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

FUNCTIONAL SERVICING AND STORM WATER MANAGEMENT REPORT

BLOCK 1 - PHASE 1

Prepared For:

Pickering Ridge Lands Inc.
&
Bayfield Realty Advisors

ORIGINAL: March 18, 2022
REVISED: April 20, 2022 (for Submission)
REVISED: April 10 2024 (for Submission)

*** Please refer to the Master Servicing Study prepared by Odan Detech Group dated April 10th, 2024 for details on the ultimate development.**

STANDARD LIMITATIONS

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This Standard Limitations statement is considered part of this report.

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1. INTRODUCTION

Site Description

The subject development comprises Phase 1 of a multi phased development, phase 1 has an area of 0.936 ha with a proposed future Right of Way of 0.258 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 April 10th 2024 for details on the ultimate build out future development Blocks 2 to 7 including future Right of Way allowance

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.

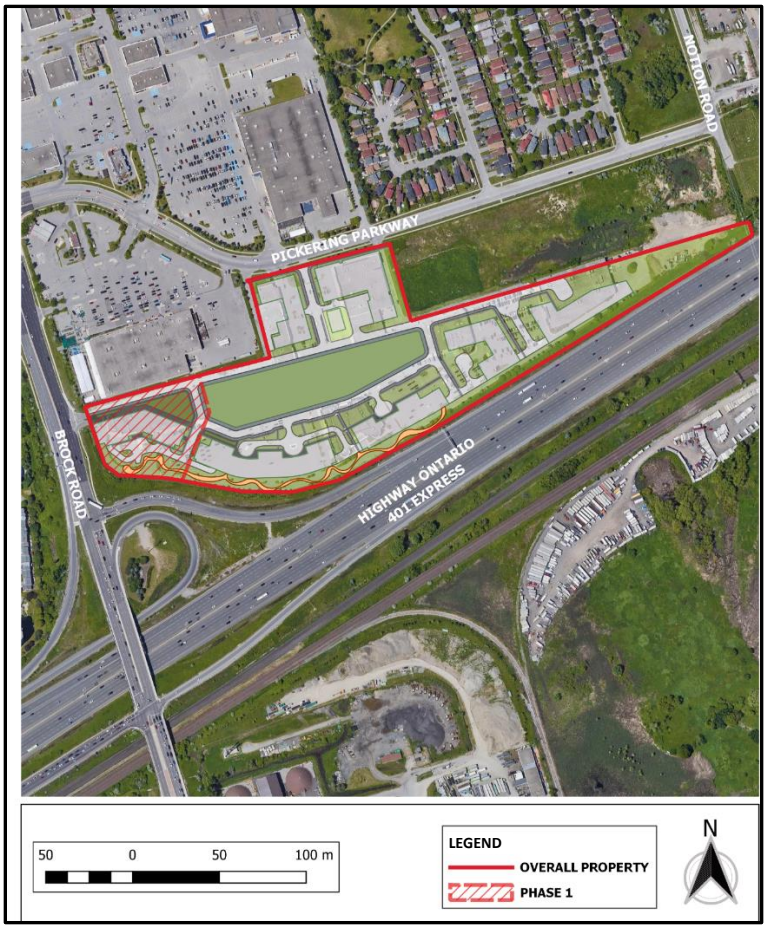

Exhibit 1 Location of the project site

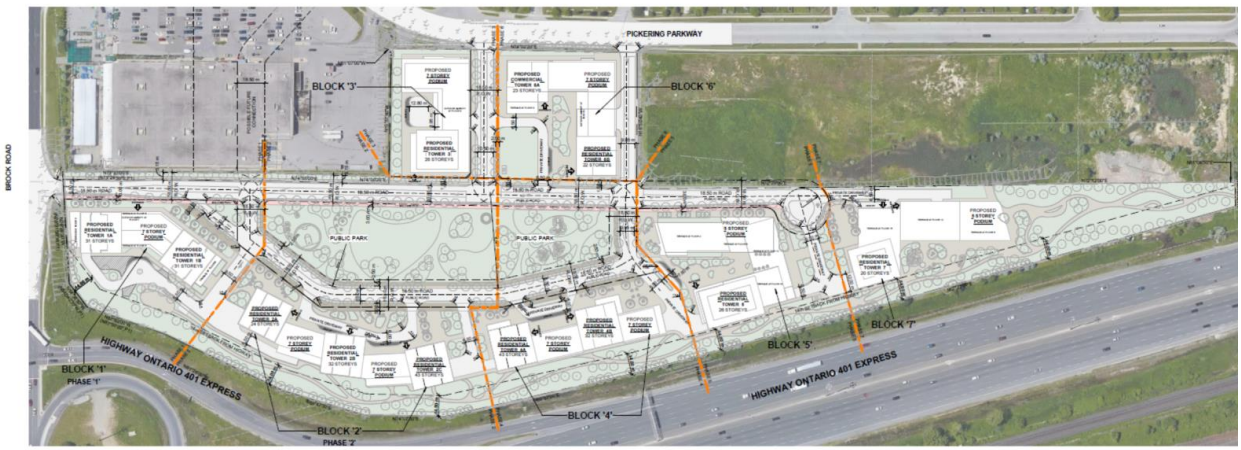

Exhibit 2 Full build out layout and location of Phase 1

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 related to this report involves Phase 1 Zoning and 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, 678 apartment dwelling units, 4 level of underground parking and surface parking, and 1,538 m2 of indoor 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.

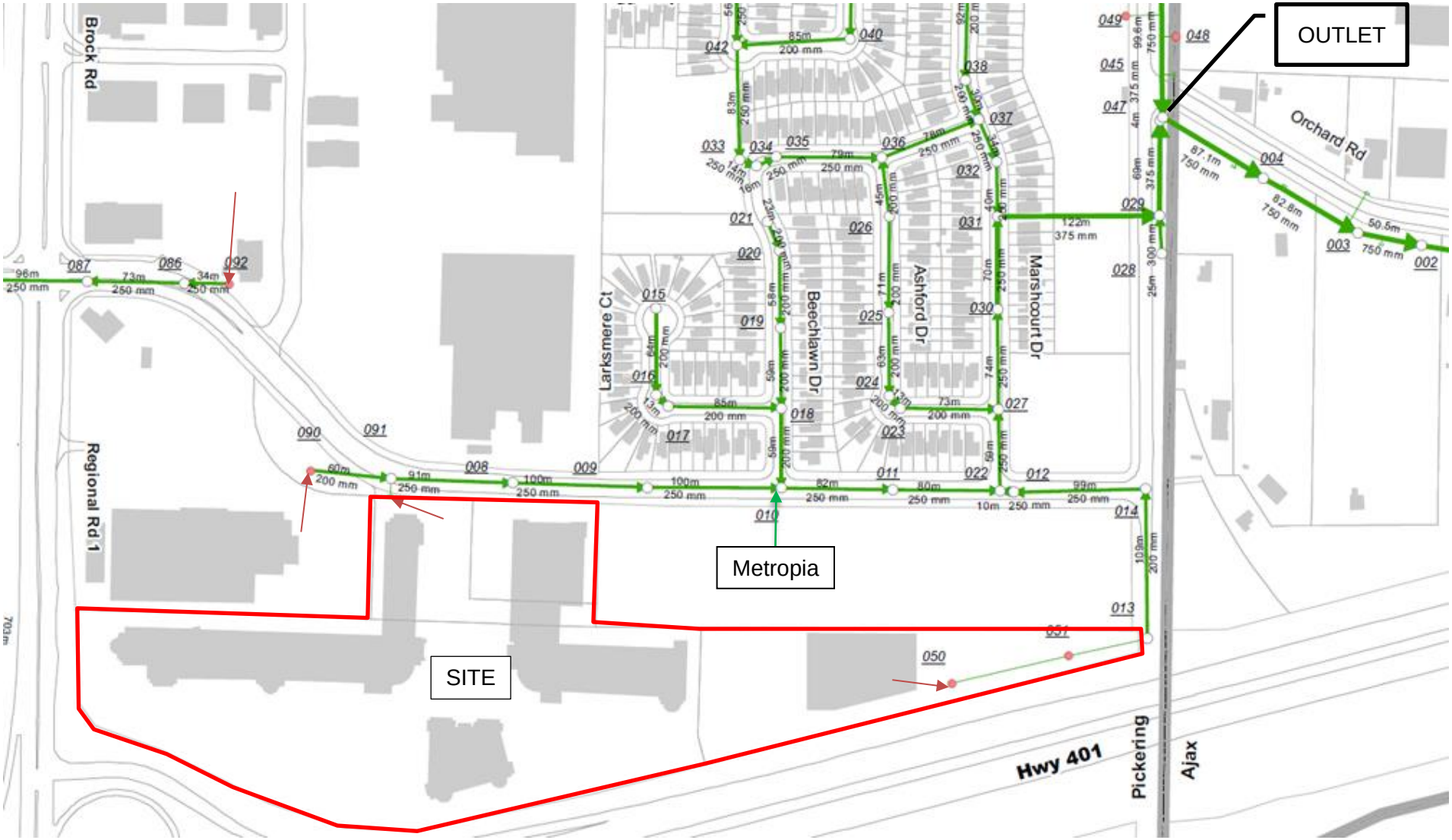

Exhibit 3 Durham Region layout of existing sanitary sewers

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. These two sanitary sewer pumping stations are outlined within the current Region's Capital Budget and 9-year forecast; however, they will be subject to further study as part of a Class Environmental Assessment. The applicant shall note that the timing for these two future projects cannot be determined at this time as indicated by the Region.

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]

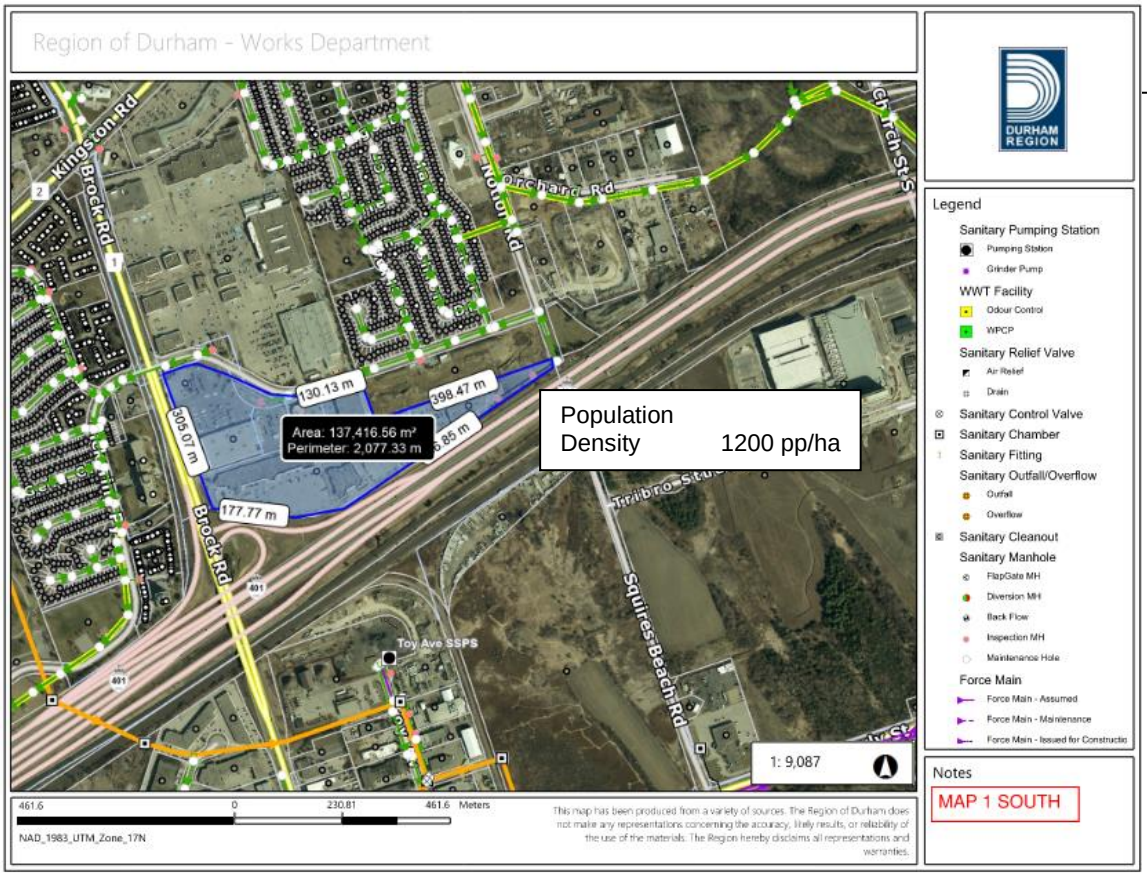

Exhibit 5 – Region Map 1 South [Subject site and 1731/1735 Pickering Pkw

MAP 1 SOUTH

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.

9) Sanitary Capacity is assigned upon execution of a development agreement with the Region of Durham.

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,

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
- 1 Bedroom and Den	2.5
- 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 (6.78 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.)	0.79 ha	-	-	1	-	1.65
Commercial (Prop.)	0.17 ha	-	-	1		0.35
Apartments (Prop.)	678 Units 126- 1 Bedroom 337- 2 Bedroom 207-3 Bedroom 8 -4 Bedroom	 1.5 2.5 3.5 4.5	1793	3.62	0.31	27.28
Total	-	-	-	-		29.28
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 66.37 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 42.42 L/s (refer to MSS report by Odan Detech). Thus, the increase in flow, 23.95 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 – 116m @ 1.0%	New pipe
Pickering Parkway	EX MH 34-82	Prop MH9A	675mm – 49.4m @ 0.45%	Replacement pipe
Pickering Parkway	Prop MH9A	EX MH 34-83	675mm – 41.8m @ 0.45%	Replacement pipe
Pickering Parkway	EX MH 34-83	EX MH 35-5	675mm – 100m @ 0.45%	Replacement pipe
Pickering Parkway	EX MH 35-5	EX MH 35-6	675mm – 100m @ 0.45%	Replacement pipe
Pickering Parkway	EX MH 36-6	EX MH 36-7	675mm – 83m @ 0.45%	Replacement pipe
Pickering Parkway	EX MH 36-7	EX MH 36-8	675mm – 80m @ 0.45%	Replacement pipe
Pickering Parkway	EX MH 35-8	EX MH 35-28	675mm – 110m @ 0.45%	Replacement pipe
Pickering Parkway	EX MH 35-28	Prop MH 13A	375mm – 15m @ 0.22%	Interim Pipe Phase 1
Notion Road	Prop MH 13A	Prop MH 14A	375mm – 100m @ 0.22%	Interim Pipe Phase 1
Notion Road	Prop MH 14A	SAN MH 35-29	375mm – 102m @ 0.22%	Interim Pipe Phase 1
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 and looped to Brock St. 600mm water main via a 300mm local water main connection. These two locations will provide a looped system complete with an isolation valve on the Pickering Parkway and Brock Street mainlines. The proposed looped system will surround be located on the west side rear laneway of the 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. This will ensure that a separate water main is provided to Phase 1 without interconnecting to the existing Plaza water main.

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 and Brock Street 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 via a looped water main to Brock Street 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

SCENARIO	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 (1793 persons)	7.55 L/s
b)	Max day demand -	1.9 x daily demand	14.35 L/s
c)	Peak hour demand -	2.85 x daily demand	21.52 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	14.35	227.45
Fire Flow Demand	166.67	2,642
Total Water Demand	181.02	2869
Available Flow at Block 1 (from MSS)	374	5,928

The total water demand for the Phase 1 development is 181 L/s which is less than the available flow of 374 L/s. Therefore, the existing flow within the system is adequate to meet the domestic and fire demands for the proposed Phase 1 site.

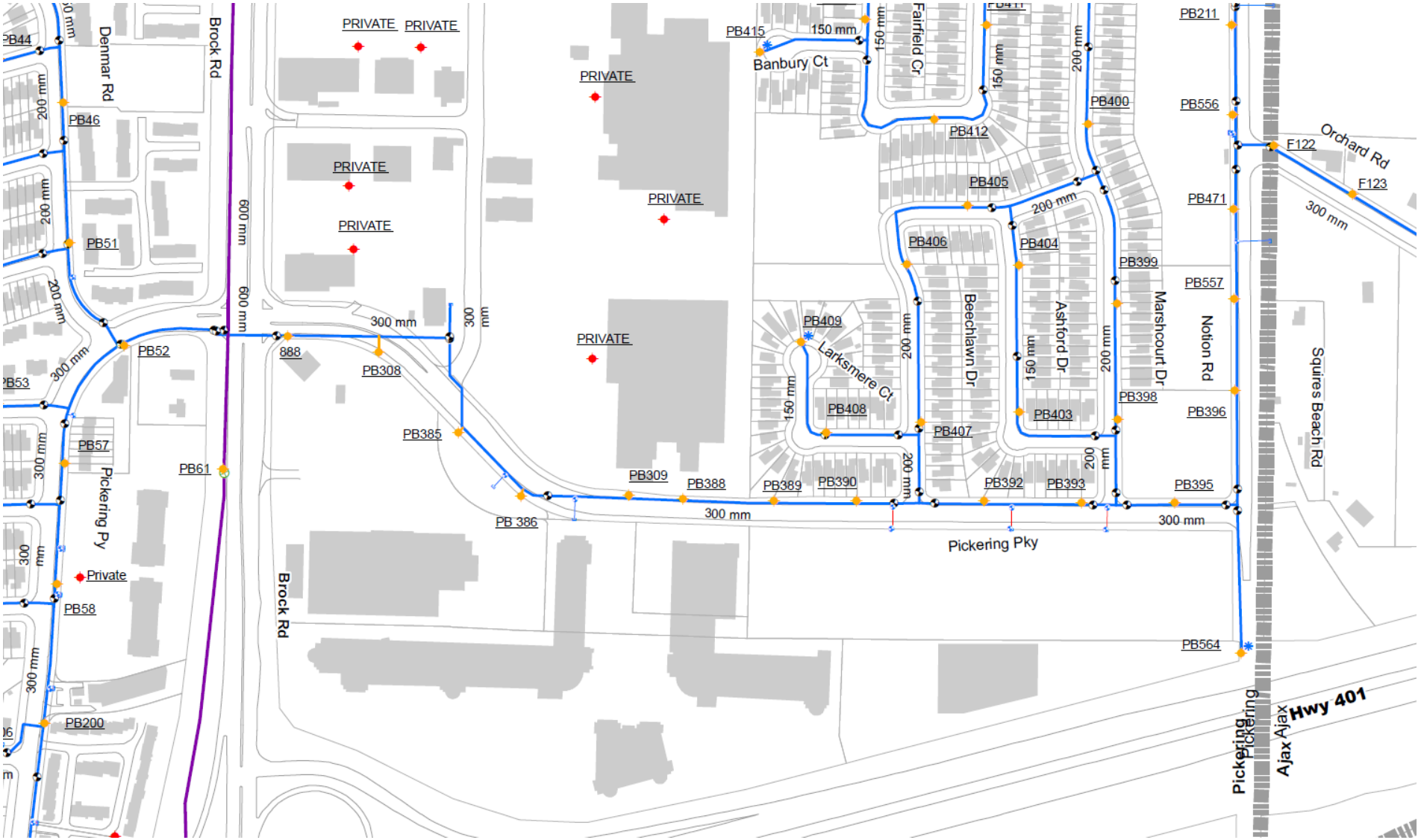

Exhibit 7 Durham Region layout of existing water system

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:

The City of Pickering requires quantity control of Blocks 1 to 7 to a post development allowable flow based on a 5 year Design Storm to a runoff coefficient of C=0.50 during this event. All storms up to and including the 100 Year Design storm must be controlled to this criterion.

Block 1 will follow this requirement to control flows to a C=0.50 for the 5 Year Design Storm up to and including the 100 year design storm.

Quality Control:

Quality control measures are to be designed to provide Enhanced Protection - long term average removal of 80% of 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.

This can be achieved via filtration many methods and Low Impact Development Techniques (LID). To ensure that 80% TSS removal is achieved the use of a Jellyfish Filtration Oil Grit Separator (JFOGS) or similar approved equivalent would accomplish this.

Water Balance:

Retention of the runoff from up to a 5mm storm event on site for reuse, evaporation or infiltration.

- Rain Harvesting
- Green Roofs
- Downspout Disconnection
- Soakaway Pits, Infiltration Trenches (Galleries) and Chambers
- Bioretention Facilities
- Vegetated Filter Strips
- Permeable Pavers
- Enhanced Grass Swales
- Dry Swales
- Perforated Pipe Systems

These techniques help to promote water quality and quantity and water reuse as it relates to stormwater management techniques. At the Stie Plan development stage these techniques will be reviewed in detailed to determine the ideal strategy for each development Block.

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.

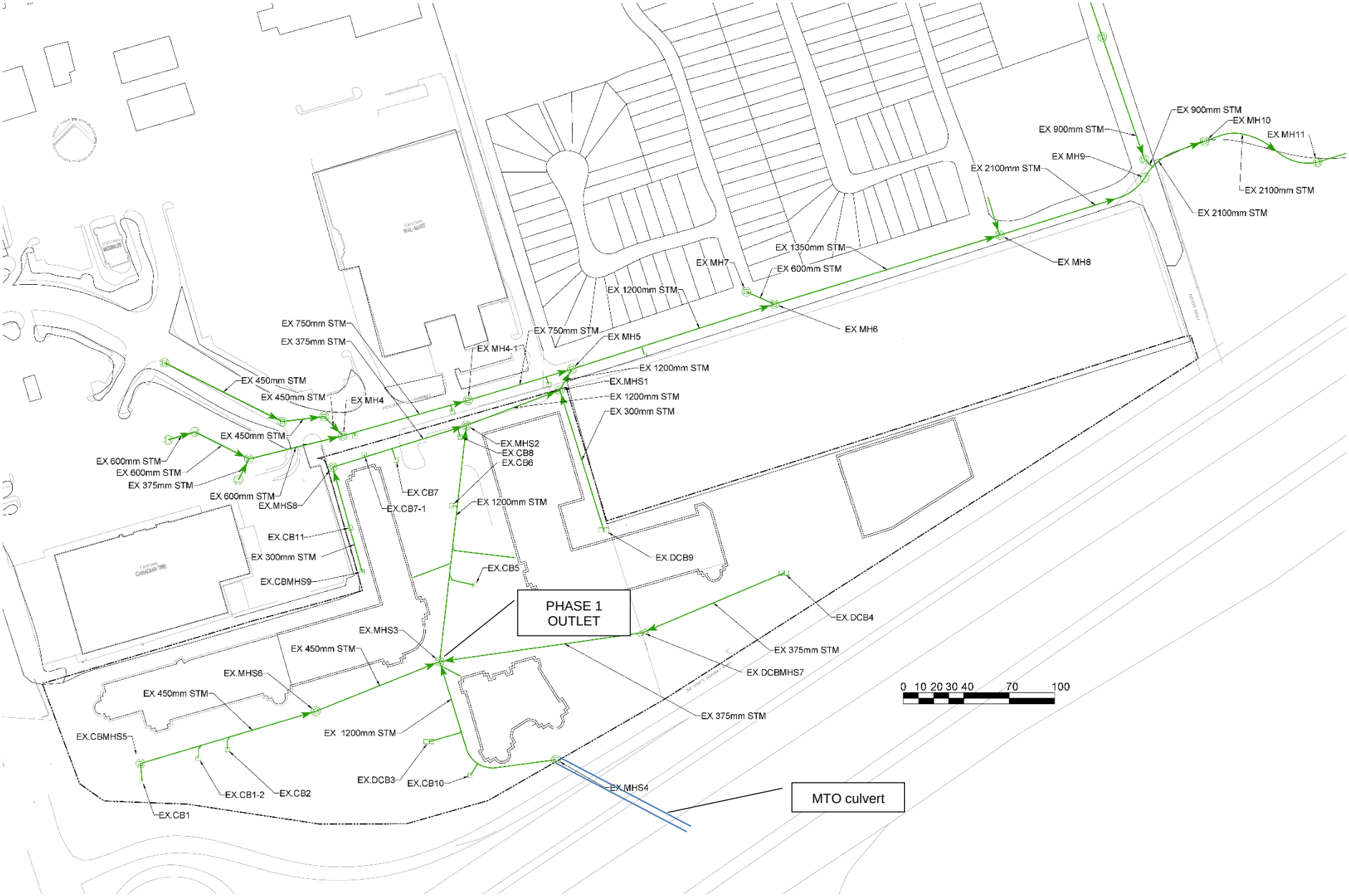

Exhibit 8 - City layout of existing Storm sewers and Site sewers

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 5-year design storm event at an allowable rate based on a runoff coefficient of C=0.50 up to the 100-year design storm event. Please note that the actual runoff coefficient for the existing site condition is much higher than C=0.5. The flows were calculated using both rational method. The City of Pickering's Intensity Duration Frequency (IDF) curve values were used for rational method calculation.

The allowable flows for Phase 1 site are presented in Table 5.

Table 5 – Summary Table of Allowable Flows

Block #	Area	$Q_{5yr\ Pre}$
Block 1	0.936	0.110

The existing Mall and City ROW are not included in the above as they will remain uncontrolled during Phase 1 which is the current existing Site Condition as this area is mainly asphalt and rooftop.

The post-development flows from the site will be limited to the pre-development flows for the 5-year design storm event. The pre-development flows were calculated based on pre-development tributary areas 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 allowable flows were calculated using the rational method. The City of Pickering's Intensity Duration Frequency (IDF) curve values were used for rational method calculation. Refer to Appendix for Rational Calculations.

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.

Based on the description of the existing system City requires a flow reduction to a C =0.5 from the existing site C= 0.85. The post developed site will reduce the existing 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.

The City of Pickering uses the the 4 hour Chicago storm is the critical storm for all storage facilities.

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

- Control of post-development peak flow rates from the 100 year design storm to 5 Year Design Storm Event at a runoff coefficient equal to C=0.50 for development Blocks.
- A maximum runoff coefficient of 0.5 should be used to represent pre-development conditions for Block 1.
- 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.

The following Table establishes the allowable flows from Block 1 based on a runoff coefficient of C=0.50 for the 5 year design storm event and provides for the required storage volumes of each block. In order to establish required storage volumes a conservative approach was taken at this stage using a runoff coefficient of C=0.90 for post development. This will be refined during the Site Plan approval and detailed design stage.

In general a C=0.85 is used for apartment type developments. It is therefore likely that the runoff coefficient will be reduced further from C=0.90 through implementation of various Low Impact Design Techniques and Water Reuse at the time of Detailed Design during Site Plan approval.

Table 6 – Summary Table of SWMM Quantity Pre Development Allowable Flows and Storage

Block #	Area	$Q_{5yr\ Pre}$	Volume $Q_{100\ Post}$
Block 1	0.936	0.110	216

Refer to Appendix D for detailed calculations related to storage volumes and orifice sizes based on the Rationale Method related to the above Table values.

The Tank Size and related storage techniques including locations will be finalized for Phase 1 development at the detailed design stage during Site Plan approval based on the finalized build form.

SUMMMARY OF SWM Quantity Control Features:

Refer to table 7 for the SWM used for quantity control on the redeveloped Site.

Table 7 – Summary Table of SWMM Quantity Features for Redeveloped Site

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=0.80	ORIFICE max head (m)	Maximum 100-year flow (L/sec)
BLOCK 1 (0.936 ha)	1-Storage Tank (225)	* TANK 1 – 325	175 mm	1.52	105

All Maximum Volumes created by 4-hour Chicago storm.

Max volumes calculated using the modified rational method and City of Pickering IDF parameters.

*Note – Tank Sizes have been provided with a safety factor of 1.5x and will be adjusted during the Site Plan approval stage based on detailed design. The safety factor has been applied to account for maximizing tank volumes should the system require pumping in order to minimize the footprint of the tank within the proposed building and underground parking.

Refer to Appendix for Rational Method calculations.

Table 8 summarizes the allowable flows for Block 1 – Phase 1.

Table 8 – Target Release rates from development Block 1 Phase 1 to Pickering Parkway sewer

Block #	**Area (ha)**	**Allowable Release Rate** (m^3/s) 5 year Storm	**Post-development Flows** (m^3/s) 100 Year Storm
Block 1	0.936	0.110	0.105
Total Site (Excluding Park & Private Roads)	0.936	0.110	0.105

Rational method uses C = 0.5 for 5 year event, Tc = 15 min (conservative).

As per City criteria for; 100-year storm - Ca = 1.25

For Detailed Rational Calculations related to Block 1 refer to Appendix D.

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 *= (8,160m^2 x 0.005m)*
= 40.8m^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. Other techniques will be considered at the Site Plan approval stage based on the finalized detailed site plan.

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:	***40.8m^3***
Capture:	
Initial Abstraction (Absorption/ Infiltration/ Evapotranspiration)	
Green Roofs (assumed)	*4.8m^3*
Planters & Landscaping	*4.6m^3*
Total Captured Volume by Initial Abstraction	*13.6m^3*
Capture in Cistern from Roof Top for Reuse	*27.7m^3*
Total Volume Capture	***41.3m^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	***>27.7m^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.

At the Site Plan approval stage a Jellyfish Filtration Oil/Grit Separator will be sized to meet the required 80% TSS removal.

Further review to determine if alternative Train Treatment will be reviewed at that time.

8. 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)

9. 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.

10. 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.

11. 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.

12. 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.

13. 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 9 summarizes the SWM components of the proposed development.

Table 9 – Summary Information for Proposed Re-Development	
Allowable release rate from site (L/s)	110 L/s
Actual release rate from site (L/s) (100-year storm)	105 L/s
Total Stormwater Storage Volume Required/Available in U/G Parking SWM Tank	325 m^3
Cistern Tank For Stormwater Reuse	27.7 m^3
Orifice tube size used	175 mm
Water Quality	80% TSS Achieved via Jellyfish Filtration OGS

14. REFERENCES

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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.
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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.

April 10, 2024

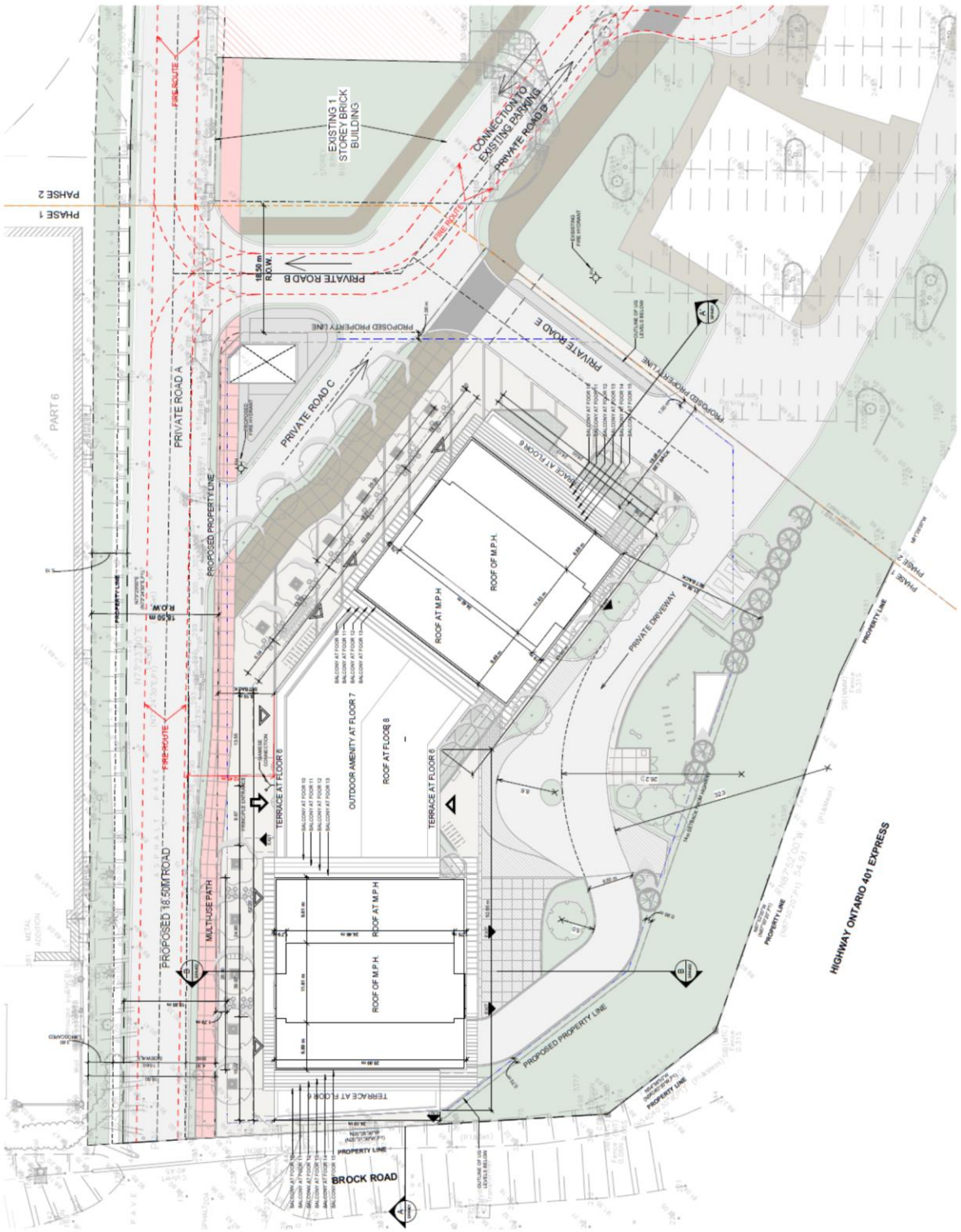
Paul Hecimovic, P.Eng.	Mark Harris, Dipl. Tech.

APPENDIX A

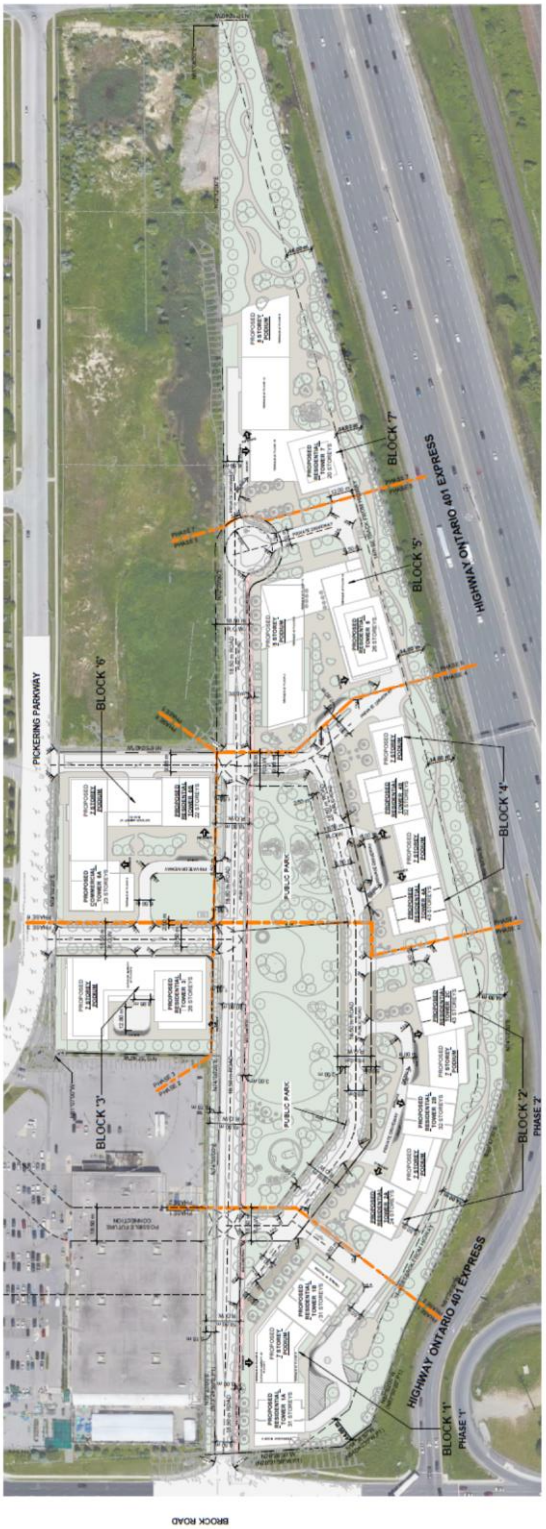
Aerial Photo of Existing Site
Phase 1 Site Plan of the Proposed Development (reduced)
Ultimate Site Plan of the Proposed Development (reduced)

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

FIGURE S4

NOTE: THIS DESIGN IS PROVIDED FOR REFERENCE ONLY, AND INTENDED TO PROVIDE CONTEXT OF REQUIRED PHASE 1 PIPE SIZES WITHOUT NO FUTURE BUILD OUT

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

DESIGNED BY: S. Ahonen
CHECKED BY: M. Al-Awad
DATE: 2023-03-06

STREET	TRIB ID	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL						COMMERCIAL				INDUST.	IND GROSS	FLOW (L/s)						EXISTING SEWER					PRESENT CONDITION	NOTES
				LOT AREA		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		GROSS FLOOR AREA		RESIDENTIAL FLOW		COMM. 2.08 l/s	INDUS. 2.08 l/s see note 4	INSTIT. 1.30 l/s	TOTAL FLOW l/s	Length	Size	Slope	Full Flow Capacity	Full Flow Velocity	% Full	
				UNIT (ha)	ACCUM. (ha)								GFA (ha)	ACCUM. (ha)	UNIT (ha)	ACRES	INFIL. 0.26 (L/s)	SEWAGE 0.0042 (L/s)					L (m)	D (mm)	S (%)	Qcap (L/s)	V (m/s)	Q(d)/Qcap	
Canadian Tire Site	4	EX.MH090	SAN MH 34-82										0.79	0.79					1.65			1.65	59.8	200	0.30	17.96	0.57	9.2	
Pickering Parkway		SAN MH 34-82	Prop MH9A	0.52	0.52									0.79			0.14	0.00	1.65			1.78	49.0	250	0.37	36.17	0.74	4.9	required pipe see following sheet
Subject Site	P1	Prop MH1A	Prop MH2A	1.18	1.18		1.5	126	1793	3.62			0.17	0.17			0.31	27.28	0.35			27.94	20.7	300	0.87	90.20	1.28	31.0	required pipe see following sheet
							2.5	337																				
							3.5	207																				
							4.5	8																				
Subject Site		Prop MH2A	Prop MH3A		1.18				1793	3.62				0.17			0.31	27.28	0.35			27.94	60.8	300	0.70	80.91	1.14	34.5	required pipe see following sheet
Subject Site	P2	Prop MH3A	Prop MH4A		1.18				1793	3.62			0.28	0.45			0.31	27.28	0.93			28.52	90.0	300	0.72	82.05	1.16	34.8	required pipe see following sheet
Subject Site		Prop MH4A	Prop MH1A-1		1.18				1793	3.62				0.45			0.31	27.28	0.93			28.52	96.4	300	0.55	71.72	1.01	39.8	Interim pipe Phase 1
Subject Site	P3,2	Prop MH1A-1	Prop MH7A		1.18				1793	3.62			1.50	1.95			0.31	27.28	4.05			31.64	45.4	300	0.31	53.84	0.76	58.8	Interim pipe Phase 1
Subject Site		Prop MH7A	Prop MH8A		1.18				1793	3.62				1.95			0.31	27.28	4.05			31.64	29.9	300	0.52	69.73	0.99	45.4	required pipe see following sheet
Subject Site		Prop MH8A	Prop MH9A		1.18				1793	3.62				1.95			0.31	27.28	4.05			31.64	14.3	300	0.72	82.05	1.16	38.6	required pipe see following sheet
Pickering Parkway	13	Prop MH9A	SAN MH 34-83	0.25	1.95				1793	3.62				2.74			0.51	27.28	5.70			33.48	42.0	300	0.42	62.67	0.89	53.4	required pipe see following sheet
Pickering Parkway	14	SAN MH 34-83	SAN MH 35-5	0.24	2.19				1793	3.62				2.74			0.57	27.28	5.70			33.55	100.0	300	0.47	66.29	0.94	50.6	required pipe see following sheet
Pickering Parkway	15	SAN MH 35-5	SAN MH 35-6	0.28	2.47				1793	3.62				2.74			0.64	27.28	5.70			33.62	99.8	300	0.48	67.00	0.95	50.2	required pipe see following sheet
BEECHLAWN DR		EX MH018	SAN 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	SAN MH 35-6	2.14	2.14				390	3.80							0.56	6.22				6.78	38.2	200	1.00	32.80	1.04	20.7	
Pickering Parkway	16	SANMH 35-6	SAN MH 35-7	0.22	7.72				2356	3.53				2.74			2.01	34.93	5.70			42.64	82.5	300	0.38	59.61	0.84	71.5	required pipe see following sheet
Pickering Parkway	17	SAN MH 35-7	SAN MH 35-8	0.24	7.96				2356	3.53				2.74			2.07	34.93	5.70			42.70	80.0	300	0.46	65.59	0.93	65.1	required pipe see following sheet
Pickering Parkway	18	SAN MH 35-8	SAN MH 35-28	0.22	8.18				2356	3.53				2.74			2.13	34.93	5.70			42.76	110.1	300	0.57	73.01	1.03	58.6	required pipe see following sheet
Subject Site	5	SAN MH 35-34	SAN 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	SAN 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	0.10	10.37	0.33	22.7	
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	0.54	43.70	0.89	6.2	
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	
NOTION ROAD		SAN MH 35-28	Prop MH 13A	0.01	8.69				2356	3.53				3.16			2.26	34.93	6.58			43.77	14.5	450	0.22	133.73	0.84	32.7	Interim pipe Phase 1
NOTION ROAD		Prop MH 13A	Prop MH 14A	0.25	8.94				2356	3.53				3.16			2.32	34.93	6.58			43.84	100.0	450	0.22	133.73	0.84	32.8	Interim pipe Phase 1
NOTION ROAD		Prop MH 14A	SAN MH 35-29	0.25	9.19				2356	3.53				3.16			2.39	34.93	6.58			43.90	101.8	450	0.22	133.73	0.84	32.8	Interim pipe Phase 1
NOTION ROAD	21	SAN MH 35-29	SAN MH 35-30	0.25	29.65				3569	3.38				3.83	0.66		7.71	50.62	7.98	1.3728		67.68	71.8	450	0.20	127.50	0.80	53.1	Interim pipe Phase 1
NOTION ROAD		SAN MH 35-30	SAN MH 17	0.25	29.90				3569	3.38				3.83	0.66		7.77	50.62	7.98	1.3728		67.74	4.0	450	0.20	127.50	0.80	53.1	Interim pipe Phase 1
ORCHARD ROAD		SAN MH 17	SAN MH 18		29.90																	**67.74**		750	Available capacity at Orchard Rd 750mm dia. pipe is 150 L/s. Total flow calculated here does not include the existing sanitary flows conveyed south on Notion Rd to Orchard Rd.				see note below about capacity*

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 Draln 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
1 Bedroom	1.5 P/u
2 Bedroon and 1 Bedroom+Den	2.5 P/u
3 Bedroom	3.5 P/u
4 Bedroom	4.5 P/u

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

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

ODAN·DETECH CONSULTING ENGINEERS

MUNICIPALITY: REGIONAL MUNICIPALITY OF DURHAM
PROJECT: 20266

20266 - Phase 1 - FSR - Sanitary Design Sheets April 2024.xlsx
ODAN DETECH GROUP INC.

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

DESIGNED BY: S. Ahonen
CHECKED BY: M. Al-Awad

FIGURE S-4

DATE: 2023-03-06

STREET	TRIB ID	UPSTREAM MH	DOWNSTREAM MH	RESIDENTIAL						COMMERCIAL				INDUST.		FLOW (L/s)						EXISTING SEWER					PRESENT CONDITION	NOTES
				LOT AREA		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		GROSS FLOOR AREA		RESIDENTIAL FLOW		COMM. 2.08 l/s	INDUS. 2.08 l/s see note 4	INSTIT. 1.30 l/s	TOTAL FLOW l/s	Length	Size	Slope	Full Flow Capacity	Full Flow Velocity	% Full	
				UNIT (ha)	ACCUM. (ha)								GFA (ha)	ACCUM. (ha)	UNIT (ha)	ACCUM. (ha)	INFIL. 0.26 (L/s)	SEWAGE 0.0042 (L/s)					L (m)	D (mm)	S (%)	Qcap (L/s)	V (m/s)	Q(d)/Qcap	
Canadian Tire Site	4	EX.MH090	SAN MH 34-82										0.79	0.79					1.65			1.65	59.8	200	0.30	17.96	0.57	9.2	
Pickering Parkway		SAN MH 34-82	Prop MH9A	0.52	0.52									0.79			0.14	0.00	1.65			1.78	49.0	675	0.45	563.88	1.58	0.3	pipe sized for full build-out
Subject Site	P1	Prop MH1A	Prop MH2A	1.18	1.18			678	1793	3.62			0.17	0.17			0.31	27.28	0.35			27.94	11.3	300	1.60	122.32	1.73	22.8	pipe sized for full build-out
Subject Site		Prop MH2A	Prop MH3A		1.18				1793	3.62				0.17			0.31	27.28	0.35			27.94	60.8	300	0.70	80.91	1.14	34.5	pipe sized for full build-out
Subject Site	P2	Prop MH3A	Prop MH4A		1.18				1793	3.62			0.28	0.45			0.31	27.28	0.93			28.52	90.0	300	0.72	82.05	1.16	34.8	pipe sized for full build-out
Subject Site		Prop MH4A	Prop MH1A-1		1.18				1793	3.62				0.45			0.31	27.28	0.93			28.52	96.4	300	0.55	71.72	1.01	39.8	Interim pipe Phase 1
Subject Site	P3,2	Prop MH1A-1	Prop MH7A		1.18				1793	3.62			1.50	1.95			0.31	27.28	4.05			31.64	45.4	450	0.31	158.74	1.00	19.9	Interim pipe Phase 1
Subject Site		Prop MH7A	Prop MH8A		1.18				1793	3.62				1.95			0.31	27.28	4.05			31.64	29.9	450	0.52	205.59	1.29	15.4	pipe sized for full build-out
Subject Site		Prop MH8A	Prop MH9A		1.18				1793	3.62				1.95			0.31	27.28	4.05			31.64	14.3	450	0.72	241.92	1.52	13.1	pipe sized for full build-out
Pickering Parkway	13	Prop MH9A	SAN MH 34-83	0.25	1.95				1793	3.62				2.74			0.51	27.28	5.70			33.48	42.0	675	0.45	563.88	1.58	5.9	pipe sized for full build-out
Pickering Parkway	14	SAN MH 34-83	SAN MH 35-5	0.24	2.19				1793	3.62				2.74			0.57	27.28	5.70			33.55	100.0	675	0.45	563.88	1.58	5.9	pipe sized for full build-out
Pickering Parkway	15	SAN MH 35-5	SAN MH 35-6	0.28	2.47				1793	3.62				2.74			0.64	27.28	5.70			33.62	99.8	675	0.45	563.88	1.58	6.0	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	2.14	2.14				390	3.80							0.56	6.22				6.78	38.2	200	1.00	32.80	1.04	20.7	
Pickering Parkway	16	SAN MH 35-6	SAN MH 35-7	0.22	7.72				2356	3.53				2.74			2.01	34.93	5.70			42.64	82.5	675	0.45	563.88	1.58	7.6	pipe sized for full build-out
Pickering Parkway	17	SAN MH 35-7	SAN MH 35-8	0.24	7.96				2356	3.53				2.74			2.07	34.93	5.70			42.70	80.0	675	0.45	563.88	1.58	7.6	pipe sized for full build-out
Pickering Parkway	18	SAN MH 35-8	SAN MH 35-28	0.22	8.18				**2356**	3.53				2.74			2.13	34.93	5.70			42.76	110.1	675	0.45	563.88	1.58	7.6	pipe sized for full build-out
Subject Site	5	SAN MH 35-34	SAN 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	SAN 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	0.10	10.37	0.33	22.7	
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	0.54	43.70	0.89	6.2	
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	
NOTION ROAD		SAN MH 35-28	Prop MH 13A	0.01	8.69				2356	3.53				3.16			2.26	34.93	6.58			43.77	14.5	450	0.22	133.73	0.84	32.7	**Interim pipe Phase 1**
NOTION ROAD		Prop MH 13A	Prop MH 14A	0.25	8.94				2356	3.53				3.16			2.32	34.93	6.58			43.84	100.0	450	0.22	133.73	0.84	32.8	**Interim pipe Phase 1**
NOTION ROAD		Prop MH 14A	SAN MH 35-29	0.25	9.19				2356	3.53				3.16			2.39	34.93	6.58			43.90	101.8	450	0.22	133.73	0.84	32.8	**Interim pipe Phase 1**
NOTION ROAD	21	SAN MH 35-29	SAN MH 35-30	0.25	29.65				3569	3.38				3.83	0.66		7.71	50.62	7.98	1.3728		67.68	71.8	450	0.20	127.50	0.80	53.1	Interim pipe Phase 1
NOTION ROAD		SAN MH 35-30	SAN MH 17	0.25	29.90				3569	3.38				3.83	0.66		7.77	50.62	7.98	1.3728		67.74	4.0	450	0.20	127.50	0.80	53.1	Interim pipe Phase 1
ORCHARD ROAD		SAN MH 17	SAN MH 18		29.90																	**67.74**		750	Available capacity at Orchard Rd 750mm dia. pipe is 150 L/s. Total flow calculated here does not include the existing sanitary flows conveyed south on Notion Rd to Orchard Rd.				see note below about capacity

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 OTHERWISE KNOWN

Population Density by Land Use

Housing Type	Density
Single & Semi Detached	3.5 P/u
Townhouse	3.0 P/u
1 Bedroom	1.5 P/u
2 Bedroon and 1 Bedroom+Den	2.5 P/u
3 Bedroom	3.5 P/u
4 Bedroom	4.5 P/u

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

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

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APPENDIX C

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

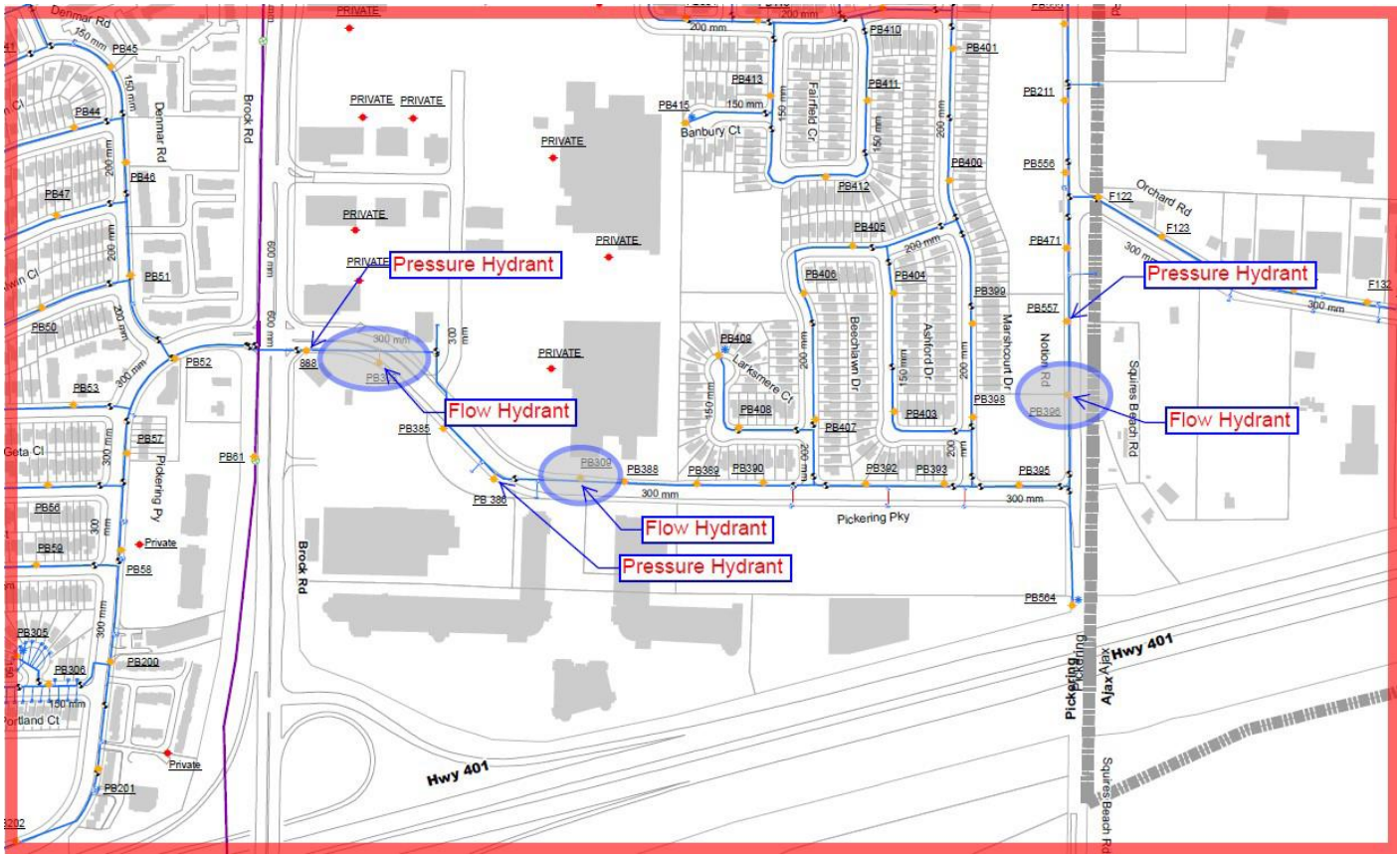
FUS Fire Demand Calculations

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

$F = 220 \times C \times \sqrt{A}$
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							Contents	Charge
# OF STOREYS	31							Non-Combustible	-25%
								Limited Combustible	-15%
								Combustible	0%
CONSTRUCTION CLASS:	Fire Resistive							Free Burning	15%
								Rapid Buring	25%
AUTOMATED SPRINKLER PROTECTION		Credit	Total						
NFPA 13 sprinkler standard	yes	30%	50%					Coefficient related to type of construction	
Standard Water Supply	yes	10%						1.5	Wood Frame
Fully Supervised System	yes	10%						1	Ordinary
		50%						0.8	Non combustible
								0.6	Fire Resistive
CONTENTS FACTOR:	Limited Combustible				CHARGE:	-15%			
								Separation	Charge
EXPOSURE 1 (south)	Distance to Exposure Building (m)				>45	0		0-3 m	25%
	Length - Height							3.1 -10 m	20%
EXPOSURE 2 (east)	Distance to Exposure Building (m)				21.0	10		10.1 - 20 m	15%
	Length - Height							20.1 - 30 m	10%
EXPOSURE 3 (west)	Distance to Exposure Building (m)				>45	0		30.1 - 45	5%
	Length - Height							> 45 m	0%
EXPOSURE 4 (north)	Distance to Exposure Building (m)				27.9	10		Firewall	10%
	Length - Height								
					Total:	20	no more than 75%		
ARE BUILDINGS CONTIGUOUS:	NO								
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				STOREY AREAS m2	
	F =	16470	L/min					1715	1
Round to Nearest 1000 L/min	F =	16000	L/min	must be > 2000 L/min				1454	2
								1454	3
CORRECTION FACTORS:								1454	4
OCCUPANCY		-2400	L/min					1454	5
FIRE FLOW ADJUSTED FOR OCCUPANCY		13600	L/min					1289	6
REDUCTION FOR SPRINKLER		-6800	L/min					728	7
EXPOSURE CHARGE		2720	L/min					778	8-15 (8)
								762	16-31 (16)
REQUIRED FIRE FLOW	**F =**	9520	L/min						
Round to Nearest 1000 L/min	**F =**	10000	L/min	2642	usgm				
	F =	166.67	L/sec						

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.

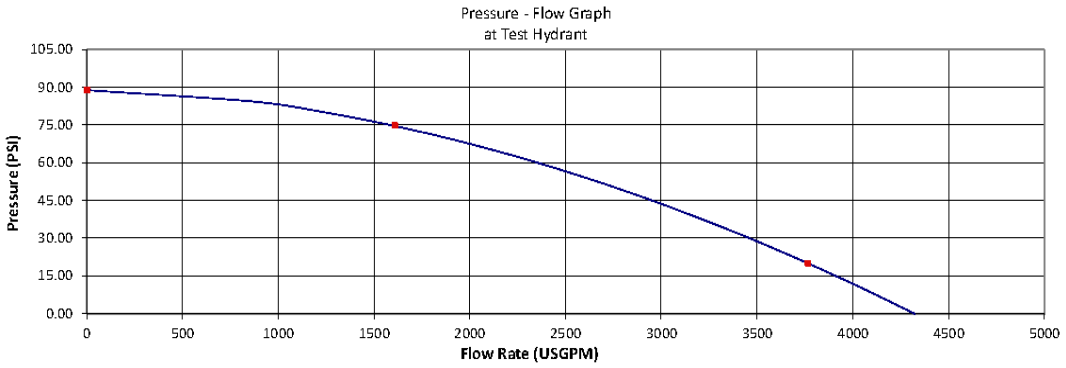
HYDRANT #	PB557	
N.F.P.A. COLOUR CODE	BLUE	
STATIC PRESSURE	88.9	psi
RESIDUAL PRESSURE	74.6	psi
PRESSURE DROP	14.3	psi
% PRESSURE DROP	16.0	% psi

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

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.

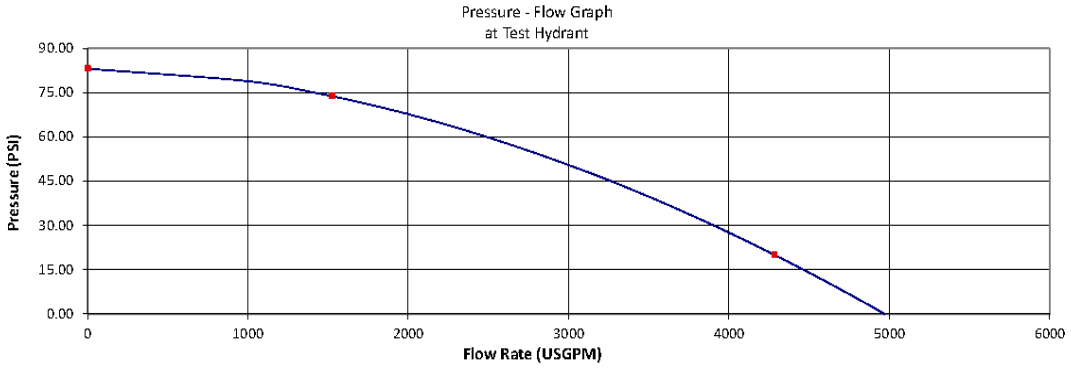
HYDRANT #	PB386	
N.F.P.A. COLOUR CODE	BLUE	
STATIC PRESSURE	83.2	psi
RESIDUAL PRESSURE	73.8	psi
PRESSURE DROP	9.3	psi
% PRESSURE DROP	11.2	% psi

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
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PROCESS
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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.

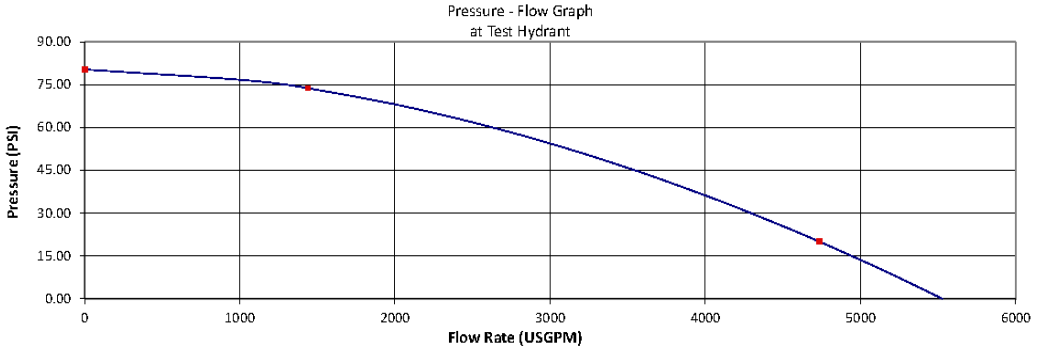
HYDRANT #	PB888	
N.F.P.A. COLOUR CODE	BLUE	
STATIC PRESSURE	80.3	psi
RESIDUAL PRESSURE	73.7	psi
PRESSURE DROP	6.7	psi
% PRESSURE DROP	8.3	% psi

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

Rational Method Calculations
Water Balance Calculations
Jellyfish ETV Certification

Modified Rational Method

Project:	1755 & 1805 Pickering PKWY	Date:	4/2/2024
Project No.:	20266		
Municipality:	Pickering		
Catchment No.	Block 1		

Area (ha):	0.936		100-year Rainfall	
Runoff Coefficient:	0.500		Intensity (I) :	A/(T+B)^C
100-Yr Runoff Coefficient:		0.900	A:	2096.43
*Target Flow (m3/s):	0.110	(5-yr Allowable)	B:	6.485
			C:	0.863

Initial Time:	15 min
Increment:	5 min

Time	I	Peak Flow	Runoff Vol.	Discharge Vol.	Storage
min	mm/hr	m3/s	m3	m3	m3
15	148.5	0.348	313.1	99	214.1
20	124.0	0.290	348.5	132	216.5
25	106.8	0.250	375.2	165	210.2
30	94.1	0.220	396.5	198	198.5
35	84.2	0.197	414.0	231	183.0
40	76.3	0.179	428.9	264	164.9
45	69.9	0.164	441.8	297	144.8
50	64.5	0.151	453.2	330	123.2
60	56.0	0.131	472.4	396	76.4
65	52.6	0.123	480.8	429	51.8
70	49.7	0.116	488.4	462	26.4
75	47.0	0.110	495.4	495	0.4
80	44.7	0.105	502.0	528	-26.0
85	42.5	0.100	508.1	561	-52.9
90	40.6	0.095	513.9	594	-80.1

* Target Flow is calculated based on 5-year storm event-Rational Method

I5= 1082.901/(T+6.007)^0.837
Tc= 15 min
I5=84.68 mm/hr.

ORIFICE DISCHARGE CALCULATOR - SWM TANK - BLK 1

This program calculates the discharge from a circular orifice when given elevations and orifice diameters by the user.

Discharge based on orifice equ.: Q = CA x sqrt(2gh)

Tank Area
145 m2

Q-allowable
110 l/s

Orifice Diameter = 0.1750 m
Orifice Area = 0.0241 m2
Discharge Coeff. = 0.8000

	Head (m)	Discharge(m3/s)	Discharge (L/s)	Vol (m3)
	0	0.0000	0	0
	0.20	0.0381	38	29
	0.40	0.0539	54	58
	0.80	0.0762	76	116
	1.00	0.0852	85	145
100-year	1.52	0.1051	105	220
Top of Tank (free board)	1.80	0.1144	114	261

Water Balance Calculations

CITY OF PICKERING GUIDELINE WATER BALANCE SUMMARY

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

Site Area	8160	m^2
Rainfall depth required to capture	5	mm
Captured Volume Target (5mm across entire site) (Total Area x Rainfall Depth)	40.8	m^3

SURFACE TYPE	SURFACE CAPTURE (mm)	AREA (m^2)	% OF SITE AREA	VOLUME CAPTURE (m^3)
Green Roof	7	682	8.4	4.8
Landscaped Areas	5	921	11.3	4.6
Roof Area (Drains to Cistern for Reuse)	12	2309	28.3	27.7
Asphalt Driveway, Pavers and Concrete (Ground)	1	4248	52.1	4.2
TOTAL		8160	100	37.1

CAPTURED VOLUME BY INTIAL ABSTRACTION (m^3)	**13.6**
VOLUME OF CISTERN (m^3)	**27.7**
CAPTURED VOLUME (m^3)	**41.3**

◆ Verification Statement ◆ Verification Statement ◆ Verification Statement ◆

VERIFICATION STATEMENT

GLOBE Performance Solutions

Verifies the performance of

Jellyfish® Filter

Developed by Imbrium Systems, Inc.,
Whitby, Ontario, Canada

Registration: GPS-ETV_VR2023-08-31_Imbrium-JF

In accordance with

ISO 14034:2016

Environmental Management —
Environmental Technology Verification (ETV)

John D. Wiebe, PhD
Executive Chairman
GLOBE Performance Solutions

August 15, 2023
Vancouver, BC, Canada

Verification Body
GLOBE Performance Solutions
404 – 999 Canada Place | Vancouver, B.C | Canada |V6C 3E2

Technology description and application

The Jellyfish® Filter is an engineered stormwater quality treatment technology designed to remove a variety of stormwater pollutants including floatable trash and debris, oil, coarse and fine suspended sediments, and particulate-bound pollutants such as nutrients, heavy metals, and hydrocarbons. The Jellyfish Filter combines gravitational pre-treatment (sedimentation and floatation) and membrane filtration in a single compact structure. The system utilizes membrane filtration cartridges comprised of multiple pleated filter elements ("filtration tentacles") that provide high filtration surface area with the associated advantages of high flow rate, high sediment capacity, and low filtration flux rate.

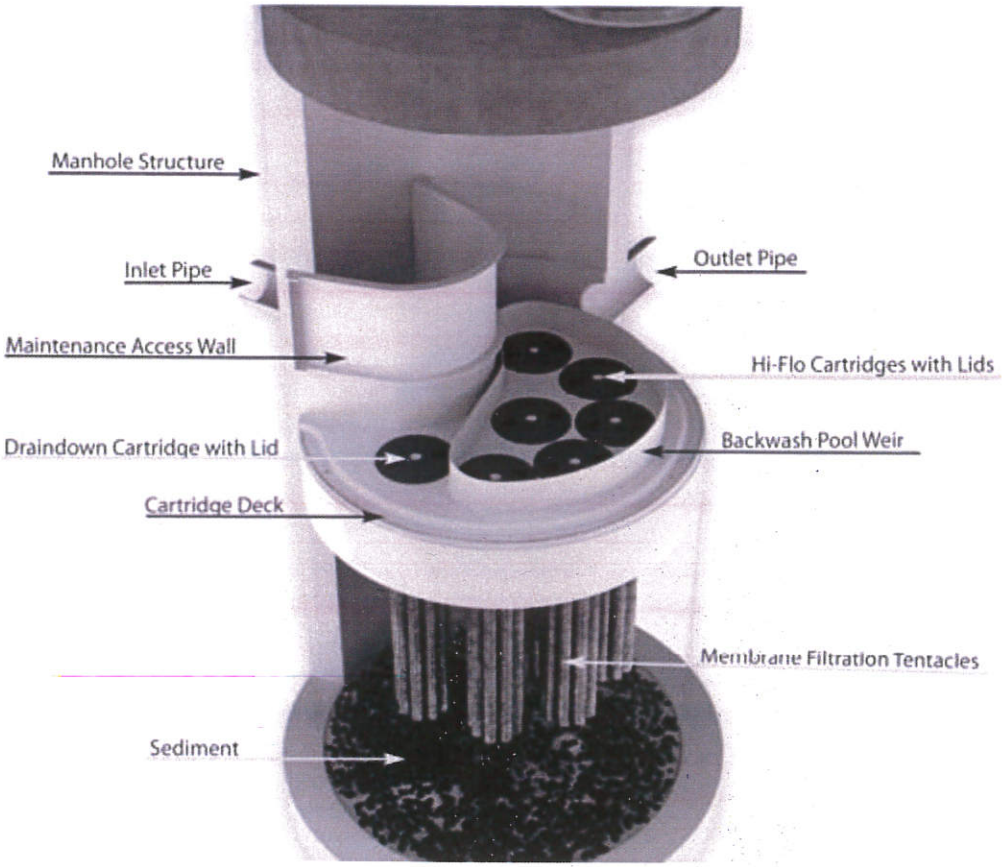


Figure 1. Cut-away graphic of a Jellyfish® Filter manhole with 6 hi-flo cartridges and 1 draindown cartridge

Figure 1 depicts a cut-away graphic of a typical 6-ft diameter Jellyfish® Filter manhole with 6 hi-flo cartridges and 1 draindown cartridge (JF6-6-1). Stormwater influent enters the system through the inlet pipe and builds a pond behind the maintenance access wall, with the pond elevation providing driving head. Flow is channeled downward into the lower chamber beneath the cartridge deck. A flexible separator skirt (not shown in the graphic) surrounds the filtration zone where the filtration tentacles of each cartridge are suspended, and the volume between the vessel wall and the outside surface of the separator skirt comprises a pretreatment channel. As flow spreads throughout the pretreatment channel, floatable pollutants accumulate at the surface of the pond behind the maintenance access wall and also beneath the cartridge deck in the pretreatment channel, while coarse sediments settle to the sump. Flow proceeds under the separator skirt and upward into the filtration zone, entering each filtration tentacle and depositing fine suspended sediment and associated particulate-bound pollutants on the outside surface of the membranes. Filtered water proceeds up the center tube of each tentacle, with the flow from each tentacle combining under the cartridge lid, and discharging to the top of the

cartridge deck through the cartridge lid orifice. Filtered effluent from the hi-flo cartridges enters a pool enclosed by a 15-cm high weir, and if storm intensity and resultant driving head is sufficient, filtered water overflows the weir and proceeds across the cartridge deck to the outlet pipe. Filtered effluent discharging from the draindown cartridge(s) passes directly to the outlet pipe, and requires only a minimal amount of driving head (2.5 cm) to provide forward flow. As storm intensity subsides and driving head drops below 15 cm, filtered water within the backwash pool reverses direction and passes backward through the hi-flo cartridges, and thereby dislodges sediment from the membranes which subsequently settles to the sump below the filtration zone. During this passive backwashing process, water in the lower chamber is displaced only through the draindown cartridge(s). Additional self-cleaning processes include gravity, as well as vibrational pulses emitted when flow exits the orifice of each cartridge lid, and these combined processes significantly extend the cartridge service life and maintenance cleaning interval. Sediment removal from the sump by vacuum is required when sediment depths reach 30 cm, and cartridges are typically removed, externally rinsed, and recommissioned on an annual basis, or as site-specific maintenance conditions require. Filtration tentacle replacement is typically required every 3 – 5 years.

Performance conditions

The data and results published in this Technology Fact Sheet were obtained from a field monitoring program conducted on a Jellyfish® Filter JF4-2-1 (4-ft diameter manhole with 2 hi-flo cartridges and 1 draindown cartridge), in accordance with the provisions of the TARP Tier II Protocol (TARP, 2003) and New Jersey Tier II Stormwater Test Requirements—Amendments to TARP Tier II Protocol (NJDEP, 2009). Testing was completed by researchers led by Dr. John Sansalone at the University of Florida's Engineering School of Sustainable Infrastructure and Environment. The drainage area providing stormwater runoff to the test unit varied between 502 m^2 and 799 m^2 (5400 ft^2 to 8600 ft^2) depending on storm intensity and wind direction. The unit was monitored for a total of 25 TARP qualifying storm events (i.e. $\geq$ 2.5 mm of rainfall) contributing cumulative rainfall of 381 mm (15 in) over the 13-month period between May 28, 2010 and June 27, 2011. Only TARP-qualified storms were routed through the unit, and maintenance was not required during the testing period based on sediment accumulation less than the depth indicated for maintenance, and also based on hydraulic testing performed on the system after the conclusion of monitoring.

Table 1 shows the specified and achieved amended TARP criteria for storm selection and sampling.
Table 2 shows the observed ranges of operational conditions that occurred over the testing period.

Table 1. Specified and achieved amended TARP criteria for storm selection and sampling

Description	Criteria value	Achieved value
Total rainfall	$\geq$ 2.5 mm (0.1 in)	> 2.5 mm (0.1 in)
Minimum inter-event period	6 hrs	10 hrs
Minimum flow-weighted composite sample storm coverage	70% including as much of the first 20% of the storm	100%
Minimum influent/effluent samples	10, but a minimum of 5 subsamples for composite samples	Minimum of 8 subsamples for composite samples
Total sampled rainfall	Minimum 381 mm (15 in)	384 mm (15.01 in)
Number of storms	Minimum 20	25

Table 2. Observed operational conditions for events monitored over the study period

Operational condition	Observed range
Storm durations	26 – 691 min
Previous dry hours	10 - 910 hrs
Rainfall depth	3 – 50 mm
Initial rainfall to runoff lag time	1 – 34 min
Runoff volume	206 – 13,229 L
Peak rainfall intensity	5 – 137 mm/hr
Peak runoff flow rate	0.5 – 14.3 L/s
Event median flow rate	0.01 – 5.5 L/s

The 4-ft diameter test unit has sedimentation surface area of 1.17 m^2 (12.56 ft^2). Each of the three filter cartridges employed in the test unit uses filtration tentacles of 137 cm (54 in) length, with filter surface area of 35.4 m^2 (381 ft^2) per cartridge, and total filter surface area of 106.2 m^2 (1143 ft^2) for the three cartridges combined. The design treatment flow rate is 5 L/s (80 gal/min) for each of the two hi-flo cartridges and 2.5 L/s (40 gal/min) for the single draindown cartridge, for a total design treatment flow rate of 12.6 L/s (200 gal/min) at design driving head of 457 mm (18 in). This translates to a filtration flux rate (flow rate per unit filter surface area) of 0.14 L/s/m^2 (0.21 gal/min/ft^2) for each hi-flo cartridge and 0.07 L/s/m^2 (0.11 gal/min/ft^2) for the draindown cartridge. The design flow rate for each cartridge is controlled by the sizing of the orifice in the cartridge lid. The distance from the bottom of the filtration tentacles to the sump is 61 cm (24 in).

Performance claims

The Jellyfish® Filter demonstrated the removal efficiencies indicated in **Table 3** for respective constituents during field monitoring of 25 TARP qualified storm events with cumulative rainfall of 381 mm, conducted in accordance with the provisions of the TARP Tier II Protocol (TARP, 2003) and New Jersey Tier II Stormwater Test Requirements—Amendments to TARP Tier II Protocol (NJDEP, 2009), and using the following design parameters:

- System hydraulic loading rate (system treatment flow rate per unit of sedimentation surface area) of 10.8 L/s/m^2 (15.9 gal/min/ft^2) or lower
- Filtration flux rate (flow rate per unit filter surface area) of 0.14 L/s/m^2 (0.21 gal/min/ft^2) or lower for each hi-flo cartridge and 0.07 L/s/m^2 (0.11 gal/min/ft^2) or lower for each draindown cartridge
- Distance from the bottom of the filtration tentacles to the sump of 61 cm (24 in) or greater
- Driving head of 457 mm (18 in) or greater

Table 3. Mean, median and 95% confidence interval (median) for removal efficiencies of selected stormwater constituents

Parameter	Mean	Median	Median - 95% Lower Limit	Median - 95% Upper Limit
TSS	84.7	85.6	82.8	89.8
SSC	97.5	98.3	97.1	98.7
Total phosphorus	48.8	49.1	43.3	60.1
Total nitrogen	37.9	39.3	31.2	54.6
Zinc	55.3	69	39	75
Copper	83.0	91.7	75.1	98.9
Oil and grease	60.1	60	42.7	100

N.B. As with any field test of stormwater treatment devices, removal efficiencies will vary based on pollutant influent concentrations and other site specific conditions.

❖The performance claims can be applied to other Jellyfish® Filter models smaller or larger than the tested model as long as the untested models are designed in accordance with the design parameters specified in the performance claims.

Performance results

The frequency of rainfall depths monitored during the study is presented in **Figure 2**. The median and 90th percentile rainfall depths were 11 mm and 31.7 mm, respectively. These values represent the depth of rainfall that is not exceeded in 50 and 90 percent of the monitored rainfall events.

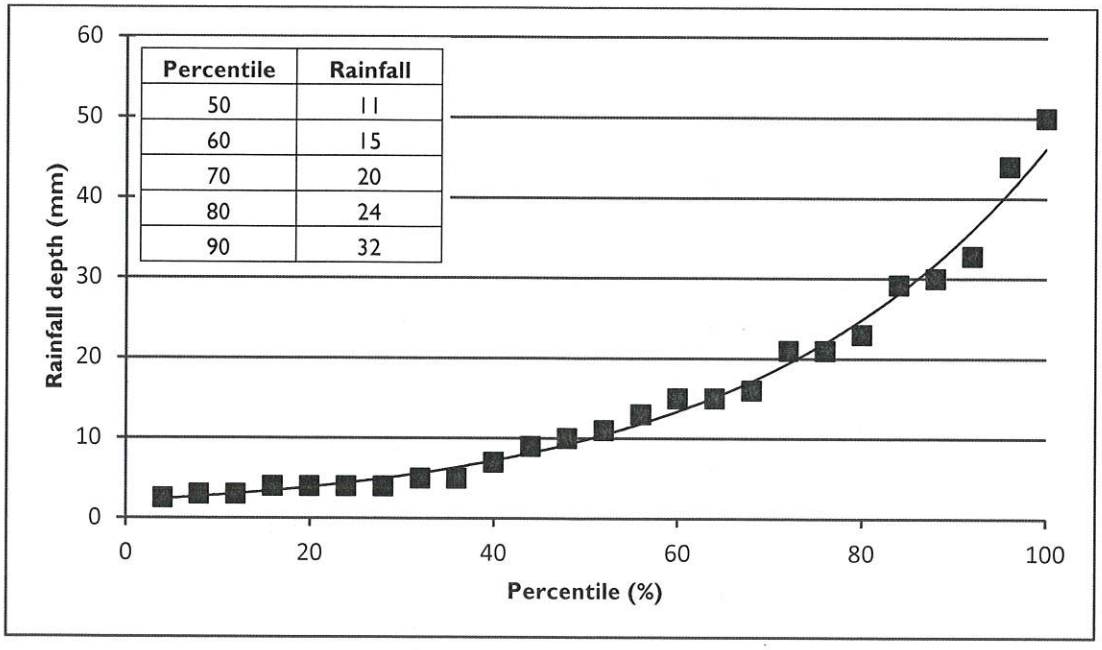


Figure 2. Rainfall depth frequency curve

Sediment removal performance was assessed by measuring the event mean concentration and mass of suspended sediment entering and leaving the unit during runoff events. This involved sampling the full cross-section of influent and effluent flows manually at 2 - 10 minute intervals for the full duration of each storm event and combining discrete samples into flow-weighted composites. Comparing the theoretical mass recovery from the sump calculated by the difference between the influent and effluent mass to the actual dry weight of the recovered sump mass showed an overall mass balance recovery of 94.5% over the study period.

The median d50 particle size (i.e. 50th percentile particle size) of the influent and effluent was 82 and 3 µm, respectively (**Figure 3**). The median influent particles sizes ranged between 22 and 263 µm, whereas median effluent particle sizes ranged between 1 and 11 µm.

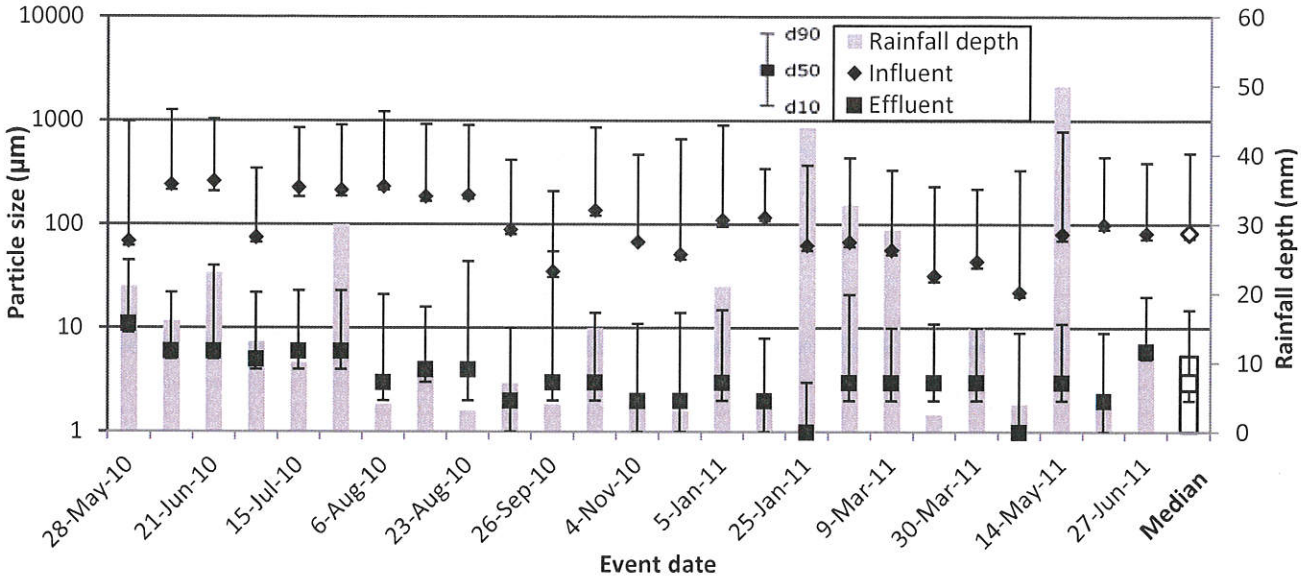


Figure 3. The rainfall depth and d10, d50, and d90 particle sizes of the influent and effluent composite samples for each monitored storm event over the 13-month testing period

Sampling of flows into and out of the Jellyfish Filter over the testing period showed statistically significant reductions ($p < 0.05$; Wilcoxon signed-rank test) in influent event mean concentrations for all selected stormwater constituents (**Table 4** and **Figure 4**). Effluent event mean Suspended Sediment Concentrations (SSC) were below 19 mg/L during all monitored events. Load-based removal rates were also calculated based on the sum of loads over the study period. These removal rages ranged from 46.3 for Total Nitrogen to 98.6 for SSC (**Table 4**).

Table 4. Summary statistics for influent and effluent event mean concentrations for selected constituents

Water Quality Variable	Sampling Location	Min	Max	Median	Range	Mean	SD	Load based removal efficiency (%)
TSS	Influent (mg/L)	16.30	261.00	79.30	244.70	86.26	51.37	87.2
	Effluent (mg/L)	3.20	21.70	11.80	18.50	10.99	4.79	
SSC	Influent (mg/L)	78.20	1401.70	444.50	1323.50	482.26	338.34	98.6
	Effluent (mg/L)	2.80	18.10	7.30	15.30	7.88	3.77	
TP	Influent (µg/L)	887.00	8793.00	3063.00	7906.00	3550.20	1914.50	64.2
	Effluent (µg/L)	472.00	4769.00	1480.00	4297.00	1688.08	1059.98	
TN	Influent (µg/L)	1170.00	10479.00	3110.00	9309.00	3519.32	2161.47	46.3
	Effluent (µg/L)	553.00	6579.00	1610.00	6026.00	2091.76	1613.61	
Zn	Influent (µg/L)	0.005	7600.00	1500.00	7600.00	1792.00	1852.91	76.1
	Effluent (µg/L)	0.005	2760.00	450.00	2760.00	561.64	594.70	
Cu	Influent (µg/L)	0.001	880.40	79.50	880.40	171.28	229.33	92.1
	Effluent (µg/L)	0.001	51.30	6.90	51.30	14.36	17.22	
Oil and Grease	Influent (mg/L)	0.20	4.06	0.93	3.86	1.07	0.82	46.4
	Effluent (mg/L)	0.00	2.32	0.35	2.32	0.50	0.60	

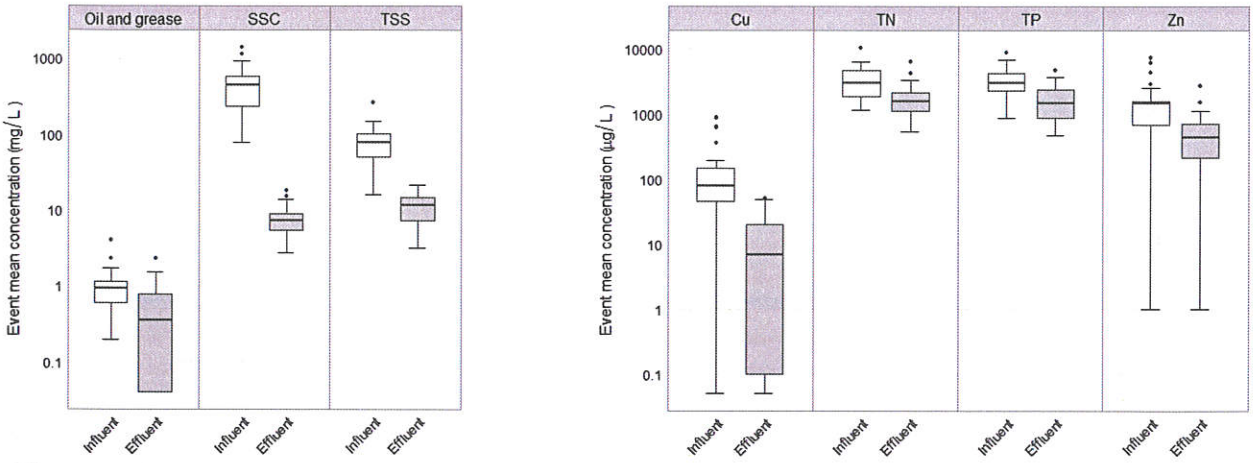


Figure 4. Boxplots showing the distribution of influent and effluent event mean concentrations (EMC) for selected stormwater constituents over the study period

Verification

The verification was completed by the Verification Expert, Toronto and Region Conservation Authority, contracted by GLOBE Performance Solutions, using the International Standard ***ISO 14034:2016 Environmental Management -- Environmental Technology Verification (ETV)***. Data and information provided by Imbrium Systems to support the performance claim included the performance monitoring report prepared by University of Florida, Engineering School of Sustainable Infrastructure and Environment, and dated November 2011. This report is based on testing completed in accordance with the Technology Acceptance Reciprocity Partnership (TARP) Tier II Protocol (2003) and New Jersey Tier II Stormwater Test Requirements--Amendments to TARP Tier II Protocol (NJDEP, 2009).

What is ISO14034:2016 Environmental Management – Environmental Technology Verification (ETV)?

ISO 14034:2016 specifies principles, procedures and requirements for Environmental Technology Verification (ETV), and was developed and published by the *International Organization for Standardization (ISO)*. The objective of ETV is to provide credible, reliable and independent verification of the performance of environmental technologies. An environmental technology is a technology that either results in an environmental added value or measures parameters that indicate an environmental impact. Such technologies have an increasingly important role in addressing environmental challenges and achieving sustainable development.

For more information on the Jellyfish® Filter please contact:

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407 Fairview Drive
Whitby, ON
L1N 3A9, Canada
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info@imbriumsystems.com

For more information on ISO 14034:2016 / ETV please contact:

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404 – 999 Canada Place
Vancouver, BC
V6C 3E2 Canada
Tel: 604-695-5018 / Toll Free: 1-855-695-5018
etv@globeperformance.com

Limitation of verification - Registration: GPS-ETV_VR2023-08-31_Imbrium-JF
GLOBE Performance Solutions and the Verification Expert provide the verification services solely on the basis of the information supplied by the applicant or vendor and assume no liability thereafter. The responsibility for the information supplied remains solely with the applicant or vendor and the liability for the purchase, installation, and operation (whether consequential or otherwise) is not transferred to any other party as a result of the verification.

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

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
- PROPOSED DRIVEWAY (S = SINGLE, D = DOUBLE)
- 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
- BOREHOLE LOCATION
- PROPOSED VALVE CHAMBER
- EXISTING WATER MAIN
- PROPOSED WATER MAIN
- PROPOSED REDUCER
- PROPOSED CAP FOR SANITARY, STORM AND/OR WATER AS NOTED
- PROPOSED SLOPE (3:1 OR HIGHER)
- LIMIT OF CONSTRUCTION
- PROPERTY LINE

1899 BROCK ROAD

Pickering Pkwy

Brock Rd

Orchard Rd

Notion Rd

Easement

Ashford Dr

Beechlawn Dr

Marshcourt Dr

METROPIA

HWY 401

PROP 3.46m 450mmø CONC SAN @ 0.23%

SAN MH 35-30

SAN MH 17

PROP 7.39m 450mmø CONC SAN @ 0.32%

SAN MH 35-27

SAN MH 35-29

PROP 10.15m 450mmø PVC SAN @ 0.22%

SAN MH35-26

MH14A

SAN MH 35-25

PROP 15.43m 600mmø PVC SAN @ 0.20%

SAN MH 35-28

MH13A

PROP 14.47m 450mmø PVC SAN @ 0.22%

SAN MH 35-7

SAN MH 35-8

PROP 42.06m 675mmø CONC SAN @ 0.45%

EX 91.15m 250mm PVC SAN

PROP SAN MH 34-82

CONNECT TO EXISTING 300mm PVC WM

PROP ISOLATION VALVE

PROP MH9A

PROP 40.09m 675mmø PVC SAN @ 0.45%

PROP SAN MH 34-83

PROP 30.59m 600mmø CONC SAN @ 0.45%

PROP SAN MH 35-5

PROP 39.88m 600mmø CONC SAN @ 0.45%

PROP SAN MH 35-6

PROP MH8A

PROP 14.30m 450mmø CONC SAN @ 0.72%

PROP 29.89m 450mmø CONC SAN @ 0.88%

PROP MH7A

PROP 300mmø PVC W/M

TO BE REMOVED DURING PHASE 3

PROP 4.51m 300mmø PVC SAN @ 0.31%

PROP MH1A-1

PROP 300mmø PVC W/M

PROP 62.83m 300mmø PVC STM @ 0.98%

EX FIRE HYDRANT

16.50 m R.O.W.

PUC ROAD

MH1

MH2

PROP FH&V

PROP SIAMESE CONNECTION

PROP DOMESTIC 300mm PVC WM

PROP SECOND FIRE 300mm PVC WM

PROP FIRST FIRE 300mm PVC WM

PROP 11.35m 300mmø PVC SAN @ 1.59%

PROP MH1A

MH3

PROP 33.14m 375mmø PVC STM @ 1.43%

PROP DOMESTIC 300mm PVC WM

PROP FIRST FIRE 300mm PVC WM

PROP SECOND FIRE 300mm PVC WM

PROP MH2A

PROP 8.95m 450mmø CONC STM @ 2.23%

PARTIAL DEMOLITION OF EXISTING BUILDING A DURING PHASE 1

BUILDING A EXISTING 1 STOREY BRICK BUILDING

EX SIAMESE CONNECTION

PROP 96.38m 300mmø PVC SAN @ 0.55%

EX SIAMESE CONNECTION

BUILDING B EXISTING 1 STOREY BRICK & STUCCO BUILDING

PROP 60.76m 300mmø PVC SAN @ 0.70%

PROP 17.72m 600mmø CONC STM @ 1.07%

EX.MHS3

MH4

PROP MH3A

PROP 64.70m 300mmø PVC SAN @ 1.01%

PROP MH4A

PROP 61.43m 525mmø CONC STM @ 0.85%

MH5

PROP 70.88m 600mmø CONC STM @ 1.16%

MH6-1

EX SIAMESE CONNECTION

BUILDING C EXISTING 1 STOREY BRICK AND STUCCO BUILDING

EXISTING SERVICES AND HYDRANTS SHALL BE RECONNECTED TO SUIT AS REQUIRED

BENCHMARK

ELEVATIONS ARE GEODETIC AND ARE DERIVED FROM THE TOWN OF PICKERING BENCH MARK No. 67-U-002

TABLET IN SOUTHWEST CONCRETE FOUNDATION WALL AT THE NORTHWEST SIDE OF MAIN ENTRANCE TO THE TOWN OF PICKERING MUNICIPAL BUILDING, AND 0.53 METRES ABOVE GRADE.

PUBLISHED ELEVATION =87.581 metres.

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
9150 SOUTH SERVICE ROAD, BURLINGTON, ONTARIO, L7L 5K2

BENCHMARK

ELEVATIONS ARE GEODETIC AND ARE DERIVED FROM THE TOWN OF PICKERING BENCH MARK No. 67-U-002

LOCATION :
TABLET IN SOUTHWEST CONCRETE FOUNDATION WALL AT THE NORTHWEST SIDE OF MAIN ENTRANCE TO THE TOWN OF PICKERING MUNICIPAL BUILDING. AND 0.53 METRES ABOVE GRADE.

PUBLISHED ELEVATION =87.581 metres.

PROPOSED 18.50M ROAD

PRIVATE ROAD A

PRIVATE ROAD B

PRIVATE ROAD C

PRIVATE ROAD D

PRIVATE ROAD E

PRIVATE DRIVEWAY

MULTI-USE PATH

PROPOSED PROPERTY LINE

F.F.E. 90.50m

OUTLINE OF LEVEL 7 ABOVE

OUTLINE OF LEVEL 6 ABOVE

OUTLINE OF BALCONIES ABOVE

OUTLINE OF TOWER ABOVE

OUTLINE OF UG BELOW

FIRE ROUTE

PROP STM MH1 RIM 89.64

PROP STM MH2 RIM 88.95

PROP CB1 RIM 89.55

PROP CB2 RIM 89.55

PROP CBCB1 T/G 88.99

PROP DCB1 T/G 89.00

PROP STM MH2 T/G 88.95

PROP CBCB16 RIM 90.14 CONNECT TO SWM TANK

AD4 RIM 89.24 CONNECT TO SWM TANK

AD5 RIM 89.10 CONNECT TO SWM TANK

AD6 RIM 89.09 CONNECT TO SWM TANK

AD7 RIM 89.29 CONNECT TO SWM TANK

AD8 RIM 89.64 CONNECT TO SWM TANK

AD9 RIM 89.73 CONNECT TO SWM TANK

AD10 RIM 89.73 CONNECT TO SWM TANK

AD11 RIM 89.41 CONNECT TO SWM TANK

AD12 RIM 89.40 CONNECT TO SWM TANK

AD13 RIM 89.23 CONNECT TO SWM TANK

AD14 RIM 89.37 CONNECT TO SWM TANK

DCB2 RIM 88.68

DCB3 RIM 88.68

PROP CB17 RIM 88.85 CONNECT TO SWM TANK

PROP SAN MH1A RIM 85.76

PROP SAN MH2A RIM 86.12

PROP SAN MH3A RIM 88.19

PROP STM MH5 RIM 87.93

PROP STM MH B2 RIM 88.08

MH3 RIM 88.87

MH4 RIM 89.03

EXHAUST SHAFT: GROUND LEVEL

INTAKE SHAFT: GROUND LEVEL

PROPOSED FIRE HYDRANT

RETAIL BIKE PARKING

PRINCIPLE ENTRANCE

SIAMESE CONNECTION

CANOPY

RESIDENTIAL LOADING 4.0m x 13m (MIN. VERTICAL CLEARANCE OF 6.1m)

RETAIL LOADING 3.5m x 11m (MIN. VERTICAL CLEARANCE OF 4.0m)

ACCESS TO UG1 PARKING 12% RAMP

5% RAMP

PET RELIEF AREA

POTENTIAL AT GRADE RETAIL PARKING

PARKING CONTROL ARM

14m SETBACK FROM HIGHWAY

LANDSCAPE

1 STOREY CONCRETE BUILDING

1 STOREY BRICK BUILDING

METAL ADDITION

PART 2

PART 6

ASPHALT PAVED

LIMIT OF CONSTRUCTION/MATCH LINE, MATCH EX GRADE

LIMIT OF STRUCTURE TO BE REMOVED

LIMIT OF GRADING PHASE 1

ROAD EXTENSION TO EX. PARKING LOT

PROP_BARRIERS

17 Parking Spaces

14 Parking Spaces

15 Parking Spaces

PARKING HC SPACES

N74°55'00"E (P1&Meas) 49.76 Metal Lids

N73 23 00 E (N73 24 30 E,P1)

N54°38'50"W 19.85 (P1&Meas)

N87°52'00"W (N87°50'20"P1) 54.91 (P1&Meas)

GRADING LEGEND:

EXISTING STORM MANHOLE	EXISTING WATER VALVE & BOX	(100.00)	PROPOSED SWALE INVERT ELEVATION
PROPOSED STORM MANHOLE	PROPOSED WATER VALVE & BOX	1.0%	PROPOSED FLOW ARROW AND SLOPE
EXISTING CATCH BASIN MANHOLE	EXISTING VALVE CHAMBER		PROPOSED EMERGENCY OVERLAND FLOW
PROPOSED CATCH BASIN MANHOLE	BOREHOLE LOCATION	199.50	EXISTING CONTOUR
PROPOSED STORMCEPTOR	PROPOSED VALVE CHAMBER		PROPOSED SLOPE (3:1 OR HIGHER)
EXISTING CATCH BASIN	(100.00) FUTURE ELEVATION		DENOTES PROPOSED PROPERTY LINE
PROPOSED CATCH BASIN	*100.00* EXISTING SPOT ELEVATION		DENOTES PROPOSED LIMIT OF CONSTRUCTION
PROPOSED AREA DRAIN	(100.00) PROPOSED ELEVATION		DENOTES PROPOSED HEAVY DUTY ASPHALT AREA
EXISTING SANITARY MANHOLE	(100.00)TC PROPOSED TOP OF CURB ELEVATION		
PROPOSED SANITARY MANHOLE	(100.00)GL PROPOSED GUTTER LINE ELEVATION		
EXISTING HYDRANT	(100.00)HP PROPOSED HIGH POINT		
PROPOSED HYDRANT	(100.00)LP PROPOSED LOW POINT		

FIGURE 2
PRELIMINARY GRADING PLAN
(PHASE 1)

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

DATE:	PROJ. NO.:	SCALE:
SEPT 2021	20266	1:250

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

BENCHMARK

ELEVATIONS ARE GEODETIC AND ARE DERIVED FROM THE TOWN OF PICKERING BENCH MARK No. 67-U-002

TABLET IN SOUTHWEST CONCRETE FOUNDATION WALL AT THE NORTHWEST SIDE OF MAIN ENTRANCE TO THE TOWN OF PICKERING MUNICIPAL BUILDING. AND 0.53 METRES ABOVE GRADE.

PUBLISHED ELEVATION =87.581 metres.

Brock Rd

PUBLIC ROAD

18.50 m R.O.W

EX 300mm W/M

CONNECT TO EXISTING 300mm PVC WM

PROP ISOLATION VALVE

PROP 300mm PVC W/M

TO BE REMOVED DURING PHASE 3

EX FIRE HYDRANT

EX SIAMESE CONNECTION

PARTIAL DEMOLITION OF EXISTING BUILDING A DURING PHASE 1

BUILDING A
EXISTING 1
STOREY BRICK BUILDING

EX 300mm W/M
(DEDICATED BY BY-LAW 2635/87 AS IN INST. LT 411787 AND BY BY-LAW 211/85 AS IN LT 423376)

P.I.N. 26331-0489 (LT)

EX 200mm W/M

EX 150mm W/M

PROP FH&V

PROP SIAMESE CONNECTION

PROP DOMESTIC 300mm PVC WM

PROP SECOND FIRE 300mm PVC WM

PROP FIRST FIRE 300mm PVC WM

PROP DOMESTIC 300mm PVC WM

PROP FIRST FIRE 300mm PVC WM

PROP SECOND FIRE 300mm PVC WM

EX SIAMESE CONNECTION

BUILDING B
EXISTING 1 STOREY
BRICK & STUCCO
BUILDING

EX SIAMESE CONNECTION

BUILDING C
EXISTING 1 STOREY
BRICK AND STUCCO
BUILDING

LANDSCAPE

LANDSCAPE

PHASE 1
PHASE 2

EXISTING SERVICES AND HYDRANTS SHALL BE RECONNECTED TO SUIT AS REQUIRED

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 OdanDetech 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

BENCHMARK

ELEVATIONS ARE GEODETIC AND ARE DERIVED FROM THE TOWN OF PICKERING BENCH MARK No. 67-U-002

TABLET IN SOUTHWEST CONCRETE FOUNDATION WALL AT THE NORTHWEST SIDE OF MAIN ENTRANCE TO THE TOWN OF PICKERING MUNICIPAL BUILDING. AND 0.53 METRES ABOVE GRADE.

PUBLISHED ELEVATION =87.581 metres.

Brock Rd

PROP SAN MH 34-82

PROP MH9A

PROP SAN MH 34-83

EX 750mmø STM

EX 1200mmø STM

EX 375mmø STM

EX 300mmø STM

EX 450mmø STM

EX 250mmø STM

EX 1200mmø STM

PART 12 PLAN 40R-15636

PART 1 PLAN 40R-10331

P.I.N. 26330-0061 (LT)

1 STOREY CONCRETE BUILDING

METAL ADDITION

PART 5

PART 6

PART 2

ASPHALT PAVED

PHASE 1

PHASE 2

PROP 62.83m 300mmø PVC STM @ 0.98%

PUBLIC ROAD

PROPOSED 18.50M ROAD

18.50 m R.O.W.

OUTLINE OF LEVEL 7 ABOVE

OUTLINE OF LEVEL 6 ABOVE

FIRE ROUTE

MH1

MH2

PRIVATE ROAD A

MULTI-USE PATH

PROPOSED PROPERTY LINE

OUTLINE OF U/G PARKING BELOW

OUTLINE OF ABOVE BALCONIES

PRIVATE ROAD B

LANDSCAPE

PROP 33.14m 375mmø PVC STM @ 1.43%

1 STOREY BRICK BUILDING

PARTIAL DEMOLITION OF EXISTING BUILDING A DURING PHASE 1

BUILDING A EXISTING 1 STOREY BRICK BUILDING

PROP SWM TANK TO BE DESIGNED AT SPA STAGE

MH3

MH4

PROP 8.95m 450mmø CONC STM @ 2.23%

PROP 61.43m 525mmø CONC STM @ 0.85%

MH5

PROP 70.88m 600mmø CONC STM @ 1.16%

EX.MHS3

PROP 17.72m 600mmø CONC STM @ 1.07%

MH6-1

PRIVATE ROAD E

EXISTING SERVICES AND HYDRANTS SHALL BE RECONNECTED TO SUIT AS REQUIRED

PART 4 P.I.N. 26330-0002 (LT)

LOT

P.I.N. 26330-0165 (LT)

CONCESSION

PART 1

18

BUILDING C EXISTING 1 STOREY BRICK AND STUCCO BUILDING

BUILDING B EXISTING 1 STOREY BRICK & STUCCO BUILDING

1 STOREY BRICK & STUCCO BUILDING

PART 3

PART 4

PART 7 P.I.N. 26330-0073 (LT)

PART 8

PART 9

PART 10 Subject to Easement as in Inst. LT 1035242

PART 11 Right-of-Way as in Inst. D377787 Subject to Easement as in Inst. LT 1035242

PART 5 Subject to Easement as in Inst. LT 1035241

Subject to Easement as in Inst. LT 1035241

Subject to Easement as in Inst. LT 1035242

40R-22952

40R-11780

40R-20443

P.I.N. 26330-0072 (LT)

Line of Canopy & Concrete Wall

Concrete Curb

Concrete Sidewalk

Brick Canopy

Brick Planter

Step

Guard Rail

Column

Wall

Planter

Lawn

Curb

Sidewalk

Ex.FH

Sib/Hole

Ex.Pwr

Ex.MH

Ex.CB

Ex.CBMH

Ex.Gas

Ex.Bell

Ex.Hydro

Ex.Comm

Ex.Cable

Ex.Pole

Ex.Guy

Ex.Sign

Ex.Tree

FIGURE 4

FUNCTIONAL SITE SERVICING PLAN STORM

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
3238 SOUTH SERVICE ROAD, BURLINGTON, ONTARIO, L7L 5K2

1899 BROCK ROAD

Pickering Pkwy

Brock Rd

Beechlawn Dr

MATCHLINE

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

BENCHMARK

ELEVATIONS ARE GEODETIC AND ARE DERIVED FROM THE TOWN OF PICKERING BENCH MARK No. 67-U-002

TABLET IN SOUTHWEST CONCRETE FOUNDATION WALL AT THE NORTHWEST SIDE OF MAIN ENTRANCE TO THE TOWN OF PICKERING MUNICIPAL BUILDING. AND 0.53 METRES ABOVE GRADE.

PUBLISHED ELEVATION =87.581 metres.

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

EX.MH090

EX 59.62m 200mm PVC SAN

EX 250mm PVC SAN

EX 250mm PVC SAN

EX 91.15m 250mm PVC SAN

PROP SAN MH 34-82

PROP MH8A

PROP 42.06m 675mmØ CONC SAN @ 0.45%

PROP SAN MH 34-83

PROP 99.99m 675mmØ CONC SAN @ 0.45%

EX 99.99m 250mm PVC SAN

PROP SAN MH 35-5

PROP 99.80m 675mmØ CONC SAN @ 0.45%

EX 99.80m 250mm PVC SAN

PROP SAN MH 35-6

EX.MH018

EX 200mm PVC SAN

EX 200mm PVC SAN

METROPIA EXMH3A

PROP 49.09m 675mmØ PVC SAN @ 0.45%

PROP 14.30m 450mmØ CONC SAN @ 0.72%

PROP 29.89m 450mmØ CONC SAN @ 0.88%

PROP MH8A

PROP MH7A

PROP MH1A-1

PROP 0.30m 450mmØ PVC SAN @ 0.33%

Ex 150mm PVC SAN

EX 150mm PVC SAN

EX 150mm PVC SAN

EX 150mm PVC SAN

PROP MH1A

PROP 11.35m 300mmØ PVC SAN @ 1.59%

PROP MH2A

PROP 60.76m 300mmØ PVC SAN @ 0.70%

PROP 96.38m 300mmØ PVC SAN @ 0.55%

PROP MH3A

PROP 64.76m 300mmØ PVC SAN @ 1.01%

PROP MH4A

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 AND STUCCO BUILDING

EXISTING SERVICES AND HYDRANTS SHALL BE RECONNECTED TO SUIT AS REQUIRED

PUBLIC ROAD — PROPOSED 18.50M ROAD — 18.50 m R.O.W.

PRIVATE ROAD A

PRIVATE ROAD B

PHASE 1
PHASE 2

LANDSCAPING

CONCESSION

LOT

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
5030 SOUTH SERVICE ROAD, BURLINGTON, ONTARIO, L7L 5K2

Orchard Rd

Notion Rd

Marshcourt Dr

Ashford Dr

Easement

EX 3.46m 375mm PVC SAN

PROP 3.46m 450mm∅ CONC SAN @ 0.23%

SAN MH 35-30

SAN MH 17

EX 1.50m 375mm PVC SAN

PROP 1.50m 450mm∅ CONC SAN @ 0.22%

EX 750mm CONC SAN

EX 750mm CONC SAN

EX 750mm CONC SAN

CONTINUES

SAN MH 35-27

EX 375mm PVC SAN

SAN MH 35-29

EX 250mm PVC SAN

SAN MH35-26

EX 250mm PVC SAN

PROP 110.13m 675mm∅ CONC SAN @ 0.45%

PROP 110.13m 450mm∅ PVC SAN @ 0.22%

MH14A

EX 200mm PVC SAN

SAN MH 35-25

EX 200mm PVC SAN

PROP 80.09m 675mm∅ CONC SAN @ 0.45%

PROP 80.09m 450mm∅ PVC SAN @ 0.22%

TO OUTLET AT ORCHARD ROAD
PIPES TO BE SIZED FOR PHASE 1
THROW AWAY ONCE REGION
CONSTRUCTS TRUNK SEWER

SAN MH 35-28

SAN MH 35-7

SAN MH 35-8

PROP 82.45m 675mm∅ CONC SAN @ 0.45%

EX 82.45m 250mm CONC SAN

EX 80.09m 250mm PVC SAN

PROP 110.13m 675mm∅ CONC SAN @ 0.45%

MH13A

PROP 14.47m 450mm∅ PVC SAN @ 0.22%

EX 10.40m 250mm PVC SAN

EX 200mm PVC SAN

MATCHLINE

METROPIA

SAN MH 35-33

SAN MH 35-34

PART 1
PLAN 40R-4475

PART 2

PART 1

1 STOREY commercial BUILDING

17

BENCHMARK

ELEVATIONS ARE GEODETIC AND ARE DERIVED FROM THE TOWN OF PICKERING BENCH MARK No. 67-U-002

TABLET IN SOUTHWEST CONCRETE FOUNDATION WALL AT THE NORTHWEST SIDE OF MAIN ENTRANCE TO THE TOWN OF PICKERING MUNICIPAL BUILDING. AND 0.53 METRES ABOVE GRADE.

PUBLISHED ELEVATION =87.581 metres.

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

EXISTING SERVICES AND HYDRANTS SHALL BE RECONNECTED TO SUIT AS REQUIRED

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) 632-3513 F: (905) 632-3363
5230 SOUTH SERVICE ROAD, BURLINGTON, ONTARIO, L7L 5K2

Kingston Rd
Notion Rd
Orchard Rd
Pickering Pkwy
Brock Rd
HWY 401
EXISTING COMMERCIAL
EXISTING RESIDENTIAL
12 0.67
11 17.39 60 1044
10 0.60 60 36
9 0.29 60 17
8 1.93 60 116
7 2.89 60 173
6 3.65 N/A 672
5 0.42
4 0.79
3 0.58
2 0.92
15 0.28 0 0
14 0.24 0 0
13 0.25 0 0
20 0.5 0 0
P3 0.58
P2 0.28
SAN MH 17
SAN MH 35-30
SAN MH 18
SAN MH 20
SAN MH 19
SAN MH 21
SAN MH 35-29
SAN MH 35-27
SAN MH35-26
MH14A
SAN MH 35-28
SAN MH 35-25
EX.MH023
EX.MH018
SAN MH 35-6
SAN MH 35-8
SAN MH 35-7
SAN MH 34-83
SAN MH 35-5
MH13A
SAN MH 35-33
SAN MH 35-34
MH9A
SAN MH 34-82
EX.MH090
MH8A
MH7A
EX.MH1A
MH1A-1
EX.MH3A
EX.MH5A
MH2A
MH1A
EX.MH4A
MH4A
MH3A
METROPIA EXMH3A
EX 87.10m 750mmØ CONC SAN @ 0.17%
EX 83.34m 750mmØ CONC SAN @ 0.17%
EX 50.50m 750mmØ CONC SAN @ 0.18%
EX 109.30m 750mmØ CONC SAN @ 0.15%
CONTINUES
PROP 101.76m 450mm PVC SAN @ 0.22%
PROP 100.00m 450mm PVC SAN @ 0.22%
PROP 110.13m 675mm PVC SAN @ 0.40%
PROP 80.09m 675mm PVC SAN @ 0.45%
PROP 99.80m 675mm PVC SAN @ 0.45%
PROP 82.45m 675mm PVC SAN @ 0.45%
PROP 14.47m 450mm PVC SAN @ 0.22%
PROP 41.80m 675mm PVC SAN @ 0.45%
PROP 14.30m 450mm PVC SAN @ 0.72%
PROP 99.99m 675mm PVC SAN @ 0.45%
PROP 29.89m 450mm PVC SAN @ 0.52%
PROP 45.41m 300mm PVC SAN @ 0.31%
PROP 49.35m 675mm PVC SAN @ 0.45%
RECONNECT EX. SERVICE CONNECTIONS AS REQ'D
PROP 96.38m 300mm PVC SAN @ 0.55%
PROP 90.01m 300mm PVC SAN @ 0.72%
PROP 60.76m 300mm PVC SAN @ 0.70%
PROP 11.35m 300mm PVC SAN @ 1.59%
Q=11.68L/s METROPIA

LEGEND

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

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

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

BENCHMARK

ELEVATIONS ARE GEODETIC AND ARE DERIVED FROM THE TOWN OF PICKERING BENCH MARK No. 67-U-002

TABLET IN SOUTHWEST CONCRETE FOUNDATION WALL AT THE NORTHWEST SIDE OF MAIN ENTRANCE TO THE TOWN OF PICKERING MUNICIPAL BUILDING. AND 0.53 METRES ABOVE GRADE.

PUBLISHED ELEVATION =87.581 metres.

P1 PHASE 1 - 'BLOCK 1'

A = 1.18ha

RESIDENTIAL
POP. DENSITY: 2.5(PP/UNIT)
UNITS: 678
RES POP = 1,793

RETAIL/COMMERCIAL
GFA: 0.17ha [1,688m²]

1: 2,000 — 0 20 40 80 140 200

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
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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

NORTH
CONSTRUCTION

EX 450mm STM
EX 450mm STM
PROP 450mm STM
EX 600mm STM
EX MH4
EX 750mm STM
EX MH4-1
EX 750mm STM
EX MH5
EX 1200mm STM
EX MH7
EX 600mm STM
EX MH6
EX 1350mm STM
EX.CB-1
EX.CB-2
EX.CB-3
EX.CB-4
EX.MHS8
EX.CB7-1
EX 375mm STM
EX.MHS2
EX 1200mm STM
EX.MHS1
EX.CB7
EX.CB8
EX 300mm STM
EX.CB11
EX.CB6
EX.CBMHS9
EX 300mm STM
EX.DCB9
EX.CB5
CB1
MH1
CB2
AD2
AD8
AD3
DCB2
AD5
AD6
AD4
AD10
AD9
AD12
AD11
AD14
AD1
AD13
PROP 300mm STM
PROP 375mm STM
DCB3
MH3
MH4
PROP 450mm STM
PROP 525mm STM
PHASE 1
PARK
AD7
STA:222?+???
RIM:89.2?
SUMP:88.0?
BUILDING A
EXISTING 1
STOREY BRICK BUILDING
BUILDING B
EXISTING 1 STOREY
BRICK & STUCCO
BUILDING
BUILDING C
EXISTING 1 STOREY
BRICK AND STUCCO
BUILDING
EX.MHS3
PROP 600mm STM
PROP 600mm STM
MH5
MH6-1
EX 375mm STM
EX 375mm STM
EX.DCB4
EX.DCBMHS7
EX.DCB3
EX.CB10
EX 1200mm STM
EX.MHS4
EX 300mm STM
EX 300mm STM
CONCESSION
LOT
PLAN
PART 1
PART 2
PART 3
PART 4
PART 5
PART 6
PART 7
PART 8
PART 9
PART 10
PART 11
PART 12
40R-10331
40R-22952
40R-11780
40R-20443
40R-16543
40R-11413
40R-549
26330-0061 (LT)
26330-0071 (LT)
26330-0072 (LT)
26330-0075 (LT)
26330-0002 (LT)
26330-0049 (LT)
26330-0164 (LT)
26330-0022 (LT)
(DEDICATED BY BY-LAW 2625/97 AS IN INST. LT 411727 AND BY BY-LAW 211/80 AS IN LT 133375)
(DEDICATED AS KING'S HIGHWAY BY ORDER IN COUNCIL DATED JANUARY 3, 1949
DEPOSITED PLAN 478
DEPOSITED 184/50 EFFECTIVE AUGUST 15, 1950 (P-2350-44)
DESIGNATED AS CONTROLLED ACCESS HIGHWAY BY
1
0.93 0.50
A1
41.9 10

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

1 — ID NUMBER
0.11 | 0.50 — RUNOFF COEFFICIENT
DRAINAGE AREA (ha)

AS PER CITY OF PICKERING
TRIBUTARY PLAN (JUNE 1991)

0 10 20 50 100

BENCHMARK

ELEVATIONS ARE GEODETIC AND ARE DERIVED FROM THE TOWN OF PICKERING BENCH MARK No. 67-U-002

TABLET IN SOUTHWEST CONCRETE FOUNDATION WALL AT THE NORTHWEST SIDE OF MAIN ENTRANCE TO THE TOWN OF PICKERING MUNICIPAL BUILDING. AND 0.53 METRES ABOVE GRADE.

PUBLISHED ELEVATION =87.581 metres.

FIGURE 7
PROPOSED STORM TRIBUTARY PLAN
PHASE 1

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
5030 SOUTH SERVICE ROAD, BURLINGTON, ONTARIO, L7L 5K2

EX 900mm STM
EX MH10
EX MH11
EX 900mm STM
EX MH9
EX 2100mm STM
EX 2100mm STM
EX 2100mm STM
EX 1350mm STM
EX MH7
EX 600mm STM
EX MH8
EX 1200mm STM
EX MH6
EX 750mm STM
EX 375mm STM
EX MH4-1
EX 750mm STM
EX MH5
EX 1200mm STM
EX.MHS1
EX 1200mm STM
EX 300mm STM
EX 450mm STM
EX 450mm STM
EX MH4
EX 450mm STM
EX.MHS2
EX.CB8
EX.CB6
EX 600mm STM
EX 600mm STM
EX 375mm STM
EX 600mm STM
EX.MHS8
EX.CB7
EX.CB7-1
EX 1200mm STM
EX.CB11
EX 300mm STM
EX.CBMHS9
EX.CB5
EX.DCB9
EX.DCB4
EX 375mm STM
EX.DCBMHS7
EX.MHS3
EX 450mm STM
EX.MHS6
EX 450mm STM
EX 375mm STM
EX 1200mm STM
EX.CBMHS5
EX.DCB3
EX.CB10
EX.MHS4
EX.CB1-2
EX.CB2
EX.CB1

EXISTING WAL-MART
EXISTING MCDONALD'S
EXISTING CANADIAN TIRE
PICKERING PARKWAY
BROCK ROAD
CONCESSION

LEGEND

- EXISTING STORM MANHOLE
- EXISTING CATCH BASIN
- EXISTING DRAINAGE AREA
- EXISTING STORM SEWER
- SURFACE FLOW DIRECTION

NOTE:
PLAN PROVIDED FOR REFERENCE ONLY
AS PER CITY OF PICKERING FLOWS ARE TO BE CONTROLLED TO C=0.50 FOR BLOCKS 1 TO 7 POST DEVELOPMENT THEREFORE PREDEVELOPMENT RUNOFF COEFFICIENTS AND IMPERVIOUSNESS DO NOT DETERMINE ALLOWABLE FLOWS
PLAN PROVIDED TO SHOW BOUNDARY OF DEVLEPOMENT ONLY

BENCHMARK
ELEVATIONS ARE GEODETIC AND ARE DERIVED FROM THE TOWN OF PICKERING BENCH MARK No. 67-U-002

TABLET IN SOUTHWEST CONCRETE FOUNDATION WALL AT THE NORTHWEST SIDE OF MAIN ENTRANCE TO THE TOWN OF PICKERING MUNICIPAL BUILDING. AND 0.53 METRES ABOVE GRADE.

PUBLISHED ELEVATION =87.581 metres.

0 10 20 30 40 70 100

FIGURE 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**

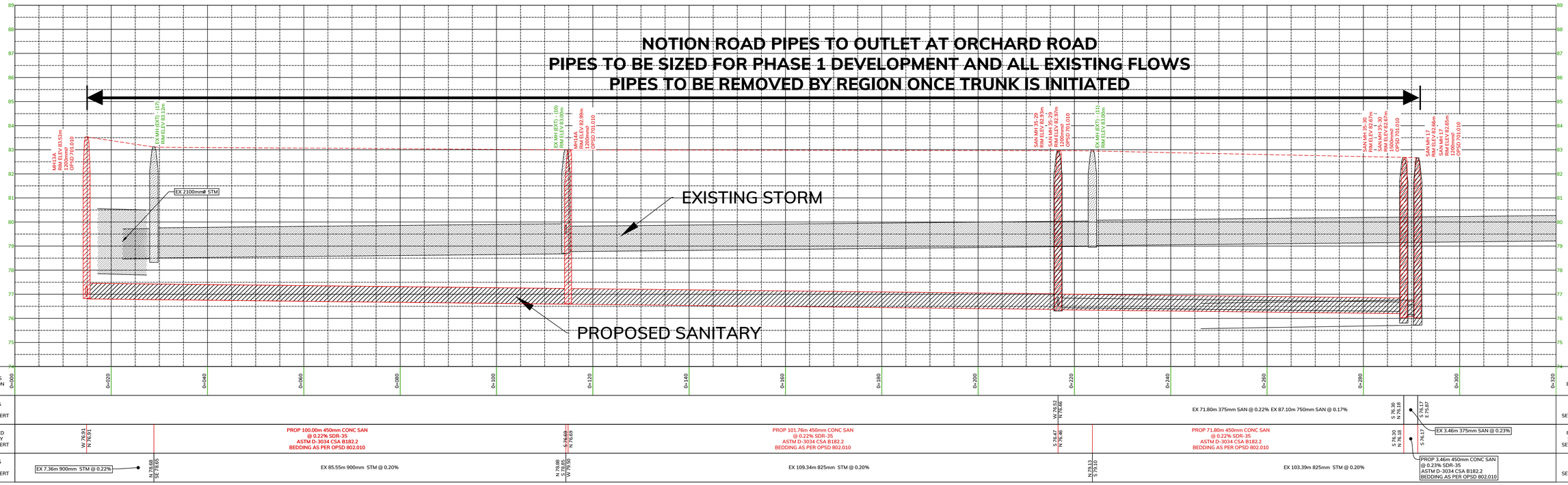

FIGURE 9
NOTION ROAD PROFILE
(0+000 to 0+320)

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

DATE:	PROJ. NO.:	SCALE:
APR 2024	20266	NTS

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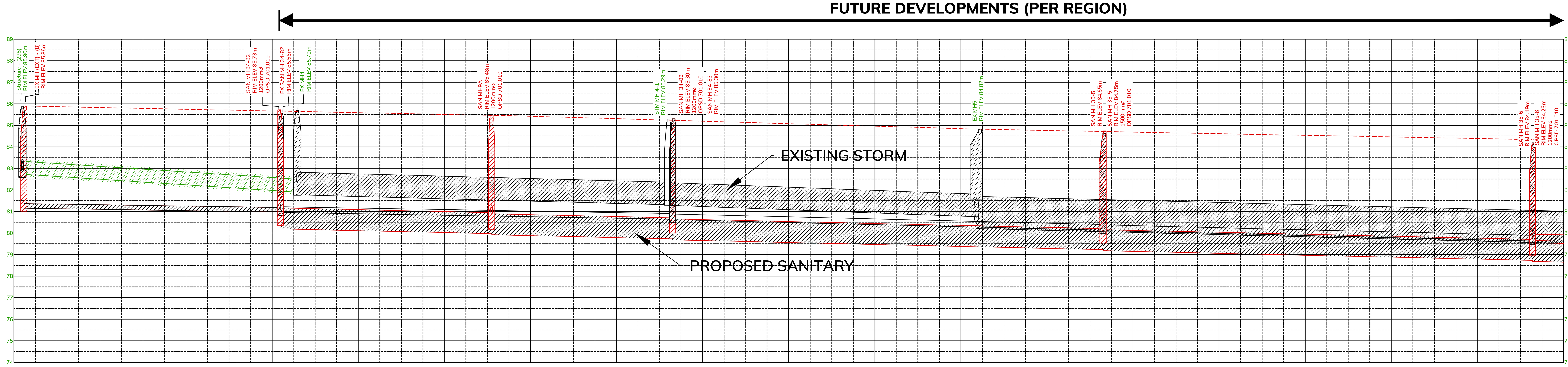
PICKERING PARKWAY - PROFILE 1of2

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; 0+020; 0+040 85.85; 0+060 85.76; 0+080 85.65; 0+100 85.54; 0+120; 0+140; 0+160; 0+180; 0+200; 0+220; 0+240; 0+260; 0+280; 0+300; 0+320; 0+340; 0+360	EXISTING ELEVATION
PROPOSED SANITARY	E 81.16; PROP 59.82m 200mm PVC SAN @ 0.30% PVC-SDR 35 ASTM D-3034 CSA B182.2 BEDDING AS PER OPSD 802.010; E 80.34 W 80.98; PROP 49.09m 675mm CONC SAN @ 0.45% PVC-SDR 35 ASTM D-3034 CSA B182.2 BEDDING AS PER OPSD 802.010; S 80.86 E 80.07 W 80.12; PROP 42.06m 675mm CONC SAN @ 0.45% PVC-SDR 35 ASTM D-3034 CSA B182.2 BEDDING AS PER OPSD 802.010; W 79.88 E 79.83; PROP 99.99m 675mm CONC SAN @ 0.45% PVC-SDR 35 ASTM D-3034 CSA B182.2 BEDDING AS PER OPSD 802.010; W 79.38 E 79.33; PROP 99.80m 675mm CONC SAN @ 0.45% PVC-SDR 35 ASTM D-3034 CSA B182.2 BEDDING AS PER OPSD 802.010; W 78.88 E 78.83	PROPOSED SANITARY SEWER INVERT
EXISTING SANITARY	EX 59.82m 200mm SAN @ 0.30%; E 80.96 S 81.07 W 80.98; EX 91.15m 250mm SAN @ 0.35%; W 80.65 E 80.63; EX 99.99m 250mm SAN @ 0.49%; W 80.14 E 80.12; EX 99.80m 250mm SAN @ 0.48%; PROP 82.45m 675mm CONC SAN @ 0.45% PVC-SDR 35 ASTM D-3034 CSA B182.2 BEDDING AS PER OPSD 802.010; W 79.64 E 79.62 N 79.92 S 79.74	EXSTING SAN SEWER INVERT
EXISTING STORM	E 82.73 SW 82.93 NW 82.83; EX 63.91m 600mm STM @ 1.30%; W 81.90 NW 82.34; EX 86.05m 750mm STM @ 0.54%; E 81.44 W 81.46; EX 71.76m 750mm STM @ 0.75%; W 80.90 E 80.36 SW 80.44; EX 140.65m 1200mm STM @ 0.50%; EX 82.45m 250mm SAN @ 0.36%	EXSTING STORM SEWER INVERT

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 2024	20266	NTS

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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

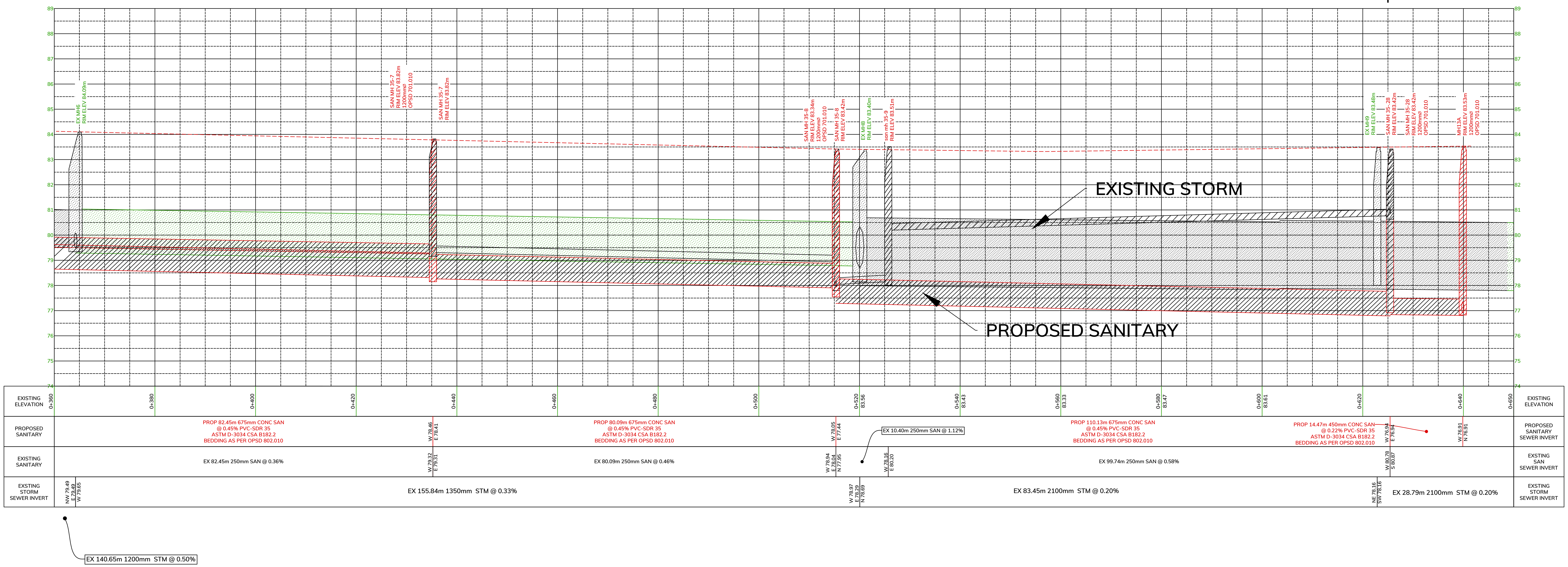

FIGURE 11
PICKERING PARKWAY PROFILE (0+360 to 0+650)

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

DATE:	PROJ. NO.:	SCALE:
APR 2024	20266	NTS

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