

# TECHNICAL MEMORANDUM

**TO:** Region of Peel  
**FROM:** WSP  
**SUBJECT:** Approach for Evaluation of Alternatives – Front Street Station Wastewater Flow Diversion Project  
**DATE:** March 1, 2018, Final

## 1 INTRODUCTION

This technical memorandum documents the proposed evaluation approach to determine the preferred alternative for the Front St. Wastewater Flow Diversion Class EA. The information presented in this document will be incorporated into Phase 2 of the Class Environmental Assessment process.

## 2 ALTERNATIVE SOLUTIONS

As discussed in Technical Memorandum – List of Alternatives, the identification of alternatives involved of a multi-step process, which includes intermediate screening and evaluation steps. This is illustrated in Figure 1: Problem Solving Process below.

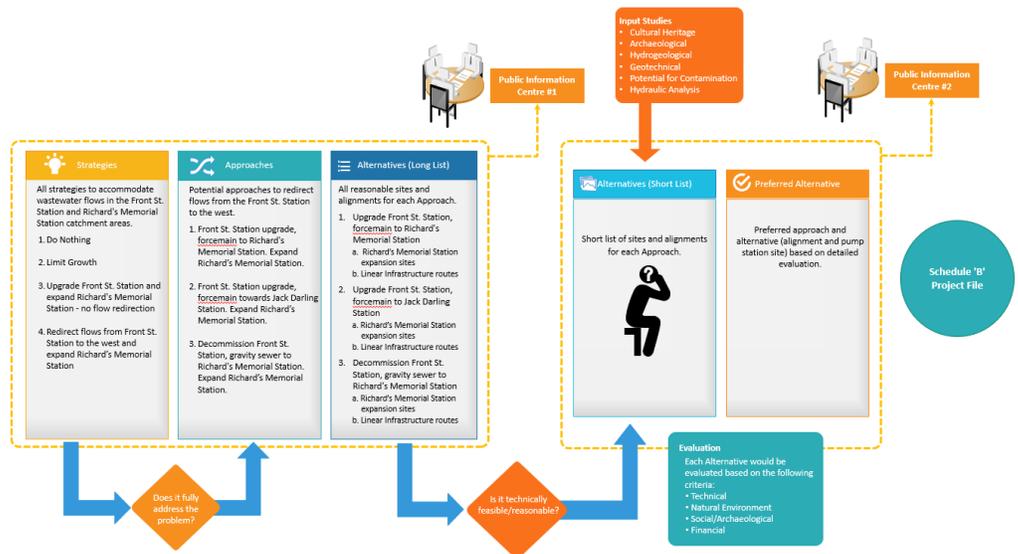


Figure 1: Problem Solving Process

## 2.1 EVALUATION OF STRATEGIES

In Technical Memorandum – List of Alternatives, various high level strategies to address the problem were identified. The Strategies considered for this study include:

1. Do Nothing
2. Limit Growth
  - Limit community growth to reduce the need for infrastructure improvements.
3. Upgrade Front Street WWPS and Richard’s Memorial WWPS
  - Maintain current wastewater conveyance strategy and upgrade the existing pumping stations to accommodate forecasted flows in their corresponding catchments.
  - No east to west diversion of flows.
4. Redirect flows from Front Street WWPS to the west
  - Flows from the Front Street WWPS catchment could be redirected towards the Clarkson WWTP.

Table 2-1 below lists the screening criteria and scoring system used to identify short-listed strategies for further evaluation.

*Table 2-1 Screening Criteria for Strategies*

<b>SCREENING CRITERIA</b>
Does it fully address the problem?
Does it allow for growth in the Study Area?
Does it address the condition concerns with existing infrastructure?
Does it address the need to redirect flows away from G. E. Booth WWTP?

Strategy 4 (“Redirect flows from Front Street WWPS to the West”) was determined to be the only Strategy that satisfied all the above criteria. Therefore, Strategy 4 is carried forward for further evaluation.

## 2.2 EVALUATION OF APPROACHES

As discussed in Technical Memorandum – List of Alternatives, Strategy 4 can be further broken down into several approaches.

1. Front Street WWPS upgrade and construction of a forcemain to Richard’s Memorial WWPS
  - This involves retrofitting of the Front Street WWPS to pump to Richard’s Memorial WWPS and expansion of the Richard’s Memorial WWPS.
2. Front Street WWPS upgrade and construction of a forcemain towards the Jack Darling WWPS
  - This involves retrofitting of the Front Street WWPS to pump to a point upstream of the Jack Darling WWPS.
  - Richard’s Memorial WWPS would require expansion to accommodate future growth in its current catchment.
3. Decommission Front Street WWPS and construction of a deep sewer to Richard’s Memorial WWPS
  - Richard’s Memorial WWPS would need to be expanded to accommodate flows from the combined catchment areas.

To short-list approaches for further evaluation, the only criterion was whether an approach was considered to be technically feasible.



Upon an initial review, all three Approaches to implementing Strategy 4 were deemed feasible and have been carried forward for further evaluation.

### **2.3 EVALUATION OF LONG LIST OF ALTERNATIVES**

As discussed in Technical Memorandum – List of Alternatives, the Approaches were refined to identify possible alignments for the linear infrastructure and potential site locations for the pumping station construction.

In general, the possible alignments/routes for linear infrastructure and site locations for the pumping station expansion would be similar regardless of which of the three Approaches is considered.

Sewer and forcemain alignments would ideally minimize the distance between the start and end points (generally, the shorter the distance the lowest the construction cost and in the case of a forcemain, a shorter distance means less headloss and reduced pumping costs). Another consideration for routing would be impact to existing roadways, impact to existing infrastructure, and constraints due to natural, social/cultural and/or archaeological features. Therefore, often a straight line route will not be feasible.

A long list of alternatives was developed for each of the three approaches. The alternatives consisted of various combinations of linear infrastructure alignments and pumping station sites. A total of eight different forcemain and sewer route sub-sections and five wastewater pumping station sites were identified for the long list as follows:

1. Upgrade Front St. WWPS and new forcemain along Lakeshore Rd. W towards Richard's Memorial WWPS. Expand Richard's Memorial WWPS
  - Pumping station sites (5 sites)
  - Forcemain route (1 route)
2. New forcemain along Lakeshore Rd. W to redirect flows from Front St. WWPS to Jack Darling WWPS. Expand Richard's Memorial WWPS
  - Pumping station sites (5 sites)
  - Forcemain route (1 route)
3. Construct a gravity sewer from Front St. WWPS to Richard's Memorial WWPS. Expand Richard's Memorial WWPS.
  - Pumping station sites (5 sites)
  - Sewer routes (6 routes)

The three approaches and the associated alternatives with each approach are depicted in Figure 2, 3 and 4 below.

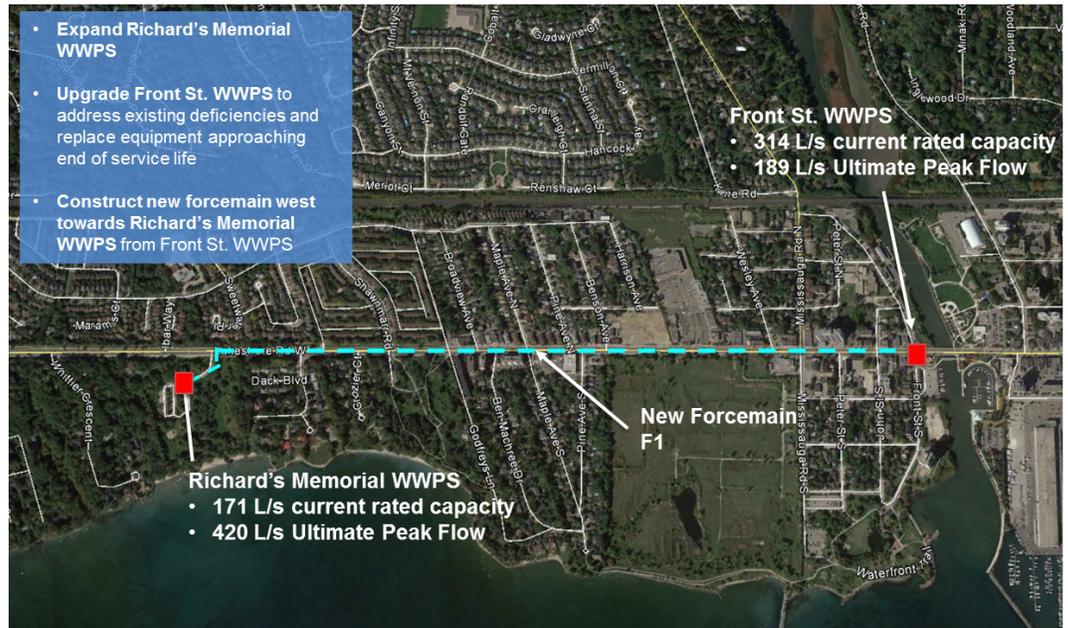


Figure 2: Approach 1 - Upgrade Front Street WWPS and Construct a New Forcemain to Richard's Memorial WWPS

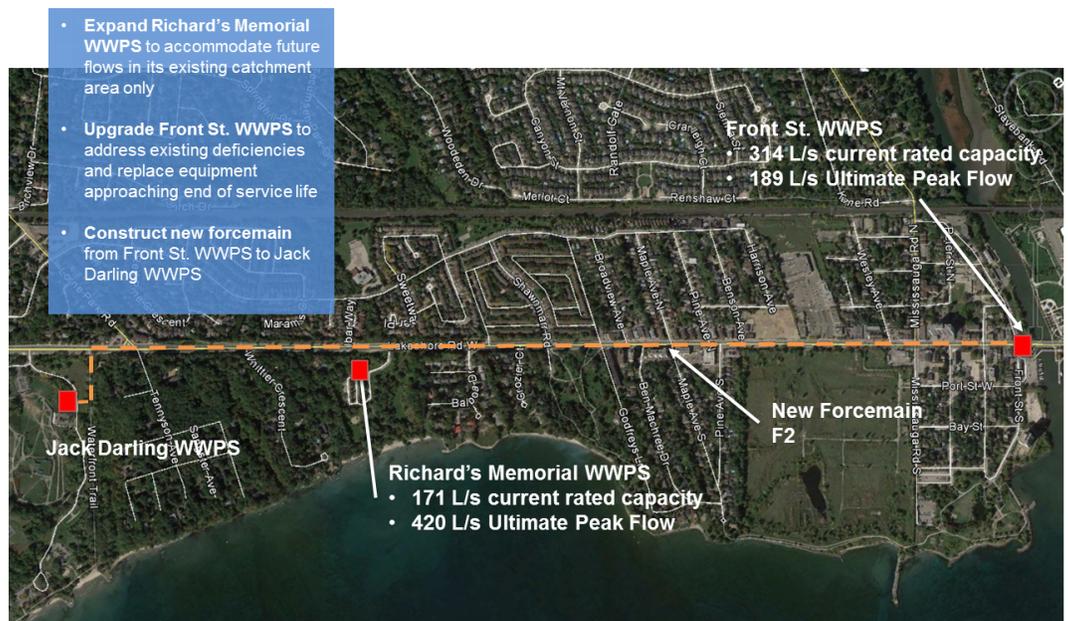


Figure 3: Approach 2 - Upgrade the Front Street WWPS and Construct a New Forcemain to Jack Darling WWPS



*Figure 4: Approach 3 – Construct a New Gravity Sewer to Richard's Memorial WWPS*

Following the Public Information Centre (PIC) 1 hosted March 28, 2017, the three approaches were more clearly defined and revised to five (5) approaches with associated alternatives (long list). The redefined approaches and associated long list of alternatives consist of various combinations of linear infrastructure alignments and pumping station sites. In each of the approaches, a new wastewater pumping station in Richard's Memorial Park is contemplated. As follows:

1. Expand Front St. Wastewater Pumping Station. Construct new forcemain from Front St. Wastewater Pumping Station to Richard's Memorial Park. Construct new Richard's Memorial Wastewater Pumping Station. Construction new trunk sewer from Richard's Memorial Wastewater Pumping Station to Jack Darling Wastewater Pumping Station
  - Pumping station sites at Richard's Memorial Park (7 sites)
  - Forcemain route (1 route)
2. Expand Front St. Wastewater Pumping Station. Construct new forcemain from Front St. Wastewater Pumping Station to Jack Darling Wastewater Pumping Station. Construct New Richard's Memorial Wastewater Pumping Station (to service its existing catchment area only)
  - Pumping station sites at Richard's Memorial Park (7 sites)
  - Forcemain route (1 route)
3. Expand Front St. Wastewater Pumping Station. Construct new forcemain from Front St. WWPS to Brueckner Rhododendron Gardens. Construct new wastewater pumping station in Brueckner Rhododendron Gardens. Construct new forcemain from Brueckner WWPS to Richard's Memorial WWPS. Construct new Richard's Memorial WWPS. Construct new trunk sewer from Richard's Memorial WWPS to Jack Darling WWPS.
  - Pumping station sites at Richard's Memorial Park (7 sites)
  - Pumping station site at Brueckner Rhododendron Gardens (1 site)

- Forcemain route (1 route)
- 4. Decommission Front St. Wastewater Pumping Station. Construct new trunk sewer from Front St. WWPS to Brueckner Rhododendron Gardens. Construct new WWPS in Brueckner Rhododendron Gardens. Construct new forcemain from Brueckner WWPS to Richard’s Memorial WWPS. Construct new Richard’s Memorial WWPS. Construct new trunk sewer from Richard’s Memorial WWPS to Jack Darling WWPS.
  - Pumping station sites at Richard’s Memorial Park (7 sites)
  - Pumping station site at Brueckner Rhododendron Gardens (1 site)
  - Forcemain route (1 route)
  - Sewer route (1 route)
- 5. Decommission Front St. WWPS. Construct trunk sewer from Front St WWPS to Richard’s Memorial Park. Construct new Richard’s Memorial WWPS. Construct new trunk sewer from Richard’s Memorial WWPS to Jack Darling WWPS.
  - Pumping station sites at Richard’s Memorial Park (7 sites)
  - Sewer routes (6 routes)

The five approaches and the associated alternatives with each approach are depicted in Figure 5, 6, 7, 8, and 9 below.



*Figure 5: Redefined Approach 1 - Expand Front St. WWPS. Pump to Richard's Memorial Park. Construct new forcemain from Richard's Memorial to Jack Darling WWPS.*



Figure 6: Redefined Approach 2 – Expand Front St. WWPS and Pump to Jack Darling WWPS

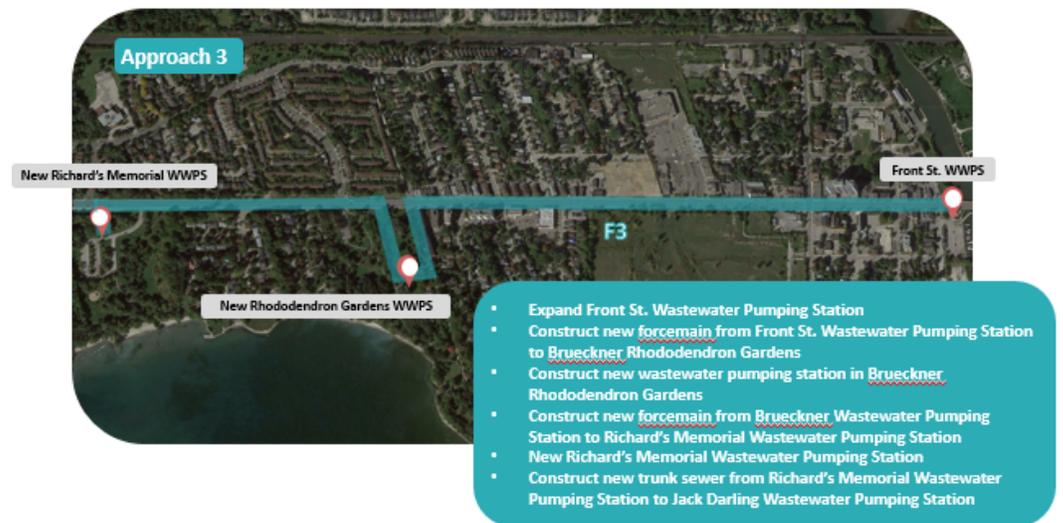


Figure 7: Redefined Approach 3 – Expand Front St WWPS to Pump to New WWPS in Rhododendron Gardens and Construct new Sewer to Jack Darling WWPS

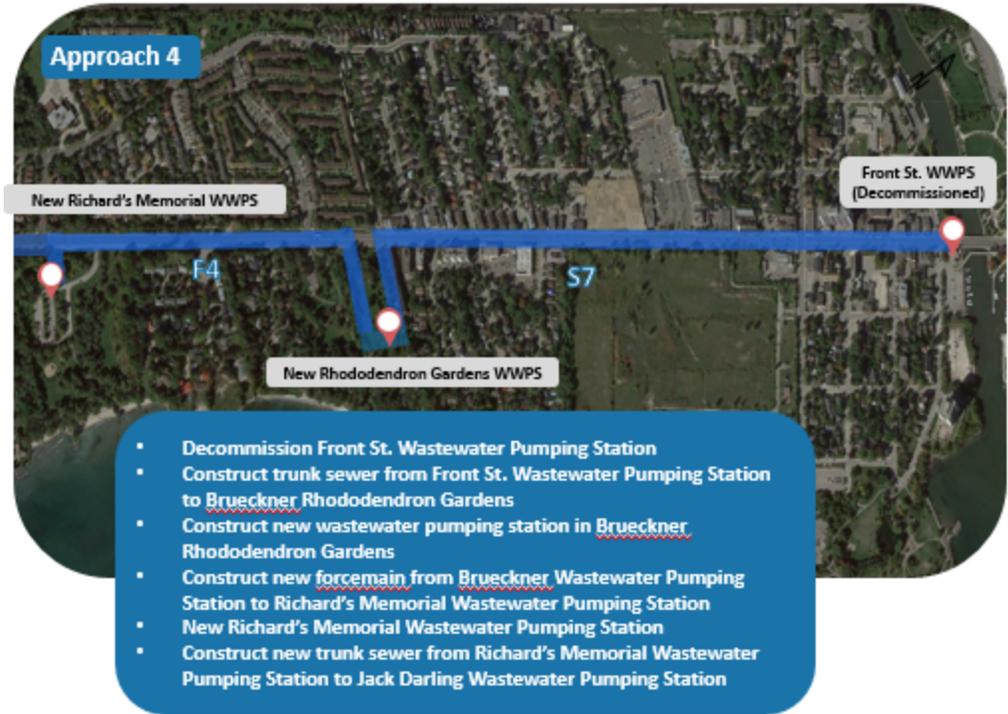


Figure 8: Redefined Approach 4 – Decommission Front St WWPS, Construct new sewer to New Rhododendron Gardens WWPS and Construct new Forcemain and Sewer to Jack Darling WWPS



Figure 9: Redefined Approach 5 – Decommission Front St. WWPS, Construct new Sewer to Jack Darling WWPS



Evaluation criteria were defined to develop a short list alternatives to be carried forward for a more detailed evaluation. The proposed criteria for the linear infrastructure routes and potential pumping station sites are as listed in Table 2-2 and **Error! Reference source not found.** below, respectively.

*Table 2-2 Screening Criteria for Long List Alternatives to Short List Alternatives – Linear Infrastructure Routes and Pumping Station Locations*

SCREENING CRITERIA	RATIONALE/INDICATORS
Technical	<ul style="list-style-type: none"><li>– Ease of construction given soil/ground conditions</li><li>– Impact to existing utilities (gas, hydro, etc.)</li><li>– Constructability</li><li>– Upgrade requirements to other infrastructure</li><li>– Opportunity to consolidate/decommission existing infrastructure and provide a more sustainable long term wastewater servicing strategy</li></ul>
Social	<ul style="list-style-type: none"><li>– Construction impacts on traffic</li><li>– Impact on existing roadways</li><li>– Easement requirements</li><li>– Proximity to built-up areas</li><li>– Proximity to areas of archaeological impact</li><li>– Proximity to designated heritage features</li></ul>
Environmental	<ul style="list-style-type: none"><li>– Crossing of creeks, natural features</li><li>– Potential impacts on ground water</li></ul>

A review of the long list of alternative solutions described above was completed to determine feasibility. Long list alternatives 1, 2, and 3 are not deemed feasible as they require pumping over long distances, thus increasing the cost of operation of the Front St. WWPS. Long list alternatives 3 and 4 are deemed not feasible as the proposed new WWPS would be located within the Rhododendron Gardens, thus requiring a large amount of plants and trees to be removed from the community. Therefore, only long list alternative 5 was carried forward to the short list of alternatives for further evaluation.



## Front St. Wastewater Flow Diversion Class EA Approach Evaluation Matrix

Screening Criteria	Approach 1	Approach 2	Approach 3	Approach 4	Approach 5
Description	<p>Expand Front St. WWPS. Forcemain from Front St. WWPS to Richard's Memorial WWPS. Gravity sewer from Richard's Memorial WWPS to Jack Darling WWPS. New Richard's Memorial WWPS.</p>	<p>Expand Front St. WWPS. Forcemain from Front St. WWPS to WWPS to Jack Darling WWPS. Forcemain from Richard's Memorial WWPS to Jack Darling WWPS. New Richard's Memorial WWPS.</p>	<p>Expand Front St WWPS. Forcemain from Front St. WWPS to new WWPS at the Rhododendron Gardens. Forcemain from Rhododendron Gardens to Richard's Memorial Park WWPS. New Richard's Memorial WWPS. Gravity sewer from new Richard's Memorial WWPS to Jack Darling WWPS.</p>	<p>Gravity sewer from Front St. WWPS to new WWPS at the Rhododendron Gardens. Decommissioning of Front St. WWPS. Forcemain from Rhododendron Gardens to Richard's Memorial WWPS. Gravity sewer from Richard's Memorial WWPS to Jack Darling WWPS.</p>	<p>Gravity sewer from Front St. WWPS to New Richard's Memorial WWPS. Decommissioning of Front St. WWPS. Gravity sewer from Richard's Memorial WWPS to Jack Darling WWPS.</p>
TECHNICAL	<p>Limited space to retrofit the Front St. WWPS as it is within the lighthouse building. Retrofitting would include the replacement of all process and electrical equipment within the station.</p> <p>The station's wet well structure would need to be expanded to meet the Region's design standards. Expansion of the Front St. WWPS would require installing a temporary pump station to allow construction to take place while maintaining the system in operation.</p> <p>City of Mississauga is planning to develop the site as a park as part of the Port Credit Harbour Parks development. Access to the site for construction and operation and maintenance would be restricted.</p> <p>Space within Richard's Memorial is limited by trees, parking, and other features.</p> <p>Can easily tie in existing sewers discharging to the existing Richard's Memorial WWPS.</p>	<p>Limited space to retrofit the Front St. WWPS as it is within the lighthouse building. Retrofitting would include the replacement of all process and electrical equipment within the station.</p> <p>The station's wet well structure would need to be expanded to meet the Region's design standards. Expansion of the Front St. WWPS would require installing a temporary pump station to allow construction to take place while maintaining the system in operation.</p> <p>City of Mississauga is planning to develop the site as a park as part of the Port Credit Harbour Parks development. Access to the site for construction and operation and maintenance would be restricted.</p> <p>Space within Richard's Memorial is limited by trees, parking, and other features.</p> <p>Can easily tie in existing sewers discharging to the existing Richard's Memorial WWPS.</p>	<p>Limited space to retrofit the Front St. WWPS as it is within the lighthouse building. Retrofitting would include the replacement of all process and electrical equipment within the station.</p> <p>The station's wet well structure would need to be expanded to meet the Region's design standards. Expansion of the Front St. WWPS would require installing a temporary pump station to allow construction to take place while maintaining the system in operation.</p> <p>City of Mississauga is planning to develop the site as a park as part of the Port Credit Harbour Parks development. Site access for construction, operation and maintenance would be restricted.</p> <p>Space within Richard's Memorial is limited by trees, parking, and other features. Can easily tie in existing sewers discharging to the existing Richard's Memorial WWPS.</p> <p>Space within the Gardens would be limited to avoid disturbing the plants. Would require significant modifications to the existing wastewater collection system to redirect sewers now discharging to the existing Richard's Memorial WWPS, east to the new pumping station in the Brueckner Gardens.</p>	<p>A new gravity sewer would be constructed from Front St. WWPS to Richard's Memorial WWPS.</p> <p>This approach allows for the Front St. WWPS to be decommissioned.</p> <p>Space within Richard's Memorial is limited by trees, parking, and other features. Can easily tie in existing sewers discharging to the existing Richard's Memorial WWPS.</p> <p>Space within the Gardens would be limited to avoid disturbing the plants. Would require significant modifications to the existing wastewater collection system to redirect sewers now discharging to the existing Richard's Memorial WWPS, east to the new pumping station in the Brueckner Gardens.</p>	<p>A new gravity sewer would be constructed from Front St. WWPS to Richard's Memorial WWPS.</p> <p>This approach allows for the Front St. WWPS to be decommissioned.</p> <p>Space within Richard's Memorial is limited by trees, parking, and other features. Can easily tie in existing sewers discharging to the existing Richard's Memorial WWPS.</p>

<p><b>SOCIAL</b></p>	<p>The City of Mississauga is planning the Port Credit Harbour West Parks development in the area in front of the Front St. WWPS. Retrofitting of the station would decrease the space available for the park development.</p> <p>The City of Mississauga and Community prefers Richard's Memorial Park location over Brueckner Rhododendron Gardens, per findings in PIC 1</p>	<p>The City of Mississauga is planning the Port Credit Harbour West Parks development in the area in front of the Front St. WWPS. Retrofitting of the station would decrease the space available for the park development.</p> <p>The City of Mississauga and Community prefers Richard's Memorial Park location over Brueckner Rhododendron Gardens, per findings in PIC 1</p>	<p>The City of Mississauga is planning the Port Credit Harbour West Parks development in the area in front of the Front St. WWPS. Retrofitting of the station would decrease the space available for the park development.</p> <p>Received comments during PIC #1 indicating that there is strong opposition to a new pumping station in the Brueckner Gardens.</p>	<p>Decommissioning of the Front St. WWPS would allow the City of Mississauga to increase the area available for park space. The lighthouse building would be returned to the City.</p> <p>Received comments during PIC #1 indicating that there is strong opposition to a new pumping station in the Brueckner Gardens.</p>	<p>Decommissioning of the Front St. WWPS would allow the City of Mississauga to increase the area available for park space. The lighthouse building would be returned to the City.</p> <p>The City of Mississauga and Community prefers Richard's Memorial Park location over Brueckner Rhododendron Gardens, per findings in PIC #1</p>
<p><b>ENVIRONMENTAL</b></p>	<p>Operation and maintenance costs will be higher as the collected wastewater will be pumped twice. Maintenance on the Front St. WWPS may be difficult due to limited space.</p> <p>Significant energy would be required to pump wastewater 2 km to Richard's Memorial WWPS.</p> <p>Expansion of the Front St. WWPS would require installing a temporary pump station to allow construction to take place while maintaining the system in operation. This would increase capital costs.</p> <p>The electricity required to operate both pumping stations will increase the greenhouse gas footprint.</p> <p>Removal of trees required.</p>	<p>Operation and maintenance costs will be higher as the collected wastewater will be pumped twice. Maintenance on the Front St. WWPS may be difficult due to limited space.</p> <p>Significant energy would be required to pump wastewater 3 km to Jack Darling WWPS.</p> <p>Expansion of the Front St. WWPS would require installing a temporary pump station to allow construction to take place while maintaining the system in operation. This would increase capital costs.</p> <p>The electricity required to operate both pumping stations will increase the greenhouse gas footprint.</p> <p>Removal of trees required</p>	<p>The Brueckner Gardens is the only botanical garden in Mississauga and contains several donated and planted plants.</p> <p>Operation and maintenance costs will be higher as the collected wastewater will be pumped three times. Maintenance on the Front St. WWPS may be difficult due to limited space.</p> <p>Significant energy would be required to pump wastewater 2 km to Richard's Memorial WWPS.</p> <p>Expansion of the Front St. WWPS would require installing a temporary pump station to allow construction to take place while maintaining the system in operation. This would increase capital costs.</p> <p>The electricity required to operate both pumping stations will increase the greenhouse gas footprint.</p> <p>Removal of trees required at Richard's Memorial WWPS.</p>	<p>Operation and maintenance costs associated with Front St WWPS and Richard's Memorial WWPS forcemains will be lower as the wastewater will flow by gravity from Front St. WWPS to the Rhododendron Gardens. This reduces the greenhouse gas footprint of the project. However the cost to maintain and operate will remain for three pumping station sites.</p> <p>A new pumping station would be located within the only botanical garden in Mississauga and contains several donated plants and protected trees.</p> <p>Removal of trees required at Richard's Memorial WWPS</p>	<p>Operation and maintenance costs will be lower as the wastewater will flow by gravity from Front St WWPS as well as from Richard's Memorial WWPS. This reduces the greenhouse gas footprint of the project.</p> <p>Removal of trees required</p>

## 2.4 EVALUATION OF SHORT LIST OF ALTERNATIVES

The only long list alternative # 5 was carried forward to the short list of alternatives for further evaluation. The Alternative 5 is described as follows:

Decommission Front St. WWPS. Construct trunk sewer from Front St WWPS to Richard’s Memorial Park. Construct new Richard’s Memorial WWPS. Construct new trunk sewer from Richard’s Memorial WWPS to Jack Darling WWPS.

This alternative comprises of seven different locations for the new pumping station at Richard’s Memorial Park and six different sewer routes. These are indicated below.

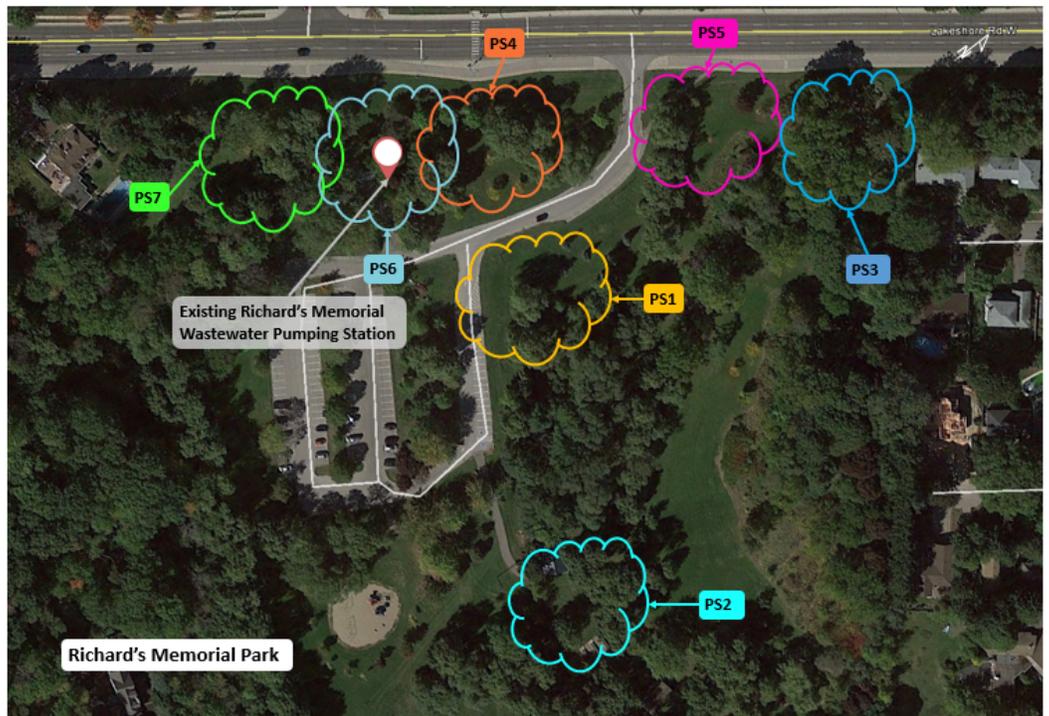


Figure 10: Short list of Alternatives – Richard’s Memorial WWPS Sites



*Figure 11: Short list of Alternatives – Linear Infrastructure Routes*

The short list of identified alternatives will be subject to a more detailed evaluation based on technical, environmental, built/social, financial, and legal/jurisdictional criteria to determine the preferred solution.

The evaluation criteria for the evaluation of the short listed alternatives can be seen in Table 2-3.

*Table 2-3 Evaluation Criteria for Short Listed Alternatives*

FACTOR	EVALUATION CRITERIA
Technical	<ul style="list-style-type: none"> <li>– Design and construction site requirements</li> <li>– Constructability</li> <li>– Overall project delivery risk</li> <li>– Traffic impacts</li> <li>– Impact to existing utilities</li> </ul>
Environment	<ul style="list-style-type: none"> <li>– Potential effects on water features/resources</li> <li>– Geology, hydrogeology considerations</li> <li>– Potential effects on natural features</li> <li>– Land contamination considerations</li> <li>– Effect on park areas</li> <li>– GHG Emissions &amp; Carbon Footprint</li> </ul>
Built/Social Environment	<ul style="list-style-type: none"> <li>– Effect on existing residences, businesses and/or community institutional and recreational facilities</li> <li>– Effect of noise and vibration Effect on existing utility infrastructure</li> <li>– Effect on existing road infrastructure</li> <li>– Built Heritage Resources (BHR) and Cultural Heritage</li> <li>– Landscape (CHL)</li> <li>– Archaeology</li> </ul>
Financial	<ul style="list-style-type: none"> <li>– Initial capital costs</li> <li>– Operation and maintenance costs</li> <li>– Lifecycle costs</li> </ul>
Legal/Jurisdictional	<ul style="list-style-type: none"> <li>– Compliance with applicable planning and environmental policies</li> <li>– Potential land requirements</li> </ul>

An evaluation matrix will be developed to compare the data found from the technical investigations and studies. The findings will be presented at a second Public Information Centre (PIC2) to present the preferred alternative, initiate discussions and receive feedback.

Once the technical findings are complete, the public feedback collected and the preferred alternative confirmed, the evaluation matrix and data will be presented in the Project File.