

GREAT LAKES WATER AUTHORITY

Raw Sludge Clarifiers and Raw Sludge Pumping Systems Improvements at the Lake Huron Water Treatment Plant

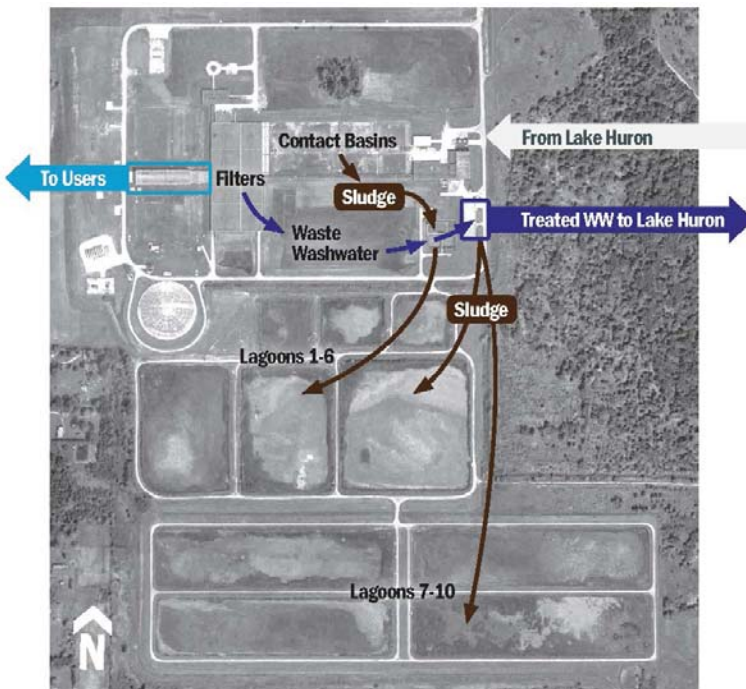
**Drinking Water Revolving Fund
Public Hearing Brochure
April 11, 2018**

Summary of Project Need

The Lake Huron Water Treatment Plant (LHWTP) is a Type I public water system that was placed into service in 1974. The LHWTP supplies water to the Great Lakes Water Authority's (GLWA) residential, commercial, and industrial customers. The rated treatment capacity of the LHWTP is 400 million gallons per day. There are major issues associated with the sludge handling system at the LHWTP as it relates to the twice annual cleaning of the settling basins. Specifically, those issues include:

- Poor structural condition of clarifier basins,
- Poor condition of sludge pumping facilities,
- Lack of flexibility for conveying settling basin sludge and managing decant water, and
- Use of sludge pumping systems that may not be optimized for the intended purposes.

GLWA is proposing to undertake the Raw Sludge Clarifiers and Raw Sludge Pumping Systems Improvements Project at the LHWTP with Drinking Water Revolving Fund (DWRP) funding.



Aerial View of Lake Huron Water Treatment Plant (LHWTP)

LHWTP Sludge Handling Systems

Sludge is generated in or sludge handling operations are performed in the following process facilities:

1. WTP Settling Basins
2. WTP Filters
3. Waste Washwater Retention Basin
4. Clarifiers
5. Sludge Pumping Systems
6. Washwater Treatment Facility
7. Lagoons

Potential Alternatives

Five alternatives were considered. Alternative 1, the "No Action" alternative, did not include any rehabilitation or improvements and was not pursued further given the risk of system failure. Alternative 2, a regional alternative, was not possible because GLWA is the only existing water supply in South-Eastern Michigan large enough to service the customers of the LHWTP. Alternative 3, included for rehabilitation of the existing clarifiers and the adjacent sludge withdrawal box and pumping system. Alternative 4 included rehabilitating the existing clarifiers so they may remain in place as redundant washwater retention volume and providing a new sludge pumping station that does not use the clarifiers for flow equalization during sludge removal operations. Both Alternative 3 and Alternative 4 were considered costly and risky because of the uncertainty associated with the efficacy of structural rehabilitation and the design life would only be extended 20 years. Alternative 5 included construction of a new redundant washwater retention basin and a new sludge pumping station and is considered to be the preferred and selected alternative.

Proposed Improvements

GLWA identified and evaluated sludge handling alternatives that best suited the LHWTP. The recommended alternative maintains the existing capacity. The major components of the project are as follows:

- Construction of a new redundant washwater retention basin,
- Construction of a new sludge pumping station,
- Abandonment or demolition of existing clarifiers, and
- Provisions to decant clear water from Lagoon 5 and Lagoon 6 to Lagoon 8.

Monetary Evaluation - Cost Effectiveness

Based on their ability to meet all of the functional requirements identified for the project, Alternative 4 and Alternative 5 were carried forward for detailed evaluation.

TABLE 1-1 // Summary of Cost Comparison

Cost Item	Alternative 4: Rehabilitate Clarifiers and New Sludge System (\$M)	Alternative 5: New Redundant Washwater Retention and New Sludge System (\$M)
Construction Cost*	5.2	6.1
Estimate Range*	2.6-10.5	3.1-12.2
20-Year NPV	8.0	8.0
40-Year NPV	12.0	10.2

*Based on a AACE Class 5 estimate with an accuracy range of -50% to +100%.

Estimated Project Cost

TABLE 1-2 // Estimated Costs for the Selected Alternative

Item	Estimated Cost (\$)
Opinion of Probable Construction Cost	6,120,000
Engineering and Design Consultant Contract	940,000
GLWA Portion of Engineering and Administrative Costs	180,000
Total	7,240,000

User Cost Impact for the Sludge Handling Systems at the LHWTP

TABLE 1-3 // User Cost Impact for the DWRFLHWP – Raw Sludge Clarifiers and Raw Sludge Pumping System Improvements Project

Item	Estimated Cost (\$)
Total Cost of Project	7,240,000
Annualized Cost of Project (Assuming DWRP Interest Rate of 2% Over 20 Years)	450,000
Service Area Households (Customers Served by GLWA as of the 2010 Census without including Genesee County)*	1,400,000
Estimated Household User Cost (per Year)	0.33

**Customer population of GLWA has increased since the 2010 Census, likely resulting in an estimated household user cost lower than what is represented.*

Environmental Evaluation

- The proposed improvements will significantly improve GLWA's capability to reliably operate the LHWTP and provide sufficient sludge handling operations.
- Construction is highly unlikely to have any adverse impact on any neighboring properties surrounding the LHWTP.
- The project will not detrimentally affect the water and the air quality of the area.

Implementation Schedule

The following schedule is anticipated for the Raw Sludge Clarifiers and Raw Sludge Pumping System Improvements Project at the LHWTP.

Project: 42 Months (September 2017 to February 2021)

Design: 16 Months (September 2017 to December 2018)

Biddings: 4 Months (January 2019 to April 2019)

Construction: 22 Months (May 2019 to February 2021)

TABLE 1-4 // Schedule for Design and Construction[illegible]



Detroit

100 West Big Beaver Road

Suite 200

Troy, MI 48084

T 248.680.6708

100% Environmental | Employee Owned | Offices Nationwide | BrownandCaldwell.com