CITY OF NORTH PORT

PROFESSIONAL ENGINEERING SERVICES FOR NPU NO. 2020-58

THIS IS NOT AN ORDER

Date:	**8/2/2022**
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CITY OF NORTH PORT
Utilities Department
6644 W. Price Blvd.
North Port, Florida 34291

Contact Person: **Michael Acosta, P.E., Engineering Mgr.**
Contact Phone: **941-240-8013**
Contact Fax: **941-240-8022**
Contact Email: **macosta@cityofnorthport.com**

Reply No Later Than: September 9, 2022 @ 2:00 p.m. (EST)

REQUEST FOR LETTERS OF INTEREST NO. 2023-04

CITY OF NORTH PORT
WATER RECLAMATION FACILITY EFFLUENT CHAMBER AND PUMPING SYSTEM EXPANSION

The City of North Port Utilities Department (NPU) is currently accepting letters of interest from firms for Professional Engineering Services for NPU, Category 1.

INTENT: It is the intention of NPU to secure the professional services of a qualified firm to design, permit and provide limited inspection during construction for the expansion of the effluent chamber and pumping capacity at the City's Water Reclamation Facility on Pan American Boulevard. The effluent chamber and pumping system is intended to meet full flow from the plant at design and maximum flows.

BACKGROUND/SCOPE OF SERVICES:

BACKGROUND

The City of North Port (CITY) owns and operates a water reclamation facility on Pan American Boulevard under FDEP permit FLA013378-018. The facility currently disposes of effluent via beneficial reuse and deep injection well. The existing effluent chamber and pumping system delivers reclaimed water from the facility to the deep injection well site via a 16-inch diameter pipeline. The City is also increasing the capacity of the pipeline via a separate project. The effluent chamber and pumping system capacity are being expanded to meet increasing demands on the system. The deep injection well system also disposes of concentrate from the Myakkahatchee Creek Reverse Osmosis Water Treatment Plant. Brown and Caldwell developed a preliminary design report, attached, that included an upgraded effluent chamber and pumping system.

SCOPE OF SERVICES

TASK 1- PROJECT MANAGEMENT AND COORDINATION

This task will include overall project management by the consultant and coordination with NPU, attendance at project meetings, and assistance with any permitting coordination as needed. This task will include a project kickoff meeting with NPU staff to review the project, regulatory concerns, and any items pertinent to the progress of the project.

Additional data may be requested as needed. The firm will work with NPU staff to acquire the information. This may include phone calls, meetings, site visits and email communications with staff.

TASK 2 – DESIGN AND PERMITTING

The firm will review existing data, including the plant's permit and the Brown and Caldwell Preliminary Design Report. The firm will then design and permit an effluent chamber and pumping system to meet plant hydraulic capacity of the water reclamation facility and the concentrate from the reverse osmosis plant. This task will include any hydraulic modeling required at the plant to ensure proper chamber and pump sizing. The hydraulic capacity of the injection well should also be included in the analysis. A technical memorandum shall be prepared and approved by NPU to confirm sizing of the effluent chamber and pumping system. This task will include FDEP permitting as well as any other permitting necessary to complete the project.

TASK 3 – SPECIFICATIONS AND DETAILS
The City's specifications and details will be used to the greatest extent possible with any additional specifications and details necessary for the project supplied by the selected firm.

TASK 4 – BID SERVICES
The firm shall develop a detailed, line item, unit price all-inclusive bid form, non-standard contract documents, and an estimate of the construction time for use by NPU. The firm will develop an Engineer's Opinion of Probable Cost for use by NPU in the bidding process. The firm will attend a pre-bid meeting as necessary and assist the City in answering contractor questions via addenda during the bidding process. Upon receipt of bids, the firm will evaluate the bids and make an award recommendation to the City.

TASK 5 SERVICES DURING CONSTRUCTION AND FDEP CERTIFICATION
The firm will provide shop drawing review and limited oversight during construction. The City will be actively involved in the inspection of the project as it proceeds. Upon completion, the firm will certify construction to FDEP to place the project into service.

TASK 6 – REPORT OF FINDINGS
The firm shall provide an electronic copy, and one original hard copy of their plans, technical specifications and details by 26 weeks after the Kickoff meeting. The technical specifications bid form and all other written material will be provided electronically in Microsoft Word or Excel format and portable document format (pdf). Any plans will be provided in (pdf) and in AutoCAD. Once this contract is complete, the technical specifications, bid form and details will become property of NPU and the City of North Port.

<u>DELIVERABLES</u>
The deliverables to be provided for this project include the following:

- Kick-off meeting minutes
- Data request
- Innovyze hydraulic model input and results (as applicable in Task 2)
- Technical memorandum on effluent chamber and pump sizing
- Plans and specifications for the project, 60, 90 and issued for bid sets
- Permit applications for FDEP and other agencies as necessary
- Up to two (2) Responses to FDEP Requests for Additional Information during the permitting process
- Construction layout
- Review of shop drawings/submittals, RFIs, and COs, as applicable
- Certification of construction completion to FDEP
- Record Drawings

<u>PROPOSAL REQUIREMENTS</u>
It is the responsibility of the Engineer to be knowledgeable of the City's FDEP permit, the facilities, and operational limitations of the system to determine the most appropriate installation method.

Engineers are to provide references for at least three (3) similar projects within the last 10 years. Name, email and phone numbers are required for appropriate contact for each reference.

Proposals shall specify the project team to include the project manager, task manager, and field staff, detailing each team member's specific experience as it relates to this project.

Proposals are to include the names of all subcontractors to be used on this project.

Any questions concerning this project must be submitted via email to both Michael Acosta, P.E. and Nicole Brown at macosta@cityofnorthport.com and nbrown@cityofnorthport.com, respectively no later than September 2, 2022.

ATTACHMENTS

1. Statement of Non-Submittal
2. Conflict of Interest Form
3. Disclosure for Consultant, Engineer, Architect
4. Scrutinized Companies Form
5. E-Verify Certification Form
6. Brown and Caldwell Preliminary Design Report, January 2007
7. FDEP permit FLA013378-018

All firms within Contract No. 2020-58, Category 1 are encouraged to submit a letter (not to exceed three single-sided pages) that provides the above information and adequately expresses why it would be in the City's best interest to select the submitting firm(s).

LETTERS OF INTEREST ARE TO BE DELIVERED TO THE UTILITIES DEPARTMENT ON OR BEFORE SEPTEMBER 9, 2022 AT 2:00 P.M. (EST) VIA EMAIL TO:

MICHAEL ACOSTA, P.E.: MACOSTA@CITYOFNORTHPORT.COM
AND
NICOLE BROWN: NBROWN@CITYOFNORTHPORT.COM.

STATEMENT OF NON-SUBMITTAL

If you **do not** intend to submit a bid on this service, please return this form (see information below) immediately.

We, the undersigned, have declined to submit a Letter of Interest for **RLI No. 2023-04 - WATER RECLAMATION FACILITY EFFLUENT CHAMBER AND PUMPING SYSTEM EXPANSION**

- ☐ Insufficient time to respond to the Request for Bid.
- ☐ We do not offer this product/service.
- ☐ Unable to meet bond/insurance requirements.
- ☐ Specifications are unclear (explain below).
- ☐ OTHER (please specify below).

REMARKS: ____

____

____

COMPANY NAME: ____

ADDRESS: ____

CITY:______________________ **STATE:**________**ZIP CODE:** ______________

TELEPHONE:______________________**FAX:**______________________

E-MAIL ADDRESS:____

SIGNATURE:______________________**DATE:** ______________________

PRINT NAME:______________________

Note: Please email "Statement of Non-Submittal" to:

MICHAEL ACOSTA, P.E.: MACOSTA@CITYOFNORTHPORT.COM
AND
NICOLE BROWN: NBROWN@CITYOFNORTHPORT.COM.

CONFLICT OF INTEREST FORM

F.S. §112.313 places limitations on public officers (including advisory board members) and employees' ability to contract with the City either directly or indirectly. Therefore, please indicate if the following applies:

PART l.

☐ I am an employee, public officer or advisory board member of the City
____ (List Position or Board)

☐ I am the spouse or child of an employee, public officer or advisory board member of the City
Name: ____

☐ An employee, public officer or advisory board member of the City, or their spouse or child, is an officer, partner, director, or proprietor of Respondent or has a material interest in Respondent. "Material interest" means direct or indirect ownership of more than 5 percent of the total assets or capital stock of any business entity. For the purposes of [§112.313], indirect ownership does not include ownership by a spouse or minor child.
Name: ____

☐ Respondent employs or contracts with an employee, public officer or advisory board member of the City
Name: ____

☐ None of The Above

PART ll:

Are you going to request an advisory board member waiver?

☐ I will request an advisory board member waiver under §112.313(12)

☐ I will NOT request an advisory board member waiver under §112.313(12)

☐ N/A

The City shall review any relationships which may be prohibited under the Florida Ethics Code and will disqualify any vendors whose conflicts are not waived or exempt.

BUSINESS NAME: ____

NAME(PERSON AUTHORIZED TO BIND COMPANY): ___________________________________

SIGNATURE: ____

THIS PAGE MUST BE SUBMITTED WITH LETTER OF INTEREST

DISCLOSURE FORM FOR CONSULTANT/ENGINEER/ARCHITECT

Please select only one of the following three options:

Print Form Clear All Fields

☐ Our firm has no actual, potential, or reasonably perceived, **financial*** or **other interest**** in the outcome of the project.

☐ Our firm has a potential or reasonably perceived **financial*** or **other interest**** in the outcome of the project as described here:

____.

Our firm proposes to mitigate the potential or perceived conflict according to the following plan:

____.

☐ Our firm has an actual **financial*** or **other interest**** in the outcome of the project as described here:

____.

***What does "financial interest" mean?**

If your firm, or employee(s) of your firm working on the project (or a member of the employee's household), will/may be perceived to receive or lose private income depending on the government business choices based on your firm's findings and recommendations, this must be listed as a financial interest. An example would be ownership in physical assets affected by the government business choices related to this project. The possibility of contracting for further consulting services is not included in this definition and is not prohibited.

****What does "other interest" mean?**

If your firm, or employee(s) of your firm working on the project (or a member of the employee's household), will/may be perceived to have political, legal or any other interests that will affect what goes into your firm's findings and recommendations, or will be/may be perceived to be affected by the government business choices related to this project, this must be listed as other interest.

BUSINESS NAME:____

NAME (PERSON AUTHORIZED TO BIND THE COMPANY): ______________________________

SIGNATURE:____________________________________ **DATE:**______________________

Scrutinized Company Certification Form

Company Name: ____

Authorized Representative Name and Title: ______________________________________

Address: ______________________ City: ______________________ State:__________ ZIP: ____________

Phone Number:______________________ Email Address:__________________________________

A company is ineligible to, and may not, bid on, submit a proposal for, or enter into or renew a contract with the City of North Port for goods or services of any amount if, at the time of bidding on, submitting a proposal for, or entering into or renewing such contract, the company is on the Scrutinized Companies that Boycott Israel List, created pursuant to Florida Statutes, section 215.4725, or is engaged in a boycott of Israel.

A company is ineligible to, and may not, bid on, submit a proposal for, or enter into or renew a contract with the City of North Port for goods or services of $1 million or more if, at the time of bidding on, submitting a proposal for, or entering into or renewing such contract, the company is on the Scrutinized Companies with Activities in Sudan List, the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, created pursuant to Florida Statutes, section 215.473, or with companies engaged in business operations in Cuba or Syria.

CHOOSE ONE OF THE FOLLOWING

☐ This bid, proposal, contract or contract renewal is for goods or services of less than $1 million. As the person authorized to sign on behalf of the above-named company, and as required by Florida Statutes, section 287.135(5), I hereby certify that the above-named company is not participating in a boycott of Israel.

☐ This bid, proposal, contract or contract renewal is for goods or services of $1 million or more. As the person authorized to sign on behalf of the above-named company, and as required by Florida Statutes, section 287.135(5), I hereby certify that the above-named company is not participating in a boycott of Israel, is not on the Scrutinized Companies with Activities in Sudan List or the Scrutinized Companies with Activities in the Iran Petroleum Energy Sector List, and it does not have business operations in Cuba or Syria.

I understand that pursuant to Florida Statutes, section 287.135, the submission of a false certification may result in the termination of the contract if one is entered into, and may subject the above-named company to civil penalties, attorney's fees and costs.

Certified By: ____
AUTHORIZED REPRESENTATIVE SIGNATURE

Print Name and Title: ____

Date Certified: ______________________

Solicitation/Contract/PO Number (Completed by Purchasing): ______________________

VENDOR'S CERTIFICATION FOR E-VERIFY SYSTEM

The undersigned Vendor/Consultant/Contractor (Vendor), certifies the following:

1. Vendor is a person or entity that has entered into or is attempting to enter into a contract with the City of North Port (City) to provide labor, supplies, or services to the City in exchange for salary, wages or other renumeration.

2. Vendor has registered with and will use the E-Verify System of the United States Department of Homeland Security to verify the employment eligibility of:

   a. All persons newly hired by the Vendor to perform employment duties within Florida during the term of the contract; and

   b. All persons, including subcontractors or subconsultants, assigned by the Vendor to perform work pursuant to the contract with the City.

3. If the Vendor becomes the successful Contractor who enters into a contract with the City, then the Vendor will comply with the requirements of Section 448.095, Fla. Stat. "Employment Eligibility", as amended from time to time.

4. Vendor will obtain an affidavit from all subcontractors attesting that the subcontractor does not employ, contract with, or subcontract with, an unauthorized alien as defined in 8 United States Code, Section 1324A(H)(3).

5. Vendor will maintain the original affidavit of all subcontractors for the duration of the contract.

6. Vendor affirms that failure to comply with the state law requirements can result in the City's termination of the contract and other penalties as provided by law.

7. Vendor understands that pursuant to Florida Statutes, section 448.095, the submission of a false certification may result in the termination of the contract if one is entered into, and may subject the Vendor named in this certification to civil penalties, attorney's fees and costs.

VENDOR: ____ (Vendor's Company Name)

Certified By: ____

AUTHORIZED REPRESENTATIVE SIGNATURE

Print Name and Title: ____

Date Certified: ___________________________

City of North Port, Florida

Existing Wastewater Treatment Facility Upgrades & Expansion

Preliminary Engineering Report

January 2007

BROWN AND CALDWELL

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LIST OF ACRONYMS

A - Amps
AADF - Annual average daily flow
ADF - Average daily flow
AE - Aeration efficeincy
$Al_2(SO_4)_3$ - Alum
ANSI - American National Standards Institute
AOTR - Actual oxygen transfer rate
ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers
ASR - Aquifer storage recovery
ATAD - Autothermal thermophilic aerobic digestion
bls - Below land surface
°C - Degrees Centigrade
CBOD5- 5-day Carbonaceous biochemical oxygen demand
CCC - Chlorine contact chamber
CCI - Construction cost index
CCTV - Closed circuit television
CH3COOH - Acetic acid
City - City of North Port
COD - Chemical oxygen demand
CO_2 - Carbon dioxide
CST - Capillary suction time
CT - Concentration time
dBA - Decibels on A rated scale
DCS - Distributed control system
DIP - Ductile iron pipe
DIW - Deep injection well
EPDM - Ethylene propylene diene monomer
ENR - Engineering News Record
°F - Degrees Fahrenheit
FAC - Florida Administrative Code
Fac - Acetic acid fraction
Fbs - Readily biodegradable COD fraction
FDEP - Florida Department of Environmental Protection
$FeCl_3$ - Ferric chloride
F/M - Food to microorganisms ratio
Fna - NH3-N-to-TKN ratio
FOG - Fats, oils and grease
FPC-16 - Flow proportioned composite sampler taken during a period of 16-hours
fpm - Feet per minute
F_{PO4} - Phosphate to Total Phosphorus fraction
fps - Feet per second
FRP - Fiberglass reinforced plastic
FS - Florida Statutes
FSS -Fixed suspended solids
ft - Feet
Fup - Unbiodegradable particulate COD fraction
Fus - Readily undegradable COD fraction
Fxsp - Slowly biodegradable particulate COD fraction
GIS - Geographical information systems
gpd/ft - Gallons per day per foot
gpd/sf - Gallons per day per square foot
gph - Gallons per hour
gpm - Gallons per minute
gpm/m - Gallons per minute per meter
gpm/sf - Gallons per minute per square foot
H_2S - Hydrogen sulfide
HCl - Hydrochloric acid
HDPE - High density polyethylene
HP - horsepower
HP/MG - Horsepower per million gallons
HVAC - Heating, ventilation, and air conditioning
I/I - Infiltration/Inflow
I/O - Input/Output
IRML - Internal recycled mixed liquor
ISA - Instrumentation, Systems, and Automation Society
kW - Kilowatts
kwh - Kilowatt hours
lbs - Pounds
lbs/m/hr - Pounds per meter per hour
lbs/ton - Pounds per ton
LED - Light-emitting diode
LP - Liquid propane
mA - Milliamp
MCC - Motor control center
MCRT - Mean cell residence time
MDF - Maximum daily flow
MG - Million gallons
mgd - Million gallons per day
mg/kg - Milligrams per kilogram
mg/L - Milligrams per liter
MIF - Maximum instantaneous flow
MIT - Mechanical integrity test
ml - Millilitiers
ML - Mixed liqour
MLE - Modified Ludzack Ettinger
mL/g - Milliliters per gram
MLSS - Mixed liquor suspended solids
MLVSS - Mixed liquor volatile suspended solids
mm - Milimeters
MMADF - Maximum month average daily flow

MOR - Monthly operating report
Mrad - Megarad
MSF - Maximum solids flux
M3MADF - Maximum 3-month average daily flow
M24HF - Maximum 24-hour flow
mV - Millivolts
NaOCl - Sodium hypochlorite
NEC - National Electric Code
NEMA - National Electrical Manufacturers Association
NFPA - National Fire Protection Association
NH3-N - Ammonia as nitrogen
nm - nanometers
NO2-N - Nitrite as nitrogen
NO3-N - Nitrate as nitrogen
NPDES - National Pollution Discharge Elimination System
NTU - nephelometric turbidity units
O&M - Operation and maintenance
ON - Organic Nitrogen
ORP - Oxidation reduction potential
OSHA - Occupational Safety and Health Administration
OTE - Oxygen transfer efficeincy
OTR - Oxygen transfer rate
PER - Preliminary Engineering Report
PFD - Process flow diagram
PHF - Peak hourly flow
P&ID - Process and instrumentation diagram
PLC - Programable Logic Controller
PO4-P - Orthohosphate as phospohrus
ppd/sf - Pounds per day per square foot
psi - Pounds per square inch
ppd - Pounds per day
PTZ - Pan, tilt, zoom
ROW - Rights of way
RCP - Reinforced concrete pipe
RFI - Request for additional information
SCADA - supervisory control and data acquisition system
scfm - Standard cubic feet per minute
SLR - Solids loading rate
SON - Soluble Organic Nitrogen
SOR - Surface overflow rate
SOTE - Standard oxygen transfer efficiency
SOTR - Standard oxygen transfer rate
SPA - State Point Analysis
SRT - Solids retention time
SU - Standard units
SVI - Sludge volume index
SWRWMD - Southwest Regional Water Management District
3MADF - Three-month average daily flow
TAC - Technical Advisory Committee
TDS - Total dissolved solids
TFS - Total fixed solids
TKN - Total Kjeldahl nitrogen
TN - Total nitrogen
TP - Total phosphorus
TS - Total solids
TSS - Total suspended solids
TVS -Total volatile solids
TVSS - Total volatile suspended solids
UIC - Underground Injection Control
RAI - Request for additional information
RAS - Return activated sludge
RFMT - Flow meter with a recorder and totalizer
PVC - Polyvinyl chloride
PVDF - Polyvinylidene fluoride
UL - Underwriters Laboratories
UPS - Uninterruptable power supply
USDW - Underground source of drinking water
UV – Ultraviolet
USDW - Underground source of drinking water
USEPA - United State Environmental Protection Agency
V - Volt
VDS -Volatile dissolved solids
VFA - Volatile fatty acids
VFD - Variable frequency drives
VS - Volatile solids
VSS - Volatile suspended solids
WAN - Wide area network
WAS - Waste activated sludge
WLR - Weir loading rate
WRS - Water Resources Solutions
WWTF - Wastewater treatment facility

1. INTRODUCTION

Based on projected wastewater needs of the City of North Port (City) and proposed revised effluent standards, the City's existing Wastewater Treatment Facility (WWTF) must be expanded and upgraded. This Preliminary Engineering Report (PER) describes the City's existing WWTF and summarizes the assumptions and design criteria for the proposed expansion and upgrade of the facility. This report will support the permit application required by the Florida Department of Environmental Protection (FDEP) in order to modify, upgrade and expand the facility. In addition to identifying the improvements necessary to meet future growth, the preliminary engineering phase of the wastewater expansion project will also provide the City with a site master plan for build-out conditions at the existing WWTF location.

1.1 Background

The City owns and operates one WWTF with a permitted capacity of 3.7 million gallons per day (mgd), based on a maximum 3-month average daily flow (M3MADF) flow basis. The WWTF is located on the west side of Pan American Boulevard just north of U.S. Highway 41 and is operated under a FDEP domestic wastewater facility permit (No. FLA013378). A copy of the permit, which is currently under review by FDEP for renewal, is provided in Appendix A.

Based on typical engineering planning guidelines, the 3.7mgd M3MADF permitted treatment capacity at the WWTF correlates to an annual average daily flow (AADF) of approximately 3.1 mgd. The other design flows of the WWTF can be summarized as follows:

- Annual Average Daily Flow (AADF) = 3.1 mgd
- Maximum Three Month Average Daily Flow (M3MADF) = 3.7 mgd
- Maximum Month Average Daily Flow (MMADF) = 4.0 mgd
- Maximum Daily Flow (MDF) = 6.4 mgd
- Peak Hourly Flow (PHF) = 8.3 mgd
- Maximum Instantaneous Flow (MIF) = 12.5 mgd

The WWTF is classified as an extended aeration activated sludge facility with screening, grit removal, coarse bubble aeration, and secondary clarification. Effluent from this facility is either distributed to a public access reclaimed water system or to a Class I deep injection well (DIW). The effluent that is diverted to the reclaimed water system undergoes additional treatment, which includes filtration and high level disinfection prior to distribution to the reuse customers.

The reclaimed water system is regulated under the WWTF FDEP operating permit, (No. FLA013378) as well as Rule 62-610-450, FAC and currently serves two primary customers - Sabal Trace (residential development and golf course) and Heron Creek (residential development and golf course). Additionally, the City uses reclaimed water to irrigate some City owned properties including the North Port Skate Park and road rights-of-way (ROW). The capacity of the reclaimed water system is approximately 1.9 mgd on an AADF basis, and is limited by the capacity of the effluent filtration system at the WWTF. Treated reclaimed water is transferred to a 400,000 gallon reclaimed water ground storage tank on the WWTF site from where an on-site pump station delivers it to the reclaimed water distribution system. The pump station consists of three constant speed pumps (one 25-HP and two 50-HP) and has a firm capacity of 1.63 mgd at a design operating pressure of 60 psi.

Reclaimed water is pumped northeast approximately 2-miles through a 10-inch force main to an off-site 600,000 gallon reclaimed water ground storage tank located at the Sabal Trace Golf Course, which is owned and operated by the City. This storage tank is used to supply reclaimed water to the Sabal Trace Golf Course irrigation system. In addition, the City delivers reclaimed water to two irrigation ponds on the Heron Creek development through a 12-inch pipeline from where it is transferred to the golf course irrigation system. The storage tank is owned and operated by the City whereas, the irrigation pumps are owned, operated and maintained by the golf course. The two irrigation ponds are privately owned and maintained by the developer.

Effluent from the WWTF that is not distributed in the reclaimed water system is pumped approximately 3-miles through a 16-inch diameter pipeline and disposed of through the Class I DIW, located southwest of the City core area just west of the City on the Charlotte County/City border and east of the Myakka River.

The Class I DIW is regulated by the FDEP through a Class I municipal injection well system permit (No. 131285002-UO) and the Underground Injection Control (UIC) Department under Rules 62-4, 62-520, 62-522, 62-528, 62-600, and 62-610 of the Florida Administrative Code (FAC). The Class I DIW has been in operation for approximately 20 years and is currently permitted for a maximum injection rate of 5.32 mgd, at a maximum pressure of 84 pounds per square inch (psi) at the well head. The Class I DIW is approximately 3,200 feet deep with 1,105 feet of 14-inch diameter casing. The Class I DIW system also includes 2 groundwater monitoring wells. One monitoring well is located on the DIW site and the other is located approximately 4,150 feet north of the site.

The City's wastewater biosolids processing operations were changed a little over a year ago. The City currently aerates the waste activated sludge (WAS) in the holding tank (with no lime stabilization) and contracts with a private residuals management company, Synagro Southeast Incorporated for final handling and disposal of the solids. Synagro utilizes a mobile unit equipped with a gravity belt thickener and belt filter press to dewater the sludge. This process produces biosolids with approximately 18percent solids, which are hauled by the contractor to the Okeechobee landfill. Filtrate from the dewatering process is returned to the WWTF headworks for treatment.

Previously, the WAS was stabilized through the addition of lime in the aerobic digestion tanks. Under this mode of operation, the liquid stabilized Class B biosolids were then removed from the facility in liquid form by a contracted hauler who disposed of it by land application. This process was decommissioned by the City due to increased operator attention and equipment maintenance which increased the City's operational costs. In addition, the process generated significant odors. The WWTF still has the facilities required to treat biosolids to Class "B" standards should the need arise.

1.2 Objectives

Based on wastewater utility needs identified in the City of North Port Utility Master Plan (Black and Veatch, 2005), an expansion of the capacity of the existing WWTF to 7.0 mgd, based on a M3MADF basis is proposed. The objective of this report is to identify the plant modifications and improvements needed to increase the permitted capacity of the WWTF to 5.7mgd on an AADF basis, and provide an effluent that meets the following criteria:

- 5-day Carbonaceous biochemical oxygen demand ($CBOD_5$): < 5 milligrams per liter (mg/L)
- Total suspended solids (TSS): < 5 mg/L
- Total Nitrogen (TN) < 10 mg/L

- High level disinfection pursuant to Rule 62-610, FAC

This report will support the permit application required by the FDEP to modify and expand this facility. This report will be prepared to meet the wastewater treatment facility permitting requirements of Rules 62-604 and 62-620, FAC. In addition to identifying the improvements necessary to meet future growth and new regulatory requirements, the preliminary engineering phase of the wastewater expansion program will also provide the City with a site master plan for build-out conditions at the existing WWTF location.

1.3 Authorization

The City has authorized Brown and Caldwell to develop this PER as part of the City's overall Wastewater Management Program, Agreement 2005-18, and issued the notice to proceed on February 23, 2006.

1.4 Scope of Work

The objective of this project is to provide sufficient wastewater treatment and effluent disposal capacity to support the development in the city for the next 20 years. The engineering services associated with this project include identification of the improvements needed to provide the required capacity at the existing WWTF and provision of the permitting and design services necessary for construction of the improvements. Because it is not yet possible to define the initial improvements that will be designed as part of the project, the initial Scope of Services for this phase of the project only includes the work associated with preparation of the PER and the application for a construction permit from the FDEP. The PER will provide the City with a site master plan and the bases of design for initial and future improvements at the existing WWTF. The PER will also provide the bases for permitting of initial improvements by the FDEP. Subsequent phases of work will include detailed design, assistance during bidding and construction phase services.

Following is a summary description of the work activities performed by Brown and Caldwell during the initial PER and permitting phase of the project:

- **Project Management** - Project management includes contract administration and project coordination with City staff including attendance at project review and other meetings.
- **Facility Inspection and Data Review** - This task involves the review of information about the existing WWTF and an assessment of its current condition. Information gathered during this process was used in development and evaluation of alternative concepts for plant expansion and upgrade. For this purpose, each individual process unit and structure was identified and evaluated. Hydraulic bottlenecks and flow distribution problems throughout the existing treatment facility were also identified.
- **Other plant/facility assessments** - will include structural and electrical evaluation of the facilities. Structural inspections will seek to establish the structural integrity of existing tankage and buildings. However, proposed structural inspections were limited to what can be observed from the surface and the exterior of the tanks but did not include taking any units out of service. The electrical equipment inspection served to establish the long-term integrity of the electrical power supply and distribution system for the existing WWTF.
- **Wastewater Characterization Program** - In addition to the collection and review of historic influent and effluent wastewater data, a special sampling program was conducted to better characterize the wastewater received at the plant and to establish the current treatment performance of the facility. The proposed sampling plan was completed within a period of 3-weeks with 6-days of composite sampling events, and 3-days of diurnal (discrete) sampling events. The data obtained during sampling was used in conjunction with historical operating data to calibrate the BioWin™ simulation model developed for the facility.

The main objective of the intensive sampling program was to provide information on:

a. Influent wastewater characteristics - for example: the distribution of influent organic material into biodegradable and unbiodegradable fractions; the fraction of the influent Total Kjeldahl Nitrogen (TKN) in the form of ammonia, etc.

b. The form of the diurnal influent flow and the concentration patterns (e.g., chemical oxygen demand (COD), TKN, ammonia, etc.) and.

c. The performance of the treatment systems.

- Preliminary Engineering Report - In this task, a PER was prepared addressing the wastewater treatment facility permitting requirements of Chapters 62-604 and 62-620, FAC. The PER involved the following engineering efforts:

  a. Wastewater Process Design and Modeling - Using current influent flows and loads to the existing WWTF, a wastewater process model using BioWin™ was developed. The BioWin™ model was used to size process units to achieve the City's treatment objectives at the existing WWTF both now and in the future. The facility is being designed to meet Class I reliability requirements and to produce an effluent that meets standards for public access reuse. Residuals management consists of aerated sludge holding, and contract dewatering and hauling via the existing City's contract with Synagro™.

  Process flow diagrams and site layouts were also be developed. Site layouts identify the general flow stream layout and unit process locations; potential unit processes by phase and at build-out; anticipated increments for WWTF expansions based on anticipated projections; and setback requirements at build-out on all sides of the property. The process flow diagrams and mass balances were developed for the critical effluent water quality parameters. Preliminary assessments of the probable opinion of the capital and O&M costs for each process alternative were also developed. The applicable design criteria for the treatment process alternatives selected were developed and described.

  b. Process Hydraulics - Review of the process design concepts developed, which will include flow routing, hydraulic capacity assessment, layout of facilities, flexibility for future expansion, and reliable capacity based on selected design criteria. The hydraulic bottlenecks and flow distribution problems throughout the existing treatment units were identified. A hydraulic profile will be developed for the AADF, MMADF and MDADF flows and all internal recycle streams. The hydraulic profiles will be developed for existing and proposed conditions.

  c. Energy Management Requirements - The power requirements through ultimate build-out of the facilities were estimated. This includes feeders, switching, voltage transformers and sectionalizing gear requirements; anticipated downtime frequencies and durations and standby protection with bumpless transfer. Probable opinion of construction costs for feeders and corresponding equipment, as well as anticipated power rates, are also provided.

  d. Instrumentation and Controls System – Conceptual plans for the overall control system architecture and control and monitoring strategies for defining local manual/automatic and remote manual/automatic monitoring and process control requirements that are compatible with the City's existing system were developed. The efforts included development of preliminary process and instrumentation diagrams (P&IDs) and control descriptions. It is anticipated that the control system architecture diagrams and control and monitoring strategies determined for the existing WWTF will form the basis of design for the lift stations and other two WWTFs proposed for construction by the City.

e. Control of Odor, Noise and Environmental Impacts - Control of odors, noise and other potential environmental impacts during construction, future expansions, and sustained operation were evaluated and mitigation measures incorporated into the design.

The odor control plan will include the identification of anticipated odor sources; use and type of basin covers; type, number and location of odor control systems; and type and location of odor control ductwork. Odor threshold and visibility impacts are incorporated into odor control plan. Evaluation includes but was not limited to the following odor control technologies: wet chemical scrubber, carbon adsorption, liquid stream (chemical addition), or combination thereof.

The noise abatement plan includes the identification of anticipated noise sources; and use, type, number, and location of noise abatement systems. The noise threshold and visibility impacts were incorporated into an overall noise abatement plan.

The lighting mitigation plan for the site to minimize impacts of associated visual impacts of the facilities on the neighboring community includes the identification of anticipated light sources; and use, type, number, and location of light mitigation features.

f. Preliminary Design of Initial Plant Improvements - Preliminary design of the recommended improvements to increase AADF capacity at the existing WWTF from 3.1 mgd to a flow that can be documented, while not impacting the overall treatment operations and capabilities of the treatment process units was carried out. This includes additional BioWin® modeling for process design, hydraulic modeling through the various unit processes to create a hydraulic profile, and other calculations to determine sizing of structures and mechanical equipment such as blowers, piping and pumps. For all unit processes, a detailed basis of design was prepared that, defines the design criteria to be applied during detailed design.

g. Preliminary Opinion of Cost - A budgetary-level opinion of probable construction cost was prepared with the intention of developing a cost trending model to be utilized throughout the entire planning and design phases. Cost information includes both capital and annual operation and maintenance (O&M) costs. The O&M costs were estimated for both initial start-up and design capacity conditions. Life-cycle cost analyses were also developed and documented.

h. Site Master Plan - Based upon projections of future wastewater generation in the existing WWTF service area, an estimate of the capacity of the WWTF at build-out was made. A site master plan was then prepared for providing the required build-out capacity. The site master plan will take into account site buffers, land area requirements for on-site effluent storage and disposal, phased expansion of the existing WWTF in modular process trains, flexibility to modify treatment processes to achieve lower effluent limits, and City preferences for on-site administrative, operation and maintenance support facilities. The site master plan also takes into account the City's long-term objective of developing a pressurized public access reclaimed water reuse system and the facility modifications that could result from implementing such a system.

i. Surveying Support Services - Construction was completed in early 2004 on the last expansion to the WWTF. This data contained in the Record Drawings were assumed to still be valid since no additional work at the facility has been done since that time.

However, additional topographic data adjacent to the structures and other survey information on and around the existing WWTF site as required for the PER and the subsequent detailed design phase of the project and was collected as part of this activity.

j. FDEP Permitting Assistance - This task involves coordination with the FDEP during preparation of the PER and obtaining a construction permit for initial improvements at the existing WWTF based on the recommendations of the PER. The following subtask were included in this effort:

- Pre-Application Meetings with FDEP Staff – Two pre-application meetings were scheduled with FDEP staff during preparation of the PER. The first meeting occurred early in the project after alternatives for facility improvements were identified. The second meeting will occur after the City has provided final comments from the review of the draft PER. The purpose of this meeting will be to present the recommended improvements to FDEP staff to obtain any regulatory input that could facilitate review and approval of the City's permit application.

- Draft FDEP Permit Application – In conjunction with the 90-percent PER review, a draft permit application on FDEP Forms 62-610.910(1) and 62-620-910(2) will be prepared and submitted to the City for review and comment. Once finalized, the application will be submitted to FDEP.

- Responses to Requests for Additional Information – Brown and Caldwell will prepare responses to Requests for Additional Information (RAI) from FDEP as required.

1.5 Acknowledgements

Brown and Caldwell wishes to the thank the City staff involved in this project including Ms. Cindi B. Mick, Utilities Director, Mr. Angel Carrasquillo, P.E., Assistant Utilities Director, Mr. Patrick Zoeller, P.E., Utilities Engineer, Mr. Rick Newkirk, Manager of Field Operations, and Mr. Jerry Manning, Manager of Utility Operations. In addition, the assistance of the operations staff, which included Mr. Paul Benecke, Mr. Jim Finley, Mark Sutton, and Mr. Andy West, who were especially helpful in the successful completion of the wastewater characterization study and assisted the project team to understand the existing system configuration and operational practices. All of these individuals were very helpful in the preparation and completion of this PER and their efforts are gratefully acknowledged.

2. EXISTING CONDITIONS

This section provides a description of the existing WWTF, its characteristics and current environmental requirements and permits. In addition, a condition assessment of the existing WWTF is presented herein.

The City is located in southwest Florida and is situated in the southeastern corner of Sarasota County, bordering both Charlotte and DeSoto Counties. The WWTF is located near the intersection of Pan American Boulevard and U.S. Highway 41 as shown on Figure 2-1.

2.1 Site Location and Characteristics

The City's wastewater system includes the collection and transmission system, the WWTF, a DIW and a public access reclaimed water system. The wastewater collection and transmission system consists of approximately 100 miles of gravity sewers and force mains and over 70 sewage lift stations. The gravity sewers and force mains consist of pipes of differing materials that range in diameter from 4 to 24-inches. The gravity system can be described as a conventional system, which conveys wastewater flows by gravity from the customers' connection points or laterals to one of the City's lift stations. These lift stations pump the wastewater flows through force mains to another gravity collection system, a manifolded force main, a regional master lift station, or directly to the WWTF.

The WWTF is a conventional activated sludge facility located on a 9.6 acre site as shown on Figure 2-2. The WWTF has a permitted capacity of 3.7 mgd on a M3MADF basis. The unit treatment processes at this facility includes pretreatment (screening and grit removal), biological treatment using coarse bubble aeration, secondary clarification, filtration of a portion of the flow that is pumped to the public access reclaimed water system, and disinfection. The sludge that is generated in the treatment process is dewatered and hauled off-site by a private contractor. Figure 2-3 shows a process flow schematic of the existing facilities at the WWTF. All of the structures for process units are constructed of cast-in-place concrete except for the effluent filters, which are of 304 stainless steel.

There are two methods of effluent disposal at the City's WWTF, a Class I DIW and a public access reclaimed water system. The DIW is an off-site facility that consists of one Class I DIW for the disposal of secondarily treated wastewater effluent, and two wells for monitoring ground water. The DIW was constructed in 1987, and is currently permitted for a maximum injection rate of 5.32 mgd, at a maximum pressure of 84 psi at the well head. The DIW is approximately 3,200 feet deep with 1,105 feet of 14 inch diameter casing. The location of the DIW and both monitoring wells are shown on Figure 2-4.

A portion of the effluent that is not disposed of in the DIW is filtered, disinfected and pumped to the on-site storage tank if it meets the water quality criteria for use as public access reclaimed water. From the storage tank the reclaimed water is delivered to the reuse water to users on an as-needed where it is used for irrigating the Heron Creek and Sabal Trace golf courses, city owned properties, road ROW and individual residential lawns. Additionally, the reclaimed water may also be pumped and stored at the Sabal Trace Golf Course in a pre-stressed concrete tank with a capacity of approximately 600,000 gallons and to private irrigation ponds that are located on the Heron Creek golf course. The City's reclaimed water system has a current installed capacity of 1.9 mgd based on the capacity of the existing effluent filters. The major reclaimed water users currently connected to the City's reclaimed water system are shown on Figure 2-5.

2.2 Service Area Characteristics and Adjacent Land Uses

The majority of the land within the incorporated limits of the City has already been platted into some 87,000 lots, approximately one-quarter acre in size, located within 60 designated neighborhoods in the City. A majority of these platted lots have remained vacant and most neighborhoods currently lack the infrastructure necessary to provide water and wastewater services. A recent Geographical Information Systems (GIS) study by the City's Planning Department concluded that the City is approximately 15-percent (vs. 17.1-percent on the Master Plan) built out.

Dwelling units in the City of North Port area are predominantly single family homes of moderate density. The United States Census Bureau Year 2000 Census showed 22,797 persons within the City. The population within the WWTF service area, which includes the Old Myakka Utilities service area, as derived from a summation of the Year 2000 Census Blocks was 27,876 persons. Table 2.1 shows a breakdown of Year 2000 Census counts of persons and occupied dwelling units within the Study Area.

Table 2.1: Year 2000 Population and Dwelling Units - North Port WWTF Service Area[1]

	Year 2000 Census		
Portion of the Study Area	**Population**	**Occupied Dwelling Units**	**Persons Per Dwelling Unit**
Within North Port City Limits	22,797	9,111	2.50
Old Myakka Utilities Service Area	5,079	2,834	1.79
Totals for Study Area	27,876	11,945	2.33

Notes: 1. Source: City of North Port Utility Master Plan, Black & Veatch (2004).

Currently, sewer service is primarily available within the City core area and in the new developments located along the Price Boulevard and Toledo Blade Boulevard corridor. Within these areas, the City's wastewater customer base is predominately residential, but there are some light industrial and commercial customers located within the City's wastewater service area. The commercial customers consist primarily of restaurants, retail businesses, office space, and other similar uses. The industrial users are a plastic extrusion facility, motor repair, metal fabrication and other similar users.

Recent data from the City indicates that wastewater services are currently provided to approximately 12,700 customers, of whom roughly 9,300 live in the City and the remaining 3,400 customers in the surrounding areas of unincorporated Sarasota County. The City's wastewater customers are less than its potable water customers, because of the number of on-site septic tank and drainfield systems permitted within the City.

It is the City's goal to provide wastewater service to all existing platted areas in the long term, with a few exceptions such as the Agricultural Estates area. In addition, all new developments within the City are being developed to include City water and wastewater services, consistent with the City's Comprehensive Plan.

2.3 Existing Permits and Requirements

The existing WWTF operates under FDEP Permit No. FLA013378, which is currently under renewal status with the FDEP, and receipt of a draft permit, is anticipated within the next 30-days. The FDEP classifies the WWTF as a Category II, Class B facility. The permitted operating capacity of the WWTF was recently expanded in 2004 from 2 mgd to 3.7 mgd on a M3MADF basis. This permit is issued under the provisions of Chapter 403, Florida Statutes (FS), and all applicable rules of the FAC. Through this the WWTF is permitted to discharge its wastewater effluent to an existing Class I DIW and to a public access reclaimed water reuse system.

The Class I DIW system (U001) is permitted under FDEP number U058-250044 and discharges to a Class G-IV groundwater. This permit sets forth the operating, testing, and reporting requirements for the DIW system. The permit states that "the injection well shall be continuously monitored and controlled at all times to ensure that the maximum sustained pressure at the wellhead does not exceed 84 psi on the final casing and a maximum peak flow of 5.32 mgd or 3,960 gallons per minute (gpm)."

The use of public access reclaimed water system is authorized within the City of North Port Master Urban Reuse System (R001). This Reuse System covers the incorporated limits of the City, and the existing and potential major users in the general reuse service area. The City's reclaimed water system is regulated under Rule 62-610-450, FAC – Part III: Slow Rate Land Application Systems; Public Access Areas, Residential Irrigation, and Edible Crops, which states that the reclaimed water shall not contain more than 5.0 mg/L of suspended solids before the application of the disinfectant. This section of the FAC also contains additional treatment requirements, monitoring and operating protocol, storage, and other requirements. Table 2.2 summarizes the major reclaimed water users in the area.

Table 2.2: Existing and Proposed Major Reclaimed Water Users

Major User	User Type[1]	Capacity (mgd)	Acreage
Heron Creek Development and Golf Course Phases I and II	R/L/GC	0.8	117
Narramore Sports Park	L/H	0.04	7
North Port City Complex	L/H	0.15	68
North Port High School	L/H	0.2	104
North Port Public ROWs	H	0.02	5
Sabal Trace Golf Course	GC	0.6	97
Sabal Trace Residential	R/H/L	0.05	30
WWTF Reuse	L	0.02	22

[1]Notes: GC - Golf Courses *H - Highway Medians, Rights of Way*
L: Landscaped Areas (include condominium common areas) *R: Residential lawns*

The current FDEP minimum criteria for disposal of the WWTF effluent to the Class I DIW and to the reclaimed water systems are summarized in Table 2.3.

Table 2.3: Effluent Limitations

Parameter	Annual Average	Monthly Average	Weekly Average	Single Sample
DIW (U011)				
Flow, mgd	-	3.7(1)	-	-
5-day Carbonaceous Biochemical Oxygen Demand, mg/L	20	30	45	60
Total Suspended Solids, mg/L	20	30	45	60
pH, Standard Units	-	-	-	6.0 to 8.5

Table 2.3: Effluent Limitations (Continued)

Reclaimed Water System (R001)				
Flow, mgd	1.88[(2)]	-	-	-
5-day Carbonaceous Biochemical Oxygen Demand, mg/L	20	30	45	60
Total Suspended Solids, mg/L	20	30	45	60
Fecal Coliform Bacteria	See Note [(3)]	See Note [(3)]	See Note [(3)]	See Note [(3)]
pH, Standard Units	-	-	-	6.0 to 8.5
Total Residual Chlorine, mg/L	-	-	-	1.0
Turbidity, NTU	-	-	-	3.5

[1] 3-month average daily flow.

[2] 2-month maximum annual average daily flow.

[3] Over a period of 30-days, 75-percent of the fecal coliform values shall be below the detection limits. Any one sample shall not exceed 25 fecal coliform values per 100 mL of any sample. Any one sample shall not exceed 5 mg/L of total suspended solids at a point before application of the disinfectant.

A review of the WWTF operating data for the past 10 years indicates that the WWTF appears to be consistently able to achieve compliance with the flow and effluent criteria specified in the WWTF and DIW operating permits described above.

2.4 Description of Existing Treatment Facilities

This subsection provides a description of the existing WWTF based on conducted visits and discussions with utility staff and operational personnel. The existing WWTF is a conventional activated sludge facility supplied with screening, grit removal, aeration, secondary clarification, filtration, and chlorine disinfection. Design Parameters for the major process items are shown on Table 2.4. The raw wastewater enters the WWTF through a series of force mains (5 total) that range in diameter from 8-inches to 16-inches. These five force mains are then manifolded into either a 14 inch or 24 inch force main. Presently, all flow enters the plant through the 14 inch diameter force main, and the 24 inch diameter force main is not in service.

To operate under emergency conditions, the WWTF has two generators on-site, a 1,000 kilowatt (kW) unit and an 800 kW unit, which are estimated to be sufficient for the major process equipment items during design electrical load conditions, when the total estimated electrical load is 1,580 kW. The existing site plan and process flow diagram for the WWTF are illustrated in Figures 2-2 and 2-3, respectively.

Table 2.4: WWTF Existing Equipment Description

Description	Unit	Capacity
General		
Design Flow(Maximum-3-month average daily flow)	mgd	3.7
Annual Average Daily Flow	mgd	3.2
Maximum Monthly Average Flow	mgd	4.0
Maximum Daily flow	mgd	6.4
Peak Hourly flow	mgd	8.3
Influent Characteristics		

Table 2.4: WWTF Existing Equipment Description

Design $CBOD_5$ Loading	mg/L	192
$CBOD_5$ Loading at Design Flow	Lbs/day	6,405
Design TSS Loading	mg/L	192
TSS Loading at Design Flow	Lbs/day	6,405
Pretreatment Structure		
Type-Screen	each	Mech. Step-Bar
Number of Bar-Screens		2
Spacing between bars	inches	0.38
Channel width	feet	2.5
Grit Chamber		
Type		Pista Grit
Number		1
Size(diameter)	feet	18
Capacity	mgd	30
Aeration Basins		
Number		5
Sidewater Depth	feet	15
Volume per Basin	gallons	224,400
Total Aeration Volume	gallons	1,122,000
Design SRT	days	5
MLSS	mg/L	2,500
Aeration Blowers		
Type		Centrifugal
Number		5
Capacity Total	scfm	13,800
Installed Horsepower per unit	HP	3 @ 100 / 2 @ 200
Firm Capacity	scfm	9600
Secondary Clarifiers		
Number		3
Size, diameter, each	feet	65
Sidewater Depth, each	feet	14
Total Surface Area, each	square feet	3,318
Total Volume, each	cubic ft.	46,456
RAS, @ m=5000 mg/L	mgd	2.8
Design Surface Loading Rate	lb/sf/d	19.9
SOR	gpd/sf	402
Effluent Disk Filters		
Number	No	2
Number of Disks	each	6
Surface Loading Rate	gpm/sf	2
Firm Capacity	mgd	1.88
Effluent Gravity Filtration (not in operation)		
Media	Type	sand
Number of ABW filters	each	1
ABW Filter Size @ each	square feet	741
ABW Filter Media Depth	inches	11
Surface Loading Rate	gpm/sf	2

Table 2.4: WWTF Existing Equipment Description

Chlorine Contact Basin		
Number	each	2
Size, each	gallons	29,350
Total Volume	gallons	64,770
Capacity @ 15 min HRT	mgd	6.2
HRT @ MDF	minutes	44
Reuse Water Transfer Pumps		
Number		3
Capacity, each	gpm	1,020
Firm Capacity, total	gpm	2,040
Reuse High Service Pumps		
Number		4
Capacity, each	gpm	380/750
Approx Firm Capacity, total	gpm	1,510
RAS and WAS Pumps		
Number of RAS pumps		3
RAS pump capacity, each	gpm	1,500
Number of WAS pumps		2
WAS pumping capacity, each	gpm	250
WAS pump capacity, each	gpm	100
Sludge Holding Basins		
Number		2
Size, each	gal	88,000
Sludge Air Blowers		
Number		2
Size, each	cfm	1,800
Sludge Thickener		
Number		1
Capacity, each	gpm	100
Lime Stabilization Basins (OFF LINE)		
Number		3
Size, each	gal	22,000
Max stab rate	gal/day	25,714
Min WAS concentration	percent	3
Estimate Lime Use @ 600 lb/d	Lb/d	1,960
Deep Injection Well (DIW)		
Number		1
Capacity (MDF)	mgd	5.32

2.4.1 Pretreatment

The pretreatment structure consists of a common influent box, which is split into two influent channels that are each 2.5-foot wide. Each channel is equipped with mechanically cleaned step screens that provide continuous removal of particle sizes greater than 6 millimeters (mm) in the influent wastewater. This material is captured on the screens and is discharged to a compactor system that removes the excess water from the screenings prior to discharge to a dumpster located beneath the pretreatment structure. The mechanically cleaned screens can be operated based either on the level in the influent channel upstream of the screen or on a timer with level overrides.

From the screens, the influent flow continues to a mechanically induced grit removal system that incorporates a submerged rotating paddle to create a vortex that forces grit particles out and downward into the grit sump. The grit is then removed by grit pumps, which operate automatically at set times. The individual channels and grit removal units can be isolated through the use of slide gates. Additionally, there is a by-pass channel installed with a manually cleaned bar rack that can be used to treat wastewater flows during period of equipment routine maintenance or replacement.

The grit pumping system consists of two grit pumps; each one is designed to pump 250 gpm of grit slurry to the grit cyclone and classifier, which further separates and dewaters the grit and discharges it to a second dumpster located beneath the pretreatment structure. The water from the grit classifier is discharged into the WWTF influent channel downstream of the mechanical screens for treatment.

The pretreatment structure is open without walls or a roof, leaving the influent channels, screens, grit tank and classifier exposed to the atmosphere. In order to address odor control in this open pretreatment structure, all openings are covered with rubber mats. The air below the mats was previously withdrawn by a fiberglass reinforced plastic (FRP) blower mounted on the structure and vented to atmosphere. However, since the air withdrawn was not treated, this system tended to disperse odors throughout the plant site and was discontinued. Consequently, odors build up in the channels and eventually escape through openings in the mats and through small open areas around structures such as the screens. Odors are also generated from the two open dumpsters used to store screenings and grit as well as the drainage from these dumpsters. Attempts have been made to minimize the odors generated in the dumpsters by using a closed plastic bag/sausage to contain the screenings and grit.

A drain pump station for the pretreatment structure is located next to the structure. Flow drains into the pump station from the surface drain located beneath the dumpster accepting the screenings and grit. The station can also be used to drain the grit tank or any of the channels if this is desired. The pump station is equipped with two submersible pumps that are each rated at 140 gpm. The pumps are automatically controlled based on level, and the flow is discharged via a 4-inch diameter force main to the plant influent piping that is located just upstream of the pretreatment structure.

2.4.1.1 Assessment of Pretreatment System

A hydraulic evaluation of the pretreatment facilities indicated that they are capable of passing a maximum flow of 6.4 mgd. The City's operational personnel have indicated that both screens, screenings washer and grit removal facilities appear to be in good working condition. However, concern has been expressed about access to the dumpsters and the difficulties encountered in maneuvering them into and out of position. Odor control at this location is also an issue. Some concerns have also been expressed by plant personnel about the capacity of the pretreatment structure drain pump station.

2.4.2 Aeration Basin

From the pretreatment structure the wastewater flows to a flow splitter box where it is mixed with return activated sludge (RAS) and diverted to three pairs of aeration basins – aeration basins 1 and 2, aeration basins 3 and 4, and aeration basins 5 and 6 (future). Using weir gates located at the influent chamber in the flow splitter box, the wastewater flow is regulated and diverted to each pair of aeration basins. The influent section of the flow splitter box is also aerated to encourage mixing of the RAS and wastewater from the pretreatment structure.

The aeration basins are aerated using coarse bubble diffusers installed on six down pipes off the main air header in each aeration basin. The distribution of air has been modified in all of the aeration basins so that 50-percent of the air is delivered to the upstream third of each basin and the remainder to the downstream two thirds of basin. If necessary, adjustments to the aeration process can be made. The total volume of air supplied to the system can be modified by starting and stopping blowers or by throttling the intake valves to the blowers. Also, the air supplied to each section of the basin may be changed by throttling the butterfly valves on the air downpipes to each basin.

The air is supplied by five centrifugal blowers; three 100 HP blowers with a capacity of 1,800 standard cubic feet per minute (scfm) each, and two 250 HP blowers with a capacity of 4,200 scfm each. The three 100 HP blowers are the original units installed in 1988 while the two 250 HP units were installed in 2004. The blowers provide sufficient oxygen to meet the treatment requirements for the M3MADF, with the largest unit out of service.

The City's operational staff manually measures the dissolved oxygen (DO) concentration in the basins twice daily using portable DO meters to determine the effectiveness of the treatment process, and monitor the system energy efficiency. The City targets a DO of approximately 2.0 mg/L in these aerations basins. In addition, the (Mixed Liquor Suspended Solids) MLSS concentration is measured at the end of each aeration basin on a daily basis for process control.

The individual aeration basins can be drained using two self priming centrifugal pumps each rated at 15 HP. The pumps are located at the northeastern corner of the aeration basins near the fence line. Each basin can be drained and controlled separately through a valve system located on the upstream side of the aeration basins. Flow from the aeration basin drain pump station discharges into the piping between the pretreatment structure and the aeration basin splitter box.

The mixed liquor (ML) from the aeration basins discharges into a common channel prior to flowing by gravity to the secondary clarifier splitter box, which diverts the ML to the individual clarifiers. This splitter box has two influent boxes that are hydraulically connected and flow is split using downward opening weir gates. This splitter box is designed to handle build-out conditions when a fourth clarifier will be required.

2.4.2.1 Assessment of Aeration System

Based on the current operating arrangements of the aeration basin at the WWTF, which include a solids retention time (SRT) of 5-days, an MLSS concentration of 3,500 mg/L, a food to microorganism (F/M) ratio of 0.2 and a hydraulic retention time (HRT) of 6.7-hours, the existing system appears capable of treating the current flows with the largest blower out of service.

However, while the aeration system appears to be in generally good condition, City staff has expressed concerns about the following items:

- Coarse bubble aeration systems: the treatment capabilities of the biological treatment process are currently limited by the efficiency of the aeration system and conversion to a fine bubble air diffusion system will improve the oxygen transfer and treatment efficiency of the WWTF.
- Foaming within aeration basins: some foaming has occurred at the downstream end of the aeration basins which have generally been addressed by spraying reuse water on the foam using hoses. A system installed to permanently address this issue should be considered.
- Existing blowers utilize fixed speed motors leading to inefficient system operation. Variable speed motors or other control systems should be considered that will allow for automatic adjustment of the air flow to better match demands.
- Ventilation of the blower building has been noted as being inefficient and should be reviewed.

2.4.3 Secondary Clarifiers

There are three secondary clarifiers, each 65-foot in diameter with a sidewater depth of 14-feet. Each of the clarifiers consists of collection arms that are supported and driven by a center drive unit by way of a cage that connects to the main gear. The ML from the clarifier splitter box enters the clarifiers through the base of the center influent column and is discharged through submerged ports within the clarifier stilling well, which helps to dissipate the entering velocity. As the ML flow is directed downward and then outward the solids settle out on the bottom of the clarifier.

The clarified wastewater flows over adjustable v-notch weirs into an overflow collection launder around the perimeter of the clarifiers. Each clarifier is equipped with two full radius skimmer arms on the surface for scum removal. The scum is deposited into a full radius scum trough, which flows by gravity to the scum box. A 1-inch polyvinyl chloride (pvc) line installed at the top of the inboard ledge of the launder is used to inject a chlorine solution and to control algae in the weir, launder and the scum baffle. The clarifiers can be drained using two self-priming centrifugal pumps, which are located south of clarifier no. 3.

Effluent from the secondary clarifiers flows by gravity to a splitter box that diverts the flow either to the effluent filters for further treatment or to the Class I DIW pump station. This splitter box consists of two chambers, with 6-foot adjustable weir gate. The flow is first directed to the effluent filters for further treatment and reuse. However, if flow exceeds the capacity of the filters, the excess flow is diverted to the Class I DIW pump station for disposal at the DIW.

Settled sludge is continuously removed from the clarifiers. For clarifiers 1 and 2 a scraper mechanism is used for sludge removal, while for clarifier 3, vacuum suction piping located on the rotating collection arms is used to divert the sludge to the RAS/WAS wet well. The RAS /WAS wet well consists of a center box and four peripheral boxes. The center box serves as a suction well for all of the RAS and WAS pumps. Downward opening weir gates located between each of the peripheral boxes and the center box are operated to control flow from each clarifier and can also be used to terminate flows when a clarifier is taken out of service. Sludge flow is induced by the head differential between the liquid levels in the individual clarifier and in the wet well. This differential head is determined by the rate of feed into the tank which sets the level in the clarifier and the gate setting, which sets the levels in the outer box of the RAS/WAS wet well. An aeration header is installed in the center box of the RAS/WAS wet well for mixing and to keep the solids in suspension.

From the RAS/WAS wet well, sludge is both returned to the aeration basins and wasted. The RAS pumps include three screw centrifugal pumps, each with a capacity of 1,500 gpm. The RAS pumps are equipped with variable speed drives (VFDs) in order to vary the return flow. The WAS pumps consist of two self priming centrifugal pumps, each with a capacity of 250 gpm. At present, the WAS pumps are not operated continuously. Instead, operators run the WAS pumps at appropriate intervals each day while attempting to maintain required MLSS concentrations and biological populations in the aeration basins.

2.4.3.1 Assessment of Clarification System

A M3MADF of 3.7 mgd results in a solids loading rate of 19.9 pounds per day per square foot (lbs/d/sf) and a surface loading rate of 402 gallons per day per square foot (gpd/sf), which are both within industry standards for secondary clarifiers used in this type of process, indicating that the existing secondary clarifiers are adequately sized for current flows. Also, the existing RAS and WAS pumping facilities have firm capacities adequate to meet the demand with one unit out of service.

The WWTF's operational personnel reported that clarifier no. 2 collects large amounts of scum and that the effluent channel must be hosed out several times a day. Also, at the splitter box between the aeration basin and clarifiers, the weir gate for clarifier no. 3 is raised higher than the others. If the weir gate heights are set equally, almost no flow goes to clarifier's no. 1 and no. 2. Concerns have been expressed by the WWTF's personnel about the new clarifier no. 3, due to problems experienced with the sludge vacuum suction system. With future expansions, the operational personnel have expressed a strong desire to use a scraper mechanism for the removal of the sludge from the secondary clarifiers.

2.4.4 Effluent Filtration

The effluent filtration system consists of two tanks, with cloth filters mounted on a center tube, all located within the tanks. A total of six disks are installed in each filter tank constructed of 304 stainless steel. The secondary effluent enters each of the tanks, passes through the filters, and discharges into the center collection tube. The filter cloth is designed to retain all particles greater than 10 microns in size. The existing effluent filtration system is rated at 1.88 mgd.

The backwash cycle is initiated by pressure transducers on both sides of the filter cloth which measure the differential head across each filter. When the differential head reaches a desired set point, the backwash valve opens and turns on the centrifugal backwash pump. Water is drawn from the filtered side of the cloth media to a backwash pump header and the backwash pump. The backwash water drains to the onsite pump station that is located adjacent to the aerated sludge holding tanks. In addition to operating the filters at a set differential head, the backwash cycle can also be initiated at specified time intervals but a level sensor in the filtration tanks will prevent the backwash cycle from initiating if the filtrate water level is too low.

The design of the tanks which house the filters also allows for the settlement and removal of heavier particles without taking the system offline. Such particles settle to the bottom of the tank from where they are removed periodically during a sludge removal cycle. A set of perforated pipes in the bottom of the tank is used to withdraw this settled material. Removal is accomplished by opening the sludge valve on the line and starting the backwash pumps for set periods. The removal of sludge from the effluent filters is initiated in the first instance on a specified time interval or a specified number of backwashes per hour. As with the backwash cycle, the sludge removal cycle will not initiate if the level in the tank is too low.

2.4.4.1 Assessment of Filtration System

The WWTF's personnel reported that they have constantly experienced problems with disc filters and especially with effluent turbidity after the backwash cycle is completed. Additionally, hydraulic problems have also been experienced within the filtration system. During operation of the filters, large amounts of air apparently become entrained in the effluent flow from the splitter box to the filter causing large hydraulic surges when the pocket of air is released, which adversely impacts the hydraulics of the filter system.

2.4.5 Disinfection

Disinfection of the final plant effluent is carried out using sodium hypochlorite (NaOCl) or "liquid chlorine". The chlorination system consists of two 2,000 gallon sodium hypochlorite (NaOCl) "liquid chlorine" bulk storage tanks, three chemical feed pumps with a capacity of 6 gallons per hour (gph) and a Chlorine Contact Chamber. The pumps feed approximately 150 pounds of chlorine per day from the 12.5-percent NaOCl solution. Two of the pumps are designed to feed the desired chlorine amounts ahead of the chlorine contact chamber. A pacing system at the chlorine contact chamber discharge enables the WWTF operators to set a desired residual at the controller, and the chlorine feed pumps will increase or decrease the NaOCl flow rate to meet the desired residual. The third chemical feed pump is intended to provide chlorine to the filtration/DIW splitter box for disinfection and the secondary clarifiers for algae control on the weirs.

After chlorine is applied, the filtered effluent flows through the chlorine contact chamber with its serpentine flow path, in order to meet the required chlorine contact time. Chlorine residual is measured in the common channel at the discharge end of the chlorine contact chamber. The filtered and chlorinated effluent is discharged to the transfer pump station wet well and if the water quality meets reuse standards, it is pumped to the on-site reuse water storage tank. If the effluent is substandard and is not suitable for reuse, it is pumped to the DIW pump station for disposal in the Class I DIW as described below.

In order to establish effluent water quality for reuse, turbidity and chlorine residual are monitored using on-line turbidity and chlorine residual analyzers. The on-line turbidity analyzer measures the filtered effluent turbidity prior to the addition of the NaOCl for disinfection. While a limit of 3.5 nephelometric turbidity units (NTUs) has been established by FDEP for water reuse, plant operators have established a setpoint of 2.8 NTU to detect an excursion of TSS in the reclaimed water quality. After chlorine contact, the total chlorine residual is continuously monitored using an on-line chlorine analyzer and to allow for TDS introduced with the NaOCl. A minimum chlorine residual setpoint of 1.2 mg/L has been established for this location. When the turbidity exceeds 2.8 NTUs or the chlorine residual falls below 1.2 mg/L continuously for 5-minutes, an alarm is sounded and a red light is illuminated at the reclaimed water control panel. The alarm is sounded for three minutes and the light illuminated until acknowledged.

If the condition cannot be immediately corrected or, if the WWTF is not attended, the system is automated so that the appropriate automatic valves open and close to divert the substandard effluent away from the reclaimed water storage tank and to the DIW pump station for disposal at the DIW. A lag time of 5 minutes is provided from the time of excursion of the turbidity or total chlorine residual to when the automated valves open and close. This will allow operating conditions to stabilize in the event the excursion was an aberration or was the result of an inconsistent in-line meter reading due to interference.

2.4.5.1 Assessment of Disinfection System

The NaOCl feed pumps appear to be undersized, as the pumps cannot currently transfer any NaOCl to the secondary clarifiers, if this is desired. In addition, the current pacing system for feeding the NaOCl is not effective, causing high chlorine use and may be one of the reasons that the effluent has higher than expected levels of TDS. Finally, there is concern regarding the leaking chlorine contact chamber (CCC). Leaks appear to have been caused by the differential settlement between the chlorine contact tank and the effluent transfer pump station adjacent to it. To remedy this leakage problem, the joints will be injected with a water reactive polyurethane grout.

2.4.6 Solids Handling System

Sludge that is generated and wasted from the biological treatment process is stored in two aerated sludge storage tanks. The sludge holding tanks have an operating volume of 88,000 gallons. Additionally, there are three old mixing basins, each with a capacity of approximately 21,600 gallons. The two large holding tanks are hydraulically connected and each of the tanks has a single telescoping valve to decant the supernatant from the sludge. Coarse bubble aeration is used to aerate and mix the WAS in the aerated sludge holding tanks.

The solids handling system has the capability to operate as a sludge thickening operation. A rotary drum thickener is located above one the northern aerated sludge holding tanks. The purpose of the rotary drum thickener was to thicken the sludge prior to further treatment and disposal. However, the rotary drum thickener is presently not in operation due to the contractual requirements with Synagro Southeast, Inc. for disposal of solids. This agreement limits the percent solids in the waste sludge to a maximum of 2-percent and therefore, the drum thickener is not necessary.

Under the existing circumstances, WAS is pumped from the secondary clarifiers to the aerated sludge holding tanks for storage. The contents in the aerated sludge holding tanks are manually thickened by the operational staff through shutting off of the aeration system to the tanks, which permits the sludge to settle in the tank. Two methods are used to remove the supernatant from the sludge holding tanks. One method uses telescoping valves that are manually lowered to the appropriate level and the supernatant is then drained off. The second method uses submersible pumps that are lowered into the tank and the supernatant is then pumped from the tanks. The thickened sludge is transferred to the old mixing basins using one of the two recessed impeller sludge pumps and mixed to keep the solids in suspension. Using a mobile dewatering unit, Synagro dewaters the sludge to a minimum of 18-percent solids and then hauls it to the Okeechobee landfill for ultimate disposal.

The filtrate from the Synagro sludge dewatering process is discharged into the on-site pump station and returned to the head of the WWTF for treatment. The duration of the Synagro contract is for 3-years with the option of two 1-year extensions with mutual consent. The current agreement with the county is set to expire on December 16, 2007.

2.4.6.1 Assessment of Solids Handling System

Currently costs incurred by the City for sludge hauling is high; and the City would prefer to handle its solids on-site and develop a Class "A" sludge. Under a separate contract, BC is investigating solids handling options for the City as part of a Biosolids Management Plan that will address handling of solids from this facility, as well as the two future WWTFs that will ultimately be part of the City's overall wastewater system.

2.4.7 Existing Effluent Management

The WWTF has two methods of effluent disposal, which include a Class I DIW and a public access reclaimed water reuse system.

2.4.7.1 The Class I DIW

This DIW is designated for the effluent that does not go through filtration or chlorination and does not meet the requirements for public access reclaimed water reuse, or for wet weather flow conditions.

The DIW is located approximately 3 miles southwest of the City core area just west of the City of North Port and Charlotte County jurisdictional border and east of the Myakka River. The effluent is pumped from the WWTF to the DIW through a 16-inch diameter pipeline. The DIW pump station consists of three vertical turbine pumps, each with a rated capacity of 1,500 gpm at a total dynamic head of 168 feet. A 10-inch diameter magnetic flow meter is used to measure the flow rate and volume of water transferred from the wet well to either the Class I DIW or to the reuse storage tank.

Additionally, there are two emergency holding ponds that are used to store substandard effluent in emergencies or when the City is conducting their mechanical integrity test (MIT) for the DIW. When situations arise, the DIW pump station wet well will overflow into one of these two holding ponds. Each pond has a capacity of approximately 1.2 million gallons. The effluent in these ponds can then be returned to the DIW pump station for ultimate disposal. Emergency disinfection of the effluent is possible using chlorine at the DIW pump station.

The DIW has been in operation for approximately 20 years and is currently permitted for a maximum injection rate of 5.32 mgd, at a maximum pressure of 84 psi at the well head. The DIW is approximately 3,200 feet deep with 1,105 feet of 14-inch diameter casing.

Under a separate program, BC and Water Resources Solutions (WRS) is in the process of permitting a second DIW, which will provide an additional 13.2 mgd of effluent disposal/wet weather disposal capacity for the City. The proposed DIW will be located on the existing DIW site, and within 150-feet of the existing monitoring well. The DIW well head pressure is anticipated to reach 60 to 70 psi.

The DIW will be designed to inject reclaimed water into the Avon Park formation, which lies approximately 1,100-feet below the land surface (bls) and approximately 470 feet below the base of the underground source of drinking water (USDW). All casings and other materials used in the construction of the proposed DIW will be new and meet or exceed the appropriate standards as set forth in Rule 62-528.410, FAC. The permit application and responses to the requests for additional information (RFI) has been submitted to the FDEP for review.

2.4.7.2 The Public Access Reclaimed Water System

The public access reclaimed water system primarily serves the Sabal Trace area and Heron Creek, both of which are newer large residential developments with golf courses. The reclaimed water is also used to irrigate some City owned properties, which includes the North Port Skate Park and ROWs. The capacity of the City's reclaimed water reuse system is 1.88 mgd and is regulated under the WWTF FDEP operating permit and Rule 62-610, FAC.

For reuse, the secondary effluent is filtered and given high level disinfection. Treated reclaimed water is transferred to a 400,000 gallon reclaimed water ground storage tank that is located on the WWTF site by the reclaimed water transfer pumps. A reclaimed water high service pump then delivers the reclaimed water to the reclaimed transmission system on an as needed basis. The pump station consists of four high service split-case horizontal centrifugal pumps. Two of these pumps have a capacity of 380 gpm, while the remaining two have a capacity of 750 gpm and 2,300 gpm, respectively.

Reclaimed water from the WWTF is pumped east approximately 2-miles through a 10-inch force main to the City's 600,000 gallon reclaimed water ground storage tank that is located on the Sabal Trace Golf Course or to the Heron Creek golf course irrigation ponds. The Sabal Trace storage tank is used to store and supply reclaimed water for the Sabal Trace Golf Course irrigation system, no other users can be supplied with reuse water from this particular tank. A 12-inch pipeline from the City's WWTF is used to deliver reclaimed water supply to two irrigation lakes located on the Heron Creek golf course, which are owned, maintained and operated by Heron Creek development and golf course. Similarly, no other users can be supplied with reuse water from these two lakes other than the Heron Creek golf course and common areas.

2.5 Process Control and Monitoring

The City's WWTF is automated to some degree, but all of the control functions are performed locally using dedicated programmable logic controllers (PLCs). The operator interface consists of Allen-Bradley PanelView 550 screens located at each PLC. In addition, there is an Allen-Bradley PanelView 550 screen located in the Operations Building that monitors all of the PLCs distributed around the WWTF site at the various process locations.

2.5.1 Description of Existing Instrumentation System

There are seven Allen-Bradley model SLC 5/04 PLC's located in various process areas around the facility. Locations and designations are as follows on Table 2.5.

Table 2.5: Allen Bradley Models Located in the WWTF

PLC No.	Process Area	Location	Panel No.
10-PLC-1	Headworks	Northeast Electrical and Mechanical Bldg.	10-CP-1
30-PLC-1	Aeration	Northeast Electrical and Mechanical Bldg.	30-CP-1
50-PLC-1	RAS/WAS	RAS/WAS Pump Station	50-CP-2

Table 2.5: Allen Bradley Models Located in the WWTF			
60-PLC-1	Filter 1	Field near Filter	60-CP-1
60-PLC-2	Filter 2	Field near Filter	60-CP-2
80-PLC-1	Thickener	Sludge Holding/Lime Stabilization Structure	80-CP-2
140-PLC-1	Disinfection	Chlorination Building	140-CP-1

The PLC's have limited control at their associated equipment area and generally only provide alarm status inputs to the monitoring system. Other than alarm conditions, there is very little information provided regarding equipment status. Additionally, the amount of data available at the PanelView screens is very limited. Historical data storage is limited; and report generation capabilities are not available with the system as installed.

2.5.2 Assessment of Instrumentation System

The PLC's have been housed in environmentally friendly conditions and appear to be in generally good condition. However, further evaluations will be necessary to determine if the existing PLC's have sufficient capacity to accommodate the proposed new Input/Output (I/O) points associated with this project. There are some spare I/O points installed at each location, and there is also some available rack space for future I/O cards at each location.

The turbidity and chlorine residual analyzers are the only on-line monitoring that the City has installed at the WWTF. The aeration system is not automatically controlled and manual DO concentrations are taken twice per day to determine if air being supplied to the system is adequate or not.

The existing system is not the typical PC-based SCADA system with enhanced historical data storage and report generation capabilities. Although some of the functionality is provided in this system, the installed operator interface equipment, specifically the PanelView 550, does not offer many of the capabilities that the typical SCADA software package offers. In addition, the existing local area network (LAN) is hardwired communicating via Allen Bradley DH+ protocol, which is out dated for a facility of this size and type.

2.6 Description of Existing Electrical System

The primary source of power for the WWTF is the Florida Power and Light (FP&L) system. The FP&L transformer is located in a fenced area next to the Main Electrical Switchgear Room. The transformer primary feed is underground with the transformer 480 Volt (V) secondary cables routed over head, which terminate on open bus bars mounted on the outdoor wall of the switchgear building. The WWTF service entrance cables also terminate on the open bus bars at this location and are routed in conduit over head into the main WWTF switchgear. The block diagram of the existing electrical distribution system is shown on Figure 2-7.

The main WWTF switchgear functions both as the WWTF service entrance disconnect for the WWTF and automatic transfer controls for the two back up emergency generators. The switchgear is comprised of draw out circuit breakers. The main circuit breaker is rated at 3000A, and it is electrically operated. There are two 1600A electrically operated circuit breakers which are used to tie in the two outdoor generators (1000kW and 800kW). There are additional breakers that provide feeds to the motor control centers (MCC) Nos. 1, 4 and 6.

The main switchgear houses an ASCO generator control system. The transfer scheme provides for open transition to standby power. Both generators are self contained outdoor units. An 800 kW unit is located adjacent to the switchgear building. A 2,000 gallon "Con Vault" diesel storage tank is located next to the generator. The 1000 kW unit is also located near the switchgear building. This generator is furnished with a 2,500 gallon base diesel storage tank. The control system has the ability to operate both generators in parallel.

The main switchgear has 1200A circuit breaker feeding MCC no. 1 and an 800A circuit breaker feeding MCC no. 4. A bus tap of the main switchgear is used to feed a 1600A free standing draw out circuit breaker. This circuit breaker also feeds MCC no. 4.

An underground duct bank system is used to route feeders from the main switchgear to MCCs throughout the WWTF. Summarized in Table 2.6 are the locations and a description of the MCCs at this facility.

Table 2.6: Motor Control Description and Location

Motor Type	Location	Rated Capacity/Main Circuit	Function
MCC1	Electrical/Mechanical Chlorination Bldg	1200A/1200A	Provides power for the following: Reuse Pumps, Lime Mixers, WAS Thickener, Scum Pumps, High Service Pumps. Power Panels L1, L2, L3, LP (120/208V)
MCC 2	Located in Electrical / Mechanical Chlorination Building	1200A/No Main Circuit Breaker	Provides power for the Sludge Digester Blowers, Wash water Return Pumps and the Transfer Pumps.
MCC 3	Located in Electrical / Mechanical Chlorination Building	1200A/600A	Provides power for the Plant Water Pumps
MCC 4	Located in the Switchgear Building.	1600A/1600A	Provides power for Aeration Blowers, Bar Screen Loads, Headwork Pump Station, Power Panel LP1 (120/208V)
MCC 5	Located outside at the RAS/WAS Pumping Station.	600A/400A	Provides power for Clarifier Drives, WAS pumps and Power Panel L5 (120/208V)
MCC 5A	Located outside at the RAS/WAS Pumping Station.	600A/Tap feed from MCC5	Provides power for RAS pumps, Power Panel L5A (120/240V)
MCC 6:	Located outside at the DIW Pumping Station	600A/500A	Provides power for the Filter Drives, DIW pumps and Power Panel L6 (120/240V)

2.6.1 Main Plant Switchgear and Power Distribution:

Based on the selected upgrades option for the electrical distribution system of the WWTF a review of the FP&L service transformer size will be performed during the final design stage.

Based on utility records, the 12 month maximum demand of the plant is 754 kW, and occurred in April, 2006. This corresponds to demand factor of 42-percent and demand load of 1,140A. The existing connected load is approximately 2,700A.

The Main Switchgear is rated at 3000A. However, there are no additional switchgear breakers or spaces available, as well as no additional space in the electrical room to add electrical equipment. The Main Switchgear and MCC no. 4 were installed in 2003 and are in excellent condition. MCCs nos. 1, 2, 3, and 5 appear to be in satisfactory condition. MCC nos. 1, 4, 5, 5A and 6 are manufactured by GE and are 8000 line. MCC nos. 2 and 3 are manufactured by Square D, model 5.

The generators look well maintained and appear to be in excellent condition. However, according to the operators there are operational issues with running the generators in parallel during exercising or returning from a power outage. The problems appear to be associated with the synchronizing controls in the switchgear.

The last expansion to the WWTF, completed in 2004, provided new power feeders to the MCCs. During the current design a load study will be performed to determine if the existing power distribution feeders are still adequate.

With regards to the MCCs, the following observations were made:

- MCC no. 1: There is only one third of a vertical section that has available space for future use. A new vertical section will have to be added if any additional loads are fed from this MCC.
- MCC no. 2: There are numerous available spaces in this MCC for future use.
- MCC no. 3: There are two abandoned size 4 starters (effluent pumps) and 1 abandoned soft start (effluent pump). If necessary these can be removed and smaller starters and feeders can be installed in the MCC. A total of three vertical sections would be affected.
- MCC no. 4: There is one vertical section that has no starters that can possibly be used for project requirements.
- MCC nos.5,5A: Upon visual inspection, there are no spares in either of these MCCs. manufacturer shop drawings, however, indicate availability of empty spaces. It is noted that currently there are 25 HP VFD that take full vertical sections of the MCC, which is in excess of the spatial requirements posed by the VFD. During the detailed design stage possible modifications of the MCC will be investigated to provide room for new loads.
- MCC no. 6: There is no spare space and any additional loads will require adding additional vertical sections.

2.7 Assessment of Hydraulic System

Influent entering the WWTF is pumped from City wastewater pumping stations to the headworks of the WWTF through a series of force mains. There are a total of six of force mains that enter the WWTF site, which range from 8-inches to 16-inches in diameter. All flow south of U.S. Highway 41 and west of the Myakkahatchee Creek, and north of U.S. Highway 41 and west of the WWTF enters the site via a single 12-inch diameter force main. When this force main enters the WWTF site, the flows are split between two force mains (12-inch and 8-inch diameter).

Similarly, on the eastern side of the WWTF, a number of force mains deliver wastewater that is generated east and northeast of the WWTF for treatment. These force mains range in diameter from 8-inches to 16-inches. Presently, all wastewater combines at the entrance road for the WWTF and enters the site. Flows from the following areas enter the WWTF at this location:

- A 12-inch force main delivers wastewater to the WWTF from the West Villages Improvement District (WVID)
- From the area north of U.S. Highway 41, and north and east of the WWTF site via three force mains (8-inch, 12-inch and 16-inch diameter force main) transports the wastewater to the WWTF site.
- South of U.S. Highway 41, and east of the Myakkahatchee Creek, all wastewater generated is pumped to the site through an 8-inch diameter force main.

Similar to the flows that enter the WWTF site from the west, flows from these four force mains are also split between two force mains (12-inch and 8-inch diameter). Additionally, there is a 24-inch diameter force main that enters the WWTF north of the entrance road, which was not in operation until recently.

Compounding the problem is the fact that the two 8-inch and 12-inch diameter force mains that deliver from the remaining four force mains are manifolded into a single 14-inch diameter force main. The hydraulic capacity of these manifolded force mains impact the operation of the lift stations in the City.

Up until recently, the WVID was going to construct a WWTF that would be located on their property, and in operation by July 2009. However, due to the housing slowdown, the developer has decided to reduce their commitments to the City, and defer the construction of the WWTF until July 2013. This proposed date significantly impacts the hydraulic capacity of the City's existing wastewater transmission system. Based on these significant changes to the developer's plans, as well as other developers committing wastewater capacity by the payment of capital charges, the City will be required to revise their 10-year wastewater capital program. A number of options are currently being investigated, and will definitely include the WVID participation in funding. These options include the following:

- The construction of force main improvements at the intersection where the three force mains are manifolded to a location on the site where the four manifolded force mains are combined into a single 14-inch force main. At this location on the City's existing WWTF, a master pump station will be constructed. The developers for the WVID would be required to pay for their portion of the improvements to accommodate these required improvements.
- Reschedule the completion of construction for the WVID WWTF from July 1, 2013 to July 1, 2010. Based on the developer's ability to fund the improvements, the capacity of the WVID WWTF may range from 1.0 mgd to 3.0 mgd.

After entering the WWTF, the wastewater flows through the system by gravity from the headworks to effluent disposal, either at the DIW pump station or the reuse pump station wet wells. From the individual wetwells, the treated effluent is pumped to either the reuse storage tanks or the DIW for ultimate disposal. The primary method of effluent disposal is pumping to the onsite reuse storage tanks from the chlorine contact chambers and then to the customers of the public access reclaimed water system. Secondary disposal is provided by pumping into the DIW. The DIW wetwell has an emergency overflow that empties into two ponds.

The hydraulic profile for the gravity flow portion of the WWTF (i.e. after flow enters the pretreatment structure) was modeled using Brown and Caldwell's hydraulic modeling software PROFILE. The primary purpose of the hydraulic model is to verify the maximum hydraulic capacity of the WWTF. Secondly, results of the modeling will help identify hydraulic problem areas throughout the WWTF for future expansion. The existing plant hydraulic profile is shown on Figure 2-6.

2.7.1 Modeling Conditions and Assumptions

The facility was modeled under three operating conditions. The first condition has the WWTF operating with all units online. Wastewater flows were also modeled through the WWTF with either an aeration basin or clarifier out of service. The last two conditions were investigated in case the WWTF needs to provide Class I reliability in the future. Class I reliability requires that a majority of the facility be able to handle 75-percent of the facility's peak flow with one unit out of service.

For the sake of conservatism, the flow paths chosen to be modeled were the ones that have the most head loss through them. Equal flow distribution was assumed throughout the facility where flows are divided, however, it has been observed that this assumption does not hold true at all times. The flow splitter boxes upstream of the aeration basin and clarifiers are regulated using adjustable gate weirs which are set for an equal flow distribution at a certain flowrate. Any change from that flowrate disrupts the preferred distribution. Therefore, at most times, flow distributions are not equal between the aeration basins and the clarifiers.

The RAS flow enters the process stream at the aeration basin splitter box and exits in the secondary clarifier. For the purpose of this analysis the RAS flows were assumed to be 85-percent of the influent flow, up to a maximum RAS flow of 3.74 mgd.

For this hydraulic analysis, the City's WWTF was considered to have adequate capacity at a certain flow if the water elevation remains below the top of walls in each particular structure and the clarifier weirs are not submerged.

2.7.2 Modeling Results

It was determined that the peak hydraulic capacity of the existing WWTF is approximately 10.0 mgd with all units in operation. However, it was also determined that not all the flow can be disposed of through the reuse system, as only approximately 7.5 mgd can hydraulically pass through to the chlorine contact chamber. This is primarily due to the elevation of the filters which causes a head loss of 6 feet of head from the filters to the chlorine contact chamber. The remainder of the effluent would have to flow to the DIW wetwell. The hydraulic capacity of the flow path to the injection well wetwell is sufficient to handle all 10.0 mgd capable of traveling through the WWTF.

Modeling the hydraulic flow through the facility with either a clarifier or an aeration basin out of service resulted in the same hydraulic capacity of 7.5 mgd. Having one of the three clarifiers out of service creates a hydraulic constraint in the influent pipes of the two remaining clarifiers. This backs up flow in the clarifier splitter box and into the aeration basin where the water levels rise to unacceptable levels at flows higher than 7.5 mgd. A similar situation occurs with one aeration basin out of service. The increased flow through the remaining basins creates constraints in the piping between the clarifier splitter box and the aeration basin, leading again to unacceptably high water levels in the aeration basin at flows higher than 7.5 mgd.

2.8 Condition Assessment of Existing Treatment Facility

A general assessment of the existing WWTF was conducted in order to identify the areas that need to be upgraded or replaced. This evaluation is based on the FDEP MORs, available monitoring data, field evaluation, operating records, as well as discussions with the WWTF's operational staff.

The WWTF consists of different process treatment units, which includes:

- Pretreatment (screening, grit removal, and odor control)
- Biological treatment (aeration basins and secondary clarifiers)
- Tertiary treatment (effluent filters and chlorine contact)
- Biosolids management (aerated sludge holding basins)
- Effluent disposal (public access reclaimed water reuse and DIW)

In terms of process treatment, the primary concern is the handling of biosolids at the facility. Currently, the City is paying a very high charge for sludge hauling. For that reason, the City would like to handle its solids on-site and obtain a Class "A" biosolids. Brown and Caldwell is already assisting the City on this matter under a separate contract and will not be part of this upgrade and expansion program.

Based on the current operating conditions of the WWTF, which include the SRT of 5-days, a MLSS concentration of 3,500 mg/L, an F/M ratio of 0.2 and a HRT of 6.7-hours, the existing aeration facilities appear capable of treating the M3MADF of 4.4 mgd, with the largest centrifugal blower out of service.

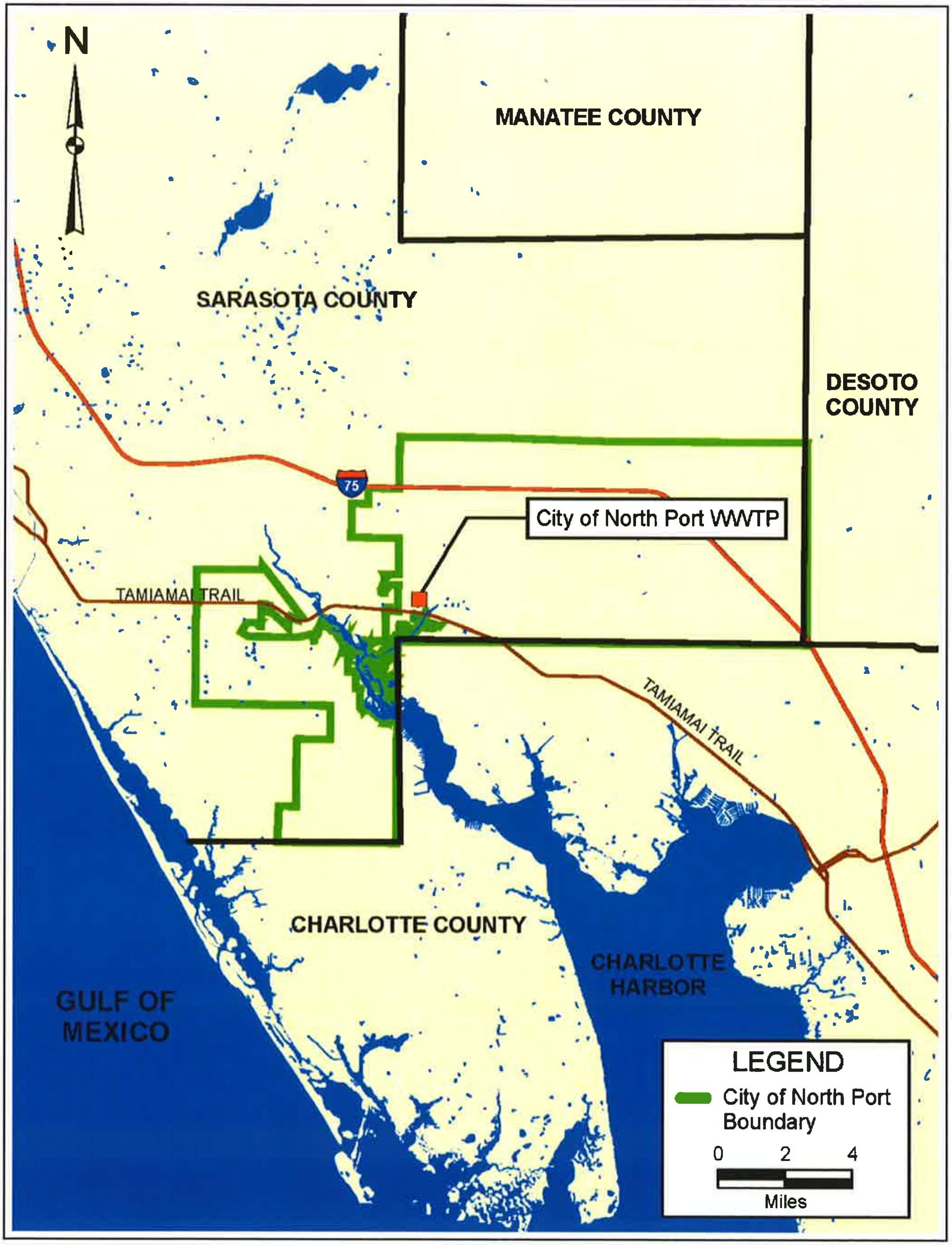
The City's operational staff members have expressed concerns about foaming formation within the aeration basin, which is being addressed by spraying reuse water using hoses several times during the day. In addition, the WWTF personnel would like the City to convert the current coarse bubble aeration system to a fine bubble air diffusion system to improve the oxygen transfer and reduce energy costs.

Furthermore, the existing blowers may limit the efficiency and performance of the aeration process. These blowers utilize fixed speed motors, which lead to inefficient system operation. Brown and Caldwell will consider the implementation of VFDs for the blower operation.

To complete the assessment on the biological treatment, it was observed that the secondary clarifiers present some inconveniences, as well. Concerns with the new clarifier no. 3 have been expressed by the WWTF's personnel due to its vacuum suction system. Furthermore, the existing secondary sludge removal system does not allow the City to handle each clarifier independently. Therefore, Brown and Caldwell will consider different sludge removal mechanisms to improve the current system if the City decides to optimize sludge removal operations. Finally, to maintain the highest degree of treatment and reduce the TN in the effluent, Brown and Caldwell will consider other processes, and equipment will be evaluated.

Evaluating the WWTF tertiary treatment systems, it was found that the personnel constantly have problems with disc filters (effluent turbidity after backwashing, hydraulics, etc.). It is necessary to investigate the option of restarting the traveling bridge filter. In addition, at the chlorine contact chamber, the NaOCl pumps appear to be undersized, and the current pacing system for the chlorine feed system is not effective causing high chlorine use. Brown and Caldwell will assist the City in improving its current system.

Generally speaking the facility is in good condition. The WWTF is currently permitted for a treatment capacity of 3.7 mgd (M3MADF), which correlates to an average daily flow treatment capacity of approximately 3.1 mgd. The City's DIW is currently permitted for a maximum injection rate of 5.94 mgd. It is recommended that the capacity of the DIW system should be increased to meet the future demands of this system. In order to meet this objective, Brown and Caldwell is in the process of permitting a second Class I DIW with a proposed effluent disposal capacity of 13.2 mgd.



BROWN AND CALDWELL

FIGURE 2-1
CITY OF NORTH PORT
EXISTING WWTF LOCATION MAP

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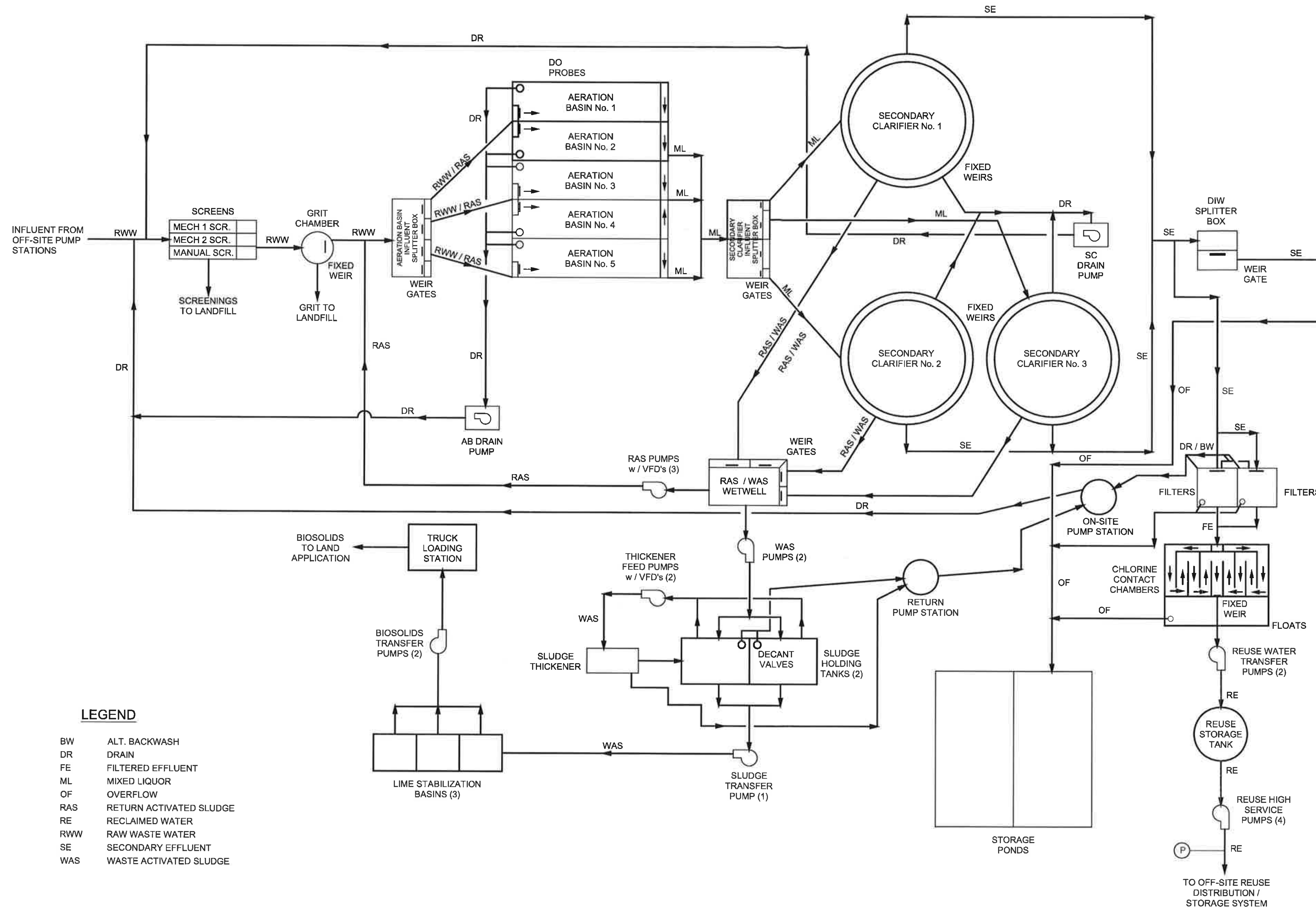
BROWN AND CALDWELL

CITY OF NORTH PORT
AERIAL PHOTOGRAPH OF EXISTING WWTF
FIGURE 2-2



BROWN AND CALDWELL
Environmental Engineering and Consulting
850 Trafalgar Court, Suite 300, Maitland, Florida 32751 (407)661-9500
Florida Board of Professional Engineers Certificate of Authorization No. 00002602

SUBMITTED: PROJECT MANAGER DATE:
APPROVED: BROWN AND CALDWELL DATE:
APPROVED: DATE:

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Submittal Stamp and/or PE data

REVISIONS

ZONE	REV.	DESCRIPTION	BY	DATE	APP.

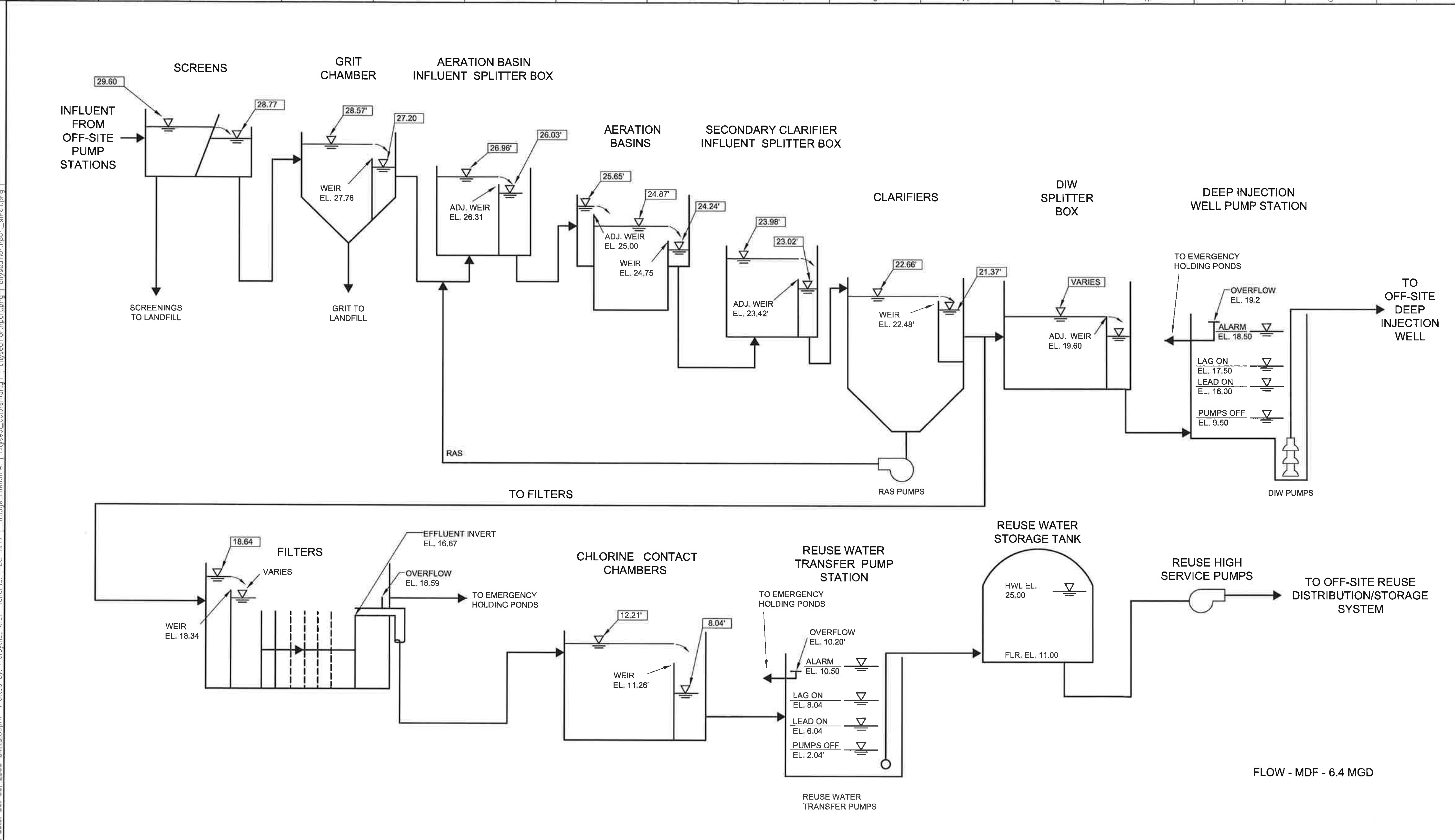
City of North Port
WASTEWATER PROGRAM
NORTH PORT, FLORIDA

EXISTING WASTEWATER TREATMENT PLANT UPGRADES and EXPANSION

EXISTING WWTF

PROCESS FLOW DIAGRAM

SCALE XXXXX
DRAWING NUMBER **FIG 2-3**
SHEET NUMBER



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SUBMITTED: ______ PROJECT MANAGER DATE: ______
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City of North Port
WASTEWATER PROGRAM
NORTH PORT, FLORIDA

EXISTING WASTEWATER TREATMENT PLANT UPGRADES and EXPANSION

EXISTING HYDRAULIC PROFILE

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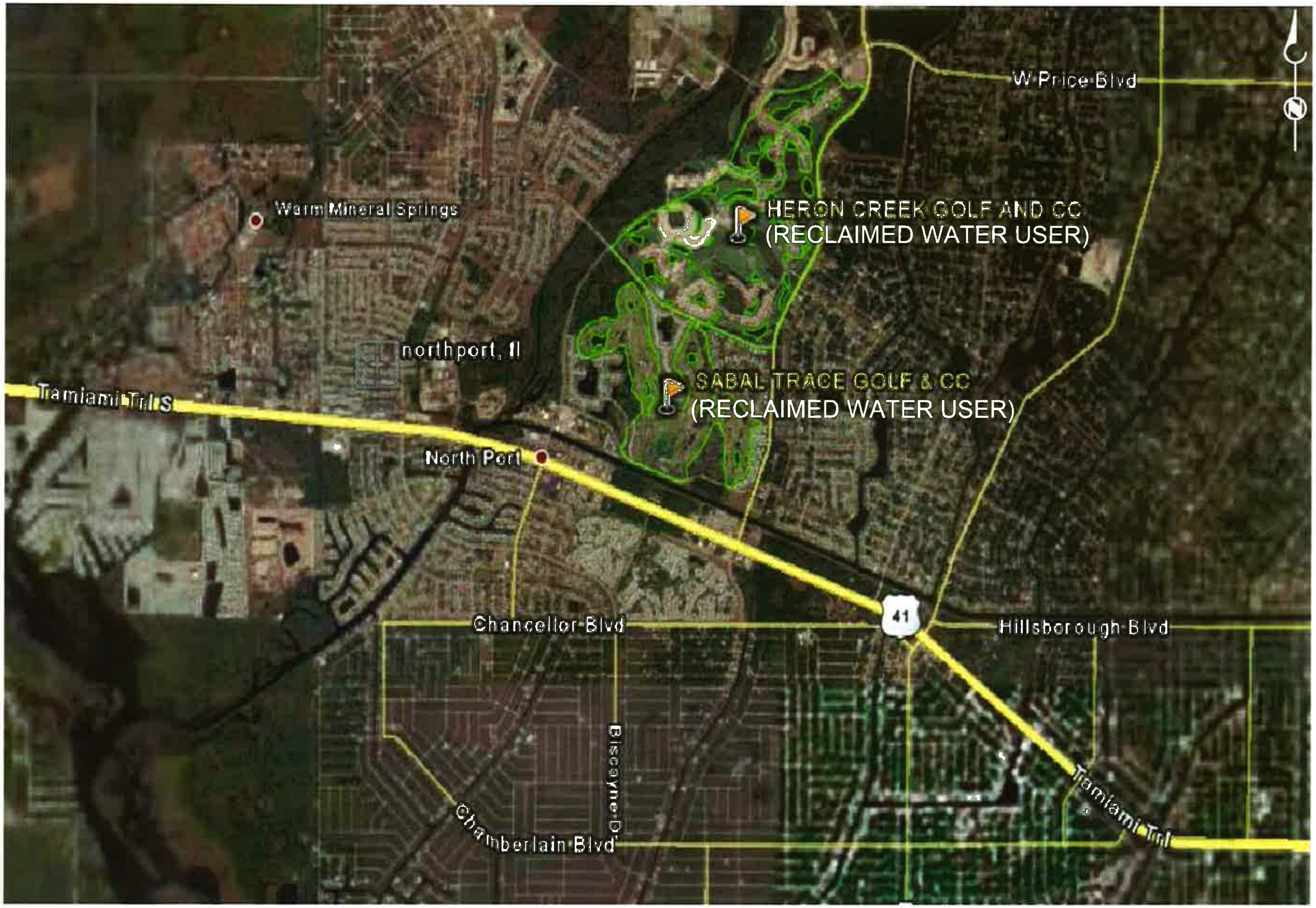
DRAWING NUMBER
FIG 2-6
SHEET NUMBER

Filename: FIGURE 2-6 Plot date: Oct 06, 2006-04:19:36pm Plotted by: rforsythe, Xref Filename: BC11x17 Image Filename: cityseal_colorsmall.gif | citysealnorthport.png | citysealnorthport_small.png

BROWN AND CALDWELL

FIGURE 2-4
CITY OF NORTH PORT
DEEP INJECTION WELL / MONITORING WELL LOCATION MAP

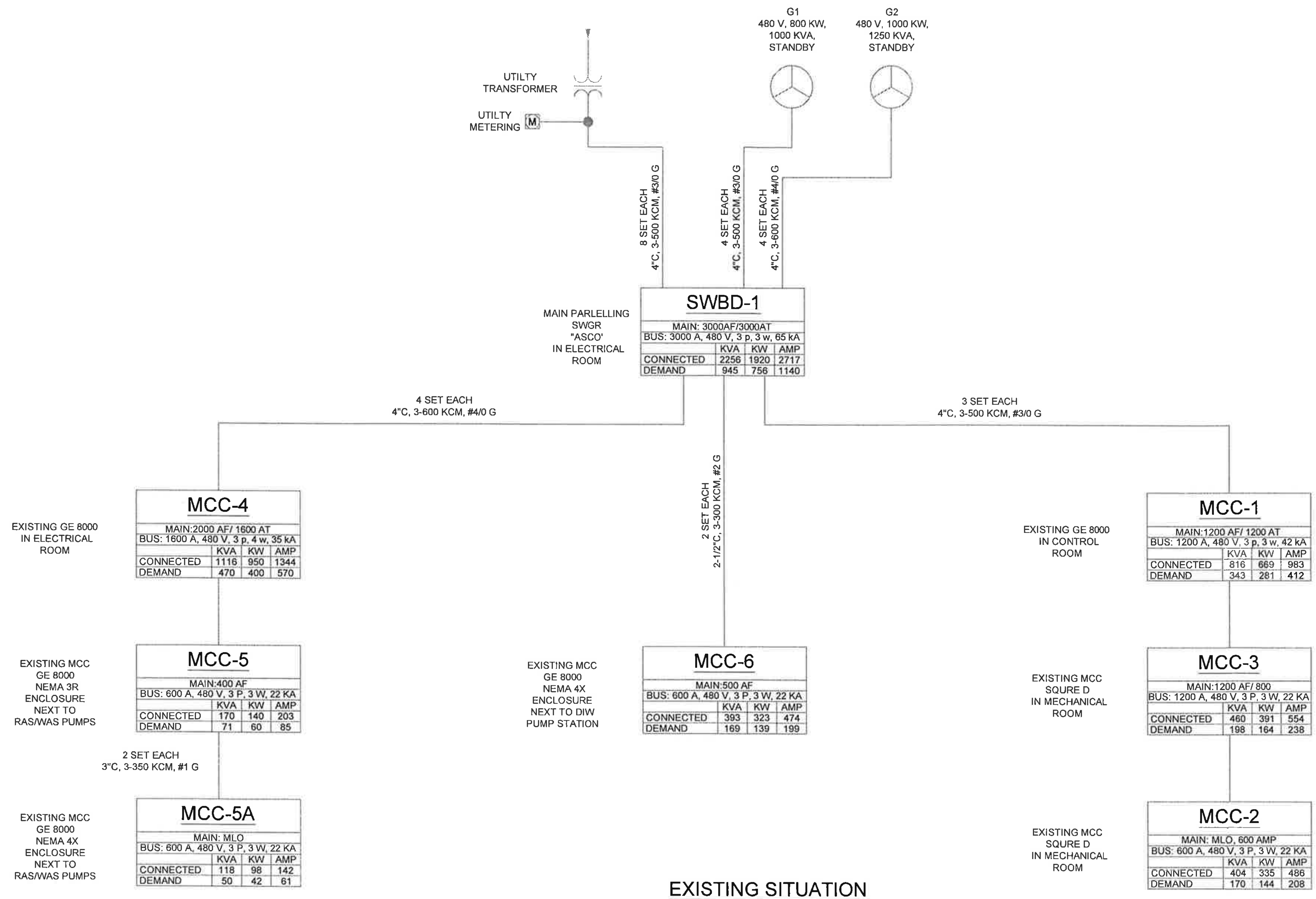
P:\Gen\North Port, City of\129942\CAD\0-Projects\Figures\FIGURE 2-4.dwg 06 Oct 2006 4:27pm Updated by: Forsythe



BROWN AND CALDWELL

FIGURE 2-5
CITY OF NORTH PORT
CURRENT RECLAIMED WATER USERS

P:\Gen\North Port, City of\129942\CAD\0-Projects\Figures\FIGURE 2-5.dwg 06 Oct 2006 4:27pm Updated by: rforsythe



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Environmental Engineering and Consulting
850 Trafalgar Court, Suite 300, Maitland, Florida 32751 (407)661-9500
Florida Board of Professional Engineers Certificate of Authorization No. 00002602

SUBMITTED: ____ DATE: ____
PROJECT MANAGER
APPROVED: ____ DATE: ____
BROWN AND CALDWELL
APPROVED: ____ DATE: ____

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ZONE	REV.	DESCRIPTION	BY	DATE	APP

City of North Port
WASTEWATER PROGRAM
NORTH PORT, FLORIDA

EXISTING WASTEWATER TREATMENT PLANT UPGRADES and EXPANSION

ELECTRICAL

EXISTING ELECTRICAL SYSTEM BLOCK DIAGRAM

SCALE: NONE
DRAWING NUMBER: FIG 2-7
SHEET NUMBER

Filename: 000-E-001-old Plot date: Feb 09, 2007-09:21:33am Plotted by: rforsythe, Xref Filename: 129942 border Image Filename:

3. DESIGN CONDITIONS

3.1 Present Flow and Loading Conditions

The historical influent flow data to the North Port WWTF was reviewed for a 10-year period that began on January 1, 1995, and ended on March 31, 2006 and is presented in Figure 3-1. For each of the 10-years of record, the AADF, M3MADF, MMF, and MDF are presented in Table 3.1.

The WWTF's influent flows have steadily increased over the years with an average of approximately 1.38 mgd since January 1995. The influent monthly average daily wastewater flows experienced at the WWTF for the period reviewed ranged from a low of 0.804mgd in May 2000 to a high of 2.697 mgd in June 2005. The MDFs have averaged nearly 1.90 mgd over the 10-year period. Since January 1995, the MDF recorded at the WWTF was reported to be 4.84 mgd in June 2003.

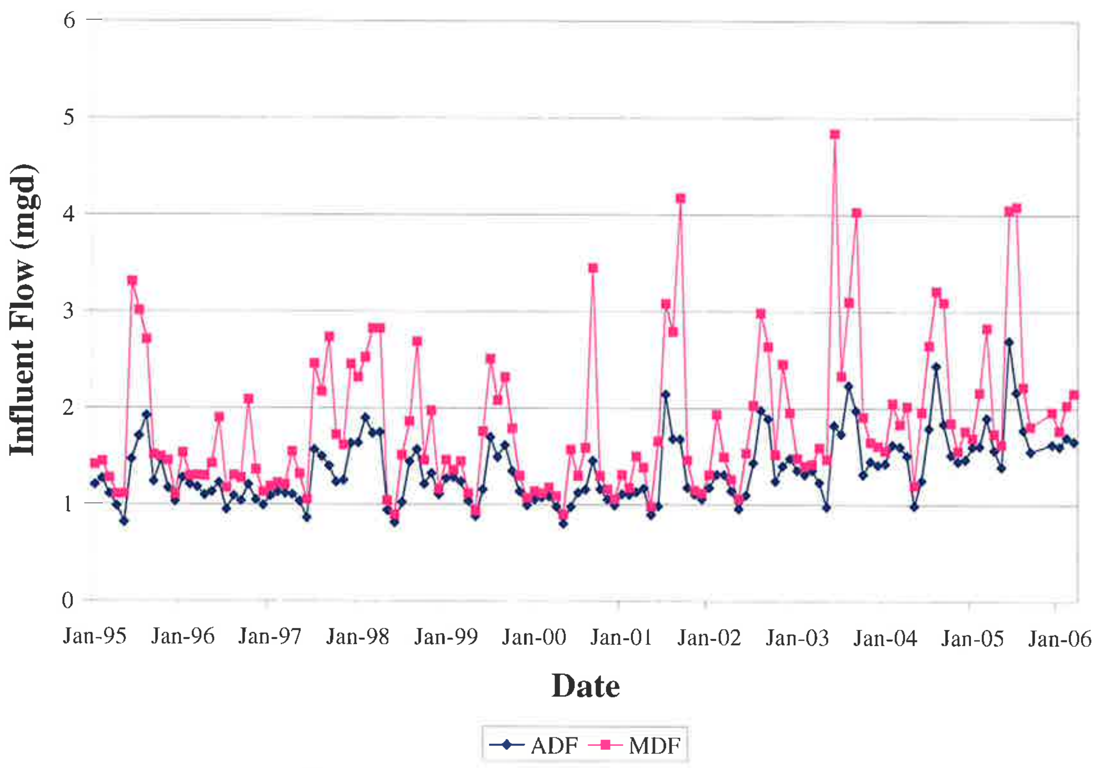

Figure 3-1: Influent Wastewater Flows during 1995 through 2006

Table 3.1: Historical Wastewater Influent Flow Data

Year	Annual Average Daily Flow, mgd	Maximum 3-Month Flow, mgd	Maximum Month Flow, mgd	Maximum Daily Flow, mgd
1995	1.284	1.700	1.919	3.309
1996	1.121	1.223	1.281	2.086
1997	1.243	1.489	1.633	2.734
1998	1.372	1.794	1.896	2.823
1999	1.263	1.602	1.698	2.510
2000	1.076	1.256	1.454	3.450
2001	1.270	1.834	2.143	4.173
2002	1.369	1.768	1.980	2.985
2003	1.514	1.981	2.234	4.030
2004	1.574	2.022	2.437	3.209
2005	1.788	2.213	2.697	3.209
2006[1]	1.653	1.653	1.698	2.156

1 Flow data through March 2006

Pursuant to rule 62-600.405, FAC, for permitting and planning purposes, a rolling 3-month average daily flow (3MADF) is used to monitor the capacity and expansion requirements for the WWTF. During the duration of the existing FDEP permit for this facility, the WWTF underwent a major expansion and upgrade that increased the permitted capacity from a M3MADF of 2.0 mgd to 3.7 mgd which was completed in February 2004. For the period from January 2000 to February 2004, the WWTF operated with a permitted capacity of 2.0 mgd. In March 2004, the construction of the improvements was certified complete and the facility began operation as a 3.7 mgd facility, based on a M3MADF.

For the period reviewed, the M3MADF for the WWTF ranged from a low of 0.920 mgd in June 2000 to a maximum flow of 2.213 mgd in August 2005. Based on the M3MADF's that were reported during this period, when the WWTF was permitted as a 2.0 mgd facility, the percent capacity treated ranged from 46.0-percent to 99.0-percent. More importantly, when the WWTF was certified complete and operating as a 3.7 mgd facility in March 2004, the percent capacity treated ranged from 33.7-percent to 59.8-percent,.

With regards to the seasonal variation in wastewater flows entering the WWTF, an increase in flow can be associated with the rainy season. The increase in influent wastewater flows are not considered unusual, and are on the same order of magnitude as most Florida municipalities of the same population and type and age of infrastructure.

The FDEP monthly operating reports (MORs) for the existing WWTF were reviewed to determine the current characteristics of the wastewater being received at the WWTF. Summarized in Table 3.2 are the historical influent concentrations and loadings of $CBOD_5$ and TSS experienced at the WWTF from 2000 through 2005, which are also presented in Figures 3-2 and 3-3 respectively. Currently the WWTF collects influent samples once per month. Therefore, the average influent characteristics, presented in Table 3-2 represent the average of 12 sampling events for each year.

The influent $CBOD_5$ concentrations for this period ranged from 66.7 mg/L to 466 mg/L, and averaged approximately 185 mg/L. The influent TSS concentrations ranged from 20 mg/L to 1,030 mg/L, and averaged approximately 210 mg/L. These values, when compared to the results from a recent survey conducted by the United States Environmental Protection Agency (USEPA), indicate that based on the organic and solids loading to the WWTF, the wastewater exhibits the characteristics of a moderately strong domestic wastewater as defined by USEPA.

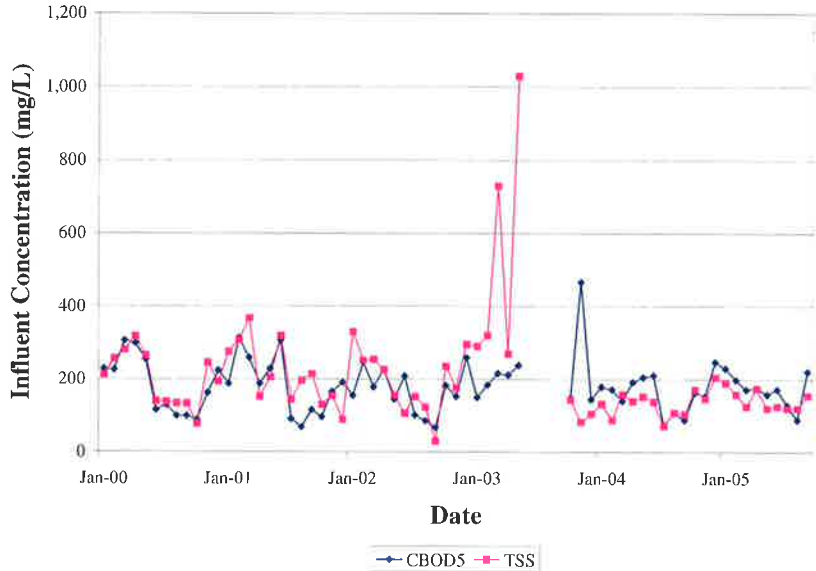

Figure 3-2: Influent Wastewater CBOD5 and TSS Concentrations during 2000 through 2005

Annual average loads have increased steadily at the City's WWTF during the past 6-years, which can be attributed to the City's infiltration/inflow (I/I) rehabilitation program and the newer infrastructure being installed to accommodate the growth in the City. The WWTF influent $CBOD_5$ loads have averaged approximately 2,030 pounds per day (lb/d) over the 6-year period with values ranging from a low of 1,608 lb/d in 2000 to a high of 2,548 lb/d in 2005. Similarly, the influent TSS loads experienced at the WWTF have averaged approximately 2,275 lb/d over the six year period ranging from a low of 1,738 lb/d in 2000 to a high of 3,751 lb/d in 2003.

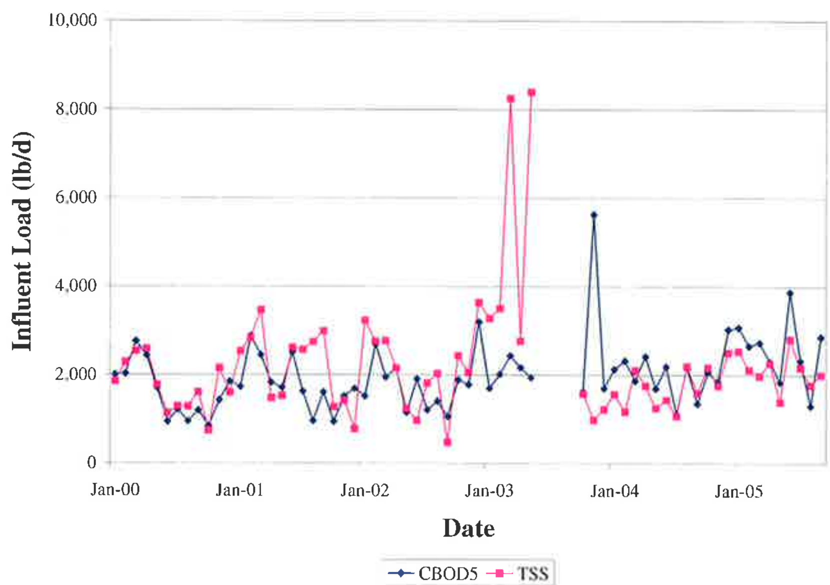

Figure 3-3: Influent Wastewater CBOD5 and TSS Loads during 2000 through 2005

Table 3.2: Influent Characteristics

Year	Influent $CBOD_5$		Influent TSS	
	(mg/L)	(lb/d)	(mg/L)	(lb/d)
2000	179	1,608	194	1,738
2001	169	1,787	207	2,190
2002	160	1,825	187	2,134
2003	190	2,399	297	3,751
2004	154	2,015	131	1,718
2005	171	2,548	142	2,118

3.2 Historic Design Flow Rates and Variability

Table 3.3 presents the calculated WWTF influent flow peaking factors from 1995 through 2006. The peaking factors for any given year represent the ratio of the peak flows identified for the MMF, MDF, and M3MADF to the AADF for a given year. The influent MMADF to AADF peaking factors experienced at the WWTF for the period reviewed ranged from 1.143 in 1996 to 1.687 in 2001; the MDF to AADF peaking factors ranged from 1.795 in 2005 to 3.286 in 2001; and the M3MADF to AADF peaking factors ranged from 1.09 in 1996 to 1.44 in 2001.

Table 3.3: Historical Wastewater Influent Flow Peaking Factors

Year	MMADF-to-AADF Ratio	MDF-to-AADF Ratio	M3MAF-to-AADF Ratio
1995	1.495	2.077	1.32
1996	1.143	1.861	1.09
1997	1.314	2.200	1.20
1998	1.382	2.058	1.31
1999	1.344	1.987	1.27
2000	1.351	3.206	1.17
2001	1.687	3.286	1.44
2002	1.446	2.180	1.29
2003	1.476	2.662	1.31
2004	1.548	2.039	1.28
2005	1.363	1.795	1.24
2006[1]	1.027	1.304	1.00

[1] Flow data through March 2006

Influent hourly (or diurnal) wastewater flow data was not available for the 10-year period. However, it was measured during the wastewater characterization program conducted at the WWTF in April 2006. Influent diurnal wastewater flow values were recorded during the 3-day period in April 2006 where no extraordinary fluctuation of the flow was observed. The influent flow variation to the WWTF was considered normal. Therefore, for the purpose of this analysis, the average diurnal variation observed during the 3-day period, which is shown on Figure 3-4, was considered typical and representative of dry weather flow conditions.

From this Figure, it can be seen that the hour flow-to-average day flow factors ranged from a low of 0.65 to 1.31.

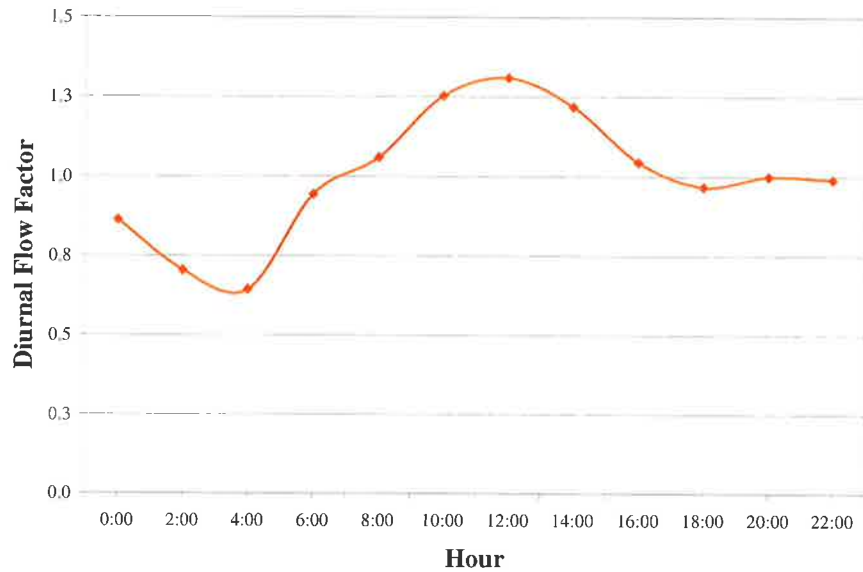

Figure 3-4: Influent Diurnal Wastewater Flow Factors during the Wastewater Characterization Program

Table 3.4 summarizes the selected design peaking factors and the correspondent design flows for different wastewater flow conditions based on the historic flow rates observed at the WWTF. The maximum month flow peaking factor corresponds to the maximum value observed during the 10 year period with a value of 1.687 in 2001. The selected maximum day peaking factor does not correspond with the maximum value observed during the period because this value was considered extremely high compared to the other high values observed during the 1995 to 2006 period. Maximum daily flow values from 2000 to 2003 were affected by extremely high wet weather flow events and were discounted. Therefore, for the purpose of this analysis, a MDADF peaking factor of 2.20 was adopted and corresponds to 1997 wastewater flow data. The PHF peaking factor was selected from data collected during the wastewater characterization program in May 2006, with a value of 1.31 based on average day flow conditions or 2.882 based on the AADF.

Table 3.4: Design Peaking Factors and Correspondent Design Flows

Condition	Peaking Factor	Flow (mgd)
Average daily flow	--	5.60
Maximum 3-month flow	1.250	7.00
Maximum month flow	1.687	9.45
Maximum daily flow	2.202	12.33
Peak hour flow	2.882	16.14

1 Peak hour flow-to-annual average daily flow

Table 3.5 compares the wastewater flow peaking factors adopted during this analysis with those applied during previous analyses of the WWTF conducted by other consultants. Specifically, this includes analyses conducted in preparation of the City's *2004 Utility Master Plan* and in development of the *Design Criteria for the WWTF Phase 3 Plant Expansion.*

Table 3.5: Influent Wastewater Flow Peaking Factors			
Condition	Peaking Factor		
	Brown and Caldwell Recommended	Master Plan [1]	Phase 3 Expansion [2]
Average daily flow	--	--	--
Maximum 3-month flow	1.250	1.194	1.150
Maximum month flow	1.687	1.290	1.250
Maximum daily flow	2.202	2.065	2.000
Peak hour flow	2.882	2.677	2.600

[1] *City of North Port 2004 Utility Master Plan – Black & Veatch Inc.*
[2] *Design Criteria for WWTF Phase 3 Expansion – Boyle Engineering*

3.3 Proposed WWTF Design Conditions

Future populations and wastewater flows and loads in the City service area were recently estimated as part of the City's *2004 Utility Master Plan* prepared by Black and Veatch. As part of this task, Brown and Caldwell reviewed the projected wastewater flows and loads presented in the Master Plan report in order to define design parameters for the WWTF.

3.3.1 Population Projections

The City's Planning Department has estimated that by the year 2021 the City's population will reach 125,325 through a combination of annexations and new construction. As part of the *2004 Utility Master Plan*, the 2021 population estimate provided by the City was extrapolated to forecast the year 2025 population. Also, a 2009 population projection was developed by individually extrapolating the recent historical growth of existing neighborhoods and accounting for growth in current and proposed developments based on projected development schedules provided by developers. The build-out project population was based on the maximum densities per land use as defined by the City's future land use data. The resulting total population projections for key planning years are indicated in Table 3.6.

Table 3.6: 2004 *Utility Master Plan* Population Projections	
Year	Report Area Population
2000	27,876(1)
2009	72,000
2021	125,325(2)
2025	143,000
Build Out	250,000

Notes:
1. *Based on Year 2000 Census data*
2. *Based on projections provided by the City's Planning Department*

Since the City's long term plan allows for construction of three (3) WWTFs, it was also necessary to develop an estimate of service area populations for the three proposed facilities. Table 3.7 presents the Brown and Caldwell estimate of projected service area populations for the existing North Port WWTF and the proposed Panacea and West Villages WWTF's.

Table 3.7: BC Projected Population by WWTF Service Areas						
Area	**2004**	**2010**	**2015**	**2020**	**2021**	**2025**
North Port WWTF	27,806	35,718	43,166	51,512	54,631	59,000
Panacea WWTF	6,684	20,177	26,783	35,087	37,909	45,600
West Villages WWTF	0	13,440	24,000	31,460	32,760	38,400
Total	34,490	69,335	93,949	118,058	125,300	143,000

Figure 3-5 shows a comparison of the Brown and Caldwell estimate of total populations and the *2004 Utility Master Plan* estimates. As will be noted, the Brown and Caldwell population projections are very similar to the projections made in the *2004 Utility Master Plan.* Generally, in the early years, Brown and Caldwell is projecting slightly lower populations but this appears consistent with recent growth rates in the City. However, both projections allow for approaching the City's projected population of 125,000 in 2021.

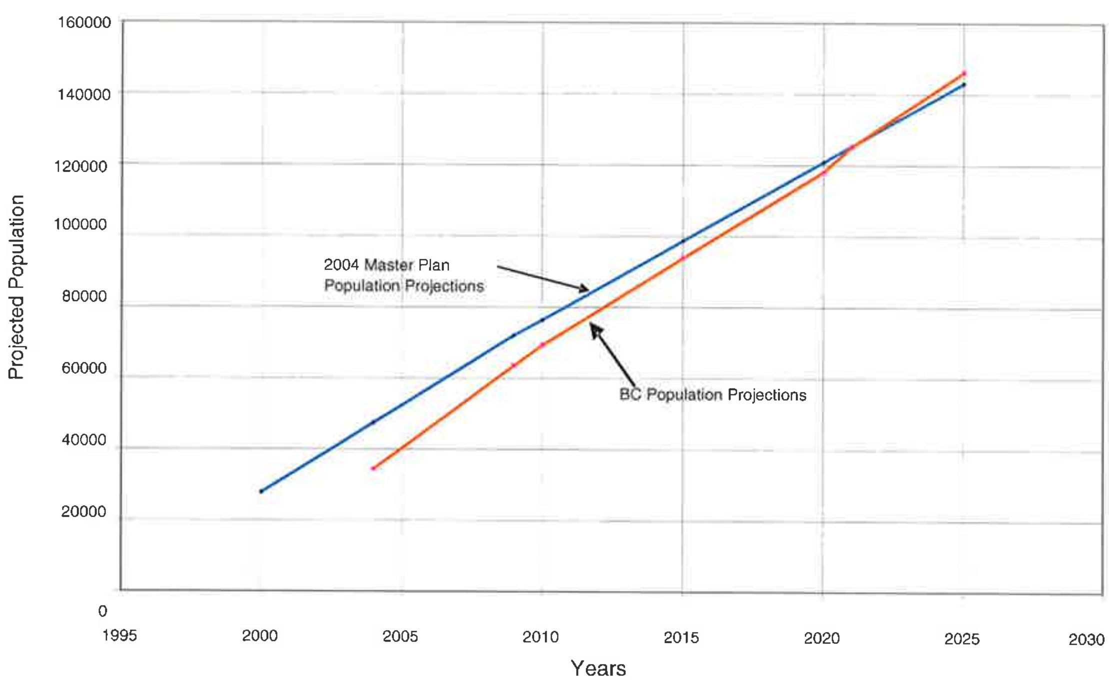

Figure 3-5: Comparison of Projected Populations

3.3.2 Wastewater Flow Projections

In general, during preparation of the *2004 Utility Master Plan,* the following steps were followed to project wastewater flows for each planning year through build-out:

- The population of the proposed developments of West Villages (a.k.a., Thomas Ranch), Panacea, Kelse Ranch and Isles of Athena were assumed to be in accordance with the developer provided schedules of development.

- Projected population growth in the service area in excess of projected growth within the proposed developments was distributed among existing neighborhoods in a manner reflective of anticipated growth trends, in accordance with information provided by the City's Planning Department.
- Wastewater flows within current and proposed developments were calculated by applying the unit usage rates established by the developers where available. In absence of developer-provided usage rates, the City's planning unit rates were used.
- Demands within existing neighborhoods were calculated by applying the planning usage rates only to those neighborhoods where utility service will have been established. That is, no neighborhood contributes to flows and demands before utility system expansion has occurred in that neighborhood.
- Commercial and light industrial demands were established by applying the commercial unit rates to areas designated for commercial and industrial development. This was established in consideration of information provided by the City's Planning Department regarding the anticipated location and timing of commercial development in the report area.

Development of future wastewater flows is significantly influenced by the projected customer growth in the large proposed new developments of West Villages, Kelse Ranch, Panacea and Isles of Athena. The projected wastewater flows presented in the *2004 Utility Master Plan* reflect the development schedules provided to the city by the developers, which the city has committed to meet. However, current progress suggests that actual development of these areas may lag behind the developer's presented schedule by at least 6-months to a year in the Panacea and Thomas Ranch developments and even longer for the Kelse Ranch and Isle of Athena developments.

Future wastewater flows are also significantly influenced by the plan for utility system expansion into existing neighborhoods, which the City is committed to pursue to reduce the number of septic tanks in the region. For the purpose of this analysis, the wastewater flow projections assume that the City will expand wastewater service into existing neighborhoods according to the preliminary schedule described in the *2004 Utility Master Plan*. Consequently, the City also has the ability to delay expansion into the existing neighborhoods in order to slow down the projected increase in wastewater flows based on funding capabilities.

Based on typical planning guidelines, Black and Veatch in preparing the *2004 Utility Master Plan,* assumed that 85 percent of the potable water used in the City is returned to the sewer as wastewater. Water usage rates were estimated at about 70 gallons per capita per day (gpcd) in North Port, giving a wastewater contribution of about 60 gpcd. Due to the occurrence of I/I of rainwater into wastewater collection systems during storm events, the average daily flow (ADF) of wastewater that enters the WWTF is generally higher than the AADF. The ratio of ADF to AADF for the City of North Port was calculated as 1.16, based on an evaluation of the actual 2002 North Port WWTF operational data. Utilizing this ratio, the average day wastewater production rate was calculated to be 70 gpcd.

A planning database was used to determine projected wastewater flows for planning years 2005 through 2025, and at build-out. The resulting average and peak daily flow projections are summarized in Table 3.8 As noted in this table, the wastewater flows are anticipated to increase significantly from a present flow of approximately 1.9 mgd in 2005 to over 13.3 mgd in the year 2025. A majority of the increase in wastewater flows can be attributed to the two existing new developments in the City, Panacea and West Villages.

Table 3.8: Master Plan Wastewater Flow Projections		
Year	Average Daily Flow (mgd)	Peak Daily Flow (mgd)
2002	1.32	3.43
2005	1.87	4.86
2010	5.59	14.54
2015	8.18	21.27
2020	10.74	27.92
2025	13.30	34.58
Build-out	23.50	61.10

Brown and Caldwell estimated projected wastewater flow rates to the individual WWTF's, based on a detailed evaluation of the schedule for extending sewers to existing neighborhoods. For this purpose, Brown and Caldwell assumed a per capita residential wastewater contribution of 70 gpcd and a non-residential wastewater flow contribution of 34 percent of the total flow, to be consistent with the approach used in the *2004 Utility Master Plan*. Table 3.9 shows a summary of Brown and Caldwell projected flows to the three WWTF's and a comparison with Master Plan projections and indicates that Brown and Caldwell wastewater flow projections are in the same general range as in the projections in the *2004 Utility Master Plan*.

Table 3.9: BC Estimate of Projected Flows to Individual WWTF's (mgd)					
Year	Existing North Port WWTF	Panacea WWTF	West Villages WWTF	Total Flow all WWTF's	Master Plan Total Flow Projection
2010	2.93	1.00	1.43	5.36	5.59
2015	3.89	1.75	2.55	8.19	8.18
2020	4.66	2.52	3.34	10.51	10.74
2025	5.34	3.63	4.18	13.15	13.30

3.3.3 WWTF Construction/Expansion Schedule

The *2004 Utility Master Plan* schedule for WWTF construction/expansion to satisfy projected wastewater treatment needs within the City is shown on Figure 3-6 and summarized on Table 3.10 on the following page.

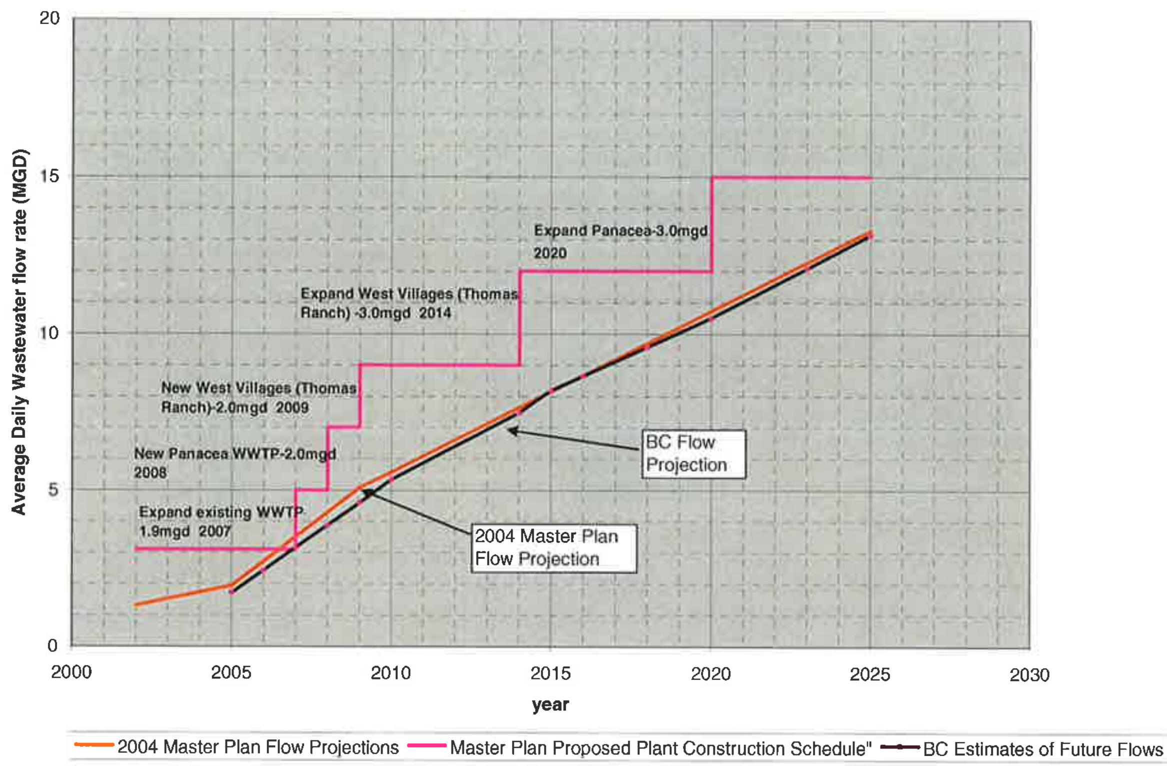

Figure 3-6: Comparison of Average Daily Wastewater Flow Projections and Plant Expansion Program

Table 3.10: Summary of Proposed WWTF Construction/Expansion Schedule

Year	Action	Incremental Plant Capacity - MGD	Total Plant Capacity - MGD
2006	Existing WWTF Capacity	0	3.1.
2007	Expand existing WWTF	1.9	5.0
2008	New Panacea WWTF	2.0	7.0
2009	New West Villages WWTF	2.0	9.0
2014	Expand West Villages WWTF	3.0	12.0
2020	Expand Panacea WWTF	3.0	15.0

Source: City of North Port 2004 Utility System Master Plan, Black & Veatch, January 2005.

With the proposed schedule, WWTF capacity will always exceed projected wastewater flows as shown on Figure 3-6 but there will also be some periods with significant excess installed plant capacity. To meet the projected demands during the early period, from 2006 to 2010, there will be continuous construction at WWTF sites in the City. Further, there will be significant excess, unused capacity at the existing WWTF until sometime after 2020. Therefore, Brown and Caldwell developed an alternative schedule for plant construction as summarized in Table 3.11 and Figure 3-7. The objective of preparing this alternative schedule was to maximize use of installed plant capacity at all times and allow for the proper planned construction of needed facilities.

With this approach, the total plant capacity in 2025 will be reduced but it will be somewhat closer to the anticipated projected future flow. Also, by increasing the AADF capacity of the existing plant to 5.6 mgd instead of 5.0 mgd as previously proposed, it was planned that construction of the Panacea plant could be deferred until 2014. However, as noted in Section 2, of this report the developer of the WVID has significantly reduced their development plans, which impacts the hydraulic capabilities of the City's wastewater transmission system. Therefore, in order to make full use of the capacity at the existing plant, flows designated for treatment at the Panacea WWTF will have to be diverted back to this facility 2-years ahead of schedule. In other words the Panacea WWTF will have to be constructed and on-line by 2012. This is quite possible using the proposed Toledo Blade/Price Boulevard pump station as was originally proposed in the City's *2004 Utility System Master Plan* for the initial period before construction of Panacea WWTF was completed.

Table 3.11: Summary of Alternative WWTF Construction/Expansion Schedule

Year	Action	Incremental Plant Capacity - MGD	Total Plant Capacity - MGD
2006	Existing WWTF Capacity	0	3.1.
2007	Expand existing WWTF	2.5	5.6
2010	New West Villages WWTF	2.0	7.6
2012	New Panacea WWTF	2.0	9.6
2018	Expand West Villages WWTF	2.0	11.6
2020	Expand Panacea WWTF	2.0	13.6

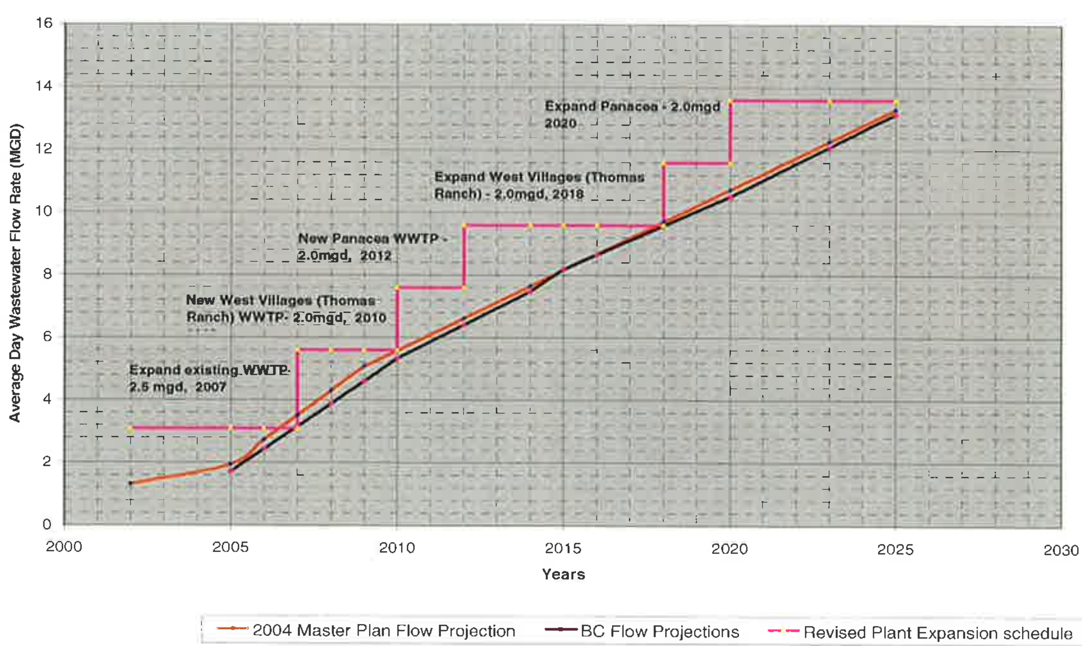

Figure 3-7: Revised Plant Expansion Schedule

Since this approach will require that all flows to the Panacea WWTF be diverted to the existing facility until 2012, a comparison of total flows to the two plants with available capacity was also carried out with results as shown on Table 3.12.

Table 3.12: Comparison of Flows and Plant Capacities – Existing and Panacea WWTF's (mgd)

	Flows (MGD)			WWTF Capacity		
Year	Existing North Port WWTF	Panacea WWTF	Total Both Plants	Existing North Port WWTF's	Proposed Panacea WWTF	Total Both Plants
2010	2.93	1.00	3.93	5.60	0	5.60
2015	3.89	1.75	5.64	5.60	2.00	7.60
2020	4.66	2.52	7.18	5.60	2.00	7.60
2025	5.34	3.63	8.97	5.60	4.00	9.60

3.3.4 WWTF Design Loading and Variability

Based on the information presented in subsection 3.2 and above, the basis for the process design of the existing WWTF, is an AADF of 5.6 mgd or 7.0 mgd as M3MADF. Historical annual average daily flows, $CBOD_5$ loads and concentrations from 2000 through 2005 are presented in Table 3.13. The influent $CBOD_5$ loads have averaged 2,030 lb/d during the 6-year period, ranging from 1,608 lb/d to 2,548 lb/d. For this analysis, the design annual average $CBOD_5$ concentration of approximately 200 mg/L would be adopted, which would yield an annual average $CBOD_5$ load of 9,340 lb/d. This corresponds well with data from year 2003. A similar $CBOD_5$ concentration was adopted during the preparation of the *"Design Criteria for WWTF Phase 3 Expansion Report"*, which was prepared by Boyle Engineering Corporation as part of the last expansion of the City's existing WWTF.

Table 3.13: Historical Annual Average Daily Flow, $CBOD_5$ Loads and $CBOD_5$ Concentrations

Year	ADF (mgd)	Influent $CBOD_5$	
		(mg/L)	(lb/d)
2000	1.076	179	1,608
2001	1.27	169	1,787
2002	1.369	160	1,825
2003	1.514	190	2,399
2004	1.574	154	2,015
2005	1.788	171	2,548
Average	1.432	170.5	2,030

3.4 Future Regulatory Considerations

The City of North Port appears to be in compliance with their existing wastewater treatment and disposal requirements, but future trends in wastewater disposal policies may impose new challenges on the City's wastewater practices. For instance, in the State of Florida, the number of landfills accepting biosolids from outside counties is diminishing. Likewise, available lands for application of Class "B" wastewater biosolids are decreasing. This may result in longer hauling distances and increased disposal costs for biosolids in the future. As, public concerns grow regarding biosolids management, reuse water quality, nutrients, odors and truck traffic, the FDEP has chosen to review their current rulemaking processes with an emphasis on wastewater biosolids and reclaimed water management systems.

The Technical Advisory Committee (TAC) currently proposed revisions to the existing wastewater biosolids management regulations and requirements. The TAC is comprised of 13 members that include representatives from groups such as; citizens, FDEP district offices, cities and industry representatives, as well as counties and local governments. The TAC may enact more restrictive ordinances on residual management and uses in the near term. This evolving regulatory requirement may further restrict the disposal of Class "B" biosolids. Due to these trends, it is advantageous for the City to consider treating biosolids to achieve Class "A" standards in the future. The proposed changes to Chapter 62-640, FAC are summarized in Table 3-14.

Currently the FDEP is considering new and more stringent regulations for reclaimed water management systems. These new regulations concentrate on improving technical guidance, relating rules and forms to check, monitor, and to report reuse water facilities. Furthermore, FDEP has completed modifications to the operation, maintenance requirements and the operating protocols for reuse water systems. The recent changes to the reuse regulations are summarized in Table 3.15.

Table 3.14: Summary of Future Environmental Regulations Proposed Biosolids Rule

Existing	Proposed
Terminology: Residuals	Terminology: Biosolids
Terminology: Agricultural Use Plan	Terminology: Nutrient Management Plans
62-640-200 (4) Agronomic rate: Monitoring Requirements: only for Nitrogen	62-640-200 (4) Agronomic rate is redefined to address also Phosphorous in the definition: Monitoring Requirement: add Phosphorous
62-640-400 (44) General Definitions	62-640-400 (44) Identifying Responsibilities/Responsible -New Subsection that adds Site Manager- definition
62-640-300 (5)	62-640-300 (5) (c) New Subsection that establishes all shared responsibilities for a facility's biosolids between the Site (WWTF) and the Site Manager (land application).
Not specified	62-640-450 (1,2,3,4) New Subsection that adds all definitions, characteristics, and requirements for Site Registration. It includes notice to all adjacent land owners, occupant and to local government.
62-640-600 (1) Pathogen Reduction Requirements: all residuals applied to the land shall be classified as either Class A or Class B with respect to pathogens.	62-640-600 (1) Removes text after "Pathogen Reduction Requirements" to avoid confusion. Removes Alternative 4, treatment in an unknown process with biosolids tested for pathogens, bacteria, enteric viruses, and helminth ova at time of use, from options allowed. Requires processes that are essentially pasteurization with quicklime to address concerns in Chapter 7 of the USEPA Control of Pathogens and vector attraction in Sewage Sludge manual.
62-640-600 (1) (b) Class B Residuals: residuals will be classified as Class B if one of the pathogen reduction requirements described in section 503.32.(b) or (3), is met	62-640-600 (1) (b) Adds a requirement that the permittee demonstrates a 2 log reduction in the addition to meeting the fecal limit when using the fecal monitoring-only option for Class B.
62-640-600 (2) (a) Address Vector Attraction Reduction Requirements.	62-640-600 (2) (a) It is revised to clarify acceptable vector attraction reduction options. It clarifies that biosolids that are distributed and marketed to Vector Attraction Reduction Options 1-8 with the exception of Option 6 (alkaline addition).

Table 3.14: Summary of Future Environmental Regulations Proposed Biosolids Rule

62-640-650 (1)(c) Monitoring, Record Keeping, Reporting and Notification Monitoring Frequency for Biosolids generated (dry ton per year) 0 < 320 dtpy.........once per year 320 < 1,653..........once per quarter 1,653< ....once per 60 days	62-640-650 (1)(c) It adds increased monitoring requirements including monitoring frequency. Monitoring Frequency for Biosolids generated (dry ton per year) 0 < 320 dtpy.........once per quarter 320 < 1,653..........once per 60 days 1,653< ....once per month
62-640-650 (3) (a) (5) For Class AA biosolids not distributed and marketed within one month after being treated, the facility permittee shall conduct additional representative samples.	62-640-650 (3) (a) (5) New subsections add re-sampling for fecal coliform or salmonella sp. This sampling shall take place within 30 days of the actual distribution and marketing date.
Not specified	62-640-650 (3) (c) New subsection that adds ground water monitoring and surface water monitoring for registered sites under certain conditions.
Not specified	62-640-650 (4) (d)(i) It adds requirements for facility permitees and site managers to obtain hauling records for Class A and B biosolids.
Not specified	62-640-880 (2) (f) It requires reliability at larger biosolids management facilities to provide redundancy and reliability for their treatment processes.

Table 3.15: Summary of Future Environmental Regulations Reuse Water Systems

Existing	Promulgated Change
62-610-462 FAC Automatic control valves and monitoring equipment monitor the water quality of the filtered effluent (turbidity) and total chlorine residual. Valves automatically diverts flow to Class I deep injection well on excursions	62-610-320 (6) (g) Requires continuous monitoring of turbidity. Creation of this rule enables the use of other meters (like the so-called TSS meters) in lieu of turbidity meters in monitoring reclaimed water. Utilities wanting to employ the so-called "TSS meters" in lieu of turbidity meters no longer will need to pursue a variance.
62-610-200(17) A recording flowmeter and totalizer shall be utilized to measure flow and calibrated at least annually.	62-610-300 (4)(a)2 Annual Reuse Report Form: refinements to the annual reuse report form include the addition of requirements for reporting of plans and activities related to metering reclaimed water use, per statutory requirements, which added to Section 403-064, Florida Statues, in 2004.
Not specified	62-610-300 4(a) 4c. Requires domestic WWTF's with a permitted capacity of/or greater than 100,000 gpd that discharged via reuse and land application systems to monitor reclaimed water or effluent for the primary and secondary drinking water standards contained in Chapter 62-550 FAC. Except for asbestos, color, and corrosivity, all parameters listed as primary and secondary drinking water standards in Chapter 62-550 FAC, shall be monitored and reported on the DMR with submittal to the Department by June 28. Approved analytical method identified in Rule 62-620.100(3) j shall be used for analysis. If no method is included for a parameter, methods specified in Chapter 62-550 FAC shall be used.
Not specified	62-610-300 (4)(a)4 Refinements to the Pathogen Monitoring Form, which requires use of certified labs and approved methods for re-testing if high pathogen concentrations are observed, were added to this form.

Future regulations also require Class I reliability for all reclaimed reuse wastewater systems. Therefore, design of the upgraded WWTF for North Port will consider the minimum applicable requirements for a Class 1 facility as shown in Table 3.16.

Table 3.16: Class I Reliability Requirements

Operations	Requirement
Bar Screens	One backup bar screen must be provided. For facilities with only two bar screens, one must be designed to permit manual cleaning.
Aeration Blowers or Mechanical Aerators	Design oxygen transfer must not be impaired with largest capacity unit out of service.
Clarifiers	At least two units must be provided. Capacity of at least 75 percent of design flow with one unit out of service.
Chlorine Contact Chamber	At least two units. Capacity of at least 50 percent of design flow with one unit out of service.
Pumps	A backup pump shall be provided for each set of pumps which performs the same function.

Finally, this Preliminary Engineering Report considers future environmental regulations for nitrogen removal. Presently, the FDEP does not require the control of nitrogen in the effluent from public access reclaimed water systems; however, the City's desire to produce a higher quality effluent to protect the ground water resources in the region is of primary consideration. Therefore, all alternatives will provide effluent that partially denitrifies wastewater influent. The upgrades for the WWTF are designed to provide an effluent capable of meeting the following criteria:

- $CBOD_5$: 5 mg/L
- TSS: 5 mg/L
- TN: <10 mg/L

4. PROCESS EVALUATION AND SELECTION

The WWTF is currently permitted for a flow of 3.7 mgd on a M3MADF basis, which is equivalent to 3.1 mgd on an AADF basis. The WWTF is classified as a conventional activated sludge facility with screening, grit removal, conventional activated sludge reactors with coarse bubble aeration and secondary clarification. A portion of the effluent which is to be distributed as reclaimed water, undergoes additional treatment including filtration and high level disinfection. The balance of the effluent, which is not provided additional treatment, is discharged at the Class I DIW.

The objective of this section is to identify the improvements needed to increase the permitted capacity of the WWTF to 7.0 mgd on an M3MADF basis, and provide for all effluent that will meet the following criteria:

- $CBOD_5$: < 5 mg/L
- TSS: < 5 mg/L
- TN < 10 mg/L
- High level disinfection pursuant to Rule 62-610, FAC

Process simulation modeling of the WWTF was conducted using the BioWin™ simulation model version 2.2. The BioWin™ simulation model is based upon the IAWQ Activated Sludge Model No. 1 modified for biological phosphorus removal. The model is a PC-based simulator that uses a series of mechanistic and empirical models to represent material transformations and pollutant removals in both the liquid and solid streams of a biological wastewater facility. It enables the user to simulate carbonaceous oxidation, nitrification, denitrification, and enhanced biological phosphorus removal. BioWin™ is an industry standard in North America and overseas, having been used for the design and performance evaluation of many treatment plants in the United States., Canada, the United Kingdom, the Far East, and Australia.

4.1 Wastewater Characterization

Process simulation modeling requires accurate characterization of the different carbon, nitrogen and phosphorus fractions contained in the wastewater. To accurately determine the onsite wastewater characteristics at the WWTF, a special sampling campaign was performed in April 2006. The information gathered from this analysis was used in the calculation of important wastewater fractions to calibrate the constructed BioWin™ model for the WWTF.

This intensive sampling program was conducted with the main objectives of providing information on:

- Influent wastewater characteristics
- The form of the diurnal influent flow and load patterns
- Performance of the systems

Appendix B presents data collected during the special sampling campaign performed from April 23 through May 1, 2006 at the City's WWTF.

Presented in Table 4.1 are the average parameter values for the daily composite samples collected during the special sampling. Based on these results, important wastewater characterization parameters were determined as input data for the BioWin™ and are presented in Table 4.2. These results allow an interpretation of the most consistent ratios and thereby, the most reliable parameter values from the data collected during the special sampling campaign.

Table 4.1: Average Composite Sampling Results

Parameter (mg/L)	Influent	Secondary Effluent	Final Effluent
Flow, mgd	1.57	--	--
TSS	172	9	< 1.0
VSS	131	--	--
COD	509	50	43
Soluble COD (0.45 μm)	219	41	41
Soluble COD (GF)	248	39	42
Floc-Filtered COD	203	39	38
BOD_5	232	< 2.0	--
$CBOD_5$	209	< 2.0	--
TKN	43.34	1.80	1.55
Soluble TKN (0.45 μm)	35.04	1.34	1.17
Soluble TKN (GF)	39.24	1.61	1.51
NH3-N	31.35	0.36	0.20
NO3-N	0.06	30.0	31.01
SON	3.68	0.98	0.97
TP	8.05	5.7	4.44
Soluble P (0.45 μm)	5.85	5.4	5.51
Soluble P (GF)	5.96	5.6	5.51
Alkalinity	445	158	130
pH	7.08	7.0	7

Table 4.2: Parameters Ratios From Special Sampling Composite Results

Ratios	Average	Median	Maximum	Minimum
COD-to- $CBOD_5$	2.43	2.45	2.84	1.90
COD-to-BOD_5	2.22	2.09	2.84	1.60
$CBOD_5$-to-BOD_5	0.91	0.93	1.00	0.74
COD-to-TSS	2.96	2.89	3.49	2.35
$CBOD_5$-to-TSS	1.22	1.23	1.41	1.06
BOD_5-to-TSS	1.36	1.29	1.66	1.06
Soluble COD (GF)-to-COD	0.49	0.49	0.57	0.40
Soluble COD (0.45 μm)-to-COD	0.43	0.43	0.52	0.29
Floc-Filtered COD-to-COD	0.40	0.41	0.47	0.29
NH3-N-to-TKN	0.73	0.75	0.89	0.48
NH3-N-to-COD	0.06	0.06	0.08	0.05
NH3-N-to- $CBOD_5$	0.15	0.16	0.17	0.11

Table 4.2: Parameters Ratios From Special Sampling Composite Results				
NH3-N-to-BOD_5	0.14	0.15	0.17	0.08
NH3-to-TSS	0.18	0.19	0.21	0.13
TKN-to-COD	0.09	0.09	0.11	0.07
TKN-to- $CBOD_5$	0.21	0.22	0.23	0.18
TKN-to-BOD_5	0.19	0.19	0.22	0.16
TP-to-COD	0.02	0.02	0.02	0.01
TP-to- $CBOD_5$	0.04	0.04	0.05	0.03
TP-to-NH3-N	0.26	0.25	0.33	0.19
TP-to-TKN	0.19	0.18	0.23	0.14
Soluble P (0.45 µm)-to-TP	0.74	0.77	0.82	0.63
Soluble P (GF)-to-TP	0.75	0.76	0.86	0.65
VS-to-TS	0.76	0.75	0.85	0.70
ISS-to-COD	0.08	0.08	0.11	0.04
VS-to-COD	0.26	0.26	0.34	0.20

4.1.1 COD Fraction

The COD-to-BOD_5 ratio is useful since the historical influent organic load is recorded in terms of BOD_5 data. However, the process simulation model requires specification of the influent COD concentration. The daily composite COD and BOD_5 concentrations recorded during April 23 through May 1, 2006 indicates average and median COD-to-BOD_5 ratios of 2.2 and 2.09, respectively.

The daily composite $CBOD_5$ and BOD_5 concentrations recorded during the sampling effort indicates average and median $CBOD_5$-to-BOD_5 ratio of 0.93 and 0.91, which corresponds with ratios often found in municipal wastewaters for a community of this type.

A number of other useful COD fractions were estimated on the basis of the special sampling conducted:

The readily biodegradable COD (Fbs) fraction was estimated using the following approach:

Fbs = [CODxf, inf – CODxf, effl] / CODmx, inf

Where:

CODxf, inf = influent COD concentration of flocculated, filtrated wastewater, in mg/L

CODxf, effl = effluent COD concentration of flocculated, filtrated wastewater, in mg/L

CODmx, inf = influent total COD concentration, in mg/L

The results of the calculation of the readily biodegradable COD fraction based on the data collected during the special sampling are presented in Table 4.3.

Table 4.3: Biodegradable COD	
Date	**Fbs**
4/23/2006	0.39
4/24/2006	0.36
4/25/2006	0.34
4/26/2006	0.33
4/27/2006	0.32
4/28/2006	0.19
Average	0.32
Median	0.33
Flow Weighted Average	0.32

The unbiodegradable soluble COD (Fus) fraction was estimated using the following approach:

Fus = CODxf, effl / CODmx, inf

The results of the calculation of the unbiodegradable soluble COD fraction are presented in Table 4.4

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Table 4.4: Undegradable COD	
Date	**Fus**
4/23/2006	0.08
4/24/2006	0.06
4/25/2006	0.07
4/26/2006	0.06
4/27/2006	0.09
4/28/2006	0.10
Average	0.08
Median	0.08
Flow Weighted Average	0.08

The other COD fractions were calculated based on the BioWin COD/VSS mass balance model for COD wastewater fractions. The COD fractions adopted for modeling purposes are summarized as follows:

- Soluble COD fractions:
  Readily biodegradable, Fbs = 0.32
  Acetic acid fraction, Fac = 0.15
  Unbiodegradable, Fus = 0.08
- Particulate COD fractions:
  Slowly biodegradable particulate, Fxsp = 0.78
  Unbiodegradable particulate, Fup = 0.20
  Unbiodegradable particulate, Fup = 0.20

4.1.2 Nitrogen Fractions

The computed influent ammonia (NH_3-N)-to-TKN ratio (Fna) results obtained from the Wastewater Characterization study, ranged from 0.69 to 0.79, with average and median values of 0.73 and 0.75, respectively. The flow weighted Fna average was determined to be 0.73. This fraction is within the range measured at other facilities in Florida, and therefore, it is adopted for the calibration and simulation of the BioWin™ model. The NH_3-N concentrations are calculated internally by BioWin™ using this Fna factor of 0.73.

During the special wastewater sampling effort, the soluble organic nitrogen (SON) concentration in the influent wastewater was reported to have average and median values of 5.7 mg/l and 6.20 mg/L, respectively. The final effluent SON concentration has average and median values of 0.97 mg/l and 1.02 mg/L, respectively.

The COD-to-TKN ratio was derived from the composite daily samples collected during the special sampling program, with values ranging from 9.5 to 13.4 and average and median ratios of 11.6.

4.1.3 Phosphorus Fractions

Average total Phosphorus (TP)-to-COD and TP-to-TKN ratios were computed based on data obtained during the special sampling program, and were determined to be 0.02 mg/l and 0.19mg/l, respectively. The phosphate (PO_4-P) data from the special sampling was not available to determine the PO4-P-to-TP (FPO_4) ratio. However, for modeling purposes, soluble phosphorus data (filtered through a 0.45-micron filter) was used to estimate the F_{PO4} ratio with average and median values of 0.73. Therefore, a FPO_4 value of 0.73 was adopted for this analysis.

4.1.4 Solids Fractions

The average and median volatile solids (VS) fraction of the influent TSS calculated during the special sampling program were 76 and 75 percent, respectively. These values were used to establish the inert SS (ISS) to be included in the process modeling. Based on results from the special sampling program, the VS-to-COD and the ISS-to-COD ratios averaged 0.26 and 0.08, respectively.

Table 4.5 shows the wastewater fractions adopted for the BioWin™ simulation model. Most of the other parameter values were maintained as BioWin™ default values.

Table 4.5: BioWin™ Parameter Values

Name	Value
Fbs - Readily biodegradable (including Acetate)	0.32
Fac - Acetate	0.15
Fxsp - Non-colloidal slowly biodegradable	0.78
Fus - Unbiodegradable soluble	0.08
Fup - Unbiodegradable particulate	0.20
Fna - Ammonia	0.73
Fnox - Particulate organic nitrogen	0.50
Fnus – Soluble unbiodegradable TKN	0.02
FupN - N:COD ratio for unbiodegradable part. COD	0.035
Fpo4 - Phosphate	0.73
FupP - P:COD ratio for influent unbiodegradable part. COD	0.011

4.2 Diurnal Influent Flow and Load Patterns

Diurnal influent flow and influent concentration samples were collected during the special sampling campaign to provide information on the form of the diurnal flow and loads to the WWTF. The form of the average diurnal flow and load patterns are illustrated in Figures 4-1 through 4-4. Appendix B provides additional information on the diurnal special sampling data collected during April 23 to May 01 2006.

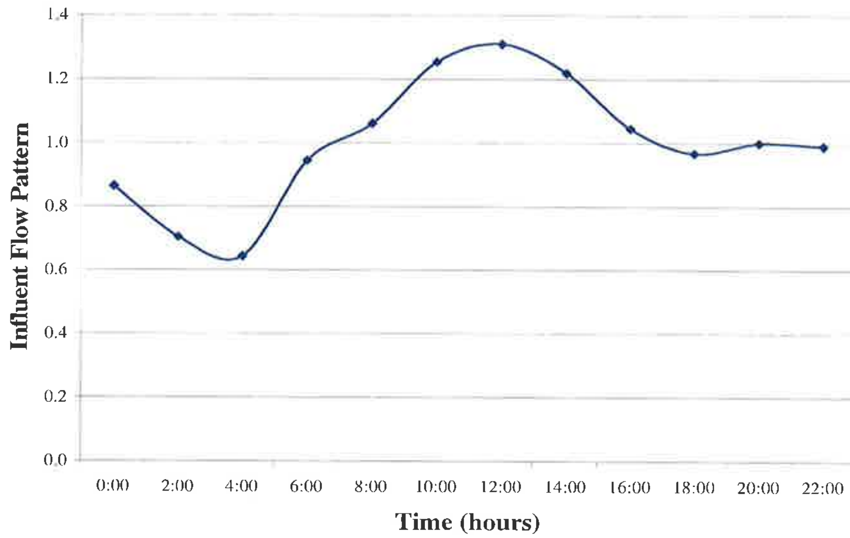


Figure 4-1: Diurnal influent flow pattern

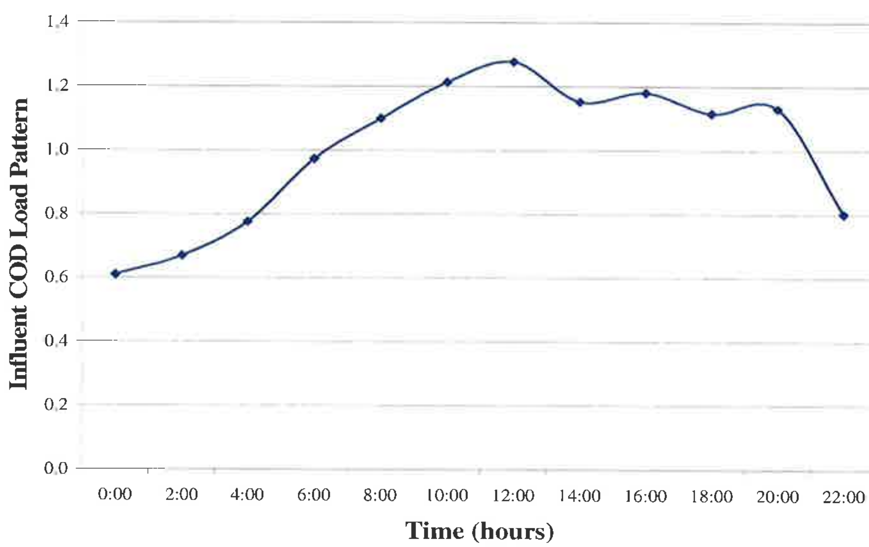


Figure 4-2: Diurnal influent COD load pattern

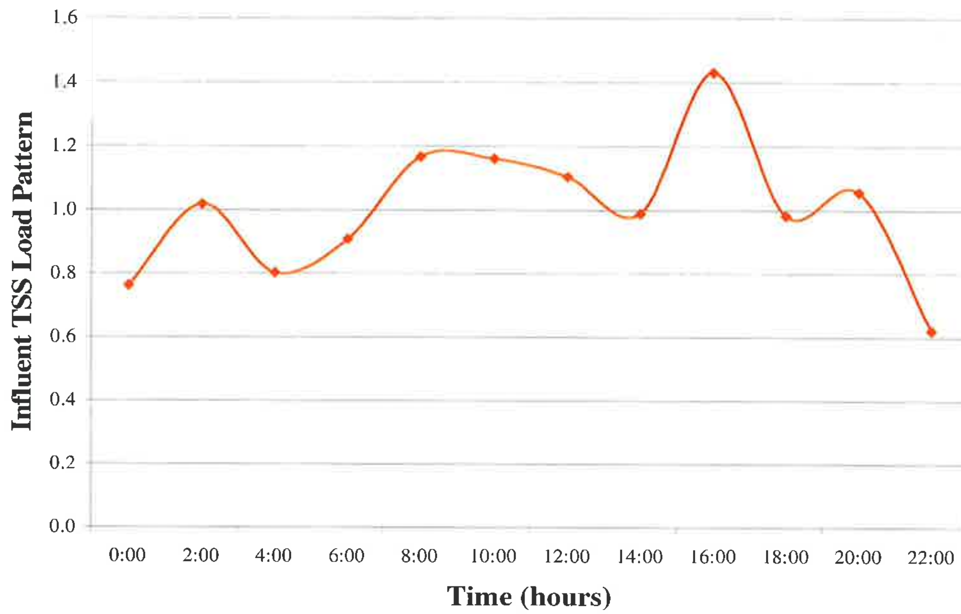


Figure 4-3: Diurnal influent TSS load pattern

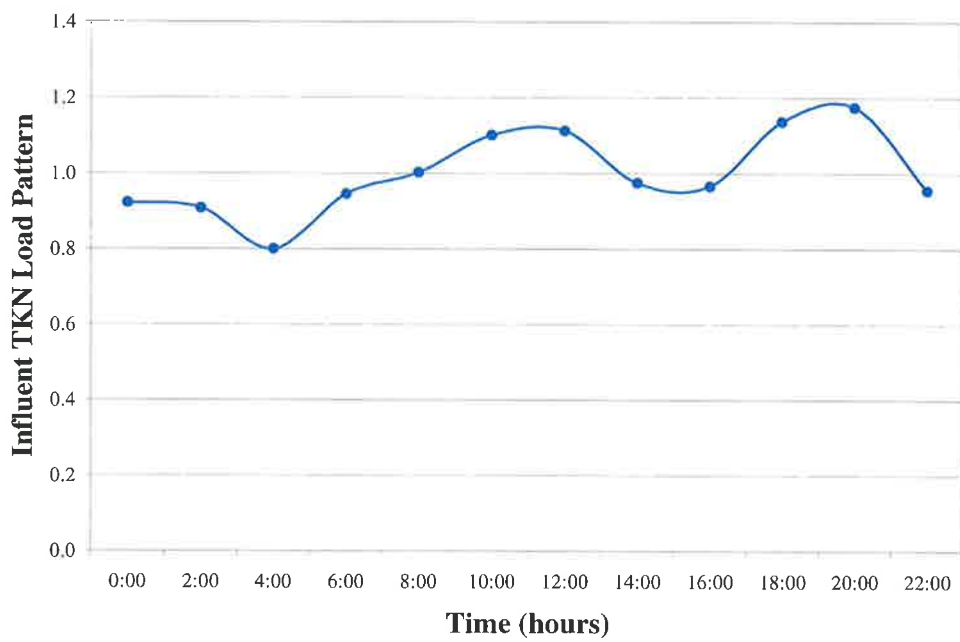


Figure 4-4: Diurnal influent TKN load pattern

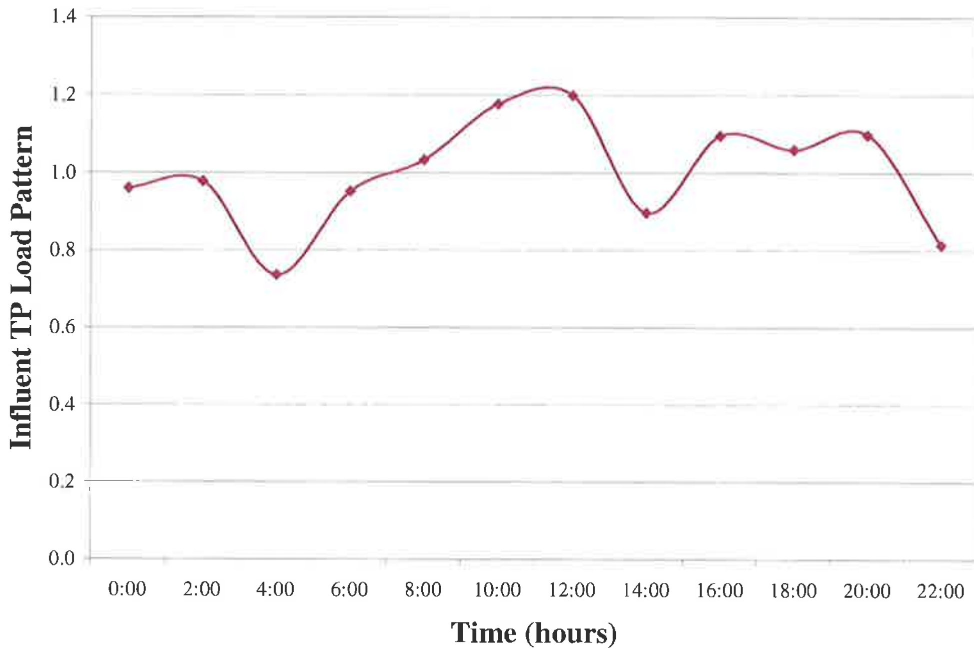


Figure 4-5: Diurnal influent TP load pattern

4.3 Process Modeling

The BioWin™ process simulation model was used to establish the maximum capacity of the existing WWTF and to identify improvements needed to increase the permitted capacity of the WWTF to 7.0 mgd on a M3MADF basis, and provide for effluent that will meet the following criteria:

- $CBOD_5 < 5$ mg/L
- TSS < 5 mg/L
- TN< 10 mg/L
- High level disinfection pursuant to Rule 62-610, FAC

Any process model first requires calibration and then verification of the predicted results before its application. To ensure that the constructed BioWin™ simulator accurately predicted WWTF performance, it was calibrated with WWTF information collected during the special sampling effort performed at the WWTF between April 23rd and May 1st, 2006. Appendix C provides additional detail on calibration of the BioWin™ model for the WWTF.

The calibrated BioWin™ model was then used to identify improvements to increase the capacity of the WWTF under the following process configurations:

- Alternative 1: Capacity Assessment of Existing WWTF, with No Improvements
- Alternative 2: Conventional Activated Sludge Process with Tertiary Filters added.
- Alternative 3: Activated Sludge with Anaerobic Selectors and Tertiary Filters
- Alternative 4: Modified Ludzack-Ettinger Process with Tertiary Filters

This analysis was focused on the secondary and tertiary treatment portions of the WWTF rather than on pretreatment, or solids processing. A description of each alternative follows. Appendix D explains the details of the process modeling results for the different alternatives evaluated.

An influent itinerary was developed and used for the process modeling of the City's WWTF to assess the capacity of the existing facility. Additionally, the process modeling was performed to determine the necessary improvements required to increase the capacity and to meet future effluent regulations. The 90 day influent itinerary was developed to simulate the following loading scenarios:

- *Month 1:* Peak load and maximum flow conditions
- *Month 2:* Peak load and maximum three month average flow condition
- *Month 3:* Annual average load and annual average flow

These months serve as the basis for an influent itinerary of flows and loads to be modeled using BioWin™ for facility analysis.

4.3.1 Capacity Assessment of Existing WWTF, with No Improvements

The BioWin™ calibrated model was first used to assess the capacity of the current liquid treatment system at the City's WWTF. In section 2 of this PER, the hydraulic capacities of the existing unit processes and the interconnecting conduits and channels were determined to be adequate for an increased flow rate of up to 10 mgd, and were not affected by the magnitude of the proposed revised flow rate. This determination means that system hydraulics was not limiting and instead, plant capacity was only limited by the process capacity of the biological treatment system without modifications. BioWin™ was used to assess the WWTF's process capacity and for this purpose, it was assumed that all the treatment units were in service.

The capacity of the secondary treatment system at the City's WWTF is established by determining the limiting factor among following:

- Aeration system capacity
- Secondary clarifier surface overflow rate
- Secondary clarifier solids loading rate
- Filtration system capacity

The current effluent permit for the City's WWTF limits focus to TSS and BOD_5 concentrations only and no effluent nitrogen limits were established at this time. Therefore, the capacity assessment for current conditions was performed at an SRT of approximately 3 days, which yields an average mixed liquor concentration of 2,200 mg/L. This SRT value takes into account the biomass inventory in the aeration tanks only, neglecting the biomass present in the secondary clarifiers.

The calibrated BioWin™ model was used to determine the capacity of the WWTF, as currently configured, and under current permit conditions. For the purpose of this analysis, influent wastewater flows were incrementally increased until limiting capacity conditions were found in one or more unit processes. Based on this analysis, with results as shown on Figures 4.6 and 4.7, the existing limiting biological treatment capacity of plant can be summarized as follows:

- AADF: 3.5 mgd
- M3MADF: 4.4 mgd
- MMADF: 5.9 mgd

For comparison, the City's WWTF is currently rated at 3.7 mgd on a M3MADF basis, and based on the flow peaking factors presented in Section 3; represents an AADF of approximately 3.1 mgd.

Each of the five aeration basins at the City's WWTF is currently equipped with 108 coarse bubble diffusers that are supplied with air by five centrifugal blowers with a total airflow capacity of approximately 9,600scfm with the largest unit out of service. Each aeration basin has a volume of approximately 224,400 gallons.

To determine the oxygen demands at 3.5 mgd as an AADF, the BioWin™ simulation model was used to estimate OUR profiles and the results are summarized in Table 4.6. This Table also presents the AOR for each zone. The capacity of the aeration system was based on a standard oxygen transfer efficiency (SOTE) for the coarse bubble diffusers of 0.87 percent per foot of submergence and an alpha (α) value of 0.80. The capacity assessment of the aeration system was based on the ability of the existing system to maintain a DO concentration of 2.0 mg/L through the reactors during peak hour loading conditions. Table 4.7 summarizes the aeration requirements per aeration tank during peak hour loading conditions. As Table 4.7 demonstrates, the airflow rate required per aeration basin, to maintain an average DO of 2.0 mg/L is approximately 1,740 scfm or 8,700 scfm for the five existing aeration basins, which is less than the actual blower capacity. Therefore, based on the results obtained, the existing aeration system is not limiting and will be able to maintain at least 2.0 mg/L of DO in all the aerated zones at the maximum biological treatment rate of 3.5 mgd on an AADF basis which is equivalent to 4.4mgd on a M3MADF basis using the Brown and Caldwell proposed peaking factors as shown previously on Table 3.5.

Table 4.6: Summary of OUR and AOR Values

OUR Condition (mg O/L-hr)	Zone 1	Zone 2	Zone 3
Annual Average	78	36	22
Maximum Day	100	49	31
Peak Hour	112	61	40
AOR Condition (lb O/d)			
Annual Average	1,166	538	329
Maximum Day	1,674	912	598
Peak Hour	1,495	732	463

Table 4.7: Peak Aeration System Requirements per Aeration Tank

Parameter	Zone 1	Zone 2	Zone 3	Total
Volume (MG)	0.0748	0.0748	0.0748	0.2244
DO (mg/L)	2.0	2.0	2.0	--
No. of Diffusers	52	28	28	108
SOTE (percent)	12.2	12.2	12.2	--
Alpha	0.8	0.8	0.8	--
Airflow (scfm)	910	500	330	1,740
Airflow per Diffuser	17.5	17.85	11.78	--

The treatment capacity of the secondary clarifiers is established by the SOR and the SLR capacities. Since no historic sludge volume index (SVI) data was available for the City's WWTF, a design SVI of 180 milliliters per gram (mL/g) was adopted based on Brown and Caldwell's experience with similar treatment facilities using this process in Florida.

The State Point Analysis (SPA) program was used to determine the maximum allowable solids loading rate or maximum solids flux (MSF) to the secondary clarifiers. For the purpose of this analysis, a maximum RAS flow rate of 2.8 mgd was adopted, which corresponds to the maximum sludge return rate with one pump out of service. Based on the adopted design SVI of 180 mL/g and maximum RAS flow of 2.8 mgd, the maximum allowable SLR is 29 lb/sf-d. However, there is an inherent uncertainty in sizing clarifiers based on historical SVI data, although the 90-percentile value was used in this analysis. In any case, the maximum allowable solids flux value obtained from the SPA should be reduced by a factor of approximately 80 percent, to account for non-ideal settling conditions in the clarifiers. Surety in design could be obtained by on-site stress testing following the CRTC Protocol and secondary clarifier modeling which was not performed. Therefore, in this case, the MSF as indicated by the maximum SLR determined above, should be reduced from 29 to 20 lb/sf-d.

Normally, the peak SORs in secondary clarifiers vary from 1,000 to 1,800 gpd/sf depending on the biological process used ahead of the clarifiers. For the purpose of this analysis, and based on conditions at the WWTF, a maximum allowable SOR value of 1,200 gpd/sf under peak flow conditions was adopted. Again, to ensure that the existing secondary clarifiers can safely handle these high loading conditions, it is recommended that on-site stress testing following the CRTC protocol and secondary clarifier modeling be carried out.

Figures 4-6 and 4-7 illustrate the BioWin™ predicted secondary clarifier SLR and SOR at 3.5 mgd AADF. These Figures also show the maximum allowable limit for SLR and SOR adopted for this analysis. As Figure 4-6 illustrates, the secondary clarifiers will periodically reach the maximum allowable limit for SLR at 3.5 mgd AADF; but this is considered acceptable since the limit will only be reached for limited periods. Figure 4-7 demonstrates that the peak hour SOR is below the maximum allowable SOR limit and the clarifiers are considered underloaded in terms of SOR. Therefore, based on these results, the limiting capacity of the secondary clarifiers at the City's WWTF is approximately 3.5 mgd AADF or 4.4mgd M3MADF based on SLR considerations.

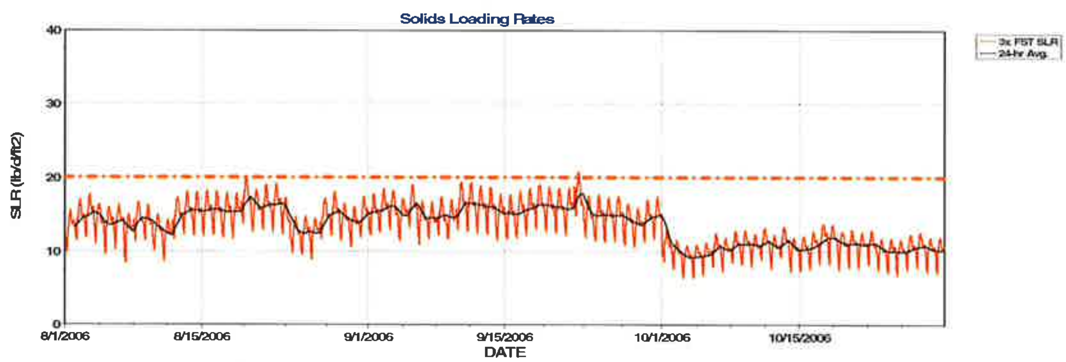


Figure 4-6: Solids Loading Rates Predicted by BioWin at 3.5 mgd as AADF

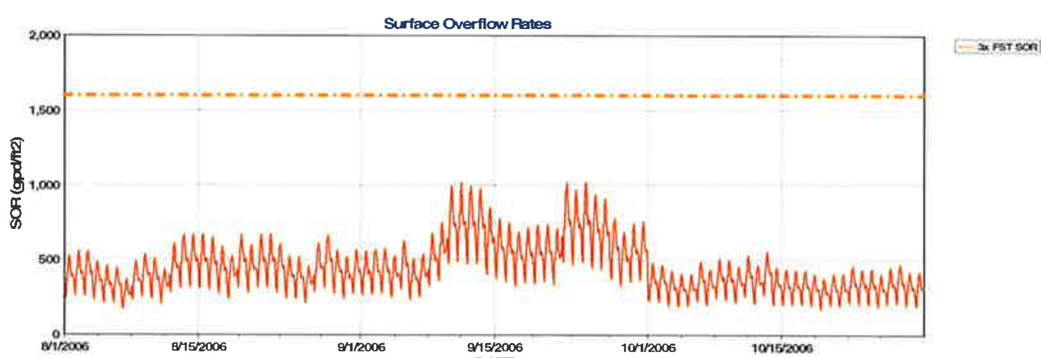


Figure 4-7: Surface Overflow Rates Predicted by BioWin at 3.5 mgd as AADF

Currently, the City's WWTF is equipped with two Aqua Disk Package Filters with a total filtration area of approximately 760 ft^2. The design filtration rate for this type of filters is in the range of 2 to 5 gpm/ft^2. Based on the total filtration area available and a filtration rate of 5.0 gpm/ft^2, the capacity of the filtration system is approximately 5.47 mgd as peak hour flow. Using the influent flow peaking factors presented in a Section 3, a peak hour flow of 5.47 mgd equates to approximately an annual average daily flow of approximately 1.9 mgd.

Since only a portion of the secondary flow is treated by the filters while the remainder is disposed at the City's Class I DIW, the capacity of the effluent filters do not impact the overall treatment capacity of the City's WWTF. Therefore, based on the results of the wastewater characterization and modeling completed as part of this PER, the City's WWTF can safely be re-rated from a M3MADF of 3.7 mgd (2.8 mgd AADF) to a flow of 4.4 mgd on a M3MADF basis (3.5 mgd AADF) since this flow rate corresponds to the limiting capacities of both the biological treatment system and the secondary clarifiers in their current modes of operation.

The following sections describe process improvements required to increase plant capacity and to meet future effluent regulations summarized in Section 4.3. For the purpose of this analysis, the 90 day influent itinerary was modified to represent the design conditions previously mentioned in Section 3 and described as follows:

- Month 1:
  - Flow = 9.45 mgd
  - BOD Load = 12,610 lb/d
- Month 2:
  - Flow = 7.0 mgd
  - BOD Load = 12,610 lb/d
- Month 3
  - Flow = 5.6 mgd
  - BOD Load = 9,340 lb/d

4.3.2 Alternative 2: Conventional Activated Sludge Process and Deep-Bed Denitrification Filters

This treatment alternative uses the same secondary treatment process configuration currently utilized at the WWTF and was considered the base alternative. However, in order to reduce the effluent TN concentration to the proposed levels, this option would assume that the facility would be equipped with tertiary deep-bed denitrification filters with carbon addition for nitrate removal.

In order to handle projected greater flows, the secondary treatment process would consist of eight aeration tanks (three new units), with the coarse bubble aeration system in existing tanks replaced with a fine bubble aeration system and the new tanks also equipped with fine bubble aeration. The process would be operated at a SRT of 4 days to provide adequate conditions for carbonaceous material removal and for nitrification to occur. After biological treatment, the ML would flow by gravity to four circular secondary clarifiers (one new unit) for solids-liquid separation. Settled ML would be pumped back to the influent distribution channel at the front-end of the WWTF at a maximum rate of 8.0 mgd to allow the capacity of the secondary clarifiers to be maximized and the remainder would be wasted.

Clear secondary effluent will be directed to new tertiary deep-bed denitrification filters with carbon addition using methanol for example, for additional removal of particulate organics and nitrate removal by denitrification. From the denitrification filters, all of the effluent would flow by gravity to the CCC for high level disinfection. From this point, flows will first be diverted to the public access reclaimed water system and only excess flows not used in the reclaimed water system would be diverted to the Class I DIW.

4.3.3 Alternative 3: Activated Sludge with Anaerobic Selectors and Deep-Bed Denitrification Filters

This alternative modifies Alternative 2 and the current secondary process configuration by creating anaerobic selectors for bulking control at the front-end of the aerobic zones. Anaerobic selectors prevent the growth of filamentous bacteria in the aerobic zone by removing their food source – namely the readily biodegradable BOD in the selector ahead of the aerobic zone. The reduced inclination for sludge bulking in the City's WWTF with selectors, will produce a ML with better sludge settling properties that will lead to more efficient activated sludge system operation. In addition, the anaerobic selectors would result in anticipated lower operating costs such as reduced sludge chlorination requirements for bulking control and reduced energy requirements.

To handle projected increased flows, the secondary treatment process would consist of eight aeration tanks (three new units) equipped with anaerobic selectors at the front-end of tanks. Each selector would be equipped with a mixing system that would be designed to provide enough mixing to prevent solids from settling in the selector. In addition, the mixers would be sized to minimize the DO in the ML by avoiding excessive mixing. Similar to Alternative 2, all of the aerobic zones of the reactors would be equipped with fine bubble aeration systems.

Also in a manner similar to Alternative 2, the process would be operated at a SRT of 4 days. After the wastewater undergoes biological treatment, the ML would flow to four circular secondary clarifiers (one new unit) for solids-liquid separation and the settled ML would be returned to the aeration tanks at a maximum rate of 8.0 mgd.

Finally, clear secondary effluent would flow by gravity to new tertiary deep-bed denitrification filters with carbon addition for additional removal of particulate organics and nitrate removal by denitrification. Effluent from the filters would flow by gravity to the CCC and then transferred to the effluent disposal sites in a similar manner as described for Alternative 2.

4.3.4 Alternative 4: Modified Ludzack-Ettinger Process with Tertiary Filters

This alternative modifies Alternative 3 by incorporating an internal mixed liquor recycle (IMLR) from the end of the aerobic zones back to the front-end of the anoxic section of the basins for denitrification. This process is known as the Modified Ludzack-Ettinger (MLE) process and represents the simplest denitrification-nitrification process technology. The IMLR from the aerobic zones to the anoxic zones returns nitrified ML at a regulated rate to ensure adequate nitrates for the heterotrophic denitrification population in this zone. The process uses carbon provided by the raw wastewater for the denitrification that occurs in the anoxic zone. This process will eliminate the need for an external carbon source, as well as the need for denitrification Filters.

Similar to Alternatives 2 and 3, the process would be operated at a total SRT of 4 days. This design SRT will provide adequate conditions for carbonaceous BOD removal and close to complete nitrification to occur in the aerobic zones. Denitrification and nitrification processes would occur in the biological reactors at levels that would allow the WWTF to meet reduced effluent TN requirements.

After the wastewater undergoes biological treatment, the ML flows to four circular secondary clarifiers (one new unit) for solids-liquid separation and the settled ML would be returned to the aeration tanks at a maximum rate of 8.0 mgd.

Finally, secondary effluent would flow by gravity to a new tertiary filtration system. The filters, for the purpose of this alternative, would be used mainly for additional physical removal of particulate organics in the secondary effluent to meet BOD_5 and TSS requirements and not for TN removal as in the case of alternatives 2 and 3. Effluent from the filters will then flow to the chlorine contact chamber and using NaOCl will be treated to meet high level disinfection requirements. The effluent will then be diverted to either the public access reclaimed water system or the Class I DIW system depending on demand and water quality.

4.3.5 Summary of Process Modeling Results

Table 4.8 summarizes the recommended improvements for each of the alternatives evaluated for the WWTF to increase the permitted capacity and to provide additional contaminant removal capabilities.

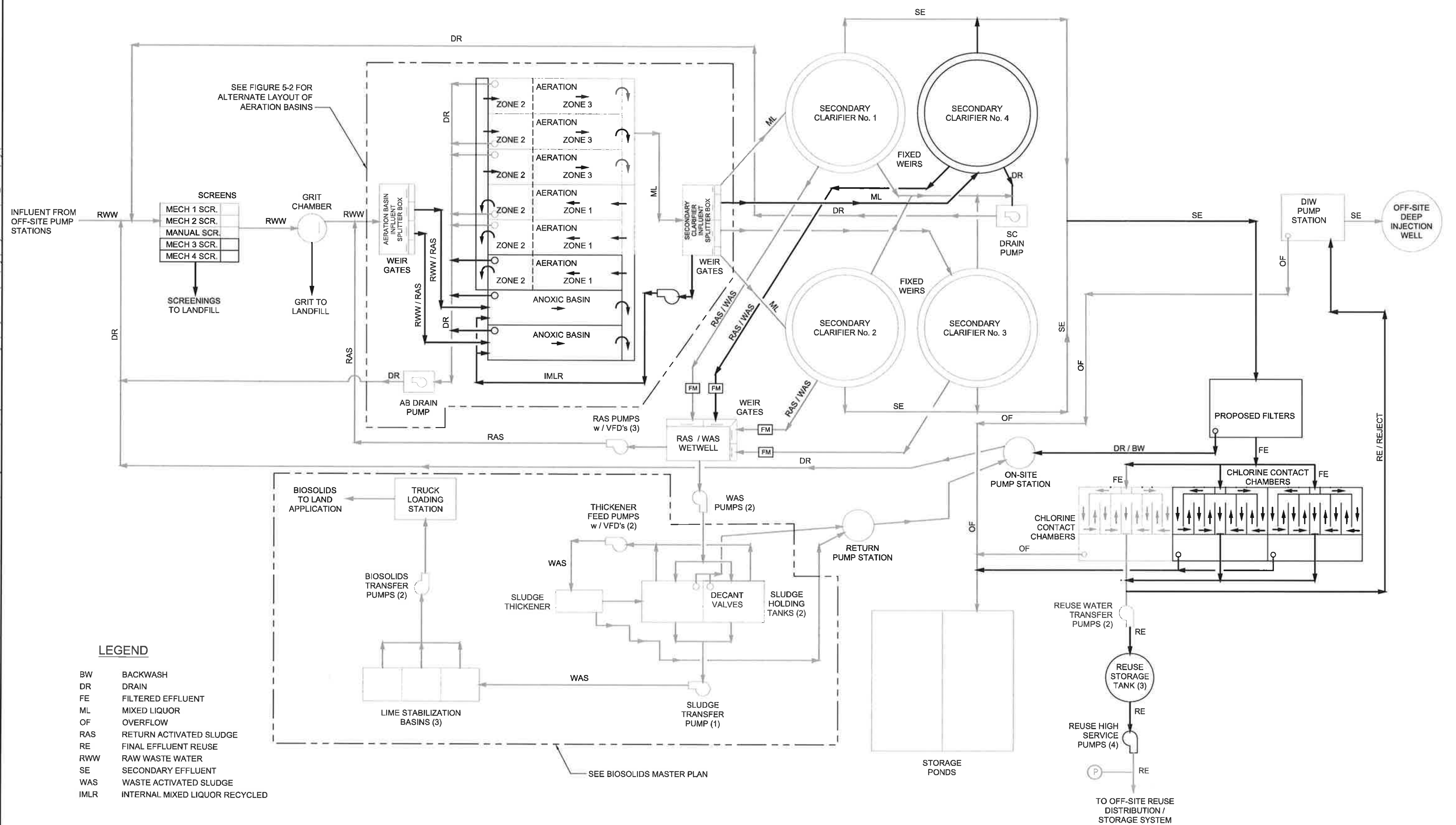
Table 4.8: Summary of Process Modeling Results for Alternatives 1, 2, 3 & 4

Parameter	Alternative 1	Alternative 2	Alternative 3	Alternative 4
AADF (mgd)	3.50	5.60	5.60	5.60
MMADF (mgd)	5.90	9.45	9.45	9.45
M3MADF (mgd)	4.40	7.00	7.00	7.00
Peak Flow (mgd)	10.10	16.14	16.14	16.14
Total SRT (days)	3	4	4	4
Activated Sludge Reactors				
No. Aeration Tanks	5	8 (3 new)	8 (3 new)	8 (3 new)
Total Un-aerated Volume (MG)	--	--	0.3585	0.3585
Total Aerobic Volume (MG)	1.122	1.7922	1.4337	1.4337
Total Reactor Volume (MG)	1.122	1.7922	1.7922	1.7922
Avg. MLSS (mg/L)	2,200	2,850	2,950	2,890
Total AOR (lb/d)	3,184	26,879	21,489	21,489
Total No. of Fine Bubble Diffusers	108 (course bubble)	3,850	3,050	3,050
Peak Airflow Requirements (scfm)	8,700	11,620	9,270	9,270
IMLR (mgd)	--	--	--	10.00
Secondary Clarifiers				
No. Secondary Clarifiers	3	4 (1 new)	4 (1 new)	4 (1 new)
Total Secondary Clarification Area (ft2)	9,955	13,273	13,273	13,273
Maximum RAS (mgd)	2.80	8.00	8.00	8.00
Peak SOR (gpd/ft2)	1,000	1,215	1,215	1,215
Maximum Peak SLR (lb/ft2d)	20	36	36	36
Waste Activated Sludge (lb/d)	7,020	10,670	11,015	10,815
Secondary Effluent				
SE NH_3-N (mg/L)	<0.1	< 0.1	< 0.1	0.13
SE NO_3-N (mg/L)	22.80	22.80	12.52	7.19
SE TN (mg/L)	24.63	24.63	14.18	8.97
SE TP (mg/L)	5.13	5.13	< 0.50	0.86
Tertiary Deep-Bed Filters				
Deep-Bed Filters (ft2)	760 (disk filters)	2,830	2,830	2,830

Table 4.8: Summary of Process Modeling Results for Alternatives 1, 2, 3 & 4				
Average Filtration Rate (gpm/ft2)	5	2	2	2
Methanol Feed Rate (gpd)	--	1,420	600	--
Final Effluent				
FE NH_3-N (mg/L)	<0.1	< 0.1	< 0.1	0.13
FE NO_3-N (mg/L)	15.0	8.00 (1)	8.00 (1)	7.19
FE TN (mg/L)	16.4	9.40	9.21	8.56
FE TP (mg/L)	4.99	4.99	< 0.50	0.55

4.3.6 Summary of Process Modeling Results

Based on the results of the BioWin™ modeling that was performed, it is recommended that the City's WWTF be re-rated in the interim to 4.4 mgd on a M3MADF basis. This will permit the City to optimize the existing unused capacity in the facility. Additionally, it is recommended that the existing WWTF be converted to a MLE process as described in Alternative 4, above with a capacity of 7.0 mgd on a M3MADF basis. This option will maximize the existing aeration basins and secondary clarification facilities at the WWTF, produce a high quality effluent without the need for additional chemicals other than NaOCl, and permit for future expansion, if needed at this site. The process flow diagram for the MLE facility is shown on Figure 4-8 and the proposed site plan on Figure 4-9. The recommended improvements at this facility will be described further in Section 5 of this report.



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Florida Board of Professional Engineers Certificate of Authorization No. 00002602

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APPROVED: ______ BROWN AND CALDWELL DATE: ______
APPROVED: ______ DATE: ______

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REVISIONS

ZONE	REV.	DESCRIPTION	BY	DATE	APP.

City of North Port
WASTEWATER PROGRAM
NORTH PORT, FLORIDA

EXISTING WASTEWATER TREATMENT PLANT UPGRADES and EXPANSION

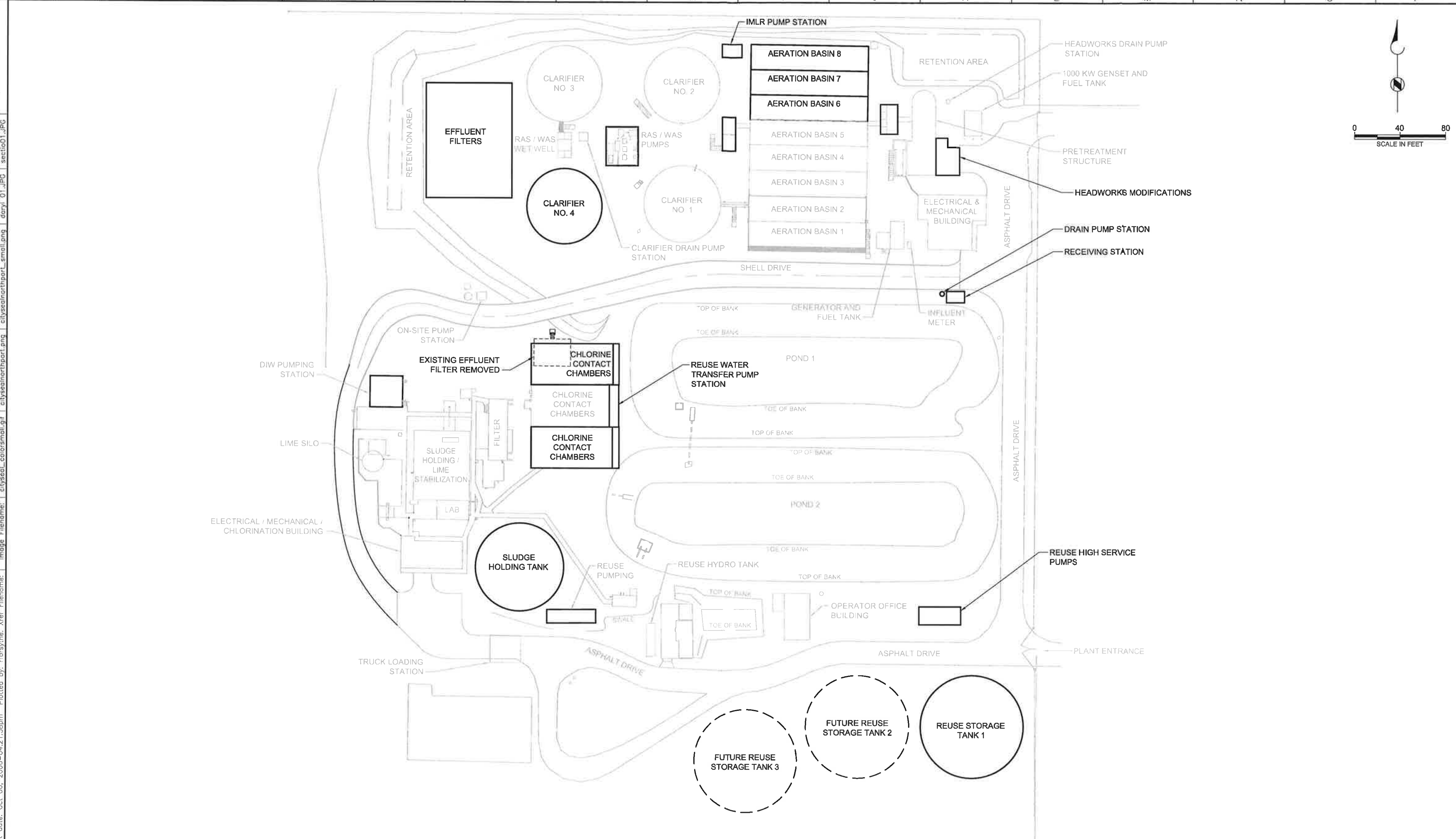
WWTF

PROPOSED PROCESS FLOW DIAGRAM

SCALE XXXXX

DRAWING NUMBER **FIG 4-8**

SHEET NUMBER



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City of North Port
WASTEWATER PROGRAM
NORTH PORT, FLORIDA

EXISTING WASTEWATER TREATMENT PLANT UPGRADES and EXPANSION

WWTF

PROPOSED SITE PLAN

SCALE 1" = 40'

DRAWING NUMBER **FIG 4-9**

SHEET NUMBER

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5. PROPOSED TREATMENT FACILITY

The purpose of this section is to clearly describe the City's program for upgrades and expansion of the existing WWTF and reclaimed water reuse facilities. This section describes alternative methods for upgrading and expanding the WWTF, identifies equipment proposed and proposes a specific course of action in accordance with the State and Federal Regulations currently in effect.

This section will satisfy the FDEP requirements as summarized within Section 62-503.700(2), FAC for funding the improvements at the City's existing WWTF using the State Revolving Loan (SRF) program. While the City is interested in receiving funds through the Bond Market, the SRF program will provide an alternative funding method for the project.

The alternative analyses conducted for each process component of the WWTF has focused on the most cost effective means of expanding and upgrading the WWTF.

5.1 Evaluation Criteria

The alternative options available to the City for expanding and upgrading their existing WWTF differ in many respects. The purpose of this subsection will be to identify and describe the criteria used for evaluating these options and to provide a format for rating and selecting the preferred equipment and options, which will include the following:

- Cost criteria. Including capital and operation and maintenance costs
- Performance criteria. Including reliability, flexibility, and effectiveness in meeting the project goals.
- Environmental criteria. Including odor, noise, aesthetics, effluent quality, impacts on adjacent land uses, etc.
- Implementation criteria. Including permit compliance, financing capabilities and public acceptance.

Each of these four criteria groups is described and specific factors within each group are selected for subsequent use in rating the options for expanding and upgrading the WWTF.

5.1.1 Cost Criteria

Cost criteria include capital and operating costs, and consider factors such as power, chemicals and staffing. The monetary cost criteria for each option will be determined by calculating the total annual cost or present worth.

Construction, and operation and maintenance (O&M) costs cited in this report are based on preliminary layouts of the proposed alternative and equipment selected. For estimating purposes, prices of comparable work performed in the State of Florida were obtained from available sources. Manufacturers, suppliers of materials and equipment, local contractors were sources of the cost information used in the analysis. The cost data for the wastewater treatment processes were derived from actual projects designed by Brown and Caldwell, recent projects bid in the State, and from project data in professional literature. In considering the estimates, it is important to realize that changes during final design will alter the totals to some degree, and that future changes in the cost of material, labor, and equipment will certainly cause comparable changes in costs provided herein. On the other hand, because of the relative economy of the options that are available, they can be expected to change only slightly with a small increase or decrease in general construction costs and decisions based on present comparisons should remain valid.

The construction costs of the options are the estimated costs for constructing the process tankage, installing the equipment, pipelines and appurtenances. For the purpose of this evaluation, these costs have been estimated to a "planning level" or within 30-percent of the actual cost in present day dollars. Planning level cost estimates are adequate for comparison of equipment and layout of tankage. Once the processes and equipment has been selected, construction costs will be refined to the highest level obtainable without preparing detailed design drawings and specifications. The refined cost estimates will be presented with a detailed description of the recommended wastewater treatment process and equipment.

It is anticipated that construction costs are expected to continue to undergo long-term changes in keeping up with the corresponding changes in the national and local economies. Over the past several years, the construction industry has experienced a significant escalation in costs. Both raw materials and labor have exhibited price escalation that is not exhibited elsewhere in the United States economy. These events have made it very difficult to provide accurate cost estimate information. One of the best available barometers of these changes has been the Engineer News Record (ENR) Construction Cost Index (CCI), which is computed from prices on construction materials and labor. Looking ahead, spreading shortages of cement and continuing price increases for petroleum products are likely to push construction costs higher. Construction is more vulnerable than the economy as a whole to commodities prices and supply-chain factors such as shortages in cement, oil, scrap metal or ore, because the industry is so dependent on materials and delivery costs.

A 30-percent contingency allowance will be made for uncertainties unavoidably associated with preliminary design. Such factors as unforeseen conditions, such as electrical duct banks and pipes not shown on the Record Drawings, variations in final lengths or average depths of pipelines are just a few of the many items, which can increase the construction cost, and for which an allowance must be made in the preliminary design stage of the project. The capital costs also include the Sarasota County sales tax rate of 7-percent. No provisions have been included in the cost estimate for the City to pre-purchase large equipment items as a tax cost savings.

Other costs directly associated with the cost of constructing the expansion and upgrades to the WWTF include engineering services, administration and legal services, costs associated with the bond sales, and interest on money borrowed during the construction period. The allowance for engineering has been determined in the existing contract that Brown and Caldwell has with the City, and should not change, unless a treatment process (i.e., biosolids treatment) or equipment proposed was not intended. Therefore, the costs for engineering services will not be included in the overall capital cost analysis. However, allowances for administrative, legal and financial costs based on past projects could be as high as 5 to 10-percent, and are accounted for in estimating the cost of the project.

For the purposes of estimating the total project costs, the following allowances were added to the basic construction cost:

- Contingency: 30-percent.
- Sales tax: 7-percent.
- Legal, administration, and financial: 5-percent.

When applied in sequence, the total project capital cost amounts to 142-percent of the base construction cost estimate, plus engineering fees as previously determined.

The economic evaluation of alternatives requires consideration of both annual costs and capital expenditures. In fact, it is the varying relationship between the capital and annual costs, which results in one option being economically favorable or more attractive than another. Annual costs include O&M and administration, as well as depreciation of structures, equipment and interest charges on capital expenditures. For consistency, the same price levels will be used for annual costs.

Interest rates, generally used as a compounded percentage per annum, are an expression of the time value of money. Interest rates must be assumed for the purposes of computing the annual cost of capital and for discounting the value of deferred facilities in present worth comparisons. The discount or interest rate that will be used for these analyses will be 5.75-percent. Actual debt service recommended for this analysis must be refined to reflect the actual or expected interest rates and the specific financial parameters of the funding mechanism used. For this comparison it will be assumed that the City will be going to the Bond Market for funding, rather than using the SRF program.

All costs associated with the O&M of the facilities and equipment associated with each option will be included in this factor. This includes all costs for labor, materials and supplies, power, and chemicals related to each process component. Chemicals used at this facility will only include NaOCl, since the polymer system that will be designed into the process will only be used on an intermittent basis, and only when needed at the secondary clarifiers. The cost of the NaOCl will be increased at a rate that has been experienced over the past 10-years.

Equivalent annual costs expressed as a percentage of total present worth of the project or capital costs, and the total present worth of the O&M costs as a uniform amount. The total equivalent annual cost of each process option, which in this case will be biological nitrogen removal as opposed to chemical nitrogen removal either using a carbon source or using denitrification filters will be used as a single expression of true economic burden on the City. Equipment will be handled in a similar manner, when more than one type of equipment is identified that can accomplish the same function and is acceptable to the City for incorporating into the final design.

5.1.2 Performance Criteria

Performance criteria will relate to the way each treatment process option and/or equipment achieves objectives of the planning and how well they are expected to function. The performance factors include:

- Effectiveness.
- Reliability.
- Flexibility.
- Public health potential

Compliance with the FDEP Operating Permits, both for the WWTF and the Class I DIW will be the primary factor to be evaluated under the effectiveness category. The relative ease of achieving compliance is a primary consideration; however, the ration of the expected performance to total project cost will also enter into this evaluation.

Assurance of the design performance is the overall screening consideration under the reliability category. The evaluation of the relative risk of either a process or mechanical equipment failure, the susceptibility of the process to disruption from catastrophes (i.e., hurricanes, etc.) and the consequences of a functional system failure, regardless of cause.

The adaptability of the treatment processes and major equipment proposed is the overall flexibility consideration. This criterion is particularly concerned with the possible future constraints, such as stricter effluent regulations, modified effluent disposal methods and resource scarcities, or technological advancements in the wastewater industry. The flexibility evaluations will also consider responsiveness to increased wastewater flows due to development patterns, and lifestyle changes (i.e., water, power conservation, etc.).

Similarly, each treatment process option will be evaluated in terms of potential public health risks. The public access reclaimed water reuse system and Class I DIW will be given particular emphasis in evaluating this criterion.

5.1.3 Environmental Criteria

Environmental criteria have been selected from topics generally covered in the FDEP criteria for a Facilities Plan, as well as environmental assessments that dealing with WWTFs. The primary environmental criteria considered important for the WWTF include the following:

- Air quality.
- Effluent quality.
- Noise impact.
- Aesthetics and surrounding land use compatibility.

There is always some odor risk near any WWTF. Important factors include the character and location of sensitive receptors, climate, and degree of odor control provided. Different wastewater treatment processes have different degrees of odor generation potential, and hence varied risk of producing measurable odor at the WWTF boundary.

The purpose of these improvements will be to provide a treatment process that partially denitrifies the wastewater influent. While presently the FDEP does not require the control of nitrogen in the effluent that is discharged to public access reclaimed water systems, it is apparent that regulation of nitrogen will be forthcoming. Additionally, all options for the City will be capable of providing an effluent that meets the following criteria:

- $CBOD_5$: 5 mg/L
- TSS: 5 mg/L
- TN: <10 mg/L

In addition to the above, the facility will need to meet high-level disinfection requirements outlined in Rule 62-610, FAC.

Noise concerns are associated with both the construction and facility operations. The construction of proposed improvements at the WWTF will cause some noise impacts. However, when construction is complete, the noise from the WWTF will generally be considered as low or background levels. In addition to the noise levels experienced off-site, the health and safety of the facility operations staff must be considered. Several methods to reduce or eliminate potential sources of noise will be implemented at the WWTF, which include consideration of the source that generates the noise and the path through which the noise is transmitted.

The visual impacts of the site will be evaluated in terms of the impact on the surrounding land uses. This facility is located off the main transportation corridor entering the City. The WWTF is located on the existing site that is zoned for this use, and no additional land will be necessary to accommodate the new process tankage and equipment. The land uses immediately surrounding the site include residential (single and multi-family, commercial and light industrial).

5.1.4 Implementation Criteria

The ability to implement a wastewater improvements program is the single most important factor in evaluating options available for expanding and upgrading the WWTF. It is also the factor that is least susceptible to engineering analyses. The key aspects of implementation include the overall acceptability of the preferred plan to city officials, the public and regulatory agencies. To some degree, public acceptance will depend on financial impacts to the citizens. Acceptability to the regulatory agencies will depend on the consistency of the selected option to meet the current regulations. Factors such as constructability and permitting potential, public acceptance, and compliance with regulatory requirements are considered in the evaluation of the implementability of each wastewater treatment option (nitrogen removal).

The overall acceptability of the upgrades and improvements that will be constructed will be determined as a result of the regulatory agency review, the actions by the City utilities staff and City Commission. A subjective rating of the options contained herein will consider factors believed to weigh most heavily in this case, including total monetary cost, site related impacts, effluent criteria and permit compliance. The Rules and regulations that will govern this expansion and upgrades program are summarized in Chapter 62, FAC. As noted above, the effluent criteria will be of a higher quality of the effluent traditionally associated with public access reclaimed water facilities, which a result of the City's desire to reduce the NO_3-N in the effluent.

Construction considerations include such factors as size and complexity of structures, groundwater constraints, unforeseen conditions, and the need to keep the facility operating during construction period. Therefore, since no geological work has been performed on-site, any unforeseen conditions that may impact the design and construction of the improvements were considered.

5.2 Headworks

The headworks structure and equipment at the City's WWTF reduces problem wastewater characteristics that could otherwise be detrimental and impede operation, and/or increase the O&M of the downstream treatment unit processes. For example, the equipment installed at the headworks removes rags and material (e.g., grit, inorganics, etc.) that can damage downstream equipment and/or reduce the treatment capacity of the unit processes.

5.2.1 Process Design Considerations

The general evaluation criteria developed in subsection 5.1 above and summarized below were used for development and evaluation of various treatment facilities that will be included in the headworks (pretreatment system) for the WWTF which included screens; grit removal and handling; tanker truck receiving station; odor control measures and on-line monitoring and sampling systems.

- Cost Criteria in which both the capital and long term O&M costs of the facility were evaluated.
- Performance Criteria including overall system treatment effectiveness and reliability; flexibility of operations and potential impact to public health.
- Environmental Criteria in which impacts on air and effluent quality, noise impacts and impacts on general aesthetics at the WWTF were considered.
- Implementation Criteria which evaluated the overall acceptability of the proposed facility and its ease of implementation.

5.2.2 Influent System Piping and Master Lift Station

As noted in Section 2 of this report, the influent entering the WWTF is pumped from City wastewater pumping stations that are located out in the wastewater collection/transmission system directly to the headworks of the WWTF through a series of force mains. There are a total of six of force mains that enter the WWTF site. On the west side of the WWTF, a single 12-inch diameter force main enters the site that is then split between two force mains (12-inch and 8-inch diameter).

Whereas, on the east side of the site, five force mains that range in diameter from 8-inches to 16-inches are manifolded and deliver wastewater to the WWTF for treatment. All five of these force mains are manifolded into two force mains (8-inches and 12-inches). These four pipes (two 8-inch and two 12-inch) are then manifolded into a single 14-inch diameter force main.

When this force main enters the WWTF site this 14-inch diameter force main is split between two force mains (12-inch and 8-inch diameter). Similarly, a number of force mains deliver wastewater that is generated east and northeast of the WWTF for treatment. These force mains range in diameter from 8-inches to 16-inches. Presently, all wastewater combines at the entrance road for the WWTF and enters the site. Flows from the following areas enter the WWTF at this location:

- From the West Villages Improvement District (WVID)
- North of U.S. Highway 41, and north and east of the WWTF site via three force mains (8-inch, 12-inch and 16-inch diameter force main).
- South of U.S. Highway 41, and east of the Myakkahatchee Creek.

Similar to the flows that enter the WWTF site from the west these four force mains are also split between two force mains (12-inch and 8-inch diameter). Additionally, there is a 24-inch diameter force main that enters the WWTF north of the entrance road, which was not in operation until recently.

Coupling the problem is the fact that the two 8-inch and 12-inch diameter force mains that deliver raw wastewater from the remaining four force mains are manifolded into a single 14-inch diameter force main. The hydraulic capacity of these manifolded force mains impact the operation of the lift stations in the City.

Up until recently, the WVID was going to construct a WWTF that would be located on their property, and in operation by July 2009. However, due to the housing slowdown, the developer has decided to reduce their commitments to the City, and defer the construction of the WWTF until July 2013. This proposed date significantly impacts the hydraulic capacity of the City's existing wastewater transmission system. Based on these significant changes to the developer's plans, as well as other developers committing wastewater capacity by the payment of capital charges, the City will be required to revise their 10-year wastewater capital program. A number of options are currently being investigated, and will definitely include the WVID participation in funding. These options include the following:

- The construction of force main improvements at the intersection where the three force mains are manifolded to a location on the site where the four manifolded force mains are combined into a single 14-inch force main. At this location on the City's existing WWTF a master pump station will be constructed. The developers for the WVID would be required to pay for their portion of the improvements to accommodate these required improvements.
- Reschedule the completion of construction for the WVID WWTF from July 1, 2013 to July 1, 2010. Based on the developer's ability to fund the improvements, the capacity of the WVID WWTF may range from 1.0 mgd to 3.0 mgd.

5.2.3 Flow Metering

All of the influent wastewater flows that enter the City's WWTF flow process through a single 14-inch magnetic flow meter that is manufactured by Sparling. The magnetic flow meter is installed above grade for ease of access and for maintenance, and a bypass line is also included to allow the magnetic meter to be removed or maintained while continuing influent flow to the treatment facility. The capacity of the flow meter is rated for flows up to 20 mgd.

The meter indicates flow locally in gpm. Additionally, a flow signal from this meter is transmitted to the PLC for recording and totalizing. All data from this flow meter can be read in the operations building.

Based on the anticipated future flows that will be experienced at this facility, the existing flowmeter may be sufficient to handle the peak instantaneous flows that enter the City's WWTF during the initial 5-years of operation. However, consideration should be given to changing the unit in future as the influent flows that enter the WWTF increase.

5.2.4 Screens

The existing WWTF pretreatment system includes two mechanically cleaned step screens in two 2.5 ft wide channels and a stand-by manually cleaned bar screen. The two mechanical screens are Hycor® Rotoscreen™ units manufactured by the Parkson Corporation. The clear opening in the mechanically cleaned screens is currently 6 millimeters (mm) or approximately ¼ inch. Material captured on the mechanically cleaned bar screens is discharged from each unit and conveyed by a transfer screw to a compactor and dewatering unit to remove the excess water contained in the screenings. The compactor dewatering unit is a Hycor® Helipress® screenings press. The dewatered screenings are then discharged to a dumpster located beneath the pre-treatment structure, and hauled off-site by a private contractor for disposal.

All WWTF flows can also be diverted to a single 3-foot wide channel that is equipped with a manually cleaned bar screen through the manual operation of valves located on the influent piping. The clear opening between the bars in the manually cleaned bar screen is 1-inch, and all screenings removed from this bar screen is transported by bucket to the discharge chute, The bypass channel is intended for use when either or both of the existing screens are out of service, and may also be used if additional flow capacity is required, such as during an exceptional storm event. However, based on the current WWTF configuration, all flows diverted to the manual cleaned bar screen will also bypass the grit removal system, which is considered unacceptable over the long term.

The available design information suggests that the screens were designed for a MDF of 10.4 mgd and a PHF of 13.5 mgd. Therefore, in order to handle the projected PHF of 16.14 mgd, at least one additional screen and channel would be needed. In addition, in order to provide Class I reliability at this structure, a back up screen will also be provided.

Existing WWTF "As-Built" drawings indicates that during the most recent WWTF expansion, sufficient space was provided for two additional channels and screens. It is therefore proposed that both of these channels be constructed and utilized under the proposed WWTF expansion. Each channel will house an additional operational mechanical screen, and one channel/screen can be used as a back-up unit.

Recent trends in the wastewater industry have been to move to screens with smaller openings and types of screening mechanisms. Therefore, it is recommended that the existing screens be evaluated to determine if the existing unit can be upgraded to incorporate a smaller clear space opening, with openings of 1/8 inch or 3 mm. If such a modification is not possible, then the existing screens will be retained in place as they appear to be generally effective and the City already has two sets of replacement steps for the existing units in stock. However, the proposed mechanically cleaned screens in the new channels will be installed with the smaller 3 mm openings. As per current arrangements, screenings will continue to be discharged to an upgraded washer/compactor as described below, from where they will be discharged to a dumpster for off-site disposal.

Each new channel at the headworks structure will include influent and effluent gates to isolate any channel for maintenance and will be designed to provide a minimum approach velocity of 1 fps to maintain the solids in the influent in suspension and a maximum velocity of 3 fps to minimize materials from being forced through the screen openings. Each channel will have a drain pipe that will be equipped with a valve to allow for full dewatering of the channel for screen maintenance should the need arise.

Each of the channels at the headworks will be covered using flat panels to minimize odors from this structure. The covers will be constructed of structural aluminum or a fiberglass reinforced plastic (FRP) material. Access hatches will also be provided at key locations for sampling and monitoring by the City's operational staff. In addition to the channel covers, each of the mechanical bar screens will also be enclosed to minimize the emissions of odors from this location.

The following three basic types of mechanically cleaned screens were evaluated for use at the City's WWTF:

- Vertical bar screens. These screens are composed of parallel bars or rods and have been used extensively at WWTF's throughout the State. These types of bar screens can either be cleaned manually or mechanically. In the latter case, a chain and rake system is typically be used for cleaning. Vertical bar screens are a proven technology which can be adapted for a wide range of particular flow conditions at the WWTF, including modification of the inlet channel to ensure that acceptable influent flow velocities are maintained. However, there are many disadvantages associated with these types of mechanically cleaned screens. The first is the minimum clear space between the bars, which is not less than 0.5-inches, but in most instances are 1 to 2-inches. Another disadvantage is that it is possible for particles larger that the screen opening to pass the screen if they are flowing parallel to the screen.
- Step screen. This type of bar screen is similar to the types of screens that the City already has installed at the headworks structure. The primary advantage of this screen is that it can have smaller clear space openings. It is designed with one set of static and one set of movable bar racks, which can be installed at various angles in the influent channels. The rows of self-cleaning bars are set in an escalating staircase configuration where the screenings are lifted step by step and discharged at the top of the unit. Other than the smaller material that is can remove, the step screen provides a number of other advantages, which include:

    a. It is adjustable and can be modified to fit individual WWTF channel arrangements;

    b. It has a high separation efficiency due to the formation of a screenings carpet;

    c. It is self cleaning without spray water and brushes;

    d. It may be direct driven without the need for chains and sprockets that are in the wastewater;

    e. It allows for some draining of the screenings as they move to upwards to the disposal point.

  The disadvantages of the step screen include possible misalignment of the mechanism due to items being caught between lamina and possible grit accumulation at the toe of the screen. However, manufacturers of this type of screen have been developing measures to address grit accumulation.

- Rotating drum screen. This type of screen utilizes a cylindrical bar screen arrangement rotating perpendicular to the influent wastewater flow. A rotating rake or "plow" carries the screenings to a central conveyor for disposal. The central conveyor then transports the screenings as they are washed, compacted and then dewatered prior to final delivery to the discharge chute. One advantage of this type of screen is that the movement of the rake through the bars ensures that no material is left that may block the screen. In addition, screenings are washed and dewatered leaving screenings with a solids concentration in excess of 40-percent. The disadvantages of this type of screen include the possibility of larger materials passing through the screen depending on their orientation; the need for maintenance of lower upstream water levels in the channel and the large number of moving parts in the flow stream.

Based on the discussion of available screening technologies presented above and the City's relatively good experience with mechanically cleaned step screens, it is recommended that type of unit continue to be utilized at this installation. It is a proven technology that has been successfully used at the City's WWTF. The design criteria for the proposed screens are provided in Table 5.1

Table 5.1: Mechanical Screen Design Criteria

Parameter	Units	Design Criteria	Remarks
Design Average Day Flow	MGD	6.00	
Design Maximum Day Flow	MGD	17.28	Peaking Factor of 2.88
Minimum Channel Velocity	fps	1.00	To minimize settlement of solids
Maximum Channel Velocity	fps	3.00	To minimize pass through of solids
Operating Channels	Number	3	Mechanically Cleaned screens
Bypass Channels	Number	1	Manually Cleaned Screen
Total Channels	Number	4	
Opening Size	mm	3	1/8 inch

5.2.5 Grit Removal

After passing through the mechanically cleaned bar screens, the wastewater enters the grit removal system. The existing grit removal system includes one Waste Tech, Inc., Model 1300 XGT grit removal system that includes an 18 foot diameter grit tank, a mechanical low speed axial submerged mixer, two recessed impeller grit removal pumps and a grit classifier/concentrator.

The screened wastewater enters the circular grit tank tangentially, flows around the tanks and exits parallel to the inlet. The axial flow submerged mixer at the center of the tank creates an inward radial flow velocity across the flow of the tank, which draws the grit towards the center hopper. The recessed impeller pumps then remove the grit from the center hopper, and pump it to the grit classifier unit. Prior to entering the classifier the grit slurry flows through a cyclone unit where it is washed to remove any organics attached to the grit particles. The grit slurry then discharges into the concentrator/classifier where an auger system conveys the dewatered grit particles from the classifier, and discharges it to a dumpster prior to disposal.

Available information suggests that the Waste Tech Grit system installed at the WWTF was designed for a MDF of approximately 10 mgd and a PHF of 13.5 mgd. When this grit tank was added to the WWTF during the last expansion in 2004, no provisions were made for an additional grit removal system and instead, the grit tank was constructed with an 18 foot diameter grit trap. Based on information from Waste Tech the unit is capable of handling flows of up to 30 mgd. Therefore, no additional grit removal tank will be added as part of this project, and all screened wastewater will be diverted to the existing grit tank.

5.2.6 Screenings and Grit Handling

Currently, screenings from the mechanically cleaned bar screens are conveyed by a transfer screw, dewatered and discharged to a dumpster located on the lower level of the headworks structure. A drain system that is located below the dumpster can be used to convey any excess wastewater in the screenings to the headworks drain pump station from where it is returned to the influent chamber of the headworks structure for retreatment.

Given the concerns expressed by the operational personnel regarding odors and the volume of screenings that will need to be handled, it is proposed that an upgraded screenings washer/compactor be installed under this program. Putrescible organics, fecal matter and septic biosolids are commonly caught along with screened solids. If not removed, they retain water, inhibit drainage, emit odors and attract flies and other disease vectors. The newer versions of screenings washer/compactors are self-contained systems used to effectively wash, compact and dewater screenings that have been captured the mechanically cleaned bar screen. The removed solids contain up to 50-percent dry solids, are 80-percent compacted and are significantly lighter and cleaner than typical screened solids.

Several screenings washer/compactor are available commercially. Washers are generally self-contained, hopper-fed systems that use a type of auger which washes and separates the soft organics from the plastics, paper and other undesirables. The spray water is also used to isolate and clean more of the unwanted solids. The material is then conveyed, compacted and dewatered. The result is drier, less odorous screenings ready for disposal.

The Parkson Helicon® is one commercially available screenings washer, which is compatible with the City's existing mechanical step screens. This system does not compact or dewater the screenings that are removed from the wastewater, and is primarily a shaftless auger conveying system. The screenings that are discharged from this type of unit will still contain a significant volume of water, which can result in odors in the screenings discharged to the dumpster for disposal at the landfill.

Parkson's Helicon® screenings washer system is an in-channel system that effectively separates most putrescible organics from primary screenings and returns the organics to the biological process. Solids are washed and rinsed by the natural influent flow using the Helicon® unit's vigorous turbo-washing agitation at 1800 rpm, which breaks up the solids and releases the organics back into the wastewater flow. The washed screenings are transported via the shaftless spiral to the integral dewatering zone and final discharge. The result is reduced solids for disposal. This type of unit can effectively reduce the volume of screenings by as much as 50-percent and weight up to 80-percent. The Helicon® in-channel screenings washer totally encloses solids from screen to discharge.

Parkson's SWP Screw Wash Press is another commercially unit that is compatible with the City's existing screens. The unit produces dewatered solids of up to 30-percent and volume reduction of up to 70-percent. The screenings enter the Screw Wash Press from a hopper and are conveyed by a slowly rotating shafted screw to a wash zone. This is followed by a perforated dewatering zone. The organics are separated from the screenings by the use of backpressure that is developed within the discharge pipe. Once the organics are squeezed out in the wash zone, the remaining solids are dewatered so they are acceptable for disposal at a landfill. The organics, which are washed and squeezed out of the screenings, are returned to the influent where they can be treated as part of the normal WWTF process.

A third commercially available unit is the Vulcan Industries, Inc., Model EWP Washing Press that is also compatible with the City's existing screens. The Washing Press receives the screenings discharged into the hopper from the mechanically cleaned bar screen. The spiral auger transports the screenings from the inlet to the washing zone where they are compacted and washed. In the washing zone, washwater is injected into the screenings from the openings in the hollow shaft of the auger, and from a nozzle at the top of the unit. To maximize washing, after the press compacts the screenings the auger reverses, pulling apart the compacted screenings. The cycle is repeated a minimum of four times; thereby recompacting the screenings and squeezing out excess washwater. The repetition helps the press achieve up to 90-percent organic removal from the screenings. As the screenings move into the dewatering zone, the pitch of the auger continues to decrease, further compacting the screenings for maximum water extraction prior to entering the discharge pipe. From inlet hopper to discharge, the screenings volume is reduced by up to approximately 80-percent. This piece of equipment is a spiral press unit that is effective in washing organic, dissolvable material out of coarse or fine screenings. This unit washes, dewaters, compresses and transports the screenings to a container, conveyor or other suitable receiving device.

Grit currently collected in the grit tank and the slurry is pumped to a cyclone where it is concentrated and washed before discharging into the grit classifier. Approximately, 90 to 95-percent of the grit slurry that enters the cyclone discharges through the vortex finder located at the top of the cyclone and discharges into the grit tank effluent channel for further treatment. The concentrated girt slurry that discharges into the grit classifier settle to the bottom of the hopper. The settled grit is then transported via a screw auger conveyor up an inclined trough for disposal into a dumpster. Organic solids, which remain in suspension are discharged over the weir and reintroduced into the effluent channel of the grit tank for further treatment.

The grit classifier is currently located on the upper level of the headworks structure, and the dumpster on the lower level allowing for gravity discharge. The current location of the grit dumpster makes access difficult and WWTF operators have discussed relocating it. In fact an area was identified on earlier WWTF engineering drawings for relocating the classifier and dumpster to the lower level in the future to make it more accessible for the operational staff.

It is assumed that the existing grit classifier system will be capable of handling future flows. Therefore, an additional grit classifier will not be required. However, in order to address existing access problems, the classifier will be relocated to a more accessible area as described above. A general layout for the proposed screens, grit tank and classifier are illustrated on Figure 5.1.

5.2.7 Receiving Station for City Vacuum Trucks

The City's has requested that a receiving station be provided so that their vacuum trucks that are currently used to clean the City's wastewater pump stations can transport their contents to the WWTF for treatment and disposal. While it is not expected that the characteristics of the truck contents will be similar to that expected from septic tanks, it is considered that the wastewater conveyed in trucks will include a larger quantity of rags, grit and grease, and may even contain very large objects which can damage downstream treatment equipment. Therefore, it will always be necessary to evaluate the wastewater being conveyed to confirm its characteristics prior to transport to the WWTF site. Also, for efficient transfer of transported wastes to the WWTF without adverse impacts, a self-contained receiving station will be constructed.

The receiving station will be constructed on a paved surface sloped to a drain for cleaning and collection of spillage. It will include a flexible hose fitted with a quick connect coupling for direct connection to the haul truck to minimize spillage and help control odors. Washdown water will be provided at adequate pressures for cleaning of the receiving station and the truck. A preliminary coarse screen will also be provided to remove large rocks and other heavy objects before the wastewater enters the flow into the receiving station. The contents from the City's vacuum trucks that pass through the coarse bar screen will be screened further. The screenings will then be washed, dewatered and compacted in a similar manner as the screening material from the mechanically cleaned bar screens at the headworks structure. The washwater and drainage from the screenings will be pumped to the headworks for further treatment. The contents delivered to the receiving station will be monitored (e.g., date, time volume, etc.).

Currently, road elevations around the headworks are about 13.1 to 13.5 feet while the elevation of the screen channel is 27.5 feet and flows entering the WWTF in the force main, are under pressure. Therefore, flows from the City's vacuum trucks will have to be pumped up to the screen channel and the receiving station must also include a pump.

5.2.8 Odor Control Considerations

The existing headworks at the WWTF are constructed as an open structure. In an attempt to control odors within this structure during the last expansion, the screens have been totally enclosed and the aluminum grating walkways for the channels and grit removal tank have been covered with rubber mats. The air in the clear space between the top of the wastewater and the rubber mats was to be continuously withdrawn by a blower located in the southeast corner of the structure and vented to atmosphere. However, the blower system is not operational.

Continuous operation of the blower is intended to induce air flow through the open areas above the wastewater and minimize the concentration of gases which cause odors. The blower is rated at 800 scfm and the air is continuously vented to atmosphere. At this rate, it is estimated that there will be at least 15 air changes per hour in the open area above the wastewater, which is slightly above the recommended standards for ventilation systems in wet wells for sewage lift stations which require at least 12 air changes per hour. Therefore, assuming that the air containment by the rubber mats is acceptable and that air flow from the grit tank to the point of extraction of the air is unimpeded, this exhaust fan appeared adequate to minimize odors at the existing headworks. However, since no treatment of the odorous air was undertaken, this operation tended to disperse the odors throughout the site and the operation of this method of odor control has been discontinued by the plant operators.

In light of the proposed construction of two additional screen channels and the concerns expressed by plant personnel about odors at the headworks, it is recommended that more effective odor control measures be implemented. For effective air containment and eventual removal from all areas of concern, it is proposed that all channels be covered with flat panels that are constructed of either FRP or aluminum material. Air will be withdrawn from one end of the system of channels as per current operations. Additionally, the area that houses the dumpsters that receive the dewatered grit and screenings will also be enclosed. Extracted air from both the channels and enclosed dumpster area will then be diverted to the aeration tanks where the odors will be neutralized before venting to atmospheres. However, during detailed system design and prior to the final selection of the method for treating the odors, air sampling is recommended to determine the full range of odor causing constituents present and to confirm that the proposed approach will be acceptable.

5.2.9 Flow Sampling

An automatic flow-proportioned composite sampler will be installed at the influent box of the headworks structure in order to monitor influent wastewater characteristics. In addition, continuous pH and conductivity monitoring devices will be installed to monitor the pH and conductivity of the influent. The automatic flow-proportioned composite sampler, and the pH and conductivity monitoring devices will provide influent data on the loading and performance of the system, and allow the City's operational staff to anticipate the need for operational adjustments based on changes in influent characteristics. The pH and conductivity monitoring devices will provide the City staff with an early warning of toxic industrial discharges that can be captured before they impacts the WWTF's biological system.

The primary goal of sampling is to ensure that the sample obtained will be representative of the flow stream to be analyzed. Because the sample represents only a small portion of the flow, both the site selection and sampling techniques are crucial. The location where the pH and conductivity monitoring devices, and the sample withdrawal point is well mixed, and is upstream of any recycle discharge. The automatic flow-proportioned sampler will be programmed to automatically collect samples required for analyses specified in the operating permit, as well as those required for operational process control.

5.2.10 Recommended Headworks Facilities Upgrades

Based on the discussions presented above, the recommended upgrades to the headworks at the City's WWTF can be summarized as follows:

- Existing screens: Investigate replacement of step screen mechanism with a similar system with smaller openings. If not feasible, retain existing screens in their current condition.
- Proposed screens: Install two additional step screens with 3 mm openings.
- Screenings Washer/Compactor: Add an upgraded screenings washer compactor to handle screenings from existing and proposed screens.
- Grit Tank: No improvements are proposed
- Grit Handling: The grit classifier will be relocated to a more accessible location.
- Odor Control: FRP or aluminum panels will replace rubber mats above channels, and the area where the grit and screenings dumpsters are located will be enclosed. Under this program, an additional backup exhaust fan will be provided and all extracted air will be diverted to the WWTF aeration Tanks to neutralize odors before discharge to atmosphere. Odor monitoring should be performed, and a recommended odor control method will be proposed for incorporation in the future, should odor problems persist.

5.3 Biological Treatment Process

The upgrades and expansion of the secondary treatment facilities is designed to substantially degrade the biological and the ammonia content of the influent wastewater. Therefore, three different secondary treatment alternatives were considered and modeled previously in Section 4, to obtain the most suitable alternative to implement. The simulation models that were performed concluded that the MLE activated sludge process offered the reliability and efficiency needed to meet any future more stringent effluent nutrient requirements, and to overcome existing WWTF constraints. The MLE process has been successfully used at other regional facilities throughout the State of Florida and it is well known for being considered one of the simplest biological denitrification–nitrification process technologies available. The process consists of an anoxic tank followed by the aeration tank where nitrification occurs. Nitrate produced in the aeration tank is recycled back to the anoxic tank, where the organic substrate in the influent wastewater provides the electron donor for oxidation reduction reactions using nitrate.

5.3.1 Biological Treatment Process Design Consideration

The proposed MLE process will consist of biological reactors that will include an anoxic zone followed by an aerobic zone with gradually reducing air requirements. This technology incorporates an internal mixed liquor recycle (IMLR) system that returns nitrified mixed liquor from the end of the aerobic zone to the anoxic zone at a regulated rate, to ensure adequate nitrates for the heterotrophic denitrification population in the anoxic zone. This process uses external carbon provided by the raw wastewater for the denitrification that occurs in the anoxic zone and no external carbon source is required. After denitrification in the anoxic zone, the mixed liquor flows to the aerobic zones where the remaining $CBOD_5$ and ammonia are oxidized. There are a number of flow schemes available; however, the two flow schemes that were evaluated for the City are illustrated in Figure 5-2, and included the following:

- Eight anoxic followed by eight aerobic zones, each operating in parallel, so that each operates as an independent treatment train. This option would require that the baffles be installed in the existing five aeration basins to provide the volume for the anoxic portion of the treatment process.

  The advantages of this layout include:
  1. Flow thru arrangement in the existing tanks will be maintained.
  2. Taking one tank down for maintenance still maintains 87.5-percent capacity for the process
  3. No need for additional hydraulic structures for flow control, other than to control and equally distribute the influent to each unit.

  The disadvantages of this flow scheme include:
  1. Flow splitting will be difficult with the need to equally split flows to 8 tanks.
  2. Each basin will require a baffle wall to physically separate the anoxic zone from the aeration zone 1.
  3. Each basin will require a separate mixer in each anoxic zone.
  4. There will be eight separate, relatively small aeration zones 1, 2 and 3 and control of oxygen/aeration in each of these zones will be more difficult.
  5. Mixed liquor recycle flows and RAS will have to added into the flow splitter box to ensure equal flow split to all tanks. This will significantly increase the flows in the splitter box and the head losses in this box. In fact, existing weirs may be too short. Piping from the splitter box to the aeration basins will need to be upsized to accommodate the additional RAS and IMLR flow.
  6. Mixed liquor recycle flows will have to be taken from the secondary clarifier splitter box.
  7. The diffuser layout will not provide adequate spacing to maximize the aeration system efficiency.
  8. More monitoring equipment would be required.

- Two anoxic basins operating in parallel and two sets of three aeration basins operating series. This option would require the construction of influent and effluent channels in the existing basins for flow distribution.

  The advantages associated with this layout, includes:
  1. Flow splitting is simplified. Flow from headworks is only divided into two parts. Flow from the anoxic basin is subdivided into three parts but by using channels for the inlet, flow control is downstream, using the effluent weirs.
  2. There is no need for internal baffle walls in any of the tanks. The anoxic zone is in a separate tank and the change from aeration zones 1 to 2 and 2 to 3 can be gradual.
  3. Construction of the new anoxic tanks will be simplified.
  4. There are only three areas of each aeration zone and the size of each zone is larger, making control of the aeration system simpler and more stable.
  5. Mixed liquor recycle flows and RAS flows only need to be diverted to two tanks. This can be done downstream of the splitter box, reducing the headlosses in the splitter.
  6. Mixed liquor recycle flows can be taken from the last three tanks instead of eight tanks, making this simpler.
  7. Installation of air drops and aeration piping and diffusers will be simpler. Only three air headers will be required instead of four.
  8. Under this mode, aeration system efficiency would be maximized since it will provide a better diffuser grid arrangement.

The primary disadvantages with this layout include the following:

1. Flow arrangement in the existing tanks will have to be modified and sequencing of construction will have to be defined in order to maintain system operations during construction.
2. Inlet and outlet channels on existing tanks will have to be modified.
3. Taking down one anoxic basin reduces the anoxic capacity by 50-percent.
4. Need to provide access to mixers (two or three per anoxic tank).

The MLE process also has the benefit of producing good settling sludge since filamentous bacteria are not allowed to proliferate. The proposed anoxic zones will be designed to operate at a DO concentration of 0.0 mg/L, and the aerobic zones will be designed to operate at a DO concentrations ranging from 1.0 mg/L to 2.0 mg/L. The SVI values for the MLE process were designed in the order of 120 mL/g to 150 mL/g, which is typical for facilities operating in warm environments, such as the City's WWTF. SVI values in this range results in good performance in the downstream secondary clarification process.

In the MLE process, nitrate is pumped to the anoxic tank from the nitrate in the RAS flow from the secondary clarifiers and the IMLR from the aeration basin. The electronic donor is provided y the influent wastewater entering the anoxic tank. The key design parameters that affect the amount of nitrogen removed include the following:

- The detention time in the anoxic tank.
- The mixed liquor volatile suspended solids (MLVSS) concentration.
- The IMLR and the RAS flow rates.
- The influent BOD or biodegradable COD concentration.
- The readily biodegradable COD available.
- Temperature.

The decision to proceed with the second flow scheme made the existing flow splitter box non-essential; therefore, this structure will be converted from a flow splitter box to an influent mixing chamber. The influent from the pretreatment structure will continue to discharge into this structure. The RAS and IMLR will now discharge into this structure where it will mix with the influent prior to entering the two anoxic basins.

Each anoxic zone will be mechanically mixed to simulate the conditions of a complete mix reactor. Several varieties of mixers are available including rigidly mounted blade mixers, floating mixers, submersible mixers and jet mixers. The mixing energy should be sufficient to prevent solids deposition on the anoxic basin floor, but not so great as to cause votexing and/or excessive air entrainment in the basin. Additionally, the mixers that impart between 40 to 50 horsepower per million gallon (HP/MG) into the system. All of these options were evaluated in detail during this phase of the design.

The first three types of mixers are generally considered mechanical mixers, whereas, the jet mixers have no moving parts below the surface or structural supports that are common with the mechanical mixers. Additionally, unlike the mechanical type of mixers, a jet mixing system offers a great deal of control within the mixing tank (e.g., by turning the valve on the pump, the mixing intensity within the tank can be controlled). However, clogging of the nozzles, high shear forces, and the introduction of air are common problems associated with jet mixing systems. Based on the evaluation conducted, submersible mixers were selected for this facility.

Submersible mixers allow a great deal of flexibility in installation, unlike their dry-mounted counterparts. The mixer can be positioned to develop over a long distance and adapted to the shape of the tank, which ensures the creation of a maximum level of bulk flow. The result: more efficient mixing and lower power consumption. Depending upon the tank configuration, these types of mixers are installed using either single or double guide bar systems.

The aeration system design for the City's system must be adequate to:

- Satisfy the biodegradable COD of the wastewater, the endogenous respiration by the biomass, and the oxygen demand for nitrification.
- Provide adequate mixing.
- Maintain a minimum DO concentration throughout the aeration tank.

The supply of oxygen to the suspended biomass represents the largest single energy consumer at the City's WWTF, estimated to be approximately over 60-percent of the total energy requirements of this facility. Therefore, with the increasing cost for power, it is beneficial to the City to investigate options to improve the oxygen transfer efficiency (OTE) of the system. As noted in Section 2 of this report, the City. Currently, no control of the oxygen to the biological system is provided, and the aeration basins are maintained at a minimum DO concentration of 2.0 mg/L.

To improve the OTE of the system, it is recommended that a fine-bubble or porous diffusion system be installed in all the aeration tanks. The primary reasons that a fine bubble system will be installed include the higher OTE of this type of system over the system currently installed, which will ultimately result in energy savings to the City. The proposed system will consist of tapered aeration, which will provide more air (more diffusers) in the first zone, less in the second zone, and the least in the third zone. By providing tapered aeration, better process control is realized, which results in higher energy efficiency.

Another system critical to the performance of the MLE process is the IMLR pumping system. The system will be designed to continuously pump a recycle stream that can range between one to six times the influent flow rate, and was designed to operate at three times the influent flow rate under normal operating conditions. The IMLR will be pumped from the last aerobic zone back to the flow splitter structure where it will be mixed with influent wastewater and RAS, prior to discharging into the anoxic zone. Since the IMLR system will pump continuously, economic efficiency of the pumping system will be critical. This pumping application is somewhat challenging since it is a high flow, low head application. It is recommended for that a non-clog centrifugal pumps be used for this application.

5.3.2 Centrifugal Blowers

As noted above, the biological wastewater aeration process requires large volumes of low pressure, generally in the range of 5 to 20 psig of air. Additionally, air demand varies throughout the day. Currently, the existing WWTF is equipped with five centrifugal blowers that vary in capacity; three at 1,800 scfm and two at 4,200 scfm. The total airflow capacity available is approximately 9,600 scfm, with one of the largest units used as a standby blower. Based on results presented in Section 4 of this report, the MLE process will required approximately 9,300 scfm to maintain adequate DO levels in the aerobic zones of the treatment process. Therefore, based on this preliminary assessment, it appears that no additional blower capacity will be required to handle the future flows and loadings at the City's WWTF; however, the three smaller blowers appear to have reached their useful life, and should be considered for replacement.

Three types of blowers were evaluated for this facility, which included:

- Centrifugal - single and multi-stage.
- Rotary lobe positive displacement.
- Inlet/discharge guide variable vane centrifugal

Based on information presented in Section 2, the existing blowers are equipped with fixed-speed motors making operation of the WWTF inefficient and energy insensitive. Discussions with the City's operational staff indicate that there are currently no provisions to regulate or turn down the blowers, and therefore, the existing centrifugal blowers can only meet one particular set of operating conditions efficiently. It is recommended that the new blowers be capable of operating at a wide range of operating conditions, and the existing fixed-speed motors be replaced with variable speed motors equipped with an automatic throttling system to provide flexibility and better process control. A number of options were evaluated to improve the efficiency of the centrifugal blowers, which included inlet throttling, adjustable discharge diffuser, variable frequency drives and the parallel operation of multiple units. The control system for the blowers will be discussed later in subsection 5.3.4 of this report.

Based on the evaluation conducted, inlet/discharge guide vane-variable diffuser type blowers were determined to be the best suited for the City's application. These types of blowers appear to mitigate some of the problems and considerations associated with the standard centrifugal type blowers currently used at the City's WWTF, as well as positive displacement type aeration blowers. This type of blower is based on a single-stage centrifugal operation that incorporates actuators to position the inlet guide vane and variable diffusers to vary blower flowrate and optimize efficiency. These types of aeration blowers are especially well suited for applications with medium to high fluctuations of air flow requirements. The primary disadvantages of these types of blowers include the high initial cost and a sophisticated computer control system to ensure efficient operation.

For the City's operation, the three existing smaller centrifugal blowers will be replaced with two, inlet/discharge guide vane-variable diffuser type blowers, each with a capacity of 4,000 scfm. The existing two multi-stage centrifugal blowers will be retrofitted with variable speed drives or automatic inlet throttling valves, and controls to interconnect the two blower systems, by replacing the aging instruments and panels with new, state-of-the-art electrical components and engineered, automated systems controls.

The following components will also be included be for each of the new inlet guided blower:

- Dual inlet air filters.
- Outlet isolation valve and check valve.
- Vibration monitors.
- Amperage monitors.

5.3.3 Diffused Aeration System

The existing aeration tanks at the City's WWTF are currently equipped with coarse bubble diffusion system. Many types of aeration systems were evaluated for this project, which included fine bubble, mechanical, jet aeration, and surface aeration. However, to increase the OTE of the system a number of aeration systems were eliminated from further consideration. With increased OTE as a major consideration, it is recommended that the existing system be converted to a fine-bubble air diffusion system that will provide better control of the DO concentration set point throughout the aeration basins. Additionally, based on the future peak aeration requirements that may be experienced at this facility, the higher efficiency obtained by the fine-bubble diffusion system will eliminate the need for increasing the capacity of the blowers at the facility.

The efficiency of oxygen transfer depends on may factors, including:

- Type, size and shape of the diffuser.
- Air flow rate
- Depth of submersion, and header and diffuser location

- Tank geometry
- Wastewater characteristics

The compressed air from the blowers discussed above will be delivered through aeration piping to the diffused aeration system. To minimize internal fouling due to impurities in the compressed air, each of the blowers will include dual air filters. Many types of fine bubble diffusers were evaluated, which included ceramic domes and disks, porous plastic disks, and membranes (circular, tubes and rectangular panels). Other than the shapes of these devices, the primary difference in these types of diffusers is the materials used for construction.

The ceramic materials disks of rounded or irregular-shaped mineral particles bonded together to produce a network of interconnecting passageways through which the air from the blowers flow. The most common material used for ceramic diffusers is aluminum oxide; however, other materials that are used include alumina, aluminum silicates, and silica. Generally, the ceramic diffusers have the highest reported OTE, but require periodic cleaning to restore diffuser efficiency. The cleaning is required because in operation, a biofilm layer can form on the surface of the diffuser. Originally, cleaning ceramic disks meant taking a unit out of service, now cleaning can be done while the facility is in operation. During the cleaning small amounts of a cleaning agent, such as anhydrous hydrochloric acid (HCl) are introduced with the process air. The acid permeates the pores of the ceramic diffusers, and at the air/water interface it combines with water to form a concentrated HCl.

Porous plastic materials are similar to the ceramic materials, and are made from a number of thermosetting polymers. The two most common are high density polyethylene (HDPE) and styrene-acrylonitrile. These diffusers contain a number of interconnecting channels or pores through which the air can pass. While these materials are lighter in weight, their primary disadvantages include the brittleness of some plastics, and the lack of quality control on others.

Membrane diffusers differ from rigid diffusers because they do not contain a network of interconnected passageways for the air to flow. Instead the air passages are created by punching minute holes in the sheath material, and when air is turned on, the sheath expands and each slot acts as a variable aperture opening. Most membranes are made from elastomers mostly EPDM; however, some membranes are made from thermoplastics. Perforations are produced by slicing, punching, or drilling holes or slits in the membrane. The slit or size of the hole will affect the bubble size, and therefore, the OTE and backpressure.

Based on the evaluation of the various types of diffusers and materials used, it was determined to incorporate membrane type diffusers into the treatment process. The diffused aeration system will consists of circular 9-inch diameter membrane diffusers that force compressed air to separate into very small bubbles. To maintain a high OTE in the treatment process a maximum air flow rate of 3.0 scfm per diffuser will be permitted for this design.

The primary goal of this aeration system will be to provide enough aeration to maintain 2.0 mg/L throughout the basin. The aeration system will be designed so the system will automatically adjust to reduce the amount of aeration during low demands periods but as oxygen demand increases, the opposite action will occur.

The final diffuser layout will be determined during final design; however, will include a tapered system layout. The location of the diffusers will be varied based on the oxygen demand gradient. While there are many documented advantages to using a tapered aeration system layout, such as improved OTEs, the most prevalent advantage is a substantial reduction in power and operating expenses. Other considerations for placement of diffusers will include:

- Safe access.
- Clearance for maintenance and cleaning.

- Fulfillment of a wide range of air requirements without exceeding diffuser air flux rates.

In addition, the aeration supply system will be designed with the following considerations:

- Piping will be Type 304 stainless steel, Schedule 10.
- Pipe supports, valves, gaskets and other appurtenances associated with the aeration piping will be designed to accommodate thermal stress.
- Pipe sizes will be selected to maintain velocities under 3,000 feet per minute (fpm).
- Piping and associated components will be selected to withstand 300 degrees Fahrenheit (°F)

5.3.4 On-line Monitoring System

Presently, all of the monitoring and controls in the aeration basins are manual adjustments. The primary goal of this aeration system will be to provide just enough aeration to maintain a DO concentration of 2.0 mg/L, reduce aeration power consumption, increase WWTF performance and improve the effluent. Two types of monitoring devices will be employed at the City's WWTF. The will include DO probes and nitrate-nitrogen analyzers. The monitoring system will control the aeration system in a manner that as oxygen demand drops; the system will automatically adjust to reduce the amount of aeration. As oxygen demand increases, the opposite action will occur.

The aeration system will be connected into a loop control system where the DO concentration is the primary control signal. The DO levels in the aeration basins will be monitored by DO probes installed along each aeration basin, and will correspond to varying diffuser densities and motorized butterfly valves on each drop leg will be automatically adjusted based on the operators entered DO setpoint. Via the SCADA system that will be installed as part of this expansion and upgrades program, the WWTF operational staff may select one of two options for DO control:

- One of the three DO monitoring stations may be selected and a desired DP setpoint input by the operational staff.
- The DO output from the three DO monitoring stations is averaged and a desired setpoint input by the operational staff.

Changes in DO concentration occur very slowly, so a change in DO will result in a change in the air flow set point, and the throttling motorized valves will adjust to maintain this flow rate. As the flow rate changes, the pressure in the system changes and is monitored by pressure sensors. A pressure set point will be maintained by adjustments in the blower inlet throttling valves. To minimize the motorized valve "hunting" and frequent valve movement, DO changes in the aeration basins must be sustained for a minimum period of time before a motorized valve position adjustment is initiated. The final control is to start and stop additional blowers. A blower is stopped if the amperage drops to the low set point, and an additional blower is brought on if all throttling valves are open and pressure is not maintained.

In addition to controlling the aeration system based on DO readings, an online nutrient monitoring system will be included in the monitoring system. With the availability of online nutrient readings, the blower system has the capability to operate based on the actual level of treatment desired and obtained, in addition to utilizing DO as a surrogate. The blower control system will be designed to operate using several control schemes including concentration-based feedback control, load-based feed-forward control, removal-based control, and DO control. The online nutrient monitoring system also will be used to control nitrate recycle pump speed to optimize the performance of the anoxic zone.

It was determined during the preliminary design phase that the City's WWTF should have the flexibility of more than one means of automatic control of the aeration blowers. The control options that were developed and tailored to the City's WWTF are summarized below:

- Concentration based feedback control: The air flow rate is controlled based on the ammonia concentration toward the end of the aeration zone. The control system monitors this ammonia concentration and adjusts the airflow rate up and down, as required.
- DO concentration based feedback control: The air flow rate is controlled based on the DO concentration toward the end of the aeration basins. Setpoints will be optimized and adjusted using baseline information from the online monitoring system. For each of three control modes using the online nutrient analyzer, nitrate and nitrite concentrations are used to monitor the effectiveness of the control system. The ration of nitrite to nitrate (NO_2/NO_3) is calculated for each sample point and a warning is issued if this ratio exceeds a user-defined level. If this ratio increases it may indicate that the nitrification is incomplete and that the control system is supplying inadequate air to the process. In addition, the DO is still checked periodically as a back-up. If the DO is too high at the end of the aerated zone, the IMLR brings DO back to the anoxic zone, and can adversely impact denitrification.

The control system consists of the following components:

- DO monitors.
- Nutrient analyzers.
- Air flow meters.
- Air distribution motorized throttling valves
- Pressure sensors.
- Blower inlet throttling valves.
- Electrical amperage monitors.

Table 5-2 contains the design criteria for the recommended treatment facility while Figure 5.2 shows the alternative conceptual layouts evaluated for the reactor basins.

Table 5.2: MLE Biological System Design Criteria

Parameter	Alternative 3 MLE Process
Process Trains	
No. of Trains	8
Internal Recycle Rate (mgd)	10
Anoxic Zone	
No. of Reactor Zones per Process Train	1
Volume of Each Zone (gallons)	45,000
Total Anoxic Volume (gallons)	360,000
No. of Mixers per Reactor Zone	1
Estimated Motor Size per Zone (HP)	1
Aerobic Zones	
No. of Reactor Zones per Process Train	3
Volume of Each Zone (gallons)	60,000
Total Aeration Volume per Train (gallons)	180,000
Total Aeration Volume (gallons)	1,440,000
Depth of Zone (feet)	15

Table 5.2: MLE Biological System Design Criteria	
Method of Aeration	Fine Bubble Diffused Aeration
No. of Diffusers per Zone 1	175
No. of Diffusers per Zone 2	125
No. of Diffusers per Zone 3	90
Total Diffusers per Train	390
Air per Diffuser (scfm)	3.0
Air Flow Rate per Train (scfm)	1,160
Total Air Flow Rate (scfm)	9,280
SOTE (percent)	24.5
Aeration System	
Type of Blowers	Centrifugal
No. of Blowers	4@ 250 HP
No. of Blowers Operating	3@ 250 HP
No. of Blowers in Standby	1@ 250 HP
Capacity of Each Blower (scfm)	4,200
Internal Recycle Pumping System	
Type of Pumps	Variable-Speed Non-Clog Centrifugal
No. of Pumps	3
Capacity of Each Pump (gpm)	3,500
Estimated Motor Size (HP)	30

5.4 Secondary Clarifiers

Currently, mixed liquor from the aeration basins flow by gravity into the clarifier splitter box where flow is distributed to three 65-foot diameter secondary clarifiers. Based on future design loads, the addition of a fourth 65-foot diameter secondary clarifier will be included in this design. Currently, the City's secondary clarifiers employ different types of sludge withdrawal systems, scrapper and vacuum. Since the City has had problems with the operation of the vacuum system, a scrapper type system will be installed for this application. Additionally, consideration of replacing the existing vacuum mechanism with a scrapper mechanism has been incorporated into the design as a bid alternate. Therefore, this new clarifier will be identical to Clarifiers nos. 1 and 2 and will be located west side of these two units.

Flow from the new MLE process will flow into the existing flow splitter box. During the preliminary design process consideration of replacing this splitter box with a new unit because of the difficulty of maintaining near equal flows to the secondary clarifiers. The cause of this problem was the 16-inch diameter pipe that was used to transport the flow from the splitter box to clarifier no. 3 that was installed during the last expansion. The remaining two clarifiers incorporate a 24-inch diameter influent pipe. Under peak flow conditions, the difference in flow to clarifiers nos. 1, 2 and 4 (new) and clarifier no. 3 can vary by nearly 15-percent (28.6-percent each to clarifiers nos. 1, 2 and 4, and 14.2-percent to clarifier no. 3). To remedy this problem, a parallel pipe will be installed to clarifier no. 3 from the flow splitter box.

Flow from the flow splitter box will enter the new clarifier through a center standpipe and is distributed by an energy dissipating influent well. The clarifier will use a V-notched weir plate approximately equal in length to the circumference of the tank for discharge of the settled flow. After passing over the weir plate, flow will be collected in a peripheral channel and discharged from the tank through a single discharge pipe.

In addition, it is recommended that an improved weir and peripheral channel cleaning system be considered for both existing and the proposed clarifiers. The existing system that uses chlorine to control algal growth along the weirs, and effluent trough in the effluent channels is not effective in maintaining clean weirs or reducing the algal growth. Cleaning mechanisms that will be considered in the final design include brush and jet spray devices.

The settled mixed liquor will be directed by a scraper mechanism to the center sump of the new clarifier and will flow by gravity to the existing RAS/WAS wet well. From this point, return sludge will be directed to the aeration basins by the RAS pumps and excess sludge sent to the sludge handling facilities by the WAS pumps.

In addition to the possible replacement of the vacuum sludge withdrawal mechanism with a new scrapper mechanism, the effluent weirs of the clarifier no. 3 will be adjusted. Physical inspection of the weirs indicates that the effluent weirs appear to have been installed improperly, and are not level. During the upgrades and expansion work that will be performed under this program, the effluent weirs for clarifier no. 3 will be re-installed properly.

5.4.1 Secondary Clarification Process Design Considerations

Table 5.3 summarizes the design considerations for the secondary clarification system at the City's WWTF.

Table 5.3: Basis of Design for Secondary Clarifiers and Related Systems

Parameter	Characteristic
Secondary Clarifiers	
No. of Clarifiers	4
Type of Existing Clarifiers	2 – Scraper & 1 – Suction
Type of New Clarifier	Scraper
Diameter (feet)	65
Side Water Depth (feet)	14
Area of Each Unit (ft^2)	3,318
Total Area (ft^2)	13,273
Average MLSS (mg/L)	2,850
Design SVI (mL/g)	150
Design RAS Concentration (mg/l)	6,000
Sludge Blanket Depth (ft)	< 1.0
Maximum Allowable SLR (lbs/ft^2·day)	36
Maximum Allowable SOR (gpd/ ft^2)	1,200

5.4.2 Return Activated Sludge System and Controls

Currently, flow of the settled mixed liquor from each clarifier is hydraulically driven and controlled by weir gates located at the RAS/WAS wet well structure. A weir gate dedicated to each clarifier, and controls the rate of sludge withdrawal from that clarifier. The RAS flow is induced by a head differential between the liquid levels in the individual clarifier and the level just upstream of the weir gate, which is a function of the weir gate setting. An aeration header is installed in the center box of the RAS/WAS center wet well for mixing the sludge and keeping the solids in suspension. RAS and WAS are withdrawn from the wet well through separate withdrawal pipes to the RAS and WAS pumps.

The existing RAS pumps include three screw centrifugal pumps, each with a rated capacity of 1,500 gpm. The existing RAS pumping capacity is approximately 4.0 mgd with one pump as standby unit. These pumps are equipped with VFDs in order to maintain a constant elevation in the RAS/WAS wet well, and to do this, the speed of the pumps will vary in response to the level in the wet well.

The future RAS flows have been projected to be approximately 8.0 mgd in the long-term for all of the treatment options evaluated. Therefore, existing RAS pumps will not be capable of meeting this demand and new pumps will be required to meet this demand with one unit out of service. Since the existing facility can oly accommodate four pumps, and since the three existing RAS pumps were recently installed, it is proposed that a fourth similar pump be installed immediately to provide a firm capacity of 6.0 mgd. This capacity should be adequate until average daily plant flows approach 4.5 mgd, sometime in 2009, when all RAS pumps should be replace by larger units, each with a capacity of 2.66 mgd, to provide a firm capacity of 8.0 mgd with one unit out of service. Therefore, the existing modified facility will incorporate four pumps, each with a pumping capacity 2.0 mgd, and VFDs. Presented in Table 5.4 is the RAS pumping design criteria. Further, in order to better control flow rates from the individual clarifiers, flow meters will be installed on all sludge return lines and the weir gates will be adjusted. Weir gate positions in the RAS/WAS wet well structure will then be modified to maintain set return flow rates from individual clarifiers.

Table 5.4: RAS Pumping Design Criteria

Parameter	Description
Design RAS flow	8.0 mgd
Maximum RAS rate	15,000 gpm
Type of Pump	Screw Centrifugal
Number of Pumps	
Operating	3
Standby	1
Total	4
Pump Drive Type	Variable Frequency Drives.

5.4.3 Waste Activated Sludge System Control

The existing WAS pumps consists of two self priming centrifugal pumps, each with a capacity of 250 gpm. Presently, the operators operate the WAS pumps at appropriate intervals each day to maintain the biological population in the aeration basins.

The new design will allow for withdrawing the WAS from the WAS/RAS wet well in a similar manner to the existing arrangement. The WAS will be pumped to the sludge holding tank at a flow rate to maintain the design SRT in the biological treatment system. Due to their age and present condition, it is recommended that the existing WAS pumps be replaced with progressive cavity type pumps with new units with VFDs for pumping at variable rates. Presented in Table 5.5 is the recommended WAS Pumping Design Criteria.

Table 5.5: WAS Pumping Design Criteria	
Parameter	**Description**
Maximum WAS rate	300 gpm
Type of Pump	Progressive Cavity
Number of Pumps	
Operating	2
Standby	1
Total	3
Pump Drive Type	Variable Frequency Drives.

5.4.4 Scum Removal

As discussed in section 2, during the facility assessment the WWTF's personnel reported that Clarifier no. 1 collects large amounts of scum and that the scum trough channel must be hosed out several times a day. Thus, consideration will be given to installing customized skimmer blades and washdown system to improve the existing scum removal system.

This system design will include a full-radius rotating skimmer arm with a scraper extending from the center of the tank to the periphery. It collects scum and floating material during each revolution, discharging it into a scum box. From the scum box, upon discharging into the scum trough, a washwater system will be activated to move the scum removed from the clarifier to the scum wet well, which will then be pumped to the solids holding tank for subsequent treatment.

5.4.5 Weir Cleaning

The City's operational personnel are aware of the importance of maintaining the weirs, scum baffles, and effluent trough of the clarifiers free from algae formation, since it affects not only the effluent quality, but also the operation of the filters. Currently the WWTF utilizes the old fashioned, time consuming and precarious way of manually cleaning clarifier weirs, with brushes, cleaning compounds and high pressure water hoses. It is recommended that the weir cleaning system be upgraded by using an algae sweep automation mechanism and chlorine system.

Available systems include spring-loaded brushes and water jets that attach to the skimmer arm of a circular clarifier. Both systems offer flexibility and adjustment needed to ensure scrupulous sweeping of all weir, baffle, launder, and spillway surfaces and can be installed on all three of the City's existing clarifiers and the proposed unit. Both cleaning systems will be investigated during detailed design of facilities. Additionally, the chlorine feed system will be upgraded to enable the City to feed chlorine solution to aid in controlling the algae growth in this area of the treatment process.

5.5 Effluent Filtration

Effluent utilized for public access reuse in the City must meet the requirements of High Level Disinfection as defined by the State of Florida in Rule 62-600.440, FAC, *Disinfection – Design and Operational Criteria.* High level disinfection requires that the TSS level in the effluent be reduced to less than 5 mg/L prior to disinfection, and the unit process most frequently utilized for this purpose is filtration. Filtration is a size exclusion process that limits larger material to pass, and therefore reduces the total suspended solids in the filtered effluent. In addition, a properly maintained and operated filter can aid in reducing pathogens such as fecal coliform in the filtered effluent.

The four types of filtration systems that were considered and evaluated for use at the City's WWTF are summarized below:

- Cloth Media Disk Filter: Cloth media disk filters are the same type of filters that the City has installed now. The existing filters have a rated capacity of 1.9 mgd. These filters operate by passing effluent through cloth media installed around filter disks. Backwashing occurs when the pressure differential in the basin and effluent chamber exceeds a specified level, signifying a high level of solids collected in the filter media. Backwashing of the disk only occurs over portions of the disk at a time, thereby retaining the filtering ability of the remainder of the disk. As compared to granular media filters, cloth media provide comparable filtration with a lower capital cost and a smaller footprint but are subject to hydraulic and other breakthrough problems as currently experienced at the WWTF.
- Traveling Bridge Filter: This type of filter is a granular media gravity downflow filter. The City has a traveling bridge filter that is currently off-line, with a rated capacity of 0.6 mgd. The filter bed is divided into independent cells, approximately one foot in width. The bed depth can vary from 9-inches (single media) to 18-inches (dual media). A carriage equipped with a backwash pump moves across the bed, backwashing a single cell at a time. This allows the filter to remain in operation during backwash cycles. The carriage can be controlled by a timer or by a level probe which senses the increase in water level as headloss increases through the bed.
- Deep Bed Downflow Filter: Secondary effluent passes through a deep bed of granular media by gravity in this type of filter. The deep media bed allows for high level of solids loading per square foot of surface area and minimizes breakthroughs during high loading periods. Backwashing cycles are triggered when head losses through the filter exceed a preset level. Backwashing consists of a combination of compressed air and pressurized water streams. The typical depth of media for this type of filter is generally 6-feet. The deep media bed allows for high solids loading per square foot and minimizes the chance for breakthrough during high loading periods. An advantage to this type of filter is that they have the capability to be converted into denitrification filters with the addition of methanol, acetic acid, or some other type of carbon source and other minor modifications to system operation. The operation of a deep bed filter requires the use rotary lobe positive displacement type blowers and pumps to backwash the filters, as well as a supplemental clearwell for the source of backwash water. The backwash water is returned to the head of the WWTF for treatment.
- Continuous Backwash Filter: The continuous backwash filter operates with the secondary effluent flowing downward through an upward moving granular media bed. When the sand and accumulated solids reach the bottom of the bed, they are air lifted with compressed air through a pipe positioned in the center of the tank. Agitation and turbulence in the air stream cleans the sand. A gravity washer/separator utilizing the difference in settling velocities of the sand and the removed solids separates and returns the sand to the filter bed. The media depth with this type of filter is typically 4-feet. The flow pattern may allow oils, grease, and floatables through to the effluent as these types of filters are susceptible of doing. Other than the disk filters, continuous backwash filters have the smallest footprint of the filter technologies being investigated for the City.

5.5.1 Effluent Filtration Design Considerations

The design considerations given to tertiary effluent filter technology selection are as stated in the Evaluation Criteria in subsection 5.1 of this report. All the filter technologies discussed above are FDEP approved and capable of reducing the facility's effluent TSS level to the permit limit of less than or equal to 5 mg/L. Therefore, the environmental and implementation criteria are met for the technologies being discussed and cannot be used to differentiate between them.

The selection of filter technology will be based primarily upon their ability to meet the other performance criteria discussed earlier, particularly the reliability and flexibility considerations. The ability of the filters to consistently perform over a range of influent conditions, while maintaining an effluent quality of less than or equal to 5 mg/L, without the use of chemicals, is the most important performance criteria for the filter technology to meet. The recommendation for tertiary filter selection will also be based upon the level of confidence that the City has with the particular filter technologies in terms of reliability and ease of operation. The chosen filter technology must be able to satisfy these performance criteria in a cost effective manner.

5.5.2 Existing and Past Effluent Filtration

The WWTF currently operates cloth media disk filters for tertiary filtration with a rated capacity of 1.9 mgd. Additionally, the City has a traveling bridge filter that was recently put into operation, and has a rated capacity of 0.6 mgd.

The City has found the disk filters operate unreliably during backwash cycles, allowing significant amounts of solids and turbidity to pass through the filter media, and ultimately to the chlorine contact tank. This has resulted in the City sending large quantities of effluent to the Class I DIW, rather than to the public access reclaimed water reuse system. Because of their prior experiences and reliability problems, the City prefers not to use this type of filters for effluent filtration. Therefore, the disk filters were eliminated from any further consideration for the expansion.

Prior to the installation of the disk filters in 2004, the City operated a traveling bridge filter that, while providing acceptable effluent while in operation, proved to be difficult to maintain and problematic to keep in operation, especially with a wastewater that contains significant fats, oils and grease (FOG) due to media loss. Because of their prior experiences, the City also prefers not to use this type of filter for effluent filtration. However, the City does understand that their traveling bridge filter is nearly 20-years old, and that the newer designs, materials and techniques of construction for these types of filters, the rate of media loss can be reduced, and therefore, should be considered as a possible filtration mechanism under this program.

5.5.3 Effluent Filter Recommendation

Because of the City's very poor experience with cloth disk filters, they have been discounted from further consideration and the remaining three options for effluent filtration - continuous backwash filters, traveling bridge filters and deep bed filters will be evaluated in detail. Table 5.6 presents preliminary design characteristics of the three filter technologies to be investigated with estimated costs for each option.

Table 5.6: Comparison of Effluent Filter Characteristics

	Upflow	Downflow	
	Continuous Backwash	Deep Bed	Traveling Bridge
Number of Filters	5	4	3
Approximate Area Needed for Installation	45' x 80'	60' x 75'	75' x 100'
Height of Tank	19.2'	15'	6.5'
Depth of Media	40"	72"	11"
Surface Area (ft^2)	2,500	2,988	3,456
Average Loading Rate (gpm/ft^2)	1.56	1.30	1.13
Peak Hour Loading Rate (gpm/ft^2)	4.48	3.75	3.24
Peak Hour Loading Rate (1 unit out of service) (gpm/ft^2)	4.98	5.00	4.86

Table 5.6: Comparison of Effluent Filter Characteristics

Average Backwash Rate (gpd)	100,800	27,784	95,889
Peak Backwash Rate (gpd)	201,600	241,990	575,343
Estimated Cost of Materials	$1,250,000	$1,550,000	$675,000
Estimated Cost of Structure	$565,500	$955,500	$451,100
Total Estimated Cost	$1,815,500	$2,505,500	$1,126,100

Based on the reliability and site constraints for future expansions at this WWTF, the traveling bridge filters were eliminated from further considerations. Based on input from the City of North Port staff concentrating on operator preferences and their desire to reduce the TN concentration in the effluent to levels less than 3.0 mg/L in the future, the deep bed downflow filter was chosen as the preferred alternative for effluent filtration at this facility. It was determined that the additional capital cost associated with the downflow deep bed filters did not outweigh the potential benefits associated with reducing the TN concentrations in the future.

5.6 Disinfection

Currently, the degree of disinfection provided to the final plant effluent is a function of the proposed method of disposal of the effluent. Effluent that is used in the City's public access reclaimed water system requires high level disinfection, while effluent that is disposed in the Class I DIW, only requires basic disinfection. The City currently uses liquid chlorine in the form of NaOCl that is delivered to the site for both disinfection options. This form of disinfection will be maintained.

5.6.1 Disinfection Process Design Considerations

Disinfection requirements outlined by 62-610, Part III, FAC will continue to be satisfied using NaOCl addition followed by detention in a Chlorine Contact Basin (CCC). To achieve high-level disinfection, the effluent must first be filtered to reduce TSS to less than 5 mg/L, then NaOCL added to meet the minimum Concentration Time (CT) values specified. Rule 62-610, FAC indicates that for high level disinfection, a minimum CT value of 25 mg/L-min must be obtained at peak hourly flow if the fecal coliform count in the effluent is less than 1,000 per 100 mL while higher CT values of up to 120 mg/L-min are required for fecal counts in excess of this amount.

In the case of the City's proposed WWTF, where the final effluent will be filtered, the fecal count is expected to be less than 100 per 100 mL and a design CT value of 25 mg/L-min should be enough most of the time. However, in order to cater for potential plant upsets, the chlorine feed system will be designed to provide a CT of 120 mg/l-min during M3MADF flows.

Rule 62-610, FAC also requires that chlorine residual of 1 mg/L or greater be obtained after 15 minutes of contact time at peak hourly flow and system design will also take this into consideration. In addition to the FAC rules, EPA Class 1 Reliability Standards also must be satisfied for a system such as this one that will incorporate water reuse. Class 1 reliability standards require that with the largest flow capacity unit out of service, the remaining units must have a design flow capacity of at least 50 percent of the total design flow. To achieve Class 1 reliability standards, additional chlorine solution pumps will be provided and at least two chlorine contact basins will be constructed with each basin able to be operated and monitored independently.

Chlorine residuals will be monitored continuously at the City's WWTF using an on-line chlorine residual analyzer, to protect the user from reclaimed water that does not meet the minimum chlorine residual standards (chlorine residual >1 mg/L). In the event that the reclaimed water does not meet these criteria, it will be considered reject water and must be stored for further treatment or disposed of at the Class 1 DIW.

The existing FDEP permit (FLA013378) also requires that over a period of 30-days, 75-percent of the fecal coliform values shall be below the detection limits. Any one sample shall not exceed 25 fecal coliform values per 100 mL of any sample. Also, any one sample shall not exceed 5 mg/L of total suspended solids at a point before application of the disinfectant.

Since the existing chemical feed system lacks adequate controls resulting in over feeding of NaOCl and since it is not adequate to satisfy future chlorine demands, it will be replaced. The new chemical feed system will be sized to feed the appropriate quantity of NaOCl to the chlorine contact tanks to meet the required CT value of 120 mg/L-min at M3MADF conditions. The chlorine residual of 1 mg/L or greater after 15 minutes of contact time at peak hourly flow will also be satisfied.

5.6.2 Chlorine Contact Basin Upgrades and Design Considerations

As indicated above, the CCC shall be designed so each basin can be operated independently. Contacting is a separate process from mixing. Both processes are required in an optimized disinfection system, neither process can substitute for the other. The objective of contacting is to further enhance the inactivation of microorganisms by the disinfection process. The CCC tanks will provide for plug flow conditions and will be constructed to provide a serpentine pattern, to minimize short-circuiting and ensure that the minimum contact time is achieved. Additionally, each basin will be equipped with a drain for cleaning purposes. Additionally, to improve the hydraulic performance of the CCC, the addition of submerged baffles, deflection guide vanes, or the combination of the two will be considered during the final design. A summary of the chlorine contact tank design criteria is provided in Table 5.6.

Table 5.6: Chlorine Contact Tank Design Criteria

Parameter	Units	Existing	Future
Plant Rated Capacity (M3MADF)	mgd	3.7	7.0
Number of Basins	--	2	2 New (4 Total)
Basin Dimensions			
Number of Passes	--	4	4
Width of Pass	ft	3.0	3.0 (fifth channel is 5.0)
Length	ft	50	50
Side Water Depth	ft	5	5.5
Total Basin Volume	Gallons	64,770	170,750
Total Basin Volume (1 basin out of service)	Gallons	29,350	141,400
Design Flows			
WWTF Influent Peak hour flow	mgd	8.3	16.1
Diverted flow from filters	mgd	2.1	0
Reference PHF (mgd)	mgd	6.2	16.1
M3MADF	mgd	3.7	7.0
Hydraulic Detention Time			
PHF (all basins in service)	minutes	12.1	15.2
PHF (1 basin out of service)	minutes	7.3	9.9
50-percent PHF (1 basin out of service)	minutes	14.6	19.8
M3MADF (all basins in service)	minutes	21.0	34.6
Estimated Chlorine Dosage	mg/L	5.7	3.5
Estimated Maximum Hypochlorite Solution Flowrate	gpm	0.120	0.134

Chlorine will be injected into the effluent from the filters at a mixing chamber at the head of the CCC, and mixed rapidly. Currently, the addition of the NaOCl solution is accomplished with a diffuser, which consists of a plastic pipe with drilled holes through which the chlorine solution can be distributed into the path of filtered effluent flow. However, this means of adding NaOCl and mixing is not very effective. Effective methods of mixing chlorine with the filter effluent include the use of:

- In-line static mixers.
- In-line mixers.
- High speed induction mixers.
- Pressurized water jets.
- Turbine and propeller mixers.

Static in-line static mixers contain internal vane or orifice plates that being about sudden changes in the velocity patterns as well as momentum reversals. For static in-line mixers with vanes, the longer the mixing elements, the better the mixing; however, the pressure loss also increases. The mixing time using static in-line mixers is quite short, generally less than 1 second, but actual time varies with the length of the mixers, number of mixing elements used, and internal volume occupied by the mixing element.

In-line mixers are similar to static mixers, but contain a rotating mixing element to enhance the mixing process. The power for mixing is supplied by the energy dissipation caused by the orifice place and by the power input to the propeller mixer.

The high speed induction mixer is a proprietary device and consists of a motor-driven open propeller that creates a vacuum in the chamber directly above the propeller. The vacuum created by the impeller induces the NaOCl and the high operating speed of the impeller provides a thorough mixing of the NaOCl by the high velocity of the liquid leaving the impeller of the mixer.

Pressurized water jets have been used to mix NaOCl, when added to pipelines. It is important that the velocity of the jet containing the NaOCl to be mixed must be sufficient to achieve mixing in all parts of the pipeline. With this type of mixing device, the power for mixing is provided by the solution feed pumps or some other external source.

Turbine and propeller mixers are constructed with a vertical shaft driven by a speed reducer and electric motor. Axial-flow and radial-flow impellers are the most common impeller used with these devices. However, when these mixers are used, it is important that vortexing or mass swirling of the liquid is eliminated, which both reduces the effectiveness of the mixing.

5.6.3 Sodium Hypochlorite Storage

For the disinfection system, two 2,000 gallon NaOCl tanks are currently on site for chemical storage of approximately 12.5 percent solution chlorine for the WWTF. The chemical storage tanks, metering pumps, and appurtenances were constructed into the existing chlorine gas building. Per requirements, the chemical storage facilities for NaOCl shall provide over 15 days of storage at 7.0 mgd (M3MADF conditions). Assuming a CT of 120 mg/l-min during M3MADF conditions, the estimated chlorine concentration is approximately 3.5 mg/L and the 15 day storage volume required is approximately 3,000 gallons. Therefore the existing storage of 4,000 gallons is adequate and it does not need to be modified during this design.

5.6.4 Sodium Hypochlorite Pumps and Controls

The NaOCl is currently fed with diaphragm metering pumps (2-operation and 1-standby). Appropriate 4-20 mA signals in the SCADA system allow for monitoring and automation of the chlorine feed rates, but these pumps have proven to be inadequate to provide the necessary NaOCl solution to all locations in the WWTF, most notably the secondary clarifier weirs. Therefore, three new diaphragm metering pumps (2-operation and 1-standby) will be installed as part of this expansion program. The pumps will be provided with a variable speed motor that will be controlled by an input signal using compound loop that will receive input form the flow entering the CCC and the chlorine residual at the discharge from the CCC. As mentioned previously, the facility was designed to provide a maximum chlorine dosage rate of 3.5 mg/L, which was selected as a conservative value.

In addition, to the two new NaOCl feed for the disinfection process two new NaOCl pumps will be incorporated into the design to provide NaOCl to the effluent filters and four secondary clarifiers. However, these pumps will be a constant speed pump that will be manually controlled by changing the stroke movement.

Currently, the bulk chlorine storage tanks do not contain level indicators and a sight glass to monitor the available chemical. Therefore, ultrasonic level indicators will be incorporated into the existing storage tanks to monitor the levels in the tanks for monitoring volume of NaOCl used.

5.6.5 On-line Control and Monitoring

As noted above, to control the dosage of NaOCl added for disinfection, a compound loop system that incorporates the flow and chlorine residual signals will be employed at the WWTF. In this operation, the control signals from the flowmeter and residual chlorine analyzer/recorder will be sent to a PLC to control the NaOCl dosage rates fed to the CCC. In addition, NaOCl shall be capable of being added prior to the effluent filters and to the effluent weirs of the secondary clarifiers for algae control, which will be manually controlled, and use dedicated feed pumps for these applications.

5.6.6 Recommended Disinfection System Upgrades

Based on the discussions presented above, the recommended upgrades to the disinfection system at the City's WWTF can be summarized as follows:

- Proposed CCC expansion: Install additional chlorine contact basins by replicating the existing CCC configuration two times west of the existing structure.
- Chlorine injection system: Install an in-line mixer near the filter discharge or a high speed induction mixer prior to the CCC.
- Chlorine metering pumps: Install three new variable speed pumps for the CCC feed system, and two new manually controlled pumps for the effluent filters and secondary clarifiers. Confirm piping sizes to ensure delivery of adequate quantities of NaOCl at the desired pressures to the points of application.
- Operation and controls: Provide the appropriate 4-20 mA signals to the SCADA system for monitoring and automation of the chlorine feed rates to all of the locations in the WWTF. Additionally, level sensors will be included to monitor the storage volume in each tank.

5.7 Effluent Disposal

Currently, the effluent disposal methods that are available to the City of North Port consist of a Class I DIW and a public access reclaimed water system. Based on existing permit conditions a total of 7.82 mgd of disposal capacity is available with these two systems in operation. Additionally, the addition of a second Class I DIW will provide an additional 13.2 mgd of wet weather and effluent disposal capacity at this facility, bringing the total capacity available to slightly greater than 21 mgd, which is inclusive of the existing reclaimed water reuse customers of the City. On January 5 2007, the City received from the FDEP the

Notice of Draft Permit for the second DIW. The Notice has been published and is currently in the 30-day public comment period. A copy of the Notice of Draft Permit is provided in Appendix C of this report.

5.7.1 Deep Injection Well

The primary means of effluent disposal currently used by the City is the Class I DIW system, which is located approximately 3-miles from the WWTF site. The DIW pump station is located on the WWTF site, and consists of three vertical turbine pumps each with a capacity of 1,500 gpm at a total dynamic head (TDH) of 168-feet. Each pump is equipped with a 100 HP motor. The operating volume of the DIW wet well is approximately 46,000 gallons. The effluent is pumped to the DIW through a 16-inch force main that is approximately 15,500-feet long.

The existing DIW is currently permitted for 5.94 mgd and was drilled in 1987 to a depth of 3,120-feet, and cased to a depth of 1,105-feet. In addition to the Class I DIW, the City has two regional dual zoned monitoring wells that were also drilled in 1987 to monitor the groundwater quality. One monitoring well is located on the existing Class I DIW site, and the second monitoring well is located approximately 4,150-feet north of the existing DIW site. The monitoring wells were completed with open intervals from 551 to 600-feet and from 730 to the total depth of 750-feet.

As noted above, the City is proposing to install a second Class I DIW which will be constructed on the same site as the existing DIW, and will be located within 150-feet of the existing monitoring well. The new DIW is currently in the permitting process, and will be designed to meet the Underground Injection Control (UIC) program requirements for a brine disposal well using the alternate design specified in Chapter 62-258, FAC, and is currently under permitting review. The design of the proposed DIW will be based on a maximum injection rate of 13.2 mgd or 9,200gpm.

The DIW will be designed to inject effluent into the Avon Park formation, which lies approximately 1,100-feet below land surface (bls), and approximately 470-feet below the base of the underground source of drinking water (USDW). The existing dual zone monitoring well will monitor the upper zone located between 551 and 600-feet, and a lower zone between 730 and 650-feet. The current drilling program is designed to have the surface casing isolate these zones from the well bore prior to drilling into the current injection interval. All casings and other materials used in the construction of the new proposed DIW will meet or exceed the appropriate minimum standards set forth in Chapter 62-528.410, FAC, and as summarized in Table 5.7.

Table 5.7: Proposed New Injection Well

Casing	Diameter (in)	Depth (ft)	Wall Thickness (in)	Material Type
Conductor casing	45	40	0.375	Spiral welded mild steel
Surface casing	34	850	0.375	Spiral welded mild steel
Injection casing	24	1,082	0.5	Seamless steel
Liner	20	1,082	0.312	2205 duplex steel liner

Sulfate resistant cement will be used for all cementing of casings and hole plugging, and the 20-inch diameter liner system will be cemented in place.

The wellhead injection pressure at each of the DIWs is anticipated to reach 60 to 70 psi during periods of high-rate injection. Based on recent injection tests and the initial analysis that was performed by CH_2MHill when the original DIW was constructed, it would appear that the interference between the two DIWs would not cause the actual surface injection pressure to rise above 56 psi in the original DIW assuming that an injection rate of 5.94 mgd down the existing DIW, and less than 40 psi in the new DIW assuming an injection rate of 13.2 mgd and a slightly increased brine density associated with the injection of concentrate. Neither of these pressures reaches the surface pressure injection limit of 100 psi that will be established during the Mechanical Integrity Testing (MIT) for both of these DIW's. The existing DIW is typically pressure tested at 150 to 160 psi.

The improvements that will be required under this construction program include upgrades to the existing DIW transfer pumps and reclaimed water high service pump station. However, it should be noted that the effluent force main to deliver the effluent to the new DIW is not included under this construction program. An analysis of the existing flow conditions (5.94 mgd) against the existing system head curves for the pumps indicated a pump head of approximately 400-feet will be required when two pumps are running. This new rerated flow condition will increase the power requirements of the existing pumps from 100 HP to approximately 200 HP.

Pum

Additionally, to deliver the effluent to the new DIW will require the construction of a new DIW pump station, pumps and effluent force main. It is anticipated that five 2,500 gpm pumps will be installed to deliver the effluent to the new DIW. Based on head conditions, it is anticipated that a 30-inch diameter pipe will be required to transport the effluent to the new DIW.

Upon completion of the second DIW the sufficient capacity will provide an effluent disposal capacity for the City of nearly 21 mgd. The primary purpose of this will be for wet weather and/or reject wastewater disposal. Therefore, no wet weather or reject storage will be constructed on-site, since sufficient

5.7.2 Public Access Reclaimed Water Reuse System

The public access reclaimed water system consists of the effluent disk filters and high-level disinfection that were discussed in subsections 5.5 and 5.6 earlier, and reuse high service pumping facilities that deliver the reclaimed water to the customers of the system. There are three existing reclaimed system pumps installed at the City's WWTF that range in capacity from 380 gpm (one pump) to 750 gpm (two pumps) at a TDH of 140-feet. The station has room to install two more pumps to accommodate future expansion of the reclaimed water system. Under this construction program, the existing pumps will be relocated on the site and enclosed in a building. It is anticipated that the location of the new high service pump station will be located near the new on-site reclaimed water storage tanks. Sufficient space will be provided in the new building to incorporate the addition of three new high service pumps to meet the future reclaimed water demands of the City.

5.7.3 Reclaimed Water, Wet Weather and Reject Storage

Storage will only be provided for system operation. Wet weather storage and a separate, off-line system for the storage of reject water will not be provided. In accordance with Rule 62-610, FAC, these requirements are not required where another permitted reuse system or effluent disposal system is incorporated into the system design to ensure continuous facility operation in accordance with Rule 62-600, FAC. However, some system storage will be provided on-site to ensure that the reclaimed water flows will match the demand pattern during diurnal cycles.

Currently, reclaimed water storage in the City's system consists of both on-site and off-site reclaimed water facilities. The on-site storage consists of a covered tank that is 75-feet in diameter with a side water depth of 12-feet, which equates to a total capacity of approximately 400,000 gallons. The tank was an aerobic digester that was converted to its present function in 1998. It serves as the supply tank for the on-site reclaimed water pump station, which delivers water to the Heron Creek and Sabal Trace areas.

In addition, there are two off-site storage areas that are incorporated into the reclaimed water reuse system. The first is a 600,000 gallon prestressed concrete storage that that is 95-feet in diameter with a sidewater depth of 12-feet. This tank is located on the Sabal Trace golf course. The second storage area is located at the Heron Creek development where reclaimed water is discharged into the irrigation lake that is located on the golf course for this development.

Based on demands of the system, and the fact that the entire wastewater flow will be filtered, thereby enabling the City to connect more customers to the reclaimed water system, and the City's desire to interconnect the three WWTFs to manage the water resources within the City's wastewater service area, additional storage will be required. It is recommended that additional storage be constructed on-site, in the area south of the entrance road to match the demand pattern of the reclaimed water system during influent diurnal cycles experienced at the City's WWTF. Based on the land available and raw wastewater diurnal conditions, and storage in the system, a total of three 1.0 to 2.0 million gallon (MG) prestressed concrete tanks can be constructed in this area. The final size of the tanks will be based on the height restrictions that the City wishes to maintain for the area. During this construction program, a single tank will be constructed, and the necessary yard piping installed to accommodate the additional tanks in the future.

Furthermore, it is recommended that the existing 400,000 gallon reclaimed water storage tank be decommissioned and converted to an aerated sludge storage tank to provide for additional sludge storage. The entire volume of this tank cannot be effectively used due to internal piping that was installed during the last expansion. Additionally, it is recommended that any future large developments/golf courses in the City include reclaimed water storage in the irrigation ponds to maximize the water resources in the region to be utilized for irrigation purposes. These issues have already been included in the City's discussions with developers during the preparation of the Utility System Developer's Agreements.

5.7.4 Effluent Disposal On-line Control and Monitoring

For public access reclaimed water reuse, minimum quality criteria, pursuant to Rule 62-610, FAC, must be satisfied after disinfection and before discharge to the storage tanks or holding ponds for release to the reuse systems. Also, TSS/turbidity limitations must be satisfied before disinfection, regardless of the actual reclaimed water compliance monitoring location.

The on-line monitoring system that is required for the upgraded and expanded public access reclaimed water system will consist of the following:

- An on-line continuous TSS and/or turbidity analyzer located at the effluent from the filters, prior to chlorination.
- A total chlorine residual analyzer located in the common effluent channel of the chlorine contact basin, prior to discharge to the effluent pump station.

The continuous on-line monitoring instruments for turbidity/TSS and disinfectant residuals will be equipped with an automated data logging and recording device.

Under the new operating protocol, all of the secondary effluent will be filtered and chlorinated using NaOCl prior to being pumped to the public access reclaimed water system or the Class I DIW. The transfer pumps located at the discharge end of the CCC will be used to pump the reclaimed water to the storage tanks on site. These pumps will need to be modified to meet the flow demands and the head conditions. The high service distribution pumps discussed in subsection 5.7.2 deliver the reclaimed water to the users of the system. In the event of a substandard effluent or a high level condition in the storage tanks, the effluent will automatically be diverted to the DIW pump station using automatically controlled valves that are controlled by the setpoints for the turbidity/TSS and chlorine residual meters.

After filtration, the turbidity will be continually monitored through an in-line turbidity meter (turbidimeter). A TSS monitoring device will be included in this design; however, its final application is unknown at this time. A turbidity setpoint of 3.5 NTU has been established by FDEP for this facility, which was established to detect an excursion of TSS in the reclaimed water quality. After chlorine contact, the total chlorine residual will be continually monitored through an in-line chlorine analyzer. A total chlorine residual setpoint of 1.2 mg/L has been established. This setpoint was established to detect an excursion of reclaimed water quality. When either the turbidity exceeds a pre-setpoint of 2.8 NTU or the total residual chlorine falls below 1.2 mg/L continuously for 5-minutes, an alarm is sounded and a red light is illuminated at the reclaimed water control panel. The alarm will be sounded for 5-minutes and the light illuminated until acknowledged.

If the reclaimed water exceeds either the turbidity or total chlorine residual setpoints (3.5 NTU or 1.2 mg/L) an alarm is sounded and a red light is illuminated at the reclaimed water control panel. When the WWTF is staffed, the operator will investigate the cause of the substandard effluent and correct the condition. If the condition cannot be immediately corrected or, if the WWTPF is not attended, the system is automated so that appropriate motorized control valves will open and close. This valving sequence sends the substandard reclaimed water back to the deep injection well for disposal.

A lag time of 5 minutes is provided from the time of the turbidity or total chlorine residual setpoints excursion to when the automated valves open and close. This will allow operating conditions to stabilize in the event the excursion was an aberration or was the result of an inconsistent in-line meter reading due to interference.

In addition to the normal on-line monitoring, a grab sample of the effluent after disinfection will be sampled once every 2 years for Cryptosporidium and Giardia.

5.7.5 Recommended Effluent Disposal System Upgrades

- Effluent Transfer Pump Station: Increase capacity of the effluent transfer pump station to the projected capacity of the WWTF - 5.6 mgd AADF and 19.2 mgd PHF.
- Reuse Water Storage Tanks: Install one 1.0 MG reuse water storage tank.
- Reuse Water High Service Pump Station: Relocate the three existing pumps to a building, and increase capacity of the reuse water high service pump station to 5.6 mgd.
- Existing DIW Pump Station: Upgrade the existing DIW pumps with new motors to meet the aerated capacity of the existing pumps (5.92 mgd).
- DIW: Construct a new DIW with a capacity of 13.2 mgd.
- Operation and controls: Install online monitoring and control systems for automatic control of the effluent disposal system.
- Existing reclaimed water reuse storage tank: Convert to an aerated sludge holding tank.

5.8 Biosolids Management

The solids removed from the wastewater include screenings, grit, scum, and solids. The screenings and grit that are removed from the wastewater at the headworks are disposed of in a dumpster located at this structure, and taken to a landfill for ultimate disposal. The remaining biosolids resulting from the wastewater treatment operations and processes are in the form of a liquid, or semisolid liquid, which typically contains 0.5 to 1.0-percent solids by weight. The term biosolids reflects the fact that the wastewater solids are organic products that can be used beneficially after treatment with processes such as stabilization and other processes. The term sludge is generally used in conjunction with a process descriptor, such as WAS or secondary sludge. The principal methods used for solids processing include pumping, conditioning, thickening, dewatering, stabilization and ultimate disposal.

The sources of solids from the City's WWTF are WAS that is produced from the biological conversion of BOD, and scum from the surface of the secondary clarifiers. The scum consists of floatable materials that are skimmed from the surface of the secondary clarifiers. The peak quantity of WAS predicted to be produced at the City's WWTF was estimated to be approximately 11,000 lbs/day. Based on a underflow concentration of 0.75-percent solids from the secondary clarifiers, which is typical for the City's operation resulted in a quantity of slightly greater than 175,000 gpd of WAS. Currently, two non-clog centrifugal pumps are used to pump the WAS from the three existing secondary clarifiers. Each of the pumps is rated at 100 gpm. As noted in subsection 5.4, two new progressing cavity pump will be installed to meet the peak WAS rates.

Presently, the WAS is pumped to sludge holding tanks that were originally aerobic digesters, which were converted to their current use in 1996. They are divided into two chambers that are hydraulically connected through openings in the common tank wall. The two tanks are each 30-feet square, and have a design operating sidewater depth of 13-feet. The total volume available for sludge holding is approximately 175,000 gallons. Aeration is provide to the sludge holding tanks using coarse bubble diffusers with air provided by two centrifugal blowers, each with a capacity of 1,800 scfm. Additionally, a telescoping valve is located in the northern tank for decanting the supernatant; however, it is currently not used for decanting. Instead, submersible pumps are utilized to drain approximately 2-feet of supernatant or approximately 28,000 gallons from the top of the tanks.

A rotary drum thickener is located at the top of the northern tank to thicken the WAS prior to discharging into the sludge holding tanks. The rotary drum thickener was designed to thicken the WAS to at least 4-percent solids prior to discharging the solids into the aerated sludge holding tanks. However, this unit is presently not in operation, since the City is operating "piggy-back" Sarasota County's agreement with Synagro Southeast, Inc.

After decanting the supernatant, the thickened sludge is then transferred to the old mixing basins using one of the two recessed impeller sludge pumps and mixed to keep the solids in suspension. Using a mobile dewatering unit Synagro dewaters the sludge to a minimum of 18-percent solids using a mobile sludge dewatering unit and then hauled off to the Okeechobee landfill for ultimate disposal. The filtrate from the sludge dewatering process is discharged into the on-site pump station and returned to the head of the WWTF for treatment. The duration of the contract is for 3-years with the option of two 1-year extensions upon mutual consent. Based on the agreement with the County, the contract is set to expire on December 16, 2007.

5.8.1 Sludge Conditioning Options

Sludge is chemically conditioned to improve their thickening and dewatering characteristics. Chemical conditioning can result in coagulation of the solids and release of the absorbed water in advance of thickening or dewatering. Chemicals commonly used for conditioning WAS include ferric chloride ($FeCl_3$), alum ($Al_2(SO_4)_3$), lime and polymers. Adding chemical salts and lime to the sludges could increase the dry solids by approximately 20 to 30-percent; therefore, polymers are the most common coagulant used. The coagulants can be received in either the dry or liquid form, however, for a facility the size of the City's liquid form is the most cost effective.

The factors that affect the selection of the type and dosage of the conditioning agents are the properties of the solids and the type of mixing and thickening and/or dewatering devices to be used. Important solids properties include the source of the solids, solids concentration, age, pH and alkalinity. The chemical dosage required for any sludge is determined in the laboratory. Tests used for selection chemical dosages include the Buchner funnel test for the determination of specific resistance of sludge, capillary suction time (CST) test, and the standard jar test.

In general, it has been observed that the type of sludge has the greatest impact on the quantity of coagulant required. Polymer dosages in any given case may vary greatly depending on the molecular weight, ionic strength, and activity levels of the polymer used.

The proper mixing of the sludge and coagulant is essential for the proper conditioning, and the method of mixing should not break the floc after it has formed, and the detention should be kept to a minimum so that the sludge reaches the thickening/dewatering unit as soon after conditioning as possible. The coagulants can either be added to a mixing flocculation tank, or added directly to the sludge feed line using a coagulant ring and inline static mixer.

Sludge screening is also considered a conditioning process, which consists of removing coarse debris from the RAS and WAS. Typically, this process is used to prevent debris from negatively impacting downstream processes. In the case of the City, WAS sludge screening may be advantageous to improve sludge quality for the Class A process that may be implemented in the future. The process that would most benefit from WAS screening would be a thermal drying system. Because of the nature of the drying process, the types of debris that would be removed by the screens, namely plastics and fibrous materials, could create some fouling problems within the dryer itself.

The screenings removed from the sludge stream must be collected and prepared for disposal. Although the screenings from this type of process are much less objectionable than influent screenings, care must be given to the proper handling. Washing and compacting may be desirable to ensure the least amount of odors and moisture in the final product prior to disposal. Disposal of screenings would be accomplished similar to that of influent screenings.

5.8.2 Sludge Thickening Options

The solids content of the WAS varies considerably, depending upon the characteristics of the sludge removal and pumping facilities, and the method of operation, however, for the City's operation the WAS concentration varies between 0.5 and 1.2-percent solids. Thickening is a procedure used to increase the solids content of sludge by removing a portion of the liquid faction. Thickening is accomplished by physical means, including gravity settling, dissolved air flotation, gravity belt and rotary drum. As mentioned previously, the City has a rotary drum thickener; however, this unit has not been in operation since its installation during the last expansion at the WWTF in 2004.

The volume reduction from thickening that is obtained is beneficial to subsequent treatment processes, such as digestion and dewatering. Provided in Table 5.8 are typical sludge thickening methods that are being considered in the City's Biosolids Master Plan.

Table 5.8: Sludge Thickening Alternatives

Method	Type of Solids	Frequency of Use and Relative Success
Gravity, co-settling in clarifier	Primary and waste activated sludge	Occasional use; may negatively impact the effectiveness of primary clarifier
Gravity, thickening in separate tank	Untreated primary sludge	Commonly used with excellent results. Can be odorous
	Untreated primary and waste activated sludge	Often used for small plants, generally satisfactory results with solids concentrations in the range of 4 to 6 percent
	Waste activated sludge	Seldom used, poor solids concentration generally 2 to 3-percent
Dissolve air flotation	Untreated primary and waste activated sludge	Limited use, results are similar to gravity thickeners
	Waste activated sludge	Commonly used, but is decreasing because of high operating costs; does produce good results (3.5 to 5-percent solids concentration)
Gravity belt thickener	Waste activated sludge	Often used; good results (3 to 6-percent solids concentration)
Rotary drum thickener	Waste activated sludge	Often used; good results (3 to 6-percent solids concentration)

Based on the relative success of thickening WAS, only the gravity belt and rotary drum thickener will be considered for this application.

The gravity belt thickener consists of a gravity belt that moves over a set of rollers driven by a VFD unit. The sludge is conditioned with a polymer and fed into a feed/distribution box at one end, where the sludge is distributed evenly across the width of the moving belt. The filtrate drains through the belt as the concentrating sludge is carried towards the discharge end of the thickener. The filtrate is returned to the head of the treatment process for treatment, and the thickened sludge is pumped for further processing or final disposal. The belt widths for the gravity belt thickeners range from 1 to 3-meters, and the typical hydraulic loading rates range from 100 gallons per minute per meter (gpm/m) to 250 gpm/m. Solids loading rates range on the order of 440 to 1,320 pounds per meter per hour (lbs/m/hr). Solids capture typically ranges between 90 and 98-percent, and polymer dosages for thickening WAS range from 6 to 14 pounds per ton (lbs/ton).

A rotary drum thickening system consists of a conditioning system and rotating cylindrical screen. Polymer is mixed with the sludge, and the conditioned sludge is then passed to the rotating screen drum, which separates the flocculated solids from the water. The thickened sludge rolls out of the drums, while separated water decants through the screen. Similar to the gravity belt thickener, rotary drums are typically used before further sludge processing. These units require greater quantities of polymers than gravity belt thickeners, and are available in capacities up to 400 gpm, rotate slowly, 10 to 20 rpm and have small energy requirements. Solids capture typically ranges between 93 and 99-percent; however, large amounts of polymer for conditioning can be of concern with these units, because of floc sensitivity and shear potential in the rotating drum.

Both the gravity belt thickeners and the rotary drum thickeners are relatively simple devices to operate and are often unmanned. Additionally, both of these types of thickeners have been used successfully in thickening WAS up 6-percent solids.

5.8.3 Sludge Dewatering Options

Several techniques are used for the dewatering of sludge, and the most common methods include mechanical and physical means. However, some of the techniques used rely on natural evaporation and percolation to dewater the solids. In most cases physical means are used to dewater the sludge more quickly. The physical means include filtration, squeezing, capillary action, and centrifugal separation and compaction. Similar to the thickening alternatives, the selection of the dewatering is determined by the type of sludge to be dewatered, characteristics of the dewatered product, and the space available. In addition, odor control is also an important design consideration as the level of odor release varies based on the type of sludge and the mechanical equipment selected. For example, high shear dewatering and conveyance equipment can increase odor release. The dewatering processes commonly used in Florida include centrifuges, belt filter presses, recessed plate filter press, and drying beds. The advantages and disadvantages of the various methods of sludge dewatering are summarized in Table 5.9.

Table 5.9: Sludge Dewatering Alternatives

Dewatering Method	Advantages	Disadvantages
Solid Bowl Centrifuge	Clean appearance, good odor containment, fast start-up and shutdown capabilities Produces a relatively dry sludge cake Low capital cost to capacity ratio High installed capacity to building area ratio	Scroll wear potentially a high maintenance problem Requires grit removal and possibly a sludge grinder in the feed stream Skilled maintenance personnel required Moderately high suspended solids content in the centrate

Table 5.9: Sludge Dewatering Alternatives

Belt filter press	Low energy requirements Relatively low capital and operating costs Less complex mechanically and is easier to maintain High pressure machines are capable of producing a very dry cake Minimal effort required for shutdown	High odor potential May require a sludge grinder in the feed stream Very sensitive to incoming sludge feed characteristics Automatic operation generally not achievable
Recessed-plate filter press	Highest cake solids concentration Low suspended solids in filtrate	Batch operation High equipment and labor costs Special support structure requirements Large floor area required for equipment Skilled maintenance personnel required Additional solids due to large chemical addition require disposal
Sludge drying beds	Low energy and no chemicals required Lowest capital cost method where land is readily available Small amount of operator attention and skill required Less sensitive to sludge variability	Requires large area of land Requires stabilized sludge Design requires consideration of climatic effects Sludge removal is labor intensive

For the purpose of this analysis, sludge drying beds and recessed plate filter presses were not considered further based on the WWTF site limitations, chemical requirements for conditioning and capital costs associated with these methods of dewatering.

In high solids and solid-bowl centrifuges, the sludge is fed at a constant flow rate into the rotating bowl, where it separates into a dense cake containing the solids and the centrate. The centrate contains fine, low-density solids, which is returned to the head of the facility for treatment. The sludge cake from solid-bowl centrifuges contains about 70 to 80-percent moisture, is discharged from the bowl by a screw feeder into a hopper or onto a conveyor belt. Depending upon the type of sludge, solids concentration in the cake varies from 20 to 30 percent. High-solids centrifuges are modified solid bowl centrifuges that are designed to produce a dryer solids cake. These units have a slightly longer bowl length to accommodate a longer "beach" section, a lower differential bowl speed to increase the residence time, and a modified scroll to provide a pressing action within the beach of the unit. When dewatering WAS, these types of centrifuges will only result in a few percent greater solids in the dewatered cake than a solid-bowl centrifuge.

Two basic designs of centrifuges are used: countercurrent and co-current units. The main difference in the two types are the location of the sludge feed ports, removal of centrate, and the internal flow patterns of the liquid and solid phases. In the countercurrent design, the feed slurry enters at the junction of the cylindrical conical section and the solids travel to the conical end and the liquid phase moves in the opposite direction. In the co-current design, the solids phase travels the full length of the bowl as does the liquid phase.

The primary problem with centrifuges is the disposal of the centrate, which can be relatively high in fine suspended, non-settling solids. The return of these solids to the head of the WWTF for treatment can result in the passage of fine solids through the treatment system, thereby impacting the effluent quality. This problem has been experienced at the City's WWTF, when Synagro used a centrifuge to dewater the sludge prior to hauling the dewatered sludge off-site. While Synegro never appeared to optimize the dewatering process under their contract, tests performed at other WWTFs with centrifuges have shown that by increasing the residence time or chemical conditioning has been effectively used to control the fine solids discharge.

Chemicals for conditioning are added to the sludge feed line or to the sludge within the centrifuge. Dosage rates for conditioning with polymers will vary from 2 to 15 lb/ton of sludge on a dry solids basis. The solids capture rate is generally greater than 92 percent.

Belt filter presses are continuous feed dewatering devices that use the principles of chemical conditioning, gravity drainage, and mechanically applied pressure to dewater the sludge. In most operations, the conditioner is added directly to the sludge using a polymer ring and in-line static mixer. The conditioned sludge is discharged on the gravity section where it is allowed to thicken prior to dewatering. Following the gravity drainage, pressure is applied in a low-pressure section, where the sludge is squeezed between opposing porous belts. On some units, the low-pressure sections are followed by a high-pressure section where the sludge is subjected to shearing forces as the belts pass through a series of rollers. The squeezing and shearing forces release the additional quantities of water or filtrate from the sludge. The final dewatered sludge cake is removed from the belts by scraper blades and is discharged onto a conveyor system prior to disposal.

Belt filter presses are available in belt widths that range from 0.5 meters to 3.5 meters, and the most common width is 2 meters. Sludge loading rates vary from 100 to 1,500 lb/m/hr depending upon the sludge type and throughput. The hydraulic loading rates are based on belt width and range from 10 to 100 gpm/m. For WAS the sludge loading rates typically range from 100 to 400 lb/m/hr, and the hydraulic loading rates range from 10 to 40 gpm/m. When dewatering solely WAS, the typical dewatered cake solids range from 12 to 20-percent solids, and typically average around 16-percent, and the solids capture rate is generally greater than 95-percent. Polymer dosages range from 6 to 20 lb/ton.

5.8.4 Sludge Stabilization Options

In selecting the appropriate method of solids processing reuse, and disposal, considerations must be given to the appropriate regulations. Earlier this year the FDEP recommended changes to the current regulations that govern the treatment and disposal of biosolids generated at WWTFs. Presently, the City contracts the dewatering and disposal of the sludges generated within the wastewater treatment process. Using a mobile dewatering unit Synagro dewaters the sludge to approximately 18-percent solids using a mobile sludge dewatering unit and then hauled to the Okeechobee landfill for ultimate disposal.

Table 5.10: Processes that Meet Class A Treatment Requirements

Process	Definition
Composting	Using either within vessel or static aerated pile composting, the temperature of the biosolids is maintained at 55°C or higher of 3-days. Using windrow composting, the temperature of the wastewater sludge is maintained at 55degrees centigrade(°C) or higher of 15-days or longer. During this period, a minimum of five windrow turnings is required.
Heat drying	Dewatered biosolids are dried by direct or indirect contact with hot gases to reduce moisture content to 10-percent or lower. Either the temperature of the solids exceed 80°C of the wet bulb temperature of the gas stream in contact with the biosolids leave the driver exceeds 80°C.
Heat treatment	Liquid biosolids are heated to a temperature of 180°C or higher for 30 minutes.
Autothermal thermophilic aerobic digestion (ATAD)	Liquid biosolids are agitated with air or oxygen to maintain aerobic conditions, and the MCRT is 10 days at 55°C to 60°C
Beta-ray irradiation	Biosolids are irradiated with beta rays from an accelerator at dosages of at least 1.0 megarad (Mrad) at room temperature (approximately 20°C)
Gamma-ray irradiation	Biosolids are irradiated with gamma rays from certain isotopes such as 60-cobalt or 135-cesium at dosages of at least 1.0 Mrad at room temperature (approximately 20°C)
Pasteurization	The temperature of the biosolids is maintained at 70°C or higher for at least 30-minutes

Based on the recent trends with the regulations and discussions with the City administrative and operational staff only processes that meet Class "A" treatment requirements should be considered for the upgrades. With these criteria a number of processes are eliminated from further consideration, and only a few sludge treatment options apply for the City. Summarized in Table 5.10 are the processes that meet Class "A" treatment requirements.

Based on the site requirements and the surrounding conditions, heat drying and thermophilic aerobic digestion will be required further.

The ATAD process represents a variation of both conventional and high-purity oxygen aerobic digestion. In the ATAD process, the feed sludge is thickened to approximately 6 percent solids and the reactors are insulated to conserve the heat produced from the oxidation of volatile solids during the digestion process. The thermophilic operating temperatures are generally in the range of 55°C to 60°C, which can be achieved without external heat input by using the heat released by the exothermic microbial oxidation process. Within the ATAD reactor, sufficient levels of oxygen, volatile solids, and mixing allow aerobic digestion to degrade organic matte to carbon dioxide (CO_2).

The ATAD systems are designed to have short hydraulic detention times with the reactors. As long as the ATAD reactors is well mixed and sufficient oxygen is provided, the temperature of the reactor will increase until a balance occurs, and the process becomes oxygen mass-transfer limited. The HRT of the ATAD reactors range will be in the range of 12 days and the nitrification/holding tanks will also be 12 days. Mixing and aeration should be provided by a jet aeration system, due to its ability to provide sufficient energy to mix and provide oxygen to the microorganisms in the ATAD process.

Heat drying involves the application of heat to evaporate water and to reduce the moisture content of biosolids be that achievable by conventional dewatering methods. The classification of dryers is based on the predominant method of transferring the heat to the wet solids. In convection or direct drying systems the sludge directly contacts the heat-transfer mechanism, usually hot gases. In conduction or indirect drying systems, a solid retaining wall separates the wet sludge from the heat transfer medium, usually steam or another hot fluid.

Direct dryers that have been used for drying sludges are flash dryers, rotary dryers and fluidized bed dryers. The most common method for municipal sludges is the rotary dryer. A rotary dryer consists of a cylindrical steel shell that is rotated on bearings and usually mounted with its axis at a slight slope from the horizontal. The feed sludge is mixed with previously dried cake in a blender located ahead of the dryer. The blended feed sludge has a moisture content of approximately 65 percent that improves its ability to move through the dryer without sticking. The mixture and hot gases are conveyed to the discharge end of the dryer. The conveyance of the sludge is accomplished by axial flights along the rotating interior wall that pick up and cascade the sludge through the dryer.

Indirect dryers are designed in either a horizontal or vertical configuration. Horizontal dryers utilize paddles, hollow flights, or disks mounted on one or more rotating shafts to convey the biosolids through the dryer. H heated medium, usually hot steam or oil is circulated through the jacketed shell of the dryer and the hollow core of the rotating assembly. The dewatered sludge is fed perpendicular to the dryer and pas horizontally in a helical patter through the dryer. Drying occurs as the biosolids are broken up through agitation and come into contact with the heated metal surface in the dryer.

In vertical indirect dryers, the sludge contacts a metal surface heated by either steam or oil, and the heat is conductively transferred to the sludge. The dewatered sludge is mixed with the recycled product and is fed through the top inlet of the multi-stage dryer. Rotating arms move the sludge from the heated stationary tray to another in a rotating zigzag motion until it exits at the bottom of the dryer.

The finished product of both of these types of dryers have a dry solids content of 90 to 95 percent, is generally screened and oversized material passes through a crusher and then is transported to a recycle bin. The size of the dried product can range from 2 to 8 mm.

Odor control is a necessity for both options, whether it is the ATAD process or a heat drying system. The ATAD system produces an off-gas that is high in ammonia, which can easily be treated with a quench system. Additionally, scrubber systems or biofilters traditionally treat the off-gases further. Two important control measures associated with heat drying of dewatered sludge are fly ash collection and odor control. Since most of the dryers operate at temperatures far less than what is required for the complete destruction of odors. Therefore, partial oxidation of odor-producing compounds may occur, resulting in an increase in the intensity or disagreeable character of odor produced. Thermal oxidizers have proved the most effective method for odor destruction of the odors present in the off-gases.

5.8.5 Recommended Biosolids Management System

The City is currently investigating alternative means of biosolids treatment, whether at this site or other, and to contract the operations or not. Until the *Biosolids Management Plan* is completed later this year, it is recommended that the City continue to pursue contract operations with Synagro Southeast, Inc. to dewater and dispose of the sludges at the Okeechobee landfill.

5.9 Ancillary Facilities

Constructed within the WWTF will be a number of ancillary structures that are essential for the operation of the WWTF. These facilities include items such as flow splitter boxes and chemical feed facilities.

5.9.1 Flow Splitting Structures

The flow through the WWTF will continue to be completely by gravity, and will not require the use of repumping facilities. To ensure the proper treatment, it is essential that equal flow distribution between the individual process treatment units be obtained. The use of flow splitter structures with weir gates are currently used throughout the existing WWTF. While this is not the most accurate method to split the flow, it does provide the necessary accuracy required for the wastewater process to function, and meet the operational requirements. Presently there are three flow splitting structures in operation at the WWTF, which include the following:

- Aeration basins flow splitter box.
- Secondary clarifier influent splitter box
- DIW/chlorine contact chamber flow splitter box.

Pretreated wastewater from the headworks structure flows by gravity to the aeration basins flow splitter box. Just prior to entering this flow splitter box, RAS is added to the flow stream to provide good mixing as it enters the splitter box. The influent section of the aeration basin flow splitter box is aerated to provide additional mixing and maintaining the tank contents in suspension. The pretreated wastewater and RAS is then distributed to the five existing aeration basins by the use of separate weir gates in the splitter box. There are four weir gates, and each gate distributes the flow to two aeration basins (1 and 2, 3 and 4, 5 and future 6, and the future 7 and 8 basins). Each weir gate is equipped with a staff gauge to aid in the manual checking and adjustment of the flow distribution to the aeration basins.

Under the proposed treatment flow scheme chosen, the aeration basin flow splitter box will be modified so that the weir gates and piping to the various pairs of aeration basins will be decommissioned. The weir gates and air mixing system will be removed from this flow splitting structure entirely. The individual chambers that were used to divert the pretreated wastewater to the individual pairs of aeration basins will now divert the flow to the two anoxic basins. The four chambers will be hydraulically connected and the weir gates will be replaced with stationary weirs. The main influent chamber of this structure will continue to receive the RAS and pretreated wastewater, but now will also include the IMLR.

The MLSS from the aeration basins discharges into a 30-in diameter ductile iron (DI) pipe, which enters the clarifier flow splitter box, at two locations. The influent portion of this splitter box is divided into two influent chambers, which is hydraulically connected via an opening in the bottom of the wall. Weir gates are used to distribute the flow to the three existing clarifiers, and a fourth gate is installed to accommodate the fourth future secondary clarifier.

The yard piping that was installed as part of the last expansion in 2004 makes it impossible to equally split the flows to the secondary clarifiers. Therefore, under this construction program, a parallel pipe will be installed to divert the flow from the clarifier splitter box to clarifier no. 3. While this improvement will still not provide for equal flows to each of the four clarifiers, this option will nearly equalize the flows to these treatment units.

Flow from the secondary clarifiers flow by gravity to the DIW/CCC flow splitter box. This flow splitter box was the original structure that was used to distribute the flow to the effluent filters. Prior to entering this flow splitter box, a 24-inch by 24-inch by 12-inch tee is installed to split the flow to the effluent filters. The use of solely the hydraulics in the pipes provides the City with little or no control of the flow to the effluent filters.

Based on the hydraulics of the system and the proposed layout of the new facilities, it is recommended that the existing DIW/ CCC flow splitter structure be abandoned. Instead, all of the effluent from the secondary clarifiers will flow by gravity to the effluent filters and will enter a common influent channel for the effluent filters that will be used to distribute the flow to the individual filter cells. Two options are available for final disposal of the treated effluent. The first option is for the filtered effluent to be discharged either to the chlorine contact chamber, or to the DIW pump station. Incorporation of this arrangement will provide the added benefit of discharging filtered effluent down the DIW during low reuse demand and/or wet weather conditions. This flow design will significantly improve the quality of effluent pumped to the DIW. Under present conditions, a majority of the effluent that is pumped to the DIW for disposal is not filtered.

A second option would be to allow all of the effluent from the filters to flow by gravity to the chlorine contact chamber. In this case, all of the filtered effluent will be chlorinated, and any effluent discharged to the DIW pump station will also be chlorinated. The upside to this option would be the fact that high quality effluent is being discharged down the Class I DIW, and that additional monitoring will not be required. The downside is that the City will be treating more flow to a higher standard and using more NaOCl to disinfect all of the effluent. Based on discussions with the City, it was determined that all flow from the filters will flow by gravity to the CCC for treatment, from where it will be pumped to either the on-site storage tank or to the Class I DIW system.

5.9.2 Chemical Storage and Feed Facilities

Chemical systems are used throughout the WWTF to support the associated wastewater treatment processes. The procedures for choosing the chemicals and associated dosages vary. There are many different chemicals that will be used to support the wastewater treatment process, and often, more than one chemical is suitable for a particular use. Presently at the WWTF the only chemical used is NaOCl for disinfection of the final effluent. As noted in subsection 5.6, NaOCl will continue to be used for disinfection. However, to maintain Class I reliability requirements, it is anticipated that a polymer will be used to aid in secondary clarification should the need arise. Prior to the final selection of the polymer that will be used at this facility, pilot testing is recommended to determine the effectiveness of the polymer on settling, as well as the impacts on downstream treatment processes.

More importantly, future considerations for chemical addition will need to be taken into account. The WWTF, as proposed will consistently produce an effluent with a TN concentration of less than 7 mg/L. However, the City has requested that the design of the upgrades also include provisions to produce an effluent with a TN concentration of less than 3 mg/L and TP concentration of less than 1 mg/L. Provisions have been incorporated into the design to accomplish this biologically with the addition of process tankage, and/or chemically with the addition of chemicals to the process. Additionally, provisions should be incorporated into the design for the biosolids management facilities that will be incorporated in the future. Generally, the chemicals used in conditioning the sludge prior to either thickening and/or dewatering can range from metal salts to polymers. However, the most prevalent chemicals used for sludge conditioning are polymers.

The optimum point for the application of the chemicals to the wastewater treatment process varies depending upon the application. To be effective, the chemical solution introduced into the wastewater must be adequately mixed. Mixing can be accomplished with a variety of means, such as hydraulics, static mixing, mechanical mixers and diffused aeration. Flexibility has been incorporated into the design of the chemical application systems, which will include maintaining the existing duplicate storage tanks, and installing new chemical metering pumps and introduction points.

The design of the NaOCl system currently permits the operators to provide NaOCl to four points within the WWTF, which include the:

- Chlorine contact chamber influent box.
- DIW pump station.
- Secondary clarifiers (effluent weirs).
- DIW/chlorine contact chamber flow splitter box.

While the feeding the chlorine to the above four locations has been successful in the past, our inspection of the facilities indicates that feeding of chlorine to the effluent weirs does not provide sufficient chlorine to the entire weir lengths of the clarifiers.

Provisions have been incorporated into the design to construct a future chemical building that will be used to house the chemical storage and feed equipment. In addition, a loading truck offloading system will be incorporated into the design, so that the chemicals that are used in the treatment process can be stored at a common location on the WWTF site.

5.9.3 Recommended Ancillary Facilities

- Aeration Basin Splitter Box: Will be modified to eliminate the air mixing system and weir gates. The new plan will be to hydraulically connected reduce head losses and to permit equal flow distribution to the two anoxic basins.
- Secondary Clarifier Influent Splitter Box: No change proposed to the box itself. However, to incorporate a nearly equal flow distribution between the three existing clarifiers and the new clarifier, parallel pipes will need to be installed.
- RAS/WAS Wet Well: Gates to be motorized and meters installed to permit control of RAS/WAS from individual clarifiers.
- DIW/Chlorine Contact Splitter Box: To be abandoned.

- Chemical Storage and Feed facilities: No change to storage system. New feed pumps to be installed and piping modified. Polymers, if required will be stored in an open shed type facility, located near the secondary clarifiers.
- Polymers storage for Solids handling systems: to be addressed in *Biosolids Master Plan*.

5.10 Support System Improvements

Numerous support systems are required to provide a fully functional WWTF. A well designed and coordinated process and support system will result in a facility that effectively and efficiently provides the required degree of treatment at the WWTF. In 1974, the USEPA published the *Design Criteria for Mechanical, Electrical, and Fluid System and Component Reliability*, which outlined reliability criteria for the wastewater treatment processes, but also the mechanical and electrical support systems of the facility. The WWTF must meet a Class I requirements for a portion of its facilities, since a portion of the facility provides public access reclaimed water to the City's wastewater service area.

The support systems that affect the criteria include:

- Electrical power systems.
- Instrumentation and control systems.
- Other auxiliary systems, such as WWTF water, plumbing, and heating, ventilating and air conditioning (HVAC) systems.

5.10.1 Electrical Systems

The design of the electrical power distribution system for the WWTF should be based on the system reliability that is required, which in turn defines the system distribution arrangement. In general, two separate and independent sources of electrical power should be provided to a WWTF, either from two separate substations or from a single substation and a WWTF emergency power generator. Connectivity to an electrical utility is the preferred source since it is the last to lose power from the utility grid, and is the first to be brought back on line. Power distribution reliability features within the WWTF should also include redundant buses or feeders linked to back-up equipment, dual powered motor control centers (MCCs) with transfer schemes between two sources of power, coordinated breaker settings of fused ratings, acceptable equipment locations, and stand-by power generator starting.

The existing electrical distribution system is radial. The bloc diagram was previously illustrated on Figure 2-7. The existing electrical system meets the USEPA Design Criteria in terms of availability of standby power sources. The system, however, does not meet the USEPA recommendations for dual feeds to all MCC and elimination of single point of failure. For example MCC-4 provides power to MCC-5 which in turn powers MCC-5A. Thus breaker, bus fault or feeder failure at MCC-4 will result in loss of MCC-4, MCC-5 and MCC-5A. Similarly, MCC-1 powers MCC-3 which in turn powers MCC-2, therefore failure at or before MCC-1 will result in loss of MCC-1, MCC-2, and MCC-3. A bus fault at main switchgear SWBD-1 may result in loss of the entire system until the fault is eliminated.

Under the proposed process upgrade new electrical loads will be added, amounting to approximately 1350 HP. This corresponds to approximately 1400A. During a near future upgrade a new injection pump station will be added with total installed 1200 to 1500 HP, corresponding to additional 1500 to 2000 Amp. After all upgrades the total connected load will be in the range of 6000A. Loads of that magnitude can are at the upper limit of commercially available UL or ETL listed equipment. Therefore, the approach taken in the proposed options is to attempt to split the electrical distribution system and to eliminate single points of failure as much as practically possible. The economically and technically viable options for the upgrade of the electrical system are the following:

5.10.1.1 Option no. 1 - Splitting of the Electrical System

A bloc diagram of this option is illustrated on Figure 5-3. Under that option new 4,000 Amp switchboard (SWBD-2) will be installed in a new electrical building close to the existing filter building. FP&L will provide new service transformer. For added reliability the switchboard bus will be split by a tie breaker. The existing 1,000 kW generator G2 will be relocated next to the new electrical building. The switching schematic will be open transition "Main - Tie-Main". New MCC-7 will be installed in the new electrical building, which will power most of the new loads. MCC nos. 1, 2, 3 and 6 will be powered from the new switchboard.

The existing service will remain unchanged. Generator G1 (800 kW) will remain connected to switchgear SWBD-1. The switchgear will be modified accordingly. MCC- 4 will remain connected to SWBD-1. The feeder of MCC-5 will be extended to SWBD-1. MCC-5A will be modified to provide room for 3 more starters or it will be extended.

The overall probable opinion of capital cost of Option no. 1 is currently estimated to be approximately $1,100,000.

The benefits of Option no. 1 are:

- The existing equipment is utilized to the maximum possible extend.
- From construction point of view it will be relatively easy to be implemented without major service interruptions.
- It provides for adequate reliability, which can be further enhanced by powering MCC nos. 1, 2, and 3 directly from SWBD-1. The potential of reusing the existing feeder of MCC-1 as a redundant 1200A connection between the switchboards will be investigated during the detailed design phase.
- The new SWBD-2 can be used to power the future injection pump station and sludge dewatering equipment.
- Minimizes the length of feeders.
- The preliminary estimates suggest that this is the most cost effective option.

The drawbacks of Option no. 1 are:

- Decentralizes the electrical system in two locations approximately 1,500 feet from each other.
- Generator G2 should be relocated in order to eliminate the need of 1500 ductbank, which will be more costly.
- If the option is used to provide power for the future injection pump station, the generator will have sufficient capacity to power only one or two pumps.

5.10.1.2 Option no. 2 - Centralized System with Reuse of the Existing Generators

A bloc diagram of this option is shown on Figure 5-4. Under that option new 4000A Main Switchboard will be installed close to the existing electrical building. The service will be upgraded to accommodate the new loads. The switching schematic will be "Main - Tie-Main". The existing switchgear will be used only for paralleling the generators, which will remain in place. All MCC will be powered from the new Main Switchboard. The new MCC-7 will be installed close to the filter building and will power most of the new loads in that area.

The overall probable opinion of capital cost for Option no. 2 is currently estimated to be approximately $1,600,000. The higher cost is mainly due to the longer feeders and more sections and breakers in the Main Switchboard.

The benefits of Option no. 2 are:

- The existing equipment is utilized to a great extent.
- Provides a centralized system, which facilitates the O&M.
- Does not require relocation of the generator.
- Provides adequate level of redundancy

The drawbacks of Option 2 are:

- The feeders to MCC nos. 1, 2, 3, 6, and 7 are very long.
- The future injection pump station will require separate service and standby power source.
- Maintains the parallel work of the generators.
- Higher estimated cost as compared to option no. 1.

5.10.1.3 Option no. 3 - Centralized System with New Single Generator

This option was developed at the request the City of North Port operational staff. The bloc diagram of the option is illustrated on Figure 5-5. This option is similar to Option no. 2, with the difference that the two existing generators are replaced by a single generator, which eliminates the need for paralleling and therefore the paralleling switchgear is no longer required.

The overall cost of Option no. 3 is estimated to be approximately $ 2,250,000, which is mostly due to the generator and associated large size feeders.

Compared to Option no. 2, the additional benefits with this option are:

- Uses a single generator and therefore is simpler.
- Would require less maintenance.

The drawbacks are:

- Does not utilize the existing equipment. The generators could be moved to another location. The existing paralleling gear, however, should either be scrapped or sold back to ASCO at nominal value.
- The lead delivery time for generators of that size is more than 1 year (50 to 60 weeks).
- Not accounting for the value of the existing generators, this the most costly option.

5.10.1.4 Summary of Electrical Distribution System Options

It should be noted that all of the proposed options do not meet USEPA recommendation for providing dual feeders to all MCC, and under the existing conditions this would not be possible. However, all of the proposed options will considerably increase the reliability of the system, since all of them eliminate existing single points of failure.

In terms of reliability Option no. 1 has slight advantage over Option no. 2, mainly due to its simplicity and the shorter feeder lengths. Option no. 3 would have been the recommended option for a new facility.

Cost comparison summary was developed, based on cost data published in MEANS 2006 and 2007, vendor budgetary quotes and assumptions regarding contingencies and equipment costs. From the probable opinion of capital cost comparison it is apparent that Option no. 1 is also the most cost effective one and therefore it is the recommended option.

Table 5.11: Cost Comparison of the Electrical Distribution System Options

	Option 1	Option 2	Option 3
Material	$559,120	$797,722	$1,205,224
Labor	$137,449	$219,640	$228,792
Equipment	$13,198	$11,682	$15,942
Subtotal direct cost	**$709, 766**	**$1, 029,045**	**$1,449,959**
Contingency	$212,930	$308,713	$434,988
Overhead and Profit	$177,442	$257,261	$362,490
Subtotal contingency & overhead	**$390,371**	**$565,975**	**$797,477**
Grand Total	**$1,100,138**	**$1,595,019**	**$2,247,436**

5.10.2 Lightning and Surge Protection

The existing WWTF presently does not have any lightning protection. Pursuant to the NFPA 780-2004, the facility is located in an area of the State with one of the highest flash activity. Therefore, it is recommenced that lightning protection be installed at the most critical areas of the facility at a minimum.

Lightning and surge arresters to limit the voltage impressed on the winding of a transformer or motor caused by lightning or switching surges will be provided throughout the existing WWTF site to protect all equipment installed at the site. Presently surge arrestors and capacitors are not installed on all equipment. Therefore, surge arrestors and capacitors will be located as close to the motor as possible. For economical reasons, lightning and surge arrestors will be installed in switchgear or MCC to protect a group of motors tied to such a source.

The new computer based systems are more susceptible to power line surges than older, analog based systems. One of the following power-line conditioning techniques will be used to clean up the electrical power, and will include an isolation transformer, line voltage regulator, line conditioners or an uninterruptible power supply (UPS) system.

5.10.3 Lighting Systems

The lighting systems provide for the safe and effective O&M functions of the WWTF, as well as providing a degree of security at night, without disturbing neighboring residential areas. Specific lighting levels indoors and outdoors shall be established per the latest version of the Illuminating Engineering Society of North America Lighting Handbook (IES, 2000). Three categories of lighting systems are installed throughout the WWTF, which include: indoor, outdoor and emergency lighting.

During the daylight hours, the more recent buildings at the WWTF have been designed to minimize electrical lighting with appropriately spaced windows to utilize the natural light. However, most of the older buildings require electrical lighting continuously. Indoor lighting in place at the WWTF includes primarily incandescent and fluorescent lights.

The outdoor lighting at the site is primarily used for the safety of the operations personnel and for overall WWTF security. The outdoor lighting used at the WWTF typically consist of pole mounted, general area lighting with localized, supplementary illumination at exterior building entrances. The current practices used at the WWTF include the use of 480-V, single phase, high pressure sodium fixtures and lamps. The outdoor lighting systems at this facility are controlled by photo cells and manual switches.

Emergency lighting requirements are defined by the building code, and have been designed to provide safe exit from the building during a general power failure. In general these systems are self contained, battery operated units that are self charging that denote the points of exit from a building.

In summary, the lighting throughout the WWTF site is currently adequate for the facilities in place, and is in excellent condition. However, it is recommended that lamp guards be added on the fluorescent fixtures in the main switchgear room, as any maintenance activity could cause a lamp to fall. All future lighting systems installed during this expansion will meet the requirements of the Illuminating Engineering Society of North America Lighting Handbook (IES, 2000). Additionally, the lighting systems that will be installed in the proposed chemical building will comply with the requirements for Class I, Group D, and Division 1 requirements. More importantly, to increase the reliability and minimize maintenance, all lighting fixtures in the proposed chemical building will be of high quality and corrosion resistant.

5.10.4 Emergency Power Considerations

The existing generators are sized for the existing loads. Considering the new loads that will be added during this upgrades program, the two generators will be capable of running the critical equipment for the WWTF during a power outage. If Option no. 1 is selected for the basis of the design, the 1,000 kW generator may not be capable of providing standby power for more than one or two of the DIW pumps.

The two existing emergency back up generators have been well maintained, and are in very good condition. Regardless of that the contractor will be required to perform Level 3 maintenance, 4 hour load bank test and fuel scrub for both generators.

There are operational issues with operating the generators in parallel during exercising or returning from a power outage. If Option no. 2 is chosen for the bases of the detailed design all this issues will be investigated with ASCO, aiming to find the root cause and to resolve them. This matter will not relevant to Option nos. 1 and 3.

The 800 kW is equipped with a 2,000 gallon "Con Val" tank, which consumes approximately 45 gph at 75-percent load and 59 gph at 100-percent load. The 800 kW generator is equipped with a 2,500 gallon sub-base tank. The fuel consumption of this generator is approximately 54 gph at 75-percent load and 70 gph at 100-percent load. This suggests that the existing fuel storage capacity will be sufficient for approximately 36 to 46 hours. Under normal conditions the generators are exercised for 52 hours annually, which is sufficient to replenish the stored fuel over 1-year, which is manufacturer's recommendation.

Based on the recent increased hurricane activity in the area the City has requested to increase the on site fuel storage capacity to 7 days or 168 hours. This would require installation of two new 6,000 gallon diesel fuel storage tanks or a single 12,000 (Option no. 1) to 17,000 gallon tank (Option nos. 2 and 3). This means that under normal conditions the stored fuel will not be consumed over the course of 1-year. The following options are possible in order to resolve that problem:

- Operate the plant on generators for 2 to 3 hours per week.
- Install load bank and exercise the generators on it.
- Establish a centralized diesel fuel storage facility for the future diesel operated sludge drier and refuel the generators on as needed bases from that storage.

Of the above options, the last one is most economically feasible one. However, the expected location of the sludge drier will be approximately 1,000 feet from the generator regardless of the option chosen, and installing fuel lines at such distance is not recommended. Therefore, it is recommended that the fuel should be transported on as needed bases to the generators.

5.10.5 Instrumentation and Control Systems

Instrumentation and control systems are as varied as treatment facilities are. The design criteria for instrumentation and control systems that are used at treatment facilities are based primarily on the guidelines established by the Instrumentation, Systems, and Automation Society (ISA), as well as recommendations from manufacturers and input from the WWTP operations personnel.

As noted in subsection 2.10, the WWTF is automated to some degree, but all of the control functions are performed locally in dedicated PLCs. Presently, this facility would be considered a small supervisory control and data acquisition system (SCADA) based on the current control and monitoring capabilities. The operator interface at this facility consists of six Allen-Bradley PanelView 550 screens located at each PLC that are distributed throughout the site at various process areas, as well as a PC-based HMI located in the Operations Building that monitors the six PLCs. The PLCs have been housed in environmentally friendly conditions and appear to be in generally good condition, but what is not known is whether or not they have the capacity to accommodate additional input/output (I/O) points associated with this expansion.

The PLC's that are installed have limited control at their associated equipment area and provide primarily for alarm and status inputs to the monitoring system. Other than alarm conditions, there is very little information provided regarding equipment status, and the amount of data available at the PanelView screens is limited. Historical data storage is limited; and report generation capabilities are not available with the system as installed.

Further evaluations will be necessary to determine if the existing PLCs have sufficient capacity to accommodate the proposed new I/O points associated with this project. The existing system is not the typical PC-based SCADA system with enhanced historical data storage and report generation capabilities. Although some of the functionality is provided in this system, the installed operator interface equipment, specifically the PanelView 550, does not offer many of the capabilities that the typical SCADA software package offers. The existing network is hardwired communicating via Allen Bradley DH+ protocol. The field instruments primarily consist of pH, chlorine residual, flow and turbidity monitoring.

In summary, the existing instrumentation and control system used at the WWTF is not adequate for the desired operations. The system proposed for the City will include:

- A complete PC-based SCADA system that displays all process variables and all equipment status points.
- Unlimited historian, trending and report generating capabilities.
- Wonderware for the HMI software, as well as incorporation of maintenance management software.
- All the instrument signals in a centralized location, however, leave the existing MCCs and Control Panels in the place they are currently located for the operators to have a secondary control point in case the SCADA system fails.
- Replacing the current hard wired LAN with a fiber optic cable.
- Process control monitoring data (i.e., charts, meters, etc.) signals to send to the Operations Building.
- Updating of the process control strategies to match the new treatment process proposed as part of this expansion program and interaction with other control strategies.

5.10.6 Heating, Ventilation, and Air Conditioning

Heating, ventilation and air conditioning (HVAC) systems for buildings are also important support systems. Not only are HVAC systems important for providing a comfortable working environment for the operational staff, but also are essential for the safety of the staff and protection of critical systems. These facilities control the temperature, humidity, quality, and movement of air in a conditioned space or building.

The existing HVAC systems for the operations building, laboratory, MCC and blower buildings are adequate for the intended use. All new buildings that will be designed as part of this expansion will provide a comfortable and safe atmosphere for all operational personnel and protect sensitive equipment. All local, state and federal codes will be complied with in designing the HVAC systems for any new buildings that will be part of this expansion program. The design shall include incorporation of special conditions (i.e., minimum air changes per hour, monitoring systems, etc.) and shall follow the most recent version of the guidelines established by the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE).

5.10.7 Other Support Systems

Along with the major support systems that serve as the backbone of the WWTF, several minor systems warrant consideration. These minor systems include:

- Fire protection.
- On-site non-potable water system.
- Site security.
- Communications systems

The highest risk of fire and explosion is associated primarily with the wastewater collection and pumping operations, and at the headworks of the WWTF. In addition, other areas of the WWTF that are at risk are where paints, gas and other flammables are stored. The principal control procedures currently used at this facility to minimize the potential for fire and explosion include risk evaluation, process and equipment controls, ventilation, materials of construction, and education. The specific design criteria for fire protection systems are based on the guidelines established by the NFPA, local codes and ordinances, and insurance. Presently, the only fire protection measures on-site are individual fire extinguishers.

An evaluation of the fire protection requirements will be conducted during the final design stages of the project. The fire protection measures that will be further evaluated include a wet pipe sprinkler system in the operations building, and a pre-action system in the MCC and Blower Buildings to protect valuable equipment (i.e., electronics).

On-site potable and non-potable water systems are another support system that must be considered. Potable water is used in all plumbing fixtures (i.e., sinks, toilets, showers, emergency showers, etc.). Non-potable water is currently used to supply water to pump seals, process equipment, and washdown purposes. A continuous supply of potable and non-potable water is essential to the operation of the WWTF. As such, these facilities (i.e., piping, pumps, etc.) will be designed to meet Class I reliability criteria.

Currently the site security system consists of chain-link fencing to enclose the site. Given increasing security concerns regarding terrorist acts, as a result of the events that occurred on September 11, 2001, and other liability issues, site security systems are becoming more and more important. The recommended systems are summarized later in subsection 5.12 of this Report.

Features of a communication system vary depending upon the specific needs of the WWTF. Along with standard incoming, outgoing and internal voice mail communications, cellular phones/walkie-talkie (Nextel) and data communication systems are commonly used. Currently the only land line phone on the WWTF site is in the Operations Building, and all operations personnel have a Nextel phone. It is recommended that land line phones be installed at major structures, such as the Main Switchgear Building, RAS/WAS pumping area, laboratory and MCC no. 6 room to provide full coverage of communications via a land line. In the past, a paging system was used, however, the fact that all of the operations personnel carry Nextel phones, paging systems are obsolete. An audible ringer that can be heard at the major process units throughout the WWTF should also be installed so that the land lines can be answered when necessary.

5.11 Support Buildings

Currently, the City's existing WWTF consists of a number of miscellaneous buildings, which includes an administration/operations building, blower building, laboratory, and other miscellaneous MCC buildings that are located throughout the site.

5.11.1 Administration/Operations Building

The administration/operations building currently consists of a small building that is located centrally to the existing process tankage and equipment. This building consists of one office, restrooms, a meeting/break room, and a training room, which is presently used for records (i.e., engineering drawings, O&M manuals, reports, etc.) storage. In addition, in the training room the single computer monitoring workstation is located.

Workstations should be provided for personnel in charge of operating the WWTF, recording data, and/or making calculations. Presently only two workstations are provided (lead operator and shift operator). In addition, monitoring workstations should be located near equipment intensive areas of the WWTF, presently no remote workstations are provided throughout the site. It is recommended that the monitoring workstations be provided at the laboratory, the MCC#4 room, and in the existing MCC portion of the Blower Building. Both of these locations are relatively quite clean, well lighted and air conditioned.

The chief operator's office while sufficiently sized for one person, however, this office lacks the capability of holding a private meeting, without locking the outside access door and the two doors that separate the meeting/break room and the training room.

The training room is presently used for storage of manuals and report documents. It is recommended that the room should contain either a large blackboard or a white board. The training room is presently not designed for demonstrations and/or presentations that will use audiovisual aids, such as projectors, video monitors, and easels. It is recommended that additional table space be provided, and a projector screen be provided to aid in operator training.

This building was designed to meet the requirements for use as an emergency shelter by the operational staff during a hurricane. Sufficient space is provided for storage of emergency\equipment, food, supplies, and sleeping facilities in this building.

5.11.2 Blower Building

The existing blower building was constructed as part of the 1980 upgrades to the City's WWTF. The building is separated into two rooms, and also houses the FP&L transformer which is located in a fenced area next to the Blower Building. The transformer primary feed is underground with the transformer 480 V secondary cables routed over head, which terminate on open bus bars mounted on the outdoor wall of the building. One room houses the process centrifugal blowers, and the other room houses the MCC equipment nos. 1 through 3, and main switchgear for the WWTF.

An underground duct bank system is used to route feeders from the main switchgear to MCCs throughout the WWTF site. It appears that the last expansion of the WWTF provided new power feeders to the seven MCCs. A preliminary assessment of the loads anticipated under this expansion program, the existing feeders are not adequate to meet the expansion requirements. The main switchgear and MCC no. 4 were installed in

1996, and are in excellent condition, whereas MCCs nos. 1, 2, 3, 5, 5A and 6 are the original equipment and are considered to be in satisfactory condition.

Similar to the administrative/operations building, this building can be used by operational staff during a hurricane event. Larger pieces of emergency equipment that cannot be stored in the administrative/operations building can be stored in either room of this building.

5.11.3 Miscellaneous Buildings

There are a number of other buildings on-site that includes the process laboratory, the aerobic digestion blowers/MCC no. 4/NaOCl storage building. Of the two buildings the laboratory and room that houses the MCC no. 4 equipment are air conditioned.

The laboratory provides primarily process monitoring analyses, and presently all laboratory analyses for reporting of the influent and effluent are performed by a certified laboratory. Discussions with the City staff indicate that it is desired to have the laboratory be certified to perform the necessary monthly analyses for the influent and effluent parameters. Presently, the size of the laboratory and the current facilities are not sufficient for these purposes.

To accommodate an updated laboratory on-site, it would need to be located near the area of the existing administrative/operations building, which can possibly be modified on the eastern side to incorporate a laboratory. Additionally, future monitoring and analytical requirements should be taken into account during design of the laboratory.

If a laboratory is incorporated as part of the administrative/operations building the benches will be 4-feet wide, and all surfaces, sinks, floors and plumbing will be chemical resistant. Standard bench and cabinet modules will be used for the storage of chemical reagents, equipment and glassware. The lighting that will be provided will be shadow free lighting, and the electrical system will be designed to accommodate special power requirements of muffle furnaces, autoclaves and sensitive analytical equipment. Duplex electrical outlets, compressed air and vacuum fixtures, and deionized water will be located along the work bench areas. Space will be provided for a first aid kit, fire extinguishers, a fire blanket, emergency eyewash and shower near the working area will be incorporated into the design.

5.12 Site Improvements

Other key elements that should be considered during design upgrades to the existing WWTF are the site stormwater management facilities, access to the process tankage and equipment, and site security. Currently, all stormwater is retained on-site and no discharge of stormwater from the site occurs. A limerock base roadway system currently exists to access a majority of the process tankage and equipment.

5.12.1 Stormwater Management

Stormwater from the developed areas of the WWTF site cannot be discharged without an NPDES permit. The stormwater that will be generated from the new impervious site improvements (i.e., roadway, process tankage, etc.) will be naturally drained to stormwater retention and detention basins that will be located throughout the property. The stormwater generated from the on-site improvements will be entirely retained on-site. No discharge of any stormwater from the site will be permitted.

5.12.2 Internal Roadway and Walkway Systems

As noted above, a partial roadway system consists at the site. The existing roadway system consists of paved areas on the eastern and southern side of the WWTF site, and a limerock base road bisecting the process tankage (headworks, aeration basins, and secondary clarifiers) and DIW ponds and on the western side of the property.

The design of the internal roadway system is important to the overall efficiency of the operations of the WWTF. The roadways must provide access to points where deliveries will be made, where materials are stored or transported off-site, and where maintenance of major process equipment will be required. Therefore, it is proposed that an internal roadway system be constructed at this site to improve access to the process tankage and critical equipment of the WWTF.

The internal roadway system will have a standard width of 20-feet. The pavement edge on right-angle curves will be a minimum of 38-feet. A parking area will be provided for all operational personnel and visitors. The visitor parking will be marked and placed close to the administration building so visitors can park and register without having to drive through the site. The employee parking will be located as close a possible to the area of the WWTF where the personnel end their shifts.

Areas that require frequent monitoring and maintenance will be connected by paved sidewalks. This provides the operational staff with safe footing under most conditions. The sidewalks will be a minimum of 4-feet wide.

5.12.3 Public Access and Site Security

Access to the site must be controlled. The primary goal of a security system is to mitigate the risks associated with operating the WWTF. The design, implementation and operation of a secure wastewater system and internet working environment will be an ongoing and ever-changing practice for the City. A security program has many components and is constantly evolving and subject to continual changes and updates.

The recommended design standards represent the physical requirements for security at the City's existing WWTF. However, as in all computer and electronic systems, security is ever changing; therefore, the requirements associated with the City's SCADA and computer system will be addressed during final design. Additionally, since uncontrolled access is provided to the gas company that has a facility on-site, it is recommended that either other provisions for access (e.g., separate access road) or controlled access be provided.

The physical security measures that will be installed at the existing WWTF will include:

- Place "No Trespassing - Violators Will Be Prosecuted" signage every 150-feet along the perimeter fence.
- Installation of perimeter video surveillance cameras (i.e., PTZ domes) at varying locations along the fence, and at the entrance gate and all entrance doors for the buildings located on-site. The digital video recording system shall have a 7- to 10-day storage capacity.
- Update the access control to the site using a card reader access control system (e.g., magnetic stripe, proximity or smart card).
- To eliminate any site access using bolt cutters, all padlocks and chains shall be forged hasp and shackle-protected padlock assembly.

5.12.4 Recommended Site Upgrades

The recommended upgrades to the site will include the following improvements:

- Grading of the site so that all drainage from the impervious areas (i.e., roadways, buildings, tanks, etc.) flow to on-site retention/detention ponds.

- An internal roadway system to provide access to points where deliveries can be made, where materials are stored or transported off-site, and where maintenance of major process equipment will be required will be provided. The internal roadway system will have a standard width of 20-feet. The pavement edge on right-angle curves will be a minimum of 38-feet. Additionally, a parking area will be provided for all operational personnel and visitors.
- All process tankage will be connected by paved sidewalks with a minimum width of 4-feet.
- The physical security measures that will be installed at the existing WWTF will include a perimeter video surveillance system and digital video recording system, access control using smart cards, and other measures (i.e., forged hasp and shackle shackle-protected padlock assemblies, etc.).

5.13 Materials of Construction

The City's WWTF is different from other municipal facilities as it is exposed to a unique environment that is a challenge to equipment and tankage service life. Erosive and corrosive environments are created by the combined actions of acidic and basic wastewater constituents, highly corrosive off-gases and byproducts that is present in the wastewater, and weather conditions, such as the heavy rainfall events, high temperature and humidity in the region.

5.13.1 Exposure Conditions

Material and equipment at WWTFs are exposed to different types of conditions depending upon the particular function involved. Raw wastewater typically has a pH that ranges between 6 and 8 standard units (SU) and DO is relatively absent because of the oxygen demand exerted by the organic material present in the wastewater. The build-up of sulfides in the wastewater collection system occurs during long detention periods and results in the generation of hydrogen sulfide (H_2S) by biological action, which can attack unprotected concrete and metals structures. Therefore, protection against corrosive areas where H_2S is present is essential, and it is based on our site inspection of the WWTF. When subjected to the harsh conditions inherent at the WWTF, the role of the coating system in the protection of the concrete surfaces is extremely important. There are many other constituents that can destroy the concrete in wastewater facilities, and these include sulfates of sodium, magnesium, and ammonium, however, H_2S is the most prevalent gas generated in domestic wastewaters that is the most detrimental to the concrete surfaces at WWTFs.

Exposure conditions of structures and equipment at the City's WWTF may be classified in a number of ways, which include submerged and immersion exposures, splash zone exposure, moist conditions, among others. The most corrosive environment at the City's WWTF is located at the headworks structure and aeration basin flow splitter box. At this location the raw wastewater is usually devoid of oxygen. Some dissolved salts may be present, based on the groundwater conditions and potable water quality; however, for the most part these are considered harmless to the structures. Carbon dioxide (CO_2) and H_2S are present, and the agitation caused by the overflow weirs at the flow splitter box, a portion of the H_2S could be converted to sulfurous and sulfuric acids. While these acids will most likely be neutralized by the carbonates present in the wastewater, but not on the atmospheric (air/water interface) where these gases tend to accumulate.

The corrosive nature of the raw wastewater and process effluents is a function of ph, temperature, conductivity, dissolved sulfide, chloride, sulfate, chlorine residual, ammonia, velocity, oil and grease, and grit concentrations. Ordinarily, a Pretreatment Ordinances will restrict the occurrences of some of these constituents in the raw wastewater entering the WWTF. However, as in the City's case, a Pretreatment Ordinance has not been enacted, and therefore, extra measures of protection will be necessary. Many of these constituents change if there are long periods of flow in the wastewater collection system, which is the case in the City's wastewater collection/transmission system. For example, in warm climates high detention times in the collection system generally results in a depletion of oxygen, elevated sulfide concentrations, and lower pH's in the influent wastewater.

The aeration basins and the secondary clarifiers, filters and chlorine contact chambers exhibits another type of exposure that occur, which is characterized by the large amount of CO_2 present in the wastewater at these locations. This condition is destructive to metallic and zinc coatings in many aeration basins, which is caused by the high concentrations of CO_2 in solution that is the result of the biological digestion of the carbonaceous matter. In addition, this condition has been characterized as moderately severe on certain coating systems.

One condition that needs special attention is where the material is subjected to direct contact with wastewater liquid, solids or various process sidestreams on either a continuous or semi-continuous basis. The equipment, material, and structures, at the waterline and splash zone, commonly referred to as the air/water interface, are subject to the most severe exposure in terms of potential corrosion because the material is alternately subjected to wet and dry conditions, as well as fluctuations in ambient temperatures. The liquid is destructive because it could contain salts that can act as an electrolyte and may hydrolyze certain coatings thus decreasing the strength and adhesion of the coatings. As the strength of the coatings is decreased, the passage of oxygen and other gases such as H_2S, which is destructive to the underlying, concrete structure, could occur.

The coatings are also subject to the physical forces, such as the stresses caused by wetting and drying and to a lesser degree here at the City's WWTF to the heating and cooling. However, the ultraviolet (UV) rays from the extended periods of sunlight at this facility can affect certain coatings and reduce their effective life.

Chemicals added as part of the wastewater treatment process, such as chlorine, coagulants and strong oxidants can affect the corrosive nature of the wastewater. While many of chemicals can minimize the sulfides, and thus reduce the potential for corrosion at the air/water interface, careful consideration must be taken since they can increase the potential for corrosion of metals in the submerged zone.

The conditions that occur in the wet wells, certain process buildings, and wherever wastewater and biosolids are exposed to an enclosed environment are commonly referred to as a moist environment. These exposures are potential sites for corrosion because of the presence of moisture and gases, such as H_2S. Under these conditions, the moisture tends to condense in a film on cool surfaces, such as any metal or concrete surface. The moisture absorbs oxygen and other gases such as CO_2 and H_2S, which can cause a corrosive condensate. Another problem with moist environments is the physical stresses on the coatings caused by the fluctuations in moisture and temperature at these locations. These conditions can result in the expansion and contractions, which can potentially rupture the protective coatings.

Exposures to outside conditions are probably the most variable condition that will be experienced at the City's WWTF, which can include the following:

- Actinic hear and radiant heat (sunlight)
- Gases (CO_2, H_2S, etc.)
- Salt air
- Wetting and drying (rain and humidity), heating and cooling, etc.

The effects of the outside exposure are not radiantly different than those experienced at other buildings in the City, however, the presence of the various gases that are present in the wastewater, increases the problems at the WWTF. The localized environment of the WWTF will be more corrosive than others in the regions of the City. The corrosive environment is caused by the low levels of H_2S, chlorine vapors and other gases that are in the air. On outside locations, these gases become soluble in dew and other condensed moisture to become acids and can attack concrete and metal. High humidity areas have particularly high atmospheric corrosion, and metals have been shown the effects of corrosion even without visible condensation when the relative humidity exceeds 85-percent. In addition, atmospheric H_2S is particularly destructive to electrical and electronic components.

Another aspect of atmospheric corrosion is sunlight, particularly UV radiation that can accelerate deterioration of coatings and plastics that are commonly used at WWTFs. Moisture and sunlight together may form certain soluble compounds to form, and for that reason, the humidity in the region often governs the type of coatings, paint and materials that are used.

The corrosivity of the soils in the region can affect concrete and reinforcing steel used at the various structures, and RCP and ductile iron (DI) pipes that are installed at a WWTF as part of the stormwater and yard piping systems. The physical and chemical properties of the soil that at this WWTF include:

- Resistivity - Is the measure of the electrical conductance of the soil, and lower values of resistivity are more corrosive
- pH - Values less than 7 indicate increasingly high acidity and corrosivity to metals, concrete, and polyester plastic resins. Values less than a pH of 5 are extremely corrosive to metals and concrete.
- Soluble chloride - Chlorides are increasingly corrosive to ferrous and copper metals at greater than a concentration of 200 milligrams per kilogram (mg/kg), to concrete when exceeding 2,000 mg/kg, and to polyester resins when exceeding 20,000 mg/kg.
- Soluble sulfate - Sulfates are increasingly corrosive to ferrous metals at concentrations exceeding 250 mg/kg and to concrete at concentrations greater than 150 mg/kg.
- Moisture - Usually the corrosivity of the soil will increase with increasing moisture content.
- Organic content - The corrosion will increase low pH and an increase with an increased organic concentration in the soil.
- Oxidation reduction potential (ORP) - The ORP indicates that the soil is either aerobic or anaerobic. Soils with an ORP greater than 100 millivolts (mV) are characterized as aerobic and tend to be less corrosive; values in the 50 to 100 mV range tend to be mildly corrosive; and in the 0 to 50 mV range are moderately corrosive. If the soil is characterized as anaerobic and tends to be increasingly corrosive when the ORP is increasingly negative.
- Sulfides - When the sulfide concentration exceeds 0.1 mg/kg, the soils are increasingly corrosive, particularly to metals.
- Soluble alkalinity - When the alkalinity of the soil exceeds 2,000 mg/kg, the soil tends to be increasing corrosive.
- Sodium calcium - The calcium concentration in the soil provides an indication of extra protection of concrete and metal structures provided by the soil.

5.13.2 Materials Selection for Design of Unit Processes

The environmental conditions existing in various unit process treatment areas differ widely. As such, the materials of selection for equipment, coatings, and appurtenances will vary widely.

The conditions that are experienced at the headworks typically inflict the most severe corrosive and destructive conditions on equipment and material at the WWTF. The influent raw wastewater entering the City's WWTF is considered more septic than other systems, since its wastewater remains for long periods of time in the system, prior to entering the WWTF for treatment. The raw wastewater contains dissolved gases, grit, rags, rocks, grease and oils, waste chemicals, and constituents from internal recycle streams that create corrosive and abrasive environments when combined with each other or outside factors, such as humidity and other atmospheric conditions. In addition to corrosion, a potential for fire and explosion exists whenever gasoline or other hydrocarbons spill into the wastewater collection system persist at this location.

Currently there are two influent screens and a mechanically induced vortex grit removal device installed at the headworks for the WWTF. Similar to the existing equipment installed, the new screening equipment installed will be constructed of type 304 stainless steel. The existing motor and bearing casing of the mechanically induced vortex grit removal unit will be refurbished, blasted and recoated with an epoxy coating, as the factory coating has proven to be insufficient for the environment for which it was applied. All appurtenances (i.e., bolts, nuts, clamps, etc.) associated with the new equipment installed at the headworks will be constructed of stainless steel. Additionally, equipment that was installed as part of the last expansion that has exhibited corrosion damage will either be refurbished or replaced.

In addition to the equipment that will be installed at the headworks structure, the influent channels will be covered. It is proposed that the existing rubber/vinyl covers be removed and replaced with either an aluminum or FRP plate cover system. These covers will also be installed at the flow splitter box from the headworks.

The corrosive gases that are present at the headworks are generally not a problem within the aerobic biological activated sludge systems like the system proposed for the City's WWTF. The aboveground and below ground air piping for the fine bubble diffused air system will be stainless steel. The secondary clarifier truss system will be constructed using epoxy coated carbon steel, and the walkway structure will be constructed of galvanized steel or structural aluminum. At the effluent filters, the underdrain system will be constructed of a non-corrosive material, such as FRP. All process piping at the filters will be ductile iron. All grating and handrails installed as part of this expansion program will be aluminum.

The RAS and WAS pumps will incorporate a hardened alloy for the impellers, pump bodies, wear rings and volutes. The shaft and shaft sleeve will be type 316 stainless steel. The effluent and non-potable water pumps will be heavy-duty all-iron pumps with stainless steel trim to withstand the internal corrosion associated with the elevated levels of chlorine in the effluent. Additionally, it is recommended that a fusion-epoxy lining of the pump volutes and stainless steel impellers be incorporated into the effluent and non-potable water pumps.

As noted previously in this section, the chlorine feed system will upgraded. The new feed pumps will be made of PVC, polyvinylidene fluoride (PVDF), or ethylene propylene diene monomer (EPDM) rubber materials. Hastelloy C alloy metal can be used for some pump and valve components, and all piping for the NaOCl system will be PVC.

All process yard piping will either be DI , PVC or stainless steel pipe. All stormwater piping will either be PVC or reinforced concrete pipe (RCP).

All new tankage will be constructed of reinforced concrete. The concrete shall meet the requirements outlined in American Standards and Testing Materials (ASTM) C-33 and will be coated where required. The reinforcing steel will either be galvanized or epoxy coated depending upon the location in the treatment process and soil conditions. All grout will be a non-shrink epoxy grout or a non-shrink non-metallic grout depending upon the application.

The miscellaneous metals that will be installed throughout the WWTF will need to withstand a variety of special conditions, including various degrees of corrosiveness, frequent water exposure, and O&M activities performed by the City's operational personnel. Anchor bolts and expansion anchors will be fabricated of stainless steel. All stairs, platforms, railings, floor grating, plates and access hatches, will either be constructed of aluminum, FRP, or stainless steel depending upon the location in the system. The weir plates will be constructed of FRP, and all slide, sluice, and weir gates will be constructed of either aluminum, FRP or stainless steel depending upon the application and specific area in the treatment process.

The ventilation rates, placement or equipment, and selection of materials are the primary variables for mitigating the effects of corrosion and providing a safer working environment. All air handling units will be fabricated of corrosion-resistant materials and have a weather and corrosion resistant finish. All ductwork will conform to the standards of the Sheet Metal and Air Conditioning Contractor National Association, and will either be galvanized steel, aluminum, type 304 stainless steel, and FRP depending upon the application. All heating and plumbing piping will either be Type "L" hard-drawn copper tubing, PVC or Schedule 40 black steel.

The electrical systems are often exposed to corrosive conditions imposed by humidity and corrosive gases. These conditions will be considered when locating the electrical equipment and selection of materials of construction and protective enclosures. The conduits and electrical panels for outdoor areas and areas subject to splashing of liquids will meet the requirements of the National Electrical Manufacturers Association (NEMA) 4X explosion proof, watertight, and corrosion- resistant requirements. Underground metal conduit should be concrete encased or installed in duct-banks. All conduits and conductors entering an electrical enclosure will be sealed with fittings at the enclosure to keep out moisture, insects, and gases.

The instrumentation and controls systems will be treated in a similar manner to the electrical systems, as described above. The materials for instrumentation and controls can be divided into three categories:

- Panels and enclosures.
- Panel mounting devices.
- Field instruments.

All panels and enclosures will meet the NEMA standards that apply to the differing environmental conditions. However, all panels that are located outdoors will meet the standards of NEMA-4X panels that are suitable for use in wet, corrosive and outdoor environments, and shall be constructed of type 304 stainless steel. All conduits will be sealed with fittings.

The panel devices installed as part of this upgrades program will meet the NEMA rating of the panel, and wherever, there is a possibility that a corrosive gas can migrate through conduits and doors, conformed coating of the electronics will be applied. Generally, specifying the appropriate NEMA rating for field devices will normally provide the degree of protection necessary for the installation.

5.13.3 Protective Coatings

The most common way of preventing corrosion is to cover one material with another material that has greater resistance to corrosion, which have changed over the years. Coatings are divided into two classifications:

- Thermoplastic - alkyds, vinyls, and chlorinated rubbers.
- Thermosetting - epoxies and urethanes.

All panels and enclosures will meet the NEMA standards that apply to the differing environmental conditions present at the WWTF and will be constructed of type 304 stainless steel and not be coated. It is anticipated that no coatings will be applied to the electrical panels installed at this facility.

The process equipment that will be installed as part of this expansion program will be coated with type of a protective coating dependent upon the environmental condition present at that location in the WWTF. Either a thermoplastic or thermosetting type of coating will be applied to the equipment installed at the WWTF.

Alkyds are commonly referred to as oil-based paints, and are versatile coatings, and are good choices for mild environments, such as for equipment installed inside buildings. The primary disadvantages of alkyds are poor chemical resistance and multiple coatings required to achieve any degree of protection. Additionally, alkyd products tend to crack and embrittle as they progress their useful life.

Vinyl resins are typically modified with a plasticizing compound to improve adhesion and flexibility characteristics. They exhibit excellent resistance to acids and alkalies and are well suited to withstand the effects of moisture; however they exhibit poor resistance to solvents, particularly ketone solvents. Vinyls are typically used as finish or top coats because of their good overall chemical resistance and flexibility.

Acrylics are principally used as top coats and considered a thin film product (1 to 3 mil dry-film thickness). Their main advantage is the ability to maintain their initial appearance in weathering mild environments for longer periods of time. Compared to vinyl they have the advantage of being suitable for moderate heated surfaces, such as motor housings and process piping. A major disadvantage of acrylics is that without formula modifications, they have been extremely brittle and, in general have exhibited relatively poor chemical resistance.

Chlorinated rubbers are particularly well suited to moisture resistance and, as such, offer outstanding barrier coats against wet environments. Additionally, they are reasonably flexible and are considered a medium build product (3 to 5 mil dry-film thickness). The disadvantages of chlorinated rubbers include their limited availability, high cost and relative difficulty of application.

Epoxy amines are generally the most chemically and physically resistant of the various types of epoxies. They are characterized as tough, durable to high build capabilities (4 to 8 mil per coat), and are generally used in severe service areas. The primary disadvantage with this coating is that in the liquid state it is extremely sensitive to moisture and mixing of the materials is critical because small amounts of catalyst not used may result in poorly cured finishes.

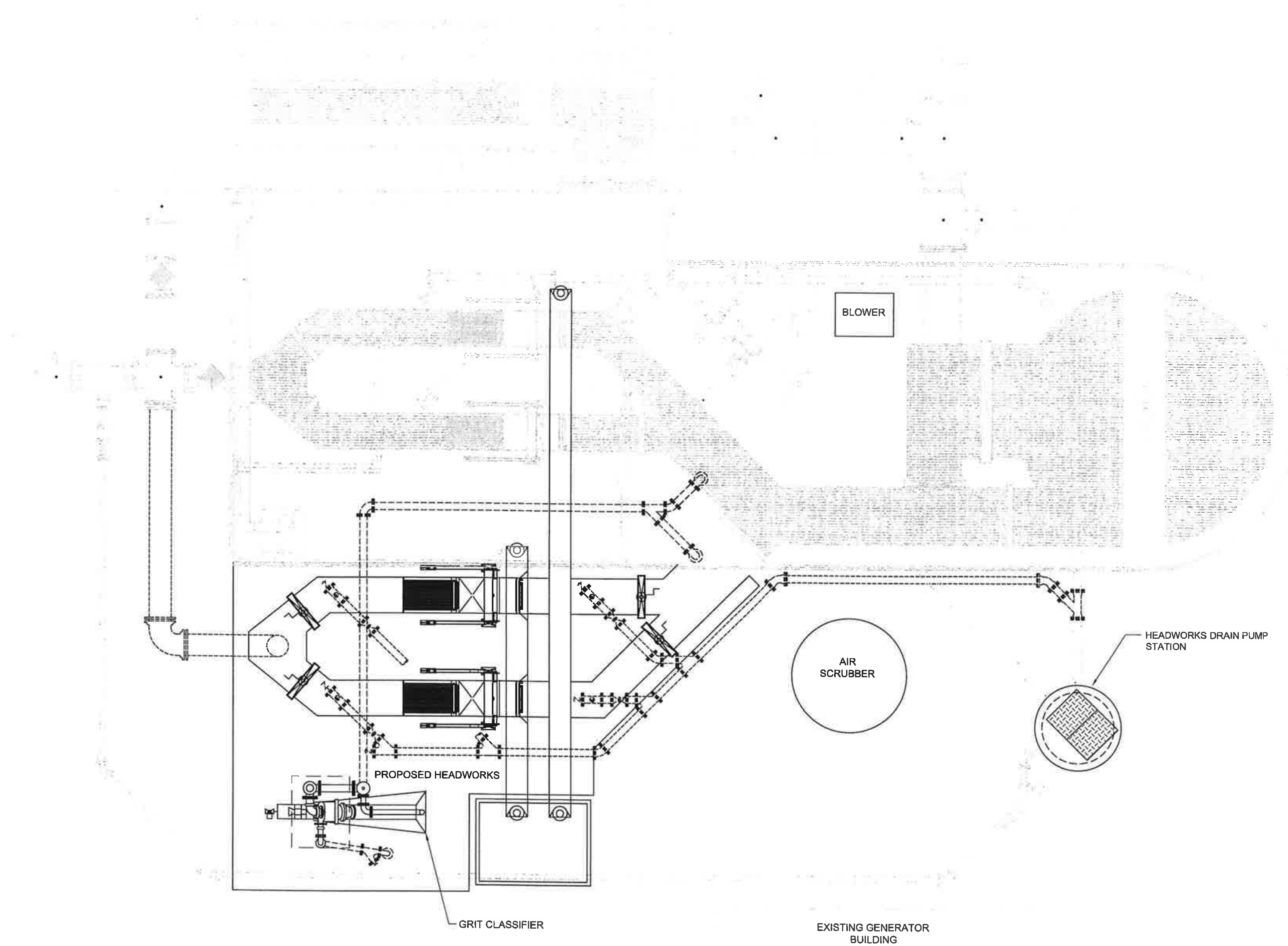
Epoxy polyamides are less sensitive to moisture and easier to apply as amines; however, they are less resistant to chemicals. The areas that these products are normally used include structural steel, tank exteriors, process piping, and equipment exteriors.

Coal tar epoxy is a hybrid form, which incorporates coal tar or some other bitumen byproduct into the standard epoxy, and is an outstanding moisture barrier. They are high-build products (6 to 10 mil or higher per coat). The primary disadvantages of epoxy coal tar coatings are that they have a lower solvent resistance than other epoxies, and that the top coats sometimes do not adhere well. Additionally, because the coating is typically black or brown, their application is limited.

Aluminum epoxy mastics have a high solids contact and can be used as a top coat with other generic types of top coats. Their primary advantage of this coating is its ability to work well over rusted steel surfaces without the need for surface preparation. The disadvantage of this product is its slow curing time.

Polyurethanes are among the most popular types of coatings currently in use for weathering and corrosion protection. They represent versatile products ranging from high gloss, thin film (1.5 to 2 mil thickness) for chemical resistance to heavy duty waterproofing membranes that are 40 o 60 mil thick and extremely flexible. The major disadvantages are their extreme moisture sensitivity in a liquid and uncured state.

The selection of the proper coating system will be developed during the final design of the upgrades to the City's WWTF. The type of coating used and will be based on the service requirements, environment and exposure, type of substrate and its condition, and surface preparation



HEADWORKS

UPPER LEVEL PLAN

SCALE: 1/4" = 1'-0"

Filename: FIGURE 5-1 Plot date: Oct 06, 2006-04:23:18pm Plotted by: rforsythe. Xref Filename: 129942 border X-NPM5 Image Filename: citysealcolorsmall.gif citysealnorthport.png citysealnorthport_small.png

BROWN AND CALDWELL

Environmental Engineering and Consulting

850 Trafalgar Court, Suite 300, Maitland, Florida 32751 (407)661-9500

Florida Board of Professional Engineers Certificate of Authorization No. 00002602

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PROJECT MANAGER

APPROVED: ____________ DATE: ______
BROWN AND CALDWELL

APPROVED: ____________ DATE: ______

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REVISIONS

ZONE	REV	DESCRIPTION	BY	DATE	APP.

City of North Port
WASTEWATER PROGRAM
ORT, FLORIDA

EXISTING WASTEWATER TREATMENT PLANT UPGRADES

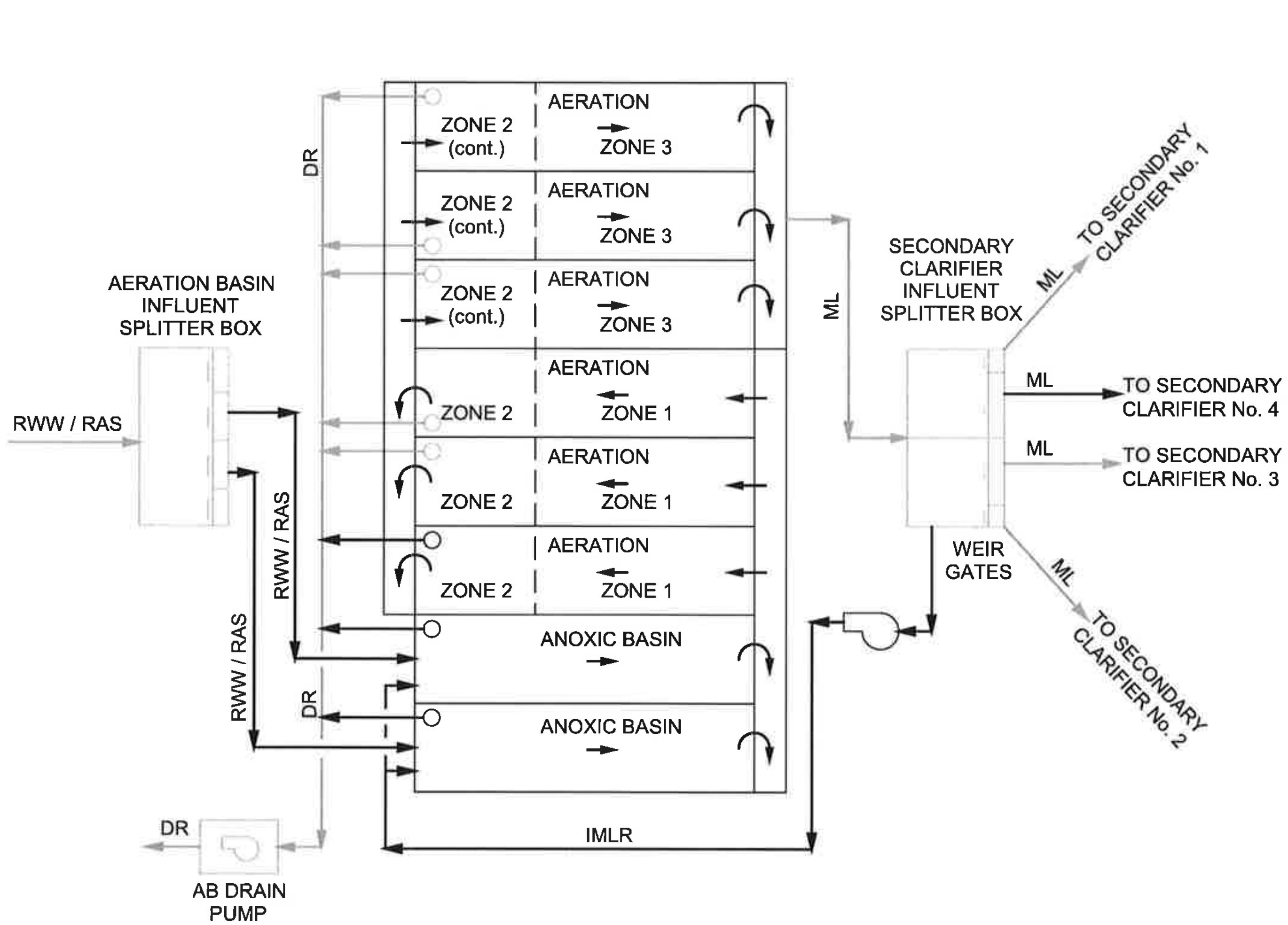
PROPOSED HEADWORKS

GRIT AND SCREEN

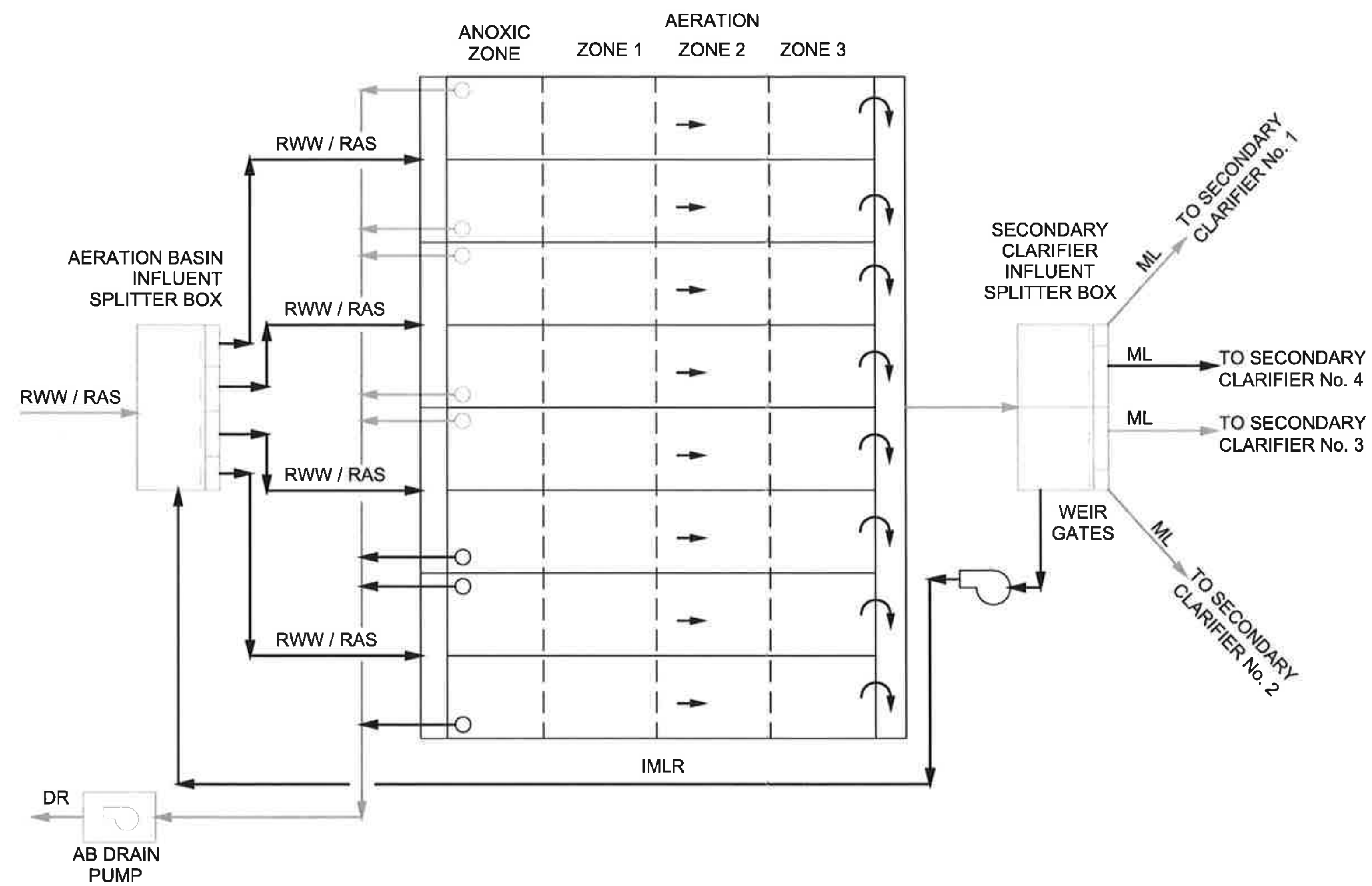
SCALE: 1/4" = 1'-0"

DRAWING NUMBER: **FIG 5-1**

SHEET NUMBER



ALTERNATIVE 1



ALTERNATIVE 2

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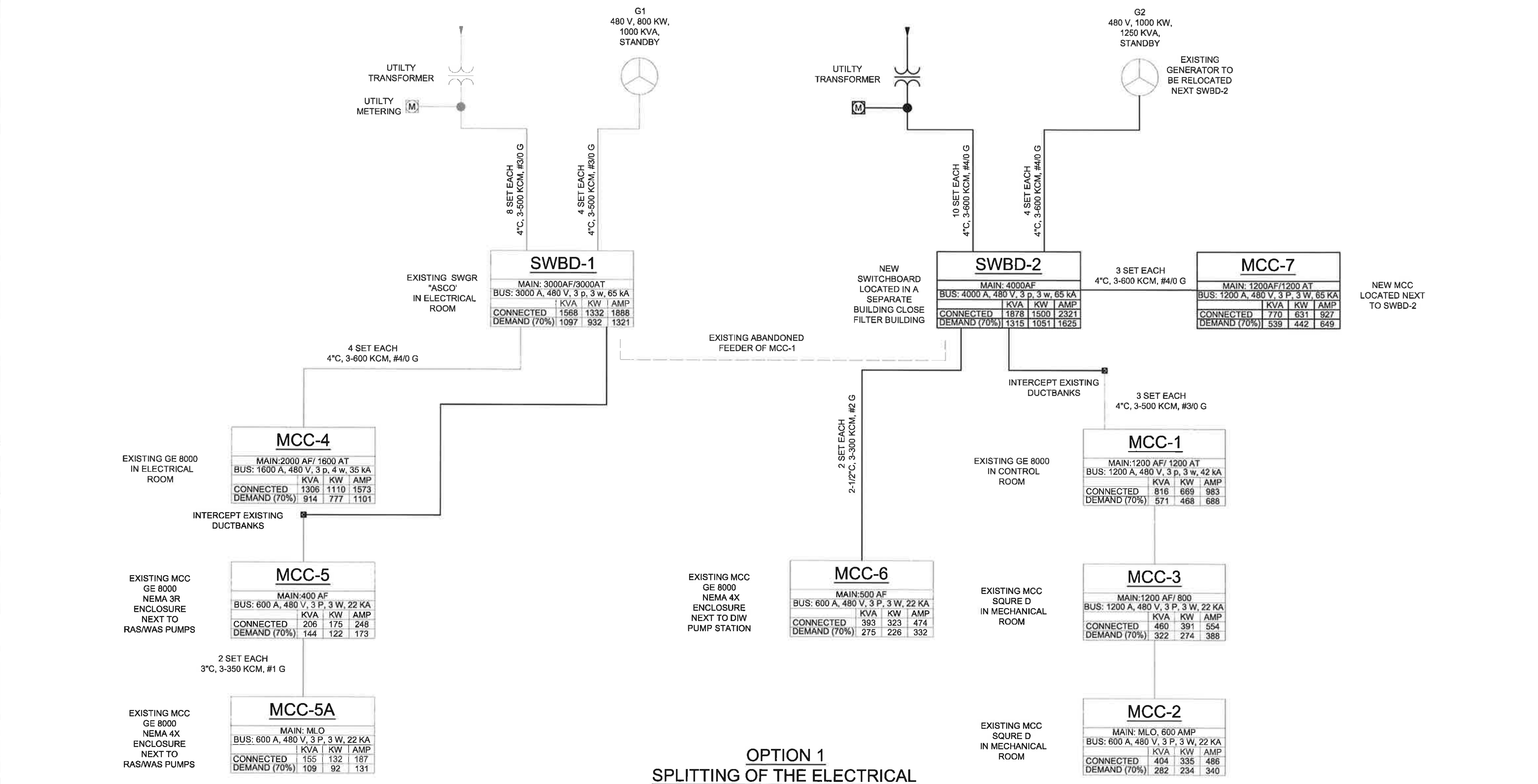
City of North Port
WASTEWATER PROGRAM
NORTH PORT, FLORIDA

EXISTING WASTEWATER TREATMENT PLANT UPGRADES and EXPANSION

ALTERNATE LAYOUT OF AERATION BASINS

SCALE
XXXXX
DRAWING NUMBER
FIG 5-2
SHEET NUMBER



OPTION 1
SPLITTING OF THE ELECTRICAL DISTRIBUTION SYSTEM

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APPROVED: ______ DATE: ______

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REVISIONS

ZONE	REV.	DESCRIPTION	BY	DATE	APP.

City of North Port
WASTEWATER PROGRAM
NORTH PORT, FLORIDA

EXISTING WASTEWATER TREATMENT PLANT UPGRADES and EXPANSION

ELECTRICAL
OPTION 1
SPLITTING OF THE ELECTRICAL SYSTEM
BLOCK DIAGRAM

SCALE NONE
DRAWING NUMBER FIG 5-3
SHEET NUMBER

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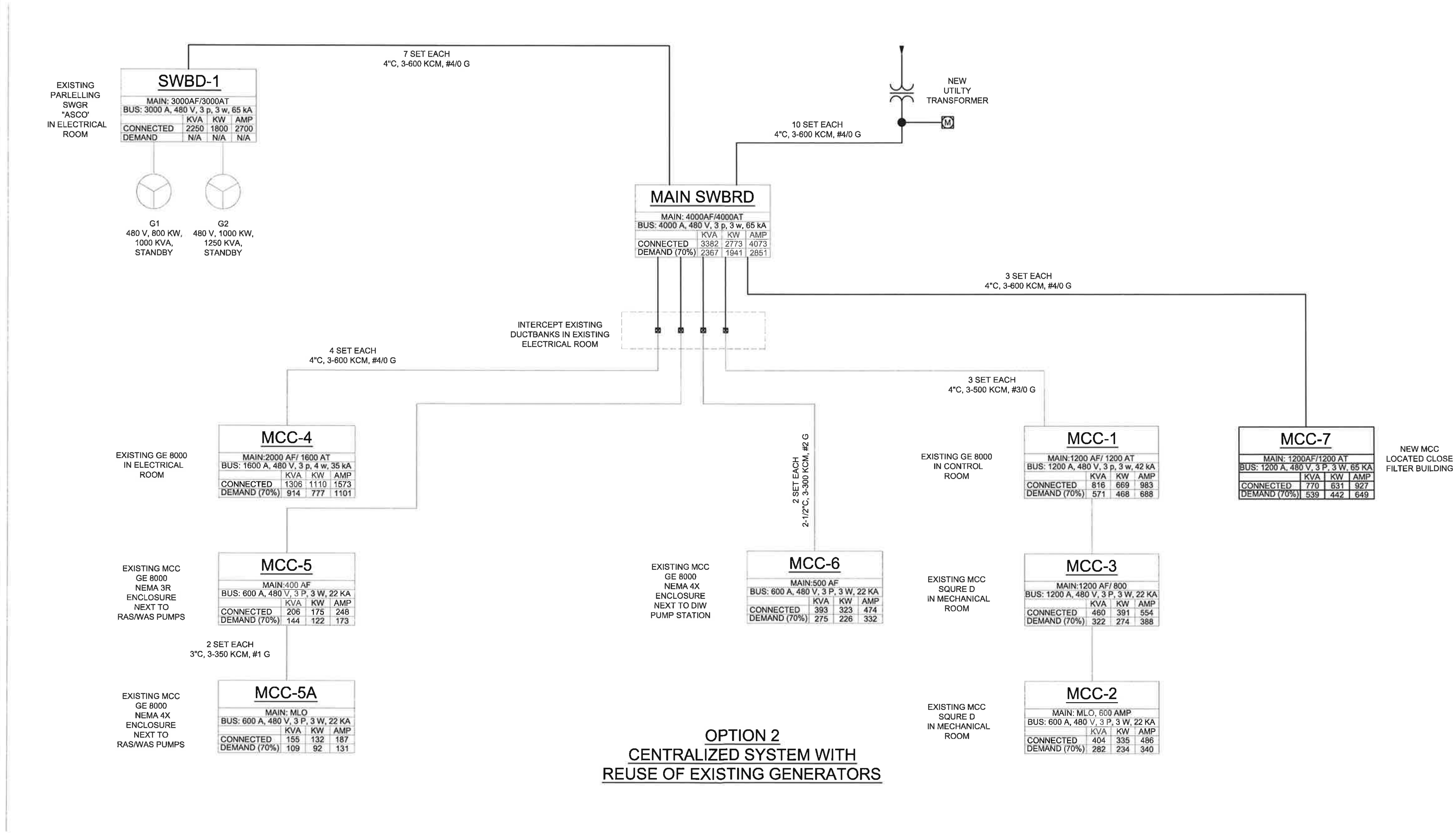

OPTION 2
CENTRALIZED SYSTEM WITH
REUSE OF EXISTING GENERATORS

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APPROVED: ______ BROWN AND CALDWELL DATE: ______
APPROVED: ______ DATE: ______

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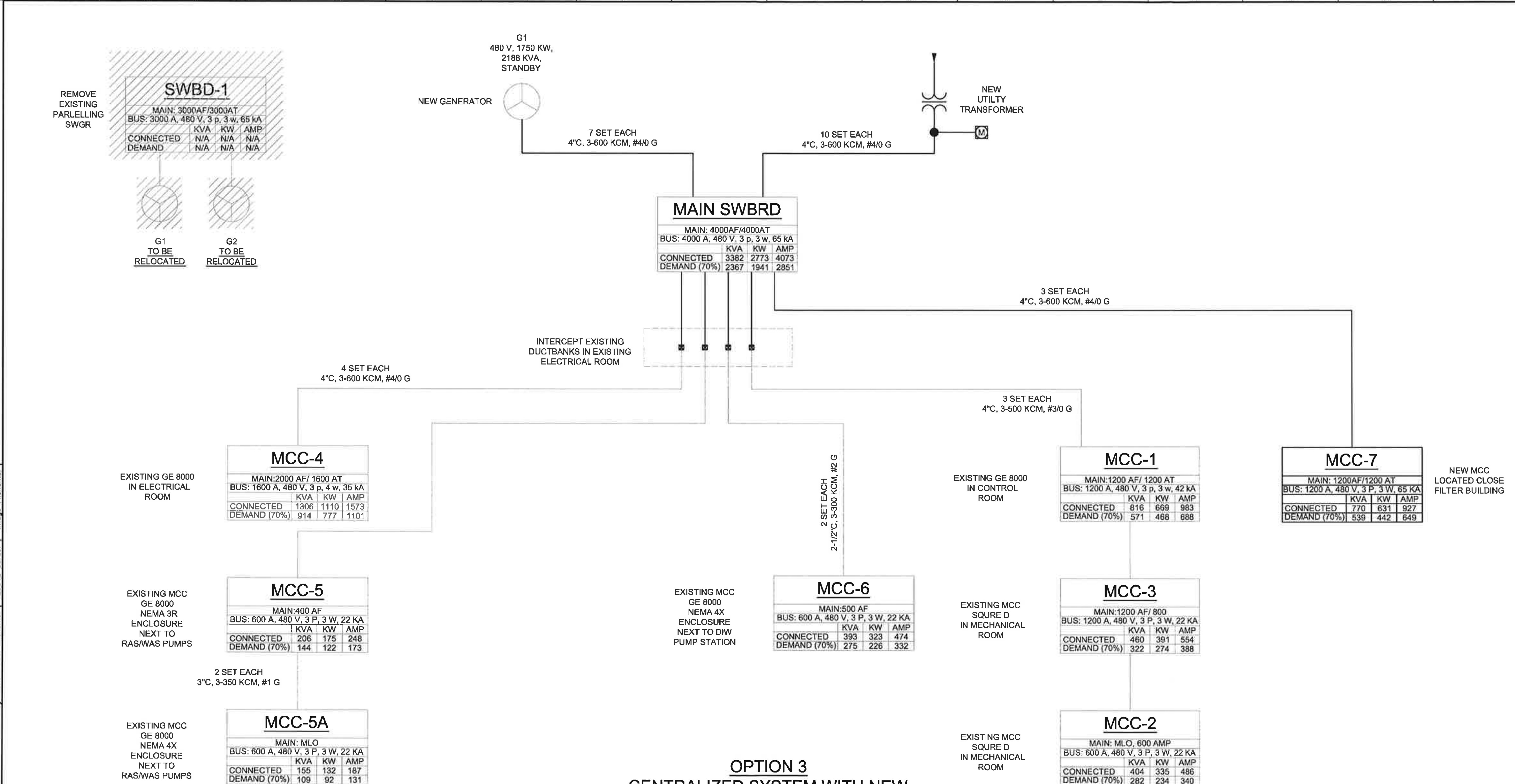
City of North Port
WASTEWATER PROGRAM
NORTH PORT, FLORIDA
EXISTING WASTEWATER TREATMENT PLANT UPGRADES and EXPANSION

ELECTRICAL
OPTION 2
CENTRALIZED SYSTEM
WITH REUSE OF GENERATORS
BLOCK DIAGRAM

SCALE NONE
DRAWING NUMBER **FIG 5-4**
SHEET NUMBER

Filename: 000-E-001 Plot date: Jan 18, 2007-10:46:10am Plotted by: koneill. Xref Filename: 129942 border Image Filename:



OPTION 3
CENTRALIZED SYSTEM WITH NEW GENERATOR

Filename: 000-E-001 Plot date: Jan 18, 2007-10:46:29am Plotted by: konsill Xref Filename: 129942 border Image Filename:

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APPROVED: ____ BROWN AND CALDWELL DATE: ____
APPROVED: ____ DATE: ____

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REVISIONS					
ZONE	REV.	DESCRIPTION	BY	DATE	APP.

City of North Port
WASTEWATER PROGRAM
NORTH PORT, FLORIDA

EXISTING WASTEWATER TREATMENT PLANT UPGRADES and EXPANSION

ELECTRICAL

OPTION 3 CENTRALIZED SYSTEM

NEW GENERATOR BLOCK DIAGRAM

SCALE NONE
DRAWING NUMBER **FIG 5-5**
SHEET NUMBER

6. ENVIRONMENTAL EFFECTS

As with all capital projects that involve upgrades and expansion to an existing WWTF such as this project, the environmental impacts associated with the work are concerns of the community, as well as the citizens that this facility may impact. The purpose of this section is to examine the compatibility of the proposed upgrades and expansion of the City's WWTF with the potential environmental effects associated with the project.

6.1 Background

The existing WWTF was constructed in the early 1960's and has been expanded over the years to accommodate growth in the service area and also to meet higher environmental standards. The last expansion was completed in the spring of 2004, which expanded the WWTF from 2.0 mgd to 3.7 mgd on a M3MADF basis. The WWTF is classified as an extended aeration activated sludge facility with screening, grit removal, coarse bubble aeration, and secondary clarification. Effluent from this facility is either distributed to a public access reclaimed water system (1.9 mgd) or to the Class I DIW. The portion of the effluent that is diverted to the reclaimed water system undergoes additional treatment, which includes filtration and high level disinfection prior to being pumped to the reclaimed water system. The biosolids that are generated in the wastewater treatment process are aerated, and dewatered by a private biosolids management company prior to disposal at a landfill.

This project will expand the City's WWTF from 3.7 mgd to 7.0 mgd on a M3MADF basis. Additionally, the biological treatment process will be upgraded to reduce the NO_3-N in the effluent to be consistently below 10 mg/L. Additionally, all secondary effluent that will be filtered and disinfected to meet high level disinfection criteria whether pumped to the public access reclaimed water reuse system or to the DIW.

6.2 Air Quality and Odor Management

WWTFs can release odorous compounds into the atmosphere, and often the odors associated with these facilities, and the operations thereof, are periodic and result in annoyance complaints in a community. Both the intensity and duration of these odors can illicit a response. However, regulating odors can be a difficult task since they are subjective in nature. The City's Land Development Code references the State Statutes and states that nothing shall be constructed or maintained that would in anyway constitute a nuisance to adjacent property owners. Objectionable odors are defined in Chapter 62-210, FAC, as "any odor present in the outdoor atmosphere which by itself or in combination with other odors, is harmful or injurious to human health or welfare, which unreasonably interferes with the comfortable use and enjoyment of life or property, or which creates a nuisance." Unfortunately, while the City's codes and State of Florida regulations cover the public health and safety aspects of odors, they do not provide for any means or measures to monitor the intensity of these odors when involving the "comfortable use and enjoyment" issues associated with odors.

The potential release of odors is a major concern of the public during any project that involves modifying an existing WWTF, such as the work being proposed at the City of North Port existing WWTF. Consequently, the control of odors has become a major consideration in the design and operation of the WWTF. All work that will be performed under this contract will involve portions of the treatment process that could increase the potential for the release of odors from the site during construction and afterwards and these must be addressed.

Currently, there are no measures for controlling the odors at the WWTF, other than vinyl covers over the grating in the headworks structure. Odor complaints have been documented as emanating from the site that has been attributed to the area around the headworks structure. Provisions for incorporating odor control into the treatment process will be included in the design of the upgrades to the WWTF. The design of the WWTF will therefore incorporate measures to reduce offensive odors, especially hydrogen sulfide, which can be detected at very low concentrations. The development of an odor control strategy will be carefully planned based on the location of the odorous air streams, the compounds generating the odor, and the best abatement technology to mitigate the particular odors. The treatment technologies used for odor control likely will include a combination of two or more of the following: process unit containment covers, chemical scrubbers, biological scrubbers, and/or chemical/biological combination systems. Consideration will be given during design to ensure that odor control can be added relatively easily in the future.

No improvements to the existing biosolids management facilities are proposed at this time under this improvement program. However, provisions for odor control will be incorporated into the overall design and master planning of the WWTF once the biosolids treatment process is selected.

There are a number of chemicals that will be used at this facility as part of the wastewater treatment process including the following:

- Polymers.
- Sodium hypochlorite (NaOCL)

Both of these chemicals are required to meet the requirements for a public access reclaimed water quality effluent. Additionally, both of these chemicals will be delivered to the site in liquid form. Polymer is required, pursuant to Rule 62-610.460, FAC to aid in the settling of MLSS in the secondary clarifiers and will be used on an as needed basis. The NaOCl will be used for high level disinfection of the secondary effluent. These chemicals are generally safe to handle but may cause minor skin irritations on contact. Secondary containment will be provided to contain accidental spills of both chemicals. No dangerous airborne gaseous chemicals are utilized on site, nor is there a potential of a dangerous airborne discharge from the treatment process with the recommended treatment process.

6.3 Noise Control

Equally important is the assurance that noise created within the facilities during normal operations shall not disturb the surrounding community. The City's Land Development Code addresses nuisance noise from equipment and generators, and it is expected that this facility will solidly comply with these requirements during construction and during operation of the recommended improvements at the site. The sound level from any of the facilities within the WWTF, whether new or as part of this upgrade, will not exceed 70 decibels on A-rated scale (dBA). In addition to the noise impacts, the health and safety of the facility operations staff must be considered.

Several methods to reduce or eliminate potential sources of noise will be considered and implemented at the WWTF. The three primary noise attenuation strategies include:

- Consideration of the source that generates the noise,
- Path through which the noise is transmitted, and
- Receiver who hears the noise.

Noise reduction opportunities at the WWTF are limited to reducing the noise at the source or modifying the transmission path through which the noise will travel.

Noise reduction at the source is dependent on the type of process or equipment creating the noise. The most effective noise attenuation is to enclose the equipment in a building when possible, such as for pumps, blowers, VFDs, or other mechanical equipment. Additionally, sound attenuation panels can be installed on the walls or ceilings of these buildings. Finally, manufactured noise suppression equipment can also be installed, if desired. Throughout the design process, the areas in which noise attenuation is required will be evaluated. At this time, the followings areas are expected to receive some type of noise attenuation:

- Odor control systems.
- Aeration blowers.
- Backup power generators.
- Miscellaneous pumps and motors.

6.4 Public Access

The site is presently surrounded by a 6-foot chain link fence. The fence is equipped with an electronic opening gate that requires use of a keypad or calling the facility to gain access to the site. The gate remains locked in order to limit public access to the site.

While the perimeter fence is sufficient for this site, it is recommended that a perimeter video surveillance camera (i.e., PTZ domes) be provided at the access gate to monitor access. The digital video recording system should have a 7- to 10-day storage capacity. Additionally, access controls should be upgraded to include a card reader access control system (e.g., magnetic stripe, proximity or smart card) to access the site rather than the key punch system currently in use. To eliminate any site access using bolt cutters, all padlocks and chains should be forged hasp and shackle-protected padlock assembly. While no dangerous or explosive chemicals are to be located on site, it is also recommended that Horizon Gas liquid propane (LP) storage be relocated and have access controls.

6.5 Impact on Existing Land Uses

The WWTF is located along the main transportation corridor, US Highway 41, entering the City where most of the commercial businesses are located. The existing land uses within 1-mile of the WWTF site is primarily commercial, light industrial and residential, and nearly built out. It is anticipated that this type of land use and proximity to the facility will not change over the next 10-years.

The proposed improvements to the WWTF are located on the existing site that has been zoned for this use when the facility was first constructed in the 1960's. No additional land will be necessary to accommodate the new process tankage and equipment that is part of the City's wastewater expansion and upgrades program. The process tankage and equipment will be designed to meet Class I reliability requirements to minimize any adverse impacts associated with any process or equipment failure. All influent pipeline modifications to improve the transmission system hydraulics will be constructed and installed in and along existing utility and transportation corridors.

The WWTF is bordered on the south by the far reaches of the Cocoplum Waterway, which is a major stormwater drainage canal in the City that ultimately discharges into the Gulf of Mexico and on the west by another stormwater canal. The integral connection of the Cocoplum and the unnamed drainage canal, and the Gulf of Mexico, will present many challenges to prevent water quality deterioration of these water bodies. All construction activities associated with the proposed improvements will abide by City, State and National Pollution Discharge Elimination System (NPDES) standards, and employ proper sediment controls to prevent any degradation of the Cocoplum Waterway. The buildings, tanks and equipment that will be constructed and installed as part of this expansion program will be such that all electrical and mechanical equipment is protected from the 100-year flood level elevation. All facilities will also be designed so that the entire facility is fully accessible and operational during a 25-year flood event.

No adverse effects on flora, fauna, threatened or endangered plant or animal species, surface water bodies, wetlands or undisturbed lands are anticipated.

6.6 Site Lighting and Light Pollution

Onsite lighting throughout the WWTF site will be provided for safety and operations visibility, without disturbing adjacent land uses. Pole mounted lights will be provided on the new process structures. However, precautions will be taken so that glare from the new lights will not impact adjacent properties during evening hours. Exterior lighting will also be provided at buildings, and along roadways and walkways to improve safety to these structures. Specific lighting levels indoors and outdoors shall be established per the latest version of the Illuminating Engineering Society of North America Lighting Handbook (IES, 2000).

6.7 Aerosol Drift

Land uses immediately adjacent to the City's WWTF site are commercial and light industrial. In addition, the site is buffered by canals on the south and west.

The method of aeration proposed (fine bubble), as well as the method of mixing proposed (submerged mechanical mixers) minimizes the formation and potential of any aerosols drifting from the site. Since there is currently no problems associated with the formation and aerosol drift, no problems are anticipated in the future after the upgrades to the existing WWTF are completed.

6.8 Site Drainage

All stormwater generated from the newly constructed areas on this site, as well as the entire site will be retained within the boundaries of the property, and no stormwater will be permitted to discharge from the site. The proposed stormwater management system will consist of a series of vegetated swales and retention ponds.

6.9 Beneficial Environmental Impacts

The SWRWMD is responsible for managing the groundwater and surface water resources in the region and both of these are raw water sources in the region. The region is facing increases in potable water demands that have impacted regional raw water supply resources. The proposed upgrades and expansion to the existing WWTF will provide beneficial environmental impacts to the region as noted below.

- The project will aid in reducing the potable water demands in the City for non-potable water uses, by increasing the quantity of public reclaimed water produced and available thereby, reducing the impact on the raw water supply for the City, which is the Myakkahatchee Creek..
- The project will assist the City's water utility in complying with the terms and conditions of their current Water Use Permit (WUP).
- The project will not impact the existing groundwater aquifers due to the reduction in nitrogen compounds through the wastewater treatment process prior to disposal on the land through the City-wide public access reclaimed water system. The upgraded facilities will improve the quality of effluent currently produced at the facility to reduce the concentration of nitrates as nitrogen (NO_3-N) to less than 8 mg/L.

- The project will enable the City to continue with its goal in reusing all of the wastewater generated within the City.
- Increasing the quantity of reclaimed water that can be produced at the City's WWTF, which will maximize the use of reclaimed water in the region and meet the demands projects.
- The expanded facilities will enable the City to expand their wastewater collection and transmission system to areas that are presently served with on-site septic tank/drainfield systems. Similarly, the same benefit will also occur with the new lift station and wastewater transmission system being installed as part of this program, since the City will now be able to pump wastewater from the eastern portion of the service area to the City's WWTP, most of which is presently not sewered.
- The expanded reclaimed water reuse system will enable the City to maximize the water resources in the region, and provide reclaimed water to areas that currently are not provided with this resource.
- Presently only a portion of the flow is filtered and disinfected to meet high level disinfection requirements. When this project is complete, all of the secondary effluent will be filtered and then chlorinated to meet high level disinfection requirements. Therefore, the portion of the effluent that will be discharged to the DIW when this project is complete will be of a significant higher quality than presently discharged under the current operation.
- The upgrades that the City's WWTF will include the conversion of coarse bubble aeration to a fine bubble aeration system that is more efficient in transferring the oxygen to the organisms in the treatment process. Controls will be incorporated to system will monitor process parameters and air flow rates, thereby reducing the energy required.

7. OPERATION AND CONTROL STRATEGY

In the previous sections of this report, special attention was devoted to the existing and proposed unit operations of the City's WWTF. While importance to these items cannot be overstated, a number of other issues related to the performance of the WWTF should also be considered. The upgrades to this facility will be designed to:

- Avoid WWTF upsets
- Provide multiple effluent disposal alternatives (Class I DIW and public access reclaimed water)
- Meet certain reliability standards as well as provide the necessary capacity to meet the demands from growth well into the future.

These items are discussed in more detail below.

7.1 Prevention of Plant Upsets and Control Strategies

The treatment process chosen, as well as the design features that have been included will reduce the impact of WWTF upsets by incorporating Class I reliability features for essential wastewater treatment processes and equipment, as well as providing continuous monitoring devices. During, and following construction of the new facilities, the City's operational staff will be trained in the proper O&M of the equipment installed at the WWTF, including upset prevention and operational procedures in case of an upset. The ultimate goal of the design of this facility is to provide the City's WWTF operations staff with sufficient flexibility to adapt to any operational situation that may arise within the design parameters.

To maintain high levels of treatment performance under a wide range of operating conditions, special attention will be given to the process control during the design of the upgrades to the WWTF using a number of continuous on-line analyzers and monitoring devices. The most important consideration for the instruments used for process control is their reproducibility, reliability, and maintenance requirements, all of which will be considered during the final design of the improvements to the City's WWTF. In the past, instruments were originally designed for use in the potable water industry, and required high maintenance when applied to the wastewater industry; however, recent advancements in these instruments have improved the reliability and maintenance problems associated with these instruments.

The basic instruments that will be critical for the operation of this facility include the following:

- DO monitoring - These meters have improved significantly over the years with the development of meters for DO measurement using fluorescent and luminescent technology. The DO meters will be installed in each of the aeration basins to control the DO in the three aeration zones and to monitor and control the air flow from the centrifugal blowers. The sensor for these DO meters is coated with a luminescent material, and the blue light from the light-emitting diode (LED) strikes the luminescent chemical on the sensor. The luminescent chemical becomes excited, and then, as the chemical relaxes, it releases red light. The red light is detected by a photo diode, and the time it takes to return to a relaxed state is measured. The DO concentration is proportional to the time it takes for the luminescent material to return to a relaxed state. The accuracy of these meters is within plus-or-minus 0.1 mg/L, with a repeatability of 0.05 mg/L.

- TSS monitoring - These meters use optical techniques for measuring suspended solids and are based on the scattering of a beam from a near infrared source by particles suspended in the process water. This type of meter has recently been approved for use by the FDEP in the recent modifications to Chapter 62-610, FAC, to replace turbidity meters. The accuracy of these meters istypically within 2-percent. The TSS meters will be installed in the common effluent channel from the filters prior to chlorination. In addition, TSS meters will be installed in the aeration basins to monitor the MLSS concentration in these basins.
- pH monitoring - These meters will be used to monitor the influent, effluent and biological treatment process conditions. On-line pH meters will be installed at the influent to the WWTF at the headworks and in the effluent transfer pump station to measure the pH of the effluent from the WWTF. The accuracy of these meters are within plus-or-minus 0.02 to 0.2 pH units, and the repeatability accuracy of these meters varies by manufacturer, but can be expected to range between 0.02 to 0.04 pH units.
- Nitrate analyzers - Online measurement of nitrates is commonly achieved using UV absorbance. Nitrates in the effluent absorb UV light up to 240 nanometers (nm). On-line instruments direct UV light through the sample and measure the amount of light that passes through to a detector. The absorbance is calculated and converted to a nitrate value. The light of a different wavelength is also passed through the sample to allow for compensation for interference resulting from turbidity. The UV nitrate probes typically provide a lower detection limit of 0.1 to 0.2 mg/L of nitrates, and the accuracy of these meters vary from 2 to 5-percent of the reading, and the repeatability is in the same range. While not presently required as a permit limit, nitrate analyzers will be installed in the common effluent channel from the aeration basins and at the effluent transfer pump station primarily as a process control mechanism.

With the existing operation, a chlorine residual analyzer is currently used at the WWTF, and measures the chlorine residual in the effluent from the WWTF. It is not proposed that this analyzer will be replaced. However, the turbidity analyzer will most likely be replaced with the TSS analyzer discussed above, pending verification of the equipment. In addition, to the analyzers discussed above, a number of new flow meters will be installed as part of the upgrades to the City's WWTF. The new flow meters will be installed on the IRML, RAS and WAS pumping systems to control the biological treatment processes, and will be of the magnetic flow meter type.

7.2 Alternative Disposal Facilities

The City's existing WWTF will rely on a combination of effluent disposal methods, which include the following:

- Public access reclaimed water usage.
- Disposal via the Class I DIW for wet weather and/or additional effluent disposal.

Unlike today's operation where only a portion of the wastewater is treated to public access reclaimed water standards, all of the wastewater will be treated to these standards when the construction of the upgrades under this program are complete. This will permit the City to expand their public access reclaimed water system to other areas of the City, as well as provide an alternative water supply to uses that would traditionally utilize potable water for non-potable uses. Initially, the reclaimed water will be stored on-site using a single 2.0-MG gallon storage tank, and distributed through the City's existing reclaimed water transmission and distribution system to the customers of the system. The proposed location for the reclaimed water storage tank will be in the area south of the entrance road, and east of the Horizon Gas LP gas storage area. Sufficient land is available in this area for the future installation of two additional 2.0 MG storage tanks in this area.

The City recently re-rated their Class I DIW to dispose of 5.32 mgd of secondary effluent from the City's WWTF. In addition, the City will be permitting a second Class I DIW with a rated capacity of 13.2 mgd. These two DIWs will be used to dispose of any excess effluent during low periods of reclaimed water usage and/or during wet weather conditions. Combined these two DIWs will have a disposal capacity of nearly 18.52 mgd. However, it should be noted that although the DIWs will be permitted for the disposal of secondary effluent, the effluent that will be discharged down these two wells will meet advanced secondary effluent and public access reclaimed water criteria, as during normal operations all of the effluent will be filtered and meet high level disinfection requirements. Only during periods of reject water quality will the effluent not meet public access reclaimed water quality criteria.

7.3 Class I Reliability

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The City's WWTF will be designed with Class I reliability features as defined in *Design Criteria for Mechanical, Electrical, and Fluid Systems and Component Reliability - MCD-05* (U.S. Environmental Protection Agency, 1974). A discussion of the methods employed to meet this design criteria is as follows:

7.3.1 Headworks

The headworks will be upgraded by incorporating two additional channels into the existing structure. Currently, there are two mechanically-cleaned bar screen installed and with the upgrades two additional mechanically cleaned bar screens will be installed. Each of the mechanically-cleaned bar screens at the headworks structure will treat one third of the PHF, with one unit out of service. The existing bypass channel is currently equipped with a manually-cleaned bar screen and is designed handle at least half the WWTF flow. However, it should be noted that all four mechanical screens are capable of pivoting out of the channels, thereby permitting unobstructed flow through the channels.

Presently there are no upgrades proposed to add a second mechanically induced vortex grit removal unit, due to the available capacity of the existing unit and space requirements. The existing facility is capable of treating the PDF experienced at the City's WWTF. If the grit removal unit is out of service, flow can bypass the grit removal system until repairs can be made.

7.3.2 Pumps

A back-up pump will be installed for each set of pumps that perform the same function under this expansion and upgrade program. These pumps include the effluent transfer, reclaimed water high service, RAS, WAS and other miscellaneous pumps installed under this expansion and upgrades program. The capacity of the pumps shall be such that with any one pump out of service, the remaining pumps will have the capacity to handle the peak design flow.

7.3.3 Anoxic/Aeration Basins

Class I reliability standards require that at least two equal volume basins be provided. Three additional basins will be constructed under this program, bringing the total number of basins to eight. Under the proposed design, two of the eight basins will be converted to anoxic basins and the remaining six basins will be used as aeration basins. In addition, the existing coarse bubble aeration system will be replaced with a fine bubble diffuser system in all aerated basins. The pretreated wastewater will enter the two anoxic basins and flow in parallel to the aeration basins. From the anoxic basins the MLSS will enter a flow channel which will divert the MLSS to the initial three aeration basins, from where it will discharge into a flow channel prior to entering the final three aeration basins. Each of the basins will be designed using isolation gates and flow channels so that any basin can be diverted without impacting the treatment process. This configuration was chosen to provide maintenance flexibility when taking basins out of service. Each aeration basin is designed so that it can be independently dewatered for maintenance consideration to provide easy access to the diffusers.

After completion of the construction the aeration basins will accommodate 100 percent of the PHF in one anoxic and one aeration basin out of service.

7.3.4 Anoxic Mixers

Submerged mixers will be installed each of the anoxic basins to maintain the contents in suspension. A total of three submerged mixers will be installed in each of the two anoxic basins. The design of the mixers is such that with one unit out of service the remaining two units can maintain the MLSS in suspension. Additionally, each of the mixers will be installed on guide rails to permit simple removal of the units for maintenance.

7.3.5 Aeration Blowers

Air for the fine bubble diffuser air system will be provided by motor-driven centrifugal blowers. As noted in Section 5, the existing original three constant speed centrifugal blowers that were installed as part of the original expansion in 1987 will be replaced. Approximately, 10,000 scfm of aeration will be necessary to provide sufficient oxygen to the wastewater treatment process during average day conditions. The three 1,800 scfm blowers will be replaced with two 4,200 scfm blowers, bringing the total air flow rate to nearly 16,800 scfm. The two new centrifugal blowers will be provided with variable inlet and outlet vanes to control the airflow rates, and the two existing blowers will be VFDs as part of this wastewater expansion program. The system is designed so that all of the aeration requirements can be provided with one unit out of service. Additionally, all of the centrifugal blowers will be connected to a common air header to provide air to the aeration basins with standby reliability.

7.3.6 Air Diffusers

The new diffused aeration system will incorporate full-flow coverage with fine-bubble membrane diffusers in all aerate basins. The air will be supplied to the diffuser system by multiple air supply headers so that any section of the diffuser system may be isolated without impairing the oxygen transfer capability of the system. Motorized control valves will be incorporated in the aeration system piping to control the airflow rates and DO in the basins.

7.3.7 Secondary Clarifiers

The secondary clarifiers are sized based on two criteria:

- Solids loading rate.
- Surface overflow rate.

Each of these criteria was evaluated for ADF and PHF conditions. These criteria include:

- A maximum SLR of 12.5 lb/day/sf during ADF conditions, and 36 lb/day/sf during PHF conditions.
- A maximum SOR of 425 gpd/sf during ADF conditions and 1,215 gpd/sf during PHF conditions with a MLSS concentration of nearly 3,000 mg/L.

Based on the above criteria, the minimum clarifier surface area appears to be limited by the solids loading during PHF.

In addition, Class I reliability requires that a sufficient number and size of clarifiers be installed so that with the largest unit out of service, the remaining secondary clarifiers will have a capacity of at least 75 percent of the design flow to the clarifiers. To meet this criterion, one additional 65-foot diameter clarifier will be provided as part of this wastewater expansion program.

A polymer feed system will be installed to add polymer to the MLSS entering the secondary clarifiers to aid in settling, should the need arise, thereby minimizing the loading on the effluent filters. Two metering pumps will be provided, so that with one unit out of service the system can still meet the polymer feed requirements. Since the system will be used intermittently, storage will consist of the minimal amount required, while still providing the necessary reliability required assuring the proper treatment.

7.3.8 Chemical Feed

The NaOCl feed system will be upgraded so that it will be flow paced rather than manually controlled as it presently is. A back-up NaOCl feed pump will be provided to meet the maximum chlorine feed required for disinfection and other uses within the WWTF (i.e., weir cleaning, filamentous control, etc.) with one unit out of service. Presently, storage tanks installed are of sufficient capacity so that the system will still maintain operating capability with one tank out of service.

7.3.9 Electrical System

The upgrades to the existing electrical distribution system will include considerations for reliability, maintainability and safety. To provide for a reliable electrical distribution system to meet USEPA Class I requirements, the new system will be designed with two independent sources of power. FP&L provides one source of utility power from a nearby distribution grid, and a two diesel engine generators provides the second source of required standby power. The existing generators are sized for the existing loads, and considering the new loads that will be added during this upgrades program, the two generators will be capable of running the critical equipment for the WWTF during a power outage.

The 800 kW is equipped with a 2,000 gallon "Con Val" tank, and the 1,000 kW generator is equipped with a 2,500 gallon sub-base tank. Based on the existing fuel consumption of these two generators the existing fuel storage capacity will be sufficient for approximately 36 to 46 hours. Under normal conditions the generators are exercised for 52 hours annually, which is sufficient to replenish the stored fuel over 1-year, which is manufacturer's recommendation.

Based on the recent increased hurricane activity in the area the City has requested to increase the on site fuel storage capacity to 7 days or 168 hours, which means that under normal conditions the stored fuel will not be consumed over the course of 1-year. Since it is not possible to establish a centralized diesel fuel storage facility at this site, due to site constraints it is recommended that the fuel should be transported on as needed bases to the generators.

To provide an electrical distribution system that is maintainable at this facility, it must be possible to take portions of the distribution out of service for routine maintenance (i.e., cable meggering, bus meggering, circuit breaker inspection/testing, etc.). The proposed layout of the electrical distribution system for the upgrades will permit this, by providing two parallel systems that have interconnecting tie breakers. In the normal mode of operation, each system or main feeder would provide power for roughly one half of all the WWTF electrical loads, however, all critical WWTF loads will be carried by a single feeder if required to do so. The proposed electrical distribution system arrangement will offer protection from common mode failures, such as a single fault or loss of power that causes a disruption to the power distribution. The critical components of the WWTF that are required of the City's WWTF to maintain treatment of the raw wastewater include the following equipment:

- Centrifugal blowers, control valves, and DO monitors for the MLE process.
- IMLR pumps.

- RAS and WAS pumps.
- Positive Displacement blowers for the sludge storage.
- Effluent filtration equipment.
- Chemical (NaOCl and polymer) feed systems.
- Effluent transfer pumps and controls.
- Reclaimed water high service and Class I DIW pumps.

The considerations for safety are directly related to maintainability of the equipment and electrical system. If WWTF maintenance personnel can service the equipment and provide preventive maintenance, the possibility of failures, temporary connections and equipment damage will be reduced. However, in certain instances, certain equipment will require outside contract services to provide preventive maintenance. During the final design these areas will be identified. Assistance in setting up preventative maintenance contracts will be provided. The secondary selective distribution system improves reliability, flexibility and maintainability while minimizing system downtime.

A new 4,000-A switchboard will be installed in a new electrical building near the rear of the site by FP&L. For added reliability the switchboard bus will be split by a tie breaker, and the existing 1,000 kW generator will be relocated next to the new electrical building. A new MCC-7 will be installed in the new electrical building, which will power most of the new loads installed, and MCC nos. 1, 2, 3 and 6 will be powered from the new switchboard.

The existing service to the facility will remain unchanged, and the 800 kW will remain connected to the main 3,000-A switchgear. MCC- 4 will remain connected to SWBD-1, and the feeder of MCC-5 will be extended to SWBD-1. The main switchgear is rated 3000 amps, and except for upgrading the FP&L utility transformer with the new 4,000-A switchboard, no other upgrade will be necessary for reliability issues.

Lightning and surge arrestors to limit the voltage impressed on the winding of the transformer or motor caused by lightning or switching surges will be provided throughout the existing WWTF site to protect all major process and pumping equipment installed at the site. For economical reasons, lightning and surge arrestors will be installed in switchgear or MCC to protect a group of motors tied to such a source. Additionally, all existing and new computer based systems will be provided with a UPS system, since they are more susceptible to power line distribution than older, analog based systems.

All new motors will be the high-efficiency squirrel cage induction type. Across-the-line bypass or reduced voltage starting will be used for all motors, except for VFD units, which will be started from zero and then ramped up to reduce the starting current. Additionally, all motors driven by VFDs will be rated for inverter duty.

All new panels installed as part of this expansion program will be rated for NEMA 4X conditions. Emergency lighting with battery back-up will be provided for emergency exits of personnel from the existing administration/operations building, the electrical switchgear/blower building, and in the sludge holding blower/MCC building.

7.4 Operation Strategies during Construction

Constructing upgrades to a WWTF, while maintaining a fully operating facility is a test of the best talents of operational staff, construction contractors and managers, and the design engineers. Renovation and upgrades are the most difficult types of construction in the wastewater industry, since they require close coordination of the construction with the requirements for proper operation and control of the facility. Unfortunately, maintaining operations at a treatment facility, where influent flows can vary with rainfall events and intensity, and equipment components may be down for repairs, presents a challenge to the construction effort. Keeping the facility in service, while making the necessary upgrades, requires a concerted effort to work out details of various facility shutdowns required during the construction.

Most successful upgrade projects are planned meticulously during the design process to allow equipment and processes to be taken out of service so new work can be accomplished without affecting the operations of the WWTF. Planning the construction sequence carefully ensures that the new facilities can be constructed without unnecessary interruption of the wastewater treatment operations. To minimize the impacts on future construction activities that may be occur on this site, the improvements that will be designed under this construction program will recognize the upgrades that will be constructed during this program, as well as any future expansion of the City's existing WWTF.

During the design phase, plans for maintenance of operations will become an integral part of the design development. Additionally, prior to the start of construction, the City's operational staff will test all valves and gates to ensure that they are operational and that the facilities can be taken out of operation. The project specifications will include a sequence of construction which will identify the ongoing needs of the functioning facility as well as the process units that can be taken out of service at any one time, to allow for necessary shutdowns and temporary flow diversion schemes. Additionally, plans for attaining effluent limits will be included as part of the design and construction process. All equipment and process shutdowns will be coordinated with the FDEP.

For process control considerations, the contractor will be required each week to submit their 3-week look ahead schedule during construction. This schedule will include a list of facilities that will need to be shut down and/or flow diversions for the installation of the necessary equipment, as well as the duration that these facilities will be off-line. This schedule will be approved by both BC and the City's operational staff to ensure that the events are sequenced adequately to maintain treatment efficiency during the period of downtime. A detailed process description and sequencing plan will be provided in the Contract Documents for the upgrades and expansion to the City's WWTF.

7.5 Operation and Control Flexibility

Flexibility in design to permit various operating methods will allow the City's operational staff to accommodate changes in influent characteristics and other conditions. To accommodate this redundancy, monitoring equipment will be designed into the new facilities, which will permit the City's operational staff to operate the facility under varying scenarios, while still meeting the permit conditions. As noted above, the treatment processes and equipment will be designed to meet the USEPA Class I requirements, so that when the largest individual unit process and/or piece of equipment is out of service the treatment performance will not be compromised.

The use of these new monitoring devices (analyzers and flow meters) will provide timely information to the City's operational staff so they can implement necessary changes to the operating protocol. The SCADA system will encompass seven levels of process control, data manipulation, and management systems, which include the following:

- Continuous process control.
- Process data acquisition.
- Supervisory control.
- Distributed alarm monitoring.
- Historical collection, display, trending and analyses.
- Information systems.

- Security

7.6 Monitoring and Reporting

The City's existing FDEP operations permit describes the monitoring and reporting requirements that are currently required for the City's existing WWTF. Monitoring and reporting of the City's WWTF is extensive, and is not just limited to the requirements of the operations permit. The operational staff is required to maintain a daily log, and perform and document analytical tests for process control. Additionally, routine microscopic observations are important for monitoring the microbial characteristics of the wastewater process, and for early detection of changes that might negatively impact the biological treatment process performance. Currently the City is required to monitor the influent to the WWTF, the effluent to both the Class I DIW (U-001) and the reclaimed water system (R001), residuals generated, reuse water generated, etc. Presented in Tables 7.1 and 7.2 are a synopsis of the monitoring and reporting requirements, respectively for the City's existing WWTF.

Table 7.1: Effluent Limitations

Parameter	Monitoring Frequency	Sample Type	Monitoring Location
Deep Injection Well (U011)			
Flow, mgd	Continuous	RFMT(1)	DIW Pump Station
5-day $CBOD_5$, mg/L	Weekly	FPC-16(2)	Effluent splitter box
TSS, mg/L	Weekly	FPC-16(2)	Effluent splitter box
pH, Standard Units	Continuous	Grab	Effluent splitter box
Reclaimed Water System (R001)			
Flow, mgd	Continuous	-	Reuse flowmeter
5-day $CBOD_5$, mg/L	Daily, 7 days/week	Grab	Effluent pump station
TSS, mg/L	Daily, 7 days/week	Grab	After filtration and before chlorination
Fecal Coliform Bacteria	Daily, 7 days/week	Grab	Effluent pump station
pH, Standard Units	Continuous	Grab - hourly	Effluent pump station
Total Residual Chlorine, mg/L	Continuous	RCA-C	Effluent pump station
Turbidity, NTU	Continuous	RCA-T	After filtration and before chlorination

Notes: 1. *RFMT: Flow meter having a recorder and totalizer.*
2. *FPC-16: Flow proportioned composite sampler taken during a period of 16-hours.*

Table 7.2: Synopsis of Reporting Requirements

Type of Report	Frequency	To:	Notes
Discharge Monitoring Report	Monthly	FDEP (TLH)(1)	28th of following month
Reportable Events	As required	FDEP (SWD)(2)	
Groundwater Monitoring Reports	Quarterly	FDEP (TLH/SWD)	28th of following month
Monitoring Well Completion Reports	As required	FDEP (SWD)(2)	
Reclaimed Water Effluent Analysis	Annually	FDEP (SWD)(2)	March 31st
Reclaimed Water Utilization Report	Annually	FDEP (TLH/SWD) and SWFWMD(3)	January 1st
Annual Summary of Reclaimed Water Users	Annually	FDEP (SWD)(2)	March 31st
Residuals Analysis	Quarterly	FDEP (TLH/SWD)	28th of following month

Table 7.2: Synopsis of Reporting Requirements

Annual Residuals Summary Report	Annually	FDEP (SWD)(2)	February 19th
Agricultural Use Plans/Updates	As required	FDEP (SWD)(2)	
Capacity Analysis Report	Annually	FDEP (SWD)(2)	March 31st
O&M Performance Reports	Permit renewal	FDEP (SWD)(2)	
Operating Protocol	Annually	FDEP (SWD)(2)	
Flow Measurement Calibration	Annually	FDEP (SWD)(2)	Upon request of FDEP
RPZ Certification	Annually	FDEP (SWD)(2)	Upon request of FDEP

Notes:
1. *FDEP - Tallahassee office.*
2. *FDEP - Southwest District office.*
3. *FDEP - Tallahassee, Southwest District, and the Southwest Florida Water Management District.*

A computer-based distributed control system will be part of the upgraded facilities. The monitoring and reporting will automatically be inputted into forms to ensure that the monitoring and reporting will meet all of the requirements of the City's WWTF Operations Permit. As recommended in Section 5 of this report Wonderware™ SCADA software will be used for monitoring real time and historical information to improve the operations, maintenance and production efficiency of the City's WWTF.

In addition, to facilitate the monitoring and reporting requirements, it is recommended that an Internet-based service, such as WaterTrax™ be used to consolidate information from multiple data sources into a database configured to the City's WWTF. The City's operational data and laboratory results can be uploaded into the database, where it will be organized, archived, and made accessible to all authorized individuals. The test results can be screened against regulatory standards, permit requirements, and operations objectives; thereby, triggering alters if the results are adverse. The operational and monitoring results are produced upon demand, eliminating the cost and time of laborious data re-entry from laboratory reports, log sheets and operating records.

8. IMPLEMENTATION PLAN

The recommended plan for the City's existing WWTF is to convert the facility from a conventional activated sludge facility to a MLE process as described in earlier sections. The improvements will increase the rated capacity of the WWTF from 3.7 mgd to 7.0 mgd on a M3MADF basis. The design criteria for the proposed improvements, which will include the following items, are presented in Table 8.1:

- Modification and expansion of the pretreatment structure, including the addition of two new influent channels, two new screens and odor control facilities.
- Addition of three (3) new tanks and modification of tank operation to provide an anoxic zone and tapered fine bubble aeration in the aerobic zones. There will be two parallel anoxic basins and two parallel sets of aeration basins (3-aeration basins per set). These modifications will also require modification of the existing inlet to the aeration basins, and the construction of a new flow splitter box.
- Installation of an IMLR pump station, flow metering and return piping.
- Replacement of the three 1980's vintage constant speed centrifugal blowers with two variable vane inlet and outlet type centrifugal blowers with capacities of 4,200 scfm and conversion of the two existing 4,200 scfm blowers to variable speed units. The aeration system will be controlled using DO on-line monitoring system.
- Modification of the secondary clarifier splitter box and addition of one 65 ft secondary clarifier to bring the total to 4 clarifiers. In addition, to maintain a nearly equal split between the four secondary clarifiers the influent piping to clarifier #3 will be modified to install a parallel pipe, and the effluent piping from clarifiers #2 and #3 will be modified to improve system hydraulics.
- Installation of a deep bed tertiary filter system and abandonment of the existing cloth filters.
- Expansion of the chlorine contact chamber to accommodate the larger flows and provide effluent that is suitable for public access reclaimed water reuse.
- Expansion of the existing reuse water transfer pump station to meet the diurnal influent flow conditions and reclaimed water demands of the facility.
- Construction of a new 1.0 MG reuse water storage tank.
- Construction of a reuse water high service pump station.
- Construction of a new DIW at the existing DIW site, with a rated capacity of 13.2 mgd..
- Expansion of the existing DIW pump station to meet the capacity requirements for the existing DIW system.
- All other support and ancillary works required for a fully functional facility match the demand pattern during diurnal cycle (e.g., yard piping, instrumentation and control system upgrades, electrical system upgrades, etc.).

Engineering drawings for each structure illustrating the improvements proposed are provided in Appendix E of this report.

Table 8.1: North Port Wastewater Treatment Facility - Design Criteria

Parameter	AADF	MDF	Additional Detailed Information
Influent Criteria			
Flow, mgd	5.6	16.14	
BOD5, lb/d	9,340	19,810	
TSS, lb/d	9,340	19,810	
TKN, lb/d	1,770	3,760	
TP, lb/d	410	870	
Pretreatment Structure			
Mechanically Cleaned Step Screen			Parkson, Hycor® Rotoscreen
Clear space openings			1/8-inch or 3 mm
Headloss through screen, inches	6.0	6.0	Nearly constant, based on screen operation
Total number of units	4	4	
In operation	3	3	Units can be removed from channels
Standby	1	1	
Velocity through screen, fps			
3 units operating	1.3	4.0	
4 units operating	1.0	2.0	
Bypass channel			Manually cleaned bar screen
Clear space openings			1"inch
Screenings Washer/Dewatering/ Compactor			Parkson, Hycor®
Number of units	2	2	
Solids capacity, ft/hr	35	90	
Grit Chamber			Waste-Tech Model XGT 1300
Particle removal			95% removal, greater than or equal to 150 μ
Number of units	1	1	
Capacity of unit (mgd)	30.0	30.0	
Headloss, inches	0.25	0.25	
Grit Classifier			
Number of units	1	1	
Lift Station Receiving			Lakeside - Raptor
Number of units	1	1	
Biological Reactors			
Number of reactors	8	8	3-new basins
Anoxic basins	2	2	Covert 2-aeration basins to anoxic
Aeration basins	6	6	
MLSS, mg/L	2,500	3,500	
MLVSS, mg/L	1,750	2,450	
SRT, days	4.0	4.0	

Table 8.1: North Port Wastewater Treatment Facility - Design Criteria

Parameter	AADF	MDF	Additional Detailed Information
Biological Reactors (continued)			
Basin volumes			
Anoxic basins, gallons (each)	180,000	180,000	Total anoxic volume is 360,000
Aerobic basins, gallons (each)	180,000	180,000	Total aerobic volume is 1,080,000
Hydraulic retention time			
Anoxic basins, hours (total)	1.54	0.54	
Aerobic basins, hours (total)	4.63	1.61	
Anoxic mixer			
Type			Submersible mixers, Flygt 4360
Number	3	3	3 mixers per anoxic basins
Motor, HP	5.0	5.0	
IMLR, mgd	10.0	10.0	
F/M, g BOD5/g MLVSS	0.4	0.1	
Total AOR, lb/d	11,330	20,900	
Total SOR, lb/d	30,050	55,500	
Air requirements, scfm	4,200	9,000	
Diffusers			Sanitaire 9" flexible membrane
SOTE, percent	29	25	
Number of diffusers	3,300	3,300	
Air Flow Per diffuser, scfm	1.22	2.70	
Blowers			Centrifugal, Single stage dual vane
Number of units	4	4	
Total capacity, scfm	16,800	16,800	
Capacity with one blower of service, scfm	12,600	12,600	
IMLR pumping station			Variable speed non-clog centrifugal
Number of pumps	3	3	
Rated operating capacity (each), gpm	6950	6,950	Total dynamic head = 14-feet, NPSHA = 33-feet
Total rated operating capacity (1-pump out of service), gpm	13,900	13,900	
Secondary Clarifiers			
Type of clarifiers			Circular, scraper type of sludge withdrawal
Number of units	4.0	4.0	3-existing and 1-new
Diameter, feet	65	65	
Sidewall water depth, feet	14.0	14.0	

Table 8.1: North Port Wastewater Treatment Facility - Design Criteria

Parameter	AADF	MDF	Additional Detailed Information
Secondary Clarifiers (continued)			
Surface overflow rate, gpd/sf	450	1,200	
All units in operation, gpd/sf	450	1,200	
One unit our of service, gpd/sf	600	1,600	Class I Reliability requires that 75% of the MDF be treated with on unit out of service resulting in an SOR of 1,200
Solids loading, lb/sf	20.0	40.5	
Weir overflow rate, gpd/ft			
Design SVI (ml/g)	150.0	150.0	
Sludge blanket depth,feet	< 1.0	< 1.0	
Weir Washer Mechanism			Weir Washer - Gill Trading
Type of system			Automated high pressure spray
Non-potable water requirements			15 to 45 gpm at 65 psi
Number of Units	4.0	4.0	3-existing and 1-new clarifier
RAS Pumping System			
Type of pumps			Variable speed screw centrifugal
Number of pumps	4	4	
Maximum rated capacity, gpd	4,260	4,260	
WAS Pumping System			
Type of pumps			Variable speed progressive cavity
Number of units	3	3	
Rated capacity, gpd			
Filtration System			Tetra Technologies, Inc.
Type of filter			Deep bed
Number of filters	3	3	
Surface area, square feet (total)	2,988	2,988	
Filtration rate			
Filtration rate with all units on line, gpm/sf	1.3	3.75	
Filtration rate with one unit out of service, gpm/sf	1.95	4.22	Class I Reliability requires that 75% of the MDF be treated with on unit out of service resulting in an SOR of 4.22 gpm/sf
Chlorination System			
Number of chlorine contact chambers	3.0	3.0	56-feet long by 14-feet wide (each basin)
Number of Passes per basin	4.0	4.0	Each pass 3.0-feet wide
Side Water Depth, feet	6.0	6.0	
Hydraulic Detention Time, minutes	43.0	15.0	
Hydraulic Detention Time with 1 basin out of service, minutes	36.0	12.6	

Table 8.1: North Port Wastewater Treatment Facility - Design Criteria

Parameter	AADF	MDF	Additional Detailed Information
Chlorine Contact Chamber (continued)			
Estimated Chlorine Dosage, mg/L	2.7	7.9	
Chemical metering pumps			Positive displacement, hydraulically actuated
Number	3	3	
Capacity, gph	22	22	Maximum operating pressure = 120 psi Minimum operating pressure = 40 psi
Reuse Water Transfer Pumps			
Number	4.0	4.0	Variable speed vertical turbine
Rated operating capacity (low), gpm	2,780	2,780	Total dynamic head = 40-feet, NPSHA = 36-feet
Rated operating capacity (high), gpm	5,560	5,560	Total dynamic head = 40-feet, NPSHA = 36-feet
Prestressed Concrete Reuse Water Storage Tank			
Number	1	1	Prestressed concrete
Volume (MG)	1.0	1.0	
Reuse Water High Service Centrifugal Pumps			
Number	4.0	4.0	
Capacity of Each Pump (mgd)	3.0	3.0	
DIW Vertical Turbine Pumps			
Number	3.0	3.0	
Capacity of Each Pump, mgd	6.6	6.6	
Emergency Power System			
Number of units	2	2	Both existing
Capacity			
Unit no. 1, KW	800	800	At 0.8 PF
Unit no. 2, KW	1,000	1,000	At 0.8 PF

Over the past several years, the construction industry has experienced a significant escalation in costs. Both raw materials and labor have exhibited price escalation that is not exhibited elsewhere in the United States economy. These events have made it very difficult to provide accurate cost estimate information. However, based on cost data from recent projects, Brown and Caldwell has developed an opinion of probable cost. It should be noted that the following information was used for development of this data:

- Contractor's profit is assumed to be 12 percent of raw construction cost
- Contingency for this level of estimating is 15 percent of the estimated construction cost with Contractor's Overhead and Profit
- The facility is anticipated to have a life expectancy greater than 50 years, so premium materials are assumed such as ductile iron pipe, concrete tanks, stainless steel hardware, etc.

The facility is anticipated to have a life expectancy greater than 50 years, so premium materials are assumed such as ductile iron pipe, concrete tanks, stainless steel hardware, etc. Table 8-2 presents Brown and

Caldwell's opinion of probable construction cost for this facility, inclusive of the DIW and effluent force main to the new DIW.

Table 8.2: City of North Port WWTF Upgrades Probable Opinion of Construction Cost	
Pretreatment Structure	$525,000
Lift Station Receiving Station	$130,000
Anoxic/Aeration Basin Modifications (MLE Process)	$1,915,000
New Secondary Clarifier	$1,000,000
RAS/WAS Pump Station Modifications/Upgrades	$330,000
Deep Bed Filtration System	$2,750,000
Chlorine Contact Basins	$815,000
Effluent Transfer Pumping System Upgrades	$500,000
1 MG Ground Storage Tank	$850,000
High Service Pump Station Modifications/Upgrades	$750,000
New DIW Pump Station	$610,000
New DIW	$3,500,000
New Transmission Main to DIW	$4,500,000
Convert Existing Reuse Tank to Sludge Holding	$250,000
Electrical System Upgrades	$5,000,000
New Instrumentation and Control System Upgrades	$800,000
Yard Piping	$750,000
Civil/Sitework	$325,000
Contingency 20-percent	$6,350,000
Total Cost	$31,620,000

The preliminary schedule for the design of proposed improvements is scheduled for completion in early 2007 after which the job will be advertised and bids requested. Award of a construction contract will occur in June 2007 and it is expected that construction will be carried out over an 18 month period, terminating in December 2008. A preliminary schedule for completion of the proposed works is shown on 8-1. As shown, design of proposed improvements is scheduled for completion in early 2007 after which the job will be advertised and Bids requested. Award of a construction contract will occur in April 2004 and it is expected that construction will be carried out over an 18 month period, terminating in December 2008.

9. LIMITATIONS

Report Limitations

This document was prepared solely for the City of North Port in accordance with professional standards at the time the services were performed and in accordance with the contract between City of North Port and Brown and Caldwell dated June 2006. This document is governed by the specific scope of work authorized by City of North Port; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by City of North Port and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

APPENDIX A

Existing Permit

Department of Environmental Protection

Jeb Bush
Governor

Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619

David B. Struhs
Secretary

RECEIVED
JUN - 1 2001
BOYLE ENGINEERING / SARASOTA

May 30, 2001

In the Matter of an
Application for Permit by:

Rick J. Newkirk, Interim Director
City of North Port Utilities Department
P.O. Box 7228
North Port, FL 34287-7228

DEP File No. 58-FLA013378-003-DW1P/NR
Sarasota County

Enclosed is Permit Number FLA013378 to operate, and to construct and operate modifications to the City of North Port Wastewater Treatment Plant to expand the plant capacity from 2.0 mgd 3MADF to 3.7 mgd 3MADF by addition of numerous major components, and to substantially increase the capacity of the Part III Public Access Reuse system to 1.88 mgd by adding additional major and minor users The system is located at 200 North Pan American Blvd., North Port, Florida. The entire permit is issued under section 403 of the Florida Statutes.

Any party to this order (permit) has the right to seek judicial review of the permit under section 120.68 of the Florida Statutes, by the filing of a Notice of Appeal under rule 9.110 of the Florida Rules of Appellate Procedure, with the Clerk of the Department of Environmental Protection, Office of General Counsel, Mail Station 35, 3900 Commonwealth Boulevard, Tallahassee, Florida 32399-3000 and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate district court of appeal. The notice of appeal must be filed within thirty days after this notice is filed with the Clerk of the Department.

Executed in Tampa, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

for E S [signature]

Timothy J. Parker, P.E.
Water Facilities Administrator
Southwest District
3804 Coconut Palm Drive
Tampa, FL 33619-8318
(813) 744-6100

CERTIFICATE OF SERVICE

The undersigned duly designated deputy agency clerk hereby certifies that this NOTICE OF PERMIT and all copies were mailed before the close of business on 5-30-01 to the listed persons.

FILING AND ACKNOWLEDGMENT

FILED, on this date, under section 120.52(7), Florida Statutes, with the designated Department Clerk, receipt of which is hereby acknowledged.

Jacqueline M. Price 5-30-01
Clerk Date

Attachments

Copies furnished to:
Boyle Engineering Corporation
Sarasota County Pollution Control Division

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Department of
Environmental Protection

Jeb Bush
Governor

Southwest District
3804 Coconut Palm Drive
Tampa, Florida 33619

David B. Struhs
Secretary

DOMESTIC WASTEWATER FACILITY PERMIT

PERMITTEE:
City of North Port Utilities Department

PERMIT NUMBER: FLA013378
ISSUANCE DATE: 05/30/01
EXPIRATION DATE: 05/29/06

RESPONSIBLE PARTY:
Rick J. Newkirk, Interim Director
P.O. Box 7228
North Port, FL 34287-7228
(941) 426-9500

FACILITY:

North Port Wastewater Treatment Plant (WWTP)
200 North Pan American Blvd.
North Port, Florida 34287

Sarasota County

Latitude: 27° 02' 51" North
Longitude: 82° 14' 43" West

This permit is issued under the provisions of Chapter 403, Florida Statutes (F.S.), and applicable rules of the Florida Administrative Code (F.A.C.). The above named permittee is hereby authorized to construct expansion of, and to operate the facilities shown on the application and other documents attached hereto or on file with the Department and made a part hereof and specifically described as follows:

TREATMENT FACILITIES:

Operation of an existing 2.0 mgd 3-month average daily flow Type I activated sludge domestic wastewater treatment plant. The facility consists of the following units: a headworks structure, with odor control, containing dual (primary and bypass) channels leading to manually cleaned coarse bar screens (with screenings collection system); two aeration basins of 224,400 gallons each with coarse bubble diffused aeration, for a total aeration volume of 448,800 gallons; a mixed liquor splitter/distribution structure; two secondary clarifiers of approximately 300,000 gallons capacity each, with a total settling capacity of 600,000 gallons and a total surface area of 6,636 ft^2; and an effluent splitter box structure. The solid waste stream consists of two aerated sludge holding basins of 87,500 gallons each, for a total combined capacity of 175,000 gallons; a lime slurry mixing/handling system including a 25 ton lime storage tank; and three lime stabilization/mixing basins of 21,600 gallons each, for a total stabilization capacity of 64,800 gallons. Residuals are removed and disposed of by land application.

PERMITTEE:		**PERMIT NUMBER:**	FLA013378
City of North Port Utilities Department		**ISSUANCE DATE:**	05/30/01
		EXPIRATION DATE:	05/29/06

RESPONSIBLE PARTY:
Rick J. Newkirk, Interim Director
P.O. Box 7228
North Port, FL 34287-7228
(941) 426-9500

Effluent for deep well injection is routed to a Deep Injection Well (DIW) pumping station with hydropneumatic surge control, thence to the well. Chlorine injection is available for emergency situations.

Effluent intended for reuse is directed to a single traveling bridge automatic backwash filter with 204 ft^2 surface area, with a capacity at design loading of 0.600 mgd (Reuse System limiting factor); a dual channel chlorine contact basin, using a gaseous chlorination system, each channel of 29,350 gallons, and a common channel of 6,070 gallons, providing a total contact volume of 64,770 gallons; thence to the reuse system described below. Filter backwash is returned to the headworks structure. A 460,000 gallon ground level storage tank is available on site for storage of reclaimed water prior to delivery to the reuse system by a high service pumping station.

The plant is a dual train facility with the exception of the filtration system. With DIW available, alum coagulant feed is available on a standby status for solids control. Effluent quality is continuously monitored for turbidity as a measure of TSS and chlorine residual as a measure of disinfection effectiveness. Effluent failing to meet Part III public access quality standards is directed by means of an automatic valve system to the DIW system. A 800 KW autostart generator is available as an alternative power source.

Two effluent storage ponds (Pond #1-North, 1.20 mg; Pond #2-South, 1.20 mg) are located on site which may be used either for wet weather storage for the Part III public access reuse system or for storage of secondary chlorinated effluent during Mechanical Integrity Testing of the DIW system.

The Part III reclaimed water system, including on-site storage tankage and ponds, is controlled, sequenced and operated during staffed and unstaffed periods according to procedures set forth in the plant Operating Protocol in order to assure maximum reliability and safeguards on the quality of the reclaimed water. Additional off-site storage is provided within the R001 reuse system as described below. Total storage capacity provided by the facilities listed above and also R001 below is 10.097 million gallons.

Construction and operation of an expansion which will increase the permitted treatment capacity of the plant to 3.7 mgd 3 month average daily flow consisting of: a new headworks with three channels, an odor control system, two mechanically cleaned fine screens and a backup manually cleaned coarse bar screen, a new magnetic flow measurement system, and a vortex grit removal system with classifier; a new aeration basin influent splitter box; three new aeration basins (using front-loaded aeration techniques) of 224,400 gallons each, which with the existing, will provide a total aeration volume of 1,122,000 gallons; two additional air blower systems to support the expanded aeration; an expanded clarifier influent splitter box with provisions for the proposed third clarifier and a future fourth clarifier; a third 65 foot diameter clarifier with identical surface area and volume as the existing, providing a total clarifier volume of 900,000 gallons and a surface area of 9,950 ft^2; two additional filter sets consisting of four disk package filters, each with a capacity of 1.0 mgd, providing, with the existing filter, a total filtration capacity of 2.6 mgd; replacement of the return activated sludge pumps; additional reuse water transfer pumps and reuse high service pumps; and installation of one rotary drum sludge thickener. Also conversion from the gaseous disinfection system liquid chlorine disinfection.

PERMITTEE:
City of North Port Utilities Department

PERMIT NUMBER: FLA013378
ISSUANCE DATE: 05/30/01
EXPIRATION DATE: 05/29/06

RESPONSIBLE PARTY:
Rick J. Newkirk, Interim Director
P.O. Box 7228
North Port, FL 34287-7228
(941) 426-9500

EFFLUENT DISPOSAL FACILITIES:

U001 Operation of an existing Underground Injection Well system with a 3,300 gallon per minute (4.75 mgd) instantaneous maximum flow permitted capacity (effective permitted capacity is limited by the permitted capacity of the treatment plant upstream of the filters) underground injection well system (U001) consisting of one Class I underground injection well permitted under Department Permit Number U058-250044 discharging to Class G-IV ground water. Underground injection well system U001 is located approximately at latitude 27° 00' 54" North and longitude 82° 15" 24" West.

REUSE:

Land Application:

R001 Construction and operation of a Part III Public Access Master Urban Reuse System consisting of existing and proposed new reuse components within a general service area as described in detail in Permit Condition IV. 2. and as shown on the City of North Port Future Reclaimed Water Reuse Service Area map, prepared by Hartman & Associates, Inc., undated. The system is generally located in the extreme southern area of Sarasota County, and includes all of the City Limits of North Port except the State of Florida Preserve and State Forest. Permitted ultimate capacity of the system including existing and potential users is 1.88 mgd 12 month average daily flow.
However, current permitted capacity of the Master Urban Reuse System is limited to 0.600 mgd 12 MADF due to plant filtration limits until installation of the additional filtration system is completed.

Existing major and minor users have a capacity of 1.49 mg spread over 271 acres. On-site storage of reclaimed water is currently provided in a single above ground storage tank of 600,000 gallons capacity located on the Sabal Trace Golf Course, and two lakes storing 6.637 mg at the Heron Creek Golf Course and residential development.

IN ACCORDANCE WITH: The limitations, monitoring requirements and other conditions set forth in Part I 11 pages, Part II 5 pages, Part III 4 pages, Part IV 4 pages, Part V 2 pages, Part VI 1 page, Part VII 1 page, Part VIII 2 pages, and Part IX 5 pages of this permit.

ADDITIONAL APPENDICES

1. Synopsis of Reporting Requirements
2. Monitor Well Completion Report

S[illegible]PSIS [illegible] REP[illegible]NG [illegible]UIR[illegible]NTS

North Port V[illegible] FLA013378

Year ___________

This synopsis of major reporting requirements is provided to assist the permittee in complying with the various reporting requirements in this permit and may not be all-inclusive.

Type of Report	Freq.	To:	Notes	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
Discharge. Monitoring. Report I.C.9.	Monthly	TLH	28th of fol. month	28th	28th	28th	28th	28th	28th	28th	28th	28th	28th	28th	28th
Reportable Events I.C.12.	As Required	SWD & SCPC													
Ground Water Monitoring III.7 & 8.	Quarterly	TLH & SWD		28th			28th			28th			28th + CumSum		
Reclaimed Water/ Effluent Analysis I.C.11	Annually	SWD				31st									
Giardia/Cryptosporidium Analysis I. B. 13.	EveryTwo Years	TLH & SWD													
Annual Reuse Report I.B.14	Annually	TLH, SWD, WMD		1st											
Public Notification Summary IV.19	Annually	TLH		1st											
Storage Systems Inventory IV.23	Annually	TLH		1st											
Users Annual Summary Report IV.5.	Annually	SWD				31st									
Residuals Analysis II.10. & 13.	Quarterly	SWD													
Annual Residuals Summary Report II.31.	Annually	SWD			19th										
Agricultural Use Plans/ Updates II.29.	As Required	SWD													
Capacity Analysis Reports V.4	Renewal	SWD													
Operation & Maint. Performance Reports V.5	Renewal	SWD													
Operating Protocol IV.7.	As Required	SWD													
Flow Measurement Cal I.A.7., I.B.6. & I.C.5.	Annually	SWD	(1)(2)												
RPZ Certification IV.9	Annually	SWD	(1)(2)												
Monitor Well Completion Reports III.19	As Required	SWD													

To: = TLH FDEP Tallahassee Office at address specified in permit.
SWD FDEP Southwest District Office at address specified in permit.
WMD Southwest Florida Water Management District at address specified in permit.
SCPC Sarasota County Pollution Control Division

Notes: (1) Upon request of the Department
(2) Submit Annually, to be received by the Department within the 12 month cycle period.

DEP Form # 62-522.900(3)

Form Title MONITOR WELL COMPLETION REPORT

Effective Date ______

DEP Application No. ______ (Filled in by DEP)

Florida Department of Environmental Protection

Twin Towers Office Bldg. 2600 Blair Stone Road Tallahassee, Florida 32399-2400

MONITOR WELL COMPLETION REPORT

DATE: ______

INSTALLATION NAME: ______

DEP PERMIT NUMBER: ______ GMS NUMBER: ______

WELL NUMBER: ______ WELL NAME: ______

DESIGNATION: Background ______ Immediate ______ Compliance ______

LATITUDE/LONGITUDE: ______

AQUIFER MONITORED: ______

INSTALLATION METHOD: ______

INSTALLED BY: ______

TOTAL DEPTH: ______ (bls) DEPTH OF SCREEN: ______ (b

SCREEN LENGTH: ______ SCREEN SLOT SIZE: ______ SCREEN TYPE: ______

NG DIAMETER: ______ CASING TYPE: ______

LENGTH OF CASING: ______ FILTER PACK MATERIAL: ______

TOP OF CASING ELEVATION (MSL): ______

GROUND SURFACE ELEVATION (MSL): ______

COMPLETION DATE: ______

DESCRIBE WELL DEVELOPMENT: ______

POST DEVELOPMENT WATER LEVER ELEVATION (MSL): ______

DATE AND TIME MEASURED: ______

REMARKS: (soils information, stratigraphy, etc.) : ______

REPORT PREPARED BY: ______ (name, company, phone number)

NOTE: PLEASE ATTACH BORING LOG.

(bls)= Below Land Surface

MITTEE: City of North Port Utilities Department
Rick J. Newkirk, Interim Director
P.O. Box 7228
North Port, FL 34287-7228

PERMIT NO: FLA013378
ISSUANCE DATE: 05/30/01
EXPIRATION DATE: 05/29/06

I. Reclaimed Water and Effluent Limitations and Monitoring Requirements

A. Underground Injection Control Systems

1. During the period beginning on the issuance date of this permit and lasting through the completion of the plant expansion, the permittee is authorized to discharge effluent to Underground Injection Well Facility U001 located at 27° 00' 54" North, 82° 15' 24" West. Such discharge shall be limited and monitored by the permittee as specified below:

			Effluent Limitations				Monitoring Requirements			
Parameter	Units	Max/Min	Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location	Notes
Flow (DIW)	mgd	Maximum	-	2.00 3MADF	-	-	Continuous, Report Monthly	Calculated (1) Rolling 3 Mo Avg	FLW-03	See Conditions I.A.4 & I.A.7.
Carbonaceous Biochemical Oxygen Demand (5 day)	mg/L	Maximum	20.0	30.0	45.0	60.0	Weekly	FPC-16(2)	INJ-01	
Total Suspended Solids	mg/L	Maximum	20.0	30.0	45.0	60.0	Weekly	FPC-16(2)	INJ-01	
pH	std. units	Range	-	-	-	6.0-8.5	Continuous	Meter	INJ-01	See Condition I.A.6.

(1) Data obtained using a flow meter having a recorder and totalizer
(2) FPC-16 = Flow -Proportioned Composite sample taken during a period of sixteen hours.

PERMITTEE: City of North Port Utilities Department
Rick J. Newkirk, Interim Director
P.O. Box 7228
North Port, FL 34287-7228

PERMIT NO: FLA013378
ISSUANCE DATE: 05/30/01
EXPIRATION DATE: 05/29/06

2. During the period beginning at the completion of the plant expansion and lasting through the expiration date of this permit, the permittee is authorized to discharge effluent to Underground Injection Well Facility U001 located at 27° 00' 54" North, 82° 15' 24" West. Such discharge shall be limited and monitored by the permittee as specified below:

			Effluent Limitations				Monitoring Requirements			
Parameter	Units	Max/Min	Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location	Notes
Flow (DIW)	mgd	Maximum	-	3.70 3MADF	-	-	Continuous, Report Monthly	Calculated (1) Rolling 3 Mo Avg	FLW-03	See Conditions I.A.5 & I.A.7.
Carbonaceous Biochemical Oxygen Demand (5 day)	mg/L	Maximum	20.0	30.0	45.0	60.0	Weekly	FPC-16(2)	INJ-01	
Total Suspended Solids	mg/L	Maximum	20.0	30.0	45.0	60.0	Weekly	FPC-16(2)	INJ-01	
pH	std. units	Range	-	-	-	6.0-8.5	Continuous	Meter	INJ-01	See Condition I.A.6.

(1) Data obtained using a flow meter having a recorder and totalizer
(2) FPC-16 = Flow -Proportioned Composite sample taken during a period of sixteen hours.

3. Effluent samples shall be taken at the monitoring site locations listed in Permit Conditions I. A. 1., I. A. 2. and as described below:

Monitoring Location	Description of Monitoring Location
INJ-01	At effluent splitter box, prior to discharge to the Deep Injection Well or reuse system.
FLW-03	Flow to Deep Injection Well

4. Prior to completion of the plant expansion, the three-month average daily flow to Underground Injection Well Facility U001 shall not exceed 2.0 mgd calculated as a rolling average.

5. After completion of the expansion, the three-month average daily flow to Underground Injection Well Facility U001 shall not exceed 3.7 mgd calculated as a rolling average.

6. Hourly measurement of pH during the period of required operator attendance may be substituted for continuous measurement. *[Chapter 62-601, Figure 2, Footnotes 1 and 2, 12-24-96]*

7. A recording flowmeter and totalizer shall be utilized to measure flow and calibrated at least annually. *[62-601.200(17) and .500(6), 12-24-96]*

8. Disinfection is not required for discharge to Class G-IV waters using Class I wells. However, the permittee must maintain the capability for disinfection at a level that is consistent with the alternate disposal mechanism approved for this facility pursuant to Rule 62-600.540(5), F.A.C. *[62-600.540(1), 12-24-96]*

PERMITTEE: City of North Port Utilities Department
Rick J. Newkirk, Interim Director
P.O. Box 7228
North Port, FL 34287-7228

PERMIT NO: FLA013378
ISSUANCE DATE: 05/30/01
EXPIRATION DATE: 05/29/06

B. **Reuse and Land Application Systems**

1. During the period beginning on the issuance date of this permit and lasting through the completion of the plant expansion, the permittee is authorized to land apply reclaimed water to Reuse System R001. Such reclaimed water shall be limited and monitored by the permittee as specified below:

			Reclaimed Water Limitations				Monitoring Requirements			
Parameter	Units	Maximum/ Minimum	Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location	Notes
Flow (R001)	mgd	Maximum	0.600 12MADF	-	-	-	Continuous, Rpt. Monthly	Calculated (1) Rolling 12 Mo Avg.	FLW-02	See Cond. I.B.4. & I.B.6.
Carbonaceous Biochemical Oxygen Demand (five day)	mg/L	Maximum	20.0	30.0	45.0	60.0	Weekly	FPC-16 (2)	INJ-01	
Total Suspended Solids	mg/L	Maximum	-	-	-	5.0	Daily, seven/week	Grab	EFB-01	
Fecal Coliform Bacteria	See Permit Conditions I.B.8.						Daily, seven/week	Grab	EFA-01	
pH	std. units	Range	-	-	-	6.0-8.5	Continuous	Meter	EFA-01	See Condition I.B.7.
Total Residual Chlorine (for disinfection)	mg/L	Minimum	-	-	-	1.0	Continuous	RCA C(3)	EFA-01	See Condition I.B.9.
Turbidity	NTU	Maximum	See Permit Condition I.B.10.				Continuous	RCA-T(4)	EFB-01	

(For notes, see page 6)

2. During the period beginning at the completion of the plant expansion and lasting through the expiration date of this permit, the permittee is authorized to land apply reclaimed water to Reuse System R001. Such reclaimed water shall be limited and monitored by the permittee as specified below:

			Reclaimed Water Limitations				Monitoring Requirements			
Parameter	Units	Maximum/ Minimum	Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Locationr	Notes
Flow (R001)	mgd	Maximum	1.880 12MADF	-	-	-	Continuous, Rpt. Monthly	Calculated (1) Rolling 12 Mo Avg.	FLW-02	See Cond. I.B.5. & I.B.6.
Carbonaceous Biochemical Oxygen Demand (five day)	mg/L	Maximum	20.0	30.0	45.0	60.0	Weekly	FPC-16 (2)	INJ-01	
Total Suspended Solids	mg/L	Maximum	-	-	-	5.0	Daily, seven/week	Grab	EFB-01	
Fecal Coliform Bacteria	See Permit Conditions I.B.8.						Daily, seven/week	Grab	EFA-01	
pH	std. units	Range	-	-	-	6.0-8.5	Continuous	Meter	EFA-01	See Condition I.B.7.
Total Residual Chlorine (for disinfection)	mg/L	Minimum	-	-	-	1.0	Continuous	RCA C(3)	EFA-01	See Condition I.B.9.
Turbidity	NTU	Maximum	See Permit Condition I.B.10.				Continuous	RCA-T(4)	EFB-01	

(For notes, see page 6)

3. Reclaimed water samples shall be taken at the monitoring site locations listed in Permit Conditions I. B. 1., I. B. 2., and as described below:

Monitoring Location	Description of Monitoring Location
FLW-02	Flow to Reuse System R001.
INJ-01	At effluent splitter box, prior to discharge to the Deep Injection Well or reuse system.
EFB-01	Turbidity monitoring/ TSS sample point after filtration and prior to disinfection.
EFA-01	After disinfection and prior to discharge to the Part III reuse system R001.

Notes

(1) Data obtained using a flow meter having a recorder and totalizer
(2) FPC-16 = Flow -Proportioned Composite sample taken during a period of sixteen hours.
(3) RCA-C = Recording Continuous Cl_2 Monitor and Analyzer
(4) RCA-T = Recording Continuous Turbidity Monitor and Analyzer

4. Prior to completion of the plant expansion, the twelve month average daily flow to Reuse System R001 shall not exceed 0.600 mgd calculated as a rolling average.

5. After completion of the expansion, the twelve month average daily flow to Reuse System R001 shall not exceed 1.880 mgd calculated as a rolling average.

6. Recording flow meters and totalizers shall be utilized to measure flow and calibrated at least annually. *[62-601.200(17) and .500(6), 12-24-96]*

7. Hourly measurement of pH during the period of required operator attendance may be substituted for continuous measurement. *[Chapter 62-601, Figure 2, Footnotes 1 and 2, 12-24-96]*

8. Over period of thirty days, 75 percent of the fecal coliform values (the 75th percentile value) shall be below the detection limits. Any one sample shall not exceed 25 fecal coliform values per 100 mL of sample. Any one sample shall not exceed 5.0 milligrams per liter of total suspended solids (TSS) at a point before application of the disinfectant. Note: To report the 75th percentile value, list the fecal coliform values obtained during the month in ascending order. Report the value of the sample that corresponds to the 75th percentile (multiply the number of samples by 0.75). For example, for thirty samples, report the corresponding fecal coliform number for the 23rd value of ascending order. *[62-600.440(5)(f), 12-24-96]*

9. The minimum total chlorine residual shall be limited as described in the approved operating protocol, such that the permit limitation for fecal coliform bacteria will be achieved. In no case shall the total chlorine residual be less than 1.0 mg/L. *[62-600.440(5)(b) and (6)(b), 12-24-96]*

10. The turbidity of the reclaimed water shall be monitored continuously at the monitor point described in Permit Condition I. B. 3. above. The maximum turbidity shall be limited as described in the approved operating protocol, such that the permit limitations for total suspended solids and fecal coliform bacteria will be achieved. *[62-610.463, 08-08-99]*

11. Instruments for continuous on-line monitoring shall be equipped with an automated data logging or recording device. *[62-610.463(2), 08-08-99]*

12. Only acceptable quality reclaimed water (meeting the conditions established in the approved operating protocol) may be released to system storage and reuse. *[62-610.320(6)(a), 08-08-99]*

13. The permittee shall sample the reclaimed water for Giardia and Cryptosporidium at least one time during each two year period after the issuance date of this permit. The intervals between sampling shall not be greater than two years. The samples shall be obtained at a point immediately following the disinfection process and shall be submitted to the Southwest District and DEP's Reuse Coordinator in Tallahassee on **Form 62-610.300(4)(a)4, Pathogen Monitoring**. *[62-610.463(4), 08-08-99]*

14. The permittee shall submit an **Annual Reuse Report** using **DEP Form** 62-610.300(4)(a)2 on or before January 1 of each year. The Annual Reuse Report shall be submitted to the following three addresses:

    a. **Florida Department of Environmental Protection**
    Reuse Coordinator - MS 3540
    2600 Blair Stone Road
    Tallahassee, FL 32399-2400
    David.York@DEP.STATE.FL.US

    b. **Florida Department of Environmental Protection**
    Domestic Wastewater Program
    3804 Coconut Palm Drive
    Tampa, FL 33619-8318
    Ed.Snipes@DEP.STATE.FL.US

    c. **Southwest Florida Water Management District**
    Conservation Projects Section
    2379 Broad Street
    Brooksville, FL 34609
    Scott.McGookey@SWFWMD.STATE.FL.US

    [62-610.870(3), 08-08-99]

C. Other Limitations and Monitoring and Reporting Requirements

1. During the period beginning on the issuance date of this permit and lasting through the completion of the plant expansion, the treatment facility shall be limited and monitored by the permittee as specified below:

			Limitations				Monitoring Requirements			
Parameter	Units	Maximum/ Minimum	Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location	Notes
Flow (WWTP)	mgd	Maximum	-	2.0 3 MADF	-	-	Continuous, Report Monthly	Calculated (1) Rolling 3 Mo Avg.	FLW-01	See Conditions I.C.4. & I.C.5.
Carbonaceous Biochemical Oxygen Demand (five day)	mg/L	Report	-	-	-	-	Monthly	FPC-16(2)	INF-01	Influent See Condition I. C. 6.
Total Suspended Solids	mg/L	Report	-	-	-	-	Monthly	FPC-16(2)	INF-01	Influent See Condition I. C. 6.

(1) Data obtained using a flow meter having a recorder and totalizer
(2) FPC-16 = Flow -Proportioned Composite sample taken during a period of sixteen hours.

2. During the period beginning at the completion of the plant expansion and lasting through the expiration date of this permit, the treatment facility shall be limited and monitored by the permittee as specified below:

			Limitations				Monitoring Requirements			
Parameter	Units	Maximum/ Minimum	Annual Average	Monthly Average	Weekly Average	Single Sample	Monitoring Frequency	Sample Type	Monitoring Location	Notes
Flow (WWTP)	mgd	Maximum	-	3.7 3 MADF	-	-	Continuous, Report Monthly	Calculated (1) Rolling 3 Mo Avg.	FLW-01	See Conditions I.C.4. & I.C.5.
Carbonaceous Biochemical Oxygen Demand (five day)	mg/L	Report	-	-	-	-	Monthly	FPC-16(2)	INF-01	Influent See Condition I. C. 6.
Total Suspended Solids	mg/L	Report	-	-	-	-	Monthly	FPC-16(2)	INF-01	Influent See Condition I. C. 6.

(1) Data obtained using a flow meter having a recorder and totalizer
(2) FPC-16 = Flow -Proportioned Composite sample taken during a period of sixteen hours.

3. Samples shall be taken at the monitoring site locations listed in Permit Conditions I. C. 1., I. C. 2., and as described below:

Monitoring Location	Description of Monitoring Location
FLW-01	Plant flow measured at the headworks flowmeter.
INF-01	At headworks prior to treatment and ahead of return activated sludge line.

4. The three month average daily flow through the plant shall not exceed 2.0 mgd calculated as a three month rolling average prior to completion of the expansion; the maximum three month average daily flow shall not exceed 3.7 mgd, calculated as a three month rolling average after construction and expansion is complete.

5. Recording flowmeters and totalizers shall be utilized to measure flows and shall all be calibrated at least annually. *[62-601.200(17) and .500(6), 12-24-96]*

6. Influent samples shall be collected so that they do not contain digester supernatant or return activated sludge, or any other plant process recycled waters. *[62-601.500(4), 12-24-96]*

7. The permittee shall provide safe access points for obtaining representative influent, reclaimed water, and effluent samples which are required by this permit. *[62-601.500(5), 12-24-96]*

8. Parameters which must be monitored as a result of a surface water discharge shall be analyzed using a sufficiently sensitive method in accordance with 40 CFR Part 136. Parameters which must be monitored as a result of a ground water discharge (i.e., underground injection or land application system) shall be analyzed in accordance with Chapter 62-601, F.A.C. *[62-620.610(18), 10-23-00]*

9. During the period of operation authorized by this permit, the permittee shall complete and submit to the Department on a monthly basis **Form 62-620.910(10), Discharge Monitoring Report(s) (DMR)**, as attached to this permit. The permittee shall make copies of the attached DMR form(s) and shall submit the completed DMR form(s) to the Department by the twenty-eighth day of the month following the month of operation to the address specified below. If the permittee desires to participate in the Department's Electronic Discharge Monitoring Report (EDMR) program, please see web site https://edmr.dep.state.fl.us/wwf for enrolling information.

   Florida Department of Environmental Protection
   Wastewater Facilities Regulation Section, Mail Station 3551
   Twin Towers Office Building
   2600 Blair Stone Road
   Tallahassee, Florida 32399-2400

   [62-620.610(18),10-23-00] [62-601.300(1),(2), and (3), 12-24-96]

10. Monitoring requirements under this permit are effective on the first day of the second month following permit issuance. Until such time, the permittee shall continue to monitor and report in accordance with previously effective permit requirements, if any. During the period of operation authorized by this permit, the permittee shall complete and submit to the Department Discharge Monitoring Reports (DMRs) in accordance with the frequencies specified by the REPORT type (i.e., monthly, toxicity, quarterly, semiannual, annual, etc.) indicated on the DMR forms attached to this permit. Monitoring results for each monitoring period shall be submitted in accordance with the associated DMR due dates below.

10. Continued:

REPORT Type	Monitoring Period	Due Date
Monthly or Toxicity	first day of month – last day of month	28th day of following month
Quarterly	January 1 - March 30 April 1 – June 30 July 1 – September 30 October 1 – December 31	April 28 July 28 October 28 January 28
Seminannual	January 1 – June 30 July 1 – December 31	July 28 January 28
Annual	January 1 – December 31	January 28

DMRs shall be submitted for each required monitoring period including months of no discharge. The permittee shall make copies of the attached DMR form(s) and shall submit the completed DMR form(s) to the Department at the address specified in Permit Condition I.C. 9 by the twenty-eighth (28th) of the month following the month of operation.

[62-620.610(18), 10-23-00] [62-601.300(1), (2), and (3), 12-24-96]

11. During the period of operation authorized by this permit, reclaimed water or effluent shall be monitored annually for the primary and secondary drinking water standards contained in Chapter 62-550, F.A.C., (except for turbidity, total coliform bacteria, color, and corrosivity). Twenty-four hour composite samples, except where grab is required by DEP Standard Operating Procedure, shall be used to analyze reclaimed water or effluent for the primary and secondary drinking water standards. These monitoring results shall be reported to the Department annually on **Form 62-620.910(15), Reclaimed Water or Effluent Analysis Report**, or in another format if requested by the permittee and if approved by the Department as being compatible with data entry into the computer system of the Department. During years when a permit is not renewed, a certification stating that no new non-domestic wastewater dischargers have been added to the collection system since the last reclaimed water or effluent analysis was conducted may be submitted in lieu of the report. The annual reclaimed water or effluent analysis report or the certification shall be completed and submitted in a timely manner so as to be received by the Southwest District Office of the Department by the thirty-first day of March of each year. *[62-601.300(4), 12-24-96] [62-601.500(3), 12-24-96]*

12. Unless specified otherwise in this permit, all reports and notifications required by this permit, including twenty-four-hour notifications, shall be submitted to or reported to, as appropriate, the Southwest District Office of the Department at the address specified below:

Southwest District Office
Florida Department of Environmental Protection
3804 Coconut Palm Drive
Tampa, Florida 33619

Phone Number - 813-744-6100
FAX Number - 813-744-8198

All FAX copies shall be followed by original copies.

Internet Address - Employee first name.last name@DEP.STATE.FL.US

II. Residuals Management Requirements

Basic Management Requirements

1. The method of residuals use or disposal by this facility is land application or disposal in a Class I or II solid waste landfill.

2. The permittee shall be responsible for proper treatment, management, use, and land application or disposal of its residuals. *[62-640.300(5), 03-30-98]*

3. The permittee will not be held responsible for violations resulting from land application of residuals if the permittee can demonstrate that it has delivered residuals that meet the parameter concentrations and appropriate treatment requirements of this rule and the applier (e.g. hauler, contractor, site manager, or site owner) has legally agreed in writing to accept responsibility for proper land application of the residuals. Such an agreement shall state that the applier agrees, upon delivery of residuals that have been treated as required by Chapter 62-640, F.A.C., that he will accept responsibility for proper land application of the residuals as required by Chapter 62-640, F.A.C., and that the applier agrees that he is aware of and will comply with requirements for proper land application as described in the facility's permit. *[62-640.300(5), 03-30-98]*

4. Disposal of residuals, septage, and other solids in a solid waste landfill, or disposal by placement on land for purposes other than soil conditioning or fertilization, such as at a monofill, surface impoundment, waste pile, or dedicated site, shall be in accordance with Chapter 62-701, F.A.C. *[62-640.100(6)(k)3&4, 03-30-98]*

5. Land application of residuals shall be in accordance with the conditions of this permit, the approved Agricultural Use Plan(s), and the requirements of Chapter 62-640, F.A.C. *[62-640, 03-30-98]*

6. The domestic wastewater residuals for this facility are classified as **Class B**. The permittee shall achieve Class B pathogen reduction by meeting the pathogen reduction requirements in section 503.32(b)(3) (PSRP-Lime Stabilization) of Title 40 CFR Part 503, revised as of October 25, 1995. *[62-640.600(1)(b), 03-30-98]*

7. The permittee shall achieve vector attraction reduction by meeting the vector attraction reduction requirements in section 503.33(b)(6) (Alkali Addition) of Title 40 CFR Part 503, revised as of October 25, 1995. *[62-640.600(2)(a), 03-30-98]*

8. Treatment of liquid residuals or septage for the purpose of meeting the pathogen reduction or vector attraction reduction requirements set forth in Rule 62-640.600, F.A.C., shall not be conducted in the tank of a hauling vehicle. Treatment of residuals or septage for the purpose of meeting pathogen reduction or vector attraction reduction requirements shall take place at the permitted facility. *[62-640.400(8), 03-30-98]*

9. Sampling and analysis shall be conducted in accordance with Title 40 CFR Part 503, section 503.8 and the U.S. Environmental Protection Agency publication - POTW Sludge Sampling and Analysis Guidance Document, 1989. In cases where disagreements exist between Title 40 CFR Part 503, section 503.8 and the POTW Sludge Sampling and Analysis Guidance Document, the requirements in Title 40 CFR Part 503, section 503.8 will apply. *[62-640.650(1), 62-640.700(1), 62-640.700(3)(b), and 62-640.850(3), 03-30-98]*

10. The permittee shall sample and analyze the Class A or B residuals to monitor for pathogen and vector attraction reduction requirements of Rule 62-640.600, F.A.C., and the parameters listed in the table below at least once every three (3) months. The following parameters shall be sampled and analyzed:

Parameter	Ceiling Concentrations (Single Sample)	Cumulative Application Limits
Total Nitrogen	(Report only) % dry weight	Not applicable
Total Phosphorus	(Report only) % dry weight	Not applicable
Total Potassium	(Report only) % dry weight	Not applicable
Arsenic	75 mg/kg dry weight	36.6 pounds/acre
Cadmium	85 mg/kg dry weight	34.8pounds /acre
Copper	4300 mg/kg dry weight	1340 pounds/acre
Lead	840 mg/kg dry weight	268 pounds/acre
Mercury	57 mg/kg dry weight	15.2 pounds/acre
Molybdenum	75 mg/kg dry weight	Not applicable
Nickel	420 mg/kg dry weight	375 pounds/acre
Selenium	100 mg/kg dry weight	89.3 pounds/acre
Zinc	7500 mg/kg dry weight	2500 pounds/acre
pH	(Report only) standard units	Not applicable
Total Solids	(Report only) %	Not applicable

[62-640.650(1), 62-640.700(1), 62-640.700(3)(b), and 62-640.850(3), 03-30-98]

11. Grab samples shall be used for pathogens and determinations of percent volatile solids. Composite samples shall be used for metals. *[62-640.650(1)(e), 03-30-98]*

12. Residuals shall not be land applied if a single sample result for any parameter exceeds the ceiling concentrations given in this permit. Residuals shall not be distributed and marketed if the monthly average of sample results for any parameter exceeds the Class AA parameter concentrations given in this permit. Monthly averages of parameter concentrations shall be determined by taking the arithmetic mean of all sample results for the month. *[62-640.650(1)(f), 03-30-98]*

13. The permittee shall submit the results of all residuals monitoring to the Southwest District Office on **DEP Form 62-640.210(2)(d), Residuals Monitoring Report.** The analytical results from each sampling event shall be submitted along with the **Report** no later than the 28th day of the month that follows the month in which the monitoring was performed. *[62-640.650(3)(a)&(e), 03-30-98]*

14. Class B residuals shall not be used on unrestricted public access areas. Use of Class B residuals is limited to restricted public access areas such as agricultural sites, forests, and roadway shoulders and medians. *[62-640.600(3)(b), 03-30-98]*

15. Plant nursery use of Class B residuals is limited to plants which will not be sold to the public for 12 months after the last application of residuals. *[62-640.600(3)(b)1., 03-30-98]*

16. Use of Class B residuals on roadway shoulders and medians is limited to restricted public access roads. *[62-640.600(3)(b)2, 03-30-98]*

17. Food crops with harvested parts that touch the residuals/soil mixture and are totally above the land surface shall not be harvested for 14 months after the last application of Class B residuals. *[62-640.600(3)(b)3., 03-30-98]*

18. Food crops with harvested parts below the surface of the land shall not be harvested for 20 months after application of Class B residuals when the residuals remain on the land surface for four months or longer before incorporation into the soil. *[62-640.600(3)(b)4., 03-30-98]*

19. Food crops with harvested parts below the surface of the land shall not be harvested for 38 months after application of Class B residuals when the residuals remain on the land surface for less than four months before incorporation into the soil. *[62-640.600(3)(b)5., 03-30-98]*

20. Food crops, feed crops, and fiber crops shall not be harvested for 30 days following the last application of Class B residuals. *[62-640.600(3)(b)6., 03-30-98]*

21. Animals shall not be grazed on the land for 30 days after the last application of Class B residuals. *[62-640.600(3)(b)7., 03-30-98]*

22. Sod which will be distributed or sold to the public or used on unrestricted public access areas shall not be harvested for 12 months after the last application of Class B residuals. *[62-640.600(3)(b)8., 03-30-98]*

23. The public shall be restricted from application zones for 12 months after the last application of Class B residuals. *[62-640.600(3)(b., 03-30-98]*

24. Residuals that do not meet the requirements of Chapter 62-640, F.A.C., for Class AA designation shall not be used for the cultivation of tobacco or leafy vegetables. *[62-640.400(7), 03-30-98]*

25. Residuals application rates are limited to agronomic rates based on the site vegetation as identified in the Agricultural Use Plan. *[62-640.750(2), 03-30-98]*

26. Residuals shall be applied with appropriate techniques and equipment to assure uniform application over the application zone. *[62-640.700(2)(c), 03-30-98]*

27. The spraying of liquid domestic wastewater residuals shall be conducted so that the formation of aerosols is minimized. *[62-640.700(2)(d), 03-30-98]*

28. Residuals application sites shall be posted with appropriate advisory signs identifying the nature of the project area. *[62-640.700(2)(f), 03-30-98]*

29. Current Agricultural Use Plan(s) identify residuals landspreading on the following site(s):

Site Name	Site Type (AG or LR)	Application Area (acres)	Site Location						
			County	Latitude			Longitude		
				DD	MM	SS	DD	MM	SS
Schroeder-Manatee North (Elmore)	AG	4,255.5	Manatee	27	28	30N	82	21	02W
Schroeder-Manatee South (Elmore)	AG	1,523.0	Sarasota	27	23	10N	82	21	03W
Myakka Ranch (Elmore)	AG	2,148.4	Sarasota	27	22	43N	82	19	05W
Carlton Ranch South (Elmore)	AG	1416.9	Sarasota	27	07	00N	82	08	00W

The wastewater treatment facility permittee shall apply for a minor permit revision on **DEP Form 62-620.910(9)** for new, modified, or expanded residuals land application sites. The facility's permit shall be revised to include the new or revised Agricultural Use Plan(s) prior to application of residuals to the new, modified, or expanded sites, unless all of the following conditions are met:

a) The permittee notifies the Department within 24 hours that the site is being used:
b) The site meets the site use restrictions of Rule 62-640.600(3), F.A.C, and the criteria for land application of residuals in Rule 62-640.700, F.A.C.
c) The permittee submits a new or revised Agricultural Use Plan for the site with a permit application in accordance with Rule 62-640.300(2), F.A.C., within 30 days of beginning use of the site.
d) The permittee does not have another approved land application site, another approved disposal method (e.g. landfilling or incineration), or approved storage facilities available for use; and,
e) The permittee demonstrates during permit application that application of additional residuals to an existing approved application site would have resulted in violation of Department rules, or was not possible due to circumstances beyond the permittee's control.

[62-640.300(2)&(3), 03-30-98]

30. The pH of the residuals soil mixture shall be 5.0 or greater at the time residuals are applied. At a minimum, soil pH testing shall be done annually. *[62-640.700(5)(d), 03-30-98]*

31. The permittee shall submit an annual summary of residuals application activity to the Southwest District Office on Department **Form 62-640.210(2)(b)** for all residuals applied during the period of January 1 through December 31. The summary for each year shall be submitted by February 19 of the following year. If more than one facility applies residuals to the same application zones, the summary must include a subtotal of each facility's contribution of residuals to the application zones. *[62-640.650(3)(b), 03-30-98]*

32. If residuals that are subject to the cumulative loading limitations of Rule 62-640.700(3), F.A.C., have been applied to an application zone, and the cumulative loading amount of one or more of the pollutants is not known, no further applications of residuals may be made to the application zone.
[62-640.700(3)(f), 03-30-98]

33. Residuals storage facilities at land application sites shall be subject to applicable setback requirements for residuals application sites. Residuals stored at land application sites shall be stored in a manner that will not cause runoff or seepage from the residuals, objectionable odors, or vector attraction. Storage areas must be fenced or otherwise provided with appropriate features to discourage the entry of animals and unauthorized persons. At the time of application, the stored residuals must meet the parameter concentrations, pathogen and vector attraction reduction requirements, and cumulative application limits of this permit. Residuals storage facilities at land application sites may be used only for temporary storage of stabilized residuals for no more than 30 days during periods of inclement weather or to accommodate agricultural operations, or up to the period (not to exceed two years) specified in the Agricultural Use Plan. *[62-640.700(2)(e), 03-30-98]*

34. A minimum unsaturated soil depth of two (2) feet above the water table level is required at the time the residuals are applied to the soil. *[62-640.700(6)(a), 03-30-98]*

35. The permittee shall maintain records of application zones and application rates and shall make these records available for inspection within seven (7) days of request by the Department, or delegated Local Program. The permittee shall maintain record items "a" through "e" below in perpetuity, and maintain record items "f" through "k" for five (5) years:

    a. Date of application of the residuals;
    b. Location of the residuals application site as specified in the Agricultural Use Plan;
    c. Identification of each application zone used by the permittee at the application site and the acreage of each zone.
    d. Amount of residuals applied or delivered to each application zone;
    e. Cumulative loading of each application zone;
    f. The names of all other wastewater facilities using each of the application zones identified in item c.
    g. Method of incorporation (if any);
    h. Measured pH of the residuals soil mixture at the time the residuals are applied (tested at least annually);
    I. Unsaturated depth of soil above the water table level at the time of application;
    j. Concentration of parameters in the residuals as required by this permit, and the date of last analysis; and
    k. The results of any soil testing that is done under Rule 62-640.500(4)(a), F.A.C.

    [62-640.650(2), 03-30-98]

36. Residuals shall not be applied during rains that cause runoff from the site or when surface soils are saturated. *[62-640.700(7)(a), 03-30-98]*

37. Land application of "other solids" as defined in Chapter 62-640, F.A.C., shall be conducted in accordance with the Agricultural Use Plan(s) approved for this facility. Land application of "other solids" is subject to Chapter 62-640, F.A.C., and the permit conditions that apply to land applied residuals. *[62-640.860, 03-30-98]*

38. If the permittee intends to accept residuals from other facilities, a permit revision is required pursuant to Rule 62-640.880(2)(d), F.A.C. *[62-640.880(2)(d), 03-30-98]*

39. Storage of residuals or other solids at the permitted facility shall require prior written notification to the Department. *[62-640.300(4), 03-30-98]*

III. Ground Water Monitoring Requirements

Operational Conditions

1. During the period of operation authorized by this permit, the permittee shall sample ground water at the monitoring wells identified in Permit Condition III.2. below, in accordance with Rule 62-522.600, F.A.C.
[62-522.600, 12-09-96]

2. The following monitoring wells shall be sampled **QUARTERLY**:

Well Name	Monitoring Site Identifier	Monitoring Location	Aquifer Monitored	Well Type	New or Existing
MW-1	MWB-01	Sabal Trace GC	Surficial	B	Existing
MW-2	MWC-01	Sabal Trace GC	Surficial	C	Existing
MW-3	MWC-02	Sabal Trace GC	Surficial	C	Existing
MW-4	MWC-03	Sabal Trace GC	Surficial	C	Existing
MW-5	MWC-04	Sabal Trace GC	Surficial	C	Existing
MW-7	MWC-05	North Port Blvd.	Surficial	C	Existing
MW-11	MWB-02	WWTP	Surficial	B	Existing
MW-12	MWC-06	WWTP	Surficial	C	Existing
MW-15	MWC-07	WWTP	Surficial	C	Existing
MW-16	MWC-08	WWTP	Surficial	C	Existing

B - Background C - Compliance

[62-522.600(11)(b), 12-09-96]

3. If any monitoring well becomes damaged or inoperable, the permittee shall notify the Department immediately and a detailed written report shall follow within seven days. The written report shall detail what problem has occurred and remedial measures that have been taken to prevent the recurrence. All monitoring well design and replacement shall be approved by the Department prior to installation.
[62-522.600, 12-09-96]

4. Ground water monitoring wells shall be sampled in accordance with Department document; **DER - QA - 001/92, Standard Operating Procedures for Laboratory Operations and Sample Collection Activities.**
[62-522.600(1), 12-09-96]

5. Ground water monitoring well samples shall be analyzed in accordance with Department document; **DER - QA - 001/92, Standard Operating Procedures for Laboratory Operations and Sample Collection Activities** as specified in Chapter 62-520, FAC, and Chapter 62-522, FAC.
[62-520.300, and 62-520.420, 12-09-96] [62-522.600(1), 12-09-96]

6. The following parameters shall be analyzed **QUARTERLY** for each of the monitoring well(s) previously identified in Permit Condition III.2.

a.	Nitrate (as N)	mg/L
b.	Fecal Coliform	cts./100ml
c.	Ammonia (as N)	mg/L
d.	Total Dissolved Solids	mg/L
e.	Sodium	mg/L
f.	Chloride	mg/L
g.	Sulfate	mg/L
h.	Turbidity	NTUs
i.	Water level (field measurement)	feet above Mean Sea Level
j.	pH (field measurement)	stnd.units
k.	Specific Conductance (field measurement)	µmhos/cm
l.	Temperature (field measurement)	°C

[62-522.600(11)(b), 12-09-96]

7. All ground water monitoring wells shall be sampled, analyzed and the results reported in accordance with the following schedule:

Sample Period	Report Due Date
1st Quarter (January-March)	April 28
2nd Quarter (April-June)	July 28
3rd Quarter (July-September)	October 28
4th Quarter (October-December)	January 28

There shall be a minimum forty-five days between any two consecutive quarterly sampling events. Additional samples, wells and parameters may be required based upon subsequent analysis.

[62-522.600(11)(b), 12-09-96]

8. Ground water monitoring well test results shall be submitted on **Part D of Form 62-620.910(10)**. Results shall be submitted at the intervals specified in Permit Condition III.7. for each year during the period of operation allowed by this permit. Results shall be submitted with the DMR in accordance with Permit Condition I. C. 9.
[62-522.600(11)(b), 12-09-96] [62-601.300(3), 62.601.700 and Figure 3 of 62-601, 12-24-96]
[62-620.610.(18), 03-02-00]

9. The ground water minimum criteria specified in Rule 62-520.400, shall be met within the zone of discharge.
[62-520.400 and 62-522.300(1), 12-09-96]

10. All ground water quality criteria specified in Chapter 62-520 and Chapter 62-522 shall be met at the edge of the zone of discharge. The zone of discharge shall extend horizontally 100 feet or to the site property line, whichever is less, and vertically to the base of the surficial aquifer.
[62-520.200(23), 62-520.400, 62-520.420, 12-09-96] [62-522.300(1), 62-522.400, and 62-522.410, 12-09-96]

11. Sixty days prior to the submittal of the wastewater facility renewal application of this permit, the permittee shall sample all groundwater monitoring wells for the Florida Primary and Secondary Drinking Water Standards contained in Chapter 62-550, F.A.C. (excluding asbestos, butachlor, dioxin, acrylamide, and epichlorohydrin), and EPA Methods 601 and 602. The analyses shall be submitted on **Part D of Form 62-620.910 (10)** to the Department and with the renewal application. *[62-522.500, 12-09-96]*

12. The permittee shall submit to the Department an annual cumulative summary of the quarterly ground water data. This document will be submitted with the 3rd Quarter DMR pursuant to Permit Condition III.7. The data shall be presented in both graphical and tabular formats for each ground water monitoring well. The specific parameters are to include the following:

a.	Nitrate (as N)	mg/L
b.	Fecal Coliform	cts./100ml
c.	Ammonia (as N)	mg/L
d.	Total Dissolved Solids	mg/L
e.	Sodium	mg/L
f.	Chloride	mg/L
g.	Sulfate	mg/L
h.	Turbidity	NTUs
i.	Water level (field measurement)	feet above Mean Sea Level
j.	pH (field measurement)	stnd.units
k.	Specific Conductance (field measurement)	µmhos/cm
l.	Temperature (field measurement)	°C

[62-522.600(11)(b), 12-09-96]

13. If at any time, ground water standards are exceeded at the edge of the zone of discharge, the permittee has fifteen days from receipt of the laboratory analysis in which to resample the monitoring well(s) to verify the original analysis. The monitoring test results must be submitted to the Department within fifteen days of receipt of the reanalyses from the laboratory. Should the permittee choose not resample, the Department will consider the water quality analysis as representative of current ground water conditions at the facility. *[62-522.500, 12-09-96]*

14. Sixty days prior to the submittal of the wastewater facility renewal application of this permit, the permittee shall provide a 24 hour composite effluent sample prior to discharge to the land application system. The composite sample shall be analyzed for the Florida Primary and Secondary Drinking Water Standards in accordance with Chapter 62-550, F.A.C., and the EPA Priority Pollutants. The effluent analysis shall be submitted to the Department with the renewal application. The analyses results will be reported on **Form 62-620.910(15)**, or a Department approved exact replica, compatible with the data entry into the Department's computer system. *[62-522.500, 12-09-96]*

Ground Water Monitoring Plan Construction Requirements

15. All new ground water monitoring wells which may subsequently be required shall be identified in a revision to the Ground Water Monitoring Plan and shall be installed within 90 days of Department approval of the GWMP revision. *[62-522.600, 12-09-96]*

16. Prior to construction of new ground water monitoring wells, a soil boring shall be made at each new monitoring well location in order to properly size the well depth and screen interval. *[62-522.900(3), 12-09-96]*

17. The **QUARTERLY** sampling and analysis of all new ground water monitoring wells shall begin upon commencement of the application of reclaimed water to the site. The wells shall be sampled for the parameters identified in Permit Condition III. 6. above. *[62-522.600(11), 12-09-96]*

18. Within sixty days of completion of construction of the ground water monitoring wells, a surveyed drawing shall be submitted showing the location of all monitoring wells (active and abandoned) which will be horizontally located by metes and bounds or equivalent surveying techniques. The surveyed drawing shall include the monitoring well identification number as well as location and elevation of all permanent benchmark(s) and/or corner monument marker(s) at the site. The survey shall be conducted by a Florida Registered Surveyor. *[62-522.600, 12-09-96]*

19. Within thirty days of completion of construction of the ground water monitoring wells, well completion reports shall be sent to the Technical Services Section, FDEP Southwest District Office. The information is to be submitted on the attached form for each well, **DEP Form 62-522.900(3), Monitor Well Completion Report.** *[62-522.600, 12-09-96]*

20. Within 30 days of completion of construction of the ground water monitoring wells, the permittee shall submit the following information for each monitoring well:

    a. A copy of the Southwest Florida Water Management District (SWFWMD) **State of Florida Permit Application to Construct, Repair, Modify, or Abandon a Well, Form 41.10-410(1), Rev. 4-95**; and

    b. A copy of the SWFWMD **Well Completion Report, Form 41.10-410(2), Rev. 8-96.**

    [62-522.600, 12-09-96]

21. Within sixty days of completion of construction of the ground water monitoring system, the permittee shall sample all new ground water monitoring wells for the Primary and Secondary Drinking Water parameters included in Rule 62-550, Florida Administrative Code, Public Drinking Water Systems (excluding asbestos, butachlor, dioxin, acrylamide and epichlorohydrin), and EPA Methods 601 and 602.
[62-520.200(23), 62-520.400, 62-520.420, 12-09-96] [62-522.300(1), 62-522.400, and 62-522.410, 12-09-96]

22. Within sixty days of completion of construction of the ground water monitoring system, or within six months of startup for new facilities, the permittee shall provide a 24 hour composite reclaimed water sample prior to discharge to the land application site. The composite sample shall be analyzed for the Primary and Secondary Drinking Water Standards, in accordance with Rule 62-550, F.A.C., and the EPA Priority Pollutants.
[62-520.200(23), 62-520.400, 62-520.420, 12-09-96] [62-522.300(1), 62-522.400, and 62-522.410, 12-09-96]

23. Within sixty days of completion of construction of the ground water monitoring system, all piezometers and wells not a part of the approved ground water monitoring plan are to be plugged and abandoned in accordance with Rule 62-532.500(4), F.A.C. and the Southwest Florida Water Management District. The permittee shall submit a written report to the Department providing verification of the plugging program. A written request for exemption to the plugging of a well must be submitted to the Department's Ground Water Section for approval. *[62-522.600, 12-09-96]*

IV. Additional Reuse and Land Application Requirements

Part III Public Access System-R001

1. Use of reclaimed water is authorized within the North Port Master Urban Reuse System (R001) consisting of existing and proposed new reuse components within a general service area as described in detail below and as shown on the City of North Port Future Reclaimed Water Reuse Service Area map, prepared by Hartman & Associates, Inc., undated. Usage will include residential lawns, golf courses, parks, playgrounds, landscape areas, highway medians, rights of way, and plant site washwaters, foam control, and irrigation. Not included are cemeteries, edible crops, toilet flush, fire protection, or aethetic purposes. *[62-620.630(10)(a) & (d), 10-23-00]*

2. North Port Master Urban Reuse General Service Area: Beginning at the Northeast corner of Section 1, T39S, R21E; thence in a southerly direction along the east sectionline of Section 1, T39S, R21E and Section 12, T39S, R21E to the intersection with the right of way of I-75; thence easterly and southeasterly along the I-75 right of way to the intersection with Snover Waterway; thence easterly along the Snover Waterway to the Sarasota/DeSoto County line; thence south along the Sarasota/DeSoto County line to the intersection with the Charlotte County line; thence west along the Sarasota/Charlotte County line to the southwest corner of Section 31, T39S, R21E, which is on the western boundary of T39S, R21E; thence north along the western boundary of T39S, R21E to the northwest corner of Section 6, T39S, R21E, which is on the northern boundary of T39S, R21E; thence east along the northern boundary of T39S, R21E to the point of beginning. The service area encompasses all of T39S, R21E, and all or part of Sections 7,8, and 16 thru 36, T39S, R22E.

3. This reuse system includes the following existing and potential major users (i.e., using 0.1 mgd or more of reclaimed water):

User Name	User Type	Capacity (mgd)	Acreage
Sabal Trace Golf Course*	GC	0.600	97
Heron Creek Development and Golf Course Phases I and II*	R/L/H/GC	0.800	117
North Port High School	L/H	0.200	104
North Port City Complex	L/H	0.150	68
*Existing	Total	1.750	386

R Residential Lawns
GC Golf Courses
L Landscaped Areas (include: Condo Commons)
H Highway Medians, Rights of Way

[62-610.800(5), 08-08-99][62-620.630(10)(b), 10-23-00]

4. This reuse system also includes the following non-major existing and potential users

User Name	User Type	Capacity (mgd)	Acreage
Sabal Trace Residential*	R/H/L	0.050	30
North Port Public Rights of Way/Medians*	H	0.020	5
WWTP Reuse*	L	0.020	22
Narramore Sports Park	L/H	0.040	7
*Existing	Total	0.130	64

R Residential Lawns
H Highway Medians, Rights of Way
L Landscaped Areas (include. Condo Commons)

[62-610.800(5), 08-08-99] [62-620.630(10)(a), 10-23-00]

5. An annual summary of major and non-major users added on-line to the system during the preceding calendar year, showing total active capacity, shall be submitted not later than March 31st to the Southwest District. *[62-610.469, 08-08-99]*

6. All ground water quality criteria specified in Chapter 62-520, F.A.C., shall be met at the edge of the zone of discharge. For major users of reclaimed water (i.e., using 0.1 mgd or more), the zone of discharge shall extend horizontally 100 feet from the application site or to site property line of the user, whichever is less, and vertically to the base of the surficial aquifer. For other users, the zone of discharge shall extend horizontally to the boundary of the general service area identified in the map referenced in the Reuse System description and vertically to the base of the surficial aquifer. *[62-520.200(23), 12-09-96] [62-522.400 and 62-522.410, 12-09-96]*

7. The treatment facilities shall be operated in accordance with the approved operating protocol. Only reclaimed water that meets the criteria established in the approved operating protocol may be released to system storage or to the reuse system. Reclaimed water that fails to meet the criteria in the approved operating protocol shall be directed to reject storage for subsequent additional treatment or disinfection or to alternative disposal. The operating protocol shall be reviewed and revised periodically and at permit renewal to ensure continuous compliance with the minimum treatment and disinfection requirements. Revised operating protocols shall be submitted to the Southwest District Office of the Department for review and approval. Approval by the Department shall be a prerequisite for permit renewal. *[62-610.320(6) and 62-610.463(2),08-08-99]*

8. Cross-connections to the potable water system are prohibited. *[62-610.469(7), 08-08-99]*

9. A cross-connection control program shall be implemented and/or remain in effect within the areas where reclaimed water will be provided for use. *[62-610.469(7), 08-08-99]*

10. In constructing reclaimed water distribution piping, the permittee shall maintain a setback distance of 75 feet from a reclaimed water transmission facility to public water supply wells. No setback distances are required to other potable water supply wells or to any nonpotable water supply wells. *[62-610.471(3), 08-08-99]*

11. Maximum obtainable separation of reclaimed water lines and potable water lines shall be provided and the minimum separation distances specified in Rule 62-610.469(7), F.A.C., shall be provided. Reuse facilities shall be color coded or marked. Underground piping which is not manufactured of metal or concrete shall be color coded Pantone Purple 522C using light stable colorants. Underground metal and concrete pipe shall be color coded or marked using purple as the predominant color. *[62-610.469(7), 08-08-99]*

12. A setback distance of 75 feet shall be maintained between the edge of the wetted area and potable water supply wells, unless the utility adopts and enforces an ordinance prohibiting potable water supply wells within the reuse service area. No setback distances are required to any nonpotable water supply well, to any surface water, to any developed areas, or to any private swimming pools, hot tubs, spas, saunas, picnic tables, barbecue pits, or barbecue grills. *[62-610.471(1), (2), (5), and (7), 08-08-99]*

13. Reclaimed water shall not be used to fill swimming pools, hot tubs, or wading pools. *[62-610.469(4), 08-08-99]*

14. Low trajectory nozzles, or other means to minimize aerosol formation shall be used within 100 feet from outdoor public eating, drinking, or bathing facilities. *[62-610.471(6), 08-08-99]*

15. A setback distance of 100 feet shall be maintained from indoor aesthetic features using reclaimed water to adjacent indoor public eating and drinking facilities. *[62-610.471(8), 08-08-99]*

16. The permittee shall ensure that users of reclaimed water are informed about the origin, nature, and characteristics of reclaimed water; the manner in which reclaimed water can be safely used; and limitations on the use of reclaimed water. Notification is required at the time of <u>initial</u> connection to the reclaimed water distribution system and <u>annually</u> after the reuse system is placed into operation. *[62-610.468(6), 08-08-99]*

17. The public shall be notified of the use of reclaimed water. This shall be accomplished by posting of advisory signs in areas where reuse is practiced, notes on scorecards, or other methods. All new advisory signs and labels on vaults, service boxes, or compartments that house hose bibbs along with all labels on hose bibbs, valves, and outlets shall bear the words "do not drink" and "no beber" along with the equivalent standard international symbol. In addition to the words "do not drink" and "no beber", advisory signs posted at storage ponds and decorative water features shall also bear the words "do not swim" and "no nadar" along with the equivalent standard international symbols. Existing advisory signs and labels shall be retrofitted, modified, or replaced in order to comply with the revised wording requirements. For existing advisory signs and labels this retrofit, modification, or replacement shall occur within 365 days after the date of this permit. For labels on existing vaults, service boxes, or compartments housing hose bibbs this retrofit, modification, or replacement shall occur within 730 days after the date of this permit. *[62-610.468 & 62-610.469, 08-08-99]*

18. Routine aquatic weed control and regular maintenance of storage pond embankments and access areas are required. *[62-610.414 and 62-610.464, 08-08-99]*

19. Permittees making reclaimed water available for activities regulated by Part III of Chapter 62-610, F.A.C., shall submit a summary of their public notification program (including copies of public notification materials) annually to the Department with the annual report of reclaimed water utilization required in Permit Condition I. B. 14. This summary shall include the details of the public notification program as specified in Rule 62-610.468(6), F.A.C. *[62-610.870(3)(g), 08-08-99] [62-610.468(6), 08-08-99]*

20. Overflows from emergency discharge facilities on storage ponds shall be reported as an abnormal event to the Southwest District Office of the Department and to Sarasota County Pollution Control Division within twenty-four hours of an occurrence as an abnormal event. The provisions of Rule 62-610.800(9), F.A.C., shall be met. *[62-610.800(9), 08-08-99]*

21. Reclaimed water shall only be released to the system storage or reuse system during periods of operator attendance or when all provisions of the approved operation protocol are functioning as intended in compliance with the approved operating protocol. *[62-610.462(2), 08-08-99]*

22. Storage of reclaimed water at individual user sites may be accomplished using new or existing ponds, reservoirs, or lakes. Technical criteria set forth within Chapter 62-610 must be complied with except for construction standards set forth in Rule 62-610.414, F.A,C., with respect to existing ponds, reservoirs, or lakes. Permittee shall notify the Department prior to placing storage into service, providing general location, storage volume, and construction information such as berm design, pond cross-section, emergency overflow location, freeboard available, etc. Permittee shall obtain appropriate Southwest Florida Water Management District permits or exemptions if the proposed ponds, reservoirs, or lakes are part of a stormwater management system. If proposed storage ponds, reservoirs, or lakes are not isolated, are part of a stormwater management system, and discharge to surface waters in other than emergency conditions, permittee shall make proper application for National Pollutant Discharge Elimination System (NPDES) permit for the reuse system. *[62-610.464, 08-08-99]*

23. The permittee shall maintain an inventory of storage systems which shall be submitted annually to the Department with the annual report of reclaimed water utilization required in Permit Condition I. B. 14. An updated inventory shall be submitted to the Department at least 30 days before reclaimed water is introduced to any new storage systems This inventory shall include the following: name or identifier of the storage system; location (latitude/longitude); function (system or reject storage); type of facility (covered tank, uncovered tank, lined pond, unlined pond); whether or not facility is a water of, or discharges to a water of the state; and distances to the nearest public supply water wells and the nearest potable water supply wells that are not public supply wells.
[62-610.870(3)(f), 08-08-99] [62-610.464(5), 08-08-99]

24. The permittee is responsible for ensuring that:

    (a) Reclaimed water delivered to users of reclaimed water is of acceptable quality for the intended uses at the point o delivery; and

    (b) Reclaimed water is used in a manner that is consistent with this chapter and with the permit, such that public health and environmental quality will be protected.

    [62-610.800(12), 08-08-99]

V. Operation and Maintenance Requirements

General

1. Permittee may activate or de-activate treatment trains or components of trains in accordance with procedures set forth in the plant Operating and Maintenance Manual to optimize operation for varying biological or hydraulic loadings, while maintaining plant design criteria. Such changes in operational practices shall be reported in writing or by electronic means to the Southwest District prior to the change.
[62-600.410 & 62-600.740(2)(d), 12-24-96]

Staffing Requirements

2. During the period of operation authorized by this permit, the wastewater facilities shall be operated under the supervision of an operator certified in accordance with Chapters 61E12-41, F.A.C. or 62-602, F.A.C. This facility is a Category II, Class B facility and, at a minimum, operators with appropriate certification must be on the site as follows:

   A Class C or higher operator 16 hours/day for 7 days/week. The lead operator must be a Class B operator. Transfer of reclaimed water to the on site or reuse system storage tanks, lakes and ponds shall only occur when an operator is on duty.

   [62-699, 05-20-92] [62-620.630(3), 10-23-00] [62-699.310, 05-20-92] [62-610.462, 08-08-99]

3. The lead operator shall be on duty for one full shift each duty day. A certified operator shall be on-site and in charge of each required shift and for periods of required staffing time when the lead operator is not on-site. A certified operator shall be on call during periods when the plant is unattended. *[62-699.311(10) and (5), 05-20-92]*

Capacity Analysis Report and Operation and Maintenance Performance Report Requirements

4. The application to renew this permit shall include an updated capacity analysis report prepared in accordance with Rule 62-600.405, F.A.C. *[62-600.405(5), 12-24-96]*

5. The application to renew this permit shall include a detailed operation and maintenance performance report prepared in accordance with Rule 62-600.735, F.A.C. *[62-600.735(1), 12-24-96]*

Record Keeping Requirements

6. The permittee shall maintain the following records and make them available for inspection on the site of the permitted facility:

   a. Records of all compliance monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation and a copy of the laboratory certification showing the certification number of the laboratory, for at least three years from the date the sample or measurement was taken;

   b. Copies of all reports required by the permit for at least three years from the date the report was prepared;

   c. Records of all data, including reports and documents, used to complete the application for the permit for at least three years from the date the application was filed;

6. Continued:

   d. Monitoring information, including a copy of the laboratory certification showing the laboratory certification number, related to the residuals use and disposal activities for the time period set forth in Chapter 62-640, F.A.C., for at least three years from the date of sampling or measurement;

   e. A copy of the current permit;

   f. A copy of the current operation and maintenance manual as required by Chapter 62-600, F.A.C.;

   g. A copy of the facility record drawings;

   h. Copies of the licenses of the current certified operators; and

   i. Copies of the logs and schedules showing plant operations and equipment maintenance for three years from the date of the logs or schedules. The logs shall, at a minimum, include identification of the plant; the signature and certification number of the operator(s) and the signature of the person(s) making any entries; date and time in and out; specific operation and maintenance activities; tests performed and samples taken; and major repairs made. The logs should also contain a record of daily reclaimed water usage by each major user where an individual flow measurement capability has been established. The logs shall be maintained on-site in a location accessible to 24-hour inspection, protected from weather damage, and current to the last operation and maintenance performed.

[62-620.350, 10-23-00] [61E12-41.010(1)(e), 07-15-96] [62-602, 12-30-99]

VI. Schedules

1. The following construction schedule for the City of North Port WWTP facility modifications and the Master Urban Reuse System (R001) shall be followed, unless a minor permit revision is issued to amend the schedule:

Implementation Step	Scheduled Completion Date
1. Complete detailed plans and specifications.	Ongoing
2. Start construction.	October 1, 2001
3. Place the modifications to existing facilities in operation.	April 30, 2003
4. Comply with reclaimed water and effluent limitations.	April 30, 2003
5. Place modified Reuse System R001 into operation	Continuing

[62-620.400, 10-23-00]

VII. Industrial Pretreatment Program Requirements

1. This facility is not required to have a pretreatment program at this time. *[62-625.500, 01-08-97]*

VIII. OTHER SPECIFIC CONDITIONS

1. Prior to placing the modified facilities into operation or any individual unit processes into operation, for any purpose other than testing for leaks and equipment operation, the permittee shall complete and submit **Form 62-620.910(12), Notification of Completion of Construction for Domestic Wastewater Facilities.** *[62-620.630(2), 10-23-00]*

2. Within six months after the modified facilities are placed in operation, the permittee shall provide written certification to the Department on **Form 62-620.910(13)** that record drawings pursuant to Chapter 62-600, F.A.C., and that an operation and maintenance manual pursuant to Chapters 62-600 and 62-610, F.A.C., as applicable, are available at the location specified on the form. *[62-620.630(7), 10-23-00]*

3. If the permittee wishes to continue operation of this wastewater facility after the expiration date of this permit, the permittee shall submit an application for renewal, using **Department Forms 62-620.910(1) and (2)**, no later than one-hundred and eighty days (180) prior to the expiration date of this permit. *[62-620.410(5), 10-23-00]*

4. Florida water quality criteria and standards shall not be violated as a result of any discharge or land application of reclaimed water or residuals from this facility. *[62-600.320(9), 12-24-96]*
[62-302.510(5), 12-26-96] [62-610.850(1)(a) and (2)(a),08-08-99] [62-640.700(2)(b), 03-30-98]

5. In the event that the treatment facilities or equipment no longer function as intended, are no longer safe in terms of public health and safety, or odor, noise, aerosol drift, or lighting adversely affects neighboring developed areas at the levels prohibited by Rule 62-600.400(2)(a), F.A.C., corrective action (which may include additional maintenance or modifications of the permitted facilities) shall be taken by the permittee. Other corrective action may be required to ensure compliance with rules of the Department. Additionally, the treatment, management, use or land application of residuals shall not cause a violation of the odor prohibition in Rule 62-296.320(2), F.A.C.
[62-600.410(8), 12-24-96] [62-640.400(6), 03-30-98]

6. The deliberate introduction of stormwater in any amount into collection/transmission systems designed solely for the introduction (and conveyance) of domestic/industrial wastewater; or the deliberate introduction of stormwater into collection/transmission systems designed for the introduction or conveyance of combinations of storm and domestic/industrial wastewater in amounts which may reduce the efficiency of pollutant removal by the treatment plant is prohibited. *[62-604.130(3), 12-26-96]*

7. Collection/transmission system overflows shall be reported to the Department in accordance with Permit Condition IX. 20. *[62-604.550, 12-26-96] [62-620.610(20), 10-23-00]*

8. The operating authority of a collection/transmission system and the permittee of a treatment plant are prohibited from accepting connections of wastewater discharges which have not received necessary pretreatment or which contain materials or pollutants (other than normal domestic wastewater constituents):

   a. Which may cause fire or explosion hazards; or
   b. Which may cause excessive corrosion or other deterioration of wastewater facilities due to chemical action or pH levels; or
   c. Which are solid or viscous and obstruct flow or otherwise interfere with wastewater facility operations or treatment; or
   d. Which result in treatment plant discharges having temperatures above 40°C.

   [62-604.130(4), 12-26-96]

9. The treatment facility, storage ponds, rapid infiltration basins, and/or infiltration trenches shall be enclosed with a fence or otherwise provided with features to discourage the entry of animals and unauthorized persons. *[62-610.464(4), 08-08-99] [and 62-600.410, 12-24-96]*

10. Disposal of screenings and grit from preliminary treatment components of wastewater treatment facilities, solids from sewer line cleaning operations, and solids from lift stations and pump stations shall be in accordance with Chapter 62-701, F.A.C. *[62-640.100(6)(k)8, 03-30-98] [62-701.300(1)(a), 04-23-97]*

11. The permittee shall provide adequate notice to the Department of the following:

    a. Any new introduction of pollutants into the facility from an industrial discharger which would be subject to Chapter 403, F.S., and the requirements of Chapter 62-620, F.A.C. if it were directly discharging those pollutants; and

    b. Any substantial change in the volume or character of pollutants being introduced into that facility by a source which was identified in the permit application and known to be discharging at the time the permit was issued.

    Adequate notice shall include information on the quality and quantity of effluent introduced into the facility and any anticipated impact of the change on the quantity or quality of effluent or reclaimed water to be discharged from the facility. *[62-620.625(2), 10-23-00]*

12. In addition to the requirements of Permit Condition IX.20., the permittee shall report all unauthorized releases or spills of untreated or treated wastewater as follows:

    a. For unauthorized releases or spills in excess of 1,000 gallons per incident, or where public health or the environme may be endangered, to the **STATE WARNING POINT TOLL FREE NUMBER (800) 320-0519**, as soon as practical, but no later than 24 hours from the time the permittee becomes aware of the discharge. The permittee, t the extent known, shall provide the following information to the State Warning Point:

        1. Name, address, and telephone number of person reporting.
        2. Name, address, and telephone number of permittee or responsible person for the discharge.
        3. Date and time of the discharge and status of discharge (ongoing or ceased).
        4. Characteristics of the wastewater spilled or released (untreated or treated, industrial or domestic wastewater).
        5. Estimated amount of the discharge.
        6. Location or address of the discharge.
        7. Source and cause of the discharge.
        8. Whether the discharge was contained on-site, and cleanup actions taken to date.
        9. Description of area affected by the discharge, including name of water body affected, if any.
        10. Other persons or agencies contacted.

    b. For unauthorized releases or spills of 1,000 gallons or less, per incident, oral reports shall be provided to the Department's Southwest District Office within 24 hours from the time the permittee becomes aware of the discharge.

    [62-620.610(20), 10-23-00]

IX. GENERAL CONDITIONS

1. The terms, conditions, requirements, limitations and restrictions set forth in this permit are binding and enforceable pursuant to Chapter 403, Florida Statutes. Any permit noncompliance constitutes a violation of Chapter 403, Florida Statutes, and is grounds for enforcement action, permit termination, permit revocation and reissuance, or permit revision. *[62-620.610(1), 10-23-00]*

2. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviations from the approved drawings, exhibits, specifications or conditions of this permit constitutes grounds for revocation and enforcement action by the Department. *[62-620.610(2), 10-23-00]*

3. As provided in Subsection 403.087(6), F.S., the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor authorize any infringement of federal, state, or local laws or regulations. This permit is not a waiver of or approval of any other Department permit or authorization that may be required for other aspects of the total project which are not addressed in this permit. *[62-620.610(3), 10-23-00]*

4. This permit conveys no title to land or water, does not constitute state recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title. *[62-620.610(4), 10-23-00]*

5. This permit does not relieve the permittee from liability and penalties for harm or injury to human health or welfare, animal or plant life, or property caused by the construction or operation of this permitted source; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department. The permittee shall take all reasonable steps to minimize or prevent any discharge, reuse of reclaimed water, or residuals use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. *[62-620.610(5), 10-23-00]*

6. If the permittee wishes to continue an activity regulated by this permit after its expiration date, the permittee shall apply for and obtain a new permit. *[62-620.610(6), 10-23-00]*

7. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control, and related appurtenances, that are installed and used by the permittee to achieve compliance with the conditions of this permit. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to maintain or achieve compliance with the conditions of the permit. *[62-620.610(7), 10-23-00]*

8. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit revision, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition. *[62-620.610(8), 10-23-00]*

9. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, including an authorized representative of the Department and authorized EPA personnel, when applicable, upon presentation of credentials or other documents as may be required by law, and at reasonable times, depending upon the nature of the concern being investigated, to:

   a. Enter upon the permittee's premises where a regulated facility, system, or activity is located or conducted, or where records shall be kept under the conditions of this permit;

   b. Have access to and copy any records that shall be kept under the conditions of this permit;

   c. Inspect the facilities, equipment, practices, or operations regulated or required under this permit; and

   d. Sample or monitor any substances or parameters at any location necessary to assure compliance with this permit or Department rules.

   [62-620.610(9), 10-23-00]

10. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data, and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except as such use is proscribed by Section 403.111, Florida Statutes, or Rule 62-620.302, Florida Administrative Code. Such evidence shall only be used to the extent that it is consistent with the Florida Rules of Civil Procedure and applicable evidentiary rules. *[62-620.610(10), 10-23-00]*

11. When requested by the Department, the permittee shall within a reasonable time provide any information required by law which is needed to determine whether there is cause for revising, revoking and reissuing, or terminating this permit, or to determine compliance with the permit. The permittee shall also provide to the Department upon request copies of records required by this permit to be kept. If the permittee becomes aware of relevant facts that were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be promptly submitted or corrections promptly reported to the Department. *[62-620.610(11), 10-23-00]*

12. Unless specifically stated otherwise in Department rules, the permittee, in accepting this permit, agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance; provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules. A reasonable time for compliance with a new or amended surface water quality standard, other than those standards addressed in Rule 62-302.500, F.A.C., shall include a reasonable time to obtain or be denied a mixing zone for the new or amended standard. *[62-620.610(12), 10-23-00]*

13. The permittee, in accepting this permit, agrees to pay the applicable regulatory program and surveillance fee in accordance with Rule 62-4.052, F.A.C. *[62-620.610(13), 10-23-00]*

14. This permit is transferable only upon Department approval in accordance with Rule 62-620.340, F.A.C. The permittee shall be liable for any noncompliance of the permitted activity until the transfer is approved by the Department. *[62-620.610(14), 10-23-00]*

15. The permittee shall give the Department written notice at least 60 days before inactivation or abandonment of a wastewater facility and shall specify what steps will be taken to safeguard public health and safety during and following inactivation or abandonment. *[62-620.610(15), 10-23-00]*

16. The permittee shall apply for a revision to the Department permit in accordance with Rules 62-620.300, 62-620.420 or 62-620.450, F.A.C., as applicable, at least 90 days before construction of any planned substantial modifications to the permitted facility is to commence or with Rule 62-620.300 for minor modifications to the permitted facility. A revised permit shall be obtained before construction begins except as provided in Rule 62-620.300, F.A.C. *[62-620.610(16), 10-23-00]*

17. The permittee shall give advance notice to the Department and to the Sarasota County Pollution Control Division of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. The permittee shall be responsible for any and all damages which may result from the changes and may be subject to enforcement action by the Department for penalties or revocation of this permit. The notice shall include the following information:

    a. A description of the anticipated noncompliance;

    b. The period of the anticipated noncompliance, including dates and times; and

    c. Steps being taken to prevent future occurrence of the noncompliance.

    [62-620.610(17), 10-23-00]

18. Sampling and monitoring data shall be collected and analyzed in accordance with Rule 62-4.246, Chapters 62-160 and 62-601, F.A.C., and 40 CFR 136, as appropriate.

    a. Monitoring results shall be reported at the intervals specified elsewhere in this permit and shall be reported on a **Discharge Monitoring Report (DMR), DEP Form 62-620.910(10).**

    b. If the permittee monitors any contaminate more frequently than required by the permit, using Department approved test procedures, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.

    c. Calculations for all limitations which require averaging of measurements shall use an arithmetic mean unless otherwise specified in this permit.

    d. Any laboratory test required by this permit for domestic wastewater facilities shall be performed by a laboratory that has been certified by the Department of Health (DOH) under Chapter 64E-1, F.A.C., to perform the test. On-site tests for dissolved oxygen, pH, and total chlorine residual shall be performed by a laboratory certified to test for those parameters or under the direction of an operator certified under Chapters 61E12-41, F.A.C. or 62-602, F.A.C.

    e. Under Chapter 62-160, F.A.C., sample collection shall be performed by following the protocols outlined in "**DER Standard Operating Procedures for Laboratory Operations and Sample Collection Activities**" (DER-QA-001/92). Alternatively, sample collection may be performed by an organization who has an approved Comprehensive Quality Assurance Plan (CompQAP) on file with the Department. The CompQAP shall be approved for collection of samples from the required matrices and for the required tests.

    [62-620.610(18), 10-23-00]

19. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule detailed elsewhere in this permit shall be submitted no later than 14 days following each schedule date. *[62-620.610(19), 10-23-00]*

20. The permittee shall report to the Department and to the Sarasota County Pollution Control Division any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within five days of the time the permittee becomes aware of the circumstances. The written submission shall contain: a description of the noncompliance and its cause; the period of noncompliance including exact dates and time, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

    a. The following shall be included as information which must be reported within 24 hours under this condition:

        1. Any unanticipated bypass which causes any reclaimed water or effluent to exceed any permit limitation or results in an unpermitted discharge,

        2. Any upset which causes any reclaimed water or the effluent to exceed any limitation in the permit,

        3. Violation of a maximum daily discharge limitation for any of the pollutants specifically listed in the permit for such notice, and

        4. Any unauthorized discharge to surface or ground waters.

    b. If the oral report has been received within 24 hours, the noncompliance has been corrected, and the noncompliance did not endanger health or the environment, the Department shall waive the written report.

[62-620.610(20), 10-23-00]

21. The permittee shall report all instances of noncompliance not reported under Permit Conditions IX. 18. and 19. of this permit at the time monitoring reports are submitted. This report shall contain the same information required by Permit Condition IX. 20 of this permit. *[62-620.610(21), 10-23-00]*

22. Bypass Provisions.

    a. Bypass is prohibited, and the Department may take enforcement action against a permittee for bypass, unless the permittee affirmatively demonstrates that:

        1. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage; and

        2. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

        3. The permittee submitted notices as required under Permit Condition IX. 22. b. of this permit.

    b. If the permittee knows in advance of the need for a bypass, it shall submit prior notice to the Department and to the Sarasota County Pollution Control Division, if possible at least 10 days before the date of the bypass. The permittee shall submit notice of an unanticipated bypass within 24 hours of learning about the bypass as required in Permit Condition IX. 20. of this permit. A notice shall include a description of the bypass and its cause; the period of the bypass, including exact dates and times; if the bypass has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent recurrence of the bypass

22. Bypass Provisions, Continued:

c. The Department shall approve an anticipated bypass, after considering its adverse effect, if the permittee demonstrates that it will meet the three conditions listed in Permit Condition IX. 22. a. 1. through 3. of this permit.

d. A permittee may allow any bypass to occur which does not cause reclaimed water or effluent limitations to be exceeded if it is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Permit Condition IX. 22. a. through c. of this permit.

[62-620.610(22), 10-23-00]

23. Upset Provisions

a. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed contemporaneous operating logs, or other relevant evidence that:

1. An upset occurred and that the permittee can identify the cause(s) of the upset;

2. The permitted facility was at the time being properly operated;

3. The permittee submitted notice of the upset as required in Permit Condition IX. 20. of this permit; and

4. The permittee complied with any remedial measures required under Permit Condition IX. 5. of this permit.

b. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

c. Before an enforcement proceeding is instituted, no representation made during the Department review of a claim that noncompliance was caused by an upset is final agency action subject to judicial review.

[62-620.610(23), 10-23-00]

ɹEPARTMENT OF ENVIRONMENTAL PROTECTION - ɹSCHARGE MONITORING REPORT - PART A

ʼHEN COMPLETED, MAIL THIS REPORT TO: Department of Environmental Protection Wastewater Facilities Regulation Section, Mail Station 3551

win Towers Office Building, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400

ERMITTEE NAME: City of North Port Utilities Department
[AILING ADDRESS: Rick J. Newkirk, Interim Director
P.O. Box 7228
North Port, FL 34287-7228

ACILITY: North Port Wastewater Treatment Plant (WWTP)
.OCATION: 200 North Pan American Blvd.
North Port, FL 34287
:OUNTY: SARASOTA COUNTY

PERMIT NUMBER: FLA013378
MONITORING PERIOD--From: ________
THREE MONTH ROLLING ADF: ________
LIMIT: Interim
CLASS SIZE:N/A
FACILITY ID: FLA013378
DISCHARGE POINT NUMBER: U001
PLANT SIZE/TREATMENT TYPE: 2B

DMR Issued: 05/30/01
To: ________
% OF PERMITTED CAPACITY
REPORT: Monthly

GROUP: DW

No Discharge To U001 ☐

Please read instructions before completing this form.

Parameter		Quantity or Loading			Quality or Concentration				No. Ex.	Frequency of Analysis	Sample Type
		Average	Maximum	Units			Maximum	Units			
FLOW (U001)	Sample Measurement				-----------------	-----------------	-----------------	-------------			
PARM Code 50050 R Mon. Site No. FLW-03	Permit Requirement	REPORT MoAvg	2.0 3 MoAvg	mgd	-----------------	-----------------	-----------------	-------------		CONTINUOUS REPORT MONTHLY	CALC. ROLLING 3 MO AVG.
CBOD$_5$, EFFLUENT	Sample Measurement	-------------	-----------------	-----------							
PARM Code 80082 S Mon. Site No. INJ-01	Permit Requirement	-------------	-----------------	-----------	30.0 MoAvg	45.0 WklyAvg	60.0 Max	mg/L		WEEKLY	16 HOUR FLOW PRO COMPOS..
CBOD$_5$, EFFLUENT	Sample Measurement	-------------	-----------------	-----------	-----------------		-----------------				
PARM Code 80082 Y Mon. Site No. INJ-01	Permit Requirement	-------------	-----------------	-----------	-----------------	20.0 12 MoAvg	-----------------	mg/L		REPORT MONTHLY	CALC. ROLLING 12 MO AVG.
TSS EFFLUENT	Sample Measurement	-------------	-----------------	-----------							
PARM Code 00530 S Mon. Site No. INJ-01	Permit Requirement	-------------	-----------------	-----------	30.0 MoAvg	45.0 WklyAvg	60.0 Max	mg/L		WEEKLY	16 HOUR FLOW PRO COMPOS..

R-3 month rolling Average Daily Flow thru WWTP to Deep Injection Well
S-Effluent parameters for DIW system
Y-Annual Average Sample

certify under penalty of law that I have personally examined and am familiar with the information submitted herein; and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the ıbmitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

NAME/TITLE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT (Type or Print)	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	TELEPHONE NO.	DATE (YY/MM/DD)
		( )	

OMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here): (Attach additional sheets if necessary.)

ɹEP Form 62-620.910(10), effective November 29, 1994

Part A contin — Facility Name: North Port Wastewater Treatment Plant (WW — Facility ID No.: FLA013378

MONTH/YEAR __________ — Interim Limits

Discharge Point No: U001

Please read instructions before completing this form.

Parameter		Quantity or Loading			Quality or Concentration				No. Ex.	Frequency of Analysis	Sample Type
		Average	Maximum	Units			Maximum	Units			
TSS EFFLUENT	Sample Measurement	------------	------------	------------	------------		------------				
PARM Code 00530 Y Mon. Site No. INJ-01	Permit Requirement	------------	------------	------------	------------	20.0 12 MoAvg	------------	mg/L		REPORT MONTHLY	CALC, ROLLING 12 MO AVG
pH	Sample measurement	------------	------------	------------		------------					
PARM Code 00400 S Mon. Site No. INJ-01	Permit Requirement	------------	------------	------------	6.0 DailyMin	------------	8.5 DailyMax	SU		CONTINUOUS	METER
	Sample Measurement										
PARM Code 1 Mon. Site No.	Permit Requirement										
	Sample Measurement										
PARM Code 1 Mon. Site No.	Permit Requirement										
	Sample Measurement										
PARM Code 1 Mon. Site No.	Permit Requirement										
	Sample Measurement										
PARM Code 1 Mon. Site No.	Permit Requirement										
	Sample Measurement										
PARM Code 1 Mon. Site No.	Permit Requirement										
	Sample Measurement										
PARM Code 1 Mon. Site No.	Permit Requirement										
	Sample Measurement										
PARM Code 1 Mon. Site No.	Permit Requirement										

S-Effluent parameters for DIW system

Y-Annual Average Sample

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here):

DEPARTMENT OF ENVIRONMENTAL PROTECTION DISCHARGE MONITORING REPORT - PART A

WHEN COMPLETED, MAIL THIS REPORT TO: Department of Environmental Protection Wastewater Facilities Regulation Section, Mail Station 3551
Twin Towers Office Building, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400

PERMITTEE NAME: City of North Port Utilities Department
MAILING ADDRESS: Rick J. Newkirk, Interim Director
P.O. Box 7228
North Port, FL 34287-7228

FACILITY: North Port Wastewater Treatment Plant (WWTP)
LOCATION: 200 North Pan American Blvd.
North Port, FL 34287
COUNTY: SARASOTA COUNTY

PERMIT NUMBER: FLA013378
MONITORING PERIOD--From: ________ To: ________
THREE MONTH ROLLING ADF: ______% OF PERMITTED CAPACITY
LIMIT: Final
CLASS SIZE:N/A
FACILITY ID: FLA013378
DISCHARGE POINT NUMBER: U001
PLANT SIZE/TREATMENT TYPE: 2B

DMR Issued: 05/30/01
REPORT: Monthly
GROUP: DW
No Discharge To U001 ☐

Please read instructions before completing this form.

Parameter	[redacted]	Quantity or Loading			Quality or Concentration				No. Ex.	Frequency of Analysis	Sample Type
		Average	Maximum	Units			Maximum	Units			
FLOW (U001)	Sample Measurement				----------	----------	----------	----------			
PARM Code 50050 R Mon. Site No. FLW-03	Permit Requirement	REPORT MoAvg	3.7 3 MoAvg	mgd	----------	----------	----------	----------		CONTINUOUS REPORT MONTHLY	CALC. ROLLING 3 MO AVG.
CBOD$_5$, EFFLUENT	Sample Measurement	----------	----------	----------							
PARM Code 80082 S Mon. Site No. INJ-01	Permit Requirement	----------	----------	----------	30.0 MoAvg	45.0 WklyAvg	60.0 Max	mg/L		WEEKLY	16 HOUR FLOW PRO COMPOS..
CBOD$_5$, EFFLUENT	Sample Measurement	----------	----------	----------	----------		----------				
PARM Code 80082 Y Mon. Site No. INJ-01	Permit Requirement	----------	----------	----------	----------	20.0 12 MoAvg	----------	mg/L		REPORT MONTHLY	CALC. ROLLING 12 MO AVG.
TSS EFFLUENT	Sample Measurement	----------	----------	----------							
PARM Code 00530 S Mon. Site No. INJ-01	Permit Requirement	----------	----------	----------	30.0 MoAvg	45.0 WklyAvg	60.0 Max	mg/L		WEEKLY	16 HOUR FLOW PRO COMPOS..

R-3 month rolling Average Daily Flow thru WWTP to Deep Injection Well
S-Effluent parameters for DIW system
Y-Annual Average Sample

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein; and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

NAME/TITLE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT (Type or Print)	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	TELEPHONE NO.	DATE (YY/MM/DD)
		( )	

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here): (Attach additional sheets if necessary.)

Part A co: ed
MONTH/YEAR ____________

Facility Name: North Port Wastewater Treatment Plant (W w TP)
Final Limits

Facility ID No.: FLA013378
Discharge Point No: U001

Please read instructions before completing this form.

Parameter		Quantity or Loading			Quality or Concentration				No. Ex.	Frequency of Analysis	Sample Type
		Average	Maximum	Units			Maximum	Units			
TSS EFFLUENT PARM Code 00530 Y Mon. Site No. INJ-01	Sample Measurement	--------------	--------------	--------------	--------------		--------------				
	Permit Requirement	--------------	--------------	--------------	--------------	20.0 12 MoAvg	--------------	mg/L		REPORT MONTHLY	CALC. ROLLING 12 MO AVG
pH PARM Code 00400 S Mon. Site No. INJ-01	Sample measurement	--------------	--------------	--------------		--------------					
	Permit Requirement	--------------	--------------	--------------	6.0 DailyMin	--------------	8.5 DailyMax	SU		CONTINUOUS	METER
PARM Code 1 Mon. Site No.	Sample Measurement										
	Permit Requirement										
PARM Code 1 Mon. Site No.	Sample Measurement										
	Permit Requirement										
PARM Code 1 Mon. Site No.	Sample Measurement										
	Permit Requirement										
PARM Code 1 Mon. Site No.	Sample Measurement										
	Permit Requirement										
PARM Code 1 Mon. Site No.	Sample Measurement										
	Permit Requirement										
PARM Code 1 Mon. Site No.	Sample Measurement										
	Permit Requirement										
PARM Code 1 Mon. Site No.	Sample Measurement										
	Permit Requirement										

S-Effluent parameters for DIW system
Y-Annual Average Sample
COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here):

DEPARTMENT OF ENVIRONMENTAL PROTECTION DISCHARGE MONITORING REPORT - PART A

WHEN COMPLETED, MAIL THIS REPORT TO: Department of Environmental Protection Wastewater Facilities Regulation Section, Mail Station 3551
Twin Towers Office Building, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400

PERMITTEE NAME: City of North Port Utilities Department
MAILING ADDRESS: Rick J. Newkirk, Interim Director
P.O. Box 7228
North Port, FL 34287-7228

FACILITY: North Port Wastewater Treatment Plant (WWTP)
LOCATION: 200 North Pan American Blvd.
North Port, FL 34287
COUNTY: SARASOTA COUNTY

PERMIT NUMBER: FLA013378
MONITORING PERIOD--From: ________ To: ________
THREE MONTH ROLLING ADF: ______% OF PERMITTED CAPACITY
LIMIT: Interim
CLASS SIZE:N/A
FACILITY ID: FLA013378
DISCHARGE POINT NUMBER: R001
PLANT SIZE/TREATMENT TYPE: 2B

DMR Issued: 05/30/01
REPORT: Monthly
GROUP: DW
No Discharge To R001 ☐

Please read instructions before completing this form.

Parameter		Quantity or Loading			Quality or Concentration				No. Ex.	Frequency of Analysis	Sample Type
		Average	Maximum	Units			Maximum	Units			
FLOW (Total Plant)	Sample Measurement				--------	--------	--------	--------			
PARM Code 50050 T Mon. Site No. FLW-01	Permit Requirement	REPORT MoAvg	2.0 3 Mo Avg	mgd	--------	--------	--------	--------		CONTINUOUS REPORT MONTHLY	CALC. ROLLING 3 MO AVG
FLOW (R001)	Sample Measurement				--------	--------	--------	--------			
PARM Code 50050 Y Mon. Site No. FLW-02	Permit Requirement	REPORT MoAvg	0.600 12 Mo Avg	mgd	--------	--------	--------	--------		CONTINUOUS REPORT MONTHLY	CALC. ROLLING 12 MO AVG
$CBOD_5$, EFFLUENT	Sample Measurement	--------	--------	--------							
PARM Code 80082 A Mon. Site No. INJ-01	Permit Requirement	--------	--------	--------	30.0 MoAvg	45.0 WklyAvg	60.0 Max	mg/L		WEEKLY	16 HOUR FLOW PRO COMPOS..
$CBOD_5$, EFFLUENT	Sample Measurement	--------	--------	--------	--------		--------				
PARM Code 80082 Y Mon. Site No. INJ-01	Permit Requirement	--------	--------	--------	--------	20.0 12 MoAvg	--------	mg/L		REPORT MONTHLY	CALC. ROLLING 12 MO AVG
TSS EFFLUENT	Sample Measurement	--------	--------	--------	--------	--------					
PARM Code 00530 B Mon. Site No. EFB-01	Permit Requirement	--------	--------	--------	--------	--------	5.0 Max	mg/L		DAILY, 7 PER WEEK	GRAB

T-3 month rolling Average Daily Flow thru WWTP
Y-Annual Average Sample

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein; and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

NAME/TITLE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT (Type or Print)	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	TELEPHONE NO.	DATE (YY/MM/DD)
		( )	

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here): (Attach additional sheets if necessary.)

DEP Form 62-620.910(10), effective November 29, 1994

Part A con. :d
MONTH/YEAR ________

Facility Name: North Port Wastewater Treatment Plant (W . . P)

Interim Limits

Facility ID No.: FLA013378

Discharge Point No: R001

Please read instructions before completing this form.

Parameter		Quantity or Loading			Quality or Concentration				No. Ex.	Frequency of Analysis	Sample Type
		Average	Maximum	Units			Maximum	Units			
COLIFORM, FECAL	Sample Measurement	----------	----------	----------	----------						
PARM Code 74055 A Mon. Site No. EFA-01	Permit Requirement	----------	----------	----------	----------	<1.0 75th %	25.0 Max	#/100mL		DAILY, 7 PER WEEK	GRAB
CHLORINE, TOTAL RESIDUAL	Sample Measurement	----------	----------	----------		----------	----------				
PARM Code 50060 A Mon. Site No. EFA-01	Permit Requirement	----------	----------	----------	1.0 DailyMin	----------	----------	mg/L		CONTINUOUS	REC. MONITOR & ANAL.
pH	Sample measurement	----------	----------	----------		----------					
PARM Code 00400 A Mon. Site No. EFA-01	Permit Requirement	----------	----------	----------	6.0 DailyMin	----------	8.5 DailyMax	SU		CONTINUOUS	METER
TURBIDITY	Sample Measurement	----------	----------	----------	----------	----------					
PARM Code 82078 B Mon. Site No. EFB-01	Permit Requirement	----------	----------	----------	----------	----------	REPORT DailyMax	NTU		CONTINUOUS	REC. MONITOR & ANAL.
$CBOD_5$, INFLUENT	Sample Measurement	----------	----------	----------	----------		----------				
PARM Code 80082 G Mon. Site No. INF-01	Permit Requirement	----------	----------	----------	----------	REPORT MoAvg	----------	mg/L		MONTHLY	16 HOUR FLOW PRO COMPOS
TSS, INFLUENT	Sample Measurement	----------	----------	----------	----------		----------				
PARM Code 00530 G Mon. Site No. INF-01	Permit Requirement	----------	----------	----------	----------	REPORT MoAvg	----------	mg/L		MONTHLY	16 HOUR FLOW PRO COMPOS
	Sample Measurement										
PARM Code 1 Mon. Site No.	Permit Requirement										
	Sample Measurement										
PARM Code 1 Mon. Site No.	Permit Requirement										
	Sample Measurement										
PARM Code 1 Mon. Site No.	Permit Requirement										

G- Influent sample

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here):

DEPARTMENT OF ENVIRONMENTAL PROTECTIO DISCHARGE MONITORING REPORT - PART A

WHEN COMPLETED, MAIL THIS REPORT TO: Department of Environmental Protection Wastewater Facilities Regulation Section, Mail Station 3551
Twin Towers Office Building, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400

PERMITTEE NAME: City of North Port Utilities Department
MAILING ADDRESS: Rick J. Newkirk, Interim Director
P.O. Box 7228
North Port, FL 34287-7228

FACILITY: North Port Wastewater Treatment Plant (WWTP)
LOCATION: 200 North Pan American Blvd.
North Port, FL 34287
COUNTY: SARASOTA COUNTY

PERMIT NUMBER: FLA013378
MONITORING PERIOD–From: ________ To: ________
THREE MONTH ROLLING ADF: ______% OF PERMITTED CAPACITY
LIMIT: Final
CLASS SIZE:N/A
FACILITY ID: FLA013378
DISCHARGE POINT NUMBER: R001
PLANT SIZE/TREATMENT TYPE: 2B

DMR Issued: 05/30/01
REPORT: Monthly
GROUP: DW
No Discharge To R001 ☐

Please read instructions before completing this form.

Parameter		Quantity or Loading			Quality or Concentration				No. Ex.	Frequency of Analysis	Sample Type
		Average	Maximum	Units			Maximum	Units			
FLOW (Total Plant)	Sample Measurement				----------	----------	----------	----------			
PARM Code 50050 T Mon. Site No. FLW-01	Permit Requirement	REPORT MoAvg	3.7 3 Mo Avg	mgd	----------	----------	----------	----------		CONTINUOUS REPORT MONTHLY	CALC. ROLLING 3 MO AVG
FLOW (R001)	Sample Measurement				----------	----------	----------	----------			
PARM Code 50050 Y Mon. Site No. FLW-02	Permit Requirement	REPORT MoAvg	1.880 12 Mo Avg	mgd	----------	----------	----------	----------		CONTINUOUS REPORT MONTHLY	CALC. ROLLING 12 MO AVG
$CBOD_5$, EFFLUENT	Sample Measurement	----------	----------	----------							
PARM Code 80082 A Mon. Site No. INJ-01	Permit Requirement	----------	----------	----------	30.0 MoAvg	45.0 WklyAvg	60.0 Max	mg/L		WEEKLY	16 HOUR FLOW PRO COMPOS..
$CBOD_5$, EFFLUENT	Sample Measurement	----------	----------	----------	----------		----------				
PARM Code 80082 Y Mon. Site No. INJ-01	Permit Requirement	----------	----------	----------	----------	20.0 12 MoAvg	----------	mg/L		REPORT MONTHLY	CALC. ROLLING 12 MO AVG
TSS EFFLUENT	Sample Measurement	----------	----------	----------	----------	----------					
PARM Code 00530 B Mon. Site No. EFB-01	Permit Requirement	----------	----------	----------	----------	----------	5.0 Max	mg/L		DAILY, 7 PER WEEK	GRAB

T-3 month rolling Average Daily Flow thru WWTP
Y-Annual Average Sample

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein; and based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

NAME/TITLE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT (Type or Print)	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	TELEPHONE NO.	DATE (YY/MM/DD)
		( )	

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here): (Attach additional sheets if necessary.)

DEP Form 62-620.910(10), effective November 29, 1994

Part A continued Facility Name: North Port Wastewater Treatment Plant (WWTP) Facility ID No.: FLA013378

MONTH/YEAR ___________ Final Limits

Discharge Point No: R001

Please read instructions before completing this form.

Parameter		Quantity or Loading			Quality or Concentration				No. Ex.	Frequency of Analysis	Sample Type
		Average	Maximum	Units			Maximum	Units			
COLIFORM, FECAL	Sample Measurement	----------	----------	----------	----------						
PARM Code 74055 A Mon. Site No. EFA-01	Permit Requirement	----------	----------	----------	----------	<1.0 75th %	25.0 Max	#/100mL		DAILY, 7 PER WEEK	GRAB
CHLORINE, TOTAL RESIDUAL	Sample Measurement	----------	----------	----------		----------	----------				
PARM Code 50060 A Mon. Site No. EFA-01	Permit Requirement	----------	----------	----------	1.0 DailyMin	----------	----------	mg/L		CONTINUOUS	REC. MONITOR & ANAL.
pH	Sample measurement	----------	----------	----------		----------					
PARM Code 00400 A Mon. Site No. EFA-01	Permit Requirement	----------	----------	----------	6.0 DailyMin	----------	8.5 DailyMax	SU		CONTINUOUS	METER
TURBIDITY	Sample Measurement	----------	----------	----------	----------	----------					
PARM Code 82078 B Mon. Site No. EFB-01	Permit Requirement	----------	----------	----------	----------	----------	REPORT DailyMax	NTU		CONTINUOUS	REC. MONITOR & ANAL.
$CBOD_5$, INFLUENT	Sample Measurement	----------	----------	----------	----------		----------				
PARM Code 80082 G Mon. Site No. INF-01	Permit Requirement	----------	----------	----------	----------	REPORT MoAvg	----------	mg/L		MONTHLY	16 HOUR FLOW PRO COMPOS
TSS, INFLUENT	Sample Measurement	----------	----------	----------	----------		----------				
PARM Code 00530 G Mon. Site No. INF-01	Permit Requirement	----------	----------	----------	----------	REPORT MoAvg	----------	mg/L		MONTHLY	16 HOUR FLOW PRO COMPOS
	Sample Measurement										
PARM Code 1 Mon. Site No.	Permit Requirement										
	Sample Measurement										
PARM Code 1 Mon. Site No.	Permit Requirement										
	Sample Measurement										
PARM Code 1 Mon. Site No.	Permit Requirement										

G- Influent sample

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here):

DAILY SAMPLE RESULTS - PART B

Facility ID: FLA013378 U001
Month/Year: ______ City of North Port WWTP

Three-month Average Daily Flow: ______
Daily Flow % of Permitted Capacity: ______

	Flow (mgd) U001	$CBOD_5$ (mg/L)	TSS (mg/L)	pH Max (std units)	pH Min (std units)							
PARM	50050	80082	00530	00400	00400							
Mon. Site	FLW-03	INJ-01	INJ-01	INJ-01	INJ-01							
1												
2												
3												
4												
5												
6												
7												
8												
9												
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29												
30												
31												

PLANT STAFFING:

	Class:	Certificate	Name:
Day Shift Operator			
Evening Shift Operator			
Night Shift Operator			
Lead Operator			

Type of Effluent Disposal or Reclaimed ______

Limited Wet Weather Discharge Activated: Yes: No: Not Applicable: If yes, cumulative days of wet weather ______

*Attach additional sheets if necessary to list all certified operators.

DAILY SAMPLE RESULTS - PART B

Facility ID: FLA013378 R001

Month/Year: ________ City of North Port WWTP

Three-month Average Daily Flow: ________

Daily Flow % of Permitted Capacity: ________

	Flow (mgd) Plant	Flow (mgd) R001	$CBOD_5$ (mg/L)	TSS (mg/L)	Fecal Coliform Bacteria (#/100 mL)	pH Max (std units)	pH Min (std units)	TRC (for disinfect.) (mg/L)	Turbidity (NTU)	$CBOD_5$ (mg/L) Influent	TSS (mg/L) Influent	
PARM	50050	50050	80082	00530	74055	00400	00400	50060	82078	80082	00530	
Mon. Site	FLW-01	FLW-02	INJ-01	EFB-01	EFA-01	EFA-01	EFA-01	EFA-01	EFB-01	INF-01	INF-01	
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
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30												
31												

PLANT STAFFING:

	Class:	Certificate	Name:
Day Shift Operator			
Evening Shift Operator			
Night Shift Operator			
Lead Operator			

Type of Effluent Disposal or Reclaimed ________

Limited Wet Weather Discharge Activated: Yes: No: Not Applicable: If yes, cumulative days of wet weather ________

:h additional sheets if necessary to list all certified operators.

GROUNDWATER MONIT ING REPORT - PART D

Facility ID: FLA013378
Month/Year:
Date Sample Obtained:
Was the well pumped before sampling? Yes No

Test Site ID: MWB-01 (MW-1)
Well Type: Background
Ground Water Class: G-2

Parameter	PARM Code	Sampling Method	Samples Filtered (Y/N)	Preservatives Added	Analysis Method	Analysis Result/Units	Detection Limits/Units
Water Level (feet MSL)	72020						
Nitrate (mg/L as N)	00620						
TDS (mg/L)	00515						
Sodium (mg/L)	00929						
Turbidity (NTU)	82079						
Chloride (mg/L)	00940						
Ammonia (mg/L)	00610						
Temperature (°C)	00010						
Fecal Coliform (#/100ML)	74055						
pH (standard units) (field measurement)	00406						
Sulfate	00945						
Specific Conductance µmhos/cm (Field measurement)	00094						

Comments and Explanations:

GROUNDWATER MONIT…ING REPORT - PART D

Facility ID: FLA013378
Month/Year:
Date Sample Obtained:
Was the well pumped before sampling? Yes No

Test Site ID: MWC-01 (MW-2)
Well Type: Compliance
Ground Water Class: G-2

Parameter	PARM Code	Sampling Method	Samples Filtered (Y/N)	Preservatives Added	Analysis Method	Analysis Result/Units	Detection Limits/Units
Water Level (feet MSL)	72020						
Nitrate (mg/L as N)	00620						
TDS (mg/L)	00515						
Sodium (mg/L)	00929						
Turbidity (NTU)	82079						
Chloride (mg/L)	00940						
Ammonia (mg/L)	00610						
Temperature (°C)	00010						
Fecal Coliform (#/100ML)	74055						
pH (standard units) (field measurement)	00406						
Sulfate	00945						
Specific Conductance µmhos/cm (Field measurement)	00094						

Comments and Explanations:

GROUNDWATER MONITC   NG REPORT - PART D

Test Site ID: MWC-02 (MW-3)
Well Type: Compliance
Ground Water Class: G-2

'acility ID: FLA013378
Aonth/Year:
)ate Sample Obtained:
Vas the well pumped before sampling? Yes No

Parameter	PARM Code	Sampling Method	Samples Filtered (Y/N)	Preservatives Added	Analysis Method	Analysis Result/Units	Detection Limits/Units
Water Level (feet MSL)	72020						
Nitrate (mg/L as N)	00620						
TDS (mg/L)	00515						
Sodium (mg/L)	00929						
Turbidity (NTU)	82079						
Chloride (mg/L)	00940						
Ammonia (mg/L)	00610						
Temperature (°C)	00010						
Fecal Coliform (#/100ML)	74055						
pH (standard units) (field measurement)	00406						
Sulfate	00945						
Specific Conductance µmhos/cm (Field measurement)	00094						

Comments and Explanations:

GROUNDWATER MON. RING REPORT - PART D

Facility ID: FLA013378
Month/Year:
Date Sample Obtained:
Was the well pumped before sampling? Yes No

Test Site ID: MWC-03 (MW-4)
Well Type: Compliance
Ground Water Class: G-2

Parameter	PARM Code	Sampling Method	Samples Filtered (Y/N)	Preservatives Added	Analysis Method	Analysis Result/Units	Detection Limits/Units
Water Level (feet MSL)	72020						
Nitrate (mg/L as N)	00620						
TDS (mg/L)	00515						
Sodium (mg/L)	00929						
Turbidity (NTU)	82079						
Chloride (mg/L)	00940						
Ammonia (mg/L)	00610						
Temperature (°C)	00010						
Fecal Coliform (#/100ML)	74055						
pH (standard units) (field measurement)	00406						
Sulfate	00945						
Specific Conductance µmhos/cm (Field measurement)	00094						

Comments and Explanations:

GROUNDWATER MOI ,RING REPORT - PART D

Facility ID: FLA013378
Month/Year:
Date Sample Obtained:
Was the well pumped before sampling? Yes No

Test Site ID: MWC-04 (MW-5)
Well Type: Compliance
Ground Water Class: G-2

Parameter	PARM Code	Sampling Method	Samples Filtered (Y/N)	Preservatives Added	Analysis Method	Analysis Result/Units	Detection Limits/Units
Water Level (feet MSL)	72020						
Nitrate (mg/L as N)	00620						
TDS (mg/L)	00515						
Sodium (mg/L)	00929						
Turbidity (NTU)	82079						
Chloride (mg/L)	00940						
Ammonia (mg/L)	00610						
Temperature (°C)	00010						
Fecal Coliform (#/100ML)	74055						
pH (standard units) (field measurement)	00406						
Sulfate	00945						
Specific Conductance µmhos/cm (Field measurement)	00094						

Comments and Explanations:

GROUNDWATER MO. .ORING REPORT - PART D

Facility ID: FLA013378
Month/Year:
Date Sample Obtained:
Was the well pumped before sampling? Yes No

Test Site ID: MWB-02 (MW-11)
Well Type: Background
Ground Water Class: G-2

Parameter	PARM Code	Sampling Method	Samples Filtered (Y/N)	Preservatives Added	Analysis Method	Analysis Result/Units	Detection Limits/Units
Water Level (feet MSL)	72020						
Nitrate (mg/L as N)	00620						
TDS (mg/L)	00515						
Sodium (mg/L)	00929						
Turbidity (NTU)	82079						
Chloride (mg/L)	00940						
Ammonia (mg/L)	00610						
Temperature (°C)	00010						
Fecal Coliform (#/100ML)	74055						
pH (standard units) (field measurement)	00406						
Sulfate	00945						
Specific Conductance µmhos/cm (Field measurement)	00094						

Comments and Explanations:

GROUNDWATER MONITORING REPORT - PART D

Facility ID: FLA013378
Month/Year:
Date Sample Obtained:
Was the well pumped before sampling? Yes No

Test Site ID: MWC-05 (MW-7)
Well Type: Compliance
Ground Water Class: G-2

Parameter	PARM Code	Sampling Method	Samples Filtered (Y/N)	Preservatives Added	Analysis Method	Analysis Result/Units	Detection Limits/Units
Water Level (feet MSL)	72020						
Nitrate (mg/L as N)	00620						
TDS (mg/L)	00515						
Sodium (mg/L)	00929						
Turbidity (NTU)	82079						
Chloride (mg/L)	00940						
Ammonia (mg/L)	00610						
Temperature (°C)	00010						
Fecal Coliform (#/100ML)	74055						
pH (standard units) (field measurement)	00406						
Sulfate	00945						
Specific Conductance µmhos/cm (Field measurement)	00094						

Comments and Explanations:

GROUNDWATER MON.   RING REPORT - PART D

Facility ID: FLA013378
Month/Year:
Date Sample Obtained:
Was the well pumped before sampling? Yes No

Test Site ID: MWC-06 (MW-12)
Well Type: Compliance
Ground Water Class: G-2

Parameter	PARM Code	Sampling Method	Samples Filtered (Y/N)	Preservatives Added	Analysis Method	Analysis Result/Units	Detection Limits/Units
Water Level (feet MSL)	72020						
Nitrate (mg/L as N)	00620						
TDS (mg/L)	00515						
Sodium (mg/L)	00929						
Turbidity (NTU)	82079						
Chloride (mg/L)	00940						
Ammonia (mg/L)	00610						
Temperature (°C)	00010						
Fecal Coliform (#/100ML)	74055						
pH (standard units) (field measurement)	00406						
Sulfate	00945						
Specific Conductance μmhos/cm (Field measurement)	00094						

Comments and Explanations:

GROUNDWATER MON ING REPORT - PART D

Facility ID: FLA013378
Month/Year:
Date Sample Obtained:
Was the well pumped before sampling? Yes No

Test Site ID: MWC-07 (MW-15)
Well Type: Compliance
Ground Water Class: G-2

Parameter	PARM Code	Sampling Method	Samples Filtered (Y/N)	Preservatives Added	Analysis Method	Analysis Result/Units	Detection Limits/Units
Water Level (feet MSL)	72020						
Nitrate (mg/L as N)	00620						
TDS (mg/L)	00515						
Sodium (mg/L)	00929						
Turbidity (NTU)	82079						
Chloride (mg/L)	00940						
Ammonia (mg/L)	00610						
Temperature (°C)	00010						
Fecal Coliform (#/100ML)	74055						
pH (standard units) (field measurement)	00406						
Sulfate	00945						
Specific Conductance µmhos/cm (Field measurement)	00094						

Comments and Explanations:

GROUNDWATER MON IRING REPORT - PART D

Facility ID: FLA013378
Month/Year:
Date Sample Obtained:
Was the well pumped before sampling? Yes No

Test Site ID: MWC-08 (MW-16)
Well Type: Compliance
Ground Water Class: G-2

Parameter	PARM Code	Sampling Method	Samples Filtered (Y/N)	Preservatives Added	Analysis Method	Analysis Result/Units	Detection Limits/Units
Water Level (feet MSL)	72020						
Nitrate (mg/L as N)	00620						
TDS (mg/L)	00515						
Sodium (mg/L)	00929						
Turbidity (NTU)	82079						
Chloride (mg/L)	00940						
Ammonia (mg/L)	00610						
Temperature (°C)	00010						
Fecal Coliform (#/100ML)	74055						
pH (standard units) (field measurement)	00406						
Sulfate	00945						
Specific Conductance μmhos/cm (Field measurement)	00094						

Comments and Explanations:

INSTRUCTIONS FOR COMPLETING THE WA. /ATER DISCHARGE MONITORING REPORT

he DMR consists of four parts--A, B, C, and D--all of which may or may not be applicable to every facility. Facilities may have one or more Part A's for reporting effluent data. All domestic wastewater facilities will have a Part for reporting daily sample results. Part C is only applicable for domestic wastewater facilities with limited wet weather discharges permitted under Chapter 62-610.860, F.A.C. Part D is used for reporting ground water ionitoring well data.

lard copies and/or electronic copies of the required parts of the DMR were provided with the permit. All required information shall be typed or printed in ink.

ı addition to filling in numerical results on various parts of the DMR, the following codes should be used and an explanation provided where appropriate. Note: Codes used by the lab for raw data may be different.

CODE	DESCRIPTION/INSTRUCTIONS
ANC	Analysis not conducted.
DRY	Dry Well
FLD	Flood disaster.
IFS	Insufficient flow for sampling.
LS	Lost sample.
MNR	Monitoring not required this period since limit is conditional.

CODE	DESCRIPTION/INSTRUCTIONS
NOD	No discharge from/to site.
OPS	Operations were shutdown so no sample could be taken.
OTH	Other. Please enter an explanation of why monitoring data were not available.
SEF	Sampling equipment failure.
TNTC	Too numerous too count (for fecal coliform bacteria only).

When reporting analytical results that fall below a laboratory's reported method detection limits or practical quantification limits, the following instructions and code should be used:

CODE	DESCRIPTION/INSTRUCTIONS
<	If the sampled value is less than the method detection limit (MDL), enter a less than sign followed by the laboratory's MDL value, e.g. < 0.001. In cases where a laboratory reports a value which is less than the parameter's practical quantification limit (PQL), but, not less than the MDL, the value should be reported as the laboratory's MDL value. For example, where the MDL = 0.001, the PQL = 0.005 and the laboratory reports <0.005 (the PQL), the value of 0.001 should be reported on the DMR.

PART A -DISCHARGE MONITORING REPORT (DMR)

Part A of the DMR is comprised of one or more sections, each having its own header information. Facility information is preprinted in the header as well as the monitoring group number, whether the limits and monitoring requirements are interim or final, and the required submittal frequency (e.g. monthly, annually, quarterly, etc.) Submit Part A based on the required reporting frequency in the header and the instructions shown in the permit. The following blanks in the header should be completed by the permittee or authorized representative:

No Discharge From Site: Check this box if no discharge occurs and, as a result, there are no data or codes to be entered for all of the parameters on the DMR for the entire monitoring group number. If there was no discharge of effluent for a particular outfall, reuse, or land application system and the DMR monitoring group includes other monitoring locations (e.g., influent sampling); the "NOD" code should be used to individually denote those parameters for which there was no discharge.

Monitoring Period: Enter the month, day, and year for the first and last day of the monitoring period (i.e. the month, the quarter, the year, etc.) during which the data on this report were collected and analyzed.

Three Month Rolling ADF as a % of Permitted Capacity: Divide the three-month average daily flow by the permitted capacity of the treatment facility, multiply by 100, and enter this value.

Sample Measurement: Before filling in sample measurements in the table, check to see that the data collected correspond to the limit indicated on the DMR (i.e. interim or final) and that the data correspond to the monitoring group number in the header. Enter the data or calculated results for each parameter on this row. Be sure the result being entered corresponds to the appropriate statistical base code (e.g. annual average, monthly average, single sample maximum, etc.).

No. Ex.: Enter the number of sample measurements during the monitoring period that exceeded the permit limit for each parameter. If none, enter zero.

Frequency of Analysis: The shaded areas in this column contain the minimum number of times the measurement is required to be made according to the permit. Enter the actual number of times the measurement was made in the space above the shaded area.

Sample Type: The shaded areas in this column contain the type of sample (e.g. grab, composite, continuous) required by the permit. Enter the actual sample type that was taken in the space above the shaded area.

Signature: This report must be signed in accordance with Rule 62-620.305, F.A.C. Type or print the name and title of the signing official. Include the telephone number where the official may be reached in the event there are questions concerning this report. Enter the date when the report is signed.

Comment and Explanation of Any Violations: Use this area to explain any exceedances, any upset or by-pass events, or other items which require explanation. If more space is needed, reference all attachments in this area.

PART B - DAI AMPLE RESULTS

Month/Year: Enter the month and year during which the data on this report were collected and analyzed.
Three-month Average Daily Flow: Calculate and enter the three-month average daily flow to the treatment facility.
(TMADF/Permitted Capacity) x 100: Divide the three-month average daily flow by the permitted capacity of the treatment facility, multiply by 100, and enter this value.
Daily Monitoring Results: Record the results of daily monitoring for the parameters required to be sampled by your permit. Record the data in the units indicated.
Plant Staffing: List the name, certificate number, and class of all state certified operators operating the facility during the monitoring period. Use additional sheets as necessary.
Type of Effluent Disposal or Reclaimed Water Reuse: Enter the type of effluent disposal or reclaimed water reuse (e.g. surface water discharge, ocean outfall, slow rate land application-public access, slow rate land application restricted public access, rapid rate land application, absorption field, underground injection).
Limited Wet Weather Discharge Activated: If this plant does not have a limited wet weather discharge permitted under the provision of Rule 62-610.860, F.A.C., check 'Not Applicable.' If the plant activated the wet weather discharge during the reporting month, check 'Yes' and attach PART C - LIMITED WET WEATHER DISCHARGE.

PART C - LIMITED WET WEATHER DISCHARGE

This part is to be completed and submitted each month reclaimed water or effluent is discharged by a limited wet weather discharge permitted under Rule 62-610.860, F.A.C. For months with no discharge, Part C need not be submitted. All information is to be provided for each day on which the limited wet weather discharge was activated.

Month/Year: Enter the month and year during which the data on this report were collected and analyzed.
Rainfall Information: Enter the name and location of the rainfall gauging station, the source of climatological (normal rainfall) data, the cumulative rainfall for the average rainfall year, and the cumulative rainfall to date for this calendar year. The cumulative rainfall for the average rainfall year is the amount of rain, in inches, which falls during an average rainfall year from January through the month for which this part contains data. The cumulative rainfall to date for this calendar year is the total amount of rain, in inches, that has been recorded since January 1 of the current year through the month for which this DMR contains data.
Date: Enter the date on which the discharge occurred.
Duration of Discharge: Enter the number of hours, to the nearest 0.1 of an hour (0.1 hr. = 6 min.) during each day of discharge that reclaimed water was actually discharged to surface waters.
Gallons Discharged: Enter the quantity in millions of gallons of reclaimed water discharged during the period shown in duration of discharge. Show the units as millions of gallons (mg), accurate to the nearest 0.01.
Average Discharge Flow Rate: Divide gallons discharged by duration of discharge (converted into days). Record in million gallons per day (MGD).
Average Upstream Flow Rate: Enter the average flow rate in the receiving stream upstream from the point of discharge for the period shown in duration of discharge. The average flow rate can be calculated based on tw measurements; one made at the start and one made at the end of the discharge period. Measurements are to be made at the upstream gauging station described in the permit.
Stream Dilution Factor: Enter the actual stream dilution ratio accurate to the nearest 0.1. To calculate the factor, divide the average upstream flow rate by the average discharge flow rate.
$CBOD_5$: Enter the average $CBOD_5$ of the reclaimed water discharged during the period shown in duration of discharge.
TKN: Enter the average TKN of the reclaimed water discharged during the period shown in duration of discharge.
Total P: Enter the cumulative number of days since January 1 of the current year during which the limited wet weather discharge was activated divided by the total number of days since January 1 of the current year multiplied b 100%.
Reason for Discharge: Provide a brief explanation of the factors contributing to the need to activate the limited wet weather discharge.

PART D - GROUND WATER MONITORING REPORT

Monitoring Period: Enter the month, day, and year for the first and last day of the monitoring period (i.e. the month, the quarter, the year, etc.) during which the data on this report were collected and analyzed.
Date Sample Obtained: Enter the date the sample was taken. Also, check whether or not the well was purged before sampling.
Sampling Methods: Indicate the procedure used to collect the sample (e.g. airlift, bucket/bailer, centrifugal pump, etc.)
Samples Filtered: Indicate whether the sample obtained was filtered by laboratory (L), filtered in field (F), or unfiltered (N).
Preservatives Added: State what preservatives were added to the sample.
Analysis Method: Indicate the analytical method used. Record the method number from Chapter 62-160 or Chapter 62-601, F.A.C., or from other sources.
Analysis Result/Units: Record the results of the analysis. If the result was below the minimum detection limit, indicate that. Enter the units associated with the results of the analysis.
Detection Limits/Units: Record the detection limits of the analytical methods used and the units associated with them.
Comments and Explanations: Use this space to make any comments on or explanations of results which are unexpected. If more space is needed, reference all attachments in this area.

APPENDIX B

Special Sampling Data

Table 1 – Special Sampling Campaign: Influent Composite Samples from April 23 to April 28, 2006

Parameter, mg/L		INFLUENT					
		4/23/06	4/24/06	4/25/06	4/26/06	4/27/06	4/28/06
Flow, MGD		1.461	1.635	1.648	1.573	1.557	1.573
TSS		160	172	160	204	160	173
VSS		112	120	136	163	112	140
COD		450	600	559	605	422	406
sCOD (0.45-mic)		214	262	241	254	219	119
sCOD (GF)		252	289	316	257	209	161
ffCOD		211	252	227	238	171	117
TBOD5		216	285	197	216	263	214
$CBOD_5$		186	242	197	216	195	214
TKN		43.6	44.7	43.4	45.3	44.6	38.4
sTKN (0.45-mic)		40	36.3	37.9	36.5	39.5	34.1
sTKN (GF)		42.5	44.4	32.9	39.1	41.3	35.6
NH3-N		30.4	33.1	33.1	35.6	31.5	26.5
NO3-N		0.087	0.081	0.020	0.083	<0.004	0.013
NO2-N		0.092	0.099	<0.003	<0.003	<0.003	0.095
SON		9.6	3.2	4.8	0.9	8	7.6
TP		5.91	7.68	8.22	10.6	7.18	8.54
sP (0.45-mic)		4.82	5.79	5.20	6.84	5.75	6.63
sP (GF)		5.1	5.66	5.57	6.92	5.74	6.72
PO4-P (0.45-mic)		-	-	-	-	-	-
Alkalinity		500	460	470	430	380	430
pH (SU)	10:00	7.1	7.0	7.1	7.1	7.1	7.1
	13:00	7.1	7.2	7.1	7.3	7.3	7.0
	16:00	7.1	7.1	7.1	7.1	7.2	7.1

Table 2 – Special Sampling Campaign: Secondary Effluent Composite Samples from April 23 to April 28, 2006

Parameter, mg/L		SECONDARY EFFLUENT					
		4/23/06	4/24/06	4/25/06	4/26/06	4/27/06	4/28/06
Flow, MGD		1.46	1.64	1.65	1.57	1.56	1.57
TSS		10	10	20	2	2	8
VSS		-	-	-	-	-	-
COD		43.0	42.3	39.9	47.7	42.1	43.4
sCOD (0.45-mic)		41.5	38.5	45.5	38.8	43.3	39.9
sCOD (GF)		34.1	40.7	43.6	40.8	39.9	34.9
ffCOD		34.1	42.9	40.7	40.1	34.7	37.9
TBOD5		2.91	2.48	<2.00	<2.00	<2.00	<2.0
$CBOD_5$		2.70	<2.00	<2.00	<2.00	<2.00	<2.0
TKN		1.99	1.88	1.20	1.59	2.49	1.71
sTKN (0.45-mic)		1.30	1.54	1.34	0.986	1.55	1.32
sTKN (GF)		1.77	1.52	1.31	1.34	2.34	1.43
NH3-N		0.456	0.170	0.439	0.456	0.489	0.177
SON		0.844	1.370	0.901	0.530	1.061	1.143
NO3-N		30.20	29.3	28.8	28.8	29.2	34.0
NO2-N		0.93	0.918	0.702	0.515	0.467	0.008
TP		5.45	5.74	5.48	5.90	5.90	5.86
sP (0.45-mic)		5.45	5.60	5.22	5.40	5.24	5.77
sP (GF)		5.45	5.66	5.26	5.46	5.48	6.01
PO4-P (0.45-mic)		-	-	-	-	-	-
Alkalinity		220	150	150	140	140	150
pH (SU)	10:00	6.3	6.5	6.6	6.6	6.8	6.4
	13:00	6.5	6.6	6.6	6.7	6.7	6.5
	16:00	6.4	6.7	6.3	6.7	6.8	6.4

Table 3 – Special Sampling Campaign: Final Effluent Composite Samples from April 23 to April 28, 2006

Parameter, mg/L		FINAL EFFLUENT					
		4/23/06	4/24/06	4/25/06	4/26/06	4/27/06	4/28/06
Flow, MGD		-	-	-	-	-	-
TSS		<1	<1	<1	<1	<1	<1
VSS		-	-	-	-	-	-
COD		40.5	44.2	43.3	43.8	38.2	48.8
sCOD (0.45-mic)		41.8	44.7	44.0	39.2	39.0	39.9
sCOD (GF)		43.6	42.5	41.8	42.7	39.5	41.2
ffCOD		37.2	38.8	37.7	38.4	37.8	39.5
TBOD5		2.06	<2.00	2.54	2.03	<2.00	<2.00
CBOD5		<2.00	3.11	2.40	2.03	<2.00	<2.00
TKN		1.81	1.17	1.08	1.04	2.15	2.13
sTKN (0.45-mic)		0.91	1.18	0.652	1.11	1.27	1.91
sTKN (GF)		1.54	1.33	0.974	1.05	2.05	2.15
NH3-N		0.114	0.116	0.169	0.133	0.178	0.488
SON		0.796	1.064	0.483	0.977	1.092	1.422
NO3-N		32.1	30.8	30.5	28.3	32.9	31.6
NO2-N		0.006	0.006	0.010	<0.003	0.008	0.31
TP		5.79	5.53	6.01	7.30	8.31	5.70
sP (0.45-mic)		5.59	5.41	5.29	5.43	5.49	5.86
sP (GF)		5.52	5.50	5.16	5.63	5.61	5.68
PO4-P (0.45-mic)		-	-	-	-	-	-
Alkalinity		140	110	140	130	120	140
pH (SU)	10:00	6.9	7.0	7.4	6.9	6.9	6.7
	13:00	7.0	7.1	7.2	6.9	7.0	6.9
	16:00	7.0	7.0	7.1	7.0	6.8	6.7

Table 4 – Special Sampling Campaign: Influent Wastewater Fractions from April 23 to April 28, 2006

Ratios	INFLUENT FRACTIONS						
	4/23/06	4/24/06	4/25/06	4/26/06	4/27/06	4/28/06	Flow Weighted Average
COD/ CBOD5	2.42	2.48	2.84	2.80	2.16	1.90	2.44
COD/BOD5	2.08	2.11	2.84	2.80	1.60	1.90	2.19
CBOD5/BOD5	0.86	0.85	1.00	1.00	0.74	1.00	0.90
COD/TSS	2.81	3.49	3.49	2.97	2.64	2.35	2.97
CBOD5/TSS	1.16	1.41	1.23	1.06	1.22	1.24	1.22
BOD5/TSS	1.35	1.66	1.23	1.06	1.64	1.24	1.35
COD (GF)/COD	0.56	0.48	0.57	0.42	0.50	0.40	0.487
COD (0.45)/COD	0.48	0.44	0.43	0.42	0.52	0.29	0.429
ffCOD/COD	0.47	0.42	0.41	0.39	0.41	0.29	0.396
NH4/ TKN	0.70	0.74	0.76	0.79	0.71	0.69	0.73
NH4/ COD	0.068	0.055	0.059	0.059	0.075	0.065	0.062
NH4/ CBOD5	0.163	0.137	0.168	0.165	0.162	0.124	0.152
NH4/ BOD5	0.141	0.116	0.168	0.165	0.120	0.124	0.137
NH4/TSS	0.190	0.192	0.207	0.175	0.197	0.153	0.185
TKN/ COD	0.097	0.075	0.078	0.075	0.106	0.095	0.085
TKN/ CBOD5	0.234	0.185	0.220	0.210	0.229	0.179	0.208
TKN/BOD5	0.202	0.157	0.220	0.210	0.170	0.179	0.187
TP/ COD	0.013	0.013	0.015	0.018	0.017	0.021	0.016
TP/ CBOD5	0.032	0.032	0.042	0.049	0.037	0.040	0.039
TP/ NH3	0.19	0.23	0.25	0.30	0.23	0.32	0.25
TP/ TKN	0.14	0.17	0.19	0.23	0.16	0.22	0.19
sP (0.45 mic)/TP	0.82	0.75	0.63	0.65	0.80	0.78	0.73
sP (GF)/TP	0.86	0.74	0.68	0.65	0.80	0.79	0.74
VS/ TS	0.70	0.70	0.85	0.80	0.70	0.81	0.76
ISS	48	52	24	41	48	33	41
ISS/COD	0.11	0.09	0.04	0.07	0.11	0.08	0.08
VS/COD	0.25	0.20	0.24	0.27	0.27	0.34	0.26
Fus	0.08	0.06	0.07	0.06	0.09	0.10	0.077
Fbs	0.39	0.36	0.34	0.33	0.32	0.19	0.32

Table 5 – Special Sampling Campaign: Influent Diurnal Flows and Concentrations, April 29, 2006

		INFLUENT, mg/L			
Bottle	Flow, MGD	TSS	COD	TKN	TP
1	1.9	152.0	344	43	12.5
2	1.49	227	424	48.8	15.5
3	1.53	188	522	39.7	8.68
4	1.51	183	422	40.2	9.86
5	1.66	164	402	36.4	11.0
6	2.14	150	374	32.7	10.4
7	2.29	154	472	34	9.51
8	1.95	144	538	36.5	7.96
9	1.73	122	456	35.7	7.40
10	1.83	151	506	38.5	7.64
11	2.03	183	522	38.9	10.0
12	1.9	96.0	338	32.3	6.27

Table 6 – Special Sampling Campaign: Secondary Effluent Diurnal Flows and Concentrations, April 29, 2006

				SECONDARY EFFLUENT, mg/L				
Bottle	Flow, MGD	TSS	COD	TKN	NH3-N	NO3-N	NO2-N	PO4-P
1	1.9	2.80	47.9	1.91	0.435	32.6	0.280	4.63
2	1.49	2.00	42.5	1.87	0.489	31.9	0.302	5.84
3	1.53	1.80	44.2	1.89	0.399	31.8	0.325	5.93
4	1.51	2.20	44.6	1.81	0.367	32.2	0.340	6.81
5	1.66	1.40	43.4	1.73	0.359	31.8	0.271	7.80
6	2.14	1.00	42.0	1.66	0.373	31.8	0.116	7.14
7	2.29	0.800	44.2	1.49	0.410	31.9	0.349	5.93
8	1.95	1.40	42.0	1.37	0.509	31.5	0.329	5.67
9	1.73	1.20	41.4	1.76	0.592	31.5	0.373	5.42
10	1.83	1.80	45.7	1.89	0.521	30.5	0.028	5.52
11	2.03	2.40	44.7	1.64	0.483	31.1	0.017	5.32

12	1.9	1.20	41.0	1.61	0.411	31.4	0.116	6.34

Table 7 – Special Sampling Campaign: Final Effluent Diurnal Flows and Concentrations, April 29, 2006

		FINAL EFFLUENT, mg/L						
Bottle	Flow, MGD	TSS	COD	TKN	NH3-N	NO3-N	NO2-N	PO4-P
1	1.9	1.20	41.8	1.11	0.153	32.9	0.009	5.48
2	1.49	0.600	40.5	0.698	0.148	33.2	0.003	6.52
3	1.53	0.800	41.2	1.18	0.149	34.1	<0.010	6.06
4	1.51	<0.570	42.3	1.10	0.165	35.0	0.007	6.64
5	1.66	0.800	42.0	1.24	0.271	35.9	0.009	7.15
6	2.14	<0.570	41.8	0.775	0.105	37.4	0.006	6.44
7	2.29	0.800	38.8	0.792	0.157	37.5	0.004	6.90
8	1.95	0.600	39.5	0.700	0.167	36.9	<0.003	7.41
9	1.73	1.40	44.7	0.594	0.148	36.6	<0.003	7.02
10	1.83	<0.570	40.1	1.05	0.151	36.3	0.016	6.72
11	2.03	1.20	38.2	1.14	0.155	36.3	0.008	7.61
12	1.9	<0.570	44.0	1.02	0.155	36.3	<0.003	2.56

Table 8 – Special Sampling Campaign: Influent Diurnal Flows and Concentrations, April 30, 2006

		INFLUENT, mg/L			
Bottle	Flow, MGD	TSS	COD	TKN	TP
1	1.61	112	285	35.9	7.09
2	1.25	218	474	45.1	9.70
3	1.23	168	536	48.6	9.38
4	1.48	186	540	43.6	9.79
5	1.88	198	617	40.9	7.08
6	2.34	190	605	39.1	7.86
7	2.27	142	495	40.9	7.94
8	1.89	180	532	36.5	7.18
9	1.83	138	444	38.1	6.77
10	2.03	114	482	44.6	8.21
11	2.02	142	474	46.3	8.88

12	2.11	68.0	334	37.5	6.98

Table 9 – Special Sampling Campaign: Secondary Effluent Diurnal Flows and Concentrations, April 30, 2006

SECONDARY EFFLUENT, mg/L

Bottle	Flow, MGD	TSS	COD	TKN	NH3-N	NO3-N	NO2-N	PO4-P
1	1.61	2.40	45.1	1.80	0.293	36.9	0.023	5.25
2	1.25	1.20	36.9	1.95	0.398	35.5	0.133	6.58
3	1.23	2.20	43.6	2.02	0.311	36.8	0.027	6.76
4	1.48	0.800	36.9	2.02	0.411	34.7	0.366	5.65
5	1.88	3.20	41.4	2.17	0.508	33.6	0.438	5.89
6	2.34	3.00	41.2	2.42	0.467	32.8	0.362	6.09
7	2.27	2.80	39.2	2.31	0.709	33.3	0.417	5.19
8	1.89	2.60	44.2	1.93	0.264	35.8	0.026	6.57
9	1.83	0.800	37.5	1.80	0.509	34.8	0.172	8.73
10	2.03	1.80	42.9	1.56	0.291	37.4	0.026	5.91
11	2.02	2.40	41.2	2.33	0.719	32.6	0.227	5.22
12	2.11	2.20	45.5	2.20	0.543	33.3	0.122	4.86

Table 10 – Special Sampling Campaign: Final Effluent Diurnal Flows and Concentrations, April 30, 2006

FINAL EFFLUENT, mg/L

Bottle	Flow, MGD	TSS	COD	TKN	NH3-N	NO3-N	NO2-N	PO4-P
1	1.61	2.40	55.7	2.00	0.181	37.3	0.003	5.39
2	1.25	1.80	54.0	2.05	0.193	36.6	<0.003	6.04
3	1.23	5.60	52.9	1.60	0.267	36.7	<0.003	6.15
4	1.48	2.00	51.1	1.53	0.199	37.3	<0.003	6.81
5	1.88	3.40	52.0	1.48	0.190	36.3	<0.003	6.52
6	2.34	2.40	51.4	1.60	0.195	37.2	<0.003	6.72
7	2.27	3.40	52.0	1.52	0.195	36.7	<0.003	7.03
8	1.89	2.20	49.2	1.62	0.177	37.7	<0.003	7.22
9	1.83	2.20	51.2	2.04	0.191	37.8	<0.003	6.99
10	2.03	2.40	47.9	1.65	0.191	37.1	<0.003	7.07

11	2.02	2.20	51.2	1.18	0.245	36.9	<0.003	6.98
12	2.11	2.60	48.3	1.55	0.195	36.3	<0.003	6.97

Table 11 – Special Sampling Campaign: Influent Diurnal Flows and Concentrations, May 1, 2006

	INFLUENT, mg/L				
Bottle	Flow, MGD	TSS	COD	TKN	TP
1	1.73	128	328	38.7	7.97
2	1.54	204	408	49.1	9.44
3	1.14	204	589	52.2	10.7
4	2.15	126	641	42.0	8.70
5	2.19	194	597	41.6	9.67
6	2	134	593	44.1	9.25
7	2.35	138	587	34.1	8.80
8	1.94	138	595	41.4	8.34
9	1.84	504	1004	48.1	17.1
10	2.02	200	611	48.3	11.3
11	2.02	146	557	46.3	8.31
12	2.01	124	456	37.8	6.92

Table 12 – Special Sampling Campaign: Secondary Effluent Diurnal Flows and Concentrations, May 1, 2006

	SECONDARY EFFLUENT, mg/L							
Bottle	Flow, MGD	TSS	COD	TKN	NH3-N	NO3-N	NO2-N	PO4-P
1	1.73	0.800	46.6	2.36	0.519	33.7	0.819	7.21
2	1.54	6.00	53.8	2.51	0.502	36.3	0.232	6.74
3	1.14	7.00	60.9	2.30	0.547	36.3	0.389	6.92
4	2.15	7.20	53.3	2.22	0.458	36.0	0.458	7.20
5	2.19	7.40	54.0	2.66	0.469	36.4	0.476	7.32
6	2	7.40	56.1	2.83	0.441	36.9	0.376	7.70
7	2.35	8.80	57.4	2.51	0.434	36.6	0.162	8.49
8	1.94	7.67	58.5	2.55	0.405	36.8	0.236	8.63
9	1.84	7.67	57.4	2.35	0.427	36.0	0.354	6.85
10	2.02	5.67	57.9	1.62	0.48	36.7	0.368	7.31

11	2.02	4.00	57.6	2.34	0.489	36.0	0.377	7.31
12	2.01	7.00	58.5	2.36	0.506	36.3	0.361	7.50

Table 13 – Special Sampling Campaign: Final Effluent Diurnal Flows and Concentrations, May 1, 2006

	FINAL EFFLUENT, mg/L							
Bottle	**Flow, MGD**	**TSS**	**COD**	**TKN**	**NH3-N**	**NO3-N**	**NO2-N**	**PO4-P**
1	1.73	2.20	51.8	1.50	0.267	37.2	<0.003	5.00
2	1.54	3.00	48.5	1.70	0.233	37.2	<0.003	6.71
3	1.14	1.80	50.1	1.70	0.204	36.8	<0.003	7.46
4	2.15	1.80	47.7	1.96	0.202	36.6	<0.003	7.21
5	2.19	1.80	49.4	1.90	0.217	37.3	<0.003	7.25
6	2	1.80	50.5	1.94	0.207	37.0	<0.003	7.01
7	2.35	2.20	49.6	1.89	0.201	36.3	<0.003	7.08
8	1.94	2.60	50.1	1.90	0.226	36.4	<0.003	7.46
9	1.84	3.40	50.1	2.01	0.216	36.4	<0.003	7.32
10	2.02	2.60	51.6	1.82	0.225	36.9	0.004	6.60
11	2.02	2.80	49.9	1.98	0.209	37.1	<0.003	6.68
12	2.01	2.20	51.6	1.97	0.205	37.1	<0.003	7.02

Table 14 – Special Sampling Campaign: Aeration Basins Operational Data from April 23, 2006 to May 01, 2006

Date	Time	DO, mg/L	Temp., °C	MLSS, mg/L	MLVSS, mg/L	COD, mg/L	TKN, mg/L	TP, mg/L
4/23/06	8:00	6.3	26	4,550	3,880	--	--	--
	12:00	4.2	27	4,380	3,800	--	--	--
	16:00	4.0	29	3,620	3,140	--	--	--
4/24/06	8:00	6.9	27	4,370	3,700	--	--	--
	12:00	4.5	28	4,080	3,520	--	--	--
	16:00	4.3	26	5,280	4,220	--	--	--
4/25/06	8:00	5.5	28	3,830	3,320	--	--	--
	12:00	4.9	28	4,440	3,790	--	--	--
	16:00	5.1	29	3,870	3,280	--	--	--
4/26/06	8:00	5.4	28	3,790	3,310	--	--	--
	11:00	5.0	29	4,180	3,610	--	--	--
	14:00	5.2	29	3,920	3,290	--	--	--
4/27/06	8:00	5.4	28	3,990	3,470	--	--	--
	12:00	5.0	28	4,290	3,640	--	--	--
	16:00	5.2	29	4,580	4,120	--	--	--
4/28/06	8:00	6.8	28	4,090	3,470	--	--	--
	12:00	5.8	29	4,110	3,490	--	--	--
	16:00	6.3	29	4,240	3,260	--	--	--
4/29/06	8:00	3.0	26	4,280	3,660	--	--	--
	12:00	4.0	27	4,320	3,715	4,243	304	70.8
	16:00	4.0	28	4,180	3,550	--	--	--
4/30/06	8:00	3.0	26	4,070	3,510	--	--	--
	12:00	4.0	28	3,410	2,910	3,086	215	67.3
	16:00	4.4	28	3,500	3,010	--	--	--
5/1/06	8:00	3	26	3,880	3,660	--	--	--
	12:00	3.9	28	3,700	3,200	3,970	194	78.8
	16:00	3.5	28	3,900	3,380	--	--	--

B C D E F G H I J K L M N O P

ꓷD CALCULATIONS

Wastewater fractions:

			Defaults
Fus	0.080	Specify	0.05
Fup	0.200	Specify	0.13
Fbs	0.320	Specify	0.16
Fxbh	0.000	Specify	0
Xs frac =	0.40	by difference (>0!)	
Fxsp	0.78		0.75 Specify

Total COD:

Sti 509 (with Xbh) *Specify*

BOD model parameters:

f	0.2
Y	0.666
b	0.24
k	0.4

VSS = 163

VS/COD = 0.32

Given	
Influent BOD	232
Influent COD (Sti)	509
Influent CODs	248
Influent ffCOD	203
Influent VSS	130
VSS/COD	0.26

Calculated concentrations (from Sti & f's)

Sus	41
Sup	102
Sbs	163
Xs (c+p)	204
Xbh	0

Soluble COD =	248	Sol. COD fraction = 0.488
FF COD =	204	
Xs - colloidal =	45	Added to Sbs for BOD calcs
Xs - particulate =	159	

Sus	Unbiodegradable Soluble
Xi *(Sup)*	Unbiodegradable Particulate
Sbs	Readily Biodegradable
Xs (c+p)	Slowly Biodegradable (Colloidal and Particulate)
Xs - colloidal	Slowly Biodegradable - Colloidal (Added to Sbs for BOD calcs)
Xs - particulate *(Xsp)*	Slowly Biodegradable - Particulate
Xbh	Biomass

Time,d	BODs	BOD - Xb	BOD - Xsp	BODtot	COD/BOD	Xsp remainder
0	69.36	0.00	0.00	69.36	7.34	158.81
1	92.97	0.00	20.78	113.75	4.47	106.45
2	111.54	0.00	39.96	151.50	3.36	71.36
3	126.15	0.00	56.94	183.09	2.78	47.83
4	137.64	0.00	71.58	209.22	2.43	32.06
5	146.68	0.00	83.94	230.62	2.21	21.49
6	153.79	0.00	94.24	248.03	2.05	14.41
7	159.39	0.00	102.72	262.11	1.94	9.66
8	163.79	0.00	109.65	273.44	1.86	6.47
9	167.25	0.00	115.28	282.53	1.80	4.34
10	169.97	0.00	119.82	289.79	1.76	2.91
20	179.10	0.00	135.94	315.04	1.62	0.05
100	180.01	0.00	137.65	317.66	1.60	0.00
1000	180.01	0.00	137.65	317.66	1.60	0.00

BOD5/BOD20 =	0.73
BOD20/BOD5 =	1.37

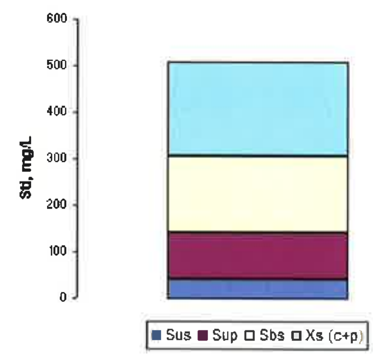
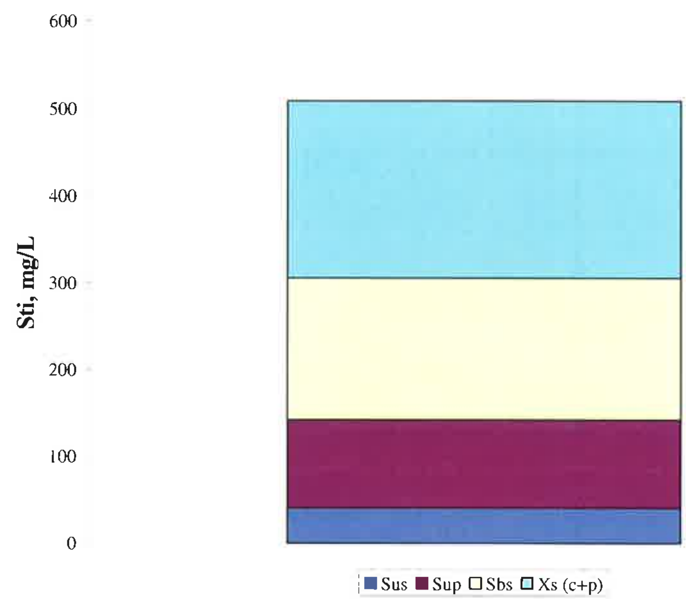


Figure 1 – BOD/COD Worksheet Model for Wastewater COD Fractions



Sus Unbiodegradable Soluble
Sup Unbiodegradable Particulate
Sbs Readily Biodegradable
Xs (c+p) Slowly Biodegradable (Colloidal and Particulate)

Figure 2 – Special Sampling Campaign: Average Influent COD Fractionation

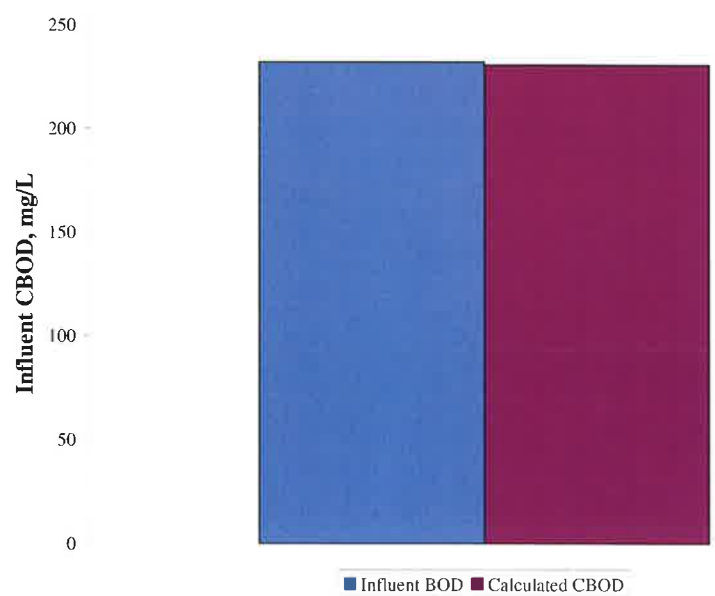


Figure 3 – Special Sampling Campaign: Observed *vs*. Calculated Influent CBOD

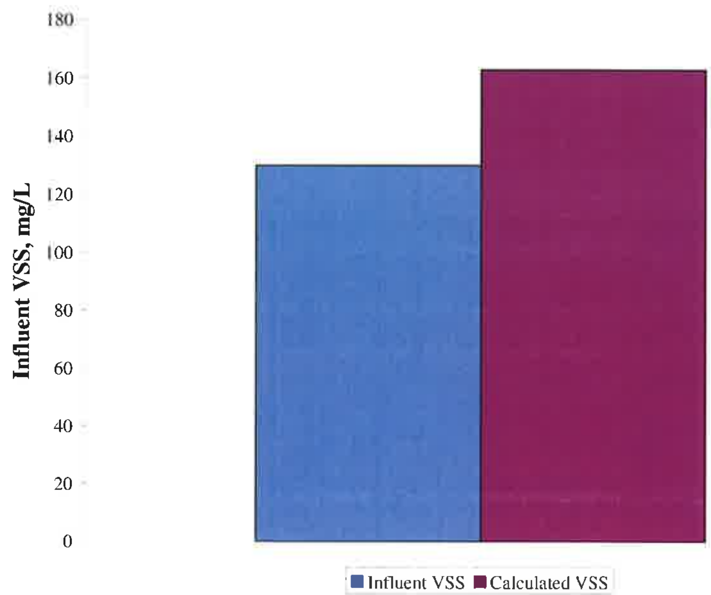


Figure 4 – Special Sampling Campaign: Observed *vs*. Calculated Influent VSS

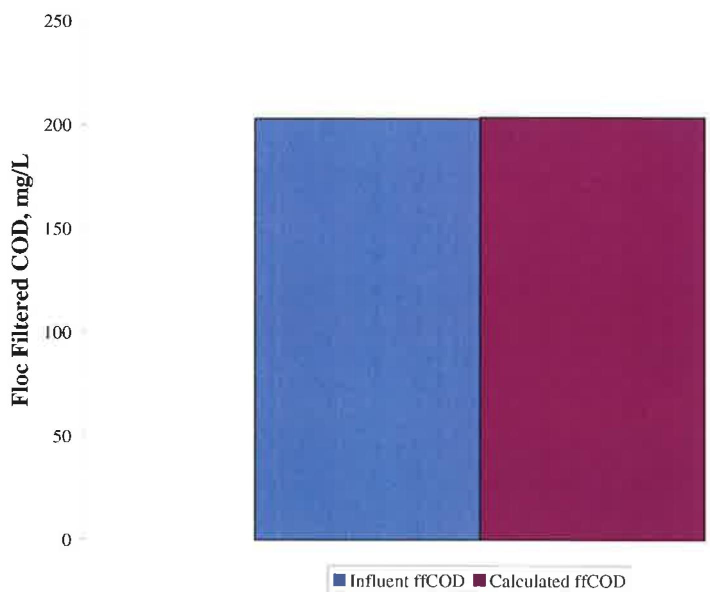


Figure 5 – Special Sampling Campaign: Observed *vs*. Calculated Influent ffCOD

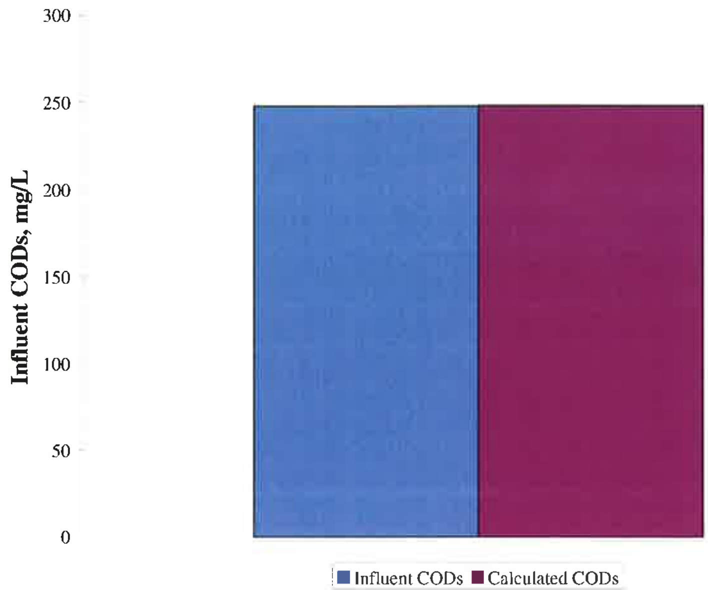


Figure 6 – Special Sampling Campaign: Observed *vs*. Calculated Influent Soluble COD

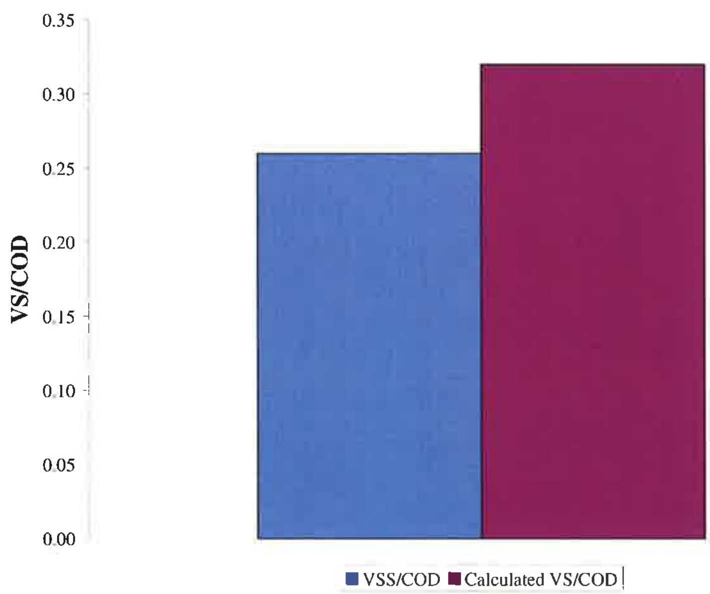


Figure 7 – Special Sampling Campaign: Observed *vs*. Calculated Influent VSS-to-COD Ratio

APPENDIX C

Process Modeling

TECHNICAL MEMORANDUM

September 24, 2006

TO: FILE

FROM: Jose A. Jimenez, Orlando

REVIEWER: John R. Bratby, Denver

SUBJECT: **City of North Port WWTP: Calibration of the BioWin Simulator**

This technical memorandum summarizes the BioWin simulator calibration for the City of North Port Wastewater Treatment Plant (WWTP).

The BioWin process simulation model (BioWin) was used to perform a capacity assessment of the City's facility as well as to evaluate different treatment process modifications to expand the capacity of the treatment plant from 3.7 mgd to 7.0 mgd as maximum three-month average flow.

To ensure that the constructed BioWin simulator accurately predicts plant performance, it must be calibrated with historical plant data. Configuration and calibration of the model was based on the operation and performance of the facility during the period from April 23, 2005 through May 01, 2005. During that period, all treatment process units were on line and no major plant upsets were identified. The BioWin flow sheet used for the purpose of the calibration is shown in Figure 1.

Multiple parallel unit processes in the actual plant were combined in the BioWin configuration into one unit with a total volume and surface area equal to the individual units. The simplifications summarized below explain the actual plant *versus* the BioWin configuration:

- Five aeration basins were combined into one tank;
- The aeration basins were modeled as three complete-mixed tank;
- Three secondary clarifiers were combined into one single unit;
- Filtration system was combined into one single unit

Physical data on each of the unit processes are summarized in Tables 1 and 2.

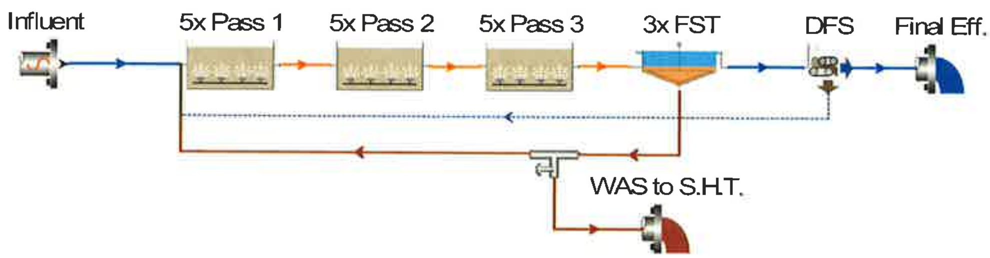


Figure 1. BioWin flow sheet used to simulate the Winter Haven WWTP No. 3

Table 1. Aeration tank physical data

Element Name	Volume (mil. gal.)	Area (ft^2)	Depth (ft)
5x Pass 1	0.3740	3,333	15.0
5x Pass 2	0.3740	3,333	15.0
5x Pass 3	0.3740	3,333	15.0

Table 2. Secondary clarifiers and gravity thickener physical data

Element Name	Volume (mil. gal.)	Area (ft^2)	Depth (ft)
3x FST	1.0421	9,951	14.0

Data collected during the special sampling period performed on the April-May period was used to calibrate the BioWin model. The calibration simulations input information to the model included flow, COD, TKN and TP. Other plant influent parameters such as TSS, NH_3, orthophosphate, and $CBOD_5$ are calculated by the simulator, based on the specified COD, TKN, TP, and the wastewater characteristic fractions.

Steady-State Simulation

Steady state model simulations were run to establish whether there was reasonable correspondence between the predicted and observed data. Table 3 compares observed average values from the special sampling dataset to predicted steady state average values from the calibrated model. In general, the match between model predictions and observed values is good with most predictions falling within the observed average value.

Table 3. Observed average values *versus* predicted steady state averages

Parameter	Observed Average	Predicted Average
Influent		
Flow (mgd)	1.82	1.82
COD (mg/L)	504	511
$CBOD_5$ (mg/L)	208	232
TSS (mg/L)	168	204
VSS (mg/L)	131	164
TKN (mg/L)	41.4	42.1
NH_3-N (mg/L)	31.7	30.78
TP (mg/L)	9	8.24
pH (SU)	7.12	7.1
Alkalinity (mmol/L)	8.9	8.93
Aeration Basins		
MLSS (mg/L)	4,106	4,116
MLVSS (mg/L)	3,515	3,003
VSS-to-TSS Ratio	0.86	0.73
Final Effluent		
TSS (mg/L)	2.13	1.8
$CBOD_5$ (mg/L)	< 2.0	< 2.0
TKN (mg/L)	1.42	1.24
NH_3-N (mg/L)	0.19	0.06
NO_3-N (mg/L)	31.69	29.35
TP (mg/L)	6.44	5.25
Return Activated Sludge		
Flow (mgd)	2.8	2.8
Concentration (mg/L)	7,050	6,568
Waste Activated Sludge		
Flow (mgd)	0.038	0.04
Concentration (mg/L)	7,050	6,568
Mass Rate (lb/d)	2,234	2,412

Dynamic Simulations

Dynamic simulations also were conducted during the calibration exercise. The period selected for the dynamic simulation corresponded with the period where the special sampling campaign was conducted. Daily influent data from the sampling were input into BioWin to compare the daily plant response with the model prediction. The following sections summarize the results of this exercise by comparing predicted and observed results for different unit processes for the City's WWTP.

Plant Influent. The following figures show flow, COD, TKN, and TP which are model inputs and are shown as solid lines. Parameters such as $CBOD_5$, TSS, VSS, ammonia and phosphate are estimated by the model based on fractions specified for wastewater characteristics; hence both lines and points appear in those figures.

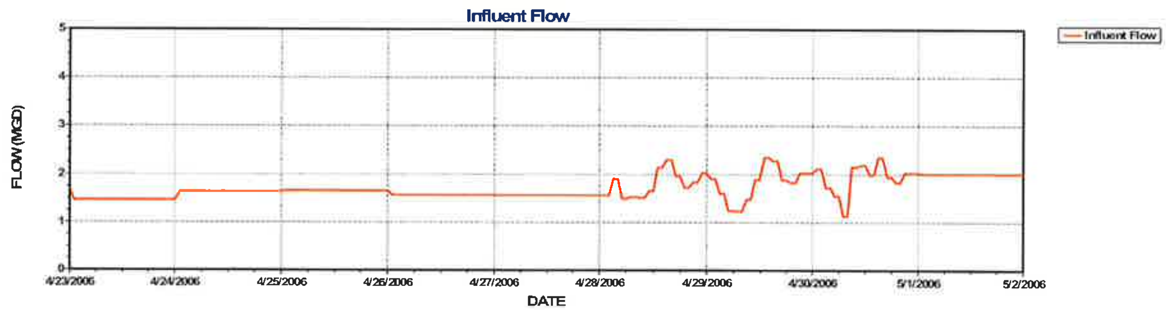


Figure 2. Plant influent flow over calibration period

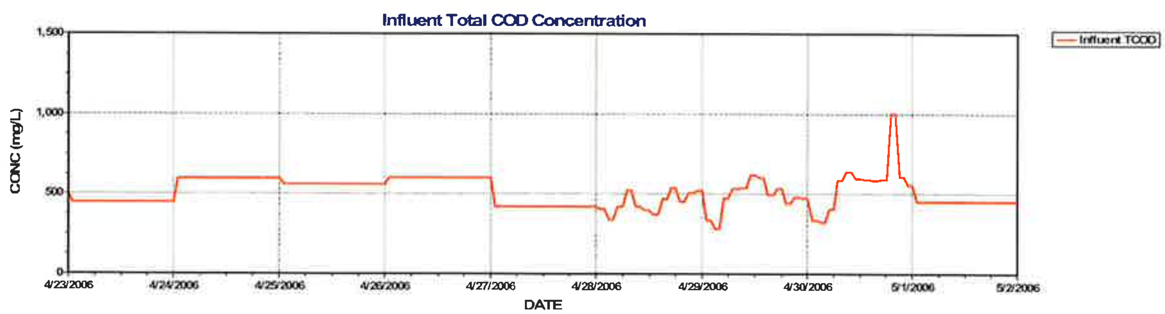


Figure 3. Plant influent COD over calibration period

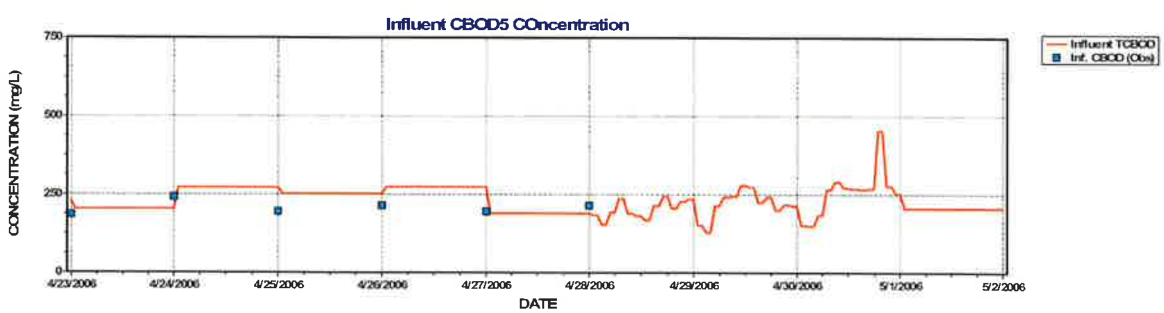


Figure 4. Predicted (line) *versus* measured (points) plant influent $CBOD_5$ over calibration period

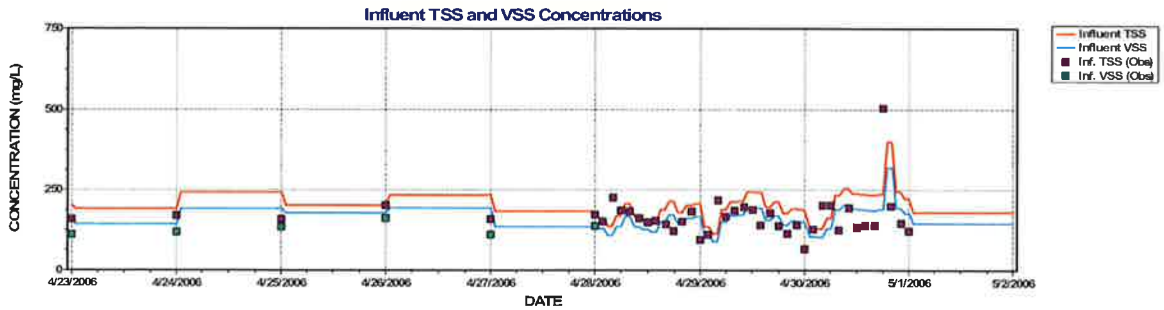


Figure 5. Predicted (line) *versus* measured (points) plant influent TSS and VSS over calibration period.

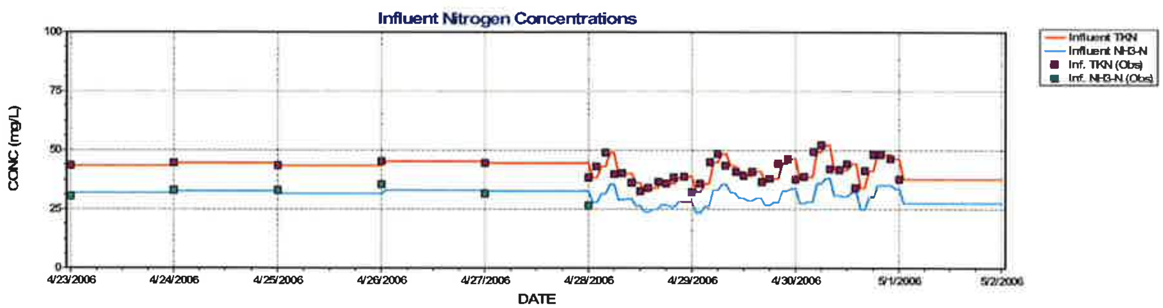


Figure 6. Predicted (line) *versus* measured (points) plant influent TKN and ammonia over calibration period

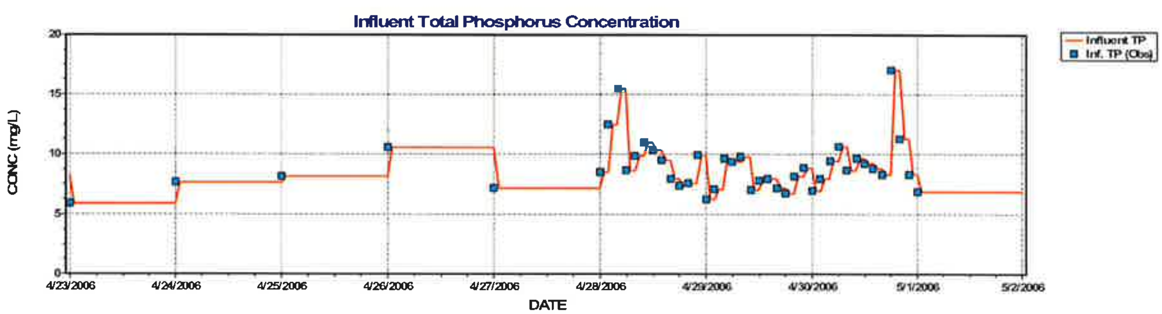


Figure 7. Predicted (line) *versus* measured (points) plant influent total phosphorus over calibration period

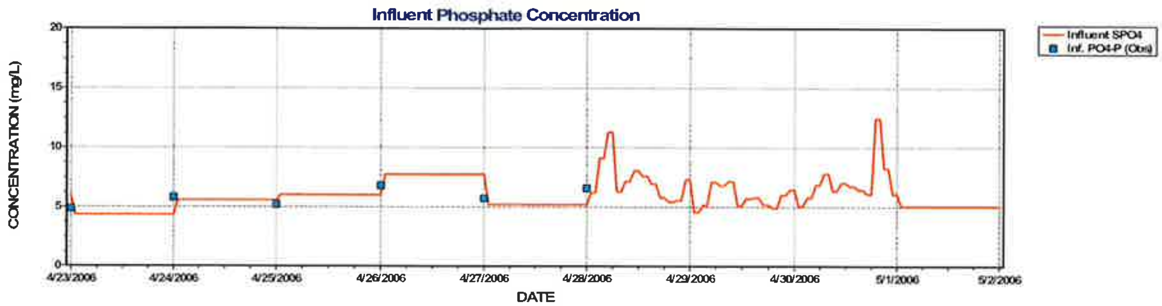


Figure 8. Predicted (line) *versus* measured (points) plant influent phosphate over calibration period

Aeration Basins. The following figure shows the predicted (lines) *versus* observed (points) responses for the mixed liquor concentration in the aeration basins. The following points are worth noting:

- As seen in Table 3, the plant reported WAS flow was modified from 0.038 to 0.040 mgd to match the mixed liquor concentration in the aeration tanks. Currently, WAS pumps are only operated during limited times during the day. The average WAS flow provided by plant staff was calculated based on one day operation only; however, WAS flow could vary during different days to maintain target solids concentrations in the aeration tanks.
- No dissolved oxygen data in the aeration tanks was measured during the special sampling; however, for the purpose of the calibration it was assumed that adequate DO was maintained within the basins.
- A solids retention time (SRT) of 16 days based on the biomass in the aeration tanks only was selected because it provided a good match on mixed liquor concentration. This offered a WAS flow discrepancy of 5 percent. However, due to limited WAS flow information, this was considered acceptable.

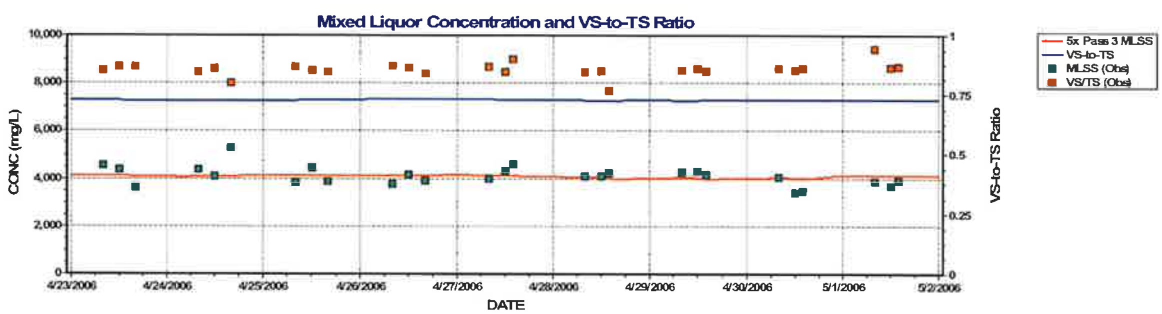


Figure 9. Predicted (lines) *versus* measured (points) mixed liquor solids levels and VS-to-TS ratio over calibration period

Final Effluent. The following figures show predicted (lines) *versus* observed (points) responses (if both are available) for a number of final effluent parameters. In general there is good agreement between model predictions and observed values over the calibration period. Note that secondary effluent data collected during the special sampling was not used for the purpose of the calibration since the monitoring equipment was installed in the secondary effluent splitter box going into the deep-well injection. However, during the special sampling period no effluent waster was sent to that side; all the secondary effluent flow was sent to reuse. Therefore, the data collected did not represent the actual secondary effluent quality.

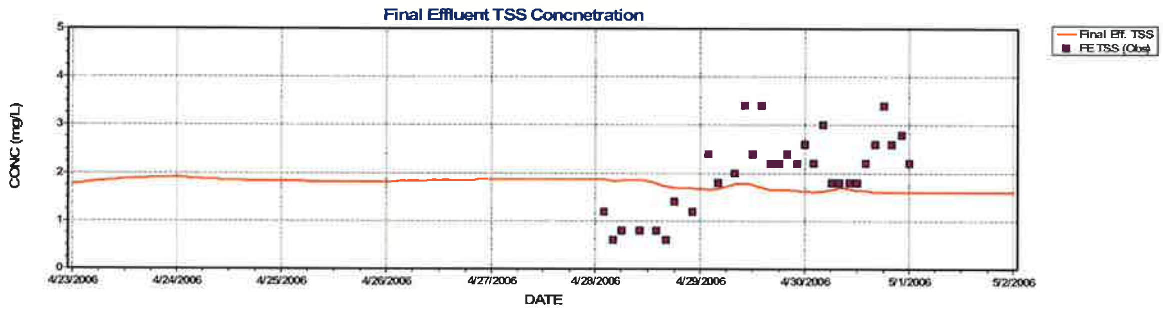


Figure 10. Predicted (line) *versus* measured (points) effluent TSS over calibration period

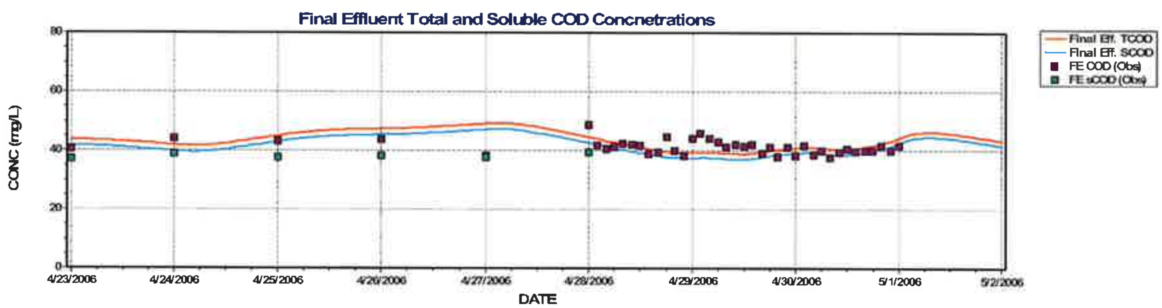


Figure 11. Predicted (line) *versus* measured (points) effluent total and soluble COD over calibration period

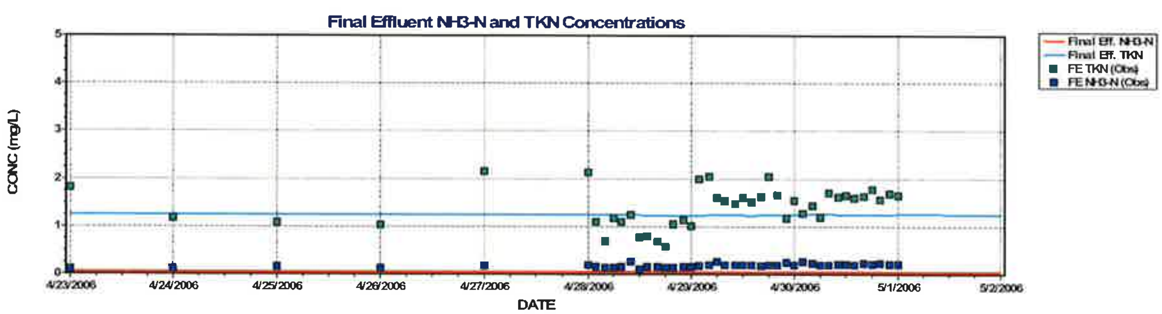


Figure 12. Predicted (line) *versus* measured (points) effluent ammonia and TKN over calibration period

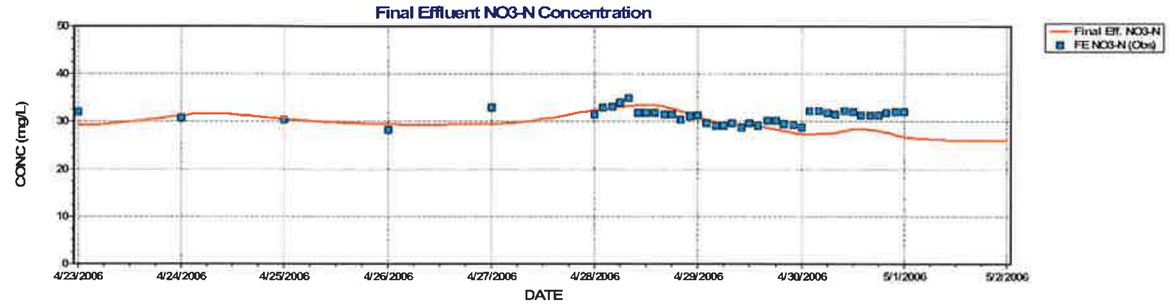


Figure 13. Predicted (line) *versus* measured (points) effluent nitrate over calibration period

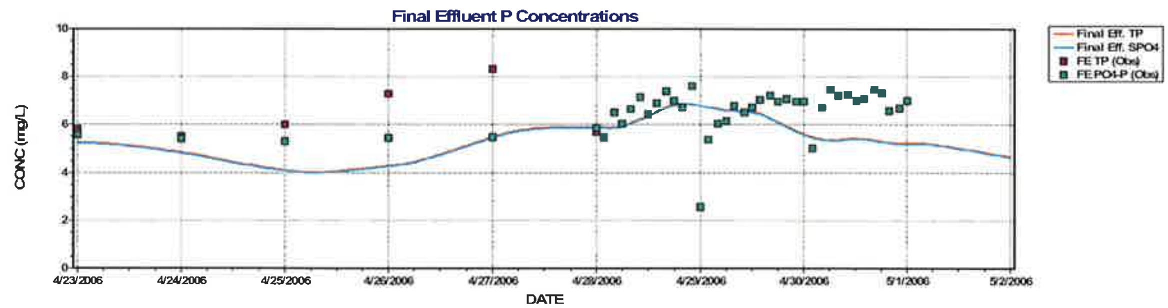


Figure 14. Predicted (line) *versus* measured (points) effluent TP and phosphate over calibration period

CONCLUSION

Based on the limited data available for calibration, it is considered that the BioWin model predicted well plant performance during the special sampling period.

Based on these results, the wastewater fractions calculated based on the special sampling data appear to be adequate for the wastewater influent at the City's facility.

Finally, it is considered that the model was successfully calibrated and can be used for the purpose of this study to perform a capacity assessment of the plant and to evaluate different process modifications required to expand the City's plant.

TECHNICAL MEMORANDUM

September 24, 2006

TO: FILE

FROM: Jose A. Jimenez, ORLANDO

REVIEWER: John R. Bratby, DENVER

SUBJECT: **City of North Port WWTP: Analysis of Future Scenario**

The City of North Port Wastewater Treatment Plant (WWTP) is currently rated at 3.7 mgd on a maximum three-month average daily flow (M3MADF), which is equivalent to 3.2 mgd on an annual average daily flow (AADF) basis. The City's WWTP is classified as a conventional extended aeration activated sludge facility with screening, grit removal, activated sludge reactors with coarse bubble aeration and secondary clarification. Effluent to be distributed as reclaimed water undergoes additional treatment including filtration and high level disinfection.

The BioWin process simulation model was used for the purpose of identifying improvements needed to increase the permitted capacity of the City's WWTP to 7.0 mgd on a M3MADF basis, and provide for effluent removal capabilities that will meet the following criteria:

- $CBOD_5$ < 5 milligrams per liter (mg/L)
- TSS < 5 mg/L
- Total Nitrogen (TN) < 10 mg/L
- High level disinfection pursuant to Rule 62-610, FAC

To ensure that the constructed BioWin simulator accurately predicted plant performance, it was calibrated with plant information collected during a special sampling effort performed at the City's WWTP in April-May 2006. Information about the calibration of the model can be found in the TM titled "*City of North Port WWTP: Calibration of the BioWin Simulator*".

The calibrated BioWin model was then used to identify improvements to increase the capacity of the City's WWTP. Different process configurations were considered during this study as follows:

- Alternative 1: Conventional Activated Sludge Process with Deep-Bed Denitrification Filters
- Alternative 2: Activated Sludge with Anaerobic Selectors with Deep-Bed Denitrification Filters
- Alternative 3: Modified Ludzack-Ettinger Process with Tertiary Filters

Figure 1 shows the steady state relationship between effluent ammonia concentrations and solids retention time (SRT) for a range of temperatures. Based on these results, an SRT of 4 days was selected for the evaluation of all the alternatives considered during this analysis. This SRT is based on the biomass inventory in the aeration basins only.

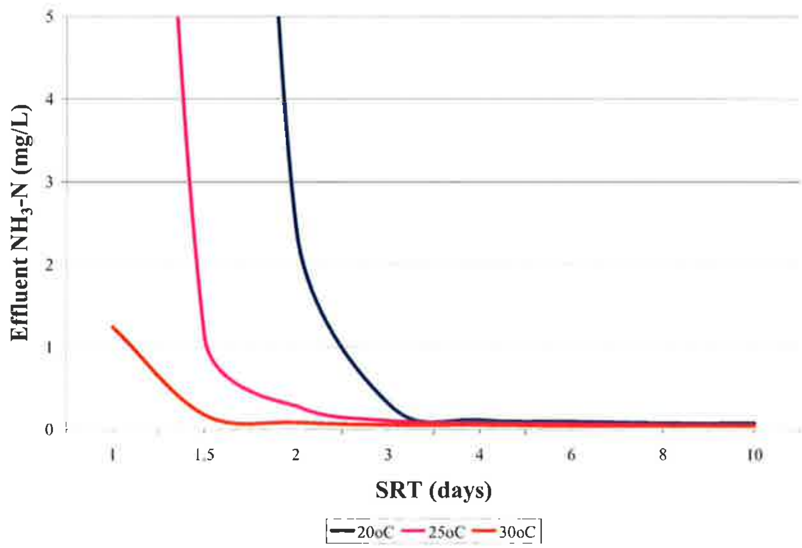


Figure 1 – Effect of SRT on Effluent Ammonia Concentration at Different Temperatures

This analysis was focused on the secondary and tertiary treatment portions of the City's WWTP rather than on pretreatment, or solids processing. A description of each alternative follows. Table 4 summarizes the modeling results for each of the alternative considered during this analysis.

Alternative 1: Conventional Activated Sludge Process and Deep-Bed Denitrification Filters

This alternative uses the same secondary treatment process configuration currently utilized at the City's WWTP. Therefore, this alternative was used as the basic alternative. To reduce the effluent TN concentration to acceptable levels, the facility would require tertiary deep-bed denitrification filters with carbon addition for nitrate removal. Figure 2 shows the BioWin configuration for this Alternative.

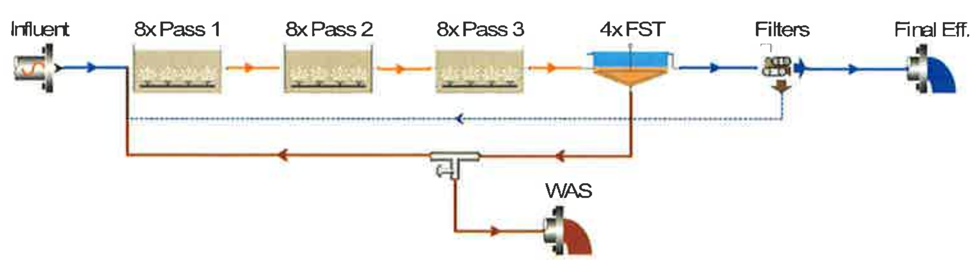


Figure 2 – BioWin Configuration for Alternative 1

To maintain adequate mixed liquor concentration levels in the aeration tanks, three new aeration basins, similar to the existing reactors, will be required. The total reactor volume would increase from approximately 1.12 MG to 1.79 MG. The higher reactor volume will minimize the need of additional secondary clarifiers. Figure 3 shows the BioWin predicted MLSS concentration in the aeration tanks.

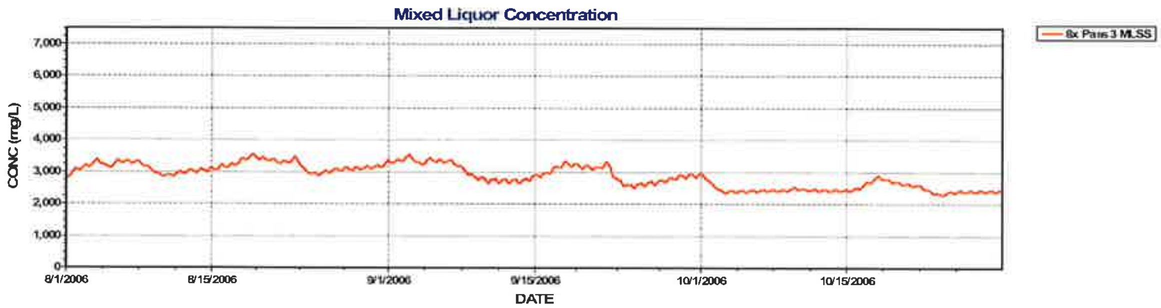


Figure 3- MLSS Concentration – Alternative 1

Currently, the City's WWTP is equipped with a coarse bubble aeration system. However, it is considered that new aeration system would be required to handle future loads at the WWTP. Therefore, the existing aeration system would be replaced by a more efficient fine-bubble aeration system. The BioWin model was used to estimate the oxygen uptake rate (OUR) profiles in the aeration tanks, Figure 4. For this alternative, average dissolved oxygen (DO) concentrations of 2.0 mg/L were set in the aerated zones of the activated sludge reactors at all time. The aeration system requirements to achieve the set dissolved oxygen concentration in each aerated zone for this alternative are listed in Table 1. In summary, a total peak airflow rate of 11,376 scfm distributed by approximately 4,056 fine-pore 9-inch diffusers can maintain the set DO levels in the reactor at peak loading conditions.

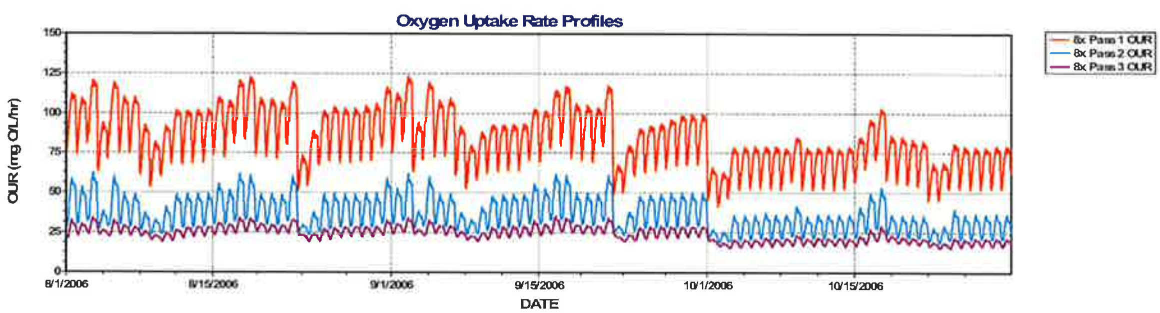


Figure 4 – Oxygen Uptake Rates – Alternative 1

Table 1 – Peak Aeration System Requirements for Alternative 1

Parameter	Zone			Total per Train	TOTAL
	8x Pass 1	8x Pass 2	8x Pass 3		
Volume (mg)	0.07468	0.07468	0.07468	0.22403	1.7922
Peak OUR (mg/l/hr)	125	65	35	--	--
Peak AOR (lb O/d)	1,874	974	525	--	--
No. of Diffusers	290	137	80	506	4,056
Density (%)	15.3	7.8	4.3	--	--
Airflow Rate (scfm)	780	422	220	1,422	11,376
Air per Diffuser (scfm)	2.70	3.0	2.75	--	--
SOTE at Peak OUR (%)	25.4	24.4	25.3	--	--
Blower Capacity (hp)	--	--	--	--	460

After biological treatment, the mixed liquor would flow by gravity to the secondary clarifiers. To increase the capacity of the clarification system, additional clarifiers would be required. For the purpose of this analysis, it was assumed that a new 65-foot diameter, 14-foot side water depth unit would be added. In addition, to maximize the capacity of the secondary clarifiers, the RAS capacity would need to be increased.

The State Point Analysis (SPA) program was used to determine the maximum allowable solids loading rate or maximum solids flux (MSF) to the secondary clarifiers. For the purpose of this analysis, a maximum RAS flow rate of 8.0 mgd and a design sludge volume index (SVI) of 150 mL/g were adopted. Based on this, the maximum allowable solids loading rate (SLR) is 36 lb/ft^2·d, which accounts for non-ideal settling conditions in the clarifiers.

Secondary clarifier surface overflow rates (SOR) vary from 1,000 to 1,800 gpd/ft^2. For the purpose of this analysis a maximum allowable SOR of 1,200 gpd/ft^2, under peak flow conditions, was adopted.

Figures 5 and 6 show the BioWin predictions for secondary clarifier SLR and SOR, respectively. As these two figures show, the secondary clarifiers would be highly loaded during peak loading conditions during the design flows and loads. However, the capacity of the secondary clarification system is considered acceptable for the purpose of this analysis.

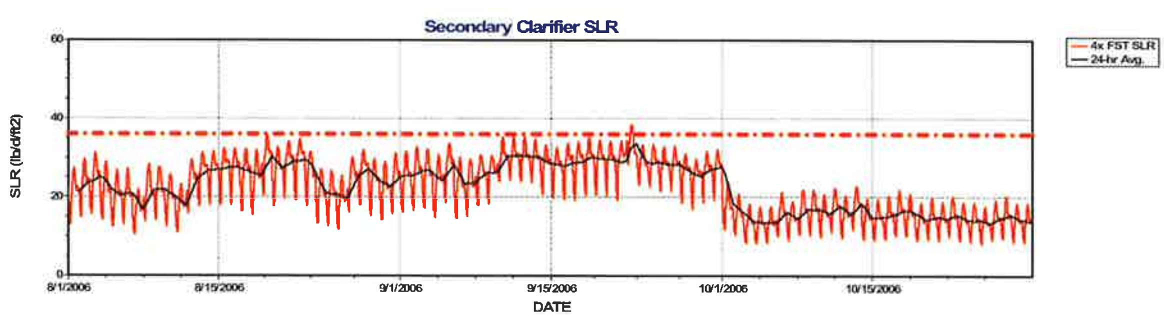


Figure 5 – Secondary Clarifier SLR – Alternative 1

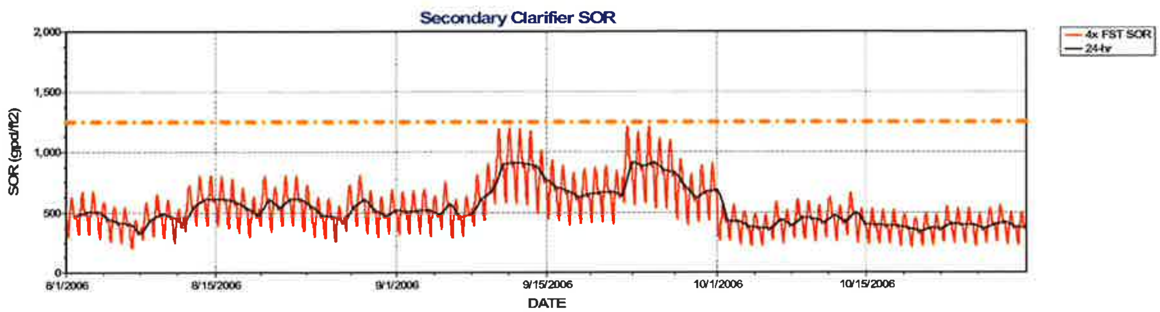


Figure 6 – Secondary Clarifier SOR – Alternative 1

After secondary clarification, clear secondary effluent will be directed to tertiary deep-bed denitrification filters with carbon addition for additional removal of particulate organics and nitrate removal by denitrification. The filters would be sized to maintain an average filtration rate of approximately 2.0 gpm/ft^2 and a peak filtration rate of approximately 4.0 gpm/ft^2. To meet, future effluent nitrogen requirements, carbon addition would be required. For the purpose of this analysis, methanol was adopted as the supplemental carbon source. To meet future effluent nitrogen requirements, approximately 1,420 gpd of methanol would be required.

To maintain the adopted filtration rates, a total filtration area of approximately 2,830 ft^2 would be required.

Figures 7 through 9 show important BioWin final effluent concentrations for TSS and CBOD, nitrogen and phosphorus, respectively.

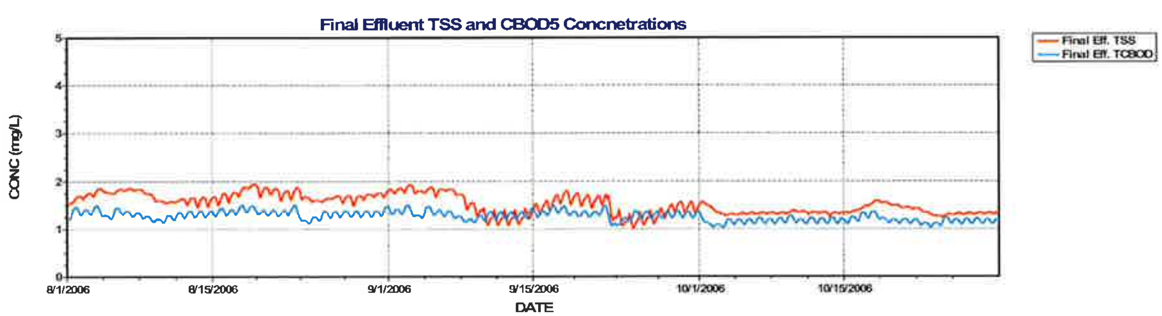


Figure 7 – Final Effluent TSS and CBOD Concentrations – Alternative 1

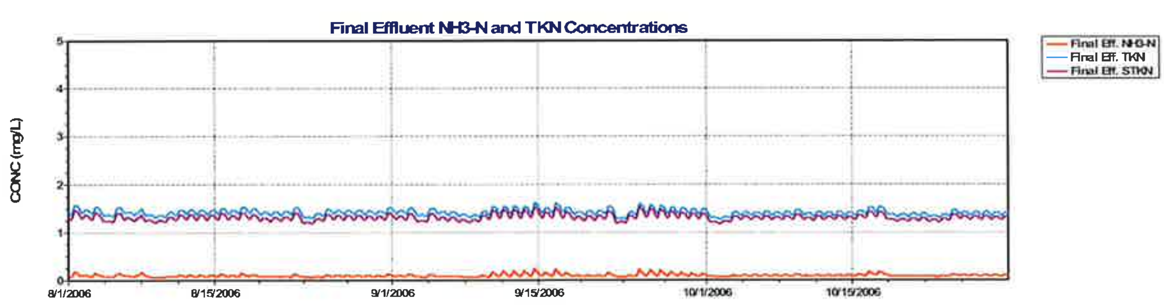


Figure 8 – Final Effluent Nitrogen Concentration – Alternative 1

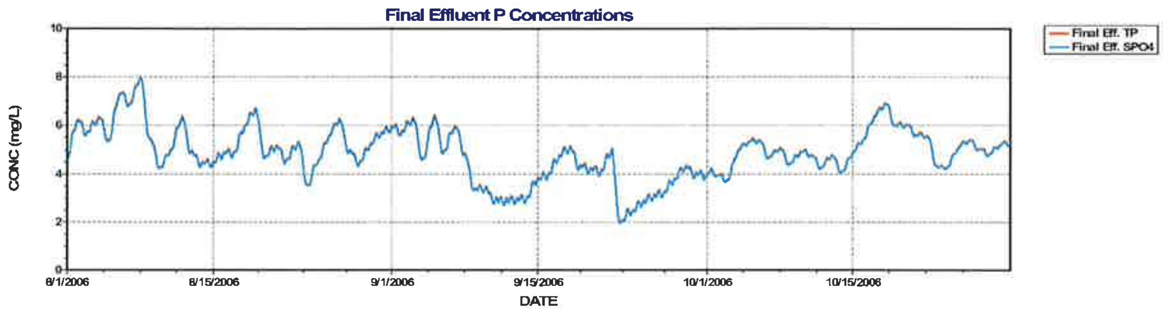


Figure 9 – Final Effluent Phosphorus Concentration – Alternative 1

Alternative 2: Activated Sludge with Anaerobic Selectors and Deep-Bed Denitrification Filters

This alternative modifies Alternative 1 and the current secondary process configuration by creating anaerobic selectors for bulking control at the front-end of the aeration tanks. Anaerobic selectors prevent the growth of filamentous bacteria in the aerobic zone by removing their food source – namely the readily biodegradable BOD in the selector ahead of the aerobic zone. The reduced inclination for sludge bulking in the City's plant with selectors will produce a mixed liquor with better sludge settling properties that will lead to more efficient activated sludge system operation. In addition, anaerobic selectors would lower the operating costs, including reduced sludge chlorination needs for bulking control and reduced energy requirements.

Figure 10 presents the BioWin configuration for this alternative. Similar to Alternative 1, three new aeration tanks would be required to maintain adequate MLSS concentrations in the reactors. The anaerobic selector comprised 20 percent of the total reactor volume.

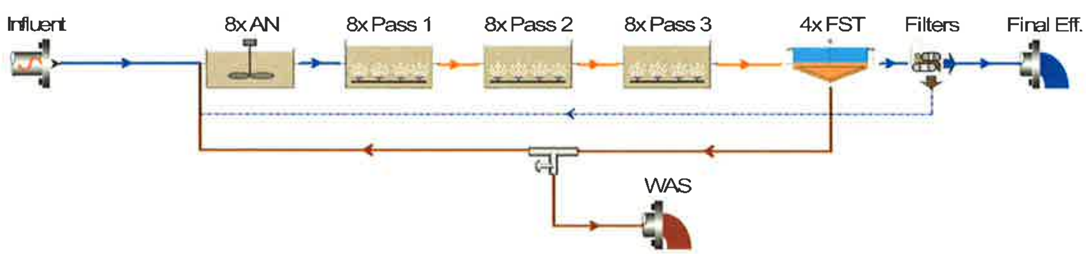


Figure 10 – BioWin Configuration for Alternative 2

Similar to Alternative 1, the total reactor volume would increase from approximately 1.12 MG to 1.79 MG (0.3585 MG and 1.4373 for anaerobic selector and aerobic zones, respectively). Figure 11 shows the BioWin predicted MLSS concentration in the aeration tanks.

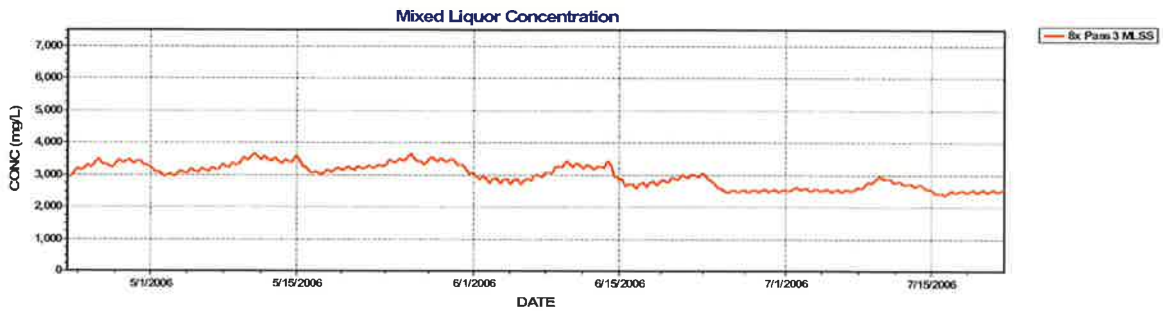


Figure 11- MLSS Concentration – Alternative 3

Similar to Alternative 1, the coarse bubble aeration system would be replaced by a new fine bubble aeration system to handle future loads at the WWTP. Figure 12 shows the oxygen uptake rate (OUR) profiles predicted by BioWin. For this alternative, average DO concentrations of 2.0 mg/L were set in the aerated zones of the activated sludge reactors at all time. The aeration system requirements to achieve the set dissolved oxygen concentration in each aerated zone for this alternative are listed in Table 2. In summary, a total peak airflow rate of 9,024 scfm distributed by approximately 3,296 fine-pore 9-inch diffusers can maintain the set DO levels in the reactor at peak loading conditions. The anaerobic selector would be equipped with mechanical mixer with a total capacity of 8 horse power (hp).

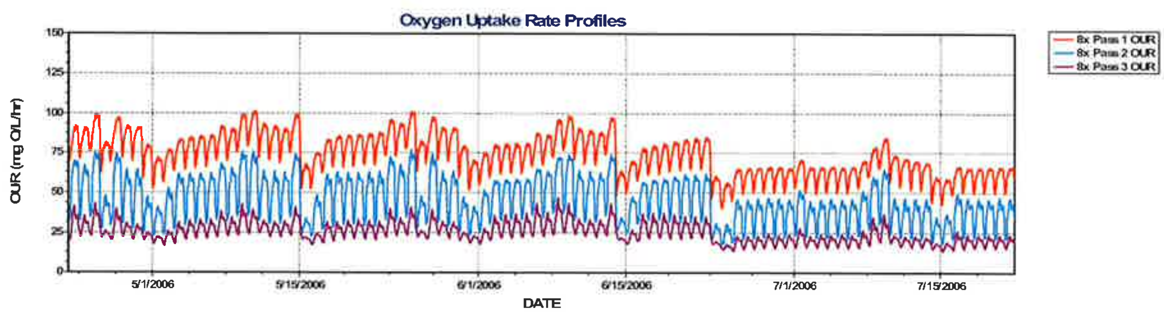


Figure 12 – Oxygen Uptake Rates – Alternative 2

Table 2 – Peak Aeration System Requirements for Alternative 2

Parameter	Zone			Total per Train	TOTAL
	8x Pass 1	8x Pass 2	8x Pass 3		
Volume (mg)	0.05974	0.05974	0.05974	0.17921	1.4337
Peak OUR (mg/l/hr)	101.00	77.00	47.00	--	--
Peak AOR (lb O/d)	1,874	974	525	--	--
No. of Diffusers	200	132	80	412	3,296
Density (%)	14.3	9.4	5.7	--	--
Airflow Rate (scfm)	491	395	242	1,128	9,024
Air per Diffuser (scfm)	2.45	2.99	3.02	--	--
SOTE at Peak OUR (%)	26.0	24.7	24.6	--	--
Blower Capacity (hp)	--	--	--	--	365

After biological treatment, the mixed liquor would flow by gravity to the secondary clarifiers. Similar to Alternative 1, additional clarifiers would be required. For the purpose of this analysis, it was assumed that a new 65-foot diameter, 14-foot side water depth unit would be added. In addition, to maximize the capacity of the secondary clarifiers, the RAS capacity would need to be increased.

The State Point Analysis (SPA) program was used to determine the maximum allowable solids loading rate or maximum solids flux (MSF) to the secondary clarifiers. For the purpose of this analysis, a maximum RAS flow rate of 8.0 mgd and a design sludge volume index (SVI) of 120 mL/g were adopted. It should be noted that a lower SVI was adopted for this alternative to provide the benefit of the anaerobic selector. Based on this, the maximum allowable solids loading rate (SLR) is 40 lb/ft^2·d, which accounts for non-ideal settling conditions in the clarifiers.

For this alternative a maximum allowable SOR of 1,200 gpd/ft^2, under peak flow conditions, was adopted.

Figures 13 and 14 present the secondary clarifier SLR and SOR, respectively, predicted by BioWin. As these two figures show, the secondary clarifiers would be highly loaded during peak loading conditions during the design flows and loads. However, the capacity of the secondary clarification system is considered acceptable for the purpose of this analysis.

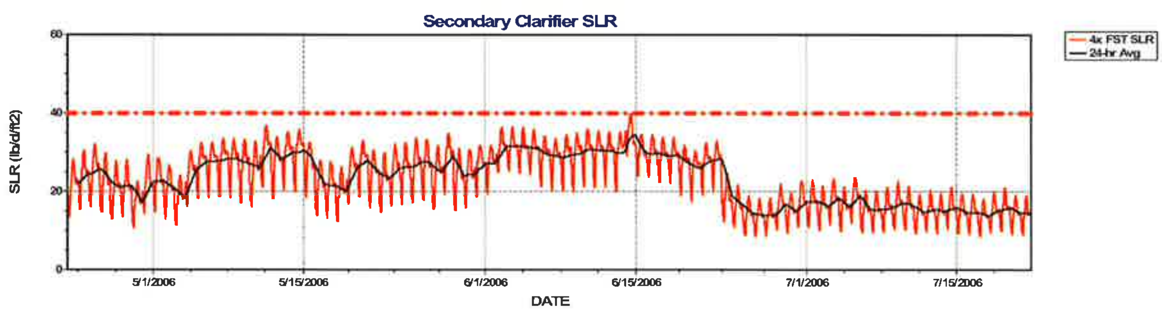


Figure 13 – Secondary Clarifier SLR – Alternative 2

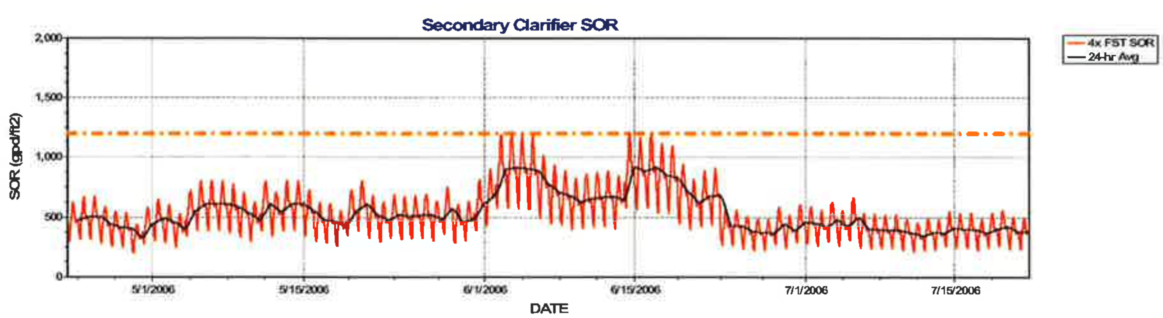


Figure 14 – Secondary Clarifier SOR – Alternative 2

After secondary clarification, clear secondary effluent will be directed to tertiary deep-bed denitrification filters with carbon addition for additional removal of particulate organics and nitrate removal by denitrification. Similar to Alternative 1, a total filtration area of approximately 2,830 ft^2 would be required to maintain low filtration rates. To meet future effluent nitrogen requirements, approximately 600 gpd of methanol would be required.

Figures 15 through 17 show important BioWin final effluent concentrations for TSS and CBOD, nitrogen and phosphorus, respectively.

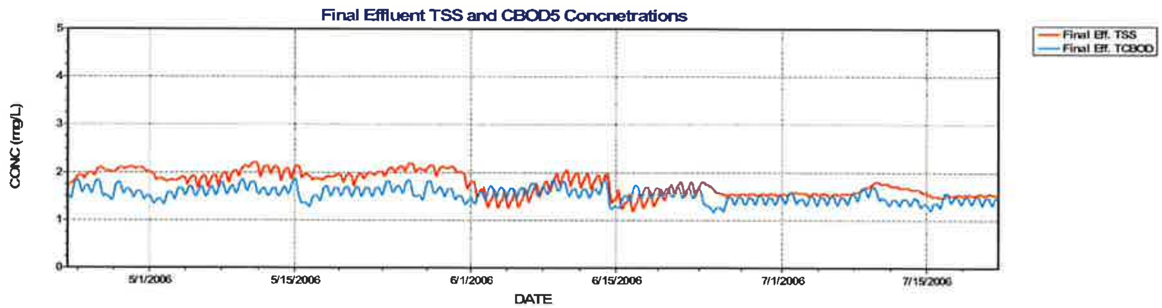


Figure 15 – Final Effluent TSS and CBOD Concentrations – Alternative 2

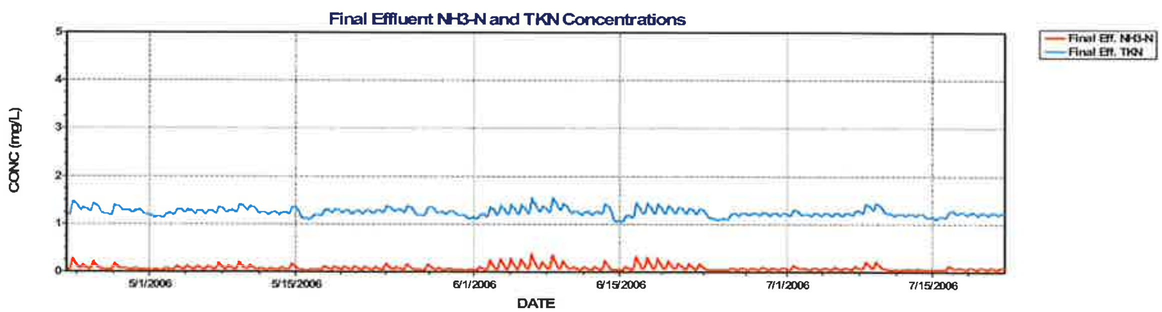


Figure 16 – Final Effluent Nitrogen Concentration – Alternative 2

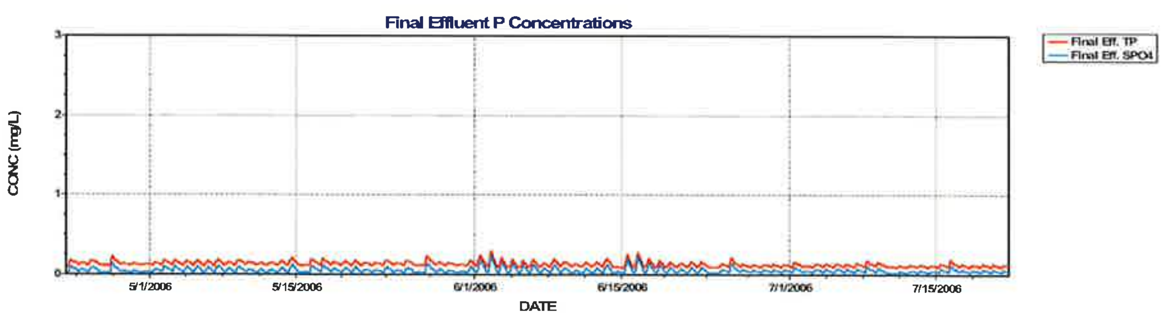


Figure 17 – Final Effluent Phosphorus Concentration – Alternative 2

Alternative 3: Modified Ludzack-Ettinger Process with Deep-Bed Filters

This alternative modifies Alternative 2 by incorporating an internal mixed liquor recycle (IMLR) from the end of the aerobic zones back to the front-end of the anoxic selectors for denitrification. This process is known as the Modified Ludzack-Ettinger (MLE) process. The IMLR from the aerobic zones to the anoxic zones returns nitrified mixed liquor at a regulated rate to ensure adequate nitrates for the heterotrophic denitrification population in the anoxic zone and this process uses external carbon provided by the raw wastewater for the denitrification that occurs in the anoxic zone.

Figure 18 presents the BioWin configuration for this alternative. Similar to Alternatives 2, the total reactor volume would increase from approximately 1.12 MG to 1.79 MG (0.3585 MG and 1.4373 for anoxic and aerobic zones, respectively). Figure 19 shows the BioWin predicted MLSS concentration in the aeration tanks.

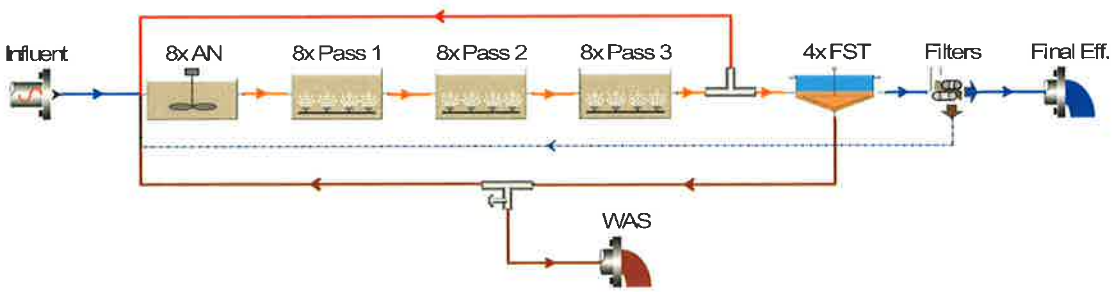


Figure 18 – BioWin Configuration for Alternative 3

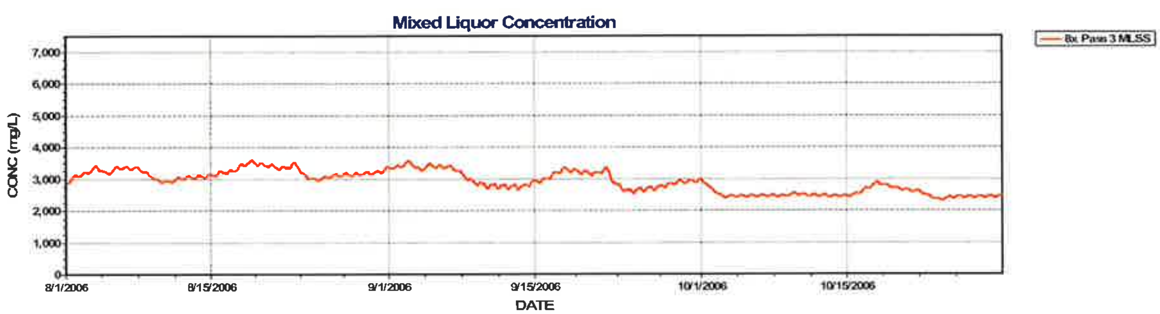


Figure 19 – MLSS Concentration – Alternative 3

Figure 20 shows the oxygen uptake rates predicted by BioWin and used to determine the aeration system requirements. As mentioned previously, the existing aeration system will be replaced by a fine-bubble aeration system. For the purpose of this analysis, the aeration system would be designed to maintain an average DO concentration of 2.0 mg/L at all times. Table 3 summarizes the aeration system requirement for the alternative. Based on the results presented in Table 3, a total peak airflow rate of 9,128 scfm distributed by approximately 3,176 fine-pore 9-inch diffusers can maintain the set DO levels in the reactor at peak loading conditions. Similar to Alternative 2, the anoxic zones would be equipped with mechanical mixer with a total capacity of 8 horse power (hp).

Table 3 – Peak Aeration System Requirements for Alternative 3

Parameter	Zone			Total per Train	TOTAL
	8x Pass 1	8x Pass 2	8x Pass 3		
Volume (mg)	0.05974	0.05974	0.05974	0.17921	1.4337
Peak OUR (mg/l/hr)	101.00	73.00	51.00	--	--
Peak AOR (lb O/d)	1,206	872	609	--	--
No. of Diffusers	188	122	87	397	3,176
Density (%)	13.5	8.7	6.2	--	--
Airflow Rate (scfm)	501	378	262	1,141	9,128
Air per Diffuser (scfm)	2.67	3.10	3.01	--	--
SOTE at Peak OUR (%)	25.5	24.4	24.6	--	--
Blower Capacity (hp)	--	--	--	--	369

Similar to Alternatives 1 and 2, one additional 65-foot diameter, 14-foot side water depth clarifier would be required. To maximize the capacity of the secondary clarifiers, the RAS capacity would need to be increased.

Similar to Alternative 2, the SPA program was used to determine the maximum allowable solids loading rate or maximum solids flux (MSF) to the secondary clarifiers, with a value of 40 $lb/ft^2 \cdot d$, which accounts for non-ideal settling conditions in the clarifiers. For this alternative a maximum allowable SOR of 1,200 gpd/ft^2, under peak flow conditions, was adopted.

Figures 20 and 21 present the secondary clarifier SLR and SOR, respectively, predicted by BioWin. As these two figures show, the secondary clarifiers would be highly loaded during peak loading conditions during the design flows and loads. However, the capacity of the secondary clarification system is considered acceptable for the purpose of this analysis.

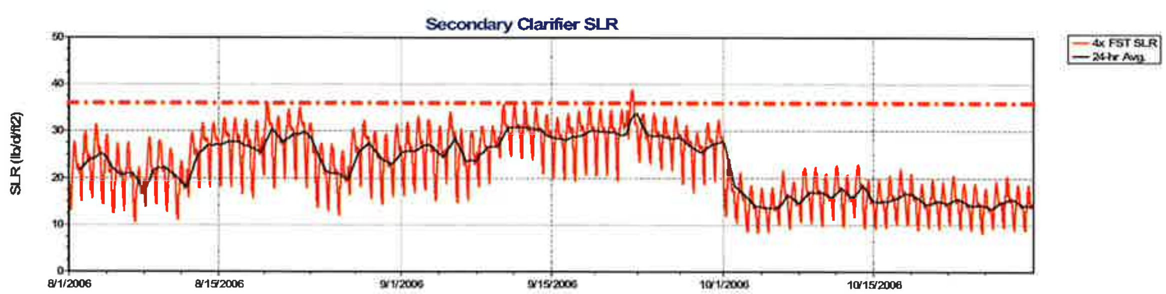


Figure 20 – Secondary Clarifier SLR – Alternative 3

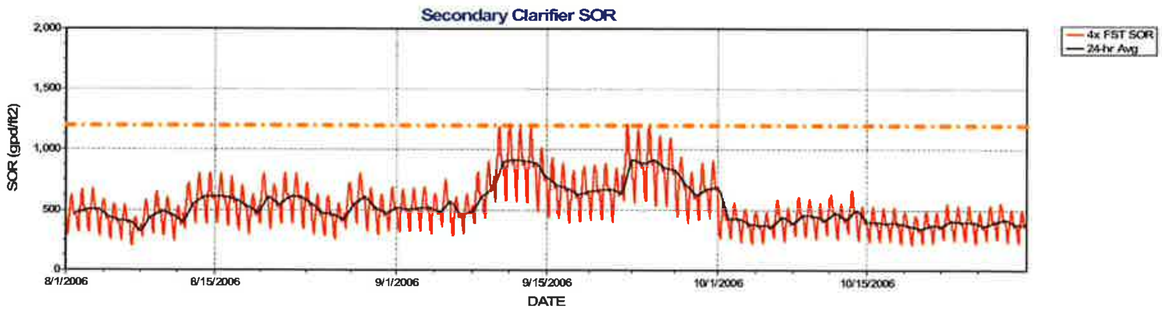


Figure 21 – Secondary Clarifier SOR – Alternative 3

After secondary clarification, the secondary effluent would be directed to tertiary filters for additional removal of particulate organics. Similar to Alternative 1 and 2, a total filtration area of approximately 2,830 ft^2 would be required to maintain low filtration rates. This alternative does not require supplemental carbon addition for denitrification in the filters since it occurs in the biological reactors.

Figures 22 through 24 show important BioWin final effluent concentrations for TSS and CBOD, nitrogen and phosphorus, respectively.

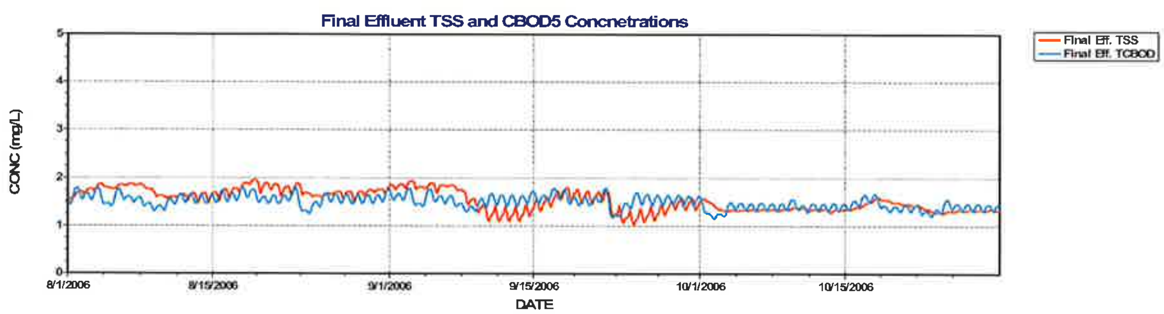


Figure 22 – Final Effluent TSS and CBOD Concentrations – Alternative 3

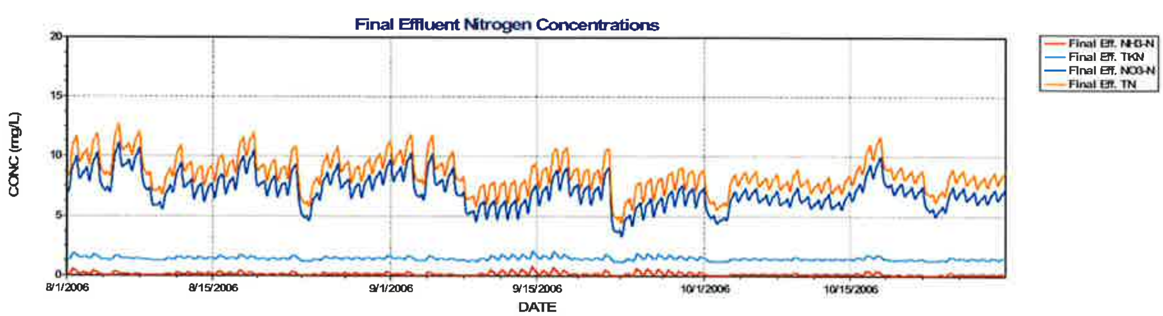


Figure 23 – Final Effluent Nitrogen Concentration – Alternative 3

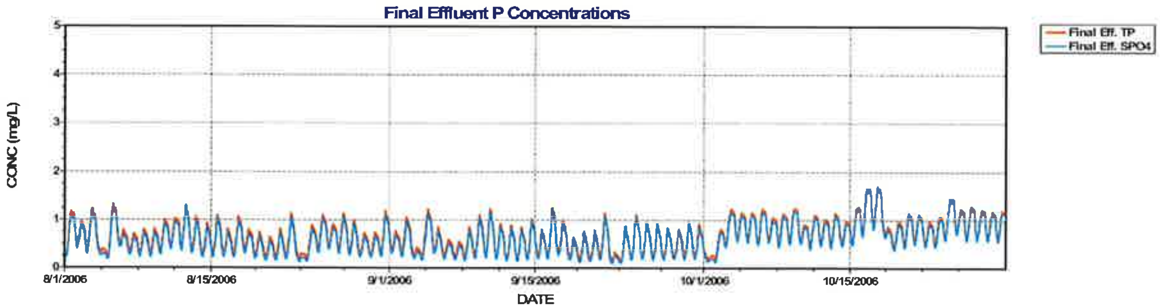


Figure 24 – Final Effluent Phosphorus Concentration – Alternative 3

Summary of Process Modeling Results

Table 4 summarizes the recommended improvements for each of the alternatives evaluated for the City of North Port WWTP to increase the permitted capacity and to provide additional effluent removal capabilities.

Table 4: Summary of Process Modeling Results for Alternatives 1, 2 and 3

Parameter	Alternative 1	Alternative 2	Alternative 3
AADF (mgd)	5.60	5.60	5.60
MMADF (mgd)	9.45	9.45	9.45
M3MADF (mgd)	7.00	7.00	7.00
Peak Flow (mgd)	16.14	16.14	16.14
Total SRT (days)	4	4	4
Activated Sludge Reactors			
No. Aeration Tanks	8 (3 new)	8 (3 new)	8 (3 new)
Total Un-aerated Volume (MG)	--	0.3585	0.3585
Total Aerobic Volume (MG)	1.7922	1.4337	1.4337
Total Reactor Volume (MG)	1.7922	1.7922	1.7922
Avg. MLSS (mg/L)	2,850	2,950	2,890
Total AOR (lb/d)	26,879	21,489	21,489
Total No. of Fine Bubble Diffusers	4,056	3,296	3,176
Peak Airflow Requirements (scfm)	11,376	9,024	9,128
IMLR (mgd)	--	--	10.00
Secondary Clarifiers			
No. Secondary Clarifiers	4 (1 new)	4 (1 new)	4 (1 new)
Total Secondary Clarification Area (ft^2)	13,273	13,273	13,273
Maximum RAS (mgd)	8.00	8.00	8.00
Peak SOR (gpd/ft^2)	1,215	1,215	1,215
Maximum Peak SLR (lb/ft^2 d)	36	36	36
Waste Activated Sludge (lb/d)	10,670	11,015	10,815
Secondary Effluent			
SE NH_3-N (mg/L)	< 0.1	< 0.1	0.13
SE NO_3-N (mg/L)	22.80	12.52	7.19
SE TN (mg/L)	24.63	14.18	8.97
SE TP (mg/L)	5.13	< 0.50	0.86
Tertiary Deep-Bed Filters			
Deep-Bed Filters (ft^2)	2,830	2,830	2,830
Average Filtration Rate (gpm/ft^2)	2.0	2.0	2.0
Methanol Feed Rate (gpd)	1,420	600	--
Final Effluent			
FE NH_3-N (mg/L)	< 0.1	< 0.1	0.13
FE NO_3-N (mg/L)	8.00 (1)	8.00 (1)	7.19
FE TN (mg/L)	9.40	9.21	8.56
FE TP (mg/L)	4.99	< 0.50	0.55

Florida Department of Environmental Protection

South District
Post Office Box 2549
Fort Myers, Florida 33902-2549
SouthDistrict@dep.state.fl.us

Rick Scott
Governor

Carlos Lopez-Cantera
Lt. Governor

Noah Valenstein
Secretary

SENT BY ELECTRONIC MAIL

In the Matter of an
Application for Permit by:

City of North Port
Marc Swartz, Manager
Water & Wastewater Plant Operations
6644 West Price Blvd.
North Port, Florida 34291
Email: mswartz@cityofnorthport.com

Sarasota County -- DW
North Port City of WWTP
P.A. File Number: FLA013378-014-DW1P
Sarasota-Peace-Myakka Basin

NOTICE OF PERMIT ISSUANCE

Enclosed is Permit Number FLA013378-014-DW to operate the North Port City of WWTP, issued under Chapter 403**,** Florida Statutes.

Monitoring requirements under this permit become effective on November 1, 2017. Until such time, the permittee shall continue to monitor and report in accordance with previously effective permit requirements. If not already registered to use the Department’s Ez Discharge Monitoring Report (EzDMR) system, the permittee should register now in order to begin using the EzDMR system when the monitoring requirements under this permit are effective.

The Department's proposed agency action shall become final unless a timely petition for an administrative hearing is filed under Sections 120.569 and 120.57, Florida Statutes, within fourteen days of receipt of notice. The procedures for petitioning for a hearing are set forth below.

A person whose substantial interests are affected by the Department's proposed permitting decision may petition for an administrative proceeding (hearing) under Sections 120.569 and 120.57, Florida Statutes. The petition must contain the information set forth below and must be filed (received by the Clerk) in the Office of General Counsel of the Department at 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida 32399-3000.

Under Rule 62-110.106(4), Florida Administrative Code, a person may request an extension of the time for filing a petition for an administrative hearing. The request must be filed (received by the Clerk) in the Office of General Counsel before the end of the time period for filing a petition for an administrative hearing.

Petitions by the applicant or any of the persons listed below must be filed within fourteen days of receipt of this written notice. Petitions filed by any persons other than those entitled to written notice under Section 120.60(3), Florida Statutes, must be filed within fourteen days of publication of the notice or within fourteen days of receipt of the written notice, whichever occurs first. Section 120.60(3), Florida Statutes, however, also allows that any person who has asked the Department in writing for notice of agency action may file a petition within fourteen days of receipt of such notice, regardless of the date of publication.

The petitioner shall mail a copy of the petition to the applicant at the address indicated above at the time of filing. The failure of any person to file a petition or request for an extension of time within fourteen days of receipt of notice shall constitute a waiver of that person's right to request an administrative determination (hearing) under Sections 120.569 and 120.57, Florida Statutes. Any subsequent intervention (in a proceeding initiated by another party) will be only at the discretion of the presiding officer upon the filing of a motion in compliance with Rule 28-106.205, Florida Administrative Code.

A petition that disputes the material facts on which the Department's action is based must contain the following information, as indicated in Rule 28-106.201, Florida Administrative Code:

(a) The name and address of each agency affected and each agency's file or identification number, if known;
(b) The name, address, any e-mail address, any facsimile number, and telephone number of the petitioner, if the petitioner is not represented by an attorney or a qualified representative; the name, address, and telephone number of the petitioner's representative, if any, which shall be the address for service purposes during the course of the proceeding; and an explanation of how the petitioner's substantial interests will be affected by the determination;
(c) A statement of when and how the petitioner received notice of the Department's decision;
(d) A statement of all disputed issues of material fact. If there are none, the petition must so indicate;
(e) A concise statement of the ultimate facts alleged, including the specific facts the petitioner contends warrant reversal or modification of the Department's proposed action;
(f) A statement of the specific rules or statutes the petitioner contends require reversal or modification of the Department's proposed action, including an explanation of how the alleged facts relate to the specific rules or statutes; and
(g) A statement of the relief sought by the petitioner, stating precisely the action petitioner wishes the Department to take with respect to the Department's proposed action.

Because the administrative hearing process is designed to formulate final agency action, the filing of a petition means that the Department's final action may be different from the position taken by it in this notice. Persons whose substantial interests will be affected by any such final decision of the Department have the right to petition to become a party to the proceeding, in accordance with the requirements set forth above.

Mediation under Section 120.573, Florida Statutes, is not available for this proceeding.

This permit action is final and effective on the date filed with the Clerk of the Department unless a petition (or request for an extension of time) is filed in accordance with the above. Upon the timely filing of a petition (or request for an extension of time), this permit will not be effective until further order of the Department.

Any party to the permit has the right to seek judicial review of the permit action under Section 120.68, Florida Statutes, by the filing of a notice of appeal under Rules 9.110 and 9.190, Florida Rules of Appellate Procedure, with the Clerk of the Department in the Office of General Counsel, 3900 Commonwealth Boulevard, Mail Station 35, Tallahassee, Florida, 32399-3000, and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate district court of appeal. The notice of appeal must be filed within 30 days from the date when this permit action is filed with the Clerk of the Department.

Executed in Ft. Myers, Florida.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION

Jon M. Iglehart
Director of
District Management

CERTIFICATE OF SERVICE

The undersigned hereby certifies that this NOTICE OF PERMIT ISSUANCE and all copies were mailed before the close of business on June 12, 2017 to the listed persons.

FILING AND ACKNOWLEDGMENT

FILED, on this date, under Section 120.52, Florida Statutes, with the designated Deputy Clerk, receipt of which is hereby acknowledged.

R. Alle Bro June 12, 2017
[Clerk] [Date]

JMI/RW

Enclosures

Copies furnished to:
James McGee P.E.; via email mike.mcgee@tkwonline.com

Florida Department of Environmental Protection

South District
Post Office Box 2549
Fort Myers, Florida 33902-2549
SouthDistrict@dep.state.fl.us

STATE OF FLORIDA
DOMESTIC WASTEWATER FACILITY PERMIT

PERMITTEE:
City of North Port

PERMIT NUMBER: FLA013378-014-DW
P.A. FILE NUMBER: FLA013378-014-DW1P
EFFECTIVE DATE: September 24, 2017
EXPIRATION DATE: September 23, 2022

RESPONSIBLE OFFICIAL:
Marc Swartz
Water & Wastewater Plant Operations Manager
6644 West Price Blvd.
North Port, FL 34291
(941) 240-8000

FACILITY:

City of North Port WWTP
200 North Pan American Blvd.
North Port, FL 34287
Sarasota County
Latitude: 27°2' 54" N Longitude: 82°14' 42" W

This permit is issued under the provisions of Chapter 403, Florida Statutes (F.S.), and applicable rules of the Florida Administrative Code (F.A.C.). This permit does not constitute authorization to discharge wastewater other than as expressly stated in this permit. The above named permittee is hereby authorized to operate the facilities in accordance with the documents attached hereto and specifically described as follows:

WASTEWATER TREATMENT:

An existing 7.0 MGD Three-Month Average Daily Flow (TMADF) Type I Modified Ludzack-Ettinger domestic wastewater treatment plant consisting of: a receiving station, a headworks structure with odor control, four mechanically cleaned and one manually cleaned bar screens with grit removal, two anoxic basins, six aeration basins, four secondary clarifiers., four effluent filters., and two chlorine contact chambers. There is one 2.5 MG reclaimed water storage tank. Biosolids are dewatered and taken to a landfill.

The permittee is authorized to modify the biosolids stream. The modified biosolids stream will consist of four aerated sludge holding basins with a total volume of 0.7 MG.

REUSE OR DISPOSAL:

Underground Injection U-001: An existing 5.32 MGD monthly average daily flow permitted capacity underground injection well system consisting of two Class I underground injection wells permitted under Department permit numbers 131285-013-UO and 131285-014-UO discharging to Class G-IV ground water. Underground Injection Well System U-001 is located approximately at latitude 27°00' 59" N, longitude 82°15' 23" W.

Land Application R-001: An existing 5.0 MGD annual average daily flow permitted capacity slow-rate public access system. R-001 is a reuse system which consists of North Port Master Urban Reuse General Service Area and consists of the incorporated limits of the City of North Port.

IN ACCORDANCE WITH: The limitations, monitoring requirements, and other conditions set forth in this cover sheet and Part I through Part IX on pages 1 through 22 of this permit.

I. RECLAIMED WATER AND EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

A. Underground Injection Control Systems

1. During the period beginning on the effective date and lasting through the expiration date of this permit, the permittee is authorized to discharge effluent to Underground Injection Well System U-001. Such discharge shall be limited and monitored by the permittee as specified below and reported in accordance with Permit Condition I.C.8.:

			Reclaimed Water Limitations		Monitoring Requirements			
Parameter	Units	Max/Min	Limit	Statistical Basis	Frequency of Analysis	Sample Type	Monitoring Site Number	Notes
Flow (to wells)	MGD	Max	5.32	Monthly Average	Continuous	Recording Flow Meter with Totalizer	FLW-02	See I.A.4
BOD, Carbonaceous 5 day, 20C	mg/L	Max Max Max Max	20.0 30.0 45.0 60.0	Annual Average Monthly Average Weekly Average Single Sample	5 Days/Week	24-hr FPC	EFA-01	
Solids, Total Suspended	mg/L	Max Max Max Max	20.0 30.0 45.0 60.0	Annual Average Monthly Average Weekly Average Single Sample	5 Days/Week	24-hr FPC	EFA-01	
pH	s.u.	Min Max	6.0 8.5	Single Sample Single Sample	Continuous	Meter	EFA-01	See I.A.3

2. Effluent samples shall be taken at the monitoring site locations listed in Permit Condition I.A.1. and as described below:

Monitoring Site Number	Description of Monitoring Site
FLW-02	Flow meter located on deep well pump line, to the UIC System U-001.
EFA-01	After disinfection but prior to discharge to the Part III Public Access Reuse System R-001.

3. Hourly measurement of pH during the period of required operator attendance may be substituted for continuous measurement. *[62-600.660(1)]*

4. A recording flow meter with totalizer shall be utilized to measure flow and calibrated at least once every 12 months. *[62-600.200(25)]*

5. Disinfection is not required for discharge to Class G-IV waters using Class I wells. However, the permittee must maintain the capability for disinfection at a level that is consistent with the alternate disposal mechanism approved for this facility pursuant to Rule 62-600.540(5), F.A.C. *[62-600.540(1)]*

B. Reuse and Land Application Systems

1. During the period beginning on the effective date and lasting through the expiration date of this permit, the permittee is authorized to direct reclaimed water to Reuse System R-001. Such reclaimed water shall be limited and monitored by the permittee as specified below and reported in accordance with Permit Condition I.C.8:

			Reclaimed Water Limitations		Monitoring Requirements			
Parameter	Units	Max/Min	Limit	Statistical Basis	Frequency of Analysis	Sample Type	Monitoring Site Number	Notes
Flow (to reuse)	MGD	Max Max	5.0 Report	Annual Average Monthly Average	Continuous	Recording Flow Meter with Totalizer	FLW-01	See I.B.4
BOD, Carbonaceous 5 day, 20C	mg/L	Max Max Max Max	20.0 30.0 45.0 60.0	Annual Average Monthly Average Weekly Average Single Sample	5 Days/Week	24-hr FPC	EFA-01	
Solids, Total Suspended	mg/L	Max	5.0	Single Sample	Daily; 24 hours	Grab	EFB-01	See I.B.11
Coliform, Fecal	#/100mL	Max	25	Single Sample	Daily; 24 hours	Grab	EFA-01	See I.B.11
Coliform, Fecal, % less than detection	percent	Min	75	Monthly Total	Daily; 24 hours	Calculated	EFA-01	See I.B.5
pH	s.u.	Min Max	6.0 8.5	Single Sample Single Sample	Continuous	Meter	EFA-01	See I.B.3
Chlorine, Total Residual (For Disinfection)	mg/L	Min	1.0	Single Sample	Continuous	Meter	EFA-01	See I.B.6 and I.B.9
Turbidity	NTU	Max	Report	Single Sample	Continuous	Meter	EFB-01	See I.B.7 and I.B.9
Phosphorus, Total (as P)	mg/L	Max	Report	Single Sample	5 Days/Week	24-hr FPC	EFA-01	
Nitrogen, Total	mg/L	Max	Report	Single Sample	5 Days/Week	24-hr FPC	EFA-01	
Nitrogen, Nitrate, Total (as N)	mg/L	Max	12.0	Single Sample	5 Days/Week	24-hr FPC	EFA-01	
Giardia	cysts/100L	Max	Report	Single Sample	Every 2 years	Grab	EFA-01	See I.B.11 and I.B.10
Cryptosporidium	oocysts/100L	Max	Report	Single Sample	Every 2 years	Grab	EFA-01	See I.B.10 and I.B.11

2. Reclaimed water samples shall be taken at the monitoring site locations listed in Permit Condition I.B.1. and as described below:

Monitoring Site Number	Description of Monitoring Site
FLW-01	Flow meter located after reuse high service pump station on line to the R-001, Public Access Reuse System; as indicated in the revised Figure 4 flow diagram received on April 24, 2017.
EFA-01	After disinfection but prior to discharge to the Part III Public Access Reuse System R-001.
EFB-01	Turbidity monitoring / TSS sample point after filtration but prior to disinfection.

3. Hourly measurement of pH during the period of required operator attendance may be substituted for continuous measurement. *[62-600.660(1)]*

4. A recording flow meter with totalizer shall be utilized to measure flow and calibrated at least once every 12 months. *[62-600.200(25)]*

5. To report the "% less than detection," count the number of fecal coliform observations that were less than detection, divide by the total number of fecal coliform observations in the month, and multiply by 100% (round to the nearest integer). *[62-600.440(6)(a)]*

6. The minimum total chlorine residual shall be limited as described in the approved operating protocol, such that the permit limitation for fecal coliform bacteria will be achieved. In no case shall the total chlorine residual be less than 1.0 mg/L. *[62-600.440(6)(b)][62-610.460(2)][62-610.463(2)]*

7. The maximum turbidity shall be limited as described in the approved operating protocol, such that the permit limitations for total suspended solids and fecal coliforms will be achieved. *[62-610.463(2)]*

8. The treatment facilities shall be operated in accordance with all approved operating protocols. Only reclaimed water that meets the criteria established in the approved operating protocol(s) may be released to system storage or to the reuse system. Reclaimed water that fails to meet the criteria in the approved operating protocol(s) shall be directed to reject storage for subsequent additional treatment or disinfection or to the following permitted alternate discharge system: to UIC wells. *[62-610.320(6) and 62-610.463(2)]*

9. Instruments for continuous on-line monitoring of total residual chlorine and turbidity shall be equipped with an automated data logging or recording device. *[62-610.463(2)]*

10. Intervals between sampling for Giardia and Cryptosporidium shall not exceed two years. *[62-610.463(4)]*

11. Grab samples shall be collected during periods of minimal treatment plant pollutant removal efficiencies or maximum organic loading in the reclaimed water or effluent. *[62-600.660(3)(e)]*

C. Other Limitations and Monitoring and Reporting Requirements

1. During the period beginning on the effective date and lasting through the expiration date of this permit, the treatment facility shall be limited and monitored by the permittee as specified below and reported in accordance with condition I.C.8:

			Limitations		Monitoring Requirements			
Parameter	Units	Max/Min	Limit	Statistical Basis	Frequency of Analysis	Sample Type	Monitoring Site Number	Notes
Flow (through plant)	MGD	Max Max	7.0 Report	3-Month Rolling Average Monthly Average	Continuous	Recording Flow Meter with Totalizer	FLW-03	See I.C.4
Percent Capacity, (TMADF/Permitted Capacity) x 100	percent	Max	Report	3-Month Rolling Average	Monthly	Calculated	CAL-01	
BOD, Carbonaceous 5 day, 20C (Influent)	mg/L	Max	Report	Single Sample	5 Days/Week	24-hr FPC	INF-01	See I.C.3
Solids, Total Suspended (Influent)	mg/L	Max	Report	Single Sample	5 Days/Week	24-hr FPC	INF-01	See I.C.3

2. Samples shall be taken at the monitoring site locations listed in Permit Condition I.C.1. and as described below:

Monitoring Site Number	Description of Monitoring Site
FLW-03	Flow meter at headworks measures total plant flow.
CAL-01	Calculated from the FLW-03 flow measurements.
INF-01	Influent sampling point prior to treatment but ahead of the return activated sludge line and pumped drainage; as indicated in the revised Figure 4 flow diagram received on April 24, 2017.

3. Influent samples shall be collected so that they do not contain digester supernatant or return activated sludge, or any other plant process recycled waters. *[62-600.660(4)(a)]*

4. A recording flow meter with totalizer shall be utilized to measure flow and calibrated at least once every 12 months. *[62-600.200(25)]*

5. Sampling results for giardia and cryptosporidium shall be reported on DEP Form 62-610.300(4)(a)4, Pathogen Monitoring, which is attached to this permit. This form shall be submitted to the Department's South District Office and to DEP's Reuse Coordinator in Tallahassee. *[62-610.300(4)(a)]*

6. The sample collection, analytical test methods, and method detection limits (MDLs) applicable to this permit shall be conducted using a sufficiently sensitive method to ensure compliance with applicable water quality standards and effluent limitations and shall be in accordance with Rule 62-4.246, Chapters 62-160 and 62-600, F.A.C., and 40 CFR 136, as appropriate. The list of Department established analytical methods, and corresponding MDLs (method detection limits) and PQLs (practical quantitation limits), which is titled "FAC 62-4 MDL/PQL Table (April 26, 2006)" is available at http://www.dep.state.fl.us/labs/library/index.htm. The MDLs and PQLs as described in this list shall constitute the minimum acceptable MDL/PQL values and the Department shall not accept results for which the laboratory's MDLs or PQLs are greater than those described above unless alternate MDLs and/or PQLs have been specifically approved by the Department for this permit. Any method included in the list may be used for reporting as long as it meets the following requirements:

   a. The laboratory's reported MDL and PQL values for the particular method must be equal or less than the corresponding method values specified in the Department's approved MDL and PQL list;

   b. The laboratory reported MDL for the specific parameter is less than or equal to the permit limit or the applicable water quality criteria, if any, stated in Chapter 62-302, F.A.C. Parameters that are listed as "report only" in the permit shall use methods that provide an MDL, which is equal to or less than the applicable water quality criteria stated in 62-302, F.A.C.; and

   c. If the MDLs for all methods available in the approved list are above the stated permit limit or applicable water quality criteria for that parameter, then the method with the lowest stated MDL shall be used.

   When the analytical results are below method detection or practical quantitation limits, the permittee shall report the actual laboratory MDL and/or PQL values for the analyses that were performed following the instructions on the applicable discharge monitoring report.

   Where necessary, the permittee may request approval of alternate methods or for alternative MDLs or PQLs for any approved analytical method. Approval of alternate laboratory MDLs or PQLs are not necessary if the laboratory reported MDLs and PQLs are less than or equal to the permit limit or the applicable water quality criteria, if any, stated in Chapter 62-302, F.A.C. Approval of an analytical method not included in the above-referenced list is not necessary if the analytical method is approved in accordance with 40 CFR 136 or deemed acceptable by the Department. *[62-4.246, 62-160]*

7. The permittee shall provide safe access points for obtaining representative samples which are required by this permit. *[62-600.650(2)]*

8. Monitoring requirements under this permit are effective on the first day of the second month following the effective date of the permit. Until such time, the permittee shall continue to monitor and report in accordance with previously effective permit requirements, if any. If not already registered to use the Department's Ez

Discharge Monitoring Report (EzDMR) system, the permittee should register now in order to begin using the EzDMR system when the monitoring requirements under this permit are effective. During the period of operation authorized by this permit, the permittee shall complete and submit to the Department Discharge Monitoring Reports (DMRs) in accordance with the frequencies specified by the REPORT type (i.e. monthly, quarterly, semiannual, annual, etc.) indicated on the DMR forms attached to this permit. Unless specified otherwise in this permit, monitoring results for each monitoring period shall be submitted in accordance with the associated DMR due dates below. DMRs shall be submitted for each required monitoring period including periods of no discharge.

REPORT Type on DMR	Monitoring Period	Submit by
Monthly	first day of month - last day of month	28th day of following month
Quarterly	January 1 - March 31 April 1 - June 30 July 1 - September 30 October 1 - December 31	April 28 July 28 October 28 January 28
Semiannual	January 1 - June 30 July 1 - December 31	July 28 January 28
Annual	January 1 - December 31	January 28

The permittee shall submit the completed DMR to the Department by the twenty-eighth (28th) of the month following the month of operation. Please contact the Department at (239) 344-5600 if you are unable to submit the completed DMR electronically using the EzDMR system.

The Department electronic EzDMR system at the time of permit issuance is available through the DEP Business Portal at: http://www.fldepportal.com/go/submit-report/

[62-620.610(18)][62-601.300(1),(2), and (3)]

9. Except as otherwise specified in this permit, all reports and other information required by this permit, including 24-hour notifications, shall be submitted to the Department in a digital format when practicable. The Department's electronic mailing address is:

   SouthDistrict@dep.state.fl.us

10. All reports and other information shall be signed in accordance with the requirements of Rule 62-620.305, F.A.C. *[62-620.305]*

II. BIOSOLIDS MANAGEMENT REQUIREMENTS

A. Basic Requirements

1. Biosolids generated by this facility may be transferred to Charlotte County Bio-Recycling Center LLC, 29751 Zemel Rd., Punta Gorda FL 33955, or disposed of in a Class I solid waste landfill. Transferring biosolids to an alternative biosolids treatment facility does not require a permit modification; however, use of an alternative biosolids treatment facility requires submittal of a copy of the agreement pursuant to Rule 62-640.880(1)(c), F.A.C., along with a written notification to the Department at least 30 days before transport of the biosolids. *[62-620.320(6), 62-640.880(1)]*

2. The permittee shall monitor and keep records of the quantities of biosolids generated, received from source facilities, treated, distributed and marketed, land applied, used as a biofuel or for bioenergy, transferred to another facility, or landfilled. These records shall be kept for a minimum of five years. *[62-640.650(4)(a)]*

3. Biosolids quantities shall be monitored by the permittee as specified below. Results shall be reported on the permittee's Discharge Monitoring Report for Monitoring Group RMP-Q in accordance with Condition IC.8.

			Biosolids Limitations		Monitoring Requirements		
Parameter	Units	Max/ Min	Limit	Statistical Basis	Frequency of Analysis	Sample Type	Monitoring Site Number
Biosolids Quantity (Landfilled)	Dry Tons	Max	Report	Monthly Total	Monthly	Calculated	RMP-01
Biosolids Quantity (Transferred)	Dry Tons	Max	Report	Monthly Total	Monthly	Calculated	RMP-02

[62-640.650(5)(a)1]

4. Biosolids quantities shall be calculated as listed in Permit Condition II.3 and as described below:

Monitoring Site Number	Description of Monitoring Site Calculations
RMP-01	Monthly Total of Biosolids Landfilled.
RMP-02	Monthly Total of Biosolids Transferred.

5. The treatment, management, transportation, use, land application, or disposal of biosolids shall not cause a violation of the odor prohibition in subsection 62-296.320(2), F.A.C. *[62-640.400(6)]*

6. Storage of biosolids or other solids at this facility shall be in accordance with the Facility Biosolids Storage Plan. *[62-640.300(4)]*

7. Biosolids shall not be spilled from or tracked off the treatment facility site by the hauling vehicle. *[62-640.400(9)]*

B. Disposal

8. Disposal of biosolids, septage, and "other solids" in a solid waste disposal facility, or disposal by placement on land for purposes other than soil conditioning or fertilization, such as at a monofill, surface impoundment, waste pile, or dedicated site, shall be in accordance with Chapter 62-701, F.A.C. *[62-640.100(6)(b) & (c)]*

C. Transfer

9. The permittee shall not be held responsible for treatment and management violations that occur after its biosolids have been accepted by a permitted biosolids treatment facility with which the source facility has an agreement in accordance with subsection 62-640.880(1)(c), F.A.C., for further treatment, management, or disposal. *[62-640.880(1)(b)]*

10. The permittee shall keep hauling records to track the transport of biosolids between the facilities. The hauling records shall contain the following information:

Source Facility
1. Date and time shipped
2. Amount of biosolids shipped
3. Degree of treatment (if applicable)
4. Name and ID Number of treatment facility
5. Signature of responsible party at source facility
6. Signature of hauler and name of hauling firm

Biosolids Treatment Facility or Treatment Facility
1. Date and time received
2. Amount of biosolids received
3. Name and ID number of source facility
4. Signature of hauler
5. Signature of responsible party at treatment facility

A copy of the source facility hauling records for each shipment shall be provided upon delivery of the biosolids to the biosolids treatment facility or treatment facility. The treatment facility permittee shall report to the Department within 24 hours of discovery any discrepancy in the quantity of biosolids leaving the source facility and arriving at the biosolids treatment facility or treatment facility.

[62-640.880(4)]

D. Receipt

11. If the permittee intends to accept biosolids from other facilities, a permit revision is required pursuant to paragraph 62-640.880(2)(d), F.A.C. *[62-640.880(2)(d)]*

III. GROUND WATER REQUIREMENTS

1. The permittee shall submit a groundwater monitoring plan to the Department by the date listed in Section VI of this permit. *[62-520.600]*

2. Upon approval of the plan, the permittee shall implement the monitoring program. *[62-520.600]*

IV. ADDITIONAL REUSE AND LAND APPLICATION REQUIREMENTS

A. Part III Public Access System

1. Use of reclaimed water is authorized within the general service area. The following uses of reclaimed water are authorized within this general service area:

   Athletic Complexes and Parks
   Golf Courses
   Other Landscape Irrigation
   Residential Developments

   [62-620.630(10)(a)]

2. This reuse system includes the following major users of reclaimed water (i.e., using 0.1 MGD or more) and general service area:

Site Number	User Name	User Type	Capacity (MGD)	Acreage
PAA-001A	Sable Trace Golf Course, Colony, and Master	Golf Courses	0.6	97
PAA-001B	Heron Creek Development Golf Course Phases I and II	Golf Courses	0.8	117
PAA-001C	North Port High School	Other Landscape Irrigation	0.2	104
PAA-001D	North Port City Complex	Other Landscape Irrigation	0.15	68
PAA-001E	Miscellaneous approved sites throughout the City of North Port	Other Landscape Irrigation	3.25	2,734
		Total	5	3,120

   [62-610.800(5)][62-620.630(10)(b)]

3. New major users of reclaimed water (i.e., using 0.1 MGD or more) may be added to the reuse system using the general permit described in Rule 62-610.890, F.A.C., if the requirements in this rule are complied with. Application for use of this general permit shall be made using Form 62-610.300(4)(a)1. *[62-610.890]*

4. Cross-connections to the potable water system are prohibited. *[62-610.469(7)]*

5. A cross-connection control program shall be implemented and/or remain in effect within the areas where reclaimed water will be provided for use and shall be in compliance with the Rule 62-555.360, F.A.C. *[62-610.469(7)]*

6. The permittee shall conduct inspections within the reclaimed water service area to verify proper connections, to minimize illegal cross-connections, and to verify both the proper use of reclaimed water and that the proper backflow prevention assemblies or devices have been installed and tested. Inspections are required when a customer first connects to the reuse distribution system. Subsequent inspections are required as specified in the cross-connection control and inspection program. *[62-610.469(7)(h)]*

7. If an actual or potential (e.g. no dual check device on residential connections served by a reuse system) cross-connection between the potable and reclaimed water systems is discovered, the permittee shall:

   a. Immediately discontinue potable water and/or reclaimed water service to the affected area if an actual cross-connection is discovered.

   b. If the potable water system is contaminated, clear the potable water lines.

   c. Eliminate the cross-connection and install a backflow prevention device as required by the Rule 62-555.360.F.A.C.

   d. Test the affected area for other possible cross-connections.

   e. Within 24 hours, notify the Department's South District Office's domestic wastewater and drinking water programs.

   f. Within 5 days of discovery of an actual or potential cross-connection, submit a written report to the Department's South District Office detailing: a description of the cross-connection, how the cross-connection was discovered, the exact date and time of discovery, approximate time that the cross-connection existed, the location, the cause, steps taken to eliminate the cross-connection, whether reclaimed water was consumed, and reports of possible illness, whether the drinking water system was contaminated and the steps taken to clear the drinking water system, when the cross-connection was eliminated, plan of action for testing for other possible cross-connections in the area, and an evaluation of the cross-connection control and inspection program to ensure that future cross-connections do not occur.

   [62-555.350(3) and 62-555.360][62-620.610(20)]

8. Maximum obtainable separation of reclaimed water lines and potable water lines shall be provided and the minimum separation distances specified in Rule 62-610.469(7), F.A.C., shall be provided. Reuse facilities shall be color coded or marked. Underground piping which is not manufactured of metal or concrete shall be color coded using Pantone Purple 522C using light stable colorants. Underground metal and concrete pipe shall be color coded or marked using purple as the predominant color. *[62-610.469(7)]*

9. In constructing reclaimed water distribution piping, the permittee shall maintain a 75-foot setback distance from a reclaimed water transmission facility to public water supply wells. No setback distances are required to other potable water supply wells or to any nonpotable water supply wells. *[62-610.471(3)]*

10. A setback distance of 75 feet shall be maintained between the edge of the wetted area and potable water supply wells, unless the utility adopts and enforces an ordinance prohibiting potable water supply wells within the reuse service area. No setback distances are required to any nonpotable water supply well, to any surface water, to any developed areas, or to any private swimming pools, hot tubs, spas, saunas, picnic tables, barbecue pits, or barbecue grills. *[62-610.471(1), (2), (5), and (7)]*

11. Reclaimed water shall not be used to fill swimming pools, hot tubs, or wading pools. *[62-610.469(4)]*

12. Low trajectory nozzles, or other means to minimize aerosol formation shall be used within 100 feet from outdoor public eating, drinking, or bathing facilities. *[62-610.471(6)]*

13. A setback distance of 100 feet shall be maintained from indoor aesthetic features using reclaimed water to adjacent indoor public eating and drinking facilities. *[62-610.471(8)]*

14. The public shall be notified of the use of reclaimed water. This shall be accomplished by posting of advisory signs in areas where reuse is practiced, notes on scorecards, or other methods. *[62-610.468(2)]*

15. All new advisory signs and labels on vaults, service boxes, or compartments that house hose bibbs along with all labels on hose bibbs, valves, and outlets shall bear the words "do not drink" and "no beber" along with the equivalent standard international symbol. In addition to the words "do not drink" and "no beber," advisory signs posted at storage ponds and decorative water features shall also bear the words "do not swim" and "no nadar" along with the equivalent standard international symbols. Existing advisory signs and labels shall be retrofitted, modified, or replaced in order to comply with the revised wording requirements. For existing advisory signs and labels this retrofit, modification, or replacement shall occur within 365 days after the date of this permit. For labels on existing vaults, service boxes, or compartments housing hose bibbs this retrofit, modification, or replacement shall occur within 730 days after the date of this permit. *[62-610.468, 62-610.469]*

16. The permittee shall ensure that users of reclaimed water are informed about the origin, nature, and characteristics of reclaimed water; the manner in which reclaimed water can be safely used; and limitations on the use of reclaimed water. Notification is required at the time of initial connection to the reclaimed water distribution system and annually after the reuse system is placed into operation. A description of on-going public notification activities shall be included in the Annual Reuse Report. *[62-610.468(6)]*

17. Routine aquatic weed control and regular maintenance of storage pond embankments and access areas are required. *[62-610.414(8)]*

18. Overflows from emergency discharge facilities on storage ponds shall be reported as abnormal events in accordance with Permit Condition IX.20. *[62-610.800(9)]*

V. OPERATION AND MAINTENANCE REQUIREMENTS

A. Staffing Requirements

1. During the period of operation authorized by this permit, the wastewater facilities shall be operated under the supervision of one or more operators certified in accordance with Chapter 62-602, F.A.C. In accordance with Chapter 62-699, F.A.C., this facility is a Category II, Class A facility and, at a minimum, operators with appropriate certification must be on the site as follows:

   A Class C or higher operator 24 hours/day for 7 days/week. The lead/chief operator must be a Class A operator.

   [62-620.630(3)][62-699.310] [62-610.462]

2. The lead/chief operator shall be employed at the plant full time. "Full time" shall mean at least 4 days per week, working a minimum of 35 hours per week, including leave time. A licensed operator shall be on-site and in charge of each required shift for periods of required staffing time when the lead/chief operator is not on-site. An operator meeting the lead/chief operator class for the treatment plant shall be available during all periods of plant operation. "Available" means able to be contacted as needed to initiate the appropriate action in a timely manner. *[62-699.311(10), (6) and (1)]*

B. Capacity Analysis Report and Operation and Maintenance Performance Report Requirements

1. The application to renew this permit shall include an updated capacity analysis report prepared in accordance with Rule 62-600.405, F.A.C. *[62-600.405(5)]*

2. The application to renew this permit shall include a detailed operation and maintenance performance report prepared in accordance with Rule 62-600.735, F.A.C. *[62-600.735(1)]*

C. Recordkeeping Requirements

1. The permittee shall maintain the following records and make them available for inspection on the site of the permitted facility.

   a. Records of all compliance monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, including, if applicable, a copy of the laboratory certification showing the certification number of the laboratory, for at least three years from the date the sample or measurement was taken;

b. Copies of all reports required by the permit for at least three years from the date the report was prepared;

c. Records of all data, including reports and documents, used to complete the application for the permit for at least three years from the date the application was filed;

d. Monitoring information, including a copy of the laboratory certification showing the laboratory certification number, related to the residuals use and disposal activities for the time period set forth in Chapter 62-640, F.A.C., for at least three years from the date of sampling or measurement;

e. A copy of the current permit;

f. A copy of the current operation and maintenance manual as required by Chapter 62-600, F.A.C.;

g. A copy of any required record drawings;

h. Copies of the licenses of the current certified operators;

i. Copies of the logs and schedules showing plant operations and equipment maintenance for three years from the date of the logs or schedules. The logs shall, at a minimum, include identification of the plant; the signature and license number of the operator(s) and the signature of the person(s) making any entries; date and time in and out; specific operation and maintenance activities, including any preventive maintenance or repairs made or requested; results of tests performed and samples taken, unless documented on a laboratory sheet; and notation of any notification or reporting completed in accordance with Rule 62-602.650(3), F.A.C. The logs shall be maintained on-site in a location accessible to 24-hour inspection, protected from weather damage, and current to the last operation and maintenance performed; and

j. Records of biosolids quantities, treatment, monitoring, and hauling for at least five years.

[62-620.350, 62-602.650, 62-640.650(4)]

VI. SCHEDULES

1. The following improvement actions shall be completed according to the following schedule:

Improvement Action	Completion Date
1. The permittee shall submit a new ground water monitoring plan, and the permittee shall provide it by way of a revision to this permit by submitting a completed DEP Form 62-620.910(1), a completed DEP Form 62-620.910(9), and the appropriate processing fee.	November 30, 2017
2. The permittee shall implement the Department-approved groundwater monitoring plan.	April 1, 2018
3. The permittee shall submit a complete asbestos notification to whether or not asbestos may be present. (The form is available at: http://www.dep.state.fl.us/air/rules/forms/asbestos.htm)	A least ten (10) working days prior to a demolition
4. The permittee shall submit a completed Form 62-620.910(12), for the modifications of the biosolids system.	Upon completion of construction

[62-620.320(6)]

5. The permittee is not authorized to discharge to waters of the state after the expiration date of this permit, unless:

a. The permittee has applied for renewal of this permit at least 180 days before the expiration date of this permit using the appropriate forms listed in Rule 62-620.910, F.A.C., and in the manner established in the Department of Environmental Protection Guide to Permitting Wastewater Facilities or Activities Under Chapter 62-620, F.A.C., including submittal of the appropriate processing fee set forth in Rule 62-4.050, F.A.C.; or

b. The permittee has made complete the application for renewal of this permit before the permit expiration date.

[62-620.335(1) - (4)]

6. Prior to placing the modifications to existing facilities into operation or any individual unit processes into operation, for any purpose other than testing for leaks and equipment operation, the permittee shall complete and submit to the Department DEP Form 62-620.910(12), Notification of Completion of Construction for Wastewater Facilities or Activities. *[62-620.410(7) and 62-620.630(2)]*

7. Within six months after a facility is placed in operation, the permittee shall provide written certification to the Department on Form 62-620.910(13) that record drawings pursuant to Chapter 62-620, F.A.C., and that an operation and maintenance manual pursuant to Chapters 62-600 and 62-610, F.A.C., as applicable, are available at the location specified on the form. *[62-620.410(6) and 62-620.630(7)]*

VII. INDUSTRIAL PRETREATMENT PROGRAM REQUIREMENTS

This facility is not required to have a pretreatment program at this time. *[62-625.500]*

VIII. OTHER SPECIFIC CONDITIONS

3. In the event that the treatment facilities or equipment no longer function as intended, are no longer safe in terms of public health and safety, or odor, noise, aerosol drift, or lighting adversely affects neighboring developed areas at the levels prohibited by Rule 62-600.400(2)(a), F.A.C., corrective action (which may include additional maintenance or modifications of the permitted facilities) shall be taken by the permittee. Other corrective action may be required to ensure compliance with rules of the Department. Additionally, the treatment, management, use or land application of residuals shall not cause a violation of the odor prohibition in Rule 62-296.320(2), F.A.C. *[62-600.410(5) and 62-640.400(6)]*

4. The deliberate introduction of stormwater in any amount into collection/transmission systems designed solely for the introduction (and conveyance) of domestic/industrial wastewater; or the deliberate introduction of stormwater into collection/transmission systems designed for the introduction or conveyance of combinations of storm and domestic/industrial wastewater in amounts which may reduce the efficiency of pollutant removal by the treatment plant is prohibited, except as provided by Rule 62-610.472, F.A.C. *[62-604.130(3)]*

5. Collection/transmission system overflows shall be reported to the Department in accordance with Permit Condition IX. 20. *[62-604.550] [62-620.610(20)]*

6. The operating authority of a collection/transmission system and the permittee of a treatment plant are prohibited from accepting connections of wastewater discharges which have not received necessary pretreatment or which contain materials or pollutants (other than normal domestic wastewater constituents):

   a. Which may cause fire or explosion hazards; or

   b. Which may cause excessive corrosion or other deterioration of wastewater facilities due to chemical action or pH levels; or

   c. Which are solid or viscous and obstruct flow or otherwise interfere with wastewater facility operations or treatment; or

   d. Which result in the wastewater temperature at the introduction of the treatment plant exceeding 40^{o}C or otherwise inhibiting treatment; or

   e. Which result in the presence of toxic gases, vapors, or fumes that may cause worker health and safety problems.

   [62-604.130(5)]

7. The treatment facility shall be enclosed with a fence or otherwise provided with features to discourage the entry of animals and unauthorized persons. *[62-600.400(2)(b)]*

8. Screenings and grit removed from the wastewater facilities shall be collected in suitable containers and hauled to a Department approved Class I landfill or to a landfill approved by the Department for receipt/disposal of screenings and grit. *[62-701.300(1)(a)]*

9. Where required by Chapter 471 or Chapter 492, F.S., applicable portions of reports that must be submitted under this permit shall be signed and sealed by a professional engineer or a professional geologist, as appropriate. *[62-620.310(4)]*

10. The permittee shall provide verbal notice to the Department's South District Office as soon as practical after discovery of a sinkhole or other karst feature within an area for the management or application of wastewater, wastewater residuals (sludges), or reclaimed water. The permittee shall immediately implement measures appropriate to control the entry of contaminants, and shall detail these measures to the Department's South District Office in a written report within 7 days of the sinkhole discovery. *[62-620.320(6)]*

11. The permittee shall provide notice to the Department of the following:

    a. Any new introduction of pollutants into the facility from an industrial discharger which would be subject to Chapter 403, F.S., and the requirements of Chapter 62-620, F.A.C., if it were directly discharging those pollutants; and

    b. Any substantial change in the volume or character of pollutants being introduced into that facility by a source which was identified in the permit application and known to be discharging at the time the permit was issued.

    Notice shall include information on the quality and quantity of effluent introduced into the facility and any anticipated impact of the change on the quantity or quality of effluent or reclaimed water to be discharged from the facility.

    [62-620.625(2)]

IX. GENERAL CONDITIONS

3. The terms, conditions, requirements, limitations, and restrictions set forth in this permit are binding and enforceable pursuant to Chapter 403, Florida Statutes. Any permit noncompliance constitutes a violation of Chapter 403, Florida Statutes, and is grounds for enforcement action, permit termination, permit revocation and reissuance, or permit revision. *[62-620.610(1)]*

4. This permit is valid only for the specific processes and operations applied for and indicated in the approved drawings or exhibits. Any unauthorized deviations from the approved drawings, exhibits, specifications, or conditions of this permit constitutes grounds for revocation and enforcement action by the Department. *[62-620.610(2)]*

5. As provided in subsection 403.087(7), F.S., the issuance of this permit does not convey any vested rights or any exclusive privileges. Neither does it authorize any injury to public or private property or any invasion of personal rights, nor authorize any infringement of federal, state, or local laws or regulations. This permit is not a waiver of or approval of any other Department permit or authorization that may be required for other aspects of the total project which are not addressed in this permit. *[62-620.610(3)]*

6. This permit conveys no title to land or water, does not constitute state recognition or acknowledgment of title, and does not constitute authority for the use of submerged lands unless herein provided and the necessary title or leasehold interests have been obtained from the State. Only the Trustees of the Internal Improvement Trust Fund may express State opinion as to title. *[62-620.610(4)]*

7. This permit does not relieve the permittee from liability and penalties for harm or injury to human health or welfare, animal or plant life, or property caused by the construction or operation of this permitted source; nor does it allow the permittee to cause pollution in contravention of Florida Statutes and Department rules, unless specifically authorized by an order from the Department. The permittee shall take all reasonable steps to minimize or prevent any discharge, reuse of reclaimed water, or residuals use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment. It shall not

be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit. *[62-620.610(5)]*

8. If the permittee wishes to continue an activity regulated by this permit after its expiration date, the permittee shall apply for and obtain a new permit. *[62-620.610(6)]*

9. The permittee shall at all times properly operate and maintain the facility and systems of treatment and control, and related appurtenances, that are installed and used by the permittee to achieve compliance with the conditions of this permit. This provision includes the operation of backup or auxiliary facilities or similar systems when necessary to maintain or achieve compliance with the conditions of the permit. *[62-620.610(7)]*

10. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit revision, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition. *[62-620.610(8)]*

11. The permittee, by accepting this permit, specifically agrees to allow authorized Department personnel, including an authorized representative of the Department and authorized EPA personnel, when applicable, upon presentation of credentials or other documents as may be required by law, and at reasonable times, depending upon the nature of the concern being investigated, to:

    a. Enter upon the permittee's premises where a regulated facility, system, or activity is located or conducted, or where records shall be kept under the conditions of this permit;

    b. Have access to and copy any records that shall be kept under the conditions of this permit;

    c. Inspect the facilities, equipment, practices, or operations regulated or required under this permit; and

    d. Sample or monitor any substances or parameters at any location necessary to assure compliance with this permit or Department rules.

    [62-620.610(9)]

12. In accepting this permit, the permittee understands and agrees that all records, notes, monitoring data, and other information relating to the construction or operation of this permitted source which are submitted to the Department may be used by the Department as evidence in any enforcement case involving the permitted source arising under the Florida Statutes or Department rules, except as such use is proscribed by Section 403.111, F.S., or Rule 62-620.302, F.A.C. Such evidence shall only be used to the extent that it is consistent with the Florida Rules of Civil Procedure and applicable evidentiary rules. *[62-620.610(10)]*

13. When requested by the Department, the permittee shall within a reasonable time provide any information required by law which is needed to determine whether there is cause for revising, revoking and reissuing, or terminating this permit, or to determine compliance with the permit. The permittee shall also provide to the Department upon request copies of records required by this permit to be kept. If the permittee becomes aware of relevant facts that were not submitted or were incorrect in the permit application or in any report to the Department, such facts or information shall be promptly submitted or corrections promptly reported to the Department. *[62-620.610(11)]*

14. Unless specifically stated otherwise in Department rules, the permittee, in accepting this permit, agrees to comply with changes in Department rules and Florida Statutes after a reasonable time for compliance; provided, however, the permittee does not waive any other rights granted by Florida Statutes or Department rules. A reasonable time for compliance with a new or amended surface water quality standard, other than those standards addressed in Rule 62-302.500, F.A.C., shall include a reasonable time to obtain or be denied a mixing zone for the new or amended standard. *[62-620.610(12)]*

15. The permittee, in accepting this permit, agrees to pay the applicable regulatory program and surveillance fee in accordance with Rule 62-4.052, F.A.C. *[62-620.610(13)]*

16. This permit is transferable only upon Department approval in accordance with Rule 62-620.340, F.A.C. The permittee shall be liable for any noncompliance of the permitted activity until the transfer is approved by the Department. *[62-620.610(14)]*

17. The permittee shall give the Department written notice at least 60 days before inactivation or abandonment of a wastewater facility or activity and shall specify what steps will be taken to safeguard public health and safety during and following inactivation or abandonment. *[62-620.610(15)]*

18. The permittee shall apply for a revision to the Department permit in accordance with Rules 62-620.300, F.A.C., and the Department of Environmental Protection Guide to Permitting Wastewater Facilities or Activities Under Chapter 62-620, F.A.C., at least 90 days before construction of any planned substantial modifications to the permitted facility is to commence or with Rule 62-620.325(2), F.A.C., for minor modifications to the permitted facility. A revised permit shall be obtained before construction begins except as provided in Rule 62-620.300, F.A.C. *[62-620.610(16)]*

19. The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. The permittee shall be responsible for any and all damages which may result from the changes and may be subject to enforcement action by the Department for penalties or revocation of this permit. The notice shall include the following information:

    a. A description of the anticipated noncompliance;

    b. The period of the anticipated noncompliance, including dates and times; and

    c. Steps being taken to prevent future occurrence of the noncompliance.

    [62-620.610(17)]

20. Sampling and monitoring data shall be collected and analyzed in accordance with Rule 62-4.246 and Chapters 62-160, 62-600, and 62-610, F.A.C., and 40 CFR 136, as appropriate.

    a. Monitoring results shall be reported at the intervals specified elsewhere in this permit and shall be reported on a Discharge Monitoring Report (DMR), DEP Form 62-620.910(10), or as specified elsewhere in the permit.

    b. If the permittee monitors any contaminant more frequently than required by the permit, using Department approved test procedures, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR.

    c. Calculations for all limitations which require averaging of measurements shall use an arithmetic mean unless otherwise specified in this permit.

    d. Except as specifically provided in Rule 62-160.300, F.A.C., any laboratory test required by this permit shall be performed by a laboratory that has been certified by the Department of Health Environmental Laboratory Certification Program (DOH ELCP). Such certification shall be for the matrix, test method and analyte(s) being measured to comply with this permit. For domestic wastewater facilities, testing for parameters listed in Rule 62-160.300(4), F.A.C., shall be conducted under the direction of a certified operator.

    e. Field activities including on-site tests and sample collection shall follow the applicable standard operating procedures described in DEP-SOP-001/01 adopted by reference in Chapter 62-160, F.A.C.

    f. Alternate field procedures and laboratory methods may be used where they have been approved in accordance with Rules 62-160.220, and 62-160.330, F.A.C.

    [62-620.610(18)]

21. Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule detailed elsewhere in this permit shall be submitted no later than 14 days following each schedule date. *[62-620.610(19)]*

22. The permittee shall report to the Department's South District Office any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within five days of the time the permittee becomes aware of the circumstances. The written submission shall contain: a description of the noncompliance and its cause; the period of noncompliance including exact dates and time, and if the

noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

a. The following shall be included as information which must be reported within 24 hours under this condition:
   (1) Any unanticipated bypass which causes any reclaimed water or effluent to exceed any permit limitation or results in an unpermitted discharge,
   (2) Any upset which causes any reclaimed water or the effluent to exceed any limitation in the permit,
   (3) Violation of a maximum daily discharge limitation for any of the pollutants specifically listed in the permit for such notice, and
   (4) Any unauthorized discharge to surface or ground waters.

b. Oral reports as required by this subsection shall be provided as follows:
   (1) For unauthorized releases or spills of treated or untreated wastewater reported pursuant to subparagraph (a)4. that are in excess of 1,000 gallons per incident, or where information indicates that public health or the environment will be endangered, oral reports shall be provided to the STATE WATCH OFFICE TOLL FREE NUMBER (800) 320-0519, as soon as practical, but no later than 24 hours from the time the permittee becomes aware of the discharge. The permittee, to the extent known, shall provide the following information to the State Watch Office:
      (a) Name, address, and telephone number of person reporting;
      (b) Name, address, and telephone number of permittee or responsible person for the discharge;
      (c) Date and time of the discharge and status of discharge (ongoing or ceased);
      (d) Characteristics of the wastewater spilled or released (untreated or treated, industrial or domestic wastewater);
      (e) Estimated amount of the discharge;
      (f) Location or address of the discharge;
      (g) Source and cause of the discharge;
      (h) Whether the discharge was contained on-site, and cleanup actions taken to date;
      (i) Description of area affected by the discharge, including name of water body affected, if any; and
      (j) Other persons or agencies contacted.
   (2) Oral reports, not otherwise required to be provided pursuant to subparagraph b.1 above, shall be provided to the Department's South District Office within 24 hours from the time the permittee becomes aware of the circumstances.

c. If the oral report has been received within 24 hours, the noncompliance has been corrected, and the noncompliance did not endanger health or the environment, the Department's South District Office shall waive the written report.

[62-620.610(20)]

23. The permittee shall report all instances of noncompliance not reported under Permit Conditions IX.17., IX.18., or IX.19. of this permit at the time monitoring reports are submitted. This report shall contain the same information required by Permit Condition IX.20. of this permit. *[62-620.610(21)]*

24. Bypass Provisions.

   a. "Bypass" means the intentional diversion of waste streams from any portion of a treatment works.

   b. Bypass is prohibited, and the Department may take enforcement action against a permittee for bypass, unless the permittee affirmatively demonstrates that:
      (1) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage; and
      (2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
      (3) The permittee submitted notices as required under Permit Condition IX.22.c. of this permit.

   c. If the permittee knows in advance of the need for a bypass, it shall submit prior notice to the Department, if possible at least 10 days before the date of the bypass. The permittee shall submit notice of an unanticipated bypass within 24 hours of learning about the bypass as required in Permit Condition IX.20. of this permit. A notice shall include a description of the bypass and its cause; the period of the bypass, including exact dates and times; if the bypass has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent recurrence of the bypass.

d. The Department shall approve an anticipated bypass, after considering its adverse effect, if the permittee demonstrates that it will meet the three conditions listed in Permit Condition IX.22.b.(1) through (3) of this permit.

e. A permittee may allow any bypass to occur which does not cause reclaimed water or effluent limitations to be exceeded if it is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Permit Condition IX.22.b. through d. of this permit.

[62-620.610(22)]

25. Upset Provisions.

a. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based effluent limitations because of factors beyond the reasonable control of the permittee.
   (1) An upset does not include noncompliance caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, careless or improper operation.
   (2) An upset constitutes an affirmative defense to an action brought for noncompliance with technology based permit effluent limitations if the requirements of upset provisions of Rule 62-620.610, F.A.C., are met.

b. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed contemporaneous operating logs, or other relevant evidence that:
   (1) An upset occurred and that the permittee can identify the cause(s) of the upset;
   (2) The permitted facility was at the time being properly operated;
   (3) The permittee submitted notice of the upset as required in Permit Condition IX.20. of this permit; and
   (4) The permittee complied with any remedial measures required under Permit Condition IX.5. of this permit.

c. In any enforcement proceeding, the burden of proof for establishing the occurrence of an upset rests with the permittee.

d. Before an enforcement proceeding is instituted, no representation made during the Department review of a claim that noncompliance was caused by an upset is final agency action subject to judicial review.

[62-620.610(23)]

Executed in Ft. Myers, Florida.

STATE OF FLORIDA DEPARTMENT OF
ENVIRONMENTAL PROTECTION

Jon M. Iglehart
Director of
District Management

June 12, 2017
PERMIT ISSUANCE DATE:

Attachments:
Discharge Monitoring Report
Statement of Basis
"Pathogen Monitoring" Form

DEPARTMENT OF ENVIRONMENTAL PROTECTION DISCHARGE MONITORING REPORT - PART A

When Completed submit this report to: Department of Environmental Protection, http://www.fldepportal.com/go/

PERMITTEE NAME: City of North Port
MAILING ADDRESS: 6644 West Price Blvd.
North Port, FL 34291

FACILITY: North Port WWTP
LOCATION: 200 North Pan American Blvd.
North Port, FL 34287

COUNTY: Sarasota
OFFICE: South District

PERMIT NUMBER: FLA013378-014-DW

LIMIT: Final
CLASS SIZE: N/A
MONITORING GROUP NUMBER: R-001
MONITORING GROUP DESCRIPTION: R-001, including Influent
RE-SUBMITTED DMR: ☐
NO DISCHARGE FROM SITE: ☐
MONITORING PERIOD From: ____________________ To: ____________________

REPORT FREQUENCY: Monthly
PROGRAM: Domestic

Parameter		Quantity or Loading		Units	Quality or Concentration			Units	No. Ex.	Frequency of Analysis	Sample Type
Flow (to reuse)	Sample Measurement										
PARM Code 50050 Y Mon. Site No. FLW-01	Permit Requirement		5.0 (An.Avg.)	MGD						Continuous	Flow Totalizer
Flow (to reuse)	Sample Measurement										
PARM Code 50050 1 Mon. Site No. FLW-01	Permit Requirement		Report (Mo.Avg.)	MGD						Continuous	Flow Totalizer
BOD, Carbonaceous 5 day, 20C	Sample Measurement										
PARM Code 80082 Y Mon. Site No. EFA-01	Permit Requirement					20.0 (An.Avg.)		mg/L		5 Days/Week	24-hr FPC
BOD, Carbonaceous 5 day, 20C	Sample Measurement										
PARM Code 80082 A Mon. Site No. EFA-01	Permit Requirement				60.0 (Max.)	45.0 (Wk.Avg.)	30.0 (Mo.Avg.)	mg/L		5 Days/Week	24-hr FPC
Solids, Total Suspended	Sample Measurement										
PARM Code 00530 B Mon. Site No. EFB-01	Permit Requirement						5.0 (Max.)	mg/L		Daily; 24 hours	Grab
Coliform, Fecal	Sample Measurement										
PARM Code 74055 A Mon. Site No. EFA-01	Permit Requirement						25 (Max.)	#/100mL		Daily; 24 hours	Grab

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

NAME/TITLE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	TELEPHONE NO	DATE (mm/dd/yyyy)

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here):

DISCHARGE MONITORING REPORT - PART A (Continued)

FACILITY: North Port WWTP

MONITORING GROUP NUMBER: R-001

PERMIT NUMBER: FLA013378-014-DW

MONITORING PERIOD From: ____________________ To: ______________

Parameter		Quantity or Loading		Units	Quality or Concentration			Units	No. Ex.	Frequency of Analysis	Sample Type
Coliform, Fecal, % less than detection	Sample Measurement										
PARM Code 51005 A Mon. Site No. EFA-01	Permit Requirement				75 (Min.Mo.Total)			percent		Daily; 24 hours	Calculated
pH	Sample Measurement										
PARM Code 00400 A Mon. Site No. EFA-01	Permit Requirement				6.0 (Min.)		8.5 (Max.)	s.u.		Continuous	Meter
Chlorine, Total Residual (For Disinfection)	Sample Measurement										
PARM Code 50060 A Mon. Site No. EFA-01	Permit Requirement				1.0 (Min.)			mg/L		Continuous	Meter
Turbidity	Sample Measurement										
PARM Code 00070 B Mon. Site No. EFB-01	Permit Requirement						Report (Max.)	NTU		Continuous	Meter
Phosphorus, Total (as P)	Sample Measurement										
PARM Code 00665 A Mon. Site No. EFA-01	Permit Requirement						Report (Max.)	mg/L		5 Days/Week	24-hr FPC
Nitrogen, Total	Sample Measurement										
PARM Code 00600 A Mon. Site No. EFA-01	Permit Requirement						Report (Max.)	mg/L		5 Days/Week	24-hr FPC
Nitrogen, Nitrate, Total (as N)	Sample Measurement										
PARM Code 00620 A Mon. Site No. EFA-01	Permit Requirement						12.0 (Max.)	mg/L		5 Days/Week	24-hr FPC
Flow (through treatment plant)	Sample Measurement										
PARM Code 50050 P Mon. Site No. FLW-03	Permit Requirement	Report (Mo.Avg.)	7.0 (3-Mo.Avg.)	MGD						Continuous	Flow Totalizer
Percent Capacity, (TMADF/Permitted Capacity) x 100	Sample Measurement										
PARM Code 00180 P Mon. Site No. CAL-01	Permit Requirement						Report (3-Mo.Avg.)	percent		Monthly	Calculated
BOD, Carbonaceous 5 day, 20C (Influent)	Sample Measurement										
PARM Code 80082 G Mon. Site No. INF-01	Permit Requirement						Report (Max.)	mg/L		5 Days/Week	24-hr FPC

DISCHARGE MONITORING REPORT - PART A (Continued)

FACILITY: North Port WWTP

MONITORING GROUP NUMBER: R-001

PERMIT NUMBER: FLA013378-014-DW

MONITORING PERIOD From: ____________________ To: ________________

Parameter		Quantity or Loading		Units	Quality or Concentration			Units	No. Ex.	Frequency of Analysis	Sample Type
Solids, Total Suspended (Influent)	Sample Measurement										
PARM Code 00530 G Mon. Site No. INF-01	Permit Requirement						Report (Max.)	mg/L		5 Days/Week	24-hr FPC

DEPARTMENT OF ENVIRONMENTAL PROTECTION DISCHARGE MONITORING REPORT - PART A

When Completed submit this report to: Department of Environmental Protection, http://www.fldepportal.com/go/

PERMITTEE NAME:	City of North Port	PERMIT NUMBER:	FLA013378-014-DW		
MAILING ADDRESS:	6644 West Price Blvd. North Port, FL 34291	LIMIT:	Final	REPORT FREQUENCY:	Monthly
		CLASS SIZE:	N/A	PROGRAM:	Domestic
FACILITY:	North Port WWTP	MONITORING GROUP NUMBER:	U-001		
LOCATION:	200 North Pan American Blvd. North Port, FL 34287	MONITORING GROUP DESCRIPTION:	Discharge to Injection Wells		
		RE-SUBMITTED DMR: ☐			
		NO DISCHARGE FROM SITE: ☐			
COUNTY:	Sarasota	MONITORING PERIOD From:	____________________	To:	____________________
OFFICE:	South District				

Parameter		Quantity or Loading		Units	Quality or Concentration			Units	No. Ex.	Frequency of Analysis	Sample Type
Flow (to injection wells)	Sample Measurement										
PARM Code 50050 1 Mon. Site No. FLW-02	Permit Requirement		5.32 (Mo.Avg.)	MGD						Continuous	Flow Totalizer
BOD, Carbonaceous 5 day, 20C	Sample Measurement										
PARM Code 80082 Y Mon. Site No. EFA-01	Permit Requirement					20.0 (An.Avg.)		mg/L		5 Days/Week	24-hr FPC
BOD, Carbonaceous 5 day, 20C	Sample Measurement										
PARM Code 80082 A Mon. Site No. EFA-01	Permit Requirement				60.0 (Max.)	45.0 (Wk.Avg.)	30.0 (Mo.Avg.)	mg/L		5 Days/Week	24-hr FPC
Solids, Total Suspended	Sample Measurement										
PARM Code 00530 Y Mon. Site No. EFA-01	Permit Requirement					20.0 (An.Avg.)		mg/L		5 Days/Week	24-hr FPC
Solids, Total Suspended	Sample Measurement										
PARM Code 00530 A Mon. Site No. EFA-01	Permit Requirement				60.0 (Max.)	45.0 (Wk.Avg.)	30.0 (Mo.Avg.)	mg/L		5 Days/Week	24-hr FPC
pH	Sample Measurement										
PARM Code 00400 A Mon. Site No. EFA-01	Permit Requirement				6.0 (Min.)		8.5 (Max.)	s.u.		Continuous	Meter

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

NAME/TITLE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	TELEPHONE NO	DATE (mm/dd/yyyy)

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here):

DEPARTMENT OF ENVIRONMENTAL PROTECTION DISCHARGE MONITORING REPORT - PART A

When Completed submit this report to: Department of Environmental Protection, http://www.fldepportal.com/go/

PERMITTEE NAME:	City of North Port	PERMIT NUMBER:	FLA013378-014-DW		
MAILING ADDRESS:	6644 West Price Blvd. North Port, FL 34291	LIMIT:	Final	REPORT FREQUENCY:	Monthly
		CLASS SIZE:	N/A	PROGRAM:	Domestic
FACILITY:	North Port WWTP	MONITORING GROUP NUMBER:	RMP-Q		
LOCATION:	200 North Pan American Blvd. North Port, FL 34287	MONITORING GROUP DESCRIPTION:	Biosolids Quantity		
		RE-SUBMITTED DMR:	☐		
		NO DISCHARGE FROM SITE:	☐		
COUNTY:	Sarasota	MONITORING PERIOD From:	____________________	To:	____________________
OFFICE:	South District				

Parameter		Quantity or Loading		Units	Quality or Concentration			Units	No. Ex.	Frequency of Analysis	Sample Type
Biosolids Quantity (Landfilled)	Sample Measurement										
PARM Code B0008 + Mon. Site No. RMP-01	Permit Requirement		Report (Mo.Total)	dry tons						Monthly	Calculated
Biosolids Quantity (Transferred)	Sample Measurement										
PARM Code B0007 + Mon. Site No. RMP-02	Permit Requirement		Report (Mo.Total)	dry tons						Monthly	Calculated

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

NAME/TITLE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	TELEPHONE NO	DATE (mm/dd/yyyy)

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here):

DEPARTMENT OF ENVIRONMENTAL PROTECTION DISCHARGE MONITORING REPORT - PART A

When Completed submit this report to: Department of Environmental Protection, http://www.fldepportal.com/go/

PERMITTEE NAME:	City of North Port	PERMIT NUMBER:	FLA013378-014-DW		
MAILING ADDRESS:	6644 West Price Blvd. North Port, FL 34291	LIMIT:	Final	REPORT FREQUENCY:	Annually
		CLASS SIZE:	N/A	PROGRAM:	Domestic
FACILITY:	North Port WWTP	MONITORING GROUP NUMBER:	RWS-A		
LOCATION:	200 North Pan American Blvd. North Port, FL 34287	MONITORING GROUP DESCRIPTION:	Annual Reclaimed Water or Effluent Analysis		
		RE-SUBMITTED DMR: ☐			
		NO DISCHARGE FROM SITE: ☐			
		MONITORING NOT REQUIRED:* ☐			
COUNTY:	Sarasota	MONITORING PERIOD From:	____________________	To:	____________________
OFFICE:	South District				

Parameter		Quantity or Loading		Units	Quality or Concentration			Units	No. Ex.	Frequency of Analysis	Sample Type
Antimony, Total Recoverable (GWS = 6)**	Sample Measurement										
PARM Code 01268 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Arsenic, Total Recoverable (GWS = 10)	Sample Measurement										
PARM Code 00978 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Barium, Total Recoverable (GWS = 2,000)	Sample Measurement										
PARM Code 01009 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Beryllium, Total Recoverable (GWS = 4)	Sample Measurement										
PARM Code 00998 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Cadmium, Total Recoverable (GWS = 5)	Sample Measurement										
PARM Code 01113 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Chromium, Total Recoverable (GWS =100)	Sample Measurement										
PARM Code 01118 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC

*THE "MONITORING NOT REQUIRED" CHECKBOX SHOULD BE SELECTED WHEN A CERTIFICATION STATEMENT IN ACCORDANCE WITH SUBSECTION 62-600.680(2), F.A.C., IS SUBMITTED WITH THIS DMR. SEE CERTIFICATION STATEMENT IN COMMENTS SECTION BELOW.
**GROUND WATER STANDARD (GWS) FOR REFERENCE AND REVIEW ONLY.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

NAME/TITLE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	TELEPHONE NO	DATE (mm/dd/yyyy)

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here):
☐ NO NEW NON-DOMESTIC WASTEWATER DISCHARGERS HAVE BEEN ADDED TO THE COLLECTION SYSTEM SINCE THE LAST RECLAIMED WATER OR EFFLUENT ANALYSIS WAS CONDUCTED.
SIGN AND DATE:

DISCHARGE MONITORING REPORT - PART A (Continued)

FACILITY: North Port WWTP

MONITORING GROUP NUMBER: RWS-A

PERMIT NUMBER: FLA013378-014-DW

MONITORING PERIOD From: ____________________ To: _______________

Parameter		Quantity or Loading		Units	Quality or Concentration			Units	No. Ex.	Frequency of Analysis	Sample Type
Cyanide, Free (amen. to chlorination)(GWS = 200)	Sample Measurement										
PARM Code 00722 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab
Fluoride, Total (as F) (GWS = 4.0/2.0)	Sample Measurement										
PARM Code 00951 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	mg/L		Annually	24-hr FPC
Lead, Total Recoverable (GWS = 15)	Sample Measurement										
PARM Code 01114 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Mercury, Total Recoverable (GWS = 2)	Sample Measurement										
PARM Code 71901 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Nickel, Total Recoverable (GWS = 100)	Sample Measurement										
PARM Code 01074 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Nitrogen, Nitrate, Total (as N) (GWS = 10)	Sample Measurement										
PARM Code 00620 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	mg/L		Annually	24-hr FPC
Nitrogen, Nitrite, Total (as N) (GWS = 1)	Sample Measurement										
PARM Code 00615 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	mg/L		Annually	24-hr FPC
Nitrite plus Nitrate, Total 1 det. (as N)(GWS = 10)	Sample Measurement										
PARM Code 00630 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	mg/L		Annually	24-hr FPC
Selenium, Total Recoverable (GWS =50)	Sample Measurement										
PARM Code 00981 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Sodium, Total Recoverable (GWS = 160)	Sample Measurement										
PARM Code 00923 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	mg/L		Annually	24-hr FPC

DISCHARGE MONITORING REPORT - PART A (Continued)

FACILITY: North Port WWTP

MONITORING GROUP NUMBER: RWS-A

PERMIT NUMBER: FLA013378-014-DW

MONITORING PERIOD From: ____________________ To: ________________

Parameter		Quantity or Loading		Units	Quality or Concentration			Units	No. Ex.	Frequency of Analysis	Sample Type
Thallium, Total Recoverable (GWS = 2)	Sample Measurement										
PARM Code 00982 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
1,1-dichloroethylene (GWS = 7)	Sample Measurement										
PARM Code 34501 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab
1,1,1-trichloroethane (GWS = 200)	Sample Measurement										
PARM Code 34506 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab
1,1,2-trichloroethane (GWS = 5)	Sample Measurement										
PARM Code 34511 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab
1,2-dichloroethane (GWS = 3)	Sample Measurement										
PARM Code 32103 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab
1,2-dichloropropane (GWS = 5)	Sample Measurement										
PARM Code 34541 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab
1,2,4-trichlorobenzene (GWS = 70)	Sample Measurement										
PARM Code 34551 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Benzene (GWS = 1)	Sample Measurement										
PARM Code 34030 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab
Carbon tetrachloride (GWS = 3)	Sample Measurement										
PARM Code 32102 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab
Cis-1,2-dichloroethene (GWS = 70)	Sample Measurement										
PARM Code 81686 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab

DISCHARGE MONITORING REPORT - PART A (Continued)

FACILITY: North Port WWTP

MONITORING GROUP NUMBER: RWS-A

PERMIT NUMBER: FLA013378-014-DW

MONITORING PERIOD From: ____________________ To: ______________

Parameter		Quantity or Loading		Units	Quality or Concentration			Units	No. Ex.	Frequency of Analysis	Sample Type
Dichloromethane (methylene chloride)(GWS = 5)	Sample Measurement										
PARM Code 03821 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab
Ethylbenzene (GWS = 700)	Sample Measurement										
PARM Code 34371 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab
Monochlorobenzene (GWS = 100)	Sample Measurement										
PARM Code 34031 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab
1,2-dichlorobenzene (GWS = 600)	Sample Measurement										
PARM Code 34536 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab
1,4-dichlorobenzene (GWS = 75)	Sample Measurement										
PARM Code 34571 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab
Styrene, Total (GWS = 100)	Sample Measurement										
PARM Code 77128 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab
Tetrachloroethylene (GWS = 3)	Sample Measurement										
PARM Code 34475 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab
Toluene (GWS = 1,000)	Sample Measurement										
PARM Code 34010 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab
1,2-trans-dichloroethylene (GWS = 100)	Sample Measurement										
PARM Code 34546 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab
Trichloroethylene (GWS = 3)	Sample Measurement										
PARM Code 39180 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab

DISCHARGE MONITORING REPORT - PART A (Continued)

FACILITY: North Port WWTP

MONITORING GROUP NUMBER: RWS-A

PERMIT NUMBER: FLA013378-014-DW

MONITORING PERIOD From: ____________________ To: ______________

Parameter		Quantity or Loading		Units	Quality or Concentration			Units	No. Ex.	Frequency of Analysis	Sample Type
Vinyl chloride (GWS = 1)	Sample Measurement										
PARM Code 39175 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab
Xylenes (GWS = 10,000)	Sample Measurement										
PARM Code 81551 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab
2,3,7,8-tetrachlorodibenzo-p-dioxin(GWS = 3x10^-5)	Sample Measurement										
PARM Code 34675 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
2,4-dichlorophenoxyacetic acid (GWS = 70)	Sample Measurement										
PARM Code 39730 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Silvex (GWS = 50)	Sample Measurement										
PARM Code 39760 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Alachlor (GWS = 2)	Sample Measurement										
PARM Code 39161 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Atrazine (GWS = 3)	Sample Measurement										
PARM Code 39033 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Benzo(a)pyrene (GWS = 0.2)	Sample Measurement										
PARM Code 34247 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Carbofuran (GWS = 40)	Sample Measurement										
PARM Code 81405 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Chlordane (tech mix. and metabolites)(GWS = 2)	Sample Measurement										
PARM Code 39350 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC

DISCHARGE MONITORING REPORT - PART A (Continued)

FACILITY: North Port WWTP

MONITORING GROUP NUMBER: RWS-A

PERMIT NUMBER: FLA013378-014-DW

MONITORING PERIOD From: ____________________ To: ______________

Parameter		Quantity or Loading		Units	Quality or Concentration			Units	No. Ex.	Frequency of Analysis	Sample Type
Dalapon (GWS = 200)	Sample Measurement										
PARM Code 38432 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Bis(2-ethylhexyl) adipate (GWS = 400)	Sample Measurement										
PARM Code 77903 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Bis (2-ethylhexyl) phthalate (GWS = 6)	Sample Measurement										
PARM Code 39100 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Dibromochloropropane (DBCP) (GWS = 0.2)	Sample Measurement										
PARM Code 82625 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab
Dinoseb (GWS = 7)	Sample Measurement										
PARM Code 30191 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Diquat (GWS = 20)	Sample Measurement										
PARM Code 04443 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Endothall (GWS = 100)	Sample Measurement										
PARM Code 38926 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Endrin (GWS = 2)	Sample Measurement										
PARM Code 39390 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Ethylene dibromide (1,2-dibromoethane)(GWS = 0.02)	Sample Measurement										
PARM Code 77651 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	Grab
Glyphosate (GWS = 0.7)	Sample Measurement										
PARM Code 79743 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	mg/L		Annually	24-hr FPC

DISCHARGE MONITORING REPORT - PART A (Continued)

FACILITY: North Port WWTP

MONITORING GROUP NUMBER: RWS-A

PERMIT NUMBER: FLA013378-014-DW

MONITORING PERIOD From: ____________________ To: ________________

Parameter		Quantity or Loading		Units	Quality or Concentration			Units	No. Ex.	Frequency of Analysis	Sample Type
Heptachlor (GWS = 0.4)	Sample Measurement										
PARM Code 39410 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Heptachlor epoxide (GWS = 0.2)	Sample Measurement										
PARM Code 39420 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Hexachlorobenzene (GWS = 1)	Sample Measurement										
PARM Code 39700 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Hexachlorocyclopentadiene (GWS = 50)	Sample Measurement										
PARM Code 34386 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Gamma BHC (Lindane) (GWS = 0.2)	Sample Measurement										
PARM Code 39782 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Methoxychlor (GWS = 40)	Sample Measurement										
PARM Code 39480 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Oxamyl (vydate) (GWS = 200)	Sample Measurement										
PARM Code 38865 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Pentachlorophenol (GWS = 1)	Sample Measurement										
PARM Code 39032 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Picloram (GWS = 500)	Sample Measurement										
PARM Code 39720 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Polychlorinated Biphenyls (PCBs)(GWS = 0.5)	Sample Measurement										
PARM Code 39516 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC

DISCHARGE MONITORING REPORT - PART A (Continued)

FACILITY: North Port WWTP

MONITORING GROUP NUMBER: RWS-A

PERMIT NUMBER: FLA013378-014-DW

MONITORING PERIOD From: ____________________ To: ______________

Parameter		Quantity or Loading		Units	Quality or Concentration			Units	No. Ex.	Frequency of Analysis	Sample Type
Simazine (GWS = 4)	Sample Measurement										
PARM Code 39055 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Toxaphene (GWS = 3)	Sample Measurement										
PARM Code 39400 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Trihalomethane, Total by summation(GWS = 0.080)	Sample Measurement										
PARM Code 82080 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	mg/L		Annually	Grab
Radium 226 + Radium 228, Total (GWS = 5)	Sample Measurement										
PARM Code 11503 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	pCi/L		Annually	24-hr FPC
Alpha, Gross Particle Activity (GWS = 15)	Sample Measurement										
PARM Code 80045 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	pCi/L		Annually	24-hr FPC
Aluminum, Total Recoverable (GWS = 0.2)	Sample Measurement										
PARM Code 01104 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	mg/L		Annually	24-hr FPC
Chloride (as Cl) (GWS = 250)	Sample Measurement										
PARM Code 00940 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	mg/L		Annually	24-hr FPC
Iron, Total Recoverable (GWS = 0.3)	Sample Measurement										
PARM Code 00980 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	mg/L		Annually	24-hr FPC
Copper, Total Recoverable (GWS = 1,000)	Sample Measurement										
PARM Code 01119 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Manganese, Total Recoverable (GWS = 50)	Sample Measurement										
PARM Code 11123 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC

DISCHARGE MONITORING REPORT - PART A (Continued)

FACILITY: North Port WWTP

MONITORING GROUP NUMBER: RWS-A

PERMIT NUMBER: FLA013378-014-DW

MONITORING PERIOD From: ____________________ To: ______________

Parameter		Quantity or Loading		Units	Quality or Concentration			Units	No. Ex.	Frequency of Analysis	Sample Type
Silver, Total Recoverable (GWS = 100)	Sample Measurement										
PARM Code 01079 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
Sulfate, Total (GWS = 250)	Sample Measurement										
PARM Code 00945 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	mg/L		Annually	24-hr FPC
Zinc, Total Recoverable (GWS = 5,000)	Sample Measurement										
PARM Code 01094 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	ug/L		Annually	24-hr FPC
pH (GWS = 6.5-8.5)	Sample Measurement										
PARM Code 00400 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	s.u.		Annually	Grab
Solids, Total Dissolved (TDS) (GWS = 500)	Sample Measurement										
PARM Code 70295 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	mg/L		Annually	24-hr FPC
Foaming Agents (GWS = 0.5)	Sample Measurement										
PARM Code 01288 P Mon. Site No. RWS-A	Permit Requirement						Report (Max.)	mg/L		Annually	24-hr FPC

DAILY SAMPLE RESULTS - PART B

Permit Number: FLA013378-014-DW Facility: North Port WWTP
Monitoring Period From: ______________________ To: ______________________

	BOD, Carbonaceous 5 day, 20C mg/L	Chlorine, Total Residual (For Disinfection) mg/L	Coliform, Fecal #/100mL	Nitrogen, Nitrate, Total (as N) mg/L	Nitrogen, Total mg/L	Phosphorus, Total (as P) mg/L	Solids, Total Suspended mg/L	pH s.u.	Solids, Total Suspended mg/L	Turbidity NTU	Flow (to reuse) MGD
Code	80082	50060	74055	00620	00600	00665	00530	00400	00530	00070	50050
Mon. Site	EFA-01	EFA-01	EFA-01	EFA-01	EFA-01	EFA-01	EFA-01	EFA-01	EFB-01	EFB-01	FLW-01
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
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22											
23											
24											
25											
26											
27											
28											
29											
30											
31											
Total											
Mo. Avg.											

PLANT STAFFING:
Day Shift Operator Class: ________ Certificate No: ______________ Name: ______________________________

Evening Shift Operator Class: ________ Certificate No: ______________ Name: ______________________________

Night Shift Operator Class: ________ Certificate No: ______________ Name: ______________________________

Lead Operator Class: ________ Certificate No: ______________ Name: ______________________________

DAILY SAMPLE RESULTS - PART B

Permit Number: FLA013378-014-DW Facility: North Port WWTP
Monitoring Period From: ____________________ To: ____________________

	Flow (to wells) MGD	Flow (through plant) MGD	BOD, Carbonaceous 5 day, 20C (Influent) mg/L	Solids, Total Suspended (Influent) mg/L							
Code	50050	50050	80082	00530							
Mon. Site	FLW-02	FLW-03	INF-01	INF-01							
1											
2											
3											
4											
5											
6											
7											
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26											
27											
28											
29											
30											
31											
Total											
Mo. Avg.											

PLANT STAFFING:

Day Shift Operator Class: ________ Certificate No: ______________ Name: ______________________________

Evening Shift Operator Class: ________ Certificate No: ______________ Name: ______________________________

Night Shift Operator Class: ________ Certificate No: ______________ Name: ______________________________

Lead Operator Class: ________ Certificate No: ______________ Name: ______________________________

INSTRUCTIONS FOR COMPLETING THE WASTEWATER DISCHARGE MONITORING REPORT

Read these instructions before completing the DMR. Hard copies and/or electronic copies of the required parts of the DMR were provided with the permit. All required information shall be completed in full and typed or printed in ink. A signed, original DMR shall be mailed to the address printed on the DMR by the 28th of the month following the monitoring period. Facilities who submit their DMR(s) electronically through eDMR do not need to submit a hardcopy DMR. The DMR shall not be submitted before the end of the monitoring period.

The DMR consists of three parts--A, B, and D--all of which may or may not be applicable to every facility. Facilities may have one or more Part A's for reporting effluent or reclaimed water data. All domestic wastewater facilities will have a Part B for reporting daily sample results. Part D is used for reporting ground water monitoring well data.

When results are not available, the following codes should be used on parts A and D of the DMR and an explanation provided where appropriate. Note: Codes used on Part B for raw data are different.

CODE	DESCRIPTION/INSTRUCTIONS
ANC	Analysis not conducted.
DRY	Dry Well
FLD	Flood disaster.
IFS	Insufficient flow for sampling.
LS	Lost sample.
MNR	Monitoring not required this period.

CODE	DESCRIPTION/INSTRUCTIONS
NOD	No discharge from/to site.
OPS	Operations were shutdown so no sample could be taken.
OTH	Other. Please enter an explanation of why monitoring data were not available.
SEF	Sampling equipment failure.

When reporting analytical results that fall below a laboratory's reported method detection limits or practical quantification limits, the following instructions should be used, unless indicated otherwise in the permit or on the DMR:

1. Results greater than or equal to the PQL shall be reported as the measured quantity.
2. Results less than the PQL and greater than or equal to the MDL shall be reported as the laboratory's MDL value. These values shall be deemed equal to the MDL when necessary to calculate an average for that parameter and when determining compliance with permit limits.
3. Results less than the MDL shall be reported by entering a less than sign ("<") followed by the laboratory's MDL value, e.g. < 0.001. A value of one-half the MDL or one-half the effluent limit, whichever is lower, shall be used for that sample when necessary to calculate an average for that parameter. Values less than the MDL are considered to demonstrate compliance with an effluent limitation.

PART A -DISCHARGE MONITORING REPORT (DMR)

Part A of the DMR is comprised of one or more sections, each having its own header information. Facility information is preprinted in the header as well as the monitoring group number, whether the limits and monitoring requirements are interim or final, and the required submittal frequency (e.g. monthly, annually, quarterly, etc.). Submit Part A based on the required reporting frequency in the header and the instructions shown in the permit. The following should be completed by the permittee or authorized representative:

Resubmitted DMR: Check this box if this DMR is being re-submitted because there was information missing from or information that needed correction on a previously submitted DMR. The information that is being revised should be clearly noted on the re-submitted DMR (e.g. highlight, circle, etc.)
No Discharge From Site: Check this box if no discharge occurs and, as a result, there are no data or codes to be entered for all of the parameters on the DMR for the entire monitoring group number; however, if the monitoring group includes other monitoring locations (e.g., influent sampling), the "NOD" code should be used to individually denote those parameters for which there was no discharge.
Monitoring Period: Enter the month, day, and year for the first and last day of the monitoring period (i.e. the month, the quarter, the year, etc.) during which the data on this report were collected and analyzed.
Sample Measurement: Before filling in sample measurements in the table, check to see that the data collected correspond to the limit indicated on the DMR (i.e. interim or final) and that the data correspond to the monitoring group number in the header. Enter the data or calculated results for each parameter on this row in the non-shaded area above the limit. Be sure the result being entered corresponds to the appropriate statistical base code (e.g. annual average, monthly average, single sample maximum, etc.) and units. Data qualifier codes are not to be reported on Part A.
No. Ex.: Enter the number of sample measurements during the monitoring period that exceeded the permit limit for each parameter in the non-shaded area. If none, enter zero.
Frequency of Analysis: The shaded areas in this column contain the minimum number of times the measurement is required to be made according to the permit. Enter the actual number of times the measurement was made in the space above the shaded area.
Sample Type: The shaded areas in this column contain the type of sample (e.g. grab, composite, continuous) required by the permit. Enter the actual sample type that was taken in the space above the shaded area.
Signature: This report must be signed in accordance with Rule 62-620.305, F.A.C. Type or print the name and title of the signing official. Include the telephone number where the official may be reached in the event there are questions concerning this report. Enter the date when the report is signed.
Comment and Explanation of Any Violations: Use this area to explain any exceedances, any upset or by-pass events, or other items which require explanation. If more space is needed, reference all attachments in this area.

PART B - DAILY SAMPLE RESULTS

Monitoring Period: Enter the month, day, and year for the first and last day of the monitoring period (i.e. the month, the quarter, the year, etc.) during which the data on this report were collected and analyzed.
Daily Monitoring Results: Transfer all analytical data from your facility's laboratory or a contract laboratory's data sheets for all day(s) that samples were collected. Record the data in the units indicated. Table 1 in Chapter 62-160, F.A.C., contains a complete list of all the data qualifier codes that your laboratory may use when reporting analytical results. However, when transferring numerical results onto Part B of the DMR, only the following data qualifier codes should be used and an explanation provided where appropriate.

CODE	DESCRIPTION/INSTRUCTIONS
<	The compound was analyzed for but not detected.
A	Value reported is the mean (average) of two or more determinations.
J	Estimated value, value not accurate.
Q	Sample held beyond the actual holding time.
Y	Laboratory analysis was from an unpreserved or improperly preserved sample.

To calculate the monthly average, add each reported value to get a total. For flow, divide this total by the number of days in the month. For all other parameters, divide the total by the number of observations.
Plant Staffing: List the name, certificate number, and class of all state certified operators operating the facility during the monitoring period. Use additional sheets as necessary.

PART D - GROUND WATER MONITORING REPORT

Monitoring Period: Enter the month, day, and year for the first and last day of the monitoring period (i.e. the month, the quarter, the year, etc.) during which the data on this report were collected and analyzed.
Date Sample Obtained: Enter the date the sample was taken. Also, check whether or not the well was purged before sampling.
Time Sample Obtained: Enter the time the sample was taken.
Sample Measurement: Record the results of the analysis. If the result was below the minimum detection limit, indicate that. Data qualifier codes are not to be reported on Part D.
Detection Limits: Record the detection limits of the analytical methods used.
Analysis Method: Indicate the analytical method used. Record the method number from Chapter 62-160 or Chapter 62-601, F.A.C., or from other sources.
Sampling Equipment Used: Indicate the procedure used to collect the sample (e.g. airlift, bucket/bailer, centrifugal pump, etc.)
Samples Filtered: Indicate whether the sample obtained was filtered by laboratory (L), filtered in field (F), or unfiltered (N).
Signature: This report must be signed in accordance with Rule 62-620.305, F.A.C. Type or print the name and title of the signing official. Include the telephone number where the official may be reached in the event there are questions concerning this report. Enter the date when the report is signed.
Comments and Explanation: Use this space to make any comments on or explanations of results that are unexpected. If more space is needed, reference all attachments in this area.

SPECIAL INSTRUCTIONS FOR LIMITED WET WEATHER DISCHARGES

Flow (Limited Wet Weather Discharge): Enter the measured average flow rate during the period of discharge or divide gallons discharged by duration of discharge (converted into days). Record in million gallons per day (MGD).
Flow (Upstream): Enter the average flow rate in the receiving stream upstream from the point of discharge for the period of discharge. The average flow rate can be calculated based on two measurements; one made at the start and one made at the end of the discharge period. Measurements are to be made at the upstream gauging station described in the permit.
Actual Stream Dilution Ratio: To calculate the Actual Stream Dilution Ratio, divide the average upstream flow rate by the average discharge flow rate. Enter the Actual Stream Dilution Ratio accurate to the nearest 0.1.
No. of Days the SDF > Stream Dilution Ratio: For each day of discharge, compare the minimum Stream Dilution Factor (SDF) from the permit to the calculated Stream Dilution Ratio. On Part B of the DMR, enter an asterisk (*) if the SDF is greater than the Stream Dilution Ratio on any day of discharge. On Part A of the DMR, add up the days with an "*" and record the total number of days the Stream Dilution Factor was greater than the Stream Dilution Ratio.
$CBOD_5$: Enter the average $CBOD_5$ of the reclaimed water discharged during the period shown in duration of discharge.
TKN: Enter the average TKN of the reclaimed water discharged during the period shown in duration of discharge.
Actual Rainfall: Enter the actual rainfall for each day on Part B. Enter the actual cumulative rainfall to date for this calendar year and the actual total monthly rainfall on Part A. The cumulative rainfall to date for this calendar year is the total amount of rain, in inches, that has been recorded since January 1 of the current year through the month for which this DMR contains data.
Rainfall During Average Rainfall Year: On Part A, enter the total monthly rainfall during the average rainfall year and the cumulative rainfall for the average rainfall year. The cumulative rainfall for the average rainfall year is the amount of rain, in inches, which fell during the average rainfall year from January through the month for which this DMR contains data.
No. of Days LWWD Activated During Calendar Year: Enter the cumulative number of days that the limited wet weather discharge was activated since January 1 of the current year.
Reason for Discharge: Attach to the DMR a brief explanation of the factors contributing to the need to activate the limited wet weather discharge.

PATHOGEN MONITORING

Part I - Instructions

1. Completion of this report is required by Rules 62-610.463(4), 62-610.472(3)(d), 62-610.525(13), 62-610.568(11), 62-610.568(12), and 62-610.652(6)(c), F.A.C., for all domestic wastewater facilities that provide reclaimed water to certain types of reuse activities. The schedule for sampling and reporting shall be in accordance with the permit for the facility. If a schedule for sampling or re-sampling is not included in the permit, the following schedule shall apply:

   a. Routine Sampling:

   If sampling is required once every two years, this report shall be submitted on or before November 28 of each even numbered year (2006, 2008, 2010, etc.).

   If sampling is required once every five years, this report shall be submitted with the application for permit renewal.

   If sampling is required quarterly, this report shall be submitted on or before February 28, May 28, August 28, and November 28 of each year.

   b. Subsequent Re-Sampling:

   If subsequent re-sampling is required by Item 9 in Part I of this form, this form shall be submitted for the subsequent re-sampling(s) in accordance with the schedule established in Item 9 in Part I of this form.

2. Submit one copy of this form and a copy of the laboratory's final report for the analysis of *Giardia* and *Cryptosporidium* to each of the following two addresses:

   a. The appropriate DEP district office (attention Domestic Wastewater Program). Addresses for the DEP district offices are available at www.dep.state.fl.us/secretary/dist/default.htm.

   b. DEP Water Reuse Coordinator
   Mail Station 3540
   2600 Blair Stone Road
   Tallahassee, Florida 32399-2400

3. Please type or print legibly.

4. In Part II, Items 7 through 12 need to be completed only if this is the first submittal of this report, if the information in Items 7 through 12 has changed since the last submittal, or if the information in any of these questions has not been previously provided.

5. Part III is to be used when sampling for *Giardia* and *Cryptosporidium* at the treatment plant. Part III is also to be used when sampling for *Giardia* and *Cryptosporidium* in a supplemental water supply (see Rule 62-610.472, F.A.C.).

6. For each sample, record the sample volume obtained in liters.

7. For *Giardia*, record the concentrations in cysts per 100 liters. For *Cryptosporidium*, record the concentrations in oocysts per 100 liters. Sufficient sample volumes shall be collected and processed such that the detection limit is no greater than 5 cysts or oocysts per 100 liters. Detection levels on the order of 1 cyst or oocyst per 100 liters are recommended. If an observation is less than the detection limit, make an entry in the form "<2" (where 2 per 100 liters is the detection limit in this example). The actual detection limit will be dictated by the volumes of sample obtained, filtered, and processed. Do NOT record nondetectable values as zero.

8. EPA Method 1623 or other approved methods for reclaimed water or nonpotable waters, adjusted appropriately to accommodate the detection limit requirements, shall be used. Methods previously allowed for EPA's Information Collection Rule (ICR) shall not be used. The full requirements of the approved method, including quality assurance and quality control, are to be met. Quality assurance and sampling requirements in Chapter 62-160, F.A.C., shall apply.

   Two concentrations of *Giardia* and *Cryptosporidium* shall be recorded on Part III of this form:

   a. Total cysts and oocysts shall be enumerated using EPA Method 1623 or other approved methods.

   b. Potentially viable cysts and oocysts shall be enumerated using the DAPI staining technique contained in EPA Method 1623 or similar enumeration techniques included in other approved methods. Cysts and oocysts that are stained DAPI positive or show internal structure by D.I.C. shall be considered as being potentially viable. If the laboratory reports separate values for DAPI positive and for cysts or oocysts having internal structure, the larger of the two concentrations will be reported as being potentially viable.

9. If the number of potentially viable cysts of *Giardia* reported exceeds 5 per 100 liters, a subsequent sample shall be taken and analyzed using EPA Method 1623 or other approved methods and reported using this form. If the number of potentially viable oocysts of *Cryptosporidium* reported exceeds 22 per 100 liters, a subsequent sample shall be taken and analyzed using EPA Method 1623 or other approved methods and reported using this form. This subsequent sample shall be collected within 90 days of the date the initial sample was taken, analyzed for both *Giardia* and *Cryptosporidium*, and the results of the subsequent analysis shall be submitted to DEP using this form within 60 days of sample collection.

10. Rule 62-160.300, F.A.C., requires that all laboratories generating environmental data for submission to the DEP shall hold certification from the Department of Health's (DOH) Environmental Laboratory Certification Program (ELCP). Certification by the ELCP for analysis of *Giardia* and *Cryptosporidium* using EPA Method 1623 for non-potable waters is required. If other approved methods are used, certification by the ELCP is required for the specific method and for the test matrix. Lists of certified laboratories can be found at www.dep.state.fl.us/labs/cgi-bin/aams/index.asp

11. Samples shall be collected during peak flow periods (normally between the hours of 8:00 a.m. and 6:00 p.m.).

12. Recognizing that concentrations of these pathogens generally increase during the late summer through fall period, it is recommended that utilities sample during the August through October time period.

13. If the wastewater treatment facility uses chlorination for disinfection, samples obtained for analysis of *Giardia* and *Cryptosporidium* shall be dechlorinated.

14. When sampling at the treatment facility, obtain a grab sample for total suspended solids (TSS) that is representative of the water leaving the filters at the treatment facility during the period when pathogen

samples are being obtained. In addition, record the highest turbidity and the lowest total chlorine residual observed during the period when pathogen samples are being obtained.

15. When sampling a supplemental water supply, obtain a grab sample for total suspended solids (TSS) that is representative of the surface water or treated stormwater as it is added to the reclaimed water system. This TSS sample shall be taken during the period when pathogen samples are being obtained. In addition, record the lowest total chlorine residual observed during the period when pathogen samples are being obtained.

Part II - General Information

1. DEP wastewater facility identification number: **FLA013378**

   Wastewater facility name: North Port WWTP

   Permittee name: City of North Port

2. Person completing this form:

   Name: ______________________________

   Telephone: (________)______________________________

   Email address: ______________________________

3. Sampling and analysis:

   Date samples were taken: ______________________________

   Organization collecting the samples: ______________________________

   Was the sample dechlorinated in the field? ☐ Yes ☐ No

   Was the sample refrigerated or kept on ice during shipment to the laboratory? ☐ Yes ☐ No

   Date samples delivered to laboratory: ______________________________

   Date analytical work was done: ______________________________

   Laboratory doing the analysis: ______________________________

   Laboratory's DOH Identification Number: ______________________________

   Approved method used:

   ☐ EPA Method 1623

   ☐ Other approved method: ______________________________

   Contact person at the laboratory: ______________________________

   Email address of the lab contact person: ______________________________

4. Is this the first time that this form has been submitted for the facility?

   ☐ Yes [Please complete Questions 7 through 16.]

   ☐ No [Proceed to Question 5.]

5. Is this a report of "subsequent re-sampling" required by Item 9 in Part I of this form based on concentrations of potentially viable cysts or oocysts in a previous sampling?

☐ No [Proceed to Question 6.]

☐ Yes [Attach a description of any facility or operational changes made to the treatment facilities since the time of the previous sampling and proceed to Question 6.]

6. Has the information requested in Questions 7 through 12 (below) changed since the last submittal of this form?

☐ Yes [Please complete Questions 7 through 16.]

☐ No [Proceed to Questions 13 through 16 of Part II of this form. You do not need to complete Questions 7 through 12.]

7. Type of secondary treatment system:

☐ Conventional activated sludge ☐ Extended aeration

☐ Contact stabilization ☐ Biological nutrient removal (such as Bardenpho)

☐ Other: ____

8. Does this treatment facility nitrify (convert ammonia nitrogen to nitrate)? ☐ Yes ☐ No

9. Filter type:

☐ Deep bed, single media ☐ Deep bed, multiple media

☐ Shallow bed, automatic backwash ☐ Upflow (including Dynasand)

☐ Slow rate sand filter ☐ Diatomaceous earth filter

☐ Fabric filter ☐ Cartridge filter

☐ Membranes (microfiltration, ultrafiltration, membrane bioreactor, reverse osmosis)

☐ Other: ____

10. Filter Media (complete for each type of media provided):

Top layer of media: Media type: ______________________________

Effective size: ________________________ mm

Uniformity coefficient: _____________________

Bed depth: __________________________ inches

Middle layer of media: Media type: ______________________________

Effective size: ________________________ mm

Uniformity coefficient: _____________________

Bed depth: __________________________ inches

Bottom layer of media: Media type: ______________________________

Effective size: ________________________ mm

Uniformity coefficient: _____________________

Bed depth: __________________________ inches

11. Filter backwash water:

☐ Backwash water is returned to the headworks of the treatment plant.

☐ Backwash water is returned to the aeration basin.

☐ Other. Please describe: ____

12. Disinfection system:

☐ Chlorination, gas ☐ Hypochlorite

☐ Chlorine dioxide ☐ Chlorination, other ____________________

☐ Ultraviolet ☐ Ozone

☐ Other: ____

13. Is chlorine added before the filters? ☐ No ☐ Yes Dose: ____________ mg/L

14. During the period that samples were taken, did you add a coagulant, coagulant aid, polyelectrolyte, or other chemical to enhance filtration?

☐ No

☐ Yes. Please list the chemicals being added and their dose.

Chemical 1 - Name: _______________________________ Dose: ________ mg/L

Chemical 2 - Name: _______________________________ Dose: ________ mg/L

Chemical 3 - Name: _______________________________ Dose: ________ mg/L

15. Wastewater treatment plant permitted capacity: _________________ MGD

16. Wastewater flow being treated at the time samples were collected: _________________ MGD

PART III - PATHOGEN MONITORING REPORT

FACILITY ID: FLA013378
FACILITY NAME: North Port WWTP
FACILITY ADDRESS: 200 North Pan American Blvd., North Port, FL 34287
PERMITTEE NAME: City of North Port
MAILING ADDRESS: 6644 West Price Blvd, North Port, Florida 34291
DATE OF SAMPLING: __________

Parameter	Quantity or Loading		Quality or Concentration	
	Sample Measurement	Units	Sample Measurement	Units
Treatment Plant: After Filter Monitoring Site No.				
Turbidity PARM Code 00070				NTU
TSS PARM Code 00530				mg/L
Treatment Plant: After Disinfection Monitoring Site No.				
Total Chlorine Residual PARM Code 50060				mg/L
Volume Collected PARM Code 71994		Liters		
Giardia, total count * PARM Code GIARD				total cysts/100 L
Giardia, potentially viable cysts * PARM Code VGIAR				potentially viable cysts/100 L
Cryptosporidium, total count * PARM Code CRYPT				total oocysts/100 L
Cryptosporidium, potentially viable oocysts * PARM Code VCRYP				potentially viable oocysts/100 L
Supplemental Water Supply (surface water or stormwater): After Treatment & Disinfection Monitoring Site No.				
TSS PARM Code 00530				mg/L
Total Chlorine Residual PARM Code 50060				mg/L
Volume Collected PARM Code 71994		Liters		
Giardia (total count) * PARM Code GIARD				total cysts/100 L
Giardia, potentially viable cysts * PARM Code VGIAR				potentially viable cysts/100 L
Cryptosporidium, total count * PARM Code CRYPT				total oocysts/100 L
Cryptosporidium, potentially viable oocysts * PARM Code VCRYP				potentially viable oocysts/100 L

* Data entries must be made for both total and potentially viable cysts and oocysts.

PART IV - CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein; and based upon my inquiry of those individuals immediately responsible for obtaining the information, I believe the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Name/Title of Principle Executive Officer or Authorized Agent (Type or Print)	Signature of Principle Executive Officer or Authorized Agent	Telephone No.	Date (YY/MM/DD)
	Email Address		

STATEMENT OF BASIS
FOR
STATE OF FLORIDA DOMESTIC WASTEWATER FACILITY PERMIT

PERMIT NUMBER: FLA013378-014-DW

FACILITY NAME: City of North Port WWTP

FACILITY LOCATION: 200 North Pan American Blvd., North Port, FL 34287
Sarasota County

NAME OF PERMITTEE: City of North Port

PERMIT WRITER: R. Walters

1. SUMMARY OF APPLICATION

   a. Chronology of Application

      Application Number: FLA013378-014-DW1P

      Application Submittal Date: 23 March 2017

   b. Type of Facility

      Domestic Wastewater Treatment Plant

      Ownership Type: Municipal

      SIC Code: 4952

   c. Facility Capacity

Existing Permitted Capacity:	7.0	MGD	Three-Month Average Daily Flow
Proposed Increase in Permitted Capacity	-- 0 --	MGD	Three-Month Average Daily Flow
Proposed Total Permitted Capacity:	7.0	MGD	Three-Month Average Daily Flow

   d. Description of Wastewater Treatment

      The facility is a Modified Ludzack-Ettinger domestic wastewater treatment plant with high level-disinfection.

      The permittee is authorized to modify the biosolids system, as originally permitted by permit revision FLA013378-013-DW1. Biosolids are dewatered and taken to landfill or an authorized Biosolids Treatment Facility.

   e. Description of Effluent Disposal and Land Application Sites (as reported by applicant)

      Slow-rate land application system/public access areas. Discharge to underground injection control well(s).

      The utility provides reuse to its general reuse service area. The entire area within the City's incorporated boundaries is the reuse area.

2. SUMMARY OF SURFACE WATER DISCHARGE

This facility does not discharge to surface waters.

3. BASIS FOR PERMIT LIMITATIONS AND MONITORING REQUIREMENTS

This facility is authorized to discharge reclaimed water to Underground Injection Well System U-001 which consists of two Class I injection wells discharging to Class G-IV ground water based on the following:

Parameter	Units	Max/ Min	Limit	Statistical Basis	Rationale
Flow (to wells)	MGD	Max	5.32	Monthly Average	62-600.700(2)(b) FAC
BOD, Carbonaceous 5 day, 20C	mg/L	Max	20.0	Annual Average	62-600.540(1) & 62-600.420(3)(a)1. FAC
		Max	30.0	Monthly Average	62-600.420(3)(a)2. FAC
		Max	45.0	Weekly Average	62-600.420(3)(a)3. FAC
		Max	60.0	Single Sample	62-600.420(3)(a)4. FAC
Solids, Total Suspended	mg/L	Max	20.0	Annual Average	62-600.540(1) & 62-600.420(3)(b)1. FAC
		Max	30.0	Monthly Average	62-600.420(3)(b)2. FAC
		Max	45.0	Weekly Average	62-600.420(3)(b)3. FAC
		Max	60.0	Single Sample	62-600.420(3)(b)4. FAC
pH	s.u.	Min	6.0	Single Sample	62-600.445 FAC
		Max	8.5	Single Sample	62-600.445 FAC

This facility is authorized to direct reclaimed water to Reuse System R-001, a slow-rate public access system, based on the following:

Parameter	Units	Max/ Min	Limit	Statistical Basis	Rationale
Flow (to reuse)	MGD	Max	5.0	Annual Average	62-600.700(2)(b) & 62-610.810(5) FAC
		Max	Report	Monthly Average	62-600.700(2)(b) & 62-610.810(5) FAC
BOD, Carbonaceous 5 day, 20C	mg/L	Max	20.0	Annual Average	62-610.460 & 62-600.420(3)(a)1. FAC
		Max	30.0	Monthly Average	62-610.460 & 62-600.420(3)(a)2. FAC
		Max	45.0	Weekly Average	62-610.460 & 62-600.420(3)(a)3. FAC
		Max	60.0	Single Sample	62-610.460 & 62-600.420(3)(a)4. FAC
Solids, Total Suspended	mg/L	Max	5.0	Single Sample	62-610.460(1) & 62-600.440(6)(a)3. FAC
Coliform, Fecal	#/100mL	Max	25	Single Sample	62-610.460 & 62-600.440(6)(a)2. FAC
Coliform, Fecal, % less than detection	percent	Min	75	Monthly Total	62-610.460 & 62-600.440(6)(a)1. FAC
pH	s.u.	Min	6.0	Single Sample	62-600.445 FAC
		Max	8.5	Single Sample	62-600.445 FAC
Chlorine, Total Residual (For Disinfection)	mg/L	Min	1.0	Single Sample	62-600.440(6)(b), 62-610.460(2), & 62-610.463(2) FAC
Turbidity	NTU	Max	Report	Single Sample	62-610.463(2) FAC
Nitrogen, Nitrate, Total (as N)	mg/L	Max	12.0	Single Sample	62-600.650(3) FAC
Nitrogen, Total	mg/L	Max	Report	Single Sample	62-600.650(3) FAC

Parameter	Units	Max/ Min	Limit	Statistical Basis	Rationale
Phosphorus, Total (as P)	mg/L	Max	Report	Single Sample	62-600.650(3) FAC
Giardia	cysts/100L	Max	Report	Single Sample	62-610.463(4) FAC
Cryptosporidium	oocysts/100L	Max	Report	Single Sample	62-610.463(4) FAC

Other Limitations and Monitoring Requirements:

Parameter	Units	Max/ Min	Limit	Statistical Basis	Rationale
Flow (through treatment plant)	MGD	Max	7.0	3-Month Rolling Average	62-600.700(2)(b) FAC
		Max	Report	Monthly Average	62-600.700(2)(b) FAC
Percent Capacity, (TMADF/Permitted Capacity) x 100	percent	Max	Report	3-Month Rolling Average	62-600.405(4) FAC
BOD, Carbonaceous 5 day, 20C (Influent)	mg/L	Max	Report	Single Sample	62-600.660(1) FAC
Solids, Total Suspended (Influent)	mg/L	Max	Report	Single Sample	62-600.660(1) FAC
Monitoring Frequencies and Sample Types	-	-	-	All Parameters	62-600 FAC & 62-699 FAC and/or BPJ of permit writer
Sampling Locations	-	-	-	All Parameters	62-600, 62-610.412, 62-610.463(1), 62-610.568, 62-610.613 FAC and/or BPJ of permit writer

4. DISCUSSION OF CHANGES TO PERMIT LIMITATIONS

An effluent limit for nitrate is added to the permit. The existing groundwater monitoring site is not at an application site.

5. BIOSOLIDS MANAGEMENT REQUIREMENTS

Biosolids generated by this facility may be transferred to Charlotte County Bio-Recycling Center, LLC, 29751 Zemel Rd., Punta Gorda, FL 33955, and/or disposed of in a Class I solid waste landfill.

See the table below for the rationale for the biosolids quantities monitoring requirements.

Parameter	Units	Max/ Min	Limit	Statistical Basis	Rationale
Biosolids Quantity (Landfilled)	dry tons	Max	Report	Monthly Total	62-640.650(5)(a)1. FAC
Biosolids Quantity (Transferred)	dry tons	Max	Report	Monthly Total	62-640.650(5)(a)1. FAC
Monitoring Frequency		All Parameters			62-640.650(5)(a) FAC

6. GROUND WATER MONITORING REQUIREMENTS

Ground water monitoring requirements have been established in accordance with Rules 62-520, 62-532, 62-600, 62-610, and 62-620, F.A.C.

7. PERMIT SCHEDULES

This permit contains a schedule to revise the groundwater monitoring plan. The existing ground water monitoring plan is located at a site which is not considered representative of the Master Reuse System.

The permittee is required to submit an asbestos notification form before demolition.

The permittee shall notify the Department when the biosolids modifications are complete.

8. INDUSTRIAL PRETREATMENT REQUIREMENTS

At this time, the facility is not required to develop an approved industrial pretreatment program. However, the Department reserves the right to require an approved program if future conditions warrant.

9. ADMINISTRATIVE ORDERS (AO) AND CONSENT ORDERS (CO)

This permit is not accompanied by an AO and has not entered into a CO with the Department.

10. REQUESTED VARIANCES OR ALTERNATIVES TO REQUIRED STANDARDS

No variances were requested for this facility.

11. THE ADMINISTRATIVE RECORD

The administrative record including application, draft permit, fact sheet, public notice (after release), comments received and additional information is available for public inspection during normal business hours at the location specified in item 12. Copies will be provided at a charge per page.

12. DEP CONTACT

Additional information concerning the permit and proposed schedule for permit issuance may be obtained during normal business hours from:

R. Walters
Engineering Specialist
South District Office
2295 Victoria Ave., Suite 364
Ft. Myers, FL 33901

Telephone No.: (239) 344-5600