

Appendix C

Sanitary Analysis

Sanitary Design Calculations

Sanitary Capacity Analysis

3400 Dufferin Street

Sanitary Sewer Design Sheet

Mixed-Use Development



NOTES: Post-development domestic sewage flow based upon a unit flow of 450.0 Lpcd.

Maximum flow velocity for pipe flowing full = 3.0 m/s.

Minimum flow velocity for pipe flowing partially full (actual flow) = 0.6 m/s.

Infiltration= 0.26 L/s/ha

Mannings= 0.013

Project Name: 3400 Dufferin Street

Project Number: 139570

Date: July 28, 2022

Designed By: Jason Jenkins, P.Eng.

	From	To	DESIGN FLOW CALCULATIONS										SEWER DESIGN & ANALYSIS						Notes	
			Area (ha)	Density	Population	Cumulative Area (ha)	Cumulative Population	Peaking Factor	Sewage Flow (L/s) (1)	Infiltration Flow (L/s) (2)	Ground Water (L/s) (3)	Total Flow, Qd (L/s) (1)+(2)+(3)	Nominal Diameter (mm)	Pipe Slope (%)	Pipe Length (m)	Full Flow Capacity, Qf (L/s)	Full Flow Velocity (m/s)	Actual Velocity V (m/s)		Percent of Full Flow (%)
Pre-Development			1.6680		34	1.6680	34	-	0.097	0.434	0.0	0.5								
Post-Development Services																				
Block B (Building A)	Control MH1A	Street C	0.4046		702	0.4046	702	3.89	14.227	0.105	0.0	14.3	200	2.00%	10.0	48.4	1.49	1.30	29.6%	
Block D (Building B)	Control MH2A	Street C	0.4079		672	0.4079	672	3.90	13.670	0.106	0.0	13.8	200	2.00%	10.0	48.4	1.49	1.29	28.5%	
Block E (Building C)	Control MH3A	Street C	0.1811		136	0.1811	136	4.20	2.974	0.047	0.0	3.0	150	2.00%	10.0	22.5	1.23	0.86	13.4%	
Post-Development Sewers																				
Block C + D + E + F	MH1A	MH2A	1.0809		808	1.0809	808	3.86	16.234	0.281	0.0	16.5	250	1.00%	42.8	62.0	1.22	1.04	26.6%	
Block B + C + D + E + F	MH2A	MH3A	0.4046		702	1.4855	1509	3.68	28.912	0.386	0.0	29.3	250	0.50%	75.3	43.9	0.87	0.93	66.8%	
Block A + B + C + D + E + F	MH3A	MH4A	0.1825		1,509	1.6680	1509	3.68	28.912	0.434	0.0	29.3	250	0.50%	6.9	43.9	0.87	0.93	66.8%	
Block A + B + C + D + E + F	MH4A	EX. MH5A	1.6680		1,509	1.6680	1509	3.68	28.912	0.434	0.0	29.3	250	0.50%	62.3	43.9	0.87	0.93	66.8%	

Pre-Development			
	Fir Area	Density	Population
Existing Commercial	3055 m2	1.1 pp/100m2	34

Block B (Building A)			
	Units	Density	Population
1 Bedroom	219	1.4 pp/unit	307
2 Bedroom	129	2.1 pp/unit	271
3 Bedroom	40	3.1 pp/unit	124
Retail		1.1 pp/100m2	0
Units =	388	Pop. =	702

Block D (Building B)			
	Units	Density	Population
1 Bedroom	224	1.4 pp/unit	314
2 Bedroom	109	2.1 pp/unit	229
3 Bedroom	38	3.1 pp/unit	118
Retail	1079 m2	1.1 pp/100m2	12
Units =	371	Pop. =	672

Block E (Building C)			
	Units	Density	Population
1 Bedroom	47	1.4 pp/unit	66
2 Bedroom	20	2.1 pp/unit	42
3 Bedroom	8	3.1 pp/unit	25
Retail	289 m2	1.1 pp/100m2	3
Units =	75	Pop. =	136

Total Units = **834 units** Total Pop. = **1,509**

Overall Subdivision (Areas)	
Block A	1,825
Block B	4,046
Block C	1,049
Block D	4,079
Block E	1,811
Block F	3,870
Total Area:	16,680



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Final Report

Sanitary Sewer Capacity Assessment

3400 Dufferin Street Development,
Toronto, ON



Prepared for Collecdev
by IBI Group

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July 2022

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July 22, 2022
Reference No. 139570

Sent via Email

Collecdev
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Attention:

Re: Sanitary Sewer Capacity Assessment
3400 Dufferin Street,
Toronto, ON

Please find the enclosed Sanitary Sewer Capacity Analysis Report by IBI Group for the above noted project. The analysis reviews the capacity of the sanitary sewers receiving sanitary flow from the proposed development site. The sanitary capacity analysis was conducted using information from the InfoWorks Model created as part of the City of Toronto's Basement Flooding EA for Study Area 16.

In order to facilitate the review of sewer capacity analysis, it is provided in a separate report.

Best Regards,

IBI Group.

Cassidy Goetz
Project Analyst
Municipal Systems

CG/mm

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1 Background

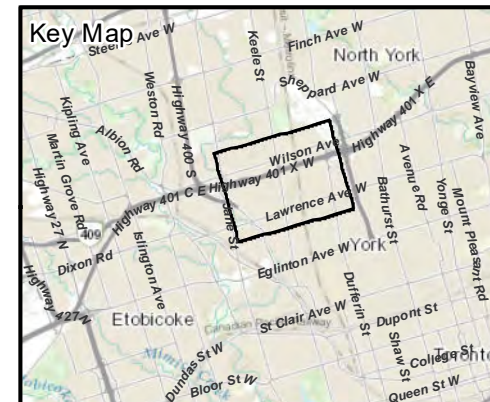
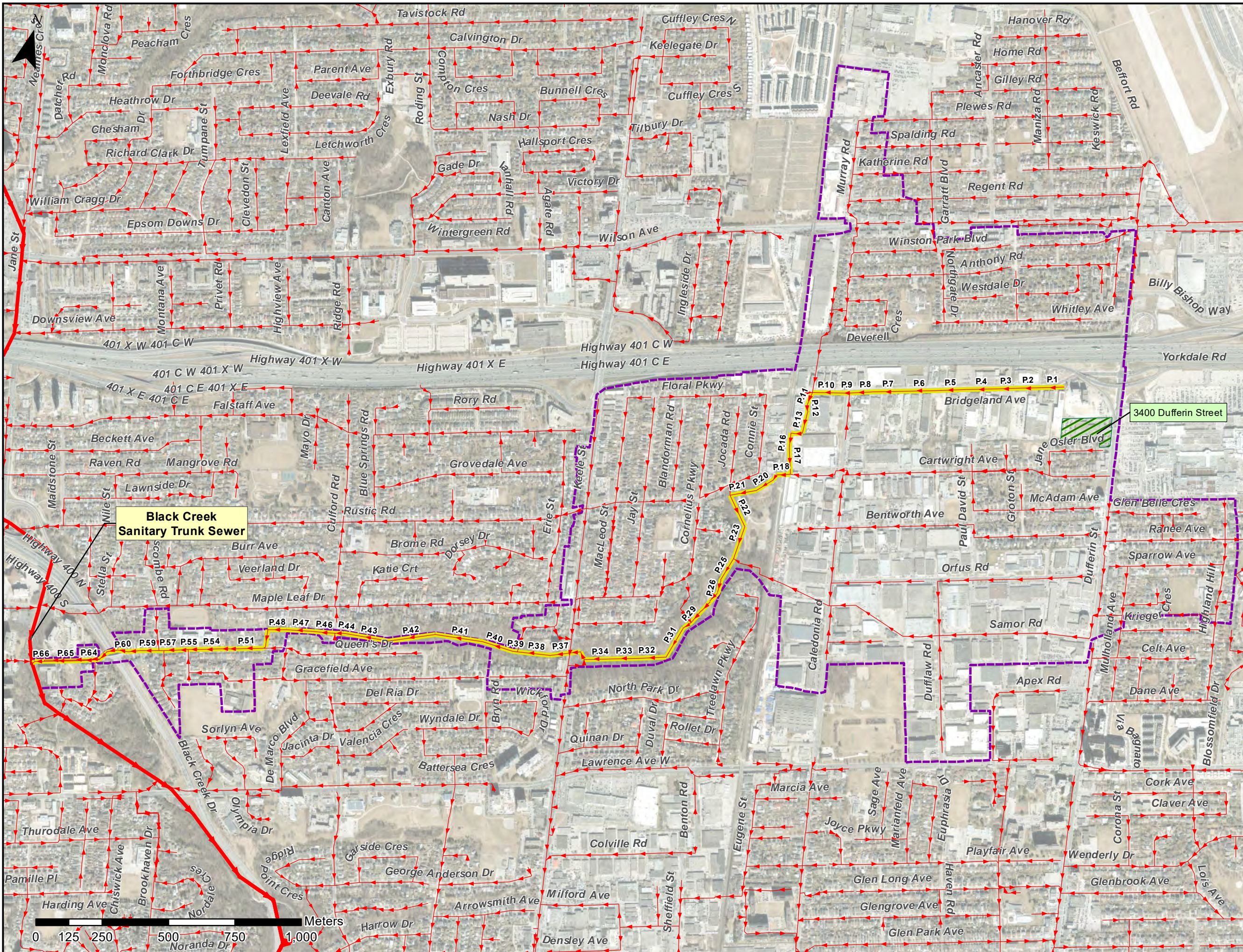
IBI Group Professional Services (Canada) Inc. (IBI Group) has been retained by Collecdev (the “Owner”) to prepare a Sanitary Capacity Assessment report for a proposed mixed-use development located at 3400 Dufferin Street (the “Subject Site”), in the City of Toronto (the “City”). Analysis is conducted on the sewers receiving sanitary discharge from the proposed development site to the nearest trunk sewer (Black Creek Sanitary Trunk Sewer) located on Black Creek Drive.

The development site is located within the City’s Basement Flooding Study Area 16 (“BF16”). The basement flooding model for BF16 was completed in 2012. Therefore, the dynamic InfoWorks model for BF16 was obtained from the City on June 8th, 2022 and used to conduct the sewer capacity analysis.

The following background and supporting information was used:

- InfoWorks Sewer Model prepared as part of the City’s Basement Flooding EA Study for Study Area 16 (the “BF16 Model”)
- City’s GIS information including land parcels, sanitary sewers, and sanitary manholes
- The Engineering Design Guidelines for the City of Toronto dated July 2021
- Development site statistics as per gh3 Architects dated July 18th, 2022
- Sewershed Area 16 Investigations of Basement Flooding Class Environmental Assessment dated August 2012
- Google Maps Overhead Satellite Imagery, Google Street View, & ESRI Base maps.

Figure 1-1 on the following page, shows the site location, analyzed sewers, and nearest trunk.



- Legend**
- Sanitary Sewer
 - Analyzed Line
 - Sanitary Trunk Sewer
 - Development Site
 - Drainage Area

Note: Only sanitary pipes are shown for clarity.

**Figure 1-1
Analysis Overview**

3400 Dufferin Street
Sanitary Capacity Analysis
City of Toronto



Project No.: 139570	Date: July 2022
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2 Subject Property

Located at 3400 Dufferin Street in the City of Toronto at postal code M6A 2V1, the 1.67 ha subject site is bounded by Dufferin Street to the east, several single family dwellings and Jane Osler Boulevard to the south, an existing commercial building to the west, and 3450 Dufferin Street to the north which is currently under construction.

The site is located within the City's Basement Flooding Area 16 (BF16) and is serviced by a fully separated sanitary system.

2.1 Existing Site

The development site currently discharges sanitary flow to a circular 250mm diameter sanitary sewer running west along Jane Osler Boulevard. The existing site is occupied by a commercial building. The City's Sewer Capacity Assessment Guidelines (July 2021) design criteria was referenced in order to determine the equivalent population of the existing and proposed sites. The existing site population is outlined below in **Table 2-1**.

Table 2-1 Existing Development Population

UNIT TYPE	UNIT COUNT OR AREA	POPULATION DENSITY	TOTAL POPULATION
Commercial	3091m ²	1.1 people/100m ²	34
Total:			34 Capita

The calculated pre-development flow contribution to the sanitary network is:

- Pre-Development Flow = $(\text{Pop} \times 250\text{L/cap/day})/86400 + \text{Infiltration Allowance}$
- Pre-Development Flow = $(34 \times 250)/86400 + (0.26 \times 1.668)$
- Pre-Development Flow = **0.53L/s**

2.2 Proposed Site

The proposed development site will consist of a 29-storey residential building, a 29-storey mixed-use building and a 9-storey mixed use building. The proposed site discharge will be serviced by a new 300mm sanitary sewer that conveys the flow north to the existing 300mm sanitary sewer on Bridgeland Avenue. The proposed site statistics per the site package provided by gh3 Inc., dated July 18, 2022, can be seen in **Table 2-2** on the following page.

Table 2-2 Proposed Development Population

BUILDING A			
	UNITS / AREA (m ²)	DENSITY	POP.
1 Bedroom	230	1.4	322
2 Bedroom	109	2.1	229
3 Bedroom	49	3.1	152
TOTAL			703
BUILDING B			
	UNITS / AREA (m ²)	DENSITY	POP.
1 Bedroom	241	1.4	337
2 Bedroom	94	2.1	197
3 Bedroom	38	3.1	118
Retail	1079	1.1	12
TOTAL			664
BUILDING C			
	UNITS / AREA (m ²)	DENSITY	POP.
1 Bedroom	45	1.4	63
2 Bedroom	19	2.1	40
3 Bedroom	11	3.1	34
Retail	288	1.1	3
TOTAL			140

The calculated post-development flow contribution to the sanitary network is:

Building A

$$Q_{\text{Building A}} = \left(\frac{240 \text{ L/c}\cdot\text{d} \cdot 703 \text{ pers} \cdot 3.89}{86400 \text{ s / day}} \right) + (0.26 \text{ L/s}\cdot\text{ha} \cdot 0.4061 \text{ ha}) = 7.65 \text{ L/s}$$

Building B

$$Q_{\text{Building B}} = \left(\frac{240 \text{ L/c}\cdot\text{d} \cdot 653 \text{ pers} \cdot 3.91}{86400 \text{ s / day}} \right) + \left(\frac{250 \text{ L/c}\cdot\text{d} \cdot 12 \text{ pers}}{86400 \text{ s / day}} \right) + (0.26 \text{ L/s}\cdot\text{ha} \cdot 0.4082 \text{ ha}) = 7.23 \text{ L/s}$$

Building C

$$Q_{\text{Building C}} = \left(\frac{240 \text{ L/c}\cdot\text{d} \cdot 137 \text{ pers} \cdot 4.2}{86400 \text{ s / day}} \right) + \left(\frac{250 \text{ L/c}\cdot\text{d} \cdot 3 \text{ pers}}{86400 \text{ s / day}} \right) + (0.26 \text{ L/s}\cdot\text{ha} \cdot 0.1811 \text{ ha}) = \mathbf{1.65 \text{ L/s}}$$

Overall Subdivision

$$Q_{\text{Subdivision}} = 7.65 \text{ L/s} + 7.23 \text{ L/s} + 1.65 \text{ L/s} = \mathbf{16.53 \text{ L/s}}$$

For details of flow calculations for existing and proposed re-development site, refer to **Appendix SAN-A**.

2.3 Groundwater Discharge

Due to watertight foundation, no long-term groundwater will be discharged to the existing sanitary sewers.

3 Capacity Analysis

The proposed development site is located in the City's Basement Flooding Study Area 16. The analysis was conducted using InfoWorks ICM software. The InfoWorks model of BF16 was provided to the project team and was used to complete the analysis. Any infrastructure upgrades and recent developments since completion of the model were added to produce the "updated model". These changes are described in **Section 4**.

Four scenarios were defined in the updated model to assess sewer conditions before and after the completion of the proposed development site. Historical rainfall data from May 12th, 2000, was used to evaluate the system under wet weather conditions.

The following assumptions were made when performing the analysis:

- The City's design criteria is valid to establish theoretical population for the proposed re-development site.
- The City's design criteria is valid to establish theoretical population flow generated for the proposed development site. Accordingly, average per capita flow rates of 240L/capita/day for residential population, and 250L/capita/day for Industrial, Commercial and Institutional (ICI) populations can be applied.
- The analysis can be conducted by assessing the difference in the system performance between the existing and proposed scenarios under both dry weather conditions and wet weather flow conditions.

In the sanitary sewer capacity analysis, the following have been verified and incorporated in the model:

- Verification the sewer analysis model correctly represents the sewer system, including any updates to the sewer analysis to reflect changes (i.e. sewer construction) since the model was initially prepared.
- The model has been updated to include all sanitary peak flow rates from groundwater being discharged to the municipal sanitary system from all active and recent development applications located within the affected sanitary sewershed.

- Best efforts have been made to include all peak flows from Private Water discharge agreements in the sanitary sewershed.

4 Model Preparation

A review of available data was undertaken in order to update and verify the received BF Model. No Subsurface Utility Engineering (SUE) work or field surveys were undertaken to further verify the accuracy of the received pipe network. Development applications, building permits and building inspection records for the surrounding area were also reviewed from the City's website (www.toronto.ca). Changes in population and land use discovered through this review were incorporated into the updated model. No changes were made to the model outside the study area.

4.1 Recent Developments

Developments relevant to the analysis were included as "Recent Developments" within the model. **Figure 4-1** illustrates all recent developments located within the site drainage area.

A relevant development is considered as any development with an approved, active or under review Site Plan Application, since the development of the BF Model. Any developments that are directly contributing to the sewer network under analysis, or any change in wastewater flow approved since the creation of the BF16 model were also considered. Six (6) such developments were considered and incorporated into the model under both the existing and proposed scenarios.

The increases in site populations, as provided by the City or calculated from Google Maps imagery were applied to the corresponding subcatchments with the design per capita rate of 240L/cap/day. The calibrated wastewater pattern for the area was then applied. This methodology is in line with the future population flow estimation applied during Basement Flooding EA Model development.

The base flow for the relevant development lots were set to the City's Design Infiltration rate of 0.26 L/s/ha. The relevant developments, similar to the proposed development site, are not expected to be subjected to the extreme wet weather infiltration rate. The RTK response from these developments was removed. The private discharge and groundwater pump rates were applied as base flows in the model from all applicable lots. Refer to **Table A-2** in **Appendix SAN - A** for a full list of assessed developments within the BF16 Study Area.

4.2 Model Updates

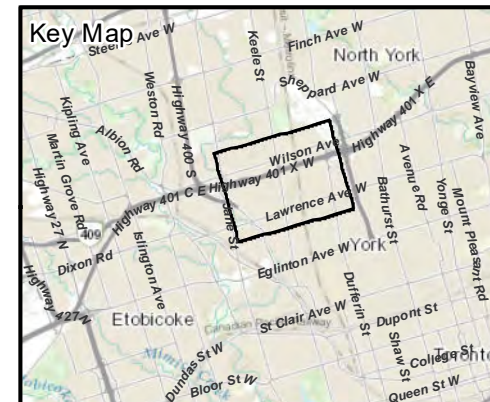
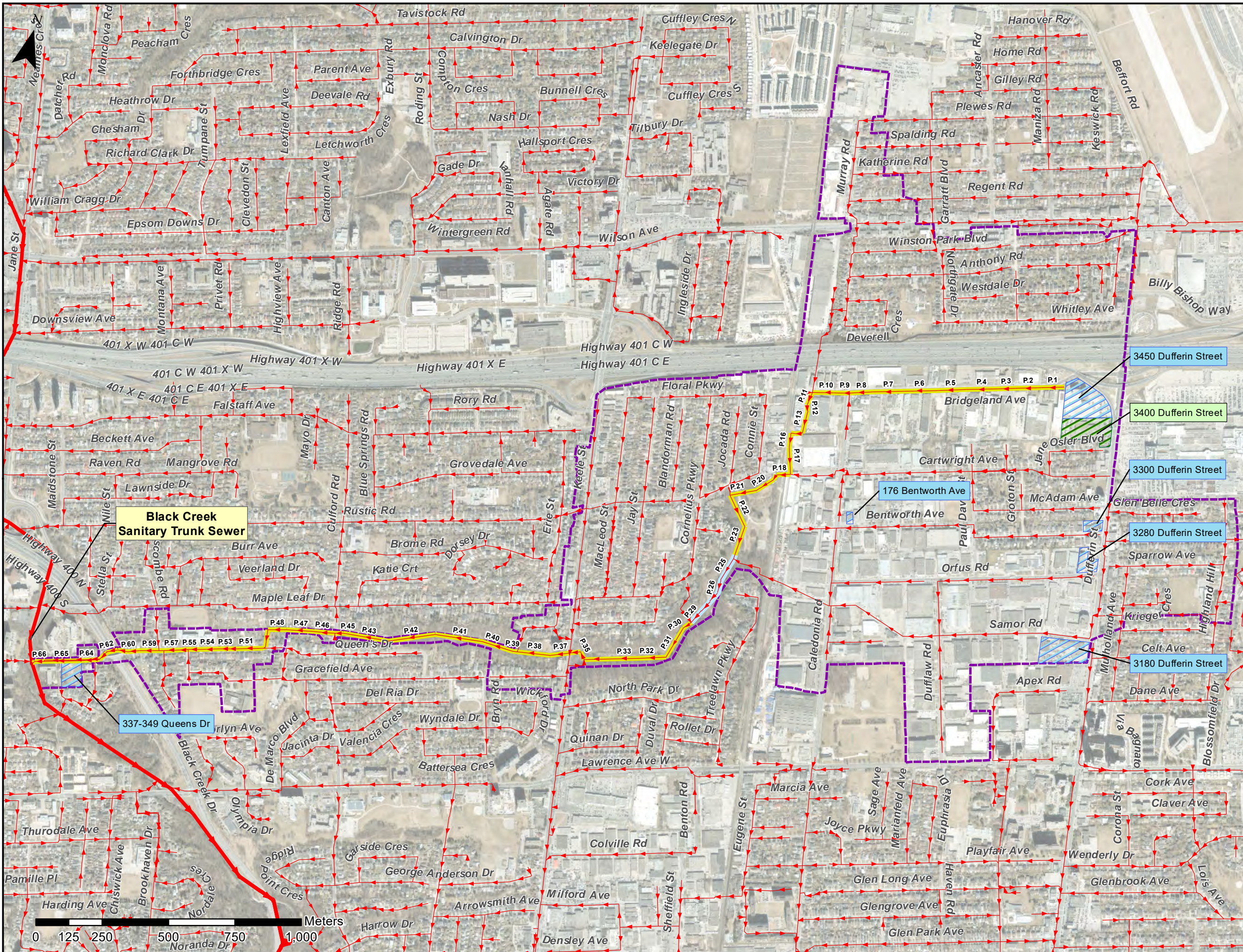
As outlined in the Sewershed Area 16 Investigations of Basement Flooding Class Environmental Assessment, storage and pipe upgrades within the North Park Ravine have been recommended. These upgrades were completed in 2016 (post-completion of the BF model) and have been included into the base condition of the provided BF 16 model. Upgrade details are outlined in the As-Built plan and profile drawings provided by the City. Refer to **Appendix SAN - A** for illustrations of the As-Built drawings and associated data release documentation.

Table 4-1 below provides a summary of specifications for the upgraded pipe segments.

Table 4-1 North Park Ravine EA Upgrade Summary

As-Built Drawing ID	Size (mm)	U/S Node	U/S Invert (m)	DS/ Node	D/S Invert (m)	Slope (%)
U-19224-004	900	NP1 (Previously MH4173906973)	159.16	NP2	158.86	0.40
U-19224-004 & 003	1050	NP2	158.71	NP3	158.62	0.15
U-19224-003	450	NP3	157.93	NP4	157.89	0.12
U-19224-003 & 002	450	NP4	157.89	NP5	157.66	0.30
U-19224-002	525	NP5	157.58	NP6 (Previously MH4146206886)	157.34	0.31

Figure 4-1 on the following page illustrates the locations of the above noted upgrades.



- Legend**
- Sanitary Sewer
 - EA Upgrades
 - Analyzed Line
 - Sanitary Trunk Sewer
 - Relevant Developments
 - Drainage Area
 - Development Site

Note: Only sanitary pipes are shown for clarity.

**Figure 4-1
Model Changes Overview**

3400 Dufferin Street
Sanitary Capacity Analysis
City of Toronto



Project No.: 139570	Date: July 2022
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5 Modeling Analysis

The analysis results based on the modeling work is provided in this section.

5.1 Downstream Sanitary Sewer Analysis Scenarios

Analysis was performed on all receiving sewers from the proposed development location up to the receiving trunk sewer. The analysis does not include the proposed servicing connection to the existing sanitary sewer on Bridgeland Avenue, as these pipes are assumed to be designed correctly.

Four (4) scenarios were considered for the sewer capacity analysis including both dry and wet weather conditions. All scenarios were performed on the existing municipal sewer network.

Table 5-1 summarizes the scenario conditions used for the capacity assessment.

The results of the downstream capacity analysis scenarios are summarized in the following sections. **Appendix SAN - B** contains the detailed results sheets for each analysis scenario along with supporting thematic mapping and hydraulic grade line profiles (HGLs).

Table 5-1 Analysis Scenarios

Scenario	Flow from Development Site to Jane Osler (L/s)	Flow from Development Site to Bridgeland (L/s)	Rainfall Applied
Scenario 1: Existing Dry Weather Condition	0.53 ¹	0	None
Scenario 2: Proposed Dry Weather Condition	0	16.53 ²	None
Scenario 3: Existing Wet Weather Condition	0.53 ¹	0	May 12, 2000
Scenario 4: Proposed Wet Weather Condition	0	16.53 ²	May 12, 2000

1: Existing site discharges flow to 250mm sanitary sewer on Jane Osler Boulevard

2: Proposed site discharges flow to 300mm sanitary sewer on Bridgeland Avenue

Scenario 1: Existing Dry Weather Flow Conditions

This scenario evaluates the downstream sewer capacity under existing dry weather flow conditions. No storm event is considered in this scenario.

Simulation results for this scenario indicate that the existing sanitary sewers operate under free flow conditions. The maximum pipe diameter utilization downstream of the development site is 48.3%, corresponding to segment P.08.

Scenario 2: Proposed Dry Weather Flow Conditions

This scenario evaluates the downstream sewer capacity under existing dry weather flow with the inclusion of the estimated flows from the proposed development site. No storm event is considered in this scenario.

Simulation results for this scenario indicate that the existing sanitary sewers operate under free flow conditions. The maximum pipe utilization downstream of the development site is 80.7%, corresponding to segment P.08.

Scenario 3: Existing Wet Weather Flow Conditions

This scenario evaluates the downstream sewer capacity with the May 12, 2000 design rainfall event applied and under existing conditions at the time of analysis. The proposed flows from the development site were not included in this scenario.

Simulation results show that the system is experiencing minor surcharging (freeboard < 1.8m) in seventeen (17) pipe segments and critical surcharging (freeboard < 1.8m) in twelve (12) pipe segments. The minimum level of freeboard is 0.76m. The pipes experiencing critical surcharging are located along a section of the analyzed line that does not contain servicing connections from private properties.

Scenario 4: Proposed Wet Weather Flow Conditions

This scenario evaluates the downstream sewer capacity with an extreme rainfall event and proposed discharge from development site. The May 12, 2000 design storm was applied in this scenario.

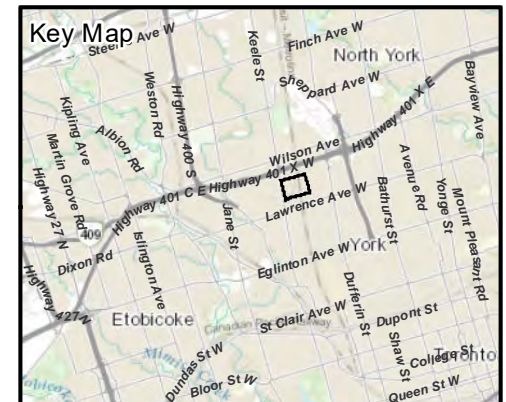
Simulation results show that the system is experiencing minor surcharging in twenty-one (21) pipe segments, and critical surcharging in fourteen (14) pipe segments. The minimum level of freeboard is 0.32m. The pipes experiencing critical surcharging are located along a section of the analyzed line that does not contain servicing connections from private properties.

5.2 North Park Ravine Sanitary Sewer Lateral Analysis

Under wet weather flow conditions, the existing and proposed analysis scenarios of the sewers downstream from the development site result in twelve (12) and fourteen (14) pipe segments respectively, that experience critical surcharging. These pipes are located within the North Park Ravine, where no private sewer connections are present. The minimum level of surcharging along these pipes is expected to be 0.32m, which is more than the minimum level of freeboard allowed under the Sewer Capacity Assessment Guidelines (July 2021) for areas that do not service adjacent lots. Under these conditions, the low levels of available freeboard are considered acceptable.

This section of sewer has three (3) local lateral connections along its length. To determine the effect of the above noted increase in HGL, a select number of sewer legs for each lateral connection have been assessed under both existing and proposed wet weather flow conditions. **Figure 5-1** highlights the analyzed lateral sewer segments. **Appendix SAN - B** presents the detailed results sheets for each lateral analysis scenario along with HGL profiles.

The results of the lateral analysis indicate that the HGL and freeboard issues experienced along the North Park Ravine sewer segments are isolated and do not continue upstream into the lateral connections. In all three laterals, the pipe segments upstream from the critically surcharged pipes meet the City's level of service. There is one location along lateral 1 (MH_NP1) and one location along lateral 3 (MH_NP6) where critical surcharging is still being experienced. Both locations are within the North Park Ravine, and as such do not represent a risk of basement flooding for the nearby residential connections via the applicable lateral.



- Legend**
- Sanitary Manhole
 - Sanitary Sewer
 - Analyzed Line
 - Sanitary Trunk Sewer
 - ▭ Drainage Area
- HGL Level**
- Free Flow
 - Surcharging (Freeboard > 1.8m)
 - Critical Surcharging (Freeboard < 1.8m)
 - Flow to Surface

Note: Only sanitary pipes are shown for clarity.

Analysis Parameters	
Storm Event	May 12, 2000
Development Flow	0.53 L/s

**Figure: SAN-B-5
Scenario L-1: Existing WWF**

3400 Dufferin Street
Sanitary Capacity Analysis
City of Toronto



Project No.:	Date:
139570	July 2022

5.3 Summary of Results

In summary, according to the modeling results:

- During Dry Weather Scenarios: The existing sanitary sewers have sufficient capacity to service the proposed development site. No sewer surcharging is expected.
- During Wet Weather Scenarios: The pre and post-development condition of the existing sewers downstream of the site do not meet the City's desired level of service.
 - However, the pipes that are experience critical surcharging are located within the North Park Ravine where no private sewer connections are present. Therefore, these pipe conditions are considered acceptable due to the criteria exceptions outlined in Section 2.3 of the City's sewer capacity guidelines, dated July 2021.
- Local lateral connections to the critically surcharged sewer segments meet the City's desired level of service during pre and post development wet weather scenarios.

6 Conclusion

The analysis was conducted using InfoWorks ICM software. The InfoWorks model of BF16 was provided to the project team and was used to complete the analysis. Any infrastructure upgrades and recent developments since completion of the model were added to produce the "updated model".

Four (4) scenarios were defined in the updated model to assess sewer conditions before and after the completion of the proposed development site. Historical rainfall data from May 12th, 2000, was applied to evaluate the system under wet weather conditions.

The existing sanitary sewers downstream of the proposed development site, are expected to experience critical surcharging under the May 12, 2000 rainfall event, however these pipe segments are located within the North Park Ravine area and are not expected to service adjacent properties. The minimum level of surcharging along these pipes is expected to be 0.32m, which is more than the minimum level of freeboard allowed under the Sewer Capacity Assessment Guidelines (July 2021) for areas that do not service adjacent lots.

It can therefore be concluded that the receiving downstream sanitary system has sufficient capacity and the proposed development is not likely to increase the risk of basement flooding.

Appendix SAN-A

Background Information

Table: SAN-A-1

Development Site Area*:	1.668	ha	*Excess Site Area is attributed to new roadways
Building A Site Area	0.406	ha	
Building B Site Area	0.408	ha	
Building C Site Area	0.181	ha	

Existing Site Flows

Unit Count					
	Count		Rate		Pop
Commercial	3091		1.1		34
	Total:				34
ICI Flow Gen. Rate	250	L/cap/day	I-I Rate	0.26	L/s/ha
DWF	0.10	L/s	I-I Flow	0.43	L/s
Total Existing DWF*:	0.53	L/s			

*Existing site flows are discharged to 250mm sanitary sewer on Jane Osler Boulevard

Proposed Site Flows

Building A					
	Count		Rate		Pop
1 Bedroom	230		1.4		322
2 Bedroom	109		2.1		229
3 Bedroom	49		3.1		152
	Total Proposed Res Pop.				703
Building B					
	Count		Rate		Pop
1 Bedroom	241		1.4		337
2 Bedroom	94		2.1		197
3 Bedroom	38		3.1		118
Retail	1079		1.1		12
	Total Proposed ICI Pop.				12
	Total Proposed Res Pop.				653
Building C					
	Count		Rate		Pop
1 Bedroom	45		1.4		63
2 Bedroom	19		2.1		40
3 Bedroom	11		3.1		34
Retail	288		1.1		3
	Total Proposed ICI Pop.				3
	Total Proposed Res Pop.				137
Building A			Building B		
Peaking Factor	3.89		Peaking Factor	3.91	
Res Flow Gen. Rate	240	L/cap/day	Res Flow Gen. Rate	240	L/cap/day
Peaked DWF	7.59	L/s	ICI Flow Gen. Rate	250	L/cap/day
			Peaked DWF	7.12	L/s
Groundwater Pump	0.00	L/s	Groundwater Pump	0.00	L/s
I-I Rate	0.26	L/s/ha	I-I Rate	0.26	L/s/ha
I-I Flow	0.05	L/s	I-I Flow	0.11	L/s
Total Design Flow	7.65	L/s	Total Design Flow	7.23	L/s
Building C					
Peaking Factor	4.2				
Res Flow Gen. Rate	240	L/cap/day			
ICI Flow Gen. Rate	250	L/cap/day			
Peaked DWF	1.61	L/s			
Groundwater Pump	0.00	L/s			
I-I Rate	0.26	L/s/ha			
I-I Flow	0.05	L/s			
Total Design Flow	1.65	L/s			
Total Proposed Subdivision Design Flow*	16.53	L/s			

*Proposed site flows are discharged to 300mm sanitary sewer on Bridgeland Avenue

Table SAN-A-2: Additional Developments Included in Model

Assessed Recent Developments - Included in InfoWorks Model

Property Address	Application Number	Area (ha)	Existing Equivalent Population	Proposed Equivalent Population	Pumped Groundwater (L/s)	Infiltration Flow (L/s)	Per Capita Rate (L/cap/day)	Wastewater Profile	Notes
Recent Developments included in BFA16 Model									
3450 Dufferin St	21 106823 NNY 08 SA	1.01	700	1595	1.60	0.26	240.00	STN 16.3	SPA Under Review
3300 Dufferin St	21 251832 NNY 08 OZ	0.38	14	642	0.19	0.10			SPA Under Review
3280 Dufferin St	21 168610 NNY 08 OZ	0.46	78	571	0.29	0.12			SPA Under Review
3180 Dufferin St	21 168610 NNY 08 OZ	0.62	76	1046	0.98	0.16			SPA Under Review
176 Bentworth Ave	16 123513 NNY 15 SA	0.10	6	13	0	0.03			SPA Under Review
337-349 Queens Dr	20 212165 WET 05 SA	0.68	14	76	0.10	0.18		STN 16.5	SPA Under Review
Recent Developments not included in BFA16 Model									
1465 Lawrence Ave W	11 330266 WET 12 OZ	-	-	-	-	-	-	-	SPA Closed
2522 Keele St	20 170753 WET 05 CD	-	-	212	-	-	-	-	Draft Phase
1184 Wilson Ave	19 254744 NNY 06 OZ	0.42	-	445	0.33	0.11	-	-	Not in Drainag Area
1277 Wilson Ave	18 219970 NNY 09 OZ	0.94	-	837	0	0.24	-	-	Not in Drainag Area
1326 Wilson Ave	16 123726 NNY 09 SA	0.16	-	154	0	0.04	-	-	Not in Drainag Area
3170 Dufferin St	21 203752 NNY 08 OZ	1.54	-	1089	4.28	0.40	-	-	Not in Drainag Area
1575 Lawrence Ave W	22 139108 WET 05 SA	-	-	-	-	-	-	-	Not in Drainag Area
1440 Lawrence Ave W	19 237185 WET 05 OZ	-	-	-	-	-	-	-	Not in Drainag Area
1289-1411 Lawrence Ave W	18 163569 WET 12 SA	-	-	-	-	-	-	-	Not in Drainag Area
2265 Keele St	16 194024 WET 12 SA	-	-	-	-	-	-	-	Not in Drainag Area
2351 Keele St	15 258619 WET 12 SA	-	-	-	-	-	-	-	Not in Drainag Area
2699 Keele St	21 249733 NNY 06 SA	0.62	-	691	0.31	0.16	-	-	Not in Drainag Area
7-11 Ingram Dr	19 263567 WET 05 SA	-	-	-	-	-	-	-	Not in Drainag Area
1017 Wilson Ave	15 236730 NNY 09 SA	-	-	19	0	0	-	-	Not in Drainag Area

https://bigroup.sharepoint.com/sites/Projects2/139570/Internal Documents/6.0_Technical/6.04_Civil/03_Reports/Revision 1/FSR/Appendix C - Sanitary/Modelling/3400Dufferin_SiteStats.xlsx SITE STATS



3400 DUFFERIN STREET

APPLICATION FOR ZONING BY-LAW AMENDMENT

PROJECT TEAM

DEVELOPER
Collecdev
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bagroup.com

STRUCTURAL
TBD

MECHANICAL & ELECTRICAL
TBD

ARCHITECTURAL SHEET LIST

Sheet	Drawing Name	Current Revision
A000 PROJECT INFORMATION		
A000	COVER SHEET	
A001	STATISTICS	
A100 SITE		
A100	CONTEXT PLAN	
A101	SURVEY	
A102	ROOF PLAN	
A103	GROUND FLOOR SITE PLAN	
A105	LEVEL P1 FLOOR PLAN	
A200 PLANS		
A200	LEVEL 1 FLOOR PLAN	
A201	LEVEL 2 FLOOR PLAN	
A202	LEVEL 3 FLOOR PLAN	
A203	LEVEL 4 FLOOR PLAN	
A204	LEVEL 5 FLOOR PLAN	
A205	LEVEL 6 FLOOR PLAN	
A206	LEVEL 7 FLOOR PLAN	
A208	LEVEL 9 FLOOR PLAN	
A209	LEVEL 10 FLOOR PLAN	
A210	LEVEL 11-29 FLOOR PLAN	

Rev. Date Issued

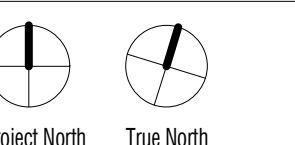


gh3

gh3*
55 OSSINGTON AVE, SUITE 100
TORONTO, ON, CANADA M5J 2Y9
416-915-1791

COLLECDEV
3400 DUFFERIN STREET

TORONTO



SCALE
PROJECT NO. 202211
ISSUE DATE -

COVER SHEET

A000

1.0 SUMMARY

GROSS SITE AREA: 16,600m²
 TOTAL GFA: 59,614 m²
 FSI: 3.57
 NEW RESIDENTIAL UNITS: 836

PART B - BUILDING A SITE AREA: 4,061 m ² GFA: 26,891 m ² FSI: 6.6 NEW RESIDENTIAL UNITS: 388	PART D - BUILDING B SITE AREA: 4,082 m ² GFA: 26,670 m ² FSI: 6.4 NEW RESIDENTIAL UNITS: 373	PART E - BUILDING C SITE AREA: 1,811 m ² GFA: 6,519 m ² FSI: 3.6 NEW RESIDENTIAL UNITS: 75
---	---	---

2.0 BUILDING HEIGHTS

3.0 FLOOR AREA

*GFA calculated per Area Plans, A1001 - A1003

Level	# of Levels	CGA							GFA				Amenity	
		GCA/Level (m ²)	Total GCA (m ²)	GCA (sf)	Residential GCA (m ²)	Residential GCA (sf)	Loading GCA (m ²)	Parking GCA (m ²)	GFA Deductions (m ²)	GFA (m ²)	GFA (SF)	Leasable (m ²)	Indoor Amenity (m ²)	Outdoor Amenity (m ²)
P1		0 m ²	0 m ²	0 SF	0 m ²	0 SF	0 m ²	0 m ²	0 m ²	0 SF	0 m ²	0 m ²	0 m ²	0 m ²
Level 1		0 m ²	0 m ²	0 SF	0 m ²	0 SF	0 m ²	0 m ²	0 m ²	0 SF	0 m ²	0 m ²	0 m ²	
BELOW GRADE TOTAL		0 m²	0 m²	0 SF	0 m²	0 SF	0 m²	0 m²	0 m²	0 SF	0 m²	0 m²	0 m²	

Level	# of Levels	GCA/Level (m ²)	Total GCA (m ²)	GCA (sf)	Residential GCA (m ²)	Residential GCA (sf)	Loading GCA (m ²)	Parking GCA (m ²)	GFA Deductions (m ²)	GFA (m ²)	GFA (SF)	Leasable (m ²)	Indoor Amenity (m ²)	Outdoor Amenity (m ²)
P2	1	8677 m ²	8677 m ²	93399 SF	8677 m ²	93399 SF	0 m ²	8677 m ²	8554 m ²	123 m ²	1320 SF	0 m ²	0 m ²	0 m ²
P1	1	8614 m ²	92720 SF	9614 m ²	92720 SF	0 m ²	8614 m ²	8448 m ²	196 m ²	1786 SF	0 m ²	0 m ²	0 m ²	0 m ²
BELOW GRADE TOTAL		17291 m²	17291 m²	186119 SF	17291 m²	186119 SF	0 m²	17291 m²	17002 m²	289 m²	3106 SF	0 m²	0 m²	0 m²

Level	# of Levels	GCA/Level (m ²)	Total GCA (m ²)	GCA (sf)	Residential GCA (m ²)	Residential GCA (sf)	Loading GCA (m ²)	Parking GCA (m ²)	GFA Deductions (m ²)	GFA (m ²)	GFA (SF)	Leasable (m ²)	Indoor Amenity (m ²)	Outdoor Amenity (m ²)
Level 1	1	2062 m ²	2062 m ²	22197 SF	2062 m ²	22197 SF	145 m ²	0 m ²	485 m ²	1577 m ²	16973 SF	1174 m ²	89 m ²	0 m ²
Level 2	1	2485 m ²	1983 m ²	21343 SF	1983 m ²	21343 SF	0 m ²	0 m ²	95 m ²	1888 m ²	20319 SF	1691 m ²	0 m ²	0 m ²
Level 3	1	2485 m ²	1983 m ²	21343 SF	1983 m ²	21343 SF	0 m ²	0 m ²	261 m ²	1722 m ²	18539 SF	1691 m ²	0 m ²	0 m ²
Level 4	1	2485 m ²	1983 m ²	21343 SF	1983 m ²	21343 SF	0 m ²	0 m ²	95 m ²	1888 m ²	20319 SF	1691 m ²	0 m ²	0 m ²
Level 5	1	2273 m ²	1862 m ²	20039 SF	1862 m ²	20039 SF	0 m ²	0 m ²	80 m ²	1782 m ²	19183 SF	1586 m ²	0 m ²	0 m ²
Level 6	1	2289 m ²	1877 m ²	20208 SF	1877 m ²	20208 SF	0 m ²	0 m ²	95 m ²	1782 m ²	19183 SF	1586 m ²	0 m ²	0 m ²
Level 7	1	1312 m ²	1254 m ²	13499 SF	1254 m ²	13499 SF	0 m ²	0 m ²	312 m ²	942 m ²	10136 SF	857 m ²	277 m ²	584 m ²
Level 8	1	1034 m ²	986 m ²	10611 SF	986 m ²	10611 SF	0 m ²	0 m ²	296 m ²	689 m ²	7421 SF	601 m ²	227 m ²	224 m ²
Level 9	1	794 m ²	746 m ²	8035 SF	746 m ²	8035 SF	0 m ²	0 m ²	50 m ²	696 m ²	7495 SF	702 m ²	0 m ²	0 m ²
Level 10-29	1	794 m ²	746 m ²	8035 SF	746 m ²	8035 SF	0 m ²	0 m ²	92 m ²	654 m ²	7042 SF	702 m ²	0 m ²	0 m ²
BUILDING A TOTAL 19		14183 m²	152664 SF	14183 m²	152664 SF	0 m²	0 m²	953 m²	13230 m²	142408 SF	13340 m²	0 m²	0 m²	190 m²
BELOW GRADE TOTAL		18808 m²	26666 m²	319319 SF	26666 m²	319319 SF	145 m²	0 m²	2815 m²	26851 m²	289020 SF	25622 m²	592 m²	809 m²

Level	# of Levels	GCA/Level (m ²)	Total GCA (m ²)	GCA (sf)	Residential GCA (m ²)	Residential GCA (sf)	Loading GCA (m ²)	Parking GCA (m ²)	GFA Deductions (m ²)	GFA (m ²)	GFA (SF)	Leasable (m ²)	Indoor Amenity (m ²)	Outdoor Amenity (m ²)
Level 1	1	2167 m ²	2167 m ²	23330 SF	2167 m ²	23330 SF	119 m ²	0 m ²	575 m ²	1592 m ²	17136 SF	1288 m ²	134 m ²	119 m ²
Level 2	1	1806 m ²	1647 m ²	17724 SF	1647 m ²	17724 SF	0 m ²	0 m ²	99 m ²	1548 m ²	16657 SF	1541 m ²	0 m ²	0 m ²
Level 3	1	2232 m ²	1823 m ²	19627 SF	1823 m ²	19627 SF	0 m ²	0 m ²	94 m ²	1729 m ²	18614 SF	2107 m ²	0 m ²	0 m ²
Level 4	1	2388 m ²	1979 m ²	21305 SF	1979 m ²	21305 SF	0 m ²	0 m ²	94 m ²	1885 m ²	20291 SF	2107 m ²	0 m ²	0 m ²
Level 5	1	2155 m ²	1820 m ²	19588 SF	1820 m ²	19588 SF	0 m ²	0 m ²	94 m ²	1726 m ²	18575 SF	1673 m ²	0 m ²	0 m ²
Level 6	1	2155 m ²	1820 m ²	19588 SF	1820 m ²	19588 SF	0 m ²	0 m ²	94 m ²	1726 m ²	18575 SF	1673 m ²	0 m ²	0 m ²
Level 7	1	1322 m ²	1265 m ²	13612 SF	1265 m ²	13612 SF	0 m ²	0 m ²	367 m ²	898 m ²	9665 SF	857 m ²	287 m ²	540 m ²
Level 8	1	1034 m ²	986 m ²	10611 SF	986 m ²	10611 SF	0 m ²	0 m ²	355 m ²	631 m ²	6793 SF	648 m ²	227 m ²	231 m ²
Level 9	1	794 m ²	746 m ²	8035 SF	746 m ²	8035 SF	0 m ²	0 m ²	49 m ²	697 m ²	7503 SF	702 m ²	0 m ²	0 m ²
Level 10-29	1	794 m ²	746 m ²	8035 SF	746 m ²	8035 SF	0 m ²	0 m ²	49 m ²	697 m ²	7503 SF	702 m ²	0 m ²	0 m ²
BUILDING B TOTAL 19		17642 m²	29163 m²	314120 SF	27259 m²	293414 SF	119 m²	0 m²	2111 m²	26372 m²	283867 SF	27344 m²	640 m²	889 m²

Level	# of Levels	GCA/Level (m ²)	Total GCA (m ²)	GCA (sf)	Residential GCA (m ²)	Residential GCA (sf)	Loading GCA (m ²)	Parking GCA (m ²)	GFA Deductions (m ²)	GFA (m ²)	GFA (SF)	Leasable (m ²)	Indoor Amenity (m ²)	Outdoor Amenity (m ²)
Level 1	1	1025 m ²	1025 m ²	11137 SF	1025 m ²	11137 SF	261 m ²	0 m ²	427 m ²	607 m ²	6538 SF	288 m ²	0 m ²	321 m ²
Level 2	1	1034 m ²	1034 m ²	11135 SF	1034 m ²	11135 SF	0 m ²	0 m ²	42 m ²	992 m ²	10681 SF	845 m ²	61 m ²	0 m ²
Level 3	1	1034 m ²	1034 m ²	11135 SF	1034 m ²	11135 SF	0 m ²	0 m ²	42 m ²	992 m ²	10681 SF	845 m ²	61 m ²	0 m ²
Level 4	1	877 m ²	877 m ²	9439 SF	809 m ²	8713 SF	0 m ²	0 m ²	110 m ²	767 m ²	8259 SF	719 m ²	67 m ²	0 m ²
Level 5	1	877 m ²	877 m ²	9439 SF	809 m ²	8713 SF	0 m ²	0 m ²	110 m ²	767 m ²	8259 SF	719 m ²	67 m ²	0 m ²
Level 6	1	877 m ²	877 m ²	9439 SF	809 m ²	8713 SF	0 m ²	0 m ²	158 m ²	719 m ²	7737 SF	719 m ²	67 m ²	0 m ²
Level 7	1	840 m ²	495 m ²	5323 SF	368 m ²	3960 SF	0 m ²	0 m ²	168 m ²	326 m ²	3510 SF	448 m ²	127 m ²	228 m ²
Level 8	1	495 m ²	495 m ²	5323 SF	495 m ²	5323 SF	0 m ²	0 m ²	42 m ²	453 m ²	4873 SF	420 m ²	0 m ²	0 m ²
Level 9	1	495 m ²	495 m ²	5323 SF	495 m ²	5323 SF	0 m ²	0 m ²	42 m ²	453 m ²	4873 SF	420 m ²	0 m ²	0 m ²
BUILDING C TOTAL 1		151 m²	1626 SF	0 m²	0 SF	0 m²	0 m²	0 m²	151 m²	0 SF	0 m²	0 m²	0 m²	0 m²
BELOW GRADE TOTAL		7823 m²	7869 m²	79322 SF	6158 m²	66284 SF	261 m²	0 m²	1292 m²	6077 m²	66411 SF	5422 m²	451 m²	550 m²
GRAND TOTAL		61264 m²	83569 m²	898880 SF	80374 m²	865136 SF	525 m²	17291 m²	23920 m²	59588 m²	641404 SF	58089 m²	1691 m²	2248 m²

4.0 AMENITY

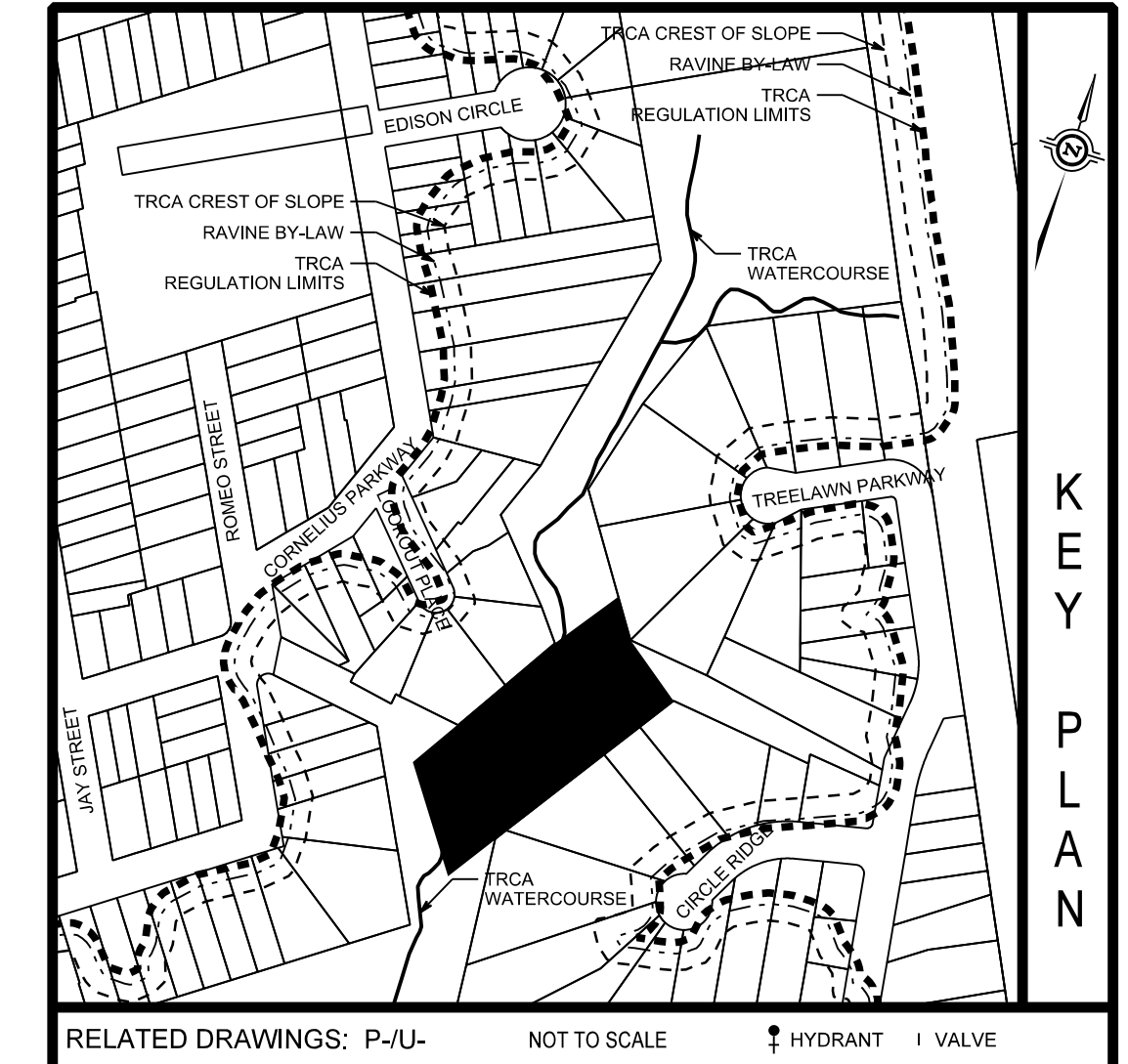
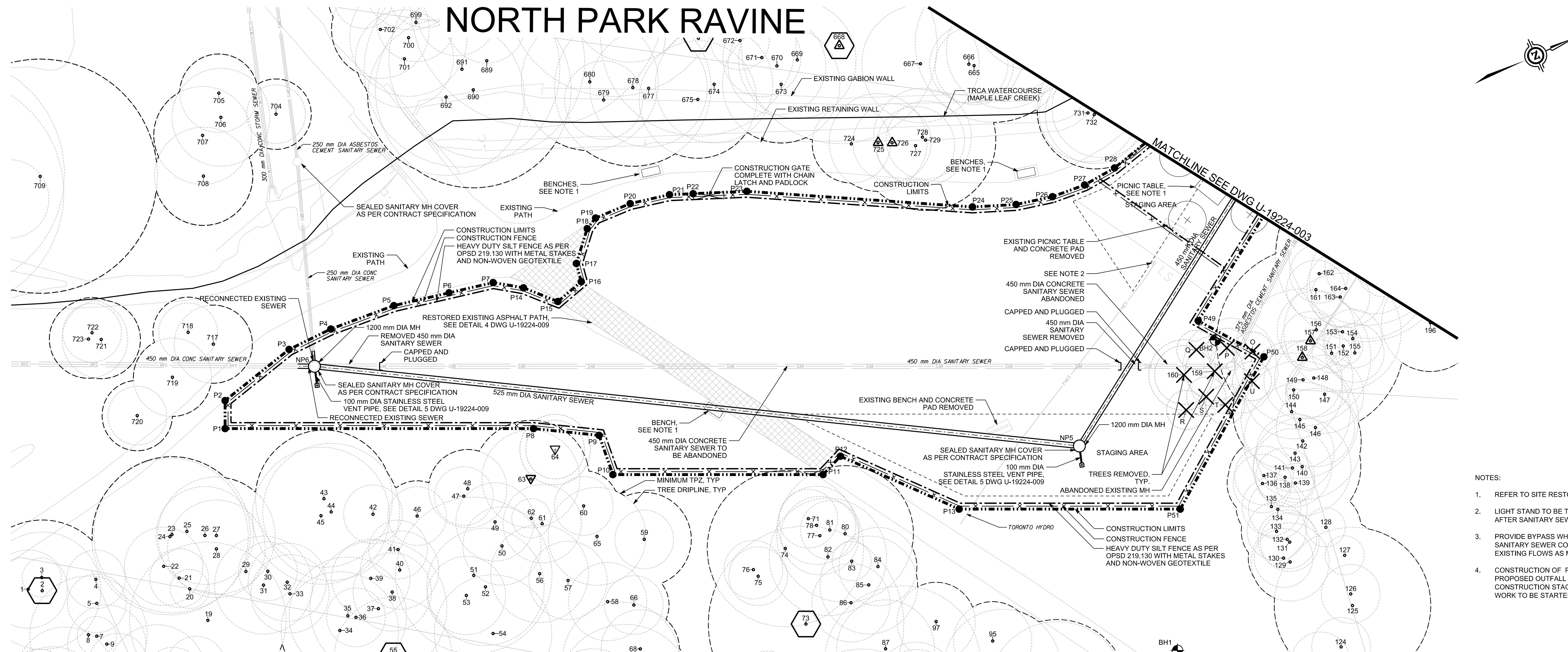
Total Units	4.1 AMENITY			
	Outdoor / Unit		Indoor / Unit	
BUILDING A	388	809 m ²	592 m ²	
BUILDING B	373	889 m ²	648 m ²	
BUILDING C	75	550 m ²	451 m ²	

5.0 PARKING

Level	5.1 CAR PARKING				5.2 BICYCLE PARKING			
	Regular	BF	Total	Visitor Car Parking	Regular	BF	Total	Total Car Parking
BUILDING A	78	0	78	0	0	0	0	78
P2	95	0	95	0	0	0	0	95
BUILDING B	73	0	73	0	0	0	0	73
P1	91	0	91	0	0	0	0	91
BUILDING C	20	0	20	0	0	0	0	20
P1	26	0	26	0	0	0	0	26
TOTAL	383	0	383	0	0	0	0	383

Level	Bicycle Parking	
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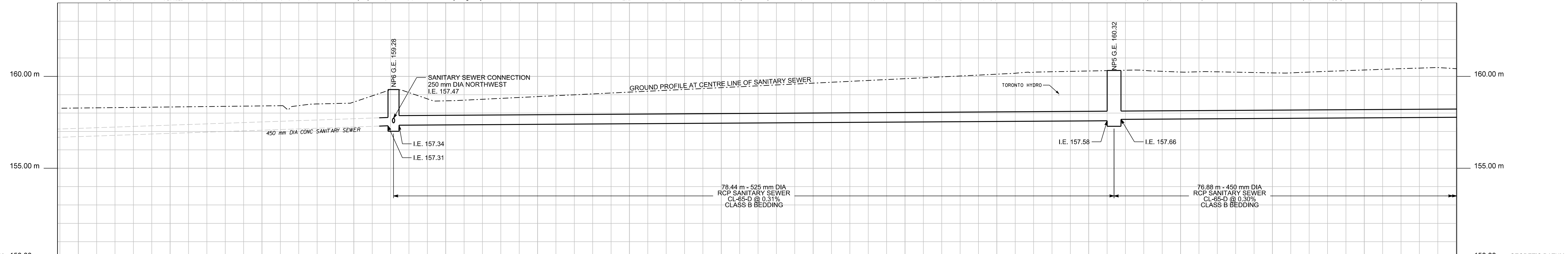
NORTH PARK RAVINE



MH NO.	NORTHING	EASTING
NP5	4841515.448	306944.797
NP6	4841462.717	306886.720

CONSTRUCTION FENCE SETOUT POINTS	PT NO.	NORTHING	EASTING
P1	4841451.692	306885.375	
P2	4841453.592	306883.252	
P3	4841461.936	306883.713	
P4	4841466.491	306885.003	
P5	4841472.874	306887.509	
P6	4841477.941	306890.291	
P7	4841481.988	306892.512	
P8	4841475.138	306906.351	
P9	4841479.659	306911.330	
P10	4841478.042	306915.245	
P11	4841494.018	306929.539	
P12	4841496.582	306929.323	
P13	4841502.016	306941.416	
P14	4841483.942	306894.972	
P15	4841485.626	306898.354	
P16	4841488.753	306898.434	
P17	4841489.514	306896.720	
P18	4841492.806	306894.811	
P19	4841494.165	306894.570	
P20	4841497.775	306895.830	
P21	4841501.370	306897.826	
P22	4841503.236	306899.360	
P23	4841507.479	306902.833	
P24	4841523.571	306919.365	
P25	4841527.047	306922.142	
P26	4841530.341	306924.022	
P27	4841533.586	306925.319	
P28	4841537.024	306926.063	
P29	4841544.013	306926.405	
P49	4841532.992	306943.358	
P50	4841535.532	306950.565	
P51	4841518.823	306956.453	

- NOTES:
- REFER TO SITE RESTORATION PLAN DWG U-19224-007.
 - LIGHT STAND TO BE TEMPORARY REMOVED AND REINSTALLED AFTER SANITARY SEWER CONSTRUCTION.
 - PROVIDE BYPASS WHEREVER REQUIRED DURING ENTIRE SANITARY SEWER CONSTRUCTION WORK TO MAINTAIN EXISTING FLOWS AS MENTIONED IN CONTRACT SPECIFICATION.
 - CONSTRUCTION OF PROPOSED PLAYGROUND, BENCHES AND PROPOSED OUTFALL TO BE DONE FIRST UNDER CONSTRUCTION STAGE 1. AFTER THAT THE SANITARY SEWER WORK TO BE STARTED UNDER CONSTRUCTION STAGE 2.



THESE AS-BUILT DOCUMENTS HAVE BEEN PREPARED BASED ON INFORMATION PROVIDED BY OTHERS. THE DESIGN PROFESSIONAL HAS NOT VERIFIED THE ACCURACY AND/OR THE COMPLETENESS OF THIS INFORMATION AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED HEREIN AS A RESULT.

AS-BUILT DRAWING

EXISTING GROUND ELEVATION	STATION	EXISTING GROUND ELEVATION	STATION
160.00	0+172.71	160.00	0+200.00
155.00	0+160.00	155.00	0+190.00

CH2MHILL
CONSULTANTS

NOTE:
ORIGINAL SEAL BY A. HASLAM
DATED 12-19-2014

TORONTO Engineering and Construction Services

NORTH PARK RAVINE
SANITARY SEWER RE-CONSTRUCTION
FROM NORTH OF CIRCLE RIDGE

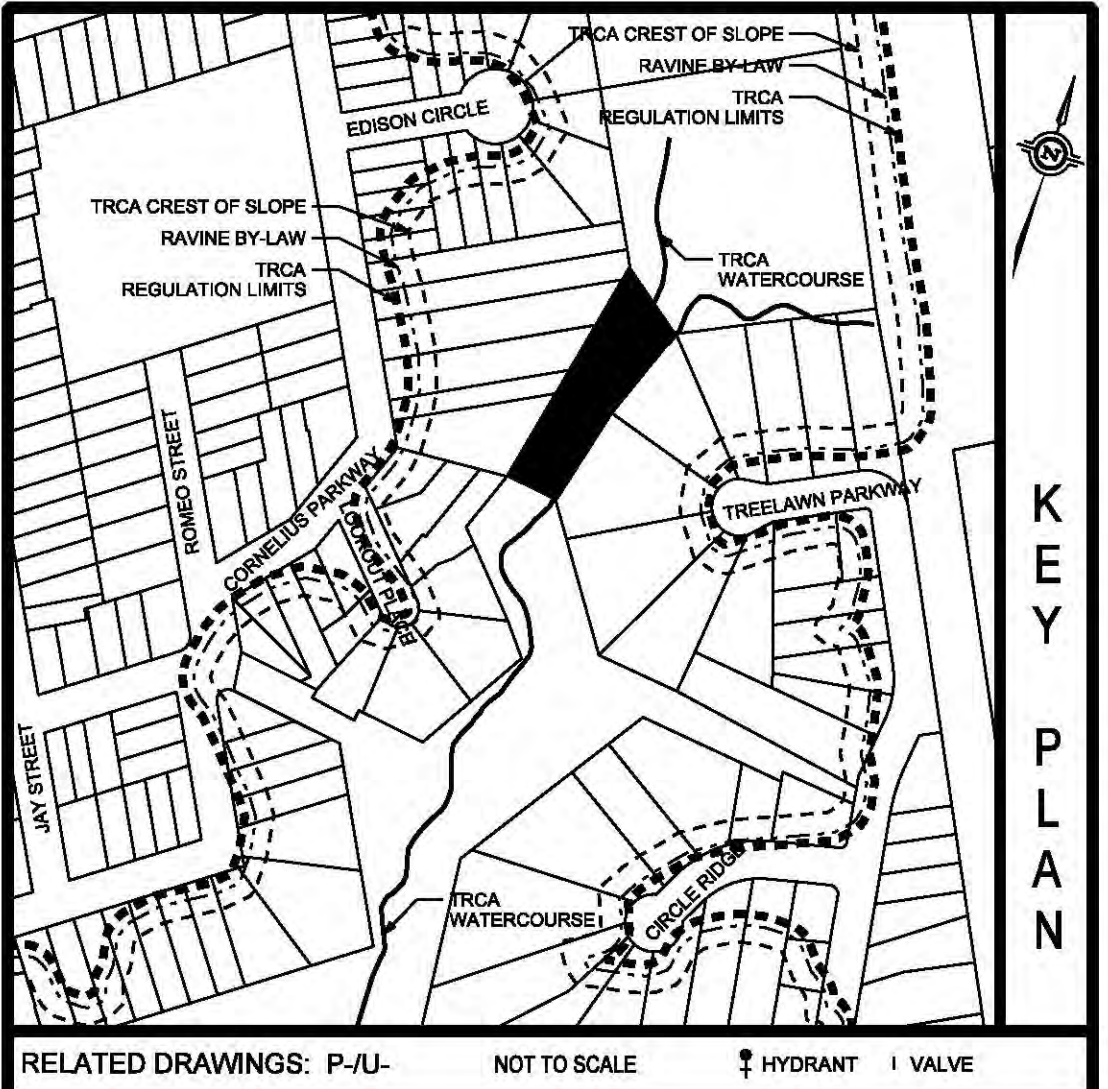
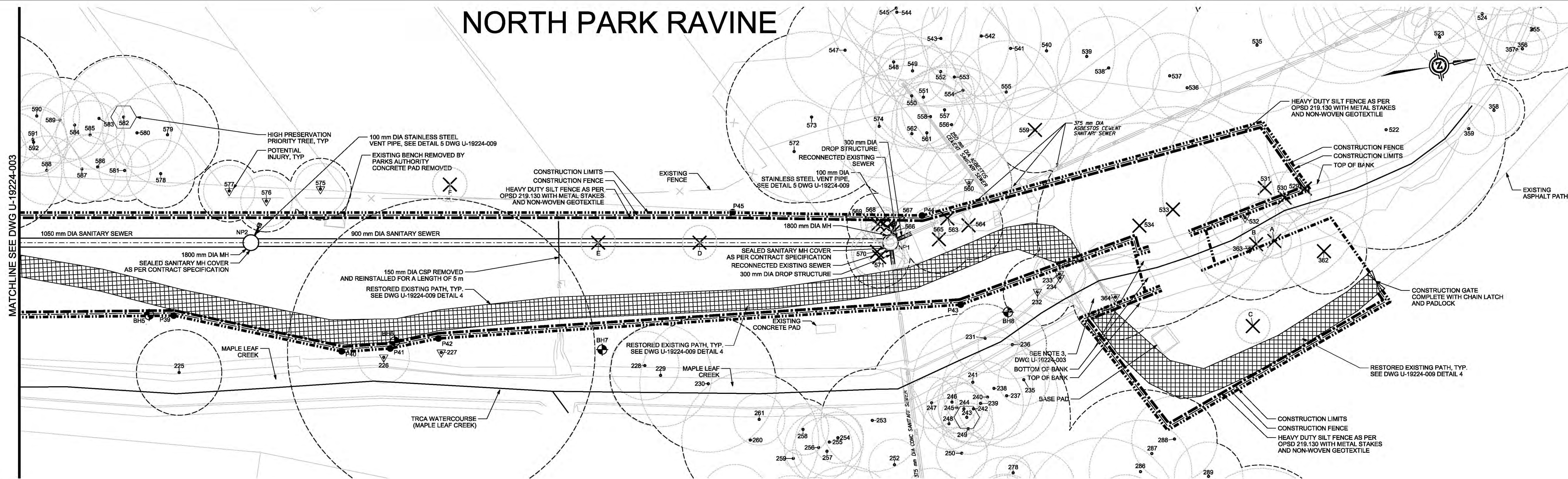
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UTILITY y13581ugs.dgn					
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STREETLINE y13581psl.dgn			SANITARY SEWERS CONSTRUCTED IN 2015/2016		

GRAHAM HARDING, P. ENG.
DIRECTOR
WATER INFRASTRUCTURE
MANAGEMENT

NANCY BONHAM, P. ENG.
ACTING DIRECTOR
ENGINEERING AND
CONSTRUCTION SERVICES
CAPITAL WORKS DELIVERY

DESIGN	N.P.	DRAWN	D.A.	CHECKED	T.H.	CONTRACT No.
						14FS-30WP
SCALE:	HORIZONTAL 1:200 VERTICAL 1:100		DRAWING NUMBER		U-19224-002	
DATE:	DECEMBER 12, 2014		SHEET		3 OF 15	

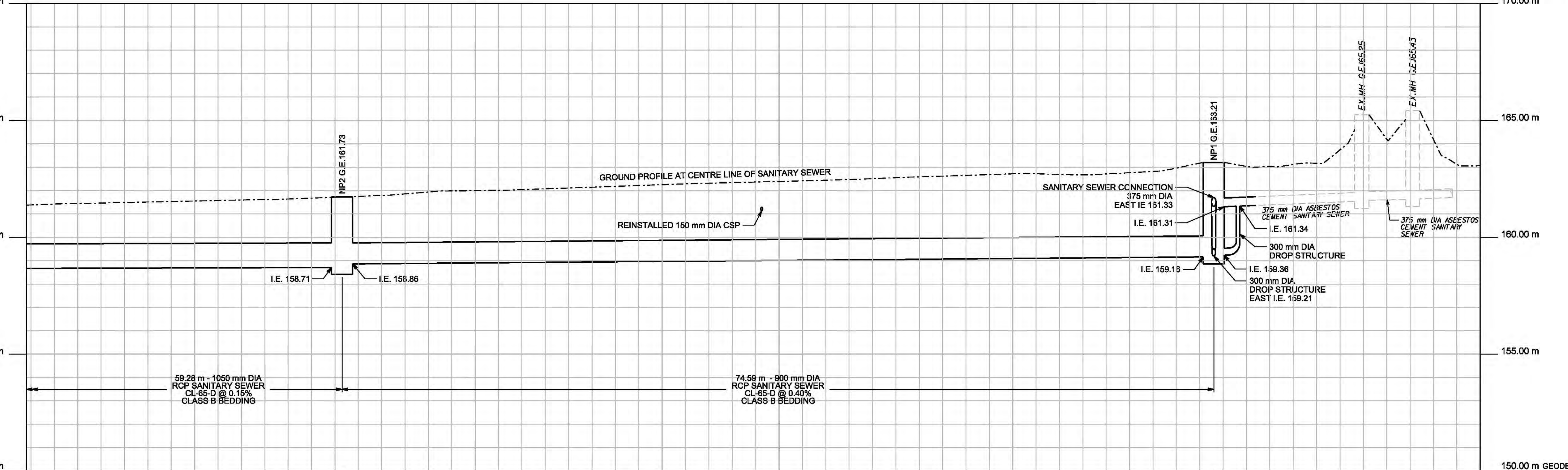
NORTH PARK RAVINE



- NOTES:
- CONTRACTOR TO ACCESS THE SITE FROM RUSTIC ROAD.
 - TWO MORE SANITARY MH COVER NEAR SOUTHEAST OF RUSTIC ROAD TO BE SEALED AS PER OPSD 401.050. SEE SPECIAL SPECIFICATION OF CONTRACT FOR MORE DETAILS.

MH NO.	NORTHING	EASTING
NP1	4841739.577	306973.482
NP2	4841873.425	306939.012

CONSTRUCTION FENCE SETOUT POINTS	PT NO.	NORTHING	EASTING
P39	4841681.504	306942.387	
P40	4841676.963	306955.133	
P41	4841682.139	306957.461	
P42	4841687.661	306959.022	
P43	4841743.517	306983.688	
P44	4841744.312	306972.369	
P45	4841724.900	306961.839	
P60	4841743.749	306980.541	
P61	4841764.698	306986.418	
P62	4841753.016	306985.480	
P63	4841765.959	306988.382	
P64	4841765.087	306992.702	
P65	4841763.295	306992.341	
P66	4841782.951	306993.903	
P67	4841783.644	307002.834	
P68	4841771.497	307008.359	
P69	4841784.232	307007.099	
P70	4841784.209	307001.736	
P71	4841775.598	307001.979	
P72	4841771.481	306995.684	
P73	4841771.831	306994.062	
P74	4841769.989	306993.691	
P75	4841770.860	306989.370	
P76	4841772.7624	306989.754	



EXISTING GROUND ELEVATION	STATION	EXISTING GROUND ELEVATION	STATION
163.6	0+00.00	163.7	0+01.75
163.4	0+03.00	162.6	0+06.00
162.6	0+09.00	162.5	0+12.00
162.5	0+15.00	162.3	0+18.00
162.5	0+21.00	162.5	0+24.00
162.5	0+27.00	162.5	0+30.00

THESE AS-BUILT DOCUMENTS HAVE BEEN PREPARED BASED ON INFORMATION PROVIDED BY OTHERS. THE DESIGN PROFESSIONAL HAS NOT VERIFIED THE ACCURACY AND/OR THE COMPLETENESS OF THIS INFORMATION AND SHALL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH MAY BE INCORPORATED HEREIN AS A RESULT.

AS-BUILT DRAWING

CH2MHILL
CONSULTANTS

NOTE:
ORIGINAL SEAL BY A. HASLAM
DATED 12-19-2014

NORTH PARK RAVINE SANITARY SEWER RE-CONSTRUCTION FROM SOUTH OF EDISON CIRCLE

DESIGN	N.P.	DRAWN	D.A.	CHECKED	T.H.	CONTRACT No.
						14FS-30WP
SCALE:	HORIZONTAL 1:200 VERTICAL 1:100		DRAWING NUMBER		U-19224-004	
DATE:	DECEMBER 12, 2014		SHEET		5 OF 15	

Toronto Engineering and Construction Services

JOHN P. KELLY, P. ENG.
DIRECTOR
DESIGN AND CONSTRUCTION
LINEAR UNDERGROUND
INFRASTRUCTURE

MICHAEL D'ANDREA, P. ENG.
EXECUTIVE DIRECTOR,
ENGINEERING AND
CONSTRUCTION SERVICES

ALICIA FRASER, P. ENG.
MANAGER
DESIGN AND CONSTRUCTION
LINEAR UNDERGROUND
INFRASTRUCTURE

SURVEY(2013)	DESIGN	UTILITY	MAPPING	STREETLINE	No.	DATE	REVISIONS	INITIAL	SIGNED
y13581svy.dgn	y13581stm.dgn, y13581stmpf.dgn, y13581ssc.dgn	y13581ugs.dgn	y13581top.dgn	y13581psl.dgn	1	07-22-2016	AS BUILT DRAWING PREPARED BY CH2M HILL CANADA LTD. USING DATA PROVIDED BY THE CITY		
							SANITARY SEWERS CONSTRUCTED IN 2015/2016		

Appendix SAN-B

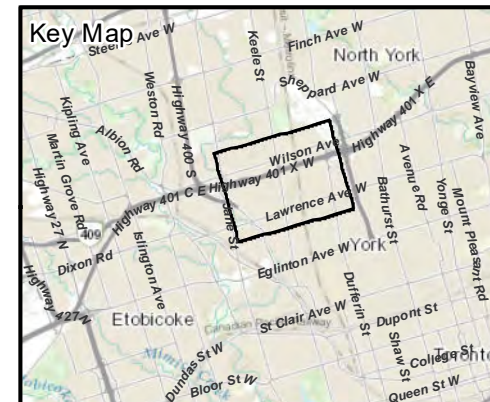
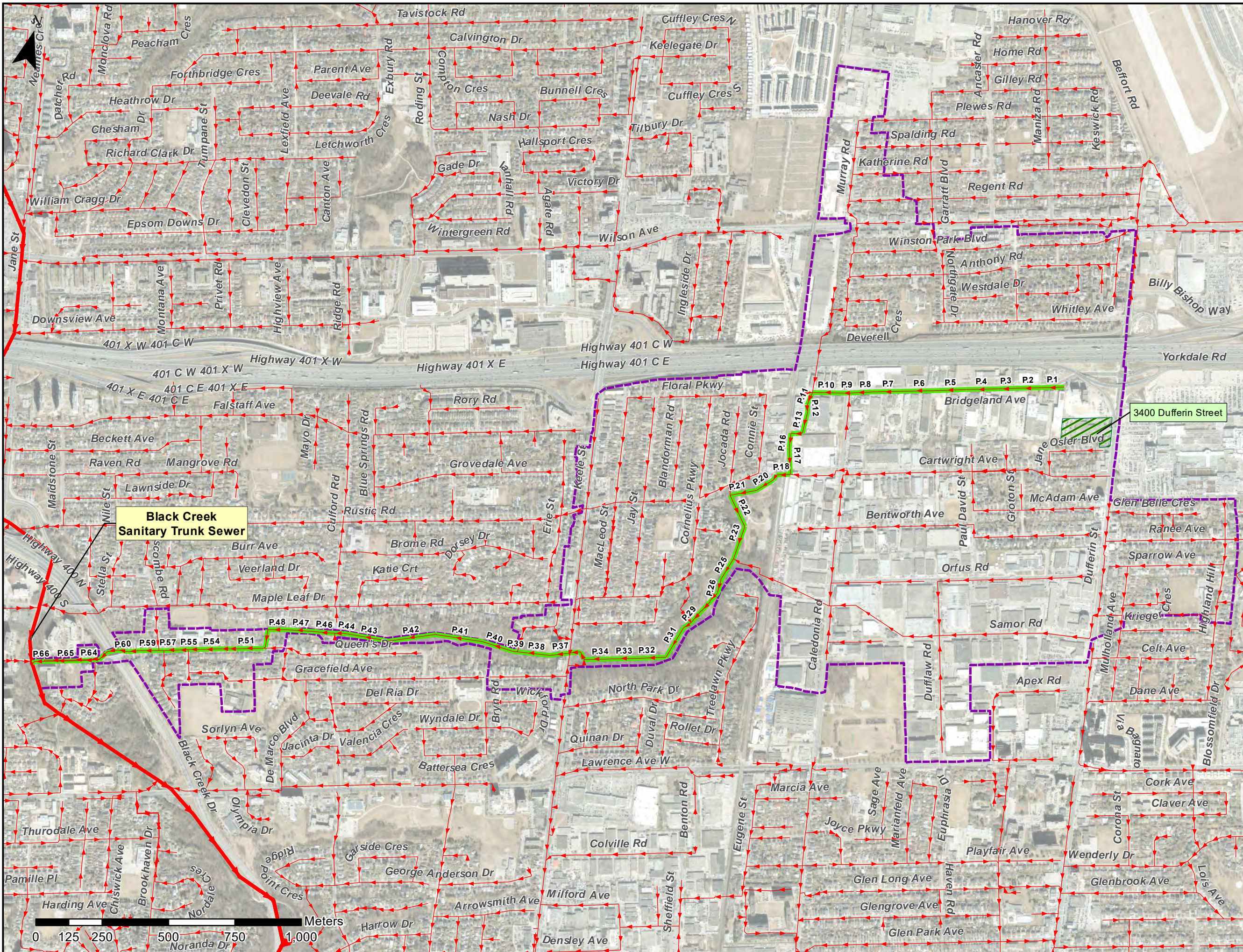
Sanitary Sewer Capacity Analysis Results

Analysis Summary Results Dry Weather Flow Conditions



Table: SAN-B-1

Pipe Data												InfoWorks Model Results														
												SC1: Existing Dry Weather Flow Conditions						SC2: Proposed Dry Weather Flow Conditions								
Pipe ID	Map ID	Length (m)	Diameter (mm)	Upstream Ground Level (m AD)	Upstream Invert (m AD)	Upstream Obvert (m AD)	Downstream Ground Level (m AD)	Downstream Invert (m AD)	Downstream Obvert (m AD)	Slope (%)	Full Flow Capacity (l/s)	Peak Flow (l/s)	Diameter Utilization (%)	Max Upstream HGL (m AD)	Max Downstream HGL (m AD)	Surcharge Status (m)	Maximum Surcharging (m)	Minimum Available Freeboard (m)	Peak Flow (l/s)	Diameter Utilization (%)	Max Upstream HGL (m AD)	Max Downstream HGL (m AD)	Surcharge Status (m)	Maximum Surcharging (m)	Minimum Available Freeboard (m)	
Downstream Analyzed Pipes																										
4270007995.1	P.01	85.8	300	190.000	183.800	184.100	190.324	183.690	183.990	0.13%	35	6.2	29.0%	183.887	183.750	Free flow	None	N/A	22.7	58.3%	183.975	183.827	Free flow	None	N/A	
4267507913.1	P.02	99.6	300	190.324	183.650	183.950	189.489	183.520	183.820	0.13%	35	6.7	30.3%	183.741	183.583	Free flow	None	N/A	23.3	59.0%	183.827	183.648	Free flow	None	N/A	
4264507818.1	P.03	65.5	300	189.489	183.500	183.800	188.633	183.330	183.630	0.26%	49	6.9	26.3%	183.579	183.394	Free flow	None	N/A	23.4	49.3%	183.648	183.448	Free flow	None	N/A	
4262607756.1	P.04	118.3	250	188.633	183.250	183.500	186.384	182.470	182.720	0.66%	48	7.5	28.0%	183.320	182.540	Free flow	None	N/A	24.0	50.4%	183.376	182.596	Free flow	None	N/A	
4259107643.1	P.05	117.1	250	186.384	182.450	182.700	184.102	181.510	181.760	0.80%	53	7.8	27.2%	182.518	181.578	Free flow	None	N/A	24.3	48.4%	182.571	181.631	Free flow	None	N/A	
4255607531.1	P.06	116.9	250	184.102	181.490	181.740	183.267	180.560	180.810	0.80%	53	8.9	28.8%	181.562	180.632	Free flow	None	N/A	25.4	49.6%	181.614	180.684	Free flow	None	N/A	
4252107419.1	P.07	117.9	250	183.267	180.550	180.800	182.434	179.630	179.880	0.78%	53	8.9	28.8%	180.622	179.702	Free flow	None	N/A	25.4	52.8%	180.675	179.762	Free flow	None	N/A	
4248607307.1	P.08	87.2	300	182.434	179.520	179.820	182.983	179.510	179.810	0.01%	10	9.1	48.3%	179.665	179.582	Free flow	None	N/A	25.6	80.7%	179.762	179.632	Free flow	None	N/A	
4245907224.1	P.09	21.6	250	182.983	179.500	179.750	182.995	179.210	179.460	1.34%	69	9.4	27.2%	179.568	179.278	Free flow	None	N/A	26.0	43.6%	179.609	179.319	Free flow	None	N/A	
4245307203.1	P.10	119.6	300	182.995	179.190	179.490	182.067	178.511	178.811	0.57%	73	9.7	25.7%	179.267	178.587	Free flow	None	N/A	26.3	42.3%	179.317	178.636	Free flow	None	N/A	
4242307088.1	P.11	52.2	375	182.067	178.461	178.836	180.579	178.126	178.501	0.64%	140	21.7	27.2%	178.563	178.228	Free flow	None	N/A	38.2	36.0%	178.596	178.261	Free flow	None	N/A	
4237107081.1	P.12	24.4	375	180.579	176.526	176.901	180.297	176.199	176.574	1.34%	203	21.7	24.0%	176.616	176.289	Free flow	None	N/A	38.2	30.9%	176.642	176.315	Free flow	None	N/A	
4234807090.1	P.13	84.5	375	180.297	176.169	176.544	179.182	175.138	175.513	1.22%	194	21.7	24.5%	176.261	175.230	Free flow	None	N/A	38.2	31.7%	176.288	175.257	Free flow	None	N/A	
4226407093.1	P.14	27.0	375	179.182	173.014	173.389	179.110	172.777	173.152	0.88%	164	22.2	25.3%	173.109	172.872	Free flow	None	N/A	38.7	33.6%	173.140	172.903	Free flow	None	N/A	
4225507067.1	P.15	14.8	375	179.110	172.708	173.083	179.214	172.578	172.953	0.88%	164	22.2	25.3%	172.803	172.673	Free flow	None	N/A	38.7	33.6%	172.834	172.704	Free flow	None	N/A	
4225307053.1	P.16	54.8	375	179.214	172.528	172.903	177.980	172.012	172.387	0.94%	170	22.2	25.1%	172.622	172.106	Free flow	None	N/A	38.7	33.1%	172.652	172.136	Free flow	None	N/A	
4219907060.1	P.17	102.0	375	177.980	171.952	172.327	177.766	171.028	171.403	0.91%	167	22.2	25.3%	172.047	171.123	Free flow	None	N/A	38.7	33.3%	172.077	171.153	Free flow	None	N/A	
4210207092.1	P.18	52.2	450	177.766	171.013	171.463	177.575	169.615	170.065	2.68%	467	27.0	19.1%	171.099	169.701	Free flow	None	N/A	43.5	22.7%	171.115	169.717	Free flow	None	N/A	
4208607043.1	P.19	20.3	350	177.575	169.595	169.945	177.850	168.560	168.910	5.10%	329	27.0	32.3%	169.671	168.673	Free flow	None	N/A	43.5	41.7%	169.688	168.706	Free flow	None	N/A	
4206607036.1	P.20	77.1	350	177.850	168.560	168.910	173.420	168.003	168.353	0.72%	124	27.0	32.3%	168.673	168.116	Free flow	None	N/A	43.5	41.7%	168.706	168.149	Free flow	None	N/A	
4200806985.1	P.21	100.8	350	173.420	167.913	168.263	167.547	165.585	165.935	2.31%	222	27.0	25.7%	168.003	165.675	Free flow	None	N/A	43.5	31.7%	168.024	165.696	Free flow	None	N/A	
4196406895.1	P.22	130.0	375	167.547	165.655	165.940	165.737	163.543	163.918	1.56%	219	30.0	27.2%	165.667	163.645	Free flow	None	N/A	46.5	33.1%	165.689	163.667	Free flow	None	N/A	
4186706981.1	P.23	115.2	375	165.737	163.493	163.868	163.217	161.542	161.917	1.69%	228	30.0	26.7%	163.593	161.642	Free flow	None	N/A	46.5	32.3%	163.614	161.663	Free flow	None	N/A	
4175206973.1	P.24	12.8	375	163.217	161.462	161.837	163.210	161.340	161.715	0.95%	171	30.0	28.8%	161.570	161.448	Free flow	None	N/A	46.5	36.0%	161.597	161.475	Free flow	None	N/A	
NP1.A	P.25	74.6	900	163.210	159.160	160.060	161.730	158.860	159.760	0.40%	1148	53.7	15.2%	159.297	158.997	Free flow	None	N/A	70.2	17.4%	159.317	159.015	Free flow	None	N/A	
NP2.1	P.26	59.3	1050	161.730	158.710	159.760	160.920	158.620	159.670	0.15%	1064	53.7	15.5%	158.873	158.751	Free flow	None	N/A	70.2	17.5%	158.894	158.768	Free flow	None	N/A	
NP3.1	P.27	33.7	450	160.920	157.930	158.380	160.670	157.890	158.340	0.12%	98	53.8	48.2%	158.147	158.075	Free flow	None	N/A	70.3	55.6%	158.180	158.104	Free flow	None	N/A	
NP4.1	P.28	76.9	450	160.670	157.890	158.340	160.320	157.660	158.110	0.30%	156	53.8	41.1%	158.075	157.820	Free flow	None	N/A	70.3	47.3%	158.103	157.844	Free flow	None	N/A	
NP5.1	P.29	78.4	525	160.320	157.580	158.105	159.280	157.340	157.865	0.31%	238	53.8	32.8%	157.752	157.493	Free flow	None	N/A	70.3	37.3%	157.776	157.516	Free flow	None	N/A	
NP6.1	P.30	36.6	450	159.280	157.310	157.760	160.213	156.823	157.273	1.33%	329	53.9	28.9%	157.440	156.953	Free flow	None	N/A	70.4	33.1%	157.459	156.972	Free flow	None	N/A	
4143506862.1	P.31	129.3	450	160.213	156.793	157.243	157.486	154.971	155.421	1.41%	339	53.9	28.7%	156.922	155.100	Free flow	None	N/A	70.4	32.7%	156.940	155.118	Free flow	None	N/A	
4131006829.1	P.32	103.5	450	157.486	154.921	155.371	154.871	153.591	154.041	1.29%	323	54.1	29.1%	155.052	153.722	Free flow	None	N/A	70.6	33.6%	155.072	153.742	Free flow	None	N/A	
4127906730.1	P.33	108.4	450	154.871	153.536	153.986	154.352	151.858	152.308	1.55%	355	54.1	28.2%	153.663	151.985	Free flow	None	N/A	70.6	31.8%	153.679	152.001	Free flow	None	N/A	
4124706627.1	P.34	96.3	450	154.352	151.728	152.178	154.726	150.747	151.197	1.02%	288	54.1	30.9%	151.867	150.886	Free flow	None	N/A	70.6	35.3%	151.887	150.906	Free flow	None	N/A	
4121906535.1	P.35	30.9	450	154.726	150.537	150.987	156.058	149.518	149.968	3.30%	518	64.6	26.0%	150.654	149.635	Free flow	None	N/A	81.2	28.4%	150.665	149.646	Free flow	None	N/A	
4124206514.1	P.36	39.8	525	156.058	149.348	149.873	163.432	148.750	149.275	1.50%	527	64.6	25.7%	149.483	148.885	Free flow	None	N/A	81.2	28.4%	149.497	148.899	Free flow	None	N/A	
4122706477.1	P.37	75.0	525	163.432	148.700	149.225	153.347	147.870	148.395	1.11%	453	64.6	27.6%	148.845	148.015	Free flow	None	N/A	81.2	30.1%	148.858	148.028	Free flow	None	N/A	
4119906407.1	P.38	124.7	525	153.347	147.690	148.215	153.679	146.345	146.870	1.08%	447	65.3	27.8%	147.836	146.491	Free flow	None	N/A	81.8	30.5%	147.850	146.505	Free flow	None	N/A	
4017360.1	P.39	17.2	525	153.679	146.345	146.870	152.130	146.160	146.685	1.08%	447	65.6	27.8%	146.491	146.306	Free flow	None	N/A	82.1	30.5%	146.505	146.320	Free flow	None	N/A	
4117506267.1	P.40	119.5	525	152.130	146.145	146.670	149.536	144.690	145.215	1.22%	475	65.6	27.2%	146.288	144.833	Free flow	None	N/A	82.1	29.7%	146.301	144.846	Free flow	None	N/A	
4117906148.1	P.41	180.1	525	149.536	144.660	145.185	145.026	141.715	142.240	1.64%	550	65.7	25.3%	144.793	141.848	Free flow	None	N/A	82.1	28.0%	144.807	141.862	Free flow	None	N/A	
4115505969.1	P.42	177.0	525	145.026	141.560	142.085	144.194	138.705	139.230	1.61%</																



Legend

- Sanitary Manhole
 - Sanitary Sewer
 - Sanitary Trunk Sewer
 - ▨ Development Site
 - ▭ Drainage Area
- HGL Level**
- Free Flow
 - Surcharging (Freeboard > 1.8m)
 - Critical Surcharging (Freeboard < 1.8m)
 - Flow to Surface

Note: Only sanitary pipes are shown for clarity.

Analysis Parameters	
Storm Event	None
Development Flow	0.53 L/s

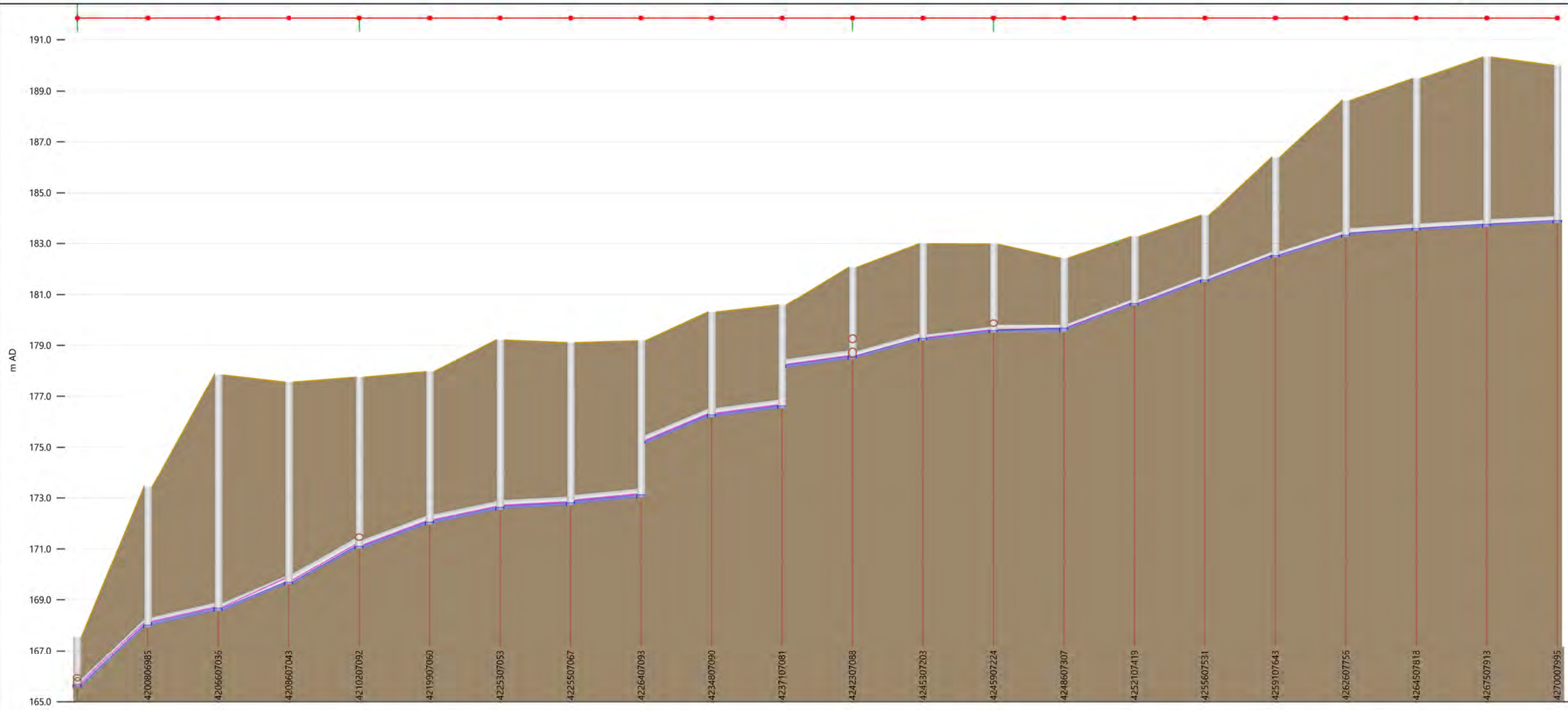
**Figure: SAN-B-1
Scenario 1: Existing DWF**

3400 Dufferin Street
Sanitary Capacity Analysis
City of Toronto



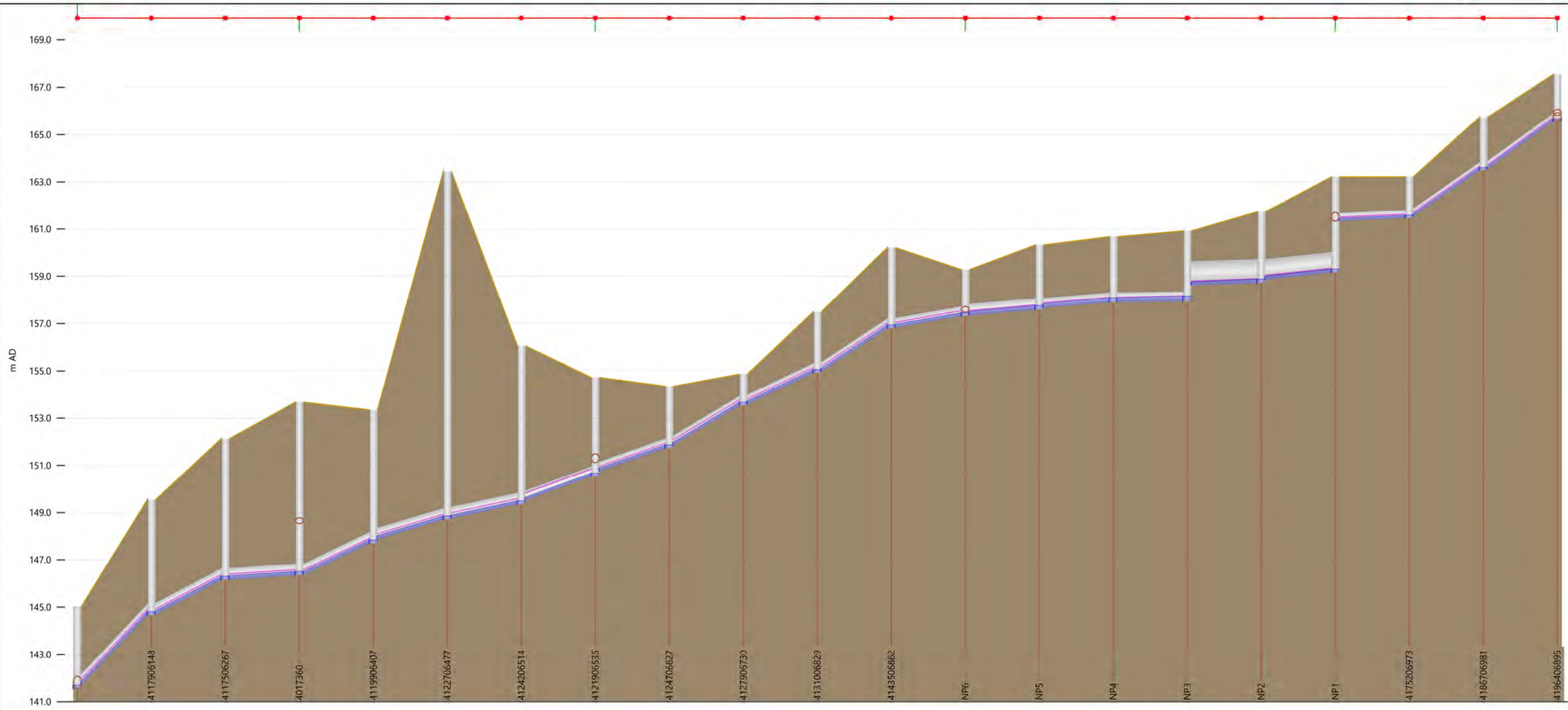
Project No.:	Date:
139570	July 2022

Scenario 1: Existing DWF - Analyzed Line Leg 1



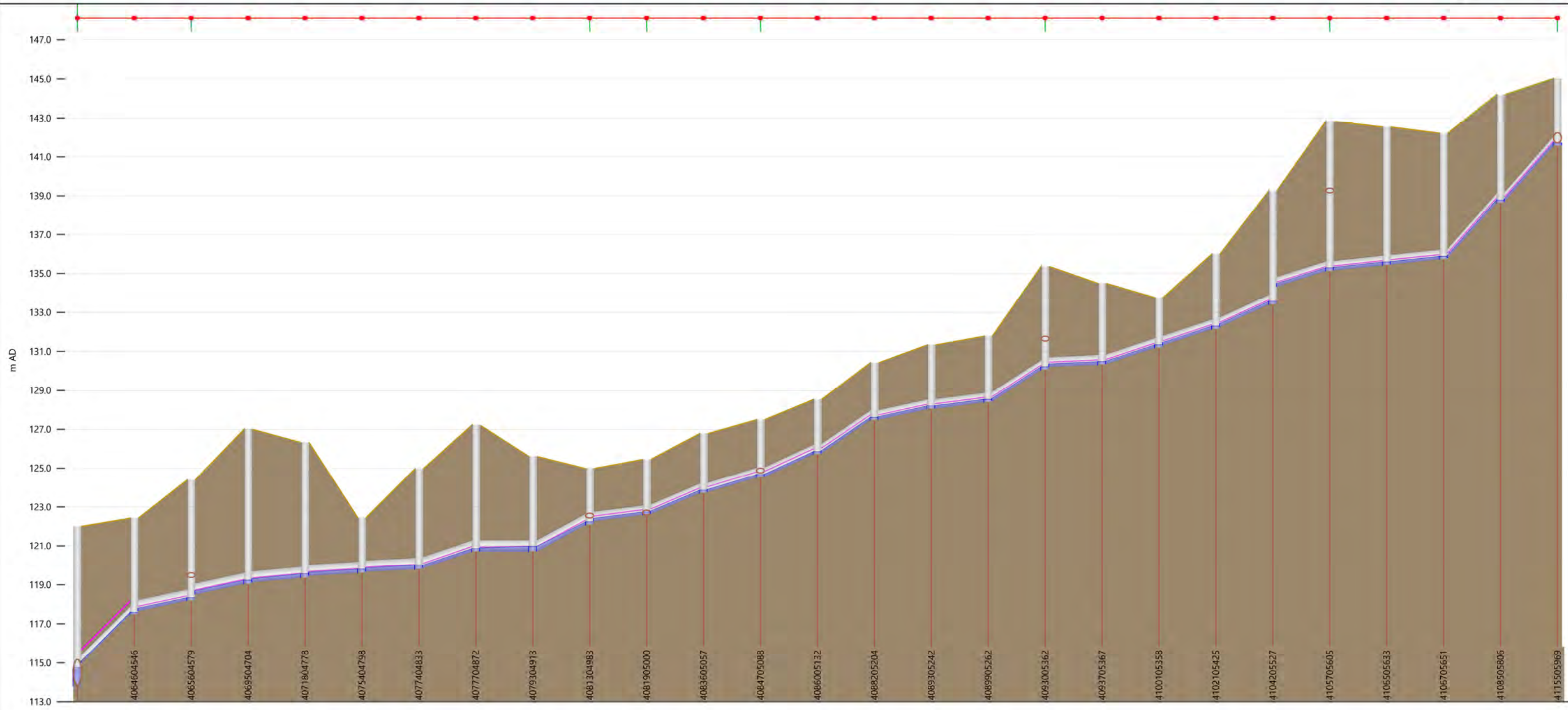
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US node ID	4200806985	4206607036	4208607043	4210207092	4219907060	4225307053	4225507067	4226407093	4234807090	4237107081	4242307088	4245307203	4245907224	4248607307	4252107419	4255607531	4259107643	4262607756	4264507818	4267507913	4270007995	
ds node	4196406895	4200806985	4206607036	4208607043	4210207092	4219907060	4225307053	4225507067	4226407093	4234807090	4237107081	4242307088	4245307203	4245907224	4248607307	4252107419	4255607531	4259107643	4262607756	4264507818	4267507913	
System type	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	
length (m)	100.8	77.1	20.3	52.2	102.0	54.8	14.8	27.0	84.5	24.4	52.2	119.6	21.6	87.2	117.9	116.9	117.1	118.3	65.5	99.6	85.8	
Shape ID	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC
height (mm)	350	350	350	450	375	375	375	375	375	375	375	300	250	300	250	250	250	250	300	300	300	
us inv (m AD)	167.913	168.560	169.595	171.013	171.952	172.528	172.708	173.014	176.169	176.526	178.461	179.190	179.500	179.520	180.550	181.490	182.450	183.250	183.500	183.650	183.800	
ds inv (m AD)	165.585	168.003	168.560	169.615	171.028	172.012	172.578	172.777	175.138	176.199	178.126	178.511	179.210	179.510	179.630	180.560	181.510	182.470	183.330	183.520	183.690	
grad (m/m)	0.02310	0.00722	0.05099	0.02678	0.00906	0.00942	0.00878	0.00878	0.01220	0.01340	0.00642	0.00568	0.01343	0.00011	0.00780	0.00796	0.00803	0.00659	0.00260	0.00131	0.00128	
r.pfc (l/s)	222	124	329	467	167	170	164	164	194	203	140	73	69	10	53	53	53	48	49	35	35	
Node	-	4200806985	4206607036	4208607043	4210207092	4219907060	4225307053	4225507067	4226407093	4234807090	4237107081	4242307088	4245307203	4245907224	4248607307	4252107419	4255607531	4259107643	4262607756	4264507818	4267507913	-
ground (m AD)	-	173.420	177.850	177.575	177.766	177.980	179.214	179.110	179.182	180.297	180.579	182.067	182.995	182.983	182.434	183.267	184.102	186.384	188.633	189.489	190.324	-
expr:FB	1.88	5.42	9.18	7.90	6.67	5.93	6.59	6.31	6.07	4.04	3.96	3.50	3.73	3.42	2.77	2.64	2.54	3.87	5.31	5.91	6.58	6.11

Scenario 1: Existing DWF - Analyzed Line Leg 2

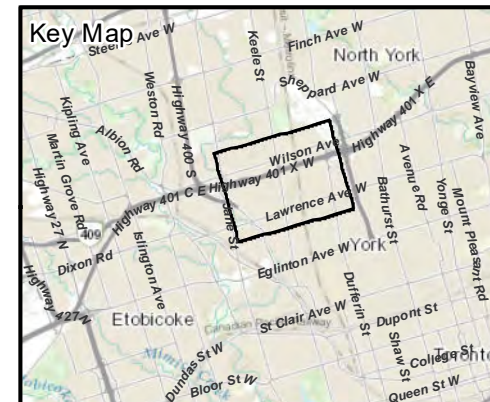
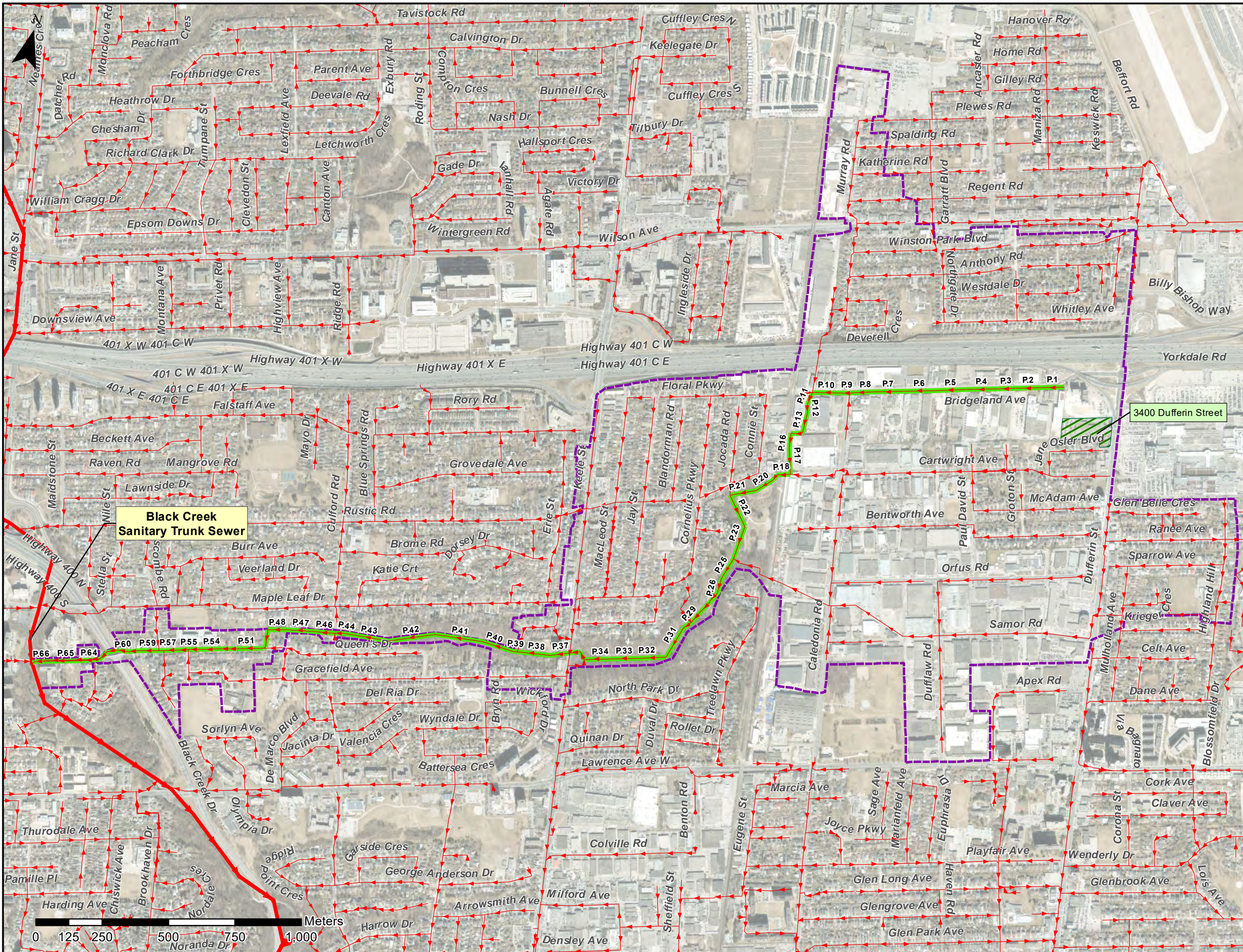


Link	4117906148.1	4117506267.1	4017360.1	4119906407.1	4122706477.1	4124206514.1	4121906535.1	4124706627.1	4127906730.1	4131006829.1	4143506862.1	NP6.1	NP5.1	NP4.1	NP3.1	NP2.1	NP1.A	4175206973.1	4186706981.1	4196406895.1	
US node ID	4117906148	4117506267	4017360	4119906407	4122706477	4124206514	4121906535	4124706627	4127906730	4131006829	4143506862	NP6	NP5	NP4	NP3	NP2	NP1	4175206973	4186706981	4196406895	
ds node	4115505969	4117906148	4117506267	4017360	4119906407	4122706477	4124206514	4121906535	4124706627	4127906730	4131006829	4143506862	NP6	NP5	NP4	NP3	NP2	NP1	4175206973	4186706981	4196406895
System type	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary
length (m)	180.1	119.5	17.2	124.7	75.0	39.8	30.9	96.3	108.4	103.5	129.3	36.6	108.4	78.4	76.9	33.7	59.3	74.6	12.8	115.2	130.0
Shape ID	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC
height (mm)	525	525	525	525	525	525	450	450	450	450	450	450	525	450	450	450	1050	900	375	375	375
us inv (m AD)	144.660	146.145	146.345	147.690	148.700	149.348	150.537	151.728	153.536	154.921	156.793	157.310	157.580	157.890	157.930	158.710	159.160	161.462	163.493	165.565	
ds inv (m AD)	141.715	144.690	146.160	146.345	147.870	148.750	149.518	150.747	151.858	153.591	154.971	156.823	157.340	157.640	157.890	158.620	158.860	161.340	161.542	163.543	
grad (m/m)	0.01635	0.01218	0.01078	0.01078	0.01107	0.01503	0.03298	0.01019	0.01548	0.01285	0.01409	0.01331	0.00306	0.00299	0.00119	0.00152	0.00402	0.00953	0.01694	0.01555	
r.pfc (l/s)	550	475	447	447	453	527	518	288	355	323	339	329	238	156	98	1064	1148	171	228	219	
Node	-	4117906148	4117506267	4017360	4119906407	4122706477	4124206514	4121906535	4124706627	4127906730	4131006829	4143506862	NP6	NP5	NP4	NP3	NP2	NP1	4175206973	4186706981	4196406895
ground (m AD)	145.026	149.536	152.130	153.679	153.347	163.432	156.058	154.726	154.352	154.871	157.486	160.213	159.280	160.320	160.670	160.820	161.730	163.210	163.217	165.737	167.547
expr:FB	3.33	4.74	5.84	7.19	5.51	14.59	6.57	4.07	2.49	1.21	2.43	3.29	1.84	2.57	2.60	2.77	2.86	3.91	1.65	2.14	1.88

Scenario 1: Existing DWF - Analyzed Line Leg 3



Link	4064604546.1	4065604579.1	4069504704.1	4071804778.1	4075404798.1	4077404833.1	4077704872.1	4079304913.1	4081304983.1	4081905000.1	4083605057.1	4084705088.1	4086005132.1	4088205204.1	4089305242.1	4089905262.1	4093005362.1	4093705367.1	4100105358.1	4102105425.1	4104205527.1	4105705605.1	4106505633.1	4106705651.1	4108505806.1	4115505969.1	
US node ID	4064604546	4065604579	4069504704	4071804778	4075404798	4077404833	4077704872	4079304913	4081304983	4081905000	4083605057	4084705088	4086005132	4088205204	4089305242	4089905262	4093005362	4093705367	4100105358	4102105425	4104205527	4105705605	4106505633	4106705651	4108505806	4115505969	
ds node	4004795	4064604546	4065604579	4069504704	4071804778	4075404798	4077404833	4077704872	4079304913	4081304983	4081905000	4083605057	4084705088	4086005132	4088205204	4089305242	4089905262	4093005362	4093705367	4100105358	4102105425	4104205527	4105705605	4106505633	4106705651	4108505806	
System type	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	
length (m)	13.1	34.8	130.8	77.6	41.1	40.8	38.3	44.6	73.1	16.9	60.7	32.5	45.6	75.1	40.0	20.3	105.3	8.4	64.4	70.1	104.0	79.4	29.6	17.8	156.4	177.0	
Shape ID	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	
height (mm)	450	600	600	600	600	600	600	600	600	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	
us inv (m AD)	117.484	118.189	119.047	119.359	119.610	119.806	120.712	120.720	122.088	122.594	123.717	124.523	125.716	127.477	128.048	128.391	130.059	130.325	131.190	132.140	133.405	135.125	135.425	135.730	138.634	141.560	
ds inv (m AD)	115.000	117.654	118.509	119.127	119.459	119.680	119.856	120.712	120.720	122.268	122.641	123.766	124.551	125.771	127.498	128.066	128.448	130.211	130.355	131.310	132.260	134.330	135.155	135.465	135.795	138.705	
grad (m/m)	0.18962	0.01537	0.00411	0.00299	0.00367	0.00309	0.02235	0.00018	0.01871	0.01929	0.01773	0.02329	0.02555	0.02272	0.01375	0.01601	0.01530	0.01357	0.01297	0.01184	0.01101	0.01001	0.00912	0.01489	0.01815	0.01613	
r.pfc (l/s)	1242	761	394	336	341	341	918	82	840	597	573	656	688	648	504	544	532	501	490	468	451	430	411	525	580	546	
Node	-	4064604546	4065604579	4069504704	4071804778	4075404798	4077404833	4077704872	4079304913	4081304983	4081905000	4083605057	4084705088	4086005132	4088205204	4089305242	4089905262	4093005362	4093705367	4100105358	4102105425	4104205527	4105705605	4106505633	4106705651	4108505806	-
ground (m AD)	-	122.432	124.398	127.011	126.324	122.448	124.962	127.226	125.613	124.991	125.451	126.785	127.497	128.539	130.420	131.336	131.788	135.363	134.496	133.760	135.999	139.260	142.834	142.545	142.220	144.194	-
expr:FB	7.28	4.86	6.07	7.79	6.78	2.66	4.97	6.39	4.65	2.77	2.73	2.93	2.85	2.70	2.82	3.15	3.26	5.17	4.03	2.43	3.72	5.71	7.56	6.98	6.35	5.43	3.33



Legend

- Sanitary Manhole
 - Sanitary Sewer
 - Sanitary Trunk Sewer
 - ▨ Development Site
 - ▭ Drainage Area
- HGL Level**
- Free Flow
 - Surcharging (Freeboard > 1.8m)
 - Critical Surcharging (Freeboard < 1.8m)
 - Flow to Surface

Note: Only sanitary pipes are shown for clarity.

Analysis Parameters	
Storm Event	None
Development Flow	16.53 L/s

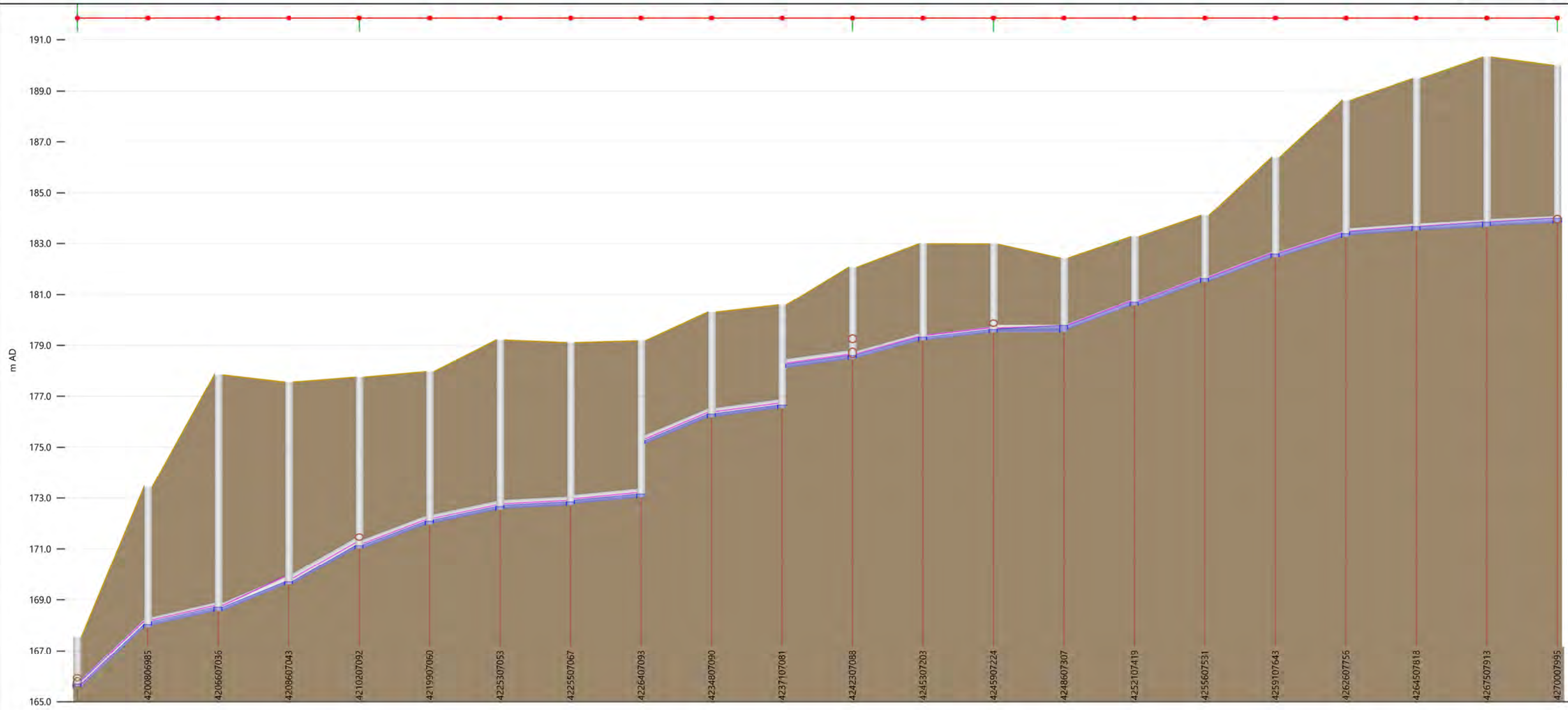
Figure: SAN-B-2
Scenario 2: Proposed DWF

3400 Dufferin Street
Sanitary Capacity Analysis
City of Toronto



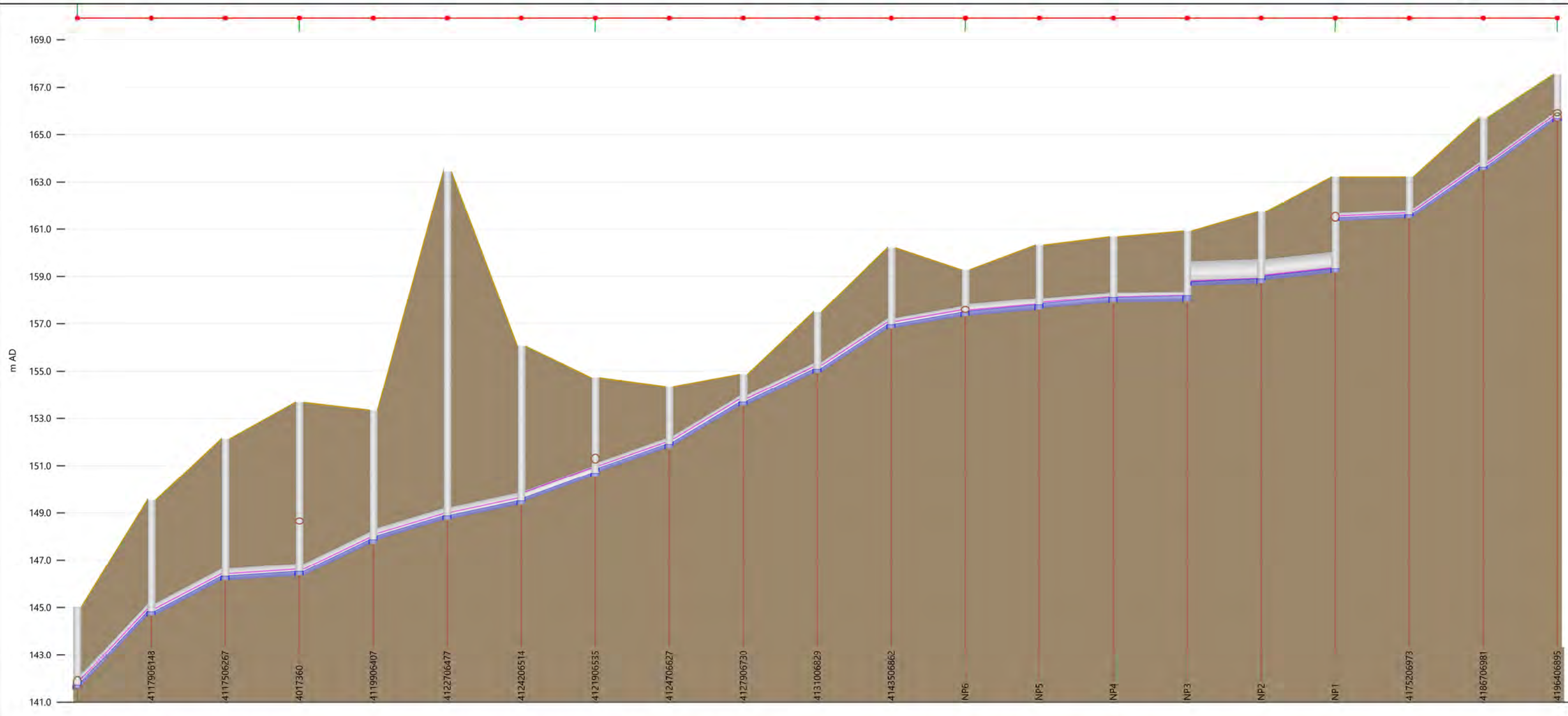
Project No.:	Date:
139570	July 2022

Scenario 2: Proposed DWF - Analyzed Line Leg 1



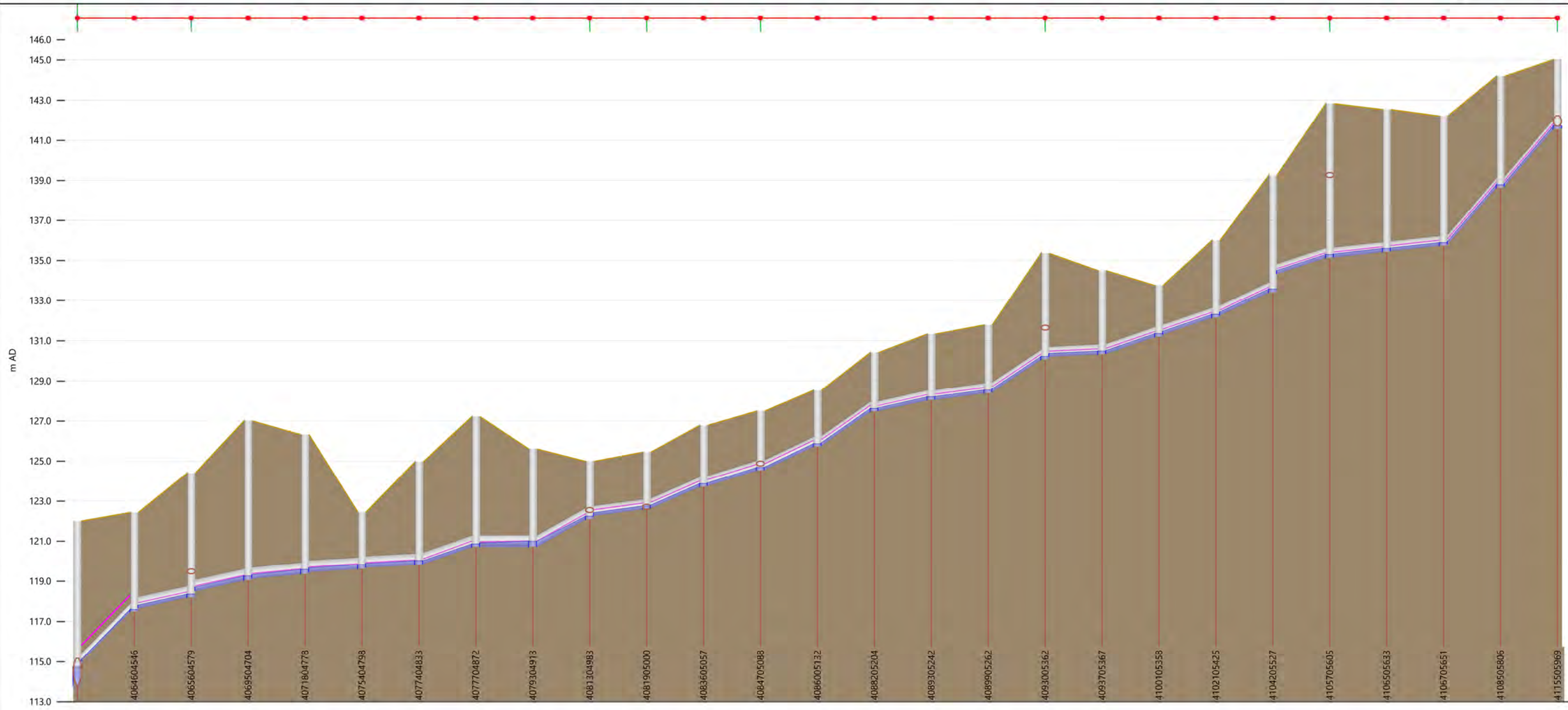
Link	4200806985.1	4206607036.1	4208607043.1	4210207092.1	4219907060.1	4225307053.1	4225507067.1	4226407093.1	4234807090.1	4237107081.1	4242307088.1	4245307203.1	4245907224.1	4248607307.1	4252107419.1	4255607531.1	4259107643.1	4262607756.1	4264507818.1	4267507913.1	4270007995.1	
US node ID	4200806985	4206607036	4208607043	4210207092	4219907060	4225307053	4225507067	4226407093	4234807090	4237107081	4242307088	4245307203	4245907224	4248607307	4252107419	4255607531	4259107643	4262607756	4264507818	4267507913	4270007995	
ds node	4196406895	4200806985	4206607036	4208607043	4210207092	4219907060	4225307053	4225507067	4226407093	4234807090	4237107081	4242307088	4245307203	4245907224	4248607307	4252107419	4255607531	4259107643	4262607756	4264507818	4267507913	
System type	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	
length (m)	100.8	77.1	20.3	52.2	102.0	54.8	14.8	27.0	84.5	24.4	52.2	119.6	21.6	87.2	117.9	116.9	117.1	118.3	65.5	99.6	85.8	
Shape ID	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC
height (mm)	350	350	350	450	375	375	375	375	375	375	375	300	250	300	250	250	250	250	300	300	300	
us inv (m AD)	167.913	168.560	169.595	171.013	171.952	172.528	172.708	173.014	176.169	176.526	178.461	179.190	179.500	179.520	180.550	181.490	182.450	183.250	183.500	183.650	183.800	
ds inv (m AD)	165.585	168.003	168.560	169.615	171.028	172.012	172.578	172.777	175.138	176.199	178.126	178.511	179.210	179.510	179.630	180.560	181.510	182.470	183.330	183.520	183.690	
grad (m/m)	0.02310	0.00722	0.05099	0.02678	0.00906	0.00942	0.00878	0.00878	0.01220	0.01340	0.00642	0.00568	0.01343	0.00011	0.00780	0.00796	0.00803	0.00659	0.00260	0.00131	0.00128	
r.pfc (l/s)	222	124	329	467	167	170	164	164	194	203	140	73	69	10	53	53	53	48	49	35	35	
Node	-	4200806985	4206607036	4208607043	4210207092	4219907060	4225307053	4225507067	4226407093	4234807090	4237107081	4242307088	4245307203	4245907224	4248607307	4252107419	4255607531	4259107643	4262607756	4264507818	4267507913	-
ground (m AD)	-	173.420	177.850	177.575	177.766	177.980	179.214	179.110	179.182	180.297	180.579	182.067	182.995	182.983	182.434	183.267	184.102	186.384	188.633	189.489	190.324	-
expr:FB	1.86	5.40	9.14	7.89	6.65	5.90	6.56	6.28	6.04	4.01	3.94	3.47	3.68	3.37	2.67	2.59	2.49	3.81	5.26	5.84	6.50	6.03

Scenario 2: Proposed DWF - Analyzed Line Leg 2



Link	4117906148.1	4117506267.1	4017360.1	4119906407.1	4122706477.1	4124206514.1	4121906535.1	4124706627.1	4127906730.1	4131006829.1	4143506862.1	NP6.1	NP5.1	NP4.1	NP3.1	NP2.1	NP1.A	4175206973.1	4186706981.1	4196406895.1	
US node ID	4117906148	4117506267	4017360	4119906407	4122706477	4124206514	4121906535	4124706627	4127906730	4131006829	4143506862	NP6	NP5	NP4	NP3	NP2	NP1	4175206973	4186706981	4196406895	
ds node	4115505969	4117906148	4117506267	4017360	4119906407	4122706477	4124206514	4121906535	4124706627	4127906730	4131006829	4143506862	NP6	NP5	NP4	NP3	NP2	NP1	4175206973	4186706981	4196406895
System type	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary
length (m)	180.1	119.5	17.2	124.7	75.0	39.8	30.9	96.3	108.4	103.5	36.6	108.4	78.4	76.9	33.7	59.3	74.6	12.8	115.2	130.0	
Shape ID	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC
height (mm)	525	525	525	525	525	525	450	450	450	450	450	450	525	450	450	1050	900	375	375	375	
us inv (m AD)	144.660	146.145	146.345	147.690	148.700	149.348	150.537	151.728	153.536	154.921	156.793	157.310	157.580	157.890	157.930	158.710	159.160	161.462	163.493	165.565	
ds inv (m AD)	141.715	144.690	146.160	146.345	147.870	148.750	149.518	150.747	151.858	153.591	154.971	156.823	157.340	157.640	157.890	158.620	158.860	161.340	161.542	163.543	
grad (m/m)	0.01635	0.01218	0.01078	0.01078	0.01107	0.01503	0.03298	0.01019	0.01548	0.01285	0.01409	0.01331	0.00306	0.00299	0.00119	0.00152	0.00402	0.00953	0.01694	0.01555	
r.pfc (l/s)	550	475	447	447	453	527	518	288	355	323	339	329	238	156	98	1064	1148	171	228	219	
Node	-	4117906148	4117506267	4017360	4119906407	4122706477	4124206514	4121906535	4124706627	4127906730	4131006829	4143506862	NP6	NP5	NP4	NP3	NP2	NP1	4175206973	4186706981	4196406895
ground (m AD)	145.026	149.536	152.130	153.679	153.347	163.432	156.058	154.726	154.352	154.871	157.486	160.213	159.280	160.320	160.670	160.820	161.730	163.210	163.217	165.737	167.547
expr:FB	3.32	4.73	5.83	7.17	5.50	14.57	6.56	4.06	2.47	1.19	2.41	3.27	1.82	2.54	2.57	2.74	2.84	3.89	1.62	2.12	1.86

Scenario 2: Proposed DWF - Analyzed Line Leg 3



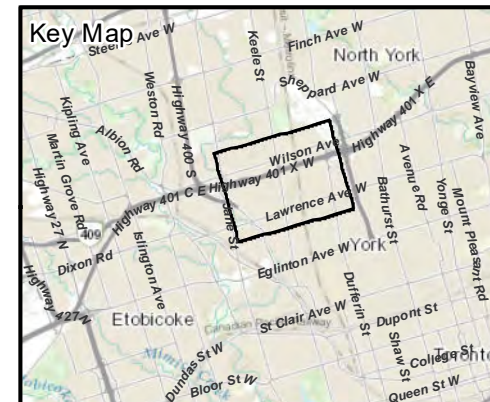
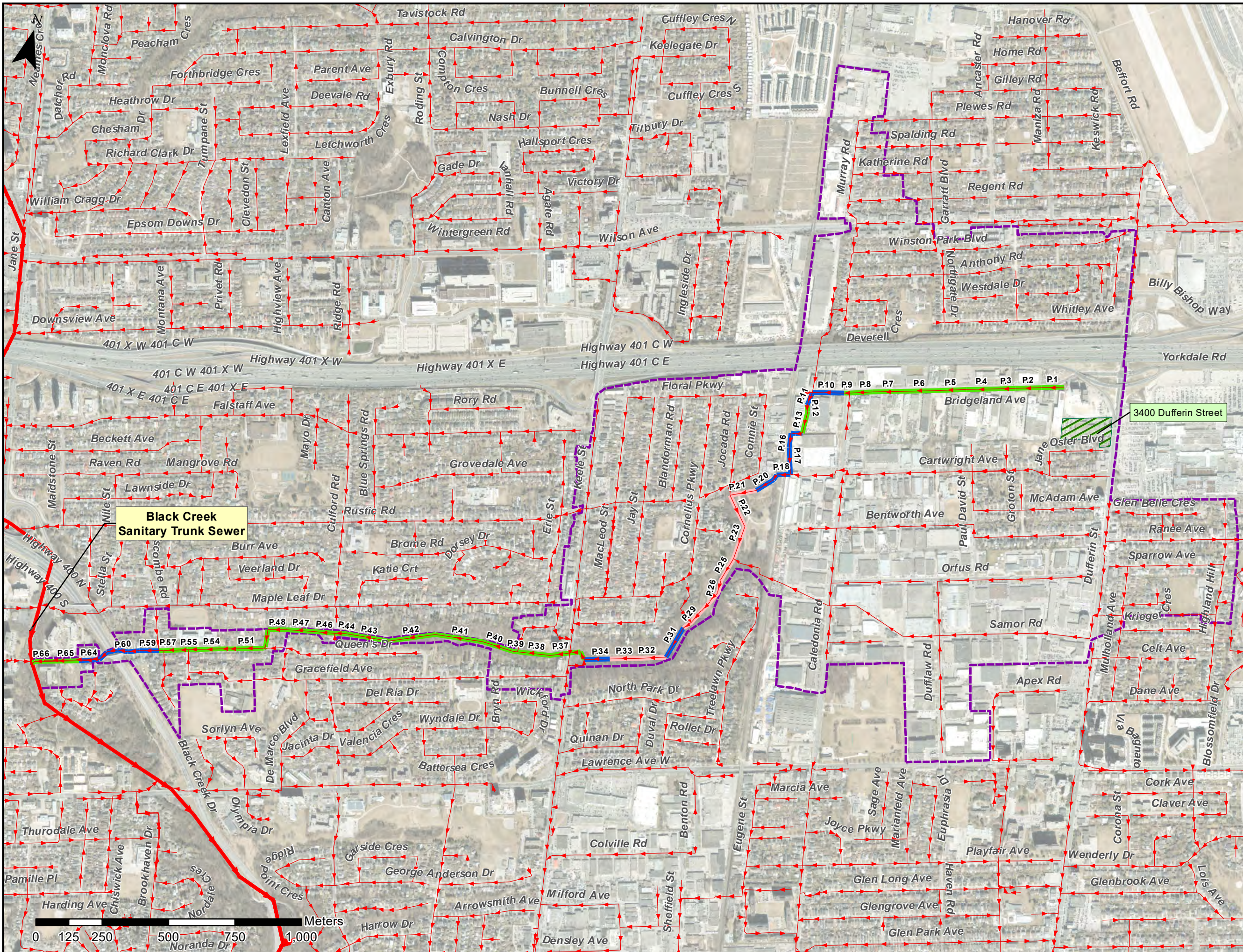
Link	4064604546.1	4065604579.1	4069504704.1	4071804778.1	4075404798.1	4077404833.1	4077704872.1	4079304913.1	4081304983.1	4081905000.1	4083605057.1	4084705088.1	4086005132.1	4088205204.1	4089305242.1	4089905262.1	4093005362.1	4093705367.1	4100105358.1	4102105425.1	4104205527.1	4105705605.1	4106505633.1	4106705651.1	4108505806.1	4115505969.1	
US node ID	4064604546	4065604579	4069504704	4071804778	4075404798	4077404833	4077704872	4079304913	4081304983	4081905000	4083605057	4084705088	4086005132	4088205204	4089305242	4089905262	4093005362	4093705367	4100105358	4102105425	4104205527	4105705605	4106505633	4106705651	4108505806	4115505969	
ds node	4004795	4064604546	4065604579	4069504704	4071804778	4075404798	4077404833	4077704872	4079304913	4081304983	4081905000	4083605057	4084705088	4086005132	4088205204	4089305242	4089905262	4093005362	4093705367	4100105358	4102105425	4104205527	4105705605	4106505633	4106705651	4108505806	
System type	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	
length (m)	13.1	34.8	130.8	77.6	41.1	40.8	38.3	44.6	73.1	16.9	60.7	32.5	45.6	75.1	40.0	20.3	105.3	8.4	64.4	70.1	104.0	79.4	29.6	17.8	156.4	177.0	
Shape ID	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	
height (mm)	450	600	600	600	600	600	600	600	600	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	
us inv (m AD)	117.484	118.189	119.047	119.359	119.610	119.806	120.712	120.720	122.088	122.594	123.717	124.523	125.716	127.477	128.048	128.391	130.059	130.325	131.190	132.140	133.405	135.125	135.425	135.730	138.634	141.560	
ds inv (m AD)	115.000	117.654	118.509	119.127	119.459	119.680	119.856	120.712	120.720	122.268	122.641	123.766	124.551	125.771	127.498	128.066	128.448	130.211	130.355	131.310	132.260	134.330	135.155	135.465	135.795	138.705	
grad (m/m)	0.18962	0.01537	0.00411	0.00299	0.00367	0.00309	0.02235	0.00018	0.01871	0.01929	0.01773	0.02329	0.02555	0.02272	0.01375	0.01601	0.01530	0.01357	0.01297	0.01184	0.01101	0.01001	0.00912	0.01489	0.01815	0.01613	
r.pfc (/s)	1242	761	394	336	372	341	918	82	840	597	573	656	688	648	504	544	532	501	490	468	451	430	411	525	580	546	
Node	-	4064604546	4065604579	4069504704	4071804778	4075404798	4077404833	4077704872	4079304913	4081304983	4081905000	4083605057	4084705088	4086005132	4088205204	4089305242	4089905262	4093005362	4093705367	4100105358	4102105425	4104205527	4105705605	4106505633	4106705651	4108505806	-
ground (m AD)	-	122.432	124.398	127.011	126.324	122.448	124.962	127.226	125.613	124.991	125.451	126.785	127.497	128.539	130.420	131.336	131.788	135.363	134.496	133.760	135.999	139.260	142.834	142.545	142.220	144.194	-
expr:FB	7.28	4.85	6.06	7.77	6.75	2.64	4.95	6.38	4.62	2.76	2.71	2.92	2.83	2.69	2.81	3.14	3.25	5.15	4.02	2.42	3.70	5.70	7.54	6.96	6.34	5.42	3.32

Analysis Summary Results Wet Weather Flow Conditions

Table: SAN-B-2



Pipe Data												InfoWorks Model Results															
												SC3: Existing Wet Weather Flow Conditions							SC4: Proposed Wet Weather Flow Conditions							Difference	
Pipe ID	Map ID	Length (m)	Diameter (mm)	Upstream Ground Level (m AD)	Upstream Invert (m AD)	Upstream Obvert (m AD)	Downstream Ground Level (m AD)	Downstream Invert (m AD)	Downstream Obvert (m AD)	Slope (%)	Full Flow Capacity (l/s)	Peak Flow (l/s)	Diameter Utilization (%)	Max Upstream HGL (m AD)	Max Downstream HGL (m AD)	Surcharge Status (m)	Maximum Surcharging (m)	Minimum Available Freeboard (m)	Peak Flow (l/s)	Diameter Utilization (%)	Max Upstream HGL (m AD)	Max Downstream HGL (m AD)	Surcharge Status (m)	Maximum Surcharging (m)	Minimum Available Freeboard (m)	Surcharging (m)	Available Freeboard (m)
Downstream Analyzed Pipes																											
427007995.1	P.01	85.8	300	190.000	183.800	184.100	190.324	183.690	183.990	0.13%	35	7.0	31.0%	183.893	183.769	Free flow	None	N/A	23.6	59.7%	183.979	183.849	Free flow	None	N/A	N/A	N/A
4267507913.1	P.02	99.6	300	190.324	183.650	183.950	189.489	183.520	183.200	0.13%	35	11.3	39.7%	183.769	183.605	Free flow	None	N/A	27.8	66.0%	183.848	183.667	Free flow	None	N/A	N/A	N/A
4264507818.1	P.03	65.5	300	189.489	183.500	183.800	188.633	183.330	183.630	0.26%	49	12.3	35.0%	183.605	183.415	Free flow	None	N/A	28.8	55.7%	183.667	183.461	Free flow	None	N/A	N/A	N/A
4262607756.1	P.04	118.3	250	188.633	183.250	183.500	186.384	182.470	182.720	0.66%	48	17.6	42.8%	183.357	182.577	Free flow	None	N/A	34.2	63.2%	183.408	182.622	Free flow	None	N/A	N/A	N/A
4259107643.1	P.05	117.1	250	186.384	182.450	182.700	184.102	181.510	181.760	0.80%	53	19.8	46.8%	182.557	181.627	Free flow	None	N/A	36.4	66.0%	182.605	181.675	Free flow	None	N/A	N/A	N/A
4255607531.1	P.06	116.9	250	184.102	181.490	181.740	183.267	180.560	180.810	0.80%	53	29.6	54.4%	181.626	180.696	Free flow	None	N/A	46.1	72.4%	181.671	180.737	Free flow	None	N/A	N/A	N/A
4252107419.1	P.07	117.9	250	183.267	180.550	180.800	182.434	179.630	179.880	0.78%	53	29.6	67.2%	180.687	179.798	Free flow	None	N/A	46.1	>100%	180.733	179.934	Surcharging w. Freeboard > 1.8m	0.05	2.50	N/A	N/A
4248607307.1	P.08	87.2	300	182.434	179.520	179.820	182.983	179.510	179.810	0.01%	10	31.4	92.3%	179.797	179.646	Free flow	None	N/A	47.8	>100%	179.929	179.679	Surcharging w. Freeboard > 1.8m	0.11	2.51	N/A	N/A
4245907224.1	P.09	21.6	250	182.983	179.500	179.750	182.995	179.210	179.460	1.34%	69	34.1	52.8%	179.627	179.342	Free flow	None	N/A	50.5	95.2%	179.667	179.448	Free flow	None	N/A	N/A	N/A
4245307203.1	P.10	119.6	300	182.995	179.190	179.490	182.067	178.511	178.811	0.57%	73	36.5	>100%	179.341	178.982	Surcharging w. Freeboard > 1.8m	0.17	3.09	52.8	>100%	179.445	179.081	Surcharging w. Freeboard > 1.8m	0.27	2.99	0.10	-0.099
4242307088.1	P.11	52.2	375	182.067	178.461	178.836	180.579	178.126	178.510	0.64%	140	174.1	>100%	178.955	178.433	Surcharging w. Freeboard > 1.8m	0.12	2.15	187.9	>100%	179.048	178.443	Surcharging w. Freeboard > 1.8m	0.21	2.14	0.09	-0.01
4237107081.1	P.12	24.4	375	180.579	176.526	176.901	180.297	176.199	176.574	1.34%	203	174.1	72.0%	176.796	176.469	Free flow	None	N/A	187.9	87.2%	176.836	176.526	Free flow	None	N/A	N/A	N/A
4234807090.1	P.13	84.5	375	180.297	176.169	176.544	179.182	175.138	175.513	1.22%	194	174.1	76.5%	176.456	175.425	Free flow	None	N/A	187.7	90.9%	176.510	175.457	Free flow	None	N/A	N/A	N/A
4226407093.1	P.14	27.0	375	179.182	173.014	173.389	179.110	172.777	173.152	0.88%	164	177.0	>100%	174.178	173.900	Surcharging w. Freeboard > 1.8m	0.79	5.00	190.7	>100%	175.185	174.865	Surcharging w. Freeboard > 1.8m	1.80	4.00	1.01	-1.007
4225507067.1	P.15	14.8	375	179.110	172.708	173.083	179.214	172.578	172.953	0.88%	164	176.9	>100%	173.882	173.730	Surcharging w. Freeboard > 1.8m	0.80	5.23	190.2	>100%	174.846	174.670	Surcharging w. Freeboard > 1.8m	1.76	4.26	0.96	-0.964
4225307053.1	P.16	54.8	375	179.214	172.528	172.903	177.980	172.012	172.387	0.94%	170	177.9	>100%	173.712	173.150	Surcharging w. Freeboard > 1.8m	0.81	4.83	190.1	>100%	174.652	174.002	Surcharging w. Freeboard > 1.8m	1.75	3.98	0.94	-0.852
4219907060.1	P.17	102.0	375	177.980	171.952	172.327	177.766	171.028	171.403	0.91%	167	179.8	>100%	173.132	172.088	Surcharging w. Freeboard > 1.8m	0.81	4.85	190.7	>100%	173.983	172.771	Surcharging w. Freeboard > 1.8m	1.66	4.00	0.85	-0.851
4210207092.1	P.18	52.2	450	177.766	171.013	171.463	177.575	169.615	170.065	2.68%	467	228.3	>100%	172.073	171.716	Surcharging w. Freeboard > 1.8m	1.65	5.69	234.9	>100%	172.756	172.379	Surcharging w. Freeboard > 1.8m	2.31	5.01	0.66	-0.683
4208607043.1	P.19	20.3	350	177.575	169.595	169.945	177.850	168.560	168.910	5.10%	329	227.1	>100%	171.683	171.169	Surcharging w. Freeboard > 1.8m	2.26	5.89	233.9	>100%	172.347	171.800	Surcharging w. Freeboard > 1.8m	2.89	5.23	0.63	-0.664
4206607036.1	P.20	77.1	350	177.850	168.560	168.910	173.420	168.003	168.353	0.72%	124	226.3	>100%	171.137	169.297	Surcharging w. Freeboard > 1.8m	2.23	4.12	233.4	>100%	171.768	169.799	Surcharging w. Freeboard > 1.8m	2.86	3.62	0.63	-0.502
4200806985.1	P.21	100.8	350	173.420	167.913	168.263	167.547	165.585	165.935	2.31%	222	225.5	>100%	169.260	166.788	Critical Surcharging (Freeboard < 1.8m)	1.00	0.76	232.8	>100%	169.762	167.111	Critical Surcharging (Freeboard < 1.8m)	1.50	0.44	0.50	-0.323
4196406895.1	P.22	130.0	375	167.547	165.565	165.940	165.737	163.543	163.918	1.56%	219	239.2	>100%	166.755	164.245	Critical Surcharging (Freeboard < 1.8m)	0.81	0.79	247.1	>100%	167.077	164.403	Critical Surcharging (Freeboard < 1.8m)	1.14	0.47	0.32	-0.322
4186706981.1	P.23	115.2	375	165.737	163.493	163.868	163.217	161.542	161.917	1.69%	228	239.2	>100%	164.197	161.970	Critical Surcharging (Freeboard < 1.8m)	0.33	1.25	247.0	>100%	164.366	161.993	Critical Surcharging (Freeboard < 1.8m)	0.50	1.22	0.17	-0.023
4175206973.1	P.24	12.8	375	163.217	161.462	161.837	163.210	161.340	161.715	0.95%	171	239.2	>100%	161.917	161.678	Critical Surcharging (Freeboard < 1.8m)	0.08	1.30	247.0	>100%	161.933	161.678	Critical Surcharging (Freeboard < 1.8m)	0.10	1.28	0.02	-0.016
NP1A	P.25	74.6	900	163.210	159.160	160.060	161.730	158.860	159.760	0.40%	1148	348.8	>100%	160.029	160.004	Critical Surcharging (Freeboard < 1.8m)	0.24	1.73	355.7	>100%	160.636	160.609	Critical Surcharging (Freeboard < 1.8m)	0.85	1.12	0.60	-0.605
NP2.1	P.26	59.3	1050	161.730	158.710	159.760	160.920	158.620	159.670	0.15%	1064	333.3	>100%	160.002	159.994	Critical Surcharging (Freeboard < 1.8m)	0.32	0.93	346.3	>100%	160.607	160.597	Critical Surcharging (Freeboard < 1.8m)	0.93	0.32	0.60	-0.603
NP3.1	P.27	33.7	450	160.920	157.930	158.380	160.670	157.890	158.340	0.12%	98	332.7	>100%	159.968	159.515	Critical Surcharging (Freeboard < 1.8m)	1.59	0.95	342.3	>100%	160.571	160.084	Critical Surcharging (Freeboard < 1.8m)	2.19	0.35	0.60	-0.603
NP4.1	P.28	76.9	450	160.670	157.890	158.340	160.320	157.660	158.110	0.30%	156	332.4	>100%	159.486	158.456	Critical Surcharging (Freeboard < 1.8m)	1.15	1.18	341.5	>100%	160.054	158.943	Critical Surcharging (Freeboard < 1.8m)	1.71	0.62	0.57	-0.568
NP5.1	P.29	78.4	525	160.320	157.580	158.105	159.280	157.340	157.865	0.31%	238	331.9	>100%	158.427	157.970	Critical Surcharging (Freeboard < 1.8m)	0.32	1.31	340.7	>100%	158.924	158.431	Critical Surcharging (Freeboard < 1.8m)	0.82	0.85	0.50	-0.461
NP6.1	P.30	36.6	450	159.280	157.310	157.760	160.213	156.223	157.273	1.33%	329	330.5	>100%	157.918	157.416	Critical Surcharging (Freeboard < 1.8m)	0.16	1.36	340.3	>100%	158.399	157.858	Critical Surcharging (Freeboard < 1.8m)	0.64	0.88	0.48	-0.481
4143506862.1	P.31	129.3	450	160.213	156.793	157.243	157.486	154.971	155.421	1.41%	339	329.6	>100%	157.366	155.584	Surcharging w. Freeboard > 1.8m	0.16	1.90	340.5	>100%	157.824	155.907	Critical Surcharging (Freeboard < 1.8m)	0.58	1.58	0.42	-0.323
4131006829.1	P.32	103.5	450	157.486	154.921	155.371	154.871	153.591	154.041	1.29%	323	329.9	>100%	155.529	154.088	Critical Surcharging (Freeboard < 1.8m)	0.16	0.78	342.4	>100%	155.869	154.319	Critical Surcharging (Freeboard < 1.8m)	0.50	0.55	0.34	-0.231
4127906730.1	P.33	108.4	450	154.871	153.536	153.986	154.352	151.858	152.308	1.55%	355	329.9	>100%	154.047	152.532	Critical Surcharging (Freeboard < 1.8m)	0.22	0.82	342.4	>100%	154.264	152.634	Critical Surcharging (Freeboard < 1.8m)	0.33	0.61	0.10	-0.217
4124706627.1	P.34	96.3	450	154.352	151.728	152.178	154.726	150.747	151.197	1.02%	288	329.9	>100%	152.482	151.145	Surcharging w. Freeboard > 1.8m	0.30	1.87	342.4	>100%	152.587	151.150	Critical Surcharging (Freeboard < 1.8m)	0.41	1.76	0.11	-0.105
4121906535.1	P.35	30.9	450	154.726	150.537	150.987	156.058	149.518	149.968	3.30%	518	412.7	69.6%	150.850	149.831	Free flow	None	N/A	418.2	70.2%	150.853	149.834	Free flow	None	N/A	N/A	N/A
4124206514.1	P.36	39.8	525	156.058	149.348	149.873	163.432	148.750	149.275	1.50%	527	412.7	71.4%	149.708	149.125	Free											



Legend

- Sanitary Manhole
 - Sanitary Sewer
 - Sanitary Trunk Sewer
 - ▨ Development Site
 - - - Drainage Area
- HGL Level**
- Free Flow
 - Surcharging (Freeboard > 1.8m)
 - Critical Surcharging (Freeboard < 1.8m)
 - Flow to Surface

Note: Only sanitary pipes are shown for clarity.

Analysis Parameters	
Storm Event	May 12, 2000
Development Flow	0.53 L/s

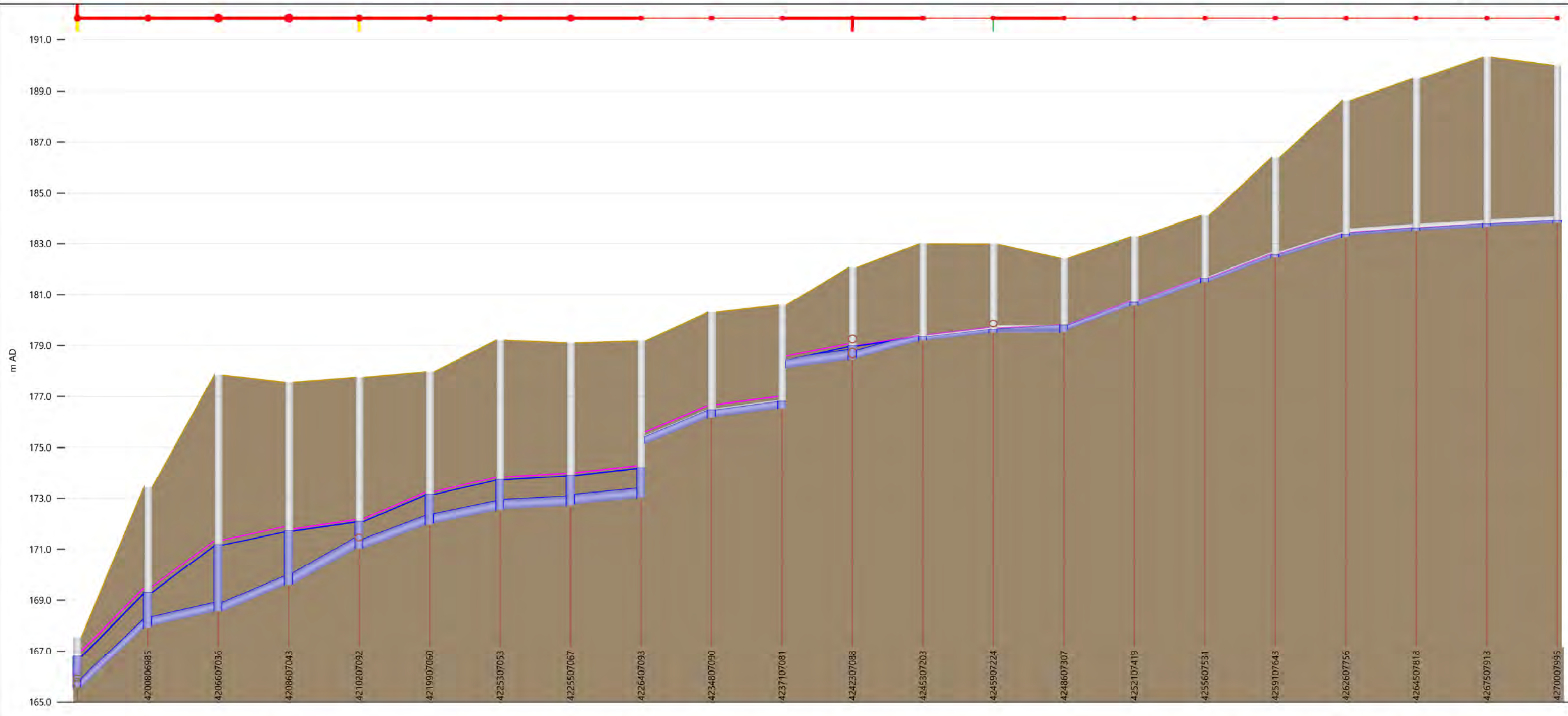
**Figure: SAN-B-3
Scenario 3: Existing WWF**

3400 Dufferin Street
Sanitary Capacity Analysis
City of Toronto



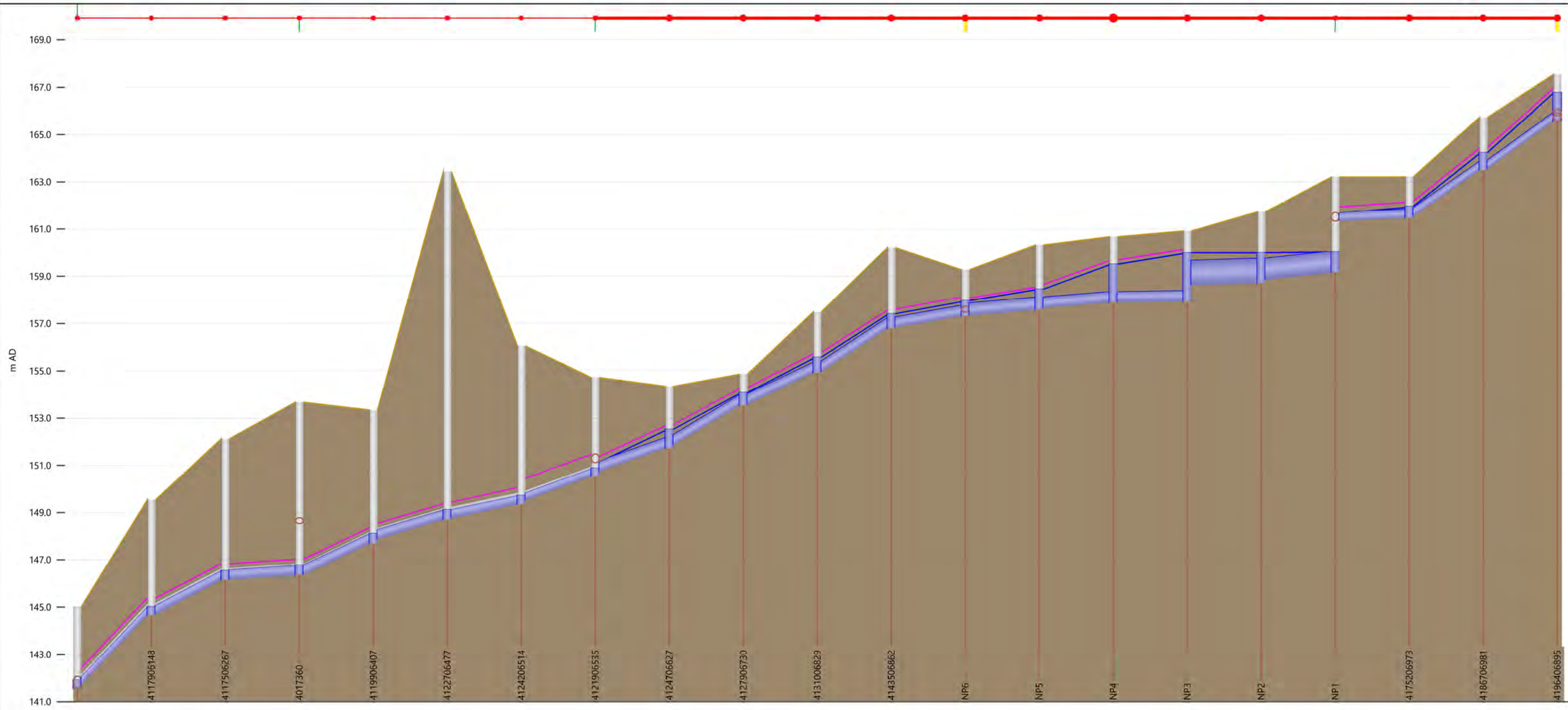
Project No.:	Date:
139570	July 2022

Scenario 3: Existing WWF - Analyzed Line Leg 1



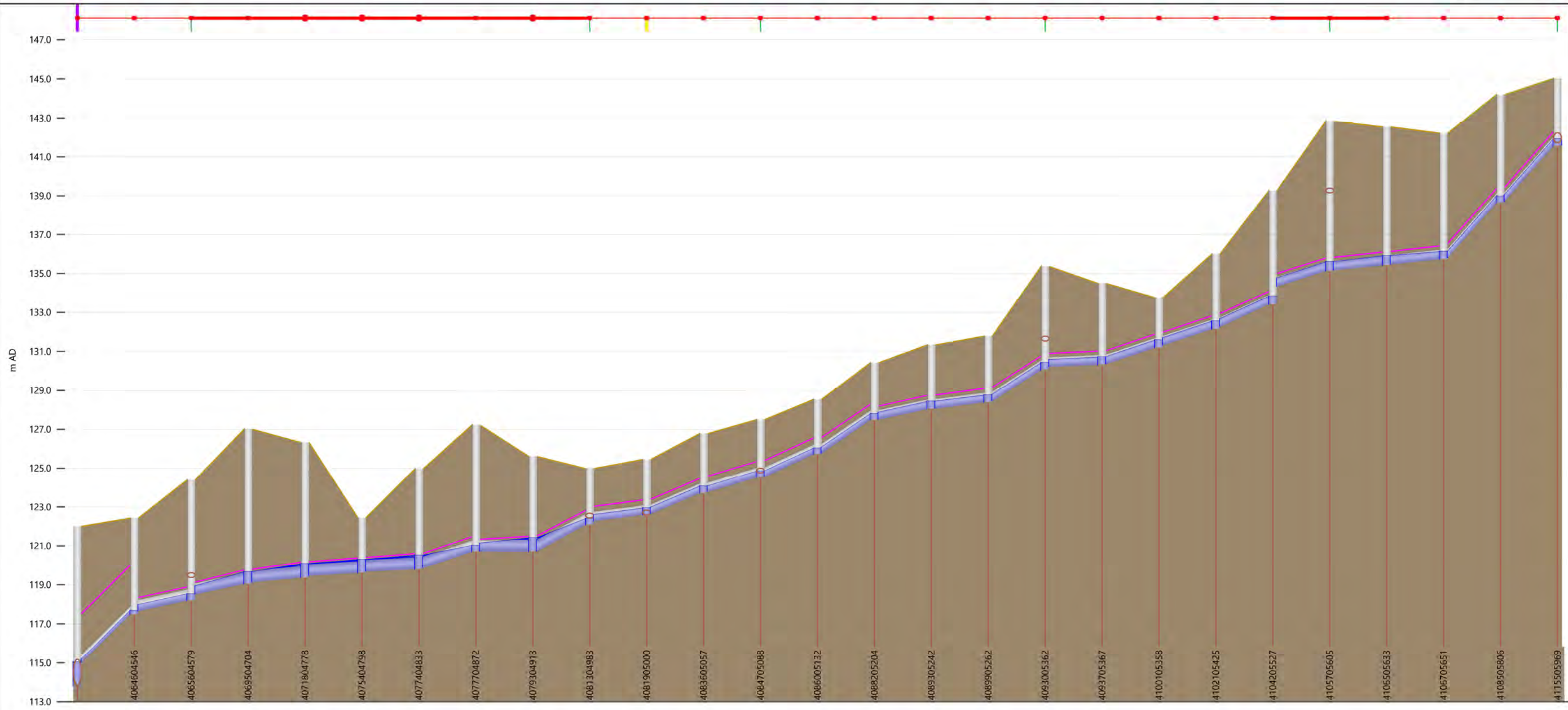
Link	4200806985.1	4206607036.1	4208607043.1	4210207092.1	4219907060.1	4225307053.1	4225507067.1	4226407093.1	4234807090.1	4237107081.1	4242307088.1	4245307203.1	4245907224.1	4248607307.1	4252107419.1	4255607531.1	4259107643.1	4262607756.1	4264507818.1	4267507913.1	4270007995.1	
US node ID	4200806985	4206607036	4208607043	4210207092	4219907060	4225307053	4225507067	4226407093	4234807090	4237107081	4242307088	4245307203	4245907224	4248607307	4252107419	4255607531	4259107643	4262607756	4264507818	4267507913	4270007995	
ds node	4196406895	4200806985	4206607036	4208607043	4210207092	4219907060	4225307053	4225507067	4226407093	4234807090	4237107081	4242307088	4245307203	4245907224	4248607307	4252107419	4255607531	4259107643	4262607756	4264507818	4267507913	
System type	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	
length (m)	100.8	77.1	20.3	52.2	102.0	54.8	14.8	27.0	84.5	24.4	52.2	119.6	21.6	87.2	117.9	116.9	117.1	118.3	65.5	99.6	85.8	
Shape ID	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC
height (mm)	350	350	350	450	375	375	375	375	375	375	375	300	250	300	250	250	250	250	300	300	300	
us inv (m AD)	167.913	168.560	169.595	171.013	171.952	172.528	172.708	173.014	176.169	176.526	178.461	179.190	179.500	179.520	180.550	181.490	182.450	183.250	183.500	183.650	183.800	
ds inv (m AD)	165.585	168.003	168.560	169.615	171.028	172.012	172.578	172.777	175.138	176.199	178.126	178.511	179.210	179.510	179.630	180.560	181.510	182.470	183.330	183.520	183.690	
grad (m/m)	0.02310	0.00722	0.05099	0.02678	0.00906	0.00942	0.00878	0.00878	0.01220	0.01340	0.00642	0.00568	0.01343	0.00011	0.00780	0.00796	0.00803	0.00659	0.00260	0.00131	0.00128	
r.pfc (l/s)	222	124	329	467	167	170	164	164	194	203	140	73	69	10	53	53	53	48	49	35	35	
Node	-	4200806985	4206607036	4208607043	4210207092	4219907060	4225307053	4225507067	4226407093	4234807090	4237107081	4242307088	4245307203	4245907224	4248607307	4252107419	4255607531	4259107643	4262607756	4264507818	4267507913	-
ground (m AD)	-	173.420	177.850	177.575	177.766	177.980	179.214	179.110	179.182	180.297	180.579	182.067	182.995	182.983	182.434	183.267	184.102	186.384	188.633	189.489	190.324	-
expr:FB	0.76	4.13	6.68	5.86	5.68	4.83	5.49	5.21	4.99	3.83	3.77	3.08	3.65	3.36	2.64	2.58	2.47	3.83	5.28	5.88	6.56	6.11

Scenario 3: Existing WWF - Analyzed Line Leg 2

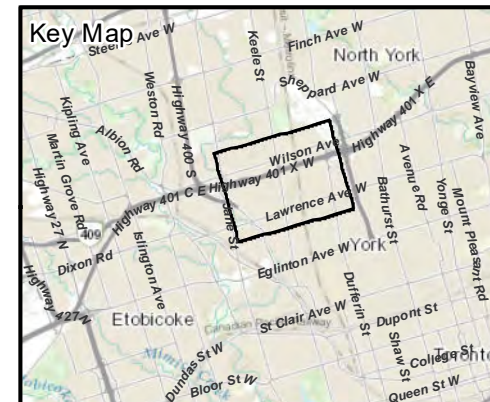
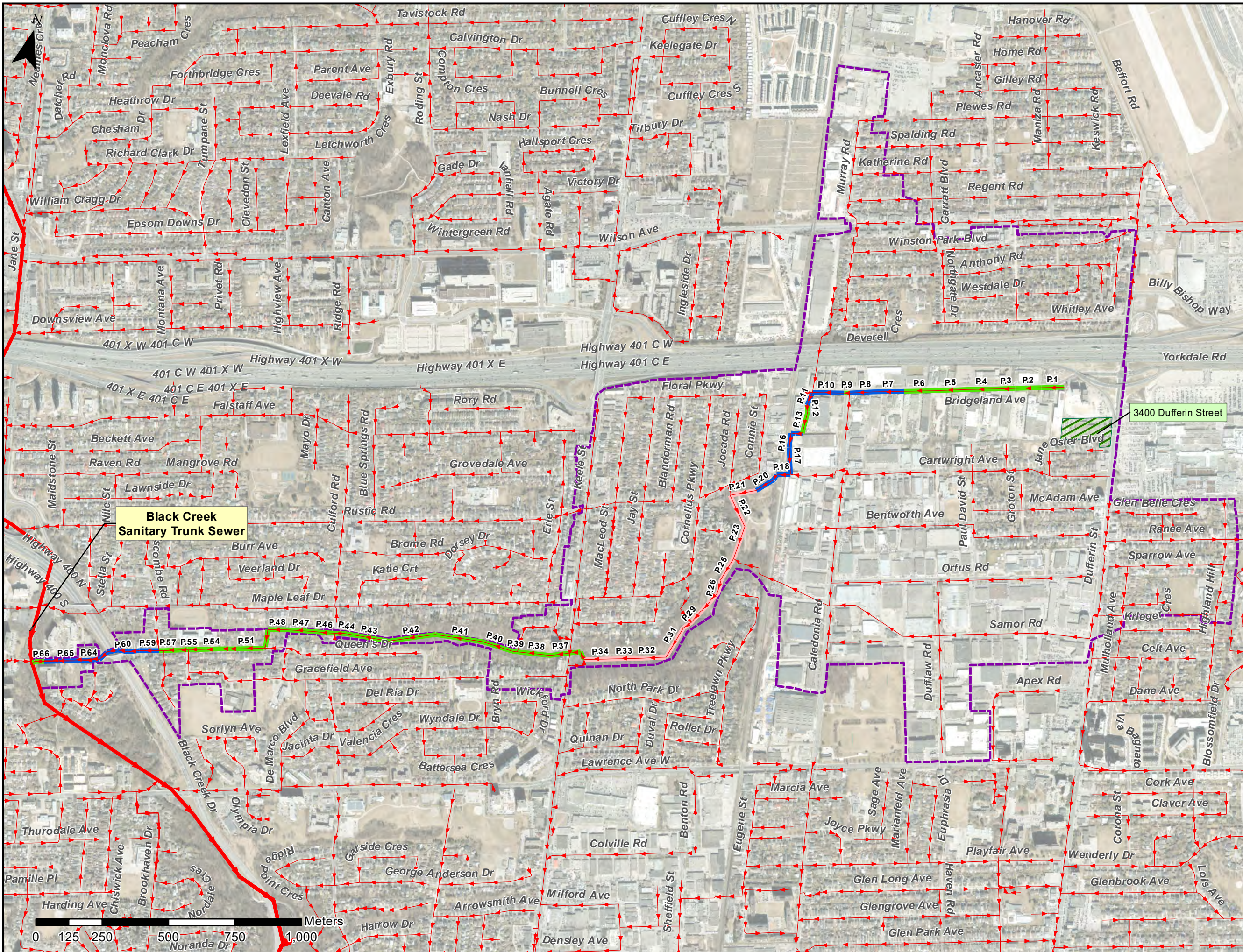


Link	4117906148.1	4117506267.1	4017360.1	4119906407.1	4122706477.1	4124206514.1	4121906535.1	4124706627.1	4127906730.1	4131006829.1	4143506862.1	NP6.1	NP5.1	NP4.1	NP3.1	NP2.1	NP1.A	4175206973.1	4186706981.1	4196406895.1	
US node ID	4117906148	4117506267	4017360	4119906407	4122706477	4124206514	4121906535	4124706627	4127906730	4131006829	4143506862	NP6	NP5	NP4	NP3	NP2	NP1	4175206973	4186706981	4196406895	
ds node	4115505969	4117906148	4117506267	4017360	4119906407	4122706477	4124206514	4121906535	4124706627	4127906730	4131006829	4143506862	NP6	NP5	NP4	NP3	NP2	NP1	4175206973	4186706981	4196406895
System type	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary
length (m)	180.1	119.5	17.2	124.7	75.0	39.8	30.9	96.3	108.4	103.5	129.3	36.6	108.4	78.4	76.9	36.6	12.8	115.2	130.0	130.0	
Shape ID	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC
height (mm)	525	525	525	525	525	525	450	450	450	450	450	450	525	450	450	1050	900	375	375	375	
us inv (m AD)	144.660	146.145	146.345	147.690	148.700	149.348	150.537	151.728	153.536	154.921	156.793	157.310	157.580	157.890	157.930	158.710	159.160	161.462	163.493	165.565	
ds inv (m AD)	141.715	144.690	146.160	146.345	147.870	148.750	149.518	150.747	151.858	153.591	154.971	156.823	157.340	157.640	157.880	158.620	158.860	161.340	161.542	163.543	
grad (m/m)	0.01635	0.01218	0.01078	0.01078	0.01107	0.01503	0.03298	0.01019	0.01548	0.01285	0.01409	0.01331	0.00306	0.00299	0.00119	0.00152	0.00402	0.00953	0.01694	0.01555	
r.pfc (l/s)	550	475	447	447	453	527	518	288	355	323	339	329	238	156	98	1064	1148	171	228	219	
Node	-	4117906148	4117506267	4017360	4119906407	4122706477	4124206514	4121906535	4124706627	4127906730	4131006829	4143506862	NP6	NP5	NP4	NP3	NP2	NP1	4175206973	4186706981	4196406895
ground (m AD)	145.026	149.536	152.130	153.679	153.347	163.432	156.058	154.726	154.352	154.871	157.486	160.213	159.280	160.320	160.670	160.820	161.730	163.210	163.217	165.737	167.547
expr:FB	3.11	4.52	5.59	6.91	5.23	14.31	6.34	3.84	1.83	0.79	1.91	2.80	1.31	1.87	1.16	0.93	1.73	3.18	1.25	1.50	0.76

Scenario 3: Existing WWF - Analyzed Line Leg 3



Link	4064604546.1	4065604579.1	4069504704.1	4071804778.1	4075404798.1	4077404833.1	4077704872.1	4079304913.1	4081304983.1	4081905000.1	4083605057.1	4084705088.1	4086005132.1	4088205204.1	4089305242.1	4089905262.1	4093005362.1	4093705367.1	4100105358.1	4102105425.1	4104205527.1	4105705605.1	4106505633.1	4106705651.1	4108505806.1	4115505969.1	
US node ID	4064604546	4065604579	4069504704	4071804778	4075404798	4077404833	4077704872	4079304913	4081304983	4081905000	4083605057	4084705088	4086005132	4088205204	4089305242	4089905262	4093005362	4093705367	4100105358	4102105425	4104205527	4105705605	4106505633	4106705651	4108505806	4115505969	
ds node	4004795	4064604546	4065604579	4069504704	4071804778	4075404798	4077404833	4077704872	4079304913	4081304983	4081905000	4083605057	4084705088	4086005132	4088205204	4089305242	4089905262	4093005362	4093705367	4100105358	4102105425	4104205527	4105705605	4106505633	4106705651	4108505806	
System type	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	
length (m)	13.1	34.8	130.8	77.6	41.1	40.8	38.3	44.6	73.1	16.9	60.7	32.5	45.6	75.1	40.0	20.3	105.3	8.4	64.4	70.1	104.0	79.4	29.6	17.8	156.4	177.0	
Shape ID	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	
height (mm)	450	600	600	600	600	600	600	600	600	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	
us inv (m AD)	117.484	118.189	119.047	119.359	119.610	119.806	120.712	120.720	122.088	122.594	123.717	124.523	125.716	127.477	128.048	128.391	130.059	130.325	131.190	132.140	133.405	135.125	135.425	135.730	138.634	141.560	
ds inv (m AD)	115.000	117.654	118.509	119.127	119.459	119.680	119.856	120.712	120.720	122.268	122.641	123.766	124.551	125.771	127.498	128.066	128.448	130.211	130.355	131.310	132.260	134.330	135.155	135.465	135.795	138.705	
grad (m/m)	0.18962	0.01537	0.00411	0.00299	0.00367	0.00309	0.02235	0.00018	0.01871	0.01929	0.01773	0.02329	0.02555	0.02272	0.01375	0.01601	0.01530	0.01357	0.01297	0.01184	0.01101	0.01001	0.00912	0.01489	0.01815	0.01613	
r.pfc (l/s)	1242	761	394	336	372	341	918	82	840	597	573	656	688	648	504	544	532	501	490	468	451	411	525	580	546		
Node	-	4064604546	4065604579	4069504704	4071804778	4075404798	4077404833	4077704872	4079304913	4081304983	4081905000	4083605057	4084705088	4086005132	4088205204	4089305242	4089905262	4093005362	4093705367	4100105358	4102105425	4104205527	4105705605	4106505633	4106705651	4108505806	-
ground (m AD)	-	122.432	124.398	127.011	126.324	122.448	124.962	127.226	125.613	124.991	125.451	126.785	127.497	128.539	130.420	131.336	131.788	135.363	134.496	133.760	135.999	139.260	142.834	142.545	142.220	144.194	-
expr:FB	6.97	4.76	5.87	7.35	6.25	2.15	4.44	6.21	4.21	2.59	2.51	2.71	2.65	2.51	2.62	2.90	3.03	4.93	3.78	2.18	3.45	5.43	7.24	6.64	6.09	5.21	3.11



Legend

- Sanitary Manhole
 - Sanitary Sewer
 - Sanitary Trunk Sewer
 - ▨ Development Site
 - - - Drainage Area
- HGL Level**
- Free Flow
 - Surcharging (Freeboard > 1.8m)
 - Critical Surcharging (Freeboard < 1.8m)
 - Flow to Surface

Note: Only sanitary pipes are shown for clarity.

Analysis Parameters	
Storm Event	May 12, 2000
Development Flow	16.53 L/s

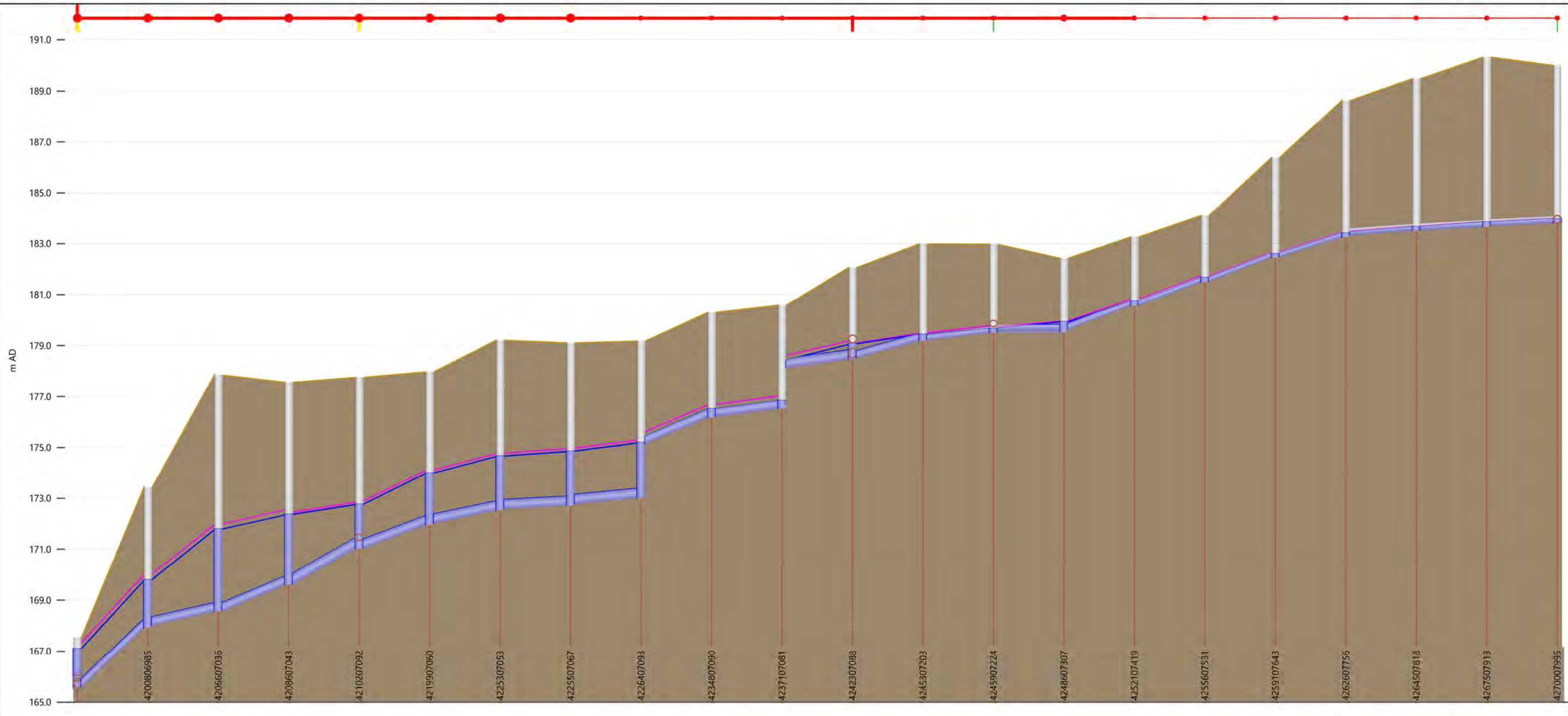
**Figure: SAN-B-4
Scenario 4: Proposed WWF**

3400 Dufferin Street
Sanitary Capacity Analysis
City of Toronto



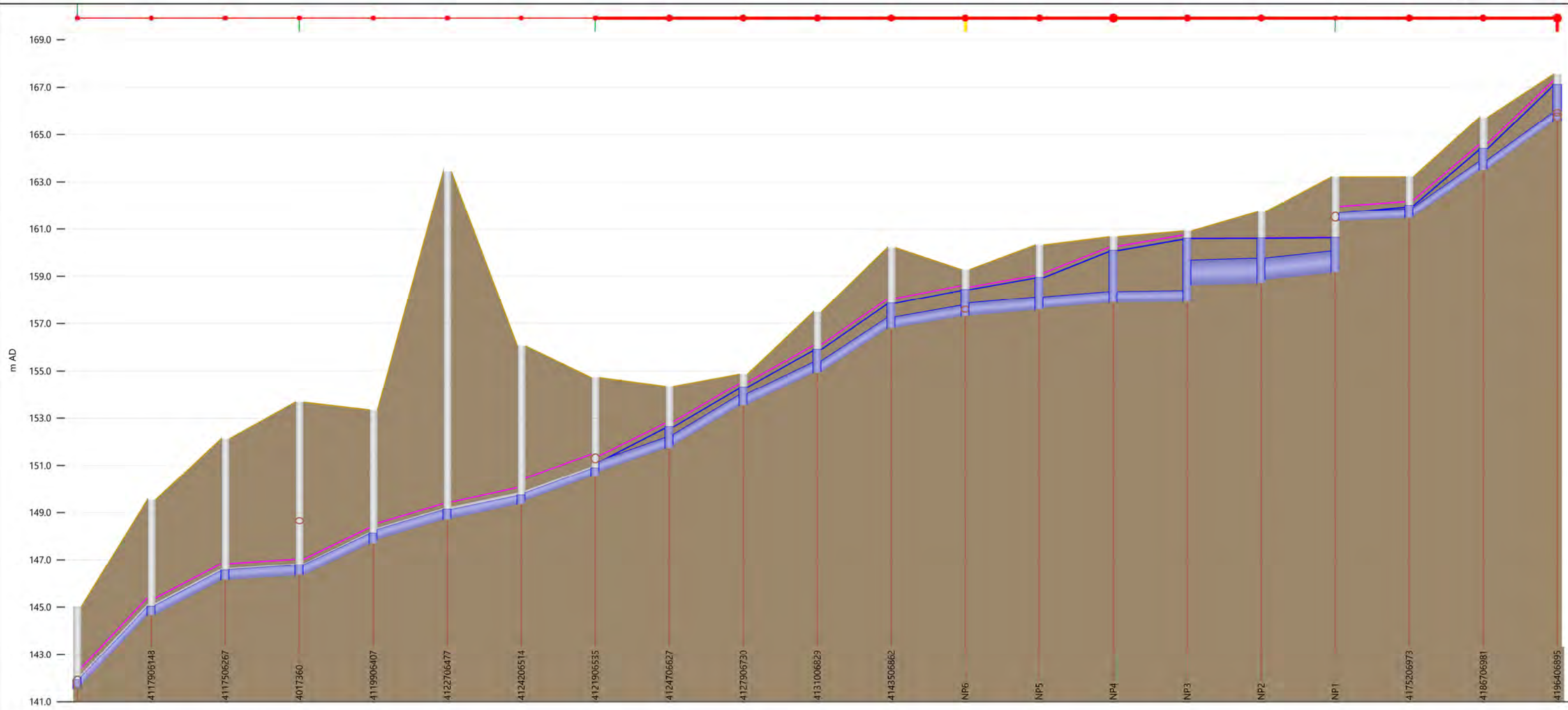
Project No.:	Date:
139570	July 2022

Scenario 4: Proposed WWF - Analyzed Line Leg 1



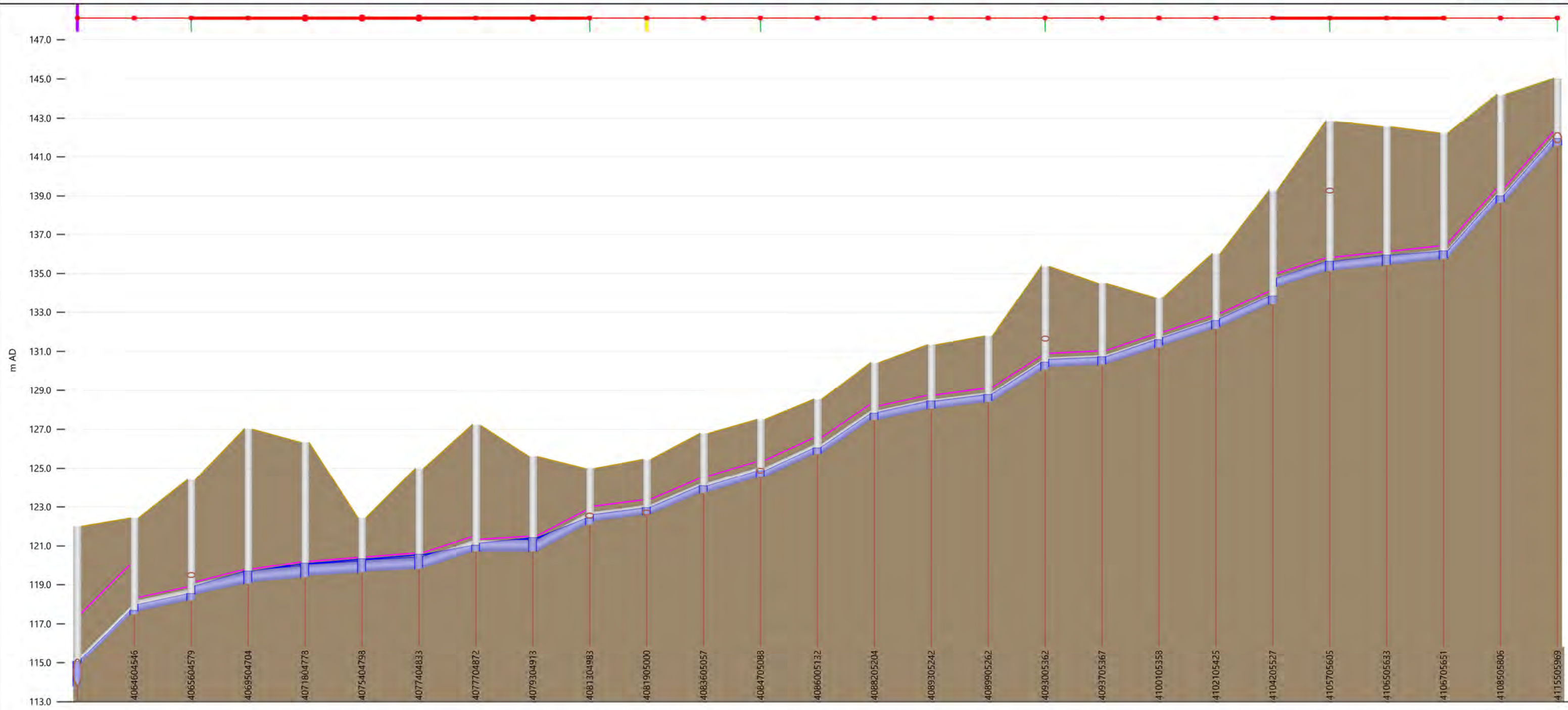
Link	4200806985.1	4206607036.1	4208607043.1	4210207092.1	4219907060.1	4225307053.1	4225507067.1	4226407093.1	4234807090.1	4237107081.1	4242307088.1	4245307203.1	4245907224.1	4248607307.1	4252107419.1	4255607531.1	4259107643.1	4262607756.1	4264507818.1	4267507913.1	4270007995.1	
US node ID	4200806985	4206607036	4208607043	4210207092	4219907060	4225307053	4225507067	4226407093	4234807090	4237107081	4242307088	4245307203	4245907224	4248607307	4252107419	4255607531	4259107643	4262607756	4264507818	4267507913	4270007995	
ds node	4196406895	4200806985	4206607036	4208607043	4210207092	4219907060	4225307053	4225507067	4226407093	4234807090	4237107081	4242307088	4245307203	4245907224	4248607307	4252107419	4255607531	4259107643	4262607756	4264507818	4267507913	
System type	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	
length (m)	100.8	77.1	20.3	52.2	102.0	54.8	14.8	27.0	84.5	24.4	52.2	119.6	21.6	87.2	117.9	116.9	117.1	118.3	65.5	99.6	85.8	
Shape ID	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC
height (mm)	350	350	350	450	375	375	375	375	375	375	375	300	250	300	250	250	250	250	300	300	300	
us inv (m AD)	167.913	168.560	169.595	171.013	171.952	172.528	172.708	173.014	176.169	176.526	178.461	179.190	179.500	179.520	180.550	181.490	182.450	183.250	183.500	183.650	183.800	
ds inv (m AD)	165.585	168.003	168.560	169.615	171.028	172.012	172.578	172.777	175.138	176.199	178.126	178.511	179.210	179.510	179.630	180.560	181.510	182.470	183.330	183.520	183.690	
grad (m/m)	0.02310	0.00722	0.05099	0.02678	0.00906	0.00942	0.00878	0.00878	0.01220	0.01340	0.00642	0.00568	0.01343	0.00011	0.00780	0.00796	0.00803	0.00659	0.00260	0.00131	0.00128	
r.pfc (l/s)	222	124	329	467	167	170	164	164	194	203	140	73	69	10	53	53	53	48	49	35	35	
Node	-	4200806985	4206607036	4208607043	4210207092	4219907060	4225307053	4225507067	4226407093	4234807090	4237107081	4242307088	4245307203	4245907224	4248607307	4252107419	4255607531	4259107643	4262607756	4264507818	4267507913	-
ground (m AD)	-	173.420	177.850	177.575	177.766	177.980	179.214	179.110	179.182	180.297	180.579	182.067	182.995	182.983	182.434	183.267	184.102	186.384	188.633	189.489	190.324	-
expr:FB	0.44	3.62	6.05	5.20	5.00	3.98	4.55	4.25	3.98	3.77	3.73	2.99	3.55	3.31	2.50	2.53	2.43	3.78	5.22	5.82	6.48	6.02

Scenario 4: Proposed WWF - Analyzed Line Leg 2



Link	4117906148.1	4117506267.1	4017360.1	4119906407.1	4122706477.1	4124206514.1	4121906535.1	4124706627.1	4127906730.1	4131006829.1	4143506862.1	NP6.1	NP5.1	NP4.1	NP3.1	NP2.1	NP1.A	4175206973.1	4186706981.1	4196406895.1	
US node ID	4117906148	4117506267	4017360	4119906407	4122706477	4124206514	4121906535	4124706627	4127906730	4131006829	4143506862	NP6	NP5	NP4	NP3	NP2	NP1	4175206973	4186706981	4196406895	
ds node	4115505969	4117906148	4117506267	4017360	4119906407	4122706477	4124206514	4121906535	4124706627	4127906730	4131006829	4143506862	NP6	NP5	NP4	NP3	NP2	NP1	4175206973	4186706981	4196406895
System type	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary
length (m)	180.1	119.5	17.2	124.7	75.0	39.8	30.9	96.3	108.4	103.5	129.3	36.6	108.4	78.4	76.9	36.6	12.8	115.2	130.0	130.0	
Shape ID	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC
height (mm)	525	525	525	525	525	525	450	450	450	450	450	450	525	450	450	1050	900	375	375	375	
us inv (m AD)	144.660	146.145	146.345	147.690	148.700	149.348	150.537	151.728	153.536	154.921	156.793	157.310	157.580	157.890	157.930	158.710	159.160	161.462	163.493	165.565	
ds inv (m AD)	141.715	144.690	146.160	146.345	147.870	148.750	149.518	150.747	151.858	153.591	154.971	156.823	157.340	157.640	157.890	158.620	158.860	161.340	161.542	163.543	
grad (m/m)	0.01635	0.01218	0.01078	0.01078	0.01107	0.01503	0.03298	0.01019	0.01548	0.01285	0.01409	0.01331	0.00306	0.00299	0.00119	0.00152	0.00402	0.00953	0.01694	0.01555	
r.pfc (l/s)	550	475	447	447	453	527	518	288	355	323	339	329	238	156	98	1064	1148	171	228	219	
Node	-	4117906148	4117506267	4017360	4119906407	4122706477	4124206514	4121906535	4124706627	4127906730	4131006829	4143506862	NP6	NP5	NP4	NP3	NP2	NP1	4175206973	4186706981	4196406895
ground (m AD)	145.026	149.536	152.130	153.679	153.347	163.432	156.058	154.726	154.352	154.871	157.486	160.213	159.280	160.320	160.670	160.820	161.730	163.210	163.217	165.737	167.547
expr:FB	3.10	4.51	5.58	6.90	5.23	14.31	6.33	3.84	1.72	0.56	1.58	2.36	0.85	1.38	0.59	0.32	1.12	2.57	1.23	1.34	0.44

Scenario 4: Proposed WWF - Analyzed Line Leg 3



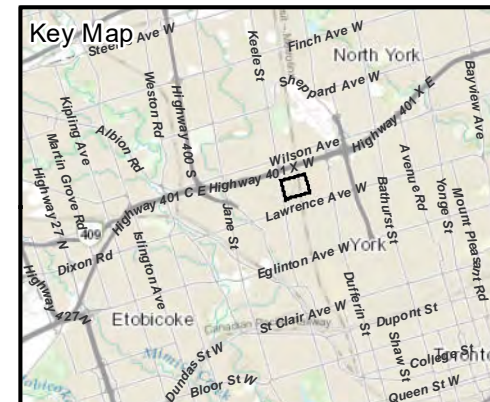
Link	4064604546.1	4065604579.1	4069504704.1	4071804778.1	4075404798.1	4077404833.1	4077704872.1	4079304913.1	4081304983.1	4081905000.1	4083605057.1	4084705088.1	4086005132.1	4088205204.1	4089305242.1	4089905262.1	4093005362.1	4093705367.1	4100105358.1	4102105425.1	4104205527.1	4105705605.1	4106505633.1	4106705651.1	4108505806.1	4115505969.1	
US node ID	4064604546	4065604579	4069504704	4071804778	4075404798	4077404833	4077704872	4079304913	4081304983	4081905000	4083605057	4084705088	4086005132	4088205204	4089305242	4089905262	4093005362	4093705367	4100105358	4102105425	4104205527	4105705605	4106505633	4106705651	4108505806	4115505969	
ds node	4004795	4064604546	4065604579	4069504704	4071804778	4075404798	4077404833	4077704872	4079304913	4081304983	4081905000	4083605057	4084705088	4086005132	4088205204	4089305242	4089905262	4093005362	4093705367	4100105358	4102105425	4104205527	4105705605	4106505633	4106705651	4108505806	
System type	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	
length (m)	13.1	34.8	130.8	77.6	41.1	40.8	38.3	44.6	73.1	16.9	60.7	32.5	45.6	75.1	40.0	20.3	105.3	8.4	64.4	70.1	104.0	79.4	29.6	17.8	156.4	177.0	
Shape ID	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	
height (mm)	450	600	600	600	600	600	600	600	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	525	
us inv (m AD)	117.484	118.189	119.047	119.359	119.610	119.806	120.712	120.720	122.088	122.594	123.717	124.523	125.716	127.477	128.048	128.391	130.059	130.325	131.190	132.140	133.405	135.125	135.425	135.730	138.634	141.560	
ds inv (m AD)	115.000	117.654	118.509	119.127	119.459	119.680	119.856	120.712	120.720	122.268	122.641	123.766	124.551	125.771	127.498	128.066	128.448	130.211	130.355	131.310	132.260	134.330	135.155	135.465	135.795	138.705	
grad (m/m)	0.18962	0.01537	0.00411	0.00299	0.00367	0.00309	0.02235	0.00018	0.01871	0.01929	0.01773	0.02329	0.02555	0.02272	0.01375	0.01601	0.01530	0.01357	0.01297	0.01184	0.01101	0.01001	0.00912	0.01489	0.01815	0.01613	
r.pfc (l/s)	1242	761	394	336	372	341	918	82	840	597	573	656	688	648	504	544	532	501	490	468	451	411	525	580	546		
Node	-	4064604546	4065604579	4069504704	4071804778	4075404798	4077404833	4077704872	4079304913	4081304983	4081905000	4083605057	4084705088	4086005132	4088205204	4089305242	4089905262	4093005362	4093705367	4100105358	4102105425	4104205527	4105705605	4106505633	4106705651	4108505806	-
ground (m AD)	-	122.432	124.398	127.011	126.324	122.448	124.962	127.226	125.613	124.991	125.451	126.785	127.497	128.539	130.420	131.336	131.788	135.363	134.496	133.760	135.999	139.260	142.834	142.545	142.220	144.194	-
expr:FB	6.96	4.76	5.87	7.34	6.22	2.12	4.41	6.20	4.20	2.59	2.51	2.71	2.65	2.51	2.62	2.90	3.02	4.93	3.78	2.18	3.44	5.43	7.22	6.62	6.08	5.21	3.10

Lateral Analysis Summary Results Wet Weather Flow Conditions



Table: SAN-B-3

Pipe Data												InfoWorks Model Results															
												SC L-1: Existing Wet Weather Flow Conditions						SC L-2: Proposed Wet Weather Flow Conditions						Difference			
Pipe ID	Map ID	Length (m)	Diameter (mm)	Upstream Ground Level (m AD)	Upstream Invert (m AD)	Upstream Obvert (m AD)	Downstream Ground Level (m AD)	Downstream Invert (m AD)	Downstream Obvert (m AD)	Slope (%)	Full Flow Capacity (l/s)	Peak Flow (l/s)	Diameter Utilization (%)	Max Upstream HGL (m AD)	Max Downstream HGL (m AD)	Surcharge Status (m)	Maximum Surcharging (m)	Minimum Available Freeboard (m)	Peak Flow (l/s)	Diameter Utilization (%)	Max Upstream HGL (m AD)	Max Downstream HGL (m AD)	Surcharge Status (m)	Maximum Surcharging (m)	Minimum Available Freeboard (m)	Surcharging (m)	Available Freeboard (m)
Analyzed North Park Ravine Laterals																											
Lateral 1																											
4200306882.1	L1.01	10.6	250	171.500	166.307	166.557	171.530	166.224	166.474	0.78%	53	49.4	>100%	166.818	166.810	Surcharging w. Freeboard > 1.8m	0.34	4.68	49.4	>100%	167.139	167.132	Surcharging w. Freeboard > 1.8m	0.66	4.36	0.32	-0.321
4199306886.1	L1.02	29.7	250	171.530	166.200	166.450	167.547	165.815	166.065	1.30%	68	49.4	>100%	166.809	166.785	Critical Surcharging (Freeboard < 1.8m)	0.72	0.76	49.4	>100%	167.131	167.108	Critical Surcharging (Freeboard < 1.8m)	1.04	0.44	0.32	-0.323
Lateral 2																											
4166507368.1	L2.01	97.5	375	178.481	171.512	171.887	178.134	169.632	170.007	1.93%	244	110.9	48.8%	171.695	169.815	Free flow	None	N/A	110.8	48.8%	171.695	169.815	Free flow	None	N/A	N/A	N/A
4168107272.1	L2.02	96.7	375	178.134	169.612	169.987	177.007	167.620	167.995	2.06%	252	110.8	48.0%	169.792	167.800	Free flow	None	N/A	110.8	48.0%	169.792	167.800	Free flow	None	N/A	N/A	N/A
4169807177.1	L2.03	95.4	375	177.007	167.620	167.995	169.138	165.211	165.586	2.53%	279	112.0	45.1%	167.789	165.380	Free flow	None	N/A	112.0	45.1%	167.789	165.380	Free flow	None	N/A	N/A	N/A
4170807082.1	L2.04	10.9	375	169.138	165.131	165.506	168.526	164.777	165.152	3.25%	316	112.0	42.7%	165.291	164.937	Free flow	None	N/A	112.0	42.7%	165.291	164.937	Free flow	None	N/A	N/A	N/A
4171907081.1	L2.05	13.3	375	168.526	164.742	165.117	168.306	164.537	164.912	1.54%	218	112.0	51.7%	164.936	164.731	Free flow	None	N/A	112.0	51.7%	164.936	164.731	Free flow	None	N/A	N/A	N/A
4173107078.1	L2.06	76.3	375	168.306	164.467	164.842	163.462	161.517	161.892	3.87%	345	112.0	66.9%	164.620	161.768	Free flow	None	N/A	112.0	66.9%	164.620	161.768	Free flow	None	N/A	N/A	N/A
4172807001.1	L2.07	30.5	375	163.462	161.497	161.872	163.210	161.331	161.706	0.54%	129	112.0	71.2%	161.764	161.578	Free flow	None	N/A	112.0	71.2%	161.764	161.578	Free flow	None	N/A	N/A	N/A
Lateral 3																											
4160206831.1	L3.01	49.4	250	173.521	169.470	169.720	171.259	167.470	167.720	4.05%	120	2.0	13.2%	169.503	167.503	Free flow	None	N/A	2.0	13.2%	169.503	167.503	Free flow	None	N/A	N/A	N/A
4150106832.1	L3.03	45.7	250	165.817	159.410	159.660	159.928	158.270	158.520	2.50%	94	6.2	20.0%	159.460	158.320	Free flow	None	N/A	6.2	64.0%	159.460	158.430	Free flow	None	N/A	N/A	N/A
4150106832.1	L3.03	45.7	250	165.817	159.410	159.660	159.928	158.270	158.520	2.50%	94	6.2	20.0%	159.460	158.320	Free flow	None	N/A	6.2	64.0%	159.460	158.430	Free flow	None	N/A	N/A	N/A
4147506870.1	L3.04	20.8	250	159.928	158.210	158.460	159.280	157.470	157.720	3.56%	112	6.2	>100%	158.257	157.968	Critical Surcharging (Freeboard < 1.8m)	0.25	1.31	6.2	>100%	158.430	158.429	Critical Surcharging (Freeboard < 1.8m)	0.71	0.85	0.46	-0.461



- Legend**
- Sanitary Manhole
 - Sanitary Sewer
 - Analyzed Line
 - Sanitary Trunk Sewer
 - ▭ Drainage Area
- HGL Level**
- Free Flow
 - Surcharging (Freeboard > 1.8m)
 - Critical Surcharging (Freeboard < 1.8m)
 - Flow to Surface

Note: Only sanitary pipes are shown for clarity.

Analysis Parameters	
Storm Event	May 12, 2000
Development Flow	0.53 L/s

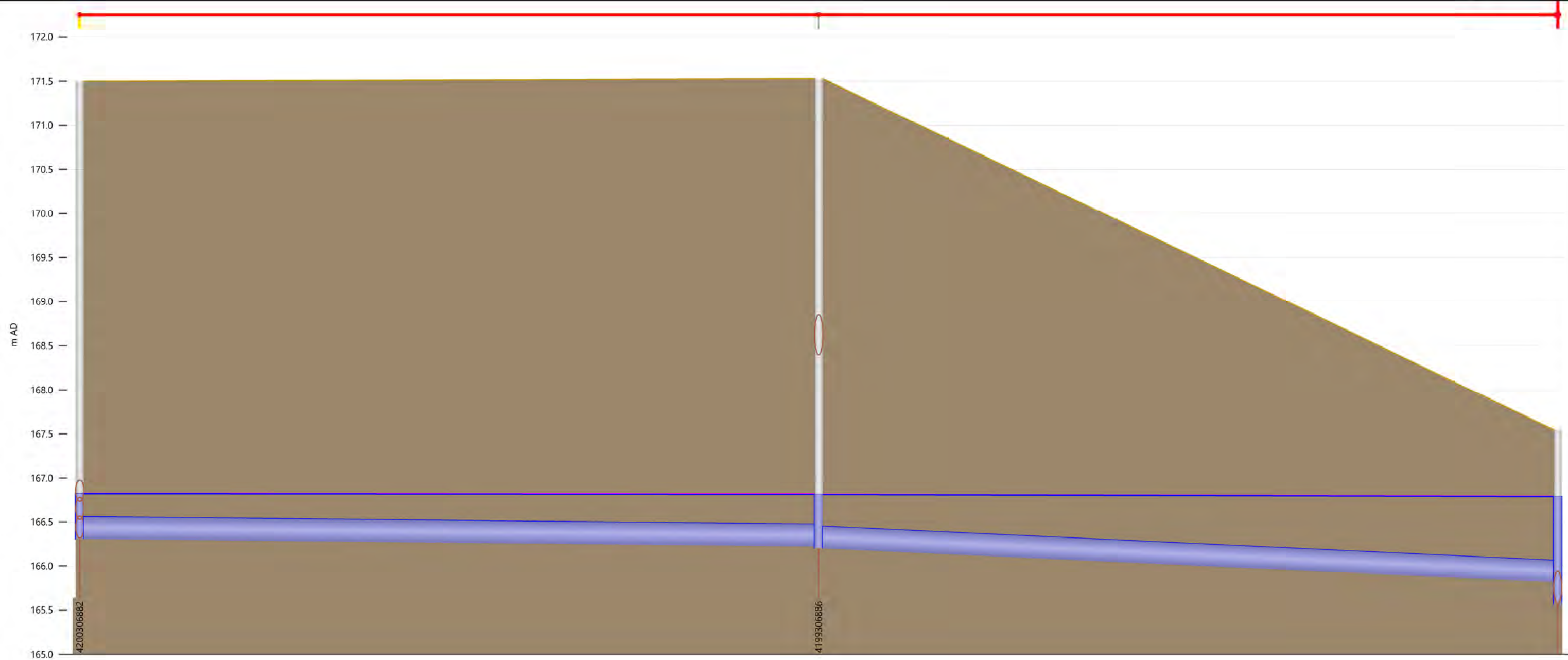
**Figure: SAN-B-5
Scenario L-1: Existing WWF**

3400 Dufferin Street
Sanitary Capacity Analysis
City of Toronto



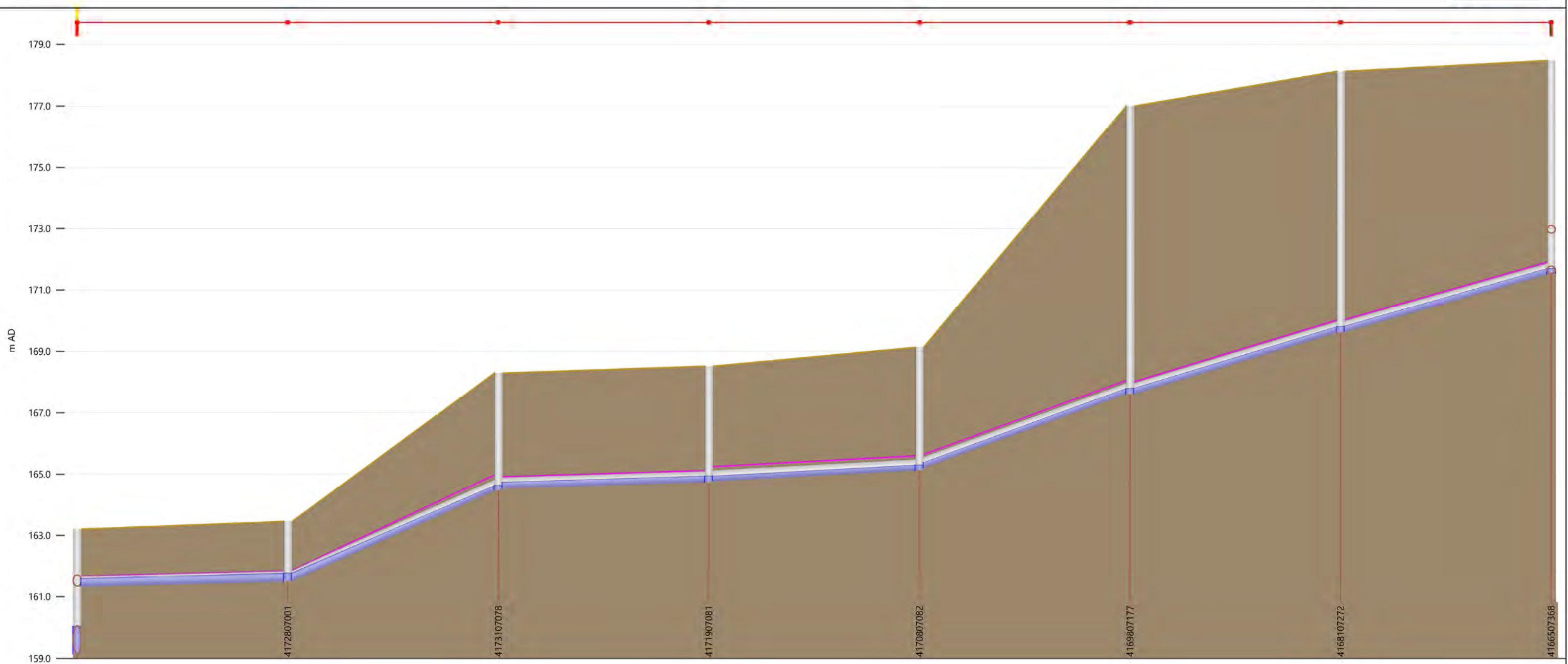
Project No.:	Date:
139570	July 2022

Scenario L-1: Existing WWF - Lateral 1



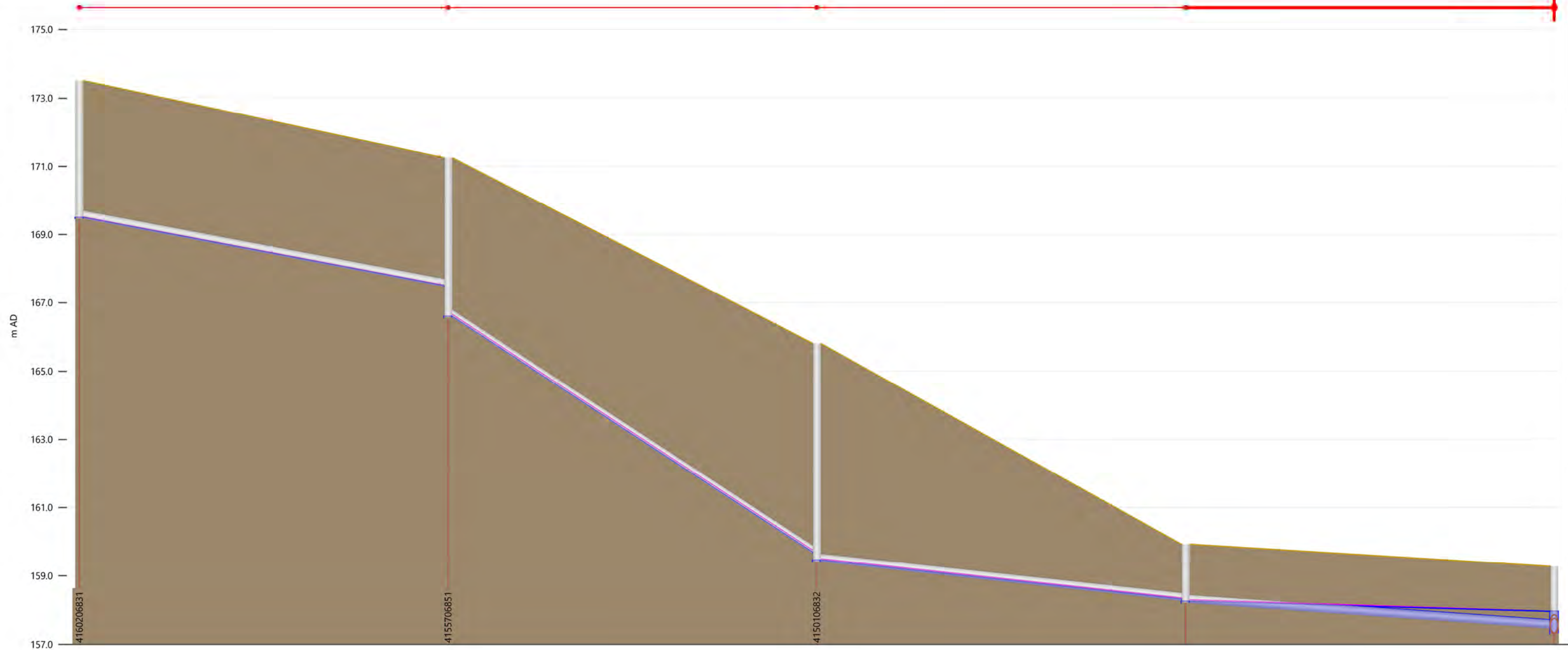
Link	4200306882.1	4199306886.1	
US node ID	4200306882	4199306886	
ds node	4199306886	4196406895	
System type	sanitary	sanitary	
length (m)	10.6	29.7	
Shape ID	CIRC	CIRC	
height (mm)	250	250	
us inv (m AD)	166.307	166.200	
ds inv (m AD)	166.224	165.815	
grad (m/m)	0.00783	0.01296	
r.pfc (l/s)	53	68	
Node	4200306882	4199306886	4196406895
ground (m AD)	171.500	171.530	167.547
expr:FB	4.68	4.72	0.76

Scenario L-1: Existing WWF - Lateral 2

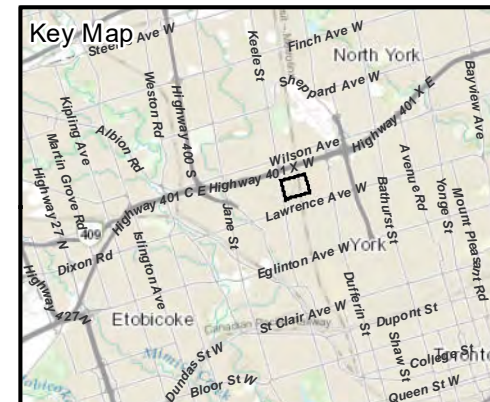


Link	4172807001.1	4173107078.1	4171907081.1	4170807082.1	4169807177.1	4168107272.1	4166507368.1	
US node ID	4172807001	4173107078	4171907081	4170807082	4169807177	4168107272	4166507368	
ds node	NP1	4172807001	4173107078	4171907081	4170807082	4169807177	4168107272	
System type	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	
length (m)	30.5	76.3	13.3	10.9	95.4	96.7	97.5	
Shape ID	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	
height (mm)	375	375	375	375	375	375	375	
us inv (m AD)	161.497	164.467	164.742	165.131	167.620	169.612	171.512	
ds inv (m AD)	161.331	161.517	164.537	164.777	165.211	167.620	169.632	
grad (m/m)	0.00544	0.03866	0.01541	0.03248	0.02525	0.02060	0.01928	
r.pfc (l/s)	129	345	218	316	279	252	244	
Node	NP1	4172807001	4173107078	4171907081	4170807082	4169807177	4168107272	4166507368
ground (m AD)	163.218	163.462	168.306	168.526	169.138	177.007	178.134	178.481
expr:FB	3.18	1.69	3.69	3.59	3.85	9.22	8.34	6.79

Scenario L-1: Existing WWF - Lateral 3



Link	4160206831.1		4155706851.1		4150106832.1		4147506870.1
US node ID	4160206831		4155706851		4150106832		4147506870
ds node	4155706851		4150106832		4147506870		NP6
System type	sanitary		sanitary		sanitary		sanitary
length (m)	49.4		59.2		45.7		20.8
Shape ID	CIRC		CIRC		CIRC		CIRC
height (mm)	250		250		250		250
us inv (m AD)	169.470		166.570		159.410		158.210
ds inv (m AD)	167.470		159.660		158.270		157.470
grad (m/m)	0.04049		0.11672		0.02495		0.03558
r.pfc (l/s)	120		203		94		112
Node	4160206831	4155706851		4150106832		4147506870	NP6
ground (m AD)	173.521	171.259		165.817		159.928	159.280
expr:FB	4.02	4.65		6.36		1.67	1.31



Legend

- Sanitary Manhole
 - Sanitary Sewer
 - Analyzed Line
 - Sanitary Trunk Sewer
 - ▭ Drainage Area
- HGL Level**
- Free Flow
 - Surcharging (Freeboard > 1.8m)
 - Critical Surcharging (Freeboard < 1.8m)
 - Flow to Surface

Note: Only sanitary pipes are shown for clarity.

Analysis Parameters	
Storm Event	May 12, 2000
Development Flow	16.53 L/s

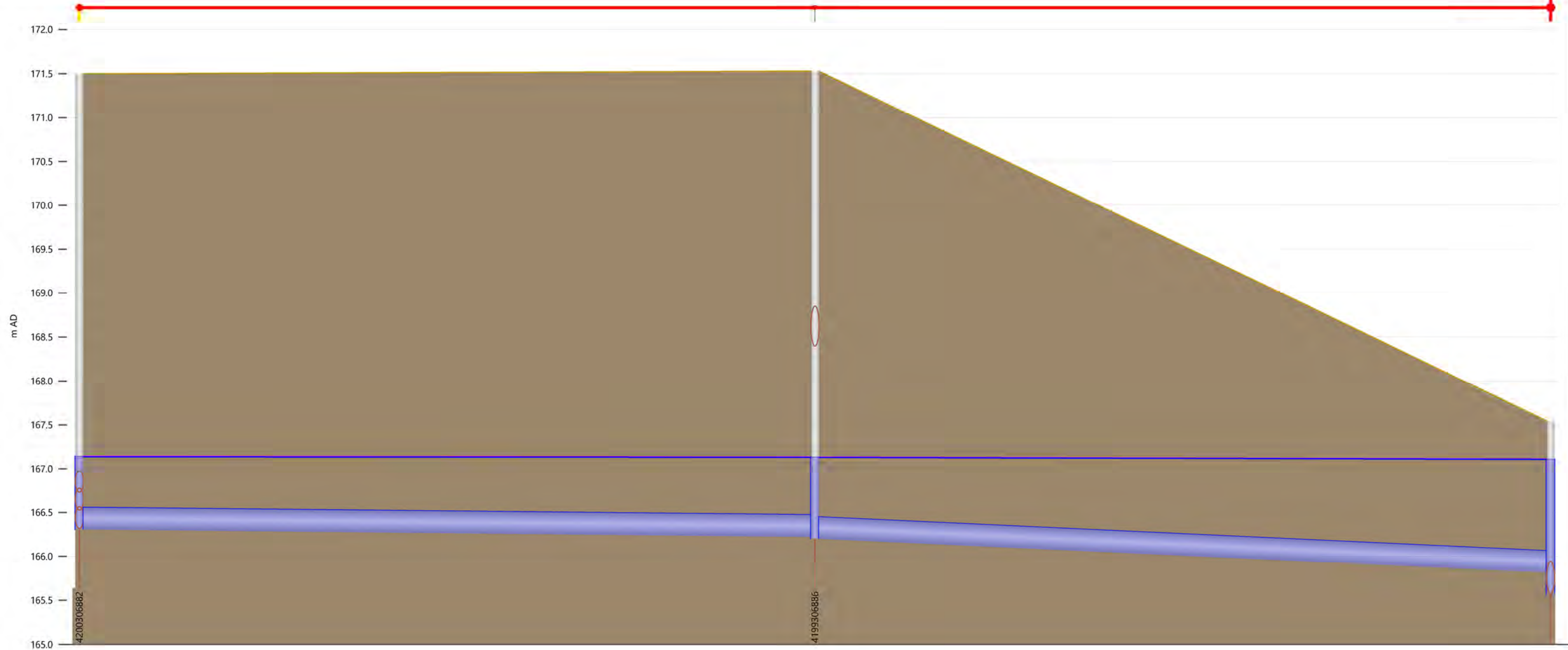
**Figure: SAN-B-6
Scenario L-2: Proposed WWF**

3400 Dufferin Street
Sanitary Capacity Analysis
City of Toronto



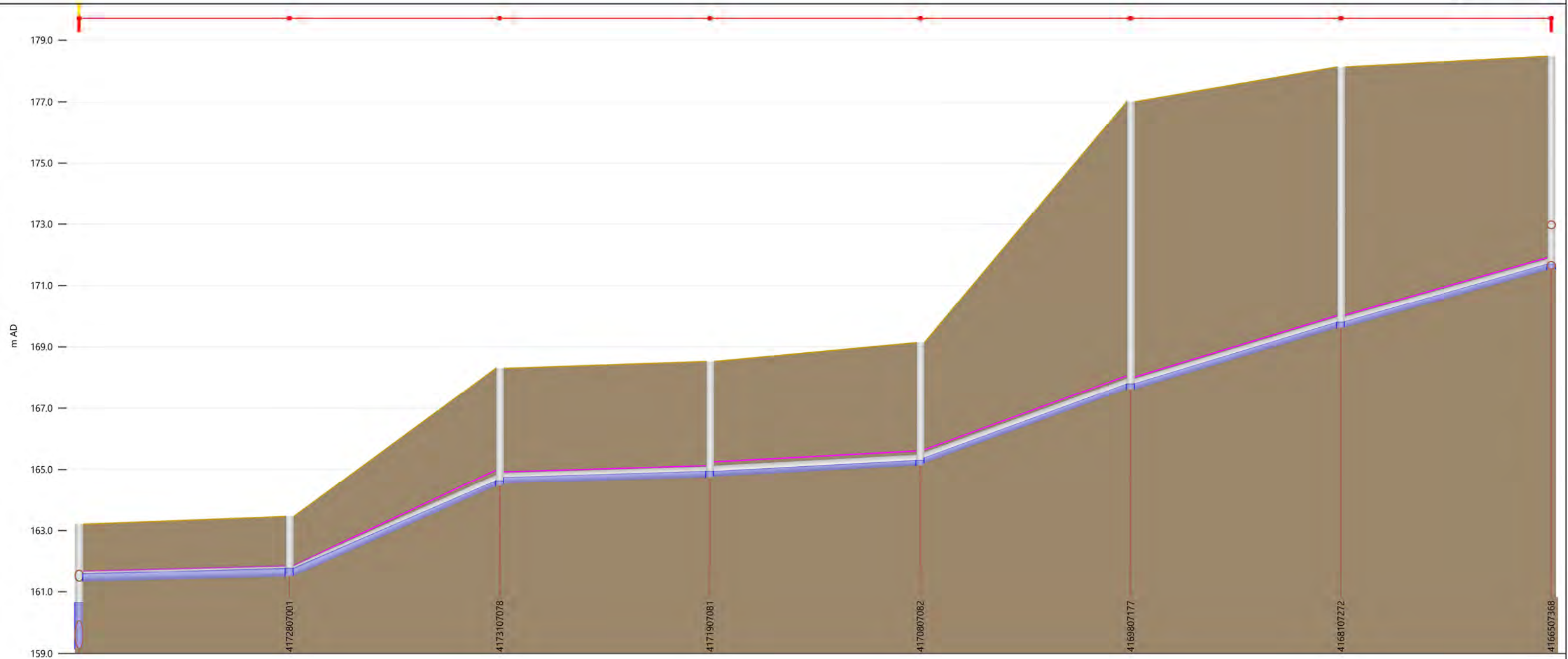
Project No.:	Date:
139570	July 2022

Scenario L-2: Proposed WWF - Lateral 1



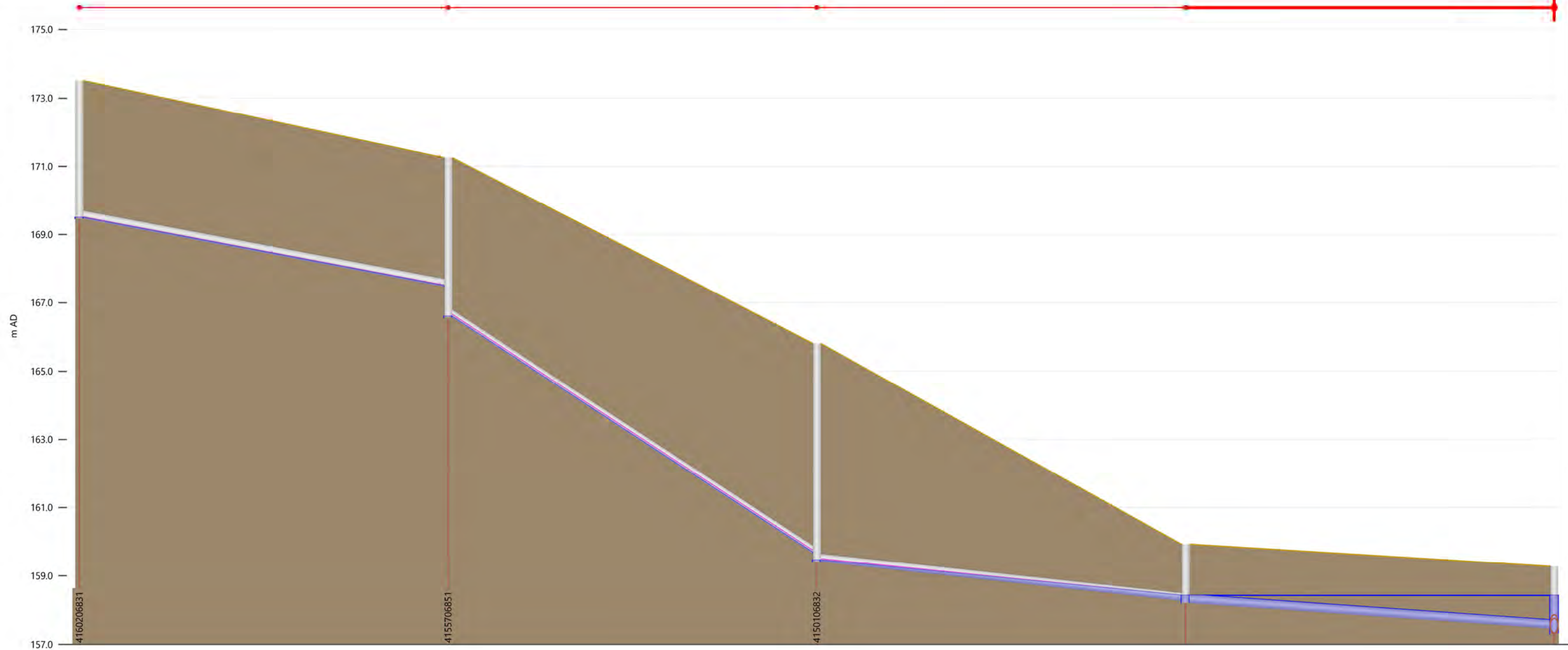
Link	4200306882.1	4199306886.1	
US node ID	4200306882	4199306886	
ds node	4199306886	4196406895	
System type	sanitary	sanitary	
length (m)	10.6	29.7	
Shape ID	CIRC	CIRC	
height (mm)	250	250	
us inv (m AD)	166.307	166.200	
ds inv (m AD)	166.224	165.815	
grad (m/m)	0.00783	0.01296	
r.pfc (l/s)	53	68	
Node	4200306882	4199306886	4196406895
ground (m AD)	171.500	171.530	167.547
expr:FB	4.36	4.40	0.44

Scenario L-2: Proposed WWF - Lateral 2



Link	4172807001.1	4173107078.1	4171907081.1	4170807082.1	4169807177.1	4168107272.1	4166507368.1	
US node ID	4172807001	4173107078	4171907081	4170807082	4169807177	4168107272	4166507368	
ds node	NP1	4172807001	4173107078	4171907081	4170807082	4169807177	4168107272	
System type	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	sanitary	
length (m)	30.5	76.3	13.3	10.9	95.4	96.7	97.5	
Shape ID	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	CIRC	
height (mm)	375	375	375	375	375	375	375	
us inv (m AD)	161.497	164.467	164.742	165.131	167.620	169.612	171.512	
ds inv (m AD)	161.331	161.517	164.537	164.777	165.211	167.620	169.632	
grad (m/m)	0.00544	0.03866	0.01541	0.03248	0.02525	0.02060	0.01928	
r.pfc (l/s)	129	345	218	316	279	252	244	
Node	NP1	4172807001	4173107078	4171907081	4170807082	4169807177	4168107272	4166507368
ground (m AD)	163.218	163.462	168.306	168.526	169.138	177.007	178.134	178.481
expr:FB	2.57	1.69	3.69	3.59	3.85	9.22	8.34	6.79

Scenario L-2: Proposed WWF - Lateral 3



Link	4160206831.1		4155706851.1		4150106832.1		4147506870.1		
US node ID	4160206831		4155706851		4150106832		4147506870		
ds node	4155706851		4150106832		4147506870		NP6		
System type	sanitary		sanitary		sanitary		sanitary		
length (m)	49.4		59.2		45.7		20.8		
Shape ID	CIRC		CIRC		CIRC		CIRC		
height (mm)	250		250		250		250		
us inv (m AD)	169.470		166.570		159.410		158.210		
ds inv (m AD)	167.470		159.660		158.270		157.470		
grad (m/m)	0.04049		0.11672		0.02495		0.03558		
r.pfc (l/s)	120		203		94		112		
Node	4160206831		4155706851		4150106832		4147506870		NP6
ground (m AD)	173.521		171.259		165.817		159.928		159.280
expr:FB	4.02		4.65		6.36		1.50		0.85

Appendix D

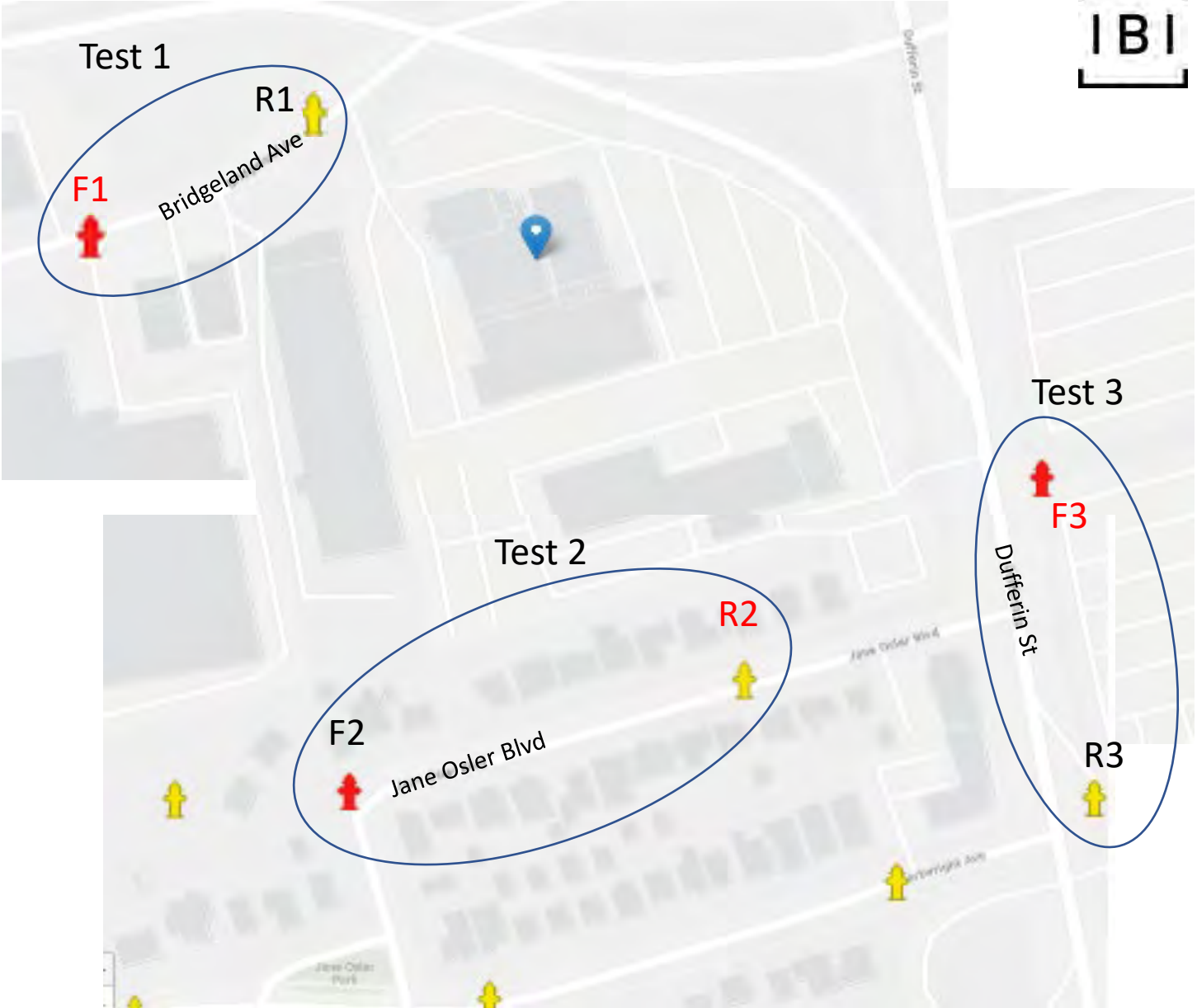
Water Analysis

Hydrant Flow Tests

Water Demand, Fire Demand, and Hazen-Williams Calculations

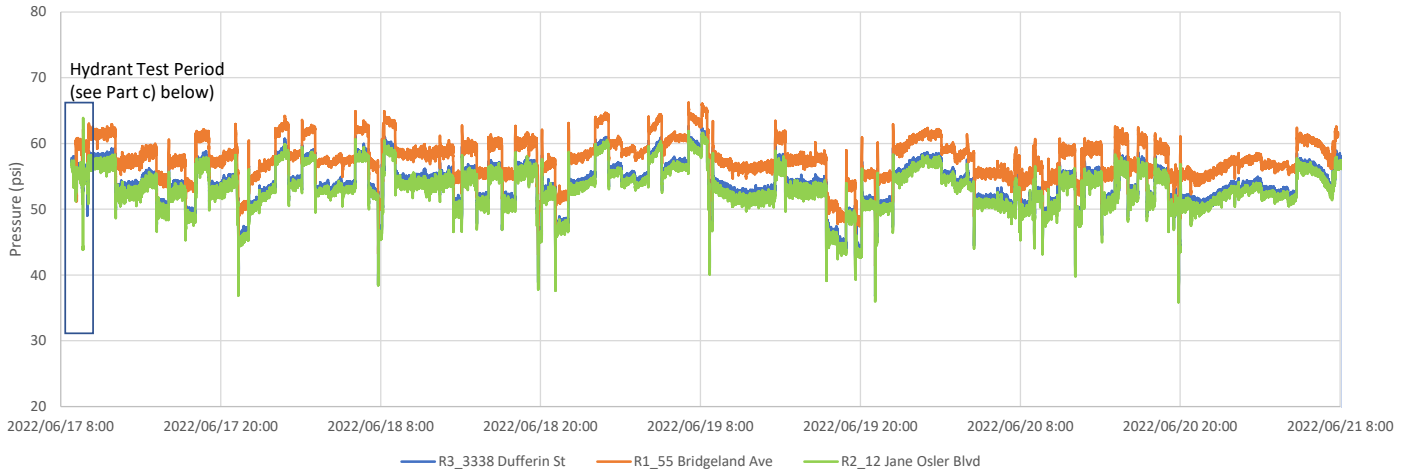
Construction Coefficient Confirmation Letter (gh3)

Hydrant Testing and Pressure Monitoring Locations

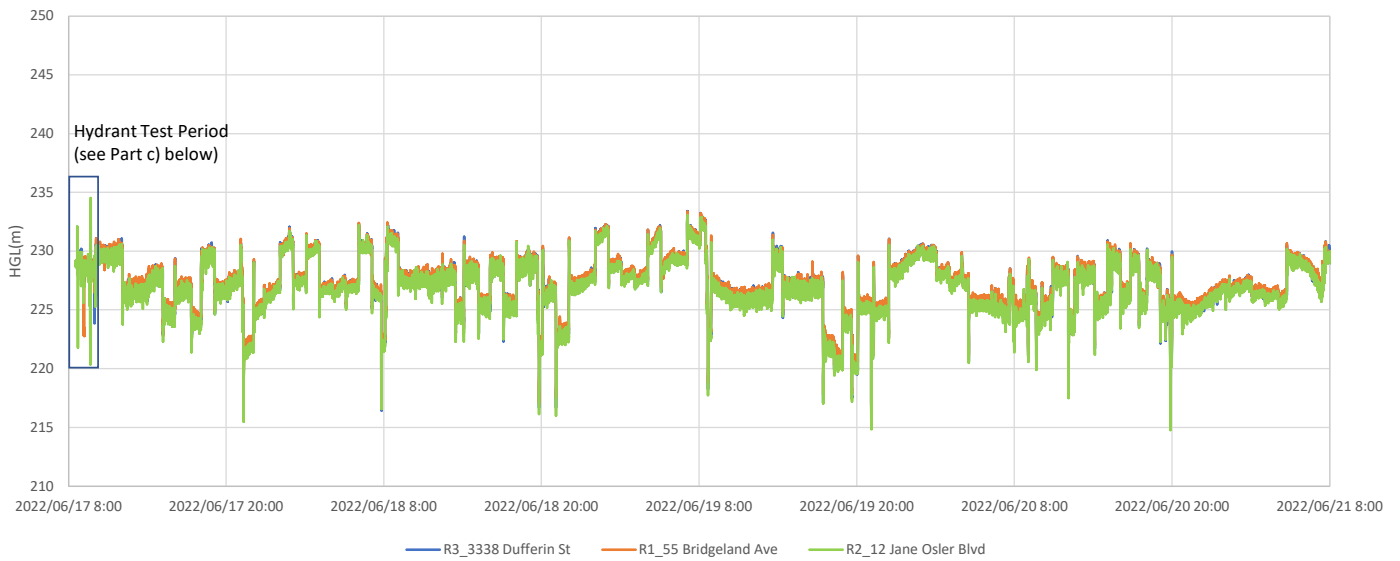


Estimated System Head and Detected Pressure During Monitoring Period from June 17 to 20, 2022

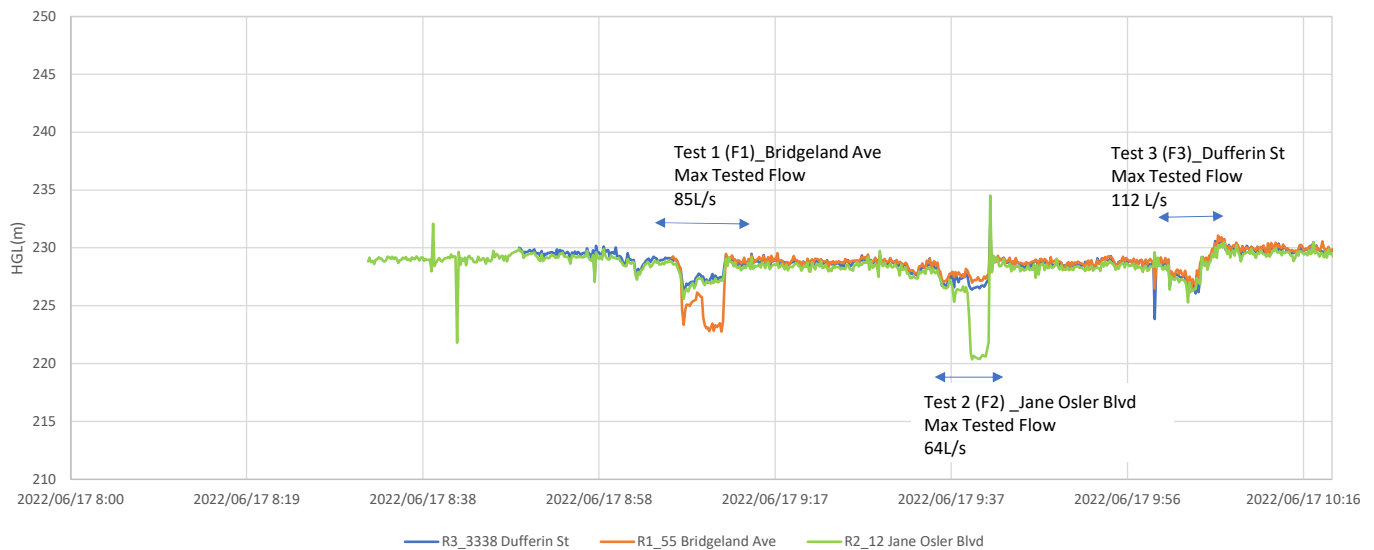
a) Detected System Pressure during Hydrant Test period from June 17 to 20, 2022



b) Estimated System Head during Field Monitoring Period from June 17 to 20, 2022



c) Estimated System Head during Hydrant Test Period on June 17, 2022





HYDRANT FLOW TESTING

NOTE: Hydrants tested according to NFPA 291: Recommended Practice for Fire Flow Testing and Marking of Hydrants

GENERAL INFORMATION

General Information

Date of Testing	17-Jun-22
Project Number:	139570
Site Location / Address:	3400 Dufferin Street
Region / Municipality	Toronto
Hydrants Opened By:	Toronto
Tested by:	Amy B

HYDRANT TEST INFORMATION

Hydrant Test Location - Residual Hydrant=R, Flow Hydrant=F (North at Top)



Test Data

Test Data

Time of Test 9:40 AM
Pipe Size (mm) 150
Flow Hydrant Test Location (description) F2, along Jane Osler Blvd, 2nd hydrant west of Dufferin St
Residual Hydrant Test Location (description) R2, along Jane Osler Blvd, 1st hydrant west of Dufferin St

Q1 Test Data (1 Orifice)

# OUTLETS	ORIFICE SIZE(IN)	PITOT PRESSURE(PSIG)	FLOW(USGPM)	RESIDUAL PRESSURE(PSIG)
1	2.5	18	712	52

QT Test Data (2 Orifices)

# OUTLETS	ORIFICE SIZE(IN)	PITOT PRESSURE(PSIG)	FLOW(USGPM)	RESIDUAL PRESSURE(PSIG)
2	2.5	9	1007	44

Calculations

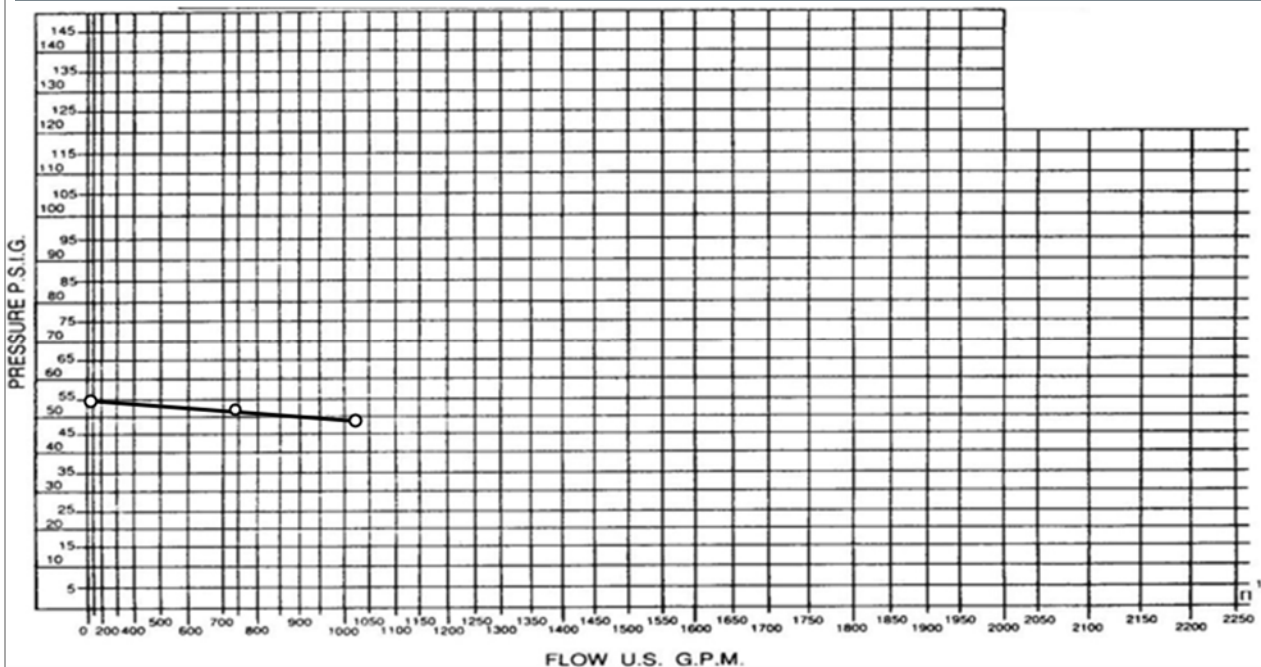
FORMULA: $Q = 29.83 \text{ cd}^2 \sqrt{p}$Where: c- coefficient of discharge (1 in smooth pipe)
 d- pipe diameter (inches)
p- pitot reading (psig)

Q1 - 1 Orifice(s) $Q1 = (29.83)(0.9)(2.5)^2 \sqrt{18} = 712$

QT - 2 Orifice(s) $QT = 2(29.83)(0.9)(2.5)^2 \sqrt{9} = 1007$

Static Pressure (PSIG) 55

Test Results - Plots





HYDRANT FLOW TESTING

NOTE: Hydrants tested according to NFPA 291: Recommended Practice for Fire Flow Testing and Marking of Hydrants

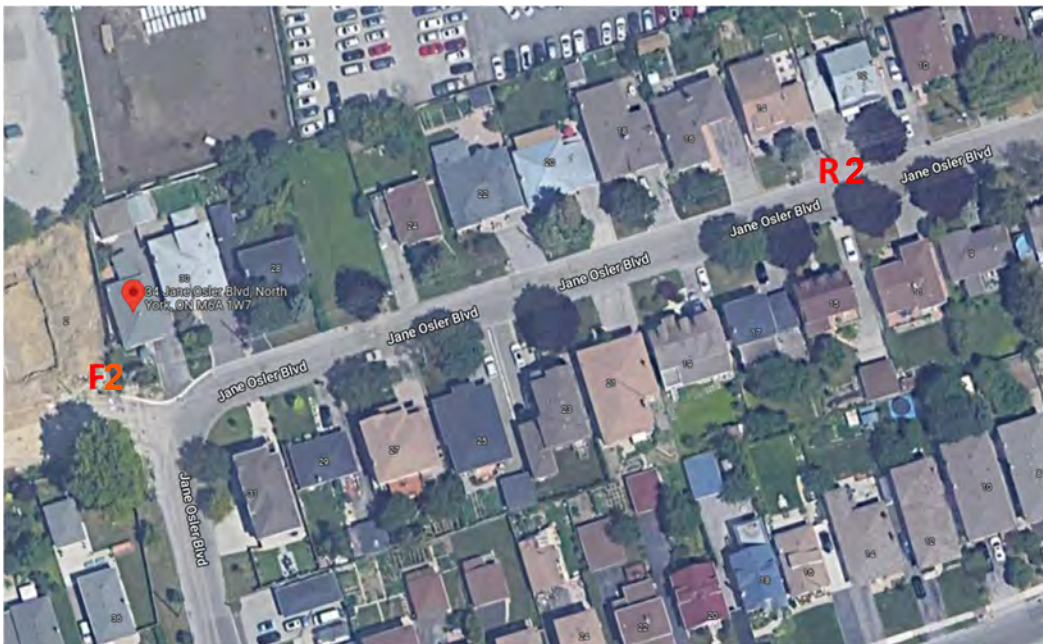
GENERAL INFORMATION

General Information

Date of Testing	17-Jun-22
Project Number:	139570
Site Location / Address:	3400 Dufferin Street
Region / Municipality	Toronto
Hydrants Opened By:	Toronto
Tested by:	Amy B

HYDRANT TEST INFORMATION

Hydrant Test Location - Residual Hydrant=R, Flow Hydrant=F (North at Top)



Time of Test	9:05 AM
Pipe Size (mm)	300
Flow Hydrant Test Location (description)	F1, along Bridgeland Ave, 2 nd hydrant west of Dufferin St
Residual Hydrant Test Location (description)	R1, along Bridgeland Ave, 1 st hydrant west of Dufferin St

Q1 Test Data (1 Orifice)

# OUTLETS	ORIFICE SIZE(IN)	PITOT PRESSURE(P SIG)	FLOW(USGPM)	RESIDUAL PRESSURE(P SIG)
1	2.5	34	978	55

QT Test Data (2 Orifices)

# OUTLETS	ORIFICE SIZE(IN)	PITOT PRESSURE(P SIG)	FLOW(USGPM)	RESIDUAL PRESSURE(P SIG)
2	2.5	16	1342	51

Calculations

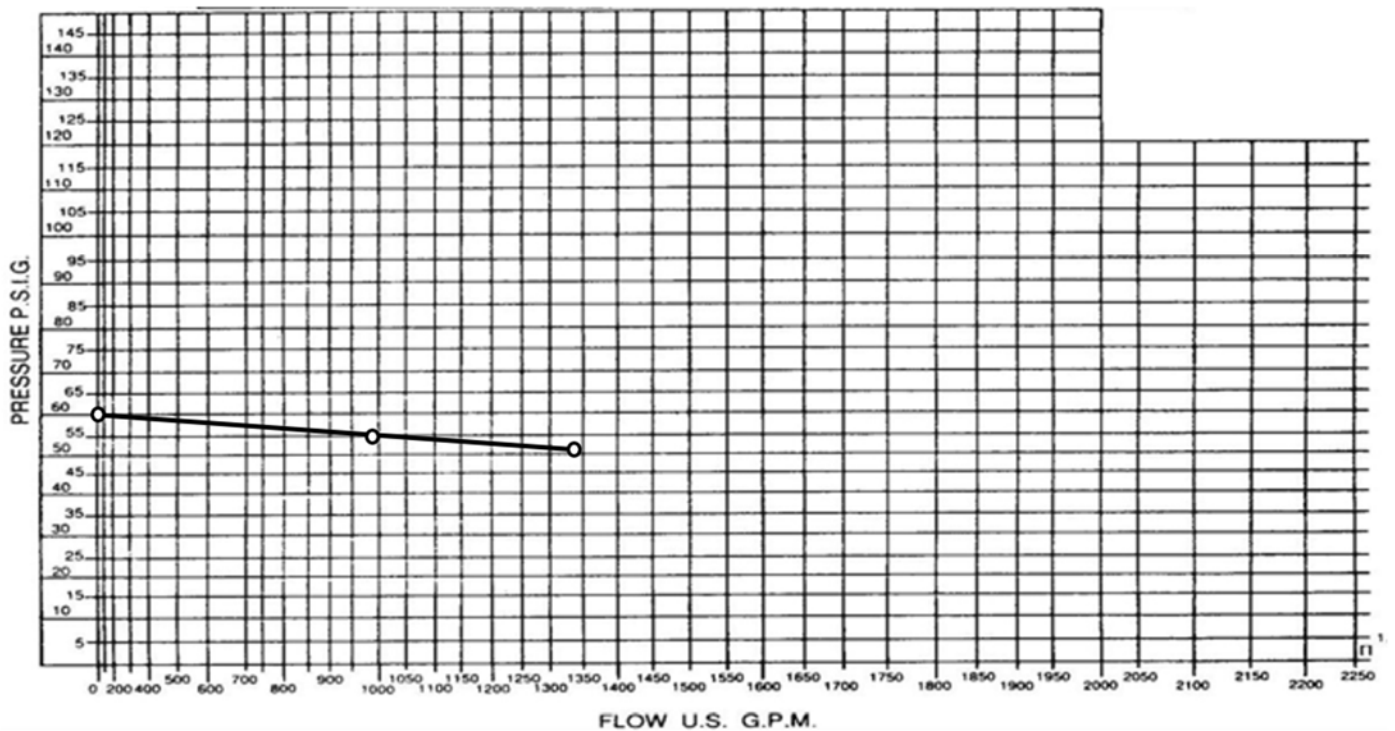
FORMULA: $Q = 29.83 cd^2\sqrt{p}$Where: c- coefficient of discharge (1 in smooth pipe)
 d- pipe diameter (inches)
p- pitot reading (psig)

Q1 - 1 Orifice(s) $Q1 = (29.83)(0.9)(2.5)^2 \sqrt{34} = 978$

QT - 2 Orifice(s) $QT = 2(29.83)(0.9)(2.5)^2 \sqrt{16} = 1342$

Static Pressure (PSIG) 60

Test Results - Plots





HYDRANT FLOW TESTING

NOTE: Hydrants tested according to NFPA 291: Recommended Practice for Fire Flow Testing and Marking of Hydrants

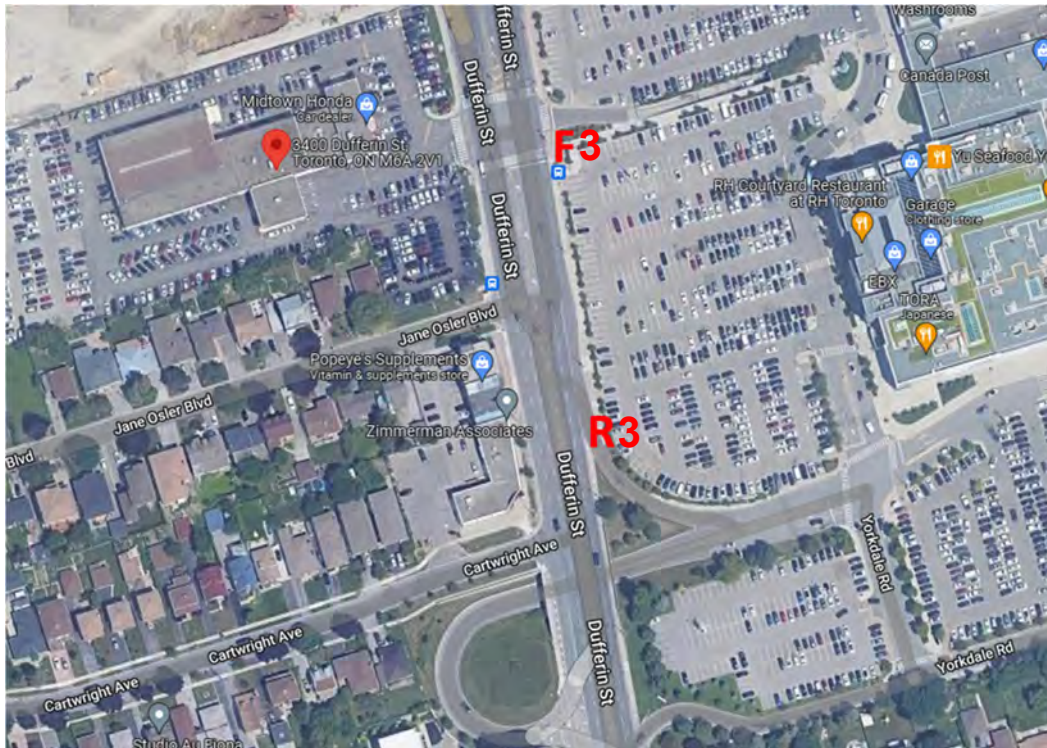
GENERAL INFORMATION

General Information

Date of Testing	17-Jun-22
Project Number:	139570
Site Location / Address:	3400 Dufferin Street
Region / Municipality	Toronto
Hydrants Opened By:	Toronto
Tested by:	Amy B

HYDRANT TEST INFORMATION

Hydrant Test Location - Residual Hydrant=R, Flow Hydrant=F (North at Top)



Test Data

Time of Test	10:05 AM
Pipe Size (mm)	300
Flow Hydrant Test Location (description)	F3, along Dufferin Street, 1 st hydrant north of Jane Osler Blvd
Residual Hydrant Test Location (description)	R3, along Dufferin St, 1 st hydrant south of Jane Osler Blvd

Q1 Test Data (1 Orifice)

# OUTLETS	ORIFICE SIZE(IN)	PITOT PRESSURE(PSIG)	FLOW(USGPM)	RESIDUAL PRESSURE(PSIG)
1	2.5	40	1061	54

QT Test Data (2 Orifices)

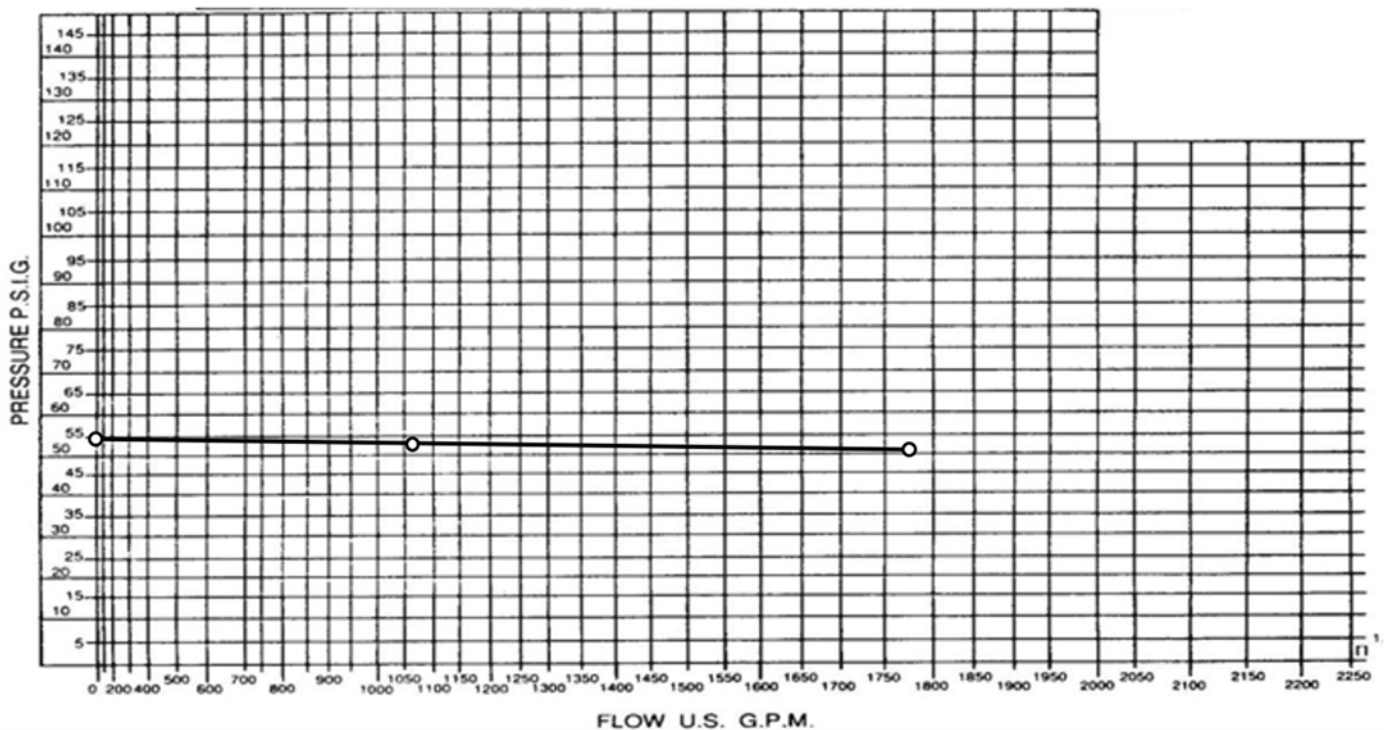
# OUTLETS	ORIFICE SIZE(IN)	PITOT PRESSURE(PSIG)	FLOW(USGPM)	RESIDUAL PRESSURE(PSIG)
2	2.5	28	1776	53

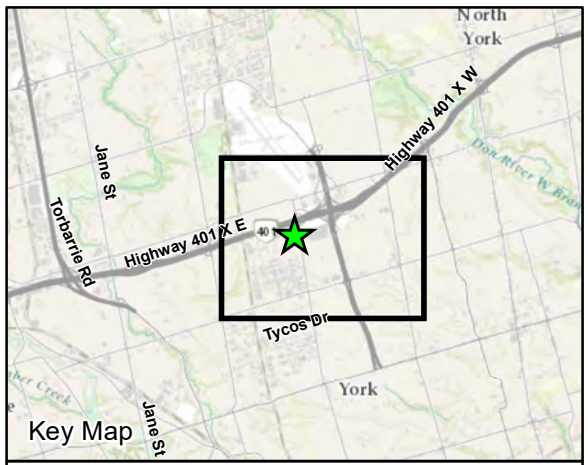
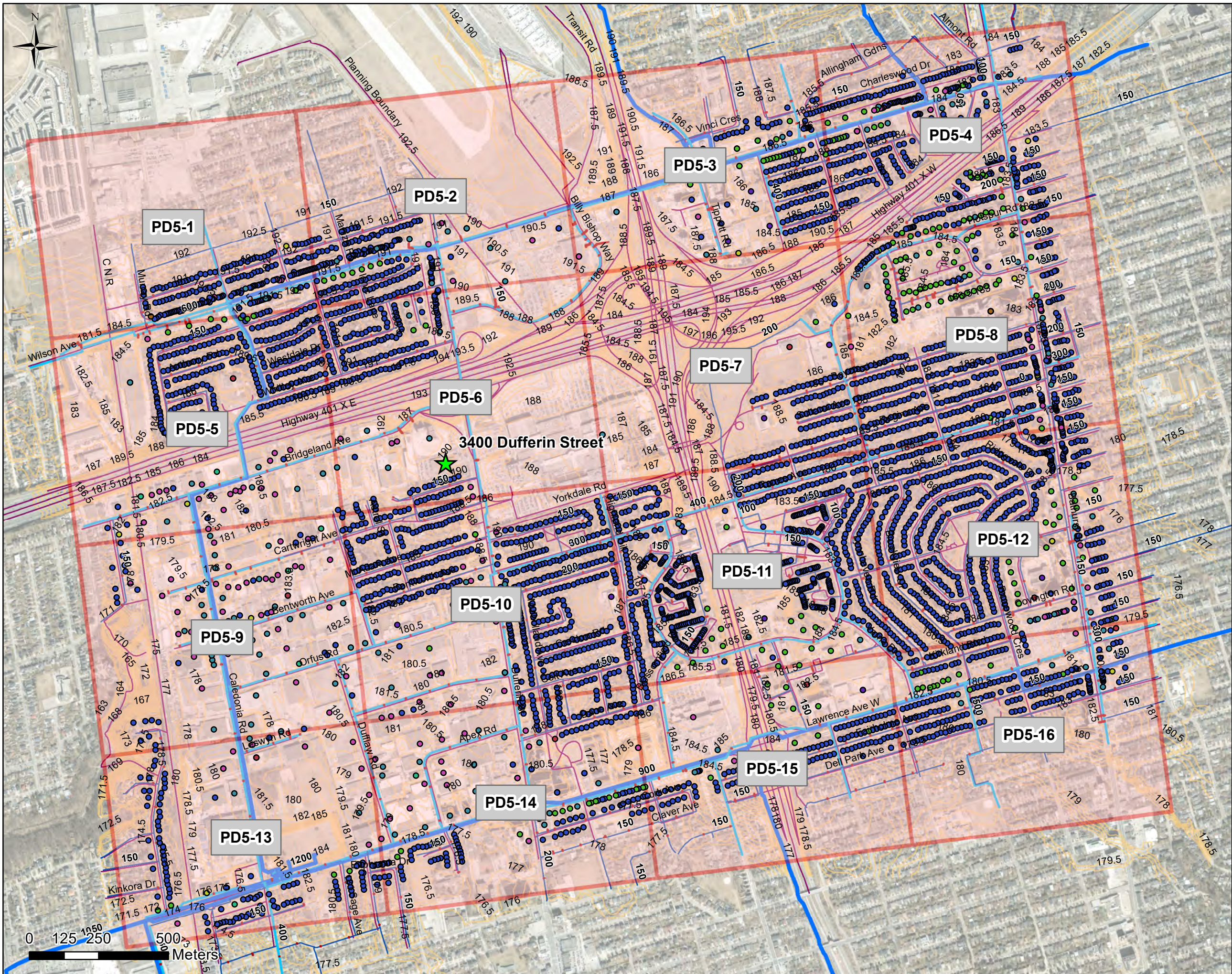
Calculations

FORMULA: $Q = 29.83 cd^2 \sqrt{p}$Where: c- coefficient of discharge (1 in smooth pipe)
..... d- pipe diameter (inches)
..... p- pitot reading (psig)

Q1 - 1 Orifice(s)	$Q1 = (29.83)(0.9)(2.5)^2 \sqrt{40} =$
QT - 2 Orifice(s)	$QT = 2(29.83)(0.9)(2.5)^2 \sqrt{28} =$
Static Pressure (PSIG)	56

Test Results - Plots





Legend

- 3400 Dufferin Street

Water Consumption Account Type

- RES-SINGLE
- ICI-COM
- ICI-EDU
- ICI-GOV
- ICI-HOS
- ICI-LITECO
- ICI-MFG
- ICI-REL
- RES-MULTI

Lateral Line

-

Elevation Contour

-

Diameter (mm)

- 0; 100; 150; 200
- 300; 400; 500; 600
- 900; 1050; 1200

Water Demand Boundaries

-

Note: Extents of this frame are all within Pressure District 5.

Figure 3
Water Demand Boundaries

3400 Dufferin Street
Water Demand
City of Toronto

Project No: 132393 Date: July 2022

Water Consumption for External Area within Study Area

Domestic Water Demand Peaking Factors (City's Guidelines, 2021)

USAGE	MINIMUM HOUR	PEAK HOUR	MAXIMUM DAY
Commercial/Retail	0.84	1.2	1.1
Residential (Multi-unit High-Rise Apartment)	0.84	2.5	1.3

Area ID	AMR 2019 Consumption (m3)			2019 Average Daily Demand (L/s)			Minimum Hour Demand (L/s)			Maximum Day Demand (L/s)			Peak Hour Demand (L/s)			Model Junction	Water Demand (L/s)			
	ICI	Residential	Total	ICI	Residential	Total	ICI	Residential	Total	ICI	Residential	Total	ICI	Residential	Total		MHD	ADD	MDD	PHD
1	12221.60	75,286	87,508	0.4	2.4	2.8	0.3	2.0	2.3	0.4	3.1	3.5	0.5	6.0	6.4	WJ4001743	2.3	2.8	3.5	6.4
2	31191.65	53,580	84,771	1.0	1.7	2.7	0.8	1.4	2.3	1.1	2.2	3.3	1.2	4.2	5.4	WJ4002868	2.3	2.7	3.3	5.4
3	30936.55	224,227	255,164	1.0	7.1	8.1	0.8	6.0	6.8	1.1	9.2	10.3	1.2	17.8	19.0	WJ4005734	6.8	8.1	10.3	19.0
4	36507.69	219,732	256,240	1.2	7.0	8.1	1.0	5.9	6.8	1.3	9.1	10.3	1.4	17.4	18.8	WJ4021751	6.8	8.1	10.3	18.8
5	60590.74	104,683	165,274	1.9	3.3	5.2	1.6	2.8	4.4	2.1	4.3	6.4	2.3	8.3	10.6	WJ14203	4.4	5.2	6.4	10.6
6	88854.04	51,529	140,383	2.8	1.6	4.5	2.4	1.4	3.7	3.1	2.1	5.2	3.4	4.1	7.5	WJ61853	3.7	4.5	5.2	7.5
7	395472.15	118,088	513,560	12.5	3.7	16.3	10.5	3.1	13.7	13.8	4.9	18.7	15.0	9.4	24.4	WJ4018028	13.7	16.3	18.7	24.4
8	258466.37	348,576	607,042	8.2	11.1	19.2	6.9	9.3	16.2	9.0	14.4	23.4	9.8	27.6	37.5	WJ18544	16.2	19.2	23.4	37.5
9	100878.12	7,519	108,397	3.2	0.2	3.4	2.7	0.2	2.9	3.5	0.3	3.8	3.8	0.6	4.4	WJ4014916	5.0	6.0	3.8	4.4
10	101190.14	141,230	242,420	3.2	4.5	7.7	2.7	3.8	6.5	3.5	5.8	9.4	3.9	11.2	15.0	WJ4011888	6.5	7.7	9.4	15.0
11	9178.24	319,084	328,263	0.3	10.1	10.4	0.2	8.5	8.7	0.3	13.2	13.5	0.3	25.3	25.6	WJ4013666	8.7	10.4	13.5	25.6
12	45925.02	398,659	444,584	1.5	12.6	14.1	1.2	10.6	11.8	1.6	16.4	18.0	1.7	31.6	33.4	WJ4013995	11.8	14.1	18.0	33.4
13	37723.34	42,140	79,864	1.2	1.3	2.5	1.0	1.1	2.1	1.3	1.7	3.1	1.4	3.3	4.8	WJ4017665	2.1	2.5	3.1	4.8
14	190331.54	246,704	437,036	6.0	7.8	13.9	5.1	6.6	11.6	6.6	10.2	16.8	7.2	19.6	26.8	WJ4013014	11.6	13.9	16.8	26.8
15	84972.00	163,068	248,040	2.7	5.2	7.9	2.3	4.3	6.6	3.0	6.7	9.7	3.2	12.9	16.2	WJ4019946	6.6	7.9	9.7	16.2
16	60329.16	95,458	155,787	1.9	3.0	4.9	1.6	2.5	4.1	2.1	3.9	6.0	2.3	7.6	9.9	WJ59680	4.1	4.9	6.0	9.9
	1,544,768	2,609,563	4,154,332	49.0	82.7	131.7	41.1	69.5	110.7	53.9	107.6	161.5	58.8	206.9	265.7		112.8	134.3	161.5	265.7

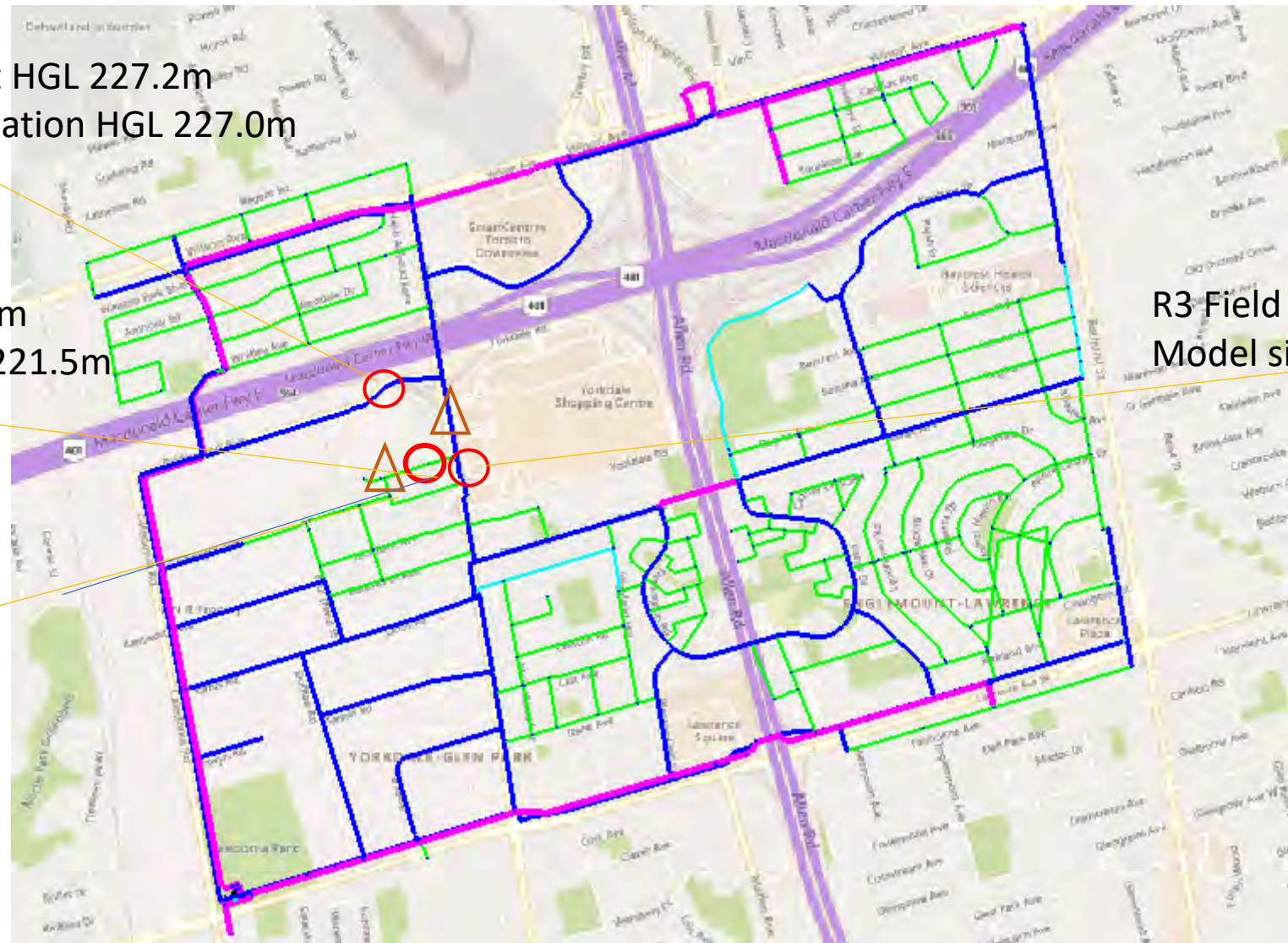
Model Calibration Test 2

R1 Field Test HGL 227.2m
Model simulation HGL 227.0m

R2 Field Test HGL 220.4m
Model simulation HGL 221.5m

R3 Field Test HGL 227.2m
Model simulation HGL 226.8m

Test 2 (F2)=64L/s

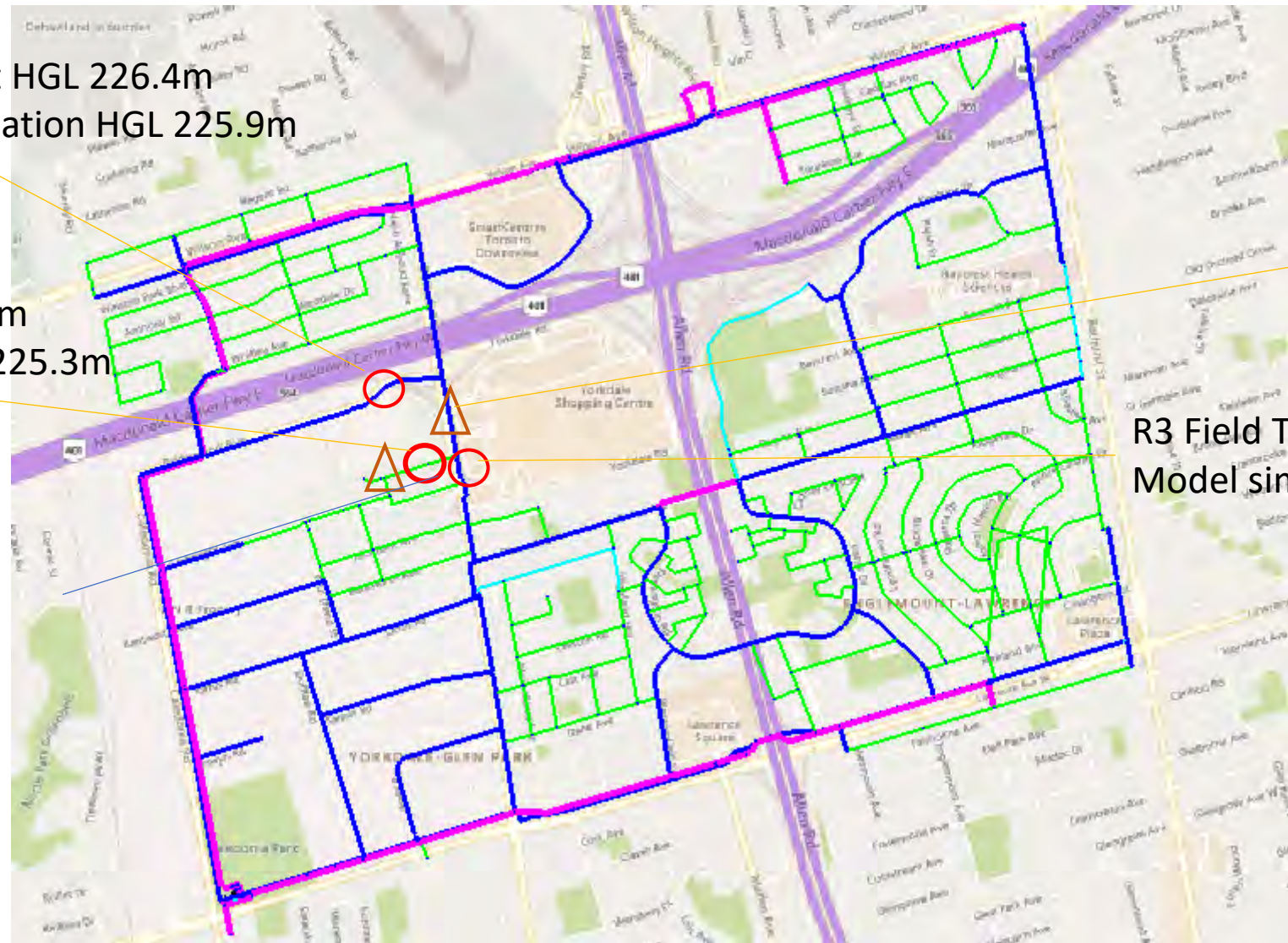


Model Calibration Test 3

R1 Field Test HGL 226.4m
Model simulation HGL 225.9m

R2 Field Test HGL 226.4m
Model simulation HGL 225.3m

Test 3 (F3)=112L/s
R3 Field Test HGL 226.5m
Model simulation HGL 225.4m



3400 Dufferin St

Residential Development



DOMESTIC WATER DEMAND CALCULATIONS

Project Name: 3400 Dufferin St

Project Number: 132393

Date: July 18, 2022

Designed By: SK

1. Based on the City of Toronto Standards and
2. ADD = 190 L/cap/day for residential uses

Peaking Factors		
Land Use	Peak Hour	Maximum Day
Residential (Apartments)	2.50	1.30
Commercial	1.20	1.10

Building A	Units / Area	Density	Population	ADD (L/s)	(ADDxP.F.) PHD (L/s)	(ADDxP.F.) MDD (L/s)
1 Bedroom	41 units	1.4 pp/unit	57	0.1	0.3	0.2
1 Bedroom + Den	178 units	1.4 pp/unit	249	0.5	1.4	0.7
2 Bedroom	108 units	2.1 pp/unit	227	0.5	1.2	0.6
2 Bedroom + Den	21 units	2.1 pp/unit	44	0.1	0.2	0.1
3 Bedroom	40 units	3.1 pp/unit	124	0.3	0.7	0.4
Retail		1.1 pp/100m2	0	0.0	0.0	0.0
Totals =	388 units		702	1.5	3.9	2.0

Building B	Units / Area	Density	Population	ADD (L/s)	PHD (L/s)	MDD (L/s)
1 Bedroom	57 units	1.4 pp/unit	80	0.2	0.4	0.2
1 Bedroom + Den	167 units	1.4 pp/unit	234	0.5	1.3	0.7
2 Bedroom	88 units	2.1 pp/unit	185	0.4	1.0	0.5
2 Bedroom + Den	21 units	2.1 pp/unit	44	0.1	0.2	0.1
3 Bedroom	38 units	3.1 pp/unit	118	0.3	0.6	0.3
Retail	1079 m2	1.1 pp/100m2	12	0.0	0.0	0.0
Totals =	371 units		672	1.5	3.7	1.9

Building C	Units / Area	Density	Population	ADD (L/s)	PHD (L/s)	MDD (L/s)
1 Bedroom	units	1.4 pp/unit	0	0.0	0.0	0.0
1 Bedroom + Den	47 units	1.4 pp/unit	66	0.1	0.4	0.2
2 Bedroom	20 units	2.1 pp/unit	42	0.1	0.2	0.1
2 Bedroom + Den	units	2.1 pp/unit	0	0.0	0.0	0.0
3 Bedroom	8 units	3.1 pp/unit	25	0.1	0.1	0.1
Retail	289 m2	1.1 pp/100m2	3	0.0	0.0	0.0
Totals =	75 units		136	0.3	0.7	0.4

Totals (all bldgs) =	Units	Population	ADD (L/s)	PHD (L/s)	MDD (L/s)
	834 units	1,510	3.3	8.3	4.5

External Area (north adjacent development (3450 Dufferin St) , as per Shaeffers study,May		4.31	10.4	5.55
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3400 Dufferin St

Residential Development



FIRE FLOW DEMAND CALCULATIONS

Building A

Project Name: 3400 Dufferin St
 Project Number: 132393
 Date: July 18, 2022
 Designed By: SK

Based on the Water Supply for Public Fire Protection Manual, 1999 by the Fire Underwriters Survey

Step 1: Calculate Fire Flow (based on area)

Construction Coefficient =	0.6	
Largest Floor Area =	2,478	m ²
Floor Above =	2,478	m ²
Floor Below =	2,478	m ²
Area =	3,717	m ²
Fire Flow (F) =	8,000	L/min

F = required fire flow (L/min)

$$F = 220C\sqrt{A}$$

C = coefficient related to type of construction

- 0.6 for fire resistive (fully protected, 3-hr ratings)
- 0.8 for non combustable (i.e. unprotected metal buildings)
- 1.0 for ordinary construction
- 1.5 for wood frame construction

A = total floor area excluding basements 50% below grade

* If vertical openings are inadequately protected, consider two largest two largest adjoining floors plus 50% of each of any floors above up to eight floors.

* If vertical openings are adequately protected (one hour rating), consider largest floor area + 25% of two immediately floors.

Step 2: Adjustment for Building Occupancy (shall not be less than 2000 L/s)

Occupancy Adjustment =	-15.00%
F ₁ = Fire Flow x Adjustment =	6800 L/min

Non-Combust.	-25%	Free Burning	15%
Limited Comb.	-15%	Rapid Burning	25%
Combustable	No change		

Step 3: Adjust F1 for Fire Suppression System

Sprinkler Adjustment =	30%
F ₂ = F ₁ x Adjustment =	2,040 L/min

Automatic Sprinklers (monitored)	-50%
Adequately Designed System	-30%

Step 4: Adjust F1 for Exposure / Proximity (shall not exceed 75%)

Proximity Adjustment =	40%	(max 75%)
F ₃ = F ₁ x Factor =	2,720	L/min

Separation	Adjustment	Separation	Adjustment
0m to 3m	25%	20.1m to 30m	10%
3.1m to 10m	20%	30.1m to 45m	5%
10.1m to 20m	15%		

Step 5: Calculate Adjusted Fire Flow (shall not be less than 2000 L/min or greater than 45,000 L/min)

F ₁ =	6,800	L/min
- F ₂ =	2,040	L/min
+ F ₃ =	2,720	L/min
Fire Flow =	7,000	L/min
Fire Flow =	116.7	L/s
Total Demand (Fire Flow + MDD) =	121.2	L/s

$$\text{Fire Flow} = F_1 - F_2 + F_3$$

Checks:

Fire Flow greater than 2000 L/min

Fire Flow less than 45,000 L/min

3400 Dufferin St

Residential Development



FIRE FLOW DEMAND CALCULATIONS

Condo B

Project Name: 3400 Dufferin St
 Project Number: 132393
 Date: July 18, 2022
 Designed By: SK

Based on the Water Supply for Public Fire Protection Manual, 1999 by the Fire Underwriters Survey

Step 1: Calculate Fire Flow (based on area)

Construction Coefficient =	0.6	
Largest Floor Area =	2,374	m2
Floor Above =	2,155	m2
Floor Below =	2,218	m2
Area =	3,467	m2
Fire Flow (F) =	8,000	L/min

F = required fire flow (L/min)
 C = coefficient related to type of construction
 0.6 for fire resistive (fully protected, 3-hr ratings)
 0.8 for non combustable (i.e. unprotected metal buildings)
 1.0 for ordinary construction
 1.5 for wood frame construction
 A = total floor area excluding basements 50% below grade

$$F = 220C\sqrt{A}$$

* If vertical openings are inadequately protected, consider two largest two largest adjoining floors plus 50% of each of any floors above up to eight floors.
 * If vertical openings are adequately protected (one hour rating), consider largest floor area + 25% of two immediately floors.

Step 2: Adjustment for Building Occupancy (shall not be less than 2000 L/s)

Occupancy Adjustment =	0.00%	
F ₁ = Fire Flow x Adjustment =	8,000	L/min

Non-Combust.	-25%	Free Burning	15%
Limited Comb.	-15%	Rapid Burning	25%
Combustable	No change		

Step 3: Adjust F1 for Fire Suppression System

Sprinkler Adjustment =	30%	
F ₂ = F ₁ x Adjustment =	2,400	L/min

Automatic Sprinklers (monitored)	-50%
Adequately Designed System	-30%

Step 4: Adjust F1 for Exposure / Proximity (shall not exceed 75%)

Proximity Adjustment =	35%	(max 75%)
F ₃ = F ₁ x Factor =	2,800	L/min

Separation	Adjustment	Separation	Adjustment
0m to 3m	25%	20.1m to 30m	10%
3.1m to 10m	20%	30.1m to 45m	5%
10.1m to 20m	15%		

Step 5: Calculate Adjusted Fire Flow (shall not be less than 2000 L/min or greater than 45,000 L/min)

F ₁ =	8,000	L/min
- F ₂ =	2,400	L/min
+ F ₃ =	2,800	L/min
Fire Flow =	8,000	L/min
Fire Flow =	133.3	L/s
Total Demand (Fire Flow + MDD) =	137.8	L/s

$$\text{Fire Flow} = F_1 - F_2 + F_3$$

Checks:
 Fire Flow greater than 2000 L/min
 Fire Flow less than 45,000 L/min

3400 Dufferin St

Residential Development



FIRE FLOW DEMAND CALCULATIONS

Condo C

Project Name: 3400 Dufferin St
 Project Number: 132393
 Date: July 18, 2022
 Designed By: SK

Based on the Water Supply for Public Fire Protection Manual, 1999 by the Fire Underwriters Survey

Step 1: Calculate Fire Flow (based on area)

Construction Coefficient =	0.6	
Largest Floor Area =	973	m2
Floor Above =	826	m2
Floor Below =	973	m2
Area =	1,423	m2
Fire Flow (F) =	5,000	L/min

F = required fire flow (L/min)
 C = coefficient related to type of construction
 0.6 for fire resistive (fully protected, 3-hr ratings)
 0.8 for non combustable (i.e. unprotected metal buildings)
 1.0 for ordinary construction
 1.5 for wood frame construction
 A = total floor area excluding basements 50% below grade

$$F = 220C\sqrt{A}$$

* If vertical openings are inadequately protected, consider two largest adjoining floors plus 50% of each of any floors above up to eight floors.
 * If vertical openings are adequately protected (one hour rating), consider largest floor area + 25% of two immediately floors.

Step 2: Adjustment for Building Occupancy (shall not be less than 2000 L/s)

Occupancy Adjustment =	0.00%	
F ₁ = Fire Flow x Adjustment =	5,000	L/min

Non-Combust.	-25%	Free Burning	15%
Limited Comb.	-15%	Rapid Burning	25%
Combustable	No change		

Step 3: Adjust F1 for Fire Suppression System

Sprinkler Adjustment =	30%	
F ₂ = F ₁ x Adjustment =	1,500	L/min

Automatic Sprinklers (monitored)	-50%
Adequately Designed System	-30%

Step 4: Adjust F1 for Exposure / Proximity (shall not exceed 75%)

Proximity Adjustment =	40%	(max 75%)
F ₃ = F ₁ x Factor =	2,000	L/min

Separation	Adjustment	Separation	Adjustment
0m to 3m	25%	20.1m to 30m	10%
3.1m to 10m	20%	30.1m to 45m	5%
10.1m to 20m	15%		

Step 5: Calculate Adjusted Fire Flow (shall not be less than 2000 L/min or greater than 45,000 L/min)

F ₁ =	5,000	L/min
- F ₂ =	1,500	L/min
+ F ₃ =	2,000	L/min
Fire Flow =	6,000	L/min
Fire Flow =	100.0	L/s
Total Demand (Fire Flow + MDD) =	104.5	L/s

$$\text{Fire Flow} = F_1 - F_2 + F_3$$

Checks:
 Fire Flow greater than 2000 L/min
 Fire Flow less than 45,000 L/min

Date: July 2022

Flow Scenario: Average Day

Junction Table

Existing Condition					
Label	Demand (L/s)	Elevation (m)	Hydraulic Grade (m)	Pressure (kPa)	Remark
WJ4002902	0.0	187.6	224.5	361	
WJ4002916	0.0	187.5	223.8	356	
WJ4002950	0.0	188.3	224.1	370	
WJ4002994	0.0	185.9	224.1	354	
WJ4003031	0.0	187.0	223.9	361	
WJ4003035 (F3)	0.0	186.2	223.8	368	
WJ4003075	0.0	184.2	224.6	396	
WJ4003078	0.0	183.9	224.7	400	
WJ4011807	0.0	182.9	224.9	412	
WJ4011821	0.0	186.3	224.7	376	
WJ4011828	0.0	188.0	224.4	357	
WJ4011903	0.0	180.4	225.1	438	
WJ4011927	0.0	181.2	225.1	430	
WJ4011950	0.0	181.4	225.0	427	
WJ4011960	0.0	181.0	225.1	432	
WJ4011984	0.0	181.1	224.8	427	
WJ4012037	0.0	187.7	224.5	360	
WJ4012040	0.0	185.6	224.7	383	
WJ4019973	0.0	182.4	224.8	415	
WJ4023049	0.0	181.2	225.1	430	
WJ57977	0.0	181.7	225.0	423	
WJ57981	0.0	181.7	225.0	424	
WJ57982	0.0	181.7	225.0	424	
WJ61853	5.2	185.9	223.7	370	
J-73	0.0	186.0	224.7	379	
J-74 (pro)	(N/A)	190.4	(N/A)	(N/A)	Subject Site
J-75 (pro)	(N/A)	190.2	(N/A)	(N/A)	Subject Site
J-76 (pro ext N D)	(N/A)	189.3	(N/A)	(N/A)	North Adjacent Dev.
J-91 (F3)	133.0	189.5	223.7	334	
J-78 (pro Hyd)	(N/A)	190.4	(N/A)	(N/A)	Subject Site
J-79 (pro)	(N/A)	189.9	(N/A)	(N/A)	Subject Site
J-80 (pro)	(N/A)	190.0	(N/A)	(N/A)	Subject Site
J-81 (BLD C)	(N/A)	189.9	(N/A)	(N/A)	Subject Site
J-82 (BLD B)	(N/A)	189.9	(N/A)	(N/A)	Subject Site
J-83 (pro)	(N/A)	190.1	(N/A)	(N/A)	Subject Site
J-84 (BLD A)	(N/A)	190.1	(N/A)	(N/A)	Subject Site
J-86 (F1)	0.0	188.0	224.8	360	
J-87 (R1)	0.0	186.7	224.7	372	
J-89 (R3)	0.0	189.5	224.0	338	
J-90 (R2)	0.0	189.3	223.8	338	

Label	Status (Initial)	Hydraulic Grade (Discharge) (m)	Flow (Total) (L/s)	Pump Head (m)	Remark
PMP-4	On	227.9	134.3	47.9	Dummy Pump

Proposed Condition					
Label	Demand (L/s)	Elevation (m)	Hydraulic Grade (m)	Pressure (kPa)	Remark
WJ4002902	0.0	187.6	227.8	393	
WJ4002916	0.0	187.5	227.7	394	
WJ4002950	0.0	188.3	227.7	386	
WJ4002994	0.0	185.9	227.7	410	
WJ4003031	0.0	187.0	227.7	398	
WJ4003035 (F3)	0.0	186.2	227.6	406	
WJ4003075	0.0	184.2	227.7	426	
WJ4003078	0.0	183.9	227.7	430	
WJ4011807	0.0	182.9	227.7	439	
WJ4011821	0.0	186.3	227.7	408	
WJ4011828	0.0	188.0	227.7	389	
WJ4011903	0.0	180.4	227.8	464	
WJ4011927	0.0	181.2	227.8	456	
WJ4011950	0.0	181.4	227.8	454	
WJ4011960	0.0	181.0	227.8	458	
WJ4011984	0.0	181.1	227.8	456	
WJ4012037	0.0	187.7	227.7	392	
WJ4012040	0.0	185.6	227.7	412	
WJ4019973	0.0	182.4	227.8	444	
WJ4023049	0.0	181.2	227.8	456	
WJ57977	0.0	181.7	227.8	451	
WJ57981	0.0	181.7	227.8	451	
WJ57982	0.0	181.7	227.8	451	
WJ61853	4.5	185.9	227.5	408	
J-73	0.0	186.0	227.8	408	
J-74 (pro)	0.0	190.4	227.7	365	Subject Site
J-75 (pro)	0.0	190.2	227.7	367	Subject Site
J-76 (pro ext N D)	4.3	189.3	227.7	376	North Adjacent Dev.
J-91 (F3)	0.0	189.5	227.7	374	
J-78 (pro Hyd)	0.0	190.4	227.7	365	Subject Site
J-79 (pro)	0.0	189.9	227.7	370	Subject Site
J-80 (pro)	0.0	190.0	227.7	369	Subject Site
J-81 (BLD C)	0.4	189.9	227.7	370	Subject Site
J-82 (BLD B)	1.5	189.9	227.7	370	Subject Site
J-83 (pro)	0.0	190.1	227.7	368	Subject Site
J-84 (BLD A)	1.5	190.1	227.7	368	Subject Site
J-86 (F1)	0.0	188.0	227.8	389	
J-87 (R1)	0.0	186.7	227.8	402	
J-89 (R3)	0.0	189.5	227.7	374	
J-90 (R2)	0.0	189.3	227.7	376	

Label	Status (Initial)	Hydraulic Grade (Discharge) (m)	Flow (Total) (L/s)	Pump Head (m)	Remark
PMP-4	On	227.8	142.0	47.8	Dummy Pump

HGL and Pressure Comparison under Pre and Post Development					
Label	Demand (L/s)	Elevation (m)	Difference*		Remark
			Hydraulic Grade (m)	Pressure (kPa)	
WJ4002902	0.0		3.2	32.0	
WJ4002916	0.0		3.9	38.0	
WJ4002950	0.0		3.7	36.0	
WJ4002994	0.0		3.6	36.0	
WJ4003031	0.0		3.8	37.0	
WJ4003035 (F3)	0.0		3.8	38.0	
WJ4003075	0.0		3.1	30.0	
WJ4003078	0.0		3.0	30.0	
WJ4011807	0.0		2.8	27.0	
WJ4011821	0.0		3.1	30.0	
WJ4011828	0.0		3.3	32.0	
WJ4011903	0.0		2.7	26.0	
WJ4011927	0.0		2.7	26.0	
WJ4011950	0.0		2.8	27.0	
WJ4011960	0.0		2.7	26.0	
WJ4011984	0.0		2.9	29.0	
WJ4012037	0.0		3.3	32.0	
WJ4012040	0.0		3.0	29.0	
WJ4019973	0.0		3.0	29.0	
WJ4023049	0.0		2.7	26.0	
WJ57977	0.0		2.8	28.0	
WJ57981	0.0		2.8	27.0	
WJ57982	0.0		2.8	27.0	
WJ61853	-0.7		3.8	38.0	
J-73	0.0		3.0	29.0	
J-74 (pro)	#VALUE!		#VALUE!	#VALUE!	Subject Site
J-75 (pro)	#VALUE!		#VALUE!	#VALUE!	Subject Site
J-76 (pro ext N D)	#VALUE!		#VALUE!	#VALUE!	North Adjacent Dev.
J-91 (F3)	-133.0		4.1	40.0	
J-78 (pro Hyd)	#VALUE!		#VALUE!	#VALUE!	Subject Site
J-79 (pro)	#VALUE!		#VALUE!	#VALUE!	Subject Site
J-80 (pro)	#VALUE!		#VALUE!	#VALUE!	Subject Site
J-81 (BLD C)	#VALUE!		#VALUE!	#VALUE!	Subject Site
J-82 (BLD B)	#VALUE!		#VALUE!	#VALUE!	Subject Site
J-83 (pro)	#VALUE!		#VALUE!	#VALUE!	Subject Site
J-84 (BLD A)	#VALUE!		#VALUE!	#VALUE!	Subject Site
J-86 (F1)	0.0		2.9	29.0	
J-87 (R1)	0.0		3.0	30.0	
J-89 (R3)	0.0		3.7	36.0	
J-90 (R2)	0.0		3.9	38.0	

*Note: "-" denotes the reduction in hydraulic grade / pressure under proposed condition.

Existing Condition											
Pipe ID	Start Node	Stop Node	Length (m)	Diameter (mm)	Hazen-Williams C	Flow (Absolute) (L/s)	Velocity (m/s)	Headloss (m)	Headloss (m/1000m)	Status (Initial)	Remark
LN4037673	WJ4011927	WJ4023049	4	300	120	1.0	0.0	0.0	0.00	Open	
LN4003218	WJ4003031	WJ4003035 (F3)	11	150	70	4.5	0.3	0.0	1.82	Open	
LN58027	WJ57977	WJ57982	14	150	70	1.0	0.1	0.0	0.00	Open	
LN4008088	WJ4012037	WJ4011828	15	300	120	5.4	0.1	0.0	0.00	Open	
LN58029	WJ57982	WJ57981	27	150	70	0.2	0.0	0.0	0.00	Open	
LN4023991	WJ4012040	WJ4011821	35	300	120	4.9	0.1	0.0	0.00	Open	
LN4037674	WJ4023049	WJ4011950	47	150	70	1.0	0.1	0.0	0.21	Open	
LN4024464	WJ4011960	WJ4011927	54	300	120	3.3	0.1	0.0	0.00	Open	
LN4020015	WJ4003075	WJ4003078	55	150	70	1.0	0.1	0.0	0.18	Open	
LN61742	WJ4003035 (F3)	WJ61853	62	150	70	4.5	0.3	0.1	1.94	Open	
LN4020179	WJ4003031	WJ4002994	62	150	70	2.7	0.2	0.1	0.81	Open	
LN4023868	WJ4011821	WJ4012037	87	300	120	4.3	0.1	0.0	0.00	Open	
LN4035118	WJ4011984	WJ4019973	105	150	70	0.4	0.0	0.0	0.00	Open	
LN4020017	WJ4002994	WJ4003075	105	150	70	1.7	0.1	0.0	0.29	Open	
LN4020012	WJ4003078	WJ57977	116	150	70	1.0	0.1	0.0	0.09	Open	
LN4024007	WJ4011807	WJ4012040	131	300	120	5.2	0.1	0.0	0.00	Open	
LN4024456	WJ57981	WJ4011950	125	150	70	0.2	0.0	0.0	0.00	Open	
LN4023857	WJ4002950	WJ4011828	132	300	120	4.9	0.1	0.0	0.00	Open	
LN4035119	WJ4019973	WJ4003075	153	150	70	0.7	0.0	0.0	0.07	Open	
LN4024469	WJ4011903	WJ4011960	154	300	120	2.4	0.0	0.0	0.00	Open	
LN4038072	WJ4011984	WJ4011984	183	150	70	0.9	0.1	0.0	0.11	Open	
LN4036406	WJ4011950	WJ4019973	183	150	70	0.8	0.1	0.0	0.05	Open	
LN4020039	WJ4002950	WJ4002994	278	150	70	1.0	0.1	0.0	0.14	Open	
LN4036073	WJ4011821	WJ4011984	310	150	70	0.6	0.0	0.0	0.03	Open	
LN4038407	WJ4019973	WJ4011828	325	150	70	0.5	0.0	0.0	0.03	Open	
LN4024333	WJ4011903	WJ4011807	455	300	120	7.2	0.1	0.0	0.07	Open	
LN4030819	WJ4002902	J-73	240	300	120	4.0	0.1	0.0	0.00	Open	
P-67 (pre-ext)	J-73	J-76 (pre_ext N Dev)	80	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-68 (pre-ext)	J-76 (pre_ext N Dev)	J-74 (pro)	68	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	North Adjacent Dev.
P-69 (pre-ext)	J-75 (pro)	J-76 (pre_ext N Dev)	116	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
LN4020060	WJ4002916	J-91 (F3)	58	300	120	6.1	0.1	0.0	0.00	Open	
LN4020061	J-91 (F3)	WJ4002902	208	300	120	7.7	0.1	0.0	0.05	Open	
P-71 (pro)	J-78 (pro Hyd)	J-74 (pro)	62	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-84 (pro)	J-91 (F3)	J-79 (pro)	77	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-83 (pro)	J-79 (pro)	J-80 (pro)	24	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-73 (pro)	J-80 (pro)	J-75 (pro)	63	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-74 (pro)	J-79 (pro)	J-81 (BLD C)	22	150	100	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	Subject site
P-75 (pro)	J-79 (pro)	J-82 (BLD B)	17	150	100	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-80 (pro)	J-80 (pro)	J-83 (pro)	34	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-81 (pro)	J-83 (pro)	J-78 (pro Hyd)	67	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-76 (pro)	J-83 (pro)	J-84 (BLD A)	14	150	100	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
LN4030822	J-73	J-87 (R1)	39	300	120	4.0	0.1	0.0	0.00	Open	
LN4030821	J-87 (R1)	J-86 (F1)	77	300	120	4.0	0.1	0.0	0.00	Open	
LN4020054	WJ4002950	J-89 (R3)	28	300	120	6.0	0.1	0.0	0.00	Open	
LN4020055	J-89 (R3)	WJ4002916	65	300	120	6.0	0.1	0.0	0.00	Open	
LN4020195	WJ4003031	J-90 (R2)	151	150	70	1.8	0.1	0.1	0.33	Open	
LN4020194	J-90 (R2)	WJ4002916	97	150	70	1.8	0.1	0.0	0.31	Open	

Proposed Condition											
Pipe ID	Start Node	Stop Node	Length (m)	Diameter (mm)	Hazen-Williams C	Flow (Absolute) (L/s)	Velocity (m/s)	Headloss (m)	Headloss (m/1000m)	Status (Initial)	Remark
LN4037673	WJ4011927	WJ4023049	4	300	120	1.1	0.0	0.0	0.00	Open	
LN4003218	WJ4003031	WJ4003035 (F3)	11	150	70	4.5	0.3	0.0	1.82	Open	
LN58027	WJ57977	WJ57982	14	150	70	1.1	0.1	0.0	0.00	Open	
LN4008088	WJ4012037	WJ4011828	15	300	120	3.9	0.1	0.0	0.00	Open	
LN58029	WJ57982	WJ57981	27	150	70	0.2	0.0	0.0	0.00	Open	
LN4023991	WJ4012040	WJ4011821	35	300	120	3.5	0.1	0.0	0.00	Open	
LN4037674	WJ4023049	WJ4011950	47	150	70	1.1	0.1	0.0	0.21	Open	
LN4024464	WJ4011960	WJ4011927	54	300	120	3.3	0.1	0.0	0.00	Open	
LN4020015	WJ4003075	WJ4003078	55	150	70	1.1	0.1	0.0	0.18	Open	
LN61742	WJ4003035 (F3)	WJ61853	62	150	70	4.5	0.3	0.1	1.94	Open	
LN4020179	WJ4003031	WJ4002994	62	150	70	2.7	0.2	0.1	0.81	Open	
LN4023868	WJ4011821	WJ4012037	87	300	120	2.8	0.0	0.0	0.00	Open	
LN4035118	WJ4011984	WJ4019973	105	150	70	0.4	0.0	0.0	0.00	Open	
LN4020017	WJ4002994	WJ4003075	105	150	70	1.7	0.1	0.0	0.29	Open	
LN4020012	WJ4003078	WJ57977	116	150	70	1.1	0.1	0.0	0.17	Open	
LN4024007	WJ4011807	WJ4012040	131	300	120	6.3	0.1	0.0	0.08	Open	
LN4024456	WJ57981	WJ4011950	125	150	70	0.2	0.0	0.0	0.00	Open	
LN4023857	WJ4002950	WJ4011828	132	300	120	3.3	0.1	0.0	0.00	Open	
LN4035119	WJ4019973	WJ4003075	153	150	70	0.7	0.0	0.0	0.07	Open	
LN4024469	WJ4011903	WJ4011960	154	300	120	2.3	0.0	0.0	0.00	Open	
LN4038072	WJ4011984	WJ4011984	183	150	70	1.0	0.1	0.0	0.11	Open	
LN4036406	WJ4011950	WJ4019973	183	150	70	0.9	0.1	0.0	0.11	Open	
LN4020039	WJ4002950	WJ4002994	278	150	70	1.0	0.1	0.0	0.11	Open	
LN4036073	WJ4011821	WJ4011984	310	150	70	0.6	0.0	0.0	0.03	Open	
LN4038407	WJ4019973	WJ4011828	325	150	70	0.5	0.0	0.0	0.03	Open	
LN4024333	WJ4011903	WJ4011807	455	300	120	7.5	0.1	0.0	0.07	Open	
LN4030819	WJ4002902	J-73	240	300	120	1.2	0.0	0.0	0.00	Open	
P-67 (pre-ext)	J-73	J-76 (pre_ext N Dev)	80	300	120	8.2	0.1	0.0	0.13	Open	
P-68 (pre-ext)	J-76 (pre_ext N Dev)	J-74 (pro)	68	300	120	1.9	0.0	0.0	0.00	Open	North Adjacent Dev.
P-69 (pre-ext)	J-75 (pro)	J-76 (pre_ext N Dev)	116	300	120	2.0	0.0	0.0	0.00	Open	
LN4020060	WJ4002916	J-91 (F3)	58	300	120	6.1	0.1	0.0	0.00	Open	
LN4020061	J-91 (F3)	WJ4002902	208	300	120	5.6	0.1	0.0	0.05	Open	
P-71 (pro)	J-78 (pro Hyd)	J-74 (pro)	62	300	120	1.9	0.0	0.0	0.00	Open	
P-84 (pro)	J-91 (F3)	J-79 (pro)	77	300	120	0.5	0.0	0.0	0.00	Open	
P-83 (pro)	J-79 (pro)	J-80 (pro)	24	300	120	2.4	0.0	0.0	0.00	Open	
P-73 (pro)	J-80 (pro)	J-75 (pro)	63	300	120	2.0	0.0	0.0	0.00	Open	
P-74 (pro)	J-79 (pro)	J-81 (BLD C)	22	150	100	0.4	0.0	0.0	0.00	Open	Subject site
P-75 (pro)	J-79 (pro)	J-82 (BLD B)	17	150	100	1.5	0.1	0.0	0.00	Open	
P-80 (pro)	J-80 (pro)	J-83 (pro)	34	300	120	1.4	0.0	0.0	0.00	Open	
P-81 (pro)	J-83 (pro)	J-78 (pro Hyd)	67	300	120	1.9	0.0	0.0	0.00	Open	
P-76 (pro)	J-83 (pro)	J-84 (BLD A)	14	150	100	1.5	0.1	0.0	0.00	Open	
LN4030822	J-73	J-87 (R1)	39	300	120	7.0	0.1	0.0	0.00	Open	
LN4030821	J-87 (R1)	J-86 (F1)	77	300	120	7.0	0.1	0.0	0.00	Open	
LN4020054	WJ4002950	J-89 (R3)	28	300	120	4.4	0.1	0.0	0.00	Open	
LN4020055	J-89 (R3)	WJ4002916	65	300	120	4.4	0.1	0.0	0.00	Open	
LN4020195	WJ4003031	J-90 (R2)	151	150	70	1.8	0.1	0.1	0.33	Open	
LN4020194	J-90 (R2)	WJ4002916	97	150	70	1.8	0.1	0.0	0.31	Open	

Pipe Velocity and Head Loss Comparison under Pre and Post Development											
Pipe ID	Start Node	Stop Node	Length (m)	Diameter (mm)	Hazen-Williams C	Flow (Absolute) (L/s)	Velocity (m/s)	Headloss (m)	Headloss (m/1000m)	Status (Initial)	Remark
LN4037673	WJ4011927	WJ4023049					0.1	0.0	0.0		
LN4003218	WJ4003031	WJ4003035 (F3)					0.0	0.0	0.0		
LN58027	WJ57977	WJ57982					0.1	0.0	0.0		
LN4008088	WJ4012037	WJ4011828					-1.5	0.0	0.0		
LN58029	WJ57982	WJ57981					0.0	0.0	0.0		
LN4023991	WJ4012040	WJ4011821					-1.4	0.0	0.0		
LN4037674	WJ4023049	WJ4011950					0.0	0.0	0.0		
LN4020015	WJ4003075	WJ4003078					0.1	0.0	0.0		
LN61742	WJ4003035 (F3)	WJ61853					0.0	0.0	0.0		
LN4020179	WJ4003031	WJ4002994					0.0	0.0	0.0		
LN4023868	WJ4011821	WJ4012037					-1.5	0.0	0.0		
LN4035118	WJ4011984	WJ4019973					0.1	0.0	0.0		
LN4020017	WJ4002994	WJ4003075					0.0	0.0	0.0		
LN4020012	WJ4003078	WJ57977					0.1	0.0	0.0		
LN4024007	WJ4011807	WJ4012040					1.1	0.0	0.0		
LN4024456	WJ57981	WJ4011950					0.0	0.0	0.0		
LN4023857	WJ4002950	WJ4011828									

Existing Condition					
Label	Demand (L/s)	Elevation (m)	Hydraulic Grade (m)	Pressure (kPa)	Remark
WJ4002902	0.0	187.6	227.6	391	
WJ4002916	0.0	187.5	227.5	392	
WJ4002950	0.0	188.3	227.5	394	
WJ4002994	0.0	185.9	227.5	407	
WJ4003031	0.0	187.0	227.4	396	
WJ4003035 (F3)	0.0	186.2	227.4	403	
WJ4003075	0.0	184.2	227.5	424	
WJ4003078	0.0	183.9	227.5	428	
WJ4011807	0.0	182.9	227.5	437	
WJ4011821	0.0	186.3	227.5	404	
WJ4011828	0.0	188.0	227.5	387	
WJ4011903	0.0	180.4	227.6	462	
WJ4011927	0.0	181.2	227.6	454	
WJ4011950	0.0	181.4	227.6	452	
WJ4011960	0.0	181.0	227.6	456	
WJ4011984	0.0	181.1	227.5	454	
WJ4012037	0.0	187.7	227.5	390	
WJ4012040	0.0	185.6	227.5	410	
WJ4019973	0.0	182.4	227.5	442	
WJ4023049	0.0	181.2	227.6	454	
WJ57977	0.0	181.7	227.6	449	
WJ57981	0.0	181.7	227.6	449	
WJ57982	0.0	181.7	227.6	449	
WJ61853	5.2	185.9	227.2	405	
J-73	0.0	186.0	227.6	407	
J-74 (pro)	(N/A)	190.4	(N/A)	(N/A)	Subject Site
J-75 (pro)	(N/A)	190.2	(N/A)	(N/A)	
J-76 (pro ext N D)	(N/A)	189.3	(N/A)	(N/A)	North Adjacent Dev.
J-91 (F3)	0.0	189.5	227.5	372	
J-78 (pro Hyd)	(N/A)	190.4	(N/A)	(N/A)	
J-79 (pro)	(N/A)	189.9	(N/A)	(N/A)	
J-80 (pro)	(N/A)	190.0	(N/A)	(N/A)	
J-81 (BLD C)	(N/A)	189.9	(N/A)	(N/A)	Subject Site
J-82 (BLD B)	(N/A)	189.9	(N/A)	(N/A)	
J-83 (pro)	(N/A)	190.1	(N/A)	(N/A)	
J-84 (BLD A)	(N/A)	190.1	(N/A)	(N/A)	
J-86 (F1)	0.0	188.0	227.6	387	
J-87 (R1)	0.0	186.7	227.6	400	
J-89 (R3)	0.0	189.5	227.5	372	
J-90 (R2)	0.0	189.3	227.5	374	

Label	Status (Initial)	Hydraulic Grade (Discharge) (m)	Flow (Total) (L/s)	Pump Head (m)	Remark
PMP-4	On	227.6	161.4	47.6	Dummy Pump

Proposed Condition					
Label	Demand (L/s)	Elevation (m)	Hydraulic Grade (m)	Pressure (kPa)	Remark
WJ4002902	0.0	187.6	227.4	389	
WJ4002916	0.0	187.5	227.3	390	
WJ4002950	0.0	188.3	227.3	382	
WJ4002994	0.0	185.9	227.3	406	
WJ4003031	0.0	187.0	227.2	394	
WJ4003035 (F3)	0.0	186.2	227.2	401	
WJ4003075	0.0	184.2	227.3	422	
WJ4003078	0.0	183.9	227.4	426	
WJ4011807	0.0	182.9	227.3	435	
WJ4011821	0.0	186.3	227.3	402	
WJ4011828	0.0	188.0	227.3	385	
WJ4011903	0.0	180.4	227.4	460	
WJ4011927	0.0	181.2	227.4	452	
WJ4011950	0.0	181.4	227.4	450	
WJ4011960	0.0	181.0	227.4	454	
WJ4011984	0.0	181.1	227.4	452	
WJ4012037	0.0	187.7	227.3	388	
WJ4012040	0.0	185.6	227.3	408	
WJ4019973	0.0	182.4	227.4	440	
WJ4023049	0.0	181.2	227.4	452	
WJ57977	0.0	181.7	227.4	447	
WJ57981	0.0	181.7	227.4	447	
WJ57982	0.0	181.7	227.4	447	
WJ61853	5.2	185.9	227.1	403	
J-73	0.0	186.0	227.4	405	
J-74 (pro)	0.0	190.4	227.3	362	Subject Site
J-75 (pro)	0.0	190.2	227.3	363	
J-76 (pro ext N D)	5.6	189.3	227.3	372	North Adjacent Dev.
J-91 (F3)	0.0	189.5	227.3	370	
J-78 (pro Hyd)	0.0	190.4	227.3	361	
J-79 (pro)	0.0	189.9	227.3	366	
J-80 (pro)	0.0	190.0	227.3	365	
J-81 (BLD C)	4.5	189.9	227.3	366	Subject Site
J-82 (BLD B)	1.9	189.9	227.3	366	
J-83 (pro)	0.0	190.1	227.3	364	
J-84 (BLD A)	2.0	190.1	227.3	364	
J-86 (F1)	0.0	188.0	227.4	385	
J-87 (R1)	0.0	186.7	227.4	398	
J-89 (R3)	0.0	189.5	227.3	370	
J-90 (R2)	0.0	189.3	227.3	372	

Label	Status (Initial)	Hydraulic Grade (Discharge) (m)	Flow (Total) (L/s)	Pump Head (m)	Remark
PMP-4	On	227.4	175.4	47.4	Dummy Pump

HGL and Pressure Comparison under Pre and Post Development					
Label	Demand (L/s)	Elevation (m)	Difference*		Remark
			Hydraulic Grade (m)	Pressure (kPa)	
WJ4002902	0.0		-0.2	-2.0	
WJ4002916	0.0		-0.2	-2.0	
WJ4002950	0.0		-0.2	-2.0	
WJ4002994	0.0		-0.2	-1.0	
WJ4003031	0.0		-0.2	-2.0	
WJ4003035 (F3)	0.0		-0.2	-2.0	
WJ4003075	0.0		-0.2	-2.0	
WJ4003078	0.0		-0.2	-2.0	
WJ4011807	0.0		-0.2	-2.0	
WJ4011821	0.0		-0.2	-2.0	
WJ4011828	0.0		-0.2	-2.0	
WJ4011903	0.0		-0.2	-2.0	
WJ4011927	0.0		-0.2	-2.0	
WJ4011950	0.0		-0.2	-2.0	
WJ4011960	0.0		-0.2	-2.0	
WJ4011984	0.0		-0.2	-2.0	
WJ4012037	0.0		-0.2	-2.0	
WJ4012040	0.0		-0.2	-2.0	
WJ4019973	0.0		-0.2	-2.0	
WJ4023049	0.0		-0.2	-2.0	
WJ57977	0.0		-0.2	-2.0	
WJ57981	0.0		-0.2	-2.0	
WJ57982	0.0		-0.2	-2.0	
WJ61853	0.0		-0.2	-2.0	
J-73	0.0		-0.2	-2.0	
J-74 (pro)	#VALUE!	186.0	#VALUE!	#VALUE!	Subject Site
J-75 (pro)	#VALUE!	186.0	#VALUE!	#VALUE!	
J-76 (pro ext N D)	#VALUE!	189.3	#VALUE!	#VALUE!	North Adjacent Dev.
J-91 (F3)	0.0		-0.2	-2.0	
J-78 (pro Hyd)	#VALUE!	190.4	#VALUE!	#VALUE!	
J-79 (pro)	#VALUE!	189.9	#VALUE!	#VALUE!	
J-80 (pro)	#VALUE!	190.0	#VALUE!	#VALUE!	
J-81 (BLD C)	#VALUE!	189.9	#VALUE!	#VALUE!	Subject Site
J-82 (BLD B)	#VALUE!	189.9	#VALUE!	#VALUE!	
J-83 (pro)	#VALUE!	190.1	#VALUE!	#VALUE!	
J-84 (BLD A)	#VALUE!	190.1	#VALUE!	#VALUE!	
J-86 (F1)	0.0		-0.2	-2.0	
J-87 (R1)	0.0		-0.2	-2.0	
J-89 (R3)	0.0		-0.2	-2.0	
J-90 (R2)	0.0		-0.2	-2.0	

*Note: "-" denotes the reduction in hydraulic grade / pressure under proposed condition.

Existing Condition											
Pipe ID	Start Node	Stop Node	Length (m)	Diameter (mm)	Hazen-Williams C	Flow (Absolute) (L/s)	Velocity (m/s)	Headloss (m)	Headloss (m/1000m)	Status (Initial)	Remark
LN4037673	WJ4011927	WJ4023049	4	300	120	1.2	0.0	0.0	0.0	Open	
LN4003218	WJ4003031	WJ4003035 (F3)	11	150	70	5.2	0.3	0.0	2.73	Open	
LN58027	WJ57982	WJ57981	14	150	70	1.2	0.1	0.0	0.0	Open	
LN4008088	WJ4012037	WJ4011828	15	300	120	6.5	0.1	0.0	0.0	Open	
LN58029	WJ57982	WJ57981	27	150	70	0.2	0.0	0.0	0.0	Open	
LN4023991	WJ4012040	WJ4011821	35	300	120	5.9	0.1	0.0	0.0	Open	
LN4037674	WJ4023049	WJ4011950	47	150	70	1.2	0.1	0.0	0.21	Open	
LN4024464	WJ4011960	WJ4011927	54	300	120	4.0	0.1	0.0	0.0	Open	
LN4020015	WJ4003075	WJ4003078	55	150	70	1.2	0.1	0.0	0.18	Open	
LN61742	WJ4003035 (F3)	WJ61853	62	150	70	5.2	0.3	0.2	2.42	Open	
LN4020179	WJ4003031	WJ4002994	62	150	70	3.1	0.2	0.1	0.97	Open	
LN4023868	WJ4011821	WJ4012037	87	300	120	6.7	0.2	0.1	0.0	Open	
LN4035118	WJ4011984	WJ4019973	105	150	70	0.4	0.0	0.0	0.0	Open	
LN4020017	WJ4002994	WJ4003075	105	150	70	1.9	0.1	0.0	0.38	Open	
LN4020012	WJ4003078	WJ57977	116	150	70	1.2	0.1	0.0	0.17	Open	
LN4024007	WJ4011807	WJ4012040	131	300	120	6.1	0.1	0.0	0.08	Open	
LN4024456	WJ57981	WJ4011950	125	150	70	0.2	0.0	0.0	0.0	Open	
LN4023857	WJ4002950	WJ4011828	132	300	120	6.0	0.1	0.0	0.08	Open	
LN4035119	WJ4019973	WJ4003075	153	150	70	0.8	0.0	0.0	0.07	Open	
LN4024469	WJ4011903	WJ4011960	154	300	120	2.9	0.0	0.0	0.00	Open	
LN4038072	WJ4011960	WJ4011984	183	150	70	1.1	0.0	0.0	0.11	Open	
LN4036406	WJ4011950	WJ4019973	183	150	70	1.0	0.1	0.0	0.11	Open	
LN4020039	WJ4002950	WJ4002994	278	150	70	1.2	0.1	0.1	0.18	Open	
LN4036073	WJ4011821	WJ4011984	310	150	70	0.7	0.0	0.0	0.06	Open	
LN4036407	WJ4019973	WJ4011828	325	150	70	0.6	0.0	0.0	0.03	Open	
LN4024333	WJ4011903	WJ4011807	455	300	120	9.6	0.1	0.0	0.17	Open	
LN4030819	WJ4002902	J-73	240	300	120	4.8	0.1	0.0	0.04	Open	
P-67 (pre-ex)	J-73	76 (pro. ext N Dev)	80	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-68 (pre-ex)	J-76 (pro. ext N Dev)	J-74 (pro)	68	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	North Adjacent Dev.
P-69 (Pre-ex)	J-75 (pro)	76 (pro. ext N Dev)	116	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
LN4020060	WJ4002916	J-91 (F3)	58	300	120	5.2	0.1	0.0	0.00	Open	
LN4020061	J-91 (F3)	WJ4002902	208	300	120	9.2	0.1	0.0	0.10	Open	
P-71 (pro)	J-78 (pro Hyd)	J-74 (pro)	62	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-84 (pro)	J-91 (F3)	J-79 (pro)	77	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-83 (pro)	J-79 (pro)	J-80 (pro)	24	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-73 (pro)	J-80 (pro)	J-75 (pro)	63	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-74 (pro)	J-79 (pro)	J-81 (BLD C)	22	150	100	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	Subject site
P-75 (pro)	J-79 (pro)	J-82 (BLD B)	17	150	100	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-80 (pro)	J-80 (pro)	J-83 (pro)	34	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-81 (pro)	J-83 (pro)	J-78 (pro Hyd)	67	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-76 (pro)	J-83 (pro)	J-84 (BLD A)	14	150	100	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
LN4030822	J-73	J-87 (R1)	39	300	120	4.8	0.1	0.0	0.00	Open	
LN4030821	J-87 (R1)	J-86 (F1)	77	300	120	4.8	0.1	0.0	0.00	Open	
LN4020054	WJ4002950	J-89 (R3)	28	300	120	7.2	0.1	0.0	0.00	Open	
LN4020055	J-89 (R3)	WJ4002916	65	300	120	7.2	0.1	0.0	0.00	Open	
LN4020195	WJ4003031	J-90 (R2)	151	150	70	2.1	0.1	0.1	0.46	Open	
LN4020194	J-90 (R2)	WJ4002916	97	150	70	2.1	0.1	0.1	0.41	Open	

Proposed Condition											
Pipe ID	Start Node	Stop Node	Length (m)	Diameter (mm)	Hazen-Williams C	Flow (Absolute) (L/s)	Velocity (m/s)	Headloss (m)	Headloss (m/1000m)	Status (Initial)	Remark
LN4037673	WJ4011927	WJ4023049	4	300	120	1.4	0.0	0.0	0.0	Open	
LN4003218	WJ4003031	WJ4003035 (F3)	11	150	70	5.2	0.3	0.0	2.73	Open	
LN58027	WJ57977	WJ57982	14	150	70	1.3	0.1	0.0	0.0	Open	
LN4008088	WJ4012037	WJ4011828	15	300	120	2.8	0.0	0.0	0.0	Open	
LN58029	WJ57982	WJ57981	27	150	70	0.3	0.0	0.0	0.0	Open	
LN4023991	WJ4012040	WJ4011821	35	300	120	2.5	0.0	0.0	0.0	Open	
LN4037674	WJ4023049	WJ4011950	47	150	70	1.4	0.1	0.0	0.21	Open	
LN4024464	WJ4011960	WJ4011927	54	300	120	4.1	0.1	0.0	0.00	Open	
LN4020015	WJ4003075	WJ4003078	55	150	70	1.3	0.1	0.0	0.18	Open	
LN61742	WJ4003035 (F3)	WJ61853	62	150	70	5.2	0.3	0.2	2.42	Open	
LN4020179	WJ4003031	WJ4002994	62	150	70	3.2	0.2	0.1	0.97	Open	
LN4023868	WJ4011821	WJ4012037	87	300	120	9.6	0.1	0.0	0.08	Open	
LN4035118	WJ4011984	WJ4019973	105	150	70	0.4	0.0	0.0	0.00	Open	
LN4020017	WJ4002994	WJ4003075	105	150	70	2.1	0.1	0.1	0.48	Open	
LN4020012	WJ4003078	WJ57977	116	150	70	1.3	0.1	0.0	0.17	Open	
LN4024007	WJ4011807	WJ4012040	131	300	120	8.9	0.1	0.0	0.00	Open	
LN4024456	WJ57981	WJ4011950	125	150	70	0.3	0.0	0.0	0.0	Open	
LN4023857	WJ4002950	WJ4011828	132	300	120	2.1	0.0	0.0	0.00	Open	
LN4035119	WJ4019973	WJ4003075	153	150	70	0.8	0.0	0.0	0.07	Open	
LN4024469	WJ4011903	WJ4011960	154	300	120	2.9	0.0	0.0	0.00	Open	
LN4038072	WJ4011960	WJ4011984	183	150	70	1.2	0.1	0.0	0.16	Open	
LN4036406	WJ4011950	WJ4019973	183	150	70	1.1	0.1	0.0	0.16	Open	
LN4020039	WJ4002950	WJ4002994	278	150	70	1.1	0.1	0.0	0.14	Open	
LN4036073	WJ4011821	WJ4011984	310	150	70	0.8	0.1	0.0	0.06	Open	
LN4036407	WJ4019973	WJ4011828	325	150	70	0.7	0.0	0.0	0.06	Open	
LN4024333	WJ4011903	WJ4011807	455	300	120	9.6	0.1	0.0	0.00	Open	
LN4030819	WJ4002902	J-73	240	300	120	1.9	0.0	0.0	0.00	Open	
P-67 (pre-ex)	J-73	76 (pro. ext N Dev)	80	300	120	11.4	0.2	0.0	0.13	Open	
P-68 (pre-ex)	J-76 (pro. ext N Dev)	J-74 (pro)	68	300	120	2.8	0.0	0.0	0.00	Open	North Adjacent Dev.
P-69 (Pre-ex)	J-75 (pro)	76 (pro. ext N Dev)	116	300	120	3.0	0.0	0.0	0.00	Open	
LN4020060	WJ4002916	J-91 (F3)	58	300	120	5.2	0.1	0.0	0.00	Open	
LN4020061	J-91 (F3)	WJ4002902	208	300	120	7.8	0.1	0.0	0.05	Open	
P-71 (pro)	J-78 (pro Hyd)	J-74 (pro)	62	300	120	2.8	0.0	0.0	0.00	Open	
P-84 (pro)	J-91 (F3)	J-79 (pro)	77	300	120	2.8	0.0	0.0	0.00	Open	
P-83 (pro)	J-79 (pro)	J-80 (pro)	24	300	120	2.8	0.1	0.0	0.00	Open	
P-73 (pro)	J-80 (pro)	J-75 (pro)	63	300	120	3.0	0.0	0.0	0.00	Open	
P-74 (pro)	J-79 (pro)	J-81 (BLD C)	22	150	100	4.5	0.3	0.0	0.91	Open	Subject site
P-75 (pro)	J-79 (pro)	J-82 (BLD B)	17	150	100	1.9	0.1	0.0	0.00	Open	
P-80 (pro)	J-80 (pro)	J-83 (pro)	34	300	120	0.8	0.0	0.0	0.00	Open	
P-81 (pro)	J-83 (pro)	J-78 (pro Hyd)	67	300	120	2.8	0.0	0.0	0.00	Open	
P-76 (pro)	J-83 (pro)	J-84 (BLD A)	14	150	100	2.0	0.1	0.0	0.00	Open	
LN4030822	J-73	J-87 (R1)	39	300	120	9.6	0.1	0.0	0.00	Open	
LN4030821	J-87 (R1)	J-86 (F1)	77	300	120	9.6	0.1	0.0	0.13	Open	
LN4020054	WJ4002950	J-89 (R3)	28	300	120	3.2	0.1	0.0	0.00	Open	
LN4020055	J-89 (R3)	WJ4002916	65	300	120	3.2	0.1	0.0	0.00	Open	
LN4020195	WJ4003031	J-90 (R2)	151	150	70	2.0	0.1	0.1	0.40	Open	
LN4020194	J-90 (R2)	WJ4002916	97	150	70	2.0	0.1	0.1	0.41	Open	

Pipe Velocity and Head Loss Comparison under Pre and Post Development											
Pipe ID	Start Node	Stop Node	Length (m)	Diameter (mm)	Hazen-Williams C	Flow (Absolute) (L/s)	Velocity (m/s)	Headloss (m)	Headloss (m/1000m)	Status (Initial)	Remark
LN4037673	WJ4011927	WJ4023049					0.2	0.0	0.0		
LN4003218	WJ4003031	WJ4003035 (F3)					0.0	0.0	0.0		
LN58027	WJ57977	WJ57982					0.1	0.0	0.0		
LN4008088	WJ4012037	WJ4011828					-3.7	-0.1	0.0		
LN58029	WJ57982	WJ57981					0.1	0.0	0.0		
LN4023991	WJ4012040	WJ4011821					-3.4	-0.1	0.0		
LN4037674	WJ4023049	WJ4011950					0.2	0.0	0.0		
LN4020015	WJ4003075	WJ4003078					0.1	0.0	0.0		
LN61742	WJ4003035 (F3)	WJ61853					0.0	0.0	0.0		
LN4020179	WJ4003031	WJ4002994					0.1	0.0	0.0		
LN4023868	WJ4011821	WJ4012037					-3.5	-0.1	0.0		
LN4035118	WJ4011984	WJ4019973					0.0	0.0	0.0		
LN4020017	WJ4002994	WJ4003075					0.2	0.0	0.0		
LN4020012	WJ4003078	WJ57977					0.1	0.0	0.0		
LN4024007	WJ4011807	WJ4012040					2.8	0.0	0.0		
LN4024456	WJ57981	WJ4011950					0.1	0.0	0.0		
LN4023857	WJ4002950	WJ4011828					-3.9				

Junction Table

Existing Condition					
Label	Demand (L/s)	Elevation (m)	Hydraulic Grade (m)	Pressure (kPa)	Remark
WJ4002902	0.0	187.6	225.8	374	
WJ4002916	0.0	187.5	225.8	375	
WJ4002950	0.0	186.3	225.8	366	
WJ4002994	0.0	185.9	225.7	360	
WJ4003031	0.0	187.0	225.6	377	
WJ4003035 (F3)	0.0	186.2	225.5	385	
WJ4003075	0.0	184.2	225.8	407	
WJ4003078	0.0	183.9	225.8	410	
WJ4011807	0.0	182.9	225.8	420	
WJ4011821	0.0	186.3	225.7	386	
WJ4011828	0.0	188.0	225.8	370	
WJ4011903	0.0	180.4	225.8	445	
WJ4011927	0.0	181.2	225.9	437	
WJ4011950	0.0	181.4	225.8	435	
WJ4011960	0.0	181.0	225.9	439	
WJ4011984	0.0	181.1	225.8	437	
WJ4012037	0.0	187.7	225.8	373	
WJ4012040	0.0	185.6	225.7	393	
WJ4019973	0.0	182.4	225.8	425	
WJ4023049	0.0	181.2	225.9	437	
WJ57977	0.0	181.7	225.8	432	
WJ57981	0.0	181.7	225.8	432	
WJ57982	0.0	181.7	225.8	432	
WJ61853	7.5	185.9	225.2	385	
J-73	0.0	186.0	225.9	390	
J-74 (pro)	(N/A)	190.4	(N/A)	(N/A)	Subject Site
J-75 (pro)	(N/A)	190.2	(N/A)	(N/A)	Subject Site
J-76 (pro ext N Dev)	(N/A)	189.3	(N/A)	(N/A)	North Adjacent Dev.
J-91 (F3)	0.0	189.5	225.8	355	
J-78 (pro Hyd)	(N/A)	190.4	(N/A)	(N/A)	
J-79 (pro)	(N/A)	189.9	(N/A)	(N/A)	
J-80 (pro)	(N/A)	190.0	(N/A)	(N/A)	
J-81 (BLD C)	(N/A)	189.9	(N/A)	(N/A)	Subject Site
J-82 (BLD B)	(N/A)	189.9	(N/A)	(N/A)	Subject Site
J-83 (pro)	(N/A)	190.1	(N/A)	(N/A)	Subject Site
J-84 (BLD A)	(N/A)	190.1	(N/A)	(N/A)	Subject Site
J-86 (F1)	0.0	188.0	225.9	371	
J-87 (R1)	0.0	186.7	225.9	383	
J-89 (R3)	0.0	189.5	225.8	355	
J-90 (R2)	0.0	189.3	225.7	356	

Label	Status (Initial)	Hydraulic Grade (Discharge) (m)	Flow (Total) (L/s)	Pump Head (m)	Remark
PMP-4	On	226.0	265.7	46.0	Dummy Pump

Proposed Condition					
Label	Demand (L/s)	Elevation (m)	Hydraulic Grade (m)	Pressure (kPa)	Remark
WJ4002902	0.0	187.6	225.3	369	
WJ4002916	0.0	187.5	225.3	370	
WJ4002950	0.0	188.3	225.3	362	
WJ4002994	0.0	185.9	225.2	385	
WJ4003031	0.0	187.0	225.1	373	
WJ4003035 (F3)	0.0	186.2	225.1	380	
WJ4003075	0.0	184.2	225.3	403	
WJ4003078	0.0	183.9	225.4	406	
WJ4011807	0.0	182.9	225.3	416	
WJ4011821	0.0	186.3	225.3	382	
WJ4011828	0.0	188.0	225.3	365	
WJ4011903	0.0	180.4	225.4	441	
WJ4011927	0.0	181.2	225.4	433	
WJ4011950	0.0	181.4	225.4	431	
WJ4011960	0.0	181.0	225.4	435	
WJ4011984	0.0	181.1	225.4	433	
WJ4012037	0.0	187.7	225.3	368	
WJ4012040	0.0	185.6	225.3	388	
WJ4019973	0.0	182.4	225.4	421	
WJ4023049	0.0	181.2	225.4	433	
WJ57977	0.0	181.7	225.4	428	
WJ57981	0.0	181.7	225.4	428	
WJ57982	0.0	181.7	225.4	428	
WJ61853	7.5	185.9	224.8	381	
J-73	0.0	186.0	225.3	385	
J-74 (pro)	0.0	190.4	225.3	342	Subject Site
J-75 (pro)	0.0	190.2	225.3	344	Subject Site
J-76 (pro ext N Dev)	10.4	189.3	225.3	353	North Adjacent Dev.
J-91 (F3)	0.0	189.5	225.3	351	
J-78 (pro Hyd)	0.0	190.4	225.3	342	
J-79 (pro)	0.0	189.9	225.3	347	
J-80 (pro)	0.0	190.0	225.3	346	
J-81 (BLD C)	0.7	189.9	225.3	347	Subject Site
J-82 (BLD B)	3.7	189.9	225.3	347	Subject Site
J-83 (pro)	0.0	190.1	225.3	344	Subject Site
J-84 (BLD A)	3.9	190.1	225.3	344	Subject Site
J-86 (F1)	0.0	188.0	225.4	366	
J-87 (R1)	0.0	186.7	225.4	378	
J-89 (R3)	0.0	189.5	225.3	350	
J-90 (R2)	0.0	189.3	225.2	352	

Label	Status (Initial)	Hydraulic Grade (Discharge) (m)	Flow (Total) (L/s)	Pump Head (m)	Remark
PMP-4	On	225.6	284.4	45.6	Dummy Pump

HGL and Pressure Comparison under Pre and Post Development					
Label	Demand (L/s)	Elevation (m)	Hydraulic Grade (m)	Pressure (kPa)	Remark
WJ4002902	0.0		-0.5	-5.0	
WJ4002916	0.0		-0.5	-5.0	
WJ4002950	0.0		-0.5	-4.0	
WJ4002994	0.0		-0.5	-5.0	
WJ4003031	0.0		-0.4	-4.0	
WJ4003035 (F3)	0.0		-0.5	-5.0	
WJ4003075	0.0		-0.4	-4.0	
WJ4003078	0.0		-0.4	-4.0	
WJ4011807	0.0		-0.4	-4.0	
WJ4011821	0.0		-0.4	-4.0	
WJ4011828	0.0		-0.4	-5.0	
WJ4011903	0.0		-0.4	-4.0	
WJ4011927	0.0		-0.4	-4.0	
WJ4011950	0.0		-0.4	-4.0	
WJ4011960	0.0		-0.4	-4.0	
WJ4011984	0.0		-0.4	-4.0	
WJ4012037	0.0		-0.4	-5.0	
WJ4012040	0.0		-0.5	-5.0	
WJ4019973	0.0		-0.4	-4.0	
WJ4023049	0.0		-0.4	-4.0	
WJ57977	0.0		-0.4	-4.0	
WJ57981	0.0		-0.4	-4.0	
WJ57982	0.0		-0.4	-4.0	
WJ61853	0.0		-0.5	-4.0	
J-73	0.0		-0.5	-5.0	
J-74 (pro)	#VALUE!	#VALUE!	#VALUE!	#VALUE!	Subject Site
J-75 (pro)	#VALUE!	#VALUE!	#VALUE!	#VALUE!	Subject Site
J-76 (pro ext N Dev)	#VALUE!	#VALUE!	#VALUE!	#VALUE!	North Adjacent Dev.
J-91 (F3)	0.0		-0.5	-4.0	
J-78 (pro Hyd)	#VALUE!	#VALUE!	#VALUE!	#VALUE!	
J-79 (pro)	#VALUE!	#VALUE!	#VALUE!	#VALUE!	
J-80 (pro)	#VALUE!	#VALUE!	#VALUE!	#VALUE!	
J-81 (BLD C)	#VALUE!	#VALUE!	#VALUE!	#VALUE!	Subject Site
J-82 (BLD B)	#VALUE!	#VALUE!	#VALUE!	#VALUE!	Subject Site
J-83 (pro)	#VALUE!	#VALUE!	#VALUE!	#VALUE!	Subject Site
J-84 (BLD A)	#VALUE!	#VALUE!	#VALUE!	#VALUE!	Subject Site
J-86 (F1)	0.0		-0.5	-5.0	
J-87 (R1)	0.0		-0.5	-5.0	
J-89 (R3)	0.0		-0.5	-5.0	
J-90 (R2)	0.0		-0.5	-4.0	

*Note: ** denotes the reduction in hydraulic grade / pressure under proposed condition.

Existing Condition											
Pipe ID	Start Node	Stop Node	Length (m)	Diameter (mm)	Hazen-Williams C	Flow (Absolute) (L/s)	Velocity (m/s)	Headloss (m)	Headloss (m/1000m)	Status (Initial)	Remark
LN4037673	WJ4011927	WJ4023049	4	300	120	1.8	0.0	0.0	0.00	Open	
LN4032118	WJ4003031	WJ4003035 (F3)	11	150	70	7.5	0.4	0.1	4.55	Open	
LN58027	WJ57977	WJ57982	14	150	70	1.8	0.1	0.0	0.71	Open	
LN4008088	WJ4012037	WJ4011828	15	300	120	11.3	0.2	0.0	0.00	Open	
LN58029	WJ57982	WJ57981	27	150	70	0.3	0.0	0.0	0.00	Open	
LN4023991	WJ4012040	WJ4011821	35	300	120	10.3	0.2	0.0	0.00	Open	
LN4037674	WJ4023049	WJ4011950	47	150	70	1.8	0.1	0.0	0.43	Open	
LN4024464	WJ4011960	WJ4011927	54	300	120	6.6	0.1	0.0	0.30	Open	
LN4020015	WJ4003075	WJ4003078	55	150	70	1.8	0.1	0.0	0.36	Open	
LN61742	WJ4003035 (F3)	WJ61853	62	150	70	7.5	0.4	0.3	4.84	Open	
LN4020179	WJ4003031	WJ4002994	62	150	70	4.5	0.3	0.1	1.94	Open	
LN4023868	WJ4011821	WJ4012037	87	300	120	9.1	0.1	0.0	0.11	Open	
LN4035118	WJ4011984	WJ4011973	105	150	70	0.6	0.0	0.0	0.00	Open	
LN4020017	WJ4002994	WJ4003075	105	150	70	2.9	0.2	0.1	0.86	Open	
LN4020012	WJ4003078	WJ57977	116	150	70	1.8	0.1	0.0	0.34	Open	
LN4024007	WJ4011807	WJ4012040	131	300	120	9.6	0.1	0.0	0.08	Open	
LN4024456	WJ57981	WJ4011950	125	150	70	0.3	0.0	0.0	0.00	Open	
LN4023857	WJ4002950	WJ4011828	132	300	120	10.3	0.2	0.0	0.08	Open	
LN4035119	WJ4019973	WJ4003075	153	150	70	1.1	0.1	0.0	0.13	Open	
LN4024469	WJ4011903	WJ4011960	154	300	120	4.9	0.1	0.0	0.00	Open	
LN4036072	WJ4011960	WJ4011984	183	150	70	1.7	0.1	0.1	0.33	Open	
LN4036406	WJ4011950	WJ4011973	183	150	70	1.7	0.1	0.1	0.27	Open	
LN4020039	WJ4002950	WJ4002994	278	150	70	1.7	0.1	0.1	0.29	Open	
LN4036073	WJ4011821	WJ4011984	310	150	70	1.2	0.1	0.1	0.16	Open	
LN4036407	WJ4011973	WJ4011828	325	150	70	1.0	0.1	0.0	0.12	Open	
LN4024333	WJ4011903	WJ4011807	455	300	120	14.0	0.2	0.1	0.20	Open	
LN4030819	WJ4002902	J-73	240	300	120	7.8	0.1	0.0	0.08	Open	
P-67 (pre-ext)	J-73	J-76 (pro. ext N Dev)	80	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-68 (pre-ext)	J-76 (pro. ext N Dev)	J-74 (pro)	68	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	North Adjacent Dev.
P-69 (Pre-ext)	J-75 (pro)	J-76 (pro. ext N Dev)	116	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
LN4020060	WJ4002916	J-91 (F3)	58	300	120	14.9	0.2	0.0	0.17	Open	
LN4020061	J-91 (F3)	WJ4002902	208	300	120	14.9	0.2	0.1	0.24	Open	
P-71 (pro)	J-78 (pro Hyd)	J-74 (pro)	62	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-84 (pro)	J-91 (F3)	J-79 (pro)	77	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-83 (pro)	J-80 (pro)	J-80 (pro)	24	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-73 (pro)	J-80 (pro)	J-75 (pro)	63	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-74 (pro)	J-79 (pro)	J-81 (BLD C)	22	150	100	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	Subject site
P-75 (pro)	J-79 (pro)	J-82 (BLD B)	17	150	100	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-80 (pro)	J-80 (pro)	J-83 (pro)	34	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-81 (pro)	J-83 (pro)	J-76 (pro Hyd)	67	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-76 (pro)	J-83 (pro)	J-84 (BLD A)	14	150	100	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
LN4030822	J-73	J-87 (R1)	39	300	120	7.8	0.1	0.0	0.00	Open	
LN4030821	J-87 (R1)	J-86 (F1)	77	300	120	7.8	0.1	0.0	0.13	Open	
LN4020054	WJ4002950	J-89 (R3)	28	300	120	12.0	0.2	0.0	0.00	Open	
LN4020055	J-89 (R3)	WJ4002916	65	300	120	12.0	0.2	0.0	0.15	Open	
LN4020195	WJ4003031	J-90 (R2)	151	150	70	3.0	0.2	0.1	0.86	Open	
LN4020194	J-90 (R2)	WJ4002916	97	150	70	3.0	0.2	0.1	0.82	Open	

Proposed Condition											
Pipe ID	Start Node	Stop Node	Length (m)	Diameter (mm)	Hazen-Williams C	Flow (Absolute) (L/s)	Velocity (m/s)	Headloss (m)	Headloss (m/1000m)	Status (Initial)	Remark
LN4037673	WJ4011927	WJ4023049	4	300	120	2.0	0.0	0.0	0.00	Open	
LN4032118	WJ4003031	WJ4003035 (F3)	11	150	70	7.5	0.4	0.1	4.55	Open	
LN58027	WJ57977	WJ57982	14	150	70	2.0	0.1	0.0	0.71	Open	
LN4008088	WJ4012037	WJ4011828	15	300	120	7.0	0.1	0.0	0.00	Open	
LN58029	WJ57982	WJ57981	27	150	70	0.3	0.0	0.0	0.00	Open	
LN4023991	WJ4012040	WJ4011821	35	300	120	6.3	0.1	0.0	0.00	Open	
LN4037674	WJ4023049	WJ4011950	47	150	70	2.0	0.1	0.0	0.43	Open	
LN4024464	WJ4011960	WJ4011927	54	300	120	6.6	0.1	0.0	0.30	Open	
LN4020015	WJ4003075	WJ4003078	55	150	70	2.0	0.1	0.0	0.36	Open	
LN61742	WJ4003035 (F3)	WJ61853	62	150	70	7.5	0.4	0.3	4.84	Open	
LN4020179	WJ4003031	WJ4002994	62	150	70	4.6	0.3	0.1	1.94	Open	
LN4023868	WJ4011821	WJ4012037	87	300	120	5.0	0.1	0.0	0.00	Open	
LN4035118	WJ4011984	WJ4011973	105	150	70	0.6	0.0	0.0	0.00	Open	
LN4020017	WJ4002994	WJ4003075	105	150	70	3.1	0.2	0.1	0.95	Open	
LN4020012	WJ4003078	WJ57977	116	150	70	2.0	0.1	0.0	0.43	Open	
LN4024007	WJ4011807	WJ4012040	131	300	120	12.8	0.2	0.0	0.15	Open	
LN4024456	WJ57981	WJ4011950	125	150	70	0.3	0.0	0.0	0.00	Open	
LN4023857	WJ4002950	WJ4011828	132	300	120	5.8	0.1	0.0	0.08	Open	
LN4035119	WJ4019973	WJ4003075	153	150	70	1.1	0.1	0.0	0.13	Open	
LN4024469	WJ4011903	WJ4011960	154	300	120	4.7	0.1	0.0	0.00	Open	
LN4036072	WJ4011960	WJ4011984	183	150	70	1.9	0.1	0.1	0.38	Open	
LN4036406	WJ4011950	WJ4011973	183	150	70	1.7	0.1	0.1	0.33	Open	
LN4020039	WJ4002950	WJ4002994	278	150	70	1.6	0.1	0.1	0.25	Open	
LN4036073	WJ4011821	WJ4011984	310	150	70	1.3	0.1	0.1	0.19	Open	
LN4036407	WJ4011973	WJ4011828	325	150	70	1.2	0.1	0.1	0.15	Open	
LN4024333	WJ4011903	WJ4011807	455	300	120	15.0	0.2	0.1	0.24	Open	
LN4030819	WJ4002902	J-73	240	300	120	2.8	0.0	0.0	0.00	Open	
P-67 (pre-ext)	J-73	J-76 (pro. ext N Dev)	80	300	120	17.4	0.3	0.0	0.25	Open	
P-68 (pre-ext)	J-76 (pro. ext N Dev)	J-74 (pro)	68	300	120	3.4	0.1	0.0	0.00	Open	North Adjacent Dev.
P-69 (Pre-ext)	J-75 (pro)	J-76 (pro. ext N Dev)	116	300	120	3.0	0.1	0.0	0.00	Open	
LN4020060	WJ4002916	J-91 (F3)	58	300	120	10.3	0.2	0.0	0.17	Open	
LN4020061	J-91 (F3)	WJ4002902	208	300	120	11.6	0.2	0.0	0.14	Open	
P-71 (pro)	J-78 (pro Hyd)	J-74 (pro)	62	300	120	3.4	0.1	0.0	0.00	Open	
P-84 (pro)	J-91 (F3)	J-79 (pro)	77	300	120	1.3	0.0	0.0	0.00	Open	
P-83 (pro)	J-80 (pro)	J-80 (pro)	24	300	120	3.1	0.0	0.0	0.00	Open	
P-73 (pro)	J-80 (pro)	J-75 (pro)	63	300	120	3.6	0.1	0.0	0.00	Open	
P-74 (pro)	J-79 (pro)	J-81 (BLD C)	22	150	100	0.7	0.0	0.0	0.00	Open	Subject site
P-75 (pro)	J-79 (pro)	J-82 (BLD B)	17	150	100	3.7	0.2	0.0	0.59	Open	
P-80 (pro)	J-80 (pro)	J-83 (pro)	34	300	120	0.5	0.0	0.0	0.00	Open	
P-81 (pro)	J-83 (pro)	J-76 (pro Hyd)	67	300	120	3.4	0.1	0.1	0.24	Open	
P-76 (pro)	J-83 (pro)	J-84 (BLD A)	14	150	100	3.9	0.2	0.0	0.71	Open	
LN4030822	J-73	J-87 (R1)	39	300	120	14.6	0.2	0.0	0.26	Open	
LN4030821	J-87 (R1)	J-86 (F1)	77	300	120	14.6	0.2	0.0	0.26	Open	
LN4020054	WJ4002950	J-89 (R3)	28	300	120	7.4	0.1	0.0	0.00	Open	
LN4020055	J-89 (R3)	WJ4002916	65	300	120	7.4	0.1	0.0	0.00	Open	
LN4020195	WJ4003031	J-90 (R2)	151	150	70	2.9	0.2	0.1	0.79	Open	
LN4020194	J-90 (R2)	WJ4002916	97	150	70	2.9	0.2	0.1	0.82	Open	

Pipe Velocity and Head Loss Comparison under Pre and Post Development											
Pipe ID	Start Node	Stop Node	Length (m)	Diameter (mm)	Hazen-Williams C	Flow (Absolute) (L/s)	Velocity (m/s)	Headloss (m)	Headloss (m/1000m)	Status (Initial)	Remark
LN4037673	WJ4011927	WJ4023049				0.2	0.0	0.0			
LN4032118	WJ4003031	WJ4003035 (F3)				0.2	0.0	0.0			
LN58027	WJ57977	WJ57982				0.2	0.0	0.0			
LN4008088	WJ4012037	WJ4011828				-4.3	-0.1	0.0			
LN58029	WJ57982	WJ57981				0.0	0.0	0.0			
LN4023991	WJ4012040	WJ4011821				-4.1	-0.1	0.0			
LN4037674	WJ4023049	WJ4011950				0.2	0.0	0.0			
LN4024464	WJ4011960	WJ4011927				0.0	0.0	0.0			
LN4020015	WJ4003075	WJ4003078				0.2	0.0	0.0			
LN61742	WJ4003035 (F3)	WJ61853				0.0	0.0	0.0			
LN4020179	WJ4003031	WJ4002994				0.1	0.0	0.0			
LN4023868	WJ4011821	WJ4012037				-4.1	-0.1	0.0			
LN4035118	WJ4011984	WJ4011973				0.1	0.0	0.0			
LN4020017	WJ4002994	WJ4003075				0.2	0.0	0.0			
LN4024007	WJ4011807	WJ4012040				0.2	0.0	0.0			
LN4024456	WJ57981										

Existing Condition

Label	Demand (L/s)	Elevation (m)	Hydraulic Grade (m)	Pressure (kPa)	Remark
WJ4002902	0.0	187.6	224.8	361	
WJ4002916	0.0	187.5	223.8	356	
WJ4002950	0.0	188.3	224.1	350	
WJ4002994	0.0	185.9	224.1	374	
WJ4003031	0.0	187.0	223.9	361	
WJ4003035 (F3)	0.0	186.2	223.8	368	
WJ4003075	0.0	184.2	224.6	396	
WJ4003078	0.0	183.9	224.7	400	
WJ4011807	0.0	182.9	224.9	412	
WJ4011821	0.0	186.3	224.7	376	
WJ4011828	0.0	188.0	224.4	357	
WJ4011903	0.0	180.4	225.1	438	
WJ4011927	0.0	181.2	225.1	430	
WJ4011950	0.0	181.4	225.0	427	
WJ4011960	0.0	181.0	225.1	432	
WJ4011984	0.0	181.1	224.8	427	
WJ4012037	0.0	187.7	224.5	380	
WJ4012040	0.0	185.6	224.7	383	
WJ4019973	0.0	182.4	224.8	415	
WJ4023049	0.0	181.2	225.1	430	
WJ57977	0.0	181.7	225.0	423	
WJ57981	0.0	181.7	225.0	424	
WJ57982	0.0	181.7	225.0	424	
WJ61853	5.2	185.9	223.7	370	
J-73	0.0	186.0	224.7	379	
J-74 (pro)	(N/A)	190.4	(N/A)	(N/A)	Subject Site
J-75 (pro)	(N/A)	190.2	(N/A)	(N/A)	Subject Site
J-76 (pro ext N E)	(N/A)	189.3	(N/A)	(N/A)	North Adjacent Dev.
J-91 (F3)	133.0	189.5	223.7	334	
J-78 (pro Hyd)	(N/A)	190.4	(N/A)	(N/A)	
J-79 (pro)	(N/A)	189.9	(N/A)	(N/A)	
J-80 (pro)	(N/A)	190.0	(N/A)	(N/A)	
J-81 (BLD C)	(N/A)	189.9	(N/A)	(N/A)	Subject Site
J-82 (BLD B)	(N/A)	189.9	(N/A)	(N/A)	Subject Site
J-83 (pro)	(N/A)	190.1	(N/A)	(N/A)	Subject Site
J-84 (BLD A)	(N/A)	190.1	(N/A)	(N/A)	Subject Site
J-86 (F1)	0.0	188.0	224.8	360	
J-87 (R1)	0.0	186.7	224.7	372	
J-89 (R3)	0.0	189.5	224.0	338	
J-90 (R2)	0.0	189.3	223.8	338	

Label	Status (Initial)	Hydraulic Grade (Discharge) (m)	Flow (Total) (L/s)	Pump Head (m)	Remark
PMP-4	On	225.3	294.4	45.3	Dummy Pump

Proposed Condition

Label	Demand (L/s)	Elevation (m)	Hydraulic Grade (m)	Pressure (kPa)	Remark
WJ4002902	0.0	187.6	223.9	355	
WJ4002916	0.0	187.5	223.7	354	
WJ4002950	0.0	188.3	223.9	348	
WJ4002994	0.0	185.9	223.9	373	
WJ4003031	0.0	187.0	223.7	359	
WJ4003035 (F3)	0.0	186.2	223.7	367	
WJ4003075	0.0	184.2	224.6	393	
WJ4003078	0.0	183.9	224.4	397	
WJ4011807	0.0	182.9	224.6	408	
WJ4011821	0.0	186.3	224.4	373	
WJ4011828	0.0	188.0	224.2	354	
WJ4011903	0.0	180.4	224.8	434	
WJ4011927	0.0	181.2	224.8	427	
WJ4011950	0.0	181.4	224.7	424	
WJ4011960	0.0	181.0	224.8	428	
WJ4011984	0.0	181.1	224.5	425	
WJ4012037	0.0	187.7	224.2	358	
WJ4012040	0.0	185.6	224.4	380	
WJ4019973	0.0	182.4	224.5	412	
WJ4023049	0.0	181.2	224.8	426	
WJ57977	0.0	181.7	224.6	420	
WJ57981	0.0	181.7	224.7	420	
WJ57982	0.0	181.7	224.7	420	
WJ61853	5.2	185.9	223.5	369	
J-73	0.0	186.0	223.9	371	
J-74 (pro)	0.0	190.4	223.7	326	Subject Site
J-75 (pro)	0.0	190.2	223.7	328	Subject Site
J-76 (pro ext N E)	5.6	189.3	223.8	337	North Adjacent Dev.
J-91 (F3)	133.0	189.5	223.6	333	
J-78 (pro Hyd)	0.0	190.4	223.7	326	
J-79 (pro)	0.0	189.9	223.6	330	
J-80 (pro)	0.0	190.0	223.7	329	
J-81 (BLD C)	4.5	189.9	223.6	330	Subject Site
J-82 (BLD B)	1.9	189.9	223.6	330	Subject Site
J-83 (pro)	0.0	190.1	223.7	328	Subject Site
J-84 (BLD A)	2.0	190.1	223.7	328	Subject Site
J-86 (F1)	0.0	188.0	224.1	353	
J-87 (R1)	0.0	186.7	224.0	365	
J-89 (R3)	0.0	189.5	223.8	336	
J-90 (R2)	0.0	189.3	223.7	337	

Label	Status (Initial)	Hydraulic Grade (Discharge) (m)	Flow (Total) (L/s)	Pump Head (m)	Remark
PMP-4	On	225.0	308.4	45.0	Dummy Pump

HGL and Pressure Comparison under Pre and Post Development

Label	Demand (L/s)	Elevation (m)	Difference*		Remark
			Hydraulic Grade (m)	Pressure (kPa)	
WJ4002902	0.0		-0.6	-6.0	
WJ4002916	0.0		-0.1	-2.0	
WJ4002950	0.0		-0.2	-2.0	
WJ4002994	0.0		-0.2	-1.0	
WJ4003031	0.0		-0.2	-2.0	
WJ4003035 (F3)	0.0		-0.2	-1.0	
WJ4003075	0.0		-0.3	-3.0	
WJ4003078	0.0		-0.3	-3.0	
WJ4011807	0.0		-0.3	-4.0	
WJ4011821	0.0		-0.3	-3.0	
WJ4011828	0.0		-0.2	-3.0	
WJ4011903	0.0		-0.3	-4.0	
WJ4011927	0.0		-0.3	-3.0	
WJ4011950	0.0		-0.3	-3.0	
WJ4011960	0.0		-0.3	-4.0	
WJ4011984	0.0		-0.3	-2.0	
WJ4012037	0.0		-0.2	-2.0	
WJ4012040	0.0		-0.3	-3.0	
WJ4019973	0.0		-0.3	-3.0	
WJ4023049	0.0		-0.3	-4.0	
WJ57977	0.0		-0.3	-3.0	
WJ57981	0.0		-0.3	-4.0	
WJ57982	0.0		-0.3	-4.0	
WJ61853	0.0		-0.2	-1.0	
J-73	0.0		-0.8	-9.0	
J-74 (pro)	#VALUE!		#VALUE!	#VALUE!	Subject Site
J-75 (pro)	#VALUE!		#VALUE!	#VALUE!	Subject Site
J-76 (pro ext N E)	#VALUE!		#VALUE!	#VALUE!	North Adjacent Dev.
J-91 (F3)	0.0		-0.1	-1.0	
J-78 (pro Hyd)	#VALUE!		#VALUE!	#VALUE!	
J-79 (pro)	#VALUE!		#VALUE!	#VALUE!	
J-80 (pro)	#VALUE!		#VALUE!	#VALUE!	
J-81 (BLD C)	#VALUE!		#VALUE!	#VALUE!	Subject Site
J-82 (BLD B)	#VALUE!		#VALUE!	#VALUE!	Subject Site
J-83 (pro)	#VALUE!		#VALUE!	#VALUE!	Subject Site
J-84 (BLD A)	#VALUE!		#VALUE!	#VALUE!	Subject Site
J-86 (F1)	0.0		-0.7	-7.0	
J-87 (R1)	0.0		-0.8	-7.0	
J-89 (R3)	0.0		-0.2	-2.0	
J-90 (R2)	0.0		-0.1	-1.0	

*Note: "-" denotes the reduction in hydraulic grade / pressure under proposed condition.

Existing Condition											
Pipe ID	Start Node	Stop Node	Length (m)	Diameter (mm)	Hazen-Williams C	Flow (Absolute) (L/s)	Velocity (m/s)	Headloss (m)	Headloss (m/1000m)	Status (Initial)	Remark
LN4037673	WJ4011927	WJ4023049	4	300	120	5.1	0.1	0.0	0.00	Open	
LN403218	WJ400331	WJ4003035 (F3)	11	150	70	5.2	0.3	0.0	2.73	Open	
LN58027	WJ57977	WJ57982	5	150	70	4.5	0.2	0.0	2.18	Open	
LN4008088	WJ4012037	WJ4011828	15	300	120	54.8	0.8	0.0	2.67	Open	
LN58029	WJ57982	WJ57981	27	150	70	1.3	0.1	0.0	0.37	Open	
LN4023991	WJ4012040	WJ4011821	35	300	120	49.1	0.7	0.1	2.00	Open	
LN4037674	WJ4023049	WJ4011950	47	150	70	5.1	0.3	0.1	2.34	Open	
LN4024464	WJ4011960	WJ4011927	54	300	120	8.0	0.1	0.0	0.00	Open	
LN4020015	WJ4003075	WJ4003078	55	150	70	4.5	0.3	0.1	2.00	Open	
LN61742	WJ4003035 (F3)	WJ61853	62	150	70	5.2	0.3	0.2	2.42	Open	
LN4020179	WJ4003031	WJ4002994	62	150	70	6.5	0.4	0.2	3.87	Open	
LN4023868	WJ4011821	WJ4012037	87	300	120	51.2	0.7	0.2	0.16	Open	
LN4035118	WJ4011984	WJ4011973	105	150	70	2.2	0.1	0.1	0.48	Open	
LN4020017	WJ4002994	WJ4003075	105	150	70	7.5	0.4	0.5	4.86	Open	
LN4020012	WJ4003078	WJ57977	116	150	70	4.5	0.3	0.2	1.90	Open	
LN4024007	WJ4011807	WJ4012040	131	300	120	40.0	0.6	0.2	1.37	Open	
LN4024456	WJ57981	WJ4011950	125	150	70	1.3	0.1	0.0	0.36	Open	
LN4023857	WJ4002950	WJ4011828	132	300	120	57.9	0.8	0.4	2.73	Open	
LN4035119	WJ4011973	WJ4003075	153	150	70	2.9	0.2	0.1	0.85	Open	
LN4024469	WJ4011903	WJ4011960	154	300	120	3.7	0.1	0.0	0.00	Open	
LN4036072	WJ4011960	WJ4011984	183	150	70	4.3	0.2	0.3	1.89	Open	
LN4036406	WJ4011950	WJ4011973	183	150	70	3.8	0.2	0.3	1.42	Open	
LN4020039	WJ4002950	WJ4002994	278	150	70	0.9	0.1	0.0	0.11	Open	
LN4036073	WJ4011821	WJ4011984	310	150	70	2.1	0.1	0.1	0.45	Open	
LN4036407	WJ4011973	WJ4011828	325	150	70	3.1	0.2	0.3	0.95	Open	
LN4024333	WJ4011903	WJ4011807	455	300	120	21.8	0.3	0.2	0.44	Open	
LN4030819	WJ4002902	J-73	240	300	120	30.4	0.4	0.2	0.83	Open	
P-67 (pro-ex)	J-73	76 (pro ext N Dev)	80	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-68 (pro-ex)	J-76 (pro ext N Dev)	J-74 (pro)	68	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	North Adjacent Dev.
P-69 (Pro-ex)	J-75 (pro)	76 (pro ext N Dev)	116	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
LN4020060	WJ4002916	J-91 (F3)	58	300	120	60	1.0	0.1	2.93	Open	
LN4020061	J-91 (F3)	WJ4002902	208	300	120	72.9	1.0	0.9	4.33	Open	
P-71 (pro)	J-78 (pro Hyd)	J-74 (pro)	62	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-84 (pro)	J-91 (F3)	J-79 (pro)	77	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-83 (pro)	J-79 (pro)	J-80 (pro)	24	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-73 (pro)	J-80 (pro)	J-75 (pro)	63	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-74 (pro)	J-79 (pro)	J-81 (BLD C)	22	150	100	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	Subject site
P-75 (pro)	J-79 (pro)	J-82 (BLD B)	17	150	100	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-80 (pro)	J-80 (pro)	J-83 (pro)	34	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-81 (pro)	J-83 (pro)	J-78 (pro Hyd)	67	300	120	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
P-76 (pro)	J-83 (pro)	J-84 (BLD A)	14	150	100	#VALUE!	(N/A)	(N/A)	#VALUE!	Closed	
LN4030822	J-73	J-87 (R1)	39	300	120	30.4	0.4	0.0	0.77	Open	
LN4030821	J-87 (R1)	J-86 (F1)	77	300	120	30.4	0.4	0.1	0.78	Open	
LN4020054	WJ4002950	J-89 (R3)	28	300	120	58.8	0.8	0.1	2.86	Open	
LN4020055	J-89 (R3)	WJ4002916	65	300	120	58.8	0.8	0.2	2.76	Open	
LN4020195	WJ4003031	J-90 (R2)	151	150	70	1.3	0.1	0.0	0.20	Open	
LN4020194	J-90 (R2)	WJ4002916	97	150	70	1.3	0.1	0.0	0.21	Open	

Proposed Condition											
Pipe ID	Start Node	Stop Node	Length (m)	Diameter (mm)	Hazen-Williams C	Flow (Absolute) (L/s)	Velocity (m/s)	Headloss (m)	Headloss (m/1000m)	Status (Initial)	Remark
LN4037673	WJ4011927	WJ4023049	4	300	120	4.7	0.1	0.0	0.00	Open	
LN403218	WJ400331	WJ4003035 (F3)	11	150	70	5.2	0.3	0.0	2.73	Open	
LN58027	WJ57977	WJ57982	5	150	70	4.2	0.2	0.0	1.43	Open	
LN4008088	WJ4012037	WJ4011828	15	300	120	49.4	0.7	0.0	2.00	Open	
LN58029	WJ57982	WJ57981	27	150	70	1.2	0.1	0.0	0.00	Open	
LN4023991	WJ4012040	WJ4011821	35	300	120	44.2	0.6	0.1	1.71	Open	
LN4037674	WJ4023049	WJ4011950	47	150	70	4.7	0.3	0.1	2.13	Open	
LN4024464	WJ4011960	WJ4011927	54	300	120	6.7	0.1	0.0	0.00	Open	
LN4020015	WJ4003075	WJ4003078	55	150	70	4.2	0.2	0.1	1.64	Open	
LN61742	WJ4003035 (F3)	WJ61853	62	150	70	5.2	0.3	0.2	2.42	Open	
LN4020179	WJ4003031	WJ4002994	62	150	70	6.1	0.4	0.2	3.39	Open	
LN4023868	WJ4011821	WJ4012037	87	300	120	48.2	0.7	0.2	0.16	Open	
LN4035118	WJ4011984	WJ4011973	105	150	70	2.0	0.1	0.0	0.38	Open	
LN4020017	WJ4002994	WJ4003075	105	150	70	6.8	0.4	0.4	4.10	Open	
LN4020012	WJ4003078	WJ57977	116	150	70	4.2	0.2	0.2	1.64	Open	
LN4024007	WJ4011807	WJ4012040	131	300	120	37.1	0.5	0.2	1.22	Open	
LN4024456	WJ57981	WJ4011950	125	150	70	1.2	0.1	0.0	0.33	Open	
LN4023857	WJ4002950	WJ4011828	132	300	120	52.3	0.7	0.3	2.27	Open	
LN4035119	WJ4011973	WJ4003075	153	150	70	2.7	0.2	0.1	0.72	Open	
LN4024469	WJ4011903	WJ4011960	154	300	120	2.8	0.0	0.0	0.00	Open	
LN4036072	WJ4011960	WJ4011984	183	150	70	3.9	0.2	0.3	1.48	Open	
LN4036406	WJ4011950	WJ4011973	183	150	70	3.5	0.2	0.2	1.20	Open	
LN4020039	WJ4002950	WJ4002994	278	150	70	0.7	0.0	0.0	0.07	Open	
LN4036073	WJ4011821	WJ4011984	310	150	70	1.9	0.1	0.1	0.39	Open	
LN4036407	WJ4011973	WJ4011828	325	150	70	2.8	0.2	0.3	0.80	Open	
LN4024333	WJ4011903	WJ4011807	455	300	120	20.4	0.3	0.2	0.40	Open	
LN4030819	WJ4002902	J-73	240	300	120	5.1	0.1	0.0	0.04	Open	
P-67 (pro-ex)	J-73	76 (pro ext N Dev)	80	300	120	48.0	0.7	0.2	1.88	Open	
P-68 (pro-ex)	J-76 (pro ext N Dev)	J-74 (pro)	68	300	120	19.9	0.3	0.0	0.44	Open	North Adjacent Dev.
P-69 (Pro-ex)	J-75 (pro)	76 (pro ext N Dev)	116	300	120	22.5	0.4	0.1	0.43	Open	
LN4020060	WJ4002916	J-91 (F3)	58	300	120	53.9	0.8	0.1	2.41	Open	
LN4020061	J-91 (F3)	WJ4002902	208	300	120	45.1	0.6	0.4	1.73	Open	
P-71 (pro)	J-78 (pro Hyd)	J-74 (pro)	62	300	120	19.9	0.3	0.0	0.32	Open	
P-84 (pro)	J-91 (F3)	J-79 (pro)	77	300	120	34.0	0.5	0.1	1.04	Open	
P-83 (pro)	J-79 (pro)	J-80 (pro)	24	300	120	40.4	0.6	0.0	0.12	Open	
P-73 (pro)	J-80 (pro)	J-75 (pro)	63	300	120	22.5	0.3	0.0	0.48	Open	
P-74 (pro)	J-79 (pro)	J-81 (BLD C)	22	150	100	4.5	0.3	0.0	0.91	Open	Subject site
P-75 (pro)	J-79 (pro)	J-82 (BLD B)	17	150	100	1.9	0.1	0.0	0.00	Open	
P-80 (pro)	J-80 (pro)	J-83 (pro)	34	300	120	17.9	0.3	0.0	0.29	Open	
P-81 (pro)	J-83 (pro)	J-78 (pro Hyd)	67	300	120	19.9	0.3	0.0	0.30	Open	
P-76 (pro)	J-83 (pro)	J-84 (BLD A)	14	150	100	2.0	0.1	0.0	0.00	Open	
LN4030822	J-73	J-87 (R1)	39	300	120	42.9	0.6	0.1	1.54	Open	
LN4030821	J-87 (R1)	J-86 (F1)	77	300	120	42.9	0.6	0.1	1.56	Open	
LN4020054	WJ4002950	J-89 (R3)	28	300	120	53.0	0.8	0.1	2.14	Open	
LN4020055	J-89 (R3)	WJ4002916	65	300	120	53.0	0.8	0.2	2.31	Open	
LN4020195	WJ4003031	J-90 (R2)	151	150	70	0.9	0.1	0.0	0.07	Open	
LN4020194	J-90 (R2)	WJ4002916	97	150	70	0.9	0.1	0.0	0.10	Open	

Pipe Velocity and Head Loss Comparison under Pre and Post Development											
Pipe ID	Start Node	Stop Node	Length (m)	Diameter (mm)	Hazen-Williams C	Flow (Absolute) (L/s)	Velocity (m/s)	Headloss (m)	Headloss (m/1000m)	Status (Initial)	Remark
LN4037673	WJ4011927	WJ4023049					-0.4	0.0	0.0		
LN403218	WJ400331	WJ4003035 (F3)				0.0	0.0	0.0	0.0		
LN58027	WJ57977	WJ57982				-0.3	0.0	0.0			
LN4008088	WJ4012037	WJ4011828				-5.4	-0.1	0.0			
LN58029	WJ57982	WJ57981				-0.1	0.0	0.0			
LN4023991	WJ4012040	WJ4011821				-4.9	-0.1	0.0			
LN4037674	WJ4023049	WJ4011950				-0.4	0.0	0.0			
LN4020015	WJ4003075	WJ4003078				-0.3	0.0	0.0			
LN61742	WJ4003035 (F3)	WJ61853				0.0	0.0	0.0			
LN4020179	WJ4003031	WJ4002994				-0.4	0.0	0.0			
LN4023868	WJ4011821	WJ4012037				-5.0	-0.1	0.0			
LN4035118	WJ4011984	WJ4011973				-0.2	0.0	0.0			
LN4020017	WJ4002994	WJ4003075				-0.7	0.0	-0.1			
LN4020012	WJ4003078	WJ57977				-0.3	0.0	0.0			
LN4024007	WJ4011807	WJ4012040				-2.9	0.0	0.0			
LN4											

Junction Table

Proposed Condition					
Label	Demand (L/s)	Elevation (m)	Hydraulic Grade (m)	Pressure (kPa)	Remark
WJ4002902	0.0	187.6	223.9	355	
WJ4002916	0.0	187.5	223.9	356	
WJ4002950	0.0	188.3	224.0	350	
WJ4002994	0.0	185.9	224.1	374	
WJ4003031	0.0	187.0	223.9	361	
WJ4003035 (F)	0.0	186.2	223.8	368	
WJ4003075	0.0	184.2	224.4	394	
WJ4003078	0.0	183.9	224.5	398	
WJ4011807	0.0	182.9	224.6	409	
WJ4011821	0.0	186.3	224.4	374	
WJ4011828	0.0	188.0	224.3	355	
WJ4011903	0.0	180.4	224.8	434	
WJ4011927	0.0	181.2	224.8	427	
WJ4011950	0.0	181.4	224.7	424	
WJ4011960	0.0	181.0	224.8	429	
WJ4011984	0.0	181.1	224.6	425	
WJ4012037	0.0	187.7	224.3	359	
WJ4012040	0.0	185.6	224.5	381	
WJ4019973	0.0	182.4	224.5	412	
WJ4023049	0.0	181.2	224.8	426	
WJ57977	0.0	181.7	224.7	420	
WJ57981	0.0	181.7	224.7	421	
WJ57982	0.0	181.7	224.7	421	
WJ61853	5.2	185.9	223.7	370	
J-73	0.0	186.0	223.7	369	
J-74 (pro)	0.0	190.4	223.2	320	Subject Site
J-75 (pro)	0.0	190.2	223.4	324	
J-76 (pro ext N)	5.6	189.3	223.4	333	North Adjacent Dev.
J-91 (F3)	0.0	189.5	223.8	335	
J-78 (pro Hyd)	133.0	190.4	223.0	319	
J-79 (pro)	0.0	189.9	223.4	328	Subject Site
J-80 (pro)	0.0	190.0	223.4	326	
J-81 (BLD C)	4.5	189.9	223.4	328	
J-82 (BLD B)	1.9	189.9	223.4	328	
J-83 (pro)	0.0	190.1	223.2	324	
J-84 (BLD A)	2.0	190.1	223.2	324	
J-86 (F1)	0.0	188.0	223.9	352	
J-87 (R1)	0.0	186.7	223.8	363	
J-89 (R3)	0.0	189.5	224.0	337	
J-90 (R2)	0.0	189.3	223.9	338	

Label	Status (Initial)	Hydraulic Grade (Discharge) (m)	Flow (Total) (L/s)	Pump Head (m)	Remark
PMP-4	On	225.0	308.4	45.0	Dummy Pump

Pipe Table

Proposed Condition

Pipe ID	Start Node	Stop Node	Length (m)	Diameter (mm)	Hazen-Williams C	Flow (Absolute) (L/s)	Velocity (m/s)	Headloss (m)	Headloss (m/1000m)	Status (Initial)	Remark
LN4037673	WJ4011927	WJ4023049	4	300	120	4.4	0.1	0.0	0.00	Open	
LN4003218	WJ4003031	WJ4003035 (F3)	11	150	70	5.2	0.3	0.0	2.73	Open	
LN58027	WJ57977	WJ57982	14	150	70	3.8	0.2	0.0	1.43	Open	
LN4008088	WJ4012037	WJ4011828	15	300	120	44.6	0.6	0.0	1.33	Open	
LN58029	WJ57982	WJ57981	27	150	70	1.2	0.1	0.0	0.00	Open	
LN4023991	WJ4012040	WJ4011821	35	300	120	39.9	0.6	0.1	1.43	Open	
LN4037674	WJ4023049	WJ4011950	47	150	70	4.4	0.3	0.1	1.70	Open	
LN4024464	WJ4011960	WJ4011927	54	300	120	6.1	0.1	0.0	0.00	Open	
LN4020015	WJ4003075	WJ4003078	55	150	70	3.8	0.2	0.1	1.45	Open	
LN61742	WJ4003035 (F3)	WJ61853	62	150	70	5.2	0.3	0.2	2.42	Open	
LN4020179	WJ4003031	WJ4002994	62	150	70	5.7	0.3	0.2	2.90	Open	
LN4023868	WJ4011821	WJ4012037	87	300	120	41.7	0.6	0.1	1.49	Open	
LN4035118	WJ4011984	WJ4019973	105	150	70	1.8	0.1	0.0	0.38	Open	
LN4020017	WJ4002994	WJ4003075	105	150	70	6.3	0.4	0.4	3.52	Open	
LN4020012	WJ4003078	WJ57977	116	150	70	3.8	0.2	0.2	1.38	Open	
LN4024007	WJ4011807	WJ4012040	131	300	120	34.7	0.5	0.1	1.07	Open	
LN4024456	WJ57981	WJ4011950	125	150	70	1.2	0.1	0.0	0.16	Open	
LN4023857	WJ4002950	WJ4011828	132	300	120	47.3	0.7	0.3	1.89	Open	
LN4035119	WJ4019973	WJ4003075	153	150	70	2.4	0.1	0.1	0.59	Open	
LN4024469	WJ4011903	WJ4011960	154	300	120	2.4	0.0	0.0	0.00	Open	
LN4036072	WJ4011960	WJ4011984	183	150	70	3.7	0.2	0.2	1.31	Open	
LN4036406	WJ4011950	WJ4019973	183	150	70	3.2	0.2	0.2	1.04	Open	
LN4020039	WJ4002950	WJ4002994	278	150	70	0.6	0.0	0.0	0.04	Open	
LN4036073	WJ4011821	WJ4011984	310	150	70	1.8	0.1	0.1	0.35	Open	
LN4036407	WJ4019973	WJ4011828	325	150	70	2.6	0.2	0.2	0.71	Open	
LN4024333	WJ4011903	WJ4011807	455	300	120	19.3	0.3	0.2	0.35	Open	
LN4030819	WJ4002902	J-73	240	300	120	27.1	0.4	0.2	0.67	Open	
P-67 (pro-ext)	J-73	J-76 (pro ext N Dev)	80	300	120	74.3	1.1	0.4	4.38	Open	North Adjacent Dev.
P-68 (pro-ext)	J-76 (pro_ext N Dev)	J-74 (pro)	68	300	120	62.5	0.9	0.2	3.09	Open	
P-69 (Pro-ext)	J-75 (pro)	J-76 (pro_ext N Dev)	116	300	120	6.2	0.1	0.0	0.09	Open	
LN4020060	WJ4002916	J-91 (F3)	58	300	120	48.3	0.7	0.1	1.90	Open	
LN4020061	J-91 (F3)	WJ4002902	208	300	120	24.3	0.3	0.1	0.53	Open	
P-71 (pro)	J-78 (pro Hyd)	J-74 (pro)	62	300	120	62.5	0.9	0.2	3.06	Open	Subject site
P-84 (pro)	J-91 (F3)	J-79 (pro)	77	300	120	72.7	1.0	0.3	4.16	Open	
P-83 (pro)	J-79 (pro)	J-80 (pro)	24	300	120	66.3	0.9	0.1	3.33	Open	
P-73 (pro)	J-80 (pro)	J-75 (pro)	63	300	120	6.2	0.1	0.0	0.00	Open	
P-74 (pro)	J-79 (pro)	J-81 (BLD C)	22	150	100	4.5	0.3	0.0	0.91	Open	
P-75 (pro)	J-79 (pro)	J-82 (BLD B)	17	150	100	1.9	0.1	0.0	0.00	Open	
P-80 (pro)	J-80 (pro)	J-83 (pro)	34	300	120	72.5	1.0	0.1	4.12	Open	
P-81 (pro)	J-83 (pro)	J-78 (pro Hyd)	67	300	120	70.5	1.0	0.3	3.88	Open	
P-76 (pro)	J-83 (pro)	J-84 (BLD A)	14	150	100	2.0	0.1	0.0	0.00	Open	
LN4030822	J-73	J-87 (R1)	39	300	120	47.3	0.7	0.1	1.79	Open	
LN4030821	J-87 (R1)	J-86 (F1)	77	300	120	47.3	0.7	0.1	1.82	Open	
LN4020054	WJ4002950	J-89 (R3)	28	300	120	47.9	0.7	0.1	1.79	Open	
LN4020055	J-89 (R3)	WJ4002916	65	300	120	47.9	0.7	0.1	1.85	Open	
LN4020195	WJ4003031	J-90 (R2)	151	150	70	0.5	0.0	0.0	0.00	Open	
LN4020194	J-90 (R2)	WJ4002916	97	150	70	0.5	0.0	0.0	0.00	Open	

Project: 139570_3400 Dufferin St

Date: July 2022

Hydraulic Model Output for Available Fire Flow

Junction under Proposed Condition

	Label	Demand (L/s)	Fire Flow (Needed) (L/s)	Flow (Total Needed) (L/s)	Flow (Total Available) (L/s)	Pressure (Residual Lower Limit) (kPa)	Pressure (Calculated Residual @ Total Flow Needed) (kPa)	Satisfies Fire Flow Constraints ?
	J-74 (pro)	0.00	133.00	133	280	140.00	319.00	TRUE
	J-75 (pro)	0.00	133.00	133	280	140.00	322.00	TRUE
	J-78 (pro Hyd)	0.00	133.00	133	280	140.00	319.00	TRUE
	J-79 (pro)	0.00	133.00	133	280	140.00	327.00	TRUE
	J-80 (pro)	0.00	133.00	133	280	140.00	326.00	TRUE
	J-83 (pro)	0.00	133.00	133	280	140.00	323.00	TRUE

gh3*

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Pat Hanson
Raymond Chow

August 1, 2022.

Neil Rodgers, President
Collecdev
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Toronto, ON, M4R 1K8

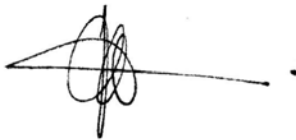
Reference: 3400 Dufferin Avenue, Toronto Ontario

Dear Sir:

Please be advised that the above-referenced building will be constructed in compliance with the 2015 Ontario Building Code (OBC), and equipped with a Fire Protection System conforming to the NFPA 13 Standards for Installation of Sprinkler Systems and specifically:

1. All structural members and floors will be of fire resistive construction per the Fire Underwriters Survey (FUS) 1999 with 2-hour ratings per the OBC.
2. All vertical openings and exterior vertical communications will be constructed with a 1-hour fire rating

Yours truly,

A handwritten signature in black ink, consisting of a series of loops and a horizontal line extending to the right, ending in a small dot.

Raymond Chow OAA RAIC
Partner gh3* architects

Appendix E

Engineering Plans

Site Plan Application Set

Draft Plan of Subdivision Set