Quarter 2 Update: April – June, 2022

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The Springfield Water and Sewer Commission (Commission) is embarking on large-scale upgrades to replace 50- to 100-year-old drinking water infrastructure and to achieve compliance with regulatory limits for disinfection by-products (DBPs). This is a quarterly update on projects related to DBP compliance and water supply capacity.

The following projects to reduce Disinfection By-Products in the Commission's drinking water and maintain a consistent supply of safe drinking water have progressed over the last quarter:

- **Clearwell & Backwash Pump Station project** - CH Nickerson began construction of the clearwell structure and are almost complete with constructing the walls of the structure.
- **Direct Filtration Plant Repairs -** Emergency repair of Rapid Sand Filter #6 is underway, after the Filter #6 underdrain system failed in January. RH White is currently demolishing the underdrain in Filter #6 in preparation to install a new underdrain system as designed by AECOM.
- **ACH Bulk Chemical Storage/Chlorination System Improvements** - RH White has constructed a temporary chlorine feed system to provide disinfection while they replace chlorine scales, piping, and equipment. They have also constructed tank pads and secondary containment for new ACH (water treatment chemical) bulk storage tanks.
- **New Water Treatment Plant Design** – We selected Hazen in February to complete an alternatives analysis and begin final design of the new water treatment plant. The alternatives analysis is underway and includes plant layout, plant capacity, and residuals handling options.
- **42-inch Raw Water Transmission Main** - We have completed a peer review of AECOM's alternatives analysis and are beginning preliminary site investigations for the repair or replacement of the 42-inch pipeline. Alternatives being considered include lining, spot repairs, and full replacement with a new main. We awarded AECOM the design contract.
- **Cobble Mountain Hydroelectric Station Improvements** - Stantec and Kleinfelder are completing an alternatives analysis for hydropower generation for the Commission.

We have included additional information for each project on the following project update pages.

Please contact us if you would like more information about these projects. More information is also available at https://waterandsewer.org/projects/.

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Clearwell & Backwash Pump Station

Project Purpose: This new facility will replace the existing clearwell and backwash, domestic, and process water pumps.

The existing clearwell is a 1920's slow sand filter that was retrofitted for the direct filtration plant in the 1970's. The structural integrity of the clearwell is uncertain and the roof is leaky, allowing rainwater to infiltrate and contaminate the finished water. The clearwell cannot be taken offline for maintenance, presenting a single point of failure for the direct filtration plant. The existing backwash, domestic, and process water pumps are original to the plant and are regularly breaking down and in need of repair.

This project will provide the reliability and redundancy needed to maintain existing operations and will also function as the first component of the new water treatment plant.

Delivery Approach: Design-Build with AECOM (OPM), Tighe & Bond (Engineer), and CH Nickerson (GC). Funded by SRF.

Design Progress: Tighe & Bond submitted the 100% design in late June.

Const. Progress: CH Nickerson is completing the concrete work associated with the clearwell structure and began excavation and concrete work for the hydraulic control structure.

Supply Chain: Pricing for large diameter ductile iron pipe has been impacted by pandemic supply chain issues and the Ukraine/Russia conflict. Pipe suppliers have put us on notice that pricing can change at any time, even right up to delivery. Delivery dates have also been uncertain and have caused a slight delay in the substantial completion date.

Project Delays: Changes in design scope as requested by the Commission and AECOM during the 60% design review, along with pipe delivery delays, have resulted in a four-month delay in project completion.

Operational Issues: During excavation for the hydraulic control structure, the washwater piping system was damaged, which provides fire flow protection, water for cleaning the slow sand filters, and powers some site hydraulic valves. This resulted in the system being down for two weeks while the contractor repaired it.

Schedule: Project scheduled to be substantially completed in June 2023 (delayed from February 2023) but is currently projected to be delayed to August 2023.

Construction of the new Clearwell structure

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Direct Filtration Plant Repairs

Project Purpose: The project will replace the Rapid Sand Filter #6A underdrain system after it failed in January. The rapid sand filters were constructed in the 1970's as part of the direct filtration plant, and the clay tile underdrain systems are original to the plant. The plastic nozzles were routinely replaced and were most recently replaced between 6 to 12 years ago. The nozzles in Filter #6 were the oldest nozzles in the plant and were replaced 12 years ago.

The clay tile underdrain structurally failed during a routine backwash, most likely due to an air blockage. This project will replace the entire underdrain system with a new Leopold Block-style system that will reduce the risk of air blockages and restore use of the filter until the new plant is online. The Commission is installing air vents and air release valves on all of the filters in conjunction with this project to reduce the risk of underdrain failure in the remaining filters.

Delivery Approach: Design-Bid-Build with AECOM (Engineer) and RH White (Contractor).
Funded by cash reserves.

Progress: RH White demolished the underdrain in Filter #6 in preparation to install a new underdrain system. They are currently preparing the filter for the installation of a new steel air supply header.

Supply Chain: No issues at this time.

Project Delays: The Leopold Block-style underdrain system selected for this project includes a custom fabricated steel air header pipe. The delivery of this pipe was delayed due to schedule miscommunications and fabrication schedule limitations, delaying project completion by six weeks. Demolition work was delayed when asbestos containing materials was found and required remediation and coordination with MassDEP.

Schedule: Project scheduled to be completed in September 2022 (originally July 2022).

Left: failure of the filter underdrain. Right: demolition of the underdrain prior to installation of new system.

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New Water Treatment Plant Design

Project Purpose: This project is for design and construction of a new water treatment facility to meet the system demand while providing a higher level of treatment to achieve long-term, consistent compliance with the Disinfection By-Product (DBP) Rule. The new WTP will replace the existing direct filtration and slow sand filtration plants, which were not designed to remove adequate dissolved NOM to meet current regulatory limits for HAA5s and THMs.

The Commission has frequently been in non-compliance for HAA5s since 2018. To address this issue, the Commission completed several studies that culminated in a pilot plant study to evaluate the effectiveness of potential plant modifications and new processes to reduce DBPs in the distribution system. The results of the pilot plant study indicated that modifications to the existing plant processes would not be sufficient to achieve compliance, and that the addition of clarification was needed to reliably remove NOM and maintain compliance. Dissolved Air Flotation (DAF) was selected as the clarification process for the new conventional plant.

Delivery Approach: Design-Bid-Build with Hazen (Engineer).
Funded by WIFIA and SRF.

Progress: Hazen was selected in February to complete an alternatives analysis and begin final design of the new water treatment plant. The alternatives analysis is underway and includes plant layout, plant capacity, and residuals handling options.

Supply Chain: Supply chain impacts on this project are currently unknown, but are a considerable possibility and concern. Hazen is considering early works packages to possibly facilitate the early procurement of long lead time materials to avoid lengthy delays.

Project Delays: This project is on an aggressive schedule. To meet the WIFIA completion date of 2027, early works and demolition packages are being considered to prepare the site prior to the completion of the treatment plant design as well as procure key long lead time items.

Schedule: Project scheduled to be completed end of 2027, as required by the terms of the WIFIA Loan.

West Parish Filters aerial view with location of future water treatment plant

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42-inch Raw Water Transmission Main

Project Purpose: This project is for the repair or replacement of the 42-inch bypass raw water conveyance PCCP pipeline, which was damaged when a new energy dissipating valve failed in 2019. The 42-inch bypass provides an important route for raw water to bypass the Cobble Mountain Hydroelectric Station (CMHS), the Intake Reservoir, and the 72-inch Intake Tunnel. Returning this route to service will allow the Commission to take the CMHS and 72-inch Intake Tunnel offline for maintenance when needed.

The Commission is currently relying on the Diversion Gates (the low-level dam outlet) to release water from the Cobble Mountain Reservoir while the CMHS is offline for maintenance. This outlet was not designed to operate as a regular intake and is not operable remotely, requiring staff to regularly perform a complicated confined space entry that, in an emergency, would require assistance from a technical rescue team. With the 42-inch bypass out of service, there is currently no bypass for the 72-inch Tunnel.

The Commission is currently considering alternatives to restore this important raw water conveyance route. Alternatives being considered include lining, spot repairs, and full replacement with a new steel main.

Delivery Approach: Design-Bid-Build with AECOM (Engineer).

Progress: Stantec/Kleinfelder completed a peer review of AECOM's alternatives analysis, which compared repair options and full replacement of the 42-inch bypass. The Commission is reviewing and considering repair vs. full replacement. AECOM has been awarded the design contract and has begun preliminary design.

Supply Chain: Supply chain impact on this project is uncertain. Current lead times on materials indicate that this may be less of a concern than some of our other projects, but possible long lead time items include the energy dissipating valves (EDVs) and possibly the piping, although current communication with vendors indicate that lead times may not be an issue for steel pipe.

Project Delays: None at this time.

Schedule: Project anticipated to be completed end of 2024.

Outlet of the 42-inch bypass water supply main at the Sedimentation Basin

ACH Bulk Chemical Storage/Chlorination System Improvements

Project Purpose: This project will provide a bulk tank and piping for storage of Aluminum Chlorohydrate (ACH), one of the coagulants used at the plant. ACH has been used since 2016 but has been stored in totes in a temporary configuration.

The project also includes replacing components of the gaseous chlorine system that are due for routine replacement, including the chlorine tank scales and all chlorine piping. This work will allow the gaseous chlorine system to continue to operate reliably until the new plant is online.

This project will allow the existing Direct Filtration Plant and chlorine system to continue to operate reliably until the new plant is online.

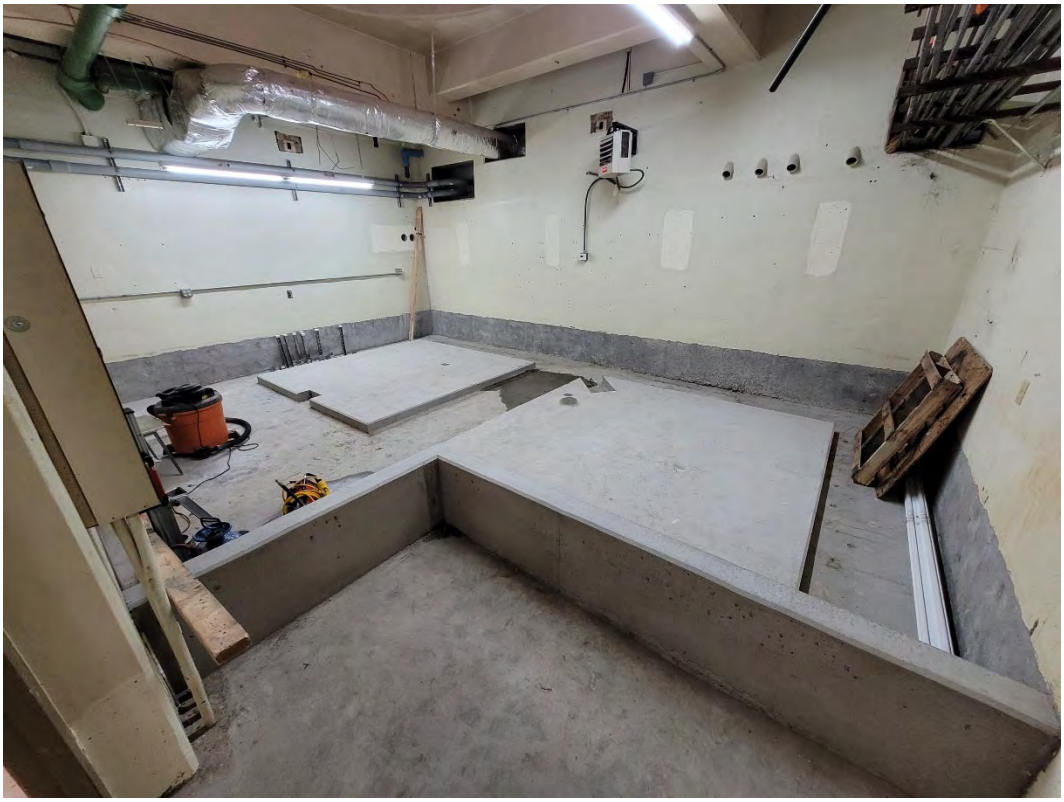
Delivery Approach: Design-Bid-Build with Tighe & Bond (Engineer) and RH White (Contractor).

Progress: RH White has constructed a temporary chlorine feed system to provide disinfection while they replace chlorination scales, piping, and equipment. They have also constructed tank pads and secondary containment for new ACH (water treatment chemical) bulk storage tanks.

Supply Chain: None at this time.

Project Delays: A two-three week delay is anticipated for additional work requested by the Commission to replace brittle piping in the chlorinators.

Schedule: Project scheduled to be substantially completed August 2022.



New bulk storage pads and secondary containment in the new ACH storage room.

Cobble Mountain Hydroelectric Station Improvements

Project Purpose: This project will identify alternatives for hydropower generation in response to the failing condition of the infrastructure at the Cobble Mountain Hydroelectric Station (CMHS). The existing turbines have reached the end of their operational lives, and only one out of the original three turbines is currently operational on a restricted schedule to reduce additional wear.

The CMHS generates power along the Commission's primary raw water conveyance route. When the CMHS is offline for maintenance, the remaining methods for bringing water to WPF are via the 42-inch bypass (currently out of service) and the low-level Diversion Gates, which are not designed for regular operation. Restoring the CMHS conveyance route is vital to establishing reliable raw water conveyance for the Commission.

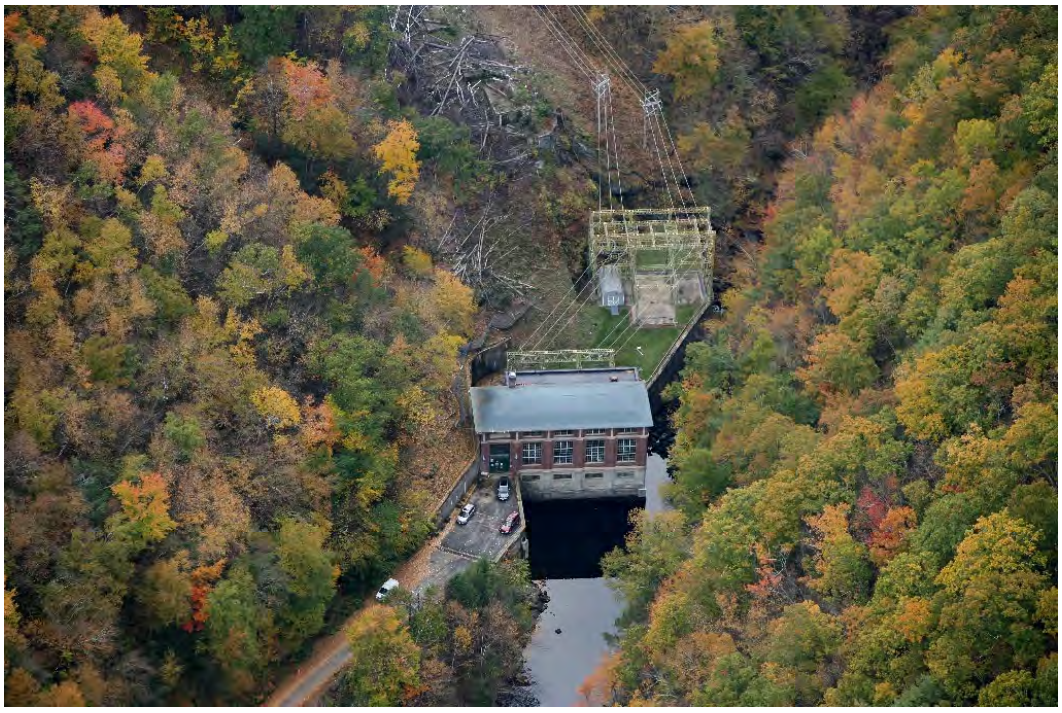
Delivery Approach: To be determined.

Progress: Stantec and Kleinfelder are completing an alternatives analysis for hydropower generation for the Commission.

Supply Chain: None at this time.

Project Delays: None at this time.

Schedule: Project schedule has not yet been established.



Cobble Mountain Hydroelectric Station

Engineering Capital Projects Schedule

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