



Hamilton

# WOODWARD WATER TREATMENT PLANT (WTP) PHASE 2 UPGRADES

June 17, 2024

# Woodward WTP Phase 2 Upgrades Report PW22078(a)

## Summary:

- Information Report PW22078 (September 19, 2022) provided Council with the status of the Woodward Water Treatment Plant (Water Treatment Plant) Phase 2 Upgrades.
- The 2022 report identified that staff would submit a recommendation report to the Public Works Committee once the third-party review assignment had been completed.
- Report PW22078(a) recommends that four new permanent Full-Time Equivalents in the Hamilton Water Division be approved to support the Woodward Water Treatment Plant Phase 2 Upgrades Capital Team.
- Report PW22078(a) recommends that three permanent Full-Time Equivalents in the Hamilton Water Division be referred to the 2025 Water, Wastewater and Stormwater Rate Budget to provide operational support for the Woodward Water Treatment Plant Phase 2 Upgrades and other large capital upgrades occurring at the City's two wastewater treatment facilities.

# Historical Background – Woodward WTP

- Services ~570,000 people within the City of Hamilton's greater urban area
- Originally constructed in 1931
- Expanded in the late 1950s
- On average WTP produces 209 million litres per day of safe clean drinking water for Hamilton Residents
- Various improvements over the decades
- Recently completed the \$25M WTP Phase 1 Upgrades in 2021



# Recent Studies – Woodward WTP Phase 2 Upgrades

Studies supporting the planning phase:

1. Best Available Technologies Study (CH2M Hill 2016)

The study assessed the following:

- Identified process capacity bottlenecks
- Suitable treatment technologies

2. Conceptual Design Phase 2 WTP Upgrades (AECOM 2022)

The design focused on process technologies for:

- Water Quality improvements
- Increasing capacity output select processes
- Replacing aged equipment and processes



# Third-party Review – Woodward WTP Phase 2 Upgrades (Stantec)

Third Party Review Key Areas	Summary of Findings
City Staff Resourcing	<b>Dedicated City staff</b> resources for the delivery of the WTP Phase 2 Upgrades and other current active capital projects at the Water Treatment Plant is recommended.
Process Risk During Construction	Risks associated with the proposed upgrades were highlighted and preferred technologies were <b>found to be suitable</b> for the desired objectives.
Constructability	Sequencing and risks were identified and accounted for; the conclusion is that the <b>construction activity is suitable</b> for this site.
Construction Phasing	Concluded that the project be <b>split into a Phase 2A &amp; 2B</b> . This phasing strategy will prioritize 2A activities to focus on upgraded disinfection (UV) and filtration upgrades that target public health benefits. Phase 2B will focus on capacity for growth.
Capital Cost Estimate	Following the recommendation that the contract be split into two distinct contracts Phase 2A and 2B, the review found the <b>capital cost and timeline breakdown to be appropriate</b> .

# Woodward WTP Phase 2A & 2B Upgrades

## Capital Cost Estimate & Schedule

Woodward WTP Upgrades Phase	Capital Cost Estimate	Schedule Estimate
<p><b>Phase 2A: Performance Enhancement</b></p> <p><b>Note:</b> assuming construction start 2028, including inflation, engineering, construction and contingency</p>	\$335M	<p>Design: 2025 to 2027</p> <p>Construction: 2028 to 2032</p>
<p><b>Phase 2B: Improving Capacity</b></p> <p><b>Note:</b> assuming construction start 2032, including inflation, engineering, construction and contingency</p>	\$208M	<p>Design: 2029 to 2031</p> <p>Construction: 2032 to 2035</p>

# Woodward WTP Phase 2A & 2B Upgrades - City Staff Resourcing

Propose four (4) new permanent Full-Time Equivalents in the Hamilton Water Division be approved to support the Woodward Water Treatment Plant Phase 2 Upgrades Capital Team. **Recommendations do not require any additional budget approvals.**

Proposed City Staff	Position Outline	Annual Investment
Manager, Capital Program	Oversee the capital delivery of Phase 2A and 2B WTP upgrades, other active/future capital projects, program and staffing management.	Grade 8 - \$185K
Senior Project Manager, Capital Projects	Provide project management for the capital delivery services for the Filter Building components within the Phase 2A and 2B upgrades and other active and future capital projects at the plant. Duties will also include supervisory role for both Project Manager and Engineering Technologist.	Grade 7 - \$169K
Project Manager, Capital Projects	Provide project management for the capital delivery services for the Chlorine Building components within the WTP Phase 2A and 2B upgrades and other active and future capital projects at the Water Treatment Plant.	Grade 6 - \$157K
Engineering Technologist, Capital Projects	Address multiple day-to-day requests received and provide project/program support, maintain a document management system and provide project controls for the various capital projects.	Grade L - \$111K
<b>Total Approximate Annual Investment</b>		<b>\$622K</b>

# Woodward WTP Phase 2A & 2B Upgrades - City Staff Resourcing

- Proposed three (3) Full-Time Equivalents be included in the recommended **2025 Water, Wastewater and Stormwater Rate Budget to provide operational support** for the Woodward Water Treatment Plant Phase 2 Upgrades and other large capital upgrades occurring at the City's two wastewater treatment facilities.

Proposed City Staff	Position Outline
Treatment Plant Senior Process Engineer	Provide regulatory and process operational requirements to the design teams and provide coordination to allow for construction at operating facilities.
SCADA Project Manager	Oversee and support automation and SCADA-related tasks throughout the lifecycle of the various capital projects.
Maintenance Supervisor	Offer technical and field support in mechanical, electrical, instrumentation aspects throughout the project lifecycle for the various capital projects.



# Woodward WTP Phase 2A & B Upgrades – Conceptual Plan

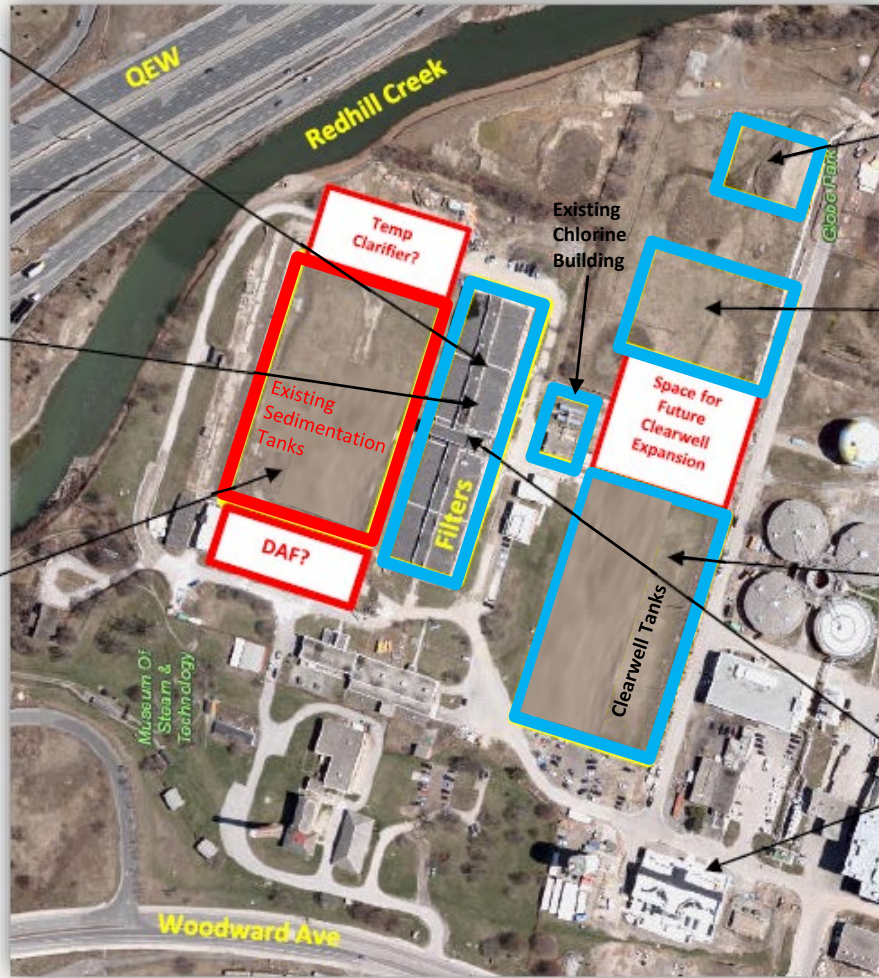
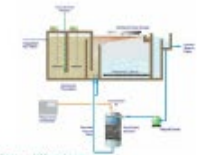
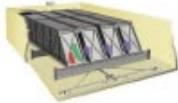
Filter Underdrains



Filter to Waste Process



Pre-Treatment



Chlorine Building  
(New Facility)

Backwash & UV  
Disinfection  
Building  
(New Facility)

Clearwell  
Concrete  
Restoration

Electrical,  
SCADA,  
HVAC



## Phase 2A

Design 2025-2027  
Construction 2028-2032  
Budget: \$335M

## Phase 2B

Design 2029-2031  
Construction 2032-2035  
Budget: \$208M

# Other Projects at the WTP

Active Capital Projects (Total \$20M Capital)	Project Description
Highlift Pump Station North Chamber Upgrades Phase A&B	North chamber immediate needs repairs for pipe, supports, large valve replacement, potable service line, sedimentation tanks, etc.
Highlift Pump Station HVAC	Improvements to the HVAC system to mitigate Highlift Pumps tripping during high heat days.
WTP Pre-Treatment Valves & Chamber	Replace multiple key isolation valves located upstream of the pre-treatment sedimentation tanks and new flowmeter chamber.
WTP Low Voltage Electrical	Consolidate low voltage electrical system for WTP Filter Bldg.
WTP Process Stress Test	Testing protocol to assess various isolation scenarios to for verification prior to large capital upgrades.
WTP Electrical Distribution Study	Power distribution concept for new processes WTP Phase 2 (UV, Chlorine Bldg., Backwash Pumps, Filter to Waste).
WTP Dissolver Air Flotation (DAF)	12 month “proof” pilot to assess suitability of a DAF high-rate clarification process consideration for WTP Phase 2B.
WTP Sedimentation Tank Retrofit Assessment	Geotechnical reporting to assess bearing capacity of the sedimentation tanks subsurface.
Condition Assessment Study	Condition reporting for the WTP facility; results will identify any future capital delivery.

# Woodward WTP Phase 2A & 2B Upgrades – Staffing Rationale

## Challenge:

- The City does not have a **dedicated capital team** for large scale capital works at the Water Treatment Plant focussed on optimized project delivery.

## Proposed Staff Rationale:

- Successful project delivery will present several staffing challenges including the necessity to resource a dedicated, **qualified and experienced capital delivery, operational, SCADA and Maintenance team, considering the scale and complexity** of this large project.
- The completed third-party assignment reviewed the resource structure for design and construction of major water treatment plants and plant rehabilitation programs with **other major municipalities** in Canada.
- The plant has **other additional active and future** capital projects that would be captured within the Water Treatment Plant capital program.

# Woodward WTP Phase 2A & 2B Upgrades

## Recommendations PW22078(a)

- a) That the Hamilton Water Divisional staff complement be increased by **four new permanent Full-Time Equivalents** to deliver the Woodward Water Treatment Plant Phase 2 Upgrades Capital Program, which consist of the following proposed positions:
  1. One Manager, Woodward Water Treatment Plant Capital Program
  2. One Senior Project Manager, Woodward Water Treatment Plant Capital Projects
  3. One Project Manager, Woodward Water Treatment Plant Capital Projects
  4. One Engineering Technologist, Woodward Water Treatment Plant Capital Projects
- b) That the above four Full-Time Equivalents be funded from the Water, Wastewater and Stormwater Rate Capital Program (Project ID No. 5142166110 and 5143066110) at an approximate annual cost of \$622K.
- c) That three permanent Full-Time Equivalents be included in the recommended 2025 Water, Wastewater and Stormwater Rate Budget to provide operational support for the Woodward Water Treatment Plant Phase 2 Upgrades and other large capital upgrades occurring at the City's two wastewater treatment facilities.



Hamilton

THANK YOU