UNITED PROPERTY RESOURCE CORPORATION

DUNBARTON – FAIRPORT UNITED CHURCH

FUNCTIONAL SERVICING REPORT

OCTOBER 19, 2022

DUNBARTON – FAIRPORT UNITED CHURCH

FUNCTIONAL SERVICING REPORT

UNITED PROPERTY RESOURCE CORPORATION

FUNCTIONAL SERVICING REPORT

PROJECT NO.: 221-05497
DATE: OCTOBER 19 2022

WSP CANADA INC.

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1 INTRODUCTION

1.1 INTRODUCTION

This report has been prepared for the United Property Resource Corporation for the Dunbarton-Fairport United Church located at 1066 Dunbarton Road (hereinafter referred to as the "Site") in the City of Pickering, to identify any servicing and/or grading constraints and to identify how the site may be developed. The current development concept, as represented in the site plan drawings and development statistics prepared by KPMB Architects, has been enclosed with this submission. The development is bordered by Dunbarton Road to the south and east, and existing residential properties to the north and west. The location of the development block is identified on **Figure 1**. The existing site conditions are shown on **Figure 2** and details the Site Limits and the neighboring properties.

The purpose of this report is to describe the existing services in the vicinity of the Site to determine how these lands will be serviced by storm, sanitary and water. The report also reviews the site grading at a preliminary level to determine drainage boundaries and grading constraints. A separate Stormwater Management Report, also prepared by WSP Canada Inc, speaks to the Storm Water Management strategies including Water Quantity Control, Low Impact Development (LIDs) and Water Quality Control.

1.2 SITE DESCRIPTION

The total Site area is 0.79 ha (1.95 acres). The Site slopes from the northwest to the south and southeast ends of the site with existing localized low points to collect drainage. The existing overland flow route is split to the southeast towards Dunbarton Road and to the south also towards Dunbarton Road. There is an existing retaining wall along the south corner of the site, adjacent to Dunbarton Road and the existing church. The retaining wall is partially on the public right-of-way and will be maintained through the development of the site. Existing Site grading is shown on the Topographic Survey, **Figure 2**. The existing grades were established by field survey on April 22, 2022 by Speight, Van Nostrand & Gibson Limited.

There is an existing 9.0m wide active sanitary easement on the property. This easement runs perpendicular to Dunbarton Road along the north property line. Record drawings received from the Region of Durham indicate that this easement contains an active 200mm sanitary sewer.

1.3 PROPOSED DEVELOPMENT

The current concept development will consist of the south portion of the existing Dunbarton-Fairport United Church and four (4) townhouse blocks. The existing Dunbarton-Fairport United Church will be partially demolished as part of this development and will leave only the south portion of the existing building remaining as shown in **Figure 3**.

One (1) of the proposed townhouse blocks will be located on the east property lines and front the existing Dunbarton Road. The remaining three (3) townhouse blocks will be located along the north and northwest property line and will front a proposed private internal roadway. The townhouse blocks will contain between seven (7) and ten (10) units, for a total of 41 residential townhouse units. The end units of each townhouse block will be three (3) storey walk-ups consisting of three individual flats.

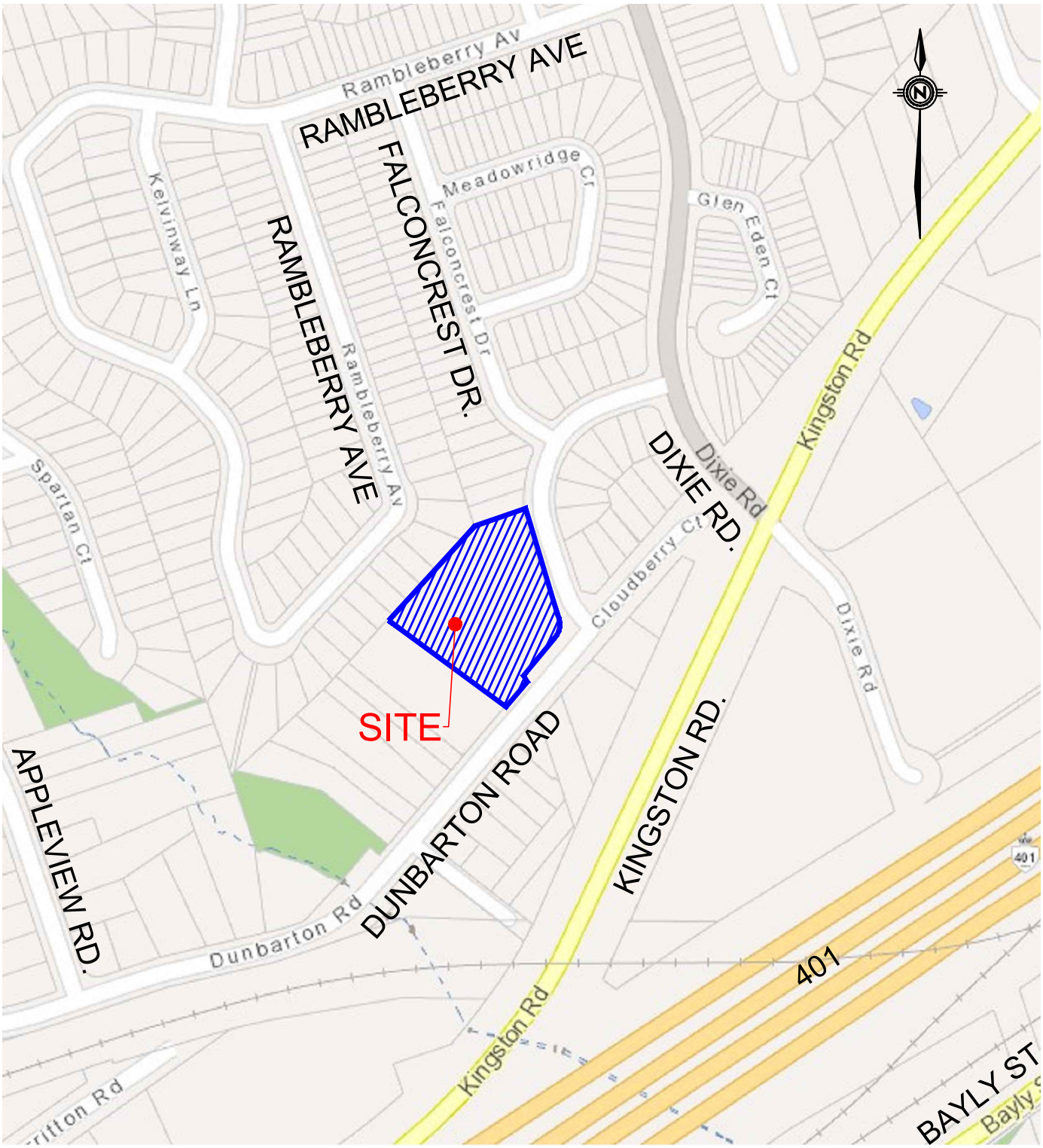
Parking for the proposed development will be handled by a mix of individual driveways for each townhouse unit, walk-up units only have one (1) driveway spot for the three (3) units. An additional 28 parking spaces will be provided along the private internal roadway which will provide visitor parking for the townhouse units and the existing church. Refer to Architectural drawings for a full breakdown of the site parking requirements.

The proposed development also includes a playground and a large open green space. In addition to the main green space there are other proposed soft landscaped areas as shown on the Architectural drawings.

The proposed development plan is shown on **Figure 3**.

1.4 REPORT OUTLINE

For the purpose of this report a number of preliminary figures have been prepared to clarify the preliminary servicing and grading issues and potential solutions. The Site limits are identified in **Figure 1** and was discussed in Section 1.2 of this report. The development block is identified by the Topographic Survey in **Figure 2**. The Conceptual Site Plan is shown in **Figure 3** outlining the conceptual layout. The Preliminary Site Grading section of this report outlines the issues encountered with the existing grade and solutions to control the major and minor overland flow, as shown in **Figure 4**. The Preliminary Site Servicing outlines the proposed watermain, sanitary, and storm connections for the Site, and schematically lays out the proposed on-site servicing, and can be seen in **Figure 5**.



CLIENT

UNITED PROPERTY RESOURCE CORPORATION

TITLE

SITE LOCATION PLAN

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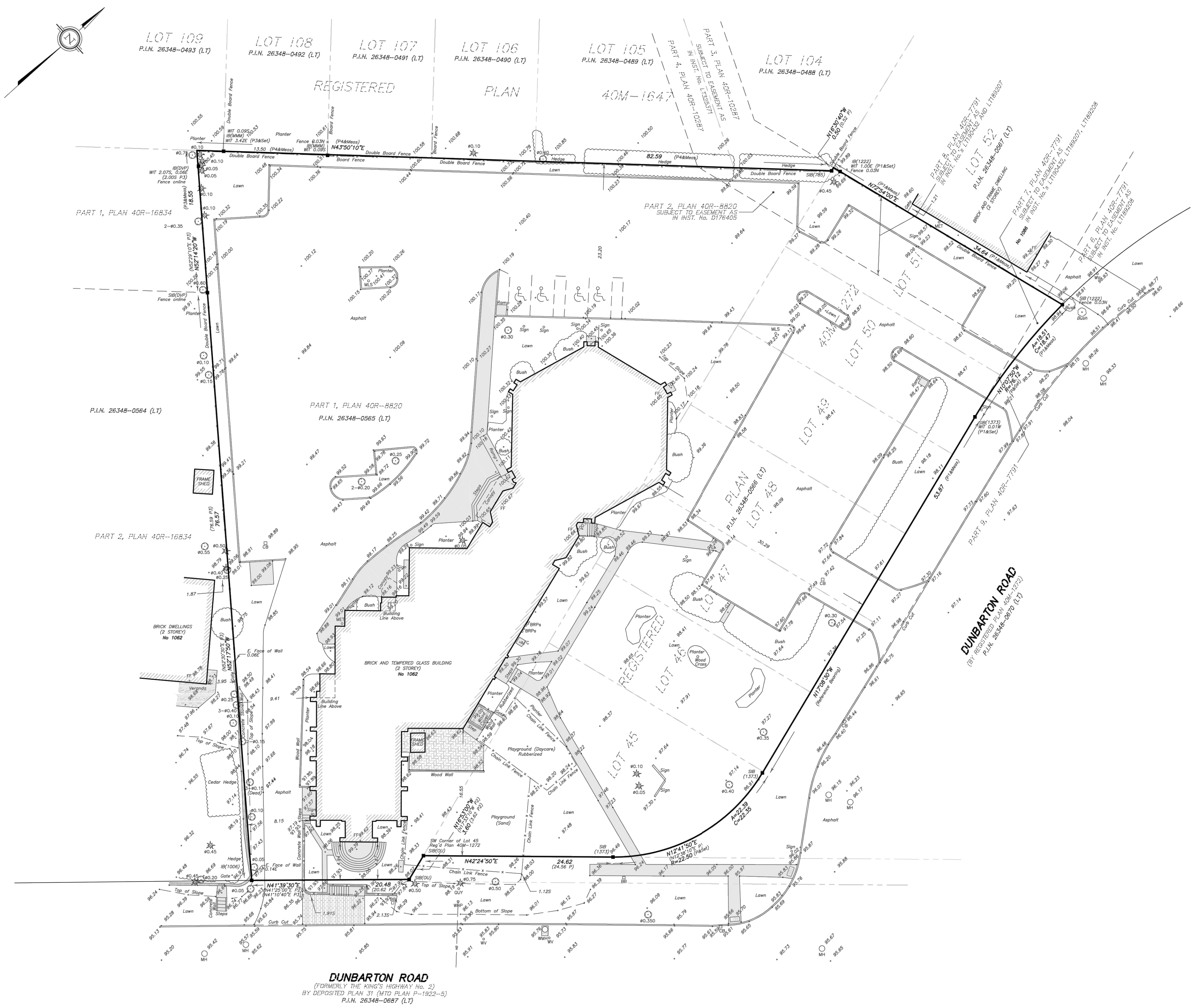
Checked: K.K.	Drawn: M.P.
Date: OCTOBER 2022	Proj. No.: 221-05497
Scale: NTS	Figure No.: 1



PLAN OF SURVEY WITH TOPOGRAPHY OF
PART OF LOT 25, CONCESSION 1,
AND
LOTS 45, 46, 47, 48, 49, 50 AND 51, REGISTERED PLAN 40M-1272
CITY OF PICKERING
REGIONAL MUNICIPALITY OF DURHAM

SCALE 1 : 250

5 0 5 10 15 20 25 metres

SPEIGHT, VAN NOSTRAND & GIBSON LIMITED
ONTARIO LAND SURVEYORS
2022

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

BEARING NOTE
BEARINGS SHOWN HEREON ARE ASTRONOMIC AND ARE REFERRED TO THE WESTERLY LIMIT OF DUNBARTON ROAD AS SHOWN ON REGISTERED PLAN 40M-1272 HAVING A BEARING OF N17°08'30"W.

ELEVATION NOTE
ELEVATIONS ARE GEODETIC AND ARE DERIVED FROM THE CITY OF PICKERING BENCHMARK No. 1-064.

LOCATION :

BRASS CAP SET VERTICALLY IN CHANCE ANCHOR. 33M WEST OF THE CENTRELINE OF DIXIE ROAD AND 27.7M SOUTH OF THE EASTERLY PRODUCTION OF THE CENTRELINE OF CLOUDBERRY COURT. CAP IS LOCATED 0.20M BELOW GRADE

ELEVATION:

PUBLISHED ELEVATION = 91.914 metres.

LEGEND

■	DENOTES	SURVEY MONUMENT FOUND
□	"	SURVEY MONUMENT PLANTED
WIT	"	WITNESS MONUMENT
SIB	"	STANDARD IRON BAR
IB	"	IRON BAR
CC	"	CUT CROSS
N,S,E,W	"	NORTH, SOUTH, EAST, WEST
OU	"	ORIGIN UNKNOWN
1006	"	H. FLIM, O.L.S.
1222	"	C.E. DOTTERILL LTD. O.L.S.
1373	"	BENNETT & NORGROVE LIMITED., O.L.S.
DVP	"	DONEVAN FLEISHMAN PETRICH LTD, O.L.S.
MMM	"	MARSHALL, MACKLIN, MONAGHAN LTD. O.L.S.
P	"	REGISTERED PLAN 40M-1272
P1	"	PLAN OF SURVEY BY C.E. DOTTERILL LTD., OLS DATED JANUARY 16, 1996
P2	"	PLAN 40R-8820
P3	"	PLAN 40R-16834
P4	"	REGISTERED PLAN 40M-1647
A/C	"	AIR CONDITIONING
BB	"	BELL BOX
BRP	"	BREATHER PIPE
CB	"	CATCH BASIN
CC	"	CUT CROSS
FF	"	FINISHED FLOOR
GUY	"	GUY WIRE / POLE
MET	"	METER
MH	"	MANHOLE
MLS	"	METAL LIGHT STANDARD
OH	"	OVERHEAD WIRE
SIB	"	STANDARD IRON BAR
WHP	"	WOODEN HYDRO POLE
WMH	"	AWATER MANHOLE
WV	"	WATER VALVE
(symbol)	"	DECIDUOUS TREE
(symbol)	"	CONIFEROUS TREE
(symbol)	"	CONCRETE
(symbol)	"	BRICK
(symbol)	"	METAL
(symbol)	"	WOODEN
98.59	"	TOP ELEVATION

SURVEYOR'S CERTIFICATE
I CERTIFY THAT :
1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON APRIL 19, 2022

DATE : APRIL 22, 2022

LES RUDNICKI
ONTARIO LAND SURVEYOR

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DRAWN : MM	FILE NAME : A2200021.DWG
CHECKED : L.R.	PLOT SCALE : MET.1=0.25
JOB No. : 220-0021	PLOTTED :
REF. No. :	UPDATED :

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2191529

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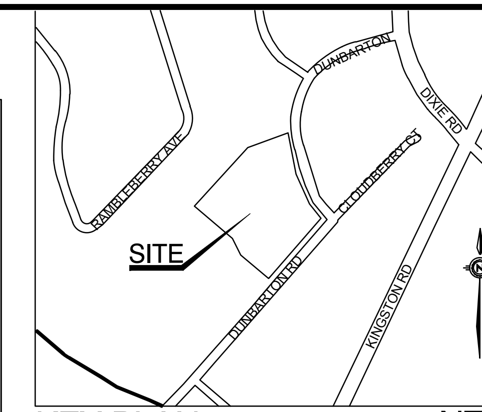

KEY PLAN NTS

CLIENT
UNITED PROPERTY RESOURCE CORPORATION

TITLE
1066 DUNBARTON ROAD
PRE-DEVELOPMENT TOPOGRAPHIC SURVEY

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Scale N.T.S.	Figure No. 2

Oct 19, 2022 - 9:09am, CANM076622
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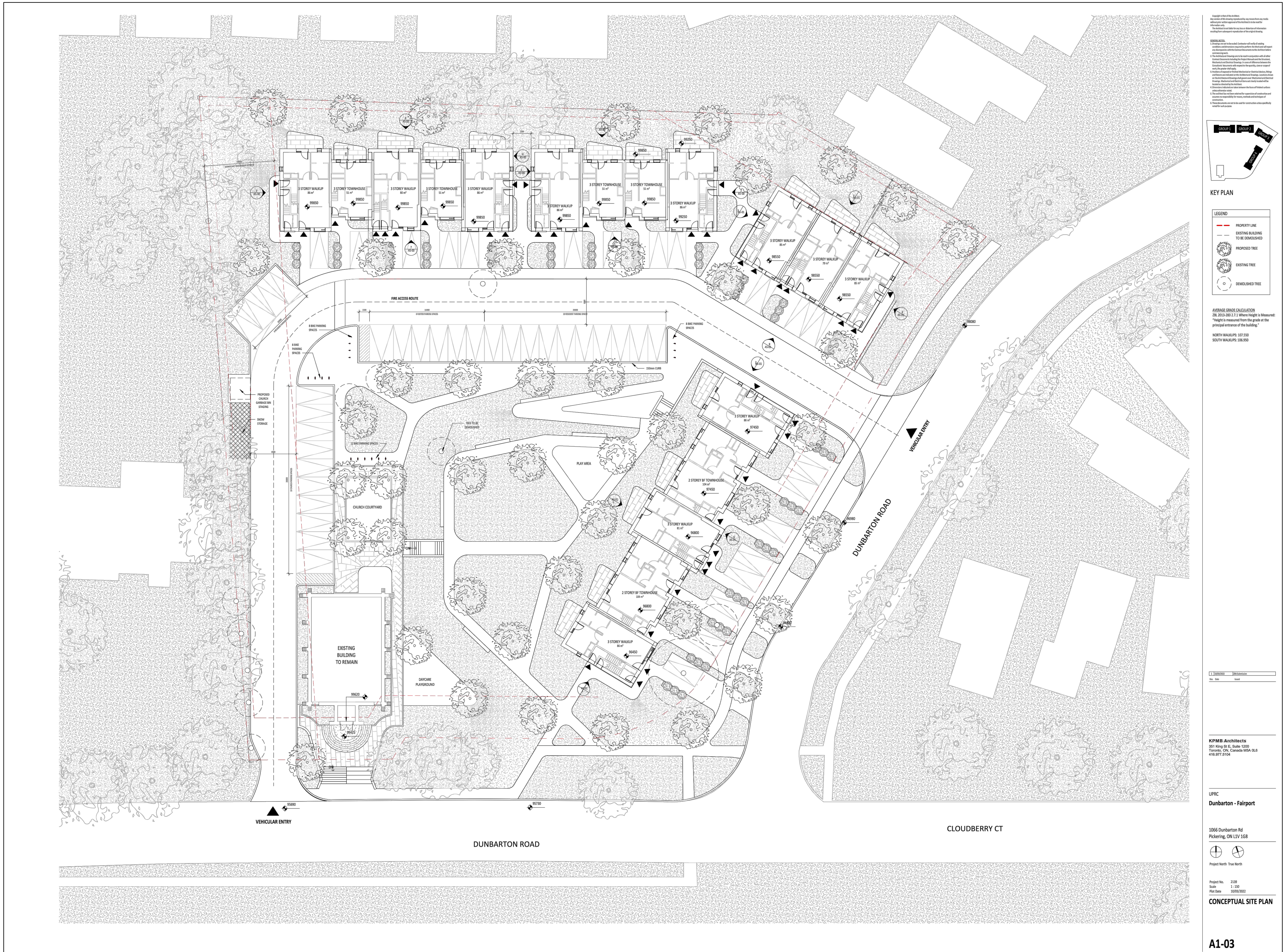

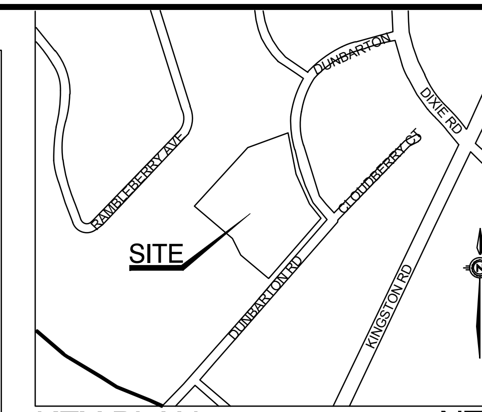

KEY PLAN NTS

CLIENT

UNITED PROPERTY RESOURCE CORPORATION

TITLE

1066 DUNBARTON ROAD

POST-DEVELOPMENT PRELIMINARY SITE PLAN

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Scale	N.T.S.	Figure No.	3

Oct 19, 2022 - 9:30am, CANM076622
C:\Users\CANM076622\ACCDocs\WSP Canada projects (AMER)\LDO\Files\221-05497 - Dunbarton\FSR\Fig3.dwg -tab:Fig 4 - PRE Site Plan

2 SITE GRADING

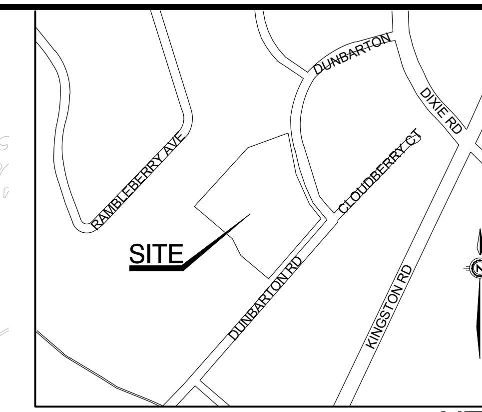
2.1 SITE GRADING

Site grading will be designed in accordance with the City of Pickering's Storm Sewer Servicing and Roads grading criteria with respect to minimum and maximum grades. The Site's pre-development overland flow is split with a portion being directed southwest towards Dunbarton Road and the remainder being directed northeast towards Cloudberry Court; refer to **Figure 4** (Preliminary Grading Plan). Minor storm flows are collected in various on-site catchbasins and directed towards a proposed service connection leading to existing storm sewers on Dunbarton Road.

The proposed development will be graded to direct all storm drainage to localized on-site catchbasins, and the split overland flow routes to Dunbarton Road and Cloudberry Court will be maintained.

Preliminary internal elevations are shown on **Figure 4**. Access to the site will be provided by two entrances off of Dunbarton Road, one southwest of the Dunbarton Road and Cloudberry Court intersection and the other northeast of the Dunbarton Road and Cloudberry Court intersection. Based on the existing and preliminary proposed elevations, road grades will generally vary between 1.0% and 4.0%. The minor flows will be captured in catchbasins and directed to a stormwater detention and retention facility located under the proposed green space. The major flow in excess of the 100-year storm will be directed to Dunbarton Road at both driveway entrances and between the townhouse block and existing church as indicated by the overland flow route arrows on **Figure 4**. Overland flows in the post-development condition will maintain the existing pre-development overland flow routes and outlet to Dunbarton Creek located southwest of the site.

The proposed site grading will maintain the existing grades along all property lines and along the sides of the existing church building which is scheduled to remain. Existing retaining walls along the south and west sides of the church will remain and be protected throughout the development of the site.



KEY PLAN NTS

LEGEND

- SITE BOUNDARY
- SWALE
- + 170.72 PROPOSED ELEVATION
- HP HIGH POINT
- LP LOW POINT
- +EX.167.16 EXISTING ELEVATION
- +SW.167.16 SWALE ELEVATION
- DIRECTION OF OVERLAND FLOW
- STORMWATER CATCHBASIN
- 3:1 SLOPING
- 2.5:1 SLOPING

CLIENT
UNITED PROPERTY RESOURCE CORPORATION

TITLE
1066 DUNBARTON ROAD
PRELIMINARY SITE GRADING PLAN

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Scale	1:500	Figure No.	4

3 STORMWATER MANAGEMENT

3.1 MINOR STORM SYSTEM

The on-site storm catchbasins, manholes and sewers will be designed to convey the 100-year flow from the development. These storm flows are to be directed to a stormwater management system located beneath the proposed green space. The schematic location of the stormwater management facility is shown in **Figure No. 5** (Preliminary Site Servicing Plan). The stormwater management facility will provide water quantity, erosion and sediment control and water balance requirements set out by the City of Pickering. Water quality control for the site will be handled by a proposed oil-grit separator (OGS) unit which will be installed immediately upstream of the proposed stormwater management facility. Please see Stormwater Management Report, also prepared by WSP Canada Inc, for details of the proposed Stormwater Management Strategy.

3.2 MAJOR STORM SYSTEM

The on-site storm drainage system will be designed to capture and convey to 100-year storm event. Any overland flows from storm events greater than the 100-year event will be directed to Dunbarton Road at both driveway entrances and between the townhouse block and existing church as indicated by the overland flow route arrows on **Figure 4** (Preliminary Grading Plan). Overland flow from the site, similar to the existing predevelopment flow, will continue to be directed to the southwest towards Dunbarton Road.

4 SANITARY DRAINAGE

4.1 INTRODUCTION

Based on the record drawings received from the Region of Durham there are a number of existing sanitary sewers in the vicinity of the site:

- A 200mm diameter sanitary sewer running northeast on Dunbarton Road to Cloudberry Court
- A 200mm diameter sanitary sewer running southwest on Dunbarton Road to Cloudberry Court

The existing 200mm sanitary sewer south of the site on Dunbarton Road flows southwest to northeast toward Cloudberry Court. There is an existing 9.0m wide sanitary sewer easement as shown on **Figure 5**.

4.2 PRE- AND POST-DEVELOPMENT FLOWS

The estimated pre- and post-development sanitary sewage flows are estimated based on the Region of Durham Sanitary design criteria.

In the pre-development condition the property contains 1 single storey institutional building with a combined GFA of approximately 7893m^2. Based on an average flow rate of 112m^3/ha/d (including infiltration and peaking factor) the peak sanitary flow from the site in the existing condition is 0.14L/s.

In the post-development condition the development is proposed to contain 41 townhouse units. Based on unit counts and floor areas and the Region of Durham Design Criteria the peak post-development sanitary flow from the site, including infiltration is 2.47L/s. Therefore the development of the site will increase the sanitary flow by approximately 2.33L/s.

For a detailed breakdown of the pre- and post-development flow calculations see **Appendix A**.

4.3 PROPOSED SANITARY CONNECTION

The proposed development will have one 200mm diameter connection to the existing 200mm diameter sanitary sewer on Dunbarton Road in the southeast corner of the site. This connection will have a control manhole immediately inside the property line and will be designed per the Region of Durham design criteria. The existing sanitary service connection from the site will be located and decommissioned. Within the private site the existing church and all townhouse units will have a sanitary service connection to a common element sewer which is proposed to flow to the control manhole and ultimately the municipal sanitary sewer system. For the proposed three storey walk-up unit only one sanitary service connection will be provided to service the three individual flats. The proposed sanitary servicing for the site is shown on **Figure 5.**

5 WATER SUPPLY

5.1 WATER SUPPLY

There is an existing 200mm feeder watermain on the north side of Dunbarton Road. The proposed development will have one 100mm diameter domestic connection and one 150mm diameter fire connection to the existing 200mm watermain on Dunbarton Road. The domestic and fire lines will be connected to a combined water meter and backflow prevention device room as per Region of Durham Standards and Specifications.

Within the site the domestic line will be extended to provide a dedicated domestic service to each townhouse blocks. The fire line will be extended to service the existing church. Furthermore, the fire line will have 1 proposed hydrant to provide fire protection for the development. The domestic and fire servicing within the individual buildings is to be designed by the mechanical consultant.

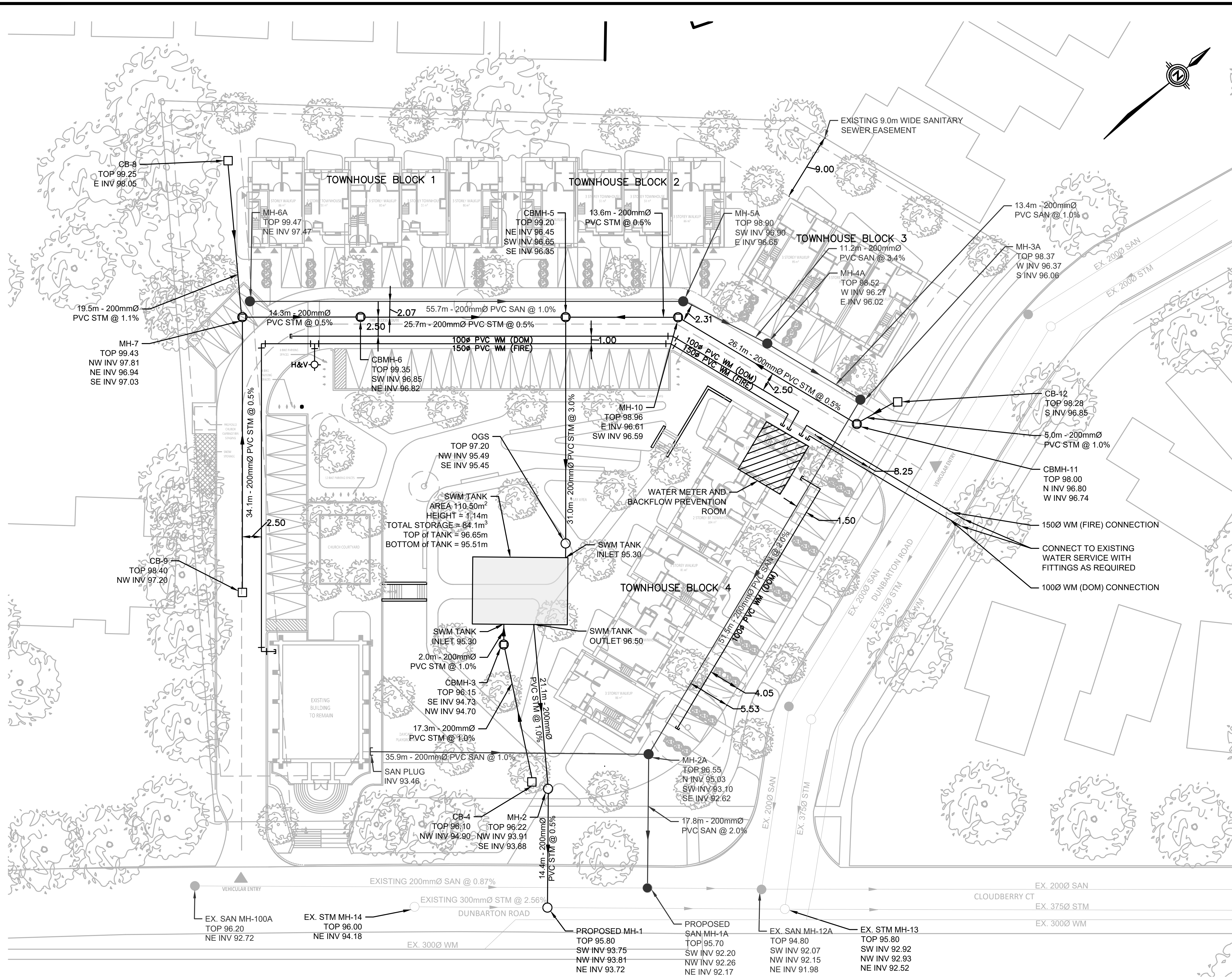
A detailed fire flow calculation has been prepared using the recommendations of the Water Supply for Public Fire Protection, 1999 – Fire Underwriters Survey (FUS). The fire flow calculation indicates that the recommended fire flow for this proposed development is 14,249 L/min (equates to 3,760 US GPM). The results of these calculations are included in **Appendix B**.

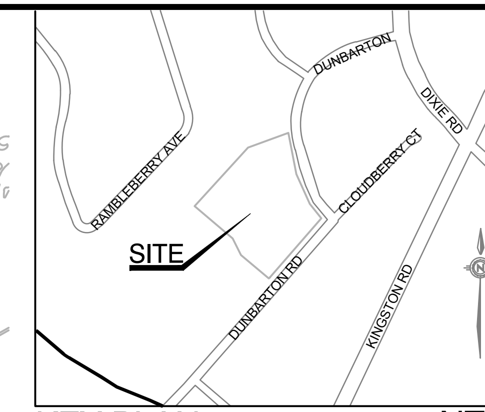
The proposed water servicing layout for the site is shown in **Figure 5.**

5.2 HYDRANT FLOW TEST

There are two (2) existing hydrants in the vicinity of the proposed development. There are two hydrants on Dunbarton Road opposite both existing parking lot entrances. The first hydrant is east of the site and is located on the east side of Dunbarton Road. The second hydrant is south of the site is located on the south side of Dunbarton Road.

The maximum estimated fire flow demand for the proposed development is 3,760 US GPM as noted above. A hydrant flow test was completed for the site on Dunbarton Road. A flow of approximately 8,400 US GPM could be achieved while maintaining a water pressure of 20psi. The fire flow available exceeds the fire demands calculated per the FUS guidelines. Therefore, the test indicates that the watermains adjacent to the site are adequate to support the fire water demand for the proposed development without the need for external upgrades or retrofits. Refer to **Appendix B** for the hydrant flow test results.





KEY PLAN NTS

LEGEND

- SITE BOUNDARY
- SANITARY MANHOLE
- HYDRANT
- CATCHBASIN MANHOLE
- STORMWATER CATCHBASIN
- EXISTING STORM MANHOLE

CLIENT

UNITED PROPERTY RESOURCE CORPORATION

TITLE

1066 DUNBARTON ROAD

PRELIMINARY SITE SERVICING PLAN

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Date	OCTOBER 2022	Proj. No.	221-05497
Scale	1:500	Figure No.	5

6 CONCLUSIONS

The following point form list summarizes the opportunities for the servicing and grading of the proposed development at 1066 Dunbarton Road in Pickering, Ontario.

- Boundary grades will generally be matched.
- Road grades will generally range between 1.0% and 4.0%.
- Storm flows from the site will be directed to on-site drains and directed to a stormwater management facility under the proposed park. The stormwater management facility will provide quantity, quality, erosion and water balance requirements.
- The overland flows for the 100-year storm event will be detained internally on site using the various water retention methods described in the SWM report. All overland flows over this regulated volume will continue to approximately follow the existing travelled path to the south of the site flowing and discharging adjacent to Dunbarton Road, ultimately contributing to Dunbarton Creek.
- There is an existing storm sewer in an easement on site.
- Sanitary Flows from the site will be discharged though a new connection into the existing sanitary sewer located on Dunbarton Road.
- There is an existing 200mm watermain of the north side of Dunbarton Road. Domestic and Fire Lines will be extended from this existing watermain to provide water service for the site. The water system within the townhouse blocks will be designed by the mechanical consultant to meet the Ontario Building Code.
- A Hydrant Flow Test has been completed on Dunbarton Road and shows that the existing hydrant is capable of delivering the FUS Fire Requirement for the development.

APPENDIX

A PRE- AND POST-DEVELOPMENT SANITARY FLOWS

SANITARY FLOW GENERATION

Project: **DUNBARTON - 1066 DUNBARTON ROAD, DURHAM REGION**
Job No.: **221-05497**

Existing Sanitary Flows

Unit Type	GFA (m^2)	GFA (ha)	Per Capita Flow (m^3/ha/day)	Peak Flow (L/s)
Institutional	1078	0.11	112	0.14

Proposed Sanitary Flows

Unit Type	GFA (m^2)	GFA (ha)	Per Capita Flow (m^3/ha/day)	Peak Flow (L/s)
Institutional	150	0.02	112	0.02

Unit Type	Unit Count	Population Density (ppl/unit)	Equivalent Population	Per Capita Flow (L/cap/day)	Average Daily Flow (L/s)	Peaking Factor	Peak San Flow (L/s)	Infiltration Allowance[2] (L/s/ha)	Infiltration Flow (L/s)	Peak Flow (L/s)
Residential	41	3	123	364	0.52	4.22	2.19	0.26	0.26	2.45
TOTAL										**2.47**

Notes:

1. Proposed infiltration allowance, per capita flows, unit population equivalent and peaking factor are as per the regional municipality of Durham 'Design Specifications for Sanitary Sewers (April 2021)'.

2. Instituational design flow includes infiltration and peaking effect.

APPENDIX

B FIRE UNDERWRITERS SURVEY AND HYDRANT FLOW TEST RESULTS

APPENDIX B

FIRE FLOW CALCULATIONS
EXISTING CHURCH - FRONTING DUNBARTON ROAD

Project: Dunbarton - Fairport United Church
Job No.: 221-05497

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

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

where

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

Calculations per FUS

1. *Estimate of Fire Flow*
C = 1.0 for ordinary construction
A = 175 m^2 (total floor area of all storeys minus basements at least 50% below grade)

F = 2,910 Lpm

2. *Occupancy Reduction*
15% reduction for "Limited Combustible" Occupancy

15% reduction of 2910 Lpm = 437 Lpm
F = 2910 - 437 = 2,474 Lpm

3. *Sprinkler Reduction*
0% reduction for no Sprinkler System

0% reduction of 2474 Lpm = - Lpm
F = 2474 - 0 = 2,474 Lpm

4. *Separation Charge*

Face	Distance (m)	Charge
Northwest Side	53	0%
Northeast Side	26	10%
Southeast Side	39	5%
Southwest Side	15	15%
	Total	30%

of 2,474 = 742 Lpm

F = 2474 + 742
F = 3,216 Lpm (2,000 Lpm < F < 45,000 Lpm; OK)
F = 849 US GPM

Notes

APPENDIX B

FIRE FLOW CALCULATIONS
BLOCK 1 - FRONTING PROPOSED ROAD

Project: Dunbarton - Fairport United Church
Job No.: 221-05497

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

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

where

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

Calculations per FUS

1. *Estimate of Fire Flow*
C = 1.5 for wood frame construction
A = 1080 m^2 (total floor area of all storeys minus basements at least 50% below grade)

F = 10,845 Lpm

2. *Occupancy Reduction*
15% reduction for "Limited Combustible" Occupancy

15% reduction of 10845 Lpm = 1,627 Lpm
F = 10845 - 1627 = 9,218 Lpm

3. *Sprinkler Reduction*
0% reduction for no Sprinkler System

0% reduction of 9218 Lpm = - Lpm
F = 9218 - 0 = 9,218 Lpm

4. *Separation Charge*

Face	Distance (m)	Charge
Northwest Side	14	15%
Northeast Side	3	25%
Southeast Side	52	0%
Southwest Side	38	5%
	Total	45%

of 9,218 = 4,148 Lpm

F = 9218 + 4148
F = 13,366 Lpm (2,000 Lpm < F < 45,000 Lpm; OK)
F = 3,527 US GPM

Notes

APPENDIX b

FIRE FLOW CALCULATIONS
BLOCK 2 - FRONTING PROPOSED ROAD

Project: Dunbarton - Fairport United Church
Job No.: 221-05497

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

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

where

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

Calculations per FUS

1. *Estimate of Fire Flow*
C = 1.5 for wood frame construction
A = 249 m^2 (total floor area of all storeys minus basements at least 50% below grade)

F = 5,207 Lpm

2. *Occupancy Reduction*
15% reduction for "Limited Combustible" Occupancy

15% reduction of 5207 Lpm = 781 Lpm
F = 5207 - 781 = 4,426 Lpm

3. *Sprinkler Reduction*
0% reduction for no Sprinkler System

0% reduction of 4426 Lpm = - Lpm
F = 4426 - 0 = 4,426 Lpm

4. *Separation Charge*

Face	Distance (m)	Charge				
Northwest Side	13	15%				
Northeast Side	4	20%				
Southeast Side	25	10%				
Southwest Side	3	25%				
	Total	70%	of	4,426	=	3,098 Lpm

F = 4426 + 3098
F = 7,525 Lpm (2,000 Lpm < F < 45,000 Lpm; OK)
F = 1,985 US GPM

Notes

APPENDIX B

FIRE FLOW CALCULATIONS
BLOCK 3 - FRONTING PROPOSED ROAD

Project: Dunbarton - Fairport United Church
Job No.: 221-05497

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

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

where

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

Calculations per FUS

1. *Estimate of Fire Flow*
C = 1.5 for wood frame construction
A = 741 m^2 (total floor area of all storeys minus basements at least 50% below grade)

F = 8,983 Lpm

2. *Occupancy Reduction*
15% reduction for "Limited Combustible" Occupancy

15% reduction of 8983 Lpm = 1,347 Lpm
F = 8983 - 1347 = 7,636 Lpm

3. *Sprinkler Reduction*
0% reduction for no Sprinkler System

0% reduction of 7636 Lpm = - Lpm
F = 7636 - 0 = 7,636 Lpm

4. *Separation Charge*

Face	Distance (m)	Charge				
North Side	9	20%				
East Side	32	5%				
South Side	15	15%				
West Side	4	20%				
	Total	60%	of	7,636	=	4,581 Lpm

F = 7636 + 4581
F = 12,217 Lpm (2,000 Lpm < F < 45,000 Lpm; OK)
F = 3,223 US GPM

Notes

APPENDIX B

FIRE FLOW CALCULATIONS
BLOCK 4 - FRONTING DUNBARTON ROAD

Project: Dunbarton - Fairport United Church
Job No.: 221-05497

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

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

where

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

Calculations per FUS

1. *Estimate of Fire Flow*
C = 1.5 for wood frame construction
A = 1416 m^2 (total floor area of all storeys minus basements at least 50% below grade)

F = 12,418 Lpm

2. *Occupancy Reduction*
15% reduction for "Limited Combustible" Occupancy

15% reduction of 12418 Lpm = 1,863 Lpm
F = 12418 - 1863 = 10,555 Lpm

3. *Sprinkler Reduction*
0% reduction for no Sprinkler System

0% reduction of 10555 Lpm = - Lpm
F = 10555 - 0 = 10,555 Lpm

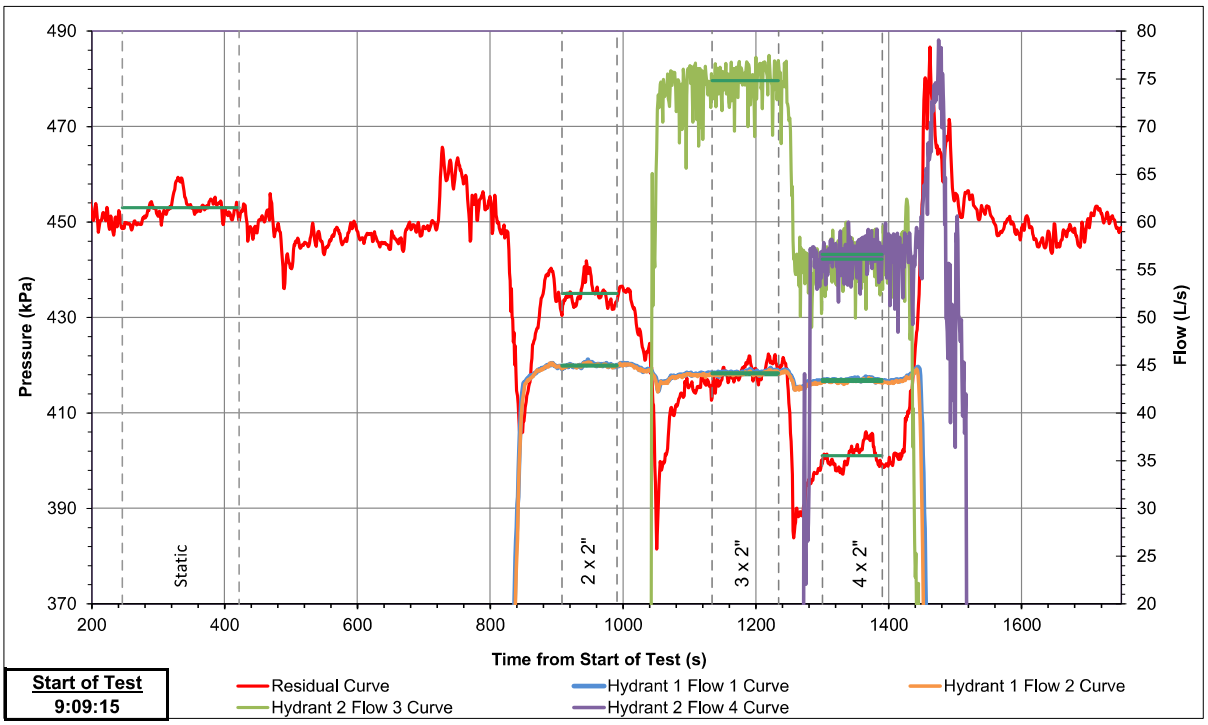
4. *Separation Charge*

Face	Distance (m)	Charge				
North Side	15	15%				
East Side	34	5%				
South Side	25	10%				
West Side	39	5%				
	Total	35%	of	10,555	=	3,694 Lpm

F = 10555 + 3694
F = 14,249 Lpm (2,000 Lpm < F < 45,000 Lpm; OK)
F = 3,760 US GPM

Notes

1066 Dunbarton Rd (PD156)



Subject Watermain Details

Diameter:	200 mm	**Material:**	
Area:	0.031 m2		

Subject Hydrant & Valve Details

Residual Hydrant:	PD156
Flow Hydrant 1:	PD157
Flow Hydrant 2:	PD126

TABLE A: TESTED PRESSURES AND FLOWS

Point	Time		Residual (PD156)		Flow Hydrant 1 (PD157)				Flow Hydrant 2 (PD126)				Total Flow		Velocity
			Residual (S1)		Flow 1 (S2)		Flow 2 (S3)		Flow 3 (S4)		Flow 4 (S5)				
	Start	Finish	(kPa)	(psi)	(L/s)	(GPM)	(L/s)	(GPM)	(L/s)	(GPM)	(L/s)	(GPM)	(L/s)	(GPM)	(m/s)
Static	246	422	453	65.7	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
1 x 2"			0	0.0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
2 x 2"	908	991	435	63.1	45.0	713	44.9	712	0.0	0	0.0	0	89.9	1425	2.9
3 x 2"	1134	1234	418	60.6	44.2	701	44.1	699	74.8	1186	0.0	0	163.1	2585	5.2
4 x 2"	1300	1390	401	58.2	43.5	689	43.3	686	56.1	889	56.6	897	199.5	3162	6.4

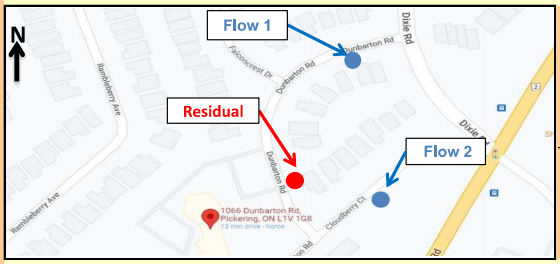
1066 Dunbarton Rd (PD156)

HYDRANT FLOW TEST RESULTS

Date: 08-Aug-22 Time: 9:09 (hh/mm) Municipality: City of Pickering

Operator:

Tested By: Sen, Issac Test No: 1



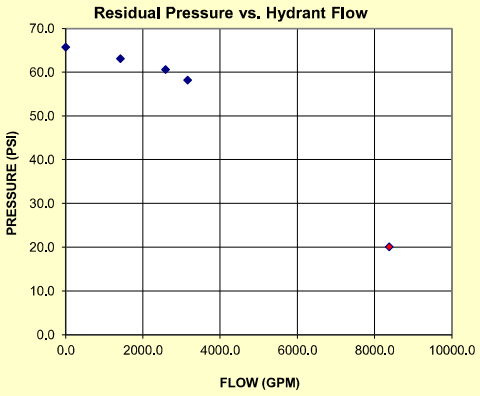
Conditions before Test (STATIC)

Residual Hydrant:	65.7 psi	453 kPa
Hydrant that will Flow:	65.7 psi	453 kPa
Δ pressure:	0.0 psi	0 kPa
Elevation Difference: (Flow El. - Residual El.)	0.0 ft	0.0 m

Test Notes:

TEST		TEST FLOW		RESIDUAL PRESSURE (psi)		Minimum Residual P_r (psi)	Fire Flow at Minimum Residual, Q_r (USGPM)	Fire Flow at Minimum Residual, Q_r (L/s)	10% Pressure Drop Achieved?
Port Size (in)	Nozzle Pressure (psi)	(USGPM)	(L/s)	Monitoring Hydrant	Flow Hydrant (Corrected) *				
STATIC	n/a	0	0	65.7	65.7				
Single Hydrant Test									
1 x 2"	0.0	0.0	0.0			20			
2 x 2"	20.9	1425.0	89.9	63.1	63.1	20	6697	423	NO
3 x 2"									
Hydrant 1	10.1	1400.0	88.3	60.6	60.6	20	8449	533	NO
Hydrant 2	50.2	1186.0	74.8						
4 x 2"									
Hydrant 1	19.4	1375.0	86.8	58.2	58.2	20	8387	529	YES
Hydrant 2	28.5	1786.0	112.7						

* Pressure correction is equal to the elevation difference. Column 2 (and Table A) show the nozzle pressure while flowing.



Results			
Static Pressure		Flow at 20 psi (140kPa)*	
(psi)	(kPa)	(gpm)	(L/s)
65.7	453	8400	530

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

Hydrant Classification as per NFPA 291			
Class	AA	Color	BLUE

Water Discharged During Test:	53100 L

Rounded up to closest 100L