# 2019 DEVELOPMENT CHARGES BACKGROUND STUDY: STORMWATER DRAINAGE COMPONENT CITY OF MISSISSAUGA

Submitted by: KSGS Engineering Corp. 470 Hensall Circle, Unit 300 Mississauga ON L5A 3V4

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## EXECUTIVE SUMMARY

KSGS Engineering Corp. was retained by the City of Mississauga to carry out this 2019 Storm Drainage Development Charge Background Study.

At the outset of the project, a detailed review of the stormwater development charge components was undertaken. The review was done in the context of accepted methodologies used in previous stormwater development charge study updates and municipal precedent. The review also took into consideration the City's Stormwater Charge along with changes to City and Provincial requirements.

At the conclusion of the review, a number of components were refined for the current study update. Accordingly, the following stormwater development charge components are deemed to be growth related, in part or in whole:

- 1) Stormwater drainage related background studies and monitoring;
- 2) Storm sewer oversizing;
- 3) Stormwater management which includes stormwater management facility retrofits, flood relief and new stormwater management facilities;
- 4) Stormwater conveyance; and,
- 5) Creek erosion works, which include identified works and future works.

Hemson Consulting completed a vacant land supply analysis for the City. For the purposes of the development charge calculation it was found that the available development lands, that are vacant and lands with redevelopment potential, is 1,567 hectares. This represents 5.4% of the total area of the City.

The total cost of growth-related works calculated in this study is \$66,115,844. In netting out the reserves, the resulting total stormwater management capital cost to be recovered through development charges is \$13,566,829. Based on the available development lands noted above, the storm drainage component of the development charge is \$8,658 per hectare.

## 1. DEVELOPMENT CHARGE UPDATE -STORMWATER DRAINAGE

### **1.1 Introduction**

KSGS Engineering Corp. was retained by the City of Mississauga to carry out this 2019 Storm Drainage Development Charge Background Study ("Storm DC"). The Development Charges Act (DCA) requires the preparation of a background study to support proposed Development Charge rates. The City has updated its Storm DC every five years since 1999, as mandated by the DCA. The content of this report is typically appended to the overall City-wide Development Charge Background Study which looks at a broader range of services (e.g. Fire, Library, Parks, etc.) as this study focuses solely on the stormwater program. The City-Wide Development Charge Study has been undertaken by Hemson Consulting and supported by KSGS Engineering Corp, while the Storm DC has been led by KSGS Engineering Corp. and supported by Hemson Consulting.

A long-term planning horizon from 2019 to 2041 has been used for the purposes of the Storm DC calculation. Consistent with the City's historical practice, the Storm DC calculation is calculated as a cost per net hectare, which in part recognizes that storm drainage is a function of the impervious area within a development parcel.

The Storm DC considered a list of growth-related capital projects between the years 2019 and 2041. Each project included the following information:

- Project name
- Work category
- Anticipated year of work
- Type of work (i.e. study, EA, design, land acquisition, construction etc.), and
- Estimated cost

### 1.2 Approach to Study Update

The past approach to this study has assumed that development charges are collected to carry out the following categories of work:

- Watercourse Erosion Control (identified and future)
- Conveyance (including channelization and culvert upgrades)
- Stormwater Management Facilities (new and retrofits)
- Storm Sewer Oversizing
- Studies

As part of this 2019 Storm DC, a review was undertaken with the City of the historical approach, which was developed well over twenty years ago at a time when greenfield development was prevalent, to determine its relevance in today's development climate. The City has since progressed from greenfield development to intensification and

redevelopment, and has also introduced the Stormwater Charge ("SW Charge"), as a move away from funding the stormwater management program from the property tax base. The SW Charge is a fair and equitable dedicated source of funding for stormwater projects based on impervious area of the largest stormwater contributors, and is coupled with a credit program that rewards the implementation of on-site measures that benefit the stormwater program. The SW Charge is distinctly different from the Storm DC in that the Storm DC is specifically for growth-related projects.

In reviewing the City's approach to completing past Storm Drainage Development Charge Background Studies, the key finding notes that; as the City is significantly built-out, the retrofitting of existing stormwater management facilities (SWMF) and storm outlets is assessed with a greater benefit to existing development (non-growth) than previous studies.

### 1.3 Analysis for Available Development Lands

The storm water management development charge is calculated as a uniform charge per net hectare of chargeable vacant land. To determine the amount of chargeable vacant land, Hemson Consulting, in collaboration with the City's Environmental Services Section and Open Data sources, prepared an inventory of all the vacant residential, non-residential, mixed use lands and lands available for redevelopment that are eligible to be recovered through development charges. In order to determine the redevelopment potential of sites, an assumption of 2.5 per cent has been applied to the occupied lands throughout the identified watersheds. Although the redevelopment potential of individual sites vary, the 2.5 per cent assumption is intended to represent a City-wide average. The resulting total future net developable area is 1,567 hectares after adjusting for the redevelopment potential of occupied lands. This land will be subject to the storm water management development charge and represents 5.4% of the total area of the City, as noted in **Table 3.1**.

### **1.4 LID Resolution**

"Low Impact Development" measures, or "LID," is a suite of stormwater management practices typically implemented close to the source of stormwater runoff that aids in reducing the impact of runoff volume. The City of Mississauga has been adopting LID across various public realm areas over the last decade through inclusion in capital projects such as parks, fire stations, libraries and road right-of-way's. LID techniques utilized include, for example, bio-retention systems, permeable pavements, green roofs and infiltration systems. Additionally, the City has updated stormwater management requirements within the "Development Standards" to require development applications to include LID. This practice had been occurring voluntarily to a certain degree however a minimum 5mm requirement was formalized in 2016.

On September 13, 2017, City Council resolved that, "LID options be considered and evaluated and, where appropriate, included in the scope of the upcoming Development Charges Background Study-Storm Drainage Component in support of the City's Development Charges Update in 2019." The Council Resolution is included in **Appendix A**.

As part of the review to the overall approach, discussed in the section above, this matter was considered. It was found that the state-of-the-industry at the time of this writing is such that LID is reasonably common. Moreover, DC funding for infrastructure has typically been applied to "trunk" infrastructure (e.g. as with the approach for storm sewers) and as LID is implemented at a local, "at-source" scale, it is found in this instance that DC funding would not apply to the LID measures expected in the City.

# 2. STORMWATER DRAINAGE

The following stormwater drainage components were re-evaluated to be updated in the current study:

- 1) Watercourse Erosion Control (identified and future)
- 2) Conveyance (including channelization and culvert upgrades)
- 3) Stormwater Management Facilities (new and retrofits)
- 4) Storm Sewer Oversizing
- 5) Studies

Each of the above is further discussed in the sections below with respect to growth related works and apportionment of cost. In the calculations, it should be noted that the latest Non-Residential Building Construction Price Index (NRBCPI) data was obtained from Statistics Canada, where applicable, to bring the project cost as close to "Present Value" as possible.

### 2.1 Erosion Control Works

### **Identified Works**

Creeks and water conveyance channels in the City of Mississauga continue to experience erosion. The City has had to carry out erosion control works based on priorities identified in various background studies and through annual condition assessments.

The priority projects to be implemented in the City's Capital Works Budget/Forecast ("Capital Plan") are shown in **Table 2.1**. If applicable, the supporting study for the erosion control work is noted in the second column of Table 2.1. The development charge portion of each project is calculated based on the percentage of available development lands within the respective watershed where the project is located, as discussed in Section 1.3 above and shown in **Table 3.1**.

### Future Works

Future erosion control works are those anticipated in the future but not yet identified in the City's Capital Plan. The total length of future erosion control was established from desktop assessment and field investigation during the 2014 development charges study update.

The method being used to carry out the current 2019 update is consistent with that used in the 2014 study update. The total length has netted out the quantity completed by the City between the year 2014 and 2018. An updated summary of future works estimated based on watershed is shown in **Table 2.2**.

The cost of future erosion works to be allocated to development charges is calculated based on 5.4% of total estimated cost, as this percentage represents an average of available development lands City-wide, as shown in **Table 3.1**.

The estimated unit rate for creek restoration works is based on past projects of a similar nature from various local and regional municipalities as shown in **Table 2.3**. The original data in **Table 2.3** was taken from the 2014 study update. Recent projects completed by the City were added to the list.

### Minor Erosion Control Works

Item **C** in **Table 2.1** is related to minor erosion control works, the total cost is based on a fixed annual rate for the next 22 years. The development charges related portion is based on 5.4% as this percentage represents an average of available development lands Citywide, as shown in **Table 3.1**.

### 2.2 Stormwater Conveyance

The main types of stormwater conveyance related works are; channelization, culvert improvements, and drainage improvements. These projects have primarily been identified in the City's Capital Plan, with some being raised through other background studies.

For example, a project identified outside of the City's Capital Plan is the upgrade of a crossing related to the Ninth Line Lands Study to facilitate development. This particular project was identified in the "Shaping Ninth Line" study that plans for the growth area along the west side of Ninth Line between Eglinton Avenue West and Highway 401. The upgrade of a watercourse crossing on the west side of Highway 407 will assist in unencumbering development lands on the east side of Highway 407 where new development is slated.

The portion of cost for stormwater conveyance allocated to future growth was based on the percentage of available development lands within the watershed where the project is located. **Table 2.4** depicts the list of stormwater conveyance projects identified for the study period.

### 2.3 Stormwater Management Facilities

Stormwater management end-of-pipe facilities are a key component in the stormwater development charge study. Outlined below are three (3) sub-components identified in past development charge studies that were reviewed in this current update.

- 1) New SWM Facilities.
- 2) Stormwater Quality Retrofit.
- 3) Flood relief.

### 1) New SWM Facilities

New stormwater management facilities have been identified in the City's Capital Plan. In preparing this study update, all of the costs related to Environmental Assessment (EA), design, construction and land to complete the new facilities were taken directly from the City's Capital Plan.

Since these facilities are required to service future development, one hundred percent of all EA, design, construction and land cost are to be funded by stormwater development charges. For a detailed summary, refer to **Table 2.5**.

The Sheridan Park Corporate Centre stormwater management facility is the only exception, being attributed to available development lands, as this facility will serve municipal lands beyond the proposed future development.

### 2) Stormwater Quality Retrofits

As stated in Section 1.2; the review of the City's approach on this item found that as the City is significantly built-out, the retrofitting of existing stormwater management facilities (SWMF) and storm outlets provides a benefit to existing development (non-growth). As such, the development charge component for this category is assessed on the available development lands.

Through the Mississauga Stormwater Quality Control Strategy (MSWQCS) study update, the City has identified opportunities to improve water quality by retrofitting existing stormwater management facilities. Stormwater retrofitting typically involves increasing capacity of permanent pool, modifications to the outlet control structure, landscaping and other restoration works.

The apportionment of stormwater quality retrofit cost to stormwater development charges is based on the percentage of available development lands in relation to the total area of the watershed where the project is located. For details, refer to development lands calculations performed by Hemson Consulting in **Table 3.1**.

### 3) Flood Relief Works

Building upon the report completed in the 2014 study update by Aquafor Beech Limited, Item **C** of **Table 2.5** outlines the flood relief projects identified in the City's Capital Plan for providing flood relief.

The portion of total cost of providing flood relief that is attributable to stormwater development charges is based on the available development lands in the watershed. The available development lands were determined to be 4.7% in the Cooksville Creek watershed.

### 2.4 Storm Sewer Oversizing

Storm sewer oversizing is a process to improve existing storm sewer systems to accommodate historically induced growth. Based on past history, large sewers generally service drainage areas that are owned by a number of land owners. In the City of Mississauga, trunk sewers are those with a diameter greater than 1500 mm. The cost component of the pipe greater than a 1500 mm pipe is eligible for stormwater development charges.

To determine the location where this situation may occur and when such works may take place is difficult. As such, an estimate has been provided for the 2019 to 2041 time period, which carries forward the assumption of \$270,000 per year. **Table 2.6** depicts the yearly cost estimate for storm sewer oversizing. The total amount of storm sewer oversizing is 100% eligible for the stormwater development charges as it is directly related to growth.

### 2.5 Studies

The full cost of this component is attributable to growth, therefore is eligible to be funded by stormwater management development charge. For studies that have a growth element but also have benefit-to-existing, the apportioning has been allocated based on a City-wide percentage if applicable, or relative to the watershed, if the study is watershed-specific. A summary of studies applicable to stormwater development charges is shown in **Table 2.7**, and the apportioning has been annotated accordingly for clarity.

## 3. SUMMARY OF 2019 STUDY UPDATE

The purpose of this 2019 Storm Drainage Development Charge Background Study was to undertake a review of the approach to date with consideration to municipal precedent and generally accepted practice; and to complete the calculations in support of the Development Charges By-law.

The following stormwater drainage components are deemed to be growth related and therefore are included in the current study update:

- 1) Stormwater drainage related background studies and monitoring;
- 2) Storm sewer oversizing;
- 3) Stormwater management which includes stormwater facility retrofits, flood relief, new stormwater management facilities;
- 4) Stormwater conveyance; and,
- 5) Creek erosion works, which include identified works and future works.

Hemson Consulting completed a vacant land supply analysis for the City. For the purposes of the development charge calculation it was found that the available development lands, that are vacant and lands with redevelopment potential, is 1,567 hectares. This represents 5.4% of the total area of the City.

The total cost of growth-related works calculated in this study is \$66,115,844. In netting out the reserves, the resulting total stormwater management capital cost to be recovered through development charges is \$13,566,829. Based on the available development lands noted above, the storm drainage component of the development charge is \$8,658 per hectare.

A summary of the calculations is depicted in Table 4.1.

TABLE 2.1 – SUMMARY OF EROSION CONTROL WORKS

# TABLE 2.1:SUMMARY OF EROSION CONTROL WORKS

#### A - EROSION CONTROL - IDENTIFIED WORKS

			Budget Timing Cost Estimates			DC	Costs		
Man ID#	Background Study*	Project Name / Leastion	EA & Docian	Construction	EA & Design Cost	Construction Cost	Total Cost	DC Portion	DC Amount
COOK-1100-01	CCRS site #/b	Cooksville Creek Erosion Control - CP Rail to Kinwin Avenue	EA & Design	2019	EA & Design Cost	Construction Cost	\$720.000	1 7%	\$33.840
COOK-0600-01	CCRS site #20	Cooksville Creek Erosion Control - OFW to Elaine Trail		2019			\$720,000	4.7%	\$103,870
COOK-2300-01	CCRS site #Ze	Cooksville Creek - Meadows Blvd to Bathburn Rd F		2019			\$2,210,000	4.7%	\$103,070
ETOB-2200-01	CONS SILE #1 a	Etobicoke Creek Frosion Control - contributions to TAM for Tomken Rd Bridge		2019			\$3,500,000	4.7%	\$4.560
MIMI-1200-01		Mimice Creek Erosion Control - Contributions to TAM for Forniken Rd. Druge		2013			\$270,000	4 7%	\$17 200
COOK-1200-01		Cooksville Crook Erosion Control - Lidde Drive to Deny Road Last	2010	2020	\$210,000	\$1 190 000	\$1,200,000	4.7%	\$65,220
COOK-1200-01	-	Downstream of Mississaura Valley Boulevard	2019	2021	\$210,000	\$1,100,000	\$1,390,000	4.7%	\$64,860
SAWM-0400-01	SCNCDS Boach # 1.8	A Sawmill Creek Erosion Control - The Folkway to Erin Mills Pkwy	2019	2021	\$00,000	\$1,320,000	\$1,300,000	4.7 %	\$04,000
MIMI-0600-01	SCINCUS Reach # 1 &	Mimice Creek Erosion Control, upstream and downstream of Pena Pd	2019	2021	\$350,000	\$1,670,000	\$2,020,000	4.4%	\$00,000 \$56,400
SHER-0300-01		Sharidan Crack Erosion Control - Upsitean and downsitean of Neha Nu.		2020			\$2,200,000	4.1 % 6.5%	\$210,700
CRED-0300/0400-01		Credit River Erosion Control North and South of OEW	2020	2020	\$210,000	\$1 600 000	\$3,300,000	5.7%	\$114,000
COOK-0700-01	-	Cooksville Creek Erosion Control - Camilla Road to North Service Road	2020	2022	\$310,000	\$1,090,000	\$2,000,000	J.7 %	\$114,000
ETOB-0900-01	internal (2007 W/CE)	Etobicoke Creek Erosion Control - Calinina Noau to North Service Road	2020	2022	\$100,000	\$160,000	\$000,000	4.7 %	\$40,420
CRED-1700-01	CRAME aita #4	Credit River Fresion Control - West of Creditview Rd, behind Konninghall Rive	2020	2022	\$230,000	\$1,090,000	\$1,900,000	5.7 %	\$112,000
COOK-2400-01	CRAINS SILE #4	Cooksville Crock Erosion Control - Rebind Tribal Court	2020	2022	\$330,000	\$1,900,000	\$2,230,000	5.7% 4.7%	\$127,110
APPI -0300-01		Applewood Crock Erosion Control - Jakeview Golf Course	2020	2022	\$70,000	\$300,000	\$370,000	4.7 %	\$17,390
LETO-0200-01	-	Little Etobicoke Creek Erosion Control - Dundas Street to Divie Road		2021			\$2,500,000	3.0%	\$34,000
LETO-0200-01	-	Little Etobicoke Creek Erosion Control - Downstream of Dundas St. E	2021	2021	\$100,000	\$460.000	\$550,000	4.0%	\$34,000
COOK-0200-01	CCRS aita #1a	Pood East	2021	2023	\$100,000	\$400,000	\$300,000	4.0%	\$22,400
MULT-0900-01	MCRS site #10	Mullet Creek Erection Control Tannery Street to Themas Street	2021	2023	\$30,000	\$130,000	\$200,000	4.7 %	\$9,400
MULT-0700/0800-01	MCPS site #60	Mullet Creek Erosion Control - Co Transit to D/S of Erin Contro Blvd	2021	2023	\$100,000	\$1,010,000	\$720,000	5.3%	\$03,070
WOLF-0700/0300-01		Wolfedale Creek Erosion Control - Central Parkway, W to Dundas St	2021	2023	\$120,000	\$000,000	\$120,000	3.3%	\$30,100
LETO 1200.01		Little Etobiceke Creek Erosion Control - Dewestream of Britannia Read East	2022	2024	\$140,000	¢760.000	\$130,000	3.3 %	\$4,900 \$26,000
MULT-2000-01		to Middlobury Drive	2022	2024	\$140,000	\$760,000	\$900,000	4.0%	\$30,000
MULT-0200/0300-01		Mullet Creek Fresion Centrel, Burnhamtherne Bead West to behind Weedebuck Lane	2022	2024	\$350,000	\$1,900,000	\$2,290,000	5.3%	\$121,370
CRED-0200-01	CRAMS cito #20 8 20	Mississauga Road	2022	2024	\$430,000	\$2,230,000	\$2,700,000	5.3%	\$145,100
COOK-1700-01	CITAINS SILE #29 & 30	Cooksville Creek Erosion Control - Highway 403 to Hurontario Street	2022	2024	\$520,000	92,920,000	\$3,440,000	J.7 %	\$190,000
WOLE-0100-01		Wolfedale Creek - Courrier Lane to Credit River	2022	2025	\$120,000	000 009	\$300,000	4.7 %	\$14,100
COOK-0800-01	CCBS aita #2a	Cooksville Creek Frecien Central King Street Fast to parth of Paisley Reyleyard Fast	2023	2025	\$120,000	\$000,000	\$500,000	4 70/	\$20,400
MULT-2200-01	MCPS site #155	Mullet Creek Erosion Control - Wabukayne Tributary, Upstream of CP Bail	2023	2025	\$140,000	\$430,000	\$390,000	4.7 %	\$27,730
MULT-2200-02	MCRS site #15a	Parkway	2023	2025	\$290,000	\$3,300,000	\$3,910,000	5.3%	\$207,230
ETOB-0300-01	internal (2007 WCE)		2023	2025	\$250,000	\$1,000,000	\$600,000	5.3%	\$104,410
CRED-2300-01	CRAMS site #1	Credit River Frosion Control - Downstream of Old Derry Rd	2023	2025	\$40,000	\$200,000	\$240,000	5.7%	\$13,680
CRED-0700-01	CRAMS site #200	Credit River Erosion Control - Upstream of Dundas St W. adjacent to UTM Campus	2023	2025	\$140,000	\$200,000	\$060,000	5.7%	\$54,720
WOLE-0200-01		Wolfedale Creek Erosion Control - CPR to Dundas St	2025	2023	ψ1 <del>4</del> 0,000	ψ020,000	\$1 120 000	3.3%	\$36,960
CRED-0500-03	CRAMS site #25 reach	Credit River Erosion Control - Adjacent to Ostler Court		2024			\$3,660,000	5.7%	\$208.620
ETOB-0800-01	internal (2007 WCE)	Etobicoke Creek Erosion Control - Falinton Avenue East to Hydro Corridor	2024	2024	\$120,000	\$320.000	\$440,000	5.7%	\$25,080
CAWT-0200-01		Cawthra Creek Erosion Control - Dellwood Park	2024	2026	\$120,000	\$560,000	\$680,000	10.1%	\$68,680
ETOB-0100-01	internal (2007 W/CE)	Etobicoke Creek Erosion Control - Downstream of OEW, adjacent to Toronto Golf Club	2024	2026	\$340,000	\$1 320 000	\$1,660,000	5.7%	\$94,620
CRED-0500-02	CRAMS site #22	Credit River Erosion Control - Downstream of Dundas St W behind Blythe Rd	2024	2026	\$140,000	\$700.000	\$840.000	5.7%	\$47,880
ETOB-0100-02	internal (2007 WCE)	Etobicoke Creek Erosion Control - Unstream of CNR adjacent to Toronto Golf Club	2024	2026	\$120,000	\$410,000	\$530,000	5.7%	\$30,210
CRED-2600-01		(340m)	2024	2026	\$140,000	\$760,000	\$900,000	5.7%	\$51,300
COOK-1500-01		MVB (580m)	2024	2026	\$110,000	\$530,000	\$640,000	4.7%	\$30,080
LOYL-0600-01		Lovalist Creek erosion control, between Thornlodge Drive	2024	2026	\$310,000	\$1,810,000	\$2 120 000	2.5%	\$53,000
WOLF-0300-01		Wolfedale Creek Erosion Control - North and South of Central Parkway W	2024	2025	φ010,000	φ1,010,000	\$860,000	3.3%	\$28,380
MARY-0200		Mary Fix Creek erosion control works - behind Old River Rd	2025	2025			\$1 180 000	5.7%	\$67,260
COOK-0500-01		Avenue	2025	2027	\$200.000	\$1 660 000	\$1,860,000	4.7%	\$87,420
APPL-0200-01		Applewood Creek Erosion Control - CNR to Lakeshore Rd	2025	2027	\$90,000	\$450,000	\$540,000	3.0%	\$16,200
CRED-1400-01	CRAMS site #10	Credit River Erosion Control - Streetsville Public Cemetery	2025	2027	\$140,000	\$820,000	\$960,000	5.7%	\$54 720
MIMI-1400-01		Mimico Creek erosion control, between Morning Star Drive and Brandon Gate Drive	2025	2027	\$100,000	\$470,000	\$570,000	4.7%	\$26 790
MULT-1400/1500-01	MCRS site #10a & 10h	Mullet Creek Erosion Control - Derry Rd W to Argentia Rd	2025	2027	\$670.000	\$3,850.000	\$4,520.000	5.3%	\$239.560
CRED-0600-01	-	Credit River Erosion Control - South of Dundas Street		2026		* - / /	\$500,000	5.7%	\$28,500

### **TABLE 2.1:** SUMMARY OF EROSION CONTROL WORKS

#### A - EROSION CONTROL - IDENTIFIED WORKS

			Budge	t Timing		Cost Estimates		DC	Costs
Map ID#	Background Study*	Project Name / Location	EA & Design	Construction	EA & Design Cost	Construction Cost	Total Cost	DC Portion	DC Amount
CRED-0900-01	CRAMS site #17	Credit River Erosion Control - Behind Bridewell Court, downstream of Hwy 403	2026	2026			\$610,000	5.7%	\$34,770
TECU-0100-01		Tecumseh Creek Erosion Control - Lakeshore Rd. to Lake Ontario	2026	2026			\$440,000	4.2%	\$18,480
MULT-2300-01	MCRS site #16a	Mullet Creek Erosion Control - Aquitaine Tributary, Eastridge Road to CP Rail	2026	2028	\$360,000	\$2,170,000	\$2,530,000	5.3%	\$134,090
ETOB-2300-01		Etobicoke Creek erosion control, from Hwy. 410 to Tomken Rd	2027	2027			\$1,330,000	5.7%	\$75,810
CRED-1600-02	CRAMS site #7	Credit River Erosion Control - Upstream of Britannia Rd W, adjacent to St. Ives Way	2027	2027			\$1,630,000	5.7%	\$92,910
CRED-2400-01	CRAMS site #1-FP	Credit River Erosion Control - Upstream of Old Derry Rd	2027	2027			\$300,000	5.7%	\$17,100
MULT-1525-01	MCRS site #10c	Mullet Creek Erosion Control - Meadowvale Blvd to Derry Rd W	2027	2027			\$1,590,000	5.3%	\$84,270
CRED-1300-01	CRAMS site #11a	Credit River Erosion Control - Old Station Rd, upstream of Reid Dam	2028	2028			\$1,250,000	5.7%	\$71,250
MULT-1000-01	MCRS site #6c	Mullet Creek Erosion Control - Upstream of Tannery Road	2028	2028			\$1,455,000	5.3%	\$77,115
CRED-1700/1800-01	CRAMS site #3	Credit River Erosion Control - West of Creditview Rd, adjacent to Hollywell Ave	2028	2028			\$1,000,000	5.7%	\$57,000
MULT-1200-01	MCRS site #9b	Mullet Creek Erosion Control - Erin Mills Pkwy to Diversion Structure	2028	2028			\$1,140,000	5.3%	\$60,420
MULT-1300-01	MCRS site #9c & 9d	Mullet Creek Erosion Control - Argentia Rd to Erin Mills Pkwy	2028	2028			\$1,650,000	5.3%	\$87,450
CRED-0500-04	CRAMS site #5a/b-FF	P Credit River Erosion Control - Mississauga Golf & Country Club	2028	2028			\$1,350,000	5.7%	\$76,950
CRED-1500-01	CRAMS site #8	Credit River Erosion Control - Amity Rd, downstream of Britannia Rd W	2028	2028			\$1,500,000	5.7%	\$85,500
MULT-1800/1900-01									
	MCRS site #12a & 12l	Mullet Creek Erosion Control - Quenippenon Tributary, Credit Valley Rd to Confluence	2028	2028			\$1,350,000	5.3%	\$71,550
MULT-1200-02	MCRS site #8b	Mullet Creek Erosion Control - Diversion Structure to CP Rail	2030	2030			\$1,020,000	5.3%	\$54,060

\* Background Studies Include: CRAMS - Credit River Adaptive Management Strategy (2005), MCRS - Mullet Creek Rehabilitation Study (2001), Cooksville Creek Rehabilitation Study (1997), SCNCDS - Sawmill Creek Natural Channel Design Study (1995) A - SUBTOTAL: \$142,825,000

\$4,771,045

#### **B - EROSION CONTROL - FUTURE WORKS**

Map ID#	Background Study	Project Name / Location	EA & Design	Construction	Design Cost**	Construction Cost**	Total Cost	DC Portion           7         5.4%           7         7	DC Amount
		Various erosion control works for streams without detailed rehabilitation studies (approx. 27,239 m).	various	various	\$12,840,893	\$85,605,954	\$98,446,847	5.4%	\$5,316,130
** Esimtated constructio	n costs based on approx. 2	7,239m at unit cost of \$3,142 per metre. Design costs assumed to be approximately 15% of constr	uction cost.						
B - SUBTOTAL:							\$98,446,847		\$5,316,130

#### C - EROSION CONTROL - MINOR EROSION CONTROL WORKS

Map ID#	Background Study	Project Name / Location	EA & Design	Construction			DC Portion	DC Amount
		Minor site-specific erosion control works	2019 to 2041	various	\$80,000 for 22 years	\$1,760,000	5.4%	\$95,040
C - SUBTOTAL:						\$1,760,000		\$95,040

TOTAL EROSION CONTROL WORKS:

\$10,182,215

\$243,031,847

 TABLE 2.2 – ESTIMATED FUTURE EROSION CONTROL WORKS

TABLE 2.2	
ESTIMATED FUTURE EROSION CONTROL V	VORKS

		Drainago Aroa		Unstable(%)	Length for	Restoration		Estimated
Watercourse	Total Length (km)	(km2)	Rational*	Estimated in '09	Restoration (m)	Works	City Project ID	Future
		(KIIIZ)		Estimateu III 00	Estimated in '14	Undertaken '14-		Restoration
Applewood	2.70	4.5	ma	13%	171			171
Avonhead	3.60	1.7	other	22%	792			792
Birchwood Creek	4.20	3.5	ma	13%	546			546
Carolyn	3.80	5.3	ma	13%	494			494
Cawthra	1.00	2.0	other	22%	220			220
Chappell	3.00	1.9	ma	13%	390			390
Clearview	1.70	1.3	other	22%	374			374
							13-143,15-135, 14-141,	
Cooksville	24.60	35.3	n/a	n/a	n/a	1500	14-146, 17-010, 12-131	n/a
Credit	25.60	27.0	n/a	n/a	n/a	100	12-131	n/a
Cumberland Creek	0.30	0.5	other	22%	66			66
Etobicoke	20.40	47.8	n/a	n/a	n/a	100	18-002	n/a
Etobicoke Lakeshore	0.80	2.8	other	22%	176			176
Fletcher's	7.33	7.9	ma	13%	952			952
Joshua	0.20	0.2	BR	30%	60			60
Kenollie	3.80	2.2	MA-BR	22%	836			836
Lakeside	0.30	4.5	other	22%	66			66
Levi	2.44	2.3	ma	13%	317			317
Little Etobicoke	13.80	22.3	MA	43%	5,934			5,934
Lornewood	3.20	4.2	ma	13%	416			416
Loyalist	4.90	8.8	BR	30%	1,470	70	13-135	1,400
Mary Fix	9.20	6.5	MA-BR	22%	1,964			1,964
Meadowvale N	0.63	0.9	other	22%	139			139
Mimico	11.00	17.3	MA	43%	4,670			4,670
Moore	0.30	0.2	ma	13%	39			39
Mullet	20.70	27.7	n/a	n/a	n/a			n/a
Sawmill	8.77	15.8	MA-BR	22%	1,929			1,929
Serson	1.50	2.3	other	22%	330			330
Sheridan	5.02	7.4	BR	30%	986			986
Sixteen Mile Creek	5.80	9.5	MA	37%	2,146			2,146
Tecumseh	1.50	1.6	ma	13%	195			195
Turtle	2.90	2.6	ma	13%	377			377
Wolfedale	5.70	7.2	MA-BR	22%	1,254			1,254
				Total Length (m)	27,309			27,239

NOTES

\*ma - modern alluvium bed with drainage area <10ha, MA - modern alluvium bed with drainage area >10ha, BR - exposed or thinly covered bedrock,

MA-BR - bedrock and modern alluvium, other - alluvial bed composed of other local geology

n/a - not applicable. Restoration/erosion works for these watercourses have been estimated in individual, detailed studies.

# TABLE 2.3 – SUMMARY OF CONSTRUCTION COSTS FOR RECENT CREEK EROSION / RESTORATION WORKS

# TABLE 2.3 SUMMARY OF CONSTRUCTION COSTS FOR RECENT CREEK EROSION / RESTORATION WORKS

Project Title/Creek Name	Location	Length of Works (m)	Tender/Construction Cost	Base Year for Cost Estimate	Adjusted Cost (2017\$)	Unit Cost (2017\$/m)
Mary Fix Erosion Control Project - Harborn Rd. to Premium Way (City Project No. 12-138)	City of Mississauga	60	\$73,295	2012	\$81,987	\$1,366.45
Sheridan Creek Stabilization - Clarkson Rd. to Meadow Wood Rd. (City Project No. 12-147)	City of Mississauga	400	\$1,339,037	2013	\$1,477,164	\$3,692.91
Little Etobicoke Creek Erosion Control - Eglinton Ave. to Hwy. 401 (City Project No. 06-132)	City of Mississauga	275	\$457,278	2010	\$544,546	\$1,980.17
Cooksville Creek Erosion Control - Atwater Ave. to CNR (City Project No. 07-138)	City of Mississauga	445	\$907,920	2008	\$1,130,954	\$2,541.47
Credit River Erosion Control - North of Eglinton Ave. (City Project No. 06-134)	City of Mississauga	150	\$383,360	2011	\$449,189	\$2,994.59
Cooksville Creek - QEW to Elaine Trail (City Project No. 17-004)	City of Mississauga	550	\$1,200,000	2017/2018	\$1,200,000	\$2,181.82
Cooksville Creek - Rathburn to Meadows(City Project No. 17-008)	City of Mississauga	670	\$2,490,000	2017/2018	\$2,490,000	\$3,716.42
Mary Fix Creek - South to Dundas(City Project No. 17-015)	City of Mississauga	160	\$687,000	2017/2018	\$687,000	\$4,293.75
Levi Creek - North of Old Derry Road(City Project No. 17-014)	City of Mississauga	60	\$156,000	2017/2018	\$156,000	\$2,600.00
Roseland Creek Phase I	City of Burlington	600	\$1,500,858	2013	\$1,655,677	\$2,759.46
Roseland Creek Phase II	City of Burlington	400	\$2,255,431	2013	\$2,488,087	\$6,220.22
Fourteen Mile Creek	Town of Oakville	495	\$1,981,608	2012	\$2,216,623	\$4,478.03
West Don River-Restoration and Sanitary Sewer Alignment	City of Toronto	160	\$779,770	2012	\$872,249	\$5,451.56
Spring Creek-Realignment of Etobicoke Creek-East Branch	Region of Peel	120	\$141,504	2011	\$165,802	\$1,381.69
Pomona Mills Creek Erosion Restoration- Kirk &Henderson Sites	Town of Markham	210	\$586,008	2009	\$668,885	\$3,185.17
Hager Creek	Region Of Halton	40	\$80,000	2013	\$88,252	\$2,206.31
Dick's Creek West Branch-Aberdeen & Glendale	City of St. Catherines	140	\$301,665	2013	\$332,783	\$2,377.02

Avg. Cost (\$/m): \$3,142.77

 TABLE 2.4 – SUMMARY OF CONVEYANCE IMPROVEMENT WORKS

 TABLE 2.4:

 SUMMARY OF CONVEYANCE IMPROVEMENT WORKS

						Budget Timing			Cost Es	stimates		Net Costs	DC	Costs
Map ID#	Finance Code	Background Study*	Project Name / Location	Type of Work	EA & Design	Land Acquisition	Construction	EA & Design Cost	Construction Cost	Land Cost	Total Cost	Net Cost	DC Portion	DC Amount
	New		Meadowvale Business Park (North 16 District) - Tenth Line Drainage Diversion Solution	Channelization	2022		2022	\$1,14	0,000		\$1,140,000	\$1,140,000	2.5%	\$28,500
	New		Meadowvale Business Park (North 16 District) - Highway 401 Drainage Diversion Channel	Channelization	2022	2022		\$340,000		\$1,350,000	\$1,690,000	\$1,690,000	2.5%	\$42,250
19-11	TWSD00017		Tecumseh Creek Culvert Improvements - CNR Culvert	Culvert Improvement	2022		2022	\$4,22	0,000		\$4,220,000	\$4,220,000	4.2%	\$177,240
20-05	New		Clearview Creek Channelization - Lakeshore Road to 800m Northerly	Channelization	2023	2023	2023	\$2,61	0,000		\$2,610,000	\$2,610,000	100.0%	\$2,610,000
17-01	TWSD00011	CCFRP site #EA2	Cooksville Creek Crossing Improvement - CP Rail	Culvert Improvement	2028		2028	\$4,16	0,000		\$4,160,000	\$4,160,000	4.7%	\$195,520
		Dundas Connects	Little Etobicoke Creek Drainage Improvements Dixie/Dundas Area (LETO-0300/ 0200-01)	Drainage			2021/22		\$6,000,000		\$6,000,000	\$6,000,000	4.0%	\$240,000
			Carolyn Creek Drainage Improvements - Various Locations	Drainage	2023		2023	\$70	,000		\$70,000	\$70,000	2.5%	\$1,750
		Ninth Line Lands SWS	Ninth Line Hvdro One Crossina	Drainage			2024	\$1.78	5.481		\$1,785,481	\$1,785,481	100.0%	\$1,785,481
COOK- QUEEN	1	Cooksville Flood Evaluation Study	Cooksville Creek Crossing Improvement - Queensway East	Culvert Improvement	2029		2029	\$3,58	60,000		\$3,580,000	\$3,580,000	4.7%	\$168,260
COOK-CNR		Cooksville Flood Evaluation Study	Cooksville Creek Crossing Improvement - CN Rail	Culvert Improvement	2029		2029	\$2,74	0,000		\$2,740,000	\$2,740,000	4.7%	\$128,780
COOK-QEW		Cooksville Flood Evaluation Study	Cooksville Creek Crossing Improvement - QEW Culvert	Culvert Improvement	2030		2030	\$8,34	0,000		\$8,340,000	\$8,340,000	4.7%	\$391,980

TOTAL CONVEYANCE IMPROVEMENT WORKS:

\$36,335,481 **\$36,335,481** 

\$5,769,761

### NINTH LINE HYDRO ONE CROSSING

CONCEPTUAL COST ESTIMATE

10/16/2018

Notes: 1) This is a preliminary estimate based on conceptual plans dated May 2018 provided by the City of Mississauga

2) Based on the location of the crossing, it is assumed that the existing railway is non-active and not required full time flagging3) It is assumed that the railway can be taken out of service for the duration of construction

4) It is assumed that the site access shown on the drawings is constructed with crusher run limestone

and will be left in place after construction

5) it is assumed that excess material can be spread and stored onsite.

Site Preparation, Erosion Control and Removals         Image: Constant of the second seco	Item	Spec. No.	Description	Est. Quantity	Unit	Est. Unit Price (\$)	Est	imated Amount
Site Preparation, Erosion Control and Removals         Image: Control and Removals         Image: Control and Removals           1         Mobilization and Demobilization for Completion of Entire Project         1         I/s         \$ 65,000.00         \$ 65,000.00           2         Clearing and Grubbing         1         I/s         \$ 1,500.00         \$ 1,500.00           3         Stilt Fence and erosion control, incl. dewatering required for Grome existing culverts and railway ballast and disposal of offsite         1         I/s         \$ 95,000.00         \$ 95,000.00           6         Cut excess material to match existing channel elevation and width (excess material to spread onsite)         1         I/s         \$ 15,000.00         \$ 11,000.00           7         Staging and diversion channel to maintain creek flow         1         I/s         \$ 12,000.00         \$ 12,000.00           8         Cut, remove and store onsite track segment required         1         I/s         \$ 55,000.00         \$ 95,000.00           9         Restore track including ballast, welding and ties         1         I/s         \$ 95,000.00         \$ 95,000.00           10         Adjustments to signal cable         1         I/s         \$ 95,000.00         \$ 95,000.00           9         Restore track including ballast, welding and ties         1         I/s <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>								
1         Mobilization and Demobilization for Completion of Entire Project.         1         1/s         \$ 65,000.00           2         Clearing and Grubbing         1         1/s         \$ 1,500.00         \$ 1,500.00           3         Sili Fence and erosion control, incl. dewatering required for staging         1         1/s         \$ 25,000.00         \$ 25,000.00           4         Construction of access road and maintain (7m wide with 1.0m thick granular) to both abutments         1         1/s         \$ 95,000.00         \$ 95,000.00           5         Remove existing culverts and railway ballast and disposal of offsite         1         1/s         \$ 15,000.00         \$ 15,000.00           6         Cut excess material to match existing channel elevation and width (excess material to spread onsite)         1         1/s         \$ 12,000.00         \$ 13,500.00         \$ 13,500.00         \$ 13,500.00         \$ 13,500.00         \$ 13,500.00         \$ 95,000			Site Preparation, Erosion Control and Removals					
2       Clearing and Grubbing       1       I/s       \$ 1,500.00       \$ 1,500.00         3       Silt Fence and erosion control, incl. dewatering required for staging       1       I/s       \$ 2,500.00       \$ 25,000.00         4       Construction of access road and maintain (7m wide with 1.0m thick granukar) to both abutments       1       I/s       \$ 9,500.00       \$ 9,5000.00         5       Remove existing culverts and railway ballast and disposal of offsite       I/s       \$ 15,000.00       \$ 15,000.00         6       Cut excess material to match existing channel elevation and width (excess material to spread onsite)       I/s       \$ 12,000.00       \$ 12,000.00         7       Staging and diversion channel to maintain creek flow       1       I/s       \$ 12,000.00       \$ 12,000.00         8       Cut, remove and store onsite track segment required       1       I/s       \$ 55,000.00       \$ 55,000.00         9       Restore track including ballast, welding and tites       1       I/s       \$ 9,500.00       \$ 9,500.00         10       Adjustments to signal cable       1       I/s       \$ 50,000       \$ 9,500.00         11       Excavate to proposed footing elevation for bridge piers and abutments in tabage based on creek diversion requirements       450       m³       \$ 5,000.00       \$ 10,000.00 <tr< td=""><td>1</td><td></td><td>Mobilization and Demobilization for Completion of Entire Project</td><td>1</td><td>l/s</td><td>\$ 65,000.00</td><td>\$</td><td>65,000.00</td></tr<>	1		Mobilization and Demobilization for Completion of Entire Project	1	l/s	\$ 65,000.00	\$	65,000.00
3       Silt Fence and erosion control, incl. dewatering required for staging       1 <i>\Uss</i> \$ 25,000.00       \$ 25,000.00         4       Construction of access road and maintain (7m wide with 1.0m thick granular) to both abutments       1 <i>\Uss</i> \$ 95,000.00       \$ 95,000.00         5       Remove existing culverts and railway ballast and disposal of offsite       1 <i>\Uss</i> \$ 15,000.00       \$ 15,000.00         6       Cut excess material to match existing channel elevation and width (excess material to spread onsite)       1 <i>\Uss</i> \$ 12,000.00       \$ 12,000.00         7       Staging and diversion channel to maintain creek flow       1 <i>\Uss</i> \$ 13,500.00       \$ 12,000.00         7       Staging and diversion channel to maintain creek flow       1 <i>\Uss</i> \$ 13,500.00       \$ 55,000.00         7       Staging and diversion channel to maintain creek flow       1 <i>\Uss</i> \$ 55,000.00       \$ 55,000.00         8       Cut, remove and store onsite track segment required       1 <i>\Uss</i> \$ 55,000.00       \$ 95,000.00       \$ 95,000.00         9       Restore track including ballast, welding and ties       1 <i>Uss</i> \$ 55,000.00       \$ 22,500.00         10       Accut remove and store maiter track welding and ties       1	2		Clearing and Grubbing	1	l/s	\$ 1,500.00	\$	1,500.00
4       Construction of access road and maintain (7m wide with 1.0m thick granular) to both abutments       1       I/s       \$ 95,000.00       \$ 95,000.00         5       Remove existing culverts and railway ballast and disposal of offsite       1       I/s       \$ 15,000.00       \$ 15,000.00         6       Cut excess material to spread onsite)       1       I/s       \$ 12,000.00       \$ 12,000.00         7       Staging and diversion channel to maintain creek flow       1       I/s       \$ 13,500.00       \$ 12,000.00         7       Staging and diversion channel to maintain creek flow       1       I/s       \$ 55,000.00       \$ 12,000.00         8       Cut, remove and store onsite track segment required       1       I/s       \$ 55,000.00       \$ 95,000.00         9       Restore track including ballast, welding and ties       1       I/s       \$ 95,000.00       \$ 95,000.00         10       Adjustments to signal cable       1       I/s       \$ 95,000.00       \$ 95,000.00         11       Excavate to proposed footing elevation for bridge piers and abutments in stages based on creek diversion requirements       450       m³       \$ 2,000.00       \$ 400,000.00         12       Cast in place concrete abutments and piers, including formwork and reinforcement       200       m³       \$ 5,000.00       \$ 15,000.00	3		Silt Fence and erosion control, incl. dewatering required for staging	1	l/s	\$ 25,000.00	\$	25,000.00
5       Remove existing culverts and railway ballast and disposal of offsite       1       1/s       \$ 15,000.00       \$ 15,000.00         6       Cut excess material to match existing channel elevation and width (excess material to spread onsite)       1       1/s       \$ 12,000.00       \$ 12,000.00         7       Staging and diversion channel to maintain creek flow       1       1/s       \$ 13,500.00       \$ 12,000.00         8       Cut, remove and store onsite track segment required       1       1/s       \$ 55,000.00       \$ 55,000.00         9       Restore track including ballast, welding and ties       1       1/s       \$ 95,000.00       \$ 95,000.00         10       Adjustments to signal cable       1       1/s       \$ 95,000.00       \$ 95,000.00         11       Excavate to proposed footing elevation for bridge piers and abutments in stages based on creek diversion requirements       450       m <sup>3</sup> \$ 2.000.00       \$ 400,000.00         12       Cast in place concrete abutments and piers, including formwork and reinforcement       200       m <sup>3</sup> \$ 2.000.00       \$ 400,000.00         14       Supply and install precast pre-stressed box girders       30       m       \$ 5,000.00       \$ 10,000.00         15       raings, waterproofing, grate on walking surface on entire length of bridge       m       \$ 1,500.0	4		Construction of access road and maintain (7m wide with 1.0m thick granular) to both abutments	1	l/s	\$ 95,000.00	\$	95,000.00
6         Cut excess material to match existing channel elevation and width (excess material to spread onsite)         1         I/s         \$ 12,000.00         \$ 12,000.00           7         Staging and diversion channel to maintain creek flow         1         I/s         \$ 13,500.00         \$ 13,500.00           8         Cut, remove and store onsite track segment required         1         I/s         \$ 55,000.00         \$ 55,000.00           9         Restore track including ballast, welding and ties         1         I/s         \$ 95,000.00         \$ 95,000.00           10         Adjustments to signal cable         1         I/s         \$ 95,000.00         \$ 95,000.00           11         Excavate to proposed footing elevation for bridge piers and abutments in stages based on creek diversion requirements atometers in stages based on creek diversion requirements abutments in stages based on creek diversion requirements formwork and reinforcement         450         m <sup>3</sup> \$ 20,00.00         \$ 400,000.00           12         Cast in place concrete abutments and piers, including formwork and reinforcement         200         m <sup>3</sup> \$ 50.00         \$ 10,000.00           14         Supply and install precast pre-stressed box girders         30         m<\$ 5,000.00	5		Remove existing culverts and railway ballast and disposal of offsite	1	l/s	\$ 15,000.00	\$	15,000.00
7       Staging and diversion channel to maintain creek flow       1       1/s       \$ 13,500.00       \$ 13,500.00         Removal and Reinstatement of Rail	6		Cut excess material to match existing channel elevation and width (excess material to spread onsite)	1	l/s	\$ 12,000.00	\$	12,000.00
Image: Network and Reinstatement of Rail         Image: Network and Reinstatement of Rail         Image: Network and Reinstatement of Rail         Image: Network and Store onsite track segment required         Image: Network and Store onsite track segment requirements         Image: Network and Store onsite track segment requirements         Image: Network and Store onsite track segment requirements         Image: Network and Store on creek diversion for bridge piers and abutments in stages based on creek diversion requirements         Image: Network and reinforcement	7		Staging and diversion channel to maintain creek flow	1	l/s	\$ 13,500.00	\$	13,500.00
Removal and Reinstatement of RailImage: constraint of the sector of the se								
8         Cut, remove and store onsite track segment required         1         1/s         \$ 55,000.00         \$ 55,000.00           9         Restore track including ballast, welding and ties         1         1/s         \$ 95,000.00         \$ 95,000.00           10         Adjustments to signal cable         1         1/s         \$ 95,000.00         \$ 95,000.00           10         Adjustments to signal cable         1         1/s         \$ 95,000.00         \$ 95,000.00           10         New bridge structure         1         1/s         \$ 9,500.00         \$ 9,500.00           11         Excavate to proposed footing elevation for bridge piers and abutments in stages based on creek diversion requirements adpiers, including formwork and reinforcement         450         m³         \$ 2,000.00         \$ 400,000.00           13         Supply and place granular backfill and frost taper         200         m³         \$ 5,000.00         \$ 10,000.00           14         Supply and install cast in place concrete surface, safety railings, waterproofing, grate on walking surface on entire length of bridge         30         m         \$ 1,500.00         \$ 45,000.00           16         Supply and place ballast for track restoration full width         70         m         \$ 400.00         \$ 22,500.00           18         Modify creek to suit new bridge, incl.			Removal and Reinstatement of Rail					
9         Restore track including ballast, welding and ties         1         1/s         \$ 95,000.00         \$ 95,000.00           10         Adjustments to signal cable         1         1/s         \$ 9,500.00         \$ 9,500.00           10         Adjustments to signal cable         1         1/s         \$ 9,500.00         \$ 9,500.00           11         Mew bridge structure         1         1/s         \$ 9,500.00         \$ 22,500.00           11         Excavate to proposed footing elevation for bridge piers and abutments in stages based on creek diversion requirements         450         m³         \$ 200.00         \$ 400,000.00           12         Cast in place concrete abutments and piers, including formwork and reinforcement         200         m³         \$ 5,000.00         \$ 10,000.00           13         Supply and install cast in place concrete surfaces griders         30         m         \$ 5,000.00         \$ 10,000.00           14         Supply and install cast in place concrete surface, safety railings, waterproofing, grate on walking surface on entire length of bridge         m         \$ 1,500.00         \$ 45,000.00           16         Supply and place ballast for track restoration full width         70         m         \$ 400.00         \$ 22,000.00           17         Adjustments to Existing Utilities         1         ea </td <td>8</td> <td></td> <td>Cut, remove and store onsite track segment required</td> <td>1</td> <td>l/s</td> <td>\$ 55,000.00</td> <td>\$</td> <td>55,000.00</td>	8		Cut, remove and store onsite track segment required	1	l/s	\$ 55,000.00	\$	55,000.00
10       Adjustments to signal cable       1       1/s       \$ 9,500.00       \$ 9,500.00         11       New bridge structure       1	9		Restore track including ballast, welding and ties	1	l/s	\$ 95,000.00	\$	95,000.00
Image: New bridge structureImage: New bridge structureImage: New bridge structureImage: New bridge structureImage: New bridge structure11Excavate to proposed footing elevation for bridge piers and abutments in stages based on creek diversion requirements $450$ m³\$ 50.00\$ 22,500.0012Cast in place concrete abutments and piers, including formwork and reinforcement $200$ m³\$ 2,000.00\$ 400,000.0013Supply and place granular backfill and frost taper $200$ m³\$ 5,000.00\$ 10,000.0014Supply and install cast in place concrete surface, safety railings, waterproofing, grate on walking surface on entire length of bridge $30$ m\$ 1,500.00\$ 45,000.0016Supply and place ballast for track restoration full width $70$ m\$ 400.00\$ 28,000.0017Adjustments to Existing Utilities1ea\$ 15,000.00\$ 15,000.0018Modify creek to suit new bridge, incl. low flow1ls\$ 25,000.00\$ 50,000.0019Planting, sod and seeding1ls\$ 50,000.00\$ 50,000.00Jow contingenceJow contingenceJ.333,600.00Jow contingenceJow contingenceJow contingenceJow contingenceJow contingenceJow contingenceJow contingenceJow contingenceJow contingenceJow contingence<td colspan="</td> <td>10</td> <td></td> <td>Adjustments to signal cable</td> <td>1</td> <td>l/s</td> <td>\$ 9,500.00</td> <td>\$</td> <td>9,500.00</td>	10		Adjustments to signal cable	1	l/s	\$ 9,500.00	\$	9,500.00
New bridge structure         Image: Struct								
11       Excavate to proposed footing elevation for bridge piers and abutments in stages based on creek diversion requirements       450       m³       \$ 50.00       \$ 22,500.00         12       Cast in place concrete abutments and piers, including formwork and reinforcement       200       m³       \$ 2,000.00       \$ 400,000.00         13       Supply and place granular backfill and frost taper       200       m³       \$ 5,000.00       \$ 10,000.00         14       Supply and install precast pre-stressed box girders       30       m       \$ 5,000.00       \$ 150,000.00         15       railings, waterproofing, grate on walking surface on entire length of bridge       30       m       \$ 1,500.00       \$ 28,000.00         16       Supply and place ballast for track restoration full width       70       m       \$ 400.000       \$ 28,000.00         17       Adjustments to Existing Utilities       1       ea       \$ 15,000.00       \$ 15,000.00         18       Modify creek to suit new bridge, incl. low flow       1       ls       \$ 25,000.00       \$ 50,000.00         19       Planting, sod and seeding       1       ls       \$ 50,000.00       \$ 11,32,000.00         19       Planting, sod and seeding       1       ls       \$ 50,000.00       \$ 113,200.00         19       Planting, sod			New bridge structure					
12       Cast in place concrete abutments and piers, including formwork and reinforcement       200       m <sup>3</sup> \$ 2,000.00       \$ 400,000.00         13       Supply and place granular backfill and frost taper       200       m <sup>3</sup> \$ 50.00       \$ 10,000.00         14       Supply and install precast pre-stressed box girders       30       m       \$ 5,000.00       \$ 150,000.00         15       Supply and install cast in place concrete surface, safety railings, waterproofing, grate on walking surface on entire length of bridge       30       m       \$ 1,500.00       \$ 45,000.00         16       Supply and place ballast for track restoration full width       70       m       \$ 400.00       \$ 28,000.00         17       Adjustments to Existing Utilities       1       ea       \$ 1,500.00       \$ 15,000.00         18       Modify creek Restoration       I       Is       \$ 25,000.00       \$ 50,000.00         19       Planting, sod and seeding       1       Is       \$ 50,000.00       \$ 50,000.00         Site and Creek Restoration         Is       Is       \$ 50,000.00       \$ 50,000.00         Site and Creek Restoration       I       Is       \$ 50,000.00       \$ 50,000.00       \$ 50,000.00       \$ 50,000.00       \$ 50,000.00       \$ 50,000	11		Excavate to proposed footing elevation for bridge piers and abutments in stages based on creek diversion requirements	450	m <sup>3</sup>	\$ 50.00	\$	22,500.00
13       Supply and place granular backfill and frost taper       200       m³       \$ 50.00       \$ 10,000.00         14       Supply and install precast pre-stressed box girders       30       m       \$ 5,000.00       \$ 150,000.00         15       Supply and install cast in place concrete surface, safety railings, waterproofing, grate on walking surface on entire length of bridge       30       m       \$ 1,500.00       \$ 45,000.00         16       Supply and place ballast for track restoration full width       70       m       \$ 400.00       \$ 28,000.00         17       Adjustments to Existing Utilities       1       ea       \$ 15,000.00       \$ 15,000.00         18       Modify creek Restoration       Image: state of the state of th	12		Cast in place concrete abutments and piers, including formwork and reinforcement	200	m <sup>3</sup>	\$ 2,000.00	\$	400,000.00
14       Supply and install precast pre-stressed box girders       30       m       \$ 5,000.00       \$ 150,000.00         15       Supply and install cast in place concrete surface, safety railings, waterproofing, grate on walking surface on entire length of bridge       30       m       \$ 1,500.00       \$ 45,000.00         16       Supply and place ballast for track restoration full width       70       m       \$ 400.00       \$ 28,000.00         17       Adjustments to Existing Utilities       1       ea       \$ 15,000.00       \$ 15,000.00         18       Modify creek to suit new bridge, incl. low flow       1       ls       \$ 25,000.00       \$ 25,000.00         19       Planting, sod and seeding       1       ls       \$ 50,000.00       \$ 50,000.00         Estimated Amount         Modify creek to suit new bridge, incl. low flow       1       ls       \$ 50,000.00         Is \$ 50,000.00       \$ 50,000.00         Is Intervented Amount       \$ 1,132,000.00         Supply and place ballast for track restoration       Image: second secon	13	1	Supply and place granular backfill and frost taper	200	m <sup>3</sup>	\$ 50.00	\$	10.000.00
15       Supply and install cast in place concrete surface, safety railings, waterproofing, grate on walking surface on entire length of bridge       30       m       \$ 1,500.00       \$ 45,000.00         16       Supply and place ballast for track restoration full width       70       m       \$ 400.00       \$ 28,000.00         17       Adjustments to Existing Utilities       1       ea       \$ 15,000.00       \$ 15,000.00         18       Modify creek to suit new bridge, incl. low flow       1       Is       \$ 25,000.00       \$ 25,000.00         19       Planting, sod and seeding       1       Is       \$ 50,000.00       \$ 50,000.00         Estimated Amount       \$ 1,132,000.00         Subtota       1       Is       \$ 1,132,000.00         Interstered Amount       \$ 1,132,000.00         Subtota       1       Is       \$ 1,132,000.00         Interstered Amount       \$ 1,132,000.00         Interstered Amount       \$ 1,132,000.00         Subtota       \$ 113,200.00         Interstered Amount       \$ 1,754,600.00         Interstered Amount       \$ 1,754,600.00         Interstered Amount       \$ 1,754,600.00         Interstered Amount	14		Supply and install precast pre-stressed box girders	30	m	\$ 5.000.00	\$	150.000.00
16       Supply and place ballast for track restoration full width       70       m       \$ 400.00       \$ 28,000.00         17       Adjustments to Existing Utilities       1       ea       \$ 15,000.00       \$ 15,000.00         17       Adjustments to Existing Utilities       1       ea       \$ 15,000.00       \$ 15,000.00         18       Site and Creek Restoration       1       Is       \$ 25,000.00       \$ 25,000.00         19       Planting, sod and seeding       1       Is       \$ 50,000.00       \$ 50,000.00         19       Planting, sod and seeding       1       Is       \$ 50,000.00       \$ 50,000.00         19       Planting, sod and seeding       1       Is       \$ 50,000.00       \$ 50,000.00         19       Planting, sod and seeding       1       Is       \$ 1,132,000.00       \$ 1,132,000.00         10       Is       \$ 1,132,000.00       \$ 1,132,000.00       \$ 1,132,000.00       \$ 1,754,600.00         10       Is       Is       Is       Is       Is       \$ 1,754,600.00         Is       Is       Is       Is       Is       Is       Is       Is       Is         Is       Is       Is       Is       Is       Is       Is <td>15</td> <td></td> <td>Supply and install cast in place concrete surface, safety railings, waterproofing, grate on walking surface on entire length of bridge</td> <td>30</td> <td>m</td> <td>\$ 1,500.00</td> <td>\$</td> <td>45,000.00</td>	15		Supply and install cast in place concrete surface, safety railings, waterproofing, grate on walking surface on entire length of bridge	30	m	\$ 1,500.00	\$	45,000.00
17       Adjustments to Existing Utilities       1       ea       \$ 15,000.00         17       Adjustments to Existing Utilities       1       ea       \$ 15,000.00       \$ 15,000.00         18       Site and Creek Restoration       1       Is       \$ 25,000.00       \$ 25,000.00         19       Planting, sod and seeding       1       Is       \$ 50,000.00       \$ 50,000.00         19       Planting, sod and seeding       1       Is       \$ 50,000.00       \$ 50,000.00         19       Planting, sod and seeding       1       Is       \$ 50,000.00       \$ 50,000.00         19       Planting, sod and seeding       1       Is       \$ 50,000.00       \$ 50,000.00         10       Is       \$ 0,000.00       Is       \$ 1,132,000.00       \$ 1,132,000.00         10       Is       Is       \$ 1,132,000.00       \$ 1,132,000.00       \$ 1,754,600.00         113,200.00       Is       Is       Is       \$ 1,754,600.00       \$ 1,754,600.00         I       Is       Is       Is       \$ 30,880.96       Is       Is       \$ 30,880.96         I       I       Is       Is       Is       Is       Is       Is       Is       Is       Is <td< td=""><td>16</td><td></td><td>Supply and place ballast for track restoration full width</td><td>70</td><td>m</td><td>\$ 400.00</td><td>\$</td><td>28.000.00</td></td<>	16		Supply and place ballast for track restoration full width	70	m	\$ 400.00	\$	28.000.00
Image: Stear and Creek Restoration         18       Modify creek to suit new bridge, incl. low flow       1       Is       \$ 25,000.00         19       Planting, sod and seeding       1       Is       \$ 50,000.00         19       Planting, sod and seeding       1       Is       \$ 50,000.00         Estimated Amount       \$ 1,132,000.00         Subtotal       \$ 1,132,000.00         Subtotal       \$ 169,800.00         Subtotal       \$ 1,754,600.00         HST(1.76%)       \$ 30,880.96         Total Estimated Amount       \$ 1,785,480.96	17	1	Adjustments to Existing Utilities	1	ea	\$ 15,000.00	\$	15,000.00
Site and Creek Restoration         Image: Site and Creek Restorating Restora						+ · · · · · · · · · · · · · · · · · · ·	Ŧ	,
18       Modify creek to suit new bridge, incl. low flow       1       Is       \$ 25,000.00         19       Planting, sod and seeding       1       Is       \$ 50,000.00       \$ 50,000.00         19       Planting, sod and seeding       1       Is       \$ 50,000.00       \$ 50,000.00         10       Is       \$ 50,000.00       \$ 50,000.00       \$ 50,000.00         Estimated Amount       \$ 1,132,000.00         Subtotal       \$ 1,132,000.00         Interview Int		1	Site and Creek Restoration			1		
19       Planting, sod and seeding       1       Is       \$ 50,000.00         19       Planting, sod and seeding       1       Is       \$ 50,000.00         Estimated Amount       \$ 1,132,000.00         Subtotal       \$ 1,132,000.00         30% Contingency       \$ 339,600.00         IS% Engineering       \$ 169,800.00         Subtotal       \$ 169,800.00         IO% permit       \$ 113,200.00         Subtotal       \$ 1,754,600.00         HST(1.76%)       \$ 30,880.96         Total Estimated Amount       \$ 1,785,480.96	18	1	Modify creek to suit new bridge. incl. low flow	1	ls	\$ 25,000.00	\$	25,000.00
Since and Since	19		Planting, sod and seeding	1	ls	\$ 50.000.00	\$	50.000.00
Estimated Amount       \$ 1,132,000.00         30% Contingency       \$ 339,600.00         15% Engineering       \$ 169,800.00         10% permit       \$ 113,200.00         Subtotal       \$ 1,754,600.00         HST(1.76%)       \$ 30,880.96         Total Estimated Amount       \$ 1,785,480.96	-		······································		-	+ ,		,
30% Contingency       \$ 339,600.00         15% Engineering       \$ 169,800.00         10% permit       \$ 113,200.00         Subtotal       \$ 1,754,600.00         HST(1.76%)       \$ 30,880.96         Total Estimated Amount       \$ 1,785,480.96					Est	imated Amount	\$	1,132,000.00
15% Engineering       \$       169,800.00         10% permit       \$       113,200.00         Subtotal       \$       1,754,600.00         HST(1.76%)       \$       30,880.96         Total Estimated Amount       \$       1,785,480.96					3	0% Contingency	\$	339,600.00
10% permit       \$       113,200.00         Subtotal       \$       1,754,600.00         HST(1.76%)       \$       30,880.96         Total Estimated Amount       \$       1,785,480.96					1	5% Engineering	\$	169,800.00
Subtotal         \$         1,754,600.00           HST(1.76%)         \$         30,880.96           Total Estimated Amount         \$         1,754,600.00						10% permit	\$	113,200.00
HST(1.76%) \$ 30,880.96 Total Estimated Amount \$ 1,785,480.96						Subtotal	\$	1,754,600.00
Total Estimated Amount \$ 1,785,480.96						HST(1.76%)	\$	30.880.96
				Т	otal Est	imated Amount	\$	1,785,480.96

TABLE 2.5 – SUMMARY OF STORMWATER MANAGEMENT WORKS

# TABLE 2.5:SUMMARY OF STORMWATER MANAGEMENT WORKS

#### A - New SWM Facilities

				Budget Timing			Cost Estimates				DC Costs	
Map ID#	Background Study*	Pond Name / Location	Pond Type	EA / Design	Land Acquisition	Construction	EA/Design Cost	Construction Cost	Land Cost	Total Cost	DC Portion	DC Amount
5708		Ninth Line Corridor - Northwest corner of Eglinton Avenue and Ninth Line.	new SWM pond - quality & quantity	2020	2020	2021	\$140,000	\$940,000	\$6,090,000	\$7,170,000	100.0%	\$7,170,000
0401	Southdown MDP / MSWQCS Update	Clearview Creek SWM Pond #0401 - South of Lakeshore Road West	new SWM pond - quality	2020	n/a - City park	2021	\$240,000	\$2,950,000	n/a - City park	\$3,190,000	100.0%	\$3,190,000
5505		Ninth Line Corridor - west of Ninth Line, north of Derry Road	new SWM pond - quality & quantity	2021	2021	2022	\$130,000	\$880,000	\$5,690,000	\$6,700,000	100.0%	\$6,700,000
5506		Ninth Line Corridor - west of Ninth Line, south of Hwy 401.	new SWM pond - quality & quantity	2022	2022	2022	\$70,000	\$450,000	\$2,900,000	\$3,420,000	100.0%	\$3,420,000
5602		Ninth Line Corridor - west of Ninth Line and Doug Leavens Blvd. intersection	new SWM pond - quality & quantity	2022	2022	2023	\$60,000	\$380,000	\$2,470,000	\$2,910,000	100.0%	\$2,910,000
4503	Meadowvale District MDP / MSWQCS Update	Meadowvale Area SWM Pond #4503 - North of Hwy 401, East of Credit River	new SWM pond - quantity & quality	2027	n/a - floodplain lands	2027	\$130,000	\$850,000	n/a - floodplain lands	\$980,000	100.0%	\$980,000
0402	Southdown MDP/ MSWQCS Update	Avonhead Creek SWM Pond #0402 - North of Lakeshore Rd W, East of Hazelhurst Rd	new SWM pond - quality	2028	2028	2028	\$520	0,000	\$2,160,000	\$2,680,000	100.0%	\$2,680,000
0403	Southdown MDP/ MSWQCS Update	Lakeside Creek SWM Pond #0403 - Lakeshore Rd W at Clarkson WWTP	new SWM pond - quality & quantity	2029	2029	2029	\$930	0,000	\$2,270,000	\$3,200,000	100.0%	\$3,200,000
1802		Sheridan Park Corporate Centre - Speakman Drive, Northeast of Winston Churchill Boulevard and QEW (Dev't driven with municipal drng)	new SWM pond - quality & quantity	2030	2030	2030	\$940,000	\$6,260,000	\$33,990,000	\$41,190,000	6.5%	\$2,677,350

#### A - SUBTOTAL:

#### B - Stormwater Quality Retrofits

3602	MSWQCS Update	Retrofit - Little Etobicoke Creek Timberlea SWM Pond #3602	retrofit of quantity pond for quality	2020	n/a - retrofit	2021	\$600,000 \$5,000,000	\$5,600,000	4.0%	\$224,000
5001	MSWQCS Update	SWM Quality Retrofit - Etobicoke Creek Storm Outfall - Derry Road East and Dixie Road	retrofit of ex. storm outfall - quality	2023	n/a - retrofit	2023	\$940,000	\$940,000	5.7%	\$53,580
3101	MSWQCS Update	Retrofit - Credit River Storm Outfall - Wellsborough Place and Tillingham Gardens	retrofit of ex. storm outfall - quality	2025	n/a - retrofit	2025	\$5,200,000	\$5,200,000	5.7%	\$296,400
4506	MSWQCS Update	Credit River SWM Pond #4506 - Creditview Road & Argentia Road	retrofit of ex. storm outfall	2029	2029	2029	\$5,490,000 \$10,760,000	\$16,250,000	5.7%	\$926,250
4505		Retrofit - Credit River Storm Outfall - Hwy 401 and Creditview Rd	retrofit of ex. storm outfall	2030	2030	2030	\$6,860,000 \$7,110,000	\$13,970,000	5.7%	\$796,290

#### B - SUBTOTAL:

#### C - New Cooksville Creek Flood Relief Works

2101	Cooksville Creek Flood Evaluation Study	Cooksville Creek Pond #2101 - Mississauga Valley Boulevard and Central Parkway East (City Centre Outlet)	flood relief		2019/20	2020/21		\$7,800,000	
3604	Cooksville Creek Flood Evaluation Study	Cooksville Creek Flood Storage Facility - Bristol Rd E, west of Kennedy Rd (Frank McKechnie Community Centre)	flood relief		n/a	2020/21		\$7,330,000	
2102	Cooksville Creek Flood Evaluation Study	Cooksville Creek Flood Storage Facility - McKenzie Park, Mississauga Valley Blvd	flood relief		n/a	2022/23		\$16,950,000	
2103	Cooksville Creek Flood Evaluation Study	Cooksville Creek Flood Storage Facility - Mississauga Valley	flood relief		n/a	2020		\$4,190,000	
3703	Cooksville Creek Flood Evaluation Study	Cooksville Creek Flood Storage Facility - Greyshale Park, Heritage Hills Blvd	flood relief	2021	n/a	2023	\$260,000	\$3,450,000	
2805	Cooksville Creek Flood Evaluation Study	Cooksville Creek Flood Storage Facility - Huron Heights Park, Central Parkway E, north of Hwy 403	flood relief	2021	n/a	2023	\$210,000	\$2,820,000	
2903	Cooksville Creek Flood Evaluation Study	Cooksville Creek Flood Storage Facility - Heritage Hills Park, Huntington Ridge Drive	flood relief	2022	n/a	2024	\$500,000	\$4,850,000	
2902	Cooksville Creek Flood Evaluation Study	Cooksville Creek Flood Storage Facility - Hydro Corridor, north of Hwy 403, West of Hurontario Street	flood relief	2024	2026	2027	\$440,000	\$5,040,000	
2804	Cooksville Creek Flood Evaluation Study	Cooksville Creek Flood Storage Facility - Hydro Corridor, north of Hwy 403, east of Hurontario Street	flood relief	2024	2025	2027	\$290,000	\$3,340,000	

C - SUBTOTAL:

TOTAL STORMWATER MANAGEMENT CONTROL WORKS:

### \$39,112,180

\$3,888,310

### \$82,730,000 \$196,130,000

#### \$6,980,000 \$14,780,000 4.7% \$694,660 \$7,330,000 4.7% \$344,510 n/a \$16,950,000 4.7% \$796,650 n/a n/a \$4,190,000 4.7% \$196,930 \$174,370 \$3,710,000 4.7% n/a n/a \$3,030,000 4.7% \$142,410 \$5,350,000 4.7% \$251,450 n/a \$11,050,000 \$16,530,000 4.7% \$776,910 \$7,230,000 \$10,860,000 4.7% \$510,420

#### \$41,960,000

#### \$71,440,000

\$2,296,520

\$32	,927,350

TABLE 2.6 – SUMMARY OF STORM SEWER OVERSIZING WORKS

# TABLE 2.6SUMMARY OF STORM SEWER OVERSIZING WORKS

Storm Sewer Oversizing and Timing	Notes	Cost	DC portion	DC amount
Storm Sewer Oversizing - Various Locations (2019-2041)	\$270,000 per year for 22 years	\$5,940,000	100.0%	\$5,940,000
LRT Storm Sewer Improvements (2019/20/21)	Sewer oversizing costs calculated as \$2.84M	\$2,840,000	100.0%	\$2,840,000
Mississauga Road storm sewer oversizing	Trunk sewer oversizing by "West Village" at 70 Mississauga Road	\$1,357,012	100.0%	\$1,357,012
South of Eglinton Ave. btwn Ninth Line & Ridgeway Dr.	Churchill Meadows, N'hood 407. Storm sewers for future dev't north of Eglinton Ave.	\$241,101	100.0%	\$241,101

TOTAL STORM SEWER OVERSIZING WORKS:

\$10,378,113

\$10,378,113

#### MISSISSAUGA ROAD - STORM SEWER OVERSIZING PRELIMINARY COST ESTIMATE

11/28/2018

- Notes: 1) This is a preliminary estimate based on drawing provided by the City of Mississauga as modified by KSGS.
  - 2) Manhole size modified to suit proposed sewers.
  - 3) Unit rates are estimated based on 2018 land development projects.

Item	Spec. No.	Description	Est. Quantity	Unit	Est. Unit Price (\$)	Est	imated Amount
		Proposed Design - Ultimate Sewer:					
1		1800X900mm Concrete Box Culvert	342.9	m	\$ 2,200.00	\$	754,380.00
2		3000X1200mm Concrete Box Culvert	244.3	m	\$ 3,500.00	\$	855,050.00
3		3000mm dia. Manholes - 217, 216, 215, 214	4	ea	\$ 40,000.00	\$	160,000.00
4		3.9x2.4m Box Manholes - 202, 201	2	ea	\$ 63,000.00	\$	126,000.00
5		Headwall - to accommodate 3000x1200 Box Culvert Sewer	1	ea	\$ 54,000.00	\$	54,000.00
					Sub-total ( A)	\$	1,949,430.00
		Base Design - 1500mm Dia Sewer:					
1		1500mm dia. storm sewer	587.2	m	\$ 1,380.00	\$	810,336.00
2		2400mmdia. Manholes - 217, 216, 215,214	4	ea	\$ 16,500.00	\$	66,000.00
3		3000mmdia. Manholes - 202, 201	2	ea	\$ 24,500.00	\$	49,000.00
4		Headwall - to accommodate 1500mm dia. Sewer	1	ea	\$ 18,900.00	\$	18,900.00
					Sub-total (B)	\$	944,236.00
		Sub-total	Oversizin	g Proj	ect Cost (A-B)	\$	1,005,194.00
				20	% Contingency	\$	201,038.80
				159	% Engineering	\$	150,779.10
		Total Estir	nated Ove	ersizing	g Project Cost	\$	1,357,011.90

TABLE 2.7 – BACKGROUND STUDIES AND MONITORING

### **TABLE 2.7 BACKGROUND STUDIES AND MONITORING**

Study and Timing	Unit Cost	Cost	DC portion	DC amount
Development Charges Study Updates (2023, 2028, 2033, 2038)	\$80,000 for each update =	\$320,000	100.0%	\$320,000
Annual Monitoring and Studies of Various SWM Ponds / Various Locations *	\$80,000 per year for 22 years =	\$1,760,000	5.4%	\$95,040
Watercourse Minor Works *	\$80,000 per year for 22 years =	\$1,760,000	5.4%	\$95,040
SWM Quality Retrofit - Etobicoke Creek Storm Outfall - Britannia Road East and Netherhart Road (2024) **	\$300,000	\$300,000	5.7%	\$17,100
Watercourse Erosion and Rehabilitation Studies (2023) *	\$750,000	\$750,000	5.4%	\$40,500
Mary Fix Creek Flood Evaluation Study (2021) **	\$260,000	\$260,000	5.7%	\$14,820
Mississauga Stormwater Management MasterPlan (2019) *	\$750,000	\$750,000	5.4%	\$40,500
Mississauga Stormwater Quality Control Strategy Update (2023, 2028) *	400000 for each update	\$800,000	5.4%	\$43,200
Serson Creek & Applewood Creek Flood Evaluation Study (2019) ***	\$250,000	\$250,000	2.95%	\$7,375
TOTAL - BACKGROUND STUDIES AND MONITORING:		\$6,950,000		\$673,575

\* DC portion based .on total watershed % \*\* DC portion based on watershed % related to the study \*\*\* DC portion based on average % of Serson and Applewood Watersheds

TABLE 3.1 – SUMMARY OF AVAILABLE DEVELOPMENT LANDS

#### TABLE 3.1 SUMMARY OF AVAILABLE DEVELOPMENT LANDS

					Total Vacant Land	
				Redevelopment	+ Redevelopment	% by Watershed*
Watershed	Total Area	Vacant Lands	Occupied Lands	Potential @ 2.5% <sup>1</sup>	Potential	+ Redevelopment
APPLEWOOD CREEK	450.33	2.42	447.91	11.20	13.62	3.0%
AVONHEAD CREEK	166.54	22.33	144.21	3.61	25.93	15.6%
BIRCHWOOD CREEK	351.78	2.23	349.55	8.74	10.97	3.1%
CAROLYN CREEK	526.23	-	526.23	13.16	13.16	2.5%
CAWTHRA CREEK	206.58	16.09	190.49	4.76	20.85	10.1%
CHAPPELL CREEK	185.81	-	185.81	4.65	4.65	2.5%
CLEARVIEW CREEK	133.20	18.66	114.54	2.86	21.52	16.2%
COOKSVILLE CREEK	3,528.85	80.48	3,448.37	86.21	166.69	4.7%
CREDIT RIVER	2,700.01	88.07	2,611.93	65.30	153.37	5.7%
CUMBERLAND CREEK	54.44	-	54.44	1.36	1.36	2.5%
ETOBICOKE CREEK	4,781.51	158.99	4,622.51	115.56	274.56	5.7%
ETOBICOKE LAKESHORE	284.80	-	284.80	7.12	7.12	2.5%
FLETCHER CREEK	785.08	68.05	717.03	17.93	85.97	11.0%
JOSHUA CREEK	16.73	-	16.73	0.42	0.42	2.5%
KENOLLIE CREEK	216.63	-	216.63	5.42	5.42	2.5%
LAKESIDE CREEK	451.04	54.87	396.17	9.90	64.78	14.4%
LEVI CREEK	225.47	-	225.47	5.64	5.64	2.5%
LITTLE ETOBICOKE CREEK	2,226.12	33.54	2,192.58	54.81	88.35	4.0%
LORNEWOOD CREEK	421.78	4.99	416.79	10.42	15.40	3.7%
LOYALIST CREEK	878.24	-	878.24	21.96	21.96	2.5%
MARY FIX CREEK	653.00	21.19	631.81	15.80	36.99	5.7%
MEADOWVALE NORTH	92.94	-	92.94	2.32	2.32	2.5%
MIMICO CREEK	1,731.29	38.22	1,693.07	42.33	80.54	4.7%
MOORE CREEK	18.63	-	18.63	0.47	0.47	2.5%
MULLET CREEK DOWNSTREAM	1,158.12	-	1,158.12	28.95		0.0%
MULLET CREEK UPSTREAM	1,612.88	-	1,612.88	40.32		0.0%
Total Mullet Creek Downstream & Upstream	2,771.01	78.79	2,771.01	69.28	148.06	5.3%
NINTH LINE		32.66	32.66	0.82	33.48	100.0%
OAKVILLE	67.62	15.97	51.65	1.29	17.26	25.5%
PORT CREDIT	96.65	-	96.65	2.42	2.42	2.5%
PORT CREDIT WEST	167.00	-	167.00	4.18	4.18	2.5%
SAWMILL CREEK	1,583.88	31.54	1,552.34	38.81	70.35	4.4%
SERSON CREEK	234.58	0.91	233.67	5.84	6.76	2.9%
SHERIDAN CREEK	740.84	30.06	710.78	17.77	47.83	6.5%
SIXTEEN MILE CREEK	946.08	49.10	896.98	22.42	71.52	7.6%
TECUMSEH CREEK	162.54	2.85	159.69	3.99	6.84	4.2%
TURTLE CREEK	256.84	6.30	250.54	6.26	12.57	4.9%
WOLFEDALE CREEK	719.50	6.09	713.42	17.84	23.92	3.3%
Total	28,833.55	864.39	28,113.27	702.83	1,567.22	5.4%

(1) Redevelopment potential at 2.5% has been applied to the occupied lands throughout the identified watersheds. This amount is intended to represent an average across the entire City.

TABLE 4.1 – 2019 STORM DRAINAGE DEVELOPMENT CHARGES

# TABLE 4.12019 STORM DRAINAGE DEVELOPMENT CHARGES

	<u>2019 DC</u>
1 EPOSION CONTROL WORKS	
	¢1 771 015
	\$4,771,045 \$5,216,120
	\$0,510,130 \$05.040
	<u>\$95,040</u> \$10,192,215
SUBTUTAL	<b>\$10,102,215</b>
2 - CONVEYANCE (CHANNELIZATION. CULVERT IMPROVEMENTS)	\$5,769,761
3 - STORMWATER MANAGEMENT	
A - STORMWATER MANAGEMENT FACILITIES - NEW FACILITIES:	\$32,927,350
B - STORMWATER QUALITY RETROFITS:	\$2,296,520
C - NEW COOKSVILLE CREEK FLOOD RELIEF WORKS	\$3,888,310
SUBTOTAL	\$39,112,180
4 - STORM SEWER OVERSIZING	\$10,378,113
5 - BACKGROUND STUDIES AND MONITORING:	\$673,575
TOTAL PROGRAM	\$66,115,844
LESS RESERVES:	
(STORM DRAINAGE DC; ACT 31350)	\$32,452,965
(WATER QUALITY ACT; 37513)	\$2,172,871
(SECTION 14 LOT LEVY-MAJOR STORM IMPROVEMENT LEVT; ACT 35124)	\$17,923,179
TOTAL RESERVES:	\$52,549,015
TOTAL STORMWATER MANAGEMENT CAPITAL COSTS TO BE RECOVERED THROUGH DEVELOPMENT CHARGES	\$13,566,829
FUTURE DEVELOPMENT AREA (NET)	1,567 ha
UNIT DEVELOPMENT CHARGE	<u>\$8,658 /ha</u>

### **APPENDIX A**

City Council Resolution – Sept.13, 2017

Jun 15erey

### MOTION: CONSIDER LOW-IMPACT DEVELOPMENT (LID) TECHNIQUES IN THE SCOPE OF THE STORMWATER DEVELOPMENT CHARGE BACKGROUND STUDY FOR THE 2019 DEVELOPMENT CHARGE BY-LAW

WHEREAS stormwater management helps to minimize the impact of urbanization by reducing the risks of flooding and erosive damages to our streams and structures as well as improving water quality;

AND WHEREAS low impact development (LID) is a stormwater management approach that encompasses a suite of innovative techniques, sustainable technologies and green infrastructure that can infiltrate, store, evaporate and/or detain stormwater runoff;

AND WHEREAS the use of LID techniques such as bio-swales, stormwater canals, permeable surfaces and others have been proven effective in mitigating the environmental impacts of urbanization and are gaining support by practitioners as viable stormwater management approaches;

AND WHEREAS the Ministry of the Environment and Climate Change recognizes the importance of LID and is currently developing a Low Impact Development Stormwater Management Guidance Manual;

AND WHEREAS the use of LID techniques is consistent with the CONNECT and LIVING GREEN pillars of the City's Strategic Plan;

AND WHEREAS the City has successfully implemented several LID projects and has numerous others currently in progress;

AND WHEREAS the City's Stormwater Charge funds the cost of operating, maintaining and upgrading the stormwater drainage system;

AND WHEREAS the City's development charges fund stormwater management projects needed to support development growth as identified and projected in the Development Charges Background Study – Storm Drainage Component;

AND WHEREAS bio-swales and other LID techniques are not accounted for in the City's most recent Development Charges Background Study – Storm Drainage Component prepared in 2014;

AND WHEREAS the next update to the Development Charges Background Study – Storm Drainage Component is scheduled to be completed in 2019 in support of the City's Development Charges Update in 2019;

NOW THEREFORE BE IT RESOLVED THAT LID options be considered and evaluated and, where appropriate, included in the scope of the upcoming Development Charges Background Study – Storm Drainage Component in support of the City's Development Charges Update in 2019.



LEGEND
PROJECT ID
WATERCOURSE
WATERCOURSE EROSION CONTROL
WATERCOURSE CHANNELIZATION
SWM FACILITY: NEW
SWM FACILITY: RETROFIT
SWM FACILITY: REHABILITATION
CULVERT IMPROVEMENTS
STORM SEWER IMPROVEMENTS
MUNICIPAL WARD BOUNDARIES
MUNICIPAL WARD NUMBERS
MISSISSauga

# PROJECT INDEX

WATE	RCOU
FORECAST YEAR (CONSTRUCTION)	PROJECT ID
2019	COOK-0600-01 COOK-1100-01 COOK-2300-01 ETOB-2200-01
2020	MIMI-0600-01 MIMI-1200-01 SHER-0300-01
2021	APPL-0300-01 COOK-1200-01 COOK-1300-02 LETO-0200-01 LETO-0200/030 SAWM-0400-01
2022	COOK-0700-01 COOK-2400-01 CRED-0300/040 CRED-1700-01 ETOB-0900-01
2023	COOK-0200-01 COOK-1700-01 LETO-0100-01 MULT-0700/080 MULT-0900-01
2024	CRED-0200-01 CRED-0500-03 LETO-1200-01 MULT-0200/030 MULT-2000-01 WOLF-0200-01
2025	COOK-0800-01 CRED-0700-01 CRED-2300-01 ETOB-0300-01 MARY-0200 MULT-2200-01 MULT-2200-02 WOLF-0100-01 WOLF-0300-01
2026	CAWT-0200-01 COOK-1500-01 CRED-0500-02 CRED-0600-01 CRED-2600-01 ETOB-0100-01 ETOB-0100-02 ETOB-0800-01 LOYL-0600-01 TECU-0100-01
2027	APPL-0200-01 COOK-0500-01 CRED-1400-01 CRED-1600-02 CRED-2400-01 ETOB-2300-01 MIMI-1400-01 MULT-1400/150 MULT-1525-01

FORECAST YEAR SWMF/ (CONSTRUCTION) PROJECT ID #2101 #2103 #3604 #0401 #2101 #3604 #3602 #5708 #2101 #2102 #5505 #5506 SIXT-1100-01 SIXT-1700-01 TECU-CNR #2102 #3703 #5602 #2805 #5001 CLER-0100-01 #2903 NINTH 202 2026 #2804 #2902 #4503 #0402 COOK-CPR #4506 COOK-CNR COOK-QUEEN #0403 COOK-QEW #4505 #1802

NOTES

PROJECT TITLE

# JRSE EROSION CONTROL

COOKSVILLE CREEK EROSION CONTROL COOKSVILLE CREEK EROSION CONTROL COOKSVILLE CREEK EROSION CONTROL ETOBICOKE CREEK EROSION CONTROL

MIMICO CREEK EROSION CONTROL MIMICO CREEK EROSION CONTROL SHERIDAN CREEK EROSION CONTROL

APPLEWOOD CREEK EROSION CONTROL

COOKSVILLE CREEK EROSION CONTROL COOKSVILLE CREEK EROSION CONTROL LITTLE ETOBICOKE CREEK EROSION CONTROL 00-01 LITTLE ETOBICOKE CREEK DRAINAGE IMPROV. (CF) SAWMILL CREEK EROSION CONTROL

COOKSVILLE CREEK EROSION CONTROL COOKSVILLE CREEK EROSION CONTROL 400-01 CREDIT RIVER EROSION CONTROL CREDIT RIVER EROSION CONTROL ETOBICOKE CREEK EROSION CONTROL

COOKSVILLE CREEK EROSION CONTROL COOKSVILLE CREEK EROSION CONTROL LITTLE ETOBICOKE CREEK 00-01 MULLET CREEK EROSION CONTROL MULLET CREEK EROSION CONTROL

CREDIT RIVER EROSION CONTROL CREDIT RIVER EROSION CONTROL (CASH-FLOWED) LITTLE ETOBICOKE CREEK EROSION CONTROL 300-01 MULLET CREEK EROSION CONTROL MULLET CREEK EROSION CONTROL WOLFDALE CREEK EROSION CONTROL

> COOKSVILLE CREEK EROSION CONTROL CREDIT RIVER EROSION CONTROL CREDIT RIVER EROSION CONTROL ETOBICOKE CREEK EROSION CONTROL EROSION CONTROL WORKS MULLET CREEK EROSION CONTROL

MULLET CREEK EROSION CONTROL WOLFEDALE CREEK WOLFEDALE CREEK EROSION CONTROL CAWTHRA CREEK EROSION CONTROL COOKSVILLE CREEK (WEST BRANCH) EROSION CONTROL CREDIT RIVER EROSION CONTROL CREDIT RIVER EROSION CONTROL

CREDIT RIVER EROSION CONTROL CREDIT RIVER EROSION CONTROL ETOBICOKE CREEK EROSION CONTROL ETOBICOKE CREEK EROSION CONTROL ETOBICOKE CREEK EROSION CONTROL LOYALIST CREEK EROSION CONTROL TECUMSEH CREEK EROSION CONTROL

APPLEWOOD CREEK EROSION CONTROL COOKSVILLE CREEK EROSION CONTROL CREDIT RIVER EROSION CONTROL CREDIT RIVER EROSION CONTROL CREDIT RIVER EROSION CONTROL ETOBICOKE CREEK EROSION CONTROL MIMICO CREEK EROSION CONTROL 500-01 MULLET CREEK EROSION CONTROL MULLET CREEK EROSION CONTROL

CRED-0500-04 CREDIT RIVER EROSION CONTROL CRED-1300-01 CREDIT RIVER EROSION CONTROL CRED-1500-01 CREDIT RIVER EROSION CONTROL CRED-1700/1800-01 CREDIT RIVER EROSION CONTROL MULT-1000-01 MULLET CREEK EROSION CONTROL MULLET CREEK EROSION CONTROL MULT-1300-01 MULLET CREEK EROSION CONTROL MULT-1800/1900-01 MULLET CREEK EROSION CONTROL MULT-2300-01 MULLET CREEK EROSION CONTROL

MULT-1200-01

MULT-1200-02

MULLET CREEK EROSION CONTROL

QEW TO ELAINE TRAIL CP RAIL TO KIRWIN AVE MEADOWS BLVD TO RATHBURN RD E TOMKEN RD BRIDGE

PROJECT LOCATION

U/S AND D/S OF RENA RD LUSHES AVE TO BEHIND FLETCHERS VALLEY CRES ADJACENT TO OSTLER CT

LAKEVIEW GOLF COURSE MISSISSAUGA VALLEY BLVD TO CP RAIL D/S OF CENTRAL PKWY E TO D/S OF MISS. VALLEY BLVD DUNDAS ST TO DIXIE RD DUNDAS ST / DIXIE RD AREA THE FOLKWAY TO ERIN MILLS PKWY

CAMILLA RD TO NORTH SERVICE RD BEHIND TRIBAL CT NORTH OF SOUTH OF QEW W OF CREDITVIEW RD, BEHIND KENNINGHALL BLVD EGLINTON AVE. TO HWY 401

CAWTHRA CREEK DIVERSION, NORTH OF LAKESHORE RD E HWY 403 TO HURONTARIO ST D/S OF DUNDAS ST E

GO TRANSIT TO D/S OF ERIN CENTRE BLVD TANNERY ST TO THOMAS ST N OF CN RAIL, BEHIND STAVEBANK RD AND MISS. RD

ADJACENT TO OSTLER COURT D/S OF BRITANNIA RD E BURNHAMTHORPE RD. TO BEHIND WOODCHUCK LN. QUENIPPENON TRIB., U/S OF ERIN MILLS PKWY TO MIDDLEBURY DR CPR TO DUNDAS ST

KING STREET E TO NORTH OF PAISLEY BLVD E U/S OF DUNDAS ST W, ADJACENT TO UTM CAMPUS D/S OF OLD DERRY RD U/S AND D/S OF CPR, SOUTH OF DUNDAS ST E BEHIND OLD RIVER RD WABUKAYNE TRIBUTARY, U/S OF CP RAIL WABUKAYNE TRIBUTARY, D/S OF ERIN MILLS PARKWAY COURRIER LN TO CREDIT RIVER N & S OF CENTRAL PKWY W

DELLWOOD PARK BURNHAMTHORPE RD D/S TO MVB (580M) D/S OF DUNDAS ST W, BEHIND BLYTHE RD SOUTH OF DUNDAS STREET BEHIND BRIDEWELL CRT, D/S OF HWY 403 VAR. SECTIONS B/W HEMUS SQ AND QUEENSWAY W (340M) D/S OF QEW, ADJ. TO TORONTO GOLF CLUB U/S OF CNR, ADJACENT TO TORONTO GOLF CLUB EGLINTON AVENUE TO HYDRO CORRIDOR BETWEEN THORNLODGE DR LAKESHORE RD TO LAKE ONTARIO

CNR TO LAKESHORE RD WILLA RD TO ORANO AVE STREETSVILLE PUBLIC CEMETERY U/S OF BRITANNIA RD W, ADJACENT TO ST. IVES WAY U/S OF OLD DERRY RD FROM HWY 410 TO TOMKEN RD BETWEEN MORNING STAR DR AND BRANDON GATE DR DERRY RD W TO ARGENTIA RD MEADOWVALE BLVD TO DERRY RD W

MISSISSAUGA GOLF AND COUNTRY CLUB OLD STATION RD AMITY RD, D/S OF BRITANNIA RD W OF CREDITVIEW RD, NEAR HOLLYWELL AVE U/S OF TANNERY RD ERIN MILLS PKWY TO DIVERSION STRUCTURE ARGENTIA RD TO ERIN MILLS PKWY Q-BROOK, CREDIT VALLEY RD TO CONFLUENCE AQUITAINE TRIB., EASTRIDGE RD TO CPR

DIVERSION STRUCTURE TO CPR

# STORMWATER MANAGEMENT IMPROVEMENTS

SWMF NEW CONSTRUCTION [CF]

PROJECT TITLE

SWMF NEW CONSTRUCTION [CF] SWMF NEW CONSTRUCTION [CF] SWMF NEW CONSTRUCTION [CF]

SWMF NEW CONSTRUCTION SWMF NEW CONSTRUCTION [CF] SWMF NEW CONSTRUCTION [CF] SWMF RETROFIT SWMF NEW CONSTRUCTION

SWMF NEW CONSTRUCTION [CF] SWMF NEW CONSTRUCTION [CF] SWMF NEW CONSTRUCTION SWMF NEW CONSTRUCTION DRAINAGE DIVERSION SOLUTION DRAINAGE DIVERSION CHANNEL

CULVERT IMPROVEMENTS

SWMF NEW CONSTRUCTION [CF] SWMF NEW CONSTRUCTION SWMF NEW CONSTRUCTION SWMF NEW CONSTRUCTION SWMF RETROFIT CREEK CHANNELIZATION

SWMF NEW CONSTRUCTION HYDRO ONE CROSSING

SWMF RETROFIT

-

SWMF NEW CONSTRUCTION SWMF NEW CONSTRUCTION SWMF NEW CONSTRUCTION

SWMF NEW CONSTRUCTION CROSSING IMPROVEMENT

SWMF RETROFIT CROSSING IMPROVEMENT CROSSING IMPROVEMENT SWMF NEW CONSTRUCTION CROSSING IMPROVEMENT SWMF RETROFIT SWMF NEW CONSTRUCTION

1. Development Charges are reviewed every 5 years.

COOKSVILLE CREEK, MISS. VALLEY BLVD

PROJECT LOCATION

COOKSVILLE CREEK, CITY CENTRE OUTLET, MV BLVD CP E COOKSVILLE CREEK, MISS. VALLEY BLVD COOKSVILLE CREEK, FRANK MCK. CC, BRISTOL RD E

CLEARVIEW CREEK, S OF LAKESHORE RD W COOKSVILLE CREEK, CITY CENTRE OUTLET, MV BLVD CP E COOKSVILLE CREEK, FRANK MCK. CC, BRISTOL RD E ETOBICOKE CREEK, TIMBERLEA BLVD NINTH LINE CORRIDOR, NW EGLINTON AVE W & NINTH LINE

COOKSVILLE CREEK, CITY CENTRE OUTLET, MV BLVD CP E COOKSVILLE CREEK, MCKENZIE PARK, MISS. VALLEY BLVD NINTH LINE CORRIDOR, W OF NINTH LINE, N OF DERRY RD NINTH LINE CORRIDOR, W OF NINTH LINE, S OF HWY 401 MDWVALE BUSINESS PK (NORTH 16 DIST.), TENTH LINE MDWVALE BUSINESS PK (NORTH 16 DIST.), HWY 401 TECUMSEH CREEK, CNR

COOKSVILLE CREEK, MCKENZIE PARK, MISS. VALLEY BLVDCOOKSVILLE CREEK, GREYSHALE PK, HERITAGE HLS BLVD NINTH LINE CORRIDOR, W OF NINTH LINE & DG LVNS BLVD COOKSVILLE CREEK, HURON HEIGHTS PARK (PARK 273) ETOBICOKE CREEK, DERRY RD E AND DIXIE RDLITTLE CLEARVIEW CREEK, 800M NORTH FROMLAKESHORE RD

COOKSVILLE CREEK, HERITAGE HILLS PK, HUNTINGTON DR WEST OF CITY LIMITS (FOR NINTH LINE LANDS)

CREDIT RIVER, WELLSBOROUGH PL & TILLINGHAM GRDNS

COOKSVILLE CREEK, HYDRO, NE HWY 403 & HURNTRIO ST COOKSVILLE CREEK, HYDRO, NW HWY 403 & HURNTRIO ST MEADOWVALE AREA, N OF HWY 401, E OF CREDIT RIVER

AVONHEAD CREEK, LAKESHORE RD AND HAZELHURST RD CANADIAN PACIFIC RAILWAY

CREDITVIEW RD TO ARGENTIA RD CANADIAN NATIONAL RAILWAY

-

QUEENSWAY AVENUE EAST LAKESIDE CREEK, LAKESHORE RD AT CLARKSON WWTP QUEEN ELIZABETH WAY

CREDIT RIVER, HWY 401 & CREDITVIEW RD SHERIDAN PARK CORPORATE CENTRE

Last updated March 19, 2019