patrol
FLNG	Florida National Guard
FMAP	Flood Mitigation Assistance Program
FPCA	Florida Police Chiefs' Association
FP&L	Florida Power & Light Company
FRP	Federal Response Plan
FSERT	Forward State Emergency Response Team
FS	Florida Statutes
GIS	Geographic Information System
HMGP	Hazard Mitigation Grants Program
HSEEP	Homeland Security Exercise and Evaluation Program
IAP	Incident Action Plan
ICS	Incident Command System
IMT	Incident Management Team
JIC	Joint Information Center
LSA	Logistical Staging Area
LMS	Local Mitigation Strategy
MACS	Multi-Agency Coordination System
MHz	Megahertz
MME	Mass Migration Event
MOU	Memorandum of Understanding
MSU	Medical Support Unit
NAWAS	National Warning System
NFIP	National Flood Insurance Program
NOAA	National Oceanic Atmospheric Administration
NWS	National Weather Service
PAO	Public Assistance Officer
PDA	Preliminary Damage Assessment
PDAT	Preliminary Damage Assessment Team
PIO	Public Information Officer
PSN	Person with Special Needs
PW	Project Worksheet
RIAT	Rapid Impact Assessment Team
ROC	Regional Operations Center

RPA	Request for Public Assistance
RRT	Rapid Response Team
SAR	Search and Rescue
SBA	Small Business Administration
SCO	State Coordinating Officer
SEL	Standard Equipment List
SEOC	State Emergency Operations Center
SERT	State Emergency Response Team
SOG	Standard Operating Guideline
SOP	Standard Operating Procedure
SMO	State Mitigation Officer
SWFWMD	Southwest Florida Water Management District
SWO	State Warning Office
TDD	Telecommunications Device for the Deaf
USAR	Urban Search and Rescue
VHF	Very High Frequency
VOAD	Voluntary Organizations Active in Disasters

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CITY OF NORTH PORT

COMPREHENSIVE EMERGENCY MANAGEMENT PLAN

ANNEXES

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K. TROPICAL CYCLONE RESPONSE

ANNEX A

RECOVERY ACTIVITIES

I. General. In the post-disaster phase of a disaster, the Emergency Operations Center will manage, coordinate, control and direct the response and recovery efforts. The EOC charts in the Organizational Charts Appendix define the assumptions and functions associated with the EOC. The EOC will serve as the coordination point for establishing the Rapid Impact Assessment Teams (RIAT's), staging areas and other sites for coordinated assistance. The EOC will be manned by representatives from each ESF and other agencies involved in the recovery process. The EOC will be organized consistent with the state and federal response and recovery systems.

Direction, control and coordination during the immediate recovery phase focuses on the following types of activities:

- Establishment of an inter-county recovery network designed to provide the support for movement of response actions, relief supplies and services into the county.
- Acquisition, allocation and administration of the distribution of emergency supplies including food, water, ice and medications.
- Managing post-event sheltering operations.
- Initiating preliminary damage assessment (airborne and ground), debris removal and the restoration of utilities.

The primary local coordinating agency for requesting resources and relief supplies and support within the City is Emergency Management.

A. Sarasota County Emergency Management has primary responsibility for coordinating Countywide recovery efforts. The Emergency Management Chief will appoint the local representative to the Joint Field Office (JFO) and state recovery staff, upon activation of the JFO.

B. The National Disaster Recovery Framework states that jurisdictions will designate a Local Disaster Recovery Manager (LDRM). For Sarasota County, the LDRM shall be appointed by the County administrator. The role of the LDRM is to organize, coordinate and advance the recovery at the local level. This position will manage and coordinate the redevelopment and rebuilding of the community. The LDRM should be able to represent and speak on behalf of the chief executives. The LDRM will serve as the county's primary point of contact with the State.

C. For incidents that necessitate an LDRM, the Emergency Management chief will designate individuals with the necessary knowledge, skills and abilities to assist the LDRM with the task of redevelopment and rebuilding of the county. The LDRM

will coordinate the long-term recovery needs of the community utilizing a committee comprised of infrastructure, planning & development, emergency services, along with various volunteer organizations active in county disaster groups.

1. The Emergency Management Chief will request the State to participate in establishing Disaster Recovery Centers (DRCs) and will appoint a representative to the State Recovery Staff. Individual ESF's in the EOC will coordinate with their state counterparts during response and recovery operations. To assure the flow of accurate and timely recovery information, and to coordinate relief and recovery efforts, state and federal agencies will coordinate with the Local Disaster Recovery Manager in the EOC.

2. The Local Disaster Recovery Manager or designee will coordinate recovery activities with the municipalities. Individual ESF's in the EOC will coordinate with their municipal counterparts during response and recovery operations. To assure the flow of accurate and timely recovery information, and to coordinate relief and recovery efforts, municipalities will be encouraged to have representatives in the EOC.

3. All recovery activities are coordinated through the Local Disaster Recovery Manager and begin during the response phase with an evaluation of:

   - situation reports
   - mission assignments logged and tracked
   - municipal status update reports received from local governments
   - EOC briefings
   - local conference calls
   - impact assessment data, as well as other impact information received from other sources
   - damage reports received from citizens

   These information sources are reviewed and monitored to start the identification of areas that should receive priority for damage assessment and human needs assessment. This gathering of intelligence sets the stage for the operational transition from response to recovery activities, which takes place as the incident begins to stabilize

4. The Coordinator for ESF-14 is the Public Information Officer (PIO) and is responsible for providing public information and education programs regarding the recovery effort and available local, state and federal assistance. The PIO will follow procedures established in ESF-14 Public Information for the dissemination of information as well as the EOC

ROG's/ROP's. The PIO will participate in the Joint Information Center (JIC). Public information programs will use all the resources outlined above in reaching the population in Sarasota County. Special efforts will be made to reach the hearing/sight impaired; non-English speaking or those that are not in touch with traditional communications outlets.

5. The Local Disaster Recovery Manager or designee is responsible for the county participation in the Disaster Recovery Center for the affected area. The Local Disaster Recovery Manager or designee will serve as the Special Projects Coordinator/County Recovery Center Coordinator to coordinate with state and federal individual assistance officers in the establishment of a Joint Field Office.

6. The Emergency Management Chief is responsible for the following items in support of the State of Florida RECON.

   - Pre-designation of helicopter landing zones for RECON aviation support. Landing zone locations (GPS coordinates) are listed in the Critical Facilities Inventory and have been transmitted to State of Florida Division of Emergency Management.

   - Pre-designation of staging areas and sites for RECON operations. Staging area locations (GPS coordinates) have been transmitted to State of Florida Division of Emergency Management.

7. The City utilizes the established process under the Stafford Act, as amended by the Disaster Mitigation Act 2002, for obtaining and administering state and federal disaster assistance. When the President issues a disaster declaration that includes Sarasota County, the County will receive notice from the State directly as well as through the media coverage. The County Emergency Management Chief will ensure that this information is transmitted to the municipalities for coordination of financial reimbursement with county agencies while maintaining compliance procedures for financial transaction, accurate accounting, grants management, document tracking and payroll procedures. Each City department is responsible for the collection and documentation of reimbursement information, identification of public assistance projects, and submission to the contractor consolidation and submission to FEMA.

   The Local Disaster Recovery Manager will transmit disaster declaration, recovery assistance information and technical assistance resources to the municipalities, special taxing districts and not-for-profit organizations, who perform essential governmental type services, as described in FEMA

regulations via fax, conference calls, e-mail and Internet, media outlets and other communications mechanisms.

8. The LDRM will assign representatives to solicit and provide technical assistance and support to municipal jurisdictions throughout Sarasota County to assist in community-wide recovery efforts. The Municipal Liaison will also ensure that multi-jurisdictional issues which require coordination, such as infrastructure restoration of roads, bridges, utility systems and telecommunications, can be effectively coordinated across jurisdictional lines. The lead coordination agency will work directly with the city managers for each impacted jurisdiction and request that a staff assignment is made for recovery working groups requiring representation from the municipality. These assignments may be based upon level of impact to the municipality, available technical expertise within the municipality, level of interest, need for coordination, and jurisdictional regulatory authority.

9. During a disaster event, the county recovery activities outlined in this section are the same for declared and non-declared disasters except for available federal and/or state resources. Without a federal disaster declaration, financial assistance for victims is limited and heavy reliance is placed on the American Red Cross, Salvation Army, charitable agencies, volunteer donations and insurance coverage. In the absence of a Presidential disaster declaration, agency declarations, such as by the Small Business Administration, may provide other sources of funding to assist with costs of the incident. Businesses must depend on insurance coverage or obtain loans/refinancing for recovery. The County and municipal governments must meet infrastructure recovery needs through existing operating funds and insurance or issue bonds to fund disaster recovery. The unmet needs committee may be an additional source of recovery resources and will be convened to identify victims' needs and possible recovery assistance.

10. The primary departments and agencies that have lead or support roles for the implementation of long term recovery are the following:

- Emergency Management
- Property Appraiser
- School Board
- Planning and Development Services
- Community Services
- Health and Human Services
- Talent and Performance Management
- Environmental Services

- Public Works
- Administrative Services
- Information Technology
- Office of Financial Management
- Sarasota Community Organizations Active in Disasters (COADs)

II. Transition to Recovery

While there is no clear line of differentiation between the Response Phase and the Recovery Phase, there are general activities which begin to occur in recovery that signify a gradual de-escalation of the response phase. The recovery phase marks the transition from response to recovery, and in Sarasota County, it begins as soon as the Response is initiated. The county may implement a Disaster Recovery Center to assist the transition to its long-term recovery, which is guided by the Post Disaster Redevelopment Plan (PDRP) and the Long-Term Recovery Coalition (LTRC) manual.

The core principles and organizational constructs in the Recovery Annex coexist with the CEMP and build upon its organizational structure and resources to more effectively address recovery needs. The CEMP fully transitions to the recovery when the disaster-specific mission objectives of the Emergency Support Functions (ESFs) are met and the EOC begins to demobilize. Response organizations will deactivate at the end of the response phase. Other organizations will remain active and/or transform into a broader post-disaster recovery role. Such organizations can include, but are not limited to, infrastructure repair, housing reconstruction, economic stabilization, and health and social services. As these post disaster redevelopment actions are implemented, oversight for long-term recovery will transition back to organizations which are typically responsible for overseeing these activities during normal operations.

The recovery process is best described as a sequence of interdependent and often concurrent activities that progressively advance the county toward a successful recovery. However, decisions made and priorities set early in the recovery process will have a cascading effect on the nature and speed of the recovery progress.

A. Joint Field Office Coordination - The Joint Field Office is a temporary Federal multi-agency coordination center. It is established locally to facilitate field-level, domestic, incident-management activities. The Joint Field Office provides a central location for coordination of federal, state, local, non-governmental and private sector organizations. The Local Disaster Recovery Manager will coordinate all activities with state and federal recovery personnel at the Joint Field Office. The Local Disaster Recovery Manager, through the County Emergency Management Chief, will liaison with the State Recovery Staff and will provide local representation if necessary. A municipal representative, selected by the Local Disaster Recover Manager will coordinate recovery activities with the municipalities.

The bulk of federal recovery field operations during a declared event are coordinated through the JFO. Unlike the State Emergency Operations Center, the Joint Field Office facility is determined by, and under the authority of, the Federal Emergency Management Agency. The Joint Field Office will be staffed with representatives from federal agencies having emergency responsibilities, and may be co-located with the office of the State Coordinating Officer. Joint Field Office site selection will be made by the Federal Coordinating Officer and the State Division of Emergency Management director. State Emergency Response Team personnel work alongside their Federal Emergency Management Agency counterparts to achieve mutual objectives. For additional information, see the State's Recovery Operations for the Joint/Disaster Field Office Standard Operating Guidelines.

B. State and Federal Disaster Assistance Process - To receive a Federal disaster declaration under the Stafford Act, the following steps must be conducted. Each step is addressed in detail in an upcoming section of this Plan. Following is a brief overview:

1. Local State of Emergency Declaration: The process for issuing a local state of emergency is outlined in the Sarasota Comprehensive Emergency Management Plan. A local state of emergency may be issued at any time deemed necessary by the executive leadership. However, to receive recovery assistance from a higher level of government (state and federal), a local state of emergency must be declared by Sarasota County.

2. Rapid Impact Assessment and Initial Damage Assessment: Sarasota County Planning and Development Services Damage Assessment Branch (consisting of members of Sarasota County, and its municipalities) will assess the impacts of the disaster as detailed in the Rapid Impact Assessment and Initial Damage Assessment of this annex. These assessments provide an initial overview of the type and extent of the damage and include inputs from municipalities, special districts and other eligible entities within the county. The initial assessment is transmitted to the State Emergency Operations Center from Sarasota County Emergency Operations Center.

3. State of Emergency Declaration by the Governor: When deemed appropriate, the Governor will issue an executive order or proclamation in support of the County's request for assistance. This will provide the authority to activate State emergency response resources to assist the County's efforts.

4. Preliminary Damage Assessment: The State Emergency Response Team and the Federal Emergency Management Agency will initiate a damage assessment with Sarasota County to document the severity of the impact and to justify the need to pursue a request for a Presidential Declaration. When the damage is of such magnitude and severity that it would appear a declaration is imminent, this assessment may not be necessary.

5. Emergency Declaration Request and Notification: When the minimum thresholds have been exceeded for a Presidential Disaster Declaration, the Governor requests a Federal Disaster Declaration, in writing to the President, through the Federal Emergency Management Agency's Region IV Headquarters in Atlanta, Georgia. If the Federal Emergency Management Agency concurs with the request, it is sent to the President who determines whether the request will be approved or rejected. Approval may be for any or all the three primary categories of Federal Disaster Assistance that are made available through the Stafford Act: Request for Public Assistance, the Individual and Household Program, and Small Business Administration loans. The response is transmitted back to the Governor through the Federal Emergency Management Agency's Region IV Headquarters. Once the State Emergency Operations Center receives the official notification, it will notify each of the counties within the State of Florida. It is the responsibility of the County Emergency Operations Center to notify all municipal jurisdictions and special districts within the County of the Federal Disaster Declaration.

III. Damage Assessment

Damage assessment is the basis for determining the type and amount of state and/or Federal financial assistance necessary for recovery and mitigation. An initial damage assessment is conducted during the response and immediate recovery phase to support a request for a gubernatorial proclamation and for the state to request a presidential declaration. Damage assessment has a two-fold mission:

- To identify the immediate needs and resources required to assist disaster victims.
- To substantiate requests for supplemental assistance.

A. Initial Impact Assessment Survey. In the immediate aftermath of the disaster, a City-wide "Initial Impact Assessment Survey" will be conducted. The goal of this survey is to determine the magnitude and severity of damage to private and public buildings and infrastructure; and, in the event of a severe rainfall event, determine the level of flooding damage. All Impact Survey Team members must report impact survey results to the City EOC within hours of disaster impact. The results are mapped in the City EOC on a Geographic Information System map. The impact survey data provides a City-wide general overview of the most significantly

impacted areas and, therefore, establishes a prioritization mechanism for damage assessment team deployment, resource allocation, and disaster assistance.

B. Damage Assessment Process. While response activities (such as search and rescue, firefighting and care for the injured) are in full operation, recovery field operations begin with clearing debris from all major roads to assist emergency units in their response operations and to facilitate access to impacted areas by joint County/City Damage Assessment Teams.

Rapid and accurate damage assessment of both the private and public sectors is essential to determine:

- Type of assistance to request
- Prioritization of resource distribution for disaster victims
- Prioritization of infrastructure restoration

A damage assessment report is created which includes the damage assessment data Citywide. The joint County/City Damage Assessment Teams are composed of individuals representing building inspections, clerical and other support. The Public Works Department and Utilities Department will coordinate damage assessment data for all public infrastructure.

Damage assessment data is reported to the recovery staff at the County EOC, which is reviewed, then transmitted to the City EOC.

Based on the magnitude and severity of the disaster impact as well as intelligence data gathered from City situation reports and mission requests, the County or State may deploy a State or joint State/Federal Preliminary Damage Assessment Team to the City of North Port before the City-wide damage assessment and reporting is complete. If this circumstance occurs, the County EOC will coordinate the activities of the City/County/State/Federal Preliminary Damage Assessment Teams with that of the City EOC. The goal is to ensure a complete and accurate damage assessment of the disaster event's impact upon the City of North Port and to assist the Governor in making a timely request for a Presidential Disaster Declaration.

Once the damage assessment process is complete, the City of North Port Neighborhood Development Services Department conducts the post-disaster habitability inspections. The purpose of these inspections is to ensure that all structures are safe for entry and that water, electric, and gas services may be reconnected to the structure. These inspections are not conducted until the damage assessment process has been completed. All buildings damaged must be permitted for rebuilding or restoration and all new work must be up to current codes. Condemnation of severely damaged buildings and structures will be

accomplished when they become public safety issues. These are legal responsibilities of all jurisdictions within the City.

III. Disaster Recovery Center. A Disaster Recovery Center may be established in the area to provide "one-stop" assistance for information and tele-registration. The County EOC will initiate a request through the State Emergency Operations Center for the establishment of a DRC within Sarasota County. The Recovery Section Chief will coordinate with the Florida Division of Emergency Management for the establishment of Disaster Recovery Centers. This coordination includes ensuring the selected facilities or locations can support DRC operations for extended periods. Although only one DRC may be established after an incident, Sarasota County Emergency Management has pre-identified a variety of locations to serve as DRC's. The location will be selected based on community need and structural suitability. The Emergency Management Coordinator has lead responsibility for coordination with the County, State and FEMA for the establishment of a Disaster Recovery Center and will work with Sarasota County to identify potential location(s).

IV. Public Assistance Process. When the President issues a major disaster declaration that includes Sarasota County, the City will receive notice from the State. The City EOC will ensure that this information is transmitted to City departments for coordination of financial reimbursement. Each City department is then responsible for the collection and documentation of reimbursement information and identification of Public Assistance projects.

The Emergency Management Director will transmit disaster declaration, recovery assistance information, and technical assistance resources to the City departments via fax, conference calls, internet e-mail and web page, media outlets, and other communications mechanisms.

V. Debris Management. In some cases, debris clearance, removal and disposal actions can be accomplished quickly using community resources augmented by assistance from neighboring communities, State agencies and contractor resources. In many other cases, however, the damage and debris are so extensive that a comprehensive debris clearance, removal and disposal management plan is required to efficiently and effectively control the operations.

The City of North Port developed, and approved by FEMA, a Debris Management Plan (Appendix H) to provide guidance to City management in planning, mobilizing, organizing and controlling a large-scale debris clearance, removal and disposal operation. These response efforts may be accomplished with local force account labor and equipment, contractors, volunteers and assistance from adjacent communities. The Plan identifies key staff members and their responsibilities for managing and controlling debris clearing, removal and disposal operations. This staff will be immediately activated whenever a natural disaster occurs. Staff members will document the critical decisions made in

response to the disaster and provide the debris manager and local, State and Federal officials with a clear plan of action. The debris clearing, removal and disposal operations may extend for weeks or months and insufficient documentation of the evolving plan could cause confusion and inefficiency.

VI. Community Outreach/Relations Teams. Private citizens and businesses are advised through the media and Community Outreach/Relations Teams of:

- Open shelter locations for immediate housing needs
- City, American Red Cross, Salvation Army, and other distribution points where food and water can be obtained
- FEMA's toll-free number to register for long term disaster recovery assistance (through the Individual Assistance Program)
- Location and hours of operation of Disaster Recovery Centers that can assist and guide persons in their individual recovery efforts.

The Community Outreach teams consist of a Federal, State, and local team member.

VII. Unmet Needs Coordination.

The Sarasota County Human Service Director, in conjunction with Sarasota County COADs, has the lead responsibility for coordinating unmet needs during long-term recovery. With assistance from the member groups and other volunteer organizations, the COAD will utilize existing lists of community service providers, local churches, community outreach programs and municipalities to fulfill all requests. A volunteer center may be established in the county to support unmet needs coordination and operations. Human Needs Assessment Teams, municipalities and local officials will meet to help identify unmet needs. The Sarasota COAD maintains the lists of volunteers and community organizations.

Generally, agencies (both nonprofit and profit) will notify the EOC of the needs of the communities which they canvas. SCEM has a cooperative relationship with a multitude of field agencies in both emergency and non-emergency times. During a major disaster operation, FEMA will provide Community Relations Teams. Sarasota County, along with the American Red Cross, will field damage assessment teams to get a sense of the community's needs. Emphasis areas for the teams will be:

A. Areas of the greatest disaster impact
B. Isolated and rural areas
C. Low socio-economic areas
D. Elderly, special needs, and socially isolated individuals

Training and workshops are available through several resources such as health care organizations that specialize in home health care, workshops provided or coordinated by

SCEM staff, and training provided to members of volunteer organizations such as American Red Cross and United Way.

VIII. Post-Disaster Emergency Housing. In a catastrophic disaster, many homes may be destroyed which may require the use of non-permanent structures, such as mobile homes, travel trailer and recreational vehicles, as temporary housing by individuals and families who have been displaced from their primary residence. In general, City Code prohibits the use of these structures.

In 2009, City Commission adopted an ordinance (09-08) which permits the use of these structures for temporary housing on their declaration of a housing emergency. Residents would be able to live in a trailer on their property while their home is being repaired, and allow the creation of a FEMA-style mobile home park for those from apartment buildings or condominiums until they can locate and transition into permanent housing. All structures must have water, sanitary sewer and electricity connections approved by the City. Residents would be permitted to remain in the temporary structure for up to 18 months, with additional increments of six months on application to the City's Neighborhood Development Services Department.

The county may establish an expedited permitting process which may include "one-stop permitting" centers staffed by county permitting representatives for implementing streamlined permit processing. The purpose of this process is to expedite repair and reconstruction of buildings, and to provide information support for provision of temporary housing and encouragement of business resumption and industrial recovery. The County may establish such centers and procedures in coordination with other governmental entities that may provide services and support, such as the Florida Division of Emergency Management, FEMA, SBA, and HUD. These centers combine the presence of multiple agencies to provide better coordination of information that disaster victims may need to rebuild.

A. Transitional Housing

If it is determined that shelter residents and evacuees will not be able to return to their homes for an extended period, it may be necessary to activate transitional shelters until more suitable, longer-term housing options are available. Such transitional shelters can be operated in churches, community centers, convention centers, barracks, or similar existing structures. The Federal Emergency Management Agency's Transitional Sheltering Assistance (TSA) Program may approve, fund, and administer the use of hotels and motels as transitional shelters, which is not charged against disaster survivors' maximum amount of Individual and Housing Program financial assistance. The Federal Emergency Management Agency can also provide reimbursement for hotel/motel accommodations to eligible applicants (County/municipality/special district) through the

Housing Assistance Program, which is subject to the Individual and Housing Program financial assistance limit.

B. Interim Housing

The main objective of interim housing is to identify interim housing solutions with the goal of providing safe and functional temporary housing that allows a family to live together, with a reasonable amount of privacy, while meeting the physical accessibility needs of the household. This includes providing essential utilities, and access to areas for food preparation and bath facilities. Interim housing requires coordination between the Disaster Housing Task Force, municipal partners, and the Joint Field Office. Interim housing is designed to provide a solution for a period of generally up to 18 months. Interim housing may include:

- Rental properties
- Hotels and motels
- Mobile home and RV parks
- Seasonal housing units
- Mobile housing units on private property or group sites
- Big box facilities
- Cruise ships

ANNEX B

MITIGATION ACTIVITIES

I. The City of North Port has adopted the Sarasota County Local Mitigation Strategy Multi-Jurisdictional Plan – which is State and FEMA-approved, and expires on February 9, 2020 (Appendix E). A copy of which is available for download from: https://www.scgov.net/government/emergency-services/documents-forms-and-plans.

II. The City' Emergency Manager is responsible for coordinating mitigation activities with the Local Mitigation Strategy Group. This person currently serves as the Vice-Chairperson of the Group and coordinates all City mitigation activities that are required to maintain compliance with the Sarasota County Local Mitigation Strategy Multi-Jurisdictional Plan.

III. The City of North Port Emergency Manager in conjunction with the Sarasota County Emergency Management Recovery Section, Damage Assessment Branch, is responsible for conducting damage assessment operations throughout the City including Special Flood Hazard Areas (SFHAs), in collaboration with the jurisdiction. The Recovery Section will forward all damage assessment reports to the Planning Section Documentation Unit. The Planning Section Chief will forward to each jurisdiction's Floodplain Manager the final damage assessment reports including damage to SFHAs, for their review. Additional assistance for the Floodplain Managers can be found within each jurisdiction damage assessment division or by requesting assistance to the Recovery Section Chief through the Planning Section Chief.

ANNEX C

WILDFIRE OPERATIONS

EXECUTIVE SUMMARY

I. INTRODUCTION

A. General
B. Scope and Purpose
C. Assumptions

II. RESPONSE ORGANIZATION

A. Local
B. State

III. RESPONSIBILITIES

A. City of North Port Fire Rescue
B. Sarasota County Emergency Management
C. Florida Forest Service, Myakka District
D. Florida Department of Agriculture and Consumer Service
E. Florida Division of Emergency Management
F. Florida Fire Chiefs' Association
G. Florida Division of State Fire Marshal

IV. METHOD OF OPERATION

A. General
B. Levels of Activation
C. Medical Unit
D. Air Operations
E. Resources
F. Logistical Support

V. PUBLIC INFORMATION AND INFORMATION FLOW

A. General
B. Unified Public Information
C. Information Flow

VI. AUTHORITIES AND REFERENCES

VII. ACRONYMS

EXECUTIVE SUMMARY

The Wildfire Operations Annex to the City of North Port Comprehensive Emergency Management Plan identifies the actions that may be taken by the Florida Forest Service and those State and local agencies in support of the Forest Service in preparing for, responding to, and recovering from wildfire event(s). This Annex addresses the role of State and local government in providing the necessary support to the Florida Forest Service in its statutory responsibilities in responding to, controlling and suppressing wildfires. The City of North Port Fire Rescue, in cooperation with the Forest Service, will update and coordinate the plans with other response and support agencies.

The Annex is a living document; being reviewed and updated after a major wild land fire event or annually. It is presently divided into four (4) Chapters as follows:

I. **Introduction:** Provides a discussion of the purpose and planning assumptions used to prepare the annex.

II. **Response Organization:** Identifies the various levels of support that may be provided through a Unified Command structure. It describes the circumstances under which the various agencies will unify under a single command structure in responding to, controlling and suppressing wildfires and the responsibilities of the Unified Command components (agencies). This Chapter also addresses the delegation of authority during a wildfire event.

III. **Responsibilities:** Identifies the response organizations, and their roles and responsibilities specific to wildfire operations.

IV. **Method of Operation:** Presents the key guidelines that will be used to make key decisions during the event. Based on joint considerations discussed and determined by the City's liaison agencies of the Unified Command (Forest Service, North Port Fire Rescue), guidelines for the three levels of activation (Monitoring, Partial, and Full) for the City of North Port Emergency Operations Center during a wildfire event have been developed. This Chapter also addresses medical unit activation, air operations, logistical support, and resources.

IV. **Public Information and Information Flow:** Discusses the notification process for active wildfires to the public, and State Warning Point, and the coordination of situation reports and incident action plans.

I. INTRODUCTION

A. General

This Annex identifies the actions that may be taken by the Florida Forest Service and those State and local agencies in support of the Forest Service in preparing for, responding to, and recovering from wildfire event(s). This Annex addresses the role of State and local government in providing the necessary support to the Florida Forest Service in its statutory responsibilities in responding to, controlling and suppressing wildfires.

B. Scope and Purpose

This Annex covers all wildfires to which the City of North Port that the Forest Service respond. The purpose of the response is to contain, control and extinguish the wildfire.

C. Planning Assumptions

1. The Forest Service is statutorily responsible for wildfire prevention, detection, and suppression on 26,000,000 acres in Florida.

2. The United States Forest Service and the Department of Interior are responsible for wildfire suppression on their respective Federal lands throughout the State.

3. Each year, lightning fires that are associated with Florida's thunderstorm season (April through September) can create tremendous wildfire activity when associated with the State's dry Spring conditions.

4. Nationwide, from 2000 through 2016, an average of 73,303 wildfires occurred per year, burning an average of 114,323,903 acres[1].

5. In Florida, the Deceiving Wildfire burned 173,000 acres in 1999 – which represented the most significant wildfire from 1981 to 2008[2]. However, the most intense fire season on record occurred in 1998 due to the escalating wildland/urban interface in the State.

6. The President of the United States is authorized to aid, including grants, equipment, supplies, and personnel, to any State for the suppression of

[1] https://www.nifc.gov/fireInfo/fireInfo_stats_totalFires.html
[2] http://www.freshfromflorida.com/Divisions-Offices/Florida-Forest-Service/Wildland-Fire/Significant-Wildfires-in-Florida-1981-2008

any fire on publicly or privately-owned forest or grassland, which threatens such destruction as would constitute a major disaster.

II. RESPONSE ORGANIZATION

A. General

This Chapter of the Annex describes the organization to be used to coordinate the City of North Port's agencies support of the Forest Service's response during wildfire events. It describes the Unified Command structure the various agencies will work under to control and suppress wildfires. Also, it addresses the circumstances under which the unified structure will support Forestry in its response to wildfires. The Unified Command structure will be the process used to manage serious wildfire events.

B. Response Organization

1. Local

The Incident Management Team (IMT) comprised of locally-trained State and local firefighters will be used to manage fire-fighting operation when two mutual aid departments and Forest Service assets are engaged in a wildland fire-fighting operation. The Incident Management Team will request activation of the City and County Emergency Operations Center and/or State's response system when the wildland fire is expected to exceed local firefighting capabilities.

2. State

The Unified Command is established as conditions warrant based on a joint decision by the State Forester and the Forest Supervisor of the National Forest in Florida and/or a representative of the Department of the Interior. Unified Command is organized like a State Multi-Agency Coordination (MAC) group, but with the important difference being that the Unified State Command also retains operational command of resources as well as provides logistical coordination. The Unified Command is set up so that an Incident Commander is provided from the primary jurisdictional agencies on which the wildfires are occurring. Unified Commanders will include the Florida Forest Service and either the USDA Forest Service, National Park Service, the United States Fish and Wildlife Service, or the Bureau of Indian Affairs.

In addition to the Incident Commanders and jurisdictional agency liaisons, the Command Staff will also include liaisons from several key support

agencies. These support agencies include the Division of Emergency Management, Division of State Fire Marshal, Florida Fire Chief's Association; Florida National Guard, and if involved, the Federal Emergency Management Agency.

III. RESPONSIBILITIES

A. City of North Port Fire Rescue and Emergency Management

1. Conduct wildland firefighting operations.

2. Operate and manage the City EOC.

3. Monitor the operation to request the City Commissioners issue a Local State of Emergency and issue warnings to the affected communities as the situation warrants.

4. Transmit resource requests to the Sarasota County EOC.

B. Sarasota County Emergency Management

1. Support wildland firefighting operations with logistical support.

2. Enter resource requests to the State Emergency Operations Center.

3. Monitor the operation to request the Board of County Commissioners issue a Local Declaration of Emergency and issue warnings to the affected communities as the situation warrants.

4. Activate the Emergency Alerting System to facilitate area evacuation(s).

5. Activate sheltering/cooling operations for those evacuated.

C. Florida Forest Service, Myakka District

The FFS Myakka District manager, or designated representative, will activate the Incident Management Team when the situation warrants.

D. Florida Department of Agriculture and Consumer Service, Forest Service

The Department of Agriculture and Consumer Services, Forest Service has statutory responsibility for the suppression of wildland fires in the State of Florida. The Forest Service has the lead role in determining when a State Unified Command will be established. In consultation with other State and Federal partners, the

Forest Service will appoint one member of their organization and at least one alternate to serve as State Incident Commander. The Incident Commander will determine the scope and structure of the Unified Command for the wildland(s) burning in the State.

E. Florida Division of Emergency Management

The Florida Division of Emergency Management has statutory responsibility for coordinating State and local support to the Forest Service in the response and recovery from wildland fires. A liaison will be appointed to coordinate the Division's Support Role. Various support elements will be initiated as requested by the Incident Commander.

F. Florida Fire Chiefs' Association

The Florida Fire Chiefs' Association provides the Forest Service logistical support through the services of fire departments throughout the State. This support effort will be initiated per the Florida Fire Chiefs' Association State Emergency Response Plan (SERP) that is activated by request for Emergency Support Function 4, Firefighting.

G. Florida Division of State Fire Marshal

The State Fire Marshal appoints an Emergency Coordination Officer for Emergency Support Function 4, Firefighting. Emergency Support Function 4 is responsible for logistical request from State and local governments for firefighting and EMS resources. These resources are then dispatched per the requirements of the Florida Fire Chiefs' Association State Emergency Response Plan.

IV. METHOD OF OPERATION

A. General

This section of the Annex presents key guidelines that can be used to make key decisions during the event. These decisions will be based on experience, the best evaluation of the current situation, and the forecast for the near future. All wildfire responses will use the National Incident Management System (NIMS) as the emergency response organizational management structure.

Based on joint considerations discussed and determined by the liaison agencies of the Unified Command (Forest Service, and the Fire Chief(s) of the affected area(s)), guidelines for the three levels of activation (Monitoring, Partial, and Full) for the City of North Port Emergency Operations Center during a wildfire event will be

developed. When the EOC is activated in support of the Wildfire Response it will act as a Multi-Agency Coordination Center in support of the Unified Command.

B. Levels of Activation

1. Level III, Monitoring Phase

When two mutual-aid departments and Forest Service or one Strike Team is called out, the City of North Port Fire Rescue may deploy a liaison to the scene upon request of the Incident Commander. The City of North Port Fire Rescue will maintain a liaison with the Incident Management Team at the point when the Multi-Agency Coordination Vehicle Post is deployed. When wildland fire-fighting activities increase whereby greater logistical support is anticipated and the State's Incident Management Team is not in place, the City and/or County Emergency Operations Center will be activated to support all logistics operations. The Emergency Management liaison will remain in contact with the Forest Service and the Emergency Operations Center, unless a firefighter liaison is deployed to the EOC.

2. Level II, Partial Activation

The City and/or County Emergency Operations Center may be activated to a Level II based on a variety of considerations.

a. When appropriate, the City Manager and the Emergency Manager will request a Local State of Emergency from the City Commissioners based on the following factors:

i. When the wildland fire is out of control and threatening a community.

ii. When the Emergency Management Director or the IMT requests additional powers to speed the logistical support effort.

iii. When community evacuations may be required.

3. Level I, Full Activation

a. The Emergency Manager, in consultation with the City Manager, will make the decision when to activate the City Emergency Operations Center to a Level I. The following factors may be used in the decision-making process:

i. When a response to a wildfire event requires the resource and/or logistical support from most the City's Emergency Support Functions.

ii. When a wildfire event necessitates evacuations that require resource support from neighboring counties.

b. The City of North Port Liaison to the County Emergency Operations Center

Once the County Emergency Operations Center has gone to Level I, the City of North Port Fire Rescue will liaison between the City and the County Emergency Operations Center, and provide information coordination for the County Emergency Support Functions.

C. Medical Unit

A medical unit may be activated when an Incident Management Team is put in place to coordinate large numbers of firefighters or emergency personnel. If the Incident Management Team requests a Medical Unit, the request will go through the County Emergency Operations Center.

D. Air Operations

When the Forest Service and the United States Department of Agriculture, Forest Service, under increased wildfire activity, establish Unified Air Operations for statewide wildfire aviation coordination, the Unified Air Operations will establish an Air Operations Plan that will coordinate all aircraft associated with fire operations or flying within wildland fire aviation air space. Within Sarasota County, the Myakka District Forestry manager, or designated representative, oversees the local air space around the wildland fire. This includes:

- Forestry Aircraft
- Fire agency aircraft
- Law Enforcement aircraft
- Military aircraft
- Contractor aircraft
- Media aircraft

E. Resources

The Forest Service and North Port Fire Rescue will be responsible for command and control of all operational elements of the wildfire response to include

resource ordering for wildfire incidents. The City and County EOCs will support the wildland fire-fighting operations by managing and coordinating any non-wildfire resource ordering through the Emergency Support Functions and the State Emergency Operations Center. The Incident Commander will order fire-fighting resources through local dispatch.

F. Logistical Support

Separate processes exist for the ordering of resources and other logistical support for the wildfire events and the Incident Management Teams commanding the suppression of wildfires. In addition, the linkage needed between these resources and logistical ordering processes to provide the correct resource, to ensure that it is provided in a timely manner, and that they are provided cost-effectively.

The primary method in which resources and logistical support is ordered for wildfire events include:

1. The Logistics Section of the City and County Emergency Operations Centers.

2. The Florida Fire Chiefs' Association State Emergency Response Plan (SERP) in support of the Division of State Fire Marshal as the Lead Agency for Emergency Support Function 4 (Firefighting), 8 (Health and Medical), 9 (Search & Rescue) and 10 (Hazardous Materials).

3. Florida Forest Service.

V. PUBLIC INFORMATION AND INFORMATION FLOW

A. General

This Chapter provides how information will be shared during a wildfire event. During a wildfire event a Joint Information Center (JIC) will be established at the scene comprised of representatives of the City of North Port and the Florida Forest Service. During the activation of the City Emergency Operations Center, the EOC representative to the JIC will establish a mechanism that efficiently provides and disseminates information to the public. The EOC's lead Public Information Officer will facilitate the logistical support and orientation for all Public Information Officers working in the City Emergency Operations Center.

B. Unified Public Information

When the City Emergency Operations Center is activated (Level II or I), City, County and State agencies will provide experienced Public Information Officers or provide

access to Public Information Officers to respond to information requests of that agency. In the initial stages of an Incident Management Team Information Flow, a plan will be developed. During Level II Activation, the additional Public Information Officers may include:

- The Florida Division of Emergency Management
- The Florida Department of Agriculture and Consumer Services, Florida Forest Service

During Level I Activation, staffing may increase based on the needs of the response and may include the Federal Emergency Management Agency, the Florida National Guard, and others as warranted. Each agency will become part of the Unified Public Information.

C. Information Flow

1. Fire Activity

a. The Forest Service, Myakka District will notify the State Watch Office of any significant fires that develop.

b. The City of North Port Fire Rescue will notify the County Emergency Management liaison or Emergency Operations Center of any significant fires that develop.

c. The criteria for significant fires includes:

i. Wildfires that threaten structures, or where structures are lost.

ii. That forces or has the potential to force evacuations of citizens.

iii. Wildfires that cause the injury or death.

iv. Wildfires that create significant smoke problems that may cause road closures to major thoroughfares.

v. Large significant wildfires that require movement of out of district forestry resources.

2. Situation Report Information

   a. The Forest Service will continue to produce a daily wildfire summary, which is available at their website http://www.freshfromflorida.com/Divisions-Offices/Florida-Forest-Service/Wildland-Fire/Current-Fire-Conditions.

   b. The City's PIO will extract pertinent information from that scene and liaison officers for its situation reports, which will be completed and transmitted to the County Emergency Operations Center.

3. Public Reporting

   a. Information may be shared with the public in several ways:

      i. City of North Port's Community Notification System.

      ii. City's Web Site for local fire conditions and the social media sites Twitter and Facebook.

      iii. Local government access Comcast channel 19 or Verizon FIOS channel 32.

      iv. Variable message boards positioned at strategic locations.

      v. CodeRED emergency notification system

VI. AUTHORTIES AND REFERENCES

The authority for the development, implementation and maintenance of this Annex and all compatible county/municipal plans in support of the Florida Forest Service and Division of Emergency Management in its statutory responsibilities in responding to, controlling and suppressing wildfires is derived from Chapter 252.38(1)(a) of the Florida Statutes.

This Annex further serves as the fundamental governing policy as prescribed for the Forest Service under Chapter 590 of the Florida Statutes.

The Federal Emergency Management Agency policy on requesting Fire Suppression Assistance is contained within 44 CFR Part 206, Subpart L.

The Federal Emergency Management Agency's Interim Policy on Fire Suppression Assistance, April 1999.

Statewide Mutual Aid Agreement between the City and State, and the State Emergency Response Plan with the Florida Fire Chief's Association.

VII. ACRONYMS

EOC	Emergency Operations Center
FDEM	Florida Division of Emergency Management
FEMA	Federal Emergency Management Agency
FFCA	Florida Fire Chiefs' Association
FFS	Florida Forest Service
IMT	Incident Management Team
ICS	Incident Command System
KBDI	Keetch-Byram Drought Index
MAC	Multi-Agency Coordination
NIMS	National Incident Management System
PIO	Public Information Officer
SCO	State Coordinating Officer
SEOC	State Emergency Operations Center
SERP	State Emergency Response Plan
USDA	United States Department of Agriculture

ANNEX D

FLOOD WARNING AND RESPONSE

I. INTRODUCTION

A. Purpose
B. Scope
C. Planning Assumptions
D. Situation

II. HAZARDS ANALYSIS AND DEMOGRAPHICS

A. Hazards Analysis
B. City Geographic Information (See Base Plan, section II(B))
C. City Demographics (See Base Plan, section II(C))

III. PREPAREDNESS

A. Exercises
B. Public Information

IV. METHOD OF OPERATIONS

A. General
B. Supplemental Assistance
C. Sources of Weather-Related Data and Warnings

V. RESPONSE

A. Public Notification
B. Critical Facilities Inventory
C. Activation Levels and Department Responsibilities
D. Re-entry

VI. ADMINISTRATION

A. Records Preservation and Restoration
B. Funding and Accounting
C. Emergency Purchasing
D. Maintenance and Auxiliary Activation of the City of North Port Flood Warning and Response Program

VII. AUTHORITIES AND REFERENCES

VIII. ACRONYMS

IX. LIST OF FIGURES

I. INTRODUCTION

A. Purpose

1. This program establishes a framework through which the City of North Port may mitigate the impacts of, prepare for, respond to, and recover from fresh water flooding conditions that could adversely affect the health, safety and general welfare of North Port residents, businesses and guests.

2. Provisions are made for the needed flexibility of direction, coordination, and method of operation to enable government and non-government entities to accomplish their objectives of mitigation, preparedness, response and recovery. This Annex also provides the framework for rendering support to other counties, municipalities, States and the Federal government in their flood management efforts.

B. Scope

1. Describes the various types of flooding that could occur and provides procedures for disseminating warning information and for determining, assessing and reporting the severity and magnitude of flooded areas.

2. Establishes the concepts under which the City government will operate in response to flood emergencies.

3. Creates a framework for expeditious, effective and coordinated employment of local resources.

4. The National Weather Service administers/disseminates flood warning information to the County, City and other municipalities.

5. Response operations are conducted under the authority of the City of North Port and Sarasota County Comprehensive Emergency Management Plans.

C. Planning Assumptions

1. The business centers of Sarasota County government and State agencies of Florida have certain expertise and resources at their disposal that may be used in relieving emergency or disaster related problems that are beyond the City's capability.

2. When the City declares a State of Local Emergency and requests County and State assistance following a flooding disaster, the Governor may

declare a State of Disaster Emergency, and the State Emergency Operations Center (SEOC) will be activated if conditions warrant.

3. Should State assistance be inadequate to cope with the flooding disaster, the Governor will request Federal assistance under a Presidential Disaster Declaration.

4. The National Weather Service (NWS), Tampa Bay, will issue flood advisory, watches and warning information to both government and the citizens via the Emergency Alert System (EAS). The State Warning Point will follow-up the NWS' warning information with direct contact with the Sarasota County Warning Point, who will issue a notification alert to the City of North Port.

D. Situation

1. Because of the seasonal possibility of large-scale flooding events within the City of North Port, the City must be adequately prepared to reduce the vulnerability to, deal with, and recover from these flood emergencies. The Emergency Management functions within the City must be coordinated as much as possible with other City government and non-governmental agencies as well as with Sarasota County Emergency Management and Florida Division of Emergency Management and surrounding jurisdictions to ensure the most effective preparation and use of manpower, resources, and facilities in response to flood threats and/or emergencies.

2. The principal causes of flooding affecting the City of North Port are as follows:

   a. Weather systems, both tropical and non-tropical, can produce up to 20 inches of rain over a five-day period. These occur primarily during the hurricane season but can occur at other times. This flooding can cause the Myakkahatchee Creek and canals to overflow their banks.

   b. Severe thunderstorms, which are local in nature, can cause flashflood-like isolated flooding from torrential rains, which may or may not be accompanied by high winds. These usually occur late May to late September, but also can occur at any time of the year.

   c. Hurricanes/tropical storms generate high winds and widespread flooding over much of the populated area of the City. Storm surge has the potential to affect up to 100% of the population depending on the intensity of the storm. Although tropical systems can form

during any month of the year, hurricane season begins on June 1 and ends on November 30.

3. The City of North Port is in the southern portion of the Big Slough Watershed, which covers approximately 195 square miles (See Figure 1). The current land uses within the watershed north of the City boundaries are predominantly agricultural with some mining activities. A large portion of the runoff from the Big Slough Watershed drains through tributaries to the Myakkahatchee Creek, which runs through the City of North Port.

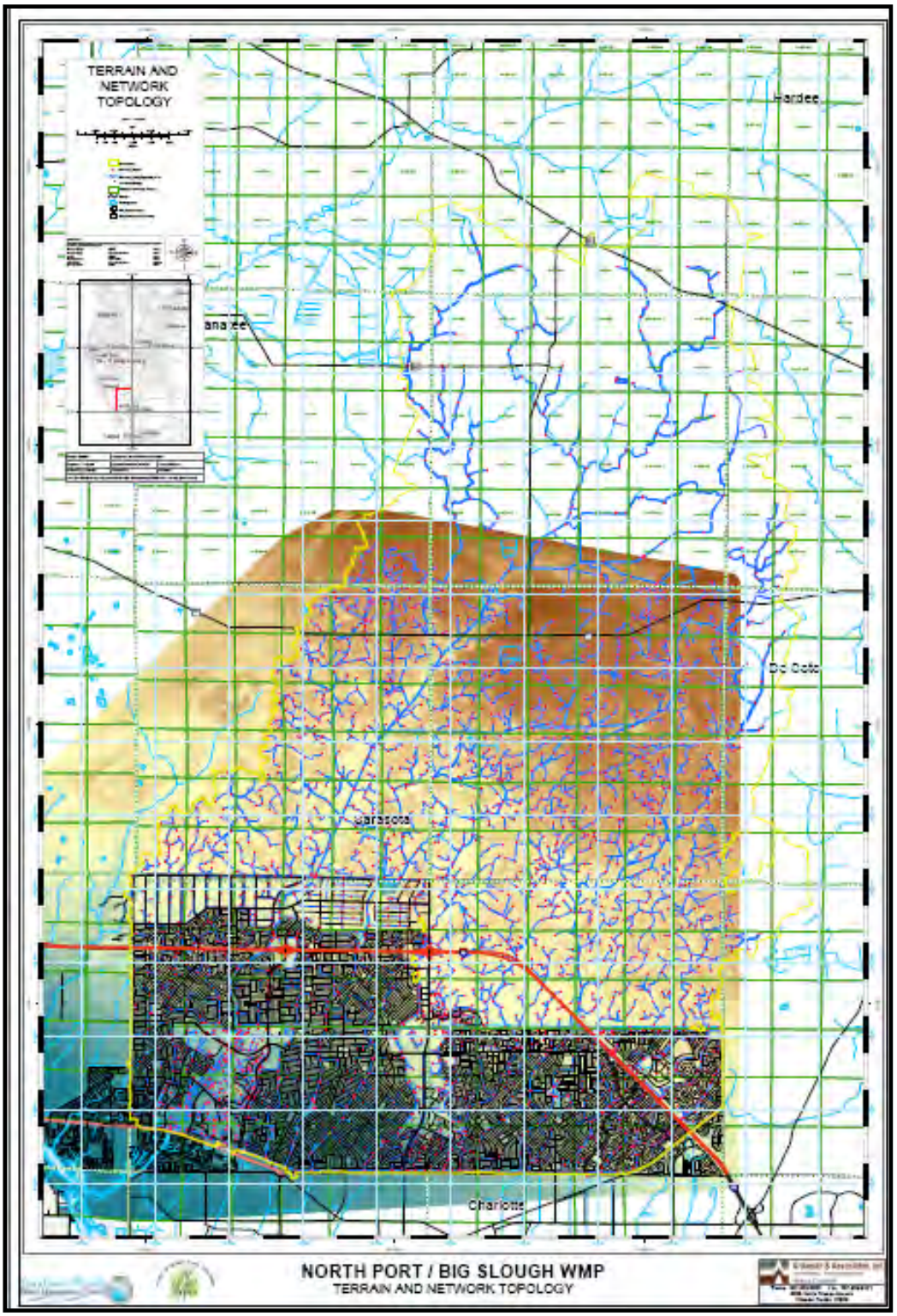
   As the City of North Port is located at the low end of the Big Slough Watershed/Myakkahatchee Creek "pipeline," the City's current flooding and water quality conditions are attributed not only to the City's growth, but also to upstream runoff in the Sarasota, Manatee and Desoto County portions of the Big Slough Watershed.

   During the mid-2000s, the Big Slough Watershed Study was conducted under a cooperative funding agreement with the Southwest Florida Water Management District (SWFWMD) and the City of North Port. Included is a detailed watershed computer model created to simulate the hydraulic conditions of the Big Slough Watershed. Once the model is calibrated to simulate historic storm conditions, it can be used as a tool to predict the level of flooding in the City under various storm events. The model will be used to revise the 100-year FEMA flood maps, and to evaluate options for drainage improvement projects to reduce the flooding currently experienced within the City. Viable drainage improvement projects are expected to be costly, and are likely to take five to 10 years to complete. Implementation of these projects will require cooperation with Sarasota County and Manatee County, acquisition of large tracts of land and rigorous review and permitting by Federal, State and local agencies.

   The City has begun a program to clear the City canals of sediment deposits that have accumulated over time. The City will also clear fallen trees and debris in the Myakkahatchee Creek. This will help restore the flow capacity of the canals and creek.

4. Due to Statewide Building Code requirements, all new construction is above the flood plain, and therefore the structure is typically not subject to flooding. However, streets may flood resulting in "islands" of structures, and strand residents. Delivery of emergency commodities or rescue using high-clearance vehicles or boats may be necessary.

Figure 1: City of North Port / Big Slough Water Shed Map



II. HAZARDS ANALYSIS AND DEMOGRAPHICS

A. Hazards Analysis

1. Non-Tropical/Severe Thunderstorm Flooding

Flooding from non-tropical and severe thunderstorms provide the greatest flood threats to the City of North Port. The City is especially vulnerable to flooding from canal overflow and ponding.

a. Flooding from Myakkahatchee Creek and canal overflow is almost always caused by heavy rains within a drainage area and the subsequent inability of the Myakkahatchee Creek and canal to accommodate the additional runoff. Myakkahatchee Creek and canal overflow would occur following an extended period of rainfall causing most bodies of water within the City to overflow their banks. The problem would be compounded if abnormally heavy rains were to fall in South and Central Florida.

b. Ponding occurs in low-lying areas that are characterized by poorly drained or super-saturated soils (high water table). This type of flooding in the City occurs in all areas of the City where it is flat and drainage conveyance capacity is limited and the water table is high.

c. History

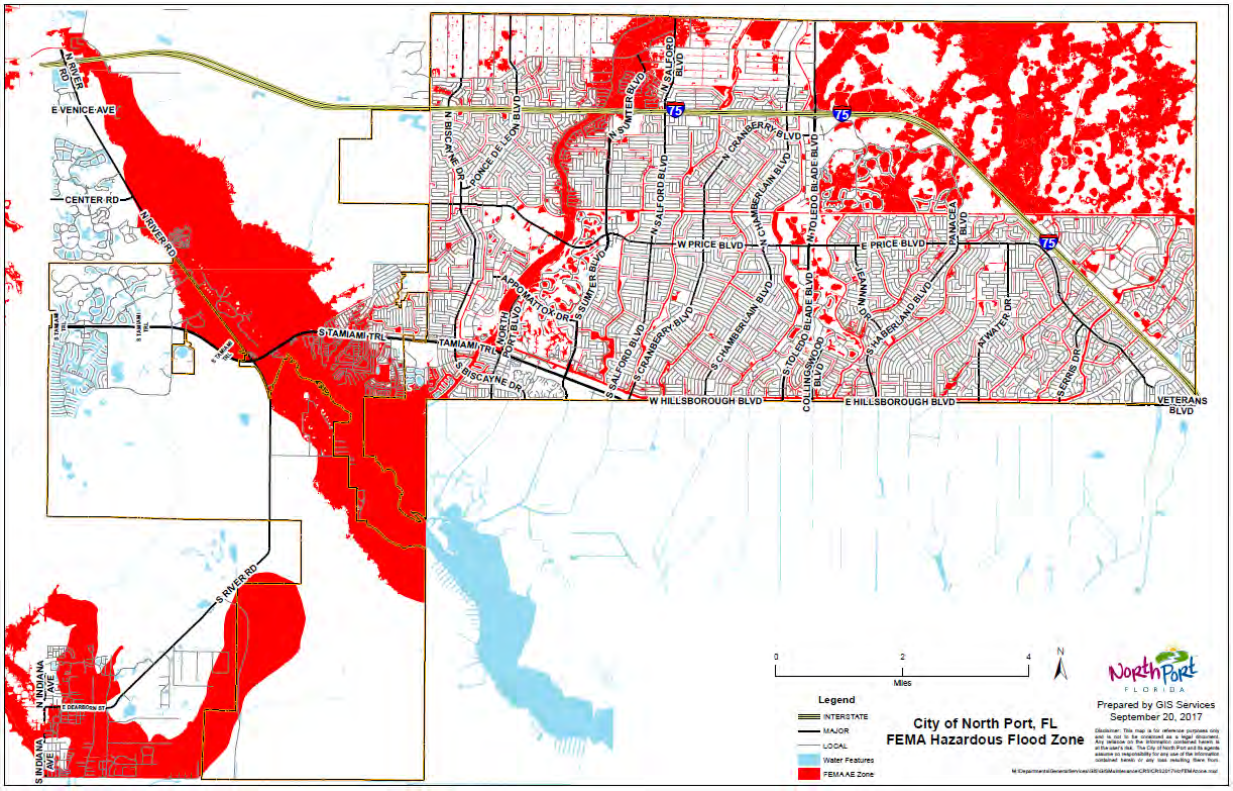
March 23-31, 1987	5.4 to 9.1 inches
September 5-9, 1988	8.2 to 8.9 inches
June 23 - July 2, 1992	16.2 to 20.7 inches
September 14-23, 2000	4.7 inches
July 20-26, 2001	4.6 to 6.9 inches
September 6-14, 2001	10.0 to 11.0 inches
June 17-22, 2003	13.6 to 14.3 inches
August 12-19, 2004	3.0 to 4.5 inches
September 10-15, 2018	9.8 inches

Seasonal flooding is experienced each year. Rainfall amounts of several inches per day spread over two to three days will have a significant impact on riverine flooding (particularly from the Myakkahatchee Creek) and street flooding due to the City's location downstream of a 200 square mile watershed and limited stormwater designed conveyance capacity.

d. Population at Risk

Areas particularly at risk are those in North Port Estates, where overflow from the canal or Myakkahatchee Creek affects the streets between Tropicaire Boulevard and Estates Drive. In addition, the residential area southwest of the I-75 interchange with Sumter Boulevard is also subject to flooding from the Myakkahatchee Creek.

Figure 2: City of North Port FEMA Flood Zones



2. Tropical Cyclone Flooding and Storm Surge

a. A Category 2 land falling or paralleling storm with a storm surge up to 10 feet would force the evacuation of most of the coastal area to the south and west of US 41. A Category 3 storm with a storm surge up to 13 feet could result in the evacuation of 20% of the City's population, which includes all the mobile home parks within and adjacent to the City.

b. History

The City of North Port (Port Charlotte statistical area) has been exposed to 44 hurricanes/tropical storms since 1870[1]. Most recently:

1960 Hurricane Donna September 10th, barometric pressure 28.08 inches, caused heavy storm surge flooding and damage, with gusts over 130 mph, water was first pulled out into Gulf then brought back in as eye passed north causing heavy damage.

2004 Friday, August 13th, Hurricane Charley hits with 145 mph winds. Very heavy destruction in Charlotte and Desoto counties from wind. A rather small but powerful hurricane with a six- to 10-mile wide eye. Thirty-three people were killed, with five deaths in Charlotte county. More than 14 billion dollars in damage. Surge was less than 7 feet on the Gulf, and only 1.5 feet in coastal waters.

2017 Hurricane Irma, September 10th passes just 18 miles to the east while moving north with 100mph winds. Rainfall from September 10th through 15th totaled 9.8 inches and flooded many streets in the Estates area and north/south of I75 along the Creek.

c. Population at Risk

Per the 2017 updated count, there are 64,472 persons living in North Port

The below table describes the potential effects to the population, and economic loss if a hurricane with sufficient storm surge, or flooding in a FEMA Special Hazard Flood Area were to affect the City of North Port.

[1] http://www.hurricanecity.com/city/portcharlotte.htm.

Residential Non-Residential / Population / Valuation Information in Storm Evacuation Zones and FEMA Hazardous Zones

Evacuation Zones	Non-Residential Units	Non-Residential Potenial Property Value Loss	Residential Units	Residential Potenial Property Value Loss	Total Units	Total Potenial Property Value Loss	Residential Population (Units *2.65)
A	4	$2,800,300	289	$47,415,800	293	$50,216,100	766
B	209	$245,514,000	4,394	$364,506,800	4,603	$610,020,800	11,644
C	11	$12,962,000	8,777	$1,277,681,000	8,788	$1,290,643,000	23,259
D	95	$269,482,000	12,693	$1,948,933,600	12,788	$2,218,415,600	33,636
E	137	$74,981,300	2,629	$482,517,900	2,766	$557,499,200	6,967
Grand Total	**456**	**$605,739,600**	**28,782**	**$4,121,055,100**	**29,238**	**$4,726,794,700**	**76,272**

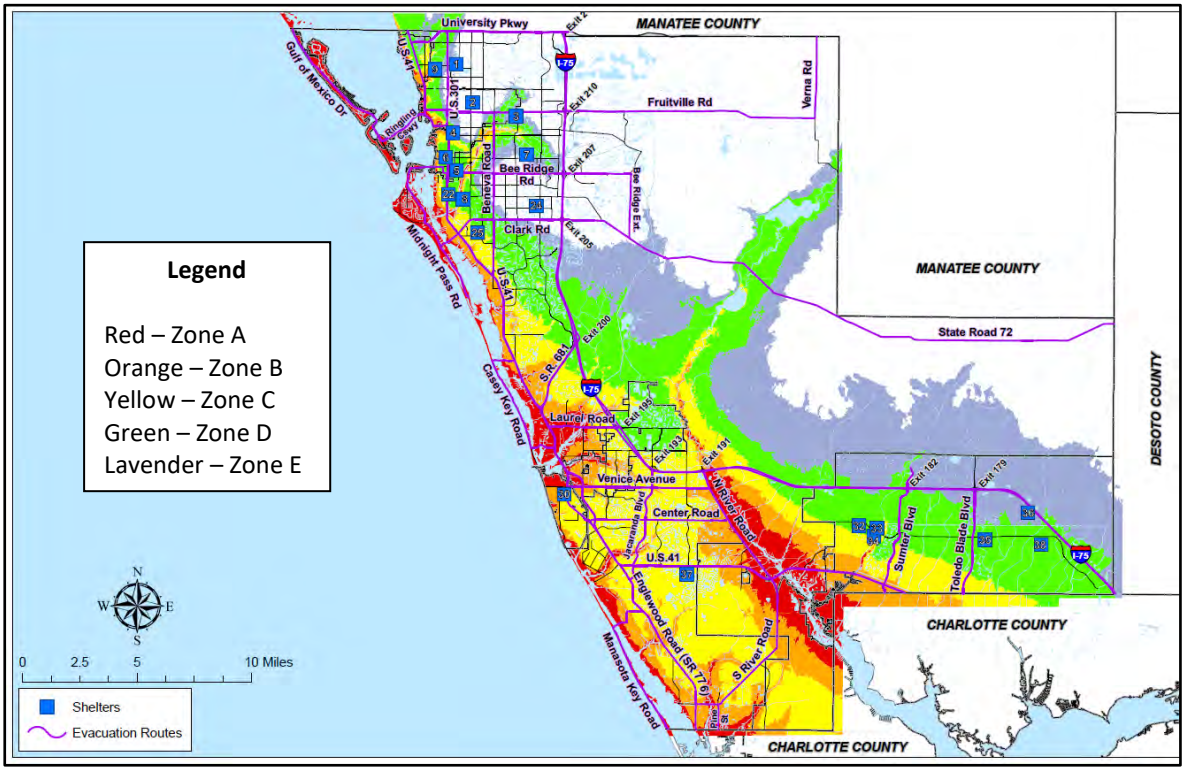
FEMA Zone	Non-Residential Units	Non-Residential Potential Property Value Loss	Residential Units	Residential Potential Property Value Loss	Total Units	Total Potential Property Value Loss	Residential Population (Units *2.65)
FEMA AE Zone	92	$384,014,800	6,122	$968,199,400	6,214	$1,352,214,200	16,223

Notes:
Known units not currently on 2017 taxroll is estimated values and included in unit counts.
Residential Units include individual Condo Units.
Residential Units only count one per apartment complex.
Total Value Loss includes total value of apartment complex.

Non-Residential includes individual Business Condo Units.
Centers under one ownership is counted as one unit and includes total value complex.

All data is based on GIS Data (August 2017): Surge Zones, FEMA A / AE Zone, Sarasota County Property Apprasier Parcels and Attribute tables.
The 2.65 multipler is the average household size.
The valuation is from the JUST value from the Preoprty Appraisers Office data (2017 Tax Role).

Figure 3: Sarasota County Hurricane Evacuation Zones
(Potential Areas of Storm Surge)



B. City Geographic Information (See Base Plan, section II(B))

C. City Demographics (See Base Plan, section II(C))

III. PREPAREDNESS

A. Exercises

1. General

a. Exercises must be conducted at least annually to verify the Flood Warning and Response Program and the skills of emergency response personnel. Results of these exercises provide a basis for changes to the Program, implementing procedures, and for further scheduling of training for response personnel. A real-world flooding type event can fulfill the exercise requirement providing a written After-Action Report was accomplished and timelines for corrective actions were established.

b. Generally, during the Statewide Hurricane Exercise, elements of the Flood Warning and Response Program may be tested and the After-Action Report will highlight those relevant portions of the plan. If the State opts not to conduct a Statewide Hurricane Exercise during a year, then the City Emergency Manager may develop and conduct it.

2. Concept of Operations

a. An exercise is an event that tests the integrated response capability and major elements within the flood warning program. The emergency preparedness exercise will simulate a flood emergency that may result in massive evacuation and sheltering.

b. There are three types of exercises

i. Table-Top Exercise is a simulation in which response activities are discussed. There is no mobilization of emergency personnel and resources.

ii. Functional Exercise is designed to demonstrate one or more functions or capabilities specified in the flood warning program. Mobilization of local personnel and resources will be limited.

iii. Full Scale Exercise is designed to fully demonstrate the emergency capabilities of appropriate agencies and organizations. Mobilization of local personnel and resources will be demonstrated.

c. Scheduling and Scenario Development

i. Exercises will be scheduled jointly by the response agencies and the Emergency Manager. Scenarios will be developed with inputs from all participating agencies. Scenarios will be varied from year to year such that all major elements of the Flood Warning and Response Program are tested during a four-year period. The scenarios will include, but not be limited to the following:

- Objectives of the exercise and appropriate evaluation criteria
- Date, time, place and participating organizations

- The simulated event
- A time schedule of real and simulated events
- A narrative summary describing the conduct of the exercises
- A description of arrangements for advance materials to be provided to observers

d. Critiques and Reports

A critique will be conducted after each exercise to evaluate the capability of each participating agency to implement plans and procedures.

An After-Action Report will be developed to document the event scenario, evaluation and recommendations for improvements.

B. Public Education

1. The Emergency Manager is responsible for coordinating public information programs and related activities about flood emergencies or disasters. This responsibility includes public awareness programs in schools, civic organizations, community subdivisions and other organized groups including radio and television when requested. Preparedness information will be posted on the City's website and social media sites. The Emergency Management Division conducts a number hurricane seminars per year. In each seminar, storm surge vulnerability is stressed, along with flood insurance requirements and methods to mitigate against any damage from flooding. In these talks to the community, information regarding evacuation routes and shelters is also made available.

2. The Sarasota County "Disaster Planning Guide" is updated on an annual basis, and distributed throughout the community, and provided during presentations. Additionally, the City Emergency Management internet site http://cityofnorthport.com/government/city-services/fire-rescue/emergency-management, Public Works website http://www.cityofnorthport.com/government/city-services/public-works/flood-information and various social media sites (City of North Port, Sarasota County Emergency Services, National Weather Service, National Hurricane Center, etc.) have preparedness information on a variety of disaster- and weather-related topics.

3. Since the main flood threat to the City of North Port's residents is from non-tropical storms, every effort will be made to educate the public concerning this threat. Additional tips will be provided via helpful hints to the daily and/or weekly papers. In all the presentations, the following items must be stressed:

   a. Areas that are particularly vulnerable to flooding from small stream or canal flooding.

   b. The use of pre-disaster checklists

   c. Flood and homeowner's insurance

   d. Preparedness tips to minimize disaster related losses

   e. Shelter locations and evacuation routes

   f. Recovery information

   g. Point of contact for additional information

IV. METHOD OF OPERATIONS

A. General

1. This program is based on the principle that the City bears the initial responsibility for disaster response and recovery. As a corollary to this principal, each department within local government will accomplish the functions for which it is responsible, requesting relief from the next higher level of government only after resources at that level are inadequate to respond to the flood emergency or disaster. Requests for assistance will be made to the Florida Division of Emergency Management, through Sarasota County Emergency Management only after the City Commission has adopted a State of Local Emergency.

2. The Emergency Manager may activate portions of the plan, if a flood disaster/emergency threatens, prior to the City Commissioners' decision to issue a Declaration of State of Local Emergency. In this situation, the Emergency Management Division will coordinate increased readiness procedures and such emergency response actions as might be necessary for the immediate protection of life and property.

B. Supplemental Assistance

1. Requests for State assistance must be forwarded to the Sarasota County Emergency Operations Center for assessment and approval before deployment of State resources. Prior to requesting State assistance, the current situation must be identified, the current and projected resource needs must be assessed, and a time frame indicating how long state resources would be needed must be identified.

2. When City, County and State resources are determined to be inadequate to the flood emergency, the Governor will request assistance through FEMA. The request will be based on local and state damage assessments and expenditure reports that are to be maintained and supplied by the City, County and/or State for each flood disaster related activity.

C. Sources of Weather-Related Data and Warnings

When conditions are favorable for either storm surge or fresh water flooding, the following actions will be taken by the agencies listed below:

1. Meteorological information will be obtained from the National Weather Service's Weather Prediction Center (WPC) for all flood threats. Tampa Bay Weather will issue flood advisories that may affect Sarasota County. Additionally, Sarasota County obtains meteorological information and images via a private meteorological service, StormGeo. Information may also be gathered from meteorological weather sites on the internet.

   a. The National Weather Service's (NWS) "Interactive NWS" or iNWS, is a source of information of impending severe weather for emergency managers through text messages sent to a registered smartphone. The message displays a map of the warning area and the nature of the severe weather. Based on the severity of the weather, this text message is forwarded to City public safety and public works managers or followed-up with a telephone call to alert them of the impending weather.

   b. All City-owned facilities are equipped with NOAA weather alert radios which activate when the NWS in Tampa Bay transmits a message indicating impending severe weather conditions.

2. Hurricanes and their related storm surge and inland precipitation amounts present a flood threat to citizens of the City; therefore, all tropical advisories will be monitored.

3. The WPC issues advisories at least at six-hour intervals during the progress of all tropical depressions, storms, and hurricanes. The National Hurricane Center (NHC) issues tropical and Hurricane "Watch" (48 hour) or "Warnings" (36 hour) for specified coastal areas. The Storm Surge Unit within the NHC will issue similar watches and warnings for storm surge potentials.

   a. When a watch or warning has been issued for Southwest Florida, the Emergency Manager will assess the situation and if appropriate, call a briefing session with the directors of all City departments.

   b. The Public Information Officer (PIO) in coordination with Emergency Management will begin issuing news advisories.

   c. Depending on the situation, all advisories received from Tampa Bay Weather, the WPC, or Sarasota County will be condensed and retransmitted via email to all City department directors.

   d. Announcement of pertinent information in the Sarasota County "Disaster Planning Guide" and the other sources will be brought to the public's attention.

4. The United States Geological Survey (USGS) and National Weather Service has established a monitoring system of gauges to display data on streamflow, precipitation and height. Personnel may subscribe to the USGS "WaterAlert" System to receive daily emails whenever a pre-determined gauge height has been exceeded. This data is then used by City Emergency Management and Public Works to determine the potential for stormwater flooding.

   a. A gauge at the Myakkahatchee Creek at Tropicaire Boulevard is a key sentinel point for determination of flood probability and response by emergency personnel and public works. Historically, one inch of rainfall at the Creek is equivalent to 0.6 to 0.7 feet of rise in the Creek's level. Adverse conditions (i.e., backup of the drainage system resulting in water-covered streets) are typically encountered at a gauge height of 23.00 feet. The City of North Port financially-supports the cost of this gauge with the USGS.

      - http://waterdata.usgs.gov/nwis/uv?site_no=02299450.

b. The headwaters of the Creek at SR 72 in Myakka City are a secondary source of data from which the City makes assumptions of stormwater flow. Historically, rainfall in Myakka City flowing down the Myakkahatchee Creek will typically take about 12 to 24 hours to reach the City. The historic correlation of Tropicaire gauge height to extent of street flooding is used to establish potential impacts on the streets in the Estates and downstream adjacent to the Creek.

- http://waterdata.usgs.gov/usa/nwis/uv?site_no=02299410.

c. The Myakka River gauge at US 41 allows personnel to view stormwater effects from upstream against tidal flows from the River and Charlotte Harbor. From this information, we can make assumptions on drainage from the Myakkahatchee Creek and east/west waterways into the Myakka River. If the flow from the River is high and there is an incoming high tide and storm surge, flow from the Creek and waterways will be prevented from draining and may backup.

- https://waterdata.usgs.gov/nwis/uv/?site_no=02299230.

d. Another gauge on the Myakka River at the Myakka River State Park, operated by the National Weather Service, Southeast River Forecasting Center, presents data on flow upstream of US 41 and therefore gives us, as with the headwaters of the Myakkahatchee Creek, an idea of what flow is headed to North Port.

- https://water.weather.gov/ahps2/hydrograph.php?wfo=tbw&gage=mkcf1.

e. A USGS gauge on the Myakkahatchee Creek at the Water Treatment Plant (Water Control Structure 101) allows operators and stormwater managers to see the level at the plant's intake pipe. As stormwater managers open water control structures to divert flow, they must coordinate their actions with plant operators to ensure sufficient depth for water to gravity flow into the intake pipe.

- https://waterdata.usgs.gov/nwis/uv?02299484.

f. The gauge at the Myakkahatchee Creek at W. Price Boulevard serves as a backup to our primary point at Tropicaire Boulevard.

- https://nwis.waterdata.usgs.gov/fl/nwis/uv?site_no=02299472.

5. All North Port Fire Rescue stations are equipped with weather stations which transmit real-time data to Fire Rescue's internet site: http://cityofnorthport.com/government/city-services/fire-rescue/weather. The information provided by the weather stations gives our emergency managers and the public a Citywide view to monitor changing weather conditions, make informed decisions, communicate with those involved, and take appropriate precautionary measures.

V. RESPONSE

A. Public Notification

Increasing the public's awareness of flood hazards and the methods they can use for protecting themselves from the effects of these hazards is a necessary part of reducing disaster potential, preparing for disasters as well as a continuing responsibility of public officials. In addition, providing accurate information immediately before, during and after a flood emergency or disaster is very important for saving lives, minimizing damage, and informing people of various assistance programs. This Annex describes the organization and procedures for providing accurate information to the public.

1. The City's Management Team, comprised of directors of each of the City's departments, will meet periodically before, during and after a flood emergency to minimize conflicting information being disseminated to the public.

2. Emergency Management operates the North Port Community Notification System (CodeRED®) which is an emergency notification system for recorded messages, text and email.

3. The City of North Port provides routine and emergency information via Twitter, Facebook and news releases on the City's website.

4. An Internet website containing City of North Port emergency management information that would be of interest to the public and official agencies is available. This information is regularly updated, especially when the EOC is activated.

5. The Crisis Communication and Public Information appendix to the Comprehensive Emergency Management Plan describes how the City will alert and continually update the public on impending or actual emergencies. Pre-scripted emails and text messages have been developed for use by the Public Information Officer in quickly disseminating relevant information.

   a. During an emergency/disaster that might result in flooding over parts of the community, a team of telephone operators will be assembled near the EOC to provide information to the public. At least one of the operators may be bilingual (to include Spanish and Ukrainian).

6. The City may contact the National Weather Service to activate weather alert radio for North Port-specific flooding or for other emergencies, such as hazardous materials releases, wildfires and civil disturbances.

7. A low-wattage radio station serving the North Port-area, WKDW at 97.5 FM and live internet stream via http://kdwradio.com/ may provide City-specific information during emergencies.

8. If necessary due to a nighttime threat or a quickly escalating threat to residents, sirens and loudspeakers from police and fire vehicles may be utilized to warn the public of impending flood conditions, tornado potential, or hazard materials spill. Vehicles with sirens will pass through the threatened neighborhood to awaken the public with instructions to tune into local media stations for further information on the impending dangers. A map will be produced for the specific area to be notified and provided to field personnel.

9. During periods of County Emergency Operation Center activations, WMTX 100.7 FM (the Local Primary (LP) 1 and LP2A stations), WWRM 94.9 FM (the LP2B station), WHPT 102.5 FM (the LP2C station) and local government access (Comcast cable channel 19, Verizon FIOS channel 32) may broadcast directly from Sarasota County. Other Emergency Alert System (EAS) Operational Stations in Sarasota County include:

WKXY AM 930	WJIS FM 88.1
WFLA AM 970	WLTQ FM 92.1
WTMY AM 1280	WKZM FM 104.3
WDDV AM 1320	WCTQ FM 106.5
WSDV AM 1450	WSRZ FM 107.9

10. The City of North Port does not use outside warning sirens for alerting the public of a weather-related emergency. A siren system cannot be as specific as the alert radio. Emergency Management for the City of North Port recommends the purchase of a NOAA weather radio, as opposed to using outside warning sirens, for the notification of weather-related emergencies.

11. Television customers will see the warning as a "crawl" at the bottom of the TV screen. The Weather Channel (Comcast cable channel 31 and 522, Verizon FIOS channel 119) routinely transmits all warnings for this area on receipt.

12. Sarasota County is mandated under Florida Statutes §252.355 to register all persons who have special transportation or medical needs during an evacuation situation. The process for notification is as follows:

    a. Once a storm threatens, and evacuation orders are imminent, the persons on the list which are residing in the potentially threatened area are called by a phone bank, which has been staffed and trained by Sarasota County Emergency Management and managed from the County EOC. The people are notified that they are about to be picked up, and that they need to get their personal effects together.

    b. The list is given to the Medically Dependent Person (MDP) Operations at the County EOC which develops routes to pick up these people via school bus with hydraulic lift, the Sarasota County Area Transit (SCAT) via buses with hydraulic lift, and North Port Fire Rescue for transport of non-ambulatory clients.

    c. These individuals and their caregivers will then be picked up and brought to a designated facility in county, if the situation allows for it, or out of county, for larger incidents.

B. North Port Emergency Management maintains a Critical Facilities Inventory (CFI) for the City. Given the sensitive nature of the facilities, they are protected under Florida Statute Chapter 119, the locations of which are not included in this Plan. Contact information for each facility is maintained in Fire Rescue's records management system.

C. Activation Levels and Department Responsibilities

In addition to the common roles and responsibilities of City departments in the CEMP's Base Plan (Section III(C)), the following missions are flood-specific during a level of EOC activation:

1. Flood Threat Recognition Phase (Level III, Monitoring Phase)

   This phase may have several pre-disposing conditions whereby any, or all those conditions being absent may not warrant a flood threat concern. The following conditions, compounded, increase the flood threat concern and result in the associated Emergency Operations Center activation level.

   - Saturated grounds due to prolonged rainy periods whereby absorption into the soil is hindered, and/or a period of three to five inches has fallen in the City or over the Big Slough Watershed within a 24-hour period.

   - A series of rain clouds producing a "training effect" (i.e., repeated areas of rain, typically associated with thunderstorms, that move over the same region in a relatively brief period and are capable of producing excessive rainfall totals over an area).

   - Condition of Myakkahatchee Creek's USGS gauge reading is at 21.00 feet and rising (Action Level)

   - Condition of headwaters of Myakkahatchee Creek at State Road 72 in Myakka City is at gauge reading 27.00 feet and rising

   a. Emergency Management will:

      i. Monitor the flooding potential and disseminate the information to those most affected via means identified in the Base Plan (e.g., City email, North Port's Community Notification system).

      ii. Collaborate with both the National Weather Service in Tampa Bay and Sarasota County Emergency Management on the flooding event potential.

      iii. Using Geographic Information System (GIS) mapping products depicting areas susceptible to past flooding events, alert response agencies based on the weather forecasts.

      iv. Brief the City Management Team, as needed.

b. Public Works Department will maintain 24-hours x 7-day capability to respond to public regarding roadway, waterway, and drainage system concerns. They can also deploy low-draft water craft.

c. The Police Department will be prepared to provide traffic control and rerouting in flooded areas.

d. Fire Rescue will deploy high-clearance vehicles for potential rescue or delivery of emergency supplies.

2. Emergency Warning Dissemination (Level II, Partial Activation)

During this phase the National Weather Service - Tampa Bay has issued a "Flood Watch" and the conditions cited above are the most unfavorable for the grounds absorbing a heavy rainfall amount and therefore roadway flooding, etc., will present hazardous/adverse conditions to the public. Additional considerations for activating to this level:

- Public Works has redirected flow away from the Creek and additional capacity is limited
- Condition of Creek is at 23.00 feet and rising (Flood Level)
- Stormwater drainage system showing signs of being inundated
- Water beginning to approach road surfaces in historically impacted areas
- Water is covering road surfaces in areas typically unaffected by severe storms
- Water is covering road surfaces of collector or arterial streets
- Water is threatening critical infrastructure

a. Emergency Management will:

i. Continue with all activities in the Threat Recognition Stage.

ii. Coordinate with the PIO regular updates via email/Web Page to City staff, and the public.

iii. Assemble partial City EOC staff, and brief at the initial stages of Level II Activation, depending on the anticipated severity of the event.

iv. Monitor the flooding event and disseminate details of the impacts via all means identified in the CEMP's Base Plan.

v. Continue to collaborate with Sarasota County Emergency Management on situation status, and need for additional resources.

vi. Pre-identify and coordinate shelter openings with the County and partner agencies, as required.

vii. Initiate actions for a Local State of Emergency, if warranted.

b. Fire Rescue will:

i. Coordinate resource requests and mission assignments for high-clearance vehicles for rescue and delivery of emergency commodities.

ii. Provide a liaison to the City EOC.

c. Police will:

i. Coordinate road blockage and traffic rerouting.

ii. Provide a liaison to the City EOC.

d. Public Works Department will:

i. Provide a liaison to the City EOC to maintain an accurate, current listing of affected roadways.

ii. Take reports from the public regarding flooding and maintain flooding records.

iii. Blockade flooded roadways as necessary.

iv. Monitor water flow in the waterway system, and adjust water control facilities.

v. Provide analysis of flood waters, and coordinate with Public Works to adjust water control facilities.

vi. Provide low-draft watercraft

e. Other Participating Departments will:

i. Initiate tasks common to department irrespective of disaster (e.g., Damage Assessment - Buildings, Cost Accounting - Finance, Purchasing - Finance, etc.).

ii. Provide a liaison to the City EOC, as requested.

3. Emergency Response Elements (Level I, Full Activation)

a. Emergency Management will:

i. Activate the City EOC to Level I, and request full staffing from participating City departments.

ii. Coordinate the inter-departmental response and recovery to the event from the City EOC.

iii. Submit resource requests and situation status to the County EOC.

D. Re-entry to evacuated areas is a controlled activity for residents, people who work in the area and for contractors, and others seeking work in the evacuated area. Re-entry will be permitted only during daylight hours.

1. The Police Department will manage appropriate Traffic Control Points (TCP), as identified by number and intersection on the TCP maps maintained in the EOC.

2. Proof of residency in the area or area employment must be presented at the TCP to gain re-entry.

a. For residents, a driver license listing an address in the evacuated area is acceptable for re-entry. Lacking that specific documentation of residency in the evacuated area can be established by photo ID along with a utility bill addressed to the bearer at the area address, or a lease or proof of building ownership.

b. Employees of businesses in the evacuated area must present a photo ID issued by that business for the address in the evacuated area, or a photo ID along with other proof of employment at the business address in the evacuated area such as a paycheck stub.

3. Re-entry to evacuated areas will begin and will be only during daylight hours, and as damage assessment, debris removal and the status of utilities restoration permits. When the evacuated area is large or involves multiple sectors, re-entry is likely to take place in phases. Local radio broadcasts will be used to announce which areas are open for re-entry, and when re-entry will commence.

4. Persons evacuated under the Medically Dependent Person (MDP) program will be returned to their homes after their homes are determined to be habitable.

VI. ADMINISTRATION

A. Records Preservation and Restoration

1. The City Clerk is responsible for the maintenance and preservation of all records. All City departments, to specifically include the Information and Technology Division, must ensure the protection of vital records so that normal activities may continue after the disaster. These records may also be necessary for the rapid recovery from the effects of a flood disaster.

2. Damage to records is most often the result of fire and water damage. These records can often be saved by prompt salvage action. Technical guidance for records preservation can be obtained from the City Clerk's office.

B. Funding and Accounting

1. The City of North Port may allocate and expend funds as appropriate for local emergency operations. Depending on the onset of hazardous weather conditions, any of the following mechanisms may be implemented:

a. Local Accounting

Complete accurate accounts of emergency expenditures and obligations, including personnel and equipment costs, must be maintained. Accurate accounting is required to identify and document:

i. The determination of eligibility under the FEMA Public Assistance grant program. Funds for which Federal reimbursement will be requested should a Presidential Declaration be made for a Major Disaster.

ii. Processing of insurance claims.

b. Cost Centers

Given the time and the urgency of the threat, the Emergency Manager may ask the Finance Department, via the City Manager, to establish and fund any, or all the following types of cost centers:

i. Departmental – This cost center will be used to fund all extraordinary departmental activities in response to, or associated with, the hazardous weather event.

ii. Debris Removal - This cost center draw will be limited only to those activities associated with debris removal (e.g., contractor services or force labor).

2. When the EOC is activated, all agencies should regularly, or upon request, report their expenditures so that the total budgetary impact to the City can be related to the County Emergency Operations Center.

C. Emergency Purchasing

Under Section 2-408, Emergency Procurement, of the Code of the City of North Port, the normal competitive process is waived, and the purchase of certain equipment and contracts is authorized with the approval of the department director, City manager or City Commission, depending on the cost.

D. Maintenance and Auxiliary Activation of the City of North Port Flood Warning and Response Program

The Emergency Manager will maintain and update this program as required. Portions of this program will be activated periodically to conduct exercises as part of the review process.

VII. AUTHORITIES AND REFERENCES

A. Public Law 91-606, Disaster Relief Act of 1970

B. Public Law 93-288, Disaster Relief Act of 1984

C. Public Law 100-707, Stafford Act

D. Chapter 252, Florida Statutes, as amended

E. City of North Port Charter, and Code of the City of North Port

F. City of North Port Comprehensive Emergency Management Plan

G. Sarasota County Comprehensive Emergency Management Plan

H. Mutual Aid Agreements (e.g., Statewide Mutual Aid Assistance, Statewide, Florida Fire Chiefs, etc.)

VIII. ACRONYMS

CEMP	Comprehensive Emergency Management Plan
DCA	[Florida] Department of Community Affairs
EAS	Emergency Alert System
EOC	Emergency Operations Center
FDEM	Florida Division of Emergency Management
FFCA	Florida Fire Chiefs' Association
FEMA	Federal Emergency Management Agency
FLNG	Florida National Guard
FS	Florida Statutes
GIS	Geographic Information System
ICS	Incident Command System
LP1	Local Primary 1 [EAS operational radio station]
LP2	Local Primary 2 [EAS operational radio station]
MDP	Medically Dependent Person (People)
NHC	National Hurricane Center
NOAA	National Oceanographic and Atmospheric Administration
NWS	National Weather Service
PIO	Public Information Officer
SEOC	[Florida] State Emergency Operations Center
SMAA	Statewide Mutual Aid Agreement
SWFWMD	Southwest Florida Water Management District
SWP	[Florida] State Warning Point
TPC	Tropical Prediction Center

IX. LIST OF FIGURES

Figure 1: City of North Port / Big Slough Water Shed Map

Figure 2: City of North Port FEMA Flood Zones

Figure 3: Sarasota County Hurricane Evacuation Zones

ANNEX E

HAZARDOUS MATERIALS AND OIL SPILL RESPONSE

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I. PURPOSE

A. The purpose of this annex is to establish guidelines under which the City will operate in the event of a hazardous material or oil spill incident.

B. It defines the roles, responsibilities and inter/intra organizational relationships of government and private entities in response to a hazardous material or oil spill incident.

C. It provides guidance to protect the population and the environment from a hazardous material or oil spill incident.

II. EXPLANATION OF TERMS

A. Acronyms

CEC	Community Emergency Coordinator
CEMP	Comprehensive Emergency Management Plan
CHEMTREC	Chemical Transportation Emergency Center
EPA	[US] Environmental Protection Agency
EPCRA	Emergency Planning, and Community Right-to-Know Act of 1986
FEMA	Federal Emergency Management Agency
FDEM	Florida Division of Emergency Management
FDEP	Florida Department of Environmental Protection
FDOH	Florida Department of Health
FDOT	Florida Department of Transportation
FHP	Florida Highway Patrol
FOSC	Federal On-Scene Coordinator
HMRT	Hazardous Material Response Team
IC	Incident Commander
ICP	Incident Command Post
ICS	Incident Command System
LEPC	Local Emergency Planning Committee
NIMS	National Incident Management System
NPFR(D)	North Port Fire Rescue (District)
NPPD	North Port Police Department
OPA	Oil Pollution Act of 1990
PIO	Public Information Officer
RP	Responsible Party
SCFD	Sarasota County Fire Department
SOSC	State On-Scene Coordinator
SWO	State Watch Office
USCG	United States Coast Guard

B. Definitions

1. **Accident Site**: The location of an unexpected occurrence, failure, or loss, either at a facility or along a transport route, resulting in a release of listed chemicals.

2. **Acute Exposure**: Exposures that occur for relatively short periods of time, generally hours to 1-2 days.

3. **CHEMTREC**: The Chemical Emergency Transportation Center (CHEMTREC) is a centralized toll-free telephone service advice on the nature of the product and steps to be taken in handling the early stages of transportation emergencies where hazardous chemicals are involved. CHEMTREC promptly contacts the shipper of the material involved for more detailed information and appropriate follow-up action including on-scene assistance when feasible.

4. **Contingency Plan**: A document developed to identify and catalog all the elements required to respond to an emergency, to define responsibilities and specific tasks, and to serve as a response guide.

5. **Exclusion Zone**: Is the area where contamination does or could occur.

6. **Extremely Hazardous Substances**: Chemicals listed by EPCRA which can cause both severe short- and long-term health effects after a single, brief exposure (short duration). These chemicals can cause damage to living tissue, impairment of the central nervous system, severe illness or in extreme cases, death when ingested, inhaled, or absorbed through the skin.

7. **Fixed Facility**: A plant site where manufacturing, handling/transferring, processing, storage, and/or disposal of chemicals is performed.

8. **Hazard**: A situation that may result in death or injury to persons or in damage to property. Includes effects of toxicity, fire, explosion, shock, concussion, fragmentation and corrosivity.

9. **Hazard Analysis**: In this context, use of a simplified vapor dispersion model which looks at the movement of toxic or explosive vapors over distance at a concentration level of concern to determine whether the amount of chemical at a facility or in a transport container poses a threat to the surrounding community, requiring more detailed analysis and planning.

10. **Hazardous Materials**: Chemicals that are explosive, flammable, poisonous, corrosive, reactive, or radioactive and require special care in handling because of the hazards they pose to public health and the environment.

11. **NCP**: The National Contingency Plan establishes the structure by which the Federal government responses to episodic hazardous material release and oil spill events.

12. **Off-site**: The area outside the boundary of the on-site area that may be affected by the consequences of an extraordinary situation.

13. **On-scene**: The total area that may be impacted by the effects of an extraordinary situation. The on-scene area is divided into mutually exclusive on-site and off-site areas.

14. **On-scene Command Post**: Facility at a safe distance from an accident site, where the IC, responders and technical representatives can make response decisions, deploy manpower and equipment, maintain liaison with media and handle communications.

15. **On-site**: The area within the boundary established by the owner of a fixed facility.

16. **Plume**: A vapor cloud formation that has shape and buoyancy.

17. **Response**: The efforts to minimize the hazards created by an emergency by protecting the people, the environment, property and returning the scene to normal pre-emergency conditions.

18. **Terrorist Activities**: A violent act, or an act dangerous to human life, in violation of the criminal laws of the United States or of any State, to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives.

19. **Weapons of Mass Destruction**: Any destructive device as defined in 18 U.S.C. §§ 921 and 2332a, which reads: (1) any explosive, incendiary, or poison gas, bomb, grenade, rocket having a propellant charge of more than four ounces, missile having an explosive or incendiary charge of more than one quarter ounce, mine or device similar to the above; (2) poison gas; (3) any weapon involving a disease organism; or (4) any weapon that is designed to release radiation or radioactivity at a level dangerous to human life.

C. References

1. Emergency Planning and Community Right-to-Know Act (EPCRA), also known as Title III to the Superfund Amendments and Reauthorization Act of 1986, 42 U.S.C. § 11000.

2. Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §§ 6901-6992k.

3. Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), also known as the Superfund Law, 42 U.S.C. §§ 9601–9675.

4. Section 112r of the Clean Air Act Amendments of 1990, 42 U.S.C § 7412.

5. Oil Pollution Act, 33 U.S.C. § 2701.

6. Hazardous Waste Operations and Emergency Response, 29 C.F.R. § 1910.120.

7. Florida Emergency Planning and Community Right-To-Know Act, F.S. §§ 252.81-252.90.

8. Hazard Communication Standard, 29 C.F.R. § 1910.1200, as amended by 52 F.R. 31,852, August 24, 1987.

9. USCG Marine Safety Office Tampa Bay, Area Contingency Plan.

10. EPA Region IV Oil and Hazardous Substances Pollution Contingency Plan.

III. SITUATION AND ASSUMPTIONS

A. Situation

1. Hazardous materials are commonly produced, stored, used, distributed and transported in the City; hence, hazardous materials incidents may occur as the result of natural disasters, human error or accident, or terrorist acts.

2. The North Port Fire Rescue District's personnel are trained to the hazardous materials awareness level. The closest technician-level service is from the Sarasota County Fire Department (SCFD) which will be requested for hazardous materials incidents within the City.

3. The SCFD Hazardous Materials Response Team (HMRT) will have, to the extent possible, the capability to make protective responses in the event

of an incident involving the transportation, storage, usage, or manufacture of hazardous materials.

4. The resources of industry, environmental consultants; emergency response companies; and local, State or Federal governments, separately or in combination, may be required to effectively manage the situation.

5. Information on sites regulated by EPCRA is maintained by the Southwest Florida LEPC, and the North Port Fire Rescue, Division of Emergency Management. Refer to Appendix 3 for a map of regulated facilities.

6. Underground natural gas and propane distribution lines are ubiquitous in the City and are identified with above-ground pipeline markers. Tampa Electric (Peoples' Gas) is responsible for natural gas, and AmeriGas propane distribution lines; the AmeriGas lines are in the process of being vacated with the expectation of elimination by 2020.

7. Major transportation routes for hazardous materials cargo are indicated in Appendix 4 to this Annex.

8. Evacuation routes should be determined by the Incident Commander and disseminated to the residents in the affected area based on the current and projected situation.

B. Assumptions

1. The existence of fixed hazardous materials facilities and natural gas/propane distribution lines provide the potential for an episodic air release with the possibility of being hazardous to the populous located within the proximity of each fixed hazardous materials facility.

2. Protective actions include alerting, in-place sheltering, evacuation, and notification of any environmental contamination.

3. The amount of time available to determine the scope and magnitude of the incident (i.e., lead-time) will impact the recommended protective actions.

4. In the event of a hazardous material incident, many of the residents in the vulnerable zone may choose to evacuate spontaneously without official recommendation. Many may leave by way of routes not designated as main evacuation routes.

5. In the event of an evacuation, some of the populace may relocate to private homes or hotel/motel facilities.

6. A transportation incident involving hazardous materials may require the evacuation of the public at any location within the City.

7. Hazardous materials entering the wastewater (i.e., sanitary sewers, lift stations and/or treatment plants) systems may necessitate the shutdown of the affected system or its components which may result in the release (bypass) of untreated wastewater. Hazardous Materials entering the stormwater system (i.e., storm sewers, roadside swales, streams) may require containment to prevent or otherwise restrict further downstream flow.

8. Wind shifts may occur that result in changes in protective action measures.

IV. METHOD OF OPERATIONS

A. General

This Annex will become effective during any situation in which there is a danger to life, health, property or the environment because of an accident involving the uncontrolled release or spill of any hazardous materials. The primary agencies involved will be the City's fire and police departments, assisted by other City and County departments as appropriate. The extent of the hazard and circumstances involved may require the activation of the Emergency Operations Center (EOC) and full disaster response from City agencies and outside organizations as outlined in the City's Comprehensive Emergency Management Plan (CEMP).

Depending upon the seriousness of the incident, protective actions could include alerting, sheltering in-place, evacuation and notification of other appropriate agencies.

The Incident Commander (IC) / Unified Command (UC) will direct and control all on-site operations involving hazardous material emergencies that may include estimating the areas and population affected by a hazardous materials release and provide warning to and implementation of protective actions for the public in the immediate vicinity of the incident site.

B. Incident Classification

The North Port Fire Rescue District classifies the response to hazardous materials into two basic categories:

1. First Responder Operations - those events of a hazardous materials nature that can typically be resolved by first responders without the intervention of a hazardous materials response team. This may include:

   a. Minor spills of a petroleum product

   b. Natural gas/propane distribution line break

   c. Other hazardous materials for which personnel have had specific training, and whose structural firefighting gear is sufficient protection

2. Hazardous Materials Incident - those events of a hazardous materials nature that cannot typically be resolved by first responders and require the intervention of a hazardous materials response team.

C. Reporting

1. First responders arriving upon a scene where hazardous materials are found to be involved will immediately notify their dispatcher and provide the following size-up insofar as possible:

   a. Location of accident

   b. Type of material involved

   c. Extent of injuries and damage

   d. Estimate of need for additional resources

   e. Estimate of need for anticipated area evacuation

   f. The actions being taken

2. In the event the initial report is through police radio channels, the North Port Police Department dispatcher will immediately pass the above information to the Sarasota County fire dispatcher.

3. **Special Statement:** ***IF THE SITUATION OBVIOUSLY REQUIRES IMMEDIATE ACTION TO ISOLATE THE AREA OR TO EVACUATE NEARBY RESIDENTS OR BUILDING OCCUPANTS (i.e., IF THERE IS IMMINENT DANGER OF EXPLOSION OR RELEASE OF TOXIC GAS), THE FIRST OFFICER ON THE SCENE (EITHER FIRE OR POLICE) SHOULD RECOMMEND EVACUATION***

IMMEDIATELY. Adjustment of the evacuation zone can be made later after the senior fire official arrives on the scene.

4. Notification

   a. On notification of an incident involving hazardous materials, the fire dispatcher will:

      i. Dispatch NPFR units and the SCFD HMRT.

      ii. If the situation warrants, notify the following departments:

         - North Port Police

         - North Port Public Works

         - North Port Utilities

   b. The Emergency Management Coordinator, or other on-scene officer, shall contact the State Watch Office, and provide information on the incident.

D. Determining Affected Areas and Protective Actions

1. The Incident Commander shall estimate areas and population affected by a hazardous materials release. Aids for determining the size of the area affected may include:

   a. The US Department of Transportation Emergency Response Guidebook

   b. Computerized release modeling (CAMEO/other software)

   c. Assistance by the responsible party

   d. Assistance by expert sources such as CHEMTREC

   e. Assistance by State and Federal agencies

2. The Incident Commander shall determine required protective actions for response personnel and the public. See Appendix 1 for emergency responder safety considerations. See Appendix 2 for public protective action information.

3. The Incident Commander will typically provide warning to and implement protective actions for the public in the immediate vicinity of the incident site. The Emergency Manager will normally oversee dissemination of warning and implementation of protective actions for the public beyond the immediate incident site and related activities such as traffic control and activation of shelters.

E. Phases of Emergency Management

1. Mitigation

a. Develop inspection guidelines

b. Conduct site inspections

c. Enforce current fire and other City codes

2. Preparedness

a. Conduct public orientation/education programs

b. Provide for training for all emergency response personnel

c. Conduct preplanning activities at regulated facilities

d. Identify resources (e.g., contractors and specialized equipment)

e. Develop recovery guidelines

3. Response

a. Determine hazard and its potential

b. Initiate protective actions to protect life, property and the environment

c. Contain and control the hazard

4. Recovery

a. Monitor/survey to declare area safe

b. Coordinate the removal of contaminants

c. Document event

d. Recover costs

F. National Incident Management System (NIMS)

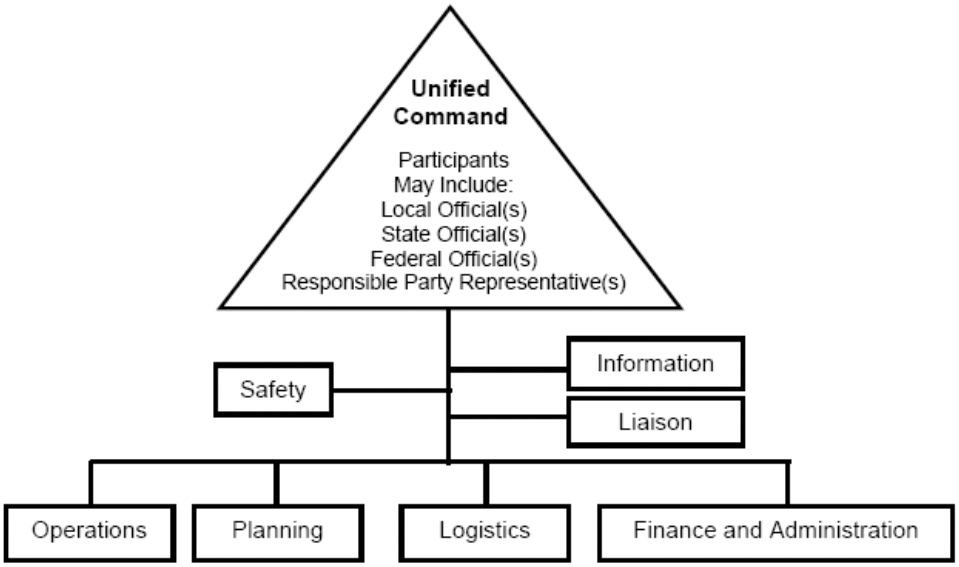
The National Incident Management System (NIMS) will be used to manage and efficiently mitigate any such incident by integrating a combination of facilities, equipment, personnel, procedures, and communications into a common organizational structure.

V. ORGANIZATION AND ASSIGNMENT OF RESPONSIBILITIES

A. Organization

1. See City's Base Plan.

2. Effective response to a hazardous materials incident or oil spill may also require response assistance from the responsible party (RP) for the spill and in some situations, by State and Federal agencies with responsibilities for hazardous materials spills. In this instance, a Unified Command (UC) structure would be established.



B. Assignment of Responsibilities

1. Southwest Florida Local Emergency Planning Committee

a. Coordinate with the emergency coordinators of regulated facilities and vulnerable facilities to maintain the list of regulated facilities and the list of vulnerable facilities.

b. Maintain an accurate and up-to-date hazardous materials emergency contact roster that provides 24-hour contact information for regulated facilities, local hazardous materials transportation companies, vulnerable facilities, State and Federal hazardous materials response agencies, and technical assistance organizations such as CHEMTREC. Disseminate this roster to local emergency responders.

c. Ensure each regulated facility and local hazardous materials transportation company is notified of the telephone number to be used to report hazardous materials incidents to local authorities.

d. Coordinate the review of regulated facility emergency plans by local officials.

2. North Port Fire Rescue

a. The first fire department officer arriving on the scene

i. Assume duties of IC until relieved by a higher-ranking fire officer.

ii. Establish an Incident Command Post (ICP) and determine the safest approach route (either upwind or crosswind).

iii. Take immediate steps to identify the hazardous material, and report to fire dispatch.

iv. Isolate the area and deny entry to all but necessary emergency response personnel.

v. Develop and initiate a plan of action appropriate to the situation, in accordance with North Port Fire Rescue procedures.

vi. Determine the need for emergency protective measures and ensure implementation of plan.

b. Initiate mass gross decontamination of victims.

c. Provide support to the HMRT as appropriate.

d. Provide a PIO as department spokesperson and coordinate public information and media releases with the City PIO.

e. If a Responsible Party (RP) has not been identified or is unwilling to assume the responsibility for cleanup and disposal of the hazardous substance and contaminated materials, it may be necessary for the City to contract with a hazardous materials cleanup company to perform those tasks.

3. The Sarasota County Fire Department HMRT

a. Identify the hazardous material if possible and determine its hazards and any appropriate action(s) to be taken to manage the incident.

b. Confine or contain the hazardous material to the smallest area possible.

c. Stabilize the emergency through limiting or stopping further release of the hazardous material.

d. Serve as an advisor to the IC.

e. Decontaminate victims, personnel, equipment and facilities.

f. Work with the Responsible Party and hazardous materials clean-up contractor to identify appropriate methods for removal of hazardous substances and contaminated materials.

4. North Port Police

a. The senior police officer at the incident scene will report to the ICP.

b. Initiate evacuation of persons from the danger area when requested to do so by the IC.

c. Cordon-off access to the scene and restrict entry by unauthorized personnel. Entry by non-emergency personnel will be permitted based on officer judgment or proper identification.

d. When necessary, coordinate local law enforcement activities with State and Federal law enforcement agencies.

5. North Port Emergency Management

a. Emergency Management Coordinator will respond to the scene and report to the ICP.

b. Determine if use of a mass notification system is required and/or press briefings are needed to keep the public informed. Coordinate with NPFR and other Department PIO representatives before any releases are forwarded to the media.

c. Coordinate efforts of volunteer groups in relocating, sheltering and feeding evacuees.

d. When the IC recommends evacuation, coordinate the evacuation operations.

e. When directed by the IC, activate and manage the EOC.

f. Coordinate with other City departments and outside agencies as required.

g. Initiate and coordinate cost recovery.

6. American Red Cross

a. Staff and operate shelter/mass care facilities

b. Register evacuees

c. Provide emergency clothing

d. Provide emergency food

e. Process inquiries from concerned families outside the disaster area

f. Maintain a current list of shelters, emergency feeding sites, and lodging facilities

7. Recommended roles of transportation shippers and fixed facility operators of Hazardous Materials within the Incident Command System (ICS)

a. Designate a facility emergency coordinator to be assigned to the ICP

b. Implement facility contingency plan

c. Provide technical support to IC

d. Provide post planning support for dealing with contingency planning to include Risk Management plans

e. Provide expertise to the EOC

f. Provide emergency service representative (fire brigade) to the ICP

g. Provide public information representative to the ICP

h. Provide for the removal and ultimate disposal of hazardous substances and contaminated materials, and restoration of affected area.

8. State Agencies with responsibility include:

a. Florida Division of Emergency Management (FDEM)

b. Florida Department of Environmental Protection (FDEP)

c. Florida Highway Patrol (FHP)

9. Federal agencies with responsibility may include the Department Environmental Protection Agency (DEP), Federal Emergency Management Agency (FEMA) and the US Coast Guard (USCG) which may respond to certain hazardous materials incidents and oil spills when required by Federal environmental protection plans or requested to do so by the State.

C. Relationship to Other Plans

1. See the City's Comprehensive Emergency Management Base Plan.

2. The SCFD's HMRT SOG establish operational concepts and activities for team activation, assessment, personnel safety, site control, identification containment, command post, staging areas, monitoring, on-site/off-site response coordination and recovery.

3. Extremely Hazardous Substance Fixed Facility Contingency Plan. Each fixed facility having extremely hazardous substances (as defined by EPCRA) is required to develop an on-site contingency plan that specifies notification, emergency response organization and responsibilities; emergency response organization procedures and coordination procedures for interfacing with off-site authorities and response organizations.

4. EPA and USCG Regional and Area Contingency Plans are required under OPA and the National Contingency Plan. They describe Federal response and recovery operations, and coordination with local and state agencies in the event of a spill or release of a hazardous material or oil in their respective areas of responsibility.

VI. ADMINISTRATION AND SUPPORT

A. Support

See the City's Basic Plan.

B. Documentation and Investigative Follow-up

1. The fixed-site facility is responsible for documentation of accidental releases and preparing the following:

   a. Fixed-site version of the incident including time, cause of spills, material and quantity released, location, response actions, etc.

   b. Chronological log that details a minute-by-minute account of spill response activities (e.g., emergency response team activation, notification of off-site authorities, significant changes in situation, time of recommendations to off-site authorities, etc.).

2. The on-scene NPFR senior officer is responsible for preparing an event log that summarizes the incident including cause of incident, incident critique, damage assessment and conclusion.

3. The North Port Emergency Manager will prepare an After-Action Report to document the event, and "lessons learned."

C. Cost Recovery

1. The City may directly invoice the responsible party for costs incurred during the response and recovery from the incident.

2. The US Environmental Protection Agency's (EPA) Local Governments Reimbursement Program provides Federal funds to local governments for costs related to temporary emergency measures conducted in response to releases or threatened releases of hazardous substances. Eligible local governments may submit applications to EPA for reimbursement of up to $25,000 per incident.

3. If the incident involves an oil spill incident(s) which has impacted or substantially threatened the navigable waters of the U.S, the City may recover costs and damages under the Federal Oil Pollution Act (OPA) which is managed by the US Coast Guard.

4. If the disaster of a such magnitude that a Major Disaster Declaration is designated by the President of the United States, the City will seek reimbursement under the Stafford Act administered by FEMA.

D. Resources, Training and Exercises

1. Resources

NPFR will provide its front-line suppression units with limited equipment and supplies for product identification, and, based on department procedures, mitigation of the spill or release.

2. Training

a. Initial hazardous materials training is conducted during basic firefighter class, and refresher training is provided on an annual basis.

b. Specialized Response Training and Equipment for SCFD HMRT is the responsibility of the SCFD HMRT Training Coordinator.

3. Exercises

a. Methods for exercising this annex are the Tabletop, Functional, and Full-Scale models for Hazardous Materials Emergency Events.

b. NPFR will conduct its own and participate in County-wide exercises as needed.

VII. ANNEX DEVELOPMENT & MAINTENANCE

A. Responsibility

1. The Emergency Manager will be responsible for the development and maintenance of this Annex.

2. Each department and tasked agency should develop its own implementing instructions and procedures to support this Annex and reviewing these annually.

B. Schedule for Annex Updating

This annex will be maintained in accordance with the following schedule:

1. The Annex will be updated with each updating of the City's Comprehensive Emergency Management Plan.

2. The Annex will be reviewed after each exercise and/or actual response to a hazardous materials event and modified as necessary.

3. The annex will be reviewed and revised, if needed, after each of the following types of events:

   a. A major change in applicable Federal or State laws, regulations, or policies.

   b. Major advances in applicable response technology and/or operational concepts.

APPENDICES

Appendix 1 - Personal Protection of Citizens
Appendix 2 - Containment and Clean-up
Appendix 3 - Regulated Facilities
Appendix 4 - Transportation Routes

APPENDIX 1 TO ANNEX E
PERSONAL PROTECTION OF CITIZENS

The following establishes policies and guidelines regarding the personal protection of citizens potentially affected by a hazardous materials incident. It includes the strategies of in-place sheltering and evacuation as well as relocation, water supply protection, and wastewater system protection

1. Sheltering In-place

   a. In some cases, advising people to stay indoors and to attempt to reduce the flow of air into a structure may be the most effective protective option. Emergency officials have used this strategy when it has been recognized that people could not be evacuated from an area prior to the arrival of a toxic chemical cloud.

   b. For an indoors protective strategy to be effective, planning and preparedness activities should provide:

      i. In-place sheltering or evacuation guidelines to be developed by the SCFD HMRT for determining when sheltering or evacuation is appropriate based on decision-making criteria such as the type of chemical, toxicity, duration, etc.

      ii. A public information and notification system to warn and advise the public of immediate danger.

      iii. A system for determining when a toxic chemical cloud has dissipated or cleared an area.

      iv. Notification procedure for advising people to evacuate a building at an appropriate time.

      v. Public education on the value of indoor protection and on expedient means to reduce ventilation rates.

2. Evacuation

   a. Evacuation can be an effective means of protecting the public if it can be accomplished prior to the arrival of the toxic cloud at a particular location. The effectiveness of evacuation is dependent upon the time required to evacuate an area, and the size of the area compared to the time available before the cloud arrives.

b. The responsibility for recommending an evacuation normally rests with the IC. The NPPD working with NPFR will carry out the evacuation. In situations where rapid evacuation is critical to the continued health and safety of the population, the IC may advise the public in the immediate vicinity to evacuate. Emergency Management will coordinate with the City Parks manager for the opening of a nearby Community Center(s) as a shelter for evacuees, if required.

c. If the emergency warrants and the IC recommends evacuation, NPPD officers will immediately initiate an evacuation. (Recommended evacuation distance guidelines for specific hazardous materials are contained in the Emergency Response Guidebook). The IC will determine the routes of evacuation.

d. Ingress for incoming personnel must be identified, so as not to endanger their lives in the process of reporting to the incident site. Evacuation guidelines must be coordinated with liaison personnel at the on-scene ICP to ensure the safety of everyone.

e. If an ordinance declaring a Local State of Local Emergency is adopted by City Commission, the EOC will be activated to coordinate the efforts of other County and municipal agencies and response personnel per the City's Comprehensive Emergency Management Plan.

3. Other Public Protection Strategies

a. Relocation: Some hazardous materials incidents may contaminate the soil, surfaces or water of an area and pose a lingering threat to people living there. It may be necessary for people to move out of the area for a substantial period until the area has been decontaminated or until natural microbiological degradation of the chemical has occurred with time.

b. Water Supply Protection: Surface and ground water supplies can be contaminated by a hazardous chemical spill or release. Recovery and restoration planning must provide for the quick identification of a threat of contamination to the drinking water supply and notification to the public and private water system operators, as well as warning of the public.

c. Wastewater and Stormwater Handling Systems: Hazardous chemicals entering stormwater and/or wastewater systems can cause serious and long-term damage to the environment or to a water/wastewater treatment plant. If wastewater is diverted, it could create public health and environmental problems.

APPENDIX 2 TO ANNEX E
CONTAINMENT AND CLEAN-UP

This Appendix provides for containment and clean-up operations and identifies resources available for clean-up and disposal.

1. Techniques for Spill Containment and Clean-up

   a. The responsibility for selecting and implementing the appropriate countermeasures is assigned to the IC in coordination with the State/Federal on-scene coordinator.

   b. The spiller is, by law, responsible for all clean-up counter-measures.

   c. The IC is responsible for monitoring the response activity to ensure that appropriate containment/displacement techniques are being initiated.

   d. Containment methods may include:

      i. Dikes

      ii. Berms and drains

      iii. Trenches

      iv. Booms

      v. Barriers in soil

      vi. Stream diversion

      vii. Patching and plugging of containers or vessels

      viii. Portable catch basins

      ix. Over-packed drums or other forms of containerization

      x. Re-orientation of the container

   e. The IC, in the absence of a responsible party, may secure private contractors for displacement techniques. These may include:

      i. Hydraulic and mechanical dredging

ii. Excavating

iii. Skimming

iv. Pumping

v. Dispersing/dilution

vi. Vacuuming

f. Treatment of spilled hazardous substances can be physical, chemical or biological in nature. Treatment operations are the responsibility of the operator. Monitoring responsibility is assigned to the FDEP, in accordance with the State of Florida Oil and Hazardous Substances Spill Contingency Plan.

g. Exposure Assessment: Initial assessment of the incident is the responsibility of the fixed facility. It should be recognized that industrial capability to assess the situation is supported by in-depth knowledge of the chemicals, facilities and the environment. The fixed facility is liable for damages resulting from a release and is motivated to provide timely and accurate assessment of each situation. Other assessment capability is available.

i. The HMRT has equipment to provide monitoring and assessment capability.

ii. The FDEP has an air toxic response program with personnel and equipment to sample suspected airborne toxic compounds.

h. Restoration

i. Treatment of contaminated soils and sediments is a responsibility of the owner of the property and/or the spiller.

ii. When feasible, contaminated soils and sediments will be treated on the site. Technologies available include:

- Incineration

- Wet air oxidation

- Solidification

- Encapsulation

- Solution mining (soil washing or soil flushing)
- Neutralization/detoxification
- Microbiological degradation

iii. Off-site transportation or storage, treatment, destruction, or secure disposition off-site may be provided in cases where State/Federal On-Scene Coordinator(s) determines such actions:

- Are most cost effective
- Will create increased capacity to manage
- Are necessary to protect public health, welfare or the environment

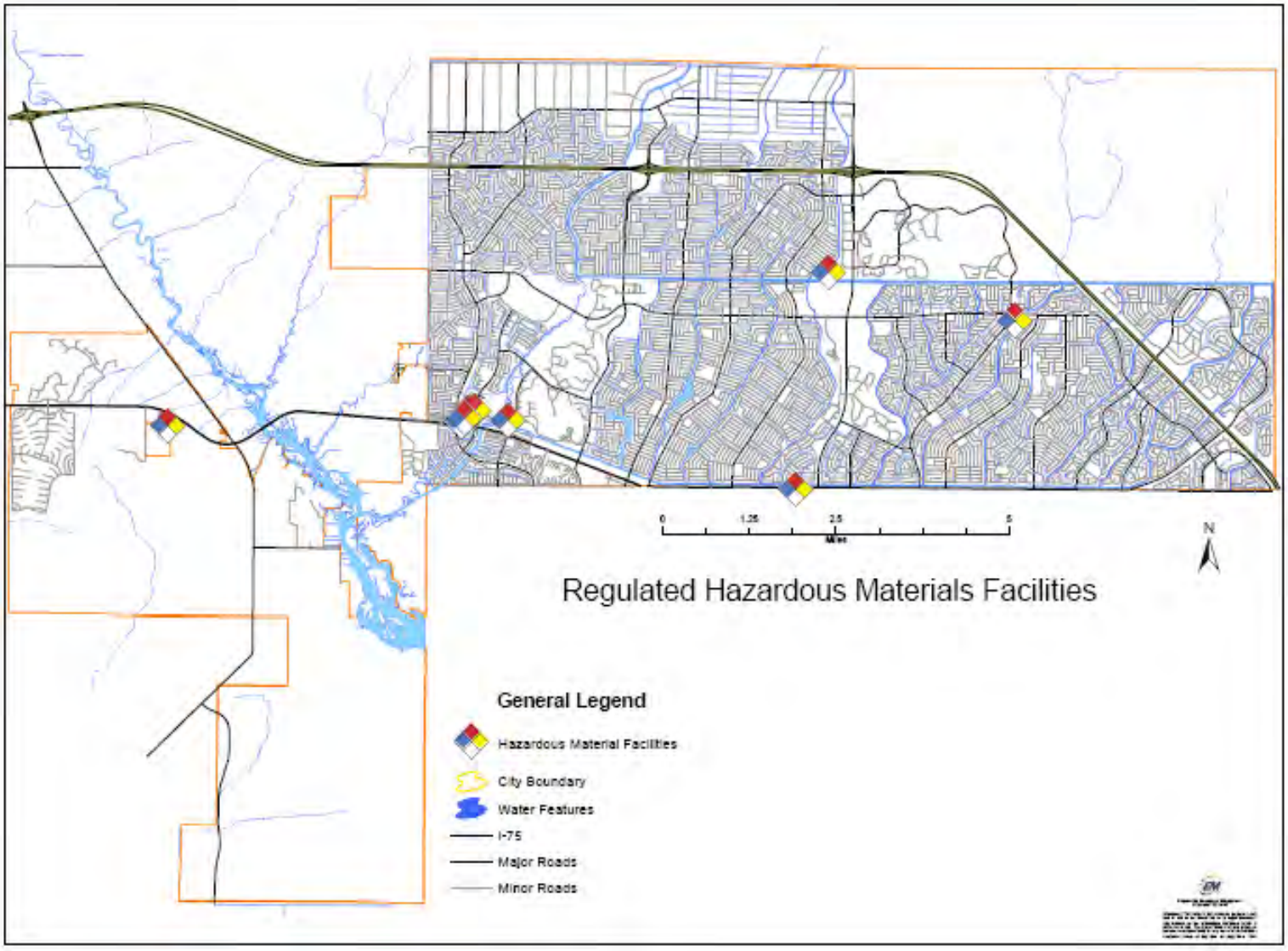
iv. Contaminated soils and sediments may be removed from the site. Technologies used to remove contaminated sediments from soils include:

- Excavation
- Hydraulic Dredging
- Mechanical Dredging

v. Provision of alternative water supplies can be provided in several ways:

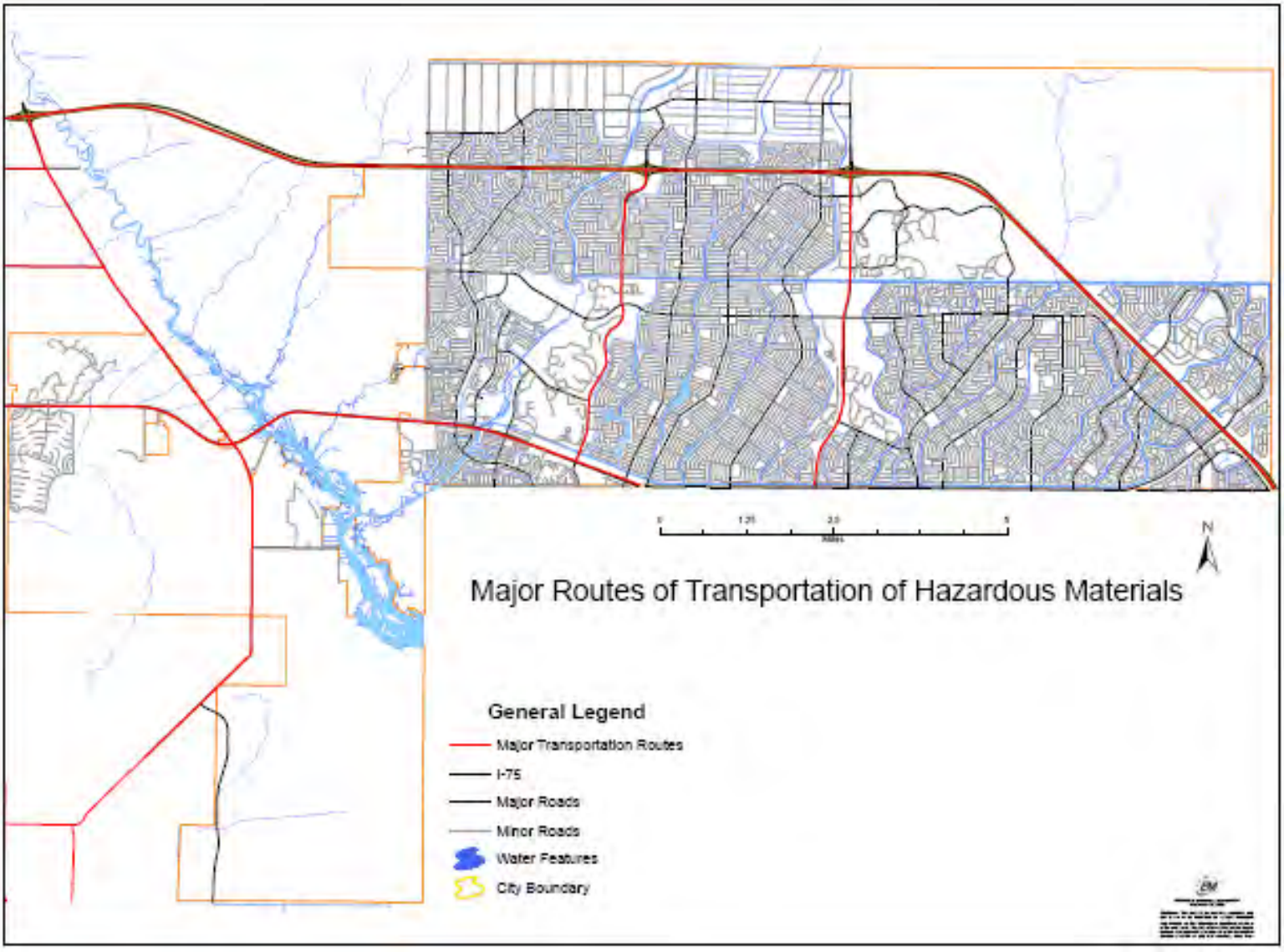
- Individual treatment units
- Water distribution system
- New wells or deeper wells
- Cisterns
- Bottled water
- Trucked-in water

APPENDIX 3 TO ANNEX E
REGULATED HAZARDOUS MATERIALS FACILITIES[1]



[1] The Tier II Emergency and Hazardous Chemical Inventory form identifies the specific locations and inventory of hazardous materials at a fixed facility. In accordance with 42 U.S.C. 11044], this information is available from the Southwest Florida Local Emergency Planning Committee during normal working hours.

APPENDIX 4 TO ANNEX E
MAJOR ROUTES OF TRANSPORTATION OF HAZARDOUS MATERIALS



ANNEX F

UTILITIES DISRUPTION AND RESTORATION

I. PURPOSE

II. SITUATION AND ASSUMPTIONS

A. Situation
B. Assumptions

III. METHOD OF OPERATIONS

A. General
B. Organization
C. Assignment of Responsibilities
D. Restoration Priorities

IV. RESPONSE OPERATIONS

A. City Response
B. Facilitating Utility Response
C. Protecting Resources and Preserving Capabilities
D. Utility Support for Emergency Response Operations
E. Utility Support for Disaster Recovery Operations
F. Public Information
G. Phases of Management

V. ADMINISTRATION AND TRAINING

A. Administration
B. Training

APPENDICIES

1. Local Utility Information & Service Area Maps
2. Utility Restoration Priorities for Critical Facilities
3. Emergency Generator Forms
4. Utility Conservation Measures

I. PURPOSE

The purpose of this Annex is to describe the organization, operational concepts and responsibilities to respond to and recover from a disruption of utility services.

II. SITUATION AND ASSUMPTIONS

A. Situation

1. During or after an emergency there may be a disruption of service in electrical power, telephone service, water and wastewater services as well as natural gas service.

2. The loss of utility services, particularly extended outages, could adversely affect the capability of local personnel to respond to and recover from the emergency that caused the disruption of utility service and create additional health and safety risks for the public.

3. Public utilities are defined as those companies and organizations that are authorized to provide utility services, including electricity, water, sewer service, natural gas, and telecommunications, to the public in a specified geographic area. Utilities may be owned and/or operated by a municipality, a municipal utility district, a regional utility authority, investors, or a by a private non-profit organization such as member of a cooperative (co-op).

4. Virtually all utilities are required by State regulators to have emergency operations plans for restoring disrupted services. Many utilities maintain emergency operations centers and those that do not, normally have procedures to establish temporary facilities when they need them.

5. Extended electrical outages can direct impact other utility systems, particularly water and wastewater systems. In areas where telephone service is proved by above ground lines that share poles with electrical distribution lines, telecommunications providers may not be able to make repairs to the telephone system until electric utilities restore power lines to a safe condition.

6. Municipal utilities and private non-profit utilities, such as electrical cooperatives, may be eligible for reimbursement of a portion of the costs for repair and restoration of damages and infrastructure in the event the emergency, which caused the damage, is approved for a Presidential disaster declaration that includes Public Assistance (PA).

7. Utility disruptions may delay return of individuals to their residences from evacuation shelters. An effect of which, the shelter (usually a public school), will not be able to re-open to students until the evacuees have departed. This will slow the return to normalcy in the post-disaster environment.

B. Assumptions

1. In the event of damage to or disruption of utility systems, utility operators will put forward their best effort to restore services as quickly as possible.

2. A major disaster or a disaster affecting a wide area may require extensive repairs and reconstruction of portions of utility systems that may take a considerable time to complete.

3. Damage to electrical distribution systems and sewer and water systems may create secondary hazards such as increased risk of fire and/or public health concerns.

4. Each utility will direct and control its own resources and plan and carry out its own response operations, coordinating as necessary with local government and other utilities.

5. Individual utility operators, particularly small companies, may not have sufficient resources to restore utility systems affected by a major disaster or one having widespread effects. Utilities typically obtain supplementary repair and restoration assistance from other utilities pursuant to mutual aid agreements, and by using contractors hired by the utility.

6. Equipment and personnel from other City departments may be employed to assist the municipal utility in repairing its systems and restoring service to the public.

III. METHOD OF OPERATIONS

A. General

The basic operational concept is that the various divisions within the City of North Port Utilities Department and private utility companies will continue their normal day to day responsibilities regardless of the emergency or disaster situation. Priority actions will be taken to restore interrupted services and provide for movement of vehicular traffic. Some specific actions to be accomplished are:

1. Make emergency repairs and restore vital utility services

2. Provide emergency power

3. Replace damaged or destroyed utilities equipment

4. Insure that adequate supplies of potable water are available and identify sources of additional supplies, if needed.

B. Organization

1. City-owned water and wastewater operations and facilities will be managed by the City of North Port Utilities Department.

2. Utilities not owned and operated by the City will be managed by those organizations based on their respective emergency operations plans.

C. Assignment of Responsibilities

1. See City's Comprehensive Emergency Management Base Plan.

a. The Director of the Utilities Department will:

In an activation of the City EOC, the Utilities Group Director will be responsible for the overall coordination of public and private utilities during a disaster. If the disaster affects only the Utilities Department, the City Manager may appoint the Director as Incident Commander.

b. The Public Information Officer will:

Coordinate with the EOC and utilities representatives to provide timely, accurate, and consistent information to the public regarding utility outages, including communicating:

i. Protective measures, such as "boil water" orders.

ii. Conservation guidance.

iii. Instructions, including where to obtain water, ice, and other essentials.

c. The EOC will monitor utility response and recovery operations regarding major utility interruptions that may affect public health and safety or threaten public or private property.

2. Non-City owned and operated utilities will be responsible for the maintenance, repair and restoration of their respective utilities.

   a. Each utility organization, both City and privately-owned and -operated, will direct its response and recovery activities.

   b. Utility crews responding from other geographical areas pursuant to a utility mutual aid agreement and contractors hired by utilities to make repairs will normally receive their assignments from the utility that summoned or hired them.

D. Restoration Priorities

Priorities for utility restoration will depend on the nature, location, and extent of the incident. Vulnerable populations and facilities essential for public safety and health will be considered first. These facilities may include medical facilities, nursing homes, water and wastewater treatment facilities, schools, grocery stores, government buildings, telecommunications and power facilities. Other facilities may be determined as dependent by the nature of the disaster and location of the event. The Base Plan of the Comprehensive Emergency Management Plan (CEMP) identifies locations designated as "Critical Infrastructure," which would receive priority restoration.

IV. RESPONSE OPERATIONS

A. City Response

1. It is essential to obtain an initial estimate of the likely duration of a major utility outage from the utility as soon as possible after it occurs. Once the estimate is obtained, a determination of the anticipated impact and actions required to protect public health and safety, and public and private property can be made.

2. Extended utility outages may require the City to act to protect public health and safety and public and private property. Such actions may include:

   a. Water or Wastewater Outage

      i. Curtail general water service to residents to retain water for firefighting and for controlled distribution to residents in containers.

ii. Arrange for supplies of emergency potable drinking water for the public and for bulk water for those critical facilities that require it to continue operations.

- Open Neighborhood Points of Distribution (NPOD) in areas where access to open retail outlets is limited.

iii. If wastewater service is disrupted, arrange for portable toilets and hand washing facilities to meet sanitary needs.

b. Electrical or Natural Gas Outage

i. Operate emergency generators to power water pumping stations, water treatment facilities, wastewater lift stations, wastewater treatment facilities, fueling facilities, and other critical sites.

ii. During periods of extreme cold weather, coordinate the establishment of shelters for residents who lack heat in their homes.

iii. During periods of extreme heat, coordinate the establishment of "cooling sites" for residents who do not have air conditioning in their homes.

iv. Request appropriate volunteer groups to set up mass feeding facilities, as necessary, for those who do not have electrical or gas service and cannot prepare meals.

v. Arrange for fuel deliveries to keep emergency generators running at critical City facilities.

c. Telecommunications Outage

i. Request telecommunications providers to implement priority service restoration plans to include establishment of cellular on wheels units (COW).

ii. Activate amateur radio support, as needed.

iii. Request external assistance (e.g., telecommunication providers, Sarasota County, State Division of Emergency

Management, etc.) in obtaining additional radios and repeaters or satellite telephones.

d. General

i. Isolate damaged portions of utility systems so as to restore service quickly to those areas where systems are substantially undamaged.

ii. In cooperation with utilities, institute conservation measures. See Appendix 4 to this Annex.

iii. Disseminate public information requesting conservation of utilities and water advisories (e.g., health issues such as a "boil water" advisory for emergency water purification.)

iv. Coordinate with medical facilities that must relocate patients, residential schools and similar institutions that cannot maintain the required level of service for their clients.

v. Assign law enforcement personnel at key intersections if traffic control devices are inoperative.

vi. Consider increased security patrols and staging fire equipment in areas without electrical or water service.

vii. Provide inspection services prior to restoration of service at building.

B. Facilitating Utility Response

1. The City may facilitate utility response by:

a. Coordinating with utility companies on utility outage areas that have been reported to the City.

b. Requesting citizens to initiate conservation measures. See Appendix 4.

c. Coordinating with the utility on priorities for clearing debris from roads which also provides access to damaged utility equipment.

d. Providing access and traffic control in utility repair areas where appropriate.

2. Large-scale Emergency Situations/Disasters

In large-scale emergency situations which produce catastrophic damage in a limited area (such as a tornado) or severe damage over a wide area (such as a hurricane), utilities are typically faced with a massive repair and rebuilding effort that cannot be completed in a reasonable time without external support. In such circumstances, utilities typically bring in equipment and crews from other utilities pursuant to mutual aid agreements and from specialized contractors.

C. Protecting Resources and Preserving Capabilities

In the event of a slowly developing emergency, it is possible that utilities may be able to mitigate some of the effects of a major emergency or disaster by protecting key facilities and equipment.

1. In the face of a threat of flooding, facilities may be protected by constructing dikes, sand-bagging, or using pumps to prevent water from entering the facility. To preserve pumps, electrical control panels, and other vital equipment, it may also be prudent in some cases to remove the equipment from facilities to prevent damage due to rising water.

2. Loss of power could severely affect critical functions such as communications, water pumping, purification and distribution, wastewater disposal, traffic control and operation of critical medical equipment. Critical facilities that require back-up electrical power should have appropriate generation equipment on site. If this is not feasible, emergency generator requirements should be pre-determined to facilitate timely arrangements for such equipment during emergency situations. Appendix 3 provides forms to record information on existing backup generators and to identify requirements for additional emergency generators.

D. Utility Support for Emergency Response Operations

The assistance of utility providers may be needed to support other emergency response and recovery operations. Such assistance may include:

1. Rendering downed or damaged electric lines safe to facilitate debris removal from roadways.

2. Cutting off utilities to facilitate the emergency response to fires, explosions, building collapses, and other emergency situations.

3. Facilitating search and rescue operations by cutting off electrical power, gas, and water to areas to be searched.

4. Establishing temporary utility hookups to facilitate response activities.

E. Utility Support for Disaster Recovery Operations

Utilities play a primary role in the recovery process relating to:

1. Rendering electrical lines and gas distribution lines safe before local officials authorize re-entry of property owners into affected areas to salvage belongings and/or repair damage to their homes and businesses.

2. Participating in inspections of affected structures to identify hazards created by damaged utilities and eliminating those hazards.

3. Restoring utility systems to their pre-disaster condition.

F. Public Information

1. It is essential to provide the public information on utility status, the anticipated time it will take to restore service, recommendations on dealing with the consequences of a utility outage, conservation measures, and information on sources of essential life support items. Public information relating to utility outages should be developed by the utility/utilities affected to ensure that messages are accurate and consistent.

2. In some emergency situations, many of the normal means of disseminating public information may be unavailable and alternative methods of getting information out to the public will be necessary.

3. Utilities are complex systems and service may be restored on a patchwork basis as damaged components are repaired or replaced. Some neighborhoods may have utility service restored while adjacent neighborhoods may not.

G. Phases of Management

1. Mitigation

a. Review proposed utility construction or renovation activities to determine if existing hazards will be increased by such activities.

b. Utilities should assess the vulnerability of their systems to known hazards and act to lessen such vulnerability.

c. Maintain portable generators and pumps to meet unexpected needs and/or identify sources for such equipment that can be accessed during an emergency.

2. Preparedness

a. Work with utilities to identify damage assessment information they can normally provide in an emergency.

b. Ensure the EOC has emergency contact numbers for the utilities providers.

c. Request that utilities brief the EOC staff on their emergency service restoration plans periodically.

d. Encourage the utilities to participate in drills and exercises conducted by the City.

e. Utilities should ensure emergency plans are up-to-date and equipment is in good repair and secure.

3. Response

a. Coordinate with utility companies to obtain regular reports on their operational status, number of customers affected by service outages and areas affected. Representatives from the City Utilities Department, Verizon, and Florida Power and Light may be present in the EOC.

b. Provide expedient substitutes for inoperable utilities at critical facilities to the extent possible or relocate those facilities if necessary. Update utility restoration priorities for critical facilities as necessary.

c. If an extended utility outage is anticipated, take those actions necessary to protect public health and safety, private and public property and implement utility conservation measures.

d. Facilitate utility emergency response to the extent possible.

e. Include utility status information in the Situation Reports produced during major emergencies and disasters.

4. Recovery

a. Request regular reports concerning the operational status, the number of customers affected by service outages and areas affected for utilities with system damage.

b. Obtain estimates of damages for inclusion in the City's requests for disaster assistance.

c. Update utility restoration priorities for critical facilities as appropriate.

d. Request utilities that participate in major emergency operations to participate in any post-incident review of such operations.

V. ADMINISTRATION AND TRAINING

A. Administration

1. A record of costs and expenses incurred in direct support of an emergency or disaster situation will be maintained to support subsequent reimbursement claims to state and federal government. Examples of fiscal expenditures which should be recorded, fully detailed, and maintained are:

a. Personnel costs which exceed "normal" costs, i.e., overtime.

b. Equipment rental or lease.

2. The persons responsible for the implementation of this Annex will annually review the Annex to insure currency.

B. Training

The individuals responsible for the Utilities function will participate in planning and training exercises conducted for the Emergency Operations Center Staff.

APPENDIX 1 TO ANNEX F

LOCAL UTILITY INFORMATION

1. Electric

   Florida Power and Electric, its mutual aid electric companies and private contractors, would be responsible for repair, restoration and maintenance of its infrastructure should an emergency or disaster damage it.

2. Telecommunications

   Frontier, its mutual aid telephone companies and private contractors would be responsible for repair, restoration and maintenance of its infrastructure should an emergency or disaster damage it.

   Verizon is the City's providers of cellular service and would be responsible for repair, restoration and maintenance of its infrastructure.

3. Natural Gas

   Peoples Gas System, its mutual aid natural gas companies and private contractors would be responsible for repair, restoration and maintenance of its infrastructure should an emergency or disaster damage it.

4. Propane

   AmeriGas, its mutual aid propane gas companies and private contractors would be responsible for repair, restoration and maintenance of its infrastructure should an emergency or disaster damage it.

5. Water

   Owned by the City of North Port and operated by the Utilities Department, Water Treatment Plant.

6. Wastewater

   Owned by the City of North Port and operated by the Utilities Department, Wastewater Treatment Plant.

7. Cable Television

Comcast and Frontier, their mutual aid natural cable television companies and private contractors would be responsible for repair, restoration and maintenance of their infrastructure should an emergency or disaster damage it.

APPENDIX 2 TO ANNEX F

UTILITY RESTORATION PRIORITIES FOR CRITICAL FACILITIES

Florida Power and Light maintains a listing of utility restoration priorities for critical facilities, emergency notification procedures, emergency telephone numbers and designated emergency points of contact.

This list is updated on an annual basis, prior to the beginning of hurricane season.

APPENDIX 3 TO ANNEX F

EMERGENCY GENERATOR FORMS

1. The emergency generator forms which follow are provided to facilitate pre-planning for emergency generator requirements, either to obtain a generator which does not have one or replace an existing generator which has failed.

    a. The Emergency Generator Information – Existing Installation form should be used to record information on existing emergency generators in case they must be replaced.

    b. The Emergency Generator Information – Additional Equipment form should be used to identify requirements for additional emergency generators for critical facilities that do not currently have such generators.

2. Forms should be completed by the owner or operator of the facility that has or may need a generator and provided to the local EMC. A separate form should be completed for each existing generator or additional generator that is required. The EMC will maintain completed forms for use during emergencies. It is suggested that individuals completing these forms retain a copy for their own records.

3. In completing these forms, keep the following in mind:

    a. If in doubt about what type of capability is needed, consult a qualified electrician.

    b. Generators are often quite heavy and should be placed on a firm, level site, and preferably a paved area.

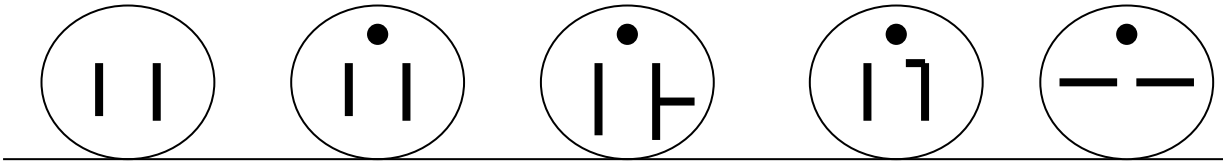
    c. A forklift is normally used to place a skid-mounted generator. The forklift operator must have adequate room to maneuver.

    d. In considering emergency generator siting, remember that generators are often noisy and produce exhaust fumes that may be sucked into nearby ventilation intakes. Vehicle access will be needed to refuel.

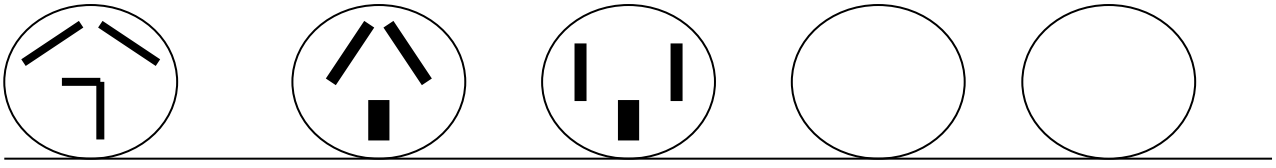
APPENDIX 3 TO ANNEX F

EMERGENCY GENERATOR INFORMATION
(Existing Installation)

1	Facility Name:
2	Facility Address:
3	Facility Type: ☐ EOC ☐ Communications Ctr ☐ Medical Facility ☐ Fuel Facility ☐ Law Enforcement ☐ Fire/Rescue Facility ☐ EMS Facility ☐ Water Pumping /Treatment ☐ Wastewater Pumping/Treatment ☐ Other (specify)
4	Facility Point of Contact: Phone:
5	If more than one generator exists, provide generator number or location within facility:
6	Electrical Requirements: Kilowatts: Volts: Amperes: Phase: ☐ Single ☐ 3-Phase Wye ☐ 3-Phase Delta ☐ Other:
7	Fuel: ☐ Gas ☐ Diesel ☐ Propane ☐ Other:
8	Fuel Tank Size: Gallons: Pounds:
9	Fuel Tank Type: ☐ Attached to generator ☐ Separate tank
10	Generator Weight: ☐ Pounds: ☐ Tons:
11	Starting: ☐ Automatic ☐ Manual/Recoil ☐ Other:
12	Generator Support: ☐ Pad/Permanent Installation ☐ Skid ☐ Trailer
13	Generator in Weather Housing: ☐ Yes ☐ No
14	Electrician On-site or Available: ☐ Yes ☐ No
15	Is Generator Hard Wired to Electrical System? ☐ Yes ☐ No
16	Generator Receptacles Required (indicate numbers and types; see illustrations below):
17	Other Pertinent Information:



15A-125V NEMA 1-15R | 15A-125V NEMA 5-15R | 20A-125V NEMA 5-20R | 30A-125V NEMA 5-30R | 30A-250V NEMA 6-30R



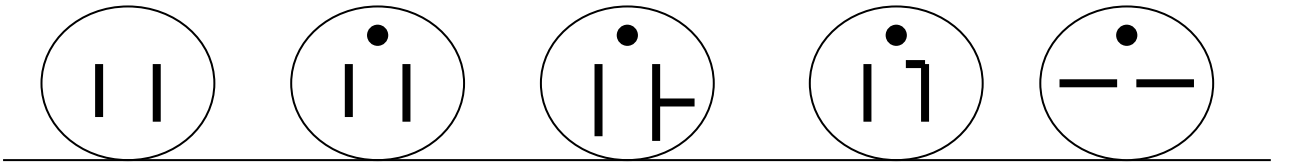
30A-125/250V NEMA 5-30R | 50A-125/250V NEMA 10-50R | 50A-250V NEMA 6-50R

If illustrations don't match what you have, draw your receptacles

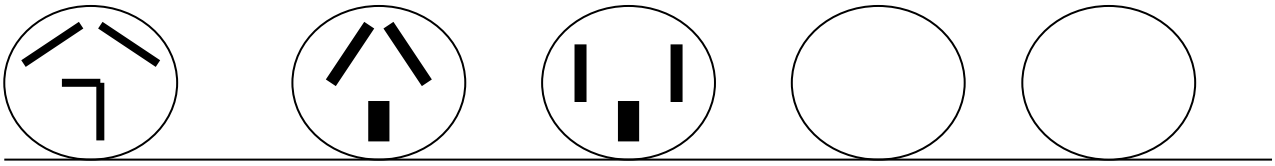
APPENDIX 3 TO ANNEX F

EMERGENCY GENERATOR INFORMATION
(Additional Equipment)

1	Facility Name:
2	Facility Address:
3	Facility Type: ☐ EOC ☐ Communications Ctr. ☐ Medical Facility ☐ Fuel Facility ☐ Law Enforcement ☐ Fire/Rescue Facility ☐ EMS Facility ☐ Water Pumping /Treatment ☐ Wastewater Pumping/Treatment ☐ Other (specify)
4	Facility Point of Contact: Phone:
5	Electrical Requirements: Kilowatts: _____ Volts: _____ Amperes: _____ . Phase: ☐ Single ☐ 3-Phase Wye ☐ 3-Phase Delta ☐ Other:
6	Fuel Available: ☐ Gas ☐ Diesel ☐ Propane ☐ Other:
7	Site Access: Site accessible for emplacing trailer-mounted unit? ☐ Yes ☐ No Site accessible for unloading/positioning skid-mounted unit? ☐ Yes ☐ No
14	Electrician On-site or Available: ☐ Yes ☐ No
16	Generator Receptacles Needed (indicate numbers and types; see illustrations below):



15A-125V NEMA 1-15R | 15A-125V NEMA 5-15R | 20A-125V NEMA 5-20R | 30A-125V NEMA 5-30R | 30A-250V NEMA 6-30R



50A-125/250V NEMA 10-50R | 50A-250V NEMA 6-50R

If illustrations don't match what you have, draw your receptacles

APPENDIX 3 TO ANNEX F

EMERGENCY GENERATOR INFORMATION
(Facility Assessment Worksheet)

Facility Name: _____ Remarks:_____
Location:_____ _____
City:_____ State:_____ _____
County/Municipality:_____ _____
Building Use:_____ Alt POC:_____
AGENCY CONTACT INFORMATION:
Power(kW) Voltage Point of Contact:_____
Agency:_____
Pre-Assessment Phone:_____
(User) site data Amperage Phase (1/3) FAX:_____
E-mail:_____

ASSESSMENT DETAILS

Main Breaker # of Service
Current: (Amps)____ Drops_____
Service Drop type: Transformer Mount:
Site Voltage_____ Feeder Cable Size: _____ Overhead Pad
Underground Pole

Backup/Existing Generator Information (if Applicable):

Latitude (North) Longitude (West):
Power(kW): _____ Voltage (V)_____
Degrees: _____ Degrees: _____
Internal Fuel
Capacity: _____ Hours: _____ Minutes: _____ Minutes: _____
Fuel Type: _____ Phase: _____ Seconds: _____ Seconds: _____

Needed Generator Information: _____ N
Power (kW):_____ _____ W

Voltage:_____ Generator Connection Point:

Phase(s):_____ _____

Configuration:_____

Assessment Remarks: *Below, provide the materials required to mate the facility with the generator.*

BOM	Category	Description	QTY Required	Unit

APPENDIX 4 TO ANNEX F

UTILITY CONSERVATION MEASURES

The utility conservation measures outlined in this appendix are suggested measures. The specific measures to be implemented should be agreed upon by the City and the utilities concerned.

I. Conservation Measures for Natural Gas

A. Step 1. Discontinue:

1. Use of gas-fueled air conditioning systems except where necessary to maintain the operation of critical equipment.

2. All residential uses of natural gas, except refrigeration, cooking, heating, and heating water.

3. Use of gas-fueled clothes dryers.

B. Step 2. Reduce:

1. Thermostat settings for gas-heated buildings to 65 degrees during the day and 50 degrees at night.

2. Use of hot water from gas-fueled water heaters.

II. Conservation Measures for Electric Power

A. Step 1. Discontinue:

1. All advertising, decorative, or display lighting.

2. Use of electric air conditioning systems except where necessary to maintain the operation of critical equipment.

3. Use of electric ovens and electric clothes dryers.

4. Use of all residential electric appliances, except those needed to store or cook food and televisions and radios.

B. Step 2. Reduce:

1. Reduce thermostat setting for electrically heated buildings to a maximum of 65 degrees during the day and 50 degrees at night.

2. Minimize use of hot water in buildings that use electric water heaters.

3. Reduce both public and private outdoor lighting.

4. Reduce lighting by 50 percent in homes, commercial establishments, and public buildings.

C. Step 3. Cut off electricity to:

1. Non-essential public facilities.

2. Recreational facilities and places of amusement such as theaters.

D. Step 4. Cut off electricity to:

1. Retail stores, offices, businesses, and warehouses, except those that distribute food, fuel, water, ice, pharmaceuticals, and medical supplies.

2. Industrial facilities that manufacture, process, or store goods other than food, ice, fuel, pharmaceuticals, or medical supplies or are determined to be essential to the response and recovery process.

3. Office buildings except those that house agencies or organizations providing essential services.

III. Water Conservation Measures

A. Step 1.

1. Restrict or prohibit outdoor watering and washing of cars.

2. Close car washes.

B. Step 2

1. Restrict or curtail water service to large industrial users, except those that provide essential goods and services.

2. Restrict or prohibit use of public water supplies for irrigation and filling of swimming pools.

3. Place limits on residential water use.

C. Step 3

1. Restrict or cut off water service to industrial facilities not previously addressed, except those that provide essential goods and services.

2. Restrict or cut off water service to offices and commercial establishments, except those that provide essential goods and services.

D. Step 4

1. Restrict or curtail residential water use.

ANNEX G

TERRORISM

I. PURPOSE

II. EXPLANATION OF TERMS

A. Acronyms
B. Definitions
C. References

III. SITUATION AND ASSUMPTIONS

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B. Assumptions

IV. METHOD OF OPERATIONS

A. General
B. Prevention
C. Detection, Notification and Classification of a Terrorist Event
D. Response
E. Coordination of Incident Management Activities
F. Implementation of the Incident Command System
G. Protective Actions
H. Requesting External Assistance
I. Phases of Management

V. ORGANIZATION AND ASSIGNMENT OF RESPONSIBILITIES

A. Organization
B. Assignment of Responsibilities
C. General Response Checklist

VI. DIRECTION AND CONTROL

VII. ADMINISTRATION & SUPPORT

A. Reports & Records
B. Preservation of Records
C. Post-Incident Review

VIII. ANNEX DEVELOPMENT & MAINTENANCE

A. Responsibility

B. Schedule for Annex Updating

C. Security Considerations - General Exemptions from Public Inspection

APPENDICES

Appendix 1 Terrorist Incident Response Checklist

Appendix 2 Background Information on Chemical, Biological, Radiological, Nuclear, Explosive Agents

Appendix 3 Guidance for City Government Activities During a "Severe Risk of Terrorist Attack," Code Red

Appendix 4 Procedure for Management of Victims of a Terrorist Incident Involving Biological, Chemical or Radiological Materials

Appendix 5 Notification of Regional Domestic Security Task Force

I. PURPOSE

A. To establish operational concepts and to clarify roles and responsibilities to lessen probable confusion resulting from a threat of terrorism or an actual event.

B. This Annex defines how the City of North Port will operate during the crisis and consequence management phases of anticipated or actual acts of terrorism.

C. The Annex provides for coordinated integration and joint operations in accordance with Federal and State emergency management plans as well as related contingency plans.

II. EXPLANATION OF TERMS

A. Acronyms

ATTF	U.S. Attorney's Anti-Terrorism Task Force
CBRNE	Chemical, Biological, Radiological, Nuclear, Explosives
EMS	Emergency Medical Services
EOC	Emergency Operations Center
FBI	Federal Bureau of Investigation
FDEM	Florida Division of Emergency Management
FEMA	Federal Emergency Management Agency
IC	Incident Command
ICP	Incident Command Post
ICS	Incident Command System
JIC	Joint Information Center
JOC	Joint Operations Center
JTTF	Joint Terrorism Task Force
MACS	Multi-Agency Coordination System
NIMS	National Incident Management System
NRF	National Response Framework
NTAS	National Terrorism Advisory System
PPE	Personal Protective Equipment
SOG	Standard Operating Guidelines
UC	Unified Command
WMD	Weapon of Mass Destruction

B. Definitions

1. **Attack.** Sabotage or the use of bombs, chemical or biological agents, nuclear or radiological materials, or armed assault with firearms or other weapons by a terrorist or quasi-terrorist actor that causes or may cause substantial damage or injury to persons or property in any manner.

2. **Biological Agents.** Living organisms or the materials derived from them that cause disease in or harm to humans, animals, or plants, or cause deterioration of material. Biological agents may be used as liquid droplets, aerosols, or dry powders.

3. **Chemical Agents.** A substance with chemical properties that is intended for use in military operations to kill, seriously injures, or incapacitates people through its physiological effects. Excluded from consideration are riot control agents, and smoke and flame materials. The agent may appear as a vapor, aerosol, or liquid; it can be either a casualty/toxic agent or an incapacitating agent.

4. **Contamination.** The deposit of absorption of chemical or biological warfare agents (or conventional hazardous materials) on structures, areas, personnel, or objects

5. **Control Zones.** The geographical areas established to control a hazardous materials incident (including those involving CBRNE agents). The three zones most commonly used are the exclusion (hot) zone, contamination reduction (warm) zone, and support (cold) zone.

6. **Decontamination (Decon).** The action that is required to physically remove or chemically change contaminants from personnel and equipment. Decon is the process used to reduce the hazards of CBRNE agents to safe levels.

7. **National Response Framework (NRF).** The interdepartmental planning mechanism, developed under the leadership of the Department of Homeland Security (DHS), by which the Federal government prepares for a response to the consequences of catastrophic disasters. Federal planning and response are coordinated on a functional basis – known as emergency support functions – with designated lead and support agencies for each identified functional area.

8. **CBRNE Emergencies.** An actual or imminent set of conditions in which CBRNE agents are intentionally introduced within a specific operational area. These incidents can involve the release of warfare agents or the intentional release of industrial agents. Thus, such incidents are essentially deliberate Hazmat incidents and constitute a complex emergency

9. **Personal Protective Equipment (PPE).** Equipment and clothing required to shield or isolate personnel from the chemical, physical and biologic hazards that may be encountered at the site.

10. **Significant Threat.** The confirmed presence of an CBRNE device capable of causing a significant destructive or hazardous event, prior to actual injury or property loss.

11. **Terrorist Incident.** A violent act, or an act dangerous to human life, in violation of the criminal laws of the United States or of any State, to intimidate or coerce a government, in furtherance of political or social objectives.

    FBI Categories:

    - *Domestic* – groups or individuals whose terrorist activities are directed at elements of our government or population without foreign direction.

    - *International* – terrorist activity committed by groups or individuals who are foreign-based and/or directed by countries or groups outside the US or whose activities transcend national boundaries.

12. **Weapon of Mass Destruction (WMD).** (A) Any destructive device as defined in section 921 of 18 U.S.C., section 2332a, (which reads) any explosive, incendiary, or poison gas, bomb, grenade, rocket having a propellant charge of more than four ounces, missile having an explosive or incendiary charge more than one quarter ounce, mine or device similar to the above; (B) poison gas; (C) any weapon involving a disease organism; or (D) any weapon that is designed to release radiation or radioactivity at a level dangerous to human life.

C. References

1. FEMA, Guide for All-hazard Emergency Operations Planning (SLG-100).

2. US Department of Transportation/Transport Canada, Emergency Response Guidebook

3. Jane's Information Group, Jane's Chem-Bio Handbook

III. SITUATION AND ASSUMPTIONS

A. Situation

1. Acts of terrorism can occur without warning. The City of North Port, its governmental entities, its public and private institutions, its businesses, and its people may all be targets of terrorism.

2. Federal law dictates that all acts of terrorism planned or executed are subject to Federal jurisdiction. Federal laws assign the primary authority to the Federal government for prevention and response to acts of terrorism; local governments will provide initial response, supported by State and Federal resources as required.

3. Since terrorist acts may be violations of local, State, and Federal law, the response to a significant local terrorist threat or actual incident may include State and Federal response agencies.

4. In the event of a significant terrorist threat or incident, it is anticipated that regional, State and Federal resources will be requested in order to supplement local capabilities.

5. The presence of chemical, biological, radiological, nuclear, or explosive (CBRNE) agents may not be detected immediately. In the case of chemical, biological, or nuclear materials, they may not be discovered until sometime after casualties occur. There may be a delay in identifying the agent present and in determining the appropriate protective measures. Such agents may quickly dissipate or be persistent.

B. Assumptions

1. The Terrorism Annex could be activated based solely on a Homeland Security Advisory color change, without any specific threat information for Sarasota County or the City of North Port.

2. Public safety agencies of the City of North Port will be the “first responders” to the scene of a terrorist incident or the locations in the City where the impacts of the event are experienced.

3. A terrorist incident may be made clear to the responding organizations by the characteristics of the impacts or a declaration on the part of the perpetrators, or may be very difficult to initially detect and identify because of uncertainty as to the cause or extent of the situation.

4. The resources and/or expertise of local agencies in the City of North Port could quickly be depleted by a response to a major terrorist incident and its consequences. Extensive use of regional, State, and Federal resources and intrastate mutual aid agreements must therefore be anticipated.

5. Specialized resources, as well as those normally utilized in disaster situations, will be needed to support the response to a terrorist incident.

Such resources may not be in Sarasota County, the FDLE Region or in the State of Florida.

6. The Florida Department of Health will have a minimum of three Biosafety Level 3 laboratories available for analytical services to assist in the response to a terrorist event in Florida.

7. Resources from local, State, and Federal agencies, as well as from private organizations, will be made available on a timely basis upon request.

8. All State and local response agencies and organizations will establish and participate in a unified command structure at or near the scene, and the Emergency Operations Center of Sarasota County will be activated and staffed (if indicated by the size or scope of the incident).

9. Federal agencies with statutory authority for response to a terrorist incident, or for the geographic location in which it occurs or has impacted, will participate in and cooperate with the unified command structure established by response organizations from the City of North Port and Sarasota County.

10. A terrorist event will result in the timely activation of the City of North Port's and Sarasota County's Comprehensive Emergency Management Plans. When needed, and the Florida Division of Emergency Management (FDEM) will activate the State Comprehensive Emergency Management Plan (CEMP).

11. Responding agencies of the City of North Port and Sarasota County will have the supportive plans and procedures, as well as appropriately trained and equipped personnel, that may be needed for the general response operations related to management of the terrorist incident. This Annex assumes the resources and procedures for such related operations as hazardous material response, mass casualty incident management, law enforcement, search and rescue, and others will be in place to be utilized when needed during a terrorist incident.

12. For terrorist events involving weapons of mass destruction, there may be many casualties. Injured or ill victims will require specialized medical treatment, potentially including decontamination and medical facilities and may require establishing temporary medical operations in the field. Fatally injured victims may be numerous, and their bodies contaminated or infectious. Special mortuary arrangements are likely to be necessary.

13. Terrorist incidents may involve damage or disruption to computer systems, telecommunications networks, or Internet systems; disturbance to vital community networks for utilities, transportation, or communication; and/or could endanger the health and safety of the population at risk, interrupt emergency response operations, and result in substantial economic losses.

14. There will be very extensive media interest in a terrorist event and media management operations will require resources beyond those needed for other types of emergency management operations.

15. The City of North Port Police Department and Sarasota County Sheriff's Office are or will be subscribers to the Secure Florida Alert System (when available) and are on the FBI Law Enforcement Online (LEO) Network.

16. The City of North Port has taken proper precautions such as implementing "firewalls" and password access to their computer systems and have implemented the same reporting mechanism that was used during Y2K for cyber incidents.

17. The City of North Port is developing the capability to implement response and recovery operations for computer networks and databases disrupted by a cyber terrorist incident.

18. The 44th WMD Civil Support Team of the Florida National Guard is available for deployment to actual/suspected WMD events in a local jurisdiction. Travel time to Sarasota County from approval of the request of the State is approximately six hours.

19. Once notified of a suspected terrorist incident, the State Watch Office will make notifications specifically to the Florida Division of Law Enforcement (FDLE) and the Federal Bureau of Investigation (FBI).

20. It is possible that the use of a weapon of mass destruction, such as a biological agent, could occur resulting in widespread illness, fatalities, or environmental contamination without a readily defined incident scene. In this case emergency operations at the local level would be coordinated through the local emergency operations center. Response operations such as mass casualty management, environmental decontamination, and public information would be provided on a region-wide basis, with coordination being done through the RDSTF and the State Emergency Operations Center. The State EOC and Department of Health will conduct cross regional coordination. Sarasota County EOC will remain operational if the State or Regional EOC is activated for a local or regional event.

21. Receipt and distribution of Strategic National Stockpile will be in concert with current Florida Department of Health policies. Health policies will be coordinated with the Sarasota County Emergency Management and the Sarasota County Health Department.

IV. METHOD OF OPERATIONS

A. General

1. The organizational structure for emergency response operations is pursuant to NIMS, which employs two levels of incident management structures.

   a. The Incident Command System (ICS) includes a core set of concepts, principles, and terminology applicable to single or multiple incidents regardless of their scope.

   b. A Multi-Agency Coordination System (MACS) integrates a combination of facilities, equipment, personnel, procedures, and communications into a common framework, which allows for the coordination and support of incident management.

2. During a terrorist event, a MACS may be advisable. Central to this system is the Emergency Operations Center (EOC), which is the nucleus of all coordination of information and resources. The Incident / Unified Command (IC/UC) will manage and direct the on-scene response from the Incident Command Post (ICP). The City EOC will mobilize and deploy resources for use by the IC/UC, coordinate external resources and technical support, research problems, provide information to senior managers, disseminate emergency public information, and perform other tasks to support on-scene operations.

3. This Annex is implemented whenever there is evidence of a threat or a suspected terrorist incident. Otherwise, the normal actions outlined in the City of North Port Comprehensive Emergency Management Plan and Standard Operating Guidelines (SOG) for responding to and recovering from any emergency or disaster situation will remain in effect.

B. Prevention

1. Prior to the occurrence of a terrorist incident, there are intelligence functions that may take place. These will be the responsibility of appropriate law enforcement agencies (i.e., North Port Police Department

(NPPD), Sarasota County Sheriff's Office (SSO), Florida Department of Law Enforcement (FDLE) and the Federal Bureau of Investigation (FBI)), and will not be addressed in this annex.

a. Lead Agencies

i. NPPD – Lead local law enforcement agency

ii. SSO – Lead County law enforcement agency

iii. FDLE – Lead State law enforcement agency

iv. FBI – Lead Federal law enforcement agency

b. An IC/UC structure will be used to provide law enforcement direction and control during crisis management operations. A Joint Operations Center (JOC) may be established to coordinate law enforcement actions.

c. NPPD will work in cooperation and coordination with the FBI exercising authority for managing the response at the incident site, additional coordination with other local, State or Federal agencies will be addressed as needed.

d. Briefings of emergency management personnel and other key City officials will be conducted by NPPD throughout operations.

C. Detection, Notification and Classification of a Terrorist Event

1. Detection

Detection of an actual, suspected or threatened terrorist or cyber terrorist incident may occur through the following types of mechanisms:

a. Law enforcement intelligence efforts

b. Warnings or announcements by the perpetrators

c. The characteristics of the event, such as an explosion or chemical recognition

c. Witness accounts

d. The medical or physical symptoms of victims

e. Laboratory results from samples taken at the scene or from victims' bodies

f. Monitoring of a community's morbidity and mortality on a routine basis

g. Syndromatic Surveillance

h. Unexplained disruption or failure of a computer network, telecommunications system or Internet service

In many cases, such detection most likely would be by City or County first responding units. Information regarding the event and its consequences would then be reported from the scene to the County Warning Point.

Should detection of the event be from a telephone call or other communication threatening a terrorist action or declaring that one has occurred, the County Warning Point will utilize existing procedures to initiate an investigation and make appropriate notifications, as indicated below.

Detection of a suspected terrorist event may be from a source other than the first arriving unit or a communicated threat or declaration, such as from monitoring of morbidity or mortality statistics in the county, reports from hospital emergency departments, laboratory results from incident victims or environmental sampling, etc. In such cases, the facility or individual recognizing the indications of a terrorist event would notify the County Warning Point, and follow-up notification would be made by the County Warning Point to the State Warning Point.

Regardless of the method of detection of a known or suspected terrorist event, within the meaning of this Annex, the Sarasota County Warning Point will be notified accordingly.

2. Classification (based on the National System)

Every known, suspected or threatened terrorist event occurring in Sarasota County or its municipalities will be classified in a manner consistent with Federal policy. The Sarasota County Warning Point will be informed of the classification and will, in turn, notify the incident commander and the County EOC, if activated.

As for in this Annex, each threat level provides for an escalating range of actions that will be implemented concurrently for crisis and consequence management. Specific actions will take place, which are synchronized to each threat level, ensuring that all agencies are operating jointly with consistent executed plans. Federal and State government will notify and coordinate with local governments, as necessary. These threat levels are described below:

In response to recent terrorist attacks both foreign and domestic, the Department of Homeland Security (DHS) has updated the National Terrorism Advisory System (NTAS). NTAS communicates threat information to the public, first responders, the private sector, transportation modes and other critical infrastructure sectors.

- BULLETIN -- Describes current developments or general trends regarding threats of terrorism.

- ELEVATED ALERT -- Warns of a credible terrorism threat against the United States.

- IMMINENT ALERT -- Warns of a credible, specific and impending terrorism threat against the United States.

The Department of Homeland Security, when warranted by conditions, may change the classification at any time. The State Warning Point will then notify or confirm notification of the change through the County Warning Point to local incident commander, the unified command, FDLE and the FBI.

The incident commander for the City of North Port, or Sarasota County will also notify the County Warning Point of one of the following two situations:

- State and/or Federal resources are requested to support local operations, or

- Local capabilities are deemed to be adequate for local crisis and consequence management response operations.

The County Warning Point will then notify the State Warning Point accordingly.

If the actual or potential consequences of the incident are such that county, State and Federal resources and assistance are likely to be needed,

these will be requested by the unified command through the county Emergency Operations Center in accordance with provisions of the City of North Port CEMP.

3. Notification

Upon receipt of notification that:

a. The NTAS changes from Bulletin to Elevated Alert the State Warning Point will notify the County Warning Point and Sarasota County Emergency Management (SCEM). SCEM will disseminate this change and recommended protective actions to members of the Public Safety Advisory Group (PSAG).

b. The NTAS changes from Elevated Alert to Imminent Alert, the State Warning Point will contact the County Warning and SCEM. SCEM will disseminate this change and recommended protective actions to members of the PSAG. The Emergency Management Chief will schedule a meeting to brief PSAG representatives on the current situation and will consider activating the County EOC.

c. A known or suspected terrorist event has occurred, is occurring or may occur, the On-Duty Communications Supervisor of the County Warning Point will notify the State Warning Point, as well as county and municipal agencies in accord with existing procedures. Regardless of the source of the detection of a known, suspected or threatened terrorist event, pursuant to this annex, under all circumstances, the County Warning Point will immediately notify State Warning Point (SWP) that a terrorist incident may have occurred or has been threatened. The County Warning Point shall immediately notify the Emergency Management Chief, or his designee, following the notification to the SWP.

D. Response

Activities undertaken to deal with effects of a terrorist incident are conducted in essentially the same manner as the response for other emergencies or disasters. Post-incident activities, such as investigation, evidence gathering, and pursuit of suspects, will continue. The agency with primary jurisdictional authority over the incident designates the individual at the scene responsible for establishing command.

1. Emergency Management will coordinate consequence management and will interface with Sarasota County Emergency Management, Florida

Division of Emergency Management (FDEM) and FEMA. Field response will operate under an Incident / Unified Command (IC/UC) for initial emergency response, resolution of the life safety issues, and initial recovery actions.

2. Actions taken early primarily deal with life safety and incident stabilization.

3. Briefings of key City officials and response agencies will be conducted by Emergency Management throughout response and recovery operations.

4. If an incident involving terrorism has taken place where injuries and/or deaths have or may soon occur, all activities will be conducted under an IC/UC structure with priority given to life safety, rescue, and incident stabilization. Cooperation between functions will be critical to prevent compromise of other operations.

5. Possible indicators of a terrorist incident could be, but are not limited to:

   a. Unexplained odors

   b. Dead animals/birds/fish

   c. Blisters/rashes

   d. Mass or unusual casualties

   e. Unusual pattern of casualties

   f. Illness associated with a specific geographic area

6. Coordination of Local Medical Response to Biological Weapons Incidents

   As the medical response to an incident involving biological agents must include the local medical community as a group, the County and State health departments as well as Federal health agencies directing the response should undertake to coordinate the efforts of local medical providers to ensure that a consistent approach to health issues is taken. Hence, concise information on the threat, recommendations on what should be done to combat it, and instructions on handling victims must be provided to all hospitals, clinics, nursing homes, home health care agencies, individual physicians, pharmacies, school nursing staffs, and other medical providers. The County health department will typically take the lead in coordinating the local medical response. They may request

assistance from local professional organizations in providing information to all members of the local medical community.

E. Coordination of Incident Management Activities

1. Law enforcement agencies involved in consequence management shall keep those agencies and/or departments responsible for response and recovery efforts informed of decisions made that may have implications on the placement of resources should it be necessary. Because of the sensitivity of law enforcement sources and methods it may be necessary to restrict dissemination of some information to selected emergency management and public health officials who have a need to know. Those individuals may have to carry out some preparedness activities surreptitiously.

2. Until law enforcement and emergency management personnel agree that investigation activities have been concluded, law enforcement personnel shall participate in incident command or EOC operations to advise those carrying out consequence management operations with respect to protection of the crime scene, evidence collection, and investigation results that may have bearing on emergency operations. FDLE and the FBI will normally provide personnel to participate in an IC/UC operation to coordinate State and Federal law enforcement assistance.

F. Implementation of the Incident Command System (ICS)

Refer to the Base Plan.

G. Protective Actions

1. Responders. Emergency personnel responding to a terrorist incident must be protected from the various hazards that a terrorist incident can produce. These include: blast effects, penetrating and fragmenting weapons, fire, asphyxiation, hazardous chemicals, toxic substances, radioactive materials, and disease-causing material. See the discussion of threat weapons and their effects in Appendix 3. Though the type of protection required varies depending on the hazard, there are three basic principles of protection that apply to all hazards: time, distance, and shielding.

a. Time. Emergency workers should spend the shortest time possible in the hazard area or exposed to the hazard. Use techniques such as rapid entries to execute reconnaissance or rescue and rotate personnel in the hazard area.

b. Distance. Maximize the distance between hazards and emergency responders and the public. For chemical, radiological, and explosive hazards, recommended isolation and protective action distances are included in the *Emergency Response Guidebook* (ERG).

c. Shielding. Use appropriate shielding to address specific hazards. Shielding can include vehicles, buildings, protective clothing, and personnel protective equipment.

2. The Public. Protective actions for the public must be selected and implemented based on the hazards present and appropriate instructions and information provided to the public through usual means of warning and public information. Protective actions for the public may include:

a. Evacuation.

b. Shelter-in-place.

c. Access control to deny entry into contaminated areas.

d. Restrictions on the use of contaminated foodstuffs, normally imposed by the Florida Department of Health Services (DOH).

e. Restrictions on the use of contaminated agricultural products before processing will normally be imposed by the Florida Department of Agriculture and Consumer Services. These are products destined for food use after processing.

f. Restrictions on the use of contaminated public water supplies, normally imposed by the Florida Department of Environmental Protection (FDEP).

g. For incidents involving biological agents, protective actions taken to prevent the spread of disease may include:

i. Isolation of diseased victims within medical facilities.

ii. Quarantines to restrict movement of people and/or livestock in specific geographic areas.

iii. Closure of schools and businesses.

iv. Restrictions on mass gatherings, such as sporting events.

Such measures are normally recommended and imposed by public health authorities.

H. Requesting External Assistance

Refer to the Base Plan.

I. Phases of Management

This Annex follows a basic approach and acknowledges that most responsibilities and functions performed during an emergency are not specific.

1. Mitigation

a. Establish guidelines for terrorist incident response

b. Identify high-risk targets and their associated hazards

c. Institute security programs for the high risk and most vulnerable areas

e. Exchange information and intelligence on activities with the Joint Terrorism Task Force (JTTF) and other appropriate agencies.

2. Preparedness

a. Conduct training sessions for other response personnel

b. Ensure detection and monitoring equipment are available and operational

c. Establish decontamination protocols

d. Maintain medical and sampling supplies and equipment

e. Maintain personal protective equipment (PPE)

3. Response

a. Establish control zones for scene security, crowds, media and Hazmat operations.

b. Conduct fire and rescue, hazardous materials, and law enforcement operations

c. Stage and deploy appropriate resources

d. Alert and/or activate medical strike teams

e. Establish effective communications with all response groups

4. Recovery

a. Initiate community mental health services

b. Restore normal services

V. ORGANIZATION & ASSIGNMENT OF RESPONSIBILITIES

A. Organization

1. City departments and public safety agencies will continue to use a functional approach to solve problems and aid, as necessary.

2. While all emergency management agencies and emergency support functions may be involved in responding to a terrorist incident, certain agencies are anticipated to play a more active role in the event.

   Because of the nature of terrorism, NPPD will act as the City's lead agency for coordinating local, mutual aid, State, and Federal response during acts of terrorism.

3. Intelligence and Prevention

   Intelligence and prevention are primarily a law enforcement direction and control function at all levels of government and will be coordinated locally by NPPD.

4. Response and Recovery Operations

   a. Are performed in the same manner as any other operation conducted for an emergency or disaster in North Port.

   b. Emergency Management will coordinate the response and recovery with support provided from State and Federal government as required.

5. The coordinating agency for the Health and Medical function is the Sarasota County Health Department.

B. Assignment of Responsibilities

1. The Emergency Manager will be responsible for coordinating all EOC operations, as required.

   a. Develop and maintain a resources database

   b. Assist in identifying high risk targets and their associated hazards

   c. Determine the vulnerabilities of the high-risk areas and their impact upon the population

   d. Coordinate periodic exercises to test response

   e. Develop and promote public awareness programs

   f. Develop communication procedures

2. North Port Police Department

   a. Assign liaison personnel to the EOC

   b. Coordinate all law enforcement activities within the City

   c. Coordinate with the JTTF, and all other law enforcement agencies

   d. Develop awareness and prevention training programs for law enforcement personnel

   e. Institute security programs for the high risk and most vulnerable areas

   f. Conduct briefing sessions for emergency management and response personnel

   g. Maintain terrorist activity information

   h. Establish scene security

   i. Provide traffic control, as necessary

j. Notify appropriate Federal, State and County law enforcement agencies when activated

3. North Port Fire Rescue

a. Assign liaison personnel to the Emergency Operations Center (EOC)

b. Coordinate all fire and EMS service activities within the City

c. Provide fire suppression, search, and rescue operations, including evacuation, as needed

d. Remain on scene with unsafe structures until the scene is rendered safe

e. Respond to medical emergency calls, establish triage if needed, provide emergency medical care to the injured, including advanced life support when appropriate

f. Transport sorted patients in a timely manner to the appropriate medical facility

g. Alert hospitals of mass casualty incident with suspected CBRNE agents so they may initiate protective action plans

h. Establish control zones, PPE requirements, decon procedures, containment of product, and product identification

i. Request activation of the Sarasota County Fire Department HMRT, as needed

j. Activate mutual aid, as needed

5. Sarasota County Health and Human Services (SCHHS)

a. Assign liaison personnel to the EOC

b. Coordinate the City's Health and Medical infrastructure

c. Conduct epidemiological investigation

d. Alert hospitals of CBRNE incident so they may initiate protective action plans

e. Conduct ongoing surveillance activities

f. Provide diagnostic and reference laboratory support for the community

g. Provide ongoing analysis of data to support decision-making during an event

6. Routine operations will be conducted in accordance to standard procedures and guidelines

7. State and Federal support will be called upon when needed

8. All mutual aid resources will function under the direction of the City and immediate control of their respective supervisors

C. General Response Checklist - These steps are not in any specific order and may be performed by various individuals from various locations.

1. Be suspicious if any indicators are present and respond with heightened awareness

2. Approach with caution from uphill and upwind

3. Establish Command Post and initial perimeter, restrict entry, consider secondary devices, and treat as a potential crime scene

4. Identify a safe staging area

5. Establish command structure (fire, hazardous materials, law enforcement, emergency management, public health and medical)

6. Establish appropriate level of personal protective equipment required

7. Establish treatment plan for victims and decedents (include triage, treatment, transport and decon as appropriate)

8. Make additional notifications (Mutual-aid, City departments, County, State, and Federal)

9. Make protective action recommendations to the public

a. Basic shelter-in-place guidance should be given for residents indoors located near the incident site.

b. Quickly establish control of ingress and restrict egress from incident site to prevent contamination spread.

c. Evacuation of non-injured/non-contaminated persons must include coordination with investigating law enforcement personnel.

d. Disseminate guidance for persons in the area at the time of the event via media resources at earliest opportunity after agent identification.

10. Coordinate media

VI. DIRECTION & CONTROL

A. The Incident Commander shall, pursuant to the CEMP and NIMS, provide general guidance for emergency operations, including the response to terrorist incidents. During periods of heightened terrorist threat or after an incident has occurred, the local EOC will be activated.

B. The IC/UC, assisted by a staff sufficient for the tasks to be performed, will manage the emergency response at the incident site from an ICP. If terrorist attacks affect multiple widely separated facilities, separate incident command operations may be set up.

C. If City resources are insufficient or inappropriate to deal with an emergency, the City may request assistance from other jurisdictions pursuant to mutual aid agreements or from organized volunteer groups. Mutual aid personnel and volunteers will normally work under the immediate control of their own supervisors. All response agencies are expected to conform to the general guidance provided by our senior decision-makers and carry out mission assignments directed by the IC/UC or the EOC.

D. In a large-scale terrorist incident, significant assistance may be needed from other local governments, State agencies, and the Federal government. As these external resources arrive, they will be integrated into the operation consistent with the NIMS guidance.

VII. ADMINISTRATION AND SUPPORT

A. Reports and Records

1. Situation Report. During emergency operations for terrorist incidents, a daily situation report should be prepared and distributed to the County EOC.

2. Records Relating to Emergency Operations

   See Base Plan.

B. Preservation of Records

As terrorist often target government facilities, government records are at risk during terrorist incidents. To the extent possible, legal, property and tax records should be protected. If government records are damaged during the incident response, the EOC should be promptly advised so that timely professional assistance can be sought to preserve and restore them.

C. Post-Incident Review

See Base Plan.

VIII. ANNEX DEVELOPMENT AND MAINTENANCE

A. Responsibility

Each agency identified in section VI(B) of this Annex will develop SOGs that address assigned tasks. Emergency Management is responsible for reviewing this annex annually and updating as necessary.

B. Schedule for Annex Updating

This annex will be maintained in accordance with the following schedule:

1. The annex will be updated with each updating of the City's Comprehensive Emergency Management Plan.

2. The annex will be reviewed after each exercise and/or actual response to a terrorist event, and modified as necessary.

3. The annex will be reviewed and revised, if needed, after each of the following types of events:

   a. A major change in applicable Federal or State laws, regulations, or policies,

b. A major terrorist or cyber terrorist event impacting a jurisdiction in Sarasota County,

c. The findings of ongoing vulnerability and needs assessments in Florida, and

d. Major advances in applicable response technology and/or operational concepts

e. Security Considerations - General Exemptions from Public Inspection

Certain security procedures and plans developed resulting from this Annex to the City of North Port Comprehensive Emergency Management Plan, may, and should be exempt from public inspection under F.S. Chapter 119.

APPENDICES

Appendix 1 Terrorist Incident Response Checklist

Appendix 2 Background Information on Chemical, Biological, Radiological, Nuclear, Explosive Agents

Appendix 3 Guidance for City Government Activities During a "Severe Risk of Terrorist Attack," Code Red

Appendix 4 Procedure for Management of Victims of a Terrorist Incident Involving Biological, Chemical or Radiological Materials

Appendix 5 Notification of Regional Domestic Security Task Force (RDSTF)

APPENDIX 1 TO ANNEX G

Terrorist Incident Response Checklist

I. INDICATORS

A. Is the response to a target hazard or target event?

B. Has there been a threat?

C. Are there multiple victims?

D. Are responders victims?

E. Are hazardous substances involved?

F. Has there been an explosion?

G. Has there been a secondary attack/explosion?

II. RESPONSE ACTIONS

A. Be suspicious if any indicators are present and respond with heightened awareness

B. Approach with caution from uphill and upwind

C. Establish Command Post and initial perimeter, restrict entry, consider secondary devices, and treat as a potential crime scene

D. Identify a safe staging area

E. Establish command structure (fire, hazardous materials, law enforcement, medical, and emergency management)

F. Establish appropriate level of personal protective equipment required

G. Establish treatment plan for victims and decedents (include triage, treatment, transport and decon as appropriate)

H. Make additional notifications (Mutual-aid, City departments, County, State, and Federal)

I. Make protective action recommendations to the public

1. Basic shelter-in-place guidance should be given for residents indoors located near the incident site.

2. Quickly establish control of ingress and restrict egress from incident site to prevent contamination spread.

3. Evacuation of non-injured/non-contaminated persons must include coordination with investigating law enforcement personnel.

4. Disseminate guidance for persons in the area at the time of the event via media resources at earliest opportunity after agent identification.

J. Coordinate media

These steps are not in any specific order and may be performed by various individuals from various locations.

III. RESPONSE RESOURCES

A. Urban search and rescue teams for collapsed structures

B. Mortuary support for mass fatalities

C. Investigative resources

D. Specialized pharmaceuticals

E. Public health prevention programs

F. Personnel support for quarantine operations

APPENDIX 2 TO ANNEX G

Background Information on Chemical, Biological, Radiological, Nuclear, Explosive Agents

I. PURPOSE

This Appendix to Annex G of the City of North Port CEMP is to provide background information regarding the CBRNE agents that could be involved in a terrorist incident in the City of North Port.

II. TYPES

A. Ballistics/Explosives

Ballistic injuries resulting from terrorist attacks are still the most common and have the highest "lethality index." A determined individual or group of individuals armed with assault-type weapons can produce a high rate of casualties in a short period.

Table 1 - Lethality Index for Ballistic Injuries[1]

Weapon	Fatalities	Nonfatal Injuries	Lethality Index*
Bullets			
Low Velocity	35	430	0.08
High Velocity	152	261	0.37
Fragmentation Munitions	5	33	0.13
Homemade Bombs	10	164	0.06
High explosive Devices	79	281	0.22
Hand Thrown missiles	0	304	0
**Lethality Index is the number of fatalities divided by the number of injuries and fatalities combined [LI=fatalities) (injuries + fatalities)].*			
Information derived from Journal of the Royal Army Medical Corps			

Bombs are the most common weapons of terrorists. Bombs are easy to make from ordinary household materials and can be very effective. A fertilizer bomb blasted the Alfred P. Murrah Federal Building in Oklahoma City. When a bomb of this type explodes, it sends a shockwave in all directions and smashes into buildings blocks away. As this shock wave travels, a powerful vacuum forms behind it, sucking in the entire atmosphere that has been displaced by the original

[1] Owen-Smith MS. A computerized data retrieval system for the wounds of war: The Northern Ireland casualties. *J R Army Med Corps*. 1981; 127:31-54.

shockwave. The surrounding area is smashed a second time by the aftershock. All this takes less than a second. Materials in the way of these shockwaves become high velocity projectiles. Walls move away from the blast and then back toward the blast before finally crumbling. Floors and roofs defy gravity for a split second before collapsing to the ground. This can all be accomplished using common household substances.

Most fertilizer bombs, like the Oklahoma City bomb, generate blast waves that can exceed 6800 miles per hour. High-order military explosives, such as C4 and Semtex, can create blast waves almost three times as fast.

Table 2 - Mechanisms of Blast Injuries [2]

Type of Blast Injury	Mechanism	Injuries	Diagnostic Procedures	Treatment
Primary	Injury from blast wave as it travels through the air or water	Pulmonary contusion Hollow viscous perforation (possibly delayed) Perforated eardrums	History and Physical examination Chest Radiograph Serial abdominal examination	Pulmonary toilet Ventilatory support Laparotomy as indicated
Secondary	Injury from primary and secondary missiles as they are propelled outward by the explosion	Penetrating missile injury Orthopedic injuries	History and physical examination Neurovascular evaluation of involved extremities Director skeletal radiographs	Fracture stabilization Debridement Tetanus prophylaxis Laparotomy or thoracotomy as indicated
Tertiary	Injury sustained when the casualty is	Closed head injury	History and physical examination	Neurosurgical intervention for intracranial mass lesions

[2] **Terrorism in America, An Evolving Threat**: Matthew S. Slater, MD; Donald D. Trunkey, MD; **Archives of Surgery**, Special Article B October 1997.

	propelled (displaced) through the air and then impacts onto a relatively fixed object	Cervical spine injury Orthopedic injuries	Cervical spine evaluation Computed tomography of the head as indicated Direct skeletal radiographs	Fracture Stabilization
Miscellaneous	Burn injuries, inhalation injuries, and injuries related to structural collapse	Burns Inhalation injury Crush syndrome Compartment syndrome	History and physical examination Creatine kinase level	Secure airway Fluid resuscitation Burn coverage
Primary missiles are those derived from the bomb container itself. Secondary missiles are those generated from the surrounding blast environment (e.g. Glass and other building materials).				

B. Nuclear/Radiation

Radiation is defined as high-energy particles or gamma rays that are emitted by an atom as the substance undergoes radioactive decay, which is the process in which a radioactive nucleus emits radiation and changes to a different isotope or element. The types of radiation are in the following forms of energetic particles:

Particles lose their energy by depositing it in the material they move through, whether that material is air, water, people, or lead. Radiation, regardless of intensity, has the potential to produce harmful effects on human beings, animals, and plant life. Background (natural) radiation poses little threat to our systems. However, serious health consequences can be expected if a person is subjected to large amounts of radiation. The types of radiation and their effects are as follows:

1. **Alpha** (particulate) radiation particles cannot penetrate the outer layer of skin. They can be stopped by thin layers of light materials (such as a sheet of paper) and pose no direct or external radiation threat. *However, they pose a serious health threat if inhaled or ingested*. Therefore, a respirator or the use of Self-Contained Breathing Apparatus (SCBA) is recommended. The range in air for alpha particles is 1 to 3 centimeters.

2. **Beta** (particulate) radiation particles can penetrate skin, but not vital organs (lungs, gastrointestinal tract, heart, etc.) and represent a hazard

both internally and externally. Beta radiation can be lethal depending upon the dose and length of time of exposure. It is easily shielded by aluminum. The range in air for beta particles is approximately 10 feet. Initial symptoms are itching and burning of the skin, with later symptoms that include reddening of the skin and more severe changes in pigmentation, hair loss, and sores.

3. **Gamma** (Energy) and **Neutron** radiation particles can penetrate through the body and represent a hazard both internally and externally. These rays have high energy and a short wavelength. Shielding against gamma radiation requires thick layers of dense materials, such as lead. Gamma and neutron radiation typically have a range in air of several hundred feet.

Table 3 - Nuclear Agents[3]

Agent	Particles	Planned Use	Potential for Terrorist Use	Mode of Contamination	Critical Body Site
Uranium 235 & 238	Alpha Beta Gamma	Reactor fuel Nuclear weapons	Nuclear weapons	Inhalation Skin Wound absorption	Bone
Plutonium 239	Alpha Gamma	Reactor fuel Nuclear weapons	Nuclear weapons	Inhalation Wound absorption	Bone
Cesium 137	Beta Gamma	Medical & Industrial radiation source	Radiation Poisoning	Inhalation Skin Gastrointestinal	Total Body
Iodine 131	Beta Gamma	Medical	Radiation Poisoning	Inhalation Skin Gastrointestinal	Thyroid
Cobalt 60	Gamma	Medical & Industrial radiation source	Radiation Poisoning	Inhalation Gastrointestinal	Gastro-intestinal

The main concern with radiation is that it is an invisible hazard. Unless the responding public safety agency has radiological detection equipment, or the nuclear material at issue is clearly marked and identified, there is a strong chance

[3] ***Adapted from*** Textbook of Military Medicine.

that the initial identification of a radiological or nuclear hazard will go unnoticed. Although, there is no one piece of equipment available on the market to meet all detection requirements, there are separate detectors for each type of radiation. An additional concern would be the availability of protective clothing and breathing gear, in sufficient quantities, to protect first responders. If first responders are subjected to large amounts of radiation due to major radiation accidents or nuclear attack, they can expect serious consequences to their health. *It should be noted that individuals suffering from radiation injuries are NOT radioactive.*

Of importance is the dose or amount of radiation absorbed over a period of time. There are many terms used to measure the dose of radiation. One is the Roentgen Equivalent Man (REM), which is a unit of absorbed dose that takes into account the relative effectiveness of the radiation involved in causing health effects. Another measurement of the absorbed dose of radiation is known as rad. Sometimes rad measurements are referred to as Gray, which is the equivalent of 100 rad. In this document, health effects are expressed in rad.

1. 50 to 200 rad - Approximately 6 hours after exposure, the individual may have symptoms ranging from none to transient mild headaches. There may be a slight decrease in the ability to conduct normal activities. Less than 5 percent of individuals in the upper part of the exposure range will require hospitalization. Average hospital stay will be 45 to 60 days, with no deaths.

2. 200 to 500 rad - Approximately 4 to 6 hours after exposure, individuals will experience headaches, malaise, nausea, and vomiting. Symptoms are not relieved by antiemetics in the upper exposure range. Individuals can perform routine tasks, but any activity-requiring moderate to heavy exertion will be hampered for 6 to 20 hours. After this period, individuals will appear to recover and enter a latent period of 17 to 21 days. If individuals have received 300 rads or more, they will have large quantities of hair loss between 12 to 18 days after exposure. Following the latent stage, symptoms will return, requiring 90 percent of the personnel to be hospitalized for 60 to 90 days. Probably less than 5 percent of those at the lower dose range will die, the percentage increasing toward the upper end of the dose range.

3. 500 to 1,000 rads - Approximately 1 to 4 hours after exposure, severe and prolonged nausea and vomiting will develop that are difficult to control. Diarrhea and fever develop early in individuals in the upper part of the exposure range. Significant incapacitation is seen in the upper ranges. Initial symptoms last for more than 24 hours, then go into a latent period lasting 7 to 10 days. Following the latent stage, the symptoms return

requiring 100 percent of the individuals to be hospitalized. Of those in the lower range, 50 percent will die, the percentage increasing toward the upper range. All deaths occur within 45 days. The survivors require 90 to 120 days of hospitalization before recovery.

4. 1,000 rad or more - Less than 1 hour after exposure, individuals develop severe vomiting, diarrhea, and prostration. There is no latent period. All individuals require hospitalization and die within 30 days.

C. Biological Agents

Governments have used biological warfare as long as civilization has depended on agriculture. Today, various governments continue to research the development of poisonous toxins that are far more deadly than chemical warfare agents. Two of the earliest reported uses of toxins occurred in the sixth century BC: the Assyrian poisoning of enemy wells with rye ergot, and Solon's use of the purgative herb hellebore during the siege of Krissa.

The use of biological agents is the oldest weapon of the NBC triad. Biological agents are more deadly than chemical agents and occur in nature and are being artificially developed in the laboratory. Large numbers of naturally occurring poisons have also been examined to determine their value as warfare agents. These include Capsaicin (and extract of cayenne pepper and paprika), Ricin (a toxic substance found in the castor bean), and Saxitoxin (a toxic substance secreted by certain shellfish).

Table 7 - Biological Agent Quick Information Chart [4]

Agent	Class	Transmission	Symptoms	Treatment
Anthrax *(Bacillus anthracis)*	Bacteria	Inhalation of bacillus or spores	Dyspnea Cyanosis Pulmonary edema Respiratory failure	Vaccination Antibiotics
Bubonic plague *(Yersinia pestis)*	Bacteria	Fleas	Fever Delirium Cutaneous lesions	Vaccination Antibiotics
Salmonella species	Bacteria	Ingestion	Gastrointestinal symptoms Fever	Antibiotics

[4] **Terrorism in America, An Evolving Threat**: Matthew S. Slater, MD; Donald D. Trunkey, MD; **Archives of Surgery**, Special Article, October 1997.

Botulinum toxin *(Clostridium botulinum)*	Bacterial (Neurotoxin)	Inhalation Contact (skin wound)	Paralysis	Supportive
Gas gangrene *(Clostridium perfringens)*	Bacteria	Wound infection	Necrotizing Soft tissue infection	Antibiotics Surgical Debridement
Ebola	Virus (Filoviridae)	Body fluids	Fever Hemorrhage Convulsions	Supportive No specific treatment

1. Biological agents generally fall into one of three types:

   a. Pathogens - Living, reproducing, disease-producing organisms.

      i. Bacteria. Capable of reproducing outside living cells. Examples: anthrax, tularemia, bubonic plague, cholera, and typhoid fever.

      ii. Viruses. Infective agents composed of DNA or RNA that can only reproduce inside living cells. Examples: Venezuelan equine encephalitis (VEE), yellow fever, smallpox, hemorrhagic fever (Marburg and Ebola), and human immunodeficiency virus (HIV).

      iii. Rickettsia. Parasitic microorganisms whose diseases are transmitted by the bite of ticks, lice, and fleas. These parasites require a living host as opposed to bacteria. Examples: Rocky Mountain spotted fever, Q fever, and flea-borne typhus.

      iv. Yeast and Fungi (Mycotoxins). Mycotoxins were allegedly used in aerosol form ("yellow rain") to produce lethal and non-lethal casualties in Laos (1975-1982), Kampuchea (1979-1981), and Afghanistan (1979-1981). Since the alleged victims were usually unprotected civilians or guerilla forces in remote jungle areas, it was extremely difficult to confirm the attacks or recover samples.

However, over 10,000 deaths have been attributed to the use of these agents in these three campaigns.[5]

iv. Genetically-Engineered Pathogens. Through advanced biochemical techniques, pathogens are subject to enhancement to increase their utility. Examples: antibiotic-resistant bacteria, bacteria genetically altered to have advanced aerosol and environmental durability, immunologically altered viruses resistant to standard vaccines and not identifiable to classical serological means.

b. Toxins - Non-living, poisonous chemical compounds produced through the metabolic activities of living organisms. Toxins are 1,000 times more lethal or effective than standard chemical agents. Examples: snake venom, scorpion venom, Ricin, Saxitoxin (produced by marine algae), and puffer fish venom.

c. Endogenous Biological Regulators (EBR) - Chemical substances produced in the body to regulate various body functions such as muscle contractions, blood pressure, heart rate, temperature, and immune responses. Examples: hormones, adrenalin, and delta sleep-inducing peptide.

2. Use

The most practical method of initiating infection using biological agents is through the dispersal of agents as minute, airborne particles (aerosols). Finely divided particles of liquid or solid suspended in a gas are sprayed over a target where the particles may be inhaled. An aerosol may be effective for some time after delivery, since it will be deposited on clothing, equipment, and soil. When the decontaminated clothing is used later, or dust is stirred up, responding personnel may be subject to a secondary dispersal.

Biological agents may be able to use portals of entry into the body other than the respiratory tract. Individuals may be infected by ingestion of contaminated food and water or even by direct contact with the skin or mucous membranes through abraded or broken skin. This makes the use of protective clothing a must, along with protection of the respiratory tract through the use of a mask with biological filters or SCBA.

[5] Jane's Chem-Bio Handbook. Frederick R. Sidell, MD; Dr. William C. Patrick, III; and Thomas R. Dashneill. Jane's Information Group, 1998. Page 147.

Exposure to biological agents, unlike chemical agents, may not be immediately apparent. Casualties may occur minutes or hours to days or weeks after an incident has occurred. The time required before symptoms are observed is dependent on the agent used. There are currently no effective monitoring devices available for first responders for use in determining whether they are involved in an incident involving biological agents, though work continues developing such devices. Often the first clue will come from blood tests, or by other means used by medical personnel, or by observing possible symptoms of people exposed in the area. hazardous materials response teams and local FBI special response teams have field test kits and procedures to detect the presence of some biological agents such as anthrax.

Some clues may be present that could be indicators that an NBC incident involving biological agents has taken place:

a. Unusual numbers of sick or dying people and animals are present. For example, all the birds that are usually present at outside trash bins are dead; no insect sounds, etc.

b. Reported illness reflects an unusual or impossible agent for the geographic area or there is an unusual distribution of the disease (that is, the casualties are aligned with the wind direction outdoors).

Biological attacks will be different from natural outbreaks of disease. For example, a steady stream of patients presents to medical facilities instead of the usual peaks and valleys. Or the illness may occur in an unusual environment or time of year (such as cases of anthrax showing up where none have occurred before).

Early warning and rapid identification of biological agents is of primary importance. This warning can sometimes be supplied by intelligence sources, but early warning is not usually available.

3. Some of the more common or anticipated biological weapons are as follows:

a. **Anthrax** is an acute infectious disease caused by the spore-forming bacterium *bacillus anthracis*. It occurs most frequently in cattle, goats, and sheep that acquire spores from direct contact with contaminated soil. Humans usually become infected through contact with, ingestion of, or inhalation of anthrax spores from infected animals or their products (like goat hair). Human-to-

human transmission has not been documented. Following are sample guidelines for responding to a WMD threat involving anthrax. [6]

1. Anonymous caller indicating a WMD threat (including anthrax)

    a. Law enforcement response including, Department of Health, local authorities, State Watch Office, and FBI.

    b. Fire department/hazardous materials response not recommended unless device or substance is found

    c. Routine law enforcement investigation.

    d. Investigative actions during this response may include:

        - Information gathering at the scene
        - Building evacuation/search following local protocol
        - Taking control of the building ventilation system may be warranted, but only if based upon investigative findings.
        - Attention should be focused on appliances or devices foreign to the surroundings.
        - Included should be an assessment of the building ventilation system to rule out forced entry and tampering.
        - Protective equipment should not be required unless hazards or risks are indicated.
        - Investigations like a telephonic bomb threat.

[6] Adapted from National Domestic Preparedness Office, Special Bulletin Number 6. January 12, 2000.

e. Suspicious findings during investigation should initiate a public safety response including:

- Fire/EMS/hazardous materials
- EOD team.
- Notifications per local plan which should include local and state health departments.

2. Potential WMD device located

a. Follow local protocols for risk assessment and evaluation of potential explosive devices. Included in the response should be:

- Law enforcement including local authorities, State Watch Office, and FBI.
- Fire/EMS/hazardous materials.
- EOD team.
- Local and state health departments

b. If explosive device is not ruled out, coordinate efforts with local/regional EOD authority and notify FBI Bomb Data Center (BDC).

c. If explosive device is ruled out:

- Evaluate for potential chemical, biological, or radioactive filler.
- If radioactive filler appears to be present, follow plans for requesting additional assistance, to include Department of Health, Bureau of Radiation Control.
- If no hazardous materials appear to be present, response continues as a law enforcement investigation.

d. Device with potential chemical or biological filler or supplement.

- Follow local and FBI ERT protocols for documentation of the crime scene.
- Contain the package following recommendations from a hazardous materials authority. FBI will assure notification of FBI/HMRU.
- Options include double bagging, steel cans, poly containment vessels, or utilization of a hazardous materials over-pack.
- Control the material as evidence and follow plan for laboratory analysis.

e. Potential release of WMD material from a device.

- Control the ventilation system.
- Follow protocols for a hazardous materials incident.
- Evaluate the extent of contamination.
- Evacuation of affected areas and decontamination procedures should be selected based on an incident and risk assessment.
- Provide medical attention following the recommendations from the local/regional public health medical authority.
- Control and/or isolate the hazard.
- Treat as a hazardous materials crime scene.
- FBI will request assistance from FBI/HMRU.

3. Specific situations - envelope with potential threat of anthrax, letter opened, and material present.

a. Public safety response including local authorities, State Watch Office, and FBI.

b. Contain the package following recommendations from a hazardous materials authority.

- Options include double-bagging, steel cans, poly containment vessels, or utilization of a hazardous materials over-pack.

- Control the material as evidence and follow plan for laboratory analysis.

c. Provide medical attention/decontamination following the recommendations from the local/regional public health medical authority.

- Evaluate the extent of contamination.

- Evacuation of the affected area and decontamination procedures should be selected based on an incident hazard and risk assessment.

- Generally, medical prophylaxis and decontamination have not been indicated except for washing hands with soap and warm water.

4. Specific Situations - envelope with potential threat of anthrax, letter opened, and no specific material present.

a. Law enforcement response including local authorities, State Watch Office, and FBI

- Fire department/EMS/hazardous materials response not recommended unless suspicious material is found or individuals are presenting symptoms.

b. Handle the package following local and FBI ERT protocols

- Double bag the material and place in a suitable container such as an evidence paint can.

- Control the material as evidence and follow plan for laboratory analysis.

c. No medical attention/decontamination is necessary unless symptoms are present, although local public health authorities should be notified.

d. Handle as a law enforcement investigation.

5. Specific situations - envelope with potential threat of anthrax, letter not opened.

a. Law enforcement response including local authorities, State Watch Office, and FBI.

- Fire department/hazardous materials response not recommended unless unsuspicious material is found.

b. Handle the package following local and FBI ERT protocols.

- Double bag the material and place in a suitable container such as evidence paint can.

- Control the material as evidence and follow plan for laboratory analysis.

c. No medical attention/decontamination is necessary.

d. Handle as a law enforcement investigation.

Note: Per the CDC, hand washing is sufficient for those who have touched the envelope and letter. Decontamination or prophylaxis is not warranted.

b. Smallpox - The last reported case in the world was in 1977, and the last case in the U.S. was in 1949. This devastating disease, for which

there is no therapy, has a 30% mortality rate and commonly leaves survivors blind or seriously scarred. Smallpox is spread by aerosol or droplets and has an incubation period of 14 days. Initial symptoms resemble the flu but are followed by a rash which, unlike chicken pox, evolves with lesions in identical stages of evolution. The disease is infectious only during the rash phase. The major mechanisms of disease control are isolation (quarantine) and vaccination. Vaccination up to 4-5 days after exposure may prevent mortality.

Vaccination is confounded by two problems: first, the national stockpile is not currently sufficient for more than several million people. The second problem is adverse reaction to the vaccination (occurs with a frequency of 3 per million--40% of these cases are fatal and the rest usually have residual neurologic problems).

This disease has historically been the most feared in medicine and now represents a highly attractive form of biological weapon. Smallpox is attractive as an agent of bioterrorism in part because abandonment of vaccine programs has resulted in near universal vulnerability to smallpox.[7]

D. Chemical Agents

Chemical agents are defined as any chemical substance intended to kill, seriously injure, or incapacitate humans due of its physiological effects. They are compounds that, through their chemical properties, produce lethal or damaging effects on man.

Persistency is an expression of the duration of effectiveness of a chemical agent. The level of persistency is used to describe the tactical use of chemical agents and should not be used as terms to technically classify the agent:

Non-persistent Agents - Remain in the target for a relatively short period. The hazard, predominately vapor, will exist for minutes or, in exceptional cases, hours after dissemination of the agent. As a rule of thumb, non-persistent agent duration will be less than 12 hours.

Persistent Agents - Remain in the target area for longer periods of time. Hazards from both vapors and liquids may exist for hours, days, or even weeks after dissemination of the agent. As a rule of thumb, persistent agent duration will be greater than 12 hours. There are many factors that will affect the persistency of chemical agents:

[7] D.A. Henderson, Director, Johns Hopkins Center for Civilian Biodefense Studies, reviewed.

1. **Type of Agent** - Different agents have various consistencies or viscosity with similarities ranging from rubbing alcohol to motor oil and will evaporate or dissipate at approximately the same rate.

2. **Amount of Agent** - Different amounts and dispersal methods used (aerosol, splash) also determine the persistency of an agent.

3. **Terrain** - The terrain will also affect the duration of an agent (open area, vegetative, urban, soil composition).

4. **Weather** - Wind, temperature, humidity, solar radiation, and precipitation all impact on the duration of an agent.

Types of Chemical Agents

The menu of chemical agents is enormous as there are agents typically used by the military, agents found in industry, agents concocted in clandestine labs, and combination agents (more than one chemical agent combined for dual effects).

It would be impossible to put together a complete list of all possible chemical agents and their possible combinations, but it is feasible to list a group of chemical agents that have more likelihood for being used in the field by terrorist agents. This list is presented in symptom logic order:

a. Nerve Agents

b. Blister Agents

c. Choking Agents

d. Blood Agents

e. Incapacitating Agents

f. Vomiting Agents

g. Compound/Mixed Agents

h. Irritant or Tear Gas

These agents are further described in more detail in the following pages.

Table 4 - Chemical Agent Quick Information Chart [8]

Class	Examples	Mechanism	Symptoms	Treatment
Nerve Agents	Tabun, Sarin, Soman, VX, malathion, parathion, sevin	Inhibition of acetylocholine-esterase	Weakness Salivation Miosis Paralysis Hipoxis	Atropine 2 - Pralidoxime
Vesicants (Blister Agents)	Mustard Gas, Lewisite, Nitrogen Mustard Gas	Alkylation	Ee inflammation or upper respiratory tract irritation	Decontamination
Choking Agents	Phosgene, Diphosgen	Variable	Tearing, coughing, Dyspnea Pulmonary edema	Supportive
Cyanide (Blood Agents)	Hydrogen cyanide (AC), Cynogen halides (cyanogen chloride)	Form stable complexes with metallo-porphyrins	Hypoxia	Nitrites
Incapacitating Agents	Quinuclidinyl benzilate Cannabinols Barbituates	Variable	Central nervous system alterations	Physostigmine

E. Nerve Agents

Nerve agents acquired their name because they affect the transmission of nerve impulses in the nervous system. All nerve agents belong chemically to the group of organo-phosphorus compounds. They are stable, easily dispersed, highly toxic, and have rapid effects both when absorbed through the skin and via respiration.

All these nerve agents produce the same basic physiological effect: they act upon enzymes at the myoneural (muscle-nerve) junction, causing immediate convulsions, paralysis, and death. They can enter the body either through the lungs or the skin and are deadly in very small quantities.

Nerve agents may be absorbed through the skin, respiratory tract, gastrointestinal tract, and the eyes. However, significant absorption through the skin takes a period of minutes, and prompt medical treatment and decontamination are imperative and sometimes quite successful.

1. Physical and Chemical Properties

[8] Adapted from; Terrorism in America, An Evolving Threat**:** Matthew S. Slater, MD; Donald D. Trunkey, MD; Archives of Surgery**,** Special Article, October 1997.

The most commonly mentioned nerve agents are listed below[9]:

The "G" series of nerve agents include **Tabun (GA), Sarin (GB),** and **Soman (GD)**. These military nerve agents are generally volatile and will evaporate at approximately the same rate as water. As a liquid, these substances are heavier than water and will sink. As a vapor, they are heavier than air and will tend to sink to the lowest level (like basements and subways).

VX is a persistent military nerve agent that does not evaporate readily and is significantly heavier than air. Its primary contact hazard is as a liquid.

Parathion and Malathion are commercial pesticides. They are quickly metabolized in the body and cause effects like those of nerve agents. However, they are significantly less toxic.

Sevin (carbaryl) is a commonly used insecticide that is absorbed by ingestion and through the skin and eyes. Carbamates cause similar effects as nerve agents. However, unlike the organophosphate compounds, the toxic effect is not permanent. After several hours, the carbamate will spontaneously leave the system. This should be considered in victim care and medical treatment.

2. Mechanism of Action

A characteristic of nerve agents is that they are extremely toxic and that they have very rapid effect. The nerve agent, either as a gas, aerosol, or liquid enters the body through inhalation or through the skin. Poisoning may also occur through consumption of liquids or foods contaminated with nerve agents. The route for entering the body is of importance for the period required for the nerve agent to start having effect. It also influences the symptoms developed and, to some extent, the sequence of the different symptoms. Generally, the poisoning works faster when the agent is absorbed through the respiratory system than via other routes.

Poisoning takes longer when the nerve agent enters the body through the skin. Since the first symptoms do not occur until 20-30 minutes after the initial exposure, immediate decontamination is essential. The poisoning process may be rapid, however, if the total dose of nerve agent is high.

[9] Jane's Chem-Bio Handbook. Frederick R. Sidell, MD; Dr. William C. Patrick, III; and Thomas R. Dashneill. Jane's Information Group, 1998. Pages 32-52.

3. Symptoms

The most identifiable characteristic of nerve agent exposure is the extreme constriction of the iris (miosis) causing pinpoint pupils. Other characteristic symptoms include increased production of saliva, a running nose, and a feeling of pressure on the chest. Short-range vision also deteriorates and the victim feels pain when they try to focus on an object nearby. This is usually accompanied by headache. More unspecific symptoms are tiredness, slurred speech, hallucinations, and nausea.

Exposure to a higher dose leads to more pronounced symptoms. Tightening of the chest and dramatic mucous membrane secretions (eyes, nose, and mouth) lead to coughing and difficulty in breathing. Discomfort in the gastrointestinal tract may develop into cramps and vomiting. Involuntary discharge of urine and defecation may also occur. Symptoms, like twitching, from the skeletal muscles are very typical. If the poisoning is moderate, this may express itself as muscular weakness, local tremors, or convulsions.

When exposed to a high dose of nerve agent, the muscular symptoms are more pronounced. The victim may suffer convulsions and lose consciousness. To some extent, the poisoning process may be so rapid that earlier mentioned symptoms may never have time to develop. Muscular paralysis caused by nerve agents also affects the respiratory muscles, which is the direct cause of death. Consequently, death caused by nerve agents is a kind of death by suffocation.

Table 5 - Effects of Nerve Agents in Humans [10]

Organ or System	Effect
Eye	Meiosis (pinpoint pupils), conjunctival injection; pain in or around eye; complaints of dim or blurred vision
Nose	Dramatic mucous discharge (Rhinorrhea)
Mouth	Increased salivation
Pulmonary Tract	Tightness of chest (Bronchoconstriction) and increased secretions, cough; shortness of breath; on exam: wheezing, rales, rhonchi
Gastrointestinal Tract	Increase in secretions and motility; nausea, vomiting, diarrhea; complaints of abdominal cramps, pain
Skin and Sweat Glands	Sweating

[10] Adapted from: Recommended therapy for casualties of nerve agents; Textbook of Military Medicine Part I; Warfare, Weapons, and the Casualty; Medical Aspects of Chemical and Biological Warfare, Office of the Surgeon General, Department of the Army, United States of America: 1997, page 145: #97-22242.

Muscular	Fasciculations ("rippling"), local or generalized; twitching of muscle groups, flaccid paralysis; complaints of twitching, weakness
Cardiovascular	Decrease or increase in heart rate; usually increase in blood pressure
Central Nervous System	*Acute effects of severe exposure*: loss of consciousness, convulsions (or seizures after muscular paralysis), depression of respiratory center to produce apnea *Acute effects of mild or moderate exposure*: forgetfulness, irritability, impaired judgment, decreased comprehension, a feeling of tenseness or uneasiness, depression, insomnia, nightmares, difficulties with expression

Table 6 - Recommended Therapy for Casualties of Nerve Agents [11]

Exposure Route	Exposure Category	Signs and Symptoms	Therapy
Inhalation (Vapor)	Minimal	Pin-point pupils with or without nasal discharge; reflex nausea and vomiting	<5 min of exposure: 1 MARK I kit >5 min of exposure*: observation
	Mild	Pin-point pupils; nasal discharge; mild difficulty breathing; reflex nausea and vomiting	<5 min of exposure: 2 MARK I kits >5 min of exposure: 0 or 1 MARK I kit, depending on severity of difficulty in breathing
	Moderate	Pin-point pupils; nasal discharge; moderate to severe difficulty breathing; reflex nausea and vomiting	<5 min of exposure: 3 MARK I kits + diazepam >5 min of exposure: 1 - 2 MARK I kits
	Moderately Severe	Severe difficulty breathing; gastrointestinal or neuromuscular signs	3 MARK I kits; standby ventilatory support; diazepam

[11] Adapted from: Recommended therapy for casualties of nerve agents; Textbook of Military Medicine Part I; Warfare, Weapons, and the Casualty; Medical Aspects of Chemical and Biological Warfare, Office of the Surgeon General, Department of the Army, United States of America: 1997, page 167: #97-22242.

	Severe	Loss of consciousness; convulsions; flaccid paralysis; breathing stops	3 MARK I kits; ventilatory support; suction; diazepam
Dermal (Liquid on Skin)	Mild	Localized sweating, twitching	1 MARK I kit
	Moderate	Gastrointestinal signs and symptoms	1 MARK I kit
	Moderately Severe	Gastrointestinal signs plus, respiratory or neuromuscular signs	3 MARK I kits; standby ventilatory support
	Severe	Same as for severe vapor exposure	3 MARK I kits; ventilatory support; suction; diazepam
**Casualty has been out of contaminated environment during this time*			

F. Blister / Mustard Agents

These are chemical agents that affect the eyes, respiratory tract, and skin. Blister agents initially cause irritation of the eyes (and respiratory tract, if inhaled), erythema (reddening of the skin), then blistering or ulcerations, followed by systemic poisoning. There are three types of blister agents: mustards, arsenicals, and urticants.

Mustard is usually classified as a blistering agent owing to the wounds caused by this substance resembling burns and blisters. However, blister agents also cause severe damage to the eyes, respiratory system, and internal organs. The effect of mustard agent is delayed and the first symptoms do not occur until 2-24 hours after exposure. Lewisite and phosgene oxime, however, produce immediate pain on whatever part of the body meets the liquid or vapor, such as the eyes or skin.

1. Physical and Chemical Properties

Mustard "gas" is a liquid that is much heavier than water and its vapor is heavier than air. It has an odor of mustard, onions, or garlic that is usually detected when concentrations are close to toxic levels. Mustard can be absorbed into the body through the eyes, the skin, and the airways within seconds of contact.[12]

2. Symptoms

There are no immediate physical signs of mustard exposure. The first sign of exposure to mustard is usually redness of the skin. Over a period of hours small blisters appear and gradually combine to form larger blisters. Irritation and

[12] Jane's Chem-Bio Handbook. Frederick R. Sidell, MD.; Dr. William C. Patrick, III; and Thomas R. Dashneill. Jane's Information Group, 1998. Pages 63-74.

redness are usually the first effects in the eyes. Victims may complain of not being able to see; this is usually due to swelling and inflaming eyelids.

Signs of damage to the upper airways may include sinus pain, irritation of the nose, a sore throat, or a hacking cough. If more than a minimal amount is inhaled symptoms may include voice changes, with hoarseness or loss of voice. If large amounts are inhaled it can lead to damage of the lower airways producing shortness of breath and a severe productive cough. The shorter the onset time of these lower airway effects, the more threatening the diagnosis. Survival is unlikely if these symptoms appear earlier than 4 hours after exposure. Absorption of a large amount will also damage the bone marrow. However, these effects are not evident for approximately 3-5 days.

3. Antidotes & Treatments

There is no treatment or antidote that can affect the basic cause of mustard agent injury. Therefore, the most important measure is to rapidly and thoroughly decontaminate the patient with soap and water. Eyes are rinsed with water or a physiological salt solution for at least five minutes. A casualty should remain under observation since no signs or symptoms occur within the first few hours.

Medical treatment may include antibiotics and local anesthetics to relieve pain. Despite treatment, inflammation and light sensitivity in the eyes may remain for long periods.

G. Cyanides/Blood Agents

Cyanide produces clinical effects by causing cell death. It does so by entering each contaminated cell of the body and poisoning the mechanism that uses oxygen. Oxygen enters the body though the lungs and is carried by the blood to the cells. Cyanide prevents the cells from using the oxygen and they suffocate.

The body can destroy small amounts of cyanide and leave no effects on the body. Large amounts will affect the brain or central nervous system. The brain and central nervous system are dependent on oxygen and most effects of cyanide poisoning are those caused by a lack of oxygen in the brain. Exposure to a large amount will cause a sudden loss of consciousness, followed by convulsions. After 3-5 minutes breathing will stop. Death will usually occur within 10 minutes.

H. Incapacitating / Irritating Agents

Riot control agents such as CS, CN, CR, and pepper spray are commonly used in the civilian world. These agents are solids that are usually dispersed in a liquid spray. There are minor differences between riot control agents, however, the effects are similar: they cause pain or burning on exposed mucous membranes and skin.

Tearing, reddening, and closing of the eyes usually accompany burning in the eyes. If these substances are inhaled, there will be a difficulty in breathing and tightening in the chest. Skin may also become irritated and burn. The effects of these agents begin within seconds of contact and decrease as the casualty moves to clean air. It is rare for these agents to produce serious harm to a casualty, unless disseminated in a forceful manner.

I. Compound/Mixed Agents

The possible mixing of chemical agents presents an additional concern to first responders in that it will be difficult to identify (by symptoms alone) which type of chemical agent is being used.

APPENDIX 3 TO ANNEX G

Guidance for City Government Activities During a "Severe Risk of Terrorist Attack," Code Red

A. The following planning guidance will be used whenever the U.S. Department of Homeland Security places the nation under a Severe Risk of Terrorism Attack (Red). The information provided will serve as a guide and is not intended to be all-inclusive. The following scenarios have been developed as potential threats.

1. A credible threat to the City of North Port (R1)

2. A credible threat to Sarasota County. (R1)

3. A credible threat to FDLE Region 6. (R2)

4. A credible threat to the State of Florida. (R3)

5. A credible threat to the United States. (R4)

B. Notification: Following notification of a change in threat condition from Alert to Imminent from the Department of Homeland Security, the Federal Emergency Management Agency (FEMA) will broadcast this threat condition to the State Warning Point in Tallahassee. The State Warning Point will disseminate the change in threat conditions to the Sarasota County Sheriff's Office – Communications and the Sarasota County EOC. During non-duty hours, the SSO will contact the County Emergency Management Chief. Sarasota County Emergency Management will forward the threat change with recommended protective actions to the City Emergency Management Director, who will re-transmit to City employees via e-mail.

C. Organizational Responsibilities:

Emergency Management	R1	R2	R3	R4	R5
Activate Emergency Operations Center to Level 2 utilizing	X	X	X		
Establish Citizen Information Line (Phone Bank)	X	X	X		
Consider the Issuance of a State of Local Emergency	X				
Obtain Project Number from Finance Department and disseminate the number to all City agencies for use in documenting all personnel & operating costs pertinent to the event	X	X	X		
Ensure provisions for the establishment of an alternate Emergency Operations Center have been considered	X	X			
Monitor all National News Networks for current information.	X	X	X	X	

Monitor intelligence from other law enforcement agencies.	X	X	X		
Property Management - Security	**R1**	**R2**	**R3**	**R4**	**R5**
Consider 24-hour staffing of Government Security Center.	X	X	X		
Consider restricting traffic / parking outside of a 300 perimeter for specified government buildings	X	X	X		
Ensure all exterior security cameras are working properly	X	X	X	X	
Coordinate with the North Port Police Department for increased patrols at specific government facilities.	X	X	X	X	
Consider increasing the frequency of security inspections of government building exteriors	X	X	X		
Ensure all fuel tanks serving back-up generators are full	X	X	X		
Consider verifying the contents of all shipments & deliveries to all government buildings	X	X	X		
Remove external trash containers and dumpsters that are within 100 feet of buildings	X	X	X		
Manager's Office	**R1**	**R2**	**R3**	**R4**	**R5**
Consider the cancellation of night meetings in government buildings	X	X			
Consider the reduction in hours of operation for non-essential government services	X				
Consider recommending the cancellation of public events such as concerts, sports events, etc.	X	X			
Clerk's Office - Mail Distribution	**R1**	**R2**	**R3**	**R4**	**R5**
Consider "out of building" mail & package screening	X	X	X	X	
Consider verifying the contents of all shipments and deliveries to government buildings	X	X	X		
Utilities – Water and Wastewater	**R1**	**R2**	**R3**	**R4**	**R5**
Consider increasing the frequency of testing for contaminants at each water facility	X	X	X	X	
Public Works - Fleet Management	**R1**	**R2**	**R3**	**R4**	**R5**
Ensure that all tanks at City-maintained fueling centers are full.	X	X	X		
Public Information Officer	**R1**	**R2**	**R3**	**R4**	**R5**
Consider establishing a Joint Information Center (JIC) to include all Fire, Law Enforcement, Utilities and Public Works PIOs	X	X	X		

Information Technology	**R1**	**R2**	**R3**	**R4**	**R5**
Consider increasing the frequency of system back-ups to more than once per day	X	X	X		
Department Directors	**R1**	**R2**	**R3**	**R4**	**R5**
Consider restricting specific areas of government buildings to authorized personnel	X	X	X	X	

Verify for accuracy all emergency contact numbers of critical staff members	X	X	X	X	
Consider placing all critical staff members on call for emergency response	X	X	X		
Check emergency supplies and, if necessary, re-stock for a minimum of 72 hours	X	X	X		
Consider storing a three-day supply of potable water and non-perishable food at work sites	X	X			
Ensure that all personnel and operating costs pertinent to the potential terrorism threat are documented	X	X	X		
Consider the provision of escorts for visitors in secure / sensitive areas	X	X	X		
Ensure that all government vehicles necessary for emergency response have at least ½ tank of fuel	X	X	X		
Ensure that City-issued ID cards are visibly worn by all employees while on duty	X	X	X	X	
Assist Property Management with the implementation of all security measures	X	X			
Individual Employee Responsibilities	**R1**	**R2**	**R3**	**R4**	**R5**
Report suspicious activities and call 9-1-1	X	X	X	X	
Expect delays, searches of purses & bags, and restricted access to public buildings	X	X	X	X	
Expect traffic delays and restrictions	X	X	X	X	
Take personal security precautions	X	X	X	X	
Avoid crowded public areas and gatherings	X	X	X	X	
Keep emergency supplies accessible. Maintain ½ tank of fuel in personal vehicles	X	X	X		
Be suspicious of persons taking photos of critical facilities or asking detailed questions about physical security arrangements	X	X	X	X	
Monitor local and world events	X	X	X	X	
Verify contents of all shipments & deliveries	X	X	X		
Assist neighbors and co-workers	X	X	X	X	
Update personal / family disaster plan to include emergency contact information	X	X	X	X	
Limit travel	X	X	X		
Create an emergency contact list for each family member to carry	X	X	X	X	
Be familiar with emergency exits when inside buildings	X	X	X	X	
When off-duty, maintain contact with your supervisor to determine status of work	X	X	X		
Carry your City-issued identification with you	X	X	X	X	

APPENDIX 4 TO ANNEX G

Procedure for Management of Victims of a Terrorist Incident Involving Biological, Chemical or Radiological Materials

I. PURPOSE

This document is an Appendix to the Terrorism Incident Response Annex of the City of North Port Comprehensive Emergency Management Plan. It provides guidance for City emergency response officials on the management of victims potentially contaminated or infected by biological, chemical or radiological agents released during a terrorist incident.

II. REMOVAL OF CASUALTIES/FATALITIES

Designated and properly protected response personnel will extricate victims who are unable to move themselves outside of the hot or warm zones. The extrication of victims will be done in accordance to either standard or specialized triage practices. Obvious fatalities will be left in place pending the activation and arrival of the Medical Examiner's Team and/or Disaster Mortuary Operational Response Team (D-MORT).

III. DECONTAMINATION OF CASUALTIES

The standard hazardous material decontamination procedure will be followed. If it is determined that an alternate decontamination method is needed due to a contaminant, the on-scene Medical Officer in Charge, Poison Control, CHEMTREC, local hazardous materials response team, Department of Health and/or the military will be consulted.

Decontamination (decon) is to proceed as soon as possible, based on three considerations:

1. Whether a person or an article is contaminated;

2. The type and physical property of the contaminant (gas, liquid, or solid); and

3. The medical condition of the victim (triage).

In all cases, as much contamination as possible should be left in the Hot Zone. Priority must be given to the decontamination of persons. Generation of diluted contaminant (due to flushing or any other action) requires the capture and confinement of that material, whenever possible. In decontamination, time is of the essence, the longer that a person remains in contact with a hazardous material, the greater the absorption of the contaminant by that person. Quick decontamination of victim(s) is the goal of first responders. The most effective decontamination time is within 1 to 2 minutes after

exposure. The simple removal of the victims' clothing can effectively remove much of the contaminants.

All decontamination actions conducted by first responders will be carried out using the appropriate personal protection equipment (PPE) as determined by the senior Hazardous Materials Officer on-scene or by the appropriate Standard Operating Procedures (SOPs). ***In the event of gas or vapor contamination, the simple removal of the outer layer of clothing on the victim may be sufficient decontamination***. If further, or more thorough, decontamination is necessary, it will be performed in the following three stages:

1. Gross decontamination involves the safe removal of the victim from the contaminated environment, complete removal of the victims' clothes, and a complete head to toe rinse with the appropriate solution (usually plain water or a combination of water and soap.)

2. Secondary decontamination involves more thorough washing of the victim in a head to toe fashion possibly using a decontamination solution, which is then followed by a complete rinsing.

3. Definitive decontamination is carried out by a series of washes and rinses until such time that it is certain that all contaminants have been removed from the victim. Definitive decontamination will usually take place at a medical facility.

First responding units arriving at a suspected terrorist attack will position their apparatus and equipment in an up-wind position and prepare to set up a drench decontamination corridor using on-board appliances and water supply, if necessary. If and when possible, first-in engine or aerial companies should connect to an appropriate hydrant and conduct a forward lay to provide a supply line to guarantee an uninterrupted water supply to adequately perform gross decontamination operations and anticipate the initial elements of a decontamination corridor. In the absence of a hydrant, a secondary source of water must be located, drafting operations should be considered, and the appropriate tanker apparatus should be deployed.

IV. TRIAGE OF CASUALTIES

Triage will be coordinated by the Medical Officer and may be highly specialized to the extent of the type of agent involved and its level/method of exposure in comparison to the victim’s injuries. Otherwise, triage will be performed in accordance with the Simple Triage and Rapid Treatment (S.T.A.R.T) method. Most Florida fire/rescue/EMS departments have adopted this Mass Casualty Incident (MCI) triage method. Every local fire department should have START kits on their first response apparatus as part of their standard equipment inventory.

START is a tag system designed to assess a large number of victims rapidly and can be used by all personnel regardless of their medical training. The initial triage is accomplished by the assessment of respiratory rate, perfusion, and mental status. Triage ribbons/tags are used to identify the priority of the patients.

- **RED** - **First Priority** – Immediate
- **YELLOW** - **Second Priority –** Delayed
- **GREEN** - **Third Priority –** Ambulatory
- **BLACK** - **Deceased**

Secondary triage is performed on all patients during the treatment phase in the medical sector. During this phase patients can be up-graded or downgraded depending upon the dynamics of their injuries.

V. TREATMENT OF CASUALTIES

The reality of an incident of large proportions has shown that victims will leave the scene and either walk to or find a rapid transport to a medical facility--usually the facility closest to the incident site. The danger in this is that victims may be contaminated with an agent that could then contaminate other people, vehicles, and medical facilities that will, in turn, increase the number of casualties and overwhelm the facility. Emergency personnel on scene should plan to have a staging area for victims. Local medical facilities will be contacted as soon as possible for them to prepare an exterior triage and decontamination area to ensure the safety of their staff and facility. Medical and other personnel will be apprised of conditions that may develop over time in case patients develop complications later. Patients who exhibit suspect symptoms will be treated by established protocols.

VI. ISOLATION AND QUARANTINING OF THE INJURED AND EXPOSED

The criteria and procedures for isolating/quarantining the injured and other exposed people who cannot be safely extracted, pending arrival of appropriate assistance, should be addressed in the local fire/rescue department's procedure manuals. Usually the first arriving unit will perform the initial size-up. An approximation of the number of victims and MCI level will be announced. Special needs such as isolation or quarantining exposed victims will be determined at this point. Incident command and a staging area will be established.

Most fire department hazardous materials operating policies require that the area be isolated and entry denied to all personnel until the material(s) has/have been identified. Protective clothing and equipment necessary to operate safely in the affected area must be utilized. Decisions regarding long-term quarantining of the community for highly contagious biological agents will be made by Sarasota County Emergency Management in consultation with the County Health Department, State Health Department, and the Centers for Disease Control and Prevention (CDC).

VII. TRANSPORT OF VICTIMS

Victims should be decontaminated at the scene prior to transportation. Transportation of decontaminated patients to the appropriate facilities will follow the Standard Protocols for a Mass Casualty Incident. In-place, on-scene, temporary sheltering of victims may be deemed necessary while receiving facility resources are stabilized. Coordination with other County, State, and Federal resources will be conducted through the Florida Division of Emergency Management.

VIII. STOCKS OF AVAILABLE ANTIDOTES

To treat a large-scale contamination, three approaches should be taken:

1. The Regional Domestic Security Task Force has stockpiled antidotes available for distribution to field responders and local hospitals. Local hospitals may also be able to provide rescue trucks with antidotes, depending upon the antidote and required amount.

2. Second, additional supplies may be available from State and/or Federal sources, but these sources must be pre-identified and pre-planned prior to an incident. Additional antidotes may be available from surrounding Veterans Administration Medical Centers, Fire/Rescue Supply Bureaus, EMS supply bureaus, and local pharmaceutical distribution warehouses.

3. Finally, through activation of National Disaster Medical Services (NDMS), additional resources can be requested.

Appendix 5 to Annex G

Notification of Regional Domestic Security Task Force

When the City is affected by a suspected terrorist situation, the incident or unified command structure will request additional assistance from the County EOC. When the County EOC appears at risk of exhausting all local resources or determines local responders need additional resources, a request for additional assistance will be made through the County EOC to the State Warning Point in State EOC.

The State EOC will notify the ESF 16 emergency coordinating officer, the Florida Department of Law Enforcement (FDLE), who in turn will notify their Regional Operations Center(s) to notify the Regional Domestic Security Task Force (RDSTF) and to place them on alert.

The RDSTF's primary role in the response phase is to coordinate the use of the Domestic Security Response Teams. Its mission is to support the local incident command structure and not to assume command and control of the incident. However, if the County requests such command and control support, then the Task Force may coordinate the activation of a separate overhead Incident Command System team to handle this operation in coordination with the State EOC, these teams will be made up of emergency service personnel trained in the ICS positions needed to assume command and control operations.

Request for Assistance & Response:

Once the initial call for additional resources has been made, all requests for Domestic Security Response Team assistance will be coordinated with the Regional Domestic Security Task Force Coordinator through the County EOC. Initial requests for resources may be verbal as response conditions dictate, but must be followed with a written request utilizing forms contained in the State Comprehensive Emergency Management Plan for requesting mutual aid resources. The requesting jurisdiction will complete the forms, assuring that an explanation of the mission to which those resources will be assigned is included. The Regional Domestic Security Task Force Coordinator will facilitate the verbal or written request through the County EOC to the State EOC for processing. The Regional Domestic Security Task Force Coordinator, in consultation with the task force chair and/or co-chair and the State and County EOC, will determine the appropriate level of response by the Domestic Security Response Teams to the request. If determined that one or more of these teams are necessary, then the Regional Domestic Security Task Force Coordinator will activate other task force members to facilitate resource mobilization and deployment. The State EOC will provide the Regional Domestic Security Task Force Coordinator with the State Mission Number(s) through the County EOC.

The appropriate task force liaison will then notify the activated resources as soon as practicable and provide the resource supervisor (leader) with the following information regarding the mission:

- The State assigned mission number
- The location and directions of travel to the staging area at the scene of the incident
- The point of contact either at the incident scene or at the affected jurisdiction's EOC
- The cell phone number, radio frequency or telephone number where the point of contact can be reached
- A brief size-up of the incident that is being responded to
- The primary mission objective and any special instructions
- 24-hour contact numbers for the response liaisons to allow team supervisor the ability to submit daily situation reports and maintain any necessary emergency communications.

The Regional Domestic Security Task Force Coordinator or liaison will also furnish an approximate estimated time of arrival at the assigned staging area. This information will be sent to the affected County EOC and the State EOC. The Regional Domestic Security Task Force Coordinator will be responsible for tracking these resources within the region, using standardized forms for ordering resources and forms compliant with the state and Federal guidelines governing mutual aid.

<u>Regional Response Template Quick Reference Guide</u>

1. Event occurs in the County without warning; public safety response and unified command established.
2. County Emergency Operations Center (EOC) activated and notifies State Warning Point.
3. Unified Command requests additional resources from County EOC. (Local Mutual Aid exhausted)
4. County EOC responds with resources (declares local State of Emergency, if necessary).
5. County EOC evaluates need for State support, and makes request to State EOC if needed.
6. State EOC notifies ESF-16, FDLE notifies Regional Operations Center, Regional Director (RD) notifies RDSTF leadership team, RDSTF Team placed on stand-by/alert.

7. County EOC contacts RDSTF for a courtesy call Situation Report (SITREP).

8. Task Force (TF) Coordinator contacts local impacted county Emergency Management Director to establish communications and obtain current SITREP and immediate needs.

9. If the affected jurisdiction struggles to control the event and requests command and support, RDSTF will coordinate activation of separate overhead ICS team in coordination with State EOC through a request from the County EOC.

10. RDSTF will serve a regional coordinator role for the State Command and State EOC.

11. TF Coordinator notifies the following liaisons; Fire-Rescue Chair, EMS Chair, Law Enforcement Chair, Health/Medical Chair, SERT Liaison, PIO Chair, Education Chair, and Interoperability Chair. TF provides SITREP.

12. TF Coordinator in consultation with TF Chair/co-chair and State and County EOC, will determine which regional response teams to deploy based on requests received (as time allows, a written request utilizing the forms in State CEMP for requesting mutual aid is completed by requesting jurisdiction) and notify response teams to mobilize and deploy.

13. TF Coordinator to obtain a State Mission Number(s) from State EOC. Advise TF Liaisons with mission number and all details necessary for response to staging area. Response teams use TPFDL principles and concepts for deployment and response standards.

14. Coordination of out of Region resources will be conducted by TF Coordinator, State EOC, and TF Chair/Co-chair from the requesting and responding regions.

15. TF Liaison notify appropriate activated resources as soon as possible and provide resource supervisor (Team Leader) with necessary response information (mission number, location and direction travel, Point of Contact (POC) on scene or at County EOC, contact information for the POC, brief size-up of incident, primary mission objective and any special instructions, 24 hour contact numbers for the response liaisons for team supervisor to submit daily SITREPS and maintain necessary communications).

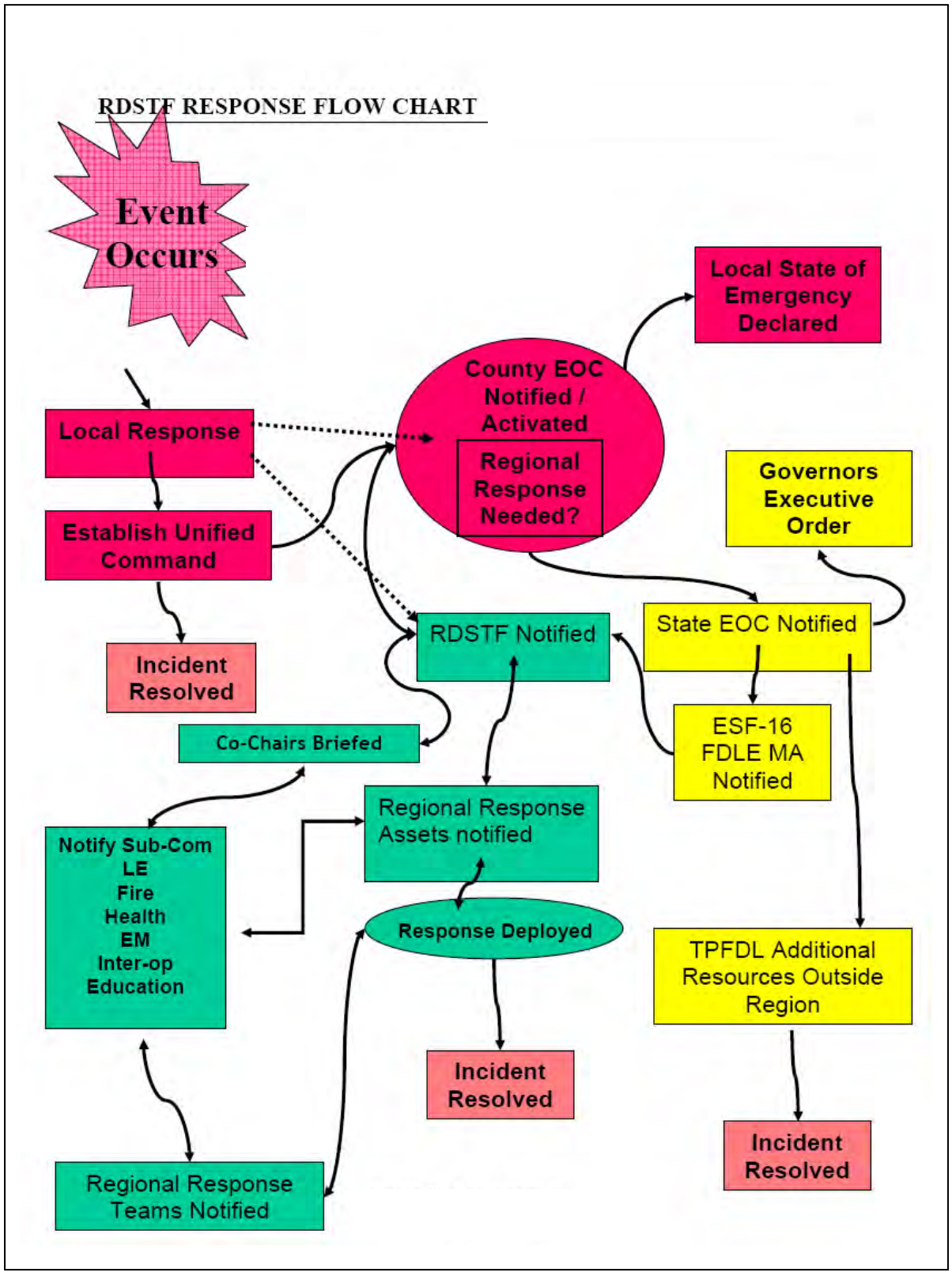
16. TF Coordinator provides approximate time of arrival of resources to staging area to County and State EOC.

17. TF Coordinator responsible for tracking resources within the region using standardized forms for ordering resources and forms compliant with State and Federal guidelines governing mutual aid agreements (TPFDL).

18. Unless otherwise specified, all regional task force resources deployed will respond to the affected jurisdiction within two hours. A deployment form will be provided to appropriate task force liaison that will provide information to the State EOC.

19. When RDSTF Response Team is deployed, the respective liaison will assure team supervisor (leader) maintains the following information until deployment is complete; appropriate ICS forms and SITREPS, contact lists, equipment/supplies inventory lists, expense activity forms.

20. Task force to determine if affected jurisdiction can maintain logistical support and service needs of activated teams. If additional logistical support is needed, RDSTF Coordinator will appoint forward liaison to serve as link between County EOC and State EOC.


RDSTF RESPONSE FLOW CHART
Event Occurs
Local Response
Establish Unified Command
Incident Resolved
County EOC Notified / Activated
Regional Response Needed?
Local State of Emergency Declared
Governors Executive Order
RDSTF Notified
State EOC Notified
ESF-16 FDLE MA Notified
Co-Chairs Briefed
Regional Response Assets notified
Notify Sub-Com
LE
Fire
Health
EM
Inter-op
Education
Response Deployed
TPFDL Additional Resources Outside Region
Incident Resolved
Incident Resolved
Regional Response Teams Notified

ANNEX H

DAM FAILURE

I. PURPOSE

II. EXPLANATION OF TERMS

A. Acronyms
B. References

III. SITUATION AND ASSUMPTIONS

A. Situation
B. Assumptions

IV. METHOD OF OPERATIONS

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B. Phases of Management

V. ORGANIZATION AND ASSIGNMENT OF RESPONSIBILITIES

A. Organization
B. Assignment of Responsibilities

VI. ADMINISTRATION & SUPPORT

A. Reports & Records
B. Preservation of Records
C. Post-Incident Review

VII. ANNEX DEVELOPMENT & MAINTENANCE

A. Responsibility
B. Schedule for Annex Updating
C. Security Considerations - General Exemptions from Public Inspection

APPENDICES

Appendix 1 Inundation Maps

I. PURPOSE

To facilitate the evacuation of downstream residents or notification of the public in the event of an imminent or impending dam failure. City officials should be prepared for reacting to unlikely but potential failure conditions at the Peace River Reservoir #2. By pre-planning the coordination of actions by the Dam Owner, the Peace River Manasota Regional Water Supply Authority, and responsible emergency management officials, timely notification, warning and evacuation can occur which will save lives and minimize property damage.

II. EXPLANATION OF TERMS

A. Acronyms

1. EAP - Emergency Action Plan

2. FDEP - Florida Department of Environmental Protection

3. MSL - Mean Sea Level

4. PRMRWSA - Peace River Manasota Regional Water Supply Authority

B. References

1. City of North Port Comprehensive Emergency Management Plan, Annex D - Flood Warning and Response

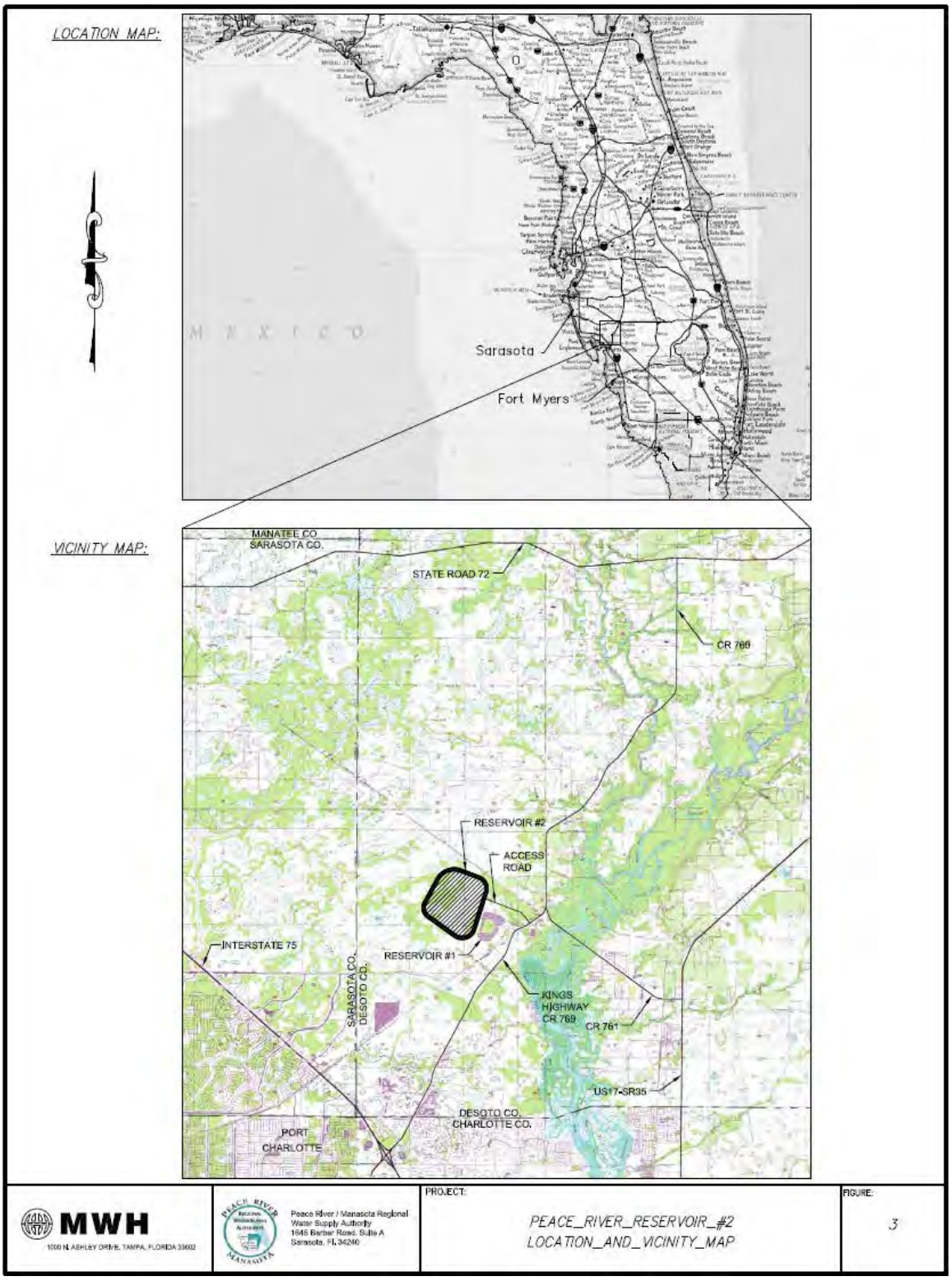
2. Peace River/Manasota Regional Water Supply Authority Reservoir, Emergency Action Plan (henceforth referred to as the EAP)

III. SITUATION AND ASSUMPTIONS

A. Situation

1. Location of Reservoir

Reservoir #2, can be accessed from the west by traveling approximately 6.5 miles northeast on Kings Highway (CR 769) from the I-75 interchange (Milepost 170) east of Port Charlotte, Florida; turn left (northwest) on a gated unpaved road that goes directly to the Reservoir #2 inlet structure. Keys for the lock on the gate are available from the Knox Box at the gate. Note that this road is in the inundation area, and may be flooded.


LOCATION MAP:
Sarasota
Fort Myers
VICINITY MAP:
MANATEE CO.
SARASOTA CO.
STATE ROAD 72
CR 769
RESERVOIR #2
ACCESS ROAD
INTERSTATE 75
RESERVOIR #1
SARASOTA CO.
DESOTO CO.
KINGS HIGHWAY
CR 769
CR 761
US17-SR35
DESOTO CO.
CHARLOTTE CO.
PORT CHARLOTTE
MWH
1000 N ASHLEY DRIVE, TAMPA, FLORIDA 33602
Peace River / Manasota Regional Water Supply Authority
1645 Barber Road, Suite A
Sarasota, FL 34240
PROJECT:
PEACE_RIVER_RESERVOIR_#2
LOCATION_AND_VICINITY_MAP
FIGURE:
3

2. Description of Reservoir

Peace River Reservoir #2 is an off-stream, above-ground reservoir that provides 18,412 acre-feet (6-billion gallons) of normal operating raw water storage for water supply to the PRMRWSA. PRMRWSA's Reservoir #1 is primarily a below-grade reservoir with approximately 2,000 acre-feet (625 million gallons) of storage located east of Reservoir #2.

Reservoir #2 is located within R.V. Griffin Reserve, an area bounded by:

- An abandoned railroad grade to the north;
- Reservoir #1 to the east;
- An old railroad grade and a residential area to the south; and,
- Undeveloped platted land to the west.

Site access is from Kings Highway to a perimeter road at the exterior toe of the embankment. The site access road extends from an intersection at King's Highway near the main entrance to the water treatment plant following an alignment approximately 100 feet north of Reservoir #1. A control gate located at the main entrance will provide security for the project site. Additionally, a perimeter fence around the reservoir will be constructed to restrict access to non-authorized personnel.

Reservoir #2 is a mostly above-ground impoundment surrounded by an earthen embankment consisting of compacted fill with a geosynthetic membrane water retaining core. A soil-bentonite slurry (cutoff) wall is constructed to limit seepage underneath the embankment, and extends from the geosynthetic membrane to an underlying low permeability clayey soil layer. In addition, an internal drain is installed to intercept potential seepage through the embankment. A perimeter drain at the downstream toe of the embankment will collect and convey seepage, from the embankment and foundation, to seepage outlets located around the perimeter of the embankment.

The normal maximum operating water level in the reservoir will be approximately 26 feet above the natural ground level (or 61.8 feet above MSL). Water will be pumped into Reservoir #2 through a submerged inlet structure. Releases from Reservoir #2 will be controlled by a gated outlet structure with an overflow spillway to Reservoir #1. The raw water source is Peace River. Water is pumped from the River via the raw water pump

station, through two 48-inch pipelines, which connect to a 66-inch supply pipeline that discharges into Reservoir #2.

B. Assumptions

1. Dam breach analyses were performed for development of this EAP. Dam-breach studies are designed to evaluate a severe hypothetical failure of the dam under a range of assumed concurrent conditions. The evacuation areas shown on EAP Figure 2 reflect the specific failure assumptions considered in the dam breach analyses. The assumptions were selected to give a "worst-case" scenario of downstream flooding for a selected reservoir condition, which would be maximum reservoir water level, and an extreme wet-weather inflow condition and an overflow failure.

2. The Peace River Reservoir #2 (Reservoir #2) project area is relatively flat with no well-defined stream/river channel, and consists of a fully encircling embankment. With an approximately 4-mile long embankment, the location of a hypothetical breach could occur at any location along the embankment. Most dam breaches occur at penetrations through the embankment (e.g. filling or outlet pipes), or at foundation defects. Therefore, model simulations included dam breach modeling at six locations around the perimeter. Flood inundation modeling of the dam breach was performed for six different locations around the dam, and the Inundation Maps showing the assumed breach location and the maximum theoretical flood wave depth, are provided in Appendix 1. Two of the modeled breach locations consisted of the pipe penetrations (the inlet pipe and the outlet/spillway pipe) through the embankment.

3. Foundation defects that are unknown cannot be predicted. The four other breach locations were selected based on proximity to population areas and to provide coverage at each of the primary compass directions (North, NE, South, SE, West, and East). Since the location of a hypothetical breach cannot be predicted, a composite map of the results for the six breach locations, presenting the hypothetical extent of inundation is shown as an evacuation map on EAP Figure 2**.** The evacuation map illustrates the time of arrival for the leading edge of a dam breach flood wave, time to 1-foot flood depth. An actual failure of the dam could result in different downstream flooding. Therefore, this map should serve as a guide for warning and evacuation, but should not replace the judgment and local experience of emergency management officials.

IV. METHOD OF OPERATIONS

A. General

1. In general, any release from the Reservoir is a flooding event, and would be managed per City of North Port Comprehensive Emergency Management Plan, Annex B - Flood Warning and Response.

B. Phases of Detection

1. Step 1 Emergency Condition Detection - This step describes the detection of an unusual or emergency event. Information is provided herein to assist the Dam Owner in determining the appropriate emergency level for the event. Unusual or emergency events may be detected by:

    a. Observations at or near the dam by PRMRWSA or other government personnel (local, state, or federal), landowners, visitors to the dam, or the public. All reports of an unusual or emergency event should be verified by the Dam Owner.

    b. Evaluation of instrumentation data

    c. Forewarning of conditions which may cause an unusual event or emergency event at the dam (for example, a severe weather or hurricane forecast)

    d. Sinkholes in or near the embankment

2. Step 2 Emergency Level Determination - After an unusual or emergency event is detected and verified, the EAP Officer is responsible for classifying the event into one of the following three levels:

    a. Emergency Level I - Urgent; dam failure is imminent or in progress:

        i. This is an extremely urgent situation when a dam failure is occurring or obviously is about to occur and cannot be prevented. Flooding will occur downstream of the dam. The appropriate Emergency Operations Center(s) should be contacted immediately so emergency services can begin evacuations of all at-risk people and close roads as needed.

ii. Examples of Emergency Level 1 Events:

- Rapid flow rate increase with cloudy discharge from existing seepage area(s) near the dam
- Rapid flow rate increase with cloudy seepage or evidence of significant, active, and continuing material movement from the drain system outfall(s)
- Sudden or rapidly progressing slides of the embankment slopes
- Overtopping flow not eroding the embankment slope; reservoir level expected to rise
- Overtopping flow eroding the embankment slope
- Detonated bomb that has resulted in damage to the dam or appurtenances
- Damage to dam or appurtenances that has resulted in uncontrolled water release
- Earthquake resulting in uncontrolled release of water from the dam

b. Emergency Level II - Potential dam failure situation, rapidly developing:

i. This situation may eventually lead to dam failure and flash flooding downstream, but there is not an immediate threat of dam failure. The appropriate Emergency Operations Center(s) should be notified of this emergency and placed on alert. The Dam Owner should closely monitor the condition of the dam and periodically report the status of the situation to the Emergency Operations Center(s) and FDEP Dam Safety Engineer.

ii. If the dam condition worsens and failure becomes imminent, the appropriate Emergency Operations Center(s) must be notified immediately of the change in the emergency level to evacuate the people at risk downstream.

iii. The Owner's Engineer of Record for the dam and the FDEP Dam Safety Engineer should be contacted to evaluate the situation and recommend remedial actions to prevent failure of the dam. The Dam Owner should initiate remedial repairs (note local resources that may be available – See EAP Appendix C-5). Time available to employ remedial actions may be hours or days.

iv. This emergency level is also applicable when discharge from the outlet-works/spillway has, or is expected to result in flooding of downstream areas where people near the channel could be endangered. Emergency services should be on alert to initiate evacuations or road closures if the flooding increases.

v. Examples of Emergency Level 2 Events:

- The reservoir level has reached El. 67.0 and is experiencing high winds.
- New seepage areas with cloudy discharge or increasing flow rate
- Rapidly enlarging sinkhole
- Cracks in the embankment with seepage
- Un-verified bomb threat that, if carried out, could result in damage to the dam
- Damage to dam or appurtenances that has resulted in seepage flow
- Earthquake resulting in visible damage to the dam or appurtenances

c. Level III - Monitoring; Operation & Maintenance Condition; Non-emergency incident; unusual event; slowly developing situation:

i. This situation is not normal but has not yet threatened the operation or structural integrity of the dam, but possibly could if it continues to develop, and/or a general state of monitoring exists during the hurricane season.

ii. The condition of the dam should be closely monitored, especially during storm events, to detect any development of a potential or imminent dam failure situation. The appropriate Emergency Operations Center(s) should be informed if it is determined that the conditions may possibly develop into a more serious condition that may require emergency actions.

iii. Examples of Level III Events:

- A hurricane is expected to make landfall near the project site
- New wet spots on the face of the dam, and the toe of the dam
- New soft spots on the face of the dam
- New seepage areas in or near the dam
- Observation of new sinkhole in reservoir area or on embankment
- Erosion gully in embankment slope of 3 feet or deeper below grade.
- New cracks in the embankment greater than *1*-inch wide without seepage
- Visual movement/slippage of the embankment slope

- Instrumentation readings beyond predetermined values
- Damage to dam or appurtenances with no impacts to the functioning of the dam
- Modification to the dam or appurtenances that could adversely impact the functioning of the dam
- Measurable earthquake felt or reported on or within 50 miles of the dam

3. Step 3 Notification and Communication Notification:

After the emergency level has been determined, people on the notification flowcharts (See EAP Page 2) shall be notified immediately.

a. Emergency Level I - Urgent; dam failure is imminent or in progress:

i. The EAP Officer should immediately contact the appropriate Emergency Operations Center(s) and communicate that dam failure is imminent or in progress and the potentially flooded area must be evacuated (see Page 2). The following actions should be taken:

- Call the Emergency Operations Center and use the following message to describe the situation:

"This is an emergency. This is (identify yourself; name, position). Peace River Reservoir #2, located on Kings Highway, is failing. The failure is occurring at the (North, NE, South, West, East) portion of the reservoir. All potential inundation area residents must be evacuated immediately. Repeat, Peace River Reservoir #2 is failing; evacuate inundation area residents immediately. This is not a test.

We have activated the Emergency Action Plan for this reservoir and are currently under Emergency Level I. Reference the inundation map in your copy of this Emergency Action Plan.

I can be contacted at the following number _____. If you cannot reach me, please call the following alternative number _____."

- Do whatever is necessary to bring people in immediate danger to safety (anyone on the dam, or within the inundation area). See EAP Appendix A and Appendix B.

- Keep in frequent contact with the Emergency Operations Center(s) to keep them up-to- date on the condition of the dam. They will tell you how you can help handle the emergency.

- If all means of communication are lost and can't quickly be re-established: (1) try to get to another radio or telephone that works, or (2) Send a PRMRWSA representative to the DeSoto County Fire Station 2 on Highway 761 near Kings Highway to summon help and re-establish communications. If these means fail, handle the immediate problems as well as you can, and periodically try to reestablish contact with the EAP Officer and emergency services.

ii. The following pre-scripted message may be used as a guide for the Emergency Operations Center staff to communicate the status of the emergency with the public:

"Attention: This is an emergency message from (Your Name and Title). Listen carefully. Your life may depend on immediate action.

Peace River Reservoir #2 located along Kings Highway is failing. Repeat. Peace River Reservoir #2 is failing. Serious flooding will result. If you are in or near this area, evacuate immediately. Do not travel on (names of roads or highways) or return to your home to recover your possessions. You cannot outrun or drive away from the flood wave. Evacuate immediately."

Repeat message.

b. Emergency Level II - Potential dam failure situation; rapidly developing:

i. Any PRMRWSA employee observing a potential situation, or receiving word of such must contact the EAP Officer immediately and describe the situation. If the EAP Officer cannot be reached the following designees, in order of responsibility, shall assume all responsibilities of the EAP Officer:

- PRMRWSA Environmental Affairs Coordinator
- PRMRWSA Water Resources Director

ii. The EAP Officer, or their designee, will contact the Dam Owner's Engineer of Record the appropriate Emergency Operations Center(s) and the FDEP Dam Safety Officer, describe the situation, and request technical assistance on the next steps that should be taken. The following message may be used to help describe the emergency situation to the emergency management personnel:

"This is (identify yourself; name, position). We have an emergency condition at Peace River Reservoir #2, located along Kings Highway. We have activated the Emergency Action Plan for this dam and are currently under Emergency Level 2.

We are implementing predetermined actions to respond to a rapidly developing situation occurring at the reservoir. Please prepare to evacuate the inundation area.

Reference the inundation maps in your copy of the Emergency Action Plan.

We will advise when this situation is resolved or if the situation gets worse.

I can be contacted at the following number _____. If you cannot reach me, please call the following alternative number _____."

c. Level III - Monitoring; Operation & Maintenance Condition; Non-emergency incident; unusual event; slowly developing situation:

The following actions should be taken:

1. The Dam Owner shall identify the situation.

2. The Dam Owner should contact the Dam Owner's Engineer of Record, describe the situation, and request technical assistance on appropriate steps that should be taken.

3. The Dam Owner should notify FDEP Dam Safety Officer of the situation.

V. ORGANIZATION AND ASSIGNMENT OF RESPONSIBILITIES

A. Organization

B. Assignment of Responsibilities

1. Peace River Manasota Regional Water Supply Authority - Dam Owner

a. Daily monitoring and management of Reservoir # 2.

b. Respond to observed or reported conditions, incidents, or unusual events to detect if an existing or potential emergency exists (See Step 1 - Event Detection, above).

c. When an emergency event is detected immediately contact the EAP Officer.

d. Immediately notify the personnel in the order shown on the notification flow chart for the appropriate emergency level.

2. Peace River Manasota Regional Water Supply Authority - Emergency Action Plan Officer(s)

a. Serve as the primary contact person responsible for coordination of all emergency actions.

b. When an emergency event is detected, immediately determine the emergency level (see Step 2 - Emergency Level Determination, above).

i. Emergency Level I: Urgent; Dam failure is imminent or in progress

ii. Emergency Level II: Potential dam failure situation; Rapidly developing

iii. Level III: Monitoring; Operation & Maintenance; Non-emergency incident Unusual event; Slowly developing situation

c. During Level III conditions

i. Monitor conditions

ii. Arrange repairs as needed

d. Immediately notify the personnel in the order shown on the notification flow chart for the appropriate emergency level.

e. Respond to specific requests from the Emergency Operation Center(s) to help minimize the impacts of an emergency event.

f. Provide updates of the situation to the Emergency Operations Center(s) to assist them in making timely and accurate decisions regarding warnings and evacuations.

g. Provide leadership to assure the EAP is reviewed, understood, and updated annually and copies of the revised EAP are distributed to all who received copies of the original EAP.

h. Facilitate exercise of the EAP as necessary to ensure the effectiveness of the EAP and emergency response.

i. Participate in annual review and update of the EAP.

3. City of North Port

a. Emergency Management

i. Maintain communication with media.

ii. When an Emergency Level I situation occurs:

– Initiate warnings and order evacuation of people at risk downstream of the dam.

– Carry out the evacuation of people and close roads within the evacuation area (See Appendix A for Inundation Maps).

– Alert the public of the emergency.

iii. When an Emergency Level II situation occurs:

– Prepare emergency management personnel for possible evacuations that may be needed if an Emergency Level I situation occurs.

VI. ADMINISTRATION & SUPPORT

A. Reports and Records

1. Situation Report. During emergency operations, a daily situation report should be prepared and distributed to the County EOC.

2. Records Relating to Emergency Operations

See Base Plan.

B. Preservation of Records

If government records are damaged during the incident response, the EOC should be promptly advised so that timely professional assistance can be sought to preserve and restore them.

C. Post-Incident Review

See Base Plan.

VII. ANNEX DEVELOPMENT & MAINTENANCE

A. Responsibility

The Dam Owner is responsible for review and update of their emergency response plan on an annual basis. North Port Emergency Management will be the Plan-holder for the City and will participate in plan review and exercises.

B. Schedule for Annex Updating

This annex will be maintained in accordance with the following schedule:

1. The annex will be updated with each updating of the City's Comprehensive Emergency Management Plan.

2. The annex will be reviewed after each exercise and/or actual response to a dam-related emergency event and modified as necessary.

3. The annex will be reviewed and revised, if needed, after each of the following types of events:

   a. A major change in applicable Federal or State laws, regulations, or policies,

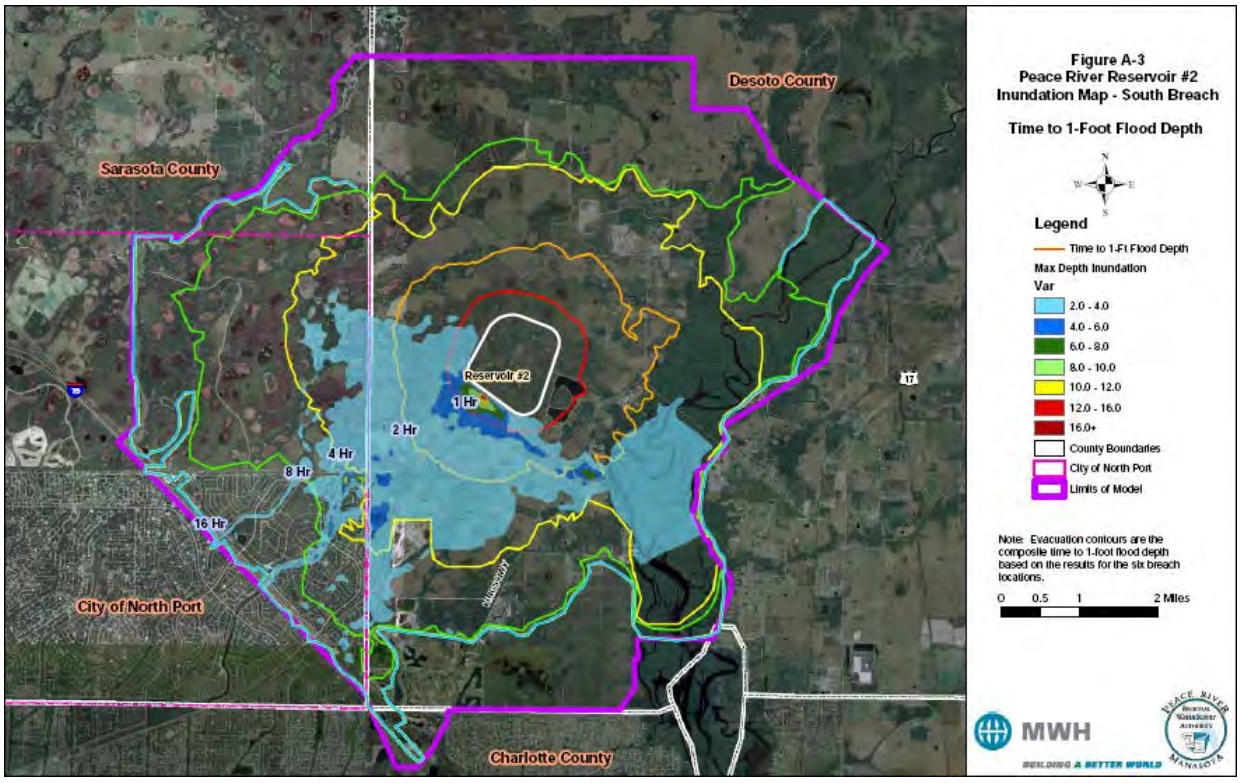
   b. The findings of ongoing vulnerability and needs assessments in Florida, and

   c. Major advances in applicable response technology and/or operational concepts

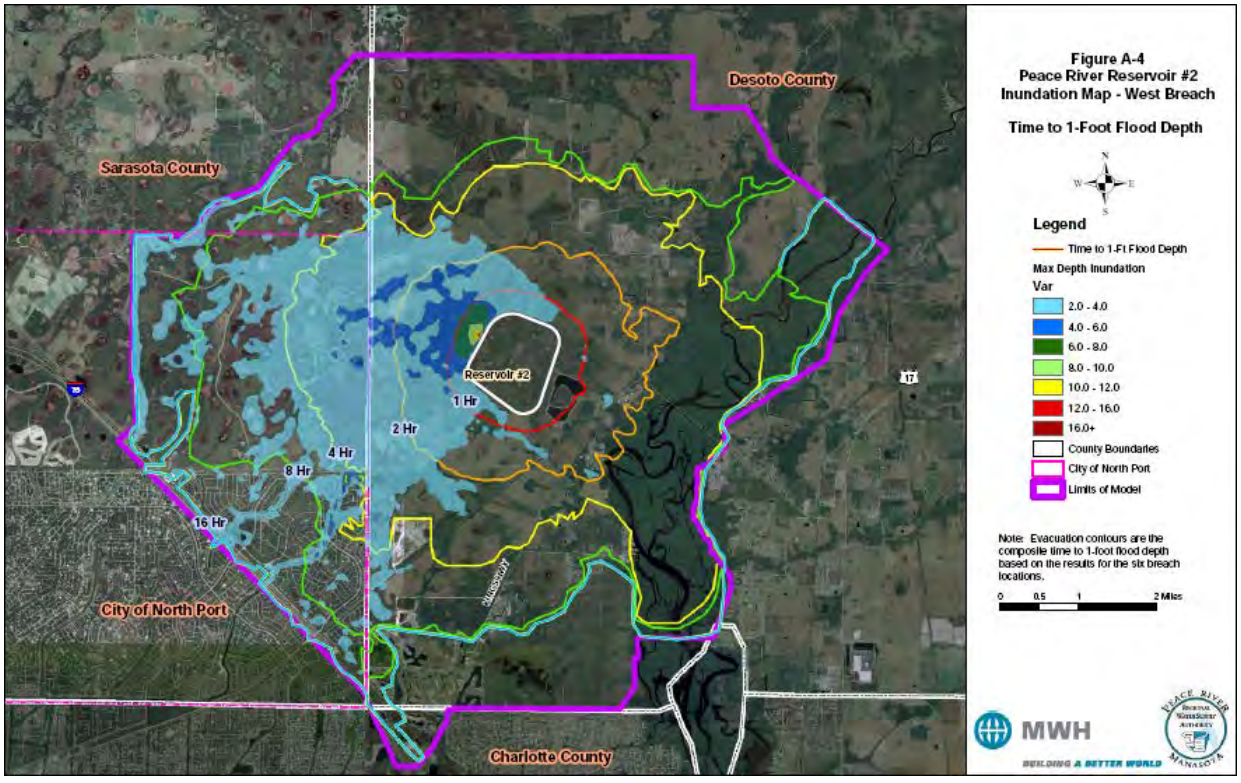
C. Security Considerations - General Exemptions from Public Inspection

Certain security procedures and plans developed resulting from this Annex to the City of North Port Comprehensive Emergency Management Plan may be exempt from public inspection under Florida Statutes Chapter 119.

Inundation Map - South Breach



Inundation Map - West Breach



ANNEX I

COLD WEATHER EMERGENCY SHELTERING

I. PURPOSE

II. DEFINITIONS

III. SITUATION AND ASSUMPTIONS

A. Situation
B. Assumptions

IV. METHOD OF OPERATIONS

A. General
B. Phases of Management

V. ORGANIZATION AND ASSIGNMENT OF RESPONSIBILITIES

A. Organization
B. Assignment of Responsibilities

VI. ADMINISTRATION & SUPPORT

A. Reports & Records
B. Post-Incident Review

VII. ANNEX DEVELOPMENT & MAINTENANCE

A. Responsibility
B. Schedule for Annex Updating

I. PURPOSE

This document outlines measures for the City of North Port and its community partners to coordinate public and private resources when outside temperatures pose an immediate danger to the life and health of unsheltered people, especially families and those living with medical or mental health conditions that render them more vulnerable in inclement weather.

Experiences in other communities demonstrate that it is best for a group of community members and organizations to lead and organize – hosted at a non-governmental facility. The City of North Port is prepared to help in ways it can (e.g., inspections in a timely manner, etc.), but it will take the community to create and implement a cold weather shelter.

While the objective of the Plan is to safeguard the lives of vulnerable homeless families and individuals by providing temporary shelter during inclement weather conditions that pose a threat to those living without adequate shelter, all applicable City and State health and safety codes and regulations remain in effect and must be followed. The Plan allows some exemptions from zoning regulations, but not health and safety codes and regulations.

II. DEFINITIONS

A. Freeze Watch is issued when there is a potential for significant, widespread freezing temperatures within the next 24-36 hours.

B. Freeze Warning is issued when significant, widespread freezing temperatures are expected.

C. Frost Advisory is issued when the minimum temperature is forecast to be 33° to 36° F on clear and calm nights during the growing season.

D. Wind Chill Advisory is issued when wind chills of -5° F to -19° F are expected.

E. Wind Chill Warning is issued when wind chills of -20° F or lower are expected.

III. SITUATION AND ASSUMPTIONS

A. Situation

1. Although infrequent, Sarasota County does experience freezing and near-freezing weather during wintertime. Since 1956, per the National Weather Service Tampa Bay Office, the area has seen an annual average of 4.7 days with minimum temperature equal to or below 32° F.

2. There exists a population of homeless persons in North Port. Some may be transients, whereas others may be residents of the City who have been displaced from their home. Community members who serve meals responded to this question, indicating that persons who are homeless are spread out over the 104 square miles of the City. There is an established network among persons in the community who are homeless, and they can get out the word quickly.

3. Sarasota County Emergency Management is responsible for "Risk Shelters," which include hurricanes. Local government (cities and counties) traditionally do not operate cold weather shelters.

4. The Salvation Army expands services for the homeless during cold weather emergencies. The shelters in the City of Sarasota and Port Charlotte open earlier and admit non-traditional clients.

5. Churches in North Port, Englewood, and Venice have operated cold weather shelters but they are subject to change.

   a. Englewood – St. David's
   b. Venice – Center of Hope
   c. North Port- New Hope

B. Assumptions

1. Any facility that develops a shelter agreement with Red Cross, including their training, will be covered under their liability.

2. Red Cross can provide the training and some of the equipment.

IV. METHOD OF OPERATIONS

A. General

1. When the outside temperature reaches 40° F (freeze watch advisory) or below (by ambient or wind-chill measure) as measured the National Weather Service, churches located within or adjacent to the City of North Port may act as temporary cold weather shelters. The Plan is in effect until the outside temperature reaches 33° F or above.

   a. Hours of operation are from 6:00 p.m. to 7:00 a.m.; however, that is at the facility's discretion.

2. While initiation of The Plan may exempt designated churches from certain zoning regulations:

   a. Facilities must be surveyed by the Red Cross.

   b. The facilities must be inspected by North Port Fire Rescue for a change in occupancy type.

   c. Volunteers and paid staff must be adequately trained (as determined by the Red Cross).

   d. The plan and protocols for churches shall include provisions limiting use of their facilities as a temporary cold weather shelter for homeless families and individuals who are not under the influence of alcohol or controlled substances not prescribed to the individual.

   e. The facilities must meet any additional requirements deemed necessary by the City.

3. While official notification from the City is not necessary to initiate the plan, the Emergency Management Coordinator will develop and maintain a contact list for those City Departments and Community Partners affected by initiation of The Plan. This process has been employed so City Departments and Community Partners can coordinate their efforts.

C. Phases of Management

1. Preparation (*prior to weather event*)

   a. The City will engage the faith-based and community organizations to participate in the providing of temporary shelter services. An orientation will be delivered to participating shelter provider organization on the Severe Weather Shelter Response Plan. The shelter will provide site location, contact information, shelter capacity, hours of intake, shelter amenities, and population to be sheltered (e.g. – singles, families with children). The Service Provider Organization Directory will be updated.

   b. The Shelter shall contact North Port Emergency Management requesting to be added to the email distribution of the National Weather Service forecast updates. Shelter provider organization will provide an email address to receive the National Weather Service forecast and will monitor the weather for activation.

c. North Port Emergency Management will add the shelter contact information to the email distribution.

d. Prior to use, a facility to be approved:

i. Survey – basic information on site and conformity to standards.

2. Response (*during weather event*):

a. The shelter provider organization will review North Port Emergency Management weather updates received via email, the National Weather Service Forecast Office, and/or weather updates available on local TV/Radio broadcasts. Shelters will determine when their facility will open to provide shelter services to the homeless.

b. The shelter provider organization, upon determination to open as a shelter, shall conduct a review of the site checklist with a facility representative.

c. The shelter provider organization(s) forwards a copy of their facility information via email (preferred) to the volunteer program coordinator.

d. The volunteer program coordinator shall retransmit the information to the Sarasota County Call Center.

e. Sarasota County Call Center manager will distribute shelter information to staff and post on the SCGOV.net website.

f. Program Coordinator will compile a list of shelter sites with amenities and distribute the information to:

i. Sarasota County and North Port non-emergency dispatch for relay to law enforcement and fire/EMS agencies in the County/City.

- The North Port Police Department should be notified if an inebriated individual requests shelter in a designated temporary cold weather shelter located in a church.

ii. Shelter provider organizations.

iii. Sarasota County and City of North Port Emergency Management.

f. Feeding would be provided by the shelter provider organization.

3. Deactivation (*following weather event*):

a. The shelter provider organization monitors weather updates and determines when to terminate shelter services (list date and time of closure) and forward via email (preferred) to the volunteer program coordinator.

b. The volunteer program coordinator shall retransmit the information to the Sarasota County Call Center.

c. Sarasota County Call Center Manager will advise Call Center staff that the shelter is closing and remove data from the website.

d. The volunteer program coordinator will update list of shelters to reflect deactivation and distributes information to:

i. Sarasota County and North Port non-emergency dispatch for relay to law enforcement and fire/EMS agencies in the county.

ii. Shelter provider organizations.

iii. Sarasota County and City North Port Emergency Management.

d. The shelter provider organization, upon determination to close, shall conduct a re-review of the site checklist with a facility representative.

V. ORGANIZATION AND ASSIGNMENT OF RESPONSIBILITIES

A. Organization

1. See City's Base Plan.

B. Assignment of Responsibilities

1. Emergency Management – alerts Red Cross and community as to cold weather warning, or incident requiring an open shelter.

2. North Port Police – As resources are available, can transport individuals to cold weather shelter in North Port and surrounding communities.

2. Red Cross – Red Cross helps establish temporary emergency shelters, which are used for events, such as cold weather and fire evacuation, and "post" shelters which are used to help after an event such as a hurricane. Training of volunteers (become a Red Cross volunteer), shelter survey and agreement.

3. North Port Community Health Action Team (CHAT) -- Maintain schedule of church availability.

4. Facility

   a. It is up to facility if they store cots
   b. Work with volunteer coordinator to staff

5. Volunteers

   a. Identify Volunteer Program Coordinator
   b. Create Contact List
   c. Receive Red Cross Training and volunteer status

VI. ADMINISTRATION & SUPPORT

A. Reports & Records

1. Shelter providing organizations shall transmit shelter counts to the volunteer program coordinator who should then prepare a report for transmission to City and County Emergency.

2. Records of facility use (e.g., agreements, inspections, counts, etc.) shall be provided to the volunteer program coordinator by each shelter. Records will be maintained for a minimum of one year.

B. Post-Incident Review

1. An after-action report should be prepared by the volunteer program coordinator after each exercise and/or actual response to a cold weather event.

VII. ANNEX DEVELOPMENT & MAINTENANCE

A. Responsibility

Each agency identified in this Annex will develop Standard Operating Guidelines that address assigned tasks. North Port Emergency Management is responsible for reviewing and updating this annex as necessary.

B. Schedule for Annex Updating

This annex will be maintained in accordance with the following schedule:

1. The annex will be updated with each revision of the City's Comprehensive Emergency Management Plan.

2. The annex will be reviewed after each exercise and/or actual response to a cold weather event, and modified as necessary.

3. The annex will be reviewed and revised, if needed, after each of the following types of events:

   a. A major change in applicable Federal or State laws, regulations, or policies,

   b. The findings of ongoing vulnerability and needs assessments in North Port and Sarasota County.

ANNEX J

HAZARDOUS WEATHER RESPONSE

I. INTRODUCTION

A. General
B. Scope and Purpose
C. Assumptions

II. RESPONSE ORGANIZATION

A. General
B. Responsibilities

III. METHOD OF OPERATION

A. General
B. Extreme Cold/Freeze
C. Thunderstorm/Lightning/Tornado
D. Drought
E. Tropical Storm/Hurricane

IV. REIMBURSEMENT

V. TRAINING AND EXERCISES

I. Introduction

A. General: This Annex establishes a framework through which the City of North Port ("City") may prevent or mitigate the impacts of, prepare for, respond to, and recover from non-flooding/tropical conditions that could adversely affect the health, safety, and general welfare of City residents and guests. This Annex details each weather hazard that can affect the City and our response from the level of Emergency Operations Center activation perspective.

B. Purpose & Scope

1. The purpose of this Annex is to describe the unique response/recovery procedures for hazardous weather events. This Annex describes the most frequent weather phenomena that can affect the City.

2. The weather hazards addressed in this Annex are:

a. Extreme Cold/Freeze.

b. Thunderstorm/Lightning/Tornado.

c. Drought.

d. Tropical Storm/Hurricane. (*See* Annex K, Tropical Cyclone Response, for greater detail.)

C. Assumptions

1. The City will usually receive advanced warning about the onset of hazardous weather conditions but not necessarily the severity or impact location. When hazardous weather information from the National Weather Service or the Florida Division of Emergency Management is received by the Emergency Management Department, it will be transmitted to Weather Spotters, critical facilities, and other governmental agencies.

2. The Emergency Operations Center ("EOC") will not be activated pre-event for most hazardous weather conditions, except for Tropical Storms & Hurricanes.

II. The Response Organization

A. General: Most responses to weather events will be by on-duty forces. The response to a hazardous weather event will depend on reports from the public

and governmental entities. For major hazardous weather events, the response organization will be as described in the Base Plan, with the Emergency Management Division serving as Lead Agency for pre-event activities and Neighborhood Development Services leading post-disaster recovery activities.

B. Responsibilities

1. As the situation warrants, the Emergency Management Division will:

   a. Be the Lead Agency responsible for this Annex as well as all pre-event hazardous weather activities;

   b. Monitor the weather and activate the warning system(s) described in the Base Plan;

   c. Contact Sarasota County Emergency Management regarding shelter openings;

   d. Activate the EOC;

   e. Request the activation of the City Call Center; and

   f. Request the City Manager declare a State of Local Emergency pursuant to F.S. 252.38(3)(a)(5).

2. Should a disaster occur, Neighborhood Development Services will be Lead Agency for damage/impact assessment and Recovery Operations.

3. The Department of Public Works will close roads and barricade as necessary.

4. The North Port Police Department will assist with evacuation and transportation operations.

5. Emergency Services (Police & Fire) will provide damage/impact assessment.

6. Local Response: In addition to on-duty forces, specialized teams may be needed to assist in the response, such as: CERT, City volunteers, and Skywarn Spotters.

III. Method of Operation

A. General: When the EOC is activated, the Response Organization will be organized and operate under the Incident Command System as outlined in the Base Plan. This section will address unique activities corresponding to a specific hazardous weather event.

B. Extreme Cold/Freeze: Extreme cold and freezes are relatively infrequent events in the City. The main threats from these events are to the lives/health of people with insufficient shelter. This part of the plan is implemented when temperatures are expected to drop below 40 degrees, including wind chill, for at least two hours. There is no EOC activation anticipated. Additional information on this type of event is contained in Annex I – Cold Weather.

1. Level Three, Monitoring Phase.

2. The Emergency Management Division will monitor weather conditions, coordinate the opening of homeless shelters, and disseminate the opening of shelter information to the media and the public.

C. Thunderstorm/Lightning/Tornado: Severe thunderstorms, which have lightning and the potential for tornadoes, are frequent in the City during the summer and fall months. The EOC is not likely to be activated beyond a Level Three, unless an EF-1 tornado, or greater, occurs somewhere in the City resulting in loss of life and/or property; in which case the EOC will be in a post-disaster type operation. The main activity for City government is to maintain contact with the Weather Service Office and disseminate weather warnings/updates via communication systems as addressed in the Base Plan.

1. Level Three, Monitoring Phase. The Emergency Management Division will monitor the storm system's potential and disseminate the information to those most affected via means identified in the Base Plan.

2. Level Two, Partial Activation.

a. The Emergency Management Division will:

(1) Activate the City Call Center based on the <u>impact</u> of the event;

(2) Provide on-going situation reporting to the County;

(3) Maintain contact with the Weather Service and disseminate weather updates and other information to the media and public; and

(4) Request shelter openings as needed.

b. Neighborhood Development Services will:

(1) Provide a liaison to the EOC post-disaster impact; and

(2) Assume Lead Agency responsibilities for damage assessment and Recovery Operations.

c. North Port Police Department will:

(1) Provide a liaison to the EOC as requested; and

(2) Coordinate traffic activities

d. The Public Information Officer will activate the Crisis Communication Plan in the EOC upon the Incident Commander's request.

3. Level One, Full Activation. This level of activation would occur if a catastrophic F-3 tornado, or greater, impacted lives and property within the City. Should this, occur, all actions described in the Base Plan will occur.

D. Drought: The main hazard with drought is the extreme reduction of the water level in wells. In these situations, well services are usually so far behind in drilling new wells that governmental intervention is needed to keep people in their homes. An associated hazard with drought is the possibility of sinkholes. No EOC activation is anticipated.

1. Level Three, Monitoring Phase.

a. The Emergency Management Division will:

(1) Monitor activities related to the drought, participate in conference calls with the County, and closely coordinate remedial activities such as water rationing information dissemination to the public.

(2) Recommend the City Manager declare a State of Local Emergency in order to take prudent action as necessary to ensure the health, safety, and welfare of the community.

b. Florida Department of Health: The City may provide private well water testing when the situation warrants.

E. Tropical Storm/Hurricane: Because this City is a coastal community, these storms have the greatest potential for loss of life and catastrophic property losses. For that reason, the EOC will be activated at some level during the course of this type of threatening weather.

1. Level Three, Monitoring Phase.

a. When a tropical system directly threatens the State of Florida, a series of activities occur consisting of conference calls, frequent public service announcements, etc.

b. All governmental agencies will implement their Pre-Storm Checklists.

2. Level Two, Partial Activation.

a. Preparedness actions will be accelerated and department managers will establish operations in the EOC.

b. The Public Information Officer will activate the Crisis Communication Plan in the EOC upon the Incident Commander's request.

3. Level One, Full Activation.

a. Between 48 and 36 hours before the Onset of Tropical Storm-force winds, evacuation decisions will be made. All of City government will be operating from the EOC. This phase will continue through the threat period into the beginning portion of Recovery operations, not going beyond two weeks.

b. The City Manager, in consultation with department directors, will decide on closing or limiting City business and/or services and recommend cancellation of other public social events.

c. The Emergency Management Division will:

(1) Recommend the City Manager declare a State of Local Emergency in order to take prudent action as necessary to ensure the health, safety, and welfare of the community;

(2) Disseminate warning information and situation reporting to the media and the public;

(3) Determine and coordinate area evacuation operations; and

(4) Coordinate recovery operations with the County.

d. The North Port Police Department will:

(1) Support shelter operations security; and

(2) Assist with evacuation operations, including denying reentry to evacuation area(s).

IV. Reimbursement and Finance

As stipulated in the Base Plan.

V. Training and Exercises

A. General: Training to support hazardous weather operations is on-going and recurring. The State of Florida and FEMA provide a variety of training courses, as well as Independent Study Courses, at no expense to the individual. The Emergency Management Division can develop a tailored training program for any agency desiring the service.

B. Training Program Development & Implementation: The Base Plan provides a chart outlining the recommended training. Other/new training offerings will be disseminated via the Emergency Management Division to all City departments.

C. Training Exercise: The City participates in the State of Florida's Annual Hurricane Exercise conducted in the spring. City departments are encouraged to conduct their own tabletop exercises, especially when procedures and/or equipment change.

ANNEX K

TROPICAL CYCLONE RESPONSE

EXECUTIVE SUMMARY

I. INTRODUCTION

A. General
B. Scope and Purpose
C. Assumptions

II. RESPONSE ORGANIZATION

A. General
B. Response Organization
C. Responsibilities

III. METHOD OF OPERATION

A. General
B. Level 3, Monitoring Phase
C. Level 2, Partial Activation
D. Level 1, Full Activation
E. Resources

IV. PUBLIC INFORMATION and INFORMATION FLOW

V. REIMBURSEMENT

VI. TRAINING AND EXERCISES

EXECUTIVE SUMMARY

This Annex addresses the role of local government in providing the necessary support to the City of North Port ("City") in its responsibilities in responding to and recovering from the effects of a hurricane or tropical cyclone event.

The City's Emergency Management Division has the overall responsibility to update and coordinate this Annex with other response and support agencies. The Annex is a living document, being reviewed and updated at least annually and at the end of each hurricane or tropical cyclone exercise or event. It is presently divided into the following four Sections:

Section I – Introduction: Provides the purpose, scope, and planning assumptions used to prepare the Annex.

Section II – The Response Organization: Identifies the various levels of support that may be provided through the Emergency Operations Center ("EOC") structure. It describes the circumstances under which the various agencies will unify under a single command structure in preparing for, responding to, recovering from, and mitigating the effects of a hurricane by the components of governmental agencies. This Section also addresses the delegation of authority during a hurricane or tropical cyclone event.

Section III – The Concept of Operation: Presents the guidelines that will be used to make key decisions during a hurricane or tropical cyclone event, as well as Pre- and Post-Disaster Operations and Activities.

Section IV – Public Information and Information Flow: Provides the information, notification, and warning process for hurricane and tropical cyclone activities to the public, governmental agencies, and Sarasota County.

Section V – Reimbursement: Identifies how the City shall recover funds expended during a Presidentially-declared disaster.

Section VI – Exercises and Training: Identifies how City personnel shall prepare for hurricanes and tropical cyclone events.

I. INTRODUCTION

A. General: This Annex identifies the actions that may be taken by the governmental agencies within the City while preparing for, responding to, and recovering from a hurricane or tropical cyclone event.

B. Purpose: The City's Emergency Management Division has the overall responsibility for coordination of support in response to a hurricane or tropical cyclone event in the City. The Emergency Management Division will update and coordinate with other response and support agencies.

C. Scope: This Annex addresses hurricanes and tropical cyclone events that affect the City. The purpose of the response is to protect lives, property, and mitigate the effects of the storm/event.

D. Assumptions:

1. The City Manager is responsible for preparing for, responding to, and recovering from the damaging effects a hurricane or tropical cyclone event has on the residents of the City following the declaration of a State of Local Emergency pursuant to F.S. 252.38(3)(a)(5).

2. Once under a Declaration , the Sarasota County Emergency Management will order evacuations as necessary to protect the public.

3. The City's resources will be overwhelmed by the direct hit of any category of hurricane or tropical cyclone event and will require mutual aid, State, and Federal assistance to recover from the effects of the disaster.

II. RESPONSE ORGANIZATION

A. General: This Section describes the organization to be used in coordinating the City's departments in support of the response during a hurricane or tropical cyclone event. It describes the Unified Command Structure the various agencies will work under in responding to and recovering from a hurricane or tropical cyclone event. It addresses the circumstances under which the City will support other jurisdictions in Sarasota County and the State of Florida in response to a hurricane or tropical cyclone event.

B. Response Organization:

1. Local: Using the principles of the National Incident Management System (NIMS), the EOC's team is organized as described in the Base Plan. This team will direct implementation of response and recovery activities.

2. County: The City will provide liaisons to the Sarasota County Multi-Agency Coordination Center (MACC) to coordinate the sharing of information and resource requests between the City and County.

C. Responsibilities:

1. As the situation warrants, the Emergency Management Division will:

a. Monitor storm development, keeping governmental agencies and the public informed about the potential impact;

b. Participate in local and National Weather Service conference calls;

c. Activate the EOC to the level appropriate for the threat;

d. Monitor the operation and determine when to request the City Manager declare a State of Local Emergency pursuant to F.S. 252.38(3)(a)(5); and

e. Act as the Functional Lead for each Incident Management activity at the EOC for the City Manager; i.e. Operations, Planning/Intelligence, Administration, and Logistics.

2. Department Directors: Directors will prepare their personnel and organizations for the hurricane or tropical cyclone event **and staff positions within the** EOC **as required by the Response Manager.** When requested, directors will make City assets available for deployment to other areas of Sarasota County or the State of Florida. Asset sharing will be done through the Sarasota County Multi-Agency Coordination Center to ensure proper tracking and accounting.

III. METHOD OF OPERATIONS

A. General: This section of the Annex presents guidelines that can be used to make key decisions during the event. These decisions will be based on experience, the best evaluation of the current situation, and the forecast for the near future. All hurricane and tropical cyclone event responses will fall under the umbrella of the Incident Command System. Since a hurricane or tropical cyclone event is a disaster that can be seen approaching, general phases of activity are defined based on the anticipated arrival of tropical storm force winds. Guidelines for the three levels of activation (Monitoring, Partial, and Full) are presented below:

B. Level 3, Monitoring Phase: The Emergency Management Division will:

1. Monitor the weather system;

2. Participate in/initiate conference calls with Sarasota County and the National Weather Service;

3. Regularly transmit warning and preparedness information through all communications media;

4. Brief the department directors; and

5. Prepare to activate the EOC.

C. Level 2, Partial Activation: The City's EOC may be activated to a Level 2 based on a variety of considerations.

1. Request to **issue a State of Local Emergency:** When appropriate and for the following factors, the Emergency Management Division will request the City Manager declare a State of Local Emergency pursuant to F.S. 252.38(3)(a)(5):

a. Evacuation(s) ordered by Sarasota County and/or decision by the County to activate to a Level 2;

b. Closing down/reducing "normal" governmental operations; or

c. Expending City monies in response to the threat of a hurricane or tropical cyclone event.

2. Department Directors will initiate their preparations using the Departmental Pre-Storm Checklist to ensure all necessary tasks are completed.

3. Staffing the City's **EOC:** Once the City's EOC has gone to Level 2, the following agencies will maintain a presence in the EOC while it is activated:

   a. Division of Public Works;

   b. Fire Rescue Department;

   c. Department of Public Utilities;

   d. North Port Police Department; and

   e. The City's Public Information Officer.

D. Level 1, Full Activation: The Emergency Management Division Guidelines to Fully Activate the City's EOC are as follows.

1. The Emergency Manager, in consultation with the City Manager, will make the decision of when to activate the City's EOC to a Level 1. The following factors may be used in the decision-making process:

   a. When a response to the hurricane or tropical cyclone event requires the resource and/or logistical support from a majority of the City's Incident Command Functions; and

   b. When the threat of a hurricane or tropical cyclone event necessitates evacuations that require resource support from neighboring counties.

2. City's Employee Shelter Activation: When the EOC becomes fully activated due to the threat of a hurricane or tropical cyclone event and a major evacuation is anticipated, the City Manager may direct the opening of an Employee Shelter so that the dependents of City employees may have a safe place to stay.

E. Resources: All resource requests will be coordinated through the Logistics Section.

IV. PUBLIC INFORMATION and INFORMATION FLOW

A. General: This Section provides how information will be shared during the activation of the City's EOC. The Public Information Officer has the responsibility to establish a mechanism that efficiently provides and disseminates information to the public. The City Manager will appoint a Lead Public Information Officer who will facilitate the logistical support and orientation for all Public Information Officers working in the City's EOC. (*See* Appendix G – Crisis Communication and Public Information Plan.)

B. Unified Public Information: When the County Emergency Operations Center is activated (Level 2 or 1) the City's Public Information Officer will coordinate information and media releases with Sarasota County to ensure consistent messaging across all formats.

C. Information Flow:

1. Hurricane and tropical cyclone event Response Activity:

   a. The Emergency Manager will notify the Sarasota County Multi-Agency Coordination Center of any significant activities that develop.

   b. The Public Information Officer will notify the EOC Manager of any significant activities that develop; such as the following:

      (1) Lives and/or property imminently jeopardized;

      (2) Evacuation issues/problems;

      (3) Injuries or deaths related to the hurricane or tropical cyclone event; or

      (4) Road closures to major thoroughfares.

2. Situation Report **Information:** The Plans Section Chief will produce situation reports on a frequency and format consistent with ICS Planning and with the needs and requirements of the Sarasota County Multi-Agency Coordination Center.

V. REIMBURSEMENT (*See* Base Plan, Section VI.)

A. When anticipating a Presidential Declaration of a Major Disaster that includes Sarasota County, and the City encounters any damage to its infrastructure or expends funds for emergency protective measures or debris removal, the City shall apply to the federal government for reimbursement consistent with the Stafford Act and its applicable regulations.

B. Complete and accurate accounts of emergency expenditures and obligations, including personnel and equipment costs, must be maintained. The Finance Department will create project and payroll codes to track all costs.

C. Following a hurricane or tropical cyclone event, the City's Emergency Management Division will coordinate with all departments and volunteers to compile costs and proper documentation needed for reimbursement under Public Assistance procedures. A member of the City's Finance Department, Emergency Management Division, and pertinent department officials must be involved with the reimbursement application process with FEMA. The Finance Department, and other City departments as necessary, will coordinate the submission of payroll reports to FEMA; individual departments will be responsible for equipment, materials, and contracts.

VI. EXERCISES AND TRAINING (*See* Base Plan, Section IV, Subsections C and D.)

A. The City will develop and conduct emergency management oriented exercises and participate in similar exercises conducted by other government entities.

B. Exercises shall be drawn from existing plans/procedures to evaluate their ability to meet the goals and objectives.

C. Exercises shall be evaluated, and an After-Action Review/Improvement Plan will be created to draw-on strengths and identify areas for improvement.

D. The Emergency Management Division will work with department directors to identify generic and task-specific training opportunities for operations related to hurricane and tropical cyclone events.

E. All training shall be consistent with NIMS/ICS principles.

CITY OF NORTH PORT

COMPREHENSIVE EMERGENCY MANAGEMENT PLAN

APPENDICES

A. EMERGENCY ORDINANCE OF A STATE OF LOCAL EMERGENCY

B. INCIDENT COMMAND SYSTEM GENERAL GUIDANCE AND POSITION MISSION STATEMENTS

C. CITY OF NORTH PORT RESOLUTION 06-R-10 IMPLEMENTING NIMS

D. CITY OF NORTH PORT RESOLUTION 01-R-44 ADOPTING THE STATEWIDE MUTUAL AID AGREEMENT

E. CITY OF NORTH PORT RESOLUTION 2016-R-02 ADOPTING THE SARASOTA COUNTY UNIFIED LOCAL MITIGATION STRATEGY

F. CITY OF NORTH PORT RESOLUTION 2019-R-10 ADOPTING THE COMPREHENSIVE EMERGENCY MANAGEMENT PLAN AS THE FORMAL GUIDE FOR THE CITY OF NORTH PORT'S EMERGENCY MANAGEMENT ACTIVITIES

G. CRISIS COMMUNICATIONS AND PUBLIC INFORMATION

H. DEBRIS MANAGEMENT

APPENDIX A

EMERGENCY ORDINANCE DECLARING
A STATE OF LOCAL EMERGENCY

AN ORDINANCE OF THE CITY OF NORTH PORT, FLORIDA, DECLARING A STATE OF LOCAL EMERGENCY, GRANTING TO THE CITY MANAGER OR DESIGNEE THE AUTHORITY TO TAKE ACTIONS IN ACCORDANCE WITH FLORIDA STATUTES SECTION 252.38(3)(a), AND SUSPENDING STANDARD PROCEDURES FOR THE PROCUREMENT OF GOODS AND SERVICES NECESSARY TO ADDRESS THE DECLARED EMERGENCY CAUSED BY THE THREAT POSED BY *[ENTER EVENT]*; PROVIDING FOR FINDINGS; PROVIDING FOR DURATION; PROVIDING FOR CONFLICTS; PROVIDING FOR SEVERABILITY; AND PROVIDING AN EFFECTIVE DATE.

WHEREAS, *[ENTER EVENT]* poses an immediate danger to the public health, safety, or welfare to the City of North Port, Florida and its residents; and

WHEREAS, these circumstances constitute an emergency which warrant the adoption of this ordinance under the procedures provided in the Charter of the City of North Port, Section 7.02 - Emergency Ordinance; and

WHEREAS, the City Commission has, by a vote of at least four members of the Commission, deemed the adoption of this ordinance as necessary for the immediate preservation of the public health, safety, and welfare of the City.

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COMMISSION OF THE CITY OF NORTH PORT, FLORIDA, AS FOLLOWS:

SECTION 1 – FINDINGS:

1.01. The above recitals are hereby ratified and confirmed as being true and correct and are incorporated herein by reference.

SECTION 2 – DECLARATION OF EMERGENCY AND EMERGENCY PROCEDURES:

2.01 The City Commission of the City of North Port, Florida hereby declares a state of local emergency due to *[EVENT]*, an emergency affecting the City.

2.02 The City Commission of the City of North Port, Florida hereby authorizes the City Manager or the City Manager's designee the power and authority set forth in Florida Statutes Section 252.38(3)(a), and to take any and all action of a temporary nature deemed necessary during this state of emergency.

2.03 The City Commission of the City of North Port, Florida hereby determines that this emergency necessities the waiver of the general procedures and formalities required by law pertaining to the City Manager's procurement of goods and services requiring emergency action, notwithstanding the provisions of Chapter 2, Code of the City of North Port, Florida. Procurements should be made

with the greatest degree of competition that circumstances will permit.

SECTION 3 – DURATION:

3.01 This ordinance shall remain in effect until it expires by operation of law or until the emergency conditions no longer exist as determined by the City Manager

SECTION 4 – CONFLICTS:

4.01 In the event of any conflict between the provisions of this ordinance and any other ordinance or portions thereof, the provisions of this ordinance shall prevail to the extent of such conflict.

SECTION 5 – SEVERABILITY:

5.01 If any section, subsection, sentence, clause, phrase, or provision of this ordinance is for any reason held invalid or unconstitutional by any court of competent jurisdiction, such provision shall be deemed a separate, distinct, and independent provision and such holding shall not affect the validity of the remaining portions hereof.

SECTION 6 – EFFECTIVE DATE:

6.01 This ordinance shall take effect immediately after adoption by the City Commission of the City of North Port, Florida.

Read in its entirety in a public session this _____ day of _____ 20___.

PASSED and ADOPTED by the City Commission of the City of North Port, Florida public session this _____ day of _____ 20___.

CITY OF NORTH PORT, FLORIDA

_____

_____

MAYOR

ATTEST:

_____

_____

CITY CLERK

APPROVED AS TO FORM AND CORRECTNESS:

_____

_____

CITY ATTORNEY

APPENDIX B

INCIDENT COMMAND SYSTEM GENERAL GUIDANCE AND POSITION MISSION STATEMENTS

General Guidance for ICS Personnel

1. On receiving your incident assignment, be certain you clearly understand the location you are to report to and the time you are expected to begin in the incident assignment.

2. On your arrival, check in with the appropriate supervisor or "check-in" location if you have been given a telephone number to call upon arrival.

3. In the event you are working in the EOC, request a copy of the EOC Activation SOP if you are not furnished one. Ask questions if you are not certain what your duties are. Request a briefing.

4. Use clear "open text" when communicating on the telephone or in written memoranda, such as multi-part message forms or Situation Reports. This means that you should not use codes, signals or jargon.

5. Acquire any office materials you may need, such as multi-part message forms or note pads.

6. Accountability of personnel is critical. Remember the principal of Unity of Command that each person is reportable to only one supervisor. Each supervisor is responsible for the accountability of those they supervise.

7. Continuously brief subordinates relative to new information you have received which pertains to their activities.

8. Advise the Incident Commander, Section Chief, or your supervisor, when personnel have accomplished their last mission and are available for new tasking.

9. Complete, maintain, or forward forms and reports as necessary.

10. Brief your subordinates about potential demobilization so they can prepare to conclude their necessary reports and activities in a timely manner.

11. Notify your subordinates when they can demobilize. Receive a final accountability report for all personnel, and advise the Incident Commander or your supervisors when you subordinates have demobilized and the status of personnel.

POSITION MISSION STATEMENT FOR
Incident Commander

Location: On scene of the Incident or at North Port EOC.

Recommended Staffing: First arriving officer-in-charge (OIC) until relieved by Higher Authority

North Port City Manager or his designated representative which may include the North Port Emergency Management Director.

Activation: Any situation which in the judgment of the on-scene ranking OIC requires the utilization of the ICS due to the concern for public safety, the safety of response personnel at the scene, and effective management of the incident.

Responsibilities: The Incident Commander is ultimately responsible for all incident activities including the development and implementation of strategic decisions and the utilization of extended resources. This individual must process information to and from the primary Section Chiefs and Staff operating within their span of control.

General Procedures:

- Arrive at the scene, or EOC, and establish command. Obtain an incident briefing from the OIC or previous incident commander.
- Assess the incident and conduct an initial strategy briefing with the current operation command personnel.
- Select and active ICS elements as needed.
- Brief the Command Staff and Section Chiefs
- Participate in the preparation and authorize implementation of the *Incident Action Plan*.
- Determine needs, make command decisions, and related the needs/decisions to the Command Staff and Section Chiefs.
- Coordinate primary staff activities.
- Manage overall incident.
- Approve requests for and utilization of extended resources.
- Brief the City Manager, or their designated representative, relative to on-going operations and significant changes in the situation.
- Authorize release of information to the news media.
- Obtain briefings from the Section Chiefs, Command Staff and other representatives as appropriate.
- Ensure that the *Incident Status Form* (work sheet) is utilized and completed.
- Obtain information on environmental concerns.

- Review the progress of the incident and channel organizational efforts toward the highest priority tasks.
- Insure that safety procedures and disciplines are practiced and maintained by all personnel.
- Approve the demobilization plan and oversee the return to normal operations.
- Participate in and approve a final incident summary, media briefing, reports and other documentation.
- Assure that historical records are transferred to the City Clerk for final custody.
- Accumulates after actions reports from those involved in the incident and develops a list of Lessons Learned, and transmits to all involved City departments, and external agencies. If appropriate make recommended changes to the North Port Comprehensive Emergency Management Plan.

POSITION MISSION STATEMENT FOR
Incident Command Aide

Location: Command Post or North Port EOC

Recommended Staffing: Any qualified individual appointed by the Incident Commander

Reports to: Incident Commander

Activation: When deemed necessary by the Incident Commander to assist with maintaining paperwork, records or communications or to assist the incident commander.

Purpose: The Aide provides administrative and operational assistance to the IC, manages the command area and processes information that does not require the attention of the IC. This position requires a person with knowledge of the City's various departmental operating responsibilities and procedures, applicable ICS tactics and strategy and command terminology. This position may formulate decisions and issue directives to a level that has been designated by the IC.

General Procedures:

- Establish and secure the EOC area. If necessary, obtain assistance from the City of North Port Police Department.
- Obtain initial briefing and assignments from the IC.
- Initiate and maintain the IC worksheet. Log all pertinent information, or if a Historian is present, direct such information to the Historian for appropriate entries.
- Assist with the research and analysis of resource and reference materials as necessary to assist the IC or Command Staff.
- Operate various communications systems as needed. Relay command directives from the Incident Commander to the Command Staff and Section Chiefs as needed.
- Disseminate and assist in the processing of information both upward and downward as needed.
- Anticipate the needs of the IC and be prepared to respond accordingly.
- Assist the PIO by relating current incident information.
- Assist the liaison officer with management of representatives from other agencies.
- Observe operations and make suggestions and recommendations to the IC.
- Contributes to the development of an After-Action Report with Lessons Learned.

POSITION MISSION STATEMENT FOR
Liaison Officer

Location: On the Scene at the Command Post or the North Port EOC

Recommended Staffing: Any Qualified Individual Appointed by the Incident Commander

Reports to: Incident Commander

Activation: When a separate point of contact is needed due to the number of agencies represented on an incident. A liaison may also be furnished to the Sarasota County EOC for coordination during a county-wide or multiple county incident.

Purpose: The Liaison Officer is a member of the Command Staff selected to serve as point of contact for other agencies to assist in communications and coordination with such.

Responsibilities: The coordination of inter-agency activities and to assure communications exists between the City of North Port and other levels of emergency response, such as: Sarasota County, the State of Florida, Florida National Guard and/or Federal government.

General Procedures:

- Obtain initial in-briefing from the Incident Commander.
- Serve as a Point of Contact for assisting, coordinating and communicating with other agency representatives.
- Identify agency representatives for each response organization and establishing a means of communications with them.
- Attempt to limit communications with other agencies to one point of contact per agency to avoid confusion and unnecessary duplication of effort.
- Respond to all requests for agencies for special needs assistance.
- Respond to requests from North Port Incident Commander for any inter-agency contacts.
- Monitor the incident operations to identify current or potential inter-agency needs or problems.
- Maintain an on-going list of response involvement, such as personnel, equipment and mutual aid supplies from other agencies involved in the response effort. Maintain a list of activities which other agencies are currently involved in.
- Participate in planning meetings by providing status, limitations and capabilities of other agencies involved in the response effort.
- Upon agency request, provide specific information about the incident relative to: Operational Activities Anticipated During of Activities.
- Status of agency personnel involved in the operations Expected demobilization schedule

- If required to do so, be prepared to serve as a liaison from the City of North Port to other organizational EOCs.
- Serve a point of contact from North Port to the other organization Communicate information and requests between the organizations.
- Coordinate actions with the other agency on behalf of the North Port Incident Commander
- Contributes to the development of an After-Action Report with Lessons Learned.

POSITION MISSION STATEMENT FOR
Public Information Officer

Location: At the Scene or in the North Port EOC

Recommended Staffing: Any individual appointed by the Incident Commander

Reports to: Incident Commander

Activation: At the discretion of the IC for any incident of such significance that news media attention is attracted and assistance is required.

Purpose: The PIO is the focal point for the official release of information to the news media.

Responsibilities: The PIO is the contact person for media representatives. Coordinates release of all incident information.

General Procedures:

- Establishes and maintains a media gathering area, schedules regular news briefings and news conferences if deemed necessary and helpful.
- Issues news releases and gathers factual background information for the news media.
- Ensures the accuracy of information and shall remain knowledgeable of current incident information, operations and status.
- Is sensitive to misinformation or rumors developing within the media or public, and develops plans to correct the misinformation or rumors.
- Obtains initial in-briefing from the IC.
- Begins to log and track incident information.
- Establishes a media area which offers safety to the media from hazards created by the incident. Requests law enforcement assistance as needed.
- Meets with arriving media to give them an initial in-briefing. Provides on-going updates based on information from the IC.
- Seeks photo opportunities for the news media and facilities their ability to take pictures.
- Serves as escort as needed.
- Conducts briefings and news conferences for the media, releasing only information and does not speculate in response to media inquiries.
- Responds to media requests for background information and updates.
- Updates the IC on information released to the news media and request which have been received by the media.
- Files all media news releases with reports.
- Corrects misinformation and/or rumors developing within the media or public at large.
- Seeks media support in furnishing correct information to the public when rumors have

been identified.

- Arranges and organizes adequate staff, equipment and facilities to support the PIO functions
- Contributes to the development of an After-Action Report with Lessons Learned.

POSITION MISSION STATEMENT FOR
Safety Officer

Location: On Scene or the North Port EOC

Recommended Staffing: Any trained Individual Appointed by the Incident Commander

Reports to: Incident Commander

Activation: When in the opinion of the Incident Commander personnel may be operating in any type of hazardous environment or when potentially dangerous operation.

Purpose: To ensure that all personnel at the scene are operating in as safe a manner as possible, consistent with current standards and practices.

Responsibilities: The Safety Officer is the member of the Command Staff with the foremost responsibility for the safety of personnel operating at the scene. The Safety Officer will continuously monitor and assess situations for unsafe or hazardous conditions and will develop countermeasures for assuring the safety of personnel.

General Procedures:

- Obtain an in-briefing from the IC relative their duties, responsibilities and current situation.
- Identify hazardous situation associated with the incident.
- Participate in planning meetings to advise the IC and operations Chief relative to personnel safety.
- Exercise emergency authority to halt and/or prevent unsafe acts.
- Conduct initial accident investigations that have occurred within the incident area.
- Establish safety assistants or seek specialized input as needed.
- Contributes to the development of an After-Action Report with Lessons Learned.

POSITION MISSION STATEMENT FOR
Logistics Section Chief

Location: Incident Scene or North Port EOC

Recommended Staffing: Ranking Qualified Officer Available

Reports To: Incident Commander

Activation: Any incident requiring resource move-ups or mutual aid

Purpose: To provide management of facilities, services, equipment and supplies. Coordinates move-ups or mutual aid support.

Responsibilities: Acquires, secures and maintains adequate inventories to support incident response activities. Will provide for the personal service needs of all personnel operating at the incident.

General Procedures:

- Obtain initial in-briefing from the Incident Commander.
- Plan for the organization of the Logistics Section and determines the need for additional personnel and resources.
- Assigns tasks and locations to Logistical Section personnel.
- Participates in the preparation of the incident action plan.
- Identifies current and anticipated future service and support requirements for the planned and expected operations.
- Coordinates with the Planning Chief regarding anticipated future resource needs.
- Reviews and provides input for the Communications Plan, Traffic Plan and Medical Plan, if needed.
- Identifies and provides support requirements for the personnel operating at the incident.
- Coordinates and processes requests for additional resources.
- Ensures move-ups or mutual aid requests are made when needed.
- Establishes secondary staging areas as needed.
- Prepares for the return of mutual aid equipment during demobilization.
- Develops a Logistics Section Demobilization Plan.
- Contributes to the development of an After-Action Report with Lessons Learned.

POSITION MISSION STATEMENT FOR
Operations Section Chief

On the Scene in Forward Area, the Command Post, or the North Port EOC

Recommended Staffing: Ranking Qualified Officer Available, designated by Command

Reports to: Incident Commander

Activation: On any incident which taxes the span of control of the Incident Commander

Purpose: Encompasses most incident mitigation activities. This includes all task oriented Divisions/Groups participating in the incident scene.

Responsibilities: Is a member of the General Staff, organizes the initial incident control activities and subsequent implementation of the incident action plan.

General Procedures:

- Obtains an initial in-brief from the Incident Commander
- Establishes Branches and Divisions/Groups as needed to initiate operation control measures
- Begins development work on the incident action plan needed for initial and immediate control of the incident
- Supervises operational aspects of the incident and the Branches or Divisions/Groups associated with that function
- Determines the need for and requests additional resources
- Advises the Incident Commander of special concerns or requirements that may impact the development of an extended incident action plan
- Makes tactical decisions and changes to the operation on an immediate basis if needed.
- Assembles and disassembles Strike Teams/Task Forces
- Assigns a Rehabilitation Officer and ensures that a remote area is established for this activity
- Establishes and maintains Staging Areas as needed and assigns a staging officer to maintain the staging area.
- Prepares a final summary of activity and demobilization report to be submitted to the Incident Commander
- Contributes to the development of an After-Action Report with Lessons Learned.

POSITION MISSION STATEMENT FOR
Planning Section Chief

Location: On the incident scene or the North Port EOC

Recommended Staffing: Ranking Qualified Officer Available

Reports to: Incident Commander

Activation: When the incident has reached a magnitude in which the Incident Commander cannot effectively forecast the future action plan due to the incident size, constraints on the IC, or complexity.

Purpose: To coordinate the preparation of the incident action plan, advises the command of potential operational impacts, and maintains alternative strategies for potential and possible incident developments. The Planning Section serves as the clearing house for analysis of incoming information.

Responsibilities: Develops and maintains the incident action plan. Collects and obtains information relative to the incident, identifies special resources as indicated by need, and provides vital information such as weather data, environmental data, special equipment needs to the Incident Commander.

General Procedures:

- Obtains initial in-briefing from the Incident Commander.
- Identifies additional staffing, equipment and supply needs.
- Identifies requirements for documentation.
- Identifies specific environmental issues.
- Continuous receives new or updated information for analysis regarding resources, weather and other incident related matters.
- Prepares and coordinates Command Staff meetings to outline the incident action plan.
- Prepares a written Incident Action Plan for the Incident Commander.
- Monitors the incident progress, updates and modifies the Incident Action Plan as needed.
- Assists with evacuation and sheltering plans as needed, or assumes this responsibility in the absence of a Relocation Officer.
- Provides the Incident Commander with special interest information such as weather predictions, weather changes, environmental concerns and critical resource shortages.
- Provides plans for demobilization and incident termination.
- Writes the final Incident Summary for approval by Incident Commander
- Contributes to the development of an After-Action Report with Lessons Learned.

POSITION MISSION STATEMENT FOR
Administration/Finance Section Chief

Location: As designated by the Incident Commander

Recommended Staffing: Any qualified individual designated by the Incident Commander

Reports to: Incident Commander

Activation: When in the judgment of the Incident Commander the position is required to manage financial and administrative issues due to the magnitude or complexity of the incident.

Purpose: To assure that financial documentation is maintained in compliance with municipal state and Federal requirements. To maximize the opportunities for financial reimbursement and to perform necessary administrative services to allow the Incident Commander and the Command and general Staffs to focus on incident management.

Responsibilities: Tracks the use of reserve personnel and internal resources for overtime costs. Coordinates all extraneous costs incurred relative to the incident involving personnel, equipment, supplies and contract services. Documents line of duty injury reports, damage to or destruction of equipment. Assuring that appropriate Federal guidelines are followed to seek reimbursement.

General Policies:

- Obtains initial in-briefing from the IC.
- Plans the Administration/Finance Section organization and determines the need for staffing.
- Assigns work locations and preliminary work tasks to section personnel
- Participates in the preparation of the Incident Action Plan.
- Identifies any special financial needs for the incident.
- Coordinates personnel-hours tracking and recall of off-duty personnel.
- Ensures prompt financial payment and insurance claims processing relative to personal injuries.
- Maintains daily contact with County, State and Federal agencies involved in the incident management relative to administrative and financial matters.
- Contributes to the development of an After-Action Report with Lessons Learned.

POSITION MISSION STATEMENT FOR
Branch Director

Location: On Scene or any prescribed location by Command

Recommended Staffing: Ranking Qualified Officer Available

Reports To: Operations or Logistics Section Chief or Incident Commander, as appropriate

Activation: When multiple City departments are working the same general incident location and coordination is needed, or when the span of control requires that Section Chiefs need to establish a level of management between themselves and response personnel.

Purpose: Provide coordination, direction and control to operational staff activities within a specific function or geographic location. Functional areas may include: Operations Section - Public Safety, Human Services, and Infrastructure; Logistics Section - Services and Supply.

Responsibilities: Directs and maintains the continuity of functions occurring within the prescribed functional or geographic area of responsibility. Maintains communications with the Operations Section Chief/Incident Commander concerning specific needs and on-going activities at their site.

General Procedures:

- Obtains initial in-briefing from the Incident Commander or Operations Section Chief
- Coordinates the activities of personnel assigned to the Branch in carrying out the incident control activities.
- Reviews assignments with field personnel as necessary.
- Updates the Operations Chief or Incident Commander on changes in conditions that will affect the plan of action in their sector.
- Coordinates activities with other Branch Directors or Group Supervisors through the Operations Section Chief or Incident Commander.
- Determines the need for and requests additional personnel, supplies, equipment, contract services or other resources as needed to accomplish the mission.
- Makes recommendations to the Operations Section Chief or Incident Commander relative to changes in the action plan and initiates critical decisions relative to immediate actions as needed.
- Contributes to the development of an After-Action Report with Lessons Learned.

POSITION MISSION STATEMENT FOR
Group / Division Supervisor

Location: As Needed for Task Completion

Recommended Staffing: Ranking Qualified Officer Available

Reports to: Operations Section Chief, Branch Director, or Incident Commander

Activation: When a need exists to assign multiple departmental units to a specific task.

Purpose: To provide supervisory support to the Unit-level resources regardless of the functional area or geographic location of the response personnel involved. Group/Division may be located within a Branch in the Operations Section.

Responsibilities: Provides direction and control to resources assigned to the Group to coordinate their operations with other Groups or Divisions. Assures the work unit is efficient and effective in the performance of its mission by maximizing the use of resources.

General Procedures:

- Receives initial in-brief from the Operations Section Chief or the Incident Commander to determine the action plan and identify the companies which are to be assigned to the Group.
- Determines the safety of the work area and assures that crews have appropriate safety or protective equipment, and that such equipment is properly used.
- Conduct on-going analysis of the current situation, develop an operating plan, and make appropriate assignments to accomplish the mission. Adjusts the operating plan as needed.
- Coordinate with other Division or Group Supervisors to ensure that a mutually supporting effort is being conducted.
- Requests additional personnel and other resources as needed to accomplish the mission.
- Ensure scene integrity so that evidence is preserved for subsequent investigation should such be required.
- Contributes to the development of an After-Action Report with Lessons Learned.

POSITION MISSION STATEMENT FOR
Staging Area Manager

Location: As designated near the scene or a remote location

Recommended Staffing: Any Qualified and Trained Individual Appointed by Command

Reports To: Incident Commander or Operations Section Chief

Activation: When Command determines that a staging area must be established to provide adequate resources to the incident operations or when resources are being assembled in a resource pool for a special or future need.

Purpose: To manage the personnel, vehicular and equipment resources in a manner which will help prevent congestion at the incident scene; to create a pool of resources and manage resource distribution.

Responsibilities: Locate and maintain an area that allows for an effective retrieval of personnel, equipment, and supplies. Fulfill resource requests from the Operations Section Chief or Incident Commander. Maintain a sufficient pool of resources to support operations.

General Procedures:

- Obtains an initial in-briefing from the Incident Commander or Operations Section Chief.
- Functions as a member of the Operations Staff advising the Operations Section Chief or Incident Commander of potential resource requirements and shortages.
- Fulfills resource requests from the Operations Section Chief or Incident Commander. Directs units of where to report, who to report to, and their anticipated assignment.
- Ensures that resources are pre-positioned in such a way as to expedite their response to the incident scene.
- Coordinates with law enforcement to ensure access from the staging area to the incident scene.
- Maintains accountability for the dispatching of mutual aid resources.
- Positions resources to coordinate team/task force later use
- Prepares a demobilization plan for the Staging Area and directs demobilization activities when appropriate.
- Contributes to the development of an After-Action Report with Lessons Learned.

APPENDIX C

CITY OF NORTH PORT RESOLUTION 06-R-10 IMPLEMENTING NIMS

City of North Port

RESOLUTION NO. 06-R-10

A RESOLUTION OF THE CITY OF NORTH PORT, FLORIDA IMPLEMENTING THE NATIONAL INCIDENT MANAGEMENT SYSTEM (NIMS) AS THE CITY OF NORTH PORT'S INCIDENT MANAGEMENT SYSTEM; PROVIDING FOR CONFLICTS; PROVIDING FOR SEVERABILITY; AND PROVIDING FOR AN EFFECTIVE DATE

WHEREAS, in Homeland Security Directive (HSPD)-5, the President directed the Secretary of the Department of Homeland Security to develop and administer a National Incident Management System (NIMS), which would provide a consistent nationwide approach for federal, state, local and tribal government to work together more effectively and efficiently to prevent, prepare for, respond to, and recover from domestic incidents, regardless of cause, size or complexity; and

WHEREAS, the collective input and guidance from all federal, state, local and tribal homeland security partners has been, and will continue to be, vital to the development, effective implementation and utilization of a comprehensive NIMS; and

WHEREAS, it is necessary that all federal, state, local, and tribal emergency agencies and personnel coordinate their efforts to effectively and efficiently provide the highest levels of incident management; and

WHEREAS, to facilitate the most efficient and effective emergency management it is critical that the federal, state, local, and tribal organizations utilize standardized terminology, standardized organizational structures, interoperable communications, consolidated action plans, unified command structures, uniform personnel qualification standards, uniform standards for planning, training and exercising, comprehensive resource management, and designated incident facilities during emergencies and disasters; and

WHEREAS, the NIMS standardized procedures for managing personnel, communications, facilities, and resources will improve the City's ability to utilize federal funding to enhance local readiness, maintain first responder safety, and streamline the incident management processes; and

WHEREAS, the Incident Command System components of NIMS are already an integral part of various incident management activities throughout the City, including all public safety and emergency response organization programs; and

WHEREAS, the National Commission on Terrorism Attacks (9-11 Commission) recommended adoption of a standardized Incident Command System,

RESOLUTION NO. 06-R-10

NOW THEREFORE, BE IT RESOLVED BY THE CITY COMMISSION, OF THE CITY OF NORTH PORT, FLORIDA, TO WIT:

SECTION 1

1.01 Hereby mandates the National Incident Management System (NIMS) to be utilized for all incident management in the City of North Port.

10.2 The City Manager shall coordinate, or designate coordination of, required NIMS training for all required City officials and/or employees with overall emergency management responsibilities; employees with overall emergency management responsibilities through delegation; and employees primarily involved in emergency planning.

SECTION 2 CONFLICTS

2.01 If there is any conflict between this Resolution and any other resolution or ordinance, or portions thereof, the provisions of this Resolution shall prevail to the extent of such conflict.

SECTION 3 SEVERABILITY

3.01 If any section, subsection, sentence, clause, phrase or portion of this Resolution is for any reason held invalid or unconstitutional by any court of competent jurisdiction, such portion shall be deemed a separate, distinct, and independent provision and such holding shall not affect the validity of the remaining portions.

SECTION 4 EFFECTIVE DATE

4.01 This Resolution shall take effect immediately upon execution by the Chair.

PASSED AND DULY ADOPTED by the City Commission of the City of North Port, Florida this 23rd day of January, 2006.

CITY OF NORTH PORT, FLORIDA

RUE S. BERRYMAN
COMMISSION CHAIR

ATTEST:

HELEN M. RAIMBEAU, CMC
CITY CLERK

Approved as to format and correctness

ROBERT K. ROBINSON
CITY ATTORNEY

APPENDIX D

CITY OF NORTH PORT RESOLUTION 01-R-44
ADOPTING THE STATEWIDE MUTUAL AID AGREEMENT

City of North Port

RESOLUTION NO. 01-R-44

A RESOLUTION OF THE CITY OF NORTH PORT, FLORIDA, ADOPTING A STATEWIDE MUTUAL AID AGREEMENT, PROVIDING FOR SEVERABILITY; AND PROVIDING AN EFFECTIVE DATE.

WHEREAS, THE State of Florida is vulnerable to a wide range of disasters that are likely to cause the disruption of essential services and the destruction of the infrastructure needed to deliver those services; and

WHEREAS, such disasters are likely to exceed the capability of any one local government to cope with the disaster with existing resources; and

WHEREAS, such disasters may also give rise to unusual technical needs that the local government may be unable to meet with existing resources, but that other local governments may be able to offer; and

WHEREAS, the Emergency Management Act, as amended, gives the local governments of the State, authority to make agreements for mutual assistance in emergencies and through such agreements ensure the timely reimbursement of costs incurred by the local governments which render such assistance.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COMMISSION OF THE CITY OF NORTH PORT, FLORIDA, TO WIT:

SECTION 1. Acceptance. We the governing body of the City of North Port and its Municipal Districts by means of this Resolution accept and authorize signing of the Statewide Mutual Aid Agreement, attached hereto as Exhibit A.

SECTION 2. Severability. If any section, subsection, sentence, clause, phrase or portion of this Resolution is for any reason held invalid or unconstitutional by any court of competent jurisdiction, such portion shall be deemed a separate, distinct and independent provision and such holding shall not affect the validity of the remaining portions.

Page 1 of 2

RESOLUTION NO. 01-R-44

SECTION 3. Effective Date. This Resolution shall take effect upon its adoption by the city Commission.

PASSED AND DULY ADOPTED by the City Commission of the City of North Port, Florida, this 23rd day of July, 2001.

CITY OF NORTH PORT, FLORIDA

RUE S. BERRYMAN
Commission Chairperson

ATTEST:

DORIS J. BRIGGS
City Clerk

Approved as to form and correctness:

ROBERT K. ROBINSON
City Attorney

Page 2 of 2

APPENDIX E

CITY OF NORTH PORT RESOLUTION 2016-R-02 ADOPTING THE SARASOTA COUNTY UNIFIED LOCAL MITIGATION STRATEGY

Resolution No. 2016-R-02

City of North Port

RESOLUTION NO. 2016-R-02

A RESOLUTION OF THE CITY OF NORTH PORT, FLORIDA, ADOPTING THE 2016 SARASOTA COUNTY UNIFIED LOCAL MITIGATION STRATEGY, WITH THE NORTH PORT FLOODPLAIN MANAGEMENT PLAN ANNEX, AS THE FORMAL GUIDE FOR THE CITY OF NORTH PORT'S HAZARD MITIGATION AND FLOODPLAIN MANAGEMENT ACTIVITIES IN ACCORDANCE WITH PUBLIC LAW 106-390, THE FEDERAL DISASTER MITIGATION ACT 2000 (44 CFR §201.6), AND THE FLORIDA ADMINISTRATIVE CODE RULE 9-G22; PROVIDING FOR CONFLICTS; PROVIDING FOR SEVERABILITY; AND PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, City of North Port is subject to hazards including, severe weather, hurricanes, tornadoes, floods and wildfires and the City faces potential damage to life, property, natural resources and the local economy; and

WHEREAS, the Sarasota County Unified Local Mitigation Strategy Work Group is comprised of staff of Sarasota County Government; the Cities of North Port, Sarasota, and Venice; the Town of Longboat Key; Sarasota County School Board; and Sarasota Memorial Hospital, and community members is open for participation to any and all interested parties; and

WHEREAS, a City of North Port Community Rating System Work Group has also been formed to review and update the Floodplain Management Plan and is comprised of key City Department and community representatives, with the City's Stormwater Manager as the work group coordinator (City planner as an alternate) and those meetings are open for participation to any and all interested parties; and

WHEREAS, the Work Groups have identified these local hazards and have assessed County- and City-wide vulnerability and risk to these hazards, ultimately identifying and prioritizing mitigation initiatives that would reduce local vulnerability; and

WHEREAS, The Sarasota County Unified Local Mitigation Strategy and the North Port Floodplain Management Plan annex represents the City of North Port's commitment to reduce vulnerability and risks from all hazards, while it serves as a policy guide as resources are committed toward reducing the effects of all hazards, and is required of all communities

participating in the Community Rating System program through which provides flood insurance discounts through the National Flood Insurance Program; and

WHEREAS, initiatives identified, based upon established and accepted criteria, on the Unified Local Mitigation Strategy Project Lists are given greater consideration by State-managed funding programs, including but not limited to the Hazard Mitigation Grant program, the Flood Mitigation Assistance Program, the Pre-Disaster Mitigation Competitive Grant Program, Communities Trust, Community Development Block Grant, Coastal Partnerships Initiative; and

NOW THEREFORE, BE IT RESOLVED BY THE CITY COMMISSION OF THE CITY OF NORTH PORT, FLORIDA, THAT:

SECTION 1

1.01 The foregoing "WHEREAS" clauses above are hereby ratified as true and correct, and incorporated herein by reference.

1.02 The Sarasota County Unified Local Mitigation Strategy, with the North Port Floodplain Management Plan Annex, is adopted as the formal guide for the City of North Port's hazard mitigation and floodplain management activities.

1.03 The City Manager or his designee is authorized to apply for funding to support these activities.

SECTION 2 CONFLICTS

2.01 If there is any conflict between this Resolution and any other Resolution or Ordinance, or portions thereof, the provisions of this Resolution shall prevail to the extent of such conflict.

SECTION 3 SEVERABILITY

3.01 If any section, subsection, sentence, clause, phrase or portion of this Resolution is for any reason held invalid or unconstitutional by any court of competent jurisdiction, such portion shall be deemed a separate, distinct, and independent provision and such holding shall not affect the validity of the remaining portions.

Resolution No. 2016-R-02

SECTION 4 EFFECTIVE DATE

4.01 This Resolution shall take effect immediately upon execution by the Chair.

PASSED AND DULY ADOPTED by the City Commission of the City of North Port, Florida this 9th day of February, 2016

CITY OF NORTH PORT

By: Jacqueline Moore
Jacqueline Moore
Mayor

ATTEST:

By: Helen N. Raimbeau
Helen Raimbeau, MMC
City Clerk

Approved as to form and legal sufficiency:

By: _____
Mark Moriarty
City Attorney

APPENDIX F

CITY OF NORTH PORT RESOLUTION 2019-R-10 ADOPTING THE COMPREHENSIVE EMERGENCY MANAGEMENT PLAN AS THE FORMAL GUIDE FOR THE CITY OF NORTH PORT'S EMERGENCY MANAGEMENT ACTIVITIES

City of North Port

RESOLUTION NO. 2019-R-10

A RESOLUTION OF THE CITY OF NORTH PORT, FLORIDA, ADOPTING THE 2018 REVISIONS TO THE CITY OF NORTH PORT, FLORIDA COMPREHENSIVE EMERGENCY MANAGEMENT PLAN AS THE FORMAL GUIDE OF THE CITY OF NORTH PORT'S EMERGENCY MANAGEMENT ACTIVITIES; INCORPORATING RECITALS; PROVIDING FOR CONFLICTS; PROVIDING FOR SEVERABILITY; AND PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the 2019 revisions to the City of North Port's Comprehensive Emergency Management Plan (the "Plan"), attached hereto as Exhibit "A" and incorporated herein by reference, provide a detailed description of the hazards, consequences, emergencies, or disasters that may be generated by natural, technological, or manmade causes within the City, as well as the processes to follow in the event of such hazards, consequences, emergencies, or disasters occurring within the City; and

WHEREAS, because the City of North Port has implemented an emergency management program, Rule 27P-6.010, Florida Administrative Code, requires that a Comprehensive Emergency Management Plan be developed, submitted to, and adopted by the City Commission; and

WHEREAS, the Sarasota County Department of Emergency Management has reviewed and determined that the City's 2019 Plan revisions comply with the established criteria as required by Rule 27P-6.010, Florida Administrative Code; and

WHEREAS, as it has been determined that the City's 2019 Plan revisions are in compliance with the terms of Chapter 27P-6, Florida Administrative Code, Rule 27P-6.010(8), Florida Administrative Code, requires that the Plan be adopted by resolution before it becomes effective; and

WHEREAS, the City's 2019 Plan revisions apply to City agencies and resources, assign lead and support responsibilities for City agencies and personnel that coordinate with the emergency support functions outlined in the County and State plans, and interface with plans of contiguous jurisdictions, regional municipalities, and State plans; and

WHEREAS, the City Commission of the City of North Port, Florida, finds that it serves the public health, safety, and welfare of the citizens of the City to adopt the 2019 revisions to the City of North Port's Comprehensive Emergency Management Plan as presented.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COMMISSION OF THE CITY OF NORTH PORT, FLORIDA, AS FOLLOWS:

SECTION 1 – INCORPORATION OF RECITALS

1.01 The recitals outlined above are incorporated by reference as findings of fact as if expressly set forth herein.

SECTION 2 – RESOLUTION

2.01 The City Commission adopts the 2019 revision to the City of North Port Comprehensive Emergency Management Plan as the formal guide for the City of North Port's emergency management activities.

SECTION 3 – CONFLICTS

3.01 In the event of any conflict between the provisions of this Resolution and any other resolution or portions thereof, the provisions of this Resolution shall prevail to the extent of such conflict.

SECTION 4 – SEVERABILITY

4.01 If any section, sentence, clause or phrase of this Resolution is for any reason held to be invalid or unconstitutional by any court of competent jurisdiction, such provision shall be deemed a separate, distinct, and independent provision and such holding shall not affect the validity of the remaining portions hereof.

SECTION 5 – EFFECTIVE DATE

5.01 This Resolution shall take effect immediately upon adoption by the City Commission of the City of North Port, Florida.

PASSED and DULY ADOPTED by the City Commission of the City of North Port this ___ day of _____ 201__.

CITY OF NORTH PORT, FLORIDA

_____
CHRISTOPHER HANKS
MAYOR

ATTEST:

KATHRYN WONG
CITY CLERK

APPROVED AS TO FORM AND CORRECTNESS:

_____

AMBER L. SLAYTON
CITY ATTORNEY

APPENDIX G

CRISIS COMMUNICATION AND PUBLIC INFORMATION

City of North Port, Florida

Crisis Communications and Public Information Plan

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A. Emergency Notifications Scripts
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I. INTRODUCTION

A. Purpose

The City of North Port's Crisis Communications Plan outlines the roles, responsibilities and protocols that will guide the City in promptly sharing information with all of City's audiences during an emergency or crisis.
This plan is a part of City of North Port's Comprehensive Emergency Management Plan, adopted by the City Commission of the City of North Port and administered by the Emergency Manager.

For the purposes of this plan, a crisis is defined as a significant event that prompts significant, often sustained, news coverage and public scrutiny and has the potential to impact the City. A crisis could be precipitated by an emergency or a controversy. An emergency is a fire, hurricane, crime or other event that presents a threat and typically involves a response from police, fire or emergency medical personnel. A controversy better describes events such as a protest.

B. Scope

The audiences for this plan include City staff, residents, commerce, visitors, the media, national and international publics, and state and federal officials.

C. Consistent with the National Incident Management System

The City of North Port has adopted the National Incident Management System (NIMS), to include the Incident Command System (ICS) as the standard by which "no-notice events/incidents and pre-planned events will be organized and managed. Based on ICS guidance, and City protocols, ICS may be implemented at any level of emergency, for any situation, and by any qualified individual. The use of ICS includes all the standardized forms approved by the National Wildfire Coordinating Group, or the NIMS Integration Center of the US Department of Homeland Security.

II. OBJECTIVES OF THE PLAN

Our guiding principle will be to communicate facts as quickly as possible, updating information regularly as circumstances change, to ensure the safety of the City and the continued operation of essential services. Our efforts to be simultaneously accurate and quick may mean that some communications are incomplete. We accept this, knowing that how we communicate in an emergency or a crisis will affect public perceptions of the City. Honesty and speed are the most effective means to avoid lasting impact to the institution and widespread second-guessing by the public, which expects immediate access to accurate information. A good offense is the best defense.

At the same time, we realize that in a crisis, people will likely expect us to have more information than we may have. That makes it imperative to speak with accuracy about what we know and not to speculate about details we do not know.

We will use multiple mediums to reach as many of our population as possible with accurate, timely information. This is especially important in the first hours and days of an emergency or a crisis. Our goal is to be open, accountable and accessible to all audiences, while also being mindful of legal and privacy concerns.

The objectives of this Plan are to establish and assign the public information functions for emergency or disaster activations. The public information plan is designed to inform and educate the public about hazards, threats to public safety, and risk reduction through various media. The public information plan provides for timely and effective dissemination of information to protect public health and safety, including response to public inquiries and rumors. Protocols are in place to interface with public officials and VIPs. Procedures include a process for obtaining and disseminating public information materials in alternative formats.

The emergency public information capability includes:

- a central contact facility for the media (i.e., Joint Information Center);
- pre-scripted information bulletins;
- method to coordinate and clear information for release;
- capability of communicating with special needs and diverse populations;
- protective measures guidelines; and
- designated and trained spokesperson(s) who have been qualified to deliver the City's message, appropriate to hazard and audience.

III. ORGANIZATION AND RESPONSIBILITIES

A. Organization

1. The Public Information Officer (PIO) position is established within the Incident Command System Organization as part of the Incident Commander's Command Staff. The City Manager shall appoint the PIO(s) for an event, crisis, or disaster.

2. The PIO is responsible to:

   a. Provide a two-person successor list to Emergency Management Director.

   b. Assemble and manage the Crisis Communications Team and function within the Emergency Operations Center.

   c. Establish and operate a Joint Information Center (JIC) and Contact Center near the EOC, collecting information in the EOC, and from field unit PIOs. The JIC will be composed of PIO elements from each responding department/agency to include but not limited to City, State and Federal agencies.

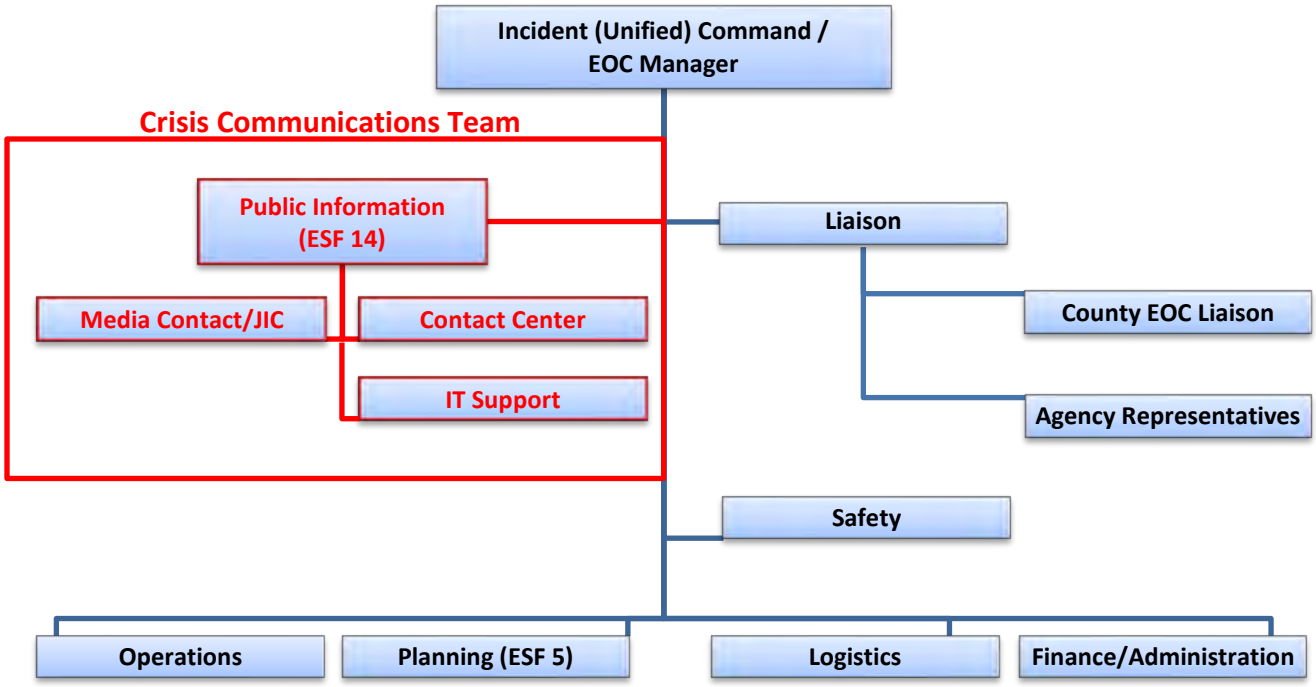
   d. Organize, schedule and manage media briefings regarding actual emergency preparedness, response, and recovery operations.

   e. Prepare and disseminate emergency public information materials incidental to an emergency operation.

   f. During and following an emergency, serve as the single official point of contact between City government and all media representatives.

   g. Coordinate public information releases and rumor items with spokespersons for emergency response organizations and representatives of County, State and Federal governmental agencies as may be on scene in any official capacity.

   h. Assist the essential services in developing and disseminating post-disaster health and safety instructions for the reoccupation of evacuated areas and storm damaged homes.



B. Crisis Communications Team Staffing

1. Public Information Officer, City Manager's Office

2. Community Outreach Manager, City Manager's Office

3. Customer Service Coordinators from Public Works and Utilities Departments

4. Information Technology support

5. Others as needed

   - Communicators for Contact Center
   - Field PIOs
   - Writers
   - JIC Facility Manager
   - Media Handlers

The City Manager or his/her designee will add or authorize the addition of other team members as appropriate under the circumstances and availability of staff.

C. Convening the Crisis Communications Team

The Crisis Communications Team will convene when the City Manager declares a Level 1 Emergency (the most severe category that presents significant risk to the

community) or has requested to assess communication needs for Level 2 or Level 3 emergencies. The City Public Information Officer or his/her designee will contact each member by phone and/or email to convene immediately.

Given the urgency of rapid communications, the City's Public Information Officer (PIO) or his/her designee has the authority to begin acting immediately, in consultation with the City Manager or his/her designee, until a broader decision can be made about how the City should proceed.

Also, the Public Information Officer may identify a potential crisis or controversy that is not an immediate emergency and assemble the Crisis Communications Team to prepare a communications strategy – again, as part of a coordinated City response.

Depending on the nature of the emergency or crisis, it may not be possible for the Emergency Leadership Team or their designees to convene prior to the timely notification. Once the Emergency Leadership Team meets and can determine whether the City is facing an emergency, execution of this plan can be adjusted accordingly.

D. Location

The Crisis Communications Team headquarters for most crises will be City Hall Room 243. The City PIO will maintain stocks of press packets, press identification badges, parking passes, and copies of this plan.

Since this room has limited conference capabilities, it may be replaced with another facility in the event of an extended crisis or emergency. The primary back-up location is the George Mullen's Activity Center (GMAC) or Morgan Family Community Center (MFCC). The team may move its headquarters to GMAC or MFCC in several circumstances, including technical limitations at City Hall or a need to be near the news media if they are set up at the disaster scene.

IV. RESPONSE

A. Implementation

The Crisis Communications Team will implement some, or all, of the steps outlined below based on circumstances, coordinating with the Emergency Leadership Team. Throughout a crisis, the team will meet frequently to review changing facts, assess whether key messages are reaching audiences and determine whether strategies need to change. The success of this plan rests on open and frequent communications among the City's Emergency Leadership Team and the Crisis Communications Team.

Contact information for leadership and communication officials is included in documents located on the City government's network P: drive.

- Team Contact List
- Senior Administrators
- Crisis Communications Team

Also, the document Checklist for Crisis Communications includes phone and mobile phone numbers and e-mail addresses for key communications personnel tasked with providing initial response.

In an emergency, our goal is to issue our first communication to key City audiences within 30 minutes of notification of the event, with regular updates as needed. Some situations may require even faster initial communications.

B. Immediate Response

The team will carry out these initial tasks immediately:

1. Convene the Crisis Communications Team for any Level 1 emergency.
2. Send management memo as appropriate.
3. Send media alert as appropriate.
4. Convene other communicators for emergency call center or other needs.

C. Secondary Response

Once the Crisis Communication Team convenes, the following tasks will be carried out by this team:

1. **Designate a secretary** who can maintain meeting notes, to-do lists, information files on the ongoing crisis and other items.

2. **Review and write down known facts** – those that can and cannot be released to the public — and determine whether a response is needed, and if that response is needed for all the City's key audiences. These facts will be used to fill in pre-scripted templates (see appendix) for news releases, text messages and other items that have already been developed. It is critical as the situation changes for new fact sheets to be developed.

3. **Develop several key messages** that will be included in all City communications.

   One message typically will address what the City of North Port is doing to ensure the safety of community members. Identify protective measures

guidelines to be taken to provide the public with essential information on evacuation, sheltering, sheltering special needs populations and pet sheltering. [Examples: public messages that include instructions for tornadoes (i.e., sheltering in center of home), mosquito-borne illnesses (i.e., using repellant, wearing clothing that covers arms and legs), etc.] Another may need to be forward-looking and address what we are doing to make sure the crisis, or a problem with our response, doesn't happen again. Determine methods for obtaining and disseminating public information materials in alternative formats (e.g., flyers/ brochures/ handouts; internet; phone/CodeRED; or print, radio or television broadcast).

All the messages should evolve as circumstances change but will always aim to restore and maintain confidence and calm, balancing a sense of concern with resolve and action. Sample messages are included in the approved pre-scripted templates (see appendix). It is critical that City Emergency Leadership Team have copies of the most recent news releases and other messages so everyone is clear on what is being shared with the public.

4. **Determine who will act as spokespeople** – the City Manager will be the public face of the City, while the PIO will run briefings and handle media questions between such formal press gatherings. One or more members of the Crisis Communications Team may communicate key messages specific to their department.

5. **Update CityofNorthPort.com website** is paramount. Consideration should be made for written translations for the foreign-speaking residents of the City. The Team should keep in mind that the parties interested in the information will not always be solely residents and should be aware that seasonal residents and out-of-state family members may also need to be apprised of on-going emergency events.

6. **Open the Contact Center** to handle phone calls using a script developed from the key messages, facts and frequently asked questions (FAQs) the Crisis Communications Team has developed or have been obtained from the Sarasota County Contact Center.

    a. Staff would initially come from customer service personnel from Utilities, Neighborhood Development Services and Public Works Departments. Supplemental staff may come from other departments.

    b. Assign staff or volunteer to greet visitors at City Hall reception desk.

c. Calls to City Hall's main number, 941-429-7000, would be forwarded to the Contact Center.

7. **Develop communications for the City Manager**, as appropriate. The City Manager will be tasked with keeping the City Commissioners informed and up-to-date with the latest key messages. The PIO will be responsible for generating and reviewing communications, including correspondence, e-mail messages, talking points, speeches or op-eds, in consultation with the appropriate members of the Crisis Communications Team. The PIO will then provide the City Manager the communications for distribution.

8. **Coordinate with Sarasota County Communications** (ESF-14) and the **Charlotte County Public Information Office**, to ensure a consistent message between jurisdictions and to obtain a copy of their frequently-asked questions (FAQs) from their Contact Centers. Attend meetings, via conference call or in-person, as necessary and available.

9. **Establish a Joint Information Center (JIC)** for the centralization of media personnel. The JIC will be composed of Public Information Officer (PIO) elements from each responding department/agency to include but not limited to City, State and Federal. This center will release public preparedness, response, recovery, and mitigation information, as well as certain information on the disaster or emergency at hand such as shelter information, danger zones, and open or closed businesses. The JIC will establish a schedule for press briefings and release other information as needed.

   a. It is the City's normal practice to permit news reporters and photographers to have open access to the City facilities for conducting interviews after they check in with the Public Information Officer. However, during crisis situations the PIO or his/her designee will determine if access needs to be restricted to avoid disruption to essential services and programs.

   b. If that determination has been made, then news reporters and photographers will first be directed to a staging area at City Hall. During a severe crisis or in severe weather, the media area may be moved to the Mullen's or Morgan Centers. The PIO may also use other rooms for press events, as needed. The PIO will be responsible for opening this facility, bringing needed supplies (including identification badges, parking passes, media guidelines and press packets) and determining a schedule for 24-hour staffing. (See appendices for JIC Toolkit)

c. Where practical, pool cameras can be set up for television journalists to share.

d. The PIO will coordinate press conferences and related media advisories, as needed. If the emergency requires the opening of a JIC, the PIO will coordinate equipping this center with such items as tables, chairs, podium, sound system, etc. Some emergencies may require that the JIC remain open 24 hours a day for an indefinite period. Should that occur, the City Manager has the authority to use communicators from around City government for staffing. In such a situation, no single person can or should be expected to work around the clock. Rather, the City Manager or his/her designee must tap and empower other communicators to assist with managing the facility and answering media requests.

e. The PIO shall arrange for a hearing-impaired interpreter to translate briefings to the deaf and hard-of-hearing community. Consideration should be made for a live or written translation for the Ukrainian and Russian residents of the City.

f. A security officer should be assigned to the JIC to prevent access to other parts of the building.

10. **Assign a staff member to monitor media, social media, and online coverage** to anticipate any problems in the way information is flowing to the news media and on the Internet. Summaries of relevant coverage will be provided to the City's Emergency Leadership and Crisis Communications Teams on at least a daily basis, or more frequently as needed.

11. **Schedule media briefings,** a minimum of one media briefing per day, to be held at a time when the information can have the best possible media/ public exposure. The PIO shall brief staff members or officials that are requested to speak at the media briefings.

12. **Coordinate all VIP visits** and tours and chaperon them. The PIO will arrange briefings or meetings for visiting dignitaries, and provide the media with information regarding all visits and tours by dignitaries. If visiting dignitaries or public officials visit the EOC, the media shall be allowed access to them upon approval by the Incident Commander and the EOC Manager.

13. **Media Access to the EOC** shall be restricted unless approval is received from the Incident Commander and the EOC Manager. If permission is granted, media shall be escorted always by a member of the PIO team.

14. **Evaluate how to help our community recover**, return to normal and, if needed, regain faith in City government after the trigger event of the crisis is over, in coordination with the City Emergency Team. This may include the need for town hall meetings, letters from the Mayor expressing sympathy, detailed plans to prevent another such crisis, etc. The Community Outreach Manager shall manage this activity.

D. Approvals of outgoing information

Typically, the City uses a collegial approach of multiple approvals before communications pieces, including emails and news releases, are distributed. That system will not work in a crisis. Seconds matter in a crisis, and we will be judged by how quickly we share information with key audiences.

As a matter of policy, the City is committed to trying to meet these expectations. It recognizes the need for unusually crisp decision-making during a crisis to enable rapid, accurate communication in coordination with the institution's broader process. Pre-scripted templates have been approved in advance by City leadership and legal counsel to expedite the approval process during a crisis (see appendices). **Final approval for all communications rests with the Incident Commander or his/her designee**.

E. The End of the Crisis

The City Manager will determine when an emergency has ended and routine communications processes can resume. The decision to declare the emergency over will trigger a review of how the crisis was handled and how communications can improve.

F. After-Action Review

Within 10 days of the end of the event, assess how this plan functioned, address any needed updates and recognize the work of partners whose help was invaluable (i.e., assistance from communicators from other departments/agencies).

Coordinate the review of communications and information with the Emergency Manager who would be preparing the event's After-Action Report and Improvement Plan.

V. TRAINING AND PLAN MAINTENANCE

A. Spokesperson Training

The PIO and Emergency Manager will work together in identifying training opportunities for those selected as City or department spokespersons. At a minimum, spokespersons shall complete the following training programs:

- FEMA, IS-700: Introduction to the National Incident Management System (NIMS)
- FEMA, IS-702: NIMS Public Information
- FEMA, ICS-100: Introduction to the Incident Command System
- FEMA, ICS-200: Basic Incident Command System
- FEMA, ICS-300: Intermediate Incident Command System
- FEMA, G-290: Basic Public Information Course

Resource and time-permitting, spokespersons should complete the following programs:

- Texas A&M Engineering Extension Service, MGT-318: Public Information in an All-Hazards Incident
- National Disaster Preparedness Training Center, PER-300: Social Media for Natural Disaster Response and Recovery

Training records shall be maintained by the Human Resources Division.

As part of this process, the PIO will schedule media training sessions for senior administrators and key team members. After the initial session to train all key officials, sessions will be scheduled annually for people who are new to the Emergency Leadership Team, the Emergency Management Team or the Crisis Communications Team. Every two years, all members will attend a refresher course in media training.

Media training also will be necessary for certain officials who are neither part of the Emergency Leadership Team nor the Crisis Communications Team. The PIO will develop a list of such officials and offer media training on an annual basis.

B. Updating

Annually, this plan will be reviewed and updated as necessary.

The PIO will update phone lists for members of the Emergency Leadership Team and Crisis Communications Team. The PIO will oversee updates and improvements to email lists for internal audiences and updates of media lists and fact sheets.

C. Exercising

The City will conduct an annual drill of emergency management with participation by members of the Emergency Leadership Team. The crisis communications plan will be tested at these times with participation by members of the Crisis Communications Team.

The City, resources permitting, will also conduct at least one test annually of the CodeRED communication tools, which include email, text messaging, website, and phone line.

Appendix G1

Emergency Notifications Scripts

General Guidelines:

- Text messages may not be longer than (140) characters. They may also be used as social media posts.
- E-mail and voice mail messages should generally be the same message.
- There are two categories of notices for text messaging: Emergency and Urgent Situation.
    - **Emergency** – An incident or condition, expected or unexpected, that threatens life or safety and requires immediate action.
    - **Urgent Situation** – An incident or condition that does not pose an immediate threat to life or safety, but that is of a nature where timely receipt of information or instructions may directly affect the well-being of the recipient.
- Keep in mind the principles of public information officers: Be First, Be Right, and Be Credible. In other words, make sure the messages are timely, accurate, and useful.
- Each message should consist of the following three components:
    - Alerting (Attention management) – calling the user's attention to the issue at hand
    - Informing (Information transfer) – what is happening, and what the user should and should not do
    - Reassuring (Affective or emotional payload) – be aware of the degree of sensitivity as to the audience.

Pre-scripted Messages

TEST

This is a test of City of North Port emergency alert system. If you have received this in error, send email to (individual).

This is a test of City of North Port Emergency Notification Service. This is only a test. In the event of an actual emergency, you would be given brief details and directed to visit the Web at (Emergency Website) for more information and instructions. If you have received this message in error or have difficulty with the transmission of this call, please send email to (individual). Thank you for participating in the City of North Port Alert Emergency Notification System.

ACTIVE SHOOTER /ARMED INTRUDER/SHELTER IN PLACE

Text Message/Social Media Post
EMERGENCY: A suspect with a weapon is (at location). Go to the nearest room and lock door. Follow authorities' instructions.

E-mail Message
City of North Port EMERGENCY! There is a suspect with a [type] weapon (at location). [Shots have been fired.] If you are on site, go into the nearest available room and lock the door. If you are not on (at location), stay away. THIS IS NOT A TEST! Wait for the all clear notification from City of North Port officials.

Voicemail Message
This is [name and title] with an EMERGENCY alert from City of North Port. There is a suspect with a [type] weapon (at location). [Shots have been fired.] If you are on site, go into the nearest available room and lock the door. If you are not (at location), stay away. THIS IS NOT A TEST! Wait for the all clear notification from City of North Port officials.

BIOLOGICAL THREAT

Text Message/Social Media Post
EMERGENCY: City received a biological threat. Prepare to evacuate. Follow authorities' instructions.

E-mail Message
City of North Port EMERGENCY! A biological threat has been received (at location). If you are near the area, prepare immediately for possible evacuation. Listen for instructions from City of North Port officials and follow them quickly and carefully. For additional information and updates go to (Emergency Website)

Voicemail Message

This is [name and title] with an EMERGENCY alert from City of North Port. We have received a biological threat that we deem credible. If you are near (at location), prepare immediately for possible evacuation. Listen for instructions from City of North Port officials and follow them quickly and carefully.

BOMB THREAT

Text Message/Social Media Post
ALERT: City received a bomb threat (at location). Evacuate. Follow authorities' instructions.

E-mail Message
City of North Port EMERGENCY! A bomb threat has been received (at location). If you are near (at location), prepare immediately for possible evacuation. Listen for instructions from City of North Port officials and follow them quickly and carefully. For additional information and updates go to (Emergency Website)

Voicemail Message
This is [name and title] with an EMERGENCY alert from City of North Port. We have received a bomb threat that we deem credible. If you are near (at location), prepare immediately for possible evacuation. Listen for instructions from City of North Port officials and follow them quickly and carefully. For additional information and updates go to (Emergency Website)

BOMB FOUND

Text Message/Social Media Post
EMERGENCY: A bomb has been found (location). Prepare to evacuate. Follow authorities' instructions.

E-mail Message
City of North Port EMERGENCY! A bomb has been found on the (location) in the [building]. Avoid the area, prepare immediately for possible evacuation. Listen for instructions from City of North Port officials and follow them quickly and carefully. Repeat, a bomb has been found (at location). For additional information and updates go to (Emergency Website)

Voicemail Message
This is [name and title] with an EMERGENCY alert from City of North Port. A bomb has been found (at location). Avoid the location, prepare immediately for possible evacuation. Listen for instructions from City of North Port officials and follow them quickly and carefully. Repeat, a bomb has been found in the (location). For additional information and updates go to (Emergency Website)

CIVIL DISTURBANCE

Text Message/Social Media Post
EMERGENCY: A violent disturbance is occurring (location). Leave the area. Follow authorities' instructions. (135)

E-mail Message
City of North Port EMERGENCY! A violent disturbance has broken out (location). There is a risk of danger to participants and bystanders. For your own safety, leave the area. If you are not in the area, stay away. Follow instructions from City of North Port officials. For additional information and updates go to (Emergency Website)

Voicemail Message
This is [name and title] with an EMERGENCY alert from City of North Port. A violent disturbance has broken out (at location). There is a risk of danger to participants and bystanders. For your own safety, leave the area. If you are not in the area, stay away. Follow instructions from City of North Port officials. For additional information and updates go to (Emergency Website)

CHILD ABDUCTION

Text Message/Social Media Post
IMPORTANT: A child has been abducted from (at location). For information on the suspect or child go to (Emergency Website)

E-Mail
A child has been abducted from (at location). Call 9-1-1 if the following suspect or child is seen: [type description of suspect and child]

Voice Mail
A child has been abducted from (at location). Call 9-1-1 if the following suspect or child is seen: [Give description of suspect and child]

EARTHQUAKE

Text Message/Social Media Post
ALERT: An earthquake has occurred. Evacuate all buildings (at location) and remain outside until further notice.

E-mail message
Emergency! An earthquake has just occurred. For you safety, evacuate all buildings (at location). Remain outside for further information. We will provide updates as we receive more information. For additional information and updates listen to NOAA weather radio.

Voicemail message

This is [name, title] with an emergency alert from City of North Port. An earthquake has just occurred. For you safety, evacuate all buildings (at location). Remain outside for further information. We will provide updates as we receive more information. For additional information and updates listen to NOAA weather radio.

EVACUATION

This is the City of North Port. Officers are responding to a report of **(problem)** at **(location)**. Calmly evacuate the building using all available exits. Move away from the building. **(Repeat message three times)**

Problem Resolved: This is the City of North Port. The incident at **(location)** has been resolved and it is safe to return to normal activity. **(Repeat message three times)**

Building Evacuation to a specific direction
This is the City of North Port. Officers are responding to a report of **(problem)** at **(location)**. Calmly evacuate the building. Avoid **(location)**. Go to **(direction/landmark)**. **(Repeat message three times)**

Problem Resolved: This is the City of North Port. The incident at **(location)** has been resolved and it is safe to return to normal activity. **(Repeat message three times)**

EXPLOSION

Text Message/Social Media Post
EMERGENCY: There has been an explosion (at location). Prepare to evacuate. Follow authorities' instructions. (120)

E-mail Message
EMERGENCY! There has been an explosion (at location). If you are in the immediate vicinity, you should evacuate as instructed to by City of North Port officials. If you are not in the area, avoid the area so that emergency units can work unimpeded. Follow instructions from City of North Port officials.

Voicemail Message
This is [name and title] with an EMERGENCY alert from City of North Port. There has been an explosion (at location). If you are in the building or in the vicinity, you should evacuate as instructed to by City of North Port officials. If you are not in the area, you should keep at a safe distance so that emergency units can work unimpeded. Follow instructions from City of North Port officials.

FIRE

Text Message/Social Media Post
ALERT! There is a fire (at location). Evacuate. If you are not in the area, stay clear of the area.

E-mail Message
City of North Port EMERGENCY! A fire has been reported (at location), if you are in the [building], evacuate immediately. If you are not in the area, stay clear so that emergency units and firefighters can work unimpeded. Follow instructions from City of North Port officials.

Voicemail Message
This is [name and title] with an EMERGENCY alert from City of North Port. A fire has been reported (at location). If you are in the (at location), evacuate immediately. If you are not in the area, stay clear of the (at location) so that emergency units and firefighters can work unimpeded. Follow instructions from City of North Port officials.

FLOODING

Text Message/Social Media Post
EMERGENCY: (At location) is currently flooding. Avoid the area. Monitor NOAA weather radio.

E-mail message
(Affected location) is currently flooding. If you are in the area, seek higher ground immediately. For additional information and updates listen to NOAA weather radio.

Voicemail message
This is [name, title] with an emergency alert from City of North Port. (Affected location) is currently flooding. If you are in the area, seek higher ground immediately. For additional information and updates listen to NOAA weather radio.

GAS LEAK

Text Message/Social Media Post
ALERT: There is a gas leak and threat of fire (at location). Extinguish all flammable items. Follow authorities' instructions. (129)

E-mail Message
City of North Port EMERGENCY! There is a gas leak (at location) posing a threat of fire from accidental ignition. If you are in the vicinity, immediately extinguish any burners or other flames and prepared to evacuate. If you are not in the area, stay away. Follow instructions from City of North Port.

Voicemail Message
This is [name and title] with an EMERGENCY alert from City of North Port. There is a gas leak in (at location). It poses a threat of fire from accidental ignition. If you are in the vicinity, immediately extinguish any burners or other flames and prepared to evacuate. If you are not in the area, stay away. Follow instructions from City of North Port officials.

HAZARDOUS MATERIALS

Text Message/Social Media Post
ALERT! There has been a hazardous release (at location). Prepare to evacuate. Follow authorities' instructions. (127)

E-mail Message
City of North Port EMERGENCY! There has been a release of a hazardous material (at location). If you are near the are leave now, all others stay away from this location so that emergency units and hazmat teams can work unimpeded. Follow instructions from City of North Port officials.

Voicemail Message
This is [name and title] with an EMERGENCY alert from City of North Port. There has been a release of a hazardous material (at location). If you are in the area leave now, all others stay away from this location so that emergency units and hazmat teams can work unimpeded. Follow instructions from City of North Port officials.

More Details

At approximately (time) today, a potentially hazardous material was released on the City of North Port in Building "?". As a result, building "?" is being evacuated while City of North Port officials are conducting a thorough investigation.

Occupants of Building "?" should take shelter in (location here) until further notice. All other members of the community should avoid the area. Building "?" will be re-opened once it is determined that the building is safe for occupancy. An update will be posted on this site at (time).

HOSTAGE INCIDENT

Text message/Social Media Post

ALERT– A hostage incident is unfolding in (at location). Evacuate immediately and avoid this area.

ISOLATED SHOOTING / STABBING EVENT, SUSPECT NOT IN CUSTODY

Text message/Social Media Post
City of North Port Alert: A [shooting/stabbing] has occurred (at location). A suspect is NOT in custody, Shelter in place. See email for more information. (138)

Email message
City of North Port Alert: A [shooting/stabbing] incident occurred [approximate time] at (at location). Police are on the scene and investigating. A suspect is NOT in custody. If you are (at location), go into the nearest room and lock door, if you are not (at location) stay away. Contact

9-1-1 if you see anything suspicious or have information on the case. Wait for the all clear form City of North Port officials.

Voicemail message
This is [name, title] with an emergency alert from City of North Port. A [shooting/stabbing] incident occurred [approximate time] (at location). Police are on the scene and investigating. A suspect is NOT in custody. If you are (at location), go into the nearest room and lock door, if you are not (at location) stay away. Contact 9-1-1 if you see anything suspicious or have information on the case. Wait for the all clear form City of North Port officials. For additional information and updates go to (Emergency Website)

ISOLATED SHOOTING / STABBING EVENT, SUSPECT IN CUSTODY

Text message/Social Media Post
ALERT: A [shooting/stabbing] has occurred at [building]. A suspect is in custody. Police are on scene.

Email message
City of North Port Alert: A [shooting/stabbing] incident occurred [approximate time] at [building location]. Police are on the scene investigating. This appears to be an isolated incident and a suspect is in custody. Even so, please be cautious and contact the Police at 9-1-1 if you see anything suspicious or have information regarding the crime.

Voicemail
This is [name, title] with an emergency alert from City of North Port. A [shooting/stabbing] incident occurred [approximate time] at [building location]. Police are on the scene investigating. This appears to be an isolated incident and a suspect is in custody. Even so, please be cautious and contact 9-1-1 if you see anything suspicious or have information regarding the crime.

LIGHTNING

Text Message/Social Media Post
EMERGENCY: Electrical storm! Lightning is striking on or near (location). Stay inside and away from metal objects.

E-mail Message
City of North Port EMERGENCY! Electrical storm lightning is striking on or near (location). Stay inside and away from metal objects until the storm has stopped. Monitor a NOAA weather radio.

Voicemail Message
This is [name and title] with an EMERGENCY alert from City of North Port. A major electrical storm with powerful and frequent lightning strikes is hitting City of North Port. Seek cover, stay away from metal objects, and remain inside until the storm has stopped. listen to NOAA weather radio.

MICRO BURST

Text Message/Social Media Post
EMERGENCY: Micro Burst! Micro Bursts are striking (at location). Stay inside and away from doors and windows.

E-mail Message
City of North Port EMERGENCY! Micro Bursts are striking (at location). Stay inside and away from doors and windows until the storm has stopped. For additional information and updates listen to NOAA weather radio.

Voicemail Message
This is [name and title] with an EMERGENCY alert from City of North Port. A major storm with powerful and frequent Microbursts is hitting City of North Port. Seek cover, stay away from doors and windows, and remain inside until the storm has stopped. For additional information and updates listen to NOAA weather radio.

MISSING PERSON

ALERT: (Individual) has been reported missing. Contact 9-1-1 with any information.

SEVERE WEATHER

ALERT: A Severe Weather report indicates potential impact to (at location). Monitor NOAA weather radio.

SEVERE ACCIDENT

City of North Port ALERT severe accident has occurred (at location). Check (City of North Port website) and email.

SHELTER IN PLACE

This is the City of North Port. Officers are responding to a report of **(problem)** at **(location)**. Get to a safe place and take precautions until given the all clear. **(Repeat message three times)**

Problem Resolved: This is the City of North Port. The incident at **(location)** has been resolved and it is safe to return to normal activity. **(Repeat message three times)**

STRUCTURAL FAILURE
City of North Port ALERT. A structural failure occurred in ___. Evacuate immediately and avoid this area. Check (Emergency Website) for further details.

SUSPICIOUS PACKAGE

City of North Port ALERT. A suspicious package found (at location). Evacuate immediately and avoid this area.

SUSPICIOUS PERSON

City of North Port ALERT. Police are checking a suspicious person around (at location). Find a secure location, lock doors, and stay away from windows.

TORNADO

Text Message/Social Media Post
ALERT: A tornado warning has been issued for City of North Port. Listen to NOAA weather radio for more details.

E-Mail Message
City of North Port Alert: A tornado warning has been issued for the City of North Port. A tornado warning means that a tornado has been sighted on the ground and you should take immediate action to take cover. Stay away from windows, doors and walls that face the building's exterior.

- Go to a shelter area, such as a basement or the lowest level in the building;
- If there is no basement, go to the center of an interior room on the lowest level (closet, interior hallway) away from corners, windows, doors and outside walls;
- Put as many walls as possible between you and the outside;
- Get under a sturdy table and use your arms to protect your head and neck
- Do not open the windows.

If a tornado hits and you sustain injuries, or witness others being injured, call 9-1-1.
If the tornado warning is extended or lifted, an update will be posted at (Emergency Website)

Voice Mail Message
This is a City of North Port Alert emergency message for the City of North Port. A tornado warning has been issued until (time) today. A tornado warning means that a tornado has been sighted on the ground and you should take immediate action to take cover. For more details and updates listen to NOAA weather radio.

UNKNOWN SITUATION

Text Message/Social Media Post
ALERT: Police are investigating an incident (at location). Please avoid the area. See email for more information (126)

E-mail Message

City of North Port EMERGENCY! Police are investigating an incident (at location). Please avoid the area. As we learn more information, we will provide further updates. Again for your safety avoid (at location) until you have been advised its All Clear.

Voicemail Message
This is [name and title] with an EMERGENCY alert from City of North Port! Police are investigating an incident (at location). Please avoid the area. As we learn more information, we will provide further updates. Again for your safety avoid (at location) until you have been advised its All Clear.

WILDFIRE EVACUATION

Text Message/Social Media Post
ALERT: There is a fast moving wildfire near the City. If you are (at location), evacuate immediately to (location).

E-mail Message
City of North Port Emergency! There is a fast moving wildfire near City of North Port. Evacuations have been ordered. If you are on (at location), evacuate immediately to (location). If you are not in the area, stay away.

Voicemail Message
This is [name and title] with an emergency from City of North Port. There is a fast-moving wildfire near City of North Port. Evacuations have been ordered. If you are (at location), evacuate immediately to (location). If you are not in the area, stay away.

WATER or SEWER FAILURE

ALERT: A water/sewer failure has occurred in (at location). The area is temporarily closed until the area is safe for re-entry.

More Details
At approximately (time) today, a water/sewer failure occurred (at location) in the City of North Port. The area will be closed until the area is safe for re-entry. An update will be posted on this site at (time). The City of North Port appreciates your patience, cooperation and understanding during this incident

ALL CLEAR

Text Message/Social Media Post
ALL CLEAR: The situation is all clear, see you email for more information. (87)

E-mail Message
Will need to be written real time after event to include summary of event and any safety tips (if applicable)

Voicemail Message
This will be written real time after event include summary of event and any safety tips (if applicable)

Warning – General Incident

1. The [County/City] Emergency Management [Office/Department] has issued the following warning for those who live, work, or are visiting in [County/the City]

2. An emergency involving [County/city] is currently in progress at: [*Describe location by reference to facility name (if known), street and cross street, other geographic features (rivers, rail lines, etc.), and neighborhood name where appropriate]*

3. Emergency personnel are currently responding to this incident and local officials are monitoring the situation. To keep yourself safe and avoid impeding the emergency response, please avoid this area until further notice.

4. To repeat, an emergency involving [County/City] is currently in progress at: *(Repeat location in 2 above)*. Please avoid this area.

5. Do not call [911] for information about the emergency. Instead, stay turned to this station for additional official information.

Warning – Road/Facility Closure

1. The City of North Port Emergency Management has issued the following warning for those who live, work, or are visiting in the City of North Port.

2. It has been necessary to close certain local streets and highways due to:
   - ☐ flooding
   - ☐ heavy accumulations of snow and ice
   - ☐ fire / explosion
   - ☐ incident involving hazardous materials
   - ☐ Other:

3. As of _____ today, the following roads have been closed by law enforcement officials:

   Street or Route _____ At or Between _____

   Please avoid these routes.

4. ☐ If you must travel, use alternate routes, such as:

5. ☐ We recommend that you refrain from driving and remain at home due to the extremely bad travel conditions.

6. ☐ In addition, the following facilities have been closed due to the emergency situation:

7. Again, the roads and streets that have been closed are: *(Repeat list in 3 above)*

8. Please stay turned to this station for additional information on the current emergency.

Warning - Shelter-in-Place

1. The City of North Port Emergency Management has issued the following warning for those who live, work, or are visiting in the City of North Port.

2. There has been an accidental release of hazardous material that is affecting a portion of the local area. People in the following area must take protective measures:

3. If you are located in this area, do the following immediately in order to protect yourself:

   A. Go inside your home, workplace, or the nearest building that appears to be reasonably airtight and stay there. Take your pets with you.
   B. Close all doors, windows, and any fireplace dampers.
   C. Turn off any heating or cooling system that draws in air from the outside.
   D. Keep your radio on and tuned to receive emergency announcements and instructions
   E. Gather items that you may need to take with you if you are advised to evacuate.

4. People traveling in vehicles should seek shelter in the nearest airtight structure. If a suitable structure is not immediately available, travelers should roll up car windows, close air vents, and turn off the heater or air conditioner until they reach a suitable building.

5. If shelter is not immediately available, keep a handkerchief, towel, or damp cloth snugly over your nose and mouth until you get indoors.

6. (If school is in session.)

   ☐ Students at the following school(s) are taking shelter at their schools:

   Parents should not attempt to pick up students at school until the hazardous situation is resolved and they are advised it is safe to do so.

   ☐ Students at the following school(s) [have been/are being] evacuated to other facilities:

   Parents should not attempt to pick up students from schools that have been evacuated. Local officials will provide information on where to pick up school children as soon as it is available.

7. If you know of any neighbors or co-workers with hearing or language problems or functional and access needs, please advise them of this message.

8. Please do not call [911] or local emergency officials for information. Stay tuned to this station for additional information.

Special News Advisory – Pre-Evacuation

1. The City of North Port Emergency Management has issued the following warning for those who live, work, or are visiting in the City of North Port.

2. Due to the threat of [_____], it may be necessary for people who live, work or are visiting in the certain local areas to evacuate in the near future. This area(s) that may be at risk include:

3. Evacuation is NOT being recommended at this time. Local officials will advise you if evacuation is necessary. However, you should be prepared to evacuate if needed. To prepare, you should:

   A. Assemble the following emergency supplies:
      - Clothing for your family for several days
      - Bedding, pillows, and towels
      - Prescription medicines & spare eyeglasses
      - Soap and toiletries
      - Baby food and diapers
      - Your address book or list of important telephone numbers
      - Your checkbook, credit cards, and cash
      - Your driver's license and identification cards
      - A portable radio and flashlight.

   B. You should also:
      - Gather suitcases, boxes, or bags to hold your emergency supplies.
      - Be prepared to secure your home or office and your property before you depart.
      - Ensure your car is in good shape and you have adequate fuel.
      - Decide where you will go if you must evacuate. Decide with relatives or friends or consider making hotel or motel reservations.

4. ☐ Potential evacuation routes from the area(s) at risk include:

5. ☐ Potential evacuation routes from the area(s) at risk are described in:

6. If you know of any neighbors or co-workers with hearing or language problems or functional and access needs, please advise them of this message. And if you have neighbors or co-workers who do not have transportation, offer to assist them if you can.

7. We want to emphasize that this is a PRECAUTIONARY message about possible evacuation. Evacuation is NOT being recommended now.

8. Keep your radio or TV on and listen for further information about this situation. Please do not call [911] or local emergency officials for information as this ties up telephone lines needed for emergency operations.

Warning Message – Urgent Evacuation

1. The City of North Port Emergency Management has issued the following warning for those who live, work, or are visiting in the City of North Port.

2. Due to [_____] that [threatens/is affecting a portion of the local area, the [County Judge/City Mayor] recommend that people in the following area evacuate immediately to protect their health and safety:

3. Recommended evacuation routes from the area(s) at risk include:

4. Be sure to take essential items such as:

   - prescription medicines
   - eyeglasses
   - identification cards
   - checkbook
   - credit cards
   - valuable papers

   Do not delay your departure to collect other belongings.

5. Take your pets with you, but make sure you bring a leash, crate, or cage for them. Some shelters will not accept pets.

6. If you have no means of transportation or if you are physically unable to evacuate on your own, ask a neighbor to assist you.

7. If you know of any neighbors or co-workers with hearing or language problems or functional and access needs, please advise them of this message. And if you have neighbors or co-workers who need help or do not have transportation, offer to assist them if you can.

8. Repeating, local officials recommend the people in the following area(s) evacuate now: *(Repeat the area description in paragraph 2 above.)*

9. Please do not use your telephone except to report a true emergency. Stay tuned to this station for more information and instructions from local officials.

Warning Message – Mandatory Evacuation

1. The [The City of North Port Emergency Management has issued the following warning for those who live, work, or are visiting in the City of North Port.

2. Due to [___], the City Commission of the City of North Port, under Florida law, has ordered that people evacuate immediately the following area to protect their health and safety and the health and safety of possible rescuers:

3. Recommended evacuation routes from the area(s) at risk include:

4. Be sure to take essential items such as:
   - prescription medicines
   - eyeglasses
   - baby supplies
   - personal care items
   - identification cards
   - checkbook and credit cards
   - valuable papers

   Listen to this station for more information on what you need to take with you. Secure your home before you depart.

5. Take your pets with you, but make sure you bring a leash, crate, or cage for them. Remember some shelters will not accept pets

6. Decide where you will stay until the emergency is resolved. Staying with relatives or friends or in a hotel or motel is a good choice.

7. If you can't stay with friends or relatives or find a motel room, listen to this station for more information on the locations of public shelters.

8. If you have no means of transportation or if you are physically unable to evacuate on your own, ask a neighbor to assist you.

9. If you know of any neighbors or co-workers with hearing or language problems or functional and access needs, please advise them of this message. And if you have neighbors or co-workers who need help or do not have transportation, offer to assist them if you can.

10. Repeating, local officials, under Florida law, are ordering the people in the following area(s) to evacuate immediately: *(Repeat the area description in paragraph 2 above.)*

11. Please do not use your telephone except to report a true emergency. Stay tuned to this station for more information and instructions from local officials.

Special News Advisory – Supplemental Evacuation Information

1. The City of North Port Emergency Management has issued the following warning for those who live, work, or are visiting in the City of North Port.

2. Due to the threat of [____], local officials have recommended that people who live, work or are visiting in the following areas evacuate to protect their health and safety:

3. Use the following evacuation routes: [list evacuation routes]

4. You should take the following emergency supplies with you:
   - clothing for your family for several days
   - bedding, pillows, and towels for each family member
   - prescription medicines & spare eyeglasses
   - soap and toiletries
   - baby food and diapers
   - address book or list of important telephone numbers
   - checkbook, credit cards, and cash
   - driver's license and identification cards
   - portable radio and flashlight, with extra batteries

5. Plan where you will stay until the emergency is resolved. Staying with relatives or friends or in a hotel or motel is a good choice.

6. If you cannot find another place to stay, temporary public shelters will be/have been opened at:

7. Take your pets with you, but make sure you bring a leash, crate, or cage for them as well as pet food.

8. Secure your property before you depart. Shut off all appliances, except refrigerators and freezers. Lock all doors and windows.

9. Expect travel delays on evacuation routes. If you have a substantial distance to drive, you may want to take drinks and ready-to-eat food in your car in case you are delayed.

10. If you have no means of transportation or if you are physically unable to evacuate on your own, ask a neighbor to help you.

11. If you have neighbors or co-workers, who need help or do not have transportation, offer to assist them if you can.

12. If you know of any neighbors or co-workers with hearing or language problems or functional and access needs, please advise them of this message.

13. Please do not use your telephone except to report a true emergency. Stay tuned to this station for more information and instructions from local officials. If you missed some of the information in this advisory, it will be broadcast again soon.

Special News Advisory – School & Public Facilities

1. The City of North Port Emergency Management has issued the following warning for those who live, work, or are visiting in the City of North Port.

2. The current emergency involving [_____] has affected the operation of the number of local facilities. This advisory is intended to provide you an update on the status of schools, hospitals, nursing homes, and other key facilities.

3. ☐ All local public schools have been closed.

4. ☐ The following schools have been closed and students [are being/have been] returned to their homes:

5. ☐ The following schools have been evacuated and their students relocated to other facilities:

   School Students relocated to:

   ☐ Parents should pick up their children at these host facilities.

6. ☐ The following hospitals and nursing homes have been evacuated and their patients relocated to other facilities:

   Facility Patients relocated to:

7. ☐ The following government offices, parks, recreation areas, and other public facilities have been closed:

8. Please stay tuned to this station for more information and instructions from local officials.

9. ☐ And please refrain from using the telephone unless you have a true emergency.

Appendix G2

Joint Information Center Toolkit

News Release Procedures

Procedures:

- News releases come from the Lead PIO and agency PIOs.
- All news releases are sent through the PIO.
- All news releases are to be approved by the Incident Commander.

The Lead PIO and staff are responsible for news releases throughout the course of the incident. These releases should provide a comprehensive, "big-picture" view of the incident and meet the JIC goals established by the Lead PIO.

Agency PIOs can release their own specific information. They can send out their own news releases, or incorporate their information into a Lead PIO release.

Agency PIOs can do their own releases if their information is time sensitive and can't wait for a Lead PIO release to be compiled. A separate news release also can be done if the information is extensive or better served if it is a stand-alone release. For instance, the American Red Cross might choose to have a listing of blood donation locations included in a Lead PIO release, but may want to do a longer, stand-alone release about severe blood shortages.

Agency PIOs who issue separate releases are encouraged to use the template. This template provides for agency PIOs having their agency's title displayed prominently at the top of the release but maintains JIC uniformity to let the news media know the news release is coming from the JIC.

The Lead PIO office and agency PIOs should have them approved by their director and the Incident Commander. Once the news release is ready to be issued to the news media, the writer records the news release on the Release Log maintained by the PIO. This will assign a number to the news release. The PIO will take care of distribution.

News Conferences

<u>General Objectives and Aides:</u>

- Adhere to the talking points.
- Avoid making conference political.
- Utilize the checklist.

When dealing with multiple agencies during an event, it's important to make sure all agencies have a voice in the news conferences without bogging it down with endless speakers and politics. News agencies attend/cover a news conference if pertinent information is offered.

It's essential to plan news conferences well in advance. The JIC should have established basic goals when first formed, and it's important to ensure the news conferences are focusing on those goals.

Basic talking points should be established and stressed up front. Talking points should address the questions foremost in the public's mind and focus on public safety. The talking points should be communicated to all speakers and speakers should be encouraged to stay on message.

Checklist: Opening a JIC

Steps taken by Lead PIO, Assistant Lead PIOs, and JIC Facility Manager

- ☐ Determine who is the Lead PIO.
- ☐ Determine the JIC location.
- ☐ Assign a JIC Facility Manager (contact Property Maintenance)
- ☐ Ensure the chosen location is available and usable.
- ☐ Send PIO call-out. Include in message where to meet and who to call for more information.
- ☐ Check/assemble supplies and equipment.
- ☐ Test equipment. Are phones and faxes working, etc.?
- ☐ Maintain roster of responding PIOs and other support personnel.
- ☐ Assign PIOs and other personnel to roles as applicable.
- ☐ Once a majority of PIOs are present, hold a situation assessment briefing.
- ☐ Announce to the news media that the JIC is operational.
- ☐ First news release lists JIC personnel, phone and fax numbers etc.

Recommended Items for a PIO "Go Kit"

The following items are recommended for stocking an Agency PIO's "Go Pack."

- Agency identification
- Business cards
- Lap top computer (with battery, charger, AC plug) and broadband card
- Smartphone (with charger, AC plug, car charger)
- 800 MHz radio with charger
- Flashlight with batteries
- Inverter (for car accessory outlet)
- Office supplies (pads of paper, folders, pens, pencils, sharpener, stapler, staples, paper clips, tape, scissors, markers, etc.)
- Contact lists (for news media and your agency) and your agency's news release templates in the following forms:
  - On hard drive of lap top
  - In memory stick
  - Hard copies
- Map Book
- Rain/weather gear
- Safety vest
- Basic personal grooming/hygiene supplies
- Waterproof container to pack it all in

JIC Technology and Equipment

- Printer
- Printer paper
- Flash drive or disks/CDs
- JIS plan and other such file resources
- Copies of various forms and checklists, etc.
- Extra notebooks, pens and pencils
- Blank nametags or something for news media credential IDs
- Corkboard and/or dry erase board
- Thumbtacks, dry erase markers, eraser
- Tape
- Sticky Pads
- Clipboards
- Paperclips, binder clips, rubber bands
- Markers
- Scissors
- Stapler
- Surge protector/power strip and extension cord

JIC NEWS RELEASE LOG

Release #	Topic	POC/Agency	Date/Time Sent

NEWS RELEASE
[Event Name] Joint Information Center

JIC Main Phone Line: (XXX) XXX-XXXX JIC FAX: (XXX) XXX-XXXX

Time/Date
Contact: John Doe / (XXX) XXX-XXXX / Email:

Event Title and Release number (such as: Hurricane Al, Release #22)

HEADLINE WILL GO HERE

Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here.

Body of the release here. Body of the release here.

Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here.

NEW INFORMATION:

- Bulleted list of the new facts not previously reported.
- Bulleted list of the new facts not previously reported.
- Bulleted list of the new facts not previously reported.

BACKGROUND:

- Bulleted list of facts previously reported of the incident.
- Bulleted list of the facts previously reported.
- Bulleted list of the facts previously reported.

NEXT UPDATE

Time and date of the next press release update and/or press conference.

NEWS RELEASE Agency Name Here
from the Joint Information Center

Phone: (XXX) XXX-XXXX FAX: (XXX) XXX-XXXX

Time/Date
Contact: John Doe / (386) 123-4567 / Email:

Event Title and Release number (such as: Hurricane Al, Release #22)

HEADLINE WILL GO HERE

Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here. Body of the release here.

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NEW INFORMATION:

- Bulleted list of the new facts not previously reported.
- Bulleted list of the new facts not previously reported.
- Bulleted list of the new facts not previously reported.

BACKGROUND:

- Bulleted list of facts previously reported of the incident.
- Bulleted list of the facts previously reported.
- Bulleted list of the facts previously reported.

NEXT UPDATE
Time and date of the next press release update and/or press conference.

Information for inclusion in JIC news release

From: Agency Name
POC: Agency PIO
Date and Time Submitted to Lead PIO office: Jan 1, 2009, 1:30 p.m.

LEAD PIO OFFICE NOTES FOR WHEN RELEASE IS COMPLETE:
Release number this information was included in: List
any changes that were made:

AGENCY PIO NOTES TO LEAD PIO OFFICE:
Include here notes/directions for the Lead PIO office news release writer.

TEXT FOR RELEASE:
Put the text of what you want put in the news release here exactly as you would like to see it published so that the news release writer can just copy and paste.

Checklist: Holding a News Conference

- Decide who needs to be present by determining the types of questions that need to be answered. (If no new information is available, do not hold a news conference/briefing.)
- Take deadlines for print/broadcast media and other community events into consideration when scheduling a conference (as a guideline, no later than 3 p.m. for print publications or evening news, no later than 9 p.m. for nightly news).
- Notify news media of time, location and topic of the briefing/conference.
- If possible, include visual aids such as large, colorful maps, photos, etc. (If possible, have visual aids available online for download.)
- Attempt to hold informational portion of the conference to less than 30 minutes and provide ample time to answer news media questions.
- At the end, announce time and location of next news conference.

Room set-up: (Contact Property Maintenance)

- Rows of chairs with wide aisles between them.
- Raised stage areas in the back of the room for photographers.
- Raised stage in front of room complete with podium and possibly a table and chairs for speakers.
- No white background behind stage. Use a color and decorate with plants.
- Visible Web site address and JIC signage/logo.
- Appropriate lighting and sound system.
- Provide water and glasses for speakers.
- Provide easy ins and outs for speakers. (Use security if necessary.)

Speaker tips:

- Arrange speakers in order of appearance.
- Prepare speakers on angles/types of questions they may be asked.
- Discuss how to transition between speakers.
- Discuss management of questions and timeframe.

News Media Inquiry (Intake Form)

No. _____ *(in order received)*

Date: _____

Time:_____A.M./P.M.

Inquiry Received from:_____(person)

Phone: _____

E-mail: Reporter/Editor with: _____(organization)

Deadline:

_____

Question/Inquiry:

_____

_____

_____

_____

_____

Response:

_____

_____

_____

Is follow-up needed? _____ If so, when? _____

Notes:

_____

_____

_____

_____

First 48 Hours Checklist

Critical First Steps After Verification

Notification

1. Ensure your leadership is aware of the emergency and that they know you are involved. ☐
2. Use your crisis plan's notification list to ensure all of the communication chain of command is aware and know you are involved. ☐
3. Give leadership your first assessment of the emergency from a communications perspective and inform them of the next steps you are taking. ☐
4. Use the internal communication system (e-mail) to notify employees that their agency is involved in the response and that updates will follow. Ask for their support. ☐

Coordination

1. Contact local, State, and Federal partners now. ☐
2. If potential criminal investigation, contact FBI counterpart now. ☐
3. Secure spokesperson as designated in the plan. ☐
4. Initiate alert notification and call in extra communication staff, per the plan. ☐
5. Connect with the Joint Information Center-make your presence known. ☐

Media

1. Be first: Provide a statement that your agency is aware of the emergency and is involved in the response. (Use the Template for Pre-scripted, Immediate Response to Media Inquiries.) ☐
2. Be credible: Give directions to media about when and where to get updates from your agency.
3. Be right: Start monitoring media for misinformation that must be corrected now. ☐

Media

1. Trigger your public information number operation now if you anticipate the public will be seeking reassurance or information directly from your organization. (You can adjust hours of operation and number of call managers as needed.) ☐
2. Use your initial media statement as your first message to the public. ☐
3. Ensure your statement expresses empathy and acknowledges the public's concern about the ☐
4. Give the pre-cleared facts you have, and refer the public to other information sites, as appropriate. ☐
5. Remind the public that your agency has a process in place to mitigate the crisis. ☐
6. Start monitoring public calls to catch trends or rumors now. ☐

Partners/Stakeholders

1. Send a basic statement to partners (the same as to the media) to let them know you are thinking about them. ☐
2. Use prearranged notification systems. ☐
3. Engage leadership to make important first phone calls, based on your plan, to partners and key stakeholders to let them know your agency is responding. ☐

Incident Situation Summary

Date and time:

Location:

Nature of incident:

Estimated number of victims:

Potential or critical infrastructure involved:

Evacuation status:

Response status:

Protective measures initiated: Lead

Agency:

Incident Verification

It is important to verify the initial reports of an incident and to make sure that you have correct information. Verified information is a critical factor in making appropriate decisions regarding the incident.

Have all the facts been received? (to the best of your knowledge?)

Did the information collected come from formal, credible sources such as a local, state, or federal agency?

Do you have similar reports about the incident from more than one source?

Is the information from different sources consistent?

Is the characterization of the event plausible?

If necessary, was information clarified through subject matter experts?

If you can answer "yes" to these key checkpoints, you have completed the key steps to verifying the situation.

Note: Verification is not a function for just one person. It requires input from a variety of sources.

Message Development for Emergency Communication

Step 1: Consider the following general factors

A. Target audience(s) (e.g., general public, health providers):
B. Purpose of messages (e.g., give facts/update, respond to media):
C. Method of delivery (e.g., TV interview, press release):

Step 2: Consider the six basic emergency message components

A. Expression of empathy:
B. Clarifying facts (Who: What: Where: When: Why: How:)
C. What we don't know:
D. Process to get answers:
E. Statement of commitment:
F. Referrals (for more information):
G. Next scheduled update:

Step 3: Decide what are the three most important message topics for you to cover

A. 1.
B. 2.
C. 3.

Step 4: Develop a complete key message for each of your three message topics

TOPIC 1:

Complete message:

Additional supporting facts (if any): Soundbite:

TOPIC 2:

Complete message:

Additional supporting facts (if any): Soundbite:

TOPIC 3:

Complete message:

Additional supporting facts (if any): Soundbite:

Step 5: Check your messages for the following and revise, if needed

- □ Positive action steps
- □ Honest/open tone
- □ Applied risk communication
- □ Test for Clarity
- □ Use simple words, short sentences
- □ Avoid jargon
- □ Avoid humor
- □ Avoid extreme speculation
- □ Avoid judgmental phrase

JIC Equipment and Supplies Checklist

Equipment	Location	How to obtain it
Fax machine (preprogrammed for broadcast fax releases to media and partners)		
Computers (on LAN designated for partners and media)		
Laptop computers		
Printers for every computer		
Copier (and backup)		
Several tables		
Smartphones		
Visible calendars, flow charts, bulletin boards, easels		
Designated personal message board		
Small refrigerator		
Paper		
Color copier		
A/V equipment		
Portable microphones		
Podium		
TVs with cable hookup		
DVD/CD		
Paper shredder		
Copier toner		
Printer ink		
Paper		
Pens		

Equipment	Location	How to obtain it
Markers		
Highlighters		
Erasable markers		
UPS/FedEx/USPS supplies		
Sticky Notes		
Tape		
Notebooks		
Poster board		
Standard press kit folders		
Formatted computer disks		
Color-coded everything (folders, inks, etc.)		
Baskets (to contain items not ready to be thrown away)		
Organizers to support your clearance and release system		
Expandable folders (indexed by alphabet or days of the month)		
Staplers (several)		
Paper punch		
Three-ring binders		
Organization's press kit or its logo on a sticker		
Colored copier paper (for door-to-door flyers)		
Paper clips (all sizes)		

Template for Pre-scripted, Immediate Response to Media Inquiries

Use this template if the media is "at your door" and you need time to assemble the facts for the initial press release statement. Getting the facts is a priority. It is important that your organization not give in to pressure to confirm or release information before you have confirmation from your management and field staff, emergency operations center, etc.

The purpose of this initial press statement is to answer the basic questions: who, what, where, when. This statement should also provide whatever guidance is possible at this point, express the association and administration's concern, and detail how further information will be disseminated. If possible, the statement should give phone numbers or contacts for more information or assistance. Remember that this template is meant only to provide you with guidance. One template will not work for every situation.

The following are responses which give you the necessary time to collect the facts. Use the Template for Press Statement for providing an initial press release statement after the facts are gathered. NOTE: Be sure you are first authorized to give out the following information.

If on Phone to Media:

- We've just learned about the situation and are trying to get more complete information now. How can I reach you when I have more information?
- All our efforts are directed at bringing the situation under control, so I'm not going to speculate about the cause of the incident. How can I reach you when I have more information?
- I'm not the authority on this subject. Let me have (name) call you right back.
- We're preparing a statement on that now. Can I fax it to you when it's ready?
- You may check our Web site for background information, and I will fax/e-mail you with the time of our next update.

If in person at incident site or in front of press meeting:

- This is an evolving emergency and I know that, just like we do, you want as much information as possible right now. While we work to get your questions answered as quickly as possible, I want to tell you what we can confirm right now:
- At approximately (time), a (brief description of what happened).
- At this point, we do not know the number of (persons ill, persons exposed, injuries, deaths, etc.).
- We have a (system, plan, procedure, operation) in place for just such an emergency and we are being assisted by (police, FBI, DHS) as part of that plan.
- The situation is (under) (not yet under) control and we are working with (local, State, Federal)

authorities to (contain this situation, determine how this happened, determine what actions may be needed by individuals and the community to prevent this from happening again).

- We will continue to gather information and release it to you as soon as possible. I will be back to you within (amount of time, 2 hours or less) to give you an update. As soon as we have more confirmed information, it will be provided.
- We ask for your patience as we respond to this emergency.

Notes: *Depending on the incident, immediate protective measures may need to be provided. Consider using an expression of empathy, if appropriate.*

FOR IMMEDIATE RELEASE

CONTACT: (name of contact)
PHONE: (number of contact)
Date of release: (date)

Headline—Insert your primary message to the public

Dateline (your location)—Describe the current situation in two or three sentences.

Insert a quote from an official spokesperson demonstrating leadership and concern for victims. “ ”

Insert actions being taken.

List actions that will be taken.

List information on possible reactions of the public and ways citizens can help. Insert a quote from an official spokesperson providing reassurance. “ ”

List contact information, ways to get more information, and other resources.

List information on possible reactions of the public and ways citizens can help.

Insert a quote from an official spokesperson providing reassurance. “ ”

List contact information, ways to get more information, and other resources.

NEW INFORMATION:

- Bulleted list of the new facts not previously reported.
- Bulleted list of the new facts not previously reported.
- Bulleted list of the new facts not previously reported.

BACKGROUND:

- Bulleted list of facts previously reported of the incident.

- Bulleted list of the facts previously reported.
- Bulleted list of the facts previously reported.

NEXT UPDATE

Time and date of the next press release update and/or press conference.

Contact Center Call Tracking

Time of call: a.m./p.m.

Nature of call:
Specific information contained in stock materials:
Clarify recommendations
Current status of the incident
Hot topic 1
Hot topic 2

Request for referral:
For more information
For medical attention
Other

Feedback to agency:
Complaint about specific contact with agency
Complaint about recommended actions
Concern about ability to carry out recommended action
Report additional information on incident
Rumor or misinformation verification (briefly describe)

Outcome of Call:
Reassured caller based on scripted information

Referred caller to:
Expert outside the department
Personal doctor or healthcare professional (if health related)
Red Cross or other nongovernment organization
FEMA or State emergency management agency
Other

Action needed:
None
Return call to: Caller's name: Telephone number: _____Gender: M / F

Return call urgency:
Critical (respond immediately)
Urgent (respond within 24 hours)
Routine

Call taken by: Date:

PIO Roster and Contact Information

Name	Agency	Phone Number	E-Mail	Comments

APPENDIX H

DEBRIS MANAGEMENT

TABLE OF CONTENTS

i. FOREWORD
ii. ACRONYMS USED IN THIS DOCUMENT
iii. TERMS USED IN THIS DOCUMENT

I. LOCAL, STATE AND FEDERAL DISASTER RESPONSE ACTIONS

A. Natural Disasters
B. Local Disaster Response Actions
C. State Disaster Response Actions
D. Federal Disaster Response Actions
E. Disaster Declaration Process
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i. FOREWORD

Each year, local officials from hundreds of communities are faced with the task of removing debris caused by natural disasters. In the past 20 years alone, over 700 major disasters have been declared by the President to facilitate Federal assistance to communities struck by hurricanes, tornadoes, floods, earthquakes, wild fires and other natural disasters.

In some cases, debris clearance, removal and disposal actions can be accomplished quickly using community resources augmented by assistance from neighboring communities, State agencies and contractor resources. In many other cases, however, the damage and debris are so extensive that a comprehensive debris clearance, removal and disposal management plan is required to efficiently and effectively control the operations.

The City of North Port developed this document to provide guidance to community leaders in planning, mobilizing, organizing and controlling a large-scale debris clearance, removal and disposal operation. Although this manual has been developed for large-scale debris clearance, removal and disposal operations, portions of all sections can be utilized on smaller operations. The sections are arranged to enable the reader to progress in a logical manner from one planning element to another. It is recommended that the sections be read consecutively because information presented in one section will be helpful in understanding materials presented in subsequent sections. The guide does not address the removal or disposal of material and products from institutional, commercial, recreational, industrial or agricultural sources that contain certain chemicals as defined by the U.S. Environmental Protection Agency to be toxic, flammable, corrosive or reactive.

This Plan will be reviewed on an annual basis to ensure compliance and consistency with local, State and Federal regulations.

ii. ACRONYMS USED IN THIS DOCUMENT

C&D	Construction and Demolition
DMTF	Debris Management Task Force
DOT	Department of Transportation
DPW	Department of Public Works
DRM	Disaster / Operations Recovery Manager
EOC	Emergency Operations Center
EPA	[U.S.] Environmental Protection Agency
ER	Emergency Relief
ESF	Emergency Support Function
FCO	Federal Coordinating Officer
FEMA	Federal Emergency Management Agency
FDEM	Florida Division of Emergency Management
FDEP	Florida Department of Environmental Protection
FDOT	Florida Department of Transportation
FHWA	Federal Highway Administration
GAR	Governor's Authorized Representative
GIS	Geographic Information System
HHW	Household Hazardous Waste
NRF	National Response Framework
PA	Public Assistance
PIO	Public Information Officer
SCO	State Coordinating Officer
SHPO	State Historic Preservation Office
SWM	Department of Solid Waste Management
TDSRS	Temporary Debris Storage and Reduction Site
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture

iii. TERMS USED IN THIS DOCUMENT

Chipping - Reducing wood related material by mechanical means into small pieces to be used as mulch or fuel. Chipping and mulching are often used interchangeably.

Debris - Scattered items and materials broken, destroyed, or displaced by a natural disaster. Example: trees, construction and demolition material, personal property.

Debris Clearance - Clearing the major road arteries by pushing debris to the roadside to accommodate emergency traffic.

Debris Removal - Picking up debris and taking it to a temporary storage site or permanent landfill.

Debris Disposal - Placing mixed debris and/or residue from volume reduction operations into an approved landfill.

Department of Public Works (DPW) - Department typically responsible for clearing debris from the roads and rights-of-way.

Force Account Labor - State or local government employees engaged in debris removal activities.

Garbage - Waste that is regularly picked up by the Department of Solid Waste Management. Example: food, plastics, wrapping, papers.

Hazardous Waste - Material and products from institutional, commercial, recreational, industrial and agricultural sources that contain certain chemicals with one or more the following characteristics, as defined by the Environmental Protection Agency: 1) Toxic, 2) Flammable, 3) Corrosive; and/or 4) Reactive.

Household Hazardous Waste (HHW) - Used or leftover contents of consumer products that contain chemicals with one or more of the following characteristics, as defined by the Environmental Protection Agency: (1) Toxic, (2) Flammable, (3) Corrosive and/or (4) Reactive. Examples of household hazardous waste include small quantities of normal household cleaning and maintenance products, latex and oil based paint, cleaning solvents, gasoline, oils, swimming pool chemicals, pesticides, propane gas cylinders.

Hot Spots - Illegal dump sites that may pose health and safety threats.

Mutual Aid Agreement - An understanding between communities and States obligating assistance during a disaster.

National Response Framework - A document developed to facilitate the delivery of all types of Federal response assistance to States following a disaster. It outlines the planning assumptions, policies, concept of operations, organizational structures and specific assignments and agencies in providing Federal response assistance to supplement the State and local response efforts.

Recycling - The recovery and reuse of metals, soils and construction materials that may have a residual monetary value.

Rights-of-Way - The portions of land over which a facility, such as highways, railroads, or power lines are built. Includes land on both sides of the highway up to the private property line.

Scale/Weigh Station - A scale used to weigh trucks as they enter and leave a landfill. The difference in weight determines the tonnage dumped and a tipping fee is charged accordingly.

Storage Site - A location where debris is temporarily stored until it is reduced in volume and/or taken to a permanent landfill.

Sweeps - The number of times a contractor passes through a community to collect all disaster-related debris from the rights-of-way. Usually limited to three passes through the community.

Tipping Fee - A fee based on weight or volume of debris dumped that is charged by landfills or other waste management facilities to cover their operating and maintenance costs.

Trash - Non-disaster related yard waste, white metals, or household furnishings placed on the curbside for pickup by local solid waste management personnel. A resident must call for pickup. Not synonymous with garbage.

United States Army Corps of Engineers (USACE) - A component of the U.S. Department of the Army which is responsible for constructing and maintaining all military bases and other government-owned and controlled entities. The USACE may be used by FEMA when direct Federal assistance, issued through a mission assignment, is needed.

White Goods – Discarded household appliances such as refrigerators, freezers, air conditioners, heat pumps, ovens, ranges, washing machines, clothes dryers, and water heaters. Many white goods contain ozone-depleting refrigerants, mercury, or compressor oils.

White Metals - Household appliances, such as refrigerators, freezers, stoves, washers and dryers.

I. LOCAL, STATE AND FEDERAL DISASTER RESPONSE ACTIONS

This section provides an overview of local, State and Federal disaster response actions available following a debris-generating natural disaster. Detailed information on the declaration process and eligibility criteria is contained in the Public Assistance Guide, FEMA publication 322.

A. Natural Disasters

1. Hurricanes - The damaging forces of hurricanes and tropical storms include high-velocity winds (up to 150 miles per hour or higher in gusts), storm surge and wave action. The most severe damage frequently occurs in the shore lands adjacent to the ocean. The resultant debris consists primarily of trees; construction materials from damaged or destroyed structures, personal property and sediment. Although the greatest concentration of debris will be located along the shoreline, flooding and tornadoes spawned by hurricanes can cause damage and leave extensive amounts of natural and manmade debris far inland.

2. Tornadoes - Damage from tornadoes is caused by high-velocity rotating winds. The severity of the damage depends on the velocity of the tornado funnel and the length of time the funnel is on the ground. Tornado debris consists primarily of trees, construction materials from damaged or destroyed structures and personal property. Damage is generally confined to a narrow path, which can be up to ½ mile wide and from 100 yards to several miles long.

3. Floods - Damage to structures from flooding is caused either by inundation or high velocity water flow. Structural damage is usually limited to the floodway and the floodplain area immediately adjacent to the river. Heavy structural damage may result from high velocity waters in mountainous areas or failure of a flood control project, such as a dam or levee. Flood debris consists of sediment, wreckage, personal belongings and sometimes hazardous materials deposited on public and private property. Additionally, heavy rains and floods may produce landslides; in such cases, debris consists primarily of soil, gravel, rock and some construction materials.

4. Earthquakes - Damage to structures is caused by shockwaves and earth movements along fault lines. Secondary damage, such as fires and explosions, may result from the disruption of utility systems. Debris consists of building materials, personal property and sediment caused by landslides.

4. Wildfires - Debris from wildfires consists of burned out structures, cars and/or other metal objects, ash and charred wood waste. Large-scale loss of ground cover may lead to mudslides, resulting in clogged drainage structures and possible damage to homes and bridges.

B. Local Disaster Response Actions

1. The City of North Port is the first to respond to a disaster. Response efforts are first directed to activities that protect lives, public health and safety, such as evacuations, sheltering, firefighting, utility restoration and clearing roads of debris. These response efforts may be accomplished with local force account labor and equipment, contractors, volunteers and assistance from adjacent communities.

2. The City of North Port has a Comprehensive Emergency Management Plan (CEMP) which identifies key staff members and their responsibilities for managing and controlling debris clearing, removal and disposal operations. This staff will be immediately activated whenever a natural disaster occurs. Staff members will document the critical decisions made in response to the disaster and provide the debris manager and local, State and Federal officials with a clear plan of action. The debris clearing, removal and disposal operations may extend for weeks or months and insufficient documentation of the evolving plan could cause confusion and inefficiency.

3. Safety assessments will be conducted to identify necessary lifesaving actions, assess the magnitude of damage and determine if additional resources are needed from other local governments and the State. Safety assessments shall be conducted in accordance with State/local health and safety standards/ requirements.

4. This Debris Management Plan will divide the City into sectors to assess the extent of debris. Sector boundaries can be determined based on the following criteria:

   a. Type of debris (structural, trees, sediment and mixed)
   b. Location of debris
   c. Volume of debris (large versus small)
   d. Land use (residential, business, agricultural)

e. Location of existing and potential temporary storage and volume reduction sites
f. Location of existing and potential permanent disposal sites (public and/or private landfills)

5. The damage assessment team will then investigate the damaged areas by sector to record the extent of damage and to identify specific assistance requirements. Damage assessment teams will also estimate the amount and composition of debris observed in each sector and annotate the locations on community maps.

6. The debris staff will initiate actions to assess the availability of local, State, Federal and other resources to provide immediate and long-term assistance. Experience has shown that resources will not be used effectively unless work assignments and cleanup priorities are coordinated and controlled by the debris manager (Solid Waste Manger). The designated local debris manager will have total responsibility and authority for managing the debris cleanup operation. The following are examples of local, State, Federal and other resources available for cleanup activities:

a. Local Government - The City of North Port maintains equipment, such as trucks, rubber tire loaders, graders, chippers, chain saws, small cranes, dozers and backhoes with experienced operators who can be used to open roads and remove debris. Temporary hires may be added to provide additional labor and equipment operators for 24-hour-a-day operations, if needed. The principal advantage to using local government force account equipment and operators is their lower cost and flexibility in assignment. This equipment generally represents the only resources the community can immediately commit to an emergency debris clearance and cleanup operation.

b. Mutual Aid Agreements - A Mutual Aid Agreement is an agreement among neighboring communities (and possibly States) to provide assistance to one another in time of need. The operators and equipment of neighboring communities can be used to quickly augment local force account resources and have many of the same advantages.

c. State Agencies - The National Guard, Florida Department of Transportation (FDOT) and Florida Department of Environmental Protection (FDEP) have equipment and personnel that may provide limited assistance on a short-

term basis. The FDOT is normally responsible for debris clearance and removal on State roads. This assistance may be obtained by contacting the Florida Division of Emergency Management (FDEM) through the Sarasota County Emergency Operations Center (EOC).

d. Volunteers - Historically, volunteers have played a significant role in large-scale debris removal operations. Volunteer organizations can assist private property owners or provide financial assistance in the removal of debris from private property. Additionally, community organizations, such as civic clubs, student groups and neighborhood organizations have proven to be a tremendous community resource in past disasters. To provide for maximum utilization of these resources, community leaders will be prepared to organize volunteer groups and keep the debris management staff informed of their activities. They will document the number of volunteers, the type of work performed and the hours worked. Sponsoring organizations will ensure that personnel are properly equipped and that common sense safety precautions are followed.

e. Federal Agencies - The U.S. Army Corps of Engineers (USACE) may be able to respond for up to 10 days without a Presidential Declaration. Additionally, the Federal Highway Administration (FHWA) and the National Resource Conservation Service (NRCS) may provide grant assistance to State and local governments for debris clearing, removal and repair of roads on the designated Federal Aid System and clearing debris from canals.

f. Contractors - Labor and equipment for debris clearance, removal and disposal will be available from local contractors. Following a major disaster, emergency contracts can be executed to augment local force account resources.

g. Immediately following a disaster, engineering personnel on the debris management staff will explore alternative courses of action and update the existing Debris Management Plan based on the initial safety assessment, available resources and any new information. The updated plan can be hand-written initially and later converted to a more formal document.

h. Maps of the affected area will be annotated to identify damaged sectors, locations of key facilities and disposal sites and distributed with the updated Debris Management Plan. Information will also be entered into a Geographic Information System (GIS) database, if available.

C. State Disaster Response Actions

1. When the response efforts appear to be beyond the capability of the City, Sarasota County normally provides the next level of assistance by declaring a State of Emergency. Florida Division of Emergency Management typically evaluates the disaster situation and provides advice to the Governor on the availability of State resources that could assist local efforts. State resources may consist of the FDOT, the Florida Department of Health, the FDEP and the National Guard. These State resources can assist the City in its immediate response efforts, including debris clearance, removal and disposal activities.

D. Federal Disaster Response Actions

1. The Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93288, as amended, was enacted into law in 1988. It is the centerpiece of the Federal Disaster Relief Programs that are managed by the Federal Emergency Management Agency (FEMA).

2. When a disaster occurs and a locality has responded to the best of its ability but is or will be overwhelmed by the magnitude of the damage, it turns to the State for help. The Governor, after examining the situation, may direct that the State's Emergency Plan be executed. If it is evident that the situation is or will be beyond the capabilities of local and State resources, the Governor may request that the President declare that an emergency or major disaster exists in the State under the authority of the Stafford Act.

3. While the request is being processed, local and State government officials will not delay in taking actions to respond to whether there will be Federal assistance. Commensurate with the supplemental nature of Stafford Act assistance, the Federal share of eligible recovery expenses for declared disasters is normally limited to 75% of eligible costs.

E. Disaster Declaration Process

1. The request for a declaration must come from the Governor or Acting Governor. Before sending a formal request letter to the President, the Governor will request that FEMA conduct a joint preliminary safety assessment (PDA) with the State to verify actual damages and estimate the amount of supplemental assistance that may be needed. After this assessment is complete and if the Governor believes that Federal assistance is necessary, the Governor sends the request letter to the President, through the Regional Director of the appropriate FEMA Region. The request is reviewed by the Regional Director and forwarded with a recommendation to the Director of FEMA who, in turn, makes a recommendation to the President. The President makes the decision whether or not to declare a major disaster or emergency. After the initial declaration, the person designated by the Governor as the Governor's Authorized Representative (GAR) may make requests for additional areas to be eligible for assistance or for additional types of assistance as deemed necessary.

2. After a declaration is made, FEMA will designate the area eligible for assistance and the types of assistance available. With the declaration, a Federal Coordinating Officer (FCO) is appointed who is responsible for coordinating all Federal disaster assistance programs administered by FEMA, other Federal departments and agencies and voluntary organizations. At the same time, the Regional Director or one of his/her staff will be appointed as the Disaster Recovery Manager (DRM), who is responsible for managing the FEMA assistance programs. The same person most often holds these two titles (FCO and DRM). Similarly, the State Coordinating Officer (SCO) and the GAR are generally the same person.

F. National Response Framework

1. The National Response Framework (NRF) is implemented to coordinate the overall delivery of Federal assistance to disaster victims. The plan is organized functionally by Emergency Support Functions (ESF). Each ESF is composed of a lead or primary agency and supporting agencies grouped together to deliver specific services and resources. Delivery of assistance under the Framework is flexible to best meet the unique needs of each disaster. Under the NRF, emergency assistance is provided either by Federal agencies under their own authorities, or under reimbursable mission assignments from FEMA.

G. FEMA Debris Mission Response Actions

1. In catastrophic disasters, FEMA can provide direct Federal assistance to support local and State governments in performing some of the activities related to debris clearance, removal and disposal. The response capabilities of the local and State governments must be clearly exceeded before this level of assistance can be provided. The work that can be performed under this authority is limited to emergency work and debris removal under Sections 402(4), 403 and 407 of the Stafford Act. The assistance will be subject to the cost-sharing provisions as specified in the FEMA-State Agreement. The grantee will reimburse FEMA for the appropriate non-Federal share of the cost of the work, including any administrative costs of the performing Federal agency. According to Florida Statutes Chapters 119 and 257, the Applicant must retain records up to five years after the close of the contract.

2. Following a Presidential Declaration, FEMA may elect to use its mission assignment authority to have the USACE contract for and manage debris clearance, removal and disposal operations. At the County-level, the debris and removal mission assignment is coordinated by Emergency Support Function #3 (ESF #3), Engineering and Public Works liaison officer. Within the structure of the City EOC, the Debris Management Team Leader, through the Public Works Group Supervisor, will be responsible for all functions of debris management.

3. The Debris Management team will meet regularly with FEMA, FDEM, and Sarasota County officials to collect and coordinate information necessary to accomplish the assigned mission.

4. ESF #10, Hazardous Materials liaison officer from the County, will also be included in all debris planning to coordinate the cleanup, transportation and disposal of hazardous materials.

H. FEMA Debris Eligibility Criteria

1. FEMA Public Assistance (PA) funds may be used for debris clearance, removal and disposal operations. Debris that may be eligible for clearance, removal and disposal includes trees, sand and gravel, building wreckage, vehicles and personal property. The debris must be a direct result of the declared event, must occur within the designated disaster area and must be the responsibility

of the applicant at the time of the disaster. Debris removal may be eligible when it:

a. Eliminates immediate threats to lives, public health and safety;
b. Eliminates immediate threats of significant damage to improved public or private property; and/or
c. Ensures economic recovery of the affected areas to the benefit of the community-at-large.

2. Debris Removal from Public Property - In general, debris that is on public property must be removed to allow continued safe operation of governmental functions and, therefore, is eligible under one of the first two criteria. However, not all public property clearance is necessarily eligible. Debris that is blocking streets and highways is a threat to public health and safety because it blocks passage of emergency vehicles or it blocks access to emergency facilities such as hospitals. Debris in a stream or flood channel may cause flooding from a future storm. If such flooding would cause an immediate threat of damage to improved property, removal of the debris only to the extent necessary to protect against an event that could reasonably be expected to occur within five years may be eligible. On the other hand, removal of fallen trees in a forested or wilderness area is not normally eligible.

3. Debris Removal from Private Property - Debris on private property (to include privately-owned roads and gated communities) is treated somewhat differently. Debris removal from private property is the responsibility of the individual property owner or homeowners' association, aided by insurance settlements and assistance from volunteer agencies. Most insurance policies, such as, homeowner, fire and extended coverage policies, have specific coverage for debris removal and demolition of heavily damaged structures. FEMA assistance is generally not available to reimburse private property owners for the cost of removing debris from their property; however, an eligible local or State government may pick up and dispose of disaster-related debris placed at the curb by those private individuals. The extent and duration of this type of work is carefully controlled. FEMA, State and local officials will agree on a time frame during which pick-up from the curb will be eligible for PA funding.

If the debris on private business and residential property is so widespread that public health, safety, or the economic recovery of the community is threatened, the actual removal of debris from the

private property may be eligible. In such situations, the work normally must be done or be contracted for by an eligible applicant, and a Right-of-Entry Agreement must be in-place to permit access onto private property.

4. Debris Removal from Drainage Structures - Debris removal from certain drainage structures may have to meet the following criteria:

   a. Reservoirs - Removal of disaster-related debris from reservoirs may be eligible if evidence is provided to FEMA that the reservoirs were regularly cleaned prior to the disaster and the pre-disaster level can be established. In addition, removal of debris that poses an immediate threat of clogging or damaging intake or adjacent structures may be eligible.

   b. Natural Streams - Debris removal from natural streams normally is not eligible for assistance. Only debris that causes a threat to lives or public health and safety or damage to improved property from an event that could be reasonably expected to occur within five years is eligible. Any work in natural streams must also be closely reviewed and monitored to minimize undesirable environmental effects. This type of work will often require a Clean Water Act Section 404 permit from the USACE. The Natural Resources Conservation Service also has the authority to clear streams of debris.

   c. Engineered Channels and Debris Basins - Debris removal from engineered channels, lined or unlined and debris basins may be eligible. Knowing the pre-disaster level of debris in the channel or basin is required in determining the amount of disaster-related debris. Such facilities must also have had a regular schedule of debris removal to be eligible for clearance.

5. Debris Removal from Roads and Highways - Debris may be removed from roads and highways, including the travel lanes, roadside ditches and drainage structures and the maintained right-of-way.

   a. Federal Highway Administration's (FHWA) Emergency Relief (ER) Program provides financial assistance to States to repair or reconstruct national highways that are damaged by natural disasters or catastrophic failures from

an external cause. This funding speeds the restoration of major highways following a disaster. Only highways that are normally eligible for under FHWA's Federal Aid Highway Program are eligible for assistance from the FHWA ER program. While ER funds repairs to “Federal Aid” eligible highways, the Federal Emergency Management Agency (FEMA) addresses all other disaster-damaged roads and public infrastructure.

The City of North Port has a number of Federal-Aid roads (See Appendix D) which require special attention for debris clearance. Eligible debris clearance criteria includes: the restoration of essential traffic along Federal-Aid roads (first push), the first pass collection of debris on Federal-Aid roads, minimize the extent of damages to public property, or protect a remaining facility from further damages. Documentation and Reimbursement requirements differ from those used by FEMA. The Detailed Damage Inspection Reports must be used, and to receive full reimbursement for debris removal activities, all work must be completed within 180 days.

Debris clearance and removal from roadways not under the jurisdiction of the FHWA-ER program may be reimbursable under FEMA’s Public Assistance program.

b. Privately-Owned Roads (See Appendix B) - FEMA will not reimburse expenses incurred for debris clearance, removal or disposal from privately-owned roads (to include gated communities), with the following exceptions: (1) The applicant must provide documentation stating that disaster-generated debris on private property in the designated area constitutes an immediate threat to life, public health, and safety, and (2) the applicant has legal responsibility to remove debris from private property through the Right-of-Entry Agreement (Appendix C).

   i. In 2008, the City has adopted an ordinance which, during a declared emergency, authorizes the City to enter onto privately-owned roads and into gated communities, and collect debris to ensure public health and safety (See City of North Port Codes, Article IV, Disaster Debris Management).

6. Debris Removal from Recreational and Wilderness Areas

a. The removal of debris from public parks and recreational areas used by the public is eligible when it affects public health or safety or proper utilization of such facilities.

b. Hazardous trees within a naturalized area of public parks or golf courses that are unstable and leaning into the areas used by the public are eligible for removal only, not replacement. Normally, trees requiring removal are flush cut at the ground. Hazardous limbs are also eligible for removal. Hazardous limbs are defined as limbs greater than two inches in diameter that are still hanging in the tree and are threatening a public-use area, such as a trail, sidewalk, road, or golf cart path.

c. Generally, stump removal is not considered eligible for reimbursement, except if the stump itself is determined to be a hazard, as when the tree has been uprooted. When eligible, stump removal is accomplished by the least expensive means.

d. A tree with more than 50% of the tree crown destroyed or damaged, a split trunk, or broken branches that expose the heartwood, or a tree that has been felled or uprooted is eligible for removal, especially it is in a location approximate to or within public-use areas. If the applicant chooses to attempt to save a tree that has any of the conditions described above that justify its removal, the expense is the applicant's.

c. Removal of debris that does not pose a health or safety threat in wilderness or forested areas of these facilities is not eligible for FEMA reimbursement.

I. FEMA Building Demolition Criteria

1. FEMA Public Assistance (PA) funds may be used for demolition and removal of resulting debris under the authority of Section 403, Essential Assistance, of the Stafford Act. This section allows for the demolition of unsafe structures that pose an immediate threat to life, property, or public health and safety.

2. Health and Safety - The primary responsibility for demolition of unsafe structures lies with the owner. Most insurance policies have

a clause that provides payment for demolishing houses damaged beyond repair. The applicant must certify that no insurance exists that would pay for the demolition, the owner is not capable of paying for such work and there is no opportunity to recoup the cost from the owner. If permission for demolition is not provided, the applicant must follow legal condemnation. The applicant must obtain right of entry and hold harmless agreements prior to start of the work. The ownership of the property remains in the hands of the original owner.

a. All properties must be reviewed in accordance with environmental, historic and other Federal laws being provided for the demolition. The State will provide each applicant with a demolition checklist that must be completed and returned by the applicant prior to any actual demolition of the property.

b. The checklist will contain a list of items with which the applicant must comply prior with demolition. These items include verification that the applicant has obtained right of entry and hold harmless agreements and investigated insurance coverage and liens. The applicant will also be provided forms pertaining to historic preservation, environmental, hazardous materials and wetland/floodplain requirements. The applicant must sign and return these forms indicating he/she has read them and understands that it is his/her responsibility to ensure full compliance with all local, State and Federal rules and regulations.

c. The applicant must provide FEMA with a copy of the bid specifications, final property list and bid results prior to demolition. FEMA reviews the bid specifications to ensure that the specifications contain the proper scope of eligible work.

d. Once all necessary information has been received and reviewed, FEMA will notify the State that they have no objection to the applicant's proceeding with the demolition of the properties identified in the demolition bid. The State provides the applicant with written authorization to proceed with the demolition project.

e. Eligible work under health and safety demolition is limited to the demolition and removal of structures that may

represent an immediate threat to public health and safety. An inspection team may inspect each facility to make a determination on the structural integrity of the unit and review the reports of the applicant's building inspector. Structures that are in danger of collapse, thus representing an immediate threat to life and safety, are documented and recommended as eligible for demolition.

f. Other eligible project descriptions under the health and safety category may include cleaning septic systems, backfilling basements, capping wells, clearing debris and any other actions to mitigate an immediate threat to public health and safety.

g. Items such as slabs on grade, driveways, fences and structurally sound buildings normally are not eligible for demolition under the public health and safety category because they do not represent an immediate threat to public health and safety.

h. At the completion of the project, the State notifies FEMA that the applicant's demolition has been completed. A joint FEMA/State team inspects the applicant's demolition sites to ensure full compliance with the project description identified in the report form.

i. Eligible costs may include any cost incurred by the applicant to complete the demolition project. Costs for monitoring and managing demolition and removal activities are eligible costs. Necessary costs of requesting, obtaining and administering the grant assistance, however, are covered by the Sub grantee Administrative Allowance and are not identified separately as eligible costs.

See the Public Assistance Guide, FEMA publication 322, for more information on the Sub-grantee Administrative Allowance.

3. Archaeological Sites or Historic Structures - listed on the National Register of Historic Places or potentially eligible must be reviewed by the State Historic Preservation Officer (SHPO) prior to any demolition. Information and forms outlining the necessary step-by-step procedures to obtain SHPO approval will be provided to the applicant by the State. It is the applicant's responsibility to obtain SHPO approval before demolishing any possible historic structures

or performing ground disturbing activities. Costs associated with the applicant's obtaining SHPO clearance may be eligible.

a. Each structure must be inspected for hazardous materials, such as asbestos or lead-based paint, prior to actual demolition of the structure. Normally, a representative of the applicant, such as a building inspector or fire marshal, will conduct a preliminary inspection of each structure. If hazardous materials are determined to exist in the structure, the applicant will contract with a certified asbestos or lead-based paint inspector. If the inspection report indicates the presence of asbestos material or lead-based paint, a certified abatement contractor must remove the material prior to demolition. Costs associated with asbestos and lead-based paint inspections, asbestos abatement and third party air monitoring may be eligible.

4. Attractive Nuisance - Private structures that are found to be structurally sound but require extensive repair are normally not eligible for demolition. The primary responsibility for securing the structures until repairs are completed lies with the owners. The applicant must certify that the structure is a health and safety threat to the public if the owners have no insurance or are not capable of paying for such work.

a. The applicant must obtain rights of entry and hold harmless agreements prior to start of the work.

b. Eligible work under this category is limited to securing the perimeter of the structure to prevent entrance into the structure and may include fencing, where necessary. FEMA can provide funding for materials (plywood or fencing) and labor as part of the project description to secure the structures from access. This funding meets the required need to protect life and safety.

5. Health Hazard - The project description on the report may include the cost of cleaning or removing items such as household hazardous waste (HHW), debris, food, chemical hazardous waste, freezers and refrigerators that may contain Freon and other items that may represent a health hazard.

a. The applicant must certify that no insurance exists that would pay for such work, the owner is not capable of paying for such work and there is no opportunity to recoup the cost

from the owner. The applicant must obtain rights of entry and hold harmless agreements prior to start of the work.

II. PRE-DISASTER PLANNING

Major natural disasters can generate enormous volumes of debris in short periods of time. Debris clearance, removal and disposal operations must be implemented quickly to expedite recovery operations and to protect public health and safety of the local population. However, the speed of initial debris clearance, removal and disposal operations depends upon the depth of pre-disaster planning by City, County and State emergency managers.

A. Identifying Potential Types and Amounts of Debris

1. Before selecting temporary debris storage and reduction sites, it is necessary to identify the areas that may be subject to widespread devastation (such as parks, tree-lined streets, orchards, groves, nurseries, mobile home parks and residential, commercial and industrial areas) and the types and amounts of resultant debris. The types and amounts of debris can be forecast on a land-use basis (such as rural, urban, industrial, or mixed use) and by examining historic records. For example, if an area has not been affected by a major storm for a long period of time, a dense tree canopy may have developed, which will result in a large amount of vegetative debris following a major storm.

2. In addition, the U.S. Army Corps of Engineers (USACE) Emergency Management staff has developed a modeling methodology designed to forecast potential amounts of hurricane-generated debris using actual data from Hurricanes Frederic, Hugo and Andrew. The estimated quantities produced by the model have a predicted accuracy of ± 30%. The primary factor used by the model is the number of households in a developed urban/suburban area. The other factors are cubic yards of debris generated per household, vegetative cover, commercial density and precipitation.

B. Identifying Temporary Debris Storage and Reduction Sites

1. All activities associated with massive debris clearance, removal and ultimate disposal operations depend upon the availability of suitable temporary debris storage and reduction sites. Identifying these potential sites before a major natural disaster will expedite debris removal and subsequent volume reduction and disposal actions. The Public Works Director and staff will work closely with other City, County and State officials to develop and maintain

current listings of potential debris storage and reduction sites in areas prone to natural disasters. Pre-disaster site selection teams will include local officials who are familiar with the area. The teams will also consult and coordinate with local residents, conservation agencies and environmental groups, if possible, to help identify potential problems. Considerations for evaluating potential temporary debris storage and reduction sites include the following:

a. Use public lands first to avoid costly leases. Pre-designated sites will be on public property and consist of between 50-100 acres, depending on anticipated needs. Consider locations with respect to noise, traffic and the environment. Use private land only if public sites are unavailable.

b. When selecting public or private sites consider pre-existing conditions that will have to be restored upon site closeout. Have attorneys review leases for private land to avoid extensive damage claims upon site closeout.

c. The required size of the site will depend on the expected volume of debris to be collected and planned volume reduction methods. As a general rule, larger sites mean fewer sites and, hence, easier site closeout. However, larger sites may create logistical problems.

d. Environmentally sensitive areas (such as wetlands, areas with endangered animal and plant species, critical habitats, well fields and surface water supplies and historic/archaeological sites) will be avoided. However, if use of such areas is unavoidable, procedures for temporary waivers will be developed. Consult and coordinate with local residents, conservation agencies, environmental groups and agencies and the State Historic Preservation Office (SHPO).

e. Public acceptability is largely dependent upon the activities planned for the site. Smoke from burning, around-the-clock light and noise from equipment operation, dust and traffic are tolerated early in the disaster, but may have to be curtailed later. Whenever possible, avoid locating near residential areas, schools, churches, hospitals and other such sensitive areas. Notify citizens early about planned site activities and possible ramifications.

f. Look for sites with good ingress/egress to accommodate heavy truck traffic.

g. Consider adjusting traffic signals to accommodate projected truck traffic on critical haul routes.

h. Identify nearby landfills and determine their present debris capacity and logistical capabilities. Also include any State-to-State or county-to-county agreements.

i. Identify recycling possibilities, such as timber agreements, mulch and chip disposal in the agriculture community and fuel sources for incinerators or heating. Recycling success will depend on the types of debris and the local recycling environment.

j. Review local and State ordinances on such items as tarps and tailgates on trucks, traffic control, truck priority, curfew, defining roadway rights-of-way and load limits. coordinate with responsible agencies to develop waiver procedures to expedite emergency operations.

k. Clearly show critical routes and priorities for clearing debris on local maps. Target emergency routes for City, County, State or Federal clearance efforts. GIS will be used as an efficient mapping tool, if available.

l. The following questions will help to identify and prioritize appropriate sites based on local requirements and conditions.

i. Potential Site Ownership

- Are public lands available?
- Are private land lease terms long enough?
- Are private land lease terms automatically renewable?
- Does the private land lease include a landscape restoration agreement?

ii. Potential Site Size

- Is the site large enough to accommodate the planned debris storage and/or reduction methods?

- Will the site configuration allow for an efficient layout?

iii. Potential Site Location

- Does site have good ingress/egress?
- Does site have good transportation arteries?
- Does site have open, flat topography?
- Does site have wetlands? If unavoidable, require the contractor to flag the area and establish buffers and/or sediment barriers.
- Does site have public water supplies, including well fields and surface waters?
- Does site have threatened and endangered animal and plant species?
- Does site have threatened and endangered species' critical habitats?
- Does site have rare ecosystems?
- Does site have historic sites?
- Does site have archaeological sites?
- Does site have sensitive surrounding land use, such as residential, school and church?

2. To ensure the City has a site where debris may be temporarily stored in the immediate aftermath of a storm, one temporary debris storage and reduction site (TDSRS) has been designated, and received pre-approval by the Florida Department of Environmental Protection (FDEP). The following is a list of the City's pre-approved TDSRS. See Appendix G for pre-approval letters:

a. Greenland Street Golf Course

C. Negotiating Mutual Aid Agreements

1. Mutual aid agreements will be negotiated and in place prior to a disaster. Mutual Aid providers normally consist of local and county Departments of Public Works from around the State under the Statewide Mutual Aid Agreement. These departments usually offer their assistance in the form of equipment and personnel. All requests for mutual aid will be placed through the Sarasota County EOC.

2. The mutual aid agreement will outline the responsibilities of each party, including the types of costs that will be reimbursed. To ensure that mutual aid providers adhere to the agreements, the

Public Works Director will assign coordinators to monitor each provider. The coordinators will be responsible for tracking the type of work performed and type of equipment used by each mutual aid provider.

3. To be eligible for FEMA assistance, reimbursement by the receiving party must not be conditioned on receipt of FEMA assistance.

III. DEBRIS MANAGEMENT STAFF ORGANIZATION AND RESPONSIBILITIES

This section provides guidelines for debris management staff organization and defines the key responsibilities involved in pre- and post-disaster planning and information management.

A. Debris Management Staff Organization

1. The size and composition of City staff organized to deal with debris clearance, removal and disposal issues will depend on the magnitude of the disaster and the size of the community. A pre-disaster debris planning staff may be quite small; however, following a major disaster, additional staff members may be required. The City debris staff will be comprised of full-time personnel supplemented with personnel from other staffs and agencies. It is essential that prospective staff members have as much training as possible and interface with other agencies responsible for debris clearance, removal and disposal activities, such as the Florida Department of Transportation (FDOT), Federal Emergency Management Agency (FEMA) and the U.S. Army Corps of Engineers (USACE), prior to any anticipated disaster.

   City staff will be comprised of personnel to perform the following generic functions:

   a. Administration - Housekeeping supplies, equipment, funding and accounting.

   b. Contracting and Procurement - Bidding requirements, advertisements for bids, instructions to bidders and contract development.

   c. Legal - Contract review, rights of entry permits, community liability, indemnification, condemnation of buildings, land acquisition for temporary staging and reduction sites, site closure/restoration and insurance.

d. Operations - Supervision of government and contract resources and overall project management.

e. Engineering and Public Works - Detailed safety assessments, identification of project tasks, assignments of tasks, preparation of cost estimates, scopes of work and specifications for debris contracts.

f. Public Information - Coordination of press releases, maintenance of contacts with local organizations, individuals, the media and drafting of public notices for debris clearance, removal and disposal operations.

B. General Debris Staff Responsibilities

1. Primary response personnel will be alerted before the disaster and deployed either before or immediately after the disaster. If possible, they will remain part of the debris management staff throughout the disaster cleanup to maintain continuity during the debris clearance, removal and disposal operations. The staff will develop disposal plans either in advance or concurrently with the removal efforts.

2. The Department of Public Works Operations Manager will be responsible for coordinating all removal and disposal activities. The staff will need to coordinate closely with all City, County, State and Federal agencies responsible for disaster response and recovery operations. They may also need to contract removal and disposal services and develop requests for additional assistance from FEMA. They must be prepared to react to evolving needs and available technologies.

   a. The Operations Manager must be able to assess debris based on:

      i. Quantities and types.
      ii. Rural, urban and/or agricultural locations.
      iii. Number of private homes, mobile homes, public facilities and commercial establishments damaged or destroyed.
      iv. Miles of roads affected, categorized by type, such as rural, urban and/or expressways.
      v. Quantity and types of household hazardous wastes.

b. The Operations Manager and debris staff will be prepared to take the following actions:

i. Develop a reliable initial assessment of the disaster's magnitude. This will enable decision-makers to assess human and material requirements for responding to the debris disposal situation.

ii. Coordinate with local procurement agencies to establish a contracted work force capable of expeditiously removing the debris.

iii. Identify the need to consult with an environmental or historic preservation specialist to assure that legal requirements in these areas are met.

iv. Evaluate damaged utility systems, structurally unstable buildings, and other heavily damaged public facilities and determine if they will be expeditiously repaired, deactivated, barricaded or removed. Activities involving these facilities will be structures that constitute a public health and safety threat may be deferred if access to the area can be controlled.

v. Develop a Debris Management team using City personnel to monitor the debris removal activities. This will allow the Solid Waste Manager and debris staff to obtain accurate information about the progress of the debris removal operation. The field inspection team becomes the debris manager's "eyes and ears" in the field. The cost for personnel to monitor debris removal activities is reimbursable.

vi. Conduct daily update briefings with key debris managers and other officials. Ensure that all debris clearance, removal and disposal actions are reviewed and approved by the local debris manager.

vii. Ensure that a debris staff representative attend all briefings to resolve any coordination problems between County, State and Federal debris removal efforts and City debris removal and disposal efforts.

viii. Coordinate with City police and FDOT to ensure that traffic control measures expedite debris removal activities.

ix. Develop a traffic control plan. Traffic control devices will not be allowed to return to normal operations until all debris operations have been completed. Debris clearance and removal activities must be

given priority at every major intersection to ensure efficient and timely debris operations.

x. Establish and maintain direct coordination with other City, County and State officials and their staffs with regard to priorities and areas of responsibility. Finally, the debris staff must be able to inform the public in understandable terms of the magnitude of the disaster and about actions the public must take.

C. Building and Engineering Staff Responsibilities

1. The debris management staff will have access to qualified engineering expertise to assess the full scope of the debris clearance, removal and disposal effort. The City may need to hire a local engineering firm if the Public Works' Engineering Division staff is heavily involved with the repair and replacement of publicly-owned facilities damaged by the disaster.

2. The Building Department and Engineering Division within the Department of Public Works will need the following personnel:

   a. Inspectors to inventory the type and amount of debris within the disaster area.
   b. Engineers to plan the work for maximum efficiency and to develop the government debris clearance, removal and disposal cost estimate.
   c. Contract specialists and draftspersons to prepare contract scopes of work and/or specifications. Engineering personnel perform tasks such as the following:

      i. Define the project scope, if the This is done by specifically defining the disaster area in which work is to be the debris to be removed and disposed of for that area.
      ii. Determine if the existing landfills have sufficient capacity for the expected volume of debris from the preliminary safety assessment.
      iii. Consider using pre-identified temporary storage sites for reducing the volume of debris by incinerating, grinding and/or recycling to reduce the impact on landfill sites.
      iv. If sufficient landfill capacity is not available, identify alternative landfill sites.

d. The engineering staff might be required to develop scopes of work and specifications if local contractors are used for debris clearing, removal and disposal operations. The following factors will be considered because they will affect overall contract costs:

   i. Truck Size - Smaller trucks require more trips for a given volume of debris, which increases the driver's time, fuel cost, maintenance and depreciation cost.
   ii. Length of Haul - The longer the haul, the greater time required to reach the disposal site, which increases costs for labor and equipment.
   iii. Traffic Conditions - Hauling over heavily traveled streets and roads also increases labor and equipment costs.
   iv. Roadway Conditions - Poor roadway conditions, such as potholes, unpaved surfaces and deteriorated pavement, increase maintenance costs as well as operational costs.
   v. Temporary/Permanent Site Access - Single lane unpaved access roads increase cost because of delays caused by restrictions for allowing loaded and empty trucks to pass. In addition, poor weather conditions may make the access road impassable.

e. Once the above factors are considered, the limits of the disaster area can be clearly defined. For debris contracting and debris management purposes, the boundaries of the disaster area will be delineated on a map. The map will identify the work area or areas to be included in the contract. If multiple contracts are used, this element of contract preparation is extremely important to ensure that the contractors remain in their assigned work areas. The establishment of the work area is also important to identify key items, such as ingress and egress routes to the debris removal area, location of utilities and distance to temporary staging and reduction sites or permanent landfill sites.

f. A quantitative estimate is extremely important to clearly identify to contractors the scope of work they are being asked to perform. This estimate will also assist in preparing project cost data.

g. Quantity estimates, or "takeoffs," will be made in the units that are going to be used in establishing contract line-item

prices. Units will be selected based on the method that will be used to verify pay quantities for work under the contract. For debris removal, units are normally “cubic yards,” “tons,” or “each.” Therefore, if a contractor is to be paid for the volume of material removed from a work site by approximate measurement of that volume, the unit will be cubic yards. If it is more convenient to pay the contractor by weighing the trucks used to haul the material to a disposal site, the units will be by weight (tons). If the contractor is to be paid by the number of items removed from the project site (i.e., trees, damaged vehicles, etc.), the unit will be established as "each." Because it is difficult in most debris operations to estimate the weight of material to be removed, the general rule is to use volume and number measurements. An estimate of length, width and height of the material can approximate the volume of debris in question. The amount of material to be removed and the accuracy desired in the estimate will determine the procedures used for this volume measurement. For a large-scale disaster, marking the area on a scaled map and approximating an average height can derive an approximate quantity estimate. When developing quantity estimates, inspectors will be instructed to note the type and location of the debris.

h. The next step is to develop unit cost data after the quantity, location and type of the debris within the disaster area has been established. Several sources exist that may assist in determining the proper unit price to be used once the project scope has been defined and contract type selected. Many nationally published cost data reports do not take into account the abnormal conditions encountered by contractors in debris operations. They also do not account for the increase in cost due to a disaster or emergency situation. The following sources will be able to provide current cost data necessary to develop the unit price estimate:

   i. Area engineering and construction firms.
   ii. Local public works departments.
   iii. FDOT and Florida Forest Service. The development of a government estimated unit price includes many variables. Factors that influence the unit price are the type of debris, method of removal, distance to

the disposal site, routes to the disposal site, permitting requirements and work-site limitations.

i. The safety assessment report will provide the engineering staff with information that addresses all items to be included in the government cost estimate. These items will include the actual work that may be required to accomplish the specific tasks.

j. The individuals performing the government cost estimate will put themselves in the place of the contractor who is being asked to submit a price for the work. This is very important in a disaster situation, where there might be a considerable variety of factors affecting the contractor's pricing. After the cost estimate is prepared, the scope of the project can be defined and the type of contract selected.

k. The engineering staff will have an understanding of FEMA debris eligibility criteria and be aware that FEMA will only reimburse “reasonable costs” associated with debris clearance, removal and disposal actions. Moreover, plans must include a means to monitor the contractor’s activities and certify the accuracy of the amount of debris handled.

D. Public Information Management

1. Public Information Officer (PIO) - A full-time public information specialist will be assigned to work with the debris management staff. This specialist will be responsible for coordination with other public information agencies to keep the public informed on all debris removal activities and schedules. Immediately after a disaster and continually throughout the removal and disposal operation, this person will arrange public notification of all ongoing and planned debris clearance, removal and disposal activities. Notification will include information bulletins, hotline responses, public service announcements for radio and television, handbills, door hangers and newspaper notices in the language(s) prevalent in the affected communities. Provision will be made to compensate for disruption of normal means of mass communication caused by power outages following a major natural disaster.

2. Public Participation - Public notices will emphasize actions that the public can perform to expedite the cleanup process, such as the following:

a. Separating flammable and nonflammable debris.
b. Segregating household hazardous waste.
c. Placing debris at the curbside.
d. Keeping debris piles away from fire hydrants and valves.
e. Reporting locations of illegal dump sites or incidents of illegal dumping.
f. Segregating recyclable materials.

3. Important Debris Removal Activities - The public will be kept informed of the following debris removal activities and regulations:

a. Debris pick-up schedules.
b. Disposal methods and ongoing actions to comply with State and Environmental Protection Agency regulations.
c. Disposal procedures for self-help and independent contractors.
d. Restrictions and penalties for creating illegal dumps.

4. Questions from the Public - The information officer will develop a means of responding to debris removal questions from the press and local residents. Questions that might be asked include the following:

a. What is the pick-up system?
b. What is the schedule of pick-up in my area?
c. Who will pick-up and how can I contact the operator?
d. Will I separate the different debris materials and how?
e. How do I handle household hazardous waste?
f. What if I am elderly or infirm?

IV. METHOD OF OPERATIONS

This section discusses how the City will implement a large-scale debris clearance, removal management by dividing the operation into two phases. Phase I consists of clearing the debris that hinders immediate lifesaving actions and that poses an immediate threat to public health and safety. Phase II consists of removing and disposing the debris that hinders the orderly recovery of the community and poses less immediate threats to health and safety. The entities responsible for implementing the strategy will be identified in advance.

A. Phase I: Emergency Roadway Debris Clearance

1. The City EOC will identify in advance which routes are essential to emergency operations. This will allow them to direct local efforts and to target areas for possible State/Federal assistance.

2. The Public Works Director and staff will be aware of City, County and State agencies' capabilities to provide service for emergency roadway debris clearance. Available resources will include the following:

   a. Municipal force account workers and equipment.
   b. Florida Department of Transportation (FDOT) workers and equipment.
   c. Local contractors hired by the City.

3. The Public Works Department Solid Waste and Operations Divisions will be responsible for debris clearance activities. These divisions have the necessary personnel, equipment and contracting experience.

4. A day before a foreseeable disaster, the Solid Waste portion of the debris management plan will be put into effect. Solid Waste and Operations will disperse vehicles throughout the area to minimize the risk of vehicle damage. Anticipated supplies and equipment necessary to complete the work will be purchased or rented. A strategy will be developed to clear all designated emergency roads using all available local force account labor and equipment, military personnel, mutual aid providers and local contractors.

5. Following a disaster, the top priority is to clear major arterial roads, including roads leading to health care facilities. The Public Works Director will organize participants based on personnel and equipment and assign each of them responsibility for certain roadways. At least one lane will be cleared on each arterial, major and secondary road as soon as possible. Available public property will be identified for use as temporary storage areas, with preference to locations that would be less expensive to restore, such as open fields and parks.

6. Debris may include tree blow-down and broken limbs; yard trash such as outdoor furniture and trash cans; utility poles, power, telephone and cable television lines, transformers and other electrical devices; building debris, such as roofs, sheds, block walls

and chimneys; and personal property, such as clothing, appliances, boats, cars, trucks and trailers.

7. In Phase I, roadway debris is quickly moved to the side of the road to provide access into devastated areas. No attempt is made to remove or dispose of the debris, only to provide clear access routes to allow for:

   a. Movement of emergency vehicles.
   b. Law enforcement.
   c. Resumption of critical services.
   d. Safety assessment of critical public facilities and utilities.

8. The requirements for City services increase dramatically following a major natural disaster. Therefore, after emergency access will be provided to emergency care centers, and police and fire stations, the next priority is to open access to other critical infrastructure, such as schools, municipal buildings, water treatment plants, and wastewater treatment plants.

9. The difficulty of assessing the amounts and types of debris to be removed from key routes slows the deployment of the right mix of equipment and labor, especially when contracting for additional resources. Moreover, local equipment and labor capabilities could be limited. Therefore, the City will be prepared to execute Time and Material (i.e., equipment rental) contracts during Phase I operations. They allow the flexibility to respond to local hot spots at a reasonable cost. Time and Material contracts for services will be very limited in scope and duration. For example, a local construction company may be awarded a Time and Material contract as a stop-gap measure to clear debris from the right-of-way until the contracted debris removal companies are fully mobilized under unit price contracts.

   See Section V for additional information on contracting procedures.

B. Phase II: Debris Removal and Disposal Responsibilities

1. The initial roadside piles of debris created during Phase I will become the dumping locations for additional yard waste and other storm-generated debris. Therefore, a private contractor may be required to perform the final disposal of all disaster-related debris from the rights-of-way or storage and reduction sites. The contract will cover hauling and disposal of debris at an approved landfill. If

local contractors are used, the area will be divided into definable sectors for control purposes and bids solicited based on the sectors and the estimated cubic yards of debris in each. Contractors are then responsible for hauling debris from the public rights-of-way to assigned temporary storage areas or approved landfills.

C. Debris Issues Requiring Close Coordination

1. The Public Works Director and debris staff will be faced with a monumental task of coordinating removal of debris that represents a significant health and safety hazard to the community. Expedient removal of debris from in front of residents' homes becomes a high priority because it is a positive sign that recovery actions are underway and expedites the replacement of key utilities located along public rights-of-way.

2. The following issues will require close coordination when removing debris from public rights-of-way:

   a. Curbside Separation - Good curbside separation is critical in the early stages of cleanup. However, even when the homeowner takes time to separate flammable, nonflammable and other hazardous debris, many contractors place everything into the truck or push the curbside debris to a cul-de-sac or an intersection and load it there. Therefore, contractor performance will be closely monitored, with emphasis being placed on curbside sorting. This monitoring will pay dividends in the long run because good sorting will make the final disposal much faster and cheaper.

   b. Monitoring Contractor Activities - To ensure that contract haulers are in compliance with their contract, the City has contracted with a company to perform debris monitoring services. The monitors will be responsible for initial load tickets where trucks are loaded and verifying the estimated amount of debris hauled at the temporary storage area or landfill. Solid Waste officials will provide overall supervision. The contractor must provide a notarized listing of the measured bed size in cubic yards and license plate number of all trucks to be used to move debris upon award of the contract.

      i. Once a truck is loaded with debris at the work site, the site monitor will fill out a load ticket, which

usually consists of one white original copy and two carbon copies (yellow and pink). The load tickets issued by the monitors are the basis for debris contractor payment.

ii. Each ticket will include the following information:

- Preprinted ticket number.
- Contract number.
- Prime Contractor's name.
- Date.
- Truck number.
- Truck capacity in cubic yards.
- Load size, either cubic yards or tons.
- Truck driver's name.
- Debris classification.
- Burnable
- Non-burnable
- Mixed
- Other
- Zone/Sector.
- Dumpsite location.
- Loading time (from work site).
- Dumping time (at disposal site).
- Loading site monitor.
- Dumping site monitor.

c. The load ticket copies will be processed in the following manner:

i. White copy - The pickup site monitor will fill in the date, truck number, contractor and departure time and sign the ticket. The pickup site monitor will keep the white copy and give the other two copies to the driver.

ii. Yellow copy - On arrival at the disposal facility, the driver will give both the yellow and pink tickets to the disposal site monitor. The disposal site monitor will fill out the arrival time, estimate the amount of material on the truck in cubic yards and sign the ticket. The disposal site monitor keeps the yellow ticket.

iii. Pink copy - This copy will be returned to the driver, who then provides it to the contractor.

d. At the end of each day, the white and yellow copies will be submitted to Solid Waste personnel, who will match and compare the tickets. These procedures can be modified to meet local requirements.

e. The Federal Emergency Management Agency (FEMA) will reimburse only reasonable costs. Therefore, it is essential that the City be responsible for monitoring debris clearance, removal and disposal activity and be prepared to certify the accuracy of the amounts of debris hauled.

3. Special Monitoring Issues

The issues described below highlight the need for Solid Waste officials to closely monitor large contracted debris clearance, removal and disposal activities. The issues focus on some of the problems associated with major debris disposal contracts and justifies the need to monitor activities at local temporary storage and reduction sites and at final disposal landfill sites. Many of the questionable actions can be attributed to human error or they may be deliberate attempts to defraud the Federal government. In either case, it is essential that Public Works Department contracting officials work closely with FEMA to ensure that contractor's perform the services required and that the services are performed at a reasonable cost.

a. Site delays - Delays in moving debris and traffic problems on adjacent highways can be caused by the need to establish initial tare weights for each truck going across the landfill site's scale. Tare weights will be established using other scales, if available, before debris hauling begins.

b. Overweight or unsafe trucks - FDOT enforcement officers will be available to issue fines for overweight vehicles and/or obvious safety hazards.

c. Tipping fees - Vehicles other than those under contract to the DPW and USACE will be required to pay the normal tipping fee at the landfill. Commercial containerized haulers will not be allowed to dump for free because they normally include the tipping fee as part of their overall costs.

d. Excessively wet debris - Local site monitors will monitor temporary storage area loading sites to ensure that contractors do not add excessive amounts of water to debris prior to loading. This practice will add unnecessary weight to the load, resulting in overpayment based on weight. Minimal amounts of water may be necessary to keep down dust.

e. Excessive dirt and sand - Local site monitors will monitor storage area loading sites to ensure that contractors do not add excessive amounts of non-debris related dirt and sand. Excavating dirt and sand from a site will add unnecessary weight to the load, resulting in overpayment based in weight and will add to the cost of site restoration. Some minimal dirt pickup is unavoidable.

D. Recycling

The City of North Port shall recycle debris to the greatest extent possible. Local site monitors will identify opportunities for the City to recover materials from disaster debris for beneficial uses. The salvage value for various recyclable or reusable debris materials depends on the regional recycling markets and the City will consider selling disaster debris for a salvage value to offset the cost of eligible debris removal work by the revenues received from the sale of the debris.

V. CONTRACTING PROCEDURES

This section highlights the procedures necessary to contract additional private debris clearance, removal and disposal resources and services. Contracting for labor and equipment may be necessary if the magnitude of the emergency debris clearance, removal and disposal operation is beyond the capabilities of local force account or contracted resources, State resources, mutual aid agreements and volunteer labor and equipment. The Public Works Director and staff will be familiar with contracting procedures, as they will be required to define specific debris removal tasks and recommend specific contract types based on the magnitude of the debris clearance, removal and disposal operation and the site clearance and restoration requirements.

To ensure the availability of qualified contractors in the immediate aftermath of a disaster, when appropriate resources are scarce, the City has competitively bid, reviewed and awarded debris clearance and removal contracts with three privately-owned companies, and a single contract for debris monitoring. These

contracts will be reviewed, extended/or re-bid on a three-year cycle. During the current contracting cycle, the following contractors have been pre-qualified:

Debris Removal

- CrowderGulf (Primary)
- TAG Grinding Services, Inc. (Secondary)
- AshBritt, Inc. (Tertiary)

Monitoring:

- Rostan Solutions (Primary)
- Thompson Consulting Services (Secondary)

A. Contracting Office Responsibilities

The City's Purchasing Division will have key personnel available to develop, process and administer debris clearance, removal and disposal contracts. The responsibilities entail the following actions:

1. Determine the type and method of contracting needed to satisfy specific debris clearance, removal and disposal requirements of an unusual and compelling urgency.

2. Solicit bids, evaluate offers, award contracts and issue notices to proceed with all contract assignments.

    a. To ensure objectivity and fairness in selection of a contractor, bidders may be rated by criteria to reflect their qualifications for Disaster Experience, Financial Strength, Operational Plan, and Compensation Schedule.

3. Supervise the full acquisition process for service and supply contracts and the oversight of contract actions to ensure conformance to regulatory requirements.

4. Coordinate with the Public Works Department.

5. The Emergency Operations Center and Public Works Department must take care to avoid the solicitation of assistance from the general public and giving the impression that compensation will be provided for such assistance. Such instances would be considered by FEMA as a request for volunteer resources and treated in that manner. In addition, there are a number of other issues involved with such a solicitation, including licensing, bonding, insurance, the

potential for the communities to incur liability in the event of injury or death, supervision and certification of work done.

B. Contracting Procedures for Immediate Response (Phase I)

Most State procurement regulations allow for abbreviated contract procedures when the Governor declares a State of Emergency. In emergency situations, City Code authorizes the waiver of certain procurement regulations, and grants the City Manager signature authority on contracts to a specified dollar amount.

Although normally not an ideal alternative, the Time and Material (i.e., equipment rental) contract is an acceptable method of contracting during Phase I. Under this type of contract, the contractor is paid on the basis of time spent in accomplishing a particular task. The contract will be set on an hourly basis for the equipment and operator because Phase I debris operations involve primarily equipment usage. Work orders will be issued for a particular piece of equipment and operator for a set number of hours. To ensure competitive bidding, hourly rates will be solicited from several contractors. Additionally, for simplicity, bid requests will specify that the hourly rate includes the operator, fuel, maintenance and repair. This will greatly simplify bookkeeping, auditing and monitoring of the work.

1. A Time and Material contract will clearly state that:

    a. The price for the equipment applies only when the equipment is operating.
    b. The hourly rate includes the operator, fuel, maintenance and repair.
    c. The community reserves the right to terminate the contract at its convenience.
    d. The community does not guarantee a minimum number of hours.
    e. The contract has either a dollar ceiling or a not-to-exceed number of hours clause.

2. Time and Material contracts will be limited to a maximum of 70 hours of actual emergency debris clearance work and will be used only after all available City and State government equipment has been committed. Time and Material contracts for debris clearing, hauling and/or disposal will be terminated once the designated not-to-exceed number of hours is reached. On occasion, Time and Material contracts may be extended for a short period when

absolutely necessary, for example, until appropriate Unit Price contracts have been prepared and executed.

3. Supervision of Time and Material contracts is extremely important. Work inspection reports will be prepared each day. These reports will clearly state the amount of work accomplished that day in quantitative terms, such as the number of cubic yards of debris hauled, the type and number of trucks used and the number of hours worked.

4. Load tickets may be used if debris is being hauled based on cubic yards under a Time and Material contract as a way of checking contractor efficiency. Solid Waste inspection personnel will verify certification of work performed and copies of the inspection reports will be furnished to the contractor to expedite the submittal of invoices for payment.

C. Contracting Procedures for Recovery Operations (Phase II)

It will become readily apparent during Phase I whether the magnitude of the debris clearance, removal and disposal operation is within the capabilities of local force account, mutual aid agreements, State and limited contract resources. If it is determined that the situation is beyond the capabilities of existing resources, immediate action must be taken to develop an organization to administer and manage Phase II recovery operations using contractors.

The primary factors influencing Phase II recovery operations are the composition and volume of debris, the size of the area of debris concentration, the location of temporary storage and volume reduction sites, the location of public or private landfill disposal sites, the need for private property debris removal and requirement for site closure and restoration.

D. Unit Price and Lump Sum Contracts

1. Unit Price and Lump Sum contracts are recommended after the immediate response phase.

2. Cost plus percentage-of-cost contracts and contingency contracts are not eligible for FEMA reimbursement and will not be used.

3. A contract proposal will always be structured to encourage prompt performance of the work; however, the proposal will not, by its

requirements, place heavy or unusual risk factors on the contractor. Such risk will be reflected in higher bids.

4. Unit Price Contract - The unit price contract uses construction units and prices for these units to develop line item costs and total contract cost. The unit price contract is used when the scope of work is difficult to define and is based on estimated quantities. It will be noted that the total "bottom line" of the contract could increase or decrease depending upon the accuracy of the final unit quantity. For this reason, it is as important to properly estimate units as it is to estimate unit cost. Change orders to adjust the estimated bid quantity to that quantity actually removed may be issued during or at the end of the contract.

    a. The advantage of the unit price contract is that the scope of work can be easily increased or decreased, because unit pricing for the work accomplished is established at the time of the bidding process. The contract also provides line items for the contractor to list all charges associated with the work, thereby taking the guesswork out of the contractor's bidding procedure. The units used in the unit price contracts will be as accurately estimated as possible; otherwise, the final amount of the contract could be significantly different from the contract bid received at the bid opening.

    b. Unit Price Contract Verification - Proper and efficient management of a temporary storage and reduction site or landfill disposal site is essential with unit price contracts because the site becomes the focal point for quantity verification for payment.

        i. Well-organized and managed inspection stations will be established near the entrance of the site. When the contract unit trucks as they enter the site. If the contract unit of measurement is cubic yards, inspection stands will be built for the inspection of loaded trucks.

    c. Payment under a unit price contract is normally made on the basis of load tickets. The following procedures will be followed when using load tickets:

        i. Load tickets will be treated as accounting forms.

ii. A work site supervisor will examine all contract trucks leaving a designated contract area and record the following information on the load ticket:

- Preprinted ticket number
- Contract number
- Prime Contractor's name
- Date
- Truck number
- Truck capacity in cubic yards
- Load size, either cubic yards or tons
- Truck driver's name
- Debris classification
- Burnable
- Non-burnable
- Mixed
- Other
- Zone/Sector
- Dumpsite location
- Loading time (from work site)
- Dumping time (at disposal site)
- Loading site monitor
- Dumping site monitor

d. To expedite filling out the form, all contract trucks will have the contractor's name or initials, the truck number and the measured capacity of the truck, as determined by a government representative, clearly visible on both sides of the vehicle.

e. The work site monitors will retain one copy of the form, which is returned to the operations office and give two copies to the truck driver after completing the initial information.

f. The temporary storage and reduction site or disposal site monitor will estimate the volume of debris and note arrival time and volume in cubic yards on the load ticket. The truck driver will keep one copy and the site monitor will keep the other. The site monitor's copy will be returned to the operations office to be matched against the work site inspector's copy for pay verification. The truck driver's copy is the basis of contract billings.

g. All monitors will read and become familiar with the technical provisions of the contract and will conscientiously estimate each load hauled by the contractor. Improper estimates can lead to large and unnecessary government expenditures. If loads are not properly loaded or compacted, monitors will reduce the rated volume of the truck accordingly. Monitors will always be fair and consistent in dealing with contractor personnel.

h. A Public Works Department staff member will be designated as the temporary storage and reduction site and/or disposal site manager. The site manager will serve as the overall supervisor of the site inspection operation and will coordinate dumping efforts with the temporary site/landfill owners or operators. The site manager will also serve as the initial arbitrator for differences in opinion between the government representative and the contractor's representative regarding the estimated loads for payment.

5. Lump Sum Contract

a. The lump sum contract establishes a total contract price by a one-item bid from the contractor. It is understood in a lump sum contract that the price for the work is fixed, unless the scope of work changes; therefore, the bottom line of the contract is not in question, as it is with the unit price contract.

b. The main disadvantage of the lump sum contract occurs if the scope of work is not well defined. In that case, the quantity estimate and the definition of the scope of work become the responsibility of the contractor bidding the project. Experience has shown that the contractor passes this burden back to the government in the form of contingencies, which are incorporated into the bid price. Therefore, the lump sum contract will be used only when the scope of work is clearly defined and the areas of work can be specifically quantified.

c. Method

i. Area Method Example - Once all debris within a well-defined geographic area has been placed at the curbside a scope of work can be written that

requires the contractor to conduct a one-time pass to remove all debris from the curbside and deposit it at the local landfill for a fixed fee.

ii. Pass Method Example - Debris will be placed at the curbside as homeowners repair their homes over a 3-week period. The scope of work requires the contractor to conduct a minimum of three passes throughout the community during the 3-week period (one pass per week) and deposit the debris at the local landfill for a fixed fee.

E. Contract Monitoring Responsibilities

1. The Public Works Director will assign a debris staff member to work directly with other City officials in developing and monitoring debris clearance, removal and disposal contracts. The following will be considered when developing and monitoring local debris removal and disposal contracts:

   a. Existing landfill capacities
   b. Tipping fees
   c. Scale house operations
   d. Private commercial haulers
   e. Law enforcement
   f. Ingress/egress to site
   g. Site logistics
   h. Truck weight restrictions
   i. Highway and bridge weight restrictions
   j. Household hazardous waste
   k. Hazardous and toxic waste
   l. Mixed debris
   m. Construction and demolition debris
   n. Ash
   o. Traffic control
   p. Illegal dumping
   q. Environmental issues
   r. Site closure/restoration requirements

2. Contract Administration - This term is generally used to encompass all of the activities that will take place after a contract is awarded and work commences. Contract administration ensures that the contract is performed as agreed.

3. Monitoring Performance - Continuous monitoring of all activities of a contractor promotes satisfactory performance. In evaluating a contractor's performance, primary interest is in the progress toward completion of the services called for and the financial status of the contract. It is important that the contract provide for submission of reports and payment estimates to aid in evaluating the contractor's progress. In lieu of progress reports, frequent visits to the job sites can be a productive method of monitoring performance.

4. Contract Modification - During the administration of the contract, modifications may be necessary to provide contractual coverage for situations that develop after the contract is awarded. All modifications will be in writing to protect the interests of both parties. The contract will contain a clause that permits the Contracting Officer to make changes unilaterally within the scope of the contract, subject to an equitable adjustment of the contract price.

5. Inspection - The City of North Port will maintain an inspection and control system under their own supervision to ensure that the work being performed complies with the terms of the contract. In addition to load ticketing, the inspection and control process will consider the following factors:

    a. Bond requirements
    b. Insurance requirements
    c. Rights-of-way and indemnification
    d. Mobilization of proper equipment
    e. Posting of permits
    f. Contractor personnel safety standards
    g. General public safety standards
    h. Completion schedules
    i. Clearance procedures
    j. Demobilization procedures
    k. Site closure/restoration procedures

6. Acceptance and Payment - Final inspection and the method of interim and final payments are part of the general conditions of the contract. The following will be set forth in the original specification or other contract documents:

    a. Parts of or all of the work will be accepted only after verification through the inspection process that the work

was performed in accordance with the standards stipulated in the contract.

b. If the contract period is less than one calendar month, normal payment will be made in one total sum. In the event the authorized work tenure exceeds a period of one month, provisions can be made to make progress payments to the contractor at least monthly.

7. Closing Out Contracts - A contract is complete when all of the services or items called for have been delivered or performed and accepted. The contract is not administratively complete, however, until all actions taken in compliance with the contract have been properly documented and final payment has been made.

VI. SPECIAL DEMOLITION AND DEBRIS REMOVAL SITUATIONS

This section provides guidance on private property demolition and removal of debris from mobile home parks and waterways that may present a health and safety hazard.

A. Private Property Demolition and Debris Removal

1. Although flood insurance policies do not provide coverage for debris removal, most homeowner, fire and extended coverage insurance policies have specific coverage for debris removal from private property and for demolition of heavily damaged structures.

2. Demolishing or securing remaining structures that threaten the health and safety of adjacent residents will be the responsibility of the owner or local government; however, experience has shown that unsafe structures will remain because of lack of insurance, absentee landlords, or understaffed and under-equipped local governments. Consequently, ensuring the demolition of these structures may become the responsibility of the local Public Works Director and staff, which requires complete cooperation of numerous local and State government officials and may require resources from any or all of the following:

   a. Tax office
   b. Local law and/or code enforcement agencies
   c. State Historic Preservation Office
   d. Environmental contractors qualified to remove asbestos and lead-based paint

e. Field teams to photograph and document the sites before and after demolition. Health and Safety program requirements contained in 29 and 40 CFR will be adhered to with respect to hazardous waste. When removing any suspected hazardous waste workers will only work in well-ventilated areas, wear chemical protective clothing and evacuate the area if a chemical odor is noticed.

3. Demolition of private property will present significant coordination problems. The checklist shown below identifies key tasks that local officials will perform before the structure is approved for demolition. To expedite the overall effort, many of the tasks will be conducted concurrently.

4. Private Property Documentation Checklist

a. Obtain copies of all ordinances that authorize the community to condemn privately-owned structures. The authority to condemn privately-owned structures might be different from the authority for the demolition of publicly owned structures.
b. Coordinate use of adjacent lands, easements and rights-of-way necessary for accomplishing the approved work.
c. Implement laws that reduce the time it takes to go from condemnation to demolition.
d. Obtain copies of all applicable permits required for demolition of subject structure(s).
e. Document the age of the structure to determine if eligible or on the National Registration of Historic Places with the SHPO.
f. Obtain copies of pertinent temporary well-capping standards.
g. Obtain executed right-of-entry and hold harmless agreements that have been signed by the owner and by renter, if rented. Right-of-entry will indicate any known intent by owner to rebuild to ensure foundation and utilities are not damaged. If these agreements are not executed, document reason(s).

5. Agreement example

a. Use radio, public meetings and newspaper ads to give notice to property owners and their renters to remove personal property in advance of demolition.

b. Document name of owner on the title, the complete address and legal description of the property and the source of this information.

6. Document name of renter, if available

a. Ensure property will be vacated by demolition date.
b. Provide written notice to property owners that clearly and completely describe the structures designated for demolition. Additionally, provide a list that identifies related structures, trees, shrubs, fences and other items to remain on the respective property.
c. Notify mortgagor of record.
d. Provide the property owner the opportunity to participate in the decision on whether the property can be repaired.
e. Determine the existence and amount of insurance on the property prior to demolition.
f. Specify procedures to determine when cleanup of a property is completed.

7. Private Property Inspection Checklist

a. Coordinate all pertinent site inspections with local, State and Federal inspection team(s). Identify asbestos and lead-based paint materials prior to demolition.
b. Notify the owner and/or renter of all site inspections.
c. Verify that all personal property has been removed from private structure(s).
d. Immediately prior to demolition, verify that the building is unoccupied.
e. Ensure that the property is properly posted.
f. Obtain a clear, concise and accurate property description and demolition verification.
g. Include a Public Health official on the demolition inspection team.
h. Evaluate the structural integrity of the building and also demonstrate "imminent and impending peril" to public health and safety caused by the structure.
i. Make arrangements to remove and transport all asbestos and lead-based paint materials to a permitted facility prior to building demolition.
j. Obtain photographs of the property and verify the address. Provide additional photographs of the property taken immediately prior to and following demolition.

8. Private Property Utilities Checklist

   a. Locate, mark, turn off and disconnect all water and sewer lines.
   b. Locate, mark, turn off and disconnect electrical, telephone and cable television services.
   c. Locate, mark, turn off and disconnect gas service.

9. Private Property Demolition and Debris Removal Checklist - The following actions will require close coordination when removing debris from demolished buildings on private property:

   a. Ensure that buildings have been properly condemned according to local ordinances.
   b. Ensure that right-of-entry and hold harmless agreements are properly executed.
   c. Ensure that local officials remove any legal residents or squatters from the building before demolition and debris removal begins.
   d. Ensure that buildings identified for demolition are properly inspected to verify that they are unsafe, cannot be repaired and present a hazard to the community.
   e. Ensure that the inspection team includes a structural engineer and a hazardous materials specialist. Any household hazardous waste, such as paints, oils, cleaning supplies and pesticides that are found will be removed prior to demolition. Houses that contain asbestos or lead-based paint will be demolished and debris removed according to current environmental regulations under a separate contract.
   f. Local code enforcement officers will accompany the contractor to ensure that they do not tear down the wrong house. The responsibility is on the community to identify the correct structure.
   g. Demolition work and debris removal will be coordinated with utility companies to ensure that all services are turned off.

B. Mobile Home Park Debris Removal

1. Post-Disaster Requirements - Hurricanes and tornadoes can cause severe damage to mobile homes and create extensive amounts of mixed debris confined to relatively small areas. The following are examples that comprise mixed debris:

a. Tree blow-down
b. Out buildings
c. Screened porches
d. Mobile home frames
e. Personal property, such as clothing, food and furniture
f. Appliances, such as stoves, refrigerators, washers and dryers
g. Household cleaners and paints
h. Propane and oxygen tanks
i. Gasoline, oil and lubricants
j. Automobiles, trucks and boats
k. Bicycles and lawn mowers
m. Utility hookups

2. Local mobile home parks will be surveyed and arrangements will be made with park owners for City resources or contractors to clear the parks of debris. The Public Works Director and staff will need to closely coordinate the cleanup activities and enforce condemnation procedures. Legal, health and safety concerns will have an important impact on the debris removal activities.

3. Planning Issues - Prior to a major natural disaster, local officials will do the following:

a. Develop generic scopes of work for debris removal.
b. Identify sites suitable for temporary storage of mobile home debris.
c. Prioritize mobile home parks for debris removal.
d. Develop a set of procedures to be followed that will combine debris removal activities and utility repair/replacement at mobile home parks into a single operation.

4. Documentation Checklist - City officials will provide the following documentation:

a. Copies of the local ordinance authorizing condemnation of mobile home parks. Condemnation for health issues is associated with prolonged exposure of trailer contents to the natural elements.
b. A copy of the local government resolution with appropriate recitals required to support adoption or enactment of ordinances to condemn, demolish and remove mobile home park contents.

c. Maps showing easements and rights-of-way access to the property.
d. Documentation signed by the mobile home park owner and mobile home owner that holds the local, State or Federal government free from liability for damage caused by the requested work and indemnifies the local, State or Federal government against any claims arising from such work.
e. Documents allowing right-of-entry to the mobile home parks.
f. Notice to individual mobile home owners to remove items of personal property in accordance with local ordinances.
g. Documentation providing the names of mobile home parks and of mobile home park owners, complete addresses and legal descriptions of the properties and limits, if any, of debris clearance to occur within the parks. Additional materials will include plats of the mobile home parks and any information about existing utilities.
h. Standards for capping all utilities.
i. All applicable permits necessary for any demolition work in the mobile home park.

5. Inspection Prior to Debris Removal - City officials will perform the following actions:

a. Ensure that the mobile home park will be vacated prior to the removal of any debris from the site.
b. Describe clearly and completely the extent of debris removal required within the mobile home park. Specify any structures, other than mobile homes, that are to be removed.
c. Locate and estimate amount of household hazardous waste within the park and ensure that appropriate procedures are established for separation and removal of such materials prior to debris removal. Household hazardous waste typically found on-site includes cleaning supplies, propane tanks, paint cans, paint thinners, pesticides, refrigerators and freezers. A qualified environmental contractor will be hired to ensure proper removal and disposal of asbestos, lead-based paint and other commercial, agricultural or industrial hazardous waste.
d. Conduct initial inspections of the mobile home park with representatives from the local government, public health office, building and zoning office, real estate office and other State and Federal officials.

e. Ensure that the contract scope of work reflects findings of the field inspection.
f. Ensure that the mobile homes are unoccupied.
g. Ensure that the property is posted in accordance with local regulations and that mobile home owners have removed their personal property.
h. To avoid subsequent disputes, ensure that any agreement made with the mobile home park owner is in writing.
i. Obtain photographic documentation of mobile home sites prior to commencement of work.
j. Have organic and perishable materials removed from the site.

6. Mobile Home Park Utilities - City officials will accomplish the following actions:

a. Consider whether using heavy equipment will cause further damage to existing utilities.
b. Be responsible for turning off utility services, such as water, telephone, electricity, natural gas and propane gas.
c. Flag septic tank locations prior to debris removal. Special care must be given to protect septic tanks during debris removal operations.

C. Debris Removal Contracts

1. Contracts will include provisions for the following:

a. Provide that all private automobiles are stored in a specific location within the park to be retrieved later by the owners.
b. Provide salvage rights to the contractor for materials remaining on-site at the time of debris removal where beneficial to the government.
c. Require flagging of existing utilities prior to debris removal.
d. Use rubber tire vehicles and backhoe with grapple attachments to protect existing utilities.
e. Require the contractor to phase debris removal operations to allow utility repair and or replacement to begin immediately after an area has been cleared. Navigation Hazard Removal

2. Coordination - Damage to publicly-owned marinas caused by a major natural disaster can include abandoned sunken boats and other debris that may impede navigation. The Public Works Director and staff will coordinate with the U.S. Coast Guard, Florida

Fish and Wildlife Commission, legal counsel, contractors specializing in marine salvage operations, commercial divers and certified surveyors to ensure that navigation hazards are removed safely and efficiently.

VII. TEMPORARY DEBRIS STORAGE SITE OPERATIONS AND VOLUME REDUCTION METHODS

The preparation and operation of a temporary debris storage and reduction site are usually left to the contractor. However, the Public Works Director and debris staff will understand how a temporary debris storage and reduction site is set up and operated. This information will be extremely valuable in developing ultimate disposal plans, keeping local government officials and the public informed on debris clearance, removal and disposal operations and ensuring compliance with various regulations. This section provides guidelines on temporary site operations, the handling of household hazardous waste and the volume reduction methods in priority of recycling, , chipping, grinding and incineration.

A. Temporary Debris Storage Site

1. Site Preparation - The topography and soil/substrate conditions will be evaluated to determine best site layout. When planning site preparation, think of ways to make site closure and restoration easier. For example, if the local soils are very thin, the topsoil can be scraped to bedrock and stockpiled in perimeter berms. Upon site closeout, the uncontaminated soil can be re-spread to preserve the integrity of the tillable soils.

2. Site Operations - Lined temporary storage areas will be established for ash, household hazardous waste, fuels and other materials that may contaminate soils and groundwater. Plastic liners will be placed under stationary equipment such as generators and mobile lighting plants. These actions will be included as a requirement in the contract scope of work.

    a. If the site is also an equipment storage area, fueling and equipment repair will be monitored to prevent and mitigate spills of petroleum products and hydraulic fluids. Include clauses in the contract to require immediate cleanup by the contractor.

    b. Be aware of and lessen the effects of operations that might irritate occupants of neighboring areas. Establishment of a

buffer zone can abate concerns over smoke, dust, noise and traffic.

c. Consider on-site traffic patterns and segregate materials based on planned volume reduction methods.

d. Operations that modify the landscape, such as substrate compaction and over excavation of soils when loading debris for final disposal, will adversely affect landscape restoration.

e. Debris removal and disposal will be viewed as a multi-staged operation with continuous volume reduction. There will be no significant accumulation of debris at temporary storage sites. Instead, debris volume will be constantly reduced and residue sent to recyclers, incinerators or a landfill in that priority.

3. Baseline Data Collection - Private land and public land used as debris storage and reduction sites will be returned to its original condition following site closeout. Baseline data are essential to document the condition of the land before it is used as a debris storage and reduction site. As soon as a site is selected, the Public Works Director and staff will work closely with County and State officials to develop baseline data. The following actions will be taken to develop baseline data on all selected sites:

a. Videotape and Photograph the Site - Thoroughly videotape and/or photograph (ground or aerial) each site before any activities begin and periodically update video and photographic documentation to track site evolution.

b. Document Physical Features - Notations about existing structures, fences, culverts, irrigation systems and landscaping can help evaluate possible damage claims made later.

c. Sample Soil and Water - Random soil samples can be easily collected prior to volume reduction activities. More time-consuming groundwater sampling can be done soon after operations commence. Household hazardous waste, ash and fuel storage areas will be sampled prior to site setup. Advance planning with community and State environmental agencies can establish requirements, chain of custody, acceptable collection methods, certified

laboratories and test parameters. If in-house assets are not available, consider establishing an off-the-shelf contract with an environmental consulting firm that can respond rapidly.

d. Sketch Site Operation Layout - Periodically map or sketch activity locations so that areas of concern can be pinpointed later for additional sampling.

e. Document Quality Assurance Issues - Document contractor operations that will have a bearing on site closeout, such as petroleum spills at fueling sites, hydraulic fluid spills at equipment breakdowns, contractor installation of water wells for stock pile cooling or dust control, discovery of household hazardous waste in debris and details on any commercial, agricultural or industrial hazardous and toxic waste storage and disposal.

f. Plan Environmental Remediation - Final restoration of the landscape must be acceptable to the landowner. Therefore, plan the landscape restoration as early as possible, preferably incorporating a basic plan in the lease. Come to an agreement with the landowner prior to occupancy to establish reasonable expectations of site conditions upon site closeout.

g. Baseline Data Checklist - The following is a suggested baseline data checklist:

i. Before activities begin

- Take ground or aerial video/photographs.
- Note important features, such as structures, fences, culverts and landscaping.
- Check with the State Historic Preservation Officer to determine if any structures identified are listed on or eligible for the National Register of Historic Places.
- Take random soil samples.
- Take water samples from existing wells.
- Check the site for volatile organic compounds.

ii. After activities begin

- Establish groundwater monitoring wells.
- Take groundwater samples.
- Take spot soil samples at household hazardous waste, ash and fuel storage areas.

iii. Progressive updates

- Update videos and photographs.
- Update maps and sketches of site layout.
- Update quality assurance reports and fuel spill reports.

B. Household Hazardous Waste

1. Pre-Disaster Planning - The Public Works Director and staff are aware of the effects that household hazardous waste can have on the overall debris clearance, removal and disposal mission. Pre-disaster planning will include having professional hazardous waste response teams assigned ahead of time to provide assistance in identifying and disposing of household hazardous waste.

   a. Household hazardous waste generated by a natural disaster may consist of common household cleaning supplies, pesticides, motor oil, lubricants, transmission and brake fluid, gasoline, anti-freeze, paints, propane tanks, oxygen cylinders and auto/marine batteries. Household hazardous waste may become mixed with other debris, requiring close attention throughout the debris clearance, removal and disposal process.

   b. White goods are defined as discarded household appliances such as refrigerators, freezers, air conditioners, heat pumps, ovens, ranges, washing machines, clothes dryers, and water heaters. Many white goods contain ozone-depleting refrigerants, mercury, or compressor oils. The Clean Air Act prohibits the release of refrigerants into the atmosphere, and requires that certified technicians extract refrigerants from white goods before they are disposed of or recycled. Some States also require certified technicians to extract compressor oils before disposing of or recycling white goods. Applicants should follow all Federal, State, and local requirements concerning ozone-depleting refrigerants, mercury, or oils. Documentation of proper disposal may be required for Public Assistance grant consideration.

c. The Public Works Director and staff will implement the following pre-disaster planning actions:

i. Assign trained hazardous waste response teams to collect, sort, store and dispose of excessive quantities of household hazardous waste.
ii. Have emergency hazardous waste contracts in place or prepare generic scopes of work that can be fine-tuned with minimal effort for removal and disposal of accumulated household hazardous waste.
iii. Coordinate with County, State and Federal regulatory agencies concerning possible regulatory waivers and other emergency response requirements.

2. Removal and Disposal Operations - Household hazardous waste items will be segregated at curbside or brought to a designated drop-off site. Specially trained field technicians can identify dangerous product constituents, segregate incompatible chemicals and properly store or pack the waste for transportation to a facility specially permitted to accept hazardous waste. The following actions are required to ensure that household hazardous waste items are removed and disposed of safely:

a. Where possible, separate household hazardous waste from other debris before removal. Arrange for salvageable household hazardous waste materials to be collected and segregated based on their intended use.
b. Properly trained environmental contractors or emergency response personnel will remove industrial, commercial or agricultural hazardous and toxic waste.
c. Maintain contact with regulatory agencies to ensure cleanup actions meet County, State and Federal regulations.
d. Complete household hazardous waste identification and segregation before any demolition work begins.
e. Qualified environmental contractors will remove any questionable debris that may be contaminated by household or commercial hazardous waste.
f. Regular demolition contractors can remove uncontaminated debris.

3. Special Handling at Temporary Storage Sites - A separate storage area for household hazardous waste materials, contaminated soils

and contaminated debris will be established at each site. The household hazardous waste storage site will be lined with an impermeable material and bermed to prevent contamination of the groundwater and surrounding area. Household hazardous waste materials will be removed from the temporary storage area and disposed of by a qualified environmental contractor in accordance with County, State and Federal regulations.

C. Commercial, Agricultural and Industrial Hazardous and Toxic Waste

1. Removal and disposal of large quantities of commercial, agricultural and industrial hazardous and toxic waste, such as asbestos, lead-based paint, pesticides, or fertilizers, may require the use of professional hazardous and toxic waste contractors. A contractor's inspection team will do the following:

    a. Establish contacts with County, State and Federal regulatory agencies.
    b. Interview tenants and building owners.
    c. Assess sites to document potential commercial or agricultural hazardous and toxic waste problems.
    d. Search buildings to establish potential hazards, such as asbestos, lead-based paint and underground tanks.
    e. Prioritize problems based on risk to human health and safety.

D. Volume Reduction Methods Listed by Priority

1. Volume Reduction by Recycling - Recycling will be considered early in the debris clearance, removal and disposal operation because it may present an opportunity to reduce the overall cost of the operation. Metals, wood and soils are prime candidates for recycling.

    a. Hurricanes and earthquakes may present opportunities to contract large-scale recycling operations and achieve an economic return from some of the prime contractors who exercise their initiative to segregate and recycle debris as it arrives at the storage and reduction sites.

    b. Specialized contractors will be available to bid on disposal of debris by recycling, if it is well sorted. Contracts and monitoring procedures will be developed to ensure that the recycling contractors comply with County, State and Federal environmental regulations.

c. Residue that cannot be recycled, such as cloth, plastic, mattresses, rugs and trash, will be shredded to reduce volume before being sent to a landfill for final disposal.

d. The following materials are suitable for recycling:

i. Metals - Hurricanes and tornadoes can cause extensive damage to mobile homes, sun porches and green houses. Most of the nonferrous and ferrous metals are suitable for recycling. Metal maulers and shredders can be used to shred trailer frames, trailer parts, appliances and other metal items. Ferrous and non-ferrous metals are separated using an electromagnet and then sold to metal recycling firms.

ii. Soil - Cleanup operations using large pieces of equipment pick up large amounts of soil. The soil is transported to the temporary combined with other organic materials that will decompose over time. Large amounts of soil can be recovered if the material is put through some type of screen or shaker system. This procedure can produce significant amounts of soil that can either be sold or recycled back into the agricultural community. It is more expensive to transport and pay tipping fees at local before moving the material. Shakers can be used to remove dirt from mixed debris. The cover material or sold to the agricultural community.

In agricultural areas where chemical fertilizers are used heavily, recovered soil may be too contaminated for use on residential or existing agricultural land. Monitoring and testing the soil may be necessary to ensure that it is not contaminated with chemicals. If the soil is not suitable for any agricultural use and is a risk to the public health, it may be used as cover material at a landfill.

iii. Construction Materials - Construction and demolition waste is material generated in the demolition of disaster damaged structures and facilities. This waste stream includes concrete,

asphalt, gypsum, wood waste, glass, red clay bricks, clay roofing tile and asphalt roofing tile. Much of this material can be recycled, if recycling contractors are readily available.

iv. Wood - Clean, woody debris can be ground, chipped, shredded, or removed by timber operations or pulpwood cutters.

2. Volume Reduction by Grinding and Chipping - Hurricanes, tornadoes and ice storms may present the opportunity to employ large-scale grinding and chipping operations as part of the overall debris volume reduction strategy. Hurricanes can blow away scarce topsoil in the agricultural areas and cause extensive tree damage and blow-down. This two-fold loss, combined with local climatic conditions, may present an opportunity to reduce clean, woody debris into suitable mulch that can be used to replenish the topsoil and retain soil moisture.

a. The economic feasibility of grinding and chipping woody debris must be studied carefully. The cost of chipping and grinding is basically equal to that of incineration; however, there are significant differences in volume reduction. Incineration, for example, reduces the volume approximately 95%, leaving only an ash residue for disposal. Chipping and grinding reduces the volume on a 4-to-1 ratio (four cubic yards is reduced to one cubic yard) or by 75%. For chipping and grinding to be feasible, the 25% of volume remaining must have some benefit or use. The ability to use the recycled wood chips as mulch for agricultural purposes or as fuel for industrial heating or in a cogeneration plant helps to tip the economic scale toward chipping and grinding. Because of shallow topsoil conditions in some locations, mulch is a desirable product. In other locations, however, the mulch may become nothing more than a landfill product. The Public Works Director and staff will work closely with local environmental and agricultural groups to determine if there is a market for mulch.

b. There are numerous makes and models of grinders and chippers on the market. When contracting, the most important item to specify is the size of the mulch. If the grinding operation is strictly for volume reduction, size is not important; however, mulch to be used for agricultural

purposes must be of a certain size and virtually free of paper, plastic and dirt.

c. Grinders are ideal for use at debris storage and reduction sites because of their high volume reduction capacity. However, there is a need for a large area to hold the resulting mulch. Ingress and egress to the site is also an important consideration. Finally, properly locating the grinders is critical for noise and safety considerations.

d. The following specifications will provide a mulch product that is suitable for agricultural purposes:

i. The average size of wood chips produced will not exceed four inches in length and ½ inch in diameter.
ii. Production output will average 100 to 150 cubic yards per hour when debris is moderately contaminated with plastic and dirt and feeding operations are slow and 200 to 250 cubic yards per hour for relatively clean debris. Note that this is not machine capability; this is contractor output or performance capability.
iii. Chips or mulch will be stored in piles no higher than 15 feet and located so as not to hinder hauling operations.
iv. Contaminants are all materials other than wood products and will be held to 10% or less for the mulch to be acceptable.
v. Plastics will be eliminated completely. To help eliminate contaminants, root rake loaders will be used to feed or crowd materials to the chipper or grinder. Bucket-loaders tend to scoop up earth, causing excessive wear to the grinder or chipper. Hand laborers will remove contaminants prior to feeding the grinders. Shaker screens will be used when processing stumps with root balls or when large amounts of soil are present in the woody debris. The separated soil can also be recycled back to the agricultural community.

e. Brush chippers are ideal for use in residential areas, orchards, or groves. The damaged and uprooted trees present significant problems if they are pushed to the right-of-way to wait for eventual pick-up and transport to storage and reduction sites. In addition, the use of on-site chippers

allows the material to be used as mulch in the area where it is chipped, thereby saving the cost of transporting it.

3. Volume Reduction by Incineration - There are several incineration methods available for volume reduction. Each method will be considered in developing a volume education strategy. The appropriate State regulatory agencies (e.g., Department of Environmental Protection and Florida Forest Service) will be contacted to acquire all respective permits for burn authorizations when using this option as a reducing technique. This will include permits for the disposal of all products of incineration.

4. Uncontrolled Open-Air Incineration - The least desirable method of volume reduction is uncontrolled open-air incineration because it lacks any type of environmental control. However, in the haste to make progress, local officials and/or independent landowners may employ this method early in a disaster. Uncontrolled open-air incineration will be closely monitored to ensure that only clean, woody debris is incinerated.

5. Controlled Open-Air Incineration - Controlled open-air incineration is a cost-effective method for reducing clean, woody debris in rural areas. Incineration of clean woody debris presents little environmental damage and the local agricultural community can use the resulting ash as a soil additive. Local agricultural extension personnel will be consulted to determine if the resulting ash can be recycled as a soil additive. The controlled open-air incineration option will be terminated if mixed debris enters the waste stream.

6. Air Curtain Pit Incineration - Air curtain pit incineration offers an effective means to expedite the volume reduction process while substantially reducing the environmental concerns caused by open-air incineration. The air curtain incineration method uses a pit constructed by digging below grade or building above grade (if a high water table exists) and a blower unit. The blower unit and pit comprise an engineered system that must be precisely configured to function properly.

    a. The blower units deliver air at predetermined velocities and capacities. The blower unit must have adequate air velocity to provide a “curtain effect” to hold smoke in and to feed air to the fire below. A nozzle 20 feet long will provide air at a velocity of over 120 miles per hour and will deliver over 20,000 cubic feet of air per minute to the fire. The air traps smoke and small particles and re-circulates them to

enhance combustion, which reaches over 2,500 degrees Fahrenheit. Manufacturers claim that combustion rates of approximately 25 tons per hour are achievable while still meeting emission standards.

b. Specifications and statements of work will be developed to expedite the proper use of the system. Before awarding a contract, the Public Works Director and staff need to ensure that the contractors are knowledgeable about air curtain pit incinerator design and operating procedures.

c. Following are recommendations and warnings to assist the Public Works Director and debris staff in planning for air curtain pit incineration operations:

i. Be aware that there are no industrial standards for air curtain pit incinerator operations. The set-up has to be customized using the information provided by the manufacturer and will consider such specifications as minimum blower air velocity, pit construction configuration, pit materials, ash handling, acceptable smoke levels and air monitoring requirements.
ii. Pits must be constructed out of a highly compacted material that will hold its shape.
iii. The water table elevation governs whether the pit is constructed above or below grade.
iv. Controls will be implemented to prevent contamination of the ground water. An acceptable solution is to use compacted limestone fill placed over an impervious clay layer.
v. Planners will take the initiative in keeping the public informed. Local officials, environmental groups and local residents will be thoroughly briefed on the incineration means being used, how the systems work, environmental standards, health issues and the risk associated with each type of incineration. A proactive public information strategy will be included in any operation that uses incineration as a primary means of volume reduction.

7. Portable Air Curtain Incinerators - Portable incinerators use the same methods as air curtain pit incinerator systems. The only difference is that portable incinerators off-site constructed earth/limestone pit. Portable air curtain incinerators are the most

efficient incineration systems available because the pre-manufactured pit is engineered to precise dimensions to complement the blower system. The pre-manufactured pit requires little or no maintenance as compared to earth/limestone constructed pits, which are susceptible to erosion. Portable air curtain units are ideal for areas with high water tables and sandy soils and areas where smoke opacity must be kept to a minimum.

8. Environmental Controls - The following are recommended environmental controls for all incineration methods:

   a. A setback of at least 100 feet will be maintained between the debris piles and the incineration area. Keep at least 1,000 feet between the incineration area and the nearest building. Contractors will use fencing and warning signs to keep the public away from the incineration area.
   b. The fire will be extinguished approximately two hours before anticipated removal of the ash mound. The ash mound will be removed when it reaches two feet below the lip of the incineration pit.
   c. The incineration pit will be either constructed above ground or below ground so that it is less than eight feet wide and between nine and 14 feet deep.
   d. The incineration pits will be constructed with limestone and reinforced with earth anchors or wire mesh to support the weight of the loaders. There will be a one foot impervious layer of clay or limestone on the bottom of the pit to seal the ash from the aquifer.
   e. The ends of the pits will be sealed with dirt or ash to a height of four feet.
   f. A 12-inch dirt seal will be placed on the lip of the incineration pit area to seal the blower nozzle. The nozzle will be three to six inches from the end of the pit.
   g. There will be one foot high nonflammable warning stops along the edge of the pit's length to prevent the loader from damaging the lip of the incineration pit.
   h. To prevent explosions, hazardous or contaminated flammable material will not be placed in the pit.
   i. The airflow will hit the wall of the pit approximately two feet below the top edge of the pit opposite the blower and the debris will not break the path of the airflow except during dumping.
   j. The pit will be no longer than the length of the blower system and will be loaded uniformly along its length.

k. Check with appropriate State agencies for Florida-specific requirements.

9. Smoke - Smoke generated by any of the above incineration methods is often interpreted by the general public as having an environmental impact. Therefore, it is important to also address smoke as part of the air monitoring guidelines. The visual measure of smoke emitted by a burning source is referred to as its "opacity." For disaster situations, the recommended opacity requirements will be set at 15% for 50 minutes out of an hour, not to exceed 40% for the remaining 10 minutes. This allows for additional debris that may be put into the incinerator during that hour. A 30-minute start-up time with a maximum of 40% opacity will be allowed.

VIII. TEMPORARY DEBRIS STORAGE AND REDUCTION SITE ENVIRONMENTAL CONSIDERATIONS

Debris clearance, removal and disposal activities can have significant environmental ramifications. The temporary storage and reduction sites must be setup, operated and closed out properly to minimize environmental harm. This section provides guidelines for air quality monitoring and site closeout procedures, including ash, soil and groundwater testing.

A. Air Quality Monitoring

1. Following a major natural disaster, emphasis is on rapid debris removal from the public rights-of-way. This results in debris coming into a temporary storage site faster than it can be reduced and ultimately disposed of. As a result, organic matter in debris piles begins to decompose and may create toxic or volatile vapors. Incineration operations may also produce pollutants that impact the air quality of the area. Air quality must be monitored to ensure compliance with County, State and Federal environmental regulations.

2. Air quality monitoring will be instituted at all debris storage and reduction sites to check for volatile organic vapors of a petrochemical origin and airborne pollutants caused by incineration operations.

3. Actions will be taken by the temporary debris storage and reduction site operators to keep pollutants at or below acceptable local, State and Federal environmental standards. Testing procedures will include readings for ozone, carbon monoxide,

nitrogen dioxide, sulfur dioxide, lead and particulate matter smaller than 2.5 microns.

4. Flame- and photo-ionization detectors will be used to detect volatile organic vapors. The flame-ionization detector is used to establish parts-per-million at the debris pile. If readings are above acceptable standards, the photo-ionization detector will be used to verify the initial readings.

5. Incineration site readings will be taken at the edge of the incineration pit and approximately 150 feet away. Scattered locations will be established and checked periodically. Wind direction, temperature and any other pertinent meteorological information will be recorded.

6. Coordinate with the appropriate County, State and Federal environmental agency responsible for implementing the Quality Assurance Sampling Plan.

7. The following situations may negatively affect the air quality at a temporary storage and reduction site:

   a. The incineration pit is not properly constructed.
   b. The incineration pit has degraded to the point where key specifications are no longer met.
   c. A poorly trained operator improperly feeds the pits.
   d. The material is not properly segregated.
   e. Prolonged rains may accelerate the decomposition process, thereby causing the emission of volatile organic gases. Site Closeout Procedures

8. Each temporary debris storage and reduction site will eventually be emptied of all material and restored to its previous condition and use. The contractor must assure the Public Works Director and staff that all sites are properly restored. Local, State and Federal government monitors will verify this. Site restoration will go smoothly if baseline data were properly collected and site operation procedures were followed.

B. Site Closeout Procedures

1. The key to timely closeout of the sites is the efficient advance scheduling of activities for multiple sites.

2. The basic closeout steps are:

a. Remove all debris from the site.
b. Conduct an environmental audit or assessment.
c. Develop a restoration plan.
d. Submit the plan for review and approval by the appropriate State regulatory agency
e. Execute the plan
f. Get acceptance from the landowner
g. Terminate lease payments

3. Potential Problems:

a. The length and terms of private property leases can create suspense dates that become very costly to meet and difficult to manage.
b. Differences between local, State and Federal government environmental regulations may cause problems.
c. Failure to collect baseline data can result in fraudulent claims for damage to nonexistent structures or the land itself. Videotape recordings and/or photographs will be taken prior to opening a site to prevent fraudulent claims. Background soil and water samples will also be taken before site activities begin to compare with closeout soil and water samples.

4. Planning Requirements - The following planning requirements will be implemented to closeout a temporary storage and reduction site:

a. Coordinate with local and State officials responsible for construction, real estate, contracting, project management and legal counseling regarding requirements and support for implementation of a site restoration plan.
b. Establish a testing and monitoring program for air, ash, soil and groundwater.
c. Ensure that the contractors are required to remove all residual debris from temporary sites to approved landfills prior to closure.
d. Reference appropriate and applicable environmental regulations.
e. Prioritize site closures.
f. Schedule closeout activities.
g. Develop cost estimates.
h. Develop decision criteria for certifying satisfactory closure based on limited baseline information.

i. Develop administrative procedures and contractual arrangements for site closeout.
j. Designate approving authority to review and evaluate contractor closure activities and progress.
k. Retain staff during the closure phase to develop site-specific restoration actions.

5. Temporary Site Closure Checklist - The following is a recommended temporary site closure checklist. Narrative responses may be required along with other closure documents.

a. Site number and location
b. Date closure complete
c. State regulatory permits observed
d. Household hazardous waste removed
e. Contractor equipment and temporary structures removed
f. Contractor petroleum spills cleaned
g. Ash piles removed
h. Comparison of baseline information to conditions after the contractor has vacated the temporary site
i. Appendices
j. Closure documents
k. Contracting status reports
l. Contract
m. Testing results
n. Correspondence
no. Narrative responses

C. Ash, Soil and Groundwater Testing

Ash, soil and groundwater need to be tested to determine that no long-term environmental contamination is left on the site. High levels of site activity may require additional testing and contaminated material may need to be disposed of in an approved landfill.

1. Ash Testing - All ash piles will be tested using the Toxicity Characteristic Leaching Procedure. One composite sample from each separate ash pile will be analyzed. A minimum of ten samples taken from different strata within the pile is appropriate to develop the composite sample. If unacceptable contamination is not found, ash may be placed in a Class I landfill. If unacceptable levels of contamination are detected, the material will be further evaluated, if appropriate and placed in a hazardous material landfill, as appropriate.

2. Soil Testing - After the stockpiles are removed from the site, soils will be tested for the presence of volatile hydrocarbon contamination. Samples will be taken immediately below the surface, if it is determined that the contractor spilled hazardous materials, such as oil or diesel fuel, on the site.

   The entire incineration site will be inspected for any areas of discoloration, odor, or obvious problems. Such areas will be identified and restored, as necessary.

3. Groundwater Testing - Runoff from the incineration sites and other debris stockpiled within storage areas have the potential to contaminate the aquifer. Although the probability of contamination is low, consideration will be given to placing ground water monitoring wells around the perimeter of the site, if it is adjacent to an important aquifer. Groundwater will be tested to determine the probable effects of rainfall leaching through either the ash areas or the stockpile areas and be compared to generally accepted water quality standards.

APPENDIX A

U.S. ARMY CORPS OF ENGINEERS

HURRICANE DEBRIS ESTIMATING MODEL

Background

- The U.S. Army Corps of Engineers (USACE) emergency management staff has developed a modeling methodology designed to forecast potential amounts of hurricane generated debris, based on actual data from Hurricanes Frederic, Hugo and Andres
- The estimated quantities produced by the model have a predicted accuracy of plus or minus 30%
- The primary factor used by the model is the number of households in a developed urban/suburban area
- Other factors utilized are:
    1. Cubic yards of debris generated per household per storm category
    2. Vegetative cover
    3. Commercial density
    4. Precipitation
- Household debris includes damage to the house, contents and surrounding shrubs/trees
- Vegetative cover includes all trees and shrubbery located along public rights-of-way, parks and residential areas
- Commercial density includes debris generated by damage to businesses and industrial facilities
- Private contractors will remove the majority of commercial related debris; however, disposal/reduction space is still required
- Very wet storms will cause ground saturations, increasing tree fall

Initial Planning Data

- For planning purposes, the worst case scenario should be used for the subject area
- The most accurate process is to determine the defined areas by using Doppler radar (National Weather Service Broadcasts) and geographical information systems (GIS)
- Doppler radar will define the storm's intensity and the exact track of the eye of the storm in relation to the affected area
- Track the storm and plot the eye path and 5-mile wide bands out from the eye to defined areas and estimate wind speeds
- The wind speed of the eye wall normally determines the reported storm category with the outward or 5-mile bands being a lesser category
- Track to storm inland until the wind speeds dissipate below hurricane strength

- Divide outlined areas by storm category
- Enter coordinates into a GIS database to determine areas and demographic information such as: Populations, Schools and Businesses

STEP 1 –ESTIMATED DEBRIS QUANTITIES

The formula used in this model will generate debris quantity as an absolute value based on a known/estimated population or a debris quantity per square mile based upon population density per square mile.

- Determine population (P) in the affected area
- For example, 2007 census data for North Port, FL is 57,000, therefore P = 57,000
- The assumption of 3 persons per household (H) is used for this model
- Known/estimated population (P) for a jurisdiction may be used to determine a value for H or H=P/3

Example

A Category 4 storm passes through the City of North Port. The area is primarily single family dwellings with some apartment complexes, schools, and shopping centers. Vegetation characteristic is heavy because of the proliferation of residential landscape shrubbery and trees throughout the area. The storm is very wet, with rain before and continuing for a few days after the hurricane.

Formula: Q = (H)(C)(V)(B)(S)

Q is the quantity of debris in cubic yards
H is the number of households
C is the storm category factor in cubic yards
V is the vegetation characteristic multiplier
B is the commercial/business/industrial use multiplier
S is the storm precipitation characteristic multiplier

H= P/3 = 57,000/3 = 19,000 (3 persons per household)
C = 50 (Factor for a Category 4 storm)
V = 1.5 (Multiplier for heavy vegetation)
B = 1.3 (Multiplier for heavy commercial due to schools/stores/apartments
S = 1.3 (Multiplier for wet storm event)

Then Q = 19,000 X 50 X 1.3 X 1.3 = 1,605,500 cubic yards of debris or 1.6 million CY

C is the storm category factor as shown below. It expresses debris quantity in cubic yards (yd^3) per household by hurricane category and includes the house and its contents, plus land foliage

Hurricane Category	Value of "C" Factor
1	2 yd^3
2	8 yd^3
3	26 yd^3
4	50 yd^3
5	80 yd^3

V is the vegetation multiplier as shown below. It acts to increase the quantity of debris by adding vegetation, including shrubbery and trees on public rights-of-way.

Vegetative Cover	Value of "V" Multiplier
Light	½
Medium	1.3
Heavy	1.5

B is the multiplier that takes into account areas that are not solely single-family residential, but includes small retail stores, schools, apartments, shopping centers, and light industrial/manufacturing facilities. Built into this multiplier is the offsetting commercial insurance requirement for owner/operator salvage operations.

Commercial Density	Value of "B" Multiplier
Light	1.0
Medium	1.2
Heavy	1.3

S is the precipitation multiplier that takes into account either a "wet" or "dry" storm event. A "wet" storm for Category 3 or greater storms will generate more vegetative debris due to the uprooting of complete trees.

Precipitation Characteristics	Value of "S" Multiplier
None To Light	1.0
Medium To Heavy	1.2

NOTE: Steps 2 and 3 of this model can also be applied to other debris generating events once an estimated quantity of debris is established.

STEP 2 – DEBRIS STORAGE SITE REQUIREMENTS

- Estimate debris pile stack height of 10 feet
- 60% usage of land area to provide for roads, safety buffers, burn pits and household hazardous waste areas

1 acre (ac) = 4,840 square yards (yd^2)

10 foot stack height = 3.33 yards (y)

Total volume per acre = 4,840 yd^2/ac x 3.33 y = 16,117 yd^3/ac

- From the example above, the acreage required for debris reduction site is:

1,600,000 / 16,117 yd^3/ac = 99 acres (required for debris storage only)

- To provide for roads and buffers, the acreage must be increased by a factor of 1.66

99 ac X 1.66 = 164.34 acres or, since one square mile (mi^2) = 640 acres

164 ac/640as/mi^2 = 0.26 mi^2

- If you assume a 100 acre storage site can be cycled every 45 to 60 days or one time during the recovery period, then 720/2 = 360 ac, or four 100 acre sites would be required.
- The number of sites varies with size, distance from source, speed of reduction (mixed debris is slower than clean woody debris)
- Removal urgency
- The USACE commonly removes approximately 70% of the total volume generated with local governments, volunteer groups, and private individuals removing the remainder.

If 1.6 million cy were estimated, the USACE would estimate removing approximately 1.12 million yd^3 of debris

STEP 3 – CATEGORIES OF DEBRIS

Debris removed will consist of two broad categories: clean wood debris and construction and demolition (C&D) debris

- The clean debris will come early in the removal process as residents and local governments clear yards and rights-of-way
- The debris removal mission can be facilitated if debris is segregated as much as possible at the origin along the right-of-way, according to type
- The public should be informed regarding debris segregation as soon as possible after the storm
- Time periods should be set for removal, the first seven to 10 days clean woody debris only, then followed by other debris, with the metals segregated from non-metals
- Most common hurricane-generated debris will consist of the following:

  30 % Clean woody debris
  70% Mixed C&D

  Of the 70% Mixed C&D:

  42% burnable, but required sorting
  5% soil
  14% metals
  38 % landfilled

- Based on the above, 1,600,000 yd^3 of debris would break down as follows:

  480,000 yd^3 clean, woody debris
  1,120,000 yd^3 mixed, C&D

- Of the 1,120,000 yd^3 of mixed C&D:

  470,400 yd^3 is burnable but requires sorting
  56,000 yd^3 is soil
  156,800 yd^3 is metals
  425,600 is landfilled

- Burning will produce about 95% volume reduction
- Chipping and grinding reduce the debris volume on a 4 to 1 ratio (4 yd^3 is reduced to 1 yd^3) or by 75%
- The rate of burning is basically equal to the rate of chipping/grinding, about 200 yd^3/hr. However, chipping requires on-site storage and disposal of the chips/mulch.

APPENDIX B

PRIVATELY-OWNED ROADS IN THE CITY OF NORTH PORT

Acacia Ct.
Alani Court
Amoko Court
Anapa Court
Apopo Court
Awana Court
Bailey Palm Court
Bayhill Court
Berkley Ct.
Berry St.
Birkdale Court
Blossom St.
Bobcat Trail
Boulton Ct.
Boxwood Street
Canary Palm Way
Carlton Ct.
Center Lane
Charm Court
Chelsea Ct.
Coconut Palm Circle
Concord Drive
Cottonwood Lane
Creek Nine Drive
Dixie Lane
Dogwood Court
Dover Ct.
Eager St.
Egret Court
Elton Ct.
Fairway Court
Fairway Drive
Fairway Place
Fantasy Ct.
Filesmere Ct.
Fishtail Palm Court
Fleetwood Court
Floral Court
Grand Terrace
Greenview Court
Greenwood Drive
Haawi Court
Haele Court
Haki Court
Hauli Court
Herron Creek Blvd.
Hidden Oak Court
Hikina Drive
Hoemi Ct.
Holiday Park Blvd.
Holo Court
Honu Court
Jasmine Way
Joy Ct.
Keena Court
Kentia Palm Court
Keystone Ct.
Kilepa Court
Kilohee Court
Kimball Road
Kipa Court
Kula Ct.
Lady Palm Court
Lakeview Lane
Laurel Ct.
Lynx Run
Lynx Trail
Magnolia Drive
Mallory Ct.
Marlowe Ct.
Meade Ct.
Medinah Court
Moonlight Court
Moonlight Cove
Neighborly Court
Night Wind Terrace
Oakmont Court
Ocean Court
Osprey Circle
Palena Blvd.
Palm Court
Palmetto Way
Park Blvd.
Park Circle
Parkview Ct.
Peach Circle
Pecan Drive
Phoenix Palm Ter.
Pickwick Road
Pine Shadow Circle
Pine Shadow Court
Pine Shadow Lane
Pinehurst Court
Plantation Blvd.
Pleasant Ct.
Randwick Ct.
Regency Ct.
Rivera Court
Royal Palm Drive
Rufus Road
Rutherford Court
Sable Trace Drive
Sage Lane
Savannah Drive
Savoy Ct.
Scarlett Avenue
Seville Ct.
Silver Palm Way
Solitaire Palm Court
St. James Court
Tara Drive
Tuscola Blvd.
Vista Lane
Whispering Oaks Court
Whispering Oaks Drive
White Ibis Court
White Ibis Drive

APPENDIX C

RIGHT OF ENTRY AGREEMENT

I/We _____, the owner(s) of the property commonly identified as _____,
(street)
_____, _____,
(city/town) (county)
State of _____ do hereby grant and give feely and without coercion, the right of access and entry to said property in the County/City of _____, its agencies, contractors, and subcontractors thereof, for the purpose of removing and clearing any or all storm-generated debris of whatever nature from the above described property.

It is fully understood that this permit is not an obligation to perform debris clearance. The undersigned agrees and warrants to hold harmless the City of
_____,
State of _____, its agencies, contractors, and subcontractors, for damage of any type, whatsoever, either to the above described property or persons situated thereon and hereby release, discharge, and waive any action, either legal or equitable that might arise out of any activities on the above described property. The property owner(s) will mark any storm damaged sewer lines, water lines, and other utility lines located on the described property.

I/We (have ____, have not ____) (will_____, will not _____) received any compensation for debris removal from any other source including Small Business Administration (SBA), National Resource Conservation Service (NRCS), private insurance, individual and family grant program or any other public assistance program. I will report for this property any insurance settlements to me or my family for debris removal that has been performed at government expense. For the considerations and purposes set forth herein, I set my hand this _____ day of _____, 20__.

_____ _____
Witness Owner

_____
Owner

_____ _____
Telephone Number Address

APPENDIX D

FEDERAL AID ROADWAYS IN THE CITY OF NORTH PORT

Local Name	Mile Point +/- .005	From (Beginning of this segment)	Mile Point +/- .005	To (End of this segment)	Net Length
Appomattox Drive	0.000	Pan American Blvd.	1.560	So. Sumter Blvd.	1.560
Atwater Blvd.	0.000	Hillsborough Blvd-Co/L	2.700	E. Price Blvd.	2.700
Chamberlain Blvd.	0.000	Hillsborough Blvd-Co/L	2.800	W. Price Blvd.	2.800
Cranberry Blvd.	0.000	Hillsborough Blvd-Co/L	2.900	W. Price Blvd.	2.900
Elyton Drive	0.000	Biscayne Drive	0.335	Pan American Blvd.	0.335
N. Biscayne Blvd.	0.000	Trionfo Ave.	1.552		1.552
N. Biscayne Blvd.	1.552		1.803	Ponce De Leon Blvd.	0.251
N. River Road	0.000	SR 45/US 41	5.596	SR 93/I-75	5.596
N. Sumter Blvd.	0.000	W. Price Blvd.	2.132		2.132
N. Sumter Blvd.	2.132		2.377		0.245
N. Sumter Blvd.	2.377		3.120	Tropicaire Blvd.	0.743
North Port Blvd.	0.000	S. Biscayne Blvd.	1.482	Appomattox Drive	1.482
Ortiz Blvd.	2.223	Deleon Dr.	2.436		0.213
Ortiz Blvd.	3.440		4.245	SR 45/US 41	0.805
Ortiz Blvd.	0.000	SR 45/US 41	0.739	Trionfo Ave.	0.739
Pan American Blvd.	0.167	Biscayne Drive	0.555	SR 45/US 41	0.388
Pan American Blvd.	0.000	SR 45/US 41	1.187	Appomattox Drive	1.187
Ponce De Leon Blvd.	0.000	N. Biscayne Blvd.	1.143		1.143
Ponce De Leon Blvd.	1.143		2.302	SR 93/I-75	1.159
Price Blvd.	0.000	Toledo Blade Blvd.	0.294		0.294
Price Blvd.	0.294		6.200	Raintree Blvd.	5.906
Raintree Blvd.	0.000	Charlotte Co. Line	1.600	SR 93/I-75	1.600
Rockley Blvd.	0.000	SR 45/US 41	2.000	Center Street	2.000
S. Biscayne Blvd.	0.000	Chancellor Blvd-Co/L	1.630	SR 45/US 41	1.630
S. Salford Blvd.	0.000	SR 45/US 41	2.541	W. Price Blvd.	2.541
S. Sumter Blvd.	0.000	SR 45/US 41	2.400	W. Price Blvd.	2.400
S. River Road	0.000	SR 45/US 41	1.460		1.460
S. River Road	1.460		3.478		2.018
S. River Road	3.478		6.790	Pine Street	3.312
San Mateo Dr.	0.000	Hillsborough Blvd-Co/L	3.000	E. Price Blvd.	3.000
SR 93/I-75	0.000	Charlotte Co Line	MM 171	City Limit	MM 187
Sumter Blvd.	0.000	Chancellor Blvd.	0.383	SR 45/Us 41	0.383
Tamiami Trail	0.000	Charlotte Co Line	6.141	CR 777/River Rd	6.141
Tamiami Trail	6.141	CR 777/River Rd	9.495		3.354
Tamiami Trail	9.495		14.895	SR 45A (US 41)	5.400
Tamiami Trail	14.895	SR 45a (Us 41)	17.131	CR 772	2.236
Toledo Blade Blvd.	0.000	Hillsborough Blvd-Co/L	4.651	SR 93/I-75	4.651
Tropicaire Blvd.	0.000	Van Camp Street	3.793		3.793
Tropicaire Blvd.	3.793		6.254	Choctaw Blvd	2.461
Tuscola Blvd.	0.000	S. Biscayne Blvd	0.445	SR 45/US 41	0.445
W. Price Blvd.	0.000	N. Biscayne Blvd.	3.300	Salford Blvd.	3.300
W. Price Blvd.	0.000	Salford Blvd.	2.510	Toledo Blade Blvd.	2.510
Winchester Blvd.	0.000	Charlotte Co. Line	3.152	River Road/CR 777	3.152
Yorkshire Blvd.	0.000	Hillsborough Blvd-Co/L	2.384	SR 93/I-75	2.384

APPENDIX E

AERIAL VIEW OF THE FDEP PRE-APPROVED TEMPORARY DEBRIS STORAGE AND REDUCTION SITE

Greenland Street TDSRS

APPENDIX F

AERIAL VIEW OF THE CITY OF NORTH PORT

APPENDIX G

TEMPORARY DEBRIS STORAGE REDUCTION SITES
FDEP PRE-APPROVAL LETTER

FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION
South District Office
2295 Victoria Avenue, Suite 364
Fort Myers, Florida 33901-3881

RICK SCOTT
GOVERNOR

CARLOS LOPEZ-CANTERA
LT. GOVERNOR

RYAN E. MATTHEWS
INTERIM SECRETARY

Sent via email to: mbramble@cityofnorthport.com

Date: 5/18/2017

Monica Bramble
1100 N Chamberlain Blvd
North Port, FL 34286

RE: 2017 - Pre-Authorization for Disaster Debris Management Sites (DDMS)

Dear Monica Bramble:

This is to notify you that on 5/18/2017, we approved your request for pre-authorization of a disaster debris management site (DDMS) located in Sarasota County for 2017. Disaster debris includes hurricane/storm-generated debris and all other types of disaster debris.

The Department has evaluated your request for a DDMS at the following location:

WACS ID: 100033
Greenland Street
Golf Course Site, North Port
Lat 27:3:23.826 / Long 82:6:46.512
Waste Planned for Management: Yard Trash

In the event of a major storm event or other disaster which results in the Department issuing an Emergency Final Order (the Order) for your county, you may begin using this temporary DDMS as necessary, while also requesting issuance of a field authorization from the Department. Once activated, a DDMS is subject to the following conditions, in addition to the requirements of the Order and Florida Statute 403.7071:

1. Standing water must not be allowed to accumulate in or within 50 feet of areas used to store or process disaster debris;

1

2. The Department must be notified when the site is opened and begins accepting debris, and when the site is closed and stops accepting debris;
3. Access must be controlled to prevent unauthorized dumping and scavenging;
4. A DDMS must have spotters to correctly identify and segregate waste types for appropriate management;
5. Once the site is open, a spotter must be located in the area where waste is being deposited in order to spot and remove prohibited waste items;
6. The DDMS is limited to managing the type(s) of debris listed above; any putrescible waste received at the DDMS must be removed from the site within 48 hours; all other types of prohibited waste should be managed in accordance with the guidance document (see link below);
7. Unless otherwise approved by the Department in response to a written request from you, the DDMS must cease operation and all disaster debris must be removed from the sites on or before the expiration date of an Order that has been executed by the Department, unless it is modified or extended by further authorization.

The Department has also prepared a guidance document on the establishment, operation and closure of a DDMS for disaster debris. This guidance includes recommended practices, which you are expected to follow as much as practicable, as well as additional requirements from the Order. A copy of this guidance document is available on the DEP website http://www.dep.state.fl.us/mainpage/em/files/debris_guidance.pdf

If you have any questions or comments on this pre-authorization letter, please feel free to contact Rick Roudebush by E-mail at rick.roudebush@dep.state.fl.us or by phone at (239) 344-5653. In order to provide better service to you, the Department is using electronic documents as much as possible. Please provide your E-mail address when replying.

Sincerely,

5/18/2017

Ryan Snyder Date
South District

RS / rr

Cc: rick.roudebush@dep.state.fl.us , samuel.cannon@em.myflorida.com , enrique.hernandez@em.myflorida.com , richard.knowles@em.myflorida.com , timothy.parsons@dos.myflorida.com , rick.roudebush@dep.state.fl.us , chad.fetrow@dep.state.fl.us , jason.aldridge@dos.myflorida.com

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Appendix H

Health and Safety Supplement

Purpose

The purpose of this Health and Safety Supplement is to support the existing City safety plan and/or procedures in regards to debris removal activities. These are recommended baseline safety provisions. Ultimately, health and safety is the responsibility of the contracted parties involved in debris removal activities. This document will outline some of the general steps necessary to provide a safe work environment for debris removal and monitoring employees. In addition, this document will identify some representative work hazards and the appropriate measures to reduce risk of injury.

1.0 Dissemination of Information

The debris removal contractor and monitoring firm project managers will be provided with this document and will be expected to disseminate the information and guidelines to their respective personnel. A copy of the document should be available for consultation. In addition, elements of the document will be reviewed periodically during the project to increase worker awareness.

2.0 Compliance

The debris removal contractor and monitoring firm project managers are responsible for health and safety compliance of their respective personnel and subcontractors. Any crews or individuals that are not compliant shall be suspended from debris removal activities until the situation is remedied. Frequent offenders of safety policies and procedures will be dismissed from the project entirely.

3.0 Job Hazard Assessment

Though debris removal activities are fairly similar among events, assessing the particular hazards of each disaster is an important part of maintaining health and safety for the debris removal workers. At a minimum, the following areas of focus should be considered as part of job hazard assessment:

- **Disaster Debris** – Disasters that result in property damage typically generate large quantities of debris which must be collected and transported for disposal. The type of debris varies depending on the characteristics of the region (e.g. terrain, climate, dwelling and building types, population, etc.) and the debris-generating event (e.g. type, event strength, duration, etc.). In addition, the disaster debris produces a host of uneven surfaces, which must be negotiated.

- **Debris Removal** – Often the removal of disaster debris involves working with splintered, sharp edges of vegetative or construction material debris. Many disasters involve heavy rains or flooding. Consequently, disaster debris is damp and heavier than usual. As weights increase, so does the risk of injury.

- **Removal Equipment** – In most disasters, debris must be removed from the public Right-of-Way (ROW) to provide access for emergency vehicles and subsequent recovery efforts. Debris collection and removal requires the use of heavy equipment and power tools to trim, separate and clear disaster debris.

- **Traffic Safety** – The ROW is located primarily on publicly-maintained roads. As a result, much of the debris removal process takes place in traffic of varying levels of congestion. In addition, disasters often damage road signs, challenging safety on the road.

- **Wildlife Awareness** – Disasters are traumatic events for people as well as wildlife. Displaced animals, reptiles and insects pose a hazard to debris removal workers.

- **Debris Disposal** – After disaster debris is collected it is often transported to a temporary disposal, storage and reduction site (DMS). Upon entry to a DMS, the monitoring firm will assess the volume of disaster debris being transported. The collection vehicle will then dispose of the disaster debris and the debris will be reduced either through a grinding operation or incineration. The DMS is a common area for injury. Response and recovery workers in this environment are more likely to be exposed to falling debris, heavy construction traffic, high noise levels, dust and airborne particles from the reduction process.

- **Climate** – Debris-generating disasters often occur in areas or seasons with extreme weather conditions. The effects of temperature and humidity on physical labor must be monitored, and proper work-rest intervals must be assessed.

4.0 Administrative and Engineering Controls

The use of administrative and engineering controls can greatly reduce the threats to public health and safety in debris removal activities. Some common administrative and engineering controls used in the debris removal process are:

Collection Operations

- Conduct debris removal operations during daylight hours only.
- Limit clean-up operations to one side of the road at a time.
- Limit collection work under overhead lines.

- Inspect piles before using heavy equipment to remove them to ensure that there are no hazardous obstructions.
- Make sure that all collection vehicles have properly functioning lights, horns and back-up alarms.
- Load collection vehicles properly (not overloaded or unbalanced).
- Cover and secure loads, if necessary.
- When monitoring the collection process, stay alert in traffic and use safe driving techniques.

Power Tools

- Inspect all power tools before use.
- Do not use damaged or defective equipment.
- Use power tools for their intended purpose.
- Avoid using power tools in wet areas.

Debris Reducing Machinery (Grinders/Wood Chippers)

- Do not wear loose-fitting clothing.
- Follow the manufacturer's guidelines and safety instructions.
- Guard the feed and discharge ports.
- Do not open access doors while equipment is running.
- Always chock the trailer wheels to restrict rolling.
- Maintain safe distances.
- Never reach into operating equipment.
- Use lock out/tag out protocol when maintaining equipment.

DMS/Disposal Operations

- Use jersey barriers and cones to properly mark traffic patterns.
- Use proper flagging techniques for directing traffic.
- Monitor towers must not exit into traffic and should have hand and guard rails to reduce trips and falls.
- Monitor towers must have properly constructed access stairways with proper treads and risers and proper ascent angle (4:1 height/width ratio).
- Monitor towers must be surrounded by jersey barriers which protect the tower and monitors from being struck by inbound or outbound collection vehicles.
- Monitor towers should be located upwind from dust- and particulate generating activities.
- A water truck should spray the site daily to control airborne dust and debris.

5.0 Personal Protective Equipment

Personal Protective Equipment (PPE) is the last resort to providing a safe working environment for workers. PPE does not eliminate or even reduce hazards as

administrative and engineering controls do. PPE works to reduce the risk of injury by creating a protective barrier between the individuals and work place hazards.
Proper use of PPE includes using PPE for its intended purpose. For example, using the wrong type of respirator might expose the worker to carcinogenic particulates. Properly fitting the equipment to the user may require examination by a medical professional. PPE that does not fit well will not provide maximum protection and will decrease the likelihood of the individual continuing to use the equipment. In addition, improper use may result in serious injury or death. The proper use of the equipment is outlined in detail in the manufacturer's instructions.

The following PPE may be applicable in standard ROW, Right-of-Entry (ROE), and vegetative and construction & demolition debris removal activities:

- **Head Protection** – Equipment designed to provide protection for an individual's head against hazards such as falling objects or the possibility of striking one's head against low hanging objects. PPE used to protect the head must comply with ANSI Z89.1-1986, "American National Standard for Personnel Protection - Protective Headwear for Industrial Workers – Requirements."

- **Foot Protection** – Equipment designed to provide protection for an individual's feet and toes against hazards such as falling or rolling objects, objects that may pierce the sole or upper section of the foot, etc. PPE used to protect the feet and toes must comply with ANSI Z-41-1991, "American National Standard for Personal Protection-Protective Footwear."

- **Hand Protection** – Equipment designed to provide protection for an individual's hands against hazards such as sharp or abrasive surfaces. The proper hand protection necessary is dependent upon the situation and characteristics of the gloves. For instance, specific gloves would be used for protection against electrical hazards while the same gloves may not be appropriate in dealing with sharp or abrasive surfaces.

- **Vision/Face Protection** – Equipment designed to provide protection for an individual's eyes or face against hazards such as flying objects. PPE used to protect eyes and face must comply with ANSI Z87.1-1989, "American National Standard Practice for Occupational and Educational Eye and Face Protection." Again, the proper eye/face protection necessary is dependent upon the situation and characteristics of the equipment. For instance, eye and face protection used by individuals who are welding may not be appropriate for individuals operating a wood chipper.

- **Hearing Protection** – Equipment designed to provide protection for an individual's hearing against prolonged exposure to high noise levels. According to OSHA, the permissible level of sound is an average of 90 decibels over the course of an eight (8) hour work day. Above the sound exposure level, hearing

protection is required. PPE used to protect hearing must comply with ANSI S3.19-1974, "American National Standard Practice for Personal Protection-Hearing Protection."

- **Respiratory Protection** – Equipment designed to provide protection for an individual's respiratory system against breathing air contaminated with hazardous gases, vapors, airborne particles, etc. PPE used to the respiratory system must comply with ANSI Z88.2-1992. In addition, the use of respiratory protection requires a qualitative fit test and in some cases a pulmonary fit test by a licensed medical professional.

6.0 PPE Debris Removal Activity

PPE requirements are made based upon the results of the job hazards assessment. The following list of PPE is organized by debris removal activity and is meant to be a representative list. Specific PPE requirements vary from location to location. In general, individuals involved in the debris removal process should personally monitor water consumption to avoid dehydration and use appropriate skin protection (breathable clothes, light colors, sunscreen, etc.). Ultimately, the selection of PPE is the responsibility of the debris removal contractor and monitoring firm project managers.

Debris Collection Monitoring

The hazards of disaster debris collection monitoring include, but are not limited to: struck by vehicles, falls or trips on uneven surfaces, cuts, abrasions or punctures from vegetative or C&D sharps. PPE requirements include:

- Reflective vest;
- Foot protection (rugged shoes or boots, steel toe and shank if required); and
- Long pants.

Debris Disposal Monitoring

The hazards of disaster debris disposal monitoring include, but are not limited to: struck by or caught in/between vehicles, falls or trips on stairs or uneven surfaces, cuts, abrasions or punctures from vegetative or C&D sharps and struck by falling disaster debris. Monitor towers must be equipped with a first aid kit. PPE requirements include:

- Reflective vest;
- Foot protection (rugged shoes or boots, steel toe if required);
- Long pants; and
- Hard Hat.

Debris Removal

The hazards of disaster debris removal include, but are not limited to: struck by vehicles, falls or trips on uneven surfaces, cuts, abrasions or punctures from vegetative or C&D sharps and airborne debris. In addition, PPE requirements include:

- Reflective vest;
- Vision and hearing protection;
- Foot protection (rugged shoes or boots, steel toe and shank if required); and
- Long pants.

Debris Disposal and Reduction

The hazards of disaster debris disposal and reduction include, but are not limited to: struck by or caught in/between vehicles, falls or trips on uneven surfaces, cuts, abrasions or punctures from vegetative or C&D sharps, struck by falling disaster debris and airborne particles. PPE requirements include:

- Reflective Vest;
- Foot protection (rugged shoes or boots, steel toe if required);
- Vision and hearing protection;
- Long pants;
- Gloves; and
- Hard Hat.

Debris Cutting and Trim Work

The hazards of disaster debris cutting and trimming work include, but are not limited to: struck by or caught in/between vehicles, falls or trips on uneven surfaces, cuts, abrasions or punctures from power tools, vegetative or C&D sharps, struck by falling disaster debris and airborne particles. PPE requirements include:

- Reflective Vest;
- Hand and Foot protection (rugged shoes or boots, steel toe if required);
- Vision and hearing protection
- Long pants; and
- Hard Hat

For additional information regarding health and safety requirements, contact OSHA.

Health and Safety Contact Information	
Occupational Safety & Health Administration	800-321-6742
City Contact	(941) 429-7130

Appendix I

FEMA Letter of Plan Approval

U.S. Department of Homeland Security
Region IV
3003 Chamblee-Tucker Road
Atlanta, GA 30341

FEMA

June 30, 2014

Mr. Bryan W. Koon, Director
Florida Division of Emergency Management
2555 Shumard Oak Boulevard
Tallahassee, Florida 32399-2100

Attention: Steve Hyatt

Reference: Public Assistance Pilot Program
Debris Management Plan Review
City of North Port

Dear Mr. Koon:

This letter responds to the Florida Division of Emergency Management request dated April 22, 2014, for the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) to accept the City of North Port's Debris Management Plan (Plan) for participation in the Public Assistance (PA) Alternative Procedures Pilot Program for Debris Removal. This pilot program allows a one-time two (2) percent Federal cost share increase for debris removal operations performed within 90 days from the start of the incident period of a major disaster or emergency declaration.

FEMA Region IV has determined that the Plan:

☒ **Contains the basic planning elements of a Debris Management Plan along with at least one prequalified debris and wreckage removal contractor (see enclosed Debris Management Plan Checklist). Therefore, FEMA has determined the Plan is acceptable. Accordingly, the City of North Port may receive a one-time two (2) percent Federal cost share increase as part of the PA Alternative Procedures Pilot Program for Debris Removal. Your office should notify FEMA when the City of North Port wishes to apply the incentive to its debris removal work.**

☐ Does not contain the basic planning elements as noted in the enclosed Debris Management Plan Checklist. The City of North Port may revise its Plan and resubmit it to FEMA, through your office, for reconsideration.

www.fema.gov

Once the Plan is accepted, it does not mean that FEMA is approving any operational component of the plan nor does it mean that the Federal government will fund work conducted under any aspect of the Plan. Eligibility of costs for debris removal and management in a declared major disaster or emergency will be determined based on established PA Program authorities, regulations, policies and guidance. Subgrantees must comply with Federal procurement requirements (i.e., competitive bidding), as outlined in 44 CFR §13.36 in the procurement of debris removal services.

If you have questions or need additional information, please contact Mr. Jesse F. Munoz, CEM, Director, Recovery Division, at (770) 220-5300.

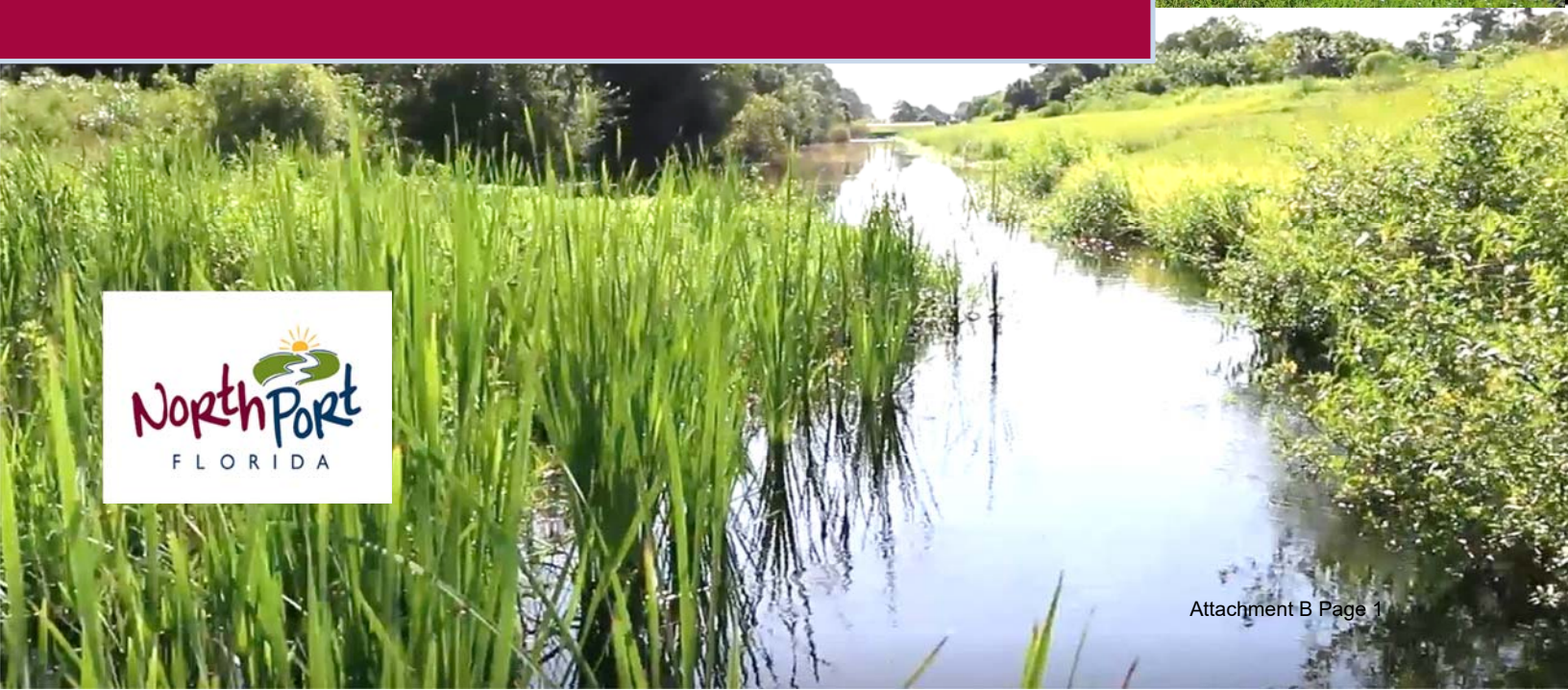
Sincerely,

Andrew Velasquez III
Acting Regional Administrator

DEPARTMENT OF PUBLIC WORKS

10-YEAR STORMWATER MANAGEMENT PLAN

FISCAL YEARS 2020-2030



NorthPort FLORIDA

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D. Grid System Map 11-1
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1 | BACKGROUND

The Stormwater Management Plan (SMP) is North Port's blueprint for an effective drainage system.

The City of North Port was incorporated in 1959 with only 23 residents and has grown over the last 60 years to become a vibrant community with a population of more than 70,000. North Port has an incorporated area of approximately 104 square miles and is located in southeast Sarasota County.

North Port started as a planned community in the 1960's with an extensive stormwater infrastructure network constructed by General Development Corporation (GDC) consisting of 132 miles of manmade retention ditches, 1,613 miles of roadside swales and 79.1 miles of major wet waterways with 64 water control structures (WCS) and stormwater conveyance piping to support its residential, commercial and light industrial developments (See map, Attachment A).

This 10-year Stormwater Management Plan focuses on the maintenance, rehabilitation and replacement of stormwater infrastructure, with budget estimates on projects within a five-year window and plans for major construction projects in years five through ten.

The infrastructure components were constructed in the late 1960's to 1970's and are all about 50 to 60 years old, nearing the end of their useful life.

The WCS are either constructed as sheet metal weirs with horizontal and vertical metal I-beam supports, or drop structures designed with corrugated metal drop pipes. The metal components in the WCS have corroded over time. Of the 64 WCS, 28 are gated structures and several of these have inoperable sheet metal gates. The GDC-installed stormwater conveyance piping is mostly corrugated metal pipes and many are severely corroded and undersized. Collapsed, corroded metal pipes under roadways have resulted in road closures and extensive erosion.

These WCS and pipe failures have been increasing in frequency. Over time, silt has accumulated in the swale, retention ditch, waterway and creek systems which can cause back up of flood waters. The recently completed Federal Emergency Management Agency (FEMA) flood insurance rate maps showed a significant increase in the 100-year special flood hazard area.

2 | DRAINAGE SYSTEM

The City of North Port's drainage system protects property, preserves natural resources and improves the quality of surface water runoff.

The City of North Port's drainage system provides water quality treatment for stormwater runoff. The system consists of swales, outfalls, retention ditches, retention ponds, waterways and the Myakkahatchee Creek.

Figure 2-0 shows how the drainage system works by conveying stormwater from individual parcels into swales (**1**). Most of the swales in the City are open-swales with a few (mainly along major roads and in private communities) having closed, or curb-and-gutter swales.

From the swales, stormwater flows into outfalls (**2**) and then into retention ditches (**3**). In a few areas, the stormwater flows directly into retention ditches (R-ditches). From the R-ditches, stormwater flows into the waterways (**4**), and then into the Myakkahatchee Creek.

The drainage system is designed to hold water and slowly convey it through the different segments. The swales, outfalls, retention ditches and waterways provide needed holding time for pollutants to get filtered out of the water. In the rainy season, May-October, stormwater is generally always in each drainage system component.

In addition to stormwater, the City's drainage system is affected by groundwater levels and high tides.

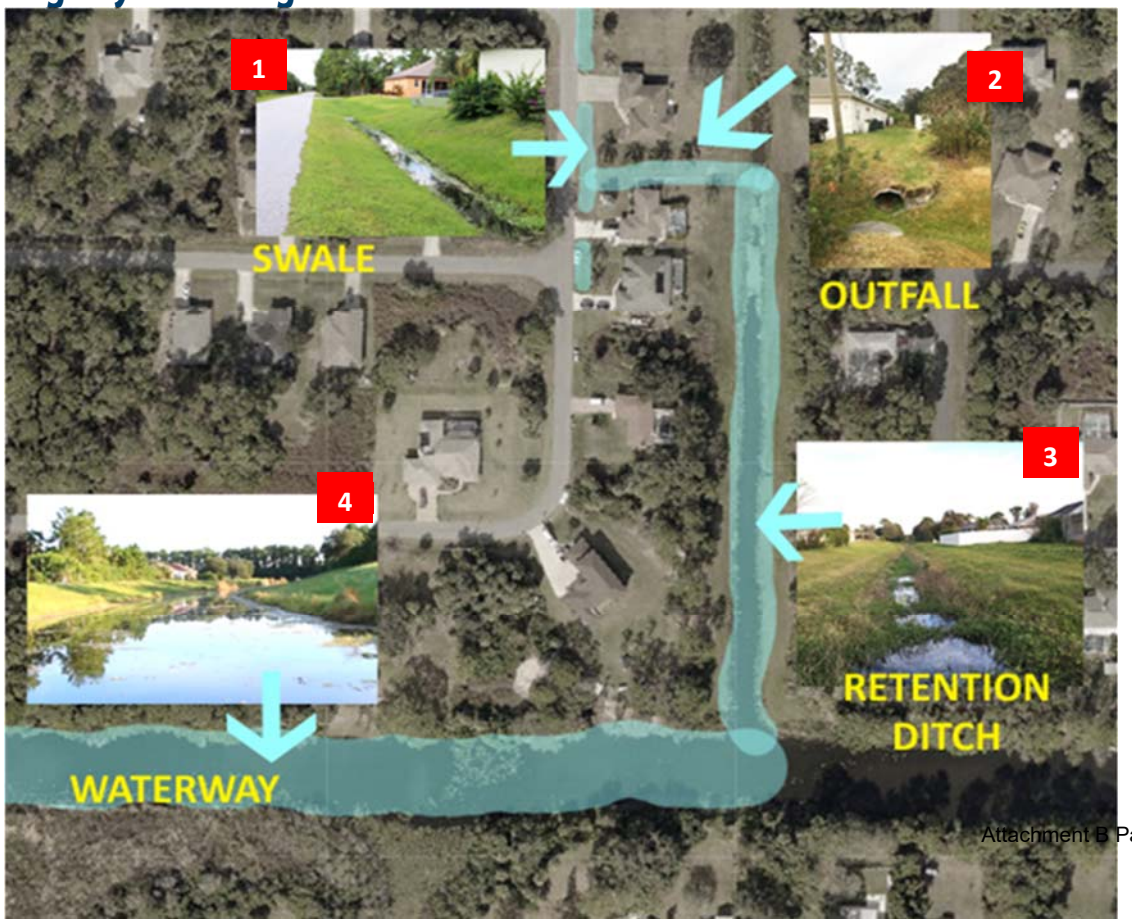
1,600+ Miles of Swales

132 Miles of R-ditches

79+ Miles of Waterways

Figure 2-0

Drainage System Diagram

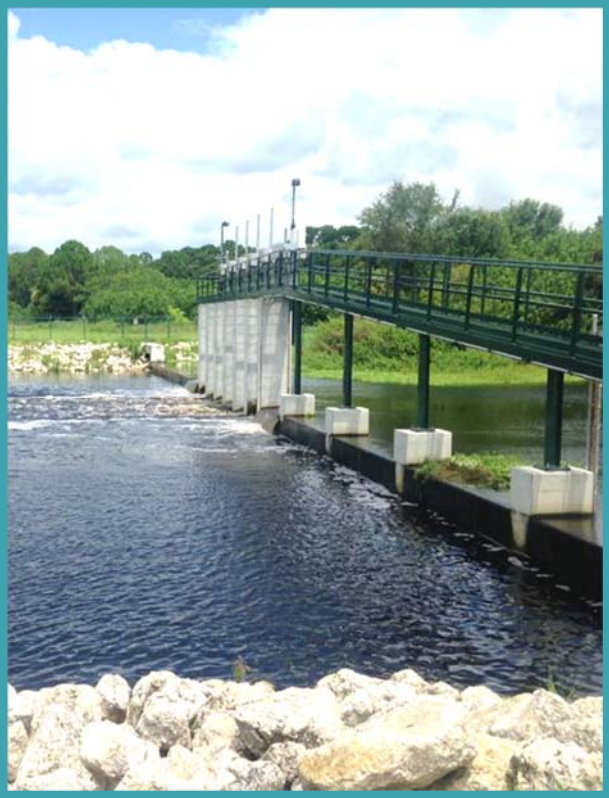


3 | WATER CONTROL STRUCTURES (WCS)

As major drainage system components, water control structures must be maintained.

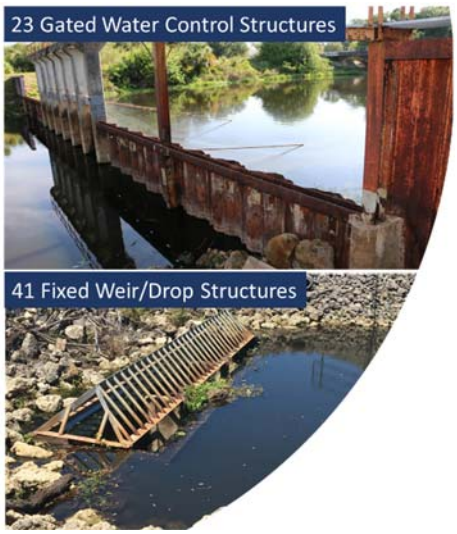
Develop and implement flood reduction and drainage improvement programs while continuing to balance the supply of potable water.

- City of North Port Strategic Plan Infrastructure Objective



The City's waterway system is designed to accommodate several needs: a source for potable water supply, water quality treatment, and stormwater conveyance and attenuation. The waterways form a grid pattern and are interconnected with each other and with the Myakkahatchee Creek.

There are 64 water control structures of which 23 are gated water control structures, five are gated drop structures, 28 are fixed weir (FW) structures, and eight are drop structures.



Water Level Control

The control elevations of these structures are designed so that water is retained in the waterways in a step-down-elevation-system configuration; meaning the water levels in the waterway segments between structures progressively decrease in elevation from north to south and from east to west (Figure 3-0).

This system configuration allows both retention of stormwater runoff for water quality treatment and storage for potable water use. The structures at the southern end of the system also act as a barrier between the tidal water bodies and the fresh water creek system. This allows the city to maintain a fresh water potable supply.

Figure 3-0
Water Control Structures and Waterway Elevations

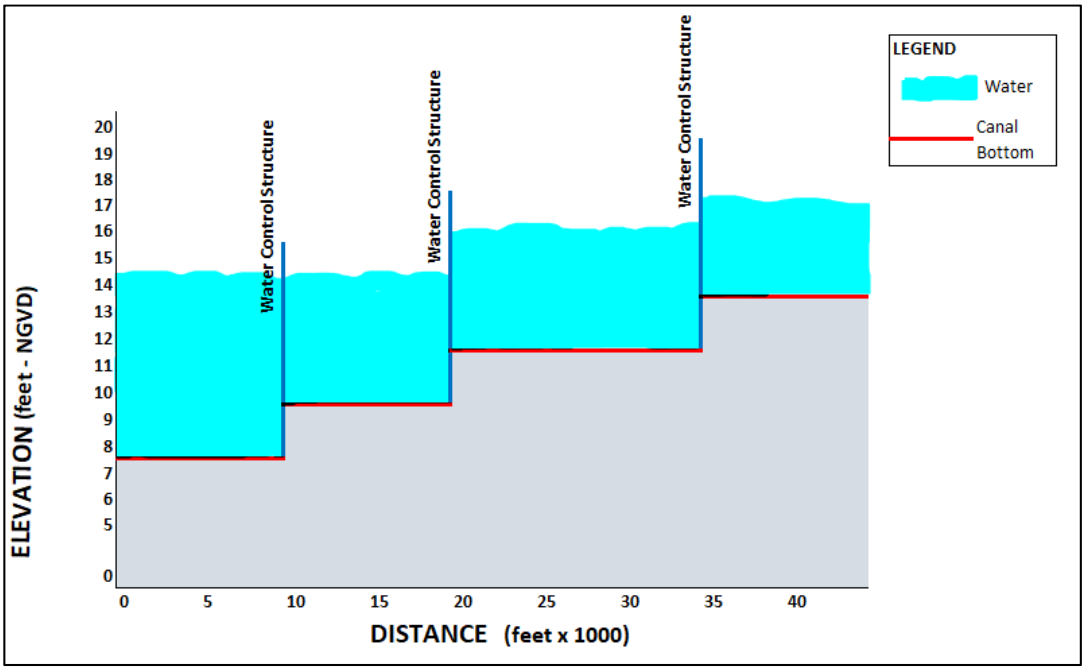
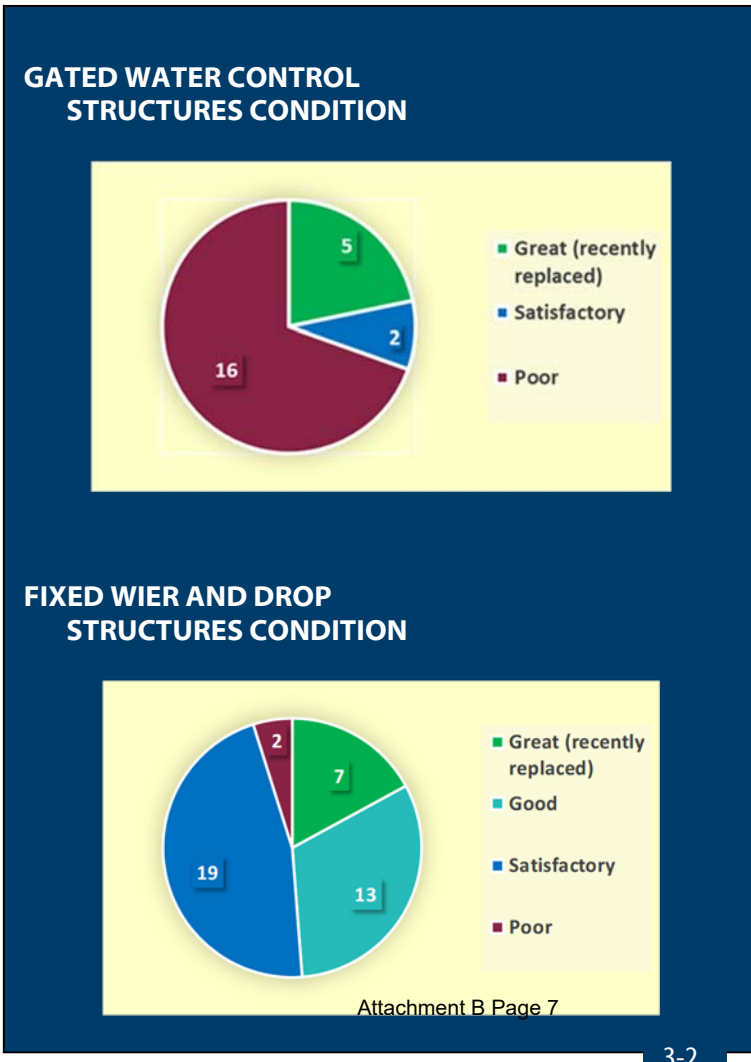


Figure 3-1
Water Control Structure Conditions



Condition

Age, function and structural integrity conditions vary between WCS's and many are in dire need of rehabilitation or complete replacement (Figure 3-1). Delays in the rehabilitation/replacement schedule increase the possibility and risk for a potential massive failure of the deteriorated structures; especially during a severe storm event. Water control structure failures could trigger other catastrophic mishaps such as downstream flooding and washout of roads and bridges.

WCS Condition Assessment

In 2010-2012, an engineering consultant was retained to inspect and evaluate 42 of the City's WCS's to determine structural integrity and functional significance. Of these structures, seven were found to be in overall good condition and require regular inspections and preventive maintenance. Of the remaining 35, 17 structures required complete rehabilitation, replacement or removal and 18 required some repair and maintenance.

The consultant provided a list of WCS priorities for repair or replacement along with cost estimates. Annually, staff updates the list, noting structures that have been repaired or replaced, revising priorities based on current inspection data, and formulating more accurate repair and replacement costs (Attachment B).

WCS Replacement Plan

The priority for the replacement of the major WCS's is updated annually (Figure 3-2). Since 2006, 11 major WCS's have been completely replaced or rehabilitated, one is in construction, and one is being designed (Attachment C). The current Public Works plan is to annually design and permit one WCS replacement while constructing a previously designed and permitted WCS.

The rehabilitation of WCS 106 on the Cocoplum Waterway just west of North Port Boulevard is underway with completion expected in Spring of 2020. Design for WCS 108 on the Cocoplum Waterway west of Collingswood Boulevard is anticipated to be completed in Fall of 2020 and will be followed by construction budgeted for fiscal year 2021.

Beyond the 5-year budget projections shown, WCS 124, WCS 127, WCS 138, WCS 118, WCS 121 and WCS 125, are anticipated to be constructed in years 2025, 2026, 2027, 2028, 2029 and 2030 respectively. Budget amounts will be proposed when the structure is within the 5-year replacement window.

WCS Repair Plan

Preventative maintenance and minor repairs prolong the life of the WCS's and keep them in good working order. Minor repairs include repair or replacement of: gates, gate actuators, gate stems, gate tracks, tie backs, catwalk deck/railing, vertical and horizontal I-beams, weir sheet metal erosion, and adjacent bank erosion.

The WCS's that have not been replaced are at a vulnerable age when unforeseen component failures can occur. Due to the significant expense and time needed to design, permit and construct replacement WCS's, significant repairs may need to be done on a WCS that is scheduled to be replaced in the near future. Generally, components such as gates, actuators and stems that are in good condition can be salvaged and become spares for use in other failing WCS's.

Public Works Operations staff perform annual inspection of all structures and prioritize major and minor WCS repairs or replacements (Attachment B). Figure 3-3 reflects the fiscal year 2020 repair budget for WCS's.

Figure 3-2

5-year WCS Replacement Budget Plan

	2020	2021	2022	2023	2024
Design	WCS 108	WCS 113	WCS 114	FW 157	WCS 124
Costs	$199,000	$308,000	$203,000	$234,000	$241,000
Construction	WCS 106	WCS 108	WCS 113	WCS 114	FW 157
Costs	$2,500,000	$2,480,000	$3,850,000	$2,540,000	$2,920,000

	WCS 106	WCS 108	WCS 113	WCS 114	FW 157
Total Costs	2,668,000	$2,679,000	$4,158,000	$2,743,000	$3,154,000

WCS 106 Is currently being rebuilt

Figure 3-3

Fiscal Year 2020 WCS Repair Budget Plan

Structure	Description	Budget Estimate
WCS 108	Repair holes in sheet piling	$10,000
WCS 113	Repair holes in sheet piling, repair gate stem attachment points, evaluate for gate replacement	$15, 000-$30,000
WCS 118	Replace #1 gate and track, evaluate for gate replacement	$15,000-$20,000
WCS 124	Replace #1 gate and track, evaluate for gate replacement	$15,000-$20,000
WCS 125	Replace actuator	$20,000

Water Control Structure Locations

WCS 106	North Port Blvd and Cocoplum Waterway
WCS 108	Collingswood Blvd and Cocoplum Waterway
WCS 113	Snover Waterway and Myakkahatchee Creek
WCS 114	N Salford Blvd and Snover Waterway

WCS 118	Abbotsford St and Blueridge Waterway
WCS 124	Parade Terrace and Lagoon Waterway
WCS 125	Parkmount Terrace and Lagoon Waterway
FW 157	Panacea Blvd and Snover Waterway

4 | DRAINAGE PROGRAM

A proactive maintenance program has reduced emergency drainage repairs and their corresponding high costs

As mentioned, a considerable portion of the City's stormwater infrastructure was constructed in the late 1960's to 1970's and is in need of replacement. Much of the work done in the past has been reactive, many times due to collapsed pipes or frequent complaints. In fiscal year 2018, Public Works began taking a comprehensive, vigorous proactive approach to scheduling and budgeting for the maintenance, rehabilitation and replacement of the stormwater system. Outlined below are the drainage program elements.

Neighborhood Rehabilitation by Grid

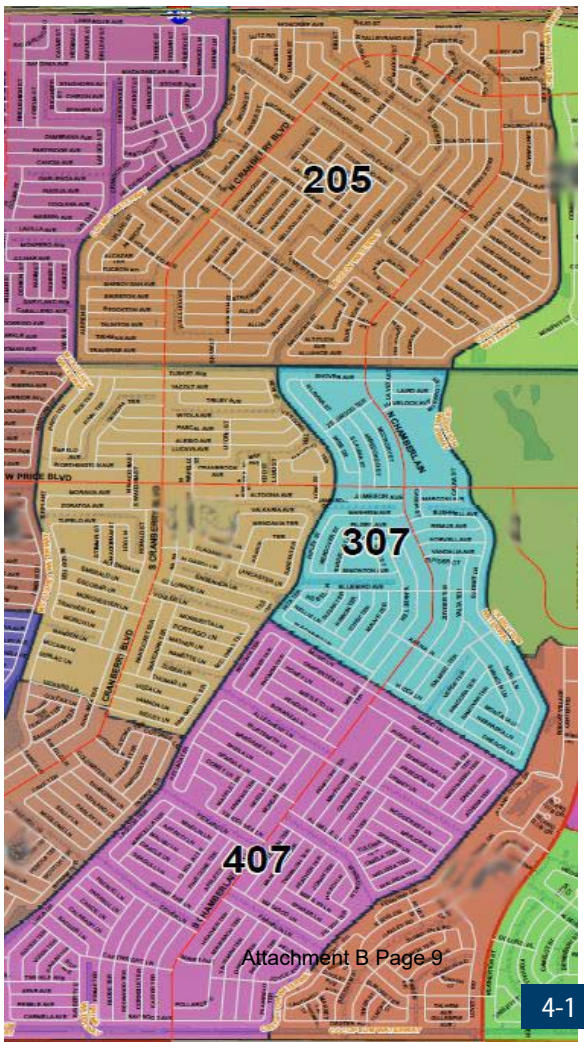
With many different components making up the stormwater drainage system, it is difficult to effectively maintain the system by continually operating in a reactive mode. Using a holistic approach to rehabilitate a neighborhood system of swales, road crossing pipes, outfalls and retention ditches better utilizes resources.

The Neighborhood Rehabilitation by Grid System prioritizes neighborhood stormwater systems improvements by: known flooding, impact on other infrastructure (roads, waterways, etc.), present condition of drainage system, residential density, and impact to community facilities (schools, parks, etc.). The grid system map can be seen in Attachment D.

Grid 205, one of the largest grids in the City, was completed in 2019. Grid 407 rehabilitation, which started in fiscal year 2019, is on schedule to be completed in fiscal year 2020. Grid 307 is scheduled to be rehabilitated in fiscal year 2020. The fiscal year 2020 budget of $469,500 covers pipes, catch basins, asphalt, rip rap, concrete, sod, hydroseed and surveying.

Figure 4-0

Map of Grids 205, 307 and 407



The Drainage Program is divided into key elements of the City's stormwater infrastructure:

- Neighborhood Rehabilitation by Grid
- Road Crossing Pipe Replacement
- Outfall Replacement
- Retention Ditch Rehabilitation
- Targeted Projects

The 2020 Projects, described in detail on the following pages, were prioritized over other stormwater needs by factors such as known flooding, impact on other infrastructure, present condition of drainage system, residential density and impact to community facilities.

Corrugated steel pipe has an average lifespan of 10-35 years before perforation of the metal occurs.

Road Crossing Pipe Replacement

Road crossing pipes, also called culverts, convey water under the roadway between swales.

Over the past five years, Public Works has replaced over 1,200 corrugated metal road crossing pipes through the following planned and unplanned activities: The Road Bond Project, the Road Rehabilitation Program, annual Drainage Improvement Program and emergency road crossing pipe failures.

There are an estimated 1,338 corrugated metal pipes (CMP's) remaining in the road crossing drainage system. Of these, 1,140 have been divided into the following categories:

- 430 CMPs inspected during the Road Bond Project were estimated to have a life span of 7 years remaining and were not replaced. These road crossing pipes will be replaced through the annual road rehabilitation program as roads are repaved.
- 680 CMPs are in the undeveloped east side area of North Port and pose no significant flood threat to North Port citizens. These will be inspected and added to future road and drainage projects.
- 30 CMPs are estimated to be replaced during the fiscal year 2020 Road Rehabilitation project.

The remaining 198 corrugated metal pipes will be inspected during fiscal years 2020 and 2021. There are a few pipes larger than 36" that will need to be replaced by a contractor. The rest are 36" and smaller and replacement can be completed in-house with material costs estimated at $550,000. This work is scheduled and budgeted to be completed over ten (10) years. The budget for fiscal year 2020 is $114,200.

Figure 4-1

Fiscal Year 2020 Retention Ditch Rehabilitation Schedule

R-DITCH ID	HYDROSEEDING COSTS
61	$ 3,590
62	$ 3,910
63	$ 4,630
66	$ 3,140

Outfall Replacement/Lining

Outfalls are located in the easement between two property parcels and connect neighborhood swale systems to retention ditches or waterways.

There are an estimated 1,200 outfalls throughout the City. If the parcels on each side of the outfall are developed, the outfall is most likely piped. Parcels that are undeveloped generally have open outfalls.

There are an estimated 300 outfalls throughout the City which are piped, with about 17% having corrugated metal pipes. As the pipes age and deteriorate, they need to be replaced. There are a few instances that due to the pipe location and proximity to homes, outbuildings and/or large trees, the metal pipe, if not too deteriorated, would be lined. In this process, a resin liner is inserted into the existing pipe and cured, creating a pipe-within-a-pipe. This extends the useful life of the pipe without excavation.

Inventorying of the outfall pipes will continue in fiscal year 2020. As part of the Drainage Project, four metal outfall pipes are scheduled to be replaced in fiscal year 2020 with a budget of $126,000, and seven pipes are expected to be lined with a budget of $100,000.

Also in fiscal year 2020, Public Works will continue assessing and identifying the outfall pipes needing pipes replaced or added. This information will be used to adequately budget for future rehabilitation.

Retention Ditch Rehabilitation

Stormwater flows from neighborhood swales through the outfalls, then many times into retention ditches prior to flowing into the City's waterway system.

Retention ditches, commonly called R-ditches, slow and store water after rain events and provide water quality benefits by reducing pollutants and sediment.

After time, retention ditches can accumulate sediment and develop slope erosion and must be rehabilitated to ensure they are working as designed. This work, completed by in-house staff, includes digging of retention ditches to the design specifications and reshaping the banks to aid in access and maintenance.

For the last couple of years, maintenance work on the main retention ditch bordering the north side of the City from the Myakkahatchee Creek to Price Boulevard, R-36, has been proceeding. This work will continue through fiscal year 2020. The retention ditches scheduled for rehabilitation in fiscal year 2020 and the costs of hydroseeding are reflected in Figure 4-1.

2019 Deming Avenue Project before and after

Tractor Crossing Pipe Replacement/ Installation

Outfalls convey and discharge stormwater into retention ditches or waterways. When the outfall is open (not piped), it is difficult to maintain the retention ditch or waterway as the mowing tractor must dip into and out of the outfall.

To make retention ditch and waterway maintenance safer and more efficient, a tractor crossing pipe is installed at the location where the tractor crosses the outfall. It is estimated there are 380 tractor crossing pipes throughout the City, with 70% of them having corrugated metal pipes. Over time, these metal pipes age and deteriorate and are in need of replacement.

In fiscal year 2020, Public Works will continue inventorying the tractor crossing pipes and assessing their condition to adequately budget for future replacement. Five metal tractor crossing pipes are scheduled to be replaced in fiscal year 2020 with a budget of $23,200.

Focused Projects

Throughout the City, there are sections of the stormwater system that are failing. These sections, outside of the Grid Project, are evaluated and prioritized for budgeting and scheduled rehabilitation. Three areas: the seawall at Pan American Boulevard and Jeffrey Avenue; Talbot Street outfall; and piping at Talbrook Road and Mayland Street, have been identified for rehabilitation in fiscal year 2020 and budgeted at $798,800.

Figure 4-2

Fiscal Year 2020 Focused Projects with Budget

FY2020 PROJECTS	BUDGET
PanAm/Jeffrey Seawall	$353,200
Talbot Street Outfall	$60,700
Talbrook/Mayland Piping	$384,900

5 | RESPONSIVE IMPROVEMENTS

With a significant portion of the stormwater infrastructure more than 60 years old, deterioration to the point of failure will occur.

While a comprehensive stormwater management program plans for maintenance, repair and replacement, situations arise where action outside of the scheduled program is needed. These include pipe failures, swale regrading, waterway erosion and such. Public Works will continue to evaluate, prioritize and budget for each situation requiring improvement.

Culvert failures on Orlando Boulevard, Richbriar Drive and Sawyer Circle
Budget: $317,350

Sardinia full front piping and sidewalk project
Budget: $70,265.40

Kenwood Drive culvert failure repair
Budget: $94,867

6 | LEVEL OF SERVICE AND MAINTENANCE

Frequently of stormwater maintenance services is set in the Level of Service and reflected in the budget.

Enhancing the System

When setting a level of service, a combination of parameters is taken into consideration: system needs, budget constraints, customer desires, and environmental impacts.

Having an open swale type of stormwater system means that after a rain event, stormwater will be stored in the City's swales, outfalls, retention ditches and waterways. Stormwater will slowly migrate through the system to maximize water treatment by filtration. Thus, controlling the movement of stormwater, as opposed to absence of stormwater in swales, is the target service.

Stormwater system maintenance is pivotal and has been set to optimize resources. Recently, assessment fee charges were re-aligned to the benefit received by properties throughout the City.

Right-of-Way Mowing Services

Mowing of right-of-way swales, outfalls, retention ditches and ponds is necessary for improved stormwater drainage flow capabilities. The mowing is completed not for aesthetic purposes, but to maintain the hydraulic function of the stormwater drainage network. A suitable level of service that corresponds to annual assessment fees has been set and is reflected below in Figure 6-0.

Aquatic Spraying Services

Spraying aquatic weeds is necessary to maintain water quality, reduce impediment of water flow, and limit the deposition of sediment. Public Works utilizes only federally-approved herbicides and the City of North Port holds a permit for their use issued by Florida Fish and Wildlife Conservation Commission. Staff carefully monitors for effectiveness of spraying, and only conducts spraying under calm weather conditions. Record keeping of herbicide use and application is documented.

Swale and Ditch Capacity and Flow Improvements

At a minimum, swales and retention ditches are inspected for elevation changes and impediments every eight years and rehabilitated as necessary. In addition, swales in the Grid Project are rehabilitated and culverts cleaned out, as are swales identified by residents as possible concerns and verified by staff as needing restoration.

Figure 6-0

Drainage Level of Service

SERVICE DELIVERY	LEVEL OF SERVICE
RIGHT-OF-WAY MOWING	
Arterial and collector roads	8 times per year
Local roads	6 times per year
Retention ponds and ditches	6 times per year
AQUATIC SPRAYING OF WATERWAYS	3 times per year
SWALE AND DITCH CAPACITY AND FLOW IMPROVEMENTS	Every 8 years
CANAL CAPACITY AND FLOW IMPROVEMENTS	Every 15 years

Canal Capacity and Flow Improvements

Clearing vegetative overgrowth is necessary for proper stormwater conveyance. Canal maintenance dredging is conducted to restore original design depths. Outside of the set service level, issues impeding canal function are addressed as soon as possible.

Lake, Pond and Creek Maintenance

Another essential part of the stormwater management plan is maintenance of the City's lakes, ponds and creek. This includes clearing dense vegetation for proper water flow, removal of debris such as rocks, trees and garbage that has fallen into the waterways, maintaining clear access, and removing sand bars.

Drainage System Inspections

Routine inspections of all City stormwater system components are conducted and any issues resolved. In addition, locations prone to localized flooding and areas where debris, dumped items, and vandalism have been known to create problems are inspected frequently.

Clearing obstructions in the Myakkahatchee Creek is essential to proper water flow which reduces stagnation and the proliferation of algae.

7 | FLOOD REDUCTION STUDIES

Reducing the frequency and severity of flooding in North Port is a high priority and studying potential system solutions helps plan for success.

Big Slough Flood Reduction Study

Public Works has been working with a consultant to complete the Big Slough Flood Reduction Study, cooperatively funded with the Southwest Florida Water Management District (SWFWMD). The consultant conducted stormwater studies and evaluated feasible, cost effective solutions to achieve the tasks listed below. The project is in the permitting stage now and anticipated to be complete in fiscal year 2020.

Reduce Flooding in the Following Localized Areas (study cooperatively funded with SWFWMD):

- Area near the Myakkahatchee Creek just north and south of interstate I-75 (Attachment E). Consultant's work indicated there are no simple local solutions to reduce the flooding in this area and recommends regional solutions.
- Jockey Club area west of the Myakkahatchee Creek (Attachment E). Since the City has resolved flooding issues within the Jockey Club area through pipe replacement and installation of plastic swale liners, the consultant was asked to redirect efforts to the Dorothy Avenue/ Bullard Street area which had flooding as recent as the 2017 Hurricane Irma. Consultant proposed improvements to the conveyance retention ditch system in this area.

Application for Conceptual Approval from SWFWMD of a Statewide Environmental Resource Permit for the Big Slough Flood Reduction Plan has been submitted.

Reduce Regional Flooding (study funded by the City):

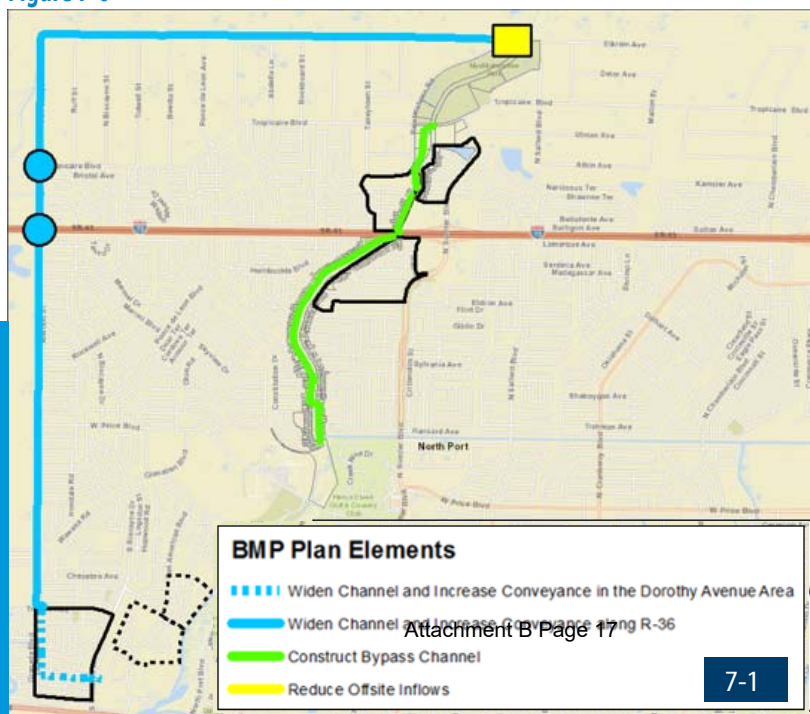
After several flood reduction alternatives were evaluated and presented to the City Commission, the following recommendations were approved as phased components:

- Improve existing retention ditch/conveyance system and upsize road crossing culverts in the Dorothy Avenue area.
- Increase conveyance capacity through widening and upsizing pipe culverts in the R-36 retention ditch/conveyance system that runs along the northern and western boundary of the City.
- Restrict/reduce high flow into the Myakkahatchee Creek near the north City boundary. (Subsequent feedback from Sarasota County and SWFWMD has deemed this option not viable.)
- Construct a new bypass canal parallel to the Myakkahatchee Creek within a portion of the City's Tier I lots that are located north of Price Boulevard. This will not proceed without conducting extensive historical and archaeological environmental research.

Costs

Study costs for the localized areas were covered 50% by a SWFWMD grant. Evaluating reduced regional flooding reduction was funded by the City. Implementation costs will be budgeted in future years.

Figure 7-0



Attachments

Attachment A

City of North Port Stormwater Drainage System

Type, Structure_Number, Grid											
Ditch Block, DB-301, C5	Ditch Block, DB-310, G6	Drop Structure Pipe, DS-504, C8	Fixed Weir, FW-151 , F4	Fixed Weir, FW-161 , J4	Gated Drop Structure, GDS-116, H4	Water Control Structure, WCS-110 , H8	Water Control Structure, WCS-127 , E7
Ditch Block, DB-302, C5	Ditch Block, DB-311, E3	Fixed Weir, FW-120 , C4	Fixed Weir, FW-152 , F4	Fixed Weir, FW-180 , G8	Gated Drop Structure, GDS-141, I5	Water Control Structure, WCS-111 , I7	Water Control Structure, WCS-128 , E6
Ditch Block, DB-303, C3	Ditch Block, DB-312, A6	Fixed Weir, FW-122 , D5	Fixed Weir, FW-153 , F4	Fixed Weir, FW-181 , G8	Gated Drop Structure, GDS-142, H5	Water Control Structure, WCS-113 , C4	Water Control Structure, WCS-130 , F8
Ditch Block, DB-304, C3	Drop Structure Box Structure, DS-119, C5	Fixed Weir, FW-123 , D4	Fixed Weir, FW-154 , G4	Fixed Weir, FW-182 , H8	Gated Drop Structure, GDS-143, I6	Water Control Structure, WCS-114 , D4	Water Control Structure, WCS-131 , F7
Ditch Block, DB-305, E2	Drop Structure Box Structure, DS-126, E5	Fixed Weir, FW-129 , E5	Fixed Weir, FW-155 , G4	Fixed Weir, FW-183 , H8	Gated Drop Structure, GDS-512, F8	Water Control Structure, WCS-115 , E4	Water Control Structure, WCS-137 , F7
Ditch Block, DB-306, E1	Drop Structure Box Structure, DS-508, E8	Fixed Weir , FW-132, F6	Fixed Weir, FW-156 , G4	Fixed Weir, FW-185 , I8	Water Control Structure, WCS-101 , B7	Water Control Structure, WCS-117 , C7	Water Control Structure, WCS-138 , G6
Ditch Block, DB-307, E2	Drop Structure Box Structure, DS-510, F8	Fixed Weir, FW-133, G5	Fixed Weir, FW-157 , H4	Fixed Weir, FW-186 , J8	Water Control Structure, WCS-106 , B7	Water Control Structure, WCS-118 , C5	Water Control Structure, WCS-140 , H6
Ditch Block, DB-308, E1	Drop Structure Pipe, DS-136, F5	Fixed Weir, FW-135 , F5	Fixed Weir, FW-158 , H4	Fixed Weir, FW-506 , E8	Water Control Structure, WCS-107 , D8	Water Control Structure, WCS-121 , D6	Water Control Structure, WCS-162, A2
Ditch Block, DB-309, F8	Drop Structure Pipe, DS-501, B8	Fixed Weir, FW-136 , F5	Fixed Weir, FW-159 , I4	Fixed Weir, FW-507 , E8	Water Control Structure, WCS-108 , E8	Water Control Structure, WCS-124 , D7	Private Gated Drop STructure , ST-GDS-1, B7
	Drop Structure Pipe, DS-503, C8	Fixed Weir, FW-139, G5	Fixed Weir, FW-160 , J4	Gated Drop Structure, GDS-112, I6	Water Control Structure, WCS-109 , G8	Water Control Structure, WCS-125 , D6	Private Gated Drop Structure, ST-GDS-2, B7
							Private Gated Drop Structure, ST-GDS-3, C7

Date: 9/24/2018

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Prepared by
Engineering Division
Public Works
City of North Port

Disclaimer: This map is for reference purposes only and is not to be construed as a legal document. Any reliance on the information contained herein is at the user's risk. The City of North Port and its agents assume no responsibility for any use of the information contained herein or any loss resulting there from.

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2019 Water Control Structures NPDES Inspection

Metal, Gates, Pipes and Risers: 1 = No Corrosion, 2 = Surface Rust, 3 = Some Rot, 4 = Major Corrosion Overall: 1 = Good, 2 = Fair, 3 = Poor, 4 = Bad
Concrete: 1 = Good, 2 = Few chips/cracks, 3 = Some Spalling, 4 = Major Chips/Cracks Deterioration Bank Condition: 1 = Good, 2 = Fair, 3 = Poor, 4 = Bad
Structure Location: Replaced or Rehabilitated = 0, Structure located in undeveloped areas (1), east of Toledo Blade (2), west of Toledo Blade (3), developed areas Snover & Cocoplum (4)

Structure #	Waterway	Date	Metal			Gates				Pipes	Risers	Concrete		Bank Condition	Overall	Structure Location	Replacement Priority Score	Other Observations in 2019	Previous Repairs Completed	Major Replacement CIP Project		Minor Repairs Needed by Contractor		In-House Work Needed				Inspector
			Sheet Pilings	I - Beams	Cat walk	# of Gates	Gate	Hard ware	Operational (yes, no, list#)			Columns	Cap							Description	Priority	Description	Priority	Description	Priority	Work Order/or Invoice No.	Completion Date	
WCS 101	Myakkahatchee	1/30/19	1	1	1	6	1	1	All Yes			1	1	1	1	0	**0**		5/9/14 - Completed replacement of existing structure with new structure, two additional gates for a total of 6 gates, gate automation and telemetry 9/5/18 - Repaired telemetry malfunction, replace part no, NL120 CSI Ethernet Interface			Gate 2 leaking oil. Sand building up on high side, 101 backside.	High					John K and Ken Smith
WCS 106	Cocoplum	1/30/19	1	1	1	6	1	1	All Yes			4	4	2	4	4	**16**	Gate 6 opens up half way and jams into track. Same way as putting it down, gate goes up crooked both ways.	Replacement under construction April 2019 to 2020									John K and Ken Smith
WCS 107	Cocoplum	1/30/19	1	1	1	6	1	1	All Yes			1	1	1	1	0	**0**		Jan 2011 - Retrofitted with concrete weir wall, 6 new stainless steel gates, concrete spillway and large revetment.									John K and Ken Smith
WCS 108	Cocoplum	1/30/19	3.5	2.5	1	6	1.5	1.5	All Yes			4		2.5	3.5	3.5	**12.25**		4/2011 - Replaced 3 Gates Nos.1, 2 and 5 9/7/12 - Replace corroded horizontal I-beams and corroded sections of vertical I-beams, and repair holes in sheet metal pile. 12/17/15 - Replaced 3 more Gates (including the existing electric gate). Use an existing actuator (from the old WCS 101). Needed two new left hand threaded rods, fabricate 3 new gates #3, 4, and 6 and tracks, minor concrete and sheet pile repair. 1/30/19 PO #047665 - Fixed catwalk grate rusted through in one location.	Design FY2020, Construction FY2021.	1	Repair holes in sheet piling both sides of structure at water level. Big chunk of concrete missing in 6th column 30" down. Catwalk grate rusted through in one location.	High	Repair small erosion on NW bank and large erosion under slab on south side. Remove island downstream ~25'x100' (WxL)				John K and Ken Smith
WCS 109	Cocoplum	1/30/19	1	1	2	6	1	1	All Yes			1	1	1	1	0	**0**		12/17/2015									John K and Ken Smith
WCS 110	Cocoplum	1/30/19	3	3	1	6	2.5	2.5	All Yes			1.5		2	3	2	**6**	Very rusted sheet pilings and I-beams.	1/30/19 PO #047665 Fixed top bars in gate frames very corroded, one hole behind I-beam					Repair large erosion under south downstream concrete side bank				John K and Ken Smith
WCS 111	Cocoplum	1/30/19	2.5	2	1	4	3	3	All Yes			1.5		4	3	2	**6**	Vertical I-beams slightly corroded at waterline. Structure was repaired before, new horizontal I-beams and catwalk. Small chips off concrete column. Gates are very corroded.	9/12/12 - Replaced corroded horizontal I-beam and corroded sections of vertical support for "cat walk" 1/30/19 PO #047665 - Fixed top bars in gate frames that was corroded					Repair wash out low side of structure				John K and Ken Smith
WCS 113	Snover	1/30/19	3	1	2	4	2	2	All Yes			3		3	3	4	**12**		7/28/14 - Repaired erosion below existing concrete slab on the northwest side of WCS No. 113 by injecting flowable fill (cementitious grout) to fill all voids	CIP WCS Replacement Project - Design FY2021, Construction FY2022.	2	Sheet piling both ends holes needs patch. 3rd column concrete busting out, can see the rebar inside the concrete. All stems on gates are rotten out. S. vertical I-beam has large hole.	High	S. downstream concrete bank cracked and large erosion.				John K and Ken Smith
WCS 114	Snover	1/30/19	3	2	2	4	1	1	All Yes			3		1	3	3.5	**10.5**	Concrete pitted and one column concrete corner broken. Sheet piling very corroded at the top.	5/12 - Replaced all 4 gates with new steel gates epoxy coated, replace all gate supports, gate slide frameworks, both horizontal I-beams and replaced corroded section of vertical I-beams, rebuilt corroded sections of all 4 lift rods 9/30/15 - Troubleshoot why gates nos. 1 and 2 not opening easily, replace corroded or bent sections of lift rods as needed; if needed, remove and replace 1 gear box with existing gear box at the public works facility; remove corroded first 14 feet long sections of two-strand horizontal and vertical catwalk railing(both sides of railing) and weld on new galvanized steel two-strand horizontal and vertical railing and paint. 12/2016 - Repaired damage to gate, tracks and gear 1/30/19 Fixed PO #047665 - Fixed hole in S. side sheet piling. Repaired Gate #2 as it does not close all the way down, need to physically hammer gate down	CIP WCS Replacement Project - Design FY2022, Construction FY2023.	3							John K and Ken Smith
WCS 115	Snover	1/30/19	1	1	1	1	1	1				1	1	1	1	1	**1**	New structure constructed 2018	8/31/18 - Completed replacement of existing structure with new structure, 4 automated gates with remote telemetry control									John K and Ken Smith

2019 Water Control Structures NPDES Inspection

Metal, Gates, Pipes and Risers: 1 = No Corrosion, 2 = Surface Rust, 3 = Some Rot, 4 = Major Corrosion Overall: 1 = Good, 2 = Fair, 3 = Poor, 4 = Bad
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Structure #	Waterway	Date	Metal			Gates				Pipes	Risers	Concrete		Bank Condition	Overall	Structure Location	Replacement Priority Score	Other Observations in 2019	Previous Repairs Completed	Major Replacement CIP Project		Minor Repairs Needed by Contractor		In-House Work Needed				Inspector
			Sheet Pilings	I - Beams	Cat walk	# of Gates	Gate	Hard ware	Operational (yes, no, list#)			Columns	Cap							Description	Priority	Description	Priority	Description	Priority	Work Order/or Invoice No.	Completion Date	
WCS 117	Blueridge	1/30/19	2	2	1	2	2	2	Yes			1		1	1	3	**3**					Small hole in horizontal I-beam web on W side. Both horizontal I-beams very corroded. Vertical I-beam at water level very corroded	Medium					John K and Ken Smith
WCS 118	Blueridge	1/30/19	2	4	1	2	2	2	Yes			1		1	3	3	**9**		9/12/13 - Replace corroded sections of horizontal and vertical railing 6/4/18 - Replaced I Beam, inspect gear box, clean rod, maintain tracks, maintain gate 1/30/19 PO #047588 - Replaced both horizontal I-beam webs that had holes. Repaired tracks for Gate #2 as it does not close all the way down. Maintained gear box and rod.			Gate 1 needs new track and gate door still open but needs replaced. Vertical I beam needs replaced, rotten out fell in water.						John K and Ken Smith
WCS 121	MacCaughey	1/30/19	2	4	2	4	3	3	1&4 Yes, 2&4 (electric) No			2	4	2	2	3	**6**	Concrete cap on weir structure				Vertical I-Beams need replaced. Concrete cap in need of repair, replace two gate actuators with salvaged actuators from WCS 115	Medium to High	Repair erosion under E. and W. downstream side concrete banks				John K and Ken Smith
WCS 124	Lagoon	1/30/19	2	1	1.5	4	2	2	2, 3, 4 Yes, 1 No			2		3	**2**	3	**6**		6/13/12 - Remove gate sill bottoms as these are corroded and prevent gate from closing and replace angles welded to gate bottoms 11/6/15 - Replace track guide systems for 3 gates and change anchors in track guide systems; clean and lubricate all 3 lift rods for gates; for all 3 tie rods, weld new equivalent 3 ft sections; replace 3 ft corroded sections of weir vertical I-beams at both side banks and encase new sections of I-beam in concrete; repair hole in sheet piling, install 3 new gates. 1/30/19 PO #047665 - Repaired holes in east side sheet piling and repaired vertical I-Beam. Retrofit surplus actuator in place of non-working actuator	CIP WCS Replacement Project - Design FY2024, Construction FY2025.	5	Gate number 1 needs new track and gate door erosion down stream west side, east side needs all new electric outlets.	Medium to High					John K and Ken Smith
WCS 125	Lagoon	1/30/19	2	1	1	4	2	2	1, 4 Yes, 2, 4 (electric) No			2		2	2	3	**6**		6/13/12 - Remove gate sill bottoms as these are corroded and prevent gate from closing and replace angles welded to gate bottoms			Replace actuator with salvaged actuator from WCS 115. Sheet piling by I-beam front side, there's a hole that needs to be patched. I-beam under walkway has half dollar holes in it	Medium to High	Erosion under E. and W. downstream side concrete bank				John K and Ken Smith
WCS 127	Creighton	1/30/19	2.5	1	2	2	2	2	All Yes			2		2	2	3	**6**		1/30/19 PO#047665 - Repaired hole in Vertical I-beams and repaired hole in sheet piling by support bar	CIP WCS Replacement Project - Design FY2025, Construction FY2026.	6			Repair downstream backside bank washing out by mesh concrete				John K and Ken Smith
WCS 128	Creighton	1/30/19	2.5	1.5	1	1	3	2	All Yes			2		1	2.5	3	**7.5**	West vertical I-beam and sheet piling corroded but no holes.	9/14/12 - Replace corroded horizontal cap and corroded sections of vertical I-beams			Gate #1 has a 0.5" hole. concrete high side has chips and cracks. Repair hole in sheet piling for tie rod attachment is corroded.	Medium to High					John K and Ken Smith
WCS 130	Bass Point	1/30/19	3	1	1	2	2	2	2 Yes			2		4	2.5	2	**5**	I-beam replaced August 2007.	8/07 - Replaced gates and corroded horizontal channels. 6/4/18 - Replaced I-Beam, inspect gear box, clean rod, maintain tracks, maintain gate 1/30/19 PO #047588 - Replaced I-beam webs that had holes. Repaired tracks. Maintained gear box and rod.					Repair E. downstream bank major erosion.				John K and Ken Smith
WCS 131	Bass Point	1/30/19	2.5	1	1	2	4	4	All Yes			3		1	2.5	2	**5**		9/25/13 Replaced corroded horizontal support beams and corroded sections of tie rods and vertical I-beams on both west and east sides of the structure, patched a small leak in the sheet metal piling and welded new boxes for both gate stems. 8/07 - Weld boxes on gate stems on each gate.			Both gates have pin holes	Medium to High	Repair minor erosion under rip rap which is concreted together. Repair erosion to catwalk again.				John K and Ken Smith

2019 Water Control Structures NPDES Inspection

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Structure #	Waterway	Date	Metal			Gates				Pipes	Risers	Concrete		Bank Condition	Overall	Structure Location	Replacement Priority Score	Other Observations in 2019	Previous Repairs Completed	Major Replacement CIP Project		Minor Repairs Needed by Contractor		In-House Work Needed				Inspector
			Sheet Pilings	I - Beams	Cat walk	# of Gates	Gate	Hard ware	Operational (yes, no, list#)			Columns	Cap							Description	Priority	Description	Priority	Description	Priority	Work Order/or Invoice No.	Completion Date	
WCS 137	New Castle	1/30/19	2.5	1	1	2	1	1	All Yes			2		2	2.5	2	**5**		8/07 - Replace gates and corroded members. 6/4/18 - Replace I Beam, Inspect Rod, clean and repair any bad threads, Gear box-open, replace any bad bearings, check key ways in gear drives. Check brass lifting bushing. Tracks, replace spacer bars as needed or tracks as needed. Adjust, clean and inspect door for proper operation. 1/30/19 PO #047588 - Replaced both horizontal I-beams which have rotted off.									John K and Ken Smith
WCS 138	New Castle	1/30/19	3	1.5	1	2	1	1	All Yes			2.5		1.5	3	2	**6**	Weir corroded on top. Crack on W. downstream concrete side bank. Tie rod bit bowed. Some corrosion on sheet piling above first support bar.	8/07 - Replace gates and corroded members. Washout by walkway fixed									John K and Ken Smith
WCS 140	Bethlehem	1/30/19	3.5	1	1	2	1	1	All Yes			1.5		1	3		**0**		12/2017 - Repair one horizontal I beam, Repair one Vertical I beam, Replace gate #1, Replace gate #2 1/30/19 - Fixed Horizontal I-beam that has fallen off, vertical I-beam has holes, gate #1			Some holes in sheet pilings . Low side backside of structure.	Medium	Repair small erosion under E. side bank concrete.				John K and Ken Smith
WCS 162	R - 36	1/30/19	1		1	1	1	1	Yes	1		1	1	1	1	3	**3**	Need some Riprap back side, 162 washing out.	6/4/15 Repaired erosion below existing concrete slab on the northwest side of WCS No. 113 by injecting flowable fill (cementitious grout) to fill all voids 1/30/19 - Removed willows in R-36 and fixed rip rap on downstream of Van Camp			Erosion continues under E. side bank rip rap. Need to add rip rap or use Uretek grout injection.	High					John K and Ken Smith
FW 120	Blueridge	1/30/19	1.5	1.5										1.5	1.5	3	**4.5**	Sheet pilings are rusty. No concrete cap. Middle vertical I-beam web corroded						Large Island blocking water flow. Need machine to pull island out.				John K and Ken Smith
FW 122	MacCaughey	1/30/19	2										1	1	1.5	3	**4.5**	Minor cracks in both sides of concrete side banks. Sheet pilings are rusty.	1/30/19 - Fixed W. downstream bank minor erosion.			Pin hole sheet piling next to 1st column	Low					John K and Ken Smith
FW 123	MacCaughey	1/30/19	1.5										1	1.5	1.5	3	**4.5**	Cracks in the concrete side bank on SE side.2018						E. downstream bank minor erosion.				John K and Ken Smith
FW 129	Creighton	1/30/19	1							3.5		1	1	1	1	1	**1**	Sheet pilings are rusty. Downstream CMP pipes under Price Blvd are corroded	1/30/19 Fixed - Remove fabric and debris over downstream pipes	This structure will be replaced with the Price Blvd Widening project								John K and Ken Smith
FW 132	Bass Point	1/30/19	1							1		1	1	1	1		**0**	Good Condition.	5/2011 - Severely corroded corrugated metal pipes CMP, erosion and undermining of side banks. Replace with open concrete weir and RCP culvert pipes.									John K and Ken Smith
FW 133	Bass Point	1/30/19	1							1		1	1	1	1		**0**	Good Condition.	11/2014 - Severely corroded corrugated metal pipes CMP, erosion and undermining of side banks. Replace with open concrete weir and RCP culvert pipes.									John K and Ken Smith
FW 135	Twin Lakes	1/30/19	1							1			1	1	1		**0**		8/2009 Replaced concrete drop structure with concrete open weir replaced as part of the Toledo Blade widening project					Repair wash out by sidewalk by Rip Rap				John K and Ken Smith
FW 136	Blue Waters	1/30/19	1.5							2		1	1	1	1.5	2	**3**	Downstream pipe is corroded. Will need replacement in the future						Needs more Rip Rap at downstream pipe				John K and Ken Smith
FW 139	New Castle	1/30/19	1							1			1	1	1	1	**1**	Culvert pipe upstream end joint separation: West=1", East = 7.75"	4/2012 Severely corroded corrugated metal pipes CMP, erosion and undermining of side banks. Replaced with open concrete weir and RCP culvert pipes.					Needs more Rip Rap at downstream pipe				John K and Ken Smith
FW 151	Snover	1/30/19	1	1									1	1	1	2	**2**	Minor crack in concrete of upstream spillway									Mike J Bob H
FW 152	Snover	1/30/19	1	1									1	1	1	2	**2**	Crack in concrete of upstream spillway. Very thick Vegetation 2018									Mike J Bob H
FW 153	Snover	1/30/19	1	1									1	1	1	2	**2**	Swamp grass thick on upstream side, concrete spillway thick vegetation									Mike J Bob H

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Structure Location: Replaced or Rehabilitated = 0, Structure located in undeveloped areas (1), east of Toledo Blade (2), west of Toledo Blade (3), developed areas Snover & Cocoplum (4)

Structure #	Waterway	Date	Metal			Gates				Pipes	Risers	Concrete		Bank Condition	Overall	Structure Location	Replacement Priority Score	Other Observations in 2019	Previous Repairs Completed	Major Replacement CIP Project		Minor Repairs Needed by Contractor		In-House Work Needed				Inspector
			Sheet Pilings	I - Beams	Cat walk	# of Gates	Gate	Hard ware	Operational (yes, no, list#)			Columns	Cap							Description	Priority	Description	Priority	Description	Priority	Work Order/or Invoice No.	Completion Date	
FW 154	Snover	1/30/19	2	4									2	2	2	2	**4**	Cracks in concrete of upstream spillway				Replace I-Beam	High					Mike J Bob H
FW 155	Snover	1/30/19	2	2									2	2	2	2	**4**	Crack in concrete of upstream spillway. Extreme vegetation 2018. Cracks in downstream concrete side bank						Remove Brazilian Peppers that are growing into weir structure				Mike J Bob H
FW 156	Snover	1/30/19	1	1									1	1	1	2	**2**	Heavy Vegetation 2018										Mike J Bob H
FW 157	Snover	1/30/19	4	4									4	2	4	2	**8**	Access to this structure to repair will need to be evaluated. This structure just west of I-75 on north side of Snover. Complete disrepair 2018.		Design FY2023, Construction FY2024.	4	Upstream concrete and horizontal I-beam completely broken off.	High	Remove large sandbar on downstream side in Snover				Mike J Bob H
FW 158	Snover	1/30/19	1	1									1.5	1	1	2	**2**	Crack in concrete of upstream spillway										Mike J Bob H
FW 159	Snover	1/30/19	1	2									2	1	2	2	**4**	Horizontal I-beam rusty. Concrete cap sank down ~4 inch off sheet piling.						Concrete cap sank down ~4 inch off sheet piling.				Mike J Bob H
FW 160	Snover	1/30/19	3	4									3	2	3	2	**6**	Very tall structure. Big alligator present. Sheet piling corroded thinner at the throat. Concrete cap sank down ~7 inch off sheet piling.				Horizontal I-beam completely broken off.	High					Mike J Bob H
FW 161	Snover	1/30/19	1	1									2	1	2	2	**4**							Remove dead cabbage palm ?				Mike J Bob H
FW 180	Lion Heart	1/30/19	2							1.5		1	1	2	1.5		**0**	Sheet pilings are rusty. Pipes partly submerged. Small dead cabbage palm and "island" downstream in Charlotte County. Sent John Elias email on 5-31-17 to check. Downstream needs to be cleaned out 2018 - N.P. side clean out										John K and Ken Smith
FW 181	Sunset	1/30/19	1.5							*		1	1	1	1.5	1	**1.5**	* Pipes underwater, not visible. Small "island" downstream in Charlotte County. Sent John Elias email on 5-31-17 to check.										John K and Ken Smith
FW 182	Dorchester	1/30/19	1.5							1		1	1	1.5	1	1	**1**	Sheet pilings are rusty at water level.										John K and Ken Smith
FW 183	Morning Star	1/30/19	1.5							2.5			1	1	1.5		**0**	Downstream CMP pipe corroded at upstream end, no visible holes in side of pipe.				Four round "bullet-like" holes on the west side sheet piling	Low					John K and Ken Smith
FW 185	Elkcam	1/30/19	1							1			1	1	1	1	**1**							Pepper trees need to be removed around bank, pipes and backside of drop structure. **Really bad				John K and Ken Smith
FW 186	Fordham	1/30/19	1							1			1	1	1	1	**1**	Banks look Good.										John K and Ken Smith
FW 506	Crestwood	1/30/19	2							1			1	2	1.5	3	**4.5**							Minor wash out downstream needs Riprap				John K and Ken Smith
FW 507	Flamingo	1/30/19	2							1			1	1	1.5	3	**4.5**							Needs more Riprap by handrail and headwall. Minor wash out by sidewalk.				John K and Ken Smith
FW 510	Courtland	1/30/19	1.5							1		1	1	1	1	2	**2**		1/30/19 - Small "island" downstream in Charlotte County removed.										John K and Ken Smith
GDS 112	Cocoplum	1/30/19			none	none	none	none	No	none	none			4	4	1	**4**	*2016 storm broke off riser, gate and portion of catwalk and eroded bank. All broken parts removed in March 2017. Only horizontal pipes left in place and part of catwalk, banks stabilized. Need to get SWFWMD approval to not replace structure in kind.										John K and Ken Smith

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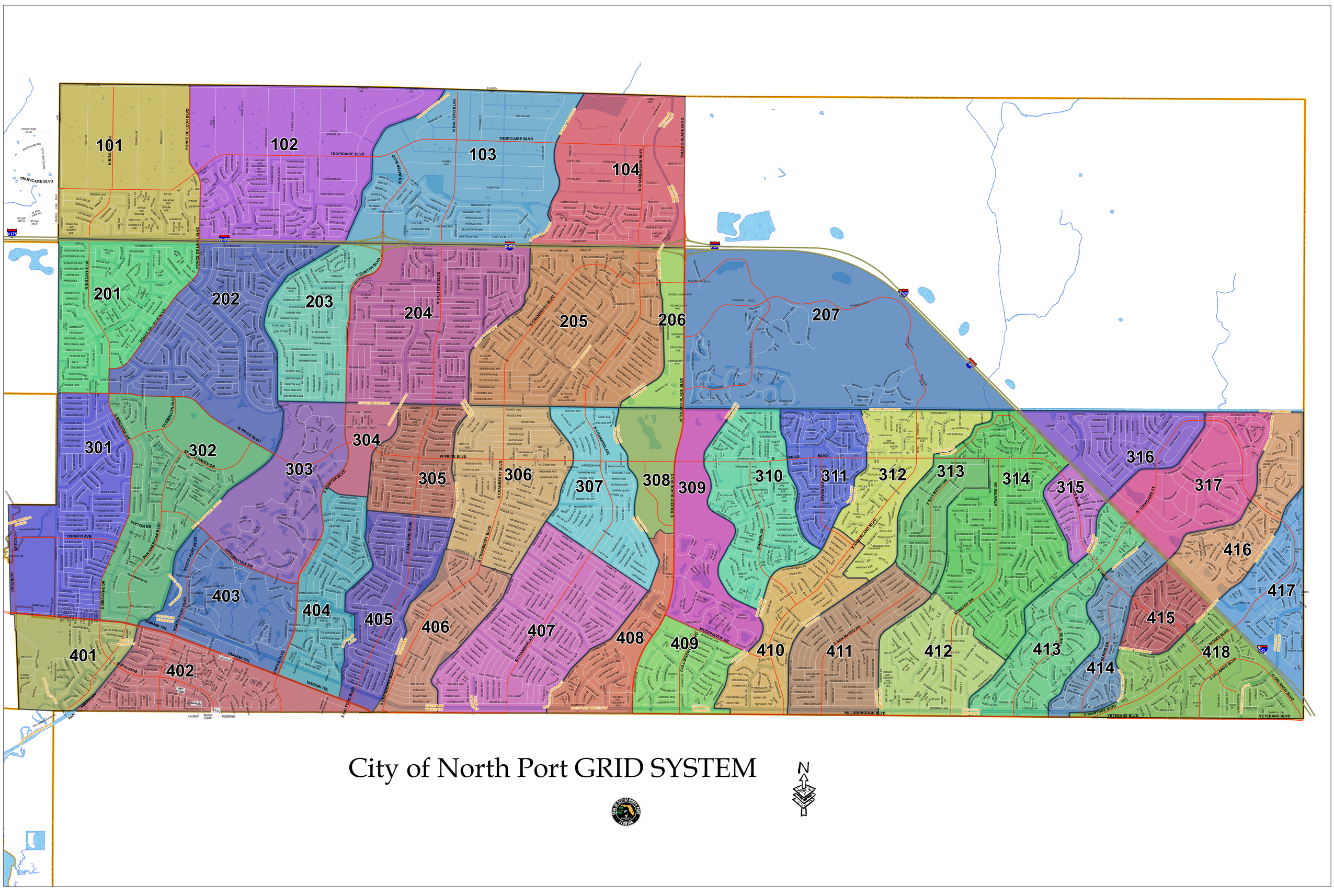
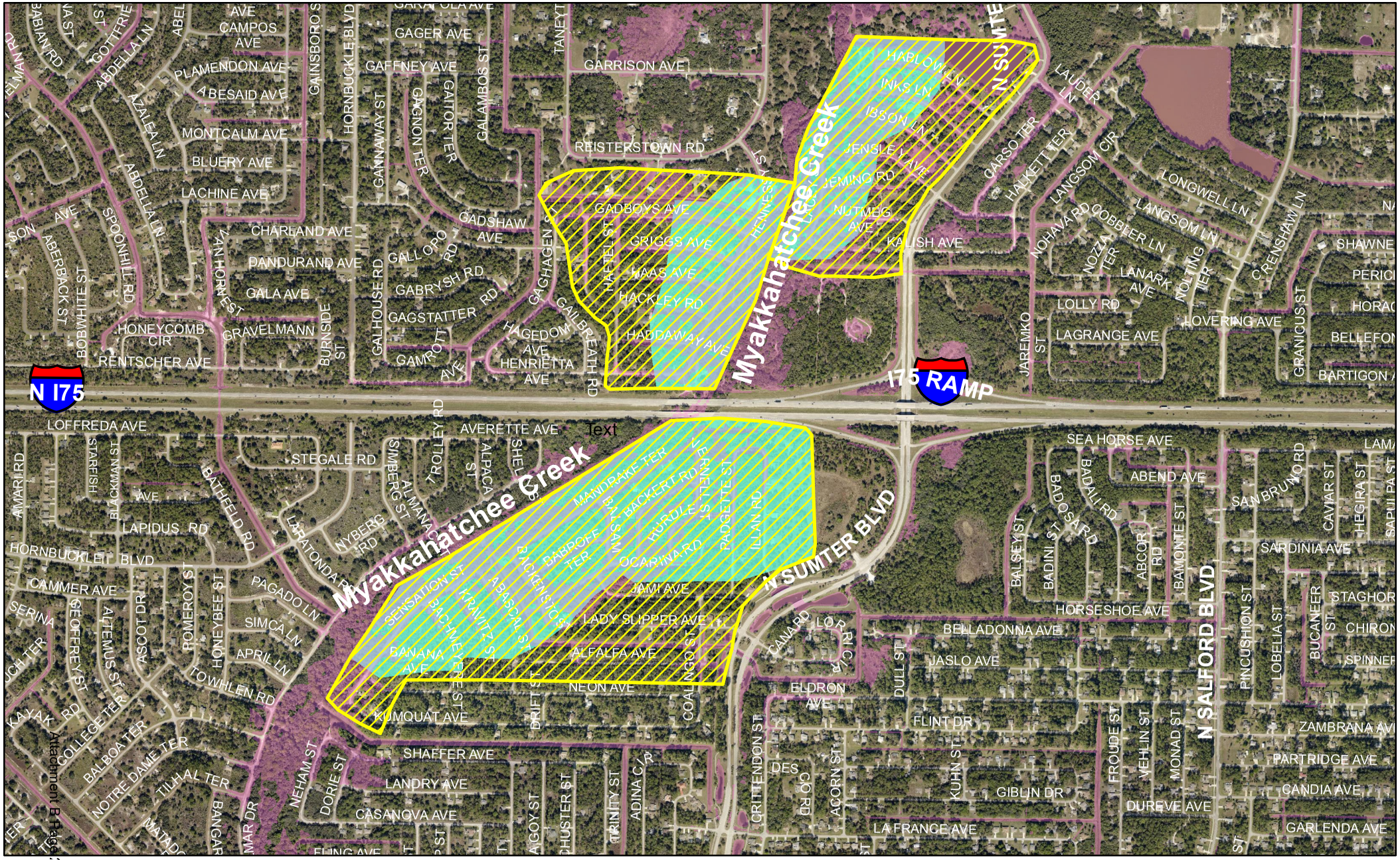
Structure #	Waterway	Date	Metal			Gates				Pipes	Risers	Concrete		Bank Condition	Overall	Structure Location	Replacement Priority Score	Other Observations in 2019	Previous Repairs Completed	Major Replacement CIP Project		Minor Repairs Needed by Contractor		In-House Work Needed				Inspector
			Sheet Pilings	I - Beams	Cat walk	# of Gates	Gate	Hard ware	Operational (yes, no, list#)			Columns	Cap							Description	Priority	Description	Priority	Description	Priority	Work Order/or Invoice No.	Completion Date	
GDS 116	Snover	1/30/19			2	1	4	4	No	4	4			4	4	1	**4**	Upstream bank has fabriform.Gate hardware completely rotted away.				Replace hand railing and repair corroded drop pipe and side pipe with gate	High	Bank washout on north and south side of road				John K and Ken Smith
GDS 141	Bethlehem	1/30/19			1	1	4	4	No	4	4			1	4	1	**4**					Repair holes in side of pipe with gate	High	Gate buried in dirt, excavate dirt from around structure				John K and Ken Smith
GDS 142	Littlefield	1/30/19			1	1	4*	4*	No *	4	4			3	4	1	**4**	*Gate and horizontal side pipe is broken off by storm in 2017.	1/30/19 - Removed massive amount of dead willows and debris clogging structure. Repaired bank erosion. Remove toy car in upstream ditch.			Replace horizontal side pipe and gate	High					John K and Ken Smith
GDS 143	Newman	1/30/19			2	1	2	2	Does side gate work??	4	4			1	4	1	**4**	Dime and quarter sized holes in pipe. Pipe under ground giving away.				Replace hand railing and repair corroded drop pipe and side pipe with gate	High	Repair bank washout. Island need to be removed.				John K and Ken Smith
GDS 512	Pellam	1/30/19			1	2	1	1	Yes			1*		2	1	2	**2**	This is concrete drop box with 2 fiberglass gates. Catwalk is made of trex type composite.						Bank needs to be repaired Riprap				John K and Ken Smith
DS 119	Blueridge	1/30/19								1	1.5	1.5	1.5	1	1.5	3	**4.5**	One pipe downstream rotten.	1/30/19 - Fixed sidewalk washing out.	This structure will be replaced with the Price Blvd Widening project.								John K and Ken Smith
DS 126	Lagoon	1/30/19								3	1	1.5	1.5	1	1.5	3	**4.5**	Downstream metal pipes are little rusty but in a good condition. Pipe 1&3 holes in pipe by the bank,	1/30/19 - Fixed erosion of rip rap bank near guardrail	This structure will be replaced with the Price Blvd Widening project.								John K and Ken Smith
DS 501	Cheshire	1/30/19								1					1		**0**		7/2009 Rebuilt covered concrete structure and replaced corroded 60' diameter CMP pipe with 60" RCP.					Grout seal small leak in joint between inside concrete weir wall and adjoining concrete box (observed by Orrin)				John K and Ken Smith
DS 503	Apollo	1/30/19								2		1	1	1	1		**0**	Good Condition. Replaced in Sept 2009 *Pipes are under water and not visible.	9/2009 Corroded Triple 72" Diameter CMP drop pipes structure and culvert replacement with concrete box structure with fiberglass skimmer and triple 72" concrete RCP and headwall.									John K and Ken Smith
DS 504	Jupiter	1/30/19								2		1	1	1	1		**0**		8/2009 Corroded Triple 72" Diameter CMP drop pipes structure and culvert replacement with concrete box structure with fiberglass skimmer and triple 72" concrete RCP and headwall.					Skimmer in the water needs to be attached back on D.S.				John K and Ken Smith
DS 508	Auburn	1/30/19	1.5							1		1	1	3	2.5		**0**		4/5/19 Ureteck chemical foam grout seal used to repair wash out under fabriform and hole near roadway guardrail									John K and Ken Smith
CRE 5.09		1/30/19																Rotted structure at Crestview Waterway and Hillsborough Blvd				Fabricate and install four 3/8" steel tracks to accommodate 4" x 6" x 8' wooden control planks.	High					

Appendix C - Water Control Structures Rehabilitated and Cost

Water Control Structures	Waterway	Location	Rehab Issues	Completed Date	Cost
WCS 135	Twin Lakes	Price East of Toledo Blade	Replace concrete drop structure with concrete open weir, replaced as part of the Toledo Blade widening project	2009	$134,860
WCS 109	Cocoplum	East of San Mateo	Severe metal sheet piling corrosions, gates, two gates will not open. Retrofit with concrete weir wall and 6 new stainless steel gates and concrete spillway and large revetment.	2009	$361,244
DS 501	Cheshire	Chancellor Between Sumter and North Port Blvd	Rebuilt covered concrete structure and replaced corroded 60' diameter CMP pipe with 60" RCP.	2009	$127,357
DS 503	Apollo	Chancellor Just east of Sumter	Corroded Triple 72" Diameter CMP drop pipes structure and culvert replacement with concrete box structure with fiberglass skimmer and triple 72" concrete RCP and headwall.	2009	$193,939
DS 504	Jupiter	Chancellor Just east of Salford	Corroded Triple 72" Diameter CMP drop pipes structure and culvert replacement with concrete box structure with fiberglass skimmer and triple 72" concrete RCP and headwall.	2009	$203,833
WCS 107	Cocoplum	Just west of Chamberlain	Severe metal sheet piling corrosions, gates, two gate will not open. Retrofit with concrete weir wall and 6 new stainless steel gates and concrete spillway and large revetment.	2011	$589,050
DS 132 and culverts	Bass Point	At Jeannin Dr	Severely corroded corrugated metal pipes CMP, erosion and undermining of side banks. Replace with open concrete weir and RCP culvert pipes.	2011	$477,603
DS 139 and culverts	Snover	East of Haberland	Severely corroded corrugated metal pipes CMP, erosion and undermining of side banks. Replace with open concrete weir and RCP culvert pipes.	2012	$529,092
WCS 101	Cocoplum	Myakkahatchee Creek near WTP	Complete replacement of existing structure with new structure, two additional gates for a total of 6 gates, gate automation and telemetry	2014	$1,476,638
DS 133 and culverts	Snover	West of Haberland	Severely corroded corrugated metal pipes CMP, erosion and undermining of side banks. Replace with open concrete weir and RCP culvert pipes.	2014	$599,152
WCS 115	Snover	East of Chamberlain Blvd	Severe corrosion of metal sheet piling corrosions and gates. Water level could not be retained upstream by structure. Will either replace or rehabilitate entire structure.	2019	$1,172,577
WCS 106	Cocoplum	South side of Water Treatment Plant	Concrete columns very deteriorated.	In Progress	$3,080,000 (budgeted)



City of North Port GRID SYSTEM



Attachment E

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Flood Reduction Study Area in Jockey Club Area West of Myakkahatchee Creek

Mean Annual Storm Floodplain from 5/22/12 Big Slough Study

0 0.0425 0.085 0.17 0.255 0.34 Miles

N W E S

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Attachment E

Watershed Management Program Consulting Services in the Big Slough Watershed (K883)

Best Management Practices (BMP) Analysis
Final Report

Prepared for

Southwest Florida Water Management District
&
City of North Port

Prepared by

Ardaman & Associates, Inc.

September 2014

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1.0 INTRODUCTION

As described in the Southwest Florida Water Management District's Watershed Management Program Guidelines and Specifications, Best Management Practice (BMP) Alternatives Analysis involves modification of the existing model condition to evaluate best management practices, to address the enhancement and protection of natural systems, recharge, and water quality while achieving flood protection.

BMP alternatives analysis involves the use and modification of the existing model condition to evaluate BMPs, to address habitual flooding conditions while ensuring no adverse impact.

Best management practices (BMP) is a phrase which means the best available techniques to reduce harmful environmental impacts. Usually, BMPs for urban watershed management are storage devices that temporarily store and/or treat urban runoff to reduce flooding and/or remove pollutants. For this task, the following alternative methods were evaluated with the unique purpose of reducing flooding: flow diversion, conveyance improvements, detention, exclusion of all existing drop structures and water control structures (WCS), and modification of gated structure and raising road elevations.

1.1 Authorization

Ardaman and Associates was contracted by the Southwest Florida Water Management District to conduct specific tasks of a Watershed Management Program for the North Port/Big Slough Watershed. The project was initiated in July 2003 and a series of work orders were issued. Work order number 4, issued in August 2005, included BMP alternative analysis for the North Port/Big Slough watershed.

1.2 Project Location and General Description

The Big Slough Watershed is located in southeastern Sarasota County, and the slough is tributary to the Myakka River. Portions of the incorporated City of North Port (those areas east of the Myakka) are located within the southern portion of the watershed. The 195.5 square mile watershed encompasses numerous depressional features, including wetlands and water bodies, the most prominent of which is the Big Slough Canal (also called Myakkahatchee Creek in its lower reaches). The Big Slough Canal passes from north to south through the City of North Port, and receives inflows from an internal system of waterways which provide surface drainage throughout the City, before discharging beneath U.S. Highway 41 toward its confluence with the Myakka River. The Big Slough Watershed and portions of the City of North Port are traversed from east to west by Interstate Highway 75.

1.3 Purpose and Objectives

The objective of this study is to evaluate BMP alternatives that would solve flooding conditions within the City of North Port. Existing condition model results and Floodplain

Level of Service (LOS) were used to identify present watershed flooding condition. Various BMP concepts and alternatives were evaluated for their effectiveness in solving flooding problems, permitablity, and economic viability.

1.4 Previous Reports

Over the course of the project, numerous interim reports have been submitted along with supporting data to SWFWMD and City of North Port. Those prior reports contain additional details and supporting documentation regarding these tasks completion, and include the following:

WO#1 – Watershed Evaluation

Task 1.1.2.1 – Existing Watershed Feature Data Evaluation and Assembly
Task 1.1.2.2 – Sub-basin delineations and landuse inventory

WO#2 – Watershed Evaluation

Task 1.1.2 – Watershed Evaluation
- 1.1.2.2 Hydrologic Feature Inventory
- 1.1.2.3 Hydraulic Feature Inventory
- 1.1.2.4 Field Reconnaissance
- 1.1.2.5 ID of Surveys to be Completed by a PLS
- 1.1.2.6 Preliminary Junction/Reach Coverage Development
- 1.1.2.7 SW Assessment Inventory and Approach Development
- 1.1.2.9 Watershed Evaluation Deliverables

WO#3 – Watershed Evaluation

Task 2.3.1 – Surveys by a Professional Land Surveyor

WO#4 – Watershed Management Plan

Task 1.1.3.2 – Watershed Parameterization
Task 1.1.3.3 – Watershed Model Development & Verification
Task 1.1.3.4 – Floodplain Analysis and Delineation Report
Task 1.1.3.5a – Level of Service Determination – original analysis
Task 1.1.3.5b – Level of Service Determination – with model maintenance
Task 1.1.3.7a – BMP Alternative Formulation Report – original analysis
Task 1.1.3.7a – BMP Evaluation of Four Crossings
Task 1.1.3.7b – BMP Evaluation Price Boulevard
Task 1.1.3.7b – BMP Evaluation WCS-162
Task 1.1.3.7b – Final BMP Report

WO#7 – Maintenance of Watershed Parameters and Models

Task 2.2.1 – 2004-2007 LiDAR Comparison
Task 2.3.1.1 – Collect and Evaluate Environmental Resource Permit (ERP) Information
Task 2.3.4 – Limited Field Reconnaissance

Task 2.3.6 and 2.3.7 – Generic Hydrologic Features and Generic Hydraulic Features
Task 2.3.6, 2.3.7, and 2.4.1 – Generic Hydrologic Features, Generic Hydraulic Features, and Refined Generic and Semi-generic Geodatabase and Parameterization
Task 2.4.1, 2.4.2, 2.4.3 – Refined Generic and Semi-generic Geodatabase and Parameterization, Watershed Computer Simulation Model Development and Verification, and Floodplain Analysis and Delineation
Task 2.4.3 – Floodplain Analysis and Delineation
Task N/A – Justification Report and Peer Review Presentation

WO#8 – Maintenance of Watershed Parameters and Models

Task 2.2.2 – 2007 LiDAR Review

WO#12 – Maintenance of Watershed Parameters and Models

Task 2.4.11 - Floodway Analysis Report

2.0 CHARACTERIZATION OF FLOOD PRONE AREAS

The Big Slough watershed is located in the Gulf coastal lowlands of southwestern Florida, characterized by flat topography and sandy, shelly and silty sand soils with little organic matter. Its headwaters are rural, consisting primarily of agricultural and undeveloped lands. A vast majority of urban and built up lands occur in the southern portion of the watershed, within in the City of North Port. Commercial development is generally limited to main thoroughfares within the city, especially along the US 41 corridor. Myakkahatchee Creek/Big Slough Canal begins in the southeastern part of Manatee County (near Edgeville) and flows approximately 21 miles through the City of North Port and ultimately empties to the estuarine portion of the Myakka River.

2.1 Hydrologic Inventory

2.1.1 *Subbasin Delineation Process*

Subbasin delineations were performed to support watershed parameterization and modeling. The subbasins were delineated using Arc Hydro Tools with LiDAR-based terrain data, where available. The surface model was prepared for “automated” subbasin delineation by combining the large terrain models with highly detailed secondary flow path information. The secondary flow paths were digitized based on scanned and orthorectified as-built information, terrain model features, and field observations of drainage patterns.

A set of protocols was developed for assigning subbasin break points, to allow for batch processing of the watershed using the delineation tools. As a result of pre-processing the surface model in the manner described here, the Arc Hydro tools were better able to recognize surface drainage characteristics and provide accurate subbasin delineations for use in model parameterization. In those areas where LiDAR was not available, other

topographic and drainage delineation information was employed to support automated and manual delineations.

2.1.2 *Tributary Subbasins and Characterization.*

Tributary areas were defined primarily by grouping surface storage features according to their connectivity (via culverts) or primary overflow paths (across topographic saddles). Open channel conveyance systems were also used to identify unique tributary areas. Each tributary area could then be summarized using GIS to describe unique characteristics, as discussed below.

Subbasin sizes range throughout the study area from 0.33 to 1,673.79 acres. Table 2-1 summarizes subbasin size by tributary area.

Table 2-1: Subbasin Size Summary per Tributary

Tributary ID	Count	Minimum	Maximum	Average
A	60	0.33	36.00	9.17
B	1282	0.06	1244.70	30.97
C	339	0.12	61.14	9.91
D	67	1.23	75.40	26.24
E	210	0.19	151.42	10.30
F	54	0.32	83.20	20.68
G	130	0.32	66.63	11.58
H	42	0.77	35.93	11.87
I	58	0.86	71.29	21.11
J	153	0.60	69.53	14.49
K	188	0.63	79.83	10.53
L	33	0.70	70.08	24.53
M	84	1.38	1040.82	133.85
N	119	0.16	28.22	8.22
O	76	0.88	82.72	15.89
P	38	0.11	120.69	13.19
Q	288	1.04	167.71	25.23
R	263	0.42	234.44	21.53
S	361	0.28	1139.68	21.10
T	65	0.28	45.34	13.73
U	799	0.03	410.92	24.79
V	116	0.42	89.73	14.68
W	29	15.55	1673.79	320.55
X	42	0.36	32.10	9.11
Y	84	0.24	47.38	12.87
Z	36	0.41	54.12	17.78

2.1.3 *Tributary Land Use Characterization*

While the headwaters of the Big Slough Watershed remain predominantly undeveloped or agricultural, changes in land uses throughout the City of North Port reflect significant population growth, with continued commercial and industrial growth along the US 41 corridor and the Price Boulevard intersections with Sumter Boulevard and Toledo Blade Boulevard.

Land use types were acquired as a GIS coverage from the SWFWMD and updated using 2004 aerial photography. Table 2-2 summarizes generalized land use encountered and respective percent areas of coverage, by tributary.

Table 2-2: Generalized Land Use Summary per Tributary

Tributary ID	Residential	Com/Industrial	Upland/Open	Water/Wetland
A	10.55	0.00	86.54	2.91
B	9.06	1.41	66.33	23.19
C	51.87	6.30	34.51	7.32
D	97.99	0.06	0.18	1.77
E	64.02	2.86	24.11	9.02
F	89.64	2.37	5.43	2.56
G	85.46	0.19	10.80	3.56
H	24.47	0.51	33.01	42.01
I	73.04	3.46	16.82	6.68
J	76.21	3.39	16.98	3.42
K	34.18	3.62	58.39	3.81
L	65.17	0.48	25.84	8.51
M	2.02	0.22	75.29	22.47
N	0.32	4.18	88.79	6.71
O	85.80	0.15	11.00	3.04
P	67.31	2.43	11.53	18.73
Q	0.00	0.75	71.86	27.39
R	32.98	0.78	40.77	25.48
S	16.20	2.33	56.24	25.22
T	57.69	5.05	27.44	9.82
U	1.18	1.95	62.64	34.23
V	35.95	7.19	36.04	20.82
W	1.49	0.27	79.92	18.32
X	76.68	2.32	8.57	12.42
Y	85.27	4.58	9.13	1.03
Z	98.90	0.00	0.00	1.10

2.1.4 *Tributary Soil Characterization.*

Low permeability, hydric soils associated with depressional areas and flood plains are predominant within the study area.

Soil types were identified using soil survey data for Sarasota, Charlotte, Manatee and DeSoto Counties acquired as a GIS coverage from SWFWMD. Individual soil types were categorized according to their runoff potential. In order to perform that categorization, the hydrologic soil group of each soil was defined according to the relevant soil survey reports. A brief discussion of each hydrologic soil group's characteristics is provided below.

HYDROLOGIC SOIL GROUP A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively well drained sands or gravelly sands. These soils have a high rate of water transmission.

HYDROLOGIC SOIL GROUP B. Soils having a moderate infiltration when thoroughly wet. These consist mainly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

HYDROLOGIC SOIL GROUP C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

HYDROLOGIC SOIL GROUP D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have high shrink-swell potential, soils that have a permanent high water table, soils that have a clay pan or clay layer at or near the surface, and soils that are shallow over nearly impervious material.

Some soil types are classified as belonging to dual hydrologic soil groups, such as A/D, B/D, or C/D. These ratings mean that, under natural conditions, the soil is classified as belonging to hydrologic soil group D, but by artificial methods the water table could be lowered sufficiently so that the soil would fit into a lower runoff potential category.

Table 2-3 presents a summary of hydrologic soil groups encountered (with dual classified groups assigned to the un-drained condition “D”) and respective percent areas of coverage.

Table 2-3: Hydrologic Soil Group Summary per Tributary

Tributary	Hydrologic Soil Coverage Area %								
	A	**A/D**	**B**	**B/D**	**C**	**C/D**	**D**	**UND**	**W**
A	0.00	0.00	0.00	70.01	0.36	0.88	28.75	0.00	0.00
B	0.00	0.00	0.09	70.30	1.07	0.04	28.16	0.23	0.10
C	0.00	0.06	0.00	61.51	7.64	0.87	25.03	0.00	4.89
D	0.00	0.00	0.00	71.73	0.09	0.21	27.98	0.00	0.00
E	0.00	0.00	0.00	77.85	0.71	0.91	18.81	0.00	1.73
F	0.00	0.00	0.00	63.79	0.00	1.48	34.73	0.00	0.00
G	0.00	0.00	0.00	50.55	0.04	0.00	49.41	0.00	0.00
H	0.00	0.00	0.00	90.15	5.12	0.00	4.73	0.00	0.00
I	0.00	0.00	0.00	66.44	0.06	0.77	32.73	0.00	0.00
J	0.00	0.00	0.00	65.84	0.00	0.85	33.09	0.00	0.22
K	0.00	0.00	0.00	70.16	0.08	1.21	28.08	0.00	0.47
L	0.00	0.00	0.00	50.53	0.00	1.90	47.57	0.00	0.00
M	0.38	0.00	0.36	77.05	4.82	0.00	17.38	0.01	0.00
N	0.00	0.00	0.00	68.48	0.00	0.45	29.89	0.00	1.18
O	0.00	0.00	0.00	67.36	0.00	0.00	32.50	0.14	0.00
P	0.00	0.00	0.00	75.24	0.00	0.12	24.64	0.01	0.00
Q	0.00	0.00	0.00	64.78	0.00	0.13	35.09	0.00	0.00
R	0.00	0.00	0.00	65.45	0.00	0.90	33.62	0.02	0.00
S	0.00	0.00	0.00	63.35	0.00	0.07	36.57	0.00	0.00
T	0.00	0.00	0.00	70.31	0.00	0.52	29.17	0.00	0.00
U	0.00	0.00	0.00	64.62	0.00	0.01	34.98	0.00	0.39
V	0.00	0.00	0.00	48.77	0.00	0.00	51.23	0.00	0.00
W	0.61	0.00	0.25	75.03	11.94	0.00	12.17	0.00	0.00
X	0.00	0.00	0.00	56.73	0.00	0.00	42.64	0.00	0.64
Y	0.00	0.00	0.00	70.24	0.00	0.15	29.61	0.00	0.00
Z	0.00	0.00	0.00	73.02	0.00	3.30	23.69	0.00	0.00

2.1.5 *Tributary Hydrologic Parameterization*

Subbasin parameterization was performed in order to assign values for hydrologic model development, including: Time of Concentration (Tc), Runoff Curve Number (CN), Percentages of imperviousness, and Peak Rate Factor (K').

Time of Concentration (Tc) is generally defined as the amount of time it takes for a drop of water to travel from the most hydrologically distant point in a basin to the point where that basin discharges to a receiving water body (represented in the model as a node). It is used as a parameter in the computation of a runoff hydrograph, when using the SCS Unit Hydrograph method for hydrograph generation.

The Tc computation was made according to techniques recommended in TR-55 by the National Resource Conservation Service. According to that methodology, runoff generally moves along the surface of a basin as sheet flow, shallow concentrated flow, open channel flow, or some combination of these until it is intercepted by a storage or conveyance system. Travel times for each flow segment are computed and summed, yielding a time of concentration for the basin. Further adjustments can be made to account for movement through ponds, storm sewers and the like in order to account for additional travel time, when not accounted for in the modeled conveyance system.

Travel segment data for this study was developed using aerial photography, one foot SWFWMD 1"=200' scale aerial imagery, 2-foot SWFWMD digital photogrammetric contours and the digital terrain model to define travel paths, lengths, slopes and land cover for sheet and shallow concentrated flow segments. For open channel segments, cross sectional geometry and roughness values were estimated, and lengths and slopes taken from the terrain model. For conveyance systems (such as pipes, channels, embedded ponds and wetlands) a velocity method was employed to adjust times of concentration.

Runoff Curve Numbers were developed for each subbasin, based on land use and hydrologic soil group designations. Using GIS, basin, land use and soils polygon coverages were intersected with one another, resulting in the creation of a single composite polygon coverage. Each polygon in the composite coverage contains a land use code, a hydrologic soil group, and a basin assignment. Combinations of land use and soils were then used, along with a lookup table of curve number values, to define area-weighted runoff curve numbers within each basin. Percentages of imperviousness were developed in a like manner, based on land use within each subbasin area. Runoff curve numbers that were employed in this analysis were representative of average antecedent moisture conditions (AMC-II) and were adapted from tables provided in the NRCS publication, TR-55.

The peak rate factor (K') is a numeric value used to describe the shape of a unit hydrograph for a basin. The peak rate factor varies from one basin to another. Throughout the state, typical values applied by hydrologists range from 256 to 484, with even lower values applied in flat, swampy areas. A peak rate factor of 256 was used for all subbasins within the Big Slough watershed. That value is most appropriate in basins that exhibit little topographic relief, which includes the vast majority of all subbasins delineated in the study area.

2.2 Hydraulic Feature Inventory

2.2.1 *Hydraulic Feature Inventory*

An inventory of hydraulic features within the watershed area was initially performed using digital aerial photography, as-built and ERP data, in order to identify conveyance structures, open channels, SMSAs, lakes and wetlands greater than one acre in area throughout the watershed. Each feature was assigned a unique HYD-ID, as an identifier for subsequent field reconnaissance and survey. The hydraulic feature inventory served as an initial database of features to be incorporated into a model database for simulation.

2.2.2 *Summary of Water Body Features by Tributary and Type*

Wetlands and water bodies of varying size are located throughout the watershed area. Named water bodies include: Big Slough Canal or Myakkahatchee Creek, Cocoplum Water Way, Snover Water Way and a series of named internal water ways providing surface drainage for the City of North Port. Area lakes range in size from 1.0 to 125 acres. In addition, numerous retention and detention ponds are present, providing stormwater attenuation and water quality treatment throughout the area. Table 2-4 presents a summary of water bodies and their sizes in each tributary.

Table 2-4: Water Body Size Summary per Tributary

Tributary	Count	Minimum Area (acres)	Maximum Area (acres)	Average Area (acres)
A	0	0.00	0.00	0.00
B	386	0.20	110.46	4.90
C	9	0.60	2.77	1.72
D	0	0.00	0.00	0.00
E	37	0.19	25.93	3.06
F	1	3.99	3.99	3.99
G	9	1.26	17.93	3.93
H	10	0.77	12.99	3.98
I	11	0.07	12.23	2.79
J	5	0.40	2.39	1.20
K	3	2.21	11.54	5.96
L	3	2.86	5.06	3.88
M	18	1.01	6.89	3.13
N	6	1.22	13.75	4.75
O	3	1.05	3.04	1.73
P	1	75.40	75.40	75.40
Q	121	1.03	36.57	4.72
R	77	1.22	60.85	9.02
S	112	0.35	35.30	5.72
T	20	1.08	19.34	5.93
U	363	0.13	125.04	5.61
V	12	1.12	30.60	12.98
W	0	0.00	0.00	0.00
X	5	1.18	15.20	7.16
Y	0	0.00	0.00	0.00
Z	0	0.00	0.00	0.00

2.2.3 *Summary of Conveyance Features by Tributary and Type*

Surface drainage throughout the watershed consists largely of natural sloughs, creeks and numerous manmade ditches and canals. Manmade storage features (SMSA) and natural depressional features (lakes and wetlands) are interconnected by drainage culverts or joined across natural topographic saddles. Table 2-5 summarizes number of conveyance features and Table 2-6 presents lengths of open channels in each tributary.

Table 2-5: Conveyance Features per Tributary

Tributary	Bridge	Channel	Culvert	Riser Pipes	Weir
A	1	23	10	50	175
B	16	382	210	39	3631
C	16	156	108	129	1028
D	0	43	9	3	194
E	0	67	67	50	616
F	0	27	13	1	175
G	1	63	42	28	384
H	2	17	9	13	138
I	0	27	10	17	195
J	0	87	51	1	427
K	4	75	51	77	531
L	0	19	6	0	103
M	0	9	18	0	202
N	2	49	27	69	316
O	0	39	19	13	218
P	0	24	15	0	95
Q	1	65	18	0	867
R	0	114	72	0	752
S	6	104	44	49	1050
T	0	27	19	10	197
U	3	47	116	62	2316
V	1	51	50	5	345
W	1	15	18	0	48
X	0	28	11	0	94
Y	0	49	23	0	239
Z	0	19	11	0	97

Table 2-6: Open Channel Lengths per Tributary

Tributary ID	Count	Minimum (feet)	Maximum (feet)	Average (feet)
A	23	267	1600	780
B	382	124	4819	1173
C	155	193	3674	1011
D	44	252	1896	1067
E	67	221	2110	855
F	27	185	1977	1053
G	64	243	1985	801
H	16	361	2261	908
I	28	293	2347	1179
J	87	255	2844	956
K	75	265	1935	897
L	19	491	2443	1167
M	10	723	5785	2052
N	49	231	2501	882
O	39	260	2186	973
P	24	88	2890	1070
Q	65	367	2677	1300
R	110	384	2878	1449
S	103	257	2309	932
T	26	260	2021	996
U	47	500	4442	1623
V	51	255	2202	786
W	15	1137	4578	2372
X	32	257	2421	1254
Y	49	224	2426	896
Z	19	443	2191	1044

2.2.4 *Tributary Hydraulic Connectivity*

Connectivity within tributary areas was determined through review of aerial photographs, as-built and construction drawings, topographic data and field investigation. That connectivity is defined and stored in the project database as a node-reach topological relationship.

2.3 Magnitude of Present Flooding

The magnitude of present flooding in the watershed was identified by using the results of floodplain and flood protection level of service (LOS) analyses.

2.3.1 *Identification of Flooded Areas*

The City of North Port experiences three distinct types of flooding problems. The most severe and the least common problem is a small number of habitable structures near Big Slough that experience flooding in the 100 year event. Also significant and very isolated is major road flooding in 25-year and 100-year events. Finally extensive local road flooding is common even during a smaller storm event. While inconvenient, this local road flooding poses little risk of damage to the citizens' property.

As shown in Figure 2-1, 2-2, and 2-3 (10, 25, and 100-year LOS figures), the majority of flooding within the City is related to street flooding. An arterial street/emergency route (West Price Boulevard), which provides access to the City's emergency facilities, will flood in 10-year or higher storm events.

Most of the habitable structures that flood in a 100-year storm event are located in the neighborhood located adjacent to Big Slough/Myakkahatchee Creek between Cocoplum Waterway and Tropicaire Boulevard. Locations of the houses that would flood (model predicted) in a 100-year storm event are shown in Figure 2-3 (100-year LOS figure).

2.3.2 *Estimated Number of Structures Flooded (10-, 25-, and 100-year)*

Based on the model results, it is estimated that ~5 structures will flood in a 10-year storm event; ~ 7 structures will flood in a 25-year storm event; and ~75 structures will flood in a 100-year storm event within the City of North Port.

Habitable structures were identified by visually inspecting 2008 aerial imagery in the City of North Port, and placing a point in GIS on the topographical high of the 2004/2007 hybrid LiDAR DTM. The elevation of the 2004/2007 hybrid LiDAR DTM at the point was compared with 10-year, 25-year and 100-year modeled maximum stages. Where maximum stages were higher than the habitable structure, it was reported as a flooded structure. Since the surveyed house pad elevations (finished floor elevations) data was not available, the method applied in estimating the number of flooded structures is very approximate.

2.3.3 *Emergency and Evacuation Route Inundation (10-, 25-, and 100-year)*

Estimated lengths of emergency and evacuation route inundation are presented in Table 2-7. As stated earlier, the majority of flooding within the City is associated with street/road flooding.

Evacuation routes were received from the City of North Port, and emergency routes were identified by Ardaman as the shortest route from an emergency facility to an evacuation route. Street centerlines were acquired from Sarasota County. The positions of all lines were verified in GIS as on the centerline of the road, and moved to the centerline if necessary. Any portion of the centerline of the road that overlapped with the 10-year, 25-year or 100-year floodplain was reported as inundated.

Table 2-7: Estimated Lengths of Road Inundation

Storm Event	Length of Emergency Route Inundation (feet)	Length of Evacuation Route Inundation (feet)
10-year	6,403	1,464
25-year	7,758	3,077
100-year	19,625	7,218

3.0 ALTERNATIVE BMP FORMULATION

According to Southwest Florida Water Management District's Watershed Management Program Guidelines and Specifications (SWFWMD G&S), the generation of best management practices (BMP) alternatives must take into account many watershed management issues in order to formulate an alternative that is permittable, economically viable, and is supported by the public. This study is mainly focused in addressing storm event flooding conditions within the City of North Port.

3.1 BMP Development Process

As described in the SWFWMD G&S, alternatives analysis involves the use and modification of the existing model condition to evaluate BMPs, to address habitual flooding conditions while ensuring no adverse impact.

Best management practice is a phrase which means the best available techniques to reduce harmful environmental impacts. Usually, BMPs for urban watershed management are storage devices that temporarily store and/or treat urban runoff to reduce flooding and/or remove pollutants. For this task, the following alternative methods were evaluated with the unique purpose of reducing flooding: Flow diversion, conveyance improvements, detention and exclusion of all existing drop structures and water control structures (WCS), modification of gated structure and raising road elevations.

3.2 Alternative BMP Concepts

Various BMP alternative concepts evaluated in this study include conveyance improvements, stormwater management storage areas, flood proofing, and flow diversions.

3.3 Alternative BMP Evaluation

BMP alternative evaluations were performed using the existing watershed model and updating it to reflect various BMP scenarios. The following sections provide a brief description of each evaluated BMP alternative and a summary of the evaluation outcome.

3.3.1 *Regional BMPs:*

BMP alternatives that could potentially improve flooding condition in a large area are considered as regional BMPs. These alternatives could significantly alter the hydrodynamics of the drainage system. Although the alternatives presented in this report might not be permittable or economically viable, they provide a better understanding of the hydraulic response when applying the BMPs to further understand improvement limitations.

Six different regional BMPs were evaluated. Results from each BMP evaluation were compared to a benchmark scenario to evaluate the impact of the BMP. The benchmark scenario used was the 24-hour-100 year existing condition model previously submitted. The storm event used for the evaluations was the 24-hour, 100 year event with a Type II, Florida modified rainfall distribution.

For these analyses, the following GIS procedures were used when comparing the existing condition (Benchmark) and the proposed scenario (BMP):

Three potential analyses were considered when comparing each BMP scenario to the Benchmark Scenario.

- For the first analysis, the geoprocessing tool “Symmetric Difference” was applied with the BMP floodplain and benchmark floodplain as inputs, resulting in flooded area reduction and flooded area increase polygons for each scenario. Flooded area reduction represents area that flooded in the benchmark scenario, but not in the BMP scenario, and flooded area increase represents area that did not flood in the benchmark scenario, but did flood in the BMP scenario. Results were then summarized by sub-watershed in acres.

- The second analysis compared the length of street flooding in the BMP scenarios to length of street flooding in the benchmark scenario. The BMP scenario floodplain shapefile was intersected with the streets shapefile, and the total length of flooding was summarized by sub-watershed. Benchmark flooded street data was obtained from previous analysis per LOS (Level of Service) requirements.

- The final analysis compared the number of flooded parcels in the benchmark scenario to the number of flooded parcels in the BMP scenarios. To determine which parcels were flooded we used the parcels polygon shapefile downloaded from Sarasota County. Elevations were extracted from the LiDAR-based terrain data utilizing the centroid of the parcel as a calculation point, and one foot was added to the calculated elevation to represent buildings on fill material. Parcels in waterways or ponds were eliminated and not considered in these analyses. These elevations were then compared to the maximum stages from the CHAN model output for the BMP and benchmark simulation. Any parcels with elevations less than the maximum stage were considered flooded. The comparisons of the BMP scenario to the benchmark scenario were then broken down by sub-watershed for better understanding of local response to the BMP.

3.3.1.1 *BMP #1: Remove Structures throughout City of North Port Waterways*

Objective:

The objective of this BMP is to understand current primary drainage system capacity assuming no losses due to water control structures or drop structures within several waterways. Also, additional connectivity was provided among a few R canals southwest of the I-75 corridor to evaluate the response when transferring some of the existing load throughout less compromised areas.

Description:

Water control structures (WCS) and drop structures (DS) depicted in Figure 3-1 were removed and replaced with an equivalent channel section that mimics the immediate upstream canal's section. Also, and as stated before, additional connections were provided between a few existing secondary manmade R canals. Specifically, canal R-36 was hydraulically connected to the R-43 canal via a weir with equivalent channel geometry. Similarly, the R-43 canal was also connected with the R-24 and R-32 (See Figure 3-1).

Results:

Overall results indicate general improvements immediately north of Price Blvd and along Bass Point waterway while increasing flooding between S Toledo Blvd and S Sumter Blvd. Also, improvements are observed southwest of I-75 where supplemental canal connectivity was provided. An initial evaluation suggests that this BMP may not be feasible due to potential loss of potable water supply, fish and wildlife habitat, and wetlands. Please refer to Figure 3-1 and Table 3-1 for a summary of BMP#1 analysis results.

Table 3-1: BMP#1 Results Summary

Sub-Watershed	Bench Mark Total Flooded Area (Acres)	BMP1 Total Flooded Area (Acres)	BMP1 Total Flooded Area Change (%)	Bench Mark Flooded Street Length (Feet)	BMP1 Flooded Street Length (Feet)	BMP1 Flooded Street Length Change (%)	Bench Mark Flooded Parcels (Units)	BMP1 Flooded Parcels (Units)	BMP1 Flooded Parcels Change (%)
A	58	59	0.8	7,959	8,124	2.1	2	2	0.0
B	15,839	15,881	0.3	304,750	306,791	0.7	665	655	-1.5
C	724	745	2.8	118,951	124,883	5.0	38	40	5.3
D	150	172	14.5	38,510	47,969	24.6	15	17	13.3
E	407	446	9.5	47,961	65,534	36.6	2	2	0.0
F	98	124	25.7	22,234	34,741	56.3	1	1	0.0
G	250	208	-16.7	53,687	36,920	-31.2	17	9	-47.1
H	199	186	-6.4	1,082	548	-49.3	2	2	0.0
I	165	165	0.2	21,519	25,051	16.4	2	1	-50.0
J	335	298	-11.2	84,088	57,952	-31.1	15	15	0.0
K	240	237	-1.3	45,022	44,366	-1.5	5	5	0.0
L	69	67	-1.5	11,354	11,267	-0.8	0	0	0.0
M	2,426	2,475	2.0	0	0	0.0	0	0	0.0
N	150	146	-2.7	14,407	14,101	-2.1	1	1	0.0
O	189	177	-6.2	56,008	49,468	-11.7	9	8	-11.1
P	191	192	0.5	11,134	11,173	0.4	6	6	0.0
Q	3,733	3,735	0.1	0	0	0.0	0	0	0.0
R	2,294	2,320	1.1	86,929	99,236	14.2	43	60	39.5
S	2,489	2,454	-1.4	23,286	20,576	-11.6	74	74	0.0
T	206	190	-8.1	14,915	9,256	-37.9	5	2	-60.0
U	9,907	9,888	-0.2	8,973	8,934	-0.4	19	19	0.0
V	553	545	-1.5	20,054	18,184	-9.3	6	6	0.0
W	1,207	1,207	0.0	0	0	0.0	0	0	0.0
X	92	92	0.4	7,471	7,445	-0.3	2	2	0.0
Y	189	179	-5.1	70,162	63,890	-8.9	11	11	0.0
Z	51	48	-5.9	14,978	14,783	-1.3	0	0	0.0
Total	42,211	42,236	0.1	1,085,434	1,081,192	-0.4	940	938	-0.2

3.3.1.2 *BMP #2: Constrain Flow Entering City Of North Port at Big Slough Canal*

Objective:

The objective of this BMP is to constrain the volume of water coming from offsite areas through the Big Slough canal prior to entering the City in the Estates area.

The BMP would involve real estate acquisition, maintenance activities, dam construction and removal of existing hydraulic structures (culverts).

Description:

On the northwest City boundary, at the intersection of Big Slough canal with R-36 and R-580 waterways, all existing earthen weirs were raised to limit runoff from offsite areas, leaving the Big Slough canal as the only conveyance system into the western portion of the City (see Figure 3-2). All earthen weirs farther north, at the intersection of Big Slough canal and Power Line Road were raised as well.

Results:

This BMP results in approximately 0.5 feet flood stage reduction within the vicinity of the Big Slough canal from the City's northern border to just south of I-75. Likewise, results indicate that flood stages increase approximately 1.0 foot in the offsite areas north of R-36 and R-580 waterways. Table 3-2 summarizes BMP#2 analysis results.

Table 3-2: BMP#2 Results Summary

Sub-Watershed	Bench Mark Total Flooded Area (Acres)	BMP2 Total Flooded Area (Acres)	BMP2 Total Flooded Area Change (%)	Bench Mark Flooded Street Length (Feet)	BMP2 Flooded Street Length (Feet)	BMP2 Flooded Street Length Change (%)	Bench Mark Flooded Parcels (Units)	BMP2 Flooded Parcels (Units)	BMP2 Flooded Parcels Change (%)
A	58	58	0.0	7,959	7,958	0.0	2	2	0.0
B	15,839	16,092	1.6	304,750	260,559	-14.5	665	458	-31.1
C	724	725	0.0	118,951	118,959	0.0	38	38	0.0
D	150	150	0.0	38,510	38,460	-0.1	15	15	0.0
E	407	407	0.0	47,961	47,969	0.0	2	2	0.0
F	98	98	0.0	22,234	22,241	0.0	1	1	0.0
G	250	250	0.0	53,687	53,666	0.0	17	17	0.0
H	199	199	-0.1	1,082	1,078	-0.4	2	2	0.0
I	165	165	0.0	21,519	21,514	0.0	2	2	0.0
J	335	314	-6.4	84,088	72,205	-14.1	15	12	-20.0
K	240	240	0.0	45,022	45,020	0.0	5	5	0.0
L	69	69	0.0	11,354	11,354	0.0	0	0	0.0
M	2,426	2,421	-0.2	0	0	0.0	0	0	0.0
N	150	150	0.0	14,407	14,407	0.0	1	1	0.0
O	189	189	0.0	56,008	55,994	0.0	9	9	0.0
P	191	179	-6.1	11,134	10,124	-9.1	6	4	-33.3
Q	3,733	3,742	0.2	0	0	0.0	0	0	0.0
R	2,294	2,302	0.3	86,929	86,186	-0.9	43	45	4.7
S	2,489	2,486	-0.2	23,286	20,530	-11.8	74	73	-1.4
T	206	206	0.0	14,915	14,904	-0.1	5	5	0.0
U	9,907	9,907	0.0	8,973	8,973	0.0	19	19	0.0
V	553	552	-0.2	20,054	20,043	-0.1	6	6	0.0
W	1,207	1,207	0.0	0	0	0.0	0	0	0.0
X	92	87	-5.1	7,471	5,780	-22.6	2	2	0.0
Y	189	188	-0.5	70,162	69,877	-0.4	11	11	0.0
Z	51	51	-0.1	14,978	14,952	-0.2	0	0	0.0
Total	42,211	42,434	0.5	1,085,434	1,022,753	-5.8	940	729	-22.4

3.3.1.3 *BMP #3: Diversion Alternative*

Objective:

The purpose of this BMP is to divert flows from offsite areas via the existing R-36 canal, by increasing its capacity and improving its hydraulic connectivity with Deer Prairie Slough canal.

This BMP would involve construction of new structures, maintenance activities, real estate acquisition, and detailed hydrologic and hydraulic evaluation of the western boundary (Deer Prairie Slough watershed).

Description:

On the northwest boundary, along R-36 canal, two earthen overflow weirs were provided to enhance the R-36 waterway connectivity with Deer Prairie Slough canal (See Figure 3). Weir location and parameters were selected based on terrain and hydraulic constraints. The weirs were located on the northwest corner to address flooding in the Estates area and along Big Slough canal. Weir lengths and elevation used are as follows: Weir 1, L: 300 feet at EL:22.0 feet, NAVD88 and Weir 2, L:450 feet at EL:21.0 feet, NAVD88. The R-36 canal capacity was also doubled by replacing the existing cross-section with a 60 feet bottom width trapezoidal channel with 4:1 side slopes. The current model assumes no tailwater influence from Deer Prairie Slough.

Results:

As anticipated, simulation results indicate flood reduction throughout the Estates area, along the Big Slough Canal between the R-36 canal and I-75 corridor as well as in the localized area along Big Slough south of I-75 (See Figure 3-3). Overall results indicate a flood stage reduction between 0.1 foot and 1.0 foot throughout the aforementioned areas.

As mentioned before, these results were obtained assuming no increase in stages in the Deer Prairie Slough Canal since a fixed tailwater condition was used for modeling purposes. Further consideration of impacts of additional flow into the Deer Prairie Slough watershed should be taken into account during final evaluation of BMP's. Table 3-3 summarizes BMP#3 analysis results.

Table 3-3: BMP#3 Results Summary

Sub-Watershed	Bench Mark Total Flooded Area (Acres)	BMP3 Total Flooded Area (Acres)	BMP3 Total Flooded Area Change (%)	Bench Mark Flooded Street Length (Feet)	BMP3 Flooded Street Length (Feet)	BMP3 Flooded Street Length Change (%)	Bench Mark Flooded Parcels (Units)	BMP3 Flooded Parcels (Units)	BMP3 Flooded Parcels Change (%)
A	58	58	0.0	7,959	7,958	0.0	2	2	0.0
B	15,839	15,720	-0.8	304,750	282,118	-7.4	665	568	-14.6
C	724	724	-0.1	118,951	118,890	-0.1	38	38	0.0
D	150	150	-0.2	38,510	38,348	-0.4	15	15	0.0
E	407	407	-0.1	47,961	47,880	-0.2	2	2	0.0
F	98	98	-0.3	22,234	22,141	-0.4	1	1	0.0
G	250	250	0.0	53,687	53,663	0.0	17	17	0.0
H	199	198	-0.3	1,082	1,065	-1.5	2	2	0.0
I	165	165	0.0	21,519	21,463	-0.3	2	2	0.0
J	335	316	-5.7	84,088	73,854	-12.2	15	13	-13.3
K	240	240	0.0	45,022	45,022	0.0	5	5	0.0
L	69	69	0.0	11,354	11,354	0.0	0	0	0.0
M	2,426	2,426	0.0	0	0	0.0	0	0	0.0
N	150	150	0.0	14,407	14,407	0.0	1	1	0.0
O	189	189	0.0	56,008	55,998	0.0	9	9	0.0
P	191	184	-3.4	11,134	10,572	-5.0	6	4	-33.3
Q	3,733	3,731	-0.1	0	0	0.0	0	0	0.0
R	2,294	2,199	-4.1	86,929	64,689	-25.6	43	27	-37.2
S	2,489	2,486	-0.1	23,286	20,653	-11.3	74	73	-1.4
T	206	206	0.0	14,915	14,892	-0.2	5	5	0.0
U	9,907	9,907	0.0	8,973	8,973	0.0	19	19	0.0
V	553	552	-0.2	20,054	19,978	-0.4	6	6	0.0
W	1,207	1,207	0.0	0	0	0.0	0	0	0.0
X	92	86	-5.6	7,471	6,029	-19.3	2	2	0.0
Y	189	184	-2.4	70,162	68,020	-3.1	11	9	-18.2
Z	51	51	-0.2	14,978	14,924	-0.4	0	0	0.0
Total	42,211	41,953	-0.6	1,085,434	1,022,891	-5.8	940	820	-12.8

3.3.1.4 *BMP #4: R-580 Improvements*

Objective:

The objective of this alternative is to induce additional flows through Creighton waterway by improving current conveyance capacity in the R-580 waterway.

Description:

Waterway R-580's bottom profile was reset assuming a flat ditch at its lower elevation of 15.0 feet, NAVD along the entire stretch. The current bottom configuration of the R-580 waterway transitions between 17.71 feet, NAVD88 bottom elevation on the most western end to 23.0 feet, NAVD88 bottom elevation at the most eastern end and sags between these ends at elevation 15.0 feet, NAVD88 (see Figure 3-4).

Results:

This alternative results in small improvements within the vicinity of Big Slough. However, and as intended, additional flows were induced towards Creighton waterway. Inducing additional flow through Creighton waterway will result in additional flooding near I-75 for this particular rainfall event as shown on Figure 3-4. A summary of BMP#4 analysis results is presented in Table 3-4.

Table 3-4: BMP#4 Results Summary

Sub-Watershed	Bench Mark Total Flooded Area (Acres)	BMP4 Total Flooded Area (Acres)	BMP4 Total Flooded Area Change (%)	Bench Mark Flooded Street Length (Feet)	BMP4 Flooded Street Length (Feet)	BMP4 Flooded Street Length Change (%)	Bench Mark Flooded Parcels (Units)	BMP4 Flooded Parcels (Units)	BMP4 Flooded Parcels Change (%)
A	58	58	-0.1	7,959	7,953	-0.1	2	2	0.0
B	15,839	15,806	-0.2	304,750	298,627	-2.0	665	638	-4.1
C	724	725	0.1	118,951	119,411	0.4	38	38	0.0
D	150	151	0.2	38,510	38,526	0.0	15	15	0.0
E	407	408	0.1	47,961	48,223	0.6	2	2	0.0
F	98	99	0.4	22,234	22,517	1.3	1	1	0.0
G	250	250	0.1	53,687	53,782	0.2	17	17	0.0
H	199	199	-0.1	1,082	1,077	-0.4	2	2	0.0
I	165	165	0.1	21,519	21,636	0.6	2	2	0.0
J	335	329	-1.9	84,088	80,578	-4.2	15	15	0.0
K	240	240	0.0	45,022	45,026	0.0	5	5	0.0
L	69	69	0.0	11,354	11,354	0.0	0	0	0.0
M	2,426	2,426	0.0	0	0	0.0	0	0	0.0
N	150	150	0.0	14,407	14,412	0.0	1	1	0.0
O	189	189	0.1	56,008	56,041	0.1	9	9	0.0
P	191	189	-0.7	11,134	11,005	-1.2	6	5	-16.7
Q	3,733	3,720	-0.4	0	0	0.0	0	0	0.0
R	2,294	2,288	-0.3	86,929	85,260	-1.9	43	43	0.0
S	2,489	2,489	0.0	23,286	22,823	-2.0	74	74	0.0
T	206	206	0.0	14,915	14,957	0.3	5	5	0.0
U	9,907	9,910	0.0	8,973	8,973	0.0	19	19	0.0
V	553	577	4.3	20,054	23,139	15.4	6	10	66.7
W	1,207	1,207	0.0	0	0	0.0	0	0	0.0
X	92	90	-1.3	7,471	7,215	-3.4	2	2	0.0
Y	189	188	-0.4	70,162	69,897	-0.4	11	11	0.0
Z	51	51	-0.1	14,978	14,939	-0.3	0	0	0.0
Total	42,211	42,179	-0.1	1,085,434	1,077,371	-0.7	940	916	-2.6

3.3.1.5 *BMP #5: Increase Capacity on Southern Boundary*

Objective:

The objective of this alternative is to evaluate the system response when doubling the southern boundary discharge capacity into Charlotte Harbor area.

The BMP would involve conveyance improvements, construction of new structures and/ or reconditioning of existing structures, maintenance activities, real estate acquisition, and detailed evaluation of the southern boundary through hydrology and hydraulic modeling.

Description:

All structures discharging from Cocoplum waterway into the Charlotte Harbor area under Hillsborough Blvd and their upstream weirs were doubled in capacity. A total of 13 structures under Hillsborough Blvd were double in the model and a total of 6 lateral weirs along Cocoplum waterway were doubled in size (see Figure 3-5).

Results:

This alternative was evaluated for information purposes only, as it is understood that inducing additional flows into Charlotte Harbor would not be desirable. Results indicate that improvements relative to house flooding were not significant; however roads experienced a considerable flood reduction between S Sumter Blvd and Atwater Dr. (see Figure 3-5). A summary of BMP#5 analysis results is presented in Table 3-5.

Table 3-5: BMP#5 Results Summary

Sub-Watershed	Bench Mark Total Flooded Area (Acres)	BMP5 Total Flooded Area (Acres)	BMP5 Total Flooded Area Change (%)	Bench Mark Flooded Street Length (Feet)	BMP5 Flooded Street Length (Feet)	BMP5 Flooded Street Length Change (%)	Bench Mark Flooded Parcels (Units)	BMP5 Flooded Parcels (Units)	BMP5 Flooded Parcels Change (%)
A	58	58	0.1	7,959	8,001	0.5	2	1	-50.0
B	15,839	15,836	0.0	304,750	304,487	-0.1	665	665	0.0
C	724	612	-15.6	118,951	75,331	-36.7	38	25	-34.2
D	150	121	-19.8	38,510	20,694	-46.3	15	7	0.0
E	407	395	-3.1	47,961	42,761	-10.8	2	2	0.0
F	98	76	-22.7	22,234	8,236	-63.0	1	1	-11.8
G	250	245	-2.1	53,687	51,993	-3.2	17	15	0.0
H	199	196	-1.4	1,082	1,000	-7.6	2	2	-50.0
I	165	143	-13.1	21,519	8,237	-61.7	2	1	0.0
J	335	335	0.0	84,088	84,042	-0.1	15	15	0.0
K	240	238	-0.8	45,022	44,688	-0.7	5	5	0.0
L	69	67	-2.1	11,354	11,317	-0.3	0	0	0.0
M	2,426	2,426	0.0	0	0	0.0	0	0	0.0
N	150	149	-0.6	14,407	14,407	0.0	1	1	0.0
O	189	180	-4.6	56,008	51,322	-8.4	9	9	0.0
P	191	191	0.0	11,134	11,133	0.0	6	6	0.0
Q	3,733	3,733	0.0	0	0	0.0	0	0	0.0
R	2,294	2,293	-0.1	86,929	86,339	-0.7	43	43	0.0
S	2,489	2,489	0.0	23,286	23,282	0.0	74	74	0.0
T	206	206	-0.3	14,915	14,756	-1.1	5	5	0.0
U	9,907	9,907	0.0	8,973	8,973	0.0	19	19	0.0
V	553	553	0.0	20,054	20,047	0.0	6	6	0.0
W	1,207	1,207	0.0	0	0	0.0	0	0	0.0
X	92	92	0.0	7,471	7,471	0.0	2	2	0.0
Y	189	189	0.0	70,162	70,161	0.0	11	11	0.0
Z	51	51	0.0	14,978	14,976	0.0	0	0	0.0
Total	42,211	41,988	-0.5	1,085,434	983,655	-9.4	940	915	-2.7

3.3.1.6 *BMP #6: Upstream Detention Alternative*

Objective:

The objective of this analysis is to examine the effects when attenuating peak flow rates in agricultural areas along the Big Slough canal with a series of new detention facilities.

This BMP would involve construction of stormwater management storage areas, maintenance activities and real estate acquisition.

Description:

In offsite areas, seven detention facilities were added to the model. Each detention area has a 100 acre footprint and is more than 10 feet deep. These areas were located on upland sites along Big Slough canal where feasible (see Figure 3-6). The bottom elevations of these detention areas were set at the adjacent canal initial elevation. Each of these ponds was linked to the Big Slough canal by a 500 feet weir. The crest elevations were set at the bottom of the pond. The total anticipated detained volume is 600 acre-ft per detention site, a total of 4,200 acre-ft.

Results:

Results indicate that the supplemental detention area alternative produces little reduction in peak water surface elevations. Elevations along Big Slough were reduced by only 0.1 to 0.6 feet, making this option less attractive. The extent of flooding for this BMP is essentially the same as the existing scenario with few flood reduction areas along the Big Slough canal (see Figure 3-6). Initial evaluation suggests that the costs associated with purchasing the proposed detention areas from private landowners will likely be high. In addition the complexity of building reservoirs will make it a less attractive solution; e.g. runup wave analysis will increase the height of the perimeter berm. Total costs include an initial cost of location, proper land acquisition and construction, in addition to recurring maintenance and operation costs. A summary of BMP#6 analysis results is presented in Table 3-6.

Table 3-6: BMP#6 Results Summary

Sub-Watershed	Bench Mark Total Flooded Area (Acres)	BMP6 Total Flooded Area (Acres)	BMP6 Total Flooded Area Change (%)	Bench Mark Flooded Street Length (Feet)	BMP6 Flooded Street Length (Feet)	BMP6 Flooded Street Length Change (%)	Bench Mark Flooded Parcels (Units)	BMP6 Flooded Parcels (Units)	BMP6 Flooded Parcels Change (%)
A	58	58	0.0	7,959	7,959	0.0	2	2	0.0
B	15,839	15,645	-1.2	304,750	280,497	-8.0	665	563	-15.3
C	724	724	-0.1	118,951	118,818	-0.1	38	38	0.0
D	150	150	-0.5	38,510	38,067	-1.2	15	15	0.0
E	407	407	-0.1	47,961	47,827	-0.3	2	2	0.0
F	98	98	-0.6	22,234	22,019	-1.0	1	1	0.0
G	250	250	0.0	53,687	53,659	-0.1	17	17	0.0
H	199	197	-0.8	1,082	1,021	-5.6	2	2	0.0
I	165	165	-0.1	21,519	21,418	-0.5	2	2	0.0
J	335	311	-7.2	84,088	72,123	-14.2	15	13	-13.3
K	240	240	0.0	45,022	45,022	0.0	5	5	0.0
L	69	69	0.0	11,354	11,354	0.0	0	0	0.0
M	2,426	2,426	0.0	0	0	0.0	0	0	0.0
N	150	150	0.0	14,407	14,407	0.0	1	1	0.0
O	189	189	-0.1	56,008	55,961	-0.1	9	9	0.0
P	191	183	-3.8	11,134	10,588	-4.9	6	4	-33.3
Q	3,733	3,723	-0.3	0	0	0.0	0	0	0.0
R	2,294	2,268	-1.2	86,929	80,023	-7.9	43	42	-2.3
S	2,489	2,485	-0.2	23,286	20,307	-12.8	74	73	-1.4
T	206	206	0.0	14,915	14,866	-0.3	5	5	0.0
U	9,907	9,907	0.0	8,973	8,973	0.0	19	19	0.0
V	553	550	-0.5	20,054	19,833	-1.1	6	6	0.0
W	1,207	1,207	0.0	0	0	0.0	0	0	0.0
X	92	88	-4.4	7,471	6,413	-14.2	2	2	0.0
Y	189	187	-0.7	70,162	69,679	-0.7	11	11	0.0
Z	51	51	-0.4	14,978	14,887	-0.6	0	0	0.0
Total	42,211	41,934	-0.7	1,085,434	1,035,721	-4.6	940	832	-11.5

3.3.2 *BMP Evaluation of Four Crossings*

Under this evaluation, as requested by the City of North Port, hydraulic performance and the effects of potential conveyance improvements at four sites, including: R-36 Canal at I-75, Myakkahatchee Creek at I-75, R-36 Canal at Tropicaire Boulevard, and Myakkahatchee Creek at Tropicaire Boulevard were analyzed.

A systematic evaluation was conducted to first understand the existing hydraulic behavior of each of the four crossings under various synthetic storm events. Head differences across each structure, flow conditions at peak discharge, and hydraulic connectivity (including flow patterns in adjacent areas) were assessed to understand unique conditions at each crossing.

In order to evaluate effectiveness of potential BMP improvements at these locations (including any resulting flood reduction and/or downstream flood increase), conveyance capacity at each site was increased by doubling the number of existing structures. This was achieved by adding a duplicate set of model reach elements at each location. A description of existing crossings and the applied BMP for evaluation are provided in Table 3-7.

Table 3-7: Location and Description of Existing and BMP Conditions

Crossing Location	Existing Crossing	BMP Condition
R-36 Canal at I-75	Two (2) 7.5' x 6' box culverts	Two (2) identical 7.5' x 6' box culverts were added in parallel to existing structure
Myakkahatchee Creek at I-75	Two (2) parallel bridges with 8 piers and a total span of 540 feet	Two (2) identical parallel bridges were added in parallel to existing structure
R-36 Canal at Tropicaire Blvd	Two (2) 5' diameter RCP culverts	Two (2) identical 5' diameter RCP culverts were added in parallel to existing structure
Myakkahatchee Creek at Tropicaire Blvd	One (1) bridge with 4 piers and a total span of 150 feet	One (1) identical bridge was added in parallel to existing structure

3.3.2.1 *R-36 Canal at I-75 Evaluation*

Existing condition model results indicate that more than two feet of head difference occurs across this structure during the 100-year storm event (see Table 3-8 and Figures 3-7 & 3-8). Under the proposed BMP condition, model results indicate that a peak stage reduction of up to 0.6 feet occurs upstream of the crossing, while a stage increase of approximately 0.6 feet occurs in the downstream areas. It is notable that reduced discharges are observed from the R-36 Canal westward into the adjacent Deer Prairie Slough watershed for the proposed BMP condition. This overflow connection with the adjacent watershed to the west is located north of I-75. The reduced overflow results in an increased total volume remaining within the North Port area, by virtue of the improved conveyance capacity of the proposed BMP. In summary, increasing the crossing capacity of the R-36 Canal at I-75 may reduce water levels upstream of the crossing, but

also raises flood elevations in the downstream areas. Mitigation of flooding in downstream areas was beyond the scope of this evaluation.

Table 3-8: R-36 Canal at I-75 Crossing Evaluation Results Summary

Table 3-8 (a): Existing Condition Upstream and Downstream Node Maximum Stages and Flows

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)*	NR3210	17.47	19.57	20.38	20.99	21.69	22.30
D/S Node Max Stage (ft)*	NR3220	16.82	18.33	18.86	19.20	19.56	19.92
Difference in Stage (ft)	n/a	0.65	1.24	1.52	1.78	2.14	2.38
Flow (cfs)	n/a	424	586	654	710	779	846

Table 3-8 (b): With BMP Upstream and Downstream Node Maximum Stages and Flows

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)*	NR3210	17.05	18.97	19.74	20.34	21.08	22.08
D/S Node Max Stage (ft)*	NR3220	16.88	18.61	19.25	19.69	20.19	20.74
Difference in Stage (ft)	n/a	0.17	0.36	0.49	0.65	0.90	1.34
Flow (cfs)	n/a	433	631	735	845	997	1223

Table 3-8 (c): Difference in Flows and Stages between BMP and Existing Condition

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)	NR3210	-0.42	-0.60	-0.64	-0.65	-0.61	-0.22
D/S Node Max Stage (ft)	NR3220	0.06	0.28	0.39	0.49	0.63	0.82
Flow (cfs)	n/a	9	45	82	135	218	377

*Vertical datum of stage reported in the table is with reference to NAVD88 Datum.

3.3.2.2 *Myakkahatchee Creek at I-75 Evaluation*

Existing condition model results indicate that approximately one foot of head difference occurs across this structure during extreme storm events (see Table 3-9 and Figures 3-9 & 3-10). This head difference is relatively small considering the magnitude of flow that arrives from the upstream contributing watershed (up to 8000 cubic feet per second). The applied BMP at this location assumes that the conveyance capacity of the bridge

crossing was doubled. In other words, an identical, parallel 540-foot bridge span was added to investigate the benefit of increasing bridge capacity. Under this hypothetical scenario, model results indicate that a localized stage reduction of 0.7 feet is observed immediately at the upstream end of the crossing. However, peak stage reductions decrease further upstream of the crossing along the creek. No significant change in peak elevations is observed 1,200 feet upstream of the crossing. Also, no significant change to flooding conditions is observed in areas downstream of the crossing. In summary, increasing the crossing capacity of the bridge over Myakkahatchee Creek at I-75 may reduce water levels immediately upstream of the crossing, but does not generally improve flooding conditions north of I-75. The area impacted by this improvement is very localized and would not justify the cost of the improvement.

3.3.2.3 *R-36 Canal at Tropicaire Boulevard Evaluation*

Existing condition model results indicate that up to three feet of head difference occurs across this structure during various storm events (see Table 3-10 and Figures 3-11 & 3-12). Under the proposed BMP conditions, model results indicate a peak stage reduction of approximately 0.8 feet upstream of the crossing, while a stage increase of up to 1.1 feet occurs downstream of Tropicaire. During all events, discharges from the R-36 canal into Deer Prairie Slough watershed are observed north of Tropicaire Boulevard. The proposed BMP results in a reduction of those discharges to Deer Prairie Slough and a resulting increased total volume remaining within the North Port area. In summary, while increasing the crossing capacity of the R-36 Canal at Tropicaire Boulevard may reduce water levels upstream of the crossing, it also raises flood elevations in downstream areas. Mitigation of flooding in downstream areas was beyond the scope of this evaluation.

3.3.2.4 *Myakkahatchee Creek at Tropicaire Boulevard Evaluation*

Existing condition model results indicate that the maximum calculated head difference for the various storm events is 0.2 feet; therefore the bridge is not causing a flow restriction (see Table 3-11 and Figures 3-13 & 3-14). Regardless, a BMP was applied for evaluation and assumes that the conveyance capacity was increased (doubled) by adding an identical bridge element in parallel to the existing structure. Under this scenario, model results indicate that a maximum localized stage reduction of approximately 0.1 feet was calculated, yet no significant change is observed further upstream nor downstream of the crossing. In summary, increasing the crossing capacity of the bridge over Myakkahatchee Creek at Tropicaire Boulevard does not substantially improve flooding conditions north of I-75.

Model results (maximum stages and maximum flows) for various storm events (Mean Annual, 5-year, 10-year, 25-year, 50-year, and 100-year) are provided in tabular form within the accompanying geodatabase.

Table 3-9: Myakkahatchee Creek at I-75 Crossing Evaluation Results Summary

Table 3-9 (a): Existing Condition Upstream and Downstream Node Maximum Stages and Flows

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)*	NB0750	20.40	21.89	22.19	22.46	22.82	23.93
D/S Node Max Stage (ft)*	NB0780	19.81	20.86	21.13	21.37	21.79	22.83
Difference in Stage (ft)	n/a	0.59	1.03	1.07	1.09	1.02	1.10
Flow (cfs)	n/a	1306	3045	3640	4236	5290	7816

Table 3-9 (b): With BMP Upstream and Downstream Node Maximum Stages and Flows

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)*	NB0750	19.97	21.16	21.45	21.71	22.14	23.35
D/S Node Max Stage (ft)*	NB0780	19.82	20.87	21.14	21.39	21.83	23.02
Difference in Stage (ft)	n/a	0.16	0.29	0.31	0.32	0.30	0.33
Flow (cfs)	n/a	1311	3601	3673	4291	5175	8509

Table 3-9 (c): Difference in Flows and Stages between BMP and Existing Condition

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)	NB0750	-0.43	-0.72	-0.75	-0.75	-0.68	-0.58
D/S Node Max Stage (ft)	NB0780	0.00	0.01	0.01	0.02	0.04	0.20
Flow (cfs)	n/a	5	556	33	55	-115	692

*Vertical datum of stage reported in the table is with reference to NAVD88 Datum.

Table 3-10: R-36 Canal at Tropicaire Boulevard Crossing Evaluation Results Summary

Table 3-10 (a): Existing Condition Upstream and Downstream Node Maximum Stages and Flows

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)*	NR0170	21.57	21.99	22.08	22.15	22.22	22.33
D/S Node Max Stage (ft)*	NR3190	18.15	19.74	20.48	21.07	21.73	22.31
Difference in Stage (ft)	n/a	3.42	2.25	1.61	1.08	0.49	0.01
Flow (cfs)	n/a	414	420	420	420	421	420

Table 3-10 (b): With BMP Upstream and Downstream Node Maximum Stages and Flows

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)*	NR0170	20.77	21.77	21.94	22.06	22.18	22.32
D/S Node Max Stage (ft)*	NR3190	19.29	20.68	21.11	21.49	21.90	22.32
Difference in Stage (ft)	n/a	1.48	1.10	0.83	0.57	0.28	0.00
Flow (cfs)	n/a	550	575	576	578	578	577

Table 3-10 (c): Difference in Flows and Stages between BMP and Existing Condition

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)	NR0170	-0.80	-0.21	-0.14	-0.09	-0.04	0.00
D/S Node Max Stage (ft)	NR3190	1.14	0.94	0.63	0.42	0.17	0.01
Flow (cfs)	n/a	136	156	156	157	158	157

*Vertical datum of stage reported in the table is with reference to NAVD88 Datum.

Table 3-11: Myakkahatchee Creek at Tropicaire Boulevard Crossing Evaluation Results Summary

Table 3-11(a): Existing Condition Upstream and Downstream Node Maximum Stages and Flows

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)*	NB0700	22.79	24.28	24.51	24.71	24.99	26.13
D/S Node Max Stage (ft)*	NB0710	22.70	24.08	24.31	24.52	24.83	26.07
Difference in Stage (ft)	n/a	0.09	0.19	0.20	0.20	0.16	0.06
Flow (cfs)	n/a	1332	2582	2785	2890	2973	2756

Table 3-11(b): With BMP Upstream and Downstream Node Maximum Stages and Flows

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)*	NB0700	22.73	24.17	24.41	24.63	24.94	26.11
D/S Node Max Stage (ft)*	NB0710	22.71	24.12	24.35	24.57	24.88	26.09
Difference in Stage (ft)	n/a	0.02	0.05	0.06	0.06	0.05	0.02
Flow (cfs)	n/a	1353	2712	3001	3167	3278	3031

Table 3-11(c): Difference in Flows and Stages between BMP and Existing Condition

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)	NB0700	-0.06	-0.10	-0.10	-0.09	-0.06	-0.02
D/S Node Max Stage (ft)	NB0710	0.01	0.04	0.04	0.05	0.05	0.02
Flow (cfs)	n/a	21	131	217	277	305	275

*Vertical datum of stage reported in the table is with reference to NAVD88 Datum.

3.3.3 *WCS-162 Evaluation*

WCS-162 is located on the R-36 Canal, north of Interstate 75, and immediately upstream of Tropicaire Boulevard (refer to Figure 3-15). This is the only gated weir structure on the R-36 Canal, with one 2.25 feet high by 2 feet wide pull up slide gate. The City generally operates this structure by fully opening the gate in anticipation of a storm event to lower the water level in the R-36 canal to minimize potential upstream flooding; otherwise, the gate remains closed. The City staff would like to determine if adding gates would help draw down the canal more quickly and increase conveyance capacity.

3.3.3.1 *R-36 Canal Drawdown Evaluation*

To reduce impacts downstream of WCS-162 while improving peak conditions upstream of the structure, an evaluation was performed to determine the benefits of adding additional gates. The evaluation included calculating the drawdown time for the R-36 canal and the additional conveyance capacity provided by the additional gates.

To evaluate BMPs at WCS-162, Ardaman requested to survey the structure to better understand the geometry of the structure and canal with the purpose of assessing availability of adequate space for additional gates. The survey data provided by Van Buskirk/Fish & Associates, Inc. is included in Appendix A, and the structure pictures are provided in Appendix B. The existing condition model was revised using the latest (2014) survey information for this BMP Evaluation. The update model simulated results rendered no change in model results compared to the May 2012 Governing Board approved model.

The benefits of reducing time required to lower R-36 canal elevation by adding gates at WCS-162 upstream of the structure were assessed by performing a drawdown analysis. For the drawdown evaluation, the R-36 canal upstream of WCS-162 was assumed to be at the control elevation of the weir (elevation 18.3 feet NAVD88). The water level at the canal was simulated by fully opening the existing gate with no additional flows coming into the canal. The existing condition drawdown simulation results indicates that it would take approximately 18 hours to lower the canal to elevation 15 feet (refer to Figure 3-16).

The canal drawdown simulation was repeated for one and two additional gates scenarios. The canal stage hydrographs upstream of the structure with additional gates are also plotted in Figure 3-16. As shown in Figure 3-16, the time required to drawdown R-36 canal will decrease to 11 hours by adding an identical gate. When 2 additional matching gates are provided, the time require to drawdown R-36 canal would decrease to 9 hours. Therefore, the total time required to drawdown R-36 canal (to elevation 15 feet) upstream of WCS-162 will be reduced by 7 and 9 hours by adding one and two additional gates respectively.

3.3.3.2 *Storm Events Simulation Results*

The mean annual, 5-year, and 10-year storm events were simulated using the updated existing condition model with 2014 survey information. The City's water control structure operation criteria were employed in these simulations. The gates are closed at the

beginning of the simulation, and they will be fully open when Big Slough Canal stage at Tropicaire rises to Elevation 15.88 feet NAVD88.

Benefits of flood control at the upstream of WCS-162 during a storm event were evaluated by simulating the mean annual storm event starting at the drawdown stage levels (Elevation 15 feet NAVD88). For this evaluation, initial stages in R-36 Canal upstream of WCS-162 were set to the drawdown levels, i.e. simulated canal stages after 18 hours of drawdown simulation. The lower initials at the canal will account for the additional canal storage capacity available upstream of WCS-162. During the lower initial condition simulation, the WCS-162 gate was assumed to be opened throughout the simulation. Model results with lowered initials were compared to the results with the normal initial stage, which is at the invert elevation (at elevation 18.29 feet NAVD88) of WCS-162 weir. Table 3-12 presents model results and comparison of max stages of R-36 canal upstream of WCS-162 weir with normal and lowered initial stage at the canal for the mean annual storm event. As indicated in the table, simulated results suggest that there will be no difference in peak stages in R-36 canal due to the lower initial canal stage. It should be noted that model results suggest the 50-foot wide weir at WCS-162 overtops by 2.6 feet conveying 328 cfs of peak flow across the structure during the mean annual storm event. The R-36 Canal upstream of WCS-162 holds approximately 30 acre-feet of storage capacity behind the gate, whereas more than 3,000 acre-feet of runoff volume is conveyed by the canal during the mean annual storm event. The additional available storage seems to be insignificant compared to the runoff conveyed by the canal during the storm event.

In addition, benefits of having one additional gate with the lowered R-36 canal stages upstream of WCS-162 were also evaluated. For this scenario, both gates (one existing and one additional BMP gate) were assumed to be fully opened throughout the simulation. The model results for mean annual storm event for this scenario are also presented in Table 3-12. The simulated results suggest that there will be no difference in R-36 canal max stages upstream of WCS-162 with an additional gate at the structure. As no difference in peak stages were predicted for the mean annual storm event, no other higher return period storm events (5-year and 10-year) were analyzed with additional gates.

In conclusion, providing one or two additional gates at WCS-162 will help to reduce the time required to drawdown canal levels at the upstream of the structure; however the model results suggest that lower initial levels in R-36 canal upstream of the structure will provide no benefits in terms of reducing flooding at the upstream areas even for small storm events such as mean annual storm event. Also, the modeling results suggest that there would be no adverse impacts in the downstream of WCS-162 due to the additional gate.

Table 3-12: Mean Annual Event Simulated Maximum Stages in R-36 Canal Upstream of WCS-162

Model Node+	Existing Condition Max Stage (ft, NAVD88)	Scenario 1: Existing with Lowered Initials		Scenario 2: One Additional Gate BMP with Lowered Initials	
		Max Stage (ft, NAVD88)	Difference in Max Stage (ft)	Max Stage (ft, NAVD88)	Difference in Max Stage(ft)
NR0170*	21.55	21.55	0.00	21.56	0.01
Water Control Structure WCS-162					
NR3160**	21.86	21.86	0.00	21.85	0.00
NR3150	21.87	21.86	0.00	21.86	0.00
NR3140	22.09	22.09	0.00	22.09	0.00
NR3130	22.23	22.23	0.00	22.23	0.00
NR3125	22.42	22.41	-0.01	22.41	-0.01
NR3120	22.58	22.57	-0.01	22.57	-0.01
NR3110	22.76	22.76	-0.01	22.76	-0.01
NR3100	22.85	22.84	-0.01	22.84	-0.01
NR3090	22.94	22.94	0.00	22.94	0.00
NR3080	23.01	23.01	0.00	23.01	0.00
NR3070	23.09	23.09	0.00	23.08	0.00
NR3060	23.20	23.20	0.00	23.20	0.00
NR3050	23.40	23.40	0.00	23.40	0.00
NR3040	23.44	23.44	0.00	23.44	0.00
NR3030	23.51	23.51	0.00	23.51	0.00
NR3025	23.58	23.58	0.00	23.58	0.00
NR3020	23.59	23.59	0.00	23.59	0.00
NR3010	23.62	23.62	0.00	23.62	0.00
NB5695	23.65	23.65	0.00	23.65	0.00

+ Model nodes are presented from downstream to upstream location at R-36 canal

* Model Node Downstream of WCS-162

** Model Node Upstream of WCS-162

3.3.4 *Price Boulevard LOS Improvements*

Existing condition model results (May 2012 Governing Board approved model) predict that West Price Boulevard would intermittently flood between Locher Road and the Big Slough Canal during the 10, 25, and 100-year, 24-hour storm events. The currently designated City of North Port Level of Service (LOS) is shown in Figure 3-17. As shown on this figure, the West Price Boulevard stretch is identified as an arterial street that floods during the 100-year, 24-hour design storm event. This arterial street is critical to stormwater emergency response since it provides access to emergency facilities such as North Port Utilities Building, North Port High School and Heron Creek Middle School. Therefore, the City of North Port requested further evaluation of the stretch of West Price Boulevard between North Biscayne Boulevard and the Big Slough Canal to provide BMP recommendations to meet the City of North Port LOS criteria. City Unified Land Development Code Chapter 18 Level of Service criteria for arterial roads states that flooding must be less than 6 inches, as measured at the outside edge of pavement in a 100-year, 24-hour design storm event.

Ardaman staff reviewed the May 2012 Governing Board approved model setup within the area of interest (AOI) to verify whether the current model adequately represents the 2014 condition. With desktop and field reconnaissance of the area, it was observed that a section of the surface and sub-surface drainage systems near the North Port High School had been recently updated. Ardaman recommended surveying the AOI to better represent the existing condition. The survey data provided by Van Buskirk/Fish & Associates, Inc. is included in Appendix C.

Existing (2014) Condition Description:

Based on recent survey, stormwater runoff collected from the north and south swales of West Price Boulevard generally flows west from the North Port Utilities Building, whereas stormwater runoff from the remaining areas flows east from this location. Accumulated stormwater runoff going west from the North Port Utilities Building ultimately flows north via the Indian burial ground toward the R-32 canal.

Stormwater runoff going east toward Big Slough is routed through a series of surface water features (ditches, swales and inlets) which connects to a sub-surface system along the north side of West Price Boulevard.

Existing Condition Model Update and Results:

The May 2012 Governing Board approved model was updated using the 2014 survey provided by Van Buskirk/Fish & Associates, Inc. The revised 100-year storm event model results indicate that West Price Boulevard would not flood near the North Port High School as previously predicted. However, the stretch of West Price Boulevard north of Little Salt Spring would still flood by 0.4 feet at the crown during the 10-year storm event. Survey data indicates that road overtopping would occur at the lowest point (near the culvert crossing) at 17.3 feet NAVD88. The model predicted the 25-year and 100-year storm maximum stages at West Price Boulevard are 17.9 and 18.2 feet NAVD88 respectively. The revised existing condition floodplain delineations for the 100-year storm event and the revised LOS are presented in Figure 3-18.

BMP Alternative Analysis

The objective of this series of BMPs is to mitigate flooding along the stretch of West Price Boulevard near the Indian burial ground to meet the existing City of North Port LOS criteria.

Five different BMP alternatives were considered. Only the three alternatives that were determined to be effective in improving the LOS are described below:

3.3.4.1 *West Price Boulevard BMP 1*

Description

The first BMP alternative involves dredging the R-24 and R-32 canals. As shown in Figure 3-19, this alternative would require: dredging 2,300 feet of R-24 canal and 1,800 feet of R-32 canal to add approximately 2 to 3 feet of depth; and installing one extra parallel 36-inch pipe at the existing culvert crossing, between Indian burial ground and the R-32 canal. Figures showing comparison of existing and BMP cross-sections and bottom profiles of these canals are provided in Appendix D.

The City is not allowed to disturb the 50-foot wide drainage right-of-way through the Indian burial ground.

Results

Model results, comparison of floodplains, and the maximum stages at notable locations are presented in Figure 3-19. Model results with BMP_1 alternative suggest that West Price Boulevard would not overtop during the 25-year storm event. In addition, this alternative would reduce flooding on some local streets (Dundee Ave, Surf Ave, and San Salvador Road) located north of R-32 canal.

The model predicted that the 100-year maximum stage at West Price Boulevard with BMP_1 alternative will be reduced from 18.2 to 17.5 feet NAVD88. West Price Boulevard would still overtop by 0.2 feet over the crown of the road at the lowest section during the 100-year storm event. However, the road would be passable according to City of North Port LOS criteria. Figure 3-20 shows the comparison of the 100-year floodplain and maximum stages at notable locations with BMP 1 alternative. Model results also indicate that there will be no adverse impacts at downstream areas due to this improvement.

3.3.4.2 *West Price Boulevard BMP 2*

Description

The second BMP alternative consists of raising the road (West Price Boulevard) such that it would not flood during the 100-year design storm event. This alternative would involve raising approximately 1,900 feet of West Price Boulevard to an elevation of 18.5 feet NAVD88. Survey data suggests that the lowest segment of the road, which is located at the culvert crossing, needs to be raised by 1.2 feet to reach an elevation of 18.5 feet NAVD88. Figure 3-21 shows the comparison of the 100-year floodplain as well

as the extent of West Price Boulevard that needs to be raised to reduce flooding potential during the event.

Results

Model results suggest that the 100-year peak stages upstream and downstream of the culvert across West Price Boulevard would be 18.2 feet NAVD88 with this alternative. The model predicted the 100-year maximum stage at West Price Boulevard is below the recommended raised road crown elevation of 18.5 feet NAVD88. The peak stage model results suggest that there will be no adverse impacts or increase in stages upstream or downstream of the improvement for any modeled storm event.

Additional right-of-way requirement to raise the road and its availability should be thoroughly assessed prior to selecting this BMP alternative.

3.3.4.3 *West Price Boulevard BMP 3*

Description

The third BMP alternative evaluated incorporates both BMP_1 and BMP_2 improvements, i.e. dredging the R-32 and R-24 canals, adding a new pipe crossing, and raising the road such that it would not flood during the 100-year storm event.

Results

Model results suggest that the 100-year peak stage upstream of the culvert across West Price Boulevard would be 17.6 feet NAVD88 with this alternative. Figure 3-22 shows the comparison of the 100-year floodplain as well as the elements of BMP_3 improvements. This alternative would require raising approximately 950 feet of West Price Boulevard to elevation 18.0 feet NAVD88. Compared to BMP_2 improvements, this alternative would reduce the required road improvement length by half at a lower elevation (6 inches lower than BMP_2). Similar to BMP_1 and BMP_2, the peak stage model results suggest that there will be no adverse impacts or increase in stages upstream or downstream of the road improvement for any model storm event.

3.3.4.4 *Other Evaluated BMPs*

In addition to the three previously described BMP alternatives, a few other BMPs were evaluated. However, modeling results suggest that theses BMPs would not mitigate the flooding conditions along the evaluated stretch of West Price Boulevard.

One of the other BMPs evaluated was to install a 24-inch pipe at the south side of West Price Boulevard near the culvert that would run approximately 1,400 feet to the east and connect to the existing sub-surface system inlet. This BMP did not show any improvements since the BMP pipe is too long and there was not sufficient hydraulic gradient available to convey the necessary flow rate through the pipe.

Another BMP evaluated was to provide a 20-foot wide cut/swale that would connect the flooded area south of West Price Boulevard to the south towards the Little Salt Spring basin. 25-year storm event model results suggest that this BMP alternative would lower

peak stages at West Price Boulevard only by 0.2 feet. However, the road would still flood during this event. Also, this BMP may raise environmental concerns considering that it would require diverting stormwater runoff from the road towards Little Salt Spring basin.

3.3.4.5 *Summary and Recommendations*

Various BMP alternatives were evaluated to mitigate flooding at West Price Boulevard with the purpose of meeting City of North Port LOS criteria. BMP_1 alternative (dredging R-24 and R-32 canals) would eradicate the road flooding in a 25-year design storm event, and it would minimize flooding in a 100-year storm event to make it passable during the event. BMP_2 alternative would eliminate road flooding in a 100-year design storm event by raising West Price Blvd. BMP_3 alternative would also eliminate West Price Boulevard road flooding in a 100-year storm event while minimizing road improvements. A summary of 100-year peak stages for each BMP alternatives and recommended road crown and edge of pavement elevations are provided in Table 3-13. It is estimated that it would cost $0.8 million, $0.9 million, and $1.3 million for BMP_1, BMP_2, and BMP_3, respectively (see Appendix E for the detailed cost estimates). These cost estimates are approximate, and they are used for the comparison purpose only. Considering the project cost, BMP_2 alternative (raising the road) appears to be the most effective approach to eliminate road flooding conditions for the 100-year design storm event. In 2010, the city cleaned these canals with the purpose of removing mucks accumulated at the bottom. It is recommended current cross-sections and bottom profiles of these canals be surveyed to verify dredging requirements prior to selecting dredging alternatives. Also, canal dredging cost could be less, if City of North Port performs the dredging using in-house resources.

Table 3-13: Summary of West Price Boulevard BMPs

BMP Description	100-year Flood Elevation (ft, NAVD88)		EOP Elevation (ft, NAVD88)		Road Crown Elevation (ft, NAVD88)		Preliminary Cost Estimate for Construction in 2017
	Without BMP	With BMP	Existing	Proposed	Existing	Proposed	
No. 1- Dredge R-24 and 32, add 36" pipe	18.2	17.5	17	17	17.3	17.3	$832,000
No. 2- Raise 1900 LF of Price Blvd 1.2' higher	18.2	18.2	17	18.2	17.3	18.5	$859,000
No. 3- Dredge R-24 and 32, add 36" pipe, Raise 850 LF of Price Blvd 0.7' higher	18.2	17.6	17	17.7	17.3	18.0	$1,308,000

The 25-year and 100-year storm events revised existing condition and BMP 1, 2, and 3 alternatives model results (maximum stages and maximum flows) are provided in tabular form within the accompanying geodatabase along with updated model network (basins, nodes, and reaches). CHAN model data and simulation run files for these alternatives are also included in an external hard drive.

4.0 CONCEPTUAL PERMIT APPLICATION

Conceptual permit application was not included in this project.

5.0 CONCLUSIONS

It is recommended that the City of North Port purchas the small number of habitable structures in which flooding is predicted in the 100 year event. Purchasing the affected properties may be more cost effective than implementing any BMPs. Figure 5-1 shows the 74 parcels (one parcel contains two habitable structures) identified in the LOS analysis, in addition to 25 parcels reported as flooded in 1992 and 27 properties reported as damaged in 2003 (also see Table 5-1 below). Several parcels were identified as flooded in more than one event, which is noted in the table.

It is recommended that finished floor elevations of the 101 parcels are acquired by survey, and finished floor elevations are compared with modeled 100 year event maximum stages, to determine which properties flood in the 100 year event. Highlighted rows indicate parcels that were identified as flooded in the LOS analysis, and have documented flooding in the 1992 and/or 2003 event.

Table 5-1: Summary of Parcels to Survey

PID	Address	City, State, Zip	In 100 Year Level of Service Analysis	Reported as Flooded in 1992	Reported as Flooded in 2003
1122-16-0325	1297 NACKMAN RD	NORTH PORT, FL 34288	Yes		
1008-25-5316	1400 LONGBOW AVE	NORTH PORT, FL 34288	Yes		
0976-26-4128	2386 VESTRIDGE ST	NORTH PORT, FL 34287	Yes		
0964-08-1404	2912 OKLAHOMA ST	NORTH PORT, FL 34286	Yes		
0995-18-2835	2989 SARLETTO ST	NORTH PORT, FL 34287		Yes	
0995-18-2836	2999 SARLETTO ST	NORTH PORT, FL 34287		Yes	
0967-06-0117	3166 SNOWBIRD ST	NORTH PORT, FL 34291	Yes	Yes	Yes
0993-26-4012	3236 MONTCLAIR CIR	NORTH PORT, FL 34287	Yes		
0993-26-3801	3262 MONTCLAIR CIR	NORTH PORT, FL 34287	Yes		
0993-26-3730	3589 MONTCLAIR CIR	NORTH PORT, FL 34287	Yes		
0993-26-3815	3626 MONTCLAIR CIR	NORTH PORT, FL 34287	Yes		
0993-26-3816	3652 MONTCLAIR CIR	NORTH PORT, FL 34287	Yes		

PID	Address	City, State, Zip	In 100 Year Level of Service Analysis	Reported as Flooded in 1992	Reported as Flooded in 2003
0954-14-2522	4268 BACKENSTO ST	NORTH PORT, FL 34291	Yes		Yes
1144-07-4316	4268 LEESBURG AVE	NORTH PORT, FL 34288	Yes		
1002-18-4613	4353 MCKIBBEN DR	NORTH PORT, FL 34287	Yes		
1002-27-6618	4399 MONGITE RD	NORTH PORT, FL 34287	Yes		
1002-18-4810	4440 MONGITE RD	NORTH PORT, FL 34287	Yes		
0955-15-4601	4441 COBBLER LN	NORTH PORT, FL 34286	Yes		
1002-27-6621	4441 MONGITE RD	NORTH PORT, FL 34287	Yes		
0996-19-1923	4531 NELE ST	NORTH PORT, FL 34287		Yes	
1002-18-4806	4534 MONGITE RD	NORTH PORT, FL 34287	Yes		
1002-27-6627	4567 MONGITE RD	NORTH PORT, FL 34287	Yes		
0996-19-1922	4573 NELE ST	NORTH PORT, FL 34287		Yes	
1002-27-6628	4583 MONGITE RD	NORTH PORT, FL 34287	Yes		
1002-27-6629	4599 MONGITE RD	NORTH PORT, FL 34287	Yes		
1002-27-6630	4609 MONGITE RD	NORTH PORT, FL 34287	Yes		
1002-27-6631	4625 MONGITE RD	NORTH PORT, FL 34287	Yes		
1002-18-5011	4628 MONGITE RD	NORTH PORT, FL 34287	Yes		
1002-18-5010	4640 MONGITE RD	NORTH PORT, FL 34287	Yes		
1002-27-6632	4641 MONGITE RD	NORTH PORT, FL 34287	Yes		
1002-18-5008	4668 MONGITE RD	NORTH PORT, FL 34287	Yes		
0996-19-4324	4943 GROBE ST	NORTH PORT, FL 34287	Yes		
0996-19-2317	4964 GROBE ST	NORTH PORT, FL 34287		Yes	
1001-27-6105	4974 ESCALANTE DR	NORTH PORT, FL 34287	Yes		
1001-27-6106	4982 ESCALANTE DR	NORTH PORT, FL 34287	Yes		
1001-27-6316	4983 ESCALANTE DR	NORTH PORT, FL 34287	Yes		
0996-19-4325	4987 GROBE ST	NORTH PORT, FL 34287	Yes		
1001-27-6107	4990 ESCALANTE DR	NORTH PORT, FL 34287	Yes		
0996-19-2318	4991 BULLARD ST	NORTH PORT, FL 34287		Yes	

PID	Address	City, State, Zip	In 100 Year Level of Service Analysis	Reported as Flooded in 1992	Reported as Flooded in 2003
0953-15-2713	5005 LACEY ST	NORTH PORT, FL 34286	Yes		Yes
0996-09-4126	5009 BULLARD ST	NORTH PORT, FL 34287	Yes		
0955-15-3218	5060 IBSON LN	NORTH PORT, FL 34286	Yes		
0942-15-3308	5089 HABLOW LN	NORTH PORT, FL 34286	Yes		
0942-15-3307	5101 HABLOW LN	NORTH PORT, FL 34286	Yes		
1001-27-6115	5102 ESCALANTE DR	NORTH PORT, FL 34287	Yes		
0942-15-3205	5133 INKS LN	NORTH PORT, FL 34286	Yes		
1001-27-6117	5142 ESCALANTE DR	NORTH PORT, FL 34287	Yes		
0942-15-3204	5149 INKS LN	NORTH PORT, FL 34286	Yes		
0942-15-3301	5173 HABLOW LN	NORTH PORT, FL 34286	Yes		
0953-15-2415	5208 GRIGGS AVE	NORTH PORT, FL 34291	Yes		
0953-15-2214	5224 HACKLEY RD	NORTH PORT, FL 34291	Yes		
0953-15-2615	5272 GADBOYS AVE	NORTH PORT, FL 34291	Yes		
0953-15-2614	5278 GADBOYS AVE	NORTH PORT, FL 34291	Yes		
0953-15-2324	5290 HAAS AVE	NORTH PORT, FL 34291	Yes		
1001-27-6122	5292 TREKELL ST	NORTH PORT, FL 34287	Yes		
1001-27-6123	5302 TREKELL ST	NORTH PORT, FL 34287	Yes		
0996-19-4339	5323 GROBE ST	NORTH PORT, FL 34287		Yes	
0944-15-2728	5363 LACEY ST	NORTH PORT, FL 34286	Yes		Yes
0955-15-4505	5382 NOHAVA RD	NORTH PORT, FL 34286	Yes		
0954-14-2930	5437 MANDRAKE TER	NORTH PORT, FL 34291	Yes		
0954-14-2515	5497 LADY SLIPPER AVE	NORTH PORT, FL 34291			Yes
0953-14-1109	5516 REISTERSTOWN RD	NORTH PORT, FL 34291			Yes
0944-07-1204	5519 GARRISON AVE	NORTH PORT, FL 34291			Yes
0953-14-1108	5547 TANEYTOWN ST	NORTH PORT, FL 34291			Yes
0953-14-1208	5551 REISTERSTOWN RD	NORTH PORT, FL 34291	Yes	Yes	Yes

PID	Address	City, State, Zip	In 100 Year Level of Service Analysis	Reported as Flooded in 1992	Reported as Flooded in 2003
0953-14-1113	5555 HENNESSY ST	NORTH PORT, FL 34291	Yes	Yes	Yes
0953-14-1207	5585 REISTERSTOWN RD	NORTH PORT, FL 34291			Yes
0953-14-1111	5588 REISTERSTOWN RD	NORTH PORT, FL 34291	Yes		Yes
0944-07-1202	5621 GARRISON AVE	NORTH PORT, FL 34291	Yes		
0953-14-1206	5621 REISTERSTOWN RD	NORTH PORT, FL 34291	Yes	Yes	Yes
0953-14-1112	5624 REISTERSTOWN RD	NORTH PORT, FL 34291	Yes	Yes	Yes
0942-08-0004	5625 N SUMTER BLVD	NORTH PORT, FL 34286	Yes		
1002-18-4802	5650 POSTMA ST	NORTH PORT, FL 34287	Yes		
0954-14-2520	5654 LADY SLIPPER AVE	NORTH PORT, FL 34291			Yes
0944-07-1309	5664 GARRISON AVE	NORTH PORT, FL 34291	Yes		Yes
0944-07-1304	5779 REISTERSTOWN RD	NORTH PORT, FL 34291	Yes	Yes	Yes
0967-05-8905	5788 SYLVANIA AVE	NORTH PORT, FL 34291			Yes
0967-05-8904	5814 SYLVANIA AVE	NORTH PORT, FL 34291			Yes
0942-04-1904	5815 SUMTER BLVD	NORTH PORT, FL 34286	Yes		Yes
0968-05-7474	5834 BURWIN AVE	NORTH PORT, FL 34291	Yes		
0968-05-7448	5839 BATTERSEA AVE	NORTH PORT, FL 34291	Yes		Yes
0968-05-7450	5861 BATTERSEA AVE	NORTH PORT, FL 34291	Yes		Yes
0968-05-8024	5933 BURWIN AVE	NORTH PORT, FL 34291	Yes		
0968-05-7454	5971 BATTERSEA AVE	NORTH PORT, FL 34291	Yes		Yes
0941-04-1613	6527 REISTERSTOWN RD	NORTH PORT, FL 34291			Yes
0943-01-1009	6531 TANEYTOWN ST	NORTH PORT, FL 34291		Yes	
0941-04-1611	6669 REISTERSTOWN RD	NORTH PORT, FL 34291	Yes	Yes	Yes
0941-04-1609	6869 REISTERSTOWN RD	NORTH PORT, FL 34291		Yes	Yes

PID	Address	City, State, Zip	In 100 Year Level of Service Analysis	Reported as Flooded in 1992	Reported as Flooded in 2003
0941-04-1615	6969 REISTERSTOWN RD	NORTH PORT, FL 34291			Yes
0952-12-1121	7254 MUNCEY RD	NORTH PORT, FL 34291	Yes		
0996-09-3204	8515 FAY AVE	NORTH PORT, FL 34287		Yes	
0996-19-4520	8634 HERBISON AVE	NORTH PORT, FL 34287		Yes	
0996-19-4508	8645 CRISTOBAL AVE	NORTH PORT, FL 34287		Yes	
0996-19-4519	8664 HERBISON AVE	NORTH PORT, FL 34287		Yes	
0996-19-4517	8720 HERBISON AVE	NORTH PORT, FL 34287	Yes		
0996-19-4515	8772 HERBISON AVE	NORTH PORT, FL 34287		Yes	
0996-19-4513	8795 CRISTOBAL AVE	NORTH PORT, FL 34287		Yes	
0995-19-2413	8796 PORTO BELLO AVE	NORTH PORT, FL 34287	Yes		
0996-19-4514	8798 HERBISON AVE	NORTH PORT, FL 34287	Yes	Yes	
0995-18-2838	8855 CHESEBRO AVE	NORTH PORT, FL 34287		Yes	
0995-18-2837	8875 CHESEBRO AVE	NORTH PORT, FL 34287		Yes	

We trust that this report satisfies your expectations and appreciate the opportunity to work with you on this important project. If you have any questions, or if we can be of further service to you, please do not hesitate to call.

Very truly yours,
ARDAMAN & ASSOCIATES, INC.

10/10/2014

Nestor Aceituno, P.E.
Senior Project Engineer

Shankar Gautam
N.A.

Shankar Gautam, P.E.
Project Engineer

cc: Elizabeth Wong, City of North Port

FIGURES

FIGURE 2-1

N
W E
S

0 3,000 6,000
Feet

Scale: 1" = 6000'

564000 576000 588000 600000 612000 624000 636000

1028000
1016000
1004000
992000
980000

- Evacuation Route Floods
- Collector Street Floods
- Local Street Floods
- Northport Boundary

City of North Port, Florida

Southwest Florida Water Management District

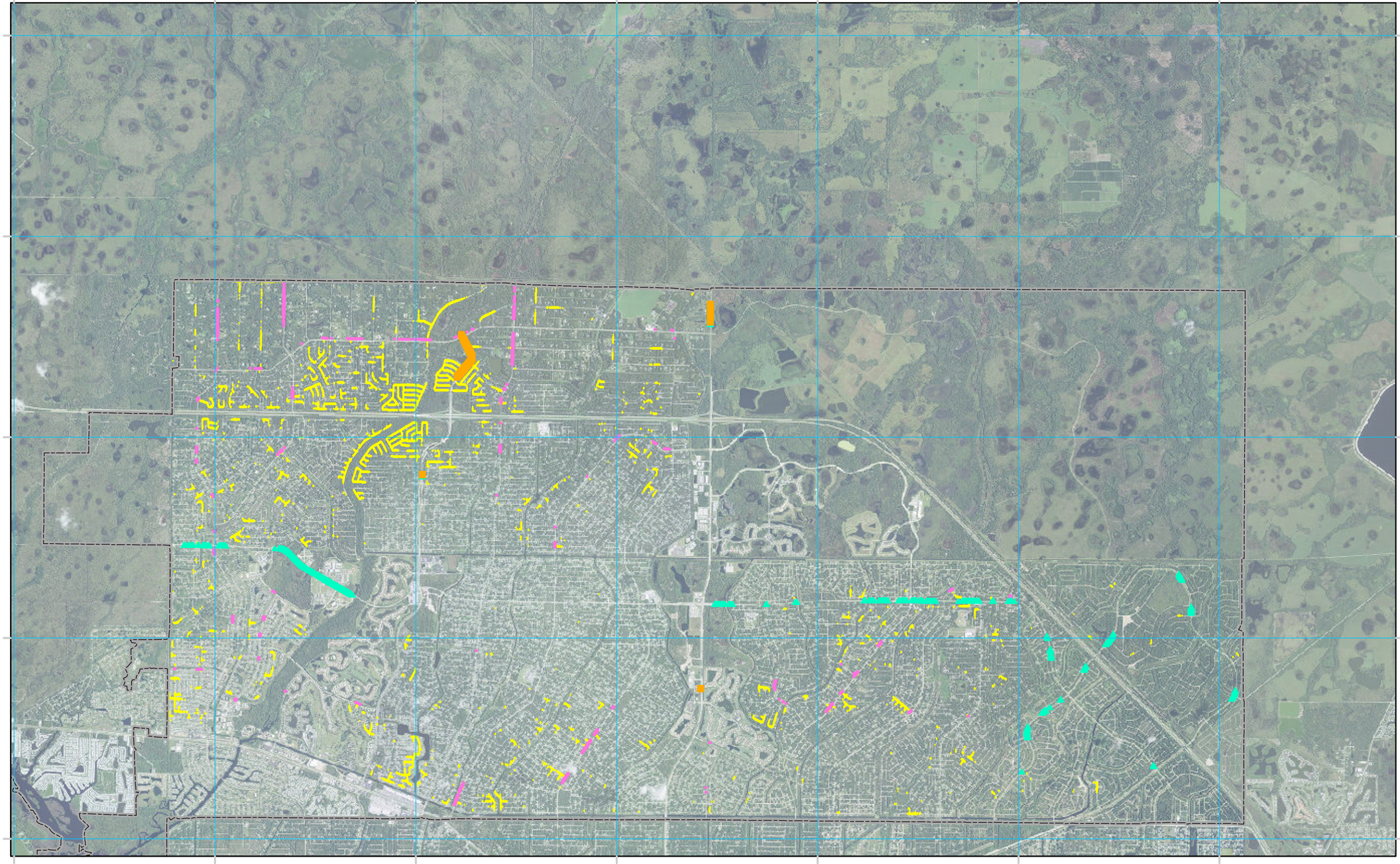
Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/17/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\03-065\ArcGIS_ArcLayouts\20140909 - Final BMP Figures\LOS 10.mxd		

10 YEAR LEVEL OF SERVICE

CITY OF NORTH PORT, SARASOTA COUNTY, FL

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants
Phone: 407-855-3860 Fax: 407-859-8121
8008 South Orange Avenue
Orlando, Florida 32809

FIGURE 2-2



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Feet

Scale: 1" = 6000'

- Evacuation Route Floods in 25 Year Event
- Arterial Street Floods in 25 Year Event
- Collector Street Floods in 25 Year Event
- Local Street Floods in 25 Year Event
- Northport Boundary

City of North Port, Florida

Southwest Florida Water Management District

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/17/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
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25 YEAR LEVEL OF SERVICE

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Orlando, Florida 32809

564000 576000 588000 600000 612000 624000 636000

1028000 1016000 1004000 992000 980000

FIGURE 2-3

N W E S

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Feet

Scale: 1" = 6000'

- Habitable Structure Floods
- Evacuation Route Floods
- Arterial Street Floods
- Collector Street Floods
- Local Street Floods
- Northport Boundary

City of North Port, Florida

Southwest Florida Water Management District

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/17/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
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100 YEAR LEVEL OF SERVICE

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Orlando, Florida 32809

564000 576000 588000 600000 612000 624000 636000

1028000 1016000 1004000 992000 980000

Big Slough

Big Slough

N I75

S I75

WCS-162 Removed

CUN-001 Removed

WCS-101

WCS-106

WCS-113 Removed

WCS-120 Removed

DS-119 Removed

WCS-114 Removed

WCS-123 Removed

WCS-115 Removed

DS-122 Removed

DS-126 Removed

DS-129 Removed

DS-135 Removed

DS-136 Removed

DS-133 Removed

DS-139 Removed

WCS-121 Removed

WCS-125 Removed

WCS-128 Removed

DS-132 Removed

WCS-124 Removed

WCS-131 Removed

WCS-111 Removed

WCS-127 Removed

WCS-117 Removed

WCS-107 Removed

WCS-108 Removed

WCS-130 Removed

WCS-109 Removed

WCS-110 Removed

FIGURE 3-1

N W E S

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Feet

Scale: 1" = 6000'

Legend

- WCS
- Removed Structures
- New Connections
- Subwatershed
- Existing Condition Floodplain
- Flood Area Reduction
- Flood Area Increase

City of North Port, Florida

Southwest Florida Water Management District

Project: 03-065	Projection: Florida East West	
Prepared: 10-11-07	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\03-065\ArcGIS_ArcLayouts\20140909 - Final BMP Figures\BMP1.mxd		

NORTH PORT / BIG SLOUGH WMP

BMP ALTERNATIVE 1 - 1 DAY 100 YEAR EVALUATION

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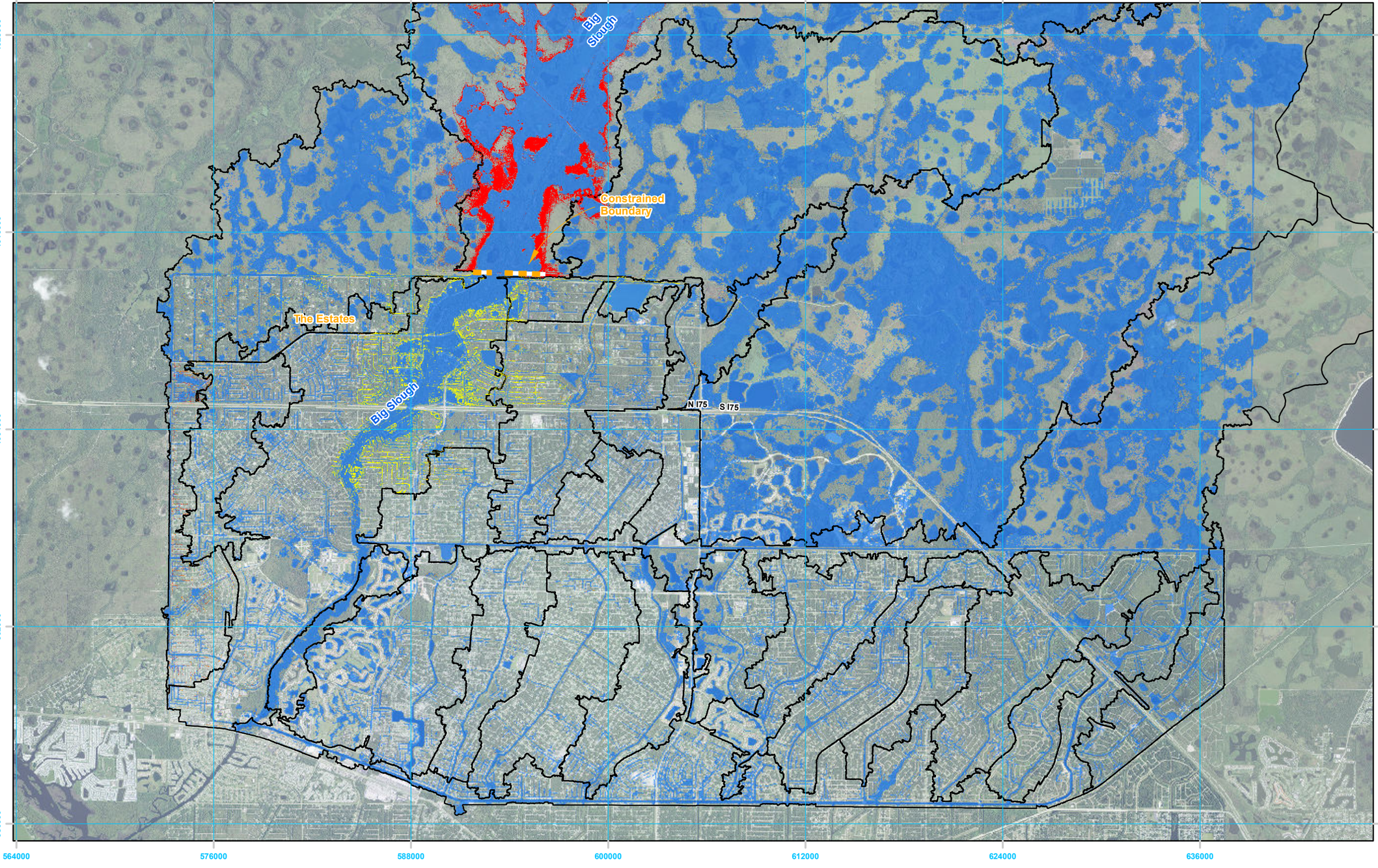
8008 South Orange Avenue
Orlando, Florida 32809

FIGURE 3-2



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Feet

Scale: 1" = 6000'

- Constrained Boundary
- Subwatershed
- Existing Condition Floodplain
- Flood Area Reduction
- Flood Area Increase

City of North Port, Florida

Southwest Florida Water Management District

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/9/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\03-065\ArcGIS_ArcLayouts\20140909 - Final BMP Figures\BMP2.mxd		

NORTH PORT / BIG SLOUGH WMP

BMP ALTERNATIVE 2 - 1 DAY 100 YEAR EVALUATION

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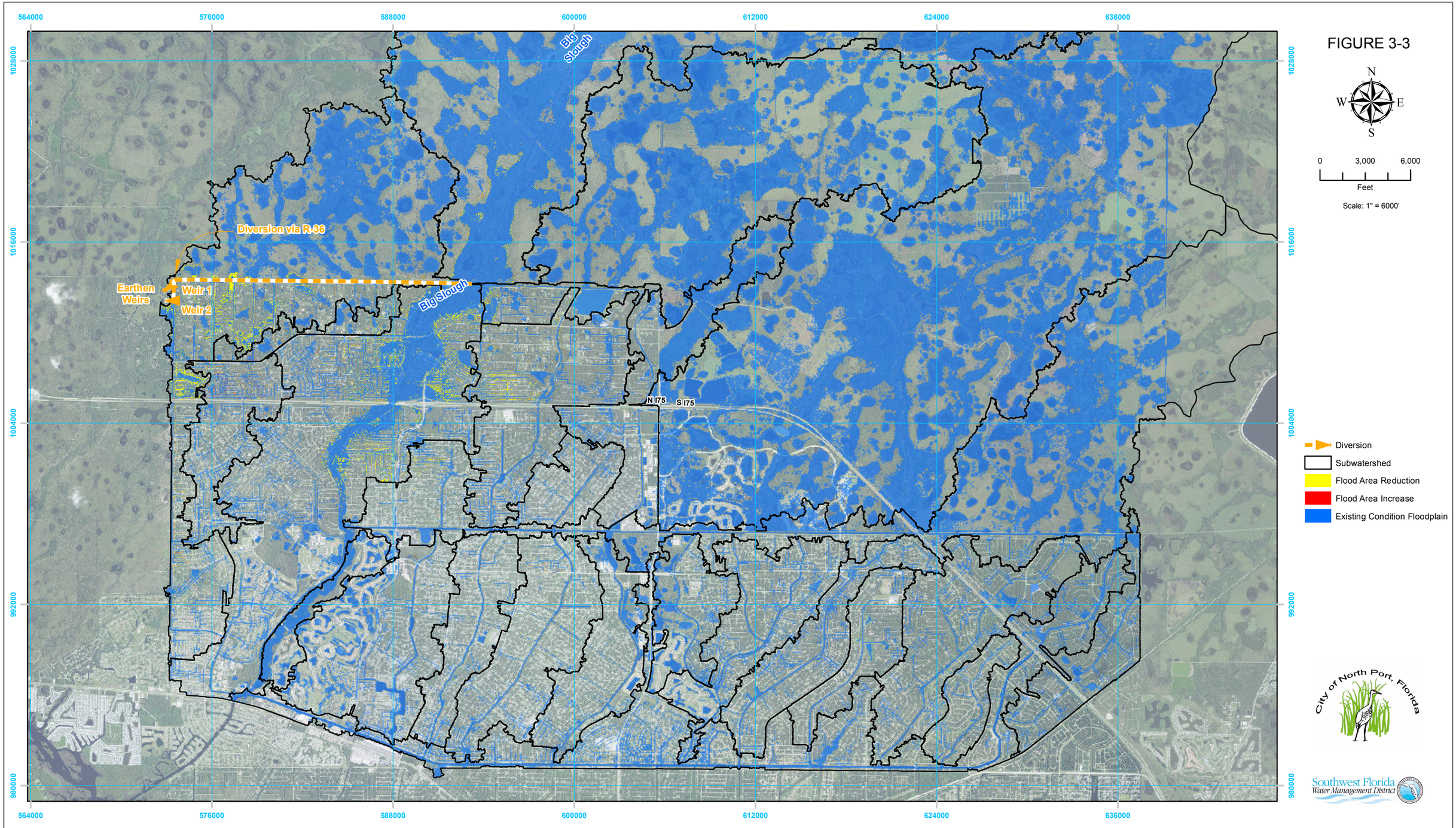
Orlando, Florida 32809

FIGURE 3-3



Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/9/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\03-065\ArcGIS_ArcLayouts\20140909 - Final BMP Figures\BMP3.mxd		

NORTH PORT / BIG SLOUGH WMP

BMP ALTERNATIVE 3 - 1 DAY 100 YEAR EVALUATION

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8008 South Orange Avenue
Orlando, Florida 32809

FIGURE 3-4

564000 576000 588000 600000 612000 624000 636000

1028000 1016000 1004000 992000 980000

Big Slough

R-580 WW Improvements

Big Slough

S I75 N I75

N

W E

S

0 3,000 6,000

Feet

Scale: 1" = 6000'

R-580 WW Improvements

Subwatershed

Existing Condition Floodplain

Flood Area Reduction

Flood Area Increase

City of North Port, Florida

Southwest Florida Water Management District

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/9/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\03-065\ArcGIS_ArcLayouts\20140909 - Final BMP Figures\BMP4.mxd		

NORTH PORT / BIG SLOUGH WMP

BMP ALTERNATIVE 4 - 1 DAY 100 YEAR EVALUATION

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Geotechnical, Environmental and Materials Consultants
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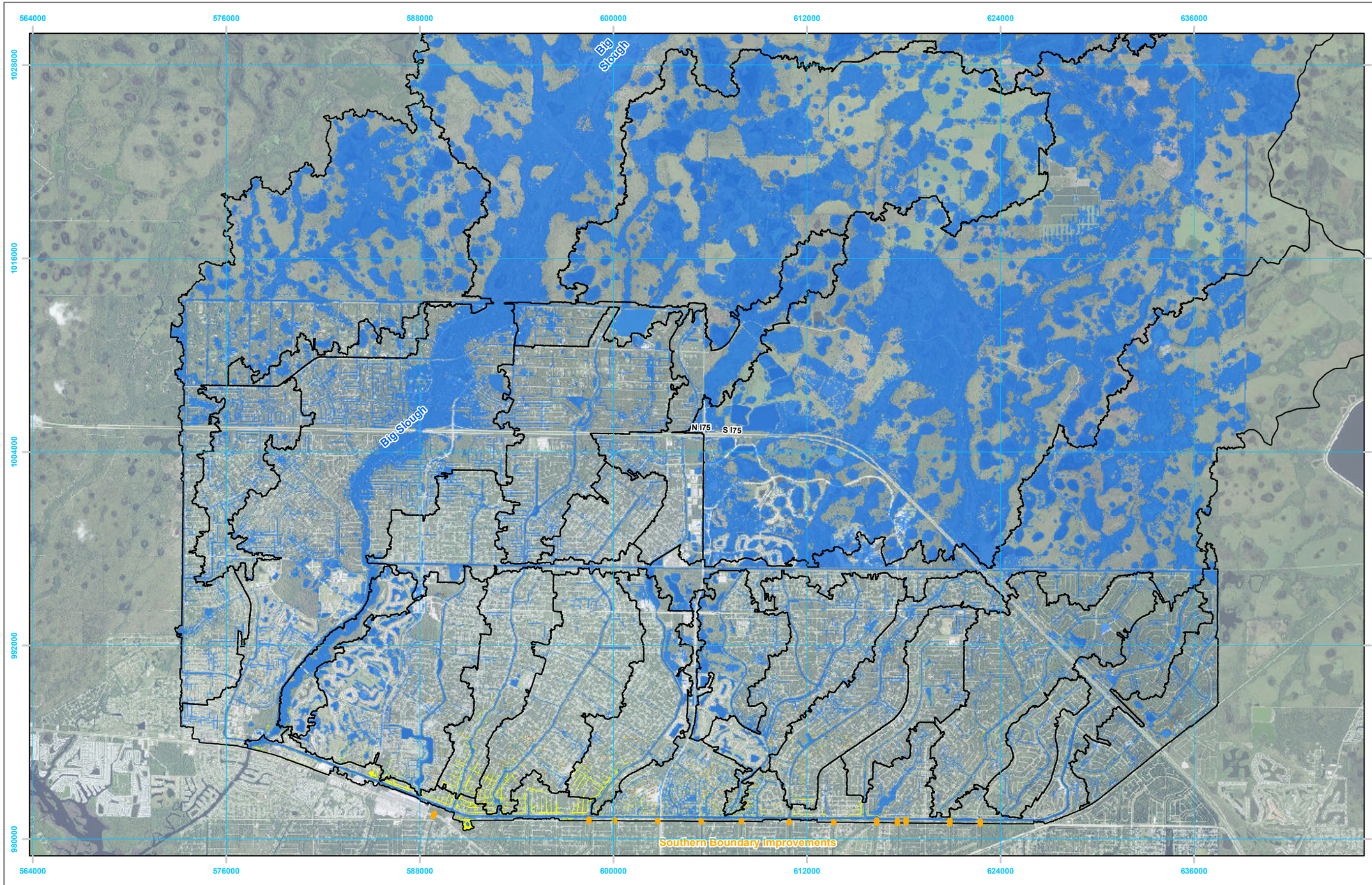
8008 South Orange Avenue
Orlando, Florida 32809

FIGURE 3-5



N

W E

S

0 3,000 6,000

Feet

Scale: 1" = 6000'

- Southern Boundary Improvements
- Subwatershed
- Existing Condition Floodplain
- Flood Area Reduction
- Flood Area Increase

City of North Port, Florida

Southwest Florida Water Management District

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/9/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\03-065\ArcGIS_ArcLayouts\20140909 - Final BMP Figures\BMP5.mxd		

NORTH PORT / BIG SLOUGH WMP

BMP ALTERNATIVE 5 - 1 DAY 100 YEAR EVALUATION

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants
Phone: 407-855-3860 Fax: 407-859-8121
8008 South Orange Avenue
Orlando, Florida 32809

564000 576000 588000 600000 612000 624000 636000

1028000 1016000 1004000 992000 980000

Big Slough

Big Slough

N I75 S I75

3

2

1

Offsite Areas Detention Facilities

Other Detention Areas Not Shown in this Figure

FIGURE 3-6

N W E S

0 3,000 6,000

Feet

Scale: 1" = 6000'

Offsite Areas Detention Facilities

Subwatershed

Existing Condition Floodplain

Flood Area Reduction

Flood Area Increase

City of North Port, Florida

Southwest Florida Water Management District

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/9/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\03-065\ArcGIS_ArcLayouts\20140909 - Final BMP Figures\BMP6.mxd		

NORTH PORT / BIG SLOUGH WMP

BMP ALTERNATIVE 6 - 1 DAY 100 YEAR EVALUATION

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Orlando, Florida 32809

FIGURE 3-7

N
W E
S

0 300 600
Feet

Scale: 1" = 600'

- Network Nodes
- Basins

Floodplain Change

- Decrease
- Increase
- No Change

City of North Port, Florida

Southwest Florida Water Management District

MODEL RESULTS WITH MEAN ANNUAL FLOODPLAIN COMPARISON AND DIFFERENCE IN MAX STAGES

R-36 CANAL AT I-75 BMP EVALUATION

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/10/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\20140909 - Final BMP Figures\BMP1 Crossing Mean Ann.mxd		

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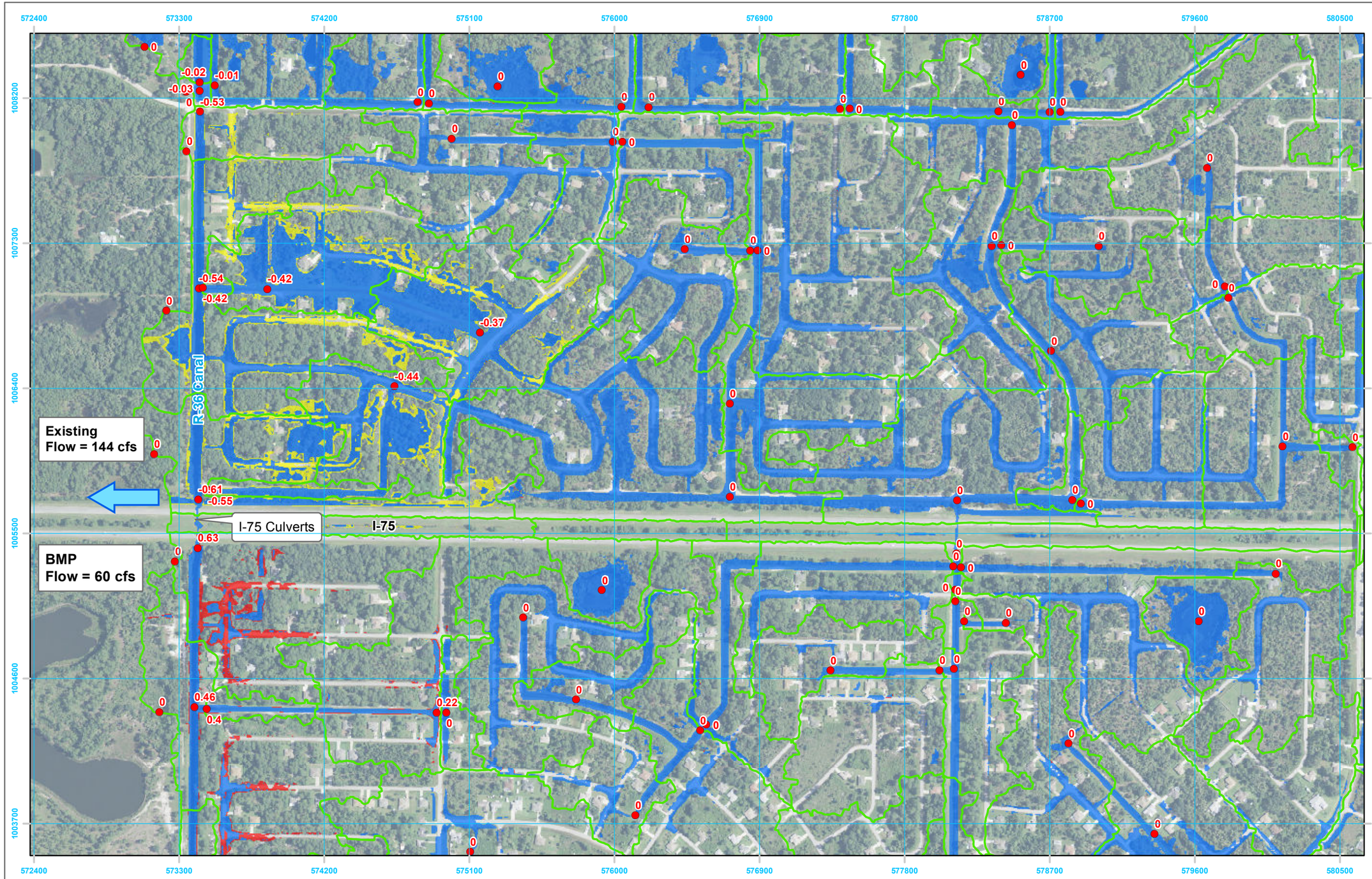
Orlando, Florida 32809

FIGURE 3-8



N
W E
S

0 300 600
Feet

Scale: 1" = 600'

Network Nodes
Basins

Floodplain Change
Decrease
Increase
No Change

City of North Port, Florida

Southwest Florida Water Management District

MODEL RESULTS WITH 1-DAY 100-YEAR FLOODPLAIN COMPARISON AND DIFFERENCE IN MAX STAGES

R-36 CANAL AT I-75 BMP EVALUATION

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/10/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\20140909 - Final BMP Figures\BMP1 Crossing 1D100Yr.mxd		

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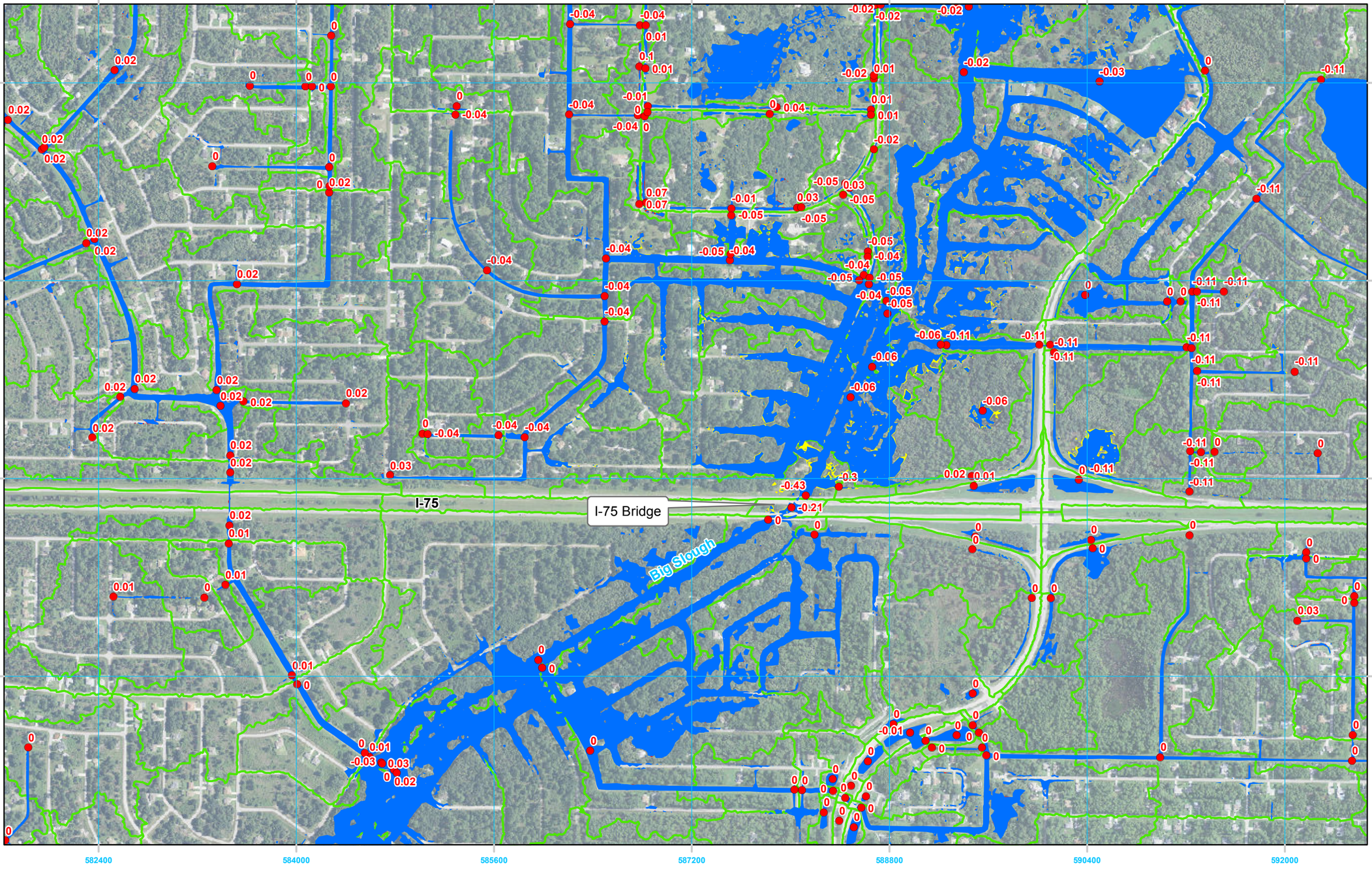
Orlando, Florida 32809

FIGURE 3-9



N
W E
S

0 400 800
Feet

Scale: 1" = 450'

Network Nodes
Basins

Floodplain Change

Decrease
Increase
No Change

City of North Port, Florida

Southwest Florida Water Management District

MODEL RESULTS WITH MEAN ANNUAL FLOODPLAIN COMPARISON AND DIFFERENCE IN MAX STAGES

MYAKKAHATCHEE CREEK AT 1-75 BMP EVALUATION

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/10/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\20140909 - Final BMP Figures\BMP2 Crossing Mean Ann.mxd		

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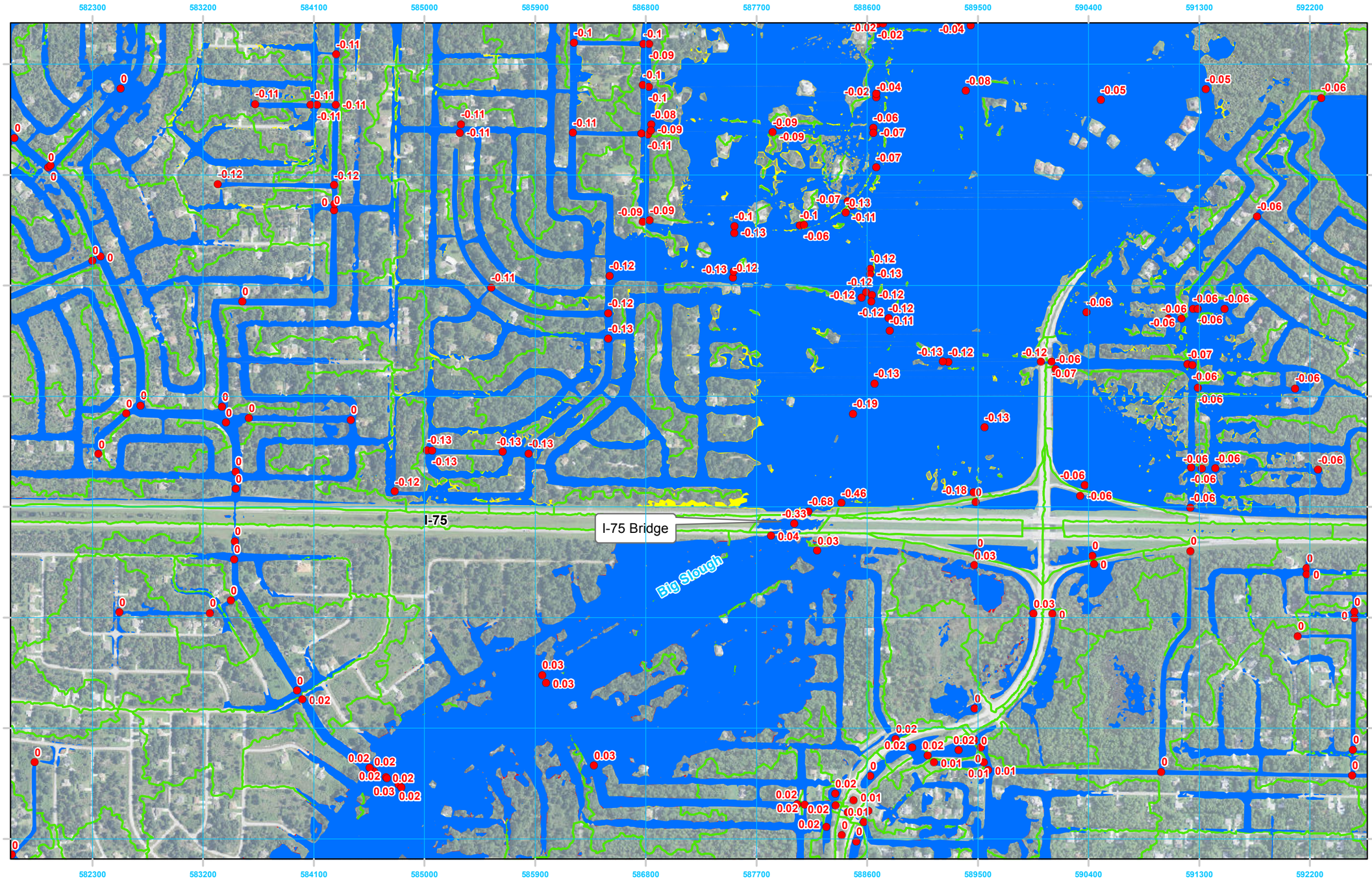
FIGURE 3-10



N
W E
S

0 400 800
Feet

Scale: 1" = 800'

Network Nodes
Basins

Floodplain Change

Decrease
Increase
No Change

City of North Port, Florida

Southwest Florida Water Management District

MODEL RESULTS WITH 1-DAY 100-YEAR FLOODPLAIN COMPARISON AND DIFFERENCE IN MAX STAGES

MYAKKAHATCHEE CREEK AT I-75 BMP EVALUATION

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/10/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: _ArcLayouts\20140909 - Final BMP Figures\BMP2 Crossing 1D100Yr.mxd		

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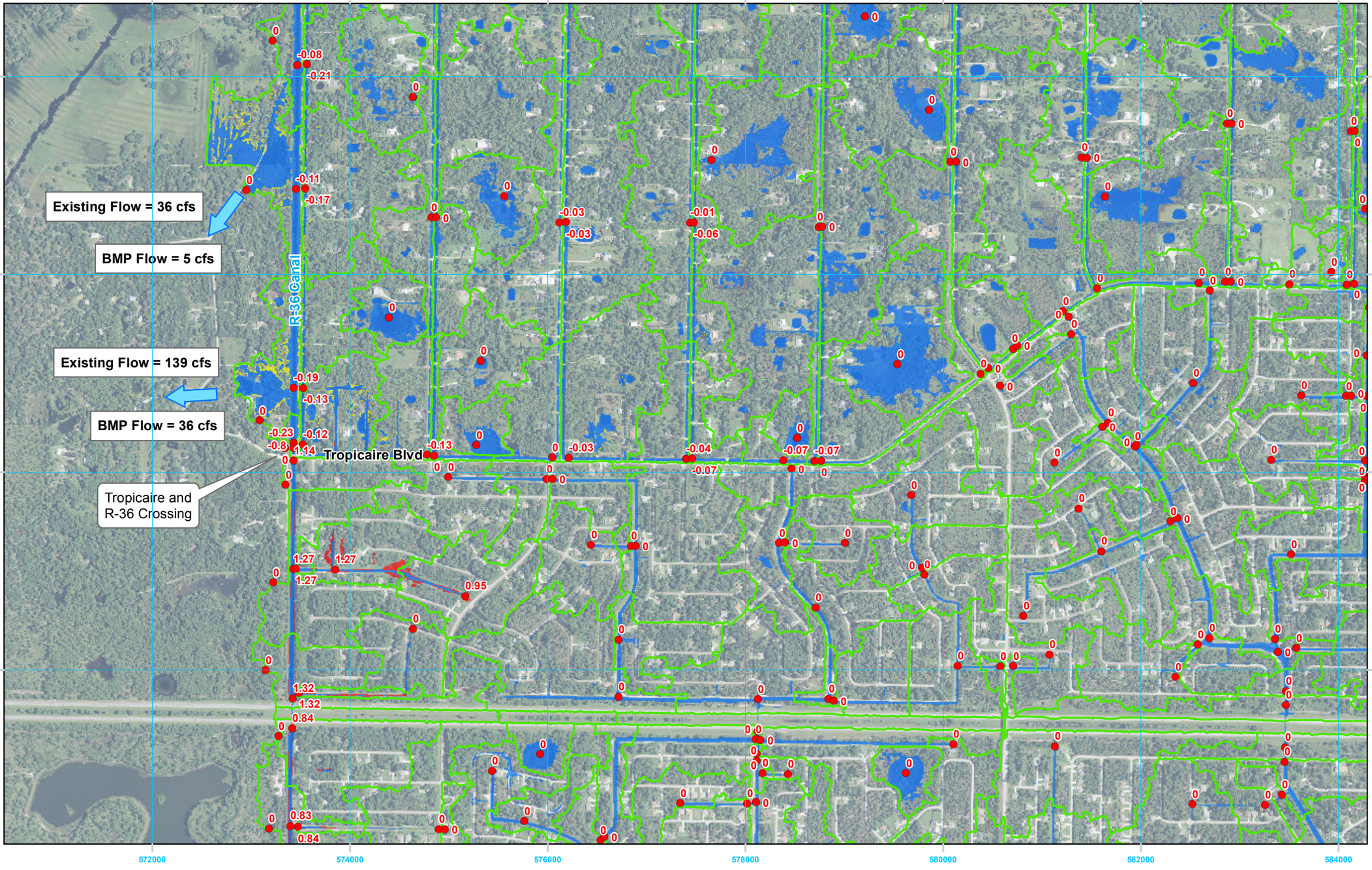
FIGURE 3-11



N
W E
S

0 500 1,000
Feet

Scale: 1" = 1000'

- Network Nodes
- Basins

Floodplain Change

- Decrease
- Increase
- No Change

City of North Port, Florida

Southwest Florida Water Management District

MODEL RESULTS WITH MEAN ANNUAL FLOODPLAIN COMPARISON AND DIFFERENCE IN MAX STAGES

R-36 CANAL AT TROPICAIRE BOULEVARD BMP EVALUATION

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/10/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\20140909 - Final BMP Figures\BMP3 Crossing Mean Ann.mxd		

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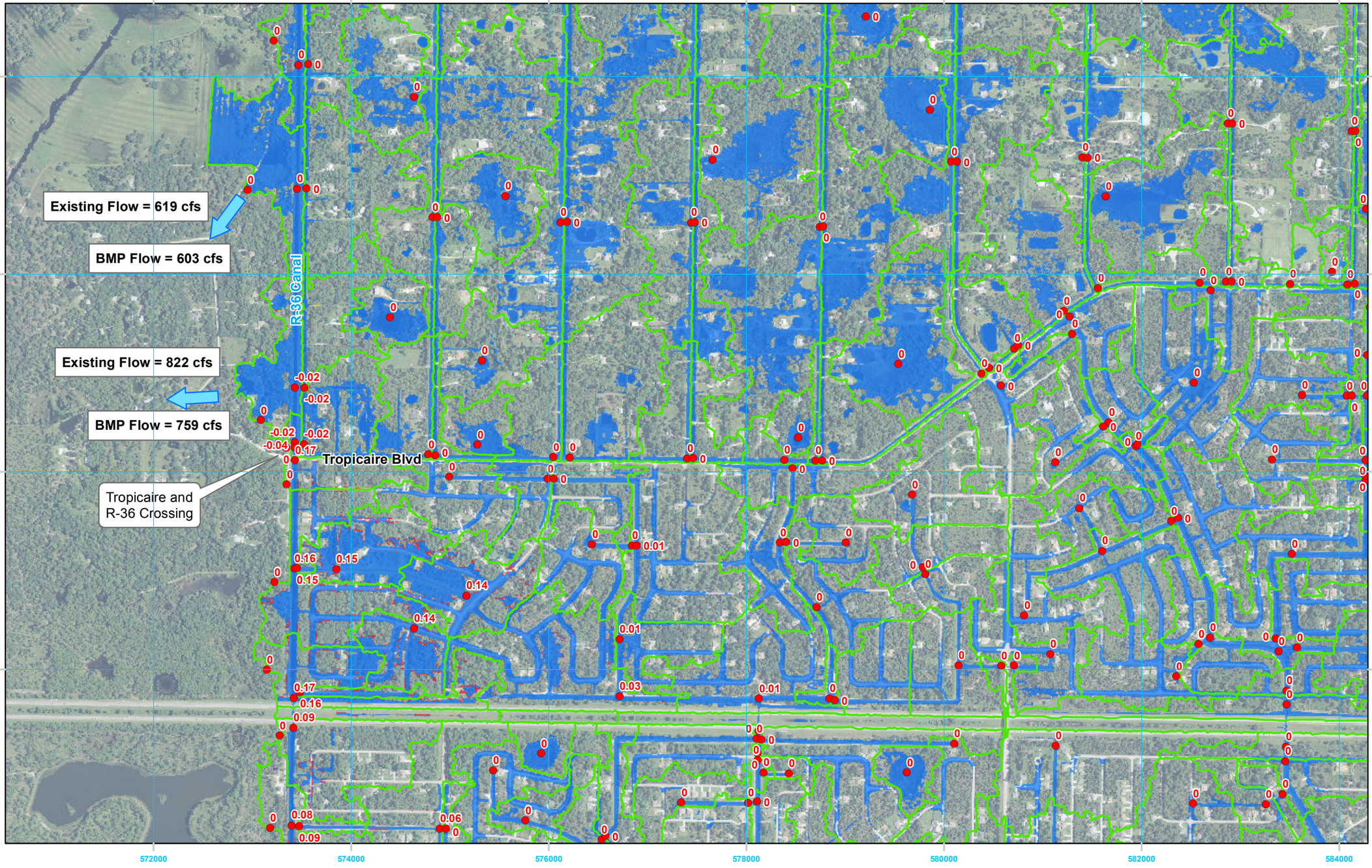
Orlando, Florida 32809

FIGURE 3-12



Scale: 1" = 1000'

- Network Nodes
- Basins

Floodplain Change

- Decrease
- Increase
- No Change

City of North Port, Florida

Southwest Florida Water Management District

MODEL RESULTS WITH 1-DAY 100-YEAR FLOODPLAIN COMPARISON AND DIFFERENCE IN MAX STAGES

R-36 CANAL AT TROPICAIRE BOULEVARD BMP EVALUATION

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/10/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\20140909 - Final BMP Figures\BMP3 Crossing 1D100Yr.mxd		

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FIGURE 3-13

582400 584000 585600 587200 588800 590400 592000

1012000 1010400 1008800 1007200

Tropicaire Blvd

Tropicaire Bridge

Big Slough

N
W E
S

0 400 800
Feet

Scale: 1" = 800'

Network Nodes
Basins

Floodplain Change

Decrease
Increase
No Change

City of North Port, Florida

Southwest Florida Water Management District

MODEL RESULTS WITH MEAN ANNUAL FLOODPLAIN COMPARISON AND DIFFERENCE IN MAX STAGES

MYAKKAHATCHEE CREEK AT TROPICAIRE BOULEVARD BMP EVALUATION

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/10/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\20140909 - Final BMP Figures\BMP4 Crossing Mean Ann.mxd		

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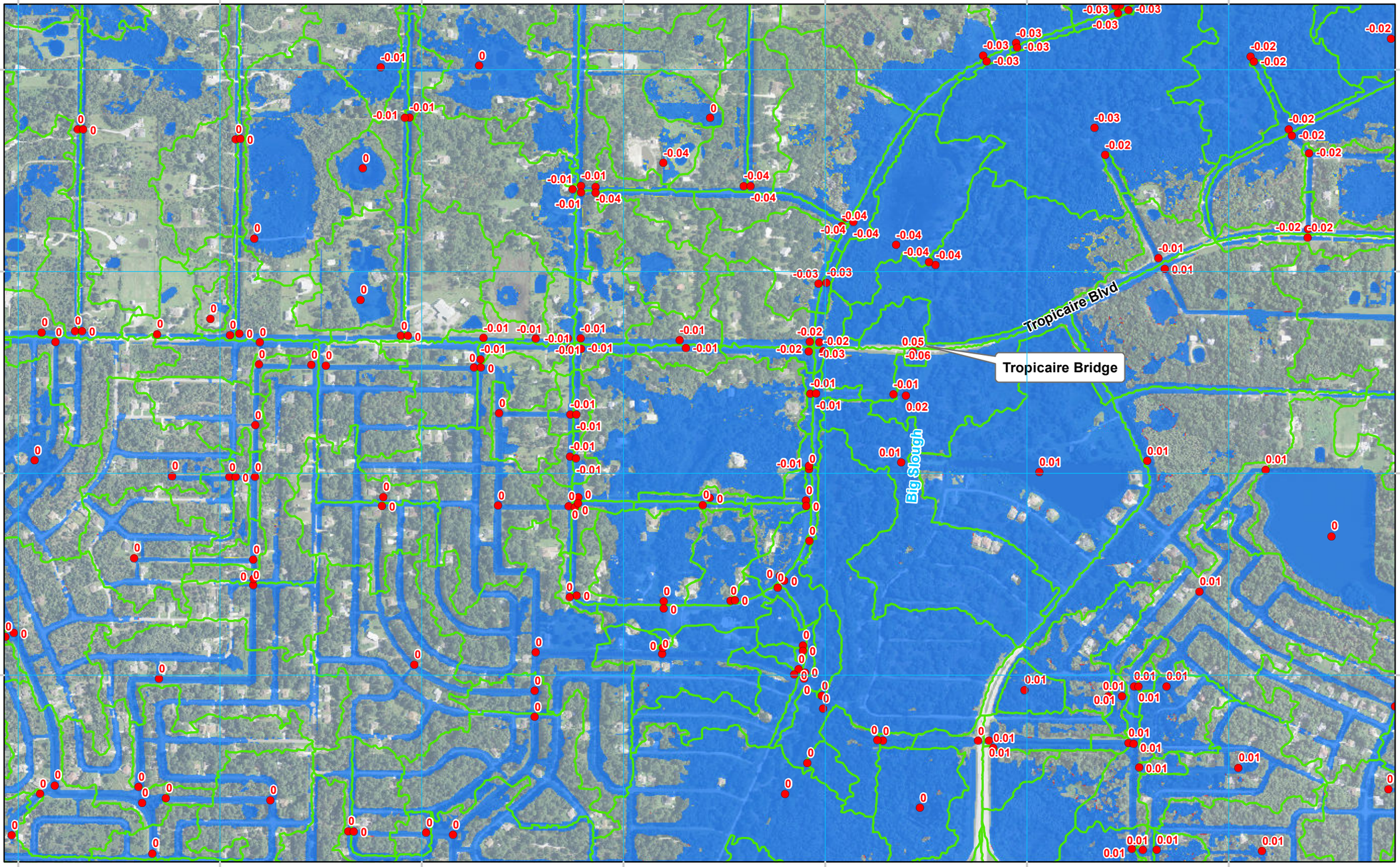
FIGURE 3-14



N
W E
S

0 400 800
Feet

Scale: 1" = 800'

- Network Nodes
- Basins

Floodplain Change

- Decrease
- Increase
- No Change

City of North Port, Florida

Southwest Florida Water Management District

MODEL RESULTS WITH 1-DAY 100-YEAR FLOODPLAIN COMPARISON AND DIFFERENCE IN MAX STAGES

MYAKKAHATCHEE CREEK AT TROPICAIRE BOULEVARD BMP EVALUATION

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/10/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\20140909 - Final BMP Figures\BMP4 Crossing 1D100Yr.mxd		

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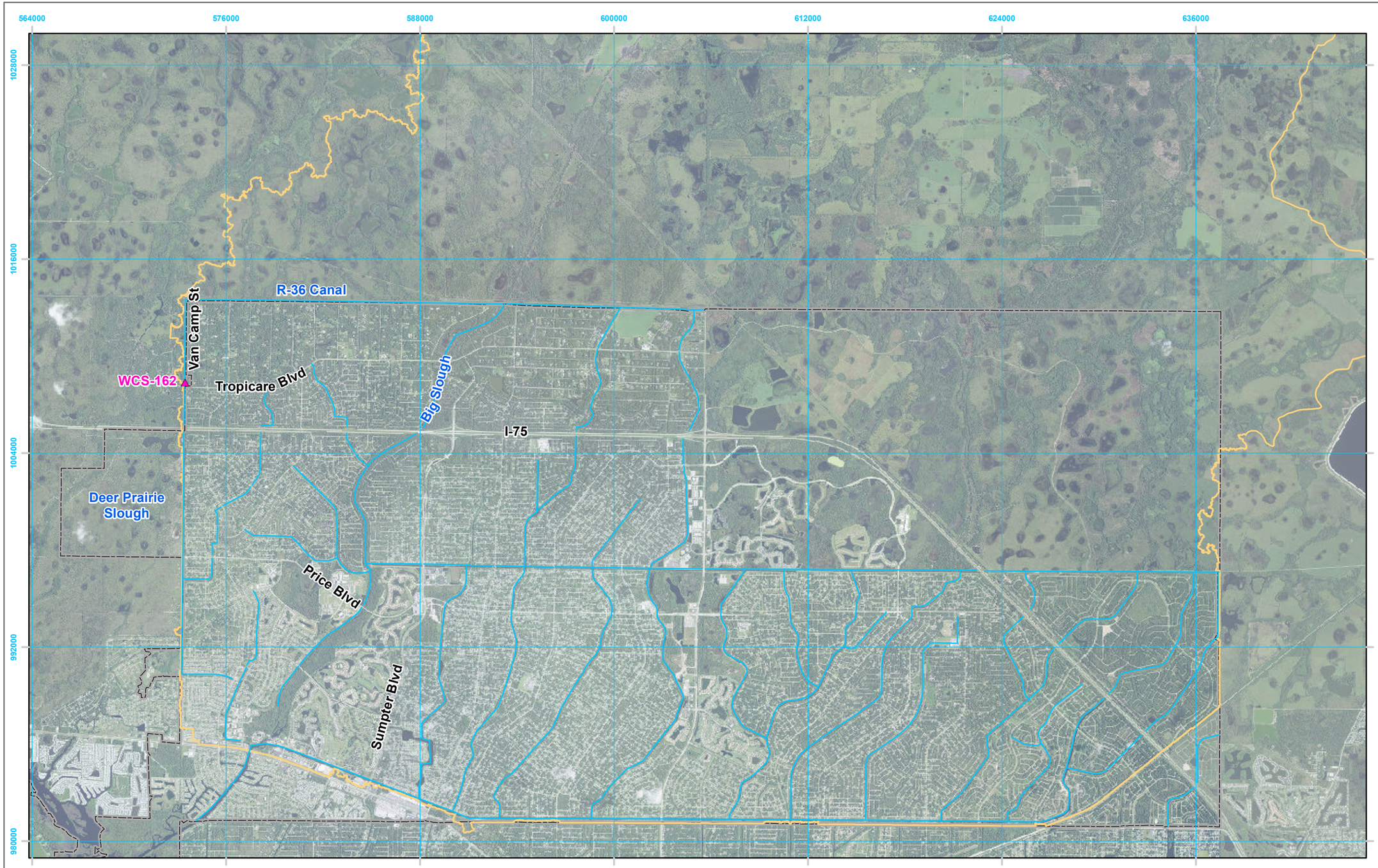
FIGURE 3-15



N
W E
S

0 3,000 6,000
Feet

Scale: 1" = 6000'

- Water Control Structures
- Waterway Flow
- Watershed Boundary
- Northport Boundary

City of North Port, Florida

Southwest Florida Water Management District

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/9/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\03-065\ArcGIS_ArcLayouts\20140909 - Final BMP Figures\WCS-162.mxd		

LOCATION OF WCS-162

CITY OF NORTH PORT, SARASOTA COUNTY, FL

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Figure 3-16. Stage at R-36 Canal Upstream of WCS-162

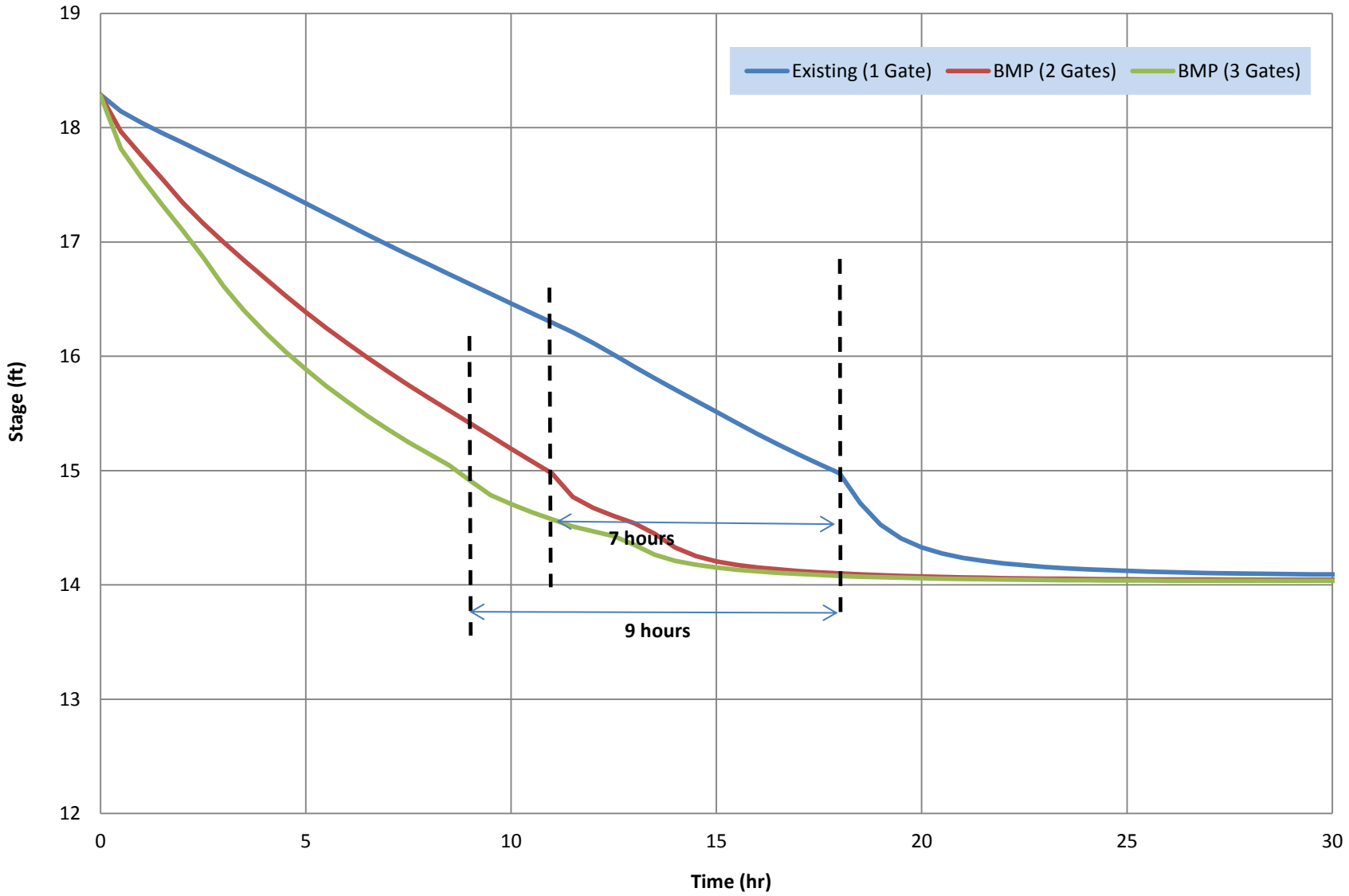

FIGURE 3-17

N
W E
S

0 250 500
Feet

Scale: 1" = 500'

- Habitable Structure Floods in 100 Year Event
- Arterial Street Floods in 100 Year Event
- Evacuation Route Floods in 100 Year Event
- Collector Street Floods in 25 Year Event
- Local Street Flods in 25 Year Event

City of North Port, Florida

Southwest Florida Water Management District

Project: 03-065	Projection: State Plane Florida West	
Prepared: 08-05-14	Horizontal Datum: HARN	Vertical Datum: N/A
Prepared by: TJC	Modified by:	Modified:
File: _ArcLayouts\20140909 - Final BMP Figures\LOS2012 City Criteria.mxd		

EXISTING CONDITION LOS AND 100-YEAR FLOODPLAIN
NORTH PORT/BIG SLOUGH WMP

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Orlando, Florida 32809

FIGURE 3-18

N
W E
S

0 250 500
Feet

Scale: 1" = 500'

- Habitable Structure Floods in 100 Year Event
- Arterial Street Floods in 100 Year Event
- Evacuation Route Floods in 100 Year Event
- Collector Street Floods in 25 Year Event
- Local Street Flods in 25 Year Event

City of North Port, Florida

Southwest Florida Water Management District

UPDATED EXISTING CONDITION 100-YEAR FLOODPLAIN
NORTH PORT/BIG SLOUGH WMP

Project: 03-065	Projection: State Plane Florida West	
Prepared: 08-05-14	Horizontal Datum: HARN	Vertical Datum: N/A
Prepared by: TJC	Modified by:	Modified:
File: _ArcLayouts\20140909 - Final BMP Figures\Price Blvd Existing_1D100Y.mxd		

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FIGURE 3-19

BMP_1 25-YEAR FLOODPLAIN COMPARISON
NORTH PORT/BIG SLOUGH WMP

Project: 03-065	Projection: State Plane Florida West	
Prepared: 08-05-14	Horizontal Datum: HARN	Vertical Datum: N/A
Prepared by: TJC	Modified by:	Modified:
File: _ArcLayouts\20140909 - Final BMP Figures\Price Blvd BMP1_1D25Y.mxd		

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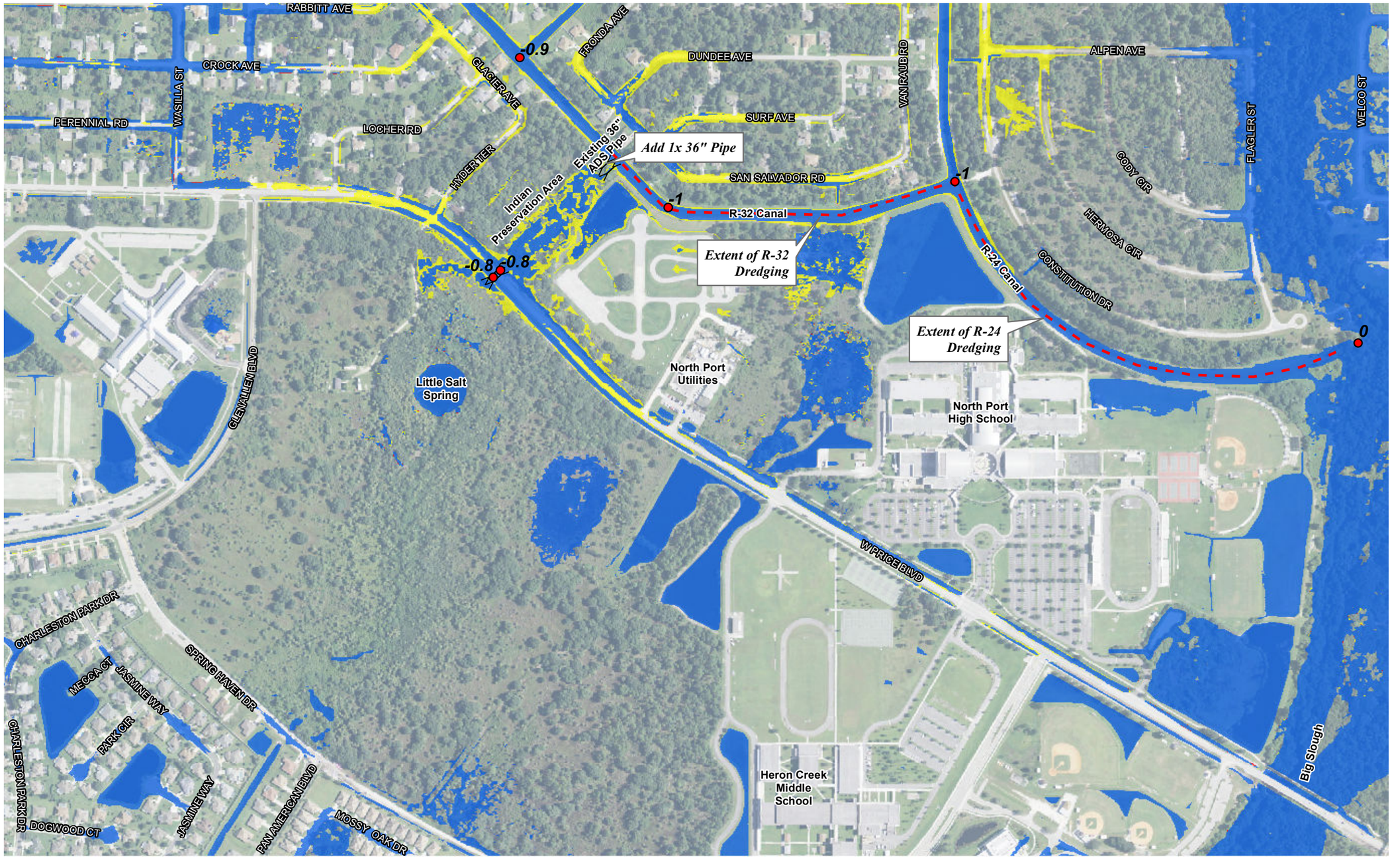
Orlando, Florida 32809

FIGURE 3-20



N
W E
S

0 250 500
Feet

Scale: 1" = 500'

- Node (Maxstage Change)
- BMP_1
- Decrease
- Increase
- No Change

City of North Port, Florida

Southwest Florida Water Management District

BMP_1 100-YEAR FLOODPLAIN COMPARISON
NORTH PORT/BIG SLOUGH WMP

Project: 03-065	Projection: State Plane Florida West	
Prepared: 08-05-14	Horizontal Datum: HARN	Vertical Datum: N/A
Prepared by: TJC	Modified by:	Modified:
File: _ArcLayouts\20140909 - Final BMP Figures\Price Blvd BMP1_1D100Y.mxd		

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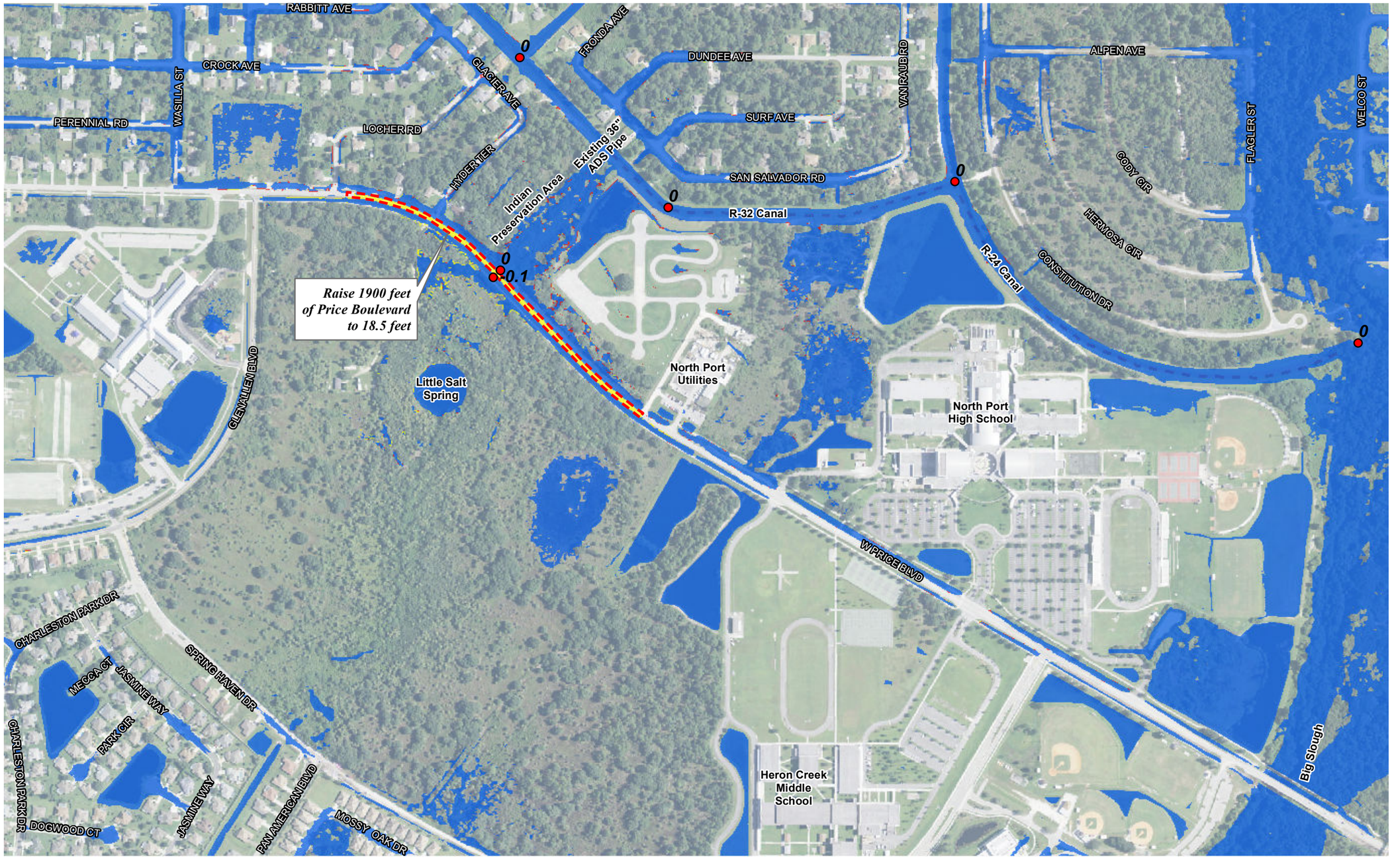
FIGURE 3-21



N
W E
S

0 250 500
Feet

- Node (Maxstage Change)
- BMP_2
- Decrease
- Increase
- No Change

City of North Port, Florida

Southwest Florida Water Management District

BMP_2 100-YEAR FLOODPLAIN COMPARISON
NORTH PORT/BIG SLOUGH WMP

Project: 03-065	Projection: State Plane Florida West	
Prepared: 08-05-14	Horizontal Datum: HARN	Vertical Datum: N/A
Prepared by: TJC	Modified by:	Modified:
File: \\ArcGIS_ArcLayouts\20140909 - Final BMP Figures\Price Blvd BMP 2.mxd		

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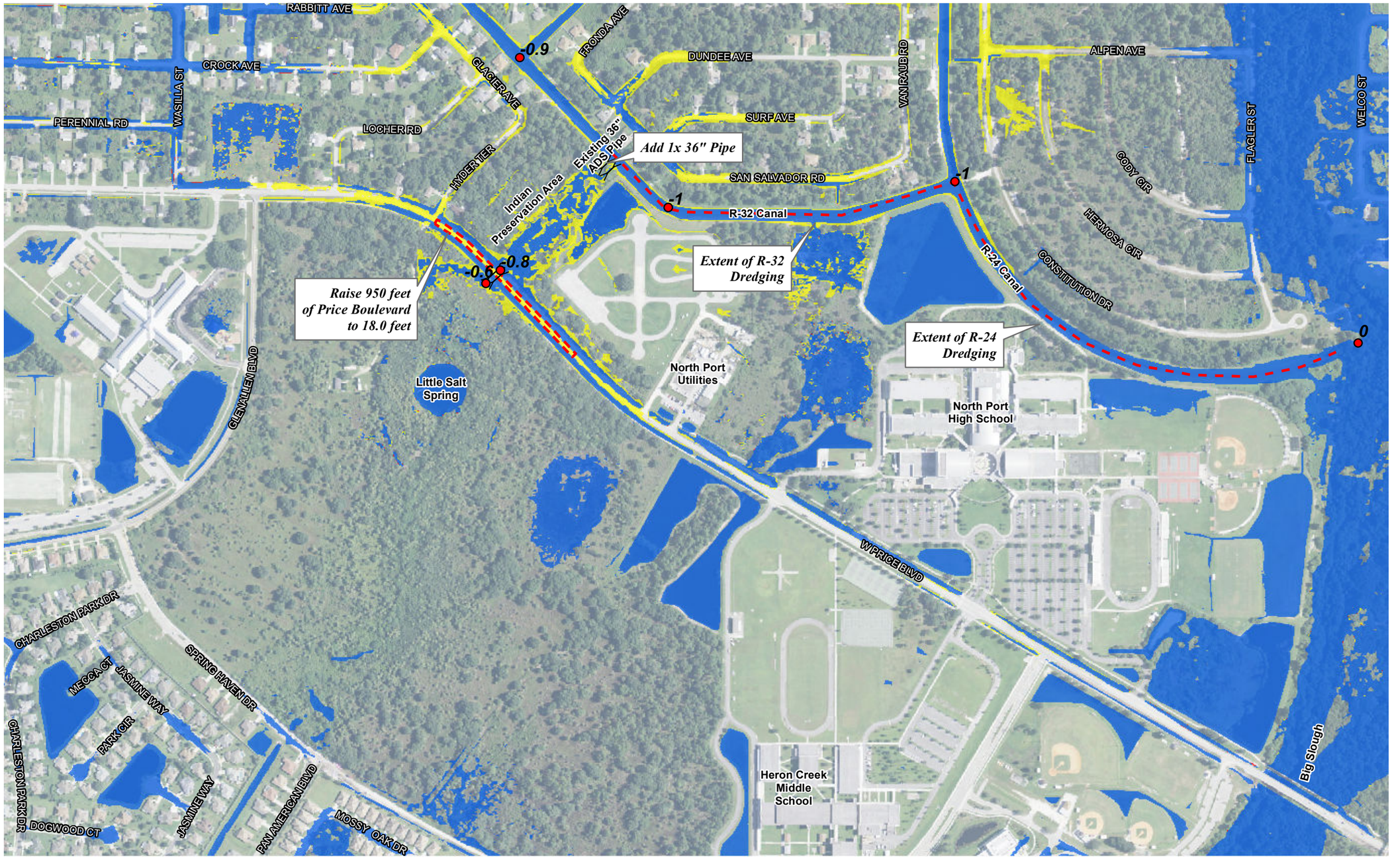
Orlando, Florida 32809

FIGURE 3-22



N
W E
S

0 250 500
Feet

- Node (Maxstage Change)
- BMP_3
- Decrease
- Increase
- No Change

City of North Port, Florida

Southwest Florida Water Management District

BMP_3 100-YEAR FLOODPLAIN COMPARISON
NORTH PORT/BIG SLOUGH WMP

Project: 03-065	Projection: State Plane Florida West	
Prepared: 08-05-14	Horizontal Datum: HARN	Vertical Datum: N/A
Prepared by: TJC	Modified by:	Modified:
File: \\ArcGIS_ArcLayouts\20140909 - Final BMP Figures\Price Blvd BMP 3.mxd		

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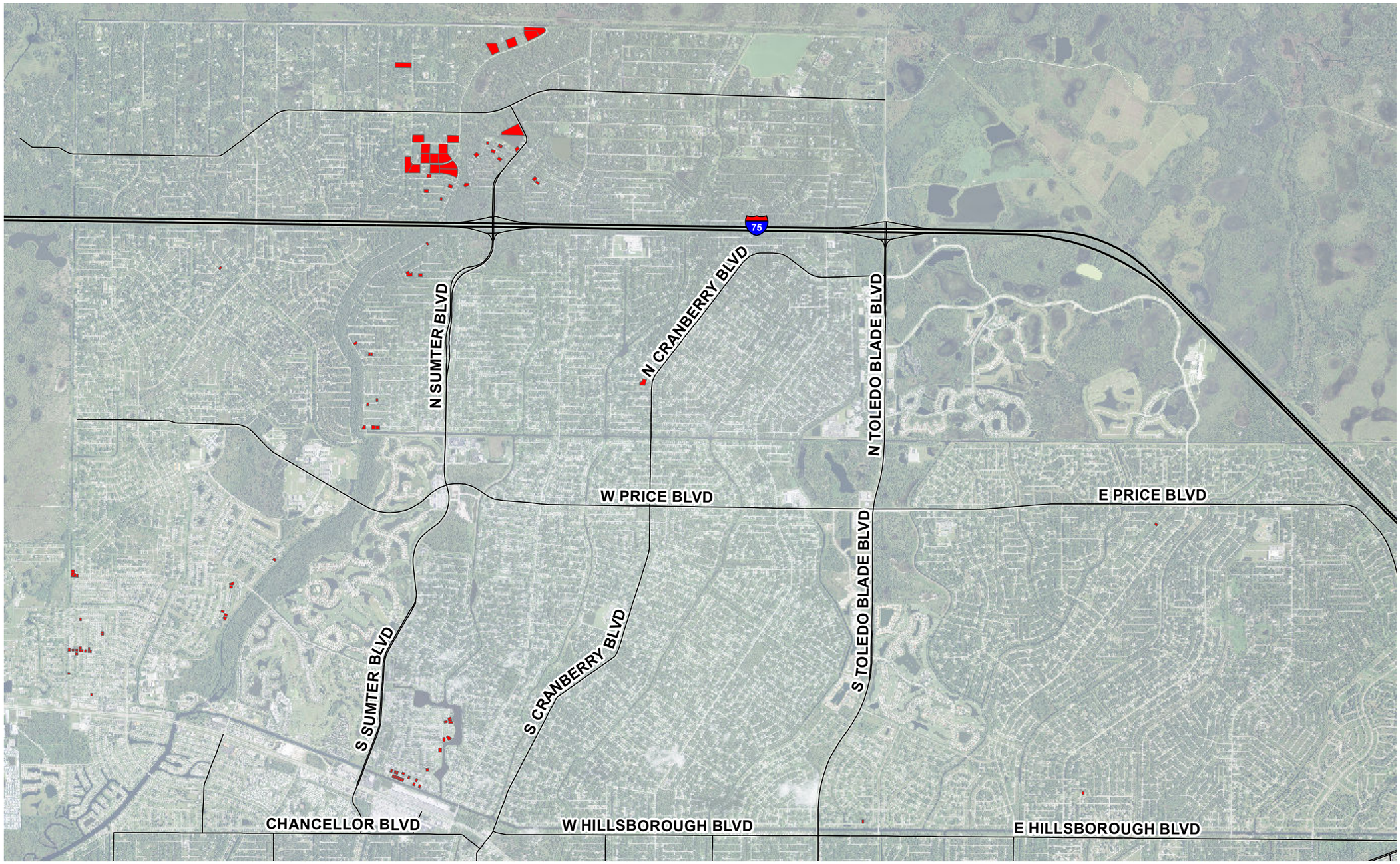
Orlando, Florida 32809

FIGURE 5-1



N
W E
S

0 2,000 4,000
Feet

City of North Port, Florida

Southwest Florida Water Management District

FLOODED PARCELS TO SURVEY
NORTH PORT/BIG SLOUGH WMP

Project: 03-065	Projection: State Plane Florida West	
Prepared: 09-30-14	Horizontal Datum: HARN	Vertical Datum: N/A
Prepared by: TJC	Modified by:	Modified:
File: \\Model_Maintenance\ArcGIS_ArcLayouts\Flooded_Parcels_To_Survey.mxd		

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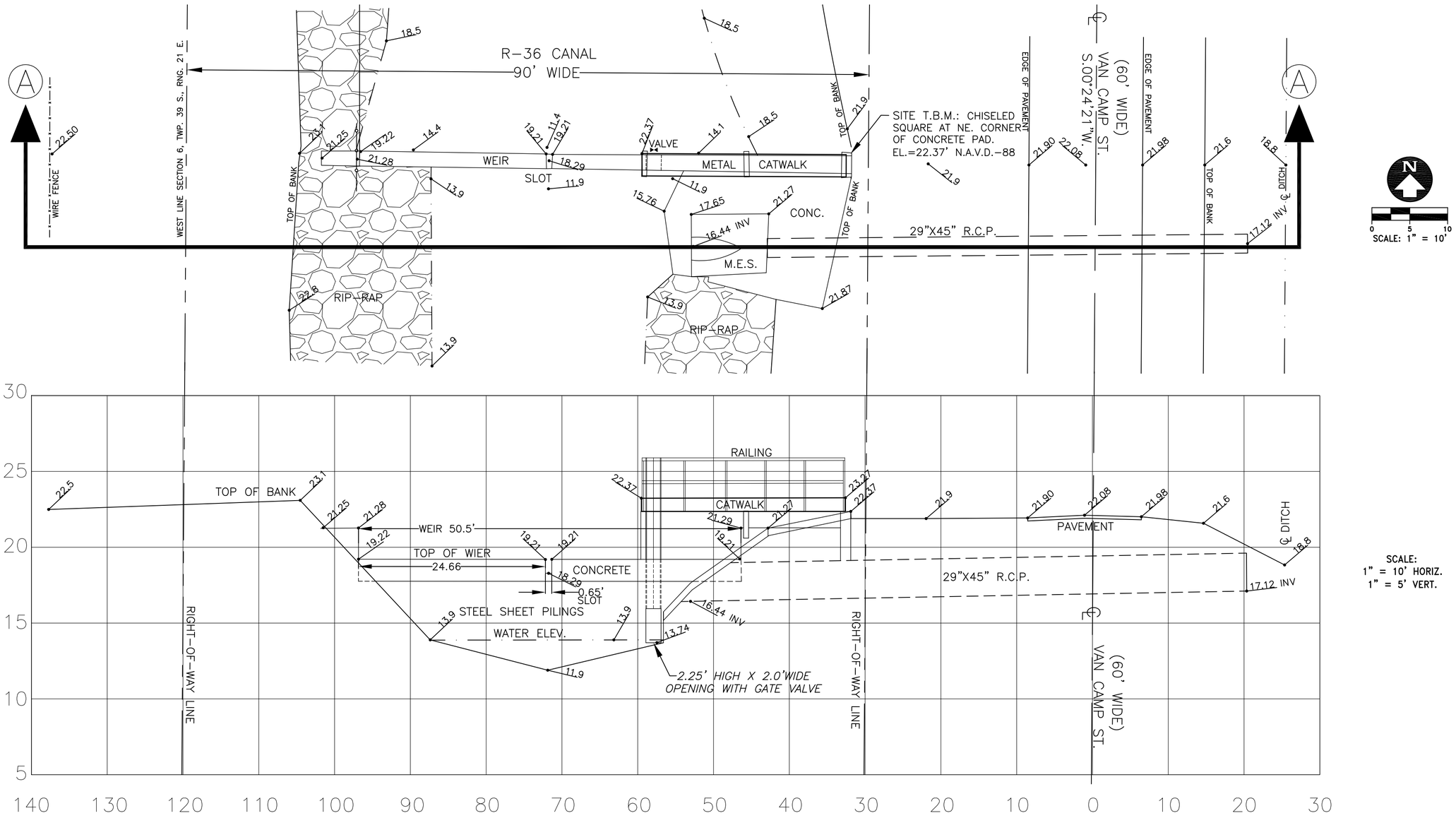
Orlando, Florida 32809

APPENDIX A

2014 Survey Data of WCS-162



SCALE:
1" = 10' HORIZ.
1" = 5' VERT.

SECTION "A"-"A"
WATER CONTROL STRUCTURE #162

LEGEND

T.B.M.	TEMPORARY BENCH MARK
E.O.P.	EDGE OF PAVEMENT
℄	CENTERLINE
7.7	TYPICAL SPOT ELEVATION
R.C.P.	REINFORCED CONCRETE PIPE
M.E.S.	MITERED END SECTION

SURVEYOR'S NOTES/REPORT:

1) BEARINGS ARE BASED ON AN ASSUMED MERIDIAN. A BEARING OF S.00°24'21"W. WAS ASSIGNED TO THE CENTERLINE OF VAN CAMP STREET PER RECORD PLAT OF NORTH PORT CHARLOTTE ESTATES.
2) ELEVATIONS SHOWN ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988. F.D.E.P. BENCH MARK N-698-2007.
3) THE ACCURACY OF THIS MAP OF SURVEY IS BASED ON CONTROL MEASUREMENTS THAT MEET OR EXCEED THE MINIMUM ACCURACY REQUIREMENTS FOR THIS TYPE OF SURVEY AS SPECIFIED IN CHAPTER 5J-17, FAC. THIS MAP'S DIGITAL DATA IS INTENDED TO BE DISPLAYED AT A SCALE OF 1"=20' OR SMALLER.
4) SURVEY PERFORMED FOR THE "SPECIFIC PURPOSE" OF PROVIDING ELEVATION AND DIMENSION DETAILS OF THE WATER CONTROL STRUCTURE FOR USE BY THE CITY OF NORTH PORT DEPARTMENT OOF ENGINEERING.

FOR: CITY OF NORTH PORT
DEPARTMENT OF ENGINEERING

CERTIFICATE

I, hereby certify that this Map/Report of Survey as shown and/or described herein represents the results of Field Surveys performed under my supervision, that it is true and correct to the best of my knowledge, information and belief and meets the requirements of Chapter 5J-17, F.A.C. pursuant to Section 472.027, F.S. Subject to all notations as shown herein.

Van Buskirk / Fish & Associates, Inc., LB#3739

By: _____
Alan K. Fish, P.S.M.
Registered Professional Surveyor & Mapper
Florida Certificate No. 3941

Date of Survey: JUNE 19TH, 2014

"Not valid without the signature and the original raised seal of a Florida licensed surveyor and mapper."

FIELD BOOK: 587 PAGE(S): 3

REVISIONS:	BY:

MAP OF "SPECIFIC PURPOSE SURVEY, OF WATER CONTROL STRUCTURE # 162 IN NORTH PORT CHARLOTTE ESTATES CITY OF NORTH PORT, SARASOTA COUNTY, FLORIDA

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Van Buskirk / Fish & Associates, Inc.
SURVEYORS - MAPPERS - DEVELOPMENT CONSULTANTS
12450 Unit C Tamiami Trail · North Port, FL 34287 · (941) 426-0681

DATE:	6-19-2014
SCALE:	AS NOTED
DRAWN:	GC
PROJECT NO.	14-1087
SHEET	1
OF	1 SHEETS

APPENDIX B

WCS-162 Pictures

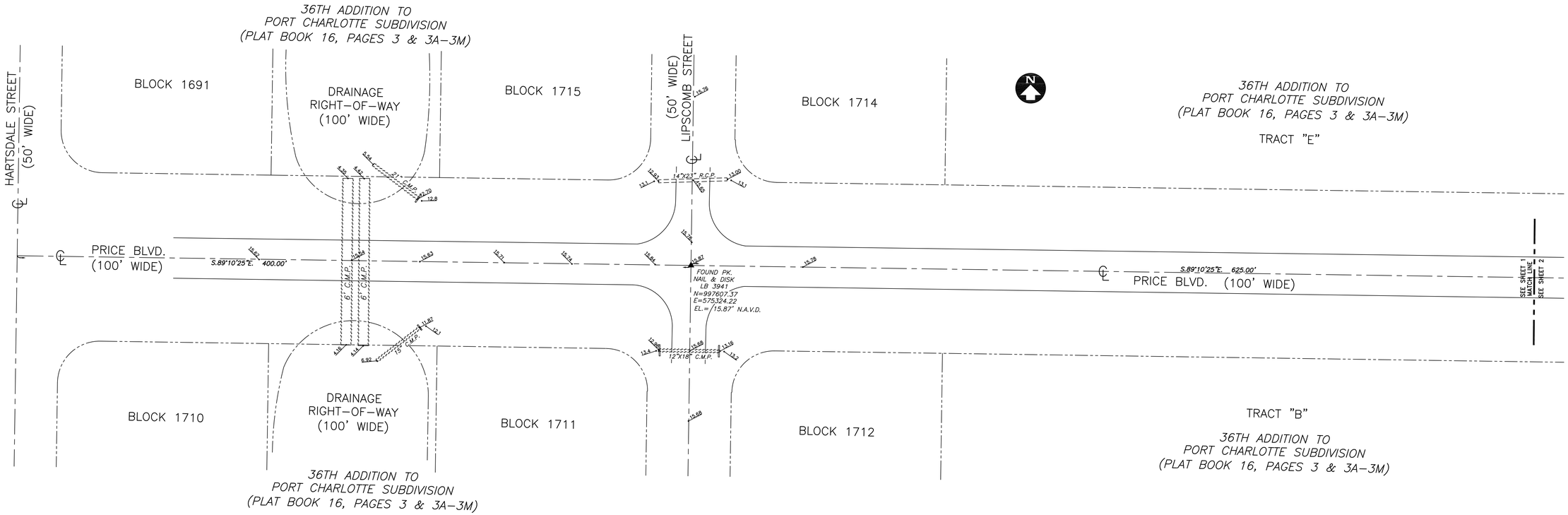
Looking North-West from the downstream of WCS-162

Looking South-West from the upstream of WCS-162

Looking South-West from the upstream of WCS-162

APPENDIX C

2014 Survey Data of West Price Boulevard



LEGEND

- FOUND 4" X 4" CONCRETE MONUMENT (DISK NUMBER NOTED, IF ANY)
- SET 4"X 4" CONCRETE MONUMENT WITH L.S. 3941 DISK.
- FOUND #4 OR #5 IRON ROD (CAP NUMBER NOTED, IF ANY)
- SET #4 IRON ROD WITH L.B. 3739 CAP.
- FOUND 1/2" TO 1" IRON PIPE (NUMBER NOTED, IF ANY)
- FOUND NAIL OR NAIL & DISC (NUMBER NOTED, IF ANY)
- SET NAIL & DISC, LS #3941
- ( ) PARENTHESES INDICATE RECORD BEARING OR DISTANCE IF DIFFERENT THAN MEASURED
- UTILITY POLE & GUY ANCHOR
- LIGHT POLE
- MAIL BOX
- STREET SIGN
- WATER VALVE
- BACK FLOW PREVENTION DEVICE
- SANITARY CLEAN OUT
- ELECTRICAL BOX
- GTE CANISTER
- PHONE RISER
- WATER METER
- HYDRANT
- SANITARY SEWER MANHOLE
- PHONE BOX
- TYPICAL SPOT ELEVATION
- 7.7 SPOT ELEVATION (POST CONSTRUCTION)
- RE–ENFORCED CONCRETE PIPE (R.C.P.)
- CORRUGATED METAL PIPE (C.M.P.)
- CORRUGATED PLASTIC PIPE (C.P.P.)

- OHL — OHL — OVERHEAD UTILITY LINES
- UGT — UGT — UNDER GROUND TELEPHONE LINES
- W — W — WATER MAIN
- WS — WS — WATER SERVICE
- GAS — GAS — UNDER GROUND GAS LINE
- CHAIN LINK FENCE
- WIRE FENCE
- WOOD FENCE

P.C.	POINT OF CURVATURE
P.T.	POINT OF TANGENCY
P.O.B.	POINT OF BEGINNING
P.O.C.	POINT OF COMMENCEMENT
P.R.M.	PERMANENT REFERENCE MONUMENT
P.C.P.	PERMANENT CONTROL POINT
T.B.M.	TEMPORARY BENCH MARK
E.O.P.	EDGE OF PAVEMENT
℄	CENTERLINE
B	BASELINE
FND.	FOUND
I.P.	IRON PIPE
I.R.	IRON ROD
C.M.P.	CORRUGATED METAL PIPE
R.C.P.	REINFORCED CONCRETE PIPE
C.M.	CONCRETE MONUMENT
EL.	ELEVATION
F.F.	FINISH FLOOR
H.W.	HEAD WALL
B.O.C.	BACK OF CURB
P.R.C.	POINT OF REVERSE CURVATURE
B.F.P.	BACK FLOW PREVENTION DEVICE
M.A.F.L.	MEAN ANNUAL FLOOD LINE
F.S.P.C.S.	FLORIDA STATE PLANE COORDINATE SYSTEM

- PINE TREE (TYP)
- OAK TREE (TYP)
- PALM TREE 10" DIAMETER (TYP)

SURVEYOR'S NOTES/REPORT:

1) BEARINGS ARE BASED ON "GRID NORTH" FLORIDA STATE PLANE COORDINATE SYSTEM, "WEST ZONE". COORDINATES ARE NAD 1983/2007.
2) ELEVATIONS SHOWN ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.
3) THIS SURVEY WAS PERFORMED FOR THE "SPECIFIC PURPOSE" OF PROVIDING TOPOGRAPHIC SPOT ELEVATIONS, CULVERT AND STORM DRAIN PIPE SIZES AND ELEVATIONS, CULVERT MATERIAL TYPES AND OTHER SELECTED ELEVATION DATA FOR USE IN A DRAINAGE STUDY OF THE PORTIONS OF PRICE BLVD. SHOWN ON THIS MAP OF SURVEY.
4) EASEMENTS SHOWN IF ANY, ARE INTERPRETED FROM RECORD PLAT DEDICATIONS OR TITLE INFORMATION SUPPLIED TO OR ACQUIRED BY, THE SURVEYOR AT TIME OF SURVEY. THE SURVEYED PROPERTY MAY BE SUBJECT TO OTHER RESERVATIONS, RESTRICTIONS, COVENANTS, EASEMENTS OR AGREEMENTS AFFECTING THE PROPERTIES NOT DEPICTED ON THIS SURVEY. UNDERGROUND UTILITIES HAVE NOT BEEN LOCATED. IF UTILITY LINES ARE SHOWN, THEY WERE LOCATED AS MARKED BY OTHERS AND THE SURVEYOR ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OR THE COMPLETENESS OF SAID UTILITY LOCATIONS.
5) THE ACCURACY OF THIS MAP OF SURVEY IS BASED ON CONTROL MEASUREMENTS THAT MEET OR EXCEED THE MINIMUM ACCURACY REQUIREMENTS FOR THIS TYPE OF SURVEY AS SPECIFIED IN CHAPTER 5J–17, FAC. THIS MAP'S DIGITAL DATA IS INTENDED TO BE DISPLAYED AT A SCALE OF 1"=20' OR SMALLER.

FOR: THE CITY OF NORTH PORT, FLORIDA

CERTIFICATE

I, hereby certify that this Map/Report of Survey Sheets 1 through 8, as shown herein represents the results of Field Surveys performed under my supervision, that it is true and accurate to the best of my knowledge, information and belief and meets the requirements of Chapter 5J–17, F.A.C. pursuant to Section 472.027, F.S. Subject to all notations as shown herein.

Van Buskirk / Fish & Associates, Inc., LB#3739

By: _____
Alan K. Fish, P.S.M.
Registered Professional Surveyor & Mapper
Florida Certificate No. 3941

ALAN K. FISH LICENSE NUMBER No. 3941 STATE OF FLORIDA Professional Surveyor & Mapper

Date of Survey: JUNE 17, 2014

"Not valid without the signature and the original raised seal of a Florida licensed surveyor and mapper."

REVISIONS:	BY:

MAP OF "SPECIFIC PURPOSE SURVEY" SHOWING FIELD SURVEY DATA COLLECTED FOR A DRAINAGE STUDY ALONG A PORTION OF PRICE BLVD. IN THE CITY OF NORTH PORT, FLORIDA

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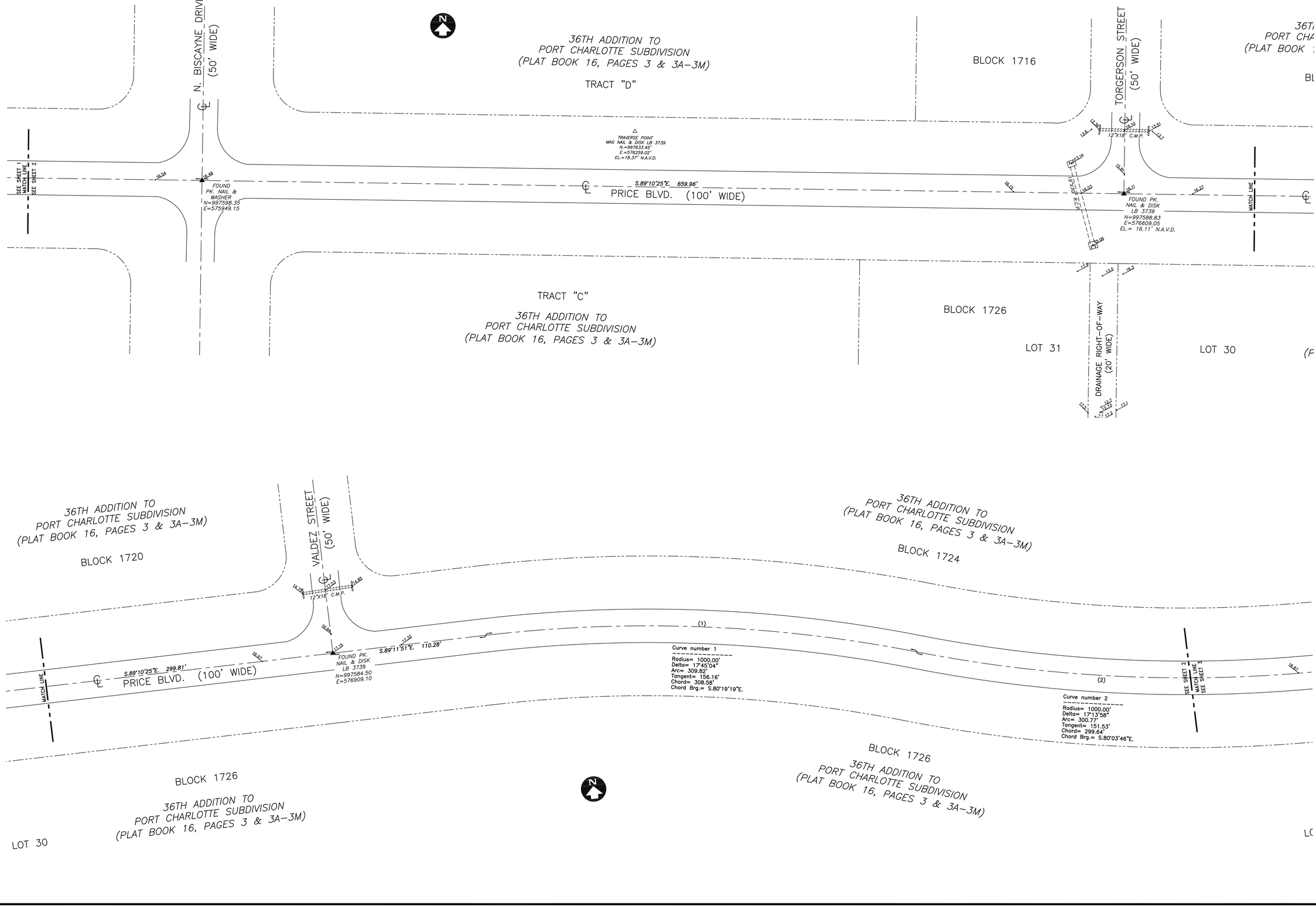
DATE:	6-17-2014
SCALE:	1" = 30'
DRAWN:	GC
PROJECT NO.	14-1088
SHEET	1
OF	7 SHEETS



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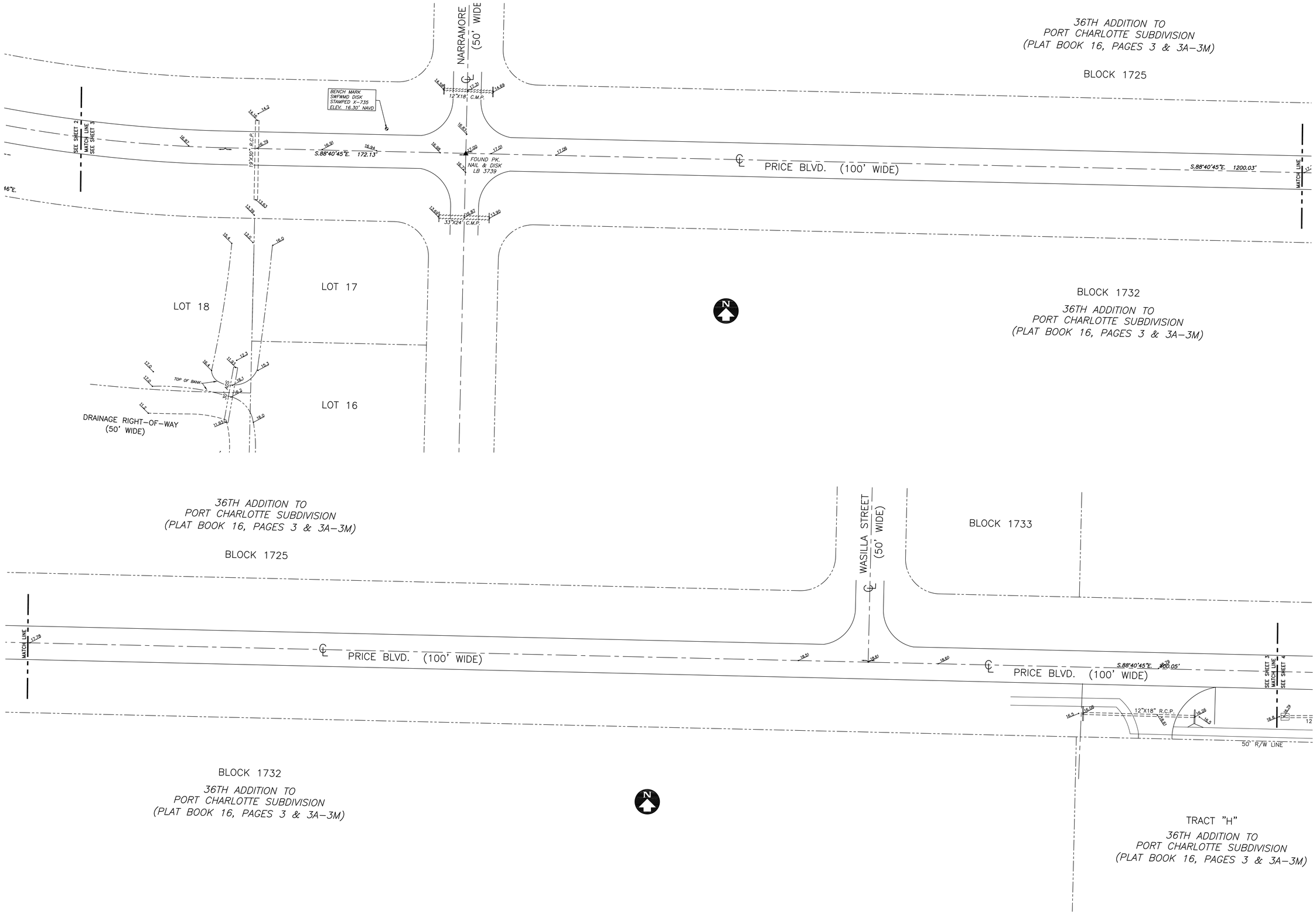
OF	7 SHEETS



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DATE:	6-17-2014
SCALE:	1" = 30'
DRAWN:	AKF
PROJECT NO.	14-1088
SHEET	3
OF	7 SHEETS

36TH ADDITION TO
PORT CHARLOTTE SUBDIVISION
(PLAT BOOK 16, PAGES 3 & 3A–3M)

TRACT "J"

BLOCK 1733

LOCHER TERRACE
(50' WIDE)

36TH ADDITION TO
PORT CHARLOTTE SUBDIVISION
(PLAT BOOK 16, PAGES 3 & 3A–3M)

BLOCK 1737

50' R/W LINE

12"X18" R.C.P.

SEE SHEET 3
MATCH LINE
SEE SHEET 4

PRICE BLVD. (100' WIDE)

S.88°40'45"E. 394.94'

24.94'

FOUND MAG. NAIL & LB 3739 DISK
N=997438.37
E=579390.52

FOUND MAG. NAIL & LB 3739 DISK
N=997429.47
E=579785.35

FOUND MAG. NAIL & LB 3739 DISK
PC. CURVE
N=997428.96
E=579810.28

SOUTHERLY HALF OF
PRICE BLVD.
(O.R. 1749, PG.1592)

CONCRETE WALK

8" P.V.C.

T.B.M.: SET PK & DISK L.B. 3739 DISK IN WALK
EL.=18.04' NAVD
N.=997393.78'
E.=579418.83'

TRAVERSE POINT 5" IRON ROD & CAP LB 3739
N.=997398.61'
E.=579981.53'
EL.=17.93' NAVD

Curve number 3
Radius= 999.98'
Delta= 27°56'39"
Arc= 487.71'
Tangent= 248.81'
Chord= 482.89'
Chord Brg.= S.74°43'41"E.

(3)

PRICE BLVD.
(100' WIDE)

MATCH LINE

ISION
3A–3M)

GLENALLEN BLVD.
(80' WIDE)

EASTERLY HALF OF
GLENALLEN BLVD.
O.R. 1749, PG.1592)

40' R/W LINE

ELEVATIONS ARE NAVD–88
COORDINATES ARE NAD 1983/2007

36TH ADDITION TO
PORT CHARLOTTE SUBDIVISION
(PLAT BOOK 16, PAGES 3 & 3A–3M)

BLOCK 1738

BLOCK 1736

HYDER TERRACE
(50' WIDE)

ACADIAN TERRACE
(50' WIDE)
"NOT OPEN"

DRAINAGE RIGHT–OF–WAY
(50' WIDE)
"NOT CONSTRUCTED"

"LIMIT OF PLAT"

LANDS OF THE SCHOOL BOARD
OF SARASOTA COUNTY
(O.R. 2533, PAGE 751)

LANDS OF THE CITY
OF NORTH PORT
(O.R. 1771, PAGE 469)

13"X22" CMP

STORM INLET
TOP=16.80'

15" ADS

FOUND MAG. NAIL & LB 3739 DISK
0.15'SW

Curve number 4
Radius= 999.98'
Delta= 17°10'35"
Arc= 299.78'
Tangent= 151.02'
Chord= 298.66'
Chord Brg.= S.52°10'05"E.

(4)

PT. CURVE

PRICE BLVD.
(100' WIDE)
150.00'

SOUTHERLY HALF OF
PRICE BLVD.
(O.R. 1749, PG.1592)

TRAVERSE POINT 5" IRON ROD & CAP LB 3739
N.=997193.04'
E.=580399.19'
EL.=17.09' NAVD

12"X18" R.C.P.

SEE SHEET 5
MATCH LINE
SEE SHEET 4

PRICE BLVD.
(O.R. 1749, PG.1592)
(100' WIDE)

S.43°34'47"E. 748.45'

598.45'

SEE SHEET 5
MATCH LINE
SEE SHEET 4

TRAVERSE POINT 5" IRON ROD & CAP LB 3739
N.=996786.62'
E.=580797.55'
EL.=17.03' NAVD

16"X22" CMP

BENCH MARK
SW"MD DISK
STAMPED W-735
ELEV 17.94' NAVD

MATCH LINE

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MAP OF "SPECIFIC PURPOSE SURVEY" SHOWING FIELD SURVEY DATA COLLECTED FOR A DRAINAGE STUDY ALONG A PORTION OF PRICE BLVD. IN THE CITY OF NORTH PORT, FLORIDA

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PROJECT NO.	14-1088
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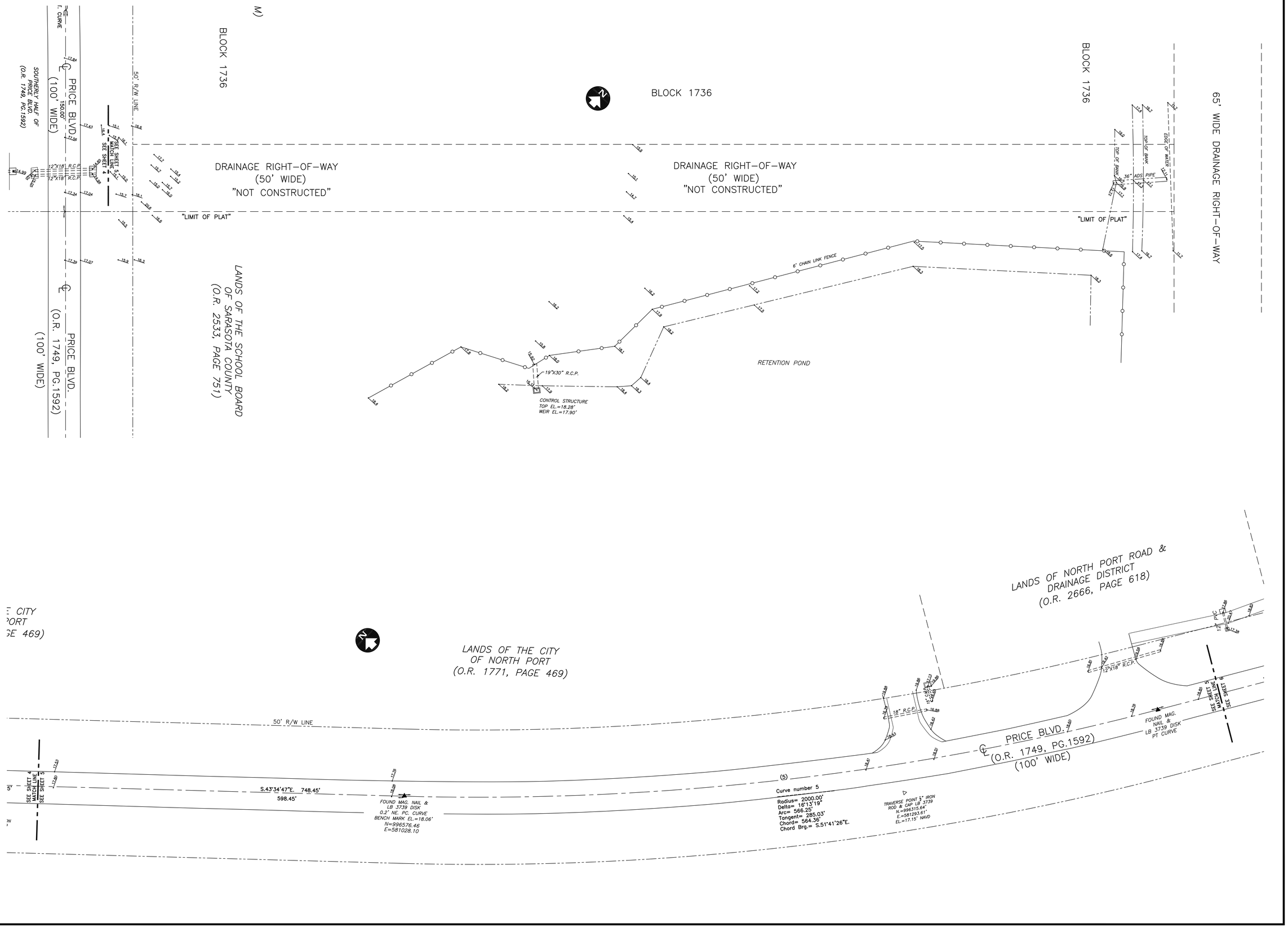
OF 7 SHEETS	



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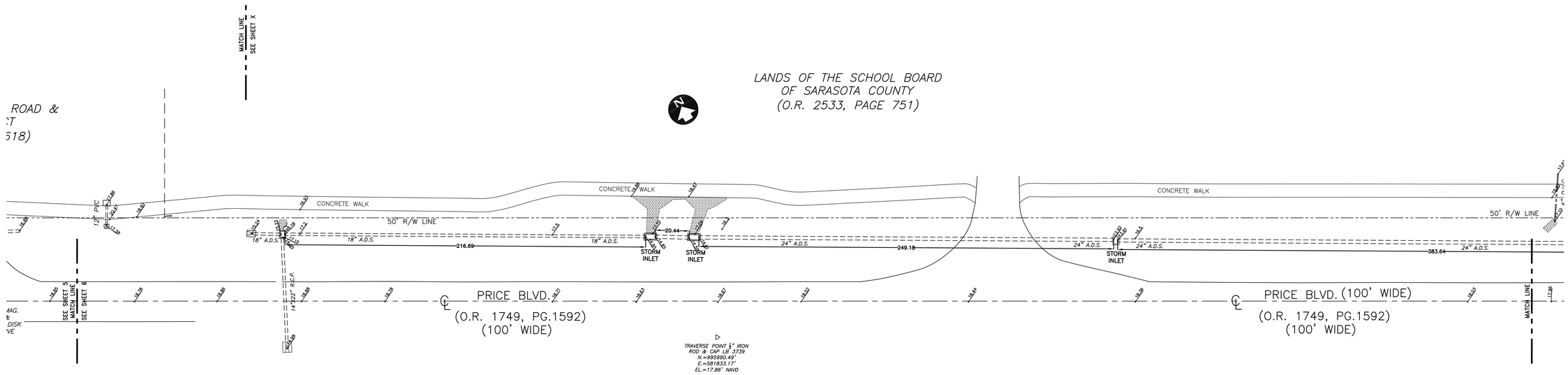
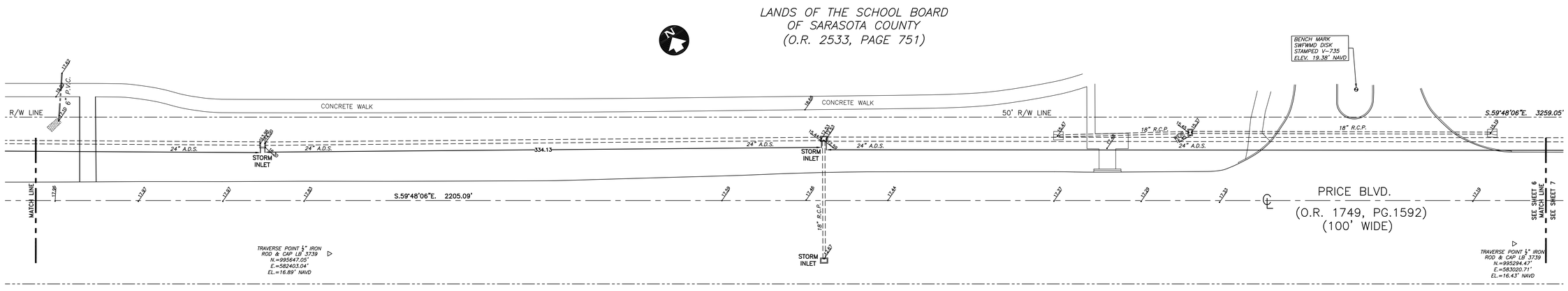
OF	7 SHEETS





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DATE:	6-17-2014
SCALE:	1" = 30'
DRAWN:	AKF
PROJECT NO.	14-1088
SHEET	6
OF	7 SHEETS

LANDS OF THE SCHOOL BOARD
OF SARASOTA COUNTY
(O.R. 2533, PAGE 751)

S.59°38'52"E. 3259.05'

50' R/W LINE

R/W LINE S. BOUNDARY SCHOOL PROPERTY (O.R. 2533, PG. 751)

50' R/W LINE

15" R.C.P.

24" A.D.S.

1163.91

24" A.D.S.

24" A.D.S.

STORM INLET

24" A.D.S.

SEE SHEET 6
MATCH LINE
SEE SHEET 7

SET MAG NAIL &
LB 3739 DISK
N=995117.28
E=583376.63

S.59°38'52"E. 1800.37'

℄ PRICE BOULEVARD
(100' WIDE UN-DEDICATED)

MATCH LINE

NT 5" IRON
LB 3739
94.47'
20.71'
1' NAVD

INLET

23"X14" R.C.P.

INLET

50' R/W LINE

SPRINGHAVEN DRIVE.
(80' WIDE)

TRAVERSE POINT 5" IRON
ROD & CAP LB 3739
N.=994881.11
E.=583694.63
EL.=16.80 NAVD

50' RIGHT-OF-WAY LINE UN-DEDICTTED PORTION OF PRICE BLVD.

END OF DEDICATED PUBLIC
RIGHT-OF-WAY FOR PRICE BLVD.
(O.R. 1749, PG.1592)

LANDS OF THE SCHOOL BOARD
OF SARASOTA COUNTY
(O.R. 2533, PAGE 751)

CONCRETE WALK

R/W LINE S. BOUNDARY SCHOOL PROPERTY (O.R. 2533, PG. 751)

SCHOOL BOUNDARY LINE PER O.R.2533, PG. 751

CONCRETE WALK

LANDS OF NORTH PORT ROAD &
DRAINAGE DISTRICT
(O.R. 2357, PAGE 382)

BIKE PATH BRIDGE

50' RIGHT-OF-WAY LINE UN-DEDICTTED PORTION OF PRICE BLVD.

EDGE OF WATER
BOTTOM OF CREEK
CREEK
BOTTOM OF CREEK
TOP OF BANK

24" A.D.S.

800.55

LF
STORM
INLET

36" C.M.P. OUTFALL PIPE

18" H.D.P.E.
52.30

EDGE OF WATER

MYAKKAHATCHEE

CONCRETE SIDEWALK

MATCH LINE

S.59°38'52"E. 1800.37'

℄ PRICE BLVD.
(100' WIDE UN-DEDICATED)

APPARENT BURIED
JUNCTION BOX NEAR
OLD CONC. HEADWALL

BRIDGE

CONCRETE SIDEWALK

TRAVERSE POINT 5" IRON
ROD & CAP LB 3739
N.=994563.77'
E.=584294.72'
EL.=16.93' NAVD

19"X30" R.C.P.

54" C.M.P.

50' RIGHT-OF-WAY LINE UN-DEDICTTED PORTION OF PRICE BLVD.

REVISIONS:	BY:

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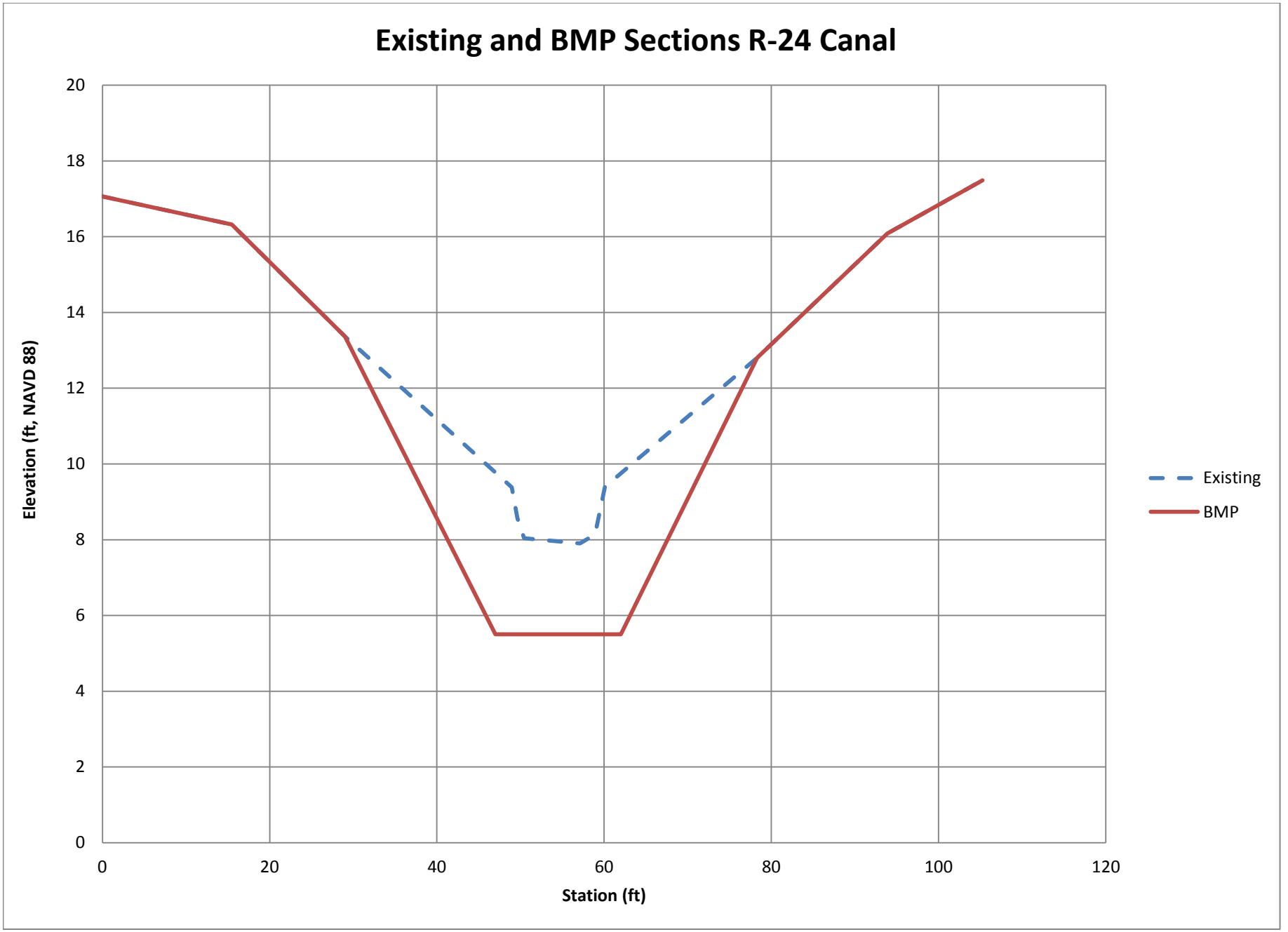
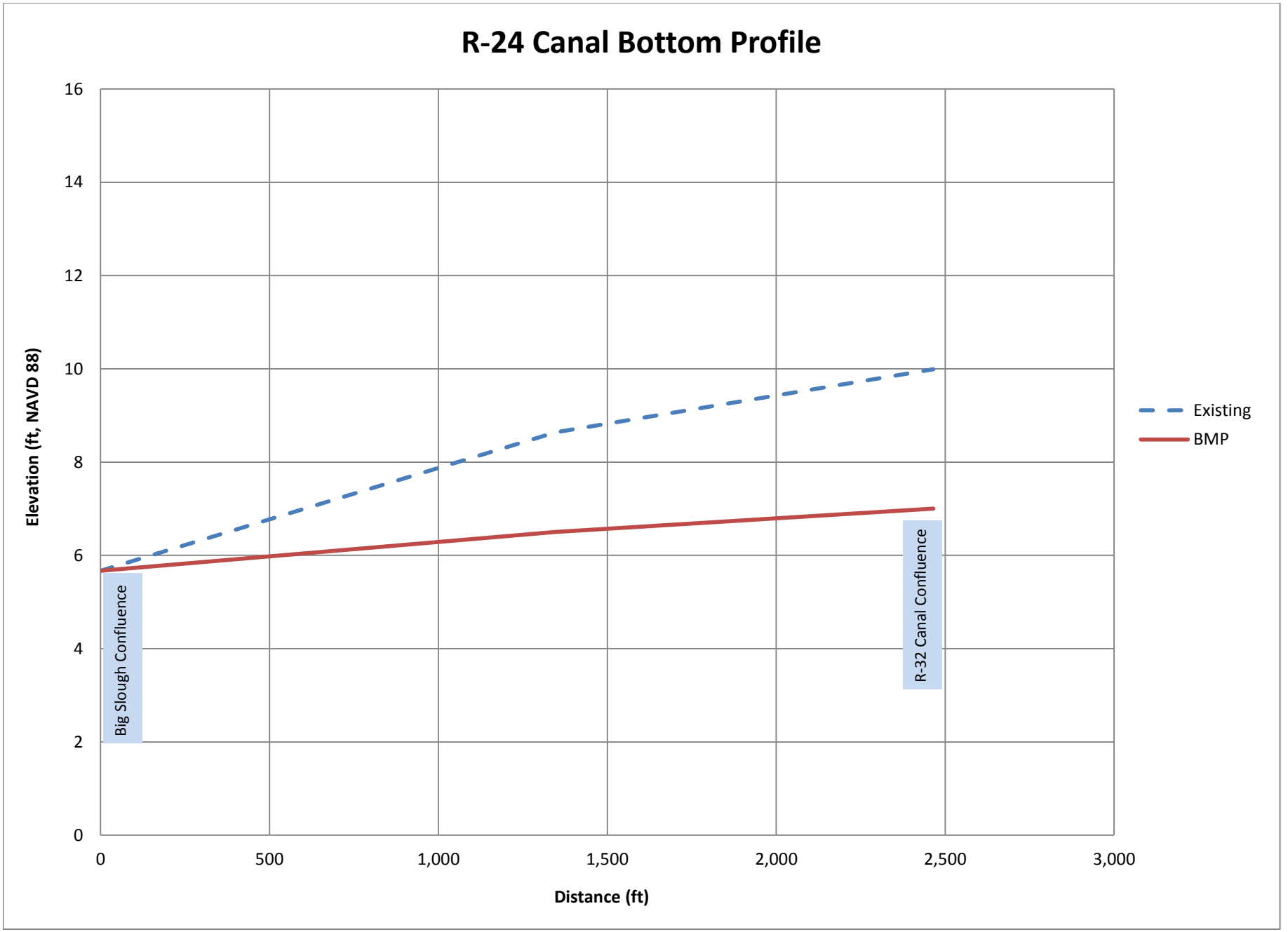
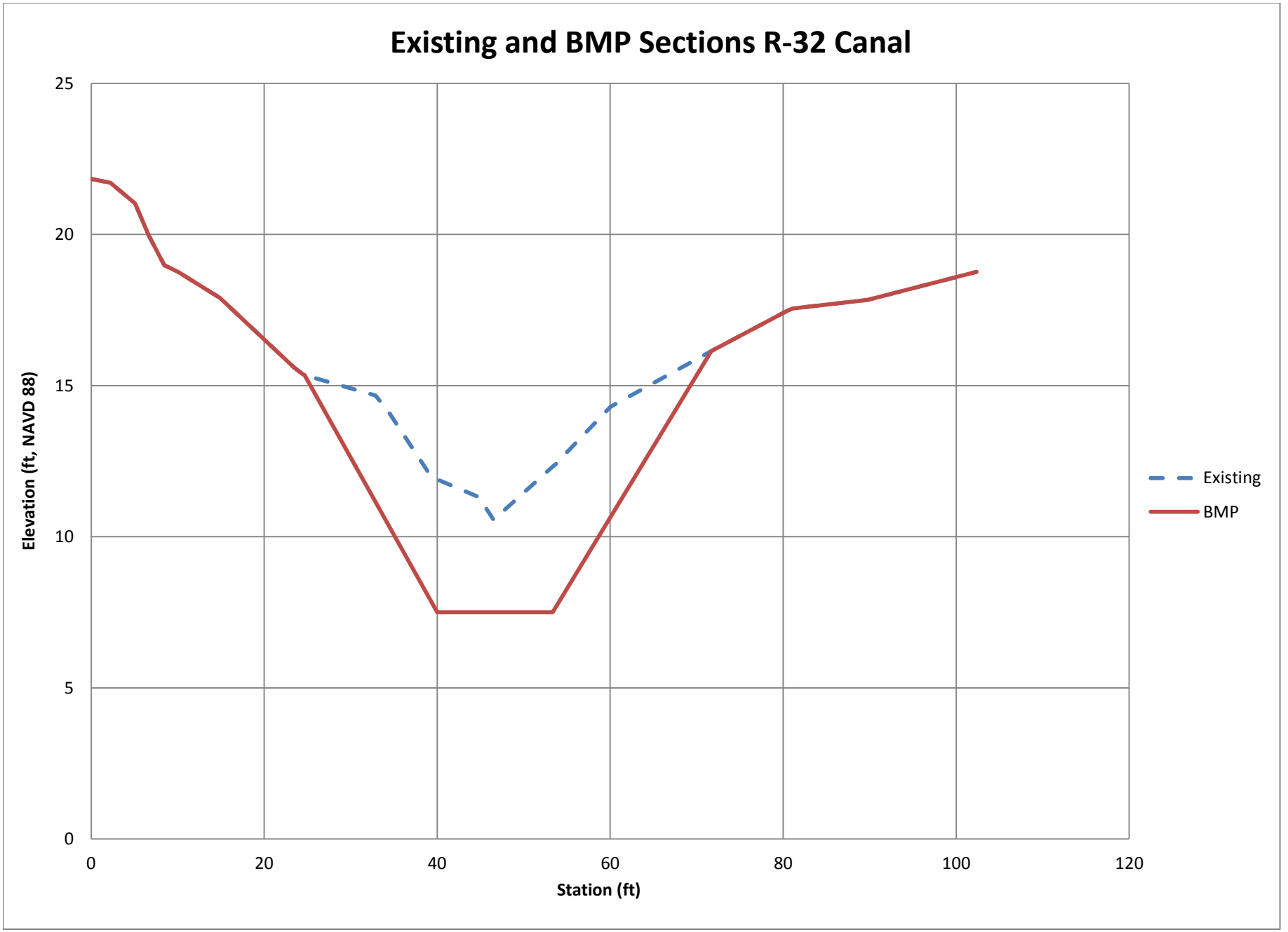
PROJECT NO.	14-1088
SHEET	7
OF	7 SHEETS

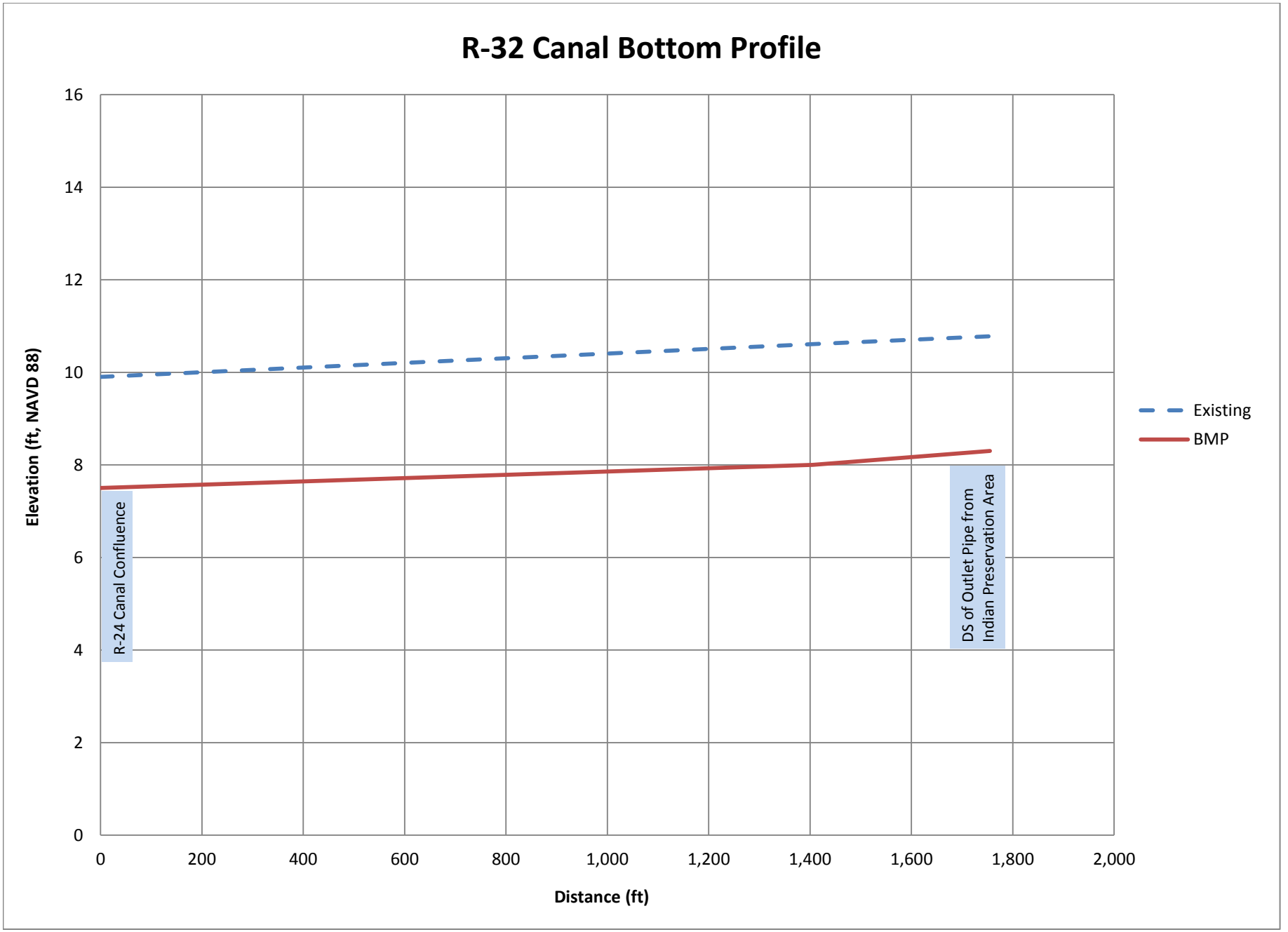
APPENDIX D

Canal Cross-sections and Profiles


Existing and BMP Sections R-24 Canal
Elevation (ft, NAVD 88)
20
18
16
14
12
10
8
6
4
2
0
0
20
40
60
80
100
120
Station (ft)
Existing
BMP


R-24 Canal Bottom Profile
16
14
12
10
8
6
4
2
0
Elevation (ft, NAVD 88)
0
500
1,000
1,500
2,000
2,500
3,000
Distance (ft)
Big Slough Confluence
R-32 Canal Confluence
Existing
BMP


Existing and BMP Sections R-32 Canal
Elevation (ft, NAVD 88)
25
20
15
10
5
0
0
20
40
60
80
100
120
Station (ft)
Existing
BMP


R-32 Canal Bottom Profile
Elevation (ft, NAVD 88)
16
14
12
10
8
6
4
2
0
0
200
400
600
800
1,000
1,200
1,400
1,600
1,800
2,000
Distance (ft)
R-24 Canal Confluence
DS of Outlet Pipe from Indian Preservation Area
Existing
BMP

APPENDIX E

Preliminary Cost Estimates

BMP No. 1 (Dredging R-24 and R-32 Canals) Preliminary Cost Estimates

Item	Length (ft)	Width (ft)	Cross Section area	Quantity	Unit	Unit Cost *	Estimated Cost	Comments
Dredging and removal of dredgings - 1,800 ft of R-32 Canal	1800		144.5	9633	CY	$ 25	$ 240,833	
Dredging and removal of dredgings - 2,300 ft of R-24 Canal	2300		118.3	10077	CY	$ 25	$ 251,935	
Bank Stabilization R-32 Canal Assume 1, 800ft long 20 feet wide on each side	1800	38		7600	SY	$ 2	$ 15,200	
Bank Stabilization R-24 Canal Assume 2,300 ft long 20 feet wide on each side	2300	38		9711	SY	$ 2	$ 19,422	
36-inch Pipe Crossing				40	LF	$ 50	$ 2,000	
Erosion and Sediment Control							$ -	
MOT				1	LS	$ 5,000	$ 5,000	
Mobilization and Demobilization				1	LS	$ 5,000	$ 5,000	
Other Project Costs				1	LS	$ 5,000	$ 5,000	
Subtotal							**$ 544,391**	
Design and Permitting Consultant Services (15%)							$ 81,659	
Construction and Inspection Consultant Services (5%)							$ 27,220	
Contingency (10%)							$ 65,327	
Total FY 2014 cost							$ 718,596	
Total FY 2017 Inflated Cost (5% per year)							**$ 831,864**	

* Estimated Costs from Thomas Marine Construction

BMP No. 2 (Raising 1,900 ft of Price Boulevard) Preliminary Cost Estimates

Item	Length (ft) *	Width (ft)	Depth (in)	Quantity	Unit	Unit Cost	Estimated Cost **	Comments
Detail Topographic Survey				1	ea	$ 5,000	$ 5,000	
Mill Existing Asphalt	2100	24		5600	SY	$ 15	$ 84,000	
Add road base to elevate road 1.2'	2100	26	15	6067	SY	$ 30	$ 182,000	$15 per SY per 8" thickness. Double cost for 15" thickness.
Type SP Structural Course 1.5"	2100	26	1.5	455	TON	$ 100	$ 45,500	100lb per SY per inch thickness / 2000lb per ton
Friction Course 1.5"	2100	26	1.5	455	TON	$ 120	$ 54,600	
Swale Regrading and sodding (assume 20 ft wide each side of Price Blvd)	2100	20		9333	SY	$ 5	$ 46,667	
Surveying (Construction staking, surveying, as-builts)				1	LS	$ 7,500	$ 7,500	
Erosion and Sediment Control				1	LS	$ 5,000	$ 5,000	
MOT				1	LS	$100,000	$ 100,000	Need bypass lanes
Mobilization and Demobilization (6%)				1	LS	$ 31,816	$ 31,816	
Subtotal							**$ 562,083**	
Design and Permitting Consultant Services (15%)							$ 84,312	
Construction and Inspection Consultant Services (5%)							$ 28,104	
Contingency (10%)							$ 67,450	
Total FY 2014 cost							$ 741,949	
Total FY 2017 Inflated Cost (5% per year)							**$ 858,899**	

* Add 100 feet on each for transition to existing road pavement elevation

** Cost inflated about 15% from 2014 Sumter/Price Intersection improvements cost from Ben Newman

BMP No. 3 (Raising 950 ft of Price Boulevard and Dredging R-24 and R-32 Canals) Preliminary Cost Estimates

Item	Length (ft) *	Width (ft)	Depth (in)	Quantity	Unit	Unit Cost	Estimated Cost **	Comments
Detail Topographic Survey				1	ea	$ 5,000	$ 5,000	
Mill Existing Asphalt	1150	24		3067	SY	$ 15	$ 46,000	
Add road base to elevate road 8"	1150	26	8	3322	SY	$ 15	$ 49,833	$15 per SY per 8" thickness.
Type SP Structural Course 1.5"	1150	26	1.5	249	TON	$ 100	$ 24,917	100lb per SY per inch thickness / 2000lb per ton
Friction Course 1.5"	1150	26	1.5	249	TON	$ 120	$ 29,900	
Swale Regrading and sodding (assume 20 ft wide each side of Price Blvd)	1150	20		5111	SY	$ 5	$ 25,556	
Surveying (Construction staking, surveying, as-builts)				1	LS	$ 7,500	$ 7,500	
Erosion and Sediment Control				1	LS	$ 5,000	$ 5,000	
MOT				1	LS	$100,000	$ 100,000	Need bypass lanes
Mobilization and Demobilization (6%)				1	LS	$ 17,622	$ 17,622.33	
Dredging R-24 and R-34 Canals (see BMP 1 cost estimate for detailed cost breakdown)							$ 544,391	
Subtotal							**$ 855,719**	
Design and Permitting Consultant Services (15%)							$ 128,358	
Construction and Inspection Consultant Services (5%)							$ 42,786	
Contingency (10%)							$ 102,686	
Total FY 2014 cost							$ 1,129,549	
Total FY 2017 Inflated Cost (5% per year)							**$ 1,307,594**	

* Add 100 feet on each for transition to existing road pavement elevation

** Cost inflated about 15% from 2014 Sumter/Price Intersection improvements cost from Ben Newman

David A. DeLoach, State of Florida, Professional Engineer, License No. 47761
This item has been electronically signed and sealed by David A. DeLoach, P.E. on May 9, 2019 using a SHA authentication code.

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City of North Port

Professional Engineering Services for the Big Slough Flood Reduction Study

Agreement #2016-48
Department of Public Works

STORMWATER MANAGEMENT PLAN

May 2019

DeLoach Engineering Science, PLLC
1845 Ivanhoe Road | Orlando, FL 32804

DeLoach Engineering Science
water resources and civil engineering

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City of North Port
Big Slough Flood Reduction Study

STORMWATER MANAGEMENT PLAN REPORT

The purpose of this report is to present a conceptual stormwater management master plan for drainage system improvements covering flood-prone areas in the Big Slough Watershed within the City of North Port. This report expands upon the North Port/Big Slough Watershed Management Program project (Ardaman & Associates, Inc., 2003-2014) and includes, as appendices, copies of selected reports including interim project reports by DeLoach Engineering Science, PLLC (DES) that have documented progress toward development of a viable stormwater management plan. Elements carried over from prior reports, including text, figures, and tables, have been updated to include new and better information and, where different, supersede information contained in those prior reports. A set of project deliverables, including updated geodatabase, collected field data, model input and output data, and digital library of prior reports and presentations, accompanies this report. These materials provide information in support of a request for conceptual approval of a Statewide Environmental Resource Permit (SWERP) application.

INTRODUCTION

The Big Slough Flood Reduction Study, which was cooperatively funded by and between the City of North Port and the Southwest Florida Water Management District (SWFWMD), was performed for the Department of Public Works under City of North Port Agreement #2016-48. Notice to Proceed to conduct the flood study was issued to DES on October 13, 2016. Per the Project Plan (Appendix A), DES evaluated feasibility and cost effectiveness of various solutions intended to reduce flooding in the City within the Big Slough Watershed. The Big Slough Flood Reduction Feasibility Study was comprised of two distinct parts:

- Part 1 was to evaluate localized flooding along Myakkahatchee Creek in two specific flood-prone areas and recommend construction projects or other methods to mitigate flooding. The I-75 and Jockey Club areas along Myakkahatchee Creek were initially designated for this work. However, collection and conveyance system improvements conceived and performed by the City of North Port stormwater department proved effective at reducing flooding within the Jockey Club area prior to this project getting underway. Consequently, the nearby flood-prone Dorothy Avenue area was instead targeted along with the I-75 area for Part 1 analysis and stormwater planning.
- Part 2 was to evaluate preliminary regional concepts including, but not limited to, those previously developed by others, with the intent to advance large scale conceptual solutions to mitigate flooding throughout the City of North Port.

Localized solutions to recurrent flooding were found to be ineffective in the selected Part 1 project areas. Larger-scale solutions thus became the focus of all flood reduction planning. To the extent that the proposed improvements can be implemented by the City independent of adjacent landowners, the stormwater plan meets Part 1 objectives. Plan components which require authorizations from adjacent land owners/managers will be implemented over a longer period of time and satisfy Part 2 objectives.

Prior Work Completed

The Big Slough watershed and City of North Port stormwater management system have been the subjects of prior investigations. Reference has been made by DES to the following reports:

- North Port Water Control District Phase I Report, Inventory and Approach to Analysis, for General Development Utilities, Inc., by R. D. Ghioto & Associates, Inc. (1984) presents data and information that describes NPWCD facilities, their function and condition.
- City of North Port Big Slough Watershed Study Phase III Task 2 Final Report, Stormwater Management Master Plan, by Camp, Dresser & McKee, Inc. (1993) presents conceptual solutions for flooding as well as assessments of potential water supplies and of nonpoint source pollution and describes a stormwater management plan to reduce flooding during extreme storm events.
- Watershed Management Program (WMP) Consulting Services in the Big Slough Watershed (K883), Best Management Practices (BMP) Analysis Final Report, for Southwest Florida Water Management District and City of North Port, by Ardaman & Associates, Inc. (2014) evaluates BMP alternatives to address flooding based on effectiveness, permittability, and economic viability.

The 1993 Stormwater Management Master Plan by CDM was partially implemented, providing increased local conveyance through replacement of culvert structures at four locations. Those improvements are accounted for in more recent model development. Other plan components were not completed including those for storage and flow diversion, apparently due to regulatory and financial constraints of that time.

Two important reports from the Ardaman WMP project are reproduced in Appendix B and Appendix C. Under the WMP project, an “existing condition” (2004 land use) model was developed and six regional BMP alternatives evaluated that could potentially reduce flooding through combinations of conveyance improvements, stormwater management storage areas, flood proofing, and flow diversion. Although the regional alternatives developed under the WMP project were not incorporated into a specific plan for implementation, the work provided insight to the system’s hydraulic response and BMP limitations.

Additionally, hydraulic performance and effects of potential local conveyance improvements were analyzed under the WMP project at the following sites:

- R-36 Canal at I-75
- Myakkahatchee Creek at I-75
- R-36 Canal at Tropicaire Boulevard
- Myakkahatchee Creek at Tropicaire Boulevard
- WCS-162 location on the R-36 Canal (possibility of adding gates to the existing structure)
- Price Boulevard drainage system (five alternative sets of improvements)

Importantly, BMP evaluation results were compared to the 1-Day 100-Year existing condition model only.

The current Big Slough Flood Reduction Study builds upon all prior work to advance previously developed and new concepts to achieve flood mitigation in areas where residential structures are shown as flooding in the recently updated Flood Insurance Rate Maps (FIRMs). Performance of proposed improvements will be considered relative to lesser storm events from mean annual up to and including the 100-year storm event to evaluate cost and benefit relationships across a broader range of conditions.

PROJECT AREA DESCRIPTION

The Big Slough Watershed (Figure 1) is located in southeastern Sarasota County and is tributary to the Myakka River. Portions of the City of North Port located east of the Myakka River are within the southern portion of the Big Slough Watershed. The Big Slough Canal (also called Myakkahatchee Creek in its lower reaches) passes from north to south and receives inflows from numerous waterways within the City.

Discharge of waters from the City and upstream offsite areas occurs primarily via Myakkahatchee Creek as it passes beneath US 41. Lesser discharges occur southward through several open weirs, drop structures, and culverts along Hillsborough Boulevard into waterways which continue through Port Charlotte. Several of those downstream waterways are controlled by structures while others are tidally influenced.

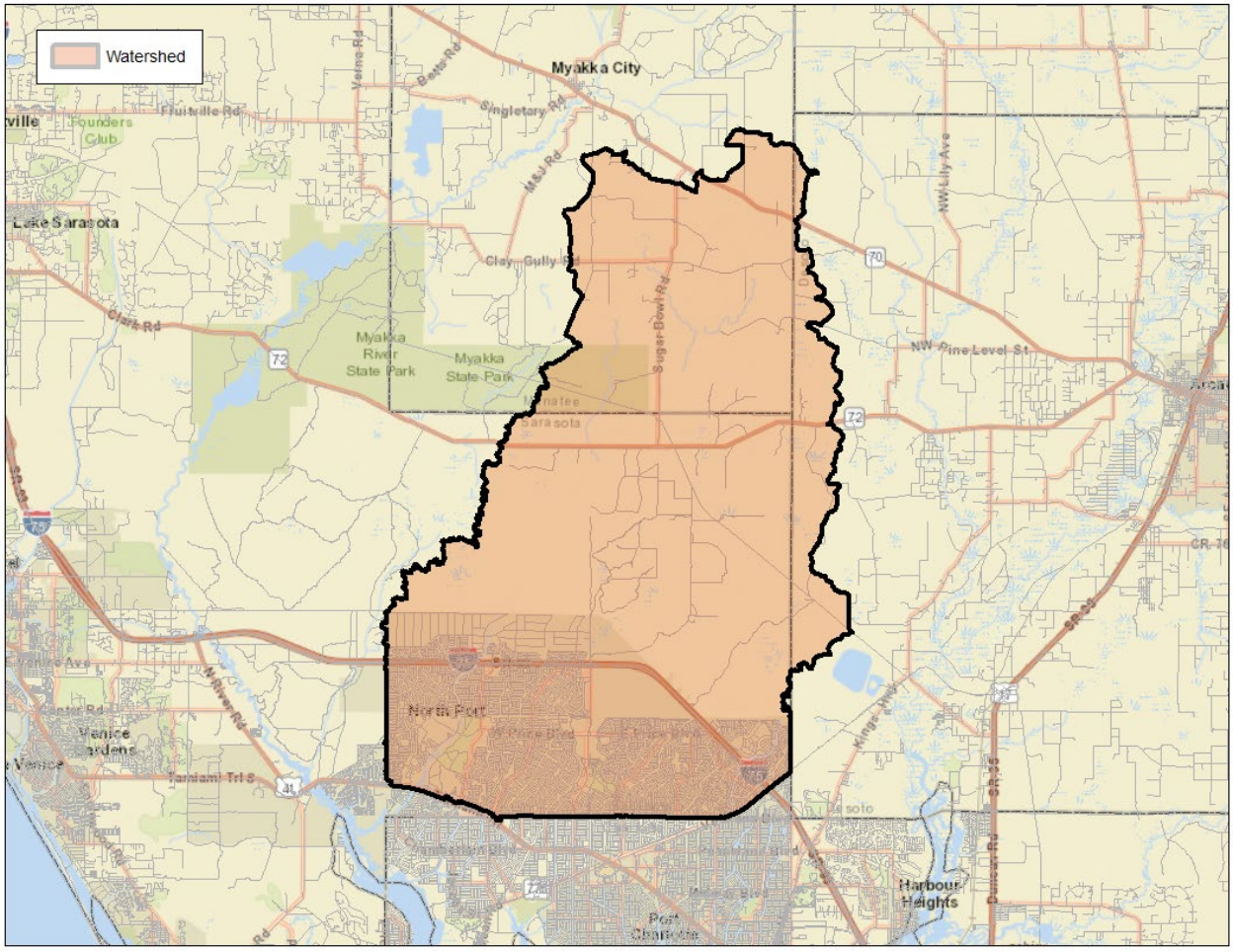

Figure 1: The Big Slough Watershed

Soil Conditions

Figure 2 and Figure 3 illustrate the spatial distribution of hydrologic soil groups in the I-75 and Dorothy Avenue project areas, respectively, based upon Soil Surveys published by the U.S. Department of Agriculture, Natural Resource Conservation Service (USDA-NRCS).

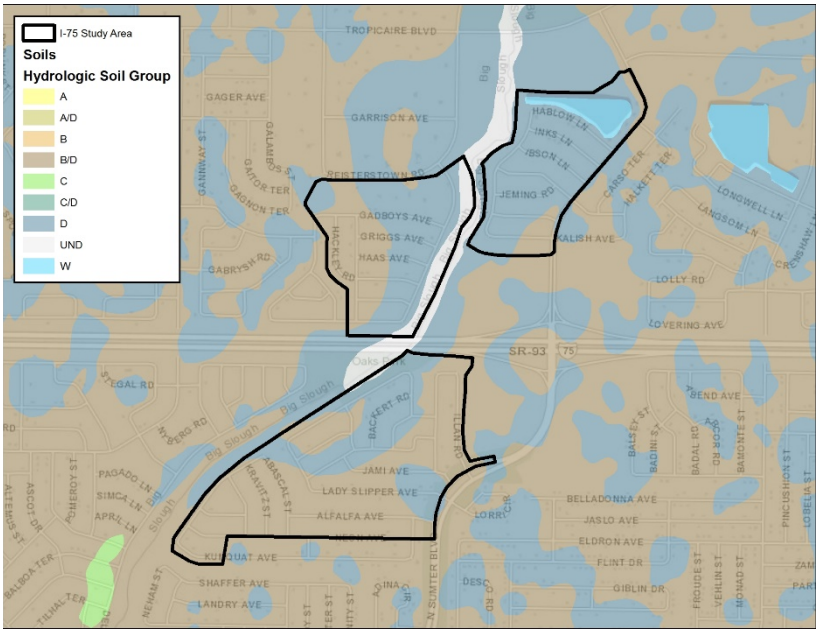

Figure 2: Hydrologic Soil Groups, I-75 Area

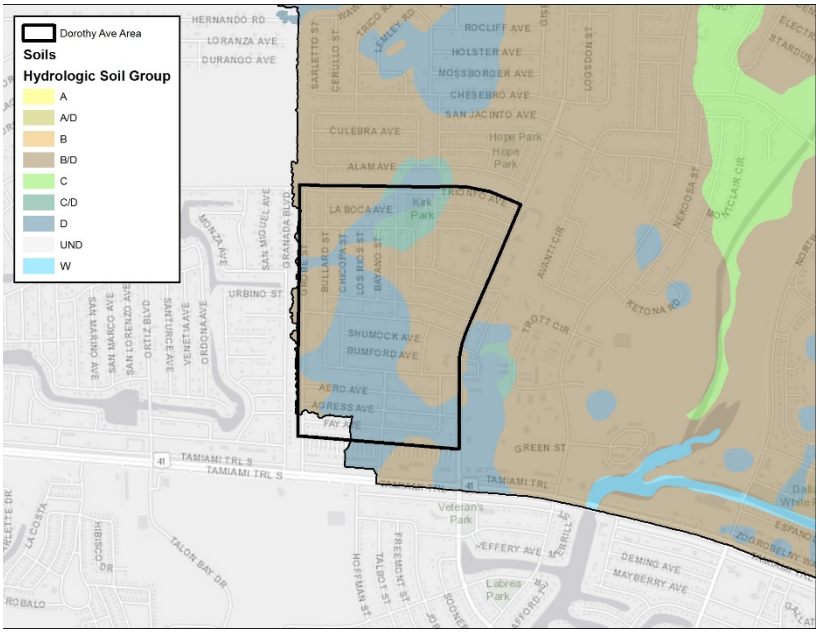

Figure 3: Hydrologic Soil Groups, Dorothy Avenue Area

Low permeability, hydric soils associated with depressional areas and floodplains are predominant in areas immediately adjacent to Myakkahatchee Creek and the Big Slough canal and throughout much of the Dorothy Avenue area. These soils are classified as being in Hydrologic Soil Group (HSG) "D", exhibiting low infiltration rates and available storage capacity. These soils are located in areas that have historically been prone to flooding.

Soils throughout much of the watershed fall into the dual HSG A/D, B/D, and C/D categories. In developed areas where extensive ditching may keep surficial aquifer water levels low, these soils may provide higher infiltration rates and maintain greater soil storage capacity than occur naturally. Water level control structures which maintain higher water level in canals, however, may reverse this effect, resulting in significantly higher runoff potential in these soils. While North Port contains an extensive ditch system, water level control structures maintain higher normal water levels to meet local or regional water supply purposes and/or to mitigate environmental impacts of dewatering.

Land Use Conditions

Figure 4 and Figure 5 illustrate conditions in the I-75 and Dorothy Avenue areas, respectively. Both are comprised primarily of single-family residential land use, ranging from low to high density, with some commercial areas. Much of the I-75 area is undeveloped, primarily due to frequent and severe flooding.

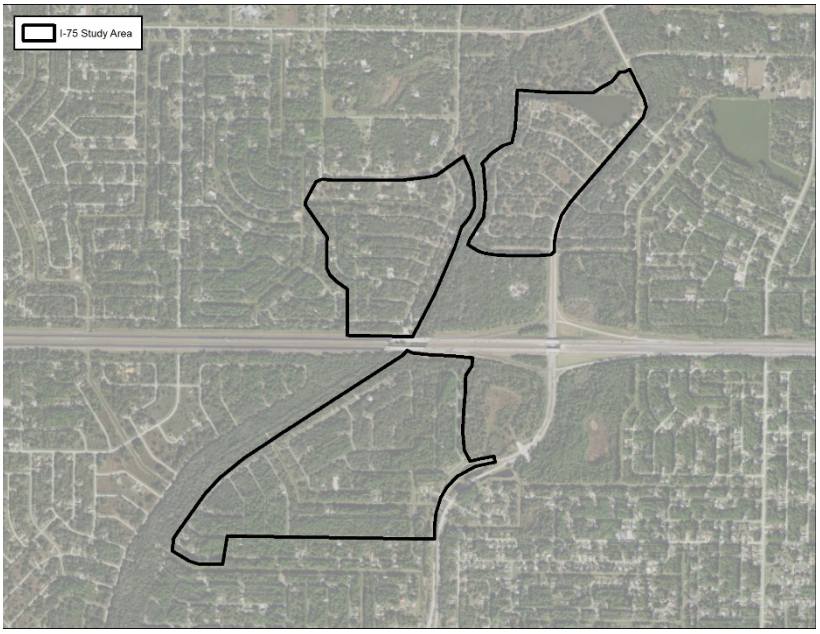

Figure 4: Land Use (Aerial), I-75 Area

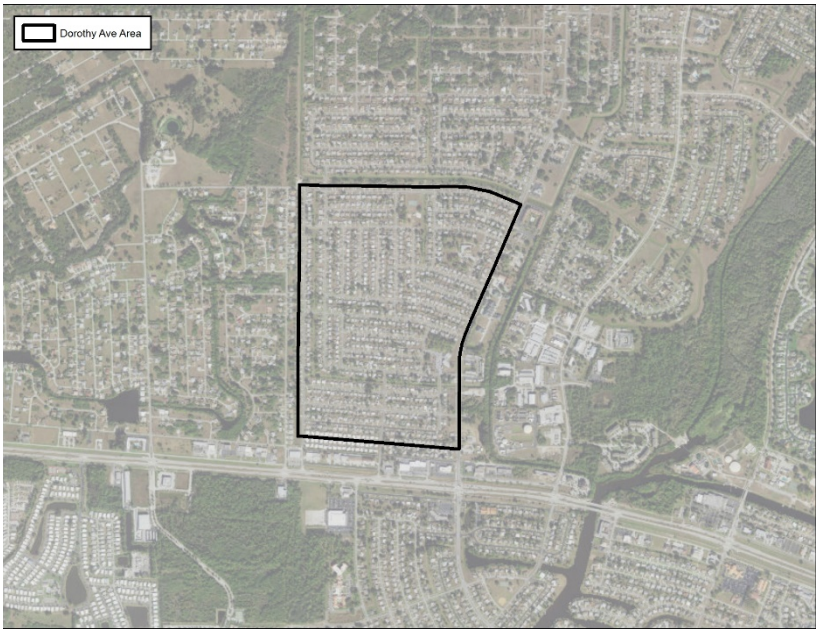

Figure 5: Land Use (Aerial), Dorothy Avenue Area

Boundaries of various land use categories were provided by the SWFWMD in GIS format for use in hydrologic model development and are based upon the Florida Land Use Cover and Forms Classification (FLUCCCS) system. Impervious values are derived for various land use categories and are an important factor in determining runoff generation from rainfall.

There is a wide variety of land use and land cover in the Big Slough watershed, including a significant amount of urban land (nearly 40%) which occurs primarily in the lower half of the watershed. A large amount of agricultural land, open range, and conservation lands are in the upper half of the watershed.

The Dorothy Avenue area is one of the earliest constructed residential communities in North Port and is comprised of high-density single family residential land use. The large amount of imperviousness (roads, driveways, and rooftops) generates high runoff rates and volumes, and local flooding results from inadequate collection and conveyance systems. Flooding during large events is exacerbated by overflows from the R-36 canal into R-231 at Trionfo Avenue.

Historical Flooding

Figure 6 and Figure 7 illustrate the extents of flood inundation in the I-75 and Dorothy Avenue areas, respectively, for the mean annual, 10-year, and 100-year storm events. Flood areas are based on storm event modeling results using the updated existing condition model and mapping on a LiDAR-based terrain.

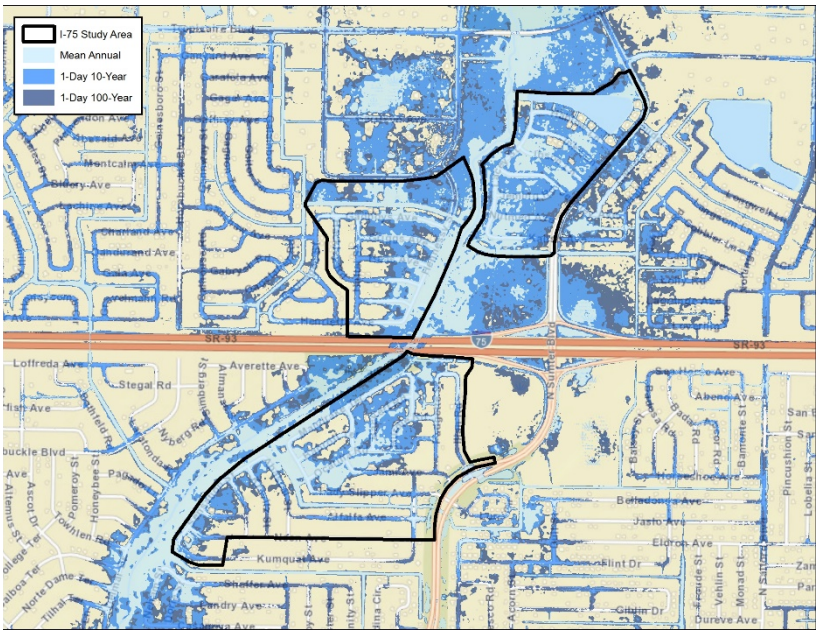

Figure 6: Flood Inundation Areas, I-75 Area

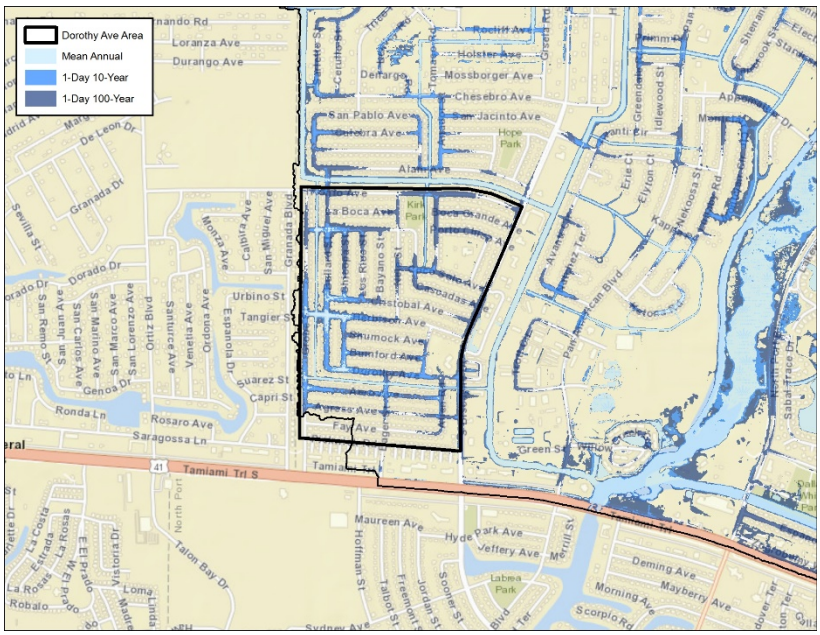

Figure 7: Flood Inundation Areas, Dorothy Avenue Area

The City of North Port has often experienced flooding in the Big Slough Watershed, including in the areas near Myakkahatchee Creek north and south of I-75, where the depth and very long duration of flooding has required emergency evacuation of many residents. Moderate to extreme flooding of streets occurs throughout older portions of the City in the vicinity of Dorothy Avenue. The nature of flooding in both of these areas, and particularly around I-75, is such that regional improvements are required to achieve significant and cost-effective flood reduction.

DES and City of North Port staff had opportunities to observe and record flooding conditions on several occasions over the past decade. The mapped inundation areas shown here accurately portray observed flooding under similar historic rainfall conditions.

Simulation results were validated and peer review performed prior to Governing Board approval of the model and flood mapping. The model represents best available information upon which to develop baseline information for design and permitting of drainage improvements in North Port.

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PREVIOUS BMP EVALUATIONS AND FINDINGS

The Big Slough watershed and City of North Port stormwater management system have been subjects of several prior investigations (Appendix D). Two projects of the past 25 years, in which rigorous evaluations were undertaken to solve recurrent, large-scale flooding problems in the City, are briefly described here.

Stormwater Management Master Plan (1993)

As part of the City of North Port's stormwater improvement program, Camp Dresser & McKee, Inc. (CDM) developed a Stormwater Management Master Plan for the Big Slough watershed. The plan, which was conducted in three phases, sought to evaluate flooding problems and determine engineering solutions. The third phase included analyses of various alternatives for flood reduction. Detailed modeling was conducted to assess potential flood reduction afforded by those alternatives. A cost/benefit analysis was also conducted to evaluate and recommend a plan for detailed design.

The Phase III Task 1 interim report (CDM, 1992) outlined conceptual solutions to identified flooding problems. Preliminary stormwater model runs were conducted to provide an initial assessment of each solution's effectiveness in reducing flooding. Results and preliminary cost estimates were presented for each solution. The costs and benefits of each conceptual solution were compared in a matrix. Solutions considered in the preliminary evaluation included the following:

- Acquisition: Purchase of flooded lands would preclude flooding damage by preventing the development of the property but would not prevent roadway flooding.
- Storage: Construction of stormwater detention basins would detain flow from the agricultural areas north of the city and would reduce and attenuate peak inflow rates.
- Diversion: Stormwater flows would be diverted into an adjacent watershed to the west (Deer Prairie Slough), thus reducing flow through the city.
- Conveyance: Increased conveyance capacity of the city's hydraulic system would include excavating existing channels, resizing culverts at stream crossings, cleaning existing channels, and constructing relief channels parallel to existing channels.

Based upon preliminary analyses, purchase of flooded lands was removed from consideration and the three remaining alternatives, and combinations of those alternatives, were examined in more detail.

The Phase III Task 2 Final Report, Stormwater Management Master Plan (CDM, 1993) presents conceptual solutions for flooding as well as assessments of potential water supplies and nonpoint source pollution and describes a stormwater management plan to reduce flooding during extreme events. The set of alternatives evaluated in greater detail included: culvert improvements; stormwater diversion by pumping; stormwater diversion by channel; upstream detention; and relief channel construction. The recommended plan included diversion pumping to the Futrell tract, located west of R-36 and south of I-75, coupled with culvert improvements and construction of a relief channel adjacent to Myakkahatchee Creek. This plan provided the greatest flood protection benefit and could be phased. The 1993 Stormwater Management Master Plan was partially implemented, providing increased local conveyance through replacement of culvert structures at four locations. Those improvements are accounted for in the current Existing Conditions model. Other plan components were not completed including those for storage and flow diversion, apparently due to regulatory and financial constraints.

Watershed Management Program Consulting Services in the Big Slough Watershed (2014)

Ardaman & Associates, Inc. evaluated various BMP alternatives to address flooding conditions based on effectiveness, permittability, and economic viability. Under the WMP project, an Existing Conditions model was developed and regional BMP alternatives evaluated to reduce flooding through combinations of conveyance improvements, stormwater management storage areas, flood proofing, and flow diversion.

Simulations were performed of six regional BMP scenarios to evaluate the impact of various large-scale flood mitigation concepts. The benchmark scenario for comparison and performance evaluation was the SWFWMD Governing Board-approved 100-year 24-hour existing condition model.

- Remove structures throughout City of North Port waterways. The objective of evaluating this BMP was to understand primary drainage system capacity assuming no losses due to water control structures or drop structures. Additional connectivity was provided among a few R canals southwest of the I-75 corridor to transferring some of the existing load to less compromised areas. Results indicate flood stage reduction immediately north of Price Blvd and along Bass Point waterway while increasing flooding between S Toledo Blvd and S Sumter Blvd. Also, improvements are observed southwest of I-75 where new canal connectivity was provided. It was noted that structure removal is not feasible due to loss of potable water supply, fish and wildlife habitat, and wetlands.

- Constrain Flow Entering City of North Port at Big Slough Canal. The objective of this BMP was to constrain the volume of water coming from offsite areas through the Big Slough canal prior to entering the north section of the City in the Estates area. The BMP would involve real estate acquisition, maintenance activities, dam construction, and removal of existing hydraulic structures. Results indicate approximately 0.5 feet flood stage reduction near the Big Slough canal from the City's northern boundary to just south of I-75 while flood stages increase approximately 1.0 foot in offsite areas in Carlton Ranch north of the R-36 and R-580 waterways.

- Diversion Alternative. The purpose of this BMP is to divert flows from offsite areas via the existing R-36 canal, by increasing its capacity and improving its hydraulic connectivity with Deer Prairie Slough canal. This BMP would involve construction of new structures, maintenance activities, real estate acquisition, and detailed hydrologic and hydraulic evaluation of the western boundary (Deer Prairie Slough watershed). Results indicate flood reduction throughout the Estates area, along the Big Slough Canal between the R-36 canal and I-75 corridor as well as in the localized area along Big Slough south of I-75, with flood stage reductions between 0.1 foot and 1.0 foot throughout those areas. Impacts of additional flow into Deer Prairie Slough were not considered.

- R-580 Improvements. The purpose of this BMP is to induce additional flows through Creighton waterway by improving conveyance capacity in the R-580 waterway. Results indicate small improvements near Big Slough. However, inducing additional flow through Creighton Waterway causes additional flooding near I-75.

- Increase Capacity on Southern Boundary. The objective of this alternative was to evaluate system response when doubling the southern boundary discharge capacity along the County line into Port Charlotte. The BMP would involve conveyance improvements, construction of new

structures and/ or reconditioning of existing structures, maintenance activities, real estate acquisition, and evaluation of the receiving waters through hydrologic and hydraulic modeling. Results indicate that improvements relative to house flooding were not significant. However, roads experienced a considerable flood reduction between S Sumter Blvd and Atwater Drive. This alternative was evaluated for information purposes only, as it is understood that allowing additional flows into Port Charlotte may not be desirable.

- Upstream Detention Alternative. The objective of this analysis is to examine the effects when attenuating peak flow rates in agricultural areas along the Big Slough canal with a series of new detention facilities. This BMP would involve construction of stormwater management storage areas, maintenance activities, and real estate acquisition. Results indicate relatively small reduction in peak water surface elevations on the order of 0.1 to 0.6 feet along Big Slough. The extent of flooding for this BMP is essentially the same as the existing scenario with few flood reduction areas along the Big Slough canal.

Although the regional alternatives developed under the WMP project were not incorporated into a specific plan for implementation, the work provides valuable insight to the system's hydraulic response and BMP limitations.

Performance of several additional, site-specific BMPs were also evaluated and discussed.

- BMP Evaluation of Four Road Crossings. Simulations were performed to assess hydraulic performance and effects of potential conveyance improvements at: R-36 Canal at I-75, Myakkahatchee Creek at I-75, R-36 Canal at Tropicaire Boulevard, and Myakkahatchee Creek at Tropicaire Boulevard. A systematic evaluation was conducted to understand existing hydraulic behavior at each of the four crossings under various synthetic storm events.

- WCS-162 Evaluation. WCS-162 is located on the R-36 Canal, north of Interstate 75, and immediately upstream of Tropicaire Boulevard. The City opens the gate in anticipation of a storm event to lower the water level in the R-36 canal to minimize potential upstream flooding; otherwise, the gate remains closed. This investigation was performed to determine if adding gates would help draw down the canal more quickly and increase conveyance capacity.

- Price Boulevard LOS Improvements. The objective of this series of BMPs is to mitigate flooding along the stretch of West Price Boulevard near the Indian burial ground to meet the existing City of North Port LOS criteria. Five different BMP alternatives were considered.

The WMP project did not result in a plan for improvements. It was recommended that the City of North Port purchase the small number of habitable structures in which flooding is predicted for the 100-year event. Purchasing the affected properties may be more cost effective than implementing BMPs evaluated under the WMP project.

BIG SLOUGH WATERSHED MODEL DESCRIPTION

As previously discussed, this current project builds upon prior work performed. The SWFWMD Governing Board-Approved North Port / Big Slough WMP Watershed Model (Ardaman & Associates, Inc.) was used, with minor updates, to develop a stormwater management plan for flood reduction in the I-75 and Dorothy Avenue areas and to demonstrate that the proposed improvements will not result in adverse impacts to adjacent properties in response to mean annual, 10-, 25- and 100-year 24-hour storm events. The model was developed under a cooperative agreement between the City of North Port and SWFWMD.

Governing Board Approval (use as best available information)

The North Port / Big Slough WMP watershed model uses CHAN (Version 2.03, Aquarian Software, Inc.) to simulate the hydrologic and hydrodynamic response of the watershed to rainfall. Having been constructed over several years according to SWFWMD Guidelines and Specifications, the WMP model was validated using historical flood information. Approved by the Governing Board on May 22, 2012, it is considered best available information for local use in environmental resource permitting at the SWFWMD.

This same model has been used successfully for other design and permitting in the North Port/Big Slough watershed area. Most recently, the same model was used for design and permitting of the WCS-106 structure replacement.

Model Updates

While the base model for this project was originally planned to be the SWFWMD Governing Board-approved 2012 Version of 2004 Condition model, City of North Port staff requested, and DES agreed, that a specific set of model features reflecting existing conditions be updated in that 2012 Version of the watershed model (Appendix E). Specifically, those updates included:

- adding a single 24-inch PVC pipe from Public Works site to Creighton WW;
- utilizing available as-built survey data and adding two (2) gates at WCS 101;
- incorporating available survey and storm pipe data in Price Blvd area;
- changing a 30-inch ADS pipe, flowing from Price Blvd to R-32, to a 36-inch ADS; and
- adding three (3) 48-inch CMP culverts beneath Appomattox Blvd.

Upon review, some of those revisions were found to have been implemented by Ardaman over the period from 2012 through 2014, with the SWFWMD Governing Board-approved 2012 Version of 2004 Condition model as a base. For example, Ardaman had already incorporated field survey data that was collected at Water Control Structure WCS-162 and throughout the vicinity of Price Boulevard.

Therefore, to expedite the 2016 model update, Ardaman's 2014 version of the 2004 Condition model was used as a starting point. An added benefit to using this model as a starting point is that model element naming conventions are preserved and will match all references in reports, notes, and correspondence generated by Ardaman during the period from 2012 through 2014.

DES staff reviewed and supplemented the 2014 model revisions as discussed in the following.

- Add a single 24-inch PVC pipe from Public Works site to Creighton WW

  The Ardaman 2014 model was found to contain the 24-inch PVC pipe. Specifically, model Reach RI0016 from Node NI0016 to Node NI0020 contains a 77-foot 24-inch pipe with upstream invert 20.21 feet, NAVD, and downstream invert 17.65 feet, NAVD. A Network_Arc feature was added to the geodatabase as the pipe was not included in the Ardaman geodatabase.

- Utilize available as-built survey data and add two (2) gates at WCS 101

  The Ardaman 2014 model does not contain up to date control structure data for the additional gates. As-built drawings provided to DES by the City of North Port were used to update model reach data for the gates as well as to correct adjacent weir lengths. No changes were made to RB1060A representing the four original gates, RB1060B was added to represent two new gates, and weir reaches RB1060E, F, and G were replaced with RB1060C. Network_Arcs were edited in the Geodatabase to reflect these changes.

- Incorporate available survey and storm pipe data in Price Blvd area

  The Ardaman 2014 model was found to incorporate site-specific field survey data collected in the Price Boulevard area. Model input was compared to survey drawings (Van Buskirk / Fish & Associates, June 17, 2014) for consistency, and no revisions were deemed necessary.

- Change 30-inch ADS pipe, flowing from Price Blvd to R-32, to 36-inch ADS

  The Ardaman 2014 model was found to correctly reflect a 36-inch diameter pipe with inverts as indicated on field survey Sheet 5 of 7 Van Buskirk / Fish & Associates dated June 17, 2014.

- Add three (3) 48-inch CMP beneath Appomattox Blvd (Stantec plans available)

  The Ardaman 2014 model does not include these conveyance features. Three (3) 48-inch CMP were added at model Reach RH0110A from Node NH0110 to Node NH0130, with upstream inverts 3.09, 2.92, and 2.87 feet, NAVD, and downstream inverts 2.51, 2.79, and 2.76 feet, NAVD. Information was taken from Stantec design drawings for Phase 3 Reclaimed Water Main Extension Appomattox Drive (2014), assuming NAVD as the vertical datum and estimating 100-ft pipe lengths. One Network_Arc was added to the Geodatabase to reflect pipe connectivity.

FLOOD REDUCTION CONCEPTS AND CANDIDATE PLANS

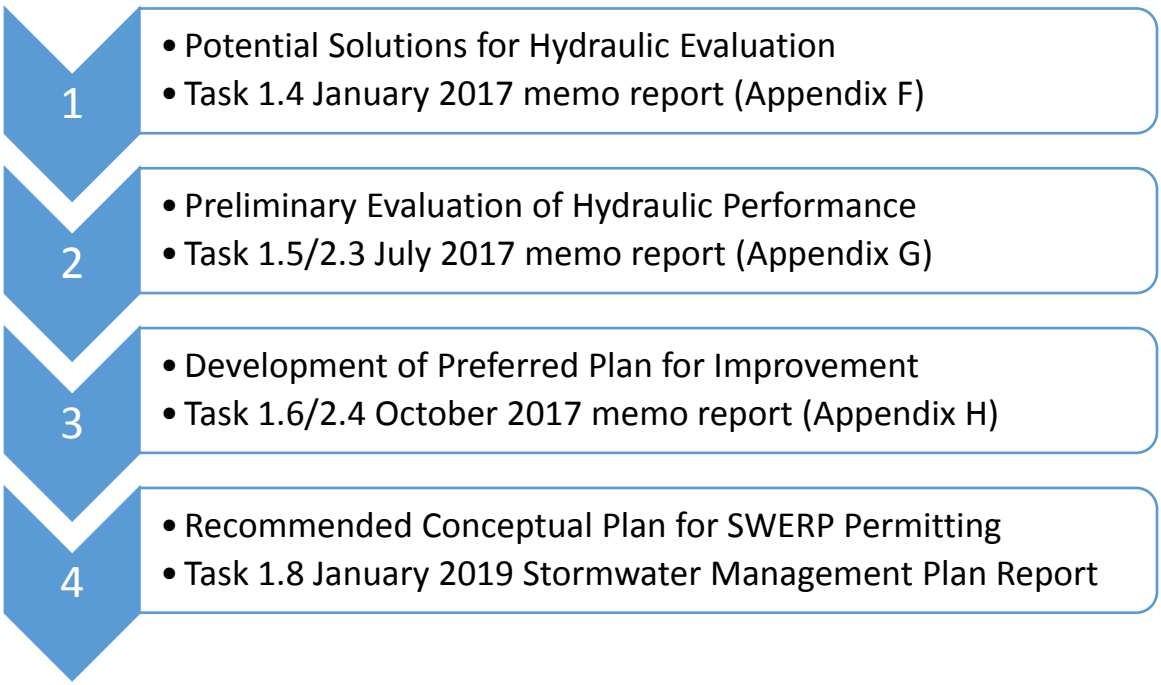
Development of a stormwater management plan to achieve flood reduction in the Big Slough watershed included:

- identification and discussion of potential solutions or plan components;
- preliminary evaluation of alternative solutions;
- assembly of promising solutions into candidate plans for testing;
- identification of a preferred plan;
- and development of the preferred plan into a stormwater management master plan.

Flood reduction solutions that were considered and discussed by the project team included internal flow diversion and increased conveyance capacity; external flow diversion; off-site storage; gate operations; flood-proofing; property acquisition; and elevation of roadways. As potential solutions were considered, a set of alternatives were selected for hydraulic evaluation as stand-alone or combined improvements.

Note: Team meeting notes are reproduced in the following section(s) to generally describe the plan development process. Not all discussion points, comments, and considerations contained in these notes are fully addressed in this Stormwater Management Plan report. The reader is directed to prior reports, memoranda, and presentations for discussion of relevant plan development and evaluation topics.

Development of the Stormwater Management Plan and Related Reports



Potential Solutions for Hydraulic Evaluation

A set of alternatives were selected for preliminary hydraulic evaluation to determine effectiveness of the individual solutions and point the way toward a cost-effective plan for flood reduction. Specifically, the following set of alternatives were selected by the project team for preliminary hydraulic evaluation.

Internal Flow Diversion and Increased Conveyance Capacity

- Parallel Relief Channel Construction
  A new, parallel canal could be constructed from the northern City boundary to Price Boulevard within Tier 1 and/or Tier 2 lots along either side of the Myakkahatchee Creek. The additional conveyance may reduce flow rate and peak stages along the main channel from start to end of the parallel relief channel.

- Channel Improvements along R-580
  The R-580 waterway's bottom profile could be reconfigured, creating a more uniform and hydraulically efficient conveyance way. Improvement of the R-580 Waterway would induce more flow eastward from Big Slough along the City's northern boundary toward Creighton Waterway, resulting in reduced flows and flood stages in Myakkahatchee Creek.

- R-36 Improvements to South of WCS-101
  A whole series of improvements could be made to canal segments and structures to enhance the overall conveyance capacity of the R-36 waterway system. The additional stormwater conveyance capacity may induce higher westward flow out of Big Slough at the north boundary of the City. Diverting those higher flows southward to WCS-101 would reduce flow and stages along the more flood prone segments of Myakkahatchee Creek.

- Snover Waterway to Cocoplum Waterway
  Improvements could be made to existing structures along Snover Waterway and beneath Price Boulevard to increase flow through canals that connect with Cocoplum Waterway. The additional conveyance capacity may induce higher eastward flow out of Big Slough into Snover Waterway. Diverting those higher flows southward to Cocoplum Waterway would reduce flow and stages along the more flood prone segments of Myakkahatchee Creek.

- Other Miscellaneous Improvements
  Evaluations of canals and structures throughout the area for opportunities to increase conveyance.

External Flow Diversion

- Connection to Deer Prairie Slough
  Stormwater flows could be diverted westward to the adjacent Deer Prairie Slough watershed, reducing flow through the City. Several variations could be considered, including gravity and pumped diversions both with and without added storage facilities.

- Enhanced Discharges Along Southern Boundary to Port Charlotte – Tidal Outfalls Only
  Structures located within the Cocoplum Waterway and discharging beneath Hillsborough Boulevard could be improved to increase discharges into the Port Charlotte conveyance system. Additional conveyance capacity would divert stormwater southward and reduce flooding in the southern portion of the City.

Offsite Storage

- Constrain Inflows to City with Increased Upstream Floodplain Storage
  Raise existing earthen berms on the northwest City boundary at the intersection of Big Slough canal with R-36 and R- 580 waterways. Also, raise earthen weirs farther north at the intersection of Big Slough canal and Power Line Road. Improvements would leave the Big Slough canal as the only conveyance system into the western portion of the City. Inflows would be reduced, dropping stages along Myakkahatchee Creek.

- Creation of Upstream Detention, Reservoirs, or Joint Use Facilities
  One or more detention ponds, reservoirs, or joint-use facilities could be constructed to provide offsite stormwater detention. The facilities would reduce inflow rates and stages along Myakkahatchee Creek.

Acquisition

- Purchase of Flood Prone Lands and/or Flood Prone Structures
  Some communities turn to property acquisition to mitigate flood risk by establishing permanent, public open space and to get homeowners in flood-prone areas permanently out of harm's way. In North Port, many lots have been acquired on the west side of the Myakkahatchee Creek to serve as a linear park. Additional acquisition may be considered to remove other lands from the 100-year floodplain. Removal of those properties would reduce future flood-related damages but would not impact flood levels.

Preliminary Evaluation of Hydraulic Performance

The above selected alternatives were combined and incorporated into the Big Slough watershed model in various configurations to allow for an initial screening-level review of hydraulic performance. Proposed condition simulations were performed for the mean annual, 10-year, and 100-year 24-hour storm events, with stages and flows compared to the existing condition. Flood inundation areas for each simulation were also mapped and used to depict areas removed from, or added to, the existing condition floodplain.

Flood reduction concepts were effective to varying degrees at reducing flood levels in the watershed, particularly in the I-75 study area, given assumptions and simplifications made while developing the screening-level models. Potential adverse impacts could also be seen in mapping the simulation results. These preliminary simulation results provided general information on potential performance characteristics of each of the tested flood reduction concepts for comparison and discussion.

A Team Meeting was held to discuss concepts and preliminary hydraulic performance. The following summarizes notable points that were raised during the team meeting and the important issues that were subsequently addressed as the project moved forward.

- Refinement and future performance evaluations of structure modifications at the upstream inflow point (to constrain and reduce inflows to the City of North Port) should consider a wider range of control elevations and results used by the District for decision-making on allowable changes to area, depth, and duration of inundation in upstream District lands.
- Refinement and future performance evaluations of the R-36 conceptual plan for improvements should consider channel widening with and without culvert structure improvements providing additional conveyance beneath Tropicaire and I-75.
- Refinement of the R-36 conceptual plan for improvements should include matching pre/post discharge rates westward into the Deer Prairie system, so as to minimize increased flows

downstream in the City of North Port. Preliminary modeling did not make full use of available discharge capacity to the west. No increase in rate of discharge to the Deer Prairie system should be considered, at this time.

- Refinement of the R-36 conceptual plan for improvements should consider (and preferably conform to) existing rights-of-way and drainage easements. City of North Port can provide existing ROW information as depicted on drainage system as-builts. However, acquisition of additional drainage easements along the western boundary from Sarasota County is not out of the question.
- Refinement of the R-36 conceptual plan for improvements should look more closely at existing bridge crossings and available right-of-way for channel enlargement to its confluence with R-226 and further downstream to Myakkahatchee Creek.
- Two culvert locations on the west boundary of Jockey Club should be evaluated and recommendations made regarding sufficiency and/or modifications needed to reduce flooding in the Jockey Club area (considering any increase in water levels that may result from the R-36 improvements and associated re-routing of flows).
- Refinement and future performance evaluations of the parallel bypass canal should include a more accurate representation of the combined conveyance and should eliminate double accounting of conveyance as a result of overlapping open channel cross sections. A request has been made to the District for cross section source data, cross section extents, surveyed point locations, conveyance way boundaries, etc., from the District's North Port/Big Slough WMP project files (including intermediate deliverables).
- Only two Price Boulevard drop structures are scheduled to be replaced with the widening project. City of North Port will identify those structures and the other remaining structures will be revised to again match the existing condition model configuration. Future performance evaluations will include the two identified structures as operable gates.

Team input in review and discussion of the screening-level model results contributed greatly to model development and the subsequent assembly and testing of candidate plans for drainage improvement.

Development of a Preferred Plan for Improvement

Through the preliminary evaluation of hydraulic performance it was determined that the Big Slough Flood Reduction Study preferred plan for improvement would be comprised of: internal flow diversion and increased conveyance capacity; external flow diversion; offsite storage; and/or property acquisition. Those basic plan components were considered by the Project Team to be most promising, based on review of preliminary hydraulic evaluations, and were merged into a small number of Candidate Plans for more rigorous consideration.

Plan Components and Candidate Plan Development

More specifically, the following alternatives were considered by the team for detailed evaluation.

- *Offsite Storage.* Flood reduction would be achieved in part by construction of a gated water control structure located at the FPL easement just north of the northern City boundary to limit high flows entering the City. Low flows will remain unchanged as a four-foot opening in the upstream face of the structure would extend fully to the existing channel bottom.

- *Internal Flow Diversion and Increased Conveyance Capacity.* Flood reduction would be achieved in part by construction of a parallel relief (bypass) channel alongside Myakkahatchee Creek within Tier 1 lots that have been acquired by the City of North Port, and through widening of the R-36 canal. Wide and Narrow options were considered for each channel improvement concept.
- *External Flow Diversion.* Flood reduction would be achieved in part through higher discharges westward to Deer Prairie Slough. Large increases are considered infeasible as SWFWMD has already restored the slough system and likely will not permit higher inflows to the slough. Therefore, the Preferred Plan will be adjusted to meet pre/post discharge rates and District staff will be asked at an upcoming coordination meeting if those rates can be increased.
- *Additional drainage improvements* may be achieved through upsizing R-36 culverts at Tropicaire, water control structure replacement during the widening of Price Boulevard, and improvements to the R-580 canal. The effect of Price Boulevard improvements will be localized. Widening of the R-36 and R-580 canals is expected to require additional and perhaps extensive downstream drainage system improvements to eliminate bottlenecks in other flood prone areas of the City.
- *Acquisition* would reduce losses through purchase of flood prone lands and/or building structures.

Numerous configurations were developed which incorporated various versions and combinations of the "Offsite Storage" and the "Internal Flow Diversion and Increased Conveyance Capacity" concepts described above. While a large number of configurations were evaluated (e.g., offsite storage with flow control set at a lower, 10-year event peak, stage), if performance was not superior to other configurations then they were not advanced as Candidate Plans.

After a Preferred Plan is selected from among the Candidate Plans, other alternative components can again be considered during finalization of the stormwater plan. For example, discussion with District land management staff may allow for adjustments to the offsite inflow control as well as external flow diversions to Deer Prairie Slough. These final plan modifications may have a small (but not insignificant) impact on performance which will be accounted for in final performance and benefit/cost evaluations.

Candidate Plan Descriptions and Performance

While a large number of configurations were assembled and tested in a preliminary fashion, a total of eight candidate plans were deemed most promising and carried forward through rigorous evaluation. Each of the eight candidate plans was comprised of one or more of the following components:

- *Offsite Storage/Control of Inflow in Myakkahatchee Creek*
  Existing: No hydraulic control of inflow in Myakkahatchee Creek from upstream offsite areas.
  Low Control: 150-foot concrete weir with crest at elevation 24.0 feet for overtopping of high flows. 4-foot wide slot open to existing channel bottom to allow normal low flows.
  High Control: 150-foot concrete weir with crest at elevation 25.5 feet for overtopping of high flows. 4-foot wide slot open to existing channel bottom to allow normal low flows.

- *Internal flow diversion via R-36*
  Existing: No improvements to existing ditch along northwestern and western city boundary.
  Narrow: Widen ditch to maximum extent within existing drainage easement/right of way.
  Wide: Widen ditch to 60-foot bottom with 4:1 side slopes, easement acquisition as-needed.

- *Internal flow diversion via R-580*
  Existing: No improvements to existing ditch along northern city boundary east of Big Slough.
  Narrow: Widen ditch to maximum extent within existing drainage easement/right of way.
  Wide: Widen ditch to 60-foot bottom with 4:1 side slopes, easement acquisition as-needed.

- *Internal flow diversion via Bypass*
  Existing: No bypass. All flow within Big Slough Canal/Myakkahatchee Creek and floodplain.
  Narrow: Excavate bypass ditch with 20- to 50-foot bottom 4:1 side slopes for flow diversion.
  Wide: Excavate bypass ditch with 50-foot bottom 4:1 side slopes for flow diversion.

Proposed condition simulations were performed for the mean annual, 10-year, and 100-year 24-hour storm events. Flood reduction performance of each plan was compared to the existing condition.

- The "wide" Internal Flow Diversion via Bypass component, comprised of excavating a bypass ditch within Tier 1 lots along the Myakkahatchee Creek with 50-foot bottom width and 4:1 side slopes, provided the majority of flood reduction benefits in each of the four best-performing Plans, with added improvement resulting from configurations of R-36 improvements and inflow control.

- Widening of R-36 provided benefits in terms of flood reduction in the I-75 area, but additional improvements (culvert pipe upsizing and modification of some secondary collection systems) would be required to mitigate increased water levels along R-36 south of Tropicaire Boulevard. Furthermore, acquisition of additional easement would be difficult along R-36 and it would therefore be desirable to keep within the existing easement with any improvements.

- Restriction of inflows from the north also reduced flood levels in the I-75 area, although to a lesser extent than the bypass construction and R-36 widening concepts, while improvements to R-580 provided very little flood reduction benefit.

Benefit and Cost Comparison of Candidate Plans

Screening-level estimates of project benefits (flood damage reduction) were developed to allow initial comparisons of rough Benefit to Cost Ratio (BCR) values across Candidate Plans. Benefits considered cost avoidance for road repair and for residential structure damages for mean annual, 10-year, and 100-year storms. Cost calculations were also performed to develop preliminary order of magnitude estimates of probable construction costs, which could be compared across Candidate Plans to aid in selecting a Preferred Plan. A ratio of annualized benefits to annualized costs was calculated and that BCR assigned to each Candidate Plan for rough comparison to aid in selecting a Preferred Plan. Based on the screening-level estimates of Candidate Plan benefits, several plans are recommended for consideration.

Flood Reduction Comparison of Candidate Plans

Flood inundation areas for each simulation were mapped to depict areas removed from the floodplain. Flood reduction scenarios incorporating the wide bypass component were more effective in reducing flood levels in the watershed, particularly in the I-75 study area, than other Candidate Plans. Candidate Plans, as initially configured, may also result in increased flooding in downstream areas. Plan refinements and additional improvements were developed for the selected plan to relieve downstream bottlenecks and accommodate increased flows that result from the wider R-36 or addition of the Bypass.

Evaluation of Cost for Acquisition

A summary of combined "just value" for flood-prone parcels in the I-75 area (Figure 8) was presented to the Project Team. Flood risk was based on Existing Condition simulation of the 10-year storm event, with inundation areas mapped on a LiDAR-based terrain model. Parcels inundated 50% or were selected.

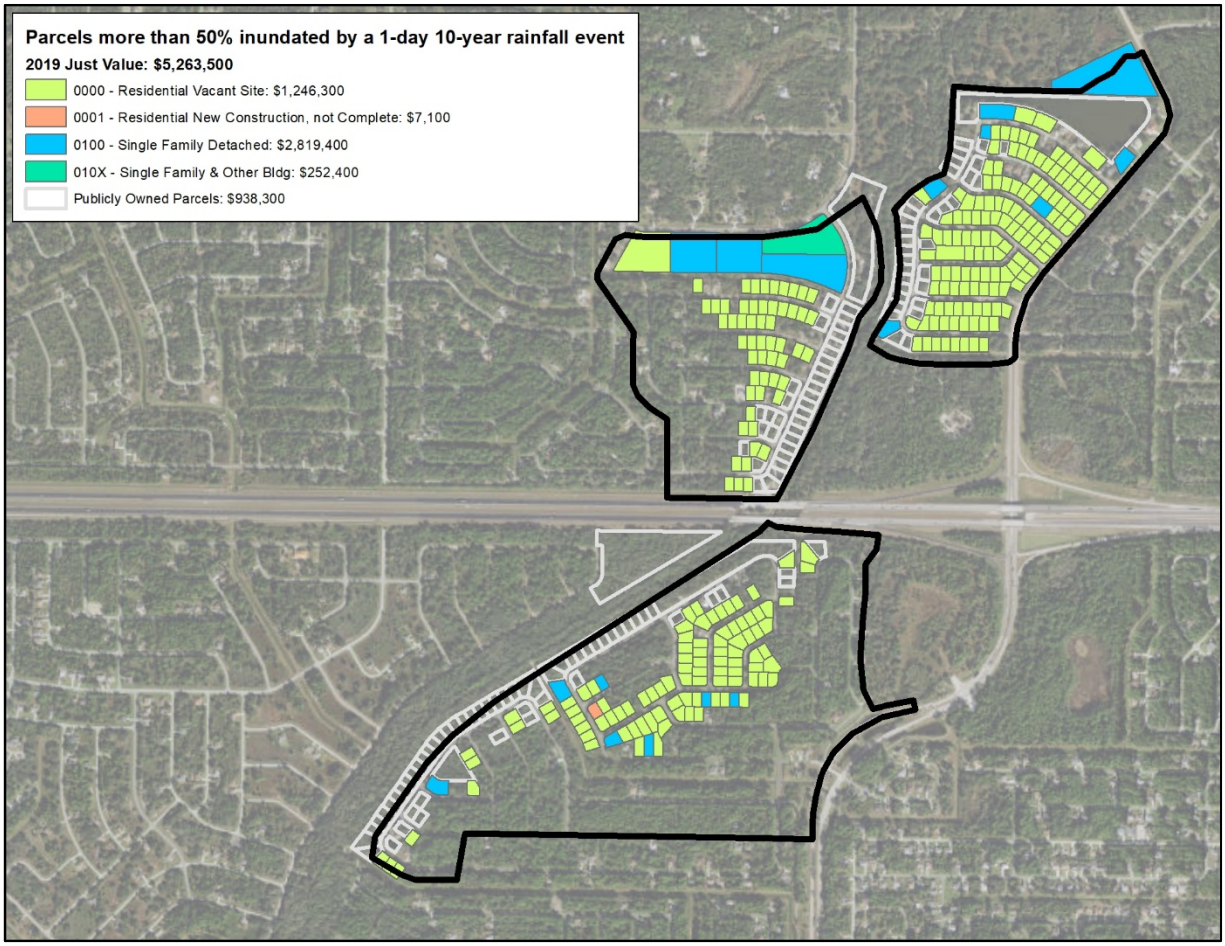


Figure 8

While it is understood that a land purchase option would be developed based on a more rigorous protocol, the cost assessment summarized below provides order of magnitude information for consideration.

	Preliminary Estimate of Acquisition Cost (Based on Sarasota County Property Appraiser 2019, projected at 4% inflation)				
	2019	2020	2025	2030	2035
Estimated Property Value*	$ 4,325,200	$ 4,498,208	$ 5,472,758	$ 6,658,447	$ 8,101,018
Estimated Annualized Cost**	$ 313,403	$ 325,939	$ 396,555	$ 482,470	$ 586,999
* Combined "Just Value" of properties inundated 50% or more by flooding from a 10-year Storm Event; Excludes publicly owned parcels ** Cost annualized over 50 years at 7%, 13.8 PV Annuity Factor (estimated acquisition cost only)					

Identification of the Preferred Plan for Flood Reduction

Based upon the Project Team's review and discussion of preliminary hydraulic evaluation results, a set of alternatives were advanced for development of improvements to achieve flood reduction through internal flow diversion and increased conveyance capacity, external flow diversion, offsite storage, and acquisition. Those concepts were refined and combined into a small number of Candidate Plans for evaluation of hydraulic performance, preliminary cost estimates, and screening-level benefit estimates.

This interim report, meetings, and team discussion provides a basis for evaluation of the Candidate Plans. The Project Team selected from among these Candidate Plans and the Preferred Plan was evaluated more rigorously for permittability, costs, and benefits, resulting in a recommended plan for SWERP permitting.

Plan Coordination with Offsite Property Owners/Managers

The City of North Port is coordinating with both Sarasota County and SWFWMD regarding planned improvements for flood reduction. Coordination with those agencies, being responsible for management of the affected adjacent properties, is required to demonstrate that the proposed stormwater system modifications would not have an adverse impact and to seek authorizations and/or easements required for permit approval and project implementation.

- Regarding the restriction of inflows, it can be shown that normal flows will not be impacted by the proposed water control structure and that peak stage increases will be inconsequential in terms of environmental or other offsite impacts.
- Regarding the increase of outflows, historical flow patterns toward the Deer Prairie Slough/Creek system were interrupted decades ago by construction of R-36. While significant amounts of stormwater are currently discharged westward from the R-36 canal when it exceeds its bank, it may be allowable or even desirable to increase and/or redistribute those flows without causing adverse impacts.

In a joint meeting it was determined that additional time was needed to fully address existing conservation easements, offsite storage and discharge requirements, and potential impacts. Some options would require revisions to be made to the District's existing model of the Deer Prairie Slough area for proper evaluation. Because discussions are expected to continue for some time, those plan elements requiring offsite easements should be scheduled for later phases of implementation.

SWERP Pre-application Meeting with SWFWMD

City of North Port staff attended a pre-application meeting with staff of the SWFWMD in November 2018, during which a description of flood problems, the preferred plan of improvements, and flood reduction performance was provided. Comments and input were solicited regarding permitting requirements and other matters. It was agreed that requesting Conceptual Approval of the Stormwater Management Master Plan through submittal of a SWERP application for the entire project, followed by timely submittals of applications for construction of project components in a phased manner, would be the appropriate approach to permitting. Summary notes of the pre-application meeting are provided in Appendix I.

RECOMMENDED STORMWATER MANAGEMENT MASTER PLAN

The recommended Stormwater Management Master Plan, as presented by DES staff to the North Port City Commission on December 6, 2018 (Appendix J), has the following major components:

- Improvements to the existing retention ditch/conveyance system and upsizing road crossing culverts in the Dorothy Avenue area.
- Construction of a new bypass canal parallel to the Myakkahatchee Creek within a portion of the City's Tier 1 lots from south of Tropicaire Boulevard to north of Price Boulevard.
- Increasing conveyance capacity through canal widening and upsizing pipe culverts in the R-36 retention ditch/conveyance system along the northern and western boundary of the city.
- Restriction/reduction of high flow into Myakkahatchee Creek near the north City Boundary.

Dorothy Avenue Improvements

Purpose: Improvements in the Dorothy Avenue area are proposed to serve two purposes:

- Under an initial phase, the extent and duration of localized flooding could be reduced by providing additional storage and conveyance capacity in the existing R-231, R-70, and R-69 canal systems. In this instance, a single box culvert should suffice to replace culverts at Trionfo Avenue, Porto Bello Avenue, Herbison Avenue, Eager Street, Allen Road, and South Biscayne Drive.
- Under the full plan, this conveyance system also serves to receive and convey higher flows passed southward via the improved R-36 ditch system. In order to handle higher flows from the north, three (3) box culverts will be required at each of the above road crossings.

Models were tested for both conditions to ensure suitable performance under phased implementation.

Configuration: For conceptual permitting purposes, the stormwater management plan includes:

- widening the existing ditches passing through the area, with bottoms ranging between fourteen and twenty feet in width and relatively steep (2:1) side slopes consistent with other stable ditches in the area, while lowering the ditch bottoms to elevation 1.5 feet, NAVD, and
- replacing existing culverts with triple 6'x4' box culverts at each road crossing.

Bypass Canal Construction

Purpose: Construction of a bypass canal is proposed to provide regional storage and conveyance capacity to reduce flooding in the I-75 project area and other portions of the City. This can be accomplished through excavation of a wide trapezoidal bypass channel within the extents of Tier 1 lots already acquired by the City between Tropicaire Boulevard and Price Boulevard. The bypass canal would be constructed on either the east or west set of Tier 1 lots. Alternate configurations may address or include the following:

- A simple, trapezoidal cross section that is sodded for erosion protection is preferred as it would allow for maximum storage and conveyance capacity with reduced construction cost and minimal maintenance requirements. Some portions of the bypass canal may have other characteristics to

meet various goals. For example, segments may contain wet pools, some types and amounts of wetland vegetation, etc., as required to achieve water quality improvement, mitigate for wetland encroachments, or mitigate/avoid surficial aquifer impacts (dewatering) in adjacent areas.

- Existing lateral ditches (R-23, R-5, R-1, and unnamed interconnections), which currently discharge to the Myakkahatchee Creek may be intercepted by the bypass, piped beneath the bypass, or allowed to flow through breaks in the bypass ditch. The latter configuration would require additional structural connections be constructed between the bypass and Myakkahatchee Creek at points upstream and downstream of the existing lateral inflows. It is recommended (and proposed condition model construction assumes) that those inflows be intercepted by the bypass
- Exchange of flow between the Myakkahatchee Creek and the bypass canal will be limited to higher flows in order to maintain minimum flows and levels. Exchange may either be limited to discrete points, with a berm constructed along the creek-side bank of the bypass to prevent overflows, or overtopping may be allowed at existing overflows located between the creek and bypass canal. Detailed topographic ground survey is required to establish existing overflow elevations.
- There are no structural weirs being proposed at this time. Conveyance between the bypass channel and existing creek will be via large openings in the bank that runs between the two. These connector features are easily located at the endpoints of each bypass segment in the plan and profile and depicted in the typical sections provided in the accompanying Conceptual Plan set. Sheet D-3 provides a conceptual-level details of the bypass channel and bypass weir configurations in plan and section views.
- Elevations shown in the Conceptual Plan set (Sheets S-2 and S-3) are approximate as they are based on LiDAR-based terrain information and will change when more-detailed survey is collected to support design of the system. For modeling and future design purposes, the bypass channel is placed approximately one foot above the adjacent creek bottom and the connecting weirs (located at bypass segment endpoints) is placed one foot above the bypass channel bottom (two feet above the creek bottom). This configuration allows the creek to carry two feet of normal flow before any flow exchange occurs into the bypass.
- The bypass canal alignment is to be determined during detailed design and may be relocated from the Tier 1 lots to over the adjacent road right of way with some encroachment on adjacent Tier 1 and Tier 2 lots. The bypass canal alignment may also shift from one side of the Myakkahatchee Creek to the other for various reasons, such as to accommodate other Tier 1 lot uses (parks, etc.), avoid local impacts (such as archaeological or wetland conditions), or reduce cost and/or complexity of construction (such as in some large meanders of the Myakkahatchee Creek).

Models were tested for <u>all</u> of the above conditions to ensure suitable performance under a range of implementation conditions. For example, manning's roughness values were varied from 0.040 to 0.150 to reflect changes in vegetation cover in the bypass channel (sodded versus wetland vegetation), all three interconnectivity options for lateral ditches were evaluated, exchange between the creek and canal was allowed across topographic saddles (from LiDAR-based terrain) and restricted with a constructed berm, and the final (downstream) segment of the bypass canal was tested on both the east and west side of the Myakkahatchee Creek in anticipation of possible construction issues just upstream of Price Boulevard.

These alternatives were generally discussed during pre-application meetings held with SWFWMD for the Statewide Environmental Resource Permit (SWERP) application and details will be worked out during subsequent design and permitting (i.e., in phased SWERP applications for construction approval)

Configuration: For conceptual permitting purposes, the stormwater management plan includes:

- construction of a sodded trapezoidal bypass canal on the west side (switching to the east side in the lower segment to avoid meanders of the Myakkahatchee Creek), utilizing the full width of Tier 1 lots from Tropicaire Boulevard to north of Price Boulevard, with bottoms ranging between fifty and eighty feet in width and moderate (4:1) side slopes, excavated to elevations one foot above the existing Creek bottom, and intercepting lateral surface inflows (from R-23, R-5, R-1, etc.).
- exchange between Myakkahatchee Creek and the bypass is allowed only at discrete flow diversion points, where 150-foot wide broad-crested weirs allow high flows to move out of and back into the Creek at elevations two feet above the Creek bottom, with the diversion structures to be comprised of either earthen or structural berms, with structure design and erosion protection to be determined based on flow conditions, site characteristics, and geotechnical recommendations.

R-36 Improvements

Purpose: Improvements to the existing R-36 canal and culvert structures are proposed to increase storage and conveyance capacity of that system, allowing diversion of higher flows from north of the City around its western perimeter and thereby reducing flooding near I-75 and in other flood prone areas. This is the "narrow" improvement option, which constrains canal widening to existing drainage easements.

Changes to flow rate and/or volume at existing overflows westward to Deer Prairie Slough require agency coordination between the City of North Port, SWFWMD, and Sarasota County. While the current conceptual design does not increase peak flows to the west, the conceptual approval of the SWERP should recognize and allow for this future improvement. Changes in the design configuration from the current plan will require detailed topographic survey of the western bank and natural grade outside (west) of the R-36 canal, detailed modeling of both the Big Slough and Deer Prairie watersheds, and a modification of the North Port/Big Slough Stormwater Management Master Plan and SWERP.

Configuration: For conceptual permitting purposes, the stormwater management plan includes:

- Widening the existing R-36 canal section to the maximum extent possible while remaining within the existing drainage easement, with bottom widths ranging from 30 to 65 feet and relatively steep (2:1) side slopes consistent with existing bank conditions along R-36, while maintaining the ditch bottoms at their current elevations. Assume 20% of total length of improved (widened) channel will require rip-rap erosion protection, for cost estimating purposes.
- Enlarging WCS-162 and installing two additional 60" culverts at Tropicaire Boulevard
- Installing two additional 48" culverts at I-75

Proposed features are depicted in plan and profile, cross section, and detail sheets in the accompanying Conceptual Plan set.

To develop cross section data for the R-36 canal system, the SWFWMD LiDAR-based terrain model was first adjusted using available bottom elevation information in order to better describe existing geometry. A proposed condition terrain model was then developed by applying proposed channel geometry for various design configurations (e.g., combinations of bottom width and side slope). Using the terrain models and other available information, such as aerial photos and property boundaries downloaded from the Sarasota County property appraiser, aided in the development of proposed condition channel geometry by confirming that the proposed system could be constructed within site constraints.

The hydraulic model and conceptual plan set depictions of channel sections are in close agreement, given that geometry for both was taken from the same set of terrain models. For model development, cross sections were cut from existing and proposed condition terrain models at the reach midpoint for each modeled channel segment. Cross sections shown in the conceptual plan drawings Sheets S-1 to S-4 were taken from the existing and proposed condition terrain models at various locations for general depiction and cost evaluation (used for quantity takeoffs, etc.) of the proposed work.

Because the model is constructed with cross sections cut from the terrain model at discrete points, there will be some small variation in storage between the two. This level of accuracy is adequate and appropriate for conceptual-level plan development, modeling, performance evaluation, and cost estimating. Construction-level design and permitting will be based on thorough site-specific survey of channel features with model updates being performed in order to confirm existing and proposed condition performance.

Inflow Control Structure

Purpose: Improvements at the inflow point north of the City are proposed to reduce flows and thereby drop peak stages along the Myakkahatchee Creek. A gated control structure will be installed at the FPL Power Line Road with an open bay at the creek bottom to allow low flows to pass unimpeded. The gated structure will cause higher flows to be attenuated with increased upstream storage on undeveloped lands. While a “high” control option is currently recommended, with overtop at elevation 25.5 feet NAVD, the degree to which inflows are restricted, upstream flood storage is increased, and downstream stages are reduced will depend on the outcome of ongoing agency coordination regarding storage on those lands.

Models were tested for a range of configurations to ensure suitable performance. The current stormwater management plan is conservative and results in a relatively small increase in upstream inundation.

Configuration: For conceptual permitting purposes, the stormwater management plan includes:

- construction of a gated water control structure on the upstream side of Power Line Road with a four-foot opening at existing channel bottom at 17.5 feet, NAVD, and with gates closed overflow and adjacent structure overtop elevations at 25.5 feet, NAVD.
- Existing culverts at Power Line Road converted to risers with control elevation 25.5 feet, NAVD.
- Power Line Road surface smoothed and low points filled to elevation 26.0 feet, NAVD.

The control structure may be located immediately upstream or downstream of the FPL roadway, and the number and size of gates are to be determined, with the single open gate for unimpeded low flows.

Engineer's Opinion of Probable Cost

Estimated project costs including engineering design, permitting, and construction are based on RS Means 2017 Heavy Construction Costs with national average values adjusted to the Ft Myers/Sarasota County area. Estimates include a 30% contingency and were projected to future years (up to 2035) assuming 4% inflation. Combined costs for each of those projections were annualized over 50 years at 7%.

	Engineer's Estimate of Probable Construction Cost (Based on RS Means 2017, with costs projected at 4% inflation)				
	2017	2020	2025	2030	2035
Dorothy (Triple Box Culvert)	$ 5,628,495	$ 6,331,291	$ 7,702,984	$ 9,371,858	$ 11,402,298
R-36 Improvements	$ 15,379,020	$ 17,299,306	$ 21,047,251	$ 25,607,199	$ 31,155,073
Bypass (flowway, n = 0.040)	$ 17,121,876	$ 19,259,782	$ 23,432,470	$ 28,509,182	$ 34,685,779
Reduce Northern Inflows	$ 2,575,105	$ 2,896,643	$ 3,524,209	$ 4,287,739	$ 5,216,690
Estimated Combined Cost	$ 40,704,496	$ 45,787,022	$ 55,706,913	$ 67,775,978	$ 82,459,840
Estimated Annualized Cost*	$ 2,949,442	$ 3,317,721	$ 4,036,515	$ 4,911,037	$ 5,975,028

** Combined construction cost annualized over 50 years at 7%, 13.8 PV Annuity Factor (capital cost only, excludes O&M)*

Benefits and Benefit to Cost Ratio (BCR)

Benefits are based upon flood reduction achieved across a range of simulated storm events compared to the existing condition. For roadway removed from floodplain, benefits reflect avoidance of repair costs at a rate of $50,000 per mile. For parcels removed from the floodplain, benefits reflect avoidance of $6,300 per occurrence, based on historical NFIP claims statistics reduced by 85 percent to account for lot vacancy.

	Flood Reduction (acres)	Road Flood Reduction (miles)	Parcels Reduction (centroid)
2.33-year	244	7.8	234
5-year	359	12.9	405
10-year	460	18.3	538
25-year	495	20.7	542
50-year	518	21.1	562
100-year	557	24.5	558

Annual benefit is calculated by multiplying total project benefits for a storm event simulation by the event probability then summing across events simulated. In the case of the full stormwater management plan, annualized benefits accrue to $1,977,742 with a BCR of 67 percent. Future enhancements (e.g., allowing greater inflow restriction or diversions to Deer Prairie) may increase the flood reduction performance and BCR of the full plan. In the meantime, a much higher BCR can be achieved through partial (Phase I) implementation of the master plan to include the Dorothy Avenue and Bypass components, only, where annualized project benefits would accrue to $1,842,132 for an excellent BCR of 138 percent.

Flood Area Reduction for 1-Day Mean Annual Event in the I-75 Area

Figure 8 illustrates reduced extents of inundation in the I-75 area for the Mean Annual storm event for the full stormwater management master plan model.

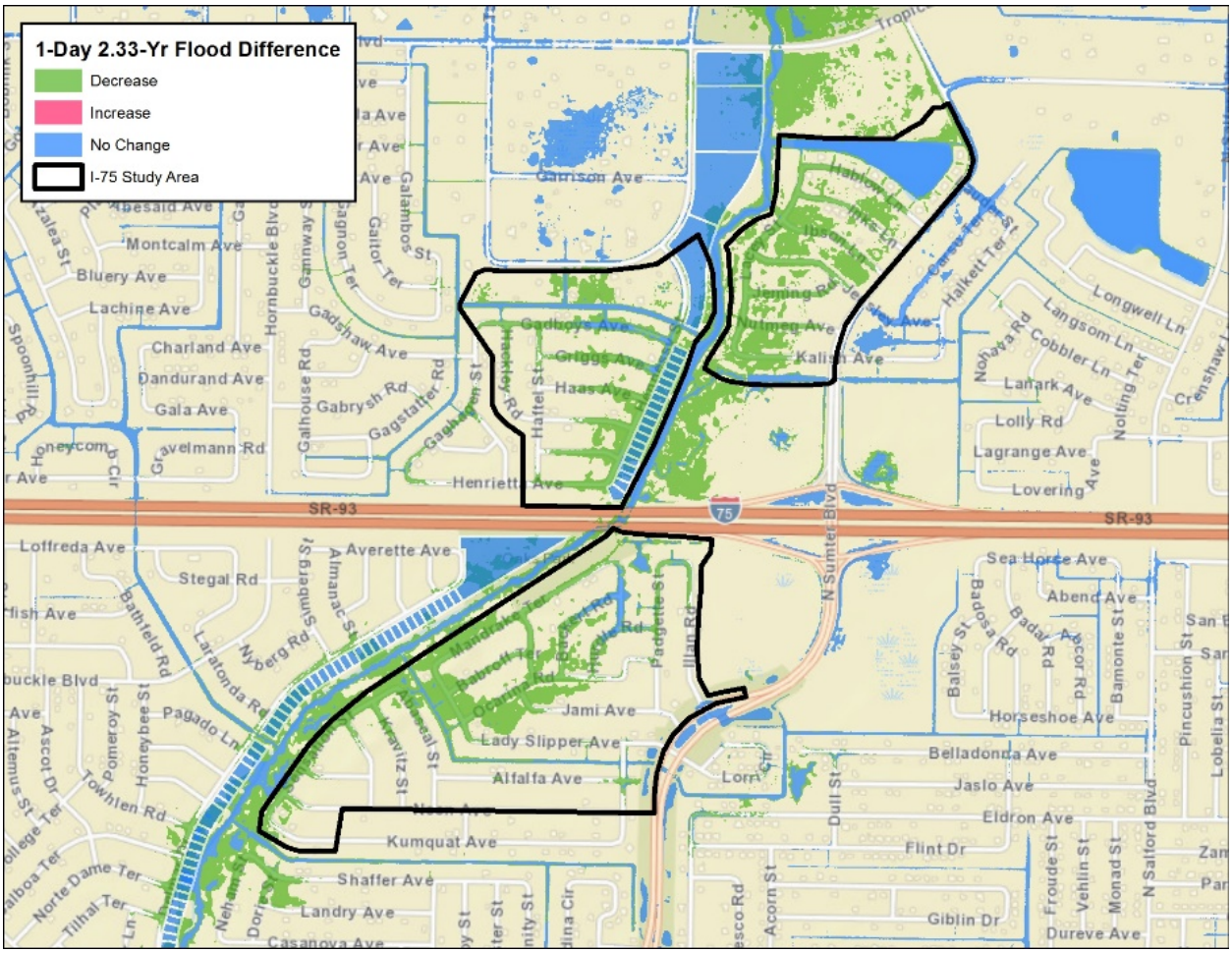


Figure 9: 1-Day 2.33-Year Flood Difference Map, I-75 Area

Flood Area Reduction for 1-Day 5-Year Event in the I-75 Area

Figure 9 illustrates reduced extents of inundation in the I-75 area for the 1-Day 5-Year storm event for the full stormwater management master plan model.

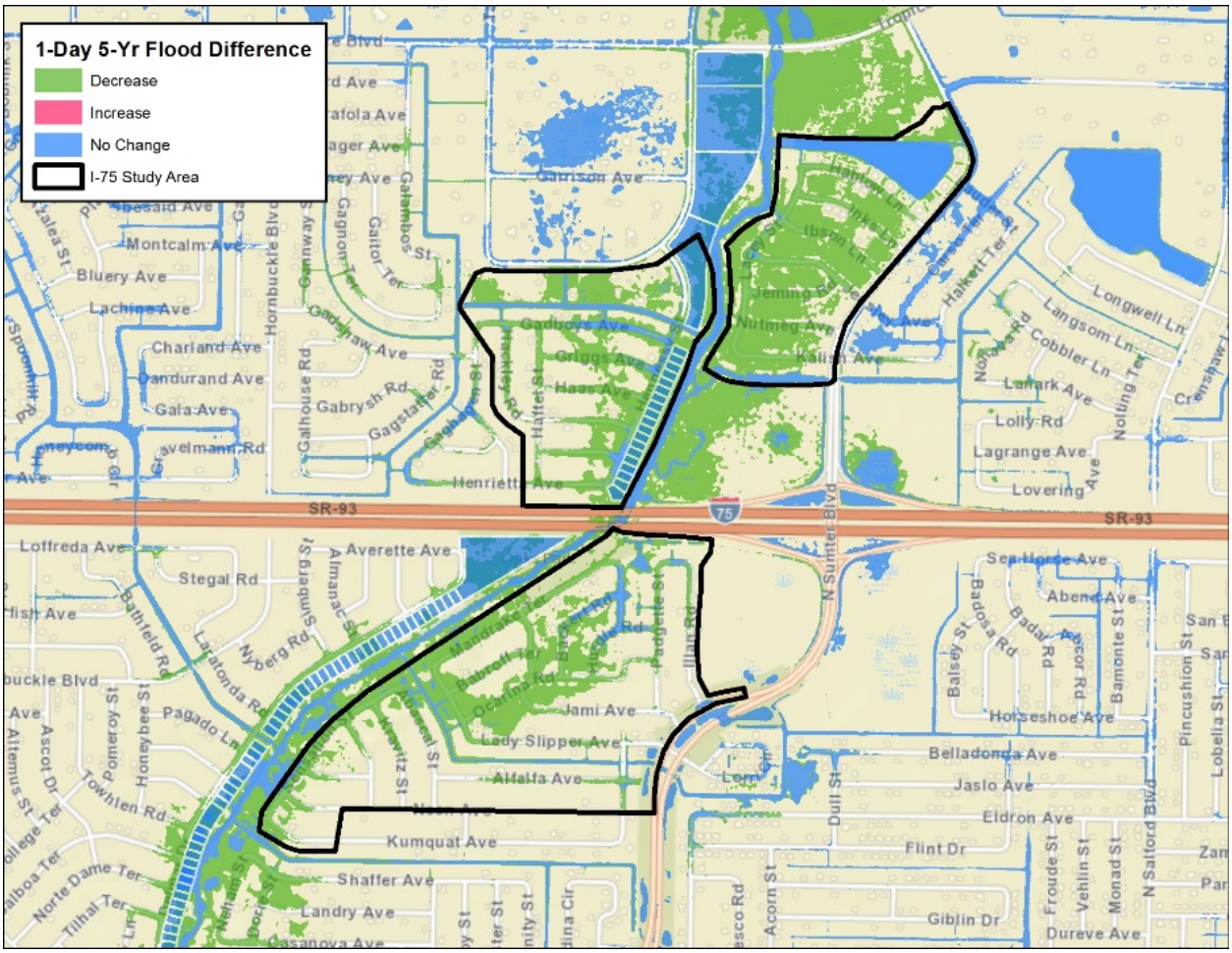


Figure 10: 1-Day 5-Year Flood Difference Map, I-75 Area

Flood Area Reduction for 1-Day 10-Year Event in the I-75 Area

Figure 10 illustrates reduced extents of inundation in the I-75 area for the 1-Day 10-Year storm event for the full stormwater management master plan model.

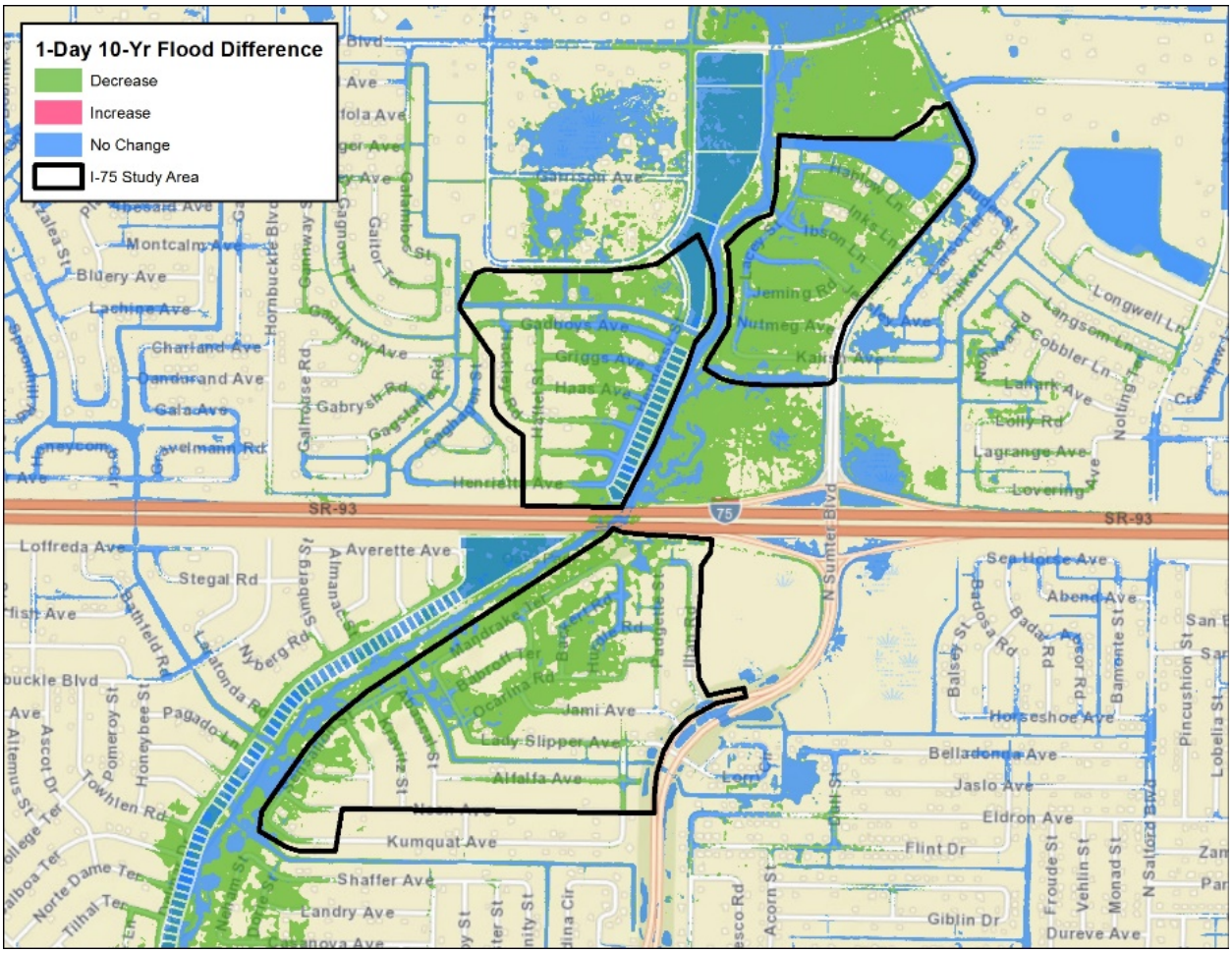


Figure 11: 1-Day 10-Year Flood Difference Map, I-75 Area

Flood Area Reduction for 1-Day 25-Year Event in the I-75 Area

Figure 11 illustrates reduced extents of inundation in the I-75 area for the 1-Day 25-Year storm event for the full stormwater management master plan model.

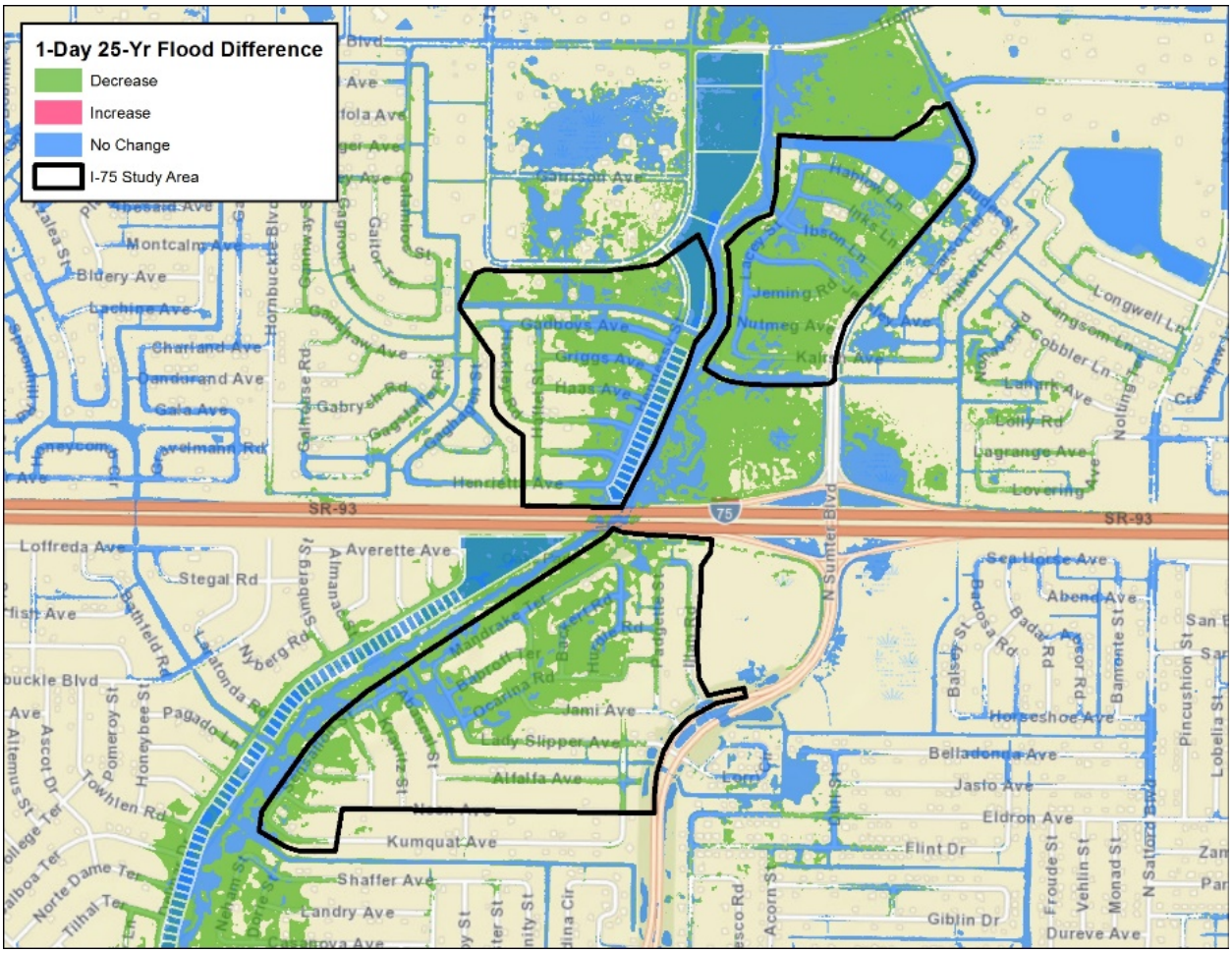


Figure 12: 1-Day 25-Year Flood Difference Map, I-75 Area

Flood Area Reduction for 1-Day 50-Year Event in the I-75 Area

Figure 12 illustrates reduced extents of inundation in the I-75 area for the 1-Day 50-year storm event for the full stormwater management master plan model.

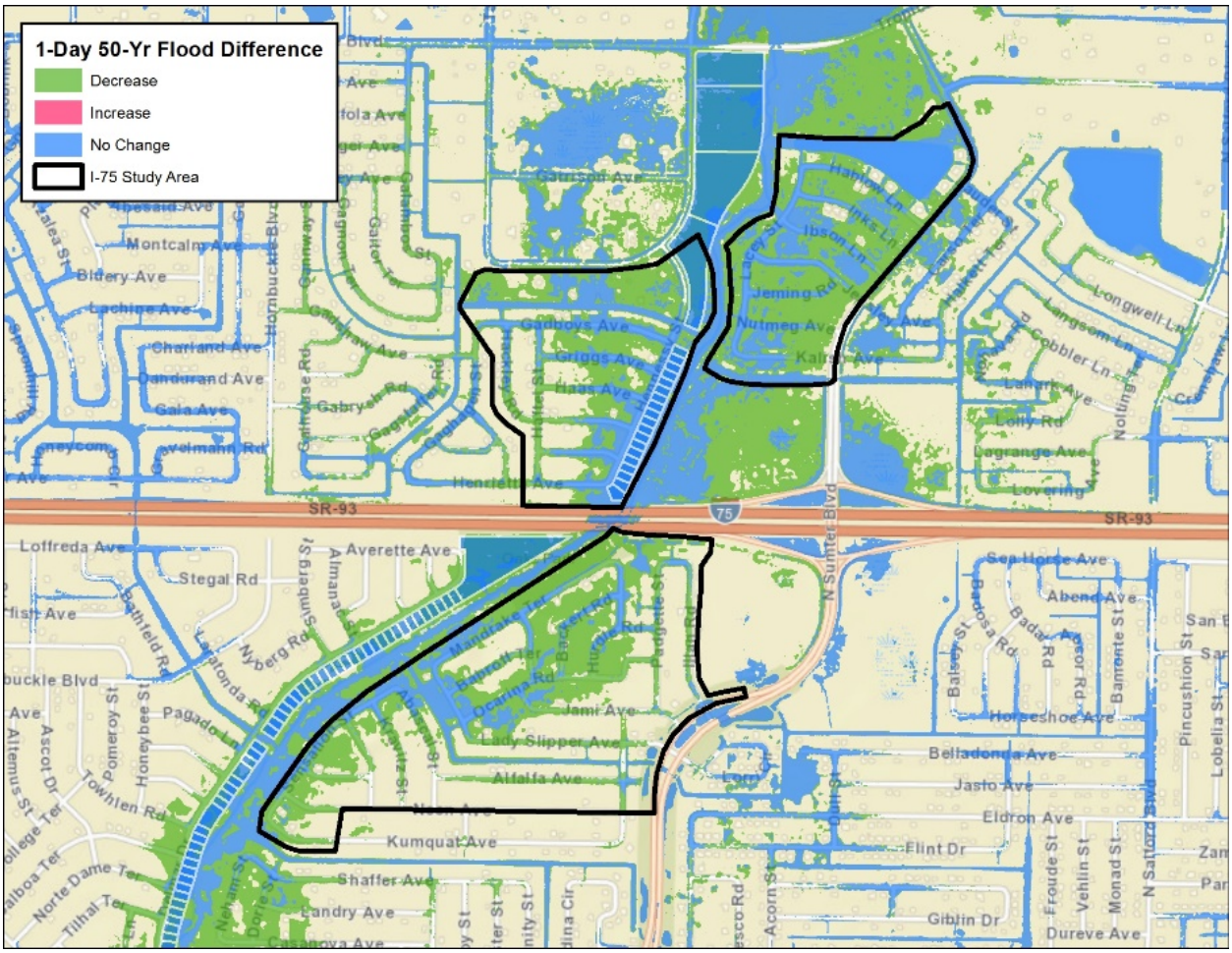


Figure 13: 1-Day 50-Year Flood Difference Map, I-75 Area

Flood Area Reduction for 1-Day 100-Year Event in the I-75 Area

Figure 13 illustrates reduced extents of inundation in the I-75 area for the 1-Day 100-Year storm event for the full stormwater management master plan model.

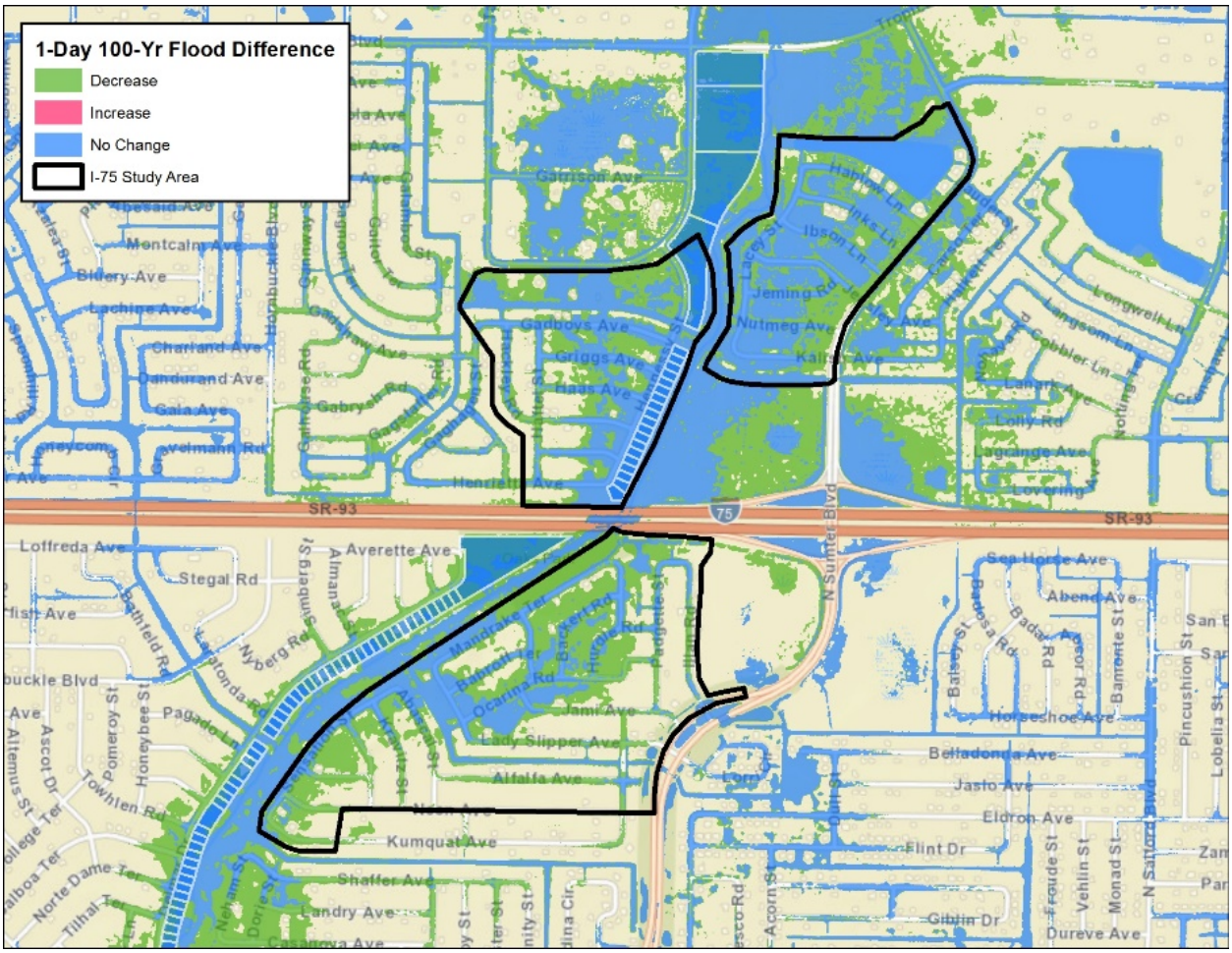


Figure 14: 1-Day 100-Year Flood Difference Map, I-75 Area

Flood Area Reduction for 1-Day Mean Annual Event in the Dorothy Avenue Area

Figure 14 illustrates reduced extents of inundation in the Dorothy Avenue area for the Mean Annual storm event for the full stormwater management master plan model.

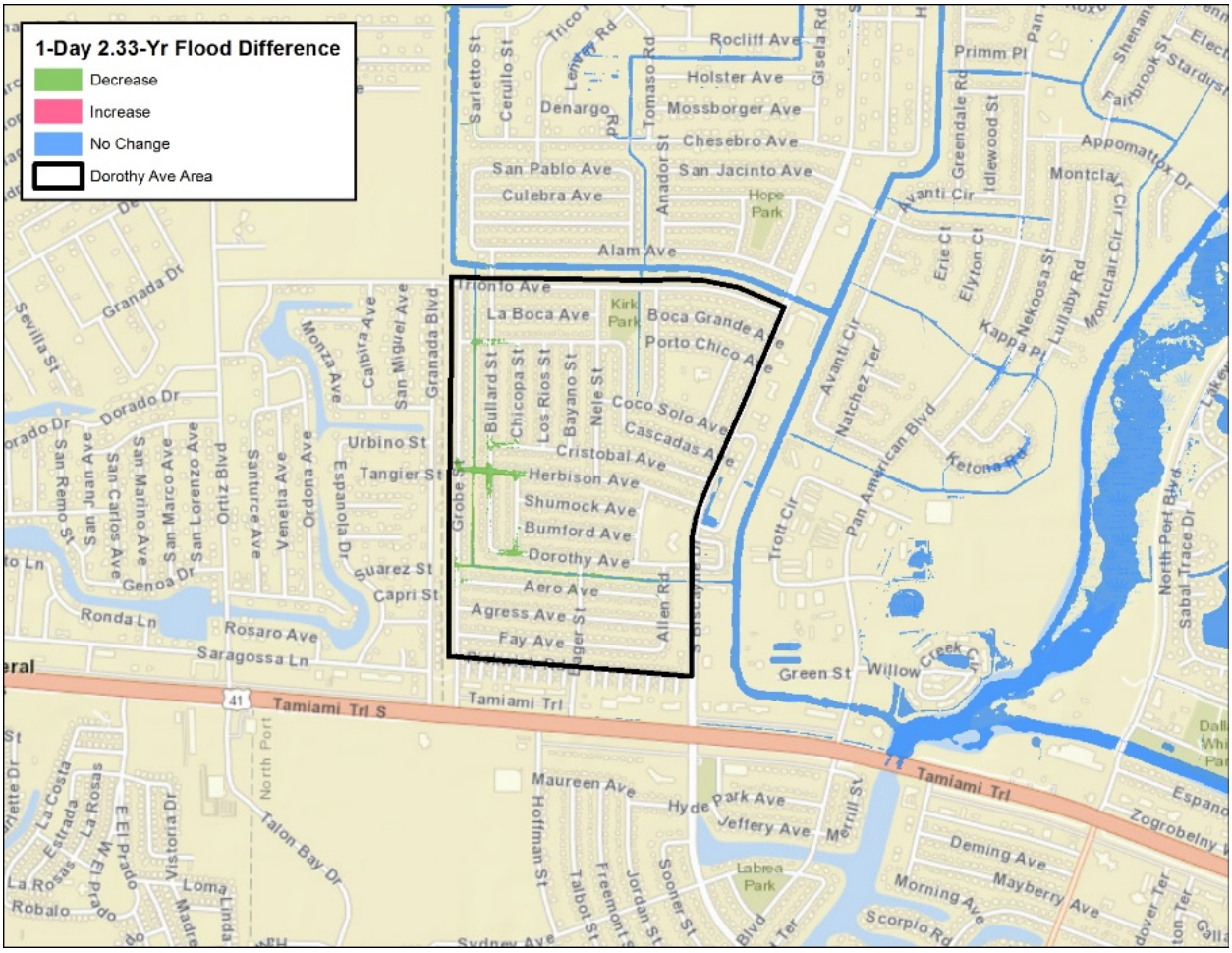


Figure 15: 1-Day 2.33-Year Flood Difference Map, Dorothy Avenue Area

Flood Area Reduction for 1-Day 5-Year Event in the Dorothy Avenue Area

Figure 15 illustrates reduced extents of inundation in the Dorothy Avenue area for the 1-Day 5-Year storm event for the full stormwater management master plan model.

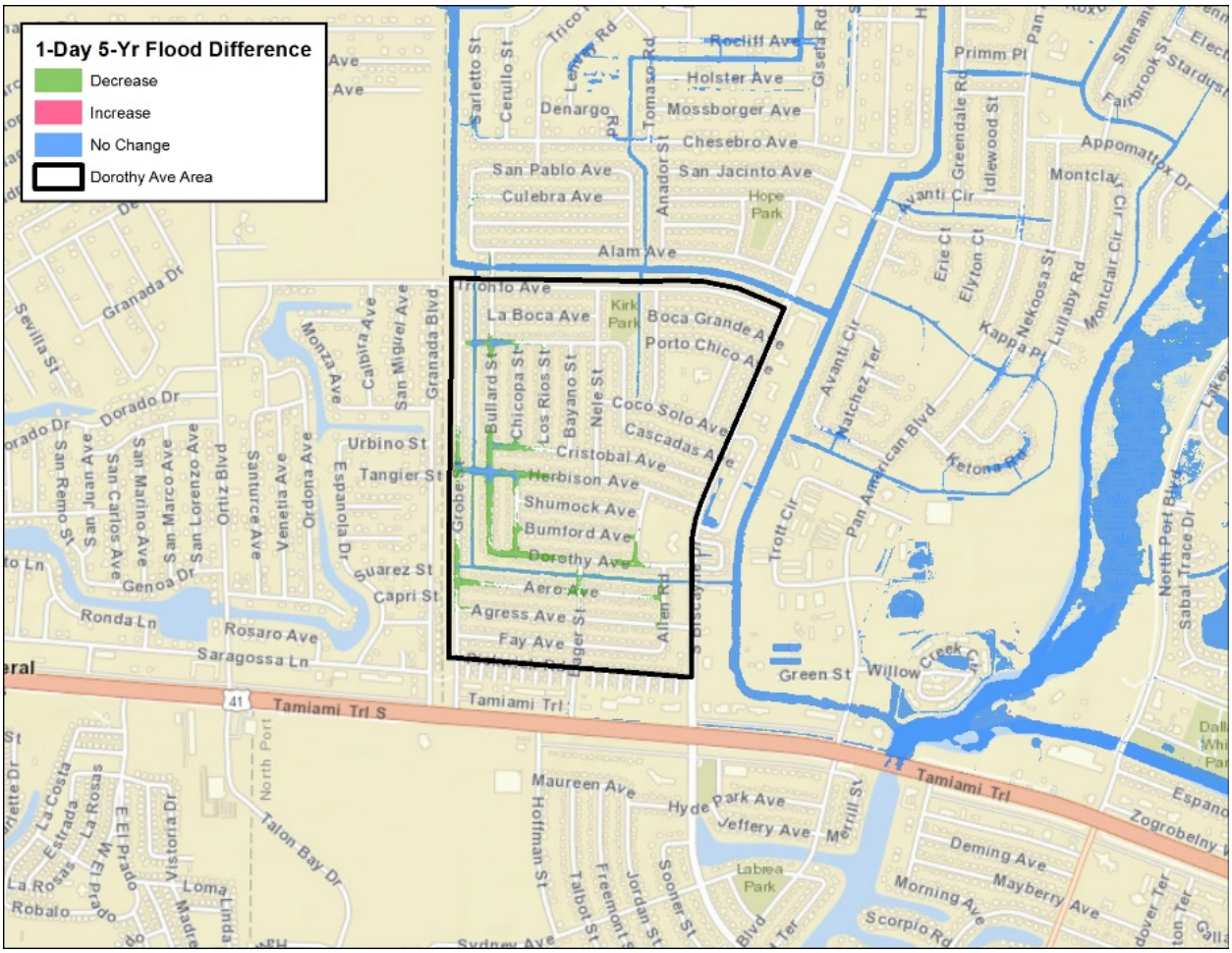


Figure 16: 1-Day 5-Year Flood Difference Map, Dorothy Avenue Area

Flood Area Reduction for 1-Day 10-Year Event in the Dorothy Avenue Area

Figure 16 illustrates reduced extents of inundation in the Dorothy Avenue area for the 1-Day 10-Year storm event for the full stormwater management master plan model.

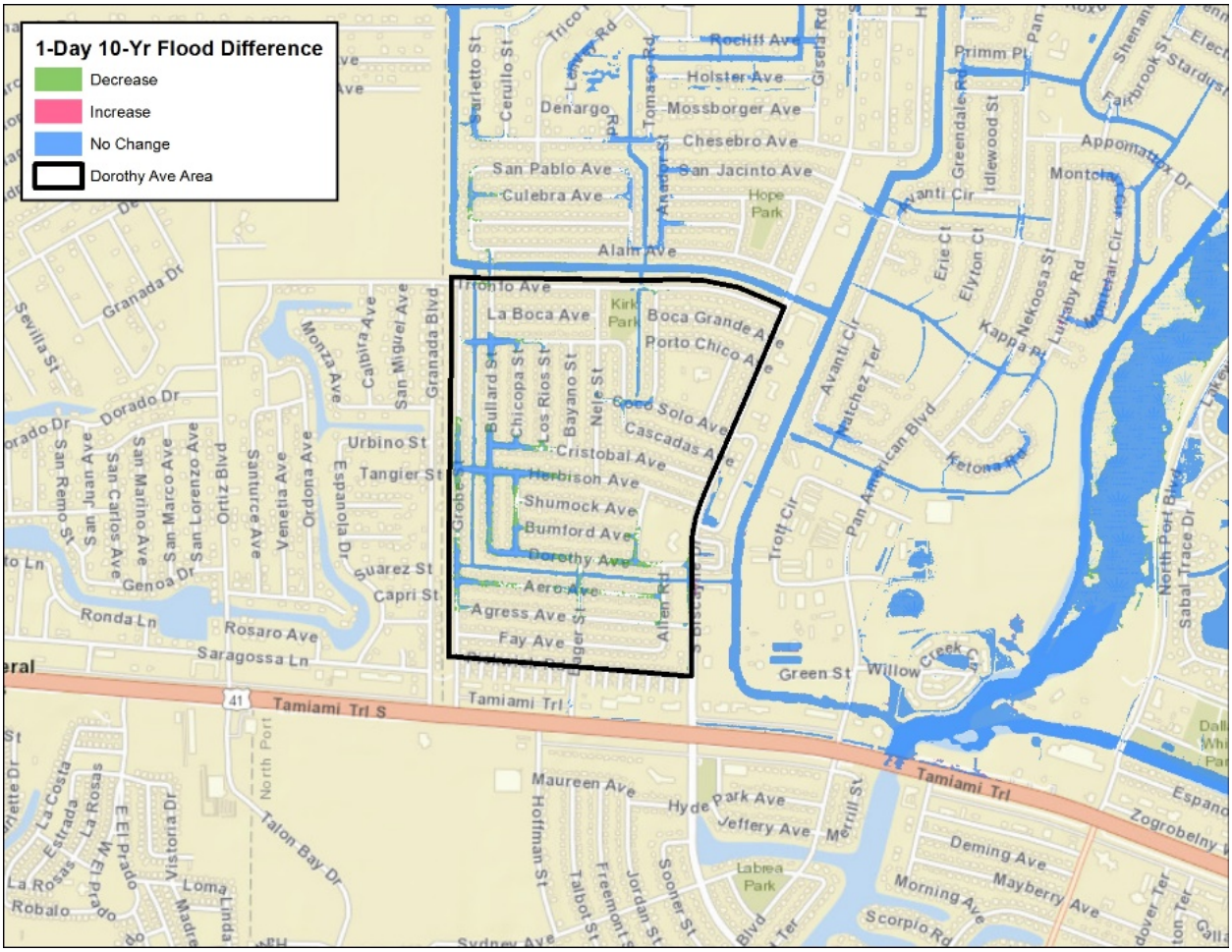


Figure 17: 1-Day 10-Year Flood Difference Map, Dorothy Avenue Area

Flood Area Reduction for 1-Day 25-Year Event in the Dorothy Avenue Area

Figure 17 illustrates reduced extents of inundation in the Dorothy Avenue area for the 1-Day 25-Year storm event for the full stormwater management master plan model.

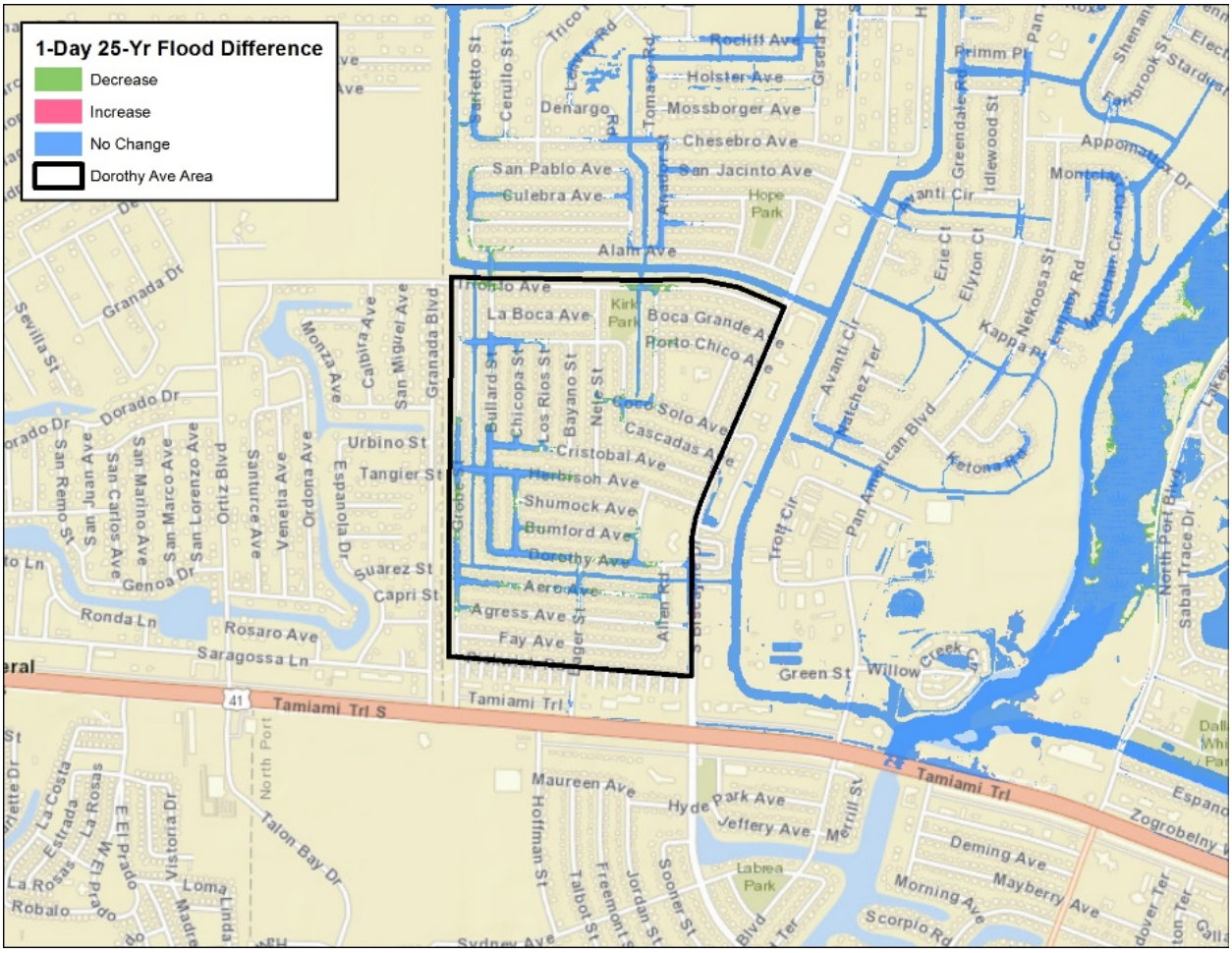


Figure 18: 1-Day 25-Year Flood Difference Map, Dorothy Avenue Area

Flood Area Reduction for 1-Day 50-Year Event in the Dorothy Avenue Area

Figure 18 illustrates reduced extents of inundation in the Dorothy Avenue area for the 1-Day 50-year storm event for the full stormwater management master plan model.

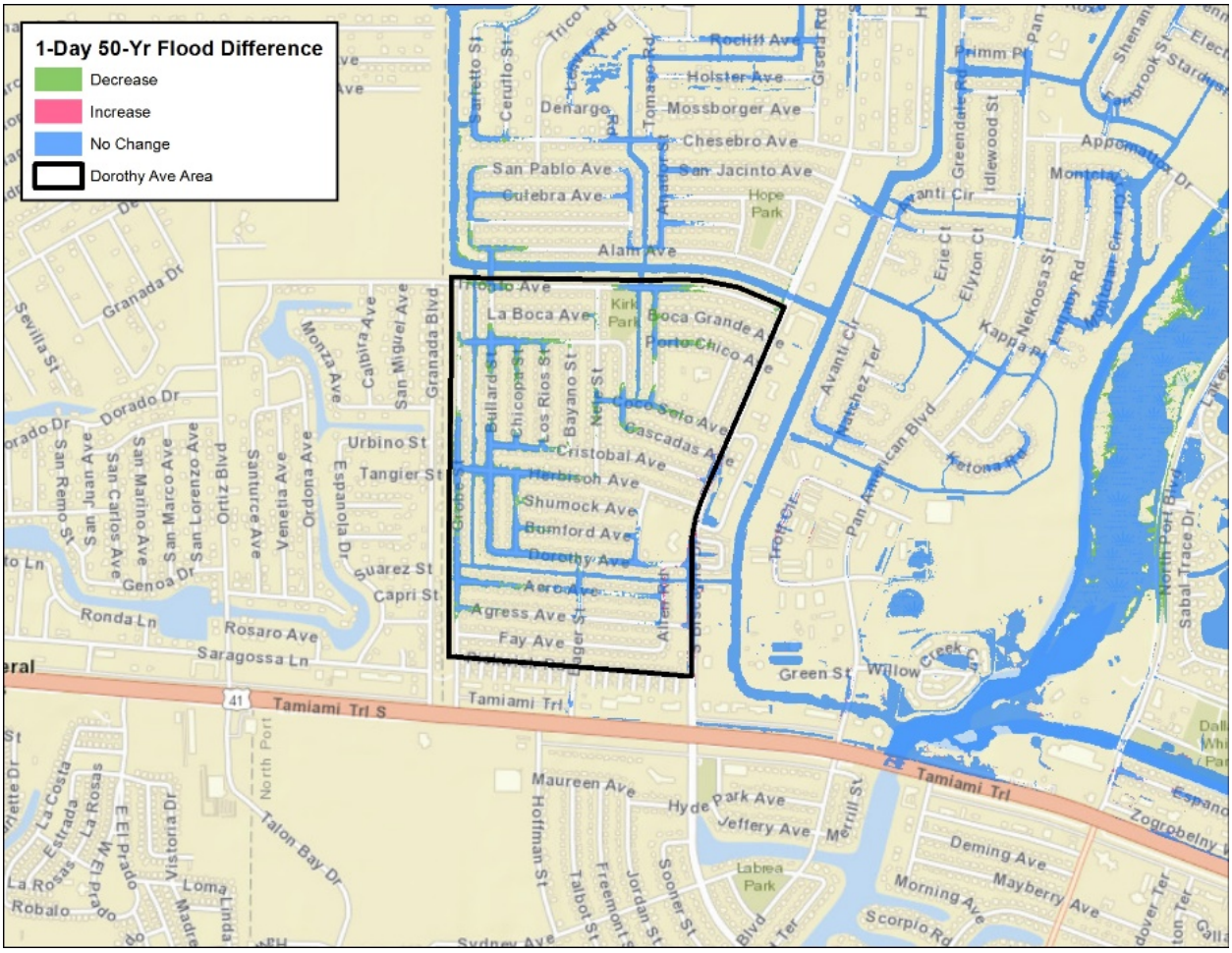


Figure 19: 1-Day 50-Year Flood Difference Map, Dorothy Avenue Area

Flood Area Reduction for 1-Day 100-Year Event in the Dorothy Avenue Area

Figure 19 illustrates reduced extents of inundation in the Dorothy Avenue areas for the 1-Day 100-Year storm event for the full stormwater management master plan model.

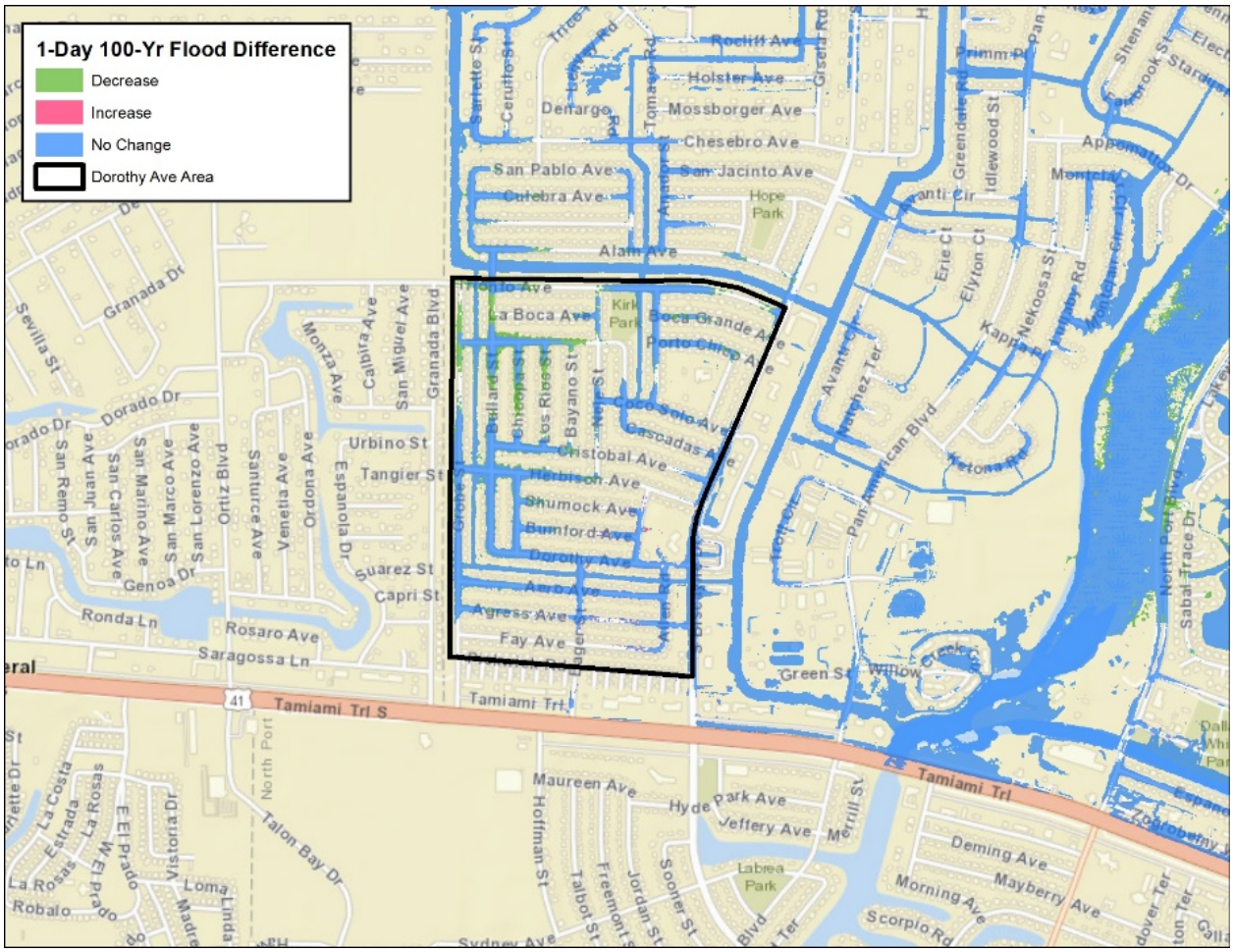


Figure 20: 1-Day 100-Year Flood Difference Map, Dorothy Avenue Area

It should be noted that the set of improvements proposed for the Dorothy Avenue area were conceived to carry higher inflows that would result from R-36 widening, with the primary objective being to carry those inflows without increasing localized flooding. As designed, the Dorothy Avenue area will also see flood reduction benefits. Those local flood reduction benefits are more noticeable for smaller storms. If R-36 widening is not performed, the Dorothy Avenue improvements could be adjusted to provide for local improvement only at lower cost and perhaps improved local flood reduction performance. Additionally, the local collection system was not evaluated for improvement. It is possible that additional flood reduction benefits could be achieved through local collection system improvements in this and other areas affected by the proposed primary conveyance system improvements.

Appendix A

Professional Engineering Services for the Big Slough Flood Reduction Study - Project Plan

DeLoach Engineering Science, PLLC., November 2016

City of North Port

Professional Engineering Services for the Big Slough Flood Reduction Study

Agreement #2016-48
Department of Public Works

PROJECT PLAN

November 2016

DeLoach Engineering Science, PLLC
1845 Ivanhoe Road | Orlando, FL 32804

DeLoach Engineering Science
water resources and civil engineering

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Professional Engineering Services for the
Big Slough Flood Reduction Study

PROJECT PLAN

The purpose of this project plan is to document the approach to executing pending project tasks and to identify outstanding project-related issues. This is the first draft of project development for the Big Slough Flood Reduction Study. *This document will periodically be revisited to assess overall progress, describe upcoming tasks and deliverables, evaluate staff allocations, and describe deficiencies and recovery actions completed and/or planned*.

Introduction

The Big Slough Flood Reduction Study, cooperatively funded by and between the City of North Port and the Southwest Florida Water Management District (SWFWMD), is being performed for the Department of Public Works under City of North Port Agreement #2016-48. Notice to Proceed to conduct the flood study was issued to DeLoach Engineering Science, PLLC (DES) on October 13, 2016. Per the agreement, DES will evaluate feasibility and cost effectiveness of various solutions intended to reduce flooding in the City of North Port within the Big Slough Watershed.

More specifically, the Big Slough Flood Reduction Feasibility Study is comprised of two distinct parts:

- Part 1 is to evaluate localized flooding along Myakkahatchee Creek within the I-75 and Jockey Club Study Areas and recommend construction projects or other methods to mitigate flooding.
- Part 2 is to evaluate preliminary regional concepts including, but not limited to, those previously developed by others, with the intent to advance large scale solutions to mitigate flooding throughout the City of North Port.

Stormwater evaluations performed by DES will employ data and a watershed model previously developed by Ardaman & Associates, Inc. (Ardaman) for the North Port/Big Slough Watershed Management Program (WMP) project. That prior project was also cooperatively funded by the City of North Port and the SWFWMD and was completed in 2014. The existing watershed model was developed by Ardaman using CHAN Version 2.03 (Aquarian Software, Inc.). All data collected, work products generated, and reports submitted under the prior North Port/Big Slough WMP project will be obtained by the City and provided to DES for use in performing this flood reduction study.

<u>Basic Watershed Information</u>

The Big Slough Watershed is in southeastern Sarasota County and is tributary to the Myakka River. Portions of the City of North Port located east of the Myakka River are within the southern portion of the Big Slough Watershed. The Big Slough Canal (also called Myakkahatchee Creek in its lower reaches) passes from north to south and receives inflows from numerous waterways within the City. Discharge of waters from the City and upstream offsite areas occurs primarily via Myakkahatchee Creek as it passes beneath US 41. Lesser discharges occur southward through several open weirs, drop structures, and culverts along Hillsborough Boulevard into waterways which continue through Port Charlotte. Several of those downstream waterways are controlled by structures while others are tidally influenced.

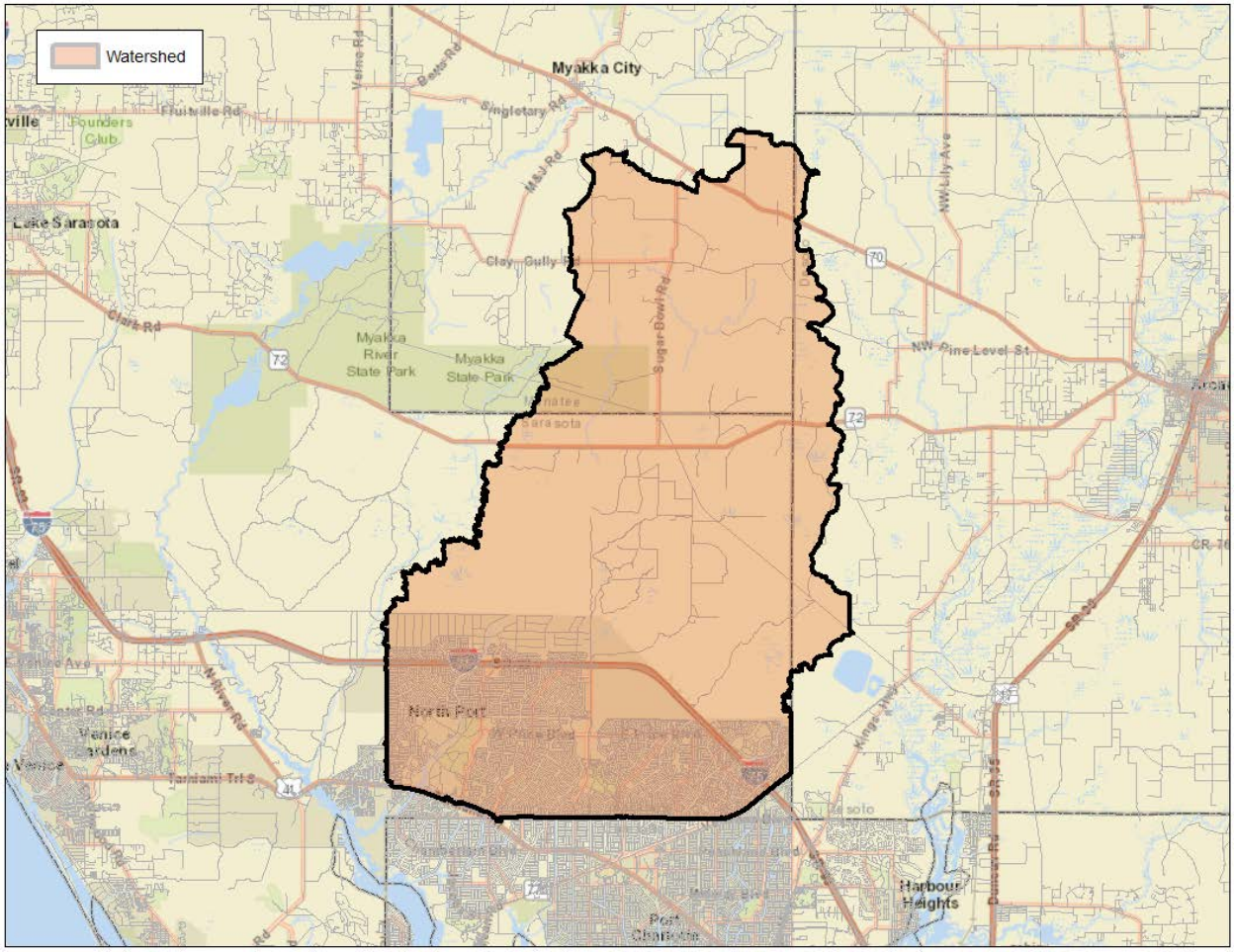


Figure 1: The Big Slough Watershed Area

The City has routinely experienced flooding in the Big Slough Watershed. Two such flood zones are the areas near Myakkahatchee Creek at I-75 and the areas in and around the Jockey Club.

- The Myakkahatchee Creek at I-75 Study Area covers approximately 335 acres adjacent to the Myakkahatchee Creek. The area is bounded on the east by Sumter Boulevard and traversed from east to west by Interstate Highway 75.
- The northern section of the Jockey Club Study Area covers approximately 62 acres and is bounded on the north by Appomattox Drive, on the west by Pan American Boulevard, and on the east by Myakkahatchee Creek. The southern section of the Jockey Club Study Area near Ketona Road is also included and is approximately 82 acres in size.

Figure 2a depicts existing mean annual and 10-year floodplains within the I-75 study area adjacent to Myakkahatchee Creek, both north and south of the interstate, as developed during the North Port/Big Slough WMP project. Figure 2b shows sub-basin delineations and the model network features used to simulate response to rainfall during the WMP project. Figure 2c depicts hydrologic soils groups. Figures 3a, 3b, and 3c illustrate the same information within and surrounding the Jockey Club study area.

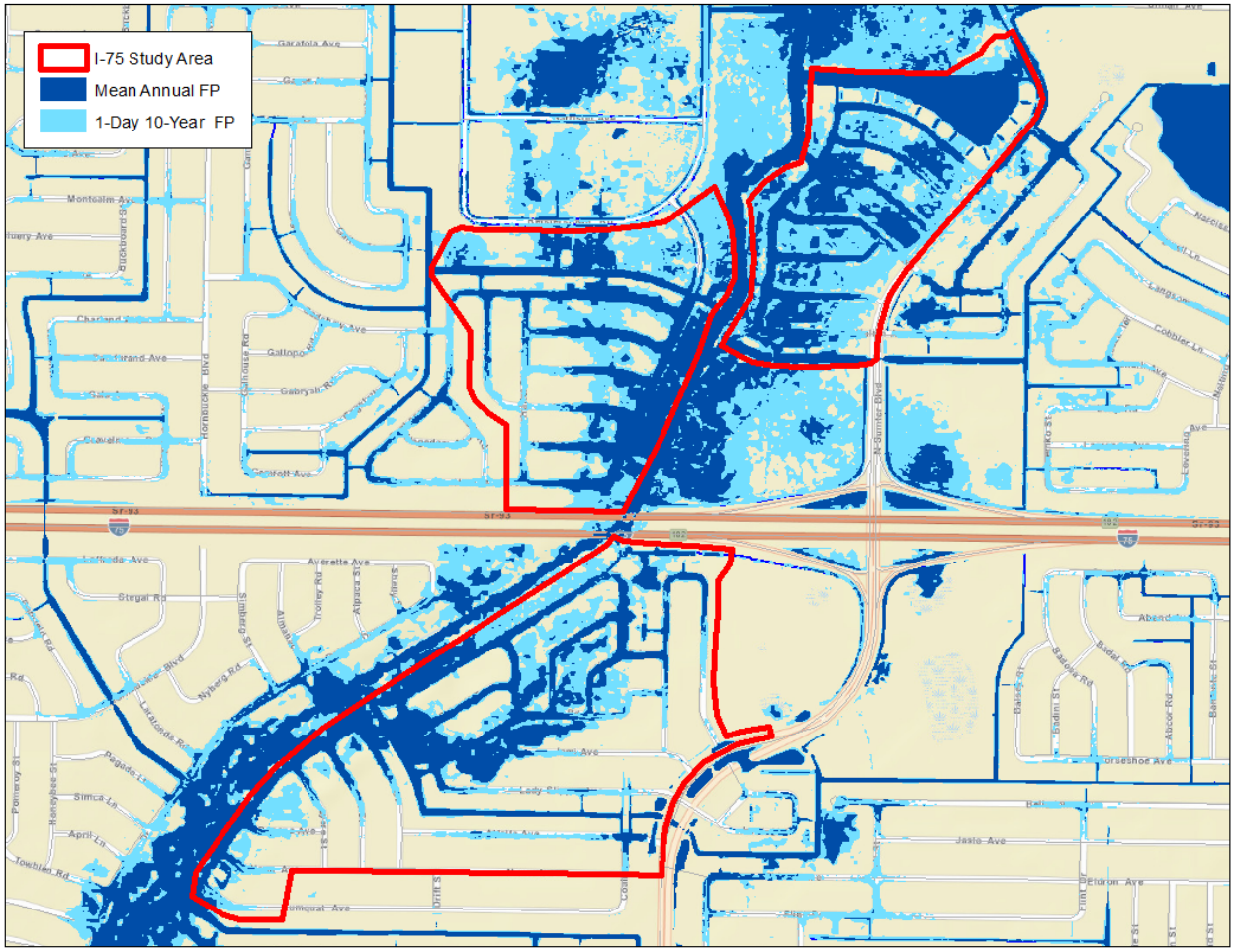


Figure 2a: I-75 Study Area, Mean Annual and 10-Year Floodplains

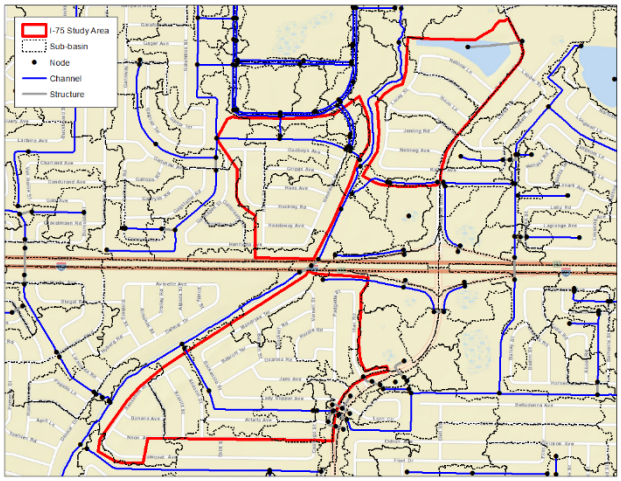


Figure 2b: I-75 Study Area, Model Network

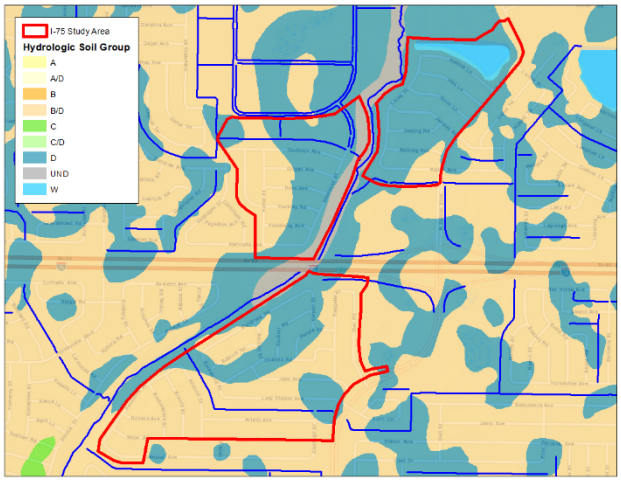


Figure 2c: I-75 Study Area, Hydrologic Soil Groups

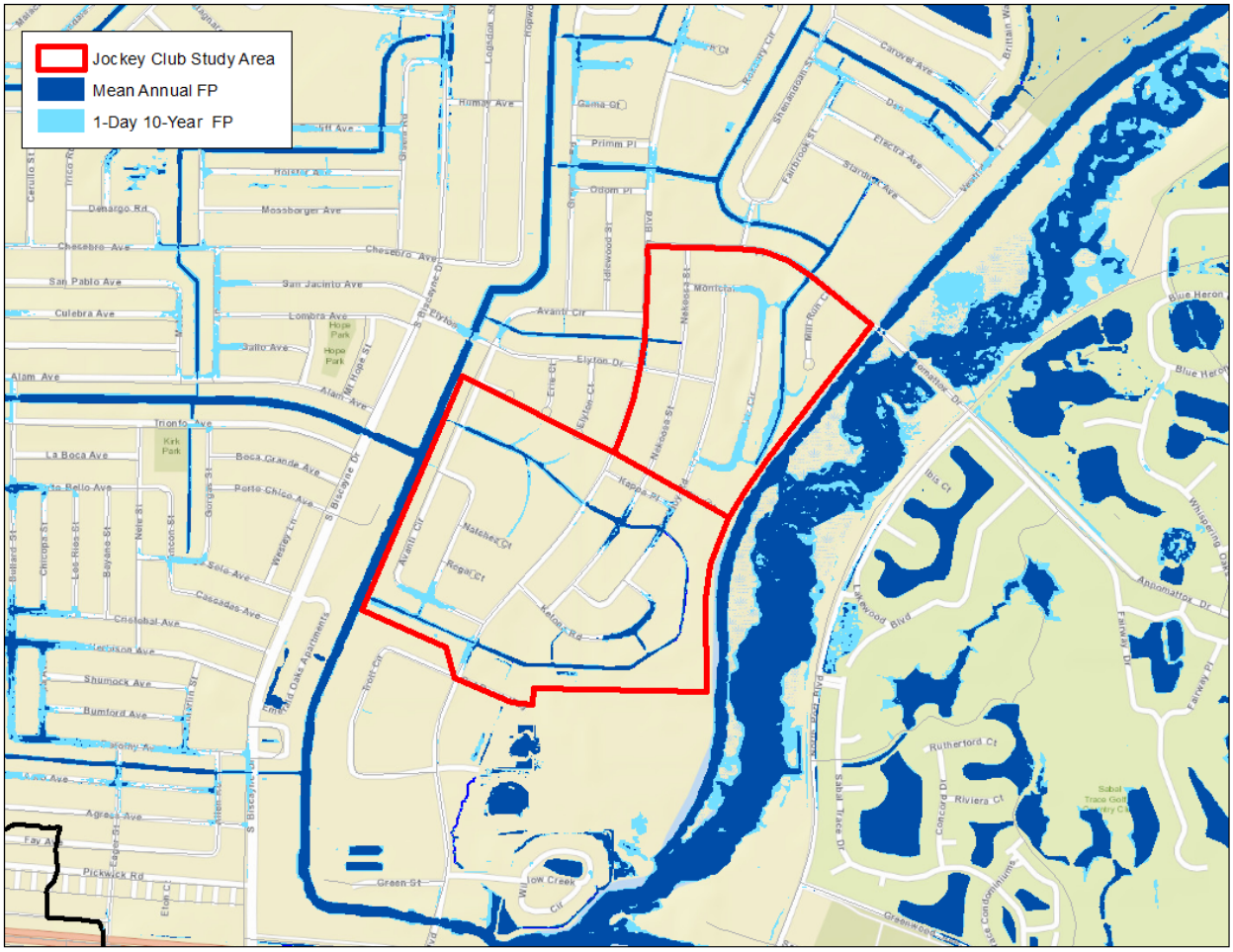


Figure 3a: Jockey Club Study Area, Mean Annual and 10-Year Floodplains

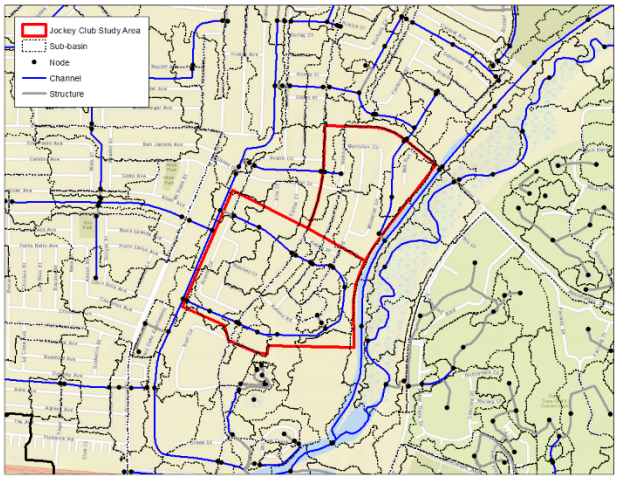


Figure 3b: Jockey Club Study Area, Model Network

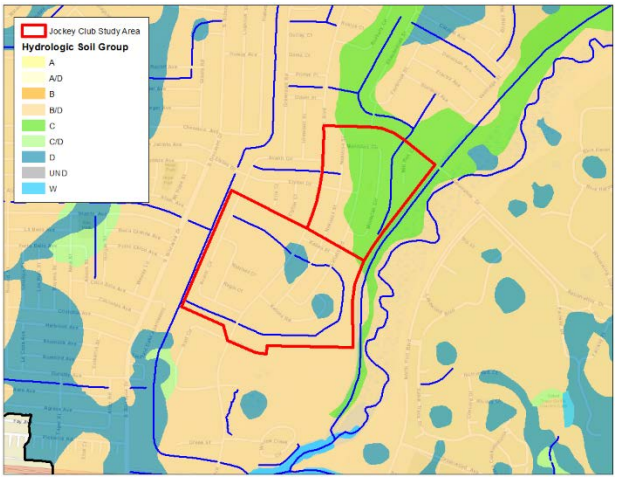


Figure 3c: Jockey Club Study Area, Hydrologic Soil Groups

Previous Work Completed

The Big Slough watershed and City of North Port stormwater management system have been the subjects of prior investigations. Reference will be made to the following reports:

- North Port Water Control District Phase I Report, Inventory and Approach to Analysis, for General Development Utilities, Inc., by R. D. Ghioto & Associates, Inc. (1984) presents data and information that describes NPWCD facilities, their function and condition.
- City of North Port Big Slough Watershed Study Phase III Task 2 Final Report, Stormwater Management Master Plan, by Camp, Dresser & McKee, Inc. (1993) presents conceptual solutions for flooding as well as assessments of potential water supplies and of nonpoint source pollution and describes a stormwater management plan to reduce flooding during extreme storm events.
- Watershed Management Program Consulting Services in the Big Slough Watershed (K883), Best Management Practices (BMP) Analysis Final Report, for Southwest Florida Water Management District and City of North Port, by Ardaman & Associates, Inc. (2014) evaluates BMP alternatives to address flooding conditions based on effectiveness, permittability, and economic viability.

The 1993 Stormwater Management Master Plan was partially implemented, providing increased local conveyance through replacement of culvert structures at four locations. Those improvements are accounted for in more recent model development. Other plan components were not completed including those for storage and flow diversion, apparently due to regulatory and financial constraints.

Under the WMP project, the 2012 Version of 2004 Condition model was developed and six regional BMP alternatives were evaluated that could potentially reduce flooding through combinations of conveyance improvements, stormwater management storage areas, flood proofing, and flow diversion. Although the regional alternatives developed under the WMP project were not incorporated into a specific plan for implementation, the work provides insight to the system's hydraulic response and BMP limitations.

Additionally, hydraulic performance and effects of potential local conveyance improvements were analyzed at the following sites:

- R-36 Canal at I-75
- Myakkahatchee Creek at I-75
- R-36 Canal at Tropicaire Boulevard
- Myakkahatchee Creek at Tropicaire Boulevard
- WCS-162 location on the R-36 Canal (possibility of adding gates to the existing structure)
- Price Boulevard drainage system (five alternative sets of improvements)

Results from each BMP evaluation were compared the 24-hour 100-year existing condition model.

The Big Slough Flood Reduction Study will build upon all prior work to advance previously developed and new concepts to achieve flood mitigation in areas where residential structures are shown as flooding in the recently updated Flood Insurance Rate Maps (FIRMs). Performance of proposed improvements will be considered relative to lesser storm events from mean annual up to and including the 100-year storm event to evaluate cost and benefit relationships across a broader range of conditions.

Potential Issues

There are currently no technical issues which would prevent moving forward with the flood reduction study per the project scope of work. When issues do arise, discussion will occur with the City project manager. The project plan will be updated to reflect discussions, corrective actions, and outcomes.

Outline of This Document

This document:

- provides an overview of the Big Slough Flood Reduction Study and includes the following:
  - Goals and Objectives
  - Work Breakdown Structure
  - Project Schedule
  - Project Costs
  - Staff Allocations
- describes the scope of work for all project activities (Task List, Deliverables, and Approach)
- includes a brief narrative describing current assumptions, issues, and issue management
- presents updated plans for Quality Assurance, Quality Control, and Communications

Goals and Objectives

The City of North Port has partnered with SWFWMD through the District's Cooperative Funding Initiative (CFI) to oversee completion of the Big Slough Flood Reduction Study. The CFI allows local governments to share costs for projects that assist in creating sustainable water resources, provide flood protection, and enhance conservation efforts. As such, cooperatively funded WMP projects must meet various goals and objectives of both the District and the local partners.

Agency Goals

Local governments often partner in the District's CFI program because they need better floodplain information to make good land use (building and zoning) decisions. The program also routinely develops recommendations to improve deficiencies in flood protection level of service and to implement BMPs for water quality improvement. The goal of the Big Slough Flood Reduction Study is to develop BMPs to address existing recurrent flooding.

Study Objectives

The flood reduction study will be performed in two distinct parts.

Part 1 is a concentrated effort which considers solutions to reduce flooding through implementing localized improvements within certain identified neighborhoods that are adjacent to Myakkahatchee Creek at I-75 and at the Jockey Club while Part 2 is a broader study which considers a regional approach to reduce flooding in other portions of the City.

More specifically, this study will:

- Develop projects to reduce flooding along Myakkahatchee Creek near I-75 and the Jockey Club

- Produce a conceptual plan for improvements covering multiple sites and facilities serving those two areas and submit a State-wide Environmental Resource Permit (SWERP) for Conceptual Approval of the plan for flood reduction
- Evaluate & advance a set of BMP concepts to reduce flood risk in North Port on a regional scale
- Produce a planning-level document describing a small number of regional projects which exhibit potential flood reduction benefits based upon screening-level hydraulic evaluations
- Produce a planning-level cost estimate that addresses additional (i.e., future) analyses as well as engineering design, environmental permitting, land acquisition, construction, and other costs

Work Breakdown Structure

The Big Slough Flood Reduction Study includes the following major elements:

- Big Slough Flood Reduction Study
  - Project Development
  - Part 1 - Problem Definition, Field Visits, and Team Coordination
  - Part 1 - Alternatives Formulation and Community Outreach
  - Part 1 - Plan Development, Reporting, and Conceptual Permitting
  - Part 2 - Regional Flood Reduction Concept Formulation
  - Part 2 - Performance Evaluation and Agency Outreach
  - Part 2 - Planning Level Report on Regional Improvement Projects

Key project milestones for the Big Slough Flood Reduction Study are as follows:

1.1 Project Development
- 1.1.1 Kickoff Meeting and Initial Field Visit
- 1.1.2 Data Collection and Assembly
  - 1.1.2.1 CHAN Model from North Port/Big Slough WMP Project
  - 1.1.2.2 Geodatabase from North Port/Big Slough WMP Project
  - 1.1.2.3 Terrain from North Port/Big Slough WMP Project
  - 1.1.2.4 PLS Survey from North Port/Big Slough WMP Project
  - 1.1.2.5 Land Use from North Port/Big Slough WMP Project
  - 1.1.2.6 Parcels from Sarasota County Property Appraiser
  - 1.1.2.7 Utilities from City of North Port (for specific areas)
- 1.1.3 Summary of Prior Work Performed
  - 1.1.3.1 Ardaman
  - 1.1.3.2 CDM
- 1.1.4 Project Plan Formulation

1.2 Define Existing Flooding Problems
- 1.2.1 Confirm Ability to Reproduce WMP Project Model Results
  - 1.2.1.1 Simulations of Mean Annual to 100-Year Events
  - 1.2.1.2 Flood Mapping and Comparison to Ardaman Results
  - 1.2.1.3 Update Model to include a Small Number of Prior Conveyance Improvements
  - 1.2.1.4 Flood Mapping and Comparison of Updated Model to Ardaman Results
- 1.2.2 Characterize Local Flooding Conditions
  - 1.2.2.1 Myakkahatchee Creek at I-75
  - 1.2.2.2 Jockey Club

1.3 Operations Staff Meeting and Team Field Visit
- 1.3.1 Meeting Topics

- 1.3.1.1 Prior Work and Project Plan
- 1.3.1.2 Existing Flooding Problems and Potential Solutions – with Operations Staff Input
- 1.3.1.3 Approach to Evaluation of Hydraulic Performance of Potential Solutions
- 1.3.1.4 Cost-Benefit and Other Project Considerations and Constraints
- 1.3.1.5 Refinements and Development of a Recommended Plan
- 1.3.1.6 Remaining Project Schedule and Upcoming Community Meeting

1.4 Formulate List of Potential Solutions for Hydraulic Evaluation
- 1.4.1 Describe Each Potential Solution and Any Known or Expected Obstacles to Success
- 1.4.2 Identify Additional Data Needs to Support Hydraulic Evaluation
- 1.4.3 Meeting to Review and Discuss List of Potential Solutions
- 1.4.4 Select a Set of Alternatives from Among Potential Solutions for Hydraulic Evaluation

1.5 Evaluate Hydraulic Performance of Selected Set of Alternatives
- 1.5.1 Perform Hydraulic Analyses
- 1.5.2 Summarize Hydraulic Performance
- 1.5.3 Meeting to Review and Discuss Performance of Alternatives
- 1.5.4 Identify Preferred Plan(s) of Improvements

1.6 Refine Preferred Plan(s) of Improvements
- 1.6.1 Evaluate Site Conditions and Design/Permitting Constraints of Preferred Plan(s)
- 1.6.2 Refine Preferred Plan(s) to Address Site Conditions and Design/Permitting Constraints
- 1.6.3 Perform Hydraulic Analyses of Refined Plan(s)
- 1.6.4 Perform Cost-Benefit Analysis of Refined Plan(s)
- 1.6.5 Meeting to Review and Discuss Refined Plan(s)
- 1.6.6 Select Recommended Plan

1.7 Community Outreach Meeting
- 1.7.1 Meeting Topics
  - 1.7.1.1 Project Update
  - 1.7.1.2 Summary of Plan Development
  - 1.7.1.3 Description of Recommended Plan
  - 1.7.1.4 Performance of Recommended Plan
  - 1.7.1.5 Cost-Benefit
  - 1.7.1.6 Public Input
  - 1.7.1.7 Remaining Project Schedule and Upcoming Presentation to City

1.8 Summarize and Present Recommended Plan of Improvements
- 1.8.1 Finalize Recommended Plan and Project Deliverables
  - 1.8.1.1 Pre/Post Models and Result Tabulations
  - 1.8.1.2 Conceptual-Level Design Drawings
  - 1.8.1.3 Opinion of Probable Cost (incl. detailed design, permitting, land, and construction)
  - 1.8.1.4 Cost-Benefit
  - 1.8.1.5 Report and Mapping
  - 1.8.1.6 Training City staff in use of CHAN Modeling Software
- 1.8.2 Meeting with City Administrative Staff
- 1.8.3 Statewide Environmental Resource Permitting
  - 1.8.3.1 SWFWMD Pre-App Meeting for Statewide Conceptual (or simple Standard) ERP
  - 1.8.3.2 Application Preparation/Submittal and Response to Two (2) Requests for Additional Information (RAIs)

2.1 Formulate List of Regional Flood Reduction Concepts
- 2.1.1 Describe Each Potential Solution and Known or Expected Obstacles to Success
- 2.1.2 Identify Additional Data Needs to Support Hydraulic Evaluation
- 2.1.3 Meeting to Review and Discuss List of Potential Solutions
- 2.1.4 Select a Set of Alternatives for Further Evaluation

2.2 Landowner & Regulatory Outreach Meeting(s)
2.3 Evaluate Hydraulic Performance of Selected Set of Alternatives
  2.3.1 Perform Screening-Level Hydraulic Analyses
  2.3.2 Summarize Hydraulic Performance
  2.3.3 Meeting to Review and Discuss Performance of Alternatives
  2.3.4 Identify Preferred Plans for Regional Improvements
2.4 Summarize and Present Preferred Plan(s) for Regional Improvements
  2.4.1 Screening-Level Hydraulic Model Pre/Post and Result Tabulations
  2.4.2 Conceptual-Level Drawings and Plan Descriptions
  2.4.3 Site Conditions and Design Constraints
  2.4.4 Relevant Permitting Requirements
  2.4.5 Opinion of Probable Cost (for detailed analysis, design, permitting, land, and construction)
  2.4.6 Planning-Level Report and Mapping

Project Schedule

An accelerated schedule for the Big Slough Flood Reduction Study dictates completion of all Part 1 and Part 2 tasks within about nine (9) months of receiving Notice to Proceed. Table 1 presents the agreed upon performance schedule for the project. The performance schedule is also depicted in a project Gantt chart, provided in Appendix A.

Generally, the following task durations are expected (Part 1 and Part 2 tasks completed concurrently):

- Project Plan, 1 month
- Part 1 - Problem Definition, Field Visits, and Initial Team Coordination, 1 month
- Part 1 - Alternatives Formulation and Community Outreach, 3 months
- Part 1 - Plan Development, Reporting, and Conceptual Permitting, 4 months
- Part 2 - Regional Flood Reduction Concept Formulation, 2 months
- Part 2 - Performance Evaluation and Agency Outreach, 2 months
- Part 2 - Planning Level Report on Plan(s) for Regional Improvements, 4 months

Critical Path

All project tasks are to be performed expeditiously and in the sequence depicted in the project Gantt chart. Note that Part 1 and Part 2 project tasks are to be performed concurrently. A critical component of the project timeline is the identification and collection of field survey data by a Professional Land Surveyor to support model evaluations of Part 1 flood reduction alternatives. A qualified local PLS firm is to be identified during the second month and field work is to be performed early in the third month of the project. Field survey by a PLS should be completed within 2 weeks.

Project Invoice Schedule

Invoicing for the Big Slough Flood Reduction Study is progress-based with monthly lump sum fee amounts generally aligned with scheduled work product submittals. The lump sum fees are based upon labor estimates and other costs to produce those work products. A projected monthly invoice schedule is presented in Table 2.

Project Cost

The budget for the Big Slough Flood Reduction Study is $300,000, allocating approximately $250K for Part 1 activities and $50K for Part 2 activities.

Itemized Cost of Services Performed

An itemized project cost spreadsheet for all tasks that have been authorized by the City of North Port under Agreement #2016-48 is provided in Appendix B.

The itemized project cost spreadsheet reflects expected staff assignments and man-hour requirements to successfully provide the contracted services, and applies labor rates from the Agreement Consultant Fee Schedule to arrive at cost, by task, to perform the work. Staffing, man-hour requirements, and associated costs contained in the itemized project cost spreadsheet reflect the considered agreement between the City of North Port and DES, attained through discussion and negotiation, as to the level of detail desired and the effort required to satisfactorily complete the Big Slough Flood Reduction Study.

Staff Allocation

Project team members and their roles are summarized in the following:

Agreement #2016-48 identifies **Ms. Elizabeth Wong, PE** and **Mr. David DeLoach, PE** as project managers and prime contacts for the City and DES, respectively. **Ms. Jezabel Pagan Garcia** will serve as the project manager and lead point of contact for the SWFWMD. Ms. Wong, Mr. DeLoach, and Ms. Garcia will collaborate over the course of the project to update the project timeline, resource allocations, and budget in response to circumstances that may arise over the course of completing the project. Project deliverables, technical reviews, and related invoicing will also be managed by these individuals.

DES has assigned **Ms. Trillian Baldassari, PE** as the team's Lead Project Engineer, responsible for technical execution and oversight of project-related activities, as well as for supporting Mr. DeLoach on certain duties related to project management. Ms. Baldassari will serve as Deputy Project Manager, will be knowledgeable in all technical aspects of the project, and will remain cognizant of the project's status, providing the City and District with access to a second, high-level point of contact at DES.

Mr. Christopher Hardin, PE will serve as Project Engineer, responsible for technical execution of select project tasks, and, along with Mr. DeLoach and Ms. Baldassari, will contribute to the performance and timely completion of the project. **Mr. Chris Gilhooley** will serve as GIS Analyst, taking the lead role in geodatabase development, geoprocessing, and GIS deliverables production. **Mr. Rod Ghioto, PE** will serve as a Senior Consultant, also contributing to the performance of project tasks.

Projected staff utilization is provided in Table 3. Generally, utilization is expected to be within desirable levels across all project tasks. Actual utilization and work progress will be closely monitored by Mr. DeLoach to ensure that the schedule is adhered to. As Principal of the company, Mr. DeLoach can make and act upon staffing decisions quickly. He will shift project team member responsibilities or bring additional resources to assist with the project as needed.

Description of Project Activities

Scope of Work

City of North Port Agreement #2016-48 was issued to DES on October 13, 2016 to evaluate feasibility and cost effectiveness of various solutions intended to reduce flooding in the City of North Port within the Big Slough Watershed. The work includes minor model updates, conceptualization and performance evaluation of various BMP alternatives, agency and public outreach, development of plans for improvements, conceptual permitting, and reporting.

Project Startup

Key points about project startup and model preparation are provided in the following:

Project development. DES will meet and coordinate with staff of the City of North Port and SWFWMD to discuss project goals and objectives. The Scope of Work, schedule, and list of deliverables for Agreement #2016-48 will be reviewed during the meeting, with opportunities for all team members to offer input and share concerns regarding any aspect of the project. Based upon those discussions, the Project Plan (this document) will be updated and submitted to the City for approval.

Update of Selected Model Parameters. This project builds upon prior work performed, and utilizes modeling tools previously developed, by others under the SWFWMD WMP. The base model is the SWFWMD Governing Board-approved 2012 Version of 2004 Condition model. DES will utilize field survey data and other information provided by the City to add and/or update a small number of hydraulic features. The resulting model will be called the 2016 Version of 2004 Condition model. It should be noted that this model will not include any other revisions beyond those items listed here:

- For model refinements in the Myakkahatchee at I-75 and at Jockey club areas, DES will:
  - perform engineering-level field visits to review and verify site conditions to be modeled
  - develop local field survey requirements for collection by a third party PLS
  - incorporate collected field survey data into the model to reflect local site conditions
- For model revisions to more accurately reflect current conditions at several sites, DES will:
  - add a single 24-inch PVC pipe from Public Works site to Creighton WW (check)
  - utilize available as-built survey data and add two (2) gates at WCS 101
  - incorporate available survey and storm pipe data in Price Blvd area
  - change 30-inch ADS pipe, flowing from Price Blvd to R-32, to 36-inch ADS
  - add three (3) 48-inch CMP beneath Appomattox Blvd (Stantec plans available)

Update Model Specific Geodatabase. DES will update parameters in the project geodatabase to reflect changes made to selected model parameters (above).

Model Replication and Design Storm Simulations. Simulations will be performed to predict the response of the Big Slough Watershed to a range of synthetic rainfall events with 1-day and 5-day durations and recurrence intervals from 2.33 to 100 years. Depth of rainfall, in inches, for each rainfall event will match those used for the prior WMP work. The Florida Type II Modified Rainfall Distribution provided in the SWFWMD ERP Information Manual will be used to distribute rainfall over 24-hours. Distribution of the rainfall over the 5-day period will be based on a 5-day dimensionless curve also provided by the District.

DES will first confirm that prior simulation results can be replicated within a reasonable tolerance (generally on the order of 0.01 feet) for all design storms using the 2012 Version of 2004 Condition model. The 2016 Version of 2004 Condition model will then be used to simulate response to the same suite of design storms. A table of elevation differences will be developed summarizing computed peak water surface elevations for the original 2012 Version of 2004 Condition model (by Ardaman), the replicated 2012 Version of 2004 Condition model (by DES), and the updated 2016 Version of 2004 Condition model (by DES).

Floodplain Delineation. DES will delineate floodplains without transition zone extents based on digital topographic information and model-predicted peak stages of each storm event. The delineated floodplain area will be compared across the original 2012 Version of 2004 Condition, replicated 2012 Version of 2004 Condition, and updated 2016 Version of 2004 Condition models.

Project Approach

The Big Slough Flood Reduction Feasibility Study will be performed per the project scope of work contained in Agreement #2016-48.

Part 1 activities shall include field surveying, hydraulic modeling, alternatives analyses, and cost benefit assessments needed to evaluate feasibility of options to alleviate flooding in the local neighborhoods. The project shall include community outreach meetings to receive input of concerns from residents. The study shall include a determination of the reasons for flooding, either from conditions within the neighborhoods or from backwater of the Myakkahatchee Creek and interconnected waterways and retention ditches. Solutions may include, but not be limited to: storm sewer construction, pump stations, raised road elevations, flood walls, flood gates, land acquisition, and any combination thereof. The study shall include, but not be limited to, evaluating mean annual, 10-, 25-, and 100-year 1-day and 100-year 5-day storm events.

The CONSULTANT shall determine which solution for these storm events provides the best cost/benefit. In assessing feasibility of various solutions, it should be noted that drainage improvements may not eliminate flooding entirely but instead may reduce the depth, duration, and/or frequency of flooding to levels that still result in reduced annualized damages and a substantial benefit to the community.

The study will focus principally on quantifying hydraulic performance, cost of implementation, and value of benefits derived from reduced flooding and will address other equally important issues qualitatively. For example, hydraulic performance will be summarized with simulation pre vs post peak stage and peak discharge tables for use in demonstrating no adverse impacts in a Statewide Environmental Resource permit (SWERP) application. On the other hand, wetland impacts associated with implementing the various solutions will be addressed qualitatively. For example, while no formal wetland jurisdictional boundary will be developed, potential wetland impacts will be identified based on engineering-level site visits, review of aerial photography, National Wetlands Inventory (NWI), and hydric soil mapping, etc., to estimate potential mitigation requirements and associated costs. Wetland impacts and other factors that are addressed qualitatively during this study would need to be deferred in any Statewide Conceptual ERP application and later resolved during subsequent construction permitting (when final design of the improvements has been completed, wetland jurisdiction has been properly established, wetland impacts and mitigation have been quantified, etc.).

It is anticipated that Part 1 will result in a conceptual plan for improvements covering multiple sites and facilities and that a Statewide Environmental Resource Permit (SWERP) will be submitted for Conceptual Approval of the plan for flood reduction in these areas. The SWERP application would include: conceptual-level drawings and/or diagrams describing the plan for improvements in general terms; a narrative including summary of project purpose, proposed facilities, and pre/post hydraulic performance; and calculations (pre/post storm event simulation results) to demonstrate no adverse impacts with respect to water quantity. Site-specific design and environmental matters (including wetland impacts and mitigation) would be deferred to one or more future SWERP construction applications for implementation of the proposed improvements.

The CONSULTANT shall review and provide a timely response to up to two (2) Requests for Additional Information (RAIs) from SWFWMD. It is expected that District review times will be on the order of one (1) month each and that CONSULTANT response times will be on the order of two (2) weeks each.

Part 2 activities shall include field investigations, hydraulic modeling, alternatives analyses, and cost benefit assessments needed to advance preliminary concepts to achieve flood mitigation in areas where residential structures are shown as flooding in the recently updated Flood Insurance Rate Maps (FIRMs) including, but not limited to, those previously suggested in the North Port/Big Slough WMP project by Ardaman & Associates, Inc. and/or in the Big Slough Watershed Study by Camp Dresser & McKee, Inc. The work will include identification of candidate site(s), citing of relevant permitting requirements for construction and operation of facilities, and providing cost estimates for detailed design, permitting, land acquisition, and construction. The CONSULTANT shall consider mixed use of regional facilities such as, but not limited to, storage for water supply to the City's water treatment plant, recreational activities, and environmental opportunities such as preserves and water quality improvement.

Using the previously developed CHAN model, the CONSULTANT shall perform a limited number of screening-level simulations to evaluate feasibility of regional concepts to achieve flood reduction. In assessing feasibility of various solutions, it should be noted that improvements may not eliminate flooding entirely but instead may reduce the depth, duration, and/or frequency of flooding to levels that nevertheless result in reduced annualized damages and a substantial benefit to the community.

It is anticipated that Part 2 will result in a detailed planning-level document describing a small number of regional projects which exhibit potential flood reduction benefits based upon screening-level hydraulic evaluations performed as part of this project. The planning document would include: conceptual-level drawings and/or diagrams describing the regional plan(s) for improvements in general terms; a narrative including summary of project purpose, proposed facilities, environmental and other constraints, and expected hydraulic performance; and calculations (screening-level pre/post storm event simulation results) to demonstrate anticipated flood reduction and identify potential adverse impacts with respect to water quantity. A project plan and cost estimate for each regional flood reduction concept would be provided along with a discussion on future SWERP application(s) for implementation of the proposed improvements.

Due to the size and scope of those solutions, additional funding would be required to fully develop and implement the regional projects. It should also be noted that additional analyses required to support design and permitting of mixed-use regional solutions may include additional storm event hydraulic modeling as well as continuous simulations, water quality evaluations, hydroperiod analyses, water

quality studies, water supply evaluations, etc. Planning-level cost estimates will address those additional analyses as well as engineering design, environmental permitting, land acquisition, construction, and other costs.

Assumptions and Issue Management

Several assumptions were made in developing this project plan. Key assumptions were related to the magnitude (level of detail) of the work effort, accuracy of available as-built drawings and other supporting data, availability of staff resources, and reliance on a third-party survey firm for performance of certain field data collection tasks.

It is expected that the current level of detail of the model is sufficient to evaluate regional alternatives at a conceptual level, sufficient to develop plans for future, more detailed work. It was also assumed that the amount of additional model detail to be provided in the Myakkahatchee at I-75 and Jockey Club areas is moderate and a $10,000 estimate was used to allow for supplemental field survey to support model refinement in those areas.

It is assumed that model results will be replicated easily from the prior WMP work. If, for some reason, DES is unable to replicate prior results, then we would rely upon City and District staff to assist in coordination with the prior contractor to resolve the matter quickly.

Staffing and assignment of key personnel to the project is considered appropriate for this project. Any staffing deficiencies that could impact the project timeline or quality of work will be identified quickly and effectively mitigated by shifting of responsibilities and addition of staff, if needed, with City approval. Progress of third-party firms in performing support activities (i.e., for field survey by a PLS) will be monitored and adjustments will be made, if necessary, to adhere to the project schedule.

This Project Plan will be updated periodically. Revisions may include minor editorial changes to clarify project background and goals, changes to better define task objectives and approach to performing the work, and/or updates to Quality Assurance, Quality Control, and Communications.

Quality Assurance Plan

DES is committed to the concept of Total Quality Management (TQM), where everyone involved with development and delivery of our work product is responsible for its quality. TQM requires effort and accountability from management, staff, and all other project participants, and it is the Project Manager's responsibility to ensure that all are capable and eager to deliver a high-quality product.

Quality Assurance

Quality Assurance (QA) is achieved through appropriate assignment of project tasks and responsibilities to team members, staff training, development of and adherence to protocols (including protocols for quality control), adherence to the baseline schedule and budget, and daily task oversight.

Assignment of Team Members. The Big Slough Flood Reduction Feasibility Study consists of a set of discrete project tasks. DES staff members will be assigned to each task team by the Project Manager, taking into consideration capabilities and experience. A Task Leader will be assigned to direct the work

of each task team. In most cases, Ms. Baldassari will serve as Task Leader, and will see that all work is performed in accordance with established protocols.

Development and Adherence to Protocols. Where appropriate, task-specific DES Protocols will be developed and serve as a supplement to the District's WMP Guidance documents, and would include procedures for documentation of work, frequent communication, and quality control checks throughout task completion. Task Protocols indicate team member assignments and encourage acceptance of individual responsibilities. Each protocol includes the following elements:

- Task Name
- Task Description
- Prerequisite Tasks
- Required Data Resources
- Initial Quality Control Procedures
- Approach to Task Completion
- Schedule for Task Completion
- Estimated Cost for Task Completion
- Anticipated Correspondence
- Approach to Quality Assurance
- Task Completion QC Procedures
- Task Reporting, Mapping & Deliverables
- Summary and Sign-off Responsibilities
- Project Debrief Checklist

Prior to initiating work, the associated task protocol document(s) are reviewed by and discussed among assigned team members in a task kickoff meeting. Based on team discussion, a determination is made whether the standard protocols can be applied to the project. Deviations from the standard protocols will be identified and a description provided of the special conditions necessitating those deviations.

Adherence to Baseline Schedule and Budget. An initial project timeline, extending approximately nine (9) months from Notice to Proceed (NTP), was developed and incorporated into Agreement #2016-48. Support documents contain initial staff allocations, man-hour estimates, and associated costs for each discrete task that makes up the overall project. Both the project schedule and the budget contained in the agreement are judged to be accurate, and staff allocations appear sufficient.

DES management and staff fully understand the critical importance of the expeditious completion of the project and are committed to meeting the timeline as it has been developed and within the allocated budget. As work proceeds, DES will provide monthly updates to the City regarding both the schedule and the budget. As project tasks are completed and project needs and data limitations (if any) are better understood, recommendations may be made to the City's Project Manager for changes to staffing allocations and/or project approach, including potential adjustments to the timeline and costs.

Daily Task Oversight. As discussed above, DES has assigned Ms. Trillian Baldassari, PE as the team's Lead Project Engineer. Ms. Baldassari will be responsible for daily oversight of project-related activities. Mr. DeLoach will also be fully engaged in the management of all aspects of the work, and will be intimately involved in the day-to-day operation. As such, two experienced professional engineers will be performing the oversight needed to provide for quality assurance on this important project.

Quality Control

Quality Control (QC) is the process where raw data, data manipulation, and calculations; parameter selection, processing, and computations; reporting, mapping, and deliverables production are subject to verification checks and validation. QC is performed according to well-designed protocols to check for

errors and omissions, to verify that staff are using tools and following procedures correctly and effectively, and to fully understand why certain processes result in certain outcomes.

Project Task Protocols include the District's Guidelines and Specifications and other task-specific procedures for performance and documentation of work performed and results achieved. The protocols also outline task-specific procedures for team communication and for quality control checks at multiple steps through project completion and acceptance.

A rigorous internal peer review will be performed as part of our standard QA/QC protocol for all tasks, consisting of:

- protocol review by Task Leader and team member(s) assigned to a task, prior to start of work
- self-check of work by team members while performing project tasks
- handoff of task materials to QA/QC Team Leader (DeLoach)
- QA review and QC checks by QA/QC Team (Baldassari and/or Hardin)
- return of task materials, comments and QA/QC report from QA/QC Team Leader (DeLoach)
- review of third-party findings by DES Project Manager and DES Task Manager for resolution
- incorporation of QA/QC work products and reports into project deliverables for City review

Communication Plan

Frequent and effective communication, whether internal between project team members or external with City or District staff, will carry a high priority throughout the project. Protocols for each distinct task will include a description of the purpose, frequency, method and participants to be involved, and the DES Project Manager will see that communications requirements are met, documented, and fulfill their intended purpose. Communication responsibilities that are unique to a specific task, if needed, will become part of the protocol for that task, and will be documented in memorandum form.

Internal Communication

Internal communication regarding project work assignments will be conducted by and between the Project Manager, Lead Project Engineer and/or Task Leader, and will primarily be in the form of email exchange. Internal staff meetings will be held for kickoff of each discrete project task, regularly thereafter for team updates to the Project Manager, prior to and following exchanges with the third-party QA/QC consultant, and prior to the delivery of task deliverables to the City.

External Communication

At the onset of the project, the DES Project Manager will communicate with the City Project Manager and others to understand expectations of all involved parties, including City and District staff, other agency officials, and the affected public. The DES Project Manager and Lead Project Engineer will, at a minimum, talk directly with the City Project Manager once each week to discuss progress on current activities, resolve outstanding issues, and coordinate future tasks, and will employ methods and measures to track and report monthly progress relative to scope, schedule, resource allocations, and budget.

External project communications may be in person or via phone/internet (using collaboration software such as GoTo Meeting) at the City's discretion. Routine exchange of written messages and accompanying data will be by email, while exchange of larger documents and data will be accomplished using the City and/or DES FTP sites. Very large data exchanges, as in the transfer of project deliverables, will be made using portable hard drives.

Meetings

The DES Project Manager and Lead Project Engineer will attend regularly-scheduled project status meetings with representatives of the City of North Port and SWFWMD to discuss project goals and objectives and the team's progress toward completing current project tasks. The DES Project Manager, Lead Project Engineer, and other DES staff will attend other task-related meetings as may be deemed necessary by the project team. A brief agenda will be provided for all meetings, and a recap memorandum will be developed by DES staff to document the meeting, ensuing discussion, and resulting action items. Meetings may be in person or via phone/internet (using collaboration software such as GoTo Meeting) at the City's discretion.

Tables

Table 1. Project Schedule		
PART 1		
Task	Start Date	Completion Date
Project Development	October 13, 2016	November 4, 2016
Define Existing Flooding Problems	October 31, 2016	November 18, 2016
Operations Staff Meeting and Team Field Visit	November 14, 2016	November 18, 2016
Formulate Potential Solutions for Hydraulic Evaluation	November 14, 2016	December 9, 2016
Evaluate Performance of Selected Set of Alternatives	December 5, 2016	January 27, 2017
Refine Preferred Plan(s) of Improvements	January 30, 2017	March 31, 2017
Community Outreach Meeting	March 27, 2017	March 31, 2017
Present Recommended Plan of Improvements	April 3, 2017	July 31, 2017
Project Management and QA/QC	*October 13, 2016*	*July 31, 2017*
PART 2		
Task	Start Date	Completion Date
Formulate List of Regional Flood Reduction Concepts	December 5, 2016	January 13, 2017
Landowner Outreach (including State agencies)	December 5, 2016	January 13, 2017
Evaluate Performance of Selected Set of Alternatives	January 16, 2017	March 31, 2017
Present Preferred Plan(s) for Regional Improvements	April 3, 2017	May 26, 2017
Project Management and QA/QC	*December 5, 2016*	*May 26, 2017*

Table 2. Projected Invoice Schedule, by Month							
	Part 1		Part 2		Project		
Month	% Complete	Invoice Amount	% Complete	Invoice Amount	% Complete	Invoice Amount	Cumulative Fees
1	11%	$28,110	0%	$0	9%	$28,110	$28,110
2	19%	$18,300	0%	$0	15%	$18,300	$46,410
3	30%	$29,520	32%	$15,870	31%	$45,390	$91,800
4	36%	$15,300	32%	$0	36%	$15,300	$107,100
5	54%	$43,240	63%	$15,540	55%	$58,780	$165,880
6	65%	$28,860	63%	$0	65%	$28,860	$194,740
7	80%	$36,040	63%	$0	77%	$36,040	$230,780
8	91%	$28,760	100%	$18,620	93%	$47,380	$278,160
9	100%	$21,840	100%	$0	100%	$21,840	$300,000

Table 3. Projected Staff Utilization, by Month					
Month	DeLoach	Baldassari	Hardin	Gilhooley	Ghioto
1	26%	26%	13%	26%	26%
2	23%	16%	09%	2%	20%
3	20%	48%	24%	4%	46%
4	13%	15%	8%	10%	18%
5	28%	85%	43%	35%	60%
6	23%	45%	23%	15%	18%
7	13%	60%	30%	35%	25%
8	45%	55%	28%	48%	29%
9	31%	25%	13%	18%	5%
Average	24%	42%	21%	21%	27%

Appendices

Project Plan attachments and appendices, to be added over the course of the project, include progress reports, meeting minutes, memoranda, and other related documents. Project Plan appendices and documents that have been attached to date include the following:

Appendix A

Project Gantt Chart

Appendix B

Itemized Project Cost Spreadsheet

Appendix A

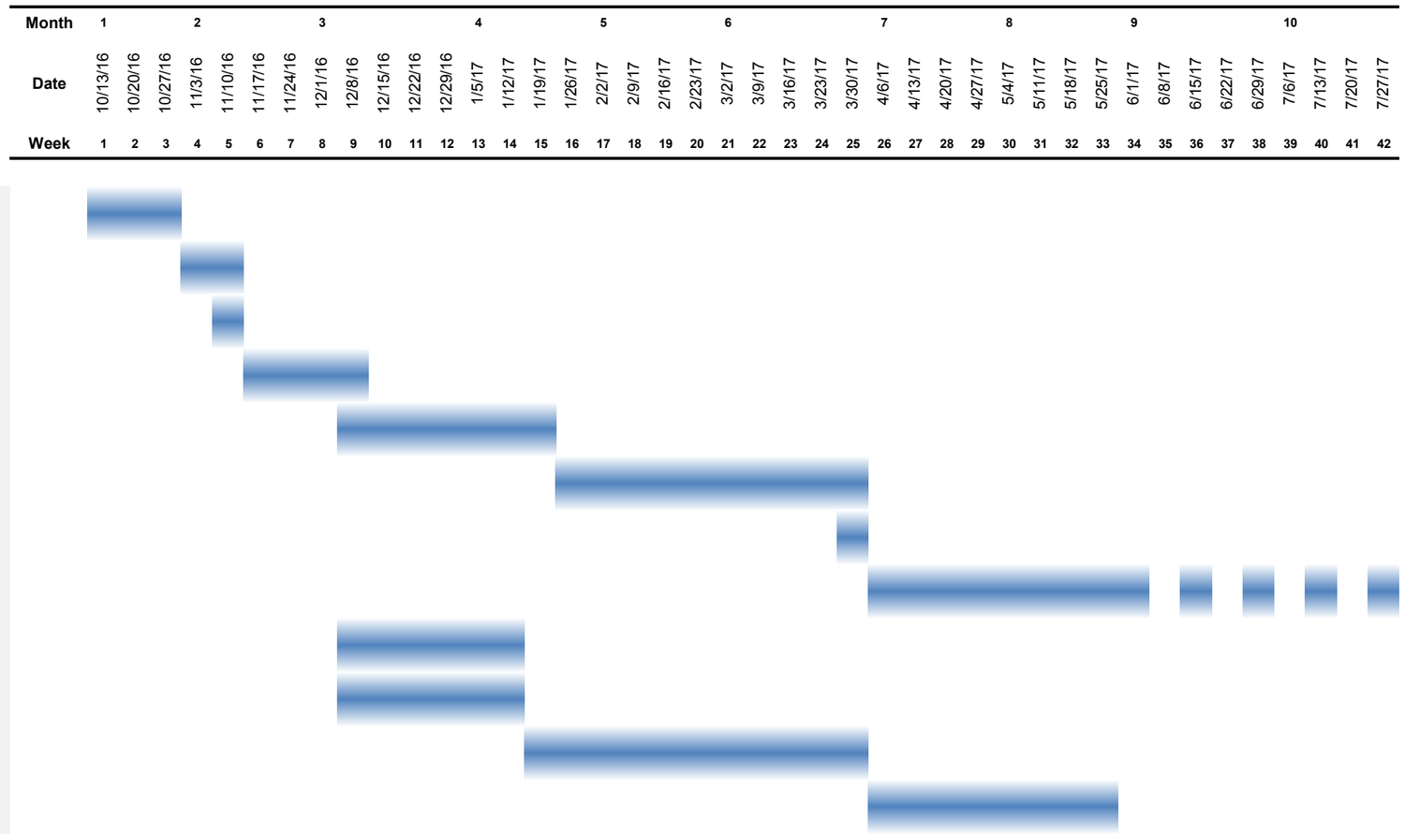
Project Gantt Chart

BIG SLOUGH FLOOD REDUCTION FEASIBILITY STUDY for CITY OF NORTH PORT

DeLoach Engineering Science, PLLC - Project Timeline

Task Descriptions

1.1	Project Development
1.2	Define Existing Flooding Problems
1.3	Operations Staff Meeting and Team Field Visit
1.4	Formulate List of Potential Solutions for Hydraulic Evaluation
1.5	Evaluate Hydraulic Performance of Selected Set of Alternatives
1.6	Refine Preferred Plan(s) of Improvements
1.7	Community Outreach Meeting
1.8	Summarize and Present Recommended Plan of Improvements
2.1	Formulate List of Regional Flood Reduction Concepts
2.2	Landowner Outreach Meeting(s) (including State agencies)
2.3	Evaluate Hydraulic Performance of Selected Set of Alternatives
2.4	Summarize and Present Preferred Plan(s) for Regional Improvements



Appendix B

Itemized Project Cost Spreadsheet

BIG SLOUGH FLOOD REDUCTION FEASIBILITY STUDY for CITY OF NORTH PORT

DeLoach Engineering Science, PLLC - Project Plan with Timeline, Manhour and Fee Estimate

Task Descriptions	Principal Engineer	Project Engineer	GIS Analyst	Sub-Consultant	Reimb. Expenses	Estimated Fee	Start Date	End Date	Task Duration	Project Duration
1.1 Project Development						**$13,290.00**				
1.1.1 Kickoff Meeting and Initial Field Visit	**8**	**8**	0	**8**	$0.00	$4,040.00	13-Oct-16	14-Oct-16	2	2
1.1.2 Data Collection and Assembly	**4**	**6**	**10**	**4**	$0.00	$3,290.00	13-Oct-16	21-Oct-16	9	9
1.1.3 Summary of Prior Work Performed, Alternatives and Findings	**8**	0	0	**8**	$0.00	$2,960.00	13-Oct-16	28-Oct-16	16	16
1.1.4 Project Plan Formulation	**12**	0	0	**4**	$0.00	$3,000.00	13-Oct-16	4-Nov-16	23	23
1.2 Define Existing Flooding Problems						**$14,820.00**				
1.2.1 Confirm Ability to Reproduce WMP Project Model Results	**2**	**32**	**16**	**2**	$0.00	$6,660.00	31-Oct-16	11-Nov-16	12	30
1.2.2 Characterize Local Flooding Conditions	**8**	**16**	**16**	**16**	$0.00	$8,160.00	7-Nov-16	18-Nov-16	12	37
1.3 Operations Staff Meeting and Team Field Visit						**$5,340.00**				
1.3.1 Meeting Topics (Preparation, Attendance, and Field Visit)	**12**	**12**	0	**8**	$0.00	$5,340.00	14-Nov-16	18-Nov-16	5	37
1.4 Formulate List of Potential Solutions for Hydraulic Evaluation						**$12,960.00**				
1.4.1 Describe Each Potential Solution and Any Known or Expected Obstacles to Success	**8**	**8**	0	**8**	$0.00	$4,040.00	14-Nov-16	25-Nov-16	12	44
1.4.2 Identify Additional Data Needs to Support Hydraulic Evaluation	**4**	**8**	**3**	**4**	$0.00	$2,860.00	21-Nov-16	25-Nov-16	5	44
1.4.3 Meeting to Review and Discuss List of Potential Solutions	**8**	**8**	0	**8**	$0.00	$4,040.00	28-Nov-16	2-Dec-16	5	51
1.4.4 Select a Set of Alternatives from Among Potential Solutions for Hydraulic Evaluation	**4**	**4**	0	**4**	$0.00	$2,020.00	28-Nov-16	9-Dec-16	12	58
1.5 Evaluate Hydraulic Performance of Selected Set of Alternatives						**$44,820.00**				
1.5.1 Perform Hydraulic Analyses (w/ estimated $10,000 Field Survey by PLS)	**8**	**80**	0	**40**	**$10,000.00**	$29,520.00	5-Dec-16	30-Dec-16	26	79
1.5.2 Summarize Hydraulic Performance	**8**	**24**	**16**	**16**	$0.00	$9,240.00	2-Jan-17	13-Jan-17	12	93
1.5.3 Meeting to Review and Discuss Performance of Alternatives	**8**	**8**	0	**8**	$0.00	$4,040.00	16-Jan-17	20-Jan-17	5	100
1.5.4 Identify Preferred Plan(s) of Improvements	**4**	**4**	0	**4**	$0.00	$2,020.00	23-Jan-17	27-Jan-17	5	107
1.6 Refine Preferred Plan(s) of Improvements						**$66,220.00**				
1.6.1 Evaluate Site Conditions and Design/Permitting Constraints of Preferred Plan(s)	**8**	**40**	**16**	**16**	$0.00	$11,400.00	30-Jan-17	3-Feb-17	5	114
1.6.2 Refine Preferred Plan(s) to Address Site Conditions and Design/Permitting Constraints	**12**	**40**	**16**	**24**	$0.00	$13,600.00	6-Feb-17	10-Feb-17	5	121
1.6.3 Perform Hydraulic Analyses of Refined Plan(s)	**8**	**80**	**16**	**24**	$0.00	$18,240.00	13-Feb-17	3-Mar-17	19	142
1.6.4 Perform Cost-Benefit Analysis of Refined Plan(s)	**12**	**80**	**24**	**8**	$0.00	$16,920.00	6-Mar-17	17-Mar-17	12	156
1.6.5 Meeting to Review and Discuss Refined Plan(s)	**8**	**8**	0	**8**	$0.00	$4,040.00	20-Mar-17	24-Mar-17	5	163
1.6.6 Select Recommended Plan	**4**	**4**	0	**4**	$0.00	$2,020.00	27-Mar-17	31-Mar-17	5	170
1.7 Community Outreach Meeting						**$5,880.00**				
1.7.1 Meeting Topics	**12**	**16**	0	**8**	**$0.00**	$5,880.00	27-Mar-17	31-Mar-17	5	170
1.8 Summarize and Present Recommended Plan of Improvements						**$86,640.00**				
1.8.1 Finalize Recommended Plan and Project Deliverables	0	0	0	0	$0.00	$0.00	3-Apr-17	2-Jun-17	61	233
1.8.1.1 Pre/Post Models and Result Tabulations	**8**	**24**	0	**8**	$0.00	$6,200.00	3-Apr-17	14-Apr-17	12	184
1.8.1.2 Conceptual-Level Design Drawings	**4**	**60**	**40**	**16**	$0.00	$15,740.00	3-Apr-17	28-Apr-17	26	198
1.8.1.3 Opinion of Probable Cost (incl. detailed design, permitting, land, and construction)	**8**	**60**	**16**	**16**	$0.00	$14,100.00	3-Apr-17	28-Apr-17	26	198
1.8.1.4 Cost-Benefit	**8**	**40**	0	**8**	$0.00	$8,360.00	1-May-17	12-May-17	12	212
1.8.1.5 Report and Mapping	**32**	**16**	**40**	**16**	$0.00	$15,120.00	1-May-17	26-May-17	26	226
1.8.1.6 Training City staff in use of CHAN Modeling Software	0	**8**	0	0	$0.00	$1,080.00	1-May-17	26-May-17	26	226
1.8.2 Meeting with City Administrative Staff	**8**	**8**	**16**	0	$0.00	$4,200.00	29-May-17	2-Jun-17	5	233
1.8.3 Statewide Environmental Resource Permitting (with Response to 2 RAIs)	**50**	**60**	**28**	**8**	$0.00	$21,840.00	29-May-17	31-Jul-17	64	292
2.1 Formulate List of Regional Flood Reduction Concepts						**$7,790.00**				
2.1.1 Describe Each Potential Solution and Known or Expected Obstacles to Success	**2**	**4**	**2**	**4**	$0.00	$1,840.00	5-Dec-16	30-Dec-16	26	79
2.1.2 Identify Additional Data Needs to Support Hydraulic Evaluation	**2**	**8**	**2**	**8**	$0.00	$3,100.00	5-Dec-16	30-Dec-16	26	79
2.1.3 Meeting to Review and Discuss List of Potential Solutions	**2**	**4**	**2**	**4**	$0.00	$1,840.00	5-Dec-16	30-Dec-16	26	79
2.1.4 Select a Set of Alternatives for Further Evaluation	**2**	**2**	0	**2**	$0.00	$1,010.00	2-Jan-17	13-Jan-17	12	93
2.2 Landowner Outreach Meeting(s) (including State agencies)						**$8,080.00**				
2.2.1 Meeting Topics	**16**	**16**	0	**16**	$0.00	$8,080.00	5-Dec-16	13-Jan-17	40	93
2.3 Evaluate Hydraulic Performance of Selected Set of Alternatives						**$15,540.00**				
2.3.1 Perform screening-level Hydraulic Analyses	**8**	**24**	0	**16**	$0.00	$7,640.00	16-Jan-17	10-Feb-17	26	121
2.3.2 Summarize Hydraulic Performance	**2**	**12**	**8**	**8**	$0.00	$4,240.00	13-Feb-17	24-Feb-17	12	135
2.3.3 Meeting to Review and Discuss Performance of Alternatives	**4**	**4**	0	**4**	$0.00	$2,020.00	27-Feb-17	10-Mar-17	12	149
2.3.4 Identify Preferred Plan(s) for Regional Improvements	**2**	**4**	0	**4**	$0.00	$1,640.00	13-Mar-17	31-Mar-17	19	170
2.4 Summarize and Present Preferred Plan(s) for Regional Improvements						**$18,620.00**				
2.4.1 Screening-Level Hydraulic Model Pre/Post and Result Tabulations	**2**	**12**	0	**8**	$0.00	$3,440.00	3-Apr-17	26-May-17	54	226
2.4.2 Conceptual-Level Drawings and Plan Descriptions	**2**	**12**	**8**	**2**	$0.00	$3,160.00	3-Apr-17	28-Apr-17	26	198
2.4.3 Site Conditions and Design Constraints	**2**	**8**	**8**	**4**	$0.00	$2,980.00	3-Apr-17	28-Apr-17	26	198
2.4.4 Relevant Permitting Requirements	**2**	**8**	0	**4**	$0.00	$2,180.00	3-Apr-17	28-Apr-17	26	198
2.4.5 Opinion of Probable Cost (for detailed analysis, design, permitting, land, and construction)	**8**	**16**	0	0	$0.00	$3,680.00	1-May-17	12-May-17	12	212
2.4.6 Planning-Level Report and Mapping	**8**	**4**	**4**	**4**	$0.00	$3,180.00	1-May-17	26-May-17	26	226
Task 4 - Survey (future task)			0	0						
Task 5 - Geotechnical (future task)			0	0						
Task 6 - Design (future task)			0	0						
Task 7 - Permitting (future task)			0	0						
Labor Hours	**352**	**900**	**307**	**394**						
Hourly Rate	**$190.00**	**$135.00**	**$100.00**	**$180.00**						
Labor Fee	**$66,880.00**	**$121,500.00**	**$30,700.00**	**$70,920.00**	**$10,000.00**					
Total Estimated Fees	**Part 1 :**	**$249,970.00**	**Part 2 :**	**$50,030.00**		**$300,000.00**			**Total Duration**	**292**

Appendix B

Floodplain Justification Report for Big Slough/City of North Port

Sarasota County, Florida

Ardaman & Associates, Inc., January 2011

Floodplain Justification Report for
Big Slough/City of North Port
Sarasota County, Florida

Prepared for:
Southwest Florida Water Management District
2379 Broad Street
Brooksville, FL 34604-6899

Prepared by:
Ardaman & Associates, Inc.
8008 South Orange Avenue
Orlando, FL 32809-6712

January 24, 2011
Project No. 08-189G

David Arnold, P.E.
Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34604-6899

Subject: Watershed Management Program Consulting Services for Maintenance of Watershed Parameters and Models in the Big Slough Watershed (B206), SWFWMD Agreement No. 06CC0000044, Work Order No. 7

Dear Mr. Arnold:

Ardaman & Associates, Inc. staff has completed storm event modeling and floodplain delineations for the Big Slough/City of North Port Watershed in Sarasota County, as specified in the subject Work Order. The attached Floodplain Justification Report is accompanied with a copy of our PowerPoint presentation for the Peer Review Consultant.

We trust that this report satisfies your expectations and appreciate the opportunity to work with you on this important project. If you have any questions, or if we can be of further service to you, please do not hesitate to call.

Very Truly Yours,
ARDAMAN & ASSOCIATES, INC.

Nestor Aceituno, P.E.
Project Engineer

David A. DeLoach, P.E.
V.P, Director of Water Resources
Florida License Number 47761

DAD/dad

cc: Elizabeth Wong, City of North Port

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Floodplain Justification Report
Big Slough/City of North Port Watershed Management Program
Sarasota County, Florida

Introduction

Ardaman & Associates, Inc. was contracted by the Southwest Florida Water Management District (SWFWMD) to perform Watershed Management Program (WMP) Consulting Services in the Big Slough/City of North Port Watershed. This work was conducted from August, 2003 through November 2010, and involved: development of a LiDAR-based digital terrain model (DTM); performance of a watershed evaluation; and watershed planning, where a storm event hydrologic and hydraulic model was constructed and utilized to identify areas of rainfall-induced flood risk in the watershed. Subsequent to completion of this work, District staff performed an internal review that resulted in minor model and floodplain revisions.

In December 2008, Ardaman staff commenced model maintenance and an overall WMP update at the District's request. The update consisted of the following major tasks:

- 2007 LiDAR QA/QC performed by an Independent Florida Licensed Surveyor and Mapper - Aerial Cartographics of America, Inc (ACA), delivered on May 14, 2009.
- Use of 2007 LiDAR elevation data at select sites (developed parcels in 10 general areas).
- Further sub-basin delineations, with node storage and overflow revisions.
- Creation of Hybrid Terrain (2004-2007)
- Flood risk identification and justification of flood mapping changes.

This report has been submitted along with a complete set of digital WMP deliverables which provide detailed information regarding the model development and delineation of floodplains for the Big Slough/City of North Port Watershed within Sarasota County.

Guidelines and Specifications

WMP activities were conducted in accordance with the 2003 SWFWMD Guidelines and Specifications (G&S) and addendums provided by District staff. In addition, the documentation of supporting technical information conforms to the Federal Emergency Management Agency (FEMA) Guidelines and Specifications for Flood Mapping Partners (2003). Additional information (including white papers, presentations, and technical email correspondence) provided by the District and its subcontractors was utilized, as appropriate, in completing project tasks.

Watershed Description

The Big Slough Watershed is located in southeastern Sarasota County, and is tributary to the Myakka River. Portions of the incorporated City of North Port (those areas east of the Myakka) are located within the southern portion of the watershed. The 195.5 square mile watershed encompasses numerous depressional features, including wetlands and

water bodies, the most prominent of which is the Big Slough Canal (also called Myakkahatchee Creek in its lower reaches). The Big Slough Canal passes from north to south through the City of North Port, and receives inflows from an internal system of waterways which provide surface drainage throughout the City, before discharging beneath U.S. Highway 41 toward its confluence with the Myakka River.

The Big Slough Watershed and portions of the City of North Port are traversed from east to west by Interstate Highway 75. It is generally characterized by flat topography and sandy, shelly and silty sand soils with little organic matter. Its headwaters are rural, consisting primarily of agricultural and undeveloped lands. A vast majority of urban and built up lands occur in the southern portion of the watershed, within the City of North Port. Commercial development is generally limited to main thoroughfares within the city, especially along the US 41 corridor.

Big Slough Canal/ Myakkahatchee Creek begins in the southeastern part of Manatee County (near Edgeville) and flows approximately 21 miles through the City of North Port where it empties to the estuarine portion of the Myakka River. Surface drainage within the City of North Port is provided by an extensive canal system, which discharges primarily to the Big Slough Canal. Some surface drainage occurs via conveyance structures southward into the Port Charlotte conveyance system. Two surface water features unique to the area are Warm Mineral Springs and Little Salt Spring in North Port that are the southernmost springs in the SWFWMD; Refer to Map 1 below.

Floodplain Model Development and Methodology

Activities conducted toward the generation of preliminary floodplains included elements of the Digital Topographic Information, Watershed Evaluation and Watershed Management Plan tasks, according to procedures described in the G&S and as previously reported in project documentation and deliverables. In December 2008, Ardaman staff commenced model maintenance and an overall WMP update. The following briefly describes changes that resulted from that model update.

The model update incorporates Light Detection and Ranging (LiDAR) elevation data that was obtained in late 2007. It also incorporates information extracted from Environmental Resource Permits (ERPs) for recent development projects (constructed between 2004 and 2007). Map 2 illustrates changes in the modified terrain from the original 2004 LiDAR. Using the new terrain and construction data, Ardaman staff updated catchment boundaries, network connectivity, node surface storage, DTM derived cross sections, and natural overflows. Catchments, nodes, and reaches were added to the existing model wherever land use changes occurred or additional model resolution was required to account for storage.

The Big Slough/City of North Port and Watershed model was originally assembled in CHAN and updated using the same hydrodynamic model during this maintenance effort, as requested by District staff. Hydrologic and hydraulic parameters were updated and revised using LiDAR terrain data, land use updates, recent field reconnaissance, a selection of storage areas for modeling, and ERPs for new developments. Below is a summary of elements relative to this watershed model.

Table 1. Summary of Model Elements

Total Area	195.5 Square Miles
Sub-catchments	5015
Nodes	5171
Total Hydraulic Connections	17,872
*** Weirs**	14,443
*** Bridges**	55
*** Channels**	1624
*** Riser Culverts**	630
*** Culverts**	1019
*** Gates**	81
*** Orifices**	20

The methodology and procedures followed in both initial model development and in the subsequent model update are based on standard engineering practices, SWFWMD and FEMA guidelines and specifications, and best available information describing site conditions. They are considered reasonable for use in estimating the extent of flooding that would result from storm event conditions, and for estimating rainfall-induced flood risk throughout the Big Slough/City of North Port Watershed.

Verification and Validation Data

Limited historical data exists to describe flood conditions that have occurred within the Big Slough/City of North Port Watershed in Sarasota County. The following summarizes available verification and validation data:

High Water Marks: Recorded water level (1992 flood) was provided by the District for a single site within the Big Slough/City of North Port Watershed. This historical high water mark was located in the Big Slough canal immediately north of I-75. The 1992 multi-day event had a total volume of 21.1 inches over a time period of seven days at that location. This was compared to the storm event rainfall-induced flooding predicted by the model, and lends a reasonable level of validation to the model results. The following table shows a comparison of high water marks corresponding to the 1992 flood event compared to the simulation results for the various evaluated (single and multiday) events 100-year and 500-year storm events:

Table 2. Comparison of High Water Marks in Big Slough/City of North Port Watershed

Flood (1992)	**HWL Type**	**HWL Elev**	**1D 100Y (10.1 in)**	**5D 100Y (18.5 in)**	**5D 500Yr (22.7 in)**
Big Slough at I-75	Peak	25.05 (NAVD88)	22.8 (NAVD88)	23.94 (NAVD88)	24.52 (NAVD88)

Documented Flooding Areas: Specific areas within the Big Slough/City of North Port Watershed have been identified by local government staff as being prone to flooding. Of those that were identified, model results have been qualitatively reviewed by the City of

North Port to confirm a level of reasonableness and to support the validity of the model as an indicator of flood risk.

Simulated Rainfall: Simulation of a historical event using recorded rainfall data (2003) was performed, and results were compared to field observations following that rainfall event. Model results were found to produce peak elevations concurrent with those observed, and provide a good level of model validation.

Hydrologic Gauge Data: Only three gauges with sufficient stream elevation data exist for verification or validation of model results for rainfall-induced flooding conditions. The results of the 2003 simulation compared to gage data at the various locations are presented in Table 3.

In addition to the 2003 calibration event result comparison, the 5-day 100-year and the 1-day 100-year storm event simulated maximum stages were compared to the observed peak stages during 1992 storm event at various locations within the watershed. Table 4 presents a summary of observed and simulated maximum stages during the event. As shown in the table, observed stages are closer to the multiday maximum stages.

Table. 3. Simulated Peaks Compared to Recorded Levels

USGS 02299410 Big Slough Canal near Myakka City	
Observed Max. Stage 06/25/03 Modeled Max. Stage	32.57 ft, NAVD88 32.20 ft NAVD88
USGS 02299450 Big Slough at Tropicare	
Observed Max. Stage 06/23/03 Modeled Max. Stage	25.80 ft, NAVD88 26.26 ft, NADV88
USGS 02299360 Snover Waterway Canal near Murdock	
Observed Max. Stage 06/24/03 Modeled Max. Stage	18.80 ft, NAVD88 19.66 ft, NADV88

Modeled Floodplains

A variety of synthetic storm events, with durations ranging from one to five days, was used to simulate the response of the watershed and to delineate areas at risk to rainfall-induced flooding. These storm events, each assigned an associated rainfall volume with a 1% annual probability of recurrence, are commonly used for floodplain analysis applications. It is assumed by this application of the storm event for flood risk determination that the recurrence frequency of the flooding is the same as that of the rainfall event, and it is understood that the computed flood elevations and extents are dependent not only on the storm event rainfall volume but also a number of other factors including initial water levels and related surface storage availability at the onset of the storm event.

For the portion of the area defined by the Big Slough conveyance system, the 5-day 100-year storm event is considered as most reasonable to use to delineate areas at risk to rainfall-induced flooding due to the multiday peak recorded stage in high water mark database. For the rest of the watershed, results from the 1-day 100-year storm event

Table 4. Observed Maximum Stages during1992 Storm Event compared to 5-day 100-year and 1-day 100-year Storm Events Simulated Maximum Stages.

Id	Location	Observed Peak Stage	Simulated Storm Event (Ardaman)	
		1992 Storm Event (ft, NGVD29)	5-Day 100-Year (ft, NGVD29)	1-Day 100-Year (ft, NGVD29)
1	Tropicaire Blvd and Chamberlain Blvd	27.6	28.01	26.16
2	Tropicaire Blvd and Imbe St	28.8	N/A	N/A
3	Tropicaire Blvd and Cosmic Waterway	26.9	28	26.16
4	Albin Ave	27.7	27.32	25.48
5	North Salford Blvd and Albin Ave	26.7	27.27	25.22
6	Lovering Ave and Salford Blvd	25.8	27.12	25.61
7	Sumter Blvd and Ulman St	26.7	27.12	25.61
8	Sumter Blvd and Tropicaire Blvd	26.3	27.22	25.24
9	Coldspring Ln and Reisterstown Rd	26.5	27.5	26.43
10	Reisterstown Rd and Estates Dr	27.4	28.11	27.00
11	Estates Dr and Taneytown Rd	27.7	26.94	26.38
12	Estates Dr and Adbella Ln	27.4	26.32	25.86
13	Adbella Ln and Old Court St	26.4	26.2	25.69
14	Van Camp Street and Olster Dr	27.1	23.55	22.94
15	North Biscayne Dr and Tropicaire Blvd	23.7, 23.9	24.19	24.10
16	Cheseboro Ave and Trico Rd	13.6	N/A	N/A
17	Sarletto Street	13.3	N/A	N/A
18	Gatun St	11.7	N/A	N/A
19	Bullard St at R-36 Canal	11.6	11.44	10.84
20	Bullard St and Herbison Ave	9.8	10.98	10.69
21	Dorothy Ave	10.4	10.97	10.45
22	Sutherlin St	10.5	10.98	10.19
23	Trianfo St	11.2	11.37	10.24
24	Eager St and Tamiami Trl	9.8	N/A	N/A
25	Postma St between McKibben Dr and Maraldo Ave	11.6, 11.8	12.59	11.41
26	Mongite Rd	11.7	12.62	11.82
27	Lingle St and McKibben Dr	11.7	12.72	11.82
28	Sumter and Sylvania Ave	23.1	N/A	N/A

simulation were used since no evidence (elsewhere) of high watermarks were recorded within the historical high water mark data base.

Using GIS mapping techniques in combination with the DEM, floodplains were automatically generated for each sub-basin delineated within this watershed. Due to the variability of the terrain, sometimes this resulted in the inadvertent creation of floodplain polygons that were detached from the primary floodplain. These polygons were termed "spackle" and were generally removed when the footprint they occupied was less than 0.1 acres. Spackle was not removed, however, when a stormwater drainage system connected the spackle to a primary floodplain. In addition to spackle, sometimes gaps were unintentionally generated within the floodplains. These voids were filled whenever the gap was less than 0.1 acres.

The results of floodplain modeling and delineation in comparison to the areas currently designated by FEMA as Special Flood Hazard Areas are shown in Maps 3, 4, 5, 6, and 7. Map 3 illustrates the 100-year floodplain resulting from current modeling efforts. Map 4 illustrates acreage change between FEMA's floodplain and the modeled floodplain. Map 5 illustrates the percent change and Map 6 illustrates the percent change by basin area. Map 7 displays the two floodplains overlain onto the aerial which illustrates the floodplain resulting from a 100-year shows more area of flood risk than is currently designated by FEMA as Special Flood Hazard Areas. FEMA flood risk map were not developed for the eastern portion of the watershed. Refer to table 5 below for FEMA and updated floodplain comparison. Both the FEMA and North Port/Big Slough WMP floodplain layers were intersected with a parcels layer, provided by the City, to generate a count of the number of inundated parcels. This count is not necessarily indicative of structural flooding, as the great majority of homes are constructed on fill.

Table 5. Floodplain Area and Parcel Inundation Comparisons:100-year Recurrence

Data Source	Floodplain Area (ac)	Parcels that Touch Floodplain	Parcels Inundated 25%	Parcels Inundated 50%
FEMA	1,825	2,527	2,433	2,370
City of North Port WMP	13,544	23,715	4,171	2,630

Floodplain Justification

This report is provided to describe engineering practices employed and data available to provide reasonable assurance that those areas of rainfall-induced flood risk have been identified and can be justified. Appendix A contains a table summarizing information on a basin-by-basin basis that includes the peak stages resulting from the model simulations, which storm event was used to generate the floodplain, FEMA Zone, Preliminary Modeled Flood zone, and High Water Mark Elevation (ft, NAVD 88)

Where existing flood risk areas have been identified by FEMA, the results of this study result in a more refined delineation of those areas. However, some of the areas in which rainfall-induced floodplains have been delineated are in areas where no previous FEMA floodplain exists. This is related to the more detailed methodology used in performing this modeling and mapping evaluation as compared to the prior efforts by FEMA to delineate flood risk areas. The newly identified floodplain areas result from the availability of detailed topographic information and from the application of more rigorous engineering analysis, providing a more accurate assessment of flood risk.

Ardaman staff performed an analysis to determine the root cause of differences (horizontal and vertical extents) between the proposed floodplains and currently adopted FEMA floodplain. Based upon the results of this analysis, it was determined that there are four general categories these discrepancies fit into: 1) terrain differences resulting from using more recent and accurate terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail. Map 8 illustrates the basins color coded according to these categories.

About 90% of sub-basins where floodplains have been delineated during this modeling effort have no FEMA floodplains. This is related to the more rigorous approach used to identify storage areas and natural depressions for modeling. No change occurred in the floodplain area for 1% of the sub-basins. Appendix B identifies which of the above categories each falls into as well as the acreage and percent change between the modeled and FEMA flood risk areas

Conclusion

While there was limited historical data with which to assess the accuracy of model results, this modeling effort was confirmed with City of North Port staff who strongly corroborated results of simulation for the 2003 flood event. Also, Ardaman staff visited the area in 2004 (immediately after Hurricane Charley) to gain first hand knowledge and to record findings of flooding issues for later model verifications.

Based on the information provided herein, describing the data, methodology, and procedures employed, and upon review of the accompanying project deliverables, the estimation of flood prone areas is considered reasonable. Based on the reasonableness of the simulation and mapping results, and given the lack of compelling evidence to dictate the use of longer duration storm events, the 100-year 24-hour storm and floodplain maps delineated as described above are to be used for estimation of flood risk in most portions of the watershed, excluding the Big Slough canal stretch. Historical water level data exists to support and justify the use of multi-day storms for the Big Slough Canal within the City of North Port.

References

Federal Emergency Management Agency. (2003). *Guidelines and Specifications for Flood Hazard Mapping Partners – Appendix M: Guidance for Preparing and Maintaining Technical and Administrative Support Data*. Retrieved September 29, 2003, from the Federal Emergency Management Agency website: http://www.fema.gov/library.

Southwest Florida Water Management District. (2002). *Watershed Management Program Guidelines and Specifications for Digital Topographic Information, Watershed Evaluation, Watershed Management Plan, and Watershed Management Plan Database Maintenance and Watershed Model Updates*. Retrieved November 22, 2002, from the Southwest Florida Water Management District's website: http://www.swfwmd.state.fl.us.

Appendix A

Basin Summary Table

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
A0020	NA0020	100 YR - 1 Day		AE	20.07	22.43	
A0021	NA0021	100 YR - 1 Day		AE	19.51	22.43	
A0022	NA0022	100 YR - 1 Day		AE	19.26	19.55	
A0023	NA0023	100 YR - 1 Day		AE	19.34	20.66	
A0024	NA0024	100 YR - 1 Day		AE	20.11	23.38	
A0026	NA0026	100 YR - 1 Day		AE	19.94	23.38	
A0028	NA0028	100 YR - 1 Day		AE	20.75	22.96	
A0030	NA0030	100 YR - 1 Day		AE	19.26	19.55	
A0035	NA0035	100 YR - 1 Day		AE	20.64	20.50	
A0040	NA0040	100 YR - 1 Day		AE	19.25	19.54	
A0050	NA0050	100 YR - 1 Day			19.23	19.53	
A0055	NA0055	100 YR - 1 Day		AE	20.17	22.35	
A0060	NA0060	100 YR - 1 Day		AE	19.23	19.52	
A0063	NA0063	100 YR - 1 Day		AE	19.76	19.74	
A0066	NA0066	100 YR - 1 Day		AE	20.31	21.85	
A0070	NA0070	100 YR - 1 Day		AE	19.22	19.52	
A0073	NA0073	100 YR - 1 Day		AE	20.26	21.85	
A0077	NA0077	100 YR - 1 Day		AE	20.25	21.69	
A0080	NA0080	100 YR - 1 Day		AE	19.21	19.52	
A0085	NA0085	100 YR - 1 Day		AE	20.22	20.12	
A0090	NA0090	100 YR - 1 Day		AE	19.20	19.51	
A0092	NA0092	100 YR - 1 Day			20.84	20.83	
A0097	NA0097	100 YR - 1 Day		AE	20.04	19.97	
A0098	NA0098	100 YR - 1 Day		AE	20.84	20.83	
A0100	NA0100	100 YR - 1 Day		AE	19.18	19.50	
A0102	NA0102	100 YR - 1 Day		AE	19.82	19.61	
A0103	NA0103	100 YR - 1 Day			20.45	20.44	
A0106	NA0106	100 YR - 1 Day		AE	19.72	19.82	
A0107	NA0107	100 YR - 1 Day		AE	20.45	20.44	
A0108	NA0108	100 YR - 1 Day		AE	19.63	19.60	
A0110	NA0110	100 YR - 1 Day		AE	19.12	19.47	
A0113	NA0113	100 YR - 1 Day		AE	19.16	19.47	
A0116	NA0116	100 YR - 1 Day		AE	19.45	19.55	
A0120	NA0120	100 YR - 1 Day		AE	19.03	19.43	
A0125	NA0125	100 YR - 1 Day		AE	19.07	19.45	
A0130	NA0130	100 YR - 1 Day		AE	18.81	19.33	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
A0132	NA0132	100 YR - 1 Day		AE	20.02	20.06	
A0135	NA0135	100 YR - 1 Day		AE	18.46	19.69	
A0139	NA0139	100 YR - 1 Day		AE	17.95	19.04	
A0140	NA0140	100 YR - 1 Day		AE	17.95	19.01	
A1010	NA1010	100 YR - 1 Day		AE	21.48	21.34	
A1020	NA1020	100 YR - 1 Day		AE	21.48	21.34	
A1030	NA1030	100 YR - 1 Day		AE	21.48	21.34	
A1040	NA1040	100 YR - 1 Day		AE	21.48	21.33	
A1050	NA1050	100 YR - 1 Day		AE	20.16	20.23	
A2010	NA2010	100 YR - 1 Day		AE	20.59	21.61	
A2020	NA2020	100 YR - 1 Day		AE	20.59	21.61	
A2023	NA2023	100 YR - 1 Day		AE	20.59	21.62	
A2027	NA2027	100 YR - 1 Day		AE	20.59	21.61	
A2028	NA2028	100 YR - 1 Day		AE	20.59	21.61	
A2030	NA2030	100 YR - 1 Day		AE	20.59	21.61	
A2040	NA2040	100 YR - 1 Day		AE	20.57	21.60	
A2050	NA2050	100 YR - 1 Day		AE	20.54	21.60	
A2060	NA2060	100 YR - 1 Day		AE	20.53	21.60	
A3010	NA3010	100 YR - 1 Day		AE	20.38	20.28	
A3020	NA3020	100 YR - 1 Day		AE	20.38	20.27	
A3030	NA3030	100 YR - 1 Day		AE	20.34	20.25	
A3040	NA3040	100 YR - 1 Day		AE	20.33	20.23	
A3050	NA3050	100 YR - 1 Day		AE	20.27	20.15	
A3060	NA3060	100 YR - 1 Day		AE	20.26	20.15	
B0630	NB0630	100 YR - 5 Day	AO		26.30	27.50	
B0640	NB0640	100 YR - 5 Day	AO	AE	25.84	26.87	
B0650	NB0650	100 YR - 5 Day	AO	AE	25.80	26.83	
B0660	NB0660	100 YR - 5 Day	AO	AE	25.82	26.85	
B0664	NB0664	100 YR - 5 Day	AO	AE	25.77	26.73	
B0670	NB0670	100 YR - 5 Day	AO	AE	25.63	26.65	
B0680	NB0680	100 YR - 5 Day	AO	AE	25.48	26.52	
B0681	NB0681	100 YR - 1 Day		AE	25.31	26.37	
B0682	NB0682	100 YR - 5 Day		AE	25.31	26.37	
B0685	NB0685	100 YR - 5 Day	AO	AE	25.31	26.38	
B0688	NB0688	100 YR - 5 Day	AO	AE	25.27	26.34	
B0689	NB0689	100 YR - 5 Day	AO	AE	25.27	26.34	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
B0690	NB0690	100 YR - 5 Day	AO	AE	25.25	26.34	
B0700	NB0700	100 YR - 5 Day	AO	AE	24.96	26.16	
B0710	NB0710	100 YR - 5 Day	AO	AE	24.83	26.13	
B0720	NB0720	100 YR - 5 Day	AO	AE	24.73	26.10	
B0722	NB0722	100 YR - 5 Day	AO	AE	24.49	26.00	
B0724	NB0724	100 YR - 5 Day	AO	AE	24.49	26.00	
B0730	NB0730	100 YR - 5 Day	AO	AE	24.28	25.64	
B0740	NB0740	100 YR - 5 Day	AO	AE	24.01	25.39	
B0745	NB0745	100 YR - 5 Day	AO	AE	23.58	24.98	
B0746	NB0746	100 YR - 5 Day	AO	AE	23.84	25.68	
B0747	NB0747	100 YR - 5 Day	AO	AE	23.65	25.04	
B0748	NB0748	100 YR - 5 Day	AO	AE	23.13	24.44	
B0750	NB0750	100 YR - 5 Day	AO		22.80	23.94	25.05 (1992)
B0765	NB0790	100 YR - 5 Day	AO		21.02	21.86	
B0770	NB0770	100 YR - 5 Day	AO	AE	22.25	23.32	
B0775	NB1160	100 YR - 5 Day	AO		21.51	22.50	
B0780	NB0780	100 YR - 5 Day	AO		21.78	22.87	
B0790	NB0790	100 YR - 5 Day	AO	AE	21.02	21.86	
B0800	NB0800	100 YR - 5 Day	AO	AE	20.80	21.64	
B0810	NB0810	100 YR - 5 Day	AO	AE	20.30	21.17	
B0813	NB0813	100 YR - 5 Day	AO	AE	19.94	20.89	
B0817	NB0817	100 YR - 5 Day	AO	AE	19.56	20.46	
B0820	NB0820	100 YR - 5 Day	AO	AE	19.54	20.44	
B0830	NB0830	100 YR - 5 Day	AO	AE	18.21	19.60	
B0835	NB0835	100 YR - 5 Day	AO	AE	17.68	19.36	
B0837	NB0837	100 YR - 5 Day	AO	AE	17.68	19.36	
B0840	NB0840	100 YR - 5 Day	AO	AE	17.68	19.12	
B0860	NB0860	100 YR - 5 Day	A0	AE	17.22	18.71	
B0870	NB0870	100 YR - 5 Day	A0	AE	16.64	18.30	
B0880	NB0880	100 YR - 5 Day	A0	AE	16.58	18.26	
B0886	NB0886	100 YR - 5 Day	A0	AE	16.46	18.14	
B0888	NB0888	100 YR - 5 Day	A3 F	AE	15.59	17.22	
B0890	NB0890	100 YR - 5 Day	A3 F	AE	15.57	17.20	
B0905	NB0905	100 YR - 1 Day		AE	16.84	16.92	
B0907	NB0907	100 YR - 1 Day		AE	16.88	16.98	
B0910	NB0910	100 YR - 5 Day	A3 F	AE	15.41	16.99	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
B0920	NB0920	100 YR - 5 Day	A3 F	AE	15.27	16.82	
B0930	NB0930	100 YR - 5 Day	A3 F		15.10	16.61	
B0931	NB0931	100 YR - 1 Day		AE	14.82	16.24	
B0934	NB0934	100 YR - 1 Day		AE	16.10	16.40	
B0935	NB0935	100 YR - 1 Day		AE	16.03	16.35	
B0936	NB0936	100 YR - 1 Day		AE	16.34	16.44	
B0938	NB0938	100 YR - 1 Day		AE	16.54	16.57	
B0940	NB0940	100 YR - 5 Day	A3 F	AE	14.82	16.23	
B0943	NB0943	100 YR - 1 Day		AE	15.84	16.34	
B0945	NB0945	100 YR - 1 Day		AE	15.92	16.35	
B0950	NB0950	100 YR - 5 Day	A3 F	AE	14.65	16.00	
B0960	NB0960	100 YR - 5 Day	A3 F	AE	14.02	15.29	
B0963	NB0963	100 YR - 5 Day	A3 F	AE	13.72	14.91	
B0965	NB0965	100 YR - 1 Day		AE	15.65	15.57	
B0970	NB0970	100 YR - 5 Day	A3 F	AE	13.45	14.55	
B0980	NB0980	100 YR - 5 Day	A3 F	AE	13.17	14.16	
B0985	NB0985	100 YR - 1 Day	A0	AE	18.00	18.01	
B0990	NB0990	100 YR - 5 Day	A3 F	AE	12.86	13.82	
B1000	NB1000	100 YR - 5 Day	A3 F	AE	12.54	13.59	
B1010	NB1010	100 YR - 5 Day	A3 F	AE	12.21	13.24	
B1020	NB1020	100 YR - 5 Day	A3 F	AE	11.58	12.62	
B1030	NB1030	100 YR - 5 Day	A4 F	AE	10.90	12.33	
B1060	NB1060	100 YR - 5 Day	A8	AE	9.66	11.36	
B1065	NB1065	100 YR - 1 Day		AE	9.78	9.96	
B1070	NB1070	100 YR - 5 Day	A8	AE	8.08	10.02	
B1110	NB1110	100 YR - 5 Day	AO	AE	21.74	23.41	
B1120	NB1120	100 YR - 5 Day	AO	AE	21.41	22.11	
B1130	NB1130	100 YR - 5 Day	AO	AE	21.38	22.05	
B1140	NB1140	100 YR - 5 Day	AO	AE	21.50	22.50	
B1145	NB1145	100 YR - 5 Day	AO	AE	22.55	23.80	
B1150	NB1150	100 YR - 5 Day	AO	AE	21.50	22.50	
B1160	NB1160	100 YR - 5 Day	AO	AE	21.51	22.50	
B3004	NB3004	100 YR - 5 Day	AO	AE	25.50	26.53	
B3006	NB3006	100 YR - 5 Day	AO	AE	25.51	26.54	
B3007	NB3007	100 YR - 5 Day	AO	AE	25.63	26.62	
B3510	NB3510	100 YR - 5 Day	AO	AE	25.82	26.66	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
B3520	NB3520	100 YR - 5 Day	AO	AE	25.82	26.66	
B3523	NB3523	100 YR - 5 Day	AO	AE	25.75	26.44	
B3527	NB3527	100 YR - 5 Day	AO	AE	25.78	26.44	
B3530	NB3530	100 YR - 5 Day	AO	AE	25.79	26.64	
B3540	NB3540	100 YR - 5 Day	AO	AE	25.78	26.64	
B3550	NB3550	100 YR - 5 Day	AO	AE	25.75	26.66	
B3560	NB3560	100 YR - 5 Day	AO	AE	25.72	26.66	
B3610	NB3610	100 YR - 5 Day	AO	AE	24.40	26.22	
B3620	NB3620	100 YR - 5 Day	AO	AE	24.66	26.10	
B3630	NB3630	100 YR - 5 Day	AO	AE	24.88	26.18	
B3640	NB3640	100 YR - 5 Day	AO	AE	25.17	26.31	
B3708	NB3708	100 YR - 5 Day	AO	AE	25.49	26.52	
B3709	NB3709	100 YR - 5 Day	AO	AE	25.36	26.42	
B3710	NB3710	100 YR - 5 Day	AO	AE	25.48	26.51	
B3718	NB3718	100 YR - 5 Day	AO	AE	25.49	26.54	
B3719	NB3719	100 YR - 5 Day	AO	AE	25.42	26.46	
B3720	NB3720	100 YR - 5 Day	AO	AE	25.48	26.49	
B3805	NB3805	100 YR - 1 Day		AE	24.43	25.55	
B3809	NB3809	100 YR - 5 Day		AE	25.15	26.22	
B3810	NB3810	100 YR - 1 Day		AE	24.78	25.78	
B3815	NB3815	100 YR - 1 Day		AE	25.16	26.22	
B3820	NB3820	100 YR - 5 Day	AO	AE	24.94	25.97	
B3905	NB3905	100 YR - 1 Day		AE	24.43	25.54	
B3910	NB3910	100 YR - 1 Day		AE	24.71	25.73	
B3912	NB3912	100 YR - 5 Day		AE	24.50	25.54	
B3920	NB3920	100 YR - 5 Day		AE	24.51	25.56	
B3930	NB3930	100 YR - 5 Day	AO	AE	24.50	25.56	
B3931	NB3931	100 YR - 1 Day		AE	24.67	25.73	
B3940	NB3940	100 YR - 5 Day	AO	AE	24.63	25.73	
B4010	NB4010	100 YR - 1 Day		AE	24.12	26.11	
B4020	NB4020	100 YR - 1 Day		AE	24.12	26.02	
B4023	NB4023	100 YR - 1 Day		AE	24.00	26.03	
B4027	NB4027	100 YR - 1 Day		AE	24.00	26.02	
B4030	NB4030	100 YR - 5 Day	AO	AE	24.11	26.02	
B4031	NB4031	100 YR - 5 Day	AO	AE	24.12	26.00	
B4032	NB4032	100 YR - 5 Day	AO	AE	24.12	26.00	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
B4033	NB4033	100 YR - 5 Day	AO	AE	24.12	26.02	
B4035	NB4035	100 YR - 5 Day	AO	AE	24.11	26.02	
B4039	NB4039	100 YR - 5 Day	AO	AE	24.11	26.02	
B4040	NB4040	100 YR - 5 Day	AO	AE	24.11	26.02	
B4115	NB4115	100 YR - 5 Day	AO	AE	24.11	26.02	
B4117	NB4117	100 YR - 5 Day	AO	AE	24.11	26.02	
B4120	NB4120	100 YR - 5 Day	AO	AE	24.11	26.01	
B4121	NB4121	100 YR - 5 Day	AO	AE	24.11	26.02	
B4122	NB4122	100 YR - 5 Day	AO	AE	24.11	26.02	
B4123	NB4123	100 YR - 5 Day	AO	AE	24.11	26.00	
B4125	NB4125	100 YR - 5 Day	AO	AE	24.11	26.01	
B4130	NB4130	100 YR - 5 Day	AO	AE	24.11	26.01	
B4131	NB4130	100 YR - 5 Day	AO		24.11	26.01	
B4132	NB4121	100 YR - 1 Day			24.11	26.02	
B4211	NB4211	100 YR - 5 Day	AO	AE	24.10	26.00	
B4213	NB4213	100 YR - 5 Day	AO	AE	24.11	26.01	
B4214	NB4214	100 YR - 5 Day	AO	AE	24.11	26.01	
B4217	NB4217	100 YR - 5 Day	AO	AE	24.11	26.01	
B4220	NB4220	100 YR - 5 Day	AO		24.10	26.00	
B4230	NB4230	100 YR - 5 Day	AO		23.80	25.14	
B4235	NB4235	100 YR - 5 Day	AO	AE	23.73	25.06	
B4240	NB4240	100 YR - 5 Day	AO	AE	23.81	25.15	
B4243	NB4243	100 YR - 5 Day	AO	AE	23.73	25.06	
B4250	NB4250	100 YR - 5 Day	AO	AE	23.73	25.07	
B4310	NB4310	100 YR - 1 Day		AE	23.98	25.27	
B4320	NB4320	100 YR - 1 Day		AE	24.01	25.31	
B4325	NB4325	100 YR - 1 Day		AE	24.05	25.33	
B4327	NB4327	100 YR - 1 Day		AE	24.17	25.51	
B4330	NB4330	100 YR - 1 Day		AE	24.01	25.32	
B4332	NB4332	100 YR - 1 Day		AE	24.21	25.51	
B4334	NB4334	100 YR - 1 Day		AE	24.06	25.47	
B4336	NB4336	100 YR - 1 Day		AE	24.06	25.46	
B4338	NB4338	100 YR - 1 Day		AE	24.06	25.44	
B4339	NB4339	100 YR - 1 Day		AE	24.06	25.45	
B4340	NB4340	100 YR - 1 Day		AE	24.01	25.33	
B4344	NB4344	100 YR - 5 Day	AO	AE	24.08	25.50	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
B4345	NB4345	100 YR - 1 Day		AE	24.05	25.48	
B4346	NB4346	100 YR - 1 Day		AE	24.00	25.38	
B4350	NB4350	100 YR - 1 Day		AE	24.00	25.38	
B4355	NB4355	100 YR - 1 Day		AE	23.99	25.31	
B4410	NB4410	100 YR - 1 Day		AE	23.77	25.05	
B4422	NB4422	100 YR - 1 Day		AE	23.80	25.06	
B4424	NB4424	100 YR - 1 Day		AE	23.80	25.06	
B4426	NB4426	100 YR - 1 Day		AE	23.80	25.06	
B4430	NB4430	100 YR - 1 Day		AE	23.80	25.06	
B4440	NB4440	100 YR - 1 Day		AE	23.81	25.08	
B4452	NB4452	100 YR - 1 Day			23.98	25.28	
B4454	NB4454	100 YR - 1 Day		AE	23.98	25.28	
B4458	NB4458	100 YR - 1 Day		AE	23.90	25.16	
B4460	NB4460	100 YR - 1 Day		AE	23.90	25.18	
B4510	NB4510	100 YR - 1 Day		AE	23.92	25.27	
B4524	NB4524	100 YR - 5 Day	AO	AE	23.98	25.37	
B4525	NB4525	100 YR - 1 Day		AE	23.97	25.36	
B4526	NB4526	100 YR - 5 Day	AO	AE	23.98	25.37	
B4527	NB4527	100 YR - 1 Day		AE	23.97	25.34	
B4529	NB4529	100 YR - 5 Day	AO	AE	23.95	25.36	
B4530	NB4530	100 YR - 5 Day	AO	AE	23.95	25.37	
B4531	NB4531	100 YR - 5 Day	AO	AE	23.94	25.32	
B4533	NB4533	100 YR - 5 Day	AO	AE	23.96	25.38	
B4535	NB4535	100 YR - 5 Day	AO	AE	23.95	25.36	
B4537	NB4537	100 YR - 5 Day	AO	AE	23.95	25.33	
B4539	NB4539	100 YR - 5 Day	AO	AE	23.95	25.36	
B4540	NB4540	100 YR - 5 Day	AO	AE	23.95	25.33	
B4541	NB4541	100 YR - 5 Day	AO	AE	24.05	25.43	
B4542	NB4542	100 YR - 5 Day	AO	AE	24.14	25.41	
B4543	NB4543	100 YR - 5 Day	AO	AE	24.05	25.43	
B4544	NB4544	100 YR - 5 Day	AO	AE	24.08	25.41	
B4545	NB4545	100 YR - 5 Day	AO	AE	24.05	25.40	
B4546	NB4546	100 YR - 5 Day	AO	AE	24.04	25.39	
B4547	NB4547	100 YR - 5 Day	AO	AE	24.03	25.37	
B4548	NB4548	100 YR - 5 Day	AO	AE	23.99	25.38	
B4549	NB4549	100 YR - 5 Day	AO	AE	24.05	25.40	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
B4550	NB4550	100 YR - 5 Day	AO	AE	23.97	25.36	
B4551	NB4551	100 YR - 5 Day	AO	AE	23.96	25.34	
B4560	NB4560	100 YR - 5 Day	AO	AE	23.96	25.35	
B4702	NB4702	100 YR - 1 Day	AO	AE	21.89	21.86	
B4703	NB4703	100 YR - 1 Day	AO	AE	21.89	21.86	
B4706	NB4706	100 YR - 1 Day		AE	22.00	21.94	
B4707	NB4707	100 YR - 1 Day		AE	22.00	21.93	
B4708	NB4708	100 YR - 1 Day		AE	21.95	21.90	
B4709	NB4709	100 YR - 1 Day		AE	21.93	21.88	
B4720	NB4720	100 YR - 1 Day		AE	21.88	21.83	
B4735	NB4735	100 YR - 1 Day		AE	21.89	21.83	
B4740	NB4740	100 YR - 1 Day		AE	21.88	21.83	
B4750	NB4750	100 YR - 1 Day		AE	21.75	21.75	
B4810	NB4810	100 YR - 1 Day		AE	21.71	21.72	
B4820	NB4820	100 YR - 1 Day		AE	21.71	21.72	
B4830	NB4830	100 YR - 1 Day		AE	21.70	21.71	
B4845	NB4845	100 YR - 1 Day	AO	AE	21.65	21.63	
B4850	NB4850	100 YR - 1 Day	AO	AE	21.22	21.30	
B4851	NB4851	100 YR - 5 Day	AO	AE	21.39	22.03	
B4852	NB4852	100 YR - 5 Day	AO	AE	21.35	22.02	
B4853	NB4853	100 YR - 1 Day		AE	21.05	21.65	
B4854	NB4854	100 YR - 5 Day	AO	AE	21.29	22.01	
B4855	NB4855	100 YR - 1 Day	AO	AE	21.28	22.01	
B4856	NB4856	100 YR - 1 Day	AO	AE	21.28	21.97	
B4857	NB4857	100 YR - 1 Day		AE	20.91	21.27	
B4858	NB4858	100 YR - 1 Day	AO	AE	21.28	21.99	
B4859	NB4859	100 YR - 1 Day		AE	20.90	21.25	
B4860	NB4860	100 YR - 1 Day		AE	20.74	21.15	
B4870	NB4870	100 YR - 1 Day	AO		20.75	21.13	
B4880	NB4880	100 YR - 1 Day	AO	AE	21.00	21.47	
B4882	NB4882	100 YR - 1 Day	AO	AE	21.75	22.00	
B4883	NB4883	100 YR - 1 Day	AO	AE	20.74	21.15	
B4884	NB4884	100 YR - 1 Day	AO		20.74	21.15	
B4885	NB4885	100 YR - 5 Day	AO	AE	21.29	22.01	
B4890	NB4890	100 YR - 5 Day	AO	AE	21.22	21.84	
B4895	NB4895	100 YR - 1 Day		AE	22.11	22.08	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
B4896	NB4896	100 YR - 1 Day	AO		22.11	22.08	
B4897	NB4897	100 YR - 5 Day	AO	AE	21.22	21.85	
B4900	NB4900	100 YR - 5 Day	AO	AE	21.27	21.89	
B4910	NB4910	100 YR - 5 Day	AO	AE	21.28	21.91	
B4920	NB4920	100 YR - 5 Day	AO	AE	21.46	22.30	
B4930	NB4930	100 YR - 5 Day	AO	AE	21.23	22.05	
B5010	NB5010	100 YR - 1 Day		AE	23.59	24.56	
B5025	NB5025	100 YR - 1 Day		AE	23.70	24.82	
B5030	NB5030	100 YR - 1 Day		AE	23.70	24.83	
B5040	NB5040	100 YR - 1 Day		AE	23.73	24.87	
B5110	NB5110	100 YR - 1 Day		AE	23.98	25.26	
B5115	NB5115	100 YR - 1 Day		AE	24.21	25.17	
B5120	NB5120	100 YR - 1 Day		AE	23.97	25.19	
B5130	NB5130	100 YR - 1 Day		AE	23.95	25.15	
B5132	NB5132	100 YR - 1 Day		AE	23.94	25.06	
B5135	NB5135	100 YR - 1 Day		AE	23.94	25.07	
B5138	NB5138	100 YR - 1 Day		AE	23.94	25.07	
B5140	NB5140	100 YR - 1 Day		AE	23.94	25.11	
B5145	NB5145	100 YR - 1 Day		AE	23.92	25.02	
B5150	NB5150	100 YR - 1 Day		AE	23.92	25.08	
B5160	NB5160	100 YR - 1 Day		AE	23.66	25.07	
B5170	NB5170	100 YR - 1 Day		AE	23.66	25.07	
B5190	NB5190	100 YR - 1 Day		AE	23.66	25.05	
B5195	NB5195	100 YR - 1 Day		AE	23.66	25.02	
B5210	NB5210	100 YR - 1 Day		AE	23.64	25.01	
B5212	NB5212	100 YR - 1 Day		AE	23.64	25.00	
B5315	NB5315	100 YR - 1 Day		AE	23.98	24.79	
B5317	NB5317	100 YR - 1 Day		AE	23.98	24.83	
B5320	NB5320	100 YR - 1 Day		AE	23.98	24.92	
B5325	NB5325	100 YR - 1 Day		AE	23.91	24.92	
B5327	NB5327	100 YR - 1 Day		AE	23.91	24.93	
B5330	NB5330	100 YR - 1 Day		AE	23.91	24.93	
B5332	NB5332	100 YR - 1 Day		AE	23.95	24.99	
B5338	NB5338	100 YR - 1 Day		AE	23.91	24.94	
B5339	NB5339	100 YR - 1 Day		AE	23.90	24.93	
B5340	NB5340	100 YR - 1 Day		AE	23.88	24.93	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
B5360	NB5360	100 YR - 1 Day		AE	23.76	24.93	
B5375	NB5375	100 YR - 1 Day		AE	23.68	24.87	
B5377	NB5377	100 YR - 1 Day		AE	23.68	24.87	
B5380	NB5380	100 YR - 1 Day		AE	23.68	24.88	
B5390	NB5390	100 YR - 1 Day		AE	23.65	24.89	
B5400	NB5400	100 YR - 1 Day		AE	23.64	24.88	
B5410	NB5410	100 YR - 1 Day		AE	23.40	24.77	
B5420	NB5410	100 YR - 1 Day			23.40	24.77	
B5440	NB5440	100 YR - 1 Day		AE	22.06	22.29	
B5450	NB5450	100 YR - 1 Day			21.92	22.13	
B5453	NB5453	100 YR - 1 Day		AE	22.23	22.18	
B5455	NB5455	100 YR - 1 Day		AE	22.05	22.13	
B5457	NB5457	100 YR - 1 Day		AE	21.94	22.13	
B5470	NB5470	100 YR - 1 Day		AE	21.79	21.97	
B5480	NB5480	100 YR - 1 Day	AO	AE	20.88	21.77	
B5490	NB5490	100 YR - 5 Day	AO	AE	20.84	21.70	
B5510	NB5510	100 YR - 5 Day	AO	AE	20.84	21.70	
B5590	NB5590	100 YR - 5 Day			26.15	27.25	
B5610	NB5610	100 YR - 1 Day		X	21.78	21.73	
B5613	NB5613	100 YR - 1 Day		AE	22.14	22.10	
B5617	NB5617	100 YR - 1 Day			21.89	21.79	
B5620	NB5620	100 YR - 1 Day		AE	21.78	21.73	
B5630	NB5630	100 YR - 1 Day		AE	21.78	21.73	
B5635	NB5635	100 YR - 1 Day		AE	21.77	21.71	
B5640	NB5640	100 YR - 1 Day		AE	20.42	20.98	
B5642	NB5642	100 YR - 1 Day		AE	20.58	21.03	
B5644	NB5644	100 YR - 1 Day			20.57	21.62	
B5646	NB5646	100 YR - 1 Day			20.57	21.62	
B5650	NB5650	100 YR - 1 Day		AE	20.43	21.46	
B5655	NB5655	100 YR - 1 Day		AE	20.43	21.47	
B5660	NB5660	100 YR - 1 Day		AE	20.43	21.61	
B5663	NB5663	100 YR - 1 Day		X	24.19	24.12	
B5667	NB5667	100 YR - 1 Day		AE	20.43	21.61	
B5670	NB5670	100 YR - 1 Day		AE	20.43	21.62	
B5675	NB5675	100 YR - 1 Day	AO	AE	20.43	21.62	
B5676	NB5676	100 YR - 5 Day	AO	AE	20.43	21.62	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
B5680	NB5680	100 YR - 5 Day	AO	AE	20.43	21.63	
B5690	NB5690	100 YR - 5 Day	AO	AE	20.29	21.15	
B5695	NB5695	100 YR - 5 Day	AO	AE	25.80	26.83	
B6010	NB6010	100 YR - 1 Day		AE	21.02	20.89	
B6015	NB6015	100 YR - 1 Day		AE	20.99	20.87	
B6020	NB6020	100 YR - 1 Day		AE	20.99	20.87	
B6030	NB6030	100 YR - 1 Day		AE	20.96	20.85	
B6110	NB6110	100 YR - 1 Day		AE	19.62	19.57	
B6116	NB6116	100 YR - 1 Day		AE	19.53	19.40	
B6118	NB6118	100 YR - 1 Day		AE	19.03	18.93	
B6119	NB6119	100 YR - 1 Day		AE	19.01	18.91	
B6120	NB6120	100 YR - 1 Day		AE	18.92	18.86	
B6130	NB6130	100 YR - 1 Day		AE	18.81	18.75	
B6210	NB6210	100 YR - 1 Day		AE	18.33	18.33	
B6220	NB6220	100 YR - 1 Day		AE	18.36	18.35	
B6310	NB6310	100 YR - 1 Day		AE	18.47	18.36	
B6320	NB6320	100 YR - 1 Day		AE	18.44	18.34	
B6330	NB6330	100 YR - 1 Day			18.32	18.28	
B6340	NB6340	100 YR - 1 Day		AE	18.29	18.26	
B6355	NB6355	100 YR - 1 Day		AE	18.07	18.04	
B6359	NB6359	100 YR - 1 Day		AE	18.23	18.19	
B6360	NB6360	100 YR - 1 Day		AE	18.33	18.29	
B6370	NB6370	100 YR - 1 Day		AE	18.42	18.41	
B6385	NB6385	100 YR - 1 Day		AE	18.25	18.52	
B6387	NB6387	100 YR - 1 Day		AE	18.25	18.52	
B6390	NB6390	100 YR - 1 Day		AE	18.25	18.52	
B6393	NB6393	100 YR - 1 Day		AE	18.15	18.15	
B6395	NB6395	100 YR - 1 Day		AE	18.15	18.15	
B6400	NB6400	100 YR - 1 Day		AE	18.23	18.53	
B6403	NB6403	100 YR - 1 Day		AE	18.89	18.89	
B6405	NB6405	100 YR - 1 Day		AE	18.18	18.53	
B6410	NB6410	100 YR - 1 Day		AE	18.12	18.57	
B6510	NB6510	100 YR - 1 Day		AE	21.23	21.15	
B6520	NB6520	100 YR - 1 Day		AE	21.22	21.15	
B6540	NB6540	100 YR - 1 Day		AE	21.21	21.13	
B6550	NB6550	100 YR - 1 Day		AE	21.21	21.12	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
B6552	NB6552	100 YR - 1 Day		AE	21.80	21.77	
B6555	NB6555	100 YR - 1 Day		AE	21.77	21.74	
B6558	NB6558	100 YR - 1 Day		AE	21.40	21.28	
B6559	NB6559	100 YR - 1 Day		AE	21.31	21.20	
B6560	NB6560	100 YR - 1 Day		AE	21.19	21.11	
B6565	NB6565	100 YR - 1 Day		AE	20.91	20.86	
B6568	NB6568	100 YR - 1 Day		AE	20.93	20.88	
B6570	NB6570	100 YR - 1 Day		AE	20.97	20.90	
B6580	NB6580	100 YR - 1 Day		AE	20.88	20.80	
B6585	NB6585	100 YR - 1 Day		AE	20.55	20.46	
B6590	NB6590	100 YR - 1 Day	AO	AE	20.02	19.95	
B6595	NB6595	100 YR - 1 Day		AE	19.28	19.42	
B6598	NB6598	100 YR - 1 Day		AE	19.26	19.42	
B6600	NB6600	100 YR - 1 Day	AO	AE	19.23	19.42	
B6610	NB6610	100 YR - 1 Day	AO	AE	18.74	19.07	
B6620	NB6620	100 YR - 1 Day		AE	17.94	18.58	
B6623	NB6623	100 YR - 1 Day		AE	18.86	18.87	
B6625	NB6625	100 YR - 1 Day			18.86	18.87	
B6630	NB6630	100 YR - 1 Day	A0	AE	16.59	18.45	
B6640	NB6640	100 YR - 5 Day	A0	AE	16.58	18.28	
B7002	NB7002	100 YR - 1 Day		AE	17.62	17.53	
B7004	NB7004	100 YR - 1 Day		AE	16.82	16.81	
B7005	NB7005	100 YR - 1 Day		AE	16.08	16.09	
B7010	NB7010	100 YR - 1 Day		AE	14.18	14.16	
B7110	NB7110	100 YR - 1 Day		AE	14.09	14.07	
B7210	NB7210	100 YR - 1 Day		AE	12.51	12.72	
B7223	NB7223	100 YR - 1 Day		AE	14.06	14.05	
B7227	NB7227	100 YR - 1 Day		AE	13.09	13.74	
B7230	NB7230	100 YR - 1 Day		AE	12.51	12.73	
B7240	NB7240	100 YR - 1 Day		AE	12.51	12.70	
B7250	NB7250	100 YR - 1 Day		AE	12.49	12.66	
B7260	NB7260	100 YR - 1 Day		AE	12.46	12.64	
B7320	NB7320	100 YR - 1 Day		AE	12.33	12.49	
B7330	NB7330	100 YR - 1 Day		AE	12.07	12.23	
B7335	NB7335	100 YR - 1 Day		AE	11.62	11.77	
B7340	NB7340	100 YR - 1 Day		AE	11.60	11.76	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
B7350	NB7350	100 YR - 1 Day		AE	11.60	11.78	
B7360	NB7360	100 YR - 1 Day		AE	11.59	11.78	
B7410	NB7410	100 YR - 1 Day		AE	11.58	11.83	
B7420	NB7420	100 YR - 1 Day		AE	11.58	11.82	
B7430	NB7430	100 YR - 1 Day		AE	11.58	11.79	
B7440	NB7440	100 YR - 1 Day			11.57	11.79	
B7450	NB7450	100 YR - 1 Day			11.53	11.79	
B7460	NB7460	100 YR - 1 Day		AE	11.37	11.79	
B7470	NB7470	100 YR - 1 Day		AE	11.31	11.77	
B7510	NB7510	100 YR - 1 Day		AE	17.71	17.63	
B7512	NB7512	100 YR - 1 Day		AE	17.03	17.01	
B7520	NB7520	100 YR - 1 Day		AE	14.78	14.78	
B8005	NB8005	100 YR - 1 Day		AE	12.23	12.18	
B8010	NB8010	100 YR - 1 Day		AE	12.22	12.19	
B8011	NB8011	100 YR - 1 Day		AE	17.27	17.22	
B8012	NB8012	100 YR - 1 Day			14.44	14.41	
B8014	NB8014	100 YR - 1 Day		AE	13.06	13.02	
B8015	NB8015	100 YR - 1 Day		AE	12.94	12.80	
B8018	NB8018	100 YR - 1 Day		AE	12.56	12.47	
B8020	NB8020	100 YR - 1 Day		AE	12.22	12.18	
B8030	NB8030	100 YR - 1 Day		AE	12.11	12.10	
B8040	NB8040	100 YR - 1 Day		AE	12.11	12.09	
B8110	NB8110	100 YR - 1 Day		AE	10.98	11.24	
B8120	NB8120	100 YR - 1 Day		AE	10.98	11.24	
B8130	NB8130	100 YR - 1 Day		AE	10.94	11.20	
B8140	NB8140	100 YR - 1 Day		AE	10.76	10.87	
B8150	NB8150	100 YR - 1 Day		AE	10.77	10.87	
B8210	NB8210	100 YR - 1 Day		AE	10.42	11.24	
B8220	NB8220	100 YR - 1 Day		AE	10.32	11.19	
B8230	NB8230	100 YR - 1 Day		AE	10.32	11.19	
B8240	NB8240	100 YR - 1 Day		AE	10.28	10.94	
B8250	NB8250	100 YR - 1 Day		AE	10.21	10.83	
B8260	NB8260	100 YR - 1 Day		AE	10.18	10.54	
B8270	NB8270	100 YR - 1 Day		AE	10.18	10.53	
B8310	NB8310	100 YR - 1 Day		AE	10.43	11.25	
B8320	NB8320	100 YR - 1 Day		AE	10.24	11.00	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
B8323	NB8323	100 YR - 1 Day		AE	10.40	10.72	
B8327	NB8327	100 YR - 1 Day		AE	10.41	10.72	
B8330	NB8330	100 YR - 1 Day		AE	10.17	10.72	
B8340	NB8340	100 YR - 1 Day		AE	10.15	10.61	
B8350	NB8350	100 YR - 1 Day		AE	10.09	10.51	
B8360	NB8360	100 YR - 1 Day		AE	10.05	10.43	
B8370	NB8370	100 YR - 1 Day		AE	10.05	10.41	
B8380	NB8380	100 YR - 1 Day		AE	10.04	10.42	
B8390	NB8390	100 YR - 1 Day		AE	10.03	10.41	
B8410	NB8410	100 YR - 1 Day		AE	9.56	9.86	
B8420	NB8420	100 YR - 1 Day		AE	9.52	9.85	
B8430	NB8430	100 YR - 1 Day		AE	9.33	9.85	
B8440	NB8440	100 YR - 1 Day		AE	9.17	9.85	
B8450	NB8450	100 YR - 1 Day			9.07	9.86	
B8460	NB8460	100 YR - 1 Day		AE	8.67	9.86	
B8480	NB8480	100 YR - 1 Day			8.60	9.85	
B8490	NB8490	100 YR - 1 Day		AE	8.54	9.86	
B8502	NB8502	100 YR - 1 Day		AE	15.87	15.82	
B8503	NB8503	100 YR - 1 Day		AE	17.31	17.20	
B8504	NB8504	100 YR - 1 Day		AE	15.71	15.53	
B8505	NB8505	100 YR - 1 Day			14.01	13.99	
B8506	NB8506	100 YR - 1 Day		AE	13.68	13.60	
B8507	NB8507	100 YR - 1 Day			14.78	14.77	
B8508	NB8508	100 YR - 1 Day		AE	13.04	13.02	
B8520	NB8520	100 YR - 1 Day		AE	12.31	12.30	
B8521	NB8521	100 YR - 1 Day		AE	14.40	14.44	
B8522	NB8522	100 YR - 1 Day			13.74	13.81	
B8523	NB8523	100 YR - 1 Day			13.74	13.81	
B8525	NB8525	100 YR - 1 Day		AE	13.36	13.77	
B8530	NB8530	100 YR - 1 Day		AE	11.52	11.62	
B8545	NB8545	100 YR - 1 Day		AE	12.72	12.49	
B8550	NB8550	100 YR - 1 Day		AE	11.10	11.24	
B8552	NB8552	100 YR - 1 Day		AE	11.59	11.71	
B8554	NB8554	100 YR - 1 Day		AE	11.54	11.62	
B8556	NB8556	100 YR - 1 Day		AE	11.54	11.62	
B8558	NB8558	100 YR - 1 Day		AE	11.53	11.61	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
B8560	NB8560	100 YR - 1 Day		AE	11.00	11.14	
B8570	NB8570	100 YR - 1 Day		AE	10.91	11.06	
B8590	NB8590	100 YR - 1 Day		AE	8.41	10.03	
B8600	NB8600	100 YR - 1 Day		AE	8.36	10.01	
B8610	NB8610	100 YR - 1 Day		AE	8.33	10.00	
B8620	NB8620	100 YR - 1 Day		AE	8.04	9.95	
B8630	NB8630	100 YR - 1 Day		AE	7.95	9.93	
B8640	NB8640	100 YR - 1 Day		AE	7.92	9.88	
B8650	NB8650	100 YR - 1 Day		AE	7.86	9.83	
B8660	NB8660	100 YR - 1 Day	A0		7.84	9.79	
B8673	NB8673	100 YR - 1 Day	A0	AE	9.54	9.95	
B8674	NB8674	100 YR - 1 Day	A0	AE	9.54	9.96	
B8675	NB8675	100 YR - 1 Day	A8	AE	8.93	9.96	
B8676	NB8676	100 YR - 1 Day	A8	AE	8.84	9.88	
B8677	NB8677	100 YR - 1 Day	A0	AE	8.83	9.84	
B8910	NB8910	100 YR - 1 Day			7.88	8.05	
B8920	NB8920	100 YR - 1 Day		AE	7.81	9.85	
B8930	NB8930	100 YR - 1 Day		AE	7.81	9.85	
B8940	NB8940	100 YR - 1 Day		AE	7.82	9.81	
B8950	NB8950	100 YR - 5 Day	A8	AE	7.82	9.81	
B9000	NB9000	100 YR - 1 Day		AE	17.63	17.51	
B9004	NB9004	100 YR - 1 Day			17.60	17.52	
B9005	NB9005	100 YR - 1 Day			17.46	17.35	
B9010	NB9010	100 YR - 1 Day		AE	17.38	17.31	
B9015	NB9015	100 YR - 1 Day		AE	18.15	18.15	
B9020	NB9020	100 YR - 1 Day		AE	16.98	16.86	
B9035	NB9035	100 YR - 1 Day		X	18.15	18.15	
B9040	NB9040	100 YR - 1 Day		AE	18.15	18.15	
B9043	NB9043	100 YR - 1 Day		AE	18.15	18.15	
B9045	NB9045	100 YR - 1 Day			18.08	18.09	
B9050	NB9050	100 YR - 1 Day		AE	18.12	18.14	
B9053	NB9053	100 YR - 1 Day		AE	18.26	18.50	
B9055	NB9055	100 YR - 1 Day		AE	18.21	18.50	
B9060	NB9060	100 YR - 1 Day		AE	18.12	18.14	
B9070	NB9070	100 YR - 1 Day		AE	17.33	17.36	
B9073	NB9073	100 YR - 1 Day		AE	17.17	17.18	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
B9075	NB9075	100 YR - 1 Day		AE	17.41	17.29	
B9080	NB9080	100 YR - 1 Day			17.17	17.18	
B9090	NB9090	100 YR - 1 Day		AE	16.48	16.53	
B9095	NB9095	100 YR - 1 Day		AE	16.51	16.64	
B9100	NB9100	100 YR - 1 Day		AE	16.35	16.44	
B9110	NB9110	100 YR - 1 Day			16.10	16.40	
B9120	NB9120	100 YR - 1 Day			16.10	16.40	
B9130	NB9130	100 YR - 1 Day		AE	15.00	14.99	
B9140	NB9140	100 YR - 1 Day		AE	14.84	14.90	
B9145	NB9145	100 YR - 1 Day			12.73	12.76	
B9150	NB9150	100 YR - 1 Day		AE	14.59	14.53	
B9160	NB9160	100 YR - 1 Day		AE	11.25	11.20	
B9170	NB9170	100 YR - 1 Day		AE	11.47	11.37	
B9180	NB9180	100 YR - 1 Day		AE	11.62	11.48	
B9185	NB9185	100 YR - 1 Day			10.24	10.27	
B9200	NB9200	100 YR - 1 Day		AE	11.12	11.08	
B9300	NB9300	100 YR - 1 Day		AE	9.55	9.92	
B9310	NB9310	100 YR - 1 Day		AE	8.17	9.86	
B9400	NB9400	100 YR - 1 Day		X	8.90	9.84	
B9500	NB9500	100 YR - 1 Day		AE	8.83	9.83	
C0006	NC0006	100 YR - 1 Day		AE	23.75	25.34	
C0008	NC0008	100 YR - 1 Day		AE	23.71	25.34	
C0010	NC0010	100 YR - 1 Day		AE	23.71	25.34	
C0012	NC0012	100 YR - 1 Day		AE	24.54	25.30	
C0014	NC0014	100 YR - 1 Day		AE	24.50	25.31	
C0015	NC0015	100 YR - 1 Day		AE	23.70	25.34	
C0016	NC0016	100 YR - 1 Day		AE	24.46	25.31	
C0018	NC0018	100 YR - 1 Day		AE	23.70	25.31	
C0020	NC0020	100 YR - 1 Day		AE	23.69	25.31	
C0023	NC0023	100 YR - 1 Day		AE	23.69	25.29	
C0026	NC0026	100 YR - 1 Day		AE	23.70	25.14	
C0030	NC0030	100 YR - 1 Day			23.69	25.29	
C0037	NC0037	100 YR - 1 Day		AE	23.68	25.27	
C0040	NC0040	100 YR - 1 Day			23.67	25.28	
C0052	NC0052	100 YR - 1 Day		AE	23.67	25.13	
C0056	NC0056	100 YR - 1 Day		AE	23.67	25.07	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
C0058	NC0058	100 YR - 1 Day		AE	23.66	25.10	
C0060	NC0060	100 YR - 1 Day		AE	23.66	25.25	
C0062	NC0062	100 YR - 1 Day		AE	24.28	25.11	
C0064	NC0064	100 YR - 1 Day		AE	24.27	25.11	
C0065	NC0065	100 YR - 1 Day		AE	23.66	25.26	
C0066	NC0066	100 YR - 1 Day		AE	24.24	25.12	
C0068	NC0068	100 YR - 1 Day		AE	23.66	25.11	
C0070	NC0070	100 YR - 1 Day		AE	23.65	25.22	
C0077	NC0077	100 YR - 1 Day		AE	23.65	25.12	
C0080	NC0080	100 YR - 1 Day		AE	23.65	25.22	
C0082	NC0082	100 YR - 1 Day		AE	23.89	25.21	
C0083	NC0083	100 YR - 1 Day		AE	24.05	25.21	
C0085	NC0085	100 YR - 1 Day		AE	23.64	25.22	
C0087	NC0087	100 YR - 1 Day		AE	23.65	25.12	
C0090	NC0090	100 YR - 1 Day		AE	23.64	25.21	
C0092	NC0092	100 YR - 1 Day			23.87	25.02	
C0093	NC0093	100 YR - 1 Day		X	23.86	25.09	
C0094	NC0094	100 YR - 1 Day			23.56	25.10	
C0095	NC0095	100 YR - 1 Day		AE	22.74	25.13	
C0096	NC0096	100 YR - 1 Day			24.40	24.38	
C0097	NC0097	100 YR - 1 Day			23.45	23.42	
C0098	NC0098	100 YR - 1 Day			23.01	22.98	
C0099	NC0099	100 YR - 1 Day		AE	21.90	21.60	
C0100	NC0100	100 YR - 1 Day		AE	21.53	21.29	
C0101	NC0094	100 YR - 1 Day			23.56	25.10	
C0102	NC0105	100 YR - 1 Day			19.57	21.51	
C0103	NC0103	100 YR - 1 Day		AE	22.99	24.74	
C0104	NC0104	100 YR - 1 Day		AE	19.36	20.61	
C0105	NC0105	100 YR - 1 Day		AE	19.57	21.51	
C0106	NC0106	100 YR - 1 Day			19.58	21.01	
C0107	NC0107	100 YR - 1 Day		X	20.54	21.03	
C0108	NC0108	100 YR - 1 Day		AE	21.36	21.33	
C0109	NC0109	100 YR - 1 Day		AE	21.55	21.48	
C0110	NC0110	100 YR - 1 Day			19.13	20.24	
C0111	NC0099	100 YR - 1 Day			21.90	21.60	
C0120	NC0120	100 YR - 1 Day		AE	19.12	20.22	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
C0124	NC0124	100 YR - 1 Day		AE	19.27	20.24	
C0127	NC0127	100 YR - 1 Day		X	19.88	20.27	
C0130	NC0130	100 YR - 1 Day			19.11	20.20	
C0140	NC0140	100 YR - 1 Day			19.09	20.18	
C0147	NC0147	100 YR - 1 Day		AE	19.12	20.25	
C0160	NC0160	100 YR - 1 Day		AE	19.08	20.16	
C0168	NC0168	100 YR - 1 Day		AE	19.09	20.20	
C0170	NC0170	100 YR - 1 Day		AE	19.07	20.16	
C0180	NC0180	100 YR - 1 Day		AE	19.06	20.14	
C0190	NC0190	100 YR - 1 Day		AE	18.25	19.33	
C0193	NC0193	100 YR - 1 Day		AE	18.79	19.48	
C0196	NC0196	100 YR - 1 Day		AE	19.14	19.42	
C0197	NC0197	100 YR - 1 Day		AE	18.78	19.48	
C0210	NC0210	100 YR - 1 Day		AE	18.22	19.30	
C0214	NC0214	100 YR - 1 Day		AE	18.36	19.77	
C0217	NC0217	100 YR - 1 Day		AE	18.31	19.37	
C0218	NC0218	100 YR - 1 Day		AE	18.42	19.32	
C0220	NC0220	100 YR - 1 Day		AE	18.17	19.25	
C0223	NC0223	100 YR - 1 Day		AE	18.15	19.23	
C0226	NC0226	100 YR - 1 Day		AE	18.22	19.43	
C0230	NC0230	100 YR - 1 Day		AE	18.15	19.22	
C0240	NC0240	100 YR - 1 Day		AE	18.11	19.18	
C0243	NC0243	100 YR - 1 Day		AE	18.87	19.53	
C0246	NC0246	100 YR - 1 Day		AE	18.05	19.14	
C0250	NC0250	100 YR - 1 Day		AE	18.05	19.11	
C0260	NC0260	100 YR - 1 Day		AE	17.95	19.01	
C0265	NC0265	100 YR - 1 Day		AE	17.78	18.93	
C0273	NC0273	100 YR - 1 Day		AE	18.76	18.97	
C0275	NC0275	100 YR - 1 Day		AE	17.67	18.78	
C0280	NC0280	100 YR - 1 Day			17.77	18.84	
C0290	NC0290	100 YR - 1 Day		AE	17.71	18.78	
C0300	NC0300	100 YR - 1 Day		AE	17.13	18.18	
C0303	NC0303	100 YR - 1 Day		AE	20.52	20.46	
C0304	NC0304	100 YR - 1 Day		AE	18.57	18.93	
C0305	NC0305	100 YR - 1 Day		AE	18.57	18.92	
C0308	NC0308	100 YR - 1 Day		AE	18.46	18.90	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
C0309	NC0309	100 YR - 1 Day		AE	17.64	18.76	
C0310	NC0310	100 YR - 1 Day		AE	17.07	18.13	
C0320	NC0320	100 YR - 1 Day		AE	17.05	18.11	
C0323	NC0323	100 YR - 1 Day		AE	15.50	17.41	
C0330	NC0330	100 YR - 1 Day		AE	17.05	18.10	
C0340	NC0340	100 YR - 1 Day			16.98	18.03	
C0350	NC0350	100 YR - 1 Day			16.89	17.91	
C0360	NC0360	100 YR - 1 Day		AE	16.72	17.70	
C0363	NC0363	100 YR - 1 Day		AE	16.46	17.58	
C0370	NC0370	100 YR - 1 Day		AE	16.65	17.62	
C0373	NC0373	100 YR - 1 Day		AE	16.04	16.86	
C0380	NC0380	100 YR - 1 Day		AE	16.64	17.60	
C0400	NC0400	100 YR - 1 Day		AE	15.16	16.74	
C0410	NC0410	100 YR - 1 Day		AE	15.03	16.65	
C0420	NC0420	100 YR - 1 Day		AE	15.03	16.66	
C0430	NC0430	100 YR - 1 Day			15.02	16.65	
C0440	NC0440	100 YR - 1 Day		AE	15.00	16.64	
C0450	NC0450	100 YR - 1 Day		AE	14.99	16.62	
C0460	NC0460	100 YR - 1 Day		AE	14.97	16.58	
C0465	NC0465	100 YR - 1 Day		AE	14.93	16.31	
C0470	NC0470	100 YR - 1 Day		AE	14.92	16.45	
C0478	NC0478	100 YR - 1 Day		AE	14.79	16.30	
C0480	NC0480	100 YR - 1 Day		AE	14.78	16.05	
C0495	NC0495	100 YR - 1 Day		AE	16.12	16.44	
C0500	NC0500	100 YR - 1 Day		AE	14.68	15.64	
C0510	NC0510	100 YR - 1 Day		AE	14.61	15.53	
C0515	NC0515	100 YR - 1 Day		AE	15.03	15.51	
C0520	NC0520	100 YR - 1 Day		AE	14.20	14.98	
C0540	NC0540	100 YR - 1 Day		AE	14.08	14.81	
C0560	NC0560	100 YR - 1 Day		AE	13.98	14.71	
C0565	NC0565	100 YR - 1 Day		AE	14.84	15.15	
C0570	NC0570	100 YR - 1 Day		AE	12.76	13.56	
C0580	NC0580	100 YR - 1 Day		AE	12.47	13.30	
C0585	NC0585	100 YR - 1 Day		AE	14.84	15.15	
C0590	NC0590	100 YR - 1 Day		AE	12.29	13.10	
C0597	NC0597	100 YR - 1 Day		AE	12.39	13.32	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
C0600	NC0600	100 YR - 1 Day		AE	12.15	12.92	
C0603	NC0603	100 YR - 1 Day		AE	12.76	13.32	
C0604	NC0604	100 YR - 1 Day		AE	12.44	13.32	
C0606	NC0606	100 YR - 1 Day		AE	12.44	13.32	
C0607	NC0607	100 YR - 1 Day		AE	12.44	13.32	
C0608	NC0608	100 YR - 1 Day		AE	12.43	13.31	
C0609	NC0609	100 YR - 1 Day		AE	11.65	11.70	
C0610	NC0610	100 YR - 1 Day		AE	11.97	12.73	
C0615	NC0615	100 YR - 1 Day		AE	12.46	13.32	
C0617	NC0617	100 YR - 1 Day		AE	11.80	12.54	
C0618	NC0618	100 YR - 1 Day		AE	12.47	13.32	
C0620	NC0620	100 YR - 1 Day		AE	11.80	12.54	
C0623	NC0623	100 YR - 1 Day		AE	11.49	12.00	
C0630	NC0630	100 YR - 1 Day		AE	11.71	12.46	
C0633	NC0633	100 YR - 1 Day		AE	10.90	11.76	
C0640	NC0640	100 YR - 1 Day		AE	11.57	12.30	
C0645	NC0645	100 YR - 1 Day		AE	11.54	12.27	
C0660	NC0660	100 YR - 1 Day		AE	11.17	12.00	
C0665	NC0665	100 YR - 1 Day		AE	11.12	11.95	
C0667	NC0667	100 YR - 1 Day		AE	11.12	11.95	
C0670	NC0670	100 YR - 1 Day		AE	11.12	11.95	
C0675	NC0675	100 YR - 1 Day		AE	10.34	10.64	
C0680	NC0680	100 YR - 1 Day		AE	11.06	11.87	
C0681	NC0681	100 YR - 1 Day		AE	6.44	8.92	
C0685	NC0685	100 YR - 1 Day		AE	10.37	10.55	
C0690	NC0690	100 YR - 1 Day		AE	10.93	11.78	
C0700	NC0700	100 YR - 1 Day		AE	10.84	11.72	
C0730	NC0730	100 YR - 1 Day		AE	10.75	11.68	
C0740	NC0740	100 YR - 1 Day			10.52	11.54	
C0760	NC0760	100 YR - 1 Day			10.49	11.52	
C0770	NC0770	100 YR - 1 Day		AE	10.45	11.50	
C0780	NC0780	100 YR - 1 Day		AE	10.26	11.45	
C0790	NC0790	100 YR - 1 Day			10.22	11.44	
C0810	NC0810	100 YR - 1 Day			10.13	11.42	
C0820	NC0820	100 YR - 1 Day		AE	10.09	11.41	
C0825	NC0825	100 YR - 1 Day		AE	10.11	11.41	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
C0830	NC0830	100 YR - 1 Day		AE	10.06	11.41	
C0840	NC0840	100 YR - 1 Day		AE	10.02	11.40	
C0845	NC0845	100 YR - 1 Day		AE	11.46	11.42	
C0850	NC0850	100 YR - 1 Day		AE	9.85	11.34	
C0860	NC0860	100 YR - 1 Day		AE	9.79	11.32	
C0870	NC0870	100 YR - 1 Day			9.54	11.27	
C0873	NC0873	100 YR - 1 Day		AE	9.54	11.27	
C0900	NC0900	100 YR - 5 Day		AE	9.43	11.24	
C0910	NC0910	100 YR - 5 Day	A8	AE	8.22	10.12	
C0915	NC0915	100 YR - 5 Day	A0	AE	8.06	10.11	
C0920	NC0920	100 YR - 5 Day	A8	AE	8.02	9.95	
C0930	NC0930	100 YR - 5 Day	A8	AE	7.83	9.78	
C0940	NC0940	100 YR - 5 Day	A8	AE	7.82	9.78	
C1010	NC1010	100 YR - 1 Day		AE	24.80	25.35	
C1020	NC1020	100 YR - 1 Day		AE	24.80	25.35	
C1025	NC1025	100 YR - 1 Day		AE	24.45	25.28	
C1030	NC1030	100 YR - 1 Day		AE	24.49	25.28	
C1040	NC1040	100 YR - 1 Day		AE	24.48	25.28	
C1042	NC1042	100 YR - 1 Day			24.48	25.27	
C1043	NC1043	100 YR - 1 Day		AE	24.48	25.27	
C1045	NC1045	100 YR - 1 Day		AE	24.48	25.27	
C1050	NC1050	100 YR - 1 Day		AE	24.46	25.27	
C1060	NC1060	100 YR - 1 Day		AE	24.42	25.27	
C1070	NC1070	100 YR - 1 Day		AE	23.97	25.27	
C1080	NC1080	100 YR - 1 Day		AE	23.68	25.27	
C1510	NC1510	100 YR - 1 Day		AE	21.14	21.27	
C1520	NC1520	100 YR - 1 Day		AE	21.14	21.27	
C1530	NC1530	100 YR - 1 Day		AE	21.13	21.27	
C1540	NC1540	100 YR - 1 Day			21.13	21.27	
C1550	NC1550	100 YR - 1 Day		AE	19.33	20.37	
C2020	NC2020	100 YR - 1 Day		AE	20.64	20.40	
C2040	NC2040	100 YR - 1 Day		AE	20.15	20.29	
C2060	NC2060	100 YR - 1 Day		AE	19.13	20.28	
C2520	NC2520	100 YR - 1 Day			20.48	20.42	
C2530	NC2530	100 YR - 1 Day			20.31	20.33	
C2550	NC2550	100 YR - 1 Day		AE	20.31	20.33	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
C2560	NC2560	100 YR - 1 Day			19.49	20.32	
C3010	NC3010	100 YR - 1 Day		AE	21.52	21.52	
C3023	NC3023	100 YR - 1 Day		AE	21.52	21.52	
C3030	NC3030	100 YR - 1 Day		AE	18.89	19.85	
C3510	NC3510	100 YR - 1 Day			21.33	20.98	
C3520	NC3520	100 YR - 1 Day		AE	21.33	20.98	
C3530	NC3530	100 YR - 1 Day		AE	21.29	20.95	
C4010	NC4010	100 YR - 1 Day			19.44	19.42	
C4020	NC4020	100 YR - 1 Day		AE	18.91	18.67	
C4030	NC4030	100 YR - 1 Day		AE	18.54	18.46	
C4040	NC4040	100 YR - 1 Day		AE	18.42	18.40	
C4050	NC4050	100 YR - 1 Day		AE	18.39	18.38	
C4060	NC4060	100 YR - 1 Day		AE	18.26	18.31	
C4070	NC4070	100 YR - 1 Day		AE	18.26	18.31	
C5010	NC5010	100 YR - 1 Day		AE	20.11	19.99	
C5020	NC5020	100 YR - 1 Day		AE	20.11	19.98	
C5030	NC5030	100 YR - 1 Day		AE	19.96	19.79	
C5040	NC5040	100 YR - 1 Day		AE	19.75	19.62	
C5050	NC5050	100 YR - 1 Day		AE	19.68	19.54	
C5060	NC5060	100 YR - 1 Day		AE	19.46	19.38	
C5070	NC5070	100 YR - 1 Day			18.79	18.63	
C5080	NC5080	100 YR - 1 Day		AE	18.46	18.35	
C5090	NC5090	100 YR - 1 Day		AE	18.25	18.18	
C5100	NC5100	100 YR - 1 Day		AE	17.93	17.90	
C5110	NC5110	100 YR - 1 Day		AE	17.88	17.87	
C5112	NC5112	100 YR - 1 Day		AE	19.14	19.12	
C5115	NC5115	100 YR - 1 Day		AE	17.94	17.90	
C5118	NC5118	100 YR - 1 Day		AE	17.92	17.89	
C5120	NC5120	100 YR - 1 Day		AE	17.88	17.87	
C5130	NC5130	100 YR - 1 Day		AE	17.78	17.83	
C5140	NC5140	100 YR - 1 Day		AE	17.36	17.69	
C5150	NC5150	100 YR - 1 Day		AE	16.93	17.65	
C6010	NC6010	100 YR - 1 Day		AE	17.12	17.17	
C6020	NC6020	100 YR - 1 Day		AE	17.02	17.16	
C6030	NC6030	100 YR - 1 Day		AE	15.90	17.15	
C6040	NC6040	100 YR - 1 Day		AE	15.89	17.15	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
C6050	NC6050	100 YR - 1 Day		AE	15.59	17.22	
C6060	NC6060	100 YR - 1 Day		AE	15.04	16.98	
C6503	NC6503	100 YR - 1 Day		AE	14.85	16.34	
C6505	NC6505	100 YR - 1 Day		AE	16.28	18.00	
C6510	NC6510	100 YR - 1 Day		AE	14.84	16.36	
C6513	NC6513	100 YR - 1 Day		AE	16.04	16.52	
C6518	NC6518	100 YR - 1 Day		AE	14.85	16.35	
C6520	NC6520	100 YR - 1 Day		AE	14.84	16.36	
C6522	NC6522	100 YR - 1 Day		AE	15.31	16.30	
C6523	NC6523	100 YR - 1 Day		AE	16.14	16.55	
C6524	NC6524	100 YR - 1 Day		AE	15.31	16.30	
C6526	NC6526	100 YR - 1 Day		AE	15.31	16.30	
C6527	NC6527	100 YR - 1 Day		AE	16.12	16.52	
C6528	NC6528	100 YR - 1 Day		AE	15.26	16.30	
C6530	NC6530	100 YR - 1 Day		AE	14.84	16.35	
C6540	NC6540	100 YR - 1 Day		AE	14.82	16.33	
C6545	NC6545	100 YR - 1 Day		AE	16.12	16.50	
C6550	NC6550	100 YR - 1 Day		AE	14.82	16.32	
C7010	NC7010	100 YR - 1 Day			15.43	16.27	
C7020	NC7020	100 YR - 1 Day		AE	15.43	16.27	
C7030	NC7030	100 YR - 1 Day		AE	15.44	16.31	
C7040	NC7040	100 YR - 1 Day		AE	15.44	16.41	
C7053	NC7053	100 YR - 1 Day		AE	15.32	16.06	
C7059	NC7059	100 YR - 1 Day		AE	15.32	16.07	
C7062	NC7062	100 YR - 1 Day		AE	15.35	16.25	
C7065	NC7065	100 YR - 1 Day		AE	15.35	16.25	
C7068	NC7068	100 YR - 1 Day		AE	15.35	16.24	
C7070	NC7070	100 YR - 1 Day		AE	15.35	16.21	
C7080	NC7080	100 YR - 1 Day		AE	15.29	16.02	
C7093	NC7093	100 YR - 1 Day		AE	14.89	15.33	
C7097	NC7097	100 YR - 1 Day		AE	14.94	15.43	
C7098	NC7098	100 YR - 1 Day		AE	14.99	15.52	
C7100	NC7100	100 YR - 1 Day		AE	15.01	15.61	
C7110	NC7110	100 YR - 1 Day		AE	14.97	15.46	
C7120	NC7120	100 YR - 1 Day		AE	14.97	15.46	
C8005	NC8005	100 YR - 1 Day		AE	16.34	16.43	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
C8010	NC8010	100 YR - 1 Day		AE	15.30	15.41	
C8012	NC8012	100 YR - 1 Day		AE	15.12	15.35	
C8013	NC8013	100 YR - 1 Day		AE	14.89	15.33	
C8018	NC8018	100 YR - 1 Day		AE	14.88	15.29	
C8020	NC8020	100 YR - 1 Day		AE	14.88	15.29	
C8025	NC8025	100 YR - 1 Day		AE	14.95	15.30	
C8030	NC8030	100 YR - 1 Day		AE	14.88	15.27	
C8040	NC8040	100 YR - 1 Day		AE	14.88	15.26	
C8043	NC8043	100 YR - 1 Day		AE	14.85	15.23	
C8045	NC8045	100 YR - 1 Day		AE	14.85	15.18	
C8046	NC8046	100 YR - 1 Day		AE	14.85	15.18	
C8047	NC8047	100 YR - 1 Day		AE	14.85	15.17	
C8048	NC8048	100 YR - 1 Day		AE	14.85	15.16	
C8050	NC8050	100 YR - 1 Day		AE	14.88	15.27	
C8060	NC8060	100 YR - 1 Day		AE	14.88	15.29	
C8065	NC8065	100 YR - 1 Day		AE	14.88	15.30	
C8070	NC8070	100 YR - 1 Day		AE	14.88	15.29	
C8080	NC8080	100 YR - 1 Day		AE	14.87	15.28	
C8090	NC8090	100 YR - 1 Day		AE	14.87	15.28	
C8100	NC8100	100 YR - 1 Day		AE	14.87	15.28	
C8110	NC8110	100 YR - 1 Day			14.87	15.28	
C8120	NC8120	100 YR - 1 Day		AE	14.86	15.26	
C8140	NC8140	100 YR - 1 Day		AE	14.85	15.16	
C8150	NC8150	100 YR - 1 Day		AE	14.85	15.15	
C8160	NC8160	100 YR - 1 Day		AE	14.84	15.15	
C8170	NC8170	100 YR - 1 Day		AE	14.84	15.13	
C8510	NC8510	100 YR - 1 Day		AE	22.93	22.94	
C8520	NC8520	100 YR - 1 Day		AE	22.64	22.62	
C8530	NC8530	100 YR - 1 Day		AE	22.20	22.30	
C8540	NC8540	100 YR - 1 Day		AE	22.11	22.18	
C8550	NC8550	100 YR - 1 Day		AE	21.01	21.28	
C8560	NC8560	100 YR - 1 Day		AE	21.18	21.27	
C8570	NC8570	100 YR - 1 Day			19.80	19.78	
C8580	NC8580	100 YR - 1 Day		AE	16.34	16.50	
C8590	NC8590	100 YR - 1 Day			15.58	15.64	
C8600	NC8600	100 YR - 1 Day		AE	15.11	15.23	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
C8610	NC8610	100 YR - 1 Day		AE	14.85	15.16	
C8620	NC8620	100 YR - 1 Day		AE	14.84	15.16	
C8630	NC8630	100 YR - 1 Day		AE	14.30	15.04	
C8640	NC8640	100 YR - 1 Day		AE	14.28	15.03	
C9010	NC9010	100 YR - 1 Day			22.08	22.25	
C9020	NC9020	100 YR - 1 Day		AE	22.18	21.97	
C9022	NC9022	100 YR - 1 Day		AE	22.18	21.96	
C9024	NC9024	100 YR - 1 Day		AE	21.58	21.37	
C9030	NC9030	100 YR - 1 Day		AE	21.04	21.05	
C9032	NC9032	100 YR - 1 Day		AE	20.93	20.84	
C9040	NC9040	100 YR - 1 Day		AE	20.92	20.83	
C9050	NC9050	100 YR - 1 Day		AE	20.46	20.46	
C9052	NC9052	100 YR - 1 Day		AE	20.43	20.42	
C9054	NC9054	100 YR - 1 Day			20.43	20.42	
C9056	NC9056	100 YR - 1 Day			19.62	19.60	
C9058	NC9058	100 YR - 1 Day		AE	18.93	19.24	
C9060	NC9060	100 YR - 1 Day		AE	20.42	20.41	
C9070	NC9070	100 YR - 1 Day		AE	18.40	18.39	
C9080	NC9080	100 YR - 1 Day		AE	16.28	16.28	
C9090	NC9090	100 YR - 1 Day			15.03	14.92	
C9100	NC9100	100 YR - 1 Day		AE	14.44	14.42	
C9110	NC9110	100 YR - 1 Day		AE	13.72	13.98	
C9120	NC9120	100 YR - 1 Day		AE	13.70	13.97	
C9130	NC9130	100 YR - 1 Day		AE	15.44	15.37	
C9510	NC9510	100 YR - 1 Day		AE	12.78	13.32	
C9520	NC9520	100 YR - 1 Day		AE	12.54	13.32	
C9530	NC9530	100 YR - 1 Day		AE	12.54	13.33	
C9540	NC9540	100 YR - 1 Day		AE	12.47	13.32	
C9550	NC9550	100 YR - 1 Day		AE	12.47	13.32	
C9560	NC9560	100 YR - 1 Day		AE	12.47	13.32	
C9570	NC9570	100 YR - 1 Day			12.47	13.32	
C9580	NC9580	100 YR - 1 Day		AE	12.47	13.32	
C9600	NC9600	100 YR - 1 Day		AE	10.42	11.40	
C9700	NC9700	100 YR - 1 Day		AE	10.02	11.40	
C9800	NC9800	100 YR - 1 Day		AE	10.28	11.40	
D0004	ND0004	100 YR - 1 Day		AE	20.21	21.02	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
D0006	ND0006	100 YR - 1 Day		AE	20.21	21.02	
D0010	ND0010	100 YR - 1 Day		AE	20.21	21.02	
D0020	ND0020	100 YR - 1 Day		AE	20.18	20.97	
D0030	ND0030	100 YR - 1 Day		AE	20.17	20.95	
D0040	ND0040	100 YR - 1 Day		AE	15.96	16.78	
D0045	ND0045	100 YR - 1 Day		AE	19.83	20.31	
D0050	ND0050	100 YR - 1 Day		AE	19.70	20.26	
D0053	ND0053	100 YR - 1 Day		AE	19.40	20.26	
D0055	ND0055	100 YR - 1 Day		AE	15.95	16.76	
D0057	ND0057	100 YR - 1 Day			16.45	17.02	
D0059	ND0059	100 YR - 1 Day		AE	15.99	16.91	
D0060	ND0060	100 YR - 1 Day		AE	15.93	16.74	
D0063	ND0063	100 YR - 1 Day		AE	15.81	16.56	
D0070	ND0070	100 YR - 1 Day		AE	15.81	16.56	
D0080	ND0080	100 YR - 1 Day		AE	15.76	16.49	
D0082	ND0082	100 YR - 1 Day			16.26	16.41	
D0085	ND0085	100 YR - 1 Day		AE	15.72	16.41	
D0088	ND0088	100 YR - 1 Day		AE	15.72	16.40	
D0090	ND0090	100 YR - 1 Day		AE	15.70	16.40	
D0092	ND0092	100 YR - 1 Day			17.47	17.46	
D0094	ND0094	100 YR - 1 Day		AE	16.77	16.51	
D0096	ND0096	100 YR - 1 Day		AE	15.73	16.41	
D0098	ND0098	100 YR - 1 Day		AE	15.72	16.41	
D0100	ND0100	100 YR - 1 Day		AE	15.70	16.40	
D0103	ND0103	100 YR - 1 Day		AE	15.25	15.37	
D0107	ND0107	100 YR - 1 Day		AE	15.39	15.82	
D0110	ND0110	100 YR - 1 Day		AE	15.44	16.05	
D0112	ND0112	100 YR - 1 Day		AE	15.10	15.19	
D0114	ND0114	100 YR - 1 Day		AE	15.10	15.19	
D0116	ND0116	100 YR - 1 Day		AE	15.32	15.86	
D0118	ND0118	100 YR - 1 Day		AE	15.37	15.95	
D0130	ND0130	100 YR - 1 Day		AE	15.39	15.99	
D0140	ND0140	100 YR - 1 Day		AE	13.91	14.23	
D0152	ND0152	100 YR - 1 Day		AE	13.96	14.26	
D0155	ND0155	100 YR - 1 Day		AE	13.96	14.26	
D0158	ND0158	100 YR - 1 Day		AE	13.77	14.08	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
D0160	ND0160	100 YR - 1 Day		AE	13.68	14.04	
D0162	ND0162	100 YR - 1 Day		AE	13.05	13.25	
D0164	ND0164	100 YR - 1 Day		AE	13.05	13.25	
D0166	ND0166	100 YR - 1 Day		AE	13.17	13.34	
D0168	ND0168	100 YR - 1 Day		AE	13.21	13.36	
D0170	ND0170	100 YR - 1 Day		AE	13.39	13.79	
D0180	ND0180	100 YR - 1 Day		AE	13.16	13.57	
D0190	ND0190	100 YR - 1 Day		AE	12.06	12.63	
D0192	ND0192	100 YR - 1 Day		AE	12.01	12.54	
D0194	ND0194	100 YR - 1 Day		AE	12.01	12.54	
D0196	ND0196	100 YR - 1 Day		AE	12.00	12.54	
D0198	ND0198	100 YR - 1 Day		AE	11.99	12.56	
D0200	ND0200	100 YR - 1 Day		AE	11.97	12.56	
D0202	ND0202	100 YR - 1 Day		AE	11.96	12.38	
D0204	ND0204	100 YR - 1 Day		AE	11.94	12.38	
D0206	ND0206	100 YR - 1 Day		AE	11.91	12.38	
D0208	ND0208	100 YR - 1 Day		AE	11.91	12.43	
D0210	ND0210	100 YR - 1 Day		AE	11.91	12.50	
D0220	ND0220	100 YR - 1 Day		AE	11.58	12.28	
D0230	ND0230	100 YR - 1 Day		AE	11.20	11.94	
D0240	ND0240	100 YR - 1 Day		AE	11.10	11.89	
D1010	ND1010	100 YR - 1 Day		AE	20.18	20.96	
D1020	ND1020	100 YR - 1 Day		AE	20.18	20.96	
D1025	ND1025	100 YR - 1 Day		AE	20.18	20.96	
D1030	ND1030	100 YR - 1 Day		AE	20.18	20.96	
D2010	ND2010	100 YR - 1 Day			18.56	18.54	
D2020	ND2020	100 YR - 1 Day		AE	17.90	17.39	
D2025	ND2025	100 YR - 1 Day			16.53	17.57	
D2030	ND2030	100 YR - 1 Day		AE	15.82	16.66	
D2040	ND2040	100 YR - 1 Day		AE	15.78	16.56	
E0010	NE0010	100 YR - 1 Day		AE	17.79	19.53	
E0020	NE0020	100 YR - 1 Day		AE	16.02	17.80	
E0023	NE0023	100 YR - 1 Day		AE	16.60	17.70	
E0027	NE0027	100 YR - 1 Day			16.61	17.70	
E0030	NE0030	100 YR - 1 Day		AE	15.97	17.72	
E0040	NE0040	100 YR - 1 Day		AE	15.95	17.70	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
E0050	NE0050	100 YR - 1 Day		AE	13.71	14.72	
E0052	NE0052	100 YR - 1 Day		AE	15.56	15.13	
E0054	NE0054	100 YR - 1 Day		AE	13.89	14.62	
E0059	NE0059	100 YR - 1 Day		AE	13.81	14.61	
E0060	NE0060	100 YR - 1 Day		AE	13.65	14.58	
E0061	NE0061	100 YR - 1 Day		AE	13.64	14.37	
E0062	NE0062	100 YR - 1 Day		AE	13.65	14.30	
E0063	NE0063	100 YR - 1 Day		AE	13.64	14.34	
E0064	NE0064	100 YR - 1 Day		AE	16.41	16.29	
E0065	NE0065	100 YR - 1 Day		AE	13.64	14.37	
E0069	NE0069	100 YR - 1 Day		AE	13.60	14.43	
E0070	NE0070	100 YR - 1 Day		AE	13.59	14.46	
E0071	NE0071	100 YR - 1 Day		AE	14.20	14.60	
E0072	NE0072	100 YR - 1 Day			14.10	14.50	
E0074	NE0074	100 YR - 1 Day		AE	13.94	14.46	
E0075	NE0075	100 YR - 1 Day		AE	13.81	14.45	
E0077	NE0077	100 YR - 1 Day		AE	13.53	14.37	
E0079	NE0079	100 YR - 1 Day		AE	13.71	14.43	
E0080	NE0080	100 YR - 1 Day		AE	13.53	14.39	
E0090	NE0090	100 YR - 1 Day		AE	13.49	14.36	
E0100	NE0100	100 YR - 1 Day		AE	11.87	12.80	
E0110	NE0110	100 YR - 1 Day		AE	11.73	12.67	
E0120	NE0120	100 YR - 1 Day		AE	11.55	12.52	
E0125	NE0125	100 YR - 1 Day		AE	11.37	12.39	
E0127	NE0127	100 YR - 1 Day		AE	11.40	12.45	
E0128	NE0128	100 YR - 1 Day		AE	11.40	12.45	
E0129	NE0129	100 YR - 1 Day		AE	11.36	12.37	
E0130	NE0130	100 YR - 1 Day		AE	11.35	12.34	
E0140	NE0140	100 YR - 1 Day		AE	11.21	12.17	
E0145	NE0145	100 YR - 1 Day		AE	11.02	11.88	
E0150	NE0150	100 YR - 1 Day		AE	11.02	11.92	
E0160	NE0160	100 YR - 1 Day		AE	10.99	11.86	
E0165	NE0165	100 YR - 1 Day		AE	11.17	11.94	
E0166	NE0166	100 YR - 1 Day		AE	11.74	11.91	
E0167	NE0167	100 YR - 1 Day		AE	11.74	11.90	
E0168	NE0168	100 YR - 1 Day		AE	11.75	11.91	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
E0170	NE0170	100 YR - 1 Day		AE	10.92	11.76	
E0180	NE0180	100 YR - 1 Day		AE	10.71	11.59	
E0510	NE0510	100 YR - 1 Day		AE	12.77	12.76	
E0520	NE0520	100 YR - 1 Day		AE	12.77	12.76	
E0530	NE0530	100 YR - 1 Day		AE	12.74	12.75	
E0540	NE0540	100 YR - 1 Day		AE	12.74	12.74	
E0555	NE0555	100 YR - 1 Day		AE	11.48	12.77	
E0560	NE0560	100 YR - 1 Day		AE	11.47	12.60	
E0570	NE0570	100 YR - 1 Day		AE	11.44	12.49	
E0580	NE0580	100 YR - 1 Day		AE	11.42	12.44	
E0890	NE0890	100 YR - 1 Day		AE	11.42	12.45	
E2010	NE2010	100 YR - 1 Day		AE	11.19	11.62	
E2020	NE2020	100 YR - 1 Day		AE	10.28	11.56	
E2030	NE2030	100 YR - 1 Day		AE	10.27	11.47	
E2041	NE2041	100 YR - 1 Day		AE	10.70	11.59	
E2043	NE2043	100 YR - 1 Day		AE	10.34	11.47	
E2045	NE2045	100 YR - 1 Day		AE	10.28	11.46	
E2049	NE2049	100 YR - 1 Day		AE	10.27	11.46	
E2050	NE2050	100 YR - 1 Day		AE	10.27	11.46	
E2060	NE2060	100 YR - 1 Day		AE	10.27	11.46	
E2510	NE2510	100 YR - 1 Day		AE	10.23	11.41	
E2530	NE2530	100 YR - 1 Day		AE	10.23	11.41	
E2540	NE2540	100 YR - 1 Day		AE	10.23	11.41	
E3010	NE3010	100 YR - 1 Day		AE	13.35	13.33	
E3015	NE3015	100 YR - 1 Day		AE	13.35	13.33	
E3020	NE3020	100 YR - 1 Day		AE	12.66	12.68	
E3051	NE3051	100 YR - 1 Day		AE	12.17	12.16	
E3053	NE3053	100 YR - 1 Day		AE	12.31	12.32	
E3060	NE3060	100 YR - 1 Day		AE	12.42	12.45	
E3080	NE3080	100 YR - 1 Day		AE	11.93	12.07	
E3090	NE3090	100 YR - 1 Day		AE	11.93	12.07	
E3095	NE3095	100 YR - 1 Day		AE	11.78	11.94	
E3112	NE3112	100 YR - 1 Day		AE	11.80	11.90	
E3113	NE3113	100 YR - 1 Day		AE	11.87	11.91	
E3115	NE3115	100 YR - 1 Day		AE	11.86	11.91	
E3118	NE3118	100 YR - 1 Day		AE	11.86	11.91	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
E3120	NE3120	100 YR - 1 Day		AE	11.65	11.81	
E3125	NE3125	100 YR - 1 Day		AE	11.43	11.59	
E3130	NE3130	100 YR - 1 Day		AE	11.43	11.59	
E3140	NE3140	100 YR - 1 Day		AE	11.05	11.43	
E3150	NE3150	100 YR - 1 Day		AE	11.04	11.43	
E3160	NE3160	100 YR - 1 Day		AE	10.96	11.41	
E3170	NE3170	100 YR - 1 Day		AE	10.94	11.41	
E5010	NE5010	100 YR - 1 Day		AE	17.91	18.20	
E5020	NE5020	100 YR - 1 Day		AE	17.91	18.20	
E5025	NE5025	100 YR - 1 Day		AE	17.22	17.50	
E5030	NE5030	100 YR - 1 Day		AE	17.22	17.37	
E5040	NE5040	100 YR - 1 Day		AE	17.06	17.29	
E5050	NE5050	100 YR - 1 Day		AE	16.96	17.14	
E5053	NE5053	100 YR - 1 Day		AE	17.49	17.64	
E5054	NE5054	100 YR - 1 Day		AE	17.42	17.60	
E5055	NE5055	100 YR - 1 Day			16.97	17.31	
E5056	NE5056	100 YR - 1 Day		AE	16.85	17.30	
E5057	NE5057	100 YR - 1 Day		AE	16.49	17.02	
E5058	NE5058	100 YR - 1 Day		AE	16.46	17.02	
E5059	NE5059	100 YR - 1 Day		AE	16.46	17.02	
E5061	NE5061	100 YR - 1 Day		AE	17.02	17.24	
E5063	NE5063	100 YR - 1 Day		AE	16.81	17.17	
E5069	NE5069	100 YR - 1 Day		AE	16.47	16.48	
E5070	NE5070	100 YR - 1 Day		AE	15.83	16.00	
E5080	NE5080	100 YR - 1 Day		AE	15.81	16.00	
E5085	NE5085	100 YR - 1 Day		AE	15.10	15.18	
E5510	NE5510	100 YR - 1 Day		AE	15.48	15.50	
E5512	NE5512	100 YR - 1 Day		AE	16.47	16.48	
E5515	NE5515	100 YR - 1 Day		AE	16.29	16.30	
E5520	NE5520	100 YR - 1 Day			15.34	15.35	
E5525	NE5525	100 YR - 1 Day		AE	14.88	14.91	
E5527	NE5527	100 YR - 1 Day		AE	14.93	14.97	
E5530	NE5530	100 YR - 1 Day		AE	14.67	14.69	
E5540	NE5540	100 YR - 1 Day		AE	14.64	14.67	
E6010	NE6010	100 YR - 1 Day		AE	16.41	16.76	
E6020	NE6020	100 YR - 1 Day	A3	AE	15.74	16.67	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
E6030	NE6030	100 YR - 1 Day	A3	AE	15.45	15.96	
E6031	NE6031	100 YR - 1 Day		AE	14.84	14.80	
E6032	NE6032	100 YR - 1 Day	A3	AE	13.94	14.33	
E6033	NE6033	100 YR - 1 Day	A3	AE	13.93	14.33	
E6034	NE6034	100 YR - 1 Day		AE	13.91	14.33	
E6035	NE6035	100 YR - 1 Day	A3	AE	13.91	14.33	
E6036	NE6036	100 YR - 1 Day	A3	AE	13.91	14.32	
E6037	NE6037	100 YR - 1 Day		AE	14.67	15.09	
E6038	NE6038	100 YR - 1 Day	A3	AE	14.67	15.09	
E6039	NE6039	100 YR - 1 Day		AE	14.67	15.09	
E6040	NE6040	100 YR - 1 Day		X	13.40	13.37	
E6041	NE6041	100 YR - 1 Day		AE	13.40	13.38	
E6042	NE6042	100 YR - 1 Day		AE	13.40	13.37	
E6043	NE6043	100 YR - 1 Day		AE	13.53	13.45	
E6046	NE6046	100 YR - 1 Day		AE	12.63	12.58	
E6047	NE6047	100 YR - 1 Day		AE	14.55	14.56	
E6048	NE6048	100 YR - 1 Day		AE	13.18	13.58	
E6051	NE6051	100 YR - 1 Day		AE	14.75	15.09	
E6052	NE6052	100 YR - 1 Day		AE	14.75	15.08	
E6053	NE6053	100 YR - 1 Day		X	13.61	13.61	
E6054	NE6054	100 YR - 1 Day		X	13.43	13.41	
E6055	NE6055	100 YR - 1 Day		AE	13.18	13.58	
E6060	NE6060	100 YR - 1 Day		AE	12.64	12.90	
E7010	NE7010	100 YR - 1 Day			16.95	16.95	
E7020	NE7020	100 YR - 1 Day			14.35	14.45	
E7030	NE7030	100 YR - 1 Day		AE	13.80	14.40	
E7040	NE7040	100 YR - 1 Day			13.80	14.40	
E7050	NE7050	100 YR - 1 Day			14.68	14.66	
E7053	NE7053	100 YR - 1 Day		AE	13.67	14.29	
E7055	NE7055	100 YR - 1 Day		AE	13.66	14.28	
E7080	NE7080	100 YR - 1 Day		AE	13.65	14.28	
E7090	NE7090	100 YR - 1 Day		AE	13.57	14.18	
E7100	NE7100	100 YR - 1 Day		AE	13.57	14.03	
E7102	NE7102	100 YR - 1 Day		AE	12.22	12.99	
E7103	NE7103	100 YR - 1 Day		AE	12.22	12.92	
E7104	NE7104	100 YR - 1 Day		AE	12.04	12.80	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
E7105	NE7105	100 YR - 1 Day			12.04	12.80	
E7107	NE7107	100 YR - 1 Day		AE	12.12	12.86	
E7110	NE7110	100 YR - 1 Day		AE	12.04	12.81	
E7120	NE7120	100 YR - 1 Day		AE	12.02	12.77	
E7130	NE7130	100 YR - 1 Day		AE	11.81	12.76	
E7135	NE7135	100 YR - 1 Day		AE	12.49	12.44	
E7138	NE7138	100 YR - 1 Day		AE	11.80	12.74	
E7140	NE7140	100 YR - 1 Day		AE	11.59	12.05	
E7150	NE7150	100 YR - 1 Day			11.54	12.00	
E7505	NE7505	100 YR - 1 Day		AE	17.17	16.85	
E7507	NE7507	100 YR - 1 Day		AE	16.18	16.13	
E7509	NE7509	100 YR - 1 Day			15.33	14.95	
E7510	NE7510	100 YR - 1 Day			13.74	14.31	
E7512	NE7512	100 YR - 1 Day		AE	19.17	19.15	
E7514	NE7514	100 YR - 1 Day		AE	18.87	19.06	
E7516	NE7516	100 YR - 1 Day		AE	18.87	19.05	
E7517	NE7517	100 YR - 1 Day		AE	18.86	19.03	
E7518	NE7518	100 YR - 1 Day		AE	18.49	18.49	
E7519	NE7519	100 YR - 1 Day		AE	16.75	16.69	
E7520	NE7520	100 YR - 1 Day		AE	13.70	14.31	
E7525	NE7525	100 YR - 1 Day		X	17.53	17.37	
E7530	NE7530	100 YR - 1 Day		AE	13.66	14.29	
E7540	NE7540	100 YR - 1 Day		AE	13.66	14.28	
E7545	NE7545	100 YR - 1 Day			14.13	14.55	
E7547	NE7547	100 YR - 1 Day			12.93	13.04	
E7550	NE7550	100 YR - 1 Day		AE	12.67	12.73	
E7560	NE7560	100 YR - 1 Day			12.52	12.51	
E7580	NE7580	100 YR - 1 Day		AE	11.84	12.15	
E9008	NE9008	100 YR - 1 Day		AE	10.94	11.67	
E9009	NE9009	100 YR - 1 Day		AE	10.88	11.80	
E9010	NE9010	100 YR - 1 Day		AE	10.86	11.80	
E9020	NE9020	100 YR - 1 Day		AE	10.89	11.64	
E9025	NE9025	100 YR - 1 Day		AE	10.77	11.64	
E9030	NE9030	100 YR - 1 Day		AE	10.89	11.64	
E9040	NE9040	100 YR - 1 Day		AE	10.89	11.64	
E9045	NE9045	100 YR - 1 Day		AE	11.02	11.64	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
E9047	NE9047	100 YR - 1 Day		AE	11.38	12.07	
E9050	NE9050	100 YR - 1 Day		AE	10.76	11.63	
E9060	NE9060	100 YR - 1 Day		AE	10.76	11.63	
E9065	NE9065	100 YR - 1 Day		AE	10.71	11.63	
E9070	NE9070	100 YR - 1 Day		AE	10.71	11.63	
E9080	NE9080	100 YR - 1 Day		AE	10.44	11.39	
E9090	NE9090	100 YR - 1 Day		AE	10.43	11.39	
E9100	NE9100	100 YR - 1 Day		AE	10.23	11.35	
E9110	NE9110	100 YR - 1 Day		AE	10.23	11.35	
E9510	NE9510	100 YR - 1 Day			10.10	11.24	
E9520	NE9520	100 YR - 1 Day			9.94	11.24	
E9602	NE9602	100 YR - 1 Day		X	12.03	11.99	
E9604	NE9604	100 YR - 1 Day		AE	12.64	12.56	
E9606	NE9606	100 YR - 1 Day		X	12.46	12.22	
E9608	NE9608	100 YR - 1 Day			12.44	12.20	
E9610	NE9610	100 YR - 1 Day		X	12.52	12.24	
E9611	NE9611	100 YR - 1 Day		X	12.55	12.25	
E9612	NE9612	100 YR - 1 Day		AE	12.53	12.22	
E9620	NE9620	100 YR - 1 Day		X	12.55	12.25	
E9626	NE9626	100 YR - 1 Day		X	12.48	12.24	
E9630	NE9630	100 YR - 1 Day		AE	11.96	11.92	
E9700	NE9700	100 YR - 1 Day		AE	12.36	12.38	
F0010	NF0010	100 YR - 1 Day		AE	20.16	20.93	
F0020	NF0020	100 YR - 1 Day		AE	17.50	18.63	
F0022	NF0022	100 YR - 1 Day		AE	18.75	18.86	
F0025	NF0025	100 YR - 1 Day		AE	18.75	18.85	
F0030	NF0030	100 YR - 1 Day		AE	17.47	18.58	
F0032	NF0032	100 YR - 1 Day			19.18	19.48	
F0034	NF0034	100 YR - 1 Day		AE	18.26	18.77	
F0036	NF0036	100 YR - 1 Day		AE	17.69	18.59	
F0038	NF0038	100 YR - 1 Day		AE	17.51	18.59	
F0040	NF0040	100 YR - 1 Day		AE	17.45	18.56	
F0070	NF0070	100 YR - 1 Day		AE	14.58	16.11	
F0082	NF0082	100 YR - 1 Day		AE	17.44	17.27	
F0085	NF0085	100 YR - 1 Day		AE	17.13	16.58	
F0088	NF0088	100 YR - 1 Day		AE	17.07	16.51	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
F0090	NF0090	100 YR - 1 Day		AE	14.23	15.43	
F0092	NF0092	100 YR - 1 Day		AE	18.85	18.71	
F0094	NF0094	100 YR - 1 Day		AE	18.85	18.62	
F0096	NF0096	100 YR - 1 Day		AE	17.73	16.87	
F0098	NF0098	100 YR - 1 Day		AE	14.16	15.32	
F0100	NF0100	100 YR - 1 Day		AE	14.15	15.31	
F0110	NF0110	100 YR - 1 Day		AE	14.06	15.18	
F0120	NF0120	100 YR - 1 Day		AE	13.95	15.05	
F0122	NF0122	100 YR - 1 Day		AE	14.78	15.08	
F0124	NF0124	100 YR - 1 Day		AE	14.32	15.08	
F0126	NF0126	100 YR - 1 Day		AE	13.97	15.08	
F0128	NF0128	100 YR - 1 Day		AE	13.97	15.07	
F0140	NF0140	100 YR - 1 Day		AE	13.82	14.96	
F0150	NF0150	100 YR - 1 Day		AE	11.83	12.94	
F0152	NF0152	100 YR - 1 Day		AE	12.53	12.96	
F0153	NF0153	100 YR - 1 Day		AE	15.06	15.08	
F0154	NF0154	100 YR - 1 Day		AE	11.93	12.92	
F0155	NF0155	100 YR - 1 Day		AE	15.09	15.19	
F0156	NF0156	100 YR - 1 Day		AE	11.85	12.88	
F0158	NF0158	100 YR - 1 Day		AE	11.84	12.86	
F0160	NF0160	100 YR - 1 Day		AE	11.69	12.78	
F0170	NF0170	100 YR - 1 Day		AE	11.62	12.67	
F0180	NF0180	100 YR - 1 Day		AE	11.40	12.45	
F0187	NF0187	100 YR - 1 Day		AE	12.96	12.92	
F0188	NF0188	100 YR - 1 Day		AE	12.98	12.93	
F0190	NF0190	100 YR - 1 Day		AE	11.28	12.26	
F0210	NF0210	100 YR - 1 Day		AE	11.06	12.06	
F0220	NF0220	100 YR - 1 Day		AE	10.96	11.91	
F0229	NF0229	100 YR - 1 Day		AE	17.49	18.58	
F0230	NF0230	100 YR - 1 Day		AE	10.88	11.82	
F1010	NF1010	100 YR - 1 Day		AE	14.23	14.60	
F1020	NF1020	100 YR - 1 Day		AE	14.23	14.61	
F1030	NF1030	100 YR - 1 Day			14.23	14.62	
F1040	NF1040	100 YR - 1 Day		AE	13.95	15.04	
F2010	NF2010	100 YR - 1 Day		AE	12.28	12.87	
F2020	NF2020	100 YR - 1 Day		AE	12.28	12.87	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
F2025	NF2025	100 YR - 1 Day		AE	12.21	12.86	
F2030	NF2030	100 YR - 1 Day		AE	12.18	12.86	
F2040	NF2040	100 YR - 1 Day		AE	11.63	12.69	
F2050	NF2050	100 YR - 1 Day		AE	11.64	12.69	
G0003	NG0003	100 YR - 1 Day		AE	22.57	22.96	
G0008	NG0008	100 YR - 1 Day		AE	22.56	23.39	
G0010	NG0010	100 YR - 1 Day		AE	22.51	22.82	
G0020	NG0020	100 YR - 1 Day		AE	22.50	22.80	
G0030	NG0030	100 YR - 1 Day		AE	22.50	22.78	
G0040	NG0040	100 YR - 1 Day		AE	22.50	22.78	
G0050	NG0050	100 YR - 1 Day			20.64	21.45	
G0053	NG0053	100 YR - 1 Day		AE	21.54	21.68	
G0057	NG0057	100 YR - 1 Day		AE	21.49	21.62	
G0060	NG0060	100 YR - 1 Day		AE	20.63	21.43	
G0080	NG0080	100 YR - 1 Day		AE	20.63	21.38	
G0090	NG0090	100 YR - 1 Day		AE	20.63	21.33	
G0110	NG0110	100 YR - 1 Day		AE	20.61	21.24	
G0120	NG0120	100 YR - 1 Day		AE	19.75	20.99	
G0130	NG0130	100 YR - 1 Day		AE	19.73	20.92	
G0140	NG0140	100 YR - 1 Day		AE	19.68	20.78	
G0150	NG0150	100 YR - 1 Day		AE	19.65	20.70	
G0170	NG0170	100 YR - 1 Day		AE	19.37	20.47	
G0180	NG0180	100 YR - 1 Day		AE	19.34	20.41	
G0190	NG0190	100 YR - 1 Day		AE	19.31	20.31	
G0200	NG0200	100 YR - 1 Day		AE	19.27	20.27	
G0210	NG0210	100 YR - 1 Day		AE	17.53	18.60	
G0215	NG0215	100 YR - 1 Day		AE	17.41	18.48	
G0216	NG0216	100 YR - 1 Day		AE	17.30	18.26	
G0217	NG0217	100 YR - 1 Day		AE	17.18	18.05	
G0218	NG0218	100 YR - 1 Day		AE	18.45	18.45	
G0219	NG0219	100 YR - 1 Day		AE	18.45	18.50	
G0220	NG0220	100 YR - 1 Day		AE	18.16	18.20	
G0221	NG0221	100 YR - 1 Day		AE	18.04	18.08	
G0222	NG0222	100 YR - 1 Day		AE	16.74	16.78	
G0223	NG0223	100 YR - 1 Day		AE	17.16	17.54	
G0224	NG0224	100 YR - 1 Day		AE	17.11	17.53	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
G0226	NG0226	100 YR - 1 Day		AE	16.99	17.53	
G0227	NG0227	100 YR - 1 Day		AE	17.00	17.62	
G0229	NG0229	100 YR - 1 Day		AE	17.00	17.66	
G0230	NG0230	100 YR - 1 Day		AE	17.15	17.93	
G0240	NG0240	100 YR - 1 Day		AE	17.00	17.57	
G0245	NG0245	100 YR - 1 Day		AE	16.03	16.41	
G0250	NG0250	100 YR - 1 Day		AE	16.85	17.32	
G0252	NG0252	100 YR - 1 Day		AE	16.18	16.58	
G0254	NG0254	100 YR - 1 Day		AE	16.23	16.61	
G0256	NG0256	100 YR - 1 Day		AE	15.87	16.16	
G0260	NG0260	100 YR - 1 Day		AE	16.69	17.05	
G0263	NG0263	100 YR - 1 Day		AE	16.23	16.61	
G0266	NG0266	100 YR - 1 Day		AE	15.81	16.07	
G0270	NG0270	100 YR - 1 Day		AE	16.60	16.93	
G0280	NG0280	100 YR - 1 Day		AE	14.67	15.59	
G1010	NG1010	100 YR - 1 Day		AE	21.50	21.99	
G1020	NG1020	100 YR - 1 Day		AE	21.51	21.99	
G1030	NG1030	100 YR - 1 Day		AE	21.55	22.15	
G1040	NG1040	100 YR - 1 Day		AE	21.56	22.16	
G1050	NG1050	100 YR - 1 Day		AE	21.89	22.19	
G1060	NG1060	100 YR - 1 Day		AE	21.90	22.19	
G1510	NG1510	100 YR - 1 Day		AE	22.45	23.01	
G1520	NG1520	100 YR - 1 Day		AE	22.45	23.01	
G1530	NG1530	100 YR - 1 Day		AE	22.45	23.01	
G1540	NG1540	100 YR - 1 Day		AE	22.45	23.01	
G2020	NG2020	100 YR - 1 Day			22.62	22.59	
G2030	NG2030	100 YR - 1 Day		AE	21.96	22.12	
G2032	NG2032	100 YR - 1 Day		AE	22.52	22.52	
G2034	NG2034	100 YR - 1 Day		AE	22.01	22.14	
G2036	NG2036	100 YR - 1 Day		AE	21.99	22.12	
G2040	NG2040	100 YR - 1 Day		AE	21.96	22.12	
G2050	NG2050	100 YR - 1 Day		AE	21.93	22.10	
G2070	NG2070	100 YR - 1 Day		AE	21.38	21.91	
G2080	NG2080	100 YR - 1 Day		AE	21.06	21.90	
G2090	NG2090	100 YR - 1 Day		AE	21.04	21.88	
G2100	NG2100	100 YR - 1 Day		AE	20.99	21.70	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
G2103	NG2103	100 YR - 1 Day		AE	20.90	21.59	
G2107	NG2107	100 YR - 1 Day		AE	20.90	21.59	
G2109	NG2109	100 YR - 1 Day		AE	20.91	21.59	
G2110	NG2110	100 YR - 1 Day		AE	20.91	21.59	
G2130	NG2130	100 YR - 1 Day		AE	20.90	21.58	
G2150	NG2150	100 YR - 1 Day		AE	20.87	21.56	
G3010	NG3010	100 YR - 1 Day		AE	21.26	21.35	
G3020	NG3020	100 YR - 1 Day		AE	21.23	21.34	
G3030	NG3030	100 YR - 1 Day		AE	21.23	21.34	
G3040	NG3040	100 YR - 1 Day		AE	21.23	21.35	
G3050	NG3050	100 YR - 1 Day		AE	21.23	21.35	
G4010	NG4010	100 YR - 1 Day		AE	20.47	20.97	
G4020	NG4020	100 YR - 1 Day		AE	20.47	20.97	
G4023	NG4023	100 YR - 1 Day		AE	20.73	21.41	
G4027	NG4027	100 YR - 1 Day		AE	20.66	21.37	
G4030	NG4030	100 YR - 1 Day		AE	20.62	21.32	
G4040	NG4040	100 YR - 1 Day		AE	20.63	21.33	
G4050	NG4050	100 YR - 1 Day		AE	20.62	21.32	
G5210	NG5210	100 YR - 1 Day		AE	22.04	22.64	
G5220	NG5220	100 YR - 1 Day		AE	22.04	22.64	
G5230	NG5230	100 YR - 1 Day		AE	22.04	22.64	
G5240	NG5240	100 YR - 1 Day		AE	22.04	22.64	
G5510	NG5510	100 YR - 1 Day			22.25	22.90	
G5520	NG5520	100 YR - 1 Day		AE	22.41	22.97	
G5535	NG5535	100 YR - 1 Day		AE	22.41	23.01	
G5540	NG5540	100 YR - 1 Day		AE	22.41	23.01	
G5545	NG5545	100 YR - 1 Day		AE	22.41	23.01	
G5550	NG5550	100 YR - 1 Day		AE	22.41	23.01	
G5560	NG5560	100 YR - 1 Day		AE	22.40	23.01	
G5580	NG5580	100 YR - 1 Day		AE	22.38	23.01	
G5810	NG5810	100 YR - 1 Day		AE	22.03	22.51	
G5815	NG5815	100 YR - 1 Day		AE	22.40	23.24	
G5820	NG5820	100 YR - 1 Day		AE	22.02	22.49	
G5830	NG5830	100 YR - 1 Day		AE	22.02	22.48	
G5835	NG5835	100 YR - 1 Day		AE	22.07	22.63	
G5840	NG5840	100 YR - 1 Day		AE	22.01	22.47	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
G5850	NG5850	100 YR - 1 Day			21.94	22.27	
G5860	NG5860	100 YR - 1 Day			19.81	21.12	
G5863	NG5863	100 YR - 1 Day		X	20.45	21.10	
G5867	NG5867	100 YR - 1 Day		AE	19.81	21.10	
G5870	NG5870	100 YR - 1 Day		AE	19.81	21.10	
G5880	NG5880	100 YR - 1 Day		AE	19.78	21.02	
G5890	NG5890	100 YR - 1 Day		AE	19.75	20.95	
G6010	NG6010	100 YR - 1 Day			20.00	20.82	
G6020	NG6020	100 YR - 1 Day		AE	19.97	20.82	
G6030	NG6030	100 YR - 1 Day		AE	19.87	20.77	
G6050	NG6050	100 YR - 1 Day		AE	19.68	20.77	
G7010	NG7010	100 YR - 1 Day		AE	19.90	20.60	
G7012	NG7012	100 YR - 1 Day		AE	19.90	20.58	
G7015	NG7015	100 YR - 1 Day		AE	19.90	20.59	
G7020	NG7020	100 YR - 1 Day		AE	19.90	20.60	
G7030	NG7030	100 YR - 1 Day			19.89	20.60	
G7040	NG7040	100 YR - 1 Day			19.65	20.67	
G7050	NG7050	100 YR - 1 Day		AE	19.65	20.68	
G8005	NG8005	100 YR - 1 Day		AE	17.44	20.03	
G8010	NG8010	100 YR - 1 Day		AE	17.43	20.03	
G8040	NG8040	100 YR - 1 Day		AE	17.41	18.71	
G8042	NG8042	100 YR - 1 Day		AE	18.68	18.61	
G8044	NG8044	100 YR - 1 Day			17.26	18.14	
G8045	NG8045	100 YR - 1 Day			17.20	17.98	
G8048	NG8048	100 YR - 1 Day		AE	17.00	17.66	
G8050	NG8050	100 YR - 1 Day		AE	17.41	18.66	
H0002	NH0002	100 YR - 1 Day		AE	17.49	18.64	
H0004	NH0004	100 YR - 1 Day		AE	17.49	18.63	
H0006	NH0006	100 YR - 1 Day		AE	17.45	18.60	
H0008	NH0008	100 YR - 1 Day			17.40	18.25	
H0010	NH0010	100 YR - 5 Day	A3 F	AE	15.66	17.52	
H0020	NH0020	100 YR - 5 Day	A3 F	AE	15.43	17.21	
H0030	NH0030	100 YR - 5 Day	A3 F	AE	14.96	16.64	
H0040	NH0040	100 YR - 5 Day	A3 F	AE	14.94	16.61	
H0050	NH0050	100 YR - 5 Day	A3 F	AE	14.79	16.19	
H0060	NH0060	100 YR - 5 Day	A3 F	AE	14.46	15.82	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
H0070	NH0070	100 YR - 5 Day	A3 F	AE	13.78	15.11	
H0072	NH0072	100 YR - 5 Day	A3 F	AE	13.51	14.68	
H0074	NH0074	100 YR - 5 Day	A3 F	AE	13.76	15.10	
H0076	NH0076	100 YR - 5 Day	A3 F	AE	13.46	14.62	
H0080	NH0080	100 YR - 5 Day	A3 F	AE	13.35	14.50	
H0090	NH0090	100 YR - 5 Day	A3 F	AE	12.96	14.02	
H0100	NH0100	100 YR - 5 Day	A3 F	AE	12.81	13.82	
H0110	NH0110	100 YR - 5 Day	A3 F	AE	12.73	13.71	
H0120	NH0120	100 YR - 5 Day	A3 F	AE	12.55	13.51	
H0130	NH0130	100 YR - 5 Day	A3 F	AE	12.25	13.14	
H0140	NH0140	100 YR - 5 Day	A3 F	AE	11.55	12.55	
H0150	NH0150	100 YR - 5 Day	A4 F	AE	11.28	12.42	
H0160	NH0160	100 YR - 5 Day	A4 F	AE	10.89	12.22	
H6010	NH6010	100 YR - 1 Day		AE	11.77	12.40	
H6020	NH6020	100 YR - 1 Day		AE	11.77	12.39	
H6035	NH6035	100 YR - 1 Day		AE	11.77	12.39	
H6050	NH6050	100 YR - 1 Day		AE	11.18	12.39	
H6060	NH6060	100 YR - 1 Day		AE	10.97	12.39	
H6065	NH6065	100 YR - 1 Day		AE	10.97	12.37	
H6080	NH6080	100 YR - 1 Day		AE	10.97	12.39	
H6100	NH6100	100 YR - 1 Day		AE	10.90	12.38	
H6105	NH6105	100 YR - 5 Day	A3	AE	11.30	12.41	
H6110	NH6110	100 YR - 5 Day	A4	AE	10.90	12.42	
H8010	NH8010	100 YR - 1 Day		AE	19.89	19.98	
H8020	NH8020	100 YR - 1 Day		AE	19.82	19.86	
H8030	NH8030	100 YR - 1 Day		AE	19.69	19.71	
H8060	NH8060	100 YR - 1 Day		AE	18.72	18.94	
H8075	NH8075	100 YR - 1 Day		AE	19.40	19.71	
H8077	NH8077	100 YR - 1 Day		AE	19.44	19.72	
H8080	NH8080	100 YR - 1 Day		AE	18.60	18.81	
H8090	NH8090	100 YR - 1 Day	A3	AE	17.92	17.95	
H9000	NH9000	100 YR - 1 Day	A3	AE	12.43	12.67	
I0012	NI0012	100 YR - 1 Day		AE	21.07	21.93	
I0015	NI0015	100 YR - 1 Day		AE	21.07	21.92	
I0016	NI0016	100 YR - 1 Day		AE	22.52	22.58	
I0018	NI0018	100 YR - 1 Day		AE	21.06	21.92	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
I0020	NI0020	100 YR - 1 Day		AE	21.06	21.92	
I0025	NI0025	100 YR - 1 Day		AE	21.10	21.86	
I0030	NI0030	100 YR - 1 Day		AE	21.01	21.86	
I0040	NI0040	100 YR - 1 Day		AE	20.46	21.04	
I0050	NI0050	100 YR - 1 Day		AE	17.76	18.80	
I0055	NI0055	100 YR - 1 Day			18.10	18.77	
I0059	NI0059	100 YR - 1 Day		AE	18.02	18.77	
I0060	NI0060	100 YR - 1 Day		AE	17.73	18.76	
I0062	NI0062	100 YR - 1 Day		AE	20.82	20.93	
I0070	NI0070	100 YR - 1 Day		AE	17.67	18.65	
I0080	NI0080	100 YR - 1 Day		AE	17.63	18.58	
I0082	NI0082	100 YR - 1 Day		AE	20.97	21.05	
I0085	NI0085	100 YR - 1 Day		AE	19.38	19.82	
I0090	NI0090	100 YR - 1 Day		AE	17.57	18.49	
I0095	NI0095	100 YR - 1 Day		AE	18.52	18.81	
I0100	NI0100	100 YR - 1 Day		AE	17.50	18.36	
I0105	NI0105	100 YR - 1 Day		AE	18.39	18.51	
I0110	NI0110	100 YR - 1 Day		AE	17.36	18.07	
I0130	NI0130	100 YR - 1 Day		AE	14.02	14.83	
I0132	NI0132	100 YR - 1 Day		AE	14.56	14.56	
I0133	NI0133	100 YR - 1 Day		AE	17.25	17.42	
I0135	NI0135	100 YR - 1 Day		AE	13.96	14.51	
I0138	NI0138	100 YR - 1 Day		AE	13.86	14.44	
I0140	NI0140	100 YR - 1 Day		AE	13.82	14.37	
I0150	NI0150	100 YR - 1 Day		AE	13.74	14.19	
I0155	NI0155	100 YR - 1 Day		AE	13.26	13.39	
I0160	NI0160	100 YR - 1 Day		AE	13.62	14.08	
I0170	NI0170	100 YR - 1 Day		AE	12.23	13.23	
I0172	NI0172	100 YR - 1 Day		AE	13.05	13.37	
I0174	NI0174	100 YR - 1 Day		AE	13.04	13.36	
I0176	NI0176	100 YR - 1 Day		AE	12.78	13.32	
I0178	NI0178	100 YR - 1 Day		AE	12.47	13.28	
I0180	NI0180	100 YR - 1 Day		AE	12.19	13.17	
I0181	NI0181	100 YR - 1 Day		AE	12.47	13.32	
I0182	NI0182	100 YR - 1 Day		AE	12.06	12.97	
I0183	NI0183	100 YR - 1 Day			11.96	12.89	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
I0185	NI0185	100 YR - 1 Day		AE	11.88	12.64	
I0188	NI0188	100 YR - 1 Day		AE	11.88	12.64	
I0190	NI0190	100 YR - 1 Day		AE	11.93	12.78	
I0192	NI0192	100 YR - 1 Day		AE	12.45	13.31	
I0193	NI0193	100 YR - 1 Day		AE	11.82	12.60	
I0195	NI0195	100 YR - 1 Day		AE	12.45	13.32	
I1010	NI1010	100 YR - 1 Day			15.11	15.84	
I1015	NI1015	100 YR - 1 Day		AE	16.72	16.39	
I1020	NI1020	100 YR - 1 Day		AE	14.73	15.80	
I1030	NI1030	100 YR - 1 Day		AE	14.13	15.69	
I2010	NI2010	100 YR - 1 Day		AE	15.07	15.08	
I2020	NI2020	100 YR - 1 Day		AE	14.70	14.91	
I2030	NI2030	100 YR - 1 Day		AE	14.66	14.85	
I2040	NI2040	100 YR - 1 Day		AE	14.63	14.81	
I2050	NI2050	100 YR - 1 Day		AE	14.59	14.78	
I9020	NI9020	100 YR - 1 Day		AE	20.86	20.99	
I9022	NI9022	100 YR - 1 Day		AE	20.86	20.99	
I9024	NI9024	100 YR - 1 Day		AE	20.84	20.95	
J0005	NJ0005	100 YR - 1 Day		AE	25.29	27.09	
J0010	NJ0010	100 YR - 1 Day		AE	25.12	26.95	
J0020	NJ0020	100 YR - 1 Day		AE	25.04	26.88	
J0030	NJ0030	100 YR - 1 Day		AE	24.10	26.32	
J0040	NJ0040	100 YR - 1 Day		AE	24.01	26.25	
J0050	NJ0050	100 YR - 1 Day		AE	23.86	26.20	
J0070	NJ0070	100 YR - 1 Day		AE	23.75	26.14	
J0080	NJ0080	100 YR - 1 Day		AE	23.68	26.10	
J0090	NJ0090	100 YR - 1 Day		AE	23.60	26.03	
J0100	NJ0100	100 YR - 1 Day		AE	23.57	26.01	
J0103	NJ3520	100 YR - 1 Day			24.58	26.17	
J0104	NJ0080	100 YR - 1 Day			23.68	26.10	
J0105	NJ0100	100 YR - 1 Day			23.57	26.01	
J0110	NJ0110	100 YR - 1 Day		AE	21.89	22.73	
J0120	NJ0120	100 YR - 1 Day		AE	21.75	22.56	
J0130	NJ0130	100 YR - 1 Day		AE	21.58	22.36	
J0140	NJ0140	100 YR - 1 Day		AE	21.49	22.21	
J0142	NJ0142	100 YR - 1 Day		AE	20.97	21.56	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
J0143	NJ0143	100 YR - 1 Day		AE	20.97	21.54	
J0144	NJ0144	100 YR - 1 Day		AE	21.07	21.67	
J0145	NJ0145	100 YR - 1 Day		AE	21.27	21.90	
J0148	NJ0148	100 YR - 1 Day		AE	21.07	21.67	
J0150	NJ0150	100 YR - 1 Day		AE	21.07	21.67	
J0160	NJ0160	100 YR - 1 Day		AE	20.97	21.54	
J0162	NJ0162	100 YR - 1 Day		AE	20.68	21.11	
J0165	NJ0165	100 YR - 1 Day		AE	20.69	21.21	
J0168	NJ0168	100 YR - 1 Day		AE	20.71	21.23	
J0170	NJ0170	100 YR - 1 Day		AE	20.86	21.43	
J0172	NJ0172	100 YR - 1 Day		AE	20.98	21.55	
J0174	NJ0174	100 YR - 1 Day		AE	20.97	21.54	
J0176	NJ0176	100 YR - 1 Day		AE	20.97	21.54	
J0178	NJ0178	100 YR - 1 Day		AE	20.94	21.54	
J0180	NJ0180	100 YR - 1 Day		AE	20.69	21.26	
J0182	NJ0182	100 YR - 1 Day		AE	20.63	21.03	
J0184	NJ0184	100 YR - 1 Day		AE	20.63	21.02	
J0186	NJ0186	100 YR - 1 Day		AE	20.63	21.19	
J0188	NJ0188	100 YR - 1 Day		AE	20.61	21.19	
J0190	NJ0190	100 YR - 1 Day		AE	20.55	21.17	
J0192	NJ0192	100 YR - 1 Day		AE	20.67	21.44	
J0195	NJ0195	100 YR - 1 Day		AE	20.61	21.34	
J0198	NJ0198	100 YR - 1 Day		AE	20.61	21.34	
J0200	NJ0200	100 YR - 1 Day		AE	20.48	21.12	
J0210	NJ0210	100 YR - 1 Day		AE	20.37	21.06	
J1010	NJ1010	100 YR - 1 Day		AE	26.51	26.64	
J1020	NJ1020	100 YR - 1 Day		AE	26.51	26.64	
J1110	NJ1110	100 YR - 1 Day		AE	26.52	26.64	
J1120	NJ1120	100 YR - 1 Day		AE	26.52	26.64	
J1130	NJ1130	100 YR - 1 Day		AE	26.52	26.64	
J1210	NJ1210	100 YR - 1 Day		AE	26.81	26.90	
J1220	NJ1220	100 YR - 1 Day		AE	26.47	26.60	
J1310	NJ1310	100 YR - 1 Day		AE	26.52	26.64	
J1320	NJ1320	100 YR - 1 Day		AE	26.52	26.64	
J1330	NJ1330	100 YR - 1 Day		AE	26.49	26.61	
J1410	NJ1410	100 YR - 1 Day		AE	26.25	26.24	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
J1420	NJ1420	100 YR - 1 Day		AE	26.02	26.21	
J1501	NJ1501	100 YR - 1 Day		AE	26.93	26.95	
J1502	NJ1502	100 YR - 1 Day		AE	26.86	26.86	
J1503	NJ1503	100 YR - 1 Day		AE	26.92	26.93	
J1504	NJ1504	100 YR - 1 Day		AE	26.89	26.90	
J1505	NJ1505	100 YR - 1 Day		AE	26.86	26.86	
J1506	NJ1506	100 YR - 1 Day		AE	26.93	26.96	
J1510	NJ1510	100 YR - 1 Day		AE	26.86	26.86	
J1520	NJ1520	100 YR - 1 Day		AE	26.57	26.70	
J1530	NJ1530	100 YR - 1 Day		AE	26.51	26.64	
J1540	NJ1540	100 YR - 1 Day			26.50	26.62	
J1550	NJ1550	100 YR - 1 Day			26.50	26.62	
J1560	NJ1560	100 YR - 1 Day		AE	26.47	26.60	
J1570	NJ1570	100 YR - 1 Day		AE	26.35	26.46	
J1580	NJ1580	100 YR - 1 Day		AE	26.33	26.45	
J1590	NJ1590	100 YR - 1 Day		AE	26.00	26.21	
J1600	NJ1600	100 YR - 1 Day		AE	24.24	26.20	
J1610	NJ1610	100 YR - 1 Day		AE	23.86	26.20	
J2010	NJ2010	100 YR - 1 Day		AE	25.30	26.22	
J2020	NJ2020	100 YR - 1 Day		AE	25.09	26.22	
J2030	NJ2030	100 YR - 1 Day		AE	25.07	26.23	
J2110	NJ2110	100 YR - 1 Day		AE	24.40	26.22	
J2120	NJ2120	100 YR - 1 Day		AE	24.81	26.22	
J2210	NJ2210	100 YR - 1 Day		AE	24.60	26.18	
J2220	NJ2220	100 YR - 1 Day		AE	24.49	26.20	
J2230	NJ2230	100 YR - 1 Day		AE	24.37	26.20	
J2310	NJ2310	100 YR - 1 Day		AE	24.36	26.20	
J2320	NJ2320	100 YR - 1 Day		AE	24.36	26.20	
J2330	NJ2330	100 YR - 1 Day		AE	24.36	26.20	
J2410	NJ2410	100 YR - 1 Day		AE	25.03	26.26	
J2420	NJ2420	100 YR - 1 Day		AE	25.02	26.23	
J2430	NJ2430	100 YR - 1 Day		AE	25.02	26.21	
J2440	NJ2440	100 YR - 1 Day		AE	24.36	26.21	
J2450	NJ2450	100 YR - 1 Day		AE	24.36	26.20	
J2460	NJ2460	100 YR - 1 Day		AE	24.33	26.20	
J2470	NJ2470	100 YR - 1 Day		AE	24.04	26.15	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
J2480	NJ2480	100 YR - 1 Day		AE	24.03	26.15	
J2510	NJ2510	100 YR - 1 Day		AE	24.12	26.15	
J2520	NJ2520	100 YR - 1 Day		AE	24.12	26.15	
J2530	NJ2530	100 YR - 1 Day		AE	23.97	26.15	
J2540	NJ2540	100 YR - 1 Day		AE	23.94	26.15	
J2550	NJ2550	100 YR - 1 Day		AE	23.91	26.14	
J3010	NJ3010	100 YR - 1 Day		AE	25.17	26.21	
J3020	NJ3020	100 YR - 1 Day		AE	25.04	26.20	
J3030	NJ3030	100 YR - 1 Day		AE	24.82	26.20	
J3210	NJ3210	100 YR - 1 Day		AE	24.82	26.20	
J3520	NJ3520	100 YR - 1 Day		AE	24.58	26.17	
J3530	NJ3530	100 YR - 1 Day		AE	24.58	26.17	
J3540	NJ3540	100 YR - 1 Day		AE	24.55	26.17	
J3550	NJ3550	100 YR - 1 Day		AE	24.54	26.17	
J3810	NJ3810	100 YR - 1 Day		AE	24.97	26.41	
J3820	NJ3820	100 YR - 1 Day		AE	24.88	26.26	
J3830	NJ3830	100 YR - 1 Day		AE	24.87	26.26	
J3835	NJ3835	100 YR - 1 Day		AE	24.87	26.24	
J3838	NJ3838	100 YR - 1 Day		AE	24.87	26.24	
J3840	NJ3840	100 YR - 1 Day		AE	24.87	26.24	
J3850	NJ3850	100 YR - 1 Day		AE	24.82	26.20	
J3870	NJ3870	100 YR - 1 Day		AE	24.81	26.20	
J3880	NJ3880	100 YR - 1 Day		AE	24.71	26.19	
J3890	NJ3890	100 YR - 1 Day		AE	24.11	26.18	
J3900	NJ3900	100 YR - 1 Day		AE	23.75	26.17	
J3910	NJ3910	100 YR - 1 Day		AE	23.75	26.17	
J3920	NJ3920	100 YR - 1 Day		AE	23.75	26.16	
J4010	NJ4010	100 YR - 1 Day		AE	24.00	26.02	
J4020	NJ4020	100 YR - 1 Day		AE	23.91	26.02	
J4030	NJ4030	100 YR - 1 Day		AE	23.91	26.02	
J4040	NJ4040	100 YR - 1 Day		AE	23.84	26.02	
J4050	NJ4050	100 YR - 1 Day		AE	23.62	26.02	
J4060	NJ4060	100 YR - 1 Day		AE	23.61	26.02	
J4503	NJ4530	100 YR - 1 Day			23.83	26.02	
J4505	NB4121	100 YR - 1 Day			24.11	26.02	
J4510	NJ4510	100 YR - 1 Day		AE	24.00	26.02	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
J4520	NJ4520	100 YR - 1 Day		AE	23.84	26.02	
J4530	NJ4530	100 YR - 1 Day		AE	23.83	26.02	
J4540	NJ4540	100 YR - 1 Day		AE	23.71	26.02	
J4550	NJ4550	100 YR - 1 Day		AE	23.70	26.02	
J5005	NJ5005	100 YR - 1 Day			21.88	22.56	
J5015	NJ5015	100 YR - 1 Day		AE	21.81	22.56	
J5020	NJ5020	100 YR - 1 Day		AE	21.75	22.56	
J5022	NJ5022	100 YR - 1 Day		AE	23.12	23.02	
J5025	NJ5025	100 YR - 1 Day			23.08	23.00	
J5030	NJ5030	100 YR - 1 Day		AE	21.75	22.56	
J5040	NJ5040	100 YR - 1 Day		AE	21.75	22.56	
J6010	NJ6010	100 YR - 1 Day			21.71	22.25	
J6020	NJ6020	100 YR - 1 Day		AE	21.50	22.25	
J6030	NJ6030	100 YR - 1 Day		AE	21.50	22.25	
J6040	NJ6040	100 YR - 1 Day		AE	21.50	22.25	
J6050	NJ6050	100 YR - 1 Day		AE	21.50	22.24	
J7010	NJ7010	100 YR - 1 Day		AE	20.98	21.55	
J7013	NJ7013	100 YR - 1 Day		AE	21.55	21.74	
J7017	NJ7017	100 YR - 1 Day		AE	20.98	21.57	
J7020	NJ7020	100 YR - 1 Day		AE	20.98	21.55	
J7022	NJ7022	100 YR - 1 Day		AE	20.97	21.33	
J7025	NJ7025	100 YR - 1 Day		AE	20.97	21.48	
J7028	NJ7028	100 YR - 1 Day		AE	20.97	21.53	
J7030	NJ7030	100 YR - 1 Day		AE	20.97	21.55	
J9000	NJ9000	100 YR - 1 Day		AE	24.17	24.16	
J9100	NJ9100	100 YR - 1 Day		AE	24.17	24.19	
J9200	NJ9200	100 YR - 1 Day		AE	24.17	24.19	
K0005	NK0005	100 YR - 1 Day		AE	24.02	25.69	
K0010	NK0010	100 YR - 1 Day			24.02	25.87	
K0030	NK0030	100 YR - 1 Day			24.00	25.82	
K0035	NK0035	100 YR - 1 Day		AE	24.48	25.81	
K0040	NK0040	100 YR - 1 Day		AE	23.95	25.75	
K0050	NK0050	100 YR - 1 Day		AE	23.91	25.68	
K0070	NK0070	100 YR - 1 Day		AE	23.85	25.61	
K0077	NK0077	100 YR - 1 Day		AE	23.98	25.90	
K0080	NK0080	100 YR - 1 Day			23.83	25.59	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
K0088	NK0088	100 YR - 1 Day		AE	23.79	25.32	
K0090	NK0090	100 YR - 1 Day		AE	23.79	25.55	
K0095	NK0095	100 YR - 1 Day		AE	23.73	25.31	
K0100	NK0100	100 YR - 1 Day		AE	23.76	25.53	
K0110	NK0110	100 YR - 1 Day		AE	23.75	25.53	
K0118	NK0118	100 YR - 1 Day		AE	23.53	25.27	
K0119	NK0119	100 YR - 1 Day		AE	23.73	25.30	
K0120	NK0120	100 YR - 1 Day		AE	23.49	25.50	
K0123	NK0123	100 YR - 1 Day		AE	23.72	25.81	
K0135	NK0135	100 YR - 1 Day		AE	23.83	25.55	
K0140	NK0140	100 YR - 1 Day		AE	21.04	25.26	
K0141	NK0144	100 YR - 1 Day			23.13	25.25	
K0142	NK0142	100 YR - 1 Day		AE	21.44	23.63	
K0143	NK7882	100 YR - 1 Day			23.36	23.15	
K0144	NK0144	100 YR - 1 Day		AE	23.13	25.25	
K0145	NK0140	100 YR - 1 Day			21.04	25.26	
K0146	NK0146	100 YR - 1 Day			22.47	23.63	
K0148	NK0148	100 YR - 1 Day		AE	21.43	23.63	
K0150	NK0150	100 YR - 1 Day		AE	20.83	23.13	
K0158	NK0158	100 YR - 1 Day		AE	20.97	23.63	
K0160	NK0160	100 YR - 1 Day		AE	20.78	22.99	
K0170	NK0170	100 YR - 1 Day		AE	20.74	22.88	
K0174	NK0174	100 YR - 1 Day		AE	20.86	23.54	
K0175	NK0175	100 YR - 1 Day		AE	20.91	22.69	
K0180	NK0180	100 YR - 1 Day		AE	20.72	22.80	
K0185	NK0185	100 YR - 1 Day		AE	20.81	22.62	
K0190	NK0190	100 YR - 1 Day		AE	20.70	22.70	
K0200	NK0200	100 YR - 1 Day		AE	20.68	22.60	
K0210	NK0210	100 YR - 1 Day		AE	20.63	22.54	
K0226	NK0226	100 YR - 1 Day		AE	19.46	21.85	
K0230	NK0230	100 YR - 1 Day		AE	19.36	21.21	
K0233	NK0233	100 YR - 1 Day		AE	19.17	21.85	
K0237	NK0237	100 YR - 1 Day		AE	19.17	21.86	
K0242	NK0242	100 YR - 1 Day		AE	19.43	20.97	
K0245	NK0245	100 YR - 1 Day		AE	19.18	20.97	
K0246	NK0246	100 YR - 1 Day		AE	19.38	21.55	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
K0248	NK0248	100 YR - 1 Day		AE	19.17	20.97	
K0250	NK0250	100 YR - 1 Day		AE	19.17	20.97	
K0274	NK0274	100 YR - 1 Day		AE	18.89	20.62	
K0280	NK0280	100 YR - 1 Day		AE	18.89	20.62	
K0294	NK0294	100 YR - 1 Day		AE	18.59	20.64	
K0300	NK0300	100 YR - 1 Day		AE	18.45	20.00	
K0302	NK0302	100 YR - 1 Day		AE	20.33	20.36	
K0305	NK0305	100 YR - 1 Day		AE	20.32	20.35	
K0308	NK0308	100 YR - 1 Day		AE	20.24	20.31	
K0309	NK0309	100 YR - 1 Day		AE	19.67	20.06	
K0310	NK0310	100 YR - 1 Day		AE	18.02	19.29	
K0314	NK0314	100 YR - 1 Day		AE	17.52	18.68	
K0318	NK0318	100 YR - 1 Day		AE	17.49	18.61	
K0320	NK0320	100 YR - 1 Day		AE	17.49	18.59	
K0323	NK0323	100 YR - 1 Day		AE	18.59	18.71	
K0327	NK0327	100 YR - 1 Day		AE	18.56	18.71	
K0328	NK0328	100 YR - 1 Day		AE	17.22	18.28	
K0330	NK0330	100 YR - 1 Day		AE	17.19	18.27	
K1010	NK1010	100 YR - 1 Day		AE	24.58	25.68	
K1020	NK1020	100 YR - 1 Day		AE	24.58	25.69	
K1030	NK1030	100 YR - 1 Day		AE	24.53	25.69	
K1040	NK1040	100 YR - 1 Day		AE	24.41	25.69	
K1050	NK1050	100 YR - 1 Day		AE	24.37	25.69	
K1510	NK1510	100 YR - 1 Day		AE	24.01	25.81	
K2010	NK2010	100 YR - 1 Day		AE	24.45	25.28	
K2020	NK2020	100 YR - 1 Day		AE	24.27	25.31	
K2040	NK2040	100 YR - 1 Day		AE	24.26	25.31	
K2510	NK2510	100 YR - 1 Day			25.29	25.68	
K2520	NK2520	100 YR - 1 Day		AE	24.93	25.68	
K2530	NK2530	100 YR - 1 Day		AE	24.62	25.68	
K2540	NK2540	100 YR - 1 Day		AE	23.91	25.68	
K3010	NK3010	100 YR - 1 Day		AE	23.89	25.26	
K3020	NK3020	100 YR - 1 Day		AE	23.89	25.26	
K3030	NK3030	100 YR - 1 Day		AE	23.89	25.26	
K3040	NK3040	100 YR - 1 Day		AE	23.89	25.28	
K3050	NK3050	100 YR - 1 Day		AE	23.89	25.31	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
K3070	NK3070	100 YR - 1 Day		AE	23.85	25.31	
K4010	NK4010	100 YR - 1 Day		AE	24.22	25.85	
K4020	NK4020	100 YR - 1 Day		AE	24.22	25.86	
K4030	NK4030	100 YR - 1 Day		AE	24.10	25.86	
K4060	NK4060	100 YR - 1 Day		AE	23.91	25.86	
K4070	NK4070	100 YR - 1 Day		AE	23.80	25.86	
K5010	NK5010	100 YR - 1 Day		AE	21.55	22.64	
K5030	NK5030	100 YR - 1 Day		AE	21.55	22.64	
K5040	NK5040	100 YR - 1 Day		AE	21.54	22.64	
K5050	NK5050	100 YR - 1 Day		AE	21.53	22.64	
K5060	NK5060	100 YR - 1 Day		AE	21.39	22.64	
K6010	NK6010	100 YR - 1 Day		AE	21.93	23.65	
K6030	NK6030	100 YR - 1 Day		AE	21.92	23.64	
K6040	NK6040	100 YR - 1 Day		AE	21.92	23.63	
K6050	NK6050	100 YR - 1 Day		AE	21.91	23.56	
K6060	NK6060	100 YR - 1 Day		AE	21.90	23.56	
K6070	NK6070	100 YR - 1 Day		AE	21.88	23.54	
K6080	NK6080	100 YR - 1 Day		AE	21.85	23.54	
K7020	NK7020	100 YR - 1 Day		AE	20.58	22.35	
K7040	NK7040	100 YR - 1 Day		AE	20.76	21.96	
K7050	NK7050	100 YR - 1 Day		AE	20.76	21.96	
K7060	NK7060	100 YR - 1 Day		AE	20.76	21.96	
K7070	NK7070	100 YR - 1 Day		AE	20.70	21.96	
K7210	NK7210	100 YR - 1 Day		AE	21.57	22.64	
K7220	NK7220	100 YR - 1 Day		AE	21.57	22.64	
K7230	NK7230	100 YR - 1 Day		AE	21.55	22.65	
K7240	NK7240	100 YR - 1 Day		AE	21.58	22.75	
K7250	NK7250	100 YR - 1 Day		AE	21.58	22.75	
K7410	NK7410	100 YR - 1 Day			22.06	22.54	
K7420	NK7420	100 YR - 1 Day			22.06	22.54	
K7430	NK7430	100 YR - 1 Day		AE	22.05	22.55	
K7440	NK7440	100 YR - 1 Day		AE	22.04	22.59	
K7450	NK7450	100 YR - 1 Day		AE	22.04	22.59	
K7460	NK7460	100 YR - 1 Day		AE	22.04	22.59	
K7470	NK7470	100 YR - 1 Day		AE	21.61	22.61	
K7480	NK7480	100 YR - 1 Day		AE	21.21	22.61	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
K7490	NK7490	100 YR - 1 Day		AE	21.15	22.62	
K7610	NK7610	100 YR - 1 Day		AE	21.55	22.63	
K7630	NK7630	100 YR - 1 Day		AE	21.56	22.64	
K7640	NK7640	100 YR - 1 Day		AE	21.55	22.63	
K7650	NK7650	100 YR - 1 Day		AE	21.55	22.62	
K7660	NK7660	100 YR - 1 Day		AE	20.86	22.61	
K7805	NK7805	100 YR - 1 Day		AE	24.12	26.20	
K7810	NK7810	100 YR - 1 Day		AE	24.12	26.21	
K7812	NK7812	100 YR - 1 Day		AE	24.12	26.20	
K7814	NK7814	100 YR - 1 Day		AE	24.12	26.20	
K7816	NK7816	100 YR - 1 Day		AE	24.12	26.20	
K7818	NK7818	100 YR - 1 Day		AE	24.12	26.19	
K7820	NK7820	100 YR - 1 Day		AE	24.12	26.20	
K7830	NK7830	100 YR - 1 Day			24.10	26.14	
K7845	NK7845	100 YR - 1 Day		AE	24.09	26.06	
K7850	NK7850	100 YR - 1 Day		AE	24.09	26.09	
K7855	NK7855	100 YR - 1 Day		AE	24.08	26.09	
K7858	NK7858	100 YR - 1 Day		AE	24.09	25.96	
K7859	NK7859	100 YR - 1 Day		AE	24.08	26.06	
K7860	NK7860	100 YR - 1 Day		AE	24.08	26.06	
K7864	NK7864	100 YR - 1 Day		X	22.63	25.94	
K7865	NK7865	100 YR - 1 Day		AE	23.53	26.05	
K7872	NK7872	100 YR - 1 Day		AE	24.02	25.81	
K7873	NK7873	100 YR - 1 Day		AE	23.90	25.77	
K7874	NK7874	100 YR - 1 Day		AE	22.76	25.89	
K7875	NK7875	100 YR - 1 Day		AE	24.76	26.04	
K7880	NK7880	100 YR - 1 Day		AE	21.89	25.89	
K7881	NK7880	100 YR - 1 Day			21.89	25.89	
K7882	NK7882	100 YR - 1 Day		AE	23.36	23.15	
K7884	NK7884	100 YR - 1 Day		AE	23.53	23.52	
K7885	NK7885	100 YR - 1 Day		AE	22.91	23.15	
K7886	NK7886	100 YR - 1 Day			23.87	24.32	
K7890	NK7890	100 YR - 1 Day		AE	21.58	23.15	
K7893	NK7893	100 YR - 1 Day		AE	22.84	23.14	
K7900	NK7900	100 YR - 1 Day		AE	21.58	23.13	
K7910	NK7910	100 YR - 1 Day		AE	20.95	22.71	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
K7913	NK7913	100 YR - 1 Day		AE	22.11	22.68	
K7917	NK7917	100 YR - 1 Day		AE	22.11	22.68	
K7920	NK7920	100 YR - 1 Day		AE	20.94	22.68	
K7930	NK7930	100 YR - 1 Day		AE	20.93	22.63	
K7932	NK7932	100 YR - 1 Day		AE	21.57	22.64	
K7934	NK7934	100 YR - 1 Day		AE	21.57	22.64	
K7936	NK7936	100 YR - 1 Day		AE	21.56	22.64	
K7938	NK7938	100 YR - 1 Day		AE	21.53	22.64	
K7940	NK7940	100 YR - 1 Day		AE	20.86	22.61	
K7945	NK7945	100 YR - 1 Day		AE	20.83	22.45	
K7947	NK7947	100 YR - 1 Day		AE	20.82	22.57	
K7950	NK7950	100 YR - 1 Day		AE	20.82	22.60	
K7960	NK7960	100 YR - 1 Day		AE	20.71	22.60	
K8010	NK8010	100 YR - 1 Day			21.44	21.50	
K8020	NK8020	100 YR - 1 Day		AE	21.44	21.49	
K8030	NK8030	100 YR - 1 Day		AE	19.45	21.23	
K8040	NK8040	100 YR - 1 Day		AE	19.37	21.21	
K8050	NK8050	100 YR - 1 Day		AE	19.36	21.21	
K9010	NK9010	100 YR - 1 Day		AE	20.93	21.40	
K9020	NK9020	100 YR - 1 Day		AE	20.93	21.38	
K9030	NK9030	100 YR - 1 Day		AE	20.84	21.28	
K9040	NK9040	100 YR - 1 Day		AE	20.61	21.14	
K9050	NK9050	100 YR - 1 Day		AE	19.67	21.08	
K9052	NK9052	100 YR - 1 Day		AE	20.68	20.79	
K9055	NK9055	100 YR - 1 Day			19.57	20.78	
K9058	NK9058	100 YR - 1 Day		AE	19.56	20.79	
K9060	NK9060	100 YR - 1 Day		AE	19.35	20.79	
K9070	NK9070	100 YR - 1 Day		AE	19.13	20.73	
K9510	NK9510	100 YR - 1 Day		AE	20.68	20.99	
K9520	NK9520	100 YR - 1 Day		AE	20.68	20.99	
K9610	NK9610	100 YR - 1 Day		AE	20.68	20.99	
K9630	NK9630	100 YR - 1 Day		AE	20.68	20.99	
K9710	NK9710	100 YR - 1 Day		AE	20.68	20.99	
K9720	NK9720	100 YR - 1 Day		AE	20.68	20.99	
K9730	NK9730	100 YR - 1 Day		AE	20.62	20.98	
L0010	NL0010	100 YR - 1 Day		AE	21.79	21.91	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
L0020	NL0020	100 YR - 1 Day		AE	21.65	21.70	
L0030	NL0030	100 YR - 1 Day			17.95	19.67	
L0035	NL0035	100 YR - 1 Day		AE	17.72	19.54	
L0040	NL0040	100 YR - 1 Day		AE	17.71	19.53	
L0042	NL0042	100 YR - 1 Day		AE	21.10	21.08	
L0045	NL0045	100 YR - 1 Day		AE	20.44	20.37	
L0047	NL0047	100 YR - 1 Day		AE	20.28	20.12	
L0048	NL0048	100 YR - 1 Day		AE	17.73	19.52	
L0050	NL0050	100 YR - 1 Day		AE	17.70	19.52	
L0057	NL0057	100 YR - 1 Day		AE	17.67	19.49	
L0060	NL0060	100 YR - 1 Day		AE	17.67	19.48	
L0063	NL0063	100 YR - 1 Day		AE	17.79	20.31	
L0067	NL0067	100 YR - 1 Day		AE	17.46	20.25	
L0070	NL0070	100 YR - 1 Day		AE	17.45	19.28	
L0073	NL0073	100 YR - 1 Day		AE	20.01	20.05	
L0077	NL0077	100 YR - 1 Day		AE	19.99	20.04	
L0080	NL0080	100 YR - 1 Day		AE	17.27	18.96	
L0083	NL0083	100 YR - 1 Day		AE	19.55	19.64	
L0087	NL0087	100 YR - 1 Day		AE	19.54	19.64	
L0090	NL0090	100 YR - 1 Day		AE	17.05	18.57	
L0100	NL0100	100 YR - 1 Day		AE	16.93	18.32	
L0110	NL0110	100 YR - 1 Day		AE	16.71	17.82	
L1010	NL1010	100 YR - 1 Day		AE	19.87	19.83	
L1013	NL1013	100 YR - 1 Day		AE	21.79	21.76	
L1017	NL1017	100 YR - 1 Day		AE	21.79	21.76	
L1020	NL1020	100 YR - 1 Day		AE	19.08	19.76	
L1021	NL1021	100 YR - 1 Day		AE	18.73	19.73	
L1023	NL1023	100 YR - 1 Day		AE	21.33	21.34	
L1027	NL1027	100 YR - 1 Day		AE	21.32	21.32	
L1030	NL1030	100 YR - 1 Day		AE	18.73	19.73	
L1035	NL1035	100 YR - 1 Day		AE	20.08	20.01	
L1040	NL1040	100 YR - 1 Day		AE	17.98	19.58	
N0009	NN0009	100 YR - 1 Day		AE	27.92	27.93	
N0010	NN0010	100 YR - 1 Day		AE	23.60	25.37	
N0020	NN0020	100 YR - 1 Day		AE	23.25	25.15	
N0030	NN0030	100 YR - 1 Day		AE	23.24	25.14	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
N0035	NN0035	100 YR - 1 Day		AE	24.27	25.12	
N0040	NN0040	100 YR - 1 Day		AE	23.23	25.12	
N0042	NN0042	100 YR - 1 Day		AE	24.46	25.14	
N0045	NN0045	100 YR - 1 Day		AE	25.38	25.34	
N0047	NN0047	100 YR - 1 Day		AE	24.44	25.14	
N0048	NN0048	100 YR - 1 Day		AE	23.25	25.14	
N0049	NN0049	100 YR - 1 Day		AE	23.62	25.06	
N0050	NN0050	100 YR - 1 Day		AE	23.22	25.11	
N0055	NN0055	100 YR - 1 Day		AE	24.46	25.14	
N0060	NN0060	100 YR - 1 Day			23.22	25.10	
N0070	NN0070	100 YR - 1 Day		AE	23.20	25.08	
N0075	NN0075	100 YR - 1 Day		AE	23.24	25.14	
N0080	NN0080	100 YR - 1 Day		AE	23.19	25.07	
N0085	NN0085	100 YR - 1 Day		AE	23.63	25.05	
N0090	NN0090	100 YR - 1 Day		AE	23.18	25.06	
N0092	NN0092	100 YR - 1 Day		AE	23.18	25.04	
N0093	NN0093	100 YR - 1 Day		AE	23.20	25.06	
N0098	NN0098	100 YR - 1 Day		AE	23.18	25.04	
N0100	NN0100	100 YR - 1 Day		AE	23.17	25.04	
N0105	NN0105	100 YR - 1 Day		AE	23.17	25.04	
N0110	NN0110	100 YR - 1 Day		AE	23.16	25.04	
N0115	NN0115	100 YR - 1 Day		X	23.03	24.71	
N0120	NN0120	100 YR - 1 Day		AE	20.29	21.72	
N0121	NN0120	100 YR - 1 Day			20.29	21.72	
N0122	NN5016	100 YR - 1 Day			24.36	24.27	
N0123	NN0123	100 YR - 1 Day		AE	23.93	24.71	
N0124	NN0125	100 YR - 1 Day			23.04	22.76	
N0125	NN0125	100 YR - 1 Day		AE	23.04	22.76	
N0127	NN0127	100 YR - 1 Day		AE	22.60	22.01	
N0130	NN0130	100 YR - 1 Day			19.83	20.99	
N0144	NN0144	100 YR - 1 Day		AE	19.90	21.07	
N0147	NN0147	100 YR - 1 Day		AE	20.38	20.77	
N0150	NN0150	100 YR - 1 Day		AE	19.64	20.74	
N0160	NN0160	100 YR - 1 Day			19.52	20.60	
N0165	NN0165	100 YR - 1 Day		AE	19.49	20.56	
N0170	NN0170	100 YR - 1 Day			19.48	20.56	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
N0171	NN0171	100 YR - 1 Day		AE	19.31	20.57	
N0172	NN0172	100 YR - 1 Day		AE	21.82	21.87	
N0174	NN0174	100 YR - 1 Day		AE	21.82	21.87	
N0176	NN0176	100 YR - 1 Day		AE	21.80	21.85	
N0177	NN0177	100 YR - 1 Day		AE	19.29	20.39	
N0178	NN0178	100 YR - 1 Day		AE	19.78	20.88	
N0180	NN0180	100 YR - 1 Day		AE	19.25	20.31	
N0182	NN0182	100 YR - 1 Day		AE	22.27	22.40	
N0184	NN0184	100 YR - 1 Day		AE	22.27	22.40	
N0185	NN0185	100 YR - 1 Day		AE	19.21	20.38	
N0186	NN0186	100 YR - 1 Day		AE	22.26	22.40	
N0188	NN0188	100 YR - 1 Day		AE	20.29	21.13	
N0190	NN0190	100 YR - 1 Day		AE	19.18	20.25	
N0194	NN0194	100 YR - 1 Day		AE	19.18	20.29	
N0200	NN0200	100 YR - 1 Day		AE	19.11	20.20	
N1010	NN1010	100 YR - 1 Day			25.12	25.25	
N1020	NN1020	100 YR - 1 Day		AE	25.07	25.25	
N1030	NN1030	100 YR - 1 Day		AE	25.02	25.25	
N1040	NN1040	100 YR - 1 Day		AE	24.99	25.25	
N1050	NN1050	100 YR - 1 Day			24.45	25.25	
N1510	NN1510	100 YR - 1 Day		AE	24.41	25.25	
N1520	NN1520	100 YR - 1 Day		AE	24.41	25.25	
N1540	NN1540	100 YR - 1 Day		AE	24.00	25.24	
N2010	NN2010	100 YR - 1 Day		AE	24.16	25.06	
N2020	NN2020	100 YR - 1 Day		AE	24.16	25.05	
N2030	NN2030	100 YR - 1 Day		AE	24.14	25.06	
N2040	NN2040	100 YR - 1 Day		AE	24.14	25.05	
N2510	NN2510	100 YR - 1 Day			24.32	25.05	
N2520	NN2520	100 YR - 1 Day		AE	24.14	25.05	
N2530	NN2530	100 YR - 1 Day		AE	24.01	25.05	
N2540	NN2540	100 YR - 1 Day		AE	23.49	25.06	
N3020	NN3020	100 YR - 1 Day		AE	23.76	25.05	
N3030	NN3030	100 YR - 1 Day		AE	23.74	25.05	
N3040	NN3040	100 YR - 1 Day		AE	23.67	25.05	
N3050	NN3050	100 YR - 1 Day		AE	23.22	25.05	
N3510	NN3510	100 YR - 1 Day		AE	23.99	25.07	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
N3520	NN3520	100 YR - 1 Day		AE	23.99	25.07	
N3530	NN3530	100 YR - 1 Day		AE	23.99	25.07	
N3540	NN3540	100 YR - 1 Day		AE	23.99	25.07	
N3550	NN3550	100 YR - 1 Day		AE	23.25	25.07	
N4010	NN4010	100 YR - 1 Day		AE	24.60	25.04	
N4020	NN4020	100 YR - 1 Day		AE	24.08	25.05	
N4024	NN4024	100 YR - 1 Day		AE	24.78	25.04	
N4026	NN4026	100 YR - 1 Day		AE	24.78	25.04	
N4028	NN4028	100 YR - 1 Day		AE	24.77	25.04	
N4030	NN4030	100 YR - 1 Day		AE	24.02	25.04	
N4040	NN4040	100 YR - 1 Day		AE	23.25	25.04	
N4045	NN4045	100 YR - 1 Day		AE	23.23	25.04	
N4050	NN4050	100 YR - 1 Day		AE	23.20	25.04	
N4060	NN4060	100 YR - 1 Day		AE	23.16	25.04	
N4320	NN4320	100 YR - 1 Day		AE	23.17	25.05	
N4710	NN4710	100 YR - 1 Day		AE	23.20	25.05	
N4720	NN4720	100 YR - 1 Day		AE	23.16	25.05	
N5010	NN5010	100 YR - 1 Day		AE	21.04	23.12	
N5013	NN5013	100 YR - 1 Day			24.13	24.04	
N5015	NN5015	100 YR - 1 Day		AE	20.79	23.00	
N5016	NN5016	100 YR - 1 Day			24.36	24.27	
N5017	NN5017	100 YR - 1 Day		AE	20.65	22.98	
N5020	NN5020	100 YR - 1 Day			20.56	22.96	
N5520	NN5520	100 YR - 1 Day		AE	21.99	22.10	
N5530	NN5530	100 YR - 1 Day		AE	21.98	22.09	
N5540	NN5540	100 YR - 1 Day		AE	21.96	22.08	
N6010	NN6010	100 YR - 1 Day		AE	21.93	21.94	
N6020	NN6020	100 YR - 1 Day		AE	21.93	21.94	
N6030	NN6030	100 YR - 1 Day		AE	21.93	21.94	
N6040	NN6040	100 YR - 1 Day		AE	21.93	21.94	
N6050	NN6050	100 YR - 1 Day		AE	21.92	21.93	
N6060	NN6060	100 YR - 1 Day		AE	21.92	21.93	
N6080	NN6080	100 YR - 1 Day		AE	21.55	21.59	
N6100	NN6100	100 YR - 1 Day			20.17	21.22	
N6510	NN6510	100 YR - 1 Day		AE	21.62	21.59	
N6520	NN6520	100 YR - 1 Day		AE	21.60	21.58	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
N6530	NN6530	100 YR - 1 Day		AE	20.44	21.17	
N7020	NN7020	100 YR - 1 Day		AE	20.89	21.08	
N7030	NN7030	100 YR - 1 Day		AE	20.89	21.08	
N7040	NN7040	100 YR - 1 Day		AE	20.88	21.06	
N7045	NN7045	100 YR - 1 Day		AE	20.88	21.06	
N7050	NN7050	100 YR - 1 Day		AE	20.88	21.05	
N7060	NN7060	100 YR - 1 Day		AE	19.29	20.77	
O0010	NO0010	100 YR - 1 Day		AE	23.15	23.81	
O0012	NO0012	100 YR - 1 Day		AE	22.50	22.96	
O0015	NO0015	100 YR - 1 Day		AE	22.48	23.08	
O0017	NO0017	100 YR - 1 Day		AE	22.48	23.07	
O0020	NO0020	100 YR - 1 Day		AE	22.48	22.87	
O0030	NO0030	100 YR - 1 Day		AE	22.19	22.43	
O0035	NO0035	100 YR - 1 Day		AE	22.59	22.83	
O0040	NO0040	100 YR - 1 Day			22.13	22.33	
O0050	NO0050	100 YR - 1 Day		AE	21.67	22.01	
O0055	NO0055	100 YR - 1 Day		AE	22.33	22.28	
O0060	NO0060	100 YR - 1 Day		AE	21.63	21.96	
O0070	NO0070	100 YR - 1 Day		AE	21.45	21.78	
O0078	NO0078	100 YR - 1 Day		AE	21.36	21.69	
O0080	NO0080	100 YR - 1 Day		AE	21.36	21.69	
O0083	NO0083	100 YR - 1 Day		AE	21.12	21.30	
O0087	NO0087	100 YR - 1 Day		AE	21.15	21.41	
O0090	NO0090	100 YR - 1 Day		AE	21.15	21.49	
O0095	NO0095	100 YR - 1 Day		AE	20.69	20.79	
O0097	NO0097	100 YR - 1 Day		AE	20.83	20.99	
O0100	NO0100	100 YR - 1 Day		AE	21.07	21.40	
O0110	NO0110	100 YR - 1 Day		AE	21.05	21.38	
O0115	NO0115	100 YR - 1 Day		AE	20.83	20.96	
O0116	NO0116	100 YR - 1 Day		AE	20.83	20.96	
O0120	NO0120	100 YR - 1 Day		AE	18.71	19.78	
O0130	NO0130	100 YR - 1 Day		AE	18.54	19.64	
O0133	NO0133	100 YR - 1 Day		AE	18.25	19.42	
O0137	NO0137	100 YR - 1 Day		AE	18.25	19.42	
O0150	NO0150	100 YR - 1 Day		AE	18.25	19.41	
O0160	NO0160	100 YR - 1 Day		AE	17.83	18.88	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
O0170	NO0170	100 YR - 1 Day		AE	17.63	18.60	
O0172	NO0172	100 YR - 1 Day		AE	17.26	18.08	
O0174	NO0174	100 YR - 1 Day		AE	17.26	18.08	
O0176	NO0176	100 YR - 1 Day		AE	17.26	18.23	
O0178	NO0178	100 YR - 1 Day		AE	17.26	18.23	
O0180	NO0180	100 YR - 1 Day		AE	17.40	18.25	
O0190	NO0190	100 YR - 1 Day		AE	17.25	18.03	
O0200	NO0200	100 YR - 1 Day		AE	16.93	17.51	
O0210	NO0210	100 YR - 1 Day		AE	15.18	16.69	
O0213	NO0213	100 YR - 1 Day		AE	16.00	16.92	
O0217	NO0217	100 YR - 1 Day		AE	15.99	16.92	
O0220	NO0220	100 YR - 1 Day		AE	15.14	16.68	
O1010	NO1010	100 YR - 1 Day		AE	23.00	23.01	
O1020	NO1020	100 YR - 1 Day		AE	22.96	22.99	
O1030	NO1030	100 YR - 1 Day		AE	22.96	22.98	
O1040	NO1040	100 YR - 1 Day		AE	22.99	23.05	
O1050	NO1050	100 YR - 1 Day		AE	23.01	23.13	
O1070	NO1070	100 YR - 1 Day		AE	23.11	23.43	
O1510	NO1510	100 YR - 1 Day		AE	23.52	23.58	
O1520	NO1520	100 YR - 1 Day		AE	23.52	23.58	
O1530	NO1530	100 YR - 1 Day		AE	23.52	23.59	
O1540	NO1540	100 YR - 1 Day		AE	23.52	23.59	
O1550	NO1550	100 YR - 1 Day		AE	23.12	23.44	
O1560	NO1560	100 YR - 1 Day		AE	23.12	23.44	
O1570	NO1570	100 YR - 1 Day		AE	23.12	23.44	
O1580	NO1580	100 YR - 1 Day		AE	23.12	23.44	
O1600	NO1600	100 YR - 1 Day		AE	23.12	23.44	
O2010	NO2010	100 YR - 1 Day		AE	22.48	22.82	
O2020	NO2020	100 YR - 1 Day		AE	22.48	22.83	
O2030	NO2030	100 YR - 1 Day		AE	22.48	22.83	
O2050	NO2050	100 YR - 1 Day		AE	22.48	22.83	
O3010	NO3010	100 YR - 1 Day		AE	21.22	21.13	
O3020	NO3020	100 YR - 1 Day		AE	20.75	20.95	
O3030	NO3030	100 YR - 1 Day		AE	20.46	20.88	
O3040	NO3040	100 YR - 1 Day		AE	20.46	20.84	
O3050	NO3050	100 YR - 1 Day		AE	20.43	20.82	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
O4010	NO4010	100 YR - 1 Day		AE	20.38	20.72	
O4020	NO4020	100 YR - 1 Day		AE	20.38	20.72	
O4030	NO4030	100 YR - 1 Day		AE	20.37	20.68	
O4040	NO4040	100 YR - 1 Day		AE	19.44	20.56	
O4050	NO4050	100 YR - 1 Day		AE	19.44	20.54	
O4060	NO4060	100 YR - 1 Day			18.56	20.54	
O5010	NO5010	100 YR - 1 Day			17.64	18.08	
O5020	NO5020	100 YR - 1 Day		AE	17.64	18.08	
O5030	NO5030	100 YR - 1 Day		AE	17.55	18.02	
O5040	NO5040	100 YR - 1 Day		AE	16.65	18.02	
O5050	NO5050	100 YR - 1 Day		AE	16.62	18.02	
P0003	NP0003	100 YR - 1 Day		AE	25.33	26.93	
P0010	NP0010	100 YR - 1 Day		AE	25.33	26.93	
P0013	NP0013	100 YR - 1 Day		AE	28.56	28.52	
P0014	NP0014	100 YR - 1 Day		AE	28.56	28.52	
P0016	NP0016	100 YR - 1 Day		AE	25.63	27.19	
P0018	NP0018	100 YR - 1 Day		AE	28.56	28.52	
P0020	NP0020	100 YR - 1 Day		AE	25.84	27.46	
P0030	NP0030	100 YR - 1 Day		AE	25.87	27.51	
P0040	NP0040	100 YR - 1 Day		AE	25.56	27.38	
P0045	NP0045	100 YR - 1 Day		AE	26.56	27.36	
P0050	NP0050	100 YR - 1 Day		AE	25.58	27.36	
P0060	NP0060	100 YR - 1 Day		AE	25.67	27.34	
P0070	NP0070	100 YR - 5 Day	AO	AE	25.92	27.28	
P0072	NP0072	100 YR - 1 Day		AE	25.80	26.53	
P0074	NP0074	100 YR - 5 Day	AO	AE	25.82	26.66	
P0076	NP0076	100 YR - 5 Day	AO	AE	25.82	26.68	
P0078	NP0078	100 YR - 5 Day	AO	AE	25.89	26.98	
P0080	NP0080	100 YR - 5 Day	AO	AE	25.89	26.98	
P0085	NP0085	100 YR - 5 Day	AO	AE	25.87	26.88	
P0090	NP0090	100 YR - 5 Day	AO	AE	25.87	26.88	
P0100	NP0100	100 YR - 5 Day	AO	AE	25.87	26.89	
P1010	NP1010	100 YR - 1 Day		AE	21.38	23.08	
P1510	NP1510	100 YR - 1 Day		AE	25.56	27.38	
P2010	NP2010	100 YR - 1 Day		AE	26.26	26.93	
P2020	NP2020	100 YR - 1 Day		AE	26.26	26.93	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
P2030	NP2030	100 YR - 1 Day		AE	26.25	26.95	
P2210	NP2210	100 YR - 1 Day		AE	26.25	26.88	
P2220	NP2220	100 YR - 1 Day		AE	26.25	26.89	
P2410	NP2410	100 YR - 1 Day		X	26.83	27.06	
P2420	NP2420	100 YR - 1 Day		AE	26.23	27.06	
P2610	NP2610	100 YR - 5 Day	AO	AE	26.04	26.98	
P2620	NP2620	100 YR - 5 Day	AO	AE	26.04	26.99	
P2810	NP2810	100 YR - 1 Day		AE	26.26	26.80	
P2820	NP2820	100 YR - 5 Day		AE	26.25	26.95	
P2830	NP2830	100 YR - 5 Day		AE	26.24	27.00	
P2840	NP2840	100 YR - 5 Day		AE	26.24	27.00	
P2850	NP2850	100 YR - 5 Day	AO	AE	26.23	27.04	
P2860	NP2860	100 YR - 1 Day		AE	26.22	27.26	
Q0175	NQ0175	100 YR - 1 Day			26.21	27.62	
Q3022	NQ3022	100 YR - 1 Day		AE	27.61	28.46	
Q3024	NQ3024	100 YR - 1 Day		AE	27.61	28.50	
Q3026	NQ3026	100 YR - 1 Day		AE	27.62	28.50	
Q3040	NQ3040	100 YR - 1 Day			27.76	28.52	
Q3041	NQ3041	100 YR - 1 Day		AE	27.72	28.50	
Q3043	NQ3043	100 YR - 1 Day		AE	27.75	28.51	
Q3044	NQ3044	100 YR - 1 Day			27.76	28.52	
Q3048	NQ3048	100 YR - 1 Day			27.76	28.52	
R0170	NR0170	100 YR - 1 Day		AE	22.22	22.33	
R0270	NR0270	100 YR - 1 Day		AE	14.27	14.64	
R1043	NR1043	100 YR - 1 Day		AE	24.45	24.92	
R2560	NR2560	100 YR - 1 Day		AE	25.67	26.64	
R3008	NR3008	100 YR - 5 Day	AO	AE	25.63	26.64	
R3010	NR3010	100 YR - 5 Day	AO	AE	25.89	26.99	
R3020	NR3020	100 YR - 5 Day	AO	AE	25.72	26.69	
R3025	NR3025	100 YR - 5 Day	AO	AE	25.66	26.64	
R3030	NR3030	100 YR - 1 Day		AE	25.48	26.30	
R3036	NR3036	100 YR - 1 Day		AE	25.24	25.79	
R3038	NR3038	100 YR - 1 Day		AE	25.24	25.79	
R3039	NR3039	100 YR - 1 Day		AE	25.12	25.63	
R3040	NR3040	100 YR - 1 Day		AE	25.26	25.82	
R3041	NR3041	100 YR - 1 Day		AE	25.12	25.64	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
R3042	NR3042	100 YR - 1 Day		AE	25.14	25.71	
R3043	NR3043	100 YR - 1 Day		AE	25.17	25.67	
R3044	NR3044	100 YR - 1 Day		AE	25.24	25.79	
R3045	NR3045	100 YR - 1 Day		AE	25.12	25.63	
R3048	NR3048	100 YR - 1 Day		AE	25.19	25.70	
R3049	NR3049	100 YR - 1 Day		AE	25.19	25.71	
R3050	NR3050	100 YR - 1 Day		AE	25.19	25.71	
R3052	NR3052	100 YR - 1 Day		AE	24.68	25.18	
R3054	NR3054	100 YR - 1 Day		AE	24.68	25.18	
R3056	NR3056	100 YR - 1 Day		AE	24.79	25.17	
R3057	NR3057	100 YR - 1 Day		AE	24.88	25.16	
R3058	NR3058	100 YR - 1 Day		AE	24.79	25.17	
R3060	NR3060	100 YR - 1 Day		AE	24.74	25.20	
R3061	NR3061	100 YR - 1 Day		AE	24.88	25.16	
R3062	NR3062	100 YR - 1 Day		AE	24.62	25.17	
R3063	NR3063	100 YR - 1 Day		AE	24.39	24.92	
R3064	NR3064	100 YR - 1 Day		AE	24.55	25.08	
R3065	NR3065	100 YR - 1 Day		AE	24.55	25.09	
R3070	NR3070	100 YR - 1 Day		AE	24.57	25.08	
R3072	NR3072	100 YR - 1 Day			24.39	24.92	
R3073	NR3073	100 YR - 1 Day		AE	24.55	25.08	
R3074	NR3074	100 YR - 1 Day		AE	24.43	24.86	
R3075	NR3075	100 YR - 1 Day		AE	24.50	25.03	
R3076	NR3076	100 YR - 1 Day		AE	24.46	24.97	
R3077	NR3077	100 YR - 1 Day		AE	24.49	25.03	
R3078	NR3078	100 YR - 1 Day		AE	24.43	24.86	
R3079	NR3079	100 YR - 1 Day		AE	24.50	25.01	
R3080	NR3080	100 YR - 1 Day		AE	24.49	25.01	
R3081	NR3081	100 YR - 1 Day		AE	24.19	24.59	
R3082	NR3082	100 YR - 1 Day		AE	24.19	24.59	
R3083	NR3083	100 YR - 1 Day		AE	24.43	24.90	
R3084	NR3084	100 YR - 1 Day		AE	24.87	24.95	
R3085	NR3085	100 YR - 1 Day		AE	24.43	24.90	
R3088	NR3088	100 YR - 1 Day		AE	24.42	24.89	
R3089	NR3089	100 YR - 1 Day		AE	24.43	24.90	
R3090	NR3090	100 YR - 1 Day		AE	24.43	24.91	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
R3094	NR3094	100 YR - 1 Day		AE	24.05	24.32	
R3095	NR3095	100 YR - 1 Day		AE	24.02	24.28	
R3096	NR3096	100 YR - 1 Day		AE	24.32	24.76	
R3097	NR3097	100 YR - 1 Day		AE	24.37	24.84	
R3098	NR3098	100 YR - 1 Day		AE	24.02	24.28	
R3099	NR3099	100 YR - 1 Day		AE	24.37	24.84	
R3100	NR3100	100 YR - 1 Day		AE	24.37	24.84	
R3101	NR3101	100 YR - 1 Day		AE	24.05	24.36	
R3102	NR3102	100 YR - 1 Day		AE	24.05	24.36	
R3107	NR3107	100 YR - 1 Day		AE	23.98	24.45	
R3108	NR3108	100 YR - 1 Day		AE	24.19	24.62	
R3109	NR3109	100 YR - 1 Day		AE	24.19	24.62	
R3110	NR3110	100 YR - 1 Day		AE	24.19	24.62	
R3111	NR3111	100 YR - 1 Day		AE	23.66	24.22	
R3112	NR3112	100 YR - 1 Day		AE	23.66	24.22	
R3113	NR3113	100 YR - 1 Day		AE	24.07	24.23	
R3114	NR3114	100 YR - 1 Day		AE	23.68	24.22	
R3118	NR3118	100 YR - 1 Day		AE	23.78	24.26	
R3119	NR3119	100 YR - 1 Day		AE	23.78	24.25	
R3120	NR3120	100 YR - 1 Day		AE	23.79	24.26	
R3125	NR3125	100 YR - 1 Day		AE	23.38	23.72	
R3128	NR3128	100 YR - 1 Day		AE	23.17	23.49	
R3129	NR3129	100 YR - 1 Day		AE	22.78	22.98	
R3130	NR3130	100 YR - 1 Day		AE	22.78	22.98	
R3138	NR3138	100 YR - 1 Day		AE	22.45	22.54	
R3140	NR3140	100 YR - 1 Day		AE	22.44	22.52	
R3148	NR3148	100 YR - 1 Day		AE	22.26	22.36	
R3150	NR3150	100 YR - 1 Day		AE	22.23	22.32	
R3160	NR3160	100 YR - 1 Day		AE	22.23	22.32	
R3161	NR3161	100 YR - 1 Day		AE	22.98	23.07	
R3162	NR3162	100 YR - 1 Day		AE	22.91	23.00	
R3163	NR3163	100 YR - 1 Day		AE	22.89	22.98	
R3164	NR3164	100 YR - 1 Day		AE	23.24	23.33	
R3165	NR3165	100 YR - 1 Day		AE	23.70	24.10	
R3167	NR3167	100 YR - 1 Day		AE	22.87	22.95	
R3168	NR3168	100 YR - 1 Day		AE	22.26	22.36	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
R3190	NR3190	100 YR - 1 Day		AE	21.78	22.32	
R3193	NR3193	100 YR - 1 Day		AE	21.87	22.52	
R3197	NR3197	100 YR - 1 Day		AE	21.82	22.43	
R3199	NR3199	100 YR - 1 Day		AE	21.82	22.43	
R3200	NR3200	100 YR - 1 Day		AE	21.77	22.32	
R3203	NR3203	100 YR - 1 Day		AE	21.87	22.49	
R3207	NR3207	100 YR - 1 Day		AE	21.78	22.38	
R3210	NR3210	100 YR - 1 Day		AE	21.74	22.31	
R3215	NR3210	100 YR - 1 Day			21.74	22.31	
R3220	NR3220	100 YR - 1 Day		AE	19.54	19.90	
R3223	NR3223	100 YR - 1 Day		AE	20.22	20.24	
R3227	NR3227	100 YR - 1 Day		AE	19.57	19.98	
R3229	NR3229	100 YR - 1 Day		AE	19.16	19.58	
R3230	NR3230	100 YR - 1 Day		AE	19.09	19.46	
R3243	NR3243	100 YR - 1 Day		X	19.00	18.98	
R3244	NR3244	100 YR - 1 Day		AE	18.86	18.95	
R3246	NR3246	100 YR - 1 Day		AE	18.80	18.91	
R3249	NR3249	100 YR - 1 Day		AE	18.22	18.45	
R3250	NR3250	100 YR - 1 Day		AE	18.22	18.44	
R3270	NR3270	100 YR - 1 Day		AE	16.86	17.12	
R3282	NR3282	100 YR - 1 Day		AE	16.38	16.75	
R3283	NR3283	100 YR - 1 Day		AE	16.38	16.76	
R3286	NR3286	100 YR - 1 Day			16.38	16.74	
R3287	NR3287	100 YR - 1 Day		AE	16.37	16.75	
R3288	NR3288	100 YR - 1 Day		AE	16.37	16.81	
R3289	NR3289	100 YR - 1 Day		AE	16.37	16.83	
R3290	NR3290	100 YR - 1 Day		AE	16.37	16.91	
R3300	NR3300	100 YR - 1 Day		AE	15.56	16.20	
R3310	NR3310	100 YR - 1 Day		AE	14.79	15.27	
R3320	NR3320	100 YR - 1 Day		AE	14.21	14.61	
R3330	NR3330	100 YR - 1 Day		AE	13.36	13.90	
R3340	NR3340	100 YR - 1 Day		AE	12.47	13.04	
R3350	NR3350	100 YR - 1 Day		AE	10.08	10.51	
R3360	NR3360	100 YR - 1 Day		AE	9.96	10.42	
R3370	NR3370	100 YR - 1 Day		AE	9.86	10.38	
R3372	NR3372	100 YR - 1 Day		AE	9.57	9.86	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
R3374	NR3374	100 YR - 1 Day		AE	9.58	9.87	
R3376	NR3376	100 YR - 1 Day		AE	9.58	9.87	
R3377	NR3377	100 YR - 1 Day		AE	9.58	9.87	
R3378	NR3378	100 YR - 1 Day		AE	9.73	10.32	
R3380	NR3380	100 YR - 1 Day		AE	9.72	10.32	
R3400	NR3400	100 YR - 1 Day		AE	9.21	10.27	
R3402	NR3402	100 YR - 1 Day		AE	9.57	10.25	
R3404	NR3404	100 YR - 1 Day		AE	9.55	10.25	
R3406	NR3406	100 YR - 1 Day		AE	9.12	10.25	
R3410	NR3410	100 YR - 1 Day		AE	9.11	10.25	
R3420	NR3420	100 YR - 1 Day		AE	8.99	10.22	
R3450	NR3430	100 YR - 1 Day		AE	8.37	10.00	
R3510	NR3510	100 YR - 1 Day		AE	12.72	12.92	
R3520	NR3520	100 YR - 1 Day		AE	12.72	12.92	
R3522	NR3522	100 YR - 1 Day		AE	14.56	14.59	
R3524	NR3524	100 YR - 1 Day		AE	13.65	13.69	
R3526	NR3526	100 YR - 1 Day		AE	13.62	13.65	
R3530	NR3530	100 YR - 1 Day		AE	12.61	12.84	
R3540	NR3540	100 YR - 1 Day		AE	12.52	12.76	
R3550	NR3550	100 YR - 1 Day		AE	12.43	12.67	
R3560	NR3560	100 YR - 1 Day		AE	12.20	12.34	
R3570	NR3570	100 YR - 1 Day		AE	12.13	12.27	
R3610	NR3610	100 YR - 1 Day		AE	12.58	12.32	
R3620	NR3620	100 YR - 1 Day		AE	12.58	12.32	
R3630	NR3630	100 YR - 1 Day		AE	12.40	12.14	
R3640	NR3640	100 YR - 1 Day		AE	12.35	11.98	
R3650	NR3650	100 YR - 1 Day		AE	12.24	11.87	
R3660	NR3660	100 YR - 1 Day		AE	12.09	11.71	
R3670	NR3670	100 YR - 1 Day		AE	11.15	11.02	
R3675	NR3675	100 YR - 1 Day		AE	12.14	12.10	
R3680	NR3680	100 YR - 1 Day		AE	10.88	10.80	
R3690	NR3690	100 YR - 1 Day		AE	10.85	10.77	
R3693	NR3693	100 YR - 1 Day		AE	10.74	10.70	
R3698	NR3698	100 YR - 1 Day		AE	9.41	10.43	
S0005	NS0005	100 YR - 1 Day		AE	24.09	25.45	
S0025	NS0025	100 YR - 1 Day		AE	30.78	31.01	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
S0030	NS0030	100 YR - 1 Day		AE	30.78	30.99	
S0035	NS0035	100 YR - 1 Day		AE	31.28	31.24	
S0036	NS0036	100 YR - 1 Day		AE	31.27	31.23	
S0038	NS0038	100 YR - 1 Day		AE	30.46	30.76	
S0039	NS0039	100 YR - 1 Day		AE	30.25	30.55	
S0040	NS0040	100 YR - 1 Day		AE	30.21	30.55	
S0046	NS0046	100 YR - 1 Day		AE	30.22	30.18	
S0047	NS0047	100 YR - 1 Day		AE	29.95	30.18	
S0048	NS0048	100 YR - 1 Day		AE	29.93	30.07	
S0049	NS0049	100 YR - 1 Day		AE	29.94	30.11	
S0050	NS0050	100 YR - 1 Day		AE	29.95	30.18	
S0059	NS0059	100 YR - 1 Day		AE	29.78	30.11	
S0060	NS0060	100 YR - 1 Day		AE	29.88	30.16	
S0065	NS0065	100 YR - 1 Day		AE	29.87	30.15	
S0070	NS0070	100 YR - 1 Day		AE	29.88	30.15	
S0086	NS0086	100 YR - 1 Day		AE	29.88	30.16	
S0087	NS0087	100 YR - 1 Day		AE	29.88	30.16	
S0088	NS0088	100 YR - 1 Day		AE	29.88	30.16	
S0089	NS0089	100 YR - 1 Day		AE	29.88	30.16	
S0090	NS0090	100 YR - 1 Day		AE	29.89	30.16	
S0100	NS0100	100 YR - 1 Day		AE	29.89	30.16	
S0110	NS0110	100 YR - 1 Day		AE	29.89	30.16	
S0119	NS0119	100 YR - 1 Day		AE	29.89	30.16	
S0120	NS0120	100 YR - 1 Day		AE	29.89	30.16	
S0129	NS0129	100 YR - 1 Day		AE	29.89	30.16	
S0130	NS0130	100 YR - 1 Day		AE	29.89	30.16	
S0134	NS0134	100 YR - 1 Day		AE	29.74	30.10	
S0135	NS0135	100 YR - 1 Day		AE	29.73	30.07	
S0136	NS0136	100 YR - 1 Day		AE	29.73	30.07	
S0137	NS0137	100 YR - 1 Day		AE	29.73	30.07	
S0138	NS0138	100 YR - 1 Day		AE	29.77	30.04	
S0139	NS0139	100 YR - 1 Day		AE	29.72	30.04	
S0140	NS0140	100 YR - 1 Day		AE	29.70	30.00	
S0143	NS0143	100 YR - 1 Day		AE	29.43	29.62	
S0144	NS0144	100 YR - 1 Day		AE	29.43	29.62	
S0145	NS0145	100 YR - 1 Day		AE	29.63	29.86	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
S0146	NS0146	100 YR - 1 Day		AE	29.48	29.63	
S0147	NS0147	100 YR - 1 Day		AE	29.60	29.86	
S0148	NS0148	100 YR - 1 Day		AE	29.65	29.93	
S0149	NS0149	100 YR - 1 Day		AE	29.67	29.95	
S0150	NS0150	100 YR - 1 Day		AE	29.69	29.99	
S0159	NS0159	100 YR - 1 Day		AE	29.70	29.87	
S0160	NS0160	100 YR - 1 Day		AE	29.54	29.86	
S0170	NS0170	100 YR - 1 Day		AE	29.54	29.86	
S0178	NS0178	100 YR - 1 Day		AE	29.00	29.56	
S0179	NS0179	100 YR - 1 Day		AE	29.00	29.56	
S0180	NS0180	100 YR - 1 Day		AE	28.95	29.49	
S0190	NS0190	100 YR - 1 Day		AE	28.48	28.91	
S0200	NS0200	100 YR - 1 Day		AE	28.48	28.90	
S0201	NS0201	100 YR - 1 Day		AE	28.45	28.86	
S0203	NS0203	100 YR - 1 Day		AE	28.15	28.57	
S0205	NS0205	100 YR - 1 Day		AE	27.94	28.31	
S0207	NS0207	100 YR - 1 Day		AE	27.89	28.24	
S0209	NS0209	100 YR - 1 Day		AE	27.33	27.58	
S0210	NS0210	100 YR - 1 Day		AE	27.33	27.58	
S0215	NS0215	100 YR - 1 Day		AE	29.25	29.49	
S0220	NS0220	100 YR - 1 Day		AE	29.25	29.49	
S0230	NS0230	100 YR - 1 Day		AE	28.88	28.88	
S0239	NS0239	100 YR - 1 Day		AE	29.28	29.49	
S0240	NS0240	100 YR - 1 Day		AE	28.26	28.34	
S0250	NS0250	100 YR - 1 Day		AE	28.26	28.34	
S0259	NS0259	100 YR - 1 Day		AE	29.04	29.12	
S0260	NS0260	100 YR - 1 Day		AE	28.26	28.34	
S0265	NS0265	100 YR - 1 Day		AE	28.26	28.31	
S0270	NS0270	100 YR - 1 Day		AE	28.24	28.26	
S0280	NS0280	100 YR - 1 Day		AE	27.28	27.59	
S0290	NS0290	100 YR - 1 Day		AE	27.28	27.59	
S0295	NS0295	100 YR - 1 Day		AE	25.44	25.70	
S0300	NS0300	100 YR - 1 Day		AE	27.26	27.55	
S0310	NS0310	100 YR - 1 Day		AE	26.77	27.47	
S0315	NS0315	100 YR - 1 Day		AE	27.96	27.90	
S0316	NS0316	100 YR - 1 Day		AE	26.92	27.36	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
S0317	NS0317	100 YR - 1 Day		AE	26.92	27.36	
S0318	NS0318	100 YR - 1 Day		AE	26.87	27.36	
S0319	NS0319	100 YR - 1 Day		AE	26.54	27.35	
S0320	NS0320	100 YR - 1 Day		AE	26.42	27.45	
S0330	NS0330	100 YR - 1 Day		AE	26.42	27.47	
S0340	NS0340	100 YR - 1 Day		AE	26.42	27.47	
S0350	NS0350	100 YR - 1 Day		AE	26.42	27.46	
S0367	NS0367	100 YR - 1 Day		AE	22.50	22.79	
S0410	NS0410	100 YR - 1 Day		AE	29.18	29.23	
S0411	NS0411	100 YR - 1 Day		AE	27.55	28.71	
S0416	NS0416	100 YR - 1 Day		AE	29.34	29.30	
S0417	NS0417	100 YR - 1 Day		AE	28.53	28.58	
S0418	NS0418	100 YR - 1 Day		AE	29.00	28.94	
S0419	NS0419	100 YR - 1 Day		AE	29.00	28.94	
S0420	NS0420	100 YR - 1 Day		AE	27.55	28.71	
S0430	NS0430	100 YR - 1 Day		AE	27.52	28.63	
S0436	NS0436	100 YR - 1 Day		AE	28.34	28.30	
S0437	NS0437	100 YR - 1 Day		AE	27.25	27.47	
S0438	NS0438	100 YR - 1 Day		AE	27.26	27.78	
S0439	NS0439	100 YR - 1 Day		AE	27.26	27.82	
S0440	NS0440	100 YR - 1 Day		AE	27.26	27.94	
S0450	NS0450	100 YR - 1 Day		AE	27.25	27.93	
S0455	NS0455	100 YR - 1 Day		AE	27.20	27.86	
S0459	NS0459	100 YR - 1 Day		AE	26.76	27.44	
S0460	NS0460	100 YR - 1 Day		AE	27.20	27.85	
S0530	NS0530	100 YR - 1 Day			31.70	31.88	
S0533	NS0533	100 YR - 1 Day		AE	32.05	31.99	
S0534	NS0534	100 YR - 1 Day		AE	31.75	31.69	
S0535	NS0535	100 YR - 1 Day		AE	31.04	31.16	
S0540	NS0540	100 YR - 1 Day		AE	29.89	30.16	
S0550	NS0550	100 YR - 1 Day			30.01	30.17	
S0585	NS0585	100 YR - 1 Day		AE	21.82	21.91	
S0595	NS0595	100 YR - 1 Day		AE	18.08	19.21	
S0630	NS0630	100 YR - 1 Day			30.39	30.71	
S0635	NS0635	100 YR - 1 Day		AE	29.97	30.30	
S0639	NS0639	100 YR - 1 Day		AE	29.91	30.22	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
S0640	NS0640	100 YR - 1 Day		AE	29.91	30.22	
S0710	NS0710	100 YR - 1 Day		AE	28.00	28.13	
S0720	NS0720	100 YR - 1 Day		AE	28.00	28.13	
S0730	NS0730	100 YR - 1 Day		AE	28.00	28.13	
S0738	NS0738	100 YR - 1 Day		AE	30.06	30.01	
S0739	NS0739	100 YR - 1 Day		AE	28.00	28.13	
S0740	NS0740	100 YR - 1 Day		AE	27.26	27.95	
S0750	NS0750	100 YR - 1 Day		AE	27.26	27.95	
S0760	NS0760	100 YR - 1 Day		AE	27.26	27.95	
S0810	NS0810	100 YR - 1 Day		AE	30.04	30.11	
S0820	NS0820	100 YR - 1 Day		AE	29.94	29.97	
S0828	NS0828	100 YR - 1 Day		AE	29.32	29.31	
S0829	NS0829	100 YR - 1 Day		AE	29.31	29.35	
S0830	NS0830	100 YR - 1 Day		AE	28.86	28.97	
S0840	NS0840	100 YR - 1 Day		AE	28.55	28.60	
S0846	NS0846	100 YR - 1 Day		AE	29.39	29.37	
S0847	NS0847	100 YR - 1 Day		AE	29.27	29.30	
S0848	NS0848	100 YR - 1 Day		AE	29.27	29.30	
S0849	NS0849	100 YR - 1 Day		AE	29.27	29.29	
S0850	NS0850	100 YR - 1 Day		AE	27.16	27.57	
S0857	NS0857	100 YR - 1 Day		AE	28.46	28.46	
S0858	NS0858	100 YR - 1 Day		AE	28.44	28.36	
S0859	NS0859	100 YR - 1 Day		AE	27.07	27.47	
S0860	NS0860	100 YR - 1 Day		AE	27.07	27.47	
S0867	NS0867	100 YR - 1 Day		AE	27.07	27.47	
S0868	NS0868	100 YR - 1 Day		AE	27.07	27.30	
S0869	NS0869	100 YR - 1 Day		AE	27.07	27.48	
S0870	NS0870	100 YR - 1 Day		AE	27.07	27.46	
S1010	NS1010	100 YR - 1 Day		AE	24.62	25.68	
S1020	NS1020	100 YR - 1 Day		AE	24.65	25.67	
S1033	NS1033	100 YR - 1 Day		AE	24.69	25.64	
S1037	NS1037	100 YR - 1 Day		AE	24.67	25.66	
S1038	NS1038	100 YR - 1 Day		AE	24.66	25.67	
S1040	NS1040	100 YR - 1 Day		AE	24.65	25.67	
S1050	NS1050	100 YR - 1 Day		AE	24.65	25.67	
S1070	NS1070	100 YR - 1 Day		AE	24.64	25.67	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
S1080	NS1080	100 YR - 1 Day		AE	24.59	25.67	
S1110	NS1110	100 YR - 1 Day		AE	22.81	23.03	
S1120	NS1120	100 YR - 1 Day		AE	22.81	23.04	
S1130	NS1130	100 YR - 1 Day		AE	22.81	23.04	
S1140	NS1140	100 YR - 1 Day		AE	22.72	23.01	
S1210	NS1210	100 YR - 1 Day		AE	22.41	22.64	
S1220	NS1220	100 YR - 1 Day		AE	22.41	22.64	
S1230	NS1230	100 YR - 1 Day		AE	22.40	22.64	
S1240	NS1240	100 YR - 1 Day		AE	22.39	22.64	
S1250	NS1250	100 YR - 1 Day		AE	22.37	22.64	
S1260	NS1260	100 YR - 1 Day		AE	22.30	22.63	
S1280	NS1280	100 YR - 1 Day		AE	21.88	22.58	
S1310	NS1310	100 YR - 1 Day		AE	21.99	22.25	
S1320	NS1320	100 YR - 1 Day		AE	21.99	22.25	
S1330	NS1330	100 YR - 1 Day		AE	21.87	22.23	
S1340	NS1340	100 YR - 1 Day		AE	21.86	22.23	
S1510	NS1510	100 YR - 1 Day			24.36	25.92	
S1530	NS1530	100 YR - 1 Day		AE	24.36	25.92	
S1540	NS1540	100 YR - 1 Day		AE	24.36	25.93	
S1560	NS1560	100 YR - 1 Day		AE	24.35	25.93	
S1570	NS1570	100 YR - 1 Day		AE	24.30	25.93	
S1575	NS1575	100 YR - 1 Day		AE	24.28	25.93	
S1580	NS1580	100 YR - 1 Day		AE	24.09	25.93	
S1610	NS1610	100 YR - 1 Day		AE	20.22	20.82	
S1620	NS1620	100 YR - 1 Day			18.68	20.80	
S1630	NS1630	100 YR - 1 Day		AE	18.64	20.58	
S1640	NS1640	100 YR - 1 Day		AE	18.63	20.57	
S1710	NS1710	100 YR - 1 Day		AE	20.02	20.96	
S1720	NS1720	100 YR - 1 Day			19.26	20.96	
S1730	NS1730	100 YR - 1 Day		AE	19.03	20.93	
S1740	NS1740	100 YR - 1 Day		AE	18.74	20.53	
S1750	NS1750	100 YR - 1 Day		AE	18.66	20.53	
S1760	NS1760	100 YR - 1 Day		AE	18.65	20.53	
S1810	NS1810	100 YR - 1 Day		AE	19.64	20.96	
S1820	NS1820	100 YR - 1 Day		AE	19.46	20.87	
S1830	NS1830	100 YR - 1 Day		AE	19.39	20.82	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
S1910	NS1910	100 YR - 1 Day		AE	20.66	21.12	
S1920	NS1920	100 YR - 1 Day		AE	20.18	20.96	
S1930	NS1930	100 YR - 1 Day		AE	19.85	20.86	
S2010	NS2010	100 YR - 1 Day		AE	19.51	20.85	
S2020	NS2020	100 YR - 1 Day		AE	19.50	20.84	
S2029	NS2029	100 YR - 1 Day		AE	19.27	20.83	
S2040	NS2040	100 YR - 1 Day		AE	19.03	20.81	
S2045	NS2045	100 YR - 1 Day		AE	18.85	20.64	
S2050	NS2050	100 YR - 1 Day		AE	18.63	20.53	
S2070	NS2070	100 YR - 1 Day		AE	18.22	20.26	
S2510	NS2510	100 YR - 1 Day		AE	24.35	26.08	
S2705	NS2705	100 YR - 1 Day	AO	AE	19.95	20.04	
S2710	NS2710	100 YR - 1 Day	AO	AE	18.62	19.26	
S2717	NS2717	100 YR - 1 Day		AE	19.67	19.65	
S2718	NS2718	100 YR - 1 Day		AE	19.45	19.27	
S2719	NS2719	100 YR - 1 Day		AE	19.28	19.23	
S2720	NS2720	100 YR - 1 Day	AO	AE	17.64	19.14	
S2810	NS2810	100 YR - 1 Day			21.12	21.08	
S2820	NS2820	100 YR - 1 Day		AE	20.07	20.02	
S2830	NS2830	100 YR - 1 Day		AE	19.66	19.65	
S2840	NS2840	100 YR - 1 Day		AE	18.64	19.32	
S2850	NS2850	100 YR - 1 Day		AE	18.59	19.32	
S2910	NS2910	100 YR - 1 Day			21.24	21.31	
S2920	NS2920	100 YR - 1 Day		AE	19.85	19.88	
S2930	NS2930	100 YR - 1 Day			19.66	19.65	
S2940	NS2940	100 YR - 1 Day		AE	18.65	19.32	
S2950	NS2950	100 YR - 1 Day		AE	17.69	19.32	
S3010	NS3010	100 YR - 1 Day		AE	24.48	25.93	
S3020	NS3020	100 YR - 1 Day		AE	24.43	25.93	
S3030	NS3030	100 YR - 1 Day		AE	24.26	25.95	
S3040	NS3040	100 YR - 1 Day		AE	24.19	25.96	
S3050	NS3050	100 YR - 1 Day		AE	24.11	25.96	
S3510	NS3510	100 YR - 1 Day		AE	24.41	25.95	
S3520	NS3520	100 YR - 1 Day		AE	24.12	25.95	
S3525	NS3525	100 YR - 1 Day		AE	24.12	25.96	
S3530	NS3530	100 YR - 1 Day		AE	24.12	25.96	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
S3540	NS3540	100 YR - 1 Day		AE	24.12	25.96	
S4010	NS4010	100 YR - 1 Day		AE	22.78	22.98	
S4020	NS4020	100 YR - 1 Day		AE	22.79	23.04	
S4030	NS4030	100 YR - 1 Day		AE	22.80	23.06	
S4050	NS4050	100 YR - 1 Day		AE	22.82	23.07	
S4510	NS4510	100 YR - 1 Day		AE	23.12	24.21	
S4520	NS4520	100 YR - 1 Day		AE	23.12	24.21	
S4530	NS4530	100 YR - 1 Day		AE	23.12	24.21	
S4540	NS4540	100 YR - 1 Day		AE	23.12	24.17	
S5010	NS5010	100 YR - 1 Day		AE	23.75	25.45	
S5020	NS5020	100 YR - 1 Day		AE	23.94	25.70	
S5030	NS5030	100 YR - 1 Day		AE	23.97	25.76	
S5040	NS5040	100 YR - 1 Day		AE	24.03	25.87	
S5050	NS5050	100 YR - 1 Day		AE	24.03	25.89	
S5059	NS5059	100 YR - 1 Day		AE	25.26	25.83	
S5060	NS5060	100 YR - 1 Day		AE	24.08	26.03	
S5070	NS5070	100 YR - 1 Day		AE	24.10	26.08	
S5080	NS5080	100 YR - 1 Day		AE	24.10	26.13	
S5090	NS5090	100 YR - 1 Day		AE	24.11	26.18	
S5100	NS5100	100 YR - 1 Day		AE	24.12	26.24	
S5109	NS5109	100 YR - 1 Day		AE	24.14	26.24	
S5110	NS5110	100 YR - 1 Day		AE	24.13	26.26	
S5114	NS5114	100 YR - 1 Day		AE	26.63	27.38	
S5116	NS5116	100 YR - 1 Day		AE	24.31	26.31	
S5117	NS5117	100 YR - 1 Day		AE	24.15	26.25	
S5118	NS5118	100 YR - 1 Day		AE	24.14	26.26	
S5119	NS5119	100 YR - 1 Day		AE	26.42	27.33	
S5120	NS5120	100 YR - 1 Day		AE	24.14	26.28	
S5130	NS5130	100 YR - 1 Day		AE	24.14	26.29	
S5142	NS5142	100 YR - 1 Day		AE	24.84	26.33	
S5144	NS5144	100 YR - 1 Day		AE	24.91	26.33	
S5146	NS5146	100 YR - 1 Day		AE	25.10	26.66	
S5150	NS5150	100 YR - 1 Day		AE	26.12	27.34	
S5158	NS5174	100 YR - 1 Day			23.93	24.29	
S5160	NS5150	100 YR - 1 Day			26.12	27.34	
S5162	NS5163	100 YR - 1 Day			23.59	24.32	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
S5163	NS5163	100 YR - 1 Day		AE	23.59	24.32	
S5165	NS5165	100 YR - 1 Day		AE	23.59	24.32	
S5170	NS5170	100 YR - 1 Day			23.59	24.32	
S5173	NS5173	100 YR - 1 Day		AE	26.38	27.46	
S5174	NS5174	100 YR - 1 Day		X	23.93	24.29	
S5175	NS5175	100 YR - 1 Day		AE	23.39	24.17	
S5180	NS5180	100 YR - 1 Day		AE	23.39	24.15	
S5189	NS5189	100 YR - 1 Day		AE	23.95	24.88	
S5198	NS5198	100 YR - 1 Day		AE	23.30	23.52	
S5200	NS5200	100 YR - 1 Day		AE	23.29	23.99	
S5210	NS5210	100 YR - 1 Day		AE	23.19	23.85	
S5220	NS5220	100 YR - 1 Day		AE	23.10	23.72	
S5229	NS5229	100 YR - 1 Day		AE	25.20	25.47	
S5230	NS5230	100 YR - 1 Day		AE	23.07	23.68	
S5238	NS5238	100 YR - 1 Day		AE	22.92	23.49	
S5240	NS5240	100 YR - 1 Day		AE	22.92	23.46	
S5245	NS5245	100 YR - 1 Day		AE	22.78	23.31	
S5250	NS5250	100 YR - 1 Day		AE	22.78	23.24	
S5255	NS5255	100 YR - 1 Day		AE	22.73	23.48	
S5258	NS5258	100 YR - 1 Day		AE	24.37	24.79	
S5260	NS5260	100 YR - 1 Day		AE	22.64	23.05	
S5270	NS5270	100 YR - 1 Day		AE	22.52	22.88	
S5275	NS5275	100 YR - 1 Day		AE	23.48	23.97	
S5278	NS5278	100 YR - 1 Day		AE	25.44	25.70	
S5280	NS5280	100 YR - 1 Day		AE	22.48	22.85	
S5290	NS5290	100 YR - 1 Day		AE	22.41	22.80	
S5295	NS5295	100 YR - 1 Day		AE	22.53	23.57	
S5300	NS5300	100 YR - 1 Day		AE	22.32	22.74	
S5310	NS5310	100 YR - 1 Day		AE	22.23	22.68	
S5313	NS5313	100 YR - 1 Day		AE	25.44	25.70	
S5318	NS5318	100 YR - 1 Day		AE	23.03	23.57	
S5320	NS5320	100 YR - 1 Day		AE	22.13	22.59	
S5325	NS5325	100 YR - 1 Day		AE	23.06	23.07	
S5330	NS5330	100 YR - 1 Day		AE	22.03	22.52	
S5340	NS5340	100 YR - 1 Day		AE	21.86	22.42	
S5348	NS5348	100 YR - 1 Day		AE	24.46	24.82	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
S5349	NS5349	100 YR - 1 Day		AE	24.46	24.83	
S5350	NS5350	100 YR - 1 Day		AE	21.82	22.39	
S5360	NS5360	100 YR - 1 Day		AE	21.43	22.11	
S5368	NS5368	100 YR - 1 Day		AE	23.63	24.89	
S5369	NS5369	100 YR - 1 Day		AE	23.21	24.68	
S5370	NS5370	100 YR - 1 Day		AE	21.41	22.12	
S5378	NS5378	100 YR - 1 Day		AE	23.17	23.22	
S5379	NS5379	100 YR - 1 Day		AE	24.86	25.49	
S5380	NS5380	100 YR - 1 Day		AE	21.36	22.11	
S5388	NS5388	100 YR - 1 Day		AE	22.11	22.25	
S5389	NS5389	100 YR - 1 Day			24.21	24.07	
S5390	NS5390	100 YR - 1 Day			21.33	22.09	
S5400	NS5400	100 YR - 1 Day		AE	21.19	22.02	
S5405	NS5405	100 YR - 1 Day		AE	22.62	22.65	
S5410	NS5410	100 YR - 1 Day		AE	21.09	21.96	
S5420	NS5420	100 YR - 1 Day		AE	20.98	21.89	
S5430	NS5430	100 YR - 1 Day		AE	20.94	21.84	
S5440	NS5440	100 YR - 1 Day		AE	20.32	21.16	
S5450	NS5450	100 YR - 1 Day		AE	20.25	21.10	
S5460	NS5460	100 YR - 1 Day			20.21	21.02	
S5470	NS5470	100 YR - 1 Day			20.19	20.99	
S5480	NS5480	100 YR - 1 Day		AE	20.17	20.94	
S5490	NS5490	100 YR - 1 Day			19.94	20.77	
S5500	NS5500	100 YR - 1 Day		AE	19.85	20.72	
S5520	NS5520	100 YR - 1 Day		AE	17.87	19.62	
S5530	NS5530	100 YR - 1 Day		AE	17.84	19.59	
S5540	NS5540	100 YR - 1 Day		AE	17.80	19.54	
S5545	NS5545	100 YR - 1 Day		AE	18.47	19.52	
S5549	NS5549	100 YR - 1 Day		AE	19.24	19.52	
S5550	NS5550	100 YR - 1 Day		AE	17.79	19.52	
S5560	NS5560	100 YR - 1 Day		AE	17.74	19.39	
S5566	NS5566	100 YR - 1 Day		AE	18.27	18.17	
S5567	NS5567	100 YR - 1 Day			19.12	19.10	
S5570	NS5570	100 YR - 1 Day		AE	17.71	19.32	
S5577	NS5577	100 YR - 1 Day			19.89	19.98	
S5578	NS5578	100 YR - 1 Day		AE	19.23	19.22	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
S5579	NS5579	100 YR - 1 Day		X	20.10	20.02	
S5580	NS5580	100 YR - 1 Day			17.68	19.23	
S5590	NS5590	100 YR - 1 Day		AE	17.64	19.14	
S5600	NS5600	100 YR - 5 Day	A0	AE	17.61	19.09	
S5610	NS5610	100 YR - 5 Day	A0	AE	17.24	18.74	
S9000	NS9000	100 YR - 1 Day		AE	21.07	21.23	
S9050	NS9050	100 YR - 1 Day		AE	26.41	26.88	
S9055	NS9055	100 YR - 1 Day		AE	26.41	26.88	
S9060	NS9060	100 YR - 1 Day		AE	26.35	26.88	
S9065	NS9065	100 YR - 1 Day		AE	26.34	26.74	
S9070	NS9070	100 YR - 1 Day		AE	25.34	25.60	
S9075	NS9075	100 YR - 1 Day		AE	25.88	26.18	
S9080	NS9080	100 YR - 1 Day		AE	25.44	25.64	
S9085	NS9085	100 YR - 1 Day		AE	25.10	25.17	
S9090	NS9090	100 YR - 1 Day		AE	25.44	25.70	
S9095	NS9095	100 YR - 1 Day		AE	20.40	20.38	
S9100	NS9100	100 YR - 1 Day		X	19.88	19.84	
S9110	NS9110	100 YR - 1 Day		X	18.59	19.40	
S9200	NS9200	100 YR - 1 Day		AE	19.78	19.52	
S9610	NS9610	100 YR - 1 Day		AE	25.07	25.17	
S9620	NS9620	100 YR - 1 Day		AE	22.98	23.55	
T0010	NT0010	100 YR - 1 Day		AE	21.38	22.03	
T0013	NT0013	100 YR - 1 Day		AE	23.19	23.24	
T0014	NT0014	100 YR - 1 Day		AE	23.60	23.61	
T0015	NT0015	100 YR - 1 Day		AE	21.40	22.25	
T0016	NT0016	100 YR - 1 Day		AE	23.59	23.62	
T0017	NT0017	100 YR - 1 Day		AE	22.62	23.62	
T0018	NT0018	100 YR - 1 Day		AE	22.62	23.62	
T0019	NT0019	100 YR - 1 Day		AE	22.62	23.62	
T0030	NT0030	100 YR - 1 Day		AE	21.20	21.74	
T0035	NT0035	100 YR - 1 Day		AE	21.38	22.16	
T0040	NT0040	100 YR - 1 Day		AE	21.09	21.55	
T0043	NT0043	100 YR - 1 Day		AE	22.65	22.64	
T0045	NT0045	100 YR - 1 Day		AE	22.92	22.94	
T0050	NT0050	100 YR - 1 Day		AE	21.04	21.45	
T0060	NT0060	100 YR - 1 Day		AE	20.09	21.33	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
T0065	NT0065	100 YR - 1 Day		AE	21.02	21.66	
T0068	NT0068	100 YR - 1 Day		AE	23.04	22.99	
T0069	NT0069	100 YR - 1 Day		AE	22.79	22.74	
T0070	NT0070	100 YR - 1 Day		AE	20.05	21.27	
T0073	NT0073	100 YR - 1 Day		AE	23.03	23.03	
T0077	NT0077	100 YR - 1 Day		AE	22.62	22.64	
T0080	NT0080	100 YR - 1 Day		AE	19.90	21.02	
T0090	NT0090	100 YR - 1 Day		AE	19.79	20.83	
T0092	NT0092	100 YR - 1 Day		AE	21.93	21.96	
T0093	NT0093	100 YR - 1 Day		AE	21.75	21.71	
T0097	NT0097	100 YR - 1 Day		AE	20.19	20.81	
T0100	NT0100	100 YR - 1 Day		AE	19.67	20.65	
T0110	NT0110	100 YR - 1 Day		AE	19.47	20.50	
T0112	NT0112	100 YR - 1 Day			19.34	20.41	
T0115	NT0115	100 YR - 1 Day		AE	19.34	20.41	
T0118	NT0118	100 YR - 1 Day		AE	19.35	20.40	
T0120	NT0120	100 YR - 1 Day		AE	19.37	20.40	
T1010	NT1010	100 YR - 1 Day		AE	22.45	22.47	
T1020	NT1020	100 YR - 1 Day		AE	22.44	22.47	
T1030	NT1030	100 YR - 1 Day		AE	22.41	22.46	
T1040	NT1040	100 YR - 1 Day		AE	22.36	22.44	
T1050	NT1050	100 YR - 1 Day		AE	21.73	22.37	
T2010	NT2010	100 YR - 1 Day			21.72	21.68	
T2020	NT2020	100 YR - 1 Day		AE	21.72	21.68	
T2030	NT2030	100 YR - 1 Day		AE	21.61	21.55	
T2040	NT2040	100 YR - 1 Day		AE	21.26	21.27	
T2050	NT2050	100 YR - 1 Day		AE	21.10	21.18	
T2510	NT2510	100 YR - 1 Day			21.81	21.85	
T2520	NT2520	100 YR - 1 Day			21.54	21.30	
T2530	NT2530	100 YR - 1 Day		AE	21.30	21.19	
T2540	NT2540	100 YR - 1 Day		AE	20.58	20.99	
T2550	NT2550	100 YR - 1 Day		AE	20.56	20.99	
T2560	NT2560	100 YR - 1 Day		AE	20.52	20.97	
T2570	NT2570	100 YR - 1 Day		AE	20.13	20.92	
T2580	NT2580	100 YR - 1 Day		AE	20.12	20.92	
T3006	NT3006	100 YR - 1 Day		AE	19.96	20.83	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
T3008	NT3008	100 YR - 1 Day		AE	19.75	20.80	
T3010	NT3010	100 YR - 1 Day		AE	19.76	20.81	
T3014	NT3014	100 YR - 1 Day		AE	22.11	22.18	
T3015	NT3015	100 YR - 1 Day		AE	22.11	22.18	
T3020	NT3020	100 YR - 1 Day		AE	20.16	21.05	
T3030	NT3030	100 YR - 1 Day		AE	19.79	20.84	
T3040	NT3040	100 YR - 1 Day		AE	19.75	20.80	
T4010	NT4010	100 YR - 1 Day		AE	17.88	18.08	
T4020	NT4020	100 YR - 1 Day		AE	18.70	19.01	
T4021	NT4021	100 YR - 1 Day		AE	20.21	21.27	
T4022	NT4022	100 YR - 1 Day		AE	18.99	19.55	
T4030	NT4030	100 YR - 1 Day		AE	18.74	19.12	
T4040	NT4040	100 YR - 1 Day		AE	19.47	20.48	
T4060	NT4060	100 YR - 1 Day		AE	19.47	20.44	
U0486	NU0486	100 YR - 1 Day			29.55	29.83	
U0487	NU0487	100 YR - 1 Day			29.07	29.59	
U0490	NU0490	100 YR - 1 Day			28.54	29.31	
U0493	NU0493	100 YR - 1 Day		AE	28.71	29.09	
U0494	NU0494	100 YR - 1 Day		AE	28.68	28.91	
U0495	NU0495	100 YR - 1 Day		AE	28.10	28.91	
U0500	NU0500	100 YR - 1 Day		AE	28.10	28.91	
U0507	NU0507	100 YR - 1 Day		AE	28.04	28.82	
U0510	NU0510	100 YR - 1 Day		AE	28.05	28.83	
U0512	NU0512	100 YR - 1 Day		AE	28.04	28.83	
U0515	NU0515	100 YR - 1 Day		AE	28.04	28.83	
U0520	NU0520	100 YR - 1 Day		AE	28.00	28.78	
U0525	NU0525	100 YR - 1 Day		AE	27.75	28.51	
U0530	NU0530	100 YR - 1 Day		AE	27.75	28.50	
U0537	NU0537	100 YR - 1 Day		AE	27.68	28.36	
U0538	NU0538	100 YR - 1 Day		AE	27.68	28.41	
U0540	NU0540	100 YR - 1 Day		AE	27.68	28.41	
U0543	NU0543	100 YR - 1 Day		AE	27.35	28.10	
U0545	NU0545	100 YR - 1 Day		AE	27.35	28.10	
U0550	NU0550	100 YR - 1 Day		AE	27.34	28.09	
U0551	NU0551	100 YR - 1 Day		AE	27.18	27.81	
U0552	NU0552	100 YR - 1 Day		AE	26.97	27.81	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
U0553	NU0553	100 YR - 1 Day		AE	28.25	28.23	
U0554	NU0554	100 YR - 1 Day		AE	27.29	27.95	
U0555	NU0555	100 YR - 1 Day		AE	27.28	27.91	
U0556	NU0556	100 YR - 1 Day		AE	26.96	27.72	
U0557	NU0557	100 YR - 1 Day		AE	26.97	27.75	
U0558	NU0558	100 YR - 1 Day		AE	26.97	27.79	
U0560	NU0560	100 YR - 1 Day		AE	26.97	27.80	
U0570	NU0570	100 YR - 1 Day		AE	26.89	27.73	
U0575	NU0575	100 YR - 1 Day		AE	26.47	27.55	
U0580	NU0580	100 YR - 1 Day		AE	26.47	27.54	
U0590	NU0590	100 YR - 1 Day		AE	26.36	27.48	
U0610	NU0610	100 YR - 1 Day		AE	26.17	27.33	
U0640	NU0640	100 YR - 1 Day		AE	25.82	26.82	
U0645	NU0645	100 YR - 1 Day		AE	25.48	25.48	
U0646	NU0646	100 YR - 1 Day		AE	26.44	27.55	
U0647	NU0648	100 YR - 1 Day			25.27	25.47	
U0648	NU0648	100 YR - 1 Day		AE	25.27	25.47	
U0650	NU0650	100 YR - 1 Day		AE	25.09	25.47	
U0655	NU0655	100 YR - 1 Day		AE	25.15	25.16	
U2610	NU2610	100 YR - 1 Day		AE	28.97	28.95	
U2625	NU2625	100 YR - 1 Day		AE	27.82	28.55	
U2630	NU2630	100 YR - 1 Day		AE	27.82	28.55	
U2710	NU2710	100 YR - 1 Day		AE	28.53	28.82	
U2720	NU2720	100 YR - 1 Day			28.04	28.82	
U2730	NU2730	100 YR - 1 Day		AE	28.04	28.82	
U2735	NU2735	100 YR - 1 Day		AE	28.04	28.78	
U2737	NU2737	100 YR - 1 Day		AE	28.04	28.82	
U2740	NU2740	100 YR - 1 Day		AE	28.04	28.81	
U2745	NU2745	100 YR - 1 Day		AE	28.04	28.82	
U2750	NU2750	100 YR - 1 Day		AE	28.04	28.82	
U2753	NU2753	100 YR - 1 Day			28.04	28.82	
U2755	NU2755	100 YR - 1 Day		AE	28.04	28.82	
U2756	NU2756	100 YR - 1 Day			28.04	28.82	
U2757	NU2757	100 YR - 1 Day		AE	28.04	28.82	
U2760	NU2760	100 YR - 1 Day		AE	28.04	28.82	
U2770	NU2770	100 YR - 1 Day			28.04	28.82	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
U3126	NU3126	100 YR - 1 Day		AE	31.36	31.33	
U3130	NU3130	100 YR - 1 Day			30.32	30.47	
U3135	NU3135	100 YR - 1 Day		AE	29.99	30.31	
U3140	NU3140	100 YR - 1 Day		AE	29.89	30.13	
U3150	NU3150	100 YR - 1 Day		AE	29.66	29.85	
U3160	NU3160	100 YR - 1 Day		AE	29.57	29.72	
U3163	NU3163	100 YR - 1 Day		AE	30.00	29.96	
U3165	NU3165	100 YR - 1 Day		AE	29.43	29.49	
U3170	NU3170	100 YR - 1 Day		AE	29.14	29.37	
U3255	NU3255	100 YR - 1 Day		AE	30.10	30.28	
U3260	NU3260	100 YR - 1 Day			30.08	30.28	
U3270	NU3270	100 YR - 1 Day		AE	29.66	29.83	
U3490	NU3490	100 YR - 1 Day			28.39	29.18	
U3510	NU3510	100 YR - 1 Day		AE	28.17	28.99	
U3810	NU3810	100 YR - 1 Day		AE	28.69	28.68	
U3815	NU3815	100 YR - 1 Day		AE	27.97	28.68	
U3820	NU3820	100 YR - 1 Day		AE	27.97	28.68	
U3825	NU3825	100 YR - 1 Day		AE	27.97	28.68	
U3830	NU3830	100 YR - 1 Day		AE	27.97	28.68	
U3840	NU3840	100 YR - 1 Day		AE	27.97	28.66	
U3843	NU3843	100 YR - 1 Day		AE	29.28	29.24	
U3845	NU3845	100 YR - 1 Day		AE	28.93	28.87	
U3848	NU3848	100 YR - 1 Day		AE	27.97	28.66	
U3850	NU3850	100 YR - 1 Day		AE	27.97	28.66	
U3910	NU3910	100 YR - 1 Day		AE	28.96	28.92	
U3915	NU3915	100 YR - 1 Day		AE	28.52	28.52	
U3920	NU3920	100 YR - 1 Day		AE	28.33	28.52	
U3930	NU3930	100 YR - 1 Day		AE	28.33	28.52	
U3940	NU3940	100 YR - 1 Day		AE	27.75	28.50	
U4010	NU4010	100 YR - 1 Day		AE	29.03	29.42	
U4020	NU4020	100 YR - 1 Day		AE	29.65	29.62	
U4030	NU4030	100 YR - 1 Day		AE	29.56	29.55	
U4040	NU4040	100 YR - 1 Day		AE	29.45	29.51	
U4050	NU4050	100 YR - 1 Day		AE	28.98	29.40	
U4052	NU4052	100 YR - 1 Day		AE	28.56	29.32	
U4053	NU4053	100 YR - 1 Day		AE	28.55	29.30	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
U4054	NU4054	100 YR - 1 Day		AE	28.55	29.31	
U4055	NU4055	100 YR - 1 Day		AE	28.55	29.31	
U4060	NU4060	100 YR - 1 Day		AE	28.93	29.32	
U4070	NU4070	100 YR - 1 Day		AE	29.11	29.35	
U4080	NU4080	100 YR - 1 Day		AE	28.29	28.82	
U4082	NU4082	100 YR - 1 Day		AE	28.29	28.78	
U4084	NU4084	100 YR - 1 Day		AE	28.29	28.82	
U4087	NU4087	100 YR - 1 Day		AE	28.99	29.00	
U4090	NU4090	100 YR - 1 Day		AE	28.24	28.78	
U4100	NU4100	100 YR - 1 Day		AE	28.16	28.72	
U4105	NU4105	100 YR - 1 Day		AE	27.97	28.66	
U4110	NU4110	100 YR - 1 Day		AE	27.94	28.57	
U4112	NU4112	100 YR - 1 Day		AE	27.81	28.42	
U4113	NU4113	100 YR - 1 Day		AE	27.81	28.42	
U4115	NU4115	100 YR - 1 Day		AE	27.60	28.28	
U4117	NU4117	100 YR - 1 Day		AE	27.78	28.24	
U4124	NU4124	100 YR - 1 Day		AE	27.64	28.53	
U4125	NU4125	100 YR - 1 Day		AE	27.52	28.07	
U4126	NU4126	100 YR - 1 Day		AE	27.57	28.32	
U4128	NU4128	100 YR - 1 Day		AE	27.52	28.08	
U4130	NU4130	100 YR - 1 Day		AE	27.52	28.23	
U4140	NU4140	100 YR - 1 Day		AE	27.11	28.02	
U4150	NU4150	100 YR - 1 Day		AE	26.96	27.84	
U4155	NU4155	100 YR - 1 Day		AE	26.89	27.73	
U4160	NU4160	100 YR - 1 Day		AE	26.89	27.73	
U4165	NU4165	100 YR - 1 Day		AE	26.90	27.74	
U4210	NU4210	100 YR - 1 Day		AE	26.72	27.61	
U4220	NU4220	100 YR - 1 Day		AE	26.69	27.59	
U4225	NU4225	100 YR - 1 Day		AE	26.69	27.59	
U4230	NU4230	100 YR - 1 Day		AE	26.56	27.54	
U4240	NU4240	100 YR - 1 Day		AE	26.51	27.52	
U4250	NU4250	100 YR - 1 Day		AE	26.47	27.51	
U4260	NU4260	100 YR - 1 Day		AE	26.42	27.47	
U4410	NU4410	100 YR - 1 Day		AE	29.31	29.55	
U4420	NU4420	100 YR - 1 Day		AE	29.31	29.54	
U4430	NU4430	100 YR - 1 Day		AE	29.40	29.44	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
U4440	NU4440	100 YR - 1 Day		AE	29.40	29.44	
U4445	NU4445	100 YR - 1 Day		AE	29.77	29.74	
U4450	NU4450	100 YR - 1 Day		AE	29.40	29.44	
U4610	NU4610	100 YR - 1 Day		AE	27.39	28.17	
U4615	NU4615	100 YR - 1 Day		AE	27.83	28.29	
U4620	NU4620	100 YR - 1 Day		AE	27.39	28.22	
U4623	NU4623	100 YR - 1 Day		AE	27.39	28.07	
U4627	NU4627	100 YR - 1 Day		AE	27.39	28.05	
U4630	NU4630	100 YR - 1 Day		AE	27.39	28.05	
U4640	NU4640	100 YR - 1 Day		AE	27.39	28.04	
U4642	NU4640	100 YR - 1 Day			27.39	28.04	
U4644	NU4644	100 YR - 1 Day		AE	27.63	28.21	
U4646	NU4646	100 YR - 1 Day		AE	27.46	28.09	
U4660	NU4660	100 YR - 1 Day		AE	26.81	27.30	
U4675	NU4675	100 YR - 1 Day		AE	26.10	26.40	
U4677	NU4677	100 YR - 1 Day		AE	26.10	26.40	
U4680	NU4680	100 YR - 1 Day		AE	26.10	26.40	
U4710	NU4710	100 YR - 1 Day		AE	26.87	27.70	
U4720	NU4720	100 YR - 1 Day		AE	26.86	27.70	
U4725	NU4720	100 YR - 1 Day			26.86	27.70	
U4730	NU4730	100 YR - 1 Day		AE	26.10	26.14	
U4740	NU4740	100 YR - 1 Day		AE	26.08	26.12	
U4750	NU4750	100 YR - 1 Day		AE	25.99	26.03	
U4760	NU4760	100 YR - 1 Day		AE	25.99	26.03	
U4770	NU4770	100 YR - 1 Day		AE	25.67	25.89	
U4810	NU4810	100 YR - 1 Day		AE	27.42	27.93	
U4820	NU4820	100 YR - 1 Day		AE	26.98	27.65	
U4830	NU4830	100 YR - 1 Day		AE	27.36	27.67	
U4840	NU4840	100 YR - 1 Day		AE	26.52	27.39	
U4844	NU4844	100 YR - 1 Day		AE	26.29	26.62	
U4850	NU4850	100 YR - 1 Day		AE	25.45	25.71	
U4857	NU4857	100 YR - 1 Day		AE	25.57	25.76	
U4860	NU4860	100 YR - 1 Day		AE	25.45	25.71	
U4870	NU4870	100 YR - 1 Day		AE	25.45	25.70	
U4910	NU4910	100 YR - 1 Day		AE	25.92	26.21	
U4920	NU4920	100 YR - 1 Day		AE	25.90	26.10	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
U5010	NU5010	100 YR - 1 Day		AE	25.67	25.96	
U5020	NU5020	100 YR - 1 Day			26.21	26.16	
U5030	NU5030	100 YR - 1 Day			26.00	25.96	
U5040	NU5040	100 YR - 1 Day		AE	25.45	25.70	
U5050	NU5050	100 YR - 1 Day		AE	25.45	25.70	
U5060	NU5060	100 YR - 1 Day		X	26.80	26.77	
U5080	NU5080	100 YR - 1 Day		X	26.80	26.77	
U5090	NU5090	100 YR - 1 Day		AE	25.45	25.70	
U5095	NU5095	100 YR - 1 Day		AE	25.44	25.70	
U5185	NU5185	100 YR - 1 Day		AE	28.04	28.82	
U5202	NU5202	100 YR - 1 Day			28.04	28.82	
U5203	NU5203	100 YR - 1 Day		AE	28.04	28.81	
U5205	NU5205	100 YR - 1 Day		AE	28.04	28.82	
U5207	NU5207	100 YR - 1 Day		AE	28.04	28.82	
U5210	NU5210	100 YR - 1 Day		AE	28.04	28.82	
U5220	NU5220	100 YR - 1 Day		AE	28.04	28.82	
U5410	NU5410	100 YR - 1 Day		AE	27.80	28.56	
U5420	NU5420	100 YR - 1 Day		AE	27.79	28.55	
U5421	NU5421	100 YR - 1 Day		AE	27.79	28.53	
U5422	NU5422	100 YR - 1 Day		AE	28.16	28.58	
U5423	NU5423	100 YR - 1 Day		AE	27.84	28.58	
U5424	NU5424	100 YR - 1 Day		AE	27.85	28.63	
U5425	NU5425	100 YR - 1 Day		AE	28.03	28.81	
U5426	NU5426	100 YR - 1 Day		AE	27.85	28.63	
U5427	NU5427	100 YR - 1 Day		AE	27.80	28.55	
U5428	NU5428	100 YR - 1 Day		AE	27.80	28.56	
U5429	NU5429	100 YR - 1 Day		AE	27.79	28.54	
U5430	NU5430	100 YR - 1 Day		AE	27.79	28.53	
U5440	NU5440	100 YR - 1 Day		AE	27.79	28.52	
U5450	NU5450	100 YR - 1 Day		AE	27.70	28.36	
U5455	NU5455	100 YR - 1 Day		AE	27.69	28.29	
U5457	NU5457	100 YR - 1 Day		AE	27.69	28.34	
U5460	NU5460	100 YR - 1 Day		AE	27.64	28.23	
U5470	NU5470	100 YR - 1 Day		AE	27.64	28.23	
U5480	NU5480	100 YR - 1 Day		AE	27.64	28.23	
U5482	NU5482	100 YR - 1 Day		AE	28.49	28.54	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
U5484	NU5484	100 YR - 1 Day		AE	28.44	28.47	
U5486	NU5486	100 YR - 1 Day		AE	28.40	28.44	
U5487	NU5487	100 YR - 1 Day		AE	28.40	28.44	
U5488	NU5488	100 YR - 1 Day		AE	27.64	28.21	
U5490	NU5490	100 YR - 1 Day		AE	27.64	28.22	
U5495	NU5495	100 YR - 1 Day		AE	27.64	28.21	
U5500	NU5500	100 YR - 1 Day		AE	27.64	28.21	
U5520	NU5520	100 YR - 1 Day		AE	27.64	28.21	
U5525	NU5525	100 YR - 1 Day		AE	27.77	27.80	
U5530	NU5530	100 YR - 1 Day		AE	27.19	27.73	
U5540	NU5540	100 YR - 1 Day		AE	26.35	26.77	
U5545	NU5545	100 YR - 1 Day		X	25.83	25.81	
U5550	NU5550	100 YR - 1 Day		AE	26.35	26.77	
U5555	NU5555	100 YR - 1 Day		AE	25.57	25.79	
U5570	NU5570	100 YR - 1 Day		AE	25.57	25.79	
U5580	NU5580	100 YR - 1 Day		AE	25.52	25.76	
U5590	NU5590	100 YR - 1 Day		AE	25.52	25.76	
U5595	NU5595	100 YR - 1 Day		AE	25.45	25.71	
U5610	NU5610	100 YR - 1 Day		AE	25.54	25.46	
U5620	NU5620	100 YR - 1 Day			25.86	25.84	
U5630	NU5630	100 YR - 1 Day			25.86	25.84	
U5640	NU5640	100 YR - 1 Day		AE	25.15	25.34	
U5710	NU5710	100 YR - 1 Day			26.30	26.28	
U5720	NU5720	100 YR - 1 Day		X	26.30	26.27	
U5730	NU5730	100 YR - 1 Day		AE	26.35	26.31	
U5810	NU5810	100 YR - 1 Day		AE	28.48	28.53	
U5820	NU5820	100 YR - 1 Day		AE	28.48	28.53	
U5825	NU5825	100 YR - 1 Day		AE	28.97	28.95	
U5830	NU5830	100 YR - 1 Day		AE	28.48	28.53	
U5835	NU5835	100 YR - 1 Day		AE	28.43	28.53	
U5840	NU5840	100 YR - 1 Day		AE	27.75	28.48	
U5845	NU5845	100 YR - 1 Day		AE	28.65	28.59	
U5850	NU5850	100 YR - 1 Day		AE	27.40	28.46	
U5870	NU5870	100 YR - 1 Day		AE	27.40	28.46	
U5910	NU5910	100 YR - 1 Day		AE	27.87	28.46	
U5915	NU5915	100 YR - 1 Day		AE	27.78	28.46	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
U5920	NU5920	100 YR - 1 Day		AE	27.78	28.46	
U5930	NU5930	100 YR - 1 Day		AE	27.32	28.46	
U5940	NU5940	100 YR - 1 Day		AE	27.32	28.46	
U6010	NU6010	100 YR - 1 Day		AE	27.68	28.17	
U6020	NU6020	100 YR - 1 Day		AE	27.68	28.17	
U6021	NU6021	100 YR - 1 Day		AE	27.32	28.45	
U6022	NU6022	100 YR - 1 Day		AE	28.06	28.29	
U6023	NU6023	100 YR - 1 Day		AE	27.97	28.25	
U6024	NU6024	100 YR - 1 Day		AE	28.01	28.17	
U6026	NU6026	100 YR - 1 Day		AE	27.68	28.17	
U6030	NU6030	100 YR - 1 Day		AE	27.68	28.17	
U6040	NU6030	100 YR - 1 Day			27.68	28.17	
U6070	NU6070	100 YR - 1 Day		AE	27.13	27.17	
U6080	NU6080	100 YR - 1 Day		AE	26.42	26.78	
U6090	NU6090	100 YR - 1 Day		AE	26.40	26.77	
U6095	NU6095	100 YR - 1 Day		AE	27.11	27.11	
U6100	NU6100	100 YR - 1 Day		AE	26.40	26.77	
U6103	NU6103	100 YR - 1 Day		AE	26.80	26.81	
U6107	NU6107	100 YR - 1 Day		AE	26.35	26.77	
U6110	NU6110	100 YR - 1 Day		AE	26.35	26.77	
U6310	NU6310	100 YR - 1 Day		AE	27.85	28.45	
U6320	NU6320	100 YR - 1 Day		AE	27.36	28.45	
U6330	NU6330	100 YR - 1 Day		AE	27.36	28.45	
U6335	NU6335	100 YR - 1 Day		AE	27.38	28.45	
U6340	NU6340	100 YR - 1 Day		AE	27.22	28.43	
U6350	NU6350	100 YR - 1 Day		AE	27.22	28.43	
U6360	NU6360	100 YR - 1 Day		AE	27.22	28.43	
U6361	NU6360	100 YR - 1 Day			27.22	28.43	
U6362	NU6362	100 YR - 1 Day		AE	27.22	28.43	
U6370	NU6370	100 YR - 1 Day		AE	27.22	28.43	
U6380	NU6380	100 YR - 1 Day		AE	27.22	28.43	
U6383	NU6383	100 YR - 1 Day		AE	27.26	28.43	
U6385	NU6385	100 YR - 1 Day			26.14	26.65	
U6387	NU6387	100 YR - 1 Day		AE	26.41	26.66	
U6390	NU6390	100 YR - 1 Day		AE	25.30	26.65	
U6410	NU6410	100 YR - 1 Day		AE	26.99	27.40	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
U6416	NU6416	100 YR - 1 Day		AE	28.03	28.01	
U6420	NU6420	100 YR - 1 Day		AE	26.90	27.40	
U6607	NU6607	100 YR - 1 Day		AE	26.99	27.40	
U6612	NU6612	100 YR - 1 Day			26.58	26.70	
U6620	NU6620	100 YR - 1 Day		AE	26.59	26.71	
U6630	NU6630	100 YR - 1 Day		AE	26.58	26.69	
U6640	NU6640	100 YR - 1 Day		AE	26.58	26.69	
U6650	NU6650	100 YR - 1 Day		AE	26.58	26.69	
U6655	NU6655	100 YR - 1 Day		AE	25.74	26.13	
U6660	NU6660	100 YR - 1 Day			25.74	26.13	
U6666	NU6666	100 YR - 1 Day		AE	25.74	26.14	
U6670	NU6670	100 YR - 1 Day		AE	25.74	26.13	
U6680	NU6680	100 YR - 1 Day		AE	25.66	25.95	
U6690	NU6690	100 YR - 1 Day		AE	25.57	25.78	
U6700	NU6700	100 YR - 1 Day			24.87	25.52	
U6810	NU6810	100 YR - 1 Day		AE	25.95	26.21	
U6820	NU6820	100 YR - 1 Day			26.77	26.76	
U6825	NU6825	100 YR - 1 Day		X	26.78	26.76	
U6830	NU6830	100 YR - 1 Day			26.64	26.59	
U6834	NU6834	100 YR - 1 Day		X	26.63	26.59	
U6840	NU6840	100 YR - 1 Day		AE	26.57	26.51	
U6850	NU6850	100 YR - 1 Day		X	26.51	26.47	
U6860	NU6860	100 YR - 1 Day		X	26.52	26.48	
U6870	NU6870	100 YR - 1 Day		AE	25.95	26.21	
U6880	NU6880	100 YR - 1 Day		AE	25.95	26.21	
U6890	NU6890	100 YR - 1 Day		X	26.43	26.39	
U6900	NU6900	100 YR - 1 Day		AE	25.95	26.21	
U6910	NU6910	100 YR - 1 Day		X	26.45	26.41	
U6915	NU6915	100 YR - 1 Day		X	26.43	26.39	
U6920	NU6920	100 YR - 1 Day			26.45	26.40	
U6930	NU6930	100 YR - 1 Day		AE	25.95	26.21	
U6940	NU6940	100 YR - 1 Day		X	26.09	26.21	
U6945	NU6945	100 YR - 1 Day		X	26.13	26.21	
U6950	NU6950	100 YR - 1 Day		X	26.26	26.20	
U6960	NU6960	100 YR - 1 Day		AE	26.47	26.45	
U6970	NU6970	100 YR - 1 Day		AE	26.20	26.14	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
U6975	NU6975	100 YR - 1 Day		AE	25.07	25.62	
U7010	NU7010	100 YR - 1 Day		AE	25.68	26.01	
U7110	NU7110	100 YR - 1 Day		AE	25.95	26.21	
U7210	NU7210	100 YR - 1 Day		X	26.43	26.39	
U7220	NU7220	100 YR - 1 Day		AE	26.10	26.20	
U7230	NU7230	100 YR - 1 Day		AE	25.94	26.20	
U7310	NU7310	100 YR - 1 Day		AE	26.63	26.74	
U7320	NU7320	100 YR - 1 Day		AE	26.62	26.72	
U7330	NU7330	100 YR - 1 Day		AE	26.59	26.70	
U7355	NU7355	100 YR - 1 Day		AE	25.95	26.21	
U7360	NU7360	100 YR - 1 Day		AE	25.95	26.21	
U7363	NU7363	100 YR - 1 Day		AE	26.54	26.61	
U7365	NU7365	100 YR - 1 Day		AE	25.95	26.21	
U7367	NU7367	100 YR - 1 Day		AE	25.95	26.21	
U7370	NU7370	100 YR - 1 Day		AE	25.95	26.21	
U7375	NU7375	100 YR - 1 Day		AE	25.94	26.20	
U7380	NU7380	100 YR - 1 Day		AE	25.95	26.21	
U7390	NU7390	100 YR - 1 Day		AE	25.94	26.20	
U7400	NU7400	100 YR - 1 Day		AE	25.67	25.96	
U7510	NU7510	100 YR - 1 Day		AE	25.95	26.21	
U7520	NU7520	100 YR - 1 Day		X	25.75	26.14	
U7530	NU7530	100 YR - 1 Day		AE	25.74	26.14	
U7540	NU7540	100 YR - 1 Day			25.74	26.14	
U7550	NU7550	100 YR - 1 Day		AE	25.95	26.21	
U7560	NU7560	100 YR - 1 Day		AE	25.95	26.21	
U7570	NU7570	100 YR - 1 Day		AE	25.95	26.22	
U8210	NU8210	100 YR - 1 Day		AE	26.88	27.03	
U8220	NU8220	100 YR - 1 Day		AE	25.95	26.21	
U8230	NU8230	100 YR - 1 Day		AE	25.67	25.96	
U8240	NU8240	100 YR - 1 Day		AE	25.14	25.24	
U8250	NU8250	100 YR - 1 Day		AE	25.14	25.24	
U8260	NU8260	100 YR - 1 Day		AE	25.14	25.24	
U9000	NU9000	100 YR - 1 Day		AE	25.71	28.55	
U9002	NU9002	100 YR - 1 Day		AE	26.61	26.72	
U9003	NU9003	100 YR - 1 Day		AE	27.52	27.38	
U9004	NU9004	100 YR - 1 Day		AE	25.57	25.76	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
U9005	NU9005	100 YR - 1 Day		AE	27.56	27.87	
U9006	NU9006	100 YR - 1 Day		AE	26.33	26.76	
U9007	NU9007	100 YR - 1 Day		AE	25.64	26.28	
U9008	NU9008	100 YR - 1 Day		AE	25.01	25.88	
U9009	NU9009	100 YR - 1 Day		AE	26.10	26.40	
U9011	NU9011	100 YR - 1 Day		AE	27.16	27.25	
U9012	NU9012	100 YR - 1 Day		AE	25.99	26.40	
U9013	NU9013	100 YR - 1 Day		AE	26.79	27.17	
U9014	NU9014	100 YR - 1 Day		AE	27.21	27.13	
U9015	NU9015	100 YR - 1 Day		AE	27.52	27.44	
U9016	NU9016	100 YR - 1 Day		AE	27.22	27.05	
U9017	NU9017	100 YR - 1 Day		AE	26.88	27.03	
U9018	NU9018	100 YR - 1 Day		AE	26.87	27.03	
U9019	NU9019	100 YR - 1 Day		AE	26.53	26.71	
U9021	NU9021	100 YR - 1 Day		AE	26.10	26.40	
U9022	NU9022	100 YR - 1 Day		AE	27.53	27.44	
U9023	NU9023	100 YR - 1 Day		AE	27.87	27.99	
U9024	NU9024	100 YR - 1 Day		AE	27.35	27.48	
U9025	NU9025	100 YR - 1 Day		AE	26.58	26.69	
U9026	NU9026	100 YR - 1 Day		AE	26.78	27.28	
U9027	NU9027	100 YR - 1 Day		X	25.97	26.21	
U9028	NU9028	100 YR - 1 Day		AE	25.95	26.21	
U9029	NU9029	100 YR - 1 Day		AE	25.95	26.21	
U9030	NU9030	100 YR - 1 Day		AE	26.47	26.61	
U9031	NU9031	100 YR - 1 Day		AE	27.41	27.84	
U9032	NU9032	100 YR - 1 Day		AE	26.54	26.61	
U9033	NU9033	100 YR - 1 Day		AE	26.62	26.72	
U9034	NU9034	100 YR - 1 Day		AE	28.56	28.55	
U9035	NU9035	100 YR - 1 Day		AE	25.98	26.21	
U9036	NU9036	100 YR - 1 Day		AE	26.62	26.72	
U9037	NU9037	100 YR - 1 Day		AE	27.42	27.93	
U9038	NU9038	100 YR - 1 Day		AE	28.32	28.27	
U9039	NU9039	100 YR - 1 Day		AE	27.42	27.93	
U9040	NU9040	100 YR - 1 Day		AE	26.81	27.29	
U9041	NU9041	100 YR - 1 Day		X	26.53	26.58	
U9042	NU9042	100 YR - 1 Day		AE	27.42	27.93	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
U9043	NU9043	100 YR - 1 Day		AE	27.42	27.93	
U9044	NU9044	100 YR - 1 Day		AE	27.60	27.72	
U9045	NU9045	100 YR - 1 Day		AE	27.81	27.70	
U9046	NU9046	100 YR - 1 Day		AE	27.36	27.67	
U9051	NU9051	100 YR - 1 Day		AE	27.36	27.68	
U9052	NU9052	100 YR - 1 Day		AE	26.98	27.65	
U9053	NU9053	100 YR - 1 Day		AE	27.05	27.65	
U9054	NU9054	100 YR - 1 Day		AE	26.98	27.65	
U9055	NU9055	100 YR - 1 Day		AE	27.07	27.65	
U9056	NU9056	100 YR - 1 Day		AE	26.98	27.65	
U9057	NU9057	100 YR - 1 Day		AE	26.98	27.65	
U9058	NU9058	100 YR - 1 Day		AE	26.36	26.62	
U9059	NU9059	100 YR - 1 Day		AE	26.36	26.70	
U9061	NU9061	100 YR - 1 Day		AE	26.29	26.62	
U9062	NU9062	100 YR - 1 Day		AE	27.33	27.45	
U9065	NU9065	100 YR - 1 Day		AE	25.45	25.71	
U9066	NU9066	100 YR - 1 Day		AE	25.45	25.71	
U9067	NU9067	100 YR - 1 Day		AE	27.43	27.34	
U9068	NU9068	100 YR - 1 Day		AE	26.88	26.86	
U9069	NU9069	100 YR - 1 Day		AE	26.30	26.62	
U9070	NU9070	100 YR - 1 Day		AE	26.38	26.57	
U9071	NU9071	100 YR - 1 Day		AE	25.47	25.72	
U9072	NU9072	100 YR - 1 Day		AE	26.52	26.49	
U9073	NU9073	100 YR - 1 Day		AE	26.30	26.62	
U9074	NU9074	100 YR - 1 Day		AE	26.31	26.63	
U9080	NU9080	100 YR - 1 Day		AE	25.67	25.89	
U9081	NU9081	100 YR - 1 Day		AE	26.29	26.62	
U9082	NU9082	100 YR - 1 Day		AE	27.99	27.95	
U9083	NU9083	100 YR - 1 Day		AE	28.13	28.13	
U9084	NU9084	100 YR - 1 Day		AE	27.62	27.72	
U9085	NU9085	100 YR - 1 Day		AE	25.57	25.79	
U9086	NU9086	100 YR - 1 Day		AE	25.57	25.79	
U9087	NU9087	100 YR - 1 Day		AE	27.13	27.13	
U9088	NU9088	100 YR - 1 Day			26.99	27.39	
U9089	NU9089	100 YR - 1 Day		AE	27.76	27.71	
U9090	NU9090	100 YR - 1 Day		AE	25.67	25.89	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
U9091	NU9091	100 YR - 1 Day		AE	27.05	27.19	
U9092	NU9092	100 YR - 1 Day		AE	28.33	28.21	
U9093	NU9093	100 YR - 1 Day		AE	26.97	27.40	
U9094	NU9094	100 YR - 1 Day		AE	28.15	27.99	
U9095	NU9095	100 YR - 1 Day		AE	27.12	27.19	
U9096	NU9096	100 YR - 1 Day		X	27.33	27.24	
U9097	NU9097	100 YR - 1 Day		AE	27.34	27.24	
U9098	NU9098	100 YR - 1 Day		AE	27.75	27.62	
U9100	NU9100	100 YR - 1 Day		AE	28.04	28.82	
U9101	NU9101	100 YR - 1 Day		X	27.41	27.44	
U9110	NU9110	100 YR - 1 Day		AE	26.27	26.17	
U9115	NU9115	100 YR - 1 Day		AE	26.70	26.72	
U9120	NU9120	100 YR - 1 Day		AE	27.07	27.30	
U9125	NU9125	100 YR - 1 Day		AE	27.44	27.43	
U9130	NU9130	100 YR - 1 Day		AE	27.48	27.41	
U9135	NU9135	100 YR - 1 Day		X	26.87	26.84	
U9140	NU9140	100 YR - 1 Day		AE	27.88	27.59	
U9145	NU9145	100 YR - 1 Day		AE	26.80	26.57	
U9155	NU9155	100 YR - 1 Day			27.62	27.41	
U9160	NU9160	100 YR - 1 Day			27.81	27.47	
U9201	NU9201	100 YR - 1 Day		AE	27.40	27.37	
U9301	NU9301	100 YR - 1 Day		X	26.41	26.38	
U9400	NU9400	100 YR - 1 Day		AE	26.10	26.40	
U9450	NU9450	100 YR - 1 Day		AE	26.83	27.09	
U9500	NU9500	100 YR - 1 Day		AE	25.67	25.89	
U9600	NU9600	100 YR - 1 Day		AE	26.10	26.40	
U9700	NU9700	100 YR - 1 Day		AE	25.67	25.88	
U9800	NU9800	100 YR - 1 Day		AE	25.67	25.88	
U9810	NU9810	100 YR - 1 Day		AE	25.97	26.02	
U9820	NU9820	100 YR - 1 Day		AE	26.33	26.70	
U9830	NU9830	100 YR - 1 Day		AE	25.23	25.48	
U9900	NU9900	100 YR - 1 Day		AE	25.67	25.86	
U9910	NU9910	100 YR - 1 Day		AE	25.68	25.86	
V0001	NV0001	100 YR - 1 Day		AE	28.39	28.35	
V0002	NV0002	100 YR - 1 Day		AE	28.39	28.35	
V0003	NV0003	100 YR - 1 Day		AE	27.51	28.29	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
V0004	NV0004	100 YR - 1 Day			27.60	28.22	
V0005	NV0005	100 YR - 1 Day		AE	27.54	28.37	
V0006	NV0006	100 YR - 1 Day		AE	27.54	28.37	
V0007	NV0007	100 YR - 1 Day		AE	27.54	28.37	
V0008	NV0008	100 YR - 1 Day		AE	27.54	28.35	
V0009	NV0009	100 YR - 1 Day		AE	27.75	28.35	
V0011	NV0011	100 YR - 1 Day		AE	27.68	28.35	
V0012	NV0012	100 YR - 1 Day		AE	27.56	28.34	
V0014	NV0014	100 YR - 1 Day		AE	25.32	26.89	
V0015	NV0015	100 YR - 1 Day			25.32	26.89	
V0020	NV0020	100 YR - 1 Day		AE	25.32	26.89	
V0029	NV0029	100 YR - 1 Day		AE	25.32	27.08	
V0030	NV0030	100 YR - 1 Day		AE	25.32	26.89	
V0040	NV0040	100 YR - 1 Day		AE	25.30	26.78	
V0045	NV0045	100 YR - 1 Day		AE	23.38	24.35	
V0050	NV0050	100 YR - 1 Day		AE	25.30	26.75	
V0051	NV0051	100 YR - 1 Day		AE	21.86	22.82	
V0055	NV0055	100 YR - 1 Day		AE	25.30	27.00	
V0060	NV0060	100 YR - 1 Day		AE	25.30	26.73	
V0062	NV0062	100 YR - 1 Day			25.27	26.50	
V0064	NV0064	100 YR - 1 Day		AE	25.27	26.50	
V0065	NV0065	100 YR - 1 Day		AE	25.27	26.56	
V0066	NV0066	100 YR - 1 Day		AE	25.27	26.50	
V0068	NV0068	100 YR - 1 Day		AE	25.27	26.50	
V0070	NV0070	100 YR - 1 Day		AE	25.27	26.65	
V0073	NV0073	100 YR - 1 Day		AE	25.20	26.49	
V0077	NV0077	100 YR - 1 Day		AE	25.21	26.50	
V0080	NV0080	100 YR - 1 Day		AE	25.23	26.58	
V0090	NV0090	100 YR - 1 Day		AE	25.21	26.54	
V0100	NV0100	100 YR - 1 Day		AE	23.75	24.18	
V0110	NV0110	100 YR - 1 Day		AE	23.72	24.14	
V0120	NV0120	100 YR - 1 Day			23.71	24.11	
V0130	NV0130	100 YR - 1 Day			22.12	23.15	
V0135	NV0135	100 YR - 1 Day		AE	22.39	24.11	
V0140	NV0140	100 YR - 1 Day		AE	22.06	23.08	
V0160	NV0160	100 YR - 1 Day		AE	21.78	22.71	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
V0170	NV0170	100 YR - 1 Day		AE	21.71	22.62	
V0180	NV0180	100 YR - 1 Day		AE	21.64	22.53	
V0187	NV0187	100 YR - 1 Day		AE	21.53	22.54	
V0190	NV0190	100 YR - 1 Day		AE	21.52	22.46	
V0200	NV0200	100 YR - 1 Day		AE	21.48	22.42	
V0205	NV0205	100 YR - 1 Day		AE	21.49	22.53	
V0210	NV0210	100 YR - 1 Day		AE	21.39	22.33	
V0220	NV0220	100 YR - 1 Day		AE	21.32	22.24	
V0230	NV0230	100 YR - 1 Day		AE	21.25	22.16	
V0240	NV0240	100 YR - 1 Day		AE	21.20	22.12	
V0250	NV0250	100 YR - 1 Day		AE	21.14	22.04	
V1010	NV1010	100 YR - 1 Day			27.82	28.55	
V1015	NV1015	100 YR - 1 Day		AE	27.75	28.51	
V1033	NV1033	100 YR - 1 Day		AE	27.75	28.51	
V1037	NV1037	100 YR - 1 Day		AE	27.40	28.46	
V1040	NV1040	100 YR - 1 Day		AE	27.31	28.46	
V1043	NV1043	100 YR - 1 Day		AE	27.31	28.46	
V1047	NV1047	100 YR - 1 Day		AE	27.30	28.45	
V1050	NV1050	100 YR - 1 Day		AE	27.26	28.43	
V1080	NV1080	100 YR - 1 Day		AE	25.60	27.01	
V1090	NV1090	100 YR - 1 Day		AE	25.48	26.91	
V2011	NV2011	100 YR - 1 Day		AE	25.80	25.70	
V2015	NV2015	100 YR - 1 Day		AE	24.18	24.32	
V2210	NV2210	100 YR - 1 Day		AE	24.18	24.33	
V2220	NV2220	100 YR - 1 Day		AE	24.16	24.32	
V2520	NV2520	100 YR - 1 Day		AE	24.29	24.34	
V2530	NV2530	100 YR - 1 Day		AE	24.29	24.34	
V2540	NV2540	100 YR - 1 Day		AE	24.28	24.34	
V2550	NV2550	100 YR - 1 Day		AE	24.27	24.33	
V2560	NV2560	100 YR - 1 Day		AE	24.27	24.33	
V2570	NV2570	100 YR - 1 Day		AE	24.25	24.32	
V2590	NV2590	100 YR - 1 Day		AE	24.20	24.31	
V2600	NV2600	100 YR - 1 Day		AE	24.17	24.30	
V2610	NV2610	100 YR - 1 Day		AE	24.15	24.30	
V2810	NV2810	100 YR - 1 Day		AE	24.14	24.31	
V2830	NV2830	100 YR - 1 Day		AE	24.14	24.31	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
V2840	NV2840	100 YR - 1 Day		AE	24.12	24.30	
V2850	NV2850	100 YR - 1 Day		AE	24.06	24.28	
V2853	NV2853	100 YR - 1 Day		AE	23.99	24.24	
V2857	NV2857	100 YR - 1 Day		AE	23.99	24.24	
V2860	NV2860	100 YR - 1 Day		AE	23.99	24.25	
V2880	NV2880	100 YR - 1 Day		AE	23.78	24.17	
V2890	NV2890	100 YR - 1 Day		AE	23.77	24.16	
V3010	NV3010	100 YR - 1 Day		AE	23.01	23.24	
V3020	NV3020	100 YR - 1 Day		AE	22.25	23.20	
V3042	NV3042	100 YR - 1 Day		AE	27.75	28.51	
V3060	NV3060	100 YR - 1 Day		AE	22.07	23.10	
V3510	NV3510	100 YR - 1 Day			23.75	23.97	
V3520	NV3520	100 YR - 1 Day		AE	22.92	23.03	
V3530	NV3530	100 YR - 1 Day		AE	22.96	23.03	
V3540	NV3540	100 YR - 1 Day		AE	22.95	23.03	
V3550	NV3550	100 YR - 1 Day		AE	23.11	23.07	
V4020	NV4020	100 YR - 1 Day		AE	26.07	26.06	
V4025	NV4025	100 YR - 1 Day		AE	26.95	27.01	
V4030	NV4030	100 YR - 1 Day			25.55	25.55	
V4035	NV4035	100 YR - 1 Day		AE	23.75	24.17	
V4040	NV4040	100 YR - 1 Day			25.55	25.54	
V4050	NV4050	100 YR - 1 Day			25.57	25.56	
V4060	NV4060	100 YR - 1 Day			25.57	25.56	
V4070	NV4070	100 YR - 1 Day		AE	25.58	25.79	
V4080	NV4080	100 YR - 1 Day		AE	25.57	25.79	
V4090	NV4090	100 YR - 1 Day		AE	25.56	25.74	
V4100	NV4100	100 YR - 1 Day		AE	25.56	25.74	
V4110	NV4110	100 YR - 1 Day			25.55	25.70	
V4120	NV4120	100 YR - 1 Day		AE	25.55	25.70	
V4130	NV4130	100 YR - 1 Day		AE	25.50	25.59	
V4140	NV4140	100 YR - 1 Day		AE	25.50	25.59	
V4150	NV4150	100 YR - 1 Day		AE	25.49	25.58	
V4160	NV4160	100 YR - 1 Day		AE	25.49	25.58	
V4170	NV4170	100 YR - 1 Day		AE	24.86	25.03	
V4180	NV4180	100 YR - 1 Day		AE	24.84	25.02	
V4190	NV4190	100 YR - 1 Day		AE	24.23	24.11	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
X0004	NX0004	100 YR - 1 Day		AE	24.14	24.79	
X0006	NX0006	100 YR - 1 Day		AE	24.12	24.80	
X0008	NX0008	100 YR - 1 Day		AE	24.03	24.92	
X0010	NX0010	100 YR - 1 Day		AE	24.01	24.92	
X0035	NX0035	100 YR - 1 Day		AE	25.52	25.60	
X0040	NX0040	100 YR - 1 Day		AE	23.97	24.77	
X0050	NX0050	100 YR - 1 Day		AE	23.38	23.65	
X0055	NX0055	100 YR - 1 Day		AE	23.41	23.74	
X0060	NX0060	100 YR - 1 Day		AE	23.36	23.63	
X0070	NX0070	100 YR - 1 Day		AE	23.28	23.50	
X0510	NX0510	100 YR - 1 Day		AE	23.19	23.23	
X0519	NX0519	100 YR - 1 Day		AE	23.34	23.50	
X0520	NX0520	100 YR - 1 Day		AE	23.34	23.52	
X1005	NX1005	100 YR - 1 Day			25.20	25.16	
X1010	NX1010	100 YR - 1 Day		AE	24.22	25.17	
X1020	NX1020	100 YR - 1 Day			24.26	25.11	
X1030	NX1030	100 YR - 1 Day		AE	24.26	24.99	
X1040	NX1040	100 YR - 1 Day		AE	24.12	24.99	
X1045	NX1045	100 YR - 1 Day		AE	24.36	24.92	
X1050	NX1050	100 YR - 1 Day		AE	24.07	24.98	
X1505	NX1505	100 YR - 1 Day		AE	25.14	25.61	
X1510	NX1510	100 YR - 1 Day		AE	24.21	25.16	
X1524	NX1524	100 YR - 1 Day		AE	25.54	25.49	
X1525	NX1525	100 YR - 1 Day		AE	26.14	26.13	
X1530	NX1530	100 YR - 1 Day		AE	24.36	25.31	
X1540	NX1540	100 YR - 1 Day		AE	24.09	25.31	
X1541	NX1541	100 YR - 1 Day		AE	26.14	26.35	
X1542	NX1542	100 YR - 1 Day		AE	25.31	26.35	
X1543	NX1543	100 YR - 1 Day		AE	25.31	26.35	
X1544	NX1544	100 YR - 1 Day		AE	25.06	25.58	
X1545	NX1545	100 YR - 1 Day		AE	25.09	25.62	
X1547	NX1547	100 YR - 1 Day		AE	24.21	25.52	
X1548	NX1548	100 YR - 1 Day		AE	24.19	25.51	
X1549	NX1549	100 YR - 1 Day		AE	24.05	25.34	
X1550	NX1550	100 YR - 1 Day		AE	24.05	25.33	
X3005	NX3005	100 YR - 1 Day			25.60	26.43	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
X3010	NX3010	100 YR - 1 Day		X	25.48	26.33	
X3020	NX3020	100 YR - 1 Day			25.95	26.36	
X3030	NX3030	100 YR - 1 Day		AE	25.31	26.36	
X3031	NX3031	100 YR - 1 Day		AE	25.31	26.35	
X3032	NX3032	100 YR - 1 Day			25.93	26.35	
X3033	NX3033	100 YR - 1 Day			25.31	26.35	
Y0010	NY0010	100 YR - 1 Day		AE	22.17	22.73	
Y0020	NY0010	100 YR - 1 Day			22.17	22.73	
Y0040	NY0040	100 YR - 1 Day			21.64	21.72	
Y0050	NY0050	100 YR - 1 Day		AE	21.63	21.72	
Y0063	NY0063	100 YR - 1 Day		AE	20.99	21.26	
Y0067	NY0067	100 YR - 1 Day		AE	21.02	21.30	
Y0070	NY0070	100 YR - 1 Day		AE	20.98	21.18	
Y0073	NY0073	100 YR - 1 Day		AE	20.97	21.19	
Y0077	NY0077	100 YR - 1 Day		AE	20.97	21.18	
Y0080	NY0080	100 YR - 1 Day		AE	20.94	21.13	
Y0083	NY0083	100 YR - 1 Day		AE	20.75	20.89	
Y0087	NY0087	100 YR - 1 Day		AE	20.75	20.89	
Y0090	NY0090	100 YR - 1 Day		AE	20.74	20.89	
Y0093	NY0093	100 YR - 1 Day			20.64	20.75	
Y0097	NY0097	100 YR - 1 Day		AE	20.64	20.75	
Y0100	NY0100	100 YR - 1 Day		AE	20.64	20.75	
Y0103	NY0103	100 YR - 1 Day		AE	20.49	20.55	
Y0107	NY0107	100 YR - 1 Day		AE	20.47	20.53	
Y0120	NY0120	100 YR - 1 Day		AE	20.46	20.52	
Y0130	NY0130	100 YR - 1 Day		AE	19.58	19.82	
Y0140	NY0140	100 YR - 1 Day		AE	19.13	19.27	
Y0150	NY0150	100 YR - 1 Day		AE	18.63	18.70	
Y0160	NY0160	100 YR - 1 Day		AE	18.39	18.45	
Y0162	NY0162	100 YR - 1 Day		AE	18.13	18.14	
Y0165	NY0165	100 YR - 1 Day		AE	18.12	18.14	
Y0168	NY0168	100 YR - 1 Day		AE	18.12	18.14	
Y0170	NY0170	100 YR - 1 Day		AE	18.27	18.31	
Y0180	NY0180	100 YR - 1 Day		AE	18.21	18.24	
Y0190	NY0190	100 YR - 1 Day		AE	16.43	16.47	
Y0200	NY0200	100 YR - 1 Day		AE	16.31	16.34	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
Y0203	NY0203	100 YR - 1 Day		AE	16.34	16.34	
Y0207	NY0207	100 YR - 1 Day		AE	16.34	16.34	
Y0208	NY0208	100 YR - 1 Day		AE	16.32	16.34	
Y0210	NY0210	100 YR - 1 Day		AE	16.09	16.12	
Y0220	NY0220	100 YR - 1 Day			16.03	16.06	
Y0230	NY0230	100 YR - 1 Day		AE	15.06	15.16	
Y0240	NY0240	100 YR - 1 Day		AE	15.00	15.11	
Y0250	NY0250	100 YR - 1 Day		AE	14.87	14.97	
Y0260	NY0260	100 YR - 1 Day		AE	14.46	14.79	
Y1003	NY1003	100 YR - 1 Day		AE	23.21	23.44	
Y1005	NY1005	100 YR - 1 Day		AE	22.56	23.12	
Y1007	NY1007	100 YR - 1 Day		AE	22.61	23.11	
Y1010	NY1010	100 YR - 1 Day		AE	22.62	23.11	
Y1020	NY1020	100 YR - 1 Day		AE	22.45	23.07	
Y1310	NY1310	100 YR - 1 Day		AE	23.01	23.75	
Y1320	NY1320	100 YR - 1 Day		AE	22.89	23.74	
Y1330	NY1330	100 YR - 1 Day		AE	22.60	23.73	
Y1332	NY1332	100 YR - 1 Day		AE	23.55	24.54	
Y1335	NY1335	100 YR - 1 Day		AE	23.46	24.51	
Y1338	NY1338	100 YR - 1 Day			22.57	23.27	
Y1340	NY1340	100 YR - 1 Day		AE	22.53	23.24	
Y1348	NY1348	100 YR - 1 Day		AE	22.47	23.07	
Y1350	NY1350	100 YR - 1 Day		AE	22.24	22.78	
Y1510	NY1510	100 YR - 1 Day		AE	22.49	22.80	
Y1520	NY1520	100 YR - 1 Day		AE	22.49	22.80	
Y1530	NY1530	100 YR - 1 Day		AE	22.30	22.80	
Y1535	NY1535	100 YR - 1 Day		AE	22.21	22.72	
Y1537	NY1537	100 YR - 1 Day		AE	22.21	22.74	
Y1540	NY1540	100 YR - 1 Day		AE	22.21	22.77	
Y1550	NY1550	100 YR - 1 Day		AE	22.17	22.72	
Y1555	NY1560	100 YR - 1 Day			22.07	22.57	
Y1560	NY1560	100 YR - 1 Day		AE	22.07	22.57	
Y2010	NY2010	100 YR - 1 Day		AE	21.63	21.71	
Y2015	NY2015	100 YR - 1 Day		AE	22.56	22.54	
Y2020	NY2020	100 YR - 1 Day		AE	21.63	21.70	
Y2510	NY2510	100 YR - 1 Day		AE	21.53	21.60	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
Y2512	NY2512	100 YR - 1 Day		AE	21.87	21.81	
Y2513	NY2513	100 YR - 1 Day		AE	21.41	21.44	
Y2517	NY2517	100 YR - 1 Day		AE	21.45	21.49	
Y2520	NY2520	100 YR - 1 Day			21.53	21.60	
Y2540	NY2540	100 YR - 1 Day		AE	21.60	21.67	
Y2550	NY2550	100 YR - 1 Day		AE	21.63	21.71	
Y3010	NY3010	100 YR - 1 Day		AE	19.87	19.84	
Y3310	NY3310	100 YR - 1 Day		AE	19.86	19.83	
Y3710	NY3710	100 YR - 1 Day		AE	19.86	19.83	
Y3720	NY3720	100 YR - 1 Day		AE	19.77	19.74	
Y3730	NY3730	100 YR - 1 Day		AE	19.67	19.65	
Y3740	NY3740	100 YR - 1 Day		AE	19.22	19.35	
Y4010	NY4010	100 YR - 1 Day		AE	16.10	16.08	
Y4020	NY4020	100 YR - 1 Day		AE	16.29	16.26	
Y4030	NY4030	100 YR - 1 Day		AE	16.09	16.08	
Y4040	NY4040	100 YR - 1 Day		AE	15.85	15.85	
Y4050	NY4050	100 YR - 1 Day		AE	15.85	15.85	
Y4060	NY4060	100 YR - 1 Day		AE	15.00	15.11	
Z0010	NZ0010	100 YR - 1 Day			23.17	23.18	
Z0020	NZ0020	100 YR - 1 Day		AE	23.17	23.18	
Z0025	NZ0025	100 YR - 1 Day		AE	23.15	23.16	
Z0030	NZ0030	100 YR - 1 Day		AE	20.28	21.22	
Z0033	NZ0033	100 YR - 1 Day		AE	20.27	21.22	
Z0037	NZ0037	100 YR - 1 Day		AE	20.27	21.21	
Z0040	NZ0040	100 YR - 1 Day		AE	20.27	21.21	
Z0043	NZ0043	100 YR - 1 Day		AE	20.27	21.20	
Z0047	NZ0047	100 YR - 1 Day		AE	20.27	21.20	
Z0050	NZ0050	100 YR - 1 Day		AE	20.27	21.20	
Z0060	NZ0060	100 YR - 1 Day		AE	20.27	21.19	
Z0070	NZ0070	100 YR - 1 Day		AE	20.26	21.13	
Z1010	NZ1010	100 YR - 1 Day		AE	23.29	23.31	
Z1020	NZ1020	100 YR - 1 Day		AE	22.75	22.87	
Z1040	NZ1040	100 YR - 1 Day		AE	22.58	22.63	
Z1510	NZ1510	100 YR - 1 Day		AE	22.31	22.18	
Z1520	NZ1520	100 YR - 1 Day		AE	22.31	22.17	
Z1540	NZ1540	100 YR - 1 Day		AE	22.29	22.16	

Subbasin Name	Node Name	Modeled Storm Event Used for Floodplain	FEMA Zone	Preliminary Modeled Floodzone	100Yr1D Max Stage ft. NAVD88	100Yr5D Max Stage ft. NAVD88	High Water Mark Elevation (ft, NAVD 88)
Z1550	NZ1550	100 YR - 1 Day		AE	21.71	21.84	
Z1560	NZ1560	100 YR - 1 Day		AE	21.28	21.66	
Z1570	NZ1570	100 YR - 1 Day		AE	20.29	21.31	
Z2010	NZ2010	100 YR - 1 Day		AE	21.36	21.37	
Z2020	NZ2020	100 YR - 1 Day		AE	20.84	21.37	
Z2310	NZ2310	100 YR - 1 Day		AE	20.90	21.39	
Z2320	NZ2320	100 YR - 1 Day		AE	20.89	21.38	
Z2710	NZ2710	100 YR - 1 Day		AE	20.69	21.41	
Z2720	NZ2720	100 YR - 1 Day		AE	20.60	21.37	
Z2740	NZ2740	100 YR - 1 Day		AE	20.33	21.37	
Z2750	NZ2750	100 YR - 1 Day		AE	20.30	21.32	
Z2760	NZ2760	100 YR - 1 Day		AE	20.29	21.30	
Z3010	NZ3010	100 YR - 1 Day		AE	20.86	21.46	
Z3020	NZ3020	100 YR - 1 Day		AE	20.86	21.47	
Z3030	NZ3030	100 YR - 1 Day		AE	20.78	21.44	
Z3040	NZ3040	100 YR - 1 Day		AE	20.78	21.43	
Z3050	NZ3050	100 YR - 1 Day		AE	20.76	21.33	
Z3060	NZ3060	100 YR - 1 Day		AE	20.26	21.18	

Appendix B

Floodplain Comparison Table

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
A0020	3.02	0.10	0.00	0.10	-	3.15	No detailed FEMA Floodplain data available for this area.
A0021	1.22	0.09	0.00	0.09	-	7.73	No detailed FEMA Floodplain data available for this area.
A0022	15.24	1.83	0.00	1.83	-	12.02	No detailed FEMA Floodplain data available for this area.
A0023	8.91	0.44	0.00	0.44	-	4.93	No detailed FEMA Floodplain data available for this area.
A0024	8.52	0.15	0.00	0.15	-	1.78	No detailed FEMA Floodplain data available for this area.
A0026	8.64	0.21	0.00	0.21	-	2.45	No detailed FEMA Floodplain data available for this area.
A0028	15.24	1.38	0.00	1.38	-	9.04	No detailed FEMA Floodplain data available for this area.
A0030	8.92	1.62	0.00	1.62	-	18.21	No detailed FEMA Floodplain data available for this area.
A0035	1.96	0.16	0.00	0.16	-	8.35	No detailed FEMA Floodplain data available for this area.
A0040	2.65	0.76	0.00	0.76	-	28.84	No detailed FEMA Floodplain data available for this area.
A0050	3.50	0.48	0.00	0.48	-	13.78	No detailed FEMA Floodplain data available for this area.
A0055	7.68	0.50	0.00	0.50	-	6.52	No detailed FEMA Floodplain data available for this area.
A0060	2.53	1.23	0.00	1.23	-	48.70	No detailed FEMA Floodplain data available for this area.
A0063	20.72	0.28	0.00	0.28	-	1.35	No detailed FEMA Floodplain data available for this area.
A0066	8.76	0.14	0.00	0.14	-	1.65	No detailed FEMA Floodplain data available for this area.
A0070	2.87	1.33	0.00	1.33	-	46.20	No detailed FEMA Floodplain data available for this area.
A0073	19.19	3.00	0.00	3.00	-	15.65	No detailed FEMA Floodplain data available for this area.
A0077	10.84	1.21	0.00	1.21	-	11.12	No detailed FEMA Floodplain data available for this area.
A0080	2.95	1.52	0.00	1.52	-	51.60	No detailed FEMA Floodplain data available for this area.
A0085	11.39	0.16	0.00	0.16	-	1.42	No detailed FEMA Floodplain data available for this area.
A0090	4.30	1.87	0.00	1.87	-	43.50	No detailed FEMA Floodplain data available for this area.
A0092	10.08	0.53	0.00	0.53	-	5.22	No detailed FEMA Floodplain data available for this area.
A0097	20.80	0.42	0.00	0.42	-	2.02	No detailed FEMA Floodplain data available for this area.
A0098	11.24	1.24	0.00	1.24	-	11.05	No detailed FEMA Floodplain data available for this area.
A0100	4.42	2.51	0.00	2.51	-	56.73	No detailed FEMA Floodplain data available for this area.
A0102	6.30	0.21	0.00	0.21	-	3.30	No detailed FEMA Floodplain data available for this area.
A0103	14.59	0.24	0.00	0.24	-	1.63	No detailed FEMA Floodplain data available for this area.
A0106	21.87	0.74	0.00	0.74	-	3.37	No detailed FEMA Floodplain data available for this area.
A0107	0.82	0.26	0.00	0.26	-	31.43	No detailed FEMA Floodplain data available for this area.
A0108	6.97	0.13	0.00	0.13	-	1.89	No detailed FEMA Floodplain data available for this area.
A0110	6.24	2.54	0.00	2.54	-	40.67	No detailed FEMA Floodplain data available for this area.
A0113	13.25	0.32	0.00	0.32	-	2.38	No detailed FEMA Floodplain data available for this area.
A0116	15.22	0.22	0.00	0.22	-	1.42	No detailed FEMA Floodplain data available for this area.
A0120	6.96	2.19	0.00	2.19	-	31.44	No detailed FEMA Floodplain data available for this area.
A0125	19.18	0.37	0.00	0.37	-	1.94	No detailed FEMA Floodplain data available for this area.
A0130	7.32	2.57	0.00	2.57	-	35.07	No detailed FEMA Floodplain data available for this area.
A0132	28.62	1.92	0.00	1.92	-	6.72	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
A0135	5.42	0.12	0.00	0.12	-	2.28	No detailed FEMA Floodplain data available for this area.
A0139	9.55	0.15	0.00	0.15	-	1.59	No detailed FEMA Floodplain data available for this area.
A0140	4.00	1.95	0.00	1.95	-	48.72	No detailed FEMA Floodplain data available for this area.
A1010	1.50	0.17	0.00	0.17	-	11.60	No detailed FEMA Floodplain data available for this area.
A1020	9.17	0.65	0.00	0.65	-	7.04	No detailed FEMA Floodplain data available for this area.
A1030	7.86	0.91	0.00	0.91	-	11.57	No detailed FEMA Floodplain data available for this area.
A1040	4.77	0.40	0.00	0.40	-	8.46	No detailed FEMA Floodplain data available for this area.
A1050	1.36	0.08	0.00	0.08	-	6.04	No detailed FEMA Floodplain data available for this area.
A2010	6.80	1.73	0.00	1.73	-	25.44	No detailed FEMA Floodplain data available for this area.
A2020	14.01	2.91	0.00	2.91	-	20.76	No detailed FEMA Floodplain data available for this area.
A2023	3.24	0.17	0.00	0.17	-	5.29	No detailed FEMA Floodplain data available for this area.
A2027	5.48	0.73	0.00	0.73	-	13.34	No detailed FEMA Floodplain data available for this area.
A2028	1.47	0.45	0.00	0.45	-	30.51	No detailed FEMA Floodplain data available for this area.
A2030	19.84	1.00	0.00	1.00	-	5.02	No detailed FEMA Floodplain data available for this area.
A2040	6.54	0.87	0.00	0.87	-	13.30	No detailed FEMA Floodplain data available for this area.
A2050	10.41	0.98	0.00	0.98	-	9.38	No detailed FEMA Floodplain data available for this area.
A2060	0.97	0.39	0.00	0.39	-	39.92	No detailed FEMA Floodplain data available for this area.
A3010	15.02	0.55	0.00	0.55	-	3.68	No detailed FEMA Floodplain data available for this area.
A3020	36.00	5.20	0.00	5.20	-	14.43	No detailed FEMA Floodplain data available for this area.
A3030	15.01	1.71	0.00	1.71	-	11.38	No detailed FEMA Floodplain data available for this area.
A3040	5.79	0.76	0.00	0.76	-	13.15	No detailed FEMA Floodplain data available for this area.
A3050	2.66	0.51	0.00	0.51	-	19.26	No detailed FEMA Floodplain data available for this area.
A3060	0.33	0.20	0.00	0.20	-	61.64	No detailed FEMA Floodplain data available for this area.
B0630	0.22	0.21	0.02	0.19	1178.53	88.90	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0640	2.25	2.25	2.22	0.03	1.27	1.25	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0650	1.96	1.96	1.96	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0660	8.61	8.61	8.61	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0664	15.82	15.82	15.82	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0670	35.59	35.59	35.59	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0680	58.50	57.83	58.50	0.67	1.14	1.14	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0681	4.95	1.55	0.00	1.55	-	31.27	No detailed FEMA Floodplain data available for this area.
B0682	23.66	13.85	0.00	13.85	-	58.53	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0685	3.84	3.84	0.37	3.47	940.66	90.39	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0688	18.94	18.94	13.95	4.99	35.78	26.35	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0689	0.25	0.25	0.25	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0690	37.15	37.06	36.59	0.47	1.28	1.26	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0700	4.98	4.54	4.98	0.44	8.86	8.86	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
B0710	0.56	0.42	0.56	0.14	24.22	24.22	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0720	16.88	16.73	16.88	0.15	0.90	0.90	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0722	36.40	31.54	22.48	9.06	40.28	24.88	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0724	47.90	46.74	47.90	1.16	2.43	2.43	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0730	30.78	30.66	29.88	0.77	2.59	2.52	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0740	45.05	44.78	44.14	0.63	1.44	1.41	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0745	44.16	41.76	29.11	12.65	43.46	28.65	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0746	5.56	1.93	5.56	3.63	65.35	65.35	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0747	1.71	1.34	1.71	0.38	21.95	21.95	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0748	1.18	0.70	1.18	0.47	40.07	40.07	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0750	11.97	7.37	8.95	1.58	17.65	13.20	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0765	8.32	0.00	3.39	3.39	100.00	40.80	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0770	1.86	0.73	1.86	1.13	60.63	60.63	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0775	4.76	0.00	4.76	4.76	100.00	100.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0780	14.58	14.16	14.58	0.42	2.88	2.88	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0790	86.81	44.34	70.26	25.92	36.90	29.86	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0800	32.12	26.30	32.12	5.82	18.13	18.13	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0810	67.78	25.02	46.34	21.31	45.99	31.44	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0813	25.95	13.90	25.95	12.05	46.43	46.43	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0817	3.95	3.77	3.95	0.19	4.71	4.71	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0820	44.49	28.76	44.49	15.73	35.35	35.35	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0830	80.64	37.95	80.64	42.69	52.94	52.94	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0835	28.53	9.03	22.65	13.62	60.11	47.72	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0837	1.11	1.11	1.11	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0840	58.32	43.54	53.50	9.96	18.62	17.08	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0860	37.87	18.75	23.99	5.24	21.85	13.84	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0870	8.79	8.27	5.17	3.10	59.97	35.24	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
B0880	3.94	3.73	3.89	0.16	4.14	4.09	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0886	1.89	1.85	1.42	0.43	29.90	22.46	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0888	0.93	0.90	0.70	0.21	29.62	22.22	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0890	1.94	1.75	1.05	0.70	66.76	35.96	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0905	8.50	7.53	0.00	7.53	-	88.54	No detailed FEMA Floodplain data available for this area.
B0907	14.17	0.62	0.00	0.62	-	4.38	No detailed FEMA Floodplain data available for this area.
B0910	4.02	3.85	3.20	0.65	20.16	16.06	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0920	2.09	1.97	1.34	0.63	46.75	30.02	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0930	1.05	0.79	0.43	0.36	84.03	34.54	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0931	0.23	0.06	0.00	0.06	-	27.18	No detailed FEMA Floodplain data available for this area.
B0934	0.70	0.62	0.00	0.62	-	88.87	No detailed FEMA Floodplain data available for this area.
B0935	8.05	2.75	0.00	2.75	-	34.19	No detailed FEMA Floodplain data available for this area.
B0936	0.53	0.44	0.00	0.44	-	82.38	No detailed FEMA Floodplain data available for this area.
B0938	1.11	0.28	0.00	0.28	-	25.33	No detailed FEMA Floodplain data available for this area.
B0940	0.79	0.65	0.05	0.60	1207.95	75.36	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0943	1.56	0.27	0.00	0.27	-	17.28	No detailed FEMA Floodplain data available for this area.
B0945	6.85	1.14	0.00	1.14	-	16.58	No detailed FEMA Floodplain data available for this area.
B0950	3.22	2.33	0.19	2.14	1131.65	66.47	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0960	6.69	4.28	1.09	3.19	292.51	47.67	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0963	1.04	0.88	0.24	0.64	267.53	61.06	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0965	17.79	3.46	0.00	3.46	-	19.46	No detailed FEMA Floodplain data available for this area.
B0970	5.62	5.09	1.99	3.10	155.84	55.12	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0980	9.82	6.77	2.05	4.72	229.84	48.05	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B0985	18.59	4.26	0.13	4.13	3179.63	22.20	No detailed FEMA Floodplain data available for this area.
B0990	6.73	5.97	1.34	4.63	344.81	68.71	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B1000	6.81	3.77	0.01	3.76	32715.55	55.18	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B1010	2.81	2.49	0.05	2.43	4612.77	86.72	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B1020	6.16	5.82	1.29	4.54	353.11	73.68	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B1030	10.16	6.37	7.18	0.81	11.31	7.99	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B1060	12.58	9.70	9.77	0.07	0.74	0.58	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B1065	7.15	1.87	0.00	1.87	-	26.08	No detailed FEMA Floodplain data available for this area.
B1070	37.47	7.92	4.53	3.39	74.78	9.04	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B1110	4.80	1.45	4.80	3.35	69.77	69.77	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B1120	10.89	4.64	10.89	6.25	57.36	57.36	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B1130	4.86	1.86	4.86	2.99	61.68	61.68	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B1140	7.02	5.02	7.02	2.00	28.54	28.54	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B1145	5.06	1.84	5.06	3.22	63.62	63.62	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
B1150	12.97	7.91	12.97	5.07	39.07	39.07	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B1160	39.30	27.12	39.30	12.17	30.98	30.98	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3004	0.23	0.23	0.23	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3006	0.35	0.35	0.35	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3007	1.65	1.65	1.65	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3510	3.53	3.17	3.28	0.11	3.34	3.11	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3520	7.04	5.75	6.77	1.01	14.98	14.41	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3523	4.23	2.69	3.73	1.04	27.92	24.67	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3527	4.71	3.40	4.44	1.05	23.55	22.21	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3530	12.35	10.36	12.35	1.99	16.11	16.11	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3540	21.17	18.17	21.17	3.00	14.19	14.19	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3550	3.84	3.83	3.84	0.00	0.08	0.08	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3560	0.42	0.42	0.42	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3610	32.44	19.84	8.75	11.09	126.73	34.19	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3620	40.61	28.40	37.64	9.25	24.56	22.77	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3630	6.32	4.88	6.32	1.45	22.90	22.90	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3640	0.61	0.59	0.61	0.02	3.96	3.96	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3708	7.86	7.76	7.86	0.10	1.33	1.33	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3709	39.44	9.79	1.38	8.41	607.46	21.31	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3710	15.80	12.12	8.85	3.27	36.90	20.68	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3718	0.56	0.56	0.56	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3719	0.65	0.65	0.65	0.00	0.01	0.01	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3720	0.54	0.54	0.54	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3805	5.15	0.98	0.00	0.98	-	19.07	No detailed FEMA Floodplain data available for this area.
B3809	11.21	5.22	0.00	5.22	-	46.53	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3810	8.39	1.31	0.00	1.31	-	15.66	No detailed FEMA Floodplain data available for this area.
B3815	0.87	0.87	0.00	0.87	-	100.00	No detailed FEMA Floodplain data available for this area.
B3820	2.27	2.26	0.08	2.18	2752.86	96.45	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3905	2.44	0.72	0.00	0.72	-	29.58	No detailed FEMA Floodplain data available for this area.
B3910	2.07	1.42	0.00	1.42	-	68.74	No detailed FEMA Floodplain data available for this area.
B3912	0.56	0.56	0.00	0.56	-	100.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3920	0.87	0.87	0.00	0.87	-	99.05	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3930	1.79	1.79	0.31	1.48	476.82	82.66	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B3931	0.37	0.37	0.00	0.37	-	100.00	No detailed FEMA Floodplain data available for this area.
B3940	4.83	4.60	3.44	1.16	33.60	23.95	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4010	37.73	21.59	0.00	21.59	-	57.22	No detailed FEMA Floodplain data available for this area.
B4020	3.73	1.68	0.00	1.68	-	45.06	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
B4023	6.72	1.87	0.00	1.87	-	27.78	No detailed FEMA Floodplain data available for this area.
B4027	17.84	4.80	0.00	4.80	-	26.89	No detailed FEMA Floodplain data available for this area.
B4030	34.18	31.10	2.26	28.83	1273.26	84.37	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4031	3.72	3.72	3.72	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4032	12.63	12.04	12.62	0.57	4.55	4.54	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4033	1.31	1.31	1.31	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4035	8.24	7.99	1.61	6.38	394.86	77.39	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4039	0.61	0.61	0.44	0.17	38.24	27.66	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4040	1.84	1.84	1.38	0.46	33.14	24.89	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4115	16.82	14.25	1.94	12.31	635.65	73.18	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4117	1.06	1.06	0.52	0.55	106.20	51.50	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4120	6.17	6.15	6.17	0.02	0.27	0.27	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4121	27.83	21.85	2.02	19.82	979.51	71.24	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4122	2.54	2.45	2.13	0.31	14.67	12.33	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4123	1.03	1.03	1.03	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4125	6.49	6.49	6.49	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4130	3.39	2.73	3.39	0.66	19.47	19.47	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4131	6.06	1.97	4.73	2.76	58.27	45.48	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4132	3.21	1.58	0.00	1.58	-	49.07	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4211	0.85	0.78	0.85	0.06	7.64	7.64	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4213	5.73	3.10	5.73	2.62	45.78	45.78	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4214	12.98	12.64	12.98	0.34	2.65	2.65	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4217	4.17	3.57	4.17	0.59	14.22	14.22	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4220	6.35	5.99	6.35	0.36	5.66	5.66	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4230	6.95	5.50	6.95	1.45	20.88	20.88	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4235	12.53	12.53	12.53	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4240	0.71	0.71	0.71	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4243	5.14	5.14	5.14	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4250	2.26	2.26	2.26	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4310	14.01	3.28	0.00	3.28	-	23.39	No detailed FEMA Floodplain data available for this area.
B4320	8.95	2.51	0.00	2.51	-	28.10	No detailed FEMA Floodplain data available for this area.
B4325	1.98	0.87	0.00	0.87	-	43.70	No detailed FEMA Floodplain data available for this area.
B4327	0.62	0.26	0.00	0.26	-	41.92	No detailed FEMA Floodplain data available for this area.
B4330	5.19	1.07	0.00	1.07	-	20.67	No detailed FEMA Floodplain data available for this area.
B4332	1.53	0.88	0.00	0.88	-	57.68	No detailed FEMA Floodplain data available for this area.
B4334	1.14	0.59	0.00	0.59	-	52.25	No detailed FEMA Floodplain data available for this area.
B4336	1.34	0.50	0.00	0.50	-	37.33	No detailed FEMA Floodplain data available for this area.

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B4338	1.37	0.44	0.00	0.44	-	32.42	No detailed FEMA Floodplain data available for this area.
B4339	1.58	0.58	0.00	0.58	-	36.34	No detailed FEMA Floodplain data available for this area.
B4340	5.93	1.52	0.00	1.52	-	25.60	No detailed FEMA Floodplain data available for this area.
B4344	41.19	38.53	2.29	36.24	1580.23	87.99	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4345	0.80	0.64	0.00	0.64	-	79.13	No detailed FEMA Floodplain data available for this area.
B4346	1.16	0.35	0.00	0.35	-	29.76	No detailed FEMA Floodplain data available for this area.
B4350	2.22	0.58	0.00	0.58	-	26.00	No detailed FEMA Floodplain data available for this area.
B4355	22.55	6.12	0.00	6.12	-	27.14	No detailed FEMA Floodplain data available for this area.
B4410	9.79	2.75	0.00	2.75	-	28.14	No detailed FEMA Floodplain data available for this area.
B4422	3.58	1.12	0.00	1.12	-	31.34	No detailed FEMA Floodplain data available for this area.
B4424	7.63	2.14	0.00	2.14	-	28.11	No detailed FEMA Floodplain data available for this area.
B4426	2.03	0.79	0.00	0.79	-	39.00	No detailed FEMA Floodplain data available for this area.
B4430	18.62	7.68	0.00	7.68	-	41.23	No detailed FEMA Floodplain data available for this area.
B4440	23.69	8.26	0.00	8.26	-	34.87	No detailed FEMA Floodplain data available for this area.
B4452	6.17	1.34	0.00	1.34	-	21.76	No detailed FEMA Floodplain data available for this area.
B4454	13.36	3.24	0.00	3.24	-	24.23	No detailed FEMA Floodplain data available for this area.
B4458	30.92	7.53	0.00	7.53	-	24.35	No detailed FEMA Floodplain data available for this area.
B4460	4.10	1.48	0.00	1.48	-	36.22	No detailed FEMA Floodplain data available for this area.
B4510	35.40	13.62	0.00	13.62	-	38.48	No detailed FEMA Floodplain data available for this area.
B4524	7.10	6.95	7.10	0.15	2.11	2.11	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4525	2.59	0.65	0.00	0.65	-	25.14	No detailed FEMA Floodplain data available for this area.
B4526	13.25	12.12	8.24	3.88	47.03	29.26	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4527	1.07	0.53	0.00	0.53	-	49.02	No detailed FEMA Floodplain data available for this area.
B4529	5.79	5.64	4.35	1.30	29.84	22.41	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4530	0.37	0.37	0.36	0.00	0.20	0.20	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4531	13.68	13.27	9.03	4.24	47.01	31.01	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4533	0.70	0.70	0.70	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4535	2.46	2.46	2.46	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4537	0.22	0.22	0.22	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4539	1.00	1.00	1.00	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4540	10.04	9.99	8.01	1.97	24.64	19.66	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4541	1.40	1.32	1.16	0.16	13.64	11.25	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4542	0.18	0.18	0.14	0.04	26.75	21.11	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4543	1.44	1.44	1.26	0.17	13.55	11.93	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4544	1.49	1.49	1.41	0.08	5.42	5.14	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4545	2.17	1.95	2.17	0.21	9.82	9.83	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4546	3.52	3.35	3.52	0.18	5.08	5.08	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.

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B4547	0.74	0.74	0.74	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4548	2.16	2.16	2.16	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4549	0.91	0.91	0.89	0.02	1.91	1.87	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4550	0.62	0.62	0.62	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4551	3.84	3.84	3.84	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4560	0.13	0.13	0.13	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4702	9.08	0.62	0.22	0.40	183.89	4.44	No detailed FEMA Floodplain data available for this area.
B4703	5.55	0.81	0.74	0.07	9.79	1.31	No detailed FEMA Floodplain data available for this area.
B4706	20.47	0.99	0.00	0.99	-	4.82	No detailed FEMA Floodplain data available for this area.
B4707	4.99	0.86	0.00	0.86	-	17.18	No detailed FEMA Floodplain data available for this area.
B4708	0.94	0.30	0.00	0.30	-	31.57	No detailed FEMA Floodplain data available for this area.
B4709	2.37	0.39	0.00	0.39	-	16.63	No detailed FEMA Floodplain data available for this area.
B4720	0.96	0.23	0.00	0.23	-	23.54	No detailed FEMA Floodplain data available for this area.
B4735	7.45	0.70	0.00	0.70	-	9.43	No detailed FEMA Floodplain data available for this area.
B4740	9.59	1.14	0.00	1.14	-	11.93	No detailed FEMA Floodplain data available for this area.
B4750	6.03	0.73	0.00	0.73	-	12.14	No detailed FEMA Floodplain data available for this area.
B4810	11.63	1.83	0.00	1.83	-	15.77	No detailed FEMA Floodplain data available for this area.
B4820	21.88	2.97	0.00	2.97	-	13.59	No detailed FEMA Floodplain data available for this area.
B4830	19.86	3.60	0.00	3.60	-	18.12	No detailed FEMA Floodplain data available for this area.
B4845	13.00	1.71	10.39	8.69	83.59	66.85	No detailed FEMA Floodplain data available for this area.
B4850	47.00	6.00	8.25	2.25	27.30	4.79	No detailed FEMA Floodplain data available for this area.
B4851	16.01	4.29	15.89	11.60	72.98	72.43	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4852	9.55	3.16	1.73	1.42	82.11	14.91	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4853	1.82	0.09	0.00	0.09	-	4.71	No detailed FEMA Floodplain data available for this area.
B4854	4.26	1.56	4.26	2.70	63.45	63.45	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4855	2.39	0.76	2.39	1.63	68.16	67.97	No detailed FEMA Floodplain data available for this area.
B4856	0.79	0.15	0.51	0.36	70.52	45.48	No detailed FEMA Floodplain data available for this area.
B4857	0.52	0.21	0.00	0.21	-	40.66	No detailed FEMA Floodplain data available for this area.
B4858	1.36	0.86	0.17	0.68	396.15	50.15	No detailed FEMA Floodplain data available for this area.
B4859	0.52	0.27	0.00	0.27	-	52.01	No detailed FEMA Floodplain data available for this area.
B4860	25.30	8.67	0.00	8.67	-	34.27	No detailed FEMA Floodplain data available for this area.
B4870	13.87	4.42	0.05	4.37	8817.57	31.53	No detailed FEMA Floodplain data available for this area.
B4880	0.23	0.07	0.23	0.16	69.91	69.91	No detailed FEMA Floodplain data available for this area.
B4882	1.31	0.47	1.31	0.84	64.22	64.22	No detailed FEMA Floodplain data available for this area.
B4883	2.76	0.41	0.59	0.18	30.66	6.55	No detailed FEMA Floodplain data available for this area.
B4884	0.54	0.00	0.54	0.54	100.00	100.00	No detailed FEMA Floodplain data available for this area.
B4885	2.79	1.02	2.79	1.78	63.62	63.62	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.

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B4890	0.32	0.19	0.32	0.13	41.31	41.31	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4895	3.07	0.63	0.00	0.63	-	20.59	No detailed FEMA Floodplain data available for this area.
B4896	1.32	0.00	0.28	0.28	100.00	20.90	No detailed FEMA Floodplain data available for this area.
B4897	3.24	0.43	0.86	0.43	50.56	13.43	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4900	9.36	3.28	9.08	5.80	63.87	61.99	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4910	9.07	3.54	9.07	5.54	61.00	61.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4920	48.36	37.11	48.36	11.24	23.25	23.25	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B4930	0.60	0.60	0.60	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B5010	20.91	2.91	0.00	2.91	-	13.92	No detailed FEMA Floodplain data available for this area.
B5025	9.22	1.11	0.00	1.11	-	12.08	No detailed FEMA Floodplain data available for this area.
B5030	19.33	5.03	0.00	5.03	-	26.03	No detailed FEMA Floodplain data available for this area.
B5040	5.27	1.60	0.00	1.60	-	30.29	No detailed FEMA Floodplain data available for this area.
B5110	8.54	1.60	0.00	1.60	-	18.68	No detailed FEMA Floodplain data available for this area.
B5115	6.59	1.59	0.00	1.59	-	24.14	No detailed FEMA Floodplain data available for this area.
B5120	1.37	0.47	0.00	0.47	-	34.03	No detailed FEMA Floodplain data available for this area.
B5130	9.48	1.41	0.00	1.41	-	14.88	No detailed FEMA Floodplain data available for this area.
B5132	13.77	2.02	0.00	2.02	-	14.67	No detailed FEMA Floodplain data available for this area.
B5135	4.10	0.89	0.00	0.89	-	21.73	No detailed FEMA Floodplain data available for this area.
B5138	2.94	0.51	0.00	0.51	-	17.27	No detailed FEMA Floodplain data available for this area.
B5140	1.16	0.61	0.00	0.61	-	52.21	No detailed FEMA Floodplain data available for this area.
B5145	15.12	2.94	0.00	2.94	-	19.48	No detailed FEMA Floodplain data available for this area.
B5150	2.31	0.86	0.00	0.86	-	37.17	No detailed FEMA Floodplain data available for this area.
B5160	7.66	0.98	0.00	0.98	-	12.76	No detailed FEMA Floodplain data available for this area.
B5170	11.33	1.75	0.00	1.75	-	15.42	No detailed FEMA Floodplain data available for this area.
B5190	28.05	6.05	0.00	6.05	-	21.58	No detailed FEMA Floodplain data available for this area.
B5195	14.26	3.36	0.00	3.36	-	23.54	No detailed FEMA Floodplain data available for this area.
B5210	14.95	3.59	0.00	3.59	-	24.02	No detailed FEMA Floodplain data available for this area.
B5212	1.19	0.41	0.00	0.41	-	34.35	No detailed FEMA Floodplain data available for this area.
B5315	21.23	1.64	0.00	1.64	-	7.74	No detailed FEMA Floodplain data available for this area.
B5317	1.75	0.25	0.00	0.25	-	13.99	No detailed FEMA Floodplain data available for this area.
B5320	11.91	3.08	0.00	3.08	-	25.86	No detailed FEMA Floodplain data available for this area.
B5325	12.98	1.14	0.00	1.14	-	8.77	No detailed FEMA Floodplain data available for this area.
B5327	1.31	0.24	0.00	0.24	-	18.73	No detailed FEMA Floodplain data available for this area.
B5330	10.14	2.65	0.00	2.65	-	26.16	No detailed FEMA Floodplain data available for this area.
B5332	12.42	2.46	0.00	2.46	-	19.81	No detailed FEMA Floodplain data available for this area.
B5338	30.48	8.97	0.00	8.97	-	29.42	No detailed FEMA Floodplain data available for this area.
B5339	1.00	0.48	0.00	0.48	-	47.83	No detailed FEMA Floodplain data available for this area.

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B5340	10.42	2.71	0.00	2.71	-	25.96	No detailed FEMA Floodplain data available for this area.
B5360	26.04	5.06	0.00	5.06	-	19.44	No detailed FEMA Floodplain data available for this area.
B5375	17.31	4.30	0.00	4.30	-	24.83	No detailed FEMA Floodplain data available for this area.
B5377	0.28	0.15	0.00	0.15	-	55.59	No detailed FEMA Floodplain data available for this area.
B5380	16.92	5.20	0.00	5.20	-	30.71	No detailed FEMA Floodplain data available for this area.
B5390	9.21	2.88	0.00	2.88	-	31.30	No detailed FEMA Floodplain data available for this area.
B5400	5.76	1.87	0.00	1.87	-	32.48	No detailed FEMA Floodplain data available for this area.
B5410	16.49	1.75	0.00	1.75	-	10.63	No detailed FEMA Floodplain data available for this area.
B5420	12.58	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
B5440	14.36	0.82	0.00	0.82	-	5.72	No detailed FEMA Floodplain data available for this area.
B5450	10.10	1.64	0.00	1.64	-	16.25	No detailed FEMA Floodplain data available for this area.
B5453	24.15	0.69	0.00	0.69	-	2.85	No detailed FEMA Floodplain data available for this area.
B5455	7.28	0.56	0.00	0.56	-	7.74	No detailed FEMA Floodplain data available for this area.
B5457	3.73	0.18	0.00	0.18	-	4.89	No detailed FEMA Floodplain data available for this area.
B5470	22.95	2.35	0.00	2.35	-	10.25	No detailed FEMA Floodplain data available for this area.
B5480	20.86	0.79	1.48	0.68	46.19	3.27	No detailed FEMA Floodplain data available for this area.
B5490	15.58	5.47	10.86	5.39	49.62	34.58	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B5510	4.70	4.70	4.70	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B5590	0.48	0.47	0.00	0.47	-	99.07	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B5610	0.75	0.06	0.00	0.06	-	8.20	No detailed FEMA Floodplain data available for this area.
B5613	0.37	0.03	0.00	0.03	-	7.02	No detailed FEMA Floodplain data available for this area.
B5617	0.96	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
B5620	2.41	0.62	0.00	0.62	-	25.56	No detailed FEMA Floodplain data available for this area.
B5630	2.93	0.96	0.00	0.96	-	32.93	No detailed FEMA Floodplain data available for this area.
B5635	4.90	1.29	0.00	1.29	-	26.31	No detailed FEMA Floodplain data available for this area.
B5640	24.44	3.15	0.00	3.15	-	12.90	No detailed FEMA Floodplain data available for this area.
B5642	3.23	0.40	0.00	0.40	-	12.44	No detailed FEMA Floodplain data available for this area.
B5644	2.68	0.25	0.00	0.25	-	9.27	No detailed FEMA Floodplain data available for this area.
B5646	4.00	0.44	0.00	0.44	-	10.87	No detailed FEMA Floodplain data available for this area.
B5650	0.19	0.03	0.00	0.03	-	14.98	No detailed FEMA Floodplain data available for this area.
B5655	0.13	0.06	0.00	0.06	-	44.63	No detailed FEMA Floodplain data available for this area.
B5660	1.78	0.56	0.00	0.56	-	31.31	No detailed FEMA Floodplain data available for this area.
B5663	0.52	0.03	0.00	0.03	-	5.30	No detailed FEMA Floodplain data available for this area.
B5667	2.53	0.57	0.00	0.57	-	22.64	No detailed FEMA Floodplain data available for this area.
B5670	1.05	0.40	0.00	0.40	-	38.26	No detailed FEMA Floodplain data available for this area.
B5675	33.69	1.19	0.50	0.69	136.83	2.04	No detailed FEMA Floodplain data available for this area.
B5676	1.79	1.00	0.80	0.20	25.44	11.40	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
B5680	84.48	23.81	72.08	48.27	66.97	57.13	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B5690	20.66	15.54	20.66	5.12	24.79	24.79	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B5695	2.97	2.97	2.48	0.49	19.60	16.39	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B6010	20.64	0.42	0.00	0.42	-	2.05	No detailed FEMA Floodplain data available for this area.
B6015	6.89	0.11	0.00	0.11	-	1.54	No detailed FEMA Floodplain data available for this area.
B6020	17.14	0.68	0.00	0.68	-	3.97	No detailed FEMA Floodplain data available for this area.
B6030	1.22	0.18	0.00	0.18	-	15.04	No detailed FEMA Floodplain data available for this area.
B6110	59.57	6.02	0.00	6.02	-	10.11	No detailed FEMA Floodplain data available for this area.
B6116	14.09	0.85	0.00	0.85	-	6.05	No detailed FEMA Floodplain data available for this area.
B6118	0.97	0.07	0.00	0.07	-	7.13	No detailed FEMA Floodplain data available for this area.
B6119	0.81	0.13	0.00	0.13	-	16.30	No detailed FEMA Floodplain data available for this area.
B6120	5.31	1.06	0.00	1.06	-	20.02	No detailed FEMA Floodplain data available for this area.
B6130	1.65	0.50	0.00	0.50	-	30.07	No detailed FEMA Floodplain data available for this area.
B6210	30.69	5.83	0.00	5.83	-	19.00	No detailed FEMA Floodplain data available for this area.
B6220	0.96	0.24	0.00	0.24	-	25.46	No detailed FEMA Floodplain data available for this area.
B6310	15.70	0.74	0.00	0.74	-	4.70	No detailed FEMA Floodplain data available for this area.
B6320	42.99	1.46	0.00	1.46	-	3.40	No detailed FEMA Floodplain data available for this area.
B6330	14.56	1.91	0.00	1.91	-	13.08	No detailed FEMA Floodplain data available for this area.
B6340	17.34	3.15	0.00	3.15	-	18.17	No detailed FEMA Floodplain data available for this area.
B6355	16.33	3.61	0.00	3.61	-	22.09	No detailed FEMA Floodplain data available for this area.
B6359	26.31	5.81	0.00	5.81	-	22.07	No detailed FEMA Floodplain data available for this area.
B6360	30.68	4.68	0.00	4.68	-	15.27	No detailed FEMA Floodplain data available for this area.
B6370	39.85	3.35	0.00	3.35	-	8.40	No detailed FEMA Floodplain data available for this area.
B6385	27.50	1.72	0.00	1.72	-	6.24	No detailed FEMA Floodplain data available for this area.
B6387	1.10	0.35	0.00	0.35	-	32.09	No detailed FEMA Floodplain data available for this area.
B6390	28.15	6.23	0.00	6.23	-	22.14	No detailed FEMA Floodplain data available for this area.
B6393	16.44	2.08	0.00	2.08	-	12.64	No detailed FEMA Floodplain data available for this area.
B6395	6.24	2.66	0.00	2.66	-	42.72	No detailed FEMA Floodplain data available for this area.
B6400	18.02	4.06	0.00	4.06	-	22.55	No detailed FEMA Floodplain data available for this area.
B6403	16.31	6.82	0.00	6.82	-	41.78	No detailed FEMA Floodplain data available for this area.
B6405	8.11	3.68	0.00	3.68	-	45.34	No detailed FEMA Floodplain data available for this area.
B6410	11.73	3.70	0.00	3.70	-	31.54	No detailed FEMA Floodplain data available for this area.
B6510	16.68	1.77	0.00	1.77	-	10.59	No detailed FEMA Floodplain data available for this area.
B6520	24.38	4.02	0.00	4.02	-	16.48	No detailed FEMA Floodplain data available for this area.
B6540	23.63	2.67	0.00	2.67	-	11.29	No detailed FEMA Floodplain data available for this area.
B6550	15.47	2.79	0.00	2.79	-	18.06	No detailed FEMA Floodplain data available for this area.
B6552	35.83	1.35	0.00	1.35	-	3.78	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
B6555	16.20	1.86	0.00	1.86	-	11.51	No detailed FEMA Floodplain data available for this area.
B6558	12.79	0.92	0.00	0.92	-	7.23	No detailed FEMA Floodplain data available for this area.
B6559	9.20	0.64	0.00	0.64	-	6.92	No detailed FEMA Floodplain data available for this area.
B6560	9.47	2.00	0.00	2.00	-	21.12	No detailed FEMA Floodplain data available for this area.
B6565	43.12	4.63	0.00	4.63	-	10.73	No detailed FEMA Floodplain data available for this area.
B6568	1.33	0.40	0.00	0.40	-	30.10	No detailed FEMA Floodplain data available for this area.
B6570	1.90	0.61	0.00	0.61	-	32.15	No detailed FEMA Floodplain data available for this area.
B6580	14.49	2.51	0.00	2.51	-	17.33	No detailed FEMA Floodplain data available for this area.
B6585	36.56	2.17	0.00	2.17	-	5.94	No detailed FEMA Floodplain data available for this area.
B6590	18.69	1.15	2.28	1.13	49.66	6.06	No detailed FEMA Floodplain data available for this area.
B6595	32.43	1.41	0.00	1.41	-	4.35	No detailed FEMA Floodplain data available for this area.
B6598	16.38	0.56	0.00	0.56	-	3.40	No detailed FEMA Floodplain data available for this area.
B6600	37.66	3.97	20.52	16.55	80.67	43.94	No detailed FEMA Floodplain data available for this area.
B6610	68.35	8.79	1.91	6.88	360.18	10.07	No detailed FEMA Floodplain data available for this area.
B6620	3.93	2.03	0.00	2.03	-	51.58	No detailed FEMA Floodplain data available for this area.
B6623	10.13	2.94	0.00	2.94	-	29.04	No detailed FEMA Floodplain data available for this area.
B6625	1.69	0.03	0.00	0.03	-	1.63	No detailed FEMA Floodplain data available for this area.
B6630	15.03	2.53	1.20	1.32	109.95	8.81	No detailed FEMA Floodplain data available for this area.
B6640	2.44	1.87	2.25	0.38	16.75	15.43	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B7002	5.91	1.41	0.00	1.41	-	23.91	No detailed FEMA Floodplain data available for this area.
B7004	23.86	3.08	0.00	3.08	-	12.89	No detailed FEMA Floodplain data available for this area.
B7005	1.24	0.86	0.00	0.86	-	69.43	No detailed FEMA Floodplain data available for this area.
B7010	4.81	0.39	0.00	0.39	-	8.10	No detailed FEMA Floodplain data available for this area.
B7110	24.14	0.87	0.00	0.87	-	3.60	No detailed FEMA Floodplain data available for this area.
B7210	2.81	0.36	0.00	0.36	-	12.95	No detailed FEMA Floodplain data available for this area.
B7223	0.73	0.47	0.00	0.47	-	64.32	No detailed FEMA Floodplain data available for this area.
B7227	0.50	0.16	0.00	0.16	-	32.36	No detailed FEMA Floodplain data available for this area.
B7230	2.63	1.18	0.00	1.18	-	44.93	No detailed FEMA Floodplain data available for this area.
B7240	10.50	2.58	0.00	2.58	-	24.63	No detailed FEMA Floodplain data available for this area.
B7250	21.97	2.87	0.00	2.87	-	13.08	No detailed FEMA Floodplain data available for this area.
B7260	2.16	0.50	0.00	0.50	-	23.29	No detailed FEMA Floodplain data available for this area.
B7320	2.46	0.76	0.00	0.76	-	30.77	No detailed FEMA Floodplain data available for this area.
B7330	10.92	1.92	0.00	1.92	-	17.55	No detailed FEMA Floodplain data available for this area.
B7335	1.22	0.14	0.00	0.14	-	11.20	No detailed FEMA Floodplain data available for this area.
B7340	4.91	1.43	0.00	1.43	-	29.15	No detailed FEMA Floodplain data available for this area.
B7350	3.02	0.68	0.00	0.68	-	22.59	No detailed FEMA Floodplain data available for this area.
B7360	9.81	1.26	0.00	1.26	-	12.84	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
B7410	5.81	0.23	0.00	0.23	-	3.88	No detailed FEMA Floodplain data available for this area.
B7420	10.68	0.49	0.00	0.49	-	4.61	No detailed FEMA Floodplain data available for this area.
B7430	3.78	0.93	0.00	0.93	-	24.61	No detailed FEMA Floodplain data available for this area.
B7440	3.72	0.72	0.00	0.72	-	19.26	No detailed FEMA Floodplain data available for this area.
B7450	18.30	4.84	0.00	4.84	-	26.47	No detailed FEMA Floodplain data available for this area.
B7460	11.21	2.23	0.00	2.23	-	19.90	No detailed FEMA Floodplain data available for this area.
B7470	16.87	4.54	0.00	4.54	-	26.93	No detailed FEMA Floodplain data available for this area.
B7510	21.04	4.64	0.00	4.64	-	22.04	No detailed FEMA Floodplain data available for this area.
B7512	11.75	3.10	0.00	3.10	-	26.35	No detailed FEMA Floodplain data available for this area.
B7520	61.59	2.01	0.00	2.01	-	3.27	No detailed FEMA Floodplain data available for this area.
B8005	6.45	0.94	0.00	0.94	-	14.65	No detailed FEMA Floodplain data available for this area.
B8010	5.18	0.41	0.00	0.41	-	7.96	No detailed FEMA Floodplain data available for this area.
B8011	13.08	2.80	0.00	2.80	-	21.41	No detailed FEMA Floodplain data available for this area.
B8012	43.95	0.32	0.00	0.32	-	0.73	No detailed FEMA Floodplain data available for this area.
B8014	0.47	0.20	0.00	0.20	-	42.20	No detailed FEMA Floodplain data available for this area.
B8015	4.64	0.31	0.00	0.31	-	6.58	No detailed FEMA Floodplain data available for this area.
B8018	2.95	0.56	0.00	0.56	-	19.13	No detailed FEMA Floodplain data available for this area.
B8020	3.80	0.98	0.00	0.98	-	25.71	No detailed FEMA Floodplain data available for this area.
B8030	7.21	1.96	0.00	1.96	-	27.16	No detailed FEMA Floodplain data available for this area.
B8040	1.78	0.55	0.00	0.55	-	30.93	No detailed FEMA Floodplain data available for this area.
B8110	4.68	0.13	0.00	0.13	-	2.76	No detailed FEMA Floodplain data available for this area.
B8120	10.97	0.82	0.00	0.82	-	7.52	No detailed FEMA Floodplain data available for this area.
B8130	10.47	1.33	0.00	1.33	-	12.74	No detailed FEMA Floodplain data available for this area.
B8140	13.52	1.40	0.00	1.40	-	10.38	No detailed FEMA Floodplain data available for this area.
B8150	0.87	0.32	0.00	0.32	-	36.94	No detailed FEMA Floodplain data available for this area.
B8210	6.70	0.71	0.00	0.71	-	10.66	No detailed FEMA Floodplain data available for this area.
B8220	3.29	0.44	0.00	0.44	-	13.45	No detailed FEMA Floodplain data available for this area.
B8230	7.04	0.54	0.00	0.54	-	7.63	No detailed FEMA Floodplain data available for this area.
B8240	4.28	0.37	0.00	0.37	-	8.55	No detailed FEMA Floodplain data available for this area.
B8250	6.74	0.73	0.00	0.73	-	10.79	No detailed FEMA Floodplain data available for this area.
B8260	22.27	1.73	0.00	1.73	-	7.78	No detailed FEMA Floodplain data available for this area.
B8270	3.59	0.31	0.00	0.31	-	8.60	No detailed FEMA Floodplain data available for this area.
B8310	4.90	0.46	0.00	0.46	-	9.32	No detailed FEMA Floodplain data available for this area.
B8320	3.05	0.29	0.00	0.29	-	9.37	No detailed FEMA Floodplain data available for this area.
B8323	2.85	0.25	0.00	0.25	-	8.81	No detailed FEMA Floodplain data available for this area.
B8327	4.59	0.50	0.00	0.50	-	10.95	No detailed FEMA Floodplain data available for this area.
B8330	3.33	0.64	0.00	0.64	-	19.14	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
B8340	17.06	1.07	0.00	1.07	-	6.28	No detailed FEMA Floodplain data available for this area.
B8350	4.15	0.33	0.00	0.33	-	8.01	No detailed FEMA Floodplain data available for this area.
B8360	3.96	0.37	0.00	0.37	-	9.45	No detailed FEMA Floodplain data available for this area.
B8370	1.70	0.57	0.00	0.57	-	33.79	No detailed FEMA Floodplain data available for this area.
B8380	12.91	2.18	0.00	2.18	-	16.90	No detailed FEMA Floodplain data available for this area.
B8390	1.01	0.38	0.00	0.38	-	37.52	No detailed FEMA Floodplain data available for this area.
B8410	10.52	2.94	0.00	2.94	-	27.95	No detailed FEMA Floodplain data available for this area.
B8420	24.63	6.35	0.00	6.35	-	25.77	No detailed FEMA Floodplain data available for this area.
B8430	6.83	1.18	0.00	1.18	-	17.29	No detailed FEMA Floodplain data available for this area.
B8440	4.28	0.77	0.00	0.77	-	17.98	No detailed FEMA Floodplain data available for this area.
B8450	25.35	2.07	0.00	2.07	-	8.16	No detailed FEMA Floodplain data available for this area.
B8460	10.68	0.92	0.00	0.92	-	8.58	No detailed FEMA Floodplain data available for this area.
B8480	9.91	0.90	0.00	0.90	-	9.03	No detailed FEMA Floodplain data available for this area.
B8490	0.29	0.08	0.00	0.08	-	26.74	No detailed FEMA Floodplain data available for this area.
B8502	1.04	0.01	0.00	0.01	-	0.63	No detailed FEMA Floodplain data available for this area.
B8503	14.67	2.79	0.00	2.79	-	19.04	No detailed FEMA Floodplain data available for this area.
B8504	1.04	0.16	0.00	0.16	-	15.63	No detailed FEMA Floodplain data available for this area.
B8505	1.39	0.12	0.00	0.12	-	8.40	No detailed FEMA Floodplain data available for this area.
B8506	9.73	0.30	0.00	0.30	-	3.13	No detailed FEMA Floodplain data available for this area.
B8507	2.33	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
B8508	23.47	0.51	0.00	0.51	-	2.18	No detailed FEMA Floodplain data available for this area.
B8520	28.61	0.72	0.00	0.72	-	2.51	No detailed FEMA Floodplain data available for this area.
B8521	12.76	2.33	0.00	2.33	-	18.29	No detailed FEMA Floodplain data available for this area.
B8522	0.76	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
B8523	0.50	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
B8525	18.05	2.32	0.00	2.32	-	12.83	No detailed FEMA Floodplain data available for this area.
B8530	14.98	1.60	0.00	1.60	-	10.70	No detailed FEMA Floodplain data available for this area.
B8545	13.92	1.57	0.00	1.57	-	11.24	No detailed FEMA Floodplain data available for this area.
B8550	11.84	2.29	0.00	2.29	-	19.30	No detailed FEMA Floodplain data available for this area.
B8552	5.11	0.68	0.00	0.68	-	13.40	No detailed FEMA Floodplain data available for this area.
B8554	8.71	1.36	0.00	1.36	-	15.60	No detailed FEMA Floodplain data available for this area.
B8556	8.64	1.93	0.00	1.93	-	22.33	No detailed FEMA Floodplain data available for this area.
B8558	1.89	0.54	0.00	0.54	-	28.46	No detailed FEMA Floodplain data available for this area.
B8560	22.85	2.80	0.00	2.80	-	12.25	No detailed FEMA Floodplain data available for this area.
B8570	29.65	2.87	0.00	2.87	-	9.66	No detailed FEMA Floodplain data available for this area.
B8590	2.09	0.56	0.00	0.56	-	26.77	No detailed FEMA Floodplain data available for this area.
B8600	3.86	1.02	0.00	1.02	-	26.42	No detailed FEMA Floodplain data available for this area.

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B8610	13.11	1.66	0.00	1.66	-	12.69	No detailed FEMA Floodplain data available for this area.
B8620	5.59	1.58	0.00	1.58	-	28.20	No detailed FEMA Floodplain data available for this area.
B8630	27.83	1.24	0.00	1.24	-	4.44	No detailed FEMA Floodplain data available for this area.
B8640	19.56	4.64	0.00	4.64	-	23.74	No detailed FEMA Floodplain data available for this area.
B8650	13.24	1.82	0.00	1.82	-	13.72	No detailed FEMA Floodplain data available for this area.
B8660	3.60	0.72	0.00	0.72	-	20.14	No detailed FEMA Floodplain data available for this area.
B8673	4.34	1.68	0.00	1.68	-	38.68	No detailed FEMA Floodplain data available for this area.
B8674	0.17	0.05	0.00	0.05	-	29.16	No detailed FEMA Floodplain data available for this area.
B8675	8.05	1.87	0.14	1.73	1275.90	21.52	No detailed FEMA Floodplain data available for this area.
B8676	1.63	0.16	0.16	0.00	2.45	0.24	No detailed FEMA Floodplain data available for this area.
B8677	2.56	0.57	0.00	0.57	-	22.38	No detailed FEMA Floodplain data available for this area.
B8910	25.90	0.24	0.00	0.24	-	0.94	No detailed FEMA Floodplain data available for this area.
B8920	5.77	0.24	0.00	0.24	-	4.20	No detailed FEMA Floodplain data available for this area.
B8930	6.86	0.53	0.00	0.53	-	7.68	No detailed FEMA Floodplain data available for this area.
B8940	0.98	0.11	0.00	0.11	-	11.53	No detailed FEMA Floodplain data available for this area.
B8950	1.12	0.33	0.02	0.32	1972.81	28.09	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
B9000	0.99	0.40	0.00	0.40	-	39.85	No detailed FEMA Floodplain data available for this area.
B9004	2.16	0.33	0.00	0.33	-	15.22	No detailed FEMA Floodplain data available for this area.
B9005	3.46	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
B9010	2.27	1.80	0.00	1.80	-	79.17	No detailed FEMA Floodplain data available for this area.
B9015	0.79	0.06	0.00	0.06	-	7.94	No detailed FEMA Floodplain data available for this area.
B9020	15.57	1.49	0.00	1.49	-	9.58	No detailed FEMA Floodplain data available for this area.
B9035	0.32	0.03	0.00	0.03	-	10.59	No detailed FEMA Floodplain data available for this area.
B9040	13.67	3.09	0.00	3.09	-	22.62	No detailed FEMA Floodplain data available for this area.
B9043	8.59	4.05	0.00	4.05	-	47.15	No detailed FEMA Floodplain data available for this area.
B9045	0.57	0.36	0.00	0.36	-	63.08	No detailed FEMA Floodplain data available for this area.
B9050	0.53	0.31	0.00	0.31	-	57.86	No detailed FEMA Floodplain data available for this area.
B9053	10.63	1.43	0.00	1.43	-	13.42	No detailed FEMA Floodplain data available for this area.
B9055	10.65	5.05	0.00	5.05	-	47.41	No detailed FEMA Floodplain data available for this area.
B9060	0.39	0.34	0.00	0.34	-	85.90	No detailed FEMA Floodplain data available for this area.
B9070	0.73	0.39	0.00	0.39	-	52.76	No detailed FEMA Floodplain data available for this area.
B9073	2.23	0.64	0.00	0.64	-	28.71	No detailed FEMA Floodplain data available for this area.
B9075	1.72	0.57	0.00	0.57	-	33.31	No detailed FEMA Floodplain data available for this area.
B9080	1.04	0.56	0.00	0.56	-	53.53	No detailed FEMA Floodplain data available for this area.
B9090	0.85	0.42	0.00	0.42	-	49.58	No detailed FEMA Floodplain data available for this area.
B9095	0.77	0.17	0.00	0.17	-	21.84	No detailed FEMA Floodplain data available for this area.
B9100	0.66	0.48	0.00	0.48	-	73.34	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
B9110	0.70	0.55	0.00	0.55	-	77.50	No detailed FEMA Floodplain data available for this area.
B9120	0.51	0.24	0.00	0.24	-	45.88	No detailed FEMA Floodplain data available for this area.
B9130	11.74	3.29	0.00	3.29	-	28.02	No detailed FEMA Floodplain data available for this area.
B9140	9.02	1.79	0.00	1.79	-	19.85	No detailed FEMA Floodplain data available for this area.
B9145	0.44	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
B9150	25.84	4.44	0.00	4.44	-	17.17	No detailed FEMA Floodplain data available for this area.
B9160	0.38	0.14	0.00	0.14	-	35.99	No detailed FEMA Floodplain data available for this area.
B9170	0.45	0.01	0.00	0.01	-	3.31	No detailed FEMA Floodplain data available for this area.
B9180	1.11	0.25	0.00	0.25	-	22.19	No detailed FEMA Floodplain data available for this area.
B9185	5.71	0.19	0.00	0.19	-	3.35	No detailed FEMA Floodplain data available for this area.
B9200	2.79	0.91	0.00	0.91	-	32.64	No detailed FEMA Floodplain data available for this area.
B9300	6.91	0.56	0.00	0.56	-	8.07	No detailed FEMA Floodplain data available for this area.
B9310	19.13	0.02	0.00	0.02	-	0.11	No detailed FEMA Floodplain data available for this area.
B9400	2.47	0.00	0.00	0.00	-	0.13	No detailed FEMA Floodplain data available for this area.
B9500	3.64	0.05	0.00	0.05	-	1.45	No detailed FEMA Floodplain data available for this area.
C0006	9.86	0.15	0.00	0.15	-	1.54	No detailed FEMA Floodplain data available for this area.
C0008	29.19	0.55	0.00	0.55	-	1.87	No detailed FEMA Floodplain data available for this area.
C0010	10.91	5.70	0.00	5.70	-	52.29	No detailed FEMA Floodplain data available for this area.
C0012	33.50	1.69	0.00	1.69	-	5.03	No detailed FEMA Floodplain data available for this area.
C0014	3.69	1.37	0.00	1.37	-	37.18	No detailed FEMA Floodplain data available for this area.
C0015	12.44	0.30	0.00	0.30	-	2.39	No detailed FEMA Floodplain data available for this area.
C0016	5.60	0.95	0.00	0.95	-	16.89	No detailed FEMA Floodplain data available for this area.
C0018	2.85	0.70	0.00	0.70	-	24.40	No detailed FEMA Floodplain data available for this area.
C0020	17.27	7.52	0.00	7.52	-	43.55	No detailed FEMA Floodplain data available for this area.
C0023	6.19	0.44	0.00	0.44	-	7.16	No detailed FEMA Floodplain data available for this area.
C0026	6.09	0.37	0.00	0.37	-	6.09	No detailed FEMA Floodplain data available for this area.
C0030	1.25	0.94	0.00	0.94	-	74.85	No detailed FEMA Floodplain data available for this area.
C0037	20.85	1.69	0.00	1.69	-	8.11	No detailed FEMA Floodplain data available for this area.
C0040	5.22	2.72	0.00	2.72	-	52.23	No detailed FEMA Floodplain data available for this area.
C0052	16.16	0.71	0.00	0.71	-	4.38	No detailed FEMA Floodplain data available for this area.
C0056	41.86	3.68	0.00	3.68	-	8.79	No detailed FEMA Floodplain data available for this area.
C0058	7.28	0.36	0.00	0.36	-	4.90	No detailed FEMA Floodplain data available for this area.
C0060	9.18	5.53	0.00	5.53	-	60.24	No detailed FEMA Floodplain data available for this area.
C0062	20.04	1.48	0.00	1.48	-	7.36	No detailed FEMA Floodplain data available for this area.
C0064	25.67	2.79	0.00	2.79	-	10.87	No detailed FEMA Floodplain data available for this area.
C0065	24.78	2.27	0.00	2.27	-	9.17	No detailed FEMA Floodplain data available for this area.
C0066	1.84	0.63	0.00	0.63	-	33.95	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
C0068	2.27	0.58	0.00	0.58	-	25.66	No detailed FEMA Floodplain data available for this area.
C0070	6.96	4.68	0.00	4.68	-	67.27	No detailed FEMA Floodplain data available for this area.
C0077	8.19	1.40	0.00	1.40	-	17.12	No detailed FEMA Floodplain data available for this area.
C0080	21.30	10.42	0.00	10.42	-	48.90	No detailed FEMA Floodplain data available for this area.
C0082	5.60	1.55	0.00	1.55	-	27.65	No detailed FEMA Floodplain data available for this area.
C0083	14.88	3.13	0.00	3.13	-	21.06	No detailed FEMA Floodplain data available for this area.
C0085	21.94	3.82	0.00	3.82	-	17.43	No detailed FEMA Floodplain data available for this area.
C0087	10.81	1.27	0.00	1.27	-	11.76	No detailed FEMA Floodplain data available for this area.
C0090	0.68	0.49	0.00	0.49	-	71.89	No detailed FEMA Floodplain data available for this area.
C0092	2.80	1.31	0.00	1.31	-	46.56	No detailed FEMA Floodplain data available for this area.
C0093	1.91	0.11	0.00	0.11	-	5.57	No detailed FEMA Floodplain data available for this area.
C0094	1.19	0.07	0.00	0.07	-	5.88	No detailed FEMA Floodplain data available for this area.
C0095	13.62	2.52	0.00	2.52	-	18.53	No detailed FEMA Floodplain data available for this area.
C0096	1.30	0.61	0.00	0.61	-	47.11	No detailed FEMA Floodplain data available for this area.
C0097	1.24	0.28	0.00	0.28	-	22.14	No detailed FEMA Floodplain data available for this area.
C0098	6.48	1.20	0.00	1.20	-	18.50	No detailed FEMA Floodplain data available for this area.
C0099	3.23	0.22	0.00	0.22	-	6.96	No detailed FEMA Floodplain data available for this area.
C0100	0.72	0.15	0.00	0.15	-	21.21	No detailed FEMA Floodplain data available for this area.
C0101	1.80	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
C0102	3.36	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
C0103	20.43	2.66	0.00	2.66	-	13.04	No detailed FEMA Floodplain data available for this area.
C0104	9.45	0.20	0.00	0.20	-	2.13	No detailed FEMA Floodplain data available for this area.
C0105	0.55	0.18	0.00	0.18	-	32.64	No detailed FEMA Floodplain data available for this area.
C0106	1.89	0.19	0.00	0.19	-	10.21	No detailed FEMA Floodplain data available for this area.
C0107	7.22	0.14	0.00	0.14	-	1.95	No detailed FEMA Floodplain data available for this area.
C0108	2.02	0.22	0.00	0.22	-	10.81	No detailed FEMA Floodplain data available for this area.
C0109	14.82	0.29	0.00	0.29	-	1.94	No detailed FEMA Floodplain data available for this area.
C0110	5.46	2.01	0.00	2.01	-	36.77	No detailed FEMA Floodplain data available for this area.
C0111	3.51	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
C0120	8.01	4.73	0.00	4.73	-	59.10	No detailed FEMA Floodplain data available for this area.
C0124	9.91	0.19	0.00	0.19	-	1.91	No detailed FEMA Floodplain data available for this area.
C0127	5.72	0.05	0.00	0.05	-	0.81	No detailed FEMA Floodplain data available for this area.
C0130	11.48	2.60	0.00	2.60	-	22.63	No detailed FEMA Floodplain data available for this area.
C0140	12.61	1.69	0.00	1.69	-	13.37	No detailed FEMA Floodplain data available for this area.
C0147	15.24	0.18	0.00	0.18	-	1.17	No detailed FEMA Floodplain data available for this area.
C0160	8.12	5.70	0.00	5.70	-	70.27	No detailed FEMA Floodplain data available for this area.
C0168	7.34	0.14	0.00	0.14	-	1.91	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
C0170	8.44	4.29	0.00	4.29	-	50.81	No detailed FEMA Floodplain data available for this area.
C0180	2.20	1.23	0.00	1.23	-	56.19	No detailed FEMA Floodplain data available for this area.
C0190	3.29	2.06	0.00	2.06	-	62.65	No detailed FEMA Floodplain data available for this area.
C0193	10.45	0.25	0.00	0.25	-	2.38	No detailed FEMA Floodplain data available for this area.
C0196	5.14	0.08	0.00	0.08	-	1.53	No detailed FEMA Floodplain data available for this area.
C0197	10.55	0.23	0.00	0.23	-	2.15	No detailed FEMA Floodplain data available for this area.
C0210	8.51	4.48	0.00	4.48	-	52.64	No detailed FEMA Floodplain data available for this area.
C0214	12.01	0.15	0.00	0.15	-	1.28	No detailed FEMA Floodplain data available for this area.
C0217	12.00	0.11	0.00	0.11	-	0.94	No detailed FEMA Floodplain data available for this area.
C0218	5.62	0.09	0.00	0.09	-	1.51	No detailed FEMA Floodplain data available for this area.
C0220	7.64	4.71	0.00	4.71	-	61.70	No detailed FEMA Floodplain data available for this area.
C0223	3.49	0.18	0.00	0.18	-	5.02	No detailed FEMA Floodplain data available for this area.
C0226	25.76	0.35	0.00	0.35	-	1.35	No detailed FEMA Floodplain data available for this area.
C0230	4.39	3.19	0.00	3.19	-	72.74	No detailed FEMA Floodplain data available for this area.
C0240	2.94	1.60	0.00	1.60	-	54.41	No detailed FEMA Floodplain data available for this area.
C0243	10.64	0.30	0.00	0.30	-	2.83	No detailed FEMA Floodplain data available for this area.
C0246	8.19	0.11	0.00	0.11	-	1.35	No detailed FEMA Floodplain data available for this area.
C0250	4.99	2.86	0.00	2.86	-	57.37	No detailed FEMA Floodplain data available for this area.
C0260	15.93	6.50	0.00	6.50	-	40.78	No detailed FEMA Floodplain data available for this area.
C0265	13.64	0.28	0.00	0.28	-	2.08	No detailed FEMA Floodplain data available for this area.
C0273	15.60	0.25	0.00	0.25	-	1.58	No detailed FEMA Floodplain data available for this area.
C0275	6.72	0.27	0.00	0.27	-	4.00	No detailed FEMA Floodplain data available for this area.
C0280	6.46	3.81	0.00	3.81	-	59.02	No detailed FEMA Floodplain data available for this area.
C0290	0.27	0.13	0.00	0.13	-	47.71	No detailed FEMA Floodplain data available for this area.
C0300	2.82	1.68	0.00	1.68	-	59.39	No detailed FEMA Floodplain data available for this area.
C0303	14.93	2.32	0.00	2.32	-	15.51	No detailed FEMA Floodplain data available for this area.
C0304	0.74	0.15	0.00	0.15	-	20.59	No detailed FEMA Floodplain data available for this area.
C0305	21.22	0.68	0.00	0.68	-	3.19	No detailed FEMA Floodplain data available for this area.
C0308	11.37	0.47	0.00	0.47	-	4.11	No detailed FEMA Floodplain data available for this area.
C0309	3.79	0.13	0.00	0.13	-	3.48	No detailed FEMA Floodplain data available for this area.
C0310	5.03	2.80	0.00	2.80	-	55.59	No detailed FEMA Floodplain data available for this area.
C0320	3.80	2.26	0.00	2.26	-	59.42	No detailed FEMA Floodplain data available for this area.
C0323	5.17	0.20	0.00	0.20	-	3.86	No detailed FEMA Floodplain data available for this area.
C0330	6.32	3.38	0.00	3.38	-	53.52	No detailed FEMA Floodplain data available for this area.
C0340	25.09	1.53	0.00	1.53	-	6.12	No detailed FEMA Floodplain data available for this area.
C0350	28.10	2.95	0.00	2.95	-	10.49	No detailed FEMA Floodplain data available for this area.
C0360	6.92	5.03	0.00	5.03	-	72.73	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
C0363	7.97	0.20	0.00	0.20	-	2.49	No detailed FEMA Floodplain data available for this area.
C0370	7.18	5.87	0.00	5.87	-	81.76	No detailed FEMA Floodplain data available for this area.
C0373	7.01	0.22	0.00	0.22	-	3.08	No detailed FEMA Floodplain data available for this area.
C0380	45.14	9.69	0.00	9.69	-	21.46	No detailed FEMA Floodplain data available for this area.
C0400	3.93	3.02	0.00	3.02	-	76.72	No detailed FEMA Floodplain data available for this area.
C0410	14.46	4.61	0.00	4.61	-	31.84	No detailed FEMA Floodplain data available for this area.
C0420	2.62	1.87	0.00	1.87	-	71.43	No detailed FEMA Floodplain data available for this area.
C0430	1.74	1.02	0.00	1.02	-	58.70	No detailed FEMA Floodplain data available for this area.
C0440	17.79	3.94	0.00	3.94	-	22.15	No detailed FEMA Floodplain data available for this area.
C0450	17.83	5.46	0.00	5.46	-	30.62	No detailed FEMA Floodplain data available for this area.
C0460	4.23	0.35	0.00	0.35	-	8.20	No detailed FEMA Floodplain data available for this area.
C0465	6.20	0.32	0.00	0.32	-	5.13	No detailed FEMA Floodplain data available for this area.
C0470	6.30	3.10	0.00	3.10	-	49.17	No detailed FEMA Floodplain data available for this area.
C0478	10.49	0.41	0.00	0.41	-	3.89	No detailed FEMA Floodplain data available for this area.
C0480	9.12	5.93	0.00	5.93	-	65.06	No detailed FEMA Floodplain data available for this area.
C0495	5.85	1.93	0.00	1.93	-	32.93	No detailed FEMA Floodplain data available for this area.
C0500	10.66	2.50	0.00	2.50	-	23.50	No detailed FEMA Floodplain data available for this area.
C0510	7.07	4.86	0.00	4.86	-	68.76	No detailed FEMA Floodplain data available for this area.
C0515	11.71	2.07	0.00	2.07	-	17.70	No detailed FEMA Floodplain data available for this area.
C0520	5.93	3.15	0.00	3.15	-	53.17	No detailed FEMA Floodplain data available for this area.
C0540	9.71	1.64	0.00	1.64	-	16.85	No detailed FEMA Floodplain data available for this area.
C0560	0.77	0.57	0.00	0.57	-	73.87	No detailed FEMA Floodplain data available for this area.
C0565	8.76	5.19	0.00	5.19	-	59.17	No detailed FEMA Floodplain data available for this area.
C0570	2.88	2.08	0.00	2.08	-	72.30	No detailed FEMA Floodplain data available for this area.
C0580	6.15	3.92	0.00	3.92	-	63.75	No detailed FEMA Floodplain data available for this area.
C0585	5.99	3.00	0.00	3.00	-	50.10	No detailed FEMA Floodplain data available for this area.
C0590	7.04	1.87	0.00	1.87	-	26.58	No detailed FEMA Floodplain data available for this area.
C0597	7.23	0.60	0.00	0.60	-	8.31	No detailed FEMA Floodplain data available for this area.
C0600	4.56	2.77	0.00	2.77	-	60.75	No detailed FEMA Floodplain data available for this area.
C0603	2.32	0.16	0.00	0.16	-	7.00	No detailed FEMA Floodplain data available for this area.
C0604	10.03	1.61	0.00	1.61	-	16.08	No detailed FEMA Floodplain data available for this area.
C0606	22.70	2.83	0.00	2.83	-	12.45	No detailed FEMA Floodplain data available for this area.
C0607	22.08	3.58	0.00	3.58	-	16.21	No detailed FEMA Floodplain data available for this area.
C0608	1.29	0.32	0.00	0.32	-	25.05	No detailed FEMA Floodplain data available for this area.
C0609	5.41	0.42	0.00	0.42	-	7.69	No detailed FEMA Floodplain data available for this area.
C0610	6.81	4.63	0.00	4.63	-	67.97	No detailed FEMA Floodplain data available for this area.
C0615	14.75	3.26	0.00	3.26	-	22.13	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
C0617	3.13	0.27	0.00	0.27	-	8.53	No detailed FEMA Floodplain data available for this area.
C0618	8.65	1.54	0.00	1.54	-	17.82	No detailed FEMA Floodplain data available for this area.
C0620	9.54	6.31	0.00	6.31	-	66.12	No detailed FEMA Floodplain data available for this area.
C0623	3.29	0.12	0.00	0.12	-	3.67	No detailed FEMA Floodplain data available for this area.
C0630	37.50	13.87	0.00	13.87	-	36.99	No detailed FEMA Floodplain data available for this area.
C0633	3.90	0.09	0.00	0.09	-	2.30	No detailed FEMA Floodplain data available for this area.
C0640	41.45	8.80	0.00	8.80	-	21.23	No detailed FEMA Floodplain data available for this area.
C0645	0.96	0.53	0.00	0.53	-	55.53	No detailed FEMA Floodplain data available for this area.
C0660	40.34	7.54	0.00	7.54	-	18.69	No detailed FEMA Floodplain data available for this area.
C0665	61.14	6.31	0.00	6.31	-	10.32	No detailed FEMA Floodplain data available for this area.
C0667	23.88	6.13	0.00	6.13	-	25.69	No detailed FEMA Floodplain data available for this area.
C0670	11.56	7.36	0.00	7.36	-	63.65	No detailed FEMA Floodplain data available for this area.
C0675	5.87	1.47	0.00	1.47	-	25.08	No detailed FEMA Floodplain data available for this area.
C0680	12.52	9.09	0.00	9.09	-	72.63	No detailed FEMA Floodplain data available for this area.
C0681	0.12	0.01	0.00	0.01	-	12.36	No detailed FEMA Floodplain data available for this area.
C0685	7.99	2.18	0.00	2.18	-	27.34	No detailed FEMA Floodplain data available for this area.
C0690	19.67	8.23	0.00	8.23	-	41.83	No detailed FEMA Floodplain data available for this area.
C0700	5.06	2.90	0.00	2.90	-	57.40	No detailed FEMA Floodplain data available for this area.
C0730	46.47	18.18	0.00	18.18	-	39.13	No detailed FEMA Floodplain data available for this area.
C0740	18.16	4.42	0.00	4.42	-	24.34	No detailed FEMA Floodplain data available for this area.
C0760	10.52	3.06	0.00	3.06	-	29.09	No detailed FEMA Floodplain data available for this area.
C0770	16.78	9.67	0.00	9.67	-	57.63	No detailed FEMA Floodplain data available for this area.
C0780	30.23	15.67	0.00	15.67	-	51.83	No detailed FEMA Floodplain data available for this area.
C0790	2.38	1.85	0.00	1.85	-	77.77	No detailed FEMA Floodplain data available for this area.
C0810	10.63	1.86	0.00	1.86	-	17.53	No detailed FEMA Floodplain data available for this area.
C0820	8.45	2.53	0.00	2.53	-	29.88	No detailed FEMA Floodplain data available for this area.
C0825	13.78	1.34	0.00	1.34	-	9.74	No detailed FEMA Floodplain data available for this area.
C0830	2.29	1.75	0.00	1.75	-	76.53	No detailed FEMA Floodplain data available for this area.
C0840	9.15	3.63	0.00	3.63	-	39.66	No detailed FEMA Floodplain data available for this area.
C0845	2.46	0.96	0.00	0.96	-	38.85	No detailed FEMA Floodplain data available for this area.
C0850	8.82	4.89	0.00	4.89	-	55.43	No detailed FEMA Floodplain data available for this area.
C0860	36.13	7.28	0.00	7.28	-	20.14	No detailed FEMA Floodplain data available for this area.
C0870	23.09	4.53	0.00	4.53	-	19.64	No detailed FEMA Floodplain data available for this area.
C0873	7.61	0.30	0.00	0.30	-	3.97	No detailed FEMA Floodplain data available for this area.
C0900	11.52	6.05	0.00	6.05	-	52.53	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
C0910	5.73	4.24	1.36	2.88	211.31	50.20	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
C0915	5.72	1.86	0.00	1.86	-	32.57	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
C0920	7.26	5.84	6.72	0.88	13.05	12.07	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
C0930	7.08	5.35	2.40	2.95	123.03	41.69	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
C0940	13.15	4.88	2.01	2.87	142.40	21.79	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
C1010	5.21	0.48	0.00	0.48	-	9.24	No detailed FEMA Floodplain data available for this area.
C1020	43.70	3.51	0.00	3.51	-	8.03	No detailed FEMA Floodplain data available for this area.
C1025	9.17	1.43	0.00	1.43	-	15.60	No detailed FEMA Floodplain data available for this area.
C1030	7.32	1.08	0.00	1.08	-	14.81	No detailed FEMA Floodplain data available for this area.
C1040	10.70	2.45	0.00	2.45	-	22.93	No detailed FEMA Floodplain data available for this area.
C1042	9.41	0.94	0.00	0.94	-	10.04	No detailed FEMA Floodplain data available for this area.
C1043	5.84	1.86	0.00	1.86	-	31.80	No detailed FEMA Floodplain data available for this area.
C1045	3.50	0.44	0.00	0.44	-	12.54	No detailed FEMA Floodplain data available for this area.
C1050	43.64	4.80	0.00	4.80	-	11.01	No detailed FEMA Floodplain data available for this area.
C1060	0.80	0.38	0.00	0.38	-	47.67	No detailed FEMA Floodplain data available for this area.
C1070	12.22	5.15	0.00	5.15	-	42.13	No detailed FEMA Floodplain data available for this area.
C1080	2.26	0.46	0.00	0.46	-	20.31	No detailed FEMA Floodplain data available for this area.
C1510	13.32	1.04	0.00	1.04	-	7.80	No detailed FEMA Floodplain data available for this area.
C1520	12.89	1.02	0.00	1.02	-	7.90	No detailed FEMA Floodplain data available for this area.
C1530	8.45	0.39	0.00	0.39	-	4.60	No detailed FEMA Floodplain data available for this area.
C1540	1.14	0.27	0.00	0.27	-	23.47	No detailed FEMA Floodplain data available for this area.
C1550	2.88	0.05	0.00	0.05	-	1.81	No detailed FEMA Floodplain data available for this area.
C2020	9.19	0.21	0.00	0.21	-	2.32	No detailed FEMA Floodplain data available for this area.
C2040	6.97	0.49	0.00	0.49	-	7.03	No detailed FEMA Floodplain data available for this area.
C2060	5.42	0.05	0.00	0.05	-	0.96	No detailed FEMA Floodplain data available for this area.
C2520	13.24	0.19	0.00	0.19	-	1.42	No detailed FEMA Floodplain data available for this area.
C2530	4.48	0.18	0.00	0.18	-	3.99	No detailed FEMA Floodplain data available for this area.
C2550	4.57	0.28	0.00	0.28	-	6.20	No detailed FEMA Floodplain data available for this area.
C2560	3.27	0.00	0.00	0.00	-	0.02	No detailed FEMA Floodplain data available for this area.
C3010	8.01	0.79	0.00	0.79	-	9.91	No detailed FEMA Floodplain data available for this area.
C3023	31.14	4.86	0.00	4.86	-	15.61	No detailed FEMA Floodplain data available for this area.
C3030	0.93	0.34	0.00	0.34	-	36.76	No detailed FEMA Floodplain data available for this area.
C3510	5.31	0.46	0.00	0.46	-	8.60	No detailed FEMA Floodplain data available for this area.
C3520	7.95	1.12	0.00	1.12	-	14.07	No detailed FEMA Floodplain data available for this area.
C3530	4.26	0.40	0.00	0.40	-	9.36	No detailed FEMA Floodplain data available for this area.
C4010	2.72	0.15	0.00	0.15	-	5.55	No detailed FEMA Floodplain data available for this area.
C4020	20.88	1.34	0.00	1.34	-	6.42	No detailed FEMA Floodplain data available for this area.
C4030	3.09	0.68	0.00	0.68	-	22.11	No detailed FEMA Floodplain data available for this area.
C4040	20.69	0.96	0.00	0.96	-	4.66	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
C4050	4.98	0.99	0.00	0.99	-	19.87	No detailed FEMA Floodplain data available for this area.
C4060	18.29	3.17	0.00	3.17	-	17.31	No detailed FEMA Floodplain data available for this area.
C4070	3.33	0.90	0.00	0.90	-	26.97	No detailed FEMA Floodplain data available for this area.
C5010	17.84	0.76	0.00	0.76	-	4.27	No detailed FEMA Floodplain data available for this area.
C5020	22.60	1.90	0.00	1.90	-	8.41	No detailed FEMA Floodplain data available for this area.
C5030	26.29	3.29	0.00	3.29	-	12.52	No detailed FEMA Floodplain data available for this area.
C5040	19.14	1.90	0.00	1.90	-	9.94	No detailed FEMA Floodplain data available for this area.
C5050	15.34	1.29	0.00	1.29	-	8.41	No detailed FEMA Floodplain data available for this area.
C5060	23.79	1.93	0.00	1.93	-	8.11	No detailed FEMA Floodplain data available for this area.
C5070	14.83	1.14	0.00	1.14	-	7.65	No detailed FEMA Floodplain data available for this area.
C5080	20.34	3.41	0.00	3.41	-	16.75	No detailed FEMA Floodplain data available for this area.
C5090	12.85	3.48	0.00	3.48	-	27.11	No detailed FEMA Floodplain data available for this area.
C5100	7.94	2.46	0.00	2.46	-	31.01	No detailed FEMA Floodplain data available for this area.
C5110	5.29	4.77	0.00	4.77	-	90.12	No detailed FEMA Floodplain data available for this area.
C5112	6.74	0.10	0.00	0.10	-	1.55	No detailed FEMA Floodplain data available for this area.
C5115	3.47	0.44	0.00	0.44	-	12.75	No detailed FEMA Floodplain data available for this area.
C5118	34.39	1.82	0.00	1.82	-	5.29	No detailed FEMA Floodplain data available for this area.
C5120	8.22	2.44	0.00	2.44	-	29.65	No detailed FEMA Floodplain data available for this area.
C5130	2.26	1.11	0.00	1.11	-	48.98	No detailed FEMA Floodplain data available for this area.
C5140	10.01	2.78	0.00	2.78	-	27.80	No detailed FEMA Floodplain data available for this area.
C5150	14.11	1.98	0.00	1.98	-	14.05	No detailed FEMA Floodplain data available for this area.
C6010	27.15	0.61	0.00	0.61	-	2.23	No detailed FEMA Floodplain data available for this area.
C6020	28.64	0.64	0.00	0.64	-	2.23	No detailed FEMA Floodplain data available for this area.
C6030	0.38	0.01	0.00	0.01	-	2.40	No detailed FEMA Floodplain data available for this area.
C6040	37.55	0.55	0.00	0.55	-	1.46	No detailed FEMA Floodplain data available for this area.
C6050	27.42	1.31	0.00	1.31	-	4.78	No detailed FEMA Floodplain data available for this area.
C6060	12.21	0.43	0.00	0.43	-	3.52	No detailed FEMA Floodplain data available for this area.
C6503	7.57	0.28	0.00	0.28	-	3.73	No detailed FEMA Floodplain data available for this area.
C6505	7.09	0.77	0.00	0.77	-	10.81	No detailed FEMA Floodplain data available for this area.
C6510	4.14	0.61	0.00	0.61	-	14.80	No detailed FEMA Floodplain data available for this area.
C6513	18.53	3.14	0.00	3.14	-	16.94	No detailed FEMA Floodplain data available for this area.
C6518	7.07	0.23	0.00	0.23	-	3.32	No detailed FEMA Floodplain data available for this area.
C6520	11.96	2.73	0.00	2.73	-	22.80	No detailed FEMA Floodplain data available for this area.
C6522	2.37	0.14	0.00	0.14	-	5.74	No detailed FEMA Floodplain data available for this area.
C6523	10.30	3.48	0.00	3.48	-	33.74	No detailed FEMA Floodplain data available for this area.
C6524	14.35	0.74	0.00	0.74	-	5.17	No detailed FEMA Floodplain data available for this area.
C6526	11.36	0.99	0.00	0.99	-	8.76	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
C6527	10.70	3.36	0.00	3.36	-	31.40	No detailed FEMA Floodplain data available for this area.
C6528	2.00	0.36	0.00	0.36	-	18.22	No detailed FEMA Floodplain data available for this area.
C6530	2.92	1.76	0.00	1.76	-	60.29	No detailed FEMA Floodplain data available for this area.
C6540	1.26	0.66	0.00	0.66	-	51.86	No detailed FEMA Floodplain data available for this area.
C6545	12.18	4.59	0.00	4.59	-	37.66	No detailed FEMA Floodplain data available for this area.
C6550	1.53	0.87	0.00	0.87	-	56.96	No detailed FEMA Floodplain data available for this area.
C7010	4.65	0.17	0.00	0.17	-	3.58	No detailed FEMA Floodplain data available for this area.
C7020	6.91	0.59	0.00	0.59	-	8.47	No detailed FEMA Floodplain data available for this area.
C7030	5.89	0.78	0.00	0.78	-	13.28	No detailed FEMA Floodplain data available for this area.
C7040	17.83	1.69	0.00	1.69	-	9.48	No detailed FEMA Floodplain data available for this area.
C7053	7.35	1.96	0.00	1.96	-	26.74	No detailed FEMA Floodplain data available for this area.
C7059	1.37	0.59	0.00	0.59	-	43.22	No detailed FEMA Floodplain data available for this area.
C7062	1.15	0.35	0.00	0.35	-	30.45	No detailed FEMA Floodplain data available for this area.
C7065	14.09	2.14	0.00	2.14	-	15.16	No detailed FEMA Floodplain data available for this area.
C7068	2.85	0.79	0.00	0.79	-	27.93	No detailed FEMA Floodplain data available for this area.
C7070	6.59	1.96	0.00	1.96	-	29.79	No detailed FEMA Floodplain data available for this area.
C7080	12.57	1.77	0.00	1.77	-	14.11	No detailed FEMA Floodplain data available for this area.
C7093	10.12	2.39	0.00	2.39	-	23.61	No detailed FEMA Floodplain data available for this area.
C7097	13.08	1.29	0.00	1.29	-	9.89	No detailed FEMA Floodplain data available for this area.
C7098	1.49	0.42	0.00	0.42	-	28.15	No detailed FEMA Floodplain data available for this area.
C7100	18.12	2.58	0.00	2.58	-	14.22	No detailed FEMA Floodplain data available for this area.
C7110	5.11	2.41	0.00	2.41	-	47.09	No detailed FEMA Floodplain data available for this area.
C7120	13.75	6.34	0.00	6.34	-	46.11	No detailed FEMA Floodplain data available for this area.
C8005	8.79	0.94	0.00	0.94	-	10.65	No detailed FEMA Floodplain data available for this area.
C8010	8.99	0.76	0.00	0.76	-	8.43	No detailed FEMA Floodplain data available for this area.
C8012	5.30	0.71	0.00	0.71	-	13.47	No detailed FEMA Floodplain data available for this area.
C8013	3.41	0.60	0.00	0.60	-	17.74	No detailed FEMA Floodplain data available for this area.
C8018	9.96	0.72	0.00	0.72	-	7.19	No detailed FEMA Floodplain data available for this area.
C8020	15.16	1.68	0.00	1.68	-	11.05	No detailed FEMA Floodplain data available for this area.
C8025	4.20	0.92	0.00	0.92	-	21.86	No detailed FEMA Floodplain data available for this area.
C8030	1.65	0.78	0.00	0.78	-	47.38	No detailed FEMA Floodplain data available for this area.
C8040	5.39	1.47	0.00	1.47	-	27.32	No detailed FEMA Floodplain data available for this area.
C8043	6.01	1.59	0.00	1.59	-	26.49	No detailed FEMA Floodplain data available for this area.
C8045	7.45	2.37	0.00	2.37	-	31.88	No detailed FEMA Floodplain data available for this area.
C8046	6.77	1.92	0.00	1.92	-	28.43	No detailed FEMA Floodplain data available for this area.
C8047	8.86	2.95	0.00	2.95	-	33.33	No detailed FEMA Floodplain data available for this area.
C8048	12.10	6.38	0.00	6.38	-	52.77	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
C8050	4.01	0.47	0.00	0.47	-	11.67	No detailed FEMA Floodplain data available for this area.
C8060	9.32	1.35	0.00	1.35	-	14.49	No detailed FEMA Floodplain data available for this area.
C8065	9.29	2.90	0.00	2.90	-	31.26	No detailed FEMA Floodplain data available for this area.
C8070	1.44	0.47	0.00	0.47	-	32.71	No detailed FEMA Floodplain data available for this area.
C8080	0.79	0.16	0.00	0.16	-	20.24	No detailed FEMA Floodplain data available for this area.
C8090	1.47	0.48	0.00	0.48	-	32.47	No detailed FEMA Floodplain data available for this area.
C8100	19.66	5.48	0.00	5.48	-	27.89	No detailed FEMA Floodplain data available for this area.
C8110	2.11	0.92	0.00	0.92	-	43.76	No detailed FEMA Floodplain data available for this area.
C8120	13.08	7.82	0.00	7.82	-	59.76	No detailed FEMA Floodplain data available for this area.
C8140	6.15	2.44	0.00	2.44	-	39.64	No detailed FEMA Floodplain data available for this area.
C8150	20.91	10.03	0.00	10.03	-	48.00	No detailed FEMA Floodplain data available for this area.
C8160	1.02	0.48	0.00	0.48	-	47.19	No detailed FEMA Floodplain data available for this area.
C8170	1.17	1.02	0.00	1.02	-	87.48	No detailed FEMA Floodplain data available for this area.
C8510	5.93	2.50	0.00	2.50	-	42.12	No detailed FEMA Floodplain data available for this area.
C8520	3.55	0.68	0.00	0.68	-	19.06	No detailed FEMA Floodplain data available for this area.
C8530	13.04	1.79	0.00	1.79	-	13.70	No detailed FEMA Floodplain data available for this area.
C8540	4.49	2.24	0.00	2.24	-	50.01	No detailed FEMA Floodplain data available for this area.
C8550	3.15	1.20	0.00	1.20	-	38.16	No detailed FEMA Floodplain data available for this area.
C8560	16.84	3.16	0.00	3.16	-	18.78	No detailed FEMA Floodplain data available for this area.
C8570	1.01	0.15	0.00	0.15	-	15.12	No detailed FEMA Floodplain data available for this area.
C8580	2.00	0.27	0.00	0.27	-	13.76	No detailed FEMA Floodplain data available for this area.
C8590	4.26	0.62	0.00	0.62	-	14.48	No detailed FEMA Floodplain data available for this area.
C8600	5.91	1.86	0.00	1.86	-	31.40	No detailed FEMA Floodplain data available for this area.
C8610	2.51	1.03	0.00	1.03	-	41.02	No detailed FEMA Floodplain data available for this area.
C8620	2.60	1.41	0.00	1.41	-	54.23	No detailed FEMA Floodplain data available for this area.
C8630	1.58	0.28	0.00	0.28	-	17.84	No detailed FEMA Floodplain data available for this area.
C8640	1.09	0.33	0.00	0.33	-	30.19	No detailed FEMA Floodplain data available for this area.
C9010	9.87	3.00	0.00	3.00	-	30.40	No detailed FEMA Floodplain data available for this area.
C9020	1.21	0.16	0.00	0.16	-	12.97	No detailed FEMA Floodplain data available for this area.
C9022	1.34	0.23	0.00	0.23	-	17.03	No detailed FEMA Floodplain data available for this area.
C9024	3.79	0.46	0.00	0.46	-	12.06	No detailed FEMA Floodplain data available for this area.
C9030	6.27	0.77	0.00	0.77	-	12.29	No detailed FEMA Floodplain data available for this area.
C9032	1.27	0.11	0.00	0.11	-	9.00	No detailed FEMA Floodplain data available for this area.
C9040	1.42	0.12	0.00	0.12	-	8.15	No detailed FEMA Floodplain data available for this area.
C9050	5.17	0.42	0.00	0.42	-	8.12	No detailed FEMA Floodplain data available for this area.
C9052	1.29	0.18	0.00	0.18	-	13.80	No detailed FEMA Floodplain data available for this area.
C9054	0.89	0.12	0.00	0.12	-	13.81	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
C9056	1.16	0.10	0.00	0.10	-	8.96	No detailed FEMA Floodplain data available for this area.
C9058	0.54	0.24	0.00	0.24	-	45.65	No detailed FEMA Floodplain data available for this area.
C9060	5.49	2.26	0.00	2.26	-	41.21	No detailed FEMA Floodplain data available for this area.
C9070	10.10	0.89	0.00	0.89	-	8.82	No detailed FEMA Floodplain data available for this area.
C9080	14.59	1.28	0.00	1.28	-	8.80	No detailed FEMA Floodplain data available for this area.
C9090	9.82	1.35	0.00	1.35	-	13.76	No detailed FEMA Floodplain data available for this area.
C9100	18.97	3.20	0.00	3.20	-	16.85	No detailed FEMA Floodplain data available for this area.
C9110	1.38	0.23	0.00	0.23	-	16.78	No detailed FEMA Floodplain data available for this area.
C9120	1.39	0.26	0.00	0.26	-	18.77	No detailed FEMA Floodplain data available for this area.
C9130	10.46	1.05	0.00	1.05	-	10.01	No detailed FEMA Floodplain data available for this area.
C9510	6.93	0.21	0.00	0.21	-	3.01	No detailed FEMA Floodplain data available for this area.
C9520	18.41	3.22	0.00	3.22	-	17.51	No detailed FEMA Floodplain data available for this area.
C9530	19.28	1.91	0.00	1.91	-	9.91	No detailed FEMA Floodplain data available for this area.
C9540	21.64	3.92	0.00	3.92	-	18.11	No detailed FEMA Floodplain data available for this area.
C9550	1.85	0.48	0.00	0.48	-	25.70	No detailed FEMA Floodplain data available for this area.
C9560	18.26	4.52	0.00	4.52	-	24.73	No detailed FEMA Floodplain data available for this area.
C9570	2.47	0.74	0.00	0.74	-	30.07	No detailed FEMA Floodplain data available for this area.
C9580	0.87	0.60	0.00	0.60	-	68.63	No detailed FEMA Floodplain data available for this area.
C9600	2.83	0.31	0.00	0.31	-	10.89	No detailed FEMA Floodplain data available for this area.
C9700	1.37	0.58	0.00	0.58	-	42.26	No detailed FEMA Floodplain data available for this area.
C9800	3.60	0.59	0.00	0.59	-	16.51	No detailed FEMA Floodplain data available for this area.
D0004	27.88	0.97	0.00	0.97	-	3.48	No detailed FEMA Floodplain data available for this area.
D0006	13.01	0.72	0.00	0.72	-	5.54	No detailed FEMA Floodplain data available for this area.
D0010	46.06	4.75	0.00	4.75	-	10.31	No detailed FEMA Floodplain data available for this area.
D0020	40.31	4.78	0.00	4.78	-	11.85	No detailed FEMA Floodplain data available for this area.
D0030	12.05	1.35	0.00	1.35	-	11.21	No detailed FEMA Floodplain data available for this area.
D0040	3.87	0.41	0.00	0.41	-	10.46	No detailed FEMA Floodplain data available for this area.
D0045	66.38	2.48	0.00	2.48	-	3.74	No detailed FEMA Floodplain data available for this area.
D0050	22.58	1.36	0.00	1.36	-	6.02	No detailed FEMA Floodplain data available for this area.
D0053	49.96	1.27	0.00	1.27	-	2.55	No detailed FEMA Floodplain data available for this area.
D0055	1.62	0.72	0.00	0.72	-	44.39	No detailed FEMA Floodplain data available for this area.
D0057	4.92	0.28	0.00	0.28	-	5.66	No detailed FEMA Floodplain data available for this area.
D0059	1.42	0.23	0.00	0.23	-	16.30	No detailed FEMA Floodplain data available for this area.
D0060	25.73	2.45	0.00	2.45	-	9.51	No detailed FEMA Floodplain data available for this area.
D0063	63.95	2.18	0.00	2.18	-	3.41	No detailed FEMA Floodplain data available for this area.
D0070	39.27	4.66	0.00	4.66	-	11.87	No detailed FEMA Floodplain data available for this area.
D0080	21.85	1.76	0.00	1.76	-	8.07	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
D0082	5.81	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
D0085	34.44	0.92	0.00	0.92	-	2.68	No detailed FEMA Floodplain data available for this area.
D0088	55.61	2.67	0.00	2.67	-	4.81	No detailed FEMA Floodplain data available for this area.
D0090	2.97	1.28	0.00	1.28	-	43.32	No detailed FEMA Floodplain data available for this area.
D0092	21.41	1.25	0.00	1.25	-	5.85	No detailed FEMA Floodplain data available for this area.
D0094	14.61	0.45	0.00	0.45	-	3.10	No detailed FEMA Floodplain data available for this area.
D0096	11.26	0.80	0.00	0.80	-	7.14	No detailed FEMA Floodplain data available for this area.
D0098	17.94	0.63	0.00	0.63	-	3.50	No detailed FEMA Floodplain data available for this area.
D0100	7.09	2.86	0.00	2.86	-	40.30	No detailed FEMA Floodplain data available for this area.
D0103	28.27	3.14	0.00	3.14	-	11.12	No detailed FEMA Floodplain data available for this area.
D0107	5.31	0.59	0.00	0.59	-	11.04	No detailed FEMA Floodplain data available for this area.
D0110	40.37	2.70	0.00	2.70	-	6.68	No detailed FEMA Floodplain data available for this area.
D0112	16.56	1.20	0.00	1.20	-	7.23	No detailed FEMA Floodplain data available for this area.
D0114	50.06	4.24	0.00	4.24	-	8.47	No detailed FEMA Floodplain data available for this area.
D0116	28.79	1.73	0.00	1.73	-	6.03	No detailed FEMA Floodplain data available for this area.
D0118	2.06	0.59	0.00	0.59	-	28.82	No detailed FEMA Floodplain data available for this area.
D0130	1.57	0.66	0.00	0.66	-	41.88	No detailed FEMA Floodplain data available for this area.
D0140	51.32	3.53	0.00	3.53	-	6.88	No detailed FEMA Floodplain data available for this area.
D0152	9.76	1.63	0.00	1.63	-	16.74	No detailed FEMA Floodplain data available for this area.
D0155	59.13	6.07	0.00	6.07	-	10.26	No detailed FEMA Floodplain data available for this area.
D0158	19.48	4.28	0.00	4.28	-	21.95	No detailed FEMA Floodplain data available for this area.
D0160	46.45	7.76	0.00	7.76	-	16.71	No detailed FEMA Floodplain data available for this area.
D0162	5.67	1.97	0.00	1.97	-	34.75	No detailed FEMA Floodplain data available for this area.
D0164	49.01	8.47	0.00	8.47	-	17.27	No detailed FEMA Floodplain data available for this area.
D0166	30.58	5.01	0.00	5.01	-	16.38	No detailed FEMA Floodplain data available for this area.
D0168	17.49	3.62	0.00	3.62	-	20.69	No detailed FEMA Floodplain data available for this area.
D0170	37.88	7.05	0.00	7.05	-	18.62	No detailed FEMA Floodplain data available for this area.
D0180	19.69	4.47	0.00	4.47	-	22.72	No detailed FEMA Floodplain data available for this area.
D0190	2.21	1.28	0.00	1.28	-	58.03	No detailed FEMA Floodplain data available for this area.
D0192	10.93	3.27	0.00	3.27	-	29.93	No detailed FEMA Floodplain data available for this area.
D0194	36.84	7.01	0.00	7.01	-	19.03	No detailed FEMA Floodplain data available for this area.
D0196	61.63	9.92	0.00	9.92	-	16.09	No detailed FEMA Floodplain data available for this area.
D0198	33.50	3.36	0.00	3.36	-	10.04	No detailed FEMA Floodplain data available for this area.
D0200	40.06	5.46	0.00	5.46	-	13.63	No detailed FEMA Floodplain data available for this area.
D0202	4.61	0.42	0.00	0.42	-	9.18	No detailed FEMA Floodplain data available for this area.
D0204	50.50	4.39	0.00	4.39	-	8.69	No detailed FEMA Floodplain data available for this area.
D0206	26.41	5.22	0.00	5.22	-	19.79	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
D0208	1.23	0.53	0.00	0.53	-	42.76	No detailed FEMA Floodplain data available for this area.
D0210	3.87	1.91	0.00	1.91	-	49.25	No detailed FEMA Floodplain data available for this area.
D0220	66.14	11.43	0.00	11.43	-	17.28	No detailed FEMA Floodplain data available for this area.
D0230	65.48	12.83	0.00	12.83	-	19.60	No detailed FEMA Floodplain data available for this area.
D0240	75.40	22.66	0.00	22.66	-	30.05	No detailed FEMA Floodplain data available for this area.
D1010	8.23	0.91	0.00	0.91	-	11.02	No detailed FEMA Floodplain data available for this area.
D1020	44.26	3.90	0.00	3.90	-	8.80	No detailed FEMA Floodplain data available for this area.
D1025	1.27	0.35	0.00	0.35	-	27.14	No detailed FEMA Floodplain data available for this area.
D1030	30.66	5.00	0.00	5.00	-	16.32	No detailed FEMA Floodplain data available for this area.
D2010	12.28	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
D2020	14.90	0.27	0.00	0.27	-	1.80	No detailed FEMA Floodplain data available for this area.
D2025	29.11	0.07	0.00	0.07	-	0.23	No detailed FEMA Floodplain data available for this area.
D2030	4.55	0.42	0.00	0.42	-	9.19	No detailed FEMA Floodplain data available for this area.
D2040	2.49	0.44	0.00	0.44	-	17.86	No detailed FEMA Floodplain data available for this area.
E0010	0.63	0.50	0.00	0.50	-	79.19	No detailed FEMA Floodplain data available for this area.
E0020	21.59	1.77	0.00	1.77	-	8.18	No detailed FEMA Floodplain data available for this area.
E0023	34.62	0.80	0.00	0.80	-	2.32	No detailed FEMA Floodplain data available for this area.
E0027	9.16	0.24	0.00	0.24	-	2.61	No detailed FEMA Floodplain data available for this area.
E0030	15.99	2.87	0.00	2.87	-	17.95	No detailed FEMA Floodplain data available for this area.
E0040	43.05	1.57	0.00	1.57	-	3.64	No detailed FEMA Floodplain data available for this area.
E0050	21.42	1.40	0.00	1.40	-	6.56	No detailed FEMA Floodplain data available for this area.
E0052	39.75	0.49	0.00	0.49	-	1.24	No detailed FEMA Floodplain data available for this area.
E0054	4.32	0.49	0.00	0.49	-	11.23	No detailed FEMA Floodplain data available for this area.
E0059	16.18	0.35	0.00	0.35	-	2.17	No detailed FEMA Floodplain data available for this area.
E0060	15.80	2.86	0.00	2.86	-	18.11	No detailed FEMA Floodplain data available for this area.
E0061	0.89	0.23	0.00	0.23	-	25.78	No detailed FEMA Floodplain data available for this area.
E0062	14.44	2.66	0.00	2.66	-	18.41	No detailed FEMA Floodplain data available for this area.
E0063	17.21	2.73	0.00	2.73	-	15.87	No detailed FEMA Floodplain data available for this area.
E0064	1.99	0.39	0.00	0.39	-	19.77	No detailed FEMA Floodplain data available for this area.
E0065	5.04	1.50	0.00	1.50	-	29.66	No detailed FEMA Floodplain data available for this area.
E0069	3.68	1.03	0.00	1.03	-	27.93	No detailed FEMA Floodplain data available for this area.
E0070	74.55	2.18	0.00	2.18	-	2.92	No detailed FEMA Floodplain data available for this area.
E0071	33.64	2.34	0.00	2.34	-	6.95	No detailed FEMA Floodplain data available for this area.
E0072	25.42	0.20	0.00	0.20	-	0.77	No detailed FEMA Floodplain data available for this area.
E0074	1.69	0.24	0.00	0.24	-	14.13	No detailed FEMA Floodplain data available for this area.
E0075	9.36	0.87	0.00	0.87	-	9.32	No detailed FEMA Floodplain data available for this area.
E0077	14.77	2.46	0.00	2.46	-	16.68	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
E0079	13.29	0.51	0.00	0.51	-	3.85	No detailed FEMA Floodplain data available for this area.
E0080	1.93	1.12	0.00	1.12	-	58.20	No detailed FEMA Floodplain data available for this area.
E0090	0.80	0.47	0.00	0.47	-	58.76	No detailed FEMA Floodplain data available for this area.
E0100	13.62	1.19	0.00	1.19	-	8.77	No detailed FEMA Floodplain data available for this area.
E0110	32.12	3.62	0.00	3.62	-	11.29	No detailed FEMA Floodplain data available for this area.
E0120	59.61	4.48	0.00	4.48	-	7.52	No detailed FEMA Floodplain data available for this area.
E0125	21.05	0.68	0.00	0.68	-	3.23	No detailed FEMA Floodplain data available for this area.
E0127	30.37	0.74	0.00	0.74	-	2.44	No detailed FEMA Floodplain data available for this area.
E0128	9.97	0.23	0.00	0.23	-	2.27	No detailed FEMA Floodplain data available for this area.
E0129	0.98	0.30	0.00	0.30	-	31.06	No detailed FEMA Floodplain data available for this area.
E0130	10.31	3.23	0.00	3.23	-	31.33	No detailed FEMA Floodplain data available for this area.
E0140	51.25	6.25	0.00	6.25	-	12.19	No detailed FEMA Floodplain data available for this area.
E0145	22.39	0.52	0.00	0.52	-	2.32	No detailed FEMA Floodplain data available for this area.
E0150	15.24	2.50	0.00	2.50	-	16.42	No detailed FEMA Floodplain data available for this area.
E0160	151.41	41.68	0.00	41.68	-	27.53	No detailed FEMA Floodplain data available for this area.
E0165	12.79	2.06	0.00	2.06	-	16.15	No detailed FEMA Floodplain data available for this area.
E0166	0.83	0.14	0.00	0.14	-	16.51	No detailed FEMA Floodplain data available for this area.
E0167	17.22	5.70	0.00	5.70	-	33.07	No detailed FEMA Floodplain data available for this area.
E0168	10.82	2.07	0.00	2.07	-	19.13	No detailed FEMA Floodplain data available for this area.
E0170	42.13	15.40	0.00	15.40	-	36.56	No detailed FEMA Floodplain data available for this area.
E0180	25.50	10.13	0.00	10.13	-	39.72	No detailed FEMA Floodplain data available for this area.
E0510	6.85	0.36	0.00	0.36	-	5.20	No detailed FEMA Floodplain data available for this area.
E0520	20.71	2.17	0.00	2.17	-	10.50	No detailed FEMA Floodplain data available for this area.
E0530	4.93	0.92	0.00	0.92	-	18.68	No detailed FEMA Floodplain data available for this area.
E0540	2.10	0.30	0.00	0.30	-	14.34	No detailed FEMA Floodplain data available for this area.
E0555	13.19	0.29	0.00	0.29	-	2.22	No detailed FEMA Floodplain data available for this area.
E0560	22.41	0.86	0.00	0.86	-	3.86	No detailed FEMA Floodplain data available for this area.
E0570	20.68	1.31	0.00	1.31	-	6.33	No detailed FEMA Floodplain data available for this area.
E0580	20.79	1.81	0.00	1.81	-	8.70	No detailed FEMA Floodplain data available for this area.
E0890	3.93	0.57	0.00	0.57	-	14.51	No detailed FEMA Floodplain data available for this area.
E2010	9.05	0.38	0.00	0.38	-	4.22	No detailed FEMA Floodplain data available for this area.
E2020	33.16	0.86	0.00	0.86	-	2.59	No detailed FEMA Floodplain data available for this area.
E2030	20.74	2.07	0.00	2.07	-	9.99	No detailed FEMA Floodplain data available for this area.
E2041	11.81	3.92	0.00	3.92	-	33.20	No detailed FEMA Floodplain data available for this area.
E2043	12.47	2.92	0.00	2.92	-	23.41	No detailed FEMA Floodplain data available for this area.
E2045	10.08	2.54	0.00	2.54	-	25.22	No detailed FEMA Floodplain data available for this area.
E2049	2.60	1.18	0.00	1.18	-	45.21	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
E2050	2.41	1.04	0.00	1.04	-	43.08	No detailed FEMA Floodplain data available for this area.
E2060	2.33	1.17	0.00	1.17	-	50.19	No detailed FEMA Floodplain data available for this area.
E2510	18.82	4.31	0.00	4.31	-	22.89	No detailed FEMA Floodplain data available for this area.
E2530	1.80	0.22	0.00	0.22	-	12.11	No detailed FEMA Floodplain data available for this area.
E2540	18.77	0.60	0.00	0.60	-	3.18	No detailed FEMA Floodplain data available for this area.
E3010	26.22	6.24	0.00	6.24	-	23.80	No detailed FEMA Floodplain data available for this area.
E3015	0.44	0.10	0.00	0.10	-	24.01	No detailed FEMA Floodplain data available for this area.
E3020	1.18	0.35	0.00	0.35	-	29.99	No detailed FEMA Floodplain data available for this area.
E3051	19.36	3.92	0.00	3.92	-	20.27	No detailed FEMA Floodplain data available for this area.
E3053	4.64	1.32	0.00	1.32	-	28.37	No detailed FEMA Floodplain data available for this area.
E3060	10.34	5.36	0.00	5.36	-	51.85	No detailed FEMA Floodplain data available for this area.
E3080	3.19	1.64	0.00	1.64	-	51.29	No detailed FEMA Floodplain data available for this area.
E3090	2.09	0.70	0.00	0.70	-	33.32	No detailed FEMA Floodplain data available for this area.
E3095	0.46	0.19	0.00	0.19	-	41.33	No detailed FEMA Floodplain data available for this area.
E3112	29.69	7.55	0.00	7.55	-	25.44	No detailed FEMA Floodplain data available for this area.
E3113	12.69	1.66	0.00	1.66	-	13.09	No detailed FEMA Floodplain data available for this area.
E3115	13.98	5.73	0.00	5.73	-	40.98	No detailed FEMA Floodplain data available for this area.
E3118	0.92	0.25	0.00	0.25	-	27.25	No detailed FEMA Floodplain data available for this area.
E3120	22.16	9.59	0.00	9.59	-	43.29	No detailed FEMA Floodplain data available for this area.
E3125	1.61	0.88	0.00	0.88	-	54.90	No detailed FEMA Floodplain data available for this area.
E3130	2.34	1.14	0.00	1.14	-	48.69	No detailed FEMA Floodplain data available for this area.
E3140	7.67	2.41	0.00	2.41	-	31.48	No detailed FEMA Floodplain data available for this area.
E3150	7.42	1.84	0.00	1.84	-	24.83	No detailed FEMA Floodplain data available for this area.
E3160	5.73	0.92	0.00	0.92	-	16.10	No detailed FEMA Floodplain data available for this area.
E3170	9.49	1.00	0.00	1.00	-	10.57	No detailed FEMA Floodplain data available for this area.
E5010	5.78	1.61	0.00	1.61	-	27.86	No detailed FEMA Floodplain data available for this area.
E5020	21.39	7.46	0.00	7.46	-	34.86	No detailed FEMA Floodplain data available for this area.
E5025	6.25	2.91	0.00	2.91	-	46.50	No detailed FEMA Floodplain data available for this area.
E5030	15.13	5.56	0.00	5.56	-	36.74	No detailed FEMA Floodplain data available for this area.
E5040	12.45	4.10	0.00	4.10	-	32.97	No detailed FEMA Floodplain data available for this area.
E5050	11.82	4.80	0.00	4.80	-	40.60	No detailed FEMA Floodplain data available for this area.
E5053	3.11	0.94	0.00	0.94	-	30.29	No detailed FEMA Floodplain data available for this area.
E5054	2.66	0.75	0.00	0.75	-	28.23	No detailed FEMA Floodplain data available for this area.
E5055	0.28	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
E5056	11.85	3.23	0.00	3.23	-	27.24	No detailed FEMA Floodplain data available for this area.
E5057	6.68	1.49	0.00	1.49	-	22.27	No detailed FEMA Floodplain data available for this area.
E5058	0.87	0.38	0.00	0.38	-	43.10	No detailed FEMA Floodplain data available for this area.

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E5059	7.97	3.71	0.00	3.71	-	46.55	No detailed FEMA Floodplain data available for this area.
E5061	11.79	4.65	0.00	4.65	-	39.41	No detailed FEMA Floodplain data available for this area.
E5063	14.86	4.44	0.00	4.44	-	29.88	No detailed FEMA Floodplain data available for this area.
E5069	8.20	1.55	0.00	1.55	-	18.88	No detailed FEMA Floodplain data available for this area.
E5070	19.62	11.37	0.00	11.37	-	57.96	No detailed FEMA Floodplain data available for this area.
E5080	1.65	0.97	0.00	0.97	-	58.72	No detailed FEMA Floodplain data available for this area.
E5085	1.99	1.28	0.00	1.28	-	64.33	No detailed FEMA Floodplain data available for this area.
E5510	32.15	9.93	0.00	9.93	-	30.89	No detailed FEMA Floodplain data available for this area.
E5512	9.07	2.49	0.00	2.49	-	27.43	No detailed FEMA Floodplain data available for this area.
E5515	4.56	0.71	0.00	0.71	-	15.61	No detailed FEMA Floodplain data available for this area.
E5520	0.95	0.03	0.00	0.03	-	3.57	No detailed FEMA Floodplain data available for this area.
E5525	1.04	0.75	0.00	0.75	-	72.64	No detailed FEMA Floodplain data available for this area.
E5527	7.35	4.05	0.00	4.05	-	55.09	No detailed FEMA Floodplain data available for this area.
E5530	3.51	1.78	0.00	1.78	-	50.79	No detailed FEMA Floodplain data available for this area.
E5540	3.17	2.17	0.00	2.17	-	68.26	No detailed FEMA Floodplain data available for this area.
E6010	7.49	2.33	0.00	2.33	-	31.16	No detailed FEMA Floodplain data available for this area.
E6020	14.86	1.94	2.91	0.97	33.33	6.52	No detailed FEMA Floodplain data available for this area.
E6030	16.87	5.64	0.13	5.50	4095.75	32.61	No detailed FEMA Floodplain data available for this area.
E6031	9.08	3.30	0.00	3.30	-	36.31	No detailed FEMA Floodplain data available for this area.
E6032	1.43	1.13	0.65	0.48	73.87	33.63	No detailed FEMA Floodplain data available for this area.
E6033	5.43	2.54	3.30	0.76	23.01	14.00	No detailed FEMA Floodplain data available for this area.
E6034	4.21	1.23	0.00	1.23	-	29.26	No detailed FEMA Floodplain data available for this area.
E6035	2.62	1.68	1.30	0.38	28.86	14.35	No detailed FEMA Floodplain data available for this area.
E6036	4.98	2.80	1.53	1.27	82.55	25.43	No detailed FEMA Floodplain data available for this area.
E6037	2.41	0.64	0.00	0.64	-	26.47	No detailed FEMA Floodplain data available for this area.
E6038	17.10	3.16	0.01	3.16	52729.61	18.45	No detailed FEMA Floodplain data available for this area.
E6039	5.97	1.45	0.00	1.45	-	24.23	No detailed FEMA Floodplain data available for this area.
E6040	15.31	3.72	0.00	3.72	-	24.29	No detailed FEMA Floodplain data available for this area.
E6041	2.76	1.09	0.00	1.09	-	39.46	No detailed FEMA Floodplain data available for this area.
E6042	13.78	0.88	0.00	0.88	-	6.35	No detailed FEMA Floodplain data available for this area.
E6043	10.04	1.62	0.00	1.62	-	16.18	No detailed FEMA Floodplain data available for this area.
E6046	9.75	1.90	0.00	1.90	-	19.50	No detailed FEMA Floodplain data available for this area.
E6047	22.11	4.02	0.00	4.02	-	18.19	No detailed FEMA Floodplain data available for this area.
E6048	12.47	2.58	0.00	2.58	-	20.69	No detailed FEMA Floodplain data available for this area.
E6051	7.41	0.74	0.00	0.74	-	10.02	No detailed FEMA Floodplain data available for this area.
E6052	2.40	0.50	0.00	0.50	-	20.73	No detailed FEMA Floodplain data available for this area.
E6053	4.28	1.65	0.00	1.65	-	38.57	No detailed FEMA Floodplain data available for this area.

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E6054	2.51	0.69	0.00	0.69	-	27.49	No detailed FEMA Floodplain data available for this area.
E6055	15.74	7.21	0.00	7.21	-	45.82	No detailed FEMA Floodplain data available for this area.
E6060	15.26	3.00	0.00	3.00	-	19.65	No detailed FEMA Floodplain data available for this area.
E7010	5.41	1.80	0.00	1.80	-	33.24	No detailed FEMA Floodplain data available for this area.
E7020	16.31	0.35	0.00	0.35	-	2.17	No detailed FEMA Floodplain data available for this area.
E7030	3.65	0.73	0.00	0.73	-	19.91	No detailed FEMA Floodplain data available for this area.
E7040	1.11	0.06	0.00	0.06	-	5.18	No detailed FEMA Floodplain data available for this area.
E7050	2.03	0.32	0.00	0.32	-	15.60	No detailed FEMA Floodplain data available for this area.
E7053	0.85	0.20	0.00	0.20	-	23.84	No detailed FEMA Floodplain data available for this area.
E7055	0.84	0.29	0.00	0.29	-	34.28	No detailed FEMA Floodplain data available for this area.
E7080	1.88	1.26	0.00	1.26	-	67.36	No detailed FEMA Floodplain data available for this area.
E7090	3.07	0.80	0.00	0.80	-	26.00	No detailed FEMA Floodplain data available for this area.
E7100	2.67	0.64	0.00	0.64	-	24.11	No detailed FEMA Floodplain data available for this area.
E7102	4.46	0.22	0.00	0.22	-	4.93	No detailed FEMA Floodplain data available for this area.
E7103	11.00	1.77	0.00	1.77	-	16.05	No detailed FEMA Floodplain data available for this area.
E7104	5.23	0.59	0.00	0.59	-	11.26	No detailed FEMA Floodplain data available for this area.
E7105	1.97	0.39	0.00	0.39	-	19.56	No detailed FEMA Floodplain data available for this area.
E7107	3.72	0.66	0.00	0.66	-	17.75	No detailed FEMA Floodplain data available for this area.
E7110	1.95	0.50	0.00	0.50	-	25.67	No detailed FEMA Floodplain data available for this area.
E7120	2.25	0.31	0.00	0.31	-	13.67	No detailed FEMA Floodplain data available for this area.
E7130	3.67	0.51	0.00	0.51	-	13.95	No detailed FEMA Floodplain data available for this area.
E7135	4.43	1.60	0.00	1.60	-	36.10	No detailed FEMA Floodplain data available for this area.
E7138	2.41	0.66	0.00	0.66	-	27.16	No detailed FEMA Floodplain data available for this area.
E7140	6.57	0.78	0.00	0.78	-	11.90	No detailed FEMA Floodplain data available for this area.
E7150	8.22	1.71	0.00	1.71	-	20.79	No detailed FEMA Floodplain data available for this area.
E7505	1.29	0.10	0.00	0.10	-	8.02	No detailed FEMA Floodplain data available for this area.
E7507	0.72	0.09	0.00	0.09	-	11.78	No detailed FEMA Floodplain data available for this area.
E7509	0.78	0.07	0.00	0.07	-	8.75	No detailed FEMA Floodplain data available for this area.
E7510	0.92	0.00	0.00	0.00	-	0.00	No detailed FEMA Floodplain data available for this area.
E7512	1.74	0.16	0.00	0.16	-	9.13	No detailed FEMA Floodplain data available for this area.
E7514	0.22	0.06	0.00	0.06	-	27.08	No detailed FEMA Floodplain data available for this area.
E7516	0.34	0.08	0.00	0.08	-	22.77	No detailed FEMA Floodplain data available for this area.
E7517	4.41	1.89	0.00	1.89	-	42.85	No detailed FEMA Floodplain data available for this area.
E7518	11.01	3.70	0.00	3.70	-	33.62	No detailed FEMA Floodplain data available for this area.
E7519	4.20	1.16	0.00	1.16	-	27.69	No detailed FEMA Floodplain data available for this area.
E7520	8.46	0.81	0.00	0.81	-	9.57	No detailed FEMA Floodplain data available for this area.
E7525	2.75	2.29	0.00	2.29	-	83.19	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
E7530	5.41	0.79	0.00	0.79	-	14.57	No detailed FEMA Floodplain data available for this area.
E7540	5.87	1.90	0.00	1.90	-	32.42	No detailed FEMA Floodplain data available for this area.
E7545	4.09	1.12	0.00	1.12	-	27.41	No detailed FEMA Floodplain data available for this area.
E7547	1.59	0.05	0.00	0.05	-	3.02	No detailed FEMA Floodplain data available for this area.
E7550	2.49	0.07	0.00	0.07	-	2.62	No detailed FEMA Floodplain data available for this area.
E7560	1.94	0.20	0.00	0.20	-	10.08	No detailed FEMA Floodplain data available for this area.
E7580	4.44	0.73	0.00	0.73	-	16.40	No detailed FEMA Floodplain data available for this area.
E9008	4.83	0.69	0.00	0.69	-	14.30	No detailed FEMA Floodplain data available for this area.
E9009	2.40	0.44	0.00	0.44	-	18.27	No detailed FEMA Floodplain data available for this area.
E9010	10.57	3.18	0.00	3.18	-	30.05	No detailed FEMA Floodplain data available for this area.
E9020	6.04	1.59	0.00	1.59	-	26.26	No detailed FEMA Floodplain data available for this area.
E9025	7.52	3.77	0.00	3.77	-	50.19	No detailed FEMA Floodplain data available for this area.
E9030	9.91	2.96	0.00	2.96	-	29.81	No detailed FEMA Floodplain data available for this area.
E9040	18.10	2.92	0.00	2.92	-	16.11	No detailed FEMA Floodplain data available for this area.
E9045	18.37	3.45	0.00	3.45	-	18.78	No detailed FEMA Floodplain data available for this area.
E9047	12.14	2.49	0.00	2.49	-	20.49	No detailed FEMA Floodplain data available for this area.
E9050	2.09	0.62	0.00	0.62	-	29.69	No detailed FEMA Floodplain data available for this area.
E9060	1.36	0.56	0.00	0.56	-	41.42	No detailed FEMA Floodplain data available for this area.
E9065	3.57	0.66	0.00	0.66	-	18.38	No detailed FEMA Floodplain data available for this area.
E9070	2.49	0.71	0.00	0.71	-	28.43	No detailed FEMA Floodplain data available for this area.
E9080	6.04	0.53	0.00	0.53	-	8.76	No detailed FEMA Floodplain data available for this area.
E9090	2.32	0.37	0.00	0.37	-	15.81	No detailed FEMA Floodplain data available for this area.
E9100	0.47	0.17	0.00	0.17	-	36.94	No detailed FEMA Floodplain data available for this area.
E9110	4.56	0.36	0.00	0.36	-	7.82	No detailed FEMA Floodplain data available for this area.
E9510	15.25	0.47	0.00	0.47	-	3.06	No detailed FEMA Floodplain data available for this area.
E9520	0.68	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
E9602	0.36	0.03	0.00	0.03	-	7.49	No detailed FEMA Floodplain data available for this area.
E9604	0.77	0.49	0.00	0.49	-	63.50	No detailed FEMA Floodplain data available for this area.
E9606	0.29	0.13	0.00	0.13	-	45.63	No detailed FEMA Floodplain data available for this area.
E9608	0.19	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
E9610	0.43	0.02	0.00	0.02	-	5.69	No detailed FEMA Floodplain data available for this area.
E9611	0.46	0.07	0.00	0.07	-	16.02	No detailed FEMA Floodplain data available for this area.
E9612	0.46	0.08	0.00	0.08	-	18.20	No detailed FEMA Floodplain data available for this area.
E9620	0.78	0.06	0.00	0.06	-	7.45	No detailed FEMA Floodplain data available for this area.
E9626	0.47	0.02	0.00	0.02	-	3.77	No detailed FEMA Floodplain data available for this area.
E9630	1.14	0.12	0.00	0.12	-	10.89	No detailed FEMA Floodplain data available for this area.
E9700	7.35	0.50	0.00	0.50	-	6.82	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
F0010	0.49	0.29	0.00	0.29	-	60.55	No detailed FEMA Floodplain data available for this area.
F0020	24.09	1.94	0.00	1.94	-	8.06	No detailed FEMA Floodplain data available for this area.
F0022	12.69	0.77	0.00	0.77	-	6.10	No detailed FEMA Floodplain data available for this area.
F0025	10.31	1.53	0.00	1.53	-	14.80	No detailed FEMA Floodplain data available for this area.
F0030	29.41	1.98	0.00	1.98	-	6.73	No detailed FEMA Floodplain data available for this area.
F0032	26.62	1.08	0.00	1.08	-	4.05	No detailed FEMA Floodplain data available for this area.
F0034	54.51	1.52	0.00	1.52	-	2.78	No detailed FEMA Floodplain data available for this area.
F0036	24.62	1.21	0.00	1.21	-	4.91	No detailed FEMA Floodplain data available for this area.
F0038	6.16	0.17	0.00	0.17	-	2.79	No detailed FEMA Floodplain data available for this area.
F0040	19.23	2.15	0.00	2.15	-	11.18	No detailed FEMA Floodplain data available for this area.
F0070	9.00	0.26	0.00	0.26	-	2.93	No detailed FEMA Floodplain data available for this area.
F0082	4.86	0.04	0.00	0.04	-	0.85	No detailed FEMA Floodplain data available for this area.
F0085	19.68	0.73	0.00	0.73	-	3.70	No detailed FEMA Floodplain data available for this area.
F0088	22.26	2.00	0.00	2.00	-	8.99	No detailed FEMA Floodplain data available for this area.
F0090	25.99	1.15	0.00	1.15	-	4.41	No detailed FEMA Floodplain data available for this area.
F0092	5.06	0.21	0.00	0.21	-	4.06	No detailed FEMA Floodplain data available for this area.
F0094	12.22	1.12	0.00	1.12	-	9.19	No detailed FEMA Floodplain data available for this area.
F0096	57.55	1.04	0.00	1.04	-	1.81	No detailed FEMA Floodplain data available for this area.
F0098	4.31	0.35	0.00	0.35	-	8.21	No detailed FEMA Floodplain data available for this area.
F0100	18.19	1.61	0.00	1.61	-	8.84	No detailed FEMA Floodplain data available for this area.
F0110	83.01	2.83	0.00	2.83	-	3.41	No detailed FEMA Floodplain data available for this area.
F0120	24.84	3.27	0.00	3.27	-	13.15	No detailed FEMA Floodplain data available for this area.
F0122	13.68	0.29	0.00	0.29	-	2.09	No detailed FEMA Floodplain data available for this area.
F0124	1.41	0.25	0.00	0.25	-	17.55	No detailed FEMA Floodplain data available for this area.
F0126	24.04	1.61	0.00	1.61	-	6.69	No detailed FEMA Floodplain data available for this area.
F0128	0.76	0.21	0.00	0.21	-	27.76	No detailed FEMA Floodplain data available for this area.
F0140	15.58	2.15	0.00	2.15	-	13.83	No detailed FEMA Floodplain data available for this area.
F0150	3.87	0.91	0.00	0.91	-	23.61	No detailed FEMA Floodplain data available for this area.
F0152	25.49	0.11	0.00	0.11	-	0.43	No detailed FEMA Floodplain data available for this area.
F0153	25.46	4.89	0.00	4.89	-	19.20	No detailed FEMA Floodplain data available for this area.
F0154	13.94	0.44	0.00	0.44	-	3.13	No detailed FEMA Floodplain data available for this area.
F0155	3.07	1.22	0.00	1.22	-	39.84	No detailed FEMA Floodplain data available for this area.
F0156	16.59	0.55	0.00	0.55	-	3.33	No detailed FEMA Floodplain data available for this area.
F0158	20.73	0.32	0.00	0.32	-	1.52	No detailed FEMA Floodplain data available for this area.
F0160	14.38	1.43	0.00	1.43	-	9.92	No detailed FEMA Floodplain data available for this area.
F0170	21.90	2.38	0.00	2.38	-	10.86	No detailed FEMA Floodplain data available for this area.
F0180	31.42	4.62	0.00	4.62	-	14.72	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
F0187	0.46	0.08	0.00	0.08	-	17.12	No detailed FEMA Floodplain data available for this area.
F0188	6.58	0.75	0.00	0.75	-	11.38	No detailed FEMA Floodplain data available for this area.
F0190	40.06	5.10	0.00	5.10	-	12.74	No detailed FEMA Floodplain data available for this area.
F0210	83.20	9.56	0.00	9.56	-	11.48	No detailed FEMA Floodplain data available for this area.
F0220	76.67	13.44	0.00	13.44	-	17.53	No detailed FEMA Floodplain data available for this area.
F0229	0.32	0.05	0.00	0.05	-	16.99	No detailed FEMA Floodplain data available for this area.
F0230	67.27	14.82	0.00	14.82	-	22.03	No detailed FEMA Floodplain data available for this area.
F1010	31.46	1.28	0.00	1.28	-	4.05	No detailed FEMA Floodplain data available for this area.
F1020	19.89	1.69	0.00	1.69	-	8.51	No detailed FEMA Floodplain data available for this area.
F1030	8.05	0.35	0.00	0.35	-	4.41	No detailed FEMA Floodplain data available for this area.
F1040	1.43	0.05	0.00	0.05	-	3.31	No detailed FEMA Floodplain data available for this area.
F2010	27.14	2.36	0.00	2.36	-	8.71	No detailed FEMA Floodplain data available for this area.
F2020	2.48	0.44	0.00	0.44	-	17.82	No detailed FEMA Floodplain data available for this area.
F2025	10.00	0.65	0.00	0.65	-	6.51	No detailed FEMA Floodplain data available for this area.
F2030	9.31	0.56	0.00	0.56	-	6.01	No detailed FEMA Floodplain data available for this area.
F2040	4.68	0.19	0.00	0.19	-	4.02	No detailed FEMA Floodplain data available for this area.
F2050	0.35	0.07	0.00	0.07	-	19.48	No detailed FEMA Floodplain data available for this area.
G0003	27.70	0.76	0.00	0.76	-	2.76	No detailed FEMA Floodplain data available for this area.
G0008	10.99	0.15	0.00	0.15	-	1.40	No detailed FEMA Floodplain data available for this area.
G0010	1.83	1.27	0.00	1.27	-	69.24	No detailed FEMA Floodplain data available for this area.
G0020	2.74	1.43	0.00	1.43	-	52.10	No detailed FEMA Floodplain data available for this area.
G0030	1.67	1.20	0.00	1.20	-	71.82	No detailed FEMA Floodplain data available for this area.
G0040	3.72	1.30	0.00	1.30	-	34.79	No detailed FEMA Floodplain data available for this area.
G0050	14.19	2.48	0.00	2.48	-	17.45	No detailed FEMA Floodplain data available for this area.
G0053	31.43	2.30	0.00	2.30	-	7.32	No detailed FEMA Floodplain data available for this area.
G0057	25.61	3.68	0.00	3.68	-	14.35	No detailed FEMA Floodplain data available for this area.
G0060	30.21	4.31	0.00	4.31	-	14.28	No detailed FEMA Floodplain data available for this area.
G0080	15.40	2.54	0.00	2.54	-	16.49	No detailed FEMA Floodplain data available for this area.
G0090	16.42	3.40	0.00	3.40	-	20.70	No detailed FEMA Floodplain data available for this area.
G0110	17.71	3.54	0.00	3.54	-	19.97	No detailed FEMA Floodplain data available for this area.
G0120	35.81	3.60	0.00	3.60	-	10.05	No detailed FEMA Floodplain data available for this area.
G0130	44.88	9.48	0.00	9.48	-	21.13	No detailed FEMA Floodplain data available for this area.
G0140	54.87	8.96	0.00	8.96	-	16.32	No detailed FEMA Floodplain data available for this area.
G0150	33.13	5.37	0.00	5.37	-	16.22	No detailed FEMA Floodplain data available for this area.
G0170	24.01	4.18	0.00	4.18	-	17.42	No detailed FEMA Floodplain data available for this area.
G0180	11.76	4.31	0.00	4.31	-	36.63	No detailed FEMA Floodplain data available for this area.
G0190	34.65	11.55	0.00	11.55	-	33.33	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
G0200	0.49	0.28	0.00	0.28	-	55.78	No detailed FEMA Floodplain data available for this area.
G0210	0.89	0.53	0.00	0.53	-	59.26	No detailed FEMA Floodplain data available for this area.
G0215	22.43	3.89	0.00	3.89	-	17.34	No detailed FEMA Floodplain data available for this area.
G0216	2.39	1.30	0.00	1.30	-	54.65	No detailed FEMA Floodplain data available for this area.
G0217	7.60	2.00	0.00	2.00	-	26.29	No detailed FEMA Floodplain data available for this area.
G0218	22.86	1.96	0.00	1.96	-	8.56	No detailed FEMA Floodplain data available for this area.
G0219	18.52	2.71	0.00	2.71	-	14.65	No detailed FEMA Floodplain data available for this area.
G0220	17.32	2.96	0.00	2.96	-	17.11	No detailed FEMA Floodplain data available for this area.
G0221	7.67	3.35	0.00	3.35	-	43.66	No detailed FEMA Floodplain data available for this area.
G0222	3.37	0.59	0.00	0.59	-	17.51	No detailed FEMA Floodplain data available for this area.
G0223	13.54	2.00	0.00	2.00	-	14.78	No detailed FEMA Floodplain data available for this area.
G0224	0.40	0.14	0.00	0.14	-	34.19	No detailed FEMA Floodplain data available for this area.
G0226	4.27	1.08	0.00	1.08	-	25.35	No detailed FEMA Floodplain data available for this area.
G0227	0.39	0.30	0.00	0.30	-	76.32	No detailed FEMA Floodplain data available for this area.
G0229	0.49	0.28	0.00	0.28	-	57.11	No detailed FEMA Floodplain data available for this area.
G0230	3.29	2.12	0.00	2.12	-	64.32	No detailed FEMA Floodplain data available for this area.
G0240	5.26	2.35	0.00	2.35	-	44.67	No detailed FEMA Floodplain data available for this area.
G0245	7.29	0.79	0.00	0.79	-	10.80	No detailed FEMA Floodplain data available for this area.
G0250	4.69	2.94	0.00	2.94	-	62.68	No detailed FEMA Floodplain data available for this area.
G0252	7.57	2.03	0.00	2.03	-	26.81	No detailed FEMA Floodplain data available for this area.
G0254	4.59	1.93	0.00	1.93	-	42.19	No detailed FEMA Floodplain data available for this area.
G0256	9.08	1.29	0.00	1.29	-	14.16	No detailed FEMA Floodplain data available for this area.
G0260	5.02	3.27	0.00	3.27	-	65.20	No detailed FEMA Floodplain data available for this area.
G0263	6.74	2.62	0.00	2.62	-	38.86	No detailed FEMA Floodplain data available for this area.
G0266	5.55	2.15	0.00	2.15	-	38.80	No detailed FEMA Floodplain data available for this area.
G0270	2.54	1.87	0.00	1.87	-	73.53	No detailed FEMA Floodplain data available for this area.
G0280	1.93	0.72	0.00	0.72	-	37.09	No detailed FEMA Floodplain data available for this area.
G1010	2.50	0.95	0.00	0.95	-	37.94	No detailed FEMA Floodplain data available for this area.
G1020	3.28	0.58	0.00	0.58	-	17.66	No detailed FEMA Floodplain data available for this area.
G1030	15.64	0.49	0.00	0.49	-	3.11	No detailed FEMA Floodplain data available for this area.
G1040	0.44	0.26	0.00	0.26	-	59.47	No detailed FEMA Floodplain data available for this area.
G1050	0.32	0.15	0.00	0.15	-	47.42	No detailed FEMA Floodplain data available for this area.
G1060	3.45	0.80	0.00	0.80	-	23.27	No detailed FEMA Floodplain data available for this area.
G1510	4.05	0.57	0.00	0.57	-	14.17	No detailed FEMA Floodplain data available for this area.
G1520	23.35	3.82	0.00	3.82	-	16.37	No detailed FEMA Floodplain data available for this area.
G1530	11.68	1.68	0.00	1.68	-	14.38	No detailed FEMA Floodplain data available for this area.
G1540	3.94	0.80	0.00	0.80	-	20.29	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
G2020	3.28	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
G2030	5.45	0.83	0.00	0.83	-	15.13	No detailed FEMA Floodplain data available for this area.
G2032	18.03	0.52	0.00	0.52	-	2.91	No detailed FEMA Floodplain data available for this area.
G2034	11.34	0.98	0.00	0.98	-	8.69	No detailed FEMA Floodplain data available for this area.
G2036	8.97	0.81	0.00	0.81	-	9.07	No detailed FEMA Floodplain data available for this area.
G2040	25.72	1.81	0.00	1.81	-	7.03	No detailed FEMA Floodplain data available for this area.
G2050	3.67	0.56	0.00	0.56	-	15.28	No detailed FEMA Floodplain data available for this area.
G2070	5.96	0.81	0.00	0.81	-	13.59	No detailed FEMA Floodplain data available for this area.
G2080	4.28	0.87	0.00	0.87	-	20.22	No detailed FEMA Floodplain data available for this area.
G2090	28.67	4.78	0.00	4.78	-	16.67	No detailed FEMA Floodplain data available for this area.
G2100	39.16	9.18	0.00	9.18	-	23.44	No detailed FEMA Floodplain data available for this area.
G2103	11.39	1.91	0.00	1.91	-	16.76	No detailed FEMA Floodplain data available for this area.
G2107	12.65	2.05	0.00	2.05	-	16.17	No detailed FEMA Floodplain data available for this area.
G2109	1.66	0.31	0.00	0.31	-	18.69	No detailed FEMA Floodplain data available for this area.
G2110	7.47	2.29	0.00	2.29	-	30.71	No detailed FEMA Floodplain data available for this area.
G2130	17.51	3.61	0.00	3.61	-	20.63	No detailed FEMA Floodplain data available for this area.
G2150	1.52	0.70	0.00	0.70	-	45.74	No detailed FEMA Floodplain data available for this area.
G3010	9.15	0.46	0.00	0.46	-	5.01	No detailed FEMA Floodplain data available for this area.
G3020	8.78	1.24	0.00	1.24	-	14.14	No detailed FEMA Floodplain data available for this area.
G3030	8.20	1.94	0.00	1.94	-	23.69	No detailed FEMA Floodplain data available for this area.
G3040	5.43	1.83	0.00	1.83	-	33.69	No detailed FEMA Floodplain data available for this area.
G3050	0.85	0.42	0.00	0.42	-	49.82	No detailed FEMA Floodplain data available for this area.
G4010	7.86	1.05	0.00	1.05	-	13.33	No detailed FEMA Floodplain data available for this area.
G4020	13.79	2.25	0.00	2.25	-	16.32	No detailed FEMA Floodplain data available for this area.
G4023	16.62	1.23	0.00	1.23	-	7.40	No detailed FEMA Floodplain data available for this area.
G4027	7.45	0.88	0.00	0.88	-	11.85	No detailed FEMA Floodplain data available for this area.
G4030	2.71	0.72	0.00	0.72	-	26.63	No detailed FEMA Floodplain data available for this area.
G4040	7.14	0.98	0.00	0.98	-	13.65	No detailed FEMA Floodplain data available for this area.
G4050	0.48	0.23	0.00	0.23	-	47.90	No detailed FEMA Floodplain data available for this area.
G5210	9.65	0.43	0.00	0.43	-	4.49	No detailed FEMA Floodplain data available for this area.
G5220	8.51	1.20	0.00	1.20	-	14.14	No detailed FEMA Floodplain data available for this area.
G5230	10.04	0.40	0.00	0.40	-	4.02	No detailed FEMA Floodplain data available for this area.
G5240	3.53	0.16	0.00	0.16	-	4.51	No detailed FEMA Floodplain data available for this area.
G5510	3.13	0.19	0.00	0.19	-	6.22	No detailed FEMA Floodplain data available for this area.
G5520	5.19	0.58	0.00	0.58	-	11.09	No detailed FEMA Floodplain data available for this area.
G5535	1.31	0.34	0.00	0.34	-	25.94	No detailed FEMA Floodplain data available for this area.
G5540	10.25	2.13	0.00	2.13	-	20.81	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
G5545	10.60	0.40	0.00	0.40	-	3.76	No detailed FEMA Floodplain data available for this area.
G5550	20.49	1.27	0.00	1.27	-	6.22	No detailed FEMA Floodplain data available for this area.
G5560	11.98	0.71	0.00	0.71	-	5.95	No detailed FEMA Floodplain data available for this area.
G5580	22.97	2.08	0.00	2.08	-	9.05	No detailed FEMA Floodplain data available for this area.
G5810	2.15	1.29	0.00	1.29	-	60.30	No detailed FEMA Floodplain data available for this area.
G5815	13.12	0.40	0.00	0.40	-	3.02	No detailed FEMA Floodplain data available for this area.
G5820	2.87	1.92	0.00	1.92	-	67.12	No detailed FEMA Floodplain data available for this area.
G5830	2.84	1.36	0.00	1.36	-	47.82	No detailed FEMA Floodplain data available for this area.
G5835	12.42	1.64	0.00	1.64	-	13.24	No detailed FEMA Floodplain data available for this area.
G5840	0.86	0.64	0.00	0.64	-	74.65	No detailed FEMA Floodplain data available for this area.
G5850	5.99	0.62	0.00	0.62	-	10.27	No detailed FEMA Floodplain data available for this area.
G5860	12.73	0.50	0.00	0.50	-	3.90	No detailed FEMA Floodplain data available for this area.
G5863	18.14	0.21	0.00	0.21	-	1.15	No detailed FEMA Floodplain data available for this area.
G5867	0.50	0.12	0.00	0.12	-	24.39	No detailed FEMA Floodplain data available for this area.
G5870	4.43	2.53	0.00	2.53	-	56.98	No detailed FEMA Floodplain data available for this area.
G5880	66.63	3.51	0.00	3.51	-	5.27	No detailed FEMA Floodplain data available for this area.
G5890	64.70	3.45	0.00	3.45	-	5.34	No detailed FEMA Floodplain data available for this area.
G6010	17.62	0.79	0.00	0.79	-	4.47	No detailed FEMA Floodplain data available for this area.
G6020	15.95	1.17	0.00	1.17	-	7.34	No detailed FEMA Floodplain data available for this area.
G6030	12.99	1.12	0.00	1.12	-	8.61	No detailed FEMA Floodplain data available for this area.
G6050	1.15	0.25	0.00	0.25	-	21.36	No detailed FEMA Floodplain data available for this area.
G7010	8.47	0.97	0.00	0.97	-	11.47	No detailed FEMA Floodplain data available for this area.
G7012	13.26	2.58	0.00	2.58	-	19.46	No detailed FEMA Floodplain data available for this area.
G7015	23.70	3.35	0.00	3.35	-	14.12	No detailed FEMA Floodplain data available for this area.
G7020	5.75	1.58	0.00	1.58	-	27.40	No detailed FEMA Floodplain data available for this area.
G7030	0.59	0.17	0.00	0.17	-	28.16	No detailed FEMA Floodplain data available for this area.
G7040	1.02	0.37	0.00	0.37	-	36.53	No detailed FEMA Floodplain data available for this area.
G7050	2.81	0.51	0.00	0.51	-	18.34	No detailed FEMA Floodplain data available for this area.
G8005	10.39	1.99	0.00	1.99	-	19.15	No detailed FEMA Floodplain data available for this area.
G8010	19.13	1.89	0.00	1.89	-	9.89	No detailed FEMA Floodplain data available for this area.
G8040	18.95	4.52	0.00	4.52	-	23.84	No detailed FEMA Floodplain data available for this area.
G8042	12.25	0.63	0.00	0.63	-	5.18	No detailed FEMA Floodplain data available for this area.
G8044	1.52	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
G8045	1.10	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
G8048	20.57	4.85	0.00	4.85	-	23.58	No detailed FEMA Floodplain data available for this area.
G8050	4.98	1.21	0.00	1.21	-	24.36	No detailed FEMA Floodplain data available for this area.
H0002	2.72	1.79	0.00	1.79	-	65.93	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
H0004	5.45	1.43	0.00	1.43	-	26.24	No detailed FEMA Floodplain data available for this area.
H0006	1.19	0.93	0.00	0.93	-	77.98	No detailed FEMA Floodplain data available for this area.
H0008	2.05	0.59	0.00	0.59	-	28.70	No detailed FEMA Floodplain data available for this area.
H0010	10.02	7.43	6.52	0.91	14.00	9.11	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
H0020	13.33	6.32	5.81	0.51	8.79	3.83	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
H0030	4.41	2.84	4.28	1.44	33.54	32.53	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
H0040	18.61	7.51	8.37	0.87	10.35	4.66	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
H0050	13.80	2.12	2.40	0.28	11.63	2.02	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
H0060	8.39	4.66	6.67	2.01	30.10	23.93	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
H0070	30.38	9.38	11.97	2.59	21.61	8.52	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
H0072	1.76	1.76	1.76	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
H0074	0.77	0.77	0.77	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
H0076	2.19	2.19	2.19	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
H0080	15.70	11.43	15.70	4.27	27.18	27.18	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
H0090	16.92	13.92	16.92	3.01	17.76	17.76	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
H0100	26.14	18.50	22.94	4.44	19.35	16.98	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
H0110	33.15	27.95	25.10	2.86	11.39	8.62	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
H0120	2.60	2.28	2.45	0.17	7.02	6.61	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
H0130	15.24	14.82	14.71	0.11	0.74	0.71	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
H0140	23.00	22.74	23.00	0.26	1.14	1.14	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
H0150	11.87	11.87	11.87	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
H0160	12.24	12.21	10.63	1.59	14.93	12.96	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
H6010	14.30	2.51	0.00	2.51	-	17.56	No detailed FEMA Floodplain data available for this area.
H6020	2.33	0.52	0.00	0.52	-	22.26	No detailed FEMA Floodplain data available for this area.
H6035	3.40	0.66	0.00	0.66	-	19.35	No detailed FEMA Floodplain data available for this area.
H6050	20.08	5.07	0.00	5.07	-	25.27	No detailed FEMA Floodplain data available for this area.
H6060	1.79	0.46	0.00	0.46	-	25.43	No detailed FEMA Floodplain data available for this area.
H6065	27.83	6.64	0.00	6.64	-	23.86	No detailed FEMA Floodplain data available for this area.
H6080	1.23	0.39	0.00	0.39	-	31.73	No detailed FEMA Floodplain data available for this area.
H6100	6.92	0.94	0.00	0.94	-	13.59	No detailed FEMA Floodplain data available for this area.
H6105	3.31	2.98	0.20	2.78	1362.41	83.83	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
H6110	4.60	4.52	2.05	2.48	120.87	53.79	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
H8010	5.61	3.34	0.00	3.34	-	59.60	No detailed FEMA Floodplain data available for this area.
H8020	8.49	4.52	0.00	4.52	-	53.23	No detailed FEMA Floodplain data available for this area.
H8030	13.26	8.26	0.00	8.26	-	62.28	No detailed FEMA Floodplain data available for this area.
H8060	15.14	4.96	0.00	4.96	-	32.76	No detailed FEMA Floodplain data available for this area.
H8075	10.00	3.04	0.00	3.04	-	30.36	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
H8077	16.23	5.61	0.00	5.61	-	34.60	No detailed FEMA Floodplain data available for this area.
H8080	14.57	2.05	0.00	2.05	-	14.06	No detailed FEMA Floodplain data available for this area.
H8090	10.62	2.26	0.28	1.99	721.13	18.72	No detailed FEMA Floodplain data available for this area.
H9000	35.93	7.49	6.70	0.79	11.83	2.20	No detailed FEMA Floodplain data available for this area.
I0012	15.75	0.96	0.00	0.96	-	6.10	No detailed FEMA Floodplain data available for this area.
I0015	10.57	1.74	0.00	1.74	-	16.41	No detailed FEMA Floodplain data available for this area.
I0016	29.58	7.51	0.00	7.51	-	25.39	No detailed FEMA Floodplain data available for this area.
I0018	1.70	0.56	0.00	0.56	-	33.04	No detailed FEMA Floodplain data available for this area.
I0020	34.79	12.24	0.00	12.24	-	35.19	No detailed FEMA Floodplain data available for this area.
I0025	1.99	0.22	0.00	0.22	-	11.20	No detailed FEMA Floodplain data available for this area.
I0030	21.13	7.58	0.00	7.58	-	35.88	No detailed FEMA Floodplain data available for this area.
I0040	4.62	0.58	0.00	0.58	-	12.54	No detailed FEMA Floodplain data available for this area.
I0050	5.80	0.61	0.00	0.61	-	10.45	No detailed FEMA Floodplain data available for this area.
I0055	19.20	0.10	0.00	0.10	-	0.51	No detailed FEMA Floodplain data available for this area.
I0059	0.86	0.13	0.00	0.13	-	14.67	No detailed FEMA Floodplain data available for this area.
I0060	18.46	2.17	0.00	2.17	-	11.73	No detailed FEMA Floodplain data available for this area.
I0062	11.76	2.46	0.00	2.46	-	20.90	No detailed FEMA Floodplain data available for this area.
I0070	26.83	3.06	0.00	3.06	-	11.40	No detailed FEMA Floodplain data available for this area.
I0080	29.06	2.15	0.00	2.15	-	7.39	No detailed FEMA Floodplain data available for this area.
I0082	16.09	3.56	0.00	3.56	-	22.11	No detailed FEMA Floodplain data available for this area.
I0085	50.93	13.72	0.00	13.72	-	26.95	No detailed FEMA Floodplain data available for this area.
I0090	12.47	2.76	0.00	2.76	-	22.10	No detailed FEMA Floodplain data available for this area.
I0095	18.00	4.38	0.00	4.38	-	24.31	No detailed FEMA Floodplain data available for this area.
I0100	31.58	4.59	0.00	4.59	-	14.54	No detailed FEMA Floodplain data available for this area.
I0105	24.16	3.22	0.00	3.22	-	13.32	No detailed FEMA Floodplain data available for this area.
I0110	29.56	4.89	0.00	4.89	-	16.55	No detailed FEMA Floodplain data available for this area.
I0130	9.20	2.46	0.00	2.46	-	26.75	No detailed FEMA Floodplain data available for this area.
I0132	26.09	0.58	0.00	0.58	-	2.22	No detailed FEMA Floodplain data available for this area.
I0133	34.23	7.79	0.00	7.79	-	22.75	No detailed FEMA Floodplain data available for this area.
I0135	29.07	0.95	0.00	0.95	-	3.25	No detailed FEMA Floodplain data available for this area.
I0138	40.16	1.00	0.00	1.00	-	2.48	No detailed FEMA Floodplain data available for this area.
I0140	5.72	2.95	0.00	2.95	-	51.48	No detailed FEMA Floodplain data available for this area.
I0150	40.51	6.77	0.00	6.77	-	16.71	No detailed FEMA Floodplain data available for this area.
I0155	17.02	0.80	0.00	0.80	-	4.71	No detailed FEMA Floodplain data available for this area.
I0160	3.66	1.87	0.00	1.87	-	51.02	No detailed FEMA Floodplain data available for this area.
I0170	11.78	0.87	0.00	0.87	-	7.41	No detailed FEMA Floodplain data available for this area.
I0172	22.42	1.18	0.00	1.18	-	5.28	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
I0174	31.78	4.49	0.00	4.49	-	14.12	No detailed FEMA Floodplain data available for this area.
I0176	71.29	5.85	0.00	5.85	-	8.21	No detailed FEMA Floodplain data available for this area.
I0178	10.54	0.73	0.00	0.73	-	6.97	No detailed FEMA Floodplain data available for this area.
I0180	6.83	3.07	0.00	3.07	-	44.99	No detailed FEMA Floodplain data available for this area.
I0181	9.53	1.01	0.00	1.01	-	10.61	No detailed FEMA Floodplain data available for this area.
I0182	33.23	4.76	0.00	4.76	-	14.34	No detailed FEMA Floodplain data available for this area.
I0183	33.59	2.39	0.00	2.39	-	7.12	No detailed FEMA Floodplain data available for this area.
I0185	46.56	7.67	0.00	7.67	-	16.47	No detailed FEMA Floodplain data available for this area.
I0188	9.50	2.69	0.00	2.69	-	28.30	No detailed FEMA Floodplain data available for this area.
I0190	3.79	2.08	0.00	2.08	-	54.86	No detailed FEMA Floodplain data available for this area.
I0192	15.98	1.47	0.00	1.47	-	9.18	No detailed FEMA Floodplain data available for this area.
I0193	21.99	4.24	0.00	4.24	-	19.26	No detailed FEMA Floodplain data available for this area.
I0195	9.04	1.73	0.00	1.73	-	19.16	No detailed FEMA Floodplain data available for this area.
I1010	22.73	0.20	0.00	0.20	-	0.87	No detailed FEMA Floodplain data available for this area.
I1015	32.59	0.51	0.00	0.51	-	1.55	No detailed FEMA Floodplain data available for this area.
I1020	62.15	1.12	0.00	1.12	-	1.80	No detailed FEMA Floodplain data available for this area.
I1030	39.56	0.80	0.00	0.80	-	2.03	No detailed FEMA Floodplain data available for this area.
I2010	5.85	0.59	0.00	0.59	-	10.12	No detailed FEMA Floodplain data available for this area.
I2020	4.73	0.56	0.00	0.56	-	11.90	No detailed FEMA Floodplain data available for this area.
I2030	9.49	1.21	0.00	1.21	-	12.75	No detailed FEMA Floodplain data available for this area.
I2040	8.59	0.90	0.00	0.90	-	10.47	No detailed FEMA Floodplain data available for this area.
I2050	18.27	1.67	0.00	1.67	-	9.13	No detailed FEMA Floodplain data available for this area.
I9020	2.61	1.38	0.00	1.38	-	52.83	No detailed FEMA Floodplain data available for this area.
I9022	9.08	2.78	0.00	2.78	-	30.67	No detailed FEMA Floodplain data available for this area.
I9024	50.34	10.78	0.00	10.78	-	21.41	No detailed FEMA Floodplain data available for this area.
J0005	5.64	1.48	0.00	1.48	-	26.17	No detailed FEMA Floodplain data available for this area.
J0010	25.39	7.45	0.00	7.45	-	29.35	No detailed FEMA Floodplain data available for this area.
J0020	25.36	6.27	0.00	6.27	-	24.73	No detailed FEMA Floodplain data available for this area.
J0030	29.51	5.75	0.00	5.75	-	19.47	No detailed FEMA Floodplain data available for this area.
J0040	37.32	12.69	0.00	12.69	-	34.01	No detailed FEMA Floodplain data available for this area.
J0050	9.34	3.42	0.00	3.42	-	36.61	No detailed FEMA Floodplain data available for this area.
J0070	3.50	2.37	0.00	2.37	-	67.62	No detailed FEMA Floodplain data available for this area.
J0080	46.37	12.14	0.00	12.14	-	26.18	No detailed FEMA Floodplain data available for this area.
J0090	13.16	8.68	0.00	8.68	-	65.96	No detailed FEMA Floodplain data available for this area.
J0100	7.56	1.52	0.00	1.52	-	20.16	No detailed FEMA Floodplain data available for this area.
J0103	3.14	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
J0104	3.30	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
J0105	6.67	0.12	0.00	0.12	-	1.84	No detailed FEMA Floodplain data available for this area.
J0110	43.62	2.74	0.00	2.74	-	6.28	No detailed FEMA Floodplain data available for this area.
J0120	41.71	4.40	0.00	4.40	-	10.55	No detailed FEMA Floodplain data available for this area.
J0130	29.88	4.59	0.00	4.59	-	15.37	No detailed FEMA Floodplain data available for this area.
J0140	2.85	1.66	0.00	1.66	-	58.33	No detailed FEMA Floodplain data available for this area.
J0142	1.25	0.53	0.00	0.53	-	42.28	No detailed FEMA Floodplain data available for this area.
J0143	3.50	0.64	0.00	0.64	-	18.43	No detailed FEMA Floodplain data available for this area.
J0144	2.01	0.09	0.00	0.09	-	4.30	No detailed FEMA Floodplain data available for this area.
J0145	63.90	9.90	0.00	9.90	-	15.50	No detailed FEMA Floodplain data available for this area.
J0148	0.86	0.25	0.00	0.25	-	29.76	No detailed FEMA Floodplain data available for this area.
J0150	13.02	2.19	0.00	2.19	-	16.82	No detailed FEMA Floodplain data available for this area.
J0160	42.00	12.44	0.00	12.44	-	29.62	No detailed FEMA Floodplain data available for this area.
J0162	17.11	3.73	0.00	3.73	-	21.82	No detailed FEMA Floodplain data available for this area.
J0165	11.78	2.59	0.00	2.59	-	21.97	No detailed FEMA Floodplain data available for this area.
J0168	0.99	0.33	0.00	0.33	-	32.87	No detailed FEMA Floodplain data available for this area.
J0170	3.89	2.14	0.00	2.14	-	55.06	No detailed FEMA Floodplain data available for this area.
J0172	9.78	1.33	0.00	1.33	-	13.61	No detailed FEMA Floodplain data available for this area.
J0174	22.00	4.07	0.00	4.07	-	18.51	No detailed FEMA Floodplain data available for this area.
J0176	11.39	3.23	0.00	3.23	-	28.35	No detailed FEMA Floodplain data available for this area.
J0178	19.35	4.66	0.00	4.66	-	24.10	No detailed FEMA Floodplain data available for this area.
J0180	12.04	4.52	0.00	4.52	-	37.54	No detailed FEMA Floodplain data available for this area.
J0182	9.42	1.25	0.00	1.25	-	13.26	No detailed FEMA Floodplain data available for this area.
J0184	4.31	1.13	0.00	1.13	-	26.28	No detailed FEMA Floodplain data available for this area.
J0186	18.58	3.23	0.00	3.23	-	17.40	No detailed FEMA Floodplain data available for this area.
J0188	0.84	0.31	0.00	0.31	-	36.46	No detailed FEMA Floodplain data available for this area.
J0190	2.63	1.28	0.00	1.28	-	48.63	No detailed FEMA Floodplain data available for this area.
J0192	8.95	1.30	0.00	1.30	-	14.50	No detailed FEMA Floodplain data available for this area.
J0195	27.28	3.64	0.00	3.64	-	13.35	No detailed FEMA Floodplain data available for this area.
J0198	6.03	1.59	0.00	1.59	-	26.41	No detailed FEMA Floodplain data available for this area.
J0200	19.40	4.83	0.00	4.83	-	24.89	No detailed FEMA Floodplain data available for this area.
J0210	14.72	2.52	0.00	2.52	-	17.10	No detailed FEMA Floodplain data available for this area.
J1010	3.45	0.69	0.00	0.69	-	20.09	No detailed FEMA Floodplain data available for this area.
J1020	5.37	1.01	0.00	1.01	-	18.81	No detailed FEMA Floodplain data available for this area.
J1110	2.53	0.80	0.00	0.80	-	31.75	No detailed FEMA Floodplain data available for this area.
J1120	19.23	2.55	0.00	2.55	-	13.28	No detailed FEMA Floodplain data available for this area.
J1130	20.25	2.97	0.00	2.97	-	14.67	No detailed FEMA Floodplain data available for this area.
J1210	9.38	0.42	0.00	0.42	-	4.52	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
J1220	3.64	0.45	0.00	0.45	-	12.33	No detailed FEMA Floodplain data available for this area.
J1310	7.11	1.45	0.00	1.45	-	20.44	No detailed FEMA Floodplain data available for this area.
J1320	31.07	2.14	0.00	2.14	-	6.87	No detailed FEMA Floodplain data available for this area.
J1330	4.58	1.05	0.00	1.05	-	22.94	No detailed FEMA Floodplain data available for this area.
J1410	14.27	0.64	0.00	0.64	-	4.45	No detailed FEMA Floodplain data available for this area.
J1420	4.11	0.51	0.00	0.51	-	12.40	No detailed FEMA Floodplain data available for this area.
J1501	7.85	5.61	0.00	5.61	-	71.43	No detailed FEMA Floodplain data available for this area.
J1502	30.44	0.74	0.00	0.74	-	2.43	No detailed FEMA Floodplain data available for this area.
J1503	14.94	1.10	0.00	1.10	-	7.35	No detailed FEMA Floodplain data available for this area.
J1504	15.09	0.73	0.00	0.73	-	4.83	No detailed FEMA Floodplain data available for this area.
J1505	10.01	4.17	0.00	4.17	-	41.61	No detailed FEMA Floodplain data available for this area.
J1506	7.86	4.13	0.00	4.13	-	52.58	No detailed FEMA Floodplain data available for this area.
J1510	0.69	0.43	0.00	0.43	-	62.06	No detailed FEMA Floodplain data available for this area.
J1520	7.93	1.05	0.00	1.05	-	13.20	No detailed FEMA Floodplain data available for this area.
J1530	14.89	3.68	0.00	3.68	-	24.72	No detailed FEMA Floodplain data available for this area.
J1540	16.56	5.10	0.00	5.10	-	30.79	No detailed FEMA Floodplain data available for this area.
J1550	8.10	1.76	0.00	1.76	-	21.74	No detailed FEMA Floodplain data available for this area.
J1560	21.88	7.43	0.00	7.43	-	33.95	No detailed FEMA Floodplain data available for this area.
J1570	13.15	1.55	0.00	1.55	-	11.81	No detailed FEMA Floodplain data available for this area.
J1580	11.67	2.57	0.00	2.57	-	22.01	No detailed FEMA Floodplain data available for this area.
J1590	6.36	1.72	0.00	1.72	-	26.97	No detailed FEMA Floodplain data available for this area.
J1600	26.57	1.64	0.00	1.64	-	6.18	No detailed FEMA Floodplain data available for this area.
J1610	5.95	1.08	0.00	1.08	-	18.12	No detailed FEMA Floodplain data available for this area.
J2010	2.23	0.05	0.00	0.05	-	2.29	No detailed FEMA Floodplain data available for this area.
J2020	18.12	1.34	0.00	1.34	-	7.40	No detailed FEMA Floodplain data available for this area.
J2030	15.80	1.77	0.00	1.77	-	11.18	No detailed FEMA Floodplain data available for this area.
J2110	34.21	2.48	0.00	2.48	-	7.26	No detailed FEMA Floodplain data available for this area.
J2120	14.21	0.92	0.00	0.92	-	6.50	No detailed FEMA Floodplain data available for this area.
J2210	9.68	0.78	0.00	0.78	-	8.03	No detailed FEMA Floodplain data available for this area.
J2220	16.18	1.49	0.00	1.49	-	9.19	No detailed FEMA Floodplain data available for this area.
J2230	16.41	0.82	0.00	0.82	-	4.97	No detailed FEMA Floodplain data available for this area.
J2310	14.81	1.98	0.00	1.98	-	13.37	No detailed FEMA Floodplain data available for this area.
J2320	25.67	2.69	0.00	2.69	-	10.47	No detailed FEMA Floodplain data available for this area.
J2330	26.74	4.72	0.00	4.72	-	17.65	No detailed FEMA Floodplain data available for this area.
J2410	16.73	0.22	0.00	0.22	-	1.32	No detailed FEMA Floodplain data available for this area.
J2420	10.99	1.17	0.00	1.17	-	10.69	No detailed FEMA Floodplain data available for this area.
J2430	18.71	0.39	0.00	0.39	-	2.11	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
J2440	11.37	0.28	0.00	0.28	-	2.50	No detailed FEMA Floodplain data available for this area.
J2450	16.64	1.57	0.00	1.57	-	9.46	No detailed FEMA Floodplain data available for this area.
J2460	15.38	0.39	0.00	0.39	-	2.52	No detailed FEMA Floodplain data available for this area.
J2470	17.27	0.40	0.00	0.40	-	2.30	No detailed FEMA Floodplain data available for this area.
J2480	0.60	0.31	0.00	0.31	-	51.19	No detailed FEMA Floodplain data available for this area.
J2510	5.34	1.23	0.00	1.23	-	23.02	No detailed FEMA Floodplain data available for this area.
J2520	30.93	3.14	0.00	3.14	-	10.14	No detailed FEMA Floodplain data available for this area.
J2530	4.26	1.75	0.00	1.75	-	40.97	No detailed FEMA Floodplain data available for this area.
J2540	1.21	0.59	0.00	0.59	-	48.59	No detailed FEMA Floodplain data available for this area.
J2550	29.26	14.88	0.00	14.88	-	50.85	No detailed FEMA Floodplain data available for this area.
J3010	16.03	2.38	0.00	2.38	-	14.87	No detailed FEMA Floodplain data available for this area.
J3020	30.88	3.29	0.00	3.29	-	10.65	No detailed FEMA Floodplain data available for this area.
J3030	13.88	1.73	0.00	1.73	-	12.49	No detailed FEMA Floodplain data available for this area.
J3210	8.87	1.85	0.00	1.85	-	20.90	No detailed FEMA Floodplain data available for this area.
J3520	8.25	0.53	0.00	0.53	-	6.47	No detailed FEMA Floodplain data available for this area.
J3530	10.89	1.00	0.00	1.00	-	9.18	No detailed FEMA Floodplain data available for this area.
J3540	15.82	1.51	0.00	1.51	-	9.56	No detailed FEMA Floodplain data available for this area.
J3550	4.66	1.83	0.00	1.83	-	39.15	No detailed FEMA Floodplain data available for this area.
J3810	17.91	2.32	0.00	2.32	-	12.96	No detailed FEMA Floodplain data available for this area.
J3820	5.26	0.61	0.00	0.61	-	11.60	No detailed FEMA Floodplain data available for this area.
J3830	3.79	0.70	0.00	0.70	-	18.49	No detailed FEMA Floodplain data available for this area.
J3835	10.10	1.01	0.00	1.01	-	9.97	No detailed FEMA Floodplain data available for this area.
J3838	4.24	0.96	0.00	0.96	-	22.71	No detailed FEMA Floodplain data available for this area.
J3840	1.39	0.63	0.00	0.63	-	45.43	No detailed FEMA Floodplain data available for this area.
J3850	4.79	2.40	0.00	2.40	-	50.12	No detailed FEMA Floodplain data available for this area.
J3870	5.12	1.18	0.00	1.18	-	23.04	No detailed FEMA Floodplain data available for this area.
J3880	23.45	3.12	0.00	3.12	-	13.30	No detailed FEMA Floodplain data available for this area.
J3890	41.33	6.20	0.00	6.20	-	15.01	No detailed FEMA Floodplain data available for this area.
J3900	4.87	1.31	0.00	1.31	-	26.83	No detailed FEMA Floodplain data available for this area.
J3910	12.72	1.93	0.00	1.93	-	15.16	No detailed FEMA Floodplain data available for this area.
J3920	1.33	0.37	0.00	0.37	-	28.28	No detailed FEMA Floodplain data available for this area.
J4010	53.11	12.11	0.00	12.11	-	22.79	No detailed FEMA Floodplain data available for this area.
J4020	13.01	3.05	0.00	3.05	-	23.42	No detailed FEMA Floodplain data available for this area.
J4030	22.79	2.72	0.00	2.72	-	11.92	No detailed FEMA Floodplain data available for this area.
J4040	18.13	1.30	0.00	1.30	-	7.18	No detailed FEMA Floodplain data available for this area.
J4050	9.89	0.52	0.00	0.52	-	5.22	No detailed FEMA Floodplain data available for this area.
J4060	1.78	0.43	0.00	0.43	-	24.34	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
J4503	3.16	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
J4505	4.07	0.00	0.00	0.00	0.00	0.00	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
J4510	21.23	4.83	0.00	4.83	-	22.73	No detailed FEMA Floodplain data available for this area.
J4520	15.91	2.62	0.00	2.62	-	16.45	No detailed FEMA Floodplain data available for this area.
J4530	29.33	4.12	0.00	4.12	-	14.06	No detailed FEMA Floodplain data available for this area.
J4540	15.79	2.26	0.00	2.26	-	14.34	No detailed FEMA Floodplain data available for this area.
J4550	3.79	1.14	0.00	1.14	-	29.99	No detailed FEMA Floodplain data available for this area.
J5005	5.74	0.04	0.00	0.04	-	0.67	No detailed FEMA Floodplain data available for this area.
J5015	7.68	0.08	0.00	0.08	-	1.09	No detailed FEMA Floodplain data available for this area.
J5020	15.12	0.50	0.00	0.50	-	3.30	No detailed FEMA Floodplain data available for this area.
J5022	8.85	0.22	0.00	0.22	-	2.47	No detailed FEMA Floodplain data available for this area.
J5025	9.13	0.20	0.00	0.20	-	2.19	No detailed FEMA Floodplain data available for this area.
J5030	11.76	0.89	0.00	0.89	-	7.56	No detailed FEMA Floodplain data available for this area.
J5040	0.80	0.23	0.00	0.23	-	28.29	No detailed FEMA Floodplain data available for this area.
J6010	18.84	0.62	0.00	0.62	-	3.26	No detailed FEMA Floodplain data available for this area.
J6020	2.78	0.19	0.00	0.19	-	6.89	No detailed FEMA Floodplain data available for this area.
J6030	4.45	0.68	0.00	0.68	-	15.28	No detailed FEMA Floodplain data available for this area.
J6040	16.96	1.43	0.00	1.43	-	8.46	No detailed FEMA Floodplain data available for this area.
J6050	0.93	0.37	0.00	0.37	-	39.73	No detailed FEMA Floodplain data available for this area.
J7010	51.26	1.09	0.00	1.09	-	2.13	No detailed FEMA Floodplain data available for this area.
J7013	55.33	3.71	0.00	3.71	-	6.70	No detailed FEMA Floodplain data available for this area.
J7017	4.40	0.83	0.00	0.83	-	18.95	No detailed FEMA Floodplain data available for this area.
J7020	21.94	2.52	0.00	2.52	-	11.49	No detailed FEMA Floodplain data available for this area.
J7022	21.19	3.69	0.00	3.69	-	17.40	No detailed FEMA Floodplain data available for this area.
J7025	3.28	0.63	0.00	0.63	-	19.14	No detailed FEMA Floodplain data available for this area.
J7028	1.24	0.29	0.00	0.29	-	23.37	No detailed FEMA Floodplain data available for this area.
J7030	69.53	6.78	0.00	6.78	-	9.75	No detailed FEMA Floodplain data available for this area.
J9000	7.84	0.86	0.00	0.86	-	11.00	No detailed FEMA Floodplain data available for this area.
J9100	7.61	1.02	0.00	1.02	-	13.41	No detailed FEMA Floodplain data available for this area.
J9200	13.30	2.21	0.00	2.21	-	16.64	No detailed FEMA Floodplain data available for this area.
K0005	7.32	0.36	0.00	0.36	-	4.89	No detailed FEMA Floodplain data available for this area.
K0010	0.95	0.41	0.00	0.41	-	42.90	No detailed FEMA Floodplain data available for this area.
K0030	3.68	1.44	0.00	1.44	-	39.23	No detailed FEMA Floodplain data available for this area.
K0035	16.84	0.74	0.00	0.74	-	4.40	No detailed FEMA Floodplain data available for this area.
K0040	6.15	2.34	0.00	2.34	-	38.00	No detailed FEMA Floodplain data available for this area.
K0050	6.28	2.57	0.00	2.57	-	40.88	No detailed FEMA Floodplain data available for this area.
K0070	3.62	1.25	0.00	1.25	-	34.46	No detailed FEMA Floodplain data available for this area.

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K0077	14.68	0.48	0.00	0.48	-	3.26	No detailed FEMA Floodplain data available for this area.
K0080	2.56	0.94	0.00	0.94	-	36.79	No detailed FEMA Floodplain data available for this area.
K0088	9.92	0.88	0.00	0.88	-	8.91	No detailed FEMA Floodplain data available for this area.
K0090	4.00	2.08	0.00	2.08	-	51.95	No detailed FEMA Floodplain data available for this area.
K0095	36.18	15.08	0.00	15.08	-	41.68	No detailed FEMA Floodplain data available for this area.
K0100	4.14	1.37	0.00	1.37	-	33.22	No detailed FEMA Floodplain data available for this area.
K0110	1.20	0.69	0.00	0.69	-	57.80	No detailed FEMA Floodplain data available for this area.
K0118	10.69	2.81	0.00	2.81	-	26.30	No detailed FEMA Floodplain data available for this area.
K0119	2.10	1.28	0.00	1.28	-	60.81	No detailed FEMA Floodplain data available for this area.
K0120	0.87	0.58	0.00	0.58	-	65.93	No detailed FEMA Floodplain data available for this area.
K0123	12.56	0.76	0.00	0.76	-	6.07	No detailed FEMA Floodplain data available for this area.
K0135	2.23	1.12	0.00	1.12	-	49.98	No detailed FEMA Floodplain data available for this area.
K0140	1.65	0.31	0.00	0.31	-	18.71	No detailed FEMA Floodplain data available for this area.
K0141	1.76	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
K0142	7.19	0.35	0.00	0.35	-	4.83	No detailed FEMA Floodplain data available for this area.
K0143	2.57	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
K0144	14.73	6.17	0.00	6.17	-	41.87	No detailed FEMA Floodplain data available for this area.
K0145	2.39	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
K0146	5.62	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
K0148	1.88	0.19	0.00	0.19	-	9.94	No detailed FEMA Floodplain data available for this area.
K0150	2.48	0.86	0.00	0.86	-	34.69	No detailed FEMA Floodplain data available for this area.
K0158	5.24	0.28	0.00	0.28	-	5.37	No detailed FEMA Floodplain data available for this area.
K0160	5.83	2.20	0.00	2.20	-	37.64	No detailed FEMA Floodplain data available for this area.
K0170	4.20	1.66	0.00	1.66	-	39.58	No detailed FEMA Floodplain data available for this area.
K0174	11.43	0.38	0.00	0.38	-	3.35	No detailed FEMA Floodplain data available for this area.
K0175	10.99	0.46	0.00	0.46	-	4.17	No detailed FEMA Floodplain data available for this area.
K0180	2.34	1.34	0.00	1.34	-	57.17	No detailed FEMA Floodplain data available for this area.
K0185	12.39	0.24	0.00	0.24	-	1.97	No detailed FEMA Floodplain data available for this area.
K0190	2.16	0.75	0.00	0.75	-	34.85	No detailed FEMA Floodplain data available for this area.
K0200	8.24	4.12	0.00	4.12	-	49.98	No detailed FEMA Floodplain data available for this area.
K0210	11.53	0.59	0.00	0.59	-	5.14	No detailed FEMA Floodplain data available for this area.
K0226	8.48	0.36	0.00	0.36	-	4.20	No detailed FEMA Floodplain data available for this area.
K0230	3.34	1.42	0.00	1.42	-	42.35	No detailed FEMA Floodplain data available for this area.
K0233	9.92	0.29	0.00	0.29	-	2.97	No detailed FEMA Floodplain data available for this area.
K0237	1.16	0.32	0.00	0.32	-	27.79	No detailed FEMA Floodplain data available for this area.
K0242	19.09	0.04	0.00	0.04	-	0.22	No detailed FEMA Floodplain data available for this area.
K0245	1.35	0.22	0.00	0.22	-	16.40	No detailed FEMA Floodplain data available for this area.

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K0246	17.53	0.52	0.00	0.52	-	2.99	No detailed FEMA Floodplain data available for this area.
K0248	1.08	0.17	0.00	0.17	-	15.58	No detailed FEMA Floodplain data available for this area.
K0250	22.10	3.50	0.00	3.50	-	15.85	No detailed FEMA Floodplain data available for this area.
K0274	4.99	0.16	0.00	0.16	-	3.26	No detailed FEMA Floodplain data available for this area.
K0280	40.95	5.54	0.00	5.54	-	13.52	No detailed FEMA Floodplain data available for this area.
K0294	6.87	0.16	0.00	0.16	-	2.36	No detailed FEMA Floodplain data available for this area.
K0300	37.60	3.91	0.00	3.91	-	10.40	No detailed FEMA Floodplain data available for this area.
K0302	24.30	3.52	0.00	3.52	-	14.47	No detailed FEMA Floodplain data available for this area.
K0305	79.83	10.08	0.00	10.08	-	12.62	No detailed FEMA Floodplain data available for this area.
K0308	1.62	0.64	0.00	0.64	-	39.42	No detailed FEMA Floodplain data available for this area.
K0309	15.33	0.47	0.00	0.47	-	3.04	No detailed FEMA Floodplain data available for this area.
K0310	20.23	3.46	0.00	3.46	-	17.11	No detailed FEMA Floodplain data available for this area.
K0314	11.59	0.22	0.00	0.22	-	1.89	No detailed FEMA Floodplain data available for this area.
K0318	10.03	0.19	0.00	0.19	-	1.87	No detailed FEMA Floodplain data available for this area.
K0320	29.21	2.85	0.00	2.85	-	9.75	No detailed FEMA Floodplain data available for this area.
K0323	30.82	1.50	0.00	1.50	-	4.86	No detailed FEMA Floodplain data available for this area.
K0327	2.20	0.34	0.00	0.34	-	15.41	No detailed FEMA Floodplain data available for this area.
K0328	6.51	0.16	0.00	0.16	-	2.48	No detailed FEMA Floodplain data available for this area.
K0330	11.08	1.96	0.00	1.96	-	17.66	No detailed FEMA Floodplain data available for this area.
K1010	2.22	0.77	0.00	0.77	-	34.85	No detailed FEMA Floodplain data available for this area.
K1020	7.21	1.08	0.00	1.08	-	15.00	No detailed FEMA Floodplain data available for this area.
K1030	20.06	1.33	0.00	1.33	-	6.65	No detailed FEMA Floodplain data available for this area.
K1040	5.71	0.62	0.00	0.62	-	10.92	No detailed FEMA Floodplain data available for this area.
K1050	0.67	0.19	0.00	0.19	-	28.06	No detailed FEMA Floodplain data available for this area.
K1510	19.48	0.92	0.00	0.92	-	4.70	No detailed FEMA Floodplain data available for this area.
K2010	19.86	1.61	0.00	1.61	-	8.10	No detailed FEMA Floodplain data available for this area.
K2020	64.42	1.55	0.00	1.55	-	2.41	No detailed FEMA Floodplain data available for this area.
K2040	10.28	1.94	0.00	1.94	-	18.85	No detailed FEMA Floodplain data available for this area.
K2510	7.68	0.34	0.00	0.34	-	4.47	No detailed FEMA Floodplain data available for this area.
K2520	5.06	0.10	0.00	0.10	-	2.05	No detailed FEMA Floodplain data available for this area.
K2530	6.83	0.23	0.00	0.23	-	3.40	No detailed FEMA Floodplain data available for this area.
K2540	8.17	0.89	0.00	0.89	-	10.90	No detailed FEMA Floodplain data available for this area.
K3010	57.98	8.75	0.00	8.75	-	15.10	No detailed FEMA Floodplain data available for this area.
K3020	14.66	1.09	0.00	1.09	-	7.44	No detailed FEMA Floodplain data available for this area.
K3030	16.58	1.50	0.00	1.50	-	9.06	No detailed FEMA Floodplain data available for this area.
K3040	1.38	0.49	0.00	0.49	-	35.70	No detailed FEMA Floodplain data available for this area.
K3050	12.60	5.36	0.00	5.36	-	42.51	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
K3070	6.65	0.47	0.00	0.47	-	7.07	No detailed FEMA Floodplain data available for this area.
K4010	4.59	0.59	0.00	0.59	-	12.77	No detailed FEMA Floodplain data available for this area.
K4020	25.70	2.16	0.00	2.16	-	8.42	No detailed FEMA Floodplain data available for this area.
K4030	18.15	1.86	0.00	1.86	-	10.26	No detailed FEMA Floodplain data available for this area.
K4060	22.42	1.59	0.00	1.59	-	7.10	No detailed FEMA Floodplain data available for this area.
K4070	3.66	0.92	0.00	0.92	-	25.22	No detailed FEMA Floodplain data available for this area.
K5010	1.62	0.41	0.00	0.41	-	25.09	No detailed FEMA Floodplain data available for this area.
K5030	5.03	0.86	0.00	0.86	-	17.09	No detailed FEMA Floodplain data available for this area.
K5040	7.27	0.91	0.00	0.91	-	12.56	No detailed FEMA Floodplain data available for this area.
K5050	12.73	0.89	0.00	0.89	-	6.97	No detailed FEMA Floodplain data available for this area.
K5060	3.93	0.24	0.00	0.24	-	6.06	No detailed FEMA Floodplain data available for this area.
K6010	14.55	1.55	0.00	1.55	-	10.67	No detailed FEMA Floodplain data available for this area.
K6030	5.67	1.62	0.00	1.62	-	28.52	No detailed FEMA Floodplain data available for this area.
K6040	11.09	1.43	0.00	1.43	-	12.87	No detailed FEMA Floodplain data available for this area.
K6050	4.27	0.65	0.00	0.65	-	15.16	No detailed FEMA Floodplain data available for this area.
K6060	7.94	1.21	0.00	1.21	-	15.24	No detailed FEMA Floodplain data available for this area.
K6070	2.37	0.75	0.00	0.75	-	31.66	No detailed FEMA Floodplain data available for this area.
K6080	3.29	0.75	0.00	0.75	-	22.82	No detailed FEMA Floodplain data available for this area.
K7020	3.16	0.17	0.00	0.17	-	5.31	No detailed FEMA Floodplain data available for this area.
K7040	3.10	0.19	0.00	0.19	-	6.05	No detailed FEMA Floodplain data available for this area.
K7050	3.83	0.19	0.00	0.19	-	4.84	No detailed FEMA Floodplain data available for this area.
K7060	2.29	0.18	0.00	0.18	-	7.79	No detailed FEMA Floodplain data available for this area.
K7070	2.97	0.14	0.00	0.14	-	4.64	No detailed FEMA Floodplain data available for this area.
K7210	7.68	1.25	0.00	1.25	-	16.26	No detailed FEMA Floodplain data available for this area.
K7220	9.21	0.90	0.00	0.90	-	9.75	No detailed FEMA Floodplain data available for this area.
K7230	3.67	0.29	0.00	0.29	-	7.81	No detailed FEMA Floodplain data available for this area.
K7240	8.46	0.72	0.00	0.72	-	8.53	No detailed FEMA Floodplain data available for this area.
K7250	1.75	0.67	0.00	0.67	-	38.07	No detailed FEMA Floodplain data available for this area.
K7410	4.03	0.28	0.00	0.28	-	6.91	No detailed FEMA Floodplain data available for this area.
K7420	11.08	1.57	0.00	1.57	-	14.19	No detailed FEMA Floodplain data available for this area.
K7430	7.87	1.38	0.00	1.38	-	17.58	No detailed FEMA Floodplain data available for this area.
K7440	5.59	1.02	0.00	1.02	-	18.19	No detailed FEMA Floodplain data available for this area.
K7450	20.83	2.97	0.00	2.97	-	14.26	No detailed FEMA Floodplain data available for this area.
K7460	61.58	6.93	0.00	6.93	-	11.26	No detailed FEMA Floodplain data available for this area.
K7470	3.67	0.48	0.00	0.48	-	13.06	No detailed FEMA Floodplain data available for this area.
K7480	6.07	0.31	0.00	0.31	-	5.10	No detailed FEMA Floodplain data available for this area.
K7490	0.63	0.15	0.00	0.15	-	23.35	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
K7610	2.64	0.70	0.00	0.70	-	26.61	No detailed FEMA Floodplain data available for this area.
K7630	6.30	0.93	0.00	0.93	-	14.74	No detailed FEMA Floodplain data available for this area.
K7640	8.32	0.71	0.00	0.71	-	8.57	No detailed FEMA Floodplain data available for this area.
K7650	7.57	0.61	0.00	0.61	-	8.05	No detailed FEMA Floodplain data available for this area.
K7660	3.94	0.15	0.00	0.15	-	3.88	No detailed FEMA Floodplain data available for this area.
K7805	13.72	2.32	0.00	2.32	-	16.92	No detailed FEMA Floodplain data available for this area.
K7810	3.55	0.63	0.00	0.63	-	17.68	No detailed FEMA Floodplain data available for this area.
K7812	4.83	0.75	0.00	0.75	-	15.48	No detailed FEMA Floodplain data available for this area.
K7814	8.98	1.01	0.00	1.01	-	11.28	No detailed FEMA Floodplain data available for this area.
K7816	5.24	0.93	0.00	0.93	-	17.80	No detailed FEMA Floodplain data available for this area.
K7818	6.50	1.60	0.00	1.60	-	24.64	No detailed FEMA Floodplain data available for this area.
K7820	5.09	1.46	0.00	1.46	-	28.73	No detailed FEMA Floodplain data available for this area.
K7830	2.77	0.96	0.00	0.96	-	34.67	No detailed FEMA Floodplain data available for this area.
K7845	16.81	2.01	0.00	2.01	-	11.98	No detailed FEMA Floodplain data available for this area.
K7850	2.95	1.73	0.00	1.73	-	58.56	No detailed FEMA Floodplain data available for this area.
K7855	7.59	2.67	0.00	2.67	-	35.22	No detailed FEMA Floodplain data available for this area.
K7858	13.49	2.69	0.00	2.69	-	19.95	No detailed FEMA Floodplain data available for this area.
K7859	3.32	1.76	0.00	1.76	-	53.15	No detailed FEMA Floodplain data available for this area.
K7860	3.67	2.15	0.00	2.15	-	58.63	No detailed FEMA Floodplain data available for this area.
K7864	1.66	0.08	0.00	0.08	-	4.76	No detailed FEMA Floodplain data available for this area.
K7865	4.26	0.36	0.00	0.36	-	8.48	No detailed FEMA Floodplain data available for this area.
K7872	9.14	2.59	0.00	2.59	-	28.29	No detailed FEMA Floodplain data available for this area.
K7873	7.09	1.68	0.00	1.68	-	23.74	No detailed FEMA Floodplain data available for this area.
K7874	6.74	0.15	0.00	0.15	-	2.26	No detailed FEMA Floodplain data available for this area.
K7875	4.55	0.74	0.00	0.74	-	16.29	No detailed FEMA Floodplain data available for this area.
K7880	0.76	0.22	0.00	0.22	-	28.60	No detailed FEMA Floodplain data available for this area.
K7881	5.25	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
K7882	5.29	0.79	0.00	0.79	-	14.88	No detailed FEMA Floodplain data available for this area.
K7884	2.21	0.95	0.00	0.95	-	42.98	No detailed FEMA Floodplain data available for this area.
K7885	1.76	0.34	0.00	0.34	-	19.53	No detailed FEMA Floodplain data available for this area.
K7886	6.08	0.14	0.00	0.14	-	2.36	No detailed FEMA Floodplain data available for this area.
K7890	1.83	0.48	0.00	0.48	-	26.43	No detailed FEMA Floodplain data available for this area.
K7893	6.42	0.21	0.00	0.21	-	3.28	No detailed FEMA Floodplain data available for this area.
K7900	7.25	0.56	0.00	0.56	-	7.72	No detailed FEMA Floodplain data available for this area.
K7910	4.48	0.58	0.00	0.58	-	13.02	No detailed FEMA Floodplain data available for this area.
K7913	9.71	1.25	0.00	1.25	-	12.85	No detailed FEMA Floodplain data available for this area.
K7917	4.60	0.75	0.00	0.75	-	16.42	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
K7920	26.96	1.75	0.00	1.75	-	6.48	No detailed FEMA Floodplain data available for this area.
K7930	22.69	1.93	0.00	1.93	-	8.51	No detailed FEMA Floodplain data available for this area.
K7932	7.80	1.29	0.00	1.29	-	16.53	No detailed FEMA Floodplain data available for this area.
K7934	13.67	1.29	0.00	1.29	-	9.46	No detailed FEMA Floodplain data available for this area.
K7936	15.43	0.95	0.00	0.95	-	6.18	No detailed FEMA Floodplain data available for this area.
K7938	6.07	0.78	0.00	0.78	-	12.79	No detailed FEMA Floodplain data available for this area.
K7940	12.68	1.08	0.00	1.08	-	8.50	No detailed FEMA Floodplain data available for this area.
K7945	16.13	0.36	0.00	0.36	-	2.25	No detailed FEMA Floodplain data available for this area.
K7947	1.28	0.38	0.00	0.38	-	29.39	No detailed FEMA Floodplain data available for this area.
K7950	13.23	1.71	0.00	1.71	-	12.92	No detailed FEMA Floodplain data available for this area.
K7960	16.04	3.05	0.00	3.05	-	19.04	No detailed FEMA Floodplain data available for this area.
K8010	5.07	0.54	0.00	0.54	-	10.73	No detailed FEMA Floodplain data available for this area.
K8020	6.93	0.80	0.00	0.80	-	11.58	No detailed FEMA Floodplain data available for this area.
K8030	14.30	0.22	0.00	0.22	-	1.56	No detailed FEMA Floodplain data available for this area.
K8040	3.19	0.63	0.00	0.63	-	19.58	No detailed FEMA Floodplain data available for this area.
K8050	11.04	0.38	0.00	0.38	-	3.48	No detailed FEMA Floodplain data available for this area.
K9010	35.52	2.68	0.00	2.68	-	7.56	No detailed FEMA Floodplain data available for this area.
K9020	23.29	2.56	0.00	2.56	-	11.00	No detailed FEMA Floodplain data available for this area.
K9030	24.98	2.61	0.00	2.61	-	10.46	No detailed FEMA Floodplain data available for this area.
K9040	13.31	1.44	0.00	1.44	-	10.81	No detailed FEMA Floodplain data available for this area.
K9050	18.38	0.49	0.00	0.49	-	2.64	No detailed FEMA Floodplain data available for this area.
K9052	16.11	0.82	0.00	0.82	-	5.12	No detailed FEMA Floodplain data available for this area.
K9055	8.93	0.21	0.00	0.21	-	2.37	No detailed FEMA Floodplain data available for this area.
K9058	40.83	1.14	0.00	1.14	-	2.79	No detailed FEMA Floodplain data available for this area.
K9060	23.40	1.83	0.00	1.83	-	7.83	No detailed FEMA Floodplain data available for this area.
K9070	1.65	0.42	0.00	0.42	-	25.65	No detailed FEMA Floodplain data available for this area.
K9510	11.57	1.23	0.00	1.23	-	10.65	No detailed FEMA Floodplain data available for this area.
K9520	9.21	1.56	0.00	1.56	-	16.94	No detailed FEMA Floodplain data available for this area.
K9610	8.85	0.70	0.00	0.70	-	7.96	No detailed FEMA Floodplain data available for this area.
K9630	25.30	2.23	0.00	2.23	-	8.82	No detailed FEMA Floodplain data available for this area.
K9710	17.48	2.62	0.00	2.62	-	15.01	No detailed FEMA Floodplain data available for this area.
K9720	1.97	0.47	0.00	0.47	-	24.04	No detailed FEMA Floodplain data available for this area.
K9730	3.35	0.65	0.00	0.65	-	19.45	No detailed FEMA Floodplain data available for this area.
L0010	70.08	11.04	0.00	11.04	-	15.75	No detailed FEMA Floodplain data available for this area.
L0020	15.38	2.07	0.00	2.07	-	13.43	No detailed FEMA Floodplain data available for this area.
L0030	32.48	0.66	0.00	0.66	-	2.04	No detailed FEMA Floodplain data available for this area.
L0035	57.64	1.27	0.00	1.27	-	2.20	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
L0040	61.71	2.02	0.00	2.02	-	3.27	No detailed FEMA Floodplain data available for this area.
L0042	14.55	0.23	0.00	0.23	-	1.55	No detailed FEMA Floodplain data available for this area.
L0045	2.28	0.45	0.00	0.45	-	19.76	No detailed FEMA Floodplain data available for this area.
L0047	8.40	2.32	0.00	2.32	-	27.66	No detailed FEMA Floodplain data available for this area.
L0048	18.88	0.04	0.00	0.04	-	0.24	No detailed FEMA Floodplain data available for this area.
L0050	18.52	2.29	0.00	2.29	-	12.37	No detailed FEMA Floodplain data available for this area.
L0057	9.88	0.65	0.00	0.65	-	6.56	No detailed FEMA Floodplain data available for this area.
L0060	19.52	3.97	0.00	3.97	-	20.33	No detailed FEMA Floodplain data available for this area.
L0063	34.04	0.14	0.00	0.14	-	0.40	No detailed FEMA Floodplain data available for this area.
L0067	0.70	0.15	0.00	0.15	-	21.06	No detailed FEMA Floodplain data available for this area.
L0070	61.85	4.01	0.00	4.01	-	6.48	No detailed FEMA Floodplain data available for this area.
L0073	16.53	1.54	0.00	1.54	-	9.33	No detailed FEMA Floodplain data available for this area.
L0077	6.96	0.90	0.00	0.90	-	12.99	No detailed FEMA Floodplain data available for this area.
L0080	20.86	2.54	0.00	2.54	-	12.18	No detailed FEMA Floodplain data available for this area.
L0083	11.29	0.61	0.00	0.61	-	5.42	No detailed FEMA Floodplain data available for this area.
L0087	12.68	1.58	0.00	1.58	-	12.43	No detailed FEMA Floodplain data available for this area.
L0090	35.25	2.09	0.00	2.09	-	5.94	No detailed FEMA Floodplain data available for this area.
L0100	58.71	2.71	0.00	2.71	-	4.61	No detailed FEMA Floodplain data available for this area.
L0110	55.56	3.90	0.00	3.90	-	7.03	No detailed FEMA Floodplain data available for this area.
L1010	27.22	0.23	0.00	0.23	-	0.86	No detailed FEMA Floodplain data available for this area.
L1013	16.65	3.82	0.00	3.82	-	22.92	No detailed FEMA Floodplain data available for this area.
L1017	10.83	2.08	0.00	2.08	-	19.24	No detailed FEMA Floodplain data available for this area.
L1020	3.21	0.51	0.00	0.51	-	15.97	No detailed FEMA Floodplain data available for this area.
L1021	13.53	2.49	0.00	2.49	-	18.43	No detailed FEMA Floodplain data available for this area.
L1023	29.20	1.06	0.00	1.06	-	3.64	No detailed FEMA Floodplain data available for this area.
L1027	18.48	2.46	0.00	2.46	-	13.33	No detailed FEMA Floodplain data available for this area.
L1030	6.02	0.86	0.00	0.86	-	14.22	No detailed FEMA Floodplain data available for this area.
L1035	17.04	5.16	0.00	5.16	-	30.30	No detailed FEMA Floodplain data available for this area.
L1040	23.61	0.52	0.00	0.52	-	2.19	No detailed FEMA Floodplain data available for this area.
N0009	18.17	4.25	0.00	4.25	-	23.39	No detailed FEMA Floodplain data available for this area.
N0010	22.86	15.24	0.00	15.24	-	66.66	No detailed FEMA Floodplain data available for this area.
N0020	6.55	2.86	0.00	2.86	-	43.59	No detailed FEMA Floodplain data available for this area.
N0030	2.94	1.56	0.00	1.56	-	52.97	No detailed FEMA Floodplain data available for this area.
N0035	11.29	0.58	0.00	0.58	-	5.18	No detailed FEMA Floodplain data available for this area.
N0040	5.13	1.92	0.00	1.92	-	37.39	No detailed FEMA Floodplain data available for this area.
N0042	19.82	0.74	0.00	0.74	-	3.74	No detailed FEMA Floodplain data available for this area.
N0045	16.13	2.50	0.00	2.50	-	15.51	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
N0047	1.55	0.49	0.00	0.49	-	31.24	No detailed FEMA Floodplain data available for this area.
N0048	1.38	0.22	0.00	0.22	-	15.56	No detailed FEMA Floodplain data available for this area.
N0049	7.11	0.37	0.00	0.37	-	5.25	No detailed FEMA Floodplain data available for this area.
N0050	3.76	1.75	0.00	1.75	-	46.42	No detailed FEMA Floodplain data available for this area.
N0055	7.39	1.47	0.00	1.47	-	19.92	No detailed FEMA Floodplain data available for this area.
N0060	1.23	0.74	0.00	0.74	-	59.93	No detailed FEMA Floodplain data available for this area.
N0070	6.57	1.63	0.00	1.63	-	24.87	No detailed FEMA Floodplain data available for this area.
N0075	11.29	0.50	0.00	0.50	-	4.47	No detailed FEMA Floodplain data available for this area.
N0080	6.86	2.70	0.00	2.70	-	39.39	No detailed FEMA Floodplain data available for this area.
N0085	25.49	2.01	0.00	2.01	-	7.87	No detailed FEMA Floodplain data available for this area.
N0090	7.85	2.58	0.00	2.58	-	32.86	No detailed FEMA Floodplain data available for this area.
N0092	3.20	0.36	0.00	0.36	-	11.33	No detailed FEMA Floodplain data available for this area.
N0093	13.22	0.57	0.00	0.57	-	4.29	No detailed FEMA Floodplain data available for this area.
N0098	28.22	2.09	0.00	2.09	-	7.41	No detailed FEMA Floodplain data available for this area.
N0100	10.21	3.46	0.00	3.46	-	33.83	No detailed FEMA Floodplain data available for this area.
N0105	13.21	0.97	0.00	0.97	-	7.38	No detailed FEMA Floodplain data available for this area.
N0110	27.15	9.33	0.00	9.33	-	34.35	No detailed FEMA Floodplain data available for this area.
N0115	0.96	0.06	0.00	0.06	-	6.47	No detailed FEMA Floodplain data available for this area.
N0120	3.74	0.22	0.00	0.22	-	5.75	No detailed FEMA Floodplain data available for this area.
N0121	2.43	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
N0122	1.98	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
N0123	1.92	0.27	0.00	0.27	-	13.93	No detailed FEMA Floodplain data available for this area.
N0124	3.19	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
N0125	2.47	0.33	0.00	0.33	-	13.30	No detailed FEMA Floodplain data available for this area.
N0127	1.34	0.25	0.00	0.25	-	18.69	No detailed FEMA Floodplain data available for this area.
N0130	3.23	1.48	0.00	1.48	-	45.77	No detailed FEMA Floodplain data available for this area.
N0144	8.50	0.09	0.00	0.09	-	1.01	No detailed FEMA Floodplain data available for this area.
N0147	14.42	0.35	0.00	0.35	-	2.43	No detailed FEMA Floodplain data available for this area.
N0150	3.64	1.53	0.00	1.53	-	42.06	No detailed FEMA Floodplain data available for this area.
N0160	4.89	0.34	0.00	0.34	-	6.88	No detailed FEMA Floodplain data available for this area.
N0165	9.80	0.37	0.00	0.37	-	3.74	No detailed FEMA Floodplain data available for this area.
N0170	5.28	1.08	0.00	1.08	-	20.45	No detailed FEMA Floodplain data available for this area.
N0171	18.32	0.44	0.00	0.44	-	2.38	No detailed FEMA Floodplain data available for this area.
N0172	14.23	1.61	0.00	1.61	-	11.32	No detailed FEMA Floodplain data available for this area.
N0174	10.75	1.22	0.00	1.22	-	11.34	No detailed FEMA Floodplain data available for this area.
N0176	8.33	0.58	0.00	0.58	-	7.02	No detailed FEMA Floodplain data available for this area.
N0177	10.52	0.25	0.00	0.25	-	2.38	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
N0178	4.00	0.45	0.00	0.45	-	11.21	No detailed FEMA Floodplain data available for this area.
N0180	4.40	2.10	0.00	2.10	-	47.85	No detailed FEMA Floodplain data available for this area.
N0182	8.71	1.69	0.00	1.69	-	19.45	No detailed FEMA Floodplain data available for this area.
N0184	5.03	1.18	0.00	1.18	-	23.54	No detailed FEMA Floodplain data available for this area.
N0185	7.34	0.11	0.00	0.11	-	1.50	No detailed FEMA Floodplain data available for this area.
N0186	22.15	3.10	0.00	3.10	-	14.00	No detailed FEMA Floodplain data available for this area.
N0188	0.47	0.08	0.00	0.08	-	17.99	No detailed FEMA Floodplain data available for this area.
N0190	2.75	1.18	0.00	1.18	-	42.96	No detailed FEMA Floodplain data available for this area.
N0194	9.55	0.22	0.00	0.22	-	2.27	No detailed FEMA Floodplain data available for this area.
N0200	3.87	1.57	0.00	1.57	-	40.53	No detailed FEMA Floodplain data available for this area.
N1010	7.11	0.18	0.00	0.18	-	2.50	No detailed FEMA Floodplain data available for this area.
N1020	7.23	0.45	0.00	0.45	-	6.17	No detailed FEMA Floodplain data available for this area.
N1030	8.28	0.46	0.00	0.46	-	5.50	No detailed FEMA Floodplain data available for this area.
N1040	5.09	0.46	0.00	0.46	-	9.09	No detailed FEMA Floodplain data available for this area.
N1050	1.83	0.10	0.00	0.10	-	5.67	No detailed FEMA Floodplain data available for this area.
N1510	0.64	0.17	0.00	0.17	-	26.68	No detailed FEMA Floodplain data available for this area.
N1520	1.56	0.52	0.00	0.52	-	33.26	No detailed FEMA Floodplain data available for this area.
N1540	1.94	0.21	0.00	0.21	-	10.73	No detailed FEMA Floodplain data available for this area.
N2010	9.98	1.04	0.00	1.04	-	10.40	No detailed FEMA Floodplain data available for this area.
N2020	2.51	0.44	0.00	0.44	-	17.42	No detailed FEMA Floodplain data available for this area.
N2030	9.33	0.65	0.00	0.65	-	6.95	No detailed FEMA Floodplain data available for this area.
N2040	5.47	0.71	0.00	0.71	-	12.92	No detailed FEMA Floodplain data available for this area.
N2510	8.31	0.79	0.00	0.79	-	9.56	No detailed FEMA Floodplain data available for this area.
N2520	11.54	0.76	0.00	0.76	-	6.56	No detailed FEMA Floodplain data available for this area.
N2530	2.83	1.10	0.00	1.10	-	38.72	No detailed FEMA Floodplain data available for this area.
N2540	1.38	0.70	0.00	0.70	-	50.42	No detailed FEMA Floodplain data available for this area.
N3020	21.47	2.33	0.00	2.33	-	10.84	No detailed FEMA Floodplain data available for this area.
N3030	18.70	1.78	0.00	1.78	-	9.54	No detailed FEMA Floodplain data available for this area.
N3040	20.89	1.48	0.00	1.48	-	7.09	No detailed FEMA Floodplain data available for this area.
N3050	5.33	1.27	0.00	1.27	-	23.89	No detailed FEMA Floodplain data available for this area.
N3510	2.83	1.72	0.00	1.72	-	60.77	No detailed FEMA Floodplain data available for this area.
N3520	25.90	1.67	0.00	1.67	-	6.44	No detailed FEMA Floodplain data available for this area.
N3530	17.67	2.13	0.00	2.13	-	12.03	No detailed FEMA Floodplain data available for this area.
N3540	1.09	0.48	0.00	0.48	-	44.52	No detailed FEMA Floodplain data available for this area.
N3550	3.38	0.17	0.00	0.17	-	5.01	No detailed FEMA Floodplain data available for this area.
N4010	1.42	0.24	0.00	0.24	-	16.72	No detailed FEMA Floodplain data available for this area.
N4020	11.90	2.09	0.00	2.09	-	17.60	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
N4024	0.85	0.42	0.00	0.42	-	48.99	No detailed FEMA Floodplain data available for this area.
N4026	1.49	0.65	0.00	0.65	-	43.73	No detailed FEMA Floodplain data available for this area.
N4028	0.81	0.36	0.00	0.36	-	44.67	No detailed FEMA Floodplain data available for this area.
N4030	8.12	0.89	0.00	0.89	-	11.00	No detailed FEMA Floodplain data available for this area.
N4040	3.63	0.15	0.00	0.15	-	4.24	No detailed FEMA Floodplain data available for this area.
N4045	0.16	0.06	0.00	0.06	-	37.49	No detailed FEMA Floodplain data available for this area.
N4050	5.17	1.04	0.00	1.04	-	20.13	No detailed FEMA Floodplain data available for this area.
N4060	21.87	9.11	0.00	9.11	-	41.64	No detailed FEMA Floodplain data available for this area.
N4320	23.09	1.06	0.00	1.06	-	4.58	No detailed FEMA Floodplain data available for this area.
N4710	26.12	4.23	0.00	4.23	-	16.18	No detailed FEMA Floodplain data available for this area.
N4720	3.39	1.53	0.00	1.53	-	45.19	No detailed FEMA Floodplain data available for this area.
N5010	13.73	0.14	0.00	0.14	-	1.04	No detailed FEMA Floodplain data available for this area.
N5013	2.28	0.04	0.00	0.04	-	1.88	No detailed FEMA Floodplain data available for this area.
N5015	13.99	0.28	0.00	0.28	-	2.00	No detailed FEMA Floodplain data available for this area.
N5016	1.67	0.15	0.00	0.15	-	8.70	No detailed FEMA Floodplain data available for this area.
N5017	2.13	0.31	0.00	0.31	-	14.74	No detailed FEMA Floodplain data available for this area.
N5020	1.36	0.14	0.00	0.14	-	10.50	No detailed FEMA Floodplain data available for this area.
N5520	28.16	2.28	0.00	2.28	-	8.09	No detailed FEMA Floodplain data available for this area.
N5530	8.66	1.21	0.00	1.21	-	13.99	No detailed FEMA Floodplain data available for this area.
N5540	0.59	0.22	0.00	0.22	-	37.21	No detailed FEMA Floodplain data available for this area.
N6010	2.31	0.35	0.00	0.35	-	14.95	No detailed FEMA Floodplain data available for this area.
N6020	2.38	0.45	0.00	0.45	-	19.06	No detailed FEMA Floodplain data available for this area.
N6030	4.28	0.56	0.00	0.56	-	13.15	No detailed FEMA Floodplain data available for this area.
N6040	3.60	0.39	0.00	0.39	-	10.82	No detailed FEMA Floodplain data available for this area.
N6050	2.59	0.45	0.00	0.45	-	17.21	No detailed FEMA Floodplain data available for this area.
N6060	7.85	1.71	0.00	1.71	-	21.84	No detailed FEMA Floodplain data available for this area.
N6080	5.65	0.63	0.00	0.63	-	11.17	No detailed FEMA Floodplain data available for this area.
N6100	4.00	0.00	0.00	0.00	-	0.02	No detailed FEMA Floodplain data available for this area.
N6510	16.58	1.07	0.00	1.07	-	6.43	No detailed FEMA Floodplain data available for this area.
N6520	15.05	1.11	0.00	1.11	-	7.37	No detailed FEMA Floodplain data available for this area.
N6530	1.65	0.13	0.00	0.13	-	7.69	No detailed FEMA Floodplain data available for this area.
N7020	8.87	0.97	0.00	0.97	-	10.88	No detailed FEMA Floodplain data available for this area.
N7030	15.98	1.37	0.00	1.37	-	8.54	No detailed FEMA Floodplain data available for this area.
N7040	1.44	0.59	0.00	0.59	-	41.23	No detailed FEMA Floodplain data available for this area.
N7045	0.49	0.23	0.00	0.23	-	46.36	No detailed FEMA Floodplain data available for this area.
N7050	20.42	3.17	0.00	3.17	-	15.54	No detailed FEMA Floodplain data available for this area.
N7060	3.69	0.31	0.00	0.31	-	8.42	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
O0010	5.74	2.77	0.00	2.77	-	48.35	No detailed FEMA Floodplain data available for this area.
O0012	15.39	0.97	0.00	0.97	-	6.30	No detailed FEMA Floodplain data available for this area.
O0015	18.55	1.39	0.00	1.39	-	7.50	No detailed FEMA Floodplain data available for this area.
O0017	7.31	1.00	0.00	1.00	-	13.75	No detailed FEMA Floodplain data available for this area.
O0020	5.76	3.94	0.00	3.94	-	68.47	No detailed FEMA Floodplain data available for this area.
O0030	4.32	2.32	0.00	2.32	-	53.66	No detailed FEMA Floodplain data available for this area.
O0035	10.69	1.79	0.00	1.79	-	16.72	No detailed FEMA Floodplain data available for this area.
O0040	8.42	2.45	0.00	2.45	-	29.14	No detailed FEMA Floodplain data available for this area.
O0050	8.36	2.54	0.00	2.54	-	30.42	No detailed FEMA Floodplain data available for this area.
O0055	2.26	1.17	0.00	1.17	-	51.85	No detailed FEMA Floodplain data available for this area.
O0060	38.04	8.39	0.00	8.39	-	22.05	No detailed FEMA Floodplain data available for this area.
O0070	35.57	6.73	0.00	6.73	-	18.93	No detailed FEMA Floodplain data available for this area.
O0078	6.60	4.29	0.00	4.29	-	64.96	No detailed FEMA Floodplain data available for this area.
O0080	42.18	11.78	0.00	11.78	-	27.94	No detailed FEMA Floodplain data available for this area.
O0083	45.51	5.36	0.00	5.36	-	11.78	No detailed FEMA Floodplain data available for this area.
O0087	12.27	1.81	0.00	1.81	-	14.76	No detailed FEMA Floodplain data available for this area.
O0090	57.46	10.23	0.00	10.23	-	17.81	No detailed FEMA Floodplain data available for this area.
O0095	72.68	8.34	0.00	8.34	-	11.47	No detailed FEMA Floodplain data available for this area.
O0097	5.23	1.76	0.00	1.76	-	33.67	No detailed FEMA Floodplain data available for this area.
O0100	13.38	3.43	0.00	3.43	-	25.60	No detailed FEMA Floodplain data available for this area.
O0110	0.90	0.56	0.00	0.56	-	62.06	No detailed FEMA Floodplain data available for this area.
O0115	0.88	0.46	0.00	0.46	-	52.02	No detailed FEMA Floodplain data available for this area.
O0116	3.18	1.15	0.00	1.15	-	36.21	No detailed FEMA Floodplain data available for this area.
O0120	21.94	1.19	0.00	1.19	-	5.41	No detailed FEMA Floodplain data available for this area.
O0130	26.59	3.43	0.00	3.43	-	12.90	No detailed FEMA Floodplain data available for this area.
O0133	64.51	0.79	0.00	0.79	-	1.23	No detailed FEMA Floodplain data available for this area.
O0137	1.88	0.49	0.00	0.49	-	25.88	No detailed FEMA Floodplain data available for this area.
O0150	82.71	7.52	0.00	7.52	-	9.10	No detailed FEMA Floodplain data available for this area.
O0160	69.03	7.77	0.00	7.77	-	11.26	No detailed FEMA Floodplain data available for this area.
O0170	25.37	2.74	0.00	2.74	-	10.78	No detailed FEMA Floodplain data available for this area.
O0172	0.97	0.41	0.00	0.41	-	42.19	No detailed FEMA Floodplain data available for this area.
O0174	6.14	0.72	0.00	0.72	-	11.75	No detailed FEMA Floodplain data available for this area.
O0176	21.51	0.95	0.00	0.95	-	4.43	No detailed FEMA Floodplain data available for this area.
O0178	1.76	0.42	0.00	0.42	-	23.67	No detailed FEMA Floodplain data available for this area.
O0180	1.79	0.96	0.00	0.96	-	53.83	No detailed FEMA Floodplain data available for this area.
O0190	2.40	1.35	0.00	1.35	-	56.33	No detailed FEMA Floodplain data available for this area.
O0200	31.24	2.85	0.00	2.85	-	9.13	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
O0210	3.94	0.70	0.00	0.70	-	17.76	No detailed FEMA Floodplain data available for this area.
O0213	27.43	0.96	0.00	0.96	-	3.50	No detailed FEMA Floodplain data available for this area.
O0217	55.93	5.20	0.00	5.20	-	9.31	No detailed FEMA Floodplain data available for this area.
O0220	4.76	2.18	0.00	2.18	-	45.78	No detailed FEMA Floodplain data available for this area.
O1010	3.51	0.06	0.00	0.06	-	1.64	No detailed FEMA Floodplain data available for this area.
O1020	5.81	0.38	0.00	0.38	-	6.61	No detailed FEMA Floodplain data available for this area.
O1030	12.57	2.48	0.00	2.48	-	19.71	No detailed FEMA Floodplain data available for this area.
O1040	17.59	1.02	0.00	1.02	-	5.78	No detailed FEMA Floodplain data available for this area.
O1050	10.82	0.75	0.00	0.75	-	6.95	No detailed FEMA Floodplain data available for this area.
O1070	4.26	0.42	0.00	0.42	-	9.86	No detailed FEMA Floodplain data available for this area.
O1510	10.57	1.76	0.00	1.76	-	16.65	No detailed FEMA Floodplain data available for this area.
O1520	9.15	3.33	0.00	3.33	-	36.44	No detailed FEMA Floodplain data available for this area.
O1530	15.47	2.59	0.00	2.59	-	16.77	No detailed FEMA Floodplain data available for this area.
O1540	7.36	0.90	0.00	0.90	-	12.23	No detailed FEMA Floodplain data available for this area.
O1550	6.26	0.51	0.00	0.51	-	8.08	No detailed FEMA Floodplain data available for this area.
O1560	12.86	1.22	0.00	1.22	-	9.52	No detailed FEMA Floodplain data available for this area.
O1570	1.49	0.75	0.00	0.75	-	50.19	No detailed FEMA Floodplain data available for this area.
O1580	9.07	0.73	0.00	0.73	-	8.03	No detailed FEMA Floodplain data available for this area.
O1600	3.58	0.45	0.00	0.45	-	12.57	No detailed FEMA Floodplain data available for this area.
O2010	2.85	0.66	0.00	0.66	-	23.14	No detailed FEMA Floodplain data available for this area.
O2020	8.21	0.98	0.00	0.98	-	11.97	No detailed FEMA Floodplain data available for this area.
O2030	11.38	1.68	0.00	1.68	-	14.73	No detailed FEMA Floodplain data available for this area.
O2050	4.82	1.01	0.00	1.01	-	21.01	No detailed FEMA Floodplain data available for this area.
O3010	24.93	2.32	0.00	2.32	-	9.30	No detailed FEMA Floodplain data available for this area.
O3020	30.37	3.38	0.00	3.38	-	11.15	No detailed FEMA Floodplain data available for this area.
O3030	18.26	2.83	0.00	2.83	-	15.50	No detailed FEMA Floodplain data available for this area.
O3040	32.63	8.48	0.00	8.48	-	25.98	No detailed FEMA Floodplain data available for this area.
O3050	14.26	1.79	0.00	1.79	-	12.52	No detailed FEMA Floodplain data available for this area.
O4010	19.85	2.74	0.00	2.74	-	13.81	No detailed FEMA Floodplain data available for this area.
O4020	11.35	3.16	0.00	3.16	-	27.85	No detailed FEMA Floodplain data available for this area.
O4030	2.52	0.57	0.00	0.57	-	22.46	No detailed FEMA Floodplain data available for this area.
O4040	1.64	0.15	0.00	0.15	-	9.09	No detailed FEMA Floodplain data available for this area.
O4050	1.61	0.16	0.00	0.16	-	9.92	No detailed FEMA Floodplain data available for this area.
O4060	0.91	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
O5010	2.95	0.36	0.00	0.36	-	12.34	No detailed FEMA Floodplain data available for this area.
O5020	9.49	1.16	0.00	1.16	-	12.28	No detailed FEMA Floodplain data available for this area.
O5030	3.74	0.52	0.00	0.52	-	13.80	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
O5040	3.63	0.10	0.00	0.10	-	2.71	No detailed FEMA Floodplain data available for this area.
O5050	1.02	0.07	0.00	0.07	-	7.33	No detailed FEMA Floodplain data available for this area.
P0003	1.24	0.27	0.00	0.27	-	22.13	No detailed FEMA Floodplain data available for this area.
P0010	3.63	1.64	0.00	1.64	-	45.00	No detailed FEMA Floodplain data available for this area.
P0013	5.55	1.06	0.00	1.06	-	19.17	No detailed FEMA Floodplain data available for this area.
P0014	3.72	1.75	0.00	1.75	-	46.90	No detailed FEMA Floodplain data available for this area.
P0016	1.44	0.50	0.00	0.50	-	34.98	No detailed FEMA Floodplain data available for this area.
P0018	11.32	1.66	0.00	1.66	-	14.68	No detailed FEMA Floodplain data available for this area.
P0020	3.47	0.82	0.00	0.82	-	23.55	No detailed FEMA Floodplain data available for this area.
P0030	3.95	1.84	0.00	1.84	-	46.64	No detailed FEMA Floodplain data available for this area.
P0040	4.57	2.69	0.00	2.69	-	58.89	No detailed FEMA Floodplain data available for this area.
P0045	13.11	0.70	0.00	0.70	-	5.34	No detailed FEMA Floodplain data available for this area.
P0050	4.09	1.34	0.00	1.34	-	32.75	No detailed FEMA Floodplain data available for this area.
P0060	2.62	1.28	0.00	1.28	-	48.78	No detailed FEMA Floodplain data available for this area.
P0070	6.75	5.63	0.32	5.31	1651.58	78.63	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
P0072	2.46	0.98	0.00	0.98	-	39.83	No detailed FEMA Floodplain data available for this area.
P0074	17.60	12.31	2.09	10.22	489.85	58.10	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
P0076	29.22	24.78	24.69	0.10	0.39	0.33	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
P0078	5.16	3.94	5.16	1.22	23.67	23.67	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
P0080	3.16	3.16	2.88	0.28	9.82	8.94	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
P0085	11.59	10.86	11.59	0.73	6.27	6.27	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
P0090	3.61	3.61	3.14	0.46	14.75	12.85	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
P0100	0.47	0.47	0.33	0.14	42.89	30.01	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
P1010	120.69	79.54	0.00	79.54	-	65.91	No detailed FEMA Floodplain data available for this area.
P1510	0.11	0.09	0.00	0.09	-	80.44	No detailed FEMA Floodplain data available for this area.
P2010	2.27	0.55	0.00	0.55	-	24.40	No detailed FEMA Floodplain data available for this area.
P2020	20.24	1.22	0.00	1.22	-	6.05	No detailed FEMA Floodplain data available for this area.
P2030	11.04	2.53	0.00	2.53	-	22.88	No detailed FEMA Floodplain data available for this area.
P2210	2.51	0.91	0.00	0.91	-	36.09	No detailed FEMA Floodplain data available for this area.
P2220	14.01	1.61	0.00	1.61	-	11.47	No detailed FEMA Floodplain data available for this area.
P2410	1.99	0.06	0.00	0.06	-	2.95	No detailed FEMA Floodplain data available for this area.
P2420	15.46	1.00	0.00	1.00	-	6.44	No detailed FEMA Floodplain data available for this area.
P2610	3.77	2.87	3.46	0.59	17.04	15.63	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
P2620	9.18	6.16	1.53	4.63	301.95	50.39	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
P2810	16.07	0.86	0.00	0.86	-	5.33	No detailed FEMA Floodplain data available for this area.
P2820	16.75	7.34	0.00	7.34	-	43.84	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
P2830	20.06	7.42	0.00	7.42	-	36.98	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
P2840	36.64	14.05	0.00	14.05	-	38.36	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
P2850	33.40	13.62	1.62	12.00	741.35	35.93	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
P2860	5.96	0.40	0.00	0.40	-	6.71	No detailed FEMA Floodplain data available for this area.
Q0175	0.13	0.06	0.00	0.06	-	47.43	No detailed FEMA Floodplain data available for this area.
Q3022	65.13	37.45	0.00	37.45	-	57.50	No detailed FEMA Floodplain data available for this area.
Q3024	5.25	1.65	0.00	1.65	-	31.43	No detailed FEMA Floodplain data available for this area.
Q3026	6.08	3.92	0.00	3.92	-	64.51	No detailed FEMA Floodplain data available for this area.
Q3040	0.62	0.62	0.00	0.62	-	99.88	No detailed FEMA Floodplain data available for this area.
Q3041	5.23	3.00	0.00	3.00	-	57.27	No detailed FEMA Floodplain data available for this area.
Q3043	1.83	1.83	0.00	1.83	-	100.00	No detailed FEMA Floodplain data available for this area.
Q3044	3.45	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
Q3048	7.26	2.25	0.00	2.25	-	30.92	No detailed FEMA Floodplain data available for this area.
R0170	0.37	0.27	0.00	0.27	-	72.68	No detailed FEMA Floodplain data available for this area.
R0270	30.93	4.28	0.00	4.28	-	13.83	No detailed FEMA Floodplain data available for this area.
R1043	31.35	10.14	0.00	10.14	-	32.33	No detailed FEMA Floodplain data available for this area.
R2560	0.00	0.00	0.00	0.00	-	87.85	No detailed FEMA Floodplain data available for this area.
R3008	13.23	11.40	10.88	0.51	4.72	3.88	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
R3010	2.39	2.39	1.01	1.38	136.03	57.62	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
R3020	1.96	1.94	0.63	1.32	209.66	67.05	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
R3025	2.68	2.48	0.19	2.28	1183.04	85.40	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
R3030	4.19	3.52	0.00	3.52	-	83.85	No detailed FEMA Floodplain data available for this area.
R3036	3.87	1.31	0.00	1.31	-	33.96	No detailed FEMA Floodplain data available for this area.
R3038	23.91	1.87	0.00	1.87	-	7.82	No detailed FEMA Floodplain data available for this area.
R3039	14.31	3.74	0.00	3.74	-	26.14	No detailed FEMA Floodplain data available for this area.
R3040	5.34	4.06	0.00	4.06	-	76.01	No detailed FEMA Floodplain data available for this area.
R3041	5.13	1.86	0.00	1.86	-	36.29	No detailed FEMA Floodplain data available for this area.
R3042	34.61	10.25	0.00	10.25	-	29.61	No detailed FEMA Floodplain data available for this area.
R3043	6.17	0.35	0.00	0.35	-	5.66	No detailed FEMA Floodplain data available for this area.
R3044	15.57	5.02	0.00	5.02	-	32.25	No detailed FEMA Floodplain data available for this area.
R3045	4.73	1.70	0.00	1.70	-	35.97	No detailed FEMA Floodplain data available for this area.
R3048	3.29	1.62	0.00	1.62	-	49.27	No detailed FEMA Floodplain data available for this area.
R3049	9.36	1.37	0.00	1.37	-	14.67	No detailed FEMA Floodplain data available for this area.
R3050	6.39	5.59	0.00	5.59	-	87.38	No detailed FEMA Floodplain data available for this area.
R3052	12.51	1.03	0.00	1.03	-	8.26	No detailed FEMA Floodplain data available for this area.
R3054	15.38	1.27	0.00	1.27	-	8.24	No detailed FEMA Floodplain data available for this area.
R3056	1.80	0.32	0.00	0.32	-	17.72	No detailed FEMA Floodplain data available for this area.
R3057	53.45	8.28	0.00	8.28	-	15.50	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
R3058	13.89	3.69	0.00	3.69	-	26.57	No detailed FEMA Floodplain data available for this area.
R3060	5.11	4.17	0.00	4.17	-	81.58	No detailed FEMA Floodplain data available for this area.
R3061	12.64	2.20	0.00	2.20	-	17.42	No detailed FEMA Floodplain data available for this area.
R3062	2.62	1.07	0.00	1.07	-	40.96	No detailed FEMA Floodplain data available for this area.
R3063	23.25	3.94	0.00	3.94	-	16.97	No detailed FEMA Floodplain data available for this area.
R3064	3.73	2.23	0.00	2.23	-	59.91	No detailed FEMA Floodplain data available for this area.
R3065	27.93	13.12	0.00	13.12	-	46.97	No detailed FEMA Floodplain data available for this area.
R3070	3.90	3.88	0.00	3.88	-	99.54	No detailed FEMA Floodplain data available for this area.
R3072	15.66	1.84	0.00	1.84	-	11.74	No detailed FEMA Floodplain data available for this area.
R3073	6.59	1.00	0.00	1.00	-	15.21	No detailed FEMA Floodplain data available for this area.
R3074	29.72	6.79	0.00	6.79	-	22.85	No detailed FEMA Floodplain data available for this area.
R3075	26.41	2.84	0.00	2.84	-	10.75	No detailed FEMA Floodplain data available for this area.
R3076	28.00	9.65	0.00	9.65	-	34.47	No detailed FEMA Floodplain data available for this area.
R3077	1.34	0.69	0.00	0.69	-	51.30	No detailed FEMA Floodplain data available for this area.
R3078	15.40	6.52	0.00	6.52	-	42.37	No detailed FEMA Floodplain data available for this area.
R3079	6.39	1.41	0.00	1.41	-	22.07	No detailed FEMA Floodplain data available for this area.
R3080	3.67	3.61	0.00	3.61	-	98.36	No detailed FEMA Floodplain data available for this area.
R3081	31.64	11.91	0.00	11.91	-	37.64	No detailed FEMA Floodplain data available for this area.
R3082	45.90	17.62	0.00	17.62	-	38.39	No detailed FEMA Floodplain data available for this area.
R3083	3.33	1.76	0.00	1.76	-	52.80	No detailed FEMA Floodplain data available for this area.
R3084	22.11	5.37	0.00	5.37	-	24.28	No detailed FEMA Floodplain data available for this area.
R3085	0.73	0.29	0.00	0.29	-	39.22	No detailed FEMA Floodplain data available for this area.
R3088	10.08	2.06	0.00	2.06	-	20.46	No detailed FEMA Floodplain data available for this area.
R3089	13.42	1.87	0.00	1.87	-	13.96	No detailed FEMA Floodplain data available for this area.
R3090	3.67	3.63	0.00	3.63	-	98.90	No detailed FEMA Floodplain data available for this area.
R3094	35.71	11.50	0.00	11.50	-	32.21	No detailed FEMA Floodplain data available for this area.
R3095	32.15	6.95	0.00	6.95	-	21.62	No detailed FEMA Floodplain data available for this area.
R3096	3.76	0.62	0.00	0.62	-	16.39	No detailed FEMA Floodplain data available for this area.
R3097	9.27	4.72	0.00	4.72	-	50.92	No detailed FEMA Floodplain data available for this area.
R3098	13.12	5.58	0.00	5.58	-	42.56	No detailed FEMA Floodplain data available for this area.
R3099	20.29	3.02	0.00	3.02	-	14.90	No detailed FEMA Floodplain data available for this area.
R3100	3.73	3.59	0.00	3.59	-	96.25	No detailed FEMA Floodplain data available for this area.
R3101	64.82	19.51	0.00	19.51	-	30.10	No detailed FEMA Floodplain data available for this area.
R3102	22.75	7.84	0.00	7.84	-	34.47	No detailed FEMA Floodplain data available for this area.
R3107	1.65	0.24	0.00	0.24	-	14.58	No detailed FEMA Floodplain data available for this area.
R3108	16.98	2.19	0.00	2.19	-	12.91	No detailed FEMA Floodplain data available for this area.
R3109	6.39	1.96	0.00	1.96	-	30.75	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
R3110	3.62	3.18	0.00	3.18	-	87.74	No detailed FEMA Floodplain data available for this area.
R3111	43.39	6.50	0.00	6.50	-	14.98	No detailed FEMA Floodplain data available for this area.
R3112	15.46	3.31	0.00	3.31	-	21.40	No detailed FEMA Floodplain data available for this area.
R3113	17.89	6.34	0.00	6.34	-	35.45	No detailed FEMA Floodplain data available for this area.
R3114	23.30	6.08	0.00	6.08	-	26.11	No detailed FEMA Floodplain data available for this area.
R3118	14.36	2.16	0.00	2.16	-	15.07	No detailed FEMA Floodplain data available for this area.
R3119	14.42	1.71	0.00	1.71	-	11.82	No detailed FEMA Floodplain data available for this area.
R3120	4.51	3.67	0.00	3.67	-	81.31	No detailed FEMA Floodplain data available for this area.
R3125	3.01	2.28	0.00	2.28	-	75.85	No detailed FEMA Floodplain data available for this area.
R3128	6.97	0.96	0.00	0.96	-	13.85	No detailed FEMA Floodplain data available for this area.
R3129	13.39	1.18	0.00	1.18	-	8.85	No detailed FEMA Floodplain data available for this area.
R3130	3.63	3.33	0.00	3.33	-	91.92	No detailed FEMA Floodplain data available for this area.
R3138	30.07	2.21	0.00	2.21	-	7.34	No detailed FEMA Floodplain data available for this area.
R3140	4.33	4.12	0.00	4.12	-	95.07	No detailed FEMA Floodplain data available for this area.
R3148	15.42	1.37	0.00	1.37	-	8.88	No detailed FEMA Floodplain data available for this area.
R3150	3.30	3.22	0.00	3.22	-	97.53	No detailed FEMA Floodplain data available for this area.
R3160	0.78	0.72	0.00	0.72	-	93.04	No detailed FEMA Floodplain data available for this area.
R3161	12.77	1.92	0.00	1.92	-	15.06	No detailed FEMA Floodplain data available for this area.
R3162	8.14	2.83	0.00	2.83	-	34.79	No detailed FEMA Floodplain data available for this area.
R3163	3.49	1.76	0.00	1.76	-	50.37	No detailed FEMA Floodplain data available for this area.
R3164	17.14	1.61	0.00	1.61	-	9.38	No detailed FEMA Floodplain data available for this area.
R3165	10.96	4.63	0.00	4.63	-	42.27	No detailed FEMA Floodplain data available for this area.
R3167	14.45	3.74	0.00	3.74	-	25.86	No detailed FEMA Floodplain data available for this area.
R3168	17.22	6.55	0.00	6.55	-	38.07	No detailed FEMA Floodplain data available for this area.
R3190	8.62	0.86	0.00	0.86	-	10.03	No detailed FEMA Floodplain data available for this area.
R3193	21.60	9.73	0.00	9.73	-	45.07	No detailed FEMA Floodplain data available for this area.
R3197	18.98	10.18	0.00	10.18	-	53.62	No detailed FEMA Floodplain data available for this area.
R3199	0.46	0.22	0.00	0.22	-	47.72	No detailed FEMA Floodplain data available for this area.
R3200	23.17	7.72	0.00	7.72	-	33.32	No detailed FEMA Floodplain data available for this area.
R3203	13.20	7.46	0.00	7.46	-	56.54	No detailed FEMA Floodplain data available for this area.
R3207	2.84	1.62	0.00	1.62	-	56.79	No detailed FEMA Floodplain data available for this area.
R3210	18.09	7.00	0.00	7.00	-	38.68	No detailed FEMA Floodplain data available for this area.
R3215	5.85	0.14	0.00	0.14	-	2.35	No detailed FEMA Floodplain data available for this area.
R3220	25.65	1.55	0.00	1.55	-	6.03	No detailed FEMA Floodplain data available for this area.
R3223	3.63	0.71	0.00	0.71	-	19.58	No detailed FEMA Floodplain data available for this area.
R3227	22.20	0.60	0.00	0.60	-	2.71	No detailed FEMA Floodplain data available for this area.
R3229	2.09	0.48	0.00	0.48	-	23.14	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
R3230	27.28	2.22	0.00	2.22	-	8.13	No detailed FEMA Floodplain data available for this area.
R3243	3.81	0.04	0.00	0.04	-	1.04	No detailed FEMA Floodplain data available for this area.
R3244	7.32	0.42	0.00	0.42	-	5.79	No detailed FEMA Floodplain data available for this area.
R3246	0.71	0.16	0.00	0.16	-	22.77	No detailed FEMA Floodplain data available for this area.
R3249	0.42	0.13	0.00	0.13	-	30.15	No detailed FEMA Floodplain data available for this area.
R3250	33.76	2.60	0.00	2.60	-	7.70	No detailed FEMA Floodplain data available for this area.
R3270	29.39	2.88	0.00	2.88	-	9.79	No detailed FEMA Floodplain data available for this area.
R3282	7.19	0.50	0.00	0.50	-	6.97	No detailed FEMA Floodplain data available for this area.
R3283	6.20	0.75	0.00	0.75	-	12.06	No detailed FEMA Floodplain data available for this area.
R3286	4.82	0.41	0.00	0.41	-	8.44	No detailed FEMA Floodplain data available for this area.
R3287	7.59	1.62	0.00	1.62	-	21.35	No detailed FEMA Floodplain data available for this area.
R3288	1.62	0.68	0.00	0.68	-	42.08	No detailed FEMA Floodplain data available for this area.
R3289	0.55	0.25	0.00	0.25	-	44.77	No detailed FEMA Floodplain data available for this area.
R3290	30.34	3.19	0.00	3.19	-	10.52	No detailed FEMA Floodplain data available for this area.
R3300	11.35	1.39	0.00	1.39	-	12.28	No detailed FEMA Floodplain data available for this area.
R3310	30.01	2.84	0.00	2.84	-	9.45	No detailed FEMA Floodplain data available for this area.
R3320	3.66	1.96	0.00	1.96	-	53.52	No detailed FEMA Floodplain data available for this area.
R3330	24.86	4.88	0.00	4.88	-	19.63	No detailed FEMA Floodplain data available for this area.
R3340	10.96	2.32	0.00	2.32	-	21.14	No detailed FEMA Floodplain data available for this area.
R3350	15.75	2.20	0.00	2.20	-	13.96	No detailed FEMA Floodplain data available for this area.
R3360	14.71	1.41	0.00	1.41	-	9.62	No detailed FEMA Floodplain data available for this area.
R3370	14.88	1.25	0.00	1.25	-	8.38	No detailed FEMA Floodplain data available for this area.
R3372	24.25	4.67	0.00	4.67	-	19.27	No detailed FEMA Floodplain data available for this area.
R3374	3.27	0.80	0.00	0.80	-	24.36	No detailed FEMA Floodplain data available for this area.
R3376	20.00	1.71	0.00	1.71	-	8.55	No detailed FEMA Floodplain data available for this area.
R3377	2.60	0.20	0.00	0.20	-	7.60	No detailed FEMA Floodplain data available for this area.
R3378	1.93	0.08	0.00	0.08	-	4.26	No detailed FEMA Floodplain data available for this area.
R3380	2.85	0.86	0.00	0.86	-	30.31	No detailed FEMA Floodplain data available for this area.
R3400	12.95	1.37	0.00	1.37	-	10.62	No detailed FEMA Floodplain data available for this area.
R3402	17.80	1.08	0.00	1.08	-	6.09	No detailed FEMA Floodplain data available for this area.
R3404	30.18	0.61	0.00	0.61	-	2.01	No detailed FEMA Floodplain data available for this area.
R3406	3.94	0.12	0.00	0.12	-	2.99	No detailed FEMA Floodplain data available for this area.
R3410	5.61	2.57	0.00	2.57	-	45.79	No detailed FEMA Floodplain data available for this area.
R3420	26.11	1.20	0.00	1.20	-	4.61	No detailed FEMA Floodplain data available for this area.
R3450	12.50	0.60	0.00	0.60	-	4.83	No detailed FEMA Floodplain data available for this area.
R3510	10.56	0.43	0.00	0.43	-	4.12	No detailed FEMA Floodplain data available for this area.
R3520	24.08	0.90	0.00	0.90	-	3.73	No detailed FEMA Floodplain data available for this area.

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R3522	6.54	0.42	0.00	0.42	-	6.44	No detailed FEMA Floodplain data available for this area.
R3524	19.80	1.90	0.00	1.90	-	9.60	No detailed FEMA Floodplain data available for this area.
R3526	20.46	2.54	0.00	2.54	-	12.41	No detailed FEMA Floodplain data available for this area.
R3530	22.20	2.34	0.00	2.34	-	10.55	No detailed FEMA Floodplain data available for this area.
R3540	47.89	8.21	0.00	8.21	-	17.15	No detailed FEMA Floodplain data available for this area.
R3550	22.15	2.01	0.00	2.01	-	9.09	No detailed FEMA Floodplain data available for this area.
R3560	40.06	4.21	0.00	4.21	-	10.51	No detailed FEMA Floodplain data available for this area.
R3570	2.50	1.59	0.00	1.59	-	63.44	No detailed FEMA Floodplain data available for this area.
R3610	11.78	0.63	0.00	0.63	-	5.35	No detailed FEMA Floodplain data available for this area.
R3620	35.52	2.69	0.00	2.69	-	7.56	No detailed FEMA Floodplain data available for this area.
R3630	6.55	0.91	0.00	0.91	-	13.92	No detailed FEMA Floodplain data available for this area.
R3640	3.09	0.73	0.00	0.73	-	23.76	No detailed FEMA Floodplain data available for this area.
R3650	23.82	1.54	0.00	1.54	-	6.45	No detailed FEMA Floodplain data available for this area.
R3660	8.28	0.46	0.00	0.46	-	5.61	No detailed FEMA Floodplain data available for this area.
R3670	2.91	0.55	0.00	0.55	-	19.01	No detailed FEMA Floodplain data available for this area.
R3675	14.87	2.87	0.00	2.87	-	19.31	No detailed FEMA Floodplain data available for this area.
R3680	23.31	1.26	0.00	1.26	-	5.41	No detailed FEMA Floodplain data available for this area.
R3690	22.68	2.52	0.00	2.52	-	11.12	No detailed FEMA Floodplain data available for this area.
R3693	24.59	3.18	0.00	3.18	-	12.93	No detailed FEMA Floodplain data available for this area.
R3698	2.20	0.09	0.00	0.09	-	4.26	No detailed FEMA Floodplain data available for this area.
S0005	12.04	0.31	0.00	0.31	-	2.59	No detailed FEMA Floodplain data available for this area.
S0025	35.53	24.57	0.00	24.57	-	69.15	No detailed FEMA Floodplain data available for this area.
S0030	56.17	30.16	0.00	30.16	-	53.69	No detailed FEMA Floodplain data available for this area.
S0035	8.67	3.08	0.00	3.08	-	35.56	No detailed FEMA Floodplain data available for this area.
S0036	4.28	1.97	0.00	1.97	-	46.00	No detailed FEMA Floodplain data available for this area.
S0038	39.19	21.20	0.00	21.20	-	54.10	No detailed FEMA Floodplain data available for this area.
S0039	5.57	3.56	0.00	3.56	-	63.84	No detailed FEMA Floodplain data available for this area.
S0040	82.18	35.32	0.00	35.32	-	42.98	No detailed FEMA Floodplain data available for this area.
S0046	12.05	6.68	0.00	6.68	-	55.45	No detailed FEMA Floodplain data available for this area.
S0047	10.24	7.51	0.00	7.51	-	73.32	No detailed FEMA Floodplain data available for this area.
S0048	9.05	4.30	0.00	4.30	-	47.50	No detailed FEMA Floodplain data available for this area.
S0049	12.08	6.75	0.00	6.75	-	55.84	No detailed FEMA Floodplain data available for this area.
S0050	107.07	78.40	0.00	78.40	-	73.22	No detailed FEMA Floodplain data available for this area.
S0059	21.89	21.31	0.00	21.31	-	97.36	No detailed FEMA Floodplain data available for this area.
S0060	20.24	17.23	0.00	17.23	-	85.12	No detailed FEMA Floodplain data available for this area.
S0065	5.25	5.04	0.00	5.04	-	96.06	No detailed FEMA Floodplain data available for this area.
S0070	6.74	6.69	0.00	6.69	-	99.23	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
S0086	16.47	4.29	0.00	4.29	-	26.02	No detailed FEMA Floodplain data available for this area.
S0087	10.90	8.97	0.00	8.97	-	82.36	No detailed FEMA Floodplain data available for this area.
S0088	14.67	3.26	0.00	3.26	-	22.22	No detailed FEMA Floodplain data available for this area.
S0089	71.24	25.68	0.00	25.68	-	36.04	No detailed FEMA Floodplain data available for this area.
S0090	6.71	6.25	0.00	6.25	-	93.05	No detailed FEMA Floodplain data available for this area.
S0100	17.00	16.30	0.00	16.30	-	95.86	No detailed FEMA Floodplain data available for this area.
S0110	23.15	19.63	0.00	19.63	-	84.79	No detailed FEMA Floodplain data available for this area.
S0119	22.90	3.47	0.00	3.47	-	15.15	No detailed FEMA Floodplain data available for this area.
S0120	50.09	14.76	0.00	14.76	-	29.47	No detailed FEMA Floodplain data available for this area.
S0129	10.39	2.24	0.00	2.24	-	21.54	No detailed FEMA Floodplain data available for this area.
S0130	56.20	37.78	0.00	37.78	-	67.22	No detailed FEMA Floodplain data available for this area.
S0134	5.90	4.73	0.00	4.73	-	80.14	No detailed FEMA Floodplain data available for this area.
S0135	38.76	7.60	0.00	7.60	-	19.61	No detailed FEMA Floodplain data available for this area.
S0136	3.41	2.61	0.00	2.61	-	76.46	No detailed FEMA Floodplain data available for this area.
S0137	55.31	30.14	0.00	30.14	-	54.49	No detailed FEMA Floodplain data available for this area.
S0138	22.95	12.43	0.00	12.43	-	54.16	No detailed FEMA Floodplain data available for this area.
S0139	127.23	112.39	0.00	112.39	-	88.34	No detailed FEMA Floodplain data available for this area.
S0140	23.08	21.84	0.00	21.84	-	94.63	No detailed FEMA Floodplain data available for this area.
S0143	10.78	8.82	0.00	8.82	-	81.83	No detailed FEMA Floodplain data available for this area.
S0144	86.37	56.80	0.00	56.80	-	65.77	No detailed FEMA Floodplain data available for this area.
S0145	8.82	6.76	0.00	6.76	-	76.67	No detailed FEMA Floodplain data available for this area.
S0146	58.15	40.31	0.00	40.31	-	69.31	No detailed FEMA Floodplain data available for this area.
S0147	28.05	18.37	0.00	18.37	-	65.47	No detailed FEMA Floodplain data available for this area.
S0148	19.64	17.33	0.00	17.33	-	88.22	No detailed FEMA Floodplain data available for this area.
S0149	25.77	23.91	0.00	23.91	-	92.78	No detailed FEMA Floodplain data available for this area.
S0150	20.66	18.97	0.00	18.97	-	91.79	No detailed FEMA Floodplain data available for this area.
S0159	11.52	6.34	0.00	6.34	-	55.02	No detailed FEMA Floodplain data available for this area.
S0160	61.59	13.96	0.00	13.96	-	22.66	No detailed FEMA Floodplain data available for this area.
S0170	37.82	31.48	0.00	31.48	-	83.24	No detailed FEMA Floodplain data available for this area.
S0178	12.74	8.54	0.00	8.54	-	67.05	No detailed FEMA Floodplain data available for this area.
S0179	9.22	4.77	0.00	4.77	-	51.70	No detailed FEMA Floodplain data available for this area.
S0180	12.19	8.10	0.00	8.10	-	66.46	No detailed FEMA Floodplain data available for this area.
S0190	28.48	18.97	0.00	18.97	-	66.62	No detailed FEMA Floodplain data available for this area.
S0200	39.00	21.99	0.00	21.99	-	56.40	No detailed FEMA Floodplain data available for this area.
S0201	2.72	2.20	0.00	2.20	-	80.82	No detailed FEMA Floodplain data available for this area.
S0203	11.20	7.57	0.00	7.57	-	67.61	No detailed FEMA Floodplain data available for this area.
S0205	10.25	6.60	0.00	6.60	-	64.42	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
S0207	15.07	5.43	0.00	5.43	-	36.02	No detailed FEMA Floodplain data available for this area.
S0209	27.30	6.35	0.00	6.35	-	23.27	No detailed FEMA Floodplain data available for this area.
S0210	57.46	25.01	0.00	25.01	-	43.53	No detailed FEMA Floodplain data available for this area.
S0215	4.88	2.48	0.00	2.48	-	50.77	No detailed FEMA Floodplain data available for this area.
S0220	26.16	13.33	0.00	13.33	-	50.96	No detailed FEMA Floodplain data available for this area.
S0230	9.67	6.72	0.00	6.72	-	69.56	No detailed FEMA Floodplain data available for this area.
S0239	103.56	67.90	0.00	67.90	-	65.57	No detailed FEMA Floodplain data available for this area.
S0240	15.08	9.25	0.00	9.25	-	61.31	No detailed FEMA Floodplain data available for this area.
S0250	39.88	30.15	0.00	30.15	-	75.60	No detailed FEMA Floodplain data available for this area.
S0259	13.15	9.41	0.00	9.41	-	71.55	No detailed FEMA Floodplain data available for this area.
S0260	29.66	19.57	0.00	19.57	-	66.00	No detailed FEMA Floodplain data available for this area.
S0265	2.37	1.74	0.00	1.74	-	73.59	No detailed FEMA Floodplain data available for this area.
S0270	1.65	1.31	0.00	1.31	-	79.78	No detailed FEMA Floodplain data available for this area.
S0280	28.37	16.02	0.00	16.02	-	56.47	No detailed FEMA Floodplain data available for this area.
S0290	35.97	7.62	0.00	7.62	-	21.19	No detailed FEMA Floodplain data available for this area.
S0295	10.71	9.60	0.00	9.60	-	89.70	No detailed FEMA Floodplain data available for this area.
S0300	17.06	3.84	0.00	3.84	-	22.50	No detailed FEMA Floodplain data available for this area.
S0310	18.09	9.84	0.00	9.84	-	54.38	No detailed FEMA Floodplain data available for this area.
S0315	8.67	7.64	0.00	7.64	-	88.12	No detailed FEMA Floodplain data available for this area.
S0316	21.86	11.97	0.00	11.97	-	54.76	No detailed FEMA Floodplain data available for this area.
S0317	39.45	15.28	0.00	15.28	-	38.75	No detailed FEMA Floodplain data available for this area.
S0318	13.13	2.18	0.00	2.18	-	16.64	No detailed FEMA Floodplain data available for this area.
S0319	15.78	3.66	0.00	3.66	-	23.18	No detailed FEMA Floodplain data available for this area.
S0320	44.06	22.64	0.00	22.64	-	51.39	No detailed FEMA Floodplain data available for this area.
S0330	27.81	21.13	0.00	21.13	-	75.99	No detailed FEMA Floodplain data available for this area.
S0340	10.03	9.64	0.00	9.64	-	96.14	No detailed FEMA Floodplain data available for this area.
S0350	8.88	8.09	0.00	8.09	-	91.11	No detailed FEMA Floodplain data available for this area.
S0367	3.92	1.19	0.00	1.19	-	30.20	No detailed FEMA Floodplain data available for this area.
S0410	12.42	10.09	0.00	10.09	-	81.29	No detailed FEMA Floodplain data available for this area.
S0411	23.27	10.03	0.00	10.03	-	43.10	No detailed FEMA Floodplain data available for this area.
S0416	19.51	7.73	0.00	7.73	-	39.65	No detailed FEMA Floodplain data available for this area.
S0417	26.76	11.08	0.00	11.08	-	41.40	No detailed FEMA Floodplain data available for this area.
S0418	0.97	0.72	0.00	0.72	-	73.77	No detailed FEMA Floodplain data available for this area.
S0419	4.78	3.68	0.00	3.68	-	77.07	No detailed FEMA Floodplain data available for this area.
S0420	76.89	27.99	0.00	27.99	-	36.40	No detailed FEMA Floodplain data available for this area.
S0430	27.32	18.90	0.00	18.90	-	69.20	No detailed FEMA Floodplain data available for this area.
S0436	9.88	8.55	0.00	8.55	-	86.55	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
S0437	41.33	7.49	0.00	7.49	-	18.13	No detailed FEMA Floodplain data available for this area.
S0438	40.76	12.49	0.00	12.49	-	30.64	No detailed FEMA Floodplain data available for this area.
S0439	12.14	9.08	0.00	9.08	-	74.82	No detailed FEMA Floodplain data available for this area.
S0440	56.07	28.89	0.00	28.89	-	51.52	No detailed FEMA Floodplain data available for this area.
S0450	12.34	9.34	0.00	9.34	-	75.72	No detailed FEMA Floodplain data available for this area.
S0455	6.71	1.08	0.00	1.08	-	16.12	No detailed FEMA Floodplain data available for this area.
S0459	9.42	2.43	0.00	2.43	-	25.76	No detailed FEMA Floodplain data available for this area.
S0460	3.96	1.88	0.00	1.88	-	47.50	No detailed FEMA Floodplain data available for this area.
S0530	0.00	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
S0533	4.98	2.94	0.00	2.94	-	58.90	No detailed FEMA Floodplain data available for this area.
S0534	7.96	3.42	0.00	3.42	-	42.92	No detailed FEMA Floodplain data available for this area.
S0535	7.44	2.40	0.00	2.40	-	32.27	No detailed FEMA Floodplain data available for this area.
S0540	59.76	42.52	0.00	42.52	-	71.15	No detailed FEMA Floodplain data available for this area.
S0550	5.49	2.72	0.00	2.72	-	49.53	No detailed FEMA Floodplain data available for this area.
S0585	2.59	1.77	0.00	1.77	-	68.34	No detailed FEMA Floodplain data available for this area.
S0595	15.88	4.99	0.00	4.99	-	31.43	No detailed FEMA Floodplain data available for this area.
S0630	3.30	1.09	0.00	1.09	-	32.96	No detailed FEMA Floodplain data available for this area.
S0635	4.47	2.37	0.00	2.37	-	52.98	No detailed FEMA Floodplain data available for this area.
S0639	33.87	16.02	0.00	16.02	-	47.30	No detailed FEMA Floodplain data available for this area.
S0640	38.50	22.37	0.00	22.37	-	58.09	No detailed FEMA Floodplain data available for this area.
S0710	3.66	1.97	0.00	1.97	-	53.75	No detailed FEMA Floodplain data available for this area.
S0720	12.47	1.67	0.00	1.67	-	13.39	No detailed FEMA Floodplain data available for this area.
S0730	5.49	3.95	0.00	3.95	-	71.91	No detailed FEMA Floodplain data available for this area.
S0738	2.68	2.27	0.00	2.27	-	84.94	No detailed FEMA Floodplain data available for this area.
S0739	12.44	6.36	0.00	6.36	-	51.13	No detailed FEMA Floodplain data available for this area.
S0740	41.11	6.84	0.00	6.84	-	16.63	No detailed FEMA Floodplain data available for this area.
S0750	21.24	6.48	0.00	6.48	-	30.50	No detailed FEMA Floodplain data available for this area.
S0760	21.94	17.93	0.00	17.93	-	81.74	No detailed FEMA Floodplain data available for this area.
S0810	40.16	16.01	0.00	16.01	-	39.86	No detailed FEMA Floodplain data available for this area.
S0820	3.59	2.48	0.00	2.48	-	69.14	No detailed FEMA Floodplain data available for this area.
S0828	3.20	1.63	0.00	1.63	-	51.12	No detailed FEMA Floodplain data available for this area.
S0829	18.99	7.25	0.00	7.25	-	38.20	No detailed FEMA Floodplain data available for this area.
S0830	6.08	2.63	0.00	2.63	-	43.24	No detailed FEMA Floodplain data available for this area.
S0840	23.46	9.20	0.00	9.20	-	39.21	No detailed FEMA Floodplain data available for this area.
S0846	4.99	3.61	0.00	3.61	-	72.46	No detailed FEMA Floodplain data available for this area.
S0847	15.14	6.39	0.00	6.39	-	42.25	No detailed FEMA Floodplain data available for this area.
S0848	43.93	8.15	0.00	8.15	-	18.55	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
S0849	8.14	5.01	0.00	5.01	-	61.57	No detailed FEMA Floodplain data available for this area.
S0850	31.81	7.05	0.00	7.05	-	22.17	No detailed FEMA Floodplain data available for this area.
S0857	14.46	3.93	0.00	3.93	-	27.17	No detailed FEMA Floodplain data available for this area.
S0858	4.65	1.98	0.00	1.98	-	42.52	No detailed FEMA Floodplain data available for this area.
S0859	14.48	4.45	0.00	4.45	-	30.76	No detailed FEMA Floodplain data available for this area.
S0860	45.32	34.77	0.00	34.77	-	76.71	No detailed FEMA Floodplain data available for this area.
S0867	4.00	2.05	0.00	2.05	-	51.40	No detailed FEMA Floodplain data available for this area.
S0868	20.84	7.06	0.00	7.06	-	33.86	No detailed FEMA Floodplain data available for this area.
S0869	15.09	2.59	0.00	2.59	-	17.14	No detailed FEMA Floodplain data available for this area.
S0870	10.28	5.85	0.00	5.85	-	56.85	No detailed FEMA Floodplain data available for this area.
S1010	2.50	0.74	0.00	0.74	-	29.35	No detailed FEMA Floodplain data available for this area.
S1020	9.59	1.12	0.00	1.12	-	11.70	No detailed FEMA Floodplain data available for this area.
S1033	10.62	0.25	0.00	0.25	-	2.31	No detailed FEMA Floodplain data available for this area.
S1037	2.00	0.45	0.00	0.45	-	22.63	No detailed FEMA Floodplain data available for this area.
S1038	1.16	0.42	0.00	0.42	-	36.00	No detailed FEMA Floodplain data available for this area.
S1040	5.00	0.52	0.00	0.52	-	10.32	No detailed FEMA Floodplain data available for this area.
S1050	14.19	0.69	0.00	0.69	-	4.90	No detailed FEMA Floodplain data available for this area.
S1070	13.62	0.75	0.00	0.75	-	5.49	No detailed FEMA Floodplain data available for this area.
S1080	4.37	0.29	0.00	0.29	-	6.61	No detailed FEMA Floodplain data available for this area.
S1110	8.67	0.84	0.00	0.84	-	9.67	No detailed FEMA Floodplain data available for this area.
S1120	11.54	0.82	0.00	0.82	-	7.10	No detailed FEMA Floodplain data available for this area.
S1130	20.79	0.75	0.00	0.75	-	3.60	No detailed FEMA Floodplain data available for this area.
S1140	0.60	0.12	0.00	0.12	-	19.98	No detailed FEMA Floodplain data available for this area.
S1210	4.80	0.63	0.00	0.63	-	13.17	No detailed FEMA Floodplain data available for this area.
S1220	11.03	1.00	0.00	1.00	-	9.09	No detailed FEMA Floodplain data available for this area.
S1230	12.94	1.02	0.00	1.02	-	7.86	No detailed FEMA Floodplain data available for this area.
S1240	4.54	0.86	0.00	0.86	-	19.04	No detailed FEMA Floodplain data available for this area.
S1250	19.02	1.19	0.00	1.19	-	6.25	No detailed FEMA Floodplain data available for this area.
S1260	6.12	0.68	0.00	0.68	-	11.08	No detailed FEMA Floodplain data available for this area.
S1280	7.14	0.22	0.00	0.22	-	3.02	No detailed FEMA Floodplain data available for this area.
S1310	9.02	3.33	0.00	3.33	-	36.91	No detailed FEMA Floodplain data available for this area.
S1320	98.91	33.85	0.00	33.85	-	34.22	No detailed FEMA Floodplain data available for this area.
S1330	1.78	1.23	0.00	1.23	-	69.09	No detailed FEMA Floodplain data available for this area.
S1340	6.92	5.64	0.00	5.64	-	81.53	No detailed FEMA Floodplain data available for this area.
S1510	13.52	0.90	0.00	0.90	-	6.68	No detailed FEMA Floodplain data available for this area.
S1530	8.58	1.24	0.00	1.24	-	14.44	No detailed FEMA Floodplain data available for this area.
S1540	13.66	1.14	0.00	1.14	-	8.32	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
S1560	20.15	1.29	0.00	1.29	-	6.42	No detailed FEMA Floodplain data available for this area.
S1570	2.29	0.89	0.00	0.89	-	39.02	No detailed FEMA Floodplain data available for this area.
S1575	5.79	0.13	0.00	0.13	-	2.31	No detailed FEMA Floodplain data available for this area.
S1580	1.28	0.67	0.00	0.67	-	51.90	No detailed FEMA Floodplain data available for this area.
S1610	8.10	0.79	0.00	0.79	-	9.79	No detailed FEMA Floodplain data available for this area.
S1620	7.24	0.07	0.00	0.07	-	0.97	No detailed FEMA Floodplain data available for this area.
S1630	3.68	0.58	0.00	0.58	-	15.73	No detailed FEMA Floodplain data available for this area.
S1640	1.62	0.26	0.00	0.26	-	16.07	No detailed FEMA Floodplain data available for this area.
S1710	20.08	1.00	0.00	1.00	-	4.98	No detailed FEMA Floodplain data available for this area.
S1720	5.97	0.62	0.00	0.62	-	10.37	No detailed FEMA Floodplain data available for this area.
S1730	12.89	1.80	0.00	1.80	-	14.00	No detailed FEMA Floodplain data available for this area.
S1740	37.37	0.22	0.00	0.22	-	0.58	No detailed FEMA Floodplain data available for this area.
S1750	3.62	0.52	0.00	0.52	-	14.28	No detailed FEMA Floodplain data available for this area.
S1760	1.55	0.36	0.00	0.36	-	23.17	No detailed FEMA Floodplain data available for this area.
S1810	39.39	2.73	0.00	2.73	-	6.93	No detailed FEMA Floodplain data available for this area.
S1820	12.76	2.10	0.00	2.10	-	16.43	No detailed FEMA Floodplain data available for this area.
S1830	12.48	2.07	0.00	2.07	-	16.62	No detailed FEMA Floodplain data available for this area.
S1910	26.50	7.86	0.00	7.86	-	29.65	No detailed FEMA Floodplain data available for this area.
S1920	17.00	3.34	0.00	3.34	-	19.68	No detailed FEMA Floodplain data available for this area.
S1930	11.68	0.97	0.00	0.97	-	8.32	No detailed FEMA Floodplain data available for this area.
S2010	18.79	0.37	0.00	0.37	-	1.95	No detailed FEMA Floodplain data available for this area.
S2020	19.84	1.07	0.00	1.07	-	5.41	No detailed FEMA Floodplain data available for this area.
S2029	11.04	1.78	0.00	1.78	-	16.09	No detailed FEMA Floodplain data available for this area.
S2040	12.46	1.34	0.00	1.34	-	10.75	No detailed FEMA Floodplain data available for this area.
S2045	46.04	3.53	0.00	3.53	-	7.68	No detailed FEMA Floodplain data available for this area.
S2050	63.00	4.90	0.00	4.90	-	7.78	No detailed FEMA Floodplain data available for this area.
S2070	44.85	2.70	0.00	2.70	-	6.01	No detailed FEMA Floodplain data available for this area.
S2510	5.83	0.15	0.00	0.15	-	2.53	No detailed FEMA Floodplain data available for this area.
S2705	16.07	0.30	3.98	3.68	92.52	22.91	No detailed FEMA Floodplain data available for this area.
S2710	16.77	0.26	1.10	0.84	76.24	5.01	No detailed FEMA Floodplain data available for this area.
S2717	4.69	0.09	0.00	0.09	-	1.95	No detailed FEMA Floodplain data available for this area.
S2718	10.73	0.52	0.00	0.52	-	4.86	No detailed FEMA Floodplain data available for this area.
S2719	1.25	0.23	0.00	0.23	-	18.19	No detailed FEMA Floodplain data available for this area.
S2720	36.68	0.75	1.59	0.84	52.71	2.28	No detailed FEMA Floodplain data available for this area.
S2810	1.48	0.18	0.00	0.18	-	12.24	No detailed FEMA Floodplain data available for this area.
S2820	20.12	0.65	0.00	0.65	-	3.24	No detailed FEMA Floodplain data available for this area.
S2830	2.90	0.76	0.00	0.76	-	26.04	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
S2840	8.29	0.83	0.00	0.83	-	9.99	No detailed FEMA Floodplain data available for this area.
S2850	1.22	0.37	0.00	0.37	-	30.34	No detailed FEMA Floodplain data available for this area.
S2910	2.71	0.16	0.00	0.16	-	5.85	No detailed FEMA Floodplain data available for this area.
S2920	2.25	0.24	0.00	0.24	-	10.90	No detailed FEMA Floodplain data available for this area.
S2930	1.50	0.60	0.00	0.60	-	39.88	No detailed FEMA Floodplain data available for this area.
S2940	5.13	0.71	0.00	0.71	-	13.76	No detailed FEMA Floodplain data available for this area.
S2950	1.03	0.07	0.00	0.07	-	6.53	No detailed FEMA Floodplain data available for this area.
S3010	12.71	0.45	0.00	0.45	-	3.51	No detailed FEMA Floodplain data available for this area.
S3020	23.32	1.66	0.00	1.66	-	7.13	No detailed FEMA Floodplain data available for this area.
S3030	2.39	0.87	0.00	0.87	-	36.25	No detailed FEMA Floodplain data available for this area.
S3040	5.62	0.72	0.00	0.72	-	12.84	No detailed FEMA Floodplain data available for this area.
S3050	3.01	0.32	0.00	0.32	-	10.60	No detailed FEMA Floodplain data available for this area.
S3510	24.26	0.93	0.00	0.93	-	3.82	No detailed FEMA Floodplain data available for this area.
S3520	8.94	0.99	0.00	0.99	-	11.11	No detailed FEMA Floodplain data available for this area.
S3525	1.26	0.44	0.00	0.44	-	34.76	No detailed FEMA Floodplain data available for this area.
S3530	22.98	2.18	0.00	2.18	-	9.51	No detailed FEMA Floodplain data available for this area.
S3540	5.73	0.46	0.00	0.46	-	8.00	No detailed FEMA Floodplain data available for this area.
S4010	6.10	0.90	0.00	0.90	-	14.79	No detailed FEMA Floodplain data available for this area.
S4020	17.65	1.66	0.00	1.66	-	9.38	No detailed FEMA Floodplain data available for this area.
S4030	9.56	1.01	0.00	1.01	-	10.52	No detailed FEMA Floodplain data available for this area.
S4050	7.41	0.29	0.00	0.29	-	3.96	No detailed FEMA Floodplain data available for this area.
S4510	13.98	0.53	0.00	0.53	-	3.81	No detailed FEMA Floodplain data available for this area.
S4520	7.70	0.71	0.00	0.71	-	9.23	No detailed FEMA Floodplain data available for this area.
S4530	2.02	0.16	0.00	0.16	-	7.90	No detailed FEMA Floodplain data available for this area.
S4540	0.40	0.14	0.00	0.14	-	34.44	No detailed FEMA Floodplain data available for this area.
S5010	21.29	13.99	0.00	13.99	-	65.72	No detailed FEMA Floodplain data available for this area.
S5020	3.49	2.08	0.00	2.08	-	59.53	No detailed FEMA Floodplain data available for this area.
S5030	4.63	2.65	0.00	2.65	-	57.30	No detailed FEMA Floodplain data available for this area.
S5040	6.13	3.65	0.00	3.65	-	59.62	No detailed FEMA Floodplain data available for this area.
S5050	6.39	4.59	0.00	4.59	-	71.79	No detailed FEMA Floodplain data available for this area.
S5059	6.81	0.25	0.00	0.25	-	3.71	No detailed FEMA Floodplain data available for this area.
S5060	6.23	3.83	0.00	3.83	-	61.43	No detailed FEMA Floodplain data available for this area.
S5070	4.05	2.88	0.00	2.88	-	71.01	No detailed FEMA Floodplain data available for this area.
S5080	5.48	3.76	0.00	3.76	-	68.63	No detailed FEMA Floodplain data available for this area.
S5090	7.33	5.42	0.00	5.42	-	73.97	No detailed FEMA Floodplain data available for this area.
S5100	7.84	5.33	0.00	5.33	-	68.00	No detailed FEMA Floodplain data available for this area.
S5109	4.63	2.61	0.00	2.61	-	56.44	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
S5110	2.85	2.43	0.00	2.43	-	85.19	No detailed FEMA Floodplain data available for this area.
S5114	45.50	10.29	0.00	10.29	-	22.61	No detailed FEMA Floodplain data available for this area.
S5116	12.35	1.98	0.00	1.98	-	16.06	No detailed FEMA Floodplain data available for this area.
S5117	2.28	1.17	0.00	1.17	-	51.31	No detailed FEMA Floodplain data available for this area.
S5118	3.44	1.37	0.00	1.37	-	39.86	No detailed FEMA Floodplain data available for this area.
S5119	15.97	7.89	0.00	7.89	-	49.42	No detailed FEMA Floodplain data available for this area.
S5120	3.53	2.71	0.00	2.71	-	76.95	No detailed FEMA Floodplain data available for this area.
S5130	2.89	0.92	0.00	0.92	-	31.90	No detailed FEMA Floodplain data available for this area.
S5142	5.97	2.49	0.00	2.49	-	41.73	No detailed FEMA Floodplain data available for this area.
S5144	5.04	1.18	0.00	1.18	-	23.40	No detailed FEMA Floodplain data available for this area.
S5146	2.20	0.74	0.00	0.74	-	33.69	No detailed FEMA Floodplain data available for this area.
S5150	3.93	2.98	0.00	2.98	-	75.83	No detailed FEMA Floodplain data available for this area.
S5158	2.25	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
S5160	4.61	1.37	0.00	1.37	-	29.71	No detailed FEMA Floodplain data available for this area.
S5162	3.19	0.00	0.00	0.00	-	0.00	No detailed FEMA Floodplain data available for this area.
S5163	8.94	0.90	0.00	0.90	-	10.07	No detailed FEMA Floodplain data available for this area.
S5165	3.14	0.45	0.00	0.45	-	14.40	No detailed FEMA Floodplain data available for this area.
S5170	3.51	1.47	0.00	1.47	-	42.00	No detailed FEMA Floodplain data available for this area.
S5173	11.80	10.08	0.00	10.08	-	85.45	No detailed FEMA Floodplain data available for this area.
S5174	4.11	0.54	0.00	0.54	-	13.21	No detailed FEMA Floodplain data available for this area.
S5175	4.58	0.65	0.00	0.65	-	14.19	No detailed FEMA Floodplain data available for this area.
S5180	6.59	3.57	0.00	3.57	-	54.10	No detailed FEMA Floodplain data available for this area.
S5189	40.91	13.34	0.00	13.34	-	32.61	No detailed FEMA Floodplain data available for this area.
S5198	13.90	1.12	0.00	1.12	-	8.07	No detailed FEMA Floodplain data available for this area.
S5200	4.63	2.51	0.00	2.51	-	54.20	No detailed FEMA Floodplain data available for this area.
S5210	3.72	2.40	0.00	2.40	-	64.66	No detailed FEMA Floodplain data available for this area.
S5220	2.18	1.45	0.00	1.45	-	66.43	No detailed FEMA Floodplain data available for this area.
S5229	52.20	4.52	0.00	4.52	-	8.67	No detailed FEMA Floodplain data available for this area.
S5230	1.48	0.98	0.00	0.98	-	65.99	No detailed FEMA Floodplain data available for this area.
S5238	5.91	0.40	0.00	0.40	-	6.72	No detailed FEMA Floodplain data available for this area.
S5240	2.26	1.38	0.00	1.38	-	60.95	No detailed FEMA Floodplain data available for this area.
S5245	5.57	0.26	0.00	0.26	-	4.72	No detailed FEMA Floodplain data available for this area.
S5250	3.55	2.35	0.00	2.35	-	66.16	No detailed FEMA Floodplain data available for this area.
S5255	10.24	0.26	0.00	0.26	-	2.54	No detailed FEMA Floodplain data available for this area.
S5258	6.34	2.17	0.00	2.17	-	34.30	No detailed FEMA Floodplain data available for this area.
S5260	2.99	1.98	0.00	1.98	-	66.31	No detailed FEMA Floodplain data available for this area.
S5270	4.22	2.70	0.00	2.70	-	63.93	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
S5275	14.09	0.27	0.00	0.27	-	1.90	No detailed FEMA Floodplain data available for this area.
S5278	8.63	6.84	0.00	6.84	-	79.32	No detailed FEMA Floodplain data available for this area.
S5280	2.54	1.53	0.00	1.53	-	60.44	No detailed FEMA Floodplain data available for this area.
S5290	2.55	1.53	0.00	1.53	-	59.78	No detailed FEMA Floodplain data available for this area.
S5295	10.51	0.22	0.00	0.22	-	2.11	No detailed FEMA Floodplain data available for this area.
S5300	2.96	1.81	0.00	1.81	-	60.95	No detailed FEMA Floodplain data available for this area.
S5310	2.46	1.56	0.00	1.56	-	63.16	No detailed FEMA Floodplain data available for this area.
S5313	5.97	2.14	0.00	2.14	-	35.86	No detailed FEMA Floodplain data available for this area.
S5318	12.00	0.56	0.00	0.56	-	4.66	No detailed FEMA Floodplain data available for this area.
S5320	2.02	1.26	0.00	1.26	-	62.62	No detailed FEMA Floodplain data available for this area.
S5325	10.31	0.52	0.00	0.52	-	5.01	No detailed FEMA Floodplain data available for this area.
S5330	3.46	2.16	0.00	2.16	-	62.25	No detailed FEMA Floodplain data available for this area.
S5340	2.68	1.74	0.00	1.74	-	65.08	No detailed FEMA Floodplain data available for this area.
S5348	11.92	9.32	0.00	9.32	-	78.21	No detailed FEMA Floodplain data available for this area.
S5349	10.70	7.23	0.00	7.23	-	67.57	No detailed FEMA Floodplain data available for this area.
S5350	1.91	1.28	0.00	1.28	-	67.31	No detailed FEMA Floodplain data available for this area.
S5360	5.06	2.69	0.00	2.69	-	53.16	No detailed FEMA Floodplain data available for this area.
S5368	2.43	0.63	0.00	0.63	-	26.04	No detailed FEMA Floodplain data available for this area.
S5369	7.93	1.77	0.00	1.77	-	22.39	No detailed FEMA Floodplain data available for this area.
S5370	2.36	1.28	0.00	1.28	-	54.27	No detailed FEMA Floodplain data available for this area.
S5378	17.17	4.69	0.00	4.69	-	27.30	No detailed FEMA Floodplain data available for this area.
S5379	1.17	0.64	0.00	0.64	-	54.54	No detailed FEMA Floodplain data available for this area.
S5380	4.09	2.34	0.00	2.34	-	57.25	No detailed FEMA Floodplain data available for this area.
S5388	9.65	0.57	0.00	0.57	-	5.92	No detailed FEMA Floodplain data available for this area.
S5389	7.25	1.07	0.00	1.07	-	14.77	No detailed FEMA Floodplain data available for this area.
S5390	3.23	1.88	0.00	1.88	-	58.20	No detailed FEMA Floodplain data available for this area.
S5400	11.24	3.36	0.00	3.36	-	29.85	No detailed FEMA Floodplain data available for this area.
S5405	33.82	4.99	0.00	4.99	-	14.76	No detailed FEMA Floodplain data available for this area.
S5410	29.87	9.83	0.00	9.83	-	32.91	No detailed FEMA Floodplain data available for this area.
S5420	29.88	2.49	0.00	2.49	-	8.33	No detailed FEMA Floodplain data available for this area.
S5430	0.65	0.21	0.00	0.21	-	32.41	No detailed FEMA Floodplain data available for this area.
S5440	22.61	2.31	0.00	2.31	-	10.22	No detailed FEMA Floodplain data available for this area.
S5450	16.90	7.27	0.00	7.27	-	43.01	No detailed FEMA Floodplain data available for this area.
S5460	31.56	4.70	0.00	4.70	-	14.89	No detailed FEMA Floodplain data available for this area.
S5470	10.01	2.22	0.00	2.22	-	22.18	No detailed FEMA Floodplain data available for this area.
S5480	10.36	5.52	0.00	5.52	-	53.28	No detailed FEMA Floodplain data available for this area.
S5490	29.14	3.77	0.00	3.77	-	12.94	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
S5500	16.68	0.73	0.00	0.73	-	4.36	No detailed FEMA Floodplain data available for this area.
S5520	13.37	1.58	0.00	1.58	-	11.80	No detailed FEMA Floodplain data available for this area.
S5530	47.98	4.10	0.00	4.10	-	8.54	No detailed FEMA Floodplain data available for this area.
S5540	4.89	2.56	0.00	2.56	-	52.32	No detailed FEMA Floodplain data available for this area.
S5545	6.09	1.69	0.00	1.69	-	27.76	No detailed FEMA Floodplain data available for this area.
S5549	16.44	1.37	0.00	1.37	-	8.32	No detailed FEMA Floodplain data available for this area.
S5550	39.66	15.59	0.00	15.59	-	39.30	No detailed FEMA Floodplain data available for this area.
S5560	26.12	2.44	0.00	2.44	-	9.32	No detailed FEMA Floodplain data available for this area.
S5566	1.97	0.30	0.00	0.30	-	15.16	No detailed FEMA Floodplain data available for this area.
S5567	1.88	0.50	0.00	0.50	-	26.52	No detailed FEMA Floodplain data available for this area.
S5570	12.93	0.94	0.00	0.94	-	7.25	No detailed FEMA Floodplain data available for this area.
S5577	9.59	1.04	0.00	1.04	-	10.89	No detailed FEMA Floodplain data available for this area.
S5578	2.32	0.96	0.00	0.96	-	41.59	No detailed FEMA Floodplain data available for this area.
S5579	3.87	0.21	0.00	0.21	-	5.31	No detailed FEMA Floodplain data available for this area.
S5580	3.69	1.54	0.00	1.54	-	41.75	No detailed FEMA Floodplain data available for this area.
S5590	42.37	3.75	0.00	3.75	-	8.86	No detailed FEMA Floodplain data available for this area.
S5600	18.53	11.08	4.46	6.63	148.58	35.75	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
S5610	2.56	2.52	2.56	0.04	1.55	1.55	1) Terrain differences resulting from using more recent and accurate Terrain data, 2) differences in methodology employed, 3) recent development that has occurred subsequent to FEMA's study, and 4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.
S9000	12.98	1.42	0.00	1.42	-	10.94	No detailed FEMA Floodplain data available for this area.
S9050	12.82	2.39	0.00	2.39	-	18.64	No detailed FEMA Floodplain data available for this area.
S9055	49.89	11.98	0.00	11.98	-	24.01	No detailed FEMA Floodplain data available for this area.
S9060	2.47	2.25	0.00	2.25	-	91.20	No detailed FEMA Floodplain data available for this area.
S9065	0.28	0.22	0.00	0.22	-	80.17	No detailed FEMA Floodplain data available for this area.
S9070	10.90	1.40	0.00	1.40	-	12.89	No detailed FEMA Floodplain data available for this area.
S9075	31.70	5.89	0.00	5.89	-	18.59	No detailed FEMA Floodplain data available for this area.
S9080	0.42	0.35	0.00	0.35	-	82.76	No detailed FEMA Floodplain data available for this area.
S9085	34.18	6.66	0.00	6.66	-	19.50	No detailed FEMA Floodplain data available for this area.
S9090	31.20	29.60	0.00	29.60	-	94.89	No detailed FEMA Floodplain data available for this area.
S9095	3.39	1.18	0.00	1.18	-	34.79	No detailed FEMA Floodplain data available for this area.
S9100	2.04	0.29	0.00	0.29	-	14.11	No detailed FEMA Floodplain data available for this area.
S9110	1.23	0.01	0.00	0.01	-	0.57	No detailed FEMA Floodplain data available for this area.
S9200	0.69	0.11	0.00	0.11	-	16.29	No detailed FEMA Floodplain data available for this area.
S9610	4.16	1.15	0.00	1.15	-	27.71	No detailed FEMA Floodplain data available for this area.
S9620	0.65	0.33	0.00	0.33	-	51.39	No detailed FEMA Floodplain data available for this area.
T0010	2.61	1.45	0.00	1.45	-	55.51	No detailed FEMA Floodplain data available for this area.
T0013	14.32	3.61	0.00	3.61	-	25.23	No detailed FEMA Floodplain data available for this area.
T0014	7.12	0.22	0.00	0.22	-	3.13	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
T0015	7.80	0.15	0.00	0.15	-	1.98	No detailed FEMA Floodplain data available for this area.
T0016	6.25	0.81	0.00	0.81	-	13.04	No detailed FEMA Floodplain data available for this area.
T0017	1.44	0.13	0.00	0.13	-	8.91	No detailed FEMA Floodplain data available for this area.
T0018	6.36	0.26	0.00	0.26	-	4.10	No detailed FEMA Floodplain data available for this area.
T0019	5.70	3.53	0.00	3.53	-	61.98	No detailed FEMA Floodplain data available for this area.
T0030	2.91	1.75	0.00	1.75	-	60.08	No detailed FEMA Floodplain data available for this area.
T0035	15.25	0.57	0.00	0.57	-	3.71	No detailed FEMA Floodplain data available for this area.
T0040	2.89	1.92	0.00	1.92	-	66.34	No detailed FEMA Floodplain data available for this area.
T0043	22.93	9.77	0.00	9.77	-	42.60	No detailed FEMA Floodplain data available for this area.
T0045	9.44	5.45	0.00	5.45	-	57.74	No detailed FEMA Floodplain data available for this area.
T0050	10.87	2.79	0.00	2.79	-	25.67	No detailed FEMA Floodplain data available for this area.
T0060	30.04	0.45	0.00	0.45	-	1.49	No detailed FEMA Floodplain data available for this area.
T0065	24.62	3.57	0.00	3.57	-	14.49	No detailed FEMA Floodplain data available for this area.
T0068	5.67	2.37	0.00	2.37	-	41.81	No detailed FEMA Floodplain data available for this area.
T0069	12.18	2.59	0.00	2.59	-	21.31	No detailed FEMA Floodplain data available for this area.
T0070	15.76	2.50	0.00	2.50	-	15.88	No detailed FEMA Floodplain data available for this area.
T0073	20.08	8.44	0.00	8.44	-	42.06	No detailed FEMA Floodplain data available for this area.
T0077	34.68	16.79	0.00	16.79	-	48.43	No detailed FEMA Floodplain data available for this area.
T0080	14.80	3.26	0.00	3.26	-	22.05	No detailed FEMA Floodplain data available for this area.
T0090	29.53	4.39	0.00	4.39	-	14.87	No detailed FEMA Floodplain data available for this area.
T0092	2.59	1.00	0.00	1.00	-	38.45	No detailed FEMA Floodplain data available for this area.
T0093	26.67	11.95	0.00	11.95	-	44.80	No detailed FEMA Floodplain data available for this area.
T0097	6.76	1.04	0.00	1.04	-	15.42	No detailed FEMA Floodplain data available for this area.
T0100	40.76	7.00	0.00	7.00	-	17.17	No detailed FEMA Floodplain data available for this area.
T0110	34.23	8.56	0.00	8.56	-	25.00	No detailed FEMA Floodplain data available for this area.
T0112	6.98	0.53	0.00	0.53	-	7.58	No detailed FEMA Floodplain data available for this area.
T0115	7.67	2.08	0.00	2.08	-	27.09	No detailed FEMA Floodplain data available for this area.
T0118	1.67	0.74	0.00	0.74	-	44.15	No detailed FEMA Floodplain data available for this area.
T0120	16.19	10.10	0.00	10.10	-	62.39	No detailed FEMA Floodplain data available for this area.
T1010	10.00	0.86	0.00	0.86	-	8.63	No detailed FEMA Floodplain data available for this area.
T1020	15.12	1.08	0.00	1.08	-	7.14	No detailed FEMA Floodplain data available for this area.
T1030	13.20	1.62	0.00	1.62	-	12.25	No detailed FEMA Floodplain data available for this area.
T1040	5.20	0.64	0.00	0.64	-	12.33	No detailed FEMA Floodplain data available for this area.
T1050	3.30	0.16	0.00	0.16	-	4.73	No detailed FEMA Floodplain data available for this area.
T2010	10.33	0.62	0.00	0.62	-	6.01	No detailed FEMA Floodplain data available for this area.
T2020	15.84	1.38	0.00	1.38	-	8.70	No detailed FEMA Floodplain data available for this area.
T2030	45.34	3.38	0.00	3.38	-	7.46	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
T2040	29.51	1.83	0.00	1.83	-	6.22	No detailed FEMA Floodplain data available for this area.
T2050	19.33	1.85	0.00	1.85	-	9.56	No detailed FEMA Floodplain data available for this area.
T2510	3.06	0.32	0.00	0.32	-	10.43	No detailed FEMA Floodplain data available for this area.
T2520	10.93	0.76	0.00	0.76	-	6.94	No detailed FEMA Floodplain data available for this area.
T2530	6.59	0.83	0.00	0.83	-	12.63	No detailed FEMA Floodplain data available for this area.
T2540	3.20	0.22	0.00	0.22	-	6.91	No detailed FEMA Floodplain data available for this area.
T2550	19.20	0.72	0.00	0.72	-	3.74	No detailed FEMA Floodplain data available for this area.
T2560	22.84	8.08	0.00	8.08	-	35.40	No detailed FEMA Floodplain data available for this area.
T2570	7.63	0.48	0.00	0.48	-	6.27	No detailed FEMA Floodplain data available for this area.
T2580	1.10	0.24	0.00	0.24	-	21.99	No detailed FEMA Floodplain data available for this area.
T3006	24.19	2.59	0.00	2.59	-	10.71	No detailed FEMA Floodplain data available for this area.
T3008	7.07	2.98	0.00	2.98	-	42.10	No detailed FEMA Floodplain data available for this area.
T3010	7.66	2.72	0.00	2.72	-	35.52	No detailed FEMA Floodplain data available for this area.
T3014	21.22	12.55	0.00	12.55	-	59.16	No detailed FEMA Floodplain data available for this area.
T3015	2.11	1.34	0.00	1.34	-	63.70	No detailed FEMA Floodplain data available for this area.
T3020	11.34	0.24	0.00	0.24	-	2.08	No detailed FEMA Floodplain data available for this area.
T3030	2.09	0.38	0.00	0.38	-	18.41	No detailed FEMA Floodplain data available for this area.
T3040	5.05	0.39	0.00	0.39	-	7.67	No detailed FEMA Floodplain data available for this area.
T4010	34.93	2.34	0.00	2.34	-	6.71	No detailed FEMA Floodplain data available for this area.
T4020	11.75	4.74	0.00	4.74	-	40.34	No detailed FEMA Floodplain data available for this area.
T4021	15.28	6.65	0.00	6.65	-	43.52	No detailed FEMA Floodplain data available for this area.
T4022	18.15	3.94	0.00	3.94	-	21.69	No detailed FEMA Floodplain data available for this area.
T4030	1.75	0.35	0.00	0.35	-	20.06	No detailed FEMA Floodplain data available for this area.
T4040	36.49	15.35	0.00	15.35	-	42.07	No detailed FEMA Floodplain data available for this area.
T4060	0.28	0.07	0.00	0.07	-	24.22	No detailed FEMA Floodplain data available for this area.
U0486	7.64	4.33	0.00	4.33	-	56.63	No detailed FEMA Floodplain data available for this area.
U0487	3.85	1.04	0.00	1.04	-	27.02	No detailed FEMA Floodplain data available for this area.
U0490	44.64	36.98	0.00	36.98	-	82.84	No detailed FEMA Floodplain data available for this area.
U0493	15.13	6.77	0.00	6.77	-	44.74	No detailed FEMA Floodplain data available for this area.
U0494	13.08	5.56	0.00	5.56	-	42.48	No detailed FEMA Floodplain data available for this area.
U0495	38.38	19.22	0.00	19.22	-	50.07	No detailed FEMA Floodplain data available for this area.
U0500	67.24	55.94	0.00	55.94	-	83.19	No detailed FEMA Floodplain data available for this area.
U0507	22.13	22.13	0.00	22.13	-	100.00	No detailed FEMA Floodplain data available for this area.
U0510	23.54	23.54	0.00	23.54	-	99.99	No detailed FEMA Floodplain data available for this area.
U0512	27.88	27.88	0.00	27.88	-	100.00	No detailed FEMA Floodplain data available for this area.
U0515	5.09	4.28	0.00	4.28	-	84.11	No detailed FEMA Floodplain data available for this area.
U0520	33.32	26.52	0.00	26.52	-	79.58	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
U0525	8.61	6.46	0.00	6.46	-	75.03	No detailed FEMA Floodplain data available for this area.
U0530	7.77	7.77	0.00	7.77	-	100.00	No detailed FEMA Floodplain data available for this area.
U0537	83.59	51.74	0.00	51.74	-	61.89	No detailed FEMA Floodplain data available for this area.
U0538	6.65	1.87	0.00	1.87	-	28.19	No detailed FEMA Floodplain data available for this area.
U0540	143.52	107.27	0.00	107.27	-	74.74	No detailed FEMA Floodplain data available for this area.
U0543	30.23	9.61	0.00	9.61	-	31.79	No detailed FEMA Floodplain data available for this area.
U0545	16.87	14.62	0.00	14.62	-	86.70	No detailed FEMA Floodplain data available for this area.
U0550	47.19	28.32	0.00	28.32	-	60.02	No detailed FEMA Floodplain data available for this area.
U0551	16.78	7.03	0.00	7.03	-	41.91	No detailed FEMA Floodplain data available for this area.
U0552	23.80	10.56	0.00	10.56	-	44.37	No detailed FEMA Floodplain data available for this area.
U0553	4.39	2.38	0.00	2.38	-	54.21	No detailed FEMA Floodplain data available for this area.
U0554	33.16	8.32	0.00	8.32	-	25.09	No detailed FEMA Floodplain data available for this area.
U0555	5.09	2.70	0.00	2.70	-	53.05	No detailed FEMA Floodplain data available for this area.
U0556	29.71	19.33	0.00	19.33	-	65.07	No detailed FEMA Floodplain data available for this area.
U0557	5.19	2.15	0.00	2.15	-	41.44	No detailed FEMA Floodplain data available for this area.
U0558	10.29	7.56	0.00	7.56	-	73.47	No detailed FEMA Floodplain data available for this area.
U0560	91.00	57.86	0.00	57.86	-	63.58	No detailed FEMA Floodplain data available for this area.
U0570	64.68	60.47	0.00	60.47	-	93.49	No detailed FEMA Floodplain data available for this area.
U0575	55.25	36.09	0.00	36.09	-	65.32	No detailed FEMA Floodplain data available for this area.
U0580	57.30	55.72	0.00	55.72	-	97.24	No detailed FEMA Floodplain data available for this area.
U0590	12.71	12.62	0.00	12.62	-	99.27	No detailed FEMA Floodplain data available for this area.
U0610	4.28	3.01	0.00	3.01	-	70.24	No detailed FEMA Floodplain data available for this area.
U0640	0.38	0.12	0.00	0.12	-	31.37	No detailed FEMA Floodplain data available for this area.
U0645	16.74	7.38	0.00	7.38	-	44.09	No detailed FEMA Floodplain data available for this area.
U0646	13.69	7.84	0.00	7.84	-	57.31	No detailed FEMA Floodplain data available for this area.
U0647	4.68	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
U0648	8.29	0.55	0.00	0.55	-	6.69	No detailed FEMA Floodplain data available for this area.
U0650	30.59	16.33	0.00	16.33	-	53.37	No detailed FEMA Floodplain data available for this area.
U0655	20.81	10.80	0.00	10.80	-	51.90	No detailed FEMA Floodplain data available for this area.
U2610	13.63	4.92	0.00	4.92	-	36.08	No detailed FEMA Floodplain data available for this area.
U2625	4.20	2.42	0.00	2.42	-	57.68	No detailed FEMA Floodplain data available for this area.
U2630	27.79	17.92	0.00	17.92	-	64.48	No detailed FEMA Floodplain data available for this area.
U2710	1.38	0.78	0.00	0.78	-	56.23	No detailed FEMA Floodplain data available for this area.
U2720	8.76	4.86	0.00	4.86	-	55.53	No detailed FEMA Floodplain data available for this area.
U2730	40.73	26.63	0.00	26.63	-	65.39	No detailed FEMA Floodplain data available for this area.
U2735	96.16	12.03	0.00	12.03	-	12.51	No detailed FEMA Floodplain data available for this area.
U2737	6.25	2.90	0.00	2.90	-	46.36	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
U2740	34.05	22.61	0.00	22.61	-	66.42	No detailed FEMA Floodplain data available for this area.
U2745	5.90	4.73	0.00	4.73	-	80.28	No detailed FEMA Floodplain data available for this area.
U2750	17.59	15.61	0.00	15.61	-	88.78	No detailed FEMA Floodplain data available for this area.
U2753	2.36	1.04	0.00	1.04	-	44.11	No detailed FEMA Floodplain data available for this area.
U2755	13.24	10.23	0.00	10.23	-	77.25	No detailed FEMA Floodplain data available for this area.
U2756	0.06	0.06	0.00	0.06	-	99.90	No detailed FEMA Floodplain data available for this area.
U2757	7.25	7.25	0.00	7.25	-	100.00	No detailed FEMA Floodplain data available for this area.
U2760	17.46	15.30	0.00	15.30	-	87.65	No detailed FEMA Floodplain data available for this area.
U2770	3.23	3.23	0.00	3.23	-	99.98	No detailed FEMA Floodplain data available for this area.
U3126	5.20	1.71	0.00	1.71	-	32.89	No detailed FEMA Floodplain data available for this area.
U3130	5.53	4.03	0.00	4.03	-	72.83	No detailed FEMA Floodplain data available for this area.
U3135	10.29	3.49	0.00	3.49	-	33.90	No detailed FEMA Floodplain data available for this area.
U3140	15.32	8.04	0.00	8.04	-	52.50	No detailed FEMA Floodplain data available for this area.
U3150	48.23	29.66	0.00	29.66	-	61.50	No detailed FEMA Floodplain data available for this area.
U3160	55.75	45.25	0.00	45.25	-	81.17	No detailed FEMA Floodplain data available for this area.
U3163	41.40	28.61	0.00	28.61	-	69.11	No detailed FEMA Floodplain data available for this area.
U3165	22.31	6.56	0.00	6.56	-	29.42	No detailed FEMA Floodplain data available for this area.
U3170	37.70	30.95	0.00	30.95	-	82.10	No detailed FEMA Floodplain data available for this area.
U3255	7.05	3.78	0.00	3.78	-	53.59	No detailed FEMA Floodplain data available for this area.
U3260	12.29	5.17	0.00	5.17	-	42.06	No detailed FEMA Floodplain data available for this area.
U3270	50.07	31.45	0.00	31.45	-	62.81	No detailed FEMA Floodplain data available for this area.
U3490	1.07	0.31	0.00	0.31	-	28.64	No detailed FEMA Floodplain data available for this area.
U3510	7.38	6.55	0.00	6.55	-	88.71	No detailed FEMA Floodplain data available for this area.
U3810	2.44	1.01	0.00	1.01	-	41.61	No detailed FEMA Floodplain data available for this area.
U3815	9.61	5.23	0.00	5.23	-	54.39	No detailed FEMA Floodplain data available for this area.
U3820	33.68	22.79	0.00	22.79	-	67.68	No detailed FEMA Floodplain data available for this area.
U3825	16.02	7.03	0.00	7.03	-	43.91	No detailed FEMA Floodplain data available for this area.
U3830	31.56	19.99	0.00	19.99	-	63.32	No detailed FEMA Floodplain data available for this area.
U3840	48.62	39.20	0.00	39.20	-	80.63	No detailed FEMA Floodplain data available for this area.
U3843	15.53	6.33	0.00	6.33	-	40.75	No detailed FEMA Floodplain data available for this area.
U3845	3.55	2.44	0.00	2.44	-	68.66	No detailed FEMA Floodplain data available for this area.
U3848	25.82	13.69	0.00	13.69	-	53.03	No detailed FEMA Floodplain data available for this area.
U3850	63.07	27.50	0.00	27.50	-	43.59	No detailed FEMA Floodplain data available for this area.
U3910	7.13	2.69	0.00	2.69	-	37.74	No detailed FEMA Floodplain data available for this area.
U3915	4.81	3.49	0.00	3.49	-	72.48	No detailed FEMA Floodplain data available for this area.
U3920	19.07	9.49	0.00	9.49	-	49.78	No detailed FEMA Floodplain data available for this area.
U3930	11.72	8.57	0.00	8.57	-	73.14	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
U3940	14.75	11.33	0.00	11.33	-	76.80	No detailed FEMA Floodplain data available for this area.
U4010	46.83	29.04	0.00	29.04	-	62.01	No detailed FEMA Floodplain data available for this area.
U4020	7.69	3.22	0.00	3.22	-	41.91	No detailed FEMA Floodplain data available for this area.
U4030	6.41	2.45	0.00	2.45	-	38.28	No detailed FEMA Floodplain data available for this area.
U4040	4.68	3.17	0.00	3.17	-	67.66	No detailed FEMA Floodplain data available for this area.
U4050	26.59	14.91	0.00	14.91	-	56.07	No detailed FEMA Floodplain data available for this area.
U4052	24.46	12.74	0.00	12.74	-	52.06	No detailed FEMA Floodplain data available for this area.
U4053	40.67	26.98	0.00	26.98	-	66.35	No detailed FEMA Floodplain data available for this area.
U4054	64.89	54.87	0.00	54.87	-	84.55	No detailed FEMA Floodplain data available for this area.
U4055	7.89	6.52	0.00	6.52	-	82.64	No detailed FEMA Floodplain data available for this area.
U4060	62.66	48.04	0.00	48.04	-	76.67	No detailed FEMA Floodplain data available for this area.
U4070	25.94	14.91	0.00	14.91	-	57.46	No detailed FEMA Floodplain data available for this area.
U4080	35.07	15.99	0.00	15.99	-	45.60	No detailed FEMA Floodplain data available for this area.
U4082	15.98	10.53	0.00	10.53	-	65.89	No detailed FEMA Floodplain data available for this area.
U4084	20.13	12.45	0.00	12.45	-	61.86	No detailed FEMA Floodplain data available for this area.
U4087	14.86	1.28	0.00	1.28	-	8.60	No detailed FEMA Floodplain data available for this area.
U4090	38.35	20.09	0.00	20.09	-	52.39	No detailed FEMA Floodplain data available for this area.
U4100	46.61	23.28	0.00	23.28	-	49.95	No detailed FEMA Floodplain data available for this area.
U4105	33.31	26.77	0.00	26.77	-	80.36	No detailed FEMA Floodplain data available for this area.
U4110	18.18	13.60	0.00	13.60	-	74.79	No detailed FEMA Floodplain data available for this area.
U4112	22.57	11.40	0.00	11.40	-	50.52	No detailed FEMA Floodplain data available for this area.
U4113	4.29	2.88	0.00	2.88	-	67.10	No detailed FEMA Floodplain data available for this area.
U4115	14.87	4.77	0.00	4.77	-	32.05	No detailed FEMA Floodplain data available for this area.
U4117	3.69	2.63	0.00	2.63	-	71.20	No detailed FEMA Floodplain data available for this area.
U4124	7.00	3.45	0.00	3.45	-	49.30	No detailed FEMA Floodplain data available for this area.
U4125	65.77	44.58	0.00	44.58	-	67.78	No detailed FEMA Floodplain data available for this area.
U4126	11.67	8.81	0.00	8.81	-	75.52	No detailed FEMA Floodplain data available for this area.
U4128	61.97	48.56	0.00	48.56	-	78.37	No detailed FEMA Floodplain data available for this area.
U4130	75.73	39.20	0.00	39.20	-	51.77	No detailed FEMA Floodplain data available for this area.
U4140	38.11	18.24	0.00	18.24	-	47.87	No detailed FEMA Floodplain data available for this area.
U4150	19.57	8.41	0.00	8.41	-	42.94	No detailed FEMA Floodplain data available for this area.
U4155	9.96	4.81	0.00	4.81	-	48.32	No detailed FEMA Floodplain data available for this area.
U4160	42.36	34.17	0.00	34.17	-	80.67	No detailed FEMA Floodplain data available for this area.
U4165	8.44	7.46	0.00	7.46	-	88.31	No detailed FEMA Floodplain data available for this area.
U4210	8.05	7.33	0.00	7.33	-	91.01	No detailed FEMA Floodplain data available for this area.
U4220	14.95	13.13	0.00	13.13	-	87.83	No detailed FEMA Floodplain data available for this area.
U4225	26.63	13.54	0.00	13.54	-	50.84	No detailed FEMA Floodplain data available for this area.

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U4230	12.70	11.34	0.00	11.34	-	89.25	No detailed FEMA Floodplain data available for this area.
U4240	40.43	14.44	0.00	14.44	-	35.72	No detailed FEMA Floodplain data available for this area.
U4250	23.96	23.10	0.00	23.10	-	96.39	No detailed FEMA Floodplain data available for this area.
U4260	37.70	37.44	0.00	37.44	-	99.31	No detailed FEMA Floodplain data available for this area.
U4410	24.01	12.53	0.00	12.53	-	52.21	No detailed FEMA Floodplain data available for this area.
U4420	26.92	19.17	0.00	19.17	-	71.22	No detailed FEMA Floodplain data available for this area.
U4430	18.17	8.14	0.00	8.14	-	44.80	No detailed FEMA Floodplain data available for this area.
U4440	55.08	41.68	0.00	41.68	-	75.66	No detailed FEMA Floodplain data available for this area.
U4445	20.49	6.71	0.00	6.71	-	32.76	No detailed FEMA Floodplain data available for this area.
U4450	72.56	48.49	0.00	48.49	-	66.83	No detailed FEMA Floodplain data available for this area.
U4610	28.72	16.94	0.00	16.94	-	58.97	No detailed FEMA Floodplain data available for this area.
U4615	19.78	10.07	0.00	10.07	-	50.92	No detailed FEMA Floodplain data available for this area.
U4620	48.85	21.69	0.00	21.69	-	44.41	No detailed FEMA Floodplain data available for this area.
U4623	8.76	3.34	0.00	3.34	-	38.14	No detailed FEMA Floodplain data available for this area.
U4627	9.23	7.27	0.00	7.27	-	78.78	No detailed FEMA Floodplain data available for this area.
U4630	49.66	15.61	0.00	15.61	-	31.43	No detailed FEMA Floodplain data available for this area.
U4640	68.59	48.55	0.00	48.55	-	70.79	No detailed FEMA Floodplain data available for this area.
U4642	3.27	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
U4644	34.31	16.54	0.00	16.54	-	48.20	No detailed FEMA Floodplain data available for this area.
U4646	22.63	16.38	0.00	16.38	-	72.38	No detailed FEMA Floodplain data available for this area.
U4660	32.08	20.27	0.00	20.27	-	63.18	No detailed FEMA Floodplain data available for this area.
U4675	64.99	39.59	0.00	39.59	-	60.92	No detailed FEMA Floodplain data available for this area.
U4677	39.29	22.49	0.00	22.49	-	57.25	No detailed FEMA Floodplain data available for this area.
U4680	23.10	20.38	0.00	20.38	-	88.25	No detailed FEMA Floodplain data available for this area.
U4710	38.48	22.69	0.00	22.69	-	58.97	No detailed FEMA Floodplain data available for this area.
U4720	22.92	10.99	0.00	10.99	-	47.95	No detailed FEMA Floodplain data available for this area.
U4725	2.96	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
U4730	12.04	4.56	0.00	4.56	-	37.86	No detailed FEMA Floodplain data available for this area.
U4740	6.88	3.44	0.00	3.44	-	49.94	No detailed FEMA Floodplain data available for this area.
U4750	15.33	11.21	0.00	11.21	-	73.13	No detailed FEMA Floodplain data available for this area.
U4760	12.92	7.18	0.00	7.18	-	55.58	No detailed FEMA Floodplain data available for this area.
U4770	13.05	12.48	0.00	12.48	-	95.65	No detailed FEMA Floodplain data available for this area.
U4810	5.21	4.04	0.00	4.04	-	77.56	No detailed FEMA Floodplain data available for this area.
U4820	26.39	21.65	0.00	21.65	-	82.03	No detailed FEMA Floodplain data available for this area.
U4830	12.80	10.27	0.00	10.27	-	80.23	No detailed FEMA Floodplain data available for this area.
U4840	11.31	8.21	0.00	8.21	-	72.54	No detailed FEMA Floodplain data available for this area.
U4844	18.29	15.62	0.00	15.62	-	85.37	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
U4850	12.82	10.74	0.00	10.74	-	83.79	No detailed FEMA Floodplain data available for this area.
U4857	3.62	2.48	0.00	2.48	-	68.59	No detailed FEMA Floodplain data available for this area.
U4860	19.06	17.90	0.00	17.90	-	93.88	No detailed FEMA Floodplain data available for this area.
U4870	18.48	17.47	0.00	17.47	-	94.50	No detailed FEMA Floodplain data available for this area.
U4910	2.22	0.78	0.00	0.78	-	34.94	No detailed FEMA Floodplain data available for this area.
U4920	14.77	6.81	0.00	6.81	-	46.11	No detailed FEMA Floodplain data available for this area.
U5010	2.40	0.36	0.00	0.36	-	14.93	No detailed FEMA Floodplain data available for this area.
U5020	0.29	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
U5030	0.26	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
U5040	11.89	2.14	0.00	2.14	-	17.96	No detailed FEMA Floodplain data available for this area.
U5050	6.37	5.74	0.00	5.74	-	90.08	No detailed FEMA Floodplain data available for this area.
U5060	0.40	0.13	0.00	0.13	-	32.18	No detailed FEMA Floodplain data available for this area.
U5080	0.33	0.15	0.00	0.15	-	44.47	No detailed FEMA Floodplain data available for this area.
U5090	20.32	6.87	0.00	6.87	-	33.80	No detailed FEMA Floodplain data available for this area.
U5095	11.86	11.07	0.00	11.07	-	93.38	No detailed FEMA Floodplain data available for this area.
U5185	25.48	24.44	0.00	24.44	-	95.92	No detailed FEMA Floodplain data available for this area.
U5202	18.02	18.02	0.00	18.02	-	100.00	No detailed FEMA Floodplain data available for this area.
U5203	7.45	7.45	0.00	7.45	-	100.00	No detailed FEMA Floodplain data available for this area.
U5205	12.24	12.23	0.00	12.23	-	99.99	No detailed FEMA Floodplain data available for this area.
U5207	22.00	22.00	0.00	22.00	-	100.00	No detailed FEMA Floodplain data available for this area.
U5210	12.79	12.79	0.00	12.79	-	100.00	No detailed FEMA Floodplain data available for this area.
U5220	15.72	15.72	0.00	15.72	-	100.00	No detailed FEMA Floodplain data available for this area.
U5410	17.07	17.07	0.00	17.07	-	100.00	No detailed FEMA Floodplain data available for this area.
U5420	68.04	68.04	0.00	68.04	-	100.00	No detailed FEMA Floodplain data available for this area.
U5421	18.72	16.87	0.00	16.87	-	90.13	No detailed FEMA Floodplain data available for this area.
U5422	6.01	3.18	0.00	3.18	-	52.93	No detailed FEMA Floodplain data available for this area.
U5423	16.96	11.35	0.00	11.35	-	66.94	No detailed FEMA Floodplain data available for this area.
U5424	9.34	7.43	0.00	7.43	-	79.57	No detailed FEMA Floodplain data available for this area.
U5425	40.50	24.57	0.00	24.57	-	60.65	No detailed FEMA Floodplain data available for this area.
U5426	24.05	24.05	0.00	24.05	-	100.00	No detailed FEMA Floodplain data available for this area.
U5427	9.11	9.11	0.00	9.11	-	100.00	No detailed FEMA Floodplain data available for this area.
U5428	15.29	15.01	0.00	15.01	-	98.12	No detailed FEMA Floodplain data available for this area.
U5429	9.78	9.66	0.00	9.66	-	98.77	No detailed FEMA Floodplain data available for this area.
U5430	40.60	15.91	0.00	15.91	-	39.20	No detailed FEMA Floodplain data available for this area.
U5440	18.93	7.01	0.00	7.01	-	37.01	No detailed FEMA Floodplain data available for this area.
U5450	84.25	38.83	0.00	38.83	-	46.09	No detailed FEMA Floodplain data available for this area.
U5455	8.05	3.10	0.00	3.10	-	38.52	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
U5457	37.64	23.83	0.00	23.83	-	63.30	No detailed FEMA Floodplain data available for this area.
U5460	21.98	6.55	0.00	6.55	-	29.79	No detailed FEMA Floodplain data available for this area.
U5470	7.48	3.84	0.00	3.84	-	51.30	No detailed FEMA Floodplain data available for this area.
U5480	64.68	51.05	0.00	51.05	-	78.93	No detailed FEMA Floodplain data available for this area.
U5482	56.92	36.82	0.00	36.82	-	64.69	No detailed FEMA Floodplain data available for this area.
U5484	28.43	20.90	0.00	20.90	-	73.51	No detailed FEMA Floodplain data available for this area.
U5486	6.16	2.50	0.00	2.50	-	40.52	No detailed FEMA Floodplain data available for this area.
U5487	27.35	17.46	0.00	17.46	-	63.84	No detailed FEMA Floodplain data available for this area.
U5488	7.26	2.72	0.00	2.72	-	37.42	No detailed FEMA Floodplain data available for this area.
U5490	3.01	3.01	0.00	3.01	-	100.00	No detailed FEMA Floodplain data available for this area.
U5495	10.98	2.35	0.00	2.35	-	21.39	No detailed FEMA Floodplain data available for this area.
U5500	28.41	24.00	0.00	24.00	-	84.48	No detailed FEMA Floodplain data available for this area.
U5520	30.63	19.89	0.00	19.89	-	64.95	No detailed FEMA Floodplain data available for this area.
U5525	20.03	7.96	0.00	7.96	-	39.74	No detailed FEMA Floodplain data available for this area.
U5530	24.78	10.68	0.00	10.68	-	43.11	No detailed FEMA Floodplain data available for this area.
U5540	29.32	14.80	0.00	14.80	-	50.46	No detailed FEMA Floodplain data available for this area.
U5545	17.20	6.09	0.00	6.09	-	35.39	No detailed FEMA Floodplain data available for this area.
U5550	10.65	5.86	0.00	5.86	-	55.01	No detailed FEMA Floodplain data available for this area.
U5555	31.32	16.22	0.00	16.22	-	51.81	No detailed FEMA Floodplain data available for this area.
U5570	17.88	8.71	0.00	8.71	-	48.68	No detailed FEMA Floodplain data available for this area.
U5580	8.24	6.92	0.00	6.92	-	84.08	No detailed FEMA Floodplain data available for this area.
U5590	58.26	27.62	0.00	27.62	-	47.40	No detailed FEMA Floodplain data available for this area.
U5595	32.94	30.91	0.00	30.91	-	93.83	No detailed FEMA Floodplain data available for this area.
U5610	4.58	0.56	0.00	0.56	-	12.17	No detailed FEMA Floodplain data available for this area.
U5620	0.27	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
U5630	0.31	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
U5640	9.92	2.30	0.00	2.30	-	23.22	No detailed FEMA Floodplain data available for this area.
U5710	0.20	0.09	0.00	0.09	-	42.46	No detailed FEMA Floodplain data available for this area.
U5720	0.33	0.21	0.00	0.21	-	62.31	No detailed FEMA Floodplain data available for this area.
U5730	12.80	4.96	0.00	4.96	-	38.79	No detailed FEMA Floodplain data available for this area.
U5810	6.42	3.17	0.00	3.17	-	49.41	No detailed FEMA Floodplain data available for this area.
U5820	11.64	7.42	0.00	7.42	-	63.75	No detailed FEMA Floodplain data available for this area.
U5825	6.71	4.46	0.00	4.46	-	66.51	No detailed FEMA Floodplain data available for this area.
U5830	54.97	32.27	0.00	32.27	-	58.71	No detailed FEMA Floodplain data available for this area.
U5835	18.66	6.18	0.00	6.18	-	33.12	No detailed FEMA Floodplain data available for this area.
U5840	97.68	28.46	0.00	28.46	-	29.14	No detailed FEMA Floodplain data available for this area.
U5845	34.31	19.15	0.00	19.15	-	55.81	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
U5850	137.41	65.36	0.00	65.36	-	47.57	No detailed FEMA Floodplain data available for this area.
U5870	3.84	3.20	0.00	3.20	-	83.26	No detailed FEMA Floodplain data available for this area.
U5910	16.74	5.16	0.00	5.16	-	30.84	No detailed FEMA Floodplain data available for this area.
U5915	5.75	3.29	0.00	3.29	-	57.21	No detailed FEMA Floodplain data available for this area.
U5920	68.42	38.59	0.00	38.59	-	56.40	No detailed FEMA Floodplain data available for this area.
U5930	22.77	19.09	0.00	19.09	-	83.81	No detailed FEMA Floodplain data available for this area.
U5940	32.91	17.56	0.00	17.56	-	53.37	No detailed FEMA Floodplain data available for this area.
U6010	13.57	7.65	0.00	7.65	-	56.38	No detailed FEMA Floodplain data available for this area.
U6020	14.51	9.91	0.00	9.91	-	68.29	No detailed FEMA Floodplain data available for this area.
U6021	24.16	3.38	0.00	3.38	-	14.00	No detailed FEMA Floodplain data available for this area.
U6022	10.28	0.67	0.00	0.67	-	6.53	No detailed FEMA Floodplain data available for this area.
U6023	83.38	74.21	0.00	74.21	-	89.00	No detailed FEMA Floodplain data available for this area.
U6024	5.49	3.57	0.00	3.57	-	65.05	No detailed FEMA Floodplain data available for this area.
U6026	13.86	9.35	0.00	9.35	-	67.43	No detailed FEMA Floodplain data available for this area.
U6030	122.00	80.39	0.00	80.39	-	65.90	No detailed FEMA Floodplain data available for this area.
U6040	4.97	1.09	0.00	1.09	-	21.93	No detailed FEMA Floodplain data available for this area.
U6070	57.31	20.68	0.00	20.68	-	36.08	No detailed FEMA Floodplain data available for this area.
U6080	41.68	5.42	0.00	5.42	-	13.00	No detailed FEMA Floodplain data available for this area.
U6090	17.10	9.71	0.00	9.71	-	56.77	No detailed FEMA Floodplain data available for this area.
U6095	15.89	2.91	0.00	2.91	-	18.32	No detailed FEMA Floodplain data available for this area.
U6100	27.00	18.09	0.00	18.09	-	66.99	No detailed FEMA Floodplain data available for this area.
U6103	26.26	8.47	0.00	8.47	-	32.27	No detailed FEMA Floodplain data available for this area.
U6107	12.86	11.29	0.00	11.29	-	87.82	No detailed FEMA Floodplain data available for this area.
U6110	64.50	18.64	0.00	18.64	-	28.89	No detailed FEMA Floodplain data available for this area.
U6310	4.97	2.02	0.00	2.02	-	40.70	No detailed FEMA Floodplain data available for this area.
U6320	5.10	1.76	0.00	1.76	-	34.44	No detailed FEMA Floodplain data available for this area.
U6330	15.31	8.36	0.00	8.36	-	54.60	No detailed FEMA Floodplain data available for this area.
U6335	26.73	6.80	0.00	6.80	-	25.43	No detailed FEMA Floodplain data available for this area.
U6340	33.68	29.13	0.00	29.13	-	86.47	No detailed FEMA Floodplain data available for this area.
U6350	11.25	6.42	0.00	6.42	-	57.08	No detailed FEMA Floodplain data available for this area.
U6360	41.53	18.30	0.00	18.30	-	44.06	No detailed FEMA Floodplain data available for this area.
U6361	9.33	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
U6362	7.98	1.40	0.00	1.40	-	17.60	No detailed FEMA Floodplain data available for this area.
U6370	10.74	8.53	0.00	8.53	-	79.46	No detailed FEMA Floodplain data available for this area.
U6380	6.91	5.77	0.00	5.77	-	83.54	No detailed FEMA Floodplain data available for this area.
U6383	5.44	4.68	0.00	4.68	-	86.11	No detailed FEMA Floodplain data available for this area.
U6385	1.24	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
U6387	7.00	1.13	0.00	1.13	-	16.20	No detailed FEMA Floodplain data available for this area.
U6390	16.31	8.73	0.00	8.73	-	53.51	No detailed FEMA Floodplain data available for this area.
U6410	24.80	16.47	0.00	16.47	-	66.44	No detailed FEMA Floodplain data available for this area.
U6416	6.92	1.53	0.00	1.53	-	22.17	No detailed FEMA Floodplain data available for this area.
U6420	4.30	0.75	0.00	0.75	-	17.38	No detailed FEMA Floodplain data available for this area.
U6607	29.54	14.72	0.00	14.72	-	49.83	No detailed FEMA Floodplain data available for this area.
U6612	5.77	3.20	0.00	3.20	-	55.51	No detailed FEMA Floodplain data available for this area.
U6620	15.10	10.79	0.00	10.79	-	71.42	No detailed FEMA Floodplain data available for this area.
U6630	24.86	22.18	0.00	22.18	-	89.25	No detailed FEMA Floodplain data available for this area.
U6640	12.26	8.84	0.00	8.84	-	72.09	No detailed FEMA Floodplain data available for this area.
U6650	9.80	7.01	0.00	7.01	-	71.51	No detailed FEMA Floodplain data available for this area.
U6655	0.88	0.65	0.00	0.65	-	73.62	No detailed FEMA Floodplain data available for this area.
U6660	4.85	1.98	0.00	1.98	-	40.81	No detailed FEMA Floodplain data available for this area.
U6666	9.07	1.70	0.00	1.70	-	18.78	No detailed FEMA Floodplain data available for this area.
U6670	4.94	2.91	0.00	2.91	-	58.96	No detailed FEMA Floodplain data available for this area.
U6680	2.76	1.95	0.00	1.95	-	70.72	No detailed FEMA Floodplain data available for this area.
U6690	1.35	0.72	0.00	0.72	-	53.06	No detailed FEMA Floodplain data available for this area.
U6700	1.28	0.47	0.00	0.47	-	36.83	No detailed FEMA Floodplain data available for this area.
U6810	3.20	1.62	0.00	1.62	-	50.59	No detailed FEMA Floodplain data available for this area.
U6820	0.92	0.21	0.00	0.21	-	23.02	No detailed FEMA Floodplain data available for this area.
U6825	0.47	0.24	0.00	0.24	-	51.22	No detailed FEMA Floodplain data available for this area.
U6830	0.49	0.11	0.00	0.11	-	23.36	No detailed FEMA Floodplain data available for this area.
U6834	0.47	0.09	0.00	0.09	-	19.61	No detailed FEMA Floodplain data available for this area.
U6840	7.12	2.73	0.00	2.73	-	38.40	No detailed FEMA Floodplain data available for this area.
U6850	0.16	0.09	0.00	0.09	-	54.56	No detailed FEMA Floodplain data available for this area.
U6860	0.63	0.24	0.00	0.24	-	38.91	No detailed FEMA Floodplain data available for this area.
U6870	0.08	0.02	0.00	0.02	-	27.64	No detailed FEMA Floodplain data available for this area.
U6880	5.54	4.55	0.00	4.55	-	82.21	No detailed FEMA Floodplain data available for this area.
U6890	0.66	0.09	0.00	0.09	-	14.00	No detailed FEMA Floodplain data available for this area.
U6900	7.90	1.68	0.00	1.68	-	21.26	No detailed FEMA Floodplain data available for this area.
U6910	0.61	0.21	0.00	0.21	-	34.10	No detailed FEMA Floodplain data available for this area.
U6915	0.58	0.19	0.00	0.19	-	32.57	No detailed FEMA Floodplain data available for this area.
U6920	0.49	0.05	0.00	0.05	-	10.39	No detailed FEMA Floodplain data available for this area.
U6930	5.03	3.61	0.00	3.61	-	71.77	No detailed FEMA Floodplain data available for this area.
U6940	0.34	0.15	0.00	0.15	-	43.45	No detailed FEMA Floodplain data available for this area.
U6945	0.66	0.17	0.00	0.17	-	26.29	No detailed FEMA Floodplain data available for this area.
U6950	0.45	0.21	0.00	0.21	-	47.06	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
U6960	0.60	0.34	0.00	0.34	-	57.76	No detailed FEMA Floodplain data available for this area.
U6970	23.77	11.77	0.00	11.77	-	49.50	No detailed FEMA Floodplain data available for this area.
U6975	16.87	8.03	0.00	8.03	-	47.59	No detailed FEMA Floodplain data available for this area.
U7010	4.19	0.47	0.00	0.47	-	11.30	No detailed FEMA Floodplain data available for this area.
U7110	6.50	1.69	0.00	1.69	-	26.06	No detailed FEMA Floodplain data available for this area.
U7210	0.77	0.20	0.00	0.20	-	26.36	No detailed FEMA Floodplain data available for this area.
U7220	0.37	0.01	0.00	0.01	-	2.91	No detailed FEMA Floodplain data available for this area.
U7230	5.30	1.87	0.00	1.87	-	35.27	No detailed FEMA Floodplain data available for this area.
U7310	23.97	14.01	0.00	14.01	-	58.44	No detailed FEMA Floodplain data available for this area.
U7320	65.63	50.35	0.00	50.35	-	76.72	No detailed FEMA Floodplain data available for this area.
U7330	6.71	5.84	0.00	5.84	-	86.98	No detailed FEMA Floodplain data available for this area.
U7355	4.38	2.13	0.00	2.13	-	48.70	No detailed FEMA Floodplain data available for this area.
U7360	29.44	20.09	0.00	20.09	-	68.23	No detailed FEMA Floodplain data available for this area.
U7363	30.83	13.20	0.00	13.20	-	42.83	No detailed FEMA Floodplain data available for this area.
U7365	4.54	4.40	0.00	4.40	-	97.06	No detailed FEMA Floodplain data available for this area.
U7367	1.94	1.41	0.00	1.41	-	72.71	No detailed FEMA Floodplain data available for this area.
U7370	22.28	17.49	0.00	17.49	-	78.48	No detailed FEMA Floodplain data available for this area.
U7375	5.58	4.36	0.00	4.36	-	78.18	No detailed FEMA Floodplain data available for this area.
U7380	7.48	6.35	0.00	6.35	-	84.85	No detailed FEMA Floodplain data available for this area.
U7390	6.49	6.03	0.00	6.03	-	92.88	No detailed FEMA Floodplain data available for this area.
U7400	2.98	2.66	0.00	2.66	-	89.35	No detailed FEMA Floodplain data available for this area.
U7510	12.28	2.62	0.00	2.62	-	21.30	No detailed FEMA Floodplain data available for this area.
U7520	0.50	0.01	0.00	0.01	-	1.99	No detailed FEMA Floodplain data available for this area.
U7530	0.94	0.60	0.00	0.60	-	63.51	No detailed FEMA Floodplain data available for this area.
U7540	0.64	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
U7550	2.57	0.74	0.00	0.74	-	28.64	No detailed FEMA Floodplain data available for this area.
U7560	0.99	0.18	0.00	0.18	-	18.44	No detailed FEMA Floodplain data available for this area.
U7570	1.43	0.48	0.00	0.48	-	33.81	No detailed FEMA Floodplain data available for this area.
U8210	11.48	9.44	0.00	9.44	-	82.24	No detailed FEMA Floodplain data available for this area.
U8220	14.72	11.66	0.00	11.66	-	79.23	No detailed FEMA Floodplain data available for this area.
U8230	5.60	4.87	0.00	4.87	-	86.90	No detailed FEMA Floodplain data available for this area.
U8240	4.92	3.91	0.00	3.91	-	79.39	No detailed FEMA Floodplain data available for this area.
U8250	6.05	4.25	0.00	4.25	-	70.23	No detailed FEMA Floodplain data available for this area.
U8260	2.21	1.05	0.00	1.05	-	47.27	No detailed FEMA Floodplain data available for this area.
U9000	21.36	12.90	0.00	12.90	-	60.41	No detailed FEMA Floodplain data available for this area.
U9002	13.03	8.89	0.00	8.89	-	68.27	No detailed FEMA Floodplain data available for this area.
U9003	0.74	0.61	0.00	0.61	-	82.44	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
U9004	5.04	2.41	0.00	2.41	-	47.77	No detailed FEMA Floodplain data available for this area.
U9005	4.58	1.02	0.00	1.02	-	22.28	No detailed FEMA Floodplain data available for this area.
U9006	21.24	8.85	0.00	8.85	-	41.67	No detailed FEMA Floodplain data available for this area.
U9007	3.55	1.41	0.00	1.41	-	39.66	No detailed FEMA Floodplain data available for this area.
U9008	4.13	1.94	0.00	1.94	-	47.07	No detailed FEMA Floodplain data available for this area.
U9009	12.26	8.92	0.00	8.92	-	72.78	No detailed FEMA Floodplain data available for this area.
U9011	19.77	5.49	0.00	5.49	-	27.77	No detailed FEMA Floodplain data available for this area.
U9012	7.43	3.94	0.00	3.94	-	52.98	No detailed FEMA Floodplain data available for this area.
U9013	5.03	1.28	0.00	1.28	-	25.46	No detailed FEMA Floodplain data available for this area.
U9014	4.84	1.26	0.00	1.26	-	26.13	No detailed FEMA Floodplain data available for this area.
U9015	3.00	0.91	0.00	0.91	-	30.23	No detailed FEMA Floodplain data available for this area.
U9016	2.16	0.15	0.00	0.15	-	6.86	No detailed FEMA Floodplain data available for this area.
U9017	1.66	0.12	0.00	0.12	-	7.19	No detailed FEMA Floodplain data available for this area.
U9018	3.13	2.31	0.00	2.31	-	73.82	No detailed FEMA Floodplain data available for this area.
U9019	0.58	0.37	0.00	0.37	-	63.97	No detailed FEMA Floodplain data available for this area.
U9021	1.09	0.80	0.00	0.80	-	73.60	No detailed FEMA Floodplain data available for this area.
U9022	5.22	1.02	0.00	1.02	-	19.61	No detailed FEMA Floodplain data available for this area.
U9023	2.74	0.69	0.00	0.69	-	25.29	No detailed FEMA Floodplain data available for this area.
U9024	2.38	0.53	0.00	0.53	-	22.30	No detailed FEMA Floodplain data available for this area.
U9025	5.21	4.22	0.00	4.22	-	81.03	No detailed FEMA Floodplain data available for this area.
U9026	4.50	2.11	0.00	2.11	-	46.91	No detailed FEMA Floodplain data available for this area.
U9027	2.01	0.45	0.00	0.45	-	22.10	No detailed FEMA Floodplain data available for this area.
U9028	3.95	3.46	0.00	3.46	-	87.59	No detailed FEMA Floodplain data available for this area.
U9029	23.56	21.11	0.00	21.11	-	89.60	No detailed FEMA Floodplain data available for this area.
U9030	4.27	1.17	0.00	1.17	-	27.35	No detailed FEMA Floodplain data available for this area.
U9031	6.60	2.94	0.00	2.94	-	44.48	No detailed FEMA Floodplain data available for this area.
U9032	2.03	1.30	0.00	1.30	-	64.09	No detailed FEMA Floodplain data available for this area.
U9033	6.19	3.23	0.00	3.23	-	52.20	No detailed FEMA Floodplain data available for this area.
U9034	5.08	0.96	0.00	0.96	-	18.99	No detailed FEMA Floodplain data available for this area.
U9035	0.28	0.11	0.00	0.11	-	40.67	No detailed FEMA Floodplain data available for this area.
U9036	1.90	1.60	0.00	1.60	-	84.01	No detailed FEMA Floodplain data available for this area.
U9037	0.91	0.03	0.00	0.03	-	2.84	No detailed FEMA Floodplain data available for this area.
U9038	1.53	0.34	0.00	0.34	-	21.97	No detailed FEMA Floodplain data available for this area.
U9039	2.13	0.03	0.00	0.03	-	1.26	No detailed FEMA Floodplain data available for this area.
U9040	0.80	0.58	0.00	0.58	-	72.80	No detailed FEMA Floodplain data available for this area.
U9041	1.80	0.78	0.00	0.78	-	43.08	No detailed FEMA Floodplain data available for this area.
U9042	5.69	4.76	0.00	4.76	-	83.69	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
U9043	7.79	5.15	0.00	5.15	-	66.14	No detailed FEMA Floodplain data available for this area.
U9044	2.85	0.14	0.00	0.14	-	4.91	No detailed FEMA Floodplain data available for this area.
U9045	7.23	0.21	0.00	0.21	-	2.87	No detailed FEMA Floodplain data available for this area.
U9046	2.12	0.27	0.00	0.27	-	12.89	No detailed FEMA Floodplain data available for this area.
U9051	1.09	0.68	0.00	0.68	-	62.63	No detailed FEMA Floodplain data available for this area.
U9052	4.39	0.19	0.00	0.19	-	4.22	No detailed FEMA Floodplain data available for this area.
U9053	3.69	0.29	0.00	0.29	-	7.87	No detailed FEMA Floodplain data available for this area.
U9054	1.01	0.08	0.00	0.08	-	8.06	No detailed FEMA Floodplain data available for this area.
U9055	6.18	2.23	0.00	2.23	-	36.17	No detailed FEMA Floodplain data available for this area.
U9056	3.31	0.13	0.00	0.13	-	3.99	No detailed FEMA Floodplain data available for this area.
U9057	2.23	0.13	0.00	0.13	-	5.61	No detailed FEMA Floodplain data available for this area.
U9058	0.62	0.22	0.00	0.22	-	35.70	No detailed FEMA Floodplain data available for this area.
U9059	2.68	1.76	0.00	1.76	-	65.71	No detailed FEMA Floodplain data available for this area.
U9061	1.56	1.18	0.00	1.18	-	75.16	No detailed FEMA Floodplain data available for this area.
U9062	20.96	3.86	0.00	3.86	-	18.41	No detailed FEMA Floodplain data available for this area.
U9065	0.46	0.22	0.00	0.22	-	48.45	No detailed FEMA Floodplain data available for this area.
U9066	1.09	0.92	0.00	0.92	-	83.74	No detailed FEMA Floodplain data available for this area.
U9067	19.13	15.00	0.00	15.00	-	78.38	No detailed FEMA Floodplain data available for this area.
U9068	8.94	1.64	0.00	1.64	-	18.30	No detailed FEMA Floodplain data available for this area.
U9069	0.26	0.13	0.00	0.13	-	51.72	No detailed FEMA Floodplain data available for this area.
U9070	2.75	0.66	0.00	0.66	-	24.00	No detailed FEMA Floodplain data available for this area.
U9071	3.02	2.67	0.00	2.67	-	88.55	No detailed FEMA Floodplain data available for this area.
U9072	1.74	1.50	0.00	1.50	-	86.04	No detailed FEMA Floodplain data available for this area.
U9073	0.46	0.29	0.00	0.29	-	62.97	No detailed FEMA Floodplain data available for this area.
U9074	0.92	0.40	0.00	0.40	-	43.44	No detailed FEMA Floodplain data available for this area.
U9080	1.96	1.24	0.00	1.24	-	63.15	No detailed FEMA Floodplain data available for this area.
U9081	8.04	5.30	0.00	5.30	-	65.87	No detailed FEMA Floodplain data available for this area.
U9082	2.70	0.55	0.00	0.55	-	20.24	No detailed FEMA Floodplain data available for this area.
U9083	2.15	0.50	0.00	0.50	-	23.25	No detailed FEMA Floodplain data available for this area.
U9084	5.28	1.07	0.00	1.07	-	20.28	No detailed FEMA Floodplain data available for this area.
U9085	46.70	27.81	0.00	27.81	-	59.54	No detailed FEMA Floodplain data available for this area.
U9086	0.79	0.42	0.00	0.42	-	53.02	No detailed FEMA Floodplain data available for this area.
U9087	0.03	0.01	0.00	0.01	-	40.51	No detailed FEMA Floodplain data available for this area.
U9088	0.10	0.06	0.00	0.06	-	54.48	No detailed FEMA Floodplain data available for this area.
U9089	3.96	0.54	0.00	0.54	-	13.71	No detailed FEMA Floodplain data available for this area.
U9090	9.76	8.66	0.00	8.66	-	88.68	No detailed FEMA Floodplain data available for this area.
U9091	0.03	0.01	0.00	0.01	-	46.13	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
U9092	2.31	0.23	0.00	0.23	-	10.08	No detailed FEMA Floodplain data available for this area.
U9093	0.11	0.06	0.00	0.06	-	51.62	No detailed FEMA Floodplain data available for this area.
U9094	1.79	0.12	0.00	0.12	-	6.55	No detailed FEMA Floodplain data available for this area.
U9095	0.09	0.01	0.00	0.01	-	16.59	No detailed FEMA Floodplain data available for this area.
U9096	1.28	0.04	0.00	0.04	-	3.18	No detailed FEMA Floodplain data available for this area.
U9097	1.35	0.05	0.00	0.05	-	3.65	No detailed FEMA Floodplain data available for this area.
U9098	1.24	0.12	0.00	0.12	-	9.64	No detailed FEMA Floodplain data available for this area.
U9100	13.79	7.80	0.00	7.80	-	56.56	No detailed FEMA Floodplain data available for this area.
U9101	0.74	0.00	0.00	0.00	-	0.05	No detailed FEMA Floodplain data available for this area.
U9110	16.54	3.16	0.00	3.16	-	19.07	No detailed FEMA Floodplain data available for this area.
U9115	10.51	2.65	0.00	2.65	-	25.18	No detailed FEMA Floodplain data available for this area.
U9120	1.19	0.24	0.00	0.24	-	20.50	No detailed FEMA Floodplain data available for this area.
U9125	6.06	1.33	0.00	1.33	-	22.01	No detailed FEMA Floodplain data available for this area.
U9130	0.88	0.05	0.00	0.05	-	5.99	No detailed FEMA Floodplain data available for this area.
U9135	3.74	0.05	0.00	0.05	-	1.42	No detailed FEMA Floodplain data available for this area.
U9140	2.13	0.15	0.00	0.15	-	6.81	No detailed FEMA Floodplain data available for this area.
U9145	1.75	0.44	0.00	0.44	-	25.41	No detailed FEMA Floodplain data available for this area.
U9155	1.36	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
U9160	2.96	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
U9201	14.97	3.86	0.00	3.86	-	25.81	No detailed FEMA Floodplain data available for this area.
U9301	1.03	0.10	0.00	0.10	-	9.81	No detailed FEMA Floodplain data available for this area.
U9400	14.36	12.04	0.00	12.04	-	83.86	No detailed FEMA Floodplain data available for this area.
U9450	16.08	4.25	0.00	4.25	-	26.42	No detailed FEMA Floodplain data available for this area.
U9500	6.28	5.61	0.00	5.61	-	89.25	No detailed FEMA Floodplain data available for this area.
U9600	3.23	2.63	0.00	2.63	-	81.40	No detailed FEMA Floodplain data available for this area.
U9700	1.40	1.16	0.00	1.16	-	82.51	No detailed FEMA Floodplain data available for this area.
U9800	1.90	1.60	0.00	1.60	-	84.24	No detailed FEMA Floodplain data available for this area.
U9810	0.29	0.09	0.00	0.09	-	32.81	No detailed FEMA Floodplain data available for this area.
U9820	3.62	0.81	0.00	0.81	-	22.45	No detailed FEMA Floodplain data available for this area.
U9830	0.66	0.28	0.00	0.28	-	41.89	No detailed FEMA Floodplain data available for this area.
U9900	0.57	0.40	0.00	0.40	-	70.72	No detailed FEMA Floodplain data available for this area.
U9910	0.07	0.04	0.00	0.04	-	55.26	No detailed FEMA Floodplain data available for this area.
V0001	2.05	0.60	0.00	0.60	-	29.40	No detailed FEMA Floodplain data available for this area.
V0002	9.38	5.88	0.00	5.88	-	62.63	No detailed FEMA Floodplain data available for this area.
V0003	2.41	0.54	0.00	0.54	-	22.20	No detailed FEMA Floodplain data available for this area.
V0004	1.83	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
V0005	8.09	4.21	0.00	4.21	-	51.96	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
V0006	6.06	1.09	0.00	1.09	-	17.95	No detailed FEMA Floodplain data available for this area.
V0007	9.38	1.64	0.00	1.64	-	17.53	No detailed FEMA Floodplain data available for this area.
V0008	0.74	0.45	0.00	0.45	-	60.78	No detailed FEMA Floodplain data available for this area.
V0009	2.86	1.87	0.00	1.87	-	65.53	No detailed FEMA Floodplain data available for this area.
V0011	3.05	1.38	0.00	1.38	-	45.08	No detailed FEMA Floodplain data available for this area.
V0012	19.98	4.50	0.00	4.50	-	22.53	No detailed FEMA Floodplain data available for this area.
V0014	18.71	1.75	0.00	1.75	-	9.35	No detailed FEMA Floodplain data available for this area.
V0015	8.16	0.13	0.00	0.13	-	1.57	No detailed FEMA Floodplain data available for this area.
V0020	1.57	1.04	0.00	1.04	-	66.14	No detailed FEMA Floodplain data available for this area.
V0029	5.52	0.01	0.00	0.01	-	0.20	No detailed FEMA Floodplain data available for this area.
V0030	5.44	0.52	0.00	0.52	-	9.61	No detailed FEMA Floodplain data available for this area.
V0040	15.24	1.55	0.00	1.55	-	10.15	No detailed FEMA Floodplain data available for this area.
V0045	62.46	3.44	0.00	3.44	-	5.50	No detailed FEMA Floodplain data available for this area.
V0050	55.80	2.07	0.00	2.07	-	3.70	No detailed FEMA Floodplain data available for this area.
V0051	17.18	1.91	0.00	1.91	-	11.09	No detailed FEMA Floodplain data available for this area.
V0055	0.65	0.20	0.00	0.20	-	31.36	No detailed FEMA Floodplain data available for this area.
V0060	7.20	3.47	0.00	3.47	-	48.10	No detailed FEMA Floodplain data available for this area.
V0062	3.28	0.13	0.00	0.13	-	3.86	No detailed FEMA Floodplain data available for this area.
V0064	4.22	1.30	0.00	1.30	-	30.82	No detailed FEMA Floodplain data available for this area.
V0065	22.68	4.04	0.00	4.04	-	17.79	No detailed FEMA Floodplain data available for this area.
V0066	4.63	1.38	0.00	1.38	-	29.92	No detailed FEMA Floodplain data available for this area.
V0068	8.44	1.30	0.00	1.30	-	15.36	No detailed FEMA Floodplain data available for this area.
V0070	5.89	2.60	0.00	2.60	-	44.12	No detailed FEMA Floodplain data available for this area.
V0073	27.30	2.92	0.00	2.92	-	10.69	No detailed FEMA Floodplain data available for this area.
V0077	1.68	0.62	0.00	0.62	-	36.85	No detailed FEMA Floodplain data available for this area.
V0080	2.91	2.00	0.00	2.00	-	68.76	No detailed FEMA Floodplain data available for this area.
V0090	24.84	4.60	0.00	4.60	-	18.50	No detailed FEMA Floodplain data available for this area.
V0100	17.84	1.87	0.00	1.87	-	10.50	No detailed FEMA Floodplain data available for this area.
V0110	10.54	2.13	0.00	2.13	-	20.26	No detailed FEMA Floodplain data available for this area.
V0120	2.71	0.58	0.00	0.58	-	21.46	No detailed FEMA Floodplain data available for this area.
V0130	11.25	0.53	0.00	0.53	-	4.74	No detailed FEMA Floodplain data available for this area.
V0135	8.86	0.32	0.00	0.32	-	3.55	No detailed FEMA Floodplain data available for this area.
V0140	4.50	2.25	0.00	2.25	-	49.91	No detailed FEMA Floodplain data available for this area.
V0160	24.55	1.03	0.00	1.03	-	4.20	No detailed FEMA Floodplain data available for this area.
V0170	12.22	1.00	0.00	1.00	-	8.18	No detailed FEMA Floodplain data available for this area.
V0180	33.63	2.17	0.00	2.17	-	6.45	No detailed FEMA Floodplain data available for this area.
V0187	13.10	2.49	0.00	2.49	-	19.03	No detailed FEMA Floodplain data available for this area.

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V0190	19.68	1.68	0.00	1.68	-	8.53	No detailed FEMA Floodplain data available for this area.
V0200	15.17	1.39	0.00	1.39	-	9.17	No detailed FEMA Floodplain data available for this area.
V0205	8.31	0.41	0.00	0.41	-	4.96	No detailed FEMA Floodplain data available for this area.
V0210	29.21	1.74	0.00	1.74	-	5.97	No detailed FEMA Floodplain data available for this area.
V0220	13.02	1.52	0.00	1.52	-	11.66	No detailed FEMA Floodplain data available for this area.
V0230	14.49	1.02	0.00	1.02	-	7.02	No detailed FEMA Floodplain data available for this area.
V0240	23.87	1.40	0.00	1.40	-	5.86	No detailed FEMA Floodplain data available for this area.
V0250	10.52	0.88	0.00	0.88	-	8.33	No detailed FEMA Floodplain data available for this area.
V1010	5.36	1.55	0.00	1.55	-	28.83	No detailed FEMA Floodplain data available for this area.
V1015	36.76	25.85	0.00	25.85	-	70.31	No detailed FEMA Floodplain data available for this area.
V1033	17.66	17.21	0.00	17.21	-	97.46	No detailed FEMA Floodplain data available for this area.
V1037	29.57	26.39	0.00	26.39	-	89.24	No detailed FEMA Floodplain data available for this area.
V1040	30.44	27.40	0.00	27.40	-	90.01	No detailed FEMA Floodplain data available for this area.
V1043	89.73	66.46	0.00	66.46	-	74.06	No detailed FEMA Floodplain data available for this area.
V1047	83.48	55.17	0.00	55.17	-	66.09	No detailed FEMA Floodplain data available for this area.
V1050	37.35	29.27	0.00	29.27	-	78.36	No detailed FEMA Floodplain data available for this area.
V1080	20.04	2.73	0.00	2.73	-	13.64	No detailed FEMA Floodplain data available for this area.
V1090	0.42	0.19	0.00	0.19	-	45.98	No detailed FEMA Floodplain data available for this area.
V2011	12.18	0.80	0.00	0.80	-	6.58	No detailed FEMA Floodplain data available for this area.
V2015	6.78	0.57	0.00	0.57	-	8.47	No detailed FEMA Floodplain data available for this area.
V2210	20.60	1.51	0.00	1.51	-	7.35	No detailed FEMA Floodplain data available for this area.
V2220	3.49	0.59	0.00	0.59	-	16.85	No detailed FEMA Floodplain data available for this area.
V2520	7.38	0.59	0.00	0.59	-	8.01	No detailed FEMA Floodplain data available for this area.
V2530	14.26	2.19	0.00	2.19	-	15.38	No detailed FEMA Floodplain data available for this area.
V2540	17.43	2.13	0.00	2.13	-	12.24	No detailed FEMA Floodplain data available for this area.
V2550	11.96	2.46	0.00	2.46	-	20.60	No detailed FEMA Floodplain data available for this area.
V2560	14.30	3.43	0.00	3.43	-	23.96	No detailed FEMA Floodplain data available for this area.
V2570	35.87	8.07	0.00	8.07	-	22.49	No detailed FEMA Floodplain data available for this area.
V2590	21.54	4.38	0.00	4.38	-	20.33	No detailed FEMA Floodplain data available for this area.
V2600	10.55	1.90	0.00	1.90	-	18.03	No detailed FEMA Floodplain data available for this area.
V2610	7.41	1.98	0.00	1.98	-	26.68	No detailed FEMA Floodplain data available for this area.
V2810	9.57	3.19	0.00	3.19	-	33.35	No detailed FEMA Floodplain data available for this area.
V2830	5.68	1.03	0.00	1.03	-	18.11	No detailed FEMA Floodplain data available for this area.
V2840	2.56	0.95	0.00	0.95	-	37.15	No detailed FEMA Floodplain data available for this area.
V2850	9.66	0.88	0.00	0.88	-	9.06	No detailed FEMA Floodplain data available for this area.
V2853	1.64	0.55	0.00	0.55	-	33.58	No detailed FEMA Floodplain data available for this area.
V2857	3.69	1.17	0.00	1.17	-	31.74	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
V2860	4.92	1.30	0.00	1.30	-	26.38	No detailed FEMA Floodplain data available for this area.
V2880	9.24	1.19	0.00	1.19	-	12.89	No detailed FEMA Floodplain data available for this area.
V2890	1.41	0.65	0.00	0.65	-	45.72	No detailed FEMA Floodplain data available for this area.
V3010	13.45	0.71	0.00	0.71	-	5.27	No detailed FEMA Floodplain data available for this area.
V3020	23.39	0.57	0.00	0.57	-	2.44	No detailed FEMA Floodplain data available for this area.
V3042	5.35	4.38	0.00	4.38	-	81.85	No detailed FEMA Floodplain data available for this area.
V3060	7.80	0.48	0.00	0.48	-	6.21	No detailed FEMA Floodplain data available for this area.
V3510	5.68	0.00	0.00	0.00	-	0.01	No detailed FEMA Floodplain data available for this area.
V3520	5.32	1.98	0.00	1.98	-	37.15	No detailed FEMA Floodplain data available for this area.
V3530	5.02	1.45	0.00	1.45	-	28.80	No detailed FEMA Floodplain data available for this area.
V3540	6.69	1.44	0.00	1.44	-	21.54	No detailed FEMA Floodplain data available for this area.
V3550	9.49	2.65	0.00	2.65	-	27.91	No detailed FEMA Floodplain data available for this area.
V4020	5.81	2.63	0.00	2.63	-	45.21	No detailed FEMA Floodplain data available for this area.
V4025	7.64	1.23	0.00	1.23	-	16.14	No detailed FEMA Floodplain data available for this area.
V4030	3.41	1.02	0.00	1.02	-	29.82	No detailed FEMA Floodplain data available for this area.
V4035	37.34	1.20	0.00	1.20	-	3.22	No detailed FEMA Floodplain data available for this area.
V4040	4.41	3.36	0.00	3.36	-	76.02	No detailed FEMA Floodplain data available for this area.
V4050	0.68	0.16	0.00	0.16	-	23.14	No detailed FEMA Floodplain data available for this area.
V4060	0.78	0.14	0.00	0.14	-	17.93	No detailed FEMA Floodplain data available for this area.
V4070	1.08	0.20	0.00	0.20	-	18.73	No detailed FEMA Floodplain data available for this area.
V4080	1.38	0.23	0.00	0.23	-	16.61	No detailed FEMA Floodplain data available for this area.
V4090	1.18	0.19	0.00	0.19	-	15.94	No detailed FEMA Floodplain data available for this area.
V4100	1.02	0.22	0.00	0.22	-	21.31	No detailed FEMA Floodplain data available for this area.
V4110	0.96	0.20	0.00	0.20	-	21.14	No detailed FEMA Floodplain data available for this area.
V4120	0.98	0.27	0.00	0.27	-	28.10	No detailed FEMA Floodplain data available for this area.
V4130	0.95	0.38	0.00	0.38	-	40.19	No detailed FEMA Floodplain data available for this area.
V4140	1.24	0.56	0.00	0.56	-	44.96	No detailed FEMA Floodplain data available for this area.
V4150	1.59	0.68	0.00	0.68	-	42.74	No detailed FEMA Floodplain data available for this area.
V4160	1.24	0.54	0.00	0.54	-	43.43	No detailed FEMA Floodplain data available for this area.
V4170	1.20	0.29	0.00	0.29	-	24.21	No detailed FEMA Floodplain data available for this area.
V4180	1.07	0.33	0.00	0.33	-	30.71	No detailed FEMA Floodplain data available for this area.
V4190	1.35	0.30	0.00	0.30	-	22.44	No detailed FEMA Floodplain data available for this area.
X0004	12.43	2.32	0.00	2.32	-	18.67	No detailed FEMA Floodplain data available for this area.
X0006	0.36	0.17	0.00	0.17	-	46.64	No detailed FEMA Floodplain data available for this area.
X0008	0.52	0.23	0.00	0.23	-	44.06	No detailed FEMA Floodplain data available for this area.
X0010	31.83	5.53	0.00	5.53	-	17.39	No detailed FEMA Floodplain data available for this area.
X0035	31.54	17.51	0.00	17.51	-	55.53	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
X0040	4.74	0.88	0.00	0.88	-	18.64	No detailed FEMA Floodplain data available for this area.
X0050	13.75	1.93	0.00	1.93	-	14.04	No detailed FEMA Floodplain data available for this area.
X0055	5.53	1.51	0.00	1.51	-	27.34	No detailed FEMA Floodplain data available for this area.
X0060	2.28	1.08	0.00	1.08	-	47.57	No detailed FEMA Floodplain data available for this area.
X0070	3.86	0.94	0.00	0.94	-	24.43	No detailed FEMA Floodplain data available for this area.
X0510	32.10	4.20	0.00	4.20	-	13.08	No detailed FEMA Floodplain data available for this area.
X0519	10.37	1.87	0.00	1.87	-	18.04	No detailed FEMA Floodplain data available for this area.
X0520	8.56	1.81	0.00	1.81	-	21.08	No detailed FEMA Floodplain data available for this area.
X1005	1.94	0.19	0.00	0.19	-	9.80	No detailed FEMA Floodplain data available for this area.
X1010	3.16	0.61	0.00	0.61	-	19.33	No detailed FEMA Floodplain data available for this area.
X1020	5.99	0.53	0.00	0.53	-	8.86	No detailed FEMA Floodplain data available for this area.
X1030	3.82	0.59	0.00	0.59	-	15.52	No detailed FEMA Floodplain data available for this area.
X1040	5.38	0.34	0.00	0.34	-	6.25	No detailed FEMA Floodplain data available for this area.
X1045	3.67	0.87	0.00	0.87	-	23.68	No detailed FEMA Floodplain data available for this area.
X1050	5.77	1.10	0.00	1.10	-	19.00	No detailed FEMA Floodplain data available for this area.
X1505	30.65	15.58	0.00	15.58	-	50.84	No detailed FEMA Floodplain data available for this area.
X1510	7.50	1.36	0.00	1.36	-	18.18	No detailed FEMA Floodplain data available for this area.
X1524	13.03	3.22	0.00	3.22	-	24.67	No detailed FEMA Floodplain data available for this area.
X1525	5.49	2.38	0.00	2.38	-	43.45	No detailed FEMA Floodplain data available for this area.
X1530	3.04	0.91	0.00	0.91	-	30.05	No detailed FEMA Floodplain data available for this area.
X1540	14.73	0.84	0.00	0.84	-	5.69	No detailed FEMA Floodplain data available for this area.
X1541	4.23	2.08	0.00	2.08	-	49.29	No detailed FEMA Floodplain data available for this area.
X1542	21.92	1.97	0.00	1.97	-	8.97	No detailed FEMA Floodplain data available for this area.
X1543	4.87	0.63	0.00	0.63	-	13.00	No detailed FEMA Floodplain data available for this area.
X1544	12.29	2.47	0.00	2.47	-	20.09	No detailed FEMA Floodplain data available for this area.
X1545	22.13	4.02	0.00	4.02	-	18.19	No detailed FEMA Floodplain data available for this area.
X1547	8.38	2.62	0.00	2.62	-	31.22	No detailed FEMA Floodplain data available for this area.
X1548	2.67	0.98	0.00	0.98	-	36.63	No detailed FEMA Floodplain data available for this area.
X1549	7.27	1.12	0.00	1.12	-	15.38	No detailed FEMA Floodplain data available for this area.
X1550	2.06	0.60	0.00	0.60	-	29.26	No detailed FEMA Floodplain data available for this area.
X3005	2.58	0.02	0.00	0.02	-	0.64	No detailed FEMA Floodplain data available for this area.
X3010	5.51	0.03	0.00	0.03	-	0.63	No detailed FEMA Floodplain data available for this area.
X3020	3.52	0.12	0.00	0.12	-	3.49	No detailed FEMA Floodplain data available for this area.
X3030	7.14	1.23	0.00	1.23	-	17.19	No detailed FEMA Floodplain data available for this area.
X3031	7.94	1.48	0.00	1.48	-	18.65	No detailed FEMA Floodplain data available for this area.
X3032	6.32	0.17	0.00	0.17	-	2.61	No detailed FEMA Floodplain data available for this area.
X3033	1.86	0.45	0.00	0.45	-	24.47	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
Y0010	29.14	7.21	0.00	7.21	-	24.74	No detailed FEMA Floodplain data available for this area.
Y0020	11.74	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
Y0040	0.31	0.11	0.00	0.11	-	35.40	No detailed FEMA Floodplain data available for this area.
Y0050	0.26	0.11	0.00	0.11	-	41.63	No detailed FEMA Floodplain data available for this area.
Y0063	2.51	0.14	0.00	0.14	-	5.50	No detailed FEMA Floodplain data available for this area.
Y0067	0.24	0.09	0.00	0.09	-	36.85	No detailed FEMA Floodplain data available for this area.
Y0070	1.26	0.36	0.00	0.36	-	28.56	No detailed FEMA Floodplain data available for this area.
Y0073	10.25	0.57	0.00	0.57	-	5.56	No detailed FEMA Floodplain data available for this area.
Y0077	16.88	0.30	0.00	0.30	-	1.79	No detailed FEMA Floodplain data available for this area.
Y0080	10.77	0.98	0.00	0.98	-	9.14	No detailed FEMA Floodplain data available for this area.
Y0083	18.67	0.32	0.00	0.32	-	1.69	No detailed FEMA Floodplain data available for this area.
Y0087	2.13	0.35	0.00	0.35	-	16.27	No detailed FEMA Floodplain data available for this area.
Y0090	14.32	1.87	0.00	1.87	-	13.05	No detailed FEMA Floodplain data available for this area.
Y0093	20.87	1.63	0.00	1.63	-	7.79	No detailed FEMA Floodplain data available for this area.
Y0097	0.69	0.19	0.00	0.19	-	28.01	No detailed FEMA Floodplain data available for this area.
Y0100	3.11	1.20	0.00	1.20	-	38.61	No detailed FEMA Floodplain data available for this area.
Y0103	28.08	0.84	0.00	0.84	-	3.01	No detailed FEMA Floodplain data available for this area.
Y0107	0.92	0.17	0.00	0.17	-	18.62	No detailed FEMA Floodplain data available for this area.
Y0120	13.92	2.14	0.00	2.14	-	15.35	No detailed FEMA Floodplain data available for this area.
Y0130	7.88	0.83	0.00	0.83	-	10.55	No detailed FEMA Floodplain data available for this area.
Y0140	26.71	5.04	0.00	5.04	-	18.85	No detailed FEMA Floodplain data available for this area.
Y0150	21.00	3.13	0.00	3.13	-	14.90	No detailed FEMA Floodplain data available for this area.
Y0160	2.43	1.07	0.00	1.07	-	44.08	No detailed FEMA Floodplain data available for this area.
Y0162	35.06	2.86	0.00	2.86	-	8.16	No detailed FEMA Floodplain data available for this area.
Y0165	10.84	1.63	0.00	1.63	-	15.00	No detailed FEMA Floodplain data available for this area.
Y0168	4.12	0.73	0.00	0.73	-	17.83	No detailed FEMA Floodplain data available for this area.
Y0170	9.20	2.83	0.00	2.83	-	30.79	No detailed FEMA Floodplain data available for this area.
Y0180	7.50	1.13	0.00	1.13	-	15.10	No detailed FEMA Floodplain data available for this area.
Y0190	3.51	0.71	0.00	0.71	-	20.28	No detailed FEMA Floodplain data available for this area.
Y0200	12.61	1.74	0.00	1.74	-	13.81	No detailed FEMA Floodplain data available for this area.
Y0203	15.66	0.71	0.00	0.71	-	4.51	No detailed FEMA Floodplain data available for this area.
Y0207	17.28	0.93	0.00	0.93	-	5.40	No detailed FEMA Floodplain data available for this area.
Y0208	0.46	0.14	0.00	0.14	-	30.27	No detailed FEMA Floodplain data available for this area.
Y0210	17.64	2.18	0.00	2.18	-	12.35	No detailed FEMA Floodplain data available for this area.
Y0220	20.79	3.81	0.00	3.81	-	18.30	No detailed FEMA Floodplain data available for this area.
Y0230	8.33	0.95	0.00	0.95	-	11.44	No detailed FEMA Floodplain data available for this area.
Y0240	15.41	3.97	0.00	3.97	-	25.78	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
Y0250	14.81	3.48	0.00	3.48	-	23.50	No detailed FEMA Floodplain data available for this area.
Y0260	6.37	2.54	0.00	2.54	-	39.91	No detailed FEMA Floodplain data available for this area.
Y1003	14.51	2.44	0.00	2.44	-	16.84	No detailed FEMA Floodplain data available for this area.
Y1005	12.19	1.73	0.00	1.73	-	14.22	No detailed FEMA Floodplain data available for this area.
Y1007	1.63	0.21	0.00	0.21	-	12.81	No detailed FEMA Floodplain data available for this area.
Y1010	14.10	4.81	0.00	4.81	-	34.09	No detailed FEMA Floodplain data available for this area.
Y1020	14.03	3.29	0.00	3.29	-	23.46	No detailed FEMA Floodplain data available for this area.
Y1310	23.92	0.55	0.00	0.55	-	2.31	No detailed FEMA Floodplain data available for this area.
Y1320	12.23	0.84	0.00	0.84	-	6.83	No detailed FEMA Floodplain data available for this area.
Y1330	10.31	0.68	0.00	0.68	-	6.60	No detailed FEMA Floodplain data available for this area.
Y1332	17.07	3.92	0.00	3.92	-	22.94	No detailed FEMA Floodplain data available for this area.
Y1335	1.95	0.26	0.00	0.26	-	13.58	No detailed FEMA Floodplain data available for this area.
Y1338	1.64	0.16	0.00	0.16	-	9.87	No detailed FEMA Floodplain data available for this area.
Y1340	17.95	2.75	0.00	2.75	-	15.32	No detailed FEMA Floodplain data available for this area.
Y1348	14.19	3.25	0.00	3.25	-	22.92	No detailed FEMA Floodplain data available for this area.
Y1350	2.22	1.37	0.00	1.37	-	61.74	No detailed FEMA Floodplain data available for this area.
Y1510	18.11	3.75	0.00	3.75	-	20.69	No detailed FEMA Floodplain data available for this area.
Y1520	9.62	2.35	0.00	2.35	-	24.38	No detailed FEMA Floodplain data available for this area.
Y1530	11.20	1.71	0.00	1.71	-	15.23	No detailed FEMA Floodplain data available for this area.
Y1535	16.02	4.08	0.00	4.08	-	25.46	No detailed FEMA Floodplain data available for this area.
Y1537	0.89	0.16	0.00	0.16	-	18.39	No detailed FEMA Floodplain data available for this area.
Y1540	41.04	5.67	0.00	5.67	-	13.82	No detailed FEMA Floodplain data available for this area.
Y1550	13.50	4.17	0.00	4.17	-	30.92	No detailed FEMA Floodplain data available for this area.
Y1555	3.30	0.00	0.00	0.00	0.00	0.00	No detailed FEMA Floodplain data available for this area.
Y1560	36.60	12.17	0.00	12.17	-	33.24	No detailed FEMA Floodplain data available for this area.
Y2010	15.11	1.17	0.00	1.17	-	7.74	No detailed FEMA Floodplain data available for this area.
Y2015	7.20	3.31	0.00	3.31	-	46.00	No detailed FEMA Floodplain data available for this area.
Y2020	26.80	4.26	0.00	4.26	-	15.88	No detailed FEMA Floodplain data available for this area.
Y2510	8.46	1.02	0.00	1.02	-	12.05	No detailed FEMA Floodplain data available for this area.
Y2512	6.23	2.21	0.00	2.21	-	35.53	No detailed FEMA Floodplain data available for this area.
Y2513	21.11	4.08	0.00	4.08	-	19.31	No detailed FEMA Floodplain data available for this area.
Y2517	8.36	2.32	0.00	2.32	-	27.76	No detailed FEMA Floodplain data available for this area.
Y2520	21.53	1.70	0.00	1.70	-	7.89	No detailed FEMA Floodplain data available for this area.
Y2540	10.42	1.87	0.00	1.87	-	17.98	No detailed FEMA Floodplain data available for this area.
Y2550	15.60	3.19	0.00	3.19	-	20.43	No detailed FEMA Floodplain data available for this area.
Y3010	29.89	2.99	0.00	2.99	-	9.99	No detailed FEMA Floodplain data available for this area.
Y3310	6.05	1.69	0.00	1.69	-	27.92	No detailed FEMA Floodplain data available for this area.

Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
Y3710	10.91	1.71	0.00	1.71	-	15.63	No detailed FEMA Floodplain data available for this area.
Y3720	42.45	3.95	0.00	3.95	-	9.30	No detailed FEMA Floodplain data available for this area.
Y3730	16.60	1.05	0.00	1.05	-	6.33	No detailed FEMA Floodplain data available for this area.
Y3740	3.21	0.12	0.00	0.12	-	3.75	No detailed FEMA Floodplain data available for this area.
Y4010	11.42	1.74	0.00	1.74	-	15.20	No detailed FEMA Floodplain data available for this area.
Y4020	47.38	5.37	0.00	5.37	-	11.34	No detailed FEMA Floodplain data available for this area.
Y4030	11.59	2.03	0.00	2.03	-	17.54	No detailed FEMA Floodplain data available for this area.
Y4040	5.39	1.57	0.00	1.57	-	29.23	No detailed FEMA Floodplain data available for this area.
Y4050	2.45	0.98	0.00	0.98	-	40.08	No detailed FEMA Floodplain data available for this area.
Y4060	1.10	0.14	0.00	0.14	-	13.14	No detailed FEMA Floodplain data available for this area.
Z0010	12.20	0.99	0.00	0.99	-	8.12	No detailed FEMA Floodplain data available for this area.
Z0020	22.74	2.85	0.00	2.85	-	12.53	No detailed FEMA Floodplain data available for this area.
Z0025	37.01	6.00	0.00	6.00	-	16.21	No detailed FEMA Floodplain data available for this area.
Z0030	3.49	1.66	0.00	1.66	-	47.44	No detailed FEMA Floodplain data available for this area.
Z0033	38.67	0.35	0.00	0.35	-	0.91	No detailed FEMA Floodplain data available for this area.
Z0037	1.70	0.45	0.00	0.45	-	26.30	No detailed FEMA Floodplain data available for this area.
Z0040	45.08	3.35	0.00	3.35	-	7.42	No detailed FEMA Floodplain data available for this area.
Z0043	23.28	0.28	0.00	0.28	-	1.18	No detailed FEMA Floodplain data available for this area.
Z0047	1.43	0.33	0.00	0.33	-	23.13	No detailed FEMA Floodplain data available for this area.
Z0050	35.68	2.02	0.00	2.02	-	5.65	No detailed FEMA Floodplain data available for this area.
Z0060	14.72	3.00	0.00	3.00	-	20.37	No detailed FEMA Floodplain data available for this area.
Z0070	27.02	2.64	0.00	2.64	-	9.78	No detailed FEMA Floodplain data available for this area.
Z1010	5.35	0.25	0.00	0.25	-	4.66	No detailed FEMA Floodplain data available for this area.
Z1020	4.83	0.21	0.00	0.21	-	4.28	No detailed FEMA Floodplain data available for this area.
Z1040	7.68	0.27	0.00	0.27	-	3.57	No detailed FEMA Floodplain data available for this area.
Z1510	9.63	0.71	0.00	0.71	-	7.34	No detailed FEMA Floodplain data available for this area.
Z1520	30.77	1.98	0.00	1.98	-	6.44	No detailed FEMA Floodplain data available for this area.
Z1540	12.43	0.97	0.00	0.97	-	7.76	No detailed FEMA Floodplain data available for this area.
Z1550	4.11	0.83	0.00	0.83	-	20.25	No detailed FEMA Floodplain data available for this area.
Z1560	45.45	0.87	0.00	0.87	-	1.91	No detailed FEMA Floodplain data available for this area.
Z1570	0.41	0.12	0.00	0.12	-	28.64	No detailed FEMA Floodplain data available for this area.
Z2010	3.04	0.07	0.00	0.07	-	2.41	No detailed FEMA Floodplain data available for this area.
Z2020	7.50	0.43	0.00	0.43	-	5.70	No detailed FEMA Floodplain data available for this area.
Z2310	11.47	0.95	0.00	0.95	-	8.24	No detailed FEMA Floodplain data available for this area.
Z2320	1.94	0.36	0.00	0.36	-	18.76	No detailed FEMA Floodplain data available for this area.
Z2710	54.12	2.34	0.00	2.34	-	4.32	No detailed FEMA Floodplain data available for this area.
Z2720	26.75	1.19	0.00	1.19	-	4.43	No detailed FEMA Floodplain data available for this area.

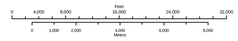
Basin Name	Basin Area (Acres)	Ardaman 100 Year Floodplain (Acres)	FEMA Q3 Area (Acres)	FP Difference (Acres)	% Change FEMA Area Basis	% Change Basin Area Basis	Justification Category
Z2740	28.03	1.49	0.00	1.49	-	5.31	No detailed FEMA Floodplain data available for this area.
Z2750	16.55	0.58	0.00	0.58	-	3.53	No detailed FEMA Floodplain data available for this area.
Z2760	1.32	0.27	0.00	0.27	-	20.37	No detailed FEMA Floodplain data available for this area.
Z3010	7.38	1.05	0.00	1.05	-	14.23	No detailed FEMA Floodplain data available for this area.
Z3020	29.78	2.82	0.00	2.82	-	9.48	No detailed FEMA Floodplain data available for this area.
Z3030	37.22	5.63	0.00	5.63	-	15.13	No detailed FEMA Floodplain data available for this area.
Z3040	22.55	1.20	0.00	1.20	-	5.31	No detailed FEMA Floodplain data available for this area.
Z3050	4.69	0.82	0.00	0.82	-	17.52	No detailed FEMA Floodplain data available for this area.
Z3060	4.03	0.12	0.00	0.12	-	2.96	No detailed FEMA Floodplain data available for this area.

Appendix C

Maps

MAP 1
LOCATION MAP

Scale 1" = 8,000'



MANATEE

HARDEE

SARASOTA

DESOTO

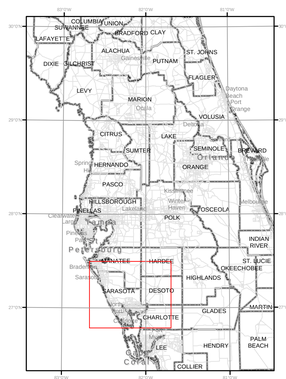
CHARLOTTE

LEE

Little Salt Spring

Warm Mineral Springs

Springs
Interstate
Highway
Major Road
City of North Port in Big Slough Watershed
Watershed
County Limits



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Prepared: 12-9-2010	Horizontal Datum: HARN	Vertical Datum:
Prepared by: TJC	Modified by:	Modified:
File: \\Model_Maintenance\ArcGIS_ArcLayouts\Dec 2010 Justification Report\Location Map 36x48.mxd		

BIG SLOUGH/CITY OF NORTH PORT WATERSHED MANAGEMENT PROGRAM

LOCATION MAP

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants
Phone: 407-855-3860 Fax: 407-859-8121
8008 South Orange Avenue
Orlando, Florida 32809

MAP 2
2007 MINUS 2004 TERRAIN

N
W E
S

Scale 1" = 2,000'

Feet
0 1,000 2,000 4,000 6,000 8,000

Meters
0 250 500 1,000 1,500 2,000

City of North Port in Big Slough Watershed
County Limits

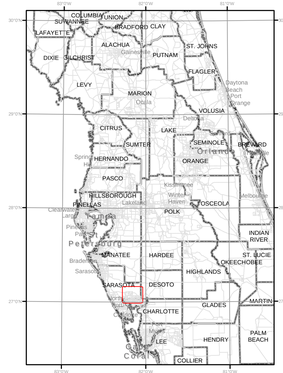
Elevation Change (feet)

- -25 - -10
- -10 - -5
- -5 - -1
- -1 - 1
- 1 - 5
- 5 - 10
- 10 - 60

SARASOTA

DESOTO

CHARLOTTE



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Prepared by: TJC	Modified by:	Modified:
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BIG SLOUGH/CITY OF NORTH PORT WATERSHED MANAGEMENT PROGRAM

TERRAIN MODEL COMPARISON

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants
Phone: 407-855-3860 Fax: 407-859-8121
8008 South Orange Avenue
Orlando, Florida 32809

MAP 3
100 YEAR FLOODPLAIN

N
W E
S

Scale 1" = 2,000'

Feet
0 1,000 2,000 4,000 6,000 8,000

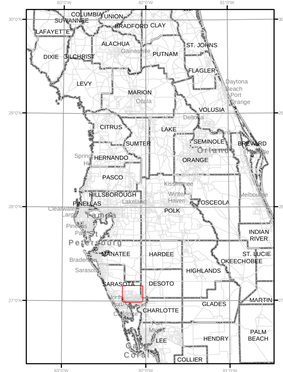
Meters
0 250 500 1,000 1,500 2,000

City of North Port in Big Slough Watershed
Floodplain
County Limits

SARASOTA

DESOTO

CHARLOTTE



Project: 03-065	Projection: Stateplane Florida West	
Prepared: 12-9-2010	Horizontal Datum: HARN	Vertical Datum:
Prepared by: TJC	Modified by:	Modified:
File: \\Model_Maintenance\ArcGIS_ArcLayouts\Dec 2010 Justification Report\Ardaman Floodplain 36x48.mxd		

BIG SLOUGH/CITY OF NORTH PORT WATERSHED MANAGEMENT PROGRAM

100 YEAR FLOODPLAIN

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants
Phone: 407-855-3860 Fax: 407-859-8121
8008 South Orange Avenue
Orlando, Florida 32809

MAP 4
ACREAGE CHANGE

N
W E
S

Scale 1" = 2,000'

Feet
0 1,000 2,000 4,000 6,000 8,000

Meters
0 250 500 1,000 1,500 2,000

County Limits
City of North Port in Big Slough Watershed

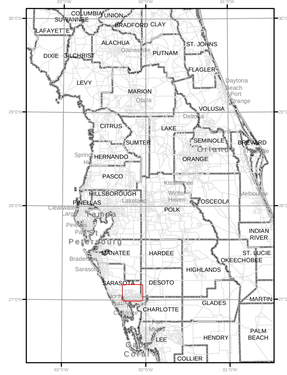
FEMA vs. Ardaman Flooded Area
- No Change
- Decrease
- Increase

Acreage Change (Absolute Value)
- 0 - 10
- 10 - 25
- 25 - 50
- 50 - 75
- 75 - 115

SARASOTA

DESOTO

CHARLOTTE



Project: 073-065	Projection: Stateplane Florida West	
Prepared: 12-9-2010	Horizontal Datum: HARN	Vertical Datum:
Prepared by: TJC	Modified by:	Modified:
File: \\Model_Maintenance\ArcGIS_ArcLayouts\Dec 2010 Justification Report\Acreage Change 36x48.mxd		

BIG SLOUGH/CITY OF NORTH PORT WATERSHED MANAGEMENT PROGRAM

FEMA VS. ARDAMAN FLOODPLAIN COMPARISON

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants
Phone: 407-855-3860 Fax: 407-859-8121
8008 South Orange Avenue
Orlando, Florida 32809

MAP 6
PERCENT CHANGE BY BASIN AREA

N
W E
S

Scale 1" = 2,500'

Feet
0 1,000 2,000 4,000 6,000 8,000

Meters
0 250 500 1,000 1,500 2,000

SARASOTA

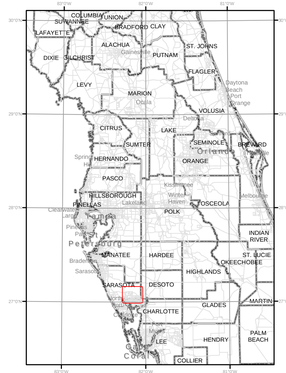
DESOTO

CHARLOTTE

City of North Port in Big Slough Watershed
County Limits

FEMA vs. Ardaman Flooded Area
- No Change
- Decrease
- Increase

Percent Change (Absolute Value)
- 0 - 10
- 10 - 25
- 25 - 50
- 50 - 75
- 75 - 100



BIG SLOUGH/CITY OF NORTH PORT WATERSHED MANAGEMENT PROGRAM

FEMA VS. ARDAMAN FLOODPLAIN COMPARISON

Project: 03-065	Projection: Stateplane Florida West	
Prepared: 12-9-2010	Horizontal Datum: HARN	Vertical Datum:
Prepared by: TJC	Modified by:	Modified:
File: \\Model_Maintenance\ArcGIS_ArcLayouts\Dec 2010 Justification Report\Percent Change by Basin 36x48.mxd		

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants
Phone: 407-855-3860 Fax: 407-859-8121
8008 South Orange Avenue
Orlando, Florida 32809

MAP 7
FLOOD RISK COMPARISON

N
W E
S

Scale 1" = 2,000'

Feet
0 1,000 2,000 4,000 6,000 8,000

Meters
0 250 500 1,000 1,500 2,000

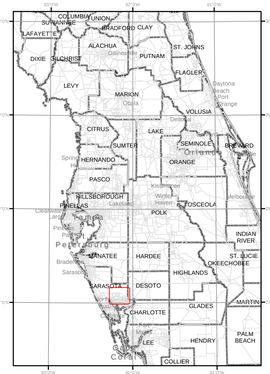
SARASOTA

DESOTO

CHARLOTTE

City of North Port in Big Slough Watershed
FEMA Floodplain
Ardaman 2010 Floodplain

	Acres	Parcels
FEMA	1,825	2,370
Ardaman 2010	13,544	2,630



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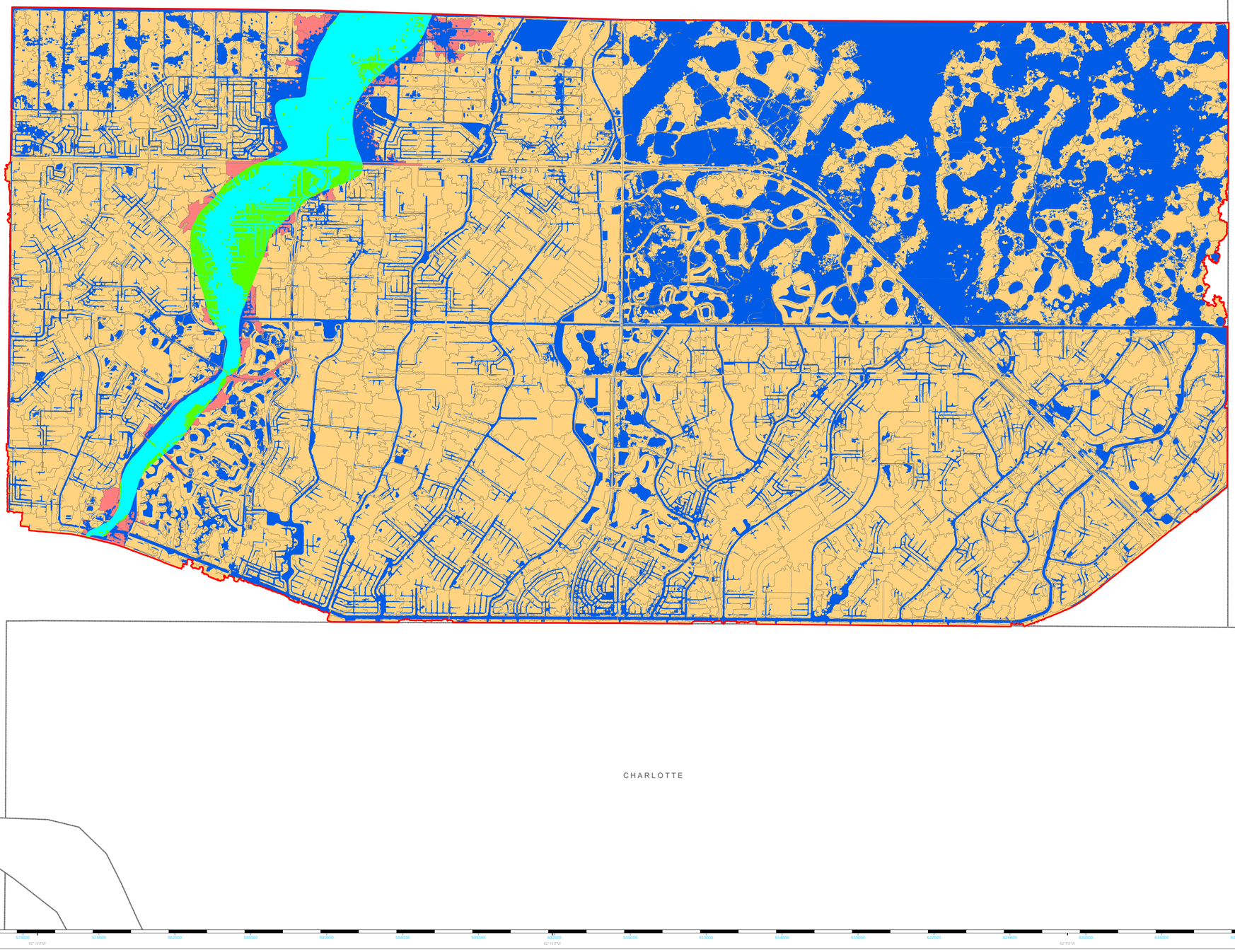
Prepared: 12-9-2010	Horizontal Datum: HARN / Vertical Datum:
Prepared by: TJC	Modified by: / Modified:
File: \\Model_Maintenance\ArcGIS_ArcLayouts\Dec 2010 Justification Report\Flood Risk Comparison 36x48.mxd	

BIG SLOUGH/CITY OF NORTH PORT WATERSHED MANAGEMENT PROGRAM

FLOOD RISK COMPARISON

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants
Phone: 407-855-3860 Fax: 407-859-8121
8008 South Orange Avenue
Orlando, Florida 32809

MAP 8
JUSTIFICATION MAP



N
W E
S

Scale 1" = 2,000'

0 1,000 2,000 4,000 6,000 8,000 Feet
0 250 500 1,000 1,500 2,000 Meters

City of North Port in Big Slough Watershed
County Limits

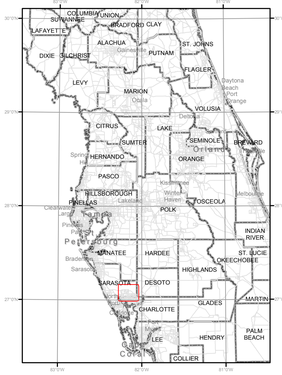
FEMA vs. Ardaman Flooded Area

No Change
Decrease
Increase

Reason for Floodplain Change

1) Terrain differences resulting from using more recent and accurate terrain data,
2) differences in methodology employed,
3) recent development that has occurred subsequent to FEMA's study, and
4) differences due to the more rigorous approach used in selecting storage locations to model and due to the resulting greater study detail.

No detailed FEMA Floodplain data available for this area.



Project: 03-065	Projection: Stateplane Florida West	
Prepared: 12-9-2010	Horizontal Datum: HARN	Vertical Datum:
Prepared by: TJC	Modified by:	Modified:
File: \\Model_Maintenance\ArcGIS_ArcLayouts\Dec 2010 Justification Report\Justification Map 36x48.mxd		

BIG SLOUGH/CITY OF NORTH PORT WATERSHED MANAGEMENT PROGRAM

FEMA VS. ARDAMAN FLOODPLAIN COMPARISON

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants
Phone: 407-855-3860 Fax: 407-859-8121
8008 South Orange Avenue
Orlando, Florida 32809

Appendix C

Watershed Management Program Consulting Services in the Big Slough Watershed (K883), Best Management Practices (BMP) Analysis Final Report

Ardaman & Associates, Inc., September 2014

Watershed Management Program Consulting Services in the Big Slough Watershed (K883)

Best Management Practices (BMP) Analysis
Final Report

Prepared for

Southwest Florida Water Management District
&
City of North Port

Prepared by

Ardaman & Associates, Inc.

September 2014

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1.0 INTRODUCTION

As described in the Southwest Florida Water Management District's Watershed Management Program Guidelines and Specifications, Best Management Practice (BMP) Alternatives Analysis involves modification of the existing model condition to evaluate best management practices, to address the enhancement and protection of natural systems, recharge, and water quality while achieving flood protection.

BMP alternatives analysis involves the use and modification of the existing model condition to evaluate BMPs, to address habitual flooding conditions while ensuring no adverse impact.

Best management practices (BMP) is a phrase which means the best available techniques to reduce harmful environmental impacts. Usually, BMPs for urban watershed management are storage devices that temporarily store and/or treat urban runoff to reduce flooding and/or remove pollutants. For this task, the following alternative methods were evaluated with the unique purpose of reducing flooding: flow diversion, conveyance improvements, detention, exclusion of all existing drop structures and water control structures (WCS), and modification of gated structure and raising road elevations.

1.1 Authorization

Ardaman and Associates was contracted by the Southwest Florida Water Management District to conduct specific tasks of a Watershed Management Program for the North Port/Big Slough Watershed. The project was initiated in July 2003 and a series of work orders were issued. Work order number 4, issued in August 2005, included BMP alternative analysis for the North Port/Big Slough watershed.

1.2 Project Location and General Description

The Big Slough Watershed is located in southeastern Sarasota County, and the slough is tributary to the Myakka River. Portions of the incorporated City of North Port (those areas east of the Myakka) are located within the southern portion of the watershed. The 195.5 square mile watershed encompasses numerous depressional features, including wetlands and water bodies, the most prominent of which is the Big Slough Canal (also called Myakkahatchee Creek in its lower reaches). The Big Slough Canal passes from north to south through the City of North Port, and receives inflows from an internal system of waterways which provide surface drainage throughout the City, before discharging beneath U.S. Highway 41 toward its confluence with the Myakka River. The Big Slough Watershed and portions of the City of North Port are traversed from east to west by Interstate Highway 75.

1.3 Purpose and Objectives

The objective of this study is to evaluate BMP alternatives that would solve flooding conditions within the City of North Port. Existing condition model results and Floodplain

Level of Service (LOS) were used to identify present watershed flooding condition. Various BMP concepts and alternatives were evaluated for their effectiveness in solving flooding problems, permitablity, and economic viability.

1.4 Previous Reports

Over the course of the project, numerous interim reports have been submitted along with supporting data to SWFWMD and City of North Port. Those prior reports contain additional details and supporting documentation regarding these tasks completion, and include the following:

WO#1 – Watershed Evaluation

Task 1.1.2.1 – Existing Watershed Feature Data Evaluation and Assembly
Task 1.1.2.2 – Sub-basin delineations and landuse inventory

WO#2 – Watershed Evaluation

Task 1.1.2 – Watershed Evaluation
- 1.1.2.2 Hydrologic Feature Inventory
- 1.1.2.3 Hydraulic Feature Inventory
- 1.1.2.4 Field Reconnaissance
- 1.1.2.5 ID of Surveys to be Completed by a PLS
- 1.1.2.6 Preliminary Junction/Reach Coverage Development
- 1.1.2.7 SW Assessment Inventory and Approach Development
- 1.1.2.9 Watershed Evaluation Deliverables

WO#3 – Watershed Evaluation

Task 2.3.1 – Surveys by a Professional Land Surveyor

WO#4 – Watershed Management Plan

Task 1.1.3.2 – Watershed Parameterization
Task 1.1.3.3 – Watershed Model Development & Verification
Task 1.1.3.4 – Floodplain Analysis and Delineation Report
Task 1.1.3.5a – Level of Service Determination – original analysis
Task 1.1.3.5b – Level of Service Determination – with model maintenance
Task 1.1.3.7a – BMP Alternative Formulation Report – original analysis
Task 1.1.3.7a – BMP Evaluation of Four Crossings
Task 1.1.3.7b – BMP Evaluation Price Boulevard
Task 1.1.3.7b – BMP Evaluation WCS-162
Task 1.1.3.7b – Final BMP Report

WO#7 – Maintenance of Watershed Parameters and Models

Task 2.2.1 – 2004-2007 LiDAR Comparison
Task 2.3.1.1 – Collect and Evaluate Environmental Resource Permit (ERP) Information
Task 2.3.4 – Limited Field Reconnaissance

Task 2.3.6 and 2.3.7 – Generic Hydrologic Features and Generic Hydraulic Features
Task 2.3.6, 2.3.7, and 2.4.1 – Generic Hydrologic Features, Generic Hydraulic Features, and Refined Generic and Semi-generic Geodatabase and Parameterization
Task 2.4.1, 2.4.2, 2.4.3 – Refined Generic and Semi-generic Geodatabase and Parameterization, Watershed Computer Simulation Model Development and Verification, and Floodplain Analysis and Delineation
Task 2.4.3 – Floodplain Analysis and Delineation
Task N/A – Justification Report and Peer Review Presentation

WO#8 – Maintenance of Watershed Parameters and Models

Task 2.2.2 – 2007 LiDAR Review

WO#12 – Maintenance of Watershed Parameters and Models

Task 2.4.11 - Floodway Analysis Report

2.0 CHARACTERIZATION OF FLOOD PRONE AREAS

The Big Slough watershed is located in the Gulf coastal lowlands of southwestern Florida, characterized by flat topography and sandy, shelly and silty sand soils with little organic matter. Its headwaters are rural, consisting primarily of agricultural and undeveloped lands. A vast majority of urban and built up lands occur in the southern portion of the watershed, within in the City of North Port. Commercial development is generally limited to main thoroughfares within the city, especially along the US 41 corridor. Myakkahatchee Creek/Big Slough Canal begins in the southeastern part of Manatee County (near Edgeville) and flows approximately 21 miles through the City of North Port and ultimately empties to the estuarine portion of the Myakka River.

2.1 Hydrologic Inventory

2.1.1 *Subbasin Delineation Process*

Subbasin delineations were performed to support watershed parameterization and modeling. The subbasins were delineated using Arc Hydro Tools with LiDAR-based terrain data, where available. The surface model was prepared for “automated” subbasin delineation by combining the large terrain models with highly detailed secondary flow path information. The secondary flow paths were digitized based on scanned and orthorectified as-built information, terrain model features, and field observations of drainage patterns.

A set of protocols was developed for assigning subbasin break points, to allow for batch processing of the watershed using the delineation tools. As a result of pre-processing the surface model in the manner described here, the Arc Hydro tools were better able to recognize surface drainage characteristics and provide accurate subbasin delineations for use in model parameterization. In those areas where LiDAR was not available, other

topographic and drainage delineation information was employed to support automated and manual delineations.

2.1.2 *Tributary Subbasins and Characterization.*

Tributary areas were defined primarily by grouping surface storage features according to their connectivity (via culverts) or primary overflow paths (across topographic saddles). Open channel conveyance systems were also used to identify unique tributary areas. Each tributary area could then be summarized using GIS to describe unique characteristics, as discussed below.

Subbasin sizes range throughout the study area from 0.33 to 1,673.79 acres. Table 2-1 summarizes subbasin size by tributary area.

Table 2-1: Subbasin Size Summary per Tributary

Tributary ID	Count	Minimum	Maximum	Average
A	60	0.33	36.00	9.17
B	1282	0.06	1244.70	30.97
C	339	0.12	61.14	9.91
D	67	1.23	75.40	26.24
E	210	0.19	151.42	10.30
F	54	0.32	83.20	20.68
G	130	0.32	66.63	11.58
H	42	0.77	35.93	11.87
I	58	0.86	71.29	21.11
J	153	0.60	69.53	14.49
K	188	0.63	79.83	10.53
L	33	0.70	70.08	24.53
M	84	1.38	1040.82	133.85
N	119	0.16	28.22	8.22
O	76	0.88	82.72	15.89
P	38	0.11	120.69	13.19
Q	288	1.04	167.71	25.23
R	263	0.42	234.44	21.53
S	361	0.28	1139.68	21.10
T	65	0.28	45.34	13.73
U	799	0.03	410.92	24.79
V	116	0.42	89.73	14.68
W	29	15.55	1673.79	320.55
X	42	0.36	32.10	9.11
Y	84	0.24	47.38	12.87
Z	36	0.41	54.12	17.78

2.1.3 *Tributary Land Use Characterization*

While the headwaters of the Big Slough Watershed remain predominantly undeveloped or agricultural, changes in land uses throughout the City of North Port reflect significant population growth, with continued commercial and industrial growth along the US 41 corridor and the Price Boulevard intersections with Sumter Boulevard and Toledo Blade Boulevard.

Land use types were acquired as a GIS coverage from the SWFWMD and updated using 2004 aerial photography. Table 2-2 summarizes generalized land use encountered and respective percent areas of coverage, by tributary.

Table 2-2: Generalized Land Use Summary per Tributary

Tributary ID	Residential	Com/Industrial	Upland/Open	Water/Wetland
A	10.55	0.00	86.54	2.91
B	9.06	1.41	66.33	23.19
C	51.87	6.30	34.51	7.32
D	97.99	0.06	0.18	1.77
E	64.02	2.86	24.11	9.02
F	89.64	2.37	5.43	2.56
G	85.46	0.19	10.80	3.56
H	24.47	0.51	33.01	42.01
I	73.04	3.46	16.82	6.68
J	76.21	3.39	16.98	3.42
K	34.18	3.62	58.39	3.81
L	65.17	0.48	25.84	8.51
M	2.02	0.22	75.29	22.47
N	0.32	4.18	88.79	6.71
O	85.80	0.15	11.00	3.04
P	67.31	2.43	11.53	18.73
Q	0.00	0.75	71.86	27.39
R	32.98	0.78	40.77	25.48
S	16.20	2.33	56.24	25.22
T	57.69	5.05	27.44	9.82
U	1.18	1.95	62.64	34.23
V	35.95	7.19	36.04	20.82
W	1.49	0.27	79.92	18.32
X	76.68	2.32	8.57	12.42
Y	85.27	4.58	9.13	1.03
Z	98.90	0.00	0.00	1.10

2.1.4 *Tributary Soil Characterization.*

Low permeability, hydric soils associated with depressional areas and flood plains are predominant within the study area.

Soil types were identified using soil survey data for Sarasota, Charlotte, Manatee and DeSoto Counties acquired as a GIS coverage from SWFWMD. Individual soil types were categorized according to their runoff potential. In order to perform that categorization, the hydrologic soil group of each soil was defined according to the relevant soil survey reports. A brief discussion of each hydrologic soil group's characteristics is provided below.

HYDROLOGIC SOIL GROUP A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively well drained sands or gravelly sands. These soils have a high rate of water transmission.

HYDROLOGIC SOIL GROUP B. Soils having a moderate infiltration when thoroughly wet. These consist mainly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

HYDROLOGIC SOIL GROUP C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

HYDROLOGIC SOIL GROUP D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have high shrink-swell potential, soils that have a permanent high water table, soils that have a clay pan or clay layer at or near the surface, and soils that are shallow over nearly impervious material.

Some soil types are classified as belonging to dual hydrologic soil groups, such as A/D, B/D, or C/D. These ratings mean that, under natural conditions, the soil is classified as belonging to hydrologic soil group D, but by artificial methods the water table could be lowered sufficiently so that the soil would fit into a lower runoff potential category.

Table 2-3 presents a summary of hydrologic soil groups encountered (with dual classified groups assigned to the un-drained condition “D”) and respective percent areas of coverage.

Table 2-3: Hydrologic Soil Group Summary per Tributary

Tributary	Hydrologic Soil Coverage Area %								
	A	A/D	B	B/D	C	C/D	D	UND	W
A	0.00	0.00	0.00	70.01	0.36	0.88	28.75	0.00	0.00
B	0.00	0.00	0.09	70.30	1.07	0.04	28.16	0.23	0.10
C	0.00	0.06	0.00	61.51	7.64	0.87	25.03	0.00	4.89
D	0.00	0.00	0.00	71.73	0.09	0.21	27.98	0.00	0.00
E	0.00	0.00	0.00	77.85	0.71	0.91	18.81	0.00	1.73
F	0.00	0.00	0.00	63.79	0.00	1.48	34.73	0.00	0.00
G	0.00	0.00	0.00	50.55	0.04	0.00	49.41	0.00	0.00
H	0.00	0.00	0.00	90.15	5.12	0.00	4.73	0.00	0.00
I	0.00	0.00	0.00	66.44	0.06	0.77	32.73	0.00	0.00
J	0.00	0.00	0.00	65.84	0.00	0.85	33.09	0.00	0.22
K	0.00	0.00	0.00	70.16	0.08	1.21	28.08	0.00	0.47
L	0.00	0.00	0.00	50.53	0.00	1.90	47.57	0.00	0.00
M	0.38	0.00	0.36	77.05	4.82	0.00	17.38	0.01	0.00
N	0.00	0.00	0.00	68.48	0.00	0.45	29.89	0.00	1.18
O	0.00	0.00	0.00	67.36	0.00	0.00	32.50	0.14	0.00
P	0.00	0.00	0.00	75.24	0.00	0.12	24.64	0.01	0.00
Q	0.00	0.00	0.00	64.78	0.00	0.13	35.09	0.00	0.00
R	0.00	0.00	0.00	65.45	0.00	0.90	33.62	0.02	0.00
S	0.00	0.00	0.00	63.35	0.00	0.07	36.57	0.00	0.00
T	0.00	0.00	0.00	70.31	0.00	0.52	29.17	0.00	0.00
U	0.00	0.00	0.00	64.62	0.00	0.01	34.98	0.00	0.39
V	0.00	0.00	0.00	48.77	0.00	0.00	51.23	0.00	0.00
W	0.61	0.00	0.25	75.03	11.94	0.00	12.17	0.00	0.00
X	0.00	0.00	0.00	56.73	0.00	0.00	42.64	0.00	0.64
Y	0.00	0.00	0.00	70.24	0.00	0.15	29.61	0.00	0.00
Z	0.00	0.00	0.00	73.02	0.00	3.30	23.69	0.00	0.00

2.1.5 *Tributary Hydrologic Parameterization*

Subbasin parameterization was performed in order to assign values for hydrologic model development, including: Time of Concentration (Tc), Runoff Curve Number (CN), Percentages of imperviousness, and Peak Rate Factor (K').

Time of Concentration (Tc) is generally defined as the amount of time it takes for a drop of water to travel from the most hydrologically distant point in a basin to the point where that basin discharges to a receiving water body (represented in the model as a node). It is used as a parameter in the computation of a runoff hydrograph, when using the SCS Unit Hydrograph method for hydrograph generation.

The Tc computation was made according to techniques recommended in TR-55 by the National Resource Conservation Service. According to that methodology, runoff generally moves along the surface of a basin as sheet flow, shallow concentrated flow, open channel flow, or some combination of these until it is intercepted by a storage or conveyance system. Travel times for each flow segment are computed and summed, yielding a time of concentration for the basin. Further adjustments can be made to account for movement through ponds, storm sewers and the like in order to account for additional travel time, when not accounted for in the modeled conveyance system.

Travel segment data for this study was developed using aerial photography, one foot SWFWMD 1"=200' scale aerial imagery, 2-foot SWFWMD digital photogrammetric contours and the digital terrain model to define travel paths, lengths, slopes and land cover for sheet and shallow concentrated flow segments. For open channel segments, cross sectional geometry and roughness values were estimated, and lengths and slopes taken from the terrain model. For conveyance systems (such as pipes, channels, embedded ponds and wetlands) a velocity method was employed to adjust times of concentration.

Runoff Curve Numbers were developed for each subbasin, based on land use and hydrologic soil group designations. Using GIS, basin, land use and soils polygon coverages were intersected with one another, resulting in the creation of a single composite polygon coverage. Each polygon in the composite coverage contains a land use code, a hydrologic soil group, and a basin assignment. Combinations of land use and soils were then used, along with a lookup table of curve number values, to define area-weighted runoff curve numbers within each basin. Percentages of imperviousness were developed in a like manner, based on land use within each subbasin area. Runoff curve numbers that were employed in this analysis were representative of average antecedent moisture conditions (AMC-II) and were adapted from tables provided in the NRCS publication, TR-55.

The peak rate factor (K') is a numeric value used to describe the shape of a unit hydrograph for a basin. The peak rate factor varies from one basin to another. Throughout the state, typical values applied by hydrologists range from 256 to 484, with even lower values applied in flat, swampy areas. A peak rate factor of 256 was used for all subbasins within the Big Slough watershed. That value is most appropriate in basins that exhibit little topographic relief, which includes the vast majority of all subbasins delineated in the study area.

2.2 Hydraulic Feature Inventory

2.2.1 *Hydraulic Feature Inventory*

An inventory of hydraulic features within the watershed area was initially performed using digital aerial photography, as-built and ERP data, in order to identify conveyance structures, open channels, SMSAs, lakes and wetlands greater than one acre in area throughout the watershed. Each feature was assigned a unique HYD-ID, as an identifier for subsequent field reconnaissance and survey. The hydraulic feature inventory served as an initial database of features to be incorporated into a model database for simulation.

2.2.2 *Summary of Water Body Features by Tributary and Type*

Wetlands and water bodies of varying size are located throughout the watershed area. Named water bodies include: Big Slough Canal or Myakkahatchee Creek, Cocoplum Water Way, Snover Water Way and a series of named internal water ways providing surface drainage for the City of North Port. Area lakes range in size from 1.0 to 125 acres. In addition, numerous retention and detention ponds are present, providing stormwater attenuation and water quality treatment throughout the area. Table 2-4 presents a summary of water bodies and their sizes in each tributary.

Table 2-4: Water Body Size Summary per Tributary

Tributary	Count	Minimum Area (acres)	Maximum Area (acres)	Average Area (acres)
A	0	0.00	0.00	0.00
B	386	0.20	110.46	4.90
C	9	0.60	2.77	1.72
D	0	0.00	0.00	0.00
E	37	0.19	25.93	3.06
F	1	3.99	3.99	3.99
G	9	1.26	17.93	3.93
H	10	0.77	12.99	3.98
I	11	0.07	12.23	2.79
J	5	0.40	2.39	1.20
K	3	2.21	11.54	5.96
L	3	2.86	5.06	3.88
M	18	1.01	6.89	3.13
N	6	1.22	13.75	4.75
O	3	1.05	3.04	1.73
P	1	75.40	75.40	75.40
Q	121	1.03	36.57	4.72
R	77	1.22	60.85	9.02
S	112	0.35	35.30	5.72
T	20	1.08	19.34	5.93
U	363	0.13	125.04	5.61
V	12	1.12	30.60	12.98
W	0	0.00	0.00	0.00
X	5	1.18	15.20	7.16
Y	0	0.00	0.00	0.00
Z	0	0.00	0.00	0.00

2.2.3 *Summary of Conveyance Features by Tributary and Type*

Surface drainage throughout the watershed consists largely of natural sloughs, creeks and numerous manmade ditches and canals. Manmade storage features (SMSA) and natural depressional features (lakes and wetlands) are interconnected by drainage culverts or joined across natural topographic saddles. Table 2-5 summarizes number of conveyance features and Table 2-6 presents lengths of open channels in each tributary.

Table 2-5: Conveyance Features per Tributary

Tributary	Bridge	Channel	Culvert	Riser Pipes	Weir
A	1	23	10	50	175
B	16	382	210	39	3631
C	16	156	108	129	1028
D	0	43	9	3	194
E	0	67	67	50	616
F	0	27	13	1	175
G	1	63	42	28	384
H	2	17	9	13	138
I	0	27	10	17	195
J	0	87	51	1	427
K	4	75	51	77	531
L	0	19	6	0	103
M	0	9	18	0	202
N	2	49	27	69	316
O	0	39	19	13	218
P	0	24	15	0	95
Q	1	65	18	0	867
R	0	114	72	0	752
S	6	104	44	49	1050
T	0	27	19	10	197
U	3	47	116	62	2316
V	1	51	50	5	345
W	1	15	18	0	48
X	0	28	11	0	94
Y	0	49	23	0	239
Z	0	19	11	0	97

Table 2-6: Open Channel Lengths per Tributary

Tributary ID	Count	Minimum (feet)	Maximum (feet)	Average (feet)
A	23	267	1600	780
B	382	124	4819	1173
C	155	193	3674	1011
D	44	252	1896	1067
E	67	221	2110	855
F	27	185	1977	1053
G	64	243	1985	801
H	16	361	2261	908
I	28	293	2347	1179
J	87	255	2844	956
K	75	265	1935	897
L	19	491	2443	1167
M	10	723	5785	2052
N	49	231	2501	882
O	39	260	2186	973
P	24	88	2890	1070
Q	65	367	2677	1300
R	110	384	2878	1449
S	103	257	2309	932
T	26	260	2021	996
U	47	500	4442	1623
V	51	255	2202	786
W	15	1137	4578	2372
X	32	257	2421	1254
Y	49	224	2426	896
Z	19	443	2191	1044

2.2.4 *Tributary Hydraulic Connectivity*

Connectivity within tributary areas was determined through review of aerial photographs, as-built and construction drawings, topographic data and field investigation. That connectivity is defined and stored in the project database as a node-reach topological relationship.

2.3 Magnitude of Present Flooding

The magnitude of present flooding in the watershed was identified by using the results of floodplain and flood protection level of service (LOS) analyses.

2.3.1 *Identification of Flooded Areas*

The City of North Port experiences three distinct types of flooding problems. The most severe and the least common problem is a small number of habitable structures near Big Slough that experience flooding in the 100 year event. Also significant and very isolated is major road flooding in 25-year and 100-year events. Finally extensive local road flooding is common even during a smaller storm event. While inconvenient, this local road flooding poses little risk of damage to the citizens' property.

As shown in Figure 2-1, 2-2, and 2-3 (10, 25, and 100-year LOS figures), the majority of flooding within the City is related to street flooding. An arterial street/emergency route (West Price Boulevard), which provides access to the City's emergency facilities, will flood in 10-year or higher storm events.

Most of the habitable structures that flood in a 100-year storm event are located in the neighborhood located adjacent to Big Slough/Myakkahatchee Creek between Cocoplum Waterway and Tropicaire Boulevard. Locations of the houses that would flood (model predicted) in a 100-year storm event are shown in Figure 2-3 (100-year LOS figure).

2.3.2 *Estimated Number of Structures Flooded (10-, 25-, and 100-year)*

Based on the model results, it is estimated that ~5 structures will flood in a 10-year storm event; ~ 7 structures will flood in a 25-year storm event; and ~75 structures will flood in a 100-year storm event within the City of North Port.

Habitable structures were identified by visually inspecting 2008 aerial imagery in the City of North Port, and placing a point in GIS on the topographical high of the 2004/2007 hybrid LiDAR DTM. The elevation of the 2004/2007 hybrid LiDAR DTM at the point was compared with 10-year, 25-year and 100-year modeled maximum stages. Where maximum stages were higher than the habitable structure, it was reported as a flooded structure. Since the surveyed house pad elevations (finished floor elevations) data was not available, the method applied in estimating the number of flooded structures is very approximate.

2.3.3 *Emergency and Evacuation Route Inundation (10-, 25-, and 100-year)*

Estimated lengths of emergency and evacuation route inundation are presented in Table 2-7. As stated earlier, the majority of flooding within the City is associated with street/road flooding.

Evacuation routes were received from the City of North Port, and emergency routes were identified by Ardaman as the shortest route from an emergency facility to an evacuation route. Street centerlines were acquired from Sarasota County. The positions of all lines were verified in GIS as on the centerline of the road, and moved to the centerline if necessary. Any portion of the centerline of the road that overlapped with the 10-year, 25-year or 100-year floodplain was reported as inundated.

Table 2-7: Estimated Lengths of Road Inundation

Storm Event	Length of Emergency Route Inundation (feet)	Length of Evacuation Route Inundation (feet)
10-year	6,403	1,464
25-year	7,758	3,077
100-year	19,625	7,218

3.0 ALTERNATIVE BMP FORMULATION

According to Southwest Florida Water Management District's Watershed Management Program Guidelines and Specifications (SWFWMD G&S), the generation of best management practices (BMP) alternatives must take into account many watershed management issues in order to formulate an alternative that is permittable, economically viable, and is supported by the public. This study is mainly focused in addressing storm event flooding conditions within the City of North Port.

3.1 BMP Development Process

As described in the SWFWMD G&S, alternatives analysis involves the use and modification of the existing model condition to evaluate BMPs, to address habitual flooding conditions while ensuring no adverse impact.

Best management practice is a phrase which means the best available techniques to reduce harmful environmental impacts. Usually, BMPs for urban watershed management are storage devices that temporarily store and/or treat urban runoff to reduce flooding and/or remove pollutants. For this task, the following alternative methods were evaluated with the unique purpose of reducing flooding: Flow diversion, conveyance improvements, detention and exclusion of all existing drop structures and water control structures (WCS), modification of gated structure and raising road elevations.

3.2 Alternative BMP Concepts

Various BMP alternative concepts evaluated in this study include conveyance improvements, stormwater management storage areas, flood proofing, and flow diversions.

3.3 Alternative BMP Evaluation

BMP alternative evaluations were performed using the existing watershed model and updating it to reflect various BMP scenarios. The following sections provide a brief description of each evaluated BMP alternative and a summary of the evaluation outcome.

3.3.1 *Regional BMPs:*

BMP alternatives that could potentially improve flooding condition in a large area are considered as regional BMPs. These alternatives could significantly alter the hydrodynamics of the drainage system. Although the alternatives presented in this report might not be permittable or economically viable, they provide a better understanding of the hydraulic response when applying the BMPs to further understand improvement limitations.

Six different regional BMPs were evaluated. Results from each BMP evaluation were compared to a benchmark scenario to evaluate the impact of the BMP. The benchmark scenario used was the 24-hour-100 year existing condition model previously submitted. The storm event used for the evaluations was the 24-hour, 100 year event with a Type II, Florida modified rainfall distribution.

For these analyses, the following GIS procedures were used when comparing the existing condition (Benchmark) and the proposed scenario (BMP):

Three potential analyses were considered when comparing each BMP scenario to the Benchmark Scenario.

- For the first analysis, the geoprocessing tool “Symmetric Difference” was applied with the BMP floodplain and benchmark floodplain as inputs, resulting in flooded area reduction and flooded area increase polygons for each scenario. Flooded area reduction represents area that flooded in the benchmark scenario, but not in the BMP scenario, and flooded area increase represents area that did not flood in the benchmark scenario, but did flood in the BMP scenario. Results were then summarized by sub-watershed in acres.

- The second analysis compared the length of street flooding in the BMP scenarios to length of street flooding in the benchmark scenario. The BMP scenario floodplain shapefile was intersected with the streets shapefile, and the total length of flooding was summarized by sub-watershed. Benchmark flooded street data was obtained from previous analysis per LOS (Level of Service) requirements.

- The final analysis compared the number of flooded parcels in the benchmark scenario to the number of flooded parcels in the BMP scenarios. To determine which parcels were flooded we used the parcels polygon shapefile downloaded from Sarasota County. Elevations were extracted from the LiDAR-based terrain data utilizing the centroid of the parcel as a calculation point, and one foot was added to the calculated elevation to represent buildings on fill material. Parcels in waterways or ponds were eliminated and not considered in these analyses. These elevations were then compared to the maximum stages from the CHAN model output for the BMP and benchmark simulation. Any parcels with elevations less than the maximum stage were considered flooded. The comparisons of the BMP scenario to the benchmark scenario were then broken down by sub-watershed for better understanding of local response to the BMP.

3.3.1.1 *BMP #1: Remove Structures throughout City of North Port Waterways*

Objective:

The objective of this BMP is to understand current primary drainage system capacity assuming no losses due to water control structures or drop structures within several waterways. Also, additional connectivity was provided among a few R canals southwest of the I-75 corridor to evaluate the response when transferring some of the existing load throughout less compromised areas.

Description:

Water control structures (WCS) and drop structures (DS) depicted in Figure 3-1 were removed and replaced with an equivalent channel section that mimics the immediate upstream canal's section. Also, and as stated before, additional connections were provided between a few existing secondary manmade R canals. Specifically, canal R-36 was hydraulically connected to the R-43 canal via a weir with equivalent channel geometry. Similarly, the R-43 canal was also connected with the R-24 and R-32 (See Figure 3-1).

Results:

Overall results indicate general improvements immediately north of Price Blvd and along Bass Point waterway while increasing flooding between S Toledo Blvd and S Sumter Blvd. Also, improvements are observed southwest of I-75 where supplemental canal connectivity was provided. An initial evaluation suggests that this BMP may not be feasible due to potential loss of potable water supply, fish and wildlife habitat, and wetlands. Please refer to Figure 3-1 and Table 3-1 for a summary of BMP#1 analysis results.

Table 3-1: BMP#1 Results Summary

Sub-Watershed	Bench Mark Total Flooded Area (Acres)	BMP1 Total Flooded Area (Acres)	BMP1 Total Flooded Area Change (%)	Bench Mark Flooded Street Length (Feet)	BMP1 Flooded Street Length (Feet)	BMP1 Flooded Street Length Change (%)	Bench Mark Flooded Parcels (Units)	BMP1 Flooded Parcels (Units)	BMP1 Flooded Parcels Change (%)
A	58	59	0.8	7,959	8,124	2.1	2	2	0.0
B	15,839	15,881	0.3	304,750	306,791	0.7	665	655	-1.5
C	724	745	2.8	118,951	124,883	5.0	38	40	5.3
D	150	172	14.5	38,510	47,969	24.6	15	17	13.3
E	407	446	9.5	47,961	65,534	36.6	2	2	0.0
F	98	124	25.7	22,234	34,741	56.3	1	1	0.0
G	250	208	-16.7	53,687	36,920	-31.2	17	9	-47.1
H	199	186	-6.4	1,082	548	-49.3	2	2	0.0
I	165	165	0.2	21,519	25,051	16.4	2	1	-50.0
J	335	298	-11.2	84,088	57,952	-31.1	15	15	0.0
K	240	237	-1.3	45,022	44,366	-1.5	5	5	0.0
L	69	67	-1.5	11,354	11,267	-0.8	0	0	0.0
M	2,426	2,475	2.0	0	0	0.0	0	0	0.0
N	150	146	-2.7	14,407	14,101	-2.1	1	1	0.0
O	189	177	-6.2	56,008	49,468	-11.7	9	8	-11.1
P	191	192	0.5	11,134	11,173	0.4	6	6	0.0
Q	3,733	3,735	0.1	0	0	0.0	0	0	0.0
R	2,294	2,320	1.1	86,929	99,236	14.2	43	60	39.5
S	2,489	2,454	-1.4	23,286	20,576	-11.6	74	74	0.0
T	206	190	-8.1	14,915	9,256	-37.9	5	2	-60.0
U	9,907	9,888	-0.2	8,973	8,934	-0.4	19	19	0.0
V	553	545	-1.5	20,054	18,184	-9.3	6	6	0.0
W	1,207	1,207	0.0	0	0	0.0	0	0	0.0
X	92	92	0.4	7,471	7,445	-0.3	2	2	0.0
Y	189	179	-5.1	70,162	63,890	-8.9	11	11	0.0
Z	51	48	-5.9	14,978	14,783	-1.3	0	0	0.0
Total	42,211	42,236	0.1	1,085,434	1,081,192	-0.4	940	938	-0.2

3.3.1.2 *BMP #2: Constrain Flow Entering City Of North Port at Big Slough Canal*

Objective:

The objective of this BMP is to constrain the volume of water coming from offsite areas through the Big Slough canal prior to entering the City in the Estates area.

The BMP would involve real estate acquisition, maintenance activities, dam construction and removal of existing hydraulic structures (culverts).

Description:

On the northwest City boundary, at the intersection of Big Slough canal with R-36 and R-580 waterways, all existing earthen weirs were raised to limit runoff from offsite areas, leaving the Big Slough canal as the only conveyance system into the western portion of the City (see Figure 3-2). All earthen weirs farther north, at the intersection of Big Slough canal and Power Line Road were raised as well.

Results:

This BMP results in approximately 0.5 feet flood stage reduction within the vicinity of the Big Slough canal from the City's northern border to just south of I-75. Likewise, results indicate that flood stages increase approximately 1.0 foot in the offsite areas north of R-36 and R-580 waterways. Table 3-2 summarizes BMP#2 analysis results.

Table 3-2: BMP#2 Results Summary

Sub-Watershed	Bench Mark Total Flooded Area (Acres)	BMP2 Total Flooded Area (Acres)	BMP2 Total Flooded Area Change (%)	Bench Mark Flooded Street Length (Feet)	BMP2 Flooded Street Length (Feet)	BMP2 Flooded Street Length Change (%)	Bench Mark Flooded Parcels (Units)	BMP2 Flooded Parcels (Units)	BMP2 Flooded Parcels Change (%)
A	58	58	0.0	7,959	7,958	0.0	2	2	0.0
B	15,839	16,092	1.6	304,750	260,559	-14.5	665	458	-31.1
C	724	725	0.0	118,951	118,959	0.0	38	38	0.0
D	150	150	0.0	38,510	38,460	-0.1	15	15	0.0
E	407	407	0.0	47,961	47,969	0.0	2	2	0.0
F	98	98	0.0	22,234	22,241	0.0	1	1	0.0
G	250	250	0.0	53,687	53,666	0.0	17	17	0.0
H	199	199	-0.1	1,082	1,078	-0.4	2	2	0.0
I	165	165	0.0	21,519	21,514	0.0	2	2	0.0
J	335	314	-6.4	84,088	72,205	-14.1	15	12	-20.0
K	240	240	0.0	45,022	45,020	0.0	5	5	0.0
L	69	69	0.0	11,354	11,354	0.0	0	0	0.0
M	2,426	2,421	-0.2	0	0	0.0	0	0	0.0
N	150	150	0.0	14,407	14,407	0.0	1	1	0.0
O	189	189	0.0	56,008	55,994	0.0	9	9	0.0
P	191	179	-6.1	11,134	10,124	-9.1	6	4	-33.3
Q	3,733	3,742	0.2	0	0	0.0	0	0	0.0
R	2,294	2,302	0.3	86,929	86,186	-0.9	43	45	4.7
S	2,489	2,486	-0.2	23,286	20,530	-11.8	74	73	-1.4
T	206	206	0.0	14,915	14,904	-0.1	5	5	0.0
U	9,907	9,907	0.0	8,973	8,973	0.0	19	19	0.0
V	553	552	-0.2	20,054	20,043	-0.1	6	6	0.0
W	1,207	1,207	0.0	0	0	0.0	0	0	0.0
X	92	87	-5.1	7,471	5,780	-22.6	2	2	0.0
Y	189	188	-0.5	70,162	69,877	-0.4	11	11	0.0
Z	51	51	-0.1	14,978	14,952	-0.2	0	0	0.0
Total	42,211	42,434	0.5	1,085,434	1,022,753	-5.8	940	729	-22.4

3.3.1.3 *BMP #3: Diversion Alternative*

Objective:

The purpose of this BMP is to divert flows from offsite areas via the existing R-36 canal, by increasing its capacity and improving its hydraulic connectivity with Deer Prairie Slough canal.

This BMP would involve construction of new structures, maintenance activities, real estate acquisition, and detailed hydrologic and hydraulic evaluation of the western boundary (Deer Prairie Slough watershed).

Description:

On the northwest boundary, along R-36 canal, two earthen overflow weirs were provided to enhance the R-36 waterway connectivity with Deer Prairie Slough canal (See Figure 3). Weir location and parameters were selected based on terrain and hydraulic constraints. The weirs were located on the northwest corner to address flooding in the Estates area and along Big Slough canal. Weir lengths and elevation used are as follows: Weir 1, L: 300 feet at EL:22.0 feet, NAVD88 and Weir 2, L:450 feet at EL:21.0 feet, NAVD88. The R-36 canal capacity was also doubled by replacing the existing cross-section with a 60 feet bottom width trapezoidal channel with 4:1 side slopes. The current model assumes no tailwater influence from Deer Prairie Slough.

Results:

As anticipated, simulation results indicate flood reduction throughout the Estates area, along the Big Slough Canal between the R-36 canal and I-75 corridor as well as in the localized area along Big Slough south of I-75 (See Figure 3-3). Overall results indicate a flood stage reduction between 0.1 foot and 1.0 foot throughout the aforementioned areas.

As mentioned before, these results were obtained assuming no increase in stages in the Deer Prairie Slough Canal since a fixed tailwater condition was used for modeling purposes. Further consideration of impacts of additional flow into the Deer Prairie Slough watershed should be taken into account during final evaluation of BMP's. Table 3-3 summarizes BMP#3 analysis results.

Table 3-3: BMP#3 Results Summary

Sub-Watershed	Bench Mark Total Flooded Area (Acres)	BMP3 Total Flooded Area (Acres)	BMP3 Total Flooded Area Change (%)	Bench Mark Flooded Street Length (Feet)	BMP3 Flooded Street Length (Feet)	BMP3 Flooded Street Length Change (%)	Bench Mark Flooded Parcels (Units)	BMP3 Flooded Parcels (Units)	BMP3 Flooded Parcels Change (%)
A	58	58	0.0	7,959	7,958	0.0	2	2	0.0
B	15,839	15,720	-0.8	304,750	282,118	-7.4	665	568	-14.6
C	724	724	-0.1	118,951	118,890	-0.1	38	38	0.0
D	150	150	-0.2	38,510	38,348	-0.4	15	15	0.0
E	407	407	-0.1	47,961	47,880	-0.2	2	2	0.0
F	98	98	-0.3	22,234	22,141	-0.4	1	1	0.0
G	250	250	0.0	53,687	53,663	0.0	17	17	0.0
H	199	198	-0.3	1,082	1,065	-1.5	2	2	0.0
I	165	165	0.0	21,519	21,463	-0.3	2	2	0.0
J	335	316	-5.7	84,088	73,854	-12.2	15	13	-13.3
K	240	240	0.0	45,022	45,022	0.0	5	5	0.0
L	69	69	0.0	11,354	11,354	0.0	0	0	0.0
M	2,426	2,426	0.0	0	0	0.0	0	0	0.0
N	150	150	0.0	14,407	14,407	0.0	1	1	0.0
O	189	189	0.0	56,008	55,998	0.0	9	9	0.0
P	191	184	-3.4	11,134	10,572	-5.0	6	4	-33.3
Q	3,733	3,731	-0.1	0	0	0.0	0	0	0.0
R	2,294	2,199	-4.1	86,929	64,689	-25.6	43	27	-37.2
S	2,489	2,486	-0.1	23,286	20,653	-11.3	74	73	-1.4
T	206	206	0.0	14,915	14,892	-0.2	5	5	0.0
U	9,907	9,907	0.0	8,973	8,973	0.0	19	19	0.0
V	553	552	-0.2	20,054	19,978	-0.4	6	6	0.0
W	1,207	1,207	0.0	0	0	0.0	0	0	0.0
X	92	86	-5.6	7,471	6,029	-19.3	2	2	0.0
Y	189	184	-2.4	70,162	68,020	-3.1	11	9	-18.2
Z	51	51	-0.2	14,978	14,924	-0.4	0	0	0.0
Total	42,211	41,953	-0.6	1,085,434	1,022,891	-5.8	940	820	-12.8

3.3.1.4 *BMP #4: R-580 Improvements*

Objective:

The objective of this alternative is to induce additional flows through Creighton waterway by improving current conveyance capacity in the R-580 waterway.

Description:

Waterway R-580's bottom profile was reset assuming a flat ditch at its lower elevation of 15.0 feet, NAVD along the entire stretch. The current bottom configuration of the R-580 waterway transitions between 17.71 feet, NAVD88 bottom elevation on the most western end to 23.0 feet, NAVD88 bottom elevation at the most eastern end and sags between these ends at elevation 15.0 feet, NAVD88 (see Figure 3-4).

Results:

This alternative results in small improvements within the vicinity of Big Slough. However, and as intended, additional flows were induced towards Creighton waterway. Inducing additional flow through Creighton waterway will result in additional flooding near I-75 for this particular rainfall event as shown on Figure 3-4. A summary of BMP#4 analysis results is presented in Table 3-4.

Table 3-4: BMP#4 Results Summary

Sub-Watershed	Bench Mark Total Flooded Area (Acres)	BMP4 Total Flooded Area (Acres)	BMP4 Total Flooded Area Change (%)	Bench Mark Flooded Street Length (Feet)	BMP4 Flooded Street Length (Feet)	BMP4 Flooded Street Length Change (%)	Bench Mark Flooded Parcels (Units)	BMP4 Flooded Parcels (Units)	BMP4 Flooded Parcels Change (%)
A	58	58	-0.1	7,959	7,953	-0.1	2	2	0.0
B	15,839	15,806	-0.2	304,750	298,627	-2.0	665	638	-4.1
C	724	725	0.1	118,951	119,411	0.4	38	38	0.0
D	150	151	0.2	38,510	38,526	0.0	15	15	0.0
E	407	408	0.1	47,961	48,223	0.6	2	2	0.0
F	98	99	0.4	22,234	22,517	1.3	1	1	0.0
G	250	250	0.1	53,687	53,782	0.2	17	17	0.0
H	199	199	-0.1	1,082	1,077	-0.4	2	2	0.0
I	165	165	0.1	21,519	21,636	0.6	2	2	0.0
J	335	329	-1.9	84,088	80,578	-4.2	15	15	0.0
K	240	240	0.0	45,022	45,026	0.0	5	5	0.0
L	69	69	0.0	11,354	11,354	0.0	0	0	0.0
M	2,426	2,426	0.0	0	0	0.0	0	0	0.0
N	150	150	0.0	14,407	14,412	0.0	1	1	0.0
O	189	189	0.1	56,008	56,041	0.1	9	9	0.0
P	191	189	-0.7	11,134	11,005	-1.2	6	5	-16.7
Q	3,733	3,720	-0.4	0	0	0.0	0	0	0.0
R	2,294	2,288	-0.3	86,929	85,260	-1.9	43	43	0.0
S	2,489	2,489	0.0	23,286	22,823	-2.0	74	74	0.0
T	206	206	0.0	14,915	14,957	0.3	5	5	0.0
U	9,907	9,910	0.0	8,973	8,973	0.0	19	19	0.0
V	553	577	4.3	20,054	23,139	15.4	6	10	66.7
W	1,207	1,207	0.0	0	0	0.0	0	0	0.0
X	92	90	-1.3	7,471	7,215	-3.4	2	2	0.0
Y	189	188	-0.4	70,162	69,897	-0.4	11	11	0.0
Z	51	51	-0.1	14,978	14,939	-0.3	0	0	0.0
Total	42,211	42,179	-0.1	1,085,434	1,077,371	-0.7	940	916	-2.6

3.3.1.5 *BMP #5: Increase Capacity on Southern Boundary*

Objective:

The objective of this alternative is to evaluate the system response when doubling the southern boundary discharge capacity into Charlotte Harbor area.

The BMP would involve conveyance improvements, construction of new structures and/ or reconditioning of existing structures, maintenance activities, real estate acquisition, and detailed evaluation of the southern boundary through hydrology and hydraulic modeling.

Description:

All structures discharging from Cocoplum waterway into the Charlotte Harbor area under Hillsborough Blvd and their upstream weirs were doubled in capacity. A total of 13 structures under Hillsborough Blvd were double in the model and a total of 6 lateral weirs along Cocoplum waterway were doubled in size (see Figure 3-5).

Results:

This alternative was evaluated for information purposes only, as it is understood that inducing additional flows into Charlotte Harbor would not be desirable. Results indicate that improvements relative to house flooding were not significant; however roads experienced a considerable flood reduction between S Sumter Blvd and Atwater Dr. (see Figure 3-5). A summary of BMP#5 analysis results is presented in Table 3-5.

Table 3-5: BMP#5 Results Summary

Sub-Watershed	Bench Mark Total Flooded Area (Acres)	BMP5 Total Flooded Area (Acres)	BMP5 Total Flooded Area Change (%)	Bench Mark Flooded Street Length (Feet)	BMP5 Flooded Street Length (Feet)	BMP5 Flooded Street Length Change (%)	Bench Mark Flooded Parcels (Units)	BMP5 Flooded Parcels (Units)	BMP5 Flooded Parcels Change (%)
A	58	58	0.1	7,959	8,001	0.5	2	1	-50.0
B	15,839	15,836	0.0	304,750	304,487	-0.1	665	665	0.0
C	724	612	-15.6	118,951	75,331	-36.7	38	25	-34.2
D	150	121	-19.8	38,510	20,694	-46.3	15	7	0.0
E	407	395	-3.1	47,961	42,761	-10.8	2	2	0.0
F	98	76	-22.7	22,234	8,236	-63.0	1	1	-11.8
G	250	245	-2.1	53,687	51,993	-3.2	17	15	0.0
H	199	196	-1.4	1,082	1,000	-7.6	2	2	-50.0
I	165	143	-13.1	21,519	8,237	-61.7	2	1	0.0
J	335	335	0.0	84,088	84,042	-0.1	15	15	0.0
K	240	238	-0.8	45,022	44,688	-0.7	5	5	0.0
L	69	67	-2.1	11,354	11,317	-0.3	0	0	0.0
M	2,426	2,426	0.0	0	0	0.0	0	0	0.0
N	150	149	-0.6	14,407	14,407	0.0	1	1	0.0
O	189	180	-4.6	56,008	51,322	-8.4	9	9	0.0
P	191	191	0.0	11,134	11,133	0.0	6	6	0.0
Q	3,733	3,733	0.0	0	0	0.0	0	0	0.0
R	2,294	2,293	-0.1	86,929	86,339	-0.7	43	43	0.0
S	2,489	2,489	0.0	23,286	23,282	0.0	74	74	0.0
T	206	206	-0.3	14,915	14,756	-1.1	5	5	0.0
U	9,907	9,907	0.0	8,973	8,973	0.0	19	19	0.0
V	553	553	0.0	20,054	20,047	0.0	6	6	0.0
W	1,207	1,207	0.0	0	0	0.0	0	0	0.0
X	92	92	0.0	7,471	7,471	0.0	2	2	0.0
Y	189	189	0.0	70,162	70,161	0.0	11	11	0.0
Z	51	51	0.0	14,978	14,976	0.0	0	0	0.0
Total	42,211	41,988	-0.5	1,085,434	983,655	-9.4	940	915	-2.7

3.3.1.6 *BMP #6: Upstream Detention Alternative*

Objective:

The objective of this analysis is to examine the effects when attenuating peak flow rates in agricultural areas along the Big Slough canal with a series of new detention facilities.

This BMP would involve construction of stormwater management storage areas, maintenance activities and real estate acquisition.

Description:

In offsite areas, seven detention facilities were added to the model. Each detention area has a 100 acre footprint and is more than 10 feet deep. These areas were located on upland sites along Big Slough canal where feasible (see Figure 3-6). The bottom elevations of these detention areas were set at the adjacent canal initial elevation. Each of these ponds was linked to the Big Slough canal by a 500 feet weir. The crest elevations were set at the bottom of the pond. The total anticipated detained volume is 600 acre-ft per detention site, a total of 4,200 acre-ft.

Results:

Results indicate that the supplemental detention area alternative produces little reduction in peak water surface elevations. Elevations along Big Slough were reduced by only 0.1 to 0.6 feet, making this option less attractive. The extent of flooding for this BMP is essentially the same as the existing scenario with few flood reduction areas along the Big Slough canal (see Figure 3-6). Initial evaluation suggests that the costs associated with purchasing the proposed detention areas from private landowners will likely be high. In addition the complexity of building reservoirs will make it a less attractive solution; e.g. runup wave analysis will increase the height of the perimeter berm. Total costs include an initial cost of location, proper land acquisition and construction, in addition to recurring maintenance and operation costs. A summary of BMP#6 analysis results is presented in Table 3-6.

Table 3-6: BMP#6 Results Summary

Sub-Watershed	Bench Mark Total Flooded Area (Acres)	BMP6 Total Flooded Area (Acres)	BMP6 Total Flooded Area Change (%)	Bench Mark Flooded Street Length (Feet)	BMP6 Flooded Street Length (Feet)	BMP6 Flooded Street Length Change (%)	Bench Mark Flooded Parcels (Units)	BMP6 Flooded Parcels (Units)	BMP6 Flooded Parcels Change (%)
A	58	58	0.0	7,959	7,959	0.0	2	2	0.0
B	15,839	15,645	-1.2	304,750	280,497	-8.0	665	563	-15.3
C	724	724	-0.1	118,951	118,818	-0.1	38	38	0.0
D	150	150	-0.5	38,510	38,067	-1.2	15	15	0.0
E	407	407	-0.1	47,961	47,827	-0.3	2	2	0.0
F	98	98	-0.6	22,234	22,019	-1.0	1	1	0.0
G	250	250	0.0	53,687	53,659	-0.1	17	17	0.0
H	199	197	-0.8	1,082	1,021	-5.6	2	2	0.0
I	165	165	-0.1	21,519	21,418	-0.5	2	2	0.0
J	335	311	-7.2	84,088	72,123	-14.2	15	13	-13.3
K	240	240	0.0	45,022	45,022	0.0	5	5	0.0
L	69	69	0.0	11,354	11,354	0.0	0	0	0.0
M	2,426	2,426	0.0	0	0	0.0	0	0	0.0
N	150	150	0.0	14,407	14,407	0.0	1	1	0.0
O	189	189	-0.1	56,008	55,961	-0.1	9	9	0.0
P	191	183	-3.8	11,134	10,588	-4.9	6	4	-33.3
Q	3,733	3,723	-0.3	0	0	0.0	0	0	0.0
R	2,294	2,268	-1.2	86,929	80,023	-7.9	43	42	-2.3
S	2,489	2,485	-0.2	23,286	20,307	-12.8	74	73	-1.4
T	206	206	0.0	14,915	14,866	-0.3	5	5	0.0
U	9,907	9,907	0.0	8,973	8,973	0.0	19	19	0.0
V	553	550	-0.5	20,054	19,833	-1.1	6	6	0.0
W	1,207	1,207	0.0	0	0	0.0	0	0	0.0
X	92	88	-4.4	7,471	6,413	-14.2	2	2	0.0
Y	189	187	-0.7	70,162	69,679	-0.7	11	11	0.0
Z	51	51	-0.4	14,978	14,887	-0.6	0	0	0.0
Total	42,211	41,934	-0.7	1,085,434	1,035,721	-4.6	940	832	-11.5

3.3.2 *BMP Evaluation of Four Crossings*

Under this evaluation, as requested by the City of North Port, hydraulic performance and the effects of potential conveyance improvements at four sites, including: R-36 Canal at I-75, Myakkahatchee Creek at I-75, R-36 Canal at Tropicaire Boulevard, and Myakkahatchee Creek at Tropicaire Boulevard were analyzed.

A systematic evaluation was conducted to first understand the existing hydraulic behavior of each of the four crossings under various synthetic storm events. Head differences across each structure, flow conditions at peak discharge, and hydraulic connectivity (including flow patterns in adjacent areas) were assessed to understand unique conditions at each crossing.

In order to evaluate effectiveness of potential BMP improvements at these locations (including any resulting flood reduction and/or downstream flood increase), conveyance capacity at each site was increased by doubling the number of existing structures. This was achieved by adding a duplicate set of model reach elements at each location. A description of existing crossings and the applied BMP for evaluation are provided in Table 3-7.

Table 3-7: Location and Description of Existing and BMP Conditions

Crossing Location	Existing Crossing	BMP Condition
R-36 Canal at I-75	Two (2) 7.5' x 6' box culverts	Two (2) identical 7.5' x 6' box culverts were added in parallel to existing structure
Myakkahatchee Creek at I-75	Two (2) parallel bridges with 8 piers and a total span of 540 feet	Two (2) identical parallel bridges were added in parallel to existing structure
R-36 Canal at Tropicaire Blvd	Two (2) 5' diameter RCP culverts	Two (2) identical 5' diameter RCP culverts were added in parallel to existing structure
Myakkahatchee Creek at Tropicaire Blvd	One (1) bridge with 4 piers and a total span of 150 feet	One (1) identical bridge was added in parallel to existing structure

3.3.2.1 *R-36 Canal at I-75 Evaluation*

Existing condition model results indicate that more than two feet of head difference occurs across this structure during the 100-year storm event (see Table 3-8 and Figures 3-7 & 3-8). Under the proposed BMP condition, model results indicate that a peak stage reduction of up to 0.6 feet occurs upstream of the crossing, while a stage increase of approximately 0.6 feet occurs in the downstream areas. It is notable that reduced discharges are observed from the R-36 Canal westward into the adjacent Deer Prairie Slough watershed for the proposed BMP condition. This overflow connection with the adjacent watershed to the west is located north of I-75. The reduced overflow results in an increased total volume remaining within the North Port area, by virtue of the improved conveyance capacity of the proposed BMP. In summary, increasing the crossing capacity of the R-36 Canal at I-75 may reduce water levels upstream of the crossing, but

also raises flood elevations in the downstream areas. Mitigation of flooding in downstream areas was beyond the scope of this evaluation.

Table 3-8: R-36 Canal at I-75 Crossing Evaluation Results Summary

Table 3-8 (a): Existing Condition Upstream and Downstream Node Maximum Stages and Flows

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)*	NR3210	17.47	19.57	20.38	20.99	21.69	22.30
D/S Node Max Stage (ft)*	NR3220	16.82	18.33	18.86	19.20	19.56	19.92
Difference in Stage (ft)	n/a	0.65	1.24	1.52	1.78	2.14	2.38
Flow (cfs)	n/a	424	586	654	710	779	846

Table 3-8 (b): With BMP Upstream and Downstream Node Maximum Stages and Flows

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)*	NR3210	17.05	18.97	19.74	20.34	21.08	22.08
D/S Node Max Stage (ft)*	NR3220	16.88	18.61	19.25	19.69	20.19	20.74
Difference in Stage (ft)	n/a	0.17	0.36	0.49	0.65	0.90	1.34
Flow (cfs)	n/a	433	631	735	845	997	1223

Table 3-8 (c): Difference in Flows and Stages between BMP and Existing Condition

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)	NR3210	-0.42	-0.60	-0.64	-0.65	-0.61	-0.22
D/S Node Max Stage (ft)	NR3220	0.06	0.28	0.39	0.49	0.63	0.82
Flow (cfs)	n/a	9	45	82	135	218	377

*Vertical datum of stage reported in the table is with reference to NAVD88 Datum.

3.3.2.2 *Myakkahatchee Creek at I-75 Evaluation*

Existing condition model results indicate that approximately one foot of head difference occurs across this structure during extreme storm events (see Table 3-9 and Figures 3-9 & 3-10). This head difference is relatively small considering the magnitude of flow that arrives from the upstream contributing watershed (up to 8000 cubic feet per second). The applied BMP at this location assumes that the conveyance capacity of the bridge

crossing was doubled. In other words, an identical, parallel 540-foot bridge span was added to investigate the benefit of increasing bridge capacity. Under this hypothetical scenario, model results indicate that a localized stage reduction of 0.7 feet is observed immediately at the upstream end of the crossing. However, peak stage reductions decrease further upstream of the crossing along the creek. No significant change in peak elevations is observed 1,200 feet upstream of the crossing. Also, no significant change to flooding conditions is observed in areas downstream of the crossing. In summary, increasing the crossing capacity of the bridge over Myakkahatchee Creek at I-75 may reduce water levels immediately upstream of the crossing, but does not generally improve flooding conditions north of I-75. The area impacted by this improvement is very localized and would not justify the cost of the improvement.

3.3.2.3 *R-36 Canal at Tropicaire Boulevard Evaluation*

Existing condition model results indicate that up to three feet of head difference occurs across this structure during various storm events (see Table 3-10 and Figures 3-11 & 3-12). Under the proposed BMP conditions, model results indicate a peak stage reduction of approximately 0.8 feet upstream of the crossing, while a stage increase of up to 1.1 feet occurs downstream of Tropicaire. During all events, discharges from the R-36 canal into Deer Prairie Slough watershed are observed north of Tropicaire Boulevard. The proposed BMP results in a reduction of those discharges to Deer Prairie Slough and a resulting increased total volume remaining within the North Port area. In summary, while increasing the crossing capacity of the R-36 Canal at Tropicaire Boulevard may reduce water levels upstream of the crossing, it also raises flood elevations in downstream areas. Mitigation of flooding in downstream areas was beyond the scope of this evaluation.

3.3.2.4 *Myakkahatchee Creek at Tropicaire Boulevard Evaluation*

Existing condition model results indicate that the maximum calculated head difference for the various storm events is 0.2 feet; therefore the bridge is not causing a flow restriction (see Table 3-11 and Figures 3-13 & 3-14). Regardless, a BMP was applied for evaluation and assumes that the conveyance capacity was increased (doubled) by adding an identical bridge element in parallel to the existing structure. Under this scenario, model results indicate that a maximum localized stage reduction of approximately 0.1 feet was calculated, yet no significant change is observed further upstream nor downstream of the crossing. In summary, increasing the crossing capacity of the bridge over Myakkahatchee Creek at Tropicaire Boulevard does not substantially improve flooding conditions north of I-75.

Model results (maximum stages and maximum flows) for various storm events (Mean Annual, 5-year, 10-year, 25-year, 50-year, and 100-year) are provided in tabular form within the accompanying geodatabase.

Table 3-9: Myakkahatchee Creek at I-75 Crossing Evaluation Results Summary

Table 3-9 (a): Existing Condition Upstream and Downstream Node Maximum Stages and Flows

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)*	NB0750	20.40	21.89	22.19	22.46	22.82	23.93
D/S Node Max Stage (ft)*	NB0780	19.81	20.86	21.13	21.37	21.79	22.83
Difference in Stage (ft)	n/a	0.59	1.03	1.07	1.09	1.02	1.10
Flow (cfs)	n/a	1306	3045	3640	4236	5290	7816

Table 3-9 (b): With BMP Upstream and Downstream Node Maximum Stages and Flows

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)*	NB0750	19.97	21.16	21.45	21.71	22.14	23.35
D/S Node Max Stage (ft)*	NB0780	19.82	20.87	21.14	21.39	21.83	23.02
Difference in Stage (ft)	n/a	0.16	0.29	0.31	0.32	0.30	0.33
Flow (cfs)	n/a	1311	3601	3673	4291	5175	8509

Table 3-9 (c): Difference in Flows and Stages between BMP and Existing Condition

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)	NB0750	-0.43	-0.72	-0.75	-0.75	-0.68	-0.58
D/S Node Max Stage (ft)	NB0780	0.00	0.01	0.01	0.02	0.04	0.20
Flow (cfs)	n/a	5	556	33	55	-115	692

*Vertical datum of stage reported in the table is with reference to NAVD88 Datum.

Table 3-10: R-36 Canal at Tropicaire Boulevard Crossing Evaluation Results Summary

Table 3-10 (a): Existing Condition Upstream and Downstream Node Maximum Stages and Flows

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)*	NR0170	21.57	21.99	22.08	22.15	22.22	22.33
D/S Node Max Stage (ft)*	NR3190	18.15	19.74	20.48	21.07	21.73	22.31
Difference in Stage (ft)	n/a	3.42	2.25	1.61	1.08	0.49	0.01
Flow (cfs)	n/a	414	420	420	420	421	420

Table 3-10 (b): With BMP Upstream and Downstream Node Maximum Stages and Flows

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)*	NR0170	20.77	21.77	21.94	22.06	22.18	22.32
D/S Node Max Stage (ft)*	NR3190	19.29	20.68	21.11	21.49	21.90	22.32
Difference in Stage (ft)	n/a	1.48	1.10	0.83	0.57	0.28	0.00
Flow (cfs)	n/a	550	575	576	578	578	577

Table 3-10 (c): Difference in Flows and Stages between BMP and Existing Condition

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)	NR0170	-0.80	-0.21	-0.14	-0.09	-0.04	0.00
D/S Node Max Stage (ft)	NR3190	1.14	0.94	0.63	0.42	0.17	0.01
Flow (cfs)	n/a	136	156	156	157	158	157

*Vertical datum of stage reported in the table is with reference to NAVD88 Datum.

Table 3-11: Myakkahatchee Creek at Tropicaire Boulevard Crossing Evaluation Results Summary

Table 3-11(a): Existing Condition Upstream and Downstream Node Maximum Stages and Flows

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)*	NB0700	22.79	24.28	24.51	24.71	24.99	26.13
D/S Node Max Stage (ft)*	NB0710	22.70	24.08	24.31	24.52	24.83	26.07
Difference in Stage (ft)	n/a	0.09	0.19	0.20	0.20	0.16	0.06
Flow (cfs)	n/a	1332	2582	2785	2890	2973	2756

Table 3-11(b): With BMP Upstream and Downstream Node Maximum Stages and Flows

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)*	NB0700	22.73	24.17	24.41	24.63	24.94	26.11
D/S Node Max Stage (ft)*	NB0710	22.71	24.12	24.35	24.57	24.88	26.09
Difference in Stage (ft)	n/a	0.02	0.05	0.06	0.06	0.05	0.02
Flow (cfs)	n/a	1353	2712	3001	3167	3278	3031

Table 3-11(c): Difference in Flows and Stages between BMP and Existing Condition

Location	Node Name	Mean Annual	1 Day 10YR	1 Day 25YR	1 Day 50YR	1 Day 100YR	5 Day 100YR
U/S Node Max Stage (ft)	NB0700	-0.06	-0.10	-0.10	-0.09	-0.06	-0.02
D/S Node Max Stage (ft)	NB0710	0.01	0.04	0.04	0.05	0.05	0.02
Flow (cfs)	n/a	21	131	217	277	305	275

*Vertical datum of stage reported in the table is with reference to NAVD88 Datum.

3.3.3 *WCS-162 Evaluation*

WCS-162 is located on the R-36 Canal, north of Interstate 75, and immediately upstream of Tropicaire Boulevard (refer to Figure 3-15). This is the only gated weir structure on the R-36 Canal, with one 2.25 feet high by 2 feet wide pull up slide gate. The City generally operates this structure by fully opening the gate in anticipation of a storm event to lower the water level in the R-36 canal to minimize potential upstream flooding; otherwise, the gate remains closed. The City staff would like to determine if adding gates would help draw down the canal more quickly and increase conveyance capacity.

3.3.3.1 *R-36 Canal Drawdown Evaluation*

To reduce impacts downstream of WCS-162 while improving peak conditions upstream of the structure, an evaluation was performed to determine the benefits of adding additional gates. The evaluation included calculating the drawdown time for the R-36 canal and the additional conveyance capacity provided by the additional gates.

To evaluate BMPs at WCS-162, Ardaman requested to survey the structure to better understand the geometry of the structure and canal with the purpose of assessing availability of adequate space for additional gates. The survey data provided by Van Buskirk/Fish & Associates, Inc. is included in Appendix A, and the structure pictures are provided in Appendix B. The existing condition model was revised using the latest (2014) survey information for this BMP Evaluation. The update model simulated results rendered no change in model results compared to the May 2012 Governing Board approved model.

The benefits of reducing time required to lower R-36 canal elevation by adding gates at WCS-162 upstream of the structure were assessed by performing a drawdown analysis. For the drawdown evaluation, the R-36 canal upstream of WCS-162 was assumed to be at the control elevation of the weir (elevation 18.3 feet NAVD88). The water level at the canal was simulated by fully opening the existing gate with no additional flows coming into the canal. The existing condition drawdown simulation results indicates that it would take approximately 18 hours to lower the canal to elevation 15 feet (refer to Figure 3-16).

The canal drawdown simulation was repeated for one and two additional gates scenarios. The canal stage hydrographs upstream of the structure with additional gates are also plotted in Figure 3-16. As shown in Figure 3-16, the time required to drawdown R-36 canal will decrease to 11 hours by adding an identical gate. When 2 additional matching gates are provided, the time require to drawdown R-36 canal would decrease to 9 hours. Therefore, the total time required to drawdown R-36 canal (to elevation 15 feet) upstream of WCS-162 will be reduced by 7 and 9 hours by adding one and two additional gates respectively.

3.3.3.2 *Storm Events Simulation Results*

The mean annual, 5-year, and 10-year storm events were simulated using the updated existing condition model with 2014 survey information. The City's water control structure operation criteria were employed in these simulations. The gates are closed at the

beginning of the simulation, and they will be fully open when Big Slough Canal stage at Tropicaire rises to Elevation 15.88 feet NAVD88.

Benefits of flood control at the upstream of WCS-162 during a storm event were evaluated by simulating the mean annual storm event starting at the drawdown stage levels (Elevation 15 feet NAVD88). For this evaluation, initial stages in R-36 Canal upstream of WCS-162 were set to the drawdown levels, i.e. simulated canal stages after 18 hours of drawdown simulation. The lower initials at the canal will account for the additional canal storage capacity available upstream of WCS-162. During the lower initial condition simulation, the WCS-162 gate was assumed to be opened throughout the simulation. Model results with lowered initials were compared to the results with the normal initial stage, which is at the invert elevation (at elevation 18.29 feet NAVD88) of WCS-162 weir. Table 3-12 presents model results and comparison of max stages of R-36 canal upstream of WCS-162 weir with normal and lowered initial stage at the canal for the mean annual storm event. As indicated in the table, simulated results suggest that there will be no difference in peak stages in R-36 canal due to the lower initial canal stage. It should be noted that model results suggest the 50-foot wide weir at WCS-162 overtops by 2.6 feet conveying 328 cfs of peak flow across the structure during the mean annual storm event. The R-36 Canal upstream of WCS-162 holds approximately 30 acre-feet of storage capacity behind the gate, whereas more than 3,000 acre-feet of runoff volume is conveyed by the canal during the mean annual storm event. The additional available storage seems to be insignificant compared to the runoff conveyed by the canal during the storm event.

In addition, benefits of having one additional gate with the lowered R-36 canal stages upstream of WCS-162 were also evaluated. For this scenario, both gates (one existing and one additional BMP gate) were assumed to be fully opened throughout the simulation. The model results for mean annual storm event for this scenario are also presented in Table 3-12. The simulated results suggest that there will be no difference in R-36 canal max stages upstream of WCS-162 with an additional gate at the structure. As no difference in peak stages were predicted for the mean annual storm event, no other higher return period storm events (5-year and 10-year) were analyzed with additional gates.

In conclusion, providing one or two additional gates at WCS-162 will help to reduce the time required to drawdown canal levels at the upstream of the structure; however the model results suggest that lower initial levels in R-36 canal upstream of the structure will provide no benefits in terms of reducing flooding at the upstream areas even for small storm events such as mean annual storm event. Also, the modeling results suggest that there would be no adverse impacts in the downstream of WCS-162 due to the additional gate.

Table 3-12: Mean Annual Event Simulated Maximum Stages in R-36 Canal Upstream of WCS-162

Model Node+	Existing Condition Max Stage (ft, NAVD88)	Scenario 1: Existing with Lowered Initials		Scenario 2: One Additional Gate BMP with Lowered Initials	
		Max Stage (ft, NAVD88)	Difference in Max Stage (ft)	Max Stage (ft, NAVD88)	Difference in Max Stage(ft)
NR0170*	21.55	21.55	0.00	21.56	0.01
Water Control Structure WCS-162					
NR3160**	21.86	21.86	0.00	21.85	0.00
NR3150	21.87	21.86	0.00	21.86	0.00
NR3140	22.09	22.09	0.00	22.09	0.00
NR3130	22.23	22.23	0.00	22.23	0.00
NR3125	22.42	22.41	-0.01	22.41	-0.01
NR3120	22.58	22.57	-0.01	22.57	-0.01
NR3110	22.76	22.76	-0.01	22.76	-0.01
NR3100	22.85	22.84	-0.01	22.84	-0.01
NR3090	22.94	22.94	0.00	22.94	0.00
NR3080	23.01	23.01	0.00	23.01	0.00
NR3070	23.09	23.09	0.00	23.08	0.00
NR3060	23.20	23.20	0.00	23.20	0.00
NR3050	23.40	23.40	0.00	23.40	0.00
NR3040	23.44	23.44	0.00	23.44	0.00
NR3030	23.51	23.51	0.00	23.51	0.00
NR3025	23.58	23.58	0.00	23.58	0.00
NR3020	23.59	23.59	0.00	23.59	0.00
NR3010	23.62	23.62	0.00	23.62	0.00
NB5695	23.65	23.65	0.00	23.65	0.00

+ Model nodes are presented from downstream to upstream location at R-36 canal

* Model Node Downstream of WCS-162

** Model Node Upstream of WCS-162

3.3.4 *Price Boulevard LOS Improvements*

Existing condition model results (May 2012 Governing Board approved model) predict that West Price Boulevard would intermittently flood between Locher Road and the Big Slough Canal during the 10, 25, and 100-year, 24-hour storm events. The currently designated City of North Port Level of Service (LOS) is shown in Figure 3-17. As shown on this figure, the West Price Boulevard stretch is identified as an arterial street that floods during the 100-year, 24-hour design storm event. This arterial street is critical to stormwater emergency response since it provides access to emergency facilities such as North Port Utilities Building, North Port High School and Heron Creek Middle School. Therefore, the City of North Port requested further evaluation of the stretch of West Price Boulevard between North Biscayne Boulevard and the Big Slough Canal to provide BMP recommendations to meet the City of North Port LOS criteria. City Unified Land Development Code Chapter 18 Level of Service criteria for arterial roads states that flooding must be less than 6 inches, as measured at the outside edge of pavement in a 100-year, 24-hour design storm event.

Ardaman staff reviewed the May 2012 Governing Board approved model setup within the area of interest (AOI) to verify whether the current model adequately represents the 2014 condition. With desktop and field reconnaissance of the area, it was observed that a section of the surface and sub-surface drainage systems near the North Port High School had been recently updated. Ardaman recommended surveying the AOI to better represent the existing condition. The survey data provided by Van Buskirk/Fish & Associates, Inc. is included in Appendix C.

Existing (2014) Condition Description:

Based on recent survey, stormwater runoff collected from the north and south swales of West Price Boulevard generally flows west from the North Port Utilities Building, whereas stormwater runoff from the remaining areas flows east from this location. Accumulated stormwater runoff going west from the North Port Utilities Building ultimately flows north via the Indian burial ground toward the R-32 canal.

Stormwater runoff going east toward Big Slough is routed through a series of surface water features (ditches, swales and inlets) which connects to a sub-surface system along the north side of West Price Boulevard.

Existing Condition Model Update and Results:

The May 2012 Governing Board approved model was updated using the 2014 survey provided by Van Buskirk/Fish & Associates, Inc. The revised 100-year storm event model results indicate that West Price Boulevard would not flood near the North Port High School as previously predicted. However, the stretch of West Price Boulevard north of Little Salt Spring would still flood by 0.4 feet at the crown during the 10-year storm event. Survey data indicates that road overtopping would occur at the lowest point (near the culvert crossing) at 17.3 feet NAVD88. The model predicted the 25-year and 100-year storm maximum stages at West Price Boulevard are 17.9 and 18.2 feet NAVD88 respectively. The revised existing condition floodplain delineations for the 100-year storm event and the revised LOS are presented in Figure 3-18.

BMP Alternative Analysis

The objective of this series of BMPs is to mitigate flooding along the stretch of West Price Boulevard near the Indian burial ground to meet the existing City of North Port LOS criteria.

Five different BMP alternatives were considered. Only the three alternatives that were determined to be effective in improving the LOS are described below:

3.3.4.1 *West Price Boulevard BMP 1*

Description

The first BMP alternative involves dredging the R-24 and R-32 canals. As shown in Figure 3-19, this alternative would require: dredging 2,300 feet of R-24 canal and 1,800 feet of R-32 canal to add approximately 2 to 3 feet of depth; and installing one extra parallel 36-inch pipe at the existing culvert crossing, between Indian burial ground and the R-32 canal. Figures showing comparison of existing and BMP cross-sections and bottom profiles of these canals are provided in Appendix D.

The City is not allowed to disturb the 50-foot wide drainage right-of-way through the Indian burial ground.

Results

Model results, comparison of floodplains, and the maximum stages at notable locations are presented in Figure 3-19. Model results with BMP_1 alternative suggest that West Price Boulevard would not overtop during the 25-year storm event. In addition, this alternative would reduce flooding on some local streets (Dundee Ave, Surf Ave, and San Salvador Road) located north of R-32 canal.

The model predicted that the 100-year maximum stage at West Price Boulevard with BMP_1 alternative will be reduced from 18.2 to 17.5 feet NAVD88. West Price Boulevard would still overtop by 0.2 feet over the crown of the road at the lowest section during the 100-year storm event. However, the road would be passable according to City of North Port LOS criteria. Figure 3-20 shows the comparison of the 100-year floodplain and maximum stages at notable locations with BMP 1 alternative. Model results also indicate that there will be no adverse impacts at downstream areas due to this improvement.

3.3.4.2 *West Price Boulevard BMP 2*

Description

The second BMP alternative consists of raising the road (West Price Boulevard) such that it would not flood during the 100-year design storm event. This alternative would involve raising approximately 1,900 feet of West Price Boulevard to an elevation of 18.5 feet NAVD88. Survey data suggests that the lowest segment of the road, which is located at the culvert crossing, needs to be raised by 1.2 feet to reach an elevation of 18.5 feet NAVD88. Figure 3-21 shows the comparison of the 100-year floodplain as well

as the extent of West Price Boulevard that needs to be raised to reduce flooding potential during the event.

Results

Model results suggest that the 100-year peak stages upstream and downstream of the culvert across West Price Boulevard would be 18.2 feet NAVD88 with this alternative. The model predicted the 100-year maximum stage at West Price Boulevard is below the recommended raised road crown elevation of 18.5 feet NAVD88. The peak stage model results suggest that there will be no adverse impacts or increase in stages upstream or downstream of the improvement for any modeled storm event.

Additional right-of-way requirement to raise the road and its availability should be thoroughly assessed prior to selecting this BMP alternative.

3.3.4.3 *West Price Boulevard BMP 3*

Description

The third BMP alternative evaluated incorporates both BMP_1 and BMP_2 improvements, i.e. dredging the R-32 and R-24 canals, adding a new pipe crossing, and raising the road such that it would not flood during the 100-year storm event.

Results

Model results suggest that the 100-year peak stage upstream of the culvert across West Price Boulevard would be 17.6 feet NAVD88 with this alternative. Figure 3-22 shows the comparison of the 100-year floodplain as well as the elements of BMP_3 improvements. This alternative would require raising approximately 950 feet of West Price Boulevard to elevation 18.0 feet NAVD88. Compared to BMP_2 improvements, this alternative would reduce the required road improvement length by half at a lower elevation (6 inches lower than BMP_2). Similar to BMP_1 and BMP_2, the peak stage model results suggest that there will be no adverse impacts or increase in stages upstream or downstream of the road improvement for any model storm event.

3.3.4.4 *Other Evaluated BMPs*

In addition to the three previously described BMP alternatives, a few other BMPs were evaluated. However, modeling results suggest that theses BMPs would not mitigate the flooding conditions along the evaluated stretch of West Price Boulevard.

One of the other BMPs evaluated was to install a 24-inch pipe at the south side of West Price Boulevard near the culvert that would run approximately 1,400 feet to the east and connect to the existing sub-surface system inlet. This BMP did not show any improvements since the BMP pipe is too long and there was not sufficient hydraulic gradient available to convey the necessary flow rate through the pipe.

Another BMP evaluated was to provide a 20-foot wide cut/swale that would connect the flooded area south of West Price Boulevard to the south towards the Little Salt Spring basin. 25-year storm event model results suggest that this BMP alternative would lower

peak stages at West Price Boulevard only by 0.2 feet. However, the road would still flood during this event. Also, this BMP may raise environmental concerns considering that it would require diverting stormwater runoff from the road towards Little Salt Spring basin.

3.3.4.5 *Summary and Recommendations*

Various BMP alternatives were evaluated to mitigate flooding at West Price Boulevard with the purpose of meeting City of North Port LOS criteria. BMP_1 alternative (dredging R-24 and R-32 canals) would eradicate the road flooding in a 25-year design storm event, and it would minimize flooding in a 100-year storm event to make it passable during the event. BMP_2 alternative would eliminate road flooding in a 100-year design storm event by raising West Price Blvd. BMP_3 alternative would also eliminate West Price Boulevard road flooding in a 100-year storm event while minimizing road improvements. A summary of 100-year peak stages for each BMP alternatives and recommended road crown and edge of pavement elevations are provided in Table 3-13. It is estimated that it would cost $0.8 million, $0.9 million, and $1.3 million for BMP_1, BMP_2, and BMP_3, respectively (see Appendix E for the detailed cost estimates). These cost estimates are approximate, and they are used for the comparison purpose only. Considering the project cost, BMP_2 alternative (raising the road) appears to be the most effective approach to eliminate road flooding conditions for the 100-year design storm event. In 2010, the city cleaned these canals with the purpose of removing mucks accumulated at the bottom. It is recommended current cross-sections and bottom profiles of these canals be surveyed to verify dredging requirements prior to selecting dredging alternatives. Also, canal dredging cost could be less, if City of North Port performs the dredging using in-house resources.

Table 3-13: Summary of West Price Boulevard BMPs

BMP Description	100-year Flood Elevation (ft, NAVD88)		EOP Elevation (ft, NAVD88)		Road Crown Elevation (ft, NAVD88)		Preliminary Cost Estimate for Construction in 2017
	Without BMP	With BMP	Existing	Proposed	Existing	Proposed	
No. 1- Dredge R-24 and 32, add 36" pipe	18.2	17.5	17	17	17.3	17.3	$832,000
No. 2- Raise 1900 LF of Price Blvd 1.2' higher	18.2	18.2	17	18.2	17.3	18.5	$859,000
No. 3- Dredge R-24 and 32, add 36" pipe, Raise 850 LF of Price Blvd 0.7' higher	18.2	17.6	17	17.7	17.3	18.0	$1,308,000

The 25-year and 100-year storm events revised existing condition and BMP 1, 2, and 3 alternatives model results (maximum stages and maximum flows) are provided in tabular form within the accompanying geodatabase along with updated model network (basins, nodes, and reaches). CHAN model data and simulation run files for these alternatives are also included in an external hard drive.

4.0 CONCEPTUAL PERMIT APPLICATION

Conceptual permit application was not included in this project.

5.0 CONCLUSIONS

It is recommended that the City of North Port purchas the small number of habitable structures in which flooding is predicted in the 100 year event. Purchasing the affected properties may be more cost effective than implementing any BMPs. Figure 5-1 shows the 74 parcels (one parcel contains two habitable structures) identified in the LOS analysis, in addition to 25 parcels reported as flooded in 1992 and 27 properties reported as damaged in 2003 (also see Table 5-1 below). Several parcels were identified as flooded in more than one event, which is noted in the table.

It is recommended that finished floor elevations of the 101 parcels are acquired by survey, and finished floor elevations are compared with modeled 100 year event maximum stages, to determine which properties flood in the 100 year event. Highlighted rows indicate parcels that were identified as flooded in the LOS analysis, and have documented flooding in the 1992 and/or 2003 event.

Table 5-1: Summary of Parcels to Survey

PID	Address	City, State, Zip	In 100 Year Level of Service Analysis	Reported as Flooded in 1992	Reported as Flooded in 2003
1122-16-0325	1297 NACKMAN RD	NORTH PORT, FL 34288	Yes		
1008-25-5316	1400 LONGBOW AVE	NORTH PORT, FL 34288	Yes		
0976-26-4128	2386 VESTRIDGE ST	NORTH PORT, FL 34287	Yes		
0964-08-1404	2912 OKLAHOMA ST	NORTH PORT, FL 34286	Yes		
0995-18-2835	2989 SARLETTO ST	NORTH PORT, FL 34287		Yes	
0995-18-2836	2999 SARLETTO ST	NORTH PORT, FL 34287		Yes	
0967-06-0117	3166 SNOWBIRD ST	NORTH PORT, FL 34291	Yes	Yes	Yes
0993-26-4012	3236 MONTCLAIR CIR	NORTH PORT, FL 34287	Yes		
0993-26-3801	3262 MONTCLAIR CIR	NORTH PORT, FL 34287	Yes		
0993-26-3730	3589 MONTCLAIR CIR	NORTH PORT, FL 34287	Yes		
0993-26-3815	3626 MONTCLAIR CIR	NORTH PORT, FL 34287	Yes		
0993-26-3816	3652 MONTCLAIR CIR	NORTH PORT, FL 34287	Yes		

PID	Address	City, State, Zip	In 100 Year Level of Service Analysis	Reported as Flooded in 1992	Reported as Flooded in 2003
0954-14-2522	4268 BACKENSTO ST	NORTH PORT, FL 34291	Yes		Yes
1144-07-4316	4268 LEESBURG AVE	NORTH PORT, FL 34288	Yes		
1002-18-4613	4353 MCKIBBEN DR	NORTH PORT, FL 34287	Yes		
1002-27-6618	4399 MONGITE RD	NORTH PORT, FL 34287	Yes		
1002-18-4810	4440 MONGITE RD	NORTH PORT, FL 34287	Yes		
0955-15-4601	4441 COBBLER LN	NORTH PORT, FL 34286	Yes		
1002-27-6621	4441 MONGITE RD	NORTH PORT, FL 34287	Yes		
0996-19-1923	4531 NELE ST	NORTH PORT, FL 34287		Yes	
1002-18-4806	4534 MONGITE RD	NORTH PORT, FL 34287	Yes		
1002-27-6627	4567 MONGITE RD	NORTH PORT, FL 34287	Yes		
0996-19-1922	4573 NELE ST	NORTH PORT, FL 34287		Yes	
1002-27-6628	4583 MONGITE RD	NORTH PORT, FL 34287	Yes		
1002-27-6629	4599 MONGITE RD	NORTH PORT, FL 34287	Yes		
1002-27-6630	4609 MONGITE RD	NORTH PORT, FL 34287	Yes		
1002-27-6631	4625 MONGITE RD	NORTH PORT, FL 34287	Yes		
1002-18-5011	4628 MONGITE RD	NORTH PORT, FL 34287	Yes		
1002-18-5010	4640 MONGITE RD	NORTH PORT, FL 34287	Yes		
1002-27-6632	4641 MONGITE RD	NORTH PORT, FL 34287	Yes		
1002-18-5008	4668 MONGITE RD	NORTH PORT, FL 34287	Yes		
0996-19-4324	4943 GROBE ST	NORTH PORT, FL 34287	Yes		
0996-19-2317	4964 GROBE ST	NORTH PORT, FL 34287		Yes	
1001-27-6105	4974 ESCALANTE DR	NORTH PORT, FL 34287	Yes		
1001-27-6106	4982 ESCALANTE DR	NORTH PORT, FL 34287	Yes		
1001-27-6316	4983 ESCALANTE DR	NORTH PORT, FL 34287	Yes		
0996-19-4325	4987 GROBE ST	NORTH PORT, FL 34287	Yes		
1001-27-6107	4990 ESCALANTE DR	NORTH PORT, FL 34287	Yes		
0996-19-2318	4991 BULLARD ST	NORTH PORT, FL 34287		Yes	

PID	Address	City, State, Zip	In 100 Year Level of Service Analysis	Reported as Flooded in 1992	Reported as Flooded in 2003
0953-15-2713	5005 LACEY ST	NORTH PORT, FL 34286	Yes		Yes
0996-09-4126	5009 BULLARD ST	NORTH PORT, FL 34287	Yes		
0955-15-3218	5060 IBSON LN	NORTH PORT, FL 34286	Yes		
0942-15-3308	5089 HABLOW LN	NORTH PORT, FL 34286	Yes		
0942-15-3307	5101 HABLOW LN	NORTH PORT, FL 34286	Yes		
1001-27-6115	5102 ESCALANTE DR	NORTH PORT, FL 34287	Yes		
0942-15-3205	5133 INKS LN	NORTH PORT, FL 34286	Yes		
1001-27-6117	5142 ESCALANTE DR	NORTH PORT, FL 34287	Yes		
0942-15-3204	5149 INKS LN	NORTH PORT, FL 34286	Yes		
0942-15-3301	5173 HABLOW LN	NORTH PORT, FL 34286	Yes		
0953-15-2415	5208 GRIGGS AVE	NORTH PORT, FL 34291	Yes		
0953-15-2214	5224 HACKLEY RD	NORTH PORT, FL 34291	Yes		
0953-15-2615	5272 GADBOYS AVE	NORTH PORT, FL 34291	Yes		
0953-15-2614	5278 GADBOYS AVE	NORTH PORT, FL 34291	Yes		
0953-15-2324	5290 HAAS AVE	NORTH PORT, FL 34291	Yes		
1001-27-6122	5292 TREKELL ST	NORTH PORT, FL 34287	Yes		
1001-27-6123	5302 TREKELL ST	NORTH PORT, FL 34287	Yes		
0996-19-4339	5323 GROBE ST	NORTH PORT, FL 34287		Yes	
0944-15-2728	5363 LACEY ST	NORTH PORT, FL 34286	Yes		Yes
0955-15-4505	5382 NOHAVA RD	NORTH PORT, FL 34286	Yes		
0954-14-2930	5437 MANDRAKE TER	NORTH PORT, FL 34291	Yes		
0954-14-2515	5497 LADY SLIPPER AVE	NORTH PORT, FL 34291			Yes
0953-14-1109	5516 REISTERSTOWN RD	NORTH PORT, FL 34291			Yes
0944-07-1204	5519 GARRISON AVE	NORTH PORT, FL 34291			Yes
0953-14-1108	5547 TANEYTOWN ST	NORTH PORT, FL 34291			Yes
0953-14-1208	5551 REISTERSTOWN RD	NORTH PORT, FL 34291	Yes	Yes	Yes

PID	Address	City, State, Zip	In 100 Year Level of Service Analysis	Reported as Flooded in 1992	Reported as Flooded in 2003
0953-14-1113	5555 HENNESSY ST	NORTH PORT, FL 34291	Yes	Yes	Yes
0953-14-1207	5585 REISTERSTOWN RD	NORTH PORT, FL 34291			Yes
0953-14-1111	5588 REISTERSTOWN RD	NORTH PORT, FL 34291	Yes		Yes
0944-07-1202	5621 GARRISON AVE	NORTH PORT, FL 34291	Yes		
0953-14-1206	5621 REISTERSTOWN RD	NORTH PORT, FL 34291	Yes	Yes	Yes
0953-14-1112	5624 REISTERSTOWN RD	NORTH PORT, FL 34291	Yes	Yes	Yes
0942-08-0004	5625 N SUMTER BLVD	NORTH PORT, FL 34286	Yes		
1002-18-4802	5650 POSTMA ST	NORTH PORT, FL 34287	Yes		
0954-14-2520	5654 LADY SLIPPER AVE	NORTH PORT, FL 34291			Yes
0944-07-1309	5664 GARRISON AVE	NORTH PORT, FL 34291	Yes		Yes
0944-07-1304	5779 REISTERSTOWN RD	NORTH PORT, FL 34291	Yes	Yes	Yes
0967-05-8905	5788 SYLVANIA AVE	NORTH PORT, FL 34291			Yes
0967-05-8904	5814 SYLVANIA AVE	NORTH PORT, FL 34291			Yes
0942-04-1904	5815 SUMTER BLVD	NORTH PORT, FL 34286	Yes		Yes
0968-05-7474	5834 BURWIN AVE	NORTH PORT, FL 34291	Yes		
0968-05-7448	5839 BATTERSEA AVE	NORTH PORT, FL 34291	Yes		Yes
0968-05-7450	5861 BATTERSEA AVE	NORTH PORT, FL 34291	Yes		Yes
0968-05-8024	5933 BURWIN AVE	NORTH PORT, FL 34291	Yes		
0968-05-7454	5971 BATTERSEA AVE	NORTH PORT, FL 34291	Yes		Yes
0941-04-1613	6527 REISTERSTOWN RD	NORTH PORT, FL 34291			Yes
0943-01-1009	6531 TANEYTOWN ST	NORTH PORT, FL 34291		Yes	
0941-04-1611	6669 REISTERSTOWN RD	NORTH PORT, FL 34291	Yes	Yes	Yes
0941-04-1609	6869 REISTERSTOWN RD	NORTH PORT, FL 34291		Yes	Yes

PID	Address	City, State, Zip	In 100 Year Level of Service Analysis	Reported as Flooded in 1992	Reported as Flooded in 2003
0941-04-1615	6969 REISTERSTOWN RD	NORTH PORT, FL 34291			Yes
0952-12-1121	7254 MUNCEY RD	NORTH PORT, FL 34291	Yes		
0996-09-3204	8515 FAY AVE	NORTH PORT, FL 34287		Yes	
0996-19-4520	8634 HERBISON AVE	NORTH PORT, FL 34287		Yes	
0996-19-4508	8645 CRISTOBAL AVE	NORTH PORT, FL 34287		Yes	
0996-19-4519	8664 HERBISON AVE	NORTH PORT, FL 34287		Yes	
0996-19-4517	8720 HERBISON AVE	NORTH PORT, FL 34287	Yes		
0996-19-4515	8772 HERBISON AVE	NORTH PORT, FL 34287		Yes	
0996-19-4513	8795 CRISTOBAL AVE	NORTH PORT, FL 34287		Yes	
0995-19-2413	8796 PORTO BELLO AVE	NORTH PORT, FL 34287	Yes		
0996-19-4514	8798 HERBISON AVE	NORTH PORT, FL 34287	Yes	Yes	
0995-18-2838	8855 CHESEBRO AVE	NORTH PORT, FL 34287		Yes	
0995-18-2837	8875 CHESEBRO AVE	NORTH PORT, FL 34287		Yes	

We trust that this report satisfies your expectations and appreciate the opportunity to work with you on this important project. If you have any questions, or if we can be of further service to you, please do not hesitate to call.

Very truly yours,
ARDAMAN & ASSOCIATES, INC.

10/10/2014

Nestor Aceituno, P.E.
Senior Project Engineer

Shankar Gautam
N.A.

Shankar Gautam, P.E.
Project Engineer

cc: Elizabeth Wong, City of North Port

FIGURES

FIGURE 2-1

N
W E
S

0 3,000 6,000
Feet

Scale: 1" = 6000'

564000 576000 588000 600000 612000 624000 636000

1028000
1016000
1004000
992000
980000

- Evacuation Route Floods
- Collector Street Floods
- Local Street Floods
- Northport Boundary

City of North Port, Florida

Southwest Florida Water Management District

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/17/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\03-065\ArcGIS_ArcLayouts\20140909 - Final BMP Figures\LOS 10.mxd		

10 YEAR LEVEL OF SERVICE

CITY OF NORTH PORT, SARASOTA COUNTY, FL

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants
Phone: 407-855-3860 Fax: 407-859-8121
8008 South Orange Avenue
Orlando, Florida 32809

564000 576000 588000 600000 612000 624000 636000

1028000 1016000 1004000 992000 980000

FIGURE 2-2

N W E S

0 3,000 6,000
Feet

Scale: 1" = 6000'

- Evacuation Route Floods in 25 Year Event
- Arterial Street Floods in 25 Year Event
- Collector Street Floods in 25 Year Event
- Local Street Floods in 25 Year Event
- Northport Boundary

City of North Port, Florida

Southwest Florida Water Management District

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/17/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\03-065\ArcGIS_ArcLayouts\20140909 - Final BMP Figures\LOS 10.mxd		

25 YEAR LEVEL OF SERVICE

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Orlando, Florida 32809

564000 576000 588000 600000 612000 624000 636000

1028000 1016000 1004000 992000 980000

FIGURE 2-3

N W E S

0 3,000 6,000
Feet

Scale: 1" = 6000'

- Habitable Structure Floods
- Evacuation Route Floods
- Arterial Street Floods
- Collector Street Floods
- Local Street Floods
- Northport Boundary

City of North Port, Florida

Southwest Florida Water Management District

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/17/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
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100 YEAR LEVEL OF SERVICE

CITY OF NORTH PORT, SARASOTA COUNTY, FL

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Orlando, Florida 32809

564000 576000 588000 600000 612000 624000 636000

1028000 1016000 1004000 992000 980000

Big Slough

WCS-162 Removed

CUN-001 Removed

Big Slough

N I75 S I75

WCS-115 Removed

WCS-120 Removed

WCS-113 Removed

WCS-114 Removed

WCS-123 Removed

DS-119 Removed

DS-122 Removed

DS-126 Removed

DS-129 Removed

DS-133 Removed

DS-135 Removed

DS-136 Removed

DS-139 Removed

WCS-121 Removed

WCS-125 Removed

WCS-128 Removed

DS-132 Removed

WCS-101

WCS-106

WCS-124 Removed

WCS-131 Removed

WCS-111 Removed

WCS-127 Removed

WCS-117 Removed

WCS-107 Removed

WCS-108 Removed

WCS-130 Removed

WCS-109 Removed

WCS-110 Removed

FIGURE 3-1

N W E S

0 3,000 6,000

Feet

Scale: 1" = 6000'

Legend

- WCS
- Removed Structures
- New Connections
- Subwatershed
- Existing Condition Floodplain
- Flood Area Reduction
- Flood Area Increase

City of North Port, Florida

Southwest Florida Water Management District

Project: 03-065	Projection: Florida East West	
Prepared: 10-11-07	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\03-065\ArcGIS_ArcLayouts\20140909 - Final BMP Figures\BMP1.mxd		

NORTH PORT / BIG SLOUGH WMP

BMP ALTERNATIVE 1 - 1 DAY 100 YEAR EVALUATION

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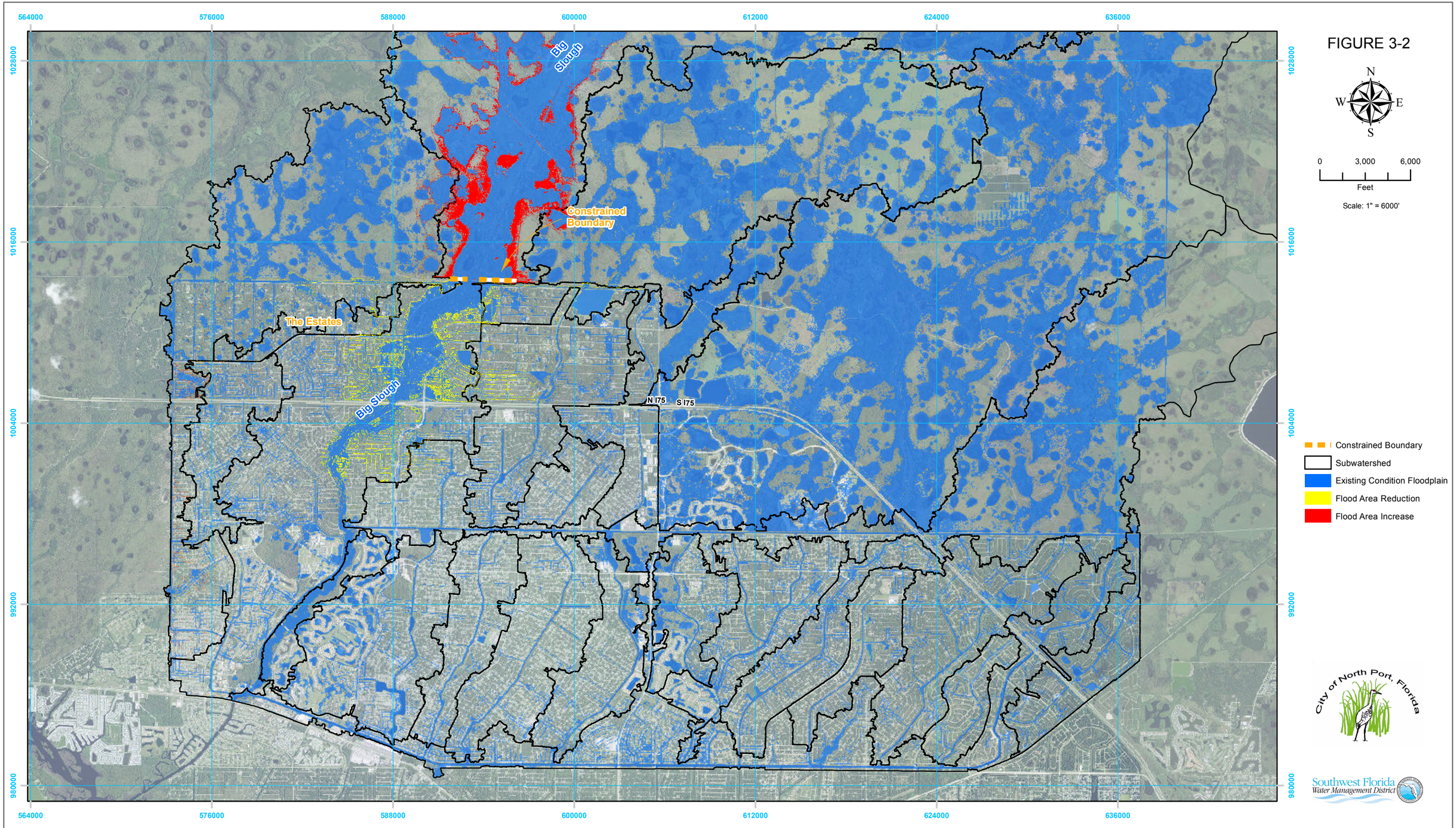
Orlando, Florida 32809

FIGURE 3-2



N

W E

S

0 3,000 6,000

Feet

Scale: 1" = 6000'

- Constrained Boundary
- Subwatershed
- Existing Condition Floodplain
- Flood Area Reduction
- Flood Area Increase

City of North Port, Florida

Southwest Florida Water Management District

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/9/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\03-065\ArcGIS_ArcLayouts\20140909 - Final BMP Figures\BMP2.mxd		

NORTH PORT / BIG SLOUGH WMP

BMP ALTERNATIVE 2 - 1 DAY 100 YEAR EVALUATION

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Geotechnical, Environmental and Materials Consultants
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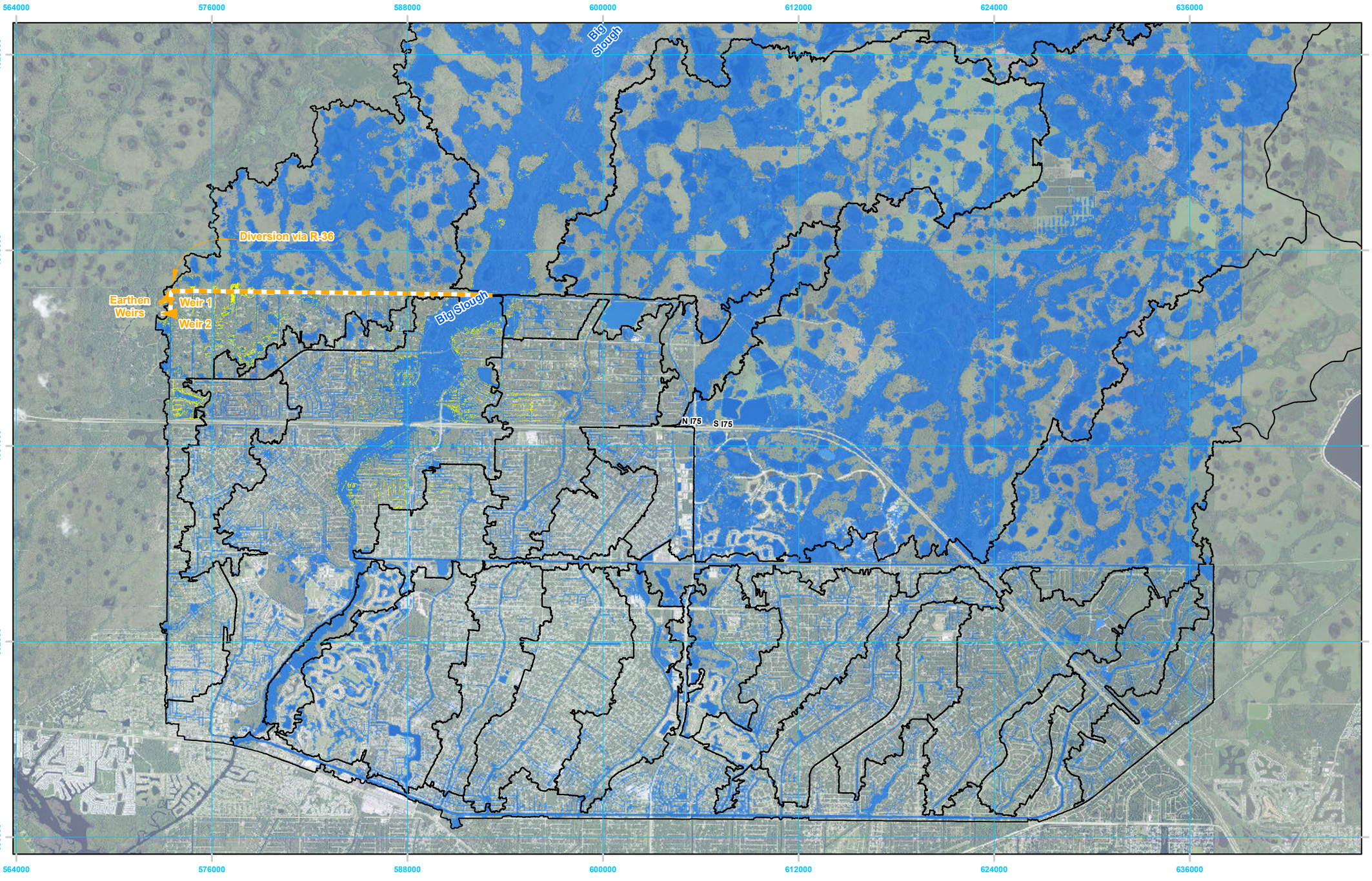
8008 South Orange Avenue
Orlando, Florida 32809

FIGURE 3-3



N

W E

S

0 3,000 6,000

Feet

Scale: 1" = 6000'

- Diversion
- Subwatershed
- Flood Area Reduction
- Flood Area Increase
- Existing Condition Floodplain

City of North Port, Florida

Southwest Florida Water Management District

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/9/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\03-065\ArcGIS_ArcLayouts\20140909 - Final BMP Figures\BMP3.mxd		

NORTH PORT / BIG SLOUGH WMP

BMP ALTERNATIVE 3 - 1 DAY 100 YEAR EVALUATION

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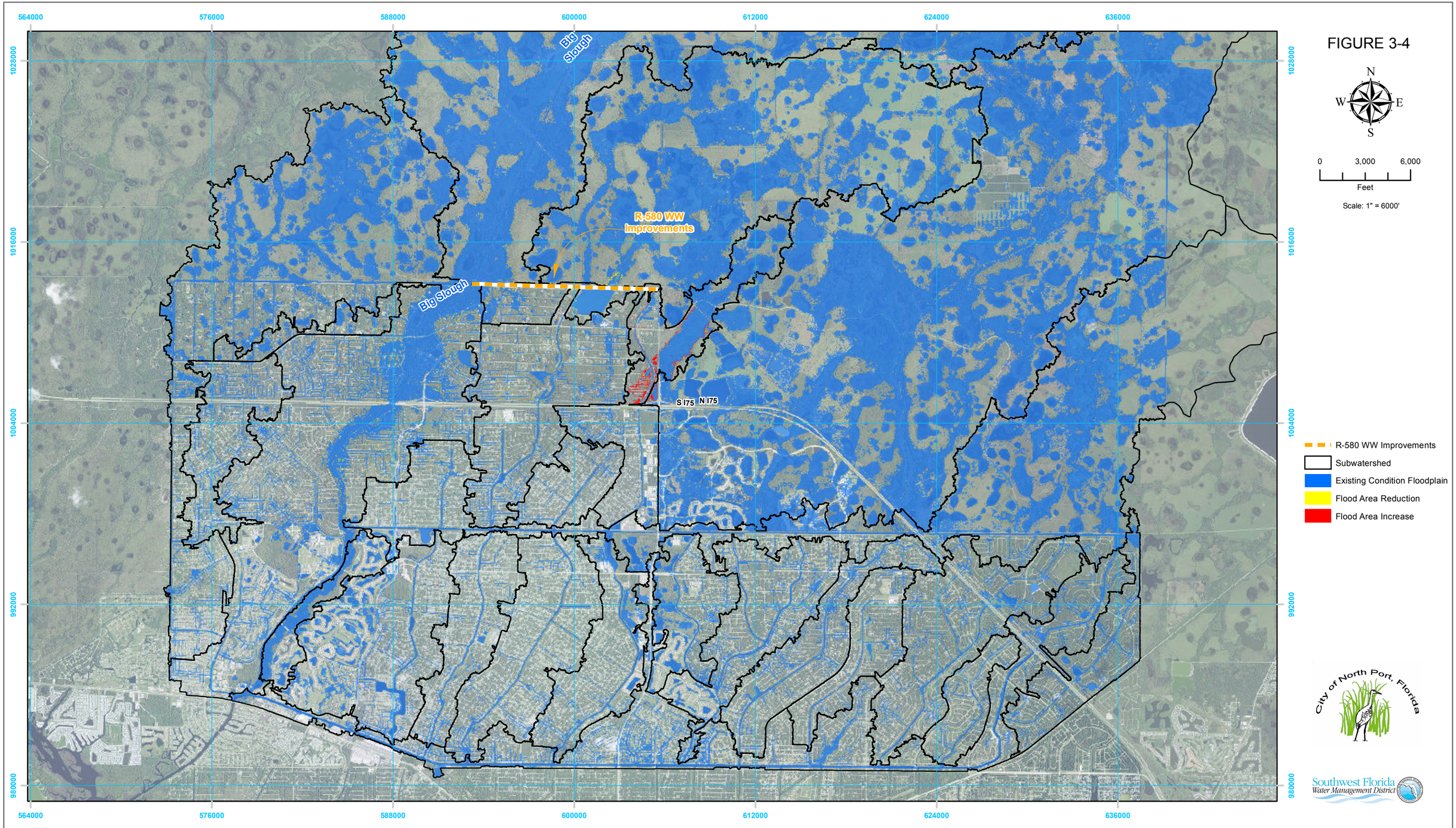
Orlando, Florida 32809

FIGURE 3-4



N
W E
S

0 3,000 6,000
Feet

Scale: 1" = 6000'

- R-580 WW Improvements
- Subwatershed
- Existing Condition Floodplain
- Flood Area Reduction
- Flood Area Increase

City of North Port, Florida

Southwest Florida Water Management District

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/9/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\03-065\ArcGIS_ArcLayouts\20140909 - Final BMP Figures\BMP4.mxd		

NORTH PORT / BIG SLOUGH WMP

BMP ALTERNATIVE 4 - 1 DAY 100 YEAR EVALUATION

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Orlando, Florida 32809

FIGURE 3-5

564000 576000 588000 600000 612000 624000 636000

1028000 1016000 1004000 992000 980000

Big Slough

Big Slough

N I75 S I75

Southern Boundary Improvements

N

W E

S

0 3,000 6,000

Feet

Scale: 1" = 6000'

- Southern Boundary Improvements
- Subwatershed
- Existing Condition Floodplain
- Flood Area Reduction
- Flood Area Increase

City of North Port, Florida

Southwest Florida Water Management District

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/9/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\03-065\ArcGIS_ArcLayouts\20140909 - Final BMP Figures\BMP5.mxd		

NORTH PORT / BIG SLOUGH WMP

BMP ALTERNATIVE 5 - 1 DAY 100 YEAR EVALUATION

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Orlando, Florida 32809

564000 576000 588000 600000 612000 624000 636000

1028000 1016000 1004000 992000 980000

Big Slough

Big Slough

N I75 S I75

3

2

1

Offsite Areas Detention Facilities

Other Detention Areas Not Shown in this Figure

FIGURE 3-6

N W E S

0 3,000 6,000

Feet

Scale: 1" = 6000'

Offsite Areas Detention Facilities

Subwatershed

Existing Condition Floodplain

Flood Area Reduction

Flood Area Increase

City of North Port, Florida

Southwest Florida Water Management District

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/9/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\03-065\ArcGIS_ArcLayouts\20140909 - Final BMP Figures\BMP6.mxd		

NORTH PORT / BIG SLOUGH WMP

BMP ALTERNATIVE 6 - 1 DAY 100 YEAR EVALUATION

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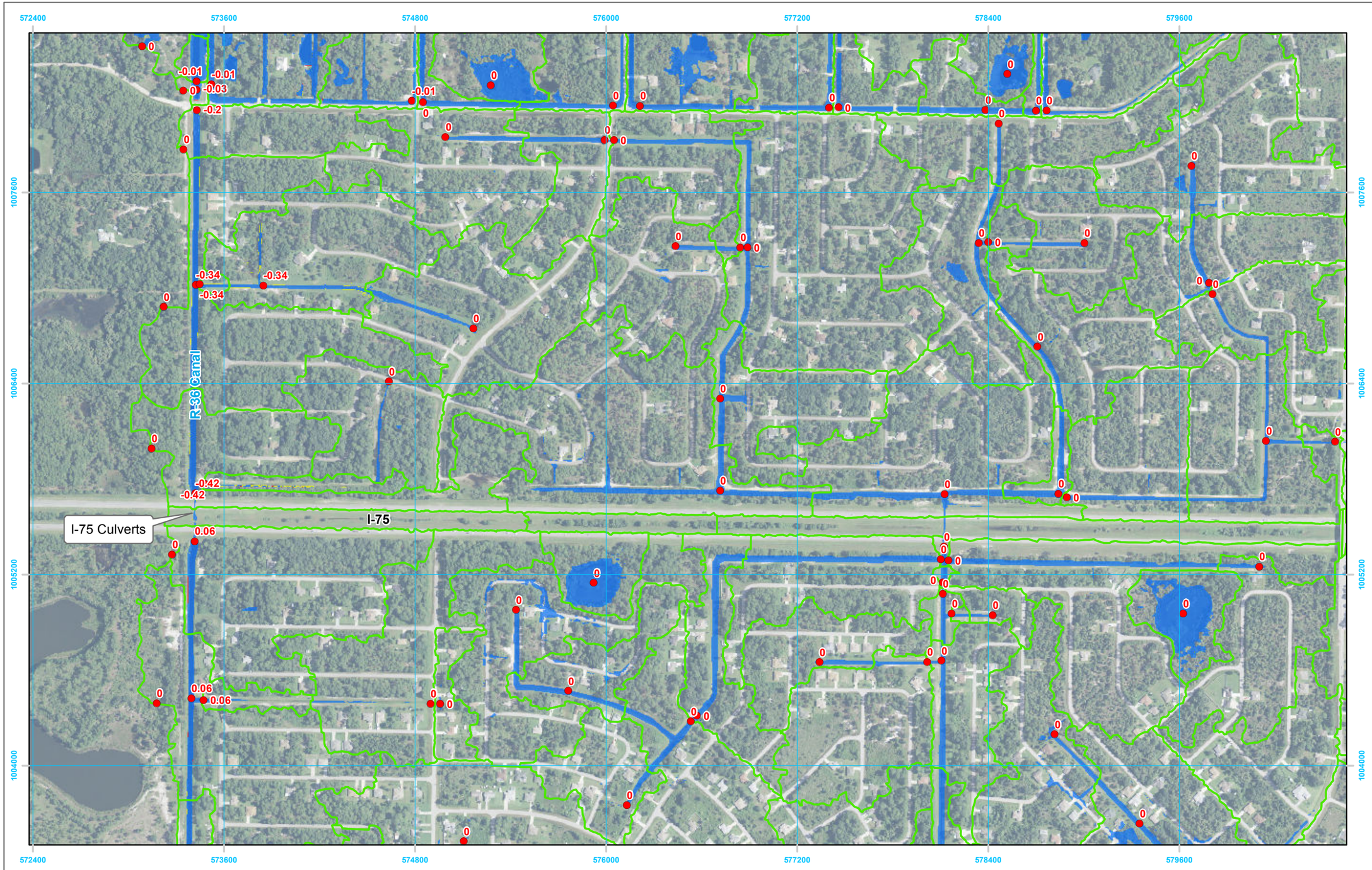
Orlando, Florida 32809

FIGURE 3-7



N
W E
S

0 300 600
Feet

Scale: 1" = 600'

- Network Nodes
- Basins

Floodplain Change

- Decrease
- Increase
- No Change

City of North Port, Florida

Southwest Florida Water Management District

MODEL RESULTS WITH MEAN ANNUAL FLOODPLAIN COMPARISON AND DIFFERENCE IN MAX STAGES

R-36 CANAL AT I-75 BMP EVALUATION

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/10/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\20140909 - Final BMP Figures\BMP1 Crossing Mean Ann.mxd		

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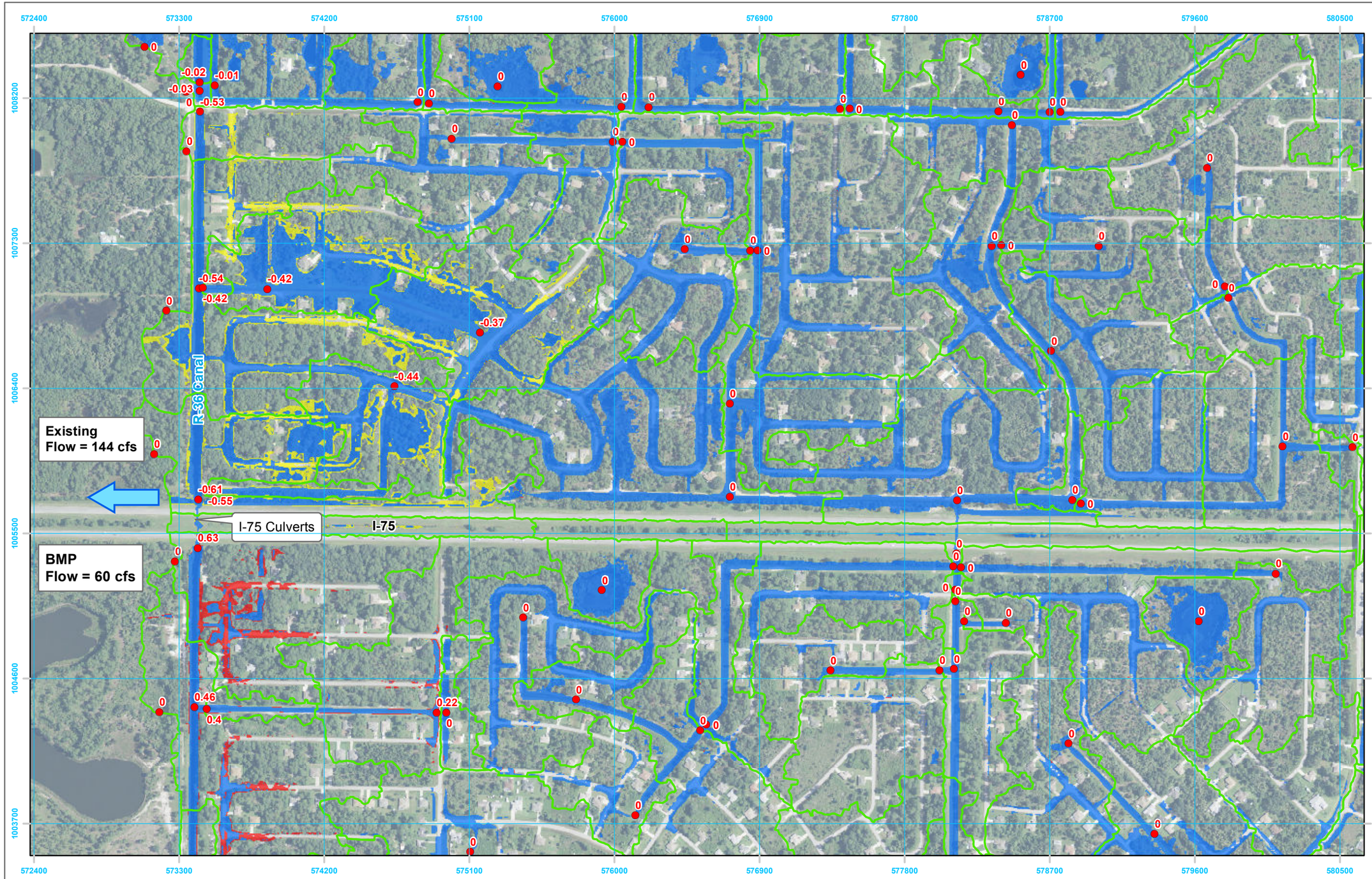
FIGURE 3-8



N
W E
S

0 300 600
Feet

Scale: 1" = 600'

Network Nodes
Basins

Floodplain Change
Decrease
Increase
No Change

City of North Port, Florida

Southwest Florida Water Management District

MODEL RESULTS WITH 1-DAY 100-YEAR FLOODPLAIN COMPARISON AND DIFFERENCE IN MAX STAGES

R-36 CANAL AT I-75 BMP EVALUATION

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/10/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\20140909 - Final BMP Figures\BMP1 Crossing 1D100Yr.mxd		

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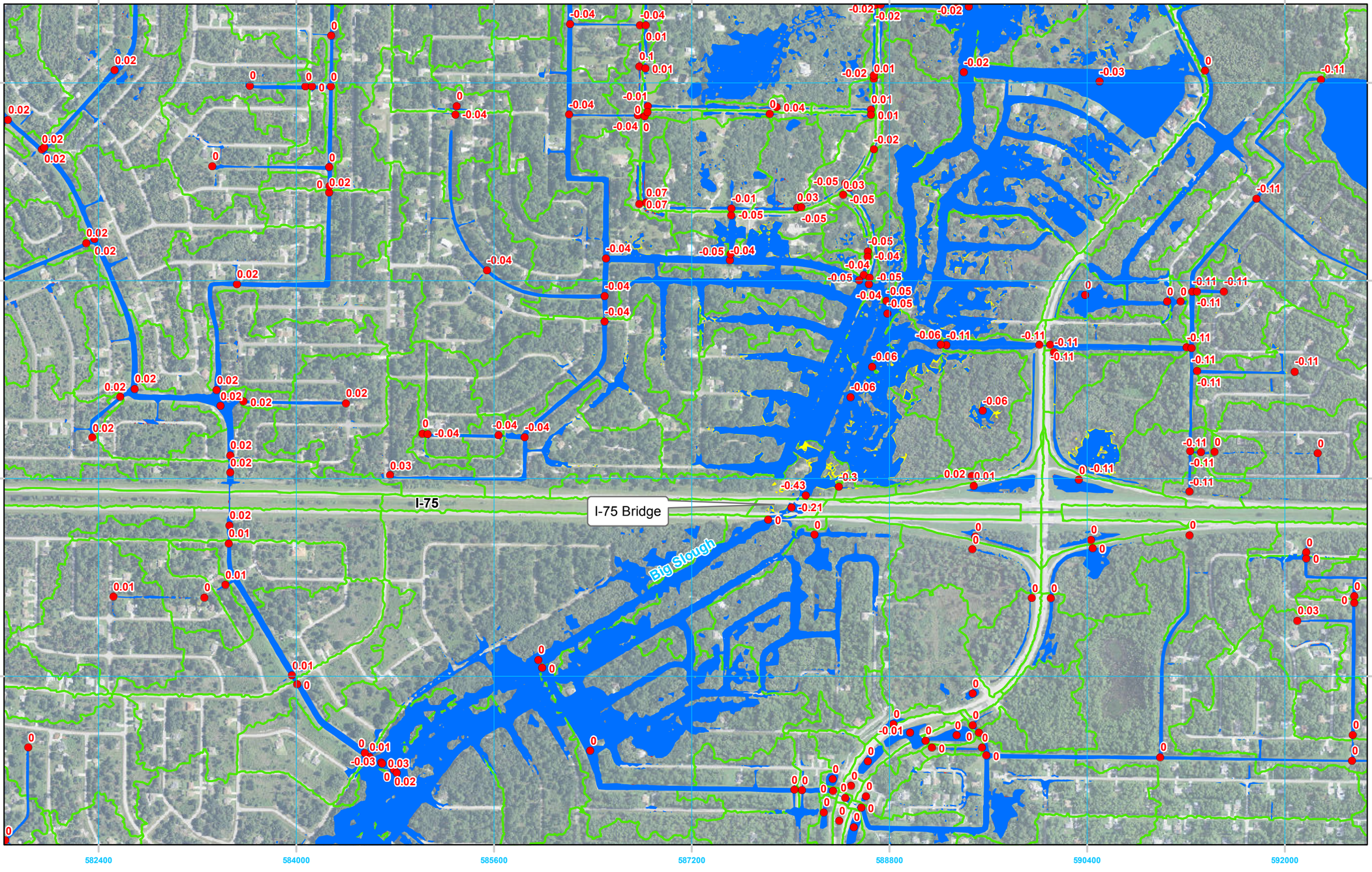
Orlando, Florida 32809

FIGURE 3-9



N
W E
S

0 400 800
Feet

Scale: 1" = 450'

Network Nodes
Basins

Floodplain Change

Decrease
Increase
No Change

City of North Port, Florida

Southwest Florida Water Management District

MODEL RESULTS WITH MEAN ANNUAL FLOODPLAIN COMPARISON AND DIFFERENCE IN MAX STAGES

MYAKKAHATCHEE CREEK AT I-75 BMP EVALUATION

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/10/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\20140909 - Final BMP Figures\BMP2 Crossing Mean Ann.mxd		

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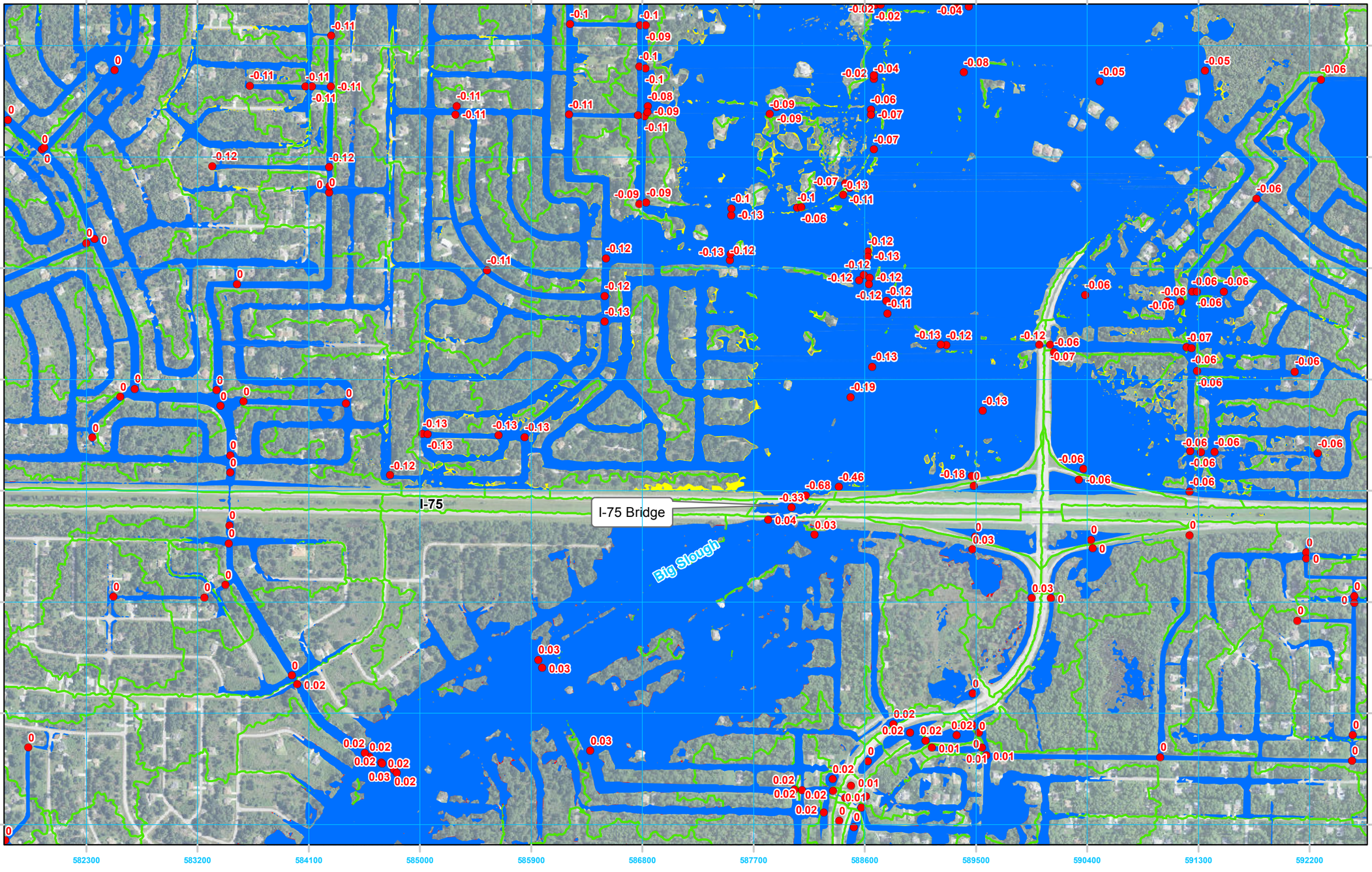
Orlando, Florida 32809

FIGURE 3-10



N
W E
S

0 400 800
Feet

Scale: 1" = 800'

Network Nodes
Basins

Floodplain Change

Decrease
Increase
No Change

City of North Port, Florida

Southwest Florida Water Management District

MODEL RESULTS WITH 1-DAY 100-YEAR FLOODPLAIN COMPARISON AND DIFFERENCE IN MAX STAGES

MYAKKAHATCHEE CREEK AT I-75 BMP EVALUATION

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/10/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: _ArcLayouts\20140909 - Final BMP Figures\BMP2 Crossing 1D100Yr.mxd		

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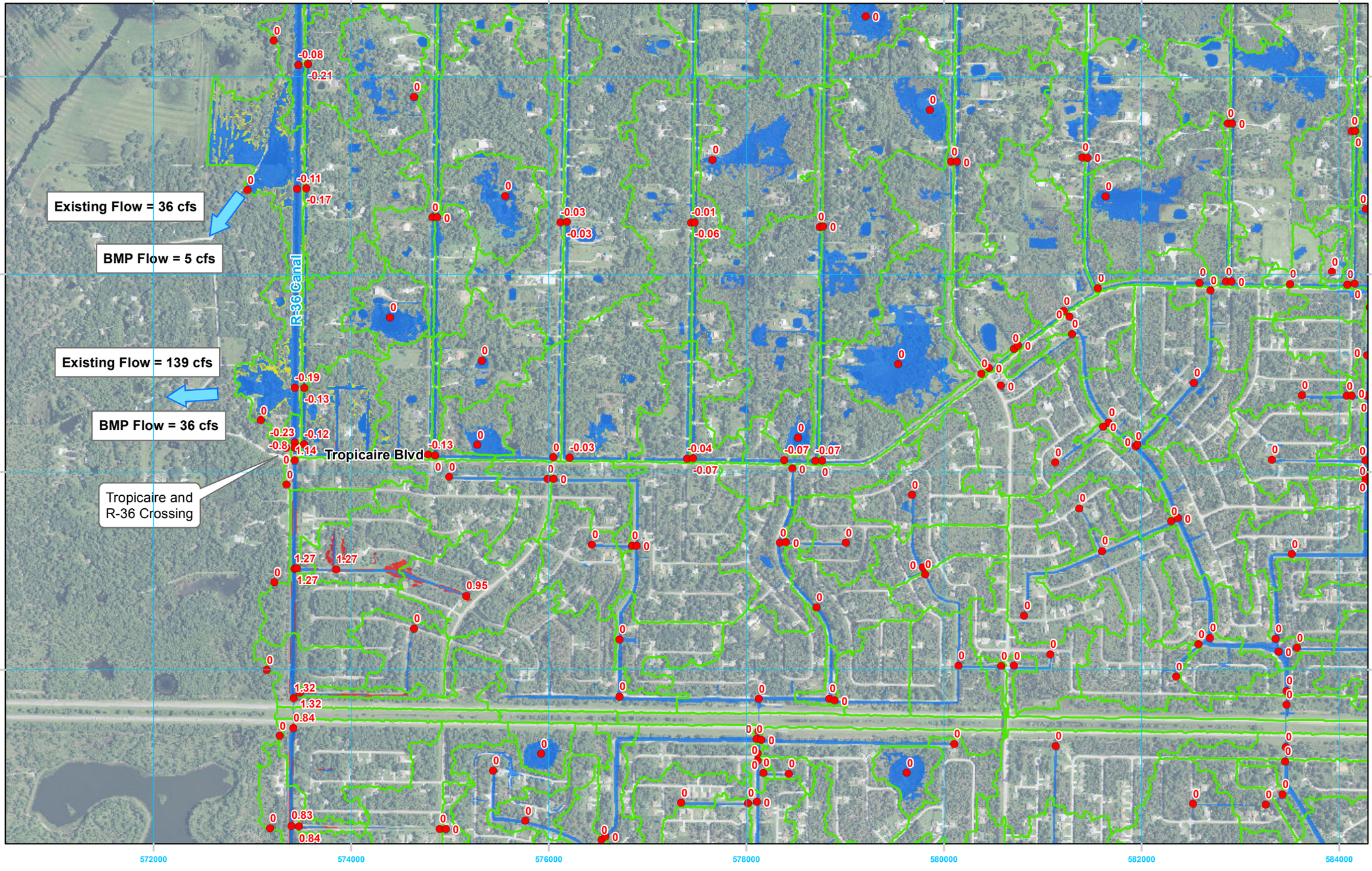
FIGURE 3-11



N
W E
S

0 500 1,000
Feet

Scale: 1" = 1000'

- Network Nodes
- Basins

Floodplain Change

- Decrease
- Increase
- No Change

City of North Port, Florida

Southwest Florida Water Management District

MODEL RESULTS WITH MEAN ANNUAL FLOODPLAIN COMPARISON AND DIFFERENCE IN MAX STAGES

R-36 CANAL AT TROPICAIRE BOULEVARD BMP EVALUATION

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/10/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\20140909 - Final BMP Figures\BMP3 Crossing Mean Ann.mxd		

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FIGURE 3-12

Existing Flow = 619 cfs

BMP Flow = 603 cfs

Existing Flow = 822 cfs

BMP Flow = 759 cfs

Tropicaire and R-36 Crossing

R-36 Canal

Tropicaire Blvd

572000 574000 576000 578000 580000 582000 584000

1012000 1010000 1008000 1006000

N W E S

0 500 1,000
Feet

Scale: 1" = 1000'

Network Nodes

Basins

Floodplain Change

Decrease

Increase

No Change

City of North Port, Florida

Southwest Florida Water Management District

MODEL RESULTS WITH 1-DAY 100-YEAR FLOODPLAIN COMPARISON AND DIFFERENCE IN MAX STAGES

R-36 CANAL AT TROPICAIRE BOULEVARD BMP EVALUATION

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/10/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\20140909 - Final BMP Figures\BMP3 Crossing 1D100Yr.mxd		

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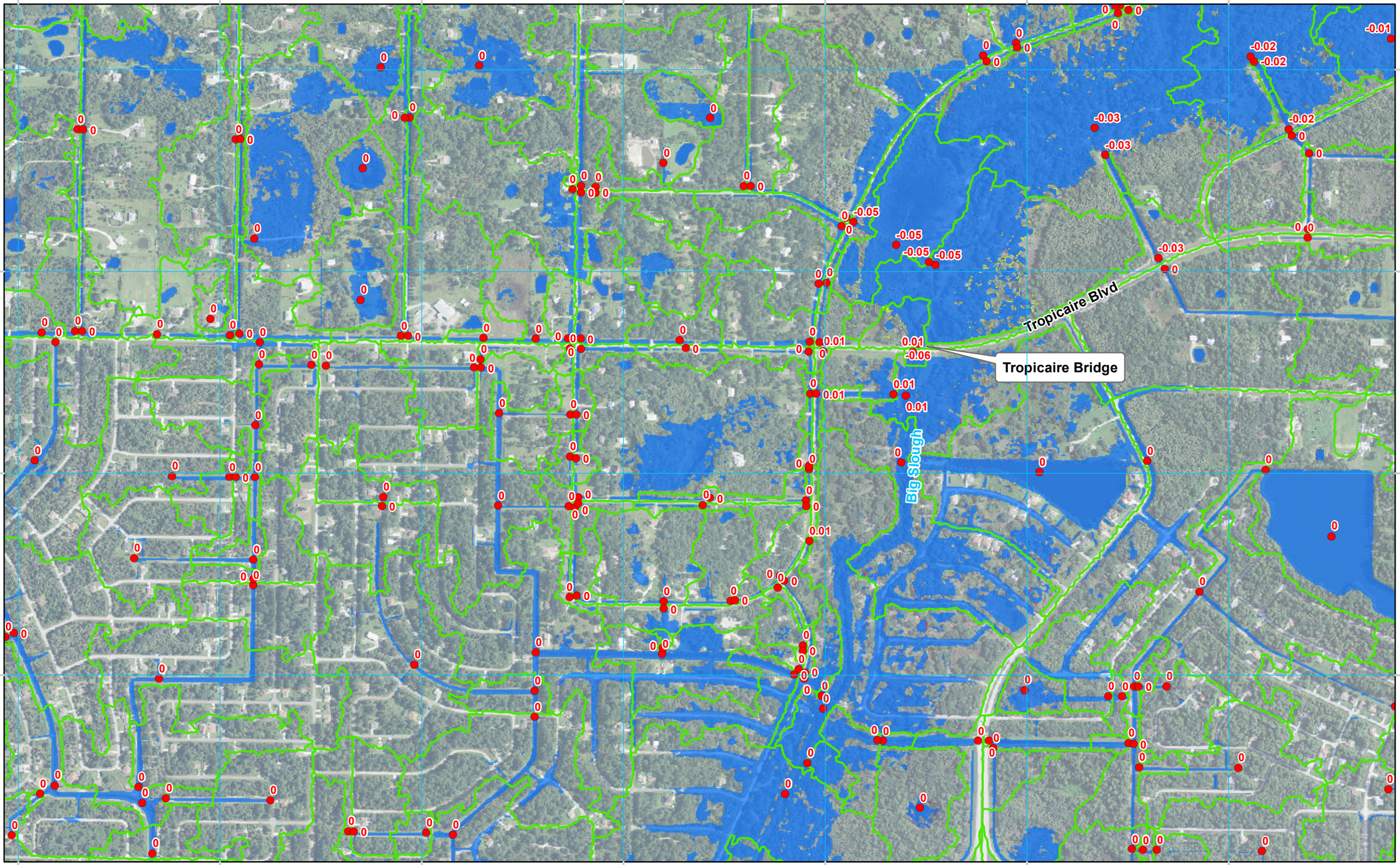
Orlando, Florida 32809

FIGURE 3-13



N
W E
S

0 400 800
Feet

Scale: 1" = 800'

Network Nodes
Basins

Floodplain Change

Decrease
Increase
No Change

City of North Port, Florida

Southwest Florida Water Management District

MODEL RESULTS WITH MEAN ANNUAL FLOODPLAIN COMPARISON AND DIFFERENCE IN MAX STAGES

MYAKKAHATCHEE CREEK AT TROPICAIRE BOULEVARD BMP EVALUATION

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/10/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\20140909 - Final BMP Figures\BMP4 Crossing Mean Ann.mxd		

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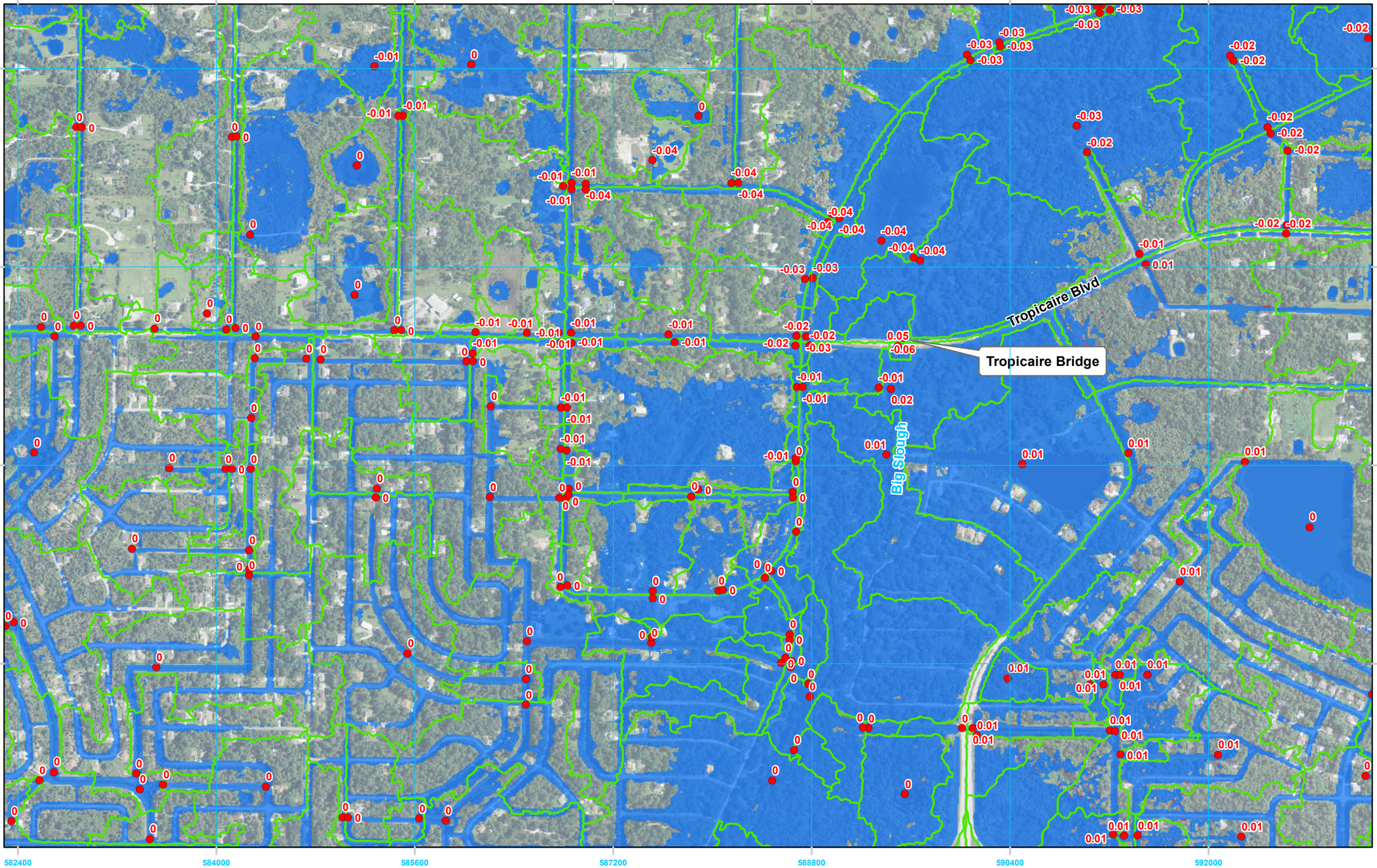
Orlando, Florida 32809

FIGURE 3-14



N
W E
S

0 400 800
Feet

Scale: 1" = 800'

- Network Nodes
- Basins

Floodplain Change

- Decrease
- Increase
- No Change

City of North Port, Florida

Southwest Florida Water Management District

MODEL RESULTS WITH 1-DAY 100-YEAR FLOODPLAIN COMPARISON AND DIFFERENCE IN MAX STAGES

MYAKKAHATCHEE CREEK AT TROPICAIRE BOULEVARD BMP EVALUATION

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/10/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\20140909 - Final BMP Figures\BMP4 Crossing 1D100Yr.mxd		

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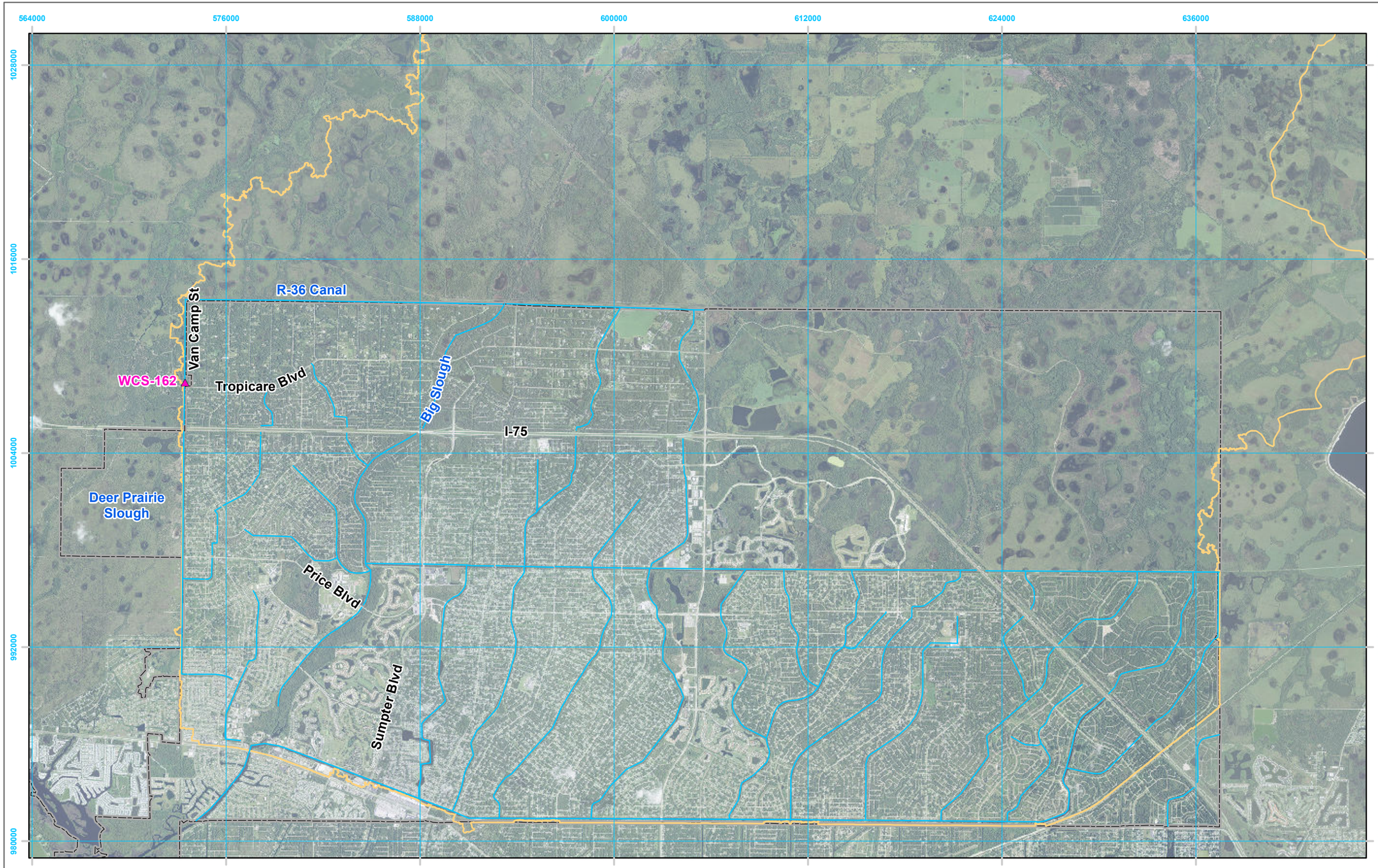
Orlando, Florida 32809

FIGURE 3-15



N
W E
S

0 3,000 6,000
Feet

Scale: 1" = 6000'

- Water Control Structures
- Waterway Flow
- Watershed Boundary
- Northport Boundary

City of North Port, Florida

Southwest Florida Water Management District

Project: 03-065	Projection: State Plane Florida West	
Prepared: 9/9/2014	Horizontal Datum: NAD83	Vertical Datum: N/A
Prepared by: CGG	Modified by:	Modified:
File: \\03-065\ArcGIS_ArcLayouts\20140909 - Final BMP Figures\WCS-162.mxd		

LOCATION OF WCS-162

CITY OF NORTH PORT, SARASOTA COUNTY, FL

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Orlando, Florida 32809

Figure 3-16. Stage at R-36 Canal Upstream of WCS-162

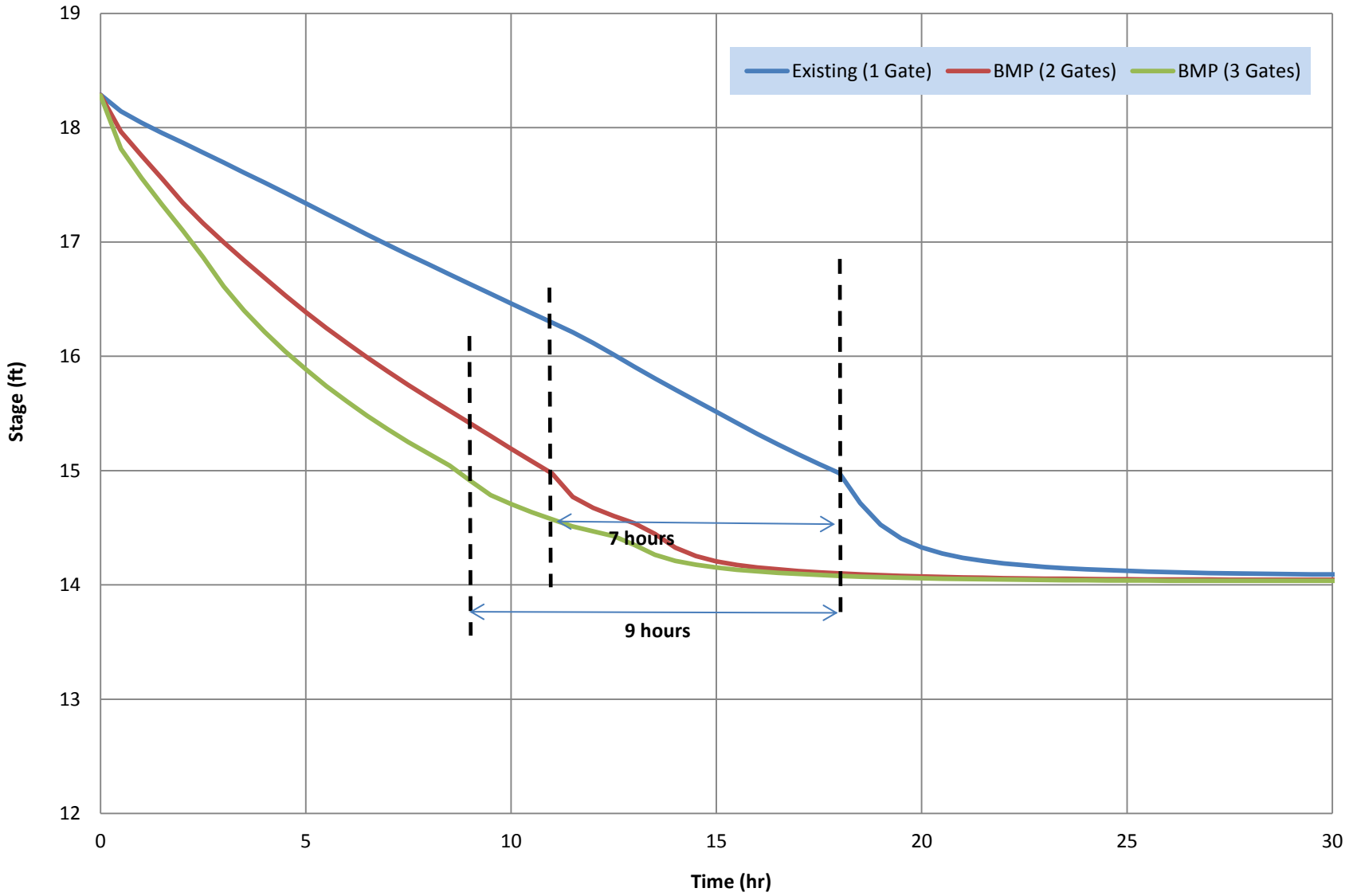

FIGURE 3-17

N
W E
S

0 250 500
Feet

Scale: 1" = 500'

- Habitable Structure Floods in 100 Year Event
- Arterial Street Floods in 100 Year Event
- Evacuation Route Floods in 100 Year Event
- Collector Street Floods in 25 Year Event
- Local Street Flods in 25 Year Event

City of North Port, Florida

Southwest Florida Water Management District

Project: 03-065	Projection: State Plane Florida West	
Prepared: 08-05-14	Horizontal Datum: HARN	Vertical Datum: N/A
Prepared by: TJC	Modified by:	Modified:
File: _ArcLayouts\20140909 - Final BMP Figures\LOS2012 City Criteria.mxd		

EXISTING CONDITION LOS AND 100-YEAR FLOODPLAIN
NORTH PORT/BIG SLOUGH WMP

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Orlando, Florida 32809

FIGURE 3-18

N
W E
S

0 250 500
Feet

Scale: 1" = 500'

- Habitable Structure Floods in 100 Year Event
- Arterial Street Floods in 100 Year Event
- Evacuation Route Floods in 100 Year Event
- Collector Street Floods in 25 Year Event
- Local Street Flods in 25 Year Event

City of North Port, Florida

Southwest Florida Water Management District

Project: 03-065	Projection: State Plane Florida West	
Prepared: 08-05-14	Horizontal Datum: HARN	Vertical Datum: N/A
Prepared by: TJC	Modified by:	Modified:
File: _ArcLayouts\20140909 - Final BMP Figures\Price Blvd Existing_1D100Y.mxd		

UPDATED EXISTING CONDITION 100-YEAR FLOODPLAIN
NORTH PORT/BIG SLOUGH WMP

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Geotechnical, Environmental and Materials Consultants
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Orlando, Florida 32809

FIGURE 3-19

BMP_1 25-YEAR FLOODPLAIN COMPARISON
NORTH PORT/BIG SLOUGH WMP

Project: 03-065	Projection: State Plane Florida West	
Prepared: 08-05-14	Horizontal Datum: HARN	Vertical Datum: N/A
Prepared by: TJC	Modified by:	Modified:
File: _ArcLayouts\20140909 - Final BMP Figures\Price Blvd BMP1_1D25Y.mxd		

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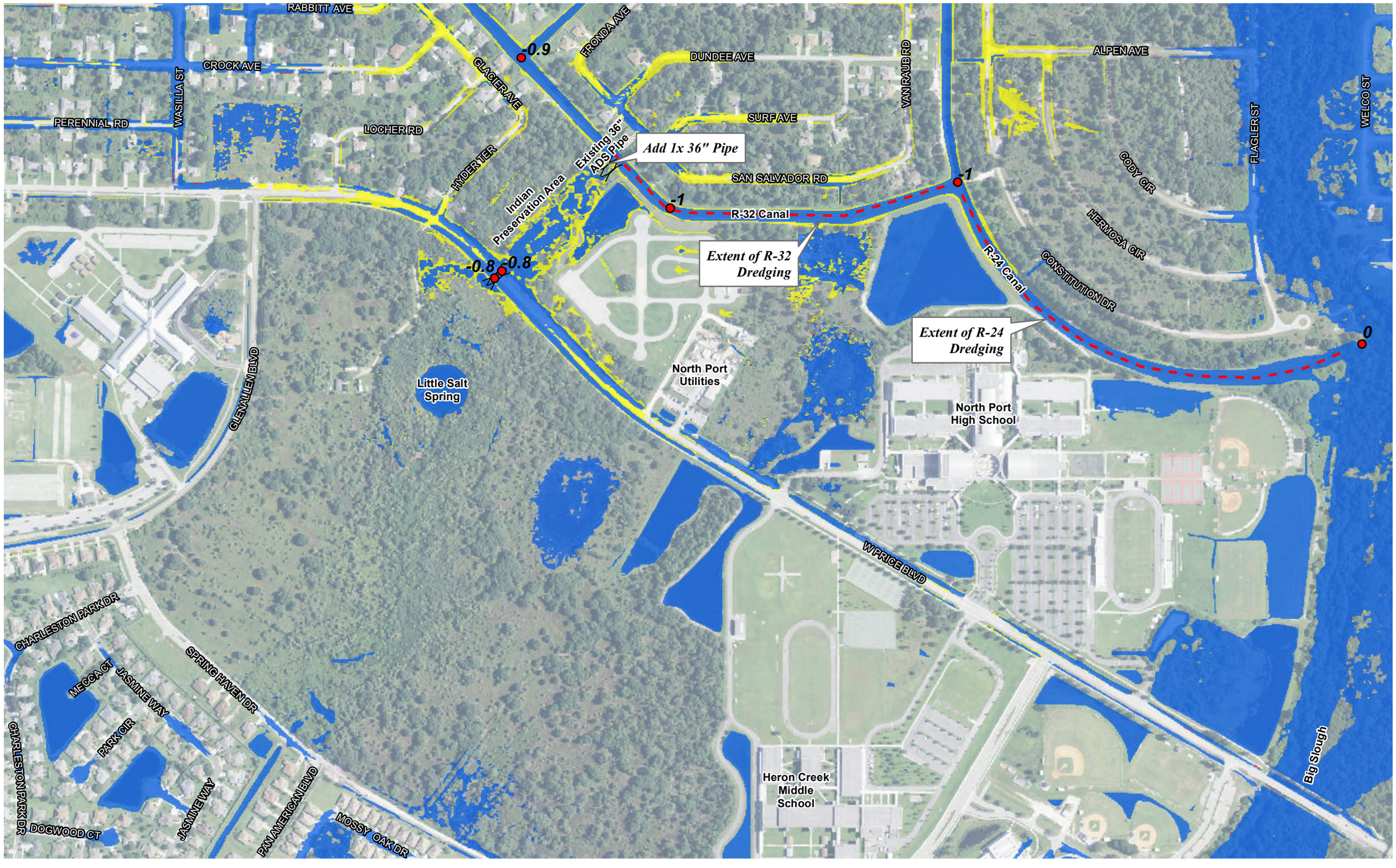
Geotechnical, Environmental and Materials Consultants
Phone: 407-855-3860 Fax: 407-859-8121
8008 South Orange Avenue
Orlando, Florida 32809

FIGURE 3-20



N
W E
S

0 250 500
Feet

Scale: 1" = 500'

- Node (Maxstage Change)
- BMP_1
- Decrease
- Increase
- No Change

City of North Port, Florida

Southwest Florida Water Management District

BMP_1 100-YEAR FLOODPLAIN COMPARISON
NORTH PORT/BIG SLOUGH WMP

Project: 03-065	Projection: State Plane Florida West	
Prepared: 08-05-14	Horizontal Datum: HARN	Vertical Datum: N/A
Prepared by: TJC	Modified by:	Modified:
File: _ArcLayouts\20140909 - Final BMP Figures\Price Blvd BMP1_1D100Y.mxd		

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Geotechnical, Environmental and Materials Consultants
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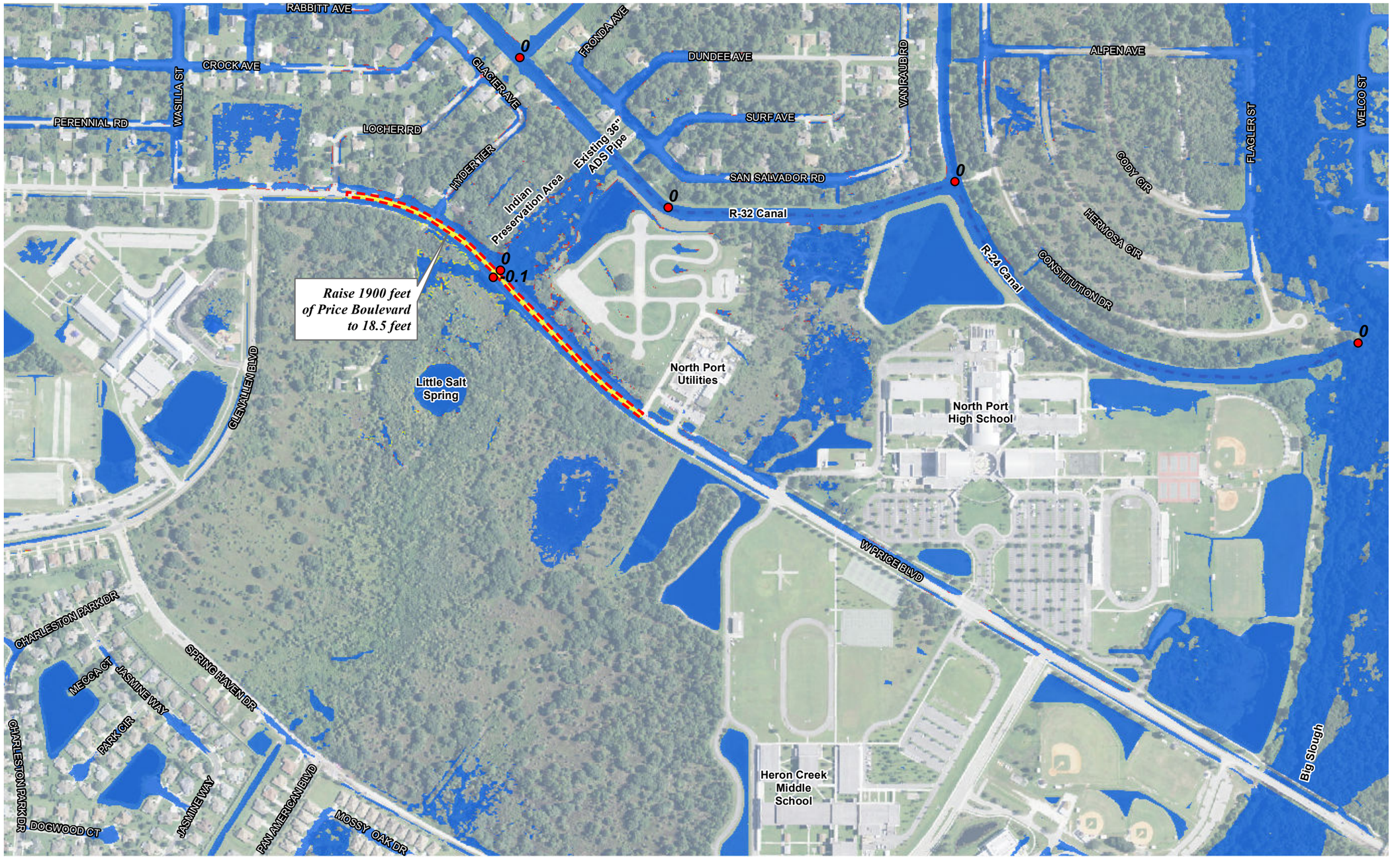
8008 South Orange Avenue
Orlando, Florida 32809

FIGURE 3-21



N
W E
S

0 250 500
Feet

- Node (Maxstage Change)
- BMP_2
- Decrease
- Increase
- No Change

City of North Port, Florida

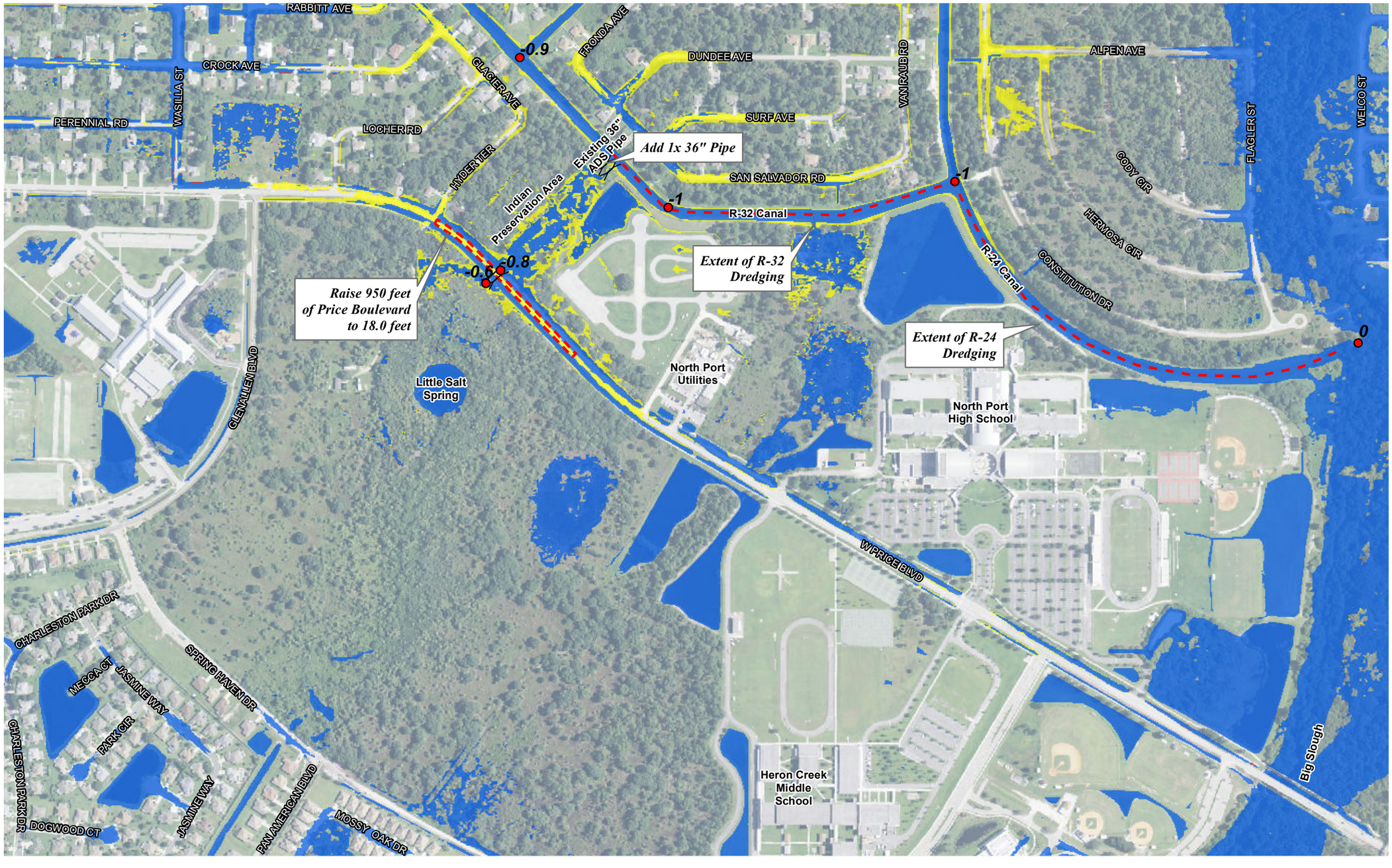
Southwest Florida Water Management District

BMP_2 100-YEAR FLOODPLAIN COMPARISON
NORTH PORT/BIG SLOUGH WMP

Project: 03-065	Projection: State Plane Florida West	
Prepared: 08-05-14	Horizontal Datum: HARN	Vertical Datum: N/A
Prepared by: TJC	Modified by:	Modified:
File: \\ArcGIS_ArcLayouts\20140909 - Final BMP Figures\Price Blvd BMP 2.mxd		

Ardaman & Associates, Inc.
Geotechnical, Environmental and Materials Consultants
Phone: 407-855-3860 Fax: 407-859-8121
8008 South Orange Avenue
Orlando, Florida 32809

FIGURE 3-22



0 250 500
Feet

- Node (Maxstage Change)
- BMP_3
- Decrease
- Increase
- No Change

City of North Port, Florida

Southwest Florida Water Management District

BMP_3 100-YEAR FLOODPLAIN COMPARISON
NORTH PORT/BIG SLOUGH WMP

Project: 03-065	Projection: State Plane Florida West	
Prepared: 08-05-14	Horizontal Datum: HARN	Vertical Datum: N/A
Prepared by: TJC	Modified by:	Modified:
File: \\ArcGIS_ArcLayouts\20140909 - Final BMP Figures\Price Blvd BMP 3.mxd		

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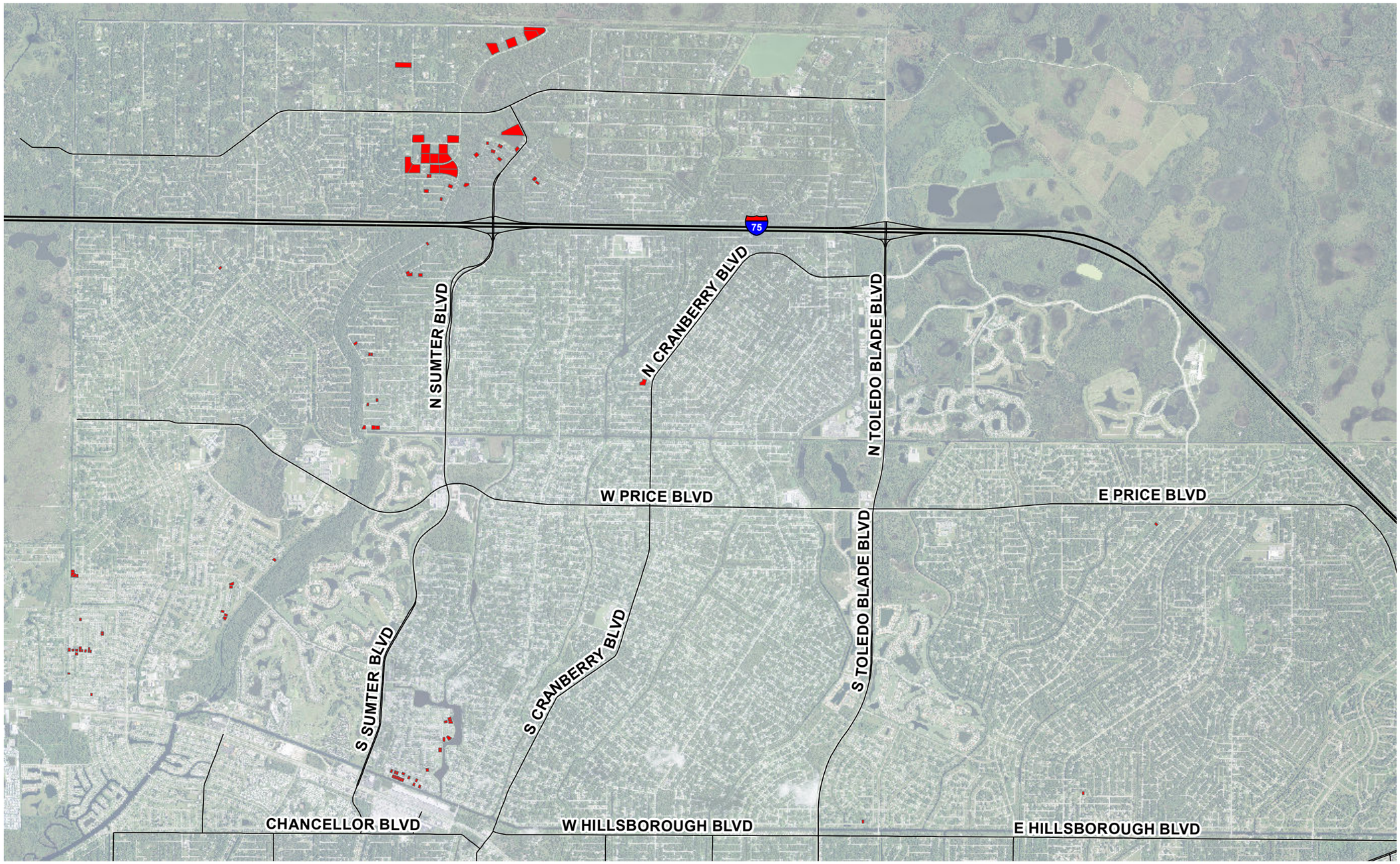
FIGURE 5-1



N
W E
S

0 2,000 4,000
Feet

City of North Port, Florida

Southwest Florida Water Management District

FLOODED PARCELS TO SURVEY
NORTH PORT/BIG SLOUGH WMP

Project: 03-065	Projection: State Plane Florida West	
Prepared: 09-30-14	Horizontal Datum: HARN	Vertical Datum: N/A
Prepared by: TJC	Modified by:	Modified:
File: \\Model_Maintenance\ArcGIS_ArcLayouts\Flooded_Parcels_To_Survey.mxd		

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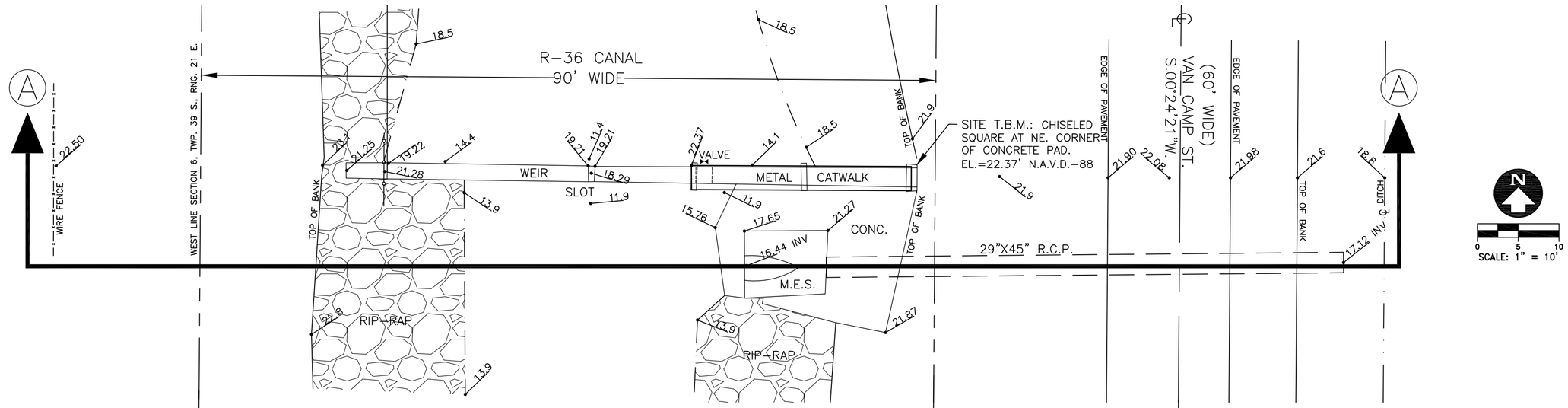
APPENDIX A

2014 Survey Data of WCS-162



SECTION "A"-"A"
WATER CONTROL STRUCTURE #162

LEGEND

T.B.M.	TEMPORARY BENCH MARK
E.O.P.	EDGE OF PAVEMENT
℄	CENTERLINE
7.7	TYPICAL SPOT ELEVATION
R.C.P.	REINFORCED CONCRETE PIPE
M.E.S.	MITERED END SECTION

FIELD BOOK: 587 PAGE(S): 3

SURVEYOR'S NOTES/REPORT:

1) BEARINGS ARE BASED ON AN ASSUMED MERIDIAN. A BEARING OF S.00°24'21"W. WAS ASSIGNED TO THE CENTERLINE OF VAN CAMP STREET PER RECORD PLAT OF NORTH PORT CHARLOTTE ESTATES.
2) ELEVATIONS SHOWN ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988. F.D.E.P. BENCH MARK N-698-2007.
3) THE ACCURACY OF THIS MAP OF SURVEY IS BASED ON CONTROL MEASUREMENTS THAT MEET OR EXCEED THE MINIMUM ACCURACY REQUIREMENTS FOR THIS TYPE OF SURVEY AS SPECIFIED IN CHAPTER 5J-17, FAC. THIS MAP'S DIGITAL DATA IS INTENDED TO BE DISPLAYED AT A SCALE OF 1"=20' OR SMALLER.
4) SURVEY PERFORMED FOR THE "SPECIFIC PURPOSE" OF PROVIDING ELEVATION AND DIMENSION DETAILS OF THE WATER CONTROL STRUCTURE FOR USE BY THE CITY OF NORTH PORT DEPARTMENT OOF ENGINEERING.

FOR: CITY OF NORTH PORT
DEPARTMENT OF ENGINEERING

CERTIFICATE

I, hereby certify that this Map/Report of Survey as shown and/or described herein represents the results of Field Surveys performed under my supervision, that it is true and correct to the best of my knowledge, information and belief and meets the requirements of Chapter 5J-17, F.A.C. pursuant to Section 472.027, F.S. Subject to all notations as shown herein.

Van Buskirk / Fish & Associates, Inc., LB#3739

By: _____
Alan K. Fish, P.S.M.
Registered Professional Surveyor & Mapper
Florida Certificate No. 3941

Date of Survey: JUNE 19TH, 2014

"Not valid without the signature and the original raised seal of a Florida licensed surveyor and mapper."

REVISIONS:	BY:

MAP OF "SPECIFIC PURPOSE SURVEY, OF WATER CONTROL STRUCTURE # 162 IN NORTH PORT CHARLOTTE ESTATES CITY OF NORTH PORT, SARASOTA COUNTY, FLORIDA

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Van Buskirk / Fish & Associates, Inc.
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DATE: 6-19-2014
SCALE: AS NOTED
DRAWN: GC
PROJECT NO. 14-1087
SHEET 1 OF 1 SHEETS

APPENDIX B

WCS-162 Pictures

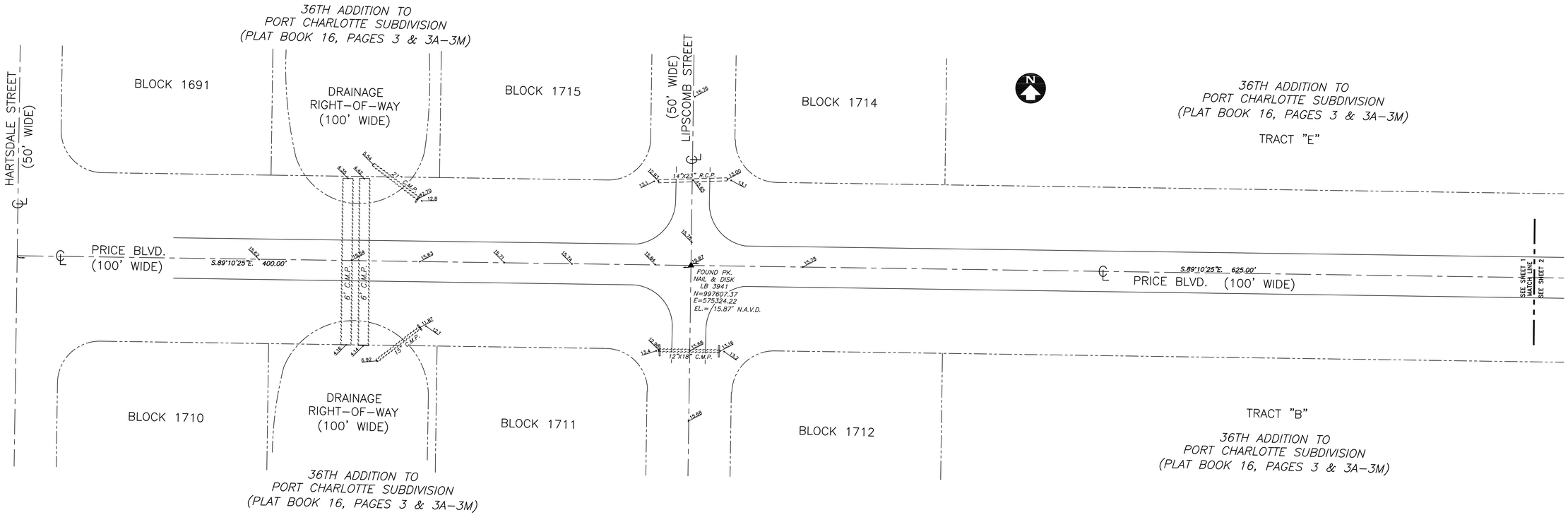
Looking North-West from the downstream of WCS-162

Looking South-West from the upstream of WCS-162

Looking South-West from the upstream of WCS-162

APPENDIX C

2014 Survey Data of West Price Boulevard



LEGEND

- FOUND 4" X 4" CONCRETE MONUMENT (DISK NUMBER NOTED, IF ANY)
- SET 4"X 4" CONCRETE MONUMENT WITH L.S. 3941 DISK.
- FOUND #4 OR #5 IRON ROD (CAP NUMBER NOTED, IF ANY)
- SET #4 IRON ROD WITH L.B. 3739 CAP.
- FOUND 1/2" TO 1" IRON PIPE (NUMBER NOTED, IF ANY)
- FOUND NAIL OR NAIL & DISC (NUMBER NOTED, IF ANY)
- SET NAIL & DISC, LS #3941
- ( ) PARENTHESES INDICATE RECORD BEARING OR DISTANCE IF DIFFERENT THAN MEASURED
- UTILITY POLE & GUY ANCHOR
- LIGHT POLE
- MAIL BOX
- STREET SIGN
- WATER VALVE
- BACK FLOW PREVENTION DEVICE
- SANITARY CLEAN OUT
- ELECTRICAL BOX
- GTE CANISTER
- PHONE RISER
- WATER METER
- HYDRANT
- SANITARY SEWER MANHOLE
- PHONE BOX
- TYPICAL SPOT ELEVATION
- 7.7 SPOT ELEVATION (POST CONSTRUCTION)
- RE–ENFORCED CONCRETE PIPE (R.C.P.)
- CORRUGATED METAL PIPE (C.M.P.)
- CORRUGATED PLASTIC PIPE (C.P.P.)

- OHL — OHL — OVERHEAD UTILITY LINES
- UGT — UGT — UNDER GROUND TELEPHONE LINES
- W — W — WATER MAIN
- WS — WS — WATER SERVICE
- GAS — GAS — UNDER GROUND GAS LINE
- CHAIN LINK FENCE
- WIRE FENCE
- WOOD FENCE

P.C.	POINT OF CURVATURE
P.T.	POINT OF TANGENCY
P.O.B.	POINT OF BEGINNING
P.O.C.	POINT OF COMMENCEMENT
P.R.M.	PERMANENT REFERENCE MONUMENT
P.C.P.	PERMANENT CONTROL POINT
T.B.M.	TEMPORARY BENCH MARK
E.O.P.	EDGE OF PAVEMENT
℄	CENTERLINE
B	BASELINE
FND.	FOUND
I.P.	IRON PIPE
I.R.	IRON ROD
C.M.P.	CORRUGATED METAL PIPE
R.C.P.	REINFORCED CONCRETE PIPE
C.M.	CONCRETE MONUMENT
EL.	ELEVATION
F.F.	FINISH FLOOR
H.W.	HEAD WALL
B.O.C.	BACK OF CURB
P.R.C.	POINT OF REVERSE CURVATURE
B.F.P.	BACK FLOW PREVENTION DEVICE
M.A.F.L.	MEAN ANNUAL FLOOD LINE
F.S.P.C.S.	FLORIDA STATE PLANE COORDINATE SYSTEM

- PINE TREE (TYP)
- OAK TREE (TYP)
- PALM TREE 10" DIAMETER (TYP)

SURVEYOR'S NOTES/REPORT:

1) BEARINGS ARE BASED ON "GRID NORTH" FLORIDA STATE PLANE COORDINATE SYSTEM, "WEST ZONE". COORDINATES ARE NAD 1983/2007.
2) ELEVATIONS SHOWN ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988.
3) THIS SURVEY WAS PERFORMED FOR THE "SPECIFIC PURPOSE" OF PROVIDING TOPOGRAPHIC SPOT ELEVATIONS, CULVERT AND STORM DRAIN PIPE SIZES AND ELEVATIONS, CULVERT MATERIAL TYPES AND OTHER SELECTED ELEVATION DATA FOR USE IN A DRAINAGE STUDY OF THE PORTIONS OF PRICE BLVD. SHOWN ON THIS MAP OF SURVEY.
4) EASEMENTS SHOWN IF ANY, ARE INTERPRETED FROM RECORD PLAT DEDICATIONS OR TITLE INFORMATION SUPPLIED TO OR ACQUIRED BY, THE SURVEYOR AT TIME OF SURVEY. THE SURVEYED PROPERTY MAY BE SUBJECT TO OTHER RESERVATIONS, RESTRICTIONS, COVENANTS, EASEMENTS OR AGREEMENTS AFFECTING THE PROPERTIES NOT DEPICTED ON THIS SURVEY. UNDERGROUND UTILITIES HAVE NOT BEEN LOCATED. IF UTILITY LINES ARE SHOWN, THEY WERE LOCATED AS MARKED BY OTHERS AND THE SURVEYOR ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OR THE COMPLETENESS OF SAID UTILITY LOCATIONS.
5) THE ACCURACY OF THIS MAP OF SURVEY IS BASED ON CONTROL MEASUREMENTS THAT MEET OR EXCEED THE MINIMUM ACCURACY REQUIREMENTS FOR THIS TYPE OF SURVEY AS SPECIFIED IN CHAPTER 5J–17, FAC. THIS MAP'S DIGITAL DATA IS INTENDED TO BE DISPLAYED AT A SCALE OF 1"=20' OR SMALLER.

FOR: THE CITY OF NORTH PORT, FLORIDA

CERTIFICATE

I, hereby certify that this Map/Report of Survey Sheets 1 through 8, as shown herein represents the results of Field Surveys performed under my supervision, that it is true and accurate to the best of my knowledge, information and belief and meets the requirements of Chapter 5J–17, F.A.C. pursuant to Section 472.027, F.S. Subject to all notations as shown herein.

Van Buskirk / Fish & Associates, Inc., LB#3739

By: _____
Alan K. Fish, P.S.M.
Registered Professional Surveyor & Mapper
Florida Certificate No. 3941

ALAN K. FISH LICENSE NUMBER No. 3941 STATE OF FLORIDA Professional Surveyor & Mapper

Date of Survey: JUNE 17, 2014

"Not valid without the signature and the original raised seal of a Florida licensed surveyor and mapper."

REVISIONS:	BY:

MAP OF "SPECIFIC PURPOSE SURVEY" SHOWING FIELD SURVEY DATA COLLECTED FOR A DRAINAGE STUDY ALONG A PORTION OF PRICE BLVD. IN THE CITY OF NORTH PORT, FLORIDA

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VB/F
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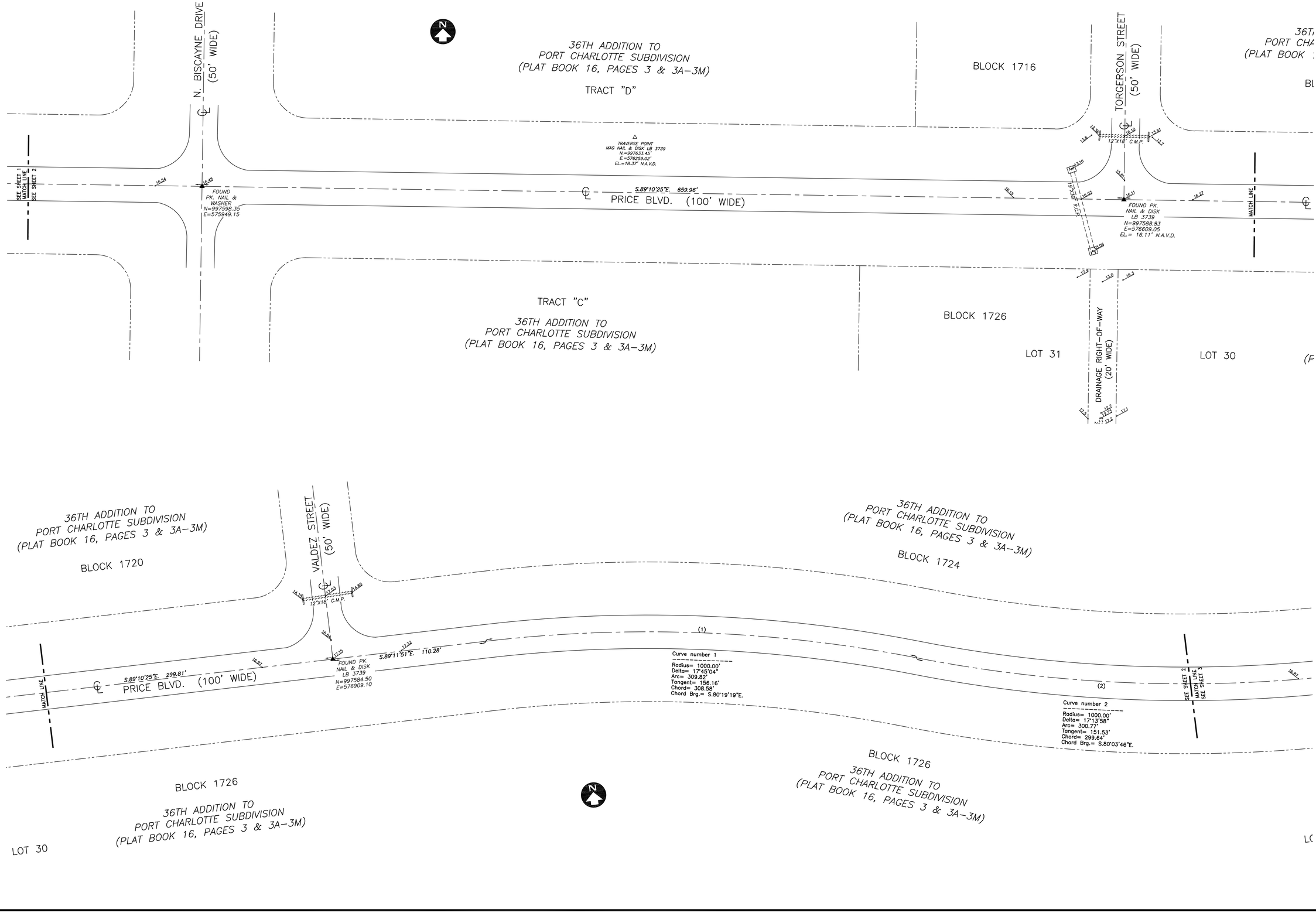
DATE:	6-17-2014
SCALE:	1" = 30'
DRAWN:	GC
PROJECT NO.	14-1088
SHEET	1
OF	7 SHEETS



REVISIONS:	BY:

MAP OF "SPECIFIC PURPOSE SURVEY" SHOWING FIELD SURVEY DATA COLLECTED FOR A DRAINAGE STUDY ALONG A PORTION OF PRICE BLVD. IN THE CITY OF NORTH PORT, FLORIDA

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DATE:	6-17-2014
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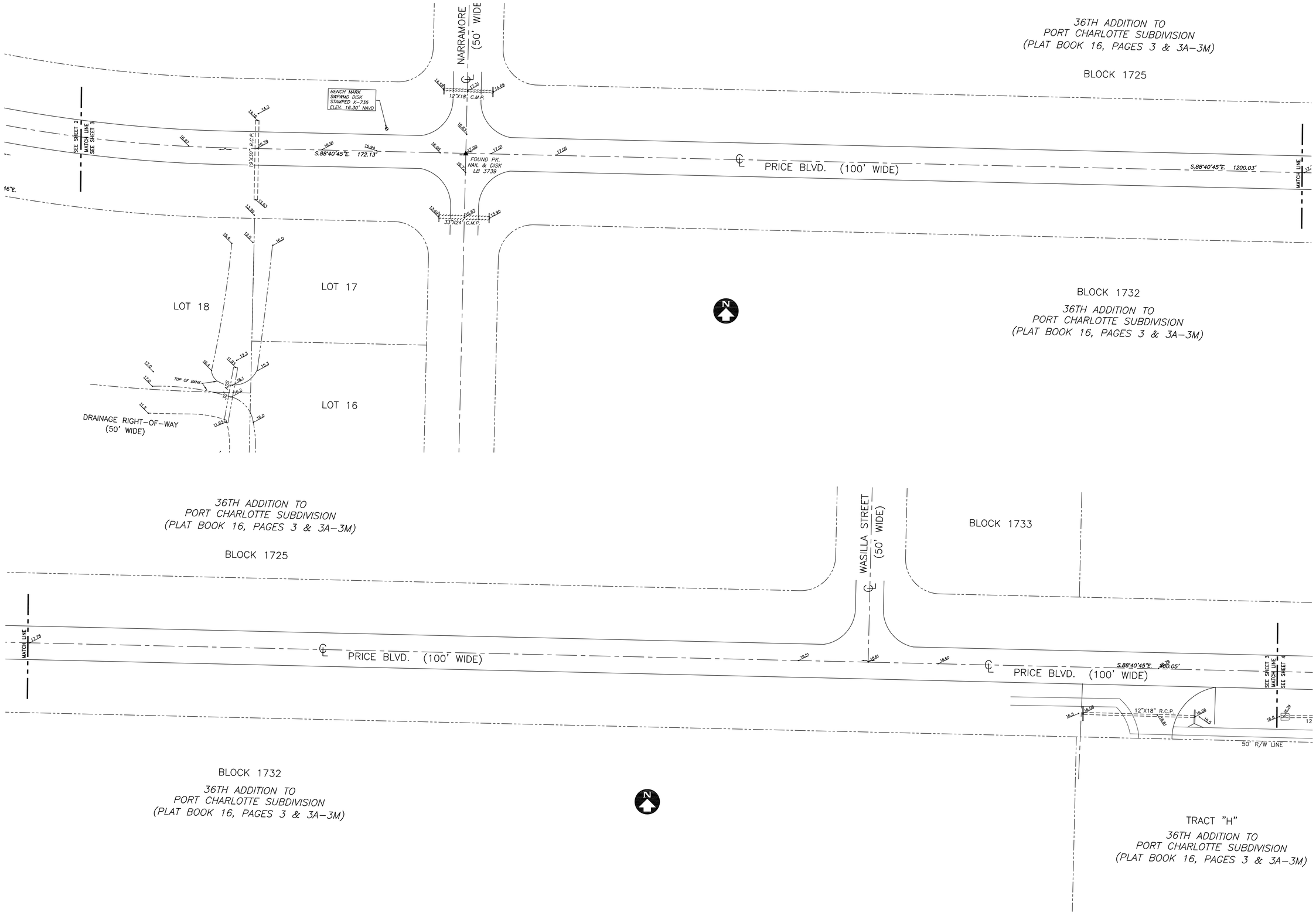
OF	7 SHEETS



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MAP OF "SPECIFIC PURPOSE SURVEY" SHOWING FIELD SURVEY DATA COLLECTED FOR A DRAINAGE STUDY ALONG A PORTION OF PRICE BLVD. IN THE CITY OF NORTH PORT, FLORIDA

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DATE:	6-17-2014
SCALE:	1" = 30'
DRAWN:	AKF
PROJECT NO.	14-1088
SHEET	3
OF	7 SHEETS

36TH ADDITION TO
PORT CHARLOTTE SUBDIVISION
(PLAT BOOK 16, PAGES 3 & 3A–3M)

TRACT "J"

BLOCK 1733

LOCHER TERRACE
(50' WIDE)

36TH ADDITION TO
PORT CHARLOTTE SUBDIVISION
(PLAT BOOK 16, PAGES 3 & 3A–3M)

BLOCK 1737

50' R/W LINE

12"X18" R.C.P.

SEE SHEET 3
MATCH LINE
SEE SHEET 4

PRICE BLVD. (100' WIDE)

S.88°40'45"E. 394.94'

24.94'

FOUND MAG. NAIL & LB 3739 DISK
N=997438.37
E=579390.52

FOUND MAG. NAIL & LB 3739 DISK
N=997429.47
E=579785.35

FOUND MAG. NAIL & LB 3739 DISK
PC. CURVE
N=997428.96
E=579810.28

SOUTHERLY HALF OF
PRICE BLVD.
(O.R. 1749, PG.1592)

CONCRETE WALK

8" P.V.C.

T.B.M.: SET PK & DISK L.B. 3739 DISK IN WALK
EL.=18.04' NAVD
N.=997393.78'
E.=579418.83'

TRAVERSE POINT 5" IRON ROD & CAP LB 3739
N.=997398.61'
E.=579861.53'
EL.=17.93' NAVD

Curve number 3
Radius= 999.98'
Delta= 27°56'39"
Arc= 487.71'
Tangent= 248.81'
Chord= 482.89'
Chord Brg.= S.74°43'41"E.

(3)

PRICE BLVD.
(100' WIDE)

MATCH LINE

ISION
3A–3M)

GLENALLEN BLVD.
(80' WIDE)

EASTERLY HALF OF
GLENALLEN BLVD.
O.R. 1749, PG.1592)

40' R/W LINE

ELEVATIONS ARE NAVD–88
COORDINATES ARE NAD 1983/2007

36TH ADDITION TO
PORT CHARLOTTE SUBDIVISION
(PLAT BOOK 16, PAGES 3 & 3A–3M)

BLOCK 1738

BLOCK 1736

HYDER TERRACE
(50' WIDE)

ACADIAN TERRACE
(50' WIDE)
"NOT OPEN"

DRAINAGE RIGHT–OF–WAY
(50' WIDE)
"NOT CONSTRUCTED"

"LIMIT OF PLAT"

LANDS OF THE SCHOOL BOARD
OF SARASOTA COUNTY
(O.R. 2533, PAGE 751)

LANDS OF THE CITY
OF NORTH PORT
(O.R. 1771, PAGE 469)

13"X22" CMP

STORM INLET
TOP=16.80'

15" ADS

FOUND MAG. NAIL & LB 3739 DISK
0.15'SW

Curve number 4
Radius= 999.98'
Delta= 17°10'35"
Arc= 299.78'
Tangent= 151.02'
Chord= 298.66'
Chord Brg.= S.52°10'05"E.

TRAVERSE POINT 5" IRON ROD & CAP LB 3739
N.=997193.04'
E.=580399.19'
EL.=17.09' NAVD

PT. CURVE

PRICE BLVD.
(100' WIDE)
150.00'

SOUTHERLY HALF OF
PRICE BLVD.
(O.R. 1749, PG.1592)

12"X18" R.C.P.

PRICE BLVD.
(O.R. 1749, PG.1592)
(100' WIDE)

S.43°34'47"E. 748.45'

598.45'

16"X22" CMP

BENCH MARK
SW'WMD DISK
STAMPED W-735
ELEV. 17.94' NAVD

TRAVERSE POINT 5" IRON ROD & CAP LB 3739
N.=996786.62'
E.=580797.55'
EL.=17.03' NAVD

SEE SHEET 5
MATCH LINE
SEE SHEET 4

SEE SHEET 5
MATCH LINE
SEE SHEET 6

MAP OF "SPECIFIC PURPOSE SURVEY" SHOWING FIELD SURVEY DATA COLLECTED FOR A DRAINAGE STUDY ALONG A PORTION OF PRICE BLVD. IN THE CITY OF NORTH PORT, FLORIDA

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REVISIONS:	BY:

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DATE: 6-17-2014
SCALE: 1" = 30'
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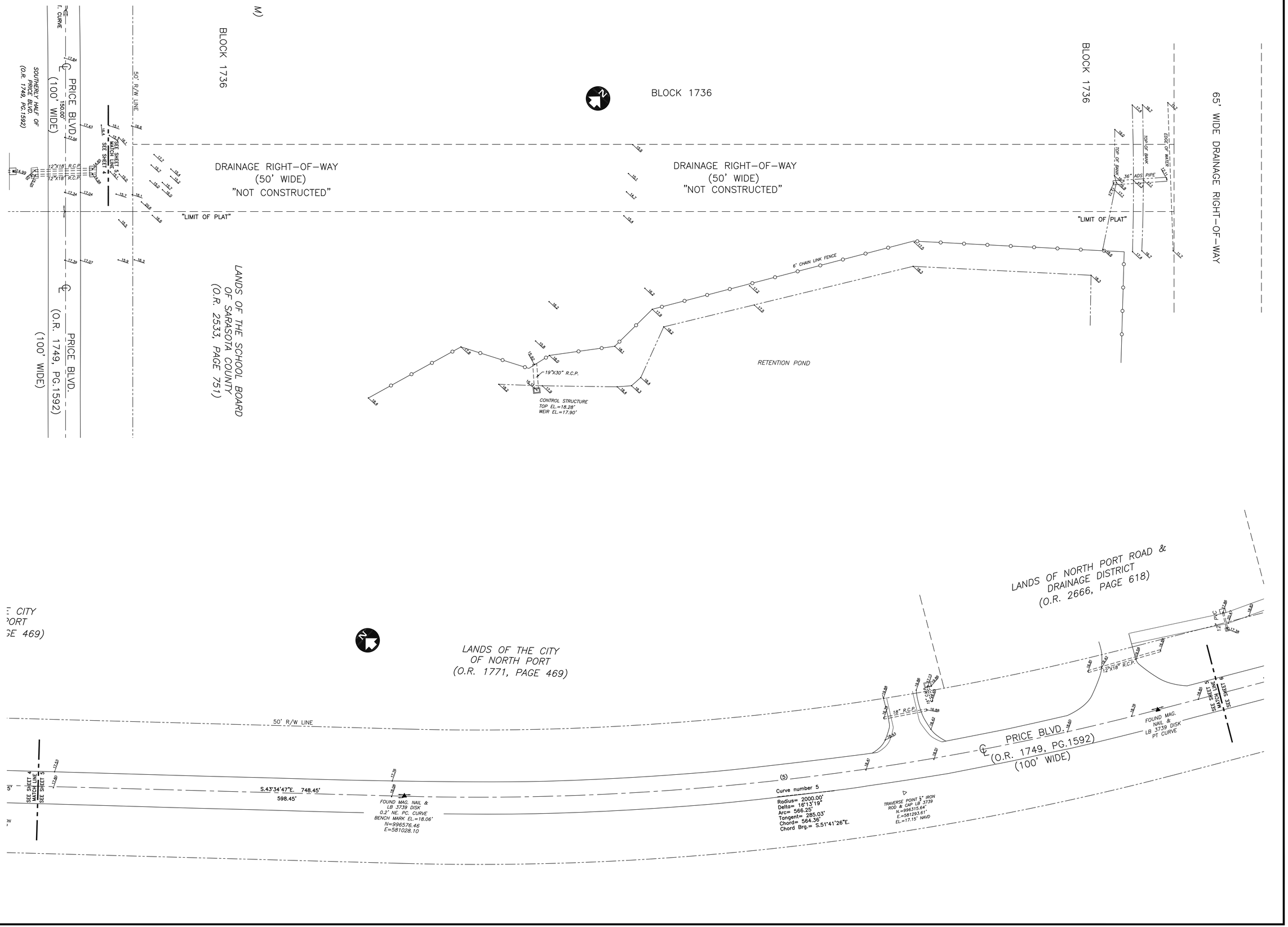
PROJECT NO. 14-1088
SHEET 4 OF 7 SHEETS



REVISIONS:	BY:

MAP OF "SPECIFIC PURPOSE SURVEY" SHOWING FIELD SURVEY DATA COLLECTED FOR A DRAINAGE STUDY ALONG A PORTION OF PRICE BLVD. IN THE CITY OF NORTH PORT, FLORIDA

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PROJECT NO.	14-1088
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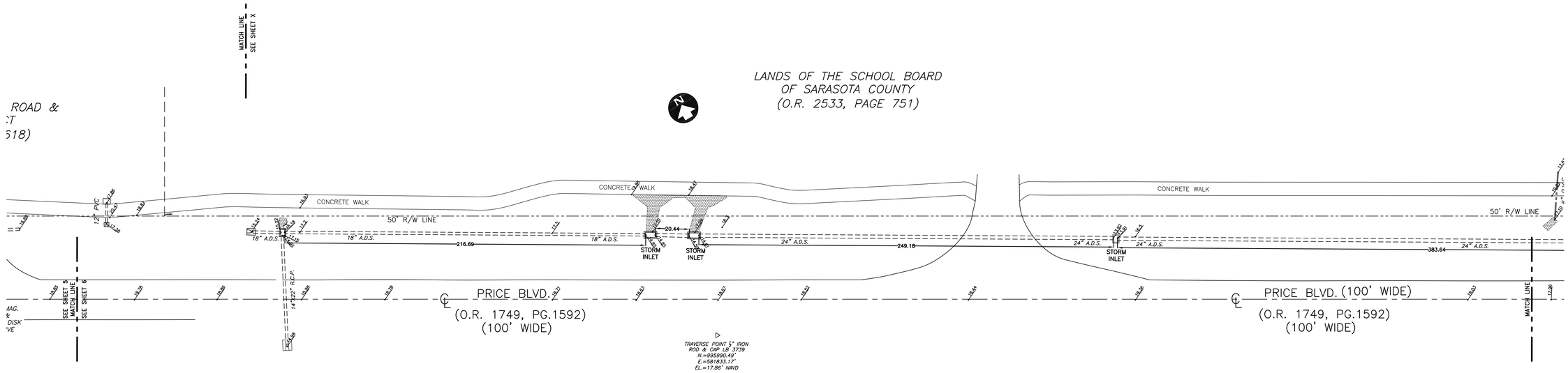
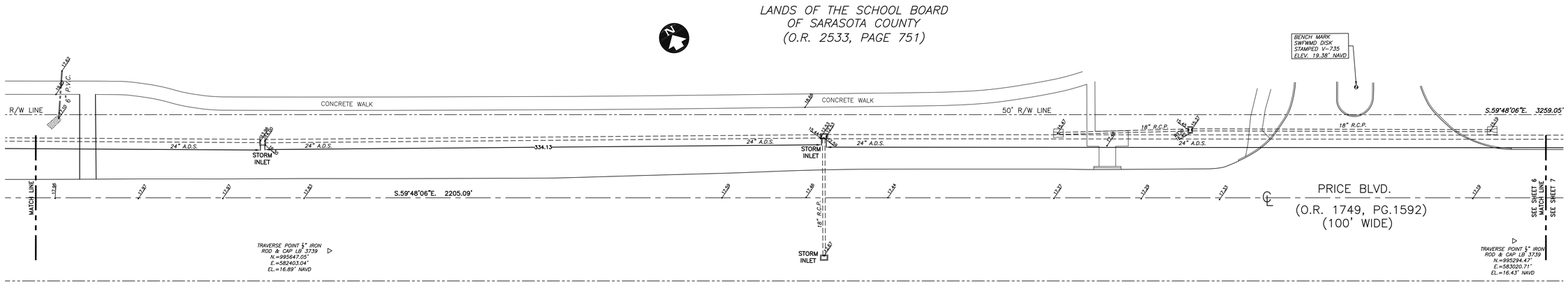
OF	7 SHEETS





REVISIONS:	BY:

MAP OF "SPECIFIC PURPOSE SURVEY" SHOWING FIELD SURVEY DATA COLLECTED FOR A DRAINAGE STUDY ALONG A PORTION OF PRICE BLVD. IN THE CITY OF NORTH PORT, FLORIDA

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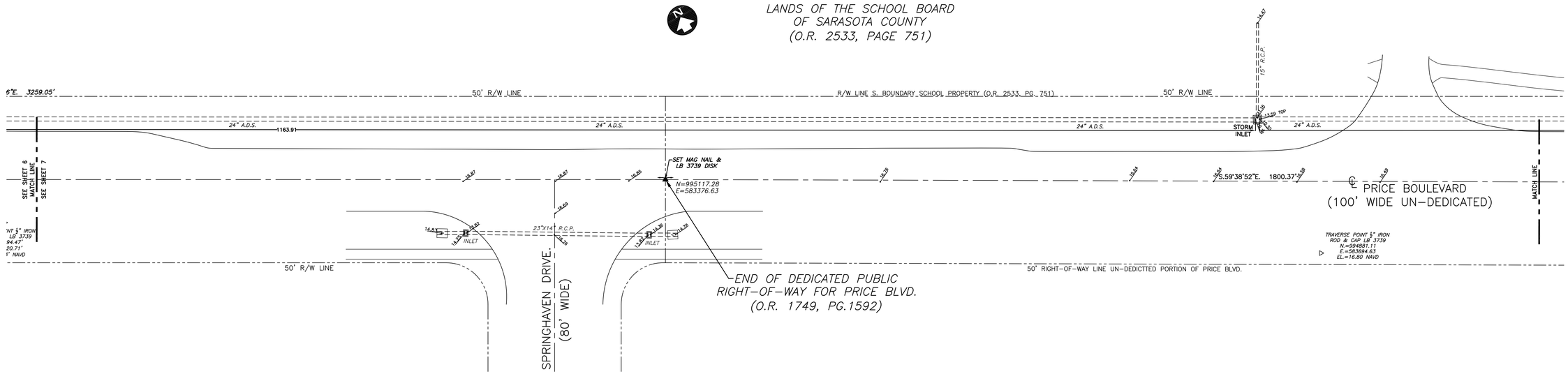
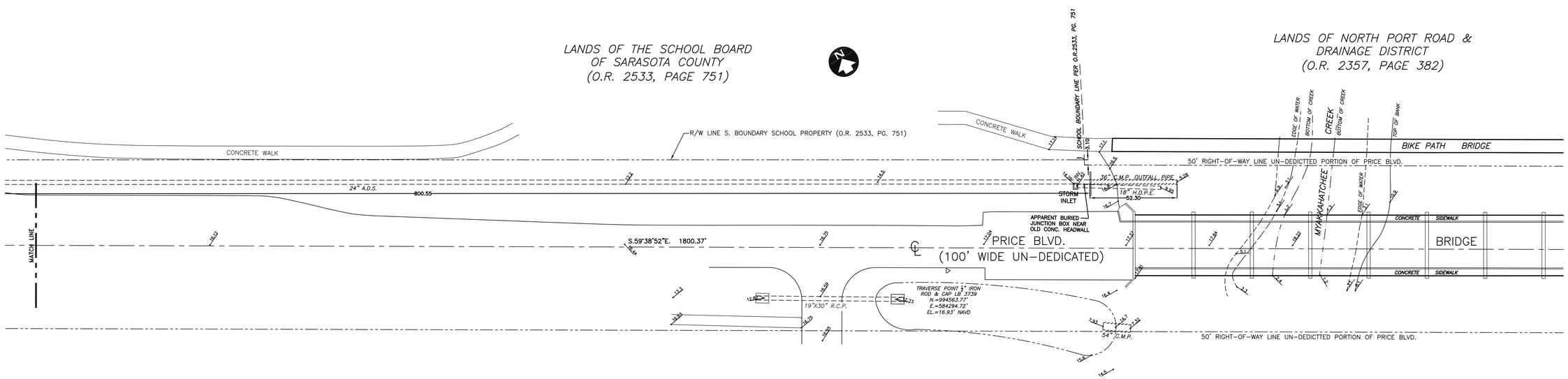
DATE:	6-17-2014
SCALE:	1" = 30'
DRAWN:	AKF
PROJECT NO.	14-1088
SHEET	6
OF	7 SHEETS





REVISIONS:	BY:

MAP OF "SPECIFIC PURPOSE SURVEY" SHOWING FIELD SURVEY DATA COLLECTED FOR A DRAINAGE STUDY ALONG A PORTION OF PRICE BLVD. IN THE CITY OF NORTH PORT, FLORIDA

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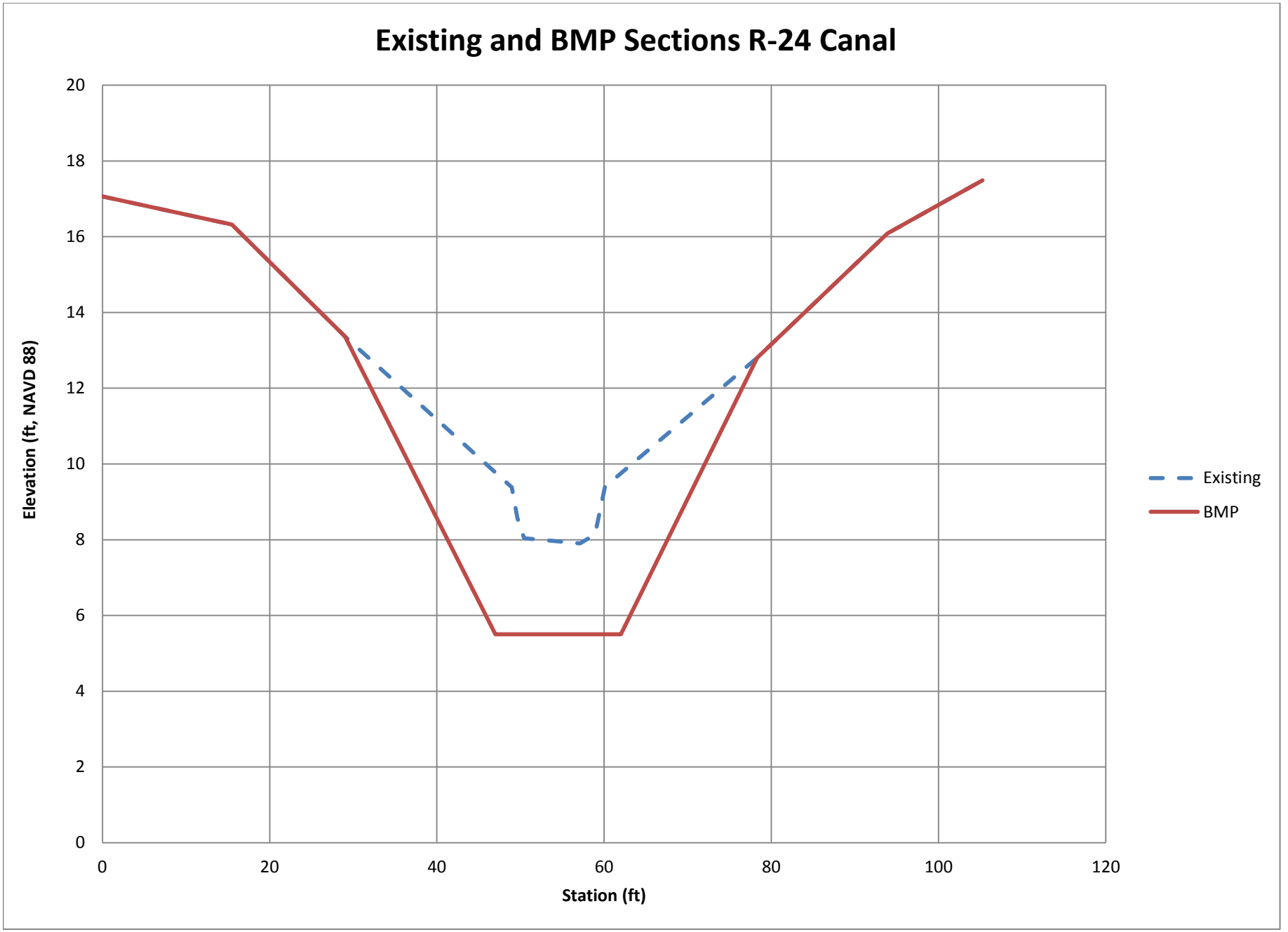
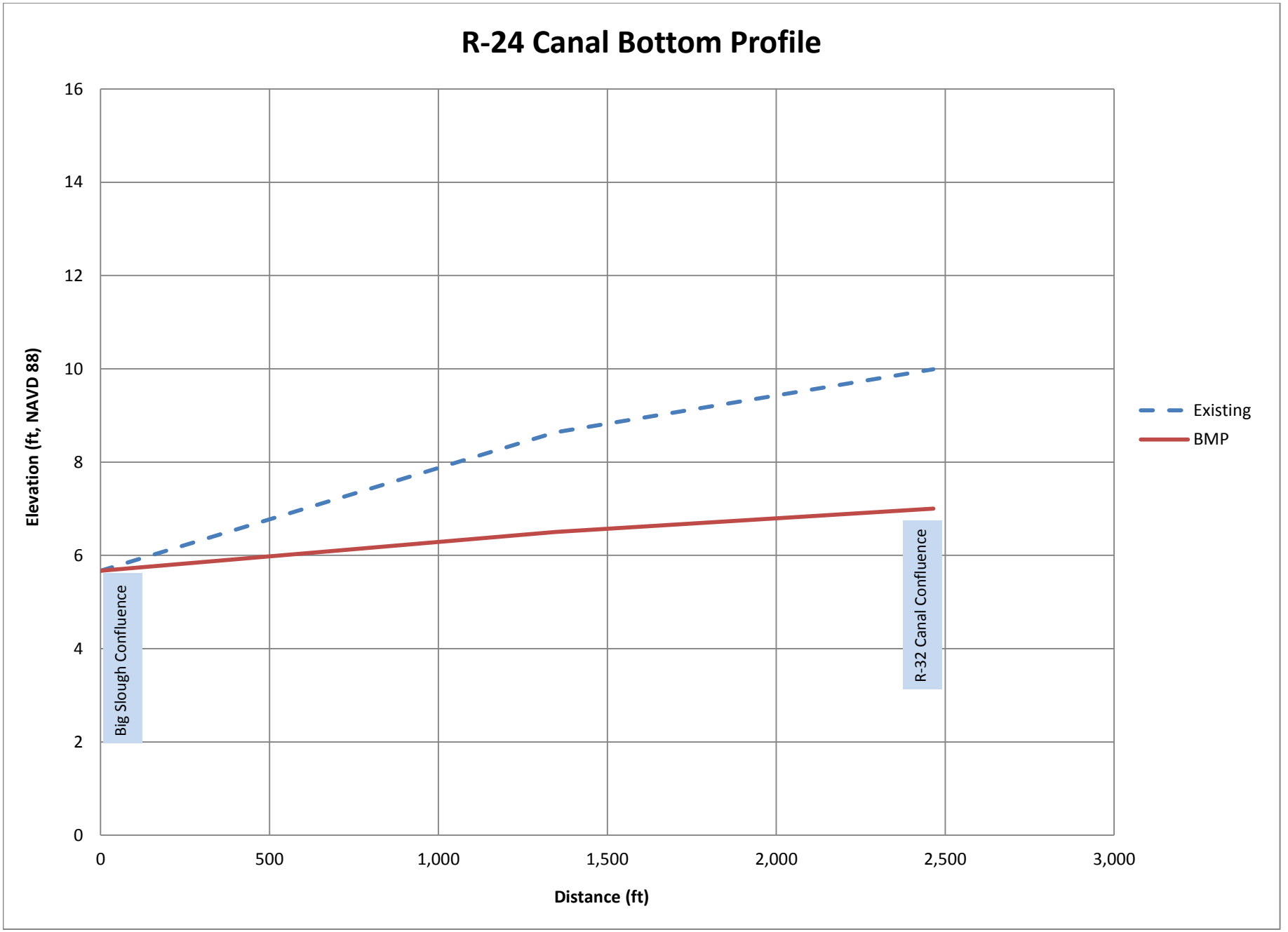
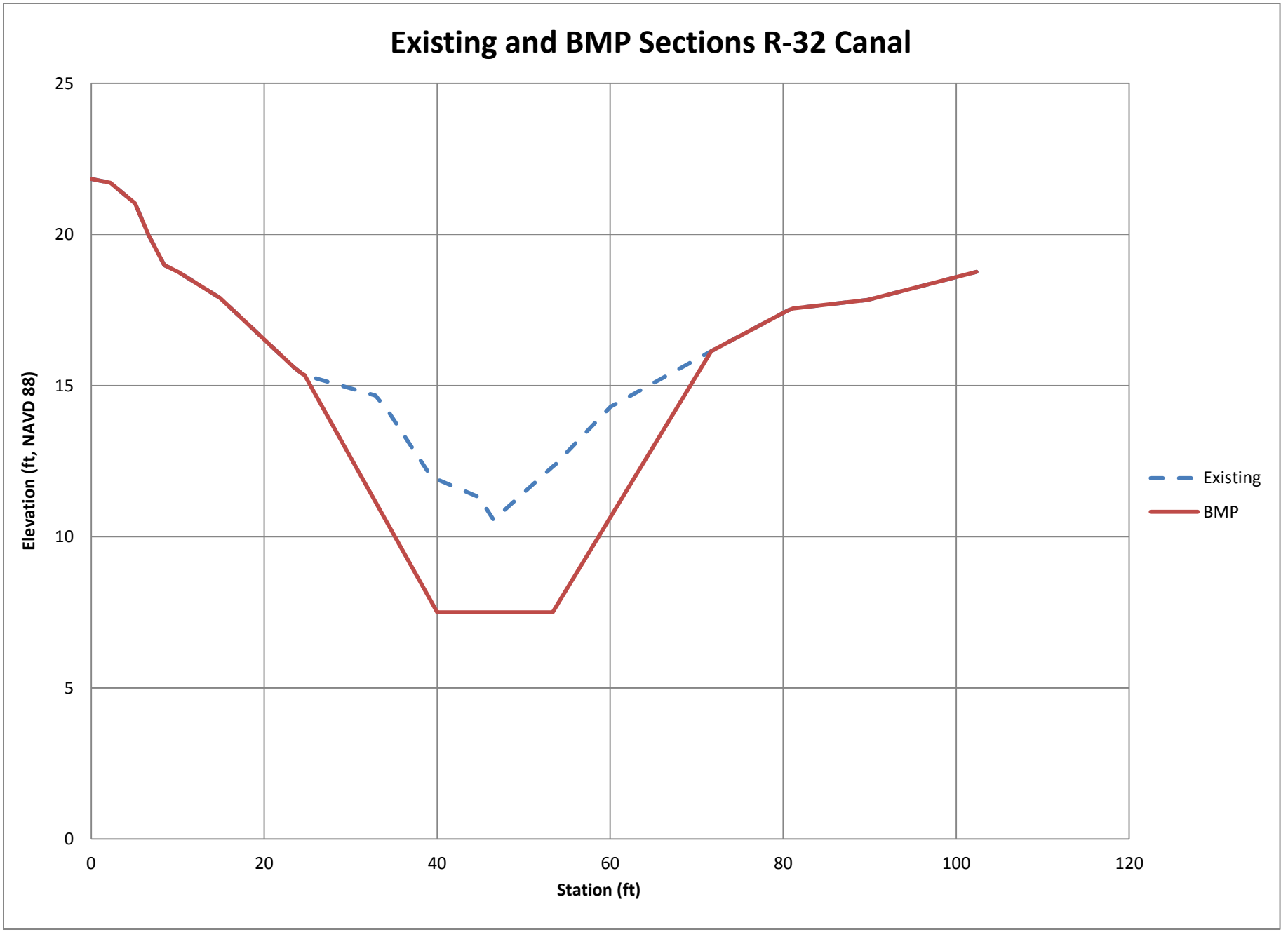
DATE:	6-17-2014
SCALE:	1" = 30'
DRAWN:	AKF
PROJECT NO.	14-1088
SHEET	7
OF	7 SHEETS

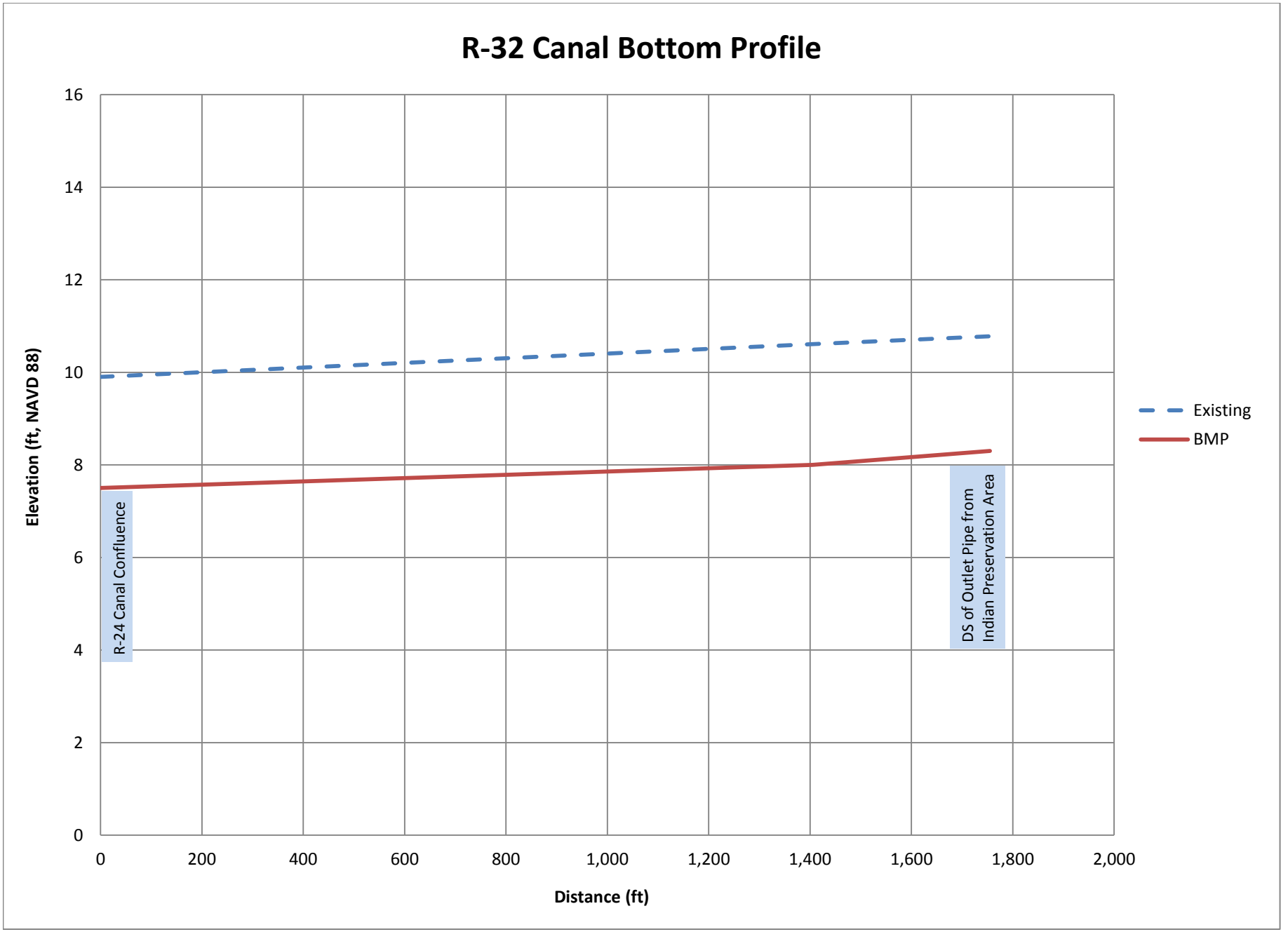
APPENDIX D

Canal Cross-sections and Profiles


Existing and BMP Sections R-24 Canal
Elevation (ft, NAVD 88)
20
18
16
14
12
10
8
6
4
2
0
0
20
40
60
80
100
120
Station (ft)
Existing
BMP


R-24 Canal Bottom Profile
16
14
12
10
8
6
4
2
0
Elevation (ft, NAVD 88)
0
500
1,000
1,500
2,000
2,500
3,000
Distance (ft)
Big Slough Confluence
R-32 Canal Confluence
Existing
BMP


Existing and BMP Sections R-32 Canal
Elevation (ft, NAVD 88)
25
20
15
10
5
0
0
20
40
60
80
100
120
Station (ft)
Existing
BMP


R-32 Canal Bottom Profile
Elevation (ft, NAVD 88)
16
14
12
10
8
6
4
2
0
0
200
400
600
800
1,000
1,200
1,400
1,600
1,800
2,000
Distance (ft)
R-24 Canal Confluence
DS of Outlet Pipe from Indian Preservation Area
Existing
BMP

APPENDIX E

Preliminary Cost Estimates

BMP No. 1 (Dredging R-24 and R-32 Canals) Preliminary Cost Estimates

Item	Length (ft)	Width (ft)	Cross Section area	Quantity	Unit	Unit Cost *	Estimated Cost	Comments
Dredging and removal of dredgings - 1,800 ft of R-32 Canal	1800		144.5	9633	CY	$ 25	$ 240,833	
Dredging and removal of dredgings - 2,300 ft of R-24 Canal	2300		118.3	10077	CY	$ 25	$ 251,935	
Bank Stabilization R-32 Canal Assume 1, 800ft long 20 feet wide on each side	1800	38		7600	SY	$ 2	$ 15,200	
Bank Stabilization R-24 Canal Assume 2,300 ft long 20 feet wide on each side	2300	38		9711	SY	$ 2	$ 19,422	
36-inch Pipe Crossing				40	LF	$ 50	$ 2,000	
Erosion and Sediment Control							$ -	
MOT				1	LS	$ 5,000	$ 5,000	
Mobilization and Demobilization				1	LS	$ 5,000	$ 5,000	
Other Project Costs				1	LS	$ 5,000	$ 5,000	
Subtotal							**$ 544,391**	
Design and Permitting Consultant Services (15%)							$ 81,659	
Construction and Inspection Consultant Services (5%)							$ 27,220	
Contingency (10%)							$ 65,327	
Total FY 2014 cost							$ 718,596	
Total FY 2017 Inflated Cost (5% per year)							**$ 831,864**	

* Estimated Costs from Thomas Marine Construction

BMP No. 2 (Raising 1,900 ft of Price Boulevard) Preliminary Cost Estimates

Item	Length (ft) *	Width (ft)	Depth (in)	Quantity	Unit	Unit Cost	Estimated Cost **	Comments
Detail Topographic Survey				1	ea	$ 5,000	$ 5,000	
Mill Existing Asphalt	2100	24		5600	SY	$ 15	$ 84,000	
Add road base to elevate road 1.2'	2100	26	15	6067	SY	$ 30	$ 182,000	$15 per SY per 8" thickness. Double cost for 15" thickness.
Type SP Structural Course 1.5"	2100	26	1.5	455	TON	$ 100	$ 45,500	100lb per SY per inch thickness / 2000lb per ton
Friction Course 1.5"	2100	26	1.5	455	TON	$ 120	$ 54,600	
Swale Regrading and sodding (assume 20 ft wide each side of Price Blvd)	2100	20		9333	SY	$ 5	$ 46,667	
Surveying (Construction staking, surveying, as-builts)				1	LS	$ 7,500	$ 7,500	
Erosion and Sediment Control				1	LS	$ 5,000	$ 5,000	
MOT				1	LS	$100,000	$ 100,000	Need bypass lanes
Mobilization and Demobilization (6%)				1	LS	$ 31,816	$ 31,816	
Subtotal							**$ 562,083**	
Design and Permitting Consultant Services (15%)							$ 84,312	
Construction and Inspection Consultant Services (5%)							$ 28,104	
Contingency (10%)							$ 67,450	
Total FY 2014 cost							$ 741,949	
Total FY 2017 Inflated Cost (5% per year)							**$ 858,899**	

* Add 100 feet on each for transition to existing road pavement elevation

** Cost inflated about 15% from 2014 Sumter/Price Intersection improvements cost from Ben Newman

BMP No. 3 (Raising 950 ft of Price Boulevard and Dredging R-24 and R-32 Canals) Preliminary Cost Estimates

Item	Length (ft) *	Width (ft)	Depth (in)	Quantity	Unit	Unit Cost	Estimated Cost **	Comments
Detail Topographic Survey				1	ea	$ 5,000	$ 5,000	
Mill Existing Asphalt	1150	24		3067	SY	$ 15	$ 46,000	
Add road base to elevate road 8"	1150	26	8	3322	SY	$ 15	$ 49,833	$15 per SY per 8" thickness.
Type SP Structural Course 1.5"	1150	26	1.5	249	TON	$ 100	$ 24,917	100lb per SY per inch thickness / 2000lb per ton
Friction Course 1.5"	1150	26	1.5	249	TON	$ 120	$ 29,900	
Swale Regrading and sodding (assume 20 ft wide each side of Price Blvd)	1150	20		5111	SY	$ 5	$ 25,556	
Surveying (Construction staking, surveying, as-builts)				1	LS	$ 7,500	$ 7,500	
Erosion and Sediment Control				1	LS	$ 5,000	$ 5,000	
MOT				1	LS	$100,000	$ 100,000	Need bypass lanes
Mobilization and Demobilization (6%)				1	LS	$ 17,622	$ 17,622.33	
Dredging R-24 and R-34 Canals (see BMP 1 cost estimate for detailed cost breakdown)							$ 544,391	
Subtotal							**$ 855,719**	
Design and Permitting Consultant Services (15%)							$ 128,358	
Construction and Inspection Consultant Services (5%)							$ 42,786	
Contingency (10%)							$ 102,686	
Total FY 2014 cost							$ 1,129,549	
Total FY 2017 Inflated Cost (5% per year)							**$ 1,307,594**	

* Add 100 feet on each for transition to existing road pavement elevation

** Cost inflated about 15% from 2014 Sumter/Price Intersection improvements cost from Ben Newman

Appendix D

Task 1.1.3 Big Slough Flood Reduction Study, Summary of Prior BMP Evaluations

DeLoach Engineering Science, PLLC., November 2016

MEMORANDUM

To: Elizabeth Wong, PE (City of North Port)
From: Dave DeLoach, PE; Trillian Baldassari, PE
Copy: Rod Ghioto, PE
File: 14-00400-00

Subject: Task 1.1.3 Big Slough Flood Reduction Study, Summary of Prior BMP Evaluations

November 21, 2016

Summary of Prior BMP Evaluations

The Big Slough watershed and City of North Port stormwater management system have been the subjects of prior investigations. The Big Slough Flood Reduction Study will build upon that prior work to advance previously developed concepts and develop original ideas to achieve some degree of flood mitigation in areas where residential structures are shown as flooding in recently updated Flood Insurance Rate Maps (FIRMs). Flood reduction performance of proposed improvements will be considered relative to storm events from mean annual to the 100-year recurrence to more broadly evaluate cost and benefit relationships. This memorandum briefly summarizes prior BMP evaluations that were performed and their findings, using much of the same language found in those prior reports.

Stormwater Management Master Plan (1993)

As part of the City of North Port's stormwater improvement program, Camp Dresser & McKee, Inc. (CDM) developed a Stormwater Management Master Plan (SWMMP) for the Big Slough watershed. The plan sought to evaluate flooding problems and determine engineering solutions, and was conducted in three phases. The third phase included analyses of alternatives for flood reduction. Detailed modeling was conducted to assess potential flood reduction afforded by alternatives. A cost/benefit analysis was conducted to evaluate the alternatives and recommend a plan for detailed design.

Development of Conceptual Solutions

A Phase III, Task l interim report (CDM, 1992) outlined conceptual solutions to identified flooding problems. Preliminary stormwater model runs were conducted to provide an initial assessment of each solution's effectiveness in reducing flooding. Results and preliminary cost estimates were developed for each solution. The costs and benefits of each conceptual solution were compared in a matrix.

Solutions considered in the preliminary evaluation included the following:

- Acquisition: Purchase of flooded lands would preclude flooding damage by preventing the development of the property, but would not prevent roadway flooding.
- Storage: Construction of stormwater detention basins would detain flow from the agricultural areas north of the city would reduce and attenuate peak flow rates.
- Diversion: Stormwater flows would be diverted into an adjacent watershed to the west (Deer Prairie Slough), thus reducing flow through the city.
- Conveyance: Increased conveyance capacity of the city's hydraulic system would include excavating existing channels, resizing culverts at stream crossings, cleaning existing channels, and constructing relief channels parallel to existing channels.

Based upon preliminary analyses, purchase of flooded lands was removed from consideration and the three remaining alternatives, and combinations of those alternatives, were examined in more detail.

Evaluation of Alternatives

City of North Port Big Slough Watershed Study Phase III Task 2 Final Report, Stormwater Management Master Plan (CDM, 1993) presents conceptual solutions for flooding as well as assessments of potential water supplies and of nonpoint source pollution and describes a stormwater management plan to reduce flooding during extreme storm events.

The specific set of alternatives evaluated in greater detail included:

- Alternative 1: Relief channel+ culvert improvements
- Alternative 2: Stormwater diversion by pumping + culvert improvements
- Alternative 3: Stormwater diversion by channel + culvert improvements
- Alternative 4: Upstream detention
- Alternative 5: Combination of Alternatives 1 and 2
- Alternative 6: Combination of Alternatives 1 and 3

Culvert improvements were recommended for the first phase of each alternative and included replacement of culverts on the R-36 canal at Bullard and Biscayne and on Cosmic and Creighton waterways at Tropicaire Blvd. Cleaning of portions of the Creighton and Cosmic waterways was also recommended to return those canals to original design dimensions. Flood reduction effects from the culvert improvements would be predominantly local, but some flooding would also be relieved by transferring flow from the upper reaches of the Big Slough and R-36 to the R-580 and Snover waterways.

The relief channel (Alternative 1) under consideration would reach from the northern boundary of the city to the Snover waterway. It could act as a parallel conveyance for peak storm flows and be integrated into a linear park system along the Big Slough. The channel would be 5 feet deep, have gentle grassed side slopes, and would be dry except during extreme storm events. When the relief channel is combined with the culvert improvements, the expected flooded area would be reduced by 540 residences.

The diversion alternative had two options: a pumping option and a channel option. The diversion pumping option (Alternative 2) would require a pumping station with a weir near Price Boulevard on the R-36 canal to convey stormwater to a bermed storage area on the Futrell tract. Release from the tract to Deer Prairie Slough would be at the existing rate and would take about a week to drain down under 25-year/24-hour storm conditions. Normally, pumping would only be initiated under high storm flow (2 feet above weir crest) conditions. To minimize noise, primary power would be by direct connection to Florida Power & Light with a diesel generator back-up.

The diversion channel option (Alternative 3) would utilize two weirs for diversion to a channel south of the Futrell tract, directly connected to the Deer Prairie Slough. The weir discharge rate would closely match the pumping capacity and would also discharge only under storm conditions. Both the pumping and channel options would have similar results by reducing downstream flooding along the R-36 canal. They provide flood relief only in the southwest area of the city, but more than 1,000 residences would benefit from this alternative by diverting water from the existing flooding area.

Upstream detention (Alternative 4) would consist of a berm designed to detain flood waters north of the city and slowly release those waters after the peak flows had passed. Six foot berms were proposed with a total storage capacity of 4,011 acre feet and 1 foot of freeboard. Little flood reduction was evident when compared to the other alternatives. The amount of land necessary and the limited benefit restricted the viability of this alternative.

Alternatives 5 and 6 combined the relief channel with each of the diversion alternatives. Simulation results indicated a significant reduction in flooding along Sumter Boulevard, as well as those areas mentioned previously. A reduction in flooded land of 4,200 acres, 1,152 residences, and 10.1 miles of roadway was predicted from the modeling.

Flooding problems along the Cocoplum Waterway were not alleviated by any of the suggested alternatives. Preliminary modeling results indicated that structural solutions to the flooding problems along the Cocoplum Waterway are cost-prohibitive. Consequently, non-structural measures should be considered.

Comparison of Alternatives/Recommendation

Alternatives were evaluated per the following weighted criteria:

- Flood protection benefit (10 point maximum)
- Annual cost (30 point maximum)
- Implementability (20 point maximum)
- Water quality benefits (10 point maximum)
- Water supply benefits {10 point maximum)

Evaluation results indicated that Alternative 2 (diversion pumping option to Futrell tract coupled with culvert improvements) scored highest (62 total points). Alternative 5, which is Alternative 2 with the addition of the relief channel, was tied for second place (60 points) with Alternative 3 (diversion channel

option plus culvert improvements). While total scores were close, Alternative 5 provided considerably more flood protection than Alternatives 2 and 3. Alternative 5 was recommended because it included the top ranked alternative, provided the greatest flood protection benefit, and could be phased.

The culvert improvements and the stormwater diversion phases were recommended first because they addressed existing flooding problems in an area of the city that is already populated. The relief channel would provide much of its benefit in areas that are currently sparsely populated but expected to grow.

For the Cocoplum Waterway, non-structural methods of flood reduction were recommended, since any feasible structural measures would be cost-prohibitive. Measures to be considered included specifying minimum first floor elevations in the city's zoning requirements, based on the 25-year or 100-year flood maps. For existing development, primarily around Blueridge Lake, local measures were recommended, such as raising structures, constructing small walls or levees around structures, and adding watertight flood shields for windows and exterior doors. While these measures will not reduce roadway flooding, they will reduce the potential structural damage from an extreme storm event.

Status of Recommendations

The 1993 Stormwater Management Master Plan was partially implemented, providing increased local conveyance through replacement of culvert structures at four locations. Those improvements are accounted for in the current Existing Conditions model. Other plan components were not completed including those for storage and flow diversion, apparently due to regulatory and financial constraints.

Watershed Management Program Consulting Services in the Big Slough Watershed (2014)

Ardaman & Associates, Inc. evaluated various BMP alternatives to address flooding conditions based on effectiveness, permittability, and economic viability. Under the WMP project, an Existing Conditions model was developed and six regional BMP alternatives were evaluated that could potentially reduce flooding through combinations of conveyance improvements, stormwater management storage areas, flood proofing, and flow diversion. Although the regional alternatives developed under the WMP project were not incorporated into a specific plan for implementation, the work provides insight to the system's hydraulic response and BMP limitations. Performance of several additional, site-specific BMPs were also evaluated and are also briefly discussed, here.

Regional BMPs

Simulations were performed of six regional BMP scenarios to evaluate the impact of various large-scale flood mitigation concepts. The benchmark scenario for comparison and performance evaluation was the SWFWMD Governing Board-approved 100-year 24-hour existing condition model.

- Remove structures throughout City of North Port waterways.
    - The objective of evaluating this BMP was to understand primary drainage system capacity assuming no losses due to water control structures or drop structures. Additional connectivity was provided among a few R canals southwest of the I-75 corridor to transferring some of the existing load to less compromised areas.

  - Water control structures (WCS) and drop structures (DS) were removed and replaced with an equivalent channel section that mimics the immediate upstream canal's section. The R-36 canal was connected to the R-43 canal via a weir with equivalent channel geometry and the R-43 canal was similarly connected to the R-24 and R-32 canals.
  - Results indicate flood stage reduction immediately north of Price Blvd and along Bass Point waterway while increasing flooding between S Toledo Blvd and S Sumter Blvd. Also, improvements are observed southwest of I-75 where new canal connectivity was provided. It was noted that structure removal may not be feasible due to potential loss of potable water supply, fish and wildlife habitat, and wetlands.
- Constrain Flow Entering City of North Port at Big Slough Canal
  - The objective of this BMP was to constrain the volume of water coming from offsite areas through the Big Slough canal prior to entering the City in the Estates area. The BMP would involve real estate acquisition, maintenance activities, dam construction and removal of existing hydraulic structures.
  - On the northwest City boundary, at the intersection of Big Slough canal with R-36 and R-580 waterways, all existing earthen weirs were raised to limit runoff from offsite areas, leaving the Big Slough canal as the only conveyance system into the western portion of the City. All earthen weirs farther north, at the intersection of Big Slough canal and Power Line Road were raised as well.
  - Results indicate approximately 0.5 feet flood stage reduction near the Big Slough canal from the City's northern boundary to just south of I-75 while flood stages increase approximately 1.0 foot in offsite areas north of the R-36 and R-580 waterways.
- Diversion Alternative
  - The purpose of this BMP is to divert flows from offsite areas via the existing R-36 canal, by increasing its capacity and improving its hydraulic connectivity with Deer Prairie Slough canal. This BMP would involve construction of new structures, maintenance activities, real estate acquisition, and detailed hydrologic and hydraulic evaluation of the western boundary (Deer Prairie Slough watershed).
  - On the northwest boundary, along R-36 canal, two earthen overflow weirs were provided to enhance the R-36 waterway connectivity with Deer Prairie Slough canal. Weir location and parameters were selected based on terrain and hydraulic constraints. The weirs were located on the northwest corner to address flooding in the Estates area and along Big Slough canal. R-36 canal capacity was also doubled by replacing the existing cross-section with a 60 feet bottom width trapezoidal channel with 4:1 side slopes. The current model assumes no tailwater influence from Deer Prairie Slough.
  - Results indicate flood reduction throughout the Estates area, along the Big Slough Canal between the R-36 canal and I-75 corridor as well as in the localized area along Big Slough south of I-75, with flood stage reductions between 0.1 foot and 1.0 foot throughout those areas. Impacts of additional flow into the Deer Prairie Slough watershed were not considered.

- R-580 Improvements
    - The purpose of this BMP is to induce additional flows through Creighton waterway by improving conveyance capacity in the R-580 waterway.
    - The R-580 waterway's bottom profile was reconfigured, assuming a flat ditch along its entire length at elevation 15.0 feet, NAVD. The current bottom sags to elevation 15.0 feet and reaches 17.7 feet and 23.0 feet at its western and eastern ends, respectively.
    - Results indicate small improvements near Big Slough. However, inducing additional flow through Creighton Waterway causes additional flooding near I-75.
- Increase Capacity on Southern Boundary
    - The objective of this alternative was to evaluate system response when doubling the southern boundary discharge capacity along the County line into Port Charlotte. The BMP would involve conveyance improvements, construction of new structures and/ or reconditioning of existing structures, maintenance activities, real estate acquisition, and evaluation of the receiving waters through hydrologic and hydraulic modeling.
    - All structures within Cocoplum Waterway and discharging beneath Hillsborough Boulevard were doubled in size. This included 6 lateral weirs along Cocoplum waterway and 13 structures beneath Hillsborough Boulevard.
    - Results indicate that improvements relative to house flooding were not significant. However, roads experienced a considerable flood reduction between S Sumter Blvd and Atwater Drive. This alternative was evaluated for information purposes only, as it is understood that allowing additional flows into Port Charlotte may not be desirable.
- Upstream Detention Alternative
    - The objective of this analysis is to examine the effects when attenuating peak flow rates in agricultural areas along the Big Slough canal with a series of new detention facilities. This BMP would involve construction of stormwater management storage areas, maintenance activities and real estate acquisition.
    - Seven detention facilities were added to the model in upstream offsite areas. Each detention area has a 100-acre footprint and is more than 10 feet deep. These areas were located on upland sites along Big Slough canal where feasible. Bottom elevations of the detention areas were set at the adjacent canal initial water level. Each was linked to the Big Slough canal by a 500-foot weir. Weir crest elevations were set at the bottom of the pond. The total anticipated detained volume is 600 acre-feet per detention site for a total of 4,200 acre-ft.
    - Results indicate relatively small reduction in peak water surface elevations on the order of 0.1 to 0.6 feet along Big Slough. The extent of flooding for this BMP is essentially the same as the existing scenario with few flood reduction areas along the Big Slough canal.

BMP Evaluation of Four Road Crossings

Simulations were performed to assess hydraulic performance and the effects of potential conveyance improvements at four sites, including: R-36 Canal at I-75, Myakkahatchee Creek at I-75, R-36 Canal at Tropicaire Boulevard, and Myakkahatchee Creek at Tropicaire Boulevard. A systematic evaluation was

conducted to understand existing hydraulic behavior at each of the four crossings under various synthetic storm events. Head differences across each structure, flow conditions at peak discharge, and hydraulic connectivity (including flow patterns in adjacent areas) were reviewed at each crossing.

To evaluate effectiveness of potential BMP improvements at these four locations (including resulting flood reduction and/or downstream flood increase), conveyance capacity at each site was increased by doubling the number of existing structures. This was achieved by adding a duplicate set of model reach elements at each location.

- R-36 Canal at I-75 Evaluation
    - Existing condition model results indicate that more than two feet of head difference occurs across this structure during the 100-year storm event. Under proposed BMP conditions, model results indicate that a peak stage reduction of up to 0.6 feet occurs upstream of the crossing, while a stage increase of approximately 0.6 feet occurs in downstream areas. It is notable that reduced discharges are observed from the R-36 Canal westward into the adjacent Deer Prairie Slough watershed for the proposed BMP condition. This overflow connection with the adjacent watershed to the west is located north of I-75. The reduced overflow results in an increased total volume remaining within the North Port area, by virtue of the improved conveyance capacity of the proposed BMP.
    - Increasing the crossing capacity of the R-36 Canal at I-75 may reduce water levels upstream of the crossing, but also raises flood elevations in the downstream areas. Mitigation of flooding in downstream areas was beyond the scope of this evaluation.
- Myakkahatchee Creek at I-75 Evaluation
    - Existing condition model results indicate that approximately one foot of head difference occurs across this structure during extreme storm events. This head difference is relatively small considering the magnitude of flow that arrives from the upstream contributing watershed (up to 8000 cubic feet per second). The applied BMP at this location assumes that the conveyance capacity of the bridge crossing was doubled. In other words, an identical, parallel 540-foot bridge span was added to investigate the benefit of increasing bridge capacity. Under this hypothetical scenario, model results indicate that a localized stage reduction of 0.7 feet is observed immediately at the upstream end of the crossing. However, peak stage reductions decrease further upstream of the crossing along the creek. No significant change in peak elevations is observed 1,200 feet upstream of the crossing. Also, no significant change to flooding conditions is observed in areas downstream of the crossing.
    - Increasing conveyance capacity of the bridge over Myakkahatchee Creek at I-75 may reduce water levels immediately upstream of the crossing, but does not generally improve flooding conditions north of I-75. The area impacted by this improvement is very localized and would not justify the cost of the improvement.

- R-36 Canal at Tropicaire Boulevard Evaluation
    - Existing condition model results indicate that up to three feet of head difference occurs across this structure during various storm events. Under proposed BMP conditions, model results indicate a peak stage reduction of approximately 0.8 feet upstream of the crossing, while a stage increase of up to 1.1 feet occurs downstream of Tropicaire. During all events, discharges from the R-36 canal into Deer Prairie Slough watershed are observed north of Tropicaire Boulevard. The proposed BMP results in a reduction of those discharges to Deer Prairie Slough and a resulting increased total volume remaining within the North Port area.
    - While increasing the crossing capacity of the R-36 Canal at Tropicaire Boulevard may reduce water levels upstream of the crossing, it also raises flood elevations in downstream areas. Mitigation of flooding in downstream areas was beyond the scope of this evaluation.
- Myakkahatchee Creek at Tropicaire Boulevard Evaluation
    - Existing condition model results indicate that the maximum calculated head difference for the various storm events is 0.2 feet; therefore, the bridge is not causing a flow restriction. Regardless, a BMP was applied, for evaluation, and assumes that the conveyance capacity was increased (doubled) by adding an identical bridge element in parallel to the existing structure. Under this scenario, model results indicate that a maximum localized stage reduction of approximately 0.1 feet was calculated, yet no significant change is observed further upstream nor downstream of the crossing.
    - Increasing the crossing capacity of the bridge over Myakkahatchee Creek at Tropicaire Boulevard does not substantially improve flooding conditions north of I-75.

WCS-162 Evaluation

WCS-162 is located on the R-36 Canal, north of Interstate 75, and immediately upstream of Tropicaire Boulevard. This is the only gated weir structure on the R-36 Canal, with one 2.25 feet high by 2 feet wide pull up slide gate. The City generally operates this structure by fully opening the gate in anticipation of a storm event to lower the water level in the R-36 canal to minimize potential upstream flooding; otherwise, the gate remains closed. The City staff would like to determine if adding gates would help draw down the canal more quickly and increase conveyance capacity.

- R-36 Canal Drawdown Evaluation
    - To reduce impacts downstream of WCS-162 while improving peak conditions upstream of the structure, an evaluation was performed to determine the benefits of adding additional gates. The evaluation included calculating the drawdown time for the R-36 canal and the additional conveyance capacity provided by the additional gates.
    - The benefits of reducing time required to lower R-36 canal elevation by adding gates at WCS-162 upstream of the structure were assessed by performing a drawdown analysis. For the drawdown evaluation, the R-36 canal upstream of WCS-162 was assumed to be at the control elevation of the weir (elevation 18.3 feet NAVD88). The water level at the

canal was simulated by fully opening the existing gate with no additional flows coming into the canal. The existing condition drawdown simulation results indicates that it would take approximately 18 hours to lower the canal to elevation 15 feet.

- The canal drawdown simulation was repeated for one and two additional gates scenarios. The time required to drawdown R-36 canal will decrease to 11 hours by adding an identical gate. When 2 additional matching gates are provided, the time require to drawdown R-36 canal would decrease to 9 hours. Therefore, the total time required to drawdown R-36 canal (to elevation 15 feet) upstream of WCS-162 will be reduced by 7 and 9 hours by adding one and two additional gates respectively.

The mean annual, 5-year, and 10-year storm events were simulated using the updated existing condition model with 2014 survey information. The City's water control structure operation criteria were employed in these simulations. The gates are closed at the beginning of the simulation, and they will be fully open when Big Slough Canal stage at Tropicaire rises to Elevation 15.88 feet NAVD88.

Benefits of flood control upstream of WCS-162 during a storm event were evaluated by simulating the mean annual storm event starting at the drawdown stage levels (Elevation 15 feet NAVD88). For this evaluation, initial stages in R-36 Canal upstream of WCS-162 were set to the drawdown levels, i.e. simulated canal stages after 18 hours of drawdown simulation. The lower elevations will account for the additional available canal storage capacity upstream of WCS-162. During the lower initial condition simulation, the WCS-162 gate was assumed to be opened throughout the simulation. Model results with lowered initials were compared to the results with the normal initial stage, which is at the invert elevation (at elevation 18.29 feet NAVD88) of WCS-162 weir. Simulated results suggest that there will be no difference in peak stages in R-36 canal due to the lower initial canal stage. It should be noted that model results suggest the 50-foot wide weir at WCS-162 overtops by 2.6 feet conveying 328 cfs of peak flow across the structure during the mean annual storm event. The R-36 Canal upstream of WCS-162 holds approximately 30 acre-feet of storage capacity behind the gate, whereas more than 3,000 acre-feet of runoff volume is conveyed by the canal during the mean annual storm event. The additional available storage seems to be insignificant compared to the runoff conveyed by the canal during the storm event.

In addition, benefits of having one additional gate with the lowered R-36 canal stages upstream of WCS-162 were also evaluated. For this scenario, both gates (one existing and one additional BMP gate) were assumed to be fully opened throughout the simulation. Simulated results suggest that there will be no difference in R-36 canal max stages upstream of WCS-162 with an additional gate at the structure. As no difference in peak stages were predicted for the mean annual storm event, no other higher return period storm events (5-year and 10-year) were analyzed with additional gates.

In conclusion, providing one or two additional gates at WCS-162 will help to reduce the time required to draw down canal levels upstream of the structure. However, model results suggest that lower initial levels in R-36 canal upstream of the structure will provide no benefits in terms of reducing flooding at the upstream areas even for small storm events such as mean annual storm event. Modeling results suggest that there would be no adverse impacts downstream of WCS-162 due to the additional gate.

Price Boulevard LOS Improvements

Existing condition model results (May 2012 Governing Board approved model) predict that West Price Boulevard would intermittently flood between Locher Road and the Big Slough Canal during the 10, 25, and 100-year, 24-hour storm events. The West Price Boulevard stretch is identified as an arterial street that floods during the 100-year, 24-hour design storm event.

This arterial street is critical to stormwater emergency response since it provides access to emergency facilities such as North Port Utilities Building, North Port High School and Heron Creek Middle School. Therefore, the City of North Port requested further evaluation of the stretch of West Price Boulevard between North Biscayne Boulevard and the Big Slough Canal to provide BMP recommendations to meet the City of North Port LOS criteria. City Unified Land Development Code Chapter 18 Level of Service criteria for arterial roads states that flooding must be less than 6 inches, as measured at the outside edge of pavement in a 100-year, 24-hour design storm event.

Ardaman staff reviewed the May 2012 Governing Board approved model setup within the area of interest (AOI) to verify whether the current model adequately represents the 2014 condition. With desktop and field reconnaissance of the area, it was observed that a section of the surface and sub-surface drainage systems near the North Port High School had been recently updated. Ardaman recommended surveying the area of interest to better represent the existing condition. The survey data was provided by Van Buskirk/Fish & Associates, Inc.

Based on recent survey, stormwater runoff collected from the north and south swales of West Price Boulevard generally flows west from the North Port Utilities Building, whereas stormwater runoff from the remaining areas flows east from this location. Accumulated stormwater runoff going west from the North Port Utilities Building ultimately flows north via the Indian burial ground toward the R-32 canal. Stormwater runoff going east toward Big Slough is routed through a series of surface water features (ditches, swales and inlets) which connects to a sub-surface system along the north side of West Price Boulevard.

The May 2012 Governing Board approved model was updated using the 2014 survey provided by Van Buskirk/Fish & Associates, Inc. The revised 100-year storm event model results indicate that West Price Boulevard would not flood near the North Port High School as previously predicted. However, the stretch of West Price Boulevard north of Little Salt Spring would still flood by 0.4 feet at the crown during the 10-year storm event. Survey data indicates that road overtopping would occur at the lowest point (near the culvert crossing) at 17.3 feet NAVD88. The model predicted the 25-year and 100- year storm maximum stages at West Price Boulevard are 17.9 and 18.2 feet NAVD88 respectively.

The objective of this series of BMPs is to mitigate flooding along the stretch of West Price Boulevard near the Indian burial ground to meet the existing City of North Port LOS criteria. Five different BMP alternatives were considered.

Only the three alternatives that were determined to be effective in improving the LOS are described below:

- West Price Boulevard BMP 1- Dredging the R-24 and R-32 canals
    - This alternative would require: dredging 2,300 feet of R-24 canal and 1,800 feet of R-32 canal to add approximately 2 to 3 feet of depth; and installing one extra parallel 36-inch pipe at the existing culvert crossing, between Indian burial ground and the R-32 canal. The City is not allowed to disturb the 50-foot wide drainage right-of-way through the Indian burial ground.
    - Model results suggest that West Price Boulevard would not overtop during the 25-year storm event. In addition, this alternative would reduce flooding on some local streets (Dundee Ave, Surf Ave, and San Salvador Road) located north of R-32 canal.
    - The model predicted that the 100-year maximum stage at West Price Boulevard will be reduced from 18.2 to 17.5 feet NAVD88. West Price Boulevard would still overtop by 0.2 feet over the crown of the road at the lowest section during the 100-year storm event. However, the road would be passable per City of North Port LOS criteria. Model results also indicate that there will be no adverse impacts at downstream areas.
- West Price Boulevard BMP 2 - Raising the Road
    - This alternative would involve raising approximately 1,900 feet of West Price Boulevard to an elevation of 18.5 feet NAVD88. Survey data suggests that the lowest segment of the road, which is located at the culvert crossing, needs to be raised by 1.2 feet to reach an elevation of 18.5 feet NAVD88.
    - Model results suggest that the 100-year peak stages upstream and downstream of the culvert across West Price Boulevard would be 18.2 feet NAVD88 with this alternative. The model predicted the 100-year maximum stage at West Price Boulevard is below the recommended raised road crown elevation of 18.5 feet NAVD88. The peak stage model results suggest that there will be no adverse impacts or increase in stages upstream or downstream of the improvement for any modeled storm event.
    - Additional right-of-way requirement to raise the road and its availability should be thoroughly assessed prior to selecting this BMP alternative.
- West Price Boulevard BMP 3 - Dredging the R-32 and R-24 canals and Raising the Road
    - This alternative incorporates all of the aforementioned West Price Blvd improvements.
    - Model results suggest that the 100-year peak stage upstream of the culvert across West Price Boulevard would be 17.6 feet NAVD88 with this alternative. This alternative would require raising approximately 950 feet of West Price Boulevard to elevation 18.0 feet NAVD88. Compared to BMP 2 improvements, this alternative would reduce the required road improvement length by half at a lower elevation (6 inches lower than BMP 2). Like BMP 1 and BMP 2, the peak stage model results suggest that there will be no adverse impacts or increase in stages upstream or downstream of the road improvement.

In addition to the three previously described BMP alternatives, a few other BMPs were evaluated. However, modeling results suggest that theses BMPs would not mitigate the flooding conditions along the evaluated stretch of West Price Boulevard.

- One of the other BMPs evaluated was to install a 24-inch pipe at the south side of West Price Boulevard near the culvert that would run approximately 1,400 feet to the east and connect to the existing sub-surface system inlet. This BMP did not show any improvements since the BMP pipe is too long and there was not sufficient hydraulic gradient available to convey the necessary flow rate.
- Another BMP evaluated was to provide a 20-foot wide cut/swale that would connect the flooded area south of West Price Boulevard to the south towards the Little Salt Spring basin. 25-year storm event model results suggest that this BMP alternative would lower peak stages at West Price Boulevard only by 0.2 feet. However, the road would still flood during this event. Also, this BMP may raise environmental concerns considering that it would require diverting stormwater runoff from the road towards Little Salt Spring basin.

Conclusions

It was recommended that the City of North Port purchase the small number of habitable structures in which flooding is predicted for the 100-year event. Purchasing the affected properties may be more cost effective than implementing BMPs evaluated under the WMP project.

Status of Recommendations

The 2012 WMP project did not result in a plan for improvements.

<u>The Big Slough Flood Reduction Study (current)</u>

The Big Slough Flood Reduction Study will build upon the above prior work to advance previously developed concepts and develop original ideas to mitigate flooding. The City of North Port has also provided a list of BMP concepts for consideration. These and other concepts will be the subject of discussion between the Consultant team and City staff prior to evaluation.

Appendix E

Task 1.2 Big Slough Flood Reduction Study, Definition of Existing Flooding Problems

DeLoach Engineering Science, PLLC., January 2017

MEMORANDUM

To: Elizabeth Wong, PE (City of North Port)
From: Dave DeLoach, PE; Trillian Baldassari, PE
Copy: Rod Ghioto, PE
File: 14-00400-00

Subject: Task 1.2 Big Slough Flood Reduction Study, Definition of Existing Flooding Problems

January 30, 2017

Definition of Existing Flooding Problems

This memorandum briefly describes existing flooding problems that are routinely experienced in portions of the Big Slough watershed, specifically along Myakkahatchee Creek near I-75 and within the Jockey Club. Information presented in this memorandum addresses the following elements of the Project Plan (Task 1.2).

- Define Existing Flooding Problems
  - Confirm Ability to Reproduce WMP Project Model Results
    - Simulations of Mean Annual to 100-Year Events
    - Flood Mapping and Comparison to Ardaman Results
    - Update Model to include a Small Number of Prior Conveyance Improvements
    - Flood Mapping and Comparison of Updated Model to Ardaman Results
  - Characterize Local Flooding Conditions
    - Myakkahatchee Creek at I-75
    - Jockey Club

<u>Ability to Reproduce WMP Project Model Results</u>

As discussed in the Big Slough Flood Reduction Study Project Plan, this project builds upon prior work performed and utilizes modeling tools previously developed by others under the Southwest Florida Water Management District (SWFWMD) Watershed Management Program (WMP). Before using those modeling tools for evaluation and development of flood reduction alternatives, it is important to confirm the ability to reproduce simulation results and inundation mapping of previous studies.

Simulations of Mean Annual to 100-year Events

Simulations were performed for the mean annual, 10-year, and 100-year 24-hour design storm events using both the 2012[1] and 2014[2] Versions of the 2004 Condition model (by Ardaman). Model network and runtime control files were retrieved directly from WMP project deliverable folders and used to perform the simulations. No changes were made to the retrieved model parameters or runtime controls.

Computed peak stages for each simulation were tabulated and compared to results taken directly from files provided as deliverables by Ardaman under the WMP project. Table 1 presents comparisons of Ardaman results to DES results for each design storm event and model version. Only those nodes with differences greater than 0.01-foot are shown.

Table 1 - Comparison of Computed Peak Stage for 24-Hour Design Storm Events, 2012 to 2014 Versions (A=Ardaman, D=DES)

Node	Version 2012									Version 2014								
	2.33-Yr			10-Yr			100-Yr			2.33-Yr			10-Yr			100-Yr		
	A	D	Δ	A	D	Δ	A	D	Δ	A	D	Δ	A	D	Δ	A	D	Δ
NU9091	26.42	26.42	-	26.65	26.65	-	26.92	26.91	***-0.01***	26.42	26.42	-	26.65	26.65	-	26.91	26.91	-
NB4856	18.71	18.73	***0.02***	20.40	20.40	-	21.39	21.39	-	18.71	18.71	-	20.40	20.40	-	21.39	21.39	-

Computational differences between Ardaman and DES results are very few in number and very small in magnitude, and may result from different runtime environments (computers, operating systems, etc.). It is possible that some model parameters or controls were slightly different at the time that the Ardaman simulations were performed and results compiled as compared to those that made their way into final project deliverables. Regardless, **simulation results indicate that DES can replicate Ardaman results reasonably well with the files retrieved from WMP project deliverables**. Mapping of 100-year inundation areas was performed and confirmed the ability to replicate prior Ardaman floodplain mapping.

Differences between the 2012 and 2014 versions of the model, as depicted in Figure 1 and Table 2, are substantially larger in magnitude than the foregoing computational differences and are owing to several specific model updates that were performed by Ardaman over the period from 2012 to 2014. These differences in computed peak stage reflect modifications that were made to the conveyance system (e.g., accounting for drainage improvements in the vicinity Price Boulevard) and/or changes in the accuracy of the model input data in describing certain features (e.g., using field survey data collected by a PLS in the vicinity of WCS-162). The 2014 results are considered more representative of conditions in the watershed in those local areas that were updated, but it should be noted that both the 2012 and 2014 models generally reflect a 2004 land use condition.

[1] SWFWMD Governing Board approved (May 22, 2012)
[2] Big Slough Watershed Study, K883 (October 10, 2014)

Table 2 - Difference Between Computed Peak Stages for 2012 and 2014 Model Versions

Node	2.33-Yr			10-Yr			100-Yr		
	2012	2014	**Δ**	2012	2014	**Δ**	2012	2014	**Δ**
NB0905	16.12	15.54	***-0.58***	16.62	16.23	***-0.38***	16.89	16.68	***-0.20***
NB0907	16.12	15.93	***-0.19***	16.62	16.23	***-0.38***	16.94	16.69	***-0.26***
NB0934	15.57	13.98	***-1.58***	15.87	14.99	***-0.88***	16.26	15.54	***-0.72***
NB0935	15.56	14.93	***-0.64***	15.85	15.25	***-0.60***	16.16	15.57	***-0.59***
NB0936	15.89	15.60	***-0.29***	16.16	15.65	***-0.51***	16.36	15.70	***-0.67***
NB0938	16.42	15.78	***-0.64***	16.47	16.06	***-0.42***	16.53	16.79	***0.26***
NB0943	14.27	14.27	-	14.95	14.95	-	16.09	15.42	***-0.68***
NB0945	14.93	14.93	-	15.14	15.14	-	16.15	15.51	***-0.64***
NB9035	18.07	19.37	***1.30***	18.10	19.40	***1.30***	18.14	19.43	***1.29***
NB9045	17.54	16.36	***-1.18***	17.94	17.27	***-0.67***	18.07	17.88	***-0.20***
NB9073	16.89	14.58	***-2.31***	17.03	16.02	***-1.01***	17.17	16.86	***-0.31***
NB9080	16.89	14.37	***-2.52***	17.03	16.01	***-1.02***	17.17	17.02	***-0.15***
NB9090	16.16	14.43	***-1.73***	16.27	14.50	***-1.77***	16.48	16.13	***-0.34***
NB9095	16.48	16.48	-	16.59	16.58	-	16.81	16.66	***-0.15***
NB9100	16.14	12.30	***-3.84***	16.19	14.48	***-1.71***	16.37	16.13	***-0.23***
NB9110	15.22	14.11	***-1.11***	15.87	14.16	***-1.71***	16.26	15.52	***-0.74***
NB9120	14.30	12.11	***-2.19***	15.87	13.44	***-2.43***	16.26	15.52	***-0.74***

Update of Selected Model Parameters Using Existing Available Data

The base model for this project was planned to be the SWFWMD Governing Board-approved 2012 Version of 2004 Condition model. City of North Port staff requested, and DES agreed, that a specific set of model features be updated in that 2012 Version of the model, as follows:

- add a single 24-inch PVC pipe from Public Works site to Creighton WW (check)
- utilize available as-built survey data and add two (2) gates at WCS 101
- incorporate available survey and storm pipe data in Price Blvd area
- change 30-inch ADS pipe, flowing from Price Blvd to R-32, to 36-inch ADS
- add three (3) 48-inch CMP beneath Appomattox Blvd (Stantec plans available)

It is evident from review of prior WMP project reports that many of these same revisions were already implemented by Ardaman over the period from 2012 through 2014, with the SWFWMD Governing Board-approved 2012 Version of 2004 Condition model as a base. In some cases, during Ardaman's development of the 2014 Version of 2004 Condition model, design-level (not "as-built") information was employed and will need to be revised. However, in other cases, site-specific field survey data was collected by a Professional Land Surveyor (PLS) and employed in Ardaman model updates. Specifically, Ardaman incorporated field survey data that was collected by a PLS at Water Control Structure WCS-162 and throughout the vicinity of Price Boulevard.

In the Ardaman WMP Project report, entitled "North Port/Big Slough Watershed Management Program (K883), Work Order #4, Completion Report for Task 1.1.3.7b – Formulation and Evaluations of BMPs for WCS-162" (Sep 2, 2014), reference is made to model revisions near WCS-162:

> "To evaluate BMPs at WCS-162, Ardaman requested to survey the structure to better understand the geometry of the structure and canal with the purpose of assessing availability of adequate space for additional gates. The survey data provided by Van Buskirk/Fish & Associates, Inc. is included in Attachment A, and the structure pictures are provided in Attachment B. The existing condition model was revised using the latest (2014) survey information for this BMP Evaluation. The update model simulated results rendered no change in model results compared to the May 2012 Governing Board approved model."

In the Ardaman report, entitled "North Port/Big Slough Watershed Management Program (K883), Work Order #4, Completion Report for Task 1.1.3.7b – Formulation and Evaluation of BMPs for Price Boulevard to Improve LOS" (Sep 22, 2014), reference is made to model revisions along Price Boulevard:

> "Ardaman staff reviewed the May 2012 Governing Board approved model setup within the area of interest (AOI) to verify whether the current model adequately represents the 2014 condition. With desktop and field reconnaissance of the area, it was observed that a section of the surface and sub-surface drainage systems near the North Port High School had been recently updated. Ardaman recommended surveying the AOI to better represent the existing condition…"

> "Based on recent survey, stormwater runoff collected from the north and south swales of West Price Boulevard generally flows west from the North Port Utilities Building, whereas stormwater runoff from the remaining areas flows east from this location. Accumulated stormwater runoff going west from the North Port Utilities Building ultimately flows north via the Indian burial ground toward the R-32 canal. Stormwater runoff going east toward Big Slough is routed through a series of surface water features (ditches, swales and inlets) which connects to a sub-surface system along the north side of West Price Boulevard…"

> "The May 2012 Governing Board approved model was updated using the 2014 survey provided by Van Buskirk/Fish & Associates, Inc. The revised 100-year storm event model results indicate that West Price Boulevard would not flood near the North Port High School as previously predicted. However, the stretch of West Price Boulevard north of Little Salt Spring would still flood by 0.4 feet at the crown during the 10-year storm event."

It is evident from those prior reports that the model network input data changes, particularly in the Price Boulevard area, were quite extensive. It is also understood that most of the other requested model updates (see bulleted items, above) were already incorporated and tested prior to development of the September 22, 2014 version of the Existing Condition model by Ardaman.

To expedite the 2016 model update, the September 22, 2014 version of the 2004 Condition model was used as a starting point. An added benefit to using this model as a starting point is that model element naming conventions are preserved and will match all references in reports, notes, and correspondence generated by Ardaman during the period from 2012 through 2014.

Rather than replicating modifications already made, DES staff reviewed and supplemented the 2014 model revisions as discussed in the following.

- **Add a single 24-inch PVC pipe from Public Works site to Creighton WW (check).**
  The Ardaman Sep 22, 2014 model was found to contain the 24-inch PVC pipe. Specifically, model Reach RI0016 from Node NI0016 to Node NI0020 contains a 77-foot 24-inch pipe with upstream invert 20.21 feet, NAVD, and downstream invert 17.65 feet, NAVD. A Network_Arc feature was added to the project geodatabase as the pipe was not included in the Ardaman geodatabase.

- **Utilize available as-built survey data and add two (2) gates at WCS 101**
  The Ardaman Sep 22, 2014 model does not contain up to date control structure data for the additional gates. As-built drawings provided to DES by the City of North Port were used to update model reach data for the gates as well as to correct adjacent weir lengths. Specifically, no changes were made to RB1060A representing the four original gates, RB1060B was added to represent the two new gates, and weir reaches RB1060E, F, and G were replaced with RB1060C. Network_Arcs were edited in the project Geodatabase to reflect these changes.

- **Incorporate available survey and storm pipe data in Price Blvd area**
  The Ardaman Sep 22, 2014 model was found to incorporate site-specific field survey data collected in the Price Boulevard area. Model input was compared to survey drawings (Van Buskirk / Fish & Associates, June 17, 2014) for consistency, and no revisions were deemed necessary.

- **Change 30-inch ADS pipe, flowing from Price Blvd to R-32, to 36-inch ADS**
  The Ardaman Sep 22, 2014 model was found to correctly reflect a 36-inch diameter pipe with inverts as indicated on field survey Sheet 5 of 7 Van Buskirk / Fish & Associates dated June 17, 2014.

- **Add three (3) 48-inch CMP beneath Appomattox Blvd (Stantec plans available)**
  The Ardaman Sep 22, 2014 model does not include these conveyance features. Three (3) 48-inch corrugated metal pipes (CMPs) were added to the model input data set per information contained in plans provided to DES by the City of North Port. Specifically, model Reach RH0110A was added from Node NH0110 to Node NH0130, containing three 48” CMPs with upstream inverts 3.09, 2.92, and 2.87 feet, NAVD, and downstream inverts 2.51, 2.79, and 2.76 feet, NAVD. Information was taken from Stantec design drawings provided by the City of North Port for Phase 3 Reclaimed Water Main Extension Appomattox Drive (2014), assuming NAVD and estimating 100-ft pipe lengths. One Network_Arc was added to the project Geodatabase to reflect pipe connectivity.

Flood Mapping and Comparison of Updated Model to Ardaman Results

Simulations were performed for the mean annual, 10-year, and 100-year 24-hour design storm events to allow comparison of the 2016 Version (DES) to the 2014 Version (Ardaman) of the 2004 Condition. The sole differences between the 2016 and 2014 versions of the model include WCS-101 control structure improvements and three 48-inch CMP culverts at Appomattox Boulevard using as-built information.

Differences in computed peak stage between the 2014 and 2016 versions of the model are depicted in Figure 2 and Table 3. Mapping of inundation areas was performed to confirm the very small spatial extent of changes resulting from the revisions. Stage differences, found only in results of simulations of the 100-year storm event, are related to model stability and result from a change in the computational time step from 0.1 seconds (for the 2014 model) to 1 second (for the 2016 model).

Table 3 - Comparison of Computed Peak Stage for 24-Hour Design Storm Events, 2014 to 2016 Versions (2014 Version by DES)

Node	2.33-Yr			10-Yr			100-Yr		
	2014	2016	***Δ***	2014	2016	***Δ***	2014	2016	***Δ***
NE7053	13.07	13.07	-	13.68	13.68	-	14.19	14.32	***0.12***
NS5578	17.65	17.65	-	17.99	17.99	-	18.30	18.51	***0.21***
NS2810	20.91	20.91	-	21.07	21.07	-	21.24	21.13	***-0.11***
NU9087	26.95	26.95	-	27.14	27.14	-	27.13	27.31	***0.18***

Characterize Local Flooding Conditions

The City has routinely experienced flooding in the Big Slough Watershed. Two such flood zones are the areas near Myakkahatchee Creek at I-75 and the areas in and around the Jockey Club.

Myakkahatchee Creek at I-75

The Myakkahatchee Creek at I-75 Study Area covers approximately 335 acres adjacent to the Myakkahatchee Creek. The area is bounded on the east by Sumter Boulevard and traversed from east to west by Interstate Highway 75. Figure 2a depicts existing mean annual and 10-year floodplains within the I-75 study area adjacent to Myakkahatchee Creek, both north and south of the interstate, as developed during the North Port/Big Slough WMP project. Figure 2b shows sub-basin delineations and the model network features used to simulate response to rainfall during the WMP project. Figure 2c depicts hydrologic soils groups.

Routine flooding of the area is due to Myakkahatchee Creek exceeding its banks in low areas of poorly drained soils. Comparison of hydrologic soil groups to areas of inundation suggest that the slough has historically flooded these low areas on a frequent basis. Alternative development will focus on reducing flows in this section of Myakkahatchee Creek, through diversion, storage, bypass, or other means.

Myakkahatchee Creek at Jockey Club

The northern section of the Jockey Club Study Area covers approximately 62 acres and is bounded on the north by Appomattox Drive, on the west by Pan American Boulevard, and on the east by Myakkahatchee Creek. The southern section of the Jockey Club Study Area near Ketona Road is also included and is approximately 82 acres in size. Figure 3a depicts existing mean annual and 10-year floodplains within the Jockey Club study area adjacent to Myakkahatchee Creek, both north and south of the interstate, as developed during the North Port/Big Slough WMP project. Figure 3b shows sub-basin delineations and the model network features used to simulate response to rainfall during the WMP project. Figure 3c depicts hydrologic soils groups.

Flooding may result from either backwater effects or local collection system capacity, depending upon the event. Recent improvements to the collection system (ditch lining) may improve capacity during short-duration local rainfall events. Alternative development will focus on improving flooding conditions related to backwater conditions.

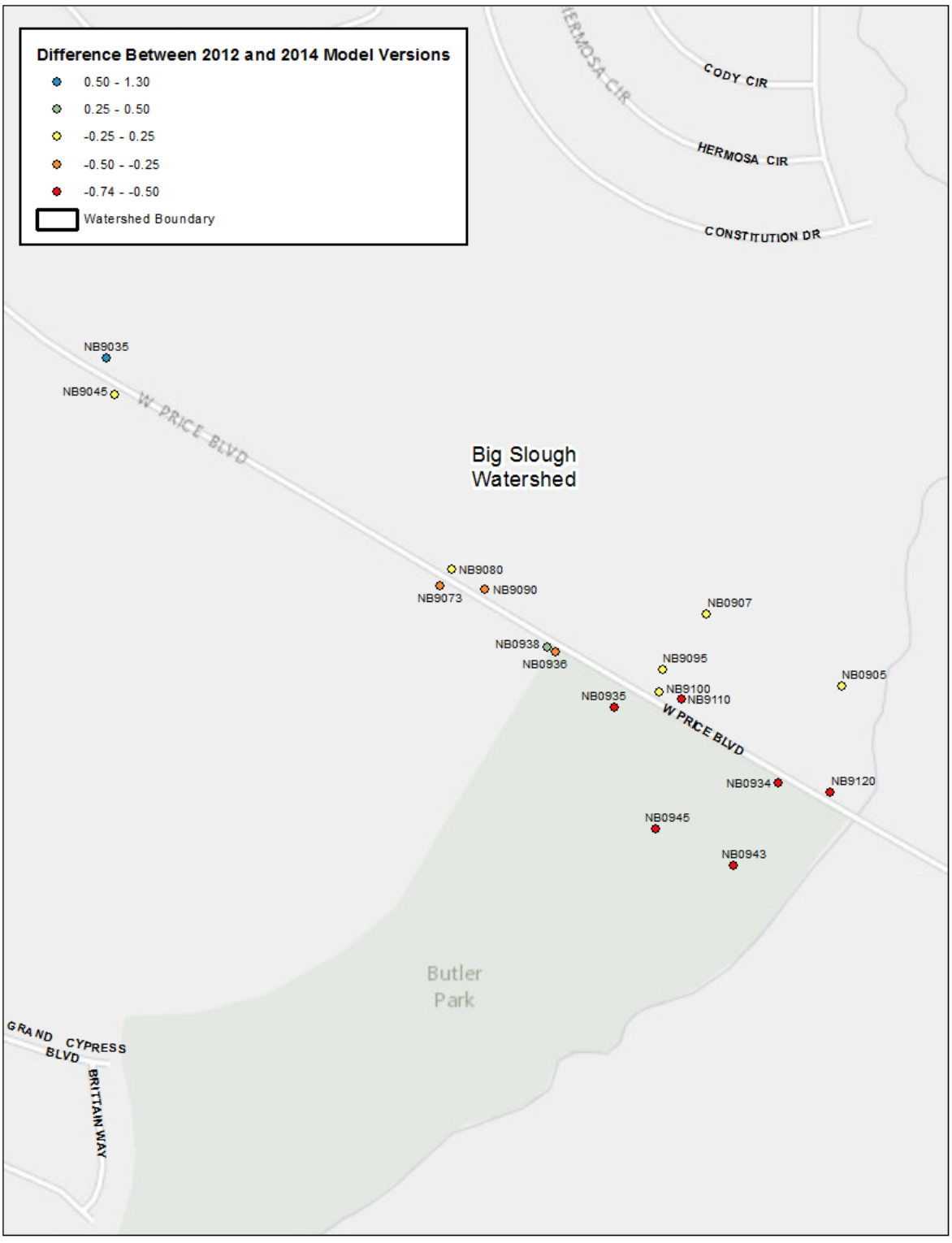


Figure 1 – Locations of Differences in Computed Peak Stages between 2012 and 2014 Model Versions

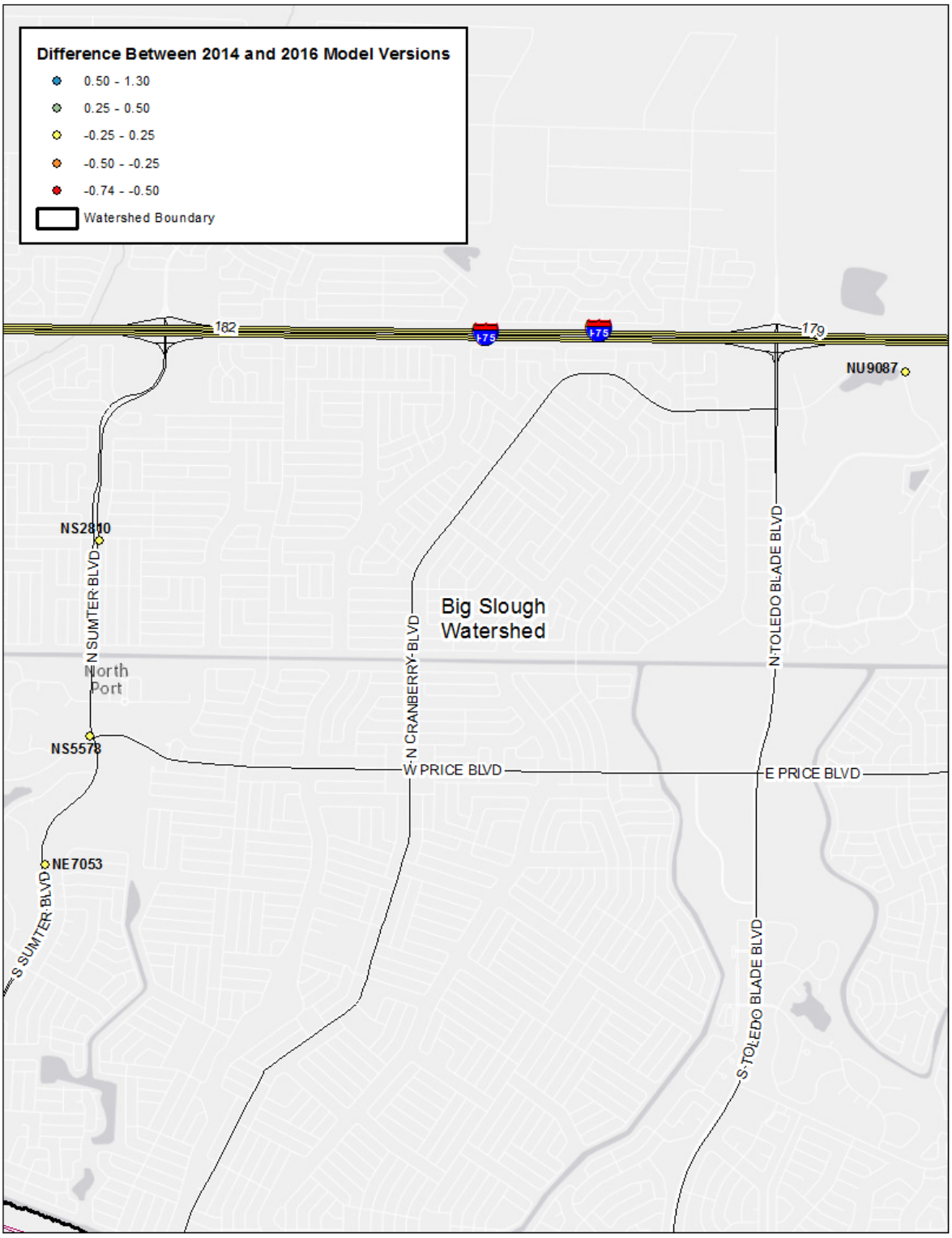


Figure 2 - Locations of Differences in Computed Peak Stages between 2014 and 2016 Model Versions

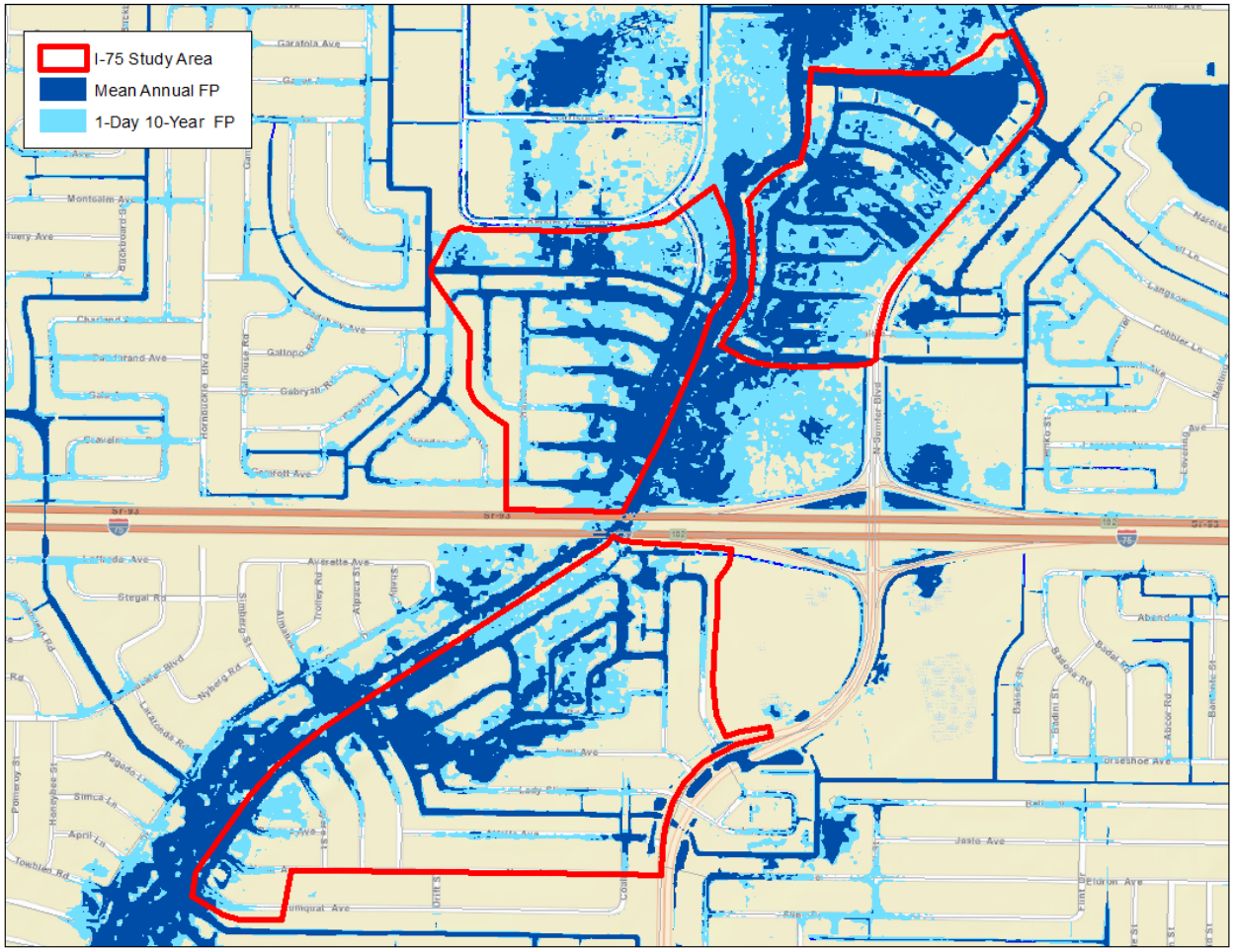


Figure 3a: I-75 Study Area, Mean Annual and 10-Year Floodplains

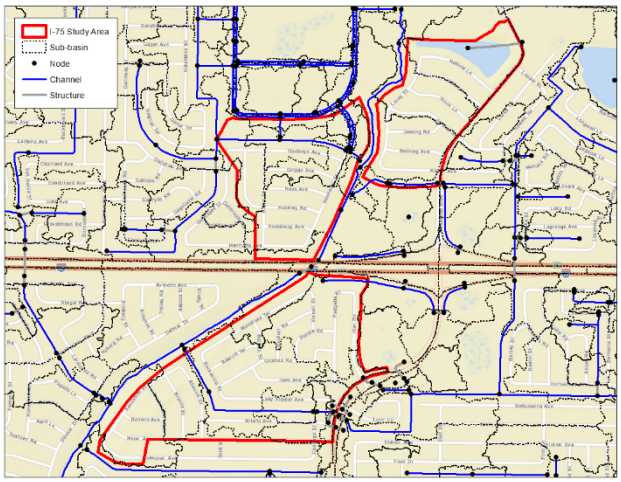


Figure 3b: I-75 Study Area, Model Network

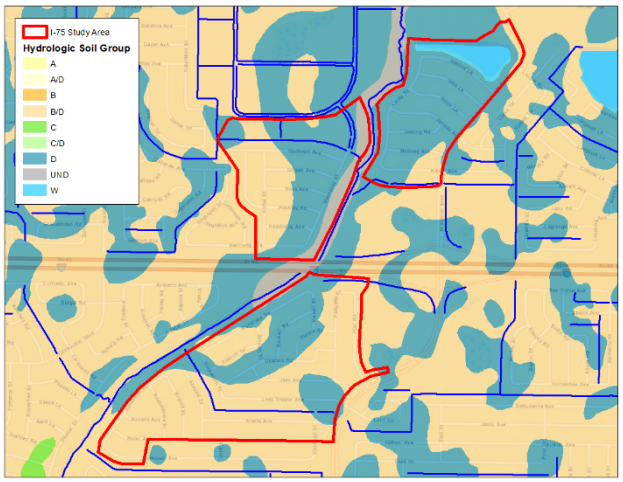


Figure 3c: I-75 Study Area, Hydrologic Soil Groups

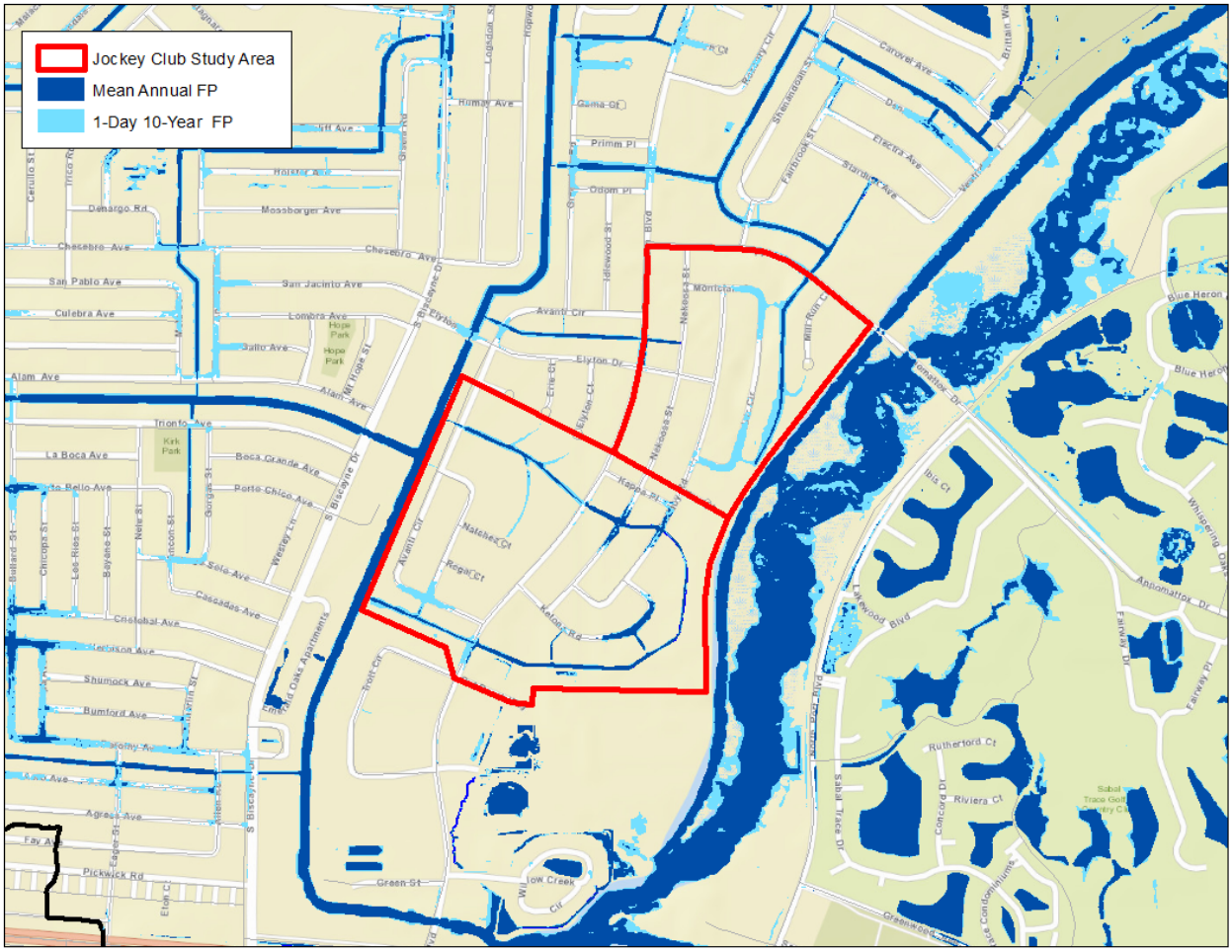


Figure 4a: Jockey Club Study Area, Mean Annual and 10-Year Floodplains

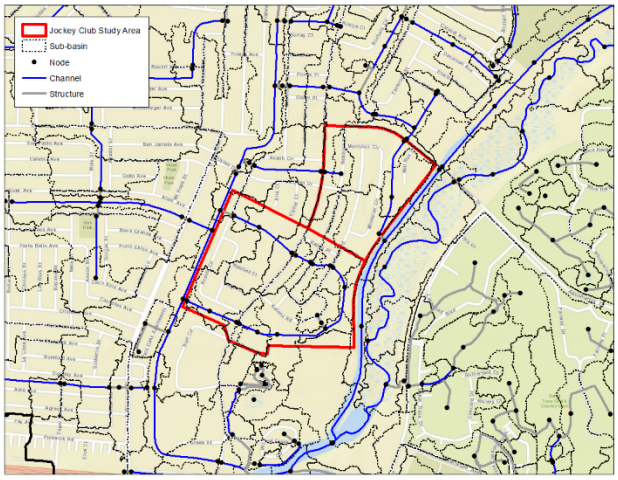


Figure 4b: Jockey Club Study Area, Model Network

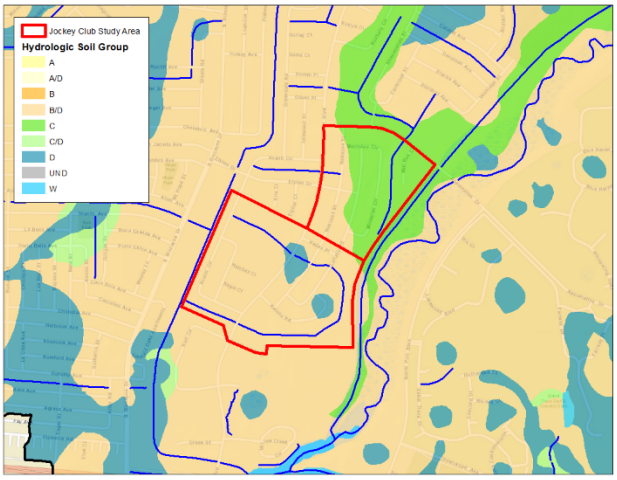


Figure 4c: Jockey Club Study Area, Hydrologic Soil Groups

Appendix F

Task 1.4 Big Slough Flood Reduction Study, Potential Solutions for Hydraulic Evaluation

DeLoach Engineering Science, PLLC., January 2017

MEMORANDUM

To: Elizabeth Wong, PE (City of North Port)
From: Dave DeLoach, PE; Trillian Baldassari, PE
Copy: Rod Ghioto, PE
File: 14-00400-00

Subject: Task 1.4 Big Slough Flood Reduction Study, Potential Solutions for Hydraulic Evaluation

January 30, 2017

Potential Solutions for Hydraulic Evaluation

As discussed in the Big Slough Flood Reduction Study Project Plan, this project builds upon prior work performed while advancing and supplementing flood reduction concepts previously developed by others. This memorandum briefly summarizes potential solutions which have been considered, including data needs and constraints on implementation, and identifies a specific set of alternatives selected from among the potential solutions for hydraulic evaluation. Information presented in this memorandum addresses the following elements of the Project Plan (Task 1.3).

- Formulate List of Potential Solutions for Hydraulic Evaluation
  - Describe Each Potential Solution and Any Known or Expected Obstacles to Success
  - Identify Additional Data Needs to Support Hydraulic Evaluation
  - Meeting to Review and Discuss List of Potential Solutions
  - Select a Set of Alternatives from Among Potential Solutions for Hydraulic Evaluation

<u>Potential Solutions and Obstacles to Success</u>

One-page descriptions of potential solutions (Attachment 1) were distributed for review and discussion by team members. These solutions may be applicable to either Task 1 Myakkahatchee Creek at I-75 and Jockey Club areas or Task 2 regional flood reduction objectives, or both.

Flood reduction solutions that were formulated generally included:

- Internal Flow Diversion and Increased Conveyance Capacity
- External Flow Diversion
- Offsite Storage
- Gate Operations
- Floodproofing
- Property Acquisition
- Elevation of Roadways

Meeting to Review and Discuss List of Potential Solutions

A project team meeting was held on December 20, 2016 to discuss potential solutions to achieve flood reduction and to develop a selected set of alternatives for hydraulic evaluation. For each concept, prior work and findings were discussed and expected obstacles to success were considered. Comments from the meeting are included in Attachment 2. From this collaboration, a set of alternatives were selected by the team for Task 1 and Task 2 hydraulic evaluations. Hydraulic evaluations will serve to better inform the team as to effectiveness of the individual solutions and will point the way toward a preferred plan for improvements.

Selected Alternatives for Hydraulic Evaluation

The following set of alternatives were selected by the team for hydraulic evaluations.

Internal Flow Diversion and Increased Conveyance Capacity

- Parallel Relief Channel Construction

  A new, parallel canal could be constructed from the northern City boundary to Price Boulevard along Tier 1 and Tier 2 lots that have been acquired on the west side of the Myakkahatchee Creek. The additional conveyance may reduce flow rate and thus peak stages along the main channel from start to end of the parallel relief channel.

- Channel Improvements along R-580

  The R-580 waterway's bottom profile could be reconfigured, creating a more uniform and hydraulically efficient conveyance way. Improvement of the R-580 Waterway would induce more flow eastward from Big Slough along the City's northern boundary toward Creighton Waterway, resulting in reduced flows and flood stages in Myakkahatchee Creek.

- R-36 Improvements to South of WCS-101

  A whole series of improvements could be made to canal segments and structures to enhance the overall conveyance capacity of the R-36 waterway system. The additional stormwater conveyance capacity may induce higher westward flow out of Big Slough at the north boundary of the City. Diverting those higher flows southward to WCS-101 would reduce flow and stages along the more flood prone segments of Myakkahatchee Creek.

- Snover Waterway to Cocoplum Waterway

  Improvements could be made to existing structures along Snover Waterway and beneath Price Boulevard to increase flow through canals that connect with Cocoplum Waterway. The additional conveyance capacity may induce higher eastward flow out of Big Slough into Snover Waterway. Diverting those higher flows southward to Cocoplum Waterway would reduce flow and stages along the more flood prone segments of Myakkahatchee Creek.

- Other Miscellaneous Improvements

  Canals and structures throughout the area will be reviewed for opportunities to increase conveyance.

External Flow Diversion

- Connection to Deer Prairie Slough

  Stormwater flows could be diverted westward to the adjacent Deer Prairie Slough watershed, reducing flow through the City. Several variations could be considered, including gravity and pumped diversions both with and without added storage facilities.

- Enhanced Discharges Along Southern Boundary to Port Charlotte – Tidal Outfalls Only

  Structures located within the Cocoplum Waterway and discharging beneath Hillsborough Boulevard could be improved to facilitate increased discharges into the adjacent Port Charlotte conveyance system. Additional conveyance capacity would effectively divert stormwater southward and may reduce flooding throughout the southern portion of the City.

Offsite Storage

- Constrain Inflows to City with Increased Upstream Floodplain Storage

  Raise existing earthen berms on the northwest City boundary at the intersection of Big Slough canal with R-36 and R- 580 waterways. Also, raise earthen weirs farther north at the intersection of Big Slough canal and Power Line Road. Improvements would leave the Big Slough canal as the only conveyance system into the western portion of the City. Inflows would be reduced, dropping peak stages along Myakkahatchee Creek.

- Creation of Upstream Detention, Reservoirs, or Joint Use Facilities

  One or more detention ponds, reservoirs, or joint-use facilities could be constructed to provide offsite upstream stormwater detention. The facilities would reduce inflow rates and thus peak stages along Myakkahatchee Creek.

Acquisition

- Purchase of Flood Prone Lands and/or Flood Prone Structures

  Some communities turn to property acquisition to mitigate flood risk by establishing permanent, public open space and to get homeowners in flood-prone areas permanently out of harm's way. In North Port, many lots have already been acquired on the west side of the Myakkahatchee Creek to serve as a linear park. Additional acquisition may be considered to remove other lands and/or structures from the 100-year floodplain. Removal of those properties would reduce future flood-related damages but would not impact flood levels.

<u>Additional Data Needs to Support Hydraulic Evaluation</u>

No additional data needs were identified during the meeting. Additional information will be gathered during subsequent meetings, such as regarding the Deer Prairie Slough restoration project. Field survey will be postponed until needed during Task 1.8.1 Finalize Recommended Plan and Project Deliverables.

Attachment 1: Team Meeting – Discussion Sheets

The following one-page descriptions of potential solutions were distributed for review and discussion at the December 20, 2016 team meeting.

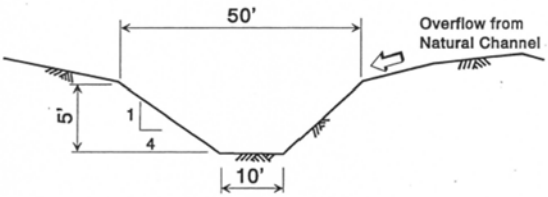
Increased Conveyance Capacity - Parallel Relief Channel Construction

Description and Potential Performance Improvement: A new, parallel canal could be constructed from the northern City boundary to Price Boulevard along Tier 1 and Tier 2 lots that have been acquired on the west side of the Myakkahatchee Creek. The additional conveyance may reduce flow rate and thus peak stages along the main channel from start to end of the parallel relief channel.

Prior Work Performed: The relief channel under consideration by CDM (1993) would have reached from the northern boundary of the city to the Snover waterway. The relief channel was conceived to act as a parallel conveyance for peak storm flows and be integrated into a linear park system along the Big Slough. CDM proposed that the channel would be about be 5 feet deep, have gentle grassed side slopes, and would be dry except during extreme storm events. The concept was brought forward as a main component of the 1993 master plan for improvements but was never constructed, apparently due to environmental permitting issues.

Constraints on Implementation: While the relief channel would be constructed within Tier 1 and Tier 2 lots that have been (or are being) acquired by the City, not all lands are currently in City ownership. Also, no improvements were proposed by CDM at the Tropicaire or I-75 crossings to accommodate reconfiguration of the main and parallel relief channels, and this may be a point of greater focus by DES given concerns that hydraulic deficiencies at those two crossings may have contributed to past flooding. Construction impacts to existing wetlands would likely be significant and require mitigation. Depending on the design of the parallel relief channel, it is possible that some wetlands would be created by the project, but it is unlikely that impacts would be entirely offset by the channel design and at least some wetland mitigation would need to be performed offsite. Also, depending on design performance, any reduction in flow attenuation along the main channel may result in higher flows downstream of the relief channel, which would need to be addressed by other means (i.e., downstream improvements).

Data Needs for Evaluation: none – DES will employ the existing watershed model, terrain information, and parcel ownership data to perform a feasibility evaluation of this flood reduction concept.



Parallel Relief Channel (as Conceived by CDM, 1993)

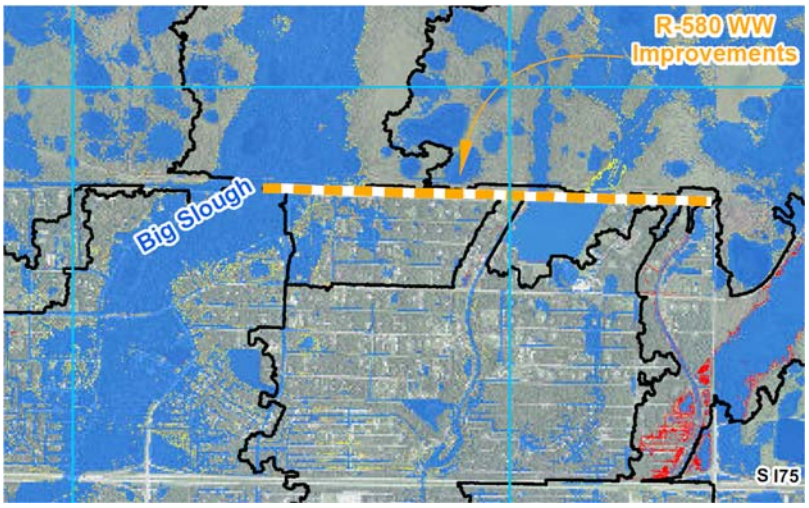
Diversion of Flow within North Port Drainage System - Channel Improvements along R-580

Description and Potential Performance Improvement: The R-580 waterway's bottom profile could be reconfigured, creating a more uniform and hydraulically efficient conveyance way. Improvement of the R-580 Waterway would induce more flow eastward from Big Slough along the City's northern boundary toward Creighton Waterway, resulting in reduced flows and flood stages in Myakkahatchee Creek.

Prior Work Performed: The channel improvements under consideration by Ardaman (2014) assumed a flat ditch along its entire length at elevation 15.0 feet, NAVD. The current bottom sags to elevation 15.0 feet at its mid-point and reaches 17.7 feet and 23.0 feet at its western and eastern ends, respectively. Results indicated small improvements (peak stage reductions) near Big Slough. However, inducing additional flow through Creighton Waterway caused additional flooding near I-75.

Constraints on Implementation: While channel improvements would be contained within existing right of way boundaries along the R-580 waterway, construction access may require additional temporary easements. There would likely be temporary construction impacts to existing wetlands. Subsurface conditions are not well-defined and there may be unknown utility conflicts or other issues that will need to be addressed by the waterway improvement design. Also, depending on hydraulic performance, any increase in conveyance capacity of the waterway may result in higher stages and flows downstream along the Creighton Waterway which would need to be addressed by other means (i.e., additional downstream improvements).

Data Needs for Evaluation: none – DES will employ the existing watershed model, terrain information, and parcel ownership data to perform a feasibility evaluation of this flood reduction concept.



R-580 Waterway Improvements (as Conceived by Ardaman, 2014)

Increase Conveyance Capacity - Channel Improvements along R-24 and R-32

Description and Potential Performance Improvement: Dredging of the R-24 and R-32 waterways could add two to three feet of depth, creating more hydraulically efficient conveyance ways downstream of Price Boulevard. Improvement of the waterways would induce more flow eastward toward Big Slough and reduce flooding along Price Boulevard and on some local streets located north of the R-32 canal.

Prior Work Performed: The channel improvements under consideration by Ardaman (2014) assumed dredging 2,300 feet of R-24 canal and 1,800 feet of R-32 canal to add approximately 2 to 3 feet of depth; and installing one extra parallel 36-inch pipe at an existing culvert crossing located between an Indian burial ground and the R-32 canal. Results indicated that West Price Boulevard would not overtop during the 25-year storm event and flooding would be reduced on some local streets (Dundee Ave, Surf Ave, and San Salvador Road) located north of R-32 canal. The model predicted that the 100-year maximum stage at West Price Boulevard will be reduced from 18.2 to 17.5 feet NAVD88. West Price Boulevard would still overtop by 0.2 feet over the crown of the road at the lowest section during the 100-year storm event. However, the road would be passable per City of North Port LOS criteria. Model results also indicated that there will be no adverse impacts in downstream areas.

Constraints on Implementation: While channel improvements would be contained within existing right of way boundaries along the R-24 and R-32 waterways, construction access may require additional temporary easements. There would likely be temporary construction impacts to existing wetlands. Subsurface conditions are not well-defined and there may be unknown utility conflicts or other issues that will need to be addressed by the waterway improvement design. It should be noted that the City is not allowed to disturb the 50-foot wide drainage right-of-way through the Indian burial ground.

Data Needs for Evaluation: none – DES will employ the existing watershed model, terrain information, and parcel ownership data to perform a feasibility evaluation of this flood reduction concept.

R-24 and R-32 Waterway Improvements (as Conceived by Ardaman, 2014)

Increased Conveyance Capacity - Increased Culvert Capacity of R-36 Canal at I-75

Description and Potential Performance Improvement: The existing R-36 canal culvert crossing at I-75 is comprised of two (2) 7.5' x 6' box culverts and could be improved by placing additional parallel box culverts to provide greater conveyance capacity. Increasing the capacity of the R-36 Canal at I-75 may reduce water levels in upstream areas.

Prior Work Performed: Ardaman's 2014 existing condition model results indicated that more than two feet of head difference occurs across this structure during the 100-year storm event. Under proposed BMP conditions, model results indicated that a peak stage reduction of up to 0.6 feet occurs upstream of the crossing. However, a stage increase of approximately 0.6 feet was found to result in downstream areas. Mitigation of flooding in downstream areas was beyond the scope of Ardaman's evaluation. It is notable that by reducing peak stage upstream of I-75 reduced discharges were observed from the R-36 Canal westward into the adjacent Deer Prairie Slough watershed for the proposed BMP condition. The reduced westward overflow causes an increased volume to remain within the North Port area. It may be possible to mitigate downstream stage increases by discharging westward to Deer Prairie Slough north of I-75 at lower elevations while matching existing condition peak flow rates.

Constraints on Implementation: Any conveyance improvements beneath I-75 would comprise a major undertaking. While culvert improvements would likely be contained within existing road right of way boundaries, construction access may require additional temporary easements. There would likely be temporary construction impacts to existing wetlands. Subsurface conditions are not well-defined and there may be unknown utility conflicts or other issues that will need to be addressed by the design. Depending on hydraulic performance, and as noted above, increase in capacity of the crossing may result in higher stages and flows downstream of I-75 which would need to be addressed by other means (i.e., adjustments to flows toward Deer Prairie Slough and/or additional downstream improvements).

Data Needs for Evaluation: none – DES will employ the existing available watershed model, terrain information, and parcel ownership data to perform an evaluation of this flood reduction concept.

R-36 Canal Culvert Crossing Improvements at I-75 (as Conceived by Ardaman, 2014)

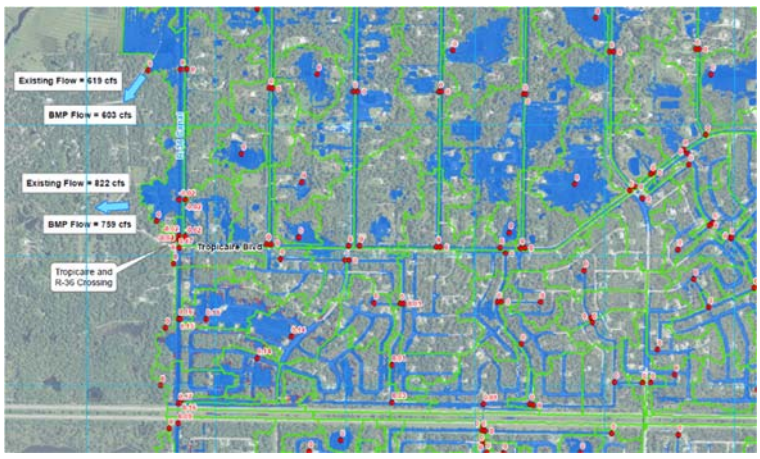
Increased Conveyance Capacity - Increased Culvert Capacity of R-36 Canal at Tropicaire

Description and Potential Performance Improvement: The existing R-36 canal culvert crossing at Tropicaire is comprised of two (2) 5-foot diameter RCP culverts and could be improved by placing additional culverts to provide greater conveyance capacity. Increasing capacity of the R-36 Canal at Tropicaire may reduce upstream water levels, particularly in association with other R-36 improvements.

Prior Work Performed: Ardaman's 2014 existing condition model results indicated that up to three feet of head difference occurs across this structure during various storm events. Under proposed BMP conditions, model results indicated a peak stage reduction of approximately 0.8 feet upstream of the crossing. However, a stage increase of up to 1.1 feet was found to result in downstream areas. Mitigation of flooding in downstream areas was beyond the scope of Ardaman's evaluation. During all events, discharges from the R-36 canal westward into the adjacent Deer Prairie Slough watershed were observed north of Tropicaire Boulevard. The proposed BMP results in a reduction of those discharges to Deer Prairie Slough and a resulting increased total volume remaining within the North Port area. It may be possible to mitigate downstream stage increases resulting from culvert improvements by discharging westward to Deer Prairie Slough at lower elevations while matching existing condition peak flow rates.

Constraints on Implementation: While culvert improvements would likely be contained within existing road right of way boundaries, construction access may require additional temporary easements. There would likely be temporary construction impacts to existing wetlands. Subsurface conditions are not well-defined and there may be unknown utility conflicts or other issues that will need to be addressed by the design. Depending on hydraulic performance, and as noted above, increase in capacity of the crossing may result in higher stages and flows downstream of Tropicaire which would need to be addressed by other means (i.e., adjustments to flows toward Deer Prairie Slough and/or additional downstream improvements).

Data Needs for Evaluation: none – DES will employ the existing available watershed model, terrain information, and parcel ownership data to perform an evaluation of this flood reduction concept.



R-36 Canal Culvert Crossing Improvements Tropicaire (as Conceived by Ardaman, 2014)

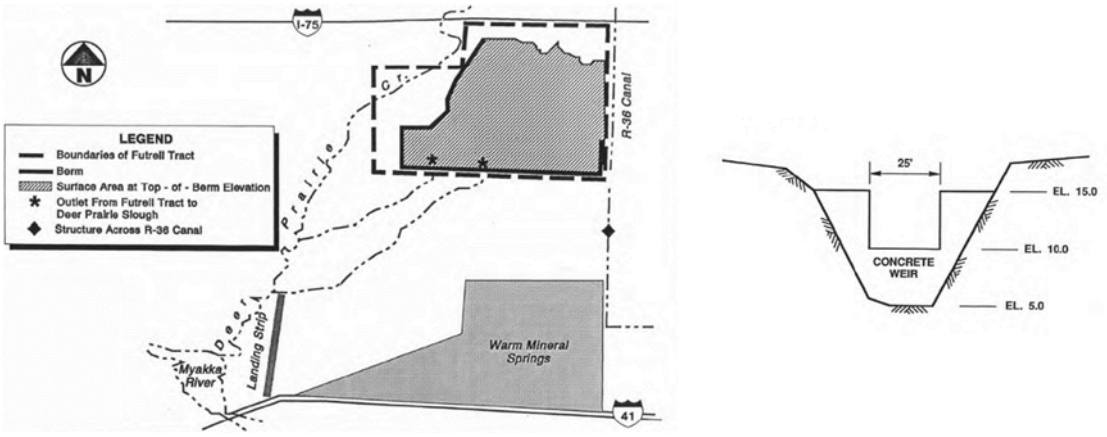
Flow Diversion Away from North Port Drainage System - Connection to Deer Prairie Slough

Description and Potential Performance Improvement: Stormwater flows could be diverted westward to the adjacent Deer Prairie Slough watershed, reducing flow through the City. Several variations could be considered, including gravity and pumped diversions both with and without added storage facilities.

Prior Work Performed: CDM (1993) considered a diversion plan which called for a pumping station and weir near Price Boulevard on the R-36 canal to convey stormwater to a bermed storage area on the Futrell tract. Release from the tract to Deer Prairie Slough would be at the existing rate and would take a week to drain down under 25-year/24-hour storm conditions. CDM's diversion channel option called for two weirs to convey stormwater to a channel located south of the Futrell tract, directly connected to Deer Prairie Slough. The weir discharge rate would closely match the pumping capacity and would also discharge only under storm conditions. Ardaman (2014) contemplated two earthen overflow weirs to enhance the R-36 waterway connectivity with Deer Prairie Slough canal and R-36 canal capacity was doubled by replacing its existing cross-section with a 60-foot bottom width trapezoidal channel with 4:1 side slopes. Each of the prior concepts had similar outcomes in reducing flooding along the R-36 canal.

Constraints on Implementation: A range of technical and non-technical issues would need to be addressed in order to implement a diversion into Deer Prairie Slough. This BMP would involve construction of new facilities, maintenance activities, real estate acquisition, and would likely require detailed hydrologic and hydraulic evaluation of the Deer Prairie Slough watershed to support statewide environmental resource permitting. For a storage component, impacts to existing wetlands could be significant and require mitigation. Also, depending on design performance, any increase in rate or volume of flow to Deer Prairie Slough would need to be addressed, and outcomes would need to be proven compatible with the ongoing Deer Prairie Slough Restoration Project.

Data Needs for Evaluation: none – DES will employ the existing available watershed model, terrain information, and parcel ownership data to perform an evaluation of this flood reduction concept.



Diversion to Deer Prairie Slough, Pumped with Storage on Futrell Tract (as Conceived by CDM, 1993)

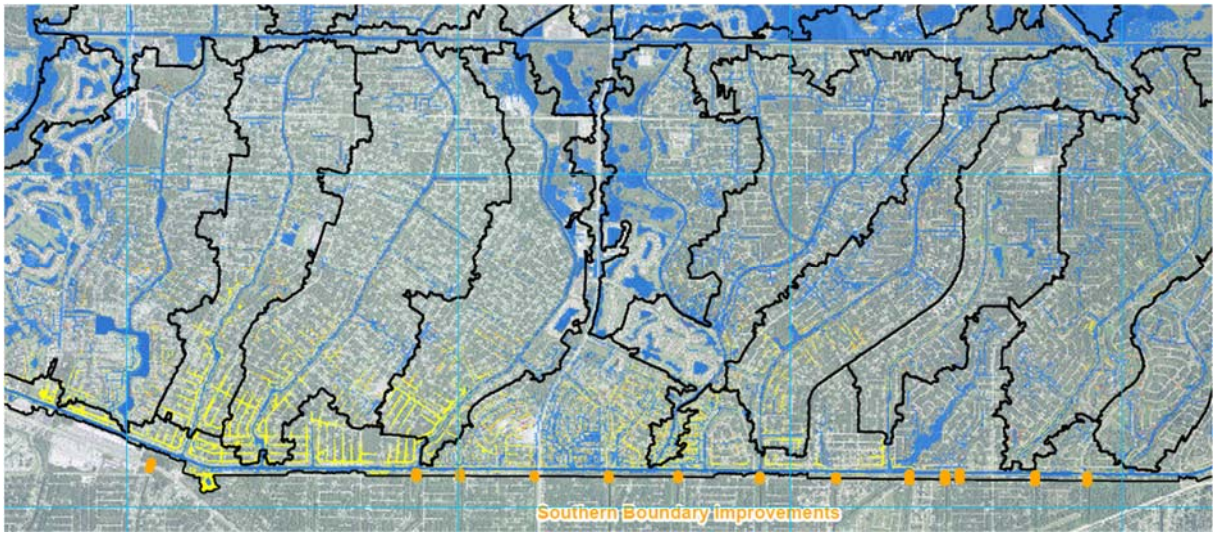
Increased Conveyance Capacity - Enhanced Discharges Along Southern Boundary to Port Charlotte

Description and Potential Performance Improvement: Structures located within the Cocoplum Waterway and discharging beneath Hillsborough Boulevard could be improved to facilitate increased discharges into the adjacent Port Charlotte conveyance system. Additional conveyance capacity would effectively divert stormwater southward and may reduce flooding throughout the southern portion of the City.

Prior Work Performed: This alternative was evaluated by Ardaman (2014) for information purposes, as it is understood that allowing additional flows into Port Charlotte may not be desirable. Six lateral weirs along the Cocoplum waterway and thirteen structures beneath Hillsborough Boulevard were doubled in size. Results indicated that improvements relative to house flooding were not significant. However, roads experienced a considerable flood reduction between Sumter Boulevard and Atwater Drive.

Constraints on Implementation: Enhancing the southerly flow of stormwater out of North Port would involve conveyance improvements, construction of new structures and/or reconditioning of existing structures, maintenance activities, real estate acquisition, and evaluation of receiving waters through hydrologic and hydraulic modeling. As the receiving water system is comprised of both controlled and tidal canals, additional channel and/or structural improvements may need to be made in downstream areas to mitigate the impacts of the diversion.

Data Needs for Evaluation: none – DES will employ the existing available watershed model, terrain information, and parcel ownership data to perform an evaluation of this flood reduction concept.



Diversion for Enhanced Discharge to Port Charlotte (as Conceived by Ardaman, 2014)

Diversion of Flow within North Port Drainage System - R-36 Improvements to South of WCS-101

Description and Potential Performance Improvement: A whole series of improvements could be made to canal segments and structures to enhance the overall conveyance capacity of the R-36 waterway system. The additional stormwater conveyance capacity may induce higher westward flow out of Big Slough at the north boundary of the City. Diverting those higher flows southward to WCS-101 would reduce flow and stages along the more flood prone segments of Myakkahatchee Creek.

Prior Work Performed: Improvements to the complete R-36 system have not been evaluated, although local improvements to portions of that system have been evaluated in a piecemeal fashion.

Constraints on Implementation: Channel improvements along the R-36 waterway may require additional right of way acquisition, and construction access may require additional temporary easements. There would likely be temporary construction impacts to existing wetlands. Subsurface conditions are not well-defined and there may be unknown utility conflicts or other issues that will need to be addressed by the waterway improvement design. Also, depending on hydraulic performance, any increase in conveyance capacity of the waterway may result in higher stages and flows downstream of WCS-101 which would need to be addressed by other means (i.e., additional downstream improvements).

Data Needs for Evaluation: none – DES will employ the existing available watershed model, terrain information, and parcel ownership data to perform an evaluation of this flood reduction concept.

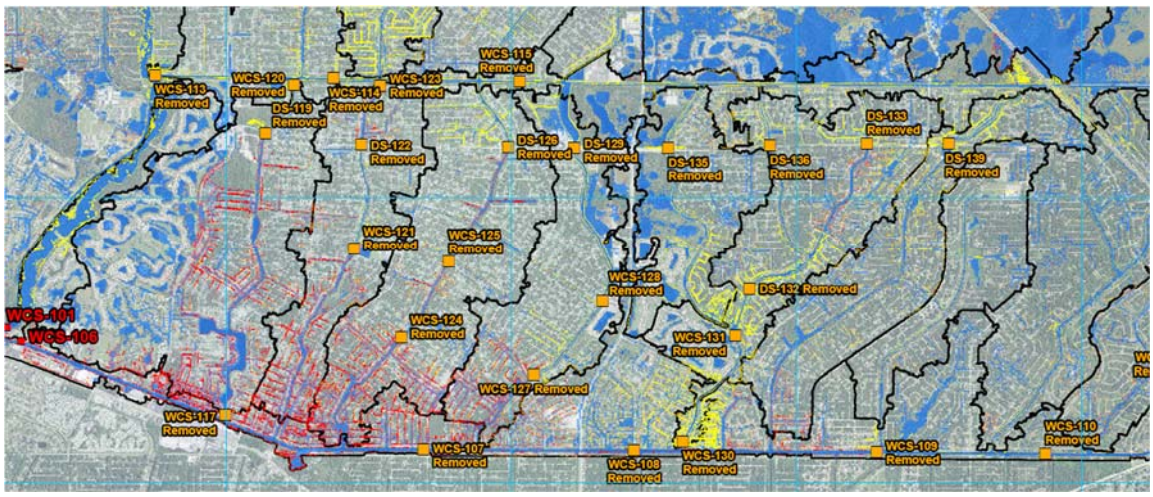
Diversion of Flow within North Port Drainage System - Snover Waterway to Cocoplum Waterway

Description and Potential Performance Improvement: Improvements could be made to existing structures along Snover Waterway and beneath Price Boulevard to increase flow through canals that connect with Cocoplum Waterway. The additional conveyance capacity may induce higher eastward flow out of Big Slough into Snover Waterway. Diverting those higher flows southward to Cocoplum Waterway would reduce flow and stages along the more flood prone segments of Myakkahatchee Creek.

Prior Work Performed: Specific improvements to the Snover-Cocoplum system have not been explicitly evaluated. Ardaman (2014) did evaluate overall system capacity assuming no losses due to water control structures or drop structures (i.e., water control structures and drop structures were removed). Results of that evaluation provide an indication that flood stages could be reduced north of Price Boulevard and along Bass Point waterway but operational controls or mitigation would be required to avoid or address increased flooding between South Toledo Boulevard and South Sumter Boulevard.

Constraints on Implementation: Structure improvements along Snover Waterway and Price Boulevard should be performed within existing right of way, but construction access may require temporary easements. There would likely be temporary construction impacts to existing wetlands. Subsurface conditions are not well-defined and there may be unknown utility conflicts or other issues that will need to be addressed by the design. Also, depending on hydraulic performance, any increase in conveyance capacity of the affected system may result in higher stages and flows in flood prone areas downstream which would need to be addressed by other means (i.e., additional downstream improvements).

Data Needs for Evaluation: none – DES will employ the existing available watershed model, terrain information, and parcel ownership data to perform an evaluation of this flood reduction concept.



Diversion of Flows Southward, by System-wide Structure Removal (as Conceived by Ardaman, 2014)

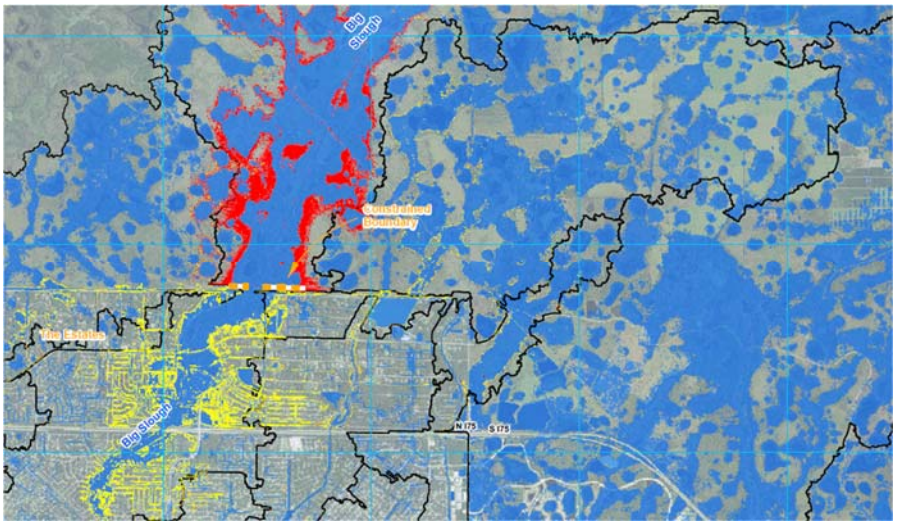
Storage – Constrain Inflows to City with Increased Upstream Floodplain Storage

Description and Potential Performance Improvement: Raise existing earthen berms on the northwest City boundary at the intersection of Big Slough canal with R-36 and R- 580 waterways. Also, raise earthen weirs farther north at the intersection of Big Slough canal and Power Line Road. Improvements would leave the Big Slough canal as the only conveyance system into the western portion of the City. Inflows would be reduced, dropping peak stages along Myakkahatchee Creek.

Prior Work Performed: Ardaman developed this BMP concept to constrain the rate and volume of water coming from offsite areas through the Big Slough canal prior to entering the City in the Estates area. Results indicated approximately 0.5 feet flood stage reduction near the Big Slough canal from the City's northern boundary to just south of I-75. However, flood stages increase approximately 1.0 foot in offsite areas north of the R-36 and R-580 waterways. Variations on the concept could consider performance under smaller storm events (Ardaman focused on the 100-year event) and installation of a flow control structure at the northern boundary.

Constraints on Implementation: Offsite lands where floodplain storage is increased are not currently in City ownership, and acquisition or easements would be required. Depending on the extent of modifications required, it is possible that wetlands would be impacted by raising berms. Hydroperiod impacts to upstream existing wetlands would need to be evaluated.

Data Needs for Evaluation: none – DES will employ the existing available watershed model, terrain information, and parcel ownership data to perform an evaluation of this flood reduction concept.



Constrained Inflows and Increased US Floodplain Storage (as Conceived by Ardaman, 2014)

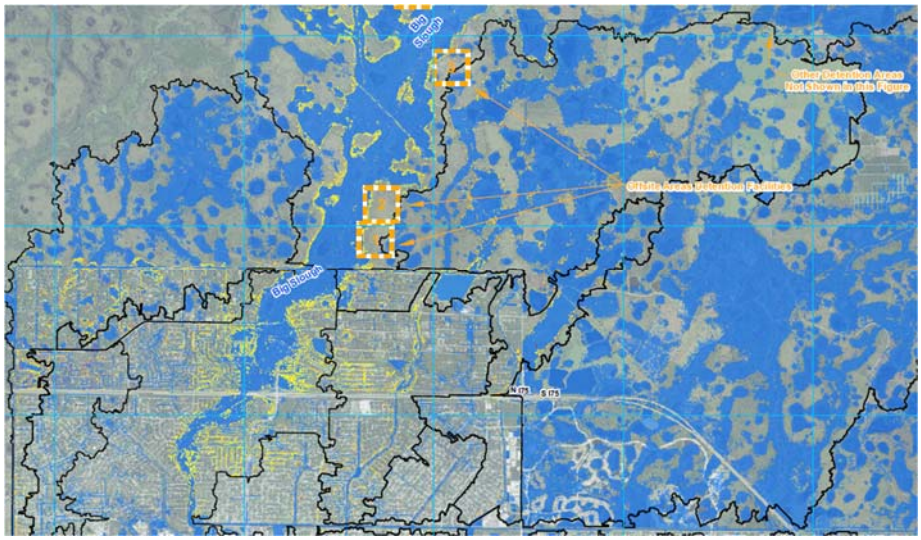
Storage – Creation of Upstream Detention, Reservoirs, or Joint Use Facilities

Description and Potential Performance Improvement: One or more detention ponds, reservoirs, or joint-use facilities could be constructed to provide offsite upstream stormwater detention. The facilities would reduce inflow rates and thus peak stages along Myakkahatchee Creek.

Prior Work Performed: CDM (1993) considered upstream detention consisting of a berm designed to detain flood waters north of the city and slowly release those waters after the peak flows had passed. Six foot berms were proposed with a total storage capacity of 4,000 acre feet and 1 foot of freeboard. Little flood reduction was evident when compared to the other alternatives and the amount of land necessary to achieve little benefit restricted the viability of this alternative. Ardaman developed a concept for creation of seven (7) individual 100-acre detention facilities located on upland sites along Big Slough canal. Each stormwater detention area was linked to the Big Slough canal by a 500-foot weir and held a volume of about of 600 acre-feet for a total of 4,200 ac-ft of storage. Results indicated relatively small reduction in water surface elevations on the order of 0.1 to 0.6 feet along Big Slough.

Constraints on Implementation: Land acquisition and cost of construction will certainly be constraining factors. Construction impacts to existing wetlands could be significant and require mitigation.

Data Needs for Evaluation: none – DES will employ the existing available watershed model, terrain information, and parcel ownership data to perform an evaluation of this flood reduction concept.



Upstream Detention Storage (as Conceived by Ardaman, 2014)

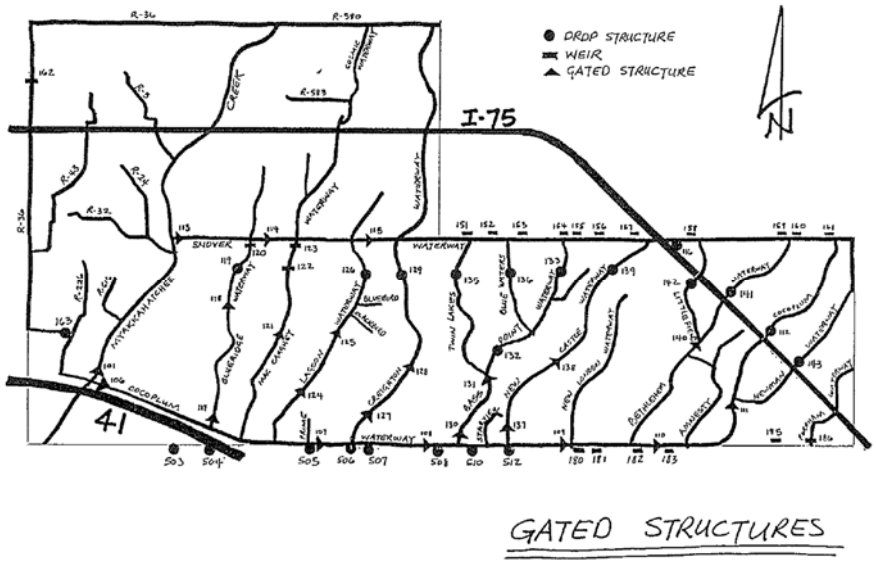
Operational – Drawdown and Other Changes to Schedule of Gate Operations

Description and Potential Performance Improvement: Modifications could be made to existing gate operation schedules to facilitate early drawdown and/or redirection of flows within the North Port drainage system. Creation of initial storage capacity and re-routing of flows may relieve pressure on some flood-prone areas including Myakkahatchee Creek, particularly under lesser storm events.

Prior Work Performed: Ardaman (2014) investigated several concepts associated with gate operations including system-wide and localized (R-36 Canal) drawdown. Generally, drawdown was found to be ineffective in lowering 100-year flood elevations. However, a more rigorous evaluation of gate operations to both draw down initial water levels and re-route flows under a variety of storm event scenarios has not specifically been performed, and gate operation schedule changes may prove more effective when combined with other structural modifications to the system in order to obtain a greater flood reduction benefit or mitigate impacts of other improvements.

Constraints on Implementation: Changes to the operational schedule should consider factors beyond flood control performance, including but not limited to environmental, water supply, and aesthetic impacts of canal drawdown. Evaluations should consider drawdown using existing infrastructure as well as identify infrastructure improvements to expedite drawdown, and such infrastructure improvements may present additional constraints on implementation.

Data Needs for Evaluation: none – DES will employ the existing available watershed model, terrain information, and parcel ownership data to perform an evaluation of this flood reduction concept.



Locations of Gated Structures (City of North Port, 2005)

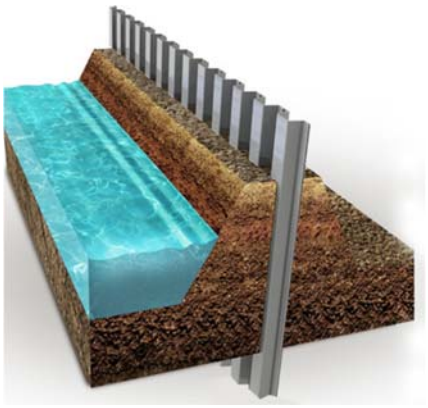
Floodproofing – Including Large-scale Concepts such as Raising Roads and Flood Barrier Walls

Description and Potential Performance Improvement: Floodproofing of existing infrastructure can reduce recurrent damages in areas where flood elevations cannot be cost-effectively reduced by other means. Floodproofing is any combination of structural and non-structural additions, changes, or adjustments to structures which reduce or eliminate flood damage to property, facilities, structures and their contents. In the context of this project, we include raising of flood prone roads and installation of flood walls to protect flood prone areas as examples of large-scale floodproofing. Flood proofing can be included along with other designs. For example, a permanent or temporary flood barrier wall could be incorporated into the linear park flow diversion concept to increase the level protection provided in that footprint.

Prior Work Performed: Ardaman (2014) investigated raising approximately 1,900 feet of West Price Boulevard to an elevation above the predicted 100-year flood stage. Model results indicated no adverse impacts or increase in stages upstream or downstream of the improvement for any modeled storm event. Cost and right-of-way requirements to raise the road were not addressed. Preliminary testing of other flood proofing concepts (e.g., raising roads and homes in flood prone areas located adjacent to Myakkahatchee Creek) was performed, but findings were not well-documented.

Constraints on Implementation: Floodproofing can often be accomplished within existing right of way, although construction access may require additional temporary easements and there can be impacts to existing wetlands. Subsurface conditions are not well-defined and there may be unknown utility conflicts or other issues that will need to be addressed by the floodproofing improvement design. Also, depending on hydraulic performance, any large-scale flood proofing of facilities such as raising of roads may result in higher stages upstream unless sufficient storage or flow capacity is provided in the design.

Data Needs for Evaluation: none – DES will employ the existing available watershed model, terrain information, and parcel ownership data to perform an evaluation of this flood reduction concept.



Raising of Road (as Conceived by Ardaman, 2014) and Barrier Wall (as illustrated by Crane Materials International, 2016)

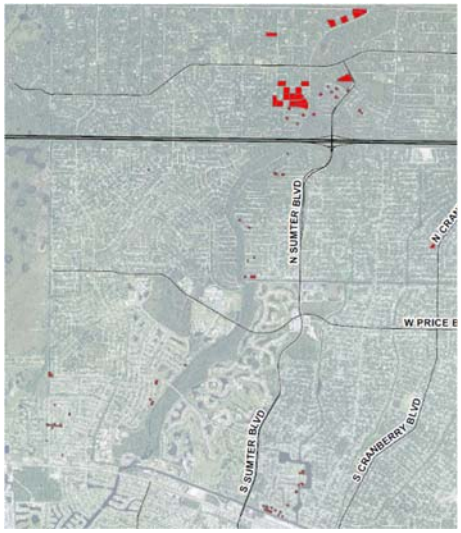
Acquisition – Purchase of Flood Prone Lands and/or Flood Prone Structures

Description and Potential Performance Improvement: Some communities turn to property acquisition to mitigate flood risk by establishing permanent, public open space and to get homeowners in flood-prone areas permanently out of harm's way. In North Port, many lots have already been acquired on the west side of the Myakkahatchee Creek to serve as a linear park. Additional acquisition may be considered to remove other lands and/or structures from the 100-year floodplain. Removal of those properties would reduce future flood-related damages but would not impact flood levels.

Prior Work Performed: CDM's preliminary evaluation (1993) considered that purchase of flooded lands would preclude flooding damage by preventing development of the property but would not prevent roadway flooding. Based upon their preliminary analyses, purchase of flooded lands was removed from consideration. Ardaman (2012) recommended that the City of North Port purchase habitable structures in which flooding is predicted in the 100-year event, as purchasing the affected properties may be more cost effective than implementing other BMPs. About 100 parcels were identified to be surveyed and for finished floor elevations to be compared with modeled 100-year event flood stages, to determine which properties are damaged in the 100-year event.

Constraints on Implementation: Constraints are related to cost, funding, and property availability. Property acquisition is generally performed through voluntary buyout programs presented to homeowners in neighborhoods that have been subject to repeated flooding. As such, acquisition depends upon having willing sellers and reaching an agreement on fair market value of properties. For eligible communities, FEMA typically funds a portion of the cost of property acquisition with the municipality contributing the remaining amount.

Data Needs for Evaluation: none – DES will employ the existing available watershed model, terrain information, and parcel ownership data to perform an evaluation of this flood reduction concept.



Properties to be Surveyed for Finished Floor Elevation (as Identified by Ardaman, 2014)

Attachment 2: Team Meeting – Comments on Potential Solutions

Summary of meeting minutes from December 20, 2016 team meeting

Increased Conveyance Capacity - Parallel Relief Channel Construction

Meeting comments: Staff indicated that this project would need to show promise with properties acquired to date or with additional properties which could reasonably be expected to be acquired by means other than eminent domain.

Diversion of Flow within North Port Drainage System - Channel Improvements along R-580

Meeting comments: Staff was interested in seeing this concept brought forward in the master plan, noting that they cannot currently control the amount of water entering the system during a large storm event. DES was directed to look at existing gate schedules or improvements, as well as installation of gates on the MacCaughey and Lagoon Waterway crossings that could assist with making the flow diversion and improve flood control performance under smaller events.

Increase Conveyance Capacity - Channel Improvements along R-24 and R-32

Meeting comments: Staff directed DES to remove this concept from the master plan – outside current areas of interest, already evaluated sufficiently in prior analyses, and provides local improvements which may be better addressed through future raising of Price Boulevard.

Increased Conveyance Capacity - Increased Culvert Capacity of R-36 Canal at I-75

Meeting comments: None (see discussion on R-36 Improvements to South of WCS-101).

Increased Conveyance Capacity - Increased Culvert Capacity of R-36 Canal at Tropicaire

Meeting comments: None (see discussion on R-36 Improvements to South of WCS-101).

Flow Diversion Away from North Port Drainage System - Connection to Deer Prairie Slough

Meeting comments: Staff inquired whether it is possible to determine how much stormwater historically moved into Deer Prairie Slough from the Big Slough and City of North Port systems prior to construction of canals by GDC. DES staff indicated that a rough calculation could be made but that it wouldn't have much of an effect on decision making. Rather, we should gather and review available information on the Deer Prairie Slough restoration project and coordinate with District staff on potential offsite inflow restoration. City staff requested that the District share any reports that are available and identify individuals to contact for a January follow-up meeting. DES staff inquired as to the status of the Futrell tract and City staff indicated that the District did not look favorably on using the tract for a reservoir. Additional District staff could be invited to attend the follow-up meeting to discuss alternate uses of the Futrell tract that might be of mutual benefit.

Increased Conveyance Capacity - Enhanced Discharges Along Southern Boundary to Port Charlotte

Meeting comments: City staff asked DES to focus on the two tidal canals (Apollo and Jupiter waterways) for enhanced discharge. The city replaced dilapidated metal pipes and gates in 2007. Staff indicated that they receive water level complaints in the Cocoplum and Toledo Blade waterways and they would like for DES to look at enhanced discharge from the Cocoplum Waterway.

Diversion of Flow within North Port Drainage System - R-36 Improvements to South of WCS-101

Meeting comments: Team agree to include this concept in the master plan, understanding that it also encompasses improvements to existing culverts at Tropicaire and I-75. During prior analysis, some coordination was held with FDOT and concept was shelved because of downstream impacts which were beyond the scope of that earlier analysis. Window of opportunity may have closed with FDOT on near-term improvements at I-75. One concern is whether the downstream infrastructure can handle the increased flow without substantial modification. Staff pointed out that the WCS-101 structure is tidally influenced and suggested evaluation should consider worst case tidal conditions.

Diversion of Flow within North Port Drainage System - Snover Waterway to Cocoplum Waterway

Meeting comments: Staff indicated that there may be an opportunity to store more water in the existing canal system for smaller events by raising gates. DES pointed out that the Panacea community discharges to some of those canals and that raising levels may have adverse impacts on those upstream stormwater management systems.

Storage – Constrain Inflows to City with Increased Upstream Floodplain Storage

Meeting comments: The team agreed that prior work focused mainly on larger storm events and that this project may be able to achieve benefits for smaller storms with upstream impacts that might be successfully mitigated.

Storage – Creation of Upstream Detention, Reservoirs, or Joint Use Facilities

Meeting comments: Staff indicated that the City Manager recently toured (and is interested in developing facilities similar to) the Celery Fields in Sarasota County and inquired as to whether additional District funding might be available in the project combined flood reduction and water quality benefits. Staff also pointed out that operating and maintaining multiple offsite reservoirs (six were considered in the prior evaluation) would be challenging.

Operational – Drawdown and Other Changes to Schedule of Gate Operations

Meeting comments: The team agreed that City staff have a firm grasp on gate operations, by virtue of working with the system for decades including during large flood events, and an evaluation of wholesale changes to gate operations is not needed. Localized changes to allow diversions (as part of other concepts listed here) may still be made.

Floodproofing – Including Large-scale Concepts such as Raising Roads and Flood Barrier Walls

Meeting comments: City staff indicated that raising roads out of the floodplain, pumping for stormwater control, and installation of flood barriers were not appealing options for large-scale flood reduction. These concepts, including raising roads, may be considered (as part of other concepts listed here).

Acquisition – Purchase of Flood Prone Lands and/or Flood Prone Structures

Meeting comments: City staff indicated that acquisition should be considered as part of the master plan.

Appendix G

Tasks 1.5 and 2.3 Big Slough Flood Reduction Study, Evaluate Performance of Selected Set of Alternatives

DeLoach Engineering Science, PLLC., May 2017

MEMORANDUM

To: Elizabeth Wong, PE (City of North Port)
From: Dave DeLoach, PE; Trillian Baldassari, PE
Copy: Rod Ghioto, PE
File: 16-00400-00

Subject: Tasks 1.5 and 2.3 Big Slough Flood Reduction Study, Evaluate Performance of Selected Set of Alternatives

May 21, 2017

Hydraulic Performance of Alternatives to Achieve Flood Reduction

A set of alternatives was previously identified by the project team from among numerous potential solutions considering expected performance, constraints on implementation, and other factors. Those selected alternatives have been combined and incorporated into the Big Slough watershed model to allow for an initial screening-level review of hydraulic performance. This memorandum summarizes work performed to incorporate the alternatives into the model, summarizes hydraulic performance for the mean annual, 10-year, and 100-year 24-hour storm events, and presents a synopsis of take-aways from the associated April 28, 2017 team meeting to discuss hydraulic performance.

Alternatives may be applicable to either Task 1 Myakkahatchee Creek at I-75 and Jockey Club areas or Task 2 regional flood reduction objectives, or both. Thus, work performed and information presented in this memorandum addresses the following elements of the Project Plan (Task 1.5 and Task 2.3).

- Task 1.5 Evaluate Hydraulic Performance of Selected Set of Alternatives
  - Perform Hydraulic Analyses
  - Summarize Hydraulic Performance
  - Meeting to Review and Discuss Performance of Alternatives
  - Identify Preferred Plan(s) of Improvements
- Task 2.3 Evaluate Hydraulic Performance of Selected Set of Alternatives
  - Perform Screening-Level Hydraulic Analyses
  - Summarize Hydraulic Performance
  - Meeting to Review and Discuss Performance of Alternatives
  - Identify Preferred Plans for Regional Improvements

Alternatives Considered

A project team meeting was held on December 20, 2016 to (1) discuss potential solutions to achieve flood reduction and (2) select a set of alternatives for initial hydraulic evaluation. Some flood reduction concepts, including raising roads out of the floodplain, pumping for stormwater control, and installation of flood barriers, were rejected by the project team as they were not appealing options for large-scale flood reduction. A more complete discussion regarding initial selection of alternatives is provided in the January 30, 2017 memorandum on Task 1.4 completion.

The following set of alternatives was selected by the team for initial hydraulic evaluation.

- Internal Flow Diversion and Increased Conveyance Capacity
    - Parallel Relief Channel Construction
    - Channel Improvements along R-580
    - R-36 Improvements to South of WCS-101
    - Snover Waterway to Cocoplum Waterway
    - Other Miscellaneous Improvements
- External Flow Diversion
    - Connection to Deer Prairie Slough
    - Enhanced Discharges Along Southern Boundary to Port Charlotte – Tidal Outfalls Only
- Offsite Storage
    - Constrain Inflows to City with Increased Upstream Floodplain Storage
    - Creation of Upstream Detention, Reservoirs, or Joint Use Facilities
- Acquisition
    - Purchase of Flood Prone Lands and/or Flood Prone Structures

Incorporation of Storage and Conveyance Alternatives into Big Slough Watershed Model

Selected alternatives were combined and incorporated into the Big Slough watershed model to allow for an initial screening-level review of hydraulic performance. The attached tables describe changes made to model elements to represent conceptual improvements. The tables also include notes on limitations and the manner in which alternatives were incorporated.

Hydraulic Performance

Proposed condition simulations were performed for the mean annual, 10-year, and 100-year 24-hour storm events, with stages and flows compared to the existing condition. Flood inundation areas for each simulation were mapped and used to depict areas removed from the floodplain. Flood reduction concepts are generally effective in reducing flood levels in the watershed, particularly in the I-75 study area, given assumptions and simplifications made while developing the screening-level models. Potential adverse impacts can also be seen in the model results. These initial storm event simulation results provide general information on potential performance characteristics of the flood reduction concepts. A more refined plan may not result in these same reductions, and preliminary model results and flood mapping should not be construed as a proposed future watershed condition.

Team Meeting

A Team Meeting was held on April 28 to discuss plan concepts and preliminary hydraulic performance. A copy of the presentation is attached and, for brevity, the reader is referred to that presentation for viewing of preliminary model results. The following summarizes notable points that were raised during the team meeting and the important issues that will be addressed as the project moves forward.

- Refinement and future performance evaluations of structure modifications at the upstream inflow point (to constrain and reduce inflows to the City of North Port) should consider a wider range of control elevations and results used by the District for decision-making on allowable changes to area, depth, and duration of inundation in upstream District lands.
- Refinement and future performance evaluations of the R-36 conceptual plan for improvements should consider channel widening with and without structure improvements providing additional conveyance beneath Tropicaire and I-75.
- Refinement of the R-36 conceptual plan for improvements should include matching pre/post discharge rates westward into the Deer Prairie system, so as to minimize increased flows downstream in the City of North Port. Preliminary modeling did not make full use of available discharge capacity to the west. No increase in rate of discharge to the Deer Prairie system should be considered, at this time.
- Refinement of the R-36 conceptual plan for improvements should consider (and preferably conform to) existing rights-of-way and drainage easements. City of North Port can provide existing ROW information as depicted on drainage system as-builts. However, acquisition of additional drainage easements along the western boundary from Sarasota County is not out of the question.
- Refinement of the R-36 conceptual plan for improvements should look more closely at existing bridge crossings and available right-of-way for channel enlargement to its confluence with R-226 and further downstream to Myakkahatchee Creek.
- Two culvert locations on the west boundary of Jockey Club should be evaluated and recommendations made regarding sufficiency and/or modifications needed to reduced flooding in the Jockey Club area (considering any increase in water levels that may result from the R-36 improvements and associated re-routing of flows).
- Refinement and future performance evaluations of the parallel bypass canal should include a more accurate representation of the combined conveyance, and should eliminate double accounting of conveyance as a result of overlapping open channel cross sections. A request has been made to the District for cross section source data, cross section extents, surveyed point locations, conveyance way boundaries, etc., from the District's North Port/Big Slough WMP project files (including intermediate deliverables).
- Only two Price Boulevard drop structures are scheduled to be replaced with the widening project. City of North Port will identify those structures and the other remaining structures will be revised to again match the existing condition model configuration. Future performance evaluations will include the two identified structures as operable gates.

Identification of the Preferred Plan

Based upon the Project Team's review and discussion of preliminary hydraulic evaluation results, the following set of alternatives are recommended for further development of the "preferred plan" of improvements to achieve flood reduction.

- Internal Flow Diversion and Increased Conveyance Capacity
    - Parallel Relief Channel Construction
        - Option 1 – Tier 1 only, reduced width, deeper excavation
        - Option 2 – Tier 1 only, full width, shallower excavation
        - Option 3 – No parallel relief channel
    - Channel Improvements along R-580
        - Option 1 – Constrained width, remains within existing available ROW
        - Option 2 – Unconstrained width, requires ROW or easement acquisition
        - Option 3 – No R-580 channel improvements
    - R-36 Improvements to South of WCS-101
        - Option 1
            - Constrained width, remains within existing available ROW
            - No additional culvert capacity beneath Tropicaire or I-75
        - Option 2
            - Unconstrained width, requires ROW or easement acquisition
            - Additional culvert capacity beneath Tropicaire and I-75
        - Option 3
            - No R-36 Improvements
    - Snover Waterway to Cocoplum Waterway Improvements, as needed to mitigate impacts
    - Price Boulevard Structures and Other Miscellaneous Improvements, as planned by City
- External Flow Diversion
    - Connection to Deer Prairie Slough – maintain pre/post, no increased offsite discharge
- Offsite Storage
    - Constrain Inflows to City with Increased Upstream Floodplain Storage
        - Option 1 – No structure overflow up to 5-year event
        - Option 2 – No structure overflow up to 10-year event
- Acquisition
    - Purchase of Flood Prone Lands and/or Flood Prone Structures, as needed
    - Acquisition of Additional Drainage Easements, as needed

The above concepts and options will be further refined and combined into a small number of candidate plans. Hydraulic performance of the candidate plans will be evaluated using the Big Slough watershed model. The project team will select a plan of improvements from among the candidate plans, based on performance. The preferred plan will then be finalized and evaluated for costs and benefits, etc.

Reduce Inflow			
Flood Reduction Concept: Raise existing earthen berms on the northwest City boundary at the intersection of Big Slough canal with R-36 and R- 580 waterways. Also, raise earthen weirs farther north at the intersection of Big Slough canal and Power Line Road. Improvements would leave the Big Slough canal as the only conveyance system into the western portion of the City. Inflows would be reduced, dropping peak stages along Myakkahatchee Creek.			
Notes: Additional configurations to be evaluated as part of preferred plan evaluation. Field visit required to better understand and conceptualize configuration.			
Reach ID	Waterway	Structure	Description of Model Revision
RB0620B			Change to Bridge w/, 150' control at 24.0, 4' notch at 17.5
RB0620C			Change to Culvert Riser, 25'control at 24.0
W13208_W W4701_W W4707_W			Raise weir sub-elements above 5-year flood to 25.0001

Channel Improvements along R-580			
Flood Reduction Concept: The R-580 waterway's bottom profile could be reconfigured, creating a more uniform and hydraulically efficient conveyance way. Improvement of the R-580 Waterway would induce more flow eastward from Big Slough along the City's northern boundary toward Creighton Waterway, resulting in reduced flows and flood stages in Myakkahatchee Creek.			
Notes: Enlargement of the R-580 canal reflects preliminary sizing performed by Ardaman & Associates, Inc. during the prior Big Slough WMP project. Node bottom elevations associated with this channel were adjusted to provide a uniform slope from the Big Slough canal eastward to Creighton Waterway.			
Reach ID	Waterway	Structure	Description of Model Revision
RP0003 RP0010A RP0016 RP0020 RP0030 RP0040A RP0050 RP0060 RP0070 RP0080 RP0090	R-580		Widen channel to 60ft bottom width trapezoidal

R-36 Improvements to South of WCS-101			
Flood Reduction Concept: A whole series of improvements could be made to canal segments and structures to enhance the overall conveyance capacity of the R-36 waterway system. The additional stormwater conveyance capacity may induce higher westward flow out of Big Slough at the north boundary of the City. Diverting those higher flows southward to WCS-101 would reduce flow and stages along the more flood prone segments of Myakkahatchee Creek.			
Notes: Enlargement of the R-36 canal reflects preliminary sizing performed by Ardaman & Associates, Inc. during the prior Big Slough WMP project. Improvements to conveyance structures located beneath Tropicaire and I-75 were included with the R-36 canal layout for initial screening. Additional work will be performed to evaluate system performance without those culvert improvements.			
Reach ID	Waterway	Structure	Description of Model Revision
RB5695B RR3010 RR3020 RR3025 RR3030 RR3040 RR3050 RR3060 RR3070 RR3080 RR3090 RR3100 RR3110 RR3120 RR3125 RR3130 RR3140 RR3150 RR3220 RR3230 RR3250 RR3270 RR3290 RR3300 RR3310 RR3320 RR3330 RR3340 RR3350 RR3360 RR3370 RR3190 RR3200	R-36		Widen channel to 60ft bottom width trapezoidal
RR3160A			Increase Capacity (from 1 to 2 weir notches)
RR0170A			Increase Capacity (from 1 to 2-60" culverts)
RR0170B			Increase Capacity (from 1 to 2-60" culverts)
RR3160B			Increase Capacity (from 1 to 2 weir notches)
RR3160C		WCS 162	Increase Capacity (from 1 to 2 gates)
RR3210A RR3210B RR3380A RR3380B RR3380C RR3420A RR3420B RR3420C			Increase Capacity (from 1 to 2 bridges)

BYPASS			
Flood Reduction Concept: A new, parallel canal could be constructed from the northern City boundary to Price Boulevard along Tier 1 and Tier 2 lots that have been acquired on the west side of the Myakkahatchee Creek. The additional conveyance may reduce flow rate and thus peak stages along the main channel from start to end of the parallel relief channel.			
Notes: Placement into the model network did not account for overlapping of proposed bypass cross sections with existing cross sections describing the Big Slough/Myakkahatchee Creek conveyance system. Conceptual designs and the model will need to be refined (and overlap removed) if it is decided to continue with the bypass alternative in the preferred plan of improvements.			
Reach ID	Waterway	Structure	Description of Model Revision
RBY0020 RBY0030 RBY0060 RBY0070 RBY0100 RBY0110 RBY0140 RBY0150 RBY0160 RBY0190 RBY0220	Big Slough		New Channel, 60ft bottom width trapezoidal
RBY0010			New Weir, 200ft at 15.75ft, 2ft above bottom
RBY0030X			New Weir, 200ft at 17.67, 5ft above bottom
RBY0040			New Weir, 200ft at 14.72ft, 2ft above bottom
RBY0050			New Weir, 200ft at 14.72ft, 2ft above bottom
RBY0070X			New Weir, 200ft at 17.37ft, 5ft above bottom
RBY0080			New Weir, 200ft at 15.5ft, 2ft above bottom
RBY0090			New Weir, 200ft at 13.9ft, 2ft above bottom
RBY0110X			New Weir, 200ft at 15.14ft, 5ft above bottom
RBY0120			New Weir, 200ft at 11.48, 2ft above bottom
RBY0130			New Weir, 200ft at 11.48, 2ft above bottom
RBY0150X			New Weir, 200ft at 14.13, 5ft above bottom
RBY0160X			New Weir, 200ft at 12.46, 5ft above bottom
RBY0170			New Weir, 200ft at 5.38, 2ft above bottom
RBY0180			New Weir, 200ft at 5.38, 2ft above bottom
RBY0200			New Weir, 200ft at 4.05, 2ft above bottom
RBY0210			New Weir, 200ft at 4.05, 2ft above bottom
RBY0230			New Weir, 200ft at 3.25, 2ft above bottom

Snover Waterway to Cocoplum Waterway			
Flood Reduction Concept: Improvements could be made to existing structures along Snover Waterway and beneath Price Boulevard to increase flow through canals that connect with Cocoplum Waterway. The additional conveyance capacity may induce higher eastward flow out of Big Slough into Snover Waterway. Diverting those higher flows southward to Cocoplum Waterway would reduce flow and stages along the more flood prone segments of Myakkahatchee Creek.			
Notes: Controls set to reflect current operations of other area structures, specifically based on water surface elevation of Myakkahatchee Creek at Tropicaire Boulevard. All four (4) Price Boulevard structures were assumed to be replaced. City direction followed that only two (2) of the structures are scheduled to be replaced and future model revisions will reflect that case.			
Reach ID	Waterway	Structure	Description of Model Revision
RE0040A RE0040B RE0040C	Blueridge	DS 119	2 5ft gates added, 10ft of weir removed from riser
RI0030A	Creighton	DS 129	6 5ft gates added, 30ft of weir removed from riser
RI0030B			
RI0040A RI0040B RI0040C			Replaced with RI0040D (removes riser from culverts)
RI0040D			New culverts to replace RI0040A/B/C
RD0030A RD0030B RD0030C	Lagoon	WCS 126	2 5ft gates added, 10ft of weir removed from riser
RS5430A RS5430B RS5430F	Snover	WCS 115	Updated to reflect proposed condition

Miscellaneous Planned Improvements			
Flood Reduction Concept: Canals and structures throughout the area will be reviewed for opportunities to increase conveyance.			
Notes: Revisions to reflect ongoing work at City of North Port to refurbish the existing system. Changes made using conceptual-level design information provided by the City. Como Water Control Structure provides structural connection from the Cocoplum Waterway to a Port Charlotte canal system outfall where there is currently a berm located on the south side of the Cocoplum Waterway.			
Reach ID	Waterway	Structure	Description of Model Revision
RC0900A RC0900D RC0900H RC0900I	Cocoplum	WCS 106	Updated to reflect proposed condition (by others)
RC0600B RC0600C	Como	Como WCS	Disabled, replaced with culvert riser
RC0600D			New gated WCS (4-5' gates, split between two barrels)
RS5430A RS5430B RS5430F	Snover	WCS 115	Updated to reflect proposed condition

Appendix H

Tasks 1.6 and 2.4 Big Slough Flood Reduction Study, Refine and Summarize Preferred Plan(s) for Improvement (interim status report)

DeLoach Engineering Science, PLLC., October 2017

MEMORANDUM

To: Elizabeth Wong, PE (City of North Port)
From: Dave DeLoach, PE; Trillian Baldassari, PE
Copy: Rod Ghioto, PE
File: 16-00400-00

Subject: Tasks 1.6 and 2.4 Big Slough Flood Reduction Study, Refine and Summarize Preferred Plan(s) for Improvement (interim status report)

October 3, 2017

Development of a Preferred Plan for Improvement

The Big Slough Flood Reduction Study plan for improvement will be comprised of: internal flow diversion and increased conveyance capacity; external flow diversion; offsite storage; and property acquisition. Those plan components were selected by the Project Team based on review of preliminary hydraulic evaluations of alternatives and have been merged into a small number of distinct Candidate Plans. The project team will compare and select one plan from among the Candidates and that Preferred Plan will be finalized and evaluated for hydraulic performance, estimated costs, and flood reduction benefits.

This interim status report introduces eight Candidate Plans, summarizes their hydraulic performance for the mean annual, 10-year, and 100-year 24-hour storm events, provides preliminary cost and flood reduction benefit information, and presents a synopsis of take-aways from the August 8, 2017 team meeting to discuss hydraulic performance and plan development.

Candidate Plans may be applicable to either Task 1 Myakkahatchee Creek at I-75 and Jockey Club areas or Task 2 regional flood reduction objectives, or both. Thus, work performed and information presented in this memorandum address the following elements of the Project Plan (Task 1.6 and Task 2.4).

- Task 1.6 Refine Preferred Plan(s) of Improvement
  - Evaluate Site Conditions and Design/Permitting Constraints of Preferred Plan(s)
  - Refine Preferred Plan(s) to Address Site Conditions and Design/Permitting Constraints
  - Perform Hydraulic Analyses of Refined Plan(s)
  - Perform Cost-Benefit Analysis of Refined Plan(s)
  - Meeting to Review and Discuss Refined Plan(s)
  - Select Recommended Plan (**on-going**)

- Task 2.4 Summarize and Present Preferred Plan(s) for Regional Improvements
    - Screening-Level Hydraulic Model Pre/Post and Result Tabulations
    - Conceptual-Level Drawings and Plan Descriptions
    - Site Conditions and Design Constraints
    - Relevant Permitting Requirements (**on-going**)
    - Opinion of Probable Cost (**on-going**)
    - Planning-Level Report and Mapping (**on-going**)

Plan Components and Candidate Plan Development

The following set of alternatives was considered by the team for initial hydraulic evaluation.

- *Offsite Storage.* Flood reduction would be achieved in part by construction of a fixed water control structure at the north boundary to limit high flows entering the City. Low flows will remain unchanged as a four-foot opening in the upstream face of the structure would extend fully to the existing channel bottom.
- *Internal Flow Diversion and Increased Conveyance Capacity.* Flood reduction would be achieved in part by construction of a parallel relief (bypass) channel alongside Myakkahatchee Creek within Tier 1 lots that have been acquired by the City of North Port, and through widening of the R-36 canal. Wide and Narrow options were considered for each channel improvement concept.
- *External Flow Diversion.* Flood reduction would be achieved in part through higher discharges westward to Deer Prairie Slough. Large increases are considered infeasible as SWFWMD has already restored the slough system and likely will not permit higher inflows to the slough. Therefore, the Preferred Plan will be adjusted to meet pre/post discharge rates and District staff will be asked at an upcoming coordination meeting if those rates can be increased.
- *Additional drainage improvements* may be achieved through upsizing R-36 culverts at Tropicaire, structure replacement during the widening of Price Boulevard, and improvements to the R-580 canal. The effect of Price Boulevard improvements will be localized. Widening of the R-36 and R-580 canals is expected to require additional and perhaps extensive downstream drainage system improvements to eliminate bottlenecks in other flood prone areas of the City.
- *Acquisition* would reduce losses through purchase of flood prone lands and/or structures.

Eight scenarios are presented in this memorandum as Candidate Plans which incorporate various configurations of the “Offsite Storage” and the “Internal Flow Diversion and Increased Conveyance Capacity” concepts described above. While other configurations were evaluated (e.g., offsite storage with flow control set at a lower, 10-year event peak, stage), their performance was not distinctive nor superior to those presented here, and so those scenarios were not advanced as Candidate Plans.

Once a Preferred Plan is selected from among these eight Candidate Plans, other alternative components can again be considered during finalization of the stormwater plan. For example, discussion with District land management staff may allow for adjustments to the offsite inflow control as well as external flow diversions to Deer Prairie Slough. These final plan modifications may have a small (but not insignificant) impact on performance which will be accounted for in final performance and benefit/cost evaluations.

Candidate Plan Descriptions and Performance

A total of eight candidate plans were evaluated. Each candidate plan was comprised of one or more of the following drainage system improvement components, as indicated in the Scenario matrix of Table 1. For example, Scenario 6A is comprised only of a "High Control" to reduce inflows at the northern city limit.

Inflow

- Existing. No hydraulic control of inflow from upstream offsite areas.
- Low Control. 150-foot concrete weir with crest at elevation 24.0 feet for overtopping of high flows. 4-foot wide slot open to existing channel bottom to allow normal low flows, unimpeded.
- High Control. 150-foot concrete weir with crest at elevation 25.5 feet for overtopping of high flows. 4-foot wide slot open to existing channel bottom to allow normal low flows, unimpeded.

R-36

- Existing. No improvements to existing ditch along northwestern and western city boundary.
- Narrow. Widen ditch to maximum extent possible within existing drainage easement/right of way.
- Wide. Widen ditch to 60-foot bottom with 4:1 side slopes, with easement acquisition as-needed.

R-580

- Existing. No improvements to existing ditch along northern city boundary east of Big Slough Canal.
- Narrow. Widen ditch to maximum extent possible within existing drainage easement/right of way.
- Wide. Widen ditch to 60-foot bottom with 4:1 side slopes, with easement acquisition as-needed.

Bypass

- Existing. No bypass. All flow carried within Big Slough Canal/Myakkahatchee Creek and floodplain.
- Narrow. Excavate bypass ditch with 20- to 50-foot bottom 4:1 side slopes for high flow diversion.
- Wide. Excavate bypass ditch with 50-foot bottom 4:1 side slopes for high flow diversion.

Proposed condition simulations were performed for the mean annual, 10-year, and 100-year 24-hour storm events. Flood reduction performance of the eight Candidate Plans (Scenarios 6A through 6H) were compared to the existing condition (Scenario 5). Table 1 presents the Candidate Plans (Scenario matrix) and summarizes flood reduction performance in terms of: area of flood reduction (in acres); length of roadway flood reduction (in miles); and number of flood-impacted parcels reduction (for where the floodplain intersects a portion of a parcel and where the floodplain overlays a parcel's centroid).

Scenario 6B, comprised of offsite inflow control, a wide bypass, and wide R-36 channel improvements, reduces flooding on more property and roadway than all other Candidate Plans. However, a substantial level of flood reduction is also achieved with scenarios 6D, 6F, and 6H, all of which employ the wide bypass, at lower overall cost and higher BCRs. The wide bypass component provides the majority of flood reduction benefits in each of the four best-performing Candidate Plans, with some added improvement resulting from various configurations of R-36 improvements and offsite inflow control.

Scenario Matrix		5	6A	6B	6C	6D	6E	6F	6G	6H
Inflow	Existing	x					x	x	x	x
	Low Control									
	High Control		x	x	x	x				
R-36	Existing	x	x					x	x	
	Narrow				x	x	x			x
	Wide			x						
R-580	Existing	x	x	x	x	x	x	x		x
	Narrow								x	
	Wide									
Bypass	Existing	x	x				x		x	
	Narrow				x					
	Wide			x		x		x		x
Prel. Estimated Combined Cost		**$ -**	**$ 750,000**	**$ 32,667,000**	**$ 11,714,000**	**$ 19,446,000**	**$ 7,825,000**	**$ 10,871,000**	**$ 2,462,000**	**$ 18,696,000**
Estimated Annualized Cost			**$ 54,345**	**$ 2,367,046**	**$ 848,795**	**$ 1,409,054**	**$ 566,998**	**$ 787,711**	**$ 178,396**	**$ 1,354,709**
Flood Reduction (acres)	2.33-year	-	22	243	156	213	53	176	24	184
	10-year	-	63	377	204	323	58	212	14	223
	100-year	-	68	450	239	338	106	190	11	184
Road Flood Reduction (miles)	2.33-year	-	0.6	6.7	4.2	6.38485	1.2	5.7	0.7	5.9
	10-year	-	2.9	14.4	8.9	12.969	3.5	9.1	1.1	9.4
	100-year	-	3.5	20.8	9.6	14.055	4.5	9.2	1.6	9.3
Parcels Reduction (touch)	2.33-year	-	22	792	433	726	119	598	7	613
	10-year	-	118	960	515	868	182	554	-33	546
	100-year	-	253	1338	643	958	292	630	34	591
Parcels Reduction (centroid)	2.33-year	-	14	240	144	235	36	225	17	226
	10-year	-	46	408	158	330	26	228	-8	242
	100-year	-	48	399	156	319	47	226	-43	217
Prel. Estimated Annualized Benefit*			**$ 113,147**	**$ 1,327,153**	**$ 734,929**	**$ 1,226,504**	**$ 191,732**	**$ 1,060,727**	**$ 66,076**	**$ 1,081,500**
Est. Benefit/Cost Ratio (BCR)			**2.08**	**0.56**	**0.87**	**0.87**	**0.34**	**1.35**	**0.37**	**0.80**

** For initial discussion purposes only. Components used to develop a preliminary estimate of project benefits are subject to further review.*

Table 1: Candidate Plan Performance Summary

Preliminary Estimates of Candidate Plan Benefits

Screening-level estimates of project benefits (flood damage reduction) presented in Table 1 were developed to allow initial comparisons of rough Benefit to Cost Ratio (BCR) values across Candidate Plans. Benefits considered cost avoidance for road repair and for residential structure damages through flood reduction across design storms with mean annual, 10-year, and 100-year return periods.

While these estimates are satisfactory for initial comparisons of Candidate Plans, the assumptions made relative to what constitutes project benefits and their per-flood-event values will be discussed further with City and District staff prior to development of a BCR for the final Preferred Plan.

Example Benefit Calculation

Rough calculations were performed to develop preliminary order of magnitude estimates of annualized benefits which can be compared across Candidate Plans to aid in selecting a Preferred Plan.

# of events considered: 3, with mean annual, 10-year, and 100-year recurrence

annual probability of occurrence: 2.33-year = 0.429, 10-year = 0.1, and 100-year = 0.01

measurable benefit units:

- reduction in feet of flooded roadway
- reduction in number of parcels intersected by floodplain
- reduction in number of parcels w centroid intersected by floodplain (implies greater damages)

benefit unit values accrued by flood reduction:

- $62,400 per mile of roadway flood averted (assumes 4 inundation events per roadway repair)
- $250 per parcel per event averted (parcel intersecting floodplain with minor cost to owner)
- $6300 per parcel per event averted (parcel centroid intersecting floodplain, 15% res. structures)

The annualized benefit is computed as the product of each “measurable benefit unit” times “benefit unit values” multiplied by “probability of occurrence”, summed across “number of events considered”

Example, for Scenario 6F:

(6.4 mi * $62,400 + 726 parcels * $250 + 235 parcels * $6,300) * 0.429 [mean annual]
+ (13.0 mi * $62,400 + 868 parcels * $250 + 330 parcels * $6,300) * 0.1 [10-year]
+ (14.1 mi * $62,400 + 958 parcels * $250 + 319 parcels * $6,300) * 0.01 [100-year]
= $884,572 + $310,656 + $31,276
= $1,226,504

Preliminary Estimates of Candidate Plan Costs

Preliminary estimates of probable design and construction costs were developed to allow reasonable comparisons across Candidate Plans. Estimated costs for Scenarios 6A through 6H are presented in Table 1. Also provided are preliminary Equivalent Annualized Costs of construction (no maintenance, etc.) for each Candidate Plan, assuming a 7% annual interest rate and 50-year life of project.

Construction costs were based upon RS Means 2017, Heavy Construction Costs, with a factor of 0.95 applied to adjust Ft. Myers/Sarasota construction costs from national averages. The overriding cost item related to channel widening and/or bypass construction is expected to be for grading and earthwork, which is estimated at $13.25 per cubic yard of material removed. No accounting was made for land acquisition or easements which would substantially increase costs associated with Scenario 6B only. No accounting was made for erosion control or structural interconnections which will increase costs across all projects fairly uniformly, but are highly dependent on final plan configuration.

Cost calculations were performed to develop preliminary order of magnitude estimates of probable construction costs, which can be compared across Candidate Plans to aid in selecting a Preferred Plan. Once the Preferred Plan is selected and refined, a more rigorous cost calculation will be expanded to cover those items that were not included in the preliminary estimate.

Preliminary Benefit Cost Evaluation

A ratio of annualized benefits to annualized costs was calculated and that BCR assigned to each Candidate Plan for rough comparison to aid in selecting a Preferred Plan. Based on the screening-level estimates of Candidate Plan benefits, Scenarios 6A, 6D, 6F, and 6H appear to be in an acceptable range for consideration. Once a Preferred Plan is selected and refined, a more rigorous annualized benefit calculation will be expanded to cover mean annual, 5-, 10-, 25-, 50-, and 100-year events with selection of measurable benefit units and assignment of benefit unit values coordinated more closely with City staff.

The more rigorous final benefit and cost values for the Preferred Plan will be used to determine a BCR for the proposed flood reduction project, providing a basis for decision-making by administrators and commissioners at the City of North Port as well as to support the City of North Port's application for cooperative funding through the SWFWMD CFI program.

Flood Inundation

Flood inundation areas for each simulation were mapped to depict areas removed from the floodplain. As shown in Figures 1 through 16, flood reduction scenarios 6B, 6D, 6F, and 6H are more effective in reducing flood levels in the watershed, particularly in the I-75 study area, than other Candidate Plans. Candidate Plans may also result in increased flooding in downstream areas. Plan refinements and additional improvements will be developed for the selected Preferred Plan to relieve downstream bottlenecks and accommodate increased flows that result from the wider R-36 or addition of the Bypass.

Team Meeting

A Team Meeting was held on August 9, 2017 to discuss plan refinement (including evaluation of project constraints), hydraulic analyses of the refined plan, preliminary costs, and development of conceptual level drawings. Attendees included: Elizabeth Wong, Chuck Speake, Julie Bellia, Monica Bramble (City of North Port); Jezabel Pagan Garcia (Southwest Florida Water Management District); and David DeLoach, Trillian Baldassari (DeLoach Engineering Science).

The PowerPoint and PDF (Preliminary Draft of Conceptual-Level Drawings) presented at the meeting are attached. The following summarizes notable points raised during the team meeting and important issues that will be addressed as the project moves forward.

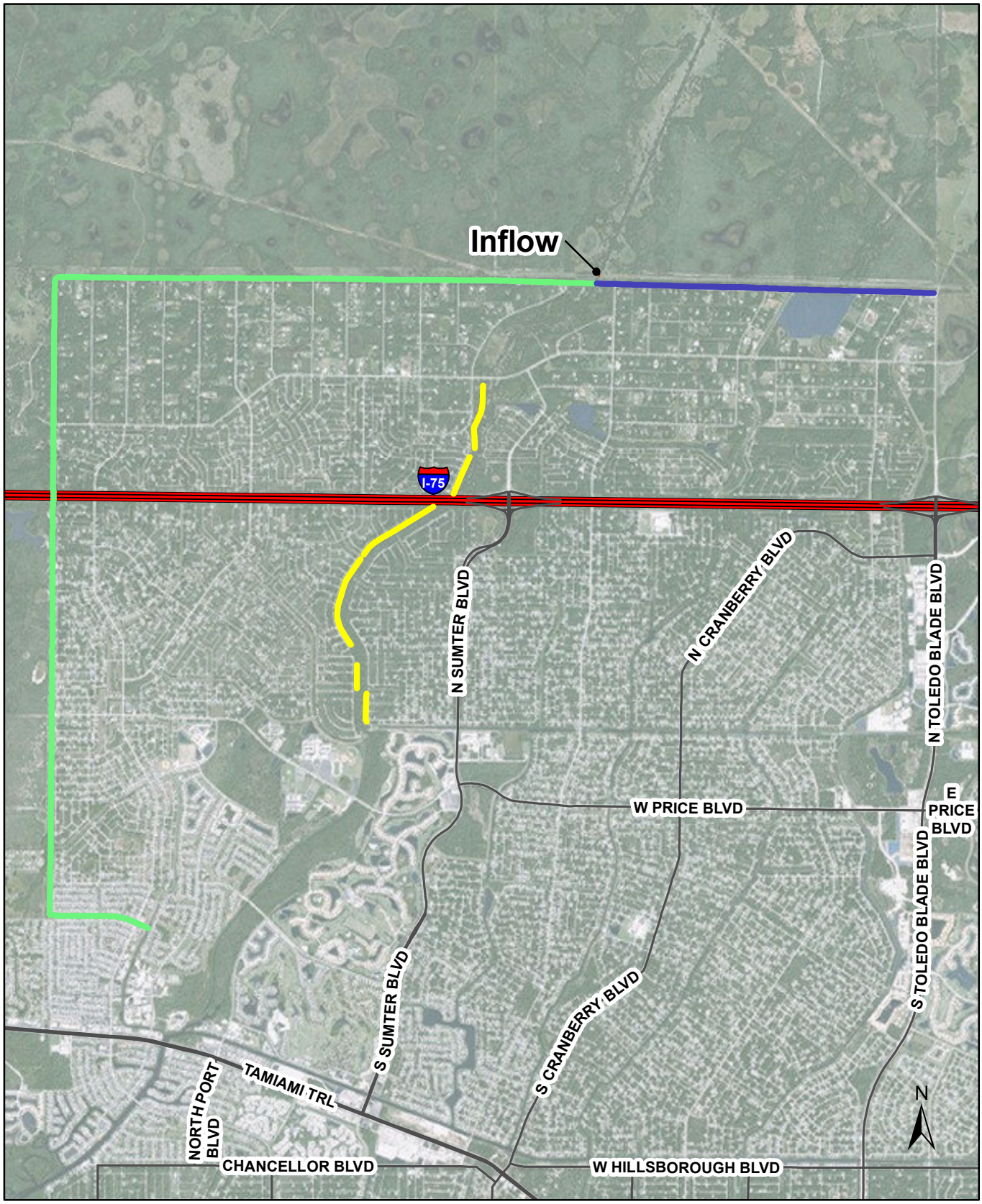
- DES presented conceptual level design drawings for expansion of R-36 (narrow and wide) and the new Bypass Canal (narrow and wide). Included are plan and profile sheets depicting project extents, cross section sheets depicting excavated sections for channel widening and bypass construction, and structure detail sheets depicting the proposed inflow control structure. Drawings will continue to be updated as the Preferred Plan is refined. Elizabeth requested that delivered AutoCAD files be compatible with AutoCAD 2008.
- DES presented a preliminary engineer's opinion of probable cost for expansion of R-36 (narrow and wide), construction of a Bypass Canal (narrow and wide), and construction of a fixed concrete weir to allow normal inflows but restrict high flood flows entering from offsite lands.
- Monica would like to see acreage of floodplain removed as part of the cost/benefit analysis.
- Elizabeth suggested that alternatives be evaluated separately. *(see Scenarios 6A, 6E, and 6F)*
- Big Slough has recently been cleaned from Price Boulevard to Snover Waterway, with plans to continue working northwards. Elizabeth will send photos of pre/post. DES will review roughness assumptions used in the model.
- Discussion to be included in the final report: date LiDAR was flown and reason for not including improvements to R-580 in further plan development.
- City and District staff will coordinate a meeting with the SWFWMD's Land Management Department. Monica would like to receive a documented response regarding sending additional water to Deer Prairie Slough.
- City staff will coordinate a meeting with the City's Parks Department. DES will demonstrate the benefit of the Bypass on Tier 1/Tier 2 Lots for use by the Parks Department.
- DES will provide tabulated benefit (floodplain removed) for each alternative evaluated separately. (*see Scenarios 6A, 6E, and 6F*)

Identification of the Preferred Plan

Based upon the Project Team's review and discussion of preliminary hydraulic evaluation results, a set of alternatives were advanced for development of improvements to achieve flood reduction through internal flow diversion and increased conveyance capacity, external flow diversion, offsite storage, and acquisition. Those concepts were refined and combined into a small number of Candidate Plans for evaluation of hydraulic performance, preliminary cost estimates, and screening-level benefit estimates.

This interim report, meetings, and team discussion provides a basis for evaluation of the Candidate Plans. The Project Team will select from among these Candidate Plans and the Preferred Plan will be finalized and evaluated more rigorously for permittability, costs, and benefits.

Note: This is an interim report describing a preliminary work product. Some elements of the Candidate Plans are known to result in small, but undesirable increases in water levels in certain areas. From a practical standpoint, it is inefficient to develop Candidate Plans while at the same time eliminating all such increases. For example, scenarios which include upgrades of the Tropicaire R-36 culvert crossing may have an adverse impact on areas between Tropicaire and I-75, depending on the magnitude of discharges to the west (into Deer Prairie Slough) and other elements of the stormwater plan. If a plan is found to be desirable (notwithstanding the increases) then additional improvements may be considered to eliminate increases. The final Preferred Plan will address undesirable increases and incorporate changes to eliminate adverse impacts.



BMP Location

Waterway

- Bypass
- R-36
- R-580

BMP LOCATION MAP

CITY OF NORTH PORT, FL

DELOACHes

Notes:

Project: 16-00400-00	**Date:** 10/03/2017	**Author:** CGG

Projection: Projection: NAD83 StatePlane Florida West HARN

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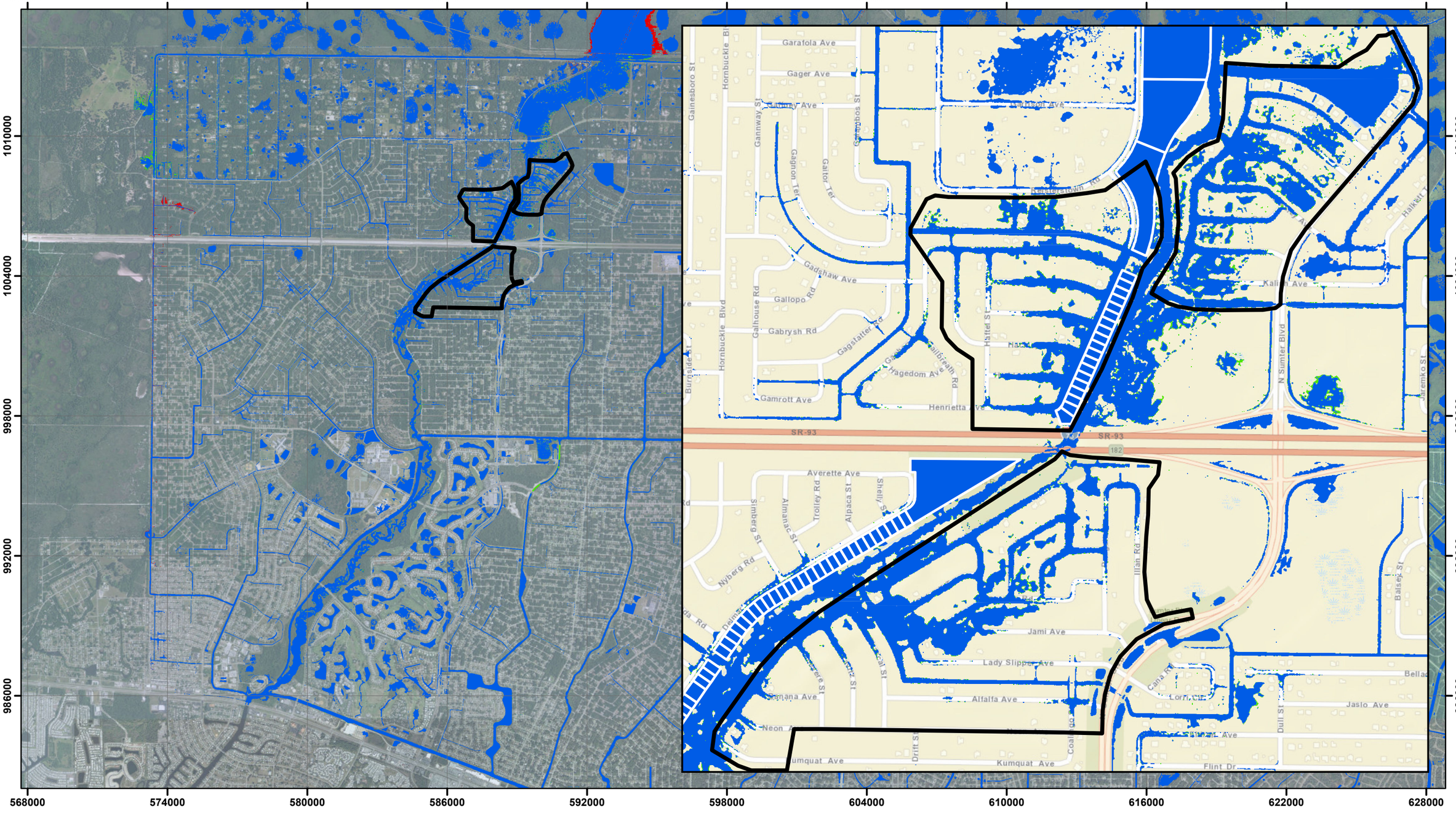

Area of Flooding
Decreased Flooding
Increased Flooding

0 4,000 8,000
Feet

N

FIGURE 1

Big Slough Flood Reduction Study

1-DAY 2.33-YEAR EVENT FLOOD REDUCTION - SCENARIO 6A

1 inch = 4,000 feet

DELOACHes

Notes:

Project: 16-00400-00	**Date:** 8/18/2017	**Author:** DAD
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Garafola Ave
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Gainesboro St
Hornbuckle Blvd
Gahnway St
Gahnway Ave
Gagnon Ter
Gailor Ter
Grambos St
Gadshaw Ave
Gallopo Rd
Galhouse Rd
Hornbuckle Blvd
Gabrysh Rd
Gagstatter Rd
Gailbreath Rd
Hagedom Ave
Gamrott Ave
Haffel St
Henrietta Ave
SR-93
182
Averette Ave
Simberg St
Almanac St
Trolley Rd
Alpaca St
Nyberg Rd
Jami Ave
Lady Slipper Ave
Alfalfa Ave
Kumquat Ave
Flint Dr
N Sumter Blvd
Illian Rd
Cana Rd
Jaslo Ave
Dull St
Baisel St
Jaremko St

Area of Flooding
Decreased Flooding
Increased Flooding

0 4,000 8,000
Feet

N

FIGURE 2

Big Slough Flood Reduction Study

1-DAY 2.33-YEAR EVENT FLOOD REDUCTION - SCENARIO 6B

1 inch = 4,000 feet

DELOACHes

Notes:

Project: 16-00400-00	**Date:** 8/18/2017	**Author:** DAD
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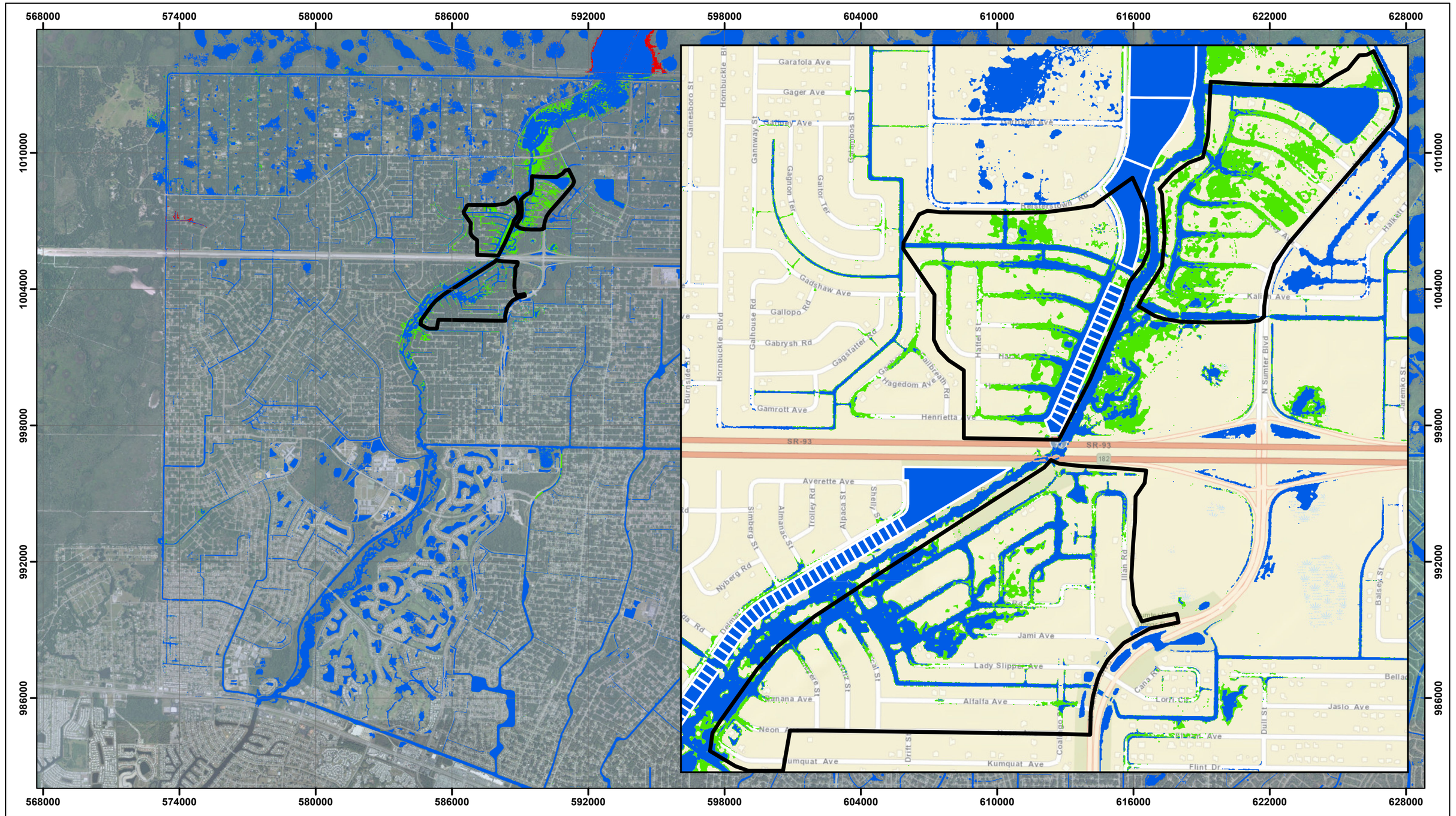

FIGURE 3

Big Slough Flood Reduction Study

1-DAY 2.33-YEAR EVENT FLOOD REDUCTION - SCENARIO 6C

1 inch = 4,000 feet

DELOACHes

Notes:

Project: 16-00400-00	**Date:** 8/18/2017	**Author:** DAD
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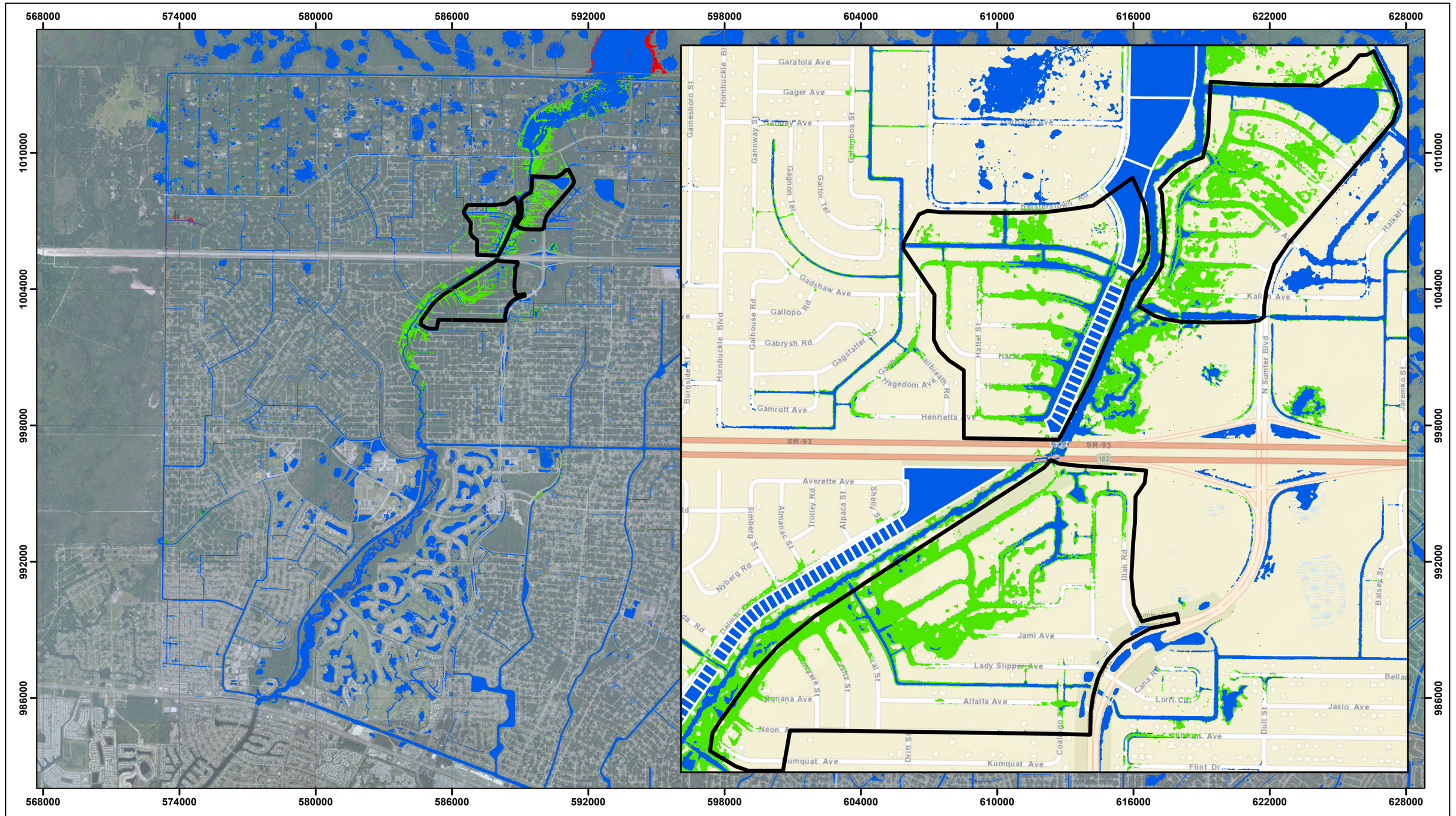

FIGURE 4

Big Slough Flood Reduction Study

1-DAY 2.33-YEAR EVENT FLOOD REDUCTION - SCENARIO 6D

1 inch = 4,000 feet

DELOACHes

Notes:

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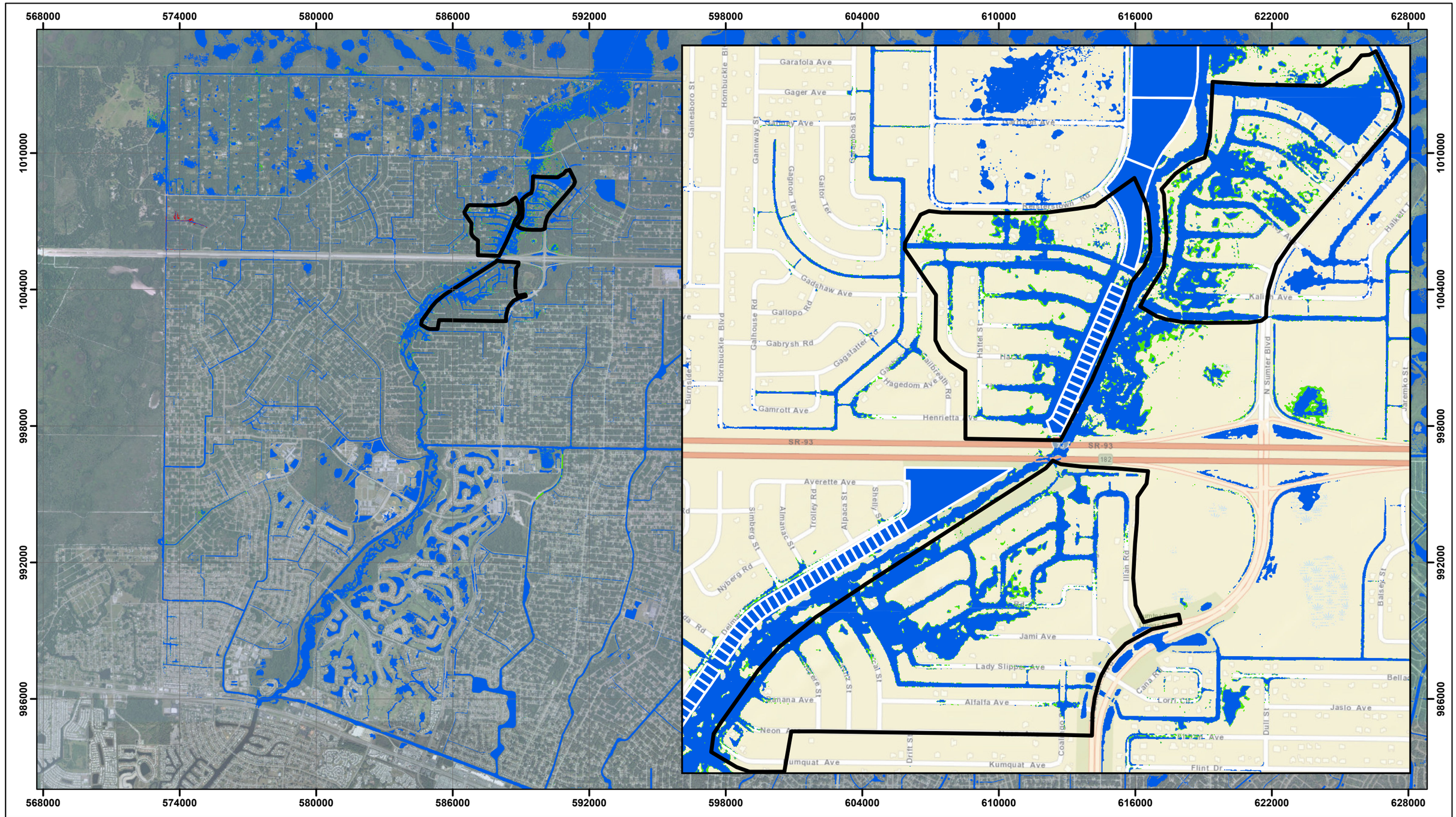

Area of Flooding
Decreased Flooding
Increased Flooding

0 4,000 8,000
Feet

N

FIGURE 5

Big Slough Flood Reduction Study

1-DAY 2.33-YEAR EVENT FLOOD REDUCTION - SCENARIO 6E

1 inch = 4,000 feet

DELOACHes

Notes:

Project: 16-00400-00	**Date:** 8/18/2017	**Author:** DAD
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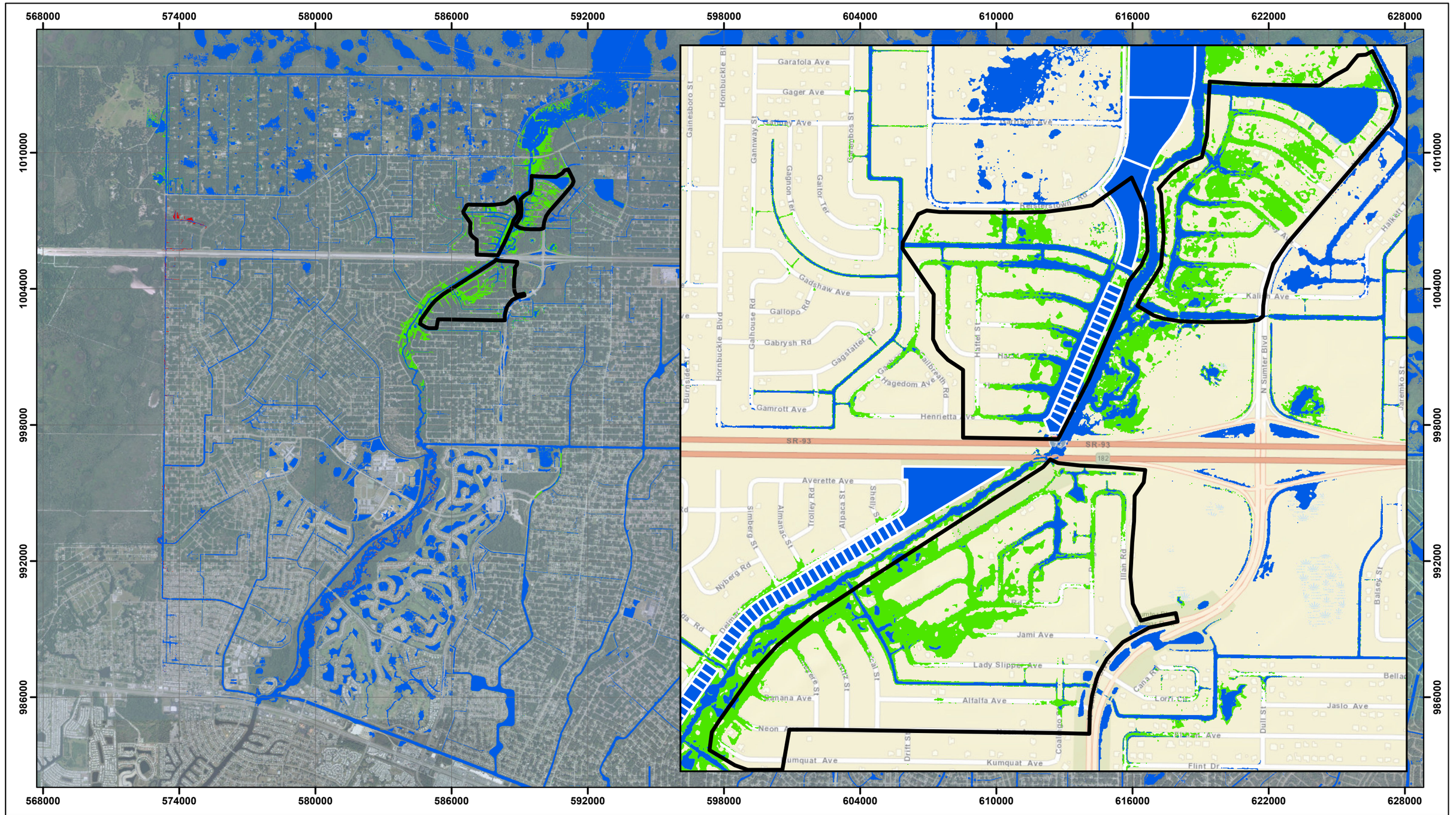

FIGURE 6

Big Slough Flood Reduction Study

1-DAY 2.33-YEAR EVENT FLOOD REDUCTION - SCENARIO 6F

1 inch = 4,000 feet

DELOACHes

Notes:

Project: 16-00400-00	**Date:** 8/18/2017	**Author:** DAD
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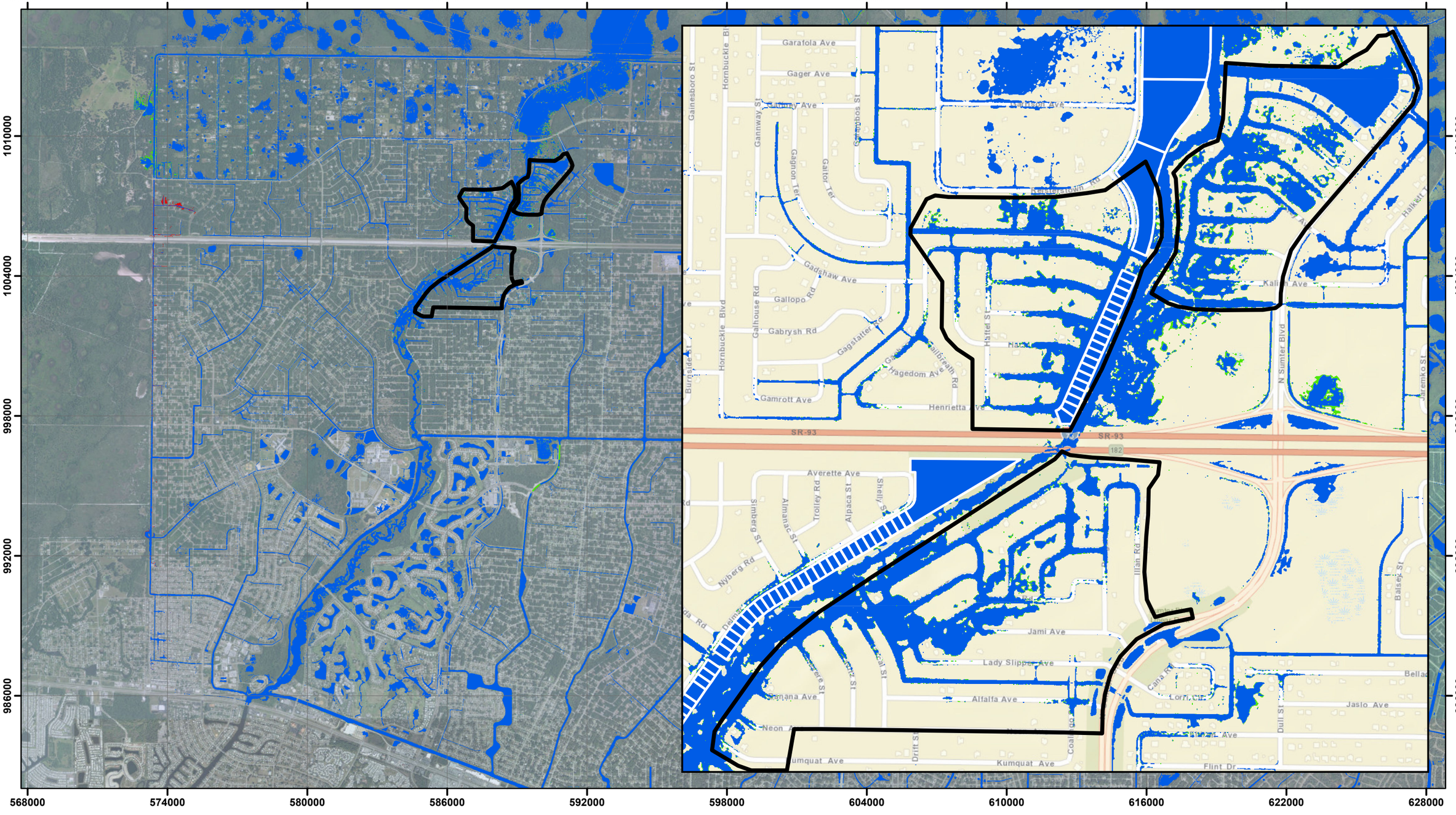

Area of Flooding
Decreased Flooding
Increased Flooding

0 4,000 8,000
Feet

N

FIGURE 7

Big Slough Flood Reduction Study

1-DAY 2.33-YEAR EVENT FLOOD REDUCTION - SCENARIO 6G

1 inch = 4,000 feet

DELOACHes

Notes:

Project: 16-00400-00	**Date:** 8/18/2017	**Author:** DAD
Projection: Projection: NAD83 StatePlane Florida West HARN		

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Garafola Ave
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Gainesboro St
Hornbuckle Blvd
Gahnway St
Gahnway Ave
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Gailor Ter
Granbos St
Gadshaw Ave
Gallopo Rd
Galhouse Rd
Gabrysh Rd
Gagstatter Rd
Hagedom Ave
Gailbreath Rd
Gamrott Ave
Henrietta Ave
Haffel St
Kalish Ave
N Sumter Blvd
Jaremko St
SR-93
182
Averette Ave
Simberg St
Almanac St
Trolley Rd
Alpaca St
Nyberg Rd
Jami Ave
Lady Slipper Ave
Alfalfa Ave
Kumquat Ave
Flint Dr
Jaslo Ave
Dull St
Illian Rd
Cana Rd
Baisel St

Area of Flooding
Decreased Flooding
Increased Flooding

0 4,000 8,000
Feet

N

FIGURE 8

Big Slough Flood Reduction Study

1-DAY 2.33-YEAR EVENT FLOOD REDUCTION - SCENARIO 6H

1 inch = 4,000 feet

DELOACHes

Notes:

Project: 16-00400-00	**Date:** 8/18/2017	**Author:** DAD
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Garafola Ave
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Hornbuckle P
Gallop Ter
Gallop Ave
Gabrysh Rd
Hornbuckle Blvd
Jarrott Ave
SR-93
182
N Sumter Blvd
Averette Ave
Simberg St
Trolley Rd
Alpaca St
Nyberg Rd
Jaslo Ave
Kumquat Ave
Drift St
Coal

Area of Flooding
Decreased Flooding
Increased Flooding

0 4,000 8,000
Feet

N

FIGURE 9

Big Slough Flood Reduction Study

1-DAY 10-YEAR EVENT FLOOD REDUCTION - SCENARIO 6A

1 inch = 4,000 feet

DELOACHes

Notes:

Project: 16-00400-00	**Date:** 8/18/2017	**Author:** DAD
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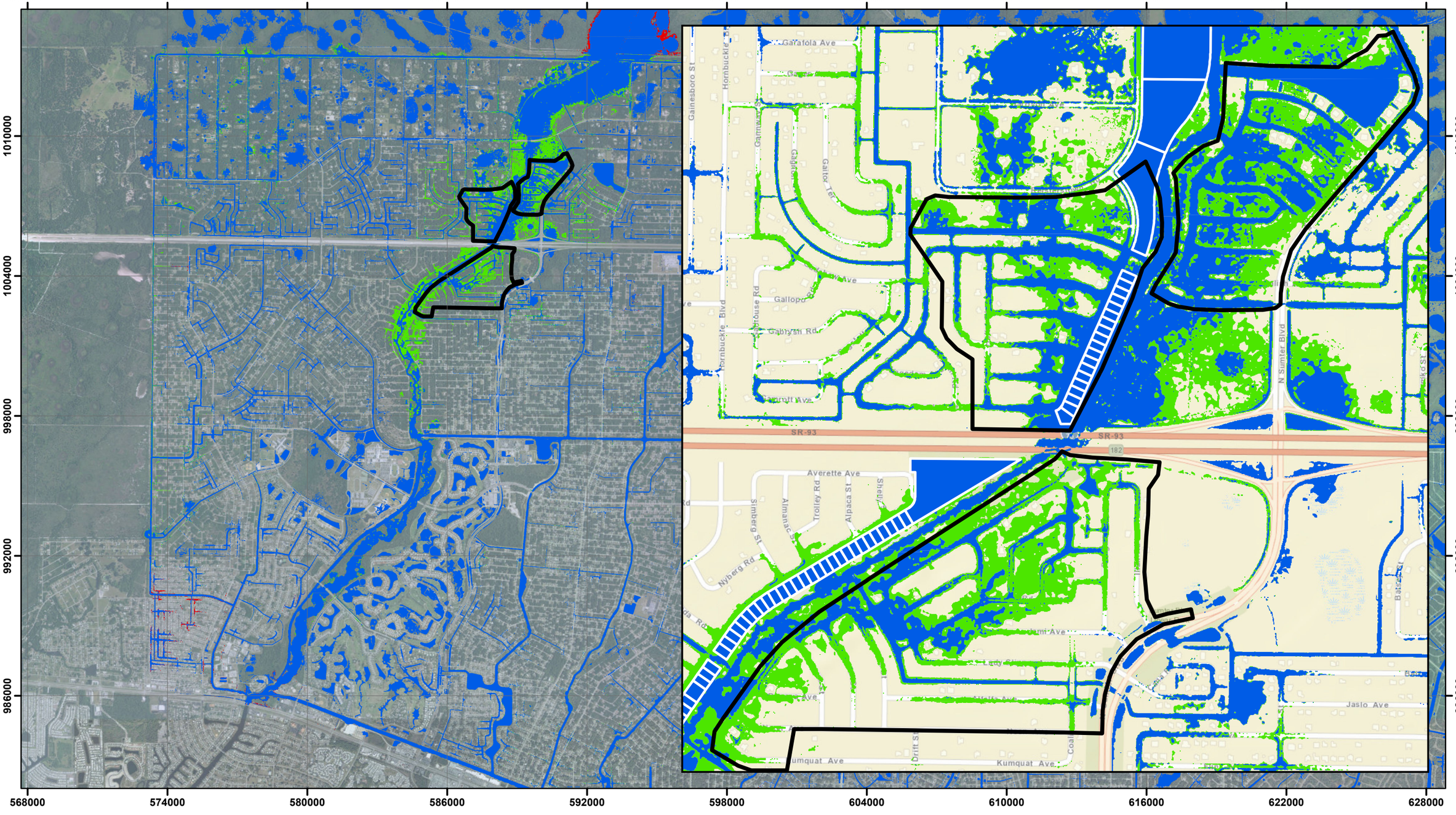

Area of Flooding
Decreased Flooding
Increased Flooding

0 4,000 8,000
Feet

N

FIGURE 10

Big Slough Flood Reduction Study

1-DAY 10-YEAR EVENT FLOOD REDUCTION - SCENARIO 6B

1 inch = 4,000 feet

DELOACHes

Notes:

Project: 16-00400-00	**Date:** 8/18/2017	**Author:** DAD
Projection: Projection: NAD83 StatePlane Florida West HARN		

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Garafola Ave
Gainesboro St
Hornbuckle St
Gallop Ter
Gallop Ave
Gabryan Rd
Hornbuckle Blvd
Hornbuckle Rd
Jarrott Ave
SR-93
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N Sumter Blvd
Averette Ave
Simberg St
Almanac St
Trolley Rd
Alpaca St
Nyberg Rd
Kumquat Ave
Drift St
Coal St
Jaslo Ave

Area of Flooding
Decreased Flooding
Increased Flooding

0 4,000 8,000
Feet

N

FIGURE 11

Big Slough Flood Reduction Study

1-DAY 10-YEAR EVENT FLOOD REDUCTION - SCENARIO 6C

1 inch = 4,000 feet

DELOACHes

Notes:

Project: 16-00400-00	**Date:** 8/18/2017	**Author:** DAD
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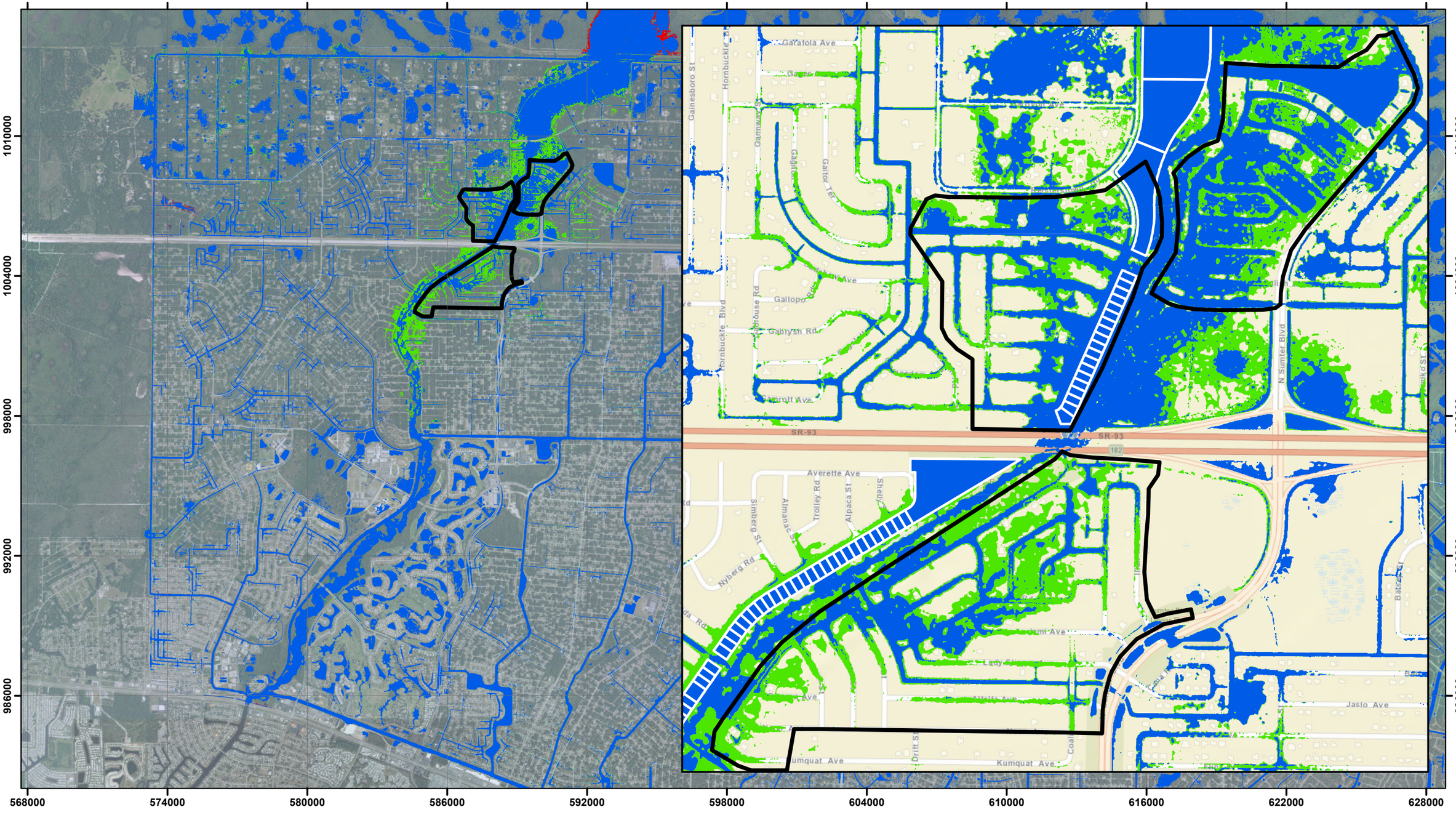

Area of Flooding
Decreased Flooding
Increased Flooding

0 4,000 8,000
Feet

N

FIGURE 12

Big Slough Flood Reduction Study

1-DAY 10-YEAR EVENT FLOOD REDUCTION - SCENARIO 6D

1 inch = 4,000 feet

DELOACHes

Notes:

Project: 16-00400-00	**Date:** 8/18/2017	**Author:** DAD
Projection: Projection: NAD83 StatePlane Florida West HARN		

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Garafola Ave
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Gallop Ave
Hornbuckle Blvd
Gallop Rd
Calmyrtl Rd
Calmyrtl Ave
SR-93
182
N Sumter Blvd
Averette Ave
Simberg St
Nyberg Rd
Trolley Rd
Alpaca St
Jaslo Ave
Kumquat Ave

Area of Flooding
Decreased Flooding
Increased Flooding

0 4,000 8,000
Feet

N

FIGURE 13

Big Slough Flood Reduction Study

1-DAY 10-YEAR EVENT FLOOD REDUCTION - SCENARIO 6E

1 inch = 4,000 feet

DELOACHes

Notes:

Project: 16-00400-00	**Date:** 8/18/2017	**Author:** DAD
Projection: Projection: NAD83 StatePlane Florida West HARN		

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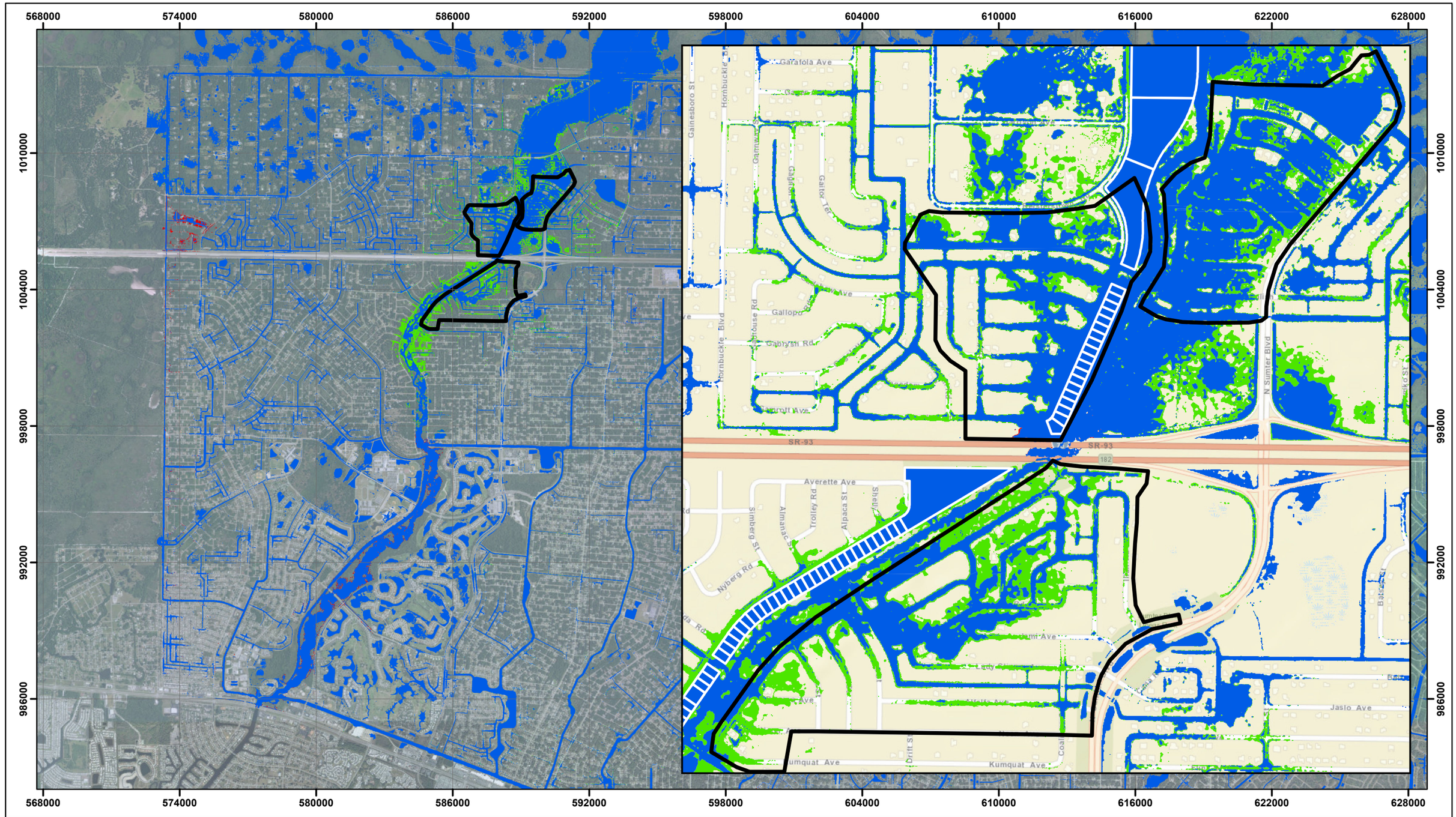

Area of Flooding
Decreased Flooding
Increased Flooding

0 4,000 8,000
Feet

N

FIGURE 14

Big Slough Flood Reduction Study

1-DAY 10-YEAR EVENT FLOOD REDUCTION - SCENARIO 6F

1 inch = 4,000 feet

DELOACHes

Notes:

Project: 16-00400-00	**Date:** 8/18/2017	**Author:** DAD
Projection: Projection: NAD83 StatePlane Florida West HARN		

Path: C:\Users\Dave\Desktop\20170821 - Scenario Comparison\20170930 - Big Slough Compare Scenarios DeLoach.xlsx Landscape 11x17.mxd

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1010000 1004000 998000 992000 986000

Garafola Ave
Gainesboro St
Hornbuckle Pl
Gallop Ln
Gallop Ave
Hornbuckle Blvd
Tenhouse Rd
Gallop Trl
Gallop Rd
Gallop Ave
SR-93
SR-93
182
N Sumter Blvd
Averette Ave
Simberg St
Almanac St
Trolley Rd
Alpaca St
Nyberg Rd
Kumquat Ave
Drift St
Coal St
Kumquat Ave
Jaslo Ave

568000 574000 580000 586000 592000 598000 604000 610000 616000 622000 628000

Area of Flooding
Decreased Flooding
Increased Flooding

0 4,000 8,000
Feet

N

FIGURE 15

Big Slough Flood Reduction Study

1-DAY 10-YEAR EVENT FLOOD REDUCTION - SCENARIO 6G

1 inch = 4,000 feet

DELOACHes

Notes:

Project: 16-00400-00	**Date:** 8/18/2017	**Author:** DAD
Projection: Projection: NAD83 StatePlane Florida West HARN		

Path: C:\Users\Dave\Desktop\20170821 - Scenario Comparison\20170930 - Big Slough Compare Scenarios DeLoach.xlsx Landscape 11x17.mxd

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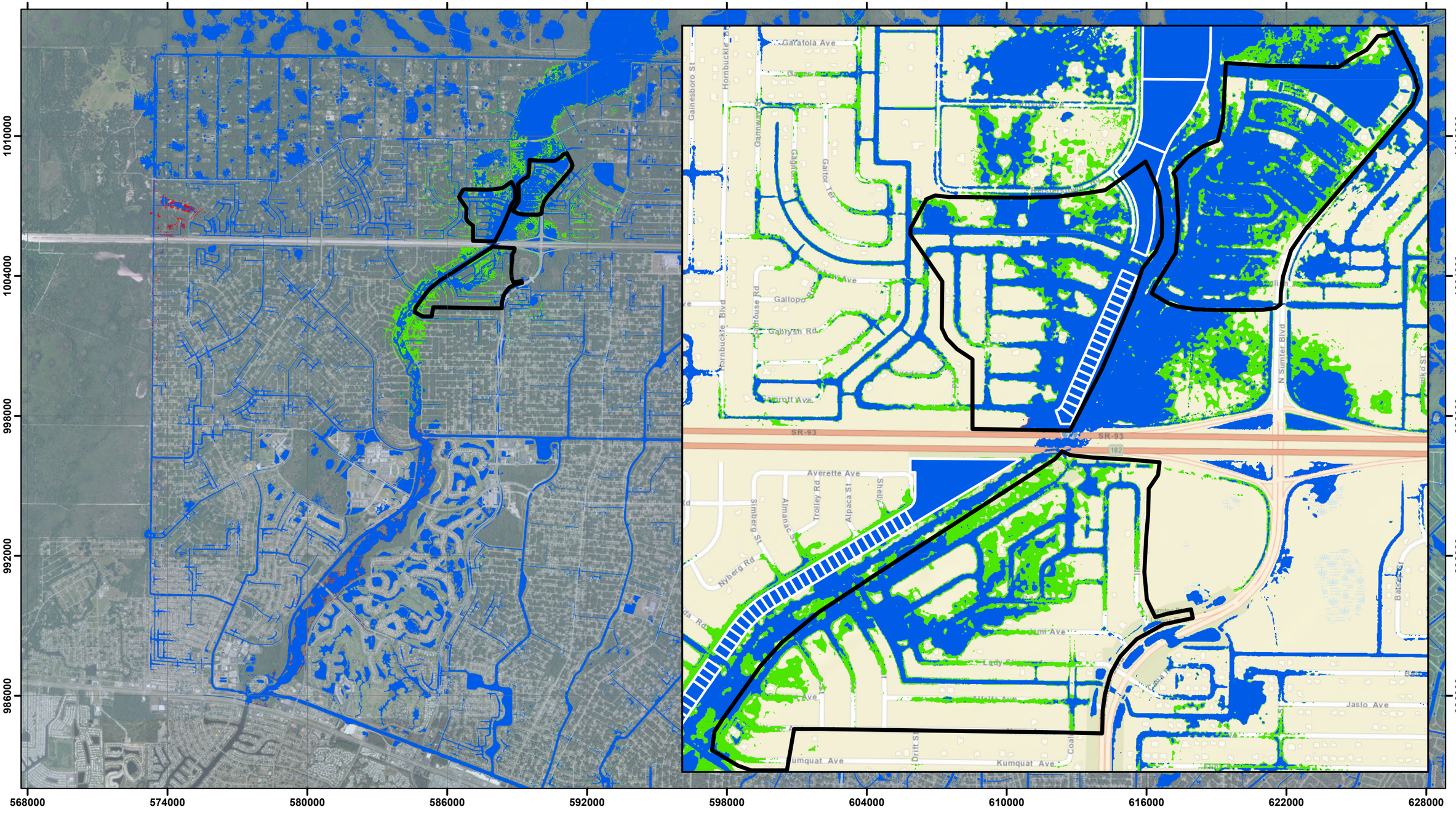
1010000 1004000 998000 992000 986000



Area of Flooding
Decreased Flooding
Increased Flooding

0 4,000 8,000
Feet

N

FIGURE 16

Big Slough Flood Reduction Study

1-DAY 10-YEAR EVENT FLOOD REDUCTION - SCENARIO 6H

1 inch = 4,000 feet

DELOACHes

Notes:

Project: 16-00400-00	**Date:** 8/18/2017	**Author:** DAD
Projection: Projection: NAD83 StatePlane Florida West HARN		

Appendix I

SWFWMD Resource Regulation Division Pre-Application Meeting Notes

City of North Port – Flooding Alternatives PreApp

Southwest Florida Water Management District, November 2018

THIS FORM IS INTENDED TO FACILITATE AND GUIDE THE DIALOGUE DURING A PRE-APPLICATION MEETING BY PROVIDING A PARTIAL "PROMPT LIST" OF DISCUSSION SUBJECTS. IT IS NOT A LIST OF REQUIREMENTS FOR SUBMITTAL BY THE APPLICANT.

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
RESOURCE REGULATION DIVISION
PRE-APPLICATION MEETING NOTES

FILE NUMBER:

PA 406256

Date:	11/27/18		
Time:	1:30		
Project Name:	City of North Port - Flooding Alternatives PreApp		
District Engineer:	David Kramer, Steve Lopes, Jezabel Pagan Garcia, Terese Power		
District ES:	Al Gagne		
Attendees:	Elizabeth Wong, Dave Jayroe, Dave Deloach		
County:	Sarasota	**Sec/Twp/Rge:**	Numerous including 3, 4, 9, 16, 17, 20, 21, 29, 30/39/21
Total Land Acreage:	ROW	**Project Acreage:**	100+ acres

Prior On-Site/Off-Site Permit Activity:

- Significant permitting history (ERP, WCP and WUP) within watershed(s).

Project Overview:

- Cooperatively funded project by and between the City of North Port and the SWFWMD to mitigate flooding throughout the City.
- Improvements may include, but may not be limited to:
  - Construction of a parallel storage and conveyance system along Myakkahatchee Creek within I-75 and Jockey Club areas.
  - Attenuation structure located close to northern City boundary that would back flows and maximize flood storage within County and District owned conservation properties.
  - Various culvert and open conveyance upgrades.

Environmental Discussion: (Wetlands On-Site, Wetlands on Adjacent Properties, Delineation, T&E species, Easements, Draw down Issues, Setbacks, Justification, Elimination/Reduction, Permanent/Temporary Impacts, Secondary and Cumulative Impacts, Mitigation Options, SHWL, Upland Habitats, Site Visit, etc.)

- Hydrographic modeling will be required in order to show that the project will not have an adverse effect on wetlands and surface waters.
- Provide the limits of jurisdictional wetlands and surface waters.
- Provide appropriate mitigation using UMAM for impacts, if applicable.
- Demonstrate elimination and reduction of wetland impacts.
- Maintain minimum 15 foot, average 25 foot wetland conservation area setback or address secondary impacts.
- Determine SHWL's at pond locations, wetlands, and OSWs.
- Determine normal pool elevations of wetlands.
- Determine 'pop-off' locations and elevations of wetlands.
- As of October 1, 2017, the District will no longer send a copy of an application that does not qualify for a State Programmatic General Permit (SPGP) to the U.S. Army Corps of Engineers. If a project does not qualify for a SPGP, you will need to apply separately to the Corps using the appropriate federal application form for activities under federal jurisdiction. Please see the Corps' Jacksonville District Regulatory Division Sourcebook for more information about federal permitting. Please call your local Corps office if you have questions about federal permitting. Link: http://www.saj.usace.army.mil/Missions/Regulatory/Source-Book/

Site Information Discussion: (SHW Levels, Floodplain, Tailwater Conditions, Adjacent Off-Site Contributing Sources, Receiving Waterbody, etc.)

- Where relevant, document/justify SHWE's at pond locations, wetlands, and OSWs.
- Discussed possible benefits of obtaining input/coordination with FDOT.
- Minimum flows and levels of receiving waters shall not be disrupted.
- Contamination issues need to be resolved with the FDEP. Check FDEP MapDirect layer for possible contamination points within/adjacent to the project area. FDEP MapDirect Link
- There do appear to be several District data collection sites including, but not limited to, Site ID's 770430, 710465, and 711760 that may be eventually be impacted by proposed construction. Contact the District's

Data Steward at Data.Maps@watermatters.org under the subject line "PRIORITY ERP Data Evaluation" to coordinate relocation of District data collection site.

Water Quantity Discussions: (Basin Description, Storm Event, Pre/Post Volume, Pre/Post Discharge, etc.)

- Big Slough Flood Reduction Study being performed by DeLoach Engineering for City. Local and regional flood alleviation alternatives in phases being investigated.
- A Conceptual ERP may be obtained to establish the baseline existing conditions and to demonstrate that proposed improvements will not cause adverse impacts.
- Conceptual could also evaluate improvements/reductions in flood stage resulting from initial phases of the project that future or later phases could rely on.
- Proposed improvements anticipated to include four possible main features:
    - New weirs or operable gates to impound/attenuate water upstream of I-75. Since this would involve stage increases on District lands, consistency with any Conservation Easements or other easements and approval from SWFWMD Lands Management would be needed.
    - Construction of a new bypass channel. It would need to be demonstrated that surrounding existing groundwater levels would not be adversely lowered (refer to Subsection 3.6, A.H.V.II).
    - Widening of Canal R-36, including associated culvert improvements.
    - Widening of conveyances in Dorothy Avenue area.
- Demonstrate that site will not impede the conveyance of contributing off-site flows.
- Provide documentation to support modeling tailwater conditions. Modeling must extend sufficiently upstream and downstream to assure no adverse stage increases upstream or downstream.
- The Big Slough Watershed Model will be used to demonstrate that proposed improvements will not increase flood stages up- or down-stream of the project area(s) based on Mean Annual, 10yr, 25yr and 100yr 24hr events.
- Please be aware that if there is credible historical evidence of past flooding or the physical capacity of the downstream conveyance or receiving waters indicates that the conditions for issuance will not be met without consideration of storm events of different frequency or duration, applicants shall be required to provide additional analyses using storm events of different duration or frequency than the 25-year 24-hour storm event, or to adjust the volume, rate or timing of discharges. [Section 3.0 Applicant's Handbook Volume II]

Water Quality Discussions: (Type of Treatment, Technical Characteristics, Non-presumptive Alternatives, etc.)

- It is anticipated that the project will not cause or contribute to pollutant loadings; please address with Application.

Sovereign Lands Discussion: (Determining Location, Correct Form of Authorization, Content of Application, Assessment of Fees, Coordination with FDEP)

- The project may be located within state owned sovereign submerged lands (SSSL). Be advised that a title determination will be required from FDEP to verify the presence and/or location of SSSL.
- If use of SSSL is proposed, authorization will be required. Refer to Chapter 18-21, F.A.C. and Chapter 18-20, F.A.C. for guidance on projects that impact SSSL and Aquatic Preserves.

Operation and Maintenance/Legal Information: (Ownership or Perpetual Control, O&M Entity, O&M Instructions, Homeowner Association Documents, Coastal Zone requirements, etc.)

- The permit must be issued to entity that owns or controls the property. City of North Port will be Applicant/permittee/O&M Entity.

Application Type and Fee Required:

For Conceptual ERP:

- Provide/address Sections A, C, and E of the ERP Application.
- Consult the fee schedule for fee.

Other: (Future Pre-Application Meetings, Fast Track, Submittal Date, Construction Start Date, Required District Permits – WUP, WOD, Well Construction, etc.)

- An application for an individual permit to construct or alter a dam, impoundment, reservoir, or appurtenant work, requires that a notice of receipt of the application must be published in a newspaper within the affected area. Provide documentation that such noticing has been accomplished. Note that the published notices of receipt for an ERP can be in accordance with the language provided in Rule 40D-1.603(10), F.A.C.
- The plans and drainage report submitted electronically must include the appropriate information required under Rules 61G15-23.005 and 61G15-23.004 (Digital), F.A.C. The following text is required by the Florida

Board of Professional Engineers (FBPE) to meet this requirement when a digitally created seal is not used and must appear where the signature would normally appear:

ELECTRONIC (Manifest): *[NAME] State of Florida, Professional Engineer, License No. [NUMBER] This item has been electronically signed and sealed by [NAME] on the date indicated here using a SHA authentication code. Printed copies of this document are not considered signed and sealed and the SHA authentication code must be verified on any electronic copies*

DIGITAL: *[NAME] State of Florida, Professional Engineer, License No. [NUMBER]; This item has been digitally signed and sealed by [NAME] on the date indicated here using a Digital Signature; Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.*

- Provide soil erosion and sediment control measures for use during construction. Refer to ERP Applicant's Handbook Vol. 1 Part IV Erosion and Sediment Control.
- Demonstrate that excavation of any stormwater ponds does not breach an aquitard (see Subsection 2.1.1, A.H.V.II) such that it would allow for lesser quality water to pass, either way, between the two systems. In those geographical areas of the District where there is not an aquitard present, the depth of the pond(s) shall not be excavated to within two (2) feet of the underlying limestone which is part of a drinking water aquifer. [Refer to Subsection 5.4.1(b), A.H.V.II]
- If lowering of SHWE is proposed, then burden is on Applicant to demonstrate no adverse onsite or offsite impacts as per Subsection 3.6, A.H.V.II. Groundwater drawdown 'radius of influence' computations may be required to demonstrate no adverse onsite or offsite impacts. Please note that new roadside swales or deepening of existing roadside swales may result in lowering of SHWE. Proposed ponds with control elevation less than SHWE may result in adverse lowering of onsite or offsite groundwater.

Disclaimer: The District ERP pre-application meeting process is a service made available to the public to assist interested parties in preparing for submittal of a permit application. Information shared at pre-application meetings is superseded by the actual permit application submittal. District permit decisions are based upon information submitted during the application process and Rules in effect at the time the application is complete.

Appendix J

North Port Big Slough Flood Reduction Study, Presentation to the North Port City Commission

DeLoach Engineering Science, PLLC., December 2018

North Port Big Slough Flood Reduction Study

Presentation to the
North Port City Commission

December 6, 2018

DeLoach Engineering Science
water resources and civil engineering

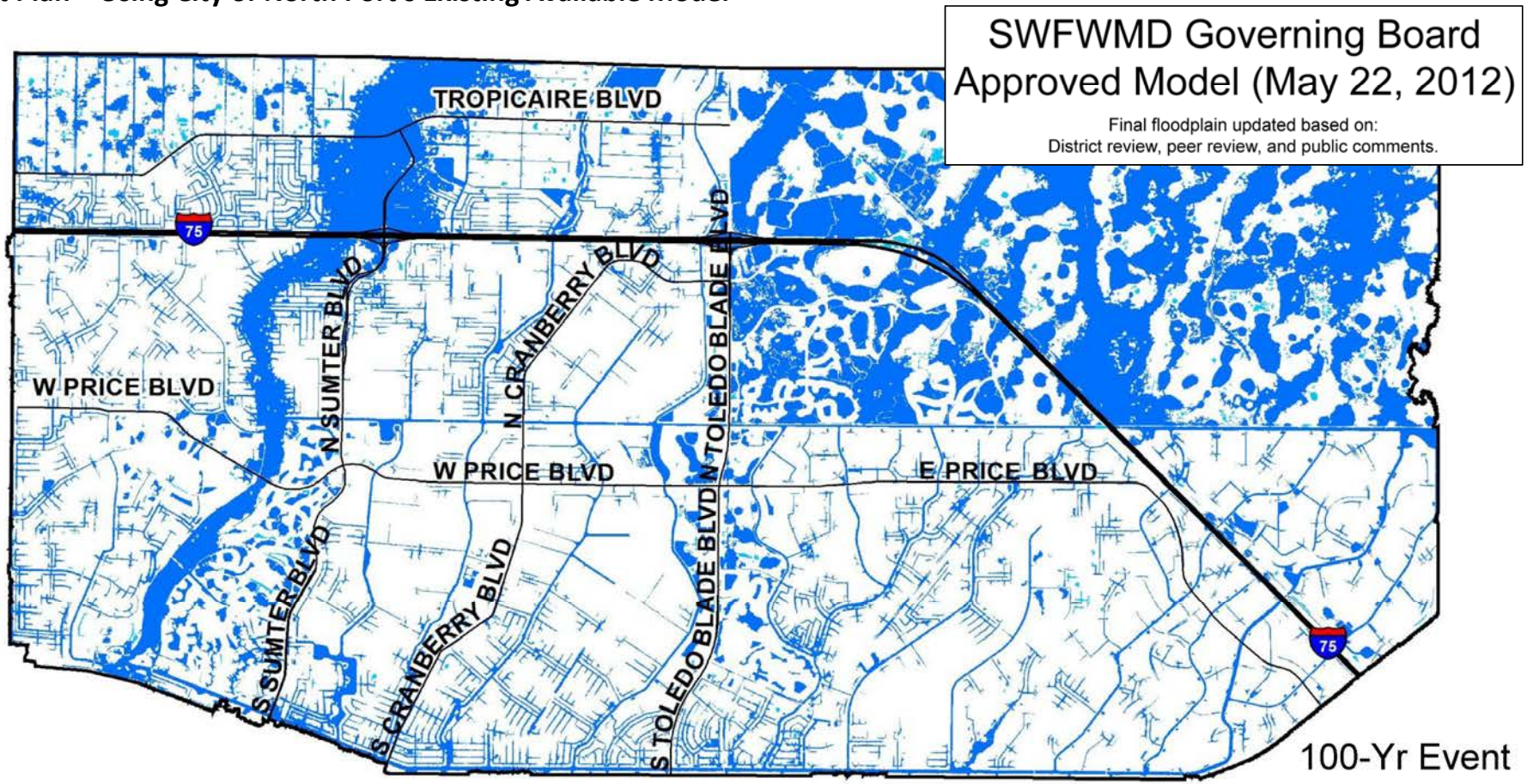
Project Plan – Scope of Work

"Evaluate the feasibility and cost effectiveness of solutions to reduce flooding"

- City of North Port Department of Public Works, Agreement #2016-48
- Cooperatively funded by and between the City of North Port and the SWFWMD
- Part 1 – localized along Myakkahatchee Creek within I-75 and Jockey Club areas
- Part 2 – preliminary regional concepts to mitigate flooding throughout City

North Port Big Slough Flood Reduction Study

Project Plan – Using City of North Port's Existing Available Model



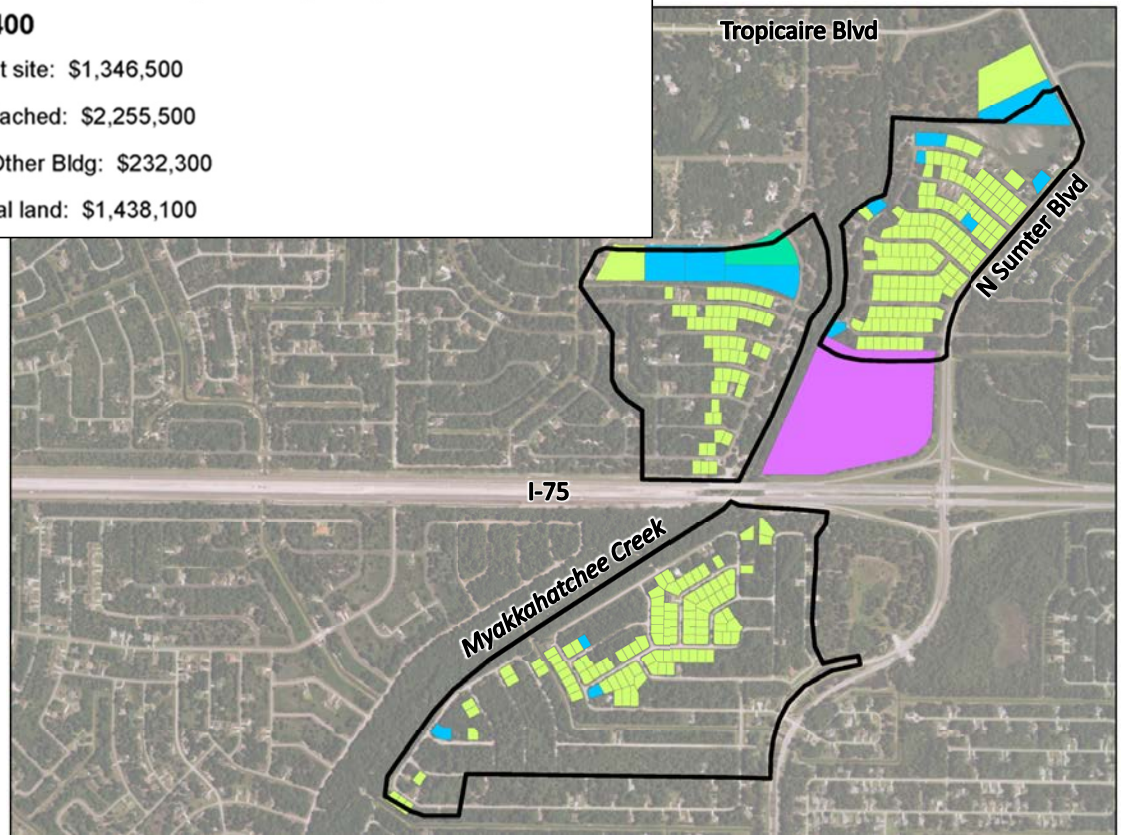
North Port Big Slough Flood Reduction Study

Project Plan – Focus on Local Areas of Recurring Flooding, I-75 Area

Parcels more than 50% inundated by a 1-day 10-year rainfall event

2017 Just Value: $5,272,400

- 0000 - Residential vacant site: $1,346,500
- 0100 - Single Family Detached: $2,255,500
- 010X - Single Family & Other Bldg: $232,300
- 1000 - Vacant commercial land: $1,438,100



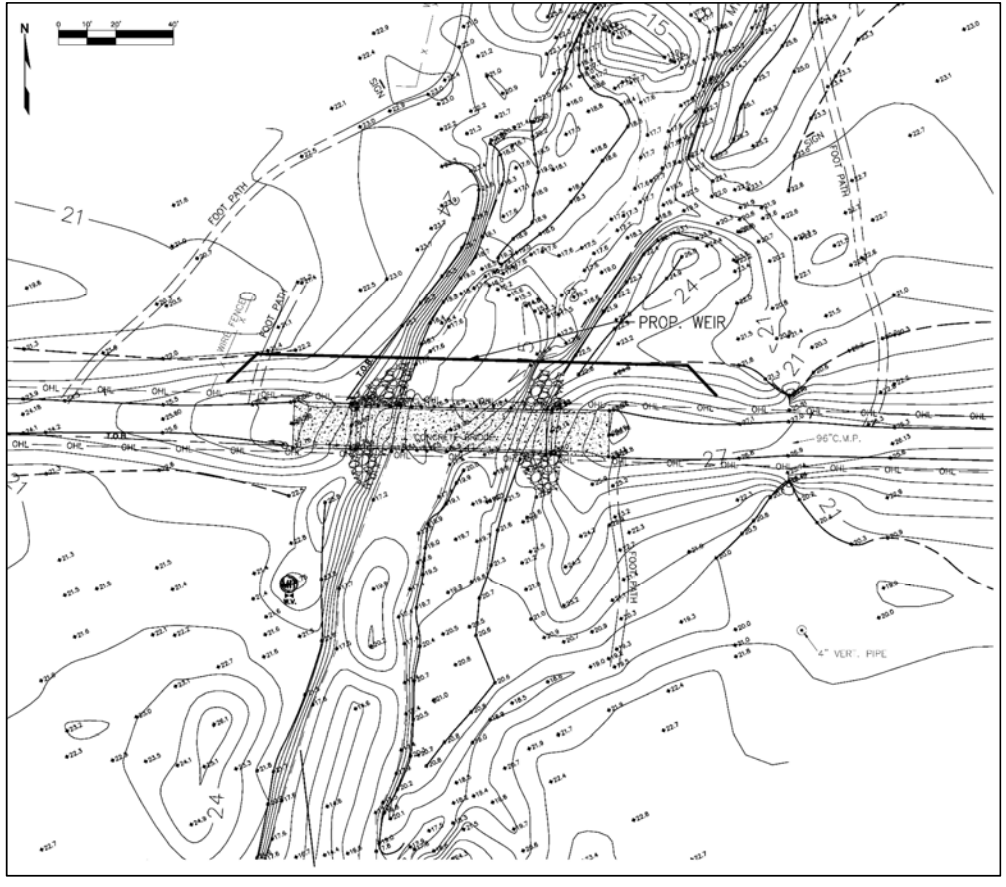
North Port Big Slough Flood Reduction Study

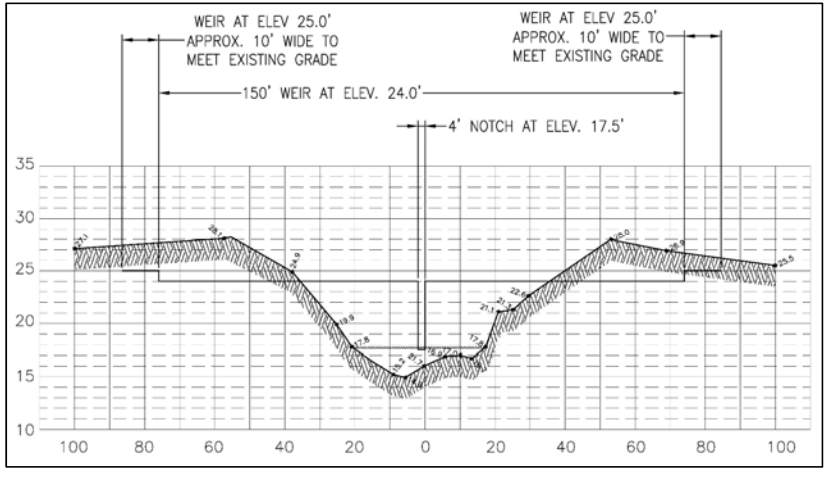
Project Plan – Focus on Local Areas of Recurring Flooding, Dorothy Avenue Area

Grobe Street at Herbison Avenue 9/11/17 after Hurricane Irma

North Port Big Slough Flood Reduction Study

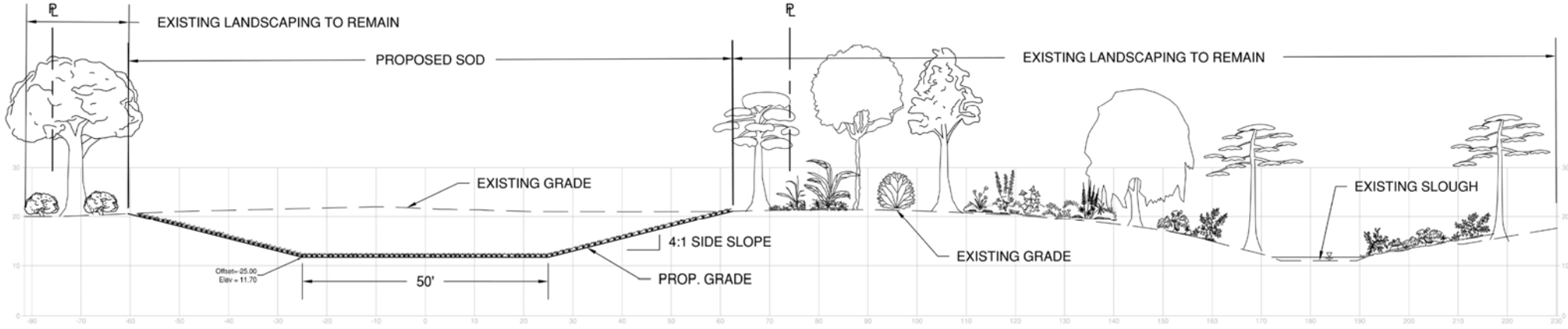
Regional Improvements (e.g., Reduce Offsite Inflows at FPL Easement North of City)





North Port Big Slough Flood Reduction Study

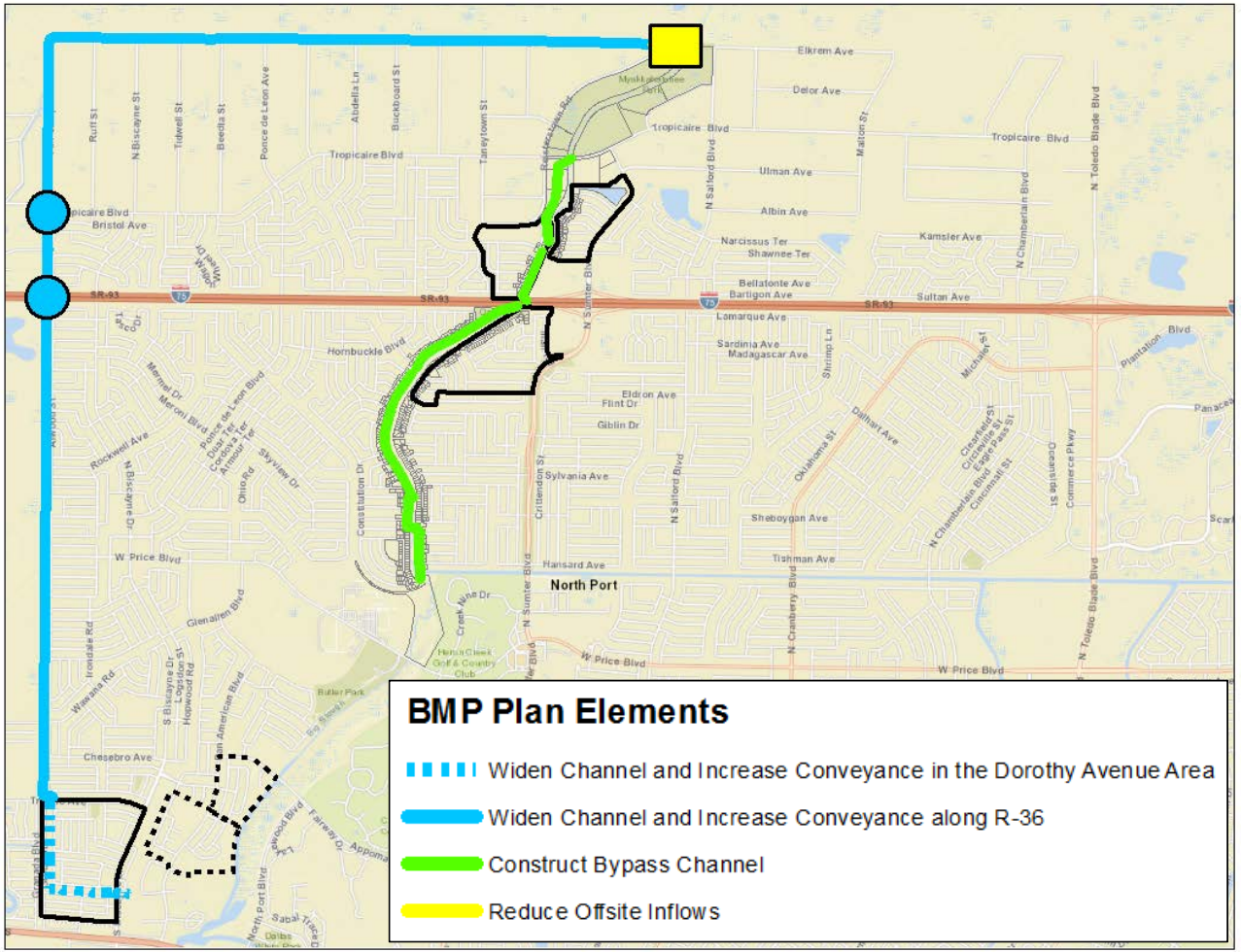
Local/Regional Improvements (e.g., Bypass Construction)



North Port Big Slough Flood Reduction Study

Recommended Plan – Plan Components

Project Components	105B
Existing Condition*	x
Dorothy (Single Box Culvert)	-
Dorothy (Triple Box Culvert)	x
R-36 Improvements	x
Bypass (flowway, n = 0.040)	x
Bypass (wetland, n = 0.150)	-
Reduce Northern Inflows	x
Other Planned Improvements	-



**** Existing Condition model updated from 2012 version***

North Port Big Slough Flood Reduction Study

Recommended Plan – Plan Components and Engineer's Opinion of Probable Costs

	Existing	Phasing			"Full Plan"		Best BCR	
Project Components	**101**	**102**	**103**	**104**	**105**	**105B**	**106**	**106A**
Existing Condition*	x	x	x	x	x	x	x	x
Dorothy (Single Box Culvert)	-	x	x	x	x	-	x	x
Dorothy (Triple Box Culvert)	-	-	-	-	-	x	-	-
R-36 Improvements	-	-	x	x	x	x	-	-
Bypass (flowway, n = 0.040)	-	-	-	x	x	x	x	-
Bypass (wetland, n = 0.150)	-	-	-	-	-	-	-	x
Reduce Northern Inflows	-	-	-	-	x	x	-	-
Other Planned Improvements	-	-	-	-	-	-	-	-
Estimated Combined Cost	**$ -**	**$ 1,299,000**	**$ 12,156,000**	**$ 29,422,000**	**$ 31,922,000**	**$ 32,771,594**	**$ 18,565,000**	**$ 22,018,200**
Estimated Annualized Cost		**$ 94,125**	**$ 880,822**	**$ 2,131,914**	**$ 2,313,063**	**$ 2,374,625**	**$ 1,345,217**	**$ 1,595,435**

Engineer's Estimate of Probable Construction Cost (by Component)

Existing Condition	$	-
Dorothy (Single Box Culvert)	$	1,299,000
Dorothy (Triple Box Culvert)	$	2,148,594
R-36 Improvements	$	10,857,000
Bypass (flowway, n = 0.040)	$	17,266,000
Bypass (wetland, n = 0.150)	$	20,719,200
Reduce Northern Inflows	$	2,500,000

North Port Big Slough Flood Reduction Study

Recommended Plan – Cost and Benefits

		Existing	Phasing			"Full Plan"		Best BCR	
Project Components		**101**	**102**	**103**	**104**	**105**	**105B**	**106**	**106A**
Existing Condition*		x	x	x	x	x	x	x	x
Dorothy (Single Box Culvert)		-	x	x	x	x	-	x	x
Dorothy (Triple Box Culvert)		-	-	-	-	-	x	-	-
R-36 Improvements		-	-	x	x	x	x	-	-
Bypass (flowway, n = 0.040)		-	-	-	x	x	x	x	-
Bypass (wetland, n = 0.150)		-	-	-	-	-	-	-	x
Reduce Northern Inflows		-	-	-	-	x	x	-	-
Other Planned Improvements		-	-	-	-	-	-	-	-
Estimated Combined Cost		**$ -**	**$ 1,299,000**	**$ 12,156,000**	**$ 29,422,000**	**$ 31,922,000**	**$ 32,771,594**	**$ 18,565,000**	**$ 22,018,200**
Estimated Annualized Cost			**$ 94,125**	**$ 880,822**	**$ 2,131,914**	**$ 2,313,063**	**$ 2,374,625**	**$ 1,345,217**	**$ 1,595,435**
Road Flood Reduction (miles)	2.33-year	-	0.4	1.2	7.7	7.7	7.8	7.5	7.4
	5-year	-	0.6	1.9	11.5	12.2	12.9	10.8	9.4
	10-year	-	0.3	2.7	16.8	18.0	18.3	14.8	11.9
	25-year	-	0.5	2.8	17.9	20.5	20.7	15.9	12.8
	50-year	-	0.6	2.5	18.3	20.9	21.1	16.7	13.8
	100-year	-	0.6	2.6	21.9	24.4	24.5	20.3	17.4
Parcels Reduction (touch)	2.33-year	-	68	113	807	854	863	811	791
	5-year	-	84	91	960	1024	1138	968	836
	10-year	-	49	98	1022	1125	1161	996	891
	25-year	-	58	90	1002	1138	1161	984	858
	50-year	-	66	152	1073	1175	1207	1012	865
	100-year	-	88	167	1170	1313	1313	1133	1000
Parcels Reduction (centroid)	2.33-year	-	0	39	232	233	234	230	223
	5-year	-	0	31	402	405	405	398	362
	10-year	-	0	15	515	538	538	505	427
	25-year	-	0	16	513	539	542	503	381
	50-year	-	0	27	510	563	562	480	366
	100-year	-	5	30	505	556	558	482	372
Estimated Annualized Benefit			**$ 25,216**	**$ 193,186**	**$ 1,889,975**	**$ 1,960,257**	**$ 1,977,742**	**$ 1,842,132**	**$ 1,636,307**
Est. Benefit/Cost Ratio (BCR)			**0.27**	**0.22**	**0.89**	**0.85**	**0.83**	**1.37**	**1.03**

North Port Big Slough Flood Reduction Study

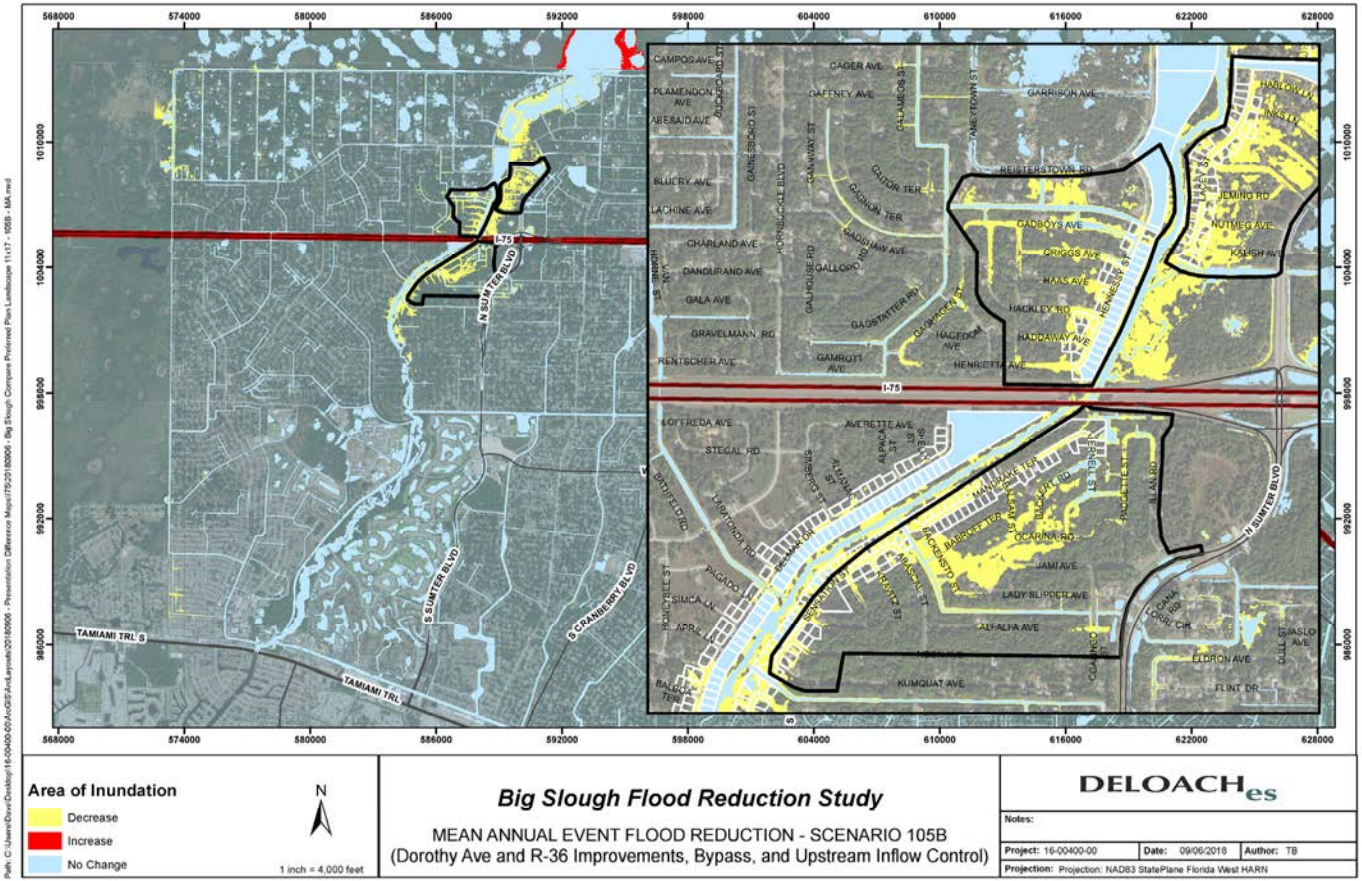
I-75 Area - Scenario 105B, Mean Annual Storm Event Flood Reduction

Project Components	105B
Existing Condition*	x
Dorothy (Single Box Culvert)	-
Dorothy (Triple Box Culvert)	x
R-36 Improvements	x
Bypass (flowway, n = 0.040)	x
Bypass (wetland, n = 0.150)	-
Reduce Northern Inflows	x
Other Planned Improvements	-

Estimated Combined Cost **$ 32,771,594**
Estimated Annualized Cost **$ 2,374,625**

Road Flood Reduction (miles)	2.33-year	7.8
	5-year	12.9
	10-year	18.3
	25-year	20.7
	50-year	21.1
	100-year	24.5
Parcels Reduction (touch)	2.33-year	863
	5-year	1138
	10-year	1161
	25-year	1161
	50-year	1207
	100-year	1313
Parcels Reduction (centroid)	2.33-year	234
	5-year	405
	10-year	538
	25-year	542
	50-year	562
	100-year	558

Estimated Annualized Benefit **$ 1,977,742**
Est. Benefit/Cost Ratio (BCR) **0.83**



North Port Big Slough Flood Reduction Study

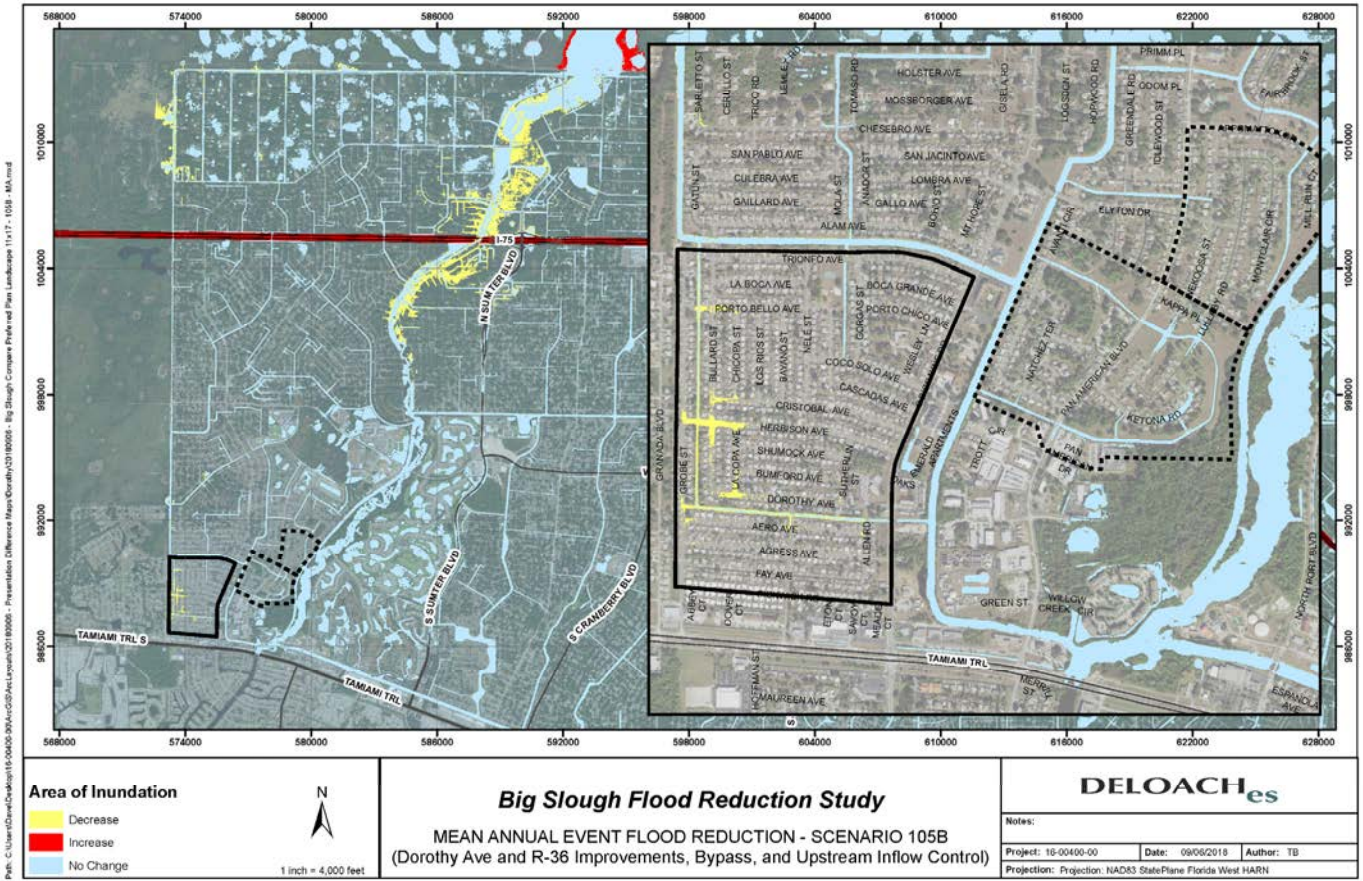
Dorothy Avenue Area - Scenario 105B, Mean Annual Storm Event Flood Reduction

Project Components	105B
Existing Condition*	x
Dorothy (Single Box Culvert)	-
Dorothy (Triple Box Culvert)	x
R-36 Improvements	x
Bypass (flowway, n = 0.040)	x
Bypass (wetland, n = 0.150)	-
Reduce Northern Inflows	x
Other Planned Improvements	-

Estimated Combined Cost **$ 32,771,594**
Estimated Annualized Cost **$ 2,374,625**

Road Flood Reduction (miles)	2.33-year	7.8
	5-year	12.9
	10-year	18.3
	25-year	20.7
	50-year	21.1
	100-year	24.5
Parcels Reduction (touch)	2.33-year	863
	5-year	1138
	10-year	1161
	25-year	1161
	50-year	1207
	100-year	1313
Parcels Reduction (centroid)	2.33-year	234
	5-year	405
	10-year	538
	25-year	542
	50-year	562
	100-year	558

Estimated Annualized Benefit **$ 1,977,742**
Est. Benefit/Cost Ratio (BCR) **0.83**



North Port Big Slough Flood Reduction Study

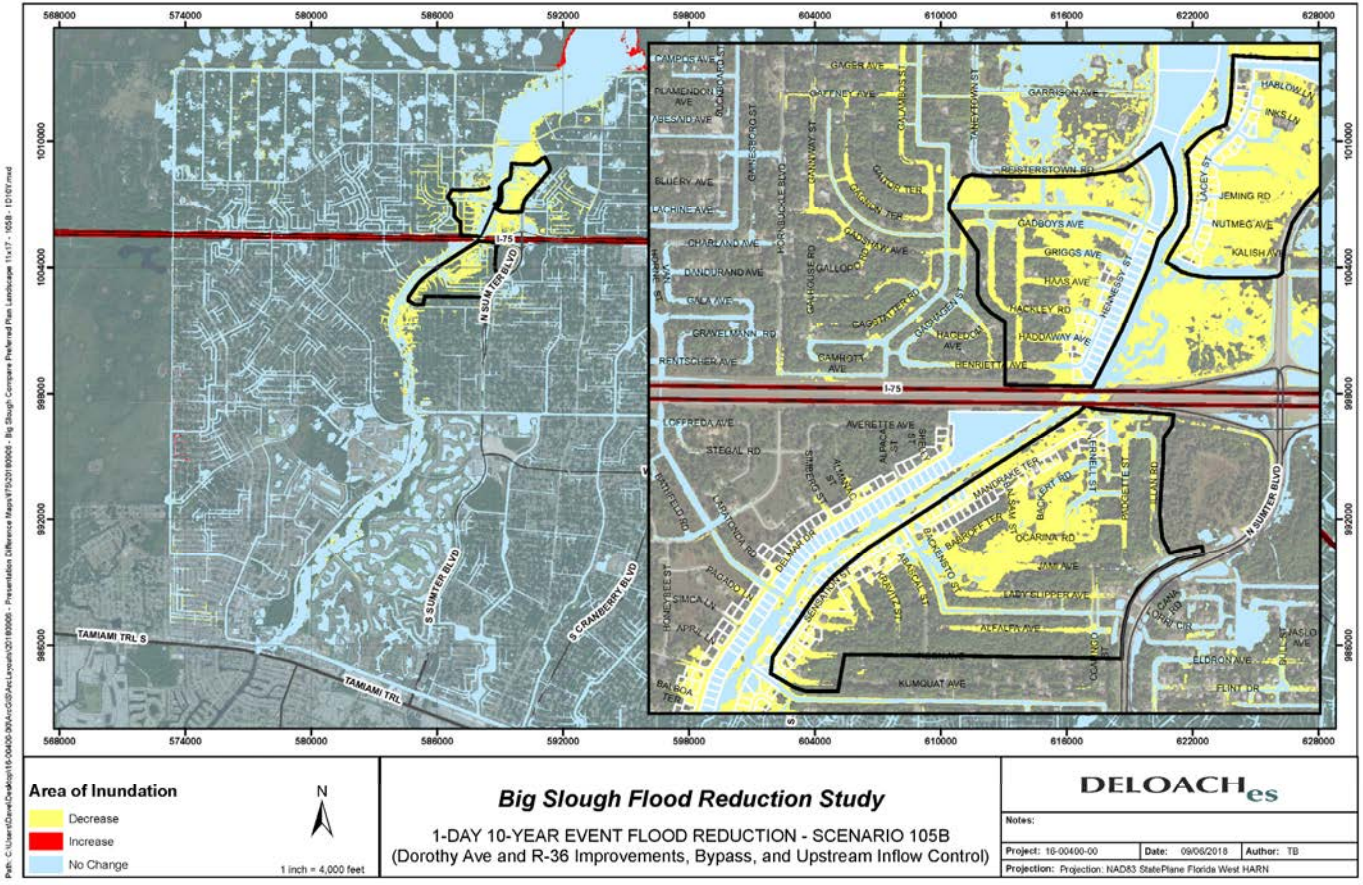
I-75 Area - Scenario 105B, 10-Year Storm Event Flood Reduction

Project Components	105B
Existing Condition*	x
Dorothy (Single Box Culvert)	-
Dorothy (Triple Box Culvert)	x
R-36 Improvements	x
Bypass (flowway, n = 0.040)	x
Bypass (wetland, n = 0.150)	-
Reduce Northern Inflows	x
Other Planned Improvements	-

Estimated Combined Cost **$ 32,771,594**
Estimated Annualized Cost **$ 2,374,625**

Road Flood Reduction (miles)	2.33-year	7.8
	5-year	12.9
	10-year	18.3
	25-year	20.7
	50-year	21.1
	100-year	24.5
Parcels Reduction (touch)	2.33-year	863
	5-year	1138
	10-year	1161
	25-year	1161
	50-year	1207
	100-year	1313
Parcels Reduction (centroid)	2.33-year	234
	5-year	405
	10-year	538
	25-year	542
	50-year	562
	100-year	558

Estimated Annualized Benefit **$ 1,977,742**
Est. Benefit/Cost Ratio (BCR) **0.83**


Area of Inundation
Decrease
Increase
No Change
N
1 inch = 4,000 feet
Big Slough Flood Reduction Study
1-DAY 10-YEAR EVENT FLOOD REDUCTION - SCENARIO 105B
(Dorothy Ave and R-36 Improvements, Bypass, and Upstream Inflow Control)
DELOACHes
Notes:
Project: 16-00400-00
Date: 09/06/2018
Author: TB
Projection: Projection: NAD83 StatePlane Florida West HARN
I-75
N SUMTER BLVD
S SUMTER BLVD
S CRANBERRY BLVD
TAMIAMI TRL S
TAMIAMI TRL
GAGER AVE
GARRISON AVE
GADSDEN AVE
GRIGGS AVE
HAAS AVE
HACKLEY RD
HADDAWAY AVE
HENRIETTA AVE
JEMING RD
NUTMEG AVE
KALISH AVE
HABLOW LN
INKS LN
LACEY ST
HENNESSY ST
CAPSTAFF RD
GALLOWAY AVE
GAITHER TER
GAITHER AVE
CHARLAND AVE
DANDURAND AVE
GRAVELMANN RD
RENTSCHLER AVE
CAMROSE AVE
CAMPBELL AVE
PLAMENDON AVE
ABSOND AVE
BLUERY AVE
MACHINE AVE
AVERETTE AVE
STEGALL RD
COFFREDA AVE
MANDRAKE TER
BACKEXIT RD
OCARINA RD
LADY SLIPPER AVE
ALFALFA AVE
KUMQUAT AVE
ELDRON AVE
FLINT DR
PACKARD ST
SIMCA LN
APRIL LN
BAYROA TER
HONEYBEE ST
ALMOND ST
ALPACA ST
ALBACORE ST
ANGELFISH ST
BARBADOS TER
CLOVERNOOK ST
ARAGONA RD
DELMAR DR
ROCKPORT ST
ROCKETTE ST
IVEY RD
SAM ST
CRANBERRY BLVD
CRANBERRY TER
CRANBERRY CIR
CRANBERRY ST
CRANBERRY LN
CRANBERRY WAY ST
CRANBERRY CROSSING
CRANBERRY BOG RD
CRANBERRY HOUSE RD
CRANBERRY WAY

North Port Big Slough Flood Reduction Study

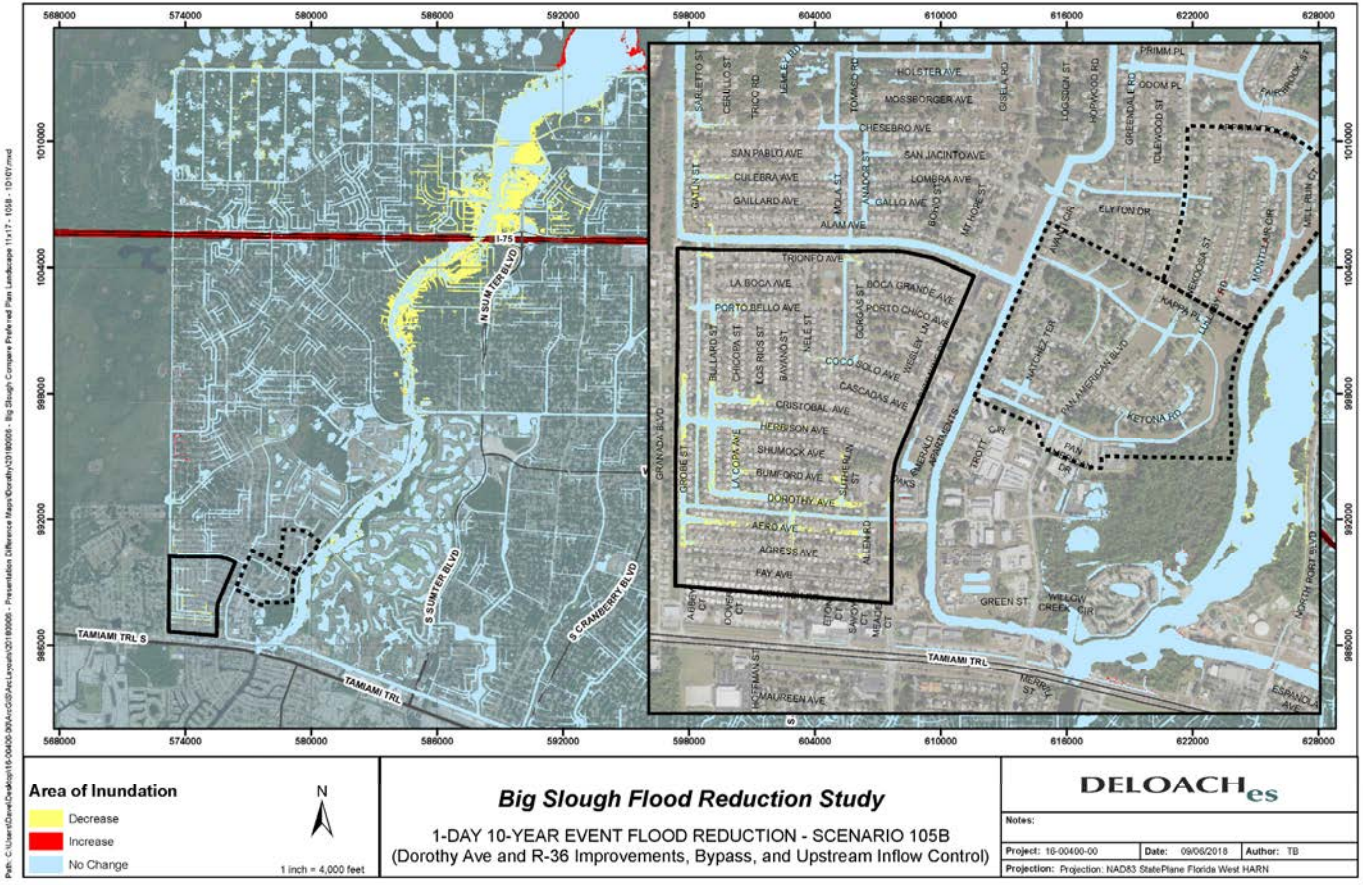
Dorothy Avenue Area - Scenario 105B, 10-Year Storm Event Flood Reduction

Project Components	105B
Existing Condition*	x
Dorothy (Single Box Culvert)	-
Dorothy (Triple Box Culvert)	x
R-36 Improvements	x
Bypass (flowway, n = 0.040)	x
Bypass (wetland, n = 0.150)	-
Reduce Northern Inflows	x
Other Planned Improvements	-

Estimated Combined Cost **$ 32,771,594**
Estimated Annualized Cost **$ 2,374,625**

Road Flood Reduction (miles)	2.33-year	7.8
	5-year	12.9
	10-year	18.3
	25-year	20.7
	50-year	21.1
	100-year	24.5
Parcels Reduction (touch)	2.33-year	863
	5-year	1138
	10-year	1161
	25-year	1161
	50-year	1207
	100-year	1313
Parcels Reduction (centroid)	2.33-year	234
	5-year	405
	10-year	538
	25-year	542
	50-year	562
	100-year	558

Estimated Annualized Benefit **$ 1,977,742**
Est. Benefit/Cost Ratio (BCR) **0.83**



North Port Big Slough Flood Reduction Study

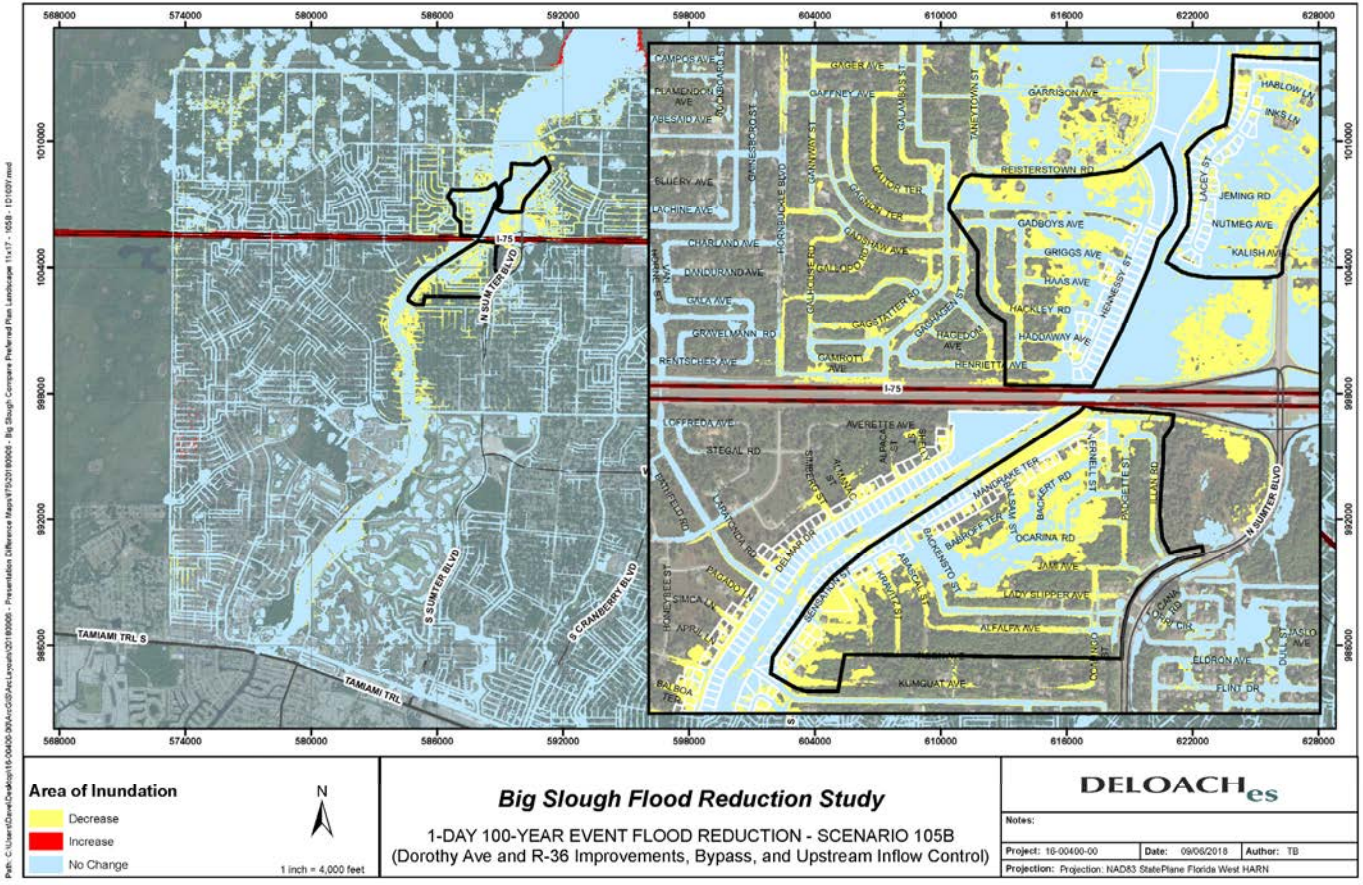
I-75 Area - Scenario 105B, 100-Year Storm Event Flood Reduction

Project Components	105B
Existing Condition*	x
Dorothy (Single Box Culvert)	-
Dorothy (Triple Box Culvert)	x
R-36 Improvements	x
Bypass (flowway, n = 0.040)	x
Bypass (wetland, n = 0.150)	-
Reduce Northern Inflows	x
Other Planned Improvements	-

Estimated Combined Cost **$ 32,771,594**
Estimated Annualized Cost **$ 2,374,625**

Road Flood Reduction (miles)	2.33-year	7.8
	5-year	12.9
	10-year	18.3
	25-year	20.7
	50-year	21.1
	100-year	24.5
Parcels Reduction (touch)	2.33-year	863
	5-year	1138
	10-year	1161
	25-year	1161
	50-year	1207
	100-year	1313
Parcels Reduction (centroid)	2.33-year	234
	5-year	405
	10-year	538
	25-year	542
	50-year	562
	100-year	558

Estimated Annualized Benefit **$ 1,977,742**
Est. Benefit/Cost Ratio (BCR) **0.83**



North Port Big Slough Flood Reduction Study

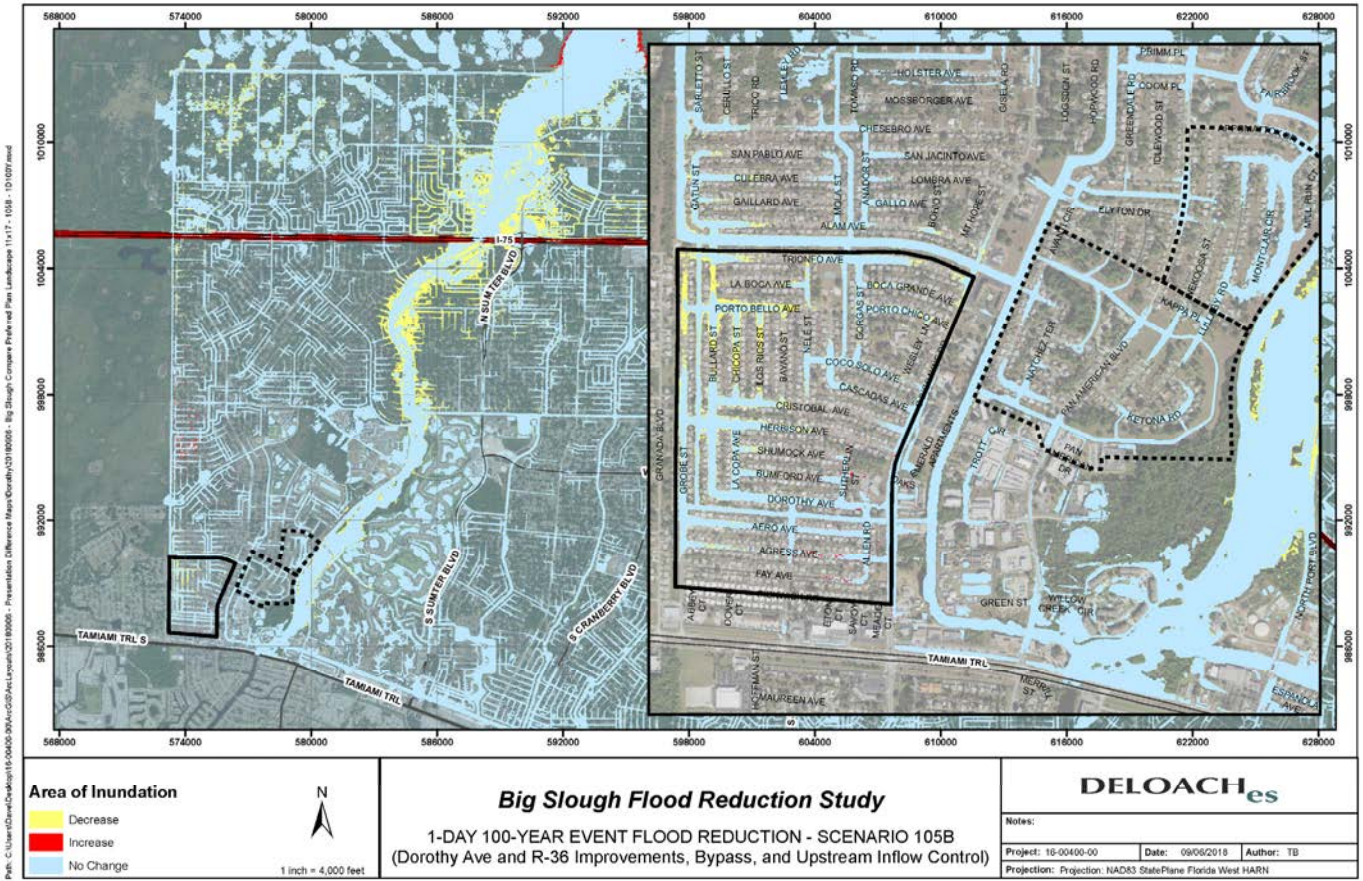
Dorothy Avenue Area - Scenario 105B, 100-Year Storm Event Flood Reduction

Project Components	105B
Existing Condition*	x
Dorothy (Single Box Culvert)	-
Dorothy (Triple Box Culvert)	x
R-36 Improvements	x
Bypass (flowway, n = 0.040)	x
Bypass (wetland, n = 0.150)	-
Reduce Northern Inflows	x
Other Planned Improvements	-

Estimated Combined Cost **$ 32,771,594**
Estimated Annualized Cost **$ 2,374,625**

Road Flood Reduction (miles)	2.33-year	7.8
	5-year	12.9
	10-year	18.3
	25-year	20.7
	50-year	21.1
	100-year	24.5
Parcels Reduction (touch)	2.33-year	863
	5-year	1138
	10-year	1161
	25-year	1161
	50-year	1207
	100-year	1313
Parcels Reduction (centroid)	2.33-year	234
	5-year	405
	10-year	538
	25-year	542
	50-year	562
	100-year	558

Estimated Annualized Benefit **$ 1,977,742**
Est. Benefit/Cost Ratio (BCR) **0.83**



North Port Big Slough Flood Reduction Study

North Port Big Slough Stormwater Management Master Plan – Apply for SWERP Conceptual Approval

Project Components	105B
Existing Condition*	x
Dorothy (Single Box Culvert)	-
Dorothy (Triple Box Culvert)	x
R-36 Improvements	x
Bypass (flowway, n = 0.040)	x
Bypass (wetland, n = 0.150)	-
Reduce Northern Inflows	x
Other Planned Improvements	-

Estimated Combined Cost $ **32,771,594**
Estimated Annualized Cost $ **2,374,625**

Road Flood Reduction (miles)	2.33-year	7.8
	5-year	12.9
	10-year	18.3
	25-year	20.7
	50-year	21.1
	100-year	24.5
Parcels Reduction (touch)	2.33-year	863
	5-year	1138
	10-year	1161
	25-year	1161
	50-year	1207
	100-year	1313
Parcels Reduction (centroid)	2.33-year	234
	5-year	405
	10-year	538
	25-year	542
	50-year	562
	100-year	558

Estimated Annualized Benefit $ **1,977,742**
Est. Benefit/Cost Ratio (BCR) **0.83**

Project Components	106
Existing Condition*	x
Dorothy (Single Box Culvert)	x
Dorothy (Triple Box Culvert)	-
R-36 Improvements	-
Bypass (flowway, n = 0.040)	x
Bypass (wetland, n = 0.150)	-
Reduce Northern Inflows	-
Other Planned Improvements	-

Estimated Combined Cost $ **18,565,000**
Estimated Annualized Cost $ **1,345,217**

Road Flood Reduction (miles)	2.33-year	7.5
	5-year	10.8
	10-year	14.8
	25-year	15.9
	50-year	16.7
	100-year	20.3
Parcels Reduction (touch)	2.33-year	811
	5-year	968
	10-year	996
	25-year	984
	50-year	1012
	100-year	1133
Parcels Reduction (centroid)	2.33-year	230
	5-year	398
	10-year	505
	25-year	503
	50-year	480
	100-year	482

Estimated Annualized Benefit $ **1,842,132**
Est. Benefit/Cost Ratio (BCR) **1.37**