ENGINEERING EVALUATION OF THE SUMMERTREE WATER TREATMENT FACILITY

New Port Richey, Pasco County, Florida

Prepared for

Utilities, Inc. of Florida
200 Weathersfield Avenue
Altamonte Springs, FL 32714

Prepared by

TBE GROUP

TBE Project Number 00025-001-00

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EXECUTIVE SUMMARY

Utilities, Inc. of Florida owns and operates a water treatment facility in New Port Richey, Pasco County, Florida. The facility services the Summertree Development located on the south side of US 52 just east of Little Road. The system consists of four groundwater production wells and three hydro-pneumatic tanks. The facility has experienced odor problems resulting from high sulfide concentrations. Higher chlorine dosages are employed to reduce the hydrogen sulfide concentrations resulting in unacceptable disinfection by-products. Large quantities of water are flushed daily in order to maintain chlorine residual in the system. An engineering solution is critical to eliminate the need for flushing, maintain chlorine residual without using excess amounts of chlorine and reduce disinfection byproducts.

Utilities Inc. of Florida has requested TBE to develop engineering solutions to address the odor and chlorine residual issues while operating under acceptable groundwater quality criteria. If a pumping station is a part of the recommended and approved solution, a hydraulic analysis of the system may be required but is not included in this evaluation.

TBE has evaluated four treatment alternatives including tray aeration, packed tower aeration, reverse osmosis, and an innovative package system ($MicrO_2$) that includes oxidation, coagulation, and filtration. Based on the evaluation, TBE recommends the packed tower aeration for its cost effectiveness and level of treatment, including odor control. The cost estimate for this alternative is $1.8M including design, construction services, and contingency. The tray aeration alternative offered a lower cost of $1.5M but does not include odor control and is not as efficient as the packed tower for higher hydrogen sulfide concentrations.

Additionally, TBE recommends Utilities, Inc. consider evaluating replacement of the supply well with the worst water quality. The well depths (approximately 60 feet) are shallow for potable water supply. If an initial hydrogeologic investigation indicates that water quality would improve with a deeper well, a new supply well could be installed at an estimated cost of $150,000 to $300,000, depending on the well depth required and other factors. This approach would reduce the hydrogen sulfide concentration in the one well with particularly high levels. This may be a short term solution while the costs for a more dependable system as recommended can be built into a capital improvement program.

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1.0 BACKGROUND AND SCOPE OF WORK

1.1 Background and Purpose

Utilities, Inc. of Florida owns and operates a water treatment facility in New Port Richey, Pasco County, Florida. The facility and distribution system consists of four groundwater production wells and three hydro-pneumatic tanks. The facility has experienced odor problems resulting from high sulfide concentrations. Higher chlorine dosages are employed to reduce the hydrogen sulfide concentrations resulting in unacceptable concentrations of disinfection by-products (DBPs) including Total Trihalomethanes (TTHMs) and Haloacetic Acids (HAAs). An engineering solution is critical to reduce TTHMs, HAAs, and hydrogen sulfide concentrations.

Utilities Inc. of Florida has requested TBE to develop engineering solutions to address the odor and chlorine residual issues while operating under acceptable DBP levels, established in Chapter 62-550 of the Florida Administrative Code (FAC). If a pumping station is a part of the recommended and approved solution, a hydraulic analysis of the system may be required but is not included in this evaluation.

1.2 Scope of Work

TBE has performed an engineering analysis on the water treatment facility and has developed engineering solutions with preliminary design and cost information. TBE conducted a site visit and viewed each of the existing treatment systems. Four potential treatment alternatives were evaluated and a recommendation was made.

2.0 EXISTING CONDITIONS

2.1 Groundwater Wells

The existing water system consists of four groundwater production wells that are treated via three chlorine dosage systems. The wells are identified as Well #1 (Condo Well), Well #2 (Paradise Point), Well #13 (Cocoa Wood Street), and Well #17 (Pear Tree). Wells #13 and #17 share a common hydropneumatic tank. The groundwater supply pumps, completed to approximately sixty feet below grade, bring groundwater to a chlorine contact chamber (hydro-tank) where chlorine from 150-lb gas cylinders are used to disinfect the raw water. The treated water is then sent directly to the existing supply system. The existing water supply system is shown as **Figure 1**.

2.1 Demand

The system currently supplies approximately 1,300 connections with an average daily flow of 100-200,000 gallons per day (gpd). However, expansion of the system is anticipated over the next twenty years, with an anticipated buildout of up to 5,000 units. The existing production wells are capable of the following flows:

Well #1	78 gpm
Well #2	400 gpm
Well#13	350 gpm
Well #17	400 gpm

The total flow, 828 gpm (excluding one 400 gpm well for fire flow), equates to slightly less than 1.2 mgd.

2.2 Water Quality

The current water quality concerns arose originally from customer odor complaints attributed to excess hydrogen sulfide levels, resulting in odor issues. Hydrogen sulfide has several negative impacts on a water supply system including aesthetic issues (taste and odor) and corrosion issues in process and homeowners' piping. In an effort to oxidize the hydrogen sulfide, chlorine dosages were increased. However, the increased chlorine dosages resulted in the formation of organic contaminant DBPs. The basis of this report was the evaluation of hydrogen sulfide removal methods to alleviate the chlorination by-product effect.

Existing analytical data (see Appendix A) from the four supply wells was reviewed. Because the data was limited, a summary of the results is provided here. The proposed treatment involves blending of raw supply water, so averages of the water quality were utilized during the evaluation of water treatment alternatives.

Table 2.1 Existing Water Quality

Color	pH	Hydrogen Sulfide	Iron	TTHMs	HAAs
Units	Units	mg/L	mg/L	ug/L	ug/L
5 to25	6.3 to 7.2	0.1 to 2.4	0.12 to 0.38	77-93	67-112

Note: mg/L = milligram per liter, ug/L = microgram per liter

Color

The color results were generally in the acceptable range of finished water of 3 to 15. A few higher levels observed at Well #2 exceeded the secondary MCL for color of 15 color units. The blending of water should alleviate the majority of color concerns. The treatment alternatives will also be evaluated for their effectiveness on color.

Hydrogen Sulfide

Most of the hydrogen sulfide readings were below 0.4 mg/L, which is generally the threshold for odor issues. One elevated hydrogen sulfide concentration was observed at Well #17. Again, like color, the overall hydrogen sulfide concentrations will improve with the blending of the raw water. However, the treatment effectiveness for hydrogen sulfide will be the emphasis during evaluation of treatment alternatives.

pH

The pH readings were in the acceptable ranges with the exception of some low readings in the 6.3 to 6.5 range. The pH may be adjusted both up and down depending on the treatment alternative. However, the pH of the finished water will be adjusted based on alkalinity and hardness to a stable level preventing both corrosion and excess scaling.

Iron

The iron levels were generally within acceptable ranges (< 0.3 mg/l) but treatment alternatives will address iron removal due to instances of iron staining at one well during flushing.

DBPs

The TTHMs and HAAs are both over the acceptable limits of 80 and 60 ug/L, respectively. Treatment alternatives will be evaluated for their disinfection processes and their potential for producing DBPs.

Dalapon

Dalapon, an herbicide used to control grasses, was discussed with Utilities, Inc. personnel as a possible issue. However, evaluation of analytical data indicates that while detectable concentrations were reported by the laboratory, the concentrations were well below the MCL of 200 ug/L. The evaluation of treatment alternatives did not include effectiveness on dalapon removal.

3.0 WATER TREATMENT ALTERNATIVES

As noted in Section 2, the main parameter of concern for the Summertree water supply is hydrogen sulfide. Free chlorine is used not only for disinfection but to reduce the sulfide levels as well. Because of the relatively high level of chlorine usage, the concentrations of disinfection byproducts (DBPs) and haloacetic acids (HAAs) have exceeded their limits. In addition, other parameters which may require some treatment include color and iron. The focus in this study is to remove the sulfides to reduce the chlorine demand, but consideration will be given to processes to reduce color, iron, and DBP precursors as well.

3.1 Basis of Design

In order to provide cost-effective treatment for the entire flow, it is necessary to bring all the raw water to a central location where it will be blended and treated. Providing treatment at each individual well site would result in four separate treatment facilities, one at each site, which is very inefficient and which may not be possible due to space constraints at some or all of the sites. Also, the well sites are located in residential neighborhoods with residents in immediate proximity. Expanding the facilities at each site, with the attendant noise and visual impact, may result in complaints from the neighbors. Finally, Utilities Inc. has a very good location for a central treatment plant on the site of the former wastewater plant, with room for storage as required by FDEP regulations as well as some buffer between any treatment facilities and the nearest resident. Also, this site already contains a master wastewater pumping station so it already has utility facilities located on it.

The design concept for this study is as follows: all four existing wells will remain in service, but will pump the raw water through existing and new raw water pipelines to the large site owned by Utilities Inc. on Paradise Pointe Way. The raw water from each well will be manifolded into a common header and enter the selected treatment process. After treatment, the finished water will be pumped into a ground storage tank, from which a new high service pump station will pump the finished water into the distribution system. Common to each of the treatment alternatives is a final chemical feed to address corrosion control (hardness, alkalinity, and pH). This will consist of a storage tank, metering pumps, and controls. The system will be designed for a peak flow of 828 gpm, or about 1.2 mgd, which is the firm capacity of the wells (the well capacity with the largest well out of service).

3.2 Treatment Alternatives

The following treatment alternatives were considered:

1. Aeration to remove sulfides by tray aerators.
2. Sulfide removal by packed tower aeration with scrubbing of the off gas to remove odors.
3. Reverse osmosis (RO) treatment system.
4. MicrO_2 treatment system.

Each of these systems is discussed below.

Alternative 1. Aeration by tray aerators. This process is widely used in Florida for removal of sulfides from groundwater, and would be the lowest cost alternative. This treatment method would do little to remove other parameters, however. Its major drawback is that the sulfides removed by the aeration process are released into the air and can result in detectable odors around and downwind from the aerator. Although the selected site has some buffer area, it is still located in a residential area and residences would be within a few hundred feet of the aerator. It is not feasible to collect and scrub the off-gas from this process. Additionally, the blended water may have concentrations up to and exceeding 1 mg/l, which is generally the maximum level tray aerators are capable of treating. For these reasons, it is not recommended that this process be considered further for implementation.

Alternative 2. Packed tower aeration with off-gas scrubbing. This process is similar to Alternative 1, except that the raw water is passed through a forced draft aeration tower to remove the sulfides. The off-gas is collected and scrubbed to remove the sulfides. Iron can typically be oxidized through an aeration process such as the packed tower. The pH may be adjusted down initially to drive most of the sulfide to its gaseous form where it can be easily stripped by the aeration tower. The post aeration water pH can be adjusted back up to a stable level to help prevent corrosion and scaling. See Appendix B for additional information.

Alternative 3. Reverse osmosis. This process would include two skid-mounted RO trains. The RO process would provide the most complete treatment, removing sulfides, iron, and DBP precursors. However, the process does produce a waste stream of approximately 15 percent of the raw water flow. This waste stream could be discharged to the master wastewater pump station on the site. Utilities, Inc. currently pays a fee to Pasco County of $4.1576 per 1,000 gallons. The RO skids would be housed in a building. See Appendix C for additional information.

Alternative 4. MicrO2 system. The MicO2 system is a relatively new water treatment system which utilizes oxidation, coagulation, and filtration in a modular design to remove contaminants. The vendor information indicates that the system will remove, among other contaminates, iron, DBP precursors, and color. Although sulfides are not specifically mentioned, the vendor reports that sulfides are removed, and the system will shortly be undergoing testing in Jacksonville to demonstrate this. Because this system has no track record, it would have to be thoroughly pilot tested with the Summertree water before implementation should be considered. Because of this lack of track record, TBE has no basis for recommending this process at this time, but is providing information on the process for your information and possible consideration. See Appendix D for additional information.

4.0 WATER SUPPLY, STORAGE, AND DISTRIBUTION

4.1 Existing Distribution System

The existing distribution system consists of 12-inch to 2-inch distribution and transmission mains. Finished water is supplied directly to the system from the four wells. The existing distribution system is shown on Figure 1.

4.2 Proposed Raw Water Supply System

As discussed in Section 3, it is proposed that raw water be pumped to a central site located on Paradise Pointe Way for treatment, storage, and pumping. This will eliminate the impact of any additional treatment at each well site and provide economy of scale for both capital and operating costs for the system. A new 8-inch raw water main will be constructed from Well #1 to Well #2, and then from Well #2 to the proposed plant site. Wells 13 and 17 are already connected by an 8-inch raw water main. A new 8-inch raw water main will be constructed from this existing main at the corner of Pear Tree Drive and Scotch Pine Drive to the proposed plant site. At the site boundary along Paradise Pointe Way the two 8-inch mains will be combined in to a 12-inch main which will transport all the raw water in to the site. Blending of the water from the wells will occur in this 12-inch main before reaching the treatment facilities.

Figure 2 shows the proposed raw water lines and a proposed location for a central treatment system. Treatment alternatives are discussed in Section 3.

4.3 Storage and High Service Pumping

After treatment, the chlorinated finished water will be stored in a 0.5 mg ground storage tank. Although DEP regulations only require storage for 25% of the peak flow, which would be approximately 0.3 mg, the larger tank is recommended in order to provide some capability for expansion, to provide some volume for chorine contact time, and because the incremental cost difference of a 0.3 mg tank and a 0.5 mg tank is relatively small.

Finished water will be pumped from the storage tank into the distribution system by variable speed, horizontal split case high service pumps. Two pumps are proposed, each capable of pumping the peak flow of 800 gpm. The need for a small jockey pump to maintain pressures in the system at low flows should be evaluated during final design. The cost estimate included herein assumes that a jockey pump will be utilized. Another option is to relocate one or more of the existing hydropneumatic tanks to the site to maintain pressure during low flows. Please see Appendix E for additional information on the storage tank and high service pumps.

Hydraulic modeling of the distribution system is outside the scope of this preliminary report, but the point of connection of the high service pumps with the existing distribution system appears to be in an excellent location for maintaining design pressures within the system. The point of connection would be at the intersection of Paradise Pointe Way and Pampas Drive, and at that location 12-inch mains proceed north and south on Paradise Pointe Way and east on Pampas Drive. Prior to final design, the system should be modeled to confirm the hydraulics and determine the operating pressure required at the high service pump station.

4.4 Site Considerations

As noted, the proposed site for the new facilities is located at the site of the old wastewater treatment plant. The plant has been replaced with a master pump station near the rear of the site, and all wastewater is pumped to Pasco County for treatment and disposal. The new water treatment, storage, and pumping facilities would be located essentially on the site of the old wastewater plant near the center of the site. For cost estimating purposes, it was assumed that the site would be accessed by a gravel road from Paradise Pointe Way. Except for Alternative 3 (RO), all treatment facilities would be located on a pad outdoors adjacent to the storage tank. For all alternatives, the high service pumps would be located in a ventilated concrete block building, with restrooms and an air-conditioned electrical equipment room. The standby generator would be located in an enclosure supplied by the manufacturer on a pad adjacent to the high service pump building. If desired by Utilities Inc., the high service pumps could also be located outside, with the electrical equipment located in outdoor rated enclosures. However, it is recommended that the pumps and electrical gear at least be under an open roof. The drawback of not enclosing the high service pumps in a building is that they can be noisy.

5.0 COST ESTIMATE

5.1 Cost Estimates

The following are capital cost estimates for each of the four alternatives evaluated. A more detailed cost breakdown for each alternative is included in Appendix F. The cost presented here include a 15% design fee and 15% for construction services/administration and contingency. The design fee includes permitting of a water treatment system. The construction services fee includes preparation of Contract Documents and Drawings and bidding services. The cost for reverse osmosis does not include the waste disposal fee for pumping the treatment brine to the Pasco County wastewater treatment system.

Alternative 1. Aeration by tray aerators.	$1,464,000
Alternative 2. Packed tower aeration with off-gas scrubbing.	$1,835,000
Alternative 3. Reverse osmosis.	$2,225,000
Alternative 4. MicrO_2 system.	$2,010,000

6.0 SUMMARY AND RECOMMENDATIONS

6.1 General

TBE has evaluated four treatment alternatives including tray aeration, packed tower aeration, reverse osmosis, and an innovative package system ($MicrO_2$) that includes oxidation, coagulation, and filtration. Based on the evaluation, TBE recommends the packed tower aeration for its cost effectiveness and level of treatment, including odor control. The cost estimate for this alternative is $1.8M including design, construction services, and contingency. The tray aeration alternative offered a lower cost of $1.5M but does not include odor control and is not as efficient as the packed tower for higher hydrogen sulfide concentrations.

Additionally, TBE recommends Utilities, Inc. consider evaluating replacement of Supply Well S17, which has the worst water quality. The well depths (approximately 60 feet) are shallow for potable water supply. If an initial hydrogeologic investigation indicates that water quality would improve with a deeper well, a new supply well could be installed at an estimated cost of $150,000 to $300,000, depending on the well depth required and other factors. This approach would reduce the hydrogen sulfide concentration in the one well with particularly high levels. This may be a short term solution while the costs for a more dependable system as recommended can be built into a capital improvement program.

6.2 Recommended Water Quality Analyses for Final Design

In addition, the following water quality parameters should be analyzed for during final design.

- TOC to evaluate color
- Color after chlorination
- Carbon dioxide
- Calcium
- Hardness
- Alkalinity

Appendix F

Cost Estimates

PRELIMINARY PROBABLE CONSTRUCTION COST ESTIMATE
Utilities, Inc. - Summertree Development
Alternative 1 - Tray Aeration

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL PRICE
	General				
1	Mobilization (5%)	LS	1	$56,325.00	$ 56,325
	Pumping and Storage				
2	8-in raw water line from Well 1 to Well 2	LF	600	$ 65	$ 39,000
3	8-in raw water line from Well 2 to site	LF	1,550	$ 65	$ 100,750
4	8-in raw water line from Well 17 to site	LF	1,350	$ 65	$ 87,750
5	12-in raw water line into site	LF	400	$ 85	$ 34,000
6	0.5 mg ground storage tank (Installed)	EA	1	$ 300,000	$ 300,000
7	High Service Pumps (2 high service, 1 jockey)	LS	1	$ 60,000	$ 60,000
8	High Service Pump Building	SF	3000	$ 80	$ 240,000
9	Electrical & Instrumentation	LS	1	$ 50,000	$ 50,000
10	Standby Power (~250kw generator)	LS	1	$ 100,000	$ 100,000
11	Site work	LS	1	$ 20,000	$ 20,000
	Treatment System				
12	Tray Aerator	EA	1	$ 20,000	$ 20,000
13	Aerator Installation	LS	1	$ 10,000	$ 10,000
14	Chemical Feed Pumps & Controls	EA	2	$ 10,000	$ 20,000
15	Sodium Hypochlorite System	EA	1	$ 45,000	$ 45,000
	SUBTOTAL (Mechanical, Electrical, & Structural)				$ 1,126,500
16	Design (15%)	LS	1	$ 168,975	$ 169,000
17	Construction Services and Contingency (15%)	LS	1	$ 168,975	$ 169,000
	TOTAL				$ 1,464,500

Note: Design costs includes permitting costs associated with water treatment system. Construction services cost includes costs for preparation of Contract Documents and Drawings and Bidding Services.

PRELIMINARY PROBABLE CONSTRUCTION COST ESTIMATE
Utilities, Inc. - Summertree Development
Alternative 2 - Packed Tower Aeration & Scrubbing

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL PRICE
	General				
1	Mobilization (5%)	LS	1	$70,575.00	$ 70,575
	Pumping and Storage				
2	8-in raw water line from Well 1 to Well 2	LF	600	$ 65	$ 39,000
3	8-in raw water line from Well 2 to site	LF	1,550	$ 65	$ 100,750
4	8-in raw water line from Well 17 to site	LF	1,350	$ 65	$ 87,750
5	12-in raw water line into site	LF	400	$ 85	$ 34,000
6	0.5 mg ground storage tank (Installed)	EA	1	$ 300,000	$ 300,000
7	High Service Pumps (2 high service, 1 jockey)	LS	1	$ 60,000	$ 60,000
8	High Service Pump Building	SF	3000	$ 80	$ 240,000
9	Electrical & Instrumentation	LS	1	$ 50,000	$ 50,000
10	Standby Power (~250kw generator)	LS	1	$ 100,000	$ 100,000
11	Site work	LS	1	$ 20,000	$ 20,000
	Treatment System				
12	Packed Tower Aerator	EA	1	$ 125,000	$ 125,000
13	Scrubber	EA	1	$ 125,000	$ 125,000
14	Transfer Pumps	EA	2	$ 7,500	$ 15,000
15	Equipment & Piping Installation	LS	1	$ 50,000	$ 50,000
16	Chemical Feed Pumps & Controls	EA	2	$ 10,000	$ 20,000
17	Sodium Hypochlorite System	EA	1	$ 45,000	$ 45,000
	SUBTOTAL (Mechanical, Electrical, & Structural)				$ 1,411,500
16	Design (15%)	LS	1	$ 211,725	$ 211,800
17	Construction Services and Contingency (15%)	LS	1	$ 211,725	$ 211,800
	TOTAL				$ 1,835,100

Note: Design costs includes permitting costs associated with water treatment system. Construction services cost includes costs for preparation of Contract Documents and Drawings and Bidding Services.

PRELIMINARY PROBABLE CONSTRUCTION COST ESTIMATE
Utilities, Inc. - Summertree Development
Alternative 3 - Reverse Osmosis

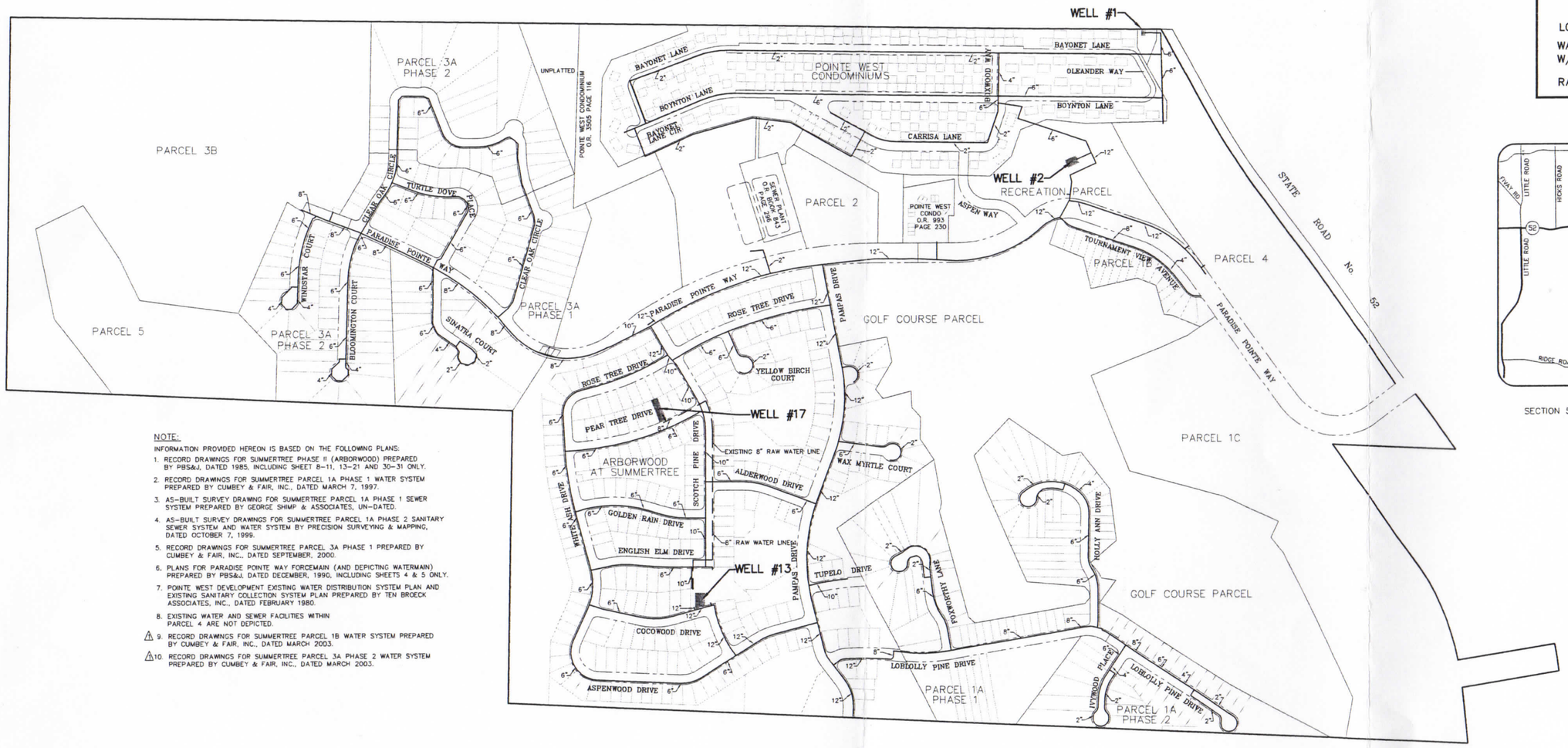
ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL PRICE
	General				
1	Mobilization (5%)	LS	1	$85,575.00	$ 85,575
	Pumping and Storage				
2	8-in raw water line from Well 1 to Well 2	LF	600	$ 65	$ 39,000
3	8-in raw water line from Well 2 to site	LF	1,550	$ 65	$ 100,750
4	8-in raw water line from Well 17 to site	LF	1,350	$ 65	$ 87,750
5	12-in raw water line into site	LF	400	$ 85	$ 34,000
6	0.5 mg ground storage tank (Installed)	EA	1	$ 300,000	$ 300,000
7	High Service Pumps (2 high service, 1 jockey)	LS	1	$ 60,000	$ 60,000
8	High Service Pump Building	SF	3000	$ 80	$ 240,000
9	Electrical & Instrumentation	LS	1	$ 50,000	$ 50,000
10	Standby Power (~300kw generator)	LS	1	$ 125,000	$ 125,000
11	Site work	LS	1	$ 20,000	$ 20,000
	Treatment System				
12	Reverse Osmosis System	EA	1	$ 460,000	$ 460,000
13	Metal Building for RO System	SF	2,000	$ 50	$ 100,000
14	RO System Installation	LS	1	$ 30,000	$ 30,000
15	Chemical Feed Pumps & Controls	EA	2	$ 10,000	$ 20,000
16	Sodium Hypochlorite System	EA	1	$ 45,000	$ 45,000
	SUBTOTAL (Mechanical, Electrical, & Structural)				$ 1,711,500
16	Design (15%)	LS	1	$ 256,725	$ 256,800
17	Construction Services and Contingency (15%)	LS	1	$ 256,725	$ 256,800
	TOTAL				$ 2,225,100

Note: Design costs includes permitting costs associated with water treatment system. Construction services cost includes costs for preparation of Contract Documents and Drawings and Bidding Services.

PRELIMINARY PROBABLE CONSTRUCTION COST ESTIMATE
Utilities, Inc. - Summertree Development
Alternative 4 - MicrO2 System

ITEM	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL PRICE
	General				
1	Mobilization (5%)	LS	1	$77,325.00	$ 77,325
	Pumping and Storage				
2	8-in raw water line from Well 1 to Well 2	LF	600	$ 65	$ 39,000
3	8-in raw water line from Well 2 to site	LF	1,550	$ 65	$ 100,750
4	8-in raw water line from Well 17 to site	LF	1,350	$ 65	$ 87,750
5	12-in raw water line into site	LF	400	$ 85	$ 34,000
6	0.5 mg ground storage tank (Installed)	EA	1	$ 300,000	$ 300,000
7	High Service Pumps (2 high service, 1 jockey)	LS	1	$ 60,000	$ 60,000
8	High Service Pump Building	SF	3000	$ 80	$ 240,000
9	Electrical & Instrumentation	LS	1	$ 50,000	$ 50,000
10	Standby Power (~250kw generator)	LS	1	$ 100,000	$ 100,000
11	Site work	LS	1	$ 20,000	$ 20,000
	Treatment System				
12	MicrO2 System	EA	1	$ 400,000	$ 400,000
13	Equipment Installation	LS	1	$ 50,000	$ 50,000
14	Chemical Feed Pumps & Controls	EA	2	$ 10,000	$ 20,000
15	Sodium Hypochlorite System	EA	1	$ 45,000	$ 45,000
	SUBTOTAL (Mechanical, Electrical, & Structural)				$ 1,546,500
16	Design (15%)	LS	1	$ 231,975	$ 232,000
17	Construction Services and Contingency (15%)	LS	1	$ 231,975	$ 232,000
	TOTAL				$ 2,010,500

Note: Design costs includes permitting costs associated with water treatment system. Construction services cost includes costs for preparation of Contract Documents and Drawings and Bidding Services.

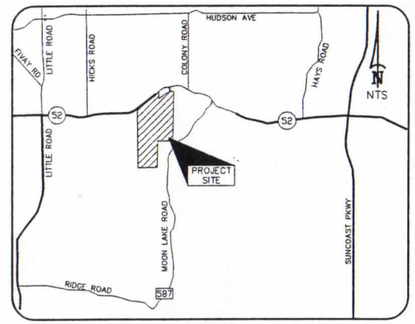


LEGEND

LOT LINES

WATER MAIN W/ LINE SIZE — 6"

RAW WATER MAIN — — — — —



VICINITY MAP

SECTION 5 & 8, TOWNSHIP 25 SOUTH, RANGE 17 EAST
PASCO COUNTY, FLORIDA

NOTE:

INFORMATION PROVIDED HEREON IS BASED ON THE FOLLOWING PLANS:

1. RECORD DRAWINGS FOR SUMMERTREE PHASE II (ARBORWOOD) PREPARED BY PBS&J, DATED 1985, INCLUDING SHEET 8-11, 13-21 AND 30-31 ONLY.
2. RECORD DRAWINGS FOR SUMMERTREE PARCEL 1A PHASE 1 WATER SYSTEM PREPARED BY CUMBEY & FAIR, INC., DATED MARCH 7, 1997.
3. AS-BUILT SURVEY DRAWING FOR SUMMERTREE PARCEL 1A PHASE 1 SEWER SYSTEM PREPARED BY GEORGE SHIMP & ASSOCIATES, UN-DATED.
4. AS-BUILT SURVEY DRAWINGS FOR SUMMERTREE PARCEL 1A PHASE 2 SANITARY SEWER SYSTEM AND WATER SYSTEM BY PRECISION SURVEYING & MAPPING, DATED OCTOBER 7, 1999.
5. RECORD DRAWINGS FOR SUMMERTREE PARCEL 3A PHASE 1 PREPARED BY CUMBEY & FAIR, INC., DATED SEPTEMBER, 2000.
6. PLANS FOR PARADISE POINTE WAY FORCEMAIN (AND DEPICTING WATERMAIN) PREPARED BY PBS&J, DATED DECEMBER, 1990, INCLUDING SHEETS 4 & 5 ONLY.
7. POINTE WEST DEVELOPMENT EXISTING WATER DISTRIBUTION SYSTEM PLAN AND EXISTING SANITARY COLLECTION SYSTEM PLAN PREPARED BY TEN BROECK ASSOCIATES, INC., DATED FEBRUARY 1980.
8. EXISTING WATER AND SEWER FACILITIES WITHIN PARCEL 4 ARE NOT DEPICTED.
9. ⚠ RECORD DRAWINGS FOR SUMMERTREE PARCEL 1B WATER SYSTEM PREPARED BY CUMBEY & FAIR, INC., DATED MARCH 2003.
10. ⚠ RECORD DRAWINGS FOR SUMMERTREE PARCEL 3A PHASE 2 WATER SYSTEM PREPARED BY CUMBEY & FAIR, INC., DATED MARCH 2003.

NO.	DESCRIPTION	BY	DATE

UTILITIES, INC. of FLORIDA

SUMMERTREE DEVELOPMENT

TBE GROUP
Civil Engineering • Transportation
Environmental • Planning
380 Park Place Boulevard, Suite 300
Clearwater, Florida, 33759
www.tbegroup.com – 800.861.8314
License No. 3843

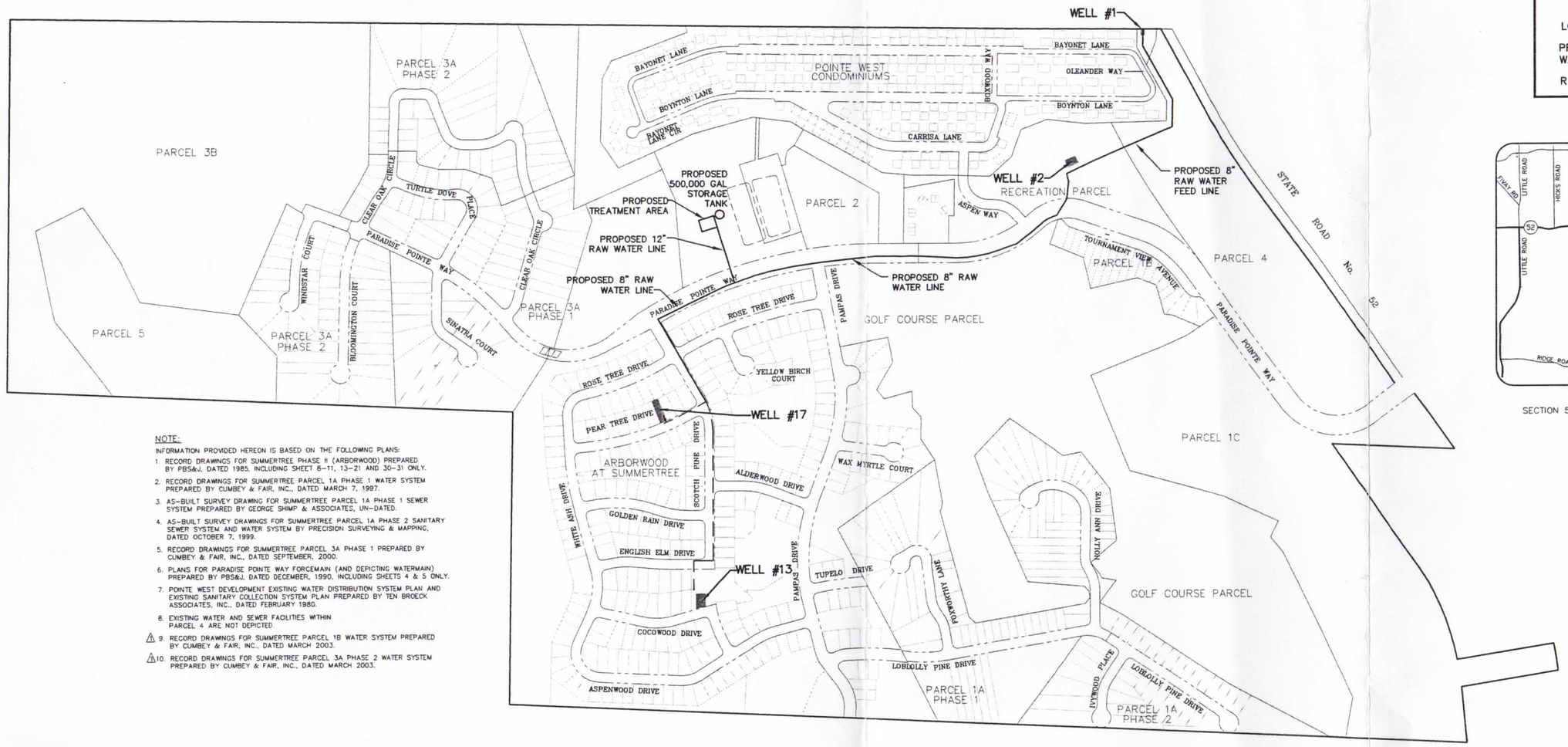
Thomas T. Jones DATE
LIC. NO.: 33422

DESIGNED DAS
DRAWN BHM
Q.C.
APPROVED

FIGURE 1
OVERALL WATER PLAN

PROJECT NO: 00025-001-00
DATE: 03-03-05
SHEET NO:

FILE: J:\00025\00025001.00\ACAD\01-WtrPln.dwg LAST SAVED: Thu, 04/07/05-10:39a PLOTTED: Thu, 04/07/05-10:52a BY: DES



NOTE:

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4. AS–BUILT SURVEY DRAWINGS FOR SUMMERTREE PARCEL 1A PHASE 2 SANITARY SEWER SYSTEM AND WATER SYSTEM BY PRECISION SURVEYING & MAPPING, DATED OCTOBER 7, 1999.
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10. RECORD DRAWINGS FOR SUMMERTREE PARCEL 3A PHASE 2 WATER SYSTEM PREPARED BY CUMBEY & FAIR, INC., DATED MARCH 2003.

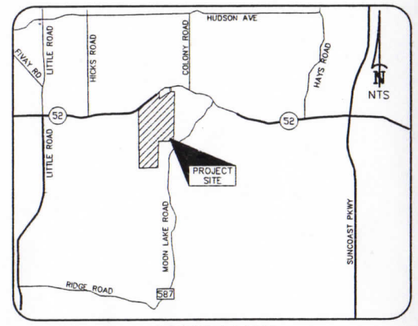
300'

LEGEND

LOT LINES

PROPOSED RAW WATER MAIN

RAW WATER MAIN



VICINITY MAP

SECTION 5 & 8, TOWNSHIP 25 SOUTH, RANGE 17 EAST
PASCO COUNTY, FLORIDA

NO.	DESCRIPTION	BY	DATE

UTILITIES, INC. of FLORIDA

SUMMERTREE DEVELOPMENT

TBE GROUP

Civil Engineering • Transportation
Environmental • Planning

380 Park Place Boulevard, Suite 300
Clearwater, Florida, 33759
www.tbegroup.com – 800.861.8314
License No. 3843

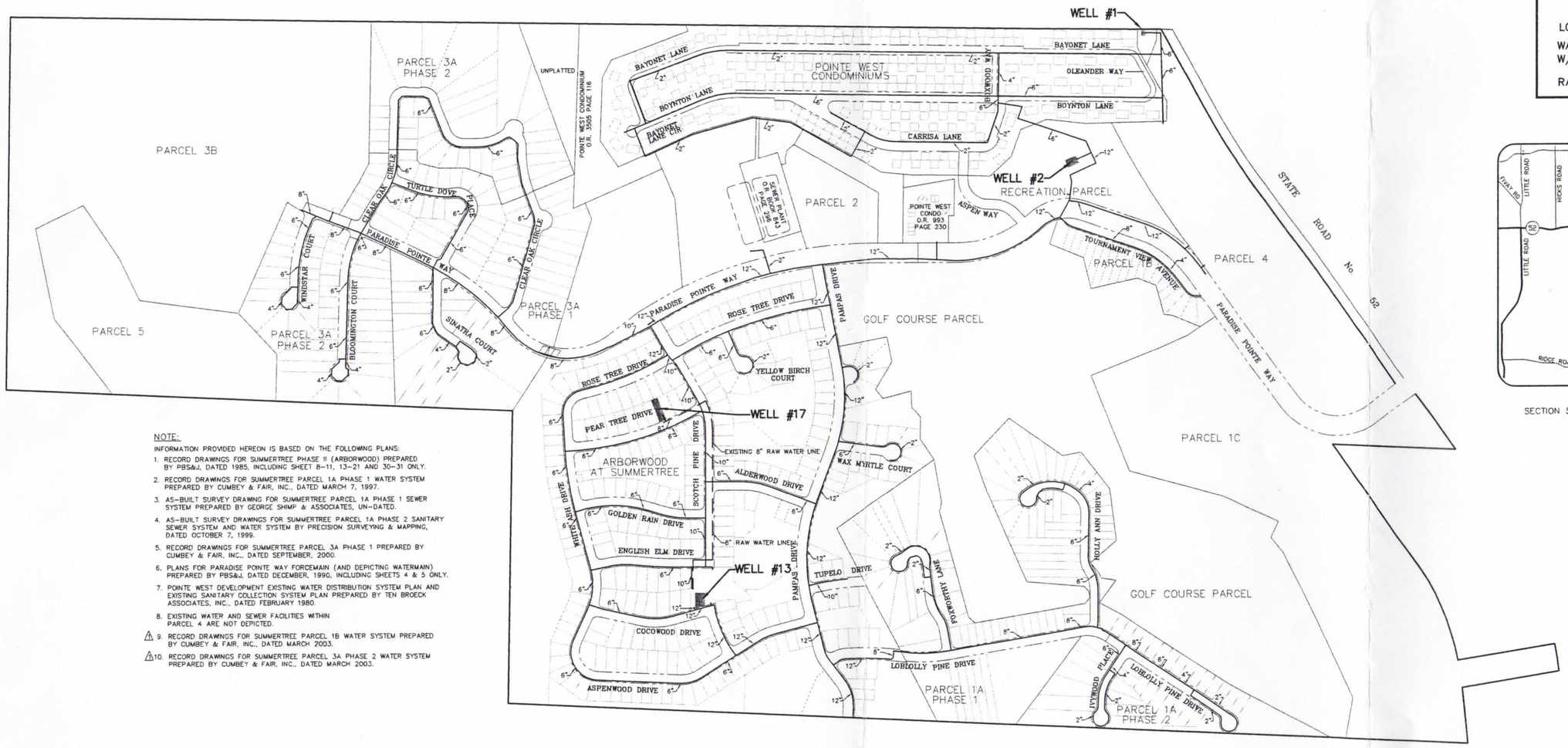
Thomas T. Jones DATE
LIC. NO.: 33422

DESIGNED DAS
DRAWN BHM
O.C.
APPROVED

FIGURE 2
PROPOSED TREATMENT SYSTEM LOCATION

PROJECT NO: 00025–001–00
DATE: 03–03–05
SHEET NO:

FILE: J:\00025\00025001.00\ACAD\01–WtrPln.dwg LAST SAVED: Thu, 04/07/05–10:39a PLOTTED: Thu, 04/07/05–10:52a BY: DES

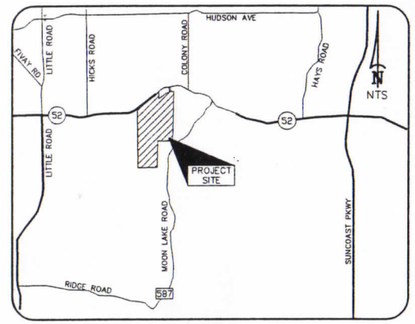


LEGEND

LOT LINES

WATER MAIN W/ LINE SIZE — 6"

RAW WATER MAIN — — — — —



VICINITY MAP

SECTION 5 & 8, TOWNSHIP 25 SOUTH, RANGE 17 EAST
PASCO COUNTY, FLORIDA

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FIGURE 1
OVERALL WATER PLAN

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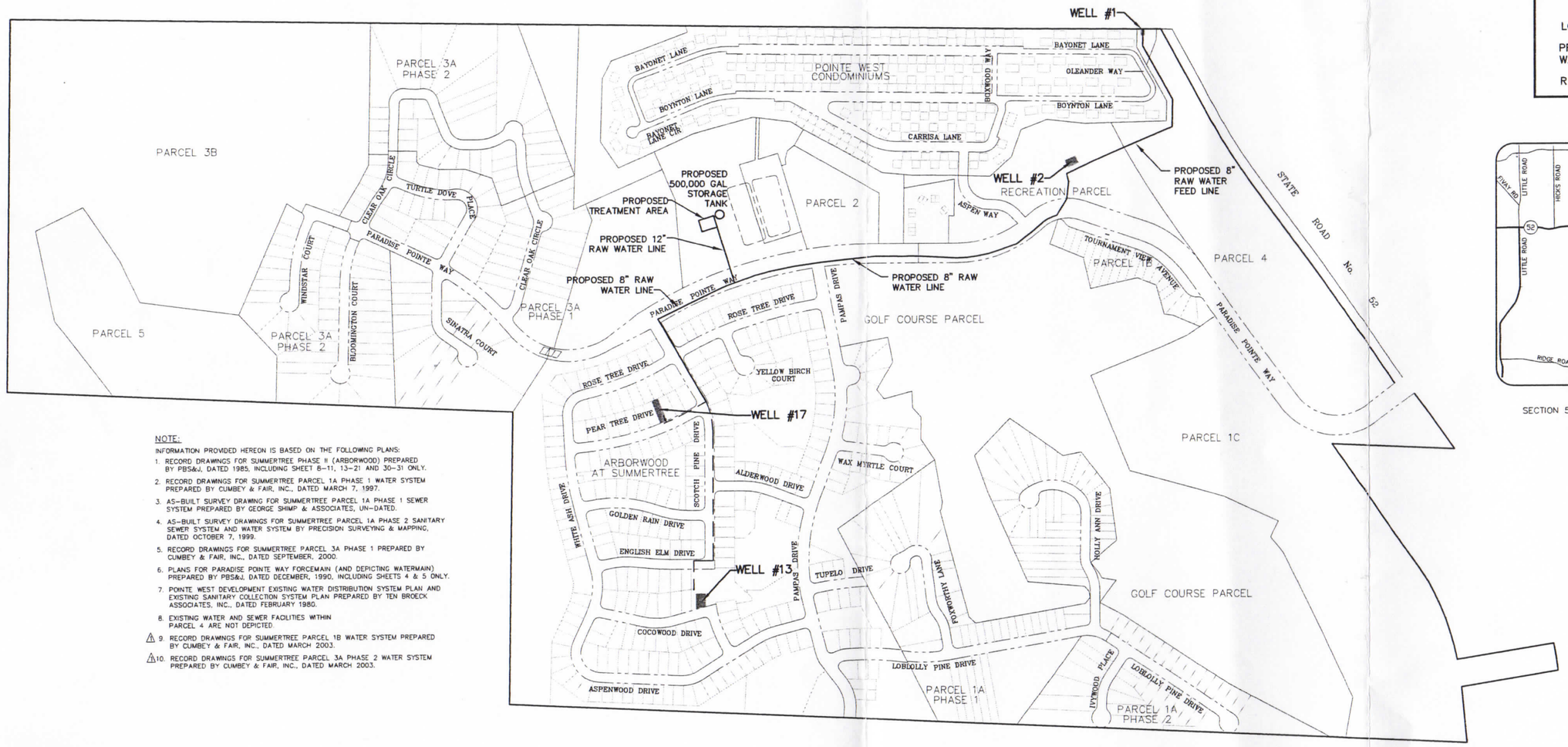

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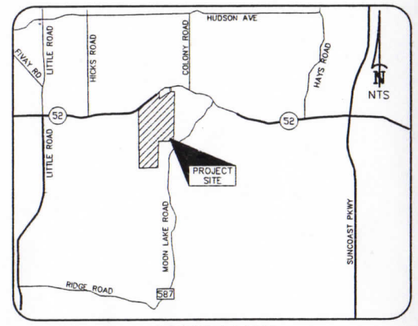
RAW WATER MAIN



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