McCafferty Brinson consulting

Water Treatment Plant Washwater Recovery Upgrades

Boca Raton, Florida

Client
City of Boca Raton

Scope of Services
Professional engineering services for design development, preparation of construction contract documents, permitting, bidding, construction contract administration, and resident project representative services.

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Start Date
March 2018

Completion Date
November 2024

Construction Cost
$ 4.93 million

Key MBC Staff
Frank A. Brinson, P.E.
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Mathew Marsh, P.M.P.

Key Features
Project included design of a washwater recovery basin, supernatant decanting system, settled sludge handling, and a washwater return pumping system. The project also included yard piping improvements, electrical improvements, associated sitework and instrumentation and controls.

Benefit to the City
The upgrades provided improved operational flexibility and redundancy in the lime softening process.

Background

The Glades Road Water Treatment Plant utilizes a combination of conventional lime softening (30 million gallons per day (mgd) capacity) and membrane softening (40 mgd capacity). The lime softening process includes a washwater recovery basin and return pumping system for the treatment (settling) and recycle of the filter backwash water and other recyclable treatment process streams. The existing concrete basin is beyond its useful service life and exhibiting age-related deterioration such as cracking, leaks, and failing mechanical equipment.

To maintain the efficiency and integrity of the lime softening treatment process, the City retained MBC to design and construct a new washwater recovery system adjacent to the lime softening units and gravity filters. The new system includes an octagonal cast-in-place concrete basin, a supernatant decanting and return pumping system, a settled sludge pumping system, and a custom-designed basin cleaning system. The new system is independent of the existing system and can be operated in parallel with, or by itself, independently of the existing system. The desgin allowed the new system to be constructed without interfering with treated water production, and will allow the City to demolish the existing system without impacting treatment plant operations.

The new system also provides more operational flexibility than the existing system, allowing the City to return settled supernatant directly to the lime softening units (rather than routing flows through the gravity sludge thickeners), as well as pump settled sludge from the basin concurrently with supernatant decant return pumping. The ability to return-pump settled supernatant directly to the head of the plant substantially reduces the hydraulic loading on the lime sludge handling system, substantially improving the performance of the sludge thickeners and enabling the City to significantly improve optimization of both the washwater recycle and sludge handling processes.

The Project

The design scope included the following improvements:

- Construction of an octagonal concrete, open-top washwater recovery basin to receive and treat plant recycle streams (e.g., filter backwash water, filter to waste from the pressure filters, and filter to waste from the gravity filters).
- Construction of a supernatant decanting system, settled sludge handling, and washwater return pumping system. The return pumping system will consist of a cast-in-place concrete wetwell adjacent to the washwater recovery basin and three return pumps. The pumps will be controlled by the liquid level in the wetwell.
- Replacement of fourteen (14) existing valve actuators including surrounding lighting and all related electrical, and instrumentation and control systems.
- Yard piping improvements to connect the new system to the filter washwater waste piping, sludge thickener feed piping, and washwater return piping.
- Associated sitework, geotechnical and foundation construction.
- Electrical improvements to provide power to the washwater return pump station.
- Instrumentation and controls associated with the recovery basin and return pumping system.

MBC scope of services for this project included:

- Design development and preparation of Construction Drawings and Technical Specifications
- Permitting
- Bidding services
- Construction contract administration and on-site observation (resident project representative services)

The contract for construction of the project was awarded to Lanzo Construction Corporation. The project was completed in November 2024 and is currently in active use.