

Project Name: St. Johns River Near Yankee Lake Project **- Scenario 1**

Project Location: Seminole, Orange, Lake and Volusia Counties

Project Number: 138a

Project Type: Surface Water

Description of project:

The St. Johns River (SJR) near Yankee Lake (Scenario 1) project involves the withdrawal of surface water from the SJR for potable consumption. After withdrawal, the water would be treated at Yankee Lake and finished potable transmitted to various end users. End users were identified by comparing potable water demands developed in the current Regional Water Supply Plan (RWSP) to various permittee's groundwater allocations in their consumptive use permit (CUP). The project includes several components, including potable water treatment of a brackish surface water, Lower Floridan aquifer (LFA) injection well for Reverse Osmosis (RO) concentrate disposal, approximately 90 miles of large diameter pipe for transmission of finished potable water, booster pumping stations, residual disinfection and storage. The surface water intake structure and raw water transmission have already been constructed, and has been in operation since December 2012.

This project is an alternative water supply (AWS) project that will develop surface water of variable quality (from fresh to slightly brackish) from a nontraditional supply source. This project will produce potable water for various entities within the CFWI region. A conceptual transmission configuration was developed as presented in Figure 1.

A conceptual-level project description was developed by the St. Johns River Water Management District (SJRWMD) in 2007 and included in the SJRWMD District Water Supply Plan. In 2007 and 2008, interested water suppliers met with the SJRWMD to further refine the project concept. Preliminary partnership meetings were held by Seminole County with various potential water users in the late 2000's to discuss partnership options. However, no partnership agreements were reached, largely due to the economic downturn. Subsequent to continued project development, the District completed the St. Johns River Water Supply Impact Study (WSIS) (2012) which indicated an expected yield at this location of up to 50 mgd.

Planning-Level Project Details:

The project includes the following systems and components: potable water treatment of a brackish surface water, Lower Floridan aquifer (LFA) injection well for Reverse Osmosis (RO) concentrate disposal, approximately 90 miles of large diameter pipe for transmission of finished potable water, booster pumping stations, residual disinfection and storage.

Potable Water Treatment Plant

Construction of a new 50 mgd brackish water SWTP

LFA injection well for RO concentrate disposal

Construction of a 10 mgd injection well for RO concentrate discharge

Potable Water Storage

Construction of five tanks totaling 12 MG of end-user system storage

Finished Water Mains (transmission to end-user storage tanks)

Treated water will be conveyed to 5 point of connection ground storage tanks via approximately 90 miles of distribution system piping.

Booster Pumping Stations and Residual Disinfection

Booster pumping and residual disinfection are needed for a transmission system of this size

Project Yield:

The project is expected to produce a maximum daily withdrawal rate of 50 mgd from the SJR and is estimated to yield 40 mgd of finished (potable) water.

Estimated planning-level costs:

Planning level costs for 50 mgd SJR withdrawal/40 mgd AADF of supply were made using the cost estimation (CE) tool developed for the CFWI Solutions team process. Table X summarizes the preliminary estimated planning-level costs.

Table X. Summary of Estimated Planning-Level Costs for the Alternative Water Supply Project near Yankee Lake (Scenario 1).

Planning Level Estimate	50 mgd average annual daily flow (AADF)/40 mgd supply (AADF)
Construction costs	\$448.9 million
Non-construction costs	\$89.8 million
Land Value	\$27.1 million
Total Capital Costs	\$565.8 million
Total Annual Costs (O&M)	\$18.6 million
Unit Cost of Production (\$/kgal)	\$4.011

Land costs include right-of-way land value for transmission piping. There are no additional land costs for the water treatment facility, as Seminole County owns the land that would be used. Costs for potential wetland mitigation are not included, nor is land required for end user storage tanks.

Estimated Implementation Schedule:

For this scenario, it is assumed that the full build out of treatment facility and transmission system would need to be in place by 2025. To accommodate that schedule, design and permitting should begin no later than 2018, with construction starting by 2022. It may be possible to phase construction of some needed treatment capacity beyond 2025, but the transmission system should largely be in place by that time. A preliminary transmission routing study, and a concentrate disposal feasibility study, can be completed within the next two years.

Water resource constraints:

Minimum flows and levels (MFLs) have been established for the St. Johns River at SR 50, the St. Johns River at Lake Monroe, the St. Johns River at SR 44, and Taylor Creek. The MFLs at all four of these locations apply for the SJR/TCR project. In addition, the SJRWMD is in the process of adopting an MFL for Lake Poinsett, just downstream of the confluence of Taylor Creek with the St. Johns River, which will also apply once adopted by rule. In addition to compliance with MFLs, ecological effects, if any, must be reduced to the extent feasible.

Project feasibility:

The project is technically feasible with appropriately designed components to treat potentially variable water quality from the SJR. The raw water intake structure, designed and constructed to accommodate flows of up to 50 MGD, has been in operation since December 2012. However, some stakeholders have expressed concerns for the potential environmental effects of withdrawals from the SJR. To address these concerns, the District conducted the St. Johns River Water Supply Impact Study (WSIS) from 2007 to 2012. In the WSIS, the SJRWMD concluded that the St. Johns River at Yankee Lake could yield at least 50 mgd, on a maximum annual average day withdrawal basis, at this location without unacceptable ecologic and hydrologic impacts.

The inclusion of the project in the SJRWMD District Water Supply Plan and confirmation through the WSIS indicate that the project is feasible and no project limitations due to rule inconsistencies have been identified.

Permittability:

Permitting challenges are likely considering past permitting efforts for SJR withdrawals and the interests and concerns of stakeholders. Stakeholder concerns related to SJR withdrawals include potential environmental effects to wetland vegetation and wildlife,

effects to aquatic vegetation, fish, plankton and macroinvertebrates; and changes in downstream salinity and water elevations.

Cost-Benefit Analysis of Yield:

As an alternative water supply (AWS) project, this project is intended to provide potable water to meet future water demands in the CFWI planning area. The Yankee Lake – Scenario 1 project is conceptualized to deliver 40 mgd at a unit production cost of \$4.01 per 1000 gallons.

Other Considerations:

To treat brackish surface water to potable standards, a reverse osmosis treatment system is required. A consequence of using reverse osmosis is the production of a concentrate that needs to be disposed. At build out, expected concentrate flow could approach 10 MGD, assuming full build out. The two viable technical options to dispose of concentrate include deep well injection into the LFA (which is assumed in this scenario) and dispersal into the SJR. However, additional study regarding the ultimate viability of these disposal options at Yankee Lake is required.

Potential partners and governance options:

The project partners in this scenario were identified by comparing potable water demands developed in the current Regional Water Supply Plan (RWSP) to various permittee's groundwater allocations in their consumptive use permit (CUP). The entities thus identified in this scenario include Seminole County, Sanlando Utilities Corp., Leesburg, Lake Utility Services Inc., Apopka and Volusia County. Potential governance options are undetermined at this time, and would have to be negotiated by potential partners. An example framework of a governance option could be that the partners enter into a memorandum of understanding, where each partner is proportionally responsible for project decisions, funding and management. Another option could be to develop a water supply authority or a facility management board where one partner is responsible for oversight of operations and capital outlay and becomes a water supplier through contractual commitments with the other entities.

Funding sources:

Significant funds will be required to support implementation of this project. Possible funding sources include the project partners, State of Florida, SJRWMD, and federal revenues. Challenges/obstacles to funding include numerous projects and entities competing for the same funding; long-term funding commitments needed by local partners.