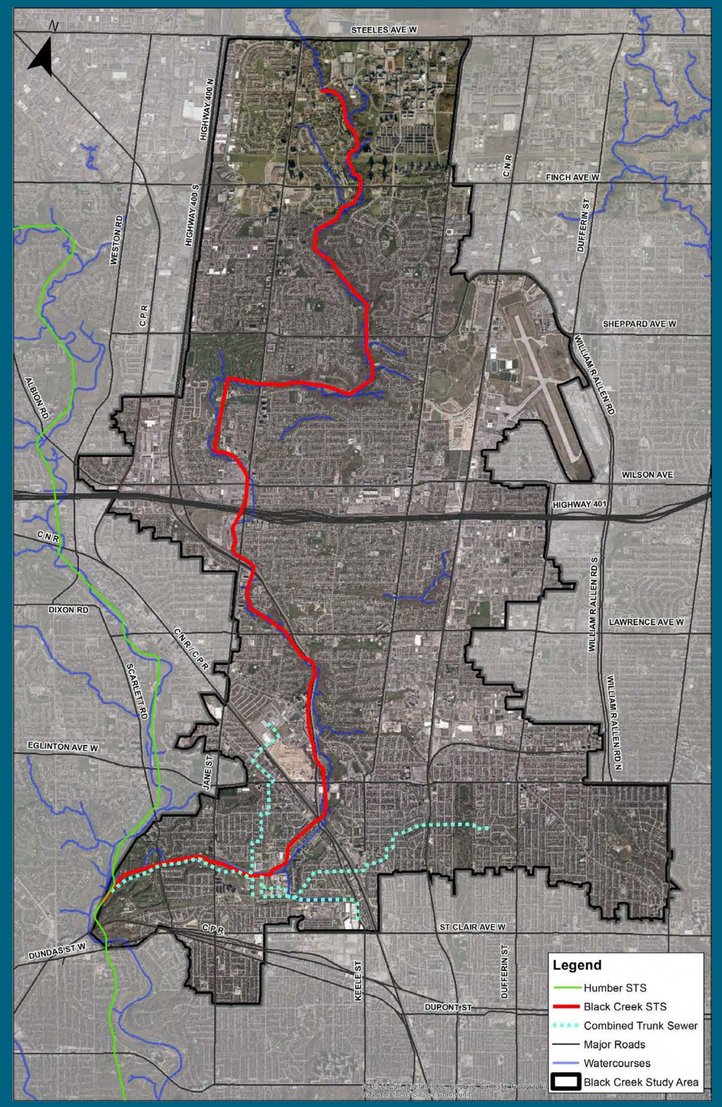
Welcome
Black Creek Sanitary Drainage Area Servicing Improvements

Municipal Class Environmental Assessment Study
Public Consultation Drop-In Event #3

Date: Wednesday December 11, 2019

Time: 6:00 pm to 8:00 pm

Please sign in to receive project updates on the study. Please provide your comments by completing a comment sheet and placing it in the box or forwarding it to the Project Team by January 8, 2020.



TORONTO WSP JACOBS

Black Creek Sanitary Drainage Area Servicing Improvements Class Environmental Assessment Study

The purpose of this Environmental Assessment Study is to recommend improvements for the Black Creek Sanitary Trunk Sewer (STS) system.

This Environmental Assessment Study is to address capacity constraints of the existing Black Creek STS and the three Combined Trunk Sewers that are connected to the Black Creek STS

- The Basement Flooding Protection Program is additionally reviewing basement flooding issues at the local sewer and street level.
- The preferred solution will work in conjunction with the Basement Flooding Protection Program solutions and the TRCA riverine flooding improvements to alleviate surface and basement flooding.

Purpose of Today's Event

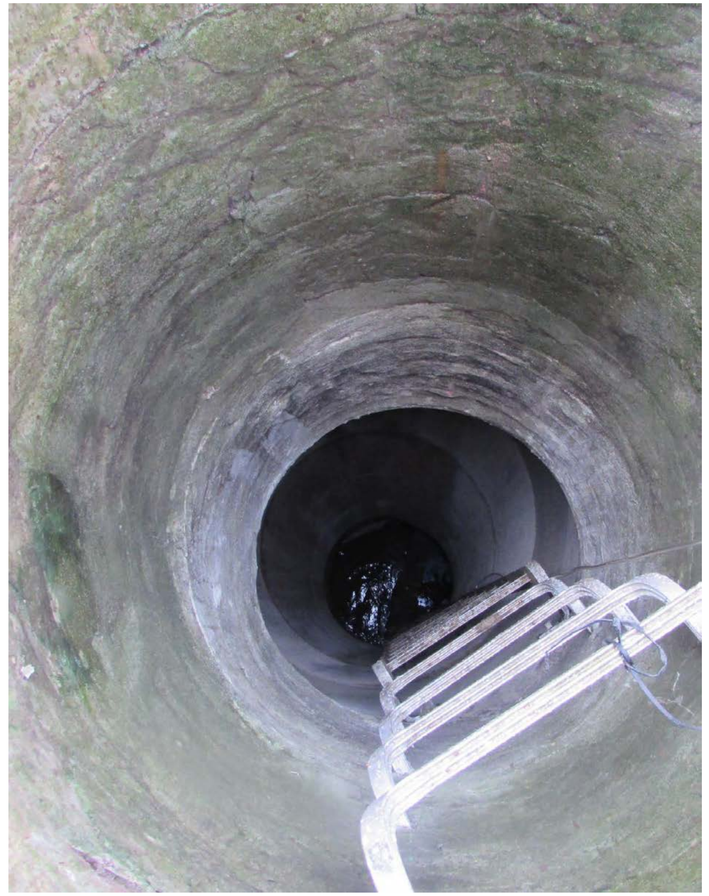
At Public Consultation Drop-In Event #1 held in 2016 the study purpose and objectives were presented. At Public Consultation Drop-In Event #2 held in spring 2019 the evaluation of the alternative solutions and a description of the recommended alternative solution were presented.

The purpose of today's event (Public Consultation Drop-In Event #3) is to provide information, and receive feedback on the following:

- Evaluation of the design concepts which were developed for the preferred solution
- Recommended design concept

We Want to Hear From You

- Sign in at the attendance register
- Review the display panels, recommended design concept and shaft locations
- Ask questions/provide input to City Staff and the engineering consultant
- Complete a comment form



Study Purpose and Objectives

The purpose of this study is to complete a detailed trunk sewers capacity analysis of the Black Creek Sanitary Drainage Area, identify issues and develop a plan to achieve the following objectives:

- Reduce sewer water level in the existing Black Creek STS during wet weather events to prevent sewer backup in the local sewers
- Reduce combined sewer overflows to Black Creek watercourse from the three combined trunk sewers
- Reduce stormwater Inflow and Infiltration (I&I) into the Black Creek STS
- Service projected population to the year 2041 and beyond

The study purpose is refined into a problem statement which guides the study and assists to develop the solutions.

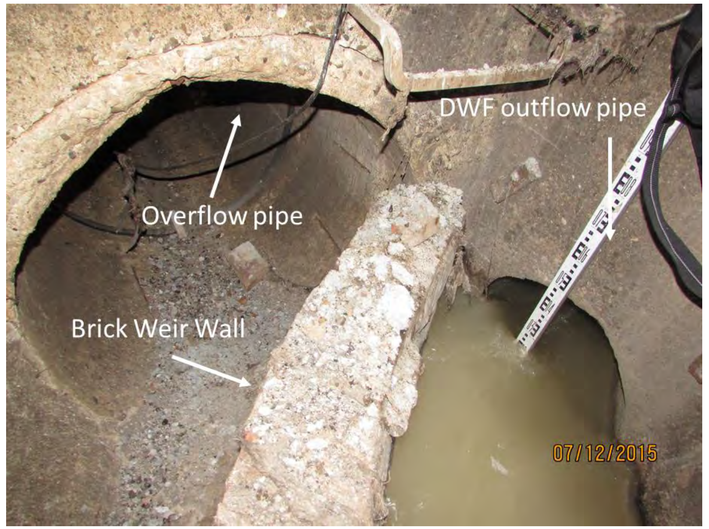
Municipal Class Environmental Assessment Process – Schedule C

- The mandated process we are following to complete this project is described here:

Phase 1	Phase 2	Phase 3	Phase 4	30 Day Review	Phase 5
• Identify the Problem • Consult with Public, Agencies, Stakeholders • **Public Consultation Drop-In Event #1 April 2016**	• Review of background studies, relevant EAs and existing conditions • Develop and Evaluate Alternative Solutions • Consult with Public, Agencies, Stakeholders • **Public Consultation Drop-In Event #2 April 2019** • Select a Preferred Solution	• Identify Design Concepts • Consult with Public, Agencies, Stakeholders • ***We are here:*** **Public Consultation Drop-In Event #3 December 2019** • Select the Preferred Design Concept	• Complete Environmental Study Report • File Environmental Study Report for Review by Public, Agencies, Stakeholders		• Design, Construct and Monitor

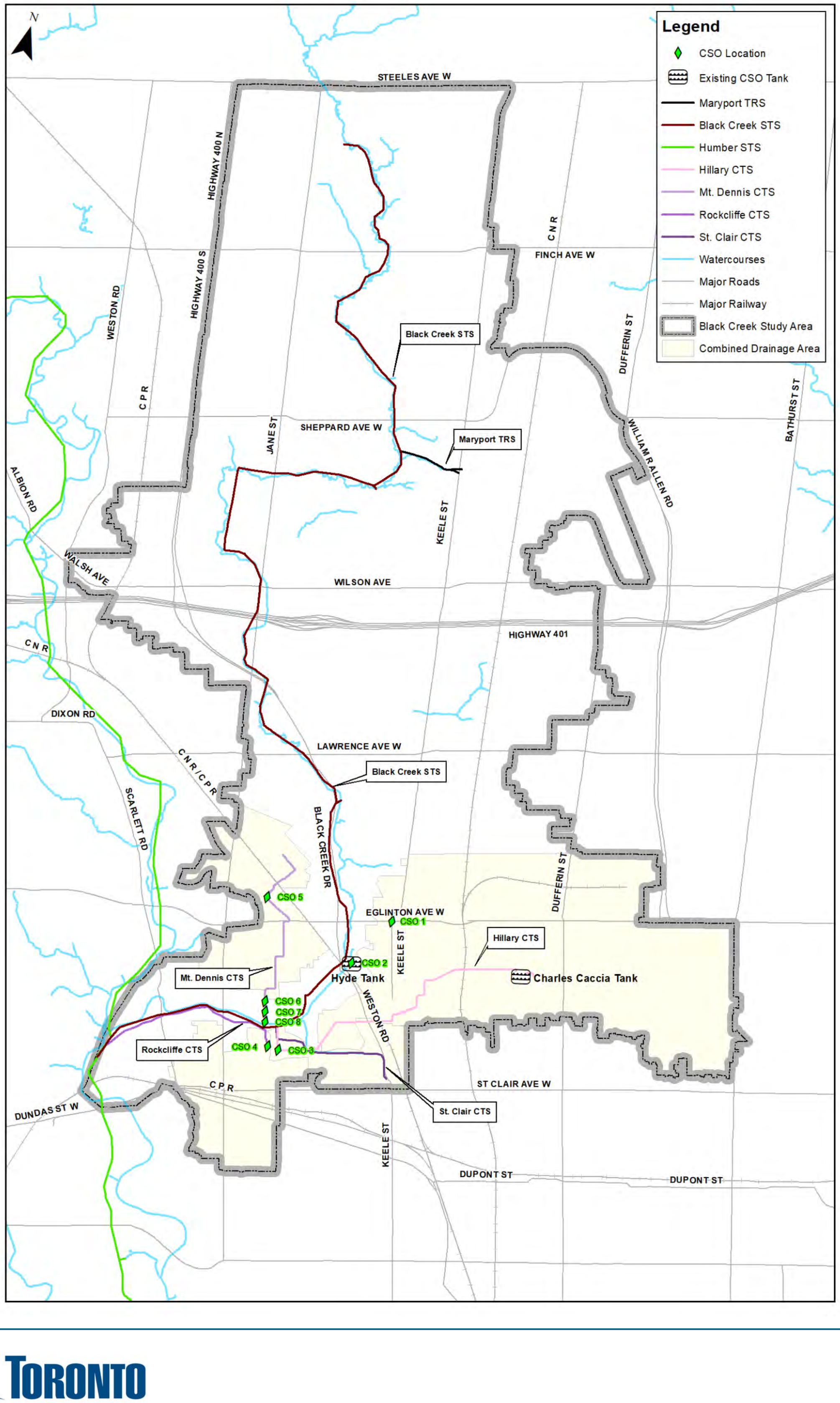
Black Creek Sanitary Trunk Sewer System and Drainage Area

- The existing Black Creek STS was built in the 1960s, is approximately 15 km long, and is located from Finch Avenue West to Scarlett Road
- The Black Creek STS services a sanitary drainage area of 5,500 hectares (ha), the equivalent of approximately 4,000 soccer fields
- The Black Creek STS services a population of 351,000 (2016 population, approx. 75% residential, 25% employment)
- 2041 population projection is 418,500 (approx. 75% residential, 25% employment), or about a 14% increase
- 80% of the sanitary drainage area has separated local sanitary and storm sewers; 20% has local combined sewers
- 3 combined trunk sewers that connect to the Black Creek STS
- 8 combined sewer overflow structures
- 3 storage facilities

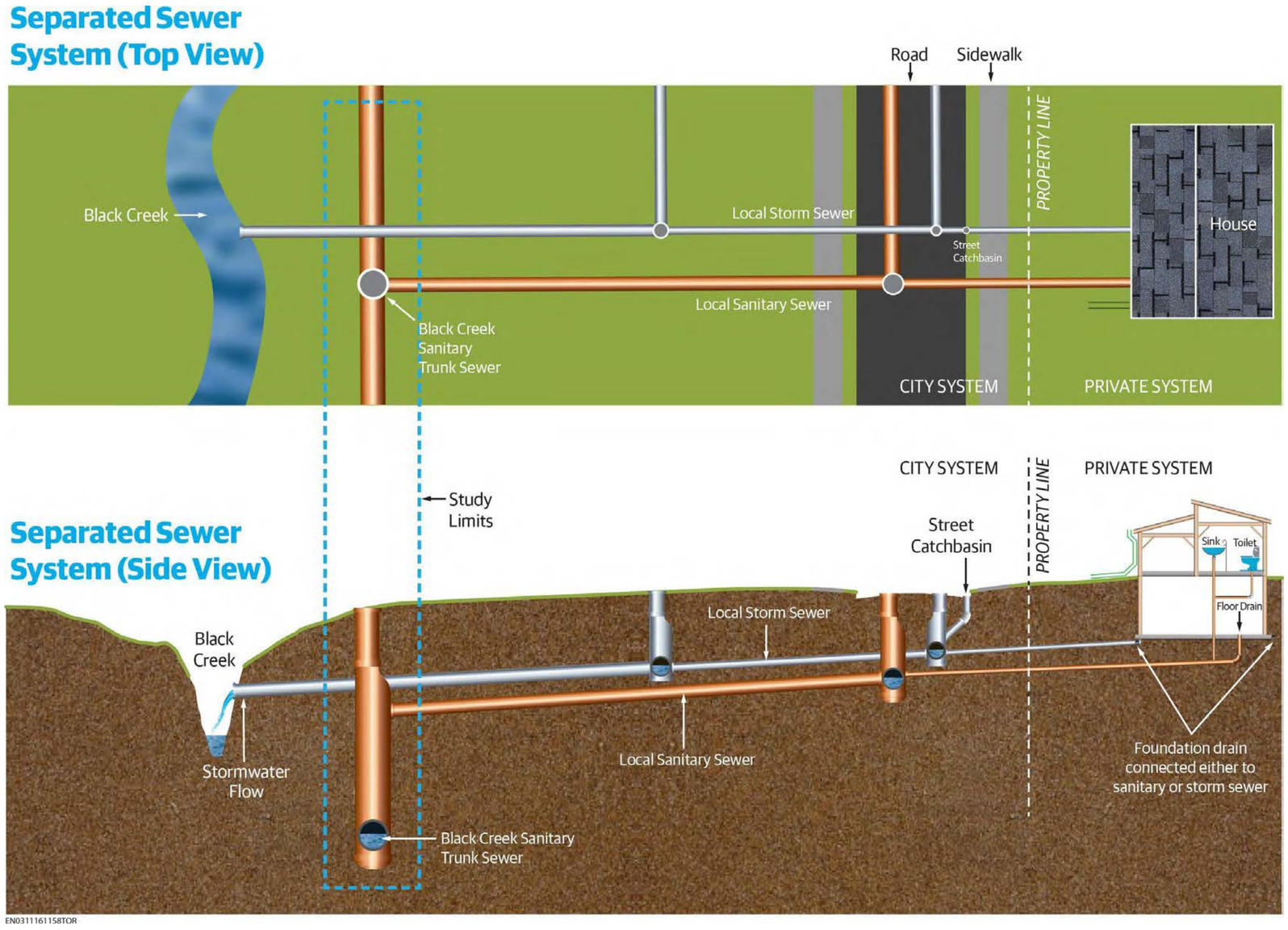


Overflow structure of the Mt. Dennis combined trunk sewer

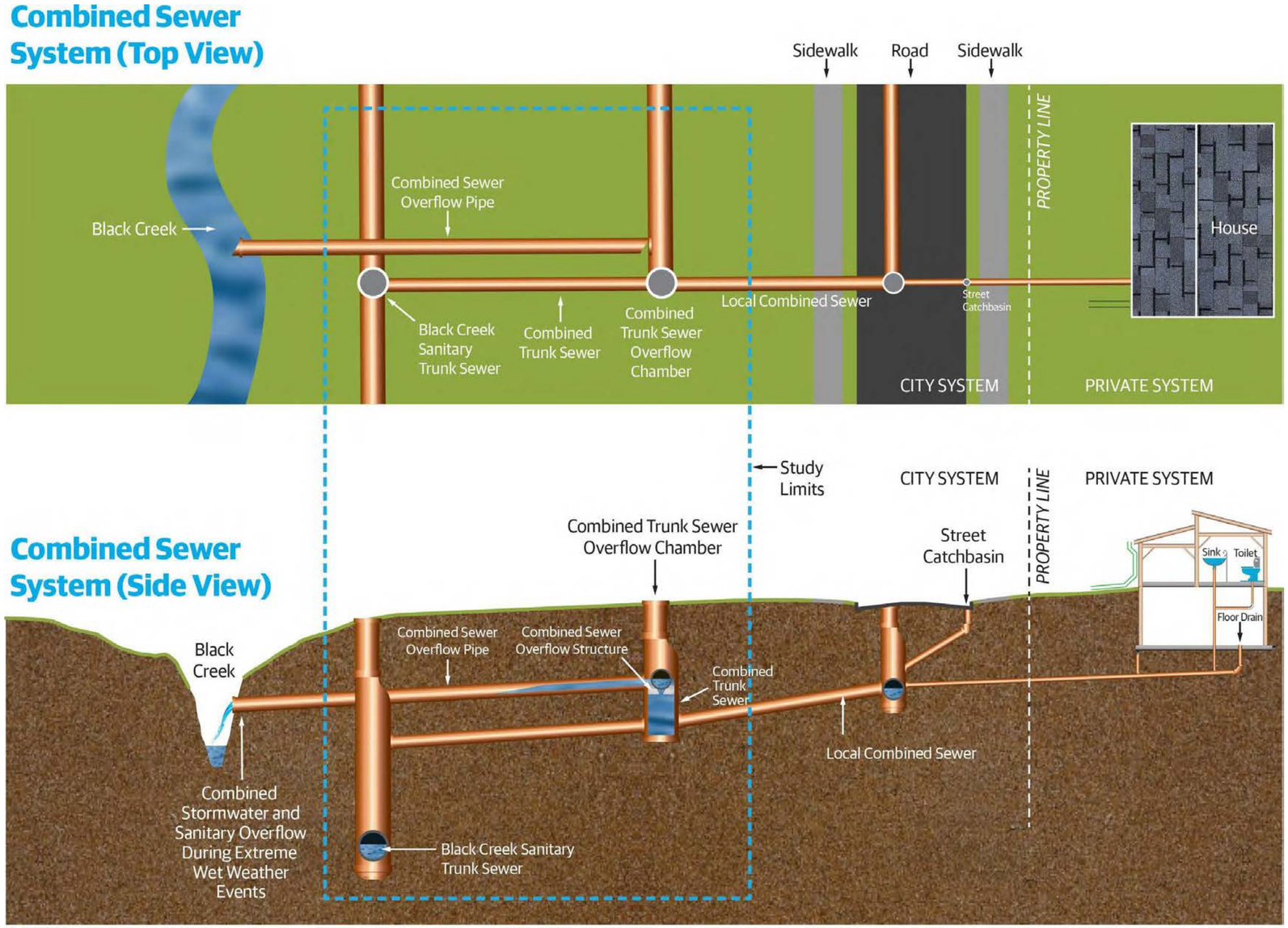
Study Area


N
Legend
CSO Location
Existing CSO Tank
Maryport TRS
Black Creek STS
Humber STS
Hillary CTS
Mt. Dennis CTS
Rockcliffe CTS
St. Clair CTS
Watercourses
Major Roads
Major Railway
Black Creek Study Area
Combined Drainage Area
STEELES AVE W
HIGHWAY 400 N
HIGHWAY 400 S
C N R
FINCH AVE W
WESTON RD
C P R
DUFFERIN ST
BATHURST ST
Black Creek STS
JANE ST
SHEPPARD AVE W
Maryport TRS
ALBION RD
KEELE ST
WILLIAM R ALLEN RD
WALSH AVE
WILSON AVE
HIGHWAY 401
C N R
DIXON RD
LAWRENCE AVE W
C N R/C P R
Black Creek STS
SCARLETT RD
BLACK CREEK DR
DUFFERIN ST
CSO 5
EGLINTON AVE W
CSO 1
KEELE ST
Hillary CTS
CSO 2
Hyde Tank
Charles Caccia Tank
Mt. Dennis CTS
WESTON RD
CSO 6
CSO 7
CSO 8
Rockcliffe CTS
CSO 4
CSO 3
C P R
ST CLAIR AVE W
DUNDAS ST W
St. Clair CTS
KEELE ST
DUPONT ST
DUPONT ST

Separated Sewer System



Combined Sewer System



Phase 1: Problem Identification

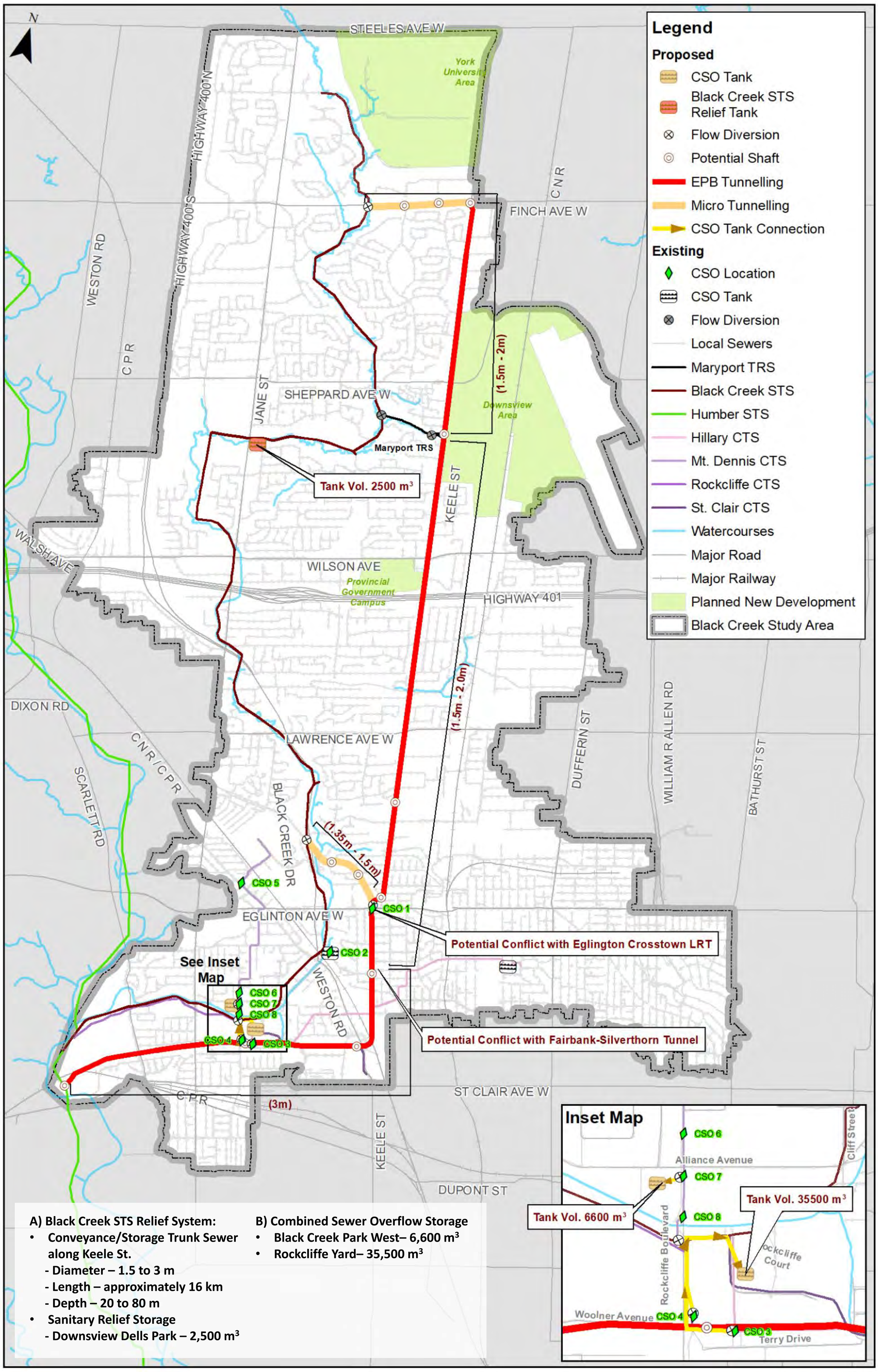
- High water level in the Black Creek STS
  - High water level in the Black Creek STS occurs during wet weather events. The excess flows may cause backup into local sewer potentially causing basement flooding or cause spill in the low lying areas.
- Combined Trunk Sewers Overflow
  - Three combined trunk sewers carry a mixture of stormwater and domestic sewage. During rainstorms excess flow are discharged to the Black Creek watercourse to control flow going to the Black Creek STS.
- Stormwater inflow & infiltration to the Black Creek STS
  - Inflow and infiltration (I&I) are terms used to describe the ways that groundwater and stormwater enter the sanitary sewer system.
  - Key sources of inflow to the Black Creek STS are from leaking maintenance hole covers; creek water backing up to the trunk sewer; excess flows from combined sewer system and local sanitary sewers due to rainfalls
- Future population growth constraints
  - Population increases will put strain on the existing system capacity. Capacity must be available to service population projections to 2041 and beyond with some safety margin consideration due to Climate Change

Example of sanitary trunk sewer overflow during a wet weather event

Phase 2: Evaluation of Alternative Solutions

1. Reviewed existing conditions
2. Developed Design Criteria
3. Identified long-list of potential solutions:
    - I&I control measures (e.g. replacement of maintenance hole covers; installation of backwater valves, sewer separation , control excessive flow from the combined sewer system, and I&I reduction in local sanitary sewers)
    - new relief trunk
    - new storage facilities
    - diversion of flows
4. Developed a short-list of feasible alternatives
5. Assessed the short-listed of alternatives in detail
6. Selected a Recommended Solution

Phase 2 Preferred Alternative – Keele Street Alignment



A) Black Creek STS Relief System:

- **Conveyance/Storage Trunk Sewer along Keele St.**
  - **Diameter – 1.5 to 3 m**
  - **Length – approximately 16 km**
  - **Depth – 20 to 80 m**
- **Sanitary Relief Storage**
  - **Downsview Dells Park – 2,500 m³**

B) Combined Sewer Overflow Storage

- **Black Creek Park West– 6,600 m³**
- **Rockcliffe Yard– 35,500 m³**

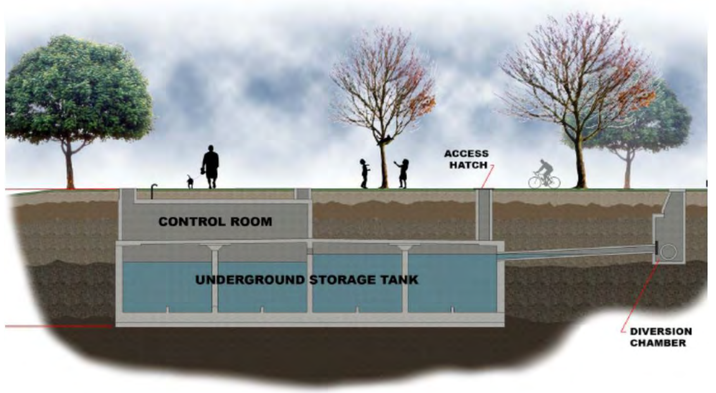
Phase 3: Conceptual Design Options

Recommended alternative consists of 4 major design components:

1. Inflow and Infiltration (I&I) and Wet Weather Flow Reduction (WWF)
2. Sanitary Relief Trunk / Diversion Design Concepts
    - Option 1: Deep 3m diameter Relief Trunk Sewer construction using EPB tunneling method
    - Option 2: Relief Trunk Sewer 1.5m to 3m diameter constructed by micro-tunneling and EPB tunneling
    - Option 3: Relief Trunk Sewer 1.5m to 3m diameter constructed by micro-tunneling, EPB and rock tunneling
3. Black Creek Sanitary Relief at Jane Street
    - Proposed to reduce water levels in the Black Creek STS in the section near Jane St and Troutbrooke Dr. to Jane St. and Downsview Ave.
    - Option 1: Underground Sanitary Storage Tank at Downsview Dells Park (Downsview Dells Tank)
    - Option 2: 1.5 m diameter relief trunk sewer constructed along Jane and Wilson (Jane/Wilson Trunk Sewer)
    - Option 3: 1.5 m diameter relief trunk sewer constructed along Jane and Downsview (Jane/Downsview Trunk Sewer)

(List continued on next panel...)

Example of underground storage with surface area landscaped to pre-construction conditions.



Example of underground storage tank design.

Phase 3: Conceptual Design Options (Continued)

(...List continued from previous panel)

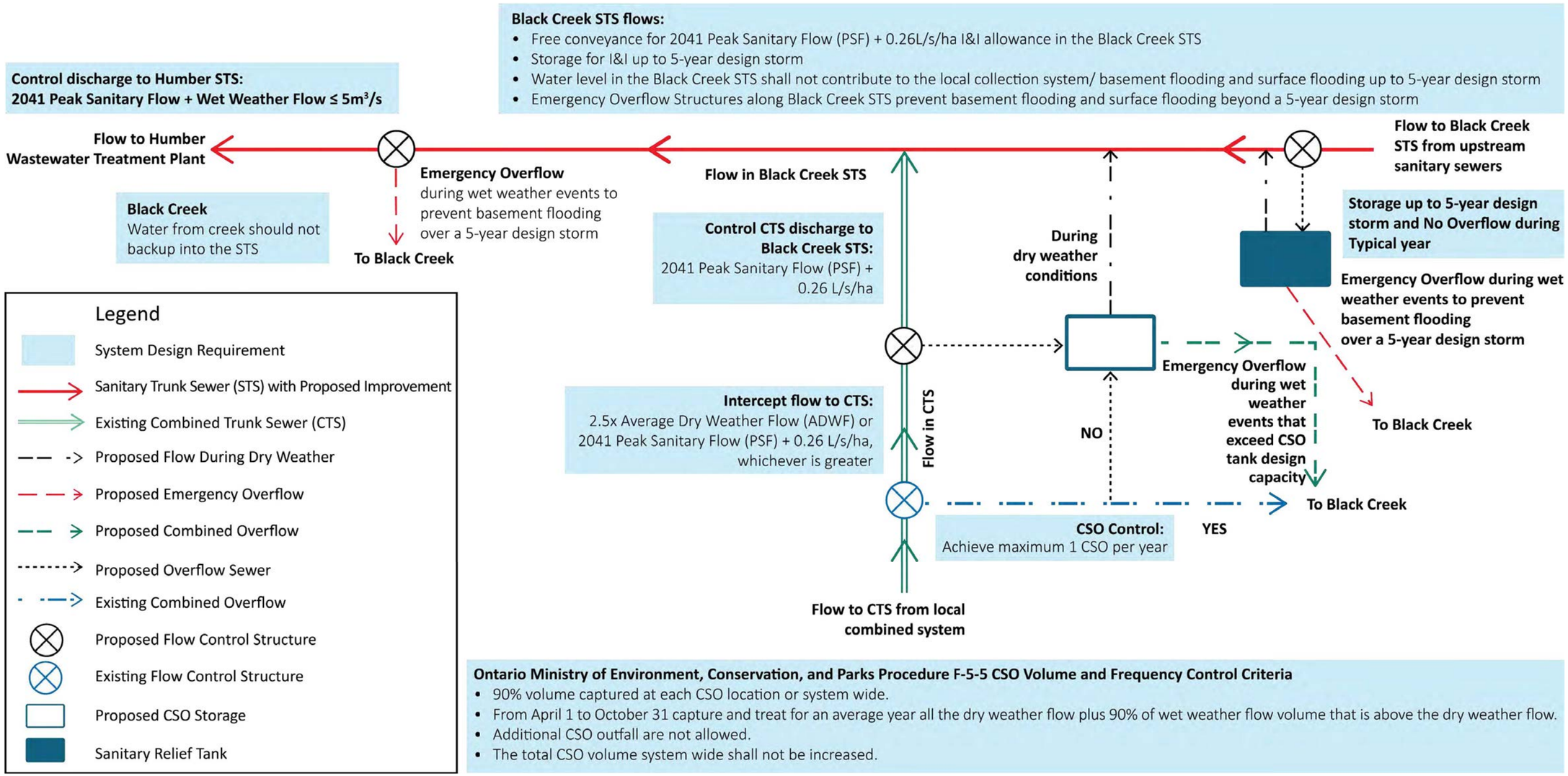
4. Combined Sewer Overflow (CSO) Design Concepts
    - Option 1: Two Separate Underground Storage Tanks
    - Option 2: One Underground Storage Tank connected to a Storage Tunnel
    - Option 3*: Storage provided entirely by a Storage Tunnel
        - Constructability review found that sufficient space for a large diameter tunnel was not available, therefore Option 3 was not considered further

The recommended design concept is a combination of I&I and WWF reduction measures, a new sanitary relief trunk and diversions to balance the flow, storing or conveying excess sanitary flows, and managing/storing excess CSOs to provide an integrated approach to achieve the required sanitary servicing capacity and to control CSO overflow.

Design Criteria

Design Criteria for the Development of Alternative Solutions (MCEA Phase 2)

- Assessment for the existing system capacity and development of alternative solutions will use 2041 population projections (From City's Official Plan)
- All alternative solutions (except DO NOTHING) will include I&I reduction measures on the trunk sewer

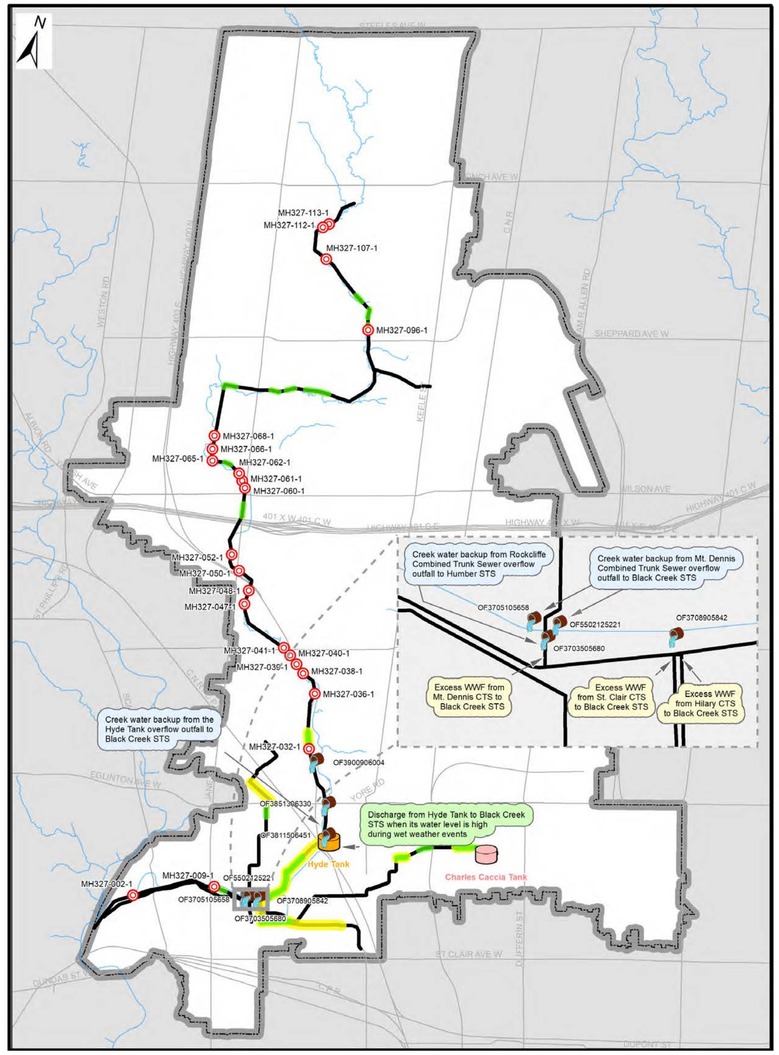


Ontario Ministry of Environment, Conservation, and Parks Procedure F-5-5 CSO Volume and Frequency Control Criteria

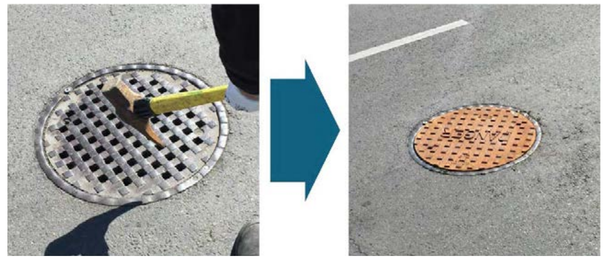
- 90% volume captured at each CSO location or system wide.
- From April 1 to October 31 capture and treat for an average year all the dry weather flow plus 90% of wet weather flow volume that is above the dry weather flow.
- Additional CSO outfall are not allowed.
- The total CSO volume system wide shall not be increased.

Inflow & Infiltration and Wet Weather Flow Reduction

- Replacement of maintenance hole covers to reduce inflow
- Prevent creek water from entering the trunk sewer
- Management of inflows from combined sewer system into Black Creek STS during wet weather
- Local sewer separation in combined sewer area
  - City's state of good repair and basement flooding protection programs (on-going)
- I&I reduction
  - Cross connections and other inflow sources (on-going)



Example of maintenance hole cover replacement.



Example of backwater prevention.

Legend

- CSO/SSO Tank
- Outfalls
- Priority Manholes
- Infiltration Observed
- Corrosion/Exposed Steel/Spalling Observed
- Trunk Sewers
- Watercourses
- Major Roads
- Study Area

Option 1 – A Deep 3 m Diameter Relief Trunk Sewer. Construction by EPB Tunnelling Method

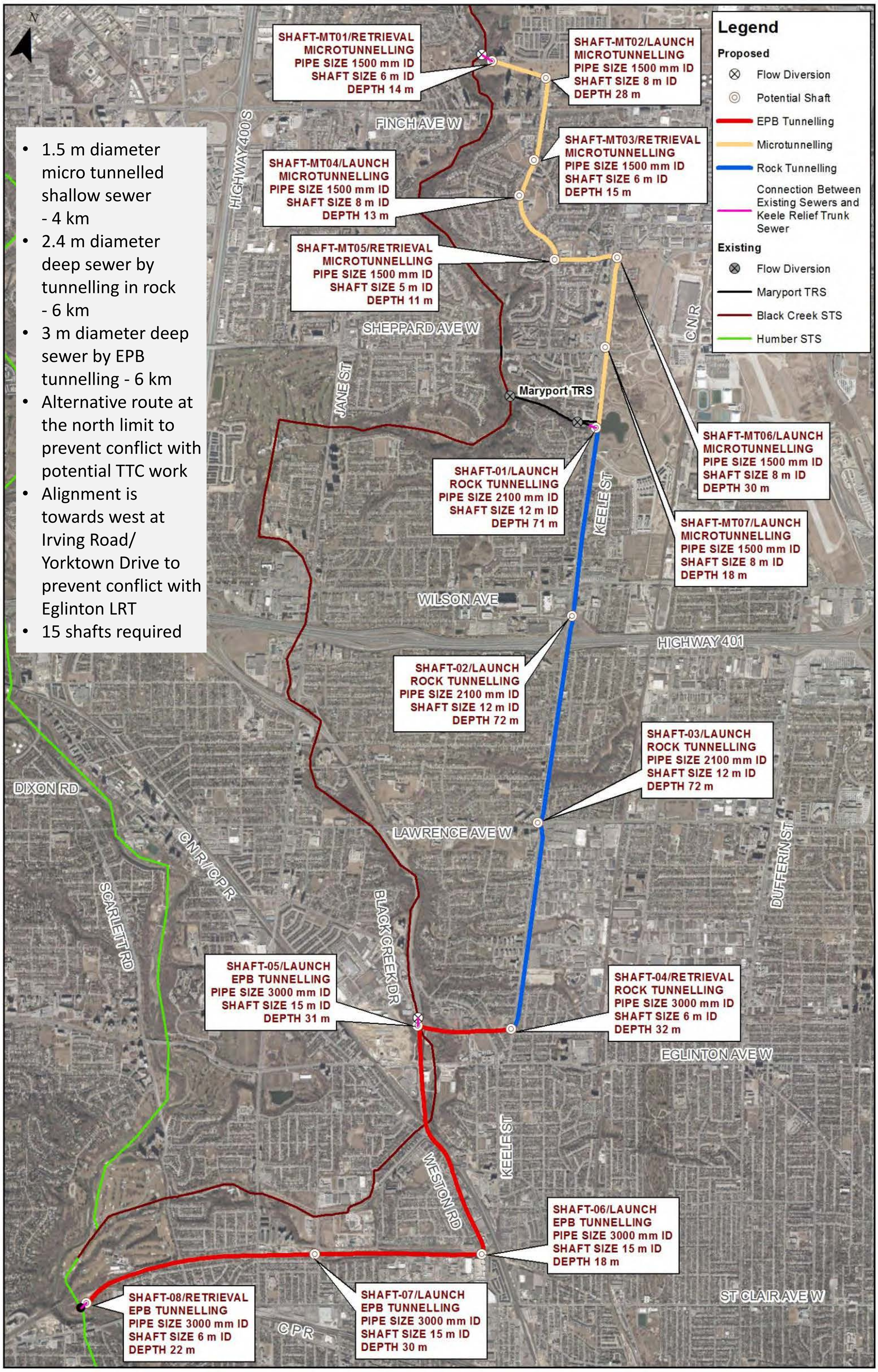
- 3 m diameter deep sewer constructed entirely by EPB tunnelling-16 km
- Deep tunnel to prevent conflict with TTC subway
- Alignment is towards west at Irving Road/Yorktown Drive to prevent conflict with Eglinton LRT
- 11 shafts required

Option 2 – 1.5 m to 3 m Diameter Relief Trunk Sewer. Construction by Microtunnelling and EPB Tunnelling Methods

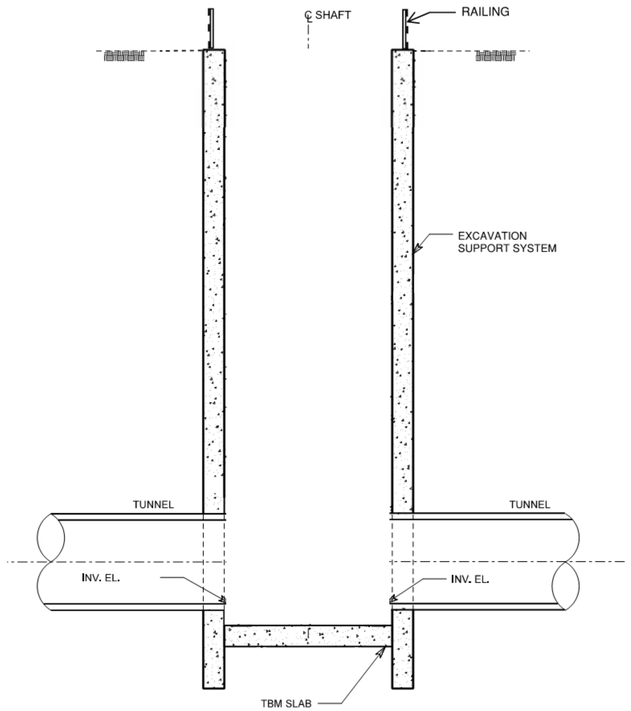
- 1.5 m diameter microtunnelled shallow sewer-4 km
- 2.1 m diameter microtunnelled deep sewer-2 km
- 3 m diameter deep sewer by EPB tunneling-10 km
- Alternative route at the north limit to prevent conflict with potential TTC work
- Alignment is towards west at Irving Road/ Yorktown Drive to prevent conflict with Eglinton LRT
- 16 shafts required

Option 3 – 1.5 m to 3 m Diameter Relief Trunk Sewer. Construction by Microtunnelling, EPB, and Rock Tunnelling Methods

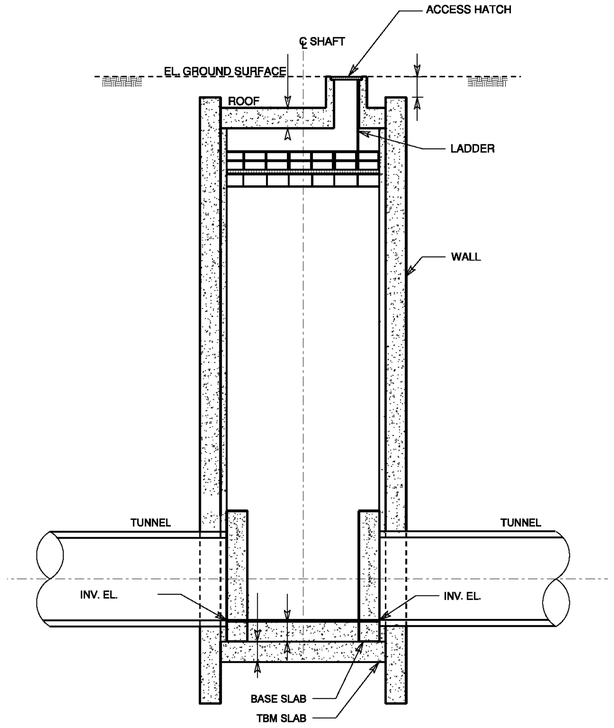
- 1.5 m diameter micro tunnelled shallow sewer - 4 km
- 2.4 m diameter deep sewer by tunnelling in rock - 6 km
- 3 m diameter deep sewer by EPB tunnelling - 6 km
- Alternative route at the north limit to prevent conflict with potential TTC work
- Alignment is towards west at Irving Road/ Yorktown Drive to prevent conflict with Eglinton LRT
- 15 shafts required



Conceptual Shaft Sections



Example cross-section of a tunnel shaft during construction



Example cross-section of a tunnel shaft post- construction

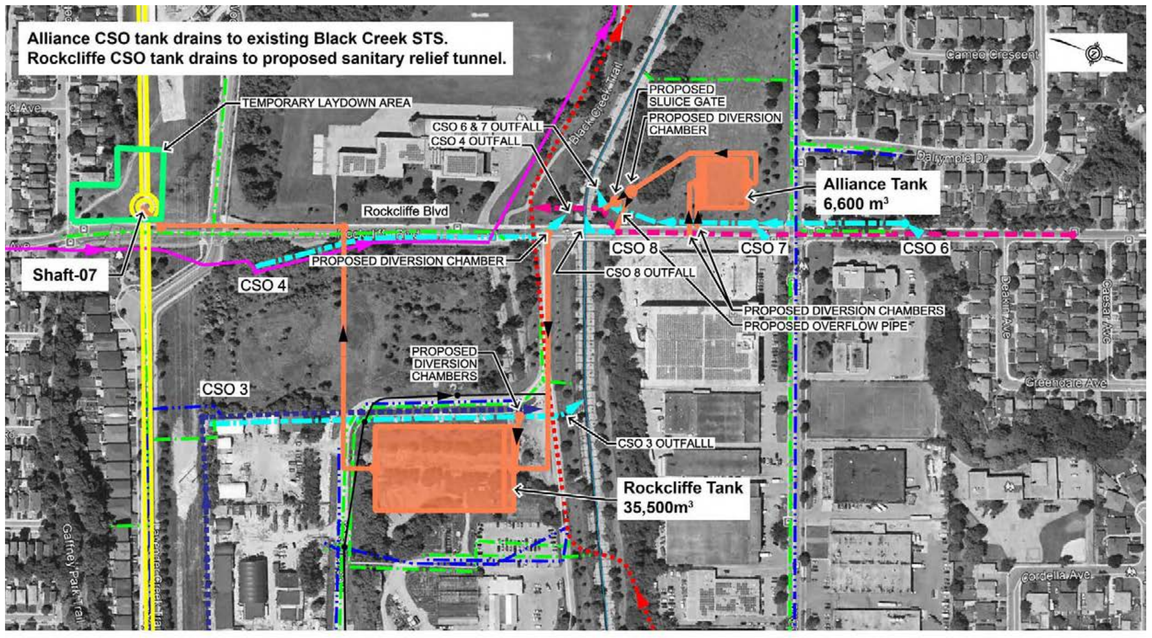
Picture of a shaft site during construction

Picture of a shaft site with grass seed post construction

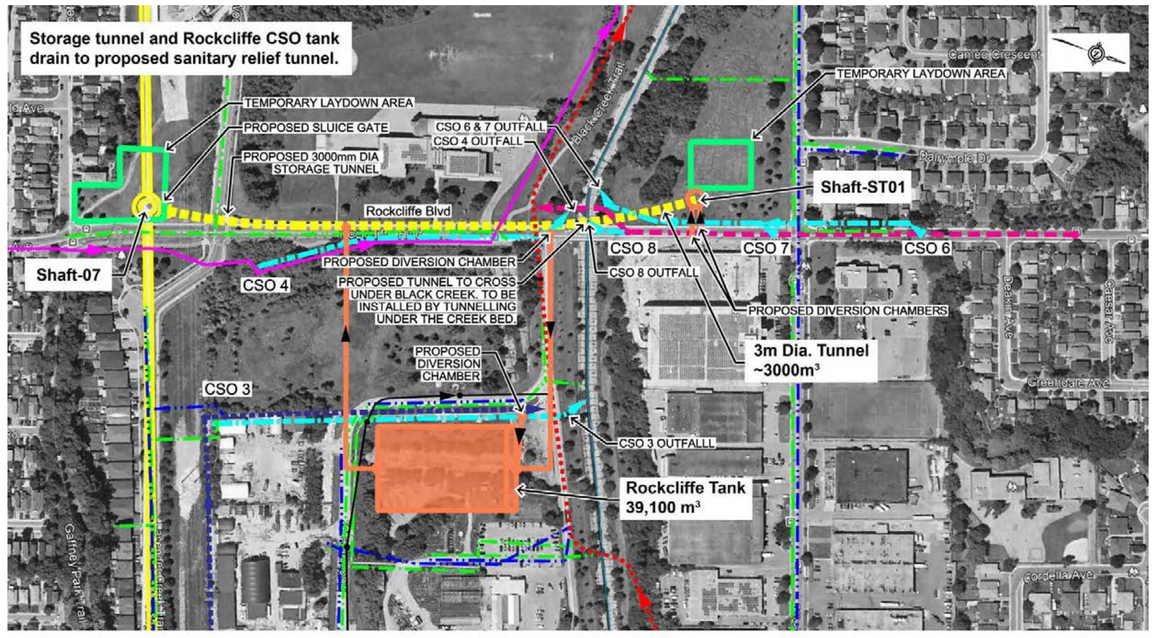
Combined Sewer Overflow Design Concepts

Two alternative concepts were identified for combined sewer overflow storage, illustrated below

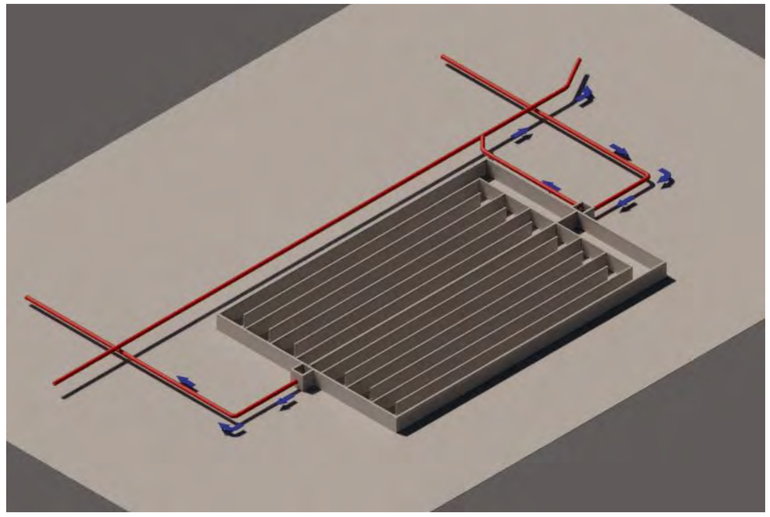
Design Concept Option 1: Two Separate Underground Storage Tanks



Design Concept Option 2: One Underground Storage Tank Connected to Storage Tunnel



3-D Representation of an Underground Tank



<u>3D VIEW</u>
(~100 m long x ~75 m wide x ~6 m depth)

Black Creek Sanitary Relief at Jane Street Design Concepts

- Three design concepts were developed to control water levels in the Black Creek STS near Jane Street, illustrated below and on the next slide.

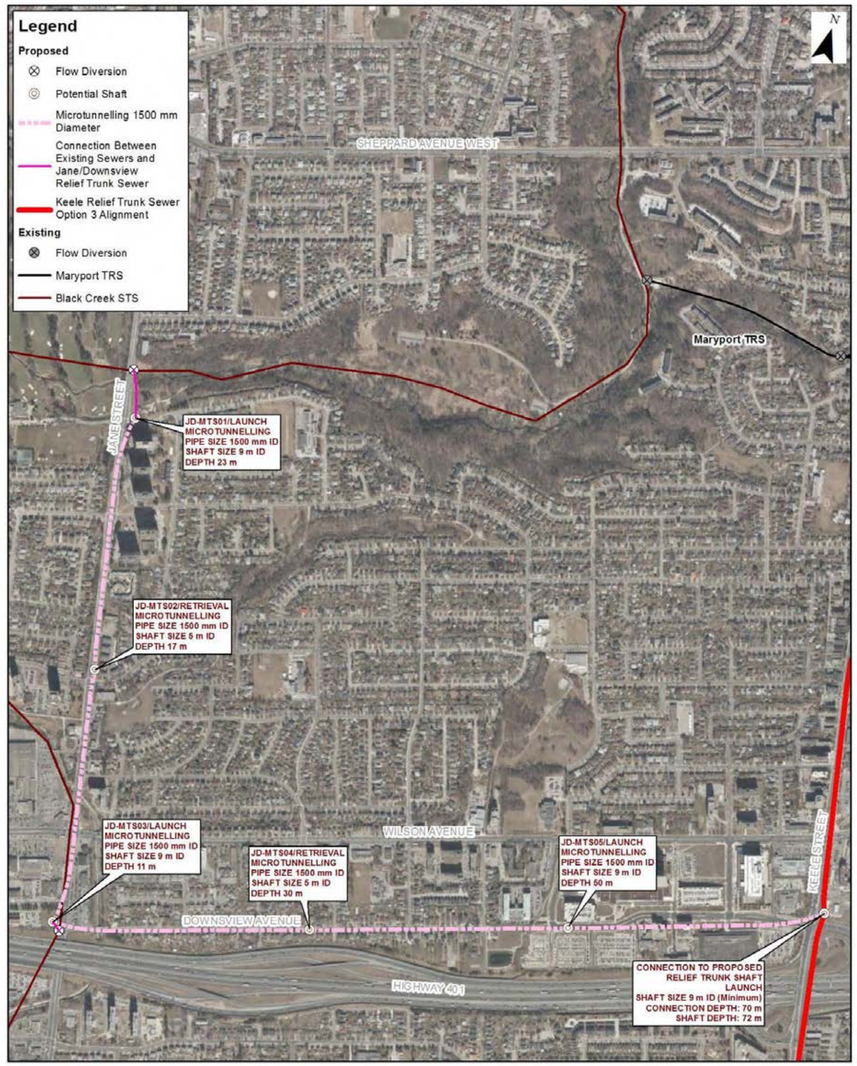
Design Concept Option 1: Underground Storage Tank

- 2500 m^3 underground tank
- Excess flows diverted from Black Creek STS into the tank during high flow periods
- During low flow periods, when there is sufficient capacity in the Black Creek STS, stored wastewater is pumped back into the Black Creek STS

Black Creek Sanitary Relief at Jane Street Design Concepts

Design Concept Option 2: Jane/Wilson Relief Trunk Sewer

Design Concept Option 3: Jane/Downsview Relief Trunk Sewer



- 1500 mm diameter sewer constructed by microtunelling along Jane St and Wilson Ave (Option 2) or Jane St and Downsview Ave (Option 3)
- Flows diverted from Black Creek STS into the sewer during high flow periods
- Connects to the main Keele St Relief Sewer

Evaluation Criteria for Alternative Design Concepts

The following evaluation criteria were developed through stakeholder input, and have been used to evaluate the design concept options.

Natural Environment

- Terrestrial impacts (e.g. trees, vegetation, wildlife)
- Aquatic habitat impacts (e.g. water quality, erosion and sedimentation impacts)
- Surface and groundwater
- Air Quality

Technical

- Ability to meet project objectives
- Long-term system reliability
- System operational complexity
- Operational flexibility and redundancy
- Risks of conflicts with other infrastructure
- Geotechnical and hydrogeology
- Regulatory approvals

Social & Cultural

- Long-term community impact (e.g. noise, odour, aesthetics, green space)
- Construction related impacts
- Property acquisition requirements
- Compatibility with existing and planned land use
- Cultural heritage and archaeological impacts

Cost

- Capital cost
- Operations and maintenance costs
- Life Cycle Costs

Sanitary Relief Trunk / Diversion Design Concepts
Design Concept Options Evaluation

Based on the evaluation criteria, the final scores for all options are very close.

- Option 3 (shallow tunneling) has the highest score (by a small margin) and is recommended.
- Option 1 (deep tunneling) is viable, but at a higher cost.
- Option 2 did not score high enough to warrant further consideration.

Alternatives	Natural	Socio-Cultural	Technical	Economic	Summary
Option 1: Deep 3000 mm Diameter Relief Trunk Sewer Construction Using an Earth Pressure Balance (EPB) Tunnel Boring Machine	Least impacts or greatest benefit when compared to other options, impacts can be mitigated [a]	Least impacts or greatest benefit when compared to other options, impacts can be mitigated [a]	Moderate impacts or moderate benefit when compared to other options.	Capital - $ 327,000,000 O&M - $ 1,600,000 Life Cycle - $ 354,000,000	Option 1 compared to the other options did score slightly lower on the technical category due to increased operation complexity due to maintaining a large tunnel with low flows and the deep construction under the planned TTC station. Option 1 is the highest cost option.
Option 2: Microtunneling and EPB Tunnel Boring Machine	Moderate impacts or moderate benefit when compared to other options.	Least impacts or greatest benefit when compared to other options, impacts can be mitigated [a]	Least impacts or greatest benefit when compared to other options [a]	Capital - $ 300,000,000 O&M - $ 1,500,000 Life Cycle - $ 325,000,000	Option 2 compared to Option 1 did score slightly lower on the natural environment category due to the increased number of shafts. Option 2 is the mid-cost option.
Option 3: Microtunneling, Rock Tunnel Boring Machine and EPB Boring Machine [a]	Moderate impacts or moderate benefit when compared to other options.	Least impacts or greatest benefit when compared to other options, impacts can be mitigated [a]	Least impacts or greatest benefit when compared to other options [a]	Capital - $ 276,000,000 O&M - $ 1,400,000 Life Cycle - $ 299,000,000 a	Option 3 compared to Option 1 did score slightly lower on the natural environment category due to the increased number of shafts. Option 1 is the lowest cost option. [a]

Notes:
O&M = Estimate of annual operation and maintenance cost
Life Cycle = Estimate of the total cost of an asset over the course of its useful life (useful life estimated to be 100 years)
[a] = Least impacts and/or lowest cost

Black Creek Sanitary Relief at Jane Street
Design Concept Options Evaluation

Based on the evaluation criteria, all three options scored very closely and are all viable alternatives.

- Option 1 has the lowest cost, but provides less flexibility and redundancy than Options 2 and 3.
- Options 2 and 3 provide additional flexibility, redundancy, and technical benefits, but at a higher cost. Option 3 is recommended.

Alternatives	Natural	Socio-Cultural	Technical	Economic	Summary
Option 1: Downsview Dells Tank	Moderate impacts or moderate benefit when compared to other options, impacts can be mitigated.	Slightly higher impacts or slightly lower benefit when compared to other options	Moderate impacts or moderate benefit when compared to other options.	Capital - $ 7,300,000 O&M - $ 146,000 Life Cycle - $ 9,730,000 [a]	Option 1 scored slightly lower than the other options in several categories: natural environment due to potential for odour impacts and for greater emergency overflow volumes; socio-cultural due to a permanent above ground control structure and potential for archeological impact; and technical due to additional operational complexity of the pumping systems and less operational flexibility/redundancy than other options . Option 1 is the lowest cost option.
Option 2: Jane/Wilson Relief Sewer	Least impacts or greatest benefit when compared to other options, impacts can be mitigated [a]	Least impacts or greatest benefit when compared to other options, impacts can be mitigated [a]	Least impacts or greatest benefit when compared to other options [a]	Capital - $ 46,860,000 O&M - $ 234,000 Life Cycle - $ 50,750,000	Option 2 scored slightly higher than Option 1 in most categories except cost. Though the total socio-cultural score was slightly higher than Option 1, there is potential for traffic disruption during construction and easements may be needed for some shaft locations and some parts of the alignment. Option 2 had the highest cost.
Option 3: Jane/Downsview Relief Sewer [a]	Least impacts or greatest benefit when compared to other options, impacts can be mitigated [a]	Least impacts or greatest benefit when compared to other options, impacts can be mitigated [a]	Least impacts or greatest benefit when compared to other options [a]	Capital - $ 42,090,000 O&M - $210,000 Life Cycle - $ 45,580,000	Option 3 scored slightly higher than Option 1 in most categories except cost. Though the total socio-cultural score was slightly higher than Option 1, there is potential for traffic disruption during construction and easements may be needed for some shaft locations and some parts of the alignment. Option 3 had a higher cost than Option 1 but lower than Option 2.

Notes:
O&M = Estimate of annual operation and maintenance cost
Life Cycle = Estimate of the total cost of an asset over the course of its useful life (useful life estimated to be 100 years)

[a] = Least impacts and/or lowest cost

Combined Sewer Overflow Design Concepts
Design Concept Options Evaluation

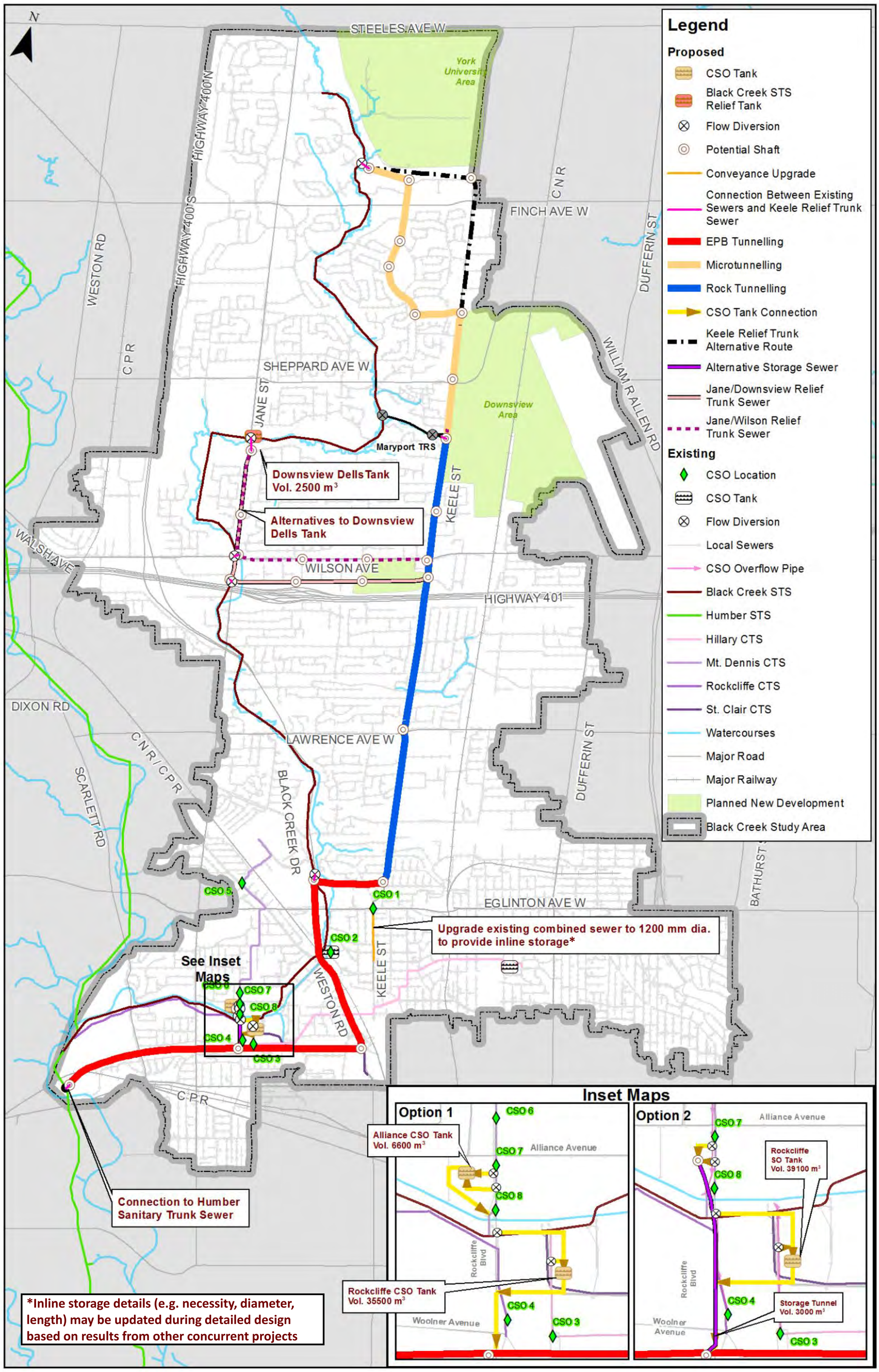
Based on the evaluation criteria, the final scores for both options are very close.

- Option 1 is recommended.
- Option 2 is also viable at an equivalent cost.

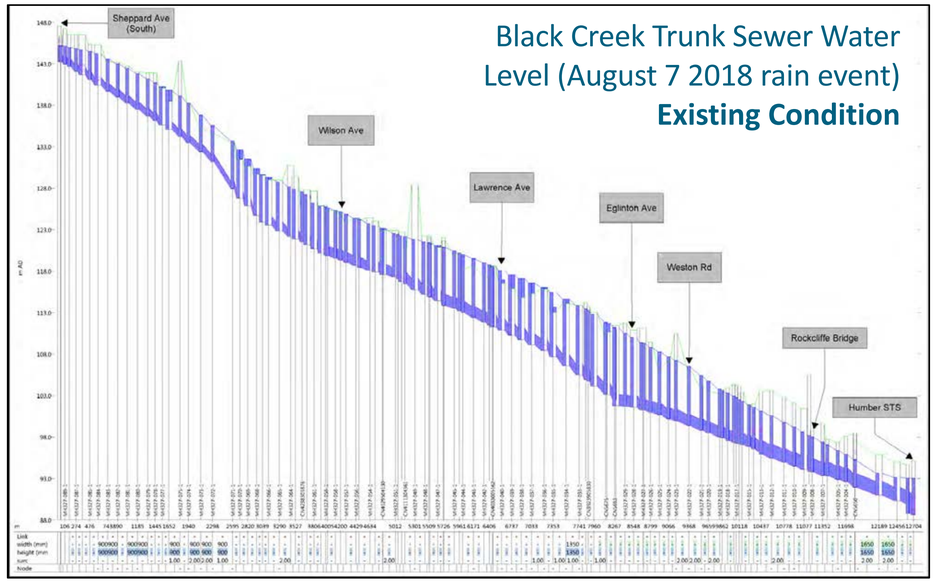
Design Concept	Natural	Socio-Cultural	Technical	Economic	Summary
Option 1: Two Separate Underground Storage Tanks [a]	Least impacts or greatest benefit when compared to other options, impacts can be mitigated [a]	Moderate impacts or moderate benefit when compared to other options.	Least impacts or greatest benefit when compared to other options [a]	Capital - $ 53,000,000 O&M - $ 570,000 Life Cycle - $ 62,000,000 [a]	Option 1 scored slightly lower in the socio-cultural category as the construction of two tanks may cause more disruption to the community during construction (mitigation measures will be implemented to minimize). Option 1 is recommended due to lower risk of operational challenges and less risk of utility impacts. [a]
Option 2: One Underground Storage Tank Connected to Storage Tunnel	Least impacts or greatest benefit when compared to other options, impacts can be mitigated [a]	Least impacts or greatest benefit when compared to other options, impacts can be mitigated [a]	Moderate impacts or moderate benefit when compared to other options.	Capital - $ 52,000,000 O&M - $ 610,000 Life Cycle - $ 62,000,000	Option 2 scored lower in the technical category due to higher risk of operational challenges and higher risk of utility impacts. It is noted that cost is similar for both options.

Notes:
O&M = Estimate of annual operation and maintenance cost
Life Cycle = Estimate of the total cost of an asset over the course of its useful life (useful life estimated to be 100 years)
[a] = Least impacts and/or lowest cost

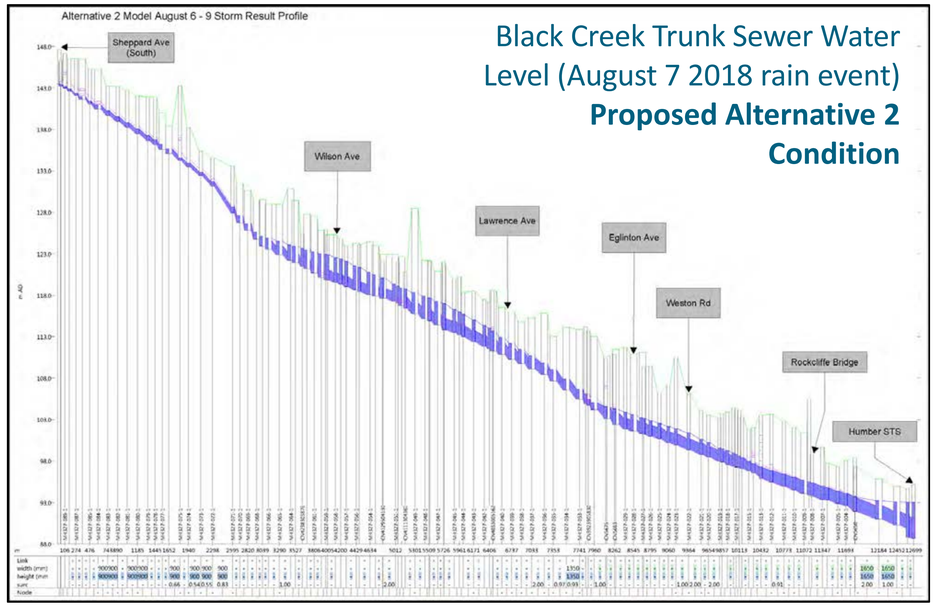
Recommended Design Concept



Benefits of Recommended Alternative – Keele Street



Black Creek Trunk Sewer Water Level (August 7 2018 rain event)
Existing Condition



Black Creek Trunk Sewer Water Level (August 7 2018 rain event)
Proposed Alternative 2 Condition

CSO #	OVERFLOW LOCATION	TRUNK SEWERSHED	EXISTING CONDITION		RECOMMENDED ALTERNATIVE CONDITION		
			OVERFLOW VOLUME (M^3)	% WWF CAPTURE	OVERFLOW VOLUME (M^3)	% WWF CAPTURE	CSO REDUCTION (%)
1	Keele St and Eglinton Avenue	Hillary	40,664	74.9%	85	99.9%	99.8%
2	Hyde tank	Hillary	16,379	90.8%	0	100.0%	100.0%
3	Rockcliffe Crt and Lavender Creek Trail	Hillary	307,824	69.2%	11,031	98.2%	96.4%
4	Rockcliffe Blvd and Woolner Avenue	Rockcliffe	131,189	53.1%	0	100.0%	100.0%
5	Weston Road and Ray Ave	Mt. Dennis	0	100.0%	0	100.0%	Not Applicable
6	Rockcliffe Blvd and Alliance Avenue	Mt. Dennis	411	99.7%	0	100.0%	100.0%
7	Rockcliffe Blvd and Alliance Avenue	Mt. Dennis	3,569	97.6%	0	100.0%	100.0%
8	Rockcliffe Blvd and Black Creek	Mt. Dennis	28,493	80.2%	2,169	98.5%	92.4%
	Total		528,529	74.4%	13,285	99.10%	97.5%

WWF capture rate (1991 typical year) = $\frac{\text{wet weather flows that enter a trunk sewer}}{\text{Total wet weather flows (enter to the trunk + overflow)}}$

Mitigation of Potential Construction Impacts

Traffic	• Consultation with City's Transportation Services Division • Early notification to homeowners if temporary blockage to their driveway has to be considered (will be kept to a minimum), alternative short-term parking provided where possible
Noise and Vibration	• Minimizing construction traffic in local residential streets • Enforcing City anti-noise by-law for all construction activities • Restricting construction noise to suitable work hours • Conducting pre-construction survey for houses which may be affected by soil vibration during construction activities
Erosion and Sedimentation	• Sediment traps will be placed to deal with storm runoff during construction, where appropriate • Silt fences will be installed along the perimeters of the construction sites where appropriate to capture blowing sand and dust. Watering will also be considered. • Exposed excavated material will be covered to prevent erosion by rain/wind • Catchbasins will be covered by filter fabric during construction to prevent migration of sediments to receiving watercourses, where necessary
Trees and Restoration	• Mature trees will be avoided, where possible, to minimize the need for their removal • Small trees, if removed, will be replaced or replanted. The replacement of trees will be done in accordance with City's requirements • Root pruning, if required, will be done in accordance with City Parks Department Standards • Disturbed sidewalks, roads and parking areas should be restored to their existing conditions after construction • Disturbed park areas or private properties should be restored to their existing conditions or better
Air Quality	• Odour control systems to be installed as needed for construction • Silt fences will be installed along the perimeters of the construction sites where appropriate to capture blowing sand and dust. Watering will also be considered to help control dust

Next Steps - Phase 4 Environmental Study Report (ESR)

After today's meeting:

- Finalize the recommended design concepts, incorporating feedback received from the public and other stakeholders
- Proceed with development of ESR
- ESR 30-day public review period

ESR will include:

- Summary of investigations and findings of the study
- Public and stakeholder comments and responses
- Description of the refined preferred alternative
- Mitigation measures for identified natural environment, social, cultural, and technical impacts

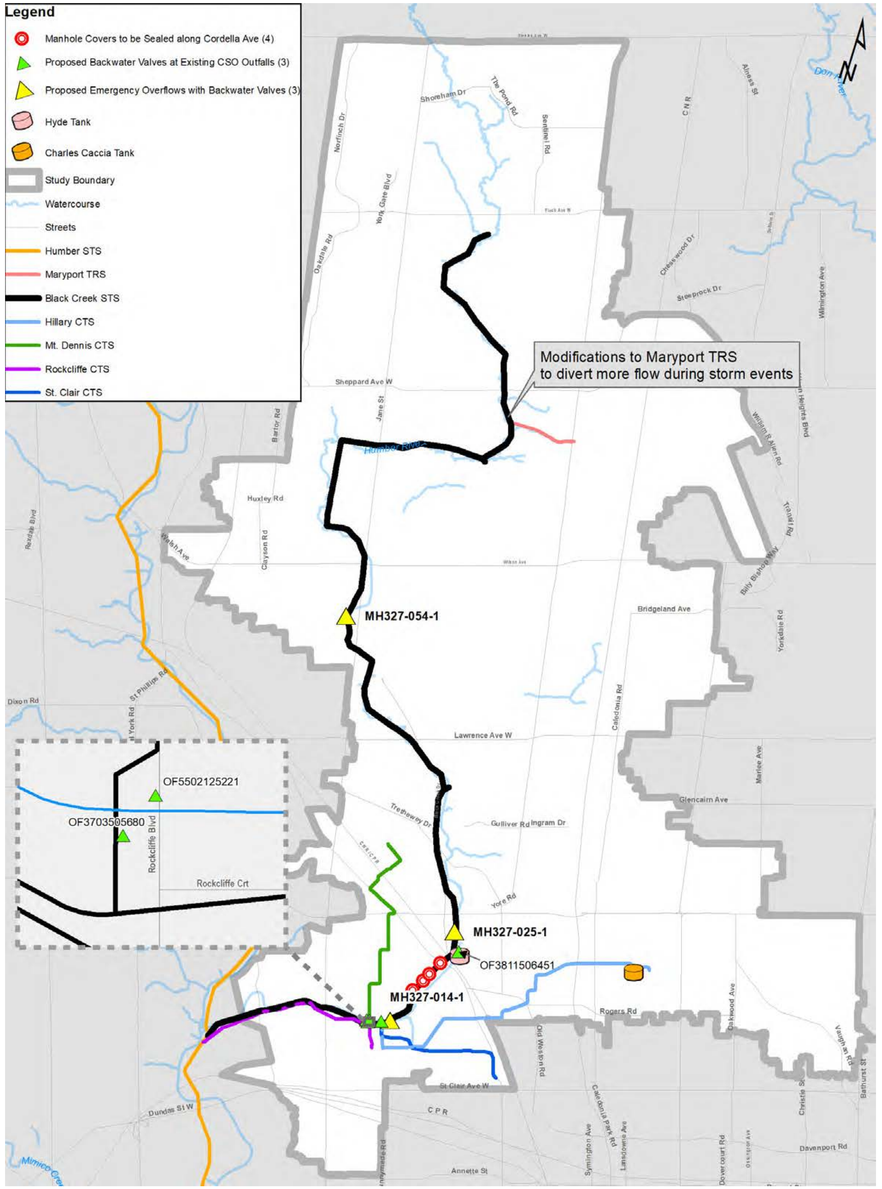
<table>
<tr><th>Phase</th><th>Phase 1</th><th colspan="3">Phase 2</th><th>Phase 3</th></tr>
<tr><td rowspan="2">Task</td><td>Identification of Problem and Opportunity</td><td colspan="3">Identification of Alternative Solutions</td><td>Identification of Alternative Design Concepts</td></tr>
<tr><td>Spring 2016 – Public Consultation Drop-In Event #1</td><td>Identify Alternatives</td><td>Assess and Recommend Preferred Alternative</td><td>April 2019 – Public Consultation Drop-In Event #2</td><td>Assess and Recommend Preferred Design Concept</td></tr>
</table>

TODAY – Public Consultation Drop-In Event #3

Phase 4
Development of ESR
Late 2019/Early 2020 – **30 Day Review**

Interim Solution

- Modifications to Maryport TRS to divert more flow during storm events
- Install 3 backwater valves at existing CSO outfalls
- Add emergency overflow locations with backwater valves
- Seal the Black Creek STS manhole covers along Cordella Avenue



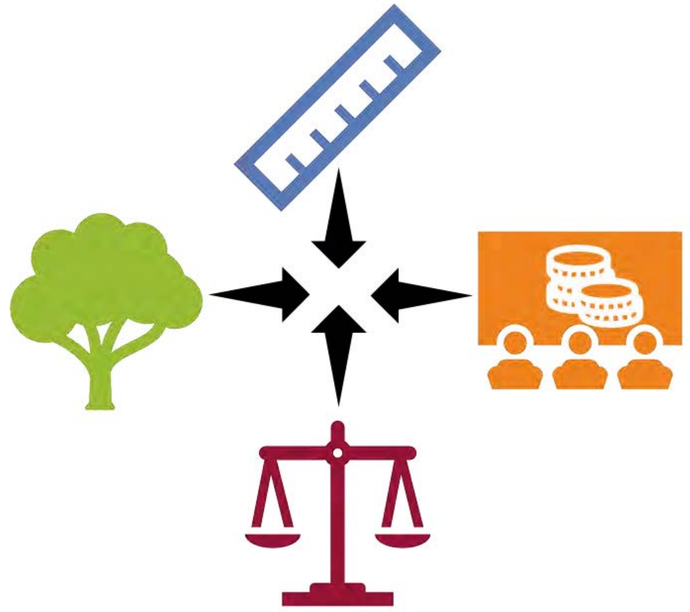
Interim Solution – Implementation Timeline

Tasks	Finish
e Modifications to Maryport TRS to divert more flow during storm events	Q1 2020
◦ Install 3 backwater valves at existing CSO outfalls	Q3 2020 (2 have already been done)
b Add emergency overflow locations with backwater valves	Implementation pending approvals
a Seal the Black Creek STS manhole covers along Cordella Avenue	Implementation pending approval of overflow locations

Thank You for Attending

We welcome your feedback. Please fill out the comment sheet provided.

Following this event, the project team will review and consider your comments in the development of the environmental study report.



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