The Odan/Detech Group Inc.
P: (905) 632-3811
F: (905) 632-3363
5230, SOUTH SERVICE ROAD, UNIT 107
BURLINGTON, ONTARIO, L7L 5K2
www.odandetech.com

PROPOSED REDEVELOPMENT
1755 & 1805 Pickering Parkway,
City of Pickering, Ontario

FUNCTIONAL SERVICING AND STORM WATER MANAGEMENT REPORT

(PHASE 1)

Prepared For:

Pickering Ridge Lands Inc.
&
Bayfield Realty Advisors

ORIGINAL: March 18, 2022
REVISED: April 20, 2022 (for Submission)

*** Please refer to the Master Servicing Study prepared by Odan Detech Group dated April 13th, 2022 for details on the ultimate development.**

STANDARD LIMITATIONS

This report was prepared by The Odan/Detech Group Inc. (Odan/Detech) for the client in accordance with the agreement between Odan/Detech and the client. This report is based on information provided to Odan/Detech which has not been independently verified. The disclosure of any information contained in this report is the sole responsibility of the client. The material in this report, accompanying spreadsheets and all information relating to this activity reflect Odan/Detech judgment in light of the information available to us at the time of preparation of this report and 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. Odan/Detech accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions based on this report.

Odan/Detech warrants that it performed services hereunder with that degree of care, skill, and diligence normally provided in the performance of such Odan/Detech in respect of projects of similar nature at the time and place those services were rendered. Odan/Detech disclaims all other warranties, representations, or conditions, either express or implied, including, without limitation, warranties, representations, or conditions of merchantability or profitability, or fitness for a particular purpose.

This Standard Limitations statement is considered part of this report.

TABLE OF CONTENTS

DESCRIPTION **Page**

LIST OF FIGURES

LIST OF TABLES

APPENDIX A

Aerial Photo of Existing Site
Phase 1 Site Plan of the Proposed Development (reduced)
Ultimate Site Plan of the Proposed Development (reduced)

APPENDIX B

Redeveloped site Phase 1 sanitary sewer design sheet

Redeveloped sites (subject site, 1899 Brock Road and surrounding tributaries) sanitary sewer design sheet

APPENDIX C

FUS Fire Demand Calculations
Location of hydrant flow tests
Hydrant flow tests

APPENDIX D

XPSWMM models and output upon request
Water Balance Calculations

APPENDIX E

Figure 1 – Preliminary Site Servicing Plan
Figure 2 – Preliminary Grading Plan

Figure 3 – Post Development Watermain Service
Figure 4 – Post Development Storm Service
Figure 5a – Post Development Sanitary Service
Figure 5b – Post Development Sanitary Service

Figure 6 – Post Sanitary Tributary Area Plan
Figure 7 – Pre Development Storm Tributary Area Plan
Figure 8 – Post Development Storm Tributary Area Plan
Figure 9 – Notion Road – Profile
Figure 10 – Pickering Parkway – Profile 1/2
Figure 11 – Pickering Parkway – Profile 2/2

1. INTRODUCTION

Site Description

The subject development comprises Phase 1 of a multi phased development, phase 1 has an area of 1.18 ha and is bound by existing commercial lands to the north, Highway 401 to the south, existing commercial lands to the east and Brock Road to the west.

Please refer to the Master Servicing Study prepared by Odan Detech Group dated January 25th, 2022 for details on the ultimate build out future development.

Currently, the site is developed with multi-tenant, "big box" and smaller commercial retail establishments with associated asphalt parking lots. The topography of the site is relatively flat sloping northeast. The subject site known as First Pickering Place (FPP) is currently designated as "Mixed Use Areas – Specialty Retailing Node" in the Pickering Official Plan; the lands with this designation are intended to have the widest variety of uses and highest levels of activities. An aerial view of the site can be found in Appendix A showing surrounding uses. Refer to Exhibit 1 below for the site location. Exhibit 2 shows the plan of the redeveloped site and location of phase 1 within the site.

Background

This report will evaluate the serviceability of the proposed Phase 1 redevelopment with respect to sanitary, water, and storm servicing. This report will also evaluate the stormwater management (SWM) strategy to meet the SWM requirements set out by regulatory agencies.

Exhibit 1 Location of the project site

Exhibit 2 Full build out layout and location of Phase 1

2. SCOPE OF WORK

The Odan/Detech Group Inc. was retained by the owners, **Pickering Ridge Lands Inc. & Bayfield Realty Advisors** to propose a servicing scheme(s) for the Redevelopment of 1755 & 1805 Pickering Parkway (Pickering Design Centre). The scope of work in brief involves the following:

a) Gather information on the existing services for the Site and surrounding the Site.

b) Work with or assemble a team of Consultants and Vendors to perform specialized tasks required for the global servicing assessment.

c) Meetings/conversations with consulting team and land owners in order to coordinate developments.

d) Produce Servicing Schemes that will allow for the development of the intensified site at full build out and focus on the development of Phase 1. The servicing analysis entails a review for sanitary waste water, water distribution, storm water management and grading.

Currently, the proposed development area is divided into 7 blocks (Block ‘1’ to Block ’7’), of which Phase 1 corresponds to Block ‘1’. The proposed redevelopment in Phase 1 will consist of a mixed-use development with two towers of 31 storeys. The proposed building will have retail at grade, 630 apartment dwelling units, 4 level of underground parking and surface parking, and 1,538 m2 of indoor and 1,052 m2 of outdoor amenity space. Refer to site plan prepared by Turner Fleischer Architects Inc. in Appendix A for additional information.

3. SANITARY SERVICING

Existing Sanitary Sewer Infrastructure

As-constructed and design drawings obtained from the Region of Durham and the City of Pickering show that an existing 250 mm diameter sanitary sewer in Pickering Parkway are located as the main sanitary outlet of the subject site.

There are two existing sanitary sewer connections to the site, a 250mm sanitary outlet toward Pickering Parkway at the north of the site and a 150 mm sanitary outlet toward Notion Road at the east of the site.

Refer to Exhibit 3 for the location of the Site and the layout of the existing sanitary sewers in the area.

The majority of sanitary flow from the existing commercial site is conveyed through an existing 250 mm diameter sanitary sewer west to east along Pickering Parkway. Then connected to a 250 mm diameter sanitary sewer at the intersection with Marshcourt Dr, which conveys the sanitary flow to the north. The 250 mm diameter sanitary sewer on Marshcourt Dr then increases to a 375 mm diameter sewer at the Region's easement and the sanitary sewer conveys the collected sanitary flow to a 375 mm diameter sanitary sewer on Notion Road. The 375 mm diameter sanitary sewer on Notion Road is connected to a 750 mm sanitary sewer on Orchard Road that conveys the collected flow to the east. The 750mm pipe is the outlet for the subject site. The sanitary analysis will be conducted considering the flow from all sites that presently flow to Orchard Road and the future flow from the redevelopment of 1899 Brock Road.

In completing the analysis, the following information will be used or relied upon:

- Drawings from City of Pickering.
- Drawings from The Regional Municipality of Durham.
- Sanitary system Maps from The Regional Municipality of Durham
- Design guidelines for sanitary sewers systems from The Regional Municipality of Durham
- Master Servicing & Stormwater Management Report -1899 Brock Road, SCHAEFFERS Consulting Engineers, May 2021
- Functional Servicing & Stormwater Management Report Residential Townhouse Development - 1856 Notion Road, GHD, Jan 2018

EXISTING SYSTEM REVIEW

Based on findings in the MSS report by Odan Detech, the redeveloped site cannot be routed through the existing sewer system along Pickering Pkwy, Marshcourt Drive, easement between homes to Notion Road to Orchard Drive Due to limitations of the existing sanitary sewer capacity, it would mean replacing a relatively deep sewer between two existing homes. The recommended and preferred routing would be along Pickering Pkwy to Notion Road to Orchard Drive.

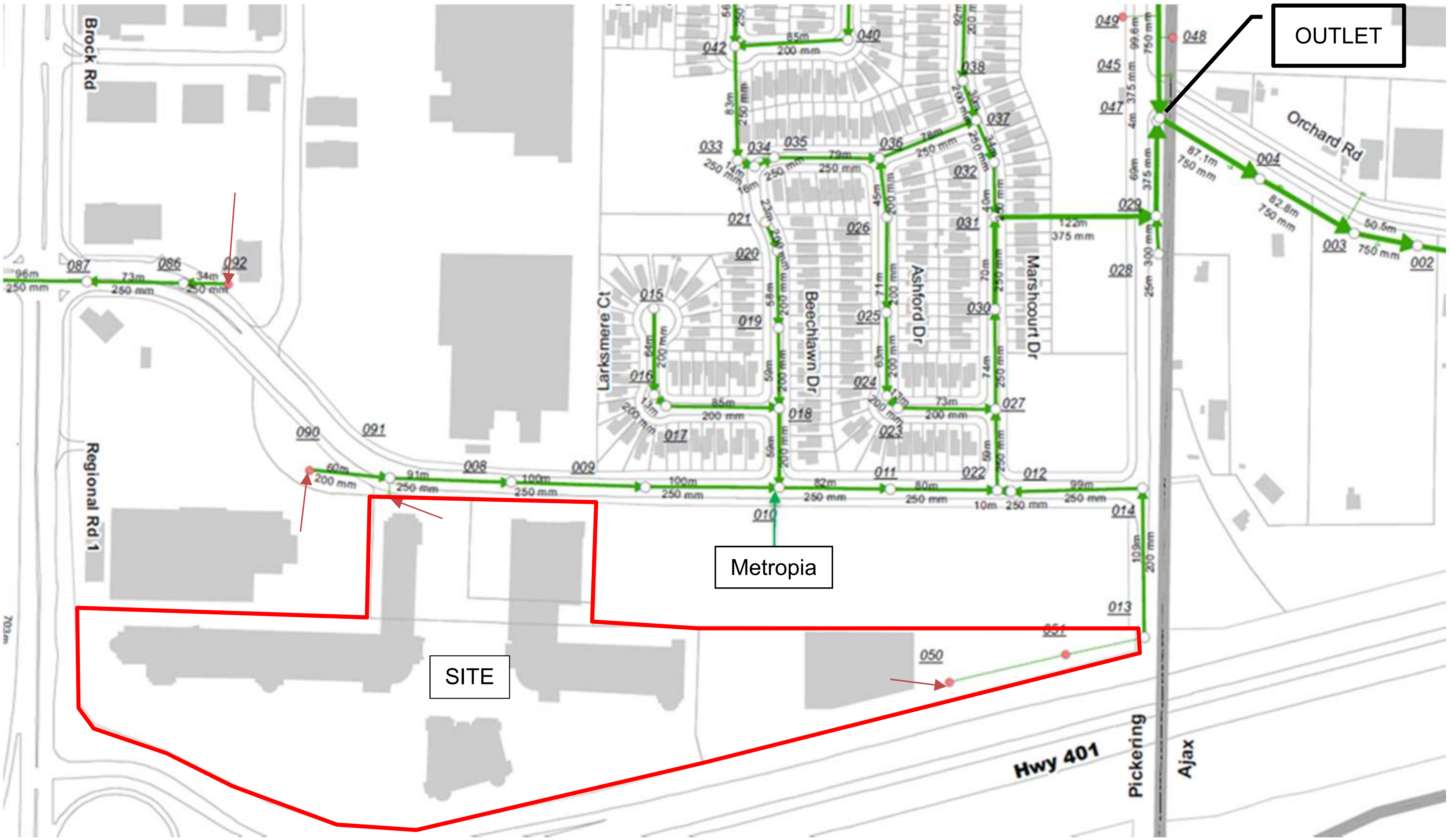


Exhibit 3 Durham Region layout of existing sanitary sewers

REGION OF DURHAM PREFERRED SYSTEM

Discussion with the Region of Durham (Aaron Christie) regarding the redevelopment of the subject site and that of the proposed future development lands can be summed up as follows:

1) The Region solution for the intensification is to provide a sewage pump station (SP) on the south side of HWY 401. From this SP a large trunk sewer will be extended North under HWY 401 to Notion Road, then continue North on Notion Road. The design and EA for this project will start shortly.

2) Sanitary mapping has been provided by the Region which indicates proposed future development lands and the associated tributary areas which will ultimately discharge to the SP on the south side of HWY 401 via Pickering Parkway and the Notion Road trunk sewer. Population densities for these proposed development lands were provided by the Region. Refer to Exhibits 4, 5 & 6 below for the Region's sanitary mapping and related population densities.

<u>Region of Durham Sanitary Maps & Correspondence indicating population densities</u>

Exhibit 4 – Region Map 1 North [1899 Brock Rd & Mixed-use Lands]

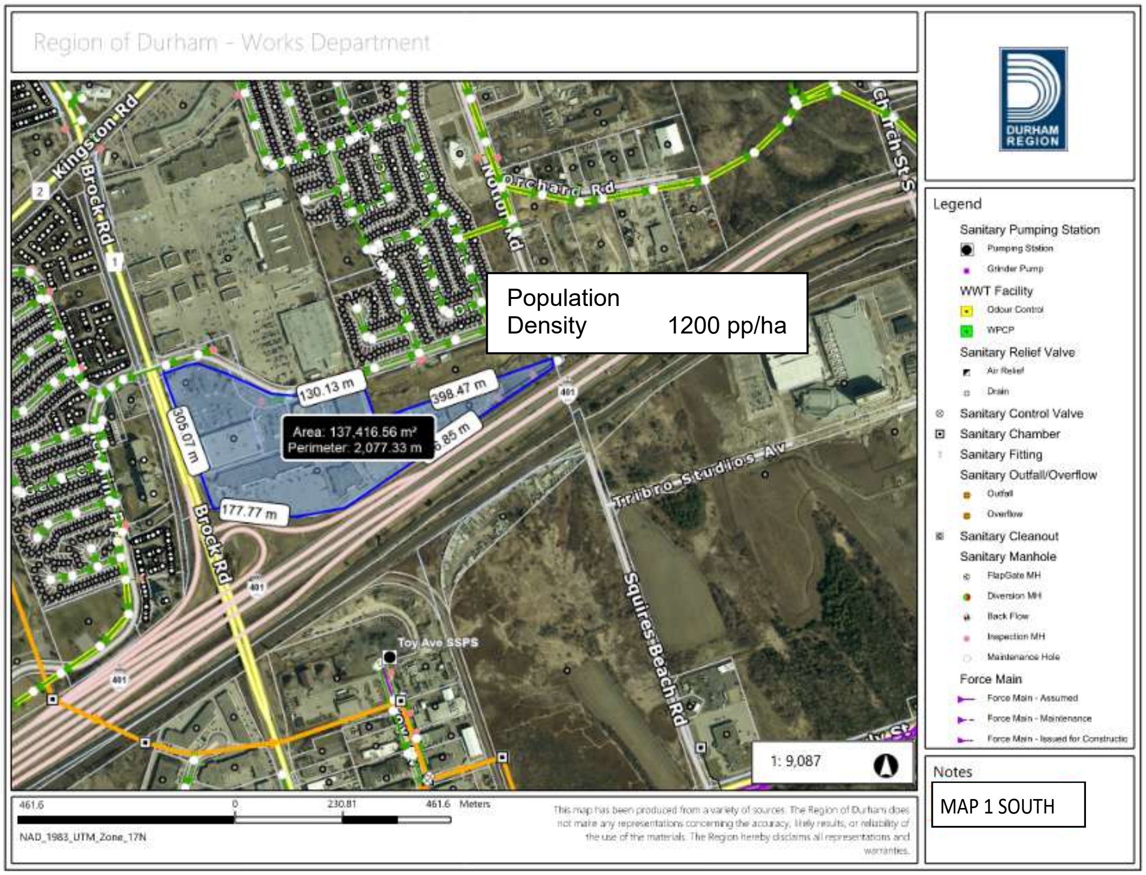


Exhibit 5 – Region Map 1 South [Subject site and 1731/1735 Pickering Pkwy]

Exhibit 6 – Region Map 2 South [Metropia Lands]

3) The Region has allowed for the Phase 1 of 1899 Brock Road to be discharged west ward to Brock Road and will therefore not be included in our Phase 1 downstream sanitary analysis.

4) The Phase 1 for the subject site will be allowed to discharge to Orchard Drive North on Notion Road, for the interim condition.

5) In the full build out condition the temporary sewers on Notion Road will be replaced by the Region with a trunk sewer. Thus, all the sewage from the existing and redeveloped sites will flow south in the Notion Road trunk, under HWY 401 to the new Region SP.

6) The Region prefers that the Sewer to Notion Road along Pickering Parkway be installed to accommodate the fully built out sites and the existing sites along the way.

7) The Region will allow a smaller sewer diameter pipe on Notion Road than on Pickering Parkway for the interim condition since the trunk sewer will replace this to flow South under the HWY 401.

8) The Region did not offer a real time table for the SP and Notion Road trunk sewer, however stated that it would be available for the Phase 2 of the development.

The Region has also given us the approximate reserve capacity of the Orchard Drive sewer from where we show it on Exhibit 3 eastward. See the following e-mail from Aaron Christie.

Hello Mark,

At this time base your study on the assumption that there could be up to a capacity of 150 l/s available within the 750mm sanitary sewer at Orchard Road. This is based on preliminary input received from the Region of Durham and is subject to change as your application and development of the surrounding lands moves forward.

Based on my interpretation of the mapping, the 600mm watermain on Brock Road has a 300mm dia. tee to the west and then there is a 300mm x 300mm dia. tee and 90 degree bend providing the 300mm dia. watermain to the east across Brock Road to Pickering Parkway.

Thanks,

DURHAM REGION

Aaron Christie, P.Eng. | Manager, Engineering Planning & Studies
Works Department
The Regional Municipality of Durham
Aaron.Christie@durham.ca | 905-668-7711 extension 3608 | durham.ca
My pronouns are he/his

Design Criteria

Sanitary flows for the subject site are calculated based on the Regional Municipality of Durham design specifications for sanitary sewers. The summary is as follows:

Residential

- Average flow: 364 L/person/day
- Infiltration: 22.5 m^3 gross ha/day (0.26 l/s/ha/day) – when foundation drains are not connected to the sanitary sewer.
- Peaking Factor:

$$K = 1 + \frac{14}{4 + P^{1/2}}$$

Where K=Harmon Peaking Factor, P = Population in thousands.
K-Maximum= 3.8m, K-Minimum= 1.5

- When the number and type of housing units within a proposed development are known, the calculation of population for the proposed development shall be based on the following:

Type of Housing	Persons/ha
Single Family Dwelling,	60
Semi-detached & Duplex	100
Townhouses	125
Apartment(s)	
- Low density (62 u/ha)	150
- Medium to low density (86 u/ha)	210
- Medium density (124 u/ha)	300
- High Density (274 u/ha)	600
u/ha = units per hectare	

Type of Housing	Persons/Unit
Single Family Dwelling, Semi-Detached and Links	3.5
Townhouses/Stacked Townhouses	3.0
Apartment(s)	
- 1 Bedroom or smaller (Bachelor)	1.5
- 2 Bedroom	2.5
- 3 Bedroom	3.5
- 4 Bedroom or larger	4.5

Commercial

Design Flow: 180 m^3/gross floor area ha/day (2.08 l/s/day) including infiltration and peaking effect.

EXISTING SANITARY SEWER CAPACITY CALCULATION

The capacity of the existing sanitary sewer system from the subject site to Orchard Rd was evaluated in the MSS report by Odan Detech. The existing sanitary sewer was found to have insufficient capacity to accept Phase 1 of the subject development. Refer to the MSS report by Odan Detech for further details and information pertaining to the existing sanitary capacity, including sanitary design spread sheet and existing sanitary tributary plan.

PROPOSED SANITARY SEWER DESIGN CONSIDERATION

Based on our discussion with the Region of Durham (Aaron Christie), that they (the Region) want the redeveloped flow from 1899 Brock Road and the updated tributary areas, provided by the Region, to flow from their Site east on Pickering Parkway to Notion Road.

Metropia is planning to develop a new townhouse development at 1856 Notion Road known as the Metropia Site. The details are contained within the “Functional Servicing and Stormwater Management Report”, by GHD, Jan 2018. The sanitary flow (11.67 L/s) from the development will be routed to the existing manhole (MH35-6) on Pickering Parkway.

Since four existing retail buildings will remain operational within the site for phase one construction. The construction of new sewers will need to be phased to ensure drainage is maintained to the existing buildings.

Table 1 is a summary of the flows generated by the Site during Phase 1.

Table 1 – Proposed population and sanitary peak flow estimate (Phase 1)

Unit Type /Land Use	Number of Units /Gross floor Area	Persons/ Unit	Population	Peaking Factor	Infiltration (L/sec)	Sanitary Flow (L/sec)
North Sanitary Outlet to Pickering Parkway						
Commercial (Ex.)	1.78 ha	-	-	1	-	3.71
Commercial (Prop.)	0.169 ha	-	-	1		0.35
Apartments (Prop.)	630 Units	2.5	1,575	3.66	0.26	24.50
Total	-	-	-	-		28.56
East Sanitary Outlet to Notion Road						
Commercial (Ex.)	0.425 ha	-	0.425 ha	1		0.88
Total	-	-	-	-		0.88

The total flow to the 750mm sanitary sewer outlet at Orchard Road for Phase 1 of the subject site including existing commercial is 85.62 L/sec. Refer to sanitary design sheets in Appendix B for detailed calculations of the Phase 1 development and the future ultimate build out development.

Existing sanitary flow into the Orchard Road outlet is 46.68 L/s (refer to MSS report by Odan Detech). Thus the increase in flow, 38.94 L/s, is less than the available excess flow capacity of 150 L/s (provided by Durham Region), therefore the outlet sewer has adequate capacity for Phase 1 of the subject development.

SUMMARY AND RECOMMENDATION

Based on the above review, analysis and findings of the MSS report by Odan Detech we offer the following summary and recommendations:

1) Phase 1 of First Pickering Place cannot be accommodated by the existing sanitary sewer system and present routing path. This would mean replacing a deep sanitary sewer between two existing houses and is not recommended. Refer to MSS report for detailed analysis of the existing conditions.

2) The 750 mm sanitary sewer on Orchard Road has sufficient capacity to accommodate Phase 1 of First Pickering Place and the existing uses.

3) We recommend that the owners of First Pickering Place build the sanitary sewer on Pickering Parkway from 1899 Brock Road site to Notion Road to accommodate the full build out of all future development sites and the existing flows. This recommendation allows the Pickering Parkway sanitary sewer to be installed and completed at one time rather than removing the road surface on separate occasions during future phasing. This section of sanitary sewer will be subject to development charges as discussed with the Region of Durham.

4) The sanitary pipe on Notion Road (from Pickering Parkway to Orchard Rd) will be sized to convey existing flows and flows from Phase 1 (First Pickering Place) to the existing Orchard Road sanitary sewer. The Region will allow this interim condition at limited capacity until such time that the Ultimate Trunk Sewer is constructed in the future to convey flows to the South SP. The interim pipe will be downsized from that on Pickering Parkway, the Region will allow this, since it is a temporary measure until the Region replaces it with a trunk sewer on Notion Road.

Refer to sanitary design spreadsheets in Appendix B for detailed calculations of Phase 1 development and the Ultimate build out development.

Table 2 – Offsite sewer improvements

Sewer location	Upstream MH	Downstream MH	Sewer size, length and slope	Comments
Pickering Parkway	1899 Brock Road	EX MH 34-82	525mm – 112m @ 1.0%	New pipe
Pickering Parkway	EX MH 34-82	Prop MH9A	675mm – 45m @ 0.37%	Replacement pipe
Pickering Parkway	Prop MH9A	EX MH 34-83	675mm – 45m @ 0.42%	Replacement pipe
Pickering Parkway	EX MH 34-83	EX MH 35-5	675mm – 100m @ 0.47%	Replacement pipe
Pickering Parkway	EX MH 35-5	EX MH 35-6	675mm – 100m @ 0.48%	Replacement pipe
Pickering Parkway	EX MH 36-6	EX MH 36-7	750mm – 83m @ 0.38%	Replacement pipe
Pickering Parkway	EX MH 36-7	EX MH 36-8	750mm – 80m @ 0.46%	Replacement pipe
Pickering Parkway	EX MH 35-8	EX MH 35-28	750mm – 101m @ 0.57%	Replacement pipe
Notion Road	EX MH 35-28	Prop MH 13A	375mm – 15m @ 0.22%	New pipe
Notion Road	Prop MH 13A	Prop MH 14A	375mm – 100m @ 0.22%	New pipe
Notion Road	Prop MH 14A	SAN MH 35-29	375mm – 102m @ 0.22%	New pipe
Notion Road	Prop MH 35-29	Prop MH 35-30	450mm – 72m @ 0.22%	Replacement pipe
Notion Road	Prop MH 35-30	Prop MH 17	450mm – 4m @ 0.23%	Replacement pipe

Note: Notion Road pipes are temporary and will be replaced by the Ultimate Regional Trunk sewer that will be directed South on Notion Road to the downstream SP.

4. WATER SUPPLY AND DISTRIBUTION

EXISTING SYSTEM:

First Pickering Place (FPP) existing water service is fed from a 300 mm Ø City main on Pickering Parkway. The Plaza has a 300mm Ø service main off of Pickering Parkway with a series of hydrants and lateral services inside the Plaza to feed the multiple buildings. Refer to Exhibit 7 for the Regions existing water system.

REDEVELOPED SITE:

Fire Protection

Fire flows for Phase 1 will be supplied by a 300mm PVC fire service proposed to connect to the 300mm watermain on Pickering Parkway at two locations to provide a looped system complete with an isolation valve on the Pickering Parkway mainline. The proposed looped system will surround the existing single storey brick retail building, refer to Figure 3 in Appendix E for details on layout of the proposed Phase 1 looped watermain system.

As per Ontario Building Code 3.2.9.7 (4), Residential Towers being over 84m tall require an additional source of water supply from a public water system. To meet this requirement a second 300mm PVC fire service will be connected to the looped 300mm watermain with isolation valves installed on the 300mm watermain between the two fire services. Isolation valves will also be installed at Pickering Parkway to create redundancy in the system.

Refer to Figure 3 in Appendix E for details and locations of proposed watermain services.

Domestic Water Service

The domestic water supply is proposed to connect to the existing 300mm watermain on Pickering Parkway with a proposed 300mm PVC watermain. Refer to Figure 3 in Appendix E for location of proposed water services.

Proposed Site

The pressures and volumes must be sufficient for Peak hour conditions and under fire conditions as established by the Ontario Building Code. The MOE minimal residual pressure under fire conditions is 140 kPa (20.3 psi). According to the Durham Region, Design Criteria for Water mains the allowable pressures are as per Table 3.

Table 3 – Allowable pressures

SCENERIO	DURHAM REGION CRITERIA Allowable Pressure (kPa)		MOE Allowable Pressure (kPa)	
	min	max	max	max
Min. Hour	275	700	275	700
Average Day	275	700	275	700
Max Day	275	700	275	700
Max Hour	275	700	275	700
Maximum Day + Fire	140	700	140	700

In order to evaluate the potential water demand for fire protection, the development was assessed using the Fire Underwriters Survey (FUS) guide. As shown in Appendix C, the following assumptions were made to perform the calculations;

1. Proposed buildings shall be of Fire Resistive type construction, therefore a construction type coefficient of 0.6 will be applied.

Proposed buildings shall be equipped with an automatic sprinkler system which meets NFPA 13 sprinkler standard including a fully supervised system, system to be designed by Mechanical Engineer.

The water demand requirement for the site based on the new population is calculated as follows:

Residential (Domestic)

a)	Average Day domestic demand -	using 364 L/cap/day (1575 persons)	6.64 L/s
b)	Max day demand -	1.9 x daily demand	12.61 L/s
c)	Peak hour demand -	2.85 x daily demand	18.91 L/s

Commercial (Domestic)

a)	Average Day domestic demand -	using 5000 L/m^2/day (1687.6m^2)	0.10 L/s
b)	Max day demand -	1.9 x daily demand	0.19 L/s
c)	Peak hour demand -	2.85 x daily demand	0.53 L/s
d)	Fire flow		167 L/s

Flow testing was conducted and results analysed using a hydraulic model KYPIPE for the full development site in the MSS report by Odan Detech. Available flow results from the report are shown below.

Table 4 – Total Water Demand For Phase 1 – First Pickering Place

	L/s	USGM
Peak Day Demand	12.79	203
Fire Flow Demand	166.67	2,642
Total Water Demand	179.46	2,748
Available Flow at Block 1 (from MSS)	234	3,579

The total water demand for the Phase 1 development is 179.5 L/s which is less than the available flow of 234 L/s. Therefore, the existing flow within the system is adequate to meet the domestic and fire demands for the proposed Phase 1 site.

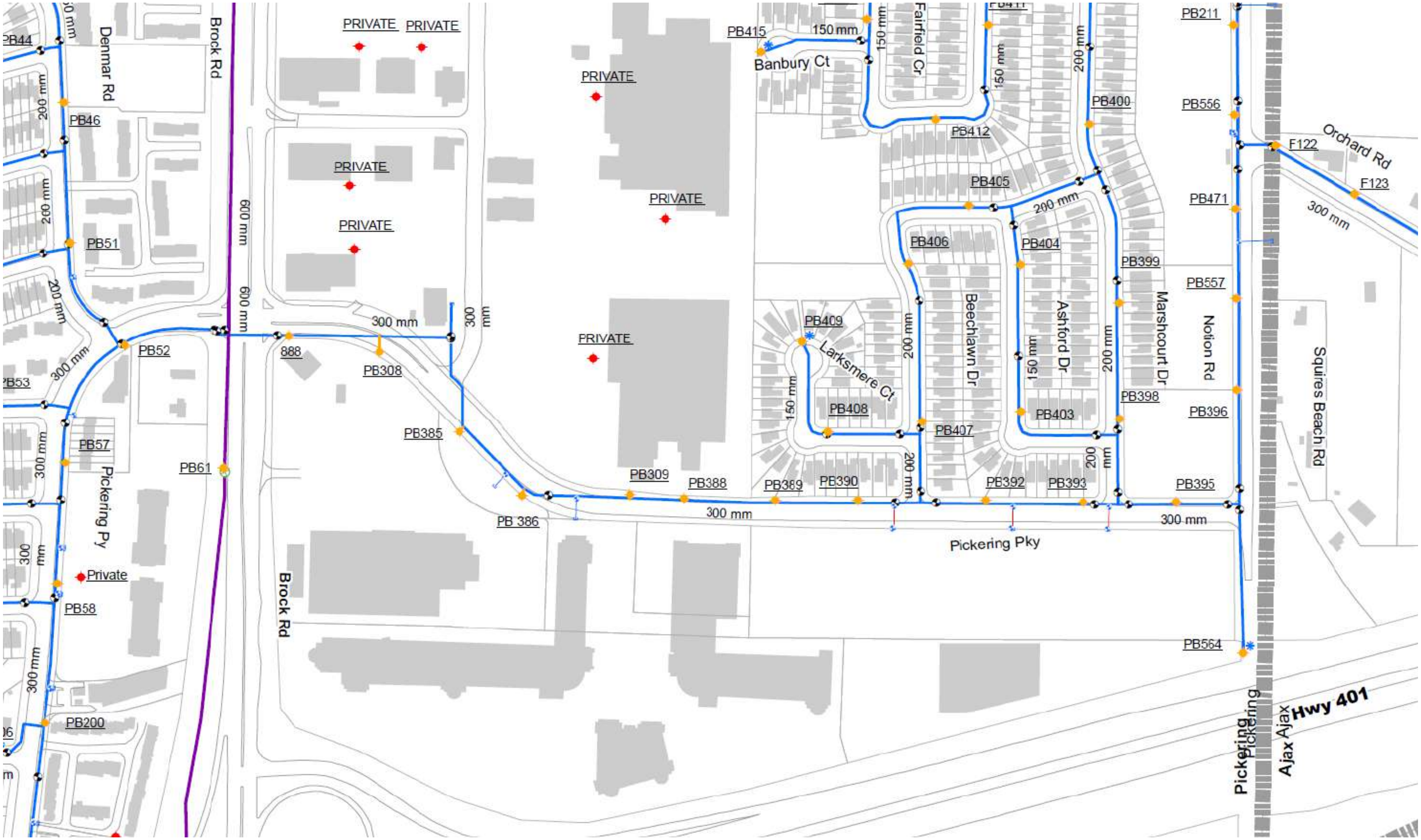


Exhibit 7 Durham Region layout of existing water system

DISCUSSION OF RESULTS:

- The pipe sizes shown are required for the fire flows and to ensure velocities are below 5.0 m/sec for fire flows.
- First Pickering Place will require new mains and hydrants. Some will be relocated to suit the development.
- The pipe sizes chosen are adequate.
- Where pressures are greater than 80 psi (550 kPa) buildings will require pressure reducing valves prior to meter connection. Hydrant tests prior to permit stage will confirm this.
- Looping the watermain connection to Pickering Parkway is required to provide redundancy in the system for the development since buildings are taller than 84 m. The OBC requires a second connection to a public system when buildings are greater than 84 m.
- Phase 1 requires an interim condition watermain which will be looped around the existing retail building to provide a redundancy to the system. For layout and details of the proposed Phase 1 watermain looped system refer to Figure 3 in Appendix E.

5. STORMWATER MANAGEMENT & FOUNDATION WATERPROOFING

Design Criteria

Stormwater management for the proposed development will follow the stormwater management criteria set out by the City of Pickering, Toronto and Region Conservation Authority and the Ontario Ministry of the Environment, Conservation and Parks.

A summary of the stormwater management criteria applicable to the site are as follows:

Quantity Control:

Stormwater Management Criteria, prepared by TRCA, 2012. The TRCA criteria for Duffin's Creek are to control post-development peak flows to pre-development levels for all storms up to and including the 100-year storm (i.e., 2-, 5-, 10-, 25-, 50-, and 100-year storms) **except** for the main branches of the East and West Duffin's Creek where no quantity control is required. The subject site is located within the watershed designated by the TRCA as not requiring quantity control.

At the Pre-consultation for 1755 & 1805 Pickering Parkway the City of Pickering Storm water management criteria was outlined as follows:

Stormwater Management Criteria that must be included in the FSSR are as follows:

- Control of post-development peak flow rates to pre-development levels.
- A maximum runoff coefficient of 0.5 should be used to represent pre-development conditions.
- Follow Stormwater Management Design Guidelines, prepared by City of Pickering. Runoff Conveyance will be as follows, the minor system is to be designed to accommodate the 5-year storm, while the major overland system is to be designed for the 100-year storm event. Where there is no suitable overland flow route, the minor system must convey the 100-year storm after on site attenuation.

Existing Storm Servicing and Drainage Patterns

As-constructed and design plans and profiles drawings obtained from the Region of Durham and the City of Pickering show that the following storm sewers are located within and around the site.

Refer to Exhibit 8 for the existing storm sewer system and outlet for the Phase 1 subject site.

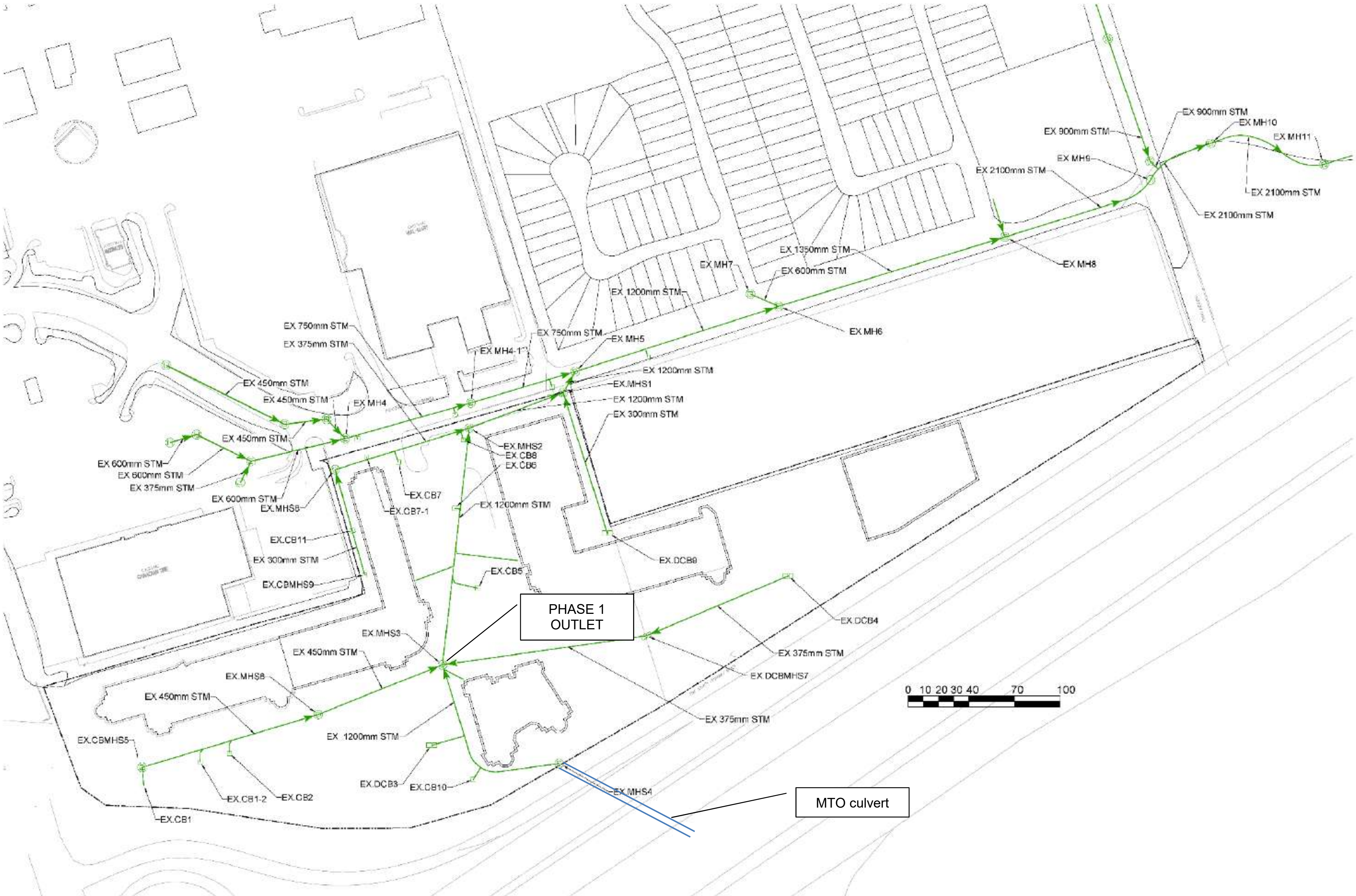


Exhibit 8 - City layout of existing Storm sewers and Site sewers

The drainage from the subject site can be summarized as follow:

1. MTO box culvert discharges flow from Hwy # 401 to a short ditch on the south side of the subject site. The flow is captured by an inlet structure attached to an existing 1200 ø storm sewer system which is routed north to Pickering Parkway where it discharges to a 1200 ø existing storm on Pickering Parkway. The pipe continues east on Pickering parkway, changes pipe sizes as shown on Exhibit 8, crosses Notion Road, continues east and discharges via a head wall to a drainage channel which empties into Duffin's Creek.

2. The subject site drains via a series of catch basins and sewers which connect to the 1200 ø storm from the 401 to Pickering Parkway as described in 1 above.

3. The overland flow from the site is conveyed more or less from the south through the lands onto the Pickering Parkway and ultimately conveyed via Pipes and existing channel, east of the Notion Road, to the Duffin's Creek.

4. Currently, there is no stormwater quantity, quality control measures implemented within the existing site.

A pre-development tributary plan has been prepared based on a drainage pattern analysis of the site's digital terrain model created from existing topographic survey and information obtained from the Region and the City. The pre-development storm tributary plan is included in Appendix E.

Pre-development/Allowable Flow Rates

The post-development flows from the site will be limited to the pre-development flows for the 2-year to 100-year design storm event. The pre-development flows were calculated based on pre-development tributary area of **0.92 ha** with runoff coefficient of 0.5. Please note that the actual runoff coefficient for the existing site condition is much higher than 0.5. The predevelopment condition consists mainly of asphalt paved parking areas and rooftop.

The flows were calculated using both rational method and hydrologic model. The City of Pickering's Intensity Duration Frequency (IDF) curve values were used for rational method calculation.

The hydrodynamic model (XPSWMM) was used to simulate flows for pre-development condition. The Atmospheric Environment Service (AES) 1-hour and 12-hour storm hyetographs and the Chicago 4-hour storms provided in the City of Pickering's SWM design guidelines were used for pre-development condition peak flow simulation. For modeling the site under existing condition, the calculation of effective rainfall in XPSWMM was accomplished using the EPA runoff method. Losses are calculated using the Horton infiltration method and initial abstraction of 1 mm and 5 mm for impervious and pervious areas respectively.

The allowable flows for the site are presented in Table 6.

- The City 2 to100 year Chicago 4 hour, AES 1-hour and 12-hour Storms were used.
- Horton infiltration parameters were used for soil types C.

  F_0 = 75 mm/hr, F_c = 5 mm/hr, decay rate $\dot{\alpha}$ = 0.000556 1/sec
- Flows were calculated using the EPA SWMM5 runoff method (similar to Stanhyd in VO2).

- Area = 0.92 ha, w= 58.7 m, C= 0.5 → % impervious = 43%

  TIMP = (C - 0.2) ÷ 0.7 = 0.43

  TIMP = total impervious fraction (dimensionless)
  C = runoff coefficient

Table 5 – Comparison Existing flows to Phase 1 – Out pipe at EX.MHS3						
Storm Event	**Storm Type**					
	Existing Conditions			**Phase 1 Conditions**		
	Chicago 4 hr (m3/s)	AES 1 hour (m3/s)	AES 12 hour (m3/s)	Chicago 4 hr (m3/s)	AES 1 hour (m3/s)	AES 12 hour (m3/s)
2- year	1.975	1.572	0.558	1.872	1.452	0.561
5- year	2.779	2.341	0.724	2.637	2.180	0.729
10- year	3.327	2.854	0.837	3.145	2.668	0.843
25- year	3.988	3.541	1.006	3.796	3.322	1.010
50- year	4.475	4.042	1.118	4.259	3.801	1.122
100- year	4.891	4.454	1.227	4.753	4.216	1.231

Table 6 shows the flows from the site only. The flows shown in table 5 is flow from the MTO culvert and the site.

Table 6 – Target Peak Flows from Phase 1 site (**allowable**)				
Storm Event	**Storm Type**			
	Chicago 4 hr (m3/s)	AES 1 hour (m3/s)	AES 12 hour (m3/s)	Rational method for comparison using IDF curves
2- year	0.110	0.084	0.036	0.079
5- year	0.189	0.148	0.053	0.108
10- year	0.244	0.196	0.063	0.128
25- year	0.312	0.258	0.076	0.168
50- year	0.360	0.305	0.085	0.205
100- year	0.401	0.349	0.094	0.237

Rational method uses C = 0.5 for 2 to10 year events, Tc = 15 min (conservative)
As per City criteria for;
25-year storm - Ca = 1.10
50-year storm - Ca = 1.20
100-year storm - Ca = 1.25

Rational method is very similar to EPA runoff using the City IDF curves (Chicago storms).

The City of Pickering uses the AES storm for sizing SWMM facilities.

POST-DEVELOPMENT

The SWM for the redeveloped First Pickering Place will establish/analyse the following:

1. Flows to the existing 1200 ø storm sewer based on the criteria established above.
2. Establish SWM criteria for Phase 1 in order to limit the flows.
3. Evaluate the flows entering the down-stream sewer system at the outlet.
4. Evaluate the water quality requirements.
5. Evaluate the water balance for the Site.
6. Make recommendations as to the implementation of the SWM.

Hydrology and Hydraulics:

We will utilize a Hydrodynamic model to evaluate the sewer items such as flow, velocity, HGL along with the above-mentioned items. The Hydrodynamic model we will use is XPSWMM by INNOVYZE version 2021. XPSWMM is using the modified EPA SWMM 5 engine. SWMM 5 models can be imported and exported into XPSWMM. The Hydrodynamic models provide the most accurate, reliable and defensible representation of flows in the collection system. They account for varying inflows, non-coincident peak flows, in system storage, hydrograph attenuation, and tail and backwater effects. The hydrology will be done using the SWM runoff methods which is similar to Otthymo Standhyd. In addition, if rural watersheds are required, XPSWMM fully implements the Nash unit hydrograph technique. The peak flows for these small tributary areas can be hand verified using the rational equation. XPSWMM will balance the entire system such as stage/storage/discharge without having to input orifice type equations. The added feature of XPSWMM is the integrated 1D/2D capability.

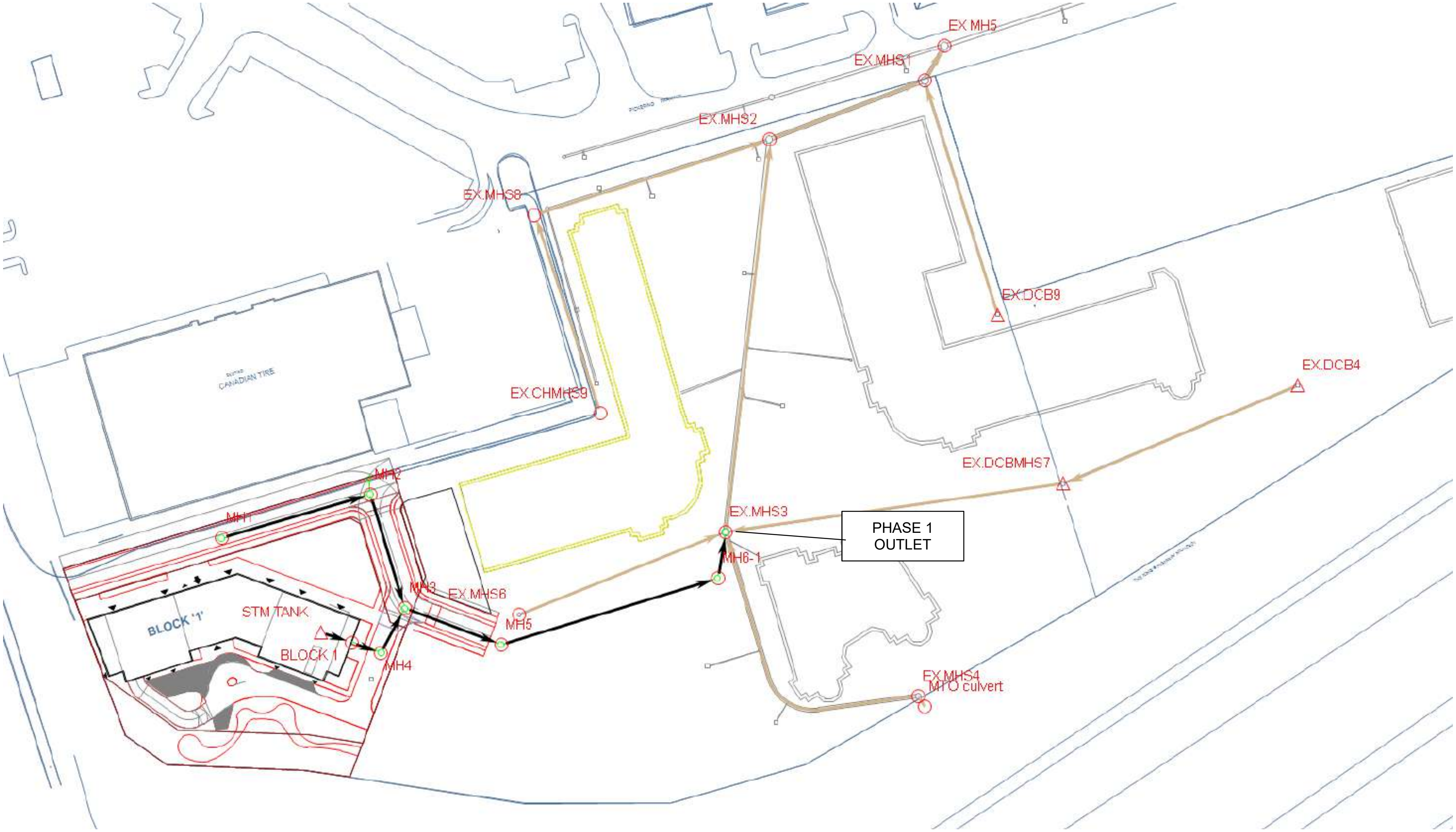
What to Model:

Based on the description of the existing system, and the imposition by the City of flow reduction to a C =0.5 from the existing site C= 0.85 (See table 6 above). The post developed site will reduce flows to the outlet at the existing 1200 ø sewer. Phase 1 allows outlet to the existing 1200 ø sewer. Refer to Appendix E for the site servicing drawings.

Therefore, the model will include the flow from the MTO culvert and the new site sewers. The boundary conditions are outfall at the existing EX.MHS3.

The City of Pickering uses the AES storm for sizing SWM facilities. It will be shown that the 4 hour Chicago storm is the critical storm for all storage facilities.

Exhibit 9- XPSWMM PHASE 1 MODEL WITH NODE LABELS



Legend: Δ - storage node, o – node/MH, Link (pipe or open channel), Tan colour shows existing
Link with pipe and channel above or orifice

Exhibit 10- XPSWMM PHASE 1 MODEL WITH TRIBUTARY AREAS

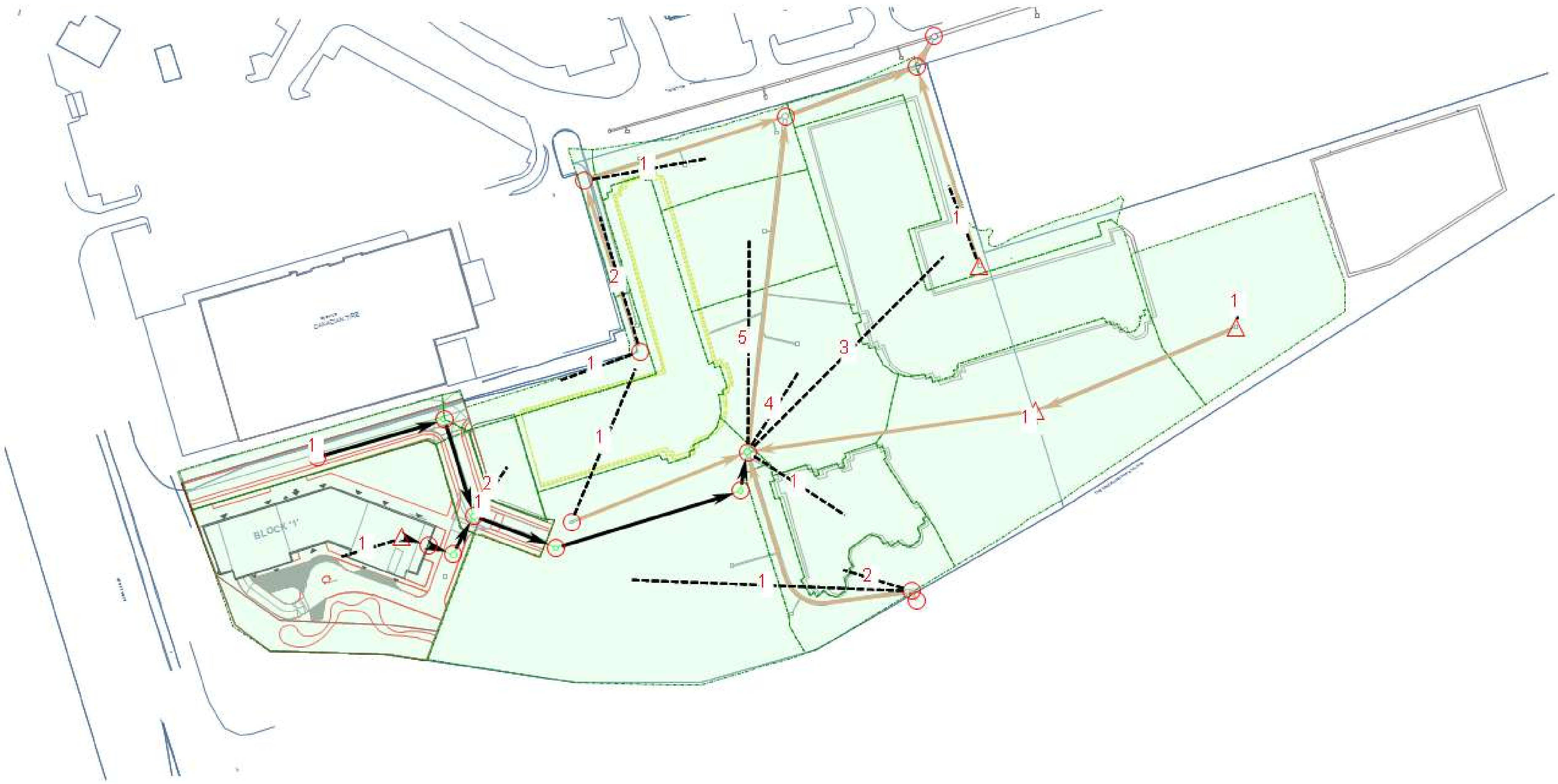
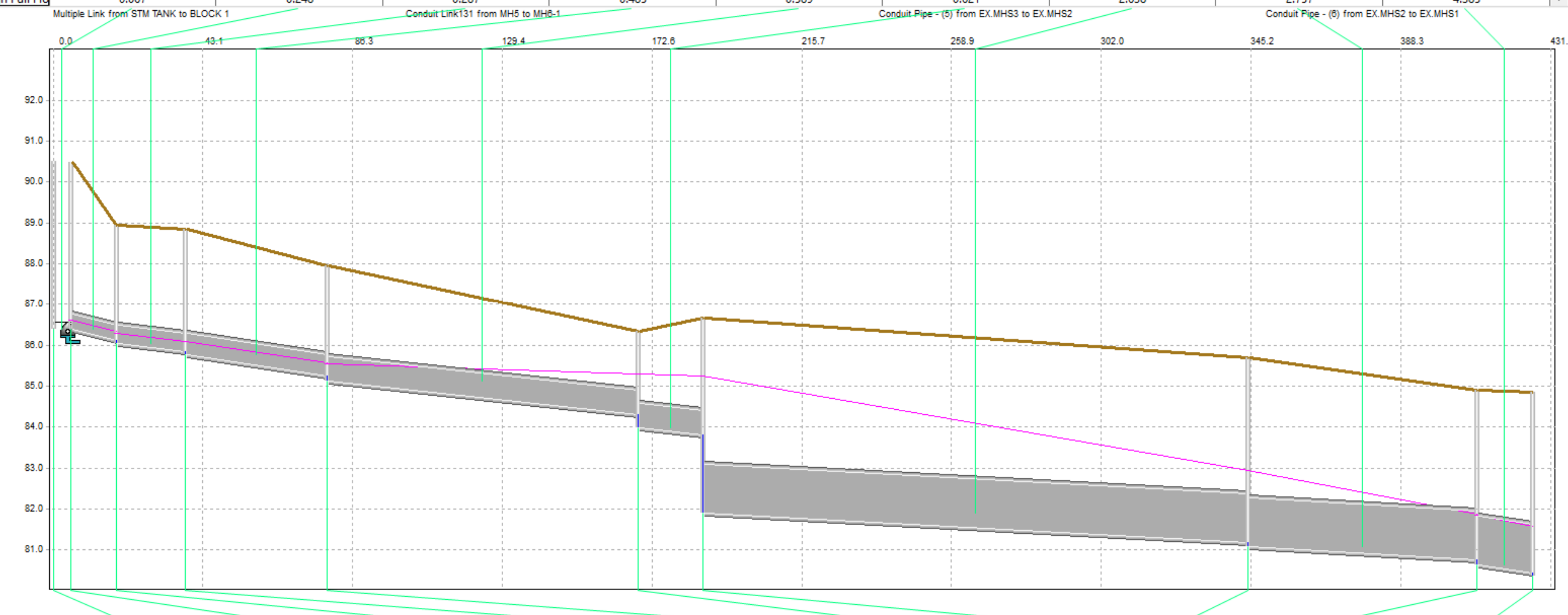


Exhibit 11- XPSWMM profile plot STM TANK to EXMH5 – 100-YR Chicago

PIPE DATA | pipe results

	Tank A-orif	Link134	Link135	Link130	Link131	Link132	Pipe - (5)	Pipe - (6)	Pipe - (7)
Storm	100yr4hrChicago	100yr4hrChicago	100yr4hrChicago	100yr4hrChicago	100yr4hrChicago	100yr4hrChicago	100yr4hrChicago	100yr4hrChicago	100yr4hrChicago
Diameter (Hei		0.375	0.450	0.525	0.600	0.600	1.200	1.200	1.200
Length		13.310	19.780	40.840	89.730	18.560	157.206	66.014	16.050
Conduit Slope		2.000	1.011	1.270	0.920	1.024	0.458	0.500	1.265
Max Flow	0.163	0.163	0.163	0.328	0.372	0.588	4.753	4.973	5.120
Design Full Flo	0.067	0.248	0.287	0.485	0.589	0.621	2.638	2.757	4.385

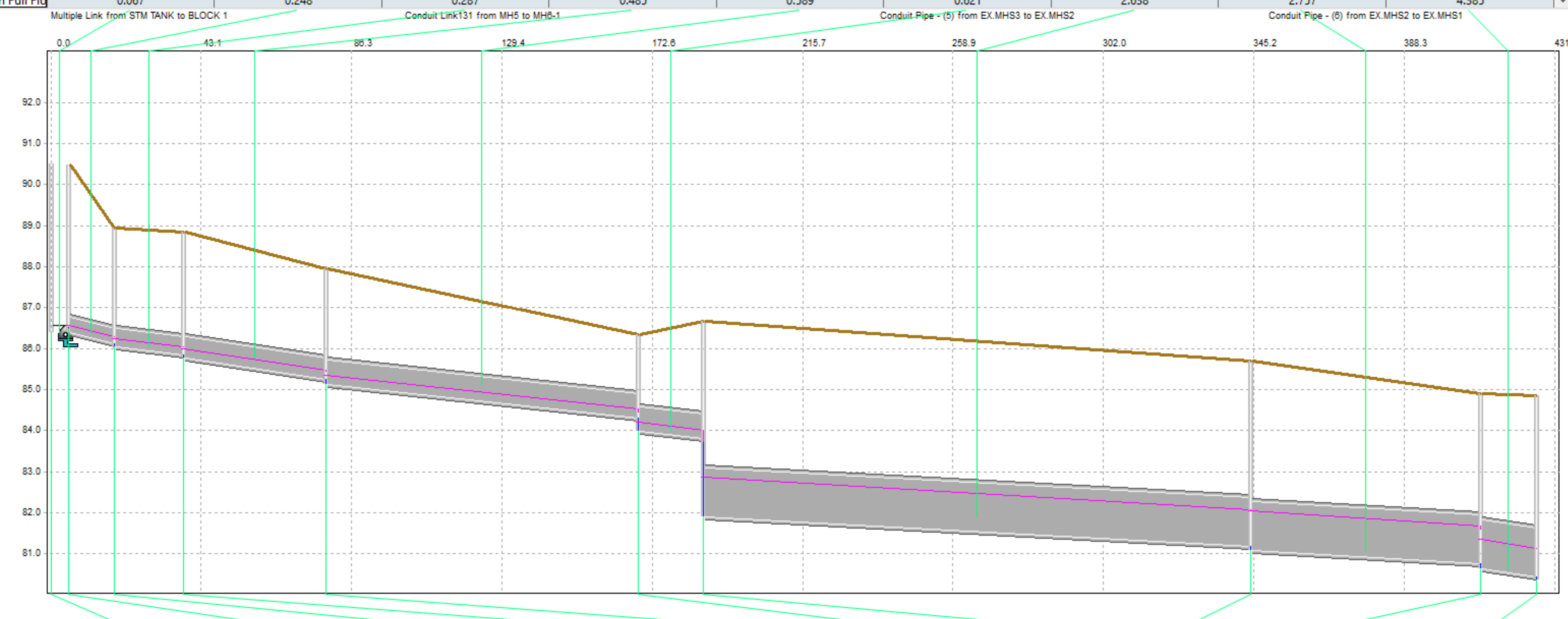


	STM TANK	BLOCK 1	MH4	MH3	MH5	MH6-1	EX.MHS3	EX.MHS2	EX.MHS1	EX MH5
Storm	100yr4hrChicago	100yr4hrChicago	100yr4hrChicago	100yr4hrChicago	100yr4hrChicago	100yr4hrChicago	100yr4hrChicago	100yr4hrChicago	100yr4hrChicago	100yr4hrChicago
Ground Elevati	90.500	90.471	88.934	88.853	87.952	86.330	86.667	85.690	84.888	84.851
Max Water Ele	87.959	86.608	86.288	86.087	85.546	85.295	85.248	82.937	81.848	81.496
Max Water De	1.573	0.225	0.243	0.317	0.416	1.305	3.358	1.857	1.208	1.139
Invert Elevatio	86.386	86.386	86.045	85.770	85.130	83.990	81.890	81.080	80.640	80.357
Max Volume	235.943	0.274	0.296	0.387	0.508	1.606	4.101	2.269	1.474	1.390

Exhibit 12- XPSWMM profile plot STM TANK to EXMH5 – 5-YR Chicago

PIPE DATA | pipe results

	Tank A-orif	Link134	Link135	Link130	Link131	Link132	Pipe - (5)	Pipe - (6)	Pipe - (7)
Storm	5yr4hrChicago	5yr4hrChicago	5yr4hrChicago	5yr4hrChicago	5yr4hrChicago	5yr4hrChicago	5yr4hrChicago	5yr4hrChicago	5yr4hrChicago
Diameter (Hei		0.375	0.450	0.525	0.600	0.600	1.200	1.200	1.200
Length		13.310	19.780	40.840	89.730	18.560	157.206	66.014	16.050
Conduit Slope		2.000	1.011	1.270	0.920	1.024	0.458	0.500	1.265
Max Flow	0.103	0.103	0.103	0.174	0.172	0.172	2.637	2.764	2.838
Design Full Flo	0.067	0.248	0.287	0.485	0.589	0.621	2.638	2.757	4.385



	STM TANK	BLOCK 1	MH4	MH3	MH5	MH6-1	EX.MHS3	EX.MHS2	EX.MHS1	EX MH5
Storm	5yr4hrChicago	5yr4hrChicago	5yr4hrChicago	5yr4hrChicago	5yr4hrChicago	5yr4hrChicago	5yr4hrChicago	5yr4hrChicago	5yr4hrChicago	5yr4hrChicago
Ground Elevati	90.500	90.471	88.934	88.853	87.952	86.330	86.667	85.690	84.888	84.851
Max Water Ele	87.170	86.554	86.231	85.988	85.353	84.206	82.866	82.037	81.344	81.060
Max Water De	0.784	0.171	0.186	0.218	0.223	0.216	0.976	0.957	0.704	0.703
Invert Elevatio	86.386	86.386	86.045	85.770	85.130	83.990	81.890	81.080	80.640	80.357
Max Volume	117.622	0.209	0.227	0.266	0.272	0.264	1.191	1.168	0.858	0.858

XPSWMM MODEL:

The XPSWMM model is a series of node Links forming a 1D dynamic model with hydrology and hydraulics coupled together. Flow (runoff) is calculated at nodes and dynamically routed through pipes, culverts, storage structures and open channels. The following are the info used in the model:

- All plastic and concrete pipes Manning n = 0.013.
- All CSP pipes Manning n = 0.024.
- All open channels Manning n = 0.040 (considering dense vegetation along the channels).
- Pipe Manhole loss coefficients for entrance and exit were accounted for via drop in manhole inverts.
- Pipe obverts were more or less matched.
- XPSWMM was chosen to accurately show the HGL.
- Refer to sewer profile plots for calculations of flows and other hydraulic stats.
- XPSWMM in 1D, uses a Finite difference Runge-Kutta explicit scheme. Scheme solves all terms of the St.Venant equations. 1D and 2D schemes automatically switch between upstream and downstream controlled flow regimes to represent shocks.

  TIME STEP:
  We have adapted the following time steps:
  1D model start with 15.0 sec. Note the explicit nature of the algorithm automatically reduces the time step. In the case of this model the program has reduced the time step to 1.25 sec or less.

- The City 2 to 100 year 4-hour Chicago, AES 1-hr and AES 12-hr Storms were used.
- Horton infiltration parameters were used for soil types C and D.

  F_0 = 75 mm/hr, F_c = 5 mm/hr, decay rate $\dot{\alpha}$ = 0.000556 1/sec

  Depression storage 1mm impervious and 5mm pervious

Refer to table 7 for the existing XPSWMM model hydrology parameters. Refer to Exhibit 9 for the Proposed Site XPSWMM model.

Table 7 – Proposed XPSWMM model hydrology parameters

Name	Subcatchment	Area ha	Impervious Percentage %	Width m	Slope m/m	Hydrology Methods	Infiltration Reference	Time to Peak Tp (min)
EX.MHS6		0	0	0	0	SWMM Methods 64		0
EX.MHS3	1	0.282	99	32.5	0.01	SWMM Methods 64	ROOF	0
EX.MHS3	2	0.57	99	62.2	0.01	SWMM Methods 64	ROOF	0
EX.MHS3	3	0.921	99	58.8	0.01	SWMM Methods 64	ROOF	0
EX.MHS3	4	0.606	88	47.7	0.016	SWMM Methods 64	Parking	0
EX.MHS3	5	0.341	95	35.8	0.012	SWMM Methods 64	Parking	0
EX.MHS2		0	0	0	0	SWMM Methods 64		0
EX.MHS1		0	0	0	0	SWMM Methods 64		0
EX MH5		0	0	0	0	SWMM Methods 64		0
EX.CHMHS9	1	0.15	99	23.7	0.046	SWMM Methods 64	Parking	0
EX.CHMHS9	2	0.058	99	14.7	0.011	SWMM Methods 64	Parking	0
EX.MHS8	1	0.258	80	31.1	0.02	SWMM Methods 64	Parking	0
EX.MHS4	1	1.347	91	69.2	0.034	SWMM Methods 64	Parking	0
EX.MHS4	2	0.271	68	31.9	0.005	SWMM Methods 64	Parking	0
EX.DCB4	1	0.593	90	47.2	0.013	SWMM Methods 64	Parking	0
EX.DCBMHS7	1	0.975	90	60.5	0.027	SWMM Methods 64	Parking	0
EX.DCB9	1	0.29	97	33	0.007	SWMM Methods 64	Parking	0
MTO culvert	1	41.635	10	395.1	0.009	SWMM Methods 64	OFF SITE	0
MH1	1	0.235	85	29.7	0.02	SWMM Methods 64	Urban-C-soils	0
MH2	1	0.16	85	10	0.01	SWMM Methods 64	Urban-C-soils	0
MH3	1	0.123	85	21.5	0.01	SWMM Methods 64	Urban-C-soils	0
MH3	2	0.1	15	19.4	0.01	SWMM Methods 64	Urban-C-soils	0
MH5		0	0	0	0	SWMM Methods 64		0
MH6-1		0	0	0	0	SWMM Methods 64		0
STM TANK	1	0.92	85	58.7	0.01	SWMM Methods 64	ROOF	0
BLOCK 1		0	0	0	0	SWMM Methods 64		0
MH4		0.92	85	0.587	0.01	SWMM Methods 64		0

DISCUSSION OF XPSWMM MODEL:

1) The Model tributary areas follow the minor system tributary areas. See model above.

2) There are no celerity issues with the model. There were no warnings or errors.

3) All conduits were stable. The continuity error was less than 1% in all storm runs which is considered excellent.

4) There were no warnings or error messages from the analysis.

5) In a dynamic model the orifice size and co-efficient are entered. The Model calculates the HGL and volume required. There is no need for a rating curve.

6) Outfalls are considered free flow, since the outlet is to a trunk sewer.

7) The HGL plots show the brown service line as the spill crest when representing surface storage nodes and rim elevation for MH nodes. The plots are for the 5 year and 100-year storms.

8) The long plots (profile) have tables that give hydraulic stats for each length of run.

9) The stats show that the City criteria for sewers has been achieved.

Phase 1 Analysis Results

Table 8 – Peak Flows from Phase 1 Site

Storm Event	Allowable Peak Flow (m3/s)			Phase 1 Peak Flow (m3/s)		
	Chicago 4 hr (m3/s)	AES 1 hour (m3/s)	AES 12 hour (m3/s)	Chicago 4 hr (m3/s)	AES 1 hour (m3/s)	AES 12 hour (m3/s)
2 year	0.110	0.084	0.036	0.074	0.068	0.043
5 year	0.189	0.148	0.053	0.103	0.096	0.057
10 year	0.244	0.196	0.063	0.120	0.113	0.066
25 year	0.312	0.258	0.076	0.138	0.132	0.077
50 year	0.360	0.305	0.085	0.150	0.145	0.086
100 year	0.401	0.349	0.094	0.163	0.157	0.094

Phase 1 Site Flow is site out-pipe flow at MH4.

Note the post development flows to the City sewer is reduced considerably due to storage tanks.

SUMMARY OF SWM Quantity Control Features:
Refer to Table 9 for the SWM used for quantity control of Phase 1.

Table 9 – SWMM Quantity Features for Phase 1

BLOCK OR DESCRIPTION AND FLOW AREA TO TANK (ha)	SWMM FEATURE DESCRIPTION & FOOTPRINT (m2)	VOLUME REQUIRED 100-year flow (m3) max of 4 hr Chicago or AES	ORIFICE CONTROL C=0.62	ORIFICE max head (m)	Maximum 100-year flow (L/sec)
BLOCK 1 (0.919 ha)	1-Storage Tank (150)	TANK 1 – 236	250 mm	1.57	163

Maximum Volume created by 4-hour Chicago storm

FOUNDATION WATERPROOFING STRATEGY

Dewatering discharge during construction and long term will be as follows:

At the Pre-consultation for 1755 & 1805 Pickering Parkway the City of Pickering made the following statement:

Please note that the City will not accept discharge of foundation drainage to the storm system due to the potential for adverse impacts.

Please note that Region of Durham will not accept discharge of foundation drainage to the sanitary sewers. This statement is part of their sewer bylaw.

Based on the above we recommend the Architect, Structural Engineer, Geotechnical Engineer and Mechanical Engineer devise a waterproofing system with the shoring and foundation design.

Based on the above we have not incorporated any allowance for foundation drainage in the SWM for the site.

DISCUSSION OF RESULTS:

- The outlet for Phase 1 can be the existing 1200mm dia. storm sewer since the Phase 1 quantity controls will reduce the flow entering this pipe

- Phase 1 requires 236m^3 of storage for quantity control to meet the City of Pickering SWM design guidelines, storage volume will be provided by means of a storm water management tank located in the underground parking levels

- Orifice control for the storm water management tank will be a 250mm dia. orifice plate

- Flows from the site will be reduced at Phase 1 of the development, further flow reduction will occur at each subsequent phase of the ultimate build out (See MSS report by Odan Detech for further details)

6. WATER BALANCE

The primary objective of the Water Balance Targets/Criteria is to capture and manage annual rainfall on the development site itself to preserve the pre-development hydrology (or "water balance", which typically consists of three components: runoff, infiltration, and evapotranspiration) through a combination of infiltration, evapotranspiration, landscaping, rainwater reuse and/or other low impact development practices.

Site Criteria

In most cases, the minimum on-site runoff retention requires the proponent to retain all runoff from a small design rainfall event – typically 5mm through infiltration, evapotranspiration and rainwater reuse.

The City of Pickering Stormwater Management Design Guidelines' target for water balance is to provide runoff reduction from the site through infiltration, evapotranspiration and reuse of a minimum of 5mm of rainfall depth across all impervious surfaces.

CITY OF PICKERING GUIDELINE WATER BALANCE SUMMARY

Project: 1755&1805 Pickering Parkway (First Pickering Place)
Project No.: 20266

Site Area	7825	m^2
Rainfall depth required to capture	5	mm
Captured Volume Target (5mm across entire s	39.1	m^3
(Total Area x Rainfall Depth)		

SURFACE TYPE	SURFACE CAPTURE (mm)	AREA (m^2)	% OF SITE AREA	VOLUME CAPTURE (m^3)
Green Roof	7	682	8.7	4.8
Landscaped Areas	5	921	11.8	4.6
Roof Area (Drains to Cistern for Reuse)	12.86	2309	29.5	29.7
Asphalt Driveway, Pavers and Concrete (Ground)	0	3913	50.0	0.0
TOTAL		7825	100	39.1

CAPTURED VOLUME BY INTIAL ABSTRACTION (m^3)	**9.4**
VOLUME OF CISTERN (m^3)	**29.7**
CAPTURED VOLUME (m^3)	**39.1**

The site area and 5mm rainfall depth will be used to calculate the water balance target. The water balance target is as follows.

Water Balance Target:

***Site Area* x 5mm** = (7825m^2 x 0.005m)*
= 39.1m^3
**Site area does not include 14m MTO Setback Lands.*

It is proposed to achieve the above target through infiltration/absorption and rainwater harvesting for reuse.

The water balance summary that follows, summarizes the rain capture over the site. The site was divided according to surface conditions, and an initial abstraction value (IA) or the expected capture depth was derived for each surface condition. **9.4m^3** will be captured by initial abstraction.

Therefore, in order to achieve the required water balance target, rain harvesting of storm run-off from the roof top to a cistern will be implemented, with a potential volume of **29.7m^3**. This volume can be used for irrigation of landscaping, greywater toilets in the retail spaces and greywater wash-down areas in the underground parking levels. Detailed calculations for water reuse consumption is located in Appendix D. The stormwater retention/water balance tank can be located within the SWM tank as chambers or individual tanks.

Further detail on water reuse will be presented in the Stormwater Management Report at the Site Plan Approval stage. Preliminary calculations are shown below.

Water Balance Summary:

Water Balance Target:	***39.1m^3***
Capture:	
Initial Abstraction (Absorption/ Infiltration/ Evapotranspiration)	
Green Roofs	*4.8m^3*
Planters & Landscaping	*4.6m^3*
Total Captured Volume by Initial Abstraction	*9.4m^3*
Capture in Cistern from Roof Top for Reuse	*29.7m^3*
Total Volume Capture	***39.1m^3***
Reuse Potential from Cistern	
Greywater toilet and urinal reuse (Retail)	**TBD**
Irrigation requirement for landscaping	**TBD**
Greywater wash-down area reuse (Underground Parking)	**TBD**
Total Reuse Potential from Cistern	***>29.7m^3***

The total capture of 39.1m^3 meets the target volume of 39.1m^3; therefore, the water balanced target can be achieved on site. In addition, the total on-site water re-use potential of shall exceed the minimum cistern capture requirement of 29.7 m^3.

7. WATER QUALITY

The water quality target for the subject development as required by City of Pickering is Enhanced Level of Protection - long term average removal of 80% Total Suspended Solids (TSS) on an annual loading basis from all runoff leaving the proposed development site based on the post-development level of imperviousness.

The site was divided according to surface conditions and the effective TSS removal for each surface condition was considered based on the treatment it would receive. The general basis of the effective TSS removal rates are as follows:

1. Rooftop areas are subject only to airborne particles and insignificant amounts of sediment transported by foot traffic. As such, an effective removal efficiency of 80% is utilized on a conventional roof to reflect the inherent runoff quality from a conventional roof.

2. Balconies and sodded areas are subject to insignificant amounts of sediment transport by foot traffic. An effective removal rate of 80% is used.

3. Driving and ground-level pedestrian surfaces which are open-to-above will be subject to Winter maintenance, therefore they are assumed to have an effective removal efficiency of 0% and filtration is thus required.

Block 1 is comprised of open-to-above driving and pedestrian areas which will be subject to future winter maintenance. Oil and Grit Separation (OGS) devices will be specified accordingly to provide 80% TSS Removal for the site. Flows from asphalt driveway, paver and concrete areas will be directed to an Oil/Grit Separator sized accordingly for the development prior to entering the SWM Tank.

Through the above inherent TSS removal rates and the OGS unit, the 80% TSS removal rate can be achieved.

8. GRADING CONSIDERATIONS

The existing topography of the site generally slopes from west to northeast towards the low point of the site located on the east side of the Site. Under the new development and existing adjacent developments there are several grading constraints for this development to match. The constraints are the existing commercial buildings, intersection at Brock Road and MTO lands to the south.

For proposed grading of the redeveloped site refer to the Preliminary Grading Plan included in Appendix E.

9. EROSION AND SEDIMENT CONTROL

Erosion and sediment controls for the site will be implemented according to the Golden Horseshoe Area Conservation Authorities' Erosion and Sediment Control Guidelines for Urban Construction. A detailed erosion control plan will be prepared upon final design and at Site Plan Approval Stage.

10. SOILS REPORT AND HYDROGEOLOGY:

A preliminary Geotechnical investigation has been completed for the site. The purpose of the study is to characterize hydrogeological conditions and determine permitting requirements for the proposed development at the First Pickering Place. The study was completed by Terraprobe dated May 27, 2021 for Pickering Ridge Lands Inc. & Bayfield Realty Advisors.

Native clayey silt glacial till, underlying dense to very dense matrix of sandy silt to silty sand till is the typical soil underlying the site. The soils have some infiltration capacity. The water table underneath varies from 4 to 6 m below grade. Based on the grading it may be possible to provide infiltration galleries. The water table should be monitored further in order to get a wide range of potential water table levels. Monitoring will provide better confidence in the potential maximum ground water levels.

11. RECOMMENDATIONS:

1) We recommend that the owners of First Pickering Place build the sanitary sewer on Pickering Parkway from 1899 Brock Road site to Notion Road to accommodate the full build out of all future development sites and the existing flows. This section of sanitary sewer will be subject to development charges as discussed with the Region of Durham.

2) The sanitary pipe on Notion Road (from Pickering Parkway to Orchard Rd) will be sized to convey existing flows and flows from Phase 1 (First Pickering Place) to the existing Orchard Road sanitary sewer. The Region will allow this interim condition at limited capacity until such time that the Ultimate Trunk Sewer is constructed in the future to convey flows to the South SP. The interim pipe will be downsized from that on Pickering Parkway, the Region will allow this, since it is a temporary measure until the Region replaces it with a trunk sewer on Notion Road.

3) We recommend looping the watermain to Notion Road or Brock Road to provide redundancy to the development since many buildings are taller than 84 m. The OBC requires a second connection to a public system when buildings are greater than 84 m.

12. CONCLUSIONS

The findings of our investigation and analysis can be concluded as follows:

The proposed site is serviceable with the added density with respect to sanitary, water and storm by connecting to the existing infrastructure in and around the site as outlined in this report.

Table 10 summarizes the SWM components of the proposed development.

Table 10 – Summary Information for Proposed Re-Development	
Allowable release rate from site (L/s)	401 L/s
Actual release rate from site (L/s) (100-year storm)	163 L/s
Total Stormwater Storage Volume Required/Available in U/G Parking SWM Tank	236 m^3
Cistern Tank For Stormwater Reuse	29.7 m^3
Orifice tube size used	250 mm
Water Quality	80% TSS achieved by nature of proposed development (i.e. all roof top & amenity) with OGS unit for driveways, pavers, and concrete

13. REFERENCES

1. City of Pickering (September 18, 2020**). Summary of Comments**, Pre-consultation for 1755 & 1805 Pickering Parkway. City of Pickering, Ontario.
2. City of Pickering (July 2019). **Stormwater Management Design Guidelines**. City of Pickering, Ontario.
3. TRCA (August 2012). **Stormwater Management Criteria**, Version 1.0. Toronto and Region Conservation Authority, Ontario.
4. GGHA CAs (December, 2006). **Erosion and Sediment Control Guideline for Urban Construction**, Greater Golden Horseshoe Area Conservation Authorities, Ontario.
5. Ontario Ministry of the Environment (March, 2003). **Stormwater Management Planning and Design** Manual. Ministry of the Environment, Ontario. ISBN 0-7794-2969-9.
6. Ontario Ministry of the Environment (2008). **Design Guidelines for Drinking-Water Systems**. Ministry of Environment, Ontario. ISBN 978-1-4249-8517-3.
7. Ontario Ministry of the Environment (2008). **Design Guidelines for Sewage Works**. Ministry of Environment, Ontario. ISBN 978-1-4249-8438-1.
8. Fire Underwriter Survey (1999). **Water Supply for Public Fire Protection**, Ontario.
9. **NEW JERSEY STORM WATER BEST MANAGEMENT PRACTICES MANUAL**, April 2004.
10. **MNR Technical Guide – River and Streams Systems: Flooding Hazard Limits**, 2002.
11. **FEMA Chapter 4 - Flood Risk Assessment**.
12. **ROAD AND BRIDGE DECK DRAINAGE SYSTEMS** by MTO, November 1982.
13. **XPSWMM users Guide** by INNOVYZE 2021.
14. **EPA SWMM 5**, Build 5.1.012, Manual.
15. **LOW IMPACT DEVELOPMENT STORMWATER MANAGEMENT MANUAL**, 2008, by Credit Valley Conservation Authority and Toronto Town Conservation Authority.
16. **Master Servicing and Stormwater Management Report**, for 1899 Brock Road, City of Pickering, May 2021 by SCHAEFFERS.
17. **Functional Servicing & Stormwater Management Report Residential Townhouse Development – 1856 Notion Road Durham Region – City of Pickering**, January 19, 2018, by GHD.
18. City of Pickering and Pickering Developments Inc. – **New Highway 401 Road Crossing (from Notion Road to Squires Beach Road) Schedule "C' Municipal Class Environmental Assessment**, October 2019, by AECOM.
19. **Master Servicing and Stormwater Management Report**, 1755 & 1805 Pickering Parkway, City of Pickering, January 2022, by ODAN/DETECH Group.

Respectfully Submitted:
The Odan Detech Group Inc.

Date: April 20, 2022

REGISTERED PROFESSIONAL ENGINEER
I. KRPAN
PROVINCE OF ONTARIO

John Krpan, M.S.C.E., P.Eng.

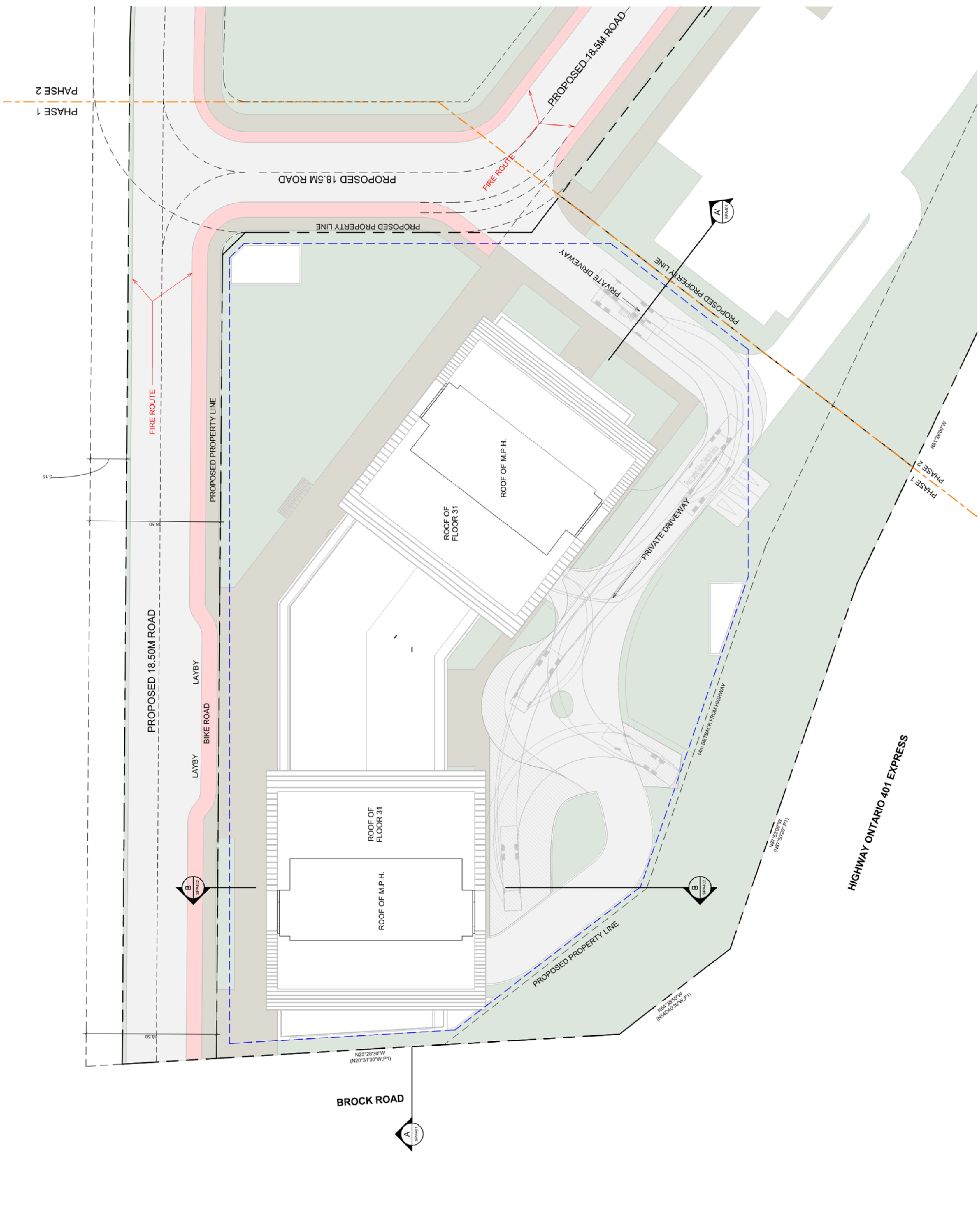
Scott Ahonen, B.Eng.

APPENDIX A

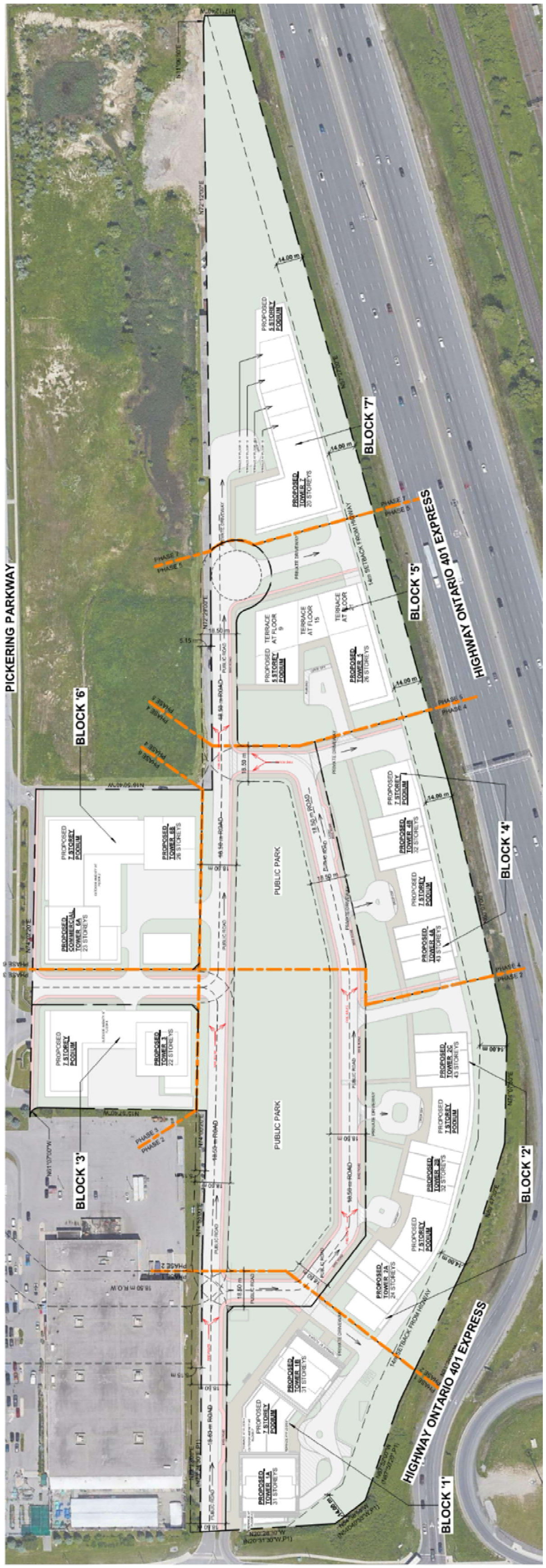
Aerial Photo of Existing Site
Phase 1 Site Plan of the Proposed Development (reduced)
Ultimate Site Plan of the Proposed Development (reduced)

Aerial Photo of Existing Site

Phase 1 Site Plan of the Proposed Development (reduced)



Ultimate Site Plan of the Proposed Development (reduced)



APPENDIX B

Redeveloped site Phase 1 sanitary sewer design sheet

Redeveloped sites (subject site, 1899 Brock Road and surrounding tributaries) sanitary sewer design sheet

Redeveloped subject site Phase 1 sanitary sewer design sheet

SCENARIO 2: PHASE 1 CONDITIONS
Redeveloped subject site Phase 1 sanitary sewer design sheet **PROPOSED PIPE SIZES**

DESIGNED BY: S. Ahonen DATE: 2022-04-06
CHECKED BY: M. Al-Awad

STREET	TRIB ID	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL							COMMERCIAL				FLOW (L/s)				EXISTING SEWER					PRESENT CONDITION	NOTES
				LOT AREA UNIT (ha)	LOT AREA ACCUM. (ha)	POP. DENSITY (Persons/ ha)	POP. DENSITY (Persons /Unit)	# OF UNITS	POP.	PEAK FLOW FACTOR, K_H	LOT AREA (Ha)	FLOOR SPACE INDEX	GROSS FLOOR AREA GFA (ha)	GROSS FLOOR AREA ACCUM. (ha)	RESIDENTIAL FLOW INFIL. 0.26 (L/s)	RESIDENTIAL FLOW SEWAGE 0.0042 (L/s)	COMM. 2.08 l/s	TOTAL FLOW l/s	Length L (m)	Size D (mm)	Slope S (%)	Full Flow Capacity Qcap (L/s)	Full Flow Velocity V (m/s)	% Full Q(d)/Qcap	
Canadian Tire Site	4	EX.MH090	EX MH 34-82										0.79	0.79			1.65	1.65	59.8	200	0.30	17.96	0.57	9.2	
Pickering Parkway		EX MH 34-82	Prop MH9A	0.52	0.52									0.79	0.14	0.00	1.65	1.78	49.4	675	0.37	511.31	1.43	0.3	pipe sized for full build-out
Subject Site	P1	Prop MH1A	Prop MH2A	1.18	1.18		2.5	630	1575	3.66			0.17	0.17	0.31	24.24	0.35	24.90	20.7	300	0.87	90.20	1.28	27.6	pipe sized for full build-out
Subject Site		Prop MH2A	Prop MH3A		1.18				1575	3.66				0.17	0.31	24.24	0.35	24.90	44.7	300	0.95	94.25	1.33	26.4	pipe sized for full build-out
Subject Site	P2	Prop MH3A	Prop MH4A		1.18				1575	3.66			0.28	0.45	0.31	24.24	0.93	25.48	83.5	300	0.78	85.40	1.21	29.8	pipe sized for full build-out
Subject Site		Prop MH4A	Prop MH1A-1		1.18				1575	3.66				0.45	0.31	24.24	0.93	25.48	97.4	300	0.55	71.72	1.01	35.5	Interim pipe Phase 1
Subject Site	P3,2	Prop MH1A-1	Prop MH7A		1.18				1575	3.66			1.50	1.95	0.31	24.24	4.05	28.60	45.4	300	0.31	53.84	0.76	53.1	Interim pipe Phase 1
Subject Site		Prop MH7A	Prop MH8A		1.18				1575	3.66				1.95	0.31	24.24	4.05	28.60	29.9	450	0.52	205.59	1.29	13.9	pipe sized for full build-out
Subject Site		Prop MH8A	Prop MH9A		1.18				1575	3.66				1.95	0.31	24.24	4.05	28.60	14.3	450	0.72	241.92	1.52	11.8	pipe sized for full build-out
Pickering Parkway		Prop MH9A	EX MH 34-83	0.25	1.95				1575	3.66				2.74	0.51	24.24	5.70	30.44	42.0	675	0.33	482.88	1.35	6.3	pipe sized for full build-out
Pickering Parkway		EX MH 34-83	EX MH 35-5	0.24	2.19				1575	3.66				2.74	0.57	24.24	5.70	30.51	100.0	675	0.49	588.41	1.64	5.2	pipe sized for full build-out
Pickering Parkway	15	EX MH 35-5	EX MH 35-6	0.28	2.47				1575	3.66				2.74	0.64	24.24	5.70	30.58	99.8	675	0.48	582.38	1.63	5.3	pipe sized for full build-out
BEECHLAWN DR		EX MH018	EX MH 35-6	2.89	2.89	60			173	3.80					0.75	2.77		3.52	59.0	200	0.95	31.97	1.02	11.0	
METROPIA	6	EX MH3A	EX MH 35-6	3.65	3.65				672	3.80					0.95	10.73		11.67	38.2	200	0.75	28.40	0.90	41.1	
Pickering Parkway	16	EX MH 35-6	EX MH 35-7	0.22	9.23				2420	3.52				2.74	2.40	35.78	5.70	43.88	82.5	675	0.38	518.17	1.45	8.5	pipe sized for full build-out
Pickering Parkway	17	EX MH 35-7	EX MH 35-8	0.24	9.47				2420	3.52				2.74	2.46	35.78	5.70	43.94	80.0	675	0.46	570.11	1.59	7.7	pipe sized for full build-out
Pickering Parkway	18	EX MH 35-8	SAN MH 35-28	0.22	9.69				2420	3.52				2.74	2.52	35.78	5.70	44.00	110.1	675	0.57	634.63	1.77	6.9	pipe sized for full build-out
Subject Site	5	EX MH 35-34	EX MH 35-33										0.42	0.42	0.00		0.88	0.88	145.7	150	1.00	15.23	0.86	5.8	
Notion Road	20	EX MH 35-33	SAN MH 35-28	0.50	0.50									0.42	0.13		0.88	1.01	109.4	200	1.82	44.25	1.41	2.3	
~~MARSHCOURT DR~~		~~EX MH 35-8~~	~~EX MH 35-25~~		~~0.00~~					~~0.00~~					~~0.00~~	~~0.00~~	~~0.00~~	~~0.00~~	~~58.9~~	~~250~~	~~0.41~~	~~38.08~~	~~0.78~~	~~0.0~~	pipe to remain as cleanout access
ASHFORD DR	8	EX.MH023	SAN MH 35-25	1.93	1.93	60			116	3.80					0.50	1.85		2.35	73.0	200	0.40	20.74	0.66	11.3	
MARSHCOURT DR	9	SAN MH 35-25	SAN MH 35-26	0.29	2.22	60			133	3.80					0.58	2.13	0.00	2.70	72.8	250	0.55	44.10	0.90	6.1	
MARSHCOURT DR	10	SAN MH 35-26	SAN MH 35-27	0.60	2.82	60			169	3.80					0.73	2.70	0.00	3.43	70.3	250	0.55	44.10	0.90	7.8	
MARSHCOURT DR	11, 12	EX MH 032	SAN MH 35-27	17.39	17.39	60			1043	3.79			0.67	0.67	4.52	16.60	1.39	22.52	40.5	250	0.27	30.90	0.63	72.9	
EASEMENT		SAN MH 35-27	SAN MH 35-29	0.00	20.21				1212	3.74				0.67	5.25	19.07	1.39	25.71	124.0	375	0.16	70.13	0.63	36.7	
Pickering Parkway		SAN MH 35-28	Prop MH 13A	0.01	10.20				2420	3.52				3.16	2.65	35.78	6.58	45.02	14.5	375	0.22	82.24	0.74	54.7	Interim pipe Phase 1
NOTION ROAD		Prop MH 13A	Prop MH 14A	0.25	10.45				3904	3.34				3.16	2.72	54.82	6.58	64.11	100.0	375	0.22	82.24	0.74	78.0	Interim pipe Phase 1
NOTION ROAD		Prop MH 14A	SAN MH 35-29	0.25	10.70				3904	3.34				3.16	2.78	54.82	6.58	64.18	101.8	375	0.22	82.24	0.74	78.0	Interim pipe Phase 1
NOTION ROAD		SAN MH 35-29	SAN MH 35-30	0.25	31.16				5117	3.24				3.83	8.10	69.54	7.98	85.61	71.8	450	0.22	133.73	0.84	64.0	Interim pipe Phase 1
NOTION ROAD		SAN MH 35-30	SAN MH 17	0.25	31.41				5117	3.24				3.83	8.17	69.54	7.98	85.68	4.0	450	0.23	136.73	0.86	62.7	Interim pipe Phase 1
ORCHARD ROAD		SAN MH 17	SAN MH 18		31.41													85.68		750	Available capacity at Orchard Rd 750mm dia. pipe is 150 L/s.				see note below about capacity

Total flow calculated here does not include the existing sanitary flows conveyed south on Notion Rd to Orchard Rd.

Design Criteria as per The Regional Municipality of Durham '*Design Specifications for Sanitary Sewers*'
Average daily per capita flow = 364 L/cap/day (Residential)
Average daily per capita flow = 180,000 L/GFA hectares/day (commercial&industrial)
I = Unit of peak extraneous flow when foundation drains are NOT connected to the storm sewer = 0.26 L/s/Ha
Q(p) = peak population flow (L/s) Q(I) = peak extraneous flow (L/s)
Q(d) = peak design flow (L/s)
PEAKING FACTOR (Harmon; Residential) M = 1 + 14/(4+(P/1000^0.5))
PEAK POPULATION FLOW, Q (p) = q*P*M / 86400 L / Sec.
PEAK EXTRANEOUS FLOW, Q(i) = I*A L / Sec.
PEAK DESIGN FLOW, Q(d) = Q(p) + Q(i) L / Sec.
PIPE ROUGHGNESS, n = 0.013 For Manning's Equation

NOTES:
1) MINIMUM VELOCITY = 0.60 m/s
2) MAXIMUM VELOCITY = 3.65 m/s
3) INFILTRATION 0.26 l/s = 22.5 m3/Ha/DAY
INFILTRATION 0.52 l/s = 45.0 m3/Ha/DAY (Foundation Drain Connections)
4) COMMERCIAL 2.08 l/s (local sewers) 1.04 l/s (trunk sewers)
5) EXISTING CONDITION INCLUDES COMMITTED DEVELOPMENT
6) USE ACTUAL METRIC I.D. PIPE SIZE IN mm
7) COMMERCIAL FLOOR SPACE INDEX=50% UNLESS

Population Density by Land Use

Housing Type	Density
Single & Semi Detached	3.5 P/u
Townhouse	3.0 P/u
Apartment-2Bdrm	2.5 P/u

Housing Type	Density
Single Family	60 persons/ha
Semi Detached & Duplex	100 persons/ha

ODAN·DETECH CONSULTING ENGINEERS

* ASSUMED 150 L/s AVAILABLE EXCESS FLOW CAPACITY AT ORCHARD ROAD as per correspondence with Durham Region

Redeveloped sites (subject site, 1899 Brock Road and surrounding tributaries) sanitary sewer design sheet

SCENARIO 3: CONCEPTUAL FULL BUILDOUT CONDITIONS
Full development of subject site and future tributary sanitary design sheet

DESIGNED BY: S. Ahonen DATE: 2022-04-13
CHECKED BY: M. Al-Awad

STREET	TRIB ID	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL: LOT AREA UNIT (ha)	LOT AREA ACCUM. (ha)	POP. DENSITY (Persons/ha)	POP. DENSITY (Persons/Unit)	# OF UNITS	POP.	PEAK FLOW FACTOR, K_H	COMMERCIAL: LOT AREA (Ha)	FLOOR SPACE INDEX	GROSS FLOOR AREA GFA (ha)	GROSS FLOOR AREA ACCUM. (ha)	FLOW (L/s): RESIDENTIAL FLOW INFIL. 0.26 (L/s)	SEWAGE 0.0042 (L/s)	COMM. 2.08 l/s	TOTAL FLOW l/s	EXISTING SEWER: Length L (m)	Size D (mm)	Slope S (%)	Full Flow Capacity Qcap (L/s)	Full Flow Velocity V (m/s)	PRESENT CONDITION % Full Q(d)/Qcap	NOTES
1899 Brock Road	P9	Prop MH16A	EX MH 34-82	29.50	29.50	800			23600	2.58					7.67	255.78	0.00	263.45	112.0	525	1.00	430.06	1.99	61.3	FUTURE PROPOSED
Canadian Tire Lands	4	EX.MH090	EX MH 34-82	4.10	4.10	1200			4920	3.25					1.07	67.19	0.00	68.25	59.8	450	0.30	156.16	0.98	43.7	EX PIPE OUTSIDE SCOPE OF WORK
Pickering Parkway	13	EX MH 34-82	Prop MH9A	0.25	33.85				28520	2.50				0.00	8.80	299.32	0.00	308.12	49.4	675	0.37	511.31	1.43	60.3	PROPOSED
Subject Site	P1	Prop MH1A	Prop MH2A	1.18	1.18		2.5	630	1575	3.66			0.17	0.17	0.31	24.24	0.35	24.90	20.7	300	0.87	90.20	1.28	27.6	PROPOSED
Subject Site		Prop MH2A	Prop MH3A		1.18				1575	3.66				0.17	0.31	24.24	0.35	24.90	44.7	300	0.95	94.25	1.33	26.4	PROPOSED
Subject Site	P2	Prop MH3A	Prop MH4A	1.23	2.41		2.5	1090	4300	3.31			0.10	0.27	0.63	59.69	0.56	60.88	83.5	300	0.78	85.40	1.21	71.3	PROPOSED
Subject Site		Prop MH4A	Prop MH5A		2.41				4300	3.31				0.27	0.63	59.69	0.56	60.88	47.2	300	1.31	110.68	1.57	55.0	PROPOSED
Subject Site	P3,P4	Prop MH5A	Prop MH6A	3.11	5.52		2.5	1022	6855	3.12			0.07	0.34	1.44	89.69	0.71	91.84	37.6	300	1.46	116.84	1.65	78.6	PROPOSED
Subject Site	P5,P6	Prop MH6A	Prop MH7A	2.51	8.03		2.5	1276	10045	2.95			0.07	0.41	2.09	124.57	0.85	127.51	19.0	450	0.77	250.18	1.57	51.0	PROPOSED
Subject Site	P7,P8	Prop MH7A	Prop MH8A	1.45	9.48		2.5	1208	13065	2.84			2.26	2.67	2.46	155.76	5.55	163.78	29.9	450	0.52	205.59	1.29	79.7	PROPOSED
Subject Site		Prop MH8A	Prop MH9A		9.48				13065	2.84				2.67	2.46	155.76	5.55	163.78	14.3	450	0.72	241.92	1.52	67.7	PROPOSED
Pickering Parkway	13	Prop MH9A	EX MH 34-83	0.25	43.58				41585	2.34				2.67	11.33	408.68	5.55	425.56	41.8	675	0.42	544.76	1.52	78.1	PROPOSED
Pickering Parkway	14	EX MH 34-83	EX MH 35-5	0.24	43.82				41585	2.34				2.67	11.39	408.68	5.55	425.62	100.0	675	0.47	576.28	1.61	73.9	PROPOSED
Pickering Parkway	15	EX MH 35-5	EX MH 35-6	0.28	44.10				41585	2.34				2.67	11.47	408.68	5.55	425.70	99.8	675	0.48	582.38	1.63	73.1	PROPOSED
BEECHLAWN DR	7	EX MH018	EX MH 35-6	2.89	2.89	60			173	3.80					0.75	2.77		3.52	59.0	200	0.95	31.97	1.02	11.0	EX
METROPIA	20	EX MH3A	EX MH 35-6	3.65	3.65				672	3.80					0.95	10.73		11.67	38.2	200	0.75	28.40	0.90	41.1	EX
~~MARSHCOURT DR~~		~~EX MH 35-8~~	~~EX MH 35-25~~							~~0.00~~					~~0.00~~	~~0.00~~	~~0.00~~	~~0.00~~	~~58.9~~	~~250~~	~~0.41~~	~~38.08~~	~~0.78~~	~~0.0~~	pipe to remain as cleanout access
ASHFORD DR	8	EX.MH023	SAN MH 35-25	1.93	1.93	60			116	3.80					0.50	1.85		2.35	73.0	200	0.40	20.74	0.66	11.3	EX
MARSHCOURT DR	9	SAN MH 35-25	SAN MH 35-26	0.29	2.22	60			133	3.80					0.58	2.13	0.00	2.70	83.6	250	0.55	44.10	0.90	6.1	EX
MARSHCOURT DR	10	SAN MH 35-26	SAN MH 35-27	0.60	2.82	60			169	3.80					0.73	2.70	0.00	3.43	69.5	250	0.55	44.10	0.90	7.8	EX
MARSHCOURT DR	11	EX MH 032	SAN MH 35-27	17.39	17.39	60			1044	3.79			0.67	0.67	4.52	16.61	1.39	22.52	40.5	250	0.27	30.90	0.63	72.9	EX
EASEMENT		SAN MH 35-27	SAN MH 35-29		20.21				1213	3.74				0.67	5.25	19.08	1.39	25.72	124.0	375	0.16	70.13	0.63	36.7	outlet to Region Trunk on Notion Rd*
Pickering Parkway	16	EX MH 35-6	EX MH 35-7	0.22	50.86				42430	2.33				2.67	13.22	415.50	5.55	434.28	82.5	750	0.38	686.27	1.55	63.3	PROPOSED
Pickering Parkway	17	EX MH 35-7	EX MH 35-8	0.24	51.10				42430	2.33				2.67	13.29	415.50	5.55	434.34	80.0	750	0.46	755.06	1.71	57.5	PROPOSED
Pickering Parkway	18	EX MH 35-8	EX MH 35-28	0.22	51.32				42430	2.33				2.67	13.34	415.50	5.55	434.40	110.1	750	0.57	840.51	1.90	51.7	outlet to Region Trunk on Notion Rd

Design Criteria as per The Regional Municipality of Durham '*Design Specifications for Sanitary Sewers*'
Average daily per capita flow = 364 L/cap/day (Residential)
Average daily per capita flow = 180,000 L/GFA hectares/day (commercial&industrial)
I = Unit of peak extraneous flow when foundation drains are NOT connected to the storm sewer = 0.26 L/s/Ha
Q(p) = peak population flow (L/s) Q(I) = peak extraneous flow (L/s)
Q(d) = peak design flow (L/s)
PEAKING FACTOR (Harmon; Residential) M =1 + 14/(4+(P/1000^0.5))
PEAK POPULATION FLOW, Q (p) = q*P*M / 86400 L / Sec.
PEAK EXTRANEOUS FLOW, Q(i) = I*A L / Sec.
PEAK DESIGN FLOW, Q(d) = Q(p) + Q(i) L / Sec.
PIPE ROUGHNESS, n = 0.013 For Manning's Equation

NOTES:
1) MINIMUM VELOCITY = 0.60 m/s
2) MAXIMUM VELOCITY = 3.65 m/s
3) INFILTRATION 0.26 l/s = 22.5 m3/Ha/DAY
INFILTRATION 0.52 l/s = 45.0 m3/Ha/DAY (Foundation Drain Connections)
4) COMMERCIAL 2.08 l/s (local sewers) 1.04 l/s (trunk sewers)
5) EXISTING CONDITION INCLUDES COMMITTED DEVELOPMENT
6) USE ACTUAL METRIC I.D. PIPE SIZE IN mm
7) COMMERCIAL FLOOR SPACE INDEX=50% UNLESS OTHERWISE KNOWN

Population Density by Land Use

Housing Type	Density
Single & Semi Detached	3.5 P/u
Townhouse	3.0 P/u
Apartment-2Bdrm	2.5 P/u

Housing Type	Density
Single Family	60 persons/ha
Semi Detached & Duplex	100 persons/ha

*ASSUMED FLOW FROM EASEMENT SEWER AND PICKERING PARKWAY WILL OUTLET TO REGION TRUNK ON NOTION RD

APPENDIX C

FUS Fire Demand Calculations
Location of hydrant flow tests
Hydrant flow tests

FUS Fire Demand Calculations

WATER SUPPLY FOR PUBLIC FIRE PROTECTION , FIRE UNDERWRITERS SURVEY
GUIDE FOR DETERMINATION OF REQUIRED FIRE FLOWS

F = 220 x C x √ A
Where:
F = required fire flow in liters per minute
C= Coefficient related to the type of construction
A = the total floor area in square meters (excluding basements) in the building considered

LOCATION:	20266 - Phase 1 (Block 1)			**PROJECT:**	31 Storey Residential - Mixed Use	
OBC OCCUPANCY:	Mixed Use			**PROJECT No:**	21241	
BUILDING FOOT PRINT (m2):	18461					
# OF STOREYS	31					
CONSTRUCTION CLASS:	Fire Resistive					
AUTOMATED SPRINKLER PROTECTION		Credit	Total			
NFPA 13 sprinkler standard	yes	30%	50%			
Standard Water Supply	yes	10%				
Fully Supervised System	yes	10%				
		50%				
CONTENTS FACTOR:	Limited Combustible			CHARGE:	-15%	
EXPOSURE 1 (south)	Distance to Exposure Building (m) / Length - Height			>45	0	
EXPOSURE 2 (east)	Distance to Exposure Building (m) / Length - Height			21.0	10	
EXPOSURE 3 (west)	Distance to Exposure Building (m) / Length - Height			>45	0	
EXPOSURE 4 (north)	Distance to Exposure Building (m) / Length - Height			27.9	10	
				Total:	20	no more than 75%
ARE BUILDINGS CONTIGUOUS:	NO					

Contents	Charge
Non-Combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Buring	25%

Coefficient related to type of construction	
1.5	Wood Frame
1	Ordinary
0.8	Non combustible
0.6	Fire Resistive

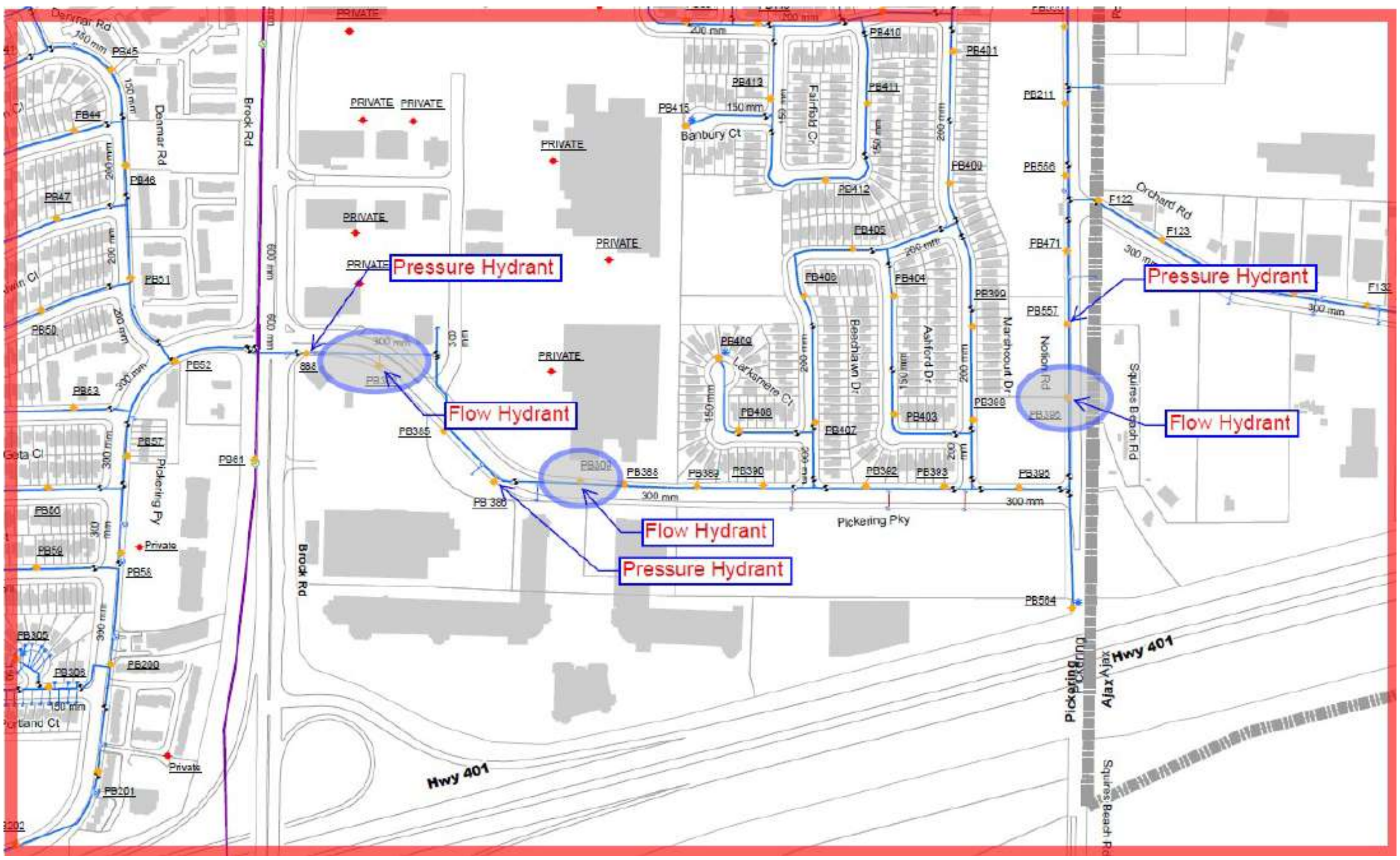
Separation	Charge
0-3 m	25%
3.1 -10 m	20%
10.1 - 20 m	15%
20.1 - 30 m	10%
30.1 - 45	5%
> 45 m	0%
Firewall	10%

FIRE RESISTANT BUILDING Are vertical openings and exterior vertical communications protected with a minimum one (1) hr rating? NO

CALCULATIONS	*C =*	0.6		Fire Resistive	
	A =	15569	m2	Total	
	F =	16470	L/min		
Round to Nearest 1000 L/min	F =	16000	L/min	must be > 2000 L/min	
CORRECTION FACTORS:					
OCCUPANCY		-2400	L/min		
FIRE FLOW ADJUSTED FOR OCCUPANCY		13600	L/min		
REDUCTION FOR SPRINKLER		-6800	L/min		
EXPOSURE CHARGE		2720	L/min		
REQUIRED FIRE FLOW	**F =**	9520	L/min		
Round to Nearest 1000 L/min	**F =**	10000	L/min	2642	usgm
	F =	166.67	L/sec		

STOREY AREAS m2	
1715	1
1454	2
1454	3
1454	4
1454	5
1289	6
728	7
778	8-15 (8)
762	16-31 (16)

Location of hydrant flow tests



FLOWMETRIX
INDU-TECH
PROCESS
WESTCAN

Fire Flow Testing Report

Residual Hydrant # **PB557**
NFPA Colour Code **BLUE**

DATE	September 8, 2021
TIME	10:30 AM
ADDRESS	1972 Notion Rd
	Pickering, ON
SIZE-Inches/mm	12 300
MATERIAL	PVC
CONTACT INFO	The Odan/Detech Group Inc.
	Mark Harris
	C: (905) 632-3811 ext.122
	E: mark@odandetech.com

RESIDUAL HYDRANT INFO.

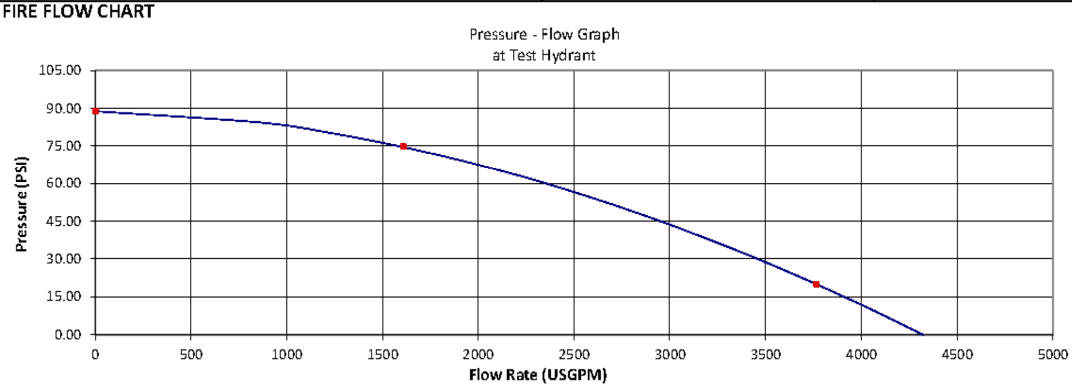
HYDRANT #	PB557	
N.F.P.A. COLOUR CODE	BLUE	
STATIC PRESSURE	88.9	psi
RESIDUAL PRESSURE	74.6	psi
PRESSURE DROP	14.3	psi
% PRESSURE DROP	16.0	% psi

Flow on Water Main At Test Hydrant - 20 psi 3766 USGPM

FLOW HYDRANT(S) INFO.

HYDRANT ASSET ID	HYD. # PORTS	OUTLET DIAMETER (INCHES)	NOZZLE COEFFICIENT	DIFFUSER TYPE	DIFFUSER COEFFICIENT	PITOT READING (psi)	PITOT FLOW (USGPM)	FLOW METER (USGPM)
PB396	2	2.5	Round	LPD250	0.90	**28.4**	804	0
		2.5	Round	LPD250	0.90	**28.4**	804	0
					Total Flow (USGPM)		1609	0
					Total Flow (USGPM)		1609	

FIRE FLOW CHART



COMMENTS

OPERATOR	FMX	Jordan Whitlock
OPERATOR	FMX	Denis Kriventsev
OPERATOR		Region of Durham

ODG_FireFlowTestingReport_Pickering "If we don't measure it, how do you manage it?"

FLOWMETRIX
INDU-TECH
PROCESS
WESTCAN

Fire Flow Testing Report

Residual Hydrant #	**PB386**
NFPA Colour Code	**BLUE**

DATE	September 8, 2021
TIME	10:45 AM
ADDRESS	1735 Pickering Pkwy
	Pickering, ON
SIZE-Inches/mm	12 300
MATERIAL	PVC
CONTACT INFO	The Odan/Detech Group Inc.
	Mark Harris
	C: (905) 632-3811 ext.122
	E: mark@odandetech.com

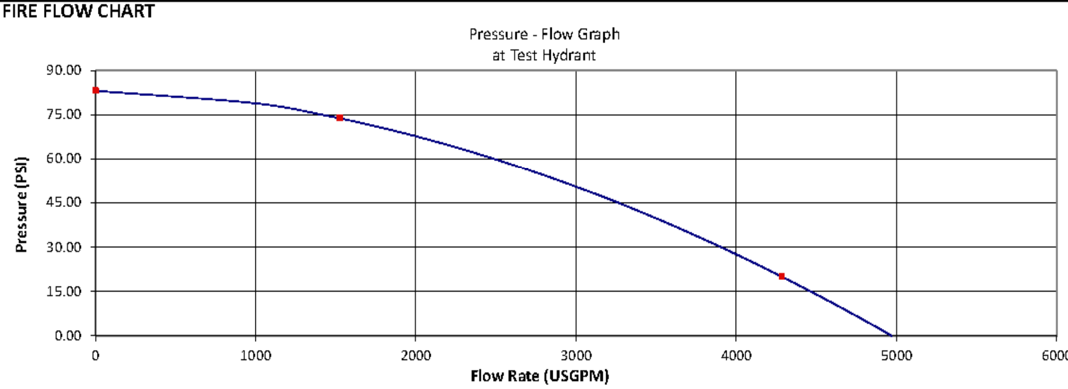
RESIDUAL HYDRANT INFO.

HYDRANT #	PB386	
N.F.P.A. COLOUR CODE	BLUE	
STATIC PRESSURE	83.2	psi
RESIDUAL PRESSURE	73.8	psi
PRESSURE DROP	9.3	psi
% PRESSURE DROP	11.2	% psi
Flow on Water Main At Test Hydrant -	20 psi	4283 USGPM

FLOW HYDRANT(S) INFO.

HYDRANT ASSET ID	HYD. # PORTS	OUTLET DIAMETER (INCHES)	NOZZLE COEFFICIENT	DIFFUSER TYPE	DIFFUSER COEFFICIENT	PITOT READING (psi)	PITOT FLOW (USGPM)	FLOW METER (USGPM)
PB309	2	2.5	Round	LPD250	0.90	**25.5**	762	0
		2.5	Round	LPD250	0.90	**25.5**	762	0
				Total Flow (USGPM)			1525	0
				Total Flow (USGPM)			1525	

FIRE FLOW CHART



COMMENTS

OPERATOR	FMX	Jordan Whitlock
OPERATOR	FMX	Denis Kriventsev
OPERATOR		Region of Durham

ODG_FireFlowTestingReport_Pickering

"If we don't measure it, how do you manage it?"

FLOWMETRIX
INDU-TECH
PROCESS
WESTCAN

Fire Flow Testing Report

Residual Hydrant # **PB888**
NFPA Colour Code **BLUE**

DATE	September 8, 2021
TIME	11:00 AM
ADDRESS	1785 Pickering Pkwy Pickering, ON
SIZE-Inches/mm	12 300
MATERIAL	PVC
CONTACT INFO	The Odan/Detech Group Inc. Mark Harris C: (905) 632-3811 ext.122 E: mark@odandetech.com

RESIDUAL HYDRANT INFO.

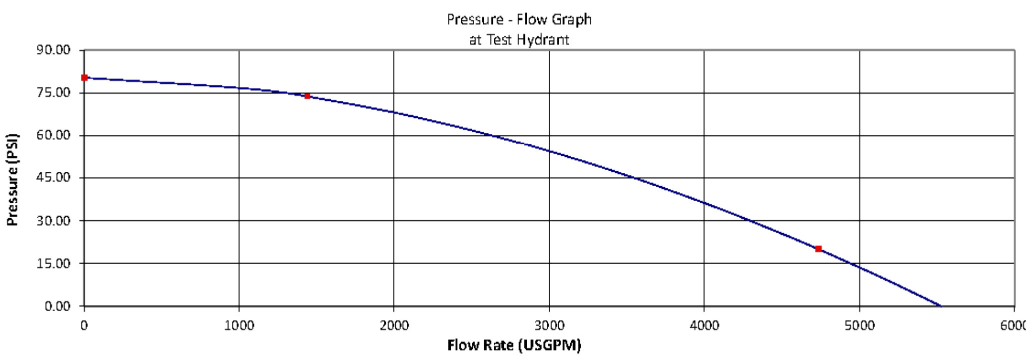
HYDRANT #	PB888	
N.F.P.A. COLOUR CODE	BLUE	
STATIC PRESSURE	80.3	psi
RESIDUAL PRESSURE	73.7	psi
PRESSURE DROP	6.7	psi
% PRESSURE DROP	8.3	% psi

Flow on Water Main At Test Hydrant - 20 psi 4735 USGPM

FLOW HYDRANT(S) INFO.

HYDRANT ASSET ID	HYD. # PORTS	OUTLET DIAMETER (INCHES)	NOZZLE COEFFICIENT	DIFFUSER TYPE	DIFFUSER COEFFICIENT	PITOT READING (psi)	PITOT FLOW (USGPM)	FLOW METER (USGPM)
PB308	2	2.5	Round	LPD250	0.90	**22.7**	720	0
		2.5	Round	LPD250	0.90	**22.7**	720	0
					Total Flow (USGPM)		1439	0
					Total Flow (USGPM)		1439	

FIRE FLOW CHART



COMMENTS

OPERATOR	FMX	Jordan Whitlock
OPERATOR	FMX	Denis Kriventsev
OPERATOR		Region of Durham

ODG_FireFlowTestingReport_Pickering

"If we don't measure it, how do you manage it?"

APPENDIX D

XPSWMM models and output upon request
Water Balance Calculations

Water Balance Calculations

CITY OF PICKERING GUIDELINE WATER BALANCE SUMMARY

Project: 1755&1805 Pickering Parkway (First Pickering Place)
Project No.: 20266

Site Area	7825	m^2
Rainfall depth required to capture	5	mm
Captured Volume Target (5mm across entire s (Total Area x Rainfall Depth)	39.1	m^3

SURFACE TYPE	SURFACE CAPTURE (mm)	AREA (m^2)	% OF SITE AREA	VOLUME CAPTURE (m^3)
Green Roof	7	682	8.7	4.8
Landscaped Areas	5	921	11.8	4.6
Roof Area (Drains to Cistern for Reuse)	12.86	2309	29.5	29.7
Asphalt Driveway, Pavers and Concrete (Ground)	0	3913	50.0	0.0
TOTAL		7825	100	39.1

CAPTURED VOLUME BY INTIAL ABSTRACTION (m^3)	**9.4**
VOLUME OF CISTERN (m^3)	**29.7**
CAPTURED VOLUME (m^3)	**39.1**

APPENDIX E

Figure 1 – Preliminary Site Servicing Plan
Figure 2 – Preliminary Grading Plan

Figure 3 – Post Development Watermain Service
Figure 4 – Post Development Storm Service
Figure 5a – Post Development Sanitary Service
Figure 5b – Post Development Sanitary Service

Figure 6 – Post Sanitary Tributary Area Plan
Figure 7 – Pre Development Storm Tributary Area Plan
Figure 8 – Post Development Storm Tributary Area Plan
Figure 9 – Notion Road – Profile
Figure 10 – Pickering Parkway – Profile 1/2
Figure 11 – Pickering Parkway – Profile 2/2

FIGURE 1
PRELIMINARY SITE SERVICING LAYOUT (Phase 1)

PICKERING BRIDGE LANDS INC.
PROPOSED MIX-USE DEVELOPMENT
1755 + 1805 PICKERING PARKWAY
PICKERING, ON

DATE:	PROJ. NO.:	SCALE:
SEPT 2021	20266	1:500

ODAN·DETECH CONSULTING ENGINEERS
The Odan/Detech Group Inc. P: (905) 632-3811 F: (905) 632-3363
5230 SOUTH SERVICE ROAD, BURLINGTON, ONTARIO, L7L 5K2


EXISTING INTERSECTION REQUIRES REDESIGN TO SUIT
PROP. 5.15m WIDENING FUTURE 18.5m ROW
PROPOSED RETAINING WALL AS REQUIRED
1 STOREY CONCRETE BUILDING
METAL ADDITION
PART 6
PART 2
PART 3
ASPHALT PAVED
PHASE 1
PAHSE 2
PROPOSED 18.50m ROAD
PROPOSED 18.50m R.O.W
STREET A
FIRE ROUTE
LAYBY
BIKE ROAD
PROPOSED PROPERTY LINE
PROP. PROPERTY LINE
OUTLINE OF UNDERGROUND PARKING BELOW
PROPOSED RETAINING WALL/FOUNDATION WALL
EXTENTS OF UNDERGROUND PARKING
LANDSCAPE
F.F.E. 90.50m
BLOCK "1"
ROOF OF M.P.H.
ROOF OF FLOOR 31
STREET B
PROPOSED 18.5M ROAD
1 STOREY BRICK BUILDING
PARTIAL DEMOLITION OF EXISTING BUILDING A DURING PHASE 1
BUILDING A
EXISTING 1 STOREY BRICK BUILDING
BROCK ROAD
EXTENTS OF UNDERGROUND PARKING BELOW
MATCH TO EXISTING ASPHALT
PRIVATE DRIVEWAY
14m SETBACK FROM HIGHWAY
14m SETBACK (MTO)
HIGHWAY 401
FUTURE TOWER 2A 24 STOREYS
FUTURE BLOCK "2"
GRADING LEGEND:
DENOTES EXISTING STORM MANHOLE
DENOTES PROPOSED STORM MANHOLE
DENOTES EXISTING CATCH BASIN
DENOTES PROPOSED CATCHBASIN
DENOTES PROPOSED STORMCEPTOR
DENOTES PROPOSED AREA DRAIN
DENOTES EXISTING SANITARY MANHOLE
DENOTES PROPOSED SANITARY MANHOLE
DENOTES EXISTING SPOT ELEVATION
(100.00) DENOTES PROPOSED ELEVATION
(100.00)T/C DENOTES PROPOSED TOP OF CURB ELEVATION
(100.00)G/L DENOTES PROPOSED GUTTER LINE ELEVATION
(100.00)T/W DENOTES PROPOSED TOP OF WALL ELEVATION
(100.00)B/W DENOTES PROPOSED BOTTOM OF WALL ELEVATION
DENOTES PROPOSED FLOW ARROW AND SLOPE
DENOTES EXISTING FLOW ARROW AND SLOPE
DENOTES OVERLAND FLOW
FIGURE 2
PRELIMINARY GRADING PLAN (PHASE 1)
PICKERING BRIDGE LANDS INC.
PROPOSED MIX-USE DEVELOPMENT
1755 + 1805 PICKERING PARKWAY
PICKERING, ON
DATE: SEPT 2021
PROJ. NO.: 20266
SCALE: 1:250
ODAN·DETECH CONSULTING ENGINEERS

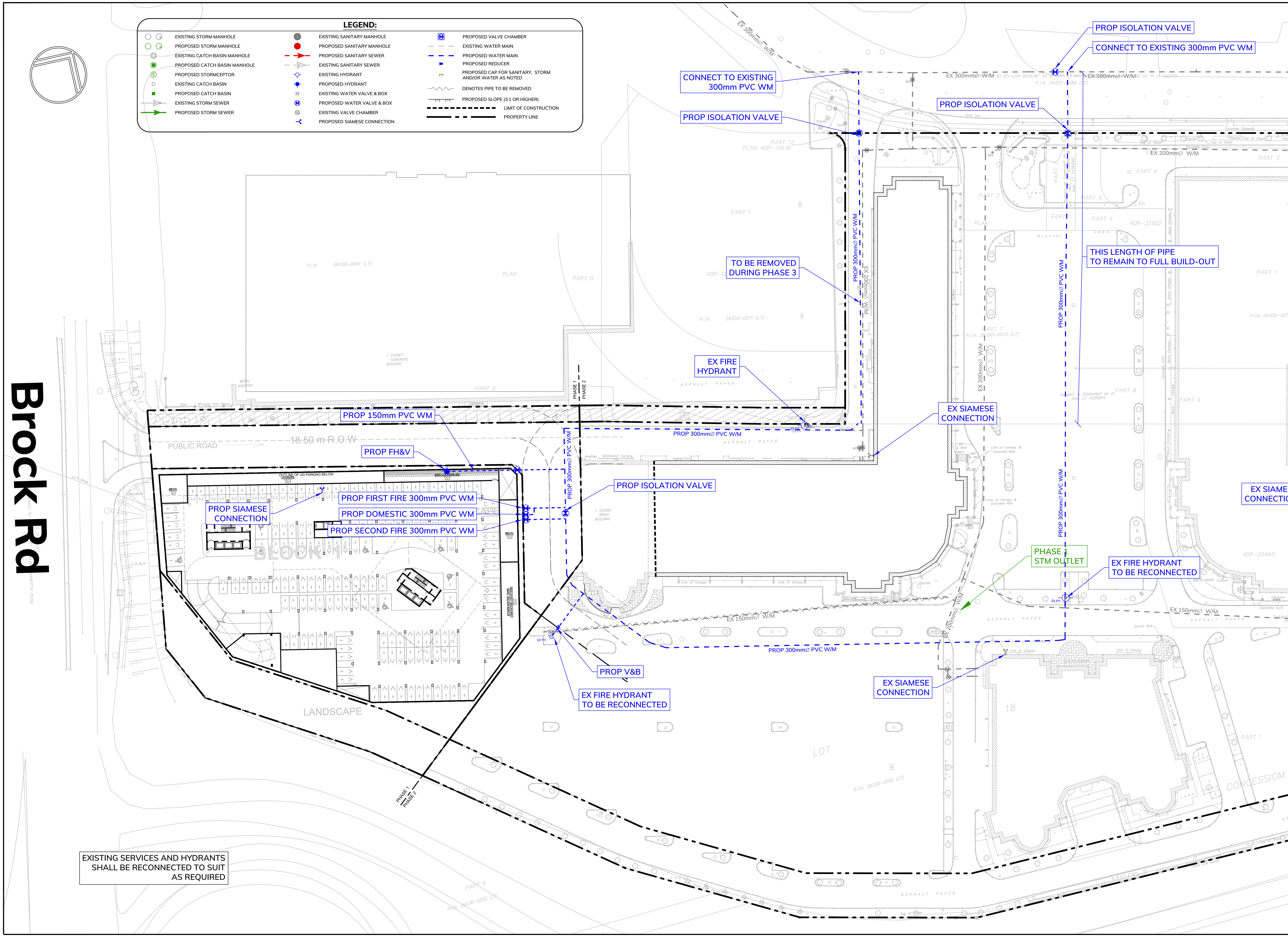


FIGURE 3
FUNCTIONAL SITE SERVICING PLAN WATERMAIN

PICKERING BRIDGE LANDS INC.
PROPOSED MIX-USE DEVELOPMENT
1755 + 1805 PICKERING PARKWAY
PICKERING, ON

DATE:	PROJ. NO.:	SCALE:
SEPT 2021	20266	1:500

ODAN·DETECH
CONSULTING ENGINEERS

The Odan/Detech Group Inc. P: (905) 632-3811 F: (905) 632-3363
5230 SOUTH SERVICE ROAD, BURLINGTON, ONTARIO, L7L 5K2

LEGEND:
EXISTING STORM MANHOLE
PROPOSED STORM MANHOLE
EXISTING CATCH BASIN MANHOLE
PROPOSED CATCH BASIN MANHOLE
PROPOSED STORMCEPTOR
EXISTING CATCH BASIN
PROPOSED CATCH BASIN
EXISTING STORM SEWER
PROPOSED STORM SEWER
EXISTING SANITARY MANHOLE
PROPOSED SANITARY MANHOLE
PROPOSED SANITARY SEWER
EXISTING SANITARY SEWER
EXISTING HYDRANT
PROPOSED HYDRANT
EXISTING WATER VALVE & BOX
PROPOSED WATER VALVE & BOX
EXISTING VALVE CHAMBER
PROPOSED SIAMESE CONNECTION
PROPOSED VALVE CHAMBER
EXISTING WATER MAIN
PROPOSED WATER MAIN
PROPOSED REDUCER
PROPOSED CAP FOR SANITARY, STORM AND/OR WATER AS NOTED
DENOTES PIPE TO BE REMOVED
PROPOSED SLOPE (3:1 OR HIGHER)
LIMIT OF CONSTRUCTION
PROPERTY LINE
Brock Rd
BROCK ROAD
PUBLIC ROAD
18.50 m R.O.W.
BLOCK "1"
BLOCK '1'
LANDSCAPE
HIGHWAY 401
PHASE 1
PHASE 2
MH1
MH2
MH3
MH4
MH5
MH6-1
EX.MH53
PROP 61.38m 300mmØ PVC STM @ 1.00%
PROP 19.78m 450mmØ CONC STM @ 1.01%
PROP 12.43m 375mmØ PVC STM @ 2.00%
PROP 40.84m 525mmØ CONC STM @ 1.27%
PROP 89.73m 600mmØ CONC STM @ 0.92%
PROP 18.56m 600mmØ CONC STM @ 1.02%
EX 450mmØ STM
EX 250mmØ STM
EX 375mmØ STM
EX 300mmØ STM
EX 750mmØ STM
EX 1200mmØ STM
PARTIAL DEMOLITION OF EXISTING BUILDING A DURING PHASE 1
BUILDING A
EXISTING 1 STOREY BRICK BUILDING
BUILDING B
EXISTING 1 STOREY BRICK & STUCCO BUILDING
BUILDING C
EXISTING 1 STOREY BRICK & STUCCO BUILDING
PHASE 1 STM OUTLET
EXISTING SERVICES AND HYDRANTS SHALL BE RECONNECTED TO SUIT AS REQUIRED
FIGURE 4
FUNCTIONAL SITE SERVICING PLAN STORM
PICKERING BRIDGE LANDS INC.
PROPOSED MIX-USE DEVELOPMENT
1755 + 1805 PICKERING PARKWAY
PICKERING, ON
DATE: SEPT 2021
PROJ. NO.: 20266
SCALE: 1:500
ODAN·DETECH
CONSULTING ENGINEERS
The Odan/Detech Group Inc. P: (905) 632-3811 F: (905) 632-3363
5230 SOUTH SERVICE ROAD, BURLINGTON, ONTARIO, L7L 5K2

FIGURE 5a

FUNCTIONAL SITE SERVICING PLAN SANITARY (1 of 2)

PICKERING BRIDGE LANDS INC.
PROPOSED MIX-USE DEVELOPMENT
1755 + 1805 PICKERING PARKWAY
PICKERING, ON

DATE:	PROJ. NO.:	SCALE:
SEPT 2021	20266	1:750

ODAN·DETECH CONSULTING ENGINEERS

The Odan/Detech Group Inc. P: (905) 632-3811 F: (905) 632-3363
5230 SOUTH SERVICE ROAD, BURLINGTON, ONTARIO, L7L 5K2

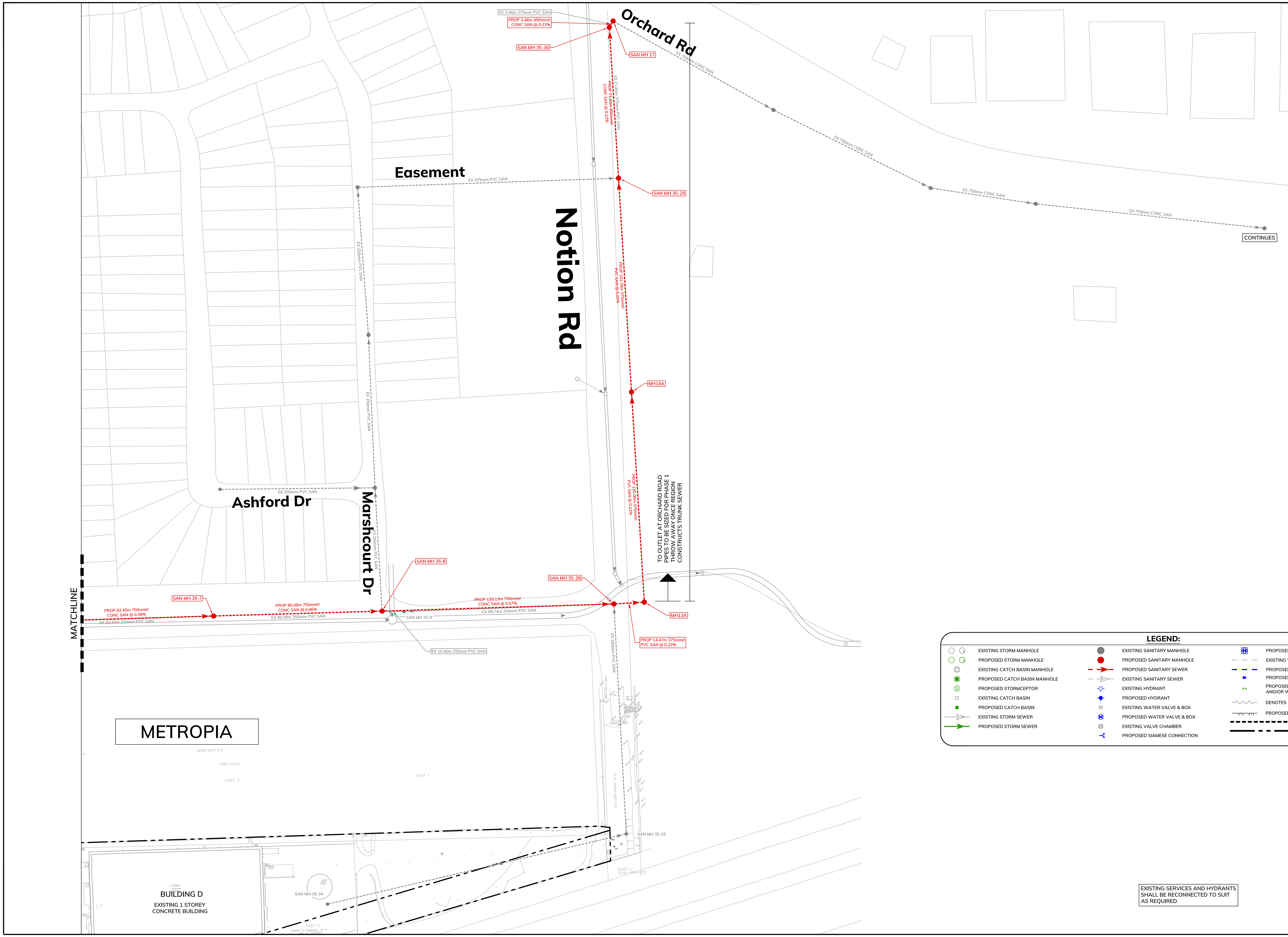


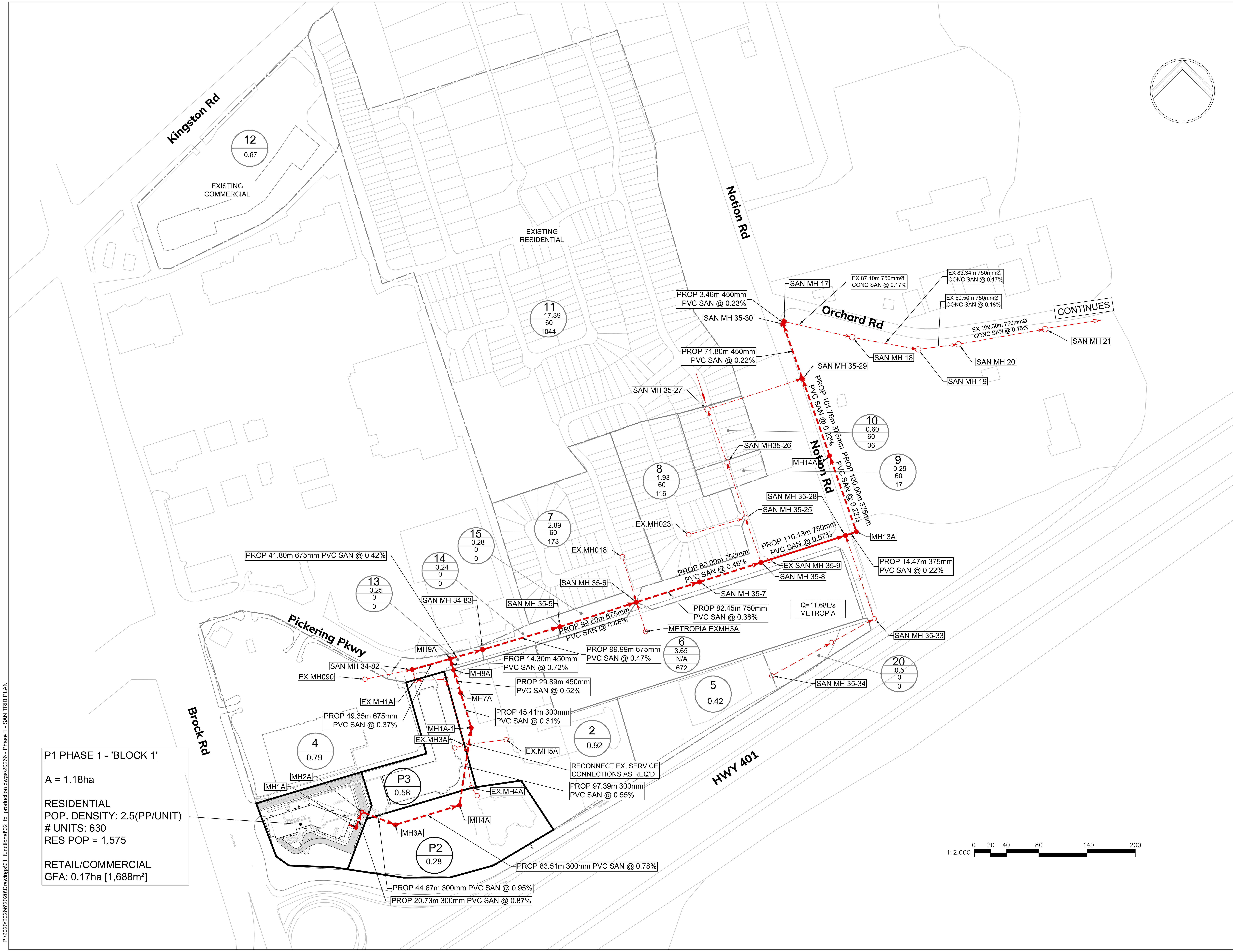
FIGURE 5b
FUNCTIONAL SITE SERVICING PLAN
SANITARY (2 of 2)

PICKERING BRIDGE LANDS INC.
PROPOSED MIX-USE DEVELOPMENT
1755 + 1805 PICKERING PARKWAY
PICKERING, ON

DATE:	PROJ. NO.:	SCALE:
SEPT 2021	20266	1:750

ODAN·DETECH
CONSULTING ENGINEERS

The Odan/Detech Group Inc. P: (905) 632-3811 F: (905) 632-3363
5230 SOUTH SERVICE ROAD, BURLINGTON, ONTARIO, L7L 5K2



LEGEND

- EXISTING SANITARY MANHOLE
- PROPOSED SANITARY MANHOLE
- EXISTING SANITARY SEWER
- PROPOSED SANITARY SEWER
- EXISTING DRAINAGE AREA
- PHASE 1 DRAINAGE AREA

COMMERCIAL

5 — TRIBUTARY AREA ID NO.
0.42 — GROSS FLOOR AREA (ha)

RESIDENTIAL

9 — TRIBUTARY AREA ID NO.
0.29 — TRIBUTARY AREA (ha)
60 — POPULATION DENSITY (Persons/ha)
17 — EQUIVALENT POPULATION

FIGURE 6

PHASE 1 CONDITIONS
SANITARY TRIBUTARY PLAN

PICKERING BRIDGE LANDS INC.
PROPOSED MIX-USE DEVELOPMENT
1755 + 1805 PICKERING PARKWAY
PICKERING, ON

DATE:	PROJ. NO.:	SCALE:
SEPT 2021	20266	1:2000

ODAN·DETECH CONSULTING ENGINEERS

The Odan/Detech Group Inc. P: (905) 632-3811 F: (905) 632-3363
5230 SOUTH SERVICE ROAD, BURLINGTON, ONTARIO, L7L 5K2

P:\2020\20266\2020\Drawings\01_functional\02_fd_production dwgs\20266 - Phase 1 - SAN TRIB PLAN

FIGURE 7
PROPOSED STORM TRIBUTARY PLAN
PHASE 1
PICKERING BRIDGE LANDS INC.
PROPOSED MIX-USE DEVELOPMENT
1755 + 1805 PICKERING PARKWAY
PICKERING, ON
DATE: SEPT 2021
PROJ. NO.: 20266
SCALE: NTS
ODAN·DETECH CONSULTING ENGINEERS
LEGEND
PROPOSED STORM MANHOLE
EXISTING STORM MANHOLE
PROPOSED CATCH BASIN
EXISTING CATCH BASIN
PROPOSED DRAINAGE AREA
PROPOSED STORM SEWER
EXISTING STORM SEWER
SURFACE FLOW DIRECTION
ID NUMBER
% IMPERVIOUS
DRAINAGE AREA (ha)
CONSTRUCTION NORTH
BROCK ROAD
HIGHWAY 401
BLOCK "1"
PHASE 1 PARK
BUILDING A EXISTING 1 STOREY BRICK BUILDING
PARTIAL DEMOLITION OF EXISTING BUILDING A DURING PHASE 1
BUILDING B EXISTING 1 STOREY BRICK & STUCCO BUILDING
BUILDING C EXISTING 1 STOREY BRICK & STUCCO BUILDING
BUILDING D EXISTING 1 STOREY CONCRETE BUILDING
FUTURE BLOCK "2"
AS PER CITY OF PICKERING TRIBUTARY PLAN (JUNE 1991)
1 0.24 85
2 0.15 85
3 0.92 85
4 0.12 85
5 0.10 15
7 0.59 90
8 0.97 90
9 0.61 88
10 0.34 95
11 0.06 99
12 1.37 91
13 0.26 80
16 0.29 97
17 0.27 68
A1 41.9 10
B1 0.28 99
B2 0.92 99
B3 0.57 99
E1 0.22 94
E2 0.84 80
MH1 MH2 MH3 MH4 MH5 MH6-1
CB1 CB2 DCB1 DCB2 DCB3
EX MH4 EX MH4-1 EX MH5 EX MH6 EX MH7 EX.MHS1 EX.MHS2 EX.MHS3 EX.MHS4 EX.MHS8
EX.CB-1 EX.CB-2 EX.CB-3 EX.CB-4 EX.CB5 EX.CB6 EX.CB7 EX.CB7-1 EX.CB8 EX.CB10 EX.CB11 EX.CBMHS9
EX.DCB3 EX.DCB4 EX.DCB9 EX.DCBMHS7
PROP 300mm STM
PROP 375mm STM
PROP 450mm STM
PROP 600mm STM
EX 450mm STM
EX 600mm STM
EX 750mm STM
EX 1200mm STM
EX 1350mm STM
EX 375mm STM
0 10 20 50 100

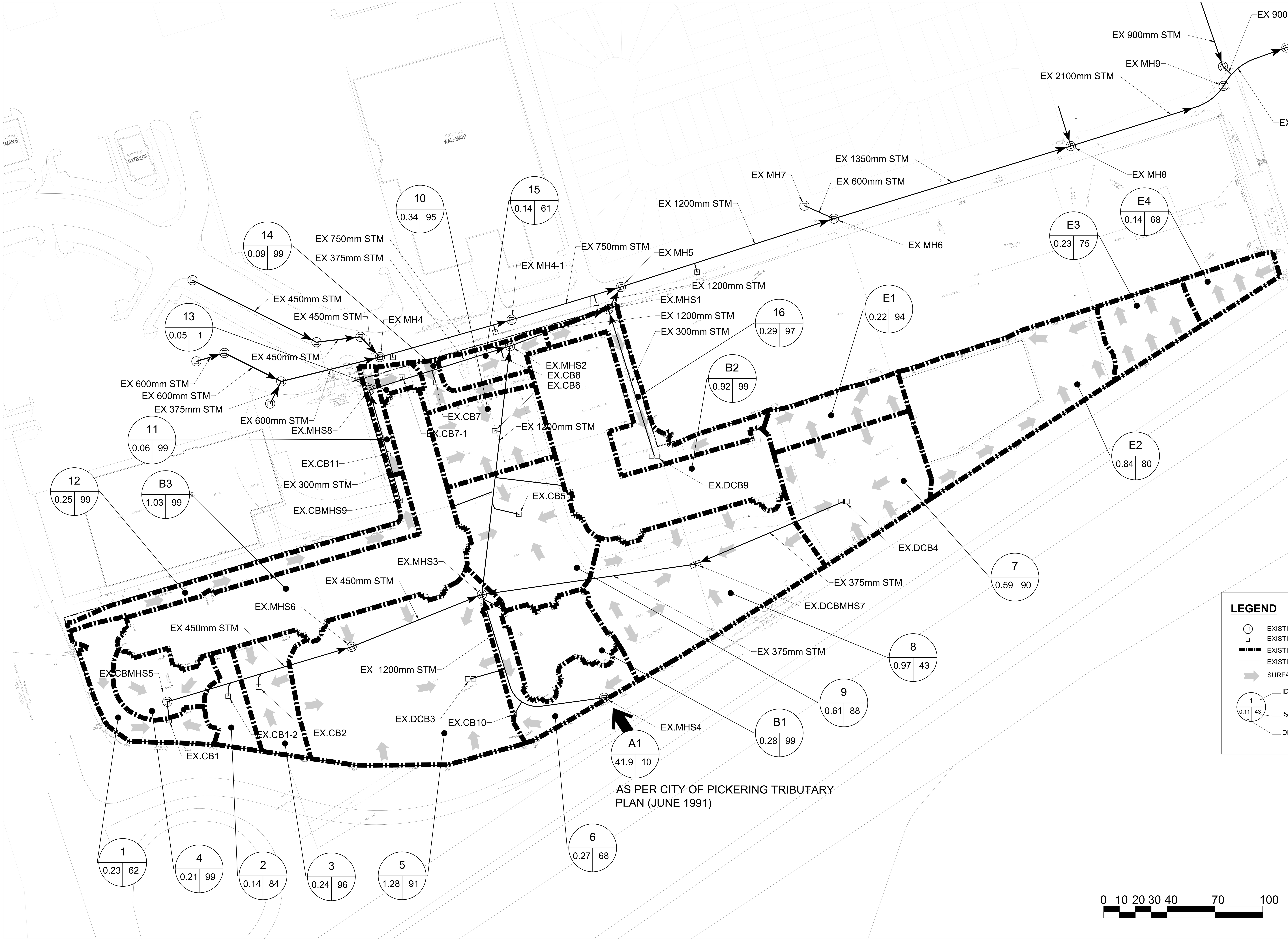


FIGURE S-8

EXISTING STORM TRIBUTARY PLAN

PICKERING BRIDGE LANDS INC.
PROPOSED MIX-USE DEVELOPMENT
1755 + 1805 PICKERING PARKWAY
PICKERING, ON

DATE:	PROJ. NO.:	SCALE:
SEPT 2021	20266	NTS

ODAN·DETECH CONSULTING ENGINEERS

The Odan/Detech Group Inc. P: (905) 632-3811 F: (905) 632-3363
5230 SOUTH SERVICE ROAD, BURLINGTON, ONTARIO, L7L 5K2

NOTION ROAD - PROFILE

SANITARY IS ON EAST SIDE

PICKERING PARKWAY

ORCHARD ROAD

FIGURE 9

NOTION ROAD PROFILE (0+000 to 0+320)

PICKERING BRIDGE LANDS INC.
PROPOSED MIX-USE DEVELOPMENT
1755 + 1805 PICKERING PARKWAY
PICKERING, ON

DATE:	PROJ. NO.:	SCALE:
APR 2022	20266	NTS

ODAN·DETECH
CONSULTING ENGINEERS

The Odan/Detech Group Inc. P: (905) 632-3811 F: (905) 632-3363
5230 SOUTH SERVICE ROAD, BURLINGTON, ONTARIO, L7L 5K2

PICKERING PARKWAY - PROFILE 1of2

SANITARY IS ON NORTH SIDE

PIPES TO NOTION ROAD TO BE SIZED AND CONSTRUCTED FOR FULL BUILD OUT OF SUBJECT SITE, 1899 BROCK ROAD AND FUTURE DEVELOPMENTS (PER REGION)

SEE FIGURE 11

EXISTING ELEVATION	0+000.00; 0+020.00; 0+040.00 85.85; 0+060.00 85.76; 0+080.00 85.65; 0+100.00 85.54; 0+120.00; 0+140.00; 0+160.00; 0+180.00; 0+200.00; 0+220.00; 0+240.00; 0+260.00; 0+280.00; 0+300.00; 0+320.00; 0+340.00; 0+360.00
PROPOSED SANITARY	PROP 49.09m 675mm CONC SAN @ 0.37%; INV 80.32; PROP 42.06m 675mm CONC SAN @ 0.42%; INV 80.15; PROP 99.99m 675mm CONC SAN @ 0.47%; INV 79.68; PROP 99.80m 675mm CONC SAN @ 0.48%; INV 79.20
EXISTING SANITARY	PROP 59.82m 200mm PVC SAN @ 0.30%; INV 80.98; PROP 91.15m 250mm PVC SAN @ 0.35%; INV 80.65; PROP 99.99m 250mm PVC SAN @ 0.49%; INV 80.14; PROP 99.80m 250mm PVC SAN @ 0.48%; INV 79.64
EXISTING STORM	INV 81.92; EX 86.05m 750mm CONC STM @ 0.54%; INV 81.46; INV 81.44; EX 71.76m 750mm CONC STM @ 0.75%; INV 80.90; INV 80.36; EX 140.65m 1200mm CONC STM @ 0.50%; INV 79.65

FIGURE 10
PICKERING PARKWAY PROFILE (0+000 to 0+360)

PICKERING BRIDGE LANDS INC.
PROPOSED MIX-USE DEVELOPMENT
1755 + 1805 PICKERING PARKWAY
PICKERING, ON

DATE:	PROJ. NO.:	SCALE:
APR 2022	20266	NTS

ODAN•DETECH CONSULTING ENGINEERS
The Odan/Detech Group Inc. P: (905) 632-3811 F: (905) 632-3363
5230 SOUTH SERVICE ROAD, BURLINGTON, ONTARIO, L7L 5K2

PICKERING PARKWAY - PROFILE 2of2

SANITARY IS ON NORTH SIDE

PIPES TO NOTION ROAD TO BE SIZED AND CONSTRUCTED FOR FULL BUILD OUT OF SUBJECT SITE, 1899 BROCK ROAD AND FUTURE DEVELOPMENTS (PER REGION)

SEE FIGURE 10

NOTION ROAD

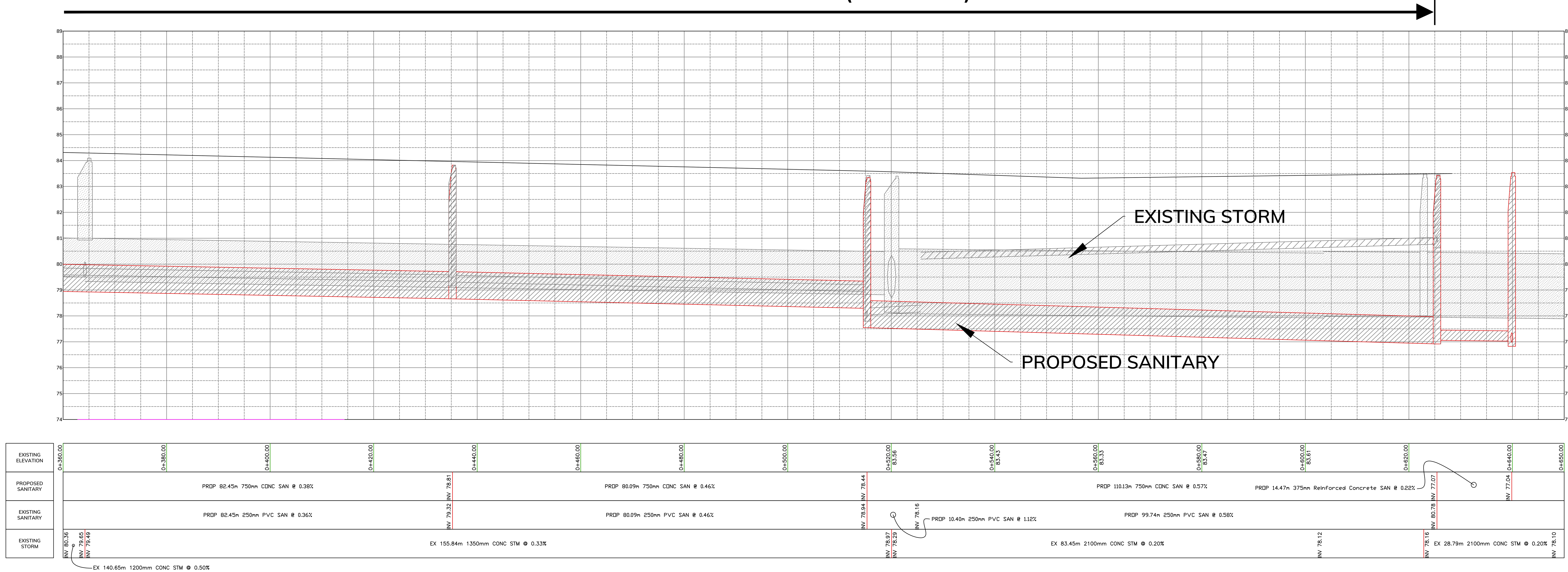


FIGURE 11
PICKERING PARKWAY PROFILE
(0+360 to 0+650)

PICKERING BRIDGE LANDS INC.
PROPOSED MIX-USE DEVELOPMENT
1755 + 1805 PICKERING PARKWAY
PICKERING, ON

DATE:	PROJ. NO.:	SCALE:
APR 2022	20266	NTS

ODAN·DETECH
CONSULTING ENGINEERS

The Odan/Detech Group Inc. P: (905) 632-3811 F: (905) 632-3363
5230 SOUTH SERVICE ROAD, BURLINGTON, ONTARIO, L7L 5K2