NE GLADES COUNTY CONCEPTUAL PLANNING REPORT

NE Glades County- Conceptual Planning Report
CHA Project Number: 199585.000

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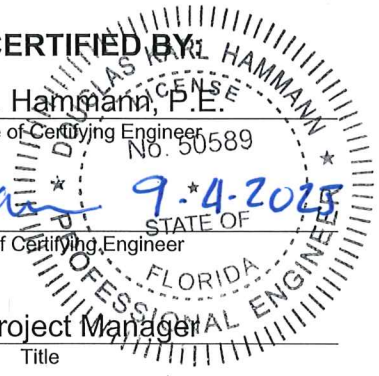

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LIST OF ACRONYMS & ABBREVIATIONS

ADF	Average Day Flow
AWT	Advanced Waste Treatment
BMAP	Basin Management Action Plan
BODR	Basis of Design Report
cBOD	Carbonaceous Biological Oxygen Demand
CHA	CHA Consulting, Inc.
DEP	Department of Environmental Protection
ERC	Equivalent Residential Connection
F.S.	Florida Statutes
FAC	Florida Administrative Code
FDEP	Florida Department of Environmental Protection
FEMA	Federal Emergency Management Agency
FDOT	Florida Department of Transportation
HDPE	High-Density Polyethylene
MGD	Million Gallons per Day
NEC	National Electric Code
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
OUA	Okeechobee Utility Authority
O&M	Operation and Maintenance
PER	Preliminary Engineering Report
PHF	Peak Hour Flow
PVC	Polyvinyl Chloride
RAP	Reasonable Assurance Plan
RAS	Return Activated Sludge
RRLA	Rapid-Rate Land Application
SFWMD	South Florida Water Management District
SR	State Road
TMDL	Total Maximum Daily Loads
TKN	Total Kjeldahl Nitrogen
TN	Total Nitrogen
TP	Total Phosphorus
USACOE	United States Army Core of Engineer
VFW	Veterans of Foreign Wars
VPS	Vacuum Pump Station
WAS	Waste Activated Sludge
WWTF	Wastewater Treatment Facility
ft	Feet
gal	Gallon(s)
gpd	Gallons per Day
gpm	Gallons per Minute
mg/L	Milligrams per Liter

1.0 INTRODUCTION

1.1 Scope of Work

The Okeechobee Utility Authority (OUA) is evaluating the potential to provide regional wastewater service to Northeast (NE) Glades County, located along the northwest shore of Lake Okeechobee. Through an interlocal agreement, OUA has established a designated service area within NE Glades County for the provision of water and wastewater utilities. Appendix A illustrates the current boundaries of this service area.

Due to elevated nitrogen and phosphorus levels in Lake Okeechobee, septic-to-sewer projects have become increasingly important, as these nutrient loadings have been linked to failing onsite treatment and disposal systems (OSTDS), i.e. septic systems, and wastewater package plants in surrounding communities. In January 2013, Eckler Engineering (now known as CHA Consulting, Inc.) completed a Preliminary Engineering Report (PER) for the NE Glades County area—referred to as the East Side Wastewater Expansion Project—which evaluated the feasibility of such a conversion. Building on that effort, OUA has now engaged CHA Consulting, Inc. to prepare a memorandum evaluating a comprehensive wastewater solution for NE Glades County, including a collection system(s), transmission infrastructure, and a regional wastewater treatment facility.

This memorandum is intended to support future applications for state funding that would aid in the planning and construction of a regional wastewater system. To that end, the study includes evaluations of projected wastewater flows, proposed collection and transmission system layouts, and a potential regional treatment facility. Class Five Opinion(s) of Probable Construction Cost are also provided to assist with budgeting and funding strategy development.

1.2 Purpose

This memorandum presents a comprehensive evaluation and preliminary plan for providing regional wastewater collection, transmission, and treatment to serve both existing and future developments within the NE Glades County Service Area. The evaluation includes consideration of a vacuum sewer collection system, a transmission system, and a regional wastewater treatment facility, with the goal of phasing out existing onsite treatment and disposal systems (OSTDS) and aging package plants. Additionally, the plan anticipates and accommodates future planned development within the service area. The information provided in this document is intended to serve as the foundation for a future Basis of Design Report (BODR), should the project proceed to the design and permitting phase.

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2.0 BASIS OF PLANNING AND DESIGN

2.1 Northeast Glades County Wastewater Treatment Facility Service Area

The Northeast (NE) Glades County Service Area, under the jurisdiction of the Okeechobee Utility Authority (OUA), includes a mix of existing and planned public and private communities. These include Lakefront Estates (a permitted private development currently under construction), Einhorn-Storey (a proposed future private development), and Buckhead Ridge (an existing public community). A summary of each of the communities are provided below:

- Buckhead Ridge is characterized by small residential lots, mobile homes, RV parks, and limited commercial properties, and is currently served by onsite treatment and sewage disposal systems (OSTDS) and an aging package wastewater treatment plant.

- Lakefront Estates is being developed with a vacuum sewer collection system and a modular 0.099 MGD 4-Stage Bardenpho Wastewater Treatment Facility. This facility is designed for phased expansion to accommodate buildout as development progresses.

- Einhorn-Storey is still in the planning stage and lacks finalized documentation; it is assumed—based on early indications—that the community will be planned with infrastructure similar to that of Lakefront Estates.

To support projected growth and ensure long-term wastewater management, the OUA is evaluating the feasibility of a centralized regional wastewater treatment facility that will serve all three communities. The planned facility is intended to replace or supplement existing systems and provide a unified approach to wastewater treatment across the NE Glades County Service Area, as illustrated in Figure 2-1.

Figure 2-1 NE Glades County WWTF Service Area

2.2 NE Glades County Equivalent Residential Connections (ERCs)

Design flow projections for the proposed wastewater sewer system are based on ERCs counts for each development. The ERC count for Buckhead Ridge was established in a 2016 report by Eckler Engineering (now CHA Consulting, Inc.). ERC values for Lakefront Estates were derived from the most recent site plans provided by Newlines Land Consultants (Engineering Firm for Developers), while estimates for Einhorn-Storey were based on preliminary planning assumptions. A summary of the ERC calculations is presented in Table 2-1.

Table 2-1 Equivalent Residential Connection (ERC) Counts

Development	ERC Counts
Buckhead Ridge	1,561
Lakefront Estates	1,292
Einhorn-Storey Property[1]	1,188
(1)ERC counts for this development were assumed to be similar to Lakefront based on correspondence with Newlines.	

2.3 NE Glades County Population and Peak Hour Flow

Peak Hour Flow (PHF) represents the highest flow rate of a collection/transmission system during any single hour of the year. This value is a critical design parameter used to appropriately size pumps and conveyance/transmission lines, ensuring the system can maintain adequate pressure and velocity during periods of maximum demand. Peak hour flow typically occurs during early morning and early evening hours when water usage is at its highest. The 2014 Ten State Standards for Wastewater Facilities were used to calculate a peaking factor due to the unavailability of hourly flow data. The peaking factor equation is shown in the following equation:

$$Peaking\ Factor = \frac{18+\sqrt{P}}{4+\sqrt{P}},\ \textit{where P = Population (in thousands)}$$

CHA Consulting, Inc. estimated the NE Glades County population of the existing and proposed communities per the below equation. Table 2-2 below provides the total population for NE Glades County.

$$Population\ = "X"\ persons/home\ x\ "X"\ Total\ ERCs\ =\ "X"\ Population$$

Table 2-2 NE Glades County Population

Development	Person per Home	ERC	Population
Buckhead Ridge	2.34[1]	1,561	3,653
Lakefront Estates	6	1,292	7,750
Einhorn-Storey Property	6	1,188	7,128
		Total:	**18,531**
(1)Data from the U.S. Census was used for NE Glades County.			

With the above information, the following peaking factor was calculated:

$$Peaking\ Factor = \frac{18 + \sqrt{18.531}}{4 + \sqrt{18.531}} = 2.69$$

The resulting peaking factor of 2.69 was used to estimate a peak hour flow value for each community within the WWTF service area.

The above populations assume minimal to no growth for the NE Glades Service Area. Buckhead Ridge has no additional land to develop while the proposed private communities have planning documents to assume a complete build out of the development. If future developments are considered, a revision to the Basis of Planning and Design would be required.

2.4 Estimated Wastewater Flows

CHA Consulting, Inc. used the above information to estimate the wastewater flow conditions for NE Glades County Service Area as presented in Table 2-3. Estimated wastewater flow conditions were Average Daily Flow (ADF) and Peak Hourly Flow (PHF).

Table 2-3 Flow Conditions for NE Glades County

Source	ERCs		ADF		PHF
	Counts	gpd	gpd	gpm	gpm
Buckhead Ridge (1)	1,561	250	390,300	271	730
Lakefront Estates (2)	1,292	350	452,100	314	840
Einhorn-Storey (2)	1,188	350	415,800	289	780
TOTAL	**4,041**	**-**	**1,258,200**	**874**	**2,350**

(1) Flow Rate per ERC was applied per OUA Standards.

(2) Flow Rate per Design Criteria used by Newlines Land Consultants.

2.5 Nutrient Effluent Treatment Limits-BMAP

Lake Okeechobee and its watershed have undergone hydrologic, land use, and other anthropogenic modifications over the past century which have impacted water quality to Lake Okeechobee and subsequently to the Everglades Caloosahatchee and St. Lucie River and Estuary watersheds. To help mitigate nutrient impairment, the Florida Department of Environmental Protection (FDEP) adopted total maximum daily loads (TMDLs) to establish and implement target nutrient loadings into surface water bodies and basins, flowing into Lake Okeechobee.

The State of Florida implemented Basin Management Action Plans (BMAPs) to help restore impaired waters by reducing nutrient pollutant loadings to meet the allowable TMDL limits. BMAPs represent a comprehensive set of strategies to help address the nutrient loading concerns with permit limits on wastewater facilities, urban and agricultural best management practices, conservation, financial assistance, and revenue generation. Glades County is in the Lake Okeechobee BMAP which was just updated in June 2025.

The June 2025 Draft Lake Okeechobee BMAP issued by the FDEP superseded the January 2020 Lake Okeechobee BMAP. The 2025 Draft Lake Okeechobee BMAP states:

> *"All new permitted facilities providing reclaimed water that will be used for commercial or residential irrigation or be otherwise land applied in the BMAP, are required to meet AWT standards for TN and TP in accordance with section 403.086, F.S."*

The June 2025 Lake Okeechobee BMAP also includes an Appendix D that lists WWTFs within the basin that will be required to achieve AWT; the Appendix D list includes the Cemetery Road WWTF and Glades Correctional WWTF.

Additionally in 2024, the Florida Legislature passed Chapter 2024-180 Committee Substitute for House Bill No. 1557, which similarly dictates AWT effluent limits:

> *"By July 1, 2034, any wastewater treatment facility providing reclaimed water that will be used for commercial or residential irrigation or be otherwise land applied within a nutrient basin management action plan or a reasonable assurance plan area must meet the advanced waste treatment standards for total nitrogen and total phosphorous as defined in paragraph (4)(a) if the department has determined in an applicable basin management action plan or reasonable assurance plan that the use of reclaimed water as described in this subparagraph is causing or contributing to the nutrient impairment being addressed in such plan. For such department determinations made in a nutrient basin management action plan or reasonable assurance plan after July 1, 2024, an applicable wastewater treatment facility must meet the requisite advanced waste treatment standards described in this subparagraph within 10 years after such determination. This subparagraph does not prevent the department from requiring an alternative treatment standard, including a more stringent treatment standard, if the department determines the alternative standard is necessary to achieve the total maximum daily load or applicable water quality criteria. This subparagraph does not apply to reclaimed water that is otherwise land applied as part of a water quality restoration project or water resource development project approved by the department or water management district to meet a total maximum daily load or minimum flow or level and where such reclaimed water will be at or below the advanced waste treatment standards described above prior to entering groundwater or surface water."*

Tables 2-4.1 and 2-4.2 contain the required effluent limits for phosphorus and nitrogen per the June 2025 Lake Okeechobee BMAP. These effluent limitations are applied as an annual average, taken at end of pipe before any land disposal (or other authorized compliance point), to the all-new and existing Wastewater Treatment Facilities (WWTFs). An additional requirement is that all new or renewed wastewater permits in the BMAP area must require at least quarterly sampling of the effluent discharge at the point of discharge or edge of mixing zone for TP and TN and the reporting of sampling results must be within the discharge monitoring reports submitted to DEP.

Table 2-4.1 Phosphorous Effluent Limits for WWTFs

Facility Capacity (mgd)	Surface Water Discharges (mg/L)	Rapid Rate Land Application Effluent Disposal System (mg/L)	WWTFs – All other Disposal Methods, Including Reuse (mg/L)
Greater than or equal to 0.5	1	1	6
Less than 0.5 and greater than or equal to 0.1	1	3	6
Less than 0.1	1	6	6

Table 2-4.2 Nitrogen Effluent Limits for WWTFs

Facility Capacity (mgd)	Surface Water Discharges (mg/L)	Rapid Rate Land Application Effluent Disposal System (mg/L)	All other Disposal Methods, Including Reuse (mg/L)
Greater than or equal to 0.5	3	3	10
Less than 0.5 and greater than or equal to 0.1	3	6	10
Less than 0.1	3	10	10

2.6 Applicable Rules and Regulations

There are general requirements by different regulatory agencies that need to be met for designing, constructing, and placing into service the new wastewater collection/transmission system and the new Wastewater Treatment Facility. Listed below are some of the applicable rules, regulations, and standards that would pertain to this project and agencies that may need to be consulted throughout its course:

1. Florida Administrative Code (F.A.C.) Chapter 62-604, Collection Systems and Transmission Facilities.
2. Florida Department of Environmental Protection (FDEP).
3. Recommended Standards for Wastewater Facilities (2014 Edition), or latest edition.
4. Florida Department of Transportation (FDOT).
5. Okeechobee County Public Works, Road and Bridge Division.
6. CSX Design and Construction Standards for Pipeline Occupancies (2018 Edition).

7. South Florida Water Management District (SFWMD).
8. United States Army Core of Engineers (USACOE).
9. Florida Building Code 8th Edition (2023 Edition), or latest edition.
10. National Fire Protection Association (2018 Edition), or latest edition.
11. National Electrical Code (NEC).
12. Federal Emergency Management Agency – National Flood Insurance Program (FEMA NFIP) Standards.
13. FDEP Environmental Resource Permit.
14. FDEP Domestic Wastewater Facilities Permit.
15. FDEP Land Application/Service Area Permits.
16. Glades County Land Development Approval.
17. Glades County Building Permit.

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3.0 BUCKHEAD RIDGE VACUUM SEWER COLLECTION SYSTEM CONCEPTUAL PLANNING

3.1 Conceptual Planning Criteria

In November 2016, Eckler Engineering (now known as CHA Consulting, Inc.) prepared a Buckhead Ridge Service Area Preliminary Design Memorandum for the OUA. As part of that memorandum, an evaluation was conducted for the most suitable sewage collection system for the community. The analysis concluded that a vacuum collection system would be more economical and practical than either a low-pressure or gravity-based system. This memorandum will continue to assume the use of a vacuum sewer collection system for Buckhead Ridge.

The 2016 memorandum also included a preliminary layout of the proposed vacuum collection system, including the siting of vacuum pump stations. For the purposes of this memorandum, the 2016 preliminary design serves as the foundational basis for the Buckhead Ridge vacuum sewer collection system currently being proposed. It shall be noted that improvements to the 2016 preliminary layout have been made with this higher-level planning document.

Table 3-1 below presents up to date general design criteria for vacuum sewer systems, as outlined in the AIRVAC Design Manual (2022 Edition).

Table 3-1 General Criteria for Vacuum Collection Systems

Design Criteria	Requirements
Pipe Material	SDR 21 PVC Pipe
Cleanouts	Not required at any point on a vacuum main or branch. Typically used only in gravity laterals per local codes.
Main Line Length	4*, 6, 8,10 and 12-inch diameter, limited by static and friction losses. *4-inch limited to initial 2,000 ft (max)
Distance between Lifts	Minimum 20 ft if uphill and minimum 50 ft before a series of lifts
Slope	Minimum 0.20%
Minimum Distance Between Lifts	50 feet
Distance between lift and any service lateral	Minimum 6 ft
Losses (Vacuum)[1]	Maximum 13 ft in static losses Maximum 5 ft in friction losses[(2)]
Isolation Valves	Maximum 1,500 ft apart and at the beginning of each branch. Additional locations per Owner.
Line Sizing	Pipe Diameter: 4-inch Maximum Flow (gpm): 55 Recommended Flow (gpm): 38

	6-inch	152	105
	8-inch	305	210
	10-inch	544	374
	12-inch	858	590

Notes:

(1) Friction loss is defined as the amount of energy lost by a fluid while moving through conduits. Static loss is defined as the energy required to transport flow through a vacuum lift or vertical profile change. Static and friction losses are of particular concern in Vacuum Sewer Systems because of the limited amount of available vacuum (energy) to move the wastewater to the vacuum pump station.

(2) The 2022 AIRVAC design manual defines maximum friction loss in vacuum sewer system mains should be 5 feet or less. However, a friction loss of 7 feet has been allowed in other systems on a case-by-case basis. CHA Consulting, Inc. has successfully designed vacuum sewer systems with friction loss up to 7 feet without any adverse impact.

3.2 Preliminary Layout of the Buckhead Ridge Vacuum Sewer Collection System

A general design layout of the proposed vacuum sewer system is presented in Appendix B which shows the sizes and preliminary layout of the vacuum mains and the location of three proposed vacuum pump stations. Due to bridge crossings throughout the existing Buckhead Ridge Service Area, this memorandum recommends three (3) vacuum pump stations throughout this service area. Vacuum Pump Station #1 (VPS#1) and Vacuum Pump Station #2 (VPS #2) are located along State Road 78 with VPS#1 next to the Florida Veterans of Foreign Wars (VFW) Post 9528 and VPS #2 next to the Buckhead Ridge Moose Lodge Vacuum Pump Station #3 (VPS#3) is located in the Northwest Corner of a pasture adjacent to Hunter Rd. This preliminary design will be confirmed during the design phase to ensure hydraulic requirements, constructability concerns, and criteria for vacuum site selections are properly addressed. Table 3-2 below provides the lengths and sizes of the proposed vacuum mains as presented in Appendix B.

Table 3-2 Vacuum Main Pipe Sizes and Lengths

Pipe Size	Pipe Length (ft)	Pipe Length (mi)
4-inch	45,100	8.5
6-inch	13,600	2.6
8-inch	12,000	2.3
10-inch	5,300	1.0

The pipe sizes and lengths being proposed are subject to change once a hydraulic evaluation is done as part of a BODR.

4.0 FORCE MAIN SYSTEM CONCEPTUAL PLANNING

4.1 Conceptual Planning Criteria

The wastewater transmission force main (FM) will be routed from the proposed vacuum pump stations to the planned wastewater treatment facility. Design criteria for the FM system were developed using the Florida Department of Environmental Protection (FDEP) rules and the *2014 Ten State Recommended Standards for Wastewater Facilities* as a guide. Table 4-1 provides a summary of the key design parameters for the FM system based on these standards.

Table 4-1 General Criteria for Force Main

Design Criteria	Requirements
Pipe Type	Ductile Iron Pipe (Per Owner)
Velocity	Between 2 and 8 ft/s
Air relief valves	High points to prevent air locking
Pipe Cover	36 inches of cover (top of pipe)
Maximum Friction Head Loss	7 feet per 1,000 feet
Hazen Williams C-Factor	130

4.2 Force Main Alignment and Sizing

The FM alignment is to run along the SR-78 roadway and eventually turn northwest towards the general area where a new proposed wastewater treatment facility would be located. The FM route will be confirmed once the wastewater treatment facility site has been determined and confirmed during the BODR. The preliminary alignment of the force main, sizes of each section, and velocity in the pipe are displayed in Appendix C, Force Main System. Table 4-2 below quantifies the pipe lengths of each diameter required to route the sewage from the vacuum pump stations to the proposed WWTF.

Table 4-2 Force Main Pipe Sizes

Pipe Size	Pipe Length (ft)	Pipe Length (mi)
6-inch	6,000	1.1
8-inch	6,200	1.2
12-inch	9,900	1.9
16-inch	4,500	0.9

As this is a preliminary layout, the exact FM route is subject to change once the final sewage collection system layouts for Einhorn-Storey and WWTF location are known.

5.0 TREATMENT FACILITIES CONCEPTUAL PLANNING

5.1 Conceptual Planning Criteria

5.1.1 Design

According to Chapter 62-610 of the Florida Administrative Code (FAC), a facility that will provide public access reclaimed water must be capable of providing Class I treatment reliability standards were developed by the United States Environmental Protection Agency in 1974 and have been the standard since its conception. Requirements for Class I reliability described in EPA's "Design Criteria for Mechanical, Electrical, and Fluid System and Component Reliability" are described in Table 5-1. Class I reliability requirements represent reliability standards that would pertain to the North Glades WWTF. While the requirement for Class I reliability will depend on specific effluent disposal method, it is assumed that the WWTF will be designed to meet Class I reliability.

5.1.2 Influent Wastewater Flow and Characteristics

The new Northeast Glades County WWTF would have an initial permitted capacity of 1.25 MGD AADF. Recommended peaking factors are as follows:

- Maximum month/3-month running average = 1.1 x AADF
- Maximum day flow = 1.3 x AADF
- Peak hour = 2.7 x AADF (Utilizing the peak hour factor calculated in Section 2).

The facility will have an ultimate capacity of 2.5 MGD AADF as the collection system is expanded. The proposed permitted design flows for the initial and buildout phase of the Northeast Glades County WWTF are presented in Table 5-2 and were considered for sizing of future piping and facility hydraulic requirements.

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Table 5-1 Class I Reliability Requirements

Component	Section Ref.	Class I Requirements
Trash removal	211.1	Shall contain components to remove trash and all other large solids contained in the wastewater.
Removal of settled solids	211.3	All components, channels, pump wells, and piping shall be accessible for cleaning out settled solids.
Mechanically-Cleaned Screens	212.1.1	A rotary drum screen and emergency by-pass channel with a manual screen is provided for the facility.
Unit operation bypass	211.5	Shall include provisions for bypassing around each unit operation, except as follows. Unit operations with two or more units involving open basins shall not be required to have provisions for bypassing if the peak flow can be handled hydraulically with the largest flow capacity unit out of service.
Backup Pumps	212.1.2	Redundant capacity has been provided for all pumping systems such that with the largest unit out of service, the remaining pumps have the capacity to handle peak flow process requirements for the facility.
Aeration Basin	212.1.6.1	Two equal volume aeration basins are provided.
Blowers or Mechanical Aerators	212.1.6.2	Blowers are sized to meet and maintain the maximum day oxygen transfer with the largest unit out of service.
Air Diffusers	212.1.6.3	The diffused aeration system would be a tapered aeration system so the largest aeration section can be isolated without impairing the design oxygen transfer capacity of the system.
Chemical Flash Mixer	212.1.7	No chemical flash mixing is required for the facility.
Final Sedimentation Basins	212.1.5	Two clarifiers will be provided with each clarifier sized to treat 75% of design flows, with one unit out of service.
Disinfection Contact Basins	212.1.	Two chlorine contact basins are proposed, each basin sized to treat 50% of design flows with one unit out of service.
Backup Power Sources	231	An emergency generator is provided, sized to power all critical process components, lighting and ventilation in the event utility power is interrupted.
Power Sources	231	An emergency generator is provided and sized to power all process components if utility power is interrupted.

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Table 5-2 Proposed Permitted Design Flows

Flow Description	Initial Phase MGD	Buildout MGD
AADF	1.25	2.50
Max Month	1.375	2.75
MDF	1.625	3.25
PHF	3.38	6.75

Influent parameters proposed for the Northeast Glades County WWTF master plan include carbonaceous biological oxygen demand (cBOD), total suspended solids (TSS), Total Kjeldahl Nitrogen (TKN), and Total Phosphorus (TP). AADF and MDF influent design characteristics are typical new, style residential Florida development taken from a similar, recently started WWTF and are summarized in Table 5-3 below.

Table 5-3 Typical Influent Wastewater Design Characteristics

Parameter	AADF	MDF
cBOD (mg/L)	300	300
TSS (mg/L)	300	300
TKN (mg/L)	45	45
TP (mg/L)	10	10

5.1.3 Effluent Quality

While likely that State of Florida regulations will require AWT for the Northeast Glades County WWTF, to facilitate master plan alternatives, a lower level of effluent limits is provided in addition to full AWT. These are taken from the previous 2020 Lake Okeechobee BMAP limits for public access reuse. The lower level would cover non-AWT alternatives, space would be designated to install a future treatment process component, e.g., denitrification filters or chemical addition for additional nutrient removal to meet AWT standards in the future, if needed. Therefore, both AWT and non-AWT limits were assigned for alternative analysis. The annual average effluent limits for each alternative are as follows:

Table 5-4 Effluent Quality Limits

Parameter	AWT Alternative	Non-AWT Alternative
cBOD (mg/L)	5	20
TSS (mg/L)	5	10
TN (mg/L)	3	10
TP (mg/L)	1	6

5.1.4 Biosolids Classification

The OUA currently produces Class AA domestic biosolids at its Cemetery Road WWTF. The Class AA biosolids that are to be produced for this facility can be distributed as a fertilizer

supplement option. Solar drying has performed well for the OUA and the Northeast Glades County WWTF would be planned to use a similar biosolids drying process.

5.1.5 Process Design Loadings

From the annual average day influent and effluent concentrations established above, process design loadings were determined for the Northeast Glades County WWTF processes and are shown in Table 5-4. Treatment process design values are important for sizing biological treatment processes.

Table 5-4 North Glades WWTF Process Design Loadings at AADF

Parameter	Initial 1.25 MGD Phase	Buildout 2.5 MGD
cBOD Loading (ppd)	3,128	6,256
TSS Loading (ppd)	3,128	6,256
TKN Loading (ppd)	469	938
TP Loading (ppd)	104	208

5.2 WWTF Treatment Options

The following treatment options were developed for this project:

18. Build both phases to meet full AWT effluent limits 5-5-3-1.
19. Build the initial phase at non-AWT, add full AWT components in buildout.
20. Build non-AWT for both phases to meet 20-10-10-6.

Options 2 and 3 have the same non-AWT initial 1.25 MGD phase. Non-AWT options have <5% capital cost savings and may reduce operating costs by 10-20% per year, depending on specific plant processes. Option 3 is likely not feasible unless a water resource or wetland recovery project is available for the full buildout flow. Option 2 would provide initial cost savings versus going with the full AWT option in first phase; however, regulatory and effluent disposal qualified options will present a challenge.

Treatment options were narrowed for master plan cost estimating purposes. Specific variations in treatment processes will be considered in subsequent design phases. For master plan cost estimating purposes certain design criteria and process assumptions were made that can be modified going forward. The influent basis of design parameters that were discussed in Section 5.0 and can be found in Table 5-2 and effluent design criteria can be found in Table 5-3. The following components are proposed for the initial 1.25 MGD AADF Northeast Glades County WRF phase and will be further discussed in the following sections.

Components of the Northeast Glades County WWTF were sized for initial phase and future process design loadings for 2.5 MGD AADF facility as presented in Table 5-5. Options 2 and 3 have the same non-AWT initial 1.25 MGD phase.

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Table 5-5 Unit Treatment Process Phasing Plan

Parameter	Initial 1.25 MGD Phase	Buildout 2.5 MGD
Headworks	2 screens + manual screen, 2 grit units sized for buildout	--
Anaerobic Basins	1 basin	2 basins
Anoxic Basins	1 basin	2 basins
Aeration Basins	1 basin	2 basins
Secondary Clarifiers	2 clarifiers	4 clarifiers
RAS/WAS Pumps	1 station	2 stations
Disc Filters or Denite Filters(1)	2 units	4 units
Chlorine Contact Chambers	1 unit	2 units
Sludge Holding Tank	1 unit sized for buildout	--
Chemical Feed	1 unit each expandable	Expand for buildout
In-Plant/Drain Pump Station	1 unit each expandable	Expand for buildout
Effluent Transfer Pump Station	1 unit each expandable	Expand for buildout
Reuse Pump Station	1 unit each expandable	Expand for buildout
Reuse Storage	Tank/reservoir for initial phase	Add tank/reservoir for buildout
Electrical/Blower/O&M Bldgs.	Sized for buildout	--
Emergency Generator	Sized for initial phase	Expand for buildout

(1) Filter selection will be based on final nutrient removal requirements. If non-AWT is permitted, disc filter is the recommended option. If conversion to AWT is required, Denite Filter with feed is recommended.

5.3 WWTF Effluent Disposal Options

Based on other, similar size WWTFs in Glades County and nearby in the Lake Okeechobee basin, the following effluent disposal options are available:

- Public access reuse of reclaimed water (public/recreation, residential/commercial irrigation)
- Slow-rate land application-restricted public access, e.g., feed, fodder, fiber or seed crops, sod
- Slow-rate land application-public access, e.g., residential/commercial irrigation, edible crops
- Industrial reuse, e.g., cooling tower makeup water (not likely)
- Deep well injection
- Water quality restoration project or water resource development project approved by FDEP or water management district
- Surface water discharge (not likely)
- Rapid rate land application, e.g., RIBs, absorption fields (not likely)
- Indirect potable reuse (not likely)
- Emergency option

Regarding slow-rate land application reuse, Florida Administrative Code 62-610 defines the following approved water reuse applications for agriculture:

- Application of reclaimed water in areas used to grow feed, fodder, fiber or seed crops (Slow-rate Land Application Systems; Restricted Public Access).
- Irrigation of sod farms (Slow-rate Land Application Systems; Restricted Public Access).
- Irrigation of trees, including managed hardwood or softwood plantations (Slow-rate Land Application Systems; Restricted Public Access).
- Irrigation of pastureland used for grazing of cattle whose milk is not intended for human consumption (Slow-rate Land Application Systems; Restricted Public Access).
- Irrigation of edible crops that will be peeled, skinned cooked or thermally processed before consumption, including direct contact of the reclaimed water with such edible crops (Slow-rate Land Application Systems; Public Access Areas, Residential Irrigation and Edible Crops).
- Irrigation of tobacco or citrus (i.e., citrus used for fresh table fruit, processing into concentrate, or other purposes), including direct contact of the reclaimed water with tobacco or citrus (Slow-rate Land Application Systems; Public Access Areas, Residential Irrigation and Edible Crops).
- Irrigation of edible crops that will not be peeled, skinned, cooked or thermally processed before consumption using an indirect application method that will preclude direct contact with the reclaimed water (such as ridge and furrow irrigation, drip irrigation or a subsurface distribution system) (Slow-rate Land Application Systems; Public Access Areas, Residential Irrigation and Edible Crops).
- Irrigation of terraced, sloped, vegetated surfaces, such as sod farms, forests, fodder crops, pasture lands and similar areas (Overland Flow Systems).

Based on other nearby WWTFs and the available effluent disposal options for the Northeast Glades County WWTF, the following options would be most feasible:

A. Identify and negotiate with nearby feed, fodder, fiber, seed or sod farms for the initial WWTF phase; especially the sod farm north of the Einhorn-Storey property.

B. Require the Einhorn-Storey property to install a reclaimed water reuse distribution system to implement public access reuse in the proposed development.

C. Look for nearby FDEP or water management district approved water resource projects or wetlands restoration projects that might be feasible for this project.

D. Identify potential reuse opportunities for buildout including requiring public access reuse dual distribution systems on all new developments.

5.4 WWTF Biosolids Handling Options

The OUA has had success with producing Class AA biosolids with aerobic digestion, dewatering and solar drying at the Cemetery Road WWTF. As the OUA is familiar with the technology and Class AA biosolids is required within the Lake Okeechobee basin; this plan assumes this method

and technology will continue.

5.5 Effluent Storage

The following effluent storage components would be included in the Northeast Glades County WWTF with the storage components selected based upon the intended reuse application:

- Operational reuse storage (tank; i.e. applicable intended reuse for public access)
- Off-site effluent storage (separate tank in most cases)
- Wet-weather storage (tanks or reservoir; i.e. applicable intended reuse for land application)

Similar to OUA's Cemetery Road WWTF, the most cost-effective approach may be to construct a reclaimed water reuse storage reservoir versus large tanks as 10+ days of storage is likely to be required depending on effluent disposal practices implemented.

5.6 Site Land Requirements

The Northeast Glades County WWTF would require 8 to 10 acres of constructable land plus 2 to 5 acres for the effluent storage reservoir if the reservoir component is implemented. Total estimated land requirement is 10 to 15 acres, plus land required for access.

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6.0 OPINION OF PROBABLE CONSTRUCTION COST (OPCC)

6.1 Class 5 Opinion of Probable Construction Cost

This section outlines the preliminary cost opinions associated with the proposed regional wastewater system. The budgetary construction cost opinions presented in this section are based on current cost estimates using information, manufacturer's budget pricing, cost factors and comparison of similar type of work and materials in the South Floria area. CHA has no control over labor and material costs or competitive procedures and market conditions or final design considerations. Therefore, the project construction cost opinions presented may vary and cannot be warranted as this opinion is being presented as an AACE Class 5 Cost Opinion for a high-level order of magnitude cost opinion suitable for guiding decision making and future planning.

The below cost opinions include the vacuum piping, force main piping, three vacuum pump stations complete with sewage and vacuum pumps (complete) and two scenarios for a regional wastewater facility either being an advanced wastewater treatment (AWT) facility or a non-advanced wastewater treatment (Non-AWT) facility.

Table 6-1 Project OPCC-Regional Wastewater System

Scenario	Description	Cost Opinion
1	Vacuum piping, Force Main Piping, 3 complete vacuum pump stations, and a 1.25 MGD TMADF AWT Treatment Plant.	**$ 102,733,301**
2	Vacuum piping, Force Main Piping, 3 complete vacuum pump stations, and a 1.25 MGD TMADF Non- AWT Treatment Plant.	**$101,357,411**

The project OPCC does not include engineering design or engineering services during construction. A detailed breakdown of the project OPCC is provided under Appendix D and E.

6.2 Opinion of Probable Construction Costs (OPCC)

6.2.1 NE Glades County Wastewater Collection and Transmission System

The total estimated construction cost will be provided later on in the design phase once a full project scope is clearly defined. A price per connection will also be provided as part of the overall cost estimate.

The Opinion of Probable Construction Cost shall be an AACE Class 5. Class 5 end usage is for concept screening level, with an expected accuracy range of low end - 20% to -50% and high end + 30% to +100 %.

6.2.2 NE Glades County Regional WWTF

The total estimated construction cost will be provided later on in the design phase once a full project scope is clearly defined. Table 6-2 on the next page provides the OUA with additional information on the annual operating cost opinion for the proposed NE Glades County Regional WWTF for a AWT and a non- AWT.

Table 6-2 Annual Operating Cost Opinion for the NE Glades County WWTF

Location	AWT Treatment $/Year	Non-AWT Treatment $/Year
NE Glades County WWTF	**$ 574,656**	**$ 493,593**

The Opinion of Probable Construction Cost shall be an AACE Class 5. Class 5 end usage is for concept screening level, with an expected accuracy range of low end - 20% to -50% and high end + 30% to +100 %.

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APPENDIX A

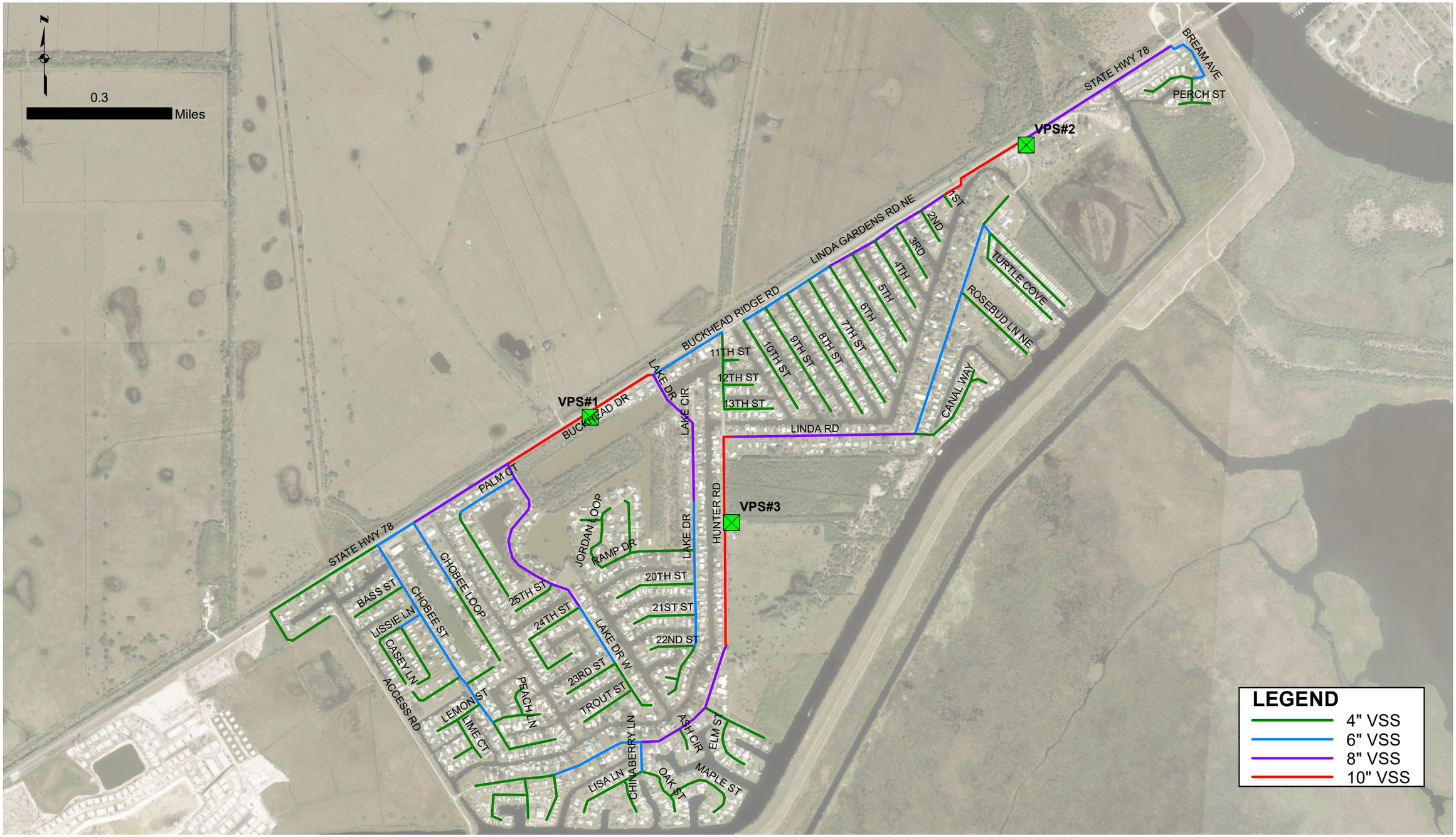
OUA Glades County Water/Wastewater Service Area

APPENDIX A

OUA GLADES COUNTY WATER / WASTEWATER SERVICE AREA

APPENDIX B

Preliminary Layout of the Buckhead Ridge Vacuum Sewer Collection System



Document Path: V:\Projects\ANY\K7\199585.000\06 Project Data\Vis-Modeling\Buckhead Vacuum Update\Buckhead Vacuum.mxd

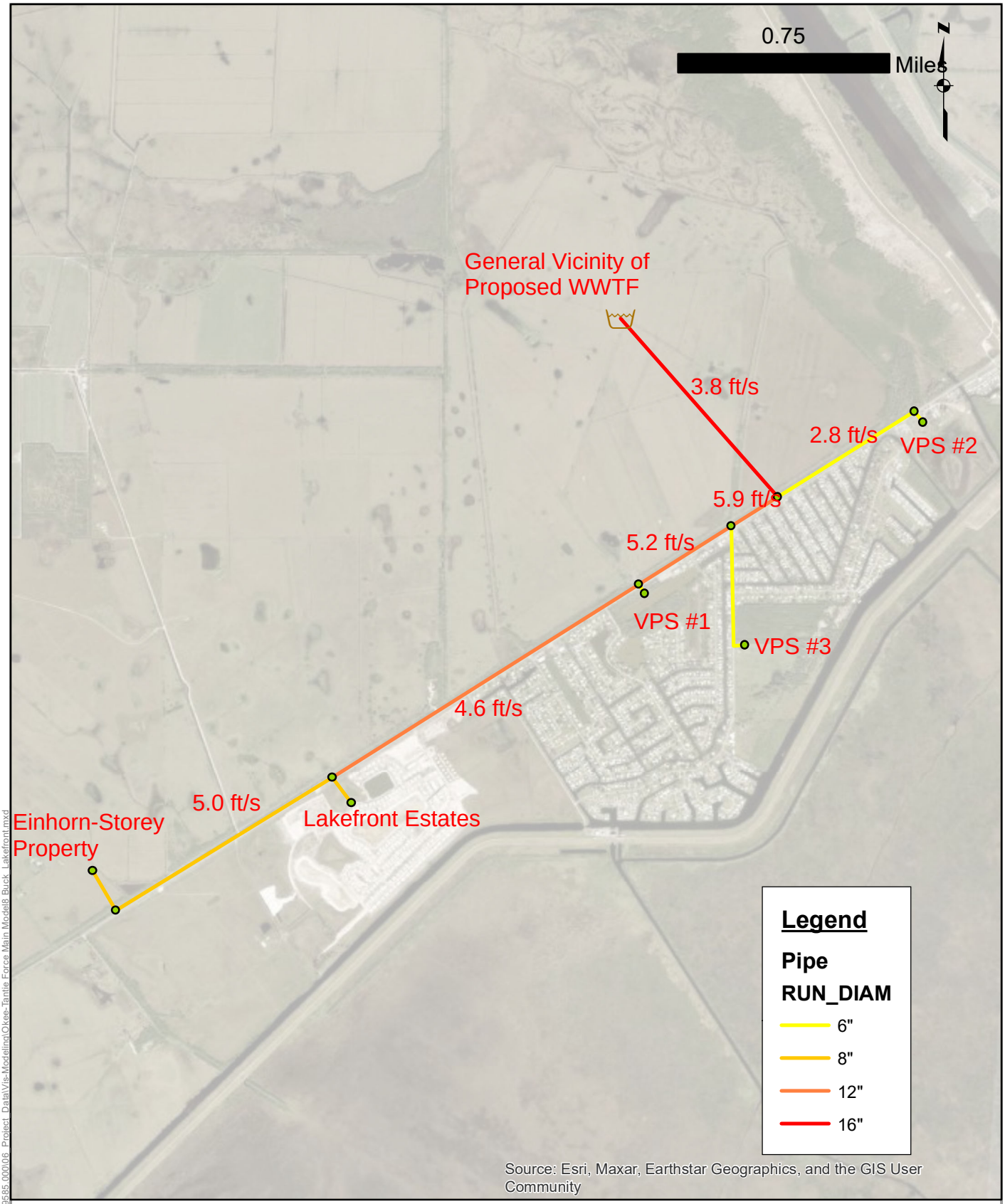
OKEECHOBEE UTILITY AUTHORITY

BUCKHEAD RIDGE VACUUM COLLECTION SYSTEM

APPENDIX B
BUCKHEAD RIDGE VACUUM COLLECTION

APPENDIX C

Force Main System



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APPENDIX C
FORCE MAIN SYSTEM

APPENDIX D

Force Main and Vacuum Collection System Opinion of Probable Construction Cost

APPENDIX D

Project Name	NE Glades County Technical Memorandum
Project Number	199585.000
Date	6/6/2025
Client	Okeechobee Utility Authority
Project Info	Northeast Glades County - Collection and Transmission System OPCC
Prepared By	Hunter Kaminski, E.I.

Item	Description	Sub Total	Unit	Unit Price	Extended Price
	General				
1	*Mobilization / Gen. Requirements	1	LS	8.00%	$2,760,514.00
2	*Indemnification	1	LS	$100.00	$100.00
3	*As-Built Record Drawings	102,600	LF	$4.00	$410,400.00
4	*Maintenance of Traffic	102,600	LF	$20.00	$2,052,000.00
5	*Existing Utility Location/Identification	1	LS	1.00%	$345,064.00
6	*NPDES General Construction Permit Compliance	1	LS	1.00%	$345,064.00
	* Calculated using Total of Items below				
	General Total				**$5,913,142.00**
	Vacuum Sewer System				
7	Furnish and Install SDR-21 PVC Vacuum Main				
	a. 4-inch	45,100	LF	$50.00	$2,255,000.00
	b. 6-inch	13,600	LF	$65.00	$884,000.00
	d. 8-inch	12,000	LF	$90.00	$1,080,000.00
	e. 10-inch	5,300	LF	$125.00	$662,500.00
8	Furnish and Install resilient wedge gate (V-3) division valves				
	a. 4-inch	45	EA	$2,300.00	$103,500.00
	b. 6-inch	13	EA	$2,700.00	$35,100.00
	d. 8-inch	12	EA	$3,000.00	$36,000.00
	e. 10-inch	5	EA	$4,500.00	$22,500.00
9	Install AIRVAC vacuum collecting pit assemblies, complete.				
	Type "A"				
	a. Adjacent to vacuum main	228	EA	$15,400.00	$3,511,200.00
	b. Across street from vacuum main	68	EA	$20,200.00	$1,373,600.00
	Type "B"				
	a. Adjacent to vacuum main	68	EA	$20,800.00	$1,414,400.00
	b. Across street from vacuum main	16	EA	$25,000.00	$400,000.00
10	Furnish and Install Vacuum Sanitary Pump Station with AIRVAC skid equipment, complete.	3	EA	$2,515,000.00	$7,545,000.00
	Vacuum Sewer System Totals				**$19,322,800.00**
	Force Main System				
11	Ductile Iron Pipe				
	a. 6-inch	6,000	LF	$184.00	$1,104,000.00
	b. 8-inch	6,200	LF	$200.00	$1,240,000.00
	c. 12-inch	9,900	LF	$294.00	$2,910,600.00
	d. 16-inch	4,500	LF	$350.00	$1,575,000.00
12	Furnish and Install Plug Valve				
	a. 6-inch	4	EA	$6,000.00	$24,000.00
	b. 8-inch	8	EA	$10,000.00	$80,000.00
	c. 12-inch	8	EA	$16,000.00	$128,000.00
	d. 16-inch	4	EA	$23,000.00	$92,000.00
13	F&I Air Release Valve Assembly	4	EA	$3,000.00	$12,000.00
14	F&I ductile iron compact fittings with reaction blocking or thrust restraint for force mains.	5	TN	$11,000.00	$55,000.00
	Force Main System Totals				**$7,220,600.00**
	Collection/Vacuum System Restoration				
15	Restoration (includes sod, concrete pavement patching, road reconstruction, and overlay)	1	LS	30%	$7,963,020.00
	Collection/Transmission System Restoration Totals				**$7,963,020.00**
16	Miscellaneous Work Allowance / Contingency	1	LS	15%	$6,062,934.00
	Total Opinion of Probable Construction Cost	→			**$46,482,000.00**
	Potential Escalation Costs				
17	Escalation	1	LS	20%	$9,296,400.00
	Total Opinion of Probable Construction Cost (w/escalation)	→			**$55,778,400.00**

NOTE: Line item 17 - Escalation is intended to take into account uncontrollable items such as labor, supply chain delays, tariffs, etc.

APPENDIX E

Wastewater Treatment Facility Opinion of Probable Construction Cost

APPENDIX E

Project Name	NE Glades County Technical Memorandum
Project Number	199585.000
Date	5/29/2025
Client	Okeechobee Utility Authority
Project Info	Northeast Glades County - WWTF OPCC
Prepared By	Edward Talton Jr., P.E.

Capital including 30% Contingency	Cost Factors	AWT Glades North	Non-AWT Glades North
In-Plant PS	--	$ 500,000	$ 500,000
Equalization	--	$ -	$ -
Headworks	--	$ 1,500,000	$ 1,500,000
BNR	--	$ 2,500,000	$ 2,231,123
BNR Chemical	--	$ 500,000	$ -
Blowers	--	$ 1,140,000	$ 1,140,000
Clarifiers	--	$ 1,470,000	$ 1,470,000
RAS/WAS	--	$ 500,000	$ 500,000
Filters	--	$ 1,650,000	$ 1,650,000
Disinfection	--	$ 1,690,000	$ 1,690,000
Effluent Storage	--	$ 5,500,000	$ 5,500,000
Effluent Pumping	--	$ 750,000	$ 750,000
Sludge Holding	--	$ 1,500,000	$ 1,500,000
Dewatering	--	$ 1,980,000	$ 1,980,000
Solar Drying	--	$ 2,700,000	$ 2,700,000
O&M Building	--	$ 2,080,000	$ 2,080,000
Subtotal	--	**$ 25,960,000**	**$ 25,191,123**
Site	5%	$ 1,298,000	$ 1,259,556
SCADA	5%	$ 1,298,000	$ 1,259,556
Yard Electrical	15%	$ 3,894,000	$ 3,778,668
Yard Piping	15%	$ 3,894,000	$ 3,778,668
Subtotal		**$ 36,344,000**	**$ 35,267,572**
Subject to Tax	20%	$ 7,268,800	$ 7,053,514
Tax Rate	6%	$ 436,128	$ 423,211
Direct Costs	--	**$ 36,780,128**	**$ 35,690,783**
Contractor Markups	15%	$ 5,451,600	$ 5,290,136
Contractor Cost Estimate	--	**$ 42,231,728**	**$ 40,980,919**
Land	--	$ 500,000	$ 500,000
Design/Permitting/Glades Mgm	5%	$ 2,111,586	$ 2,049,046
Contract/Construction Mgmt	5%	$ 2,111,586	$ 2,049,046
Capital Cost	--	**$ 46,954,901**	**$ 45,579,011**
O&M Cost	--		
Energy and Maintenance	--	$ 252,000	$ 170,936
Staffing	--	$ 220,000	$ 220,000
Chemicals	--	$ 102,656	$ 102,656
New WRF Mangt			
Total O&M		**$ 574,656**	**$ 493,593**

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