

APPENDIX E: VALIDATION REPORT

2023 – 2027

Technical Memorandum

Subject: GLWA CIP Validation – 111012

Project

This technical memorandum relates to the following project:

- CIP No. 111012 – Lake Huron Water Treatment Plant Flocculation Improvements

Status/Classification

CIP No. 111012 is classified as Active – Pre-Procurement – Design in the 2022-2026 Board Approved CIP.

This project is currently in the late stage of Procurement for Engineering Services for design of the improvements included in this project.

Information Reviewed

Existing information was reviewed and used to aid in the validation efforts. The information reviewed includes:

- 2022-2026 Board Approved CIP
- RFP for Design Services (RFP 2004549), and associated reference material included with the RFP on GLWA Bonfire
- Discussion with Project Manager (Eric Kramp)

Scope Validation

For a cost estimate with an accuracy level suitable for budgeting and tracking purposes, a firm design concept should be developed, with a minimum 20% design documents or a standard Basis of Design completed.

This project is currently about to begin design with an engineering consultant. One of the initial tasks for the Engineer is to perform a Study that will evaluate current technology and recommend preferred alternatives to achieve the goals of the project (Flocculation, Rapid Mix, and other miscellaneous improvements). Therefore, the scope is currently broadly defined and final scope of the project will be determined during the Design phase.

For purposes of validation of the project and cost estimation, it was necessary to make an assumption on the scope of the project. Based on discussions with the Project Manager, it was assumed that the project would involve direct replacement of the existing equipment and technologies.

Cost Validation

As part of the validation effort, the AECOM team developed a construction cost estimate with the details in Appendix A at the end of this memorandum.

CIP No.	Project Description	CIP Project Cost (Construction Only)	Validated Cost (Construction cost only)	Variance from Approved Budget
111012	Lake Huron WTP Flocculation Improvements	\$24,097,000 (from 2022-2026 Board Approved CIP)	\$42,985,760	\$18,888,760 (78%)

The validated construction cost estimate was based on the project scope as defined in the RFP for design services and includes the following assumptions and exclusions:

Assumptions

- Construction will involve straight replacement of the flocculators and rapid mixers in-kind.
- The estimate assumes a construction start date of 1/2/2024
- This estimate assumes that the contractor will have limited access and staging areas to the site during normal business hours.
- We have assumed that all easements, if required, will be obtained by, and paid for by the owner.
- We have assumed that all 3rd party inspections, materials and soil testing will be conducted by the owner's consultants, and paid for by the owner. This cost is included in the Construction Management line item.

Exclusions

- All scope outside what is stated in the estimate.
- Compression of schedule, premium or shift work, and restrictions on the contractor's working hours
- Testing and inspection fees (except the QA by the contractor)
- Preliminary engineering, design and construction management fees
- Assessments, finance, legal and development charges
- Builder's risk, project wrap-up and other owner provided insurance program
- Modification to the scope of work since the date of the design documents outlined in this report
- Unforeseen subsurface conditions
- Restrictive technical specifications or excessive contract conditions
- Non-competitive bidding conditions
- Sole source specifications of materials or products
- Bids delayed beyond the projected schedule
- Land acquisition and real estate fees
- Owner's field inspection costs
- Off-site work
- Owner contingency
- Hazardous material abatement other than what is included in the detailed portion of the estimate
- LEED design allowances
- Cost impacts associated with restricted access to the immediate work area except as noted.

Construction on this project is not anticipated to begin until early 2024, and therefore we do not anticipate any significant impact from the current market volatility.

Schedule Validation

The 2022-2026 Board Approved CIP shows the project advancing as follows:

- Design start 9/1/2021
- Construction start 4/1/2024
- Construction end 6/30/2028

In our review of the scope of work items, we observed that this project includes significant improvements to the treatment processes/equipment at Lake Huron WTP. There will be a need for coordination construction schedules with the plant operations staff in order to maintain treatment capacity at the plant throughout the duration of the project. Some of the construction activities will be prohibited during peak demand periods. Therefore, we foresee the following breakdown for the construction schedule:

- Mobilization – 3 Months
- Construction – 42 Months
- Project closeout activities – 3 months

A total construction period of 48 months is expected to be adequate to account for the quantity and complexity of the work, while taking into account the potential for high demand periods to limit construction activities.

Project Delivery System

It is our understanding that this project will be implemented by adopting a Design-Bid-Build delivery system. Due to the need for an alternatives analysis, selection of flocculation and rapid mix technology and other miscellaneous improvements requiring coordination with GLWA, our opinion is that a Design-Bid-Build approach is best suited for this project. Given that GLWA is currently in negotiations with an engineering consultant for design services, we feel GLWA has chosen the most appropriate project delivery method

Project Packaging and Sequencing

The scope for this project involves significant improvements to some of the process equipment, which has the potential to impact other projects or operations at the plant. Sequencing of construction will be critical for maintaining plant operations during peak demand periods. It is recommended that GLWA and the engineer plan accordingly as preparation of the Construction Contract documents progresses during design. It is also critical that the Contractor is fully aware of any potential impacts to their construction schedule.

At Lake Huron WTP, there are currently the following projects in the CIP:

- 111001 Lake Huron WTP Low-Lift, High-Lift, and Filter Backwash Pumping, Electrical, and Miscellaneous Chemical Improvements (In design, with construction scheduled for late 2022-2029)
- 111006 Lake Huron WTP Filter Instrumentation and Raw Water Flow Metering (Design-Build likely beginning in late 2022 and completing in 2025)
- 111007 Lake Huron WTP Raw Sludge Clarifier and Pumping System Improvements (Pending Closeout)
- 111008 Lake Huron WTP Architectural Programming for Lab and Admin Buildings (Study only, set to begin in 2027)
- 111009 Lake Huron WTP High Lift Pumping, Water Production Flow Metering and Yard Piping Improvements (Design-Build contract began in September of 2020 and is scheduled to be complete in 2024)

- 111010 Lake Huron WTP Filtration Improvements (Design is scheduled to begin in June of 2025, with construction scheduled for 2029-2036)
- 111011 Lake Huron WTP Pilot Plant (Design-Build contract began in July of 2021 and is scheduled to be complete in 2023)

Based on the current schedule, there is potential for overlap in construction with CIP Projects 111001, 111006, and 111009. With multiple construction projects occurring at the same time at one facility, there is a potential for conflicts between multiple Contractor's means and methods.

The scope of this project involves a treatment process that is not associated with any other CIP Project. Therefore, there are no major benefits from packaging this project with another project. Additionally, the treatment processes affected with this project are linked to each other and is better suited to be executed under a single construction contract, meaning there is no major benefit from splitting this work into multiple projects.

Depending on the final scope of improvements selected by the engineering consultant to be included in this project, it is recommended that any potential impacts to the plant during construction of this project be evaluated as it relates to other CIP projects. We feel this project can be implemented with a schedule as indicated above, assuming careful consideration and planning is performed during the design phase.

Technical Memorandum

Subject: GLWA CIP Validation – 115007

Project

This technical memorandum relates to the following project:

- CIP No. 115007 – Water Works Park WTP High Lift Pumping Station Modernization

Status/Classification

CIP No. 115007 is classified as Future Planned – Within 5 Year Plan in the 2022-2026 Board Approved CIP.

During the CIP Alignment process leading up to the development of the 2023-2027 CIP Draft 1, this project was pushed out to begin later in the future, outside of the 5-year plan.

Information Reviewed

Existing information was reviewed and used to aid in the validation efforts. The information reviewed includes:

- 2022-2026 Board Approved CIP
- 2015 Water Master Plan Update
- Existing Reference Material for High Lift Pumping Station (O&M Manual and Record Drawings)
- Discussion with Project Manager (Michael Dunne)

Scope Validation

For a cost estimate with an accuracy level suitable for budgeting and tracking purposes, a firm design concept should be developed, with a minimum 20% design documents or a standard Basis of Design completed.

This project was first identified in the 2015 Water Master Plan Update to address the aging equipment in the facility and to coordinate system hydraulics with the future repurposing of the Northeast WTP. This project is in the preliminary stages of planning and scope development. Based on discussions with the Project Manager, as well as review of the Business Case Evaluation for this project, there are many general scope items that have been identified to be addressed as part of this project. These include:

- Replacement or rehabilitation of the high-lift pumps and motors
- Replacement or rehabilitation of valving and piping as necessary
- Improvements to the electrical and instrumentation systems
- Other building or architectural improvements as necessary

In order to develop a firm scope for this project, it is necessary to perform a hydraulic analysis to assess the appropriate improvements to the pumping system. Details of the project scope, like number of pumps, size of pumps, and electrical requirements, can be finalized through a study phase. These details can have a large impact on the estimated cost for construction of this project.

One major consideration for this project is the impact of the future repurposing of the Northeast WTP. Once Northeast WTP is repurposed into a booster pumping station, Water Works Park will be required to supply a most of the demand previously supplied by Northeast WTP. Therefore, it is important that the pumping system be designed to handle multiple operating conditions, depending on the timing of this project versus the schedule for repurposing Northeast WTP. Another critical factor is the added reliance on Water Works Park to supply water to a larger service area, making reliability of the pump station critical.

For purposes of validation of the project, the scope definition for this project is at a level adequate for future planning. However, we recommend that GLWA perform a study or alternatives analysis to develop a Basis of Design, which will confirm project requirements, assess system hydraulics, select a preferred arrangement for the new pumping system, and determine the most the appropriate delivery method for the project. See section on Project Delivery System below for recommendations for an appropriate delivery method for this project.

Cost Validation

Due to the limited scope definition and planned schedule for execution of this project, the AECOM team did not perform a cost estimate for this project. As such, the AECOM team performed an overall assessment of the budgeted cost of this project in the CIP.

CIP No.	Project Description	CIP Project Cost (as Design-Build)	Validated Cost (Construction cost only)	Variance from Approved Budget
115007	Water Works Park WTP High-Lift Pumping Station Modernization	\$88,946,247 (from 2022-2026 Board Approved CIP)*	-----	-----

*It shall be noted that the CIP Project Cost has been revised to \$96,340,000 for Draft 1 of the 2023-2027 CIP

Based on discussions with the Project Manager, the estimated cost in the CIP is based on the assumed scope of a one-to-one replacement of the high-lift pumps, motors, and associated equipment. It is our understanding that the currently estimated costs for this project have been developed based on estimated equipment costs from a similar project, CS-103 Springwells WTP Low and High-Lift Pump Station Improvements (CIP 114002), which is currently in design.

The assumption of one-to-one replacement of the major pumping equipment may not be valid assumption, since new pump hydraulic requirements, based on current and future expected demands/operating scenarios, will be determined in the project design process. The pumps will need to be right-sized to meet the new hydraulic conditions with the repurposing of Northeast WTP, which can have major impacts for overall project cost, both positive and negative. Another major factor in estimating the cost for this project affects decisions that are to be made on electrical improvements to the station, as some options like Variable Frequency Drives (VFDs) can have significant cost impacts.

Another consideration to take into account when estimating construction costs for projects of this nature is construction access to the equipment. If pumps, motors, valves, or other large pieces of equipment are to be replaced, it is important to foresee any difficult access or work space limitations, as well as any ancillary building architectural/structural repairs required to complete construction. Also, since the water treatment plant will need to maintain supply capacity throughout the duration of construction, special considerations which limit the Contractor's schedule can lead to cost implications.

Construction on this project is not anticipated to begin until post 2028, and therefore we do not anticipate any significant impact from the current market volatility.

Schedule Validation

We understand that this project is being pushed to begin further out in the future as a result of the CIP Alignment review in preparation of Draft 1 of the 2023-2027 CIP, such that budgeted costs were moved outside of the 5-year planning period. However, the schedule indicated on the Business Case Evaluation for this project shows the following:

- Design-Build Engineering start 4/27/2022
- Design-Build Construction start 10/1/2025
- Construction end 6/30/2031

This schedule does not align with the understood rationale that the project has been pushed to outside of the 5-year planning period. A more valid start date for this project is in the year 2028. The AECOM team is aware of this and will be correcting this in Draft 2 of the 2023-2027 CIP.

The actual project schedule will depend on the result of the study phase or basis of design. Many obstacles that are solved during design can have a significant impact on the project schedule. For example, this project involves the replacement of equipment, like large pumps, motors, and valves, with very long lead times. Additionally, construction of this project will require coordination with the plant operations to ensure that the treatment plant is able to supply adequacy capacity to the water system.

With an assumed scope that involves one-to-one replacement of the pumping system, we anticipate the following:

- Study and Design duration of 30 – 36 months
- Construction duration of 48 – 54 months

Therefore, the duration of the project as shown in the CIP is valid. However, the schedule needs to be shifted based on the current Alignment of the 2023-2027 CIP Draft 1. The AECOM team is aware of this and will be correcting this in Draft 2.

Project Delivery System

Based on discussions with the Project Manager, this project is being planned to be implemented with a Progressive Design-Build (PDB) delivery system. Compared to traditional delivery systems, the PDB delivery system will allow GLWA to work with a Design-Build team to develop the design with transparency on the construction costs before locking into a Guaranteed Maximum Price for construction of the project. It will also allow the project to be executed under a more compressed schedule, without the need to go through the formal bidding and procurement process for construction.

While there are benefits to Progressive Design-Build, we recommend a traditional Design-Bid-Build (DBB) delivery system for this project. Since the schedule for this project was pushed to outside of the 5-year planning period, there may not be a need to accelerate the schedule with a PDB. A traditional approach to study and design of this project, taking into account existing conditions, challenges, and operations coordination, is very beneficial for a project of this magnitude and complexity. Therefore, we recommend the DBB be preceded by a separate study/BODR phase. The DBB approach gives GLWA full control over the designer and allows time for resolution of issues prior to bringing a contractor on board. This has significant value in reducing overall costs of the project.

As planning progresses and the scope for this project is developed, we recommend an analysis of the appropriate delivery method that will provide the most benefit to GLWA. If GLWA wishes to execute this project as a design-build, it is recommended that a study or preliminary design be performed to help assist in

the development of the design criteria package. This project is a good candidate for an analysis under Task 8 Advanced Facilities Planning as part of this contract with AECOM.

Project Packaging and Sequencing

The scope for this project involves significant replacement or rehabilitation of the High-Lift Pumping System at the plant. Sequencing of construction will be critical for maintaining water supply during peak demand periods. It is recommended that GLWA plans accordingly as it relates to other associated projects that may have an impact on plant operations.

At Water Works Park WTP, there are currently the following projects in the CIP:

- 115001 Water Works Park WTP Yard Piping, Valves, and Venturi Meters Replacement (In construction, with completion currently scheduled for mid 2025)
- 115005 Water Works Park WTP Building Ventilation Improvements (In design, with construction scheduled to begin in late 2022 and be completed in 2025)
- 115006 Water Works Park WTP Site/Civil Improvements (Future Planned, currently scheduled to begin design after 2027)
- 115009 Water Works Park WTP Sedimentation Basins Structural Upgrades (Future Planned, currently scheduled to begin Design-Build after 2027)

Based on the current understanding that this project will not move forward until after the 5-year planning period, there is potential for construction of this project to overlap with projects 115006 and 115009. While it is not expected that there will be any notable conflicts between Contractors due to the locations of these projects spread throughout the Plant site/process areas, GLWA should plan accordingly to ensure there aren't any delays during construction.

As planning continues, it will be important to make considerations for sequencing of this project in coordination with the other system improvements, like the new transmission mains being built/rehabilitated between Northeast WTP and Water Works Park, as well as the future repurposing of Northeast WTP.

The scope of this project involves a process in the plant that is not associated with any other CIP Project. Therefore, there are no major benefits from packaging this project with another project. However, there are benefits to the overall project schedule for developing separate procurement packages for procuring the major pieces of equipment prior to construction due to the long lead time for these sizes of pumps, motors, and valves.

Technical Memorandum

Subject: GLWA CIP Validation – 260204

Project

This technical memorandum relates to the following project:

- CIP No. 260204 – Conveyance System Engineering Services (Connors Creek Rehabilitation)

Status/Classification

CIP No. 260204 is classified as Project Execution – Design in the 2022-2026 Board Approved CIP.

This project is currently under active design and is at the 90% Design stage.

Information Reviewed

Existing information was reviewed and used to aid in the validation efforts. The information reviewed includes:

- 2022-2026 Board Approved CIP
- CIP Portal
- 90% Design Drawings and Specifications
- Discussion with Project Manager (Mini Panicker)

Scope Validation

For a cost estimate with an accuracy level suitable for budgeting and tracking purposes, a firm design concept should be developed, with a minimum 20% design documents or a standard Basis of Design completed.

The design development for this project is currently near completion with 90% drawings and specifications. That level of scope definition exceeds the criteria described above.

The scope of the project as currently defined in the design documents is adequate for planning purposes.

Cost Validation

As part of the validation effort, the AECOM team developed a construction cost estimate with the details in Appendix A at the end of this memorandum.

CIP No.	Project Description	CIP Project Cost (Construction Only)	Validated Cost (Construction cost only)	Variance from Approved Budget
260204	Conveyance System Engineering Services (Connors Creek Rehabilitation)	\$43,868,000 (from CIP Portal)	\$52,415,349	\$8,547,349 (19%)

The validated construction cost estimate was based on the 90% design documents and includes the following assumptions and exclusions:

Assumptions

- The estimate assumes a notice to proceed date of 12/1/2022
- This estimate assumes that the contractor will have limited access and staging areas to the site during normal business hours.
- We have assumed that all easements, if required, will be obtained by, and paid for by the owner.
- We have assumed that all 3rd party inspections, materials and soil testing will be conducted by the owner's consultants, and paid for by the owner. This cost is included in the Construction Management line item.

Exclusions

- All scope outside what is stated in the estimate.
- Compression of schedule, premium or shift work, and restrictions on the contractor's working hours
- Testing and inspection fees (except the QA by the contractor)
- Preliminary engineering, design and construction management fees
- Assessments, finance, legal and development charges
- Builder's risk, project wrap-up and other owner provided insurance program
- Modification to the scope of work since the date of the design documents outlined in this report
- Unforeseen subsurface conditions
- Restrictive technical specifications or excessive contract conditions
- Non-competitive bidding conditions
- Sole source specifications of materials or products
- Bids delayed beyond the projected schedule
- Land acquisition and real estate fees
- Owner's field inspection costs
- Off-site work
- Owner contingency
- Hazardous material abatement other than what is included in the detailed portion of the estimate
- LEED design allowances
- Cost impacts associated with restricted access to the immediate work area except as noted.

The design engineer provided a construction cost estimate for the 90% design of \$44,187,114. One difference accounting for the variance in estimates is that the AECOM team estimate included 23.13% escalation to midpoint of construction, while the engineers estimate used 4.53%. Our assumed NTP date was 12/1/2022 and we used a 48-month schedule (discussed below) and the engineers estimate assumed midpoint of construction would be December 2022. Otherwise, the estimates were mostly similar.

This project does not involve the procurement of any major equipment or material, and therefore we do not anticipate any significant impact from the current market volatility.

Schedule Validation

The CIP Portal shows the construction duration as 30 months (12/1/2022 thru 6/30/2025)

Our review of the scope of work items, we observe that this project involves mainly cleaning and rehabilitation of the existing pipeline and does not involve procurement of additional right-of-way or easement, nor requires extensive traffic control. Therefore, it is our opinion the degree of difficulty for the construction of this project is medium to moderate. However, the project involves multiple setup (mobilization) and demobilizations. With that premise, we suggest the following breakdown of the construction schedule:

- Mobilization – 3 Months
- Construction – 36 Months
- Allowance for weather delay – 6 months
- Project closeout activities – 3 months

A total construction period of 48 months is expected to be adequate to account for the quantity and complexity of the work, along with any potential weather delays.

Project Delivery System

It is our understanding that this project would be implemented by adopting a Design-Bid-Build delivery system. Given that the design documents are almost fully developed and near “bid ready”, we concur with the current project delivery approach.

Project Packaging and Sequencing

The scope for this project involves intermittent sewer cleaning and repair along the Connors Creek Sewer System from 8-Mile Road to the Conner Creek CSO. Part of the sequencing of the work involves bypass pumping to divert the flow during the execution of the repair work.

This is a standalone project, and there are no major benefits from packaging this project with another or splitting this work into multiple projects.

This project is independent of any on-going or known future planned projects. Under present conditions, this project can be planned and implemented at the timeline indicated in the alignment documents.

Technical Memorandum

Subject: GLWA CIP Validation – 260205

Project

This technical memorandum relates to the following project:

- CIP No. 260205 – Rehabilitation of the Northwest Interceptor from Eight Mile to Tireman

Status/Classification

CIP No. 260205 is identified as Future Planned – Within 5 Year Plan on the 2022-2026 Board Approved CIP.

This project is currently under design by FKE Engineers and is at the 100% Design stage. It is recommended the classification be updated for the next CIP.

Information Reviewed

Existing information was reviewed and used to aid in the validation efforts. The information reviewed includes:

- 2022-2026 Board Approved CIP
- CIP Portal
- 100% Design Drawings and Specifications
- Discussion with Project Manager (Mini Panicker)
- Design Contract Documents available on Bonfire

Scope Validation

For a cost estimate with an accuracy level suitable for budgeting and tracking purposes, a firm design concept should be developed, with a minimum 20% design documents or a standard Basis of Design completed.

The design development for this project is currently complete with the 100% drawings and specifications at “bid ready” level. That level of scope definition exceeds the criteria described above.

No additional scope definition is required for planning purposes.

Cost Validation

As part of the validation effort, the AECOM team developed a construction cost estimate with the details in Appendix A at the end of this memorandum.

CIP No.	Project Description	CIP Portal Project Cost	Validated Cost (Construction cost and Engineering)*	Variance from Approved Budget
260205	NWI Rehabilitation	\$10,378,828	\$12,820,802	\$2,441,974 (24%)

*Cost does not include GLWA Salary

The validated construction cost estimate was based on the 100% design documents and includes the following assumptions and exclusions:

Assumptions

- The estimate assumes a construction start date of 7/1/22
- This estimate assumes that the contractor will have limited access and staging areas to the site during normal business hours.
- We have assumed that the general building permit is included in the cost estimate.
- We have assumed that all easements, if required, will be obtained by, and paid for by the owner.
- We have assumed that all 3rd party inspections, materials and soil testing will be conducted by the owner's consultants and paid for by the owner. This cost is included in the Construction Management line item.

Exclusions

- Owner supplied and installed furniture, fixtures and equipment
- Building demolition except where noted
- Compression of schedule, premium or shift work, and restrictions on the contractor's working hours
- Testing and inspection fees (except the QA by the contractor)
- Preliminary engineering, design and construction management fees
- Assessments, taxes, finance, legal and development charges
- Builder's risk, project wrap-up and other owner provided insurance program
- Modification to the scope of work since the date of the design documents outlined in this report
- Unforeseen subsurface conditions
- Restrictive technical specifications or excessive contract conditions
- Non-competitive bidding conditions
- Sole source specifications of materials or products
- Bids delayed beyond the projected schedule
- Land acquisition and real estate fees
- Owner's field inspection costs
- Off-site work
- Owner contingency
- Hazardous material abatement other than what is included in the detailed portion of the estimate
- LEED design allowances
- Cost impacts associated with restricted access to the immediate work area except as noted.

This project does not involve the procurement of any major equipment or material, and therefore we do not anticipate any significant impact from the current market volatility.

Schedule Validation

The CIP Portal shows the construction duration as 24 months (7/1/2022 thru 6/30/2024).

Our review of the scope of work items, we observe that this project involves mainly rehabilitation of the existing pipeline and does not involve procurement of additional right-of-way or easement, nor requires extensive traffic control. Therefore, it is our opinion the degree of difficulty for the construction of this project is medium to moderate. With that premise, we suggest the following breakdown of the construction schedule:

- Mobilization – 3 Months
- Construction – 24 Months
- Allowance for weather delay – 6 months
- Project closeout activities – 3 months

This construction schedule duration coincides with the timeframe indicated in the 2022-2026 Board Approved CIP. However, it should be noted that the schedule resulting from the project alignment allows only for 2 years of construction, which might not be adequate to address any weather delays.

Project Delivery System

From the discussion with the Project Manager, it is our understanding that this project would be implemented by adopting a Design-Bid-Build delivery system. Given that the design documents are almost fully developed and near “bid ready”, we concur with the current project delivery approach.

Project Sequencing

The scope for this project involves intermittent sewer repair along the Northwest Interceptor between 8-mile and Tireman Road. Part of the sequencing of the work involves diverting the flow temporarily to allow for repairs.

This project is independent of any on-going or known future planned projects. However, there are plans for adding in-system storage devices (ISDs) to the Northwest Interceptor. Completing the repairs prior to installing the ISDs will be beneficial to the operation of the ISDs and coordinating construction of the ISDs. Currently, the ISD work is not scheduled to begin construction until 2026, 2 years after this work is scheduled to be completed.

Under present conditions, this project can be planned and implemented at the timeline indicated in the alignment documents.

Technical Memorandum

Subject: GLWA CIP Validation – 260701

Project

This technical memorandum relates to the following project:

- CIP No. 260701 – Conveyance System Infrastructure Improvements (Phase 1 Improvements)

Status/Classification

CIP No. 260701 was included in the 2022-2026 Board Approved CIP under the CIP No. 222004. The project is currently listed as Active – Procurement - Construction on the CIP Portal.

This project is currently under the procurement process for construction of the first phase of the project. With that understanding, the classification in the CIP Portal is accurate.

Information Reviewed

Existing information was reviewed and used to aid in the validation efforts. The information reviewed includes:

- 2022-2026 Board Approved CIP
- CIP Portal
- 100% Design Drawings and Specifications
- Discussion with Project Manager (Mini Panicker)

Scope Validation

For a cost estimate with an accuracy level suitable for budgeting and tracking purposes, a firm design concept should be developed, with a minimum 20% design documents or a standard Basis of Design completed.

The design development for Phase 1 of this project is currently complete with the 100% drawings and specifications at “bid ready” level. That level of scope definition exceeds the criteria described above.

No additional scope definition is required for planning purposes.

Cost Validation

As part of the validation effort, the AECOM team reviewed the Engineer's Opinion of Probable Construction Cost (OPCC) and compared it to the information in the CIP Portal. This project was not selected for the AECOM team to develop an independent cost estimate.

CIP No.	Project Description	CIP Portal Construction Cost	Design Engineer OPCC
260701	Conveyance System Infrastructure Improvements (Phase 1 Improvements)	\$38,808,000	\$39,800,000

The difference between the CIP Portal construction budget and the Design Engineer OPCC is minimal, at 2.5%. It is undetermined why a different cost is used in the Portal vs the Engineers OPCC.

The Engineers OPCC used a 30% contingency in their cost estimate. Typically, when the design documents are 100% complete, the cost estimate derived is Class 1 or 2 and the contingency is between 10-15%.

It is observed that the design engineer OPCC did not utilize American Association of Cost Estimators (AACE) methodology to develop the cost estimate. We recommended GLWA require AACE methodology for projects of this magnitude and complexity.

Since this project is with procurement and scheduled for bidding soon, no updates to the cost are recommended.

Schedule Validation

The CIP Portal shows the construction duration as 33 months (6/1/2022 thru 2/28/2025).

Our review of the scope of work items, we observe that this project involves mainly rehabilitation of outfalls including structures, gates, manholes and instrumentation. This project does not involve procurement of additional right-of-way or easement and has moderate traffic control. Therefore, it is our opinion the degree of difficulty for the construction of this project is medium to moderate. Since this project has many locations of work, there will be multiple mobilizations and demobilizations at different sites, lengthening the schedule. Given the size and complexity of this project, we estimate a minimum 42-months construction duration. With this premise, we suggest the following breakdown of the construction schedule:

- Mobilization – 3 Months
- Construction – 30 Months
- Allowance for weather delay – 6 months
- Project closeout activities – 3 months

A total construction period of 42 months is expected to be adequate to account for the quantity and complexity of the work, along with any potential weather delays.

Project Delivery System

It is our understanding that this project would be implemented by adopting a Design-Bid-Build delivery system. Given that the design documents are almost fully developed and near "bid ready", we concur with the current project delivery approach.

Project Packaging and Sequencing

The scope for this project involves rehabilitation of outfalls along the Detroit and Rouge Rivers, including structures, gates, manholes and instrumentation. Part of the sequencing of the work involves providing uninterrupted sanitary service through the outfalls at all times.

This is already a conglomerate of outfall repairs, and there are no major benefits from packaging this project with another or splitting this work into multiple projects.

This project is independent of any on-going or known future planned projects, and hence can be implemented with a schedule indicated in the alignment documents.

