FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

DERRY BRITANNIA DEVELOPMENTS LIMITED NINTH LINE LANDS

PROPOSED RESIDENTIAL DEVELOPMENT

MATTAMY HOMES LIMITED

CITY OF MISSISSAUGA

REGIONAL MUNICIPALITY OF PEEL

PROJECT NO. 13958

JUNE 2019

RAND ENGINEERING CORPORATION
5285 SOLAR DRIVE
MISSISSAUGA, ONTARIO
L4W 5B8

TABLE OF CONTENTS

LIST OF FIGURES

APPENDICES

1.0 INTRODUCTION

RAND Engineering Corporation has been retained by Mattamy Homes Limited to complete a Functional Servicing and Stormwater Management Report for the proposed Derry Britannia Developments Limited residential development located within the Ninth Line Lands, in the City of Mississauga and Region of Peel. The development encompasses approximately 45.1 Ha (111.4 ac) and is located on Part of Lots 6, 7, 8 and 9, Concession 9 of New Survey (Geographic Township of Trafalgar). As shown in Figure 1, the subject lands are bounded by Ninth Line to the east, Union Gas property to the north, Highway 407 to the west and the outlet channel from the Osprey Marsh to the south. The future development lies within the limits of the East Branch Tributary catchment of the Sixteen Mile Creek subwatershed.

The overall development plan for the Mattamy subdivision, which forms the basis for the servicing plans presented in this report, was prepared by Glen Schnarr & Associates Inc. (GSAI) on May 22nd, 2019. The subject lands will be developed in two phases as follows:

- **Phase 1** – North Draft Plan of Subdivision, which encompasses 8.9 Ha.
- **Phase 2** – South Draft Plan of Subdivision, which encompasses 36.2 Ha.

The general servicing requirements for the subject lands were established in the February 2017 "*Water and Wastewater Assessments for Ninth Line Lands*" and 2015-2019 *"Ninth Line Lands Scoped Subwatershed Study",* prepared by Wood Environmental & Infrastructure Solutions (formerly Amec Foster Wheeler). The purpose of this report is to outline the preliminary servicing details for the proposed stormwater management, wastewater and water distribution systems required to service Phases 1 and 2 of the development. The recommended storm drainage and servicing plans for the proposed development have been prepared in accordance with the design criteria and the requirements of Conservation Halton (CH), City of Mississauga, Regional Municipality of Peel and Ministry of the Environment, Conservation and Parks (MECP). The information provided in this report is intended to assist the municipality and other regulatory agencies in their review of the draft plan and rezoning applications for the North and South Draft Plans of Subdivision.

DERRY BRITANNIA DEVELOPMENT LIMITED
NINTH LINE LANDS

FIGURE No. 1

NOT TO SCALE

TOWN OF MISSISSAUGA

LOCATION PLAN

PROJECT No. 13958

RAND ENGINEERING CORPORATION

R:\13\13958\Drawings & Figures\2019 May 27, 2019 (Latest)\Figure 1_Location Plan.dwg Jun 11, 2019 – 5:46pm

2.0 BACKGROUND INFORMATION

The following is a list of the background studies and reference documents used in the preparation of this report;

- **Amec Foster Wheeler**, *"Highway 407 Transitway Corridor Assessment within the Ninth Line Lands*", October 12, 2016.
- **Amec Foster Wheeler**, *"Water and Wastewater Assessments for Ninth Line Lands, City of Mississauga, Memorandum to Region of Peel"*, February 8, 2017.
- **Amec Foster Wheeler**, *"Ninth Line Lands Scoped Subwatershed Study, Phase 1 – Background Report and Study Area Characterization*", January 2015.
- **Amec Foster Wheeler**, *"Ninth Line Lands Scoped Subwatershed Study, Phase 2 – Impact Assessment and Management Study*", prepared in March 2017.
- **City of Mississauga**, *"Development Requirements Manual*", September 2017.
- **City of Mississauga**, *"Ninth Line Lands – Proposed Neighbourhood Character Area Policies and Zoning - Corporate Report"*, November 10, 2017.
- **City of Mississauga**, *"Ninth Line - Plan and Profiles"*, 1990-1996.
- **CVC and TRCA**, *"Low Impact Development Stormwater Management Planning and Design Guide"*, 2010.
- **DS Consultants Ltd.**, *"Consolidated Report on Preliminary Geotechnical Investigation Proposed Residential Development Parcels A to J, Ninth Line, Ninth Line, Mississauga, Ontario"*, June 5, 2019.
- **GGHACA**,*"Erosion & Sediment Control Guideline for Urban Construction"*, December 2006.

- **Ministry of the Environment**, *"Stormwater Management Planning and Design Manual*", March 2003.

- **Ministry of Transportation**, *"407 Transitway, Hurontario Street to Brant Street, Environmental Assessment, PIC #1 Information*", December 2018.

- **MMM Group**, *"Ninth Line Corridor Study – Transportation Assessment*", July 2017.

- **Wood Environmental & Infrastructure Solutions**, *"Addendum to the Highway 407 Transitway Corridor Assessment within the Ninth Line Lands Study Area (2016), City of Mississauga*", May 31, 2018.

- **Wood Environmental & Infrastructure Solutions**, *"Ninth Line Lands Scoped Subwatershed Study, Phase 3 – Implementation and Monitoring Plan - DRAFT*", April 2019.

3.0 PROPOSED DEVELOPMENT

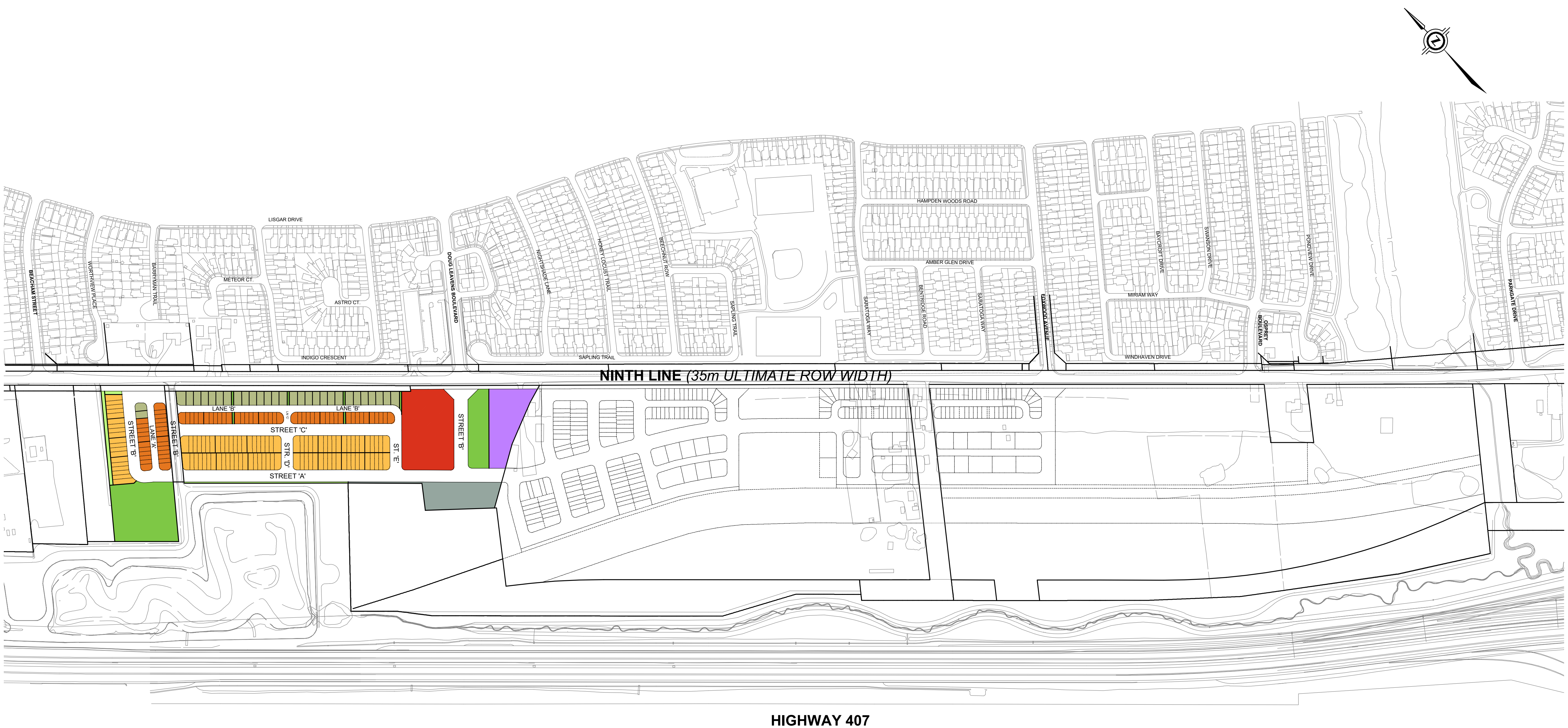
The proposed Derry Britannia Developments Limited subdivision encompasses approximately 45.1 Ha and will be developed in two phases. The North and South Draft Plans of Subdivision pertaining to Phase 1 and Phase 2, respectively were prepared by GSAI on May 22nd, 2019.

The development limits within the study area were established based on the April 2019 *"Ninth Line Lands Scoped Subwatershed Study"* findings and preliminary design information for the 407 Transitway alignment through the Ninth Line lands, obtained from the May 2018 *"Addendum to the Highway 407 Transitway Corridor Assessment within the Ninth Line Lands Study Area (2016), City of Mississauga*".

As shown in Figure 2, the North Draft Plan of Subdivision encompasses 8.9 Ha located northwest of Doug Leavens Blvd. and Ninth Line and consists of detached and townhouse units, a condominium apartments/townhouse/stacked townhouses block, school block and park blocks. Phase 1 of the development will be completed outside the existing Regional floodplain limits and will include the construction of a temporary storm water management facility with an outlet to the East Branch Tributary of Sixteen Mile Creek.

The temporary SWM facility will provide water quality, quantity and erosion control for the Phase 1 lands. The servicing of the development will be provided by an extension of the existing water and sanitary services on Ninth Line. The construction will include an installation of the servicing connections to the future residential units along Ninth line, proposed within the South Draft Plan of Subdivision limits.

The servicing plans for the subject lands have been coordinated with the design information provided by the City of Mississauga and Region of Peel. Primary access to the Phase 1 development will be provided via Street B at the intersection of Ninth Line and Doug Leavens Boulevard. The North Draft Plan of Subdivision was prepared with consideration of the future City of Mississauga plans for the Ninth Line widening from the existing two-lane road to the future four-lane road within a 35m right-of-way.



LAND USE	LOTS / BLOCKS	AREA (ha)	AREA (ac)	TOTAL UNITS	DENSITY (UPNHA)
REAR LANE DETACHED - 10.7m (35')	1-30	0.66	1.63	30	45.5
REAR LANE TOWNHOUSE - 6.05m (20')	31-42	0.77	1.90	67	87.0
STREET TOWNHOUSE - 6.0m (20')	43-60	1.70	4.20	101	59.4
CONDO APARTMENTS / TOWNS / STACKS	61	0.85	2.10	140-200	164.7-235.3
RESIDENTIAL RESERVE	62	0.50	1.24		
PARK / WALKWAY	63-70	1.13	2.79		
PUBLIC ELEMENTARY SCHOOL	71	0.43	1.06		
5m BUFFERS	72-74	0.13	0.32		
ROAD WIDENINGS	75,76	0.18	0.44		
0.3m RESERVES	77,78	0.00	0.00		
10.0m LANEWAY (445m LENGTH)		0.46	1.14		
17.0m LOCAL ROW (1,021m LENGTH)		1.75	4.32		
20.0m LOCAL ROW (184m LENGTH)		0.38	0.94		
TOTAL	**78**	**8.94**	**22.09**	**338-398**	**84.9-100**

R:\13\13958\Drawings & Figures\2019 May 27, 2019 (Latest)\Figure 2-Phase 1 Development_DP1 May 22 19.dwg | Jun 12, 2019 - 2:14pm

DERRY BRITANNIA DEVELOPMENTS LIMITED
NINTH LINE LANDS

FIGURE No. 2

NORTH DRAFT PLAN OF SUBDIVISION
PHASE 1 DEVELOPMENT

SCALE: N.T.S.

CITY OF MISSISSAUGA

RAND ENGINEERING CORPORATION

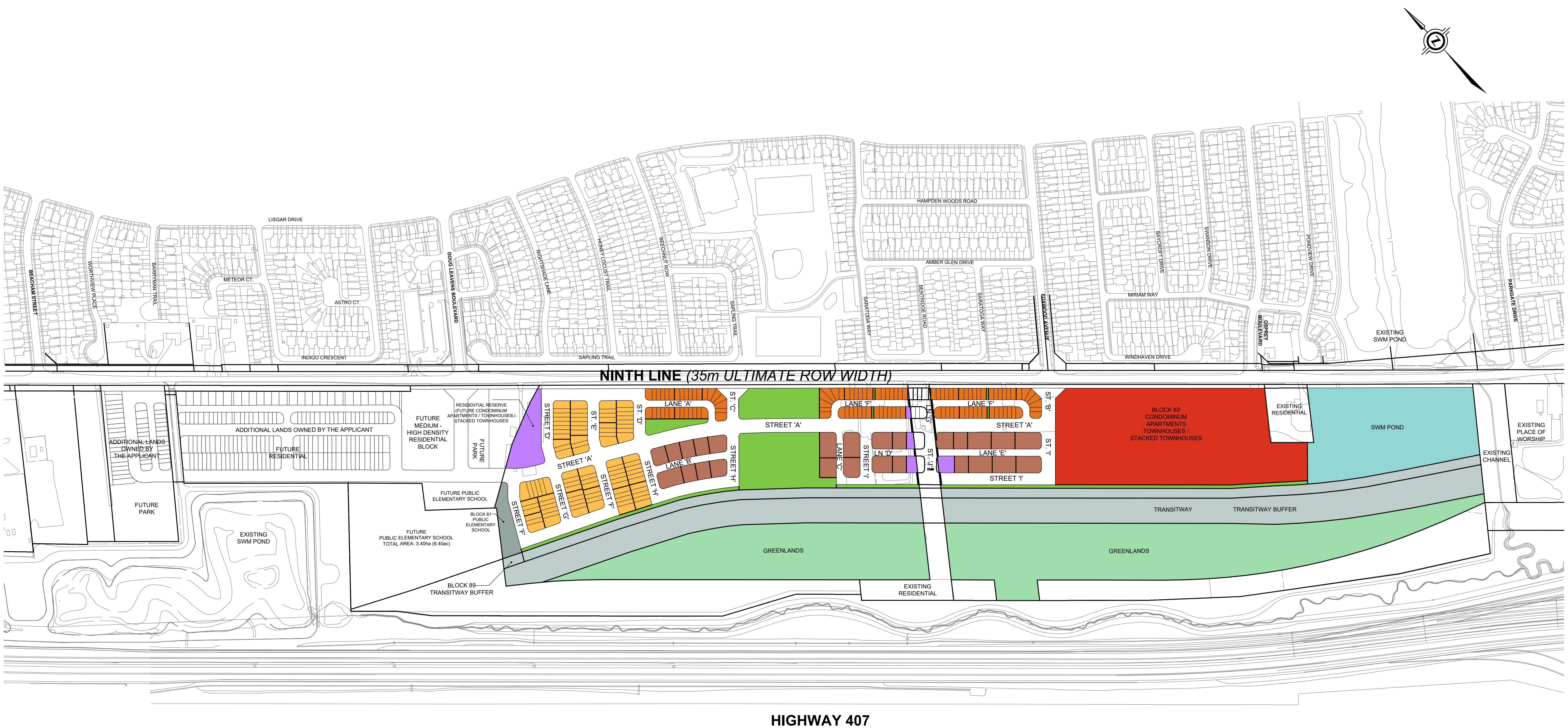
PROJECT No. 13958

As shown in Figure 3, the South Draft Plan of Subdivision for Phase 2 encompasses 36.2 Ha and consists of townhouse units, condominium duplex blocks, condominium apartments/townhouse/stacked townhouses block, park blocks, transitway corridor block, stormwater management block and areas designated for the future Natural Heritage System (NHS).

Phase 2 of the development will include grading works within the existing NHS / floodplain limits and construction of the 407 Transitway corridor berm. The grading design will be completed with the intention to maintain the existing water levels and floodplain storage for the East Branch Tributary of Sixteen Mile Creek. The existing Regional floodplain limits will be redefined to allow the completion of the Phase 2 development.

The Phase 2 works will include the internal grading and servicing and removal of the temporary SWM facility constructed within the Phase 1 lands. Stormwater quality, erosion and quantity control for the entire development will be provided within the ultimate SWM facility with a flow control outlet to the existing Osprey Marsh outlet channel.

Primary access to the development will be provided via Street B at the intersection of Ninth Line and Foxwood Avenue and via the intersection of Street C with Ninth Line.



LAND USE	BLOCKS	AREA (ha)	AREA (ac)	TOTAL UNITS	DENSITY (UPNHA)
REAR LANE TOWNHOUSE - 6.05m (20')	1-17	1.29	3.19	109	84.5
STREET TOWNHOUSE - 6.0m (20')	18-36	1.73	4.27	94	54.3
CONDOMINIUM DUPLEX	37-62	1.71	4.23	148	86.5
CONDO APARTMENTS / TOWNS / STACKS	63	4.52	11.17	350-1,360	77.4-300.9
RESIDENTIAL RESERVE	64-69	0.49	1.21		
PARK / WALKWAY / TRAIL	70-80	2.10	5.19		
PUBLIC ELEMENTARY SCHOOL	81	0.22	0.54		
SWM POND	82	2.87	7.09		
GREENLANDS	83,84	8.62	21.30		
TRANSITWAY / TRANSITWAY BUFFER	85-89	7.09	17.52		
ROAD WIDENINGS	90-92	0.65	1.61		
0.3m RESERVES	93-99	0.00	0.00		
10.0m LANEWAY (813m LENGTH)		0.81	2.00		
17.0m LOCAL ROW (1,299m LENGTH)		2.25	5.56		
20.0m LOCAL ROW (943m LENGTH)		1.80	4.45		
TOTAL	**99**	**36.15**	**89.33**	**701-1,711**	**75.8-185**

DERRY BRITANNIA DEVELOPMENTS LIMITED
NINTH LINE LANDS

SOUTH DRAFT PLAN OF SUBDIVISION
PHASE 2 DEVELOPMENT

FIGURE No. 3

SCALE: N.T.S.

RAND ENGINEERING CORPORATION

CITY OF MISSISSAUGA

PROJECT No. 13958

R:\13\13958\Drawings & Figures\2019 May 27, 2019 (Latest)\Figure 3-Phase 2 Development_DP2 May 22 19.dwg | Jun 12, 2019 - 2:41pm

4.0 EXISTING CONDITIONS

4.1 Topography and Drainage

A review of the site conditions was carried out using topographic mapping and site inspection. Topographic information for the property was obtained from a detailed survey completed by J.D. Barnes on May 13, 2019. The additional information for the adjacent lands was obtained from the City of Mississauga and *"Ninth Line Lands Scoped Subwatershed Study"*.

The subject lands comprise mainly agricultural lands with scattered pockets of small wetlands. There are a few rural residences located along Ninth Line. The subject lands are characterized by gently sloping topography with average slopes ranging from 1% to 3 % across the site. To the east of Ninth Line, there is an established Lisgar residential neighbourhood.

As shown in Figure 4, the subject lands are drained southerly via sheet flow and by a poorly defined drainage swale (HDF-6) towards the Osprey Marsh outlet channel (NLT-1). The channel drains westerly towards the East Branch Tributary of the Sixteen Mile Creek (NL-12 and NL-13), located along the east side of the Highway 407 corridor. Ultimately, the drainage is conveyed southerly via the manmade channel towards the Britannia Road 20 m span bridge crossing.

The 2015 *"Ninth Line Lands Scoped Subwatershed Study, Phase 1 – Background Report and Study Area Characterization*" (SWS Phase 1 Report) delineated natural heritage features present across the entire Ninth Line Lands study area, including the subject lands.

The SWS Phase 1 Report identified that retention of natural features east of East Branch Tributary, within the Transitway corridor and future urban development area, is restricted by the dense urban form.

mattamyHOMES

RAND

5285 SOLAR DRIVE
MISSISSAUGA, ONTARIO
L4W 5B8
TEL. (905) 625-9500

DERRY BRITANNIA DEVELOPMENTS LIMITED
NINTH LINE LANDS

EXISTING CONDITIONS

CITY OF MISSISSAUGA		FIGURE No.
SCALE N.T.S.	JOB No. 13958	4

R:\13\13958\Drawings & Figures\2019 May 27, 2019 (Latest)\Figure 4-Existing Conditions.dwg Jun 12, 2019 - 2:57pm

Opportunities to connect the creek's corridor to existing urban natural areas to the east were identified, including at the Osprey channel corridor at the southern limit of the subject lands.

No natural features outside of the East Branch Tributary corridor within the subject lands were identified for retention in the 2015 Phase 3 SWS Report.

Savanta has been contracted by the client to conduct a *"Scoped Environmental Impact Study"*, recognizing that the Phase 3 SWS did not identify any natural feature retention east of the East Branch Tributary. Savanta anticipates that the Scoped EIS will primarily focus on identifying appropriate compensation measures (i.e., area and/or functional compensation) for significant features removed (i.e., significant wildlife habitat) and preparing a conceptual features compensation design within the enhanced East Branch Tributary corridor.

4.2 Soils

A review of the property's subsurface conditions was carried out using the geotechnical information for the property provided in June 2019 *"Consolidated Report on Preliminary Geotechnical Investigation Proposed Residential Development Parcels A to J, Ninth Line, Ninth Line, Mississauga, Ontario"*, prepared by DS Consultants Ltd.

The DS Consultants report consolidated the geotechnical investigation results with the information previously completed within the subject lands by the other consultants (AMEC Earth & Environmental, Shad & Associates and Sirati and Partners Consultants Limited).

The results of the investigation indicate that the soil stratigraphy of the site consists of 0.10 m to 0.40 m layer of topsoil over a stratum of mainly silty clay and clayey silt till. These soils are exhibiting low rates of infiltration and high rates of runoff.

The groundwater level was observed ranging from approximately 0.9 m below grade in the northern part of the study lands, to approximately 4.4 m in the central part of the study lands and approximately 3.4 m in the southern part of the study lands. The investigation results also showed the water levels observed above the ground (artesian conditions) in several borehole locations in the northern part of the study lands. These lands will be the subject of hydrogeological investigation during the final design stage.

4.3 Existing Floodplain

As shown in Figure 4, a significant portion of the subject lands is located within the limits of the Regional floodplain of the East Branch Tributary of Sixteen Mile Creek.

The existing Regional floodplain and relevant hydraulic modeling information (HEC-RAS computer model) for the East Branch Tributary of Sixteen Mile Creek was obtained from the April 2019 *"Ninth Line Lands Scoped Subwatershed Study"*. The existing floodplain limits are illustrated on Drawing No. 1, included in Appendix D. It is noted that there is an existing spill over Ninth Line identified in the vicinity of Osprey Marsh.

5.0 STORMWATER MANAGEMENT PLAN

The recommended storm drainage plans applicable to Phase 1 and Phase 2 of the Mattamy development have been prepared in accordance with the recommendations from the April 2019 *"Ninth Line Lands Scoped Subwatershed Study"* and design requirements of the City of Mississauga, Conservation Halton and MECP.

5.1 Storm Drainage Design Criteria and Requirements

The following storm drainage criteria have been adopted for the stormwater conveyance system within the proposed development:

- The minor drainage system should be designed for the 10-year storm event using the Rational Method and City of Mississauga IDF curves.
- The major system should be designed to accommodate runoff exceeding the capacity of the minor system for flows up to and including the 100-year storm event. The major system should be contained within road allowances and designated easements without over-flowing onto the arterial roads.
- For residential lots, runoff from roof leaders should be discharged to surface pre-cast splash pads and directed towards pervious areas.
- Storm sewers should be installed at adequate depth to enable connection of all basement weeping tiles.
- An on-site detention of the first 5 mm of runoff over the entire development area. Due to the limited infiltration capacity of the existing soils, it is anticipated that the overall capture would be less than 5mm. The reduction in post-development infiltration can be mitigated by the implementation of Low Impact Development Best Management Practices (LID BMPs).

In accordance with the recommended stormwater management plan presented in the April 2019 *"Ninth Line Lands Scoped Subwatershed Study"*, stormwater quality, erosion and quantity control for the subject lands will be provided within an end-of-pipe stormwater management facility.

The following summarizes general design criteria for the design of the SWM facility:

- The SWM facility should be designed as an off-line wet pond with permanent storage for water quality control in accordance with the "enhanced" protection level for the receiving watercourse as defined in the March 2003 Ministry of Environment guidelines.

- The SWM facility should incorporate extended detention storage for erosion control to maintain the volume of runoff above the critical flow rate at existing levels, for the 4-hour 25mm storm event and calculated based on 275 m^3 per hectare of contributing impervious area. The extended detention release rate for the ponds should be designed based on 0.002 m^3/s per hectare of contributing area.

- The SWM facility should provide water quantity control for all storm events up to and including the Regional Storm (Hurricane Hazel) event. The storage and discharge requirements are summarized in the following table:

Return Storm	**Cumulative Volume* Required (m^3/impervious Ha)**	**Discharge (m^3/s/Ha)**
2-year	450	0.09
5-year	600	0.38
100-year	875	1.02
Regional	1775	1.53

* - Cumulative unitary volumes are inclusive of extended detention storage requirements for erosion control.

- The SWM facility design should include a bottom draw outlet structure, sediment forebay, outlet plunge pool, emergency overflow spillway and a maintenance access route from a municipal road.

- The SWM facility should be graded as follows:

  - side slopes between 5:1 and 7:1 for 3 m horizontally above and 3 m horizontally below the permanent water level; and
  - side slopes of 3:1 to 4:1 elsewhere.

In accordance with the April 2019 *"Ninth Line Lands Scoped Subwatershed Study*" findings, the stormwater management system for the Mattamy development will be separate from the stormwater management system for the 407 Transitway.

5.2 Proposed Storm Drainage Plan – North Draft Plan of Subdivision, Phase 1

The general layout of the stormwater conveyance network servicing the Phase 1 of the Mattamy development is shown on Drawing No. 2, included in Appendix E. Post-development storm drainage from the development will be managed using a combination of minor (storm sewers) and major (overland) systems.

Stormwater flows collected by the minor system will be conveyed by storm sewers sized to accommodate 10-year peak flows from the development as calculated using the Rational Method and City of Mississauga design criteria. Flows exceeding the capacity of the minor system up to the 100-year storm will be conveyed overland along proposed road allowances, generally following the direction of the minor system.

As shown on Drawing No.2, the combined minor and major systems from the subject development will be conveyed to the temporary SWM Pond located within the development limits.

5.3 Temporary SWM Pond – North Draft Plan of Subdivision, Phase 1

As shown on Drawing No. 2, the temporary SWM Pond will provide drainage control for approximately 8.9 Ha of drainage area with an average impervious level of 75%. The facility will be constructed as an off-line wet pond which will provide water quality, erosion and quantity control for the contributing drainage area. The temporary pond will be located within the 0.9 Ha block at the southern limit of the development. The block will be redeveloped as residential area and a park in conjunction with the Phase 2 development.

The permanent storage for water quality control in the pond has been sized to achieve an "enhanced" protection level for the receiving watercourse as defined in the 2003 MOE "*Stormwater Management Practices Planning and Design Manual*". The design volume provided within the facility will be 5,022 m^3 at the permanent water level of 190.70 m. The permanent storage depth will be 2.1 m.

In accordance with the April 2019 *"Ninth Line Lands Scoped Subwatershed Study*", erosion control has been determined based on the storage requirement of 275 m^3 per impervious hectare of contributing drainage area and release rate of 0.002 m^3/s per hectare of contributing drainage area.

Based on the preliminary design, the extended detention volume provided within the pond will be 2,492 m^3 controlled to a maximum rate of 0.016 m^3/s (at a depth of 0.6 m). The extended detention storage will be released through a 100 mm diameter orifice installed at the permanent pool elevation of 190.70 m. Based on the proposed development conditions, the drawdown time for the extended detention volume will be approximately 78 hours.

The SWM facility will provide water quantity control of post-development flows to the target rates for the 2-year, 5-year, 100-year and Regional Storm events established in the April 2019 *"Ninth Line Lands Scoped Subwatershed Study*". The maximum storage volume in the SWM facility will be approximately 14,950 m^3, to provide peak flow attenuation up to and including the Regional Storm event. The storage and outflows requirements for the temporary pond are provided in the following table.

Storage and Outflow Requirements for Temporary SWM Facility		
Storage Volume (m^3)		
	Required	**Provided**
Permanent	1,726	5,022
Extended Detention	1,840	2,492
2 Year	3,011	2,756
5 Year	4,015	3,583
100 Year	6,745	6,453
Regional Storm	13,682	14,949
Outflow Release Rate (m^3/s)		
	Target	**Provided**
Erosion Control	0.018	0.016
2 Year	0.805	0.021
5 Year	3.397	0.041
100 Year	9.119	0.131
Regional Storm	13.678	0.291

The SWMHYMO computer model has been used to evaluate the hydrologic response of the site with the implementation of the temporary SWM facility. Peak flows for post-development conditions have been determined for the 25-mm, 2-yr, 5-yr, 100-yr and Regional storm events.

Design storm hyetographs in the hydrologic simulation are based on a 4-hour rainfall distribution for the 25-mm storm and Chicago design storms for the 2-yr, 5-yr and 100-yr storm events. The Regional Storm event simulation is based upon the 12-hour distribution of Hurricane Hazel.

The pond sizing, outlet performance, stage-storage-discharge curves and pond performance tables for the temporary SWM Pond are provided in Appendix A. The SWMHYMO modeling results are included in Appendix C.

The pond will be graded at a slope of 3:1 down to the extended detention water level of 191.30 m, then at a minimum slope of 5:1 slope down to 0.6 m below the permanent water level and 3:1 slope to the bottom of the facility. The sediment forebay will have sufficient capacity to accommodate the anticipated 10-year sediment yield. The facility will provide a minimum 0.30 m freeboard above the maximum water level.

As shown on Drawing No.2, the controlled flows from the facility will be conveyed via an approximately 380 m long temporary outlet swale to the existing East Branch Tributary of Sixteen Mile Creek.

5.4 Proposed Storm Drainage Plan – South Draft Plan of Subdivision, Phase 2

The general layout of the stormwater conveyance network servicing Phase 2 of the Mattamy development is shown on Drawing No. 3, included in Appendix E. Post-development storm drainage from the development will be managed using a combination of minor (storm sewers) and major (overland) systems.

Stormwater flows collected by the minor system will be conveyed by storm sewers sized to accommodate 10-year peak flows from the development as calculated using the Rational Method and City of Mississauga design criteria. Flows exceeding the capacity of the minor system up to and 100-year will be conveyed overland along proposed road allowances, generally following the direction of the minor system.

As shown on Drawing No.3, the temporary SWM Pond will be removed and the combined minor and major systems from the subject development will be conveyed to the ultimate SWM Pond located at the southern limit of the development.

5.5 Ultimate SWM Pond – South Draft Plan of Subdivision, Phase 2

As shown on Drawing No. 3, the SWM Pond will provide drainage control for the entire Mattamy development (i.e. Phases 1 and 2). The facility will be constructed as an off-line wet pond and will provide water quality, erosion and quantity control for the contributing 32.6 Ha drainage area with an average impervious level of 75%. The pond will be located within the approximately 2.9 Ha block located at the southern part of the Phase 2 development.

The permanent storage for water quality control in the pond has been sized to achieve an "enhanced" protection level for the receiving watercourse as defined in the 2003 MOE "*Stormwater Management Practices Planning and Design Manual*". The design volume provided within the facility will be 12,382 m^3 at the permanent water level of 188.25 m. The permanent storage depth will be 2.25 m.

In accordance with the April 2019 *"Ninth Line Lands Scoped Subwatershed Study*", erosion control has been determined based on the storage requirement of 275 m^3 per impervious hectare of contributing drainage area and release rate of 0.002 m^3/s per hectare of contributing drainage area.

Based on the preliminary design, the extended detention volume provided within the pond will be 8,310 m^3 controlled to a maximum rate of 0.062 m^3/s (at a depth of 0.6 m). The extended detention storage will be released through a 200 mm diameter orifice installed at the permanent pool elevation of 188.25 m. Based on the proposed development conditions, the drawdown time for the extended detention volume will be approximately 66 hours.

The SWM facility will provide water quantity control of post-development flows to the target rates for the 2-year, 5-year, 100-year and Regional Storm events established in the April 2019 *"Ninth Line Lands Scoped Subwatershed Study*". The maximum storage volume in the SWM facility will be approximately 50,290 m^3, to provide peak flow attenuation up to and including the Regional Storm event. The storage and outflows requirements for the Phase 2 pond are provided in the following table.

Storage and Outflow Requirements for Phase 2 SWM Facility		
Storage Volume (m^3)		
	Required	**Provided**
Permanent	6,320	12,382
Extended Detention	6,757	8,310
2 Year	11.057	9,944
5 Year	14,743	13,540
100 Year	24,698	23,330
Regional Storm	50,101	50,289
Outflow Release Rate (m^3/s)		
	Target	**Provided**
Erosion Control	0.065	0.062
2 Year	2.930	0.078
5 Year	12.373	0.113
100 Year	33.211	0.556
Regional Storm	49.817	1.326

The SWMHYMO computer model has been used to evaluate the hydrologic response of the site with the implementation of the proposed SWM facility. Peak flows for post-development conditions have been determined for the 25-mm, 2-yr, 5-yr, 100-yr and Regional storm events.

Design storm hyetographs in the hydrologic simulation are based on a 4-hour rainfall distribution for the 25-mm storm and Chicago design storms for the 2-yr, 5-yr and 100-yr storm events. The Regional Storm event simulation is based upon the 12-hour distribution of Hurricane Hazel.

The pond sizing, outlet performance, stage-storage-discharge curves and pond performance tables for the ultimate SWM Pond are provided in Appendix B. The SWMHYMO modeling results are included in Appendix C.

The pond will be graded at an average slope of 4:1 down to the upper limit of the safety shelf, then at a slope of 7:1 for 3 m horizontally above and 3 m horizontally below the permanent water level and then at a slope of 3:1 to the bottom of the facility. The sediment forebay will have sufficient capacity to accommodate the anticipated 10-year sediment yield. The facility will provide a minimum 0.30 m freeboard above the maximum water level.

As shown on Drawing No.3, the controlled flows from the facility will be conveyed to the existing Osprey Marsh outlet channel and ultimately to the East Branch Tributary.

5.6 Temporary and Ultimate SWM Ponds Components

The outlet structure from each SWM Pond will consist of the following components:

<u>Quality and Erosion Control</u> - The water quality control outlet will be a bottom-draw consisting of a 2% (typical) reverse-grade PVC outlet pipe with vertical bends connected to a 1500 mm diameter (typical) manhole. An orifice will be installed vertically within the manhole at the permanent water elevation, allowing the extended detention volume to drain over a minimum period of 48 hours. The 1500 mm manhole will connect to a manhole downstream of the quantity control outlet structure common to both the quality and quantity control discharge streams. Treated flows will be conveyed from the common manhole via a proposed storm sewer and concrete headwall to the temporary swale.

<u>Quantity Control</u> - The controlled flows will be conveyed via a weir control structure within a concrete chamber. Controlled flows will be conveyed via storm sewer outlet into the temporary swale.

To prevent sub-surface migration of water out of the facility, the bottom and side walls of each pond will be lined with clayey fill materials in accordance with recommendations from the geotechnical consultant.

The sediment forebay will be separated from the main pond area by a berm, which will be constructed 0.30 m below the normal water level. The forebay will have sufficient capacity to accommodate the anticipated 10-year sediment yield.

Design details for the various components of the proposed ponds will be provided in a Stormwater Management Implementation Report that will be submitted at the time of the final engineering submission.

5.7 Low Impact Development Practices

Recognizing the April 2019 *"Ninth Line Lands Scoped Subwatershed Study*" objectives related to water quality and erosion control, the following LID practices are recommended to be implemented within Phases 1 and 2 of the development:

- The depth of topsoil on the lots will be increased from the typical 150 mm to 300 mm,

- Provision of the enhanced grass swales within the park blocks and buffers.

- Rainwater harvesting program. The optional provision of rainwater barrels on individual lots.

- Provision of bioretention areas within green spaces.

- Runoff from roof leaders not connected to infiltration trenches will be discharged to surface pre-cast splash pads and directed towards lawns.

The proposed storm drainage system and implementation of LID practices within the development will provide on-site detention of 5 mm of runoff from future development.

In accordance with the City of Mississauga and CH requirements the water balance analysis for the entire development plan will be conducted by the hydrogeological consultant to evaluate the proposed LID strategy, including the provision of 5 mm of rainfall detention and impact on the groundwater resources within the study limits.

5.8 Erosion and Sediment Control

Erosion and sediment control measures to be implemented during and following construction are outlined below. These measures will comply with the December 2006 *"Erosion and Sediment Control Guideline for Urban Construction"* and current Conservation Halton and City of Mississauga standards. The proposed erosion and sediment control works during construction will consist of the following:

- temporary silt fences,
- temporary snow fences,
- sediment traps for the catchbasins and manholes,
- mud mats at the construction access,
- temporary siltation facilities, which will be sized to accommodate the required permanent storage of 185 m^3 per development hectare and additional extended detention storage of 125 m^3 per contributing drainage hectare. These facilities will detain runoff for an average 48-hour period. Sizing of these facilities will also be based on anticipated phasing of construction.

6.0 NHS Channelization Works, South Draft Plan of Subdivision

In accordance with the recommendations presented in the May 2018 *"Addendum to the Highway 407 Transitway Corridor Assessment within the Ninth Line Lands Study Area (2016)* and April 2019 *"Ninth Line Lands Scoped Subwatershed Study*", the modifications to the existing Regional floodplain will be permitted within the study limits.

The proposed works will include filling within the Regional floodplain to allow for construction of the Transitway berm and create developable area between the Transitway and Ninth Line. The loss in floodplain storage will be balanced by the proposed lowering of the floodplain elevations within the NHS corridor, on the west side of the Transitway. The Transitway berm will be erected to a minimum of 0.3 m above the Regional Storm flood depth and will serve as the new watercourse embankment.

It is intended that the proposed grading modifications within the existing floodplain will have no adverse effect upon predicted water levels and floodplain storage for the study lands under post-development conditions under the 2-year to 100-year and Regional Storm events.

The proposed grading within the NHS corridor to accommodate the Regional Storm floodplain will be designed to preserve the natural channel functions and enhance hydraulic and geomorphic functionality of the existing system.

6.1 Hydraulic Assessment

The hydraulic analysis of the post-development conditions was undertaken using the original HEC-RAS hydraulic model for the East Branch Tributary of Sixteen Mile Creek. The post-development model included the preliminary 407 Transitway grading information obtained from the May 2018 *"Addendum to the Highway 407 Transitway Corridor Assessment within the Ninth Line Lands Study Area (2016), City of Mississauga*", proposed grading design for the Mattamy Phase 2 development east of the Transitway and grading works within the NHS corridor.

The following summarizes changes that have been incorporated into the HEC-RAS model for the post-development conditions:

- The HEC-RAS cross sections Nos. 225-234 in the *Existing October 2015* scenario were replaced with the same numbered cross sections from the *Proposed Partial 2KS* scenario to reflect the proposed 407 Transitway berm and NHS works.

- The HEC-RAS cross-sections 225-226 inserted from the *Proposed Partial 2KS* scenario account for the removal of floodplain storage as a result of the proposed grading for the ultimate SWM Pond grading.

The proposed conditions HEC-RAS model results and a comparison of water levels between existing and post-development conditions is summarized in Appendix D.

The results of the hydraulic analysis for the 2-year to 100-year and Regional Storm events demonstrated practically no change in water levels in the study reach of the East Branch Tributary of Sixteen Mile Creek, in comparison to the existing conditions.

The results showed a water level decrease of 0.05 m at cross-section No. 232 for the Regional Storm event, which is considered negligible. It was further confirmed that the filling required for the proposed Transitway berm and regrading within the Phase 2 development limits will not interfere with the hydraulic efficiency of the watercourse for the 2-year to 100-year and Regional Storm events.

It should be noted that flood levels for all storm events up to and including the 100-year storm event are confined within the existing East Branch Tributary channel through the study limits and as such would not be affected by the proposed filling works within the existing floodplain.

The post-development Regional Storm floodlines are shown on Drawing No. 4, included in Appendix E.

6.2 Geomorphic Analysis and Natural Channel Design

In accordance with the April 2019 *"Ninth Line Lands Scoped Subwatershed Study"* recommendations, the proposed NHS channel design will improve the overall quality of the stream corridor and enhance aquatic/terrestrial habitats. A comprehensive geomorphic assessment of the NHS will be conducted during the detailed design stage.

Off-line and on-line wetland features will be implemented to provide sediment and flow retention functions. The final design of the East Branch Tributary channel corridor will be completed at the time of final design of the subject development.

7.0 WASTEWATER SERVICING PLAN

The preliminary servicing information for the subject lands was obtained from the February 2017 *'Water and Wastewater Assessments for Ninth Line Lands'*, prepared by Amec Foster Wheeler (AFW). This report was prepared based on the population and land uses forecast determined in September 2016.

In accordance with Region of Peel plans, the Mattamy development will be serviced by the West Trunk Sewer System draining by gravity via the West Trunk System to the Clarkson WPCP. The Region's preferred strategy is a proposed trunk sewer within the development limits to be connected to the existing 900 mm diameter sewer on Ninth Line, terminated approximately 150 m north of Parkgate Drive.

Based on the proposed Phase 1 development plan and a number of lots fronting Ninth Line it is proposed to install approximately 2.0 km of 375mm diameter wastewater sewer on Ninth Line, between Beacham Street (i.e. northern limit of the development) and the existing 900mm diameter sewer. The construction of the 375mm diameter sewer will include wastewater servicing connections to the future residential units fronting Ninth Line, located within the Phase 2 development limits.

The preliminary wastewater servicing plans for the North and South Draft Plans of Subdivision are shown on Drawing No.5 and Drawing No.6, respectively, and are included in Appendix E.

The wastewater sewer network servicing the proposed development will be a conventional gravity system. The sizes and locations of proposed sanitary sewers within the development will be verified at the time of detailed engineering design in accordance with the current Region of Peel standards.

8.0 WATER SUPPLY AND DISTRIBUTION PLAN

The preliminary servicing information for the subject lands was obtained from the February 2017 *'Water and Wastewater Assessments for Ninth Line Lands'*, prepared by Amec Foster Wheeler (AFW). This report was prepared based on the population and land uses forecast determined in September 2016.

The AFW report concluded that there is sufficient capacity in the Region of Peel water supply and distribution system and recommended that the Mattamy development be serviced within the three existing pressure zone systems (PZ 4, 5A and 5A-2). The following infrastructure will be installed to service the Mattamy development:

- Installation of 1.7 km of 400mm diameter watermain between Beacham Street and Osprey Boulevard.

- Installation of an internal 400mm diameter watermain loop between Doug Leavens Blvd. and Osprey Blvd. This service is considered as part of external services.

The preliminary water servicing plans for the North and South Draft Plans of Subdivision are shown on Drawing No. 7 and Drawing No. 8, respectively, and are included in Appendix E.

The water distribution system for the proposed development will be designed in accordance with the current Region of Peel standards. The sizes and locations of proposed watermains within the subdivision will be verified at the time of detailed engineering design.

9.0 PRELIMINARY GRADING PLAN

A preliminary grading plan for the Mattamy development has been prepared in conjunction with the conceptual storm and wastewater servicing systems design for the subject lands and based on the existing grading information for the adjacent lands.

The preliminary grading design has been conducted based on the proposed land use plans and with consideration of the proposed roads and laneways. Figures 5 and 6 illustrate typical road cross section details for the proposed 17 m and 20 m rights-of-way local roads, respectively. Figure 7 shows the proposed cross section for a 10 m right-of-way laneway.

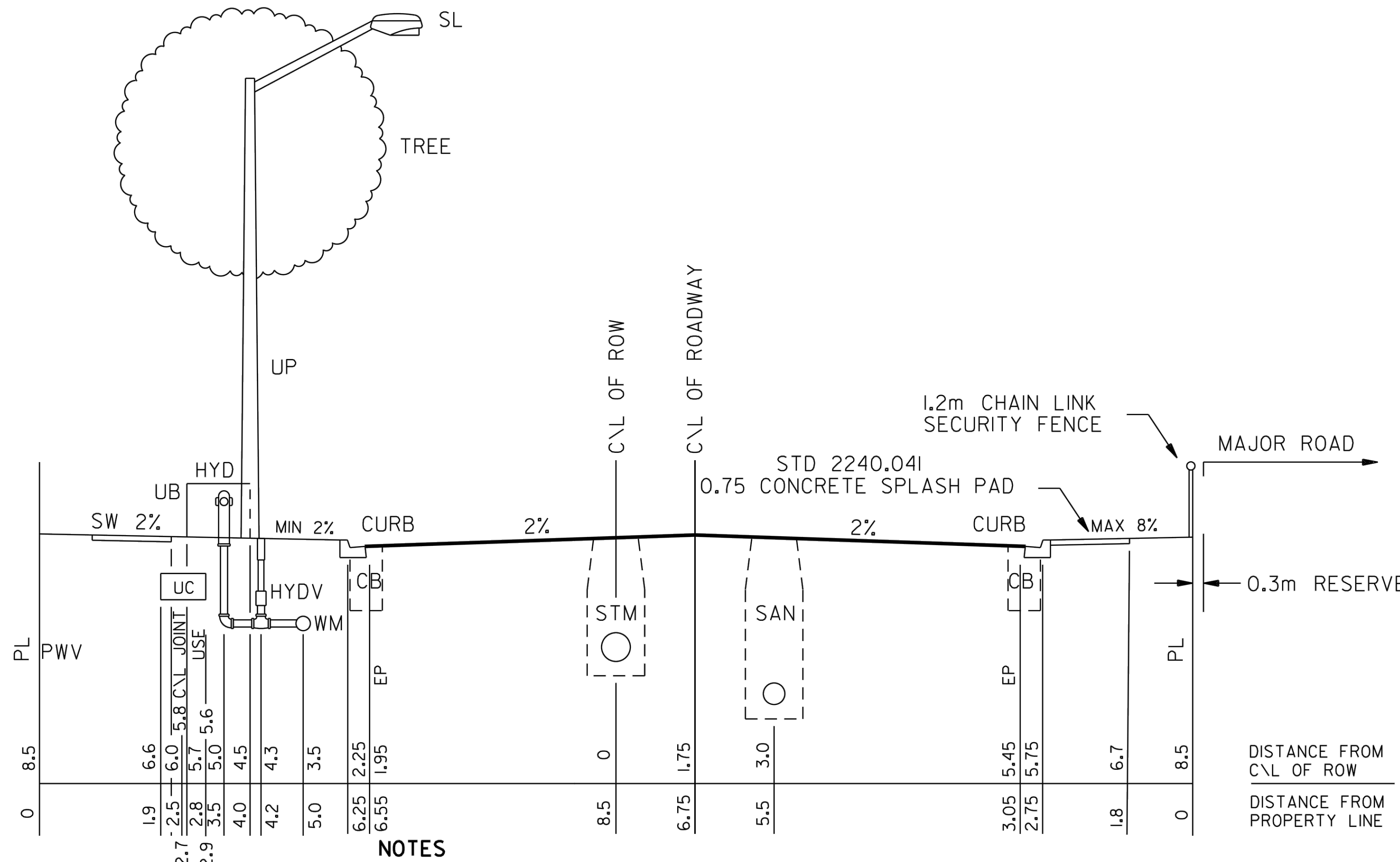
The grading of the site has been designed to provide positive drainage towards the proposed stormwater management facilities and adequate cover for the municipal services.

The preliminary grading information for the North and South Draft Plans of Subdivision are provided on Drawing No. 9 and Drawing No. 10, respectively, and are included in Appendix E.

The proposed grading works within the limits of the South Draft Plan of Subdivision, Phase 2 development will include the construction of the 407 Transitway berm and earthworks within the existing floodplain.

.

METRIC
ALL DIMENSIONS IN METRES



LEGEND

EP - EDGE OF PAVEMENT
CB - CATCH BASIN
CURB - CURB OR CURB AND GUTTER
C/L - CENTRELINE
GAS - GAS MAIN
HYD - FIRE HYDRANT
HYDV - FIRE HYDRANT VALVE
PWV - PRIVATE WATER VALVE
PL - PROPERTY LINE
SL - STREETLIGHT
SW - SIDEWALK
SAN - SANITARY SEWER
STM - STORM SEWER
UB - UTIITY BOX (HYDRO,TELECOMMUNICATIONS)
UC - UTILITY CORRIDOR(HYDRO,TELECOMM,GAS,SL)
UP - UTILITY POLE
WM - WATERMAIN

NOTES

1. HYDRO, TELECOMMUNICATIONS, GAS AND SL CORRIDOR TO HAVE A MINIMUM COVER OF 0.965m.
2. WATERMAIN TO HAVE A MINIMUM COVER OF 1.7m.
3. IF UTILITIES CANNOT BE INSTALLED ACCORDING TO THIS STANDARD THEY ARE TO BE INSTALLED AS CLOSE AS POSSIBLE TO THE PRESCRIBED LOCATION SUBJECT TO THE APPROVAL OF THE TRANSPORTATION AND WORKS DEPARTMENT OF THE CITY OF MISSISSAUGA
4. A 0.4m - 0.6m CLEARANCE MUST BE MAINTAINED BETWEEN CABLES AND HYDRANTS.
5. A 0.3m CLEARANCE MUST BE MAINTAINED BETWEEN WATERMAINS AND UTILITY POLES.
6. SPLASH PAD TO BE 130 mm THICK, 30 MPa CONCRETE WITH 5 - 7% AIR ENTRAINMENT ON 100 mm THICK GRANULAR 'A' COMPACTED TO 95% PROCTOR.
7. ROAD WIDTH IS MEASURED FROM FACE OF CURB TO FACE OF CURB AS DEFINED ON OPSD STD. 600.040 CURB & GUTTER. PAVEMENT WIDTH IS MEASURED FROM EDGE OF PAVEMENT (EP) TO EDGE OF PAVEMENT (EP).
8. FOR LOCATION OF GAS MAIN WITHIN UTLITY CORRIDOR REFER TO STD. 2211.280

MISSISSAUGA

STANDARD
BUFFER ROAD
8.0m ROAD ON 17m ROW

EFF. DATE	2002-01-01	SCALE	N.T.S.
REV. 11	2015-06-05	STANDARD No.	2211.140

FIGURE No. 5

SCALE: N.T.S.

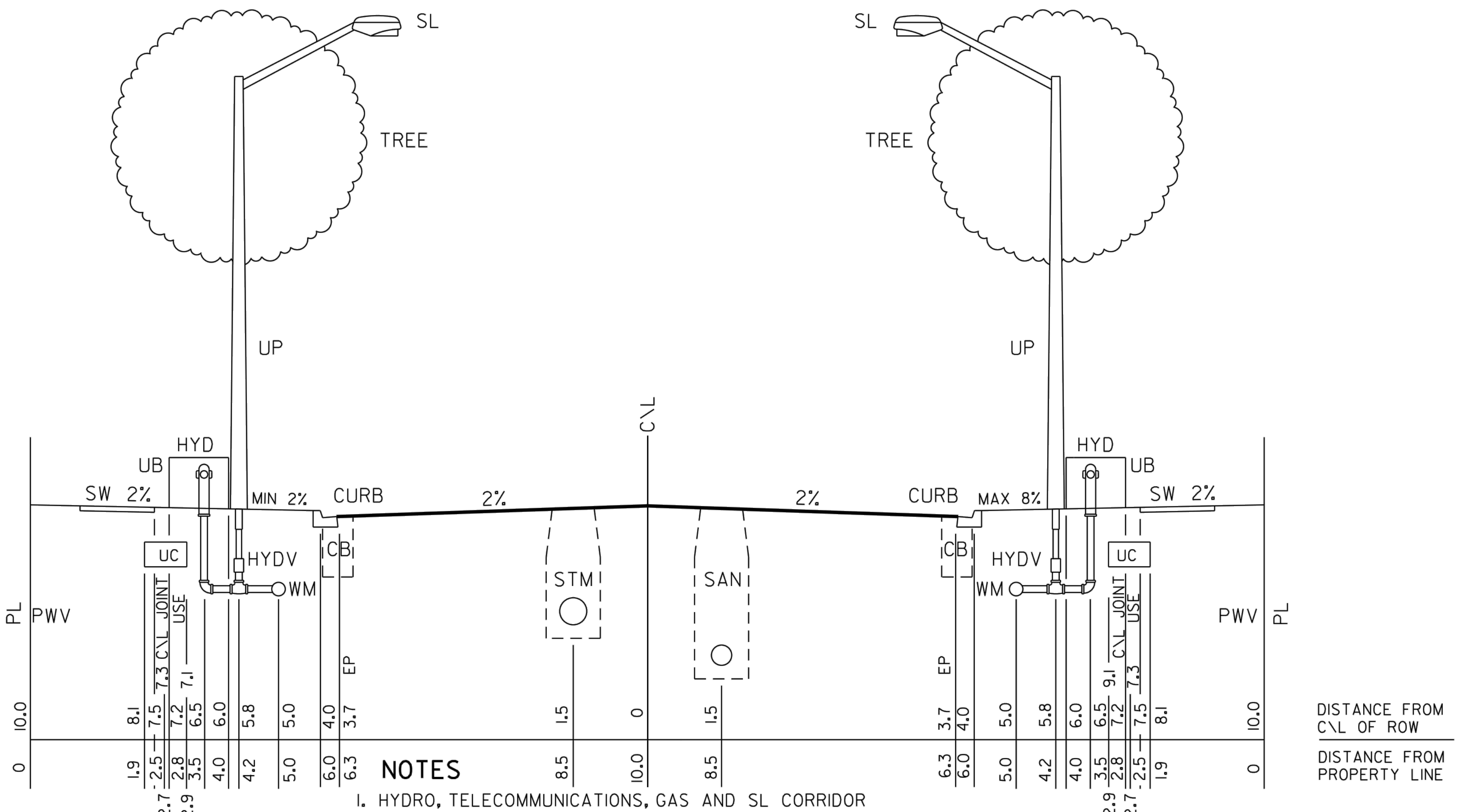
LOCAL ROAD
17.0m R.O.W. CROSS SECTION

DERRY BRITANNIA DEVELOPMENTS LIMITED
NINTH LINE LANDS

CITY OF MISSISSAUGA

PROJECT No. 13958

METRIC
ALL DIMENSIONS IN METRES



LEGEND

EP - EDGE OF PAVEMENT
CB - CATCH BASIN
CURB - CURB OR CURB AND GUTTER
C/L - CENTRELINE
GAS - GAS MAIN
HYD - FIRE HYDRANT
HYDV - FIRE HYDRANT VALVE
PWV - PRIVATE WATER VALVE
PL - PROPERTY LINE
SL - STREETLIGHT
SW - SIDEWALK
SAN - SANITARY SEWER
STM - STORM SEWER
UB - UTIITY BOX (HYDRO,TELECOMMUNICATIONS)
UC - UTILITY CORRIDOR (HYDRO,TELECOMM,GAS,SL)
UP - UTILITY POLE
WM - WATERMAIN

NOTES

1. HYDRO, TELECOMMUNICATIONS, GAS AND SL CORRIDOR TO HAVE A MINIMUM COVER OF 0.965m.
2. WATERMAIN TO HAVE A MINIMUM COVER OF 1.7m.
3. IF UTILITIES CANNOT BE INSTALLED ACCORDING TO THIS STANDARD THEY ARE TO BE INSTALLED AS CLOSE AS POSSIBLE TO THE PRESCRIBED LOCATION SUBJECT TO THE APPROVAL OF THE TRANSPORTATION AND WORKS DEPARTMENT OF THE CITY OF MISSISSAUGA.
4. A 0.4m - 0.6m CLEARANCE MUST BE MAINTAINED BETWEEN CABLES AND HYDRANTS.
5. A 0.3m CLEARANCE MUST BE MAINTAINED BETWEEN WATERMAINS AND UTILITY POLES.
6. ROAD WIDTH IS MEASURED FROM FACE OF CURB TO FACE OF CURB AS DEFINED ON OPSD STD. 600.040 CURB & GUTTER. PAVEMENT WIDTH IS MEASURED FROM EDGE OF PAVEMENT (EP) TO EDGE OF PAVEMENT (EP).
7. FOR LOCATION OF GAS MAIN WITHIN UTILITY CORRIDOR REFER TO STD. 2211.280

MISSISSAUGA

STANDARD
LOCAL RESIDENTIAL ROAD
8.0m ROAD ON 20m ROW

EFF. DATE	2002-01-01	SCALE	N.T.S.
REV. 7	2015-06-05	STANDARD No.	2211.070

FIGURE No. 6

SCALE: N.T.S.

RAND ENGINEERING CORPORATION

LOCAL ROAD
20.0m R.O.W. CROSS SECTION

DERRY BRITANNIA DEVELOPMENTS LIMITED
NINTH LINE LANDS

CITY OF MISSISSAUGA

PROJECT No. 13958

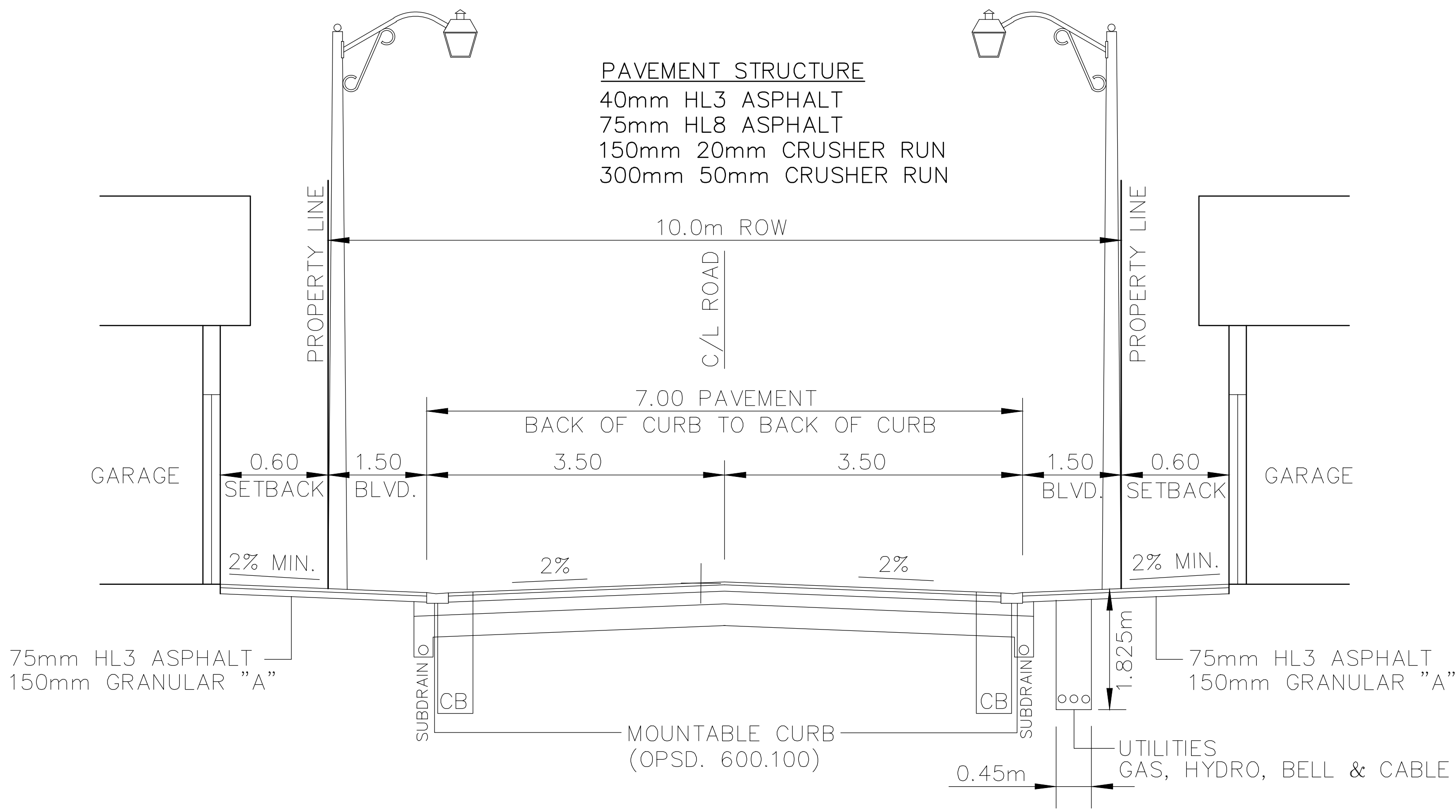


FIGURE No. 7

SCALE: N.T.S.

RAND ENGINEERING CORPORATION

DERRY BRITANNIA DEVELOPMENTS LIMITED
NINTH LINE LANDS

LANEWAY

10.0m R.O.W. CROSS SECTION

CITY OF MISSISSAUGA

PROJECT No. 13958

R:\13\13958\Drawings & Figures\2019 May 27, 2019 (Latest)\Figure 7_Laneway-10m R.O.W.dwg | Jun 12, 2019 - 11:40am

10.0 CONSTRUCTION STAGING

Based on the existing environmental constraints, the Mattamy development will be implemented in three stages over a 2-3 year period. The following summarizes the intended construction staging plans for the subject lands.

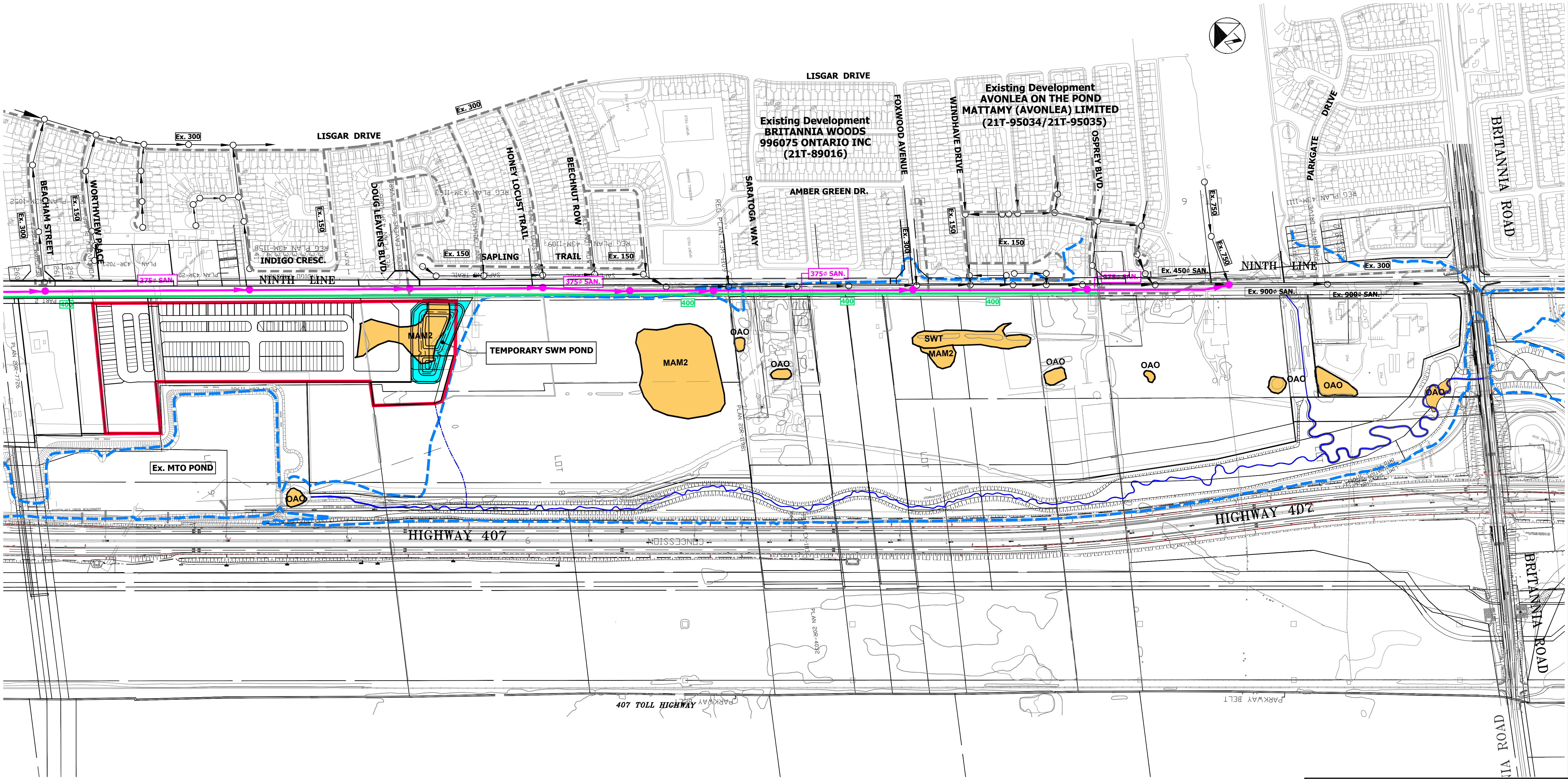
Stage 1 (North Draft Plan of Subdivision)

As shown in Figure 8, Stage 1 of the development includes the construction of the northern portion of the subdivision (approximately 9.4 Ha) located northwest of Doug Leavens Boulevard and Ninth Line. The development will be completed outside the existing Regional floodplain limits. It will include construction of the temporary SWM facility with an outlet to the existing East Branch Tributary. The servicing of the site will be provided by an extension of the existing water and sanitary services on Ninth Line. The construction will also include the installation of servicing connections to the future residential units along Ninth Line (i.e. South Draft Plan of Subdivision).

Stage 1 will include the removal of the existing wetland feature (MAM2) located within the property limits. Prior to the Stage 1 construction, a Comprehensive Restoration and Compensation Plan for the study lands will be developed and approved by all government agencies or other satisfactory arrangements will be made. It is expected that MTO will complete the EA process for a preferred transitway corridor alignment and the parkway belt plan designation for the subject lands will be lifted.

Stage 2 (South Draft Plan of Subdivision)

A shown in Figure 9, Stage 2 of the development will include grading works within the existing NHS/floodplain limits and construction of the transitway right-of-way. The grading design will be completed with the intention to maintain existing water levels and floodplain storage within the study limits. The works will be conducted with protection of the existing watercourse and will include the NHS restoration works.



LEGEND

- STAGE 1 LIMIT
- EXISTING REGIONAL FLOODLINE
- Ex. 450⌀ SAN. — EXISTING SANITARY SEWER
- 375⌀ SAN. — PROPOSED SANITARY SEWER
- OAO — EXISTING WETLAND / OPEN AQUATIC FEATURE
- Ex. 300 — EXISTING WATERMAIN (SIZE mm)
- 400 — PROPOSED WATERMAIN (SIZE mm)

STAGE 1 CONSTRUCTION INCLUDES:

1. RESIDENTIAL DEVELOPMENT, INTERNAL GRADING AND SERVICING.
2. REMOVAL OF EXISTING WETLAND FEATURE.
3. TEMPORARY SWM POND AND OUTLET TO 16 MILE CREEK TRIBUTARY.
4. EXTERNAL WATER AND SANITARY SERVICES ALONG NINTH LINE, INCLUDING SERVICING CONNECTIONS TO FUTURE RESIDENTIAL UNITS.

mattamyHOMES

RAND

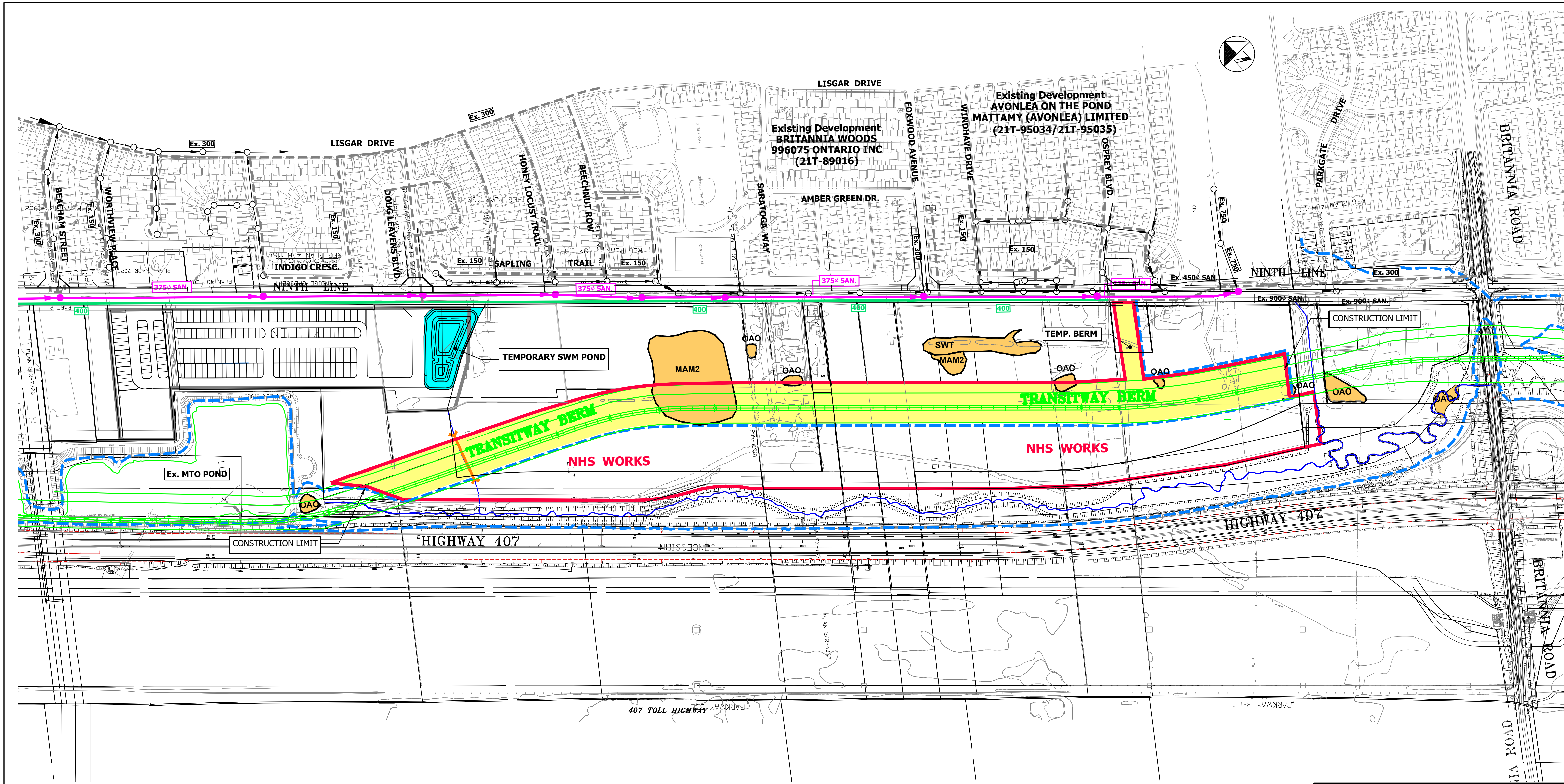
5285 SOLAR DRIVE
MISSISSAUGA, ONTARIO
L4W 5B8
TEL. (905) 625-9500

NINTH LINE DEVELOPMENT
CONSTRUCTION STAGING
STAGE - 1

CITY OF MISSISSAUGA

SCALE N.T.S.	JOB No. 13958	FIGURE No. 8

R:\13\13958\Drawings & Figures\2019 May 27, 2019 (Latest)\Figure 8, 9 & 10—CONSTRUCTION STAGING—Stage 1, 2 & 3.dwg Jun 12, 2019 — 3:23pm



LEGEND

- STAGE 2 LIMIT
- Ex. 450ϕ SAN. — EXISTING SANITARY SEWER
- 375ϕ SAN. — PROPOSED SANITARY SEWER
- POST-DEVELOPMENT REGIONAL FLOODLINE
- Ex. 300 — EXISTING WATERMAIN (SIZE mm)
- 400 — PROPOSED WATERMAIN (SIZE mm)

STAGE 2 CONSTRUCTION INCLUDES:

1. ALL EXISTING WETLANDS/ OPEN AQUATIC FEATURES WITHIN STAGE 2 AND AREA EAST OF TRANSITWAY TO BE REMOVED.
2. NHS/ FLOODPLAIN GRADING AND RESTORATION WORKS.
3. TRANSITWAY CORRIDOR BERM CONSTRUCTION.
4. RECONFIGURATION OF FLOODPLAIN LIMITS.

mattamyHOMES RAND

5285 SOLAR DRIVE
MISSISSAUGA, ONTARIO
L4W 5B8
TEL. (905) 625-9500

NINTH LINE DEVELOPMENT CONSTRUCTION STAGING STAGE - 2

CITY OF MISSISSAUGA

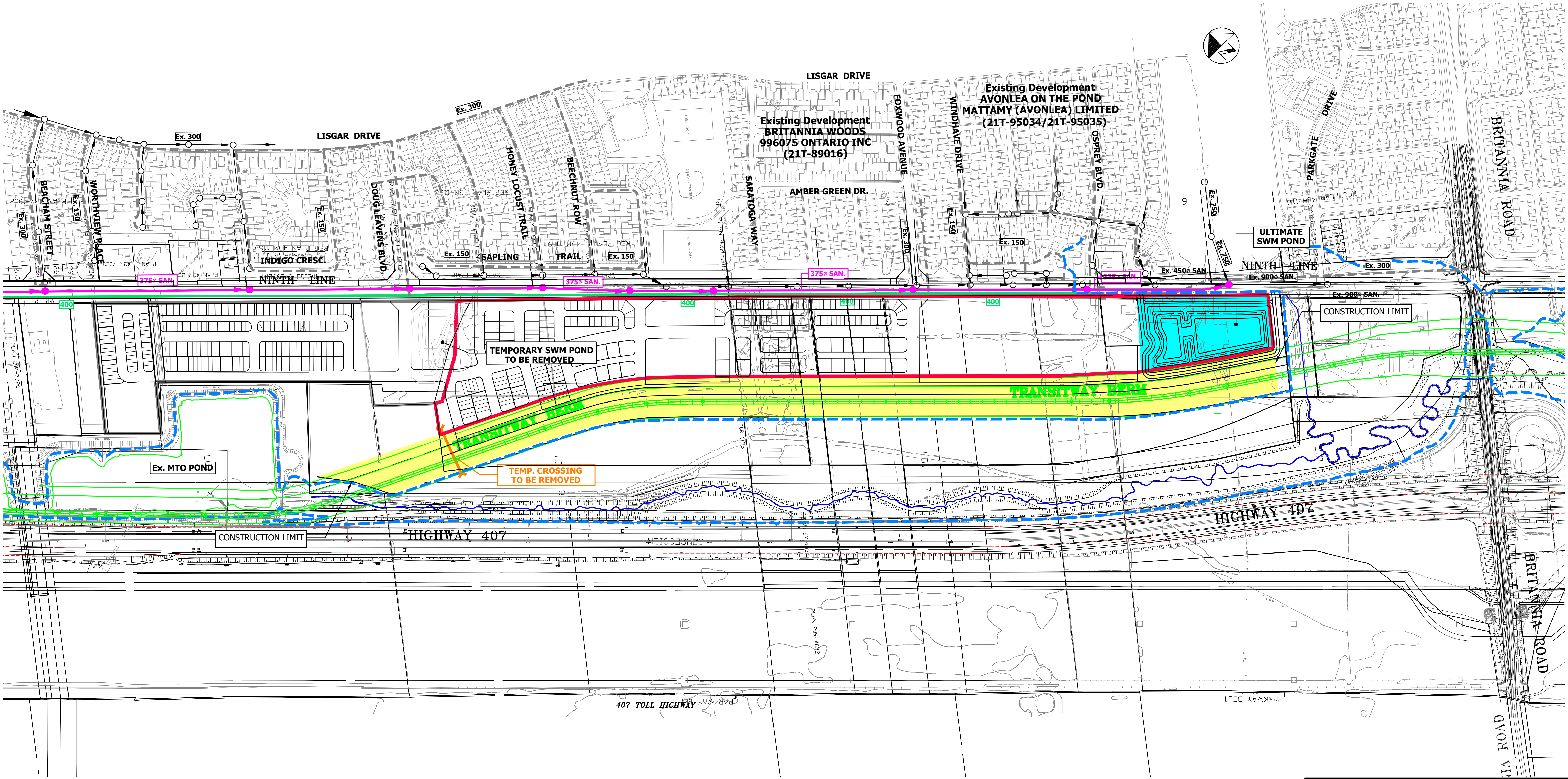
SCALE N.T.S.	JOB No. 13958	Figure No. 9

R:\13\13958\Drawings & Figures\2019 May 27, 2019 (Latest)\Figure 8, 9 & 10-CONSTRUCTION STAGING-Stage 1, 2 & 3.dwg Jun 12, 2019 – 3:34pm

The remaining wetland / open aquatic features located within the ultimate development limits (i.e. Stage 3 development) will be removed in accordance with the Comprehensive Restoration and Compensation Plan. The existing Regional floodplain limits will be redefined which will allow for completion of the grading works east of the transitway corridor.

Stage 3 (South Draft Plan of Subdivision)

As shown in Figure 10, Stage 3 of the development comprises the balance of the residential subdivision including the ultimate SWM Facility. These works will include internal grading and servicing and removal of the interim SWM facility.



LEGEND

STAGE 3 LIMIT	POST-DEVELOPMENT REGIONAL FLOODLINE
Ex. 450ø SAN. EXISTING SANITARY SEWER	Ex. 300 EXISTING WATERMAIN (SIZE mm)
375ø SAN. PROPOSED SANITARY SEWER	400 PROPOSED WATERMAIN (SIZE mm)

STAGE 3 CONSTRUCTION INCLUDES:

1. CONSTRUCTION OF ULTIMATE SWM POND.
2. RESIDENTIAL DEVELOPMENT, INTERNAL GRADING AND SERVICING.
3. REMOVAL OF TEMPORARY SWM POND.

mattamyHOMES RAND

5285 SOLAR DRIVE
MISSISSAUGA, ONTARIO
L4W 5B8
TEL. (905) 625-9500

**NINTH LINE DEVELOPMENT
CONSTRUCTION STAGING
STAGE - 3**

CITY OF MISSISSAUGA

SCALE N.T.S. | JOB No. 13958 | FIGURE No. 10

R:\13\13958\Drawings & Figures\2019 May 27, 2019 (Latest)\Figure 8, 9 & 10-CONSTRUCTION STAGING-Stage 1, 2 & 3.dwg Jun 12, 2019 - 3:55pm

11.0 Conclusions

This report identifies the storm, wastewater and water supply and distribution systems required to support the proposed North and South Draft Plans of Subdivision for the proposed Derry Britannia Developments Limited subdivision. Based on the findings of this study, it is concluded that:

1. A technical assessment of the municipal servicing requirements indicates that the site can be adequately serviced by the proposed storm drainage, sanitary and water distribution systems.

2. Stormwater quality, erosion and quantity control for the proposed North and South Draft Plans of Subdivision will be provided within the proposed temporary and ultimate Stormwater Management Ponds, respectively.

3. A detailed Stormwater Management Implementation Report will be prepared in conjunction with the final engineering design.

This report is being submitted to the City of Mississauga, Regional Municipality of Peel, Conservation Halton and Ministry of Transportation in support of the draft plan and rezoning applications for the North and South Draft Plans of Subdivision.

Respectfully Submitted,

RAND Engineering Corporation

LICENSED PROFESSIONAL ENGINEER
P. JEFFREY
100117192
13/06/19
PROVINCE OF ONTARIO

B. Kargus, B.Eng.

P. Jeffrey, P.Eng.

APPENDIX A – TEMPORARY SWM POND SIZING – PHASE 1

TABLE A.1: STORMWATER MANAGEMENT FACILITY STORAGE REQUIREMENTS

DERRY BRITANNIA DEVELOPMENTS LIMITED: PHASE 1 TEMP SWM POND

Table 3.2 Water Quality Storage Requirements based on Receiving Waters *

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35%	55%	70%	85%
Enhanced 80% long-term S.S. removal	Infiltration	25	30	35	40
	Wetlands	80	105	120	140
	Hybrid Wet Pond / Wetland	110	150	175	195
	Wet Pond	140	190	225	250
Normal 70% long-term S.S. removal	Infiltration	20	20	25	30
	Wetlands	60	70	80	90
	Hybrid Wet Pond / Wetland	75	90	105	120
	Wet Pond	90	110	130	150
Basic 60% long-term S.S. removal	Infiltration	20	20	20	20
	Wetlands	60	60	60	60
	Hybrid Wet Pond / Wetland	60	70	75	80
	Wet Pond	60	75	85	95
	Dry Pond (Continuous Flow)	90	150	200	240

* reproduced from SWM Planning and Design Manual, Ministry of the Environment, March 2003.

The volumetric water quality criteria are presented in Table 3.2. The values are based on a 24-hour drawdown time and a design which conforms to the guidance provided in this manual. Requirements differ with SWMP type to reflect differences in removal efficiencies. Of the specified storage volume for wet facilities, 40 m^3/ha is extended detention, while the remainder represents the permanent pool.

Contributing Drainage Area	Area, A	Runoff Coeff.[1], C	A * C	C 100-Year[2]	A*C 100-Year[2]
Rear Lane Detached - 10.7m (35')	0.66	0.55	0.36	0.69	0.45
Rear Lane Townhouse - 6.05m (20')	0.77	0.65	0.50	0.81	0.63
Street Townhouse - 6.0m (20')	1.70	0.65	1.11	0.81	1.38
Condo Apartments / Towns / Stacks	0.85	0.65	0.55	0.81	0.69
Temp SWMF (DP - Resid. Reserve)	0.50	0.90	0.45	0.90	0.45
Temp SWMF (DP - Park / Walkway)	0.33	0.90	0.30	0.90	0.30
Park / Walkway	0.80	0.30	0.24	0.38	0.30
Public Elementary School	0.43	0.90	0.39	0.90	0.39
5m Buffers	0.13	0.65	0.08	0.81	0.11
Road Widenings, 0.3m Reserves, Laneways, Local ROWs	2.77	0.90	2.49	0.90	2.49
Total	8.94		6.47		7.18

[1] From City of Mississauga Development Requirements Manual (2016)
[2] From City of Mississauga Development Requirements Manual (2016), in order to account for the increase in runoff due to saturation of the catchment surface that would occur for larger, less frequent storms, an adjustment factor is used. For the 100-year storm, the adjustment factor is 1.25.

Composite C = 0.72
Equivalent Imperviousness, $I = (C_{COMP} - 0.2) / 0.7$ = 75%

100-Year Storm Composite C = 0.80
Equivalent Imperviousness, $I = (C_{COMP,100\text{-}YR} - 0.2) / 0.7$ = 86%

Protection Level:	Enhanced
SWMP Type:	Wet Pond
Impervious Level:	75%
Contributing Area:	8.94 ha.

PERMANENT STORAGE

Total storage requirement from Table 3.2	233 m^3/ha
- Active storage requirement	40 m^3/ha
Permanent storage requirement	193 m^3/ha
x Contributing Area	8.94 ha
Permanent Storage Volume	**1,726 m^3**

EXTENDED DETENTION STORAGE[3]

25mm storm event runoff	18.71 mm
x Contributing Area	8.94 ha
Extended Detention Storage Volume	**1,673 m^3**

[3] Note that this estimate of Extended Detention Storage is exceded by target storage determined from speciific requirements of Phase 3 Implementation and Monitoring Ninth Line Lands Scoped Subwatershed Study (May 6, 2019)

TABLE A.2: POND PERFORMANCE SUMMARY

DERRY BRITANNIA DEVELOPMENTS LIMITED: PHASE 1 TEMP SWM POND

Proposed Total Drainage Area (ha):	8.94
Impervious Level:	75%
Proposed Impervious Drainage Area (ha):	6.69
100-Year Storm Impervious Level:	86%
Proposed 100-Yr Storm Imp. Drainage A (ha):	7.71

	TARGET STORAGE/RELEASE RATES				DESIGN STORAGE / RELEASE RATES			
Storm Event	Unit Storage[1] (m^3/Imp ha)	Unit Discharge[1] (m^3/s/ha)	Storage (m^3)	Discharge (m^3/s)	Post-Development Peak Inflow (m^3/s)	Post-Development Peak Outflow (m^3/s)	Model-Predicted Storage (m^3)	Elevation (m)
Erosion / Quality Control								
25 mm storm	275	0.002	1,840	0.018	0.961	0.013	1,676	191.12
Flood / Quantity Control								
2-Year	450	0.090	3,011	0.805	1.002	0.021	2,756	191.35
5-Year	600	0.380	4,015	3.397	1.433	0.041	3,583	191.52
100 Year	875	1.020	6,745	9.119	3.006	0.131	6,453	192.06
Regional Storm[2]	1,775	1.530	13,682	13.678	1.302	0.291	13,820	193.24

[1] Per Phase 3 Implementation and Monitoring Plan, Ninth Line Scoped Subwatershed Study, City of Mississauga, May 6, 2019

[2] Target Storage for Regional Storm determined using 100-Year Storm Impervious Drainage Area

TABLE A.3: STAGE STORAGE DISCHARGE

DERRY BRITANNIA DEVELOPMENTS LIMITED: PHASE 1 TEMP SWM POND

Level	Elevation	Surface Area			Permanent Storage			Active Storage			Quality Control		Quantity Control Outlet #1			Quantity Control Outlet #2			Outlet Structure Conc. Box Open Top			Overflow Spillway		Total Flow	Time to Empty
		Forebay	Main Cell	Total	Forebay	Main Cell	Total	Forebay	Main Cell	Total			Low Level			High Level				Total Eff.					
	(m)	(m^2)	(m^2)	(m^2)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	Head (m)	Flow (m^3/s)	Head (m)	Controlling as Weir/Orifice	Flow (m^3/s)	Head (m)	Controlling as Weir/Orifice	Flow (m^3/s)	Head (m)	Weir Length (m)	Flow (m^3/s)	Head (m)	Flow (m^3/s)	(m^3/s)	(hrs)
Bottom of Pond	188.60	128	1,323	1,451																					
	188.70	148	1,388	1,536	14	136	149																		
	188.80	169	1,453	1,622	30	278	307																		
	188.90	189	1,518	1,707	48	426	474																		
	189.00	210	1,583	1,793	68	581	649																		
	189.10	230	1,648	1,878	89	743	832																		
	189.20	250	1,713	1,963	114	911	1,024																		
	189.30	271	1,778	2,049	140	1,085	1,225																		
	189.40	291	1,843	2,134	168	1,266	1,434																		
	189.50	312	1,908	2,220	198	1,454	1,652																		
	189.60	332	1,973	2,305	230	1,648	1,878																		
	189.70	352	2,038	2,390	264	1,849	2,113																		
	189.80	373	2,103	2,476	300	2,056	2,356																		
	189.90	393	2,168	2,561	339	2,269	2,608																		
	190.00	414	2,233	2,647	379	2,489	2,868																		
	190.10	434	2,298	2,732	421	2,716	3,137																		
	190.20	493	2,376	2,869	468	2,949	3,417																		
	190.30	551	2,454	3,005	520	3,191	3,711																		
	190.40	610	2,532	3,142	578	3,440	4,018																		
	190.50	669	2,609	3,278	642	3,697	4,339																		
	190.60	727	2,687	3,415	712	3,962	4,674																		
PWL	190.70	786	2,765	3,551	787	4,235	5,022																		
	190.80	845	2,907	3,752	787	4,235	5,022	82	284	**365**	0.05	0.005												**0.005**	29
	190.90	903	3,049	3,952	787	4,235	5,022	169	581	**750**	0.15	0.008												**0.008**	42
	191.00	962	3,192	4,153	787	4,235	5,022	262	893	**1,156**	0.25	0.011												**0.011**	52
	191.10	1,020	3,334	4,354	787	4,235	5,022	361	1,220	**1,581**	0.35	0.013												**0.013**	62
	191.20	1,079	3,476	4,554	787	4,235	5,022	466	1,560	**2,026**	0.45	0.015												**0.015**	70
Ext. Det. WL	191.30	1,137	3,618	4,755	787	4,235	5,022	577	1,915	**2,492**	0.55	0.016												**0.016**	78
2-Year WL	191.40	1,179	3,688	4,867	787	4,235	5,022	693	2,280	**2,973**	0.65	0.018	0.10	WEIR	0.009									**0.026**	79
	191.50	1,220	3,759	4,979	787	4,235	5,022	813	2,653	**3,465**	0.75	0.019	0.20	ORIFICE	0.022									**0.041**	80
5-Year WL	191.60	1,262	3,829	5,091	787	4,235	5,022	937	3,032	**3,969**	0.85	0.020	0.30	ORIFICE	0.030									**0.050**	81
	191.70	1,304	3,900	5,203	787	4,235	5,022	1,065	3,418	**4,483**	0.95	0.021	0.40	ORIFICE	0.036									**0.057**	82
	191.80	1,346	3,970	5,316	787	4,235	5,022	1,198	3,812	**5,009**	1.05	0.022	0.50	ORIFICE	0.041									**0.063**	82
	191.90	1,387	4,040	5,428	787	4,235	5,022	1,334	4,212	**5,547**	1.15	0.023	0.60	ORIFICE	0.045	0.10	WEIR	0.020						**0.089**	83
	192.00	1,429	4,111	5,540	787	4,235	5,022	1,475	4,620	**6,095**	1.25	0.024	0.70	ORIFICE	0.050	0.20	ORIFICE	0.052						**0.126**	83
100-Year WL	192.10	1,471	4,181	5,652	787	4,235	5,022	1,620	5,035	**6,655**	1.35	0.025	0.80	ORIFICE	0.053	0.30	ORIFICE	0.069						**0.148**	84
	192.20	1,512	4,252	5,764	787	4,235	5,022	1,769	5,456	**7,225**	1.45	0.026	0.90	ORIFICE	0.057	0.40	ORIFICE	0.084						**0.167**	84
	192.30	1,554	4,322	5,876	787	4,235	5,022	1,922	5,885	**7,807**	1.55	0.027	1.00	ORIFICE	0.060	0.50	ORIFICE	0.095						**0.183**	84
	192.40	1,596	4,392	5,988	787	4,235	5,022	2,080	6,321	**8,401**	1.65	0.028	1.10	ORIFICE	0.064	0.60	ORIFICE	0.106						**0.198**	84
	192.50	1,637	4,463	6,100	787	4,235	5,022	2,242	6,763	**9,005**	1.75	0.029	1.20	ORIFICE	0.067	0.70	ORIFICE	0.116						**0.211**	85
	192.60	1,679	4,533	6,212	787	4,235	5,022	2,407	7,213	**9,621**	1.85	0.030	1.30	ORIFICE	0.069	0.80	ORIFICE	0.125						**0.224**	85
	192.70	1,721	4,604	6,325	787	4,235	5,022	2,577	7,670	**10,247**	1.95	0.031	1.40	ORIFICE	0.072	0.90	ORIFICE	0.133						**0.236**	85
	192.80	1,763	4,674	6,437	787	4,235	5,022	2,752	8,134	**10,886**	2.05	0.031	1.50	ORIFICE	0.075	1.00	ORIFICE	0.141						**0.247**	85
	192.90	1,804	4,745	6,549	787	4,235	5,022	2,930	8,605	**11,535**	2.15	0.032	1.60	ORIFICE	0.078	1.10	ORIFICE	0.148						**0.258**	85
	193.00	1,846	4,815	6,661	787	4,235	5,022	3,112	9,083	**12,195**	2.25	0.033	1.70	ORIFICE	0.080	1.20	ORIFICE	0.155						**0.268**	86
	193.10	1,888	4,885	6,773	787	4,235	5,022	3,299	9,568	**12,867**	2.35	0.034	1.80	ORIFICE	0.082	1.30	ORIFICE	0.162						**0.278**	86
	193.20	1,929	4,956	6,885	787	4,235	5,022	3,490	10,060	**13,550**	2.45	0.034	1.90	ORIFICE	0.085	1.40	ORIFICE	0.169						**0.288**	86
Regional WL	193.30	1,971	5,026	6,997	787	4,235	5,022	3,685	10,559	**14,244**	2.55	0.035	2.00	ORIFICE	0.087	1.50	ORIFICE	0.175						**0.297**	86
	193.40	2,013	5,097	7,109	787	4,235	5,022	3,884	11,065	**14,949**	2.65	0.036	2.10	ORIFICE	0.089	1.60	ORIFICE	0.181						**0.306**	86
	193.50	2,054	5,167	7,221	787	4,235	5,022	4,088	11,578	**15,666**	2.75	0.036	2.20	ORIFICE	0.092	1.70	ORIFICE	0.187	0.10	9.520	0.542	0.10	0.537	**1.394**	86
	193.60	2,096	5,237	7,334	787	4,235	5,022	4,295	12,099	**16,394**	2.85	0.037	2.30	ORIFICE	0.094	1.80	ORIFICE	0.192	0.20	9.440	1.520	0.20	1.653	**3.495**	86
	193.70	2,138	5,308	7,446	787	4,235	5,022	4,507	12,626	**17,133**	2.95	0.038	2.40	ORIFICE	0.096	1.90	ORIFICE	0.198	0.30	9.360	2.768	0.30	3.280	**6.380**	86
	193.80	2,180	5,378	7,558	787	4,235	5,022	4,723	13,160	**17,883**	3.05	0.038	2.50	ORIFICE	0.098	2.00	ORIFICE	0.203	0.40	9.280	4.226	0.40	5.427	**9.992**	86
	193.90	2,221	5,449	7,670	787	4,235	5,022	4,943	13,701	**18,644**	3.15	0.039	2.60	ORIFICE	0.100	2.10	ORIFICE	0.208	0.50	9.200	5.855	0.50	8.111	**14.312**	86
	194.00	2,263	5,519	7,782	787	4,235	5,022	5,167	14,250	**19,417**	3.25	0.040	2.70	ORIFICE	0.102	2.20	ORIFICE	0.214	0.60	9.12	7.629	0.60	11.353	**19.337**	86

PERMANENT STORAGE: QUALITY CONTROL

Permanent storage requirement:	1,726	m^3
Permanent storage provided:	5,022	m^3
Pond Bottom Elevation:	188.60	m
Permanent Water Level:	190.70	m
Permanent Pool Depth (Main Cell):	2.10	m

EXTENDED DETENTION STORAGE: EROSION & QUALITY CONTROL

Erosion Control Volume	1,840	m^3
Extended detention provided	2,492	m^3
Extended detention level	191.30	m
Extended detention depth	0.60	m

TABLE A.4: OUTLET STRUCTURE HYDRAULICS

DERRY BRITANNIA DEVELOPMENTS LIMITED: PHASE 1 TEMP SWM POND

Orifice Equation	Weir Equation
$Q_o = C_o A_o (2gh_o)^{1/2}$	$Q_w = C_w L_w h_w^{1.5}$

QUALITY CONTROL OUTLET - ORIFICE

where Q_o = orifice discharge (m^3/s)
C_o = flow coefficient
A = cross-sectional area of orifice (m^2)
[calculated from orifice diameter, d_o (mm)]
g = acceleration due to gravity (m/s^2)
h_o = head above orifice (m)
also, z_o = elevation of orifice (m)

Q_o, h_o = (see Stage-Storage-Discharge curve)

C_o =	0.63	
d_o =	100	mm
A_o =	0.008	m^2
g =	9.81	m/s^2
z_o =	190.70	m

QUANTITY CONTROL OUTLET - LOW LEVEL

where Q_w = weir discharge (m^3/s)
C_w = flow coefficient
L_w = weir length (m)
h_w = head above weir (m)
also, z_w = elevation of weir (m)

Q_w, h_w = (see Stage-Storage-Discharge curve)

C_w =	1.84	
L_w =	0.15	m
z_w =	191.30	m
z_{TOP} =	191.45	m

QUANTITY CONTROL OUTLET - HIGH LEVEL

where Q_w = weir discharge (m^3/s)
C_w = flow coefficient
L_w = weir length (m)
h_w = head above weir (m)
also, z_w = elevation of weir (m)

Q_w, h_w = (see Stage-Storage-Discharge curve)

C_w =	1.84	
L_w =	0.35	m
z_w =	191.80	m
z_{TOP} =	191.95	m

OVERFLOW SPILLWAY

where Q_w = weir discharge (m^3/s)
C_w = flow coefficient
L_w = weir length (m)
h_w = head above weir (m)
also, z_w = elevation of weir (m)

Q_w, h_w = (see Stage-Storage-Discharge curve)

C_w =	1.55	
L_w =	10.0	m
z_w =	193.40	m
EA Slope (H:1) =	12	
EA Length Factor =	40%	

OVERFLOW TO OUTLET CONTROL STRUCTURE
2400 X 2400 OPEN TOP CONCRETE BOX

where $L_e = L_w - (0.1 * n * h_w)$
$L_w = 2 * (L + W)$
Q_w = weir discharge (m3/s)
C_w = flow coefficient
L = length of opening (m)
W = width of opening (m)

L_w = total weir length (m)
L_e = total effective weir length (m)
n = number of end contractions
h_w = head above weir (m)
z_w = elevation of weir invert (m)

C_w =	1.80	
L =	2.4	m
W =	2.4	m
L_w =	9.6	m
n =	8	
z_w =	193.40	m

APPENDIX B – ULTIMATE SWM POND SIZING – PHASE 2

TABLE B.1: STORMWATER MANAGEMENT FACILITY STORAGE REQUIREMENTS

DERRY BRITANNIA DEVELOPMENTS LIMITED: PHASE 2 ULTIMATE SWM POND

Table 3.2 Water Quality Storage Requirements based on Receiving Waters *

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level 35%	55%	70%	85%
Enhanced	Infiltration	25	30	35	40
80% long-term	Wetlands	80	105	120	140
S.S. removal	Hybrid Wet Pond / Wetland	110	150	175	195
	Wet Pond	140	190	225	250
Normal	Infiltration	20	20	25	30
70% long-term	Wetlands	60	70	80	90
S.S. removal	Hybrid Wet Pond / Wetland	75	90	105	120
	Wet Pond	90	110	130	150
Basic	Infiltration	20	20	20	20
60% long-term	Wetlands	60	60	60	60
S.S. removal	Hybrid Wet Pond / Wetland	60	70	75	80
	Wet Pond	60	75	85	95
	Dry Pond (Continuous Flow)	90	150	200	240

* reproduced from SWM Planning and Design Manual, Ministry of the Environment, March 2003.
The volumetric water quality criteria are presented in Table 3.2. The values are based on a 24-hour drawdown time and a design which conforms to the guidance provided in this manual. Requirements differ with SWMP type to reflect differences in removal efficiencies. Of the specified storage volume for wet facilities, 40 m^3/ha is extended detention, while the remainder represents the permanent pool.

	Contributing Drainage Area	Area, A	Runoff Coeff.[1], C	A * C	C 100-Year[2]	A*C 100-Year[2]
Phase 1	Rear Lane Detached - 10.7m (35')	0.66	0.55	0.36	0.69	0.45
	Rear Lane Townhouse - 6.05m (20')	0.77	0.65	0.50	0.81	0.63
	Street Townhouse - 6.0m (20')	1.70	0.65	1.11	0.81	1.38
	Condo Apartments / Towns / Stacks	0.85	0.65	0.55	0.81	0.69
	Residential Reserve (Future Condo Apartments / Towns / Stacks)	0.50	0.65	0.33	0.81	0.41
	Park / Walkway	0.33	0.30	0.10	0.38	0.12
	Park / Walkway	0.80	0.30	0.24	0.38	0.30
	Public Elementary School	0.43	0.90	0.39	0.90	0.39
	5m Buffers	0.13	0.65	0.08	0.81	0.11
	Road Widenings, 0.3m Reserves, Laneways, Local ROWs	2.77	0.90	2.49	0.90	2.49
Phase 2	Rear Lane Townhouse - 6.05m (20')	1.29	0.65	0.84	0.81	1.05
	Street Townhouse - 6.0m (20')	1.73	0.65	1.12	0.81	1.41
	Condominium Duplex	1.71	0.65	1.11	0.81	1.39
	Condo Apartments / Towns / Stacks	4.52	0.65	2.94	0.81	3.67
	Residential Reserve (Future Condo Apartments / Towns / Stacks)	0.49	0.65	0.32	0.81	0.40
	Park / Walkway / Trail	2.10	0.30	0.63	0.38	0.79
	Public Elementary School	3.40	0.90	3.06	0.90	3.06
	SWM Pond	2.87	0.90	2.58	0.90	2.58
	Road Widenings, 0.3m Reserves, Laneways, Local ROWs	5.51	0.90	4.96	0.90	4.96
	Transitway+Buffer, do not drain to pond	7.09	0.90	6.38	0.90	6.38
	Greenlands, do not drain to pond	8.62	0.25	2.16	0.31	2.69
	Total	48.27		32.25		35.34
	Total to SWM Facility	32.56		23.71		26.27

[1] From City of Mississauga Development Requirements Manual (2016)
[2] From City of Mississauga Development Requirements Manual (2016), in order to account for the increase in runoff due to saturation of the catchment surface that would occur for larger, less frequent storms, an adjustment factor is used. For the 100-year storm, the adjustment factor is 1.25.

Composite C = 0.73
Equivalent Imperviousness, $I = (C_{COMP} - 0.2) / 0.7 =$ 75%

100-Year Storm Composite C = 0.81
Equivalent Imperviousness, $I = (C_{COMP,100\text{-}YR} - 0.2) / 0.7 =$ 87%

Protection Level:	Enhanced
SWMP Type:	Wet Pond
Impervious Level:	75%
Contributing Area:	32.56 ha.

PERMANENT STORAGE

Total storage requirement from Table 3.2	234	m^3/ha
- Active storage requirement	40	m^3/ha
Permanent storage requirement	194	m^3/ha
x Contributing Area	32.56	ha
Permanent Storage Volume	**6,320**	**m^3**

EXTENDED DETENTION STORAGE[3]

25mm storm event runoff	18.87	mm
x Contributing Area	32.56	ha
Extended Detention Storage Volume	**6,143**	**m^3**

[3] Note that this estimate of Extended Detention Storage is exceded by target storage determined from speciific requirements of Phase 3 Implementation and Monitoring Ninth Line Lands Scoped Subwatershed Study (May 6, 2019)

TABLE B.2: POND PERFORMANCE SUMMARY

DERRY BRITANNIA DEVELOPMENTS LIMITED: PHASE 2 ULTIMATE SWM POND

Proposed Total Drainage Area (ha):	32.56
Impervious Level:	75%
Proposed Impervious Drainage Area (ha):	24.57
100-Year Storm Impervious Level:	87%
Proposed 100-Yr Storm Imp. Drainage A (ha):	28.23

	TARGET STORAGE/RELEASE RATES				DESIGN STORAGE / RELEASE RATES			
Storm Event	Unit Storage[1] (m^3/Imp ha)	Unit Discharge[1] (m^3/s/ha)	Storage (m^3)	Discharge (m^3/s)	Post-Development Peak Inflow (m^3/s)	Post-Development Peak Outflow (m^3/s)	Model-Predicted Storage (m^3)	Elevation (m)
Erosion / Quality Control								
25 mm storm	275	0.002	6,757	0.065	2.740	0.051	6,068	188.70
Flood / Quantity Control								
2-Year	450	0.090	11,057	2.930	3.149	0.078	9,944	188.96
5-Year	600	0.380	14,743	12.373	4.551	0.113	13,540	189.20
100 Year	875	1.020	24,698	33.211	9.933	0.556	23,330	189.81
Regional Storm[2]	1,775	1.530	50,101	49.817	4.715	1.326	47,660	191.13

[1] Per Phase 3 Implementation and Monitoring Plan, Ninth Line Scoped Subwatershed Study, City of Mississauga, May 6, 2019

[2] Target Storage for Regional Storm determined using 100-Year Storm Impervious Drainage Area

TABLE B.3: STAGE STORAGE DISCHARGE

DERRY BRITANNIA DEVELOPMENTS LIMITED: PHASE 2 ULTIMATE SWM POND

Level	Elevation	Surface Area			Permanent Storage			Active Storage			Quality Control		Quantity Control Outlet #1			Quantity Control Outlet #2			Outlet Structure Conc. Box Open Top			Overflow Spillway		Total Flow	Time to Empty
		Forebay	Main Cell	Total	Forebay	Main Cell	Total	Forebay	Main Cell	Total			Low Level			High Level				Total Eff.					
	(m)	(m^2)	(m^2)	(m^2)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	Head (m)	Flow (m^3/s)	Head (m)	Controlling as Weir/Orifice	Flow (m^3/s)	Head (m)	Controlling as Weir/Orifice	Flow (m^3/s)	Head (m)	Weir Length (m)	Flow (m^3/s)	Head (m)	Flow (m^3/s)	(m^3/s)	(hrs)
Bottom of Pond	186.00	121	1,154	1,275																					
	186.10	188	1,439	1,626	15	130	145																		
	186.20	254	1,724	1,978	38	288	325																		
	186.30	321	2,009	2,329	66	474	541																		
	186.40	387	2,293	2,681	102	689	791																		
	186.50	454	2,578	3,032	144	933	1,077																		
	186.60	521	2,863	3,384	192	1,205	1,398																		
	186.70	587	3,148	3,735	248	1,506	1,754																		
	186.80	654	3,433	4,087	310	1,835	2,145																		
	186.90	720	3,718	4,438	379	2,192	2,571																		
	187.00	787	4,003	4,790	454	2,578	3,032																		
	187.10	854	4,288	5,141	536	2,993	3,529																		
	187.20	920	4,572	5,493	625	3,436	4,061																		
	187.30	987	4,857	5,844	720	3,907	4,627																		
	187.40	1,053	5,142	6,195	822	4,407	5,229																		
	187.50	1,120	5,427	6,547	931	4,936	5,866																		
	187.60	1,187	5,712	6,898	1,046	5,493	6,539																		
	187.70	1,253	5,997	7,250	1,168	6,078	7,246																		
	187.80	1,320	6,282	7,601	1,297	6,692	7,989																		
	187.85	1,353	6,424	7,777	1,363	7,010	8,373																		
	187.95	1,739	7,162	8,900	1,518	7,689	9,207																		
	188.05	2,124	7,899	10,023	1,711	8,442	10,153																		
	188.15	2,510	8,637	11,146	1,943	9,269	11,212																		
PWL	188.25	2,895	9,374	12,269	2,213	10,169	12,382																		
	188.35	3,078	9,765	12,843	2,213	10,169	12,382	299	957	**1,256**															25
	188.45	3,261	10,157	13,417	2,213	10,169	12,382	616	1,953	**2,569**	0.10	0.028												**0.028**	36
	188.55	3,443	10,548	13,991	2,213	10,169	12,382	951	2,988	**3,939**	0.20	0.039												**0.039**	45
	188.65	3,626	10,939	14,565	2,213	10,169	12,382	1,304	4,063	**5,367**	0.30	0.048												**0.048**	53
	188.75	3,677	11,041	14,718	2,213	10,169	12,382	1,669	5,162	**6,831**	0.40	0.055												**0.055**	59
Ext. Det. WL	188.85	3,728	11,143	14,871	2,213	10,169	12,382	2,040	6,271	**8,310**	0.50	0.062												**0.062**	66
	188.95	3,778	11,245	15,024	2,213	10,169	12,382	2,415	7,390	**9,805**	0.60	0.068	0.10	WEIR	0.009									**0.077**	67
2-Year WL	189.05	3,829	11,347	15,177	2,213	10,169	12,382	2,795	8,520	**11,315**	0.70	0.073	0.20	ORIFICE	0.022									**0.096**	68
	189.15	3,880	11,449	15,329	2,213	10,169	12,382	3,181	9,660	**12,840**	0.80	0.078	0.30	ORIFICE	0.030									**0.108**	69
5-Year WL	189.25	3,931	11,551	15,482	2,213	10,169	12,382	3,571	10,810	**14,381**	0.90	0.083	0.40	ORIFICE	0.036									**0.119**	70
	189.35	3,982	11,653	15,635	2,213	10,169	12,382	3,967	11,970	**15,937**	1.00	0.088	0.50	ORIFICE	0.041									**0.129**	71
	189.45	4,033	11,756	15,788	2,213	10,169	12,382	4,368	13,140	**17,508**	1.10	0.092	0.60	ORIFICE	0.045									**0.137**	72
	189.55	4,083	11,858	15,941	2,213	10,169	12,382	4,773	14,321	**19,094**	1.20	0.096	0.70	ORIFICE	0.050	0.10	WEIR	0.061						**0.207**	73
	189.65	4,134	11,960	16,094	2,213	10,169	12,382	5,184	15,512	**20,696**	1.30	0.100	0.80	ORIFICE	0.053	0.20	WEIR	0.173						**0.326**	73
	189.75	4,185	12,062	16,247	2,213	10,169	12,382	5,600	16,713	**22,313**	1.40	0.104	0.90	ORIFICE	0.057	0.30	WEIR	0.340						**0.501**	74
100-Year WL	189.85	4,236	12,164	16,400	2,213	10,169	12,382	6,021	17,924	**23,945**	1.50	0.107	1.00	ORIFICE	0.060	0.40	ORIFICE	0.439						**0.607**	74
	189.95	4,287	12,266	16,552	2,213	10,169	12,382	6,447	19,146	**25,593**	1.60	0.111	1.10	ORIFICE	0.064	0.50	ORIFICE	0.520						**0.694**	74
	190.05	4,337	12,368	16,705	2,213	10,169	12,382	6,879	20,377	**27,256**	1.70	0.114	1.20	ORIFICE	0.067	0.60	ORIFICE	0.590						**0.770**	74
	190.15	4,388	12,470	16,858	2,213	10,169	12,382	7,315	21,619	**28,934**	1.80	0.118	1.30	ORIFICE	0.069	0.70	ORIFICE	0.652						**0.839**	74
	190.25	4,439	12,572	17,011	2,213	10,169	12,382	7,756	22,871	**30,628**	1.90	0.121	1.40	ORIFICE	0.072	0.80	ORIFICE	0.709						**0.902**	74
	190.35	4,632	12,910	17,541	2,213	10,169	12,382	8,210	24,145	**32,355**	2.00	0.124	1.50	ORIFICE	0.075	0.90	ORIFICE	0.761						**0.960**	75
	190.45	4,824	13,247	18,071	2,213	10,169	12,382	8,683	25,453	**34,136**	2.10	0.127	1.60	ORIFICE	0.078	1.00	ORIFICE	0.810						**1.015**	75
	190.55	5,017	13,585	18,601	2,213	10,169	12,382	9,175	26,795	**35,969**	2.20	0.130	1.70	ORIFICE	0.080	1.10	ORIFICE	0.857						**1.067**	75
	190.65	5,209	13,922	19,131	2,213	10,169	12,382	9,686	28,170	**37,856**	2.30	0.133	1.80	ORIFICE	0.082	1.20	ORIFICE	0.901						**1.116**	75
	190.75	5,402	14,260	19,661	2,213	10,169	12,382	10,216	29,579	**39,796**	2.40	0.136	1.90	ORIFICE	0.085	1.30	ORIFICE	0.942						**1.163**	75
	190.85	5,594	14,597	20,191	2,213	10,169	12,382	10,766	31,022	**41,788**	2.50	0.139	2.00	ORIFICE	0.087	1.40	ORIFICE	0.983						**1.208**	75
	190.95	5,787	14,935	20,721	2,213	10,169	12,382	11,335	32,499	**43,834**	2.60	0.141	2.10	ORIFICE	0.089	1.50	ORIFICE	1.021						**1.252**	75
	191.05	5,980	15,272	21,252	2,213	10,169	12,382	11,924	34,009	**45,933**	2.70	0.144	2.20	ORIFICE	0.092	1.60	ORIFICE	1.058						**1.294**	75
Regional WL	191.15	6,172	15,610	21,782	2,213	10,169	12,382	12,531	35,553	**48,084**	2.80	0.147	2.30	ORIFICE	0.094	1.70	ORIFICE	1.094						**1.334**	76
	191.25	6,365	15,947	22,312	2,213	10,169	12,382	13,158	37,131	**50,289**	2.90	0.149	2.40	ORIFICE	0.096	1.80	ORIFICE	1.129						**1.374**	76
	191.35	6,557	16,285	22,842	2,213	10,169	12,382	13,804	38,742	**52,547**	3.00	0.152	2.50	ORIFICE	0.098	1.90	ORIFICE	1.163	0.10	9.52	0.542	0.10	0.537	**2.491**	76
	191.45	6,750	16,622	23,372	2,213	10,169	12,382	14,469	40,388	**54,857**	3.10	0.154	2.60	ORIFICE	0.100	2.00	ORIFICE	1.195	0.20	9.44	1.520	0.20	1.653	**4.622**	76
	191.55	6,942	16,960	23,902	2,213	10,169	12,382	15,154	42,067	**57,221**	3.20	0.157	2.70	ORIFICE	0.102	2.10	ORIFICE	1.227	0.30	9.36	2.768	0.30	3.280	**7.535**	76
	191.65	7,135	17,297	24,432	2,213	10,169	12,382	15,858	43,780	**59,638**	3.30	0.159	2.80	ORIFICE	0.104	2.20	ORIFICE	1.258	0.40	9.28	4.226	0.40	5.427	**11.174**	76
	191.75	7,327	17,635	24,962	2,213	10,169	12,382	16,581	45,526	**62,107**	3.40	0.162	2.90	ORIFICE	0.106	2.30	ORIFICE	1.289	0.50	9.20	5.855	0.50	8.111	**15.521**	76
	191.85	7,520	17,972	25,492	2,213	10,169	12,382	17,323	47,307	**64,630**	3.50	0.164	3.00	ORIFICE	0.107	2.40	ORIFICE	1.318	0.60	9.12	7.629	0.60	11.353	**20.572**	76

PERMANENT STORAGE: QUALITY CONTROL

Permanent storage requirement:	6,320	m^3
Permanent storage provided:	12,382	m^3
Pond Bottom Elevation:	186.00	m
Permanent Water Level:	188.25	m
Permanent Pool Depth (Main Cell):	2.25	m

EXTENDED DETENTION STORAGE: EROSION & QUALITY CONTROL

Erosion Control Volume	6,757	m^3
Extended detention provided	8,310	m^3
Extended detention level	188.85	m
Extended detention depth	0.60	m

TABLE B.4: OUTLET STRUCTURE HYDRAULICS

DERRY BRITANNIA DEVELOPMENTS LIMITED: PHASE 2 ULTIMATE SWM POND

Orifice Equation	Weir Equation
$Q_o = C_o A_o (2gh_o)^{1/2}$	$Q_w = C_w L_w h_w^{1.5}$

QUALITY CONTROL OUTLET - ORIFICE

where Q_o = orifice discharge (m^3/s)
C_o = flow coefficient
A = cross-sectional area of orifice (m^2)
[calculated from orifice diameter, d_o (mm)]
g = acceleration due to gravity (m/s^2)
h_o = head above orifice (m)
also, z_o = elevation of orifice (m)

Q_o, h_o =	(see Stage-Storage-Discharge curve)	
C_o =	0.63	
d_o =	200	mm
A_o =	0.031	m^2
g =	9.81	m/s^2
z_o =	188.25	m

QUANTITY CONTROL OUTLET - LOW LEVEL

where Q_w = weir discharge (m^3/s)
C_w = flow coefficient
L_w = weir length (m)
h_w = head above weir (m)
also, z_w = elevation of weir (m)

Q_w, h_w =	(see Stage-Storage-Discharge curve)	
C_w =	1.84	
L_w =	0.15	m
z_w =	188.85	m
z_{TOP} =	189.00	m

QUANTITY CONTROL OUTLET - HIGH LEVEL

where Q_w = weir discharge (m^3/s)
C_w = flow coefficient
L_w = weir length (m)
h_w = head above weir (m)
also, z_w = elevation of weir (m)

Q_w, h_w =	(see Stage-Storage-Discharge curve)	
C_w =	1.84	
L_w =	1.05	m
z_w =	189.45	m
z_{TOP} =	189.75	m

OVERFLOW SPILLWAY

where Q_w = weir discharge (m^3/s)
C_w = flow coefficient
L_w = weir length (m)
h_w = head above weir (m)
also, z_w = elevation of weir (m)

Q_w, h_w =	(see Stage-Storage-Discharge curve)	
C_w =	1.55	
L_w =	10.0	m
z_w =	191.25	m
EA Slope (H:1) =	12	
EA Length Factor =	40%	

OVERFLOW TO OUTLET CONTROL STRUCTURE
2400 X 2400 OPEN TOP CONCRETE BOX

where $L_e = L_w - (0.1 * n * h_w)$
$L_w = 2 * (L + W)$
Q_w = weir discharge (m3/s)
C_w = flow coefficient
L = length of opening (m)
W = width of opening (m)

L_w = total weir length (m)
L_e = total effective weir length (m)
n = number of end contractions
h_w = head above weir (m)
z_w = elevation of weir invert (m)

C_w =	1.80	
L =	2.4	m
W =	2.4	m
L_w =	9.6	m
n =	8	
z_w =	191.25	m

APPENDIX C– HYDROLOGICAL ANALYSIS - SWMHYMO

```
2     Metric units
*#****************************************************************************
*#  Project Name: [.]   Project Number: [13958]
*#  Date        : JUNE 2019
*#  Modeller    : [BK]
*#  Company     : RAND Engineering Corporation
*#  License #   :  4289424
*#****************************************************************************
*#   DERRY BRITANNIA DEVELOPMENTS LIMITED
*#   MATTAMY HOMES NINTH LINE PROJECT
*#   CITY OF MISSISSAUGA
*#   STORAGE VOLUME ESTIMATE
*#****************************************************************************
START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[1]
*%                   ["25mm_chi.4hr"] <--storm filename, one per line for NSTORM time

*#   This run is for the 4-hour 25mm Chicago Storm event.
READ STORM           ["STORM.001"]

*#   Phase 1 post-development drainage area to Temp SWM Pond
CALIB STANDHYD       ID=[1], NHYD=["PH1"], DT=[1](min), AREA=[8.94](ha),
                     XIMP=[.75], TIMP=[.75], DWF=[0](cms), LOSS=[2],
                     SCS curve number CN=[74],
                     Pervious   surfaces: IAper=[0.6](mm), SLPP=[2](%),
                                          LGP=[24.5](m), MNP=[0.25], SCP=[0](hrs),
                     Impervious surfaces: IAimp=[0.2](mm), SLPI=[0.5](%),
                                          LGI=[244](m), MNI=[0.013], SCI=[0](hrs),
                     END=-1
*%-----------------|-----------------------------------------------------------|
ROUTE RESERVOIR      IDout=[2],   NHYD=["4010"],  IDin=[1],
                     RDT=[1](min),
                           TABLE of ( OUTFLOW-STORAGE ) values
                                       (cms) - (ha-m)
                                     [ 0.000 , 0.0000 ]
                                     [ 0.008 , 0.0750 ]
                                     [ 0.013 , 0.1581 ]
                                     [ 0.016 , 0.2492 ]
                                     [ 0.026 , 0.2973 ]
                                     [ 0.050 , 0.3969 ]
                                     [ 0.063 , 0.5009 ]
                                     [ 0.089 , 0.5547 ]
                                     [ 0.167 , 0.7225 ]
                                     [ 0.211 , 0.9005 ]
                                     [ 0.247 , 1.0886 ]
                                     [ 0.278 , 1.2867 ]
                                     [ 0.306 , 1.4949 ]
                                     [ 1.394 , 1.5666 ]
                                     [ 6.380 , 1.7133 ]
                                     [19.337 , 1.9417 ]
                                     [   -1  ,   -1    ]  (max twenty pts)
                           IDovf=[3], NHYDovf=["4011"]
*%-----------------|-----------------------------------------------------------|
START                TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[1]
                     ["  "  ] <--storm filename, one per line for NSTORM time

*#   Derive Chicago Storm using City of Mississauga IDF parameters
*#   This run is for the 2-year storm event.
CHICAGO STORM        IUNITS=[2],  TD=[24.0](hrs),  R=[0.333],  CSDT=[15](min),
                     ICASEcs=[1],
                     A=[610],  B=[4.6], and C=[0.78],

*#   Phase 1 post-development drainage area to Temp SWM Pond
```

```
CALIB STANDHYD      ID=[1], NHYD=["PH1"], DT=[1](min), AREA=[8.94](ha),
                    XIMP=[.75], TIMP=[.75], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[74],
                    Pervious   surfaces: IAper=[0.6](mm), SLPP=[2](%),
                                         LGP=[24.5](m), MNP=[0.25], SCP=[0](hrs),
                    Impervious surfaces: IAimp=[0.2](mm), SLPI=[0.5](%),
                                         LGI=[244](m), MNI=[0.013], SCI=[0](hrs),
                    END=-1
*%-----------------|-----------------------------------------------------------|
ROUTE RESERVOIR     IDout=[2],   NHYD=["4010"],  IDin=[1],
                    RDT=[1](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                      (cms) - (ha-m)
                                    [ 0.000 , 0.0000 ]
                                    [ 0.008 , 0.0750 ]
                                    [ 0.013 , 0.1581 ]
                                    [ 0.016 , 0.2492 ]
                                    [ 0.026 , 0.2973 ]
                                    [ 0.050 , 0.3969 ]
                                    [ 0.063 , 0.5009 ]
                                    [ 0.089 , 0.5547 ]
                                    [ 0.167 , 0.7225 ]
                                    [ 0.211 , 0.9005 ]
                                    [ 0.247 , 1.0886 ]
                                    [ 0.278 , 1.2867 ]
                                    [ 0.306 , 1.4949 ]
                                    [ 1.394 , 1.5666 ]
                                    [ 6.380 , 1.7133 ]
                                    [19.337 , 1.9417 ]
                                    [   -1  ,  -1    ]  (max twenty pts)
                          IDovf=[3], NHYDovf=["4011"]
*%-----------------|-----------------------------------------------------------|
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[1]
                    ["  "  ] <--storm filename, one per line for NSTORM time

*#   Derive Chicago Storm using City of Mississauga IDF parameters
*#   This run is for the 5-year storm event.
CHICAGO STORM       IUNITS=[2],  TD=[24.0](hrs),  R=[0.333],  CSDT=[15](min),
                    ICASEcs=[1],
                    A=[820],  B=[4.6], and C=[0.78],

*#   Phase 1 post-development drainage area to Temp SWM Pond
CALIB STANDHYD      ID=[1], NHYD=["PH1"], DT=[1](min), AREA=[8.94](ha),
                    XIMP=[.75], TIMP=[.75], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[74],
                    Pervious   surfaces: IAper=[0.6](mm), SLPP=[2](%),
                                         LGP=[24.5](m), MNP=[0.25], SCP=[0](hrs),
                    Impervious surfaces: IAimp=[0.2](mm), SLPI=[0.5](%),
                                         LGI=[244](m), MNI=[0.013], SCI=[0](hrs),
                    END=-1
*%-----------------|-----------------------------------------------------------|
ROUTE RESERVOIR     IDout=[2],   NHYD=["4010"],  IDin=[1],
                    RDT=[1](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                      (cms) - (ha-m)
                                    [ 0.000 , 0.0000 ]
                                    [ 0.008 , 0.0750 ]
                                    [ 0.013 , 0.1581 ]
                                    [ 0.016 , 0.2492 ]
                                    [ 0.026 , 0.2973 ]
                                    [ 0.050 , 0.3969 ]
                                    [ 0.063 , 0.5009 ]
```

```
                              [ 0.089 , 0.5547 ]
                              [ 0.167 , 0.7225 ]
                              [ 0.211 , 0.9005 ]
                              [ 0.247 , 1.0886 ]
                              [ 0.278 , 1.2867 ]
                              [ 0.306 , 1.4949 ]
                              [ 1.394 , 1.5666 ]
                              [ 6.380 , 1.7133 ]
                              [19.337 , 1.9417 ]
                              [   -1  ,  -1    ]  (max twenty pts)
                    IDovf=[3], NHYDovf=["4011"]
*%-----------------|-----------------------------------------------------------|
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[1]
                    ["  "  ] <--storm filename, one per line for NSTORM time

*#   Derive Chicago Storm using City of Mississauga IDF parameters
*#   This run is for the 100-year storm event.
CHICAGO STORM       IUNITS=[2],  TD=[24.0](hrs),  R=[0.333],  CSDT=[15](min),
                    ICASEcs=[1],
                    A=[1450],  B=[4.9], and C=[0.78],

*#   Phase 1 post-development drainage area to Temp SWM Pond
CALIB STANDHYD      ID=[1], NHYD=["PH1"], DT=[1](min), AREA=[8.94](ha),
                    XIMP=[.86], TIMP=[.86], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[74],
                    Pervious   surfaces: IAper=[0.6](mm), SLPP=[2](%),
                                         LGP=[24.5](m), MNP=[0.25], SCP=[0](hrs),
                    Impervious surfaces: IAimp=[0.2](mm), SLPI=[0.5](%),
                                         LGI=[244](m), MNI=[0.013], SCI=[0](hrs),
                    END=-1
*%-----------------|-----------------------------------------------------------|
ROUTE RESERVOIR     IDout=[2],   NHYD=["4010"],  IDin=[1],
                    RDT=[1](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                (cms) - (ha-m)
                              [ 0.000 , 0.0000 ]
                              [ 0.008 , 0.0750 ]
                              [ 0.013 , 0.1581 ]
                              [ 0.016 , 0.2492 ]
                              [ 0.026 , 0.2973 ]
                              [ 0.050 , 0.3969 ]
                              [ 0.063 , 0.5009 ]
                              [ 0.089 , 0.5547 ]
                              [ 0.167 , 0.7225 ]
                              [ 0.211 , 0.9005 ]
                              [ 0.247 , 1.0886 ]
                              [ 0.278 , 1.2867 ]
                              [ 0.306 , 1.4949 ]
                              [ 1.394 , 1.5666 ]
                              [ 6.380 , 1.7133 ]
                              [19.337 , 1.9417 ]
                              [   -1  ,  -1    ]  (max twenty pts)
                    IDovf=[3], NHYDovf=["4011"]
*%-----------------|-----------------------------------------------------------|
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[1]
                    ["S-REG12H"  ] <--storm filename, one per line for NSTORM time

*#   This run is for the 12-hour Regional Storm event.
READ STORM          "STORM.001"

*#   Phase 1 post-development drainage area to Temp SWM Pond
CALIB STANDHYD      ID=[1], NHYD=["PH1"], DT=[1](min), AREA=[8.94](ha),
```

```
                 XIMP=[.86], TIMP=[.86], DWF=[0](cms), LOSS=[2],
                 SCS curve number CN=[87],
                 Pervious   surfaces: IAper=[0.6](mm), SLPP=[2](%),
                                      LGP=[24.5](m), MNP=[0.25], SCP=[0](hrs),
                 Impervious surfaces: IAimp=[0.2](mm), SLPI=[0.5](%),
                                      LGI=[244](m), MNI=[0.013], SCI=[0](hrs),
                 END=-1
*%-----------------|-----------------------------------------------------------|
ROUTE RESERVOIR    IDout=[2],   NHYD=["4010"],  IDin=[1],
                   RDT=[1](min),
                         TABLE of ( OUTFLOW-STORAGE ) values
                                    (cms) - (ha-m)
                                  [ 0.000 , 0.0000 ]
                                  [ 0.008 , 0.0750 ]
                                  [ 0.013 , 0.1581 ]
                                  [ 0.016 , 0.2492 ]
                                  [ 0.026 , 0.2973 ]
                                  [ 0.050 , 0.3969 ]
                                  [ 0.063 , 0.5009 ]
                                  [ 0.089 , 0.5547 ]
                                  [ 0.167 , 0.7225 ]
                                  [ 0.211 , 0.9005 ]
                                  [ 0.247 , 1.0886 ]
                                  [ 0.278 , 1.2867 ]
                                  [ 0.306 , 1.4949 ]
                                  [ 1.394 , 1.5666 ]
                                  [ 6.380 , 1.7133 ]
                                  [19.337 , 1.9417 ]
                                  [   -1  ,  -1    ]  (max twenty pts)
                         IDovf=[3], NHYDovf=["4011"]
*%-----------------|-----------------------------------------------------------|
*#****************************************************************************
FINISH
```

```
================================================================================

   SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
   S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
   SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
       S   W W   M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
   SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9   =========
                                                        9   9  9   9   # 4289424
        StormWater Management HYdrologic Model           999    999    =========

  ********************************************************************************
  ***************************** SWMHYMO Ver/4.05  *****************************
  *********  A single event and continuous hydrologic simulation model  *********
  *********     based on the principles of HYMO and its successors      *********
  *********                 OTTHYMO-83 and OTTHYMO-89.                  *********
  ********************************************************************************
  ********* Distributed by:  J.F. Sabourin and Associates Inc.          *********
  *********                  Ottawa,  Ontario: (613) 836-3884           *********
  *********                  Gatineau, Quebec: (819) 243-6858           *********
  *********                  E-Mail: swmhymo@jfsa.Com                   *********
  ********************************************************************************

  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
  +++++++++ Licensed user: RAND Engineering Corporation                 +++++++++
  +++++++++               Mississauga          SERIAL#:4289424          +++++++++
  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

  ********************************************************************************
  *********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++            *********
  *********           Maximum value for ID numbers  :     10            *********
  *********           Max. number of rainfall points: 105408            *********
  *********           Max. number of flow points    : 105408            *********
  ********************************************************************************

  ***** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) *****
  *****----------------------------------------------------------------------*****
  *****    ID:  Hydrograph IDentification numbers, (1-10).                   *****
  *****  NHYD:  Hydrograph reference numbers, (6 digits or characters).     *****
  *****  AREA:  Drainage area associated with hydrograph, (ac.) or (ha.).   *****
  ***** QPEAK:  Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s).     *****
  ***** TpeakDate_hh:mm is the date and time of the peak flow.              *****
  *****  R.V.:  Runoff Volume of simulated hydrograph, (in) or (mm).        *****
  *****  R.C.:  Runoff Coefficient of simulated hydrograph, (ratio).        *****
  *****     *:  see WARNING or NOTE message printed at end of run.          *****
  *****    **:  see  ERROR  message printed at end of run.                  *****
  ********************************************************************************
  ********************************************************************************

::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::

  ********************************************************************************

  **********************   S U M M A R Y   O U T P U T   **********************
  ********************************************************************************
  *         DATE: 2019-06-07     TIME: 14:43:51     RUN COUNTER: 000393         *
  ********************************************************************************
  * Input   filename: S:\13\13958\SWMHYMO\958-PH1.DAT                           *
  * Output  filename: S:\13\13958\SWMHYMO\958-PH1.out                           *
  * Summary filename: S:\13\13958\SWMHYMO\958-PH1.sum                           *
  * User comments:                                                              *
  * 1:__________________________________________________________________________*
  * 2:__________________________________________________________________________*
```

```
 * 3:__________________________________________________________________________*
 ******************************************************************************


#******************************************************************************
#  Project Name: [.]   Project Number: [13958]
#  Date         : JUNE 2019
#  Modeller     : [BK]
#  Company      : RAND Engineering Corporation
#  License #    :  4289424
#******************************************************************************
#   DERRY BRITANNIA DEVELOPMENTS LIMITED
#   MATTAMY HOMES NINTH LINE PROJECT
#   CITY OF MISSISSAUGA
#   STORAGE VOLUME ESTIMATE
#******************************************************************************
 RUN:COMMAND#
 001:0001------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   1 ]
#   This run is for the 4-hour 25mm Chicago Storm event.
 001:0002------------------------------------------------------------------------------
     READ STORM
      Filename = STORM.001
      Comment  =
      [SDT= 5.00:SDUR=   4.00:PTOT=  25.39]
#   Phase 1 post-development drainage area to Temp SWM Pond
 001:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     CALIB STANDHYD     01:PH1            8.94     .961 No_date    1:24   20.24 .797
      [XIMP=.75:TIMP=.75]
      [LOSS= 2 :CN= 74.0]
      [Pervious     area: IAper=  .60:SLPP=2.00:LGP=  25.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp=  .20:SLPI= .50:LGI= 244.:MNI=.013:SCI=   .0]
 001:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 01:PH1            8.94     .961 No_date    1:24   20.24  n/a
      [RDT= 1.00] out<- 02:4010           8.94     .013 No_date    4:08   20.24  n/a
            overflow <= 03:4011            .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.1676E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
 RUN:COMMAND#
 001:0001------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   1 ]
#   Derive Chicago Storm using City of Mississauga IDF parameters
#   This run is for the 2-year storm event.
 001:0002------------------------------------------------------------------------------
     CHICAGO STORM
      [SDT=15.00:SDUR=  24.00:PTOT=  50.23]
      [A/B/C= 610.000/   4.600/    .780]
#   Phase 1 post-development drainage area to Temp SWM Pond
 001:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     CALIB STANDHYD     01:PH1            8.94    1.002 No_date    8:02   41.95 .835
      [XIMP=.75:TIMP=.75]
      [LOSS= 2 :CN= 74.0]
      [Pervious     area: IAper=  .60:SLPP=2.00:LGP=  25.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp=  .20:SLPI= .50:LGI= 244.:MNI=.013:SCI=   .0]
 001:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
```

```
     ROUTE RESERVOIR -> 01:PH1           8.94    1.002 No_date    8:02   41.95  n/a
      [RDT= 1.00] out<- 02:4010          8.94     .021 No_date   14:21   41.95  n/a
            overflow <= 03:4011           .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.2756E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
 RUN:COMMAND#
 001:0001------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   1 ]
#   Derive Chicago Storm using City of Mississauga IDF parameters
#   This run is for the 5-year storm event.
 001:0002------------------------------------------------------------------------------
     CHICAGO STORM
      [SDT=15.00:SDUR=  24.00:PTOT=  67.52]
      [A/B/C= 820.000/   4.600/    .780]
#   Phase 1 post-development drainage area to Temp SWM Pond
 001:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     CALIB STANDHYD     01:PH1           8.94    1.433 No_date    8:01   57.66 .854
      [XIMP=.75:TIMP=.75]
      [LOSS= 2 :CN= 74.0]
      [Pervious     area: IAper=  .60:SLPP=2.00:LGP=  25.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp=  .20:SLPI= .50:LGI= 244.:MNI=.013:SCI=   .0]
 001:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 01:PH1           8.94    1.433 No_date    8:01   57.66  n/a
      [RDT= 1.00] out<- 02:4010          8.94     .041 No_date   12:15   57.65  n/a
            overflow <= 03:4011           .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.3583E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
 RUN:COMMAND#
 001:0001------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   1 ]
#   Derive Chicago Storm using City of Mississauga IDF parameters
#   This run is for the 100-year storm event.
 001:0002------------------------------------------------------------------------------
     CHICAGO STORM
      [SDT=15.00:SDUR=  24.00:PTOT= 119.37]
      [A/B/C=1450.000/   4.900/    .780]
#   Phase 1 post-development drainage area to Temp SWM Pond
 001:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     CALIB STANDHYD     01:PH1           8.94    3.006 No_date    8:00  111.98 .938
      [XIMP=.86:TIMP=.86]
      [LOSS= 2 :CN= 74.0]
      [Pervious     area: IAper=  .60:SLPP=2.00:LGP=  25.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp=  .20:SLPI= .50:LGI= 244.:MNI=.013:SCI=   .0]
 001:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 01:PH1           8.94    3.006 No_date    8:00  111.98  n/a
      [RDT= 1.00] out<- 02:4010          8.94     .131 No_date   10:10  111.98  n/a
            overflow <= 03:4011           .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.6453E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
 RUN:COMMAND#
 001:0001------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   1 ]
#   This run is for the 12-hour Regional Storm event.
```

```
 001:0002---------------------------------------------------------------------------
     READ STORM
      Filename = STORM.001
      Comment  =
      [SDT=10.00:SDUR=  12.00:PTOT= 211.12]
#   Phase 1 post-development drainage area to Temp SWM Pond
 001:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     CALIB STANDHYD     01:PH1            8.94    1.302 No_date   10:00  206.36 .977
      [XIMP=.86:TIMP=.86]
      [LOSS= 2 :CN= 87.0]
      [Pervious     area: IAper=  .60:SLPP=2.00:LGP=  25.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp=  .20:SLPI= .50:LGI= 244.:MNI=.013:SCI=   .0]
 001:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 01:PH1            8.94    1.302 No_date   10:00  206.36  n/a
      [RDT= 1.00] out<- 02:4010           8.94     .291 No_date   12:03  206.35  n/a
            overflow <= 03:4011            .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.1382E+01, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
#*****************************************************************************
 001:0005---------------------------------------------------------------------------
      FINISH
-------------------------------------------------------------------------------------
*************************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
   Simulation ended on 2019-06-07     at 14:43:52
=====================================================================================
```

```
2     Metric units
*#*****************************************************************************
*#  Project Name: [.]   Project Number: [13958]
*#  Date        : JUNE 2019
*#  Modeller    : [BK]
*#  Company     : RAND Engineering Corporation
*#  License #   :  4289424
*#*****************************************************************************
*#   DERRY BRITANNIA DEVELOPMENTS LIMITED
*#   MATTAMY HOMES NINTH LINE PROJECT
*#   MATTAMY HOMES NINTH LINE PROJECT
*#   CITY OF MISSISSAUGA
*#   STORAGE VOLUME ESTIMATE
*#*****************************************************************************
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[1]
*%                  ["25mm_chi.4hr"] <--storm filename, one per line for NSTORM time

*#   This run is for the 4-hour 25mm Chicago Storm event.
READ STORM          ["STORM.001"]

*#   Phase 1 post-development drainage area to Phase 2 Ultimate SWM Pond
CALIB STANDHYD      ID=[1], NHYD=["PH1"], DT=[1](min), AREA=[32.56](ha),
                    XIMP=[.75], TIMP=[.75], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[74],
                    Pervious   surfaces: IAper=[0.6](mm), SLPP=[2](%),
                                         LGP=[24.5](m), MNP=[0.25], SCP=[0](hrs),
                    Impervious surfaces: IAimp=[0.2](mm), SLPI=[0.5](%),
                                         LGI=[466](m), MNI=[0.013], SCI=[0](hrs),
                    END=-1
*%-----------------|-----------------------------------------------------------|
ROUTE RESERVOIR     IDout=[2],   NHYD=["4010"],  IDin=[1],
                    RDT=[1](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                      (cms) - (ha-m)
                                    [ 0.000 , 0.0000 ]
                                    [ 0.028 , 0.2569 ]
                                    [ 0.048 , 0.5367 ]
                                    [ 0.062 , 0.8310 ]
                                    [ 0.077 , 0.9805 ]
                                    [ 0.108 , 1.2840 ]
                                    [ 0.129 , 1.5937 ]
                                    [ 0.137 , 1.7508 ]
                                    [ 0.207 , 1.9094 ]
                                    [ 0.607 , 2.3945 ]
                                    [ 0.839 , 2.8934 ]
                                    [ 1.015 , 3.4136 ]
                                    [ 1.067 , 3.5969 ]
                                    [ 1.208 , 4.1788 ]
                                    [ 1.294 , 4.5933 ]
                                    [ 1.374 , 5.0289 ]
                                    [ 2.491 , 5.2547 ]
                                    [ 7.535 , 5.7221 ]
                                    [20.572 , 6.4630 ]
                                    [   -1  ,  -1    ]  (max twenty pts)
                          IDovf=[3], NHYDovf=["4011"]
*%-----------------|-----------------------------------------------------------|
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[1]
                    ["  "  ] <--storm filename, one per line for NSTORM time

*#   Derive Chicago Storm using City of Mississauga IDF parameters
*#   This run is for the 2-year storm event.
CHICAGO STORM       IUNITS=[2],  TD=[24.0](hrs),  R=[0.333],  CSDT=[15](min),
```

```
                    ICASEcs=[1],
                    A=[610],  B=[4.6], and C=[0.78],

*#   Phase 1 post-development drainage area to Phase 2 Ultimate SWM Pond
CALIB STANDHYD      ID=[1], NHYD=["PH1"], DT=[1](min), AREA=[32.56](ha),
                    XIMP=[.75], TIMP=[.75], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[74],
                    Pervious   surfaces: IAper=[0.6](mm), SLPP=[2](%),
                                         LGP=[24.5](m), MNP=[0.25], SCP=[0](hrs),
                    Impervious surfaces: IAimp=[0.2](mm), SLPI=[0.5](%),
                                         LGI=[466](m), MNI=[0.013], SCI=[0](hrs),
                    END=-1
*%-----------------|-------------------------------------------------------------|
ROUTE RESERVOIR     IDout=[2],   NHYD=["4010"],  IDin=[1],
                    RDT=[1](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                      (cms) - (ha-m)
                                    [ 0.000 , 0.0000 ]
                                    [ 0.028 , 0.2569 ]
                                    [ 0.048 , 0.5367 ]
                                    [ 0.062 , 0.8310 ]
                                    [ 0.077 , 0.9805 ]
                                    [ 0.108 , 1.2840 ]
                                    [ 0.129 , 1.5937 ]
                                    [ 0.137 , 1.7508 ]
                                    [ 0.207 , 1.9094 ]
                                    [ 0.607 , 2.3945 ]
                                    [ 0.839 , 2.8934 ]
                                    [ 1.015 , 3.4136 ]
                                    [ 1.067 , 3.5969 ]
                                    [ 1.208 , 4.1788 ]
                                    [ 1.294 , 4.5933 ]
                                    [ 1.374 , 5.0289 ]
                                    [ 2.491 , 5.2547 ]
                                    [ 7.535 , 5.7221 ]
                                    [20.572 , 6.4630 ]
                                    [   -1  ,  -1    ]  (max twenty pts)
                          IDovf=[3], NHYDovf=["4011"]
*%-----------------|-------------------------------------------------------------|
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[1]
                    ["  "  ] <--storm filename, one per line for NSTORM time

*#   Derive Chicago Storm using City of Mississauga IDF parameters
*#   This run is for the 5-year storm event.
CHICAGO STORM       IUNITS=[2],  TD=[24.0](hrs),  R=[0.333],  CSDT=[15](min),
                    ICASEcs=[1],
                    A=[820],  B=[4.6], and C=[0.78],

*#   Phase 1 post-development drainage area to Phase 2 Ultimate SWM Pond
CALIB STANDHYD      ID=[1], NHYD=["PH1"], DT=[1](min), AREA=[32.56](ha),
                    XIMP=[.75], TIMP=[.75], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[74],
                    Pervious   surfaces: IAper=[0.6](mm), SLPP=[2](%),
                                         LGP=[24.5](m), MNP=[0.25], SCP=[0](hrs),
                    Impervious surfaces: IAimp=[0.2](mm), SLPI=[0.5](%),
                                         LGI=[466](m), MNI=[0.013], SCI=[0](hrs),
                    END=-1
*%-----------------|-------------------------------------------------------------|
ROUTE RESERVOIR     IDout=[2],   NHYD=["4010"],  IDin=[1],
                    RDT=[1](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                      (cms) - (ha-m)
```

```
                                [ 0.000 , 0.0000 ]
                                [ 0.028 , 0.2569 ]
                                [ 0.048 , 0.5367 ]
                                [ 0.062 , 0.8310 ]
                                [ 0.077 , 0.9805 ]
                                [ 0.108 , 1.2840 ]
                                [ 0.129 , 1.5937 ]
                                [ 0.137 , 1.7508 ]
                                [ 0.207 , 1.9094 ]
                                [ 0.607 , 2.3945 ]
                                [ 0.839 , 2.8934 ]
                                [ 1.015 , 3.4136 ]
                                [ 1.067 , 3.5969 ]
                                [ 1.208 , 4.1788 ]
                                [ 1.294 , 4.5933 ]
                                [ 1.374 , 5.0289 ]
                                [ 2.491 , 5.2547 ]
                                [ 7.535 , 5.7221 ]
                                [20.572 , 6.4630 ]
                                [   -1  ,  -1    ]  (max twenty pts)
                      IDovf=[3], NHYDovf=["4011"]
*%-----------------|-----------------------------------------------------------|
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[1]
                    ["  "  ] <--storm filename, one per line for NSTORM time

*#   Derive Chicago Storm using City of Mississauga IDF parameters
*#   This run is for the 100-year storm event.
CHICAGO STORM       IUNITS=[2],  TD=[24.0](hrs),  R=[0.333],  CSDT=[15](min),
                    ICASEcs=[1],
                    A=[1450],  B=[4.9], and C=[0.78],

*#   Phase 1 post-development drainage area to Phase 2 Ultimate SWM Pond
CALIB STANDHYD      ID=[1], NHYD=["PH1"], DT=[1](min), AREA=[32.56](ha),
                    XIMP=[.87], TIMP=[.87], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[74],
                    Pervious   surfaces: IAper=[0.6](mm), SLPP=[2](%),
                                         LGP=[24.5](m), MNP=[0.25], SCP=[0](hrs),
                    Impervious surfaces: IAimp=[0.2](mm), SLPI=[0.5](%),
                                         LGI=[466](m), MNI=[0.013], SCI=[0](hrs),
                    END=-1
*%-----------------|-----------------------------------------------------------|
ROUTE RESERVOIR     IDout=[2],   NHYD=["4010"],  IDin=[1],
                    RDT=[1](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                  (cms) - (ha-m)
                                [ 0.000 , 0.0000 ]
                                [ 0.028 , 0.2569 ]
                                [ 0.048 , 0.5367 ]
                                [ 0.062 , 0.8310 ]
                                [ 0.077 , 0.9805 ]
                                [ 0.108 , 1.2840 ]
                                [ 0.129 , 1.5937 ]
                                [ 0.137 , 1.7508 ]
                                [ 0.207 , 1.9094 ]
                                [ 0.607 , 2.3945 ]
                                [ 0.839 , 2.8934 ]
                                [ 1.015 , 3.4136 ]
                                [ 1.067 , 3.5969 ]
                                [ 1.208 , 4.1788 ]
                                [ 1.294 , 4.5933 ]
                                [ 1.374 , 5.0289 ]
                                [ 2.491 , 5.2547 ]
```

```
                                [ 7.535 , 5.7221 ]
                                [20.572 , 6.4630 ]
                                [   -1  ,  -1    ]  (max twenty pts)
                          IDovf=[3], NHYDovf=["4011"]
*%-----------------|-----------------------------------------------------------|
START               TZERO=[0.0],  METOUT=[2],  NSTORM=[1],  NRUN=[1]
                    ["S-REG12H"  ] <--storm filename, one per line for NSTORM time

*#   This run is for the 12-hour Regional Storm event.
READ STORM          "STORM.001"

*#   Phase 1 post-development drainage area to Phase 2 Ultimate SWM Pond
CALIB STANDHYD      ID=[1], NHYD=["PH1"], DT=[1](min), AREA=[32.56](ha),
                    XIMP=[.87], TIMP=[.87], DWF=[0](cms), LOSS=[2],
                    SCS curve number CN=[87],
                    Pervious   surfaces: IAper=[0.6](mm), SLPP=[2](%),
                                         LGP=[24.5](m), MNP=[0.25], SCP=[0](hrs),
                    Impervious surfaces: IAimp=[0.2](mm), SLPI=[0.5](%),
                                         LGI=[466](m), MNI=[0.013], SCI=[0](hrs),
                    END=-1
*%-----------------|-----------------------------------------------------------|
ROUTE RESERVOIR     IDout=[2],   NHYD=["4010"],  IDin=[1],
                    RDT=[1](min),
                          TABLE of ( OUTFLOW-STORAGE ) values
                                  (cms) - (ha-m)
                                [ 0.000 , 0.0000 ]
                                [ 0.028 , 0.2569 ]
                                [ 0.048 , 0.5367 ]
                                [ 0.062 , 0.8310 ]
                                [ 0.077 , 0.9805 ]
                                [ 0.108 , 1.2840 ]
                                [ 0.129 , 1.5937 ]
                                [ 0.137 , 1.7508 ]
                                [ 0.207 , 1.9094 ]
                                [ 0.607 , 2.3945 ]
                                [ 0.839 , 2.8934 ]
                                [ 1.015 , 3.4136 ]
                                [ 1.067 , 3.5969 ]
                                [ 1.208 , 4.1788 ]
                                [ 1.294 , 4.5933 ]
                                [ 1.374 , 5.0289 ]
                                [ 2.491 , 5.2547 ]
                                [ 7.535 , 5.7221 ]
                                [20.572 , 6.4630 ]
                                [   -1  ,  -1    ]  (max twenty pts)
                          IDovf=[3], NHYDovf=["4011"]
*%-----------------|-----------------------------------------------------------|
*#*******************************************************************************
FINISH
```

```
================================================================================

  SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
  S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
  SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
      S   W W   M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
  SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9   =========
                                                       9   9  9   9   # 4289424
       StormWater Management HYdrologic Model           999    999    =========

 *******************************************************************************
 ***************************** SWMHYMO Ver/4.05  *****************************
 *********  A single event and continuous hydrologic simulation model  *********
 *********     based on the principles of HYMO and its successors      *********
 *********                 OTTHYMO-83 and OTTHYMO-89.                  *********
 *******************************************************************************
 ********* Distributed by:  J.F. Sabourin and Associates Inc.         *********
 *********                  Ottawa,  Ontario: (613) 836-3884          *********
 *********                  Gatineau, Quebec: (819) 243-6858          *********
 *********                  E-Mail: swmhymo@jfsa.Com                  *********
 *******************************************************************************

 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++++ Licensed user: RAND Engineering Corporation                +++++++++
 +++++++++                Mississauga          SERIAL#:4289424        +++++++++
 +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 *******************************************************************************
 *********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++           *********
 *********           Maximum value for ID numbers  :     10           *********
 *********           Max. number of rainfall points: 105408           *********
 *********           Max. number of flow points    : 105408           *********
 *******************************************************************************

 ***** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) *****
 *****---------------------------------------------------------------------*****
 *****    ID:  Hydrograph IDentification numbers, (1-10).                  *****
 *****  NHYD:  Hydrograph reference numbers, (6 digits or characters).     *****
 *****  AREA:  Drainage area associated with hydrograph, (ac.) or (ha.).   *****
 ***** QPEAK:  Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s).     *****
 ***** TpeakDate_hh:mm is the date and time of the peak flow.              *****
 *****  R.V.:  Runoff Volume of simulated hydrograph, (in) or (mm).        *****
 *****  R.C.:  Runoff Coefficient of simulated hydrograph, (ratio).        *****
 *****     *:  see WARNING or NOTE message printed at end of run.          *****
 *****    **:  see  ERROR  message printed at end of run.                  *****
 *******************************************************************************
 *******************************************************************************


::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::

 *******************************************************************************

 ***********************   S U M M A R Y   O U T P U T   **********************
 *******************************************************************************
 *         DATE: 2019-06-07     TIME: 14:16:03     RUN COUNTER: 000392        *
 *******************************************************************************
 * Input   filename: S:\13\13958\SWMHYMO\958-PH2.DAT                           *
 * Output  filename: S:\13\13958\SWMHYMO\958-PH2.out                           *
 * Summary filename: S:\13\13958\SWMHYMO\958-PH2.sum                           *
 * User comments:                                                              *
 * 1:__________________________________________________________________________*
 * 2:__________________________________________________________________________*
```

```
 * 3:___________________________________________________________________________*
 *****************************************************************************


#*****************************************************************************
#  Project Name: [.]   Project Number: [13958]
#  Date        : JUNE 2019
#  Modeller    : [BK]
#  Company     : RAND Engineering Corporation
#  License #   :  4289424
#*****************************************************************************
#   DERRY BRITANNIA DEVELOPMENTS LIMITED
#   MATTAMY HOMES NINTH LINE PROJECT
#   MATTAMY HOMES NINTH LINE PROJECT
#   CITY OF MISSISSAUGA
#   STORAGE VOLUME ESTIMATE
#*****************************************************************************
 RUN:COMMAND#
 001:0001-------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   1 ]
#   This run is for the 4-hour 25mm Chicago Storm event.
 001:0002-------------------------------------------------------------------------------
     READ STORM
      Filename = STORM.001
      Comment  =
      [SDT= 5.00:SDUR=   4.00:PTOT=  25.39]
#   Phase 1 post-development drainage area to Phase 2 Ultimate SWM Pond
 001:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     CALIB STANDHYD     01:PH1           32.56    2.740 No_date    1:28   20.24 .797
      [XIMP=.75:TIMP=.75]
      [LOSS= 2 :CN= 74.0]
      [Pervious     area: IAper=  .60:SLPP=2.00:LGP=  25.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp=  .20:SLPI= .50:LGI= 466.:MNI=.013:SCI=   .0]
 001:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 01:PH1           32.56    2.740 No_date    1:28   20.24  n/a
      [RDT= 1.00] out<- 02:4010          32.56     .051 No_date    4:13   20.24  n/a
            overflow <= 03:4011            .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.6068E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
 RUN:COMMAND#
 001:0001-------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   1 ]
#   Derive Chicago Storm using City of Mississauga IDF parameters
#   This run is for the 2-year storm event.
 001:0002-------------------------------------------------------------------------------
     CHICAGO STORM
      [SDT=15.00:SDUR=  24.00:PTOT=  50.23]
      [A/B/C= 610.000/   4.600/    .780]
#   Phase 1 post-development drainage area to Phase 2 Ultimate SWM Pond
 001:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     CALIB STANDHYD     01:PH1           32.56    3.149 No_date    8:04   41.95 .835
      [XIMP=.75:TIMP=.75]
      [LOSS= 2 :CN= 74.0]
      [Pervious     area: IAper=  .60:SLPP=2.00:LGP=  25.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp=  .20:SLPI= .50:LGI= 466.:MNI=.013:SCI=   .0]
```

```
 001:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 01:PH1           32.56    3.149 No_date    8:04   41.95  n/a
      [RDT= 1.00] out<- 02:4010          32.56     .078 No_date   14:25   41.95  n/a
            overflow <= 03:4011            .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.9944E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
 RUN:COMMAND#
 001:0001------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   1 ]
#   Derive Chicago Storm using City of Mississauga IDF parameters
#   This run is for the 5-year storm event.
 001:0002------------------------------------------------------------------------------
     CHICAGO STORM
      [SDT=15.00:SDUR=  24.00:PTOT=  67.52]
      [A/B/C= 820.000/   4.600/    .780]
#   Phase 1 post-development drainage area to Phase 2 Ultimate SWM Pond
 001:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     CALIB STANDHYD     01:PH1           32.56    4.551 No_date    8:03   57.66 .854
      [XIMP=.75:TIMP=.75]
      [LOSS= 2 :CN= 74.0]
      [Pervious     area: IAper=  .60:SLPP=2.00:LGP=  25.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp=  .20:SLPI= .50:LGI= 466.:MNI=.013:SCI=   .0]
 001:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 01:PH1           32.56    4.551 No_date    8:03   57.66  n/a
      [RDT= 1.00] out<- 02:4010          32.56     .113 No_date   14:04   57.65  n/a
            overflow <= 03:4011            .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.1354E+01, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
 RUN:COMMAND#
 001:0001------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   1 ]
#   Derive Chicago Storm using City of Mississauga IDF parameters
#   This run is for the 100-year storm event.
 001:0002------------------------------------------------------------------------------
     CHICAGO STORM
      [SDT=15.00:SDUR=  24.00:PTOT= 119.37]
      [A/B/C=1450.000/   4.900/    .780]
#   Phase 1 post-development drainage area to Phase 2 Ultimate SWM Pond
 001:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     CALIB STANDHYD     01:PH1           32.56    9.933 No_date    8:02  112.49 .942
      [XIMP=.87:TIMP=.87]
      [LOSS= 2 :CN= 74.0]
      [Pervious     area: IAper=  .60:SLPP=2.00:LGP=  25.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp=  .20:SLPI= .50:LGI= 466.:MNI=.013:SCI=   .0]
 001:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 01:PH1           32.56    9.933 No_date    8:02  112.49  n/a
      [RDT= 1.00] out<- 02:4010          32.56     .556 No_date    9:53  112.49  n/a
            overflow <= 03:4011            .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.2333E+01, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
 RUN:COMMAND#
 001:0001------------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   1 ]
```

```
#   This run is for the 12-hour Regional Storm event.
 001:0002-----------------------------------------------------------------------------
     READ STORM
      Filename = STORM.001
      Comment  =
      [SDT=10.00:SDUR=  12.00:PTOT= 211.12]
#   Phase 1 post-development drainage area to Phase 2 Ultimate SWM Pond
 001:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     CALIB STANDHYD     01:PH1           32.56    4.715 No_date   10:00  206.69 .979
      [XIMP=.87:TIMP=.87]
      [LOSS= 2 :CN= 87.0]
      [Pervious     area: IAper=  .60:SLPP=2.00:LGP=  25.:MNP=.250:SCP=   .0]
      [Impervious   area: IAimp=  .20:SLPI= .50:LGI= 466.:MNI=.013:SCI=   .0]
 001:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 01:PH1           32.56    4.715 No_date   10:00  206.69  n/a
      [RDT= 1.00] out<- 02:4010          32.56    1.326 No_date   11:35  206.68  n/a
            overflow <= 03:4011            .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.4766E+01, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
#******************************************************************************
 001:0005-----------------------------------------------------------------------------
      FINISH
-------------------------------------------------------------------------------------
*************************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
   Simulation ended on 2019-06-07     at 14:16:04
=====================================================================================
```

APPENDIX D – EAST BRANCH TRIBUTARY OF 16 MILE CREEK - HYDRAULIC ASSESSMENT

Project: Derry Britannia Developments Limited
Proj. No.: 13958
Date: June 7, 2019

COMPARISON OF EXISTING AND PROPOSED FLOODPLAIN WATER SURFACE ELEVATIONS
SIXTEEN MILE CREEK, DERRY ROAD TO BRITANNIA ROAD (PORTION)

Based on HEC-RAS model: 9th Line Transitway Assessment
Existing Scenario: Existing October 2015, as received from City of Mississauga
Proposed Scenario: Existing October 2015 with RS234->RS225 replaced by Proposed Partial 2KS (same RS #'s)

River Station	HEC-RAS Model Scenario	Sixteen Mile Creek Water Surface Elevation (m)						
		2-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	Regional
236	Existing	194.52	194.61	194.70	194.75	194.80	194.85	195.16
	Proposed	194.52	194.61	194.70	194.75	194.80	194.85	195.16
	Difference	0	0	0	0	0	0	0
235	Existing	193.72	193.83	193.89	193.93	193.97	194.00	194.65
	Proposed	193.72	193.85	193.96	194.04	194.02	194.09	194.52
	Difference	0	0.02	0.07	0.11	0.05	0.09	-0.13
234	Existing	192.17	192.34	192.54	192.66	192.78	192.89	193.04
	Proposed	192.17	192.29	192.39	192.46	192.59	192.62	192.78
	Difference	0	-0.05	-0.15	-0.20	-0.19	-0.27	-0.26
233	Existing	190.99	191.12	191.18	191.22	191.25	191.26	191.60
	Proposed	190.96	191.07	191.15	191.18	191.22	191.26	191.62
	Difference	-0.03	-0.05	-0.03	-0.04	-0.03	0	0.02
232	Existing	190.63	190.78	190.91	190.95	191.00	191.04	191.38
	Proposed	190.63	190.68	190.77	190.84	190.91	190.97	191.43
	Difference	0	-0.10	-0.14	-0.11	-0.09	-0.07	0.05
231	Existing	190.31	190.52	190.70	190.79	190.86	190.91	191.30
	Proposed	190.31	190.48	190.65	190.72	190.79	190.85	191.32
	Difference	0	-0.04	-0.05	-0.07	-0.07	-0.06	0.02
230	Existing	190.03	190.26	190.44	190.55	190.62	190.67	191.20
	Proposed	190.03	190.31	190.52	190.57	190.67	190.71	191.21
	Difference	0	0.05	0.08	0.02	0.05	0.04	0.01
229	Existing	189.47	189.68	189.86	189.97	190.05	190.13	191.16
	Proposed	189.47	189.57	189.70	189.79	189.78	189.83	191.16
	Difference	0	-0.11	-0.16	-0.18	-0.27	-0.30	0
228	Existing	189.23	189.42	189.61	189.70	189.82	189.93	191.15
	Proposed	189.21	189.35	189.40	189.39	189.56	189.71	191.15
	Difference	-0.02	-0.07	-0.21	-0.31	-0.26	-0.22	0
227	Existing	188.72	188.84	188.94	189.12	189.56	189.72	191.15
	Proposed	188.77	188.69	188.83	188.97	189.53	189.68	191.14
	Difference	0.05	-0.15	-0.11	-0.15	-0.03	-0.04	-0.01
226	Existing	188.20	188.38	188.66	189.01	189.54	189.69	191.14
	Proposed	188.05	188.25	188.58	188.96	189.52	189.68	191.14
	Difference	-0.15	-0.13	-0.08	-0.05	-0.02	-0.01	0
225	Existing	187.91	188.24	188.58	188.97	189.53	189.68	191.14
	Proposed	187.89	188.22	188.56	188.95	189.52	189.68	191.14
	Difference	-0.02	-0.02	-0.02	-0.02	-0.01	0	0
224	Existing	187.82	188.18	188.53	188.94	189.51	189.66	191.13
	Proposed	187.82	188.18	188.53	188.94	189.51	189.66	191.13
	Difference	0	0	0	0	0	0	0

Profile Output Table - Standard Table 1
HEC-RAS Plan: Ex-Oct 2015   River: RIVER-2   Reach: Reach-1

Rivers   = 1
Hydraulic Reaches = 1
River Stations   = 68
Plans   = 1
Profiles   = 7

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Reach-1	261	(Ex) - 2Y	0.34	208.00	208.42	208.22	208.42	0.001266	0.29	1.17	5.22	0.20
Reach-1	261	(Ex) - 5Y	1.12	208.00	208.68	208.35	208.69	0.001167	0.39	2.86	7.56	0.20
Reach-1	261	(Ex) - 10Y	1.97	208.00	208.87	208.44	208.88	0.001014	0.45	4.42	8.61	0.20
Reach-1	261	(Ex) - 25Y	2.63	208.00	208.99	208.49	209.01	0.000926	0.48	5.51	8.98	0.19
Reach-1	261	(Ex) - 50Y	3.27	208.00	209.10	208.54	209.12	0.000873	0.50	6.50	9.31	0.19
Reach-1	261	(Ex) - 100Y	3.99	208.00	209.21	208.59	209.23	0.000830	0.53	7.56	9.64	0.19
Reach-1	261	(Ex) - Regional	7.14	208.00	209.65	208.76	209.67	0.000647	0.59	12.25	30.18	0.18
Reach-1	260.5		Culvert									
Reach-1	260	(Ex) - 2Y	0.68	207.90	208.27	208.27	208.36	0.037687	1.36	0.50	2.73	1.01
Reach-1	260	(Ex) - 5Y	2.02	207.90	208.47	208.47	208.61	0.032469	1.69	1.20	4.22	1.01
Reach-1	260	(Ex) - 10Y	3.35	207.90	208.59	208.59	208.77	0.030304	1.87	1.80	5.17	1.01
Reach-1	260	(Ex) - 25Y	4.39	207.90	208.67	208.67	208.87	0.028932	1.96	2.24	5.78	1.01
Reach-1	260	(Ex) - 50Y	5.40	207.90	208.74	208.74	208.96	0.028143	2.05	2.64	6.27	1.01
Reach-1	260	(Ex) - 100Y	6.51	207.90	208.80	208.80	209.04	0.027811	2.14	3.04	6.73	1.01
Reach-1	260	(Ex) - Regional	11.52	207.90	209.03	209.03	209.34	0.024568	2.50	4.61	12.09	1.01
Reach-1	259	(Ex) - 2Y	0.68	206.90	207.27		207.27	0.000026	0.06	12.11	34.41	0.03
Reach-1	259	(Ex) - 5Y	2.02	206.90	207.47		207.47	0.000053	0.11	19.11	36.14	0.05
Reach-1	259	(Ex) - 10Y	3.35	206.90	207.50		207.50	0.000123	0.17	20.19	36.40	0.07
Reach-1	259	(Ex) - 25Y	4.39	206.90	207.57		207.57	0.000141	0.19	22.96	37.05	0.08
Reach-1	259	(Ex) - 50Y	5.40	206.90	207.64		207.64	0.000157	0.21	25.33	37.61	0.08
Reach-1	259	(Ex) - 100Y	6.51	206.90	207.70		207.70	0.000173	0.24	27.68	38.15	0.09
Reach-1	259	(Ex) - Regional	11.52	206.90	207.92		207.93	0.000233	0.32	36.39	40.08	0.11
Reach-1	258	(Ex) - 2Y	0.68	206.90	207.25	207.11	207.26	0.002386	0.43	1.87	11.09	0.27
Reach-1	258	(Ex) - 5Y	2.02	206.90	207.43	207.23	207.45	0.002673	0.65	4.39	17.20	0.32
Reach-1	258	(Ex) - 10Y	3.35	206.90	207.31	207.31	207.43	0.024931	1.61	2.64	13.25	0.92
Reach-1	258	(Ex) - 25Y	4.39	206.90	207.36	207.36	207.50	0.023414	1.73	3.39	15.07	0.92
Reach-1	258	(Ex) - 50Y	5.40	206.90	207.41	207.41	207.56	0.022361	1.83	4.11	16.63	0.91
Reach-1	258	(Ex) - 100Y	6.51	206.90	207.46	207.46	207.61	0.021302	1.92	4.91	18.21	0.91
Reach-1	258	(Ex) - Regional	11.52	206.90	207.62	207.62	207.81	0.019566	2.25	8.39	25.40	0.91
Reach-1	257	(Ex) - 2Y	0.68	205.60	205.81	205.81	205.86	0.043405	1.05	0.65	6.27	1.02
Reach-1	257	(Ex) - 5Y	2.02	205.60	205.93	205.93	206.02	0.028536	1.40	1.65	10.32	0.94
Reach-1	257	(Ex) - 10Y	3.35	205.60	207.26		207.26	0.000009	0.09	96.62	134.45	0.02
Reach-1	257	(Ex) - 25Y	4.39	205.60	207.30		207.30	0.000013	0.11	102.21	142.76	0.03
Reach-1	257	(Ex) - 50Y	5.40	205.60	207.33		207.33	0.000018	0.13	106.04	145.15	0.03
Reach-1	257	(Ex) - 100Y	6.51	205.60	207.35		207.35	0.000025	0.15	108.21	146.49	0.04
Reach-1	257	(Ex) - Regional	11.52	205.60	207.42		207.42	0.000062	0.25	118.60	153.76	0.06
Reach-1	256	(Ex) - 2Y	0.68	204.50	204.84		204.84	0.001326	0.35	3.42	22.55	0.21
Reach-1	256	(Ex) - 5Y	2.02	204.50	205.15		205.15	0.000409	0.32	13.82	45.52	0.13
Reach-1	256	(Ex) - 10Y	3.35	204.50	207.26		207.26	0.000000	0.03	319.65	252.51	0.01
Reach-1	256	(Ex) - 25Y	4.39	204.50	207.30		207.30	0.000001	0.04	329.90	258.24	0.01
Reach-1	256	(Ex) - 50Y	5.40	204.50	207.33		207.33	0.000001	0.04	336.79	262.01	0.01
Reach-1	256	(Ex) - 100Y	6.51	204.50	207.35		207.35	0.000001	0.05	340.68	264.12	0.01
Reach-1	256	(Ex) - Regional	11.52	204.50	207.41		207.41	0.000004	0.09	359.18	275.76	0.02
Reach-1	255.5	(Ex) - 2Y	0.68	204.10	204.27	204.27	204.31	0.033216	1.00	1.07	14.95	0.91
Reach-1	255.5	(Ex) - 5Y	2.02	204.10	205.15	204.36	205.15	0.000016	0.09	61.70	138.74	0.03
Reach-1	255.5	(Ex) - 10Y	3.35	204.10	207.26	204.41	207.26	0.000000	0.01	559.94	305.01	0.00
Reach-1	255.5	(Ex) - 25Y	4.39	204.10	207.30	204.45	207.30	0.000000	0.02	572.23	306.84	0.00
Reach-1	255.5	(Ex) - 50Y	5.40	204.10	207.33	204.48	207.33	0.000000	0.02	580.36	307.75	0.00
Reach-1	255.5	(Ex) - 100Y	6.51	204.10	207.35	204.50	207.35	0.000000	0.03	584.90	308.26	0.00
Reach-1	255.5	(Ex) - Regional	11.52	204.10	207.41	204.61	207.41	0.000001	0.05	606.13	310.63	0.01
Reach-1	255	(Ex) - 2Y	0.68	202.76	203.49	203.12	203.54	0.002637	0.93	0.73	8.88	0.35
Reach-1	255	(Ex) - 5Y	2.02	202.76	205.10	203.50	205.14	0.000484	0.86	2.34	169.03	0.18

Reach-1	255	(Ex) - 10Y	3.35	202.76	207.25	203.80	207.26	0.001514	0.58	13.36	307.19	0.25
Reach-1	255	(Ex) - 25Y	4.39	202.76	207.29	204.01	207.30	0.001265	0.55	21.60	308.62	0.23
Reach-1	255	(Ex) - 50Y	5.40	202.76	207.32	204.20	207.33	0.001260	0.57	26.70	309.50	0.23
Reach-1	255	(Ex) - 100Y	6.51	202.76	207.33	204.39	207.34	0.001519	0.63	29.12	309.92	0.25
Reach-1	255	(Ex) - Regional	11.52	202.76	207.40	205.14	207.41	0.002351	0.62	43.41	312.21	0.29
Reach-1	254.5		Culvert									
Reach-1	254	(Ex) - 2Y	0.68	202.63	203.27		203.33	0.004081	1.06	0.64	7.04	0.42
Reach-1	254	(Ex) - 5Y	2.02	202.63	203.72	203.37	203.75	0.010698	0.78	3.80	28.39	0.55
Reach-1	254	(Ex) - 10Y	3.35	202.63	203.79	203.71	203.82	0.010019	0.88	5.88	33.18	0.55
Reach-1	254	(Ex) - 25Y	4.39	202.63	203.84	203.75	203.87	0.009414	0.93	7.81	42.31	0.54
Reach-1	254	(Ex) - 50Y	5.40	202.63	203.88	203.77	203.91	0.009200	0.97	9.32	45.31	0.55
Reach-1	254	(Ex) - 100Y	6.51	202.63	203.92	203.79	203.95	0.008841	1.01	11.02	48.56	0.54
Reach-1	254	(Ex) - Regional	11.52	202.63	204.06	203.90	204.09	0.007887	1.14	19.49	76.02	0.53
Reach-1	253	(Ex) - 2Y	0.68	202.40	202.65	202.54	202.66	0.002243	0.37	2.41	18.07	0.26
Reach-1	253	(Ex) - 5Y	2.02	202.40	202.79	202.63	202.81	0.002599	0.56	5.55	27.13	0.30
Reach-1	253	(Ex) - 10Y	3.35	202.40	202.88	202.70	202.90	0.002745	0.67	8.25	33.00	0.32
Reach-1	253	(Ex) - 25Y	4.39	202.40	202.94	202.74	202.96	0.002860	0.74	10.17	36.75	0.34
Reach-1	253	(Ex) - 50Y	5.40	202.40	202.99	202.77	203.01	0.002906	0.79	12.01	40.08	0.34
Reach-1	253	(Ex) - 100Y	6.51	202.40	203.03	202.80	203.05	0.002991	0.85	13.88	43.32	0.35
Reach-1	253	(Ex) - Regional	11.52	202.40	203.19	202.92	203.22	0.003205	1.03	21.61	53.79	0.38
Reach-1	252.5	(Ex) - 2Y	0.68	202.00	202.14	202.14	202.18	0.040363	0.91	0.80	11.10	0.96
Reach-1	252.5	(Ex) - 5Y	2.02	202.00	202.23	202.23	202.30	0.028745	1.22	2.13	17.90	0.91
Reach-1	252.5	(Ex) - 10Y	3.35	202.00	202.29	202.29	202.38	0.026675	1.41	3.33	22.32	0.92
Reach-1	252.5	(Ex) - 25Y	4.39	202.00	202.33	202.33	202.43	0.025064	1.52	4.28	25.27	0.91
Reach-1	252.5	(Ex) - 50Y	5.40	202.00	202.36	202.36	202.47	0.024930	1.62	5.10	27.56	0.92
Reach-1	252.5	(Ex) - 100Y	6.51	202.00	202.40	202.40	202.51	0.024055	1.70	6.05	30.01	0.92
Reach-1	252.5	(Ex) - Regional	11.52	202.00	202.51	202.51	202.65	0.023286	2.01	9.66	35.47	0.95
Reach-1	252	(Ex) - 2Y	1.91	200.60	201.11		201.12	0.000931	0.41	7.63	29.00	0.19
Reach-1	252	(Ex) - 5Y	4.19	200.60	201.30		201.31	0.001021	0.54	13.88	36.92	0.21
Reach-1	252	(Ex) - 10Y	6.84	200.60	201.45		201.46	0.001115	0.64	19.64	41.72	0.23
Reach-1	252	(Ex) - 25Y	9.09	200.60	201.55		201.56	0.001187	0.72	24.13	46.75	0.24
Reach-1	252	(Ex) - 50Y	11.48	200.60	201.64		201.66	0.001246	0.78	28.56	50.75	0.25
Reach-1	252	(Ex) - 100Y	13.95	200.60	201.72		201.74	0.001294	0.84	32.79	53.74	0.26
Reach-1	252	(Ex) - Regional	34.15	200.60	202.17		202.20	0.001584	1.18	62.01	73.96	0.30
Reach-1	251	(Ex) - 2Y	1.91	200.40	200.87	200.66	200.88	0.001603	0.50	6.51	27.51	0.25
Reach-1	251	(Ex) - 5Y	4.19	200.40	201.02	200.77	201.04	0.002009	0.69	11.43	36.63	0.29
Reach-1	251	(Ex) - 10Y	6.84	200.40	201.14	200.86	201.16	0.002272	0.83	15.85	40.18	0.32
Reach-1	251	(Ex) - 25Y	9.09	200.40	201.20	200.91	201.23	0.002759	0.96	18.39	42.95	0.36
Reach-1	251	(Ex) - 50Y	11.48	200.40	201.25	200.98	201.29	0.003219	1.09	20.81	45.43	0.39
Reach-1	251	(Ex) - 100Y	13.95	200.40	201.31	201.04	201.34	0.003624	1.20	23.17	47.72	0.42
Reach-1	251	(Ex) - Regional	34.15	200.40	201.58	201.30	201.66	0.006191	1.89	37.67	58.48	0.57
Reach-1	250	(Ex) - 2Y	1.91	199.70	199.98	199.98	200.06	0.030866	1.25	1.67	13.53	0.94
Reach-1	250	(Ex) - 5Y	4.19	199.70	200.13	200.13	200.21	0.015977	1.34	4.73	41.04	0.75
Reach-1	250	(Ex) - 10Y	6.84	199.70	200.22	200.22	200.30	0.014285	1.48	8.50	58.17	0.73
Reach-1	250	(Ex) - 25Y	9.09	199.70	200.29	200.26	200.36	0.010457	1.41	12.77	64.34	0.64
Reach-1	250	(Ex) - 50Y	11.48	199.70	200.36	200.30	200.42	0.008294	1.38	17.21	71.28	0.59
Reach-1	250	(Ex) - 100Y	13.95	199.70	200.42	200.33	200.48	0.007057	1.36	21.61	77.69	0.55
Reach-1	250	(Ex) - Regional	34.15	199.70	200.78	200.52	200.82	0.003896	1.37	62.83	183.65	0.44
Reach-1	249	(Ex) - 2Y	1.91	198.40	198.88	198.68	198.89	0.001886	0.55	5.83	26.96	0.27
Reach-1	249	(Ex) - 5Y	4.19	198.40	199.05	198.79	199.07	0.002250	0.75	9.97	33.09	0.31
Reach-1	249	(Ex) - 10Y	6.84	198.40	199.19	198.88	199.21	0.002524	0.91	13.93	38.02	0.34
Reach-1	249	(Ex) - 25Y	9.09	198.40	199.28	198.94	199.31	0.002687	1.02	16.96	41.38	0.36
Reach-1	249	(Ex) - 50Y	11.48	198.40	199.37	199.00	199.40	0.002874	1.12	19.85	44.63	0.37
Reach-1	249	(Ex) - 100Y	13.95	198.40	199.44	199.05	199.48	0.003022	1.21	22.70	47.68	0.39
Reach-1	249	(Ex) - Regional	34.15	198.40	199.86	199.38	199.92	0.003811	1.72	41.53	80.40	0.46
Reach-1	248.5	(Ex) - 2Y	1.91	198.10	198.33	198.33	198.40	0.031185	1.20	1.90	19.75	0.93
Reach-1	248.5	(Ex) - 5Y	4.19	198.10	198.43	198.43	198.53	0.025519	1.48	3.90	27.19	0.91
Reach-1	248.5	(Ex) - 10Y	6.84	198.10	198.51	198.51	198.63	0.023729	1.70	5.99	32.62	0.92
Reach-1	248.5	(Ex) - 25Y	9.09	198.10	198.57	198.57	198.70	0.023500	1.86	7.60	36.21	0.93
Reach-1	248.5	(Ex) - 50Y	11.48	198.10	198.62	198.62	198.76	0.022339	1.97	9.39	39.82	0.93
Reach-1	248.5	(Ex) - 100Y	13.95	198.10	198.67	198.67	198.82	0.021964	2.09	11.09	42.97	0.94
Reach-1	248.5	(Ex) - Regional	34.15	198.10	198.94	198.94	199.16	0.020946	2.71	23.20	58.70	0.98

Reach-1	248	(Ex) - 2Y	1.91	196.26	196.84	196.39	196.85	0.000280	0.26	7.36	15.22	0.11
Reach-1	248	(Ex) - 5Y	4.19	196.26	197.10	196.49	197.11	0.000394	0.39	10.63	16.38	0.14
Reach-1	248	(Ex) - 10Y	6.84	196.26	197.34	196.57	197.35	0.000463	0.50	13.59	17.77	0.15
Reach-1	248	(Ex) - 25Y	9.09	196.26	197.49	196.64	197.51	0.000533	0.59	15.46	19.74	0.17
Reach-1	248	(Ex) - 50Y	11.48	196.26	197.63	196.70	197.65	0.000588	0.66	17.27	21.80	0.18
Reach-1	248	(Ex) - 100Y	13.95	196.26	197.76	196.76	197.79	0.000638	0.74	18.94	24.26	0.19
Reach-1	248	(Ex) - Regional	34.15	196.26	198.54	197.17	198.61	0.000952	1.19	28.74	39.43	0.25
Reach-1	247.5		Culvert									
Reach-1	247	(Ex) - 2Y	2.15	195.95	196.84	196.09	196.84	0.000086	0.19	11.24	14.93	0.06
Reach-1	247	(Ex) - 5Y	4.51	195.95	197.10	196.18	197.11	0.000163	0.31	14.49	15.60	0.09
Reach-1	247	(Ex) - 10Y	7.62	195.95	197.33	196.28	197.34	0.000252	0.44	17.41	16.20	0.12
Reach-1	247	(Ex) - 25Y	10.06	195.95	197.48	196.35	197.49	0.000315	0.52	19.24	16.58	0.14
Reach-1	247	(Ex) - 50Y	12.79	195.95	197.62	196.42	197.64	0.000381	0.61	20.99	17.06	0.15
Reach-1	247	(Ex) - 100Y	15.67	195.95	197.74	196.49	197.77	0.000446	0.69	22.61	18.33	0.17
Reach-1	247	(Ex) - Regional	40.02	195.95	198.47	196.96	198.55	0.000934	1.26	31.79	25.29	0.25
Reach-1	246	(Ex) - 2Y	2.15	195.90	196.81	196.46	196.83	0.001895	0.62	4.19	13.01	0.26
Reach-1	246	(Ex) - 5Y	4.51	195.90	197.05	196.65	197.07	0.001985	0.80	7.77	16.51	0.29
Reach-1	246	(Ex) - 10Y	7.62	195.90	197.26	196.83	197.30	0.002098	0.97	11.53	18.38	0.31
Reach-1	246	(Ex) - 25Y	10.06	195.90	197.40	196.93	197.44	0.002174	1.07	14.11	19.55	0.32
Reach-1	246	(Ex) - 50Y	12.79	195.90	197.53	197.02	197.58	0.002255	1.17	16.73	20.69	0.33
Reach-1	246	(Ex) - 100Y	15.67	195.90	197.65	197.10	197.71	0.002337	1.26	19.29	21.76	0.34
Reach-1	246	(Ex) - Regional	40.02	195.90	198.35	197.59	198.46	0.002871	1.83	36.73	28.21	0.40
Reach-1	245.5	(Ex) - 2Y	2.15	195.50	196.41	196.19	196.46	0.004747	0.98	2.92	10.39	0.42
Reach-1	245.5	(Ex) - 5Y	4.51	195.50	196.66	196.43	196.71	0.004259	1.18	6.16	15.53	0.42
Reach-1	245.5	(Ex) - 10Y	7.62	195.50	196.87	196.61	196.93	0.004126	1.36	9.82	18.99	0.43
Reach-1	245.5	(Ex) - 25Y	10.06	195.50	197.00	196.70	197.07	0.004089	1.47	12.45	21.13	0.44
Reach-1	245.5	(Ex) - 50Y	12.79	195.50	197.13	196.79	197.20	0.004056	1.57	15.26	23.19	0.44
Reach-1	245.5	(Ex) - 100Y	15.67	195.50	197.25	196.87	197.33	0.004033	1.66	18.08	25.10	0.45
Reach-1	245.5	(Ex) - Regional	40.02	195.50	197.95	197.36	198.06	0.003579	2.05	39.20	47.09	0.45
Reach-1	245	(Ex) - 2Y	2.15	195.00	196.01	195.69	196.04	0.002902	0.84	3.47	11.56	0.34
Reach-1	245	(Ex) - 5Y	4.51	195.00	196.24	195.95	196.29	0.003201	1.08	6.87	17.35	0.37
Reach-1	245	(Ex) - 10Y	7.62	195.00	196.44	196.14	196.50	0.003383	1.28	10.56	19.97	0.40
Reach-1	245	(Ex) - 25Y	10.06	195.00	196.56	196.26	196.62	0.003505	1.40	13.09	21.58	0.41
Reach-1	245	(Ex) - 50Y	12.79	195.00	196.68	196.33	196.75	0.003587	1.51	15.73	23.03	0.42
Reach-1	245	(Ex) - 100Y	15.67	195.00	196.79	196.42	196.87	0.003659	1.61	18.34	24.33	0.43
Reach-1	245	(Ex) - Regional	40.02	195.00	197.45	196.88	197.57	0.004307	2.25	38.05	37.96	0.50
Reach-1	244	(Ex) - 2Y	2.15	194.40	194.89	194.89	195.01	0.033449	1.57	1.37	5.66	1.01
Reach-1	244	(Ex) - 5Y	4.51	194.40	195.05	195.05	195.22	0.030204	1.83	2.47	7.47	1.02
Reach-1	244	(Ex) - 10Y	7.62	194.40	195.20	195.20	195.42	0.027892	2.05	3.71	8.86	1.01
Reach-1	244	(Ex) - 25Y	10.06	194.40	195.30	195.30	195.54	0.026118	2.16	4.65	9.79	1.00
Reach-1	244	(Ex) - 50Y	12.79	194.40	195.40	195.40	195.66	0.025243	2.28	5.62	10.65	1.00
Reach-1	244	(Ex) - 100Y	15.67	194.40	195.49	195.49	195.77	0.024539	2.38	6.59	11.46	1.00
Reach-1	244	(Ex) - Regional	40.02	194.40	196.00	196.00	196.46	0.018284	3.00	14.21	18.84	0.95
Reach-1	243	(Ex) - 2Y	2.15	194.20	194.73		194.73	0.000024	0.07	31.64	63.96	0.03
Reach-1	243	(Ex) - 5Y	4.51	194.20	194.92		194.92	0.000038	0.10	43.71	67.29	0.04
Reach-1	243	(Ex) - 10Y	7.62	194.20	195.08		195.08	0.000053	0.14	55.25	70.48	0.05
Reach-1	243	(Ex) - 25Y	10.06	194.20	195.19		195.19	0.000063	0.16	62.69	72.46	0.06
Reach-1	243	(Ex) - 50Y	12.79	194.20	195.29		195.29	0.000073	0.18	70.01	74.35	0.06
Reach-1	243	(Ex) - 100Y	15.67	194.20	195.38		195.38	0.000083	0.20	76.90	76.09	0.06
Reach-1	243	(Ex) - Regional	40.02	194.20	195.92		195.92	0.000143	0.33	120.08	85.18	0.09
Reach-1	242	(Ex) - 2Y	2.15	194.20	194.73		194.73	0.000018	0.06	36.14	72.81	0.03
Reach-1	242	(Ex) - 5Y	4.51	194.20	194.91		194.91	0.000029	0.09	49.74	75.95	0.04
Reach-1	242	(Ex) - 10Y	7.62	194.20	195.08		195.08	0.000041	0.12	62.60	78.81	0.04
Reach-1	242	(Ex) - 25Y	10.06	194.20	195.18		195.18	0.000049	0.14	70.84	80.59	0.05
Reach-1	242	(Ex) - 50Y	12.79	194.20	195.28		195.28	0.000056	0.16	78.88	81.91	0.05
Reach-1	242	(Ex) - 100Y	15.67	194.20	195.37		195.37	0.000063	0.18	86.37	83.05	0.06
Reach-1	242	(Ex) - Regional	40.02	194.20	195.90		195.91	0.000111	0.30	132.35	89.96	0.08
Reach-1	241	(Ex) - 2Y	2.15	194.20	194.61	194.61	194.72	0.034916	1.44	1.49	7.24	1.01
Reach-1	241	(Ex) - 5Y	4.51	194.20	194.75	194.75	194.90	0.031595	1.67	2.70	9.74	1.01
Reach-1	241	(Ex) - 10Y	7.62	194.20	194.88	194.88	195.06	0.029340	1.85	4.11	12.03	1.01
Reach-1	241	(Ex) - 25Y	10.06	194.20	194.96	194.96	195.16	0.028328	1.96	5.13	13.44	1.01
Reach-1	241	(Ex) - 50Y	12.79	194.20	195.04	195.04	195.26	0.027478	2.06	6.22	14.79	1.01
Reach-1	241	(Ex) - 100Y	15.67	194.20	195.12	195.12	195.35	0.026034	2.12	7.39	16.12	1.00

Reach-1	241	(Ex) - Regional	40.02	194.20	195.53	195.53	195.87	0.023082	2.56	15.61	23.43	1.00
Reach-1	240	(Ex) - 2Y	2.15	194.00	194.60	194.04	194.60	0.000006	0.04	57.43	99.76	0.02
Reach-1	240	(Ex) - 5Y	4.51	194.00	194.72	194.06	194.72	0.000014	0.06	69.68	101.22	0.02
Reach-1	240	(Ex) - 10Y	7.62	194.00	194.83	194.09	194.83	0.000024	0.09	81.36	102.59	0.03
Reach-1	240	(Ex) - 25Y	10.06	194.00	194.91	194.10	194.91	0.000032	0.11	88.87	103.44	0.04
Reach-1	240	(Ex) - 50Y	12.79	194.00	194.98	194.13	194.98	0.000040	0.13	96.24	104.03	0.04
Reach-1	240	(Ex) - 100Y	15.67	194.00	195.05	194.14	195.05	0.000048	0.15	103.30	104.60	0.05
Reach-1	240	(Ex) - Regional	40.02	194.00	195.48	194.26	195.48	0.000095	0.27	149.50	108.21	0.07
Reach-1	239	(Ex) - 2Y	2.15	194.00	194.60		194.60	0.000005	0.03	64.91	111.91	0.01
Reach-1	239	(Ex) - 5Y	4.51	194.00	194.72		194.72	0.000011	0.06	78.48	113.04	0.02
Reach-1	239	(Ex) - 10Y	7.62	194.00	194.83		194.83	0.000019	0.08	91.32	114.09	0.03
Reach-1	239	(Ex) - 25Y	10.06	194.00	194.90		194.90	0.000025	0.10	99.53	114.76	0.03
Reach-1	239	(Ex) - 50Y	12.79	194.00	194.97		194.97	0.000032	0.12	107.58	115.41	0.04
Reach-1	239	(Ex) - 100Y	15.67	194.00	195.04		195.04	0.000038	0.14	115.27	116.03	0.04
Reach-1	239	(Ex) - Regional	40.02	194.00	195.47		195.47	0.000077	0.24	165.68	119.90	0.07
Reach-1	238	(Ex) - 2Y	2.15	194.00	194.60		194.60	0.000001	0.02	117.51	199.14	0.01
Reach-1	238	(Ex) - 5Y	4.51	194.00	194.72		194.72	0.000003	0.03	141.58	199.90	0.01
Reach-1	238	(Ex) - 10Y	7.62	194.00	194.83		194.83	0.000006	0.05	164.20	200.61	0.02
Reach-1	238	(Ex) - 25Y	10.06	194.00	194.90		194.90	0.000008	0.06	178.61	201.06	0.02
Reach-1	238	(Ex) - 50Y	12.79	194.00	194.97		194.97	0.000009	0.07	192.68	201.50	0.02
Reach-1	238	(Ex) - 100Y	15.67	194.00	195.04		195.04	0.000011	0.08	206.08	201.92	0.02
Reach-1	238	(Ex) - Regional	40.02	194.00	195.47		195.47	0.000023	0.14	292.96	204.61	0.04
Reach-1	237	(Ex) - 2Y	2.15	194.00	194.60	194.02	194.60	0.000001	0.02	116.29	197.82	0.01
Reach-1	237	(Ex) - 5Y	4.51	194.00	194.72	194.04	194.72	0.000003	0.03	140.16	198.92	0.01
Reach-1	237	(Ex) - 10Y	7.62	194.00	194.83	194.05	194.83	0.000006	0.05	162.63	199.94	0.02
Reach-1	237	(Ex) - 25Y	10.06	194.00	194.90	194.06	194.90	0.000008	0.06	176.94	200.59	0.02
Reach-1	237	(Ex) - 50Y	12.79	194.00	194.97	194.08	194.97	0.000010	0.07	190.93	201.23	0.02
Reach-1	237	(Ex) - 100Y	15.67	194.00	195.04	194.09	195.04	0.000012	0.08	204.27	201.90	0.02
Reach-1	237	(Ex) - Regional	40.02	194.00	195.46	194.16	195.46	0.000024	0.14	291.20	206.58	0.04
Reach-1	236	(Ex) - 2Y	2.15	194.30	194.52	194.52	194.59	0.038617	1.14	1.89	14.15	1.00
Reach-1	236	(Ex) - 5Y	4.51	194.30	194.61	194.61	194.71	0.034728	1.35	3.33	17.99	1.00
Reach-1	236	(Ex) - 10Y	7.62	194.30	194.70	194.70	194.82	0.031974	1.51	5.04	22.38	1.00
Reach-1	236	(Ex) - 25Y	10.06	194.30	194.75	194.75	194.89	0.030841	1.62	6.21	24.70	1.00
Reach-1	236	(Ex) - 50Y	12.79	194.30	194.80	194.80	194.95	0.029687	1.71	7.46	26.89	1.00
Reach-1	236	(Ex) - 100Y	15.67	194.30	194.85	194.85	195.02	0.027613	1.80	8.72	28.13	0.98
Reach-1	236	(Ex) - Regional	40.02	194.30	195.16	195.16	195.43	0.022178	2.34	17.59	39.83	0.97
Reach-1	235	(Ex) - 2Y	2.59	193.20	193.72	193.54	193.73	0.003794	0.55	4.68	18.17	0.35
Reach-1	235	(Ex) - 5Y	5.06	193.20	193.83	193.64	193.85	0.004958	0.73	6.91	21.91	0.41
Reach-1	235	(Ex) - 10Y	8.20	193.20	193.89	193.74	193.94	0.007532	0.99	8.31	23.68	0.52
Reach-1	235	(Ex) - 25Y	10.89	193.20	193.93	193.80	194.00	0.009272	1.18	9.34	24.85	0.59
Reach-1	235	(Ex) - 50Y	13.72	193.20	193.97	193.85	194.06	0.010699	1.35	10.38	25.94	0.64
Reach-1	235	(Ex) - 100Y	16.73	193.20	194.00	193.91	194.12	0.012550	1.53	11.24	26.82	0.70
Reach-1	235	(Ex) - Regional	46.48	193.20	194.65	194.29	194.78	0.004786	1.66	35.16	50.11	0.50
Reach-1	234	(Ex) - 2Y	2.59	191.80	192.17	192.17	192.26	0.034915	1.37	1.89	9.88	1.00
Reach-1	234	(Ex) - 5Y	5.06	191.80	192.34	192.29	192.42	0.017078	1.28	3.97	14.41	0.75
Reach-1	234	(Ex) - 10Y	8.20	191.80	192.54	192.39	192.61	0.008111	1.19	7.35	19.30	0.56
Reach-1	234	(Ex) - 25Y	10.89	191.80	192.66	192.46	192.73	0.006119	1.21	9.95	22.12	0.51
Reach-1	234	(Ex) - 50Y	13.72	191.80	192.78	192.52	192.86	0.005019	1.24	12.74	24.79	0.47
Reach-1	234	(Ex) - 100Y	16.73	191.80	192.89	192.59	192.96	0.004215	1.25	17.03	32.93	0.44
Reach-1	234	(Ex) - Regional	46.48	191.80	193.04	193.04	193.38	0.016498	2.77	22.22	35.07	0.90
Reach-1	233	(Ex) - 2Y	2.59	190.30	190.99	190.69	191.01	0.002067	0.56	4.66	11.78	0.28
Reach-1	233	(Ex) - 5Y	5.06	190.30	191.12	190.83	191.15	0.003223	0.83	6.31	14.54	0.36
Reach-1	233	(Ex) - 10Y	8.20	190.30	191.18	190.96	191.26	0.005740	1.20	7.29	15.96	0.49
Reach-1	233	(Ex) - 25Y	10.89	190.30	191.22	191.04	191.33	0.008059	1.48	7.95	16.81	0.59
Reach-1	233	(Ex) - 50Y	13.72	190.30	191.25	191.12	191.41	0.011173	1.79	8.38	17.31	0.70
Reach-1	233	(Ex) - 100Y	16.73	190.30	191.26	191.21	191.49	0.015477	2.13	8.62	17.57	0.82
Reach-1	233	(Ex) - Regional	46.48	190.30	191.60	191.60	191.61	0.001705	0.92	145.08	368.48	0.29
Reach-1	232	(Ex) - 2Y	2.59	189.90	190.63	190.39	190.65	0.003873	0.70	4.52	47.72	0.37
Reach-1	232	(Ex) - 5Y	5.06	189.90	190.78	190.54	190.80	0.002279	0.64	16.55	103.57	0.30
Reach-1	232	(Ex) - 10Y	8.20	189.90	190.91	190.73	190.91	0.001356	0.58	40.87	247.57	0.24
Reach-1	232	(Ex) - 25Y	10.89	189.90	190.95	190.77	190.96	0.001265	0.59	52.96	256.18	0.23
Reach-1	232	(Ex) - 50Y	13.72	189.90	191.00	190.80	191.01	0.001172	0.59	65.87	273.76	0.23
Reach-1	232	(Ex) - 100Y	16.73	189.90	191.04	190.80	191.05	0.001139	0.61	77.19	281.20	0.23

Reach-1	232	(Ex) - Regional	46.48	189.90	191.38	190.99	191.39	0.000777	0.64	184.78	346.99	0.20
Reach-1	231	(Ex) - 2Y	2.59	189.50	190.31	189.98	190.32	0.001977	0.56	4.64	11.35	0.27
Reach-1	231	(Ex) - 5Y	5.06	189.50	190.52	190.13	190.55	0.001882	0.72	7.44	14.29	0.28
Reach-1	231	(Ex) - 10Y	8.20	189.50	190.70	190.26	190.73	0.001722	0.81	20.51	201.82	0.28
Reach-1	231	(Ex) - 25Y	10.89	189.50	190.79	190.35	190.81	0.001321	0.76	38.27	217.07	0.25
Reach-1	231	(Ex) - 50Y	13.72	189.50	190.86	190.44	190.88	0.001102	0.73	56.97	275.23	0.23
Reach-1	231	(Ex) - 100Y	16.73	189.50	190.91	190.51	190.93	0.000995	0.72	71.71	282.35	0.22
Reach-1	231	(Ex) - Regional	46.48	189.50	191.30	190.91	191.31	0.000599	0.69	193.40	347.23	0.18
Reach-1	230	(Ex) - 2Y	2.59	189.20	190.03	189.73	190.05	0.002645	0.61	4.23	10.62	0.31
Reach-1	230	(Ex) - 5Y	5.06	189.20	190.26	189.89	190.29	0.002607	0.72	7.04	13.77	0.32
Reach-1	230	(Ex) - 10Y	8.20	189.20	190.44	190.03	190.48	0.002785	0.83	10.79	27.32	0.34
Reach-1	230	(Ex) - 25Y	10.89	189.20	190.55	190.12	190.59	0.002960	0.91	14.00	36.70	0.36
Reach-1	230	(Ex) - 50Y	13.72	189.20	190.62	190.21	190.66	0.003325	1.01	17.44	82.17	0.38
Reach-1	230	(Ex) - 100Y	16.73	189.20	190.67	190.29	190.72	0.003759	1.10	21.68	89.32	0.41
Reach-1	230	(Ex) - Regional	46.48	189.20	191.20	190.87	191.22	0.000984	0.81	146.76	323.91	0.23
Reach-1	229	(Ex) - 2Y	2.59	188.60	189.47		189.49	0.001933	0.56	4.71	12.48	0.27
Reach-1	229	(Ex) - 5Y	5.06	188.60	189.68		189.70	0.002118	0.69	8.10	20.25	0.29
Reach-1	229	(Ex) - 10Y	8.20	188.60	189.86		189.89	0.002008	0.81	13.45	48.22	0.30
Reach-1	229	(Ex) - 25Y	10.89	188.60	189.97		190.00	0.001910	0.86	22.02	107.11	0.30
Reach-1	229	(Ex) - 50Y	13.72	188.60	190.05		190.08	0.001693	0.86	34.37	172.06	0.29
Reach-1	229	(Ex) - 100Y	16.73	188.60	190.13		190.15	0.001473	0.85	49.02	209.97	0.27
Reach-1	229	(Ex) - Regional	46.48	188.60	191.16		191.16	0.000088	0.33	380.42	421.20	0.07
Reach-1	228	(Ex) - 2Y	2.59	188.50	189.23		189.25	0.002394	0.59	4.46	12.17	0.30
Reach-1	228	(Ex) - 5Y	5.06	188.50	189.42		189.45	0.002390	0.76	7.11	15.39	0.32
Reach-1	228	(Ex) - 10Y	8.20	188.50	189.61		189.65	0.002369	0.91	11.20	37.10	0.33
Reach-1	228	(Ex) - 25Y	10.89	188.50	189.70		189.75	0.002540	1.02	15.55	55.83	0.35
Reach-1	228	(Ex) - 50Y	13.72	188.50	189.82		189.86	0.002255	1.04	22.88	77.63	0.33
Reach-1	228	(Ex) - 100Y	16.73	188.50	189.93		189.97	0.001859	1.02	33.01	100.17	0.31
Reach-1	228	(Ex) - Regional	46.48	188.50	191.15		191.16	0.000059	0.30	412.82	390.12	0.06
Reach-1	227	(Ex) - 2Y	2.59	188.10	188.72	188.55	188.75	0.005803	0.78	3.31	10.62	0.44
Reach-1	227	(Ex) - 5Y	5.06	188.10	188.84	188.69	188.90	0.007470	1.09	4.73	12.54	0.53
Reach-1	227	(Ex) - 10Y	8.20	188.10	188.94		189.04	0.009744	1.43	6.03	14.10	0.63
Reach-1	227	(Ex) - 25Y	10.89	188.10	189.12		189.21	0.006366	1.40	8.74	17.27	0.53
Reach-1	227	(Ex) - 50Y	13.72	188.10	189.56		189.60	0.001538	0.95	21.07	44.03	0.28
Reach-1	227	(Ex) - 100Y	16.73	188.10	189.72		189.75	0.001304	0.95	28.74	56.11	0.27
Reach-1	227	(Ex) - Regional	46.48	188.10	191.15		191.15	0.000047	0.30	449.55	402.81	0.06
Reach-1	226	(Ex) - 2Y	2.59	187.80	188.20		188.22	0.004048	0.67	4.48	19.67	0.37
Reach-1	226	(Ex) - 5Y	5.06	187.80	188.38		188.41	0.002896	0.77	8.48	23.31	0.34
Reach-1	226	(Ex) - 10Y	8.20	187.80	188.66		188.68	0.001471	0.73	15.58	27.53	0.26
Reach-1	226	(Ex) - 25Y	10.89	187.80	189.01		189.02	0.000658	0.62	25.94	38.31	0.19
Reach-1	226	(Ex) - 50Y	13.72	187.80	189.54		189.55	0.000191	0.43	62.85	97.94	0.11
Reach-1	226	(Ex) - 100Y	16.73	187.80	189.69		189.70	0.000182	0.45	79.09	112.61	0.11
Reach-1	226	(Ex) - Regional	46.48	187.80	191.14		191.14	0.000027	0.25	513.67	373.57	0.04
Reach-1	225	(Ex) - 2Y	2.59	187.30	187.91		187.92	0.000767	0.36	8.91	29.47	0.17
Reach-1	225	(Ex) - 5Y	5.06	187.30	188.24		188.25	0.000350	0.35	19.91	37.36	0.13
Reach-1	225	(Ex) - 10Y	8.20	187.30	188.58		188.58	0.000227	0.36	33.92	45.36	0.11
Reach-1	225	(Ex) - 25Y	10.89	187.30	188.97		188.97	0.000123	0.32	53.39	59.74	0.08
Reach-1	225	(Ex) - 50Y	13.72	187.30	189.53		189.53	0.000050	0.25	97.94	105.27	0.06
Reach-1	225	(Ex) - 100Y	16.73	187.30	189.68		189.68	0.000053	0.27	116.62	138.31	0.06
Reach-1	225	(Ex) - Regional	46.48	187.30	191.14		191.14	0.000016	0.21	561.81	334.82	0.04
Reach-1	224	(Ex) - 2Y	6.67	187.03	187.82	187.50	187.83	0.000582	0.45	35.47	89.17	0.16
Reach-1	224	(Ex) - 5Y	16.12	187.03	188.18	187.65	188.19	0.000458	0.51	68.99	97.23	0.15
Reach-1	224	(Ex) - 10Y	26.72	187.03	188.53	187.72	188.54	0.000367	0.55	104.09	105.21	0.14
Reach-1	224	(Ex) - 25Y	35.64	187.03	188.94	187.78	188.94	0.000242	0.52	152.34	127.95	0.12
Reach-1	224	(Ex) - 50Y	44.65	187.03	189.51	187.82	189.51	0.000114	0.43	240.49	178.61	0.09
Reach-1	224	(Ex) - 100Y	54.81	187.03	189.66	187.87	189.67	0.000129	0.48	268.32	192.29	0.09
Reach-1	224	(Ex) - Regional	158.24	187.03	191.13	188.24	191.13	0.000133	0.65	679.91	372.26	0.10
Reach-1	223	(Ex) - 2Y	6.67	186.81	187.62	187.27	187.64	0.001845	0.63	10.65	20.04	0.27
Reach-1	223	(Ex) - 5Y	16.12	186.81	187.98	187.48	188.02	0.002002	0.89	18.04	22.06	0.31
Reach-1	223	(Ex) - 10Y	26.72	186.81	188.34	187.65	188.40	0.001681	1.04	25.74	24.18	0.30
Reach-1	223	(Ex) - 25Y	35.64	186.81	188.79	187.77	188.85	0.001049	1.01	35.24	26.36	0.25
Reach-1	223	(Ex) - 50Y	44.65	186.81	189.42	187.88	189.47	0.000570	0.92	48.45	35.83	0.19
Reach-1	223	(Ex) - 100Y	54.81	186.81	189.55	188.00	189.61	0.000717	1.07	51.15	43.21	0.22

Reach-1	223	(Ex) - Regional	158.24	186.81	190.96	188.91	191.07	0.000885	1.57	193.06	216.00	0.26
Reach-1	222.5		Bridge									
Reach-1	222	(Ex) - 2Y	6.67	186.60	187.52		187.54	0.001231	0.57	11.75	50.75	0.23
Reach-1	222	(Ex) - 5Y	16.12	186.60	187.85		187.89	0.001896	0.88	18.30	57.16	0.30
Reach-1	222	(Ex) - 10Y	26.72	186.60	188.23		188.28	0.001563	1.02	26.26	64.64	0.29
Reach-1	222	(Ex) - 25Y	35.64	186.60	188.72		188.77	0.000919	0.97	36.60	72.55	0.24
Reach-1	222	(Ex) - 50Y	44.65	186.60	189.38		189.42	0.000495	0.89	50.45	83.90	0.18
Reach-1	222	(Ex) - 100Y	54.81	186.60	189.49		189.55	0.000638	1.04	52.87	85.93	0.21
Reach-1	222	(Ex) - Regional	158.24	186.60	190.04	188.77	190.35	0.002755	2.46	64.40	170.61	0.45
Reach-1	221	(Ex) - 2Y	6.67	186.20	187.47		187.48	0.000447	0.51	25.33	42.24	0.15
Reach-1	221	(Ex) - 5Y	16.12	186.20	187.75		187.77	0.000894	0.83	38.07	47.12	0.22
Reach-1	221	(Ex) - 10Y	26.72	186.20	188.15		188.17	0.000761	0.91	57.87	51.30	0.22
Reach-1	221	(Ex) - 25Y	35.64	186.20	188.68		188.70	0.000433	0.81	86.54	56.64	0.17
Reach-1	221	(Ex) - 50Y	44.65	186.20	189.37		189.38	0.000228	0.70	127.88	67.46	0.13
Reach-1	221	(Ex) - 100Y	54.81	186.20	189.48		189.49	0.000292	0.81	136.06	77.62	0.15
Reach-1	221	(Ex) - Regional	158.24	186.20	190.02		190.08	0.001179	1.81	189.17	116.20	0.30
Reach-1	220	(Ex) - 2Y	6.67	186.20	187.44		187.44	0.000505	0.53	28.26	54.78	0.16
Reach-1	220	(Ex) - 5Y	16.12	186.20	187.69		187.71	0.000966	0.84	43.25	62.42	0.23
Reach-1	220	(Ex) - 10Y	26.72	186.20	188.11		188.12	0.000644	0.82	70.61	67.17	0.20
Reach-1	220	(Ex) - 25Y	35.64	186.20	188.66		188.67	0.000316	0.69	109.36	72.90	0.14
Reach-1	220	(Ex) - 50Y	44.65	186.20	189.36		189.36	0.000158	0.58	162.15	81.60	0.11
Reach-1	220	(Ex) - 100Y	54.81	186.20	189.47		189.47	0.000206	0.68	171.37	85.19	0.12
Reach-1	220	(Ex) - Regional	158.24	186.20	189.97		190.01	0.000895	1.56	217.70	108.96	0.26
Reach-1	219	(Ex) - 2Y	6.67	186.20	187.41		187.41	0.000103	0.23	74.03	148.41	0.07
Reach-1	219	(Ex) - 5Y	16.12	186.20	187.65		187.65	0.000185	0.36	109.15	152.24	0.10
Reach-1	219	(Ex) - 10Y	26.72	186.20	188.09		188.09	0.000112	0.34	177.32	157.75	0.08
Reach-1	219	(Ex) - 25Y	35.64	186.20	188.65		188.65	0.000054	0.28	268.71	164.55	0.06
Reach-1	219	(Ex) - 50Y	44.65	186.20	189.35		189.35	0.000027	0.24	398.08	235.41	0.04
Reach-1	219	(Ex) - 100Y	54.81	186.20	189.46		189.46	0.000034	0.28	424.52	247.69	0.05
Reach-1	219	(Ex) - Regional	158.24	186.20	189.94		189.94	0.000196	0.73	560.93	296.68	0.12
Reach-1	218	(Ex) - 2Y	6.67	186.20	187.40		187.40	0.000084	0.21	85.82	179.91	0.07
Reach-1	218	(Ex) - 5Y	16.12	186.20	187.62		187.63	0.000148	0.32	126.42	183.06	0.09
Reach-1	218	(Ex) - 10Y	26.72	186.20	188.07		188.07	0.000082	0.29	210.08	189.39	0.07
Reach-1	218	(Ex) - 25Y	35.64	186.20	188.65		188.65	0.000038	0.24	321.48	206.55	0.05
Reach-1	218	(Ex) - 50Y	44.65	186.20	189.35		189.35	0.000022	0.22	531.26	331.92	0.04
Reach-1	218	(Ex) - 100Y	54.81	186.20	189.46		189.46	0.000027	0.25	567.47	335.73	0.04
Reach-1	218	(Ex) - Regional	158.24	186.20	189.92		189.92	0.000112	0.55	728.10	361.54	0.09
Reach-1	217	(Ex) - 2Y	6.67	186.20	187.40		187.40	0.000047	0.16	105.64	189.70	0.05
Reach-1	217	(Ex) - 5Y	16.12	186.20	187.62		187.62	0.000096	0.25	148.04	193.18	0.07
Reach-1	217	(Ex) - 10Y	26.72	186.20	188.07		188.07	0.000060	0.25	236.77	200.29	0.06
Reach-1	217	(Ex) - 25Y	35.64	186.20	188.65		188.65	0.000031	0.21	366.04	262.74	0.04
Reach-1	217	(Ex) - 50Y	44.65	186.20	189.35		189.35	0.000017	0.19	577.47	340.21	0.03
Reach-1	217	(Ex) - 100Y	54.81	186.20	189.46		189.46	0.000021	0.22	614.87	349.82	0.04
Reach-1	217	(Ex) - Regional	158.24	186.20	189.91		189.92	0.000096	0.50	790.07	404.77	0.09
Reach-1	216	(Ex) - 2Y	6.67	186.10	187.39		187.39	0.000032	0.14	112.77	161.45	0.04
Reach-1	216	(Ex) - 5Y	16.12	186.10	187.61		187.61	0.000080	0.24	148.14	168.09	0.07
Reach-1	216	(Ex) - 10Y	26.72	186.10	188.06		188.06	0.000060	0.25	227.86	182.81	0.06
Reach-1	216	(Ex) - 25Y	35.64	186.10	188.64		188.64	0.000033	0.23	353.04	229.97	0.05
Reach-1	216	(Ex) - 50Y	44.65	186.10	189.35		189.35	0.000017	0.20	575.54	352.67	0.04
Reach-1	216	(Ex) - 100Y	54.81	186.10	189.45		189.45	0.000021	0.22	613.92	358.54	0.04
Reach-1	216	(Ex) - Regional	158.24	186.10	189.90		189.90	0.000094	0.51	782.62	391.03	0.09
Reach-1	215	(Ex) - 2Y	7.53	186.00	187.39		187.39	0.000013	0.09	175.75	200.05	0.03
Reach-1	215	(Ex) - 5Y	17.50	186.00	187.60		187.60	0.000037	0.17	221.13	222.21	0.05
Reach-1	215	(Ex) - 10Y	31.27	186.00	188.06		188.06	0.000036	0.20	327.62	243.20	0.05
Reach-1	215	(Ex) - 25Y	42.17	186.00	188.64		188.64	0.000021	0.19	471.41	249.88	0.04
Reach-1	215	(Ex) - 50Y	53.27	186.00	189.34		189.34	0.000012	0.17	650.66	259.51	0.03
Reach-1	215	(Ex) - 100Y	65.78	186.00	189.45		189.45	0.000016	0.20	678.58	261.46	0.03
Reach-1	215	(Ex) - Regional	200.73	186.00	189.88		189.89	0.000140	0.63	831.72	419.40	0.10
Reach-1	214	(Ex) - 2Y	7.53	186.00	187.39		187.39	0.000009	0.07	214.78	251.79	0.02
Reach-1	214	(Ex) - 5Y	17.50	186.00	187.60		187.60	0.000023	0.13	268.05	257.49	0.04
Reach-1	214	(Ex) - 10Y	31.27	186.00	188.05		188.05	0.000023	0.16	387.38	266.31	0.04
Reach-1	214	(Ex) - 25Y	42.17	186.00	188.64		188.64	0.000015	0.15	548.35	285.94	0.03

Reach-1	214	(Ex) - 50Y	53.27	186.00	189.34		189.34	0.000009	0.14	758.98	314.40	0.03
Reach-1	214	(Ex) - 100Y	65.78	186.00	189.45		189.45	0.000012	0.17	793.23	330.09	0.03
Reach-1	214	(Ex) - Regional	200.73	186.00	189.87		189.88	0.000085	0.48	961.15	420.41	0.08
Reach-1	213	(Ex) - 2Y	7.53	186.00	187.39		187.39	0.000004	0.05	275.57	262.74	0.02
Reach-1	213	(Ex) - 5Y	17.50	186.00	187.60		187.60	0.000013	0.10	330.18	264.69	0.03
Reach-1	213	(Ex) - 10Y	31.27	186.00	188.05		188.05	0.000015	0.13	451.71	268.83	0.03
Reach-1	213	(Ex) - 25Y	42.17	186.00	188.63		188.64	0.000010	0.13	610.09	273.84	0.03
Reach-1	213	(Ex) - 50Y	53.27	186.00	189.34		189.34	0.000009	0.14	822.11	387.54	0.03
Reach-1	213	(Ex) - 100Y	65.78	186.00	189.45		189.45	0.000012	0.17	863.81	395.57	0.03
Reach-1	213	(Ex) - Regional	200.73	186.00	189.86		189.87	0.000074	0.45	1039.68	452.84	0.08
Reach-1	212	(Ex) - 2Y	7.53	186.00	187.39		187.39	0.000006	0.06	242.59	255.49	0.02
Reach-1	212	(Ex) - 5Y	17.50	186.00	187.59		187.59	0.000017	0.12	295.54	257.66	0.03
Reach-1	212	(Ex) - 10Y	31.27	186.00	188.05		188.05	0.000019	0.15	413.61	260.95	0.03
Reach-1	212	(Ex) - 25Y	42.17	186.00	188.63		188.63	0.000012	0.14	567.33	265.33	0.03
Reach-1	212	(Ex) - 50Y	53.27	186.00	189.34		189.34	0.000008	0.13	757.09	271.79	0.02
Reach-1	212	(Ex) - 100Y	65.78	186.00	189.45		189.45	0.000011	0.16	786.08	274.03	0.03
Reach-1	212	(Ex) - Regional	200.73	186.00	189.86		189.86	0.000065	0.43	900.08	282.67	0.07
Reach-1	211	(Ex) - 2Y	7.53	185.99	187.39		187.39	0.000006	0.06	252.96	256.39	0.02
Reach-1	211	(Ex) - 5Y	17.50	185.99	187.59		187.59	0.000016	0.11	305.73	257.76	0.03
Reach-1	211	(Ex) - 10Y	31.27	185.99	188.05		188.05	0.000018	0.14	423.77	260.80	0.03
Reach-1	211	(Ex) - 25Y	42.17	185.99	188.63		188.63	0.000012	0.14	577.42	264.86	0.03
Reach-1	211	(Ex) - 50Y	53.27	185.99	189.34		189.34	0.000008	0.13	767.75	273.52	0.02
Reach-1	211	(Ex) - 100Y	65.78	185.99	189.45		189.45	0.000010	0.16	796.81	275.01	0.03
Reach-1	211	(Ex) - Regional	200.73	185.99	189.85		189.85	0.000063	0.42	909.47	281.88	0.07
Reach-1	210	(Ex) - 2Y	7.53	185.90	187.39		187.39	0.000039	0.16	88.24	85.54	0.05
Reach-1	210	(Ex) - 5Y	17.50	185.90	187.59		187.59	0.000121	0.32	105.60	87.45	0.08
Reach-1	210	(Ex) - 10Y	31.27	185.90	188.04		188.04	0.000141	0.41	146.25	92.07	0.09
Reach-1	210	(Ex) - 25Y	42.17	185.90	188.63		188.63	0.000118	0.44	221.20	161.93	0.09
Reach-1	210	(Ex) - 50Y	53.27	185.90	189.34		189.34	0.000055	0.36	375.47	237.82	0.06
Reach-1	210	(Ex) - 100Y	65.78	185.90	189.44		189.44	0.000070	0.41	400.61	244.30	0.07
Reach-1	210	(Ex) - Regional	200.73	185.90	189.82		189.83	0.000383	1.04	501.77	281.10	0.17
Reach-1	209	(Ex) - 2Y	7.73	185.80	187.38		187.38	0.000040	0.17	89.33	85.75	0.05
Reach-1	209	(Ex) - 5Y	17.80	185.80	187.58		187.58	0.000122	0.32	106.24	87.35	0.08
Reach-1	209	(Ex) - 10Y	31.76	185.80	188.03		188.03	0.000143	0.41	146.64	91.64	0.09
Reach-1	209	(Ex) - 25Y	42.70	185.80	188.62		188.62	0.000137	0.48	207.96	156.10	0.10
Reach-1	209	(Ex) - 50Y	54.07	185.80	189.33		189.33	0.000067	0.40	339.46	214.31	0.07
Reach-1	209	(Ex) - 100Y	66.78	185.80	189.44		189.44	0.000087	0.46	362.04	221.21	0.08
Reach-1	209	(Ex) - Regional	205.61	185.80	189.79		189.81	0.000478	1.16	442.54	232.94	0.19
Reach-1	208	(Ex) - 2Y	7.73	185.71	187.38		187.38	0.000041	0.17	87.36	83.48	0.05
Reach-1	208	(Ex) - 5Y	17.80	185.71	187.57		187.57	0.000128	0.33	103.35	84.88	0.09
Reach-1	208	(Ex) - 10Y	31.76	185.71	188.02		188.02	0.000150	0.43	142.36	88.21	0.10
Reach-1	208	(Ex) - 25Y	42.70	185.71	188.61		188.61	0.000102	0.42	196.88	130.08	0.08
Reach-1	208	(Ex) - 50Y	54.07	185.71	189.33		189.33	0.000076	0.42	357.78	316.14	0.07
Reach-1	208	(Ex) - 100Y	66.78	185.71	189.43		189.43	0.000095	0.48	391.01	332.72	0.08
Reach-1	208	(Ex) - Regional	205.61	185.71	189.76		189.78	0.000479	1.15	506.75	361.71	0.19
Reach-1	207.7	(Ex) - 2Y	7.73	185.42	187.38		187.38	0.000059	0.22	70.99	67.91	0.06
Reach-1	207.7	(Ex) - 5Y	17.80	185.42	187.57		187.57	0.000187	0.42	83.82	69.35	0.10
Reach-1	207.7	(Ex) - 10Y	31.76	185.42	188.02		188.02	0.000222	0.53	115.77	72.81	0.12
Reach-1	207.7	(Ex) - 25Y	42.70	185.42	188.61		188.61	0.000150	0.51	160.12	77.43	0.10
Reach-1	207.7	(Ex) - 50Y	54.07	185.42	189.33		189.33	0.000080	0.44	290.63	252.35	0.08
Reach-1	207.7	(Ex) - 100Y	66.78	185.42	189.43		189.43	0.000104	0.51	317.01	267.19	0.09
Reach-1	207.7	(Ex) - Regional	205.61	185.42	189.73		189.76	0.000783	1.48	406.55	310.92	0.24
Reach-1	207.3	(Ex) - 2Y	7.73	185.14	187.38		187.38	0.000079	0.26	58.72	55.08	0.06
Reach-1	207.3	(Ex) - 5Y	17.80	185.14	187.56		187.56	0.000258	0.50	68.81	56.18	0.12
Reach-1	207.3	(Ex) - 10Y	31.76	185.14	188.01		188.01	0.000315	0.64	94.52	58.87	0.14
Reach-1	207.3	(Ex) - 25Y	42.70	185.14	188.60		188.61	0.000216	0.62	130.50	62.44	0.12
Reach-1	207.3	(Ex) - 50Y	54.07	185.14	189.32		189.33	0.000126	0.55	228.25	285.20	0.09
Reach-1	207.3	(Ex) - 100Y	66.78	185.14	189.42		189.43	0.000162	0.63	257.74	305.26	0.11
Reach-1	207.3	(Ex) - Regional	205.61	185.14	189.70		189.74	0.000925	1.59	355.76	380.42	0.25
Reach-1	207	(Ex) - 2Y	7.73	184.85	187.38	185.38	187.38	0.000009	0.09	84.58	51.36	0.02
Reach-1	207	(Ex) - 5Y	17.80	184.85	187.56	185.59	187.56	0.000033	0.19	93.90	52.25	0.04
Reach-1	207	(Ex) - 10Y	31.76	184.85	188.01	185.79	188.01	0.000053	0.27	117.28	55.12	0.06
Reach-1	207	(Ex) - 25Y	42.70	184.85	188.60	185.91	188.60	0.000045	0.29	149.49	58.89	0.06

Reach-1	207	(Ex) - 50Y	54.07	184.85	189.32	186.06	189.32	0.000034	0.28	190.47	63.92	0.05
Reach-1	207	(Ex) - 100Y	66.78	184.85	189.42	186.16	189.42	0.000048	0.34	196.27	64.76	0.06
Reach-1	207	(Ex) - Regional	205.61	184.85	189.68	186.88	189.72	0.000353	0.97	211.29	66.72	0.16
Reach-1	206.5		Bridge									
Reach-1	206	(Ex) - 2Y	7.73	184.85	187.38		187.38	0.000011	0.10	75.98	45.85	0.03
Reach-1	206	(Ex) - 5Y	17.80	184.85	187.56		187.56	0.000042	0.21	84.32	47.22	0.05
Reach-1	206	(Ex) - 10Y	31.76	184.85	188.00		188.00	0.000070	0.30	106.22	51.30	0.07
Reach-1	206	(Ex) - 25Y	42.70	184.85	188.59		188.60	0.000059	0.31	138.30	56.45	0.06
Reach-1	206	(Ex) - 50Y	54.07	184.85	189.32		189.32	0.000040	0.30	179.69	59.29	0.05
Reach-1	206	(Ex) - 100Y	66.78	184.85	189.41		189.42	0.000056	0.36	185.36	59.58	0.06
Reach-1	206	(Ex) - Regional	205.61	184.85	189.63		189.69	0.000424	1.04	198.19	60.22	0.18
Reach-1	205	(Ex) - 2Y	7.73	184.90	187.38		187.38	0.000011	0.11	74.61	48.45	0.03
Reach-1	205	(Ex) - 5Y	17.80	184.90	187.55		187.56	0.000043	0.23	83.40	50.06	0.05
Reach-1	205	(Ex) - 10Y	31.76	184.90	188.00		188.00	0.000066	0.32	110.10	66.58	0.07
Reach-1	205	(Ex) - 25Y	42.70	184.90	188.59		188.60	0.000053	0.34	152.17	74.97	0.06
Reach-1	205	(Ex) - 50Y	54.07	184.90	189.32		189.32	0.000038	0.33	207.98	79.39	0.05
Reach-1	205	(Ex) - 100Y	66.78	184.90	189.41		189.42	0.000052	0.39	215.75	79.94	0.06
Reach-1	205	(Ex) - Regional	205.61	184.90	189.63		189.68	0.000402	1.12	233.03	81.16	0.18

Profile Output Table - Standard Table 1
HEC-RAS Plan: ExOct2015wPropPart2KS(RS234-225)   River: RIVER-2   Reach: Reach-1

Rivers   = 1
Hydraulic Reaches = 1
River Stations   = 68
Plans   = 1
Profiles   = 7

Reach	River Sta	Profile	Q Total (m3/s)	Min Ch El (m)	W.S. Elev (m)	Crit W.S. (m)	E.G. Elev (m)	E.G. Slope (m/m)	Vel Chnl (m/s)	Flow Area (m2)	Top Width (m)	Froude # Chl
Reach-1	261	(Ex) - 2Y	0.34	208.00	208.42	208.22	208.42	0.001266	0.29	1.17	5.22	0.20
Reach-1	261	(Ex) - 5Y	1.12	208.00	208.68	208.35	208.69	0.001167	0.39	2.86	7.56	0.20
Reach-1	261	(Ex) - 10Y	1.97	208.00	208.87	208.44	208.88	0.001014	0.45	4.42	8.61	0.20
Reach-1	261	(Ex) - 25Y	2.63	208.00	208.99	208.49	209.01	0.000926	0.48	5.51	8.98	0.19
Reach-1	261	(Ex) - 50Y	3.27	208.00	209.10	208.54	209.12	0.000873	0.50	6.50	9.31	0.19
Reach-1	261	(Ex) - 100Y	3.99	208.00	209.21	208.59	209.23	0.000830	0.53	7.56	9.64	0.19
Reach-1	261	(Ex) - Regional	7.14	208.00	209.65	208.76	209.67	0.000647	0.59	12.25	30.18	0.18
Reach-1	260.5		Culvert									
Reach-1	260	(Ex) - 2Y	0.68	207.90	208.27	208.27	208.36	0.037687	1.36	0.50	2.73	1.01
Reach-1	260	(Ex) - 5Y	2.02	207.90	208.47	208.47	208.61	0.032469	1.69	1.20	4.22	1.01
Reach-1	260	(Ex) - 10Y	3.35	207.90	208.59	208.59	208.77	0.030304	1.87	1.80	5.17	1.01
Reach-1	260	(Ex) - 25Y	4.39	207.90	208.67	208.67	208.87	0.028932	1.96	2.24	5.78	1.01
Reach-1	260	(Ex) - 50Y	5.40	207.90	208.74	208.74	208.96	0.028143	2.05	2.64	6.27	1.01
Reach-1	260	(Ex) - 100Y	6.51	207.90	208.80	208.80	209.04	0.027811	2.14	3.04	6.73	1.01
Reach-1	260	(Ex) - Regional	11.52	207.90	209.03	209.03	209.34	0.024568	2.50	4.61	12.09	1.01
Reach-1	259	(Ex) - 2Y	0.68	206.90	207.27		207.27	0.000026	0.06	12.11	34.41	0.03
Reach-1	259	(Ex) - 5Y	2.02	206.90	207.47		207.47	0.000053	0.11	19.11	36.14	0.05
Reach-1	259	(Ex) - 10Y	3.35	206.90	207.50		207.50	0.000123	0.17	20.19	36.40	0.07
Reach-1	259	(Ex) - 25Y	4.39	206.90	207.57		207.57	0.000141	0.19	22.96	37.05	0.08
Reach-1	259	(Ex) - 50Y	5.40	206.90	207.64		207.64	0.000157	0.21	25.33	37.61	0.08
Reach-1	259	(Ex) - 100Y	6.51	206.90	207.70		207.70	0.000173	0.24	27.68	38.15	0.09
Reach-1	259	(Ex) - Regional	11.52	206.90	207.92		207.93	0.000233	0.32	36.39	40.08	0.11
Reach-1	258	(Ex) - 2Y	0.68	206.90	207.25	207.11	207.26	0.002386	0.43	1.87	11.09	0.27
Reach-1	258	(Ex) - 5Y	2.02	206.90	207.43	207.23	207.45	0.002673	0.65	4.39	17.20	0.32
Reach-1	258	(Ex) - 10Y	3.35	206.90	207.31	207.31	207.43	0.024931	1.61	2.64	13.25	0.92
Reach-1	258	(Ex) - 25Y	4.39	206.90	207.36	207.36	207.50	0.023414	1.73	3.39	15.07	0.92
Reach-1	258	(Ex) - 50Y	5.40	206.90	207.41	207.41	207.56	0.022361	1.83	4.11	16.63	0.91
Reach-1	258	(Ex) - 100Y	6.51	206.90	207.46	207.46	207.61	0.021302	1.92	4.91	18.21	0.91
Reach-1	258	(Ex) - Regional	11.52	206.90	207.62	207.62	207.81	0.019566	2.25	8.39	25.40	0.91
Reach-1	257	(Ex) - 2Y	0.68	205.60	205.81	205.81	205.86	0.043405	1.05	0.65	6.27	1.02
Reach-1	257	(Ex) - 5Y	2.02	205.60	205.93	205.93	206.02	0.028536	1.40	1.65	10.32	0.94
Reach-1	257	(Ex) - 10Y	3.35	205.60	207.26		207.26	0.000009	0.09	96.62	134.45	0.02
Reach-1	257	(Ex) - 25Y	4.39	205.60	207.30		207.30	0.000013	0.11	102.21	142.76	0.03
Reach-1	257	(Ex) - 50Y	5.40	205.60	207.33		207.33	0.000018	0.13	106.04	145.15	0.03
Reach-1	257	(Ex) - 100Y	6.51	205.60	207.35		207.35	0.000025	0.15	108.21	146.49	0.04
Reach-1	257	(Ex) - Regional	11.52	205.60	207.42		207.42	0.000062	0.25	118.60	153.76	0.06
Reach-1	256	(Ex) - 2Y	0.68	204.50	204.84		204.84	0.001326	0.35	3.42	22.55	0.21
Reach-1	256	(Ex) - 5Y	2.02	204.50	205.15		205.15	0.000409	0.32	13.82	45.52	0.13
Reach-1	256	(Ex) - 10Y	3.35	204.50	207.26		207.26	0.000000	0.03	319.65	252.51	0.01
Reach-1	256	(Ex) - 25Y	4.39	204.50	207.30		207.30	0.000001	0.04	329.90	258.24	0.01
Reach-1	256	(Ex) - 50Y	5.40	204.50	207.33		207.33	0.000001	0.04	336.79	262.01	0.01
Reach-1	256	(Ex) - 100Y	6.51	204.50	207.35		207.35	0.000001	0.05	340.68	264.12	0.01
Reach-1	256	(Ex) - Regional	11.52	204.50	207.41		207.41	0.000004	0.09	359.18	275.76	0.02
Reach-1	255.5	(Ex) - 2Y	0.68	204.10	204.27	204.27	204.31	0.033216	1.00	1.07	14.95	0.91
Reach-1	255.5	(Ex) - 5Y	2.02	204.10	205.15	204.36	205.15	0.000016	0.09	61.70	138.74	0.03
Reach-1	255.5	(Ex) - 10Y	3.35	204.10	207.26	204.41	207.26	0.000000	0.01	559.94	305.01	0.00
Reach-1	255.5	(Ex) - 25Y	4.39	204.10	207.30	204.45	207.30	0.000000	0.02	572.23	306.84	0.00
Reach-1	255.5	(Ex) - 50Y	5.40	204.10	207.33	204.48	207.33	0.000000	0.02	580.36	307.75	0.00
Reach-1	255.5	(Ex) - 100Y	6.51	204.10	207.35	204.50	207.35	0.000000	0.03	584.90	308.26	0.00
Reach-1	255.5	(Ex) - Regional	11.52	204.10	207.41	204.61	207.41	0.000001	0.05	606.13	310.63	0.01
Reach-1	255	(Ex) - 2Y	0.68	202.76	203.49	203.12	203.54	0.002637	0.93	0.73	8.88	0.35
Reach-1	255	(Ex) - 5Y	2.02	202.76	205.10	203.50	205.14	0.000484	0.86	2.34	169.03	0.18

Reach-1	255	(Ex) - 10Y	3.35	202.76	207.25	203.80	207.26	0.001514	0.58	13.36	307.19	0.25
Reach-1	255	(Ex) - 25Y	4.39	202.76	207.29	204.01	207.30	0.001265	0.55	21.60	308.62	0.23
Reach-1	255	(Ex) - 50Y	5.40	202.76	207.32	204.20	207.33	0.001260	0.57	26.70	309.50	0.23
Reach-1	255	(Ex) - 100Y	6.51	202.76	207.33	204.39	207.34	0.001519	0.63	29.12	309.92	0.25
Reach-1	255	(Ex) - Regional	11.52	202.76	207.40	205.14	207.41	0.002351	0.62	43.41	312.21	0.29
Reach-1	254.5		Culvert									
Reach-1	254	(Ex) - 2Y	0.68	202.63	203.27		203.33	0.004081	1.06	0.64	7.04	0.42
Reach-1	254	(Ex) - 5Y	2.02	202.63	203.72	203.37	203.75	0.010698	0.78	3.80	28.39	0.55
Reach-1	254	(Ex) - 10Y	3.35	202.63	203.79	203.71	203.82	0.010019	0.88	5.88	33.18	0.55
Reach-1	254	(Ex) - 25Y	4.39	202.63	203.84	203.75	203.87	0.009414	0.93	7.81	42.31	0.54
Reach-1	254	(Ex) - 50Y	5.40	202.63	203.88	203.77	203.91	0.009200	0.97	9.32	45.31	0.55
Reach-1	254	(Ex) - 100Y	6.51	202.63	203.92	203.79	203.95	0.008841	1.01	11.02	48.56	0.54
Reach-1	254	(Ex) - Regional	11.52	202.63	204.06	203.90	204.09	0.007887	1.14	19.49	76.02	0.53
Reach-1	253	(Ex) - 2Y	0.68	202.40	202.65	202.54	202.66	0.002243	0.37	2.41	18.07	0.26
Reach-1	253	(Ex) - 5Y	2.02	202.40	202.79	202.63	202.81	0.002599	0.56	5.55	27.13	0.30
Reach-1	253	(Ex) - 10Y	3.35	202.40	202.88	202.70	202.90	0.002745	0.67	8.25	33.00	0.32
Reach-1	253	(Ex) - 25Y	4.39	202.40	202.94	202.74	202.96	0.002860	0.74	10.17	36.75	0.34
Reach-1	253	(Ex) - 50Y	5.40	202.40	202.99	202.77	203.01	0.002906	0.79	12.01	40.08	0.34
Reach-1	253	(Ex) - 100Y	6.51	202.40	203.03	202.80	203.05	0.002991	0.85	13.88	43.32	0.35
Reach-1	253	(Ex) - Regional	11.52	202.40	203.19	202.92	203.22	0.003205	1.03	21.61	53.79	0.38
Reach-1	252.5	(Ex) - 2Y	0.68	202.00	202.14	202.14	202.18	0.040363	0.91	0.80	11.10	0.96
Reach-1	252.5	(Ex) - 5Y	2.02	202.00	202.23	202.23	202.30	0.028745	1.22	2.13	17.90	0.91
Reach-1	252.5	(Ex) - 10Y	3.35	202.00	202.29	202.29	202.38	0.026675	1.41	3.33	22.32	0.92
Reach-1	252.5	(Ex) - 25Y	4.39	202.00	202.33	202.33	202.43	0.025064	1.52	4.28	25.27	0.91
Reach-1	252.5	(Ex) - 50Y	5.40	202.00	202.36	202.36	202.47	0.024930	1.62	5.10	27.56	0.92
Reach-1	252.5	(Ex) - 100Y	6.51	202.00	202.40	202.40	202.51	0.024055	1.70	6.05	30.01	0.92
Reach-1	252.5	(Ex) - Regional	11.52	202.00	202.51	202.51	202.65	0.023286	2.01	9.66	35.47	0.95
Reach-1	252	(Ex) - 2Y	1.91	200.60	201.11		201.12	0.000931	0.41	7.63	29.00	0.19
Reach-1	252	(Ex) - 5Y	4.19	200.60	201.30		201.31	0.001021	0.54	13.88	36.92	0.21
Reach-1	252	(Ex) - 10Y	6.84	200.60	201.45		201.46	0.001115	0.64	19.64	41.72	0.23
Reach-1	252	(Ex) - 25Y	9.09	200.60	201.55		201.56	0.001187	0.72	24.13	46.75	0.24
Reach-1	252	(Ex) - 50Y	11.48	200.60	201.64		201.66	0.001246	0.78	28.56	50.75	0.25
Reach-1	252	(Ex) - 100Y	13.95	200.60	201.72		201.74	0.001294	0.84	32.79	53.74	0.26
Reach-1	252	(Ex) - Regional	34.15	200.60	202.17		202.20	0.001584	1.18	62.01	73.96	0.30
Reach-1	251	(Ex) - 2Y	1.91	200.40	200.87	200.66	200.88	0.001603	0.50	6.51	27.51	0.25
Reach-1	251	(Ex) - 5Y	4.19	200.40	201.02	200.77	201.04	0.002009	0.69	11.43	36.63	0.29
Reach-1	251	(Ex) - 10Y	6.84	200.40	201.14	200.86	201.16	0.002272	0.83	15.85	40.18	0.32
Reach-1	251	(Ex) - 25Y	9.09	200.40	201.20	200.91	201.23	0.002759	0.96	18.39	42.95	0.36
Reach-1	251	(Ex) - 50Y	11.48	200.40	201.25	200.98	201.29	0.003219	1.09	20.81	45.43	0.39
Reach-1	251	(Ex) - 100Y	13.95	200.40	201.31	201.04	201.34	0.003624	1.20	23.17	47.72	0.42
Reach-1	251	(Ex) - Regional	34.15	200.40	201.58	201.30	201.66	0.006191	1.89	37.67	58.48	0.57
Reach-1	250	(Ex) - 2Y	1.91	199.70	199.98	199.98	200.06	0.030866	1.25	1.67	13.53	0.94
Reach-1	250	(Ex) - 5Y	4.19	199.70	200.13	200.13	200.21	0.015977	1.34	4.73	41.04	0.75
Reach-1	250	(Ex) - 10Y	6.84	199.70	200.22	200.22	200.30	0.014285	1.48	8.50	58.17	0.73
Reach-1	250	(Ex) - 25Y	9.09	199.70	200.29	200.26	200.36	0.010457	1.41	12.77	64.34	0.64
Reach-1	250	(Ex) - 50Y	11.48	199.70	200.36	200.30	200.42	0.008294	1.38	17.21	71.28	0.59
Reach-1	250	(Ex) - 100Y	13.95	199.70	200.42	200.33	200.48	0.007057	1.36	21.61	77.69	0.55
Reach-1	250	(Ex) - Regional	34.15	199.70	200.78	200.52	200.82	0.003896	1.37	62.83	183.65	0.44
Reach-1	249	(Ex) - 2Y	1.91	198.40	198.88	198.68	198.89	0.001886	0.55	5.83	26.96	0.27
Reach-1	249	(Ex) - 5Y	4.19	198.40	199.05	198.79	199.07	0.002250	0.75	9.97	33.09	0.31
Reach-1	249	(Ex) - 10Y	6.84	198.40	199.19	198.88	199.21	0.002524	0.91	13.93	38.02	0.34
Reach-1	249	(Ex) - 25Y	9.09	198.40	199.28	198.94	199.31	0.002687	1.02	16.96	41.38	0.36
Reach-1	249	(Ex) - 50Y	11.48	198.40	199.37	199.00	199.40	0.002874	1.12	19.85	44.63	0.37
Reach-1	249	(Ex) - 100Y	13.95	198.40	199.44	199.05	199.48	0.003022	1.21	22.70	47.68	0.39
Reach-1	249	(Ex) - Regional	34.15	198.40	199.86	199.38	199.92	0.003811	1.72	41.53	80.40	0.46
Reach-1	248.5	(Ex) - 2Y	1.91	198.10	198.33	198.33	198.40	0.031185	1.20	1.90	19.75	0.93
Reach-1	248.5	(Ex) - 5Y	4.19	198.10	198.43	198.43	198.53	0.025519	1.48	3.90	27.19	0.91
Reach-1	248.5	(Ex) - 10Y	6.84	198.10	198.51	198.51	198.63	0.023729	1.70	5.99	32.62	0.92
Reach-1	248.5	(Ex) - 25Y	9.09	198.10	198.57	198.57	198.70	0.023500	1.86	7.60	36.21	0.93
Reach-1	248.5	(Ex) - 50Y	11.48	198.10	198.62	198.62	198.76	0.022339	1.97	9.39	39.82	0.93
Reach-1	248.5	(Ex) - 100Y	13.95	198.10	198.67	198.67	198.82	0.021964	2.09	11.09	42.97	0.94
Reach-1	248.5	(Ex) - Regional	34.15	198.10	198.94	198.94	199.16	0.020946	2.71	23.20	58.70	0.98

Reach-1	248	(Ex) - 2Y	1.91	196.26	196.84	196.39	196.85	0.000280	0.26	7.36	15.22	0.11
Reach-1	248	(Ex) - 5Y	4.19	196.26	197.10	196.49	197.11	0.000394	0.39	10.63	16.38	0.14
Reach-1	248	(Ex) - 10Y	6.84	196.26	197.34	196.57	197.35	0.000463	0.50	13.59	17.77	0.15
Reach-1	248	(Ex) - 25Y	9.09	196.26	197.49	196.64	197.51	0.000533	0.59	15.46	19.74	0.17
Reach-1	248	(Ex) - 50Y	11.48	196.26	197.63	196.70	197.65	0.000588	0.66	17.27	21.80	0.18
Reach-1	248	(Ex) - 100Y	13.95	196.26	197.76	196.76	197.79	0.000638	0.74	18.94	24.26	0.19
Reach-1	248	(Ex) - Regional	34.15	196.26	198.54	197.17	198.61	0.000952	1.19	28.74	39.43	0.25
Reach-1	247.5		Culvert									
Reach-1	247	(Ex) - 2Y	2.15	195.95	196.84	196.09	196.84	0.000086	0.19	11.24	14.93	0.06
Reach-1	247	(Ex) - 5Y	4.51	195.95	197.10	196.18	197.11	0.000163	0.31	14.49	15.60	0.09
Reach-1	247	(Ex) - 10Y	7.62	195.95	197.33	196.28	197.34	0.000252	0.44	17.41	16.20	0.12
Reach-1	247	(Ex) - 25Y	10.06	195.95	197.48	196.35	197.49	0.000315	0.52	19.24	16.58	0.14
Reach-1	247	(Ex) - 50Y	12.79	195.95	197.62	196.42	197.64	0.000381	0.61	20.99	17.06	0.15
Reach-1	247	(Ex) - 100Y	15.67	195.95	197.74	196.49	197.77	0.000446	0.69	22.61	18.33	0.17
Reach-1	247	(Ex) - Regional	40.02	195.95	198.47	196.96	198.55	0.000934	1.26	31.79	25.29	0.25
Reach-1	246	(Ex) - 2Y	2.15	195.90	196.81	196.46	196.83	0.001895	0.62	4.19	13.01	0.26
Reach-1	246	(Ex) - 5Y	4.51	195.90	197.05	196.65	197.07	0.001985	0.80	7.77	16.51	0.29
Reach-1	246	(Ex) - 10Y	7.62	195.90	197.26	196.83	197.30	0.002098	0.97	11.53	18.38	0.31
Reach-1	246	(Ex) - 25Y	10.06	195.90	197.40	196.93	197.44	0.002174	1.07	14.11	19.55	0.32
Reach-1	246	(Ex) - 50Y	12.79	195.90	197.53	197.02	197.58	0.002255	1.17	16.73	20.69	0.33
Reach-1	246	(Ex) - 100Y	15.67	195.90	197.65	197.10	197.71	0.002337	1.26	19.29	21.76	0.34
Reach-1	246	(Ex) - Regional	40.02	195.90	198.35	197.59	198.46	0.002871	1.83	36.73	28.21	0.40
Reach-1	245.5	(Ex) - 2Y	2.15	195.50	196.41	196.19	196.46	0.004747	0.98	2.92	10.39	0.42
Reach-1	245.5	(Ex) - 5Y	4.51	195.50	196.66	196.43	196.71	0.004259	1.18	6.16	15.53	0.42
Reach-1	245.5	(Ex) - 10Y	7.62	195.50	196.87	196.61	196.93	0.004126	1.36	9.82	18.99	0.43
Reach-1	245.5	(Ex) - 25Y	10.06	195.50	197.00	196.70	197.07	0.004089	1.47	12.45	21.13	0.44
Reach-1	245.5	(Ex) - 50Y	12.79	195.50	197.13	196.79	197.20	0.004056	1.57	15.26	23.19	0.44
Reach-1	245.5	(Ex) - 100Y	15.67	195.50	197.25	196.87	197.33	0.004033	1.66	18.08	25.10	0.45
Reach-1	245.5	(Ex) - Regional	40.02	195.50	197.95	197.36	198.06	0.003579	2.05	39.20	47.09	0.45
Reach-1	245	(Ex) - 2Y	2.15	195.00	196.01	195.69	196.04	0.002902	0.84	3.47	11.56	0.34
Reach-1	245	(Ex) - 5Y	4.51	195.00	196.24	195.95	196.29	0.003201	1.08	6.87	17.35	0.37
Reach-1	245	(Ex) - 10Y	7.62	195.00	196.44	196.14	196.50	0.003383	1.28	10.56	19.97	0.40
Reach-1	245	(Ex) - 25Y	10.06	195.00	196.56	196.26	196.62	0.003505	1.40	13.09	21.58	0.41
Reach-1	245	(Ex) - 50Y	12.79	195.00	196.68	196.33	196.75	0.003587	1.51	15.73	23.03	0.42
Reach-1	245	(Ex) - 100Y	15.67	195.00	196.79	196.42	196.87	0.003659	1.61	18.34	24.33	0.43
Reach-1	245	(Ex) - Regional	40.02	195.00	197.45	196.88	197.57	0.004307	2.25	38.05	37.96	0.50
Reach-1	244	(Ex) - 2Y	2.15	194.40	194.89	194.89	195.01	0.033449	1.57	1.37	5.66	1.01
Reach-1	244	(Ex) - 5Y	4.51	194.40	195.05	195.05	195.22	0.030204	1.83	2.47	7.47	1.02
Reach-1	244	(Ex) - 10Y	7.62	194.40	195.20	195.20	195.42	0.027892	2.05	3.71	8.86	1.01
Reach-1	244	(Ex) - 25Y	10.06	194.40	195.30	195.30	195.54	0.026118	2.16	4.65	9.79	1.00
Reach-1	244	(Ex) - 50Y	12.79	194.40	195.40	195.40	195.66	0.025243	2.28	5.62	10.65	1.00
Reach-1	244	(Ex) - 100Y	15.67	194.40	195.49	195.49	195.77	0.024539	2.38	6.59	11.46	1.00
Reach-1	244	(Ex) - Regional	40.02	194.40	196.00	196.00	196.46	0.018284	3.00	14.21	18.84	0.95
Reach-1	243	(Ex) - 2Y	2.15	194.20	194.73		194.73	0.000024	0.07	31.64	63.96	0.03
Reach-1	243	(Ex) - 5Y	4.51	194.20	194.92		194.92	0.000038	0.10	43.71	67.29	0.04
Reach-1	243	(Ex) - 10Y	7.62	194.20	195.08		195.08	0.000053	0.14	55.25	70.48	0.05
Reach-1	243	(Ex) - 25Y	10.06	194.20	195.19		195.19	0.000063	0.16	62.69	72.46	0.06
Reach-1	243	(Ex) - 50Y	12.79	194.20	195.29		195.29	0.000073	0.18	70.01	74.35	0.06
Reach-1	243	(Ex) - 100Y	15.67	194.20	195.38		195.38	0.000083	0.20	76.90	76.09	0.06
Reach-1	243	(Ex) - Regional	40.02	194.20	195.92		195.92	0.000143	0.33	120.08	85.18	0.09
Reach-1	242	(Ex) - 2Y	2.15	194.20	194.73		194.73	0.000018	0.06	36.14	72.81	0.03
Reach-1	242	(Ex) - 5Y	4.51	194.20	194.91		194.91	0.000029	0.09	49.74	75.95	0.04
Reach-1	242	(Ex) - 10Y	7.62	194.20	195.08		195.08	0.000041	0.12	62.60	78.81	0.04
Reach-1	242	(Ex) - 25Y	10.06	194.20	195.18		195.18	0.000049	0.14	70.84	80.59	0.05
Reach-1	242	(Ex) - 50Y	12.79	194.20	195.28		195.28	0.000056	0.16	78.88	81.91	0.05
Reach-1	242	(Ex) - 100Y	15.67	194.20	195.37		195.37	0.000063	0.18	86.37	83.05	0.06
Reach-1	242	(Ex) - Regional	40.02	194.20	195.90		195.91	0.000111	0.30	132.35	89.96	0.08
Reach-1	241	(Ex) - 2Y	2.15	194.20	194.61	194.61	194.72	0.034916	1.44	1.49	7.24	1.01
Reach-1	241	(Ex) - 5Y	4.51	194.20	194.75	194.75	194.90	0.031595	1.67	2.70	9.74	1.01
Reach-1	241	(Ex) - 10Y	7.62	194.20	194.88	194.88	195.06	0.029340	1.85	4.11	12.03	1.01
Reach-1	241	(Ex) - 25Y	10.06	194.20	194.96	194.96	195.16	0.028328	1.96	5.13	13.44	1.01
Reach-1	241	(Ex) - 50Y	12.79	194.20	195.04	195.04	195.26	0.027478	2.06	6.22	14.79	1.01
Reach-1	241	(Ex) - 100Y	15.67	194.20	195.12	195.12	195.35	0.026034	2.12	7.39	16.12	1.00

Reach-1	241	(Ex) - Regional	40.02	194.20	195.53	195.53	195.87	0.023082	2.56	15.61	23.43	1.00
Reach-1	240	(Ex) - 2Y	2.15	194.00	194.60	194.04	194.60	0.000006	0.04	57.43	99.76	0.02
Reach-1	240	(Ex) - 5Y	4.51	194.00	194.72	194.06	194.72	0.000014	0.06	69.68	101.22	0.02
Reach-1	240	(Ex) - 10Y	7.62	194.00	194.83	194.09	194.83	0.000024	0.09	81.36	102.59	0.03
Reach-1	240	(Ex) - 25Y	10.06	194.00	194.91	194.10	194.91	0.000032	0.11	88.87	103.44	0.04
Reach-1	240	(Ex) - 50Y	12.79	194.00	194.98	194.13	194.98	0.000040	0.13	96.24	104.03	0.04
Reach-1	240	(Ex) - 100Y	15.67	194.00	195.05	194.14	195.05	0.000047	0.15	103.33	104.60	0.05
Reach-1	240	(Ex) - Regional	40.02	194.00	195.48	194.26	195.48	0.000095	0.27	149.50	108.21	0.07
Reach-1	239	(Ex) - 2Y	2.15	194.00	194.60		194.60	0.000005	0.03	64.91	111.91	0.01
Reach-1	239	(Ex) - 5Y	4.51	194.00	194.72		194.72	0.000011	0.06	78.48	113.04	0.02
Reach-1	239	(Ex) - 10Y	7.62	194.00	194.83		194.83	0.000019	0.08	91.32	114.09	0.03
Reach-1	239	(Ex) - 25Y	10.06	194.00	194.90		194.90	0.000025	0.10	99.53	114.76	0.03
Reach-1	239	(Ex) - 50Y	12.79	194.00	194.97		194.97	0.000032	0.12	107.58	115.41	0.04
Reach-1	239	(Ex) - 100Y	15.67	194.00	195.04		195.04	0.000038	0.14	115.31	116.04	0.04
Reach-1	239	(Ex) - Regional	40.02	194.00	195.47		195.47	0.000077	0.24	165.68	119.90	0.07
Reach-1	238	(Ex) - 2Y	2.15	194.00	194.60		194.60	0.000001	0.02	117.51	199.14	0.01
Reach-1	238	(Ex) - 5Y	4.51	194.00	194.72		194.72	0.000003	0.03	141.58	199.90	0.01
Reach-1	238	(Ex) - 10Y	7.62	194.00	194.83		194.83	0.000006	0.05	164.20	200.61	0.02
Reach-1	238	(Ex) - 25Y	10.06	194.00	194.90		194.90	0.000008	0.06	178.61	201.06	0.02
Reach-1	238	(Ex) - 50Y	12.79	194.00	194.97		194.97	0.000009	0.07	192.68	201.50	0.02
Reach-1	238	(Ex) - 100Y	15.67	194.00	195.04		195.04	0.000011	0.08	206.14	201.92	0.02
Reach-1	238	(Ex) - Regional	40.02	194.00	195.47		195.47	0.000023	0.14	292.96	204.61	0.04
Reach-1	237	(Ex) - 2Y	2.15	194.00	194.60	194.02	194.60	0.000001	0.02	116.29	197.82	0.01
Reach-1	237	(Ex) - 5Y	4.51	194.00	194.72	194.04	194.72	0.000003	0.03	140.16	198.92	0.01
Reach-1	237	(Ex) - 10Y	7.62	194.00	194.83	194.05	194.83	0.000006	0.05	162.63	199.94	0.02
Reach-1	237	(Ex) - 25Y	10.06	194.00	194.90	194.06	194.90	0.000008	0.06	176.94	200.59	0.02
Reach-1	237	(Ex) - 50Y	12.79	194.00	194.97	194.08	194.97	0.000010	0.07	190.93	201.23	0.02
Reach-1	237	(Ex) - 100Y	15.67	194.00	195.04	194.09	195.04	0.000012	0.08	204.32	201.90	0.02
Reach-1	237	(Ex) - Regional	40.02	194.00	195.46	194.16	195.46	0.000024	0.14	291.20	206.58	0.04
Reach-1	236	(Ex) - 2Y	2.15	194.30	194.52	194.52	194.59	0.038617	1.14	1.89	14.15	1.00
Reach-1	236	(Ex) - 5Y	4.51	194.30	194.61	194.61	194.71	0.034728	1.35	3.33	17.99	1.00
Reach-1	236	(Ex) - 10Y	7.62	194.30	194.70	194.70	194.82	0.031974	1.51	5.04	22.38	1.00
Reach-1	236	(Ex) - 25Y	10.06	194.30	194.75	194.75	194.89	0.030841	1.62	6.21	24.70	1.00
Reach-1	236	(Ex) - 50Y	12.79	194.30	194.80	194.80	194.95	0.029687	1.71	7.46	26.89	1.00
Reach-1	236	(Ex) - 100Y	15.67	194.30	194.85	194.85	195.02	0.028472	1.81	8.63	28.04	1.00
Reach-1	236	(Ex) - Regional	40.02	194.30	195.16	195.16	195.43	0.022178	2.34	17.59	39.83	0.97
Reach-1	235	(Ex) - 2Y	2.59	193.20	193.72	193.54	193.73	0.003794	0.55	4.68	18.17	0.35
Reach-1	235	(Ex) - 5Y	5.06	193.20	193.85	193.64	193.87	0.003929	0.68	7.46	22.63	0.37
Reach-1	235	(Ex) - 10Y	8.20	193.20	193.96	193.74	194.00	0.004033	0.82	10.19	25.75	0.39
Reach-1	235	(Ex) - 25Y	10.89	193.20	194.04	193.80	194.08	0.004097	0.92	12.29	27.85	0.41
Reach-1	235	(Ex) - 50Y	13.72	193.20	194.02	193.85	194.10	0.007394	1.21	11.76	27.33	0.54
Reach-1	235	(Ex) - 100Y	16.73	193.20	194.09	193.91	194.17	0.007346	1.30	13.52	29.01	0.55
Reach-1	235	(Ex) - Regional	46.48	193.20	194.52	194.29	194.70	0.007460	1.92	29.18	44.55	0.61
Reach-1	234	(Ex) - 2Y	2.59	191.80	192.17	192.17	192.26	0.034915	1.37	1.89	9.88	1.00
Reach-1	234	(Ex) - 5Y	5.06	191.80	192.29	192.29	192.41	0.030963	1.56	3.24	12.79	0.99
Reach-1	234	(Ex) - 10Y	8.20	191.80	192.39	192.39	192.55	0.027707	1.77	4.71	15.97	0.98
Reach-1	234	(Ex) - 25Y	10.89	191.80	192.46	192.46	192.64	0.025923	1.91	5.94	17.64	0.97
Reach-1	234	(Ex) - 50Y	13.72	191.80	192.59	192.59	192.67	0.009576	1.39	19.54	138.37	0.62
Reach-1	234	(Ex) - 100Y	16.73	191.80	192.62	192.62	192.70	0.010275	1.49	23.21	138.97	0.65
Reach-1	234	(Ex) - Regional	46.48	191.80	192.78	192.78	192.91	0.015512	2.18	46.10	142.67	0.83
Reach-1	233	(Ex) - 2Y	2.59	190.30	190.96		190.97	0.001617	0.48	11.61	134.24	0.24
Reach-1	233	(Ex) - 5Y	5.06	190.30	191.07		191.08	0.001039	0.44	26.71	136.78	0.20
Reach-1	233	(Ex) - 10Y	8.20	190.30	191.15		191.15	0.001114	0.51	37.09	138.70	0.21
Reach-1	233	(Ex) - 25Y	10.89	190.30	191.18		191.19	0.001338	0.58	42.41	139.68	0.24
Reach-1	233	(Ex) - 50Y	13.72	190.30	191.22		191.23	0.001498	0.64	47.80	140.60	0.25
Reach-1	233	(Ex) - 100Y	16.73	190.30	191.26		191.27	0.001579	0.68	53.68	141.56	0.26
Reach-1	233	(Ex) - Regional	46.48	190.30	191.62		191.64	0.001528	0.89	106.38	152.00	0.28
Reach-1	232	(Ex) - 2Y	2.59	189.90	190.63	190.39	190.65	0.004038	0.71	3.63	10.00	0.38
Reach-1	232	(Ex) - 5Y	5.06	189.90	190.68	190.54	190.76	0.010331	1.20	4.22	10.78	0.61
Reach-1	232	(Ex) - 10Y	8.20	189.90	190.77	190.77	190.83	0.008437	1.21	14.49	138.94	0.57
Reach-1	232	(Ex) - 25Y	10.89	189.90	190.84	190.80	190.88	0.005209	1.05	24.47	140.12	0.46
Reach-1	232	(Ex) - 50Y	13.72	189.90	190.91	190.83	190.94	0.003602	0.95	34.17	141.25	0.39
Reach-1	232	(Ex) - 100Y	16.73	189.90	190.97	190.85	190.99	0.002982	0.92	42.38	142.20	0.36

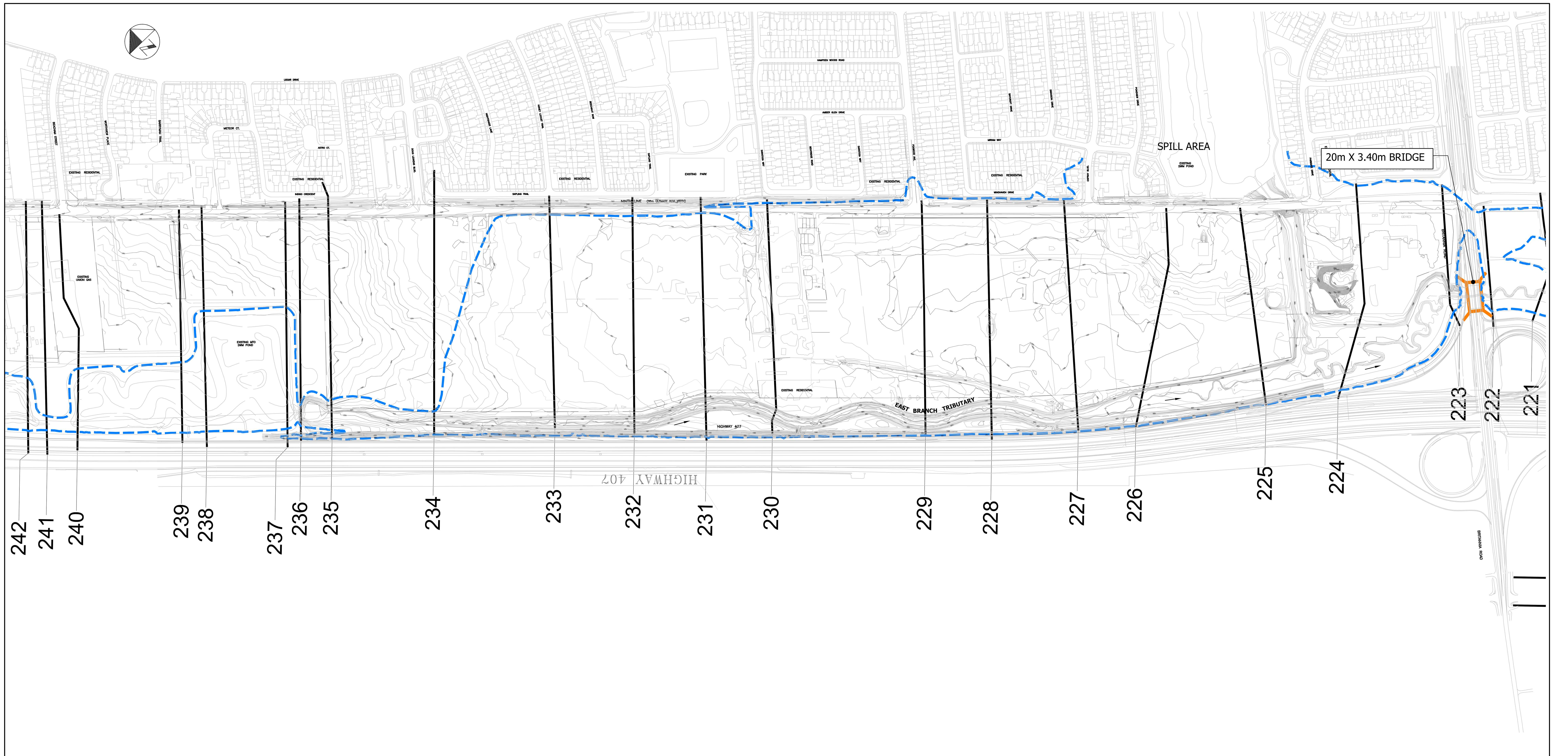
Reach-1	232	(Ex) - Regional	46.48	189.90	191.43	191.00	191.44	0.001374	0.88	109.17	149.96	0.27
Reach-1	231	(Ex) - 2Y	2.59	189.50	190.31	189.98	190.32	0.001976	0.56	5.13	107.83	0.27
Reach-1	231	(Ex) - 5Y	5.06	189.50	190.48	190.13	190.48	0.000882	0.47	24.00	110.71	0.19
Reach-1	231	(Ex) - 10Y	8.20	189.50	190.65	190.26	190.65	0.000498	0.42	43.23	113.45	0.15
Reach-1	231	(Ex) - 25Y	10.89	189.50	190.72	190.41	190.72	0.000545	0.46	51.12	114.54	0.16
Reach-1	231	(Ex) - 50Y	13.72	189.50	190.79	190.44	190.80	0.000550	0.49	59.71	115.72	0.16
Reach-1	231	(Ex) - 100Y	16.73	189.50	190.85	190.47	190.85	0.000614	0.54	65.79	116.55	0.17
Reach-1	231	(Ex) - Regional	46.48	189.50	191.32	190.64	191.33	0.000727	0.76	123.41	133.94	0.20
Reach-1	230	(Ex) - 2Y	2.59	189.20	190.03	189.73	190.05	0.002639	0.61	4.23	10.63	0.31
Reach-1	230	(Ex) - 5Y	5.06	189.20	190.31	189.89	190.33	0.002073	0.66	7.67	14.39	0.29
Reach-1	230	(Ex) - 10Y	8.20	189.20	190.52	190.03	190.55	0.002015	0.74	13.45	135.59	0.29
Reach-1	230	(Ex) - 25Y	10.89	189.20	190.57	190.12	190.60	0.002502	0.85	20.00	136.48	0.33
Reach-1	230	(Ex) - 50Y	13.72	189.20	190.67	190.21	190.69	0.001848	0.77	33.37	138.29	0.29
Reach-1	230	(Ex) - 100Y	16.73	189.20	190.71	190.29	190.73	0.002046	0.83	38.77	139.03	0.30
Reach-1	230	(Ex) - Regional	46.48	189.20	191.21	190.75	191.23	0.000987	0.81	112.46	150.15	0.23
Reach-1	229	(Ex) - 2Y	2.59	188.60	189.47		189.49	0.001937	0.56	4.64	10.62	0.27
Reach-1	229	(Ex) - 5Y	5.06	188.60	189.57		189.61	0.004243	0.89	5.72	11.79	0.41
Reach-1	229	(Ex) - 10Y	8.20	188.60	189.70		189.76	0.005489	1.13	7.29	13.34	0.48
Reach-1	229	(Ex) - 25Y	10.89	188.60	189.79	189.51	189.84	0.003801	1.04	21.29	149.61	0.41
Reach-1	229	(Ex) - 50Y	13.72	188.60	189.78	189.60	189.86	0.007329	1.42	18.56	149.28	0.56
Reach-1	229	(Ex) - 100Y	16.73	188.60	189.83	189.80	189.90	0.006145	1.37	26.70	150.25	0.52
Reach-1	229	(Ex) - Regional	46.48	188.60	191.16		191.16	0.000119	0.39	245.46	179.09	0.09
Reach-1	228	(Ex) - 2Y	2.59	188.50	189.21	188.96	189.23	0.002951	0.62	4.84	119.95	0.33
Reach-1	228	(Ex) - 5Y	5.06	188.50	189.35	189.09	189.36	0.001324	0.52	22.20	122.30	0.23
Reach-1	228	(Ex) - 10Y	8.20	188.50	189.40	189.28	189.41	0.001864	0.66	28.53	123.14	0.28
Reach-1	228	(Ex) - 25Y	10.89	188.50	189.39		189.41	0.003771	0.92	27.05	122.95	0.39
Reach-1	228	(Ex) - 50Y	13.72	188.50	189.56		189.57	0.001225	0.63	48.10	125.72	0.23
Reach-1	228	(Ex) - 100Y	16.73	188.50	189.71		189.71	0.000686	0.53	66.82	128.14	0.18
Reach-1	228	(Ex) - Regional	46.48	188.50	191.15		191.15	0.000074	0.33	269.91	170.51	0.07
Reach-1	227	(Ex) - 2Y	2.59	188.10	188.77	188.55	188.79	0.003330	0.64	6.22	133.12	0.34
Reach-1	227	(Ex) - 5Y	5.06	188.10	188.69	188.69	188.84	0.030809	1.71	2.95	10.07	1.01
Reach-1	227	(Ex) - 10Y	8.20	188.10	188.83	188.83	188.89	0.010532	1.28	14.65	134.23	0.63
Reach-1	227	(Ex) - 25Y	10.89	188.10	188.97		188.99	0.002544	0.76	33.62	136.71	0.32
Reach-1	227	(Ex) - 50Y	13.72	188.10	189.53		189.53	0.000109	0.25	112.74	148.27	0.07
Reach-1	227	(Ex) - 100Y	16.73	188.10	189.68		189.68	0.000091	0.25	135.80	150.92	0.07
Reach-1	227	(Ex) - Regional	46.48	188.10	191.14		191.15	0.000031	0.24	375.12	185.08	0.05
Reach-1	226	(Ex) - 2Y	2.59	187.80	188.05	188.05	188.07	0.015240	0.87	6.43	109.08	0.66
Reach-1	226	(Ex) - 5Y	5.06	187.80	188.25		188.25	0.000849	0.34	29.60	115.67	0.18
Reach-1	226	(Ex) - 10Y	8.20	187.80	188.58		188.58	0.000162	0.22	68.36	122.73	0.09
Reach-1	226	(Ex) - 25Y	10.89	187.80	188.96		188.96	0.000053	0.17	117.12	131.08	0.05
Reach-1	226	(Ex) - 50Y	13.72	187.80	189.52		189.52	0.000018	0.13	194.32	143.30	0.03
Reach-1	226	(Ex) - 100Y	16.73	187.80	189.68		189.68	0.000019	0.14	216.69	147.29	0.03
Reach-1	226	(Ex) - Regional	46.48	187.80	191.14		191.14	0.000016	0.19	461.89	182.42	0.03
Reach-1	225	(Ex) - 2Y	2.59	187.30	187.89		187.89	0.000206	0.18	25.98	89.15	0.09
Reach-1	225	(Ex) - 5Y	5.06	187.30	188.22		188.22	0.000071	0.15	57.45	98.58	0.06
Reach-1	225	(Ex) - 10Y	8.20	187.30	188.56		188.56	0.000044	0.16	92.92	108.63	0.05
Reach-1	225	(Ex) - 25Y	10.89	187.30	188.95		188.96	0.000024	0.14	137.39	118.06	0.04
Reach-1	225	(Ex) - 50Y	13.72	187.30	189.52		189.52	0.000011	0.12	206.64	126.46	0.03
Reach-1	225	(Ex) - 100Y	16.73	187.30	189.68		189.68	0.000013	0.13	226.26	128.74	0.03
Reach-1	225	(Ex) - Regional	46.48	187.30	191.14		191.14	0.000015	0.20	430.76	150.86	0.03
Reach-1	224	(Ex) - 2Y	6.67	187.03	187.82	187.50	187.83	0.000582	0.45	35.47	89.17	0.16
Reach-1	224	(Ex) - 5Y	16.12	187.03	188.18	187.65	188.19	0.000458	0.51	68.99	97.23	0.15
Reach-1	224	(Ex) - 10Y	26.72	187.03	188.53	187.72	188.54	0.000367	0.55	104.09	105.21	0.14
Reach-1	224	(Ex) - 25Y	35.64	187.03	188.94	187.78	188.94	0.000242	0.52	152.34	127.95	0.12
Reach-1	224	(Ex) - 50Y	44.65	187.03	189.51	187.82	189.51	0.000114	0.43	240.49	178.61	0.09
Reach-1	224	(Ex) - 100Y	54.81	187.03	189.66	187.87	189.67	0.000129	0.48	268.32	192.29	0.09
Reach-1	224	(Ex) - Regional	158.24	187.03	191.13	188.24	191.13	0.000133	0.65	679.91	372.26	0.10
Reach-1	223	(Ex) - 2Y	6.67	186.81	187.62	187.27	187.64	0.001845	0.63	10.65	20.04	0.27
Reach-1	223	(Ex) - 5Y	16.12	186.81	187.98	187.48	188.02	0.002002	0.89	18.04	22.06	0.31
Reach-1	223	(Ex) - 10Y	26.72	186.81	188.34	187.65	188.40	0.001681	1.04	25.74	24.18	0.30
Reach-1	223	(Ex) - 25Y	35.64	186.81	188.79	187.77	188.85	0.001049	1.01	35.24	26.36	0.25
Reach-1	223	(Ex) - 50Y	44.65	186.81	189.42	187.88	189.47	0.000570	0.92	48.45	35.83	0.19
Reach-1	223	(Ex) - 100Y	54.81	186.81	189.55	188.00	189.61	0.000717	1.07	51.15	43.21	0.22

Reach-1	223	(Ex) - Regional	158.24	186.81	190.96	188.91	191.07	0.000885	1.57	193.06	216.00	0.26
Reach-1	222.5		Bridge									
Reach-1	222	(Ex) - 2Y	6.67	186.60	187.52		187.54	0.001231	0.57	11.75	50.75	0.23
Reach-1	222	(Ex) - 5Y	16.12	186.60	187.85		187.89	0.001896	0.88	18.30	57.16	0.30
Reach-1	222	(Ex) - 10Y	26.72	186.60	188.23		188.28	0.001563	1.02	26.26	64.64	0.29
Reach-1	222	(Ex) - 25Y	35.64	186.60	188.72		188.77	0.000919	0.97	36.60	72.55	0.24
Reach-1	222	(Ex) - 50Y	44.65	186.60	189.38		189.42	0.000495	0.89	50.45	83.90	0.18
Reach-1	222	(Ex) - 100Y	54.81	186.60	189.49		189.55	0.000638	1.04	52.87	85.93	0.21
Reach-1	222	(Ex) - Regional	158.24	186.60	190.04	188.77	190.35	0.002755	2.46	64.40	170.61	0.45
Reach-1	221	(Ex) - 2Y	6.67	186.20	187.47		187.48	0.000447	0.51	25.33	42.24	0.15
Reach-1	221	(Ex) - 5Y	16.12	186.20	187.75		187.77	0.000894	0.83	38.07	47.12	0.22
Reach-1	221	(Ex) - 10Y	26.72	186.20	188.15		188.17	0.000761	0.91	57.87	51.30	0.22
Reach-1	221	(Ex) - 25Y	35.64	186.20	188.68		188.70	0.000433	0.81	86.54	56.64	0.17
Reach-1	221	(Ex) - 50Y	44.65	186.20	189.37		189.38	0.000228	0.70	127.88	67.46	0.13
Reach-1	221	(Ex) - 100Y	54.81	186.20	189.48		189.49	0.000292	0.81	136.06	77.62	0.15
Reach-1	221	(Ex) - Regional	158.24	186.20	190.02		190.08	0.001179	1.81	189.17	116.20	0.30
Reach-1	220	(Ex) - 2Y	6.67	186.20	187.44		187.44	0.000505	0.53	28.26	54.78	0.16
Reach-1	220	(Ex) - 5Y	16.12	186.20	187.69		187.71	0.000966	0.84	43.25	62.42	0.23
Reach-1	220	(Ex) - 10Y	26.72	186.20	188.11		188.12	0.000644	0.82	70.61	67.17	0.20
Reach-1	220	(Ex) - 25Y	35.64	186.20	188.66		188.67	0.000316	0.69	109.36	72.90	0.14
Reach-1	220	(Ex) - 50Y	44.65	186.20	189.36		189.36	0.000158	0.58	162.15	81.60	0.11
Reach-1	220	(Ex) - 100Y	54.81	186.20	189.47		189.47	0.000206	0.68	171.37	85.19	0.12
Reach-1	220	(Ex) - Regional	158.24	186.20	189.97		190.01	0.000895	1.56	217.70	108.96	0.26
Reach-1	219	(Ex) - 2Y	6.67	186.20	187.41		187.41	0.000103	0.23	74.03	148.41	0.07
Reach-1	219	(Ex) - 5Y	16.12	186.20	187.65		187.65	0.000185	0.36	109.15	152.24	0.10
Reach-1	219	(Ex) - 10Y	26.72	186.20	188.09		188.09	0.000112	0.34	177.32	157.75	0.08
Reach-1	219	(Ex) - 25Y	35.64	186.20	188.65		188.65	0.000054	0.28	268.71	164.55	0.06
Reach-1	219	(Ex) - 50Y	44.65	186.20	189.35		189.35	0.000027	0.24	398.08	235.41	0.04
Reach-1	219	(Ex) - 100Y	54.81	186.20	189.46		189.46	0.000034	0.28	424.52	247.69	0.05
Reach-1	219	(Ex) - Regional	158.24	186.20	189.94		189.94	0.000196	0.73	560.93	296.68	0.12
Reach-1	218	(Ex) - 2Y	6.67	186.20	187.40		187.40	0.000084	0.21	85.82	179.91	0.07
Reach-1	218	(Ex) - 5Y	16.12	186.20	187.62		187.63	0.000148	0.32	126.42	183.06	0.09
Reach-1	218	(Ex) - 10Y	26.72	186.20	188.07		188.07	0.000082	0.29	210.08	189.39	0.07
Reach-1	218	(Ex) - 25Y	35.64	186.20	188.65		188.65	0.000038	0.24	321.48	206.55	0.05
Reach-1	218	(Ex) - 50Y	44.65	186.20	189.35		189.35	0.000022	0.22	531.26	331.92	0.04
Reach-1	218	(Ex) - 100Y	54.81	186.20	189.46		189.46	0.000027	0.25	567.47	335.73	0.04
Reach-1	218	(Ex) - Regional	158.24	186.20	189.92		189.92	0.000112	0.55	728.10	361.54	0.09
Reach-1	217	(Ex) - 2Y	6.67	186.20	187.40		187.40	0.000047	0.16	105.64	189.70	0.05
Reach-1	217	(Ex) - 5Y	16.12	186.20	187.62		187.62	0.000096	0.25	148.04	193.18	0.07
Reach-1	217	(Ex) - 10Y	26.72	186.20	188.07		188.07	0.000060	0.25	236.77	200.29	0.06
Reach-1	217	(Ex) - 25Y	35.64	186.20	188.65		188.65	0.000031	0.21	366.04	262.74	0.04
Reach-1	217	(Ex) - 50Y	44.65	186.20	189.35		189.35	0.000017	0.19	577.47	340.21	0.03
Reach-1	217	(Ex) - 100Y	54.81	186.20	189.46		189.46	0.000021	0.22	614.87	349.82	0.04
Reach-1	217	(Ex) - Regional	158.24	186.20	189.91		189.92	0.000096	0.50	790.07	404.77	0.09
Reach-1	216	(Ex) - 2Y	6.67	186.10	187.39		187.39	0.000032	0.14	112.77	161.45	0.04
Reach-1	216	(Ex) - 5Y	16.12	186.10	187.61		187.61	0.000080	0.24	148.14	168.09	0.07
Reach-1	216	(Ex) - 10Y	26.72	186.10	188.06		188.06	0.000060	0.25	227.86	182.81	0.06
Reach-1	216	(Ex) - 25Y	35.64	186.10	188.64		188.64	0.000033	0.23	353.04	229.97	0.05
Reach-1	216	(Ex) - 50Y	44.65	186.10	189.35		189.35	0.000017	0.20	575.54	352.67	0.04
Reach-1	216	(Ex) - 100Y	54.81	186.10	189.45		189.45	0.000021	0.22	613.92	358.54	0.04
Reach-1	216	(Ex) - Regional	158.24	186.10	189.90		189.90	0.000094	0.51	782.62	391.03	0.09
Reach-1	215	(Ex) - 2Y	7.53	186.00	187.39		187.39	0.000013	0.09	175.75	200.05	0.03
Reach-1	215	(Ex) - 5Y	17.50	186.00	187.60		187.60	0.000037	0.17	221.13	222.21	0.05
Reach-1	215	(Ex) - 10Y	31.27	186.00	188.06		188.06	0.000036	0.20	327.62	243.20	0.05
Reach-1	215	(Ex) - 25Y	42.17	186.00	188.64		188.64	0.000021	0.19	471.41	249.88	0.04
Reach-1	215	(Ex) - 50Y	53.27	186.00	189.34		189.34	0.000012	0.17	650.66	259.51	0.03
Reach-1	215	(Ex) - 100Y	65.78	186.00	189.45		189.45	0.000016	0.20	678.58	261.46	0.03
Reach-1	215	(Ex) - Regional	200.73	186.00	189.88		189.89	0.000140	0.63	831.72	419.40	0.10
Reach-1	214	(Ex) - 2Y	7.53	186.00	187.39		187.39	0.000009	0.07	214.78	251.79	0.02
Reach-1	214	(Ex) - 5Y	17.50	186.00	187.60		187.60	0.000023	0.13	268.05	257.49	0.04
Reach-1	214	(Ex) - 10Y	31.27	186.00	188.05		188.05	0.000023	0.16	387.38	266.31	0.04
Reach-1	214	(Ex) - 25Y	42.17	186.00	188.64		188.64	0.000015	0.15	548.35	285.94	0.03

Reach-1	214	(Ex) - 50Y	53.27	186.00	189.34		189.34	0.000009	0.14	758.98	314.40	0.03
Reach-1	214	(Ex) - 100Y	65.78	186.00	189.45		189.45	0.000012	0.17	793.23	330.09	0.03
Reach-1	214	(Ex) - Regional	200.73	186.00	189.87		189.88	0.000085	0.48	961.15	420.41	0.08
Reach-1	213	(Ex) - 2Y	7.53	186.00	187.39		187.39	0.000004	0.05	275.57	262.74	0.02
Reach-1	213	(Ex) - 5Y	17.50	186.00	187.60		187.60	0.000013	0.10	330.18	264.69	0.03
Reach-1	213	(Ex) - 10Y	31.27	186.00	188.05		188.05	0.000015	0.13	451.71	268.83	0.03
Reach-1	213	(Ex) - 25Y	42.17	186.00	188.63		188.64	0.000010	0.13	610.09	273.84	0.03
Reach-1	213	(Ex) - 50Y	53.27	186.00	189.34		189.34	0.000009	0.14	822.11	387.54	0.03
Reach-1	213	(Ex) - 100Y	65.78	186.00	189.45		189.45	0.000012	0.17	863.81	395.57	0.03
Reach-1	213	(Ex) - Regional	200.73	186.00	189.86		189.87	0.000074	0.45	1039.68	452.84	0.08
Reach-1	212	(Ex) - 2Y	7.53	186.00	187.39		187.39	0.000006	0.06	242.59	255.49	0.02
Reach-1	212	(Ex) - 5Y	17.50	186.00	187.59		187.59	0.000017	0.12	295.54	257.66	0.03
Reach-1	212	(Ex) - 10Y	31.27	186.00	188.05		188.05	0.000019	0.15	413.61	260.95	0.03
Reach-1	212	(Ex) - 25Y	42.17	186.00	188.63		188.63	0.000012	0.14	567.33	265.33	0.03
Reach-1	212	(Ex) - 50Y	53.27	186.00	189.34		189.34	0.000008	0.13	757.09	271.79	0.02
Reach-1	212	(Ex) - 100Y	65.78	186.00	189.45		189.45	0.000011	0.16	786.08	274.03	0.03
Reach-1	212	(Ex) - Regional	200.73	186.00	189.86		189.86	0.000065	0.43	900.08	282.67	0.07
Reach-1	211	(Ex) - 2Y	7.53	185.99	187.39		187.39	0.000006	0.06	252.96	256.39	0.02
Reach-1	211	(Ex) - 5Y	17.50	185.99	187.59		187.59	0.000016	0.11	305.73	257.76	0.03
Reach-1	211	(Ex) - 10Y	31.27	185.99	188.05		188.05	0.000018	0.14	423.77	260.80	0.03
Reach-1	211	(Ex) - 25Y	42.17	185.99	188.63		188.63	0.000012	0.14	577.42	264.86	0.03
Reach-1	211	(Ex) - 50Y	53.27	185.99	189.34		189.34	0.000008	0.13	767.75	273.52	0.02
Reach-1	211	(Ex) - 100Y	65.78	185.99	189.45		189.45	0.000010	0.16	796.81	275.01	0.03
Reach-1	211	(Ex) - Regional	200.73	185.99	189.85		189.85	0.000063	0.42	909.47	281.88	0.07
Reach-1	210	(Ex) - 2Y	7.53	185.90	187.39		187.39	0.000039	0.16	88.24	85.54	0.05
Reach-1	210	(Ex) - 5Y	17.50	185.90	187.59		187.59	0.000121	0.32	105.60	87.45	0.08
Reach-1	210	(Ex) - 10Y	31.27	185.90	188.04		188.04	0.000141	0.41	146.25	92.07	0.09
Reach-1	210	(Ex) - 25Y	42.17	185.90	188.63		188.63	0.000118	0.44	221.20	161.93	0.09
Reach-1	210	(Ex) - 50Y	53.27	185.90	189.34		189.34	0.000055	0.36	375.47	237.82	0.06
Reach-1	210	(Ex) - 100Y	65.78	185.90	189.44		189.44	0.000070	0.41	400.61	244.30	0.07
Reach-1	210	(Ex) - Regional	200.73	185.90	189.82		189.83	0.000383	1.04	501.77	281.10	0.17
Reach-1	209	(Ex) - 2Y	7.73	185.80	187.38		187.38	0.000040	0.17	89.33	85.75	0.05
Reach-1	209	(Ex) - 5Y	17.80	185.80	187.58		187.58	0.000122	0.32	106.24	87.35	0.08
Reach-1	209	(Ex) - 10Y	31.76	185.80	188.03		188.03	0.000143	0.41	146.64	91.64	0.09
Reach-1	209	(Ex) - 25Y	42.70	185.80	188.62		188.62	0.000137	0.48	207.96	156.10	0.10
Reach-1	209	(Ex) - 50Y	54.07	185.80	189.33		189.33	0.000067	0.40	339.46	214.31	0.07
Reach-1	209	(Ex) - 100Y	66.78	185.80	189.44		189.44	0.000087	0.46	362.04	221.21	0.08
Reach-1	209	(Ex) - Regional	205.61	185.80	189.79		189.81	0.000478	1.16	442.54	232.94	0.19
Reach-1	208	(Ex) - 2Y	7.73	185.71	187.38		187.38	0.000041	0.17	87.36	83.48	0.05
Reach-1	208	(Ex) - 5Y	17.80	185.71	187.57		187.57	0.000128	0.33	103.35	84.88	0.09
Reach-1	208	(Ex) - 10Y	31.76	185.71	188.02		188.02	0.000150	0.43	142.36	88.21	0.10
Reach-1	208	(Ex) - 25Y	42.70	185.71	188.61		188.61	0.000102	0.42	196.88	130.08	0.08
Reach-1	208	(Ex) - 50Y	54.07	185.71	189.33		189.33	0.000076	0.42	357.78	316.14	0.07
Reach-1	208	(Ex) - 100Y	66.78	185.71	189.43		189.43	0.000095	0.48	391.01	332.72	0.08
Reach-1	208	(Ex) - Regional	205.61	185.71	189.76		189.78	0.000479	1.15	506.75	361.71	0.19
Reach-1	207.7	(Ex) - 2Y	7.73	185.42	187.38		187.38	0.000059	0.22	70.99	67.91	0.06
Reach-1	207.7	(Ex) - 5Y	17.80	185.42	187.57		187.57	0.000187	0.42	83.82	69.35	0.10
Reach-1	207.7	(Ex) - 10Y	31.76	185.42	188.02		188.02	0.000222	0.53	115.77	72.81	0.12
Reach-1	207.7	(Ex) - 25Y	42.70	185.42	188.61		188.61	0.000150	0.51	160.12	77.43	0.10
Reach-1	207.7	(Ex) - 50Y	54.07	185.42	189.33		189.33	0.000080	0.44	290.63	252.35	0.08
Reach-1	207.7	(Ex) - 100Y	66.78	185.42	189.43		189.43	0.000104	0.51	317.01	267.19	0.09
Reach-1	207.7	(Ex) - Regional	205.61	185.42	189.73		189.76	0.000783	1.48	406.55	310.92	0.24
Reach-1	207.3	(Ex) - 2Y	7.73	185.14	187.38		187.38	0.000079	0.26	58.72	55.08	0.06
Reach-1	207.3	(Ex) - 5Y	17.80	185.14	187.56		187.56	0.000258	0.50	68.81	56.18	0.12
Reach-1	207.3	(Ex) - 10Y	31.76	185.14	188.01		188.01	0.000315	0.64	94.52	58.87	0.14
Reach-1	207.3	(Ex) - 25Y	42.70	185.14	188.60		188.61	0.000216	0.62	130.50	62.44	0.12
Reach-1	207.3	(Ex) - 50Y	54.07	185.14	189.32		189.33	0.000126	0.55	228.25	285.20	0.09
Reach-1	207.3	(Ex) - 100Y	66.78	185.14	189.42		189.43	0.000162	0.63	257.74	305.26	0.11
Reach-1	207.3	(Ex) - Regional	205.61	185.14	189.70		189.74	0.000925	1.59	355.76	380.42	0.25
Reach-1	207	(Ex) - 2Y	7.73	184.85	187.38	185.38	187.38	0.000009	0.09	84.58	51.36	0.02
Reach-1	207	(Ex) - 5Y	17.80	184.85	187.56	185.59	187.56	0.000033	0.19	93.90	52.25	0.04
Reach-1	207	(Ex) - 10Y	31.76	184.85	188.01	185.79	188.01	0.000053	0.27	117.28	55.12	0.06
Reach-1	207	(Ex) - 25Y	42.70	184.85	188.60	185.91	188.60	0.000045	0.29	149.49	58.89	0.06

Reach-1	207	(Ex) - 50Y	54.07	184.85	189.32	186.06	189.32	0.000034	0.28	190.47	63.92	0.05
Reach-1	207	(Ex) - 100Y	66.78	184.85	189.42	186.16	189.42	0.000048	0.34	196.27	64.76	0.06
Reach-1	207	(Ex) - Regional	205.61	184.85	189.68	186.88	189.72	0.000353	0.97	211.29	66.72	0.16
Reach-1	206.5		Bridge									
Reach-1	206	(Ex) - 2Y	7.73	184.85	187.38		187.38	0.000011	0.10	75.98	45.85	0.03
Reach-1	206	(Ex) - 5Y	17.80	184.85	187.56		187.56	0.000042	0.21	84.32	47.22	0.05
Reach-1	206	(Ex) - 10Y	31.76	184.85	188.00		188.00	0.000070	0.30	106.22	51.30	0.07
Reach-1	206	(Ex) - 25Y	42.70	184.85	188.59		188.60	0.000059	0.31	138.30	56.45	0.06
Reach-1	206	(Ex) - 50Y	54.07	184.85	189.32		189.32	0.000040	0.30	179.69	59.29	0.05
Reach-1	206	(Ex) - 100Y	66.78	184.85	189.41		189.42	0.000056	0.36	185.36	59.58	0.06
Reach-1	206	(Ex) - Regional	205.61	184.85	189.63		189.69	0.000424	1.04	198.19	60.22	0.18
Reach-1	205	(Ex) - 2Y	7.73	184.90	187.38		187.38	0.000011	0.11	74.61	48.45	0.03
Reach-1	205	(Ex) - 5Y	17.80	184.90	187.55		187.56	0.000043	0.23	83.40	50.06	0.05
Reach-1	205	(Ex) - 10Y	31.76	184.90	188.00		188.00	0.000066	0.32	110.10	66.58	0.07
Reach-1	205	(Ex) - 25Y	42.70	184.90	188.59		188.60	0.000053	0.34	152.17	74.97	0.06
Reach-1	205	(Ex) - 50Y	54.07	184.90	189.32		189.32	0.000038	0.33	207.98	79.39	0.05
Reach-1	205	(Ex) - 100Y	66.78	184.90	189.41		189.42	0.000052	0.39	215.75	79.94	0.06
Reach-1	205	(Ex) - Regional	205.61	184.90	189.63		189.68	0.000402	1.12	233.03	81.16	0.18

APPENDIX E – DRAWINGS



LEGEND

EXISTING REGIONAL FLOODLINE

224 HEC-RAS CROSS SECTION LOCATION

mattamyHOMES

RAND

5285 SOLAR DRIVE
MISSISSAUGA, ONTARIO
L4W 5B8
TEL. (905) 625-9500

DERRY BRITANNIA DEVELOPMENTS LIMITED
NINTH LINE LANDS

FLOODPLAIN MAPPING
EXISTING CONDITIONS

CITY OF MISSISSAUGA		DRAWING No.
SCALE 1:3,000	JOB No. 13958	1

R:\13\13958\Drawings & Figures\2019 May 27, 2019 (Latest)\Drawing 1- Flood Plain Mapping-Existing Conditions_NEW TRANSITWAY.dwg Jun 11, 2019 - 6:43pm

LEGEND

- EXISITNG STORM SEWER
- PROPOSED STORM SEWER
- MAJOR SYSTEM FLOW
- POST DEVELOPMENT REGIONAL FLOODLINE
- DRAINAGE AREA BOUNDARY TO THE TEMPORARY SWM POND
- DRAINAGE AREA (Ha.)
- IMPERVIOUS LEVEL (%)

mattamyHOMES

RAND

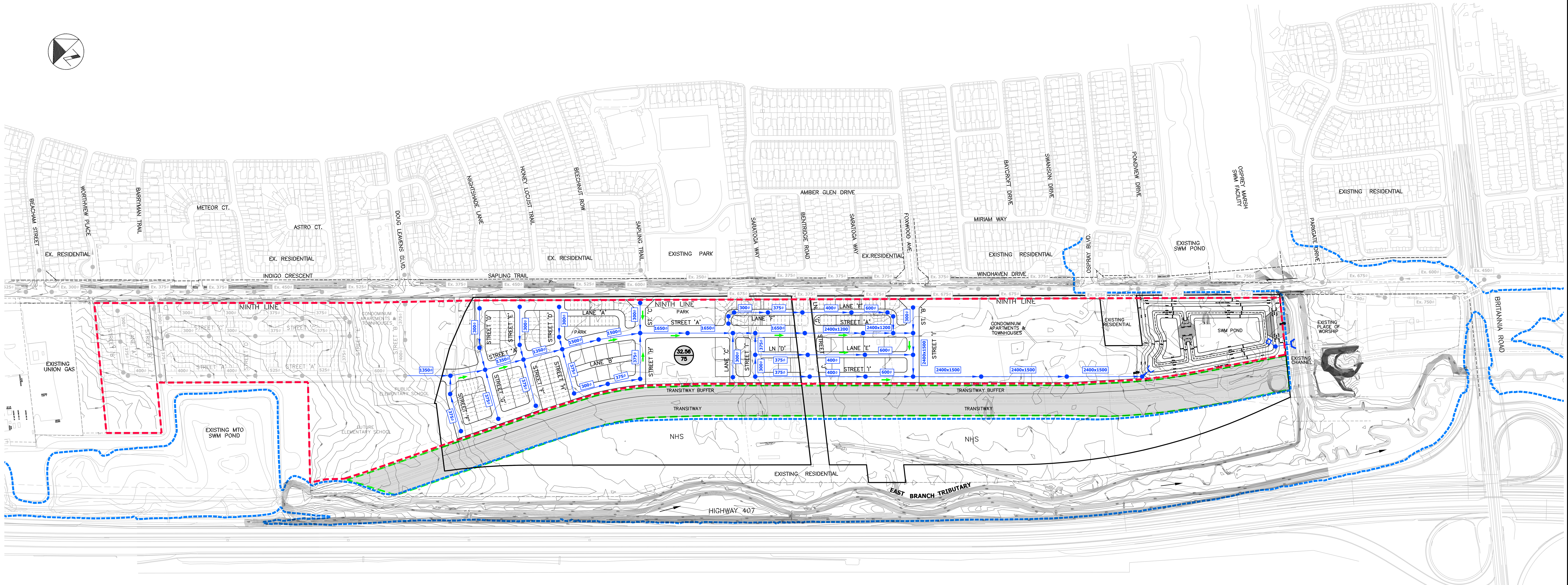
5285 SOLAR DRIVE
MISSISSAUGA, ONTARIO
L4W 5B8
TEL. (905) 625-9500

DERRY BRITANNIA DEVELOPMENTS LIMITED
NINTH LINE LANDS

PRELIMINARY
STORM DRAINAGE PLAN-PHASE 1

CITY OF MISSISSAUGA

SCALE 1:3,000	JOB No. 13958	DRAWING No. 2



LEGEND

EXISITNG STORM SEWER

PROPOSED STORM SEWER

MAJOR SYSTEM FLOW

POST DEVELOPMENT REGIONAL FLOODLINE

DRAINAGE AREA BOUNDARY TO THE TEMPORARY SWM POND

DRAINAGE AREA (Ha.)
IMPERVIOUS LEVEL (%)

mattamyHOMES

RAND

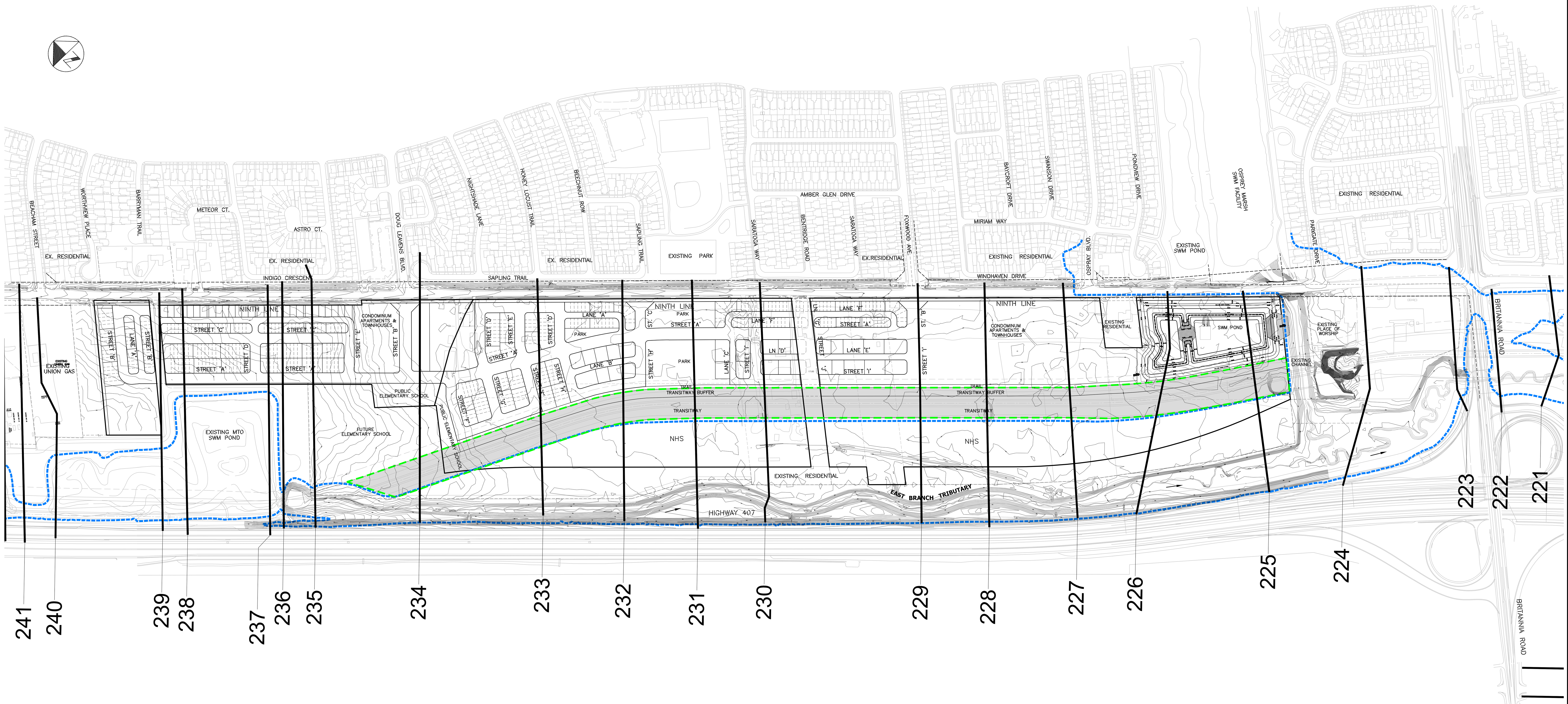
5285 SOLAR DRIVE
MISSISSAUGA, ONTARIO
L4W 5B8
TEL. (905) 625-9500

DERRY BRITANNIA DEVELOPMENTS LIMITED
NINTH LINE LANDS

STORM DRAINAGE PLAN-PHASE 2

CITY OF MISSISSAUGA		DRAWING No.
SCALE 1:3,000	JOB No. 13958	3

R:\13\13958\Drawings & Figures\2019 May 27, 2019 (Latest)\Drawing 3- Preliminary Storm Drainage Plan-Phase 2.dwg Jun 11, 2019 - 6:37pm



LEGEND

POST DEVELOPMENT REGIONAL FLOODLINE

224 HEC-RAS CROSS SECTION LOCATION

LIMIT OF THE TRANSITWAY BERM CONSTRUCTION

mattamyHOMES

RAND

5285 SOLAR DRIVE
MISSISSAUGA, ONTARIO
L4W 5B8
TEL. (905) 625-9500

DERRY BRITANNIA DEVELOPMENTS LIMITED
NINTH LINE LANDS

FLOODPLAIN MAPPING
POST DEVELOPMENT CONDITIONS

CITY OF MISSISSAUGA			DRAWING No.
SCALE 1:3,000	JOB No.	13958	4

R:\13\13958\Drawings & Figures\2019 May 27, 2019 (Latest)\Drawing 4– FloodPlain Mapping–Post Development Conditions–Phase 2.dwg Jun 11, 2019 – 6:34pm

LEGEND

EXISTING SANITARY SEWER

PROPOSED SANITARY SEWER

FUTURE SANITARY SEWER (BY OTHERS)

PROPOSED SANITARY CONNECTION

mattamyHOMES

RAND ENGINEERING CORPORATION

5285 SOLAR DRIVE
MISSISSAUGA, ONTARIO
L4W 5B8
TEL. (905) 625-9500

DERRY BRITANNIA DEVELOPMENTS LIMITED
NINTH LINE LANDS

PRELIMINARY
WASTEWATER SERVICING PLAN-PHASE 1

CITY OF MISSISSAUGA

SCALE 1:3,000	JOB No. 13958	**DRAWING No.** 5

R:\13\13958\Drawings & Figures\2019 May 27, 2019 (Latest)\Drawing 5- Preliminary Wastewater Servicing Plan-Phase 1.dwg Jun 13, 2019 - 3:20pm

LEGEND

EXISTING SANITARY SEWER

PROPOSED SANITARY SEWER

mattamyHOMES

RAND

5285 SOLAR DRIVE
MISSISSAUGA, ONTARIO
L4W 5B8
TEL. (905) 625-9500

DERRY BRITANNIA DEVELOPMENTS LIMITED
NINTH LINE LANDS

PRELIMINARY
WASTEWATER SERVICING PLAN-PHASE 2

CITY OF MISSISSAUGA		DRAWING No.
SCALE 1:3,000	JOB No. 13958	6

R:\13\13958\Drawings & Figures\2019 May 27, 2019 (Latest)\Drawing 6- Preliminary Wastewater Servicing Plan-Phase 2.dwg Jun 13, 2019 – 3:26pm

LEGEND

Ex. 150 WM — EXISTING WATERMAIN (SIZE mm)

PROPOSED WATERMAIN (SIZE mm)

PROPOSED WATERMAIN BY OTHERS

PROPOSED WATERMAIN CONNECTION

mattamyHOMES

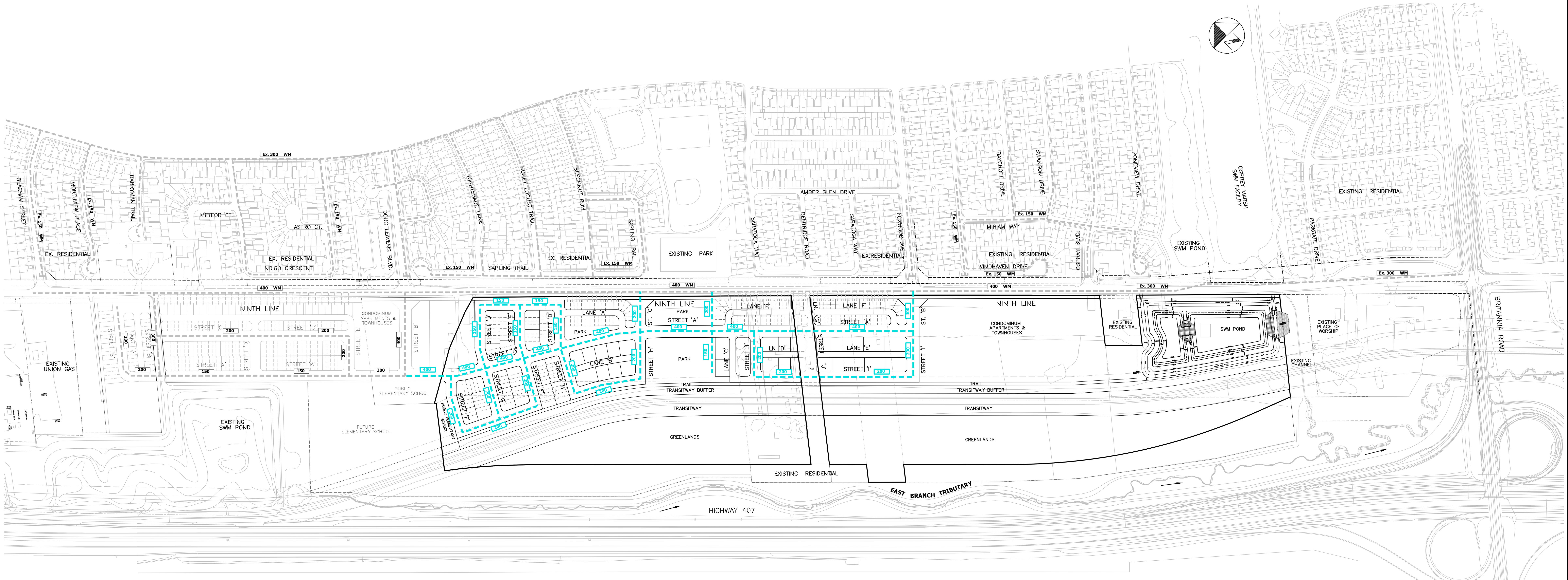
RAND

5285 SOLAR DRIVE
MISSISSAUGA, ONTARIO
L4W 5B8
TEL. (905) 625-9500

DERRY BRITANNIA DEVELOPMENTS LIMITED
NINTH LINE LANDS

PRELIMINARY
WATER SERVICING PLAN-PHASE 1

CITY OF MISSISSAUGA		DRAWING No.
SCALE 1:3,000	JOB No. 13958	7



LEGEND

Ex. 150 WM — EXISTING WATERMAIN (SIZE mm)

PROPOSED WATERMAIN (SIZE mm)

EXISTING WATERMAIN CONNECTION

mattamyHOMES

RAND

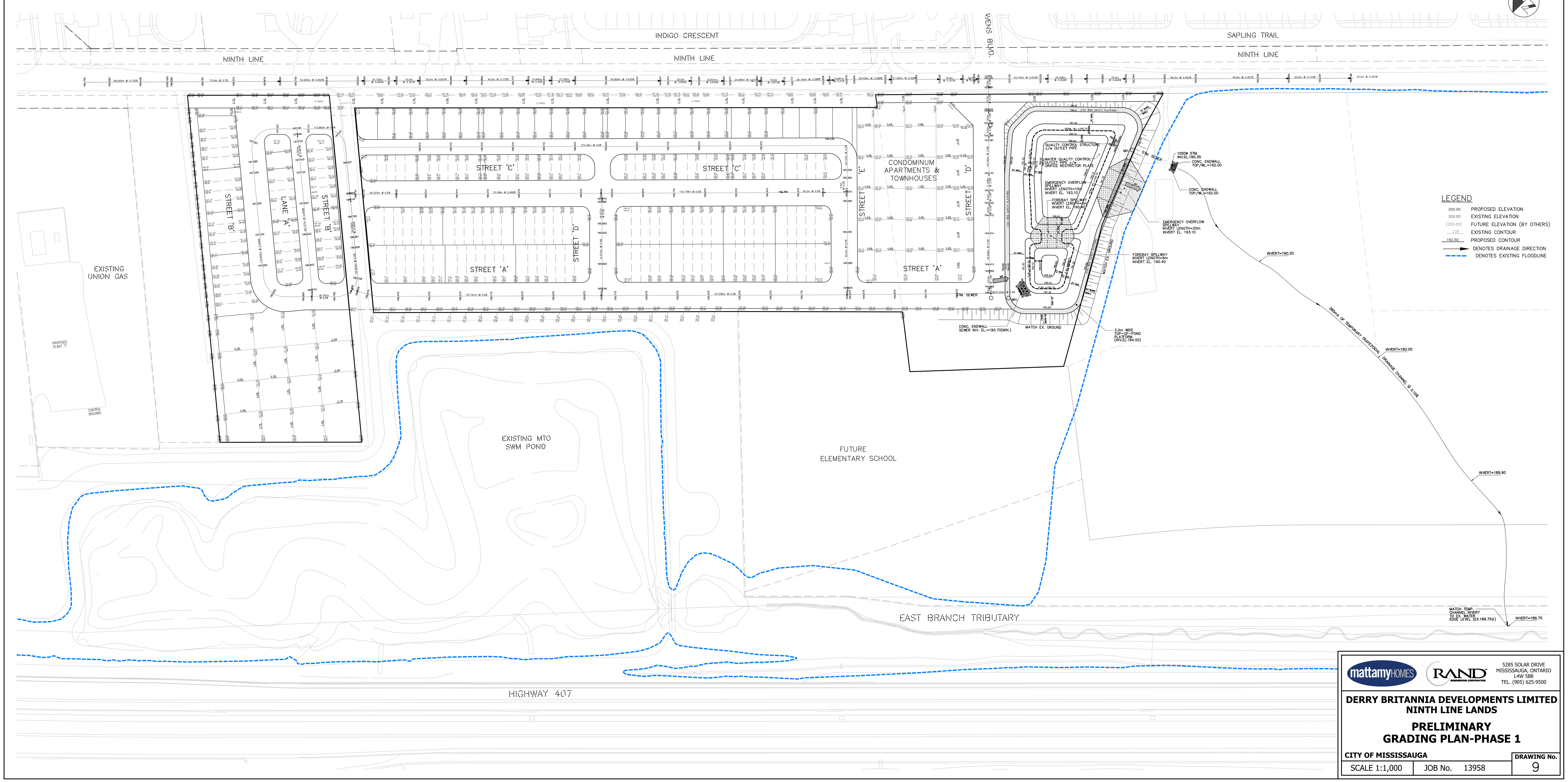
5285 SOLAR DRIVE
MISSISSAUGA, ONTARIO
L4W 5B8
TEL. (905) 625-9500

DERRY BRITANNIA DEVELOPMENTS LIMITED
NINTH LINE LANDS

PRELIMINARY
WATER SERVICING PLAN-PHASE 2

CITY OF MISSISSAUGA		DRAWING No.
SCALE 1:3,000	JOB No. 13958	8

R:\13\13958\Drawings & Figures\2019 May 27, 2019 (Latest)\Drawing 8- Preliminary Water Servicing Plan-Phase 2.dwg Jun 11, 2019 – 6:19pm



5285 SOLAR DRIVE
MISSISSAUGA, ONTARIO
L4W 5B8
TEL. (905) 625-9500

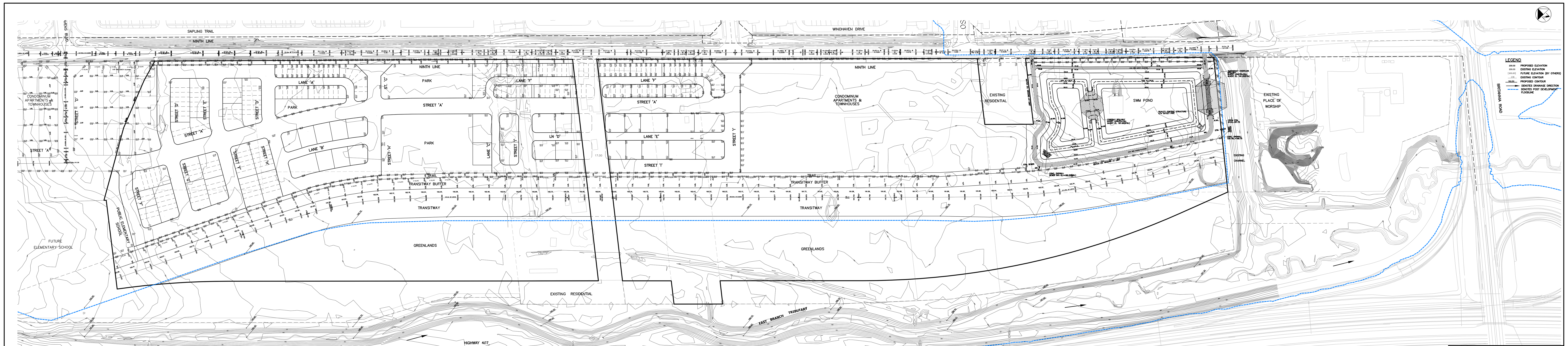
DERRY BRITANNIA DEVELOPMENTS LIMITED
NINTH LINE LANDS

PRELIMINARY GRADING PLAN-PHASE 1

CITY OF MISSISSAUGA

SCALE 1:1,000	JOB No. 13958	**DRAWING No.** 9

R:\13\13958\Drawings & Figures\2019 May 27, 2019 (Latest)\Drawing 9- Preliminary Grading Plan-Phase 1.dwg Jun 12, 2019 - 4:16pm



5285 SOLAR DRIVE
MISSISSAUGA, ONTARIO
L4W 5B8
TEL. (905) 625-9500

DERRY BRITANNIA DEVELOPMENTS LIMITED
NINTH LINE LANDS

PRELIMINARY
GRADING PLAN-PHASE 2

CITY OF MISSISSAUGA

SCALE 1:1,000	JOB No. 13958	DRAWING No. 10