



URBANTECH®

INFRASTRUCTURE SERVICING STUDY

**SECONDARY PLAN AREA 52 (HUTTONVILLE NORTH) &
53 (MOUNT PLEASANT WEST)
HERITAGE HEIGHTS**

CITY OF BRAMPTON

REGION OF PEEL

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1 INTRODUCTION

1.1. GENERAL

The Heritage Heights Secondary Plan areas (52 & 53) was prepared for inclusion within the City of Brampton's urban boundary via the Secondary Planning process set out in the City of Brampton Official Plan.

The following briefly outlines the Heritage Heights Secondary Plan history:

- A provincial moratorium on new expansion areas in Northwest Brampton was in place since 2006 to protect shale resources.
- December 2009 – City initiated secondary planning for Heritage Heights
- June 2014 – Proposed land use plan was approved “in principle”
- April 2015 – Land use plan was revisited due to uncertainty of ongoing studies including the province's GTA West Corridor
- July 2019 – Region of Peel removed all shale protection policies via a Regional Official Plan Amendment within the Northwest Brampton Policy Area.
- The Province appealed in August 2019. A hearing was held in January 2021.
- September 2019 – Province announced their technically preferred route for the GTA west corridor
- Three Charettes were conducted in November 2019, February 2020, and May 2020 to establish the vision, guiding principles, transportation, and land use plan

The Secondary Plan area is intended to be a compact, mixed-use community, with a focus on active lifestyles (walking and cycling) and easily accessible parks and schools.

In addition to the City's planning process, a landowner's group (LOG) has formed and is actively pursuing approval of the Secondary Plan.

1.2. STUDY PURPOSE

The Infrastructure Servicing Study (ISS) is intended to support an amendment to the Brampton Official Plan to implement the Heritage Heights Secondary Plan, which currently covers the Secondary Plan lands known as “Mount Pleasant West” and “Huttonville North”. The study is focused on development of an overall servicing strategy which would permit the development of the Secondary Plan put forward by the City (**Drawing 1**), and which can be carried forward for further detailed analysis at the Block Planning Stage. More specifically, this ISS will:

- Identify and describe sanitary sewer and water servicing strategies and systems for the subject lands; specifically:
 - to confirm that the planning area may be serviced through the logical extension of existing and planned water and sanitary infrastructure
- Identify servicing, grading, and environmental constraints and opportunities related to development of the Secondary Plan, including:
 - identification of off-site / downstream constraints that may preclude development,
 - mitigation of such constraints
- Determine preliminary stormwater management (SWM) requirements, including:
 - Approximate drainage boundary delineation.
 - location of SWM facilities.
 - “rule of thumb” sizing of stormwater management facilities.
 - consideration of alternative / innovative SWM measures to be considered in future studies.
- Compare Heritage Heights infrastructure servicing with previous Region of Peel infrastructure assumptions carried forward in the Water/Wastewater Master Plan and Development Charge (DC) studies.

The ISS recognizes the ongoing subwatershed study updates by Wood and the previous studies completed for Northwest Brampton including the adjacent Block 51-1 studies and designs.

While the ISS is intended to confirm the feasibility of servicing the Secondary Plan area shown in **Drawing 1**, the overall servicing strategy is generally adaptable for future iterations of the Heritage Heights plan. The results of the Subwatershed Study will influence the findings of the ISS, and more detailed servicing assessments will be completed at the Block Planning Stage; e.g., Environmental Implementation Report (EIR) and Functional Servicing Report (FSR).

1.3. BACKGROUND STUDIES

The following studies have been completed or are on-going and relate to the Heritage Heights Infrastructure servicing study as follows:

Heritage Heights Transportation Master Plan (TMP)

The City of Brampton has initiated a TMP in accordance with the Municipal Class Environmental Assessment process. The study (prepared by Toole Design) will determine transit requirements and has established the road network for the Heritage Heights Secondary Plan area as shown in **Drawing 1**. The TMP has incorporated a concept for the Ministry of Transportation North South Transportation Corridor (NSTC), also known as the GTA West Corridor.

- ***Relevance of study to ISS: Establishing the road network, which informs block areas, crossing locations, and servicing routes.***

Employment Implementation Study

The City of Brampton has retained Cushman & Wakefield Ltd. and MacNaughton Hermsen Britton Clarkson Planning Limited (MHBC) to conduct the employment study.

- ***Relevance of study to ISS: The study identifies the location, type, and amount of employment land sustainable for Heritage Heights Secondary Plan***

Subwatershed Study (SWS) Update

Wood has been engaged by the City to revisit the subwatershed study that was previously initiated, including an update of the hydrology and existing environmental characterization and proposed Natural Heritage System.

- ***Relevance of study to ISS: The SWS update has established the NHS areas to be preserved within the Heritage Heights Secondary Plan and has identified the stormwater management (SWM) criteria.***

1.4. STUDY AREA

The Study Area is the Secondary Plan Area shown on **Drawing 1**.

The lands are within the City of Brampton Ward 6 and are bounded by:

- Mayfield Road to the north (Regional Road 14)
- Mississauga Road to the east (Regional Road 1)
- Credit River to the south
- Winston Churchill Road to the west (Regional Road 19)

Wanless Drive and Bovaird Drive cross the property west-to-east, and Heritage Road traverses the property north-to-south.

The Study Area is bisected by the Canadian National Rail (CNR) corridor. The City's mapping describes the area north of the CNR as the Mount Pleasant West Secondary Plan and the Huttonville North Secondary Plan. The study area boundary is delineated on **Drawing 1** and is 1,626 ha or approximately 4,018 acres. A significant portion of the study area consists of the Credit River and West Huttonville Creek NHS features.

A portion of the subject lands (approximately 415 ha) is within the West Huttonville Creek subwatershed (CVC subwatershed 7) and drains towards the south / southeast. The remaining 1,211 ha is within the Credit River subwatershed (CVC subwatershed 9) and generally drains south / southwest.

1.5. LAND USES

The majority of the study area is used for agricultural purposes, with several institutional areas / places of worship near Bovaird Drive.

The study area has several natural features including:

- Designated valley lands
- Woodlots
- Wetlands
- Credit River headwater features / tributaries and West Huttonville Creek headwater features tributaries.
- Existing farm ponds

These features form the existing Natural Heritage System (NHS) and are depicted on **Drawings 1** and **3**.

Other land uses / features in the study area highlighted on **Drawing 1** include:

- Trans Canada Pipeline (TCPL) corridor
- Canadian National Railway (CNR – Halton subdivision) corridor servicing GO Transit and VIA Rail passenger trains, and CN freight trains

2 BACKGROUND

2.1. SECONDARY PLAN

The Heritage Heights Secondary Plan shown on **Drawing 1** and is intended to be planned as a complete, compact and connected community that will identify, protect and ensure a linked natural heritage system and provide opportunities for transit-oriented, mixed-use development including a variety of housing types and densities, as well as employment lands. The Secondary Plan includes the following land uses:

Low density (20-50 units/ha)	TCPL corridor
Medium Density (50-100 unit/ha)	Major transit station area
High density (125 to 250 units/ha) and mixed use	Community parks
“Wellness” district	Neighbourhood parks
Main street retail	Water reservoir
Convenience commercial and mixed uses	Roads
Employment and light industrial	GTA West Corridor
Open space connections	Stormwater management blocks
Natural Heritage System (NHS)	Elementary school
Pipeline corridor	Secondary school
CNR corridor	Separate School
Fire Department	

Note that the provided Secondary Plan does not include specific areas for schools, parks, etc.

Table 2-1 provides a breakdown of the approximate areas of each land use that results in wastewater flow generation or water demand within the Secondary Plan. Note that these are planning-level area estimates and will be refined at the Block Plan and Draft Plan stage.

Table 2-1: Secondary Plan Land Use Breakdown (development uses only)

Land use Type	Area (ha)	Area for Residential Development (ha)	Area for Employment Development (ha)
Community Facility	3.7	0.0	3.7
High Mixed Use	112.2	78.6	33.7
Industrial	63.4	0.0	63.4
Light Residential	228.8	228.8	0.0
Low Residential	261.3	261.3	0.0
Medium Mixed Use	179.0	125.3	53.7
Wellness	16.3	0.0	16.3
Total	864.6	693.9	170.7

2.2. POPULATION DATA AND PROJECTIONS

The City of Brampton forecasted the population for the Secondary Plan area to be **124,000**, with **46,962** jobs. A minimum target of 150 to 160 residents and jobs combined per ha for areas serviced by GO transit and light rail transit or bus rapid transit is one of the priorities of the Secondary Plan.

In estimating the population for each development location, the population density as per Region's Sanitary Sewer Design Guidelines was primarily utilized.

However, application of the Region's population density would not result in the desired population for the Study Area (124,000 residential and 46,962 employment). While the Secondary Plan land use categories do not map directly to the land use type category as per Region's Sanitary Sewer Design Guidelines, Table 2-2 illustrates the assumed relationship. Assumptions and adjustments were made to the population density criteria in order to achieve the desired Secondary Plan population projections. **Error! Reference source not found.** 2-2 summarizes the assumptions and adjustments applied.

Table 2-2: Population Density

Region's Design Guidelines		Study Area / Secondary Plan Population	
Land use	Population Density	Land use	Population Density
Single Family (> 10m frontage)	50 ppl/ha	Low Residential	70.2 ppl/ha
Single Family (<10m frontage)	70 ppl/ha	Light Residential	98.3 ppl/ha
Semi-detached	70 ppl/ha	n/a	-
Row Dwellings	175 ppl/ha	Med Mixed Use*	RES: 245.7 ppl/ha EMP: 266.8 ppl/ha
Apartments	475 ppl/ha	High Mixed Use*	RES: 666.8 ppl/ha EMP: 724.2 ppl/ha
Light Industry	70 ppl/ha	Industrial	106.7 ppl/ha
Commercial	50 ppl/ha	Community Facility	76.2 ppl/ha
Commercial	50 ppl/ha	Wellness	76.2 ppl/ha

* Residential vs. Employment = 70% vs. 30%

Population densities were compared to those anticipated using the Region of Peel Design Criteria Manual.

- **For the purposes of sanitary sewer design, the Region's design criteria for population density have been applied, as well as the more conservative Secondary Plan population densities noted above.**
- **For the purposes of water distribution modelling, the more conservative Secondary Plan population densities have been applied.**

Please refer to Section 3 / **Appendix A** for the sanitary sewer component of the study and Section 4 / **Appendix B** for the water distribution component.

3 SANITARY SERVICING

3.1. BACKGROUND

The Heritage Heights lands will be serviced through the extension of the existing wastewater trunk sewers and sub-trunk sewers. The Mississauga sanitary trunk sewer will be the outlet for the entirety of the Heritage Heights lands. This trunk sewer, and all contributing lands are tributary to the Clarkson Wastewater Treatment Plant (WWTP).

3.2. EXISTING SANITARY SERVICES

The Mississauga Road trunk sewer (1200mm) was constructed up to Sandalwood Parkway to service the Block 51-1 lands east of Heritage Heights. The trunk was extended north from Queen Street and services approximately 80% of Block 51-1 and will service 100% of the Heritage Heights secondary plan. Refer to **Drawing 4** for the location of the existing trunk sewer.

The existing trunk sewer ranges in depth from 15m to over 30m. This depth was determined by Region to accommodate future servicing of the Heritage Heights lands by gravity.

3.3. PLANNED SANITARY SERVICES

The Region of Peel 2020 Water/Wastewater Master Plan outlines the services planned within / in support of the Heritage Heights Secondary Plan area. These include, at a high level, extension of the existing 1050mm Mississauga Road trunk sewer beyond Sandalwood Parkway (to Mayfield Road) as well as sub-trunks along Wanless Drive and the future Sandalwood Parkway extension within Heritage Heights. Additional sanitary infrastructure is proposed along Heritage Road. Refer to the **2021 Wastewater DC Map** by Region of Peel.

Table 3-1: Sanitary Infrastructure Projects related to Heritage Heights

Master Plan Project #	Project Name	Description	Anticipated Year in Service	Anticipated Cost
ST-046	600-mm Sanitary Sewer - Future Street (Mount Pleasant West)	Construction of a 600-mm sanitary sewer on a future street east of Winston Churchill Boulevard from Mayfield Road to 680 meters southerly.	2036	\$3,027,900
ST-045	600-mm Sanitary Sewer - Future Street (Mount Pleasant West)	Construction of a 600-mm sanitary sewer on a future street east of Winston Churchill Boulevard from Wanless Drive to 560 meters northerly.	2036	\$2,494,300
T-047	Northwest Brampton Sanitary Trunk Sewer (Phase 3)	Construction of a 675-mm sanitary trunk sewer on Wanless Drive from Heritage Road to 820 meters westerly.	2035	\$5,903,000
ST-048	600-mm Sanitary Sewer - Heritage Road (Mount Pleasant West)	Construction of a 600-mm sanitary sewer on Heritage Road from Mayfield Road to 620 meters southerly.	2035	\$3,685,700

Master Plan Project #	Project Name	Description	Anticipated Year in Service	Anticipated Cost
ST-049	600-mm Sanitary Sewer - Heritage Road (Mount Pleasant West)	Construction of a 600-mm sanitary sewer on Heritage Road from Wanless Drive to 620 meters northerly.	2-35	\$3,685,700
T-050	Northwest Brampton Sanitary Trunk Sewer (Phase 2)	Construction of a 750-mm sanitary trunk sewer on Heritage Road from the future Sandalwood Parkway extension to Wanless Drive.	2034	\$8,807,500
T-051	Northwest Brampton Sanitary Trunk Sewer (Phase 1)	Construction of an 825-mm sanitary trunk sewer on the future extension of Sandalwood Parkway from Heritage Road to Mississauga Road.	2032	\$13,898,900
T-060	Credit Valley Sanitary Trunk Sewer (Phase 3)	Construction of a 900-mm sanitary trunk sewer on Mississauga Road from Wanless Drive to Sandalwood Parkway.	2030	\$7,245,000
T-059	Credit Valley Sanitary Trunk Sewer (Phase 3)	Construction of a 900-mm sanitary trunk sewer on Mississauga Road from Wanless Drive to Sandalwood Parkway.	2032	\$2,834,100
T-058	Credit Valley Sanitary Trunk Sewer (Phase 4)	Construction of a 900-mm sanitary trunk sewer on Mississauga Road from Wanless Drive to 570 meters northerly.	2034	\$4,488,000
T-057	Credit Valley Sanitary Trunk Sewer (Phase 4)	Construction of a 900-mm sanitary trunk sewer on Mississauga Road from Mayfield Road to 680 meters southerly.	2034	\$5,354,600
ST-054	450-mm Sanitary Sewer - Future Street (Huttonville North)	Construction of a 450-mm sanitary sewer on a future street south of Wanless Drive from Winston Churchill Boulevard to 1310 meters south-easterly.	2031	\$5,429,400
ST-052	525-mm Sanitary Sewer - Future Street (Huttonville North)	Construction of a 525-mm sanitary sewer on a future street north of Bovaird Drive, west of Heritage Road, from a future street to 830 meters northerly.	2031	\$3,651,200
ST-055	600-mm Sanitary Sewer - Future Street (Huttonville North)	Construction of a 600-mm sanitary sewer on a future street north of Bovaird Drive from Heritage Road to 340 meters westerly.	2029	\$1,831,200
ST-053	Heritage Heights Sanitary Trunk Sewer (Phase 2)	Construction of a 675-mm sanitary trunk sewer on Heritage Road from Bovaird Drive to 630 meters northerly.	2028	\$4,541,600
ST-056	375-mm Sanitary Sewer - Future Street (Huttonville North)	Construction of a 375-mm sanitary sewer on a future street south of Bovaird Drive from Heritage Road to 770 meters	2028	\$2,920,800

Master Plan Project #	Project Name	Description	Anticipated Year in Service	Anticipated Cost
		westerly.		
T-062	Heritage Heights Sanitary Trunk Sewer (Phase 2)	Construction of a 675-mm sanitary trunk sewer on Heritage Road from Bovaird Drive to 880 meters southerly.	2028	\$6,912,400
T-063	Heritage Heights Sanitary Trunk Sewer (Phase 1)	Construction of a 750-mm sanitary trunk sewer on the future extension of Williams Parkway from Mississauga Road to Heritage Road.	2026	\$5,895,800
T-064	Heritage Heights Sanitary Trunk Sewer (Phase 1)	Construction of a 750-mm sanitary trunk sewer on the future extension of Williams Parkway from Mississauga Road to Heritage Road.	2026	\$1,882,000
T-065	Heritage Heights Sanitary Trunk Sewer (Phase 1)	Construction of an 825-mm sanitary trunk sewer on the future extension of Williams Parkway from Mississauga Road to Heritage Road.	2026	\$4,187,200

3.3.1. MASTER PLAN SERVICING VS. SECONDARY PLAN

This section describes deviations from the Master Plan sanitary infrastructure based on the Heritage Heights Secondary Plan concept.

As shown on **Drawing 4**, Regional sanitary infrastructure will be located on existing right of ways wherever possible to allow for the seamless implementation of the infrastructure and not be solely reliant on private landowners to deliver infrastructure.

The following sanitary trunks are generally consistent with the Master Plan, albeit with slightly different road alignments:

- Wanless Drive @ Mayfield Road to Heritage Road
- Heritage Road @ Mayfield Road to Sandalwood Parkway
- Mississauga Road @ Mayfield Road to existing Mississauga Road trunk @ Sandalwood Parkway
- Lands west of Heritage Road / south of CNR to Bovaird Drive trunk to Mississauga Road

The following sanitary trunks deviate from the Master Plan:

- Lands west of Heritage Road / south of CNR to Williams Parkway trunk at Mississauga Road
Rationale – avoid downstream creek crossings and low laying lands south of Bovaird Drive which will require pumping station and forcemain.
- An alternative outfall for the lands south of CNR / west of Heritage Boulevard is available along Bovaird Drive.
Rationale - to allow these lands to be serviced through fewer holdout properties and connect to the existing Mississauga Road trunk sewer manhole north of Bovaird Bovaird rather than at Williams Parkway.

3.3.2. TREATMENT PLANT CAPACITY

According to the Region of Peel's 2020 Water & Wastewater Master Plan, the Clarkson WWTP has surplus capacity to accommodate wastewater flows to 2041 and potentially beyond, as shown in **Table 3-2** (adapted from Table 8 in the Master Plan). Upgrades are proposed to address the proposed diversion of sanitary drainage to the Clarkson Plant, scheduled for 2027. These upgrades will add capacity of 150 ML/d to the treatment capacity, which provides a more than adequate capacity surplus.

Table 3-2: Forecasted Flow Capacity of the Clarkson WWTP

Treatment Capacity Assessment	2021	2026	2027	2031	2036	2041
Current Plant Rated Capacity (ML/d)	350	350	+150	350+150	350+150	350+150
90% Plant Rated Capacity (ML/d)	315	315	+135	315+135	315+135	315+135
Forecasted Demand (ML/d)	216	236		257	273	290
Capacity Surplus (+) / Deficit (-) (ML/d)*	+99	+79		+58+135	+42+135	+25+135

*Based on 90% of rated treatment plant capacity

However, recent changes to the MECP regarding unit process capacities, loading rates, and more stringent discharge limits result in insufficient loading capacity estimates for 2036 and 2041 as shown in **Table 3-3** (adapted from Table 9 in the Master Plan).

Table 3-3: Forecasted Loading Capacity of the Clarkson WWTP

Treatment Capacity Assessment	2021	2023	2026	2031	2036	2041
Current Plant Rated Capacity (kgL/d)	79,100		79,100	79,100	79,100	79,100
90% Plant Rated Capacity (kg/d)	71,190		71,190	71,190	71,190	71,190
Existing Governing Capacity (kg/d)*	58,790	Upgrades	58,790	58,790	58,790	58,790
Forecasted Demand (kg/d)	47,118		51,310	55,752	59,053	62,329
Capacity Surplus(+) / Deficit (-) (kg/d)**	+11,672		+7,480	+3,038	-263	-3,539

*Existing governing capacity based on Anaerobic Digestion at Clarkson WWTP

**Based on existing governing capacity

To address the limited solids capacity, and other system-wide capacity, a strategy has been put forward in the Master Plan / 2041 Capital Program to address future growth areas in Brampton. The strategy includes (but is not limited to):

- Increasing the capacity of the Clarkson WWTP from 350 ML/d to 500 ML/d (Region of Peel project WR-TR-184, completion by 2027)
- Expanding the biosolids process at the Clarkson WWTP (Region of Peel project WR-TR-226, completion by 2023)

These measures will ensure that the Clarkson WWTP can meet the forecasted demands up to 2041 and beyond.

Note that the preceding treatment plant capacity analyses were based on the Region's population forecasts. On-going coordination and evaluation of the capacity and timing of upgrades based on the higher Secondary Plan populations described herein is recommended. For example, the forecasted demand in Table 3-2 is expected to increase by approximately 34 ML/d based on the higher Secondary Plan population. The loading demand in Table 3-3 would also increase based on the Secondary Plan population. Despite the increase in the forecasted demand, it is evident that the plant capacity will continue to have surplus capacity as a result of the proposed upgrades in 2023 and 2027.

3.4. PROPOSED SANITARY SERVICING AND ASSESSMENT

Drawing 4 and **Drawing 4A** (external) illustrates the proposed sanitary servicing strategy for the Heritage Heights lands. Since the lands can be serviced via the existing Mississauga Road trunk sewer at Sandalwood Parkway and further south, there are no options to consider with respect to the receiving system.

Similarly, sub-trunks will be extended west along major roads (Wanless Drive, Sandalwood Parkway, and Bovaird Drive) to “intercept” sanitary drainage and direct it easterly to the trunk sewer and to avoid the need for large services running north to south along internal roads. Furthermore, the sub-trunks generally run west-to-east to minimize costly crossings of the TCPL and CNR.

It is noted that the west-to-east sub-trunk extensions will require crossings of the NHS channels, but these crossings are more easily constructed and maintained compared to TCPL and CNR crossings. As part of the road crossing construction of the existing watercourses, sanitary sewers will be installed by tunneling below the channels with sufficient clearance and erosion protection. The proposed crossing locations are indicated on **Drawing 4**. **Drawings 4B-4G** illustrate preliminary plan and profiles of the sub-trunks noted below.

The following provides rationale for the suggested servicing routes as illustrated on **Drawing 4**:

- The proposed Heritage Heights sub-trunk sanitary sewers shall be placed within existing roads where possible to avoid timing issues related to non-participating property owners.
- Internal sewer alignments shown on **Drawing 4** are based on the high-level concept plan provided by City of Brampton and are therefore considered to be preliminary / subject to change.
- Mount Pleasant Block 51-3, located at the NW corner of Bovaird and Mississauga Road, will proceed with development prior to Heritage Heights.
 - Replacement of the existing 750mm sewer connection to the existing Mississauga Road trunk sewer MH 5A is anticipated by the Region of Peel to be completed by developers as part of the Block 51-3 works.
 - The proposed alignment of the south sub-trunk 2 along existing Heritage Road, Bovaird Drive and through Block 51-3 provides the opportunity to secure the wastewater outfall for a significant portion of the future development prior to full development of Heritage Heights.
- Should the Williams Parkway extension be advanced within the holdout properties south of Bovaird Drive, the south sub-trunk 2 drainage could be alternatively directed to the proposed south sub-trunk 3 for discharge to the existing Mississauga Road MH 3A.
- The future Block 51-3 development at the southwest corner of the CNR and Mississauga Road will be accommodated to the existing 375mm sanitary sewer within Block 51-1 (MH 3A to existing MH 15A) subject to agreement between the Block 51-3 owners and the property owner east of Mississauga Road.
- The proposed pump station at the south end of Heritage Heights is recommended to avoid excessively deep sewers or excessive fill within future development blocks (as would be required based on the existing topography near the Credit River valley system. Further consultation with the Region of Peel is needed regarding the pump station location and contributing drainage area of 91 ha.

The design calculations in **Appendix A** were based on the Region of Peel Sanitary Sewer Design Criteria (2017) and population densities. A separate set of calculations was completed using the Secondary Plan densities. The design calculations include a peaking factor based on the Harmon Formula and an Infiltration/inflow rate of 0.0002m³/s/ha. These calculations demonstrate the peak sanitary flows generated in the Heritage Heights Secondary Plan lands (including the external area north of Mayfield Road). **Appendix A** includes the proposed sanitary flows design sheets including the existing Mississauga Road trunk. Design sheets both with and without the external area north of Mayfield Road have been prepared.

Based on the analysis results, the Mississauga Road trunk sewer has more than sufficient capacity to convey the population based on the Region's criteria and higher Secondary Plan population to 2041. The following graph illustrates the original Mississauga Road trunk sewer design capacity (completed in parallel to the Block 51-1 development) versus the proposed Heritage Heights Secondary Plan 2041 population at each manhole along the trunk (up to Queen Street). Additional capacity analysis of the downstream system will be undertaken by the Region.

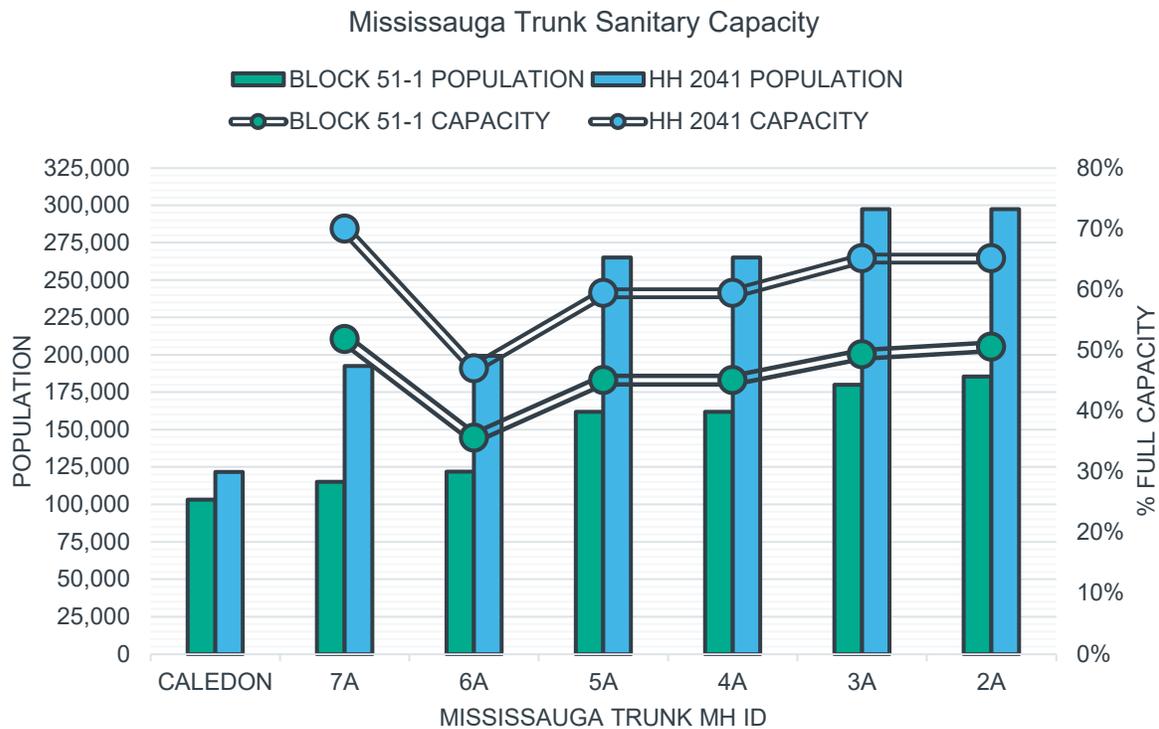


Table 3-4 includes the proposed sanitary flows, areas, and populations at each connection to the trunk sewer.

Table 3-4: Proposed Sanitary Outlets and Flows

Outlet	Location	Description	Area, Population & Flow (Including external drainage north of Mayfield Road)	
			Region Criteria	HH Secondary Plan
Ex. MH 2A	Mississauga Road	525mm connection to 1200mm trunk	38.7 ha 7388 pp 87.6 L/s	38.7 ha 10303 pp 114 L/s
Ex. MH 3A	Mississauga Road	600mm connection to 1200mm trunk	134.6 ha 23191 pp 236.3 L/s	134.6 ha 31657 pp 299.2 L/s
Ex. MH 4A	Mississauga Road	375mm connection to 1200mm trunk	40.6 ha 5806 pp 72.9 L/s	40.6 ha 7450 pp 88.5 L/s
Ex. MH 5A	Mississauga Road	825mm connection to 1200mm trunk	316.4 ha 52179 pp 474.3 L/s	316.4 ha 68816 pp 579.1 L/s
Ex. MH 6A	Mississauga Road	375mm connection to 1200mm trunk	23.6 ha 2377 pp 34.1 L/s	23.6 ha 2912 pp 40 L/s
Ex. MH 7A	Mississauga Road	975mm connection to 1200mm trunk	1105.1 ha 112872 pp 995.3 L/s	1105.1 ha 134983 pp 1118.1 L/s
Fut. MH 8A	Mississauga Road	450mm connection to 1200mm trunk	614.4 ha 53508 pp 542.4 L/s	614.4 ha 57677 pp 569.1 L/s
Total	Mississauga Road at MH 2A	1200mm trunk	2,273.4 ha Total 257,321 pp Total 2,442.9 L/s	Total 2,273.4 ha Total 313,798 pp Total 2,808 L/s

The total flow released from the Heritage Heights lands can be accommodated in the 1200mm Mississauga Road trunk sewer, and within the surplus capacity at the Clarkson WWTP up to the year 2041 (assuming upgrades are completed). Therefore, there is ample sanitary conveyance and treatment capacity for the subject lands.

4 WATER SERVICING

The Study Area includes approximately 1626 hectares for future developments and these lands area also known as Secondary Plan Areas 52 and 53. The Study Area largely falls within Zone 6 of the South Peel lake-based water supply system and the southern and northern limit of the areas falls within Zone 5 and Zone 7, respectively. The South Peel water supply system is essentially divided into East, Central and West systems. The west system will be responsible for servicing the Study Area; which the local water service will be provided by the following pumping facilities:

- Meadowvale Pumping Station – Zone 5
- West Brampton Pumping Station – Zone 5 and Zone 6
- Alloa Pumping Station – Zone 6 and Zone 7

All relevant information including existing water servicing reports for the area along with the topographical information, growth forecasts for the Study Area and latest Peel Region's Water and Wastewater Master Servicing Plan were used as a basis for completing this hydraulic analysis study.

AECOM was retained to update the Region's water model for the Secondary Plan area to include the proposed land use, grading, and population as well as to confirm the required watermain system for the full build-out of the community. This analysis is based on the 2041 Heritage Heights Secondary Plan population.

Water treatment is provided by the Lorne Park Water Treatment Plant.

4.1. EXISTING WATER INFRASTRUCTURE

With the exception of the 750mm and 1200mm watermains on Mississauga Road (extending from Williams Parkway to north of Wanless Drive) and existing 750mm watermain on Mayfield Road (from Mississauga Road to the Alloa Reservoir), there is no existing water infrastructure on the boundary roads surrounding the Heritage Heights Secondary Plan. However, the Alloa Reservoir and West Brampton Reservoir are nearby and will supply pressure / flow to the proposed system.

4.2. PLANNED WATER INFRASTRUCTURE

The Region of Peel Water/Wastewater Master Plan outlines the services planned within / in support of the Heritage Heights Secondary Plan area. These include, at a high level, extension of the existing watermains along the west-east roads within the Secondary Plan (Mayfield Road, Wanless Drive, Sandalwood Parkway, Bovair Drive, and Williams Parkway) as well as the north-south roads (Heritage Road and Winston Churchill. These watermains are ultimate looped with multiple connections to the existing watermains on Mississauga Road, the existing system along Mayfield Road connected to the Alloa Reservoir / Pumping Station. A connection at Heritage Road to the West Brampton Reservoir / Pumping Station water infrastructure is proposed along Heritage Road. Refer to **2021 Water DC Map** by Region of Peel for the proposed infrastructure, and to **Table 4-1** or a complete list of the projects and associated timelines.

Table 4-1: Water Infrastructure Projects related to Heritage Heights

Master Plan Project #	Project Name	Description	Anticipated Year in Service	Cost
D-051	400-mm Water Main - Mayfield Road (Mount Pleasant West)	Construction of a 400-mm water main on Mayfield Road from Heritage Road to Winston Churchill Boulevard.	2038	\$4,892,100
D-052	600-mm Water Main - Mayfield Road (Mount Pleasant West)	Construction of a 600-mm water main on Mayfield Road from Mississauga Road to Heritage Road.	2038	\$6,768,000
D-009	400-mm Water Main - Mayfield Road	Construction of a 400-mm water main on Mayfield Road from Heritage Road to Winston Churchill Boulevard	2038	\$ 4,892,100
ST-080	750-mm Water Main - Mayfield Road (Mount Pleasant West)	Construction of a 750-mm water main on Mayfield Road from Heritage Road to Mississauga Road.	2038	\$7,716,300
D-040	400-mm Water Main - Winston Churchill Boulevard	Construction of a 400-mm water main on Winston Churchill Boulevard from Mayfield Road to Wanless Drive.	2036	\$1,882,000
D-008	400-mm Water Main - Wanless Drive	Construction of a 400-mm water main on Wanless Drive from Winston Churchill Boulevard to Heritage Road.	2035	\$2,954,100
ST-083	750-mm Water Main - Heritage Road (Mount Pleasant West)	Construction of a 750-mm sub-transmission main on Heritage Road from Wanless Drive to Mayfield Road.	2035	\$4,115,700
D-007	400-mm Water Main - Wanless Drive	Construction of a 400-mm water main on Wanless Drive from Mississauga Road to Heritage Road.	2034	\$2,709,200
D-049	400-mm Water Main - Mississauga Road (Mount Pleasant West)	Construction of a 400-mm water main on Mississauga Road from Mayfield Road southerly to a future street.	2032	\$2,281,800
D-215	400-mm Water Main - Future Street (Heritage Heights)	Construction of a 400-mm water main on a future street from Wanless Drive southeasterly to a future street.	2030	\$2,703,500
D-078	600-mm Water Main - Heritage Road (Mount Pleasant West)	Construction of a 600-mm water main on Heritage Road from the future extension of Sandalwood Parkway to Wanless Drive.	2034	\$4,023,000
D-004	600-mm Water Main - Future Sandalwood Parkway West	Construction of a 600-mm water main on the future Sandalwood Parkway West from Mississauga Road to Heritage Road.	2032	\$3,701,200
D-090	600-mm Water Main - Heritage Road (Heritage Heights)	Construction of a 600-mm water main on Heritage Road from a future street to the future extension of Sandalwood Parkway.	2028	\$3,874,900

Master Plan Project #	Project Name	Description	Anticipated Year in Service	Cost
D-005	400-mm Water Main - Future Street (Heritage Heights)	Construction of a 400-mm water main on a future street from Heritage Road to 750 meters westerly.	2029	\$1,365,000
D-041	400-mm Water Main - Future Street (Heritage Heights)	Construction of a 400-mm water main on a future street (Heritage Heights) from Bovaird Drive northerly to a future street	2030	\$2,038,300
D-077	600-mm Water Main - Heritage Road (Heritage Heights)	Construction of a 600-mm water main on Heritage Road from Bovaird Drive northerly to a future street.	2028	\$3,708,100
D-003	400-mm Water Main - Bovaird Drive West	Construction of a 400-mm water main on Bovaird Drive West from Heritage Road to a future street	2030	\$1,702,400
ST-075	750-mm Water Main - Bovaird Drive West (Heritage Heights)	Construction of a 750-mm water main on Bovaird Drive West from Mississauga Road to Heritage Road.	2027	\$7,274,300
ST-104	900-mm Water Main - Heritage Road (Heritage Heights)	Construction of a 900-mm sub-transmission main on Heritage Road from the West Brampton Pumping Station to Bovaird Drive.	2028	\$8,557,100
S-062	West Brampton Reservoir Expansion	Expansion of the West Brampton Reservoir with the construction of a third 20-ML reservoir cell.	2031	\$36,846,800
P-061	West Brampton Pumping Station - Capacity Expansion	Installation of additional low-lift pumping capacity at the West Brampton Pumping Station.	2028	\$1,884,200
P-152	West Brampton Pumping Station - Capacity Expansion	Installation of additional low-lift pumping capacity at the West Brampton Pumping Station.	2036	\$433,600
P-175	West Brampton Pumping Station - Capacity Expansion	Installation of additional high-lift pumping capacity at the West Brampton Pumping Station	2028	\$1,010,400
D-088	600-mm Water Main - Future Williams Parkway (Bram West)	Construction of a 600-mm water main on the future extension of Williams Parkway from Heritage Road to Mississauga Road.	2027	\$2,772,900
D-049	400-mm Water Main - Mississauga Road (Mount Pleasant West)	Construction of a 400-mm water main on Mississauga Road from Mayfield Road southerly to a future street.	2032	\$2,281,800

4.3. WATER SERVICING STRATEGY

The extension of the existing water distribution system internally, within the proposed road network in the Heritage Heights Secondary Plan, and the completion of the PD6 boundary road watermains, will provide the required water distribution system as shown on **Drawing 5**.

4.3.1. MASTER PLAN SERVICING VS. SECONDARY PLAN

As shown on **Drawing 5**, Regional water infrastructure will be located on existing right of ways wherever possible to allow for the seamless implementation of the infrastructure and not be solely reliant on private landowners to deliver infrastructure.

The trunk water mains on **Drawing 5** are generally consistent with the Master Plan, albeit with slightly different road alignments to reflect the City Secondary Plan concept.

4.4. WATER SERVICING ASSESSMENT

AECOM was retained by Urbantech Consulting (Urbantech) for providing consulting services to perform hydraulic analysis for Heritage Heights Community located in the City of Brampton, Region of Peel. Heritage Heights Community is bounded by Mayfield Road to the North, Mississauga Road to the East, Credit River System to the South and Winston Churchill Boulevard to the West. **Drawing 5** illustrates the conceptual water servicing plan and associated service area.

The main focus of the hydraulic analysis is to determine infrastructure implications for the overall South Peel West water supply system and the following system assessments are to be completed.

- Water Treatment Plant capacity assessment,
- Water Storage capacity assessment,
- Pumping capacity assessment, and
- Transmission main capacity assessment.

4.4.1. POPULATION PROJECTION

Based on the information provided in the City's land use plan and background studies, the forecasted populations for the Study Area are:

- **Residential Population = 124,000**
- **Employment Population = 47,000**

The above noted population projections were further sub-divided based on the location of the developments, land use type and pressures zone boundary. The AECOM report in **Appendix B** shows the development location, pressure zones, and land use types used to calculate the population. By applying the population density for the Study Area as presented in Table 2-2,

Table 4-2 summarizes the population projections by pressure zone for the Study Area. The detailed population projection breakdown is presented in **Appendix B**.

Table 4-2: Population Projection for the Study Area

Pressure Zone	Region's Master Plan Study 2019		Study Area	
	Residential Population (2041)	Employment Population (2041)	Residential Population	Employment Population
5W	0	0	4,840	1,593
6W	39,751	11,778	119,160	38,607
7W	0	4,754	0	6,761
Total Population:	39,064	33,601	124,000	47,000
Population Density*	56.3 ppl/ha	196.9 ppl/ha	178.7 ppl/ha	275.3 ppl/ha
Equivalent Population Density*	104.7 ppl/ha		197.8 ppl/ha	

* Based on the following growth information as per proposed land use plan (Appendix A):

- Area for residential development = 693.9ha
- Area for employment development = 170.7ha

As noted in

Table 4-2, the desired populations for the Study Area were 217% and 40% higher than those for the Region's Master Plan Study for residential and employment population, respectively.

4.4.2. MODEL ANALYSIS

To estimate the projected water demands for the Study Area, the water demand criteria used in the Region's Master Plan Study 2019 was applied to the projected population as noted in

Table 4-2. The following summarizes the water demand criteria as per Region's Master Plan Study and

Table 4-3 resents the water demands for the Study Area.

- Average Day Demand (ADD) for Residential Population: 270 L/ca/d
- Average Day Demand (ADD) for Employment Population: 250 L/ca/d
- Maximum Day Demand (MDD) peaking factors:
 - MDD for Residential Population: 1.8 times Residential ADD
 - MDD for Employment Population: 1.4 times Employment ADD
- Peak Hour Demand (PHrD) peaking factors:
 - PHrD for Residential and Employment Population: 3.0 times Residential / Employment ADD

Table 4-3: Water Demand Projection for Study Area

Demand Conditions	Zone	Residential Demand (ML/d)	Employment Demand (ML/d)	Total Demand (ML/d)
Average Day Demand (ADD)	5	1.3	0.4	1.7
	6	32.2	9.7	41.8
	7	0.0	1.7	1.7
	Total	<u>33.5</u>	<u>11.7</u>	<u>45.2</u>
Maximum Day Demand (MDD)	5	2.4	0.6	2.9
	6	57.9	13.5	71.4
	7	0.0	2.4	2.4
	Total	<u>60.3</u>	<u>16.4</u>	<u>76.7</u>
Peak Hour Demand (PHrD)	5	3.9	1.2	5.1
	6	96.5	29.0	125.5
	7	0.0	5.1	5.1
	Total	<u>100.4</u>	<u>35.2</u>	<u>135.7</u>

The projected water demands as presented in

Table 4-3 were applied to the system assessments. To determine the overall impacts in the South Peel Water Supply System, assessments for treatment plant capacity, storage capacity, pumping capacity and transmission main capacity were completed based on the increase in population / demands that were associated with the Study Area. The assessments were completed by applying the Region's Master Plan (MP) methodology. **Appendix B** provides the assessment details and results.

Hydraulic modelling analysis was completed to evaluate the watermain capacity required to meet the projected growth for the Study Area. The latest hydraulic model for the Region's lake-based water supply system was utilized to analyze the water network capacity. Prior to the analysis, the model water update to include the projected water demands and their location as per the proposed development plan (Appendix A). The modelling network included the proposed DC projects as per the Region's Master Plan Study 2019.

A sensitivity analysis was also completed to evaluate the capital projects implications with phased-in population projections to determine what level of build out "triggers" the requirement for downstream infrastructure upgrades. The following population scenarios were considered:

- Full Secondary Plan Population
- 95% of Secondary Plan Population
- 80% of Secondary Plan Population
- 65% of Secondary Plan Population
- 60% of Secondary Plan Population
- 50% of Secondary Plan Population

4.4.3. MODEL RESULTS

Water system analysis for Heritage Heights Community was completed to determine the infrastructure implications in the South Peel Lake Based Water System. The analysis was undertaken based on the desired population projections of 124,000 persons and 47,000 persons for residential and employment developments, respectively. The water system analysis utilized the system assessments approach that was employed in the Region's Water and Wastewater Master Plan Study (2020). The completion of the water system analysis led to the following conclusions and recommendations.

- To achieve adequate water service for Heritage Heights Community, the following capital projects were required:
 - Increase Lorne Park Water Treatment Plant capacity by 13.9 ML/d
 - Increase Alloo Reservoir capacity by 0.2ML
 - Increase pumping capacity at the following pumping stations:
 - Lorne Park Zone 2 Highlift by 27.0 ML/d
 - Streetsville Zone 3 Lowlift by 8.0 ML/d
 - Meadowvale North Zone 4 Lowlift by 31.0 ML/d
 - West Brampton Zone 5 Lowlift by 6.0 ML/d
 - West Brampton Zone 6 Lowlift by 32.0 ML/d
 - Alloo Zone 6 Lowlift by 27.0 ML/d
- According to the transmission main capacity assessment results, the Region's future transmission mains would provide adequate capacity to meet the desired population projections for Heritage Heights Community. The assessments included the consideration of the following transmission main projects as per Region's Master Plan study.
 - 2100 mm Zone 2 Transmission Main from Herridge Pumping Station to Streetsville Reservoir (Master Plan Project ID: W-T-1331)
 - 1800 mm zone 3 Transmission Main from Streetsville Pumping Station to Meadowvale North Reservoir (Master Plan Project ID: W-T-135)
- The hydraulic modelling analysis was completed to determine the local system serviceability for Heritage Heights Community. The analysis results shown that the Region's water system network with inclusion of the DC projects and assumed 300 mm local distribution mains would provide adequate pressures to the future developments.
- The hydraulic analysis results completed in this study represents a high-level evaluation for the Region's water system capability to support the projected populations. The following detailed hydraulic analysis was recommended when the growth plan for the Study Area is updated / finalized.
 - Fire Flow Analysis
 - Size evaluation for the local distribution network and DC projects

- Constructability review of the required infrastructures within the Study Area
- Sensitivity analysis was completed to determine various growth scenarios that could allow for phasing in of capital projects for maintaining the water service for Heritage Heights Community. The sensitivity analysis results shown that at up to 50% of the desired population projections, none of the capital projects identified in the preceding bullets would be required. Populations in excess of 50% of the forecast would trigger infrastructure upgrades. **Error! Reference source not found.** in **Appendix B** presents the sensitivity analysis results.

5 GRADING & SERVICING CONSTRAINTS

The following grading constraints were taken into consideration in the development of the preliminary grading plans for the Heritage Heights Secondary Plan.

- The existing grades along the CNR corridor
- The anticipated future grades along Mississauga Road, Mayfield Road, Heritage Road, and the other internal major road systems.
- Maintain existing drainage patterns and accommodate external drainage from north of Mayfield Road.
- Accommodate at-grade and overpass crossings of the CNR.
- Maintenance of existing ground elevations in the vicinity of natural features that are to be preserved to provide appropriate buffering.
- Match existing boundary grading conditions/constraints.
- Conform to City standards (where feasible).
- Maintain drainage patterns in / out of the natural areas.
- Provide overland flow conveyance for major storm conditions.
- Minimize cut and fill operations and work towards a balanced site.
- Maintain appropriate cover over buried utilities.
- Accommodate the proposed block grading based on preliminary land use concepts in accordance with the City standards.

The CNR and TCPL corridors bisect the Heritage Heights Secondary Plan area as illustrated on **Drawing 2**. The three natural gas pipelines within the TCPL corridor range between 600mm and 1000mm in diameter.

TCPL has recently expanded their services by twinning the pipeline through the corridor, and they should be consulted for updates for future potential upgrades and additional easement requirements.

Through Block 51-1, the existing pipelines were generally less than 2m below the existing ground surface, and the same pipeline depth is anticipated within the Heritage Heights lands. However, the existing infrastructure will be daylighted for confirmation of potential conflicts with future servicing and road crossings. The potential TCPL corridor crossings are illustrated on **Drawings 2-4**.

NATURAL HERITAGE SYSTEM

The preliminary NHS is being developed by the Subwatershed Study Team, and the proposed NHS has taken into consideration the environmental features and hydraulics / flood hazards related to the watercourses. To optimize the land use within the Heritage Heights Secondary Plan area, channel realignments and lowering are proposed.

- Existing headwater systems are extremely flat, shallow and do not provide enough depth to allow for gravity servicing of the future roads and basements.
- Without watercourse lowering, future road grades would need to be raised 2m or more across 100 hectares requiring the need to import more than 2 million cubic meters of fill, which is not a practical solution.
- Watercourse lowering can manage broad wide floodplains that are generally attributed to flat shallow drainage systems and undersized road and rail crossings creating significant backwater and flooding. Creation of deeper channel corridors will improve flooding conditions.

Drawing 3 illustrates the preliminary NHS system including realignments and the proposed channel corridors considered by the ISS and SWS consulting teams.

6 STORMWATER MANAGEMENT

6.1. PREVIOUS STUDIES

The Wood SWS update represents the latest characterization of the existing drainage conditions for the Heritage Heights Secondary Plan area, as well as the proposed NHS / channel alignments and stormwater management criteria.

6.2. EXISTING CONDITIONS

Drawing 3 illustrates the overall existing drainage areas delineated based on the available LIDAR topographic information (RPE), CVC catchment delineation shapefiles, as well as mapping coordinated with Wood as part of the subwatershed study update. As shown in **Table 6-1**, a portion of the subject lands are within the West Huttonville Creek subwatershed, with the remaining area discharging into the Credit River tributary.

Table 6-1: Overall Drainage areas within the Heritage Heights Secondary Plan area

Watershed	Outlet	Heritage Heights Secondary Plan Area [hectares]
West Huttonville	West Huttonville Creek at Mississauga Road south of Bovaird Drive	415
Credit River	Credit River at south/southwest boundary of study area; crossing Mississauga Road south of Queen Street.	1,211

6.2.1. TOPOGRAPHY AND SOILS

As described in the Phase 1 SWS, the Halton Till overlies the Queenston shale bedrock over the majority of the area. Isolated sand or gravel units may occur at or near bedrock. The plain is relatively flat in the upper Study Area and slopes to the southeast in the lower reaches. Along portions of the Credit River and tributaries in the southwest and west central portion of the Study Area, erosion through both the glaciolacustrine and Halton Till deposits has exposed the shale bedrock within the stream valleys. Minor bedrock valleys associated with these stream reaches occasionally contain sand and gravel infill deposits. More significant deposits of sand and gravel may infill the lower reaches of these creeks as they enter the Credit River valley.

The depth to the water table is typically related to the topography, with relatively shallow groundwater levels in the lower lying areas and deeper groundwater levels in the topographically higher areas. Groundwater levels were found at or above ground surface in MW2 and MW5), approximately 1 to 2 m below ground surface at MW1, MW3, MW6 and MW7s/d and approximately 4 m below ground surface at MW4 and 8 m below ground surface for MW8. The groundwater levels in the monitoring wells typically fluctuate by approximately 1.5 m to 2 m seasonally with the trend being quite consistent.

6.3. POST DEVELOPMENT DRAINAGE

Drawing 3 illustrates the approximate post-development drainage boundaries within the Heritage Heights Secondary Plan area, in addition to the receiving SWM facility / outlets. The post-development drainage areas were based on the preliminary grading plan (**Drawing 2**), which strove to:

- Match post- to pre-development drainage boundaries, where possible
- Avoid excessive cut/fill to achieve gravity drainage and suitable pipe depths.
- Avoid crossings of the TCPL and NHS
- Avoid excessive lengths / sizes of storm sewer
- Ensure overland flow routes can drain positively.

6.3.1. POND BLOCK LOCATION

The SWM facility locations shown on **Drawing 3** were adapted from the SWS Update and are generally situated at the lowest points of the terrain relative to the respective catchment areas.

Similar to the sanitary servicing design, unnecessary crossings of the TCPL or CNR have been avoided and therefore natural “breaks” in the storm drainage boundaries have been introduced in the form of SWM facilities to capture and treat runoff and discharge it into the NHS.

A total of 30 ponds have been established for the Secondary Plan area.

6.3.1.1. POND BLOCK SIZING

Table 6-2 summarizes the revised January 4th, 2011 SWM design criteria provided by the City of Brampton, which are considered to be the currently accepted standards for Heritage Heights. These design criteria have been utilized in Blocks 51-1 and 52-2. The preliminary sizing carried out herein has considered these approved grading design requirements and other pond block components.

The Wood SWS update (Phase 3) has identified the following criteria for pond block sizing:

- 80% TSS removal through provision of a permanent pool sized according to Table 3.2 in the MOE SWM Planning and Design Manual (2003)
- Extended detention / erosion control
- Quantity controls up to and including the Regional event

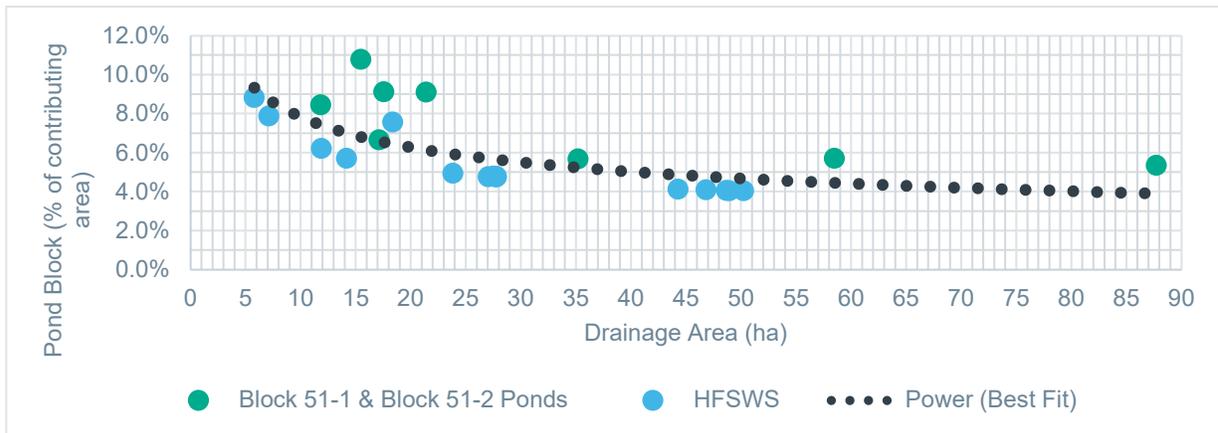
These criteria have been taken into account to create a “rule of thumb” block sizing criteria.

Table 6-2: Updated SWM pond design Criteria

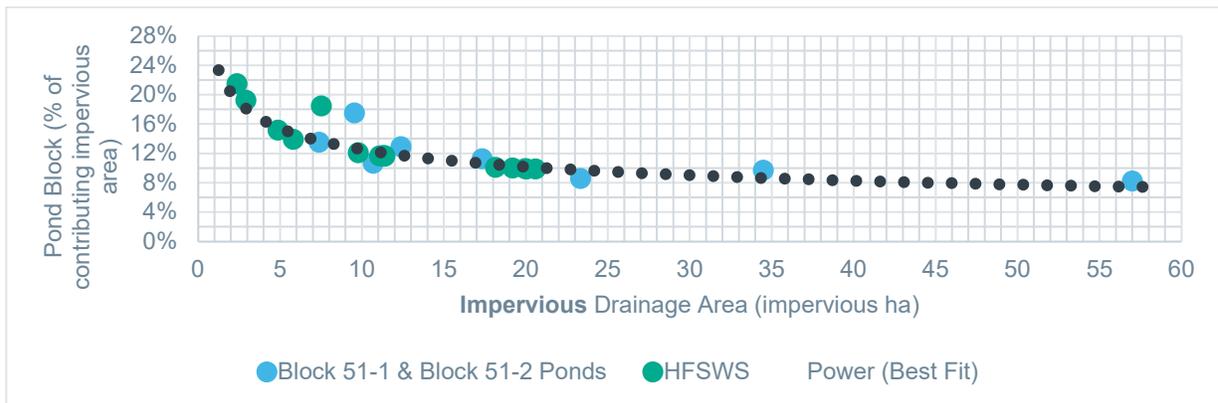
Pond Element	Design Criteria
Rescue Shelf	Brampton's Fire and Emergency Services Division will require a 2.4 m wide rescue shelf (with a cross slope of 2% into the pond) located at a minimum height of 0.3 m above the high water level and around the periphery of the pond.
Mow Strip	A mow strip with a width of 2.4m (with a cross slope of 2% into the pond) will be required where the pond abuts residential properties. This mow strip could also function as the rescue shelf.
Maintenance Access Road	A maintenance access road with a width of 4.0 meters (with a cross slope of 2% into the pond) shall be provided on at least two sides of the pond (i.e. one long side and one short side). The maintenance access road shall be configured such that two points of entry are provided from a street. Secondary access points could also be made through open space blocks that have street frontages. Access should be provided to all inlets, outlets with 12:1 (horizontal: vertical) access to the bottom of the pond forebay and main cell. The access road shall be situated in a manner that allows trucks to drive through the pond without having to turn around. Where possible the maintenance access road may also be utilized as a rescue shelf.
Staging/Loading Area	A separate staging / loading area will be required for both the pond forebay and the main cell. Minimum dimensions for the staging / loading areas would be 4.5 m x 5.5 m. The staging / loading areas should be situated between the permanent pool and the maintenance access road and should be placed adjacent to the 12:1 slope to the bottom of the pond.
Side Slopes	<p>Side slopes of 3:1 (h:v) will only be allowed above the rescue shelf. Side slopes of 4:1 (h:v) will be provided in the following situations:</p> <ul style="list-style-type: none"> • Below the rescue shelf to the maintenance access road; • Below the rescue shelf to 5-year predicted water level; and • Adjacent to right-of-ways <p>All other criteria for side slopes noted in the City of Brampton design guidelines shall remain the same.</p>
Armour Stone Retaining Walls	<p>Not permitted with Pond Blocks.</p> <ul style="list-style-type: none"> • Note, in the case of Pond F-3 the use of retaining wall was accepted at the draft plan approval stage to increase the community park size adjacent to the pond.
Trails	<p>A continuous trail shall be constructed around the pond and shall adhere to the following criteria:</p> <ul style="list-style-type: none"> • Minor trails shall be: <ul style="list-style-type: none"> ○ 2.4 meters wide with a 0.5 meter buffer on either side of the trail; ○ Constructed of 5/8" clear stone; and ○ Located at a minimum height of 0.3 m above the 5-year predicted water level. • Major trails (which form part of the City's trail system) shall be: <ul style="list-style-type: none"> ○ 3.0 meters wide ○ Constructed of asphalt; ○ Located at a minimum height of 0.3 m above the regulatory storm event; and ○ Located one meter away from the pond embankment. • The trail shall be located a minimum of three meters away from the property line, where the trails abut residential properties; • The maintenance access road and/or the rescue shelf can facilitate the trail; • Every effort shall be made to locate paved trails away from the maintenance access road.
Sediment Drying Area & Bypass pipe	Not required as agreed with City

“Rule of thumb” pond sizing is often estimated as a percentage of the contributing drainage area ranging from 6% to 8% (for Regional ponds). In the case of the Heritage Heights Secondary Plan area, there are many available pond designs as well as actual, implemented ponds adjacent to the study area with similar sizing criteria and design assumptions. Therefore, the rule of thumb sizing has been based on actual / previously sized pond blocks in the area.

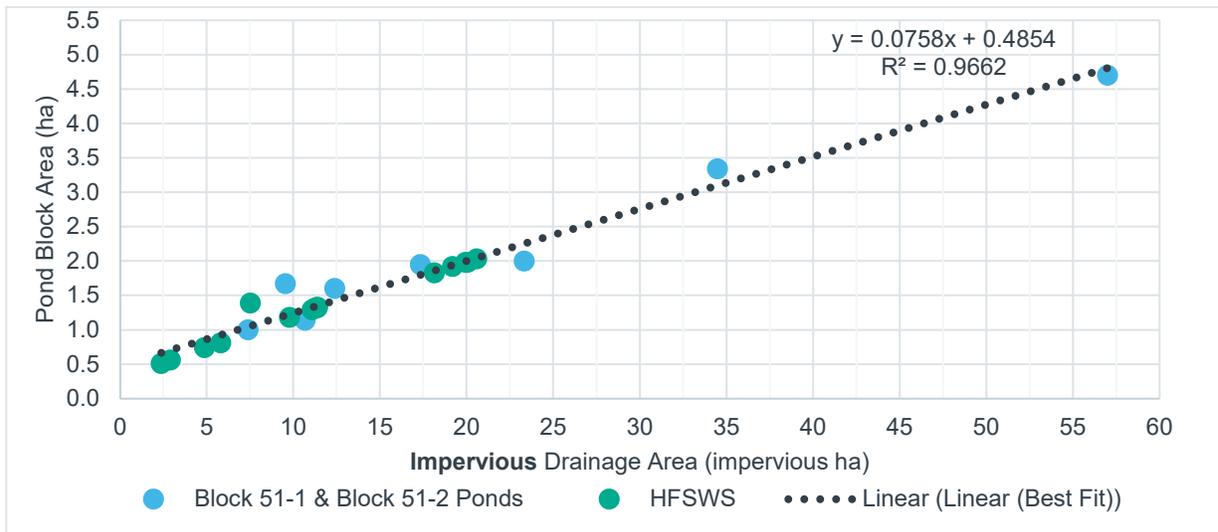
The previously sized HFSWS pond blocks and the implemented Blocks 51-1 and 51-2 ponds were plotted against their respective contributing drainage areas to establish a line of best fit. As shown below, a reasonable correlation was noted for the “designed” HFSWS ponds, but not for the actually implemented Block 51-1 and 51-2 ponds.



However, when pond blocks were plotted against **impervious** drainage area, a much better fit was noted as shown below.



This relationship was translated to express pond block area versus contributing impervious area, which results in a simple, strong linear correlation.



The pond block sizing equation selected for the Heritage Heights Secondary Plan area is:

- **Pond Block Area (ha) = 7.5% x Impervious Drainage Area + 0.5**

Based on this equation, all pond blocks in the Secondary Plan were sized as shown in

Table 6-3.

Table 6-3: Preliminary Stormwater Management Facility Sizing

SWM FACILITY ID	DRAINAGE AREA (ha)	%IMP	Permanent Pool Elevation (m)	Pond Block Area based on 0.075 x IMP Area +0.5 (ha)
Credit River SWM Facilities				
CR-1	75.4	79%	251.5	4.96
CR-1A	37.7	88%	250.5	3.0
CR-2	65.5	71%	251.5	3.98
CR-3	38.4	73%	247.5	2.6
CR-3A	19.7	76%	247.5	1.63
CR-4	23.4	73%	240.5	1.78
CR-5	34.3	73%	240.5	2.38
CR-6	34.2	68%	240	2.24
CR-7	44.9	76%	247	3.06
CR-8	51.6	94%	246.5	4.14
CR-9	27.9	79%	244.3	2.15
CR-10	29.2	74%	242.5	2.12
CR-11	34.2	73%	232	2.37
CR-12	20.3	92%	234	1.9
CR-13	29	73%	233	2.09
CR-14	52.1	94%	229.5	4.17
CR-15	50.6	91%	222	3.95
CR-16	23.6	80%	212	1.92
CR-17	32.4	83%	231.5	2.52
CR-18	45.3	76%	214.5	3.1
West Huttonville Creek SWM Facilities				
HW-1	58.8	95%	252.5	4.69
HW-1A	26.5	95%	256	2.39
HW-2	46.6	81%	252.5	3.33
HW-2A	51.2	85%	255.5	3.76
HW-3	24.7	90%	250	2.17
HW-4	42.6	86%	249.5	3.25
HW-5	28.5	95%	243	2.53
HW-6	46.4	86%	242.5	3.49
HW-7	69.4	85%	235.5	4.92
Huttonville Creek SWM Facilities				
H-8	39.1	78%	232	2.79

6.3.2.LOW IMPACT DEVELOPMENT

In addition to conventional wet ponds described in the preceding section, the City of Brampton has identified that the Heritage Heights Secondary Plan area should consider the use of innovative SWM best management practices including the use of Low Impact Development (LID) measures. The following presents a “long list” of SWM measures and their applicability to various land uses within the Heritage Heights Secondary Plan. Subject to City and CVC approval, some of these measures, if implemented, could offset the quality, extended detention, or flood control volumes at the end-of-pipe SWM facilities, thereby resulting in smaller SWM pond blocks and distributed SWM controls. Furthermore, SWM facilities could be combined with other land uses such as parks to improve the plan efficiency and create dual-purpose public areas, similar to parks and sports fields in the City of Markham, Richmond Hill, and King City.

Table 6-4 - Alternative SWM measures

SWM BMP	Description	Applicability to Heritage Heights Secondary Plan	Potential to reduce end-of-pipe SWM facility size
U/G Tanks	On-site, underground stormwater retention /detention accomplishes the capture and storage of stormwater collected from surrounding impervious areas. Isolator rows are also ETV certified and can be implemented in tanks for quality control.	Medium / High / ICI / Parks	Yes – reduces flood control requirements at EOP
CB Shields	CB Shield inserts are placed into catchbasins to prevent scour. The top slope of the shield deflects the flow of water to the back wall of the catchbasin while the grates allow water to flow over the top and exit the outlet pipe. Sediment falls between the slots. ETV certified for TSS removal	All uses	Unlikely
Super Pipe	A superpipe, consisting of pre-manufactured pipe requiring on-site assembly, can reduce peak flow rates by providing subsurface storage. There are marginal water quality benefits as some of the coarse sediment may settle. Generally, superpipes are utilized for small development sites which lack sufficient surface space to construct detention facilities. Superpipes are equipped with small outlet pipes.	All uses	Yes – reduces flood control requirements at EOP
Oil / grit separators	Oil grit separators (OGS) are designed to remove sediment, screen debris and trash, and separate oil from stormwater. Removal processes vary for different types of OGS, but most depend at least partly on gravity-based settling for sediment and associated contaminants (e.g. heavy metals), and phase separation for oil. OGS do not effectively remove dissolved or emulsified oils and pollutants. Many devices are ETV certified. (Performance Assessment of Two Types of Oil & Grit Separator)	All uses	Yes – by reducing quality control storage or eliminating forebays at EOP
Infiltration Trench	Infiltration trenches are rectangular trenches lined with geotextile fabric and filled with clean granular stone or other void forming material. They typically service an individual lot and receive only roof and walkway runoff. This design variation on soakaways is well suited to sites where available space for infiltration is limited to narrow strips of land between buildings or properties, or along road rights-of-way.	All uses	Yes – reduces quality and erosion control volumes at EOP

SWM BMP	Description	Applicability to Heritage Heights Secondary Plan	Potential to reduce end-of-pipe SWM facility size
Bioretention	Infiltration practice that treats runoff from paved areas by using the natural properties of soil and vegetation to remove contaminants. Lots of variation such as the addition or exclusion of an underdrain and impermeable liner. Has ability to meet SWM water quality, water balance and partial objectives for erosion (STEP).	All uses	Yes – reduces quality and erosion control volumes at EOP
Rain Barrel	Water collected is typically used as a non-potable source for uses such as toilet flushing, urinals, and irrigation. Has ability to meet SWM water quality, water balance and partial objectives for erosion (STEP).	Low / medium	Unlikely
Filter strip	Vegetated filter strips (a.k.a. buffer strips and grassed filter strips) are gently sloping, densely vegetated areas that treat runoff as sheet flow from adjacent impervious areas. They function by slowing runoff velocity and filtering out suspended sediment and associated pollutants, and by providing some infiltration into underlying soils.	All uses	Unlikely
Silva Cell	The Silva Cell is a modular suspended pavement system that uses soil volumes to support large tree growth and provide powerful on-site stormwater management through absorption, evapotranspiration, and interception.	All uses	Yes – reduces quality and erosion control volumes at EOP
Green Roofs	Green roofs are lightweight, engineered rooftops designed to promote the growth of vegetation while protecting the structural integrity of the roof. The stormwater management benefit provided by green roofs lies in the ability of the soil media and plants to retain stormwater, increase evapotranspiration, and allow stormwater runoff to be released gradually to receiving waters at decreased flow rates. Has ability to meet SWM objectives for water balance, water quality, and erosion (STEP).	Medium / High / ICI	Yes – reduces erosion control volumes at EOP
Blue roofs	On blue roofs, stormwater is detained and then slowly released over time through the use of flow control devices or structures. Blue roof technology can be applied on flat roofs of buildings that are structurally capable of accommodating the additional load of system components and detained stormwater. Several different blue roof configurations are possible, including: flow-restricting roof drains; modular tray systems, weighed down with ballast; and check dams installed to pond sheet flow to roof drains. (STEP)	High / ICI	Yes – reduces erosion control volumes at EOP
Active / controlled-release ponds	End-of pipe facilities with active / dynamic controls to optimize the release rate (and reduce total storage volumes)	End-of-pipe	Yes – reduces erosion control and flood control requirements at EOP

SWM BMP	Description	Applicability to Heritage Heights Secondary Plan	Potential to reduce end-of-pipe SWM facility size
Permeable pavement	Building parking lots, driveways and roads using permeable pavement helps to restore natural infiltration functions to the landscape and reduce impacts to watercourses by allowing rainwater to slowly infiltrate into the ground. Contaminants are removed from the stormwater as it infiltrates slowly through the gravel sub-base and into the native soil. Has ability to meet SWM water quality, water balance objectives and partial objectives for erosion (STEP).	All uses	Yes – reduces quality and erosion control volumes at EOP
Dry ponds	End-of-pipe facility which provides quantity control, primarily. Should be coupled with other quality control measures.	End-of-pipe	
Ponds in parks	End-of-pipe facility which provides quantity control, primarily. Should be coupled with other quality control measures. Can be placed underground in tanks to optimize land use or can be considered as temporary major system surface storage during large events.	End-of-pipe	
Long swales / linear ponds	Swales detain, filter and infiltrate runoff as it is conveyed along the grassed ditch, resulting in smaller volumes of runoff and associated pollutants from reaching the watercourse or stormwater management facility. Has ability to meet SWM water quality, and partial objectives for erosion and water balance (STEP).	End-of-pipe	
Wet Ponds	Conventional end-of-pipe wet pond	End-of-pipe	
Wetland Ponds	Conventional end-of-pipe wetland	End-of-pipe	
Parking lot storage	Provision of inlet control devices and creation of depression storage areas in parking areas	Medium / High / ICI	Yes – reduces flood control requirements at EOP
ROW storage (surface of road / sag areas)	Provision of inlet control devices and creation of depression storage areas along ROWs	Roads	Yes – reduces flood control requirements at EOP
Front yard cisterns / U/G tanks in detached lots (i.e. public easements up to front door)	Individual tanks to capture rainwater for irrigation or mechanical uses	Low / Medium	Yes – reduces erosion control volumes at EOP
Rain gardens	See bioretention above	Low / Medium	Yes – reduces erosion control volumes at EOP
Pervious catchbasins	Catchbasins with perforated bottoms and stone trenches to promote infiltration	Roads	Yes – reduces erosion control volumes at EOP

SWM BMP	Description	Applicability to Heritage Heights Secondary Plan	Potential to reduce end-of-pipe SWM facility size
Clean water collector / exfiltration system Perforated pipe system	Storm sewer or manholes perforations and stone trenches to promote infiltration	Roads	Yes – reduces erosion control volumes at EOP
Storage in channel corridors (account for channel routing or culvert restrictions as controls)	Similar to Block 51-1, ample storage in channels could be used to account for dynamic Regional flow routing / attenuation	NHS	Yes – reduces flood control requirements at EOP
Filter Sock	Filter material typically filled with mulch to act as level spreaders / pre-treatment devices. They function by slowing runoff velocity and filtering out suspended sediment and associated pollutants	All uses	Unlikely
Absorptive Landscape	Additional topsoil, enhanced soil media, etc. to promote infiltration	All uses	Yes – reduces erosion control volumes at EOP
Rainwater harvesting and reuse for non-potable demands such as irrigation and toilet/urinals, trap priming, evaporative cooling tanks	Individual tanks to capture rainwater for irrigation uses	High density / ICI	Yes – reduces erosion control volumes at EOP

7 CONCLUSIONS AND RECOMMENDATIONS

The Heritage Heights Secondary Plan is serviceable and can be implemented.

- Several grading constraints existing, including the NHS boundaries / hazards, existing pipeline and rail corridors, and existing / future ROWs bounding the site. Refer to **Drawing 2** for preliminary grading details.
- Ample sanitary capacity is available in the Mississauga Road trunk sewer and will be available in terms of treatment capacity at the Clarkson WWTP. Refer to **Drawings 4** and **4A** and **Appendix A** for the preliminary sanitary infrastructure design calculations and cost estimates.
- The water distribution system is adequate up to 50% build-out of the full Heritage Heights Secondary Plan population of 124,000 (residential) and 47,000 (employment). System upgrades would be required downstream and at the Lorne Park WTP. Refer to **Drawing 5** and **Appendix B** for details including the AECOM water distribution analysis report and cost estimates.
- Multiple (30) SWM facilities are required to service the subject lands. These locations have been coordinated with the HFSWS consulting team and have been placed at ideal locations to promote gravity drainage, minimize large areas / large storm sewer sizes, and optimize land use. Channel lowering is required at several locations as shown on **Drawings 2 and 3** and **3. Appendix C** includes the rule of thumb sizing details and alternative SWM BMP measures for consideration.

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President

APPENDIX A
SANITARY DESIGN SHEETS AND COST ESTIMATES



SANITARY SEWER DESIGN SHEET
HERITAGE HEIGHTS
REGION DENSITY - WITH EXTERNAL NORTH OF MAYFIELD
Region of Peel

PROJECT DETAILS

Project No: 11-349
 Date: 16-Jul-21
 Designed by: J.P.O
 Checked by: A.F

DESIGN CRITERIA

Min. Flow = 13 l/s
 Min Diameter = 250 mm
 Mannings 'n' = 0.013
 Min. Velocity = 0.75 m/s
 Max. Velocity = 3.50 m/s
 Factor of Safety = 15 %

Avg. Domestic Flow = 302.8 l/c/d
 Infiltration = 0.200 l/s/ha
 Max. Peaking Factor = 4.00
 Min. Peaking Factor = 1.50
 Domestic Sewage flow for < 1000 ppl = 0.013m³/s
 (Region of Peel Std. 2-5-2)

NOMINAL PIPE SIZE USED

STREET	FROM MH	TO MH	RESIDENTIAL						COMMERCIAL/INDUSTRIAL/INSTITUTIONAL						FLOW CALCULATIONS						PIPE DATA											
			LOW DENSITY AREA (ha)	MEDIUM DENSITY AREA (ha)	HIGH DENSITY AREA (ha)	ACC. AREA (ha)	LOW DENSITY (P/ha)	MEDIUM RES DENSITY (P/ha)	HIGH RES DENSITY (P/unit)	POP	ACCUM. RES. POP.	AREA (ha)	ACC. AREA (ha)	EQUIV. POP. (p/ha)	FLOW RATE (l/s/ha)	EQUIV. POP.	ACCUM. EQUIV. POP.	INFILTRATION (l/s)	TOTAL ACCUM. POP.	PEAKING FACTOR	RES. FLOW (l/s)	MIN. RES. FLOW (l/s)	COMM. FLOW (l/s)	ACCUM. COMM. FLOW (l/s)	TOTAL FLOW (l/s)	SLOPE (%)	PIPE DIAMETER (mm)	FULL FLOW CAPACITY (l/s)	FULL FLOW VELOCITY (m/s)	ACTUAL VELOCITY (m/s)	PERCENT FULL (%)	
Mississauga Road	External	Prop.MH.9A	531.70			531.70						42536	42536						106.3	42536	2.33	347.4	347.4			453.8	0.50	675	594.4	1.66	1.81	76%
Mississauga Road	Prop.MH.9A	Prop.MH.8A				531.70						42536	42536						106.3	42536	2.33	347.4	347.4			453.8	0.80	1050	2442.4	2.82	2.14	19%
Wainless Drive	MH.A1	Prop.MH.8A	44.60	5.40	12.40	62.40	70	175	475	9957	9957	20.30	20.30	50		1015	1015		16.5	10972	2.91	112.1	112.1			128.6	0.50	450	201.6	1.27	1.31	64%
Mississauga Road	Prop.MH.8A	EX.MH.7A				594.10										1015	1015		122.9	53508	2.24	419.6	419.6			542.4	0.80	1050	2442.4	2.82	2.23	22%
External	Fut. San1	MH.1B	220.90			220.90						17672	17672						44.2	17672	2.71	167.6	167.6			211.8	0.30	600	336.3	1.19	1.23	63%
Wainless Drive	MH.1B	MH.3B	95.70			316.60	70			6699	24371	32.40	32.40	50	1620	1620			69.8	25991	2.54	231.3	231.3			301.1	0.35	600	363.3	1.28	1.41	83%
External	Fut. San2	MH.2B	428.10			428.10				34248	34248								85.6	34248	2.42	290.6	290.6			376.2	0.30	675	460.4	1.29	1.42	82%
Heritage Road	MH.2B	MH.3B		31.60	21.40	481.10		175	475	15695	49943	20.70	20.70	50	1035	1035			100.4	50978	2.26	403.2	403.2			503.5	0.30	750	609.8	1.38	1.52	83%
Heritage Road	MH.3B	MH.5B	1.90	36.60	24.50	860.70	70	175	475	18176	92490	32.60	85.70	50	1630	4285			189.3	96775	2.01	682.3	682.3			871.6	0.35	900	1071.0	1.68	1.85	81%
Sandalwood Parkway	MH.4B	MH.5B	103.40	11.40		114.80	70	175		9233	9233								23.0	9233	2.99	96.7	96.7			119.7	0.30	450	156.2	0.98	1.07	77%
Sandalwood Parkway	MH.5B	MH.6B				975.50					101723		85.70		4285	4285			212.2	106008	1.98	735.3	735.3			947.6	0.50	975	1584.7	2.12	2.19	60%
Sandalwood Parkway	MH.6B	EX.MH.7A	17.80	22.60	3.50	1019.40	70	175	475	6864	108587		85.70		4285	4285			221.0	112872	1.96	774.3	774.3			995.3	0.50	975	1584.7	2.12	2.19	63%
Mississauga Road	EX.MH.7A	EX.MH.6A	175.03			1788.53				12885	173965		106.00			5300	5300		378.9	179265	1.81	1134.1	1134.1			1513.0	0.80	1050	2442.4	2.82	2.91	62%
Serve Street	MH.A2	EX.MH.6A	16.70	6.90		23.60	70	175		2377	2377								4.7	2377	3.53	29.4	29.4			34.1	0.50	375	124.0	1.12	0.95	28%
Mississauga Road	EX.MH.6A	EX.MH.5A				1812.13					176342		106.00			5300	5300		383.6	181642	1.80	1146.5	1146.5			1530.1	0.80	1200	3487.1	3.08	2.87	44%
Internal - Below CNR	MH.A3	EX.MH.15A	2.70	0.50		3.20	70	175		277	277								0.6	277	4.00	3.9	13.0			13.6	0.50	250	42.0	0.86	0.75	32%
	EX.MH.15A	agerfeld Driv				3.20					277								0.6	277	4.00	3.9	13.0			13.6	0.81	375	157.8	1.43	0.89	9%
	agerfeld Driv	EX.MH.A				3.20					277								0.6	277	4.00	3.9	13.0			13.6	0.50	450	201.6	1.27	0.72	7%
Serve Street	MH.C7	MH.9C	26.20	7.90	8.60	42.70	70	175	475	7302	7302								8.5	7302	3.09	79.0	79.0			87.6	1.00	375	175.3	1.59	1.57	50%
Internal - Below CNR	MH.C1	MH.1C	18.60			18.60	70			1302	1302								3.7	1302	3.72	17.0	17.0			20.7	0.75	250	51.5	1.05	0.98	40%
Internal - Below CNR	MH.1C	MH.2C				18.60					1302								3.7	1302	3.72	17.0	17.0			20.7	0.30	375	96.0	0.87	0.69	22%
Tennis Street	MH.C2	MH.2C	34.60			34.60	70			2422	2422								6.9	2422	3.52	29.9	29.9			36.8	0.50	250	42.0	0.86	0.95	88%
Internal - Below CNR	MH.2C	MH.3C				53.20					3724								10.6	3724	3.36	43.9	43.9			54.5	0.30	450	156.2	0.98	0.88	35%
Heritage Road	MH.3C	MH.4C				53.20					3724								10.6	3724	3.36	43.9	43.9			54.5	0.30	525	235.6	1.09	0.86	23%
Tennis Street	MH.C2	MH.C3	30.30			30.30	70			2121	2121								6.1	2121	3.57	26.5	26.5			32.6	0.50	250	42.0	0.86	0.93	77%
Tennis Street	MH.C3	MH.C4				30.30					2121								6.1	2121	3.57	26.5	26.5			32.6	0.40	300	61.2	0.87	0.86	53%
Tennis Street	MH.C4	MH.4C	35.40	16.90		82.60	70	175		5436	7557								16.5	7557	3.07	81.4	81.4			97.9	0.30	450	156.2	0.98	1.01	63%
Heritage Road	MH.4C	MH.5C	17.10	2.90		155.80	70	175		1705	12986								31.2	12986	2.84	129.3	129.3			160.5	0.30	525	235.6	1.09	1.14	68%
Tennis Street	MH.C5	MH.C6	41.80	1.30		43.10	70	175		3154	3154								8.6	3154	3.42	37.8	37.8			46.5	1.30	250	67.8	1.38	1.45	69%
Boviard Drive	MH.C6	MH.5C				43.10					3154								8.6	3154	3.42	37.8	37.8			46.5	0.50	300	68.4	0.97	1.02	68%
Boviard Drive	MH.5C	MH.6C				198.90					16140								39.8	16140	2.75	155.3	155.3			195.1	0.30	600	336.3	1.19	1.20	58%
Boviard Drive	MH.6C	MH.7C	18.50	53.10		270.50		175	475	28460	44600								54.1	44600	2.31	361.2	361.2			415.3	0.30	750	609.8	1.38	1.45	68%
Boviard Drive	MH.7C	MH.8C				270.50					44600								54.1	44600	2.31	361.2	361.2			415.3	0.30	750	609.8	1.38	1.45	68%
Serve Street	MH.8C	MH.9C				270.50					44600								54.1	44600	2.31	361.2	361.2			415.3	0.30	750	609.8	1.38	1.45	68%
Area 51-3	MH.9C	MH.10C				313.20					51902								62.6	51902	2.25	409.2	409.2			471.8	0.30	825	786.2	1.47	1.51	60%
Area 51-3	MH.10C	EX.MH.A				313.20					51902								62.6	51902	2.25	409.2	409.2			471.8	0.30	825	786.2	1.47	1.51	60%
Area 51-3	EX.MH.A	EX.MH.5A				316.40					52179								63.3	52179	2.25	411.0	411.0			474.3	0.30	825	786.2	1.47	1.51	60%
Mississauga Road	EX.MH.5A	EX.MH.4A	109.13			2237.66				9853	238374		106.00			5300	5300		468.7	243674	1.71	1463.7	1463.7			1932.4	0.80	1200	3487.1	3.08	3.11	55%
Internal - South of Bovaird	MH.A4	EX.MH.4A	29.80	4.70	6.10	40.60	70	175		5806	5806								8.1	5806	3.18	64.8	64.8			72.9	0.50	375	124.0	1.12	1.13	59%
Mississauga Road	EX.MH.4A	EX.MH.3A				2278.26	70	175			244180		106.00			5300	5300		476.9	249480	1.71	1492.7	1492.7			1969.6	0.80	1200	3487.1	3.08	3.11	56%
Heritage Road	MH.D1	MH.D2					70	175																			0.50	250	42.0	0.86	0.22	



SANITARY SEWER DESIGN SHEET
HERITAGE HEIGHTS
REGION DENSITY - NO EXTERNAL NORTH OF MAYFIELD
Region of Peel

PROJECT DETAILS

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Date: 16-Jul-21
Designed by: J.P.O
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DESIGN CRITERIA

Min. Flow = 13 l/s	Avg. Domestic Flow = 302.8 l/c/d
Min Diameter = 250 mm	Infiltration = 0.200 l/s/ha
Mannings 'n' = 0.013	Max. Peaking Factor = 4.00
Min. Velocity = 0.75 m/s	Min. Peaking Factor = 1.50
Max. Velocity = 3.50 m/s	Domestic Sewage flow for < 1000 ppl = 0.013m³/s
Factor of Safety = 15 %	(Region of Peel Std. 2-5-2)

NOMINAL PIPE SIZE USED

STREET	FROM MH	TO MH	RESIDENTIAL						COMMERCIAL/INDUSTRIAL/INSTITUTIONAL						FLOW CALCULATIONS						PIPE DATA									
			LOW DENSITY AREA (ha)	MEDIUM DENSITY AREA (ha)	HIGH DENSITY AREA (ha)	ACC. AREA (ha)	LOW RES DENSITY (P/ha)	MEDIUM RES DENSITY (P/ha)	HIGH RES DENSITY (P/unit)	POP	ACCUM. RES. POP.	AREA (ha)	ACC. AREA (ha)	EQUIV. POP. (p/ha)	FLOW RATE (l/s/ha)	EQUIV. POP.	ACCUM. EQUIV. POP.	INFILTRATION (l/s)	TOTAL ACCUM. POP.	PEAKING FACTOR	RES. FLOW (l/s)	MIN. RES. FLOW (l/s)	COMM. FLOW (l/s)	ACCUM. COMM. FLOW (l/s)	TOTAL FLOW (l/s)	SLOPE (%)	PIPE DIAMETER (mm)	FULL FLOW CAPACITY (l/s)	FULL FLOW VELOCITY (m/s)	ACTUAL VELOCITY (m/s)
Mississauga Road	External	Prop.MH.9A																							0.50	675	594.4	1.66	0.43	
Mississauga Road	Prop.MH.9A	Prop.MH.8A																							0.80	1050	2442.4	2.82	0.73	
Wainless Drive	MH.A1	Prop.MH.8A	44.60	5.40	12.40	62.40	70	175	475	9957	9957	20.30	20.30	50	1015	1015	16.5	10972	2.91	112.1	112.1			128.6	0.50	450	201.6	1.27	1.31	64%
Mississauga Road	Prop.MH.8A	EX.MH.7A				62.40					9957		20.30			1015	16.5	10972	2.91	112.1	112.1			128.6	0.80	1050	2442.4	2.82	1.47	5%
External	Fut. San1	MH.1B																						0.30	600	336.3	1.19	0.31		
Wainless Drive	MH.1B	MH.3B	95.70			95.70	70			6699	6699	32.40	32.40	50	1620	1620	25.6	8319	3.03	88.4	88.4			114.1	0.35	600	363.3	1.28	1.12	31%
External	Fut. San2	MH.2B																						0.30	675	460.4	1.29	0.33		
Heritage Road	MH.2B	MH.3B		31.60	21.40	53.00		175	475	15695	15695	20.70	20.70	50	1035	1035	14.7	16730	2.73	160.1	160.1			174.8	0.30	750	609.8	1.38	1.17	29%
Heritage Road	MH.3B	MH.5B	1.90	36.60	24.50	211.70	70	175	475	18176	40570	32.60	85.70	50	1630	4285	59.5	44855	2.31	362.9	362.9			422.4	0.35	900	1071.0	1.68	1.52	39%
Sandalwood Parkway	MH.4B	MH.5B	103.40	11.40		114.80	70	175		9233	9233						23.0	9233	2.99	96.7	96.7			119.7	0.30	450	156.2	0.98	1.07	77%
Sandalwood Parkway	MH.5B	MH.6B				326.50					49803		85.70			4285	82.4	54088	2.23	423.3	423.3			505.7	0.50	975	1584.7	2.12	1.85	32%
Sandalwood Parkway	MH.6B	EX.MH.7A	17.80	22.60	3.50	370.40	70	175	475	6864	56667		85.70			4285	91.2	60952	2.19	466.9	466.9			558.1	0.50	975	1584.7	2.12	1.91	35%
Mississauga Road	EX.MH.7A	EX.MH.6A				432.80					66624		106.00			5300	107.8	71924	2.12	534.8	534.8			642.6	0.80	1050	2442.4	2.82	2.34	26%
Serve Street	MH.A2	EX.MH.6A	16.70	6.90		23.60	70	175		2377	2377						4.7	2377	3.53	29.4	29.4			34.1	0.50	375	124.0	1.12	0.95	28%
Mississauga Road	EX.MH.6A	EX.MH.5A				456.40					69001		106.00			5300	112.5	74301	2.11	549.3	549.3			661.8	0.80	1200	3487.1	3.08	2.34	19%
Internal - Below CNR	MH.A3	EX.MH.15A	2.70	0.50		3.20	70	175		277	277						0.6	277	4.00	3.9	13.0			13.6	0.50	250	42.0	0.86	0.75	32%
	EX.MH.15A	agerfeld Driv				3.20					277						0.6	277	4.00	3.9	13.0			13.6	0.81	375	157.8	1.43	0.89	9%
	agerfeld Driv	EX.MH.A				3.20					277						0.6	277	4.00	3.9	13.0			13.6	0.50	450	201.6	1.27	0.72	7%
Serve Street	MH.C7	MH.9C	26.20	7.90	8.60	42.70	70	175	475	7302	7302						8.5	7302	3.09	79.0	79.0			87.6	1.00	375	175.3	1.59	1.57	50%
Internal - Below CNR	MH.C1	MH.1C	18.60			18.60	70			1302	1302						3.7	1302	3.72	17.0	17.0			20.7	0.75	250	51.5	1.05	0.98	40%
Internal - Below CNR	MH.1C	MH.2C				18.60					1302						3.7	1302	3.72	17.0	17.0			20.7	0.30	375	96.0	0.87	0.69	22%
Tennis Street	MH.C2	MH.2C	34.60			34.60	70			2422	2422						6.9	2422	3.52	29.9	29.9			36.8	0.50	250	42.0	0.86	0.95	88%
Internal - Below CNR	MH.2C	MH.3C				53.20					3724						10.6	3724	3.36	43.9	43.9			54.5	0.30	450	156.2	0.98	0.88	35%
Heritage Road	MH.3C	MH.4C				53.20					3724						10.6	3724	3.36	43.9	43.9			54.5	0.30	525	235.6	1.09	0.86	23%
Tennis Street	MH.C2	MH.C3	30.30			30.30	70			2121	2121						6.1	2121	3.57	26.5	26.5			32.6	0.50	250	42.0	0.86	0.93	77%
Tennis Street	MH.C3	MH.C4				30.30					2121						6.1	2121	3.57	26.5	26.5			32.6	0.40	300	61.2	0.87	0.86	53%
Tennis Street	MH.C4	MH.4C	35.40	16.90		82.60	70	175		5436	7557						16.5	7557	3.07	81.4	81.4			97.9	0.30	450	156.2	0.98	1.01	63%
Heritage Road	MH.4C	MH.5C	17.10	2.90		155.80	70	175		1705	12986						31.2	12986	2.84	129.3	129.3			160.5	0.30	525	235.6	1.09	1.14	68%
Tennis Street	MH.C5	MH.C6	41.80	1.30		43.10	70	175		3154	3154						8.6	3154	3.42	37.8	37.8			46.5	1.30	250	67.8	1.38	1.45	69%
Boviard Drive	MH.C6	MH.5C				43.10					3154						8.6	3154	3.42	37.8	37.8			46.5	0.50	300	68.4	0.97	1.02	68%
Boviard Drive	MH.5C	MH.6C				198.90					16140						39.8	16140	2.75	155.3	155.3			195.1	0.30	600	336.3	1.19	1.20	58%
Boviard Drive	MH.6C	MH.7C	18.50	53.10		270.50		175	475	28460	44600						54.1	44600	2.31	361.2	361.2			415.3	0.30	750	609.8	1.38	1.45	68%
Boviard Drive	MH.7C	MH.8C				270.50					44600						54.1	44600	2.31	361.2	361.2			415.3	0.30	750	609.8	1.38	1.45	68%
Serve Street	MH.8C	MH.9C				270.50					44600						54.1	44600	2.31	361.2	361.2			415.3	0.30	750	609.8	1.38	1.45	68%
Area 51-3	MH.9C	MH.10C				313.20					51902						62.6	51902	2.25	409.2	409.2			471.8	0.30	825	786.2	1.47	1.51	60%
Area 51-3	MH.10C	EX.MH.A				313.20					51902						62.6	51902	2.25	409.2	409.2			471.8	0.30	825	786.2	1.47	1.51	60%
Area 51-3	EX.MH.A	EX.MH.5A				316.40					52179						63.3	52179	2.25	411.0	411.0			474.3	0.30	825	786.2	1.47	1.51	60%
Mississauga Road	EX.MH.5A	EX.MH.4A				772.80					121180		106.00			5300	175.8	126480	1.92	850.3	850.3			1026.1	0.80	1200	3487.1	3.08	2.62	29%
Internal - South of Bovaird	MH.A4	EX.MH.4A	29.80	4.70	6.10	40.60	70	175		5806	5806						8.1	5806	3.18	64.8	64.8			72.9	0.50	375	124.0	1.12	1.13	59%
Mississauga Road	EX.MH.4A	EX.MH.3A				813.40	70	175			126986		106.00			5300	183.9	132286	1.90	882.3	882.3			1066.2	0.80	1200	3487.1	3.08	2.68	31%
Heritage Road	MH.D1	MH.D2					70	175																0.50	250	42.0	0.86	0.22		

STREET	FROM MH	TO MH	RESIDENTIAL											COMMERCIAL/INDUSTRIAL/INSTITUTIONAL					FLOW CALCULATIONS							PIPE DATA							
			LOW DENSITY AREA (ha)	MEDIUM DENSITY AREA (ha)	HIGH DENSITY AREA (ha)	ACC. AREA (ha)	LOW	MEDIUM	MEDIUM	HIGH	HIGH	POP	ACCUM. RES. POP.	AREA (ha)	ACC. AREA (ha)	EQUIV. POP. (p/ha)	FLOW RATE (l/s/ha)	EQUIV. POP.	ACCUM. EQUIV. POP.	INFILTRATION (l/s)	TOTAL ACCUM. POP.	PEAKING FACTOR	RES. FLOW (l/s)	MIN. RES. FLOW (l/s)	COMM. FLOW (l/s)	ACCUM. COMM. FLOW (l/s)	TOTAL FLOW (l/s)	SLOPE (%)	PIPE DIAMETER (mm)	FULL FLOW CAPACITY (l/s)	FULL FLOW VELOCITY (m/s)	ACTUAL VELOCITY (m/s)	PERCENT FULL (%)
							DENSITY (P/ha)	RES DENSITY (P/ha)	EMP DENSITY (P/ha)	RES DENSITY (P/unit)	EMP DENSITY (P/unit)																						
	MH.2D	MH.3D				91.00						19539							18.2	19539	2.66	182.3	182.3			200.5	0.30	525	235.6	1.09	1.21	85%	
Williams Parkway	MH.3D	MH.4D				91.00						19539							18.2	19539	2.66	182.3	182.3			200.5	0.30	525	235.6	1.09	1.21	85%	
Serve Street	Internal	MH.4D	16.60	17.40	9.60	43.60	70.2	245.7	266.8	666.8	724.2	12118	12118						8.7	12118	2.87	121.9	121.9			130.7	0.50	450	201.6	1.27	1.33	65%	
Williams Parkway	MH.4D	Ex.MH.3A				134.60							31657						26.9	31657	2.45	272.3	272.3			299.2	0.30	600	336.3	1.19	1.32	89%	
Mississauga Road	Ex.MH.3A	Ex.MH.2A				2412.86							315914	106.00			10319		503.8	326233	1.63	1868.9	1868.9			2372.6	0.80	1200	3487.1	3.08	3.24	68%	
Four X Development Inc.	Internal	Ex.MH.2A	11.00	21.80	5.90	38.70	70.2	245.7	266.8	666.8	724.2	10303	10303						7.7	10303	2.94	106.2	106.2			114.0	0.50	525	304.1	1.40	1.26	37%	
Mississauga Road	Ex.MH.2A	Ex.MH.1A	33.21			2484.77						1660	327877	106.00			10319		518.2	338196	1.63	1926.4	1926.4			2444.5	0.80	1200	3487.1	3.08	3.30	70%	

STREET	FROM MH	TO MH	RESIDENTIAL											COMMERCIAL/INDUSTRIAL/INSTITUTIONAL						FLOW CALCULATIONS							PIPE DATA						
			LOW DENSITY AREA (ha)	MEDIUM DENSITY AREA (ha)	HIGH DENSITY AREA (ha)	ACC. AREA (ha)	LOW	MEDIUM	MEDIUM	HIGH	HIGH	POP	ACCUM. RES. POP.	AREA (ha)	ACC. AREA (ha)	EQUIV. POP. (p/ha)	FLOW RATE (l/s/ha)	EQUIV. POP.	ACCUM. EQUIV. POP.	INFILTRATION (l/s)	TOTAL ACCUM. POP.	PEAKING FACTOR	RES. FLOW (l/s)	MIN. RES. FLOW (l/s)	COMM. FLOW (l/s)	ACCUM. COMM. FLOW (l/s)	TOTAL FLOW (l/s)	SLOPE (%)	PIPE DIAMETER (mm)	FULL FLOW CAPACITY (l/s)	FULL FLOW VELOCITY (m/s)	ACTUAL VELOCITY (m/s)	PERCENT FULL (%)
							DENSITY (P/ha)	RES DENSITY (P/ha)	EMP DENSITY (P/ha)	RES DENSITY (P/unit)	EMP DENSITY (P/unit)																						
	MH.2D	MH.3D				91.00						19539							18.2	19539	2.66	182.3	182.3			200.5	0.30	525	235.6	1.09	1.21	85%	
Williams Parkway	MH.3D	MH.4D				91.00						19539							18.2	19539	2.66	182.3	182.3			200.5	0.30	525	235.6	1.09	1.21	85%	
Serve Street	Internal	MH.4D	16.60	17.40	9.60	43.60	70.2	245.7	266.8	666.8	724.2	12118							8.7	12118	2.87	121.9	121.9			130.7	0.50	450	201.6	1.27	1.33	65%	
Williams Parkway	MH.4D	Ex.MH.3A				134.60													26.9	31657	2.45	272.3	272.3			299.2	0.30	600	336.3	1.19	1.32	89%	
Mississauga Road	Ex.MH.3A	Ex.MH.2A				948.00						198720		106.00				10319	210.8	209039	1.76	1288.3	1288.3			1499.1	0.80	1200	3487.1	3.08	2.87	43%	
Four X Development Inc.	Internal	Ex.MH.2A	11.00	21.80	5.90	38.70	70.2	245.7	266.8	666.8	724.2	10303							7.7	10303	2.94	106.2	106.2			114.0	0.50	525	304.1	1.40	1.26	37%	
Mississauga Road	Ex.MH.2A	Ex.MH.1A				986.70						209023		106.00				10319	218.5	219342	1.74	1340.8	1340.8			1559.4	0.80	1200	3487.1	3.08	2.96	45%	

WASTEWATER INFRASTRUCTURE - PROJECT COMPARISON
HERITAGE HEIGHTS
CITY OF BRAMPTON

July 14, 2021



2020 Wastewater Masterplan - Wastewater Projects Related to Heritage Heights						
Master Plan Project #	Project Name	Description	Size	Length	Anticipated Year in Service	Anticipated Cost
ST-046	600-mm Sanitary Sewer - Future Street (Mount Pleasant West)	Construction of a 600-mm sanitary sewer on a future street east of Winston Churchill Boulevard from Mayfield Road to 680 meters southerly.	600mm Dia	680m	2036	\$3,027,900
ST-045	600-mm Sanitary Sewer - Future Street (Mount Pleasant West)	Construction of a 600-mm sanitary sewer on a future street east of Winston Churchill Boulevard from Wanless Drive to 560 meters northerly.	600mm Dia	560m	2036	\$2,494,300
T-047	Northwest Brampton Sanitary Trunk Sewer (Phase 3)	Construction of a 675-mm sanitary trunk sewer on Wanless Drive from Heritage Road to 820 meters westerly.	675mm Dia	820m	2035	\$5,903,000
ST-048	600-mm Sanitary Sewer - Heritage Road (Mount Pleasant West)	Construction of a 600-mm sanitary sewer on Heritage Road from Mayfield Road to 620 meters southerly.	600mm Dia	620m	2035	\$3,685,700
ST-049	600-mm Sanitary Sewer - Heritage Road (Mount Pleasant West)	Construction of a 600-mm sanitary sewer on Heritage Road from Wanless Drive to 620 meters northerly.	600mm Dia	620m	2035	\$3,685,700
T-050	Northwest Brampton Sanitary Trunk Sewer (Phase 2)	Construction of a 750-mm sanitary trunk sewer on Heritage Road from the future Sandalwood Parkway extension to Wanless Drive.	750mm Dia	?	2034	\$8,807,500
T-051	Northwest Brampton Sanitary Trunk Sewer (Phase 1)	Construction of an 825-mm sanitary trunk sewer on the future extension of Sandalwood Parkway from Heritage Road to Mississauga Road.	825mm Dia	?	2032	\$13,898,900
ST-054	450-mm Sanitary Sewer - Future Street (Huttonville North)	Construction of a 450-mm sanitary sewer on a future street south of Wanless Drive from Winston Churchill Boulevard to 1310 meters south-easterly.	450mm Dia	1,310m	2031	\$5,429,400
T-060	Credit Valley Sanitary Trunk Sewer (Phase 3)	Construction of a 900-mm sanitary trunk sewer on Mississauga Road from Wanless Drive to Sandalwood Parkway.	900mm Dia	?	2030	\$7,245,000
T-059	Credit Valley Sanitary Trunk Sewer (Phase 3)	Construction of a 900-mm sanitary trunk sewer on Mississauga Road from Wanless Drive to Sandalwood Parkway.	900mm Dia	?	2032	\$2,834,100
T-058	Credit Valley Sanitary Trunk Sewer (Phase 4)	Construction of a 900-mm sanitary trunk sewer on Mississauga Road from Wanless Drive to 570 meters northerly.	900mm Dia	570m	2034	\$4,488,000
T-057	Credit Valley Sanitary Trunk Sewer (Phase 4)	Construction of a 900-mm sanitary trunk sewer on Mississauga Road from Mayfield Road to 680 meters southerly.	900mm Dia	680m	2034	\$5,354,600
NEW						
ST-052	525-mm Sanitary Sewer - Future Street (Huttonville North)	Construction of a 525-mm sanitary sewer on a future street north of Bovaird Drive, west of Heritage Road, from a future street to 830 meters northerly.	525mm Dia	830m	2031	\$3,651,200
ST-055	600-mm Sanitary Sewer - Future Street (Huttonville North)	Construction of a 600-mm sanitary sewer on a future street north of Bovaird Drive from Heritage Road to 340 meters westerly.	600mm Dia	340m	2029	\$1,831,200
ST-053	Heritage Heights Sanitary Trunk Sewer (Phase 2)	Construction of a 675-mm sanitary trunk sewer on Heritage Road from Bovaird Drive to 630 meters northerly.	675mm Dia	630m	2028	\$4,541,600
ST-056	375-mm Sanitary Sewer - Future Street (Huttonville North)	Construction of a 375-mm sanitary sewer on a future street south of Bovaird Drive from Heritage Road to 770 meters westerly.	375mm Dia	770m	2028	\$2,920,800
T-063	Heritage Heights Sanitary Trunk Sewer (Phase 1)	Construction of a 750-mm sanitary trunk sewer on the future extension of Williams Parkway from Mississauga Road to Heritage Road.	750mm Dia	?	2026	\$5,895,800
NEW						
T-062	Heritage Heights Sanitary Trunk Sewer (Phase 2)	Construction of a 675-mm sanitary trunk sewer on Heritage Road from Bovaird Drive to 880 meters southerly.	675mm Dia	880m	2028	\$6,912,400
T-064	Heritage Heights Sanitary Trunk Sewer (Phase 1)	Construction of a 750-mm sanitary trunk sewer on the future extension of Williams Parkway from Mississauga Road to Heritage Road.	750mm Dia	?	2026	\$1,882,000
T-065	Heritage Heights Sanitary Trunk Sewer (Phase 1)	Construction of an 825-mm sanitary trunk sewer on the future extension of Williams Parkway from Mississauga Road to Heritage Road.	825mm Dia	?	2026	\$4,187,200

PROPOSED ASSUMPTION AND COST (***)BASED ON REGION OF 2020 PEEL ESTIMATING FRAMEWORK)												
SUB-TRUNK REFERENCE	MH REFERENCE	Description	Size	Length	Estimate Depth	Condition	Proposed Year in Service	Anticipated Cost (Region Estimating Tool)				
A	NORTH SUB-TRUNK 1	MH 1B to MH 3B	Construction of a 600-mm sanitary sewer on future Wanless Drive east of Winston Churchill Boulevard from Mayfield Road to Heritage Road	600mm Dia	1,850m	7-12m	Greenfield (Open Cut)	TBD	\$10,088,700			
B	NORTH SUB-TRUNK 2	MH 2B to MH 3B	Construction of a 750-mm sanitary sewer on Heritage Road from Mayfield Road to 620 meters southerly.	750mm Dia	620m	8-12m	Suburban (Trenchless)	TBD	\$10,389,800			
C		MH 5B to MH 3B	Construction of a 750-mm sanitary sewer on existing Heritage Road from Wanless Drive to 630 meters northerly.	750mm Dia	630m	6-9m	Suburban (Trenchless)	TBD	\$10,557,400			
D		MH 5B to MH 3B	Construction of a 900-mm sanitary trunk sewer on Heritage Road from the future Sandalwood Parkway extension to Wanless Drive.	900mm Dia	1,060m	6-8m	Suburban (Open Cut)	TBD	\$9,282,400			
E	NORTH SUB-TRUNK 3	MH 5B to Ex. MH 7A	Construction of a 975-mm sanitary trunk sewer on the future extension of Sandalwood Parkway from Heritage Road to Mississauga Road.	975mm Dia	1,370m	9-16m	Greenfield (Open Cut / Trenchless)	TBD	\$16,571,300			
F		MH 5B to MH 4B	Construction of a 450-mm sanitary sewer on the future extension of Sandalwood Parkway from Heritage Road to 610m Westerly (to Tennis Street).	450mm Dia	610m	6-8m	Greenfield (Open Cut) 1x Creek Crossing	TBD	\$3,157,700			
G	MISSISSAUGA TRUNK SANITARY	MH 8A to Ex. MH 7A	Construction of a 1050-mm sanitary trunk sewer on Mississauga Road from Wanless Drive to Sandalwood Parkway.	1050mm Dia	1,240m	21-25m	Suburban (Trenchless)	TBD	\$27,895,900			
H		MH 8A to MH 9A	Construction of a 1050-mm sanitary trunk sewer on Mississauga Road from Wanless Drive to 570 meters northerly.	1050mm Dia	570m	17-20m	Suburban (Trenchless)	TBD	\$13,348,600			
I		MH 8A to MH 9A	Construction of a 1050-mm sanitary trunk sewer on Mississauga Road from Mayfield Road to 680 meters southerly.	1050mm Dia	680m	17m	Suburban (Trenchless)	TBD	\$15,297,700			
J		MH 8A to MH A1	Construction of a 450-mm sanitary sewer on Existing Wanless Drive from Mississauga Road to 250m Westerly (to Serve Street).	450mm Dia	250m	10m	Greenfield (Open Cut)	TBD	\$1,205,700			
K	SOUTH SUB-TRUNK 1	MH 3C to MH 1C	Construction of a 375-450-mm sanitary sewer on a future street north of Bovaird Drive from Heritage Road to 1230 meters westerly.	375-450 mm Dia	1,230m	6-18m	Greenfield (Open Cut / Trenchless)	TBD	\$9,407,700			
L		MH 4C to MH C4	Construction of a 375-mm sanitary sewer on a future street north of Bovaird Drive from Heritage Road to 570 meters westerly.	375mm Dia	570m	10m	Greenfield (Open Cut)	TBD	\$2,649,000			
M		MH 5C to MH 3C	Construction of a 525-mm sanitary trunk sewer on Heritage Road from Bovaird Drive to 1570 meters northerly.	525mm Dia	1,570m	8-17m	Suburban (Trenchless) 1x Creek Crossing	TBD	\$22,074,900			
N	SOUTH SUB-TRUNK 3		Pump Station (Including Forcemain)	Construction of Pump Station and Forcemain south of Bovaird Drive	TBD	TBD	TBD	TBD	TBD			
O		Ex. MH 3A to MH 1D	Construction of a 525-600-mm sanitary trunk sewer on the future extension of Williams Parkway and Future Street from Mississauga Road to 1440 meters north-westerly.	525-600 mm Dia	1,440m	7-10m	Greenfield (Open Cut) 1x Creek Crossing	TBD	\$7,758,600			
P		Ex. MH 4A to MH A4	Construction of a 375-mm sanitary sewer approximately 570m south of Bovaird Drive. From Mississauga Road to 260 meters easterly.	375mm Dia	270m	10m	Greenfield (Open Cut)	TBD	\$1,254,800			
Q	SOUTH SUB-TRUNK 2	Ex. MH 5C to MH 7C	Construction of a 600-750-mm sanitary trunk sewer on existing Bovaird Drive from Heritage Road to Williams Parkway.	600-750 mm Dia	640m	9-14m	Suburban (Trenchless) 2x Crossings	TBD	\$11,673,300			
R		Ex. MH 7C to MH 8C	Construction of a 750-mm sanitary trunk sewer on existing Bovaird Drive from Williams Parkway to 490 meters easterly.	750mm Dia	490m	14-18m	Suburban (Trenchless)	TBD	\$9,047,700			
S		Ex. MH 5A to MH 8C	Construction of a 750-mm sanitary trunk sewer on the future streets west of Mississauga Road and North of Bovaird Drive from Mississauga Road to Bovaird Drive.	750-825 mm Dia	520m	16-18m	Greenfield (Trenchless)	TBD	\$9,580,400			

COST ESTIMATE IS BASED ON 2020 WATER AND WASTEWATER MASTER PLAN COST ESTIMATION FRAMEWORK - PREPARED FOR ORDER OF MAGNITUDE COMPARISON ONLY -

REFER TO FIGURE 4A FOR EXTERNAL DRAINAGE AREAS

TOWN OF CALEDON

TOWN OF HALTON HILLS

LEGEND:

- HERITAGE HEIGHTS STUDY AREA
- LOW DENSITY RESIDENTIAL
- MEDIUM DENSITY RESIDENTIAL
- HIGH DENSITY RESIDENTIAL
- INDUSTRIAL & COMMERCIAL
- HOSPITAL DISTRICT
- NATURAL HERITAGE SYSTEM
- STORMWATER MANAGEMENT POND
- EXISTING WATERCOURSE
- POTENTIAL WATERCOURSE LOWERING
- POTENTIAL WATERCOURSE REALIGNMENT
- SIGNIFICANT WETLANDS (MNR 2021) - SAVANTA
- WOODLOT
- EXISTING LOCAL SAN SEWER AND FLOW DIRECTION
- EXISTING TRUNK SAN SEWER AND FLOW DIRECTION
- PROPOSED TRUNK SAN SEWER AND FLOW DIRECTION
- ALTERNATE TRUNK SAN SEWER AND FLOW DIRECTION
- PROPOSED LOCAL SAN SEWER AND FLOW DIRECTION
- SAN SEWER DRAINAGE BOUNDARY
- SAN SEWER DRAINAGE AREA CONTRIBUTING TO PUMP STATION
- SAN PUMP STATION
- SAN FORCEMAIN

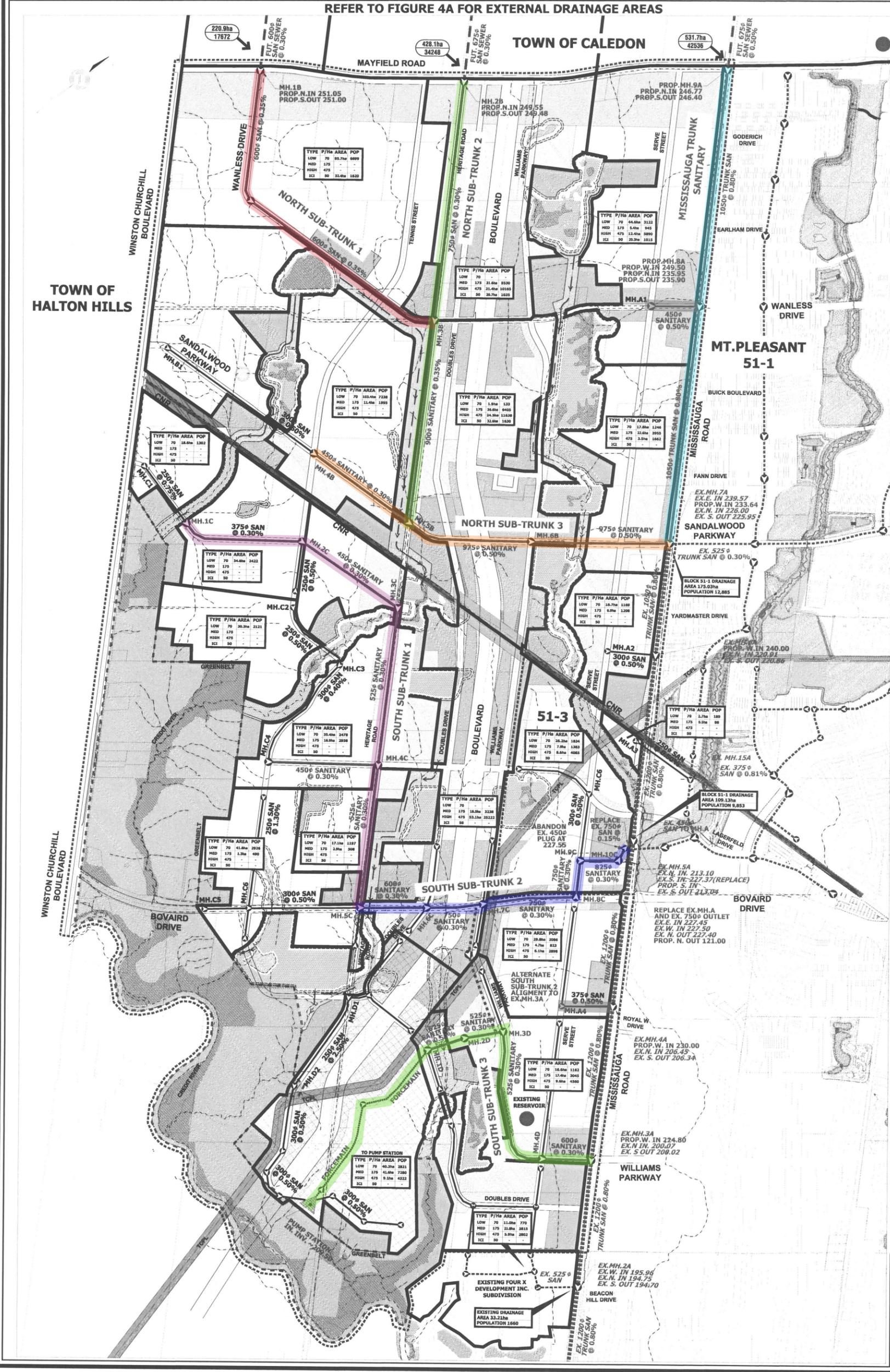
NOTES:

1. PROPOSED HERITAGE HEIGHTS SUB-TRUNK SANITARY SEWERS TO BE UTILIZED WITHIN EXISTING ROADS WHERE POSSIBLE. INTERNAL SEWER ALIGNMENTS SHOWN ON THIS DRAWING ARE BASED ON THE HIGH LEVEL CONCEPT PLAN PROVIDED BY CITY OF BRAMPTON.
2. MOUNT PLEASANT BLOCK 51-3 WILL PROCEED WITH DEVELOPMENT PRIOR TO HERITAGE HEIGHTS. REPLACEMENT OF EXISTING 750^{mm} SEWER CONNECTION TO EX. MISSISSAUGA TRUNK SEWER MH. 5A IS ANTICIPATED BY REGION AS PART OF BLOCK 51-3 WORKS. THEREFORE, PROPOSED ALIGNMENT OF THE SOUTH SUB-TRUNK 2 ALONG EXISTING HERITAGE ROAD, BOVAIRD DRIVE AND THROUGH 51-3 PROVIDES OPPORTUNITY TO SECURE THE WASTEWATER OUTFALL FOR A SIGNIFICANT PORTION OF THE FUTURE DEVELOPMENTS PRIOR TO FULL DEVELOPMENT OF HERITAGE HEIGHTS.
3. SHOULD WILLIAMS PARKWAY EXTENSION BE ADVANCED WITHIN THE HOLDOUT PROPERTIES SOUTH OF BOVAIRD DRIVE, SOUTH SUB-TRUNK 2 DRAINAGE COULD BE ALTERNATIVELY DIRECTED TO THE PROPOSED SOUTH SUB-TRUNK 3 FOR DISCHARGE TO EXISTING MISSISSAUGA MANHOLE 3A.
4. FUTURE 51-3 DEVELOPMENT AT THE SW CORNER OF CNR AND MISSISSAUGA ROAD WILL BE ACCOMMODATED TO THE EXISTING 375^{mm} SANITARY SEWER WITHIN BLOCK 51-1 (MH.13 TO EX. MH.15A) SUBJECT TO AGREEMENT BETWEEN 51-3 AND THE PROPERTY OWNER EAST OF MISSISSAUGA ROAD.
5. PUMP STATION AT THE SOUTH END OF HERITAGE HEIGHTS IS RECOMMENDED TO AVOID EXCESSIVELY DEEP SEWERS WITHIN FUTURE DEVELOPMENT GOVERNED BY THE EXISTING TOPOGRAPHY. FURTHER CONSULTATION WITH PEEL REGION IS NEEDED REGARDING THE PUMP STATION LOCATION AND CONTRIBUTING DRAINAGE.
6. REFER TO FIGURES 4B-4G FOR PRELIMINARY SUB-TRUNK PROFILES.

URBANTECH CONSULTING
URBANTECH

HERITAGE HEIGHTS
PRELIMINARY INTERNAL WASTEWATER SERVICING

PROJECT NO. 11-349 DATE: JULY 2021 SCALE: 1:6000 DWG NO. 4



**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

A

PROJECT NO.: Replaces ST-046 / ST-045 / T-047
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 600-mm sanitary sewer on future Wanless Drive east of Winston Churchill Boulevard from Mayfield Road to Heritage Road

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Greenfield (Open Cut)	Area Condition uplifts unit cost and restoration

		DEPTH
PROPOSED DIAMETER:	600mm	7-12m
TOTAL LENGTH:	1,850m	
	Tunnelled	0%
	Open Cut	100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	1850 m	\$3,234	\$5,982,900	
Pipe Construction - Tunneling			m	0 m	\$8,000	\$0	
Pipe Construction Uplift (Based on Area Conditions)	0%					\$0	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$598,290	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$658,119	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$7,239,309	
Geotechnical / Hydrogeological / Materials	0.5%					\$36,197	
Geotechnical Sub-Total Cost						\$36,197	
Property Requirements	1.0%					\$72,393	
Property Requirements Sub-Total						\$72,393	
Consultant Engineering/Design	15%					\$1,085,896	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$1,085,896	
In House Labour/Engineering/Wages/CA	8%					\$579,145	
In-house Labour/wages Sub-Total						\$579,145	
Project Contingency	10%					\$901,294	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$901,294	
Non-Refundable HST	1.76%					\$174,491	
Non-Refundable HST Sub-Total						\$174,491	
Total (2021) Dollars						\$10,088,700	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

B

PROJECT NO.: Replaces ST-048
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 750-mm sanitary sewer on Heritage Road from Mayfield Road to 620 meters southerly.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Medium	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	18%	
Area Condition:	Suburban (Trenchless)	Area Condition uplifts unit cost and restoration

		DEPTH
PROPOSED DIAMETER:	750mm	8-12m
TOTAL LENGTH:	620m	
	Tunnelled	620m
	Open Cut	0%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	0 m	\$3,757	\$0	
Pipe Construction - Tunneling			m	620 m	\$8,200	\$5,084,000	
Pipe Construction Uplift (Based on Area Conditions)	10%					\$508,400	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	15%		ea.			\$838,860	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$643,126	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$7,074,386	
Geotechnical / Hydrogeological / Materials	1.0%					\$70,744	
Geotechnical Sub-Total Cost						\$70,744	
Property Requirements	1.5%					\$106,116	
Property Requirements Sub-Total						\$106,116	
Consultant Engineering/Design	15%					\$1,061,158	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$1,061,158	
In House Labour/Engineering/Wages/CA	8%					\$565,951	
In-house Labour/wages Sub-Total						\$565,951	
Project Contingency	15%					\$1,331,753	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$1,331,753	
Non-Refundable HST	1.76%					\$179,698	
Non-Refundable HST Sub-Total						\$179,698	
Total (2021) Dollars						\$10,389,800	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

C

PROJECT NO.: Replaces ST-049
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 750-mm sanitary sewer on existing Heritage Road from Wanless Drive to 630 meters northerly.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Medium	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	18%	
Area Condition:	Suburban (Trenchless)	Area Condition uplifts unit cost and restoration

	PROPOSED DIAMETER:	750mm	DEPTH
TOTAL LENGTH:	630m		6-9m
	Tunnelled	630m	100%
	Open Cut		0%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	0 m	\$3,757	\$0	
Pipe Construction - Tunneling			m	630 m	\$8,200	\$5,166,000	
Pipe Construction Uplift (Based on Area Conditions)	10%					\$516,600	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	15%		ea.			\$852,390	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$653,499	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$7,188,489	
Geotechnical / Hydrogeological / Materials	1.0%					\$71,885	
Geotechnical Sub-Total Cost						\$71,885	
Property Requirements	1.5%					\$107,827	
Property Requirements Sub-Total						\$107,827	
Consultant Engineering/Design	15%					\$1,078,273	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$1,078,273	
In House Labour/Engineering/Wages/CA	8%					\$575,079	
In-house Labour/wages Sub-Total						\$575,079	
Project Contingency	15%					\$1,353,233	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$1,353,233	
Non-Refundable HST	1.76%					\$182,596	
Non-Refundable HST Sub-Total						\$182,596	
Total (2021) Dollars						\$10,557,400	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

D

PROJECT NO.: Replaces T-050
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 900-mm sanitary trunk sewer on Heritage Road from the future Sandalwood Parkway extension to Wanless Drive.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Medium	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	18%	
Area Condition:	Suburban (Open Cut)	Area Condition uplifts unit cost and restoration

	PROPOSED DIAMETER:	900mm	DEPTH
TOTAL LENGTH:	1,060m		6-8m
	Tunnelled		0%
	Open Cut	1,060m	100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	1060 m	\$4,285	\$4,542,100	
Pipe Construction - Tunneling			m	0 m	\$10,000	\$0	
Pipe Construction Uplift (Based on Area Conditions)	10%					\$454,210	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	15%		ea.			\$749,447	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$574,576	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$6,320,332	
Geotechnical / Hydrogeological / Materials	1.0%					\$63,203	
Geotechnical Sub-Total Cost						\$63,203	
Property Requirements	1.5%					\$94,805	
Property Requirements Sub-Total						\$94,805	
Consultant Engineering/Design	15%					\$948,050	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$948,050	
In House Labour/Engineering/Wages/CA	8%					\$505,627	
In-house Labour/wages Sub-Total						\$505,627	
Project Contingency	15%					\$1,189,803	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$1,189,803	
Non-Refundable HST	1.76%					\$160,544	
Non-Refundable HST Sub-Total						\$160,544	
Total (2021) Dollars						\$9,282,400	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

E

PROJECT NO.: Replaces T-051
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 975-mm sanitary trunk sewer on the future extension of Sandalwood Parkway from Heritage Road to Mississauga Road.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Greenfield (Open Cut / Trenchless)	Area Condition uplifts unit cost and restoration

	PROPOSED DIAMETER:	975mm	DEPTH	9-16m
TOTAL LENGTH:		1,370m		
	Tunnelled	720m		53%
	Open Cut	650m		47%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	650 m	\$4,453	\$2,894,450	
Pipe Construction - Tunneling			m	720 m	\$10,200	\$7,344,000	
Pipe Construction Uplift (Based on Area Conditions)	0%					\$0	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$1,023,845	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$1,126,230	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$12,388,525	
Geotechnical / Hydrogeological / Materials	0.5%					\$61,943	
Geotechnical Sub-Total Cost						\$61,943	
Property Requirements	1.0%					\$123,885	
Property Requirements Sub-Total						\$123,885	
Consultant Engineering/Design	12%					\$1,486,623	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$1,486,623	
In House Labour/Engineering/Wages/CA	6%					\$743,311	
In-house Labour/wages Sub-Total						\$743,311	
Project Contingency	10%					\$1,480,429	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$1,480,429	
Non-Refundable HST	1.76%					\$286,611	
Non-Refundable HST Sub-Total						\$286,611	
Total (2021) Dollars						\$16,571,300	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

F

PROJECT NO.: Replaces ST-054
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 450-mm sanitary sewer on the future extension of Sandalwood Parkway from Heritage Road to 610m Westerly (to Tennis Street).

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Greenfield (Open Cut) 1x Creek Crossing	Area Condition uplifts unit cost and restoration

		DEPTH
PROPOSED DIAMETER:	450mm	6-8m
TOTAL LENGTH:	610m	
	Tunnelled	0%
	Open Cut	100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	610 m	\$2,860	\$1,744,600	
Pipe Construction - Tunneling			m	0 m	\$6,400	\$0	
Pipe Construction Uplift (Based on Area Conditions)	0%					\$0	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.	1	\$128,000.00	\$128,000	
Major Creek Crossings			ea.		\$960,000.00	\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$187,260	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$205,986	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$2,265,846	
Geotechnical / Hydrogeological / Materials	0.5%					\$11,329	
Geotechnical Sub-Total Cost						\$11,329	
Property Requirements	1.0%					\$22,658	
Property Requirements Sub-Total						\$22,658	
Consultant Engineering/Design	15%					\$339,877	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$339,877	
In House Labour/Engineering/Wages/CA	8%					\$181,268	
In-house Labour/wages Sub-Total						\$181,268	
Project Contingency	10%					\$282,098	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$282,098	
Non-Refundable HST	1.76%					\$54,614	
Non-Refundable HST Sub-Total						\$54,614	
Total (2021) Dollars						\$3,157,700	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

G

PROJECT NO.: Replaces T-060 / T-059
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 1050-mm sanitary trunk sewer on Mississauga Road from Wanless Drive to Sandalwood Parkway.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	High	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	20%	
Area Condition:	Suburban (Trenchless)	Area Condition uplifts unit cost and restoration

		DEPTH
PROPOSED DIAMETER:	1050mm	21-25m
TOTAL LENGTH:	1,240m	
	Tunnelled	100%
	Open Cut	0%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	0 m	\$4,776	\$0	
Pipe Construction - Tunneling			m	1240 m	\$10,400	\$12,896,000	
Pipe Construction Uplift (Based on Area Conditions)	10%					\$1,289,600	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	20%		ea.			\$2,837,120	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$1,702,272	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$18,724,992	
Geotechnical / Hydrogeological / Materials	2.0%					\$374,500	
Geotechnical Sub-Total Cost						\$374,500	
Property Requirements	2.0%					\$374,500	
Property Requirements Sub-Total						\$374,500	
Consultant Engineering/Design	12%					\$2,246,999	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$2,246,999	
In House Labour/Engineering/Wages/CA	6%					\$1,123,500	
In-house Labour/wages Sub-Total						\$1,123,500	
Project Contingency	20%					\$4,568,898	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$4,568,898	
Non-Refundable HST	1.76%					\$482,476	
Non-Refundable HST Sub-Total						\$482,476	
Total (2021) Dollars						\$27,895,900	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

H

PROJECT NO.: Replaces T-058
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 1050-mm sanitary trunk sewer on Mississauga Road from Wanless Drive to 570 meters northerly.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	High	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	20%	
Area Condition:	Suburban (Trenchless)	Area Condition uplifts unit cost and restoration

		DEPTH
PROPOSED DIAMETER:	1050mm	17-20m
TOTAL LENGTH:	570m	
	Tunnelled	570m
	Open Cut	0%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	0 m	\$4,776	\$0	
Pipe Construction - Tunneling			m	570 m	\$10,400	\$5,928,000	
Pipe Construction Uplift (Based on Area Conditions)	10%					\$592,800	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	20%		ea.			\$1,304,160	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$782,496	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$8,607,456	
Geotechnical / Hydrogeological / Materials	2.0%					\$172,149	
Geotechnical Sub-Total Cost						\$172,149	
Property Requirements	2.0%					\$172,149	
Property Requirements Sub-Total						\$172,149	
Consultant Engineering/Design	15%					\$1,291,118	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$1,291,118	
In House Labour/Engineering/Wages/CA	8%					\$688,596	
In-house Labour/wages Sub-Total						\$688,596	
Project Contingency	20%					\$2,186,294	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$2,186,294	
Non-Refundable HST	1.76%					\$230,873	
Non-Refundable HST Sub-Total						\$230,873	
Total (2021) Dollars						\$13,348,600	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**



PROJECT NO.: Replaces T-057
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 1050-mm sanitary trunk sewer on Mississauga Road from Mayfield Road to 680 meters southerly.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	High	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	20%	
Area Condition:	Suburban (Trenchless)	Area Condition uplifts unit cost and restoration

		DEPTH
PROPOSED DIAMETER:	1050mm	17m
TOTAL LENGTH:	680m	
	Tunnelled	680m 100%
	Open Cut	0%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	0 m	\$4,776	\$0	
Pipe Construction - Tunneling			m	680 m	\$10,400	\$7,072,000	
Pipe Construction Uplift (Based on Area Conditions)	10%					\$707,200	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	20%		ea.			\$1,555,840	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$933,504	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$10,268,544	
Geotechnical / Hydrogeological / Materials	2.0%					\$205,371	
Geotechnical Sub-Total Cost						\$205,371	
Property Requirements	2.0%					\$205,371	
Property Requirements Sub-Total						\$205,371	
Consultant Engineering/Design	12%					\$1,232,225	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$1,232,225	
In House Labour/Engineering/Wages/CA	6%					\$616,113	
In-house Labour/wages Sub-Total						\$616,113	
Project Contingency	20%					\$2,505,525	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$2,505,525	
Non-Refundable HST	1.76%					\$264,583	
Non-Refundable HST Sub-Total						\$264,583	
Total (2021) Dollars						\$15,297,700	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

J

PROJECT NO.: NEW
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 450-mm sanitary sewer on Existing Wanless Drive from Mississauga Road to 250m Westerly (to Serve Street).

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Greenfield (Open Cut)	Area Condition uplifts unit cost and restoration

		DEPTH
PROPOSED DIAMETER:	450mm	10m
TOTAL LENGTH:	250m	
Tunnelled		0%
Open Cut	250m	100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	250 m	\$2,860	\$715,000	
Pipe Construction - Tunneling			m	0 m	\$6,400	\$0	
Pipe Construction Uplift (Based on Area Conditions)	0%					\$0	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$71,500	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$78,650	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$865,150	
Geotechnical / Hydrogeological / Materials	0.5%					\$4,326	
Geotechnical Sub-Total Cost						\$4,326	
Property Requirements	1.0%					\$8,652	
Property Requirements Sub-Total						\$8,652	
Consultant Engineering/Design	15%					\$129,773	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$129,773	
In House Labour/Engineering/Wages/CA	8%					\$69,212	
In-house Labour/wages Sub-Total						\$69,212	
Project Contingency	10%					\$107,711	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$107,711	
Non-Refundable HST	1.76%					\$20,853	
Non-Refundable HST Sub-Total						\$20,853	
Total (2021) Dollars						\$1,205,700	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

K

PROJECT NO.: Replaces ST-052
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 375-450-mm sanitary sewer on a future street north of Bovaird Drive from Heritage Road to 1230 meters westerly.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Greenfield (Open Cut / Trenchless)	Area Condition uplifts unit cost and restoration

		DEPTH
PROPOSED DIAMETER:	375-450mm Dia	6-18m
TOTAL LENGTH:	1,230m	
	Tunnelled	600m 49%
	Open Cut	630m 51%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	630 m	\$2,808	\$1,769,040	
Pipe Construction - Tunneling			m	600 m	\$6,350	\$3,810,000	
Pipe Construction Uplift (Based on Area Conditions)	0%					\$0	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$557,904	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$613,694	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$6,750,638	
Geotechnical / Hydrogeological / Materials	0.5%					\$33,753	
Geotechnical Sub-Total Cost						\$33,753	
Property Requirements	1.0%					\$67,506	
Property Requirements Sub-Total						\$67,506	
Consultant Engineering/Design	15%					\$1,012,596	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$1,012,596	
In House Labour/Engineering/Wages/CA	8%					\$540,051	
In-house Labour/wages Sub-Total						\$540,051	
Project Contingency	10%					\$840,454	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$840,454	
Non-Refundable HST	1.76%					\$162,712	
Non-Refundable HST Sub-Total						\$162,712	
Total (2021) Dollars						\$9,407,700	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**



PROJECT NO.: Replaces ST-055
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 375-mm sanitary sewer on a future street north of Bovaird Drive from Heritage Road to 570 meters westerly.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Greenfield (Open Cut)	Area Condition uplifts unit cost and restoration

		DEPTH
PROPOSED DIAMETER:	375mm	10m
TOTAL LENGTH:	570m	
	Tunnelled	0%
	Open Cut	100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	570 m	\$2,756	\$1,570,920	
Pipe Construction - Tunneling			m	0 m	\$6,300	\$0	
Pipe Construction Uplift (Based on Area Conditions)	0%					\$0	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$157,092	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$172,801	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$1,900,813	
Geotechnical / Hydrogeological / Materials	0.5%					\$9,504	
Geotechnical Sub-Total Cost						\$9,504	
Property Requirements	1.0%					\$19,008	
Property Requirements Sub-Total						\$19,008	
Consultant Engineering/Design	15%					\$285,122	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$285,122	
In House Labour/Engineering/Wages/CA	8%					\$152,065	
In-house Labour/wages Sub-Total						\$152,065	
Project Contingency	10%					\$236,651	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$236,651	
Non-Refundable HST	1.76%					\$45,816	
Non-Refundable HST Sub-Total						\$45,816	
Total (2021) Dollars						\$2,649,000	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

M

PROJECT NO.: Replaces ST-053
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 525-mm sanitary trunk sewer on Heritage Road from Bovaird Drive to 1570 meters northerly.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	High	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	20%	
Area Condition:	Suburban (Trenchless) 1x Creek Crossing	Area Condition uplifts unit cost and restoration

		DEPTH
PROPOSED DIAMETER:	525mm	8-17m
TOTAL LENGTH:	1,570m	
	Tunnelled	100%
	Open Cut	0%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	0 m	\$2,955	\$0	
Pipe Construction - Tunneling			m	1570 m	\$6,500	\$10,205,000	
Pipe Construction Uplift (Based on Area Conditions)	10%					\$1,020,500	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	20%		ea.			\$2,245,100	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$1,347,060	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$14,817,660	
Geotechnical / Hydrogeological / Materials	2.0%					\$296,353	
Geotechnical Sub-Total Cost						\$296,353	
Property Requirements	2.0%					\$296,353	
Property Requirements Sub-Total						\$296,353	
Consultant Engineering/Design	12%					\$1,778,119	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$1,778,119	
In House Labour/Engineering/Wages/CA	6%					\$889,060	
In-house Labour/wages Sub-Total						\$889,060	
Project Contingency	20%					\$3,615,509	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$3,615,509	
Non-Refundable HST	1.76%					\$381,798	
Non-Refundable HST Sub-Total						\$381,798	
Total (2021) Dollars						\$22,074,900	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**



PROJECT NO.: Replaces ST-056
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of Pump Station and Forcemain south of Bovaird Drive

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	High	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	20%	
Area Condition:	TBD	Area Condition uplifts unit cost and restoration

		DEPTH
PROPOSED DIAMETER:	TBD	TBD
TOTAL LENGTH:	TBD	
	Tunnelled	#VALUE!
	Open Cut	#VALUE!

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	0 m		\$0	
Pipe Construction - Tunneling			m	0 m		\$0	
Pipe Construction Uplift (Based on Area Conditions)	0%					\$0	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	20%		ea.			\$0	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$0	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$0	
Geotechnical / Hydrogeological / Materials	2.0%					\$0	
Geotechnical Sub-Total Cost						\$0	
Property Requirements	2.0%					\$0	
Property Requirements Sub-Total						\$0	
Consultant Engineering/Design	15%					\$0	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$0	
In House Labour/Engineering/Wages/CA	8%					\$0	
In-house Labour/wages Sub-Total						\$0	
Project Contingency	20%					\$0	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$0	
Non-Refundable HST	1.76%					\$0	
Non-Refundable HST Sub-Total						\$0	
Total (2021) Dollars						\$0	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**



PROJECT NO.: Replaces T-063
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 525-600-mm sanitary trunk sewer on the future extension of Williams Parkway and Future Street from Mississauga Road to 1440 meters north-westerly.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Greenfield (Open Cut) 1x Creek Crossing	Area Condition uplifts unit cost and restoration

		DEPTH
PROPOSED DIAMETER:	525-600 mm Dia	7-10m
TOTAL LENGTH:	1,440m	
	Tunnelled	0%
	Open Cut	100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	1440 m	\$3,095	\$4,456,080	
Pipe Construction - Tunneling			m	0 m	\$7,250	\$0	
Pipe Construction Uplift (Based on Area Conditions)	0%					\$0	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.	1	\$145,000.00	\$145,000	
Major Creek Crossings			ea.		\$1,087,500.00	\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$460,108	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$506,119	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$5,567,307	
Geotechnical / Hydrogeological / Materials	0.5%					\$27,837	
Geotechnical Sub-Total Cost						\$27,837	
Property Requirements	1.0%					\$55,673	
Property Requirements Sub-Total						\$55,673	
Consultant Engineering/Design	15%					\$835,096	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$835,096	
In House Labour/Engineering/Wages/CA	8%					\$445,385	
In-house Labour/wages Sub-Total						\$445,385	
Project Contingency	10%					\$693,130	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$693,130	
Non-Refundable HST	1.76%					\$134,190	
Non-Refundable HST Sub-Total						\$134,190	
Total (2021) Dollars						\$7,758,600	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

P

PROJECT NO.: NEW
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 375-mm sanitary sewer approximately 570m south of Bovaird Drive. From Mississauga Road to 260 meters easterly.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Greenfield (Open Cut)	Area Condition uplifts unit cost and restoration

	PROPOSED DIAMETER:	DEPTH
	375mm	10m
TOTAL LENGTH:	270m	
	Tunnelled	0%
	Open Cut	270m 100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	270 m	\$2,756	\$744,120	
Pipe Construction - Tunneling			m	0 m	\$6,300	\$0	
Pipe Construction Uplift (Based on Area Conditions)	0%					\$0	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$74,412	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$81,853	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$900,385	
Geotechnical / Hydrogeological / Materials	0.5%					\$4,502	
Geotechnical Sub-Total Cost						\$4,502	
Property Requirements	1.0%					\$9,004	
Property Requirements Sub-Total						\$9,004	
Consultant Engineering/Design	15%					\$135,058	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$135,058	
In House Labour/Engineering/Wages/CA	8%					\$72,031	
In-house Labour/wages Sub-Total						\$72,031	
Project Contingency	10%					\$112,098	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$112,098	
Non-Refundable HST	1.76%					\$21,702	
Non-Refundable HST Sub-Total						\$21,702	
Total (2021) Dollars						\$1,254,800	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**



PROJECT NO.: Replaces T-062
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 600-750-mm sanitary trunk sewer on existing Bovaird Drive from Heritage Road to Williams Parkway.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	High	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	20%	
Area Condition:	Suburban (Trenchless) 2x Crossings	Area Condition uplifts unit cost and restoration

	DEPTH
PROPOSED DIAMETER:	600-750 mm Dia 9-14m
TOTAL LENGTH:	640m
Tunnelled	640m 100%
Open Cut	0%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	0 m	\$3,496	\$0	
Pipe Construction - Tunneling			m	640 m	\$8,100	\$5,184,000	
Pipe Construction Uplift (Based on Area Conditions)	10%					\$518,400	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	20%		ea.			\$1,140,480	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$684,288	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$7,527,168	
Geotechnical / Hydrogeological / Materials	2.0%					\$150,543	
Geotechnical Sub-Total Cost						\$150,543	
Property Requirements	2.0%					\$150,543	
Property Requirements Sub-Total						\$150,543	
Consultant Engineering/Design	15%					\$1,129,075	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$1,129,075	
In House Labour/Engineering/Wages/CA	8%					\$602,173	
In-house Labour/wages Sub-Total						\$602,173	
Project Contingency	20%					\$1,911,901	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$1,911,901	
Non-Refundable HST	1.76%					\$201,897	
Non-Refundable HST Sub-Total						\$201,897	
Total (2021) Dollars						\$11,673,300	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

R

PROJECT NO.: Replaces T-064
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 750-mm sanitary trunk sewer on existing Bovaird Drive from Williams Parkway to 490 meters easterly.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	High	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	20%	
Area Condition:	Suburban (Trenchless)	Area Condition uplifts unit cost and restoration

	PROPOSED DIAMETER:	750mm Dia	DEPTH	14-18m
TOTAL LENGTH:		490m		
	Tunnelled	490m		100%
	Open Cut			0%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	0 m	\$3,757	\$0	
Pipe Construction - Tunneling			m	490 m	\$8,200	\$4,018,000	
Pipe Construction Uplift (Based on Area Conditions)	10%					\$401,800	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	20%		ea.			\$883,960	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$530,376	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$5,834,136	
Geotechnical / Hydrogeological / Materials	2.0%					\$116,683	
Geotechnical Sub-Total Cost						\$116,683	
Property Requirements	2.0%					\$116,683	
Property Requirements Sub-Total						\$116,683	
Consultant Engineering/Design	15%					\$875,120	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$875,120	
In House Labour/Engineering/Wages/CA	8%					\$466,731	
In-house Labour/wages Sub-Total						\$466,731	
Project Contingency	20%					\$1,481,871	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$1,481,871	
Non-Refundable HST	1.76%					\$156,486	
Non-Refundable HST Sub-Total						\$156,486	
Total (2021) Dollars						\$9,047,700	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

S

PROJECT NO.: Replaces T-065
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 750-mm sanitary trunk sewer on the future streets west of Mississauga Road and North of Bovaird Drive from Mississauga Road to Bovaird Drive.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	High	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	20%	
Area Condition:	Greenfield (Trenchless)	Area Condition uplifts unit cost and restoration

	DEPTH	
PROPOSED DIAMETER:	750-825 mm Dia	16-18m
TOTAL LENGTH:	520m	
	Tunnelled	520m
	Open Cut	0%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	0 m		\$0	
Pipe Construction - Tunneling			m	520 m	\$9,000	\$4,680,000	
Pipe Construction Uplift (Based on Area Conditions)	0%					\$0	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	20%		ea.			\$936,000	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$561,600	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$6,177,600	
Geotechnical / Hydrogeological / Materials	2.0%					\$123,552	
Geotechnical Sub-Total Cost						\$123,552	
Property Requirements	2.0%					\$123,552	
Property Requirements Sub-Total						\$123,552	
Consultant Engineering/Design	15%					\$926,640	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$926,640	
In House Labour/Engineering/Wages/CA	8%					\$494,208	
In-house Labour/wages Sub-Total						\$494,208	
Project Contingency	20%					\$1,569,110	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$1,569,110	
Non-Refundable HST	1.76%					\$165,698	
Non-Refundable HST Sub-Total						\$165,698	
Total (2021) Dollars						\$9,580,400	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

APPENDIX B
**WATER MODELLING SUMMARY REPORT AND
COST ESTIMATES**

DRAFT

AECOM Imagine it.
Delivered.

Water Hydraulic Analysis for Heritage Heights Community

Technical Memorandum

Urbantech

Project number: 60640248

May 6, 2021

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The attached Report (the "Report") has been prepared by AECOM Canada Ltd. ("AECOM") for the benefit of the Client ("Client") in accordance with the agreement between AECOM and Client, including the scope of work detailed therein (the "Agreement").

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- represents AECOM's professional judgement in light of the Limitations and industry standards for the preparation of similar reports;
- may be based on information provided to AECOM which has not been independently verified;
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued;
- must be read as a whole and sections thereof should not be read out of such context;
- was prepared for the specific purposes described in the Report and the Agreement; and
- in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time.

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1. Introduction

AECOM was retained by Urbantech Consulting (Urbantech) for providing consulting services to perform hydraulic analysis for Heritage Heights Community located in the City of Brampton, Region of Peel. Heritage Heights Community is bounded by Mayfield Road to the North, Mississauga Road to the East, Credit River System to the South and Winston Churchill Boulevard to the West. Figure 1 shows the boundary of Heritage Heights Community (Study Area).

The Study Area includes approximately 1618 hectares (3998 acres) for future developments and these lands area also known as Secondary Plan Areas 52 and 53. The Study Area largely falls within Zone 6 of the South Peel lake based water supply system and the southern and northern limit of the areas falls within Zone 5 and Zone 7, respectively. The South Peel water supply system is essentially divided into East, Central and a West systems. The west system will be responsible for servicing the Study Area; which the local water service will be provided by the following pumping facilities:

- Meadowvale Pumping Station – Zone 5
- West Brampton Pumping Station – Zone 5 and Zone 6
- Alloo Pumping Station – Zone 6 and Zone 7

All relevant information including existing water servicing reports for the area along with the topographical information, growth forecasts for the Study Area and Peel Region's Water and Wastewater Master Servicing Plan in (2019) will be used as a basis for completing this hydraulic analysis study.

The main focus of the hydraulic analysis is to determine infrastructure implications for the overall South Peel West water supply system and the following system assessments are to be completed.

- Water Treatment Plant capacity assessment,
- Water Storage capacity assessment,
- Pumping capacity assessment, and
- Transmission main capacity assessment.

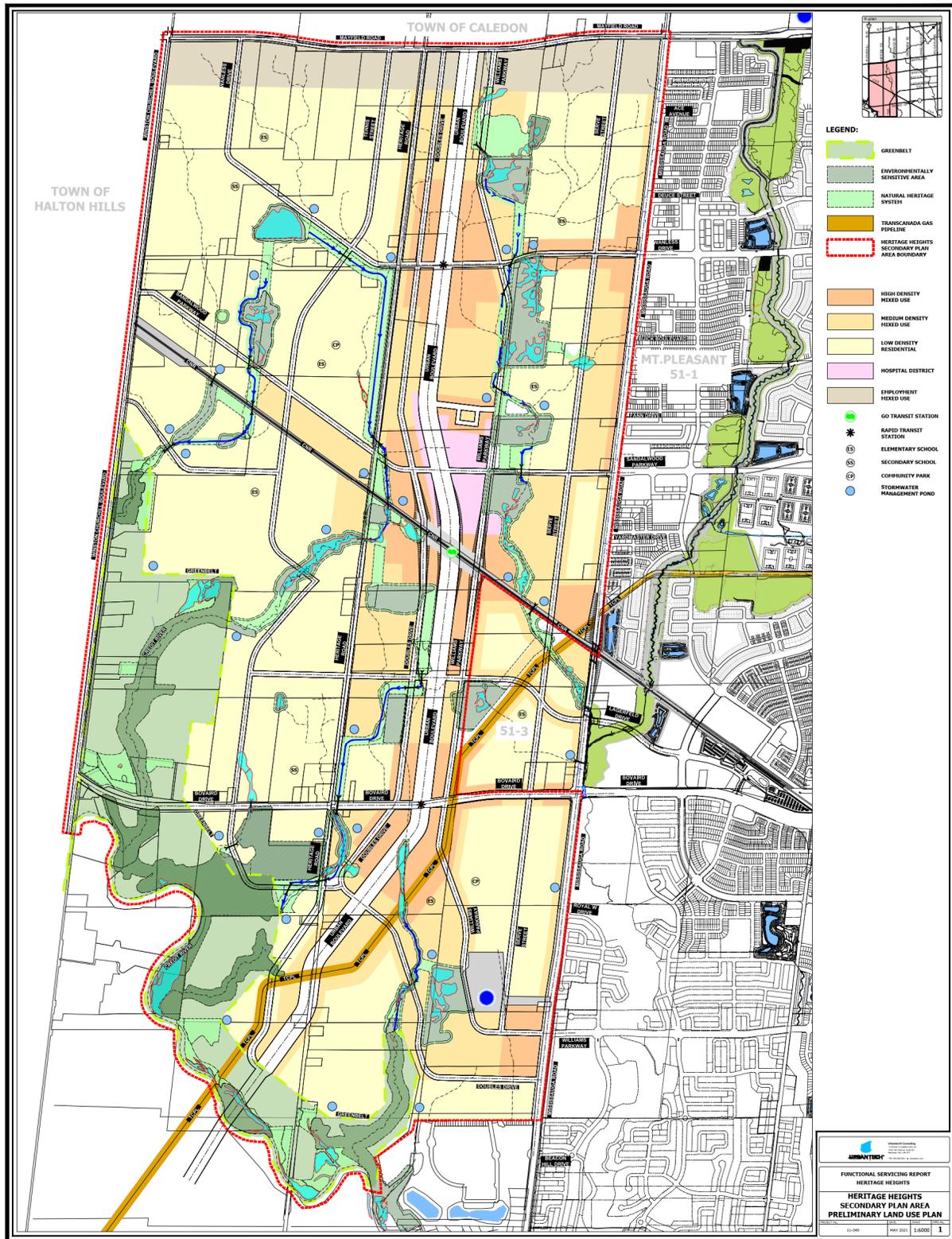


Figure 1: Study Area

2. Population Projection and Water Demand Forecast

Based on the information provided to AECOM, the desired populations for the Study Area were:

- Residential Population = 124,000
- Employment Population = 47,000

The above noted population projections were further sub-divided based on the location of the developments, landuse type and pressures zone boundary. Appendix A shows the development location and landuse type.

In estimating the population for each development location, the population density as per Region's Sanitary Sewer Design Guidelines was utilized. Since the Region's population density would not result in the desired population for the Study Area and the landuse type category as per Region's Sanitary Sewer Design Guidelines was different than those presented in Appendix A, assumptions and adjustments were made in order to achieve the desired population projections. Table 1 summarizes the assumptions and adjustments applied.

Table 1: Population Density

Region's Design Guidelines		Study Area	
Landuse	Population Density	Landuse	Population Density
Single Family (> 10m frontage)	50 ppl/ha	Low Residential	70.2 ppl/ha
Single Family (<10m frontage)	70 ppl/ha	Light Residential	98.3 ppl/ha
Semi-detached	70 ppl/ha	n/a	-
Row Dwellings	175 ppl/ha	Med Mixed Use*	RES: 245.7 ppl/ha EMP: 266.8 ppl/ha
Apartments	475 ppl/ha	High Mixed Use*	RES: 666.8 ppl/ha EMP: 724.2 ppl/ha
Light Industry	70 ppl/ha	Industrial	106.7 ppl/ha
Commercial	50 ppl/ha	Community Facility	76.2 ppl/ha
Commercial	50 ppl/ha	Wellness	76.2 ppl/ha

* Residential vs. Employment = 70% vs. 30%

By applying the population density for the Study Area as presented in Table 1, Table 2 summarizes the population projections by pressure zone for the Study Area and the detailed population projections breakdown is presented in Appendix B.

Table 2: Population Projection for Study Area

Pressure Zone	Region's Master Plan Study 2019		Study Area	
	Residential Population (2041)	Employment Population (2041)	Residential Population	Employment Population
5W	0	0	4,840	1,593
6W	39,751	11,778	119,160	38,607
7W	0	4,754	0	6,761
Total Population:	39,064	33,601	124,000	47,000
Population Density*	56.3 ppl/ha	196.9 ppl/ha	178.7 ppl/ha	275.3 ppl/ha
Equivalent Population Density*	104.7 ppl/ha		197.8 ppl/ha	

* Based on the following growth information as per proposed landuse plan (Appendix A):

- Area for residential development = 693.9ha
- Area for employment development = 170.7ha

As noted in Table 2, the desired populations for the Study Area were 217% and 40% higher than those for the Region's Master Plan Study for residential and employment population, respectively.

To estimate the projected water demands for the Study Area, the water demand criteria used in the Region's Master Plan Study 2019 was applied to the projected population as noted in Table 2. The following summarizes the water demand criteria as per Region's Master Plan Study and Table 3 resents the water demands for the Study Area.

- Average Day Demand (ADD) for Residential Population: 270 L/ca/d
- Average Day Demand (ADD) for Employment Population: 250 L/ca/d
- Maximum Day Demand (MDD) peaking factors:
 - MDD for Residential Population: 1.8 times Residential ADD
 - MDD for Employment Population: 1.4 times Employment ADD
- Peak Hour Demand (PHrD) peaking factors:
 - PHrD for Residential and Employment Population: 3.0 times Residential / Employment ADD

Table 3: Water Demand Projection for Study Area

Demand Conditions	Zone	Residential Demand (ML/d)	Employment Demand (ML/d)	Total Demand (ML/d)
Average Day Demand (ADD)	5	1.3	0.4	1.7
	6	32.2	9.7	41.8
	7	0.0	1.7	1.7
	Total	<u>33.5</u>	<u>11.7</u>	<u>45.2</u>
Maximum Day Demand (MDD)	5	2.4	0.6	2.9
	6	57.9	13.5	71.4
	7	0.0	2.4	2.4
	Total	<u>60.3</u>	<u>16.4</u>	<u>76.7</u>
Peak Hour Demand (PHrD)	5	3.9	1.2	5.1
	6	96.5	29.0	125.5
	7	0.0	5.1	5.1
	Total	<u>100.4</u>	<u>35.2</u>	<u>135.7</u>

The projected water demands as presented in Table 3 were applied to the system assessments and Section 3 presents the system assessment details.

3. System Assessment Results

To determine the overall impacts in the South Peel Water Supply System, assessments for treatment plant capacity, storage capacity, pumping capacity and transmission main capacity were completed based on the increase in population / demands that were associated with the Study Area. The assessments were completed by applying the Region's Master Plan (MP) methodology. The following sub-sections provide the assessment details and results.

3.1 Treatment Plant Capacity Assessments

According to the Region's MP Study 2019, the following criteria were used to identify the water treatment plant capacity expansion requirements:

- Rated capacity of a water treatment plant = Maximum Day Demand (MDD)
- Capacity expansion is required when projected MDD exceeds 90% of the rated capacity

The following summarizes the treatment plant capacity assessments results.

- Installed Treatment Capacity at Lorne Park Water Treatment Plant = 500 ML/d
- 90% of Installed Treatment Capacity at Lorne Park Water Treatment Plant = 450 ML/d
- Projected MDD:
 - 2041 MDD as per Region's MP = 412.4 ML/d (capacity surplus = 37.6 ML/d)
 - 2041 MDD with Study Area = 463.9 ML/d (capacity surplus = -13.9 ML/d)

Based on the treatment plant capacity assessment results, the available capacity of 450 ML/d at Lorne Park Water Treatment Plant was insufficient to accommodate the increase in water demand for the Study Area. To meet the Region's MP design criteria for Water Treatment Plant capacity, an expansion of treatment plant capacity for 13.9 ML/d at Lorne Park Water Treatment Plant would be required.

3.2 Storage Capacity Assessments

According to the Region's MP Study 2019, the following criteria were used to identify the storage capacity expansion requirements:

- Storage capacity requirement is the sum of Equalization Storage, Fire Storage and Emergency Storage; where:
 - Equalization Storage: 25% of MDD for upper pressure zones serviced by pumping station from the reservoir
 - Fire Storage: Based on Mistry of Environment, Conservation and Parks guidelines with a maximum limit of 378 L/s for 6 hrs.
 - Emergency Storage: 25% of Equalization Storage plus 25% of Fire Storage

Since the Study Area was located in Zone 5, Zone 6 and Zone 7, storage capacity assessments were completed for the following storage facilities:

- Zone 3W Storage – Meadowvale North Reservoir
- Zone 4W Storage – West Brampton Reservoir
- Zone 5W Storage – Alloa Reservoir

The following sub-sections provide the assessment details and results for each storage facility.

3.2.1 Storage Capacity Assessments Results – Zone 3W

The Region's Zone 3W storage is currently provided by Meadowvale North Reservoir. The total installed capacity for Meadowvale North Reservoir is 55 ML and no expansion requirement was identified in the Region's MP.

Meadowvale North Reservoir is responsible to provide:

- Equalization storage for Zone 4W and Zone 5W via pumping,
- Fire storage for Zone 3W via gravity feed, and
- Emergency storage based 25% of equalization storage plus 25% of fire storage requirements.

According to the storage capacity assessment results, the existing Meadowvale North Reservoir provides sufficient capacity to accommodate the projected growth in the Study Area. Table 4 presents the storage capacity assessment results.

Table 4: Zone 3W Storage Capacity Assessments Results

Zone 3W Storage Requirements	Region's MP 2019 (2041)	Study Area
Equalization Storage	20.2 ML	20.6 ML
Fire Storage	8.2 ML	8.2 ML
Emergency Storage	7.1 ML	7.2 ML
Total Storage Requirements	35.4 ML	36.0 ML

Available Storage Capacity	55.0 ML	55.0 ML
Storage Capacity Surplus / Deficit (-)	19.6 ML	19.0 ML

3.2.2 Storage Capacity Assessments Results – Zone 4W

The Region’s Zone 4W storage is currently provided by West Brampton Reservoir. The existing installed capacity for West Brampton Reservoir is 40 ML and Region’s MP indicated a need for capacity expansion of 15 ML by Year 2031 (MP Project ID: W-S-062). West Brampton Reservoir is responsible to provide:

- Equalization storage for Zone 5W and Zone 6W via pumping,
- Fire storage for:
 - Zone 4W via gravity feed,
 - Zone 5W via pumping, and
 - Zone 6W via pumping
- Emergency storage based 25% of equalization storage plus 25% of fire storage requirements.

According to the storage capacity assessment results, the available storage capacity by 2041 at West Brampton Reservoir would provide sufficient capacity to accommodate the projected growth in the Study Area. Table 4Table 5 presents the storage capacity assessment results.

Table 5: Zone 4W Storage Capacity Assessments Results

Zone 4W Storage Requirements	Region’s MP 2019 (2041)	Study Area
Equalization Storage	23.4 ML	30.8 ML
Fire Storage	15.5 ML	15.5 ML
Emergency Storage	9.7 ML	11.6 ML
Total Storage Requirements	48.6 ML	57.9 ML
Available Storage Capacity*	60.0 ML	60.0 ML
Storage Capacity Surplus / Deficit (-)	11.4 ML	2.1 ML

* Include future storage capacity expansion of 20 ML/d by 2031 (MP project ID: W-S-062)

3.2.3 Storage Capacity Assessments Results – Zone 5W

The Region’s Zone 5W storage is currently provided by Alloa Reservoir. The existing installed capacity for Alloa Reservoir is 35 ML and no expansion requirement was identified in the Region’s MP. Alloa Reservoir is responsible to provide:

- Equalization storage for Zone 6W and Zone 7W via pumping,
- Fire storage for:
 - Zone 5W via gravity feed,
 - Zone 6W via pumping, and
 - Zone 7W via pumping
- Emergency storage based 25% of equalization storage plus 25% of fire storage requirements.

According to the storage capacity assessment results, slight storage capacity deficit was identified at Alloo Reservoir for accommodating the projected growth in the Study Area. Table 4Table 5 presents the storage capacity assessment results.

Table 6: Zone 5W Storage Capacity Assessments Results

Zone 5W Storage Requirements	Region's MP 2019 (2041)	Study Area
Equalization Storage	13.3 ML	18.3 ML
Fire Storage	9.8 ML	9.8 ML
Emergency Storage	5.8 ML	7.0 ML
Total Storage Requirements	29.0 ML	35.2 ML
Available Storage Capacity*	35.0 ML	35.0 ML
Storage Capacity Surplus / Deficit (-)	6.0 ML	-0.2 ML

To mitigate the storage deficit at Alloo Reservoir, the following options could be considered:

- Construct a new Zone 6 Storage
 - The Region was considering a construction of a new Zone 6 storage facility to meet the potential ultimate buildout condition
- Reduce the Zone 5W storage requirements by conveying the storage capacity via pumping from West Brampton Zone 5 Lowlift; a storage capacity surplus of 2.1 ML was identified at West Brampton Reservoir (Table 5)

3.3 Pumping Capacity Assessments

According to the Region's MP Study 2019, the following criteria were used to identify the pumping capacity expansion requirements:

- Available pumping capacity is rated on the firm capacity¹
- Actual pumping capacity is based available pumping capacity with consideration of the head losses in the system due to friction; actual pumping capacity was generated from the hydraulic modelling runs
- Water supply transfer to upper zones based on maximum day demand (MDD)
- Water supply to immediate serviced zone(s) based on peak hour demand (PHrD)
- Pump capacity expansion is required when the required supply (MDD for transfer and PHrD for immediate supply) exceeds the available pumping capacity.

Based on the location of the Study Area (Zone 5W, Zone 6W and Zone 7W), the pumping capacity assessments were completed for the following water pump stations (PS):

- Lorne Park WTP Zone 1 Highlift (Z1HL) for water supply transfer
- Lorne Park WTP Zone 2 Highlift (Z2HL) for water supply transfer
- Herridge PS Zone 2 Lowlift (Z2LL) for water supply transfer

¹ Firm capacity = total installed pumping capacity with a single largest pump out of service

- Streetsville PS Zone 3 Lowlift (Z3LL) for water supply transfer
- Meadowvale North PS Zone 4 Lowlift (Z4LL) for water supply transfer
- Meadowvale North PS Zone 5 Highlift (Z5HL) for immediate zone supply
- West Brampton PS Zone 5 Lowlift (Z5LL) for transfer and immediate zone supply
- West Brampton PS Zone 6 Highlift (Z6HL) for immediate zone supply
- Alloa PS Zone 6 Lowlift (Z6LL) for immediate zone supply
- Alloa PS Zone 7 Highlift (Z7HL) for immediate zone supply

The pumping capacity assessments included the following future pumping station upgrades indicated in the Region's MP Study 2019. The pumping capacity assessments results are summarized in Table 8.

Table 7: Region's Pumping Station Upgrades

Master Plan Project ID	Facility	Year in Service	Capacity Increase
W-P-061	West Brampton Z5LL	2028	+45 ML/d
W-P-152	West Brampton Z5LL	2036	+45 ML/d
W-P-154	Lorne Park Z2HL	2031	+150 ML/d
W-P-175	West Brampton Z6HL	2028	+38 ML/d

Table 8: Pumping Capacity Assessment Results

Facility	Zone	Installed Capacity (ML/d)	Firm Capacity (ML/d)	Actual Capacity (ML/d)	Required Capacity (ML/d)	
					Region's MP (Year 2041)	Study Area
Lorne Park WTP	Z1HL	541	450	336	196	196
	Z2HL	450	300	299	274	326
Herridge PS	Z2LL	408	340	309	143	143
Streetsville PS	Z3LL	379	289	328	285	336
Meadowvale North PS	Z4LL	346	276	226	207	257
	Z5HL	143	116	97	94	97
West Brampton PS	Z5LL	165	120	132	116	138
	Z6HL	124	93	129	110	161
Alloa PS	Z6LL	126	84	80	73	107
	Z7HL	45	30	27	13	14

According to the pump capacity assessments results, insufficient pumping capacity was identified for the following pumping facilities:

- Lorne Park WTP Z2HL: Pumping shortfall of 27.0 ML/d
- Streetsville PS Z3LL: Pumping shortfall of 8.0 ML/d
- Meadowvale North PS Z4LL: Pumping shortfall of 31.0 ML/d
- West Brampton PS Z5LL: 6.0 ML/d
- West Brampton PS Z6HL: 32.0 ML/d
- Alloo PS Z6LL: 27.0 ML/d

The pumping capacity shortfall for Lorne Park WTP could be mitigated by increasing the supply at Lorne Park WTP Z1HL and Herridge PS Z2LL since the surplus capacity at these facilities was sufficient to offset the deficit supply of 27.0 ML/d. However, the pumping shortfalls at the other pumping facilities should be addressed by additional pumping capacity upgrades.

3.4 Transmission Capacity Assessments

According to the Region's MP Study 2019, the following criteria were used to identify the transmission capacity upgrade requirements:

- Transfer Maximum Day Demands for local and upper pressure zones
- Maintaining the maximum velocity below 2.0 m/s
- "Actual" capacity of the transmission main considers the expected energy loss (headloss) due to friction²

The transmission capacity assessments were completed for the following South Peel West transmission mains:

- WT1: Herridge 1500 mm Zone 1 Transmission Main (from Lorne Park WTP Z1HL to Herridge Reservoir)
- WT2S: Lorne Park 2100 mm / 1800 mm (future) Zone 2 Transmission Main (from Lorne Park WTP Z2HL to Streetsville Reservoir)
- WT2: Streetsville 1500 mm and 1050 mm Zone 2 Transmission Mains (from Herridge Z2LL to Streetsville Reservoir)
- WT3: Meadowvale North 1200 mm, 900 mm and 1500 mm (future) Zone 3 transmission Mains (from Streetsville Z3LL to Meadowvale North Reservoir)
- WT4: West Brampton 1500 mm Zone 4 Transmission Main (from Meadowvale North Z4LL to West Brampton Reservoir)
- WT5: Alloo 1200 mm Zone 5 Transmission Main (from West Brampton Z5LL to Alloo Reservoir)

The transmission capacity assessments included the following future transmission main upgrades indicated in Table 9 per Region's MP Study 2019. The transmission main capacity assessments results are summarized in Table 10.

Table 9: Master Plan Project for Transmission Main

Master Plan Project ID	Project Description	Year in Service	Transmission Main Size
------------------------	---------------------	-----------------	------------------------

² Energy loss of the transmission main was estimated based on the calibrated hydraulic model (calibrated C-factor)

W-T-131	Zone 2 Transmission Main from Herridge PS to Streetsville Reservoir	2028	2100 mm
W-T-135	Zone 3 Transmission Main from Streetsville PS to Meadowvale North Reservoir	2031	1800mm

Table 10: Transmission Main Capacity Assessment Results

Transmission ID	Available (“Actual”) Capacity (ML/d)	Required Capacity (ML/d)	
		Region’s MP (Year 2041)	Study Area
WT1	181	162	162
WT2S	695	274	326
WT3	648	228	279
WT4	230	147	197
WT5	150	53	73

According to the transmission capacity assessments results, sufficient transmission main capacity was identified to accommodate the increase in water demands for the Study Area.

3.5 Water System Assessment Summary

The following summarizes the key findings from the water system assessments for Treatment Plant capacity, storage capacity, pumping capacity and transmission main capacity changes due to increase in water demands for the Study Area.

Table 11: Water System Assessment Summary

Assessment Type	Results	Mitigation Option(s)
Water Treatment Plant Capacity	Deficit of 13.9 ML/d was identified at Lorne Park Water Treatment Plant	Water Treatment Plant expansion
Storage Capacity	Deficit of 0.2 ML was identified at Alloa Reservoir (Zone 5)	<ol style="list-style-type: none"> Storage capacity expansion Increase pumping from West Brampton PS
Pumping Capacity	Capacity Shortfalls at: <ul style="list-style-type: none"> - Lorne Park Z2HL - Streetsville Z3LL - Meadowvale North Z4LL - West Brampton Z5LL & Z6HL - Alloa Z6LL 	<ol style="list-style-type: none"> Supply re-distribution for Lorne Park Z1HL and Herridge Z2LL to mitigate the shortfall at Lorne Park Z2HL only Pump capacity upgrade (e.g. additional pump(s) or pump replacement for other pumping stations)
Transmission Main Capacity	Sufficient transmission capacity to meet the projected growth for the Study Area.	Not required

4. Hydraulic Modelling Analysis

Hydraulic modelling analysis was completed to evaluate the watermain capacity required to meet the projected growth for the Study Area. The latest hydraulic model for the Region's lake-based water supply system was utilized to analyze the water network capacity. Prior to the analysis, the model water update to include the projected water demands and their location as per the proposed development plan (Appendix A). The modelling network included the proposed DC projects as per the Region's Master Plan Study 2019. Figure 2 shows the watermain network within the Study Area.

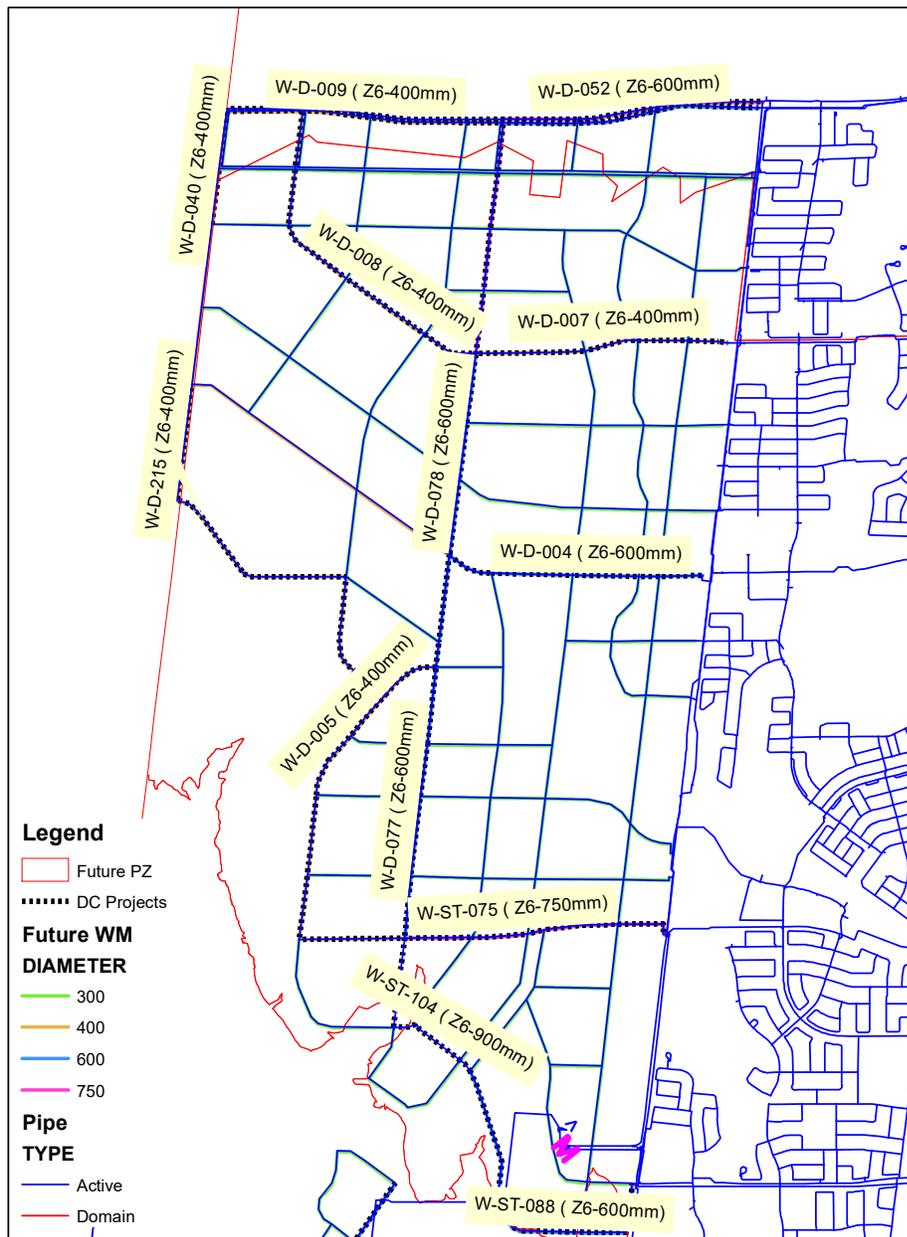


Figure 2: Water System Network for the Study Area

The modelling analysis was completed in extended period simulation and the Region's MP scenario for 2041 MDD was utilized as a base for the modelling analysis.

The following criteria was applied in evaluating watermain network capacity:

- Minimum pressure greater than or equal to 40 psi

- Maximum velocity in the watermains less than or equal to 2.0 m/s

Figure 3 and Figure 4 show the hydraulic modelling analysis results for minimum pressures and maximum velocity for the watermains within the Study Area, respectively.

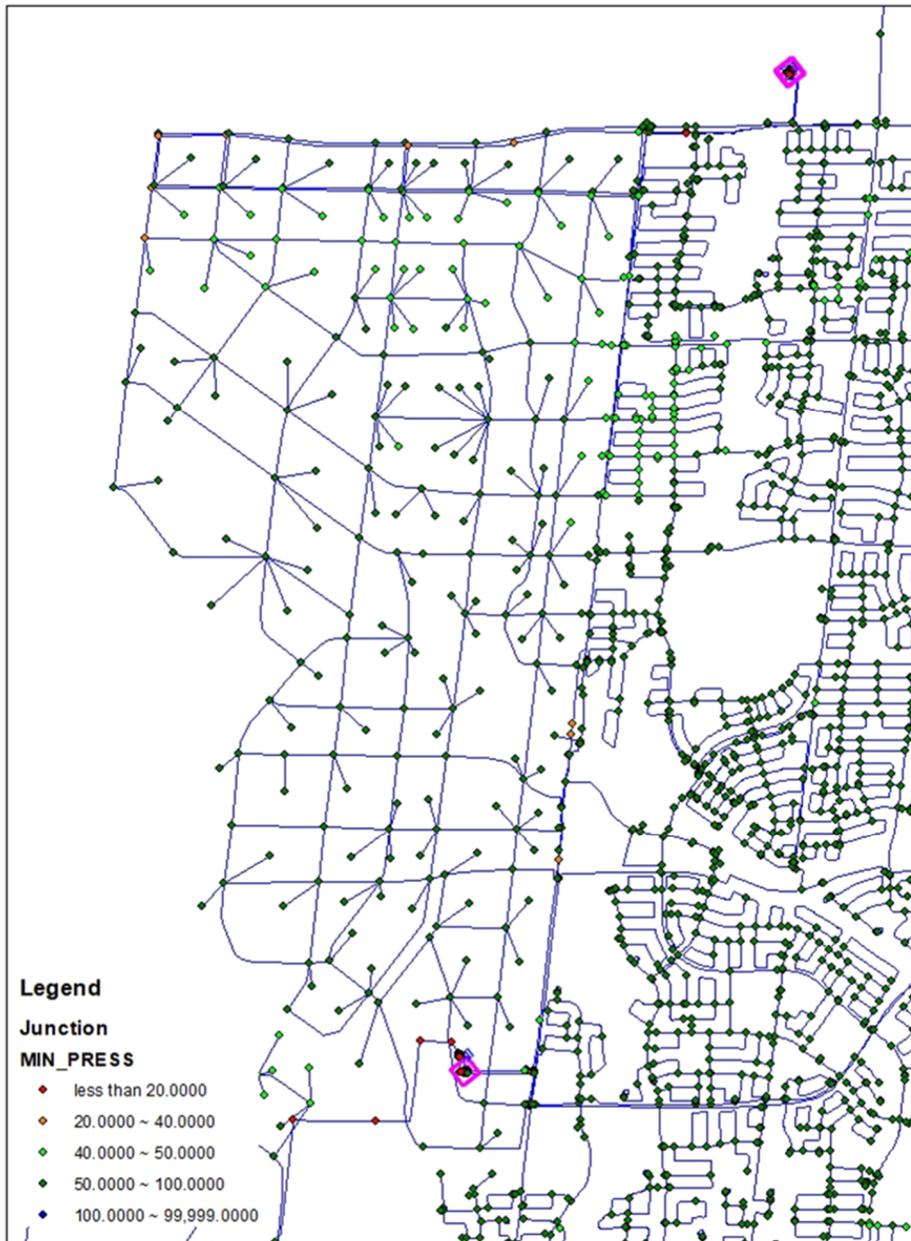


Figure 3: Minimum Pressures under 2041 Maximum Day Demand Conditions

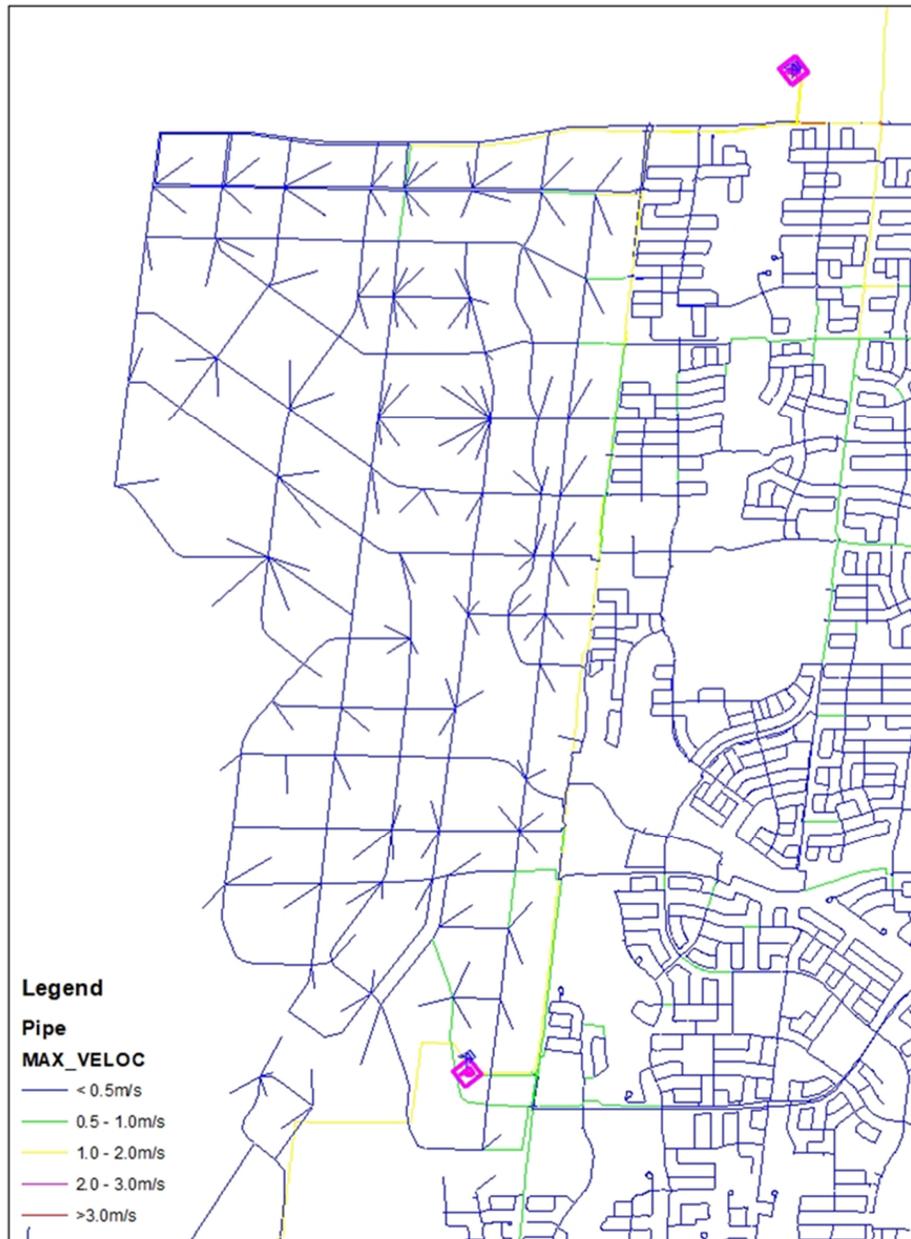


Figure 4: Maximum Velocity under 2041 Maximum Day Demand Conditions

According to the hydraulic analysis results presented in Figure 3 and Figure 4, the future water system network with the inclusions of Region's DC projects and the assumed 300 mm local distribution watermains within the Study Area would provide adequate pressures to support the future growth.

The hydraulic analysis results completed in this study represents a high-level evaluations of the Region's water system capability to support the projected growth for the Study Area. The following detailed hydraulic analysis should be undertaken when the growth plan for the Study Area is updated / finalized.

- Fire Flow Analysis
- Size evaluation for the local distribution network and DC projects
- Constructability review of the required infrastructures within the Study Area

5. Sensitivity Analysis

In Section 3.0, the water system assessment results indicated that several capital projects were required to meet the desired population projections for the Study Area. A sensitivity analysis was completed to evaluate the capital projects implications with possible reduction in the population projections. Table 12 summarizes the sensitivity analysis results.

Table 12: Sensitivity Analysis Results

Population Projections Scenario	Residential Population	Employment Population	Capital Project(s) Requirement
Desired Population	124,000	47,000	<ul style="list-style-type: none"> • WTP Expansion: <ul style="list-style-type: none"> ○ Lorne Park WTP • PS Upgrades: <ul style="list-style-type: none"> ○ Lorne Park WTP Z2HL ○ Streetsville PS Z3LL ○ Meadowvale North PS Z4LL ○ West Brampton PS Z5LL ○ West Brampton PS Z6HL ○ Alloo PS Z6LL • Storage Upgrades: <ul style="list-style-type: none"> ○ Alloo Reservoir
95% of Desired Population	117,800	44,613	<ul style="list-style-type: none"> • WTP Expansion: <ul style="list-style-type: none"> ○ Lorne Park WTP • PS Upgrades: <ul style="list-style-type: none"> ○ Lorne Park WTP Z2HL ○ Streetsville PS Z3LL ○ Meadowvale North PS Z4LL ○ West Brampton PS Z5LL ○ West Brampton PS Z6HL ○ Alloo PS Z6LL • Storage Upgrades: <ul style="list-style-type: none"> ○ Alloo Reservoir
80% of Desired Population	99,200	37,569	<ul style="list-style-type: none"> • WTP Expansion: <ul style="list-style-type: none"> ○ Lorne Park WTP • PS Upgrades: <ul style="list-style-type: none"> ○ Lorne Park WTP Z2HL ○ Streetsville PS Z3LL ○ Meadowvale North PS Z4LL ○ West Brampton PS Z5LL ○ West Brampton PS Z6HL ○ Alloo PS Z6LL • Storage Upgrades: <ul style="list-style-type: none"> ○ Alloo Reservoir
65% of Desired Population	80,600	30,525	<ul style="list-style-type: none"> • WTP Expansion: <ul style="list-style-type: none"> ○ Lorne Park WTP • PS Upgrades: <ul style="list-style-type: none"> ○ Lorne Park WTP Z2HL ○ Streetsville PS Z3LL ○ Meadowvale North PS Z4LL ○ West Brampton PS Z5LL ○ West Brampton PS Z6HL ○ Alloo PS Z6LL • Storage Upgrades: <ul style="list-style-type: none"> ○ Alloo Reservoir

Population Projections Scenario	Residential Population	Employment Population	Capital Project(s) Requirement
60% of Desired Population	74,400	28,177	<ul style="list-style-type: none"> ● WTP Expansion: <ul style="list-style-type: none"> ○ Lorne Park WTP ● PS Upgrades: <ul style="list-style-type: none"> ○ Lorne Park WTP Z2HL ○ Streetsville PS Z3LL ○ Meadowvale North PS Z4LL ○ West Brampton PS Z5LL <ul style="list-style-type: none"> ○ West Brampton PS Z6HL ○ Allea PS Z6LL ● Storage Upgrades: ● Allea Reservoir
50% of Desired Population	62,000	23,481	<ul style="list-style-type: none"> ● WTP Expansion: <ul style="list-style-type: none"> ○ Lorne Park WTP ● PS Upgrades: <ul style="list-style-type: none"> ○ Lorne Park WTP Z2HL ○ Streetsville PS Z3LL ○ Meadowvale North PS Z4LL ○ West Brampton PS Z5LL ○ West Brampton PS Z6HL ○ Allea PS Z6LL ● Storage Upgrades: ● Allea Reservoir

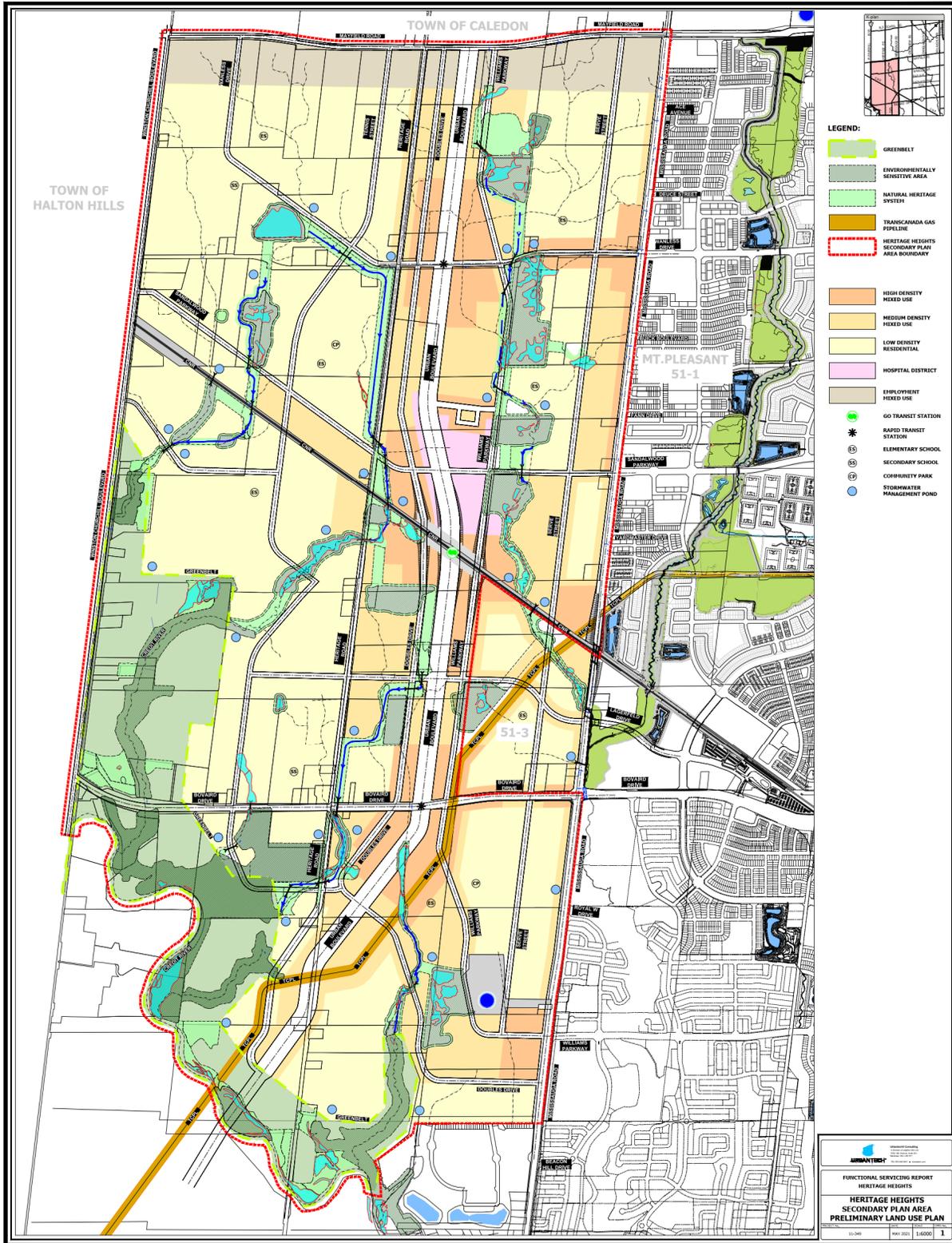
The sensitivity analysis results shown various growth scenarios that would avoid the major capital projects required for accommodating the population projections within the Study Area. It is recommended to complete a cost / benefit analysis to determine the best growth scenarios that would justify the overall capital investment in the South Peel water system.

6. Conclusions and Recommendations

Water system analysis for Heritage Heights Community was completed to determine the infrastructure implications in the South Peel Lake Based Water System. The analysis was undertaken based on the desired population projections of 124,000 persons and 47,000 persons for residential and employment developments, respectively. The water system analysis utilized the system assessments approach that was employed in the Region's Water and Wastewater Master Plan Study (2019). The completion of the water system analysis led to the following conclusions and recommendations.

- To achieve adequate water service for Heritage Heights Community, the following capital projects were required:
 - Increase Lorne Park Water Treatment Plant capacity by 13.9 ML/d
 - Increase Alloa Reservoir capacity by 0.2ML
 - Increase pumping capacity at the following pumping stations:
 - Lorne Park Zone 2 Highlift by 27.0 ML/d
 - Streetsville Zone 3 Lowlift by 8.0 ML/d
 - Meadowvale North Zone 4 Lowlift by 31.0 ML/d
 - West Brampton Zone 5 Lowlift by 6.0 ML/d
 - West Brampton Zone 6 Lowlift by 32.0 ML/d
 - Alloa Zone 6 Lowlift by 27.0 ML/d
- According to the transmission main capacity assessment results, the Region's future transmission mains would provide adequate capacity to meet the desired population projections for Heritage Heights Community. The assessments included the consideration of the following transmission main projects as per Region's Master Plan study.
 - 2100 mm Zone 2 Transmission Main from Herridge Pumping Station to Streetsville Reservoir (Master Plan Project ID: W-T-1331)
 - 1800 mm zone 3 Transmission Main from Streetsville Pumping Station to Meadowvale North Reservoir (Master Plan Project ID: W-T-135)
- The hydraulic modelling analysis was completed to determine the local system serviceability for Heritage Heights Community. The analysis results shown that the Region's water system network with inclusion of the DC projects and assumed 300 mm local distribution mains would provide adequate pressures to the future developments.
- The hydraulic analysis results completed in this study represents a high-level evaluation for the Region's water system capability to support the projected populations. The following detailed hydraulic analysis was recommended when the growth plan for the Study Area is updated / finalized.
 - Fire Flow Analysis
 - Size evaluation for the local distribution network and DC projects
 - Constructability review of the required infrastructures within the Study Area
- Sensitivity analysis was completed to determine various growth scenarios that could avoid the capital projects for maintaining the water service for Heritage Heights Community. The sensitivity analysis results shown that a 50% reduction of the desired population projections would completely avoid any capital projects identified in the study. Table 12 presents the sensitivity analysis results.

Appendix A – Development Information for Study Area



Appendix B – Detailed Population Breakdown

Table B.1: Growth Area Distribution for Study Area

Landuse Type	Area (ha)	Area for Residential Development (ha)	Area for Employment Development (ha)
Community Facility	3.7	0.0	3.7
High Mixed Use	112.2	78.6	33.7
Industrial	63.4	0.0	63.4
Light Residential	228.8	228.8	0.0
Low Residential	261.3	261.3	0.0
Med Mixed Use	179.0	125.3	53.7
Wellness	16.3	0.0	16.3
Total	864.6	693.9	170.7

Table B.2: Zonal Population Breakdown for Study Area

Pressure Zone	Landuse	Area (ha)	Residential Population	Employment Population
5	High Mixed Use	3.8	1,760	819
	Light Residential	14.4	1,417	-
	Med Mixed Use	9.7	1,663	774
	Zone 5 Total	27.9	4,840	1,593
6	Community Facility	3.65	-	278
	High Mixed Use	108.47	50,632	23,568
	Light Residential	214.38	21,067	-
	Low Residential	261.27	18,339	-
	Med Mixed Use	169.34	29,122	13,555
	Wellness	15.82	-	1,206
	Zone 6 Total	772.93	119,160	38,607
7	Industrial	63.35	-	6,761
	Zone 7 Total	63.35	-	6,761
Study Area Total		864.1	124,000	46,962

WATER INFRASTRUCTURE - PROJECT COMPARISON

HERITAGE HEIGHTS

CITY OF BRAMPTON

July 14, 2021



2020 Water Masterplan - Water Projects Related to Heritage Heights						
Master Plan Project #	Project Name	Description	Size	Length	Anticipated Year in Service	Anticipated Cost
D-051	400-mm Water Main - Mayfield Road (Mount Pleasant West)	Construction of a 400-mm water main on Mayfield Road from Heritage Road to Winston Churchill Boulevard.	400mm		2038	\$4,892,100
D-052	600-mm Water Main - Mayfield Road (Mount Pleasant West)	Construction of a 600-mm water main on Mayfield Road from Mississauga Road to Heritage Road.	600mm		2038	\$6,768,000
D-009	400-mm Water Main - Mayfield Road	Construction of a 400-mm water main on Mayfield Road from Heritage Road to Winston Churchill Boulevard	400mm		2038	\$4,892,100
ST-080	750-mm Water Main - Mayfield Road (Mount Pleasant West)	Construction of a 750-mm water main on Mayfield Road from Heritage Road to Mississauga Road.	750mm		2038	\$7,716,300
D-049	400-mm Water Main - Mississauga Road (Mount Pleasant West)	Construction of a 400-mm water main on Mississauga Road from Mayfield Road southerly to a future street.	400mm		2032	\$2,281,800
D-040	400-mm Water Main - Winston Churchill Boulevard	Construction of a 400-mm water main on Winston Churchill Boulevard from Mayfield Road to Wanless Drive.	400mm		2036	\$1,882,000
NEW						
D-008	400-mm Water Main - Wanless Drive	Construction of a 400-mm water main on Wanless Drive from Winston Churchill Boulevard to Heritage Road.	400mm		2035	\$2,954,100
D-007	400-mm Water Main - Wanless Drive	Construction of a 400-mm water main on Wanless Drive from Mississauga Road to Heritage Road.	400mm		2034	\$2,709,200
ST-083	750-mm Water Main - Heritage Road (Mount Pleasant West)	Construction of a 750-mm sub-transmission main on Heritage Road from Wanless Drive to Mayfield Road.	750mm		2035	\$4,115,700
D-078	600-mm Water Main - Heritage Road (Mount Pleasant West)	Construction of a 600-mm water main on Heritage Road from the future extension of Sandalwood Parkway to Wanless Drive.	600mm		2034	\$4,023,000
D-090	600-mm Water Main - Heritage Road (Heritage Heights)	Construction of a 600-mm water main on Heritage Road from a future street to the future extension of Sandalwood Parkway.	600mm		2028	\$3,874,900
D-077	600-mm Water Main - Heritage Road (Heritage Heights)	Construction of a 600-mm water main on Heritage Road from Bovaird Drive northerly to a future street.	600mm		2028	\$3,708,100
D-215	400-mm Water Main - Future Street (Heritage Heights)	Construction of a 400-mm water main on a future street from Wanless Drive southeasterly to a future street.	400mm		2030	\$2,703,500
D-004	600-mm Water Main - Future Sandalwood Parkway West	Construction of a 600-mm water main on the future Sandalwood Parkway West from Mississauga Road to Heritage Road.	600mm		2032	\$3,701,200
D-005	400-mm Water Main - Future Street (Heritage Heights)	Construction of a 400-mm water main on a future street from Heritage Road to 750 meters westerly.	400mm		2029	\$1,365,000
NEW						
NEW						
D-041	400-mm Water Main - Future Street (Heritage Heights)	Construction of a 400-mm water main on a future street (Heritage Heights) from Bovaird Drive northerly to a future street	400mm		2030	\$2,038,300
D-003	400-mm Water Main - Bovaird Drive West	Construction of a 400-mm water main on Bovaird Drive West from Heritage Road to a future street	400mm		2030	\$1,702,400
ST-075	750-mm Water Main - Bovaird Drive West (Heritage Heights)	Construction of a 750-mm water main on Bovaird Drive West from Mississauga Road to Heritage Road.	750mm		2027	\$7,274,300
D-088	600-mm Water Main - Future Williams Parkway (Bram West)	Construction of a 600-mm water main on the future extension of Williams Parkway from Heritage Road to Mississauga Road.	600mm		2027	\$2,772,900
ST-104	900-mm Water Main - Heritage Road (Heritage Heights)	Construction of a 900-mm sub-transmission main on Heritage Road from the West Brampton Pumping Station to Bovaird Drive.	900mm		2028	\$8,557,100

PROPOSED ASSUMPTION AND COST (***)BASED ON REGION OF 2020 PEEL ESTIMATING FRAMEWORK						
LOCATION REFERENCE	Description	Size	Length	Condition	Proposed Year in Service	Anticipated Cost (Region Estimating Tool)
A	MAYFIELD ROAD	Construction of a 400-mm water main on Mayfield Road from Heritage Road to Winston Churchill Boulevard.	400mm Dia	1,460m	Suburban	\$2,364,200
B		Construction of a 600-mm water main on Mayfield Road from Mississauga Road to Heritage Road.	600mm Dia	1,340m	Suburban	\$3,323,200
C		Construction of a 400-mm water main on Mayfield Road from Heritage Road to Winston Churchill Boulevard				TBD
D		Construction of a 750-mm water main on Mayfield Road from Heritage Road to Mississauga Road.				TBD
E	MISSISSAUGA ROAD	Construction of a 400-mm water main on Mississauga Road from Mayfield Road southerly to a future street.				TBD
F	WINSTON CHURCHILL BLVD	Construction of a 400-mm water main on Winston Churchill Boulevard from Mayfield Road to Wanless Drive.	400mm Dia	1,260m	Suburban	\$2,040,300
G		Construction of a 400-mm water main on Winston Churchill Boulevard from Wanless Drive to 820m southerly.	400mm Dia	820m	Suburban (1x CNR Crossing)	\$2,934,000
H	WANLESS DRIVE	Construction of a 400-mm water main on Future Wanless Drive from Mayfield Road to Heritage Road.	400mm Dia	1,850m	Greenfield	\$2,723,400
I		Construction of a 400-mm water main on Wanless Drive from Mississauga Road to Heritage Road.	400mm Dia	1,360m	Suburban (1x Creek Crossing)	\$2,416,400
J	HERITAGE ROAD	Construction of a 600-mm sub-transmission main on Heritage Road from Wanless Drive to Mayfield Road.	600mm Dia	1,250m	Suburban	\$3,100,000
K		Construction of a 600-mm water main on Heritage Road from the future extension of Sandalwood Parkway to Wanless Drive.	600mm Dia	1,060m	Suburban	\$2,628,800
L		Construction of a 600-mm water main on Heritage Road from Lagerfeld Boulevard to the future extension of Sandalwood Parkway.	600mm Dia	1,280m	Suburban (2x Creek Crossing) (1x CNR Crossing)	\$5,737,500
M		Construction of a 600-mm water main on Heritage Road from Bovaird Drive northerly to a future street.	600mm Dia	750m	Suburban	\$1,860,000
N	Fut. STREET	Construction of a 400-mm water main on a future street from Winston Churchill Boulevard to Tennis Street.	400mm Dia	1,060m	Greenfield (1x Creek Crossing)	\$1,774,600
O	SANDALWOOD PKWY	Construction of a 600-mm water main on the future Sandalwood Parkway West from Mississauga Road to Heritage Road.	600mm Dia	1,360m	Greenfield (1x Creek Crossing)	\$3,336,000
P	LAGERFELD DRIVE	Construction of a 400-mm water main on Lagerfeld Drive from Heritage Road to Tennis Street.	400mm Dia	560m	Greenfield	\$824,400
Q		Construction of a 400-mm water main on Lagerfeld Drive from Heritage Road to Mississauga Road.	400mm Dia	1,420m	Greenfield (1x TCPL Crossing) (1x Creek Crossing)	\$2,947,000
R		Construction of a 400-mm water main on Lagerfeld Drive from Mississauga Road to Creditview Road.	400mm Dia	600m	Greenfield (1x Road Crossing) (1x Major Creek Crossing)	\$3,131,900
S	TENNIS STREET	Construction of a 400-mm water main on a future street (Heritage Heights) from Bovaird Drive northerly to a future street	400mm Dia	2,200m	Greenfield (1x Major Creek Crossing)	\$4,844,800
T	BOVAIRD DRIVE	Construction of a 400-mm water main on Bovaird Drive West from Heritage Road to Tennis Street.	400mm Dia	570m	Suburban (1x Creek Crossing)	\$1,137,200
U		Construction of a 750-mm water main on Bovaird Drive West from Mississauga Road to Heritage Road.	750mm Dia	1,380m	Suburban (1x TCPL Crossing) (1x Creek Crossing)	\$6,106,600
V	WILLIAMS PKWY	Construction of a 600-mm water main on the future extension of Williams Parkway from Bovaird Drive to Mississauga Road.	600mm Dia	1,730m	Greenfield (1x TCPL Crossing)	\$4,709,700
W	HERITAGE ROAD (BOVAIRD TO CREDIT RIVER)	Construction of a 900-mm sub-transmission main on Heritage Road from Urban Boulevard (North Side of Credit River) to Bovaird Drive.	900mm Dia	1,620m	Greenfield (1x TCPL Crossing) (1x Creek Crossing)	\$7,679,900

TRANSITION MAIN AND PUMP STATION UPGRADES:						
NEW	Project Name	Description	Size	Length	Anticipated Year in Service	Anticipated Cost
NEW						
S-062	West Brampton Reservoir Expansion	Expansion of the West Brampton Reservoir with the construction of a third 20-ML reservoir cell.	20ML		2031	\$36,846,800
P-061	West Brampton Pumping Station - Capacity Expansion	Installation of additional low-lift pumping capacity at the West Brampton Pumping Station.			2028	\$1,884,200
P-152	West Brampton Pumping Station - Capacity Expansion	Installation of additional low-lift pumping capacity at the West Brampton Pumping Station.			2036	\$433,600
P-175	West Brampton Pumping Station - Capacity Expansion	Installation of additional high-lift pumping capacity at the West Brampton Pumping Station			2028	\$1,010,400

	SOUTH OF CREDIT RIVER	Construction of a 900-mm sub-transmission main - Credit River Crossing and South of Credit River				TBD
		Expansion of the West Brampton Reservoir with the construction of a third 20-ML reservoir cell.	20ML			TBD
		Installation of additional low-lift pumping capacity at the West Brampton Pumping Station.				TBD
		Installation of additional low-lift pumping capacity at the West Brampton Pumping Station.				TBD
		Installation of additional high-lift pumping capacity at the West Brampton Pumping Station				TBD

COST ESTIMATE IS BASED ON 2020 WATER AND WASTEWATER MASTER PLAN COST ESTIMATION FRAMEWORK - PREPARED FOR ORDER OF MAGNITUDE COMPARISON ONLY -

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

A

PROJECT NO.: Replaces D-051
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 400-mm water main on Mayfield Road from Heritage Road to Winston Churchill Boulevard.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Suburban	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	400mm
TOTAL LENGTH:	1,460m
Tunnelled	0%
Open Cut	100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	1460 m	\$873	\$1,274,580	
Pipe Construction - Tunneling			m	0 m	\$6,350	\$0	
Pipe Construction Uplift (Based on Area Conditions)	10%					\$127,458	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$140,204	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$154,224	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$1,696,466	
Geotechnical / Hydrogeological / Materials	0.5%					\$8,482	
Geotechnical Sub-Total Cost						\$8,482	
Property Requirements	1.0%					\$16,965	
Property Requirements Sub-Total						\$16,965	
Consultant Engineering/Design	15%					\$254,470	Includes planning, pre-design, detailed design, training, CA, commissioning
Engineering/Design Sub-Total						\$254,470	
In House Labour/Engineering/Wages/CA	8%					\$135,717	
In-house Labour/wages Sub-Total						\$135,717	
Project Contingency	10%					\$211,210	Construction Contingency is dependent on Cost Estimate Class and Project Complexity
Project Contingency Sub-Total						\$211,210	
Non-Refundable HST	1.76%					\$40,890	
Non-Refundable HST Sub-Total						\$40,890	
Total (2021) Dollars						\$2,364,200	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

B

PROJECT NO.: Replaces D-052
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 600-mm water main on Mayfield Road from Mississauga Road to Heritage Road.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Suburban	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	600mm
TOTAL LENGTH:	1,340m
Tunnelled	0%
Open Cut	1,340m 100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	1340 m	\$1,337	\$1,791,580	
Pipe Construction - Tunneling			m	0 m	\$8,000	\$0	
Pipe Construction Uplift (Based on Area Conditions)	10%					\$179,158	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$197,074	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$216,781	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$2,384,593	
Geotechnical / Hydrogeological / Materials	0.5%					\$11,923	
Geotechnical Sub-Total Cost						\$11,923	
Property Requirements	1.0%					\$23,846	
Property Requirements Sub-Total						\$23,846	
Consultant Engineering/Design	15%					\$357,689	Includes planning, pre-design, detailed design, training, CA, commissioning
Engineering/Design Sub-Total						\$357,689	
In House Labour/Engineering/Wages/CA	8%					\$190,767	
In-house Labour/wages Sub-Total						\$190,767	
Project Contingency	10%					\$296,882	Construction Coningency is dependent on Cost Estimate Class and Project Complexity
Project Contingency Sub-Total						\$296,882	
Non-Refundable HST	1.76%					\$57,476	
Non-Refundable HST Sub-Total						\$57,476	
Total (2021) Dollars						\$3,323,200	
Other Estimate							
Chosen Esitmate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONET	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

C

PROJECT NO.: Replaces D-009
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 400-mm water main on Mayfield Road from Heritage Road to Winston Churchill Boulevard

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	0	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	0mm
TOTAL LENGTH:	0m
Tunnelled	#DIV/0!
Open Cut	0m

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	0 m		\$0	
Pipe Construction - Tunneling			m	0 m		\$0	
Pipe Construction Uplift (Based on Area Conditions)	0%					\$0	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$0	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$0	Provisional Labour and Materials in addition to base construction cost
Sub-Total Construction Base Costs						\$0	
Geotechnical / Hydrogeological / Materials	0.5%					\$0	
Geotechnical Sub-Total Cost						\$0	
Property Requirements	1.0%					\$0	
Property Requirements Sub-Total						\$0	
Consultant Engineering/Design	15%					\$0	Includes planning, pre-design, detailed design, training, CA, commissioning
Engineering/Design Sub-Total						\$0	
In House Labour/Engineering/Wages/CA	8%					\$0	
In-house Labour/wages Sub-Total						\$0	
Project Contingency	10%					\$0	Construction Contingency is dependent on Cost Estimate Class and Project Complexity
Project Contingency Sub-Total						\$0	
Non-Refundable HST	1.76%					\$0	
Non-Refundable HST Sub-Total						\$0	
Total (2021) Dollars						\$0	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

D

PROJECT NO.: Replaces ST-080
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 750-mm water main on Mayfield Road from Heritage Road to Mississauga Road.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	0	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	0mm
TOTAL LENGTH:	0m
Tunnelled	#DIV/0!
Open Cut	0m

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	0 m		\$0	
Pipe Construction - Tunneling			m	0 m		\$0	
Pipe Construction Uplift (Based on Area Conditions)	0%					\$0	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$0	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$0	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$0	
Geotechnical / Hydrogeological / Materials	0.5%					\$0	
Geotechnical Sub-Total Cost						\$0	
Property Requirements	1.0%					\$0	
Property Requirements Sub-Total						\$0	
Consultant Engineering/Design	15%					\$0	Includes planning, pre-design, detailed design, training, CA, commissioning
Engineering/Design Sub-Total						\$0	
In House Labour/Engineering/Wages/CA	8%					\$0	
In-house Labour/wages Sub-Total						\$0	
Project Contingency	10%					\$0	Construction Contingency is dependent on Cost Estimate Class and Project Complexity
Project Contingency Sub-Total						\$0	
Non-Refundable HST	1.76%					\$0	
Non-Refundable HST Sub-Total						\$0	
Total (2021) Dollars						\$0	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

E

PROJECT NO.: Replaces D-049
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 400-mm water main on Mississauga Road from Mayfield Road southerly to a future street.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	0	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	0mm	
TOTAL LENGTH:	0m	
	Tunnelled	#DIV/0!
	Open Cut	0m

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	0 m		\$0	
Pipe Construction - Tunneling			m	0 m		\$0	
Pipe Construction Uplift (Based on Area Conditions)	0%					\$0	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$0	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$0	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$0	
Geotechnical / Hydrogeological / Materials	0.5%					\$0	
Geotechnical Sub-Total Cost						\$0	
Property Requirements	1.0%					\$0	
Property Requirements Sub-Total						\$0	
Consultant Engineering/Design	15%					\$0	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$0	
In House Labour/Engineering/Wages/CA	8%					\$0	
In-house Labour/wages Sub-Total						\$0	
Project Contingency	10%					\$0	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$0	
Non-Refundable HST	1.76%					\$0	
Non-Refundable HST Sub-Total						\$0	
Total (2021) Dollars						\$0	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

F

PROJECT NO.: Replaces D-040
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 400-mm water main on Winston Churchill Boulevard from Mayfield Road to Wanless Drive.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Suburban	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	400mm
TOTAL LENGTH:	1,260m
Tunnelled	0%
Open Cut	1,260m 100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	1260 m	\$873	\$1,099,980	
Pipe Construction - Tunneling			m	0 m	\$6,350	\$0	
Pipe Construction Uplift (Based on Area Conditions)	10%					\$109,998	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$120,998	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$133,098	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$1,464,073	
Geotechnical / Hydrogeological / Materials	0.5%					\$7,320	
Geotechnical Sub-Total Cost						\$7,320	
Property Requirements	1.0%					\$14,641	
Property Requirements Sub-Total						\$14,641	
Consultant Engineering/Design	15%					\$219,611	Includes planning, pre-design, detailed design, training, CA, commissioning
Engineering/Design Sub-Total						\$219,611	
In House Labour/Engineering/Wages/CA	8%					\$117,126	
In-house Labour/wages Sub-Total						\$117,126	
Project Contingency	10%					\$182,277	Construction Contingency is dependent on Cost Estimate Class and Project Complexity
Project Contingency Sub-Total						\$182,277	
Non-Refundable HST	1.76%					\$35,289	
Non-Refundable HST Sub-Total						\$35,289	
Total (2021) Dollars						\$2,040,300	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

G

PROJECT NO.: Replaces NEW
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 400-mm water main on Winston Churchill Boulevard from Wanless Drive to 820m southerly.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Suburban (1x CNR Crossing)	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	400mm	
TOTAL LENGTH:	820m	
	Tunnelled	0%
	Open Cut	100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	820 m	\$873	\$715,860	
Pipe Construction - Tunneling			m	0 m	\$6,350	\$0	
Pipe Construction Uplift (Based on Area Conditions)	10%					\$71,586	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.	1	\$952,500.00	\$952,500	CNR CROSSING
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$173,995	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$191,394	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$2,105,335	
Geotechnical / Hydrogeological / Materials	0.5%					\$10,527	
Geotechnical Sub-Total Cost						\$10,527	
Property Requirements	1.0%					\$21,053	
Property Requirements Sub-Total						\$21,053	
Consultant Engineering/Design	15%					\$315,800	Includes planning, pre-design, detailed design, training, CA, commissioning
Engineering/Design Sub-Total						\$315,800	
In House Labour/Engineering/Wages/CA	8%					\$168,427	
In-house Labour/wages Sub-Total						\$168,427	
Project Contingency	10%					\$262,114	Construction Coningency is dependent on Cost Estimate Class and Project Complexity
Project Contingency Sub-Total						\$262,114	
Non-Refundable HST	1.76%					\$50,745	
Non-Refundable HST Sub-Total						\$50,745	
Total (2021) Dollars						\$2,934,000	
Other Estimate							
Chosen Esitmate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONET	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

H

PROJECT NO.: Replaces D-008
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 400-mm water main on Future Wanless Drive from Mayfield Road to Heritage Road.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Greenfield	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	400mm
TOTAL LENGTH:	1,850m
Tunnelled	0%
Open Cut	100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	1850 m	\$873	\$1,615,050	
Pipe Construction - Tunneling			m	0 m	\$6,350	\$0	
Pipe Construction Uplift (Based on Area Conditions)	0%					\$0	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$161,505	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$177,656	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$1,954,211	
Geotechnical / Hydrogeological / Materials	0.5%					\$9,771	
Geotechnical Sub-Total Cost						\$9,771	
Property Requirements	1.0%					\$19,542	
Property Requirements Sub-Total						\$19,542	
Consultant Engineering/Design	15%					\$293,132	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$293,132	
In House Labour/Engineering/Wages/CA	8%					\$156,337	
In-house Labour/wages Sub-Total						\$156,337	
Project Contingency	10%					\$243,299	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$243,299	
Non-Refundable HST	1.76%					\$47,103	
Non-Refundable HST Sub-Total						\$47,103	
Total (2021) Dollars						\$2,723,400	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**



PROJECT NO.: Replaces D-007
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 400-mm water main on Wanless Drive from Mississauga Road to Heritage Road.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Suburban (1x Creek Crossing)	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	400mm
TOTAL LENGTH:	1,360m
Tunnelled	0%
Open Cut	1,360m 100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	1360 m	\$873	\$1,187,280	
Pipe Construction - Tunneling			m	0 m	\$6,350	\$0	
Pipe Construction Uplift (Based on Area Conditions)	10%					\$118,728	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.	1	\$127,000.00	\$127,000	
Major Creek Crossings			ea.		\$952,500.00	\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$143,301	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$157,631	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$1,733,940	
Geotechnical / Hydrogeological / Materials	0.5%					\$8,670	
Geotechnical Sub-Total Cost						\$8,670	
Property Requirements	1.0%					\$17,339	
Property Requirements Sub-Total						\$17,339	
Consultant Engineering/Design	15%					\$260,091	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$260,091	
In House Labour/Engineering/Wages/CA	8%					\$138,715	
In-house Labour/wages Sub-Total						\$138,715	
Project Contingency	10%					\$215,875	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$215,875	
Non-Refundable HST	1.76%					\$41,793	
Non-Refundable HST Sub-Total						\$41,793	
Total (2021) Dollars						\$2,416,400	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**



PROJECT NO.: Replaces ST-083
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 600-mm sub-transmission main on Heritage Road from Wanless Drive to Mayfield Road.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Suburban	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	600mm
TOTAL LENGTH:	1,250m
Tunnelled	0%
Open Cut	1,250m 100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	1250 m	\$1,337	\$1,671,250	
Pipe Construction - Tunneling			m	0 m	\$8,000	\$0	
Pipe Construction Uplift (Based on Area Conditions)	10%					\$167,125	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$183,838	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$202,221	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$2,224,434	
Geotechnical / Hydrogeological / Materials	0.5%					\$11,122	
Geotechnical Sub-Total Cost						\$11,122	
Property Requirements	1.0%					\$22,244	
Property Requirements Sub-Total						\$22,244	
Consultant Engineering/Design	15%					\$333,665	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$333,665	
In House Labour/Engineering/Wages/CA	8%					\$177,955	
In-house Labour/wages Sub-Total						\$177,955	
Project Contingency	10%					\$276,942	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$276,942	
Non-Refundable HST	1.76%					\$53,616	
Non-Refundable HST Sub-Total						\$53,616	
Total (2021) Dollars						\$3,100,000	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**



PROJECT NO.: Replaces D-078
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 600-mm water main on Heritage Road from the future extension of Sandalwood Parkway to Wanless Drive.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Suburban	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	600mm
TOTAL LENGTH:	1,060m
Tunnelled	0%
Open Cut	100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	1060 m	\$1,337	\$1,417,220	
Pipe Construction - Tunneling			m	0 m	\$8,000	\$0	
Pipe Construction Uplift (Based on Area Conditions)	10%					\$141,722	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$155,894	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$171,484	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$1,886,320	
Geotechnical / Hydrogeological / Materials	0.5%					\$9,432	
Geotechnical Sub-Total Cost						\$9,432	
Property Requirements	1.0%					\$18,863	
Property Requirements Sub-Total						\$18,863	
Consultant Engineering/Design	15%					\$282,948	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$282,948	
In House Labour/Engineering/Wages/CA	8%					\$150,906	
In-house Labour/wages Sub-Total						\$150,906	
Project Contingency	10%					\$234,847	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$234,847	
Non-Refundable HST	1.76%					\$45,466	
Non-Refundable HST Sub-Total						\$45,466	
Total (2021) Dollars						\$2,628,800	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**



PROJECT NO.: Replaces D-090
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 600-mm water main on Heritage Road from Lagerfeld Boulevard to the future extension of Sandalwood Parkway.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Suburban (2x Creek Crossing) (1x CNR Crossing)	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	600mm
TOTAL LENGTH:	1,280m
Tunnelled	0%
Open Cut	100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	1280 m	\$1,337	\$1,711,360	
Pipe Construction - Tunneling			m	0 m	\$8,000	\$0	
Pipe Construction Uplift (Based on Area Conditions)	10%					\$171,136	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.	2	\$160,000.00	\$320,000	
Major Creek Crossings			ea.		\$1,200,000.00	\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.	1	\$1,200,000.00	\$1,200,000	CNR CROSSING
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$340,250	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$374,275	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$4,117,020	
Geotechnical / Hydrogeological / Materials	0.5%					\$20,585	
Geotechnical Sub-Total Cost						\$20,585	
Property Requirements	1.0%					\$41,170	
Property Requirements Sub-Total						\$41,170	
Consultant Engineering/Design	15%					\$617,553	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$617,553	
In House Labour/Engineering/Wages/CA	8%					\$329,362	
In-house Labour/wages Sub-Total						\$329,362	
Project Contingency	10%					\$512,569	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$512,569	
Non-Refundable HST	1.76%					\$99,233	
Non-Refundable HST Sub-Total						\$99,233	
Total (2021) Dollars						\$5,737,500	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**



PROJECT NO.: Replaces D-077
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 600-mm water main on Heritage Road from Bovaird Drive northerly to a future street.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Suburban	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	600mm Dia
TOTAL LENGTH:	750m
Tunnelled	0%
Open Cut	750m 100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	750 m	\$1,337	\$1,002,750	
Pipe Construction - Tunneling			m	0 m	\$8,000	\$0	
Pipe Construction Uplift (Based on Area Conditions)	10%					\$100,275	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$110,303	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$121,333	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$1,334,660	
Geotechnical / Hydrogeological / Materials	0.5%					\$6,673	
Geotechnical Sub-Total Cost						\$6,673	
Property Requirements	1.0%					\$13,347	
Property Requirements Sub-Total						\$13,347	
Consultant Engineering/Design	15%					\$200,199	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$200,199	
In House Labour/Engineering/Wages/CA	8%					\$106,773	
In-house Labour/wages Sub-Total						\$106,773	
Project Contingency	10%					\$166,165	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$166,165	
Non-Refundable HST	1.76%					\$32,170	
Non-Refundable HST Sub-Total						\$32,170	
Total (2021) Dollars						\$1,860,000	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**



PROJECT NO.: Replaces D-215
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 400-mm water main on a future street from Winston Churchill Boulevard to Tennis Street.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Greenfield (1x Creek Crossing)	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	400mm
TOTAL LENGTH:	1,060m
Tunnelled	0%
Open Cut	100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	1060 m	\$873	\$925,380	
Pipe Construction - Tunneling			m	0 m	\$6,350	\$0	
Pipe Construction Uplift (Based on Area Conditions)	0%					\$0	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.	1	\$127,000.00	\$127,000	
Major Creek Crossings			ea.		\$952,500.00	\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$105,238	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$115,762	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$1,273,380	
Geotechnical / Hydrogeological / Materials	0.5%					\$6,367	
Geotechnical Sub-Total Cost						\$6,367	
Property Requirements	1.0%					\$12,734	
Property Requirements Sub-Total						\$12,734	
Consultant Engineering/Design	15%					\$191,007	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$191,007	
In House Labour/Engineering/Wages/CA	8%					\$101,870	
In-house Labour/wages Sub-Total						\$101,870	
Project Contingency	10%					\$158,536	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$158,536	
Non-Refundable HST	1.76%					\$30,693	
Non-Refundable HST Sub-Total						\$30,693	
Total (2021) Dollars						\$1,774,600	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**



PROJECT NO.: Replaces D-004
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 600-mm water main on the future Sandalwood Parkway West from Mississauga Road to Heritage Road.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Greenfield (1x Creek Crossing)	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	600mm
TOTAL LENGTH:	1,360m
Tunnelled	0%
Open Cut	100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	1360 m	\$1,337	\$1,818,320	
Pipe Construction - Tunneling			m	0 m	\$8,000	\$0	
Pipe Construction Uplift (Based on Area Conditions)	0%					\$0	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.	1	\$160,000.00	\$160,000	
Major Creek Crossings			ea.		\$1,200,000.00	\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$197,832	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$217,615	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$2,393,767	
Geotechnical / Hydrogeological / Materials	0.5%					\$11,969	
Geotechnical Sub-Total Cost						\$11,969	
Property Requirements	1.0%					\$23,938	
Property Requirements Sub-Total						\$23,938	
Consultant Engineering/Design	15%					\$359,065	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$359,065	
In House Labour/Engineering/Wages/CA	8%					\$191,501	
In-house Labour/wages Sub-Total						\$191,501	
Project Contingency	10%					\$298,024	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$298,024	
Non-Refundable HST	1.76%					\$57,697	
Non-Refundable HST Sub-Total						\$57,697	
Total (2021) Dollars						\$3,336,000	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

P

PROJECT NO.: Replaces D-005
 PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
 PROJECT DESCRIPTION: Construction of a 400-mm water main on Lagerfeld Drive from Heritage Road to Tennis Street.

CAPITAL BUDGET YEAR:
 VERSION: URBANTECH - PRELIMINARY
 DATE UPDATED: JULY 14, 2021
 UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Greenfield	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	400mm
TOTAL LENGTH:	560m
Tunnelled	0%
Open Cut	560m 100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	560 m	\$873	\$488,880	
Pipe Construction - Tunneling			m	0 m	\$6,350	\$0	
Pipe Construction Uplift (Based on Area Conditions)	0%					\$0	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$48,888	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$53,777	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$591,545	
Geotechnical / Hydrogeological / Materials	0.5%					\$2,958	
Geotechnical Sub-Total Cost						\$2,958	
Property Requirements	1.0%					\$5,915	
Property Requirements Sub-Total						\$5,915	
Consultant Engineering/Design	15%					\$88,732	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$88,732	
In House Labour/Engineering/Wages/CA	8%					\$47,324	
In-house Labour/wages Sub-Total						\$47,324	
Project Contingency	10%					\$73,647	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$73,647	
Non-Refundable HST	1.76%					\$14,258	
Non-Refundable HST Sub-Total						\$14,258	
Total (2021) Dollars						\$824,400	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**



PROJECT NO.: Replaces NEW
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 400-mm water main on Lagerfeld Drive from Heritage Road to Mississauga Road..

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Greenfield (1x TCPL Crossing) (1x Creek Crossing)	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	400mm
TOTAL LENGTH:	1,420m
Tunnelled	0%
Open Cut	100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	1420 m	\$873	\$1,239,660	
Pipe Construction - Tunneling			m	0 m	\$6,350	\$0	
Pipe Construction Uplift (Based on Area Conditions)	0%					\$0	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.	1	\$127,000.00	\$127,000	
Major Creek Crossings			ea.		\$952,500.00	\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.	1	\$381,000.00	\$381,000	
Additional Construction Costs	10%		ea.			\$174,766	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$192,243	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$2,114,669	
Geotechnical / Hydrogeological / Materials	0.5%					\$10,573	
Geotechnical Sub-Total Cost						\$10,573	
Property Requirements	1.0%					\$21,147	
Property Requirements Sub-Total						\$21,147	
Consultant Engineering/Design	15%					\$317,200	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$317,200	
In House Labour/Engineering/Wages/CA	8%					\$169,173	
In-house Labour/wages Sub-Total						\$169,173	
Project Contingency	10%					\$263,276	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$263,276	
Non-Refundable HST	1.76%					\$50,970	
Non-Refundable HST Sub-Total						\$50,970	
Total (2021) Dollars						\$2,947,000	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**



PROJECT NO.: Replaces NEW
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 400-mm water main on Lagerfeld Drive from Mississauga Road to Creditview Road.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Greenfield (1x Road Crossing) (1x Major Creek Crossing)	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	400mm
TOTAL LENGTH:	600m
Tunnelled	0%
Open Cut	600m 100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	600 m	\$873	\$523,800	
Pipe Construction - Tunneling			m	0 m	\$6,350	\$0	
Pipe Construction Uplift (Based on Area Conditions)	0%					\$0	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.		\$127,000.00	\$0	
Major Creek Crossings			ea.	1	\$952,500.00	\$952,500	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.	1	\$381,000.00	\$381,000	
Utility Crossings			ea.		\$381,000.00	\$0	
Additional Construction Costs	10%		ea.			\$185,730	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$204,303	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$2,247,333	
Geotechnical / Hydrogeological / Materials	0.5%					\$11,237	
Geotechnical Sub-Total Cost						\$11,237	
Property Requirements	1.0%					\$22,473	
Property Requirements Sub-Total						\$22,473	
Consultant Engineering/Design	15%					\$337,100	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$337,100	
In House Labour/Engineering/Wages/CA	8%					\$179,787	
In-house Labour/wages Sub-Total						\$179,787	
Project Contingency	10%					\$279,793	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$279,793	
Non-Refundable HST	1.76%					\$54,168	
Non-Refundable HST Sub-Total						\$54,168	
Total (2021) Dollars						\$3,131,900	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**



PROJECT NO.: Replaces D-041
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 400-mm water main on a future street (Heritage Heights) from Bovaird Drive northerly to a future street

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Greenfield (1x Major Creek Crossing)	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	400mm
TOTAL LENGTH:	2,200m
Tunnelled	0%
Open Cut	2,200m 100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	2200 m	\$873	\$1,920,600	
Pipe Construction - Tunneling			m	0 m	\$6,350	\$0	
Pipe Construction Uplift (Based on Area Conditions)	0%					\$0	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.		\$127,000.00	\$0	
Major Creek Crossings			ea.	1	\$952,500.00	\$952,500	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$287,310	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$316,041	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$3,476,451	
Geotechnical / Hydrogeological / Materials	0.5%					\$17,382	
Geotechnical Sub-Total Cost						\$17,382	
Property Requirements	1.0%					\$34,765	
Property Requirements Sub-Total						\$34,765	
Consultant Engineering/Design	15%					\$521,468	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$521,468	
In House Labour/Engineering/Wages/CA	8%					\$278,116	
In-house Labour/wages Sub-Total						\$278,116	
Project Contingency	10%					\$432,818	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$432,818	
Non-Refundable HST	1.76%					\$83,794	
Non-Refundable HST Sub-Total						\$83,794	
Total (2021) Dollars						\$4,844,800	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**

T

PROJECT NO.: Replaces D-003
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 400-mm water main on Bovaird Drive West from Heritage Road to Tennis Street.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Suburban (1x Creek Crossing)	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	400mm
TOTAL LENGTH:	570m
Tunnelled	0%
Open Cut	570m 100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	570 m	\$873	\$497,610	
Pipe Construction - Tunneling			m	0 m	\$6,350	\$0	
Pipe Construction Uplift (Based on Area Conditions)	10%					\$49,761	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.	1	\$127,000.00	\$127,000	
Major Creek Crossings			ea.		\$952,500.00	\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.			\$0	
Additional Construction Costs	10%		ea.			\$67,437	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$74,181	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$815,989	
Geotechnical / Hydrogeological / Materials	0.5%					\$4,080	
Geotechnical Sub-Total Cost						\$4,080	
Property Requirements	1.0%					\$8,160	
Property Requirements Sub-Total						\$8,160	
Consultant Engineering/Design	15%					\$122,398	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$122,398	
In House Labour/Engineering/Wages/CA	8%					\$65,279	
In-house Labour/wages Sub-Total						\$65,279	
Project Contingency	10%					\$101,591	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$101,591	
Non-Refundable HST	1.76%					\$19,668	
Non-Refundable HST Sub-Total						\$19,668	
Total (2021) Dollars						\$1,137,200	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**



PROJECT NO.: Replaces ST-075
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 750-mm water main on Bovaird Drive West from Mississauga Road to Heritage Road.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	High	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	20%	
Area Condition:	Suburban (1x TCPL Crossing) (1x Creek Crossing)	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	750mm
TOTAL LENGTH:	1,380m
Tunnelled	0%
Open Cut	100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	1380 m	\$1,533	\$2,115,540	
Pipe Construction - Tunneling			m	0 m	\$8,200	\$0	
Pipe Construction Uplift (Based on Area Conditions)	10%					\$211,554	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.	1	\$164,000.00	\$164,000	
Major Creek Crossings			ea.		\$1,230,000.00	\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.	1	\$492,000.00	\$492,000	
Additional Construction Costs	20%		ea.			\$596,619	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$357,971	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$3,937,684	
Geotechnical / Hydrogeological / Materials	2.0%					\$78,754	
Geotechnical Sub-Total Cost						\$78,754	
Property Requirements	2.0%					\$78,754	
Property Requirements Sub-Total						\$78,754	
Consultant Engineering/Design	15%					\$590,653	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$590,653	
In House Labour/Engineering/Wages/CA	8%					\$315,015	
In-house Labour/wages Sub-Total						\$315,015	
Project Contingency	20%					\$1,000,172	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$1,000,172	
Non-Refundable HST	1.76%					\$105,618	
Non-Refundable HST Sub-Total						\$105,618	
Total (2021) Dollars						\$6,106,600	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**



PROJECT NO.: Replaces D-088
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 600-mm water main on the future extension of Williams Parkway from Bovaird Drive to Mississauga Road.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	Low	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	15%	
Area Condition:	Greenfield (1x TCPL Crossing)	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	600mm
TOTAL LENGTH:	1,730m
Tunnelled	0%
Open Cut	100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	1730 m	\$1,337	\$2,313,010	
Pipe Construction - Tunneling			m	0 m	\$8,000	\$0	
Pipe Construction Uplift (Based on Area Conditions)	0%					\$0	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.			\$0	
Major Creek Crossings			ea.			\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.	1	\$480,000.00	\$480,000	
Additional Construction Costs	10%		ea.			\$279,301	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$307,231	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$3,379,542	
Geotechnical / Hydrogeological / Materials	0.5%					\$16,898	
Geotechnical Sub-Total Cost						\$16,898	
Property Requirements	1.0%					\$33,795	
Property Requirements Sub-Total						\$33,795	
Consultant Engineering/Design	15%					\$506,931	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$506,931	
In House Labour/Engineering/Wages/CA	8%					\$270,363	
In-house Labour/wages Sub-Total						\$270,363	
Project Contingency	10%					\$420,753	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$420,753	
Non-Refundable HST	1.76%					\$81,458	
Non-Refundable HST Sub-Total						\$81,458	
Total (2021) Dollars						\$4,709,700	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

**REGION OF PEEL
WATER AND WASTEWATER MASTER SEVICING PLAN
PROJECT TRACKING AND COSTING SHEET**



PROJECT NO.: Replaces ST-104
PROJECT NAME: HERITAGE HEIGHTS - CITY OF BRAMPTON
PROJECT DESCRIPTION: Construction of a 900-mm sub-transmission main on Heritage Road from Urban Boulevard (North Side of Credit River) to Bovard Drive.

CAPITAL BUDGET YEAR:
VERSION: URBANTECH - PRELIMINARY
DATE UPDATED: JULY 14, 2021
UPDATED BY: URBANTECH CONSULTING

Class Estimate Type:	3	Class adjusts Construction Contingency and expected accuracy
Project Complexity:	High	Complexity adjusts Construction Contingency, and expected accuracy
Accuracy Range:	20%	
Area Condition:	Greenfield (1x TCPL Crossing) (1x Creek Crossing)	Area Condition uplifts unit cost and restoration

PROPOSED DIAMETER:	900mm
TOTAL LENGTH:	1,620m
Tunnelled	0%
Open Cut	1,620m 100%

CLASS EA REQUIREMENTS:	
CONSTRUCTION ASSUMPTION:	

COST ESTIMATION SPREADSHEET

COMPONENT	RATE (%)	RATE (\$)	UNIT	ESTIMATED QUANTITY	COST PER UNIT	SUB-TOTAL	COMMENTS
Construction Cost							
Pipe Construction - Open Cut			m	1620 m	\$1,822	\$2,951,640	
Pipe Construction - Tunneling			m	0 m	\$10,000	\$0	
Pipe Construction Uplift (Based on Area Conditions)	0%					\$0	Includes removals, restoration, utility conflicts
Minor Creek Crossings			ea.	1	\$200,000.00	\$200,000	
Major Creek Crossings			ea.		\$1,500,000.00	\$0	
Road Crossings			ea.			\$0	
Major road Crossings (Highway)			ea.			\$0	
Utility Crossings			ea.	1	\$600,000.00	\$600,000	
Additional Construction Costs	20%		ea.			\$750,328	Includes Mod.Demob, connections, inspection, signage, traffic management, bonding, insurance
Provisional & Allowance	10%		ea.			\$450,197	Provisional Labour and Materials in addition to base construction cost.
Sub-Total Construction Base Costs						\$4,952,165	
Geotechnical / Hydrogeological / Materials	2.0%					\$99,043	
Geotechnical Sub-Total Cost						\$99,043	
Property Requirements	2.0%					\$99,043	
Property Requirements Sub-Total						\$99,043	
Consultant Engineering/Design	15%					\$742,825	Includes planning, pre-design, detailed design, training, CA
Engineering/Design Sub-Total						\$742,825	
In House Labour/Engineering/Wages/CA	8%					\$396,173	
In-house Labour/wages Sub-Total						\$396,173	
Project Contingency	20%					\$1,257,850	Construction Contingency is dependent on Cost
Project Contingency Sub-Total						\$1,257,850	
Non-Refundable HST	1.76%					\$132,829	
Non-Refundable HST Sub-Total						\$132,829	
Total (2021) Dollars						\$7,679,900	
Other Estimate							
Chosen Estimate							

COST ESTIMATE SUMMARY - FOR PHASING ESTIMATING ONLY

PROJECT COMPONENT	PROJECT COMPONENT DESCRIPTION	PERCENTAGE	TOTAL	YEAR	COMMENTS
Study	Feasibility study, EA				
Design	Design fees, Town fees for design, contract admin				
Construction	Town fees, base costs and project contingency				
TOTAL					

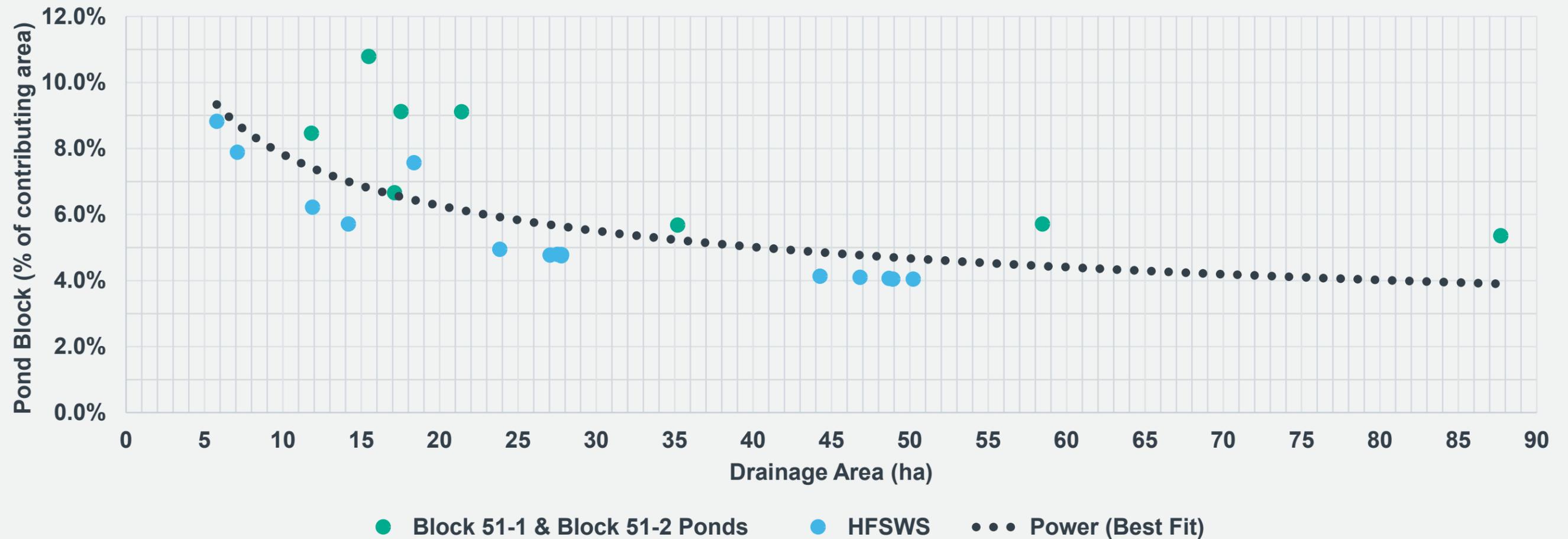
APPENDIX C

**SWM POND BLOCK RULE OF THUMB CALCULATIONS
ALTERNATIVE SWM MEASURES ESTIMATES**

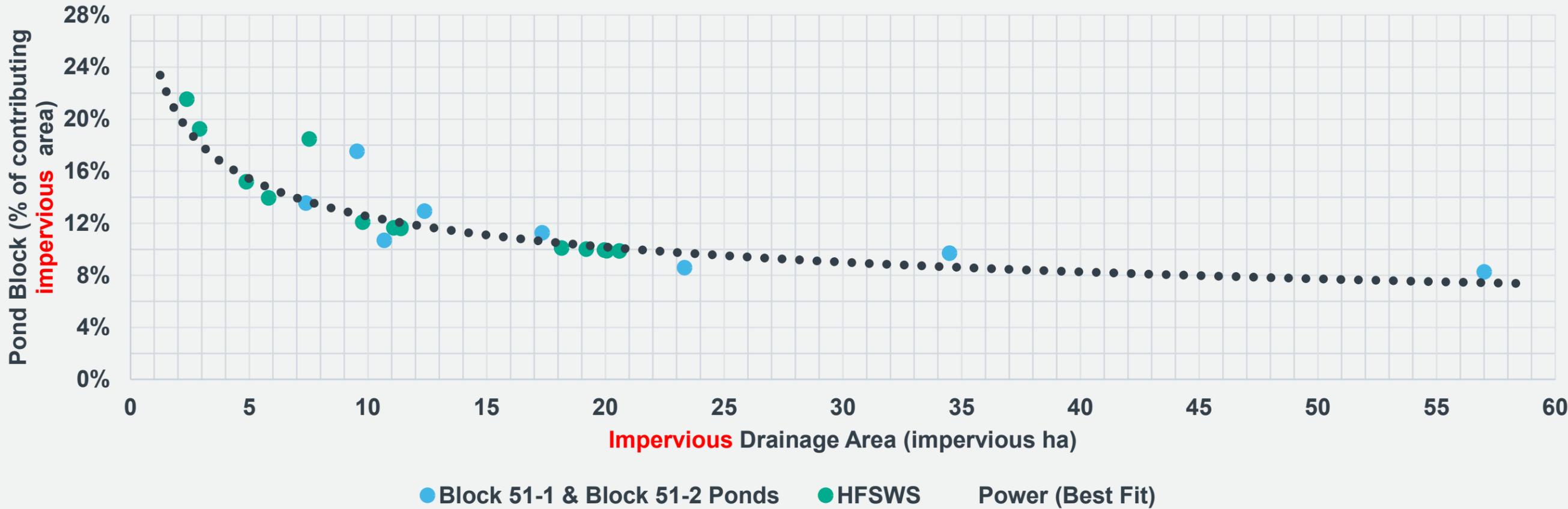
Northwest Brampton SWM Facility Data

Pond ID	Location	Watercourse	Type	Status	Contributing Drainage Area	Pond Block Area	Imperviousness	Pond Block as % of contributing area	Pond Block as % of contributing Impervious area
					[ha]	[ha]	%	%	%
F1	Block 51-1	Fletcher's Creek	Regional Control / Wet Pond	Constructed	87.7	4.7	65	5%	8%
F2	Block 51-2	Fletcher's Creek	Regional Control / Wet Pond	Constructed	35.19	2	66.3	6%	9%
F3	Block 51-2	Fletcher's Creek	Regional Control / Wet Pond	Constructed	17.54	1.6	70.6	9%	13%
F6	Block 51-2	Fletcher's Creek	Regional Control / Wet Pond	Constructed	15.48	1.67	61.6	11%	18%
F7	Block 51-2	Fletcher's Creek	Regional Control / Wet Pond	Constructed	17.12	1.14	62.4	7%	11%
F8	Block 51-2	Fletcher's Creek	Regional Control / Wet Pond	Constructed	11.82	1	62.5	8%	14%
F10	Block 51-2	Fletcher's Creek	Regional Control / Wet Pond	Constructed	58.46	3.34	59	6%	10%
H6	Block 51-1	East Huttonville Creek	Regional Control / Wet Pond	Constructed	21.4	1.95	81	9%	11%
704	Heritage Heights	West Huttonville Creek	Regional Control / Wet Pond	Planned (previous Wood HFSWS)	50.22	2.03	41	4%	10%
705	Heritage Heights	West Huttonville Creek	Regional Control / Wet Pond	Planned (previous Wood HFSWS)	18.36	1.39	41	8%	18%
706	Heritage Heights	West Huttonville Creek	Regional Control / Wet Pond	Planned (previous Wood HFSWS)	44.27	1.83	41	4%	10%
707	Heritage Heights	West Huttonville Creek	Regional Control / Wet Pond	Planned (previous Wood HFSWS)	48.92	1.98	41	4%	10%
708	Heritage Heights	West Huttonville Creek	Regional Control / Wet Pond	Planned (previous Wood HFSWS)	5.78	0.51	41	9%	22%
709	Heritage Heights	West Huttonville Creek	Regional Control / Wet Pond	Planned (previous Wood HFSWS)	46.82	1.92	41	4%	10%
711	Heritage Heights	West Huttonville Creek	Regional Control / Wet Pond	Planned (previous Wood HFSWS)	27.77	1.32	41	5%	12%
713	Heritage Heights	West Huttonville Creek	Regional Control / Wet Pond	Planned (previous Wood HFSWS)	27.52	1.32	41	5%	12%
715	Heritage Heights	West Huttonville Creek	Regional Control / Wet Pond	Planned (previous Wood HFSWS)	14.18	0.81	41	6%	14%
716	Heritage Heights	West Huttonville Creek	Regional Control / Wet Pond	Planned (previous Wood HFSWS)	23.84	1.18	41	5%	12%
718	Heritage Heights	West Huttonville Creek	Regional Control / Wet Pond	Planned (previous Wood HFSWS)	27.04	1.29	41	5%	12%
720	Heritage Heights	West Huttonville Creek	Regional Control / Wet Pond	Planned (previous Wood HFSWS)	11.89	0.74	41	6%	15%
721	Heritage Heights	West Huttonville Creek	Regional Control / Wet Pond	Planned (previous Wood HFSWS)	48.67	1.98	41	4%	10%
725	Heritage Heights	West Huttonville Creek	Regional Control / Wet Pond	Planned (previous Wood HFSWS)	27.78	1.33	41	5%	12%
726	Heritage Heights	West Huttonville Creek	Regional Control / Wet Pond	Planned (previous Wood HFSWS)	7.1	0.56	41	8%	19%

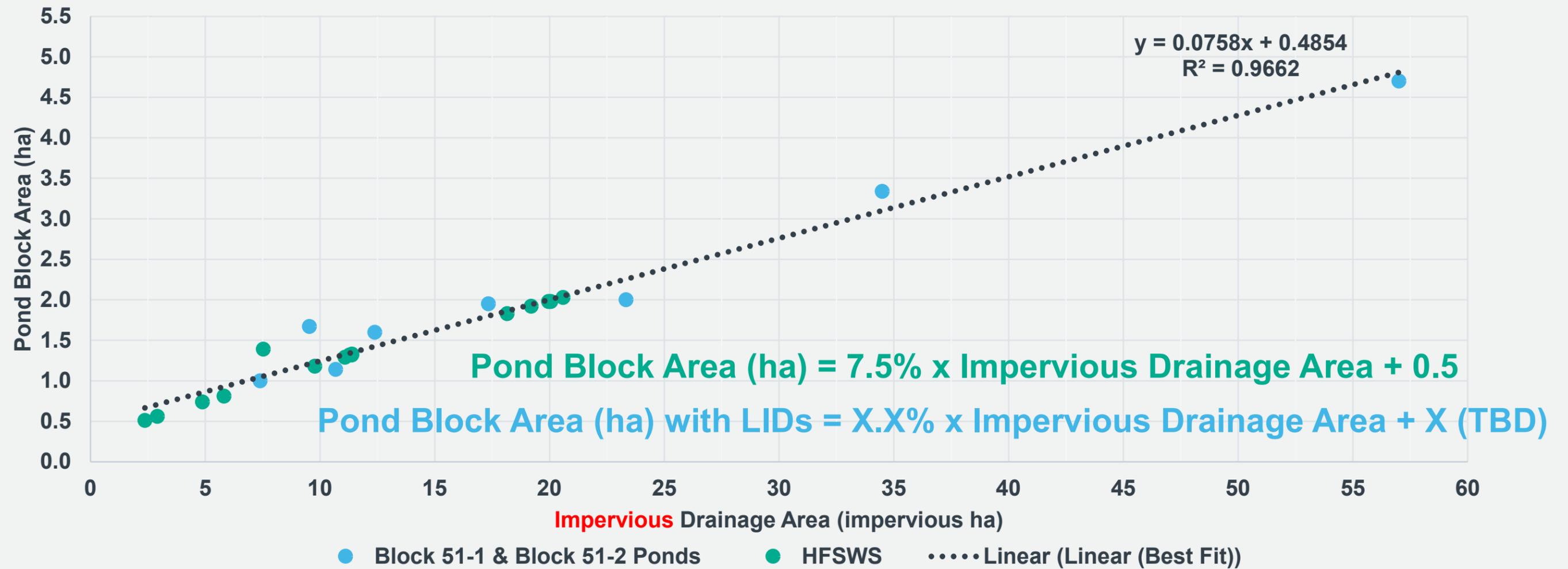
SWM Pond Sizing Rule of Thumb



SWM Pond Sizing Rule of Thumb



SWM Pond Sizing Rule of Thumb





ROADS



LOW-RISE



END-OF-PIPE



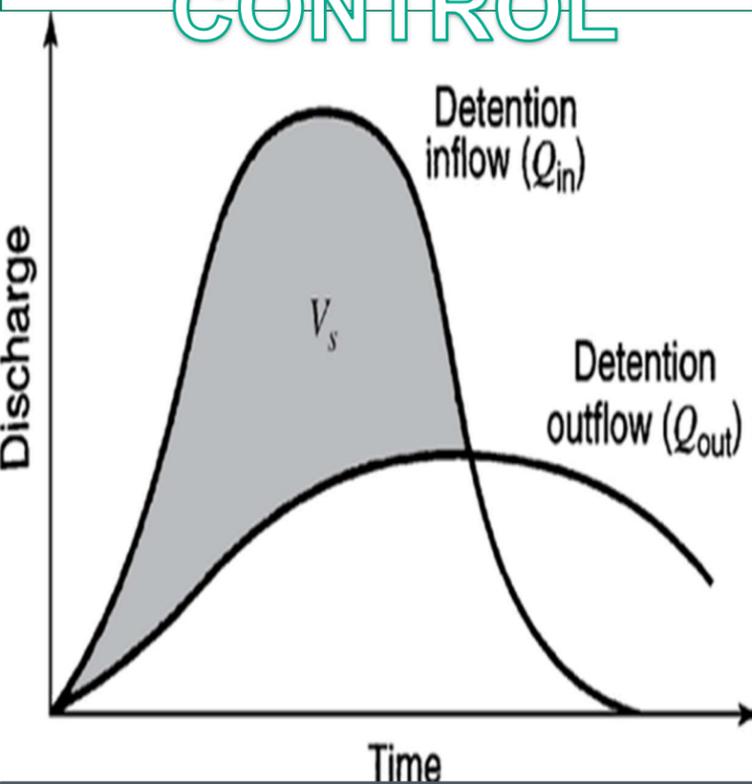
HIGH DENSITY /
INDUSTRIAL

LID / SWM BMP LAND USE APPLICATIONS



URBANTECH®

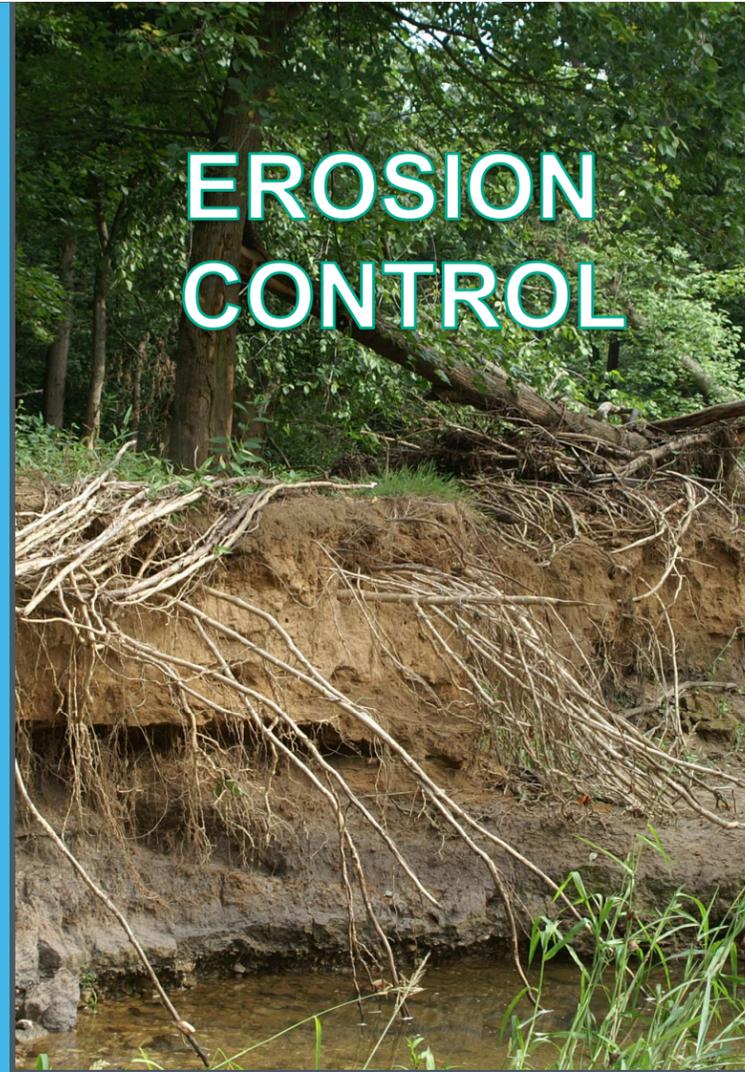
QUANTITY CONTROL



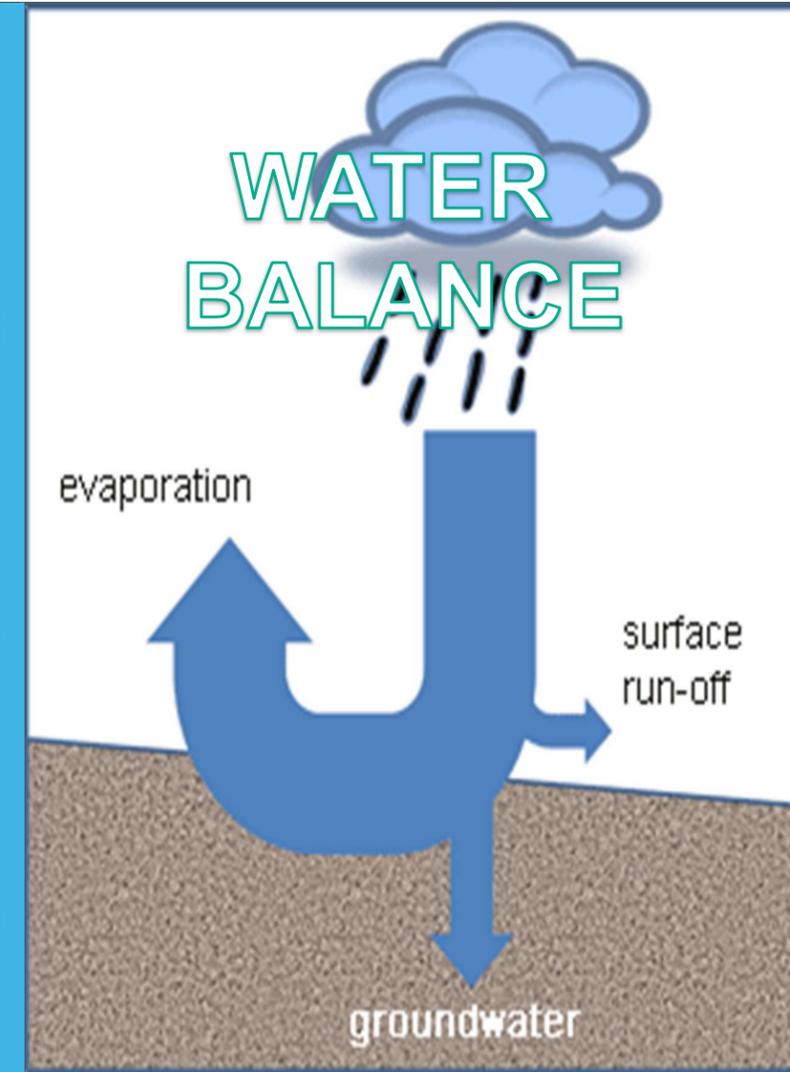
QUALITY CONTROL & THERMAL MITIGATION



EROSION CONTROL



WATER BALANCE



STORMWATER MANAGEMENT OBJECTIVES



URBANTECH®

APPLICABLE SWM MEASURES - LOW RISE	Quantity Control	Quality Control	Erosion Control	Water Balance	Reduce EOP Facility Size?
Oil / grit separators		▲			▲
CB Shields		▲			
Filter strip		▲			
Super Pipe	▲				▲
Infiltration Trench	▲	▲	▲	▲	▲
Bioretention	▲	▲	▲	▲	▲
Tree Pits	▲	▲	▲	▲	▲
U/G Tanks	▲				▲
Permeable pavement	▲	▲	▲	▲	▲
Rain Barrel / Cistern					
ROW storage (surface of road / sag areas)	▲				
Front yard cisterns / U/G tanks in detached lots (i.e. public easements up to front door)	▲		▲	▲	
Rain gardens	▲		▲	▲	

APPLICABLE SWM MEASURES – HIGH DENSITY / INDUSTRIAL / COMMERCIAL	Quantity Control	Quality Control	Erosion Control	Water Balance	Reduce EOP Facility Size?
Oil / grit separators		▲			▲
CB Shields		▲			
Filter strip		▲			
Super Pipe	▲				▲
Infiltration Trench	▲	▲	▲	▲	▲
Bioretention	▲	▲	▲	▲	▲
Tree Pit	▲	▲	▲	▲	▲
U/G Tanks	▲				▲
Permeable pavement	▲	▲	▲	▲	▲
Rain Barrel / Cistern	▲	▲	▲	▲	
Rooftop Storage	▲		▲	▲	▲
Green Roofs	▲		▲	▲	▲
Blue roofs	▲		▲	▲	▲

APPLICABLE SWM MEASURES – ROW	Quantity Control	Quality Control	Erosion Control	Water Balance	Reduce EOP Facility Size?
Oil / grit separators		▲			▲
CB Shields		▲			
Filter strip		▲			
Super Pipe	▲				▲
Infiltration Trench	▲	▲	▲	▲	▲
Bioretention	▲	▲	▲	▲	▲
Tree Pit	▲	▲	▲	▲	▲
U/G Tanks	▲				▲
Permeable pavement	▲	▲	▲	▲	▲
Long swales / linear ponds	▲	▲	▲	▲	▲
ROW storage (surface of road / sag areas)	▲				
Pervious catchbasins	▲	▲	▲	▲	

APPLICABLE SWM MEASURES – END-OF-PIPE	Quantity Control	Quality Control	Erosion Control	Water Balance
Oil / grit separators		▲		
Bioretention	▲	▲	▲	▲
U/G Tanks	▲			
Wetland Ponds	▲	▲	▲	▲
Active / controlled-release ponds	▲	▲	▲	▲
Wet Ponds	▲	▲	▲	
Dry ponds	▲		▲	
Ponds in parks	▲		▲	
Long swales / linear ponds	▲	▲	▲	▲
“Urban” ponds with retaining walls	▲	▲	▲	
SWM Shield		▲		