November 2024

UD23-058

Functional Servicing and Stormwater Management Report

Project: 900 Lakeshore Road West

Client: 1000570027 Ontario Inc.

Lithos Group Inc.
150 Bermondsey Road
Toronto, ON M4A-1Y1
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LITHOS GROUP INC.

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Principal

Identification	Date	Description of issued and/or revision
FSR/SWM Report	November 1st, 2024	Issued for ZBA/OPA

Statement of Conditions

This Report / Study (the "Work") has been prepared at the request of, and for the exclusive use of, the Owner / Client, the City of Mississauga and its affiliates (the "Intended User"). No one other than the Intended User has the right to use and rely on the Work without first obtaining the written authorization of Lithos Group Inc. and its Owner. Lithos Group Inc. expressly excludes liability to any party except the intended User for any use of, and/or reliance upon, the work.

Executive Summary

Lithos Group Inc. (Lithos) was retained by 1000570027 Ontario Inc. (the "Owner") to prepare a Functional Servicing and Stormwater Management (FSR-SWM) Report in support of an Official Plan Amendment and a Zoning By-Law Amendment (ZBA) for a proposed residential-use development at 900 Lakeshore Road West Dr (L5H 1H9), in the City of Mississauga (the "City"). The following summarizes our conclusions:

Storm Drainage

A detailed Stormwater Management (SWM) report will be prepared at the Site Plan Application stage. The site stormwater discharge will be controlled to the 2-year pre-development flow and will be directed to the existing Creek along North Crescent. In order to attain the target flows and meet the City's Storm Water Quantity Control requirements, quantity controls will be utilized and up to approximately 167.0 m^3 of storage will be required for the proposed development. The stormwater management (SWM) system will be designed to provide enhanced level (Level 1) protection, as specified by the Ministry of the Environment, Conservation and Parks (MECP). Quality control will be provided for the subject site for a minimum total suspended solids (TSS) removal of 80%.

Sanitary Sewers

The proposed residential-use development will connect to the existing 400 mm diameter (forcemain) sanitary sewer on Lakeshore Road West, via a 50 mm diameter forcemain sanitary sewer lateral connection. The additional net discharge flow from the proposed residential-use development, is anticipated at approximately 6.22 L/s.

Water Supply

Water supply for the site will be from the existing 150 mm diameter watermain along the south side of Lakeshore Road West. It is anticipated that a total design flow of 77.38 L/s will be required to support the proposed development. The results of the hydrant flow test, prepared by Lithos Group Inc., dated April 08, 2024 reveal that the existing water infrastructure can support the proposed development.

Site Grading

The proposed grades will match current drainage patterns and will improve the existing drainage conditions to meet the City's/Regional requirements. Grades will be maintained along the property line wherever feasible and overland flow will be directed towards the adjacent right of ways (ROW).

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Appendices

1.0 Introduction

Lithos Group Inc. (Lithos) was retained by 1000570027 Ontario Inc. (the "Owner") to prepare a Functional Servicing and Stormwater Management Report in support of an Official Plan Amendment and a Zoning By-Law Amendment (ZBA) for a proposed residential-use development at Lakeshore Road West (L5H 1H9), in the City of Mississauga (the "City").

The purpose of this report is to provide site-specific information for the City's review with respect to infrastructure required to support the proposed development. More specifically, the report will present details on sanitary discharge, water supply and an outline of the storm drainage pattern.

We contacted the City's engineering department to obtain existing information in preparation of this report. The following documents were available for our review:

- Plan and Profile drawing of Lakeshore Road West, drawing No 24206-D, dated June, 1997;
- Site Plan and Site Statistics prepared by KFA architects + planners Inc., dated October 03, 2024;
- Hydrogeological Investigation prepared by Fisher Engineering, dated September 20, 2024; and,
- Topographical Survey prepared by Tarasick McMillan Kubicki Limited, dated November 08, 2023.

2.0 Site Description

The existing site is approximately 0.47 hectares. It is currently occupied by a one 1-storey building and one 1.5-storey dwelling. The site area is bound by Lakeshore Road West to the northeast, undeveloped green area to the south-west and south. Refer to **Figures 1** and **2** following this report and site photographs in **Appendix A** as well as to the topographic survey in **Appendix B**.

3.0 Site Proposal

The proposed development will consist of a 10-storey tower with an additional Mechanical Penthouse. The proposed development will consist of 188 residential units and will be supported by three (3) level of underground parking space. The total development will approximately include 17,098 m² of Gross Floor Area (GFA). Please refer to **Appendix B** for the proposed site plan and building site statistic.

4.0 Terms of Reference and Methodology

4.1. Terms of Reference

The Terms of Reference used for the scope of this report were based on:

- City of Mississauga Development Requirements Manual, revised November 2020;
- Region of Peel Watermain Design Criteria, revised June 2010;
- Region of Peel Sanitary Sewer Design Criteria, revised March 2017;
- Region of Peel Development Charges Background Study, revised December 2020;
- Region of Peel Stormwater Design Criteria and Procedural Manual (Version 2.1) June 2019;
- Ministry of Environment: Guidelines for the Design of Sanitary Sewage Works – 2008;
- Ministry of Environment: Design Guidelines for Drinking Water Systems – 2008;
- Ministry of Environment: Stormwater Management Planning and Design Manual – 2003;
- Ontario Building Code 2012 (O.B.C.); and,
- Credit Valley Conservation: Stormwater Management Guideline, revised July 2022.

4.2. Methodology: Stormwater Drainage and Management

This report provides an overview of the pre and post-development conditions and comments on opportunities to reduce peak flows. A detailed Stormwater Management report will be prepared at the Site Plan Application stage.

The proposed development will be designed to comply with the City of Mississauga storm drainage design requirements, the Stormwater Management Guideline, by Credit Valley Conservation, revised July 2022, as well as the standards of the Region and the Province of Ontario, as outlined in the Ministry of the Environment, Conservation and Park (MECP) 2003 Stormwater Management Planning and Design Manual (SWMPD). The following design criteria will be reviewed:

- Post-development peak flow for the 100-year storm event from the site should be controlled to the 2-year target flow;
- A safe overland flow route will be provided for all flows in excess of the 100-year storm event; and,
- A specified rainfall depth of 5mm is to be retained on-site as required by the City's Guidelines.

4.3. Methodology: Sanitary Discharge

The sanitary sewage discharge from the site will be determined using sanitary sewer design sheets that incorporate the land use and building statistics as supplied by the design team. The calculated values provide peak sanitary flow discharge that considers infiltration.

The estimated sanitary discharge flows from the proposed site will be calculated based on the criteria shown in **Table 4-1** below.

Table 4-1 – Sanitary Flows

Usage	Design Flow	Units	Population Equivalent
Residential	290	Litres / capita / day	1 Bedroom Unit = 1.7 ppu 2 Bedroom Unit = 3.1 ppu 3 Bedroom Unit = 3.1 ppu
Townhouses	-		2.7 persons/unit

Based on the calculated peak flows, the adequacy of the existing infrastructure to support the proposed development will be discussed.

4.4. Methodology: Water Usage

The fire flow requirements were estimated using the method prescribed by the Fire Underwriters Survey (FUS). This method is based on the fire protected building floors, the type and combustibility of the structural frame and the separation distances with adjoining building units. The domestic water usage was calculated based on the City's design criteria outlined in **Table 4.2.**

Table 4-2 – Water Usage

Usage	Water Demand	Units
Residential	270	Litres / capita / day

Pressure and flow treating have been conducted on the existing hydrants located near the site to obtain existing flows residual and static pressure.

5.0 Stormwater Management and Drainage

The existing site is approximately 0.470 hectares and is currently occupied by one 1-storey building and one 1.5-storey dwelling. According to available records, there is one (1) existing storm sewer abutting the subject property. More specifically there is:

- A 300 mm diameter storm sewer along Lakeshore Road West flowing east.

5.1. Existing Conditions

According to the Site Investigation and Dye Test Report conducted by our inspection team, dated March 8, 2024, found in **Appendix B**, the subject property is divided into two (2) drainage areas as shown on **Figure DAP-1**. More specifically, under existing conditions the site consists of the following drainage areas:

1. A1 Pre – Storm runoff from the landscaped area at the north-west portion of the site, collected by the existing 300 mm diameter storm sewer along Lakeshore Road West; and,
2. A2 Pre – Storm runoff from the largest portion of the site, flows overland towards the existing Creek along North Crescent.

The existing site is primarily covered by buildings and landscaped areas, thus, there is some infiltration onsite. The input parameters are summarized in **Table 5.1** below, are illustrated in the pre-development drainage area plan in **Figure DAP-1** in **Appendix C.**

Table 5-1 – Pre-development Input Parameters

Catchment	Drainage Area (ha)	Actual "C"	Design "C"	Tc (min.)
A1 Pre (Towards Lakeshore Road West)	0.049	0.25	0.25	15
A2 Pre (Towards Creek along North Crescent)	0.421	0.42	0.42	15

Peak flows calculated for the existing conditions are shown in **Table 5-2** below. Detailed calculations are in **Appendix C**.

Table 5-2 – Target Peak Flows

Catchment	Peak Flow Rational Method (L/s)					
	2-year	5-year	10-year	25-year	50-year	100-year
A1 Pre (Towards Lakeshore Road West)	2.1	2.8	3.4	3.9	4.4	4.8
A2 Pre (Towards Creek along North Crescent)	29.1	39.2	48.2	55.4	61.8	68.4

As shown in **Table 5.2**, the post-development flows for the proposed development will need to be controlled to the target flow of 29.1 L/s.

5.2. Stormwater Management

In order to meet the City's Storm Design requirements, the post development flow rate is to be controlled to the pre development two (2)-year target flow established in **Section 5.1**. Overland flow from the site will be directed towards the adjacent rights-of-way. The site consists of two (2) internal drainage areas:

1. A1 Post – Storm runoff from the rooftops, landscaped, hardscaped areas, controlled into the underground storage tank, located at P1 level; and,
2. A2 Post – Uncontrolled storm runoff draining towards the existing Creek along North Crescent.

The post-development drainage areas and runoff coefficients are indicated on **Figure DAP-2**, located in **Appendix C** and summarized in **Table 5-3** below.

Table 5-3 - Post-development Input Parameters

Drainage Area	Drainage Area (ha)	"C"	"C_{100}"	Tc (min.)
A1 Post – Controlled in Underground storage tank	0.297	0.90	1.13	15
A2 Post – Uncontrolled towards Creek along North Crescent	0.173	0.25	0.31	15

5.2.1. Water Balance

The City's Guidelines require a 5mm of onsite runoff from any rainfall event to be retained over the entirety of the site. A 5mm of rainfall over the entire site equates to a required water balance volume of 23.51 m^3. In order to achieve this, the following low impact development (LID) techniques may be implemented.

- Rainwater capture in storage tanks to be reused for irrigation purposes; and,
- Green Roof and Planters.

Detailed calculation will be provided during the detailed design stage at Site Plan Application.

5.2.2. Quantity Controls

Using the City's intensity-duration-frequency (IDF) data, modified rational method calculations were undertaken to determine the maximum storage required during each storm event. Results for the 2, 5, 10, 25, 50 and 100-year storm events are provided in **Table 5-4** below. The detailed post-development quantity control calculations are provided in **Appendix C**.

Table 5-4 – Post-development Quantity Control as per City Requirements

Drainage Area	Storm Event	2-year Pre Development Release Rate (L/s)	Uncontrolled Release rate (L/s)	Allowable Release Rate (L/s)	Minimum Required Storage Volume (m^3)
A1 Post (Controlled in Underground storage tank)	2-year	29.1	7.2	21.9	20.4
	5-year		9.7	19.4	36.9
	10-year		11.9	17.2	54.3
	25-year		15.0	14.1	83.8
	50-year		18.3	10.8	123.0
	100-year		21.1	8.0	167.0

As shown in **Table 5-4** above, in order to control post-development flows to 2-year pre-development conditions, a target flow of 29.1L/s is to be satisfied. The minimum required on-site storage for the proposed development is 167.0 m^3, for the 100-year storm event. Details of the above-mentioned preliminary design feature will be provided at the detailed design stage of Site Plan Application. Please refer to engineering drawing **Site Servicing Plan** (**"SS-01",** submitted separately) for details.

5.2.3. Quality Controls

Stormwater treatment must meet Enhanced Protection criteria as defined by the MECP 2003 SWMPD Manual, including a minimum 80% of total suspended solids removal (TSS). In order to meet the quality control requirements an Oil & Grid Separation (OGS) will be provided for the driveway areas that are exposed to oil and grit, in order to achieve the minimum total suspended solids (TSS) removal of 80% as per MECP requirements. Further details and specifications regarding the proposed OGS units will be provided at SPA stage. Refer to engineering drawing **Site Servicing Plan** (**"SS-01",** submitted separately) for details. A summary of the quality control is included below.

Table 5-5 – Site TSS Removal

Drainage Area	Drainage Area (ha)	Overall TSS Removal	Additional Quality Control Required
Rooftop/Landscaped/ Hardscaped Areas	0.278	75%	Inherent
Driveway Area	0.019	5%	Stormwater Treatment Device
Total	0.297	80%	-

5.3. Proposed Storm Connection

Proposed Development

The proposed development will discharge into the existing Creek along North Crescent, running south-east, via a 150 mm diameter storm sewer service connection with a minimum grade of 2.00% (or equivalent design).

Orifice controls, if required, will be designed to meet the allowable release rates to the municipal system and will be defined at the detailed design stage. Refer to engineering drawing **Site Servicing Plan** (**"SS-01",** submitted separately) for details.

6.0 Sanitary Drainage System

6.1. Existing Sanitary Drainage System

The existing site contain one 1-storey building and one 1.5-storey dwelling. According to available records, there is one (1) sanitary sewer abutting the subject property. More specifically there is:

- A 400 mm (forcemain) diameter sanitary sewer along Lakeshore Road West flowing east.

6.2. Existing Flows

The sanitary flow generated by the proposed development at Lakeshore Road West was compared to the existing flow, in order to quantify the net increase in the sanitary sewer network.

According to the Site Investigation and Dye Test Report conducted by our inspection team, dated March 8, 2024, found in **Appendix B**, the sanitary discharge from the subject property is discharging at a Septic Tank located on the East side of the property.

Using the design criteria outlined in **Section 4.3** and existing site information, the sanitary discharge flow from the existing buildings is estimated at 0.90 L/s. Detailed calculations can be found in **Appendix D.**

6.3. Proposed Flows

According to the proposed developments site statistics as well as the design criteria outlined in **Section 4.3**, the total post-development sanitary discharge flow is calculated at 6.22L/s towards the City's infrastructure.

The additional flow, which includes infiltration and sanitary flow, will be considered within the sanitary discharge rate. Detailed calculations can be found in **Appendix D**

6.4. Proposed Sanitary Connection

The proposed development will connect to the existing 400 mm diameter (forcemain) sanitary sewer on Lakeshore Road West through a 200 mm forcemain sanitary sewer connection. Refer to **"Proposed Servicing Figure", Figure 3** in **Appendix F** for details.

7.0 Groundwater

As per the "Hydrogeological Investigation" prepared by 'Fisher Engineering', dated September 20, 2024, found in **Appendix B**, deep groundwater levels range from 2.07 to 5.79 meters below ground surface (mbgs) to approximately 78.79 to 84.99 meters above sea level (masl).

The results of groundwater sampling on site, reveal that groundwater quality limits according to the City's by-law are met for discharging into the sanitary/combined, but are not in compliance with the storm sewer's network criteria. The results of the Hydrogeological Investigation Report can be found in **Appendix B**.

7.1. Long Term Dewatering

The proposed development will have three (3) underground levels and the lowest basement's elevation will extend approximately at 74.60 meters above sea level (masl). Given that the construction will be partially submerged into the existing groundwater table, long-term discharge will be required along the installation of a permanent dewatering system. Groundwater will be pumped into the existing 400mm diameter (forcemain) sanitary sewer on Lakeshore Road West. According to the "Hydrogeological Investigation" prepared by 'Fisher Engineering', dated September 20, 2024, found in **Appendix B**, long term groundwater dewatering is anticipated at 31,750 L/day which translates to 0.55 L/s, assuming the pump will run for approximately 16 hours.

7.2. Short- Term Groundwater Dewatering

Site dewatering during construction is anticipated at 40,220 L/day which translates to approximately 0.47 L/s as per the "Hydrogeological Investigation" prepared by 'Fisher Engineering', dated September 20, 2024, found in **Appendix B**. Assuming an additional conservative accumulated volume of 15,000 L/day, the total maximum short-term discharge rate is estimated at 55,220 L/day. Assuming that a temporary groundwater pump will run for approximately 12 hours per day, the peak groundwater discharge rate is estimated at approximately 1.28 L/s. Groundwater will be discharged into the existing 400mm diameter (forcemain) sanitary sewer on Lakeshore Road West without treatment.

Following the fact that the existing sanitary network along Lakeshore Road West can accommodate the proposed permanent total net flow under post-development conditions, it is anticipated that it will be capable to accommodate the groundwater discharge during construction.

8.0 Water Supply System

8.1. Existing System

Based on plans provided by the City, the existing watermain system consists of the following waterlines:

- a 400 mm diameter watermain on the north side of Lakeshore Road West;
- a 200 mm diameter watermain on the south side of Lakeshore Road West.

Fire hydrant test was carried out by Lithos Group, dated April 08, 2024 along Lakeshore Road West, to determine the flow and pressure in the existing 400mm watermain.

The results of the test conducted along Lakeshore Road West indicate the existing static pressure is 620 KPa (90 psi) and 112.05 L/sec (1775 USPGM) of water is available with a residual pressure of 593 KPa (86 psi). The full detailed report is included in **Appendix E**.

8.2. Proposed Water Supply Requirements

The estimated water consumption was calculated based on the occupancy rates shown on **Table 4.2**, based on the City's design criteria. Calculation was conducted to confirm that the proposed site can be supported by the existing water infrastructure.

It is anticipated that an average consumption of approximately 1.32 L/s (114,048 L/day), a maximum daily consumption of 2.37 L/s (204,768 L/day) and a peak hourly demand of 3.95 L/s (14,220 L/hr) will be required to service this development with domestic water. Detailed calculations are found in **Appendix E**.

The fire flow requirements were estimated using the method prescribed by the Fire Underwriters Survey (FUS) be undertaken to assess the minimum requirement for fire suppression. The fire flow calculations are normally conducted for the largest storey, by area, and for the two immediately adjacent storeys.

As a result, to the above-mentioned method, we have the selected Levels 2, 3 and 4 which result the maximum fire flow requirement. **Table 8-1** illustrates the input parameters used for the FUS calculations. According to our calculations, a minimum fire suppression flow of approximately 75.02 L/s (1189 USGPM) will be required. Refer to detailed calculations found in **Appendix E**.

Table 8-1 – Fire Flow Input Parameters (East Block)

Parameter	Frame used for Building	Combustibility of Contents	Presence of Sprinklers	Separation Distance			
				West	North	South	East
Value according to FUS options	Fire-Resistive Construction	Non-Combustible	Yes	30.1m to 45m	>45m	>45m	30.1m to 45m
Surcharge/reduction from base flow	0.6	25%	30%	5%	0%	0%	5%

In summary, the required design flow is the sum of 'the minimum fire suppression flow' and 'maximum daily demand' (75.02 + 2.37 = 77.38 L/s, 1227 USGPM). The results of the hydrant flow test, prepared by Lithos Group, dated April 08, 2024 at Lakeshore Road West, indicate that 525.60 L/s (8329 USGPM) of water is available with a pressure of 138KPa (20.0 psi). Therefore, the existing water infrastructure will support the proposed development. The hydrant flow test and detailed calculations can be found in **Appendix E**.

8.3. Proposed Watermain Connections

The proposed residential-use development will be serviced by a 150 mm diameter fire and a 100 mm domestic water service. The proposed water service will be connected to the existing 400 mm diameter watermain one the north side of Lakeshore Road West. Please refer to engineering drawing **Site Servicing Plan** (**"SS-01",** submitted separately) for details.

9.0 Site Grading

9.1. Existing Grades

The existing site is approximately 0.47 hectares. It is currently occupied by a one 1-storey building and one 1.5-storey dwelling. Under pre-development conditions, the site drains uncontrolled towards the adjacent right of way (ROW).

9.2. Proposed Grades

The proposed grades will match current drainage patterns and will improve the existing drainage conditions to meet the City's/Regional requirements. Grades will be maintained along the property line wherever feasible and emergency overland flow will be directed towards Lakeshore Road West and the existing Creek along North Crescent. Refer to engineering drawing Site Grading Plan (**"SG-01",** submitted separately) for details.

10.0 Conclusions and Recommendations

Based on our investigations, we conclude the following:

Storm Drainage

A detailed Stormwater Management (SWM) report will be prepared at the Site Plan Application stage. The site stormwater discharge will be controlled to the 2-year pre-development flow and will be directed to the existing Creek along North Crescent. In order to attain the target flows and meet the City's Storm Water Quantity Control requirements, quantity controls will be utilized and up to approximately 167.0 m^3 of storage will be required for the proposed development. The stormwater management (SWM) system will be designed to provide enhanced level (Level 1) protection, as specified by the Ministry of the Environment, Conservation and Parks (MECP). Quality control will be provided for the subject site for a minimum total suspended solids (TSS) removal of 80%.

Sanitary Sewers

The proposed residential-use development will connect to the existing 400 mm diameter (forcemain) sanitary sewer on Lakeshore Road West, via a 50 mm diameter forcemain sanitary sewer lateral connection. The additional net discharge flow from the proposed residential-use development, is anticipated at approximately 6.22 L/s.

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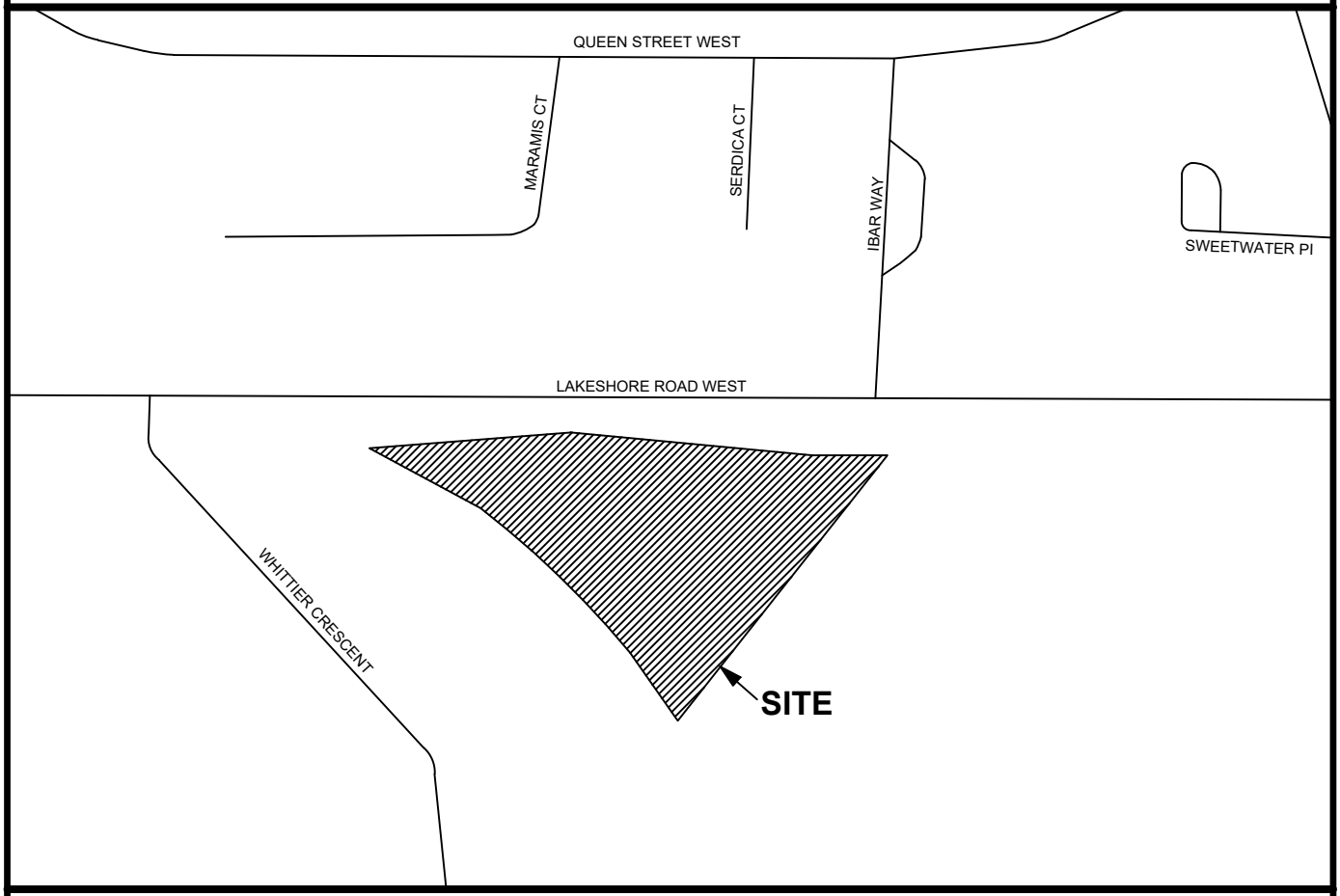
Water supply for the site will be from the existing 150 mm diameter watermain along the south side of Lakeshore Road West. It is anticipated that a total design flow of 77.38 L/s will be required to support the proposed development. The results of the hydrant flow test, prepared by Lithos Group Inc., dated April 08, 2024 reveal that the existing water infrastructure can support the proposed development.



Lithos

150 Bermonsdey Road, North York, Ontario M4A 1Y1

LOCATION PLAN

RESIDENTIAL-USE DEVELOPMENT
900 LAKESHORE ROAD WEST
MISSISSAUGA, ONTARIO

DATE:	NOVEMBER 2024	PROJECT No:	UD23-058
SCALE:	N.T.S.	FIGURE No:	FIG 1

Lithos

150 Bermonsdey Road, North York, Ontario M4A 1Y1

AERIAL PLAN

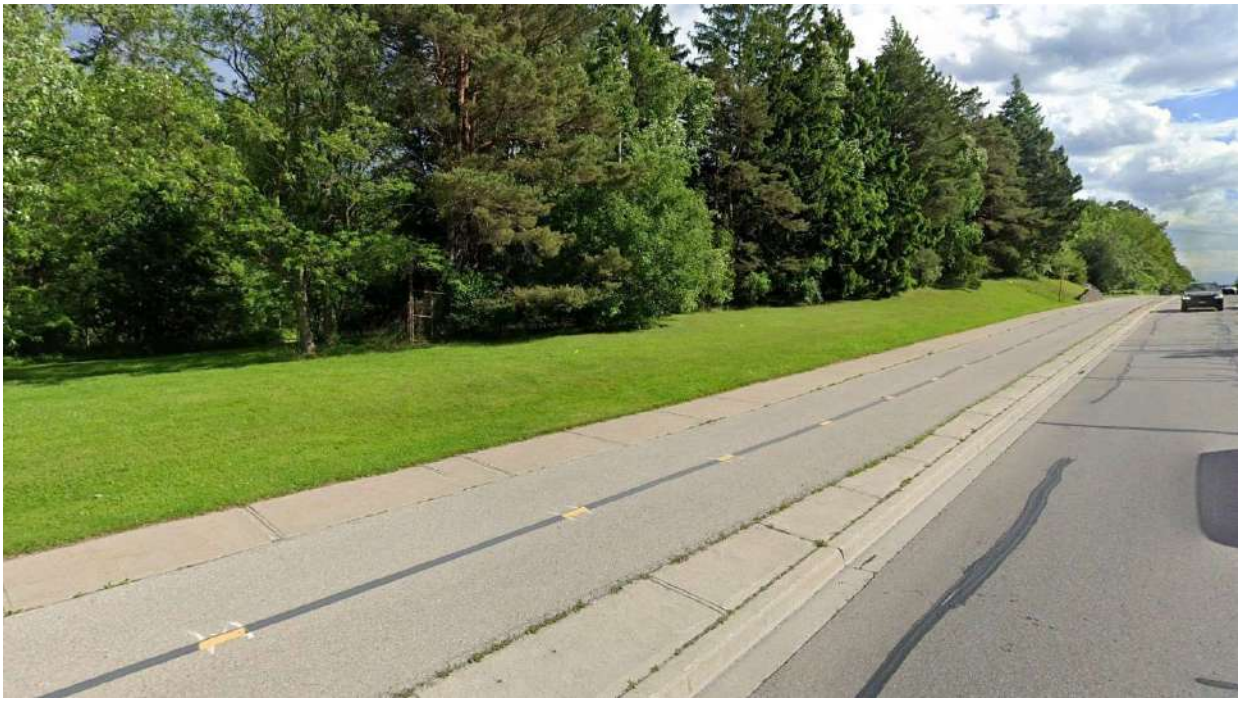
RESIDENTIAL-USE DEVELOPMENT
900 LAKESHORE ROAD WEST
MISSISSAUGA, ONTARIO

DATE:	NOVEMBER 2024	PROJECT No:	UD23-058
SCALE:	N.T.S.	FIGURE No:	FIG 2

Appendix A

Site Photographs

North – West corner of the property along Lakeshore Road West facing North – East.



North – East corner of the property along Lakeshore Road West facing South – East.

Appendix B

Background Information

PLAN OF TOPOGRAPHY OF

PART OF LOT 1 REGISTERED PLAN C–89 AND PART OF LOT 22 CONCESSION 3 SOUTH OF DUNDAS STREET

(ORIGINALLY IN TOWNSHIP OF TORONTO)

CITY OF MISSISSAUGA

REGIONAL MUNICIPALITY OF PEEL

SCALE 1 : 200

5 0 5 10 metres

TARASICK McMILLAN KUBICKI LIMITED
ONTARIO LAND SURVEYORS

METRIC

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

ELEVATION NOTE

ELEVATIONS ARE REFERRED TO CANADIAN GEODETIC VERTICAL DATUM–1928, AND WERE DERIVED FROM CITY OF MISSISSAUGA BENCHMARK No. 132, HAVING A PUBLISHED ELEVATION OF 93.630 metres.

BEARING NOTE

BEARINGS ARE ASTRONOMIC AND ARE REFERRED TO THE SOUTHEASTERLY LIMIT OF LAKESHORE ROAD WEST AS SHOWN ON DEPOSITED PLAN 43470, HAVING A BEARING OF N38°05'30"E.

LEGEND

■	DENOTES	SURVEY MONUMENT FOUND
IB	DENOTES	IRON BAR
SIB	DENOTES	STANDARD IRON BAR
CP	DENOTES	CONCRETE PIN
TC	DENOTES	TOP OF CURB
BC	DENOTES	BOTTOM OF CURB
CCT	DENOTES	CURB CUT
MH	DENOTES	MANHOLE
CB	DENOTES	CATCH BASIN
TOB	DENOTES	TOP OF BANK
WUP	DENOTES	WOOD UTILITY POLE
WV	DENOTES	WATER VALVE
P1	DENOTES	PLAN BY DEPARTMENT OF HIGHWAYS, ONTARIO (F–1954–26)
P2	DENOTES	TARASICK McMILLAN KUBICKI LTD., O.L.S., DATED MAY 22, 2019
0.20#D	DENOTES	DECIDUOUS TREE WITH TRUNK DIAMETER
0.20#C	DENOTES	CONIFEROUS TREE WITH TRUNK DIAMETER

TREE CANOPIES ARE DRAWN TO SCALE.

PLAN UPDATED TO SHOW TOP OF BANK, BOTTOM OF BANK, WETLAND AND DRIPLINE, ON JANUARY 18, 2024.

CONTOUR LINES ADDED JANUARY 26, 2024

I CERTIFY THAT THE SURVEY WAS COMPLETED ON OCTOBER 13, 2023.

ASSOCIATION OF ONTARIO LAND SURVEYORS J. HANG 2073

NOVEMBER 8, 2023
DATE

JACKIE HANG 2073
ONTARIO LAND SURVEYOR

TARASICK McMILLAN KUBICKI LIMITED
ONTARIO LAND SURVEYORS
4181 SLADEVIEW CRESCENT, UNIT 42, MISSISSAUGA, ONTARIO L5L 5R2
TEL: (905) 569–8849 FAX: (905) 569–3160
E–MAIL: office@tmksurveyors.com

DRAWN BY: R.E. | FILE No. 8139–TOPO

(24"x36")

900 Lakeshore Statistics

Address: 900 Lakeshore Road West, Mississauga, ON
Project No: 23016
Legal Description: Lot 1, Plan C89 and Part Lot 22, Concession 3 SDS
Review: October 25, 2024

1.0 Official Plan & Zoning

Land Use:	Residential Low Density
City of Mississauga Zoning By-Law:	R2-5
By-Law No:	0225-2007

2.0 Site Statistics

	m	ft	m²	ft²	Hectares	Acres	%
Gross Site Area			4,702.9	50,623	0.47	1.16	
Net Site Area			4,702.9	50,623	0.47	1.16	
Lot Frontage	123.0	404					
Lot Depth	84.8	278					
Existing GFA			348.66	3,753			

3.0 Building proposal

Building Footprint	2,393.0	m²
Building Height*	32.2	m *Mech. Pent. Excluded*
Storey	10	
Gross Floor Area *(Based on GFA - Apartment Zone)*	17,098.0	m²
Lot Coverage (%) *(Based on Gross Site Area)*	51%	
Lot Coverage (%) *(Based on Net Site Area)*	51%	
FSI *(GFA / Gross Site Area)*	**3.64**	
FSI *(GFA / Net Site Area)*	**3.64**	

3.1 Setbacks

		Required (0225-2007)	*Proposed*	
Front Yard (m)	(Norm)	9.0m	0.5m	*(0.93m on GF)*
Rear Yard (m)	(Souh)	n/a	n/a	
Side Yard (m)	(East)	7.9m	4m	
Side Yard (m)	(West)	7.9m	9.6m	

4.0 Proposed Areas

Floor	GCA** * (m²)	*GCA *** (ft²)*	GFA* (m²)	*GFA * (ft²)*	*GFA * exclusions*
P3 Level	2,396.0	25,790			
P2 Level	2,396.0	25,790			
P1 Level	2,396.0	25,790			
Ground Floor	1,402.0	*15,091*	512.0	*5,511*	*890*
2nd floor	2,383.0	25,650	2,157.3	*23,218*	*226*
3rd floor	2,366.0	25,467	2,220.3	*23,896*	*146*
4th floor	2,163.0	23,282	2,028.3	*21,829*	*135*
5th floor	2,141.0	23,046	2,006.3	*21,592*	*135*
6th floor	2,094.0	22,540	1,959.3	*21,086*	*135*
7th floor	1,659.0	17,857	1,554.3	*16,727*	*105*
8th floor	1,659.0	17,857	1,554.0	*16,727*	*105*
9th floor	1,659.0	17,857	1,554.0	*16,727*	*105*
10thFloor	1,659.0	17,857	1,554.0	*16,727*	*105*
Mech. P.H	474.0	5,102			
Total Proposed GFA*	**19,669.0**	***211,607.5***	**17,098.0**	***184,041***	

***Total GCA excluded parking garage levels**

****Gross Floor Area (GFA)** - Apartment Zone means the sum of the areas of each storey of a building above or below established grade, measured from the exterior of outside walls of the building including floor area occupied by interior walls but excluding anyart of the building used for mechanical floor area, stairwells, elevators, mcor vehicle parking, bicycle parking, storage lockers, below-grade storage, any enclosed area used for the collection or storage of disposable or recyclable waste generated within the building, common facilities for the use of the residents of the building, a day care and amenity area.*

***** Gross Construction Area (GCA)** - The total enclosed area of a floc or building measured to the outside surface of the permanent exterior walls of the building or structure or to a predetermined surface, or plane as in the case of overhangs and projecions to the outside surface of the building.*

5.0 Unit Count

	Units	Townhouse	1 Bec	2 Bed	3 Bed
Ground Floor	7	7	0	0	0
2nd Floor	18		15	0	3
3rd Floor	25		19	2	4
4th Floor	25		20	1	4
5th Floor	25		21	2	2
6th Floor	24		20	2	2
7th Floor	16		8	7	1
8th Floor	16		8	7	1
9th Floor	16		8	7	1
10th Floor	16		8	7	1
Total Units	**188**	**7**	**127**	**35**	**19**
		3.7%	67.6%	18.6%	10.1%

6.0 Vehicular Parking

6.1 Parking Required

	Units	Parking	Ratio
Residential	188	207	*1.10*
Visitors	188	38	*0.20*
Total Parking Required		**244**	

6.2 Parking Provided

	At Grade	P1 Level	P2 Level	P3 Level	Sub Total	*Ratio*
Residential (20% EVSE)	0	29	67	69	165	*0.88*
- Barrier Free Parking	0	2	0	0	2	*0.01*
Visitors (20% EVSE)	3	35	0	0	38	*0.20*
Total Parking Provided	**3**	**66**	**67**	**69**	**205**	***1.09***

7.0 Bicycle Parking

7.1 Bicycle Parking Required

	Ratio			
Short Term Residential	*0.05*	*x unit*	9	
Long Term Residential	*0.6*	*x unit*	113	
		Total:	**122**	

7.2 Bicycle Parking Provided

	At Grade	P1	P2	P3	TOTAL
Short Term Residential	10	0	0	0	10
Long Term Residential (20% EVSE)	100	12	0	0	112
Total Bicycle Parking Provided	**110**	**12**	**0**	**0**	**122**

8.0 Proposed Landscaped Areas

	Total (m²)	Total (ft²)
Soft Landscaping	1,988	*21,399*
Hard Landscaping	307	*3,305*
Green Roof	600	*6,458*
Total Landscape	**2,895**	***31,161***

9.0 Amenity Area

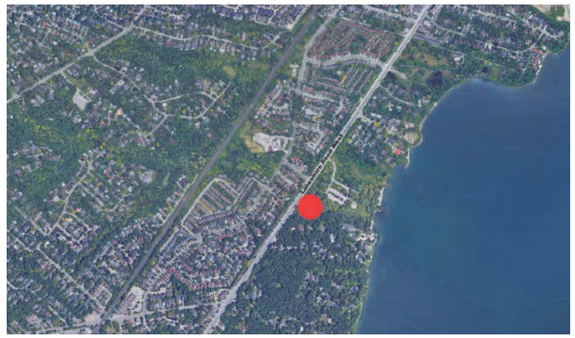
9.1 Amenity Area Required

5.6 m² per unit	(Based on Apartment Zone)	1052.8 m²
Total		**1052.8 m²**

9.2 Amenity Area Provided

Proposed Amenity Rate 6.79 m² per unit

	Indoor (m²)	Outdoor (m²)	Total (m²)	Total (ft²)
Ground Floor	*428*	55	483.0	*5,199*
Mech PH Floor	216	578	794.0	*8,547*
Total	**644**	**633**	**1277.0**	***13,746***



1. Aerial View Context

2. Aerial View Context

900 LAKESHORE

900 LAKESHORE ROAD WEST
MISSISSAUGA, ON

No.	Description	Date
1	Issued for MUDAP	29.01.2024
8	Issued for DARC-2	03.10.2024

CONTEXT KEY PLAN

PROJECT NORTH

STAMP

CLIENT

KFA architects + planners inc.

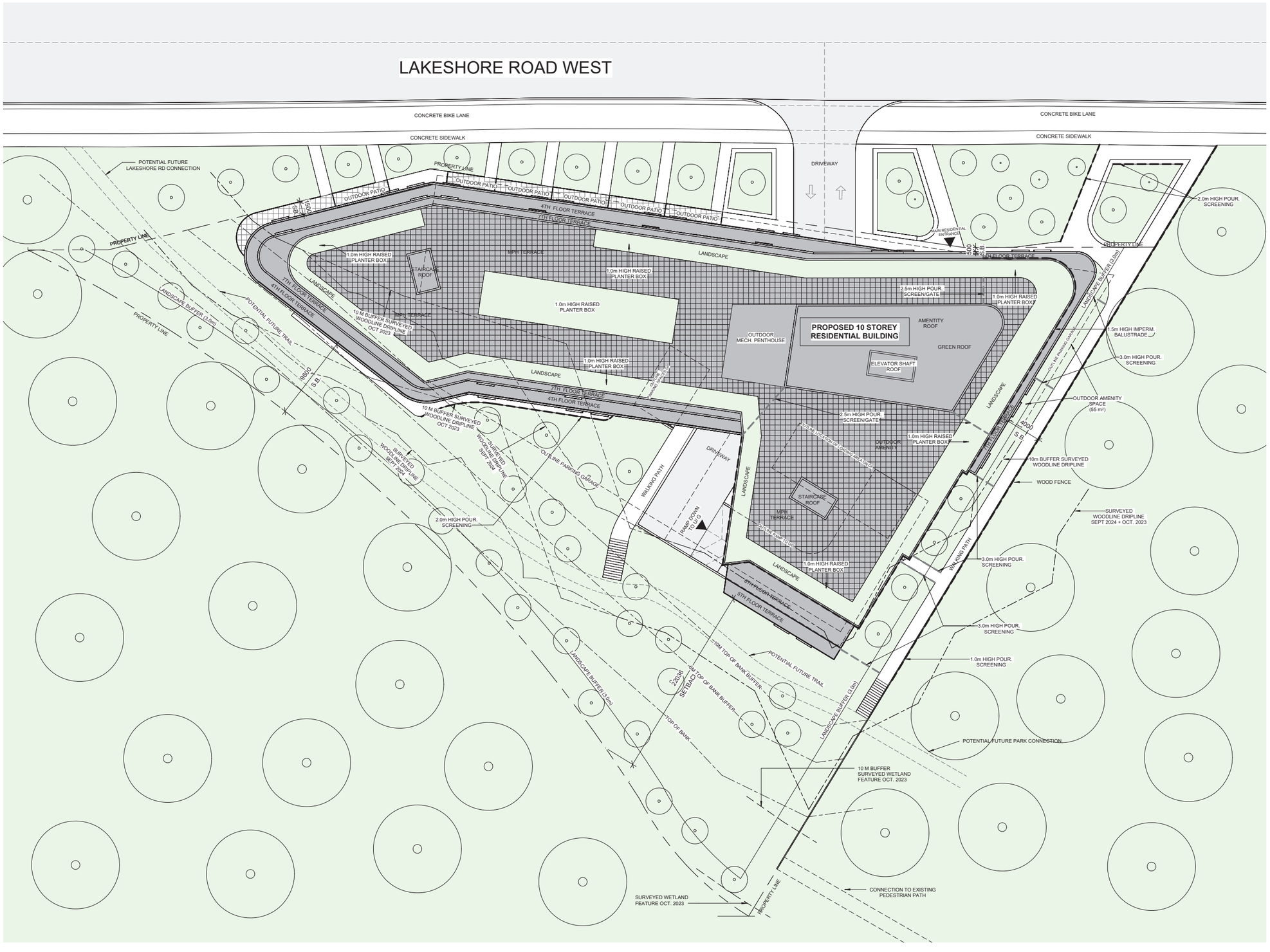
PROJECT NO:	23016
SCALE:	
DATE:	09.01.2024
DRAWN BY:	FC

DRAWING TITLE

SITE STATISTICS & CONTEXT

DRAWING NO

A001



1 Site Plan
1 : 200

900
LAKESHORE

900 LAKESHORE ROAD WEST
MISSISSAUGA, ON

No.	Description	Date
1	Issued for MUDAP	29.01.2024
8	Issued for DARC-2	03.10.2024

CONTEXT KEY PLAN

PROJECT NORTH

STAMP

CLIENT

KFA architects + planners inc.

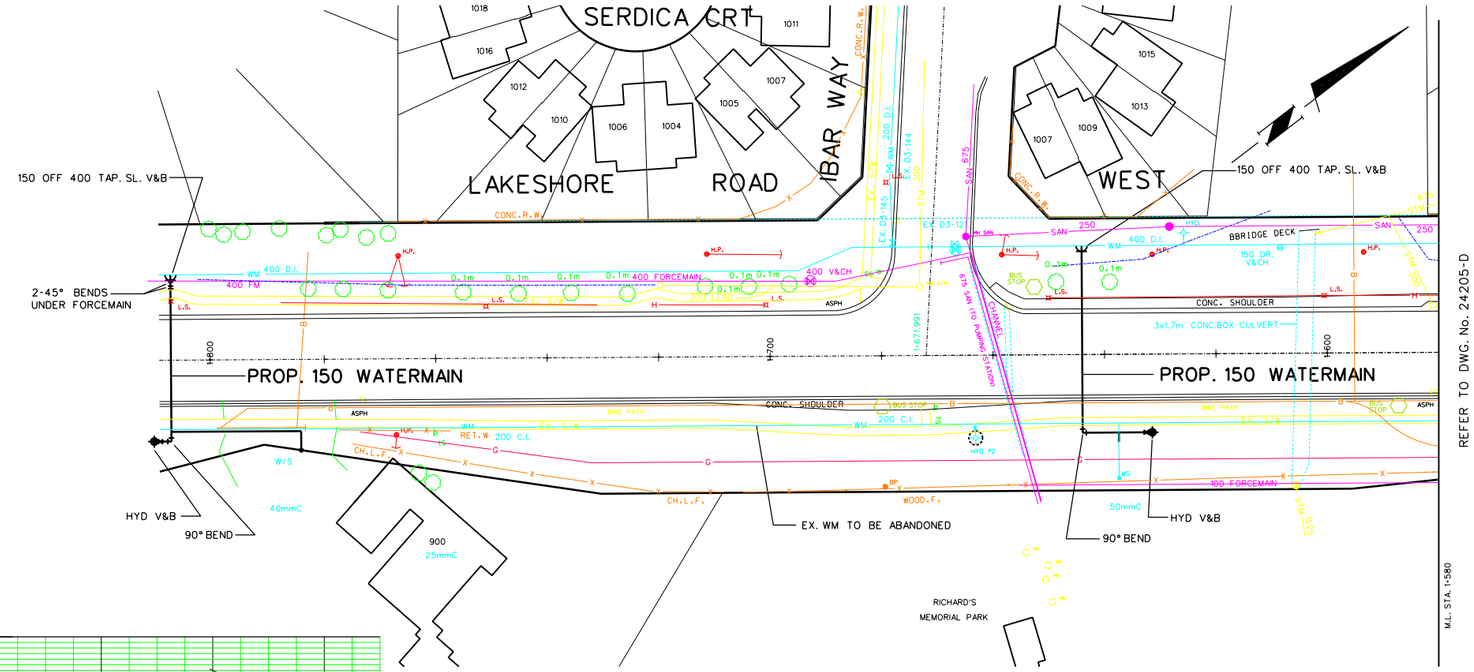
PROJECT NO:	23016
SCALE:	1 : 200
DATE:	09.01.2024
DRAWN BY:	FC

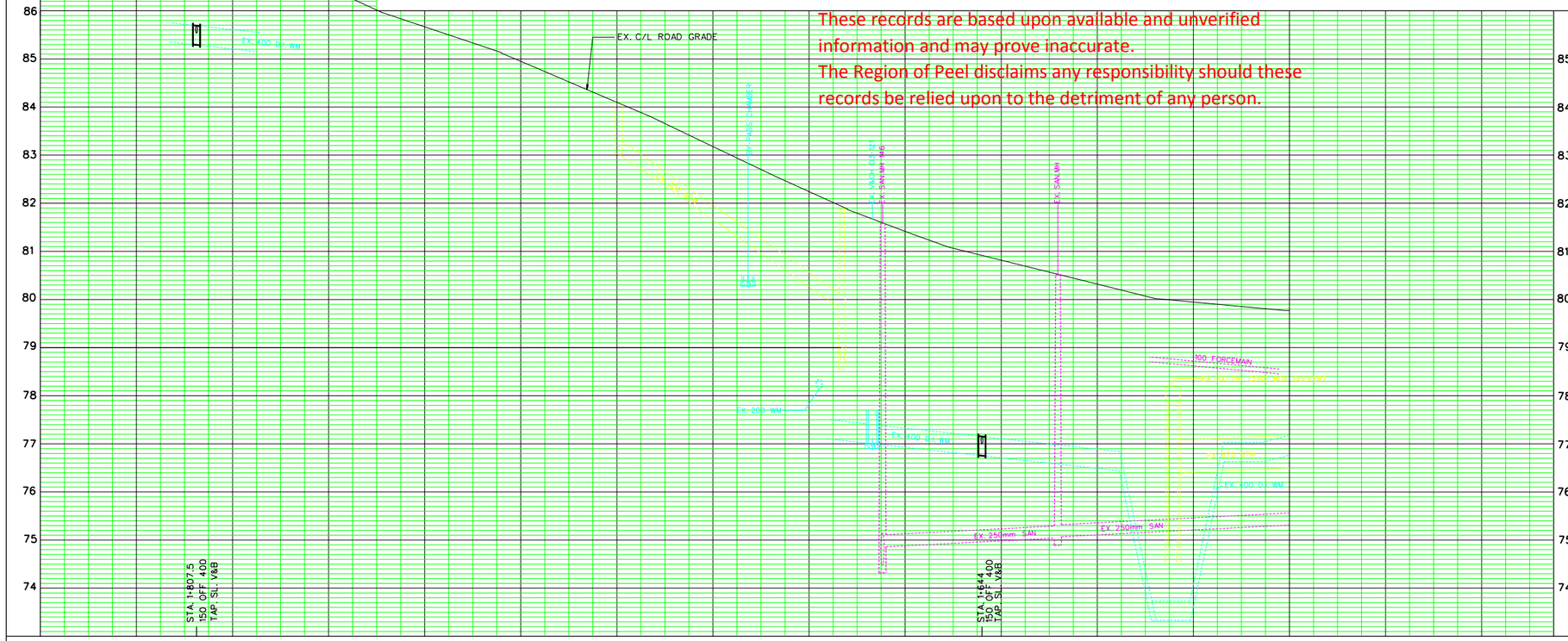
DRAWING TITLE

SITE PLAN

DRAWING NO

A002





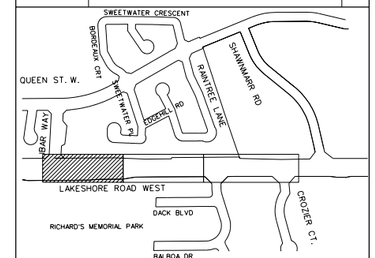
FOR GENERAL NOTES, LEGEND AND DETAILS SEE DWG. No. 24205-D

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS	MAY 21/97	J.P.
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE	MAY 20/97	J.P.
TRANSIT	MAY 21/97	J.P.	ONT. HYDRO	MAY 20/97	J.P.
PARKS & REC.	MAY 28/97	J.P.	CTV	MAY 23/97	J.P.
ONT. CLEAN WATER	MAY 29/97	J.P.			

REVISIONS

DATE	DETAILS	INIT.
OCT. 1997	**AS CONSTRUCTED**	J.P.



KEY PLAN N.T.S.

General Notes

- ALL DRIVEWAYS ASPHALT UNLESS OTHERWISE NOTED.
- ALL SERVICE LOCATIONS ARE APPROXIMATE AND MUST BE LOCATED ACCURATELY IN THE FIELD
- DENOTES BUILDING - NOT LOCATED
- DENOTES BUILDING LOCATED
- TYPE 'B' BEDDING UNLESS OTHERWISE NOTED (SAN)

B.M. NO. ELEV.

THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL EXISTING UTILITIES PRIOR TO AND DURING CONSTRUCTION LOCATION OF EXISTING UTILITIES APPROXIMATE ONLY. TO BE VERIFIED IN FIELD BY CONTRACTOR.

DESIGNED BY | APPROVED BY

CHKD.

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL TELEPHONE COMPANY
CONSUMERS GAS COMPANY
MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ELECTRIC POWER COMM. OF ONTARIO
HYDRO ELECTRIC COMM. CITY OF MISSISSAUGA
HYDRO ELECTRIC COMM. CITY OF BRAMPTON
CABLE TELEVISION

10m 0 10 20 30m HORIZONTAL SCALE

1m 0 1 2 3m VERTICAL SCALE

Region of Peel
Public Works

LAKESHORE RD. WEST

FROM IBAR WAY TO SHAWNMARR RD.

PROP. 300mm WATERMAIN

Sta. 1+580 **To Sta.** 1+780

LOTS	AREA Z-2, Z-9	PROJECT NO. 97-1500
CHECKED BY	DRAWN BY J.P.	
DATE JUNE, 1997	SHEET 3 OF 3	PLAN NO. 24206-D

KFA
architects +
planners inc.

September 30, 2024

Re: 900 Lakeshore Road West, Mississauga, Ontario

To whom it may concern,

Kindly be advised that the Construction Type of the 10-Storey building proposed at 900 Lakeshore Road West will be **Type I - Fire Resistive**, in accordance with the Fire Underwriters Survey definition.

As such, all structural Elements, walls, arches, floors and roofs will be constructed with a minimum 2-hour fire resistance rating, and all materials used in the construction of the structural elements, walls, arches, floors and roofs are constructed with noncombustible materials.

In addition, please note that the entire building will be provided with a fully supervised automatic sprinkler system. The central Fire Alarm Panel will be located in the CACF (Central Alarm Control Facility) situated in proximity to the main entrance on the Ground Floor in order to be readily accessible to the firefighters entering the building in accordance with OBC 3.2.6.7.

Sincerely,

Kregg Fordyce
President, BES, March, OAA, NSAA, MRAIC, RPP, MCIP
KFA Architects and Planners Inc,

197 SPADINA AVE • SUITE 500 | TORONTO • ON • M5T 2C8
416.633.6226 | www.kfarchitecture.com

FISHER ENGINEERING

ENGINEERING

Professional Engineers Ontario

LABORATORY

CALA
Canadian Association for Laboratory Accreditation Inc.

HYDROGEOLOGICAL INVESTIGATION

900 LAKESHORE ROAD WEST,

MISSISSAUGA, ONTARIO, L5H 1H9

Prepared for:

1000570027 Ontario Inc.

Project No. FH24-14065_V2

January 23, 2024

Updated September 20, 2024

400 Esna Park Drive, Unit 15
Markham, ON
L3R 3K2

Tel: (905) 475-7755
Fax: (905) 475-7718
www.fishereng.com

Issued to:	1000570027 Ontario Inc. 17b Cosmo Rd, Etobicoke, Ontario M8X 1Z3
Contact:	Ryan Atkinson ryan@atkinsonlaw.ca
Project Name:	Hydrogeological Investigation for Proposed Development
Project Address:	900 Lakeshore Road West, Mississauga, ON., L5H 1H9
Project Number:	FH24-14065_V2
Issued on:	January 23, 2024; Updated September 20, 2024
Report Prepared by:	 Clive Wiggan, PhD., PMP., Project Manager clive@fishereng.com
Report Reviewed by:	 Frank Fan, PEng., Geotechnical Engineer frank@fishereng.com

with trace of roots/topsoil. Fill extended to approximate depths below prevailing grades/elevations as shown in Table 1.

Table 1: Fill Depths and Elevations

Borehole No.	BH1	BH2	BH3	BH4	BH5	TH1	TH2	BH101	BH102	BH103
Surface Elevation (m asl)	86.63	85.68	86.60	83.20	82.63	85.98	86.81	89.10	85.39	82.55
Depth of Borehole (m)	17.53	12.29	13.72	10.97	10.74	1.98	1.98	13.82	12.19	17.45
Elevation at Bottom of Borehole (m asl)	69.10	73.39	72.88	72.23	71.89	84.00	84.83	75.28	73.20	65.10
Depth of Fill (m)	1.37	1.37	1.37	1.52	1.17	1.52	1.52	1.91	3.66	1.67
Elevation at Bottom of Fill (m asl)	85.26	84.31	85.23	81.68	81.46	84.46	85.29	87.19	81.73	80.88
Depth to bedrock surface(m)	12.19	12.19	13.72	9.30	10.67	n/a	n/a	12.04	10.36	10.52
Elevation at surface of Bedrock (m asl)	74.44	73.49	72.88	73.90	71.96			77.06	75.03	72.03

Brown Sand/ Silty Sand – Layers of native, brown to grey, moist, compact to very dense sand/silty sand were found underlying the fill soils of BH1 to BH5 and BH101 extending to approximate depths of 2.59m (BH5) to 5.18m (BH101).

Grey Silt/Sandy Silt – The brown to grey silty sand layers were underlain by grey, moist, dense to very dense silt to sandy silt extending to depths of 5.18m in BH101 to 9.76m in BH3.

Grey Clayey Silt/Clayey Silt Till – Layers of grey clayey silt to clayey silt till, of variable thickness/depth (less than 1.12m thick in BH103 to 2.6m thick in BH4), and consistency (firm to very stiff), were encountered below the grey to brown silt to sandy silt. Moisture content of the clayey silt varied from 11.5% to 23.1% in the samples tested.

Grey Sandy Silt Till – Deposits of grey, moist, dense to very dense sandy silt till were encountered beneath the grey clayey silt of BH2, BH3, BH5, BH102 and BH103 extending to approximate depths of 8.84m (BH103) to 13.72m (BH3).

Grey Shale/Weathered Shale – Weathered shale bedrock was found underlying the grey clayey silt/clayey silt till of BH1, BH4 & BH101 and grey sandy silt till/silty sand of BH2, BH5, BH102 & BH103. Shale was found to be hard in consistency and dry within the depths explored. Rock coring carried out in BH1 and BH103 indicated that the upper 1.3m of shale is severely weathered.

RQD values of 85% to 100% below depth of 14.48m in BH1 and 12.79m in BH103 indicate very good to excellent quality of bedrock. Core samples retrieved from BH1 yielded compressive strength of 13 MPa & 21.2MPa at depths of 14m and 16.5m. One core sample from BH103 yielded compressive strength of 24.8MPa at depths of 15.85m below prevailing grade. Inferred bedrock surface elevation are shown in Table 1.

6. HYDROGEOLOGICAL STUDY

A hydrogeological study for the subject site was conducted based on the boreholes/wells' exploration, observation and site/laboratory tests. Groundwater details from the five (5) monitoring wells were used in the Hydrogeological Study. The monitoring wells were constructed with 3.05m (10') long, 51mm diameter PVC slotted screen pipes, with the bases at approximate depths below existing grade as shown in Appendix B. Clean silica sand packs were placed around each well screen which was isolated with bentonite extending to slightly below existing grade.

Standing water was observed in the open boreholes BH1, BH3 and BH5 at depths of 9.14m to 10.67m below prevailing grades (elevations of 72.12m to 77.49m asl) on completion of drilling while the other boreholes were observed to be dry. No caving in of soils was observed during drilling.

6.1 Hydrogeological Conditions

Review of the available surficial geological and hydrogeological information for the area shows that the site is underlain generally with Glacial Lake Deposits consisting predominantly of Lake Iroquois, shallow water deposits of sand and silty sand (Quaternary Geology, Toronto and Surrounding Area, Ontario Geological Survey Map 2204, 1998). Underlying bedrock is represented by shale interbedded siltstone, and minor limestone of the Georgian Bay Formation. Depth to bedrock in the area is generally less than 5m.

The subsoils and hydrogeological conditions were observed and recorded during both the Geotechnical and Hydrogeological Investigations. Based on the boreholes/wells' exploration, the saturated soil layers

on the site, below the fill material, are dominated by grey, sandy silt to clayey silt, with occasional layers of sand in some areas, underlain by shale at further depths.

All monitoring wells were purged/developed and allowed to fully recover prior to carrying out groundwater level measurements and sampling. Groundwater levels were monitored bi-weekly for three months to determine seasonal highwater levels. Measured groundwater depths and elevations are summarized in Table 2.

Table 2: Groundwater Depths and Elevations

Monitoring Wells		MW1	MW2	MW3	MW4	MW5	MW101	MW102	MW103
Surface Elevation, m asl		86.63	85.68	86.60	83.20	82.63	89.10	85.39	82.55
Depth of Well, m bgs		7.62	7.62	7.62	6.10	4.57	10.18	10.49	14.41
Elevation at well base, m asl		79.01	78.06	78.98	77.10	78.06	78.92	74.90	68.14
In open BH on completion	GW level, m bgs	9.14	dry	10.67	dry	10.51	dry	dry	dry
	GW Ele, m asl	77.49		75.93		72.12			
28-Nov-23	GW level, m bgs	3.17	3.96	4.41	2.42	3.21	n/a		
	GW Ele, m asl	83.46	81.72	82.19	80.78	79.42			
6-Dec-23	GW level, m bgs	2.96	3.89	4.18	2.16	3.11			
	GW Ele, m asl	83.67	81.79	82.42	81.04	79.52			
10-Dec-23	GW level, m bgs	3.36	4.53	4.70	2.66	3.79			
	GW Ele, m asl	83.27	81.15	81.90	80.54	78.84			
15-Jan-24	GW level, m bgs	3.39	4.58	4.79	2.61	3.84			
	GW Ele, m asl	83.24	81.10	81.81	80.59	78.79			
3-Apr-24	GW level, m bgs	3.37	4.05	4.10	2.35	3.65			
	GW Ele, m asl	83.26	81.63	82.50	80.85	78.98			
17-Apr-24	GW level, m bgs	3.35	3.86	3.91	2.31	3.54			
	GW Ele, m asl	83.28	81.82	82.69	80.89	79.09			

Monitoring Wells		MW1	MW2	MW3	MW4	MW5	MW101	MW102	MW103
Surface Elevation, m asl		86.63	85.68	86.60	83.20	82.63	89.10	85.39	82.55
Depth of Well, m bgs		7.62	7.62	7.62	6.10	4.57	10.18	10.49	14.41
8-May-24	GW level, m bgs	3.32	3.74	3.77	2.26	3.01			
	GW Ele, m asl	83.31	81.94	82.83	80.94	79.62			
22-May-24	GW level, m bgs	3.30	3.52	3.56	2.11	2.65			
	GW Ele, m asl	83.33	82.16	83.04	81.09	79.98			
5-Jun-24	GW level, m bgs	3.31	3.51	3.53	2.07	2.31			
	GW Ele, m asl	83.32	82.17	83.07	81.13	80.32			
19-Jun-24	GW level, m bgs	3.30	3.50	3.51	2.10	2.30			
	GW Ele, m asl	83.33	82.18	83.09	81.10	80.33			
29-Aug-24	GW level, m bgs	3.37	3.54	3.90	2.09	2.39			
	GW Ele, m asl	83.26	82.14	82.70	81.11	80.24			
9-Sep-24	GW level, m bgs	3.31	4.85	5.11	3.86	3.67	4.11	2.86	2.43
	GW Ele, m asl	83.32	80.83	81.49	79.34	78.96	84.99	82.53	80.12

Comments on Table 2:

The following general comments regarding groundwater conditions at the site are based on the groundwater level data and the Geotechnical Investigation:

- Static groundwater levels were measured at depths of 2.07m to 5.11m bgs (elevations vary from 78.79m to 84.99m asl).
- Groundwater flow is towards southeast with a gradient of approximately 4.5%.
- The nearest body of surface water is Lake Ontario located approximately 300m southeast of the site.
- The site is located in a developed residential/commercial neighbourhood, with water supply via municipal water system, and with no active domestic water wells in the area.
- Groundwater levels on the site are being monitored biweekly to determine seasonal highwater levels.

6.2 Hydraulic Conductivity K Modeling Results

Single Well Response Tests

Single well response tests (SWRT) were conducted in MW1, MW3 and MW4 on November 28, 2023 and in MW101, MW102 and MW103 on September 5, 2024. The upper water bearing soils consist mainly of layers of grey silt/sandy silt in some areas and were assumed to be unconfined, homogenous, isotropic and of uniform thickness. Monitoring well MW103 was screened in the upper region of shale. It was also assumed that the wells fully penetrated the water bearing layers. Data from the single well response tests were used to calculate the hydraulic conductivity values using Luthin's method.

Details of the hydraulic conductivity analyses are presented in Appendix C and summarized in Table 3.

Table 3: Summary of Single Well Response Tests and Hydraulic Conductivity Results

Test Wells	Well Surface Elevation (m asl)	Groundwater Depth (m)	Screen Elevation (m asl)	Variance of water head created (m)	30 Minutes/	Hydraulic Conductivity, K (Luthin's Method)	
					Recovery Percentage	m/s	m/day
MW1	86.63	3.17	79.01 – 82.10	3.16	31 mins / 42%	1.06E-06	0.092
MW3	86.60	5.31	78.98 – 86.60	2.51	31 mins / 10%	6.05E-07	0.052
MW4	83.20	3.20	77.10 – 80.15	3.27	31 mins / 15%	3.03E-07	0.026
MW101	89.10	4.09	78.92 – 81.97	5.96	31 mins / 3%	9.08E-08	0.008
MW102	85.39	2.85	74.90 – 77.95	7.545	31 mins / 6%	6.05E-08	0.005
MW103	82.55	2.40	68.14 – 71.19	14.155	31 mins / 92%	1.36E-07	0.012

6.3 Grain Size Analysis for Hydraulic Conductivity K

Representative samples from BH1, BH11, BH13, BH101 and BH103 were selected from depths associated with the footing/slab on grade locations for the underground levels or change in soil stratigraphy and submitted to Fisher Engineering laboratory for grain size distribution and hydrometer analyses. The results for the grain size distribution and hydrometer analyses are presented in Appendix C.

The effective D_{10} sizes obtained from the Grain Size Distribution Graph were used to estimate the hydraulic conductivity (K) of the overburden soils using Hazen's expression, Equation 1:

$$K=10^{-2} D^2_{10} (m/s) \qquad \text{Equation 1}$$

The hydraulic conductivity values at various depths, based on grain size, are summarized in Table 4. The estimated k values are consistent with those obtained during the single well response tests.

Table 4: Hydraulic Conductivity Estimated from Grain Size Analyses

Location	Depth of soil sample (m)	Soil Classification	Estimated Hydraulic Conductivity (Hazen Number)	
			m/s	m/day
BH1	9.15 – 9.61	Silt, trace Clay, trace Sand	6.25×10^{-8}	0.0054
	10.68 – 11.13	Sandy Silt, some Clay, some Gravel	4.76×10^{-9}	0.00041
BH2	10.68 – 10.82	Clayey Silt and Sand, trace Gravel	4.23×10^{-9}	0.000365
BH3	10.68 – 11.13	Clayey Silt, trace Sand, trace Gravel	2.03×10^{-9}	0.000175
BH5	4.58 – 5.03	Silt, some Clay, trace Sand	3.24×10^{-8}	0.0028
BH101	4.58 – 5.03	Silt, some Sand, trace Clay	2.30×10^{-7}	0.02
BH101	7.63 – 8.08	Silt, some Sand, trace Clay	4.62×10^{-7}	0.04
BH101	9.15 – 9.46	Sandy Clayey Silt, trace Gravel	4.23×10^{-9}	0.00037
BH101	9.46 – 9.91	Sand and Silt, some Clay, trace Gravel	8.10×10^{-9}	0.0007
BH101	9.91 – 10.37	Sandy Silt, some Clay, some Gravel	8.10×10^{-9}	0.0007
BH101	10.68 – 11.13	Sandy Silt, some Clay, trace Gravel	7.23×10^{-9}	0.00062
BH103	4.58 – 5.03	Silt, trace Clay, trace Sand	1.60×10^{-7}	0.0138
BH103	7.63 – 8.08	Silt, some Sand, trace Clay, trace Gravel	3.97×10^{-7}	0.0343
BH103	9.15 – 9.61	Clayey Silt, some Sand, some Gravel	1.23×10^{-9}	0.00011
BH103	10.68 – 11.13	Silt & Sand, some Clay, trace Gravel	3.03×10^{-9}	0.000261
TH1	1.53 – 1.98	Silt and Sand, trace Clay, trace Gravel	5.93×10^{-7}	0.051
TH2	1.53 – 1.98	Clayey, Sandy Silt, some Gravel	1.23×10^{-7}	0.00011

7. CONSTRUCTION DEWATERING & PERMANENT DRAINAGE

7.1 Construction Dewatering

It was understood that the proposed development will have three underground levels. Based on the geotechnical engineering report and latest site drawings, conventional shallow footings would typically be located at depths of 9.8m (P3) to 12.4m (extended P3) below ground floor. It is expected however that footings will be socketed into the shale bedrock at various elevations. The following assumptions were made in estimating construction dewatering rates:

a. Average grade: 85.22m asl.
b. Lowest P3 basement floor elevation of 74.60m asl.
c. Average footing elevation at 73.60m asl.
d. Average groundwater level of 81.93m asl.
e. Gross floor /excavation area of 2,300m^2.
f. Average hydraulic conductivity 3.76 x 10^{-7}m/s based on single well response tests.

Construction groundwater dewatering flowrate of **26.81m^3/day (26,810 L/day)** was calculated for excavation of three underground levels as shown in Appendix F. Factored construction groundwater dewatering flowrate is **40.22 m^3/day (40,220 L/day)** with FS=1.5.

Seasonal High Groundwater Levels

Groundwater levels were monitored over the period November 2023 to January 2024 and April to June 2024 with additional measurements taken in August and September 2024. The average groundwater level (81.93m asl) was used to calculate construction groundwater dewatering and permanent drainage rate.

Accounting for Accumulated Precipitation

Provisions should be made to pump accumulated water from the excavation areas during construction, particularly following a period of heavy rainfall. For example, 25mm rainfall in 24 hrs may result in accumulation of up to 53m^3 in the excavated area dominated by silt/sandy silt/clayey silt with shale at greater depths. Some of this water is expected to pond based on the types of soils in the excavation area although some will be lost otherwise. A conservative accumulated volume of **15 m^3/day** may be assumed. Accumulated precipitation may be stored on site for subsequent disposal to an MECP-licensed facility. If the water is to be discharged into the public sewer system, then an application for the discharge of private water will have to be made to the Region of Peel/City of Mississauga. The water quality, at the time of

the application, will need to be ascertained to ensure compliance with the Ontario Reg. Mun of Peel Sanitary Bylaw #53-2010 and Peel Storm Sewer By-law #53-201 (Apr 2011).

The maximum construction discharge rates, taking into consideration accumulated precipitation volumes, are:

Unfactored: **41.81 m^3/day (41,810 L/day).**
Factored: **55.22 m^3/day (55,220 L/day).**

7.2 Permanent Drainage

Total permanent groundwater discharge rate of **21.17 m^3/day (21,170 L/day)** was estimated for the building with three underground parking levels. Factored discharge rates of **31.75 m^3/day (31,750 L/day)** using a FS of 1.5 are applicable.

An application for permission to discharge to the municipal/regional sewer will be required unless the subsurface structure of the building is designed as watertight.

7.3 Permit to Take Water (PTTW) and EASR

As the calculated construction dewatering flowrate (including accumulated precipitation), for the building with three underground levels, is more than 50 m^3/day, registration on the MECP Environmental Activity and Sector Registry (EASR) for Water Taking will be required. An application for permission to take water (PTTW) is not required for neither construction dewatering nor permanent drainage as the daily discharge rates are less than 400,000 and 50,000 litres respectively.

7.4 Groundwater Quality

The results of analyses for groundwater quality under the Ontario Reg. Mun of Peel Sanitary Bylaw #53-2010 and Peel Storm Sewer By-law #53-201 (Apr 2011) show compliance with all parameters except as listed in Table 5.

Table 5: Results from Sewer Use Bylaw tests

Parameters	Guide Limits		Results
	Table 1 (Sanitary Sewer)	Table 2 (Storm Sewer)	MW3
Total Suspended Solids, mg/L	350	15	21.4
Manganese, mg/L	5	0.05	0.111

Based on the results, presented in Table 5, *pre-treatment of the groundwater will be required prior to discharging to the storm sewer system*. The groundwater, in its present form, may be discharged to the public sanitary sewer system without treatment.

It should be noted however that testing of groundwater at the depths observed during the investigation would not be representative of the water that might accumulate during a high rainfall event. Any accumulation of precipitation occurring in the excavation during construction, that may require offsite discharge, will have to be tested at the time of the event to determine the quality of water for discharge.

7.5 Dewatering Influence Zone

The estimated construction dewatering quantities are based on the worst-case groundwater conditions that might occur during the construction period. Calculated dewatering influence zones are expected to be up to 11.44m from the edge of the dewatering point for the building with three underground levels.

Based on the field investigation, the soils to the proposed excavation depths are dominated by silt/sandy silt to clayey silt with shale at further depths. Based on the amount of groundwater for construction dewatering and the flowrates encountered during the field work, an active dewatering system will not be required. Consequently, dewatering influence zones will be less than calculated.

Notwithstanding the preceding, it is recommended that a pre-construction survey of adjacent structures/roads be carried out prior to dewatering/shoring construction stage. Potential adverse impact on adjacent structures, due to dewatering/shoring construction, must be assessed, quantified and reviewed during construction.

7.6 Hydrogeological Impact

The calculated dewatering influence zone will not extend beyond the property boundaries. Review of the soils show that the saturated soils for dewatering are dominated by compact to very dense silt to sandy silt till and stiff to very stiff clayey silt, with shale at further depths, in which significant groundwater induced settlement is not expected. A shoring system may be required if sufficient space is not available for safe slopes to be constructed. Dewatering, where required, will take place within the shoring enclosure. It is therefore determined that there will not be any negative impact to the natural environment, City of Mississauga/ Peel Region Sewer works nor surrounding properties due to construction dewatering, assuming the same soil profile in the vicinity of the subject site.

8. DISCUSSION

- Hydraulic conductivity values (k) calculated from onsite single well response tests are 6.05 x 10^{-8} to 1.05 x 10^{-6} m/s (0.005 and 0.092 m/day) in the monitoring wells covering three underground levels. These are representative of the water bearing soils consisting of silt/sandy silt/clayey silt/sand and shale at the expected excavation depths.
- Total construction groundwater dewatering and permanent drainage flowrates of 26.81 m^3/day and 21.17 m^3/day were estimated for the proposed building with three underground levels. An additional discharge volume of 15m^3/day of accumulated precipitation should be accounted for during construction dewatering.
- Factors of safety of 1.5 should be applied to both construction groundwater dewatering and permanent drainage rates.
- Registration on the MECP's EASR Website for water taking will be required for construction dewatering. An application for PTTW is not required.
- An active construction dewatering system may not be required for the construction of the three underground levels.
- The groundwater quality determined by laboratory analyses revealed exceedance of storm limits for suspended solids and manganese and consequently pre-treatment of the water will be required before it can be discharged in the public storm sewer. The groundwater, in its present form, may be discharged to the sanitary sewer without treatment.
- It should be noted that if it is intended that any accumulated water, following periods of heavy rainfall, be discharged into the public sewer, then a permit to discharge would be required along with laboratory analyses to ensure compliance with City of Mississauga/Peel Region Sewer Use Bylaws.
- Construction groundwater dewatering and permanent drainage rates, given in the preceding, are based on the current site /foundation plans provided to Fisher during the investigation and common practice and our reasonable assumption for the underground level grades. The calculations may be subject to further modification when final building details and, or footing/foundation depth/elevations become available.

9. LIMITATIONS

This report is limited in scope to those items specifically referenced in the text. The discussions and recommendations presented in this report are intended only as guidance for the named client, design engineers and those directly associated with the implementation and monitoring of the project. The information on which these recommendations are based is subject to confirmation by engineering personnel at the time of construction. Localized variations in the subsoil conditions may be present between and beyond the boreholes and should be verified during construction.

As more specific subsurface information becomes available during excavations on the Site, this report should be updated. Contractors bidding on or undertaking the work should decide on their own investigations, as well as their own interpretations of the factual borehole results. This concern specifically applies to the classification of the subsurface soil and the potential reuse of these soils on/off Site. Contractors should draw their own conclusions as to how the near surface and subsurface conditions may affect them.

Site Investigation and Dye Test Report

General Information	
Date: **March 8, 2024**	Report No. : **R24-03-08-01**
Project No. : **PUD23-058**	Address: **900 Lakeshore Road West**
Owner : **1000570027 Ontario Inc.**	Region/Municipality: **City of Toronto**

Attendants			
	Name	Title	Contact Info.
Lithos Inspector	**Peter Varsos**	**Construction Inspector**	**437-215-1144**
Lithos Inspector	**Alma Loshe**	**Project Inspector**	**647-901-3494**
Lithos Inspector	**Surabhi Suresh**	**Project Coordinator**	**647-394-1527**
Lithos Inspector	**Pradeep Oletti**	**Construction Inspector**	**905-609-3435**
Lithos Inspector	**Arfa Ahmad**	**Project Coordinator**	**613-290-2923**

Weather Condition			
☑ Sunny	☐ Cold	☐ Light Rain	☐ Windy
☐ Partly Cloudy	☑ Cool	☐ Heavy Rain	☐ Fogy
☐ Overcast	☐ Warm	☐ Light Snow	
Temprature :3**°C**	☐ Hot	☐ Heavy Snow	

Existing Facilities at Project/Site

The subject property is currently occupied by one 1-storey building, one 1.5-story dwelling, one barn and a pool.

Site Location

General Information	
Date: **March 8, 2024**	Report No. : **R24-03-08-01**
Project No. : **PUD23-058**	Address: **900 Lakeshore Road West**
Owner : **1000570027 Ontario Inc.**	Region/Municipality: **City of Toronto**

Summary of Findings

1. Two water valves are located on the North side of the buildings.
2. Storm runoff from Areas A, B, C, D, and F at 900 Lakeshore Road West is collected by the creek along North Crescent.
3. Storm runoff from Area E at 900 Lakeshore Road West is directed towards the catch basins along Lakeshore Road West.
4. Sanitary Discharge from Area A (Existing building) at 900 Lakeshore Road West, is discharging at the Septic Tank located on the East side of the property.

5. There is no existing Storm and Sanitary Serwer along Lakeshore Road West from Ibar Way to Whittier Crescent.

General Information	
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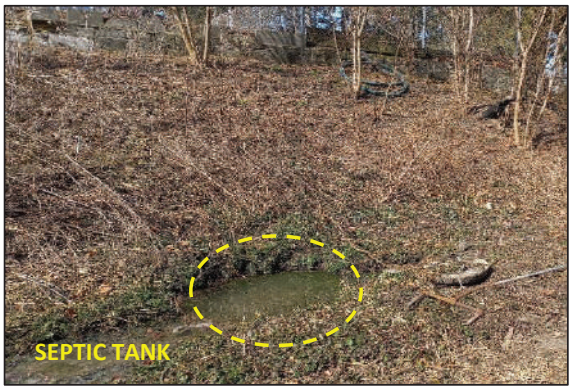
Project No. : **PUD23-058**	Address: **900 Lakeshore Road West**
Owner : **1000570027 Ontario Inc.**	Region/Municipality: **City of Toronto**

Existing Infrastructure at the area of investigation



General Information	
Date: **March 8, 2024**	Report No. : **R24-03-08-01**
Project No. : **PUD23-058**	Address: **900 Lakeshore Road West**
Owner : **1000570027 Ontario Inc.**	Region/Municipality: **City of Toronto**

Investigation Details

Area A

This area is occupied by one of the existing buildings at 900 Lakeshore Road West.

The existing building has a flat and pitched roofs with different elevations, and the storm runoff within this area is captured by the existing roof scuppers, where one part flows free overland and the other part is directed to the ground via an existing network of storm drains within the building.

There is no existing Storm Sewer along Lakeshore Road West from Ibar Way to Whittier Crescent on both sides of Lakeshore Road West.

All the Storm runoff from Area A at 900 Lakeshore Road West flows towards Area F and is collected by the creek along North Crescent.

General Information	
Date: **March 8, 2024**	Report No. : **R24-03-08-01**
Project No. : **PUD23-058**	Address: **900 Lakeshore Road West**
Owner : **1000570027 Ontario Inc.**	Region/Municipality: **City of Toronto**

Investigation Details

General Information	
Date: **March 8, 2024**	Report No. : **R24-03-08-01**
Project No. : **PUD23-058**	Address: **900 Lakeshore Road West**
Owner : **1000570027 Ontario Inc.**	Region/Municipality: **City of Toronto**

Investigation Details

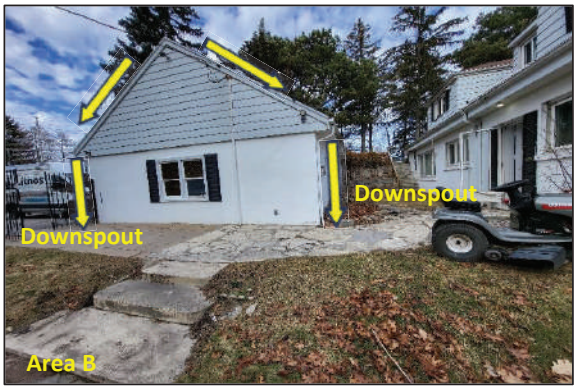
Area B

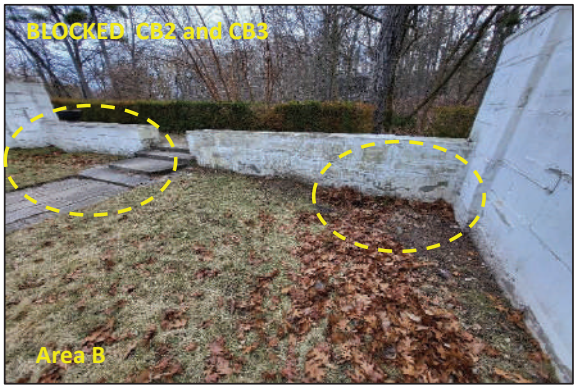
This area is occupied by one of the existing buildings at 900 Lakeshore Road West.

The existing building has a slopped roof, and the storm runoff within this area is captured by the existing roof scuppers and is directed to the ground via the existing network of storm drains within the building.

There is no existing Storm Sewer along Lakeshore Road West from Ibar Way to Whittier Crescent on both sides of Lakeshore Road West.

All the Storm runoff from Area A at 900 Lakeshore Road West flows towards Area F and is collected by the creek along North Crescent.





General Information	
Date: **March 8, 2024**	Report No. : **R24-03-08-01**
Project No. : **PUD23-058**	Address: **900 Lakeshore Road West**
Owner : **1000570027 Ontario Inc.**	Region/Municipality: **City of Toronto**

Investigation Details

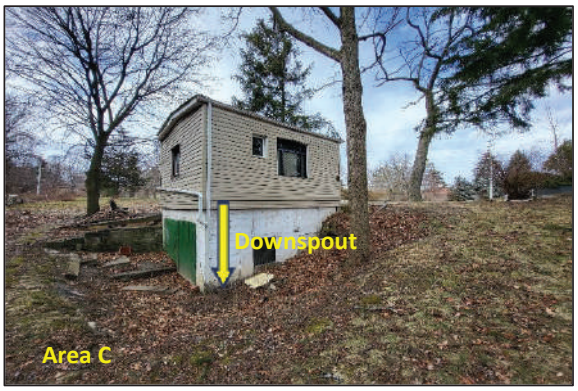
Area C

This area is occupied by the existing barn at 900 Lakeshore Road West.

The existing building has a slopped roof, and the storm runoff within this area is captured by the existing roof scuppers and is directed to the ground via the existing network of storm drains within the building.

There is no existing Storm Sewer along Lakeshore Road West from Ibar Way to Whittier Crescent on both sides of Lakeshore Road West.

All the Storm runoff from Area A at 900 Lakeshore Road West flows towards Area F and is collected by the creek along North Crescent.



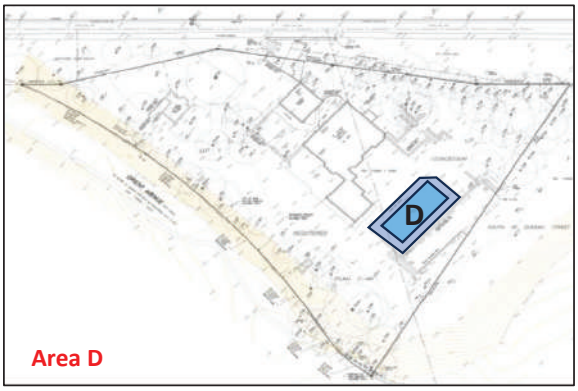
General Information	
Date: **March 8, 2024**	Report No. : **R24-03-08-01**
Project No. : **PUD23-058**	Address: **900 Lakeshore Road West**
Owner : **1000570027 Ontario Inc.**	Region/Municipality: **City of Toronto**

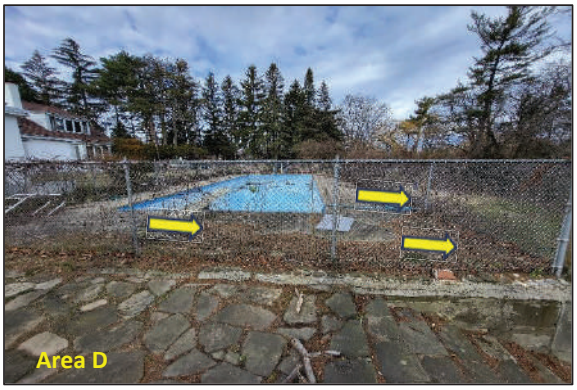
Investigation Details

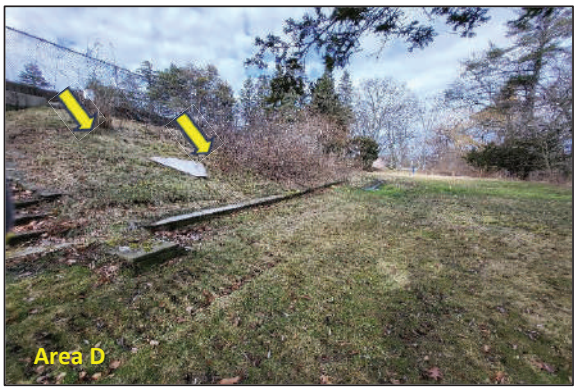
Area D

This area consists of a concrete pool.

Storm runoff within Area D flows overland and any excess runoff is directed towards the South of Dundas West, and is collected by by the creek along North Crescent.







General Information	
Date: **March 8, 2024**	Report No. : **R24-03-08-01**
Project No. : **PUD23-058**	Address: **900 Lakeshore Road West**
Owner : **1000570027 Ontario Inc.**	Region/Municipality: **City of Toronto**

Investigation Details

Area E

This area consists of stone steps, trees, and an unpaved grass-filled area along Lakeshore Road West, with an overall slope towards Lakeshore Road West.

Storm runoff within the Area flows overland and any excess runoff is directed toward the catch basins along Lakeshore Road West.

General Information	
Date: **March 8, 2024**	Report No. : **R24-03-08-01**
Project No. : **PUD23-058**	Address: **900 Lakeshore Road West**
Owner : **1000570027 Ontario Inc.**	Region/Municipality: **City of Toronto**

Investigation Details

Area F

This area consists of concrete steps, stone pavement, trees, and an unpaved grass-filled area.
Storm runoff within Area F flows overland and any excess runoff is directed towards the South of Dundas West and North Crescent, and is collected by the creek along North Crescent.

General Information	
Date: **March 8, 2024**	Report No. : **R24-03-08-01**
Project No. : **PUD23-058**	Address: **900 Lakeshore Road West**
Owner : **1000570027 Ontario Inc.**	Region/Municipality: **City of Toronto**

Investigation Details

Dye Test #1

In order to identify the sanitary discharge pattern within area A, a Dye test was conducted on the existing sanitary network within the property at 900 Lakeshore Road West.

The dye was discharged into one of the sanitary sinks and the dye was observed at Septic Tank.

The result of this Dye Test confirmed that the sanitary discharge in the existing building at 900 Lakeshore Road West is discharging at the Septic Tank.

Sanitary sink before dye test

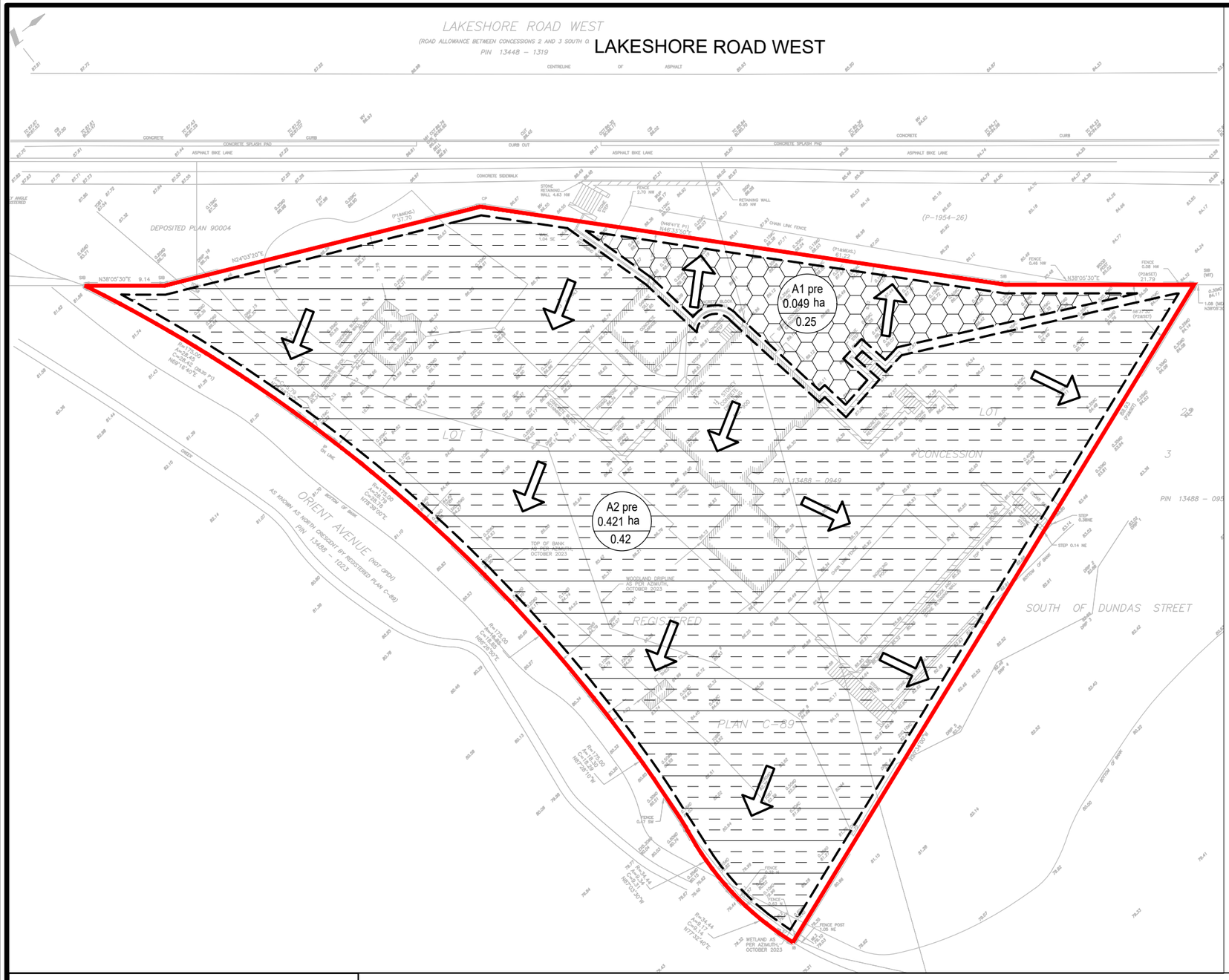
Sanitary sink after dye test

Septic Tank before dye test

Septic Tank after dye test

Appendix C

Storm Analysis



DRAINAGE AREA	LEGEND	AREA (ha)	TOTAL AREA (ha)
A1 PRE		0.230	0.470
A2 PRE		0.122	

RUN-OFF COEFFICIENTS					
DRAINAGE AREA	LAND USE	AREA (ha)	INITIAL COEFFICIENT	ACTUAL COEFFICIENT	DESIGN COEFFICIENT
A1 PRE (TOWARDS LAKESHORE ROAD WEST)	LANDSCAPE	0.049	0.25	0.25	0.25
	HARDSCAPE	0.000	0.90		
A2 PRE (TOWARDS CREEK ALONG NORTH CRESCENT)	LANDSCAPE	0.108	0.25	0.42	0.42
	HARDSCAPE	0.313	0.90		

Lithos

150 Bermonsdey Road, North York, Ontario M4A 1Y1

LEGEND

A1 pre / 0.04 ha / 0.50 — STORM DRAINAGE AREA NUMBER; DRAINAGE AREA (ha); COMPOSITE RUNOFF COEFFICIENT

PRE-DEVELOPMENT STORM DRAINAGE AREA

PROPERTY LINE

DRAINAGE DIRECTION - BOTH MANOR AND MAJOR DRAINAGE PATTERNS

PRE-DEVELOPMENT STORM DRAINAGE AREA PLAN

RESIDENTIAL-USE DEVELOPMENT
900 LAKESHORE ROAD WEST
MISSISSAUGA, ONTARIO

DATE: NOVEMBER 2024	PROJECT No: UD23-058
SCALE: N.T.S.	FIGURE No: DAP1

Lithos

Prepared By: Dimitra Savvaoglou P.E., M.A.Sc.
Reviewed by: John Pasalidis, P.Eng., M.A.Sc

Rational Method

Pre-Development Flow Calculation

900 Lakeshore Road West
File No. UD23-058
City of Mississauga
Date: November 2024

Input Parameters

Area Number	Area (ha)	Actual "C"	Design "C"	Tc (min.)
A1 pre (Towards Lakeshore Road West)	0.049	0.25	0.25	15
A2 pre (Towards Creek along North Crescent)	0.421	0.42	0.42	15
Total	0.470	0.40	0.40	15

$$Q = 0.0028\ C\ I\ A$$

$$I = \frac{a}{(t+c)^b}$$

Rational Method Calculation for the City of Mississauga

Event 2 yr
IDF Data Set Region of Peel
a = 610
b = 0.7800
c = 4.60

Area Number	A (ha)	C	AC	Tc (min.)	I (mm/h)	Q (m^3/s)	Q (L/s)
A1 pre (Towards Lakeshore Road West)	0.049	0.25	0.01	15	59.9	0.002	2.1
A2 pre (Towards Creek along North Crescent)	0.421	0.42	0.18	15	59.9	0.029	29.1

Event 5 yr
IDF Data Set Region of Peel
a = 820
b = 0.7800
c = 4.60

Area Number	A (ha)	C	AC	Tc (min.)	I (mm/h)	Q (m^3/s)	Q (L/s)
A1 pre (Towards Lakeshore Road West)	0.049	0.25	0.01	15.0	80.5	0.003	2.8
A2 pre (Towards Creek along North Crescent)	0.421	0.42	0.18	15.0	80.5	0.039	39.2

Event 10 yr
IDF Data Set Region of Peel
a = 1010
b = 0.7800
c = 4.60

Area Number	A (ha)	C	AC	Tc (min.)	I (mm/h)	Q (m^3/s)	Q (L/s)
A1 pre (Towards Lakeshore Road West)	0.049	0.25	0.01	15	99.2	0.003	3.4
A2 pre (Towards Creek along North Crescent)	0.421	0.42	0.18	15	99.2	0.048	48.2

Event 25 yr
IDF Data Set Region of Peel
a = 1160
b = 0.7800
c = 4.60

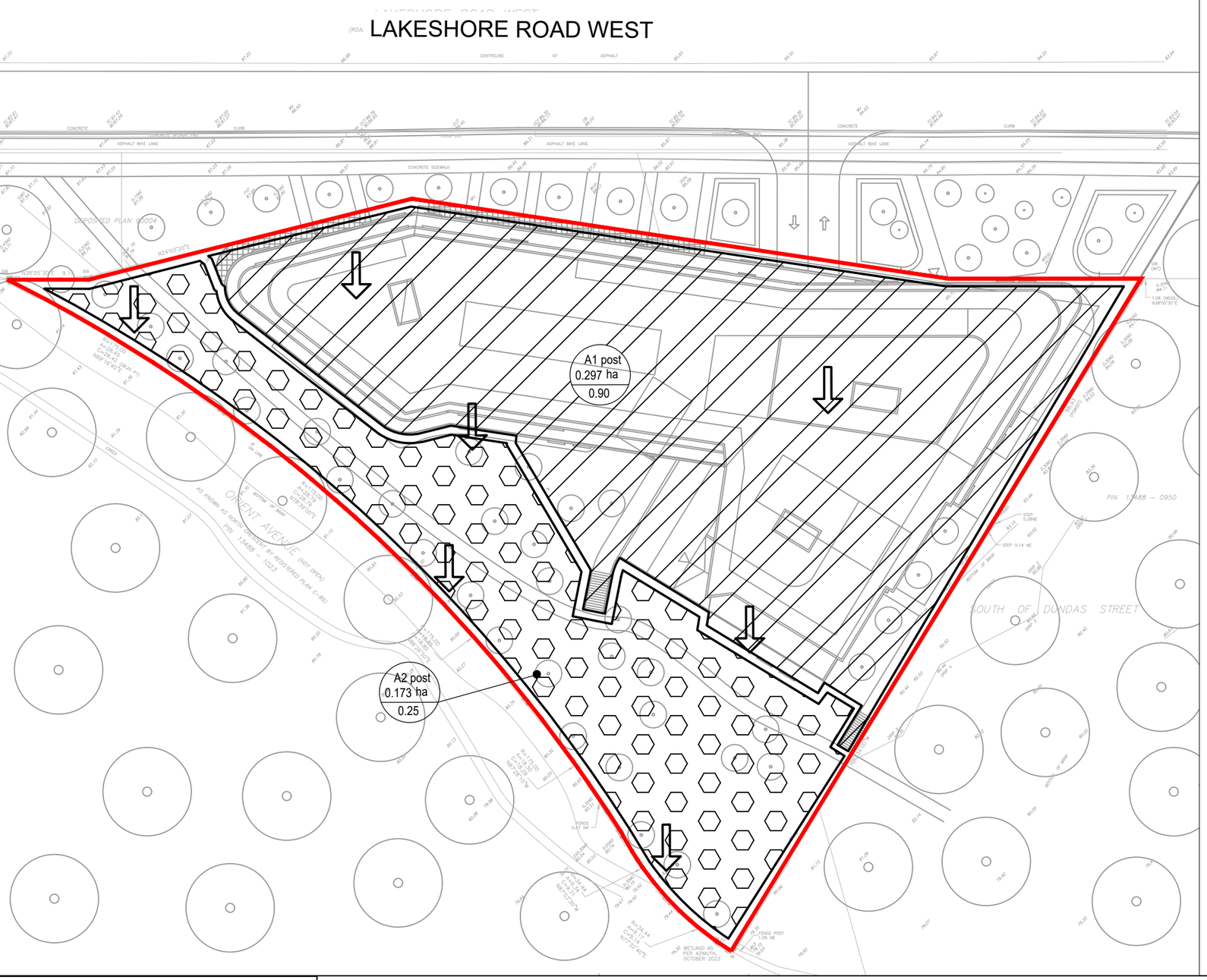
Area Number	A (ha)	C	AC	Tc (min.)	I (mm/h)	Q (m^3/s)	Q (L/s)
A1 pre (Towards Lakeshore Road West)	0.049	0.25	0.01	15	113.9	0.004	3.9
A2 pre (Towards Creek along North Crescent)	0.421	0.42	0.18	15	113.9	0.055	55.4

Event 50 yr
IDF Data Set Region of Peel
a = 1300
b = 0.7800
c = 4.70

Area Number	A (ha)	C	AC	Tc (min.)	I (mm/h)	Q (m^3/s)	Q (L/s)
A1 pre (Towards Lakeshore Road West)	0.049	0.25	0.01	15	127.1	0.004	4.4
A2 pre (Towards Creek along North Crescent)	0.421	0.42	0.18	15	127.1	0.062	61.8

Event 100 yr
IDF Data Set Region of Peel
a = 1450
b = 0.7800
c = 4.90

Area Number	A (ha)	C	AC	Tc (min.)	I (mm/h)	Q (m^3/s)	Q (L/s)
A1 pre (Towards Lakeshore Road West)	0.049	0.25	0.01	15	140.7	0.005	4.8
A2 pre (Towards Creek along North Crescent)	0.421	0.42	0.18	15	140.7	0.068	68.4



RUN-OFF COEFFICIENTS				
DRAINAGE AREA	LEGEND	COMPOSITE COEFFICIENT	AREA (ha)	TOTAL AREA (ha)
A1 POST (CONTROLLED IN UNDERGROUND STORAGE TANK)		0.90	0.297	0.470
A2 POST (UNCONTROLLED AREA TOWARDS ORIENT AVENUE)		0.90	0.173	

Lithos

150 Bermonsdey Road, North York, Ontario M4A 1Y1

LEGEND

A1 post / 0.04 ha / 0.50 — STORM DRAINAGE AREA NUMBER; DRAINAGE AREA (ha); COMPOSITE RUNOFF COEFFICIENT

POST-DEVELOPMENT STORM DRAINAGE AREA

PROPERTY LINE

DRAINAGE DIRECTION - BOTH MANOR AND MAJOR DRAINAGE PATTERNS

POST-DEVELOPMENT STORM DRAINAGE AREA PLAN

RESIDENTIAL-USE DEVELOPMENT
900 LAKESHORE ROAD WEST
MISSISSAUGA, ONTARIO

DATE: NOVEMBER 2024	PROJECT No: UD23-058
SCALE: N.T.S.	FIGURE No: DAP2

Lithos

Modified Rational Method - Two Year Storm

Site Flow and Storage Summary

900 Lakeshore Road West

File No. UD23-058

Date: November 2024

2-Year Design Storm	
a=	610
b=	0.78
c=	4.60
I =	a / (c + t)^b

Controlled Area A1 Post (towards Creek along North Crescent)

Area (A1) = **0.297** ha
"C" = **0.90**
AC1= **0.27**
Tc = **15.0** min
Time Increment = **5.0** min

Max Release Rate = **44.5** L/s

Uncontrolled Area A2 Post (towards Creek along North Crescent)

Area (A2) = **0.173** ha
"C" = **0.25**
AC2= **0.04**
Tc = **15.0** min
Time Increment = **5.0** min

Max Release Rate = **7.2** L/s

TOTAL SITE

2-yr Pre-Development Allowable Site Release Rate= **29.1** L/s

Uncontrolled Release rate= 7.2 L/s

Allowable Release Rate= 21.9 L/s

Min. Storage= 20.4 m³

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Time	**Rainfall Intensity**	**Rainfall Rate (A1 Post)**	**Total Storm Volume (A1 Post)**	**Rainfall Rate (A2 Post)**	**Total Storm Volume (A2 Post)**	**Target Released Volume**	**Total Required Storage**
(min)	**(mm/hr)**	**(m^3/s)**	**(m^3)**	**(m^3/s)**	**(m^3)**	**(m^3)**	**(m^3)**
15.0	59.9	0.045	40.06	0.007	6.47	19.7	20.35
20.0	50.2	0.037	44.74	0.006	7.22	26.3	18.46
25.0	43.4	0.032	48.41	0.005	7.81	32.9	15.56
30.0	38.4	0.029	51.43	0.005	8.30	39.4	12.01
35.0	34.6	0.026	54.01	0.004	8.72	46.0	8.02
40.0	31.5	0.023	56.25	0.004	9.08	52.6	3.69
45.0	29.0	0.022	58.25	0.003	9.40	59.1	0.00
50.0	26.9	0.020	60.05	0.003	9.69	65.7	0.00
55.0	25.2	0.019	61.70	0.003	9.96	72.3	0.00
60.0	23.6	0.018	63.20	0.003	10.20	78.8	0.00
65.0	22.3	0.017	64.60	0.003	10.43	85.4	0.00
70.0	21.1	0.016	65.91	0.003	10.64	92.0	0.00
75.0	20.1	0.015	67.13	0.002	10.83	98.6	0.00
80.0	19.1	0.014	68.28	0.002	11.02	105.1	0.00
85.0	18.3	0.014	69.37	0.002	11.20	111.7	0.00
90.0	17.5	0.013	70.41	0.002	11.36	118.3	0.00
95.0	16.9	0.013	71.39	0.002	11.52	124.8	0.00
100.0	16.2	0.012	72.33	0.002	11.67	131.4	0.00
105.0	15.6	0.012	73.23	0.002	11.82	138.0	0.00
110.0	15.1	0.011	74.10	0.002	11.96	144.5	0.00
115.0	14.6	0.011	74.93	0.002	12.09	151.1	0.00
120.0	14.2	0.011	75.73	0.002	12.22	157.7	0.00
125.0	13.7	0.010	76.50	0.002	12.35	164.3	0.00
130.0	13.3	0.010	77.24	0.002	12.47	170.8	0.00
135.0	13.0	0.010	77.97	0.002	12.58	177.4	0.00
140.0	12.6	0.009	78.66	0.002	12.70	184.0	0.00
145.0	12.3	0.009	79.34	0.001	12.81	190.5	0.00
150.0	12.0	0.009	80.00	0.001	12.91	197.1	0.00
155.0	11.7	0.009	80.64	0.001	13.01	203.7	0.00
160.0	11.4	0.008	81.26	0.001	13.12	210.2	0.00
165.0	11.1	0.008	81.87	0.001	13.21	216.8	0.00
170.0	10.9	0.008	82.46	0.001	13.31	223.4	0.00
175.0	10.6	0.008	83.03	0.001	13.40	230.0	0.00
180.0	10.4	0.008	83.60	0.001	13.49	236.5	0.00
185.0	10.2	0.008	84.15	0.001	13.58	243.1	0.00
190.0	10.0	0.007	84.68	0.001	13.67	249.7	0.00
195.0	9.8	0.007	85.21	0.001	13.75	256.2	0.00
200.0	9.6	0.007	85.72	0.001	13.84	262.8	0.00
205.0	9.4	0.007	86.23	0.001	13.92	269.4	0.00
210.0	9.3	0.007	86.72	0.001	14.00	275.9	0.00
215.0	9.1	0.007	87.21	0.001	14.07	282.5	0.00
220.0	8.9	0.007	87.68	0.001	14.15	289.1	0.00
225.0	8.8	0.007	88.15	0.001	14.23	295.7	0.00
230.0	8.6	0.006	88.60	0.001	14.30	302.2	0.00
235.0	8.5	0.006	89.05	0.001	14.37	308.8	0.00
240.0	8.4	0.006	89.49	0.001	14.44	315.4	0.00
245.0	8.2	0.006	89.93	0.001	14.51	321.9	0.00

Lithos

Modified Rational Method - Five Year Storm

Site Flow and Storage Summary

900 Lakeshore Road West

File No. UD23-058

Date: November 2024

5-Year Design Storm	
a=	820
b=	0.78
c=	4.60
I =	a / (c + t)^b

Controlled Area A1 Post (towards Creek along North Crescent)

Area (A1) = **0.297** ha
"C" = **0.90**
AC1= **0.27**
Tc = **15.0** min
Time Increment = **5.0** min

Max Release Rate = **59.8** L/s

Uncontrolled Area A2 Post (towards Creek along North Crescent)

Area (A2) = **0.173** ha
"C" = **0.25**
AC2= **0.04**
Tc = **15.0** min
Time Increment = **5.0** min

Max Release Rate = **9.7** L/s

TOTAL SITE

2-yr Pre-Development Allowable Site Release Rate= **29.1** L/s

Uncontrolled Release rate= 9.7 L/s
Allowable Release Rate= 19.4 L/s

Min. Storage= 36.9 m³

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Time (min)	**Rainfall Intensity** (mm/hr)	**Rainfall Rate (A1 Post)** (m^3/s)	**Total Storm Volume (A1 Post)** (m^3)	**Rainfall Rate (A2 Post)** (m^3/s)	**Total Storm Volume (A2 Post)** (m^3)	**Target Released Volume** (m^3)	**Total Required Storage** (m^3)
15.0	80.5	0.060	53.85	0.010	8.69	17.5	36.39
20.0	67.4	0.050	60.14	0.008	9.71	23.3	36.86
25.0	58.4	0.043	65.07	0.007	10.50	29.1	35.97
30.0	51.7	0.038	69.14	0.006	11.16	34.9	34.22
35.0	46.5	0.035	72.60	0.006	11.72	40.7	31.86
40.0	42.4	0.032	75.62	0.005	12.20	46.6	29.06
45.0	39.0	0.029	78.31	0.005	12.64	52.4	25.93
50.0	36.2	0.027	80.73	0.004	13.03	58.2	22.53
55.0	33.8	0.025	82.93	0.004	13.39	64.0	18.91
60.0	31.8	0.024	84.96	0.004	13.71	69.8	15.12
65.0	30.0	0.022	86.84	0.004	14.02	75.7	11.18
70.0	28.4	0.021	88.60	0.003	14.30	81.5	7.12
75.0	27.0	0.020	90.24	0.003	14.56	87.3	2.94
80.0	25.7	0.019	91.79	0.003	14.81	93.1	0.00
85.0	24.6	0.018	93.26	0.003	15.05	98.9	0.00
90.0	23.6	0.018	94.65	0.003	15.28	104.8	0.00
95.0	22.7	0.017	95.97	0.003	15.49	110.6	0.00
100.0	21.8	0.016	97.24	0.003	15.69	116.4	0.00
105.0	21.0	0.016	98.45	0.003	15.89	122.2	0.00
110.0	20.3	0.015	99.61	0.002	16.08	128.0	0.00
115.0	19.6	0.015	100.72	0.002	16.26	133.9	0.00
120.0	19.0	0.014	101.80	0.002	16.43	139.7	0.00
125.0	18.4	0.014	102.84	0.002	16.60	145.5	0.00
130.0	17.9	0.013	103.84	0.002	16.76	151.3	0.00
135.0	17.4	0.013	104.81	0.002	16.92	157.1	0.00
140.0	16.9	0.013	105.75	0.002	17.07	163.0	0.00
145.0	16.5	0.012	106.66	0.002	17.21	168.8	0.00
150.0	16.1	0.012	107.54	0.002	17.36	174.6	0.00
155.0	15.7	0.012	108.40	0.002	17.50	180.4	0.00
160.0	15.3	0.011	109.24	0.002	17.63	186.2	0.00
165.0	15.0	0.011	110.05	0.002	17.76	192.1	0.00
170.0	14.6	0.011	110.85	0.002	17.89	197.9	0.00
175.0	14.3	0.011	111.62	0.002	18.02	203.7	0.00
180.0	14.0	0.010	112.38	0.002	18.14	209.5	0.00
185.0	13.7	0.010	113.12	0.002	18.26	215.3	0.00
190.0	13.4	0.010	113.84	0.002	18.37	221.2	0.00
195.0	13.2	0.010	114.54	0.002	18.49	227.0	0.00
200.0	12.9	0.010	115.24	0.002	18.60	232.8	0.00
205.0	12.7	0.009	115.91	0.002	18.71	238.6	0.00
210.0	12.4	0.009	116.58	0.001	18.82	244.4	0.00
215.0	12.2	0.009	117.23	0.001	18.92	250.3	0.00
220.0	12.0	0.009	117.87	0.001	19.02	256.1	0.00
225.0	11.8	0.009	118.49	0.001	19.12	261.9	0.00
230.0	11.6	0.009	119.11	0.001	19.22	267.7	0.00
235.0	11.4	0.008	119.71	0.001	19.32	273.5	0.00
240.0	11.2	0.008	120.30	0.001	19.42	279.4	0.00
245.0	11.1	0.008	120.89	0.001	19.51	285.2	0.00

Lithos

Modified Rational Method - Ten Year Storm

Site Flow and Storage Summary

900 Lakeshore Road West

File No. UD23-058

Date: November 2024

		Controlled Area A1 Post (towards Creek along North Crescent)			**Uncontrolled Area A2 Post (towards Creek along North Crescent)**			**TOTAL SITE**	
		Area (A1) =	**0.297**	ha	Area (A2) =	**0.173**	ha		
Adjustment Factor		"C_{10}" =	**0.90**		"C_{10}" =	**0.25**		2-yr Pre-Development Allowable Site Release Rate=	**29.1** L/s
C(10) =1.0 *C		AC1=	**0.27**		AC2=	**0.04**			
		Tc =	**15.0**	min	Tc =	**15.0**	min		
		Time Increment =	**5.0**	min	Time Increment =	**5.0**	min	**Uncontrolled Release rate=**	**11.9 L/s**
								Allowable Release Rate=	**17.2 L/s**
10-Year Design Storm		Max Release Rate =	**73.7**	L/s	Max Release Rate =	**11.9**	L/s		
a=	1010							**Min. Storage=**	**54.3 m³**
b=	0.78								
c=	4.60								
I =	a / (c + t)^b								

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Time	**Rainfall Intensity**	**Rainfall Rate (A1 Post)**	**Total Storm Volume (A1 Post)**	**Rainfall Rate (A2 Post)**	**Total Storm Volume (A2 Post)**	**Target Released Volume**	**Total Required Storage**
(min)	**(mm/hr)**	**(m^3/s)**	**(m^3)**	**(m^3/s)**	**(m^3)**	**(m^3)**	**(m^3)**
15.0	99.2	0.074	66.33	0.012	10.71	15.5	50.85
20.0	83.1	0.062	74.07	0.010	11.96	20.6	53.43
25.0	71.9	0.053	80.15	0.009	12.94	25.8	54.35
30.0	63.7	0.047	85.16	0.008	13.74	31.0	54.20
35.0	57.3	0.043	89.42	0.007	14.43	36.1	53.30
40.0	52.2	0.039	93.14	0.006	15.03	41.3	51.86
45.0	48.1	0.036	96.45	0.006	15.57	46.4	50.01
50.0	44.6	0.033	99.43	0.005	16.05	51.6	47.83
55.0	41.7	0.031	102.15	0.005	16.49	56.8	45.39
60.0	39.1	0.029	104.65	0.005	16.89	61.9	42.73
65.0	36.9	0.027	106.97	0.004	17.26	67.1	39.89
70.0	35.0	0.026	109.13	0.004	17.61	72.2	36.89
75.0	33.2	0.025	111.15	0.004	17.94	77.4	33.75
80.0	31.7	0.024	113.06	0.004	18.25	82.6	30.50
85.0	30.3	0.023	114.87	0.004	18.54	87.7	27.15
90.0	29.0	0.022	116.58	0.003	18.82	92.9	23.70
95.0	27.9	0.021	118.21	0.003	19.08	98.0	20.17
100.0	26.9	0.020	119.77	0.003	19.33	103.2	16.57
105.0	25.9	0.019	121.26	0.003	19.57	108.4	12.90
110.0	25.0	0.019	122.69	0.003	19.80	113.5	9.17
115.0	24.2	0.018	124.06	0.003	20.02	118.7	5.38
120.0	23.4	0.017	125.39	0.003	20.24	123.8	1.55
125.0	22.7	0.017	126.66	0.003	20.44	129.0	0.00
130.0	22.1	0.016	127.90	0.003	20.64	134.2	0.00
135.0	21.4	0.016	129.09	0.003	20.83	139.3	0.00
140.0	20.9	0.016	130.25	0.003	21.02	144.5	0.00
145.0	20.3	0.015	131.37	0.002	21.20	149.6	0.00
150.0	19.8	0.015	132.46	0.002	21.38	154.8	0.00
155.0	19.3	0.014	133.52	0.002	21.55	160.0	0.00
160.0	18.9	0.014	134.55	0.002	21.72	165.1	0.00
165.0	18.4	0.014	135.55	0.002	21.88	170.3	0.00
170.0	18.0	0.013	136.53	0.002	22.04	175.4	0.00
175.0	17.6	0.013	137.48	0.002	22.19	180.6	0.00
180.0	17.2	0.013	138.41	0.002	22.34	185.8	0.00
185.0	16.9	0.013	139.32	0.002	22.49	190.9	0.00
190.0	16.5	0.012	140.21	0.002	22.63	196.1	0.00
195.0	16.2	0.012	141.08	0.002	22.77	201.2	0.00
200.0	15.9	0.012	141.94	0.002	22.91	206.4	0.00
205.0	15.6	0.012	142.77	0.002	23.04	211.6	0.00
210.0	15.3	0.011	143.59	0.002	23.17	216.7	0.00
215.0	15.1	0.011	144.39	0.002	23.30	221.9	0.00
220.0	14.8	0.011	145.18	0.002	23.43	227.0	0.00
225.0	14.5	0.011	145.95	0.002	23.56	232.2	0.00
230.0	14.3	0.011	146.70	0.002	23.68	237.4	0.00
235.0	14.1	0.010	147.45	0.002	23.80	242.5	0.00
240.0	13.8	0.010	148.18	0.002	23.92	247.7	0.00
245.0	13.6	0.010	148.90	0.002	24.03	252.8	0.00

Lithos

Modified Rational Method - Twenty Five Year Storm

Site Flow and Storage Summary

900 Lakeshore Road West

File No. UD23-058

Date: November 2024

		Controlled Area A1 Post (towards Creek along North Crescent)			**Uncontrolled Area A2 Post (towards Creek along North Crescent)**			**TOTAL SITE**	
		Area (A1) =	**0.297**	ha	Area (A2) =	**0.173**	ha		
Adjustment Factor		"C_{25}" =	**0.99**		"C_{25}" =	**0.28**		2-yr Pre-Development Allowable Site Release Rate=	**29.1** L/s
C(25) =1.1 *C		AC1=	**0.29**		AC2=	**0.05**			
		Tc =	**15.0**	min	Tc =	**15.0**	min		
		Time Increment =	**5.0**	min	Time Increment =	**5.0**	min	**Uncontrolled Release rate=**	**15.0 L/s**
								Allowable Release Rate=	**14.1 L/s**
25-Year Design Storm		Max Release Rate =	**93.1**	L/s	Max Release Rate =	**15.0**	L/s		
a=	1160							**Min. Storage=**	**83.8 m³**
b=	0.78								
c=	4.60								
I =	a / (c + t)^b								

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Time	**Rainfall Intensity**	**Rainfall Rate (A1 Post)**	**Total Storm Volume (A1 Post)**	**Rainfall Rate (A2 Post)**	**Total Storm Volume (A2 Post)**	**Target Released Volume**	**Total Required Storage**
(min)	**(mm/hr)**	**(m^3/s)**	**(m^3)**	**(m^3/s)**	**(m^3)**	**(m^3)**	**(m^3)**
15.0	113.9	0.093	83.80	0.015	13.52	12.7	71.11
20.0	95.4	0.078	93.58	0.013	15.10	16.9	76.66
25.0	82.6	0.068	101.26	0.011	16.34	21.2	80.11
30.0	73.1	0.060	107.58	0.010	17.36	25.4	82.20
35.0	65.8	0.054	112.97	0.009	18.23	29.6	83.36
40.0	60.0	0.049	117.67	0.008	18.99	33.8	83.83
45.0	55.2	0.045	121.85	0.007	19.67	38.1	83.78
50.0	51.2	0.042	125.62	0.007	20.27	42.3	83.32
55.0	47.8	0.039	129.05	0.006	20.83	46.5	82.52
60.0	44.9	0.037	132.21	0.006	21.34	50.8	81.45
65.0	42.4	0.035	135.14	0.006	21.81	55.0	80.15
70.0	40.2	0.033	137.87	0.005	22.25	59.2	78.65
75.0	38.2	0.031	140.43	0.005	22.66	63.5	76.98
80.0	36.4	0.030	142.84	0.005	23.05	67.7	75.16
85.0	34.8	0.028	145.12	0.005	23.42	71.9	73.21
90.0	33.4	0.027	147.28	0.004	23.77	76.1	71.14
95.0	32.0	0.026	149.34	0.004	24.10	80.4	68.97
100.0	30.8	0.025	151.31	0.004	24.42	84.6	66.71
105.0	29.7	0.024	153.19	0.004	24.72	88.8	64.36
110.0	28.7	0.023	155.00	0.004	25.02	93.1	61.94
115.0	27.8	0.023	156.74	0.004	25.30	97.3	59.45
120.0	26.9	0.022	158.41	0.004	25.57	101.5	56.89
125.0	26.1	0.021	160.02	0.003	25.83	105.8	54.27
130.0	25.3	0.021	161.58	0.003	26.08	110.0	51.60
135.0	24.6	0.020	163.09	0.003	26.32	114.2	48.88
140.0	24.0	0.020	164.55	0.003	26.56	118.4	46.11
145.0	23.3	0.019	165.97	0.003	26.79	122.7	43.30
150.0	22.7	0.019	167.34	0.003	27.01	126.9	40.44
155.0	22.2	0.018	168.68	0.003	27.22	131.1	37.55
160.0	21.7	0.018	169.98	0.003	27.43	135.4	34.62
165.0	21.2	0.017	171.25	0.003	27.64	139.6	31.66
170.0	20.7	0.017	172.49	0.003	27.84	143.8	28.67
175.0	20.2	0.017	173.69	0.003	28.03	148.1	25.64
180.0	19.8	0.016	174.87	0.003	28.22	152.3	22.59
185.0	19.4	0.016	176.02	0.003	28.41	156.5	19.51
190.0	19.0	0.016	177.14	0.003	28.59	160.7	16.40
195.0	18.6	0.015	178.24	0.002	28.77	165.0	13.27
200.0	18.3	0.015	179.32	0.002	28.94	169.2	10.12
205.0	17.9	0.015	180.37	0.002	29.11	173.4	6.94
210.0	17.6	0.014	181.40	0.002	29.28	177.7	3.74
215.0	17.3	0.014	182.42	0.002	29.44	181.9	0.53
220.0	17.0	0.014	183.41	0.002	29.60	186.1	0.00
225.0	16.7	0.014	184.38	0.002	29.76	190.4	0.00
230.0	16.4	0.013	185.34	0.002	29.91	194.6	0.00
235.0	16.2	0.013	186.28	0.002	30.07	198.8	0.00
240.0	15.9	0.013	187.20	0.002	30.21	203.0	0.00
245.0	15.7	0.013	188.11	0.002	30.36	207.3	0.00

Lithos

Modified Rational Method - Fifty Year Storm

Site Flow and Storage Summary

900 Lakeshore Road West

File No. UD23-058

Date: November 2024

		Controlled Area A1 Post (towards Creek along North Crescent)			**Uncontrolled Area A2 Post (towards Creek along North Crescent)**			**TOTAL SITE**	
		Area (A1) =	**0.297**	ha	Area (A2) =	**0.173**	ha		
Adjustment Factor		"C_{50}" =	**1.08**		"C_{50}" =	**0.30**		2-yr Pre-Development Allowable Site Release Rate=	**29.1** L/s
C(50) =1.2 *C		AC1=	**0.32**		AC2=	**0.05**			
		Tc =	**15.0**	min	Tc =	**15.0**	min		
		Time Increment =	**5.0**	min	Time Increment =	**5.0**	min	**Uncontrolled Release rate=**	**18.3 L/s**
								Allowable Release Rate=	**10.8 L/s**
50-Year Design Storm		Max Release Rate =	**113.4**	L/s	Max Release Rate =	**18.3**	L/s		
a=	1300							**Min. Storage=**	**123.0 m³**
b=	0.78								
c=	4.70								
I =	a / (c + t)^b								

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Time	**Rainfall Intensity**	**Rainfall Rate (A1 Post)**	**Total Storm Volume (A1 Post)**	**Rainfall Rate (A2 Post)**	**Total Storm Volume (A2 Post)**	**Target Released Volume**	**Total Required Storage**
(min)	**(mm/hr)**	**(m^3/s)**	**(m^3)**	**(m^3/s)**	**(m^3)**	**(m^3)**	**(m^3)**
15.0	127.1	0.113	102.04	0.018	16.47	9.7	92.32
20.0	106.6	0.095	114.05	0.015	18.41	13.0	101.09
25.0	92.3	0.082	123.47	0.013	19.93	16.2	107.27
30.0	81.7	0.073	131.23	0.012	21.18	19.4	111.79
35.0	73.6	0.066	137.84	0.011	22.25	22.7	115.16
40.0	67.1	0.060	143.61	0.010	23.18	25.9	117.69
45.0	61.8	0.055	148.74	0.009	24.01	29.2	119.58
50.0	57.3	0.051	153.36	0.008	24.75	32.4	120.96
55.0	53.5	0.048	157.57	0.008	25.43	35.6	121.93
60.0	50.3	0.045	161.44	0.007	26.06	38.9	122.56
65.0	47.4	0.042	165.03	0.007	26.64	42.1	122.91
70.0	45.0	0.040	168.38	0.006	27.18	45.4	123.02
75.0	42.7	0.038	171.51	0.006	27.68	48.6	122.91
80.0	40.8	0.036	174.47	0.006	28.16	51.8	122.63
85.0	39.0	0.035	177.26	0.006	28.61	55.1	122.18
90.0	37.4	0.033	179.91	0.005	29.04	58.3	121.59
95.0	35.9	0.032	182.44	0.005	29.44	61.6	120.88
100.0	34.5	0.031	184.85	0.005	29.83	64.8	120.05
105.0	33.3	0.030	187.16	0.005	30.21	68.0	119.12
110.0	32.2	0.029	189.37	0.005	30.56	71.3	118.09
115.0	31.1	0.028	191.50	0.004	30.91	74.5	116.98
120.0	30.1	0.027	193.54	0.004	31.24	77.8	115.78
125.0	29.2	0.026	195.52	0.004	31.56	81.0	114.52
130.0	28.4	0.025	197.43	0.004	31.86	84.2	113.19
135.0	27.6	0.025	199.28	0.004	32.16	87.5	111.80
140.0	26.8	0.024	201.07	0.004	32.45	90.7	110.35
145.0	26.1	0.023	202.80	0.004	32.73	94.0	108.84
150.0	25.5	0.023	204.49	0.004	33.00	97.2	107.29
155.0	24.9	0.022	206.12	0.004	33.27	100.4	105.68
160.0	24.3	0.022	207.72	0.003	33.52	103.7	104.04
165.0	23.7	0.021	209.27	0.003	33.78	106.9	102.35
170.0	23.2	0.021	210.78	0.003	34.02	110.2	100.62
175.0	22.7	0.020	212.26	0.003	34.26	113.4	98.86
180.0	22.2	0.020	213.70	0.003	34.49	116.6	97.06
185.0	21.7	0.019	215.11	0.003	34.72	119.9	95.23
190.0	21.3	0.019	216.48	0.003	34.94	123.1	93.36
195.0	20.9	0.019	217.83	0.003	35.16	126.4	91.47
200.0	20.5	0.018	219.15	0.003	35.37	129.6	89.55
205.0	20.1	0.018	220.44	0.003	35.58	132.8	87.60
210.0	19.7	0.018	221.70	0.003	35.78	136.1	85.62
215.0	19.4	0.017	222.94	0.003	35.98	139.3	83.62
220.0	19.0	0.017	224.15	0.003	36.18	142.6	81.59
225.0	18.7	0.017	225.35	0.003	36.37	145.8	79.55
230.0	18.4	0.016	226.52	0.003	36.56	149.0	77.48
235.0	18.1	0.016	227.67	0.003	36.74	152.3	75.39
240.0	17.8	0.016	228.80	0.003	36.93	155.5	73.28
245.0	17.5	0.016	229.91	0.003	37.11	158.8	71.15

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Modified Rational Method - Hundred Year Storm

Site Flow and Storage Summary

900 Lakeshore Road West

File No. UD23-058

Date: November 2024

		Controlled Area A1 Post (towards Creek along North Crescent)			**Uncontrolled Area A2 Post (towards Creek along North Crescent)**			**TOTAL SITE**	
		Area (A1) =	**0.297**	ha	Area (A2) =	**0.173**	ha		
Adjustment Factor		"C_{100}" =	**1.13**		"C_{100}" =	**0.31**		2-yr Pre-Development Allowable Site Release Rate=	**29.1** L/s
C(100) =1.25 *C		AC1=	**0.33**		AC2=	**0.05**			
		Tc =	**15.0**	min	Tc =	**15.0**	min		
		Time Increment =	**5.0**	min	Time Increment =	**5.0**	min	**Uncontrolled Release rate=**	**21.1 L/s**
								Allowable Release Rate=	**8.0 L/s**
100-Year Design Storm		Max Release Rate =	**130.7**	L/s	Max Release Rate =	**21.1**	L/s		
a=	1450							**Min. Storage=**	**167.0 m³**
b=	0.78								
c=	4.90								
I =	a / (c + t)^b								

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Time	**Rainfall Intensity**	**Rainfall Rate (A1 Post)**	**Total Storm Volume (A1 Post)**	**Rainfall Rate (A2 Post)**	**Total Storm Volume (A2 Post)**	**Target Released Volume**	**Total Required Storage**
(min)	**(mm/hr)**	**(m^3/s)**	**(m^3)**	**(m^3/s)**	**(m^3)**	**(m^3)**	**(m^3)**
15.0	140.7	0.131	117.63	0.021	18.98	7.2	110.43
20.0	118.1	0.110	131.68	0.018	21.25	9.6	122.08
25.0	102.4	0.095	142.71	0.015	23.03	12.0	130.71
30.0	90.8	0.084	151.79	0.014	24.50	14.4	137.39
35.0	81.8	0.076	159.53	0.012	25.75	16.8	142.73
40.0	74.6	0.069	166.28	0.011	26.84	19.2	147.08
45.0	68.7	0.064	172.27	0.010	27.80	21.6	150.67
50.0	63.8	0.059	177.68	0.010	28.68	24.0	153.68
55.0	59.6	0.055	182.60	0.009	29.47	26.4	156.20
60.0	56.0	0.052	187.12	0.008	30.20	28.8	158.32
65.0	52.8	0.049	191.31	0.008	30.88	31.2	160.11
70.0	50.0	0.046	195.22	0.008	31.51	33.6	161.62
75.0	47.6	0.044	198.89	0.007	32.10	36.0	162.89
80.0	45.4	0.042	202.33	0.007	32.66	38.4	163.93
85.0	43.4	0.040	205.60	0.007	33.18	40.8	164.80
90.0	41.6	0.039	208.69	0.006	33.68	43.2	165.49
95.0	40.0	0.037	211.64	0.006	34.16	45.6	166.04
100.0	38.5	0.036	214.45	0.006	34.61	48.0	166.45
105.0	37.1	0.034	217.14	0.006	35.05	50.4	166.74
110.0	35.8	0.033	219.72	0.005	35.46	52.8	166.92
115.0	34.7	0.032	222.20	0.005	35.86	55.2	167.00
120.0	33.6	0.031	224.59	0.005	36.25	57.6	166.99
125.0	32.6	0.030	226.89	0.005	36.62	60.0	166.89
130.0	31.6	0.029	229.12	0.005	36.98	62.4	166.72
135.0	30.7	0.029	231.27	0.005	37.33	64.8	166.47
140.0	29.9	0.028	233.36	0.004	37.66	67.2	166.16
145.0	29.1	0.027	235.38	0.004	37.99	69.6	165.78
150.0	28.4	0.026	237.34	0.004	38.31	72.0	165.34
155.0	27.7	0.026	239.25	0.004	38.61	74.4	164.85
160.0	27.0	0.025	241.11	0.004	38.91	76.8	164.31
165.0	26.4	0.025	242.92	0.004	39.21	79.2	163.72
170.0	25.8	0.024	244.68	0.004	39.49	81.6	163.08
175.0	25.3	0.023	246.40	0.004	39.77	84.0	162.40
180.0	24.7	0.023	248.08	0.004	40.04	86.4	161.68
185.0	24.2	0.022	249.72	0.004	40.30	88.8	160.92
190.0	23.7	0.022	251.32	0.004	40.56	91.2	160.12
195.0	23.3	0.022	252.89	0.003	40.82	93.6	159.29
200.0	22.8	0.021	254.42	0.003	41.06	96.0	158.42
205.0	22.4	0.021	255.92	0.003	41.31	98.4	157.52
210.0	22.0	0.020	257.40	0.003	41.54	100.8	156.60
215.0	21.6	0.020	258.84	0.003	41.78	103.2	155.64
220.0	21.2	0.020	260.25	0.003	42.00	105.6	154.65
225.0	20.9	0.019	261.64	0.003	42.23	108.0	153.64
230.0	20.5	0.019	263.01	0.003	42.45	110.4	152.61
235.0	20.2	0.019	264.35	0.003	42.66	112.8	151.55
240.0	19.9	0.018	265.66	0.003	42.88	115.2	150.46
245.0	19.5	0.018	266.95	0.003	43.09	117.6	149.35

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Water Quality Calculations

900 Lakeshore Road West
File No. UD23-058
Date: November 2024
Prepared By: Dimitra Savvaoglou P.E., M.A.Sc.
Reviewed by: John Pasalidis, P.Eng., M.A.Sc

Surface	Method	Effective TSS Removal	Area (ha)	% Area of Controlled Site	Overall TSS Removal
Rooftop/ Landscaped / Hardscaped Areas	Inherent	80%	0.278	94%	75%
Driveway Area	Stormwater Treatment Device	80%	0.019	6%	5%
Total			0.297	100%	80%

Note: Uncontrolled water does not account in the above calculation

Appendix D

Sanitary Data Analysis

SANITARY SEWER DESIGN SHEET

900 Lakeshore Road West

CITY OF MISSISSAUGA

LOCATION	RESIDENTIAL							FLOW										SEWER DESIGN				
	SECTION AREA (ha.)	Townhouses (ha.)	Dwelling (ha.)	1 Bed Apts. @ 1.7 ppu	2 Bed Apts. @ 3.1 ppu	3 Bed Apts. @ 3.1 ppu	SECTION POP. (persons)	TOTAL ACCUM. POP. (persons)	AVERAGE RESIDENTIAL FLOW '@' 290 L/c/d (L/s)	HARMON PEAKING FACTOR	RES. PEAK FLOW (L/s)	AVERAGE COMMERCIAL FLOW @ 270 L/c/d (L/s)	TOTAL ACCUM. AREA (ha.)	INFILT. @ 0.26 L/s/ha. (L/s)	PEAK GROUNDWATER FLOW (L/s)	TOTAL DESIGN FLOW Towards Septic Tank (L/s)	TOTAL DESIGN FLOW Towards Lakeshore Road West (L/s)	PIPE LENGTH (m)	PIPE DIA. (mm)	SLOPE (%)	FULL FLOW CAPACITY n = 0.013 (L/sec)	% of DESIGN CAPACITY (%)
column number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Existing Condition																						
Residential-Use Development	0.470	0	0.026	0	0	0	5	16	0.18	4.39	0.774	0.00	0.470	0.122	0.00	**0.90**	**0.00**					
Proposed Condition																						
Residential-Use Development	0.470	7	0.000	127	35	19	421	421	1.41	4.01	5.67	0.00	0.470	0.000	0.55	**0.00**	**6.22**	30.3	50	FORCEMAIN		
															Total Net Flow	**-0.90**	**6.22**					

Residential Flow Rate - 290 litres/capita/day
The population equivalent for the townhouses was assumed at 2.7 people/townhouse.
The population equivalent for the 1.5 storey dwelling was assumed at 175 persons/ hectare.
Infiltration - 0.26 L/ha
Peaking Factor = 1 + [14 / (4 + $P^{0.5}$)], P=Population in thousands
Site Area: 0.470 ha

Prepared by: George Karagiannidis P.E., M.A.Sc.
Reviewed by: John Pasalidis P.Eng., M.A.Sc.
Date: November 2024

Project: 900 Lakeshore Road West
Project No: UD23-058
City of Mississauga

Sheet 1 OF 1

Appendix E

Water Data Analysis

WATER DEMAND

900 Lakeshore Road West, Mississauga

File No: PUD23-058

Date: November 2024

Prepared by: George Karagiannidis, P.E., M.A.Sc.

Reviewed By: John Pasalidis, P.Eng., M.A.Sc.

Fire Flow Calculation

1 $F = 220\ C\ (A)^{1/2}$

Where F= Fire flow in Lpm

C= construction type coefficient

= 0.6 Fire Resistive Construction

A = total floor area in sq.m. excluding basements, includes garage*

		Area Applied
Level 3 =	2220 m^2	100%
Level 4 =	2028 m^2	25%
Level 2 =	2157 m^2	25%
=	3,266 sq.m.	

Note: The levels indicated, reference the worst case scenario for townhouse fire separation according to the OBC

F = 7,543.95 L/min

F = 7,500 L/min Round to nearest 100 l/min

2 Occupancy Reduction

25% non-combustible occupancy

F = 5625 L/min

3 Sprinkler Reduction

30% Reduction for NFPA Sprinkler System

F = 3938 l/min

4 Separation Charge

0%	North	>45m
5%	East	30.1 to 45m
5%	West	30.1 to 45m
0%	South	>45m
10%	Total Separation Charge	563 L/min

F = 4,501.00 L/min

75.02 L/s

F = 1189 US GPM

Domestic Flow Calculations

Population =	421	Persons	(from sanitary design sheet for Residential)
Retail Area =	0	m^2	(from sanitary design sheet for Commercial)
Average Day Demand (Residential Use)=	270	L/cap/day	From Peel's 2020 Development Charges Background Study
Average Day Demand (Retail Use) =	250	L/emp/day	
=	1.32	L/s	
=	21	US GPM	

1 US Gallon=3.785 L

1 US GPM=15.852L/s

Max. Daily Demand Peaking Factor = 1.8 (For residential)

Max. Daily Demand = 2.37 L/s = 38 US GPM

or

Max. Hourly Demand Peaking Factor = 3.0 (For residential and commercial)

Max. Hourly Demand = 3.95 L/s = 63 US GPM

Max Daily Demand = 2.37 L/s

Fire Flow = 75.02 L/s

Required 'Design' Flow = 77.38 L/s

1227 US GPM

Note: Required 'Design' Flow is the maximum of either:

1) Fire Flow + Maximum Daily Demand
2) Maximum Hourly Demand

WATER DEMAND

900 Lakeshore Road West, Mississauga

File No: PUD23-058

Date: November 2024

Prepared by: George Karagiannidis, P.E., M.A.Sc.

Reviewed By: John Pasalidis, P.Eng., M.A.Sc.

Pressure Losses

Hazen-Williams Formula

$V = kCR_h^{0.63}xS^{0.54}$

k= 0.85 - conversion factor (0.849 for SI units and 1.318 for US customary units)

C= 140 - roughness coefficient (PVC : 140-150)

$S = h_f/L$

Rh= D/4 - hydraulic radius (D/4 for full flow, A/P_W for partially flow)

Fire Fighting and Domestic Head Loss

Flow Requirements=	77.4	L/s
Diameter=	150	mm
Area=	1.77E-02	m^2
L=	31.8	m
V=	4.38	m/s
S=	1.02E-01	
R_h=	0.04	
H_f=	3.24	m
=	4.62	psi

Flow Test *(dated: April 08, 2024)*

when:	Static Pressure =	90	psi	Flow =	0	GPM	=	0.00 L/s
	Residual Pressure =	86	psi	Flow =	1775.76	GPM	=	112.05 L/s

Pressure (psi)	***Flow (L/s)***
90	0.00
86	112.05
88.0	***77.38***

Based on the Pressure/Flow relationship, we have to confirm that the flow requirement of 77.38 L/s can be provided at minimum pressure (20.3 psi + Losses) as set out by the FUS guidelines

Fire Flow is above minimum of **24.92** psi (20.3+Hf)

Since the flow of 77.38 L/s required for the proposed development is provided in the existing watermain at 88.0 psi (which is more than the minimum of 24.92 psi), we anticipate that the existing watermain infrastructure can support the proposed development.

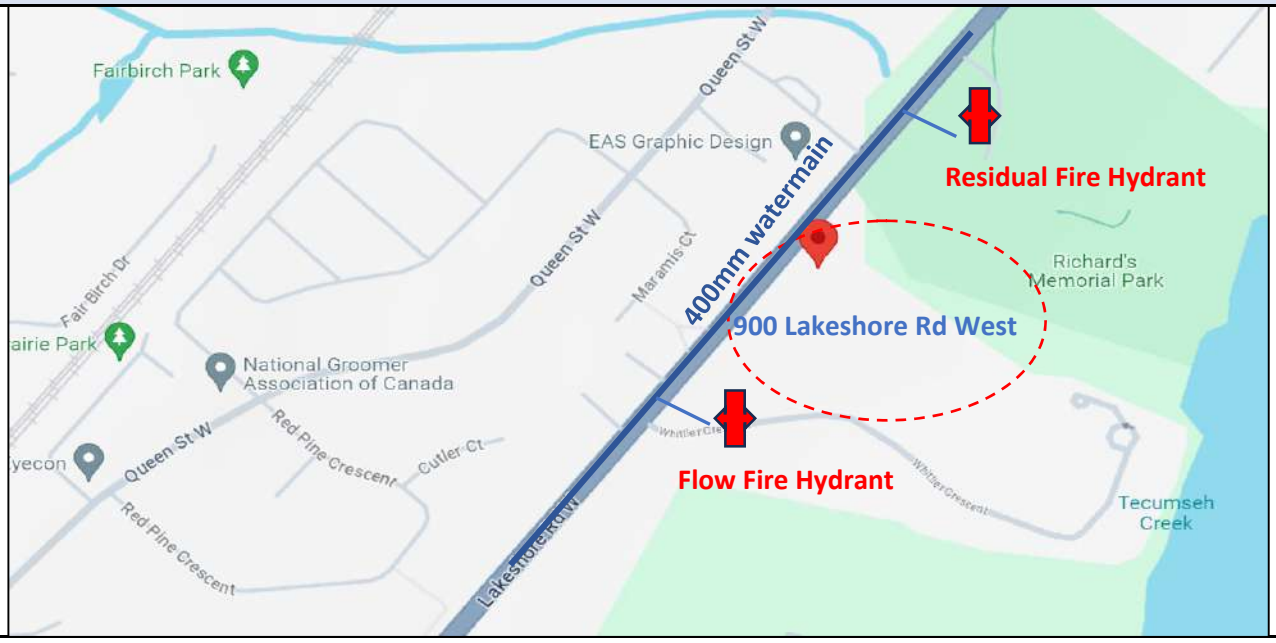
Lithos

Fire Hydrant Flow Test Report

General Information	
Report No. : **FHR-24-04-08-01**	Date : **8-Apr-24**
Project No. : **PUD23-058**	
Site Address/Location: **900 Lakeshore West, Mississauga.**	
Region/Municipality: **City of Mississauga**	
Residual Fire Hydrant Location/description :	**43.536459, -79.602013**
Flow Fire Hydrant Location/description :	**43.535333, -79.603242**
Watermain Pipe Size (mm) :	**400mm**
Test Equipment Orifice Size (in) :	**2.5**
Test Equipment Orifice coefficient :	**0.9**
Date of test:	**28-03-2024**
Time of test:	**10:45AM**
Temperature:	**7°C**
Testing Method : **NFPA 291 (Recommended Practice for Fire Flow Testing and Marking of Hydrants)**	

Attendants			
	Name	Title	Contact Info.
Lithos Inspector	**Peter**	**Project inspector**	**437-215-1144**
Lithos Inspector	**Pradeep**	**Construction inspector**	**(905)-609-3435**
Peel region Rep.	**Scott**	**Technician**	**(647)-821-3983**

Site Plan/Sketch



Pressure Readings (PSIG)			
Flow Hydrant's Outlet Condition	C-0 { Outlet #1 : Close; Outlet #2 : Close }	C-1 { Outlet #1 : Open; Outlet #2 : Close }	C-2 { Outlet #1 : Open; Outlet #2 : Open }
Residual Fire Hydrant	**90**	**88**	**86**
Flow Fire Hydrant		**52**	**28**

Lithos

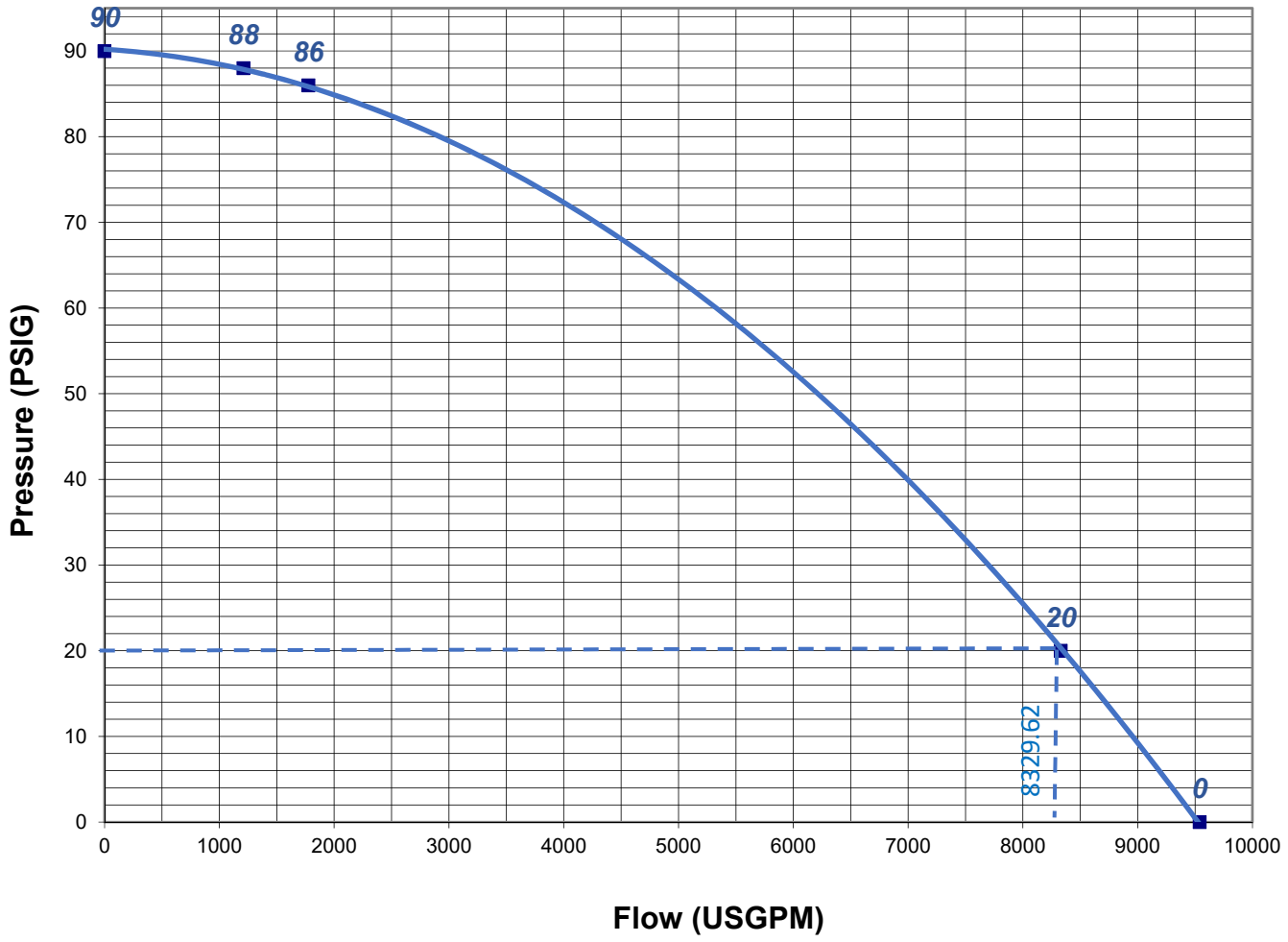
Fire Hydrant Flow Test Report

General Information	
Report No. : **FHR-24-04-08-01**	Date : **8-Apr-24**
Project No. : **PUD23-058**	
Site Address/Location: **900 Lakeshore West, Mississauga.**	
Region/Municipality: **City of Mississauga**	

Pressure-Flow Table

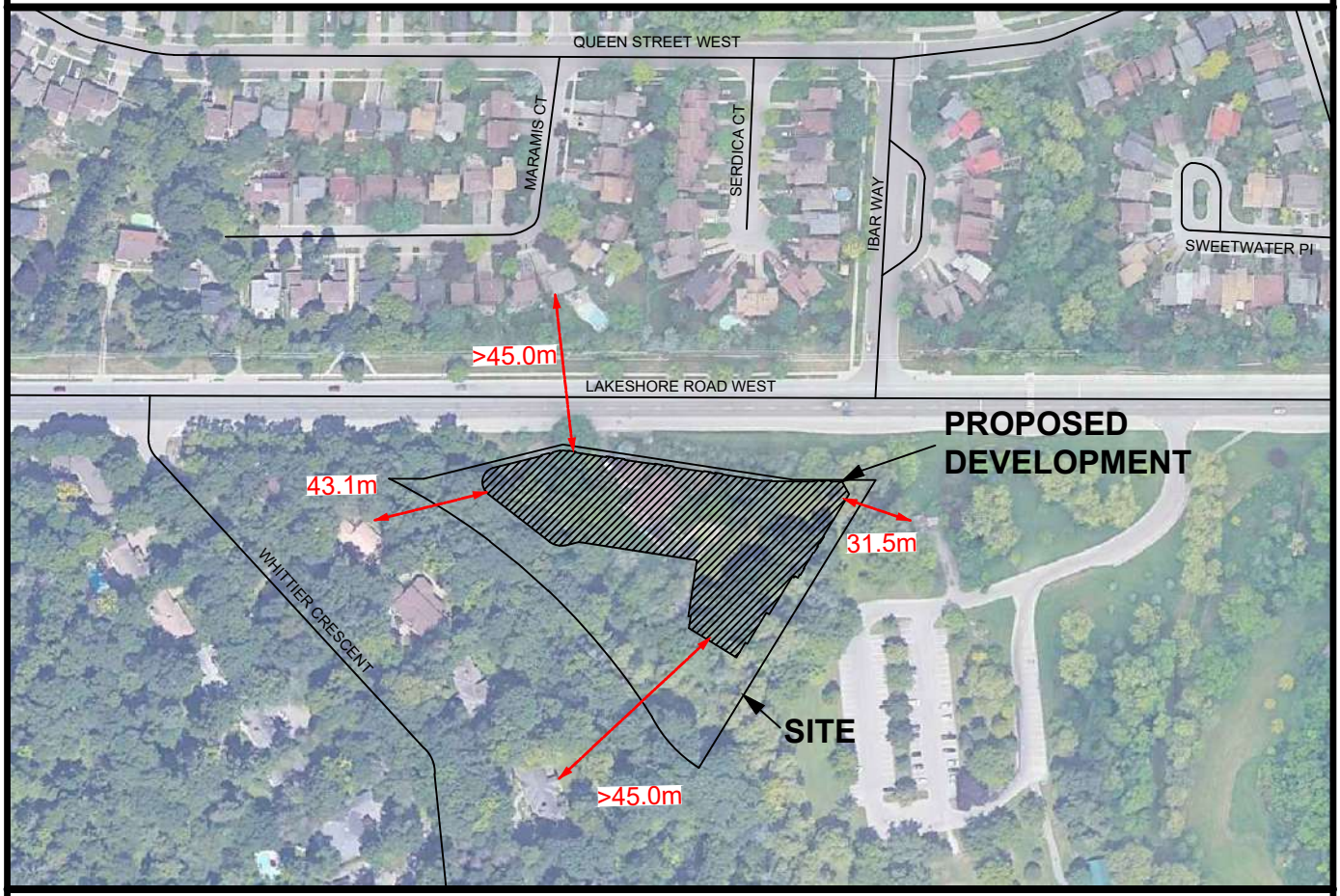
Condition		C-0	C-1	C-2	C(20)	C(0)
Pressure (PSIG)		90	88	86	20	0
Flow	(USGPM)	0	1209.98	1775.76	8329.62	9540.33
	(L/S)	0.00	76.35	112.05	525.60	601.99

Pressure-Flow Graph



Result

Maximum available flow at 20PSI = 8329.62 USGPM or 525.60 L/s



Lithos

150 Bermonsdey Road, North York, Ontario M4A 1Y1

SEPERATION CHARGE DISTANCES

RESIDENTIAL-USE DEVELOPMENT
900 LAKESHORE ROAD WEST
MISSISSAUGA, ONTARIO

DATE:	NOVEMBER 2024	PROJECT No:	UD23-058
SCALE:	N.T.S.	FIGURE No:	FIG 4