

# **Cypress Lake Wellfield**

(Water Supply Options project number 4 and 5)

## **DESCRIPTION OF PROJECT**

The Cypress Lakes Wellfield project is the collection of two projects included in the CFWI RWSP Water Supply Options (WSO) project listing: a water treatment plant and the associated infrastructure. These combined projects represent a collaborative effort between the members of the Water Cooperative of Central Florida (WCCF) which is comprised of the Toho Water Authority (TWA), Orange County Utilities (OCU), Polk County Utilities (PCU), and the City of St. Cloud. The Reedy Creek Improvement District (RCID) is also a partner on this project with the WCCF.

This proposed project will develop a Lower Floridan aquifer brackish groundwater wellfield located in central Osceola County. The project includes the construction of a new water treatment plant (WTP), wellfield and raw water transmission systems, concentrate disposal well(s), and the construction of the distribution water mains to facilitate water wheeling among the WCCF partners. The project definition is limited to those elements necessary for delivery of finished water to a partner connection point. Internal infrastructure upgrades by each participating utility to address distribution and water quality concerns are not addressed in this project. A groundwater withdrawal of 37.5 million gallons per day (mgd) has been authorized for this project by the SFWMD under Water Use Permit No. 49-02051-W, a 30-year water use permit (WUP) issued to the WCCF partners and RCID on Oct. 3, 2011. The project has been identified as having a 15 mgd and 30 mgd finished water construction phases.

Associated with, but not included with this project is a study to look at water wheeling alternatives between WCCF members. The study is evaluating water distribution options for the Cypress Lakes Wellfield project in conjunction with existing water withdrawal facilities operated by the WCCF partners and RCID. Results of the water wheeling study, due at the end of 2014, are expected to identify the routes of water transmission mains and required upgrades to existing distribution systems.

## **PLANNING-LEVEL PROJECT DETAILS**

The project include the following systems and components: WTP, production wells, concentrate disposal well(s), transmission service pumps, raw water pipelines, and

finished water transmission mains to partner utilities at points to be determined under a separate water wheeling study.

## **WELLFIELD**

A total of 12 Lower Floridan aquifer wells are proposed as part of the project. Seven wells are projected to be constructed during the 15 mgd phase and 5 additional wells during the 30 mgd phase. The construction of each well is envisioned as a 16-inch diameter well with a total depth of approximately 1,500 feet with casing to approximately 1,350 feet. The wells will be spaced over an approximate ten-mile corridor stretching north to south in a linear manner. **Figure 1** shows the estimated location of this well corridor. Property acquisition of approximately one acre is anticipated for each well.

## **WATER TREATMENT PLANT**

Testing conducted during wellfield investigation indicate that the water quality is expected to be brackish requiring advanced treatment to reduce chlorides, hardness, and other ions. An implementation of reverse osmosis (RO) treatment facility is being anticipated. For design purposes, the total dissolved solids (TDS) of the raw water is estimated at 1,500 milligrams per liter (mg/L). The project includes design and construction of a 30 mgd finished WTP to be located near the northern end of the wellfield just east of Cypress Lake (**Figure 2**). The plant is anticipated to be constructed in two phases of 15 mgd and 30 mgd capacity. The plant is designed to act as a base load facility that provides a constant water supply (no substantive peaking capability). Property acquisition of approximately 30 acres is estimated to be required for the WTP.

## **DEEP INJECTION WELL**

Deep well injection is proposed for disposal of the brine concentrate from the RO treatment process. Based on the TetraTech, Inc. engineering report (**Add reference**) the possible brine disposal zone would be 4,000 feet below land surface (bls). For an initial design, two 10-inch diameter wells with a total depth of 4,500 feet and casing to a depth of 4,000 feet bls are used for cost estimation purposes.

## **RAW WATER MAINS**

Water deliveries from the wells to the WTP are estimated to require the following components:

- Phase 1 piping: 10,000 ft of 36-inch diameter, 5,300 ft of 30-inch diameter; 2,700 ft of 24-inch diameter, 2,700 ft of 20-inch diameter, and 2,600 ft of 16-inch diameter pipe to be installed from the first 7 raw water wells to the WTP site
- Phase 2 piping: 26,500 ft of 16-inch diameter piping for connection of the remaining 5 production wells to the WTP site

## FINISHED WATER MAINS

Water delivery of finished water to the WCCF partners requires construction by each WCCF member and RCID. The associated components and costs are not part of this project but are included for reference. Land acquisition and surveying for water main installation will also be addressed by the WCCF partners. Preliminary design information from an ongoing WCCF Water Wheeling Study (**add Reference?**) was used to identify potential utility connection points and finished water main sizes and lengths (**Figure 2**).

- TWA –finished water mains connecting to points near the Poinciana and Camelot service areas and to convey water to OCU, PCU, and RCID.
- OCU – finished water delivery from the Cypress Lake (CL) WTP is estimated to be delivered to OCU’s South Service Area.
- PCU – finished water delivery from the CL WTP is estimated to be delivered somewhere near their PCU’s NERUSA service area.
- City of St. Cloud – finished water delivery from the CL WTP is estimated to be delivered to the St. Cloud WTP in the southern end of their service area.
- RCID - finished water delivery from the CL WTP is estimated to be delivered somewhere near/in RCID service boundary off US 192 in Osceola County.

## ESTIMATED PLANNING-LEVEL COSTS

Planning level costs for the 30 mgd brackish groundwater wellfield project were made using the cost estimation (CE) tool developed for the CFWI Solutions team process (Chapter 7). **Table 1** summarizes the estimated planning-level costs. Booster pump costs associated with each finished water delivery point were not included in the estimate but would add about \$3.8 million in capital and \$850,000 in annual costs.

**Table 1.** Summary of Estimated Planning-Level Costs for the Cypress Lake Wellfield Project.

<b>Planning Level Estimate</b>	
Construction Costs	\$200,979,922
Non-construction costs	\$40,195,984

Land Costs	\$3,350,000
Total Capital Costs	\$224,525,906
Equivalent Annual Costs (over 30 yrs)	\$12,670,355
Annual Operation and Maintenance	\$12,040,438
Total Annual Costs	\$24,710,793
Unit Cost of Production (\$/kgal)	2.71

## ESTIMATED IMPLEMENTATION SCHEDULE

### Phase 1 (15 mgd) Project implementation is on the following schedule:

- Planning: 2010 – 2015 including completion of Water Wheeling Study
- WTP and well head property acquisition: FY15 - FY17
- Design: FY14 – FY18
- Construction oversight: FY18 – FY19
- Production well construction: 1 existing wells, 2 wells in FY18 and another 4 wells in FY19
- WTP Construction: FY18-FY19
- Raw water main construction: FY15 – FY20
- Finished water transmission main construction: FY15 – FY20

### Phase 2 (30 mgd) Project implementation is on the following schedule:

- Production well construction: To be determined (TBD)
- High service pumps and WTP expansion: TBD
- Additional injection well construction: TBD
- Raw and finished water transmission main construction: TBD

## WATER RESOURCE CONSTRAINTS

Impacts to wetlands and lakes near the wellfield are expected to be minimal due to extensive confining units above the Lower Floridan aquifer where water is being withdrawn. Producing water from the Lower Floridan should minimize the potential for impacts along the ridges and into Polk County however, the Cypress Lakes Wellfield is one of a number of groundwater withdrawal locations projected to grow beyond 850 mgd baseline regional water use estimate and, as such, may contribute to possible impacts to MFL lakes and wetlands closer to the ridge areas. A wetlands monitoring plan will be implemented during project construction and prior to withdrawal. A consumptive use permit has already been issued for the Cypress Lake Wellfield in 2011 by the SFWMD. The permit was issued for 30-years for the amount of 37.5 mgd. The potential impacts to

wetlands and MFL lakes solely from this project have been addressed under the issued permit.

## **PROJECT FEASIBILITY**

This project is feasible and the WCCF and RCID are currently implementing the planning, preliminary design, and property acquisition required to initiate the project.

## **PERMITTABILITY**

This project has already been issued a WUP by the SFWMD in 2011 (WUP 49-02051-W).

## **COST-BENEFIT ANALYSIS OF YIELD**

As an alternative water supply (AWS) project, the Cypress Lake wellfield project is intended to implement a new sustainable source of water supply to meet demands beyond the demands met by traditional fresh groundwater sources. Due to the location and depth of the wellfield, the potential effects to natural resources are minimized. Though more costly than traditional fresh groundwater sources, the Cypress Lake wellfield project is anticipated to be more cost-effective than other potentially available AWS sources such as surface water or seawater desalination.

## **OTHER CONSIDERATIONS**

The project is currently being designed and implemented.

## **POTENTIAL PARTNERS AND GOVERNANCE OPTIONS**

Current members of the WCCF and RCID are participants in this project. The partner's anticipated share of the 30 mgd finished water production total is shown below. For project cost estimation purposes, each project partner is anticipated to receive a proportionate for each unit of production.

- Toho Water Authority (12 mgd)
- Orange County Utilities (9 mgd)
- Polk County Utilities (3 mgd)
- City of St. Cloud (5 mgd)

- Reedy Creek Improvement District (1 mgd)

The Cypress Lake WTP, wellfield, and raw transmission mains are currently in preliminary design. Project partners are also involved in a related water wheeling study that is looking at planning level design for finished water transmission between utility members.

## **FUNDING SOURCES**

The project is being funded by the members of the WCCF and RCID. OCU also contributed funds for AWS development originally provided by the SFWMD to OCU to the Cypress Lake project. Additionally the SFWMD is providing \$500,000 to help fund the related Water Wheeling Study that is reviewing transmission routes and water sharing opportunities among the WCCF partners.

Other potential funding sources for construction include state grants, impact fees, revenue bonds, and state revolving fund loans.

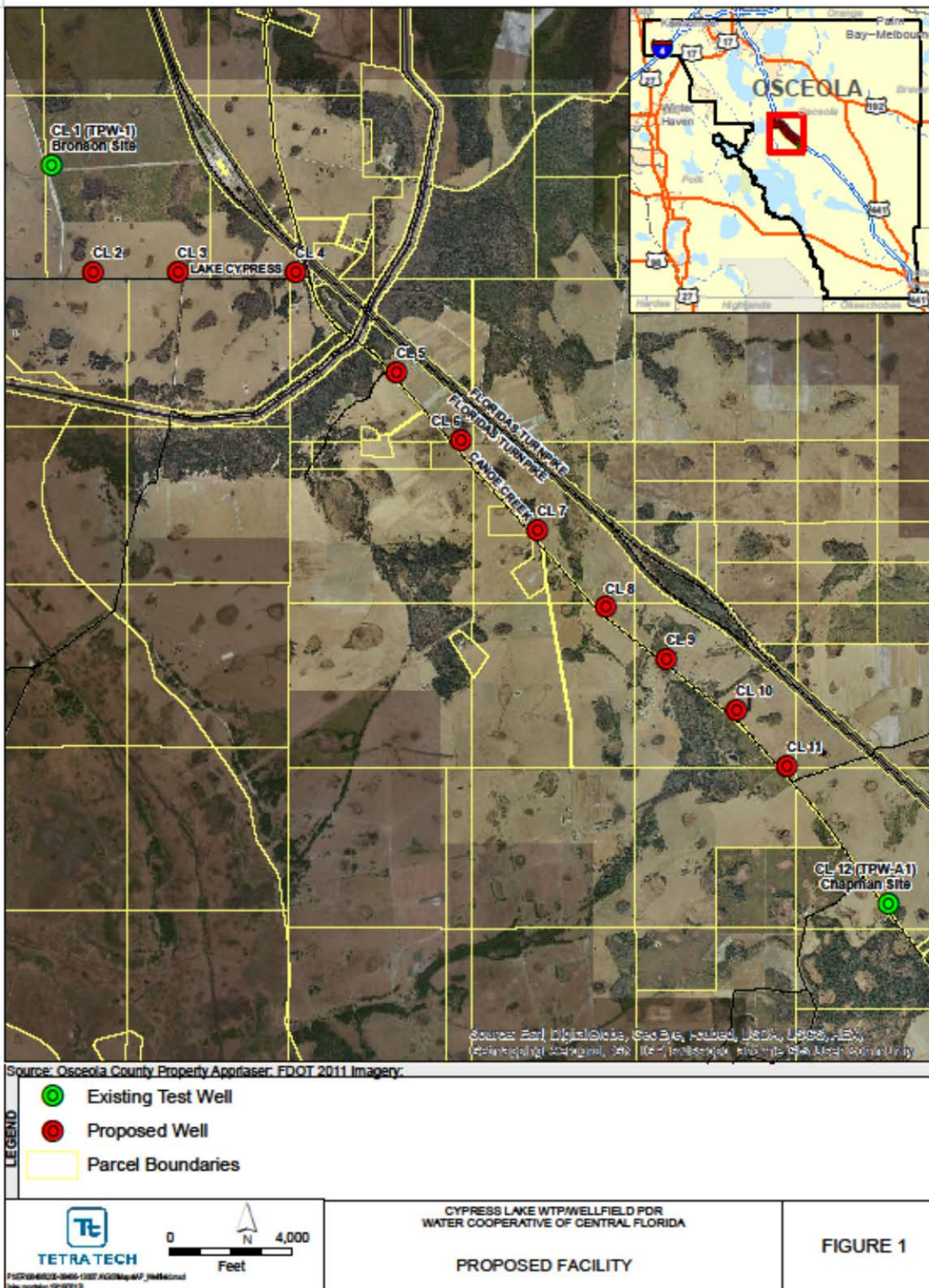
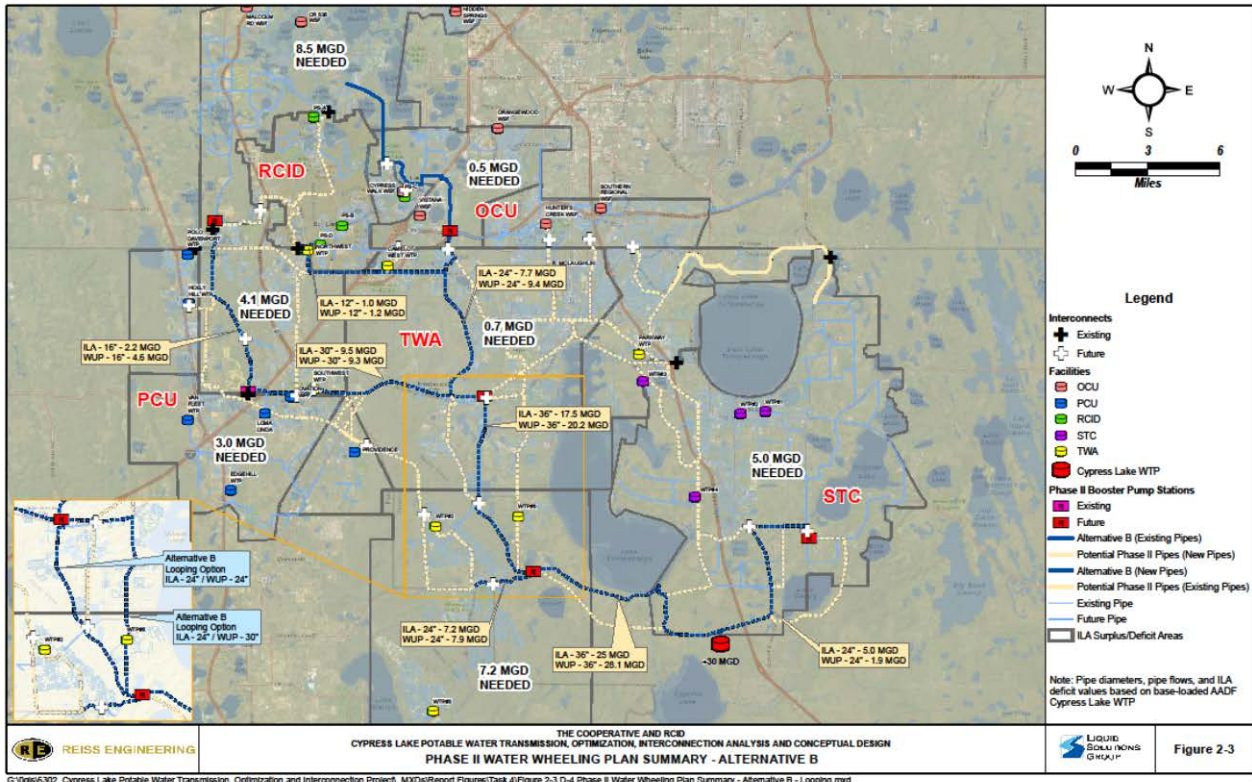


Figure 1. Cypress Lake Wellfield proposed well locations.



**Figure 2.** Proposed locations of finished water mains connecting the Cypress Water Treatment Plant with WCCF partner utilities.