

Exhibit I. Tamanend Business Park West
Site Potable Water Infrastructure Upgrade
Letter & Map



Tamanend Business Park West Site Potable Water Infrastructure Upgrade Letter & Map



CSRS, INC.
6767 Perkins Road, Suite 200
Baton Rouge, Louisiana 70808

Phone: (225) 769-0546
Fax: (225) 767-0060

June 14, 2016

Mr. Michael Tomlinson
St. Tammany Economic Development Foundation
21489 Koop Drive, Suite 7
Mandeville, LA 70471
Re. Tamanend Business Park West Site Potable Water System Cost Estimate
CSRS Job No. 214094

Dear Mr. Tomlinson:

According to correspondence with local utility officials, the Tamanend Business Park West site located in St. Tammany Parish, Louisiana currently does not have access to an existing potable/process water line to service the site. A plan to improve and upgrade the water infrastructure is in place.

A sewer and water master plan has been developed by Richard C. Lambert Consultants. In addition, a sewer and water design plan has been provided for the Tamanend Business Park West site and infrastructure upgrades are currently being constructed.

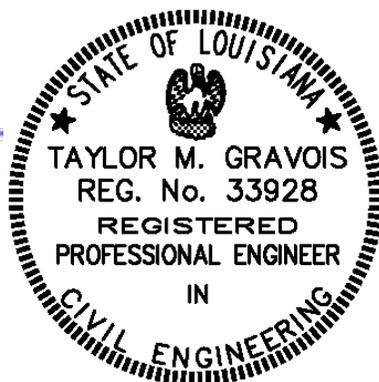
Regarding the potable water capacity, the system has been designed and partially constructed, but is currently not in active use. A Tamanend Water System Storage, Production & Pressure Recommendations report has been provided by Principal Engineering, Inc. The report shows that the proposed water system will meet LED requirements.

Thank you for the opportunity to assist you in this project. Should you have any questions or require additional information, feel free to contact me.

Sincerely,

CSRS, Inc.

Taylor M. Gravois, PE, PLS



Tamanend Business Park West Site Potable Water Infrastructure Upgrade Letter & Map

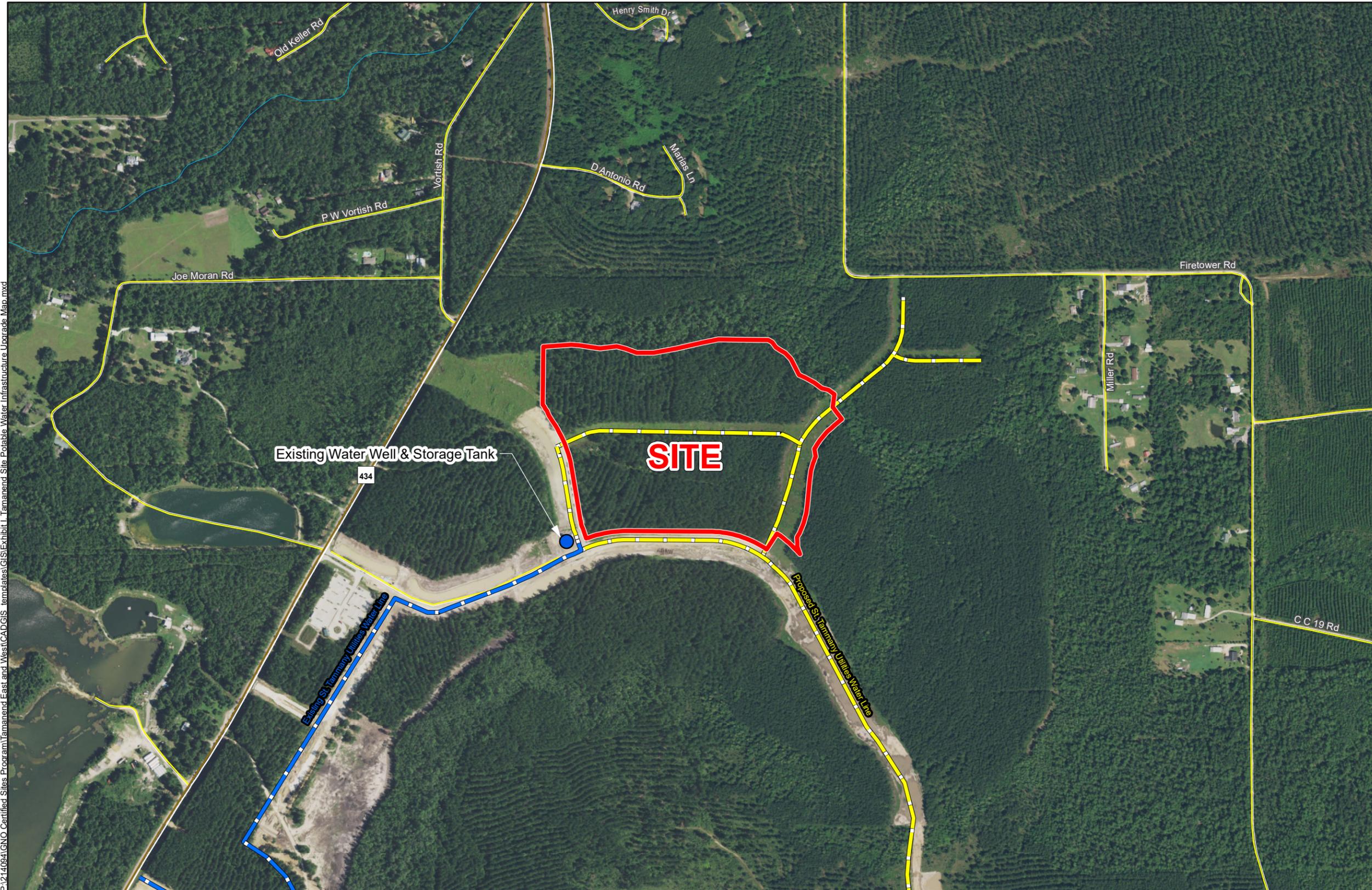
Potable Water
Tamanend Business Park West Site
St. Tammany Parish, LA

St. Tammany EDF



LEGEND

- Site Boundary (48.34 Ac. ±)
- Existing St. Tammany Utilities Water Line
- Proposed St. Tammany Utilities Water Line
- Existing Roadway**
 - Rural State Highway
 - Local Roads
 - Stream



P:\214094\IGNO_Certified Sites Program\Tamanend East and West\CAD\GIS_templates\GIS\Tamanend Site Potable Water Infrastructure Upgrade Map.mxd



Date:	6/13/2016
Project Number:	214094
Drawn By:	TMK
Checked By:	JAY

General Notes:

- No attempt has been made by CSRS, Inc. to verify site boundary, title, actual legal ownership, deed restrictions, servitudes, easements, or other burdens on the property, other than that furnished by the client or his representative.
- Transportation data from 2013 TIGER datasets via U.S. Census Bureau at [ftp://ftp2.census.gov/geo/tiger/TIGER2013](http://ftp2.census.gov/geo/tiger/TIGER2013).
- Utility information from visual inspection and/or the individual utility operators. Exact field location has not been determined by survey. The lines shown are an approximate representation only and may have been offset for depiction purposes.
- 2015 aerial imagery from USDA-APFO National Agricultural Inventory Project (NAIP) and may not reflect current ground conditions.

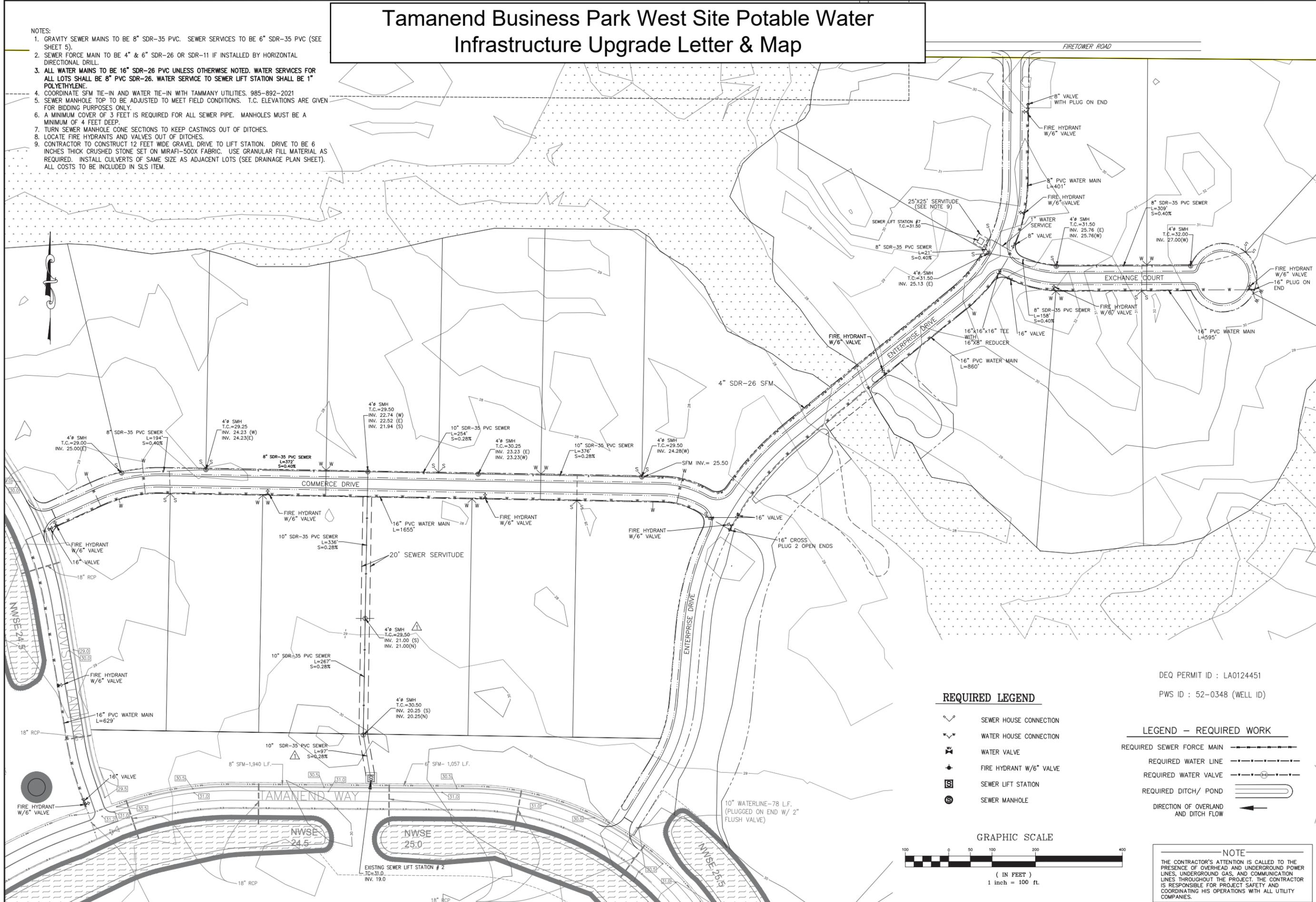


Scale 1:8,000
0 330 660 Feet



Tamanend Business Park West Site Potable Water Infrastructure Upgrade Letter & Map

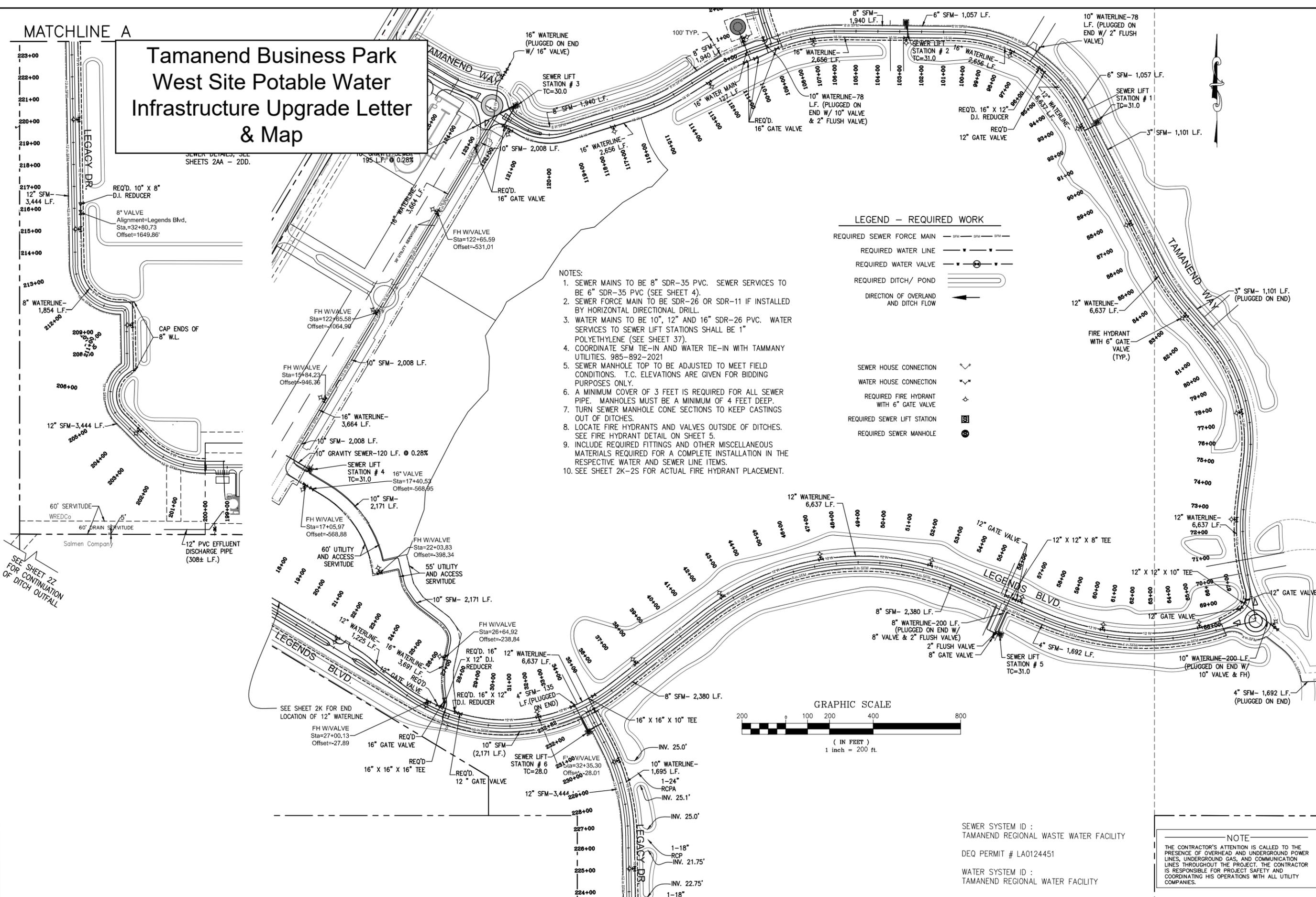
- NOTES:
- GRAVITY SEWER MAINS TO BE 8" SDR-35 PVC. SEWER SERVICES TO BE 6" SDR-35 PVC (SEE SHEET 5).
 - SEWER FORCE MAIN TO BE 4" & 6" SDR-26 OR SDR-11 IF INSTALLED BY HORIZONTAL DIRECTIONAL DRILL.
 - ALL WATER MAINS TO BE 16" SDR-26 PVC UNLESS OTHERWISE NOTED. WATER SERVICES FOR ALL LOTS SHALL BE 8" PVC SDR-26. WATER SERVICE TO SEWER LIFT STATION SHALL BE 1" POLYETHYLENE.
 - COORDINATE SFM TIE-IN AND WATER TIE-IN WITH TAMMANY UTILITIES. 985-892-2021
 - SEWER MANHOLE TOP TO BE ADJUSTED TO MEET FIELD CONDITIONS. T.C. ELEVATIONS ARE GIVEN FOR BIDDING PURPOSES ONLY.
 - A MINIMUM COVER OF 3 FEET IS REQUIRED FOR ALL SEWER PIPE. MANHOLES MUST BE A MINIMUM OF 4 FEET DEEP.
 - TURN SEWER MANHOLE CONE SECTIONS TO KEEP CASTINGS OUT OF DITCHES.
 - LOCATE FIRE HYDRANTS AND VALVES OUT OF DITCHES.
 - CONTRACTOR TO CONSTRUCT 12 FEET WIDE GRAVEL DRIVE TO LIFT STATION. DRIVE TO BE 6 INCHES THICK CRUSHED STONE SET ON MIRAFI-500X FABRIC. USE GRANULAR FILL MATERIAL AS REQUIRED. INSTALL CULVERTS OF SAME SIZE AS ADJACENT LOTS (SEE DRAINAGE PLAN SHEET). ALL COSTS TO BE INCLUDED IN SLS ITEM.



MATCHLINE A

Tamanend Business Park West Site Potable Water Infrastructure Upgrade Letter & Map

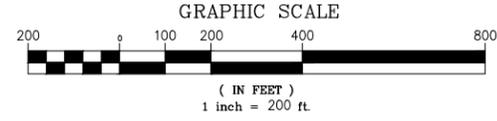
SEWER DETAILS, SEE SHEETS 2AA - 2DD.



- NOTES:**
- SEWER MAINS TO BE 8" SDR-35 PVC. SEWER SERVICES TO BE 6" SDR-35 PVC (SEE SHEET 4).
 - SEWER FORCE MAIN TO BE SDR-26 OR SDR-11 IF INSTALLED BY HORIZONTAL DIRECTIONAL DRILL.
 - WATER MAINS TO BE 10", 12" AND 16" SDR-26 PVC. WATER SERVICES TO SEWER LIFT STATIONS SHALL BE 1" POLYETHYLENE (SEE SHEET 37).
 - COORDINATE SFM TIE-IN AND WATER TIE-IN WITH TAMMANY UTILITIES. 985-892-2021
 - SEWER MANHOLE TOP TO BE ADJUSTED TO MEET FIELD CONDITIONS. T.C. ELEVATIONS ARE GIVEN FOR BIDDING PURPOSES ONLY.
 - A MINIMUM COVER OF 3 FEET IS REQUIRED FOR ALL SEWER PIPE. MANHOLES MUST BE A MINIMUM OF 4 FEET DEEP.
 - TURN SEWER MANHOLE CONE SECTIONS TO KEEP CASTINGS OUT OF DITCHES.
 - LOCATE FIRE HYDRANTS AND VALVES OUTSIDE OF DITCHES. SEE FIRE HYDRANT DETAIL ON SHEET 5.
 - INCLUDE REQUIRED FITTINGS AND OTHER MISCELLANEOUS MATERIALS REQUIRED FOR A COMPLETE INSTALLATION IN THE RESPECTIVE WATER AND SEWER LINE ITEMS.
 - SEE SHEET 2K-2S FOR ACTUAL FIRE HYDRANT PLACEMENT.

LEGEND - REQUIRED WORK

- REQUIRED SEWER FORCE MAIN
- REQUIRED WATER LINE
- REQUIRED WATER VALVE
- REQUIRED DITCH/ POND
- DIRECTION OF OVERLAND AND DITCH FLOW
- SEWER HOUSE CONNECTION
- WATER HOUSE CONNECTION
- REQUIRED FIRE HYDRANT WITH 6" GATE VALVE
- REQUIRED SEWER LIFT STATION
- REQUIRED SEWER MANHOLE



SEWER SYSTEM ID : TAMANEND REGIONAL WASTE WATER FACILITY
 DEQ PERMIT # LA0124451
 WATER SYSTEM ID : TAMANEND REGIONAL WATER FACILITY

NOTE
 THE CONTRACTOR'S ATTENTION IS CALLED TO THE PRESENCE OF OVERHEAD AND UNDERGROUND POWER LINES, UNDERGROUND GAS, AND COMMUNICATION LINES THROUGHOUT THE PROJECT. THE CONTRACTOR IS RESPONSIBLE FOR PROJECT SAFETY AND COORDINATING HIS OPERATIONS WITH ALL UTILITY COMPANIES.



RICHARD C. LAMBERT
 CONSULTANTS, L.L.C.
 900 W. Causeway Approach
 Mandeville, LA 70471
 985-727-4440
 Fax: 985-727-4447

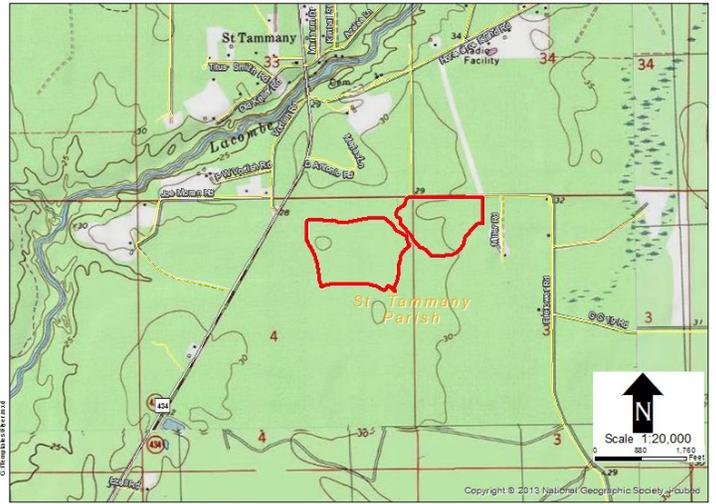
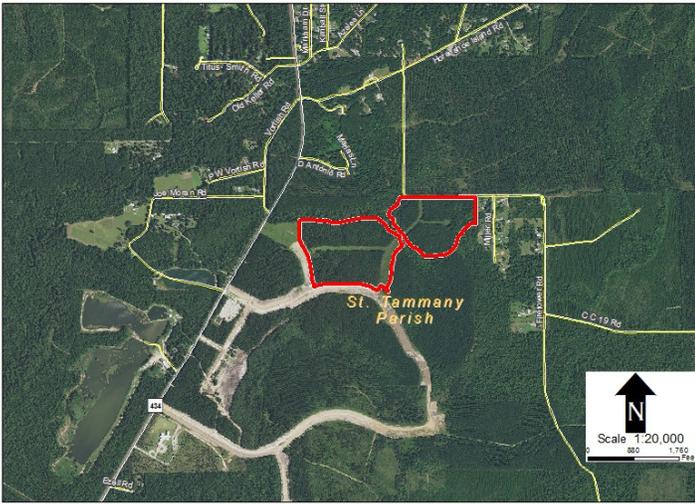
DESIGNED	CHECKED	DATE	BY
FUZ	FUZ	03/02/15	3
FUZ	FUZ		

MASTER SEWER AND WATER PLAN
 TAMANEND WREDCO 4.34- DEVELOPMENT

Project Number: RCLC No: 713-17



04/15/15
 Sheet Number: 3



Tamanend Business Park West Site Potable Water Infrastructure Upgrade Letter & Map

Site Map 1

Site Map 2

Date:	06/01/2016		Contact Information	
Provider Name:	Tammany Utilities		Name:	Tim Brown
Address:	21454 Koop Drive		Phone:	(985) 898-2535
City:	Mandeville		Email:	tbrown@stpgov.org
State:	LA	Zip Code:	70471	
			Title:	Utility Manager

Is potable or process water currently available at this site?

Yes No

Please provide the distance in feet to the nearest potable or process water distribution line to service this site.

100

What is the size (inches in diameter) of the nearest line?

16

What are the pressures of the water line at or nearest to this site?

Static

Residual

Source of potable or process water (lake, well, other source)

groundwater

What is the total potable/process capacity of the existing water system in millions of gallons per day (MGD)

What is the current average daily use of the existing water system in millions of gallons per day (MGD)

0

What is the peak demand on the existing water system in millions of gallons per day (MGD)

What is the excess capacity of the existing water system in millions of gallons per day (MGD)

Capacity of closest elevated potable water storage tank (gallons)

Distance to closest elevated potable water storage tank in miles

Distance to appropriate booster station in miles

Is or will there be adequate pressure and flow at site to combat fires?

Yes No

Is a plan underway to improve services at or near this site within the next year? If so, please provide anticipated upgrades, location, and time for implementation.

Facility is still under construction. The pump and well tests have not been completed. As-built plans have not yet been provided.

Tamanend Business Park West Site Potable Water
Infrastructure Upgrade Letter & Map

TAMANEND WATER SYSTEM
STORAGE, PRODUCTION, & PRESSURE
RECOMMENDATIONS

PREPARED FOR:



CALDWELL TANKS, INC.

JULY 2014



PREPARED BY:
PRINCIPAL ENGINEERING, INC.



PURPOSE

This document summarizes a limited study conducted by Principal Engineering, Inc., on the proposed water storage, production, and distribution system for the Weyerhaeuser development, Tamanend. The study purpose is to provide the developer with data to validate the selected storage capacity/height and distribution network pipe diameters or make revisions to same in the interest of better economic outcome. No deficiency in the current design is implied, and the parcels as located on the master plan prepared by Reich Associates are constructible with respect to water supply, but it is possible that certain modifications would lessen the cost of building construction and increase usable land area. Additionally, no water supply design well capacity has been selected; this document presents a rationale and recommendation for water production capacity.

EXECUTIVE SUMMARY

Within the framework of National Fire Protection Association (NFPA) regulations adopted by the State of Louisiana, and the physical behavior of a water system; storage capacity, production capacity, water pressure, pipe diameters, and building type/use are interconnected. Modification to one element's characteristics may place constraints on another element. The potential variations are endless. As such, a set of design assumptions have been selected, and the recommendations made based on those assumptions. Matrices of broader results are included later in this document for the interested reader (the matrices are limited in scope for reasonableness).

1. Tank Capacity. ***The assumed water storage tank capacity of 500,000 gallons is validated.*** The controlling case is the demand created by fire suppression sprinklers in a warehouse (1,860 gpm for 90 minutes) during a period of high domestic usage. No auxiliary water storage is required for the assumed 60,000-100,000 SF warehouse (4,000 SF sprinkler area plus hose stream, ordinary hazard), when the proposed 500,000 gallon tank is provided, and the recommended well capacity is installed. Demand can vary greatly based on materials stored, method of storage, rack height, sprinkler type, etc.; used here was a conservative configuration.
2. Well Production Capacity.
 - a. Primary Capacity ***is recommended to be 1,000 gpm, although in no case should it be less than 750 gpm.*** The two controlling cases for well capacity are 1) domestic demand when the storage tank is out of service; and 2) fire demand triggered at the end of a maximum domestic use day (for a storage capacity of 500,000 gallons). Peak domestic (non-fire) hourly demand at full build-out is estimated at 1,235 gpm in summer, and 987 gpm in winter. While tank maintenance is performed, 1000 gpm production capacity will maintain system pressure during the

winter months at all times of day. It is not recommended to size the primary well down, and rely on the auxiliary and primary sources in combination for this purpose, as redundancy is lost. ***If possible, it is recommended that two 500 or 600 gpm wells be installed as the primary source for maximum redundancy, vs. a single well of 1000 gpm capacity.*** Depending on the ultimate build out of Phase 1, well construction could be phased.

- b. Auxiliary Capacity ***is recommended to be 500 gpm.*** This value is an estimate of the most water the existing Coroner's well can produce with a pump and controls upgrade. For higher capacity than 500 gpm, re-drilling would be required, negating the benefit of using that existing facility. The capacity will be adequate to provide redundancy during Phase I development; however, ***as the demand increases, and particularly if a single 1000 gpm or 750 gpm well is installed as the primary source, it will be inadequate during days of peak summer domestic demand (when in redundant use).*** The 500 gpm auxiliary source can likely supply winter domestic demand at build-out, but in no case can fire demand be met.
3. Pressure. ***It is recommended to maintain the proposed HWL height of 140 feet, and to increase the water main diameters serving the office/warehouse parcels from 10" to 16".*** Installation of a fire pump in the major buildings can be avoided (for most usage cases) with this diameter increase. Raising the tank elevation sufficiently to provide adequate sprinkler head pressure at the aforementioned warehouse fire flow without a pump, and using the 10" pipe diameter would require tank height approaching 200 feet; this is considered impractical. With the tank level depleted to 120 feet during a day's use, pressure and flow have been validated as adequate at the most hydraulically distant fire hydrant from the tower, at the proposed pipe diameters.
 4. Economic Interpretation of #1 thru #3.
 - a. Storage: Employing the recommended 500,000 gallon storage tank capacity and 1000 gpm production capacity will eliminate the need for fire water ground storage tanks located adjacent to each of the office and warehouse buildings. For reference, a single 50,000 gallon steel water storage tank would cost over \$100,000. It is conceivable that each of the 12 warehouse/office facilities would require such a tank, in addition to any single large commercial area in the Town Center.
 - b. Production: As primary production, two wells of smaller capacity are desired vs. one well of higher capacity. A single 500 gpm well can be budgeted at \$450,000; and a single 1000 gpm well can be budgeted at

-
- \$700,000 (bare costs, well and pump only). The higher total construction cost of two smaller wells (\$900K vs. \$700K) negates risk of required future additional upgrade to the auxiliary source as build-out occurs. It is possible that during DHH review, this two well primary supply approach will be mandated (or other solution that delivers complete redundancy).
- c. Pressure: Increasing the water main distribution diameter will cost an estimated additional \$20 per linear foot (nominal additional cost for Phase 1, and \$114,000 additional cost during future build out for 5700 LF of distribution mains to the warehouses). However, this will eliminate the need for a fire pump in most potential facility uses. The estimated per parcel construction savings (assume 12 warehouses/offices plus town center and campus) is \$25,000 in upfront cost, plus the O&M necessary to ensure that equipment's reliable operation.
 - d. No Action Required: As previously stated, no deficiency in the distribution design is implied. Should the recommended 1000 gpm production capacity and pipe diameter increase not be implemented, the development will not be technically hindered; but building construction will become more expensive as described above.

LIMITATIONS

Water demands have been estimated using the rendered plan produced by Reich Associates, and not on definitive information. It is possible that changes to the Tamanend layout or land usage could render the information contained herein invalid. Additionally, a wide variety of fire suppression sprinkler types, configurations, design methods, and building characteristics can produce required flows and pressures above or below what is presented herein. Principal Engineering has made an effort to present a reasonably conservative envelope, but cannot guarantee that if the recommendations are followed, that certain building owners will not require fire pumps. Lastly, the cost figures are for comparison purposes only, and are based on past experience, not proposed pricing by Contractors. As such, the developer should make independent investigation to verify accuracy.

TABULATED RESULTS OF ANALYSIS

Selected tables of results are presented below.

Table 1, Domestic Use Values: This table presents water use that can be expected upon full build-out of the property, according to the Reich Associates plan. Hourly max flow during winter months has been assumed as (base flow) x 0.8 x 2.5.

1 - Domestic Use Values

	Peaking Factor	Flow (gpd)	Flow (gpcd)	Flow (gpm)
Base	N/A	711,060	94.5	493.8
Winter	0.8	568,848	75.6	-
Summer	1.3	924,378	122.8	-
Daily Max	1.65	1,173,249	155.9	-
Hourly Max	2.5	-	236.2	1,235

Table 2, Volume Deficit for Fire Demand Duration of 90 min.: This table presents the deficit in available water volume for various well production capacities and various building hazard classifications. Fire sprinkler demands were estimated for warehouse/office buildings of varying hazard classifications.

2 - Volume Deficit (gal) for Fire Demand of 90 minutes Fire Demand varies & Domestic Demand = 1,235 gpm

Hazard Class	Water Well Capacity (gpm)						
	500	750	1000	1500	2000	2500	3000
Ordinary 1	124,650	102,150	79,650	34,650	N/A	N/A	N/A
Ordinary 2	142,650	120,150	97,650	52,650	7,650	N/A	N/A
Extra Hazard 1	197,550	175,050	152,550	107,550	62,550	17,550	N/A
Extra Hazard 2	233,550	211,050	188,550	143,550	98,550	53,550	8,550

Table 3, Volume Deficit for Peak Domestic Flow: This table presents the deficit in available water volume for various well production capacities during a peak domestic use day. The maximum expected hourly flow is assumed to be maintained until the maximum expected daily production for a peak day is reached (calculated to be 16 hr.).

**3 - Volume Deficit (gal) for Peak Domestic Flow
(1,235 gpm for 16 hr.)**

	Water Well Capacity (gpm)						
	500	750	1000	1500	2000	2500	3000
	705,600	465,600	225,600	0	0	0	0

Table 4, Volume Deficit for Peak Domestic + Fire Demand: This table sums the values of volume deficit in Tables 2 and 3. This models a fire sprinkler demand at the design office/warehouse building on a peak domestic usage day.

4 - Volume Deficit (gal) for Peak Domestic Flow of 16 hours + Fire Demand

	Water Well Capacity (gpm)						
Hazard Class	500	750	1000	1500	2000	2500	3000
Ordinary 1	830,250	567,750	305,250	34,650	0	0	0
Ordinary 2	848,250	585,750	323,250	52,650	7,650	0	0
Extra Hazard 1	903,150	640,650	378,150	107,550	62,550	17,550	0
Extra Hazard 2	939,150	676,650	414,150	143,550	98,550	53,550	8,550

Tables 5A – 5C, Design Parameters for Various Pipe Diameter Configurations: This series of tables estimates the instantaneous flow of water to the most hydraulically distant office/warehouse parcel, given varying pipe diameters and tank water levels. The highlighted values are the flow that can be expected for the given configuration at a point 40 ft above ground elevation (assumed roofline), at a residual pressure of 30 psi. Pressure

loss of 10 psi has been assumed in the fire suppression riser piping. The tank level shown represents a tank HWL height 20 feet higher (120 in the table is a 140' tank), to account for water volume depletion. Topography has been assumed as flat. Criteria is the 1,860 gpm fire flow mentioned above.

5A - Design Parameters for 16" Main Pipe & 10" North Spur Pipe

Tank Level (ft)	Pipe Section	Velocity (ft/s)	Flow (gpm)
120	16" Main Pipe	1.87	1,629
	10" Spur Pipe	4.80	1,174
140	16" Main Pipe	2.51	2,179
	10" Spur Pipe	6.42	1,570
170	16" Main Pipe	3.26	2,834
	10" Spur Pipe	8.35	2,042
180	16" Main Pipe	3.48	3,024
	10" Spur Pipe	8.91	2,179

5B - Design Parameters for 16" Main Pipe & 12" North Spur Pipe

Tank Level (ft)	Pipe Section	Velocity (ft/s)	Flow (gpm)
120	16" Main Pipe	2.57	2,234
	12" Spur Pipe	4.57	1,610
140	16" Main Pipe	3.44	2,987
	12" Spur Pipe	6.11	2,153
170	16" Main Pipe	4.47	3,886
	12" Spur Pipe	7.95	2,801
180	16" Main Pipe	4.77	4,145
	12" Spur Pipe	8.48	2,988

5C - Design Parameters for 16" Main Pipe & 16" North Spur Pipe

Tank Level (ft)	Pipe Section	Velocity (ft/s)	Flow (gpm)
120	16" Main Pipe	5.88	5,112
	16" Spur Pipe	5.88	5,112
140	16" Main Pipe	7.88	6,850
	16" Spur Pipe	7.88	6,850
170	16" Main Pipe	10.23	8,893
	16" Spur Pipe	10.23	8,893
180	16" Main Pipe	10.92	9,493
	16" Spur Pipe	10.92	9,493

DESIGN PARAMETER CONFIRMATION

1. The elevated storage tank will be designed to a capacity of 500,000 gallons, with a high water level of 140 feet above foundation elevation.
2. A single well of 500 gpm will be designed at the tank site. A future 500 gpm well shown on the drawings will be required as Tamanend develops and water demand increases. An upgrade to the Coroner's well will be designed to flow 500 gpm.

Approved: _____
Signature

Date: _____

Printed Name: _____