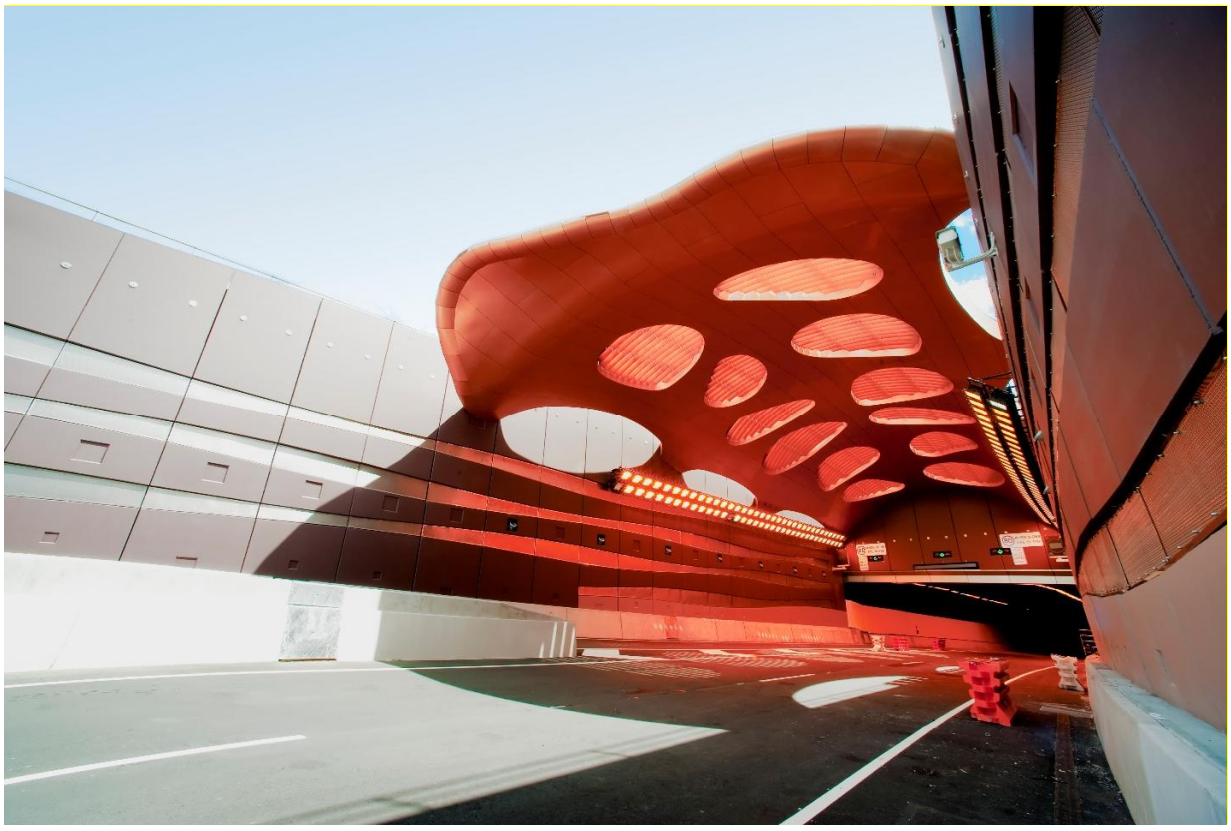
EDENSHAW ELIZABETH DEVELOPMENTS LIMITED

42-46 PARK STREET & 23 ELIZABETH STREET

FUNCTIONAL SERVICING REPORT

APRIL 29, 2020



wsp

42-46 PARK STREET EAST & 23 ELIZABETH STREET

FUNCTIONAL SERVICING REPORT

EDENSHAW ELIZABETH DEVELOPMENTS LIMITED

FUNCTIONAL SERVICING REPORT

PROJECT NO.: 20M-00430
DATE: APRIL 29, 2020

WSP CANADA GROUP LIMITED
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SIGNATURES

PREPARED BY

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Project Engineer

REVIEWED BY

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Project Manager

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1.0 INTRODUCTION

WSP Canada Group Limited has been retained by Edenshaw Elizabeth Developments Limited to prepare a Functional Servicing Report to assess the servicing requirements relating to the proposed development at 42-46 Park Street East & 23 Elizabeth Street. The property is located at the northwest corner of Park Street East and Elizabeth Street in Port Credit in the City of Mississauga.

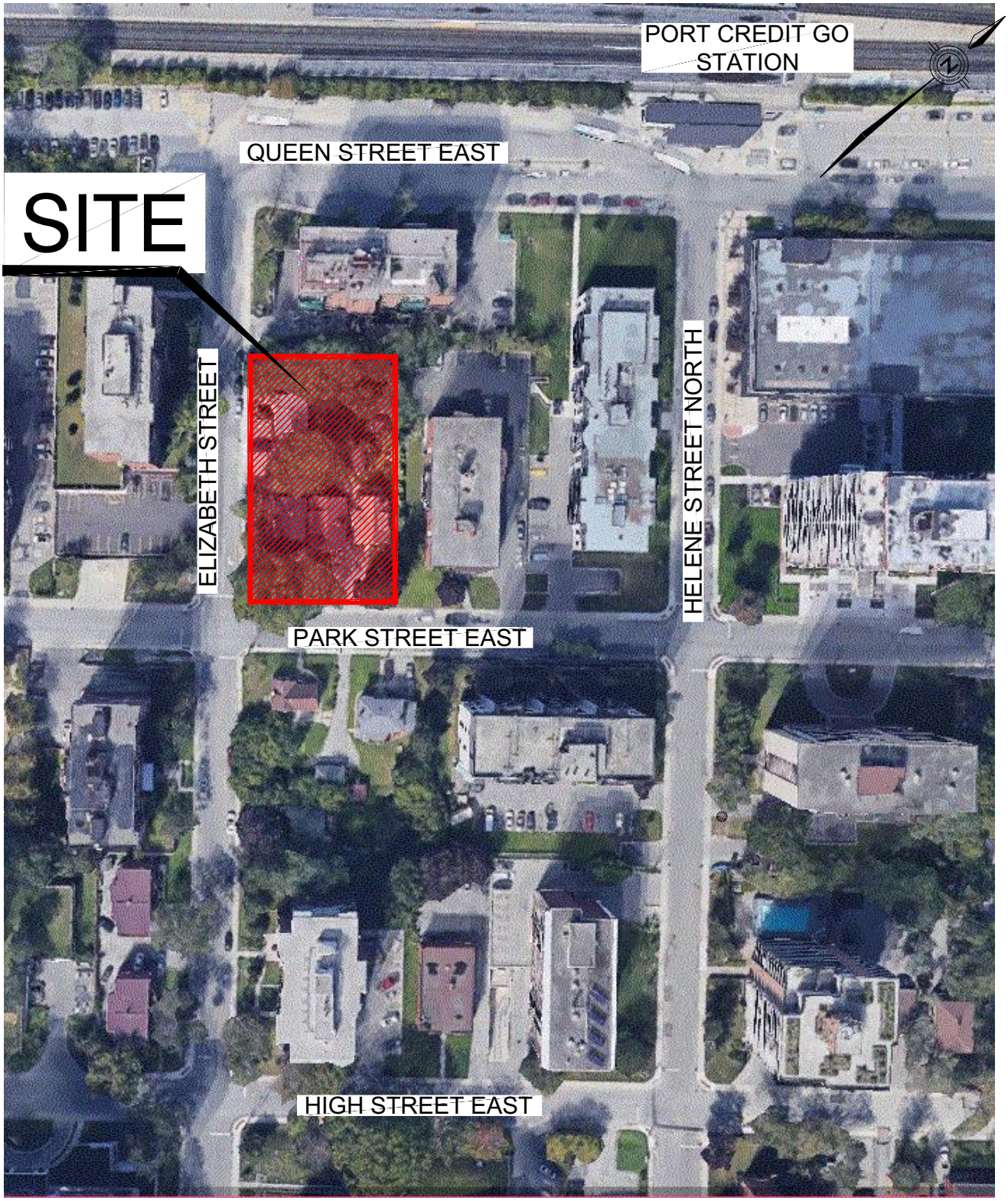
A Stormwater Management Report outlining the proposed Stormwater quality and quantity controls on this site has been prepared under a separate cover, also by WSP Canada Group Limited. In preparing this report, WSP staff reviewed and secured available City of Mississauga and Region of Peel Plan and Profile Drawings, as well as the architectural site plans prepared by IBI Group Architects and a topographical survey prepared by R. Avis Surveying Inc.

1.1 SITE DESCRIPTION

The site is a 0.18 ha parcel of land located in the northeast corner of Park Street East and Elizabeth Street in Port Credit. Currently the site has four (4) existing detached single family residential properties.

The proposed development is a 22-storey multi-unit residential building. The total estimated unit count for the development is 258. The building will have six (6) floors of below grade parking, covering the entire site.

The site will be serviced by existing local municipal sewers and watermains within the adjoining municipal rights-of-ways. The existing service connections to the existing building within the municipal road allowance will be decommissioned at the owner's cost. The proposed service connections will be extended to the underground parking foundation wall and will be coordinated with the building design team. Refer to Figure 1 for the Location Map, Figure 2 for the Predevelopment Plan, and Figure 3 for an illustration of the Proposed Development Plan.



CLIENT

Edenshaw Elizabeth Developments Limited

TITLE

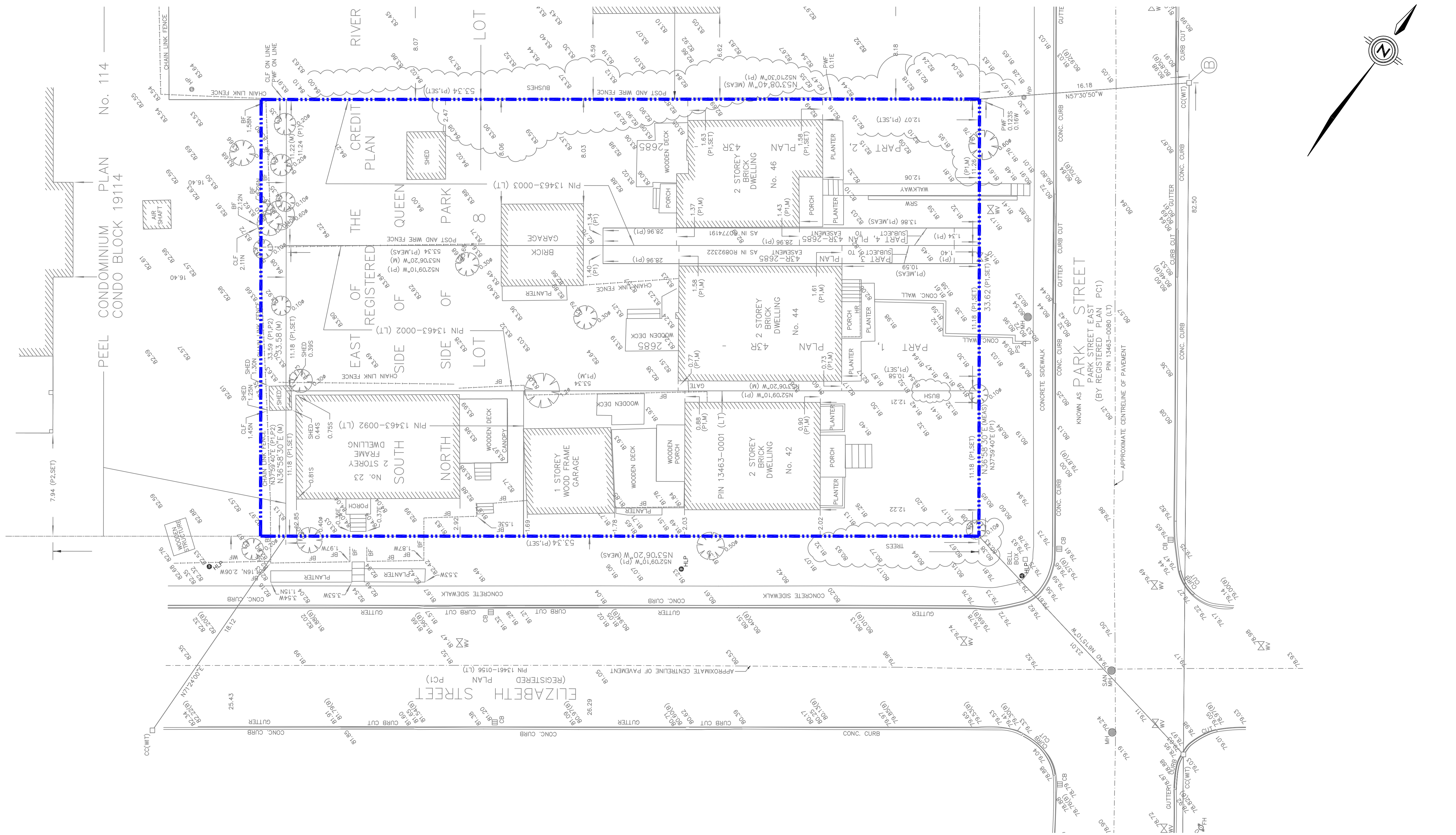
42-46 Park St E & 23 Elizabeth St
Mississauga, Ontario

LOCATION PLAN

100 Commerce Valley Dr. West, Thornhill, ON Canada L3T 0A1
t: 905.882.1100 f: 905.882.0055 www.wsp.com

Checked	M.M.	Drawn	10/12 Cad
Date	APR 2020	Proj. No.	20M-00430
Scale	NTS	Figure No.	1

FILENAME: X:\DIV\10\20M-00430-00 - Elizabeth St. N & Park St. East\Mun\FSR\Figures_Fig_1.dwg
PLOTDATE: Apr 15, 2020 - 7:54pm, CAMM071189



LEGEND

LIMIT OF PROPERTY

CLIENT	Edenshaw Elizabeth Developments Limited
TITLE	42-46 Park St E & 23 Elizabeth Street Mississauga, Ontario
	PRE- DEVELOPMENT PLAN

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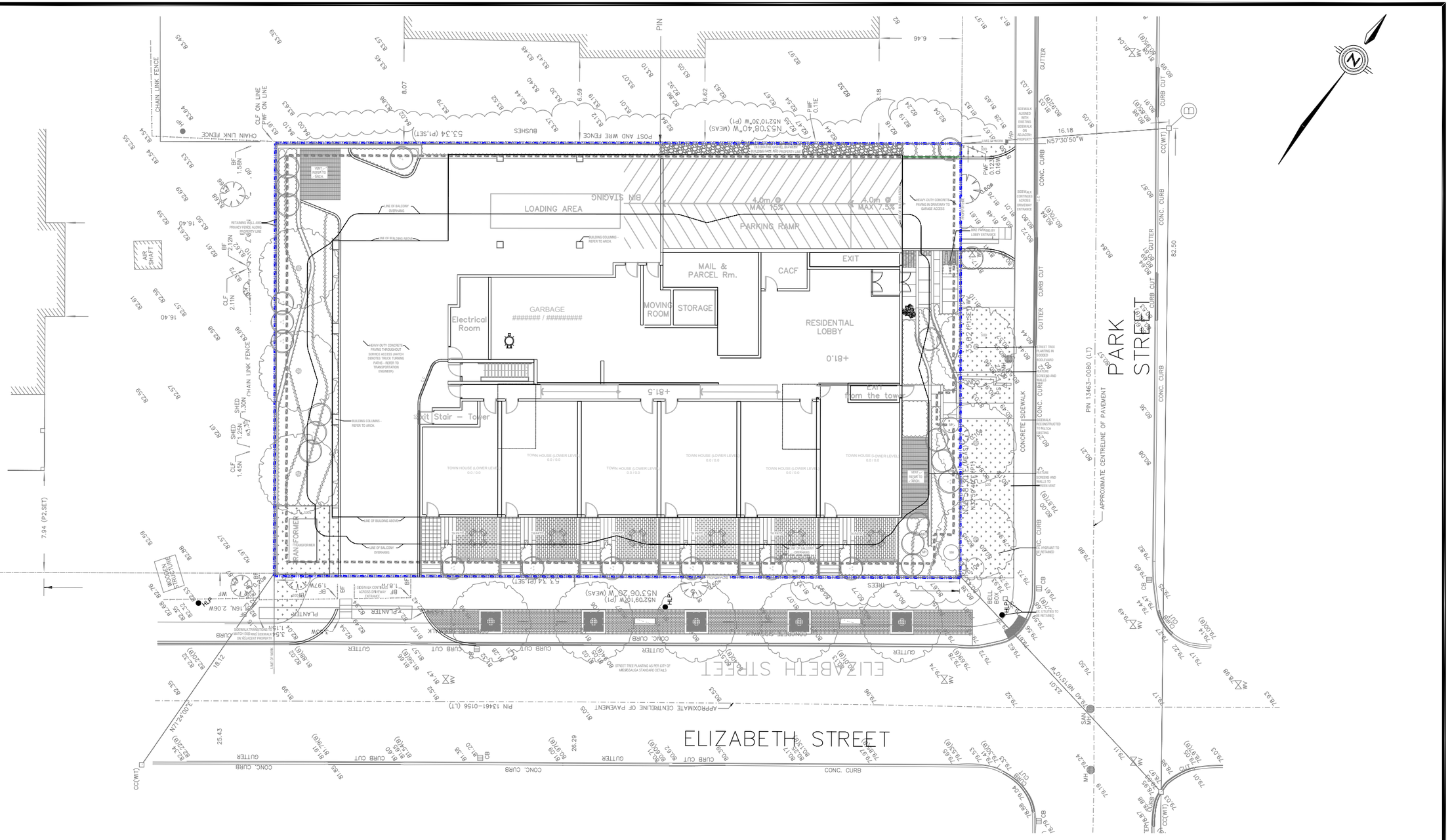
Scale	1: 300	Figure No.	2

PLOTDATE: Apr 15, 2020 - 7:55pm, CAMM071189



LEGEND

LIMIT OF PROPERTY

CLIENT	Edenshaw Elizabeth Developments Limited
TITLE	42-46 Park St E & 23 Elizabeth Street Mississauga, Ontario
	PROPOSED DEVELOPMENT PLAN

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Scale	1: 300	Figure No.	3

PLOTDATE: Apr 29, 2020 - 8:00pm, CAMM071189

2.0 WATER SUPPLY AND APPURTENANCES

2.1 EXISTING CONDITIONS

WSP has obtained existing Plan and Profile drawings from the Region of Peel and the City of Mississauga for the area adjacent to the site. A subsurface Utility Engineering Report was completed by T2 Utility Engineers which identified all the underground infrastructure in the vicinity of the site. Locally, there is a 300mm watermain on Elizabeth Street and a 150mm watermain on Park Street East.

2.2 WATER SUPPLY

In accordance with Region of Peel Standards a 300mm diameter watermain is required to service high density residential. Therefore, it is proposed to provide one (1) domestic and one (1) fire service connection to the building from the existing 300mm watermain on Elizabeth Street. Both services will include a valve and box at the property line. In addition, a water meter and backflow preventer will be installed on the domestic line and a double detector check valve will be installed on the fire lines, inside the mechanical room within the building in accordance with the Region standards. The domestic connection will be an h-style connection with a 150mm domestic service branching off a 200mm fire service. The mechanical room will need to be accessible by the Region and provide remote read-out locations for the Region's use in reading the meters. Refer to Figure 4 for proposed water servicing layout.

The estimated domestic water demand has been calculated using the Region of Peel Design Criteria and the preliminary site statistics provided by the architect. Please note that the population per unit rate used differs from the Region design criteria as WSP was given direction by Alex Martino on the 22-28 Ann Street project to use an alternative population per unit rate. As this development is in close proximity to the 22-28 Ann Street & 78 Park Street development, it is assumed that the same population per unit rate would apply. The Region of Peel Watermain Design Criteria also note that some new development can generate higher water demands during the first years of occupancy. Therefore, domestic water demands have been calculated for both the long term and the short term. For detailed calculations, see Appendix B.

Table 2.1 – Estimated Domestic Water Demand

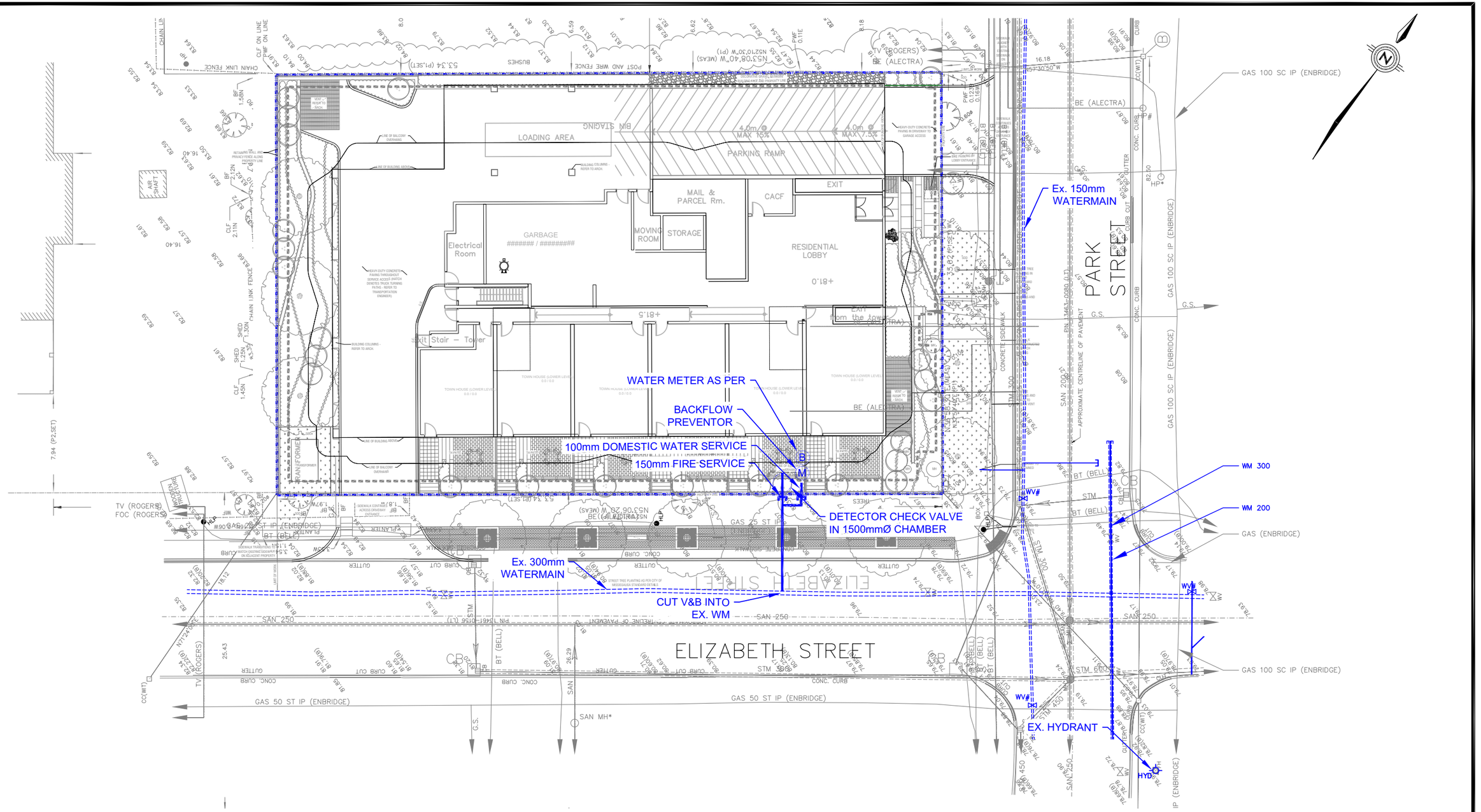
	Long Term	Short Term
Average Water Consumption Rate (Long Term)	280 litres/person/day	409 litres/person/day
Residential Apartment Units	258 units	258 units
Office/Retail GFA	$0m^2$	$0m^2$
Total Residential Equivalent Population	517 people	517 people
Average Water Demand	1.68L/s	2.45L/s
Max Day Water Demand	3.35L/s	4.89L/s
Peak Hour Water Demand	5.03L/s	7.34L/s

The estimated fire flow has been calculated using the recommendations of the Fire Underwriters Survey. The fire flow calculation indicates that the recommended fire flow is 9000L/min (2375 US GPM) AT 20psi. The results of these calculations are included in Appendix A.

There is currently an existing hydrant approximately 8m from the proposed building. The existing hydrant will provide the required fire coverage. The Siamese connection to the building will be located so that it is a maximum of 45 m away from the proposed hydrant. The southwest corner of the building is ±35m from the hydrant so the Siamese connection will need to be located near the southwest corner of the building to ensure the 45m distance is not exceeded. The proposed water servicing and existing hydrant locations are shown on Figure 4.

2.3 HYDRANT FLOW TEST

The maximum estimated fire flow demand for the proposed development at 42-46 Park Street & 23 Elizabeth Street is 150L/s (2375US GPM), as noted above. A hydrant flow test was completed for the site on Park Street East. A flow of ~6800 USGPM could be achieved while maintaining a water pressure of 20psi. The hydrant flow test results can be found in Appendix A of this report. Please note that this test is from 2017. A new hydrant flow test will be conducted and included with a future version of this report. For all tests the fire flow available exceeds the fire demand calculated above. Therefore, we can conclude that the watermains adjacent to the site are adequate to support the domestic and fire water demand of the proposed development.



LEGEND

- LIMIT OF PROPERTY
- EX. WATERMAIN
- PROP. W/M CONNECTION
- PROP. VALVE & CHAMBER
- PROP. VALVE & BOX
- (M) WATER METER
- (D) DETECTOR ASSEMBLY

CLIENT: Edenshaw Elizabeth Developments Limited

TITLE: 42-46 Park St E & 23 Elizabeth Street
Mississauga, Ontario

WATER SERVICING PLAN

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Scale	1: 300	Figure No.	4

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3.0 SANITARY SEWAGE SYSTEM

3.1 EXISTING CONDITIONS

Locally, there is an existing 250mm sanitary sewer on Elizabeth Street. There is an existing 200mm sanitary sewer on Park Street East. The Elizabeth Street sewer flows south to High Street, east along High Street to Helene Street, and south along Helene Street to Lakeshore Road.

3.2 DESIGN PARAMETERS

To calculate the theoretical peak sanitary flows, the following design criteria have been utilized taken from the Region of Peel Sanitary Sewer Design Criteria:

►302.8 L/cap/day average day domestic flow generation rate

►50 persons/hectare for Single Family Dwelling (>10m frontage)

►70 persons/hectare for Single Family Dwelling (<10m frontage)

►2.7 persons/unit for apartment buildings (>475 ppl/ha)

►Peaking Factor – Harmon Peaking Factor

►Infiltration = 0.2 L/s/ha

The demand and peaking factors are based on Region of Peel Sanitary Sewer Design Criteria, March 2017.

3.3 EXISTING SANITARY SEWER FLOW

In the pre-development condition there are 4 single family homes. Based on the design criteria noted above it is estimated that in the pre-development condition the site discharged an average of 0.08L/s to the sanitary sewer system and a peak of 0.23L/s to the sanitary sewer system, including infiltration. Refer to Appendix B for the detailed pre-development sanitary flow rate calculations.

3.4 POST-DEVELOPMENT SANITARY SEWER FLOW

An estimated post-development sanitary sewage flows to the downstream sanitary sewer system has been calculated based the Region of Peel Design Criteria and the preliminary site statistics provided by the architect. Please note that the population per unit rate used differs from the Region design criteria as WSP was given direction by Alex Martino on the 22-28 Ann Street project to use an alternative population per unit rate. A summary of the calculations can be found below.

Table 3.4.1 – Estimated Proposed Sanitary Flow

Sanitary Demand Rate	302.8 litres/person/day
Residential Population	517 people*
Avg. Residential Flow	1.81L/s
Infiltration	No infiltration (Entire Site U/G Parking)
Average Sanitary Flow from Site	1.81L/s
Peaking Factor	Residential: Harmon Peaking Factor (3.97)
Peak Sanitary Flow from Site	7.19L/s

**Residential unit population based on direction received from Alex Martino, Region of Peel for the 22-28 Ann Street project in the Planning Application Status Report dated August 12, 2019.*

Refer to Appendix B for site statistics and detailed post-development flow calculations.

3.5 SANITARY SERVICE

It is proposed to connect the development to the existing 250mm sanitary sewer on Park Street East with one connection. The proposed connection will be 200mm diameter. A control manhole is proposed to be placed immediately inside the property line for the connection. The internal system inside the parking structure will be designed by the mechanical engineer. Proposed sanitary service connection within the private site will be designed to meet the Ontario Plumbing Code. The sanitary connection to the site within the municipal road allowance will be designed to the Region of Peel Standards. Refer to Figure 5 for proposed sanitary servicing layout.

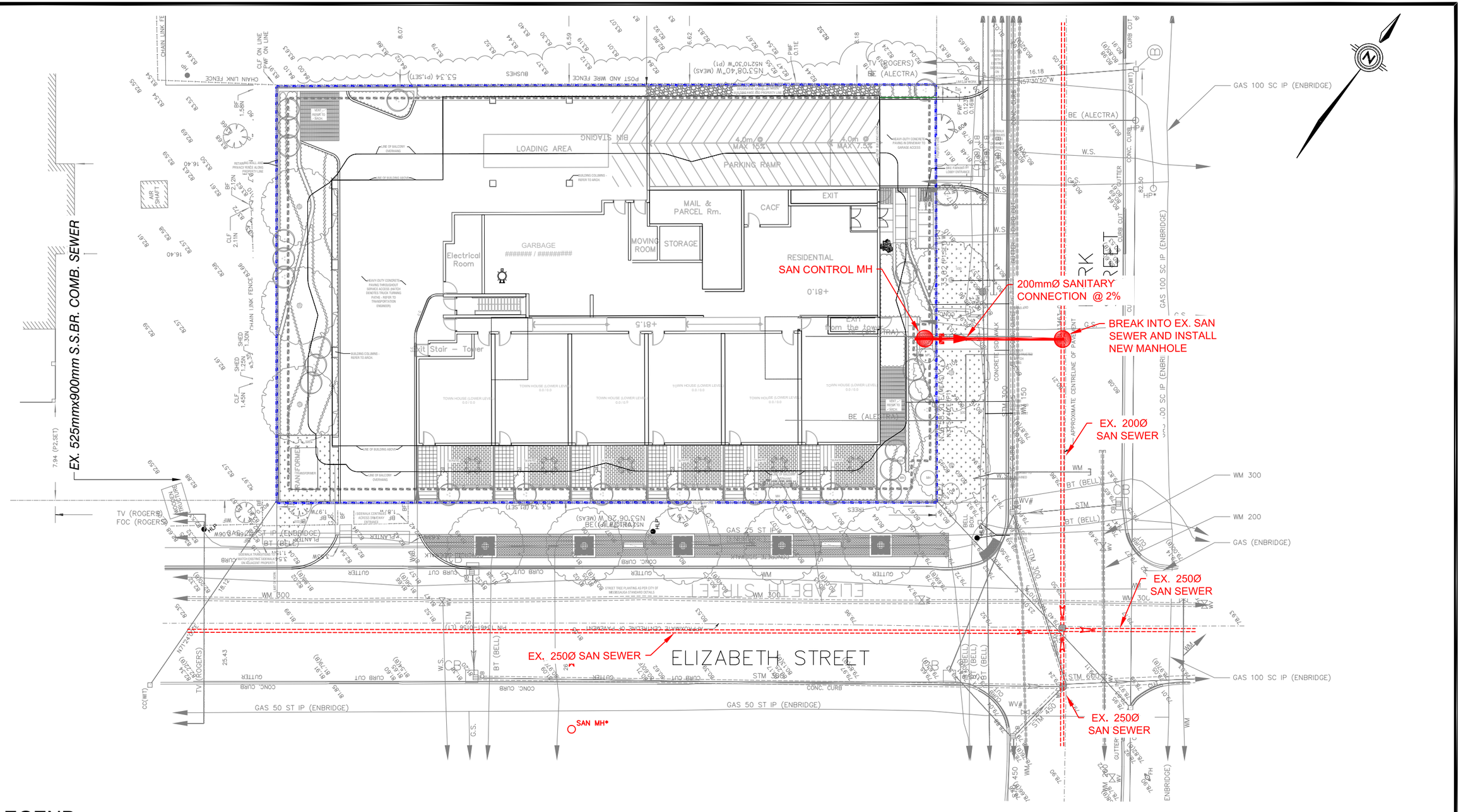
3.6 DOWNSTREAM SEWER ANALYSIS

WSP has prepared a pre- and post-development downstream combined sewer analysis. The analysis includes calculations for the wet weather flow condition, where an infiltration (0.20 L/s/ha) has been added to the calculated sanitary flow. The sanitary flow for the sewershed was calculated using the Region of Peel Sanitary Sewer Design Criteria as outlined in Section 3.2. The sanitary generation determined in Section 3.4 was applied to the pre-development analysis to form the analysis of the post-development conditions. See Appendix C for the Sanitary Sewer Design Sheets. To facilitate this analysis, a Sanitary Sewer Drainage Area Plan has been created and is located in Appendix C.

Development applications for 21-29 Park Street and 22-28 Ann Street have been submitted. 21-29 Park Street is currently under construction and it is expected that 22-28 Ann Street will be developed in the

near future. Therefore, the post-development sanitary flows from these developments, calculated based on the Region of Peel design criteria and site statistics provided by the architect, have been included as existing sanitary flows for the purpose of analyzing receiving sewer capacity.

In the post development condition, the analysis demonstrates that the existing municipal sewer system has adequate capacity to support the addition of 7.19L/s of flow from the proposed development without surcharging in any leg. Consequently, WSP Group concludes that the existing municipal sewer can accept the flow from the proposed site and no external improvements are required.



LEGEND

- LIMIT OF PROPERTY
- EX. SANITARY SEWER
- PROP. SAN CONNECTION

CLIENT: Edenshaw Elizabeth Developments Limited

TITLE: 42-46 Park St E & 23 Elizabeth Street
Mississauga, Ontario

SANITARY SERVICING PLAN

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Date	APR 2020	Proj. No.	20M-00430
Scale	1: 300	Figure No.	5

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4.0 STORM DRAINAGE

A Stormwater Management Report for this development has been prepared by WSP under a separate cover. It identifies the Stormwater quantity and quality controls under which this site will operate to comply with.

4.1 EXISTING CONDITIONS

The existing site is a 0.18 ha parcel of land located the northwest corner of Park Street East and Elizabeth Street in Port Credit.

There is a 300mm storm sewer on Elizabeth Street and a 300mm storm sewer on Park Street East.

4.2 PROPOSED DEVELOPMENT

The proposed development is a 22-storey multi-unit residential building. The total estimated unit count for the development is 258. Additionally, there will be underground parking that will cover the entire site.

The majority of storm flow from the site will be captured and directed to the Stormwater storage tank. There will be some uncontrolled areas along Park Street East. The tank will be sized to control the 100-year post-development flows to the 2-year pre-development levels. A detailed Stormwater management report is being submitted under a separate cover.

4.3 MINOR STORM DRAINAGE SYSTEM

Storm flows will be directed to the Stormwater storage tank and controlled to an allowable release rate which will conform to the requirements of the City of Mississauga.

It is proposed to provide a new 200mm storm connection that will connect to the existing 300mm storm sewer on Elizabeth Street. As per City requirements, a control manhole is proposed to be placed immediately inside the property line. The orifice from the Stormwater storage cistern to the control manhole will be sized to control the flow to the allowable release rate. The allowable release rate for the site is such that for all storm events the storm outflow from the site is reduced in the post development condition. It can therefore be concluded that during wet weather events, the development will produce a net reduction in the flows to the existing municipal storm sewer system. For further information on Stormwater management system being used for this site please see the Stormwater Management Report.

The new storm connection within the Elizabeth Street right-of-way will be designed to the standards and specifications of the City of Mississauga. The new on-site storm sewers, which will be located within the parking garage, will be designed by a mechanical engineer to meet the standards of the Ontario Building Code. Refer to Figure 6 for the proposed storm sewer layout.

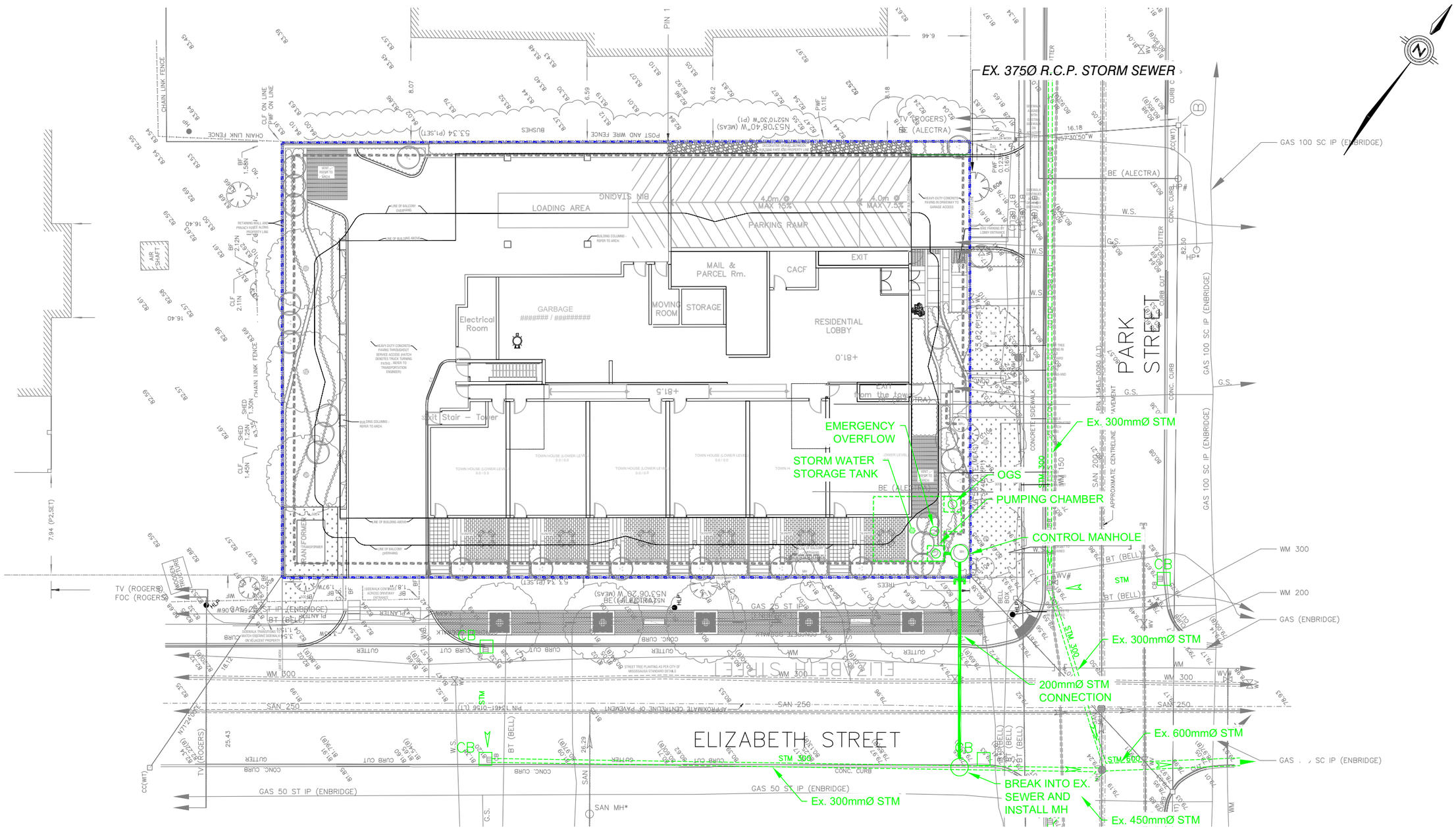
4.4 MAJOR STORM DRAINAGE SYSTEM

All storm flows will be collected by an internal storm drainage system and directed into the Stormwater storage tank. The flow will be controlled by a flow control device and release to the City's storm sewer at the allowable release rate for the site. In case of system failure, the system will be designed to have an emergency overflow access to the surface. Since all storm flows, up to 100-year storm events, will be reduced to pre-development levels, the existing storm sewer system will have reduced flows under the post-development condition. Refer to the separate Stormwater Management Report for Stormwater management calculation details.

4.5 DOWNSTREAM STORM SEWER CAPACITY ANALYSIS

WSP has prepared a pre- and post-development downstream storm sewer analysis. The analysis includes calculations for a 10-year design storm. The storm flow for the sewershed was calculated using the City of Mississauga Storm Sewer Design Criteria. The controlled storm release rate from the site was applied to the pre-development analysis to form the analysis of the post-development conditions. See Appendix C for the Storm Sewer Design Sheets. To facilitate this analysis, a Storm Sewer Drainage Area Plan has been created and is located in Appendix D.

In the pre-development conditions the design sheet shows that all downstream sewer legs in the sewershed are surcharged. Acknowledging this, the proposed development has proposed to control the storm flow the site to the 2-year pre-development level for all storm events up to the 100-year storm. This means that during all storm events greater than a 2-year storm, including the 10-year event for which the sewers are to be designed there will be less flow in the downstream sewers as a result of this development and the surcharge in the sewers will be reduced as a result. To demonstrate this, a pre-development and post-development HGL analysis has been conducted and is included in Appendix D. The results of the HGL analysis show that the HGL is lowered in all downstream sewer legs. Therefore, since the development is improving the surcharge conditions in the existing sewers, WSP has concluded that no external sewer improvements are required as a result of this development.



LEGEND

- LIMIT OF PROPERTY
- EX. STORM SEWER
- PROP. STORM CONNECTION

CLIENT
Edenshaw Elizabeth Developments Limited

TITLE
42-46 Park St E & 23 Elizabeth Street
Mississauga, Ontario

STORM SERVICING PLAN

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Scale 1: 300	Figure No. 6

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5.0 CONCLUSION

5.1 WATER DISTRIBUTION

The proposed 42-46 Park Street East & 23 Elizabeth Street development will have one (1) water service connection from the existing 300mm watermain on Elizabeth Street. The connection on Elizabeth Street is proposed to provide one 100mm domestic water connection and one 150mm fire connection. A Hydrant flow test of watermains in the area has shown that the local watermains have sufficient capacity to provide fire protection to the proposed development. The existing public fire hydrant on Park Street East will be less than 45m from the Siamese connection. Water service design within Region's Right-of-Way will be designed to meet the standards and specifications of the Region of Peel, while services within the building are to be designed by the mechanical consultant per the Ontario Building Code, and coordinated with WSP.

5.2 SANITARY SEWAGE

The 42-46 Park Street East & 23 Elizabeth Street development will have one sanitary sewer service connection, which will be conveyed to the existing 200mm sanitary sewer on Park Street East. The connection will be 200mm diameter. The proposed sanitary service connection within the Region's right-of-way will be designed to meet the standards and specifications of the Region of Peel, while services within the building are to be designed by the mechanical consultant per the Ontario Building Code, and coordinated with WSP.

5.3 STORM SEWAGE

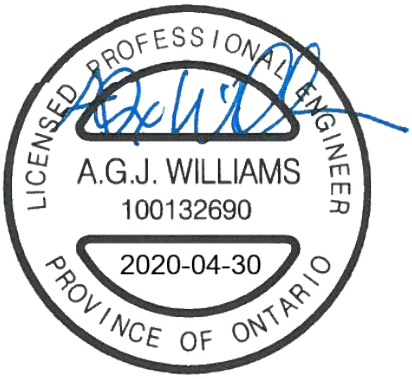
The proposed 42-46 Park Street East & 23 Elizabeth Street development will have one (1) Stormwater management system. Minor and major storm drainage for the proposed development will be collected by the internal site drainage system and directed into the proposed Stormwater storage tank. The flow will be controlled to the allowable flow levels and released to the existing 300mm storm sewer on Elizabeth Street. The existing storm sewer system will not be adversely affected by the post-development condition as the rate of Stormwater release from this site will be decreased.

A separate Stormwater Management Report, has been prepared to address requirements concerning Stormwater management.

We trust that the information provided in this report is sufficient to satisfy the servicing design requirements for the 42-46 Park Street East & 23 Elizabeth Street development. Please call Mark Mitchell at 647-730-7123 or Alex Williams at 647-730-7156 if you have any questions or require additional information regarding the site.

Yours very truly,

WSP CANADA GROUP LIMITED



Alex Williams, P.Eng.
Project Manager
Land Development

Mark Mitchell, P.Eng.
Project Engineer
Land Development

APPENDIX A – Fire Flow Calculations & Hydrant Flow Test Results

APPENDIX A
42-46 Park St. E & 23 Elizabeth Street
FIRE FLOW CALCULATIONS

Job No.: **20M-00430**

Fire Flow Calculation Procedure per Water Supply for Public Fire Protection, 1999 by Fire Underwriter Survey, p 20.

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

where

F = Fire flow in Litres per minute (Lpm)
C = coefficient related to the type of construction
A = total floor area in square metres

A. **Determine Type of Construction**
=> Non-combustible Construction
Therefore C = 0.8

B. **Determine Ground Floor Area**
=> Fire-resistive building with vertical openings and exterior vertical communications properly protected
Therefore A = Largest Floor + 25% of 2 immediately adjoining floors
A = 994.2 + 0.25*(994.2 + 994.2)
A = 1,491 m2

C. **Determine Height in Storeys**
=> 22 Storeys

D. **Determined the Fire Flow**
F = 220 x 0.8 x √1491
F = 6,796 Lpm

E. **Determine Increase or Decrease for Occupancy**
=> Apartments are considered "Combustible"
Therefore 0% reduction

F. **Determine Decrease for Automatic Sprinkler Protection**
=> Has Automatic Sprinkler Protection (Per NFPA 13 Standards)
Therefore 30% reduction
30% reduction of 6796 Lpm = 2,039 Lpm

G. **Determine the Total Increase For Exposures**

Face	Distance (m)	Charge
West Side	22	10%
East Side	7	20%
North Side	13	15%
South Side	20	15%
	Total	60% of 6,796 = 4,078 Lpm

H. **Req'd Fire Flow = D - F + G**
F = 8,835 Lpm
F = 9,000 Lpm (4,800 Lpm < F < 45,000 Lpm; OK)
F = 2,375 US GPM

Note

Park St E

HYDRANT FLOW TEST RESULTS

Date: 27/Jun/17 Time: 13:10 (hh/mm)

Tested By: D. Mu

Municipality: Peel Region

Operator: Dennis, Muhammad

Test No: **01**

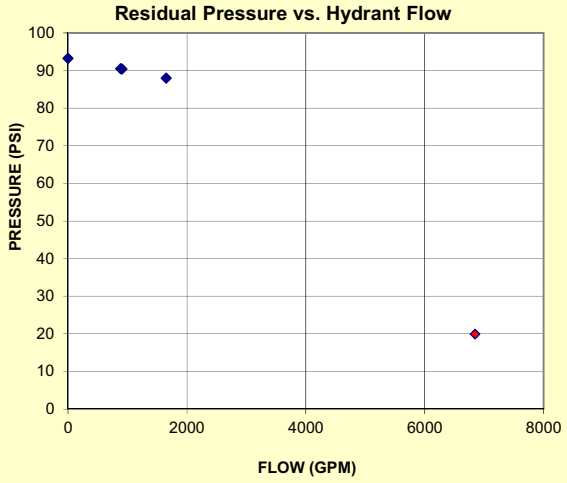
Initial Conditions

Pressure @ Residual:	93.3 psi	643 kPa
Pressure @ Flow:	93.3 psi	643 kPa
Δ pressure:	0.0 psi	0 kPa
Elevation Difference: (Flow El. - Residual El.)	0.0 ft	0.0 m

Test Notes:

Nozzle		FLOW		RESIDUAL PRESSURE (psi)		Minimum Residual P_r (psi)	Fire Flow at Minimum Residual, Q_r (USGPM)	Fire Flow at Minimum Residual, Q_r (L/s)	5% Pressure Drop Achieved?
Size (in)	Pressure Flow Gauge (psi)	(USGPM)	(L/s)	Monitoring Hydrant	Flowing Hydrant*				
STATIC		0	0	93.3	93.3				
Single Port Tests									
2	33.8	907.0	57.2	90.4	90.4	20	5227	330	NO
2	32.0	883.0	55.7	90.5	90.5	20	5187	327	NO
Two Port Test									
1						20			
2									
Two Port Test									
2	26.8	807.0	50.9	88	88.0	20	6842	432	YES
2	29.2	843.0	53.2						

*gain/loss in pressure due to elevation difference between flow & monitoring hydrants



Results			
Static Pressure		Flow at 20 psi (140kPa)*	
(psi)	(kPa)	(gpm)	(L/s)
93.3	643	6800	429

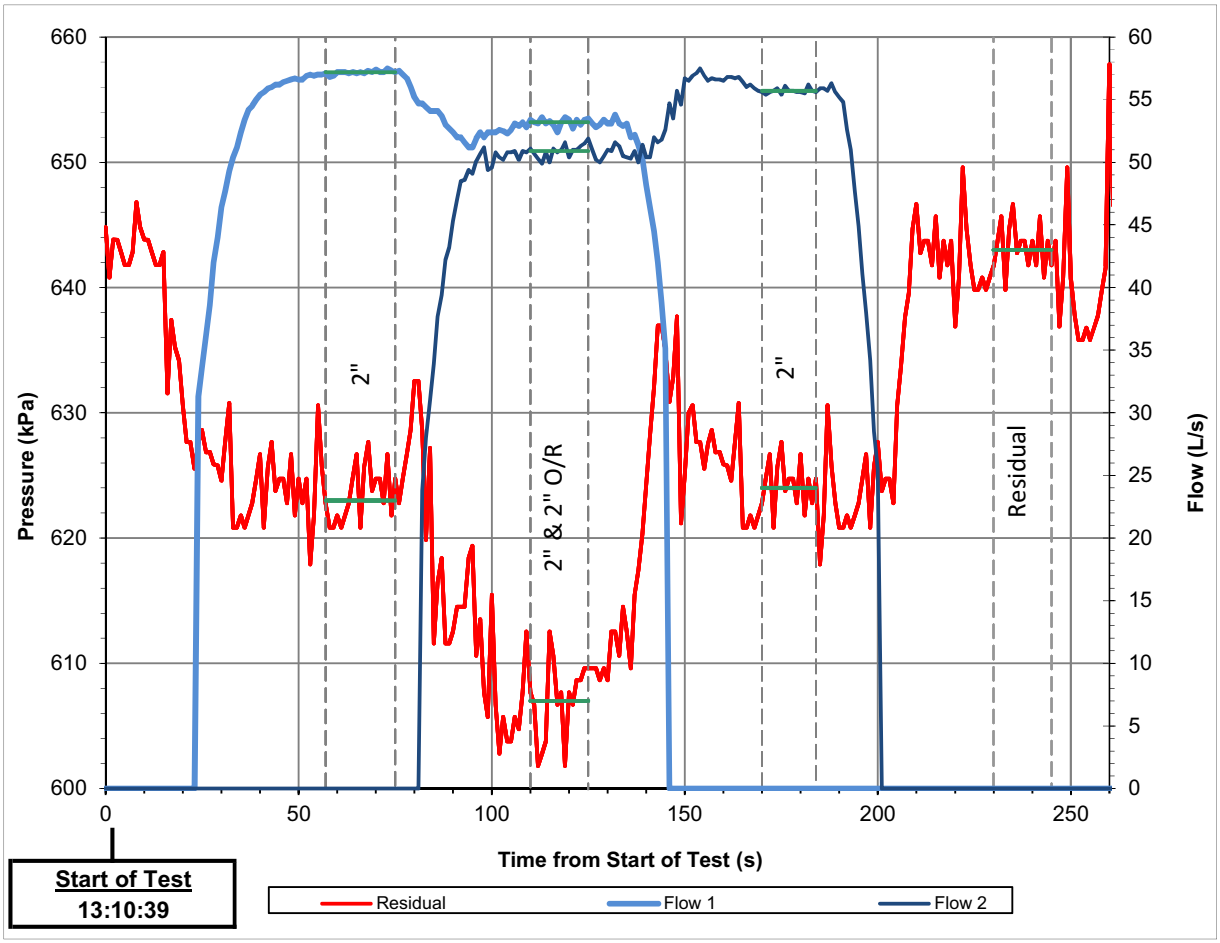
* Results carried to nearest 50 gpm or 100 gpm if over 1000 gpm

Hydrant Classification as per NFPA 291			
Class	AA	Color	BLUE

Water Discharged During Test:	12500 L

Rounded up to closest 100L

TEST 01 - Park St E



Subject Watermain Details			
Diameter:	200 mm	**Material:**	PVC
Area:	0.031 m2		

Subject Hydrant Details	
Flow Residual:	N/A
Flow Hydrant 1:	N/A
Flow Hydrant 2:	N/A

Point	Time		Residual 1		Flow Hydrant (N/A&HN/A)				Total Flow		Velocity
			PL-1 on HN/A		Port 1 (<S1>)		Port 2 (<S2>)				
	Start	Finish	(kPa)	(psi)	(L/s)	(GPM)	(L/s)	(GPM)	(L/s)	(GPM)	(m/s)
Static	230	245	643	93.3	0.0	0	0.0	0	0.0	0	0.0
2"	57	75	623	90.4	57.2	907	0.0	0	57.2	907	1.8
2"	170	184	624	90.5	0.0	0	55.7	883	55.7	883	1.8
1" + 2"			0	0	0.0	0	0.0	0	0.0	0	0.0
2" + 2"	110	125	607	88	53.2	843	50.9	807	104.1	1650	3.3

APPENDIX B – Site Statistics and Flow calculations

APPENDIX B
42-46 Park St. E & 23 Elizabeth Street
Post-Development Site Statistics

Residential Units

Unit Type	Quantity	Pop Density	Population
1 Bedroom	162	**1.68**	273
2 Bedroom	96	**2.54**	244
Total	258		517

Note: Population calculated per previous comment from Alex Martino Region of Peel in the *Planning Application Status Report* for 22-24 Ann Street

Office/Retail Units

Total Retail/Office Area =	0	m^2
	0.0	ha
Comm. Population Density =	50	persons/ha (R.O.P. Sani Design Criteria)
Total Comm. Population =	0	persons

Post-Development Sanitary Flow

Total Population =	517	(Residential + Commercial)
Avg Flow =	1.81	L/s (assumes 302.8L/cap/d)
Peak Factor =	3.97	(Harmon Formula)
Peak Flow =	7.19	L/s
Total Avg San Flow =	**1.81**	**L/s**
Total Peak San Flow =	**7.19**	**L/s**

Post-Development Water Demand - Short Term

	Residential	Commercial	Total	
Population =	517	0	517	
Consumption Rate =	409	300	---	
Avg Demand =	2.45	0.00	2.45	L/s
Max Day Factor =	2.00	2.00	---	
Max Day Flow =	4.89	0.00	4.89	L/s
Peak Hour Factor =	3.00	3.00	---	
Peak Hour Flow =	**7.34**	**0.00**	**7.34**	**L/s**
Fire Flow =	150		**150**	L/s
Maximum Day + Fire Flow =	**154.89**	**0.00**	**154.89**	**L/s**

Post-Development Water Demand - Long Term

	Residential	Commercial	Total	
Population =	517	0	517	
Consumption Rate =	280	300	---	
Avg Demand =	1.68	0.00	1.68	L/s
Max Day Factor =	2.00	1.40	---	
Max Day Flow =	3.35	0.00	3.35	L/s
Peak Hour Factor =	3.00	3.00	---	
Peak Hour Flow =	**5.03**	**0.00**	**5.03**	**L/s**
Fire Flow =	150		**150**	L/s
Maximum Day + Fire Flow =	**153.35**	**0.00**	**153.35**	**L/s**

APPENDIX C – Combined Sewer Downstream Sewer and HGL Analysis

THE REGIONAL MUNICIPALITY OF PEEL
SANITARY DESIGN CHART
42-46 PARK ST & 23 ELIZABETH ST - CITY OF MISSISSAUGA
PRE-DEVELOPMENT CONDITION

CONSULTANT:
WSP CANADA GROUP LIMITED

*** DESIGN FLOWS AS PER REGION OF PEEL SANITARY SEWER DESIGN FLOW**

DATE: APRIL 2020
DESIGNED BY: MM
CHECKED BY: AW

DRAINAGE AREA PLAN NO.:

Manning's n= 0.013

LOCATION	FROM MH	TO MH	AREA (ha)	AREA DENSITY (ppha)	POP.	CUMM. AREA (ha)	CUMM. POP.	DESIGN SEWAGE FLOW (L/sec)	Peaking Factor	PEAK SEWAGE FLOW (L/sec)	INFILTRATION FLOW * 0.200 (L/sec/ha)	TOTAL FLOW (L/sec)	LENGTH (m)	GRADIENT (%)	PIPE SIZE (mm)	CAPACITY (L/sec)	% FULL	VELOCITY FULL (m/sec)	VELOCITY ACTUAL (m/sec)
21-29 Park St Development			---	---	559														
			0.19	50	10														
			1.43	475	679														
Park St E	149	150	1.62	---	1248	1.62	1248	4.37	3.74	16.3	0.3	16.6	113.5	0.38	250	36.7	45.28%	0.75	0.72
		150	0.18	70	13														
Elizabeth St	North	150	1.06	475	504	1.24	516	1.8	3.97	7.2	0.2	7.4	---	---	---	---	---	---	---
			0.22	50	11														
			0.56	475	266														
Park St E	East	150	0.78	---	277	0.78	277	1.0	4.09	4.0	0.2	4.1	---	---	---	---	---	---	---
Elizabeth St	150	147	0.63	475	299	4.27	2340	8.2	3.53	29.0	0.9	29.8	123.0	0.50	250	42.0	70.91%	0.86	0.93
Elizabeth St North	South	147	0.10	475	48	0.10	48	0.2	4.32	0.7	0.0	0.7	---	---	---	---	---	---	---
High Street E	West	147	0.82	475	390	0.82	390	1.4	4.03	5.5	0.2	5.7	---	---	---	---	---	---	---
High St E	147	157	0.18	475	86	5.37	2863	10.0	3.46	34.7	1.1	35.8	40.0	0.30	375	96.0	37.26%	0.87	0.81
High St E	157	155A	0.72	475	342	6.09	3205	11.2	3.42	38.4	1.2	39.6	70.0	0.47	375	120.2	32.95%	1.09	0.96
High St E	155A	155	0.00	0	0	6.09	3205	11.2	3.42	38.4	1.2	39.6	13.0	0.47	375	120.2	32.95%	1.09	0.96
			0.44	175	77														
Park St E	East	170	0.57	50	29	1.01	106	0.4	4.24	1.6	0.2	1.8	---	---	---	---	---	---	---
Ann St	171	170	0.21	50	11	0.21	11	0.0	4.41	0.2	0.0	0.2	104.0	1.14	250	63.4	0.32%	1.29	0.39
22-28 Ann Street Development			---	---	684														
Park St E	170	153	1.26	475	599	2.48	1399	4.9	3.70	18.1	0.5	18.6	119.6	0.68	250	49.0	37.93%	1.00	0.94
Helene St N	North	153	0.94	475	447	0.94	447	1.6	4.00	6.3	0.2	6.5	---	---	---	---	---	---	---
Helene St N	153	153A	0.00	0	0	3.42	1845	6.5	3.61	23.4	0.7	24.1	23.9	4.67	250	128.5	18.75%	2.62	1.96
Helene St N	153A	154	0.00	0	0	3.42	1845	6.5	3.61	23.4	0.7	24.1	42.0	4.67	250	128.5	18.75%	2.62	1.96
Helene St N	154	155	0.00	0	0	3.42	1845	6.5	3.61	23.4	0.7	24.1	55.0	0.50	250	42.0	57.31%	0.86	0.89
			1.35	475	641														
			0.80	50	40														
High St E	East	155	0.96	475	456	3.11	1137	4.0	3.76	15.0	0.6	15.6	---	---	---	---	---	---	---
Helene St N	155	Lakeshore	0.93	475	442	13.55	6629	23.2	3.13	72.7	2.7	75.4	125.8	0.30	450	156.2	48.28%	0.98	0.97

NOTE: (1) - For population of proposed development see Appendix B Post-Development Site Statistics
(2) - Grey rows are not receiving sewers and flows are unchanged by the proposed development.

THE REGIONAL MUNICIPALITY OF PEEL
SANITARY DESIGN CHART
42-46 PARK ST & 23 ELIZABETH ST - CITY OF MISSISSAUGA
POST-DEVELOPMENT CONDITION

CONSULTANT:
WSP CANADA GROUP LIMITED

*** DESIGN FLOWS AS PER REGION OF PEEL SANITARY SEWER DESIGN FLOW**

DATE: APRIL 2020
DESIGNED BY: MM
CHECKED BY: AW

DRAINAGE AREA PLAN NO.:

Manning's n= 0.013

LOCATION	FROM MH	TO MH	AREA (ha)	AREA DENSITY (ppha)	POP.	CUMM. AREA (ha)	CUMM. POP.	DESIGN SEWAGE FLOW (L/sec)	Peaking Factor	PEAK SEWAGE FLOW (L/sec)	INFILTRATION FLOW * 0.200 (L/sec/ha)	TOTAL FLOW (L/sec)	LENGTH (m)	GRADIENT (%)	PIPE SIZE (mm)	CAPACITY (L/sec)	% FULL	VELOCITY FULL (m/sec)	VELOCITY ACTUAL (m/sec)
21-29 Park St Development			---	---	559														
			0.19	50	10														
			1.43	475	679														
Park St E	149	150	1.62	---	1248	1.62	1248	4.37	3.74	16.3	0.3	16.6	113.5	0.38	250	36.7	45.28%	0.75	0.72
Proposed Development			**0.18**	**---**	**517**														
Elizabeth St	North	150	1.06	475	1021	1.06	1021	3.6	3.79	13.6	0.2	13.8	---	---	---	---	---	---	---
			0.22	50	11														
			0.56	475	266														
Park St E	East	150	0.78	---	277	0.78	277	1.0	4.09	4.0	0.2	4.1	---	---	---	---	---	---	---
Elizabeth St	150	147	0.63	475	299	4.09	2845	10.0	3.46	34.5	0.8	35.3	123.0	0.50	250	42.0	84.02%	0.86	0.98
Elizabeth St North	South	147	0.10	475	48	0.10	48	0.2	4.32	0.7	0.0	0.7	---	---	---	---	---	---	---
High Street E	West	147	0.82	475	390	0.82	390	1.4	4.03	5.5	0.2	5.7	---	---	---	---	---	---	---
High St E	147	157	0.18	475	86	5.19	3367	11.8	3.40	40.1	1.0	41.2	40.0	0.30	375	96.0	42.85%	0.87	0.83
High St E	157	155A	0.72	475	342	5.91	3709	13.0	3.36	43.7	1.2	44.9	70.0	0.47	375	120.2	37.35%	1.09	1.01
High St E	155A	155	0.00	0	0	5.91	3709	13.0	3.36	43.7	1.2	44.9	13.0	0.47	375	120.2	37.35%	1.09	1.01
			0.44	175	77														
Park St E	East	170	0.57	50	29	1.01	106	0.4	4.24	1.6	0.2	1.8	---	---	---	---	---	---	---
Ann St	171	170	0.21	50	11	0.21	11	0.0	4.41	0.2	0.0	0.2	104.0	1.14	250	63.4	0.32%	1.29	0.39
22-28 Ann Street Development			---	---	684														
Park St E	170	153	1.26	475	599	2.48	1399	4.9	3.70	18.1	0.5	18.6	119.6	0.68	250	49.0	37.93%	1.00	0.94
Helene St N	North	153	0.94	475	447	0.94	447	1.6	4.00	6.3	0.2	6.5	---	---	---	---	---	---	---
Helene St N	153	153A	0.00	0	0	3.42	1845	6.5	3.61	23.4	0.7	24.1	23.9	4.67	250	128.5	18.75%	2.62	1.96
Helene St N	153A	154	0.00	0	0	3.42	1845	6.5	3.61	23.4	0.7	24.1	42.0	4.67	250	128.5	18.75%	2.62	1.96
Helene St N	154	155	0.00	0	0	3.42	1845	6.5	3.61	23.4	0.7	24.1	55.0	0.50	250	42.0	57.31%	0.86	0.89
			1.35	475	641														
			0.80	50	40														
High St E	East	155	0.96	475	456	3.11	1137	4.0	3.76	15.0	0.6	15.6	---	---	---	---	---	---	---
Helene St N	155	Lakeshore	0.93	475	442	13.37	7133	25.0	3.10	77.5	2.7	80.2	125.8	0.30	450	156.2	51.36%	0.98	0.99

NOTE: (1) - For population of proposed development see Appendix B Post-Development Site Statistics
(2) - Grey rows are not receiving sewers and flows are unchanged by the proposed development.

THE REGIONAL MUNICIPALITY OF PEEL
SANITARY DESIGN CHART
42-46 PARK ST & 23 ELIZABETH ST - CITY OF MISSISSAUGA
PRE-DEVELOPMENT CONDITION - HGL ANALYSIS

CONSULTANT:
WSP CANADA GROUP LIMITED

* DESIGN FLOWS AS PER REGION OF
PEEL SANITARY SEWER DESIGN FLOW

DATE: APR 2020
DESIGNED BY: MM
CHECKED BY: AW

DRAINAGE AREA PLAN NO.:

Manning's n= 0.013

LOCATION	FROM MH	TO MH	US INVERT (m)	DS INVERT (m)	US OBVERT (m)	DE OBVERT (m)	GROUND ELEV. @ US MH (m)	LENGTH (m)	SLOPE (%)	DIAMETER (mm)	PIPE CAPACITY (L/s)	PEAK FLOW (L/s)	HGL SLOPE (%)	US HGL (m)	DS HGL (m)	SURCHARGE ABOVE OBV @ US MH (m)	DISTANCE BELOW SURFACE @ US MH (m)
Park St E	149	150	76.53	76.10	76.78	76.35	79.62	113.5	0.38	250	36.7	16.6	0.078	76.44	76.35	-0.35	3.18
Elizabeth St	150	147	75.86	75.24	76.11	75.49	79.31	123.0	0.50	250	42.0	29.8	0.251	75.80	75.49	-0.31	3.51
High St E	147	157	75.21	75.08	75.58	75.46	77.50	40.0	0.30	375	96.0	35.8	0.042	75.47	75.46	-0.11	2.03
High St E	157	155A	75.06	74.73	75.44	75.11	77.00	70.0	0.47	375	120.2	39.6	0.051	75.14	75.11	-0.29	1.86
High St E	155A	155	74.73	74.67	75.11	75.04	77.15	13.0	0.47	375	120.2	39.6	0.051	75.05	75.04	-0.05	2.10
Helene St N	155	Lakeshore	74.68	74.30	75.13	74.75	77.22	125.8	0.30	450	156.2	75.4	0.070	74.84	74.75	-0.29	2.38

NOTE: For population of proposed development see Appendix B.

THE REGIONAL MUNICIPALITY OF PEEL
SANITARY DESIGN CHART
42-46 PARK ST & 23 ELIZABETH ST - CITY OF MISSISSAUGA
POST-DEVELOPMENT CONDITION - HGL ANALYSIS

CONSULTANT:
WSP CANADA GROUP LIMITED

* DESIGN FLOWS AS PER REGION OF
PEEL SANITARY SEWER DESIGN FLOW

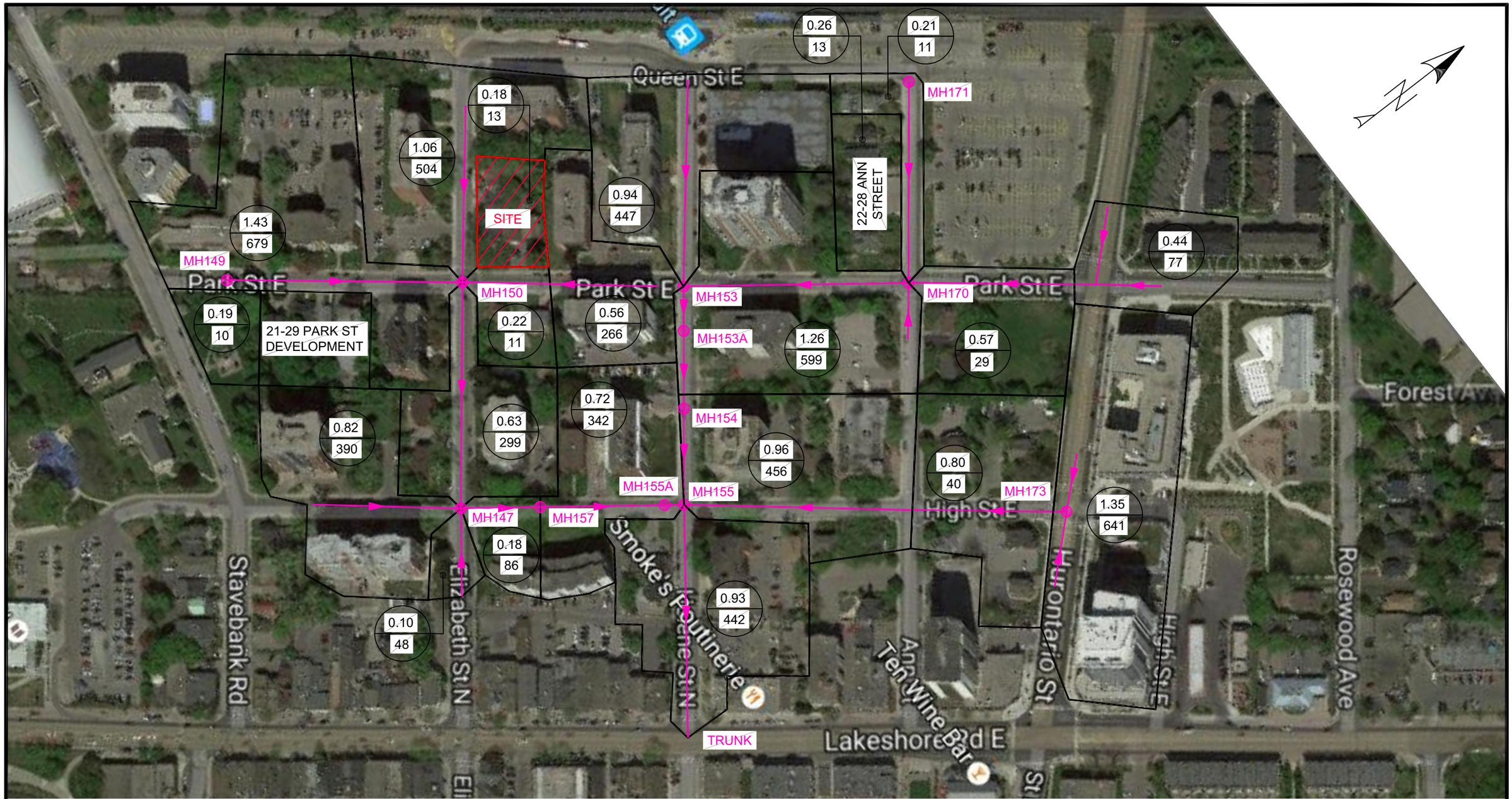
DATE: APR 2020
DESIGNED BY: MM
CHECKED BY: AW

DRAINAGE AREA PLAN NO.:

Manning's n= 0.013

LOCATION	FROM MH	TO MH	US INVERT (m)	DS INVERT (m)	US OBVERT (m)	DE OBVERT (m)	GROUND ELEV. @ US MH (m)	LENGTH (m)	SLOPE (%)	DIAMETER (mm)	PIPE CAPACITY (L/s)	PEAK FLOW (L/s)	HGL SLOPE (%)	US HGL (m)	DS HGL (m)	SURCHARGE ABOVE OBV @ US MH (m)	DISTANCE BELOW SURFACE @ US MH (m)
Park St E	149	150	76.53	76.10	76.78	76.35	79.62	113.5	0.38	250	36.7	16.6	0.078	76.44	76.35	-0.35	3.18
Elizabeth St	150	147	75.86	75.24	76.11	75.49	79.31	123.0	0.50	250	42.0	35.3	0.353	75.92	75.49	-0.18	3.39
High St E	147	157	75.21	75.08	75.58	75.46	77.50	40.0	0.30	375	96.0	41.2	0.055	75.48	75.46	-0.10	2.02
High St E	157	155A	75.06	74.73	75.44	75.11	77.00	70.0	0.47	375	120.2	44.9	0.066	75.15	75.11	-0.28	1.85
High St E	155A	155	74.73	74.67	75.11	75.04	77.15	13.0	0.47	375	120.2	44.9	0.066	75.05	75.04	-0.05	2.10
Helene St N	155	Lakeshore	74.68	74.30	75.13	74.75	77.22	125.8	0.30	450	156.2	80.2	0.079	74.85	74.75	-0.28	2.37

NOTE: For population of proposed development see Appendix B.



EXISTING SANITARY SEWER

SANITARY SEWER DRAINAGE BOUNDARY

0.93 / 442 — DRAINAGE AREA (IN HA) / ESTIMATED POPULATION IN DRAINAGE AREA

CLIENT
EDENSHAW ELIZABETH DEVELOPMENTS LIMITED

TITLE
42-46 PARK STREET E & 23 ELIZABETH STREET

SANITARY SEWER DRAINAGE PLAN

WSP
100 Commerce Valley Dr. West, Thornhill, ON Canada L3T 0A1
t: 905.882.1100 f: 905.882.0055 www.mmm.ca

Checked	A.W.	Drawn	10/12 Cad
Date	APR 2020	Proj. No.	20M-00430
Scale	NTS	Figure No.	SAN-1

APPENDIX D – Storm Sewer Analysis

DEVELOPMENT: 42-46 Park Street E & 23 Elizabeth Street
CONSULTANT: WSP Canada Group Limited
MAJOR DRAINAGE AREA:

SHEET: 1 of 2
DESIGNED BY: MM
CHECKED BY: AW

MISSISSAUGA Transportation and Works

STORM DRAINAGE DESIGN CHART
FOR CIRCULAR DRAINS FLOWING FULL

10 YEAR POST-DEVELOPMENT STORM DESIGN SHEET

LOCATION OF SITE	From Upstream MH#	To Downstream MH#	Adjacent Contributary Area A (ha)	Total Contributary Area ΣA (ha)	Runoff Coefficient C	Area Times Runoff Coefficient A*C	Accumulated Area Times Runoff Coefficient for Section ΣA*C	Time of Concentration at Upstream End of Section t_c (min)	Flow Time within Section t_f (min)	Time of Concentration at Downstream End of Section $tc=t_f + t_c$ (min)	Intensity of Rainfall (10 Year Event) i_{10} (mm / hr)	Quantity of Flow to be Accomodated in Section Q = 0.0028*AiC (m^3 / s)	Controlled Flow From Section (m^3 / s)	Accumulated Controlled Flow (m^3 / s)	TOTAL Quantity of Flow to be Accomodated in Section (m^3 / s)	Manning's Roughness Coefficient n	Slope s (%)	Nominal Diameter D (inches)	Nominal Diameter D (mm)	Length of Section L (ft)	Length of Section L (m)	Velocity of Flow with Pipe Flowing Full V (m / s)	Capacity of Pipe Flowing Full Q (m^3 / s)	SURCHARGED?	% FREE (m)	Time of Flow in Section $t = L/V*60$ (min)
High Rise			1.35	---	0.90	1.22	---																			
SF Homes			0.03	---	0.55	0.02	---																			
Park Street E (Total)			1.38	1.38	---	1.23	1.23																			
Park Street E (1/3)	23	25	0.46	0.46		0.41	0.41	15.00	0.39	15.39	99.17	0.114	0.000	0.000	0.114	0.013	1.54	12.00	300	130	39.6	1.698	0.120		5.02%	0.39
21-29 Park St. Development	SITE	25	0.31	0.31	0.00	0.00	0.00	15.00	0.00	15.00	99.17	0.000	0.026	0.026	0.026											
Park Street E (1/3)	25	26	0.46	1.23		0.41	0.82	15.39	0.25	15.64	97.66	0.224	0.000	0.026	0.250	0.013	0.81	12.00	300	60	18.3	1.231	0.087	SURCHARGED	-187.82%	0.25
Park Street E (1/3)	26	27	0.46	1.69		0.41	1.23	15.64	0.30	15.94	96.72	0.334	0.000	0.026	0.360	0.013	0.81	18.00	450	95	29.0	1.613	0.257	SURCHARGED	-40.11%	0.30
Park Street E	27	35	0.00	1.69		0.00	1.23	15.94	0.05	15.99	95.62	0.330	0.000	0.026	0.356	0.013	1.31	18.00	450	20	6.1	2.054	0.327	SURCHARGED	-8.92%	0.05
High Rise			1.14	---	0.90	1.03	---																			
SF Homes			0.58	---	0.55	0.32	---																			
Upstream of MH35	Upstream	35	1.72	1.72	---	1.35	1.35																			
High Rise			0.44	---	0.90	0.40	---																			
Dense Housing			0.22	---	0.65	0.14	---																			
Elizabeth Street (Total)			0.66	0.66	---	0.54	0.54																			
Elizabeth Street (1/3)	35	37	0.22	3.63		0.18	2.76	15.99	0.78	16.77	95.44	0.737	0.000	0.026	0.763	0.013	0.47	24.00	600	230	70.1	1.489	0.421	SURCHARGED	-81.16%	0.78
Elizabeth Street (1/3)	37	40	0.22	3.85		0.18	2.94	16.77	0.20	16.97	92.70	0.762	0.000	0.026	0.788	0.013	0.47	24.00	600	60	18.3	1.489	0.421	SURCHARGED	-87.20%	0.20
Elizabeth Street (1/3)	40	42	0.22	4.07		0.18	3.12	16.97	0.38	17.35	92.01	0.803	0.000	0.026	0.829	0.013	0.47	24.00	600	110	33.5	1.489	0.421	SURCHARGED	-96.86%	0.38
Elizabeth Street	42	21	0.00	4.07		0.00	3.12	17.35	0.09	17.44	90.78	0.792	0.000	0.026	0.818	0.013	0.44	24.00	600	25	7.6	1.440	0.407	SURCHARGED	-100.82%	0.09
High Rise/Commercial			4.40	---	0.90	3.96	---																			
Park			0.20	---	0.30	0.06	---																			
Upstream of MH21	Upstream	21	4.60	4.60	---	4.02	4.02																			
High Street E (Total)			1.00	1.00	0.90	0.90	0.90																			
High Street E (1/2)	21	48	0.50	9.17		0.45	7.59	17.44	0.92	18.35	90.50	1.922	0.000	0.026	1.948	0.013	0.30	33.00	825	265	80.8	1.471	0.786	SURCHARGED	-147.79%	0.92
High Street E (1/2)	48	50	0.50	9.67		0.45	8.04	18.35	0.60	18.96	87.67	1.973	0.000	0.026	1.999	0.013	0.30	33.00	825	175	53.3	1.471	0.786	SURCHARGED	-154.20%	0.60
Single Family			0.06	---	0.55	0.03	---																			
Parking Lot			0.91	---	0.90	0.82	---																			
Ann Street	68	70	---	---	---	0.85	0.85	15.00	0.39	15.39	99.17	0.236	0.000	0.000	0.236	0.013	1.54	12.00	300	131	39.9	1.698	0.120	SURCHARGED	-96.67%	0.39
Ann Street	70	72	0.00	---	---	0.00	0.85	15.39	0.07	15.46	97.65	0.232	0.000	0.000	0.232	0.013	1.25	12.00	300	20	6.1	1.530	0.108	SURCHARGED	-114.95%	0.07
Park Street E (Total)			0.80	---	0.90	0.72	---																			
22-28 ANN STREET			---	---	---								0.018	0.018												
Park Street E (1/3)	72	74	---	---	---	0.24	1.09	15.46	0.53	15.99	97.39	0.297	0.000	0.018	0.315	0.013	1.32	15.00	375	190	57.9	1.824	0.201	SURCHARGED	-56.35%	0.53
Park Street E (1/3)	74	76	---	---	---	0.24	1.33	15.99	0.38	16.36	95.44	0.355	0.000	0.018	0.373	0.013	1.04	15.00	375	120	36.6	1.619	0.179	SURCHARGED	-108.67%	0.38
Park Street E (1/3)	76	66	---	---	---	0.24	1.57	16.36	0.31	16.67	94.10	0.414	0.000	0.018	0.431	0.013	0.95	18.00	450	105	32.0	1.747	0.278	SURCHARGED	-55.22%	0.31
Helene St N	North	66	1.76	---	0.90	1.58	1.58																			
Helene St N (Total)			0.42	---	0.90	0.38	---																			
Helene St N (1/4)	66	78	---	---	---	0.09	3.25	16.67	0.35	17.02	93.04	0.846	0.000	0.018	0.864	0.013	1.75	24.00	600	200	61.0	2.873	0.812	SURCHARGED	-6.37%	0.35
Helene St N (1/4)	78	80	---	---	---	0.09	3.34	17.02	0.31	17.34	91.85	0.860	0.000	0.018	0.877	0.013	1.72	24.00	600	175	53.3	2.848	0.805	SURCHARGED	-8.97%	0.31
Helene St N (1/4)	80	50	---	---	---	0.09	3.44	17.34	0.04	17.37	90.83	0.874	0.000	0.018	0.892	0.013	1.72	24.00	600	20	6.1	2.848	0.805	SURCHARGED	-10.76%	0.04
Helene St N (1/4)	50	97	---	---	---	0.09	11.57	18.96	0.13	19.09	85.91	2.783	0.000	0.044	2.826	0.013	0.25	48.00	1,200	45	13.7	1.724	1.949	SURCHARGED	-44.99%	0.13
			0.43	---	0.55	0.24	---																			
High Street E	East	97	2.17	---	0.90	1.95	2.19																			
Helene Street N	97	Trunk	0.81	0.81	0.90	0.73	14.49	19.09	1.16	20.25	85.54	3.469	0.000	0.044	3.513	0.013	0.25	48.00	1,200	230.0	120.0	1.724	1.949	SURCHARGED	-80.22%	1.16

Notes

DEVELOPMENT: 42-46 Park Street E & 23 Elizabeth Street
CONSULTANT: WSP Canada Group Limited
MAJOR DRAINAGE AREA:

SHEET: 1 of 2
DESIGNED BY: MM
CHECKED BY: AW

MISSISSAUGA Transportation and Works

STORM DRAINAGE DESIGN CHART
FOR CIRCULAR DRAINS FLOWING FULL

10 YEAR POST-DEVELOPMENT STORM DESIGN SHEET

LOCATION OF SITE	From Upstream MH#	To Downstream MH#	Adjacent Contributary Area A (ha)	Total Contributary Area ΣA (ha)	Runoff Coefficient C	Area Times Runoff Coefficient A*C	Accumulated Area Times Runoff Coefficient for Section ΣA*C	Time of Concentration at Upstream End of Section tc_i (min)	Flow Time within Section tc_f (min)	Time of Concentration at Downstream End of Section $tc = tc_f + tc_i$ (min)	Intensity of Rainfall (10 Year Event) i_{10} (mm / hr)	Quantity of Flow to be Accomodated in Section Q = 0.0028*AiC (m^3 / s)	Controlled Flow From Section (m^3 / s)	Accumulated Controlled Flow (m^3 / s)	TOTAL Quantity of Flow to be Accomodated in Section (m^3 / s)	Manning's Roughness Coefficient n	Slope s (%)	Nominal Diameter D (inches)	Nominal Diameter D (mm)	Length of Section L (ft)	Length of Section L (m)	Velocity of Flow with Pipe Flowing Full V (m / s)	Capacity of Pipe Flowing Full Q (m^3 / s)	SURCHARGED?	% FREE (m)	Time of Flow in Section $t = L/V*60$ (min)
High Rise			1.35	---	0.90	1.22	---																			
SF Homes			0.03	---	0.55	0.02	---																			
Park Street E (Total)			1.38	1.38	---	1.23	1.23																			
Park Street E (1/3)	23	25	0.46	0.46		0.41	0.41	15.00	0.39	15.39	99.17	0.114	0.000	0.000	0.114	0.013	1.54	12.00	300	130	39.6	1.698	0.120		5.02%	0.39
21-29 Park St. Development	SITE	25	0.31	0.31	0.00	0.00	0.00	15.00	0.00	15.00	99.17	0.000	0.026	0.026	0.026											
Park Street E (1/3)	25	26	0.46	1.23		0.41	0.82	15.39	0.25	15.64	97.66	0.224	0.000	0.026	0.250	0.013	0.81	12.00	300	60	18.3	1.231	0.087	SURCHARGED	-187.82%	0.25
Park Street E (1/3)	26	27	0.46	1.69		0.41	1.23	15.64	0.30	15.94	96.72	0.334	0.000	0.026	0.360	0.013	0.81	18.00	450	95	29.0	1.613	0.257	SURCHARGED	-40.11%	0.30
Park Street E	27	35	0.00	1.69		0.00	1.23	15.94	0.05	15.99	95.62	0.330	0.000	0.026	0.356	0.013	1.31	18.00	450	20	6.1	2.054	0.327	SURCHARGED	-8.92%	0.05
High Rise			1.14	---	0.90	1.03	---																			
Proposed Development	Site	35	0.18		0.00	0.00	---						0.006	0.006												
Upstream of MH35	Upstream	35	1.32	1.32	---	1.03	1.03																			
High Rise			0.44	---	0.90	0.40	---																			
Dense Housing			0.22	---	0.65	0.14	---																			
Elizabeth Street (Total)			0.66	0.66	---	0.54	0.54																			
Elizabeth Street (1/3)	35	37	0.22	3.23		0.18	2.44	15.99	0.78	16.77	95.44	0.651	0.000	0.032	0.683	0.013	0.47	24.00	600	230	70.1	1.489	0.421	SURCHARGED	-62.33%	0.78
Elizabeth Street (1/3)	37	40	0.22	3.45		0.18	2.62	16.77	0.20	16.97	92.70	0.679	0.000	0.032	0.711	0.013	0.47	24.00	600	60	18.3	1.489	0.421	SURCHARGED	-68.96%	0.20
Elizabeth Street (1/3)	40	42	0.22	3.67		0.18	2.80	16.97	0.38	17.35	92.01	0.720	0.000	0.032	0.752	0.013	0.47	24.00	600	110	33.5	1.489	0.421	SURCHARGED	-78.76%	0.38
Elizabeth Street	42	21	0.00	3.67		0.00	2.80	17.35	0.09	17.44	90.78	0.711	0.000	0.032	0.743	0.013	0.44	24.00	600	25	7.6	1.440	0.407	SURCHARGED	-82.39%	0.09
High Rise/Commercial			4.40	---	0.90	3.96	---																			
Park			0.20	---	0.30	0.06	---																			
Upstream of MH21	Upstream	21	4.60	4.60	---	4.02	4.02																			
High Street E (Total)			1.00	1.00	0.90	0.90	0.90																			
High Street E (1/2)	21	48	0.50	8.77		0.45	7.27	17.44	0.92	18.35	90.50	1.841	0.000	0.032	1.873	0.013	0.30	33.00	825	265	80.8	1.471	0.786	SURCHARGED	-138.27%	0.92
High Street E (1/2)	48	50	0.50	9.27		0.45	7.72	18.35	0.60	18.96	87.67	1.894	0.000	0.032	1.926	0.013	0.30	33.00	825	175	53.3	1.471	0.786	SURCHARGED	-145.00%	0.60
Single Family			0.06	---	0.55	0.03	---																			
Parking Lot			0.91	---	0.90	0.82	---																			
Ann Street	68	70	---	---	---	0.85	0.85	15.00	0.39	15.39	99.17	0.236	0.000	0.000	0.236	0.013	1.54	12.00	300	131	39.9	1.698	0.120	SURCHARGED	-96.67%	0.39
Ann Street	70	72	0.00	---	---	0.00	0.85	15.39	0.07	15.46	97.65	0.232	0.000	0.000	0.232	0.013	1.25	12.00	300	20	6.1	1.530	0.108	SURCHARGED	-114.95%	0.07
Park Street E (Total)			0.80	---	0.90	0.72	---																			
22-28 ANN STREET			---	---	---								0.018	0.018												
Park Street E (1/3)	72	74	---	---	---	0.24	1.09	15.46	0.53	15.99	97.39	0.297	0.000	0.018	0.315	0.013	1.32	15.00	375	190	57.9	1.824	0.201	SURCHARGED	-56.35%	0.53
Park Street E (1/3)	74	76	---	---	---	0.24	1.33	15.99	0.38	16.36	95.44	0.355	0.000	0.018	0.373	0.013	1.04	15.00	375	120	36.6	1.619	0.179	SURCHARGED	-108.67%	0.38
Park Street E (1/3)	76	66	---	---	---	0.24	1.57	16.36	0.31	16.67	94.10	0.414	0.000	0.018	0.431	0.013	0.95	18.00	450	105	32.0	1.747	0.278	SURCHARGED	-55.22%	0.31
Helene St N	North	66	1.76	---	0.90	1.58	1.58																			
Helene St N (Total)			0.42	---	0.90	0.38	---																			
Helene St N (1/4)	66	78	---	---	---	0.09	3.25	16.67	0.35	17.02	93.04	0.846	0.000	0.018	0.864	0.013	1.75	24.00	600	200	61.0	2.873	0.812	SURCHARGED	-6.37%	0.35
Helene St N (1/4)	78	80	---	---	---	0.09	3.34	17.02	0.31	17.34	91.85	0.860	0.000	0.018	0.877	0.013	1.72	24.00	600	175	53.3	2.848	0.805	SURCHARGED	-8.97%	0.31
Helene St N (1/4)	80	50	---	---	---	0.09	3.44	17.34	0.04	17.37	90.83	0.874	0.000	0.018	0.892	0.013	1.72	24.00	600	20	6.1	2.848	0.805	SURCHARGED	-10.76%	0.04
Helene St N (1/4)	50	97	---	---	---	0.09	11.25	18.96	0.13	19.09	85.91	2.706	0.000	0.050	2.756	0.013	0.25	48.00	1,200	45	13.7	1.724	1.949	SURCHARGED	-41.36%	0.13
High Street E	East	97	0.43	---	0.55	0.24	---																			
			2.17	---	0.90	1.95	2.19																			
Helene Street N	97	Trunk	0.81	0.81	0.90	0.73	14.17	19.09	1.16	20.25	85.54	3.393	0.000	0.050	3.443	0.013	0.25	48.00	1,200	230.0	120.0	1.724	1.949	SURCHARGED	-76.61%	1.16

Notes

DEVELOPMENT 42-46 Park Street E & 23 Elizabeth Street

CONSULTANT WSP Canada Group Limited

MAJOR DRAINAGE AREA

DESIGNED BY MM

CHECKED BY AW

MISSISSAUGA Transportation and Works

10 YEAR POST-DEVELOPMENT STORM HGL ANALYSIS

LOCATION OF SITE	From Upstream MH#	To Downstream MH#	US Invert (m)	DS Invert (m)	US Obvert (m)	DS Obvert (m)	Ground Elevation @ US MH (m)	Length m	Slope (%)	Diameter mm	Pipe Capacity m3/s	Pipe Capacity L/s	Peak Flow m3/s	Peak Flow L/s	HGL Slope (%)	US HGL	DS HGL	Surcharge Above Obvert @ US MH	Distance Below Surface @ US MH
Park Street E	**SITE**	**35**	78.18	78.10	78.48	78.40	80.02	11.0	3.00	300	0.168	168	0.026	26.0	0.072	81.55	81.54	3.07	-1.53
Elizabeth Street	**35**	**37**	76.05	75.72	76.65	76.32	79.53	70.1	0.47	600	0.421	420.9	0.763	762.6	1.542	81.54	80.46	4.90	-2.02
Elizabeth Street	**37**	**40**	75.72	75.63	76.32	76.23	77.38	18.3	0.47	600	0.421	420.9	0.788	788.0	1.647	80.46	80.16	4.14	-3.08
Elizabeth Street	**40**	**42**	75.63	75.47	76.23	76.07	77.20	33.5	0.47	600	0.421	420.9	0.829	828.7	1.821	80.16	79.55	3.93	-2.96
Elizabeth Street	**42**	**21**	75.47	75.44	76.07	76.04	77.31	7.6	0.44	600	0.407	407.3	0.818	817.9	1.775	79.55	79.42	3.48	-2.24
High Street E	**21**	**48**	75.44	75.20	76.26	76.02	77.69	80.8	0.30	825	0.786	786.2	1.948	1,948.1	1.842	79.42	77.93	3.15	-1.73
High Street E	**48**	**50**	75.19	75.03	76.02	75.86	76.83	53.3	0.30	825	0.786	786.2	1.999	1,998.6	1.939	77.93	76.89	1.91	-1.09
Ann Street	**68**	**70**	81.38	80.77	81.68	81.07	82.93	39.9	1.54	300	0.120	120.0	0.236	236.0	5.957	86.53	84.16	4.85	-3.61
Ann Street	**70**	**72**	80.77	80.70	81.07	81.00	82.24	6.1	1.25	300	0.108	108.1	0.232	232.4	5.776	84.16	83.80	3.08	-1.91
Park Street E	**72**	**74**	80.62	79.86	80.99	80.23	82.48	57.9	1.32	375	0.201	201.4	0.315	314.9	3.227	83.80	81.94	2.81	-1.32
Park Street E	**74**	**76**	79.86	79.48	80.23	79.85	81.26	36.6	1.04	375	0.179	178.8	0.373	373.1	4.528	81.94	80.28	1.70	-0.68
Park Street E	**76**	**66**	79.40	79.10	79.85	79.55	80.83	32.0	0.95	450	0.278	277.9	0.431	431.3	2.289	80.28	79.55	0.43	0.55
Helene Street N	**66**	**78**	77.88	76.81	78.48	77.41	81.38	61.0	1.75	600	0.812	812.3	0.864	864.0	1.980	79.32	78.11	0.84	2.06
Helene Street N	**78**	**80**	76.50	75.59	77.10	76.19	79.02	53.3	1.72	600	0.805	805.3	0.877	877.5	2.042	78.11	77.02	1.01	0.91
Helene Street N	**80**	**50**	75.69	75.59	76.29	76.19	77.14	6.1	1.72	600	0.805	805.3	0.892	891.9	2.110	77.02	76.89	0.73	0.12
Helene Street N	**50**	**97**	74.98	74.95	76.18	76.15	77.28	13.7	0.25	1,200	1.949	1,949.4	2.826	2,826.3	0.526	76.89	76.82	0.71	0.39
Helene Street N	**97**	**Trunk**	74.95	74.65	76.15	75.85	77.15	120.0	0.25	1,200	1.949	1,949.4	3.513	3,513.1	0.812	76.82	75.85	0.67	0.33

Notes

DEVELOPMENT 42-46 Park Street E & 23 Elizabeth Street

CONSULTANT WSP Canada Group Limited

MAJOR DRAINAGE AREA

DESIGNED BY MM

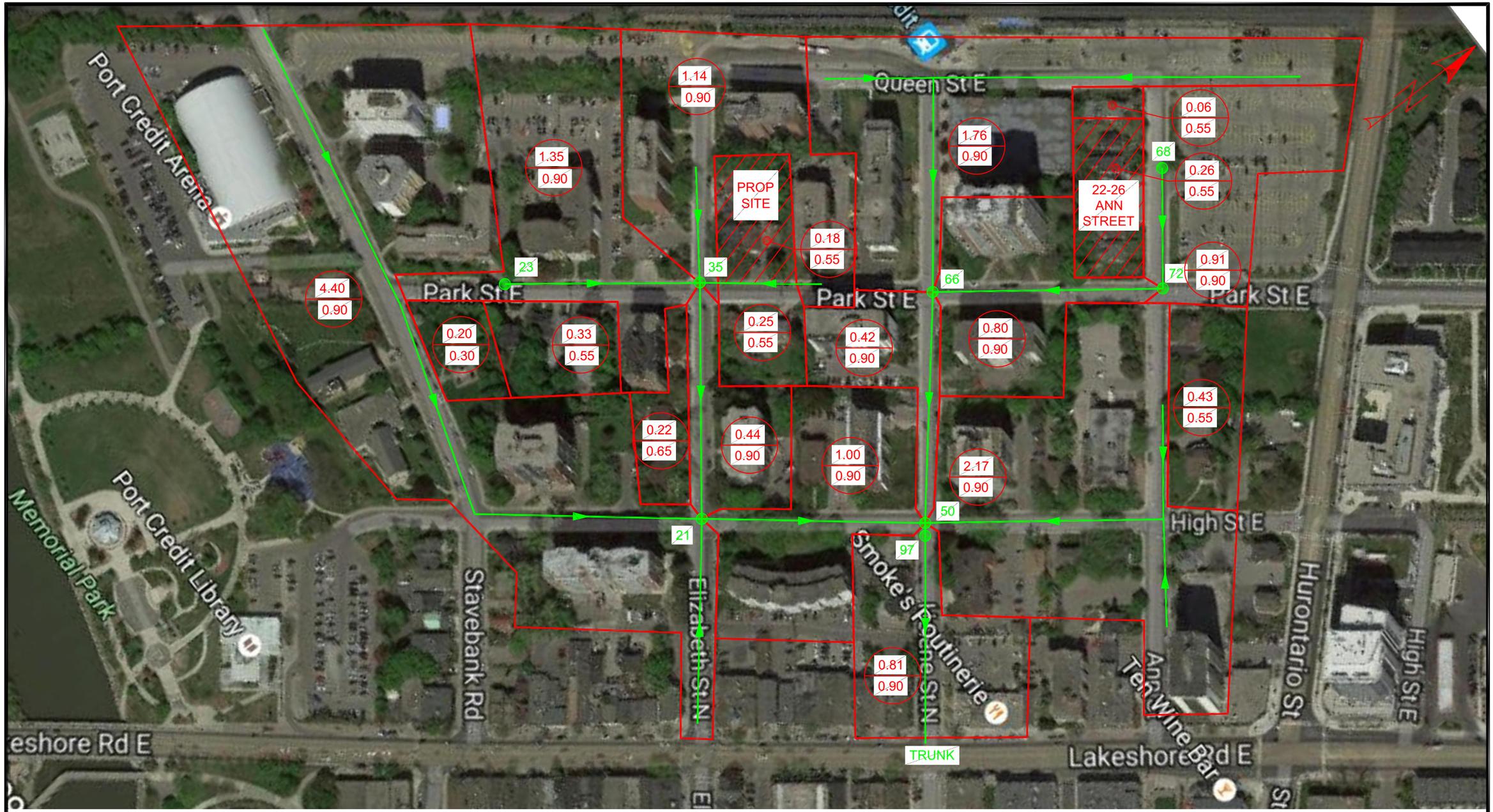
CHECKED BY AW

MISSISSAUGA Transportation and Works

10 YEAR POST-DEVELOPMENT STORM HGL ANALYSIS

LOCATION OF SITE	From Upstream MH#	To Downstream MH#	US Invert (m)	DS Invert (m)	US Obvert (m)	DS Obvert (m)	Ground Elevation @ US MH (m)	Length m	Slope (%)	Diameter mm	Pipe Capacity m3/s	Pipe Capacity L/s	Peak Flow m3/s	Peak Flow L/s	HGL Slope (%)	US HGL	DS HGL	Reduction in US HGL Elevation as a Result of Development (m)	Surcharge Above Obvert @ US MH	Distance Below Surface @ US MH
Park Street E	**SITE**	**35**	78.18	78.10	78.48	78.40	80.02	11.0	3.00	300	0.168	167.5	0.026	26.0	0.072	80.92	80.92	0.63	2.44	-0.90
Elizabeth Street	**35**	**37**	76.05	75.72	76.65	76.32	79.53	70.1	0.47	600	0.421	420.9	0.683	683.3	1.238	80.92	80.05	0.63	4.27	-1.39
Elizabeth Street	**37**	**40**	75.72	75.63	76.32	76.23	77.38	18.3	0.47	600	0.421	420.9	0.711	711.2	1.342	80.05	79.80	0.41	3.73	-2.67
Elizabeth Street	**40**	**42**	75.63	75.47	76.23	76.07	77.20	33.5	0.47	600	0.421	420.9	0.752	752.5	1.502	79.80	79.30	0.36	3.57	-2.60
Elizabeth Street	**42**	**21**	75.47	75.44	76.07	76.04	77.31	7.6	0.44	600	0.407	407.3	0.743	742.8	1.464	79.30	79.19	0.25	3.23	-1.99
High Street E	**21**	**48**	75.44	75.20	76.26	76.02	77.69	80.8	0.30	825	0.786	786.2	1.873	1,873.3	1.703	79.19	77.81	0.23	2.92	-1.50
High Street E	**48**	**50**	75.19	75.03	76.02	75.86	76.83	53.3	0.30	825	0.786	786.2	1.926	1,926.3	1.801	77.81	76.85	0.12	1.79	-0.98
Ann Street	**68**	**70**	81.38	80.77	81.68	81.07	82.93	39.9	1.54	300	0.120	120.0	0.236	236.0	5.957	86.53	84.16	0.00	4.85	-3.61
Ann Street	**70**	**72**	80.77	80.70	81.07	81.00	82.24	6.1	1.25	300	0.108	108.1	0.232	232.4	5.776	84.16	83.80	0.00	3.08	-1.91
Park Street E	**72**	**74**	80.62	79.86	80.99	80.23	82.48	57.9	1.32	375	0.201	201.4	0.315	314.9	3.227	83.80	81.94	0.00	2.81	-1.32
Park Street E	**74**	**76**	79.86	79.48	80.23	79.85	81.26	36.6	1.04	375	0.179	178.8	0.373	373.1	4.528	81.94	80.28	0.00	1.70	-0.68
Park Street E	**76**	**66**	79.40	79.10	79.85	79.55	80.83	32.0	0.95	450	0.278	277.9	0.431	431.3	2.289	80.28	79.55	0.00	0.43	0.55
Helene Street N	**66**	**78**	77.88	76.81	78.48	77.41	81.38	61.0	1.75	600	0.812	812.3	0.864	864.0	1.980	79.28	78.07	0.04	0.80	2.11
Helene Street N	**78**	**80**	76.50	75.59	77.10	76.19	79.02	53.3	1.72	600	0.805	805.3	0.877	877.5	2.042	78.07	76.98	0.04	0.96	0.95
Helene Street N	**80**	**50**	75.69	75.59	76.29	76.19	77.14	6.1	1.72	600	0.805	805.3	0.892	891.9	2.110	76.98	76.85	0.04	0.69	0.16
Helene Street N	**50**	**97**	74.98	74.95	76.18	76.15	77.28	13.7	0.25	1,200	1.949	1,949.4	2.756	2,755.6	0.500	76.85	76.78	0.04	0.67	0.43
Helene Street N	**97**	**Trunk**	74.95	74.65	76.15	75.85	77.15	120.0	0.25	1,200	1.949	1,949.4	3.443	3,442.7	0.780	76.78	75.85	0.04	0.64	0.37

Notes



EXISTING STORM SEWER

STORM SEWER DRAINAGE BOUNDARY

0.81 / 0.90 — DRAINAGE AREA (IN HA) / RUN-OFF COEFFICIENT

CLIENT
EDENSHAW ELIZABETH DEVELOPMENTS LIMITED

TITLE
42-46 PARK STREET E & 23 ELIZABETH STREET

STORM SEWER DRAINAGE PLAN

100 Commerce Valley Dr. West, Thornhill, ON Canada L3T 0A1
t: 905.882.1100 f: 905.882.0055 www.mmm.ca

Checked	A.W.	Drawn	10/12 Cad
Date	APR 2020	Proj. No.	20M-00430
Scale	NTS	Figure No.	STM-1