EDENSHAW ANN DEVELOPMENTS LIMITED

22-28 ANN STREET & 78 PARK STREET EAST

FUNCTIONAL SERVICING REPORT

MAY 10, 2019

22-28 ANN STREET & 78 PARK STREET EAST

FUNCTIONAL SERVICING REPORT

EDENSHAW ANN DEVELOPMENTS LIMITED

FUNCTIONAL SERVICING REPORT

PROJECT NO.: 19M-00253
DATE: MAY 10, 2019

WSP CANADA GROUP LIMITED
SUITE 201
701 ROSSLAND ROAD EAST
WHITBY, ON, CANADA L1N 8Y9

T: +1 905 668-3022
F: +1 905 668-9443
WSP.COM

SIGNATURES

PREPARED BY

Andrew Kerr, P.Eng.
Project Engineer

REVIEWED BY

Alex Williams, P.Eng.
Project Manager

This report was prepared by WSP Canada Group Limited for the account of EDENSHAW ANN DEVELOPMENTS LIMITED, in accordance with the professional services agreement. The disclosure of any information contained in this report is the sole responsibility of the intended recipient. The material in it reflects WSP Canada Group Limited's best judgement in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. WSP Canada Group Limited accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. This limitations statement is considered part of this report.

The original of the technology-based document sent herewith has been authenticated and will be retained by WSP for a minimum of ten years. Since the file transmitted is now out of WSP's control and its integrity can no longer be ensured, no guarantee may be given with regards to any modifications made to this document.

TABLE OF CONTENTS

FIGURES

APPENDICES

1 INTRODUCTION

1.1 INTRODUCTION

WSP Canada Group Limited (herein called WSP) has been retained to prepare a Functional Servicing Report to assess the servicing requirements relating to the proposed development at 22-28 Ann Street and 78 Park Street East in the City of Mississauga. This report provides the conceptual framework for water distribution, sanitary sewage, and storm drainage for the development of this site. 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.

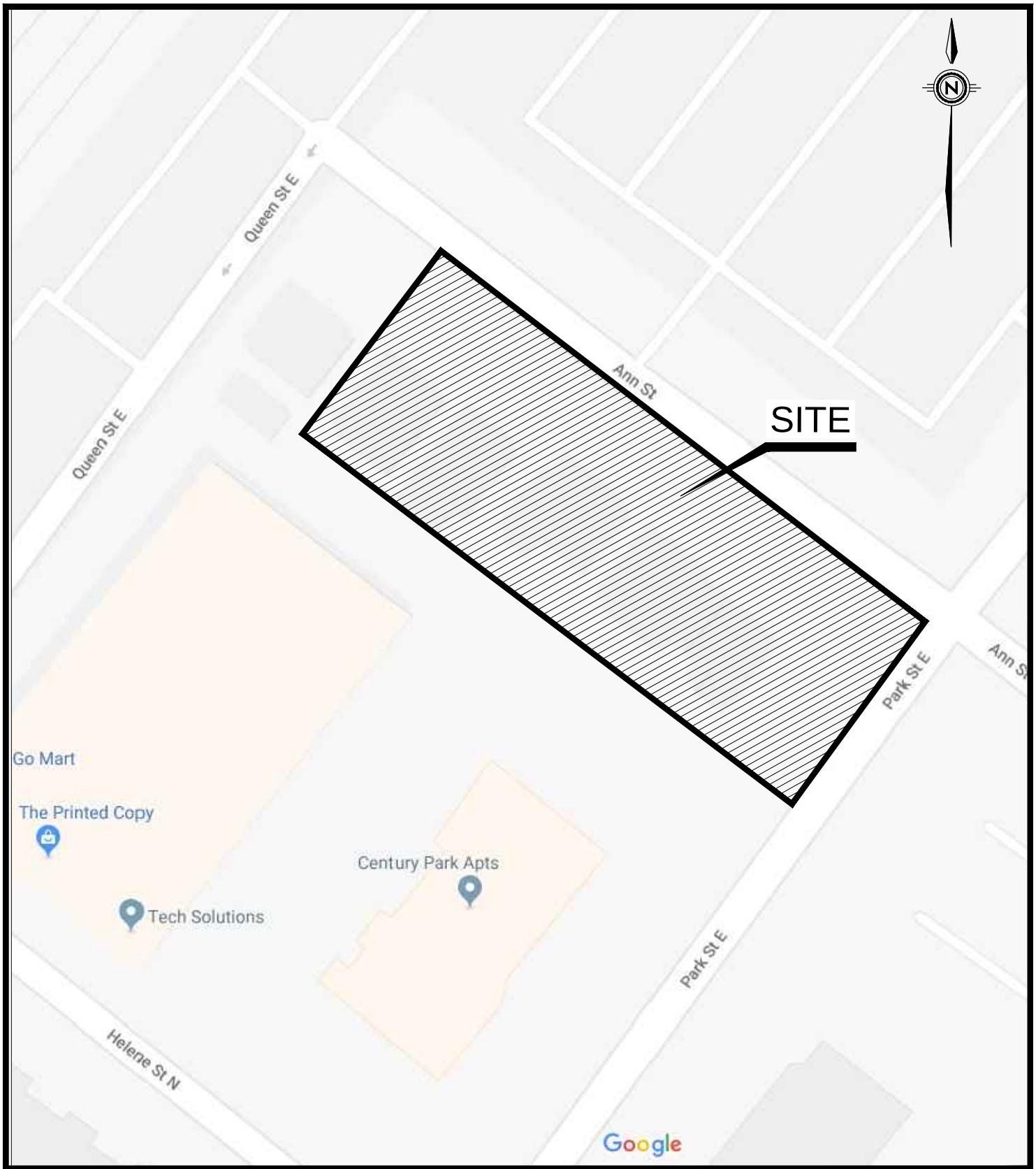
In preparing this report, WSP staff reviewed and secured available City of Mississauga and Region of Peel Plan and Profile Drawings, as well as the architectural site plans prepared by IBI Group Architects, a survey prepared by Tarasick McMillan Kubicki Limited, and SUE investigation by Multiview Locates Inc.

1.2 SITE DESCRIPTION

The site is a 0.26 ha parcel of land located at the west corner of Ann Street and Park Street East intersection, consisting of municipal addresses 22-28 Ann Street and 78 Park Street East. In the predevelopment condition the site is contains four detached single family residential homes as well as a 3 storey multi-unit apartment building.

The proposed site development includes a 22-storey residential condominium building with an estimated 313 residential units, 3 live/work units and 4 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 right-of-ways. All existing service connections within the site will be decommissioned per Region of Peel and City of Mississauga Standards at the owner's cost. The proposed service connections will be extended to the underground parking foundation wall and coordinated with the building design team during detailed design. Refer to Figure 1.1 for the Location Map, Figure 1.2 for the Pre-development Site Condition and Figure 1.3 for an illustration of the Proposed Development Plan.



CLIENT

EDENSHAW ANN DEVELOPMENTS LIMITED

TITLE

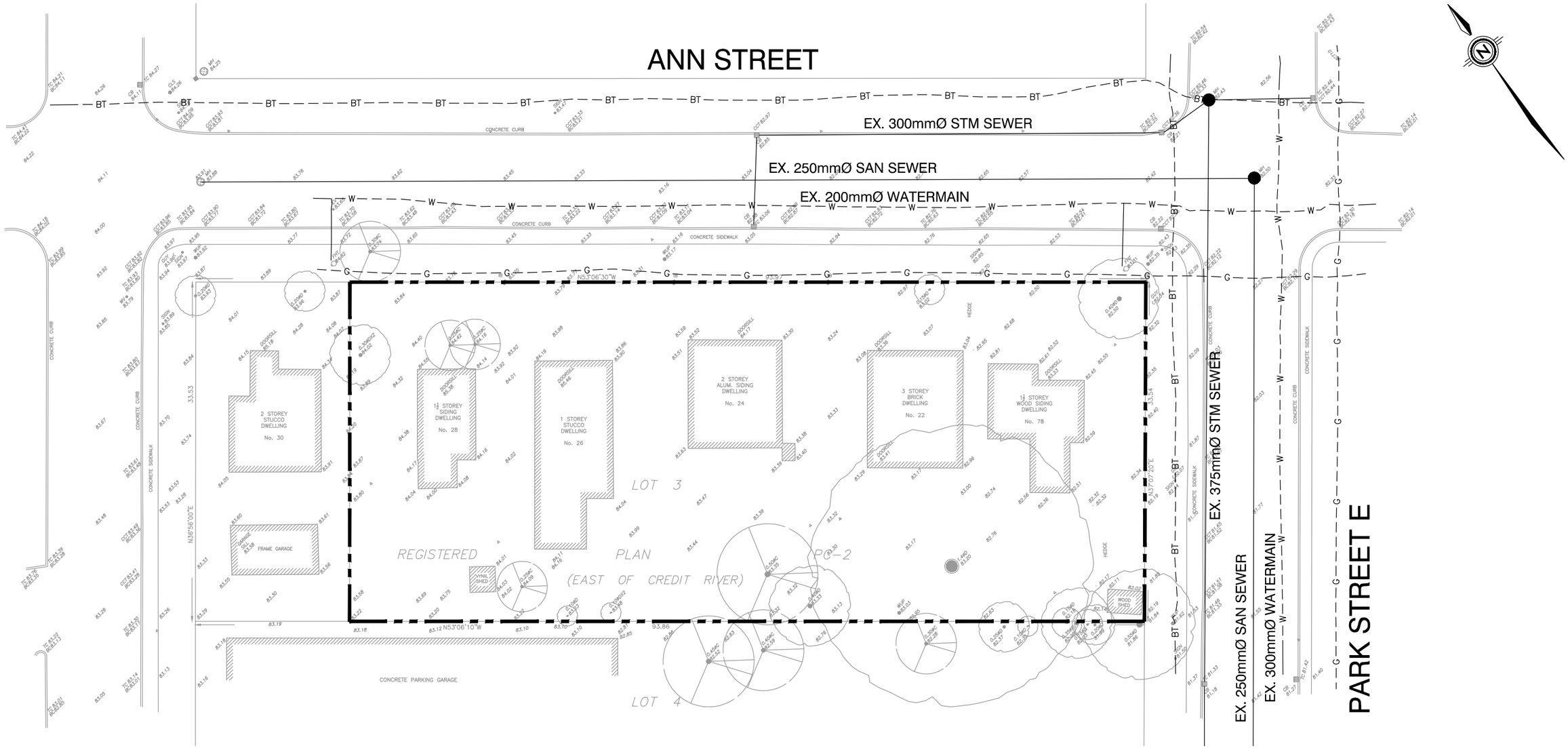
22 - 28 ANN STREET

LOCATION 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	MAY 2019	Proj. No.	19M-00253
Scale	NTS	Figure No.	1.1



LEGEND

PROPERTY LINE

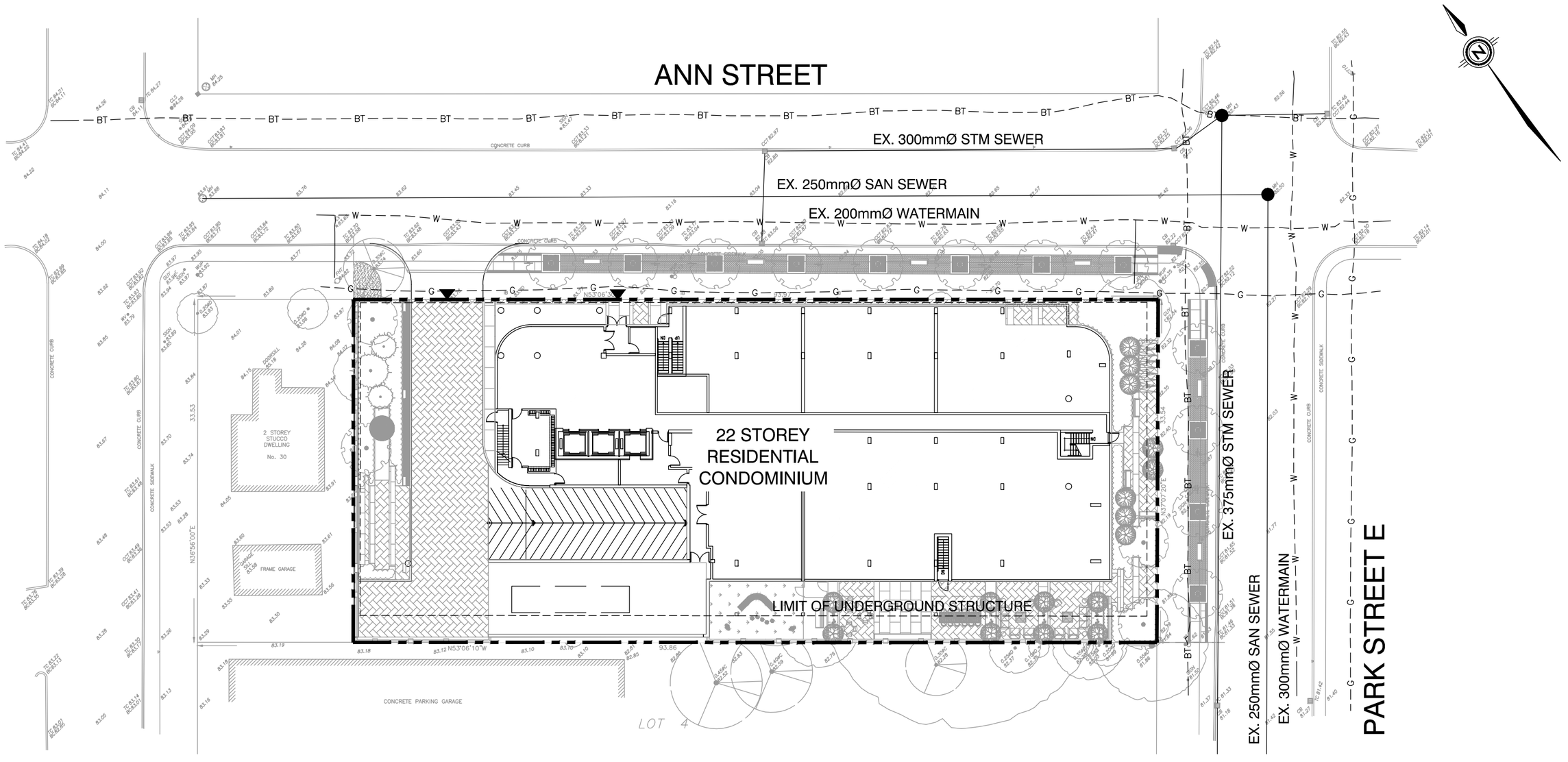
CLIENT
EDENSHAW ANN DEVELOPMENTS LIMITED

TITLE
22-28 ANN STREET

PRE-DEVELOPMENT PLAN

wsp

Checked	A.W.	Drawn	10/12 Cad
Date	MAY 2019	Proj. No.	19M-00253
Scale	1:400	Figure No.	1.2



LEGEND

PROPERTY LINE

CLIENT

EDENSHAW ANN DEVELOPMENTS LIMITED

TITLE

22-28 ANN STREET

PROPOSED DEVELOPMENT PLAN

wsp

Checked	A.W.	Drawn	10/12 Cad
Date	MAY 2019	Proj. No.	19M-00253
Scale	1:400	Figure No.	1.3

2 WATER SUPPLY AND APPURTENANCES

2.1 EXISTING CONDITIONS

Locally, there is a 200 mm diameter watermain on Ann Street, and a 300 mm diameter watermain on Park Street East.

2.2 WATER SUPPLY

In accordance with Region of Peel Standards, a 300 mm diameter watermain is required to service high density residential. Therefore, the proposed development will be serviced from the 300 mm diameter watermain on Park Street East. It is proposed to provide a 150 mm diameter domestic connection branching off a proposed 200 mm diameter fire service connection. The proposed connections will include valve and boxes at the property line. In addition, a water meter and a double detector check valve will be installed in the mechanical room within the building in accordance with the Region of Peel standards. 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 Figure 2.1 for proposed water servicing layout.

The estimated domestic water demand has been calculated using the Region of Peel Watermain Design Criteria and the site statistics provided by the architect. 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;

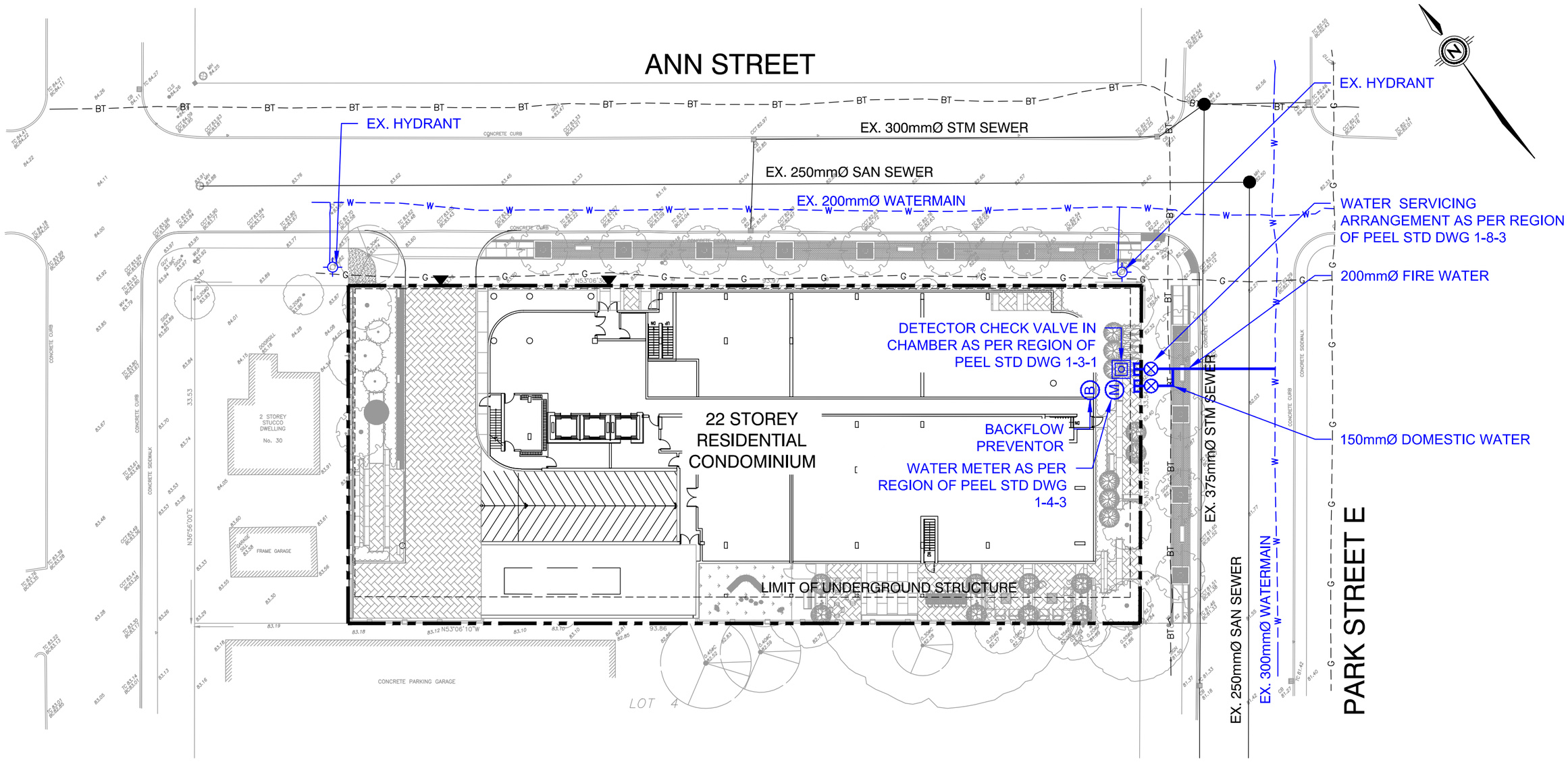
	Long Term	**Short Term**
Average Water Consumption Rate (Long Term)	280 litres/person/day	409 litres/person/day
Residential Apartment Units & Population Density	316 units / 2.7 people per unit	316 units / 2.7 people per unit
Total Residential Equivalent Population	854 people	854 people
Max Day Peaking Factor	2.0	2.0
Peak Hour Peaking Factor	3.0	3.0
Average Water Demand	2.77 L/s	4.04 L/s
Max Day Water Demand	5.54 L/s	8.09 L/s
Peak Hour Water Demand	8.30 L/s	12.13 L/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 for this proposed development is ~6,841 L/min (~1,805 US GPM). The results of these calculations are included in Appendix A.

Currently, there are two (2) existing hydrants in the vicinity of the proposed development. One is located near the south corner of Ann Street and Queen Street East intersection and the other is located near the west corner of Ann Street and Park Street East intersection. The proposed water servicing and existing hydrant locations are shown on Figure 2.1.

2.3 HYDRANT FLOW TEST

At the time of preparing this report, a hydrant flow test has not been completed. The test will be scheduled and conducted in the near future and the results will be analyzed against the required flow demand of the proposed development described above and included in the Functional Servicing Report at such time.



LEGEND

- LIMIT OF PROPERTY
- EX. WATERMAIN
- PROP. W/M CONNECTION
- PROP. VALVE & BOX
- PROP. SHUT-OFF VALVE

CLIENT

EDENSHAW ANN DEVELOPMENTS LIMITED

TITLE

22-28 ANN STREET

PROPOSED WATER SERVICING PLAN

wsp

Checked	A.W.	Drawn	10/12 Cad
Date	MAY 2019	Proj. No.	19M-00253
Scale	1:400	Figure No.	2.1

3 SANITARY SEWAGE SYSTEM

3.1 EXISTING CONDITIONS

Locally, there is a 250 mm diameter sanitary sewer on Ann Street and a 250 mm dimeter sanitary sewer on Park Street East. The Ann Street sewer flows southeast to the Park Street East sewer, the Park Street East sewer flows southwest to the Helene Street North sewer, and southeast along Helene Street to the trunk sewer on Lakeshore Road East sewer.

3.2 DESIGN PARAMETERS

The theoretical peak sanitary flows have been calculated using the following factors taken from the Region of Peel Sanitary Sewer Design Criteria, July 2009

- 50 ppl/ha (Single Family > 10m frontage)
- 70 ppl/ha (Single Family < 10m frontage)
- 70 ppl/ha (Semi-Detached)
- 175 ppl/ha (Row Dwellings)
- 475 ppl/ha (Apartments)
- 2.7 people per unit (For apartments with density greater than 475 ppl/ha)
- 302.8 L/cap/day average day flow generation rate
- Peaking Factor – Harmon Peaking Factor
- Infiltration = 0.0002m^3/s/ha

3.3 EXISTING FLOW TO SANITARY SEWER

Based on the design criteria noted above, it is estimated that in the pre-development condition the site discharged an average of 0.10 L/s to the sanitary sewer system and a peak of 0.25 L/s to the sanitary sewer system, including infiltration. Refer to Appendix B for detailed pre-development sanitary flow rate calculations.

3.4 POST DEVELOPMENT SANITARY SEWER FLOW

An estimate of the post-development sanitary sewage flows to the downstream sanitary sewer system has been calculated based on the Region of Peel Sanitary Sewer Design Criteria and the preliminary site statistics provided by the architect. A summary of the calculations can be found below;

Sanitary Demand Rate	302.8 litres/person/day
Residential Population	854 people
Avg. Residential Flow	2.99 L/s
Infiltration	No infiltration (Entire site UG Parking)
Average Sanitary Flow from Site	2.99L/s
Peaking Factor	Residential: Harmon Peaking Factor (3.84)
Peak Sanitary Flow from Site	11.50 L/s
Net Sanitary Flow Increase in Peak Sanitary Flow from Site to Sanitary Sewer System	**11.25 L/s (11.50 L/s – 0.25 L/s)**

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

3.5 DOWNSTREAM SANITARY SEWER CAPACITY ANALYSIS

WSP has prepared a pre- and post-development downstream sanitary 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 from the site outlined 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.

A development application for the 21-29 Park Street East site has been submitted, and it is expected that the site will be developed in the near future. Therefore, the post-development sanitary flow, calculated based on the Region of Peel design

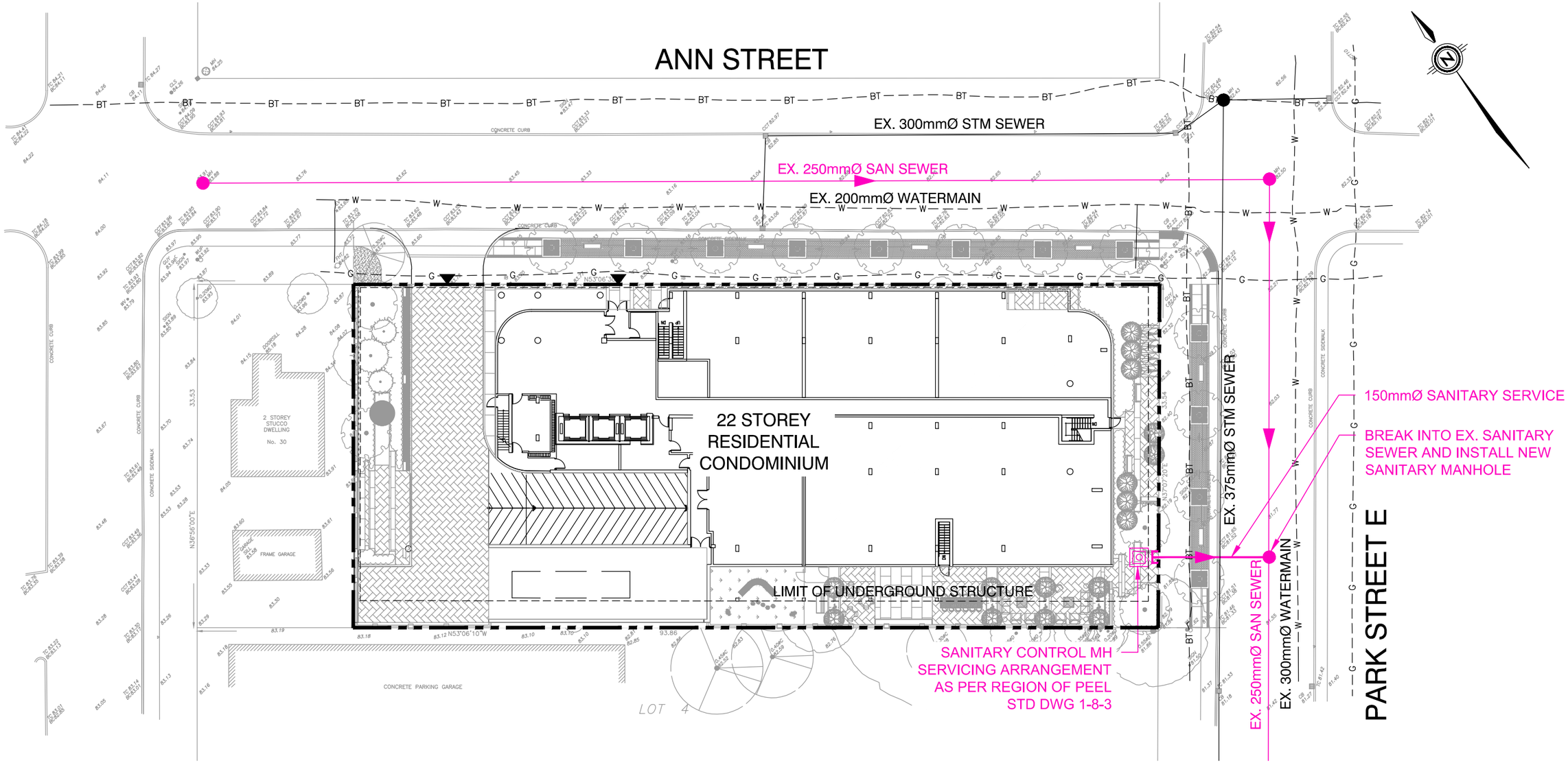
criteria and site statistics provided by the architect, has been included as an existing sanitary flow for the purpose of analyzing receiving sewer capacity.

In the post development condition, the analysis demonstrates that the existing municipal sewer system has adequate capacity to support the addition of 11.25 L/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 sewer improvements are required.

3.6 SANITARY SERVICE

It is proposed to service the site with a 150 mm diameter PVC sanitary service connected to the existing 250 mm sanitary sewer on Park Street East. A control manhole will be placed immediately inside the underground parking structure.

The internal sanitary sewer system within the parking structure will be designed by the mechanical engineer. Proposed sanitary sewers within the private site will be designed to meet Ontario Plumbing Code Standards. The sanitary service connection to the site within the existing municipal road allowance will be designed to the Region of Peel Standards. Refer to Figure 3.1 for proposed sanitary servicing layout.



LEGEND

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

CLIENT
EDENSHAW ANN DEVELOPMENTS LIMITED

TITLE
22-28 ANN STREET

PROPOSED SANITARY SERVICING PLAN

wsp

Checked	A.W.	Drawn	10/12 Cad
Date	MAY 2019	Proj. No.	19M-00253
Scale	1:400	Figure No.	3.1

4 STORM DRAINAGE

4.1 STORMWATER MANAGEMENT REPORT

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

4.2 EXISTING CONDITIONS

The existing storm sewer in the vicinity of the site is a 375mm diameter storm sewer on Park Street East.

4.3 PROPOSED DEVELOPMENT

The proposed development covers the majority of the site and as noted, includes a 22-storey residential building and below grade parking. All storm flows from the site will be captured and directed to a stormwater storage tank. The tank will be sized to reduce the 100-year post-development flows to the 2-year pre-development levels. The tank will have an access hatch which is accessible from the surface which will also double as an emergency overflow. For detailed storage and storm flow calculations, refer to separate Stormwater Management Report prepared by WSP.

4.4 GRADING

4.4.1 EXISTING CONDITIONS

WSP reviewed the topographical survey prepared Tarasick McMillan Kubicki Limited to determine the existing drainage patterns. Our review indicated that the site primarily drains south to Park Street East. Specifically, the existing buildings have a split drainage pattern, with the fronts of the buildings draining to Ann St and the rears of the buildings draining to Park Street East.

4.4.2 PROPOSED CONDITIONS

The Ann Street and Park Street East boulevards, adjacent to the proposed development, will be regraded to a 2.0% cross fall towards the roads, while maintaining the existing bottom of curb elevations. The existing elevations along the north and west property lines promote the overland drainage away from the proposed development and, therefore, will not require any changes to the grading design.

Refer to Figure 4.2 for the preliminary proposed grading.

4.5 MINOR STORM DRAINAGE SYSTEM

The storm flows will be directed to the stormwater cistern and controlled to an allowable release rate, which has been set to be equal to a 2-year storm in the pre-development condition.

It is proposed to provide a new 200 mm diameter storm connection that will connect to the existing 375 mm diameter storm sewer on Park Street East. A control manhole is proposed to be placed immediately inside the property line. The control manhole and cistern will be accessible at grade outside the building.

The new storm connection within the Park Street East 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 Figure 4.1 for the proposed storm sewer layout.

4.6 MAJOR STORM DRAINAGE SYSTEM

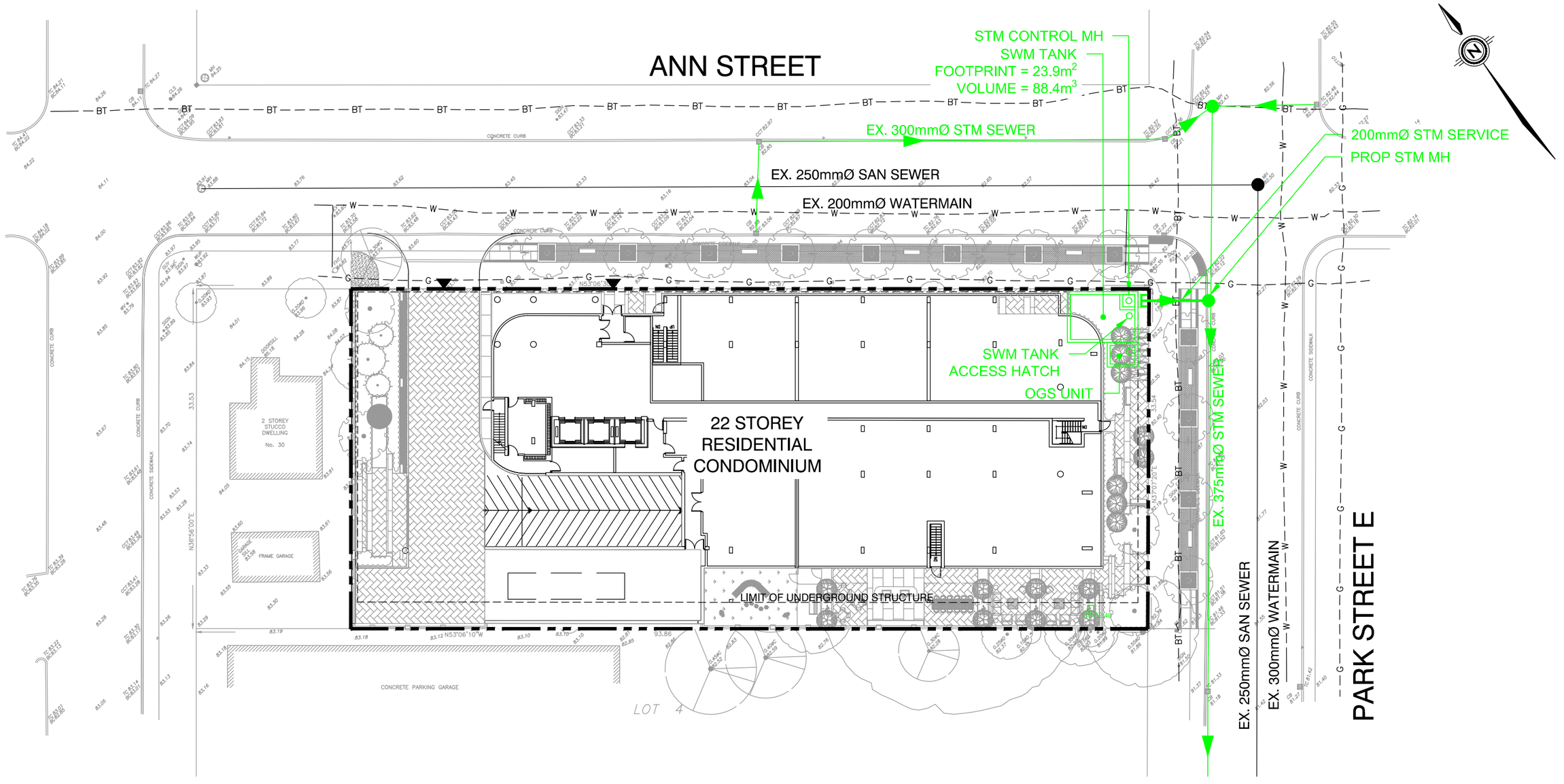
The storm flows will be collected by on site area drains and catchbasins connected to an internal storm drainage system and directed into the stormwater storage tank. The flow will be controlled by a flow control device and released to the City's storm sewer at the controlled release rate. In case of system failure, the system has been designed to have an emergency overflow access to the surface. Since all storm flows, up to 100-year storm events, will be reduced to the 2-year pre-development levels, the existing storm sewer system will not be adversely affected by the post-development condition.

4.7 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 from 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 condition 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 ANN DEVELOPMENTS LIMITED

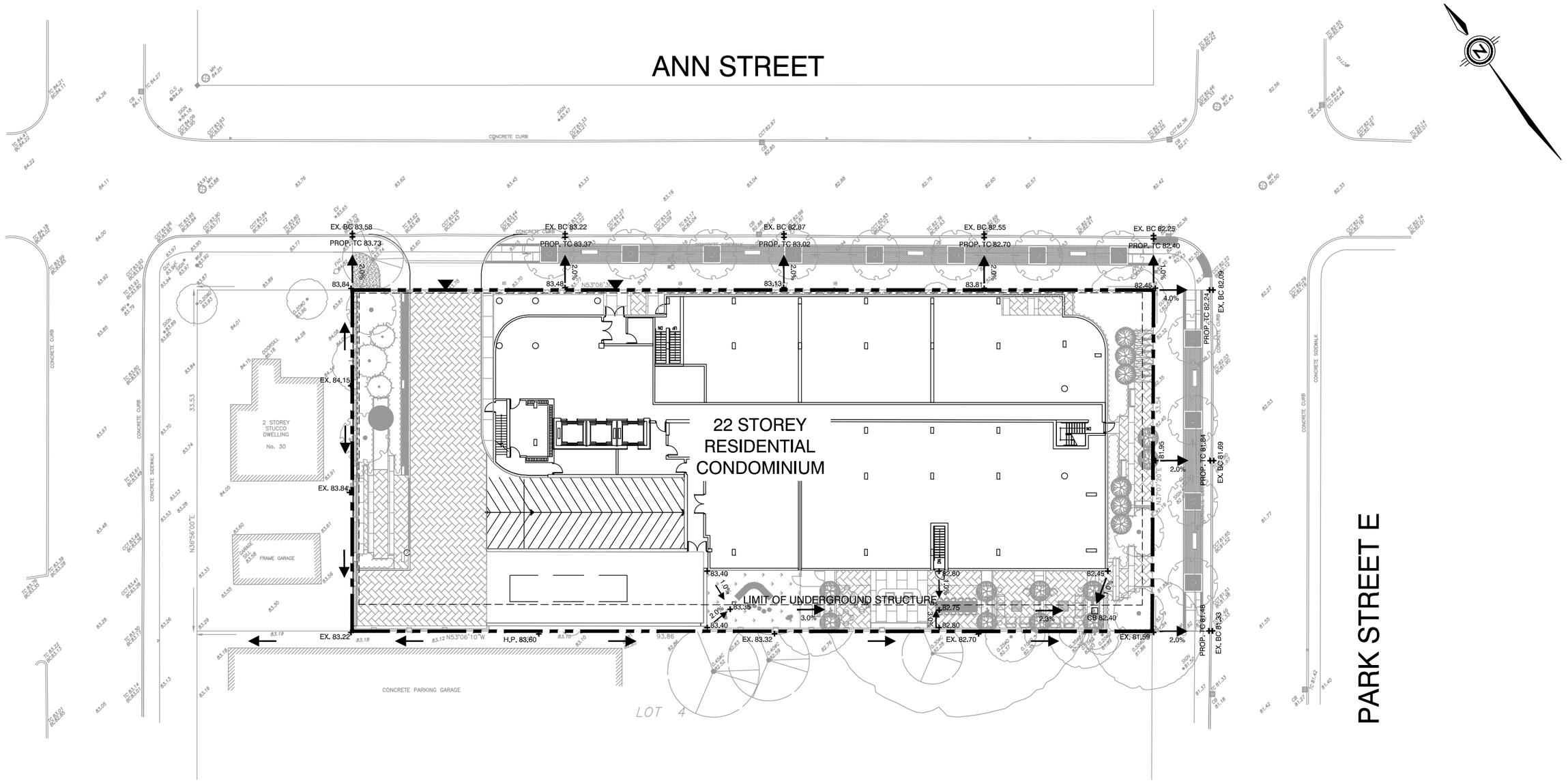
TITLE

22-28 ANN STREET

PROPOSED STORM SERVICING PLAN

wsp

Checked	A.W.	Drawn	10/12 Cad
Date	MAY 2019	Proj. No.	19M-00253
Scale	1:400	Figure No.	4.1



LEGEND

	PROPERTY LINE
	DRAINAGE PATH
82.09	PROPOSED ELEVATION
EX. 82.09	EXISTING ELEVATION
EX. BC 82.09	EXISTING BOTTOM OF CURB ELEVATION
PROP. TC 82.09	PROPOSED TOP OF CURB ELEVATION

CLIENT

EDENSHAW ANN DEVELOPMENTS LIMITED

TITLE

22-28 ANN STREET

PRELIMINARY SITE GRADING PLAN

wsp

Checked	A.W.	Drawn	10/12 Cad
Date	MAY 2019	Proj. No.	19M-00253
Scale	1:400	Figure No.	4.2

5 CONCLUSIONS

5.1 WATER

The proposed water servicing for the site will include a 150 mm diameter domestic water connection branching off a 200 mm diameter fire water connection. The water service connections will be made to the existing 300 mm watermain on Park Street East. A hydrant flow test will be conducted to verify that the existing watermain has adequate capacity to support the proposed development.

5.2 SANITARY

The proposed sanitary servicing for the site will include a 150 mm diameter sanitary service connecting to the existing 250 mm diameter sanitary sewer on Park Street East. The downstream sanitary sewer capacity analysis demonstrates that the existing sanitary sewer system has adequate capacity to accept the estimated post-development flows from the development without surcharging in any leg.

5.3 STORM

The proposed storm servicing for the site will include a 200 mm diameter storm service connecting to the existing 375 mm diameter storm sewer on Park Street East. A downstream storm sewer capacity analysis and HGL analysis has been conducted that demonstrates that the existing storm sewer system is surcharged, however the stormwater management control proposed as part of this development will reduce the storm flows from the site and reduce the surcharge in all of the downstream storm sewer legs.

APPENDIX

A FUS CALCULATIONS

APPENDIX A

FIRE FLOW CALCULATIONS

Project: **22-28 Ann Street**
Job No.: **19M-00253**

Fire flow required for a given area based on Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection (1999)

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

where

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

Calculations per FUS

1. *Estimate of Fire Flow*
C = 0.6 for fire resistive construction
A = 2810.8 m2 (largest GFA plus 25% of GFA for two immediately adjoining floors)

F = 6,998 Lpm

2. *Occupancy Reduction*
15% reduction for "Non-Combustible" Occupancy

15% reduction of 6998 Lpm = 1,050 Lpm
F = 6998 - 1050 = 5,948 Lpm

3. *Sprinkler Reduction*
30% reduction for NFPA Sprinkler System

30% reduction of 5948 Lpm = 1,784 Lpm
F = 5948 - 1784 = 4,164 Lpm

4. *Separation Charge*

Face	Distance (m)	Charge
West Side	2	25%
East Side	46	0%
North Side	8	20%
South Side	46	0%
	Total	45%

of 5,948 = 2,677 Lpm

F = 4164 + 2677
F = 6,841 Lpm (2,000 Lpm < F < 45,000 Lpm; OK)
F = 1,805 US GPM
F = 114 L/s

Notes

APPENDIX

B DOMESTIC WATER DEMAND AND SANITARY FLOW CALCULATIONS

APPENDIX B
22-28 ANN STREET
Pre-Development Site Statistics

Residential Units

Unit Type	Area (ha)	Pop Density (ppl/ha)	Population
SF Homes	0.26	50	13

Note: Population calculated per Region of Peel Sanitary Sewer Design Criteria Section 2.1. The pre-development site consists of 3 single family homes on a combined 0.26ha of land. The population was based on a population density of 50 ppl/ha for SF homes.

Pre-Development Sanitary Flow

Res Population =	13	
Avg Res Flow =	0.05	L/s (assumes 302.8L/cap/d)
Res Peak Factor =	4.40	(Harmon Formula)
Peak Res Flow =	0.20	L/s
Infiltration =	0.05	L/s
Total Avg San Flow =	**0.10**	**L/s**
Total Peak San Flow =	**0.25**	**L/s**

Pre-Development Water Demand

Res Population =	13	
Avg Res Demand =	0.04	L/s (assumes 280L/cap/d)
Max Day Factor =	2.00	
Max Day Flow =	**0.09**	**L/s**
Peak Hour Factor =	3.00	
Peak Hour Flow =	**0.13**	**L/s**

APPENDIX B
22-28 ANN STREET
Post-Development Site Statistics

Residential Units

Unit Type	Quantity	Pop Density	Population
Res. Units	316	2.7	854

Note: Population calculated per Region of Peel Sanitary Sewer Design Criteria Section 2.1. As the population density of the site is expected to be greater than 475ppl/haa factor of 2.7ppl/unit was used.

Post-Development Sanitary Flow

Res Population =	854	
Avg Res Flow =	2.99	L/s (assumes 302.8L/cap/d)
Res Peak Factor =	3.84	(Harmon Formula)
Peak Res Flow =	11.50	L/s
Total Avg San Flow =	**2.99**	**L/s**
Total Peak San Flow =	**11.50**	**L/s**

Post-Development Water Demand - Short Term

Res Population =	854	
Avg Res Demand =	4.04	L/s (assumes 409L/cap/d)
Max Day Factor =	2.00	
Max Day Flow =	8.09	L/s
Peak Hour Factor =	3.00	
Peak Hour Flow =	**12.13**	**L/s**
Fire Flow =	114	L/s
Maximum Day + Fire Flow =	**122.09**	**L/s**

Post-Development Water Demand - Long Term

Res Population =	854	
Avg Res Demand =	2.77	L/s (assumes 280L/cap/d)
Max Day Factor =	2.00	
Max Day Flow =	5.54	L/s
Peak Hour Factor =	3.00	
Peak Hour Flow =	**8.30**	**L/s**
Fire Flow =	114	L/s
Maximum Day + Fire Flow =	**119.54**	**L/s**

APPENDIX

C SANITARY SEWER DRAINAGE PLANS AND DESIGN SHEETS

THE REGIONAL MUNICIPALITY OF PEEL
SANITARY DESIGN CHART
22-28 ANN STREET - CITY OF MISSISSAUGA
PRE-DEVELOPMENT CONDITION

CONSULTANT:
WSP CANADA GROUP LIMITED

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

DATE: MAY 2019
DESIGNED BY: IB
CHECKED BY: AK

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	---	---	---	---	---	---	---
Elizabeth St	North	150	1.06	475	504	1.06	504	1.8	3.97	7.0	0.2	7.2	---	---	---	---	---	---	---
			0.36	50	18														
			0.56	475	266														
Park St E	East	150	0.92	---	284	0.92	284	1.0	4.09	4.1	0.2	4.3	---	---	---	---	---	---	---
Elizabeth St	150	147	0.63	475	299	4.23	2335	8.2	3.53	28.9	0.8	29.7	---	---	---	---	---	---	---
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	5.33	2857	10.0	3.46	34.6	1.1	35.7	---	---	---	---	---	---	---
High St E	157	155A	0.72	475	342	6.05	3199	11.2	3.42	38.3	1.2	39.5	---	---	---	---	---	---	---
High St E	155A	155	0.00	0	0	6.05	3199	11.2	3.42	38.3	1.2	39.5	---	---	---	---	---	---	---
			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	---	---	---	---	---	---	---
			0.21	50	11														
EXISTING SITE	171	170	0.26	50	13	0.47	24	0.1	4.37	0.4	0.1	0.5	104.0	1.14	250	63.4	0.72%	1.29	0.39
Park St E	170	153	1.26	475	599	2.74	728	2.5	3.88	9.9	0.5	10.4	119.6	0.68	250	49.0	21.21%	1.00	0.78
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	3.68	1174	4.1	3.75	15.4	0.7	16.1	23.9	4.67	250	128.5	12.53%	2.62	1.73
Helene St N	153A	154	0.00	0	0	3.68	1174	4.1	3.75	15.4	0.7	16.1	42.0	4.67	250	128.5	12.53%	2.62	1.73
Helene St N	154	155	0.00	0	0	3.68	1174	4.1	3.75	15.4	0.7	16.1	55.0	0.50	250	42.0	38.29%	0.86	0.81
			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	13.77	5952	20.9	3.17	66.2	2.8	69.0	125.8	0.30	450	156.2	44.19%	0.98	0.94

NOTE: (1) - Grey rows are not receiving sewers and flows are unchanged by the proposed development.

THE REGIONAL MUNICIPALITY OF PEEL
SANITARY DESIGN CHART
22-28 ANN STREET - CITY OF MISSISSAUGA
POST-DEVELOPMENT CONDITION

CONSULTANT:
WSP CANADA GROUP LIMITED

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

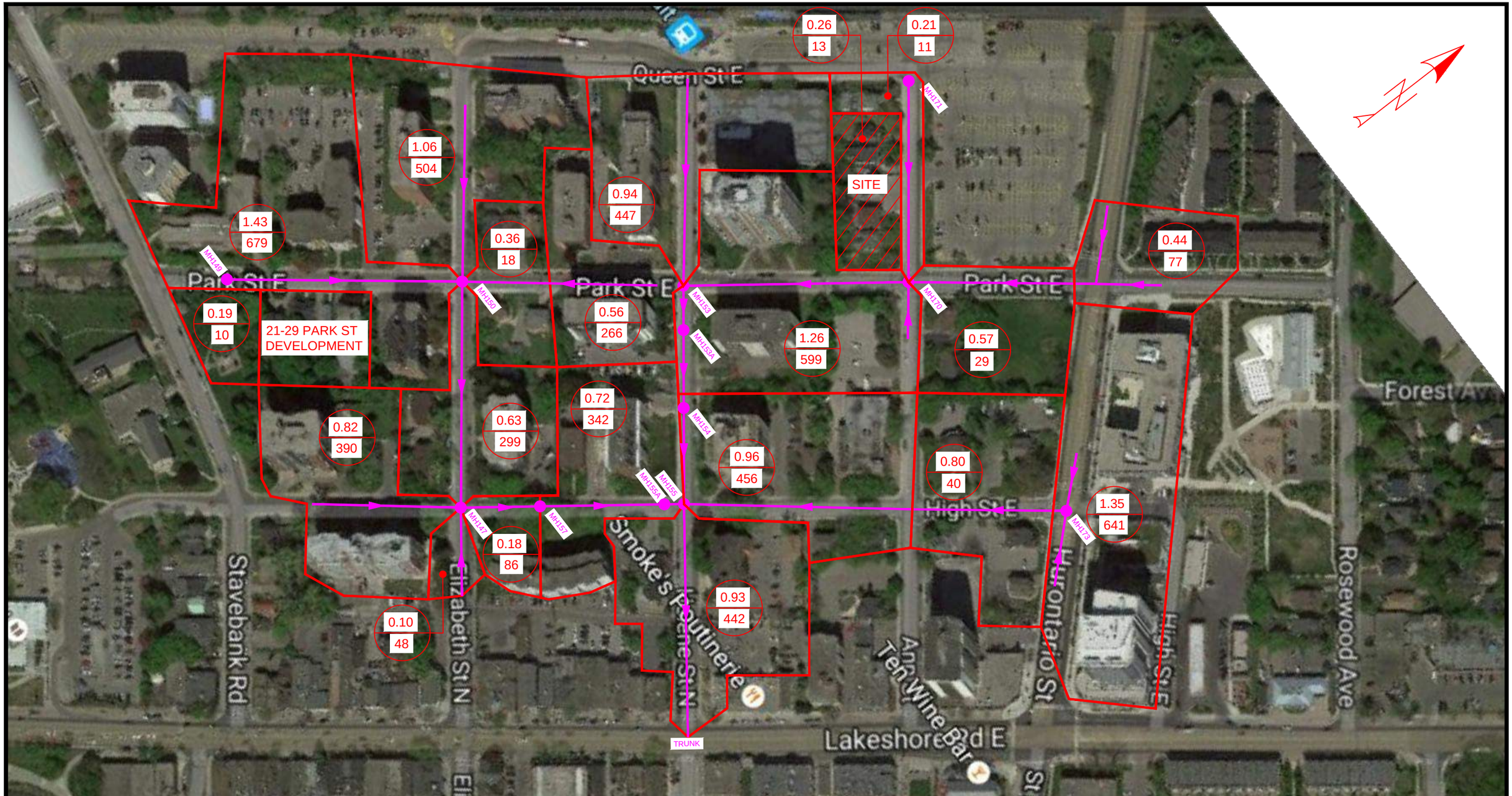
DATE: MAY 2019
DESIGNED BY: IB
CHECKED BY: AK

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
Elizabeth St	North	150	1.06	475	504	1.06	504	1.8	3.97	7.0	0.2	7.2	---	---	---	---	---	---	---
			0.36	50	18														
			0.56	475	266														
Park St E	East	150	0.92	---	284	0.92	284	1.0	4.09	4.1	0.2	4.3	---	---	---	---	---	---	---
Elizabeth St	150	147	0.63	475	299	4.23	2335	8.2	3.53	28.9	0.8	29.7	123.0	0.50	250	42.0	70.75%	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	5.33	2857	10.0	3.46	34.6	1.1	35.7	40.0	0.30	375	96.0	37.19%	0.87	0.81
High St E	157	155A	0.72	475	342	6.05	3199	11.2	3.42	38.3	1.2	39.5	70.0	0.47	375	120.2	32.89%	1.09	0.96
High St E	155A	155	0.00	0	0	6.05	3199	11.2	3.42	38.3	1.2	39.5	13.0	0.47	375	120.2	32.89%	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
PROPOSED DEVELOPMENT			---	---	**854(1)**														
Park St E	170	153	1.26	475	599	2.48	1569	5.5	3.67	20.1	0.5	20.6	119.6	0.68	250	49.0	42.01%	1.00	0.95
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	2015	7.1	3.58	25.3	0.7	26.0	23.9	4.67	250	128.5	20.23%	2.62	1.99
Helene St N	153A	154	0.00	0	0	3.42	2015	7.1	3.58	25.3	0.7	26.0	42.0	4.67	250	128.5	20.23%	2.62	1.99
Helene St N	154	155	0.00	0	0	3.42	2015	7.1	3.58	25.3	0.7	26.0	55.0	0.50	250	42.0	61.83%	0.86	0.91
			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	13.51	6793	23.8	3.12	74.3	2.7	77.0	125.8	0.30	450	156.2	49.31%	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.



EXISTING SANITARY SEWER

SANITARY SEWER DRAINAGE BOUNDARY

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

CLIENT

EDENSHAW DEVELOPMENTS LIMITED

TITLE

22-28 ANN 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.K.	Drawn	10/12 Cad
Date	MAR 2019	Proj. No.	19M-00253
Scale	NTS	Figure No.	SAN-1

APPENDIX

D STORM SEWER DRAINAGE PLANS AND DESIGN SHEETS

DEVELOPMENT 22-28 ANN STREET

CONSULTANT WSP Canada Group Limited

MAJOR DRAINAGE AREA

SHEET 1 of 1

DESIGNED BY IB

CHECKED BY AK

MISSISSAUGA Transportation and Works

STORM DRAINAGE DESIGN CHART
FOR CIRCULAR DRAINS FLOWING FULL

10 YEAR PRE-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)	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			0.33	---	0.55	0.18	---																	
Park Street E (Total)			1.68	1.68	---	1.40	1.40																	
Park Street E (1/3)	23	25	0.56	0.56		0.47	0.47	15.00	0.39	15.39	99.17	0.129	0.129	0.013	1.54	12.00	300	130	39.6	1.698	0.120	SURCHARGED	-7.71%	0.39
Park Street E (1/3)	25	26	0.56	1.12		0.47	0.93	15.39	0.25	15.64	97.66	0.255	0.255	0.013	0.81	12.00	300	60	18.3	1.231	0.087	SURCHARGED	-192.51%	0.25
Park Street E (1/3)	26	27	0.56	1.68		0.47	1.40	15.64	0.30	15.94	96.72	0.378	0.378	0.013	0.81	18.00	450	95	29.0	1.613	0.257	SURCHARGED	-47.40%	0.30
Park Street E	27	35	0.00	1.68		0.00	1.40	15.94	0.05	15.99	95.62	0.374	0.374	0.013	1.25	18.00	450	20	6.1	2.004	0.319	SURCHARGED	-17.30%	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	3.62		0.18	2.92	15.99	0.78	16.77	95.44	0.781	0.781	0.013	0.47	24.00	600	230	70.1	1.489	0.421	SURCHARGED	-85.45%	0.78
Elizabeth Street (1/3)	37	40	0.22	3.84		0.18	3.10	16.77	0.20	16.98	92.69	0.805	0.805	0.013	0.47	24.00	600	60	18.3	1.489	0.421	SURCHARGED	-91.19%	0.20
Elizabeth Street (1/3)	40	42	0.22	4.06		0.18	3.28	16.98	0.38	17.35	92.01	0.845	0.845	0.013	0.47	24.00	600	110	33.5	1.489	0.421	SURCHARGED	-100.77%	0.38
Elizabeth Street	42	21	0.00	4.06		0.00	3.28	17.35	0.09	17.44	90.78	0.834	0.834	0.013	0.44	24.00	600	25	7.6	1.440	0.407	SURCHARGED	-104.73%	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	9.16		0.45	7.75	17.44	0.92	18.35	90.50	1.964	1.964	0.013	0.30	33.00	825	265	80.8	1.471	0.786	SURCHARGED	-149.79%	0.92
High Street E (1/2)	48	50	0.50	9.66		0.45	8.20	18.35	0.60	18.96	87.67	2.013	2.013	0.013	0.30	33.00	825	175	53.3	1.471	0.786	SURCHARGED	-156.03%	0.60
Single Family			0.06	---	0.55	0.03	---																	
Parking Lot			0.91	---	0.90	0.82	---																	
EXISTING SITE			0.26	---	0.55	0.14	---																	
Ann Street	68	70	---	---	---	0.99	0.99	15.00	0.39	15.39	99.17	0.275	0.275	0.013	1.54	12.00	300	131	39.9	1.698	0.120	SURCHARGED	-129.07%	0.39
Ann Street	70	72	0.00	---	---	0.00	0.99	15.39	0.07	15.46	97.65	0.271	0.271	0.013	1.25	12.00	300	20	6.1	1.530	0.108	SURCHARGED	-150.36%	0.07
Park Street E (Total)			0.80	---	0.90	0.72	---																	
Park Street E (1/3)	72	74	---	---	---	0.24	1.23	15.46	0.53	15.99	97.39	0.335	0.335	0.013	1.32	15.00	375	190	57.9	1.824	0.201	SURCHARGED	-66.51%	0.53
Park Street E (1/3)	74	76	---	---	---	0.24	1.47	15.99	0.38	16.36	95.44	0.393	0.393	0.013	1.04	15.00	375	120	36.6	1.619	0.179	SURCHARGED	-119.69%	0.38
Park Street E (1/3)	76	66	---	---	---	0.24	1.71	16.36	0.31	16.67	94.10	0.451	0.451	0.013	0.95	18.00	450	105	32.0	1.747	0.278	SURCHARGED	-62.13%	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	3.39	16.67	0.35	17.02	93.04	0.883	0.883	0.013	1.75	24.00	600	200	61.0	2.873	0.812	SURCHARGED	-8.68%	0.35
Helene St N (1/4)	78	80	---	---	---	0.09	3.48	17.02	0.31	17.34	91.85	0.896	0.896	0.013	1.72	24.00	600	175	53.3	2.848	0.805	SURCHARGED	-11.24%	0.31
Helene St N (1/4)	80	50	---	---	---	0.09	3.58	17.34	0.04	17.37	90.83	0.910	0.910	0.013	1.72	24.00	600	20	6.1	2.848	0.805	SURCHARGED	-12.99%	0.04
Helene St N (1/4)	50	97	---	---	---	0.09	11.87	18.96	0.13	19.09	85.91	2.856	2.856	0.013	0.25	48.00	1,200	45	13.7	1.724	1.949	SURCHARGED	-46.50%	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	14.79	19.09	1.16	20.25	85.53	3.542	3.542	0.013	0.25	48.00	1,200	230.0	120.0	1.724	1.949	SURCHARGED	-81.72%	1.16

DEVELOPMENT 22-28 ANN STREET

CONSULTANT WSP Canada Group Limited

MAJOR DRAINAGE AREA

DESIGNED BY IB

CHECKED BY AK

MISSISSAUGA Transportation and Works

10 YEAR PRE-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 L/s	Peak Flow L/s	HGL Slope (%)	US HGL	DS HGL	Surcharge Above Obvert @ US MH	Distance Below Surface @ US MH
Park Street E	**23**	**25**	77.11	76.50	77.41	76.80	78.79	39.6	1.54	300	120.0	129.3	1.787	83.59	82.89	6.18	-4.80
Park Street E	**25**	**26**	76.66	76.51	76.96	76.81	77.88	18.3	0.81	300	87.0	254.6	6.930	82.89	81.62	5.93	-5.01
Park Street E	**26**	**27**	76.28	76.04	76.73	76.49	78.09	29.0	0.81	450	256.6	378.2	1.760	81.62	81.11	4.89	-3.53
Park Street E	**27**	**35**	76.12	76.05	76.57	76.50	78.88	6.1	1.25	450	318.8	373.9	1.720	81.11	81.00	4.54	-2.23
Elizabeth Street	**35**	**37**	76.05	75.72	76.65	76.32	79.53	70.1	0.47	600	420.9	780.6	1.616	81.00	79.87	4.36	-1.48
Elizabeth Street	**37**	**40**	75.72	75.63	76.32	76.23	77.38	18.3	0.47	600	420.9	804.8	1.718	79.87	79.56	3.55	-2.49
Elizabeth Street	**40**	**42**	75.63	75.47	76.23	76.07	77.20	33.5	0.47	600	420.9	845.1	1.894	79.56	78.92	3.33	-2.35
Elizabeth Street	**42**	**21**	75.47	75.44	76.07	76.04	77.31	7.6	0.44	600	407.3	833.8	1.844	78.92	78.78	2.85	-1.61
High Street E	**21**	**48**	75.44	75.20	76.26	76.02	77.69	80.8	0.30	825	786.2	1,963.9	1.872	78.78	77.27	2.52	-1.09
High Street E	**48**	**50**	75.19	75.03	76.02	75.86	76.83	53.3	0.30	825	786.2	2,013.0	1.967	77.27	76.22	1.25	-0.44
Ann Street	**68**	**70**	81.38	80.77	81.68	81.07	82.93	39.9	1.54	300	120.0	274.9	8.081	88.01	84.78	6.32	-5.08
Ann Street	**70**	**72**	80.77	80.70	81.07	81.00	82.24	6.1	1.25	300	108.1	270.7	7.835	84.78	84.30	3.71	-2.54
Park Street E	**72**	**74**	80.62	79.86	80.99	80.23	82.48	57.9	1.32	375	201.4	335.4	3.660	84.30	82.18	3.31	-1.82
Park Street E	**74**	**76**	79.86	79.48	80.23	79.85	81.26	36.6	1.04	375	178.8	392.8	5.019	82.18	80.35	1.95	-0.92
Park Street E	**76**	**66**	79.40	79.10	79.85	79.55	80.83	32.0	0.95	450	277.9	450.5	2.497	80.35	79.55	0.50	0.49
Helene Street N	**66**	**78**	77.88	76.81	78.48	77.41	81.38	61.0	1.75	600	812.3	882.7	2.067	78.75	77.49	0.27	2.63
Helene Street N	**78**	**80**	76.50	75.59	77.10	76.19	79.02	53.3	1.72	600	805.3	895.8	2.128	77.49	76.35	0.38	1.53
Helene Street N	**80**	**50**	75.69	75.59	76.29	76.19	77.14	6.1	1.72	600	805.3	909.8	2.196	76.35	76.22	0.06	0.79
Helene Street N	**50**	**97**	74.98	74.95	76.18	76.15	77.28	13.7	0.25	1,200	1,949.4	2,855.9	0.537	76.22	76.15	0.04	1.06
Helene Street N	**97**	**Trunk**	74.95	74.65	76.15	75.85	77.15	120.0	0.25	1,200	1,949.4	3,542.3	0.826	76.84	75.85	0.69	0.32

Notes

DEVELOPMENT: 22-28 ANN STREET
CONSULTANT: WSP Canada Group Limited
MAJOR DRAINAGE AREA:

SHEET: 1 of 1
DESIGNED BY: IB
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			0.33	---	0.55	0.18	---																			
Park Street E (Total)			1.68	1.68	---	1.40	1.40																			
Park Street E (1/3)	23	25	0.56	0.56		0.47	0.47	15.00	0.39	15.39	99.17	0.129	0.000	0.000	0.129	0.013	1.54	12.00	300	130	39.6	1.698	0.120	SURCHARGED	-7.71%	0.39
Park Street E (1/3)	25	26	0.56	1.12		0.47	0.93	15.39	0.25	15.64	97.66	0.255	0.000	0.000	0.255	0.013	0.81	12.00	300	60	18.3	1.231	0.087	SURCHARGED	-192.51%	0.25
Park Street E (1/3)	26	27	0.56	1.68		0.47	1.40	15.64	0.30	15.94	96.72	0.378	0.000	0.000	0.378	0.013	0.81	18.00	450	95	29.0	1.613	0.257	SURCHARGED	-47.40%	0.30
Park Street E	27	35	0.00	1.68		0.00	1.40	15.94	0.05	15.99	95.62	0.374	0.000	0.000	0.374	0.013	1.25	18.00	450	20	6.1	2.004	0.319	SURCHARGED	-17.30%	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	3.62		0.18	2.92	15.99	0.78	16.77	95.44	0.781	0.000	0.000	0.781	0.013	0.47	24.00	600	230	70.1	1.489	0.421	SURCHARGED	-85.45%	0.78
Elizabeth Street (1/3)	37	40	0.22	3.84		0.18	3.10	16.77	0.20	16.98	92.69	0.805	0.000	0.000	0.805	0.013	0.47	24.00	600	60	18.3	1.489	0.421	SURCHARGED	-91.19%	0.20
Elizabeth Street (1/3)	40	42	0.22	4.06		0.18	3.28	16.98	0.38	17.35	92.01	0.845	0.000	0.000	0.845	0.013	0.47	24.00	600	110	33.5	1.489	0.421	SURCHARGED	-100.77%	0.38
Elizabeth Street	42	21	0.00	4.06		0.00	3.28	17.35	0.09	17.44	90.78	0.834	0.000	0.000	0.834	0.013	0.44	24.00	600	25	7.6	1.440	0.407	SURCHARGED	-104.73%	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	9.16		0.45	7.75	17.44	0.92	18.35	90.50	1.964	0.000	0.000	1.964	0.013	0.30	33.00	825	265	80.8	1.471	0.786	SURCHARGED	-149.79%	0.92
High Street E (1/2)	48	50	0.50	9.66		0.45	8.20	18.35	0.60	18.96	87.67	2.013	0.000	0.000	2.013	0.013	0.30	33.00	825	175	53.3	1.471	0.786	SURCHARGED	-156.03%	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	---																			
PROPOSED DEVELOPMENT			---	---	---								0.016	0.016												
Park Street E (1/3)	72	74	---	---	---	0.24	1.09	15.46	0.53	15.99	97.39	0.297	0.000	0.016	0.313	0.013	1.32	15.00	375	190	57.9	1.824	0.201	SURCHARGED	-55.45%	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	0.016	0.371	0.013	1.04	15.00	375	120	36.6	1.619	0.179	SURCHARGED	-107.66%	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	0.016	0.430	0.013	0.95	18.00	450	105	32.0	1.747	0.278	SURCHARGED	-54.57%	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	0.016	0.862	0.013	1.75	24.00	600	200	61.0	2.873	0.812	SURCHARGED	-6.15%	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	0.016	0.876	0.013	1.72	24.00	600	175	53.3	2.848	0.805	SURCHARGED	-8.74%	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	0.016	0.890	0.013	1.72	24.00	600	20	6.1	2.848	0.805	SURCHARGED	-10.54%	0.04
Helene St N (1/4)	50	97	---	---	---	0.09	11.73	18.96	0.13	19.09	85.91	2.822	0.000	0.016	2.838	0.013	0.25	48.00	1,200	45	13.7	1.724	1.949	SURCHARGED	-45.59%	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	14.65	19.09	1.16	20.25	85.53	3.509	0.000	0.016	3.525	0.013	0.25	48.00	1,200	230.0	120.0	1.724	1.949	SURCHARGED	-80.81%	1.16

Notes

DEVELOPMENT 22-28 ANN STREET

CONSULTANT WSP Canada Group Limited

MAJOR DRAINAGE AREA

DESIGNED BY IB

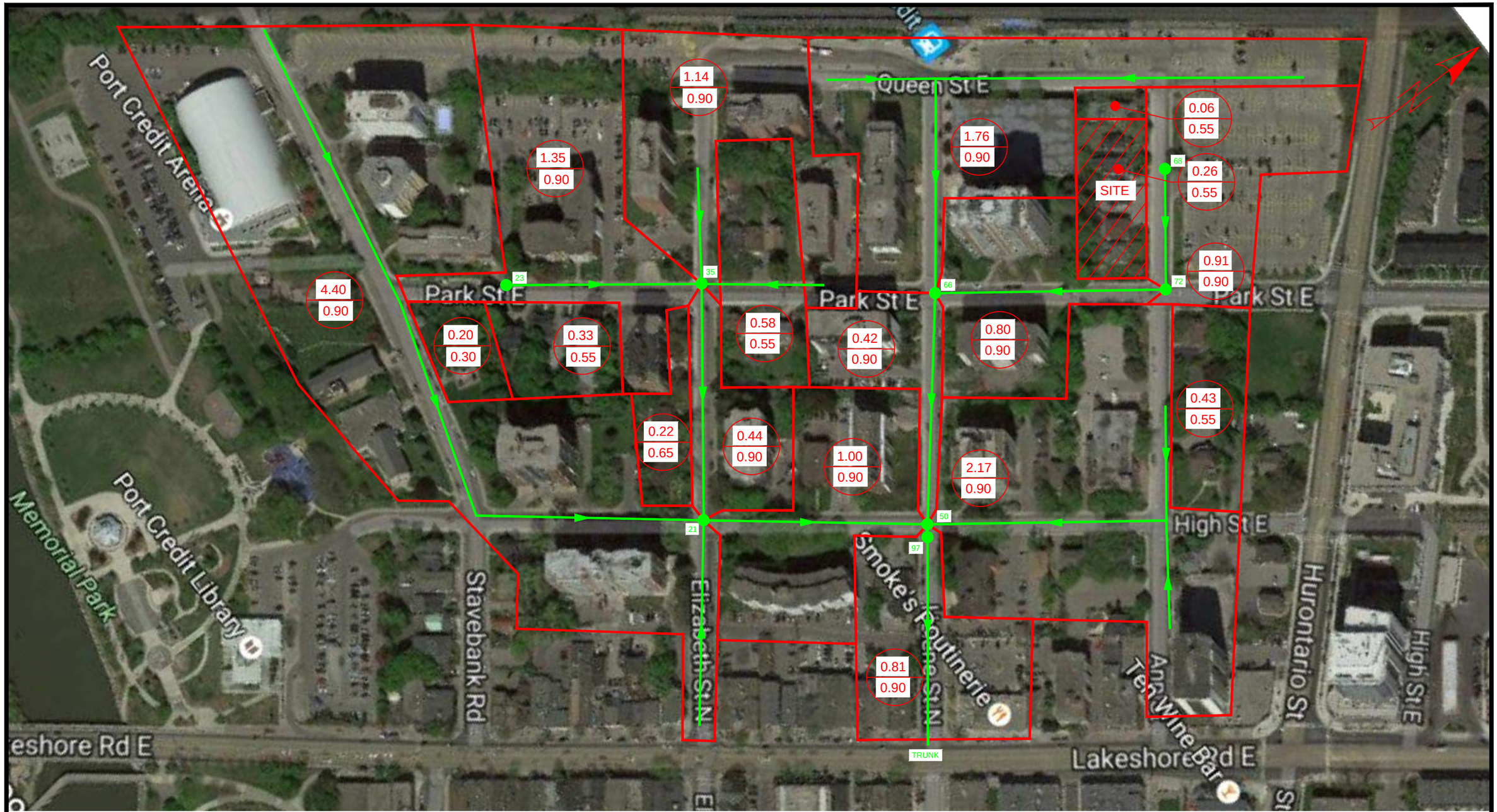
CHECKED BY AK

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	**23**	**25**	77.11	76.50	77.41	76.80	78.79	39.6	1.54	300	0.120	120.0	0.129	129.3	1.787	83.59	82.88	0.00	6.18	-4.80
Park Street E	**25**	**26**	76.66	76.51	76.96	76.81	77.88	18.3	0.81	300	0.087	87.0	0.255	254.6	6.930	82.88	81.62	0.00	5.93	-5.01
Park Street E	**26**	**27**	76.28	76.04	76.73	76.49	78.09	29.0	0.81	450	0.257	256.6	0.378	378.2	1.760	81.62	81.11	0.00	4.89	-3.53
Park Street E	**27**	**35**	76.12	76.05	76.57	76.50	78.88	6.1	1.25	450	0.319	318.8	0.374	373.9	1.720	81.11	81.00	0.00	4.53	-2.23
Elizabeth Street	**35**	**37**	76.05	75.72	76.65	76.32	79.53	70.1	0.47	600	0.421	420.9	0.781	780.6	1.616	81.00	79.87	0.00	4.36	-1.47
Elizabeth Street	**37**	**40**	75.72	75.63	76.32	76.23	77.38	18.3	0.47	600	0.421	420.9	0.805	804.8	1.718	79.87	79.56	0.00	3.55	-2.49
Elizabeth Street	**40**	**42**	75.63	75.47	76.23	76.07	77.20	33.5	0.47	600	0.421	420.9	0.845	845.1	1.894	79.56	78.92	0.00	3.33	-2.35
Elizabeth Street	**42**	**21**	75.47	75.44	76.07	76.04	77.31	7.6	0.44	600	0.407	407.3	0.834	833.8	1.844	78.92	78.78	0.00	2.85	-1.61
High Street E	**21**	**48**	75.44	75.20	76.26	76.02	77.69	80.8	0.30	825	0.786	786.2	1.964	1,963.9	1.872	78.78	77.27	0.00	2.52	-1.09
High Street E	**48**	**50**	75.19	75.03	76.02	75.86	76.83	53.3	0.30	825	0.786	786.2	2.013	2,013.0	1.967	77.27	76.22	0.00	1.25	-0.43
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	86.49	84.11	1.51	4.81	-3.56
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	84.11	83.76	0.67	3.04	-1.87
Park Street E	**72**	**74**	80.62	79.86	80.99	80.23	82.48	57.9	1.32	375	0.201	201.4	0.313	313.1	3.190	83.76	81.91	0.54	2.77	-1.28
Park Street E	**74**	**76**	79.86	79.48	80.23	79.85	81.26	36.6	1.04	375	0.179	178.8	0.371	371.3	4.485	81.91	80.27	0.27	1.68	-0.65
Park Street E	**76**	**66**	79.40	79.10	79.85	79.55	80.83	32.0	0.95	450	0.278	277.9	0.430	429.5	2.270	80.27	79.55	0.07	0.42	0.56
Helene Street N	**66**	**78**	77.88	76.81	78.48	77.41	81.38	61.0	1.75	600	0.812	812.3	0.862	862.2	1.972	78.63	77.43	0.12	0.16	2.75
Helene Street N	**78**	**80**	76.50	75.59	77.10	76.19	79.02	53.3	1.72	600	0.805	805.3	0.876	875.7	2.034	77.43	76.35	0.06	0.33	1.59
Helene Street N	**80**	**50**	75.69	75.59	76.29	76.19	77.14	6.1	1.72	600	0.805	805.3	0.890	890.1	2.102	76.35	76.22	0.01	0.05	0.80
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	2.838	2,838.1	0.530	76.22	76.15	0.00	0.04	1.06
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	3.525	3,524.7	0.817	76.83	75.85	0.01	0.68	0.33

Notes



EXISTING STORM SEWER

STORM SEWER DRAINAGE BOUNDARY

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

CLIENT

EDENSHAW ANN DEVELOPMENTS LIMITED

TITLE

22-28 ANN STREET

STORM 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.K.	Drawn	10/12 Cad
Date	MAY 2019	Proj. No.	19M-00253
Scale	NTS	Figure No.	STM-1