TATHAM ENGINEERING

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49 Collier Street, Barrie

FUNCTIONAL SERVICING REPORT

JDL Development Corporation

File 422442 | September 23, 2022

Document Control

File:

422442

Date:

September 23, 2022

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Issue	Date	Description
1	September 23, 2022	First Submission

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1 Introduction

Tatham Engineering Limited has been retained by JDL Development Corporation to prepare a Functional Servicing Report (FSR) in support of Zoning By-law Amendment (ZBA) and Site Plan Approval (SPA) applications for a proposed development located at 49 Collier Street in the City of Barrie (City).

1.1 OBJECTIVES

This report was prepared to demonstrate the servicing feasibility of the proposed development with respect to civil servicing including site grading, stormwater management (SWM), sewage collection and treatment, water supply and distribution, site grading, transportation, and utility distribution.

1.2 GUIDELINES AND BACKGROUND REPORTS

This report is prepared in consideration of the following municipal, provincial and agency guideline documents:

- The Ministry of the Environment, Conservation, and Parks (MECP, formerly known as Ministry of Environment), *Stormwater Management Practices Planning and Design Manual* (2003);
- The Ministry of the Environment, Conservation, and Parks (MECP, formerly known as Ministry of Environment), *Lake Simcoe Protection Plan* (LSPP) (2009);
- Lake Simcoe Region Conservation Authority (LSRCA), *Technical Guidelines for SWM Submissions* (2016);
- Lake Simcoe Region Conservation Authority (LSRCA), *Phosphorous Offsetting Policy* (2019);
- City of Barrie, *Storm Drainage and Stormwater Management Policies and Design Guidelines* (2022);
- City of Barrie, *Sanitary Sewage Collection System Policies and Design Guideline* (2017); and
- City of Barrie, *Water Transmission and Distribution Design Standard* (2021).

This report is prepared in consideration of the following City of Barrie reports and publications:

- City of Barrie, *Wastewater Collection Master Plan Update* (2019), prepared by Cole Engineering Group Ltd.;
- City of Barrie, *Wastewater Treatment Master Plan* (2019), prepared by WSP Canada Inc.;

- City of Barrie, *Water Storage and Distribution Master Plan Update* (2019), prepared by WSP Canada Inc.; and
- City of Barrie, *Water Supply Master Plan Update* (2019), prepared by WSP Canada Inc.).

This report is prepared in consideration of the following site-specific studies and reports:

- McClymont & Rax Engineers Inc., *Preliminary Geotechnical Report Proposed Development 47, 49, 51 Collier Street & 21, 23, 25 Owen Street Barrie, Ontario*; and
- McClymont & Rax Engineers Inc., *Preliminary Geohydrology Assessment Proposed Development 47, 49, 51 Collier Street & 21, 23, 25 Owen Street Barrie, Ontario*.
- Terraprobe Inc., *Updated Geotechnical Investigation and Engineering Design 47, 49, 51, 53 Collier Street & 21, 23, 25 Owen Street, Barrie, Ontario* (February 2020);
- Terraprobe Inc., *Hydrogeological Assessment 47, 49, 51, 53 Collier Street & 21, 23, 25 Owen Street, Barrie, Ontario* (May 2020);

2 Site Description

2.1 SITE LOCATION

The subject property is located at 49 Collier Street in the City of Barrie. The site is bound by Collier Street to the north, a private laneway to the east, Owen Street to the west, and a public lane and existing commercial properties with frontages on Dunlop Street to the south. The site is located within the Lake Simcoe Region Conservation Authority (LSRCA) watershed, but it is not within the LSRCA regulated area.

The site is legally described as:

- PLAN 2 PT LOT 10 N DUNLOP ST PT LOTS 52 AND 53 S COLLIER ST PLAN 85 LOTS 4 AND 5 E

Refer to Figure 1: Site Location Plan, below.

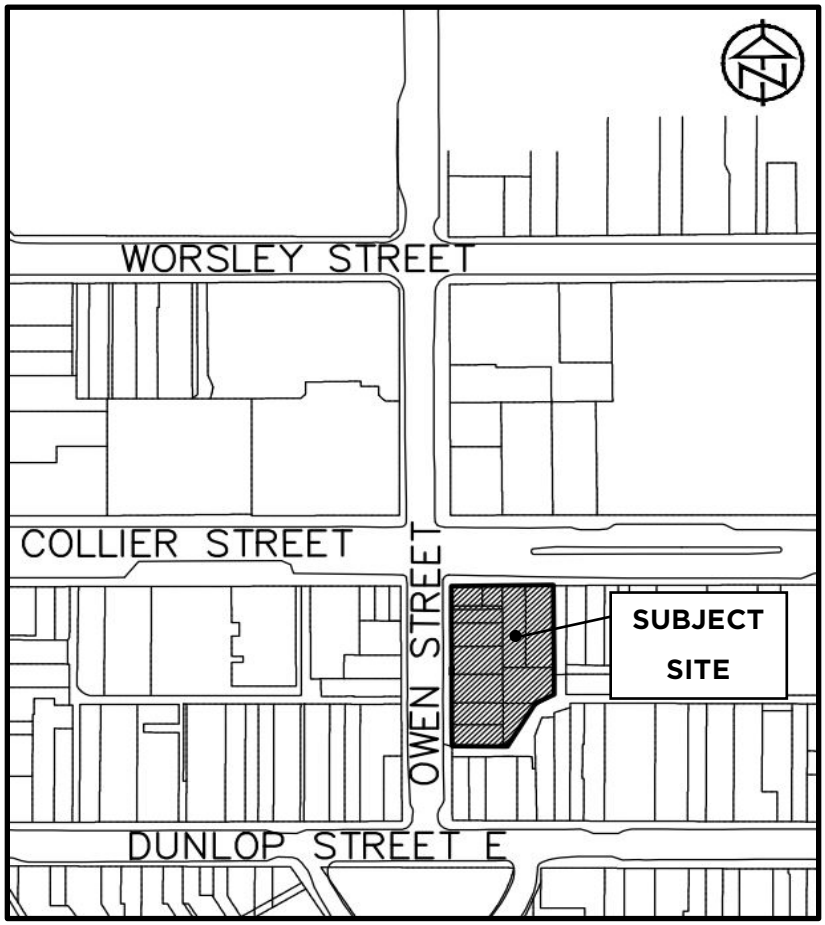


Figure 1: Site Location Plan

2.2 LAND USE

Based on the City's current Official Plan the property is designated City Centre.

2.3 TOPOGRAPHY

Information relating to existing topography, ground cover, and drainage patterns was obtained through a review of relevant background studies, available plans, base mapping, and topographic surveys, and was confirmed during site visits.

A detailed topographic survey was completed by Rudy Mak Surveying Limited in November 2017. This survey has been reviewed and compared to other available contour mapping and appears to be sufficient.

The subject property is approximately 0.25 ha of vacant land, where the previously existing commercial buildings have since been demolished and removed. The site topography is lower than the lands to the east and north and falls in a southerly direction (7 - 8%) toward Lake Simcoe.

Refer to the *Stormwater Management Report* for detailed existing site drainage characteristics.

2.4 GEOTECHNICAL

Based on the Ontario Soil Survey the existing soils on the site are classified as a combination of Tioga Loamy Sand and Vasey Sandy Loam, Hydrologic Soil Groups A and AB, respectively.

The *Preliminary Geotechnical Report Proposed Development 47, 49, 51 Collier Street & 21, 23, 25 Owen Street Barrie* was completed by McClymont & Rak to identify the subsurface conditions and determine the engineering properties of the in-situ soils for the design and construction of the proposed development.

The report describes the existing stratigraphy, summarizing the strata in descending order of how they were generally logged in the boreholes:

- A layer of earth fill;
- A native upper sand deposit;
- A glacial till deposit;
- A clayey silt to silt and clay deposit; and
- A lower deposit of sands and gravels.

2.5 HYDROGEOLOGICAL

The *Geohydrology Assessment* was completed by McClymont & Rak to analyze groundwater at the proposed site. The stabilized groundwater table was recorded between elevations of approximately 217 m and 222 m. Note, groundwater levels will vary seasonally.

3 Proposed Development

3.1 SITE PLAN

The proposed development consists of one 32-storey high-rise tower containing 253 residential units, commercial space (totalling 13,686 m^2) fronting both Collier and Owen Streets, and 234 parking spaces.

The proposed development will be serviced by municipal water, sanitary and storm systems. Improvements along the site frontage will be implemented as shown on the site plan and engineering drawings provided with this submission. All existing water and sanitary services to the property will be permanently capped/cut off at the main to the satisfaction of the City.

3.2 SITE ACCESS

The proposed development includes a main entrance to the lobby from Collier Street. Access to the underground parking is provided from private laneway located off Collier Street. Vehicular access to the underground parking garage is also provided from the public laneway.

Delivery and garbage vehicles will access the rear of the building via the existing public laneway located along the south property boundary. Pedestrian and accessible entrances to the site will be constructed at both frontages of Collier Street and Owen Street.

The proposed Site Plan (prepared by Scott Shields Architects Inc.) is provided in Appendix A.

4 Water Supply and Distribution

4.1 EXISTING WATER SYSTEM

The site is located within an area of the City serviced by the municipal water system. Specifically, the site is located within Pressure Zone 1, supplied by the City's groundwater system. The closest well pump houses to site are Well 11 at 5 Simcoe Street and Well 14 at 19 Simcoe Street, both located in Heritage Park on the northwest shore of Kempenfelt Bay.

4.1.1 Existing Infrastructure

The following existing watermains surround the subject site:

- 300 mm dia. ductile iron watermain on Collier Street; and
- 150 mm dia. cast iron watermain on Owen Street.

All existing water services are to be abandoned by cutting off the service at the watermain connection.

4.1.2 Municipal Water Supply

Per Tables 6-4 and 6-5 of the *Water Storage and Distribution Master Plan Update* (WSDMP), Well 11 has a firm capacity of 6.91 ML/day (6,910 m^3/day) and Well 14 has a firm capacity of 9.10 ML/day (9,100 m^3/day). Both wells contribute to supplying Pressure Zone 1, which has an overall zone firm capacity of 82.03 ML/day (82,030 m^3/day). Note that Zone 1's firm capacity includes well pump supply and 15.9 ML of storage volume from the Anne Street Reservoir. Per Table 2-9 of the WSDMP, the maximum average day demand (ADD) for Zone 1 between 2011 and 2017 was 7,741 m^3/day and the highest maximum day demand (MDD) was 16,687 m^3/day, resulting in significant residual capacity within the existing supply system. The *Geohydrology Report* by McClymont & Rak posits that it is unlikely impacts from the proposed development will affect these water sources.

Per Table 3-6 of the WSDMP, estimated ADDs and MDDs based on projected growth within Pressure Zone 1 (i.e. an area of the City supplied via the groundwater) as per WSP are summarized in Table 1, overleaf.

Therefore, under existing conditions there is sufficient water supply capacity to service additional development within Pressure Zone 1. Per WSP, no additional storage will be required for this pressure zone for the post-2031 scenario demand conditions.

Table 1: Municipal Water Supply - Projected Zone 1 Demands

SCENARIO	AVERAGE DAY DEMAND (m^3)	MAXIMUM DAY DEMAND (m^3)	RESIDUAL (m^3)
2021	7,676	17,422	64,608
2026	8,459	18,772	63,258
2031	9,731	21,063	60,967
2036	11,068	23,469	58,561
2041	12,493	26,034	55,996

4.1.3 Municipal Water Storage

Water storage for Pressure Zone 1 is provided in the Anne Street and Sunnidale Road Reservoirs. Under existing conditions there is a local storage deficit for Pressure Zone 2N. However, there is a surplus in storage within the Pressure Zone 1 system. As such, the storage surplus in Pressure Zone 1 is assigned to Pressure Zone 2N to offset the existing deficit, resulting in a total storage surplus of 9.10 ML for the groundwater supplied zones (all as per Table 6-3 of the WSDMP). Therefore, under existing conditions there is sufficient water storage within the existing municipal system to service additional development in the area.

Under future growth projections (2041) there is a storage surplus of 3.91 ML within the groundwater supplied zones (all as per Table 6-7 of the WSDMP).

4.2 PROPOSED WATER SYSTEM

4.2.1 Proposed Demands

Water demands for the proposed development have been estimated by applying relevant City standards and criteria, including the following:

- Per capita ADD = 225 L/person/day;
- Commercial ADD = 28,000 L/ha/day (assumed to be applicable for the commercial space);
- Person per unit (PPU) =
    - 1.67 for high density (residential units).

MDD and peak hour demand (PHD) factors of 2.5 and 3.75, respectively, have been applied in accordance with Table 3-1 of the MECP Design Guidelines for Drinking Water Systems (2008).

Refer to Appendix B for Water Demand Calculations.

Table 2: Summary of Proposed Water Demands

SCENARIO	VOLUME (m^3)	FLOW (L/S)
Average Day Demand - Residential	95.07	1.10
Average Day Demand - Commercial	38.36	0.44
Maximum Day Demand	366.92	4.25
Peak Hour Demand	551.04	6.38

4.2.2 Fire Protection

As noted above, there is an existing 300 mm dia. watermain in Collier Street and a 150 mm dia. watermain in Owen Street which provide water supply and fire protection for the area including the subject property.

There are three existing fire hydrants all located within 38 m of the subject property. A dedicated 200 mm dia. fire service will be provided to the building from the existing 300 mm dia. watermain in Collier Street in order to provide adequate fire protection water for the proposed development. This is depicted on the Site Servicing Plan (Drawing SS-1).

Fire fighting water demands have been estimated for the building using the *Water Supply Public Fire Protection* (1999) prepared by Fire Underwriters Survey (FUS). The required fire flow has been estimated at 167 L/s. Detailed calculations are provided in Appendix B. Two fire hydrant flow test were conducted (one on the hydrant at the intersection of Owen and Collier Street, and one at the intersection of Collier and Mulcaster) as documented in Appendix B. The estimated available fire flow at 20 psi off Collier Street and Owen Street is 165 L/s and 196 L/s respectively. This is greater than the required fire flow plus the maximum daily demand (MDD) of 154 L/s. Therefore, the Owen Street and Collier Street watermains have sufficient capacity to provide fire protection water plus MDD for the development while maintaining minimum operating pressures in the system.

Details of the internal sprinkler system and demands calculated by the mechanical engineering consultant have not yet been provided. Therefore, should the mechanical engineering consultant require additional information, or should the fire fighting requirements change, our assessment will be updated accordingly. These elements are expected to be confirmed during the detailed building design stage in support of the building permit application submission.

Reasonable assumptions have been made with respect to building design and construction methods, recognizing the preliminary stage of the development.

Refer to Appendix B for FUS Calculations and the results of the fire flow tests.

4.2.3 Proposed Infrastructure

The following proposed water services will connect to the existing 300 mm dia. watermain on Collier Street and service the subject site:

- 150 mm dia. domestic service on Collier Street; and
- 200 mm dia. fire service on Collier Street.

These proposed connections are depicted on the Site Servicing Plan (Drawing SS-1). All existing water services are to be abandoned by cutting off the service at the watermain connection.

The City has advised in its pre-consultation meeting that, due to the age and condition of the existing 150 mm dia. watermain along Owen Street, a connection to the existing 300 mm dia. watermain along Collier Street is preferred.

It is expected the City will input the proposed development into its water model to confirm there is satisfactory overall capacity in its watermain network to support the development.

5 Sewage Collection and Treatment

5.1 EXISTING SANITARY SYSTEM

The site is located within an area of the City serviced by the municipal sanitary sewer system. The following existing sanitary sewers surround the subject site:

- 250 mm dia. PVC sanitary sewer on Collier Street; and
- 300 mm dia. PVC sanitary trunk sewer on Owen Street.

Under existing conditions sewage from the site is conveyed south by the sanitary trunk sewer on Owen Street before navigating downtown streets towards the large trunk sewer on Simcoe Street. The sewage then continues to gravity flow south on Lakeshore Drive, before ultimately ending up at the Barrie Wastewater Treatment Facility (WWTF) located at the west end of Kempenfelt Bay on Lake Simcoe.

All existing sanitary services are to be plugged and abandoned.

5.1.1 WWTF Capacity

As per the *Wastewater Treatment Master Plan*, the Barrie WWTF has a rated average daily flow (ADF) capacity of 76,000 m^3/day, and a peak flow capacity of 156,000 m^3/day. Based on historical flow data, the WWTF has received between 48,000 m^3/day to 50,700 m^3/day between 2014 and 2017. Based on population growth projections the ADF in 2021 is 60,019 m^3/day. Therefore, under existing conditions there is an estimated residual capacity of 16,000 m^3/day to service additional development in the City.

Based on the *Wastewater Treatment Master Plan*, the WWTF is expected to reach its current rated capacity of 76,000 m^3/day in 2031. However, improvements are proposed to increase the capacity of the plant to support population growth projections beyond 2031.

5.2 PROPOSED SANITARY FLOWS

5.2.1 Average Day Flow

The following City design criteria have been utilized to establish the Average Daily Flow (ADF) for the subject site:

- Per capita average day demand (ADF) = 225 L/person/day;
- Commercial ADF = 28,000 L/ha/day (assumed to be applicable for retail units);
- Extraneous flow (infiltration) ADF = 0.10 L/s/ha; and

- Person per unit (PPU) = 1.67 for high density (condo units).

Utilizing this design criteria and applying the proposed unit counts and retail space, the estimated ADF for the site is 135.58 m^3 (refer to calculations provided in Appendix C).

5.2.2 Peak Flow (WWTF Capacity)

Peak day flow (PDF) with respect to capacity within the WWTF has been calculated by applying peaking factors which consider the entirety of the population contributing to the WWTF. Based on the WSP reports, a peaking factor of 2.05 is recommended. This results in a total PDF of 460.16 m^3. As mentioned above, the existing WWTF is understood to have sufficient capacity to service additional development, with an estimated existing conditions residual capacity of 16,000 m^3/day. Therefore, the WWTF has sufficient capacity to service the subject development.

5.3 PROPOSED SANITARY INFRASTRUCTURE

A proposed 300 mm dia. sanitary service will connect to the existing 300 mm dia. sanitary trunk sewer on Owen Street and service the subject site. The estimated PDF for the site is 460.16 m^3 (refer to calculations provided in Appendix C). A sanitary maintenance hole will be constructed on the existing sewer at the property frontage, as well as in between the main and the building to provide a sampling location, as per City standards. This is depicted on the Site Servicing Plan (Drawing SS-1).

6 Stormwater Management Plan

6.1 STORMWATER MANAGEMENT REPORT SUMMARY

A *Stormwater Management Report* has been prepared under separate cover and should be read in conjunction with this report. The following summarizes the findings of the report:

- The post-development flow will be controlled to the pre-development 1:5-year flow;
- Water quantity control is provided via a cistern located within the parking garage, where a pump will send stormwater collected from the building's roof area to the storm sewer on Owen Street; and
- The private and public laneways are designed to discharge uncontrolled flows from the site directly to the Owen Street ROW, before being directed towards Lake Simcoe.

Pre- and post-development and external catchments information is depicted on Drawings DP-1, DP-2 and DP-3, provided in the accompanying *Stormwater Management Report*.

6.2 PHOSPHORUS BUDGET

The proposed development will be subject to the Lake Simcoe Phosphorus Offsetting Policy (LSPOP), which requires all major development projects to implement LID controls to facilitate net zero phosphorus loading from the site. Through discussion with LSRCA it was confirmed that based on the lack of available space on zero-setback, high density developments, implementation of phosphorus controls is not required, and the site will rather be subject to the offsetting fee.

Refer to the *Stormwater Management Report* for a preliminary phosphorus assessment.

6.3 VOLUME CONTROL AND WATER BALANCE

The *Hydrogeological Assessment* includes a preliminary water balance analysis. Pre-development conditions see significantly greater infiltration and evapotranspiration volumes than post-development conditions. Conversely, there is significantly less surface water runoff in pre-development conditions compared to post-development conditions. This is attributed to a much larger hardscaped area for the proposed development compared to existing conditions. However, the volume of available surface water runoff, which exceeds the infiltration deficit between pre- and post-development conditions, can be used to further increase groundwater recharge and function. This results in the site being able to maintain infiltration rates with the appropriate SWM controls.

7 Laneways and Transportation

7.1 LANEWAYS

There is a private laneway adjacent to the east side of the site, located off Collier Street, providing access to the underground parking. There is a public laneway adjacent to the south side of the site, located off Owen Street, providing delivery and garbage vehicles access the rear of the building.

7.2 TRAFFIC IMPACT STUDY

A *Traffic Impact Study* has been prepared under separate cover and should be read in conjunction with this report.

8 Grading and Landscaping

The site building footprint covers the site with zero setbacks with the exception of a small strip along the south to accommodate the laneway and maintain a positive overland drainage route to Owen Street. The site will be graded to suit the existing boundary conditions on the boulevard to the north and the existing public laneway to the south. Refer to the Site Grading Plan (Drawing SG-1) for additional details.

Significant street frontage improvements are proposed on both Collier Street and Owen Street to improve the public realm within the municipal rights-of-way (ROW). The proposed development will match to the existing grades along the east and south.

Landscape design has been completed by Envision-Tatham Inc. to address the landscape considerations of the proposed development, including the ROW improvements along Owen Street and Collier Street.

Grading on the site will be in a range of 1% - 3% typical. With boulevard reconstruction, the typical crossfall will be 2%. The street longitudinal grades are steeper, in particular along Owen Street immediately south of the intersection with Collier Street. Accessibility considerations will be provided with ramping, depressed curbs, tactile plates and gentle slopes wherever achievable throughout.

Entrance grading will be governed by the boulevard along the frontage of the site. Overall site grading will match perimeter grades on all sides.

Refer to Appendix D for the Site Grading Plan (Drawing SG-1).

9 Erosion and Sediment Control

Erosion and sediment control measures will be implemented for all construction activities within the development site including vegetation clearing, topsoil stripping, grading, servicing and lot development. The basic principles considered to minimize erosion and sedimentation transport include:

- All erosion control measures will be designed in accordance with relevant City, LSRCA and OPSD standards;
- Silt fences to be constructed prior to commencement of any grading operations;
- Designated construction vehicle entrance(s) with stone mud mat;
- Catch basins will be provided with filter screens during construction; and
- Confine refueling and servicing of equipment sufficiently away from existing drainage systems.

Regular inspection of control measures will be completed through a monitoring and mitigation plan, with regular repairs made as necessary. A detailed erosion and sediment control plan will be completed at detailed design stage.

10 Utilities

The following utility agencies provide services to the proposed development:

- Alectra Utilities Corporation;
- Enbridge Inc.;
- Bell Canada; and
- Rogers Communication Inc.

All utilities (electrical, gas, telecommunications) are expected to be available from Collier Street and Owen Street to service the proposed development. Utility coordination is expected to be completed by the electrical engineer.

11 Summary

In summary, this report demonstrates the proposed development can be adequately serviced with municipal water, sanitary, stormwater and utility infrastructure.

11.1 WATER SUPPLY AND DISTRIBUTION

The site will be serviced by a proposed 150 mm dia. domestic service and a proposed 200 mm dia. fire service connecting to the existing 300 mm dia. watermain on Collier Street. The existing municipal system has sufficient pressures, capacity and storage volumes to provide service to the proposed development.

11.2 SEWAGE COLLECTION AND TREATMENT

The site will be serviced by a proposed 300 mm dia. sanitary service connecting to the existing 300 mm dia. sanitary trunk sewer on Owen Street. The Barrie WWTP has sufficient capacity to service the proposed development.

11.3 STORMWATER MANAGEMENT PLAN

A *Stormwater Management Report* has been prepared to demonstrate the proposed development will not result in negative impacts with respect to stormwater. Appropriate water quantity and quality controls are provided.

11.4 LANEWAYS AND TRANSPORTATION

A separate *Traffic Impact Study* was completed to confirm significant external improvements are not required for the site and the internal networks are sufficient for the proposed use.

11.5 GRADING AND LANDSCAPING

The concept grading design was prepared in accordance with the City's Engineering Standards and will match into the existing grades along the property lines.

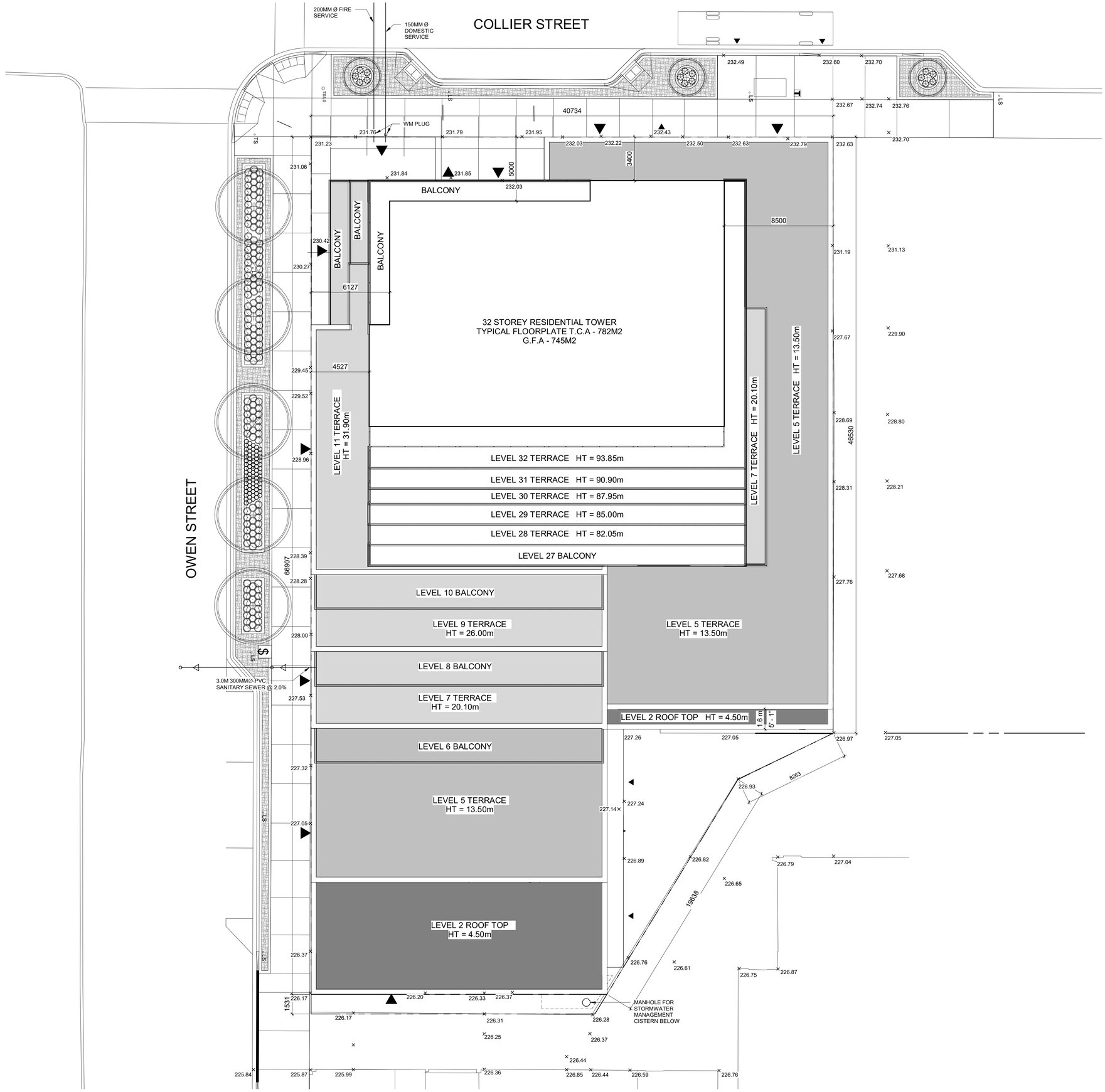
11.6 EROSION AND SEDIMENT CONTROL

A detailed erosion and sediment control plan will be prepared and executed prior to construction in accordance with the City, LSRCA and OPSD standards.

11.7 UTILITIES

Utilities are expected to be available to service the proposed development.

Appendix A:
Site Plan



General Notes

1. ALL DIMENSIONS IN MILLIMETRES.
2. VERIFY ALL DIMENSIONS.
3. DO NOT SCALE DRAWINGS.
4. CHECK DRAWINGS AGAINST SPECIFICATIONS.
5. USE THE LATEST REVISED DRAWINGS ONLY.
6. REPORT ANY DISCREPANCIES, DISCOVERED ERRORS, OR OMISSIONS, TO THE ARCHITECT BEFORE PROCEEDING.
7. DRAWINGS AND SPECIFICATIONS ARE THE PROPERTY OF THE ARCHITECT, AND MUST BE RETURNED UPON COMPLETION OF WORK.

True North Project North

No.	Issue	Date

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Collier & Owen Street Barrie

49 Collier Street, Barrie, ON

Drawing

SITE PLAN

Project number	21323
Date	2022-06-03
Drawn by	AH
Checked by	AS

A1.02

Scale

Appendix B:
Water Calculations

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PROJECT	49 Collier Street, Barrie	FILE	422442
		DATE	July 14, 2022
SUBJECT	Preliminary Water Demand Calculations	NAME	JLM
		PAGE	1 OF 1

Design Criteria (as per City Standards)

Demands

High Density PPU	=	1.67	
Per Capita Demand	=	225	L/cap/day
Commercial Demand	=	28,000	L/ha/day

Peaking Factors (from MOE Design Guidelines for Drinking Water Systems - Table 3-1)

Max Day Demand	=	2.75
Peak Hour Demand	=	4.13

Proposed Development

Condo Units	=	253	Population	=	423 persons
Commercial Floor Space	=	1.37 ha			

Residential Average Day Demand (ADD)	=	95,065	L	=	95.06	m^3	=	1.10 L/s
Commercial Average Day Demand (ADD)	=	38,360	L	=	38.36	m^3	=	0.44 L/s
Total ADD	=	133,425	L	=	133.42	m^3	=	1.54 L/s
Max Day Demand (MDD)	=	366,918	L	=	366.92	m^3	=	4.25 L/s
Peak Hour Demand (PHD	=	551,044	L	=	551.04	m^3	=	6.38 L/s
Max Fire Flow (FF)	=	167.00	L/s	(refer to FUS calculations)				
MDD + FF	=	171.25	L/s					
PHD + FF	=	173.38	L/s					

TATHAM ENGINEERING	Project: 49 Collier Street, Barrie	Date:	July 14, 2022
	File No.: 422442	Designed:	JLM
	Subject: FUS Fire Flow Calculations	Checked	DJR
	Revisions:		

Fire Underwriters Survey Fire Flow Calculations
Long Method

Calculation Based on 1999 Publication "Water Supply for Public Fire Protection" by Fire Underwriters Survey (FUS).

Step	Description	Term	Options	Multiplier Associated with Option	Choose	Value used	Unit	Total Fire Flow (L/min)	
1	Frame Use for Construction of Unit	**Framing Material**							
		Coefficient related to type of construction (C)	Wood Frame	1.5	Non-combustible construction	**0.8**	-	N/A	
			Ordinary Construction	1					
			Non-combustible construction	0.8					
			Fire resistive construction (< 2 hrs)	0.7					
			Fire resistive construction (> 2 hrs)	0.6					
2	Type of Housing (if Townhouse, enter number of units per TH block)	**Floor Space Area**							
		Type of Housing	Single Family	1		**0**	Units	N/A	
			Townhouse / Apartment- inform # of units	1		**258**			
			Other (Comm. Ind., etc.)	1					
			2 hour Fire Separation Between Units	1	Yes	**1**			
2.1	Number of Storeys	Number of Floors / Storeys in the unit (do not include basement)				**32**	Storeys	N/A	
3	Floor Area (exclude basements, per unit for townhouses, per single family dwelling or per building for apartments, commercial or institutional)	Ground Floor Area				**2345**	Square Metres (m2)	N/A	
		Total Floor Area - One Storey of Townhouse/Apartment Block				**2345**			
		Total Floor Area - All Storeys				**35435**			
		Does the building have fire-resistive design?			No	**35435**			
		Are vertical openings/communications properly protected (1 hour rating)?			Yes	**3518**			
		Total Floor Area (A) - for all storeys excluding basement - Single Family				**3518**			
		Measurement Unis	Square Feet (ft^2)	0.093		**3518**	m^2		
			Square Metres (m^2)	1					
			Hectares (ha)	10000					
4	Required Fire Flow without Reductions or Increases	Required Fire Flows without Reductions or Increases per FUS): (FF= 220 x C x $A^{0.5}$)					L/min	10,000	
5	Factors Affecting Burning	**Reductions / Increases Due to Factors Affecting Burning**							
5.1	Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Non-combustible	-0.25	N/A	(2,500)	7,500
			Limited combustible	-0.15					
			Combustible	0.00					
			Free burning	0.15					
			Rapid burning	0.25					
5.2	Reduction Due to Presence of Sprinklers	Sprinkler reduction	Fully supervised system	-0.5	Automatic sprinkler protection	-0.3	N/A	(2,250)	5,250
			Water supply system/hose connections	-0.4					
			Automatic sprinkler protection	-0.3					
			None	0					
5.3	Separation Distance Between Units (Use 10% for 2 hour Fire Separation between adjacent units)	Exposure distance between units	North Side	30.1 to 45.0 m	0.05	0.55	%	4,125	9,375
			East Side	3.1 to 10.0 m	0.20				
			South Side	3.1 to 10.0 m	0.20				
			West Side	20.1 to 30.0 m	0.10				
5.4	Combustibility of Wood Shingle or Shake Roof Material	Surcharge for potential to spread fire	Non-combustible roofing material	0	Non-combustible roofing material	0	L/min	0	9,375
			Low risk of fire spread	2000					
			Moderate risk of fire spread	3000					
			High risk of fire spread	4000					
Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:								9,000	
6	Required Fire Flow, Duration and Volume	Total Required Fire Flow (above) in L/s:						150	
		Required Duration of Fire Flow of 9,000 L/min (hrs):						2	
		Required volume for Fire Flow of 9,000 L/min (m^3):						1,080	

TATHAM ENGINEERING

49 Collier Street

CITY OF BARRIE

Tatham File No. 422442

AVAILABLE FIRE FLOW AT 20 P.S.I.
COLLIER STREET

TEST 1

QR = $QF \times (hr^{0.54}/hf^{0.54})$ From City of Barrie "Water transmission and Distribution Policies and Design Guidelines" page 8

			Value	
Where QR =				
QF =	Flow at Test		471	GPM from Fire Flow Test by Vipond
hr=	Pressure Drop Available	68-20 =	48	P.S.I.
hf =	Pressure Drop at Test	68-66=	2	P.S.I.

QR= 2,620 GPM
165 L/s

TEST 2

QR = $QF \times (hr^{0.54}/hf^{0.54})$ From City of Barrie "Water transmission and Distribution Policies and Design Guidelines" page 8

			Value	
Where QR =	Flow at 20 P.S.I.			
QF =	Flow at Test		608	GPM from Fire Flow Test by Vipond
hr=	Pressure Drop Available	68-20 =	48	P.S.I.
hf =	Pressure Drop at Test	68-64 =	4	P.S.I.

QR= 2,326 GPM
147 L/s

TATHAM ENGINEERING

49 Collier Street

CITY OF BARRIE

Tatham File No. 422442

AVAILABLE FIRE FLOW AT 20 P.S.I.
OWEN STREET

TEST 1

QR = QF X ($hr^{0.54}/hf^{0.54}$) From City of Barrie "Water transmission and Distribution Policies and Design Guidelines" page 8

			Value	
Where QR =				
QF =	Flow at Test		313	GPM from Fire Flow Test by Vipond
hr=	Pressure Drop Available	75-20 =	55	P.S.I.
hf =	Pressure Drop at Test	75-70 =	5	P.S.I.

QR= 1,143 GPM
72 L/s

TEST 2

QR = QF X ($hr^{0.54}/hf^{0.54}$) From City of Barrie "Water transmission and Distribution Policies and Design Guidelines" page 8

			Value	
Where QR =	Flow at 20 P.S.I.			
QF =	Flow at Test		617	GPM from Fire Flow Test by Vipond
hr=	Pressure Drop Available	75-20 =	55	P.S.I.
hf =	Pressure Drop at Test	75-68 =	7	P.S.I.

QR= 1,878 GPM
118 L/s

TEST 3

QR = QF X ($hr^{0.54}/hf^{0.54}$) From City of Barrie "Water transmission and Distribution Policies and Design Guidelines" page 8

			Value	
Where QR =	Flow at 20 P.S.I.			
QF =	Flow at Test		675	GPM from Fire Flow Test by Vipond
hr=	Pressure Drop Available	75-20 =	55	P.S.I.
hf =	Pressure Drop at Test	75-68 =	7	P.S.I.

QR= 2,055 GPM
129 L/s

TEST 4

QR = QF X ($hr^{0.54}/hf^{0.54}$) From City of Barrie "Water transmission and Distribution Policies and Design Guidelines" page 8

			Value	
Where QR =	Flow at 20 P.S.I.			
QF =	Flow at Test		1168	GPM from Fire Flow Test by Vipond
hr=	Pressure Drop Available	75-20 =	55	P.S.I.
hf =	Pressure Drop at Test	75-66 =	9	P.S.I.

QR= 3,104 GPM
196 L/s

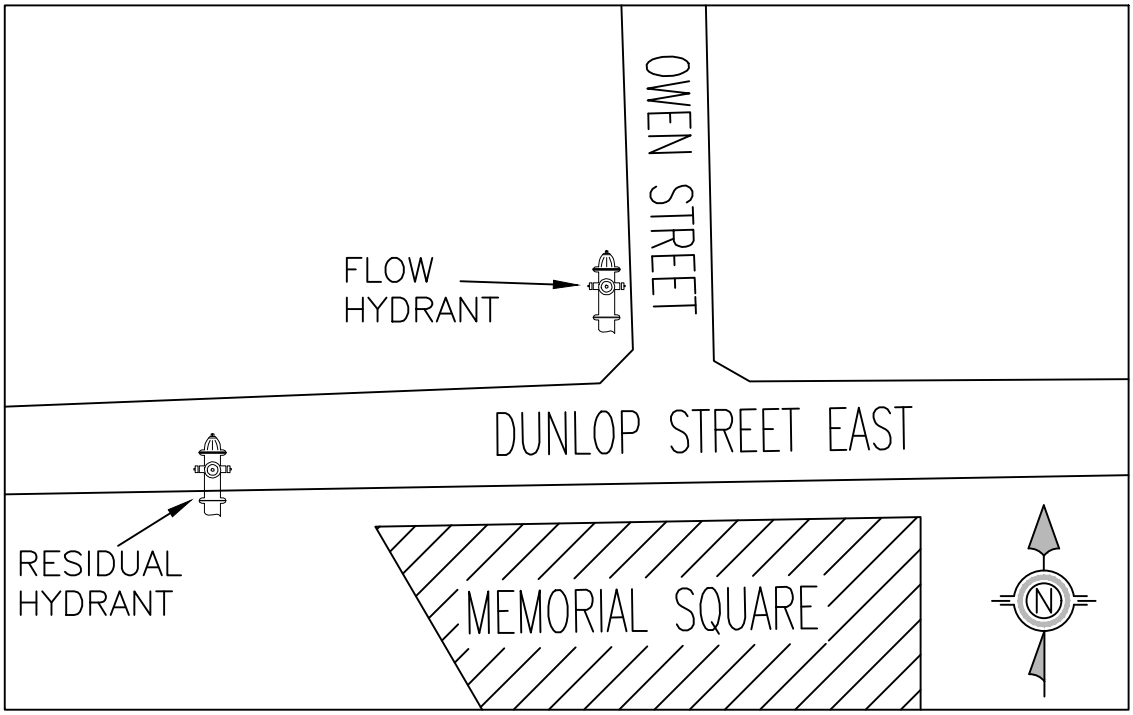
FLOW TEST RESULTS

FIRST FOR FIRE, LIFE SAFETY & SECURITY
VIPOND INC
est. 1945

DATE : WEDNESDAY AUGUST 26, 2020 TIME : 2:30 PM

LOCATION : OWEN STREET & DUNLOP STREET EAST
BARRIE
ONTARIO

TEST BY : VIPOND FIRE PROTECTION AND LOCAL PUC



STATIC PRESSURE : 75 PSI

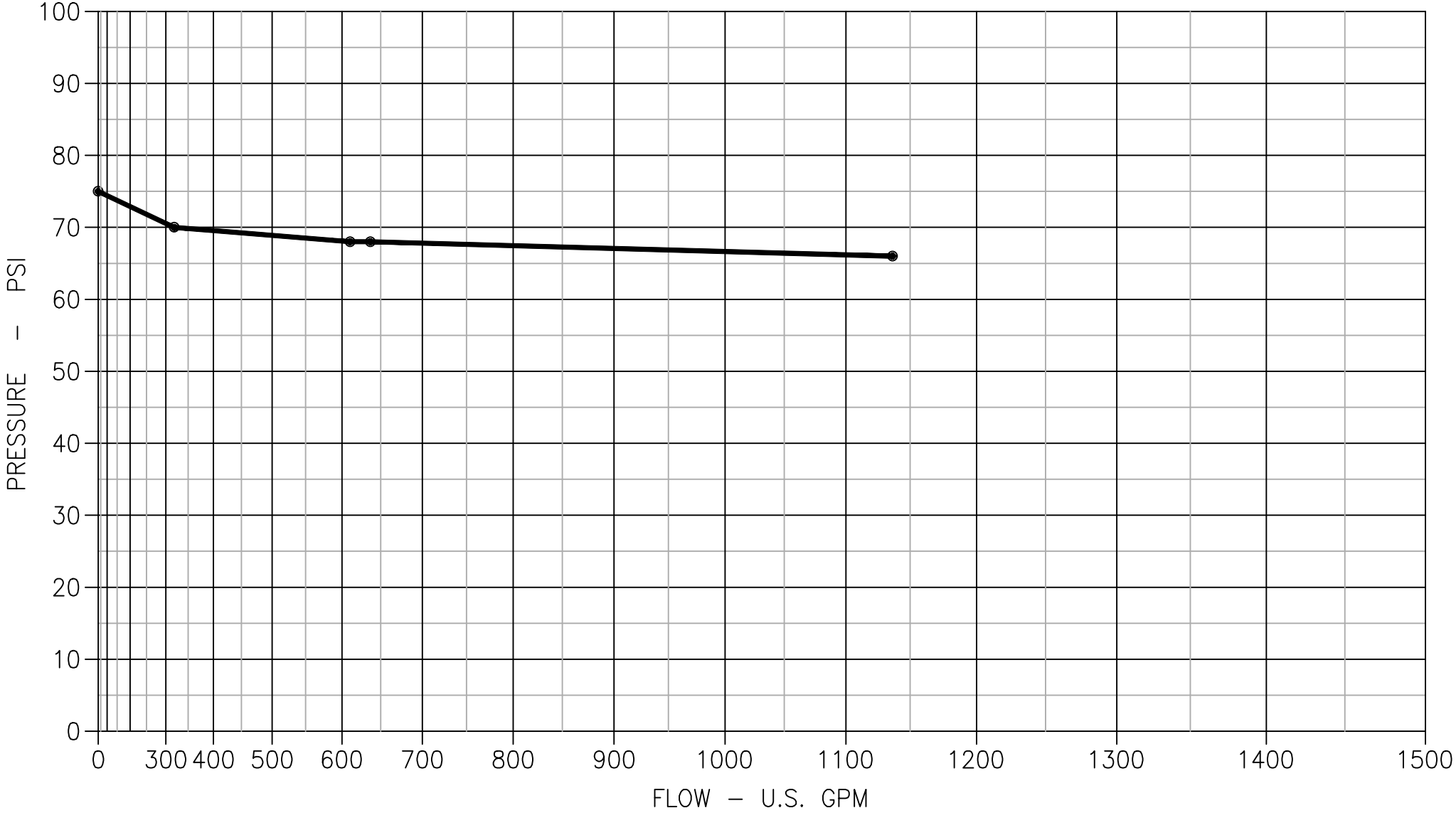
TEST NO.	NO. OF NOZZLES	NOZZLE DIAMETER (INCHES)	DISCHARGE CO-EFFICIENT	RESIDUAL PRESSURE (PSI)	PITOT PRESSURE (PSI)	DISCHARGE (U.S.GPM)
1	1	1-1/8	0.97	70	51	313
2	1	1-3/4	0.97	68	48	617
3	1	2-1/2	0.9	68	16	675
4	2	2-1/2	0.9	66	12	1168

FIRST FOR FIRE, LIFE SAFETY & SECURITY

VIPOND INC est. 1945

OWEN STREET & DUNLOP STREET EAST	BY : GUS A.
BARRIE	OFFICE : BARRIE
ONTARIO	TEST BY : VIPOND & PUC
	DATE : AUGUST 26, 2020

STATIC:	RESIDUAL:		FLOW:
75 PSI	TEST#1	70 PSI @	313 GPM
	TEST#2	68 PSI @	617 GPM
	TEST#3	68 PSI @	675 GPM
	TEST#4	66 PSI @	1168 GPM



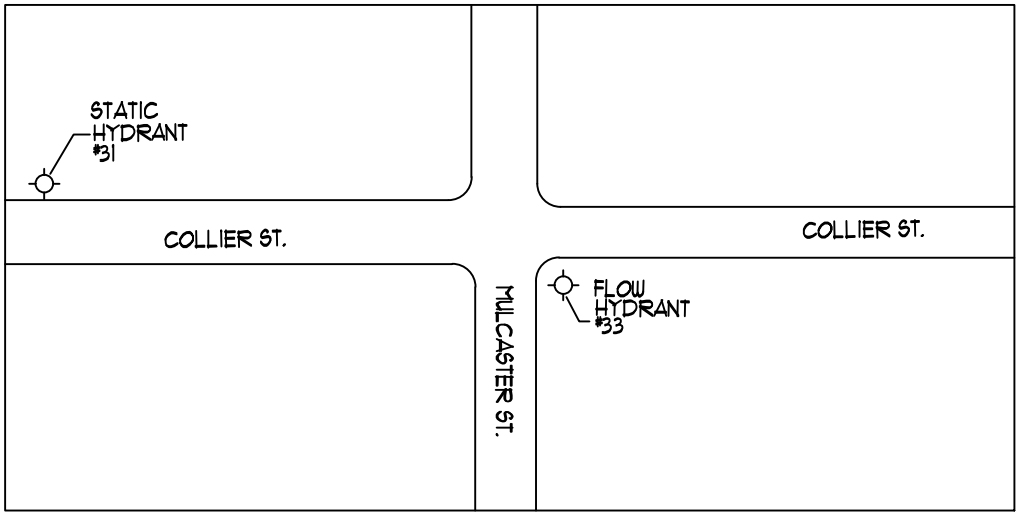
FLOW TEST RESULTS

FIRST FOR FIRE, LIFE SAFETY & SECURITY
VIPOND INC
est. 1945

DATE : JUNE 16,2020 TIME : 10:30 AM

LOCATION : MULCASTER STREET & COLLIER STREET
BARRIE
ONTARIO

TEST BY : VIPOND FIRE PROTECTION AND LOCAL PUC



STATIC PRESSURE : 68 PSI UNDERGROUND TYPE & SIZE : N/A

TEST NO.	NO. OF NOZZLES	NOZZLE DIAMETER (INCHES)	DISCHARGE CO-EFFICIENT	RESIDUAL PRESSURE (PSI)	PITOT PRESSURE (PSI)	DISCHARGE (U.S.G.P.M)
1	1	1 3/4"	0.995	66	28	471
2	2	2 1/2"	0.90	64	13	608

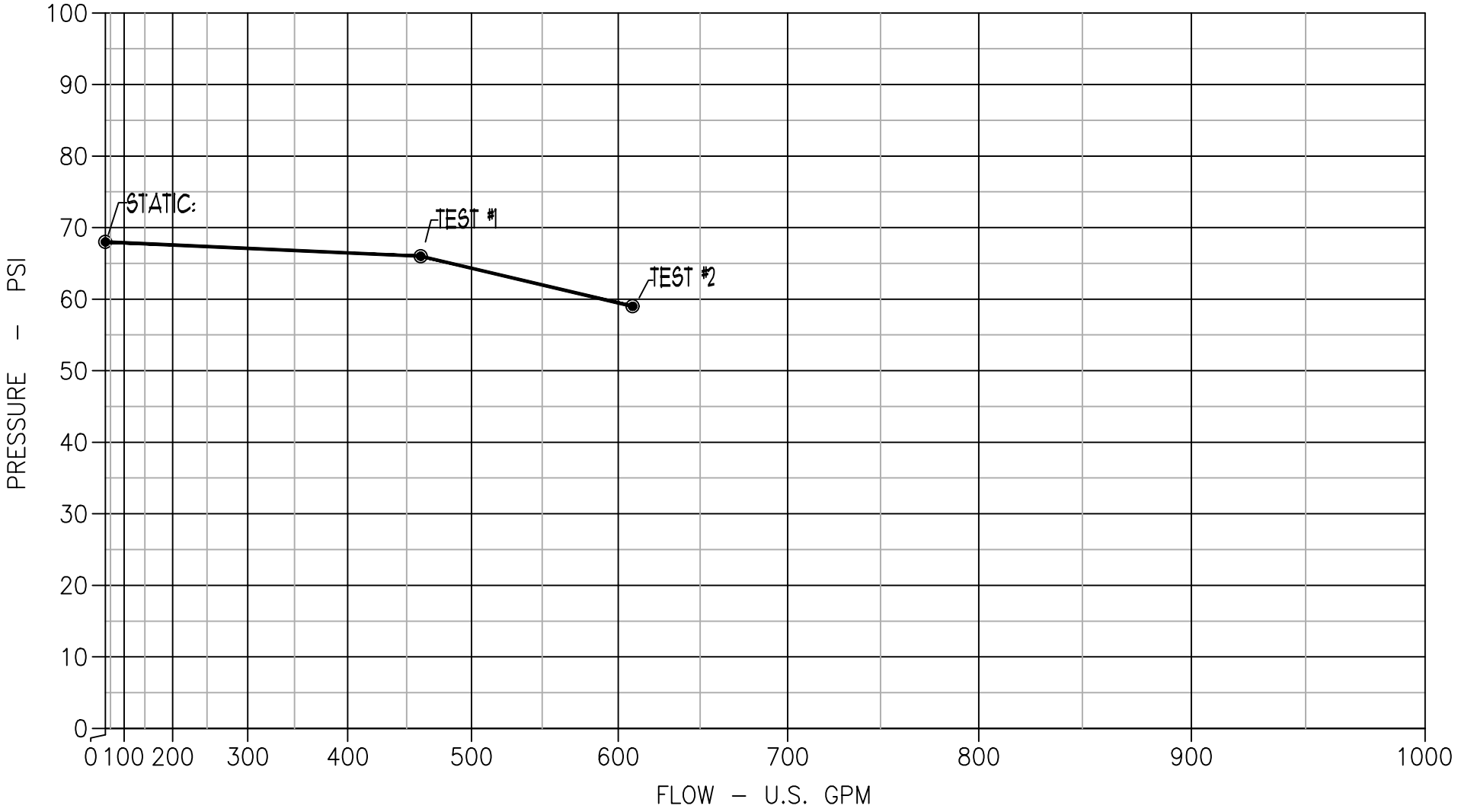
FIRST FOR FIRE, LIFE SAFETY & SECURITY

VIPOND INC

est. 1945

MULCASTER STREET & COLLIER STREET		BY :	LEN K.
BARRIE		VIPOND OFFICE :	BARRIE
ONTARIO		TEST BY :	VIPOND & PUC
		DATE :	JUNE 26,2020

STATIC:		RESIDUAL:		FLOW:
68 PSI	TEST#1	66 PSI	@	471 GPM
	TEST#2	64 PSI	@	608 GPM



Appendix C:
Sanitary Calculations

TATHAM ENGINEERING

PROJECT	49 Collier Street, Barrie	FILE	422442
		DATE	July 14, 2022
SUBJECT	Sanitary Flows	NAME	JLM
		PAGE	1 OF 1

Design Criteria (as per City Standards)

Demands

Per Capita Flow	=	225	L/cap/day
Commercial Flow	=	28,000	L/ha/day
Extraneous Flow (Infiltration)	=	0.10	L/s/ha

Peaking Factors

Commercial	=	2.00
Residential	=	Harmon

Population Densities (PPU)

High Density PPU = 1.67

Site Information

Apartment Units	=	253	
Total Commercial Floor Space	=	1.37	ha
Residential Area (used for Extraneous Flows only	=	0.25	ha

Population = 423 persons

Average Day Flow (ADF)

ADF Residential	=	95,065	L	=	95.06	m^3	=	1.10 L/s
ADF Commercial	=	38,360	L	=	38.36	m^3	=	0.44 L/s
ADF Extraneous	=	2,160	L	=	2.16	m^3	=	0.03 L/s
Total ADF	=	135,585	L	=	135.58	m^5	=	1.57 L/s

Peak Day Flow (PDF)

PDF Residential	=	381,281	L	=	381.28	m^2	=	4.41 L/s
PDF Commercial	=	76,720	L	=	76.72	m^3	=	0.89 L/s
Total PDF (including ADF Extraneous)	=	460,161	L	=	460.16	m^3	=	5.33 L/s

SANITARY SEWER DESIGN SHEET

TATHAM ENGINEERING

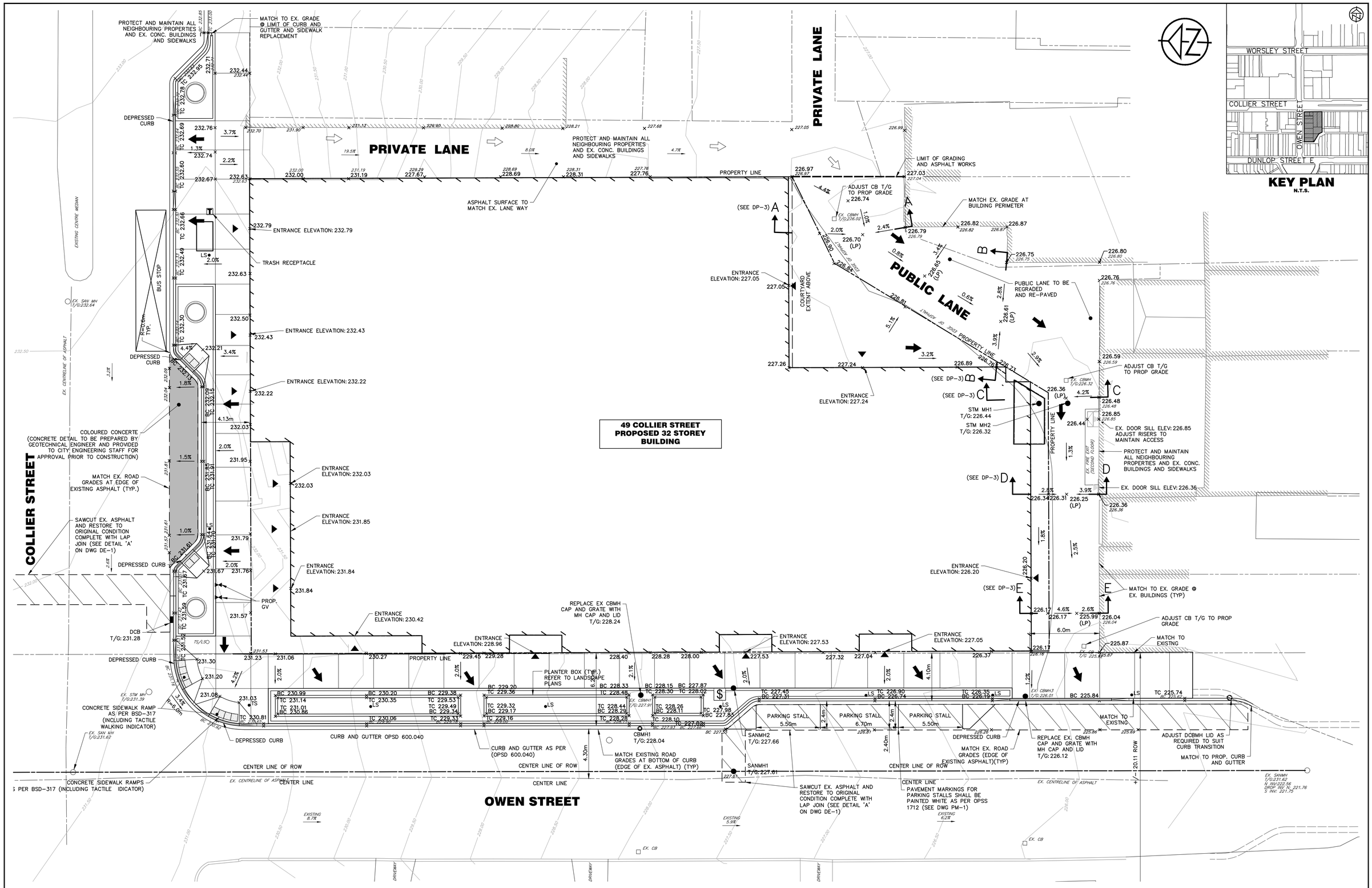
FLOW CRITERIA

Average Daily Flow Rate (L/cap/day)		225
Commercial Flow (L/ha/day)		28,000
Extraneous Flow (L/s/ha)		0.10
Peaking Factor:	Residential	Harmon
	Commercial	2.00
Population Density (ppu):	High	1.67

Project Number:	422442
Project Name:	49 Collier Street
Municipality:	City of Barrie
Designed By:	JLM
Date:	Jul-22
Checked By:	DJR
Date:	Jul-22
Revision:	

STREET NAME	AREA LABEL	UPSTREAM MAINTENANCE HOLE	DOWNSTREAM MAINTENANCE HOLE	NUMBER OF UNITS	POPULATION	ACCUMULATED POPULATION	PEAKING FACTOR	AREA	ACCUMULATED AREA	AVERAGE FLOW			PEAK FLOW			SEWER						
										FLOW	INFILTRATION	TOTAL	RESIDENTIAL	INFILTRATION	TOTAL	LENGTH OF PIPE	PIPE DIAMETER	GRADE	FULL FLOW CAPACITY	FULL FLOW VELOCITY	ACTUAL FLOW VELOCITY	PERCENT FLOWING FULL
		MH No.	MH No.	no.	cap.	cap.		ha	ha	l/s	l/s	l/s	l/s	l/s	l/s	m	mm	%	l/s	m/s	m/s	%
49 Collier Street	101	Building (Residential)	PROP. SAN MH2	253	423	423	4.01	0.25	0.25	1.10	0.03	**1.13**	4.41	0.03	**4.44**	3.0	300	2.0%	**136.74**	1.93	0.88	3.2%
49 Collier Street	101	Building (Commercial)	PROP. SAN MH2	-	-	-	2.00	1.37	-	0.44	0.00	**0.44**	0.89	0.00	**0.89**	3.0	300	2.0%	**136.74**	1.93	0.57	0.6%
Owen Street	101	PROP. SAN MH2	PROP. SAN MH1	-	-	423	4.01	-	0.25	1.54	0.03	**1.57**	5.30	0.03	**5.33**	7.1	300	2.0%	**136.74**	1.93	0.93	3.9%

Appendix D: Drawings



DISCLAIMER AND COPYRIGHT

CONTRACTOR MUST VERIFY ALL DIMENSIONS AND BE RESPONSIBLE FOR SAME. ANY DISCREPANCIES MUST BE REPORTED TO THE ENGINEER BEFORE COMMENCING WORK. DRAWINGS ARE NOT TO BE SCALED.

BENCHMARKS

TBM #1
ELEVATION:225.99

DESCRIPTION: TOP OF THE SPINDLE OF FIRE HYDRANT @ EAST SIDE OF OWEN STREET

VERTICAL BENCHMARK: 03120030003 (2nd ORDER)
ELEVATION: 241.012

BENCHMARKS

VERTICAL BENCHMARK: 0011931U455S (1st ORDER)
ELEVATION: 228.735

HORIZONTAL BENCHMARK: 03120040046 (2nd ORDER)
NORTHING: 4916082.772
EASTING: 603662.430

HORIZONTAL BENCHMARK: 01019860463 (2nd ORDER)
ELEVATION: 250.63

No.	REVISION DESCRIPTION	DATE
1.	FIRST SUBMISSION	SEP 23/22

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
D.J. REID
100225660
Sept 23/22
PROVINCE OF ONTARIO

49 COLLIER STREET
CITY OF BARRIE

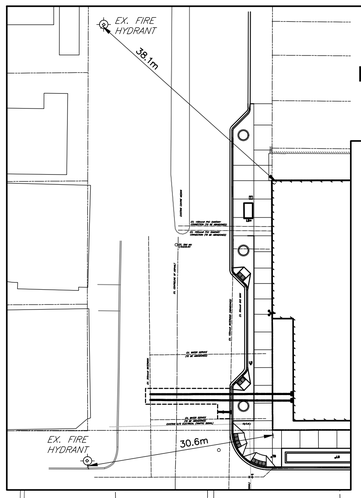
SITE GRADING

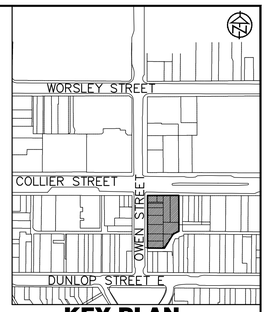
TATHAM ENGINEERING

DESIGN: LCG	FILE: 422442	DWG: SG-1
DRAWN: LCG	DATE: JUNE 2022	
CHECK: DJR	SCALE: 1:150	

Drawing Name: 422442-SG01.dwg, Plotted: Sep 23, 2022

LOCATION OF EXISTING FIRE HYDRANTS NEAR SUBJECT SITE
SCALE: 1:500





KEY PLAN
N.T.S.

49 COLLIER STREET
PROPOSED 32 STOREY BUILDING

PRIVATE LANE

PUBLIC LANE

COLLIER STREET

OWEN STREET

ADJUST EX. CBMH AS REQUIRED TO MATCH LANEWAY GRADE

EX. CBMH T/G:226.92

EX. 300mmø CONCRETE STORM SEWER

U/G PARKING RAMP

LOADING AREA

1%MIN/ 3% MAX

EX. 400mmø CONCRETE STORM SEWER

1%MIN/ 4% MAX

PROP. 45.2m³ STORM CISTERN
S INV: 224.84
WATER TO BE PUMPED FROM CISTERN AT A MAXIMUM RATE OF 0.06m³/s (PUMP TO BE DESIGNED BY OTHERS)

EX. CBMH T/G:226.32
E. INV: 224.78
W INV: 224.78

STM MH1
(ACCESS TO STM CISTERN)
T/G:226.44

1.8m 200mmø PVC STORM SEWER @ 2.0%

STM MH2
T/G: 226.32
N INV: 224.80
E INV: 224.73
W INV: 224.72
(SHOP DRAWING TO BE PROVIDED FOR DOGHOUSE MANHOLE PRIOR TO INSTALLATION)

ADJUST EX. CBMH AS REQUIRED TO MATCH LANEWAY GRADE

EX. FIRE EXIT (SECOND FLOOR)

EX. 400mmø CONCRETE STORM SEWER

EX. 300mmø WATERMAIN

EX. 100mmø WATERMAIN

EX. 250mmø PVC SANITARY SEWER

EX. CENTRELINE OF ASPHALT

EX. SAN MH
T/G:232.64
I.E. INV:230.14
W. INV:230.30

EX. 50mmø GAS MAIN

EX. 100mmø WATERMAIN (ABANDONED)

EX. 375mmø CONCRETE STORM SEWER @ 2.4%

LS

EX. 150mmø PVC SANITARY CONNECTION (TO BE ABANDONED)

EX. 150mmø PVC SANITARY CONNECTION (TO BE ABANDONED)

CONNECT PROP. FIRE DEPARTMENT CONNECTION TO BUILDING

CROSSING #3
SURFACE ELEV: 231.63
STM INV: 230.15
WM OBV: 229.85
(STORM INVERT TO BE CONFIRMED DURING CONSTRUCTION)

CROSSING #4
SURFACE ELEV: 231.60
STM INV: 230.13
WM OBV: 229.83
(STORM INVERT TO BE CONFIRMED DURING CONSTRUCTION)

150ø G/V

DOMESTIC WATER METER AND BACK FLOW PREVENTER AS PER BSD-533

NOTE:
1. DOMESTIC AND FIRE WATER SERVICE TO ENTER BUILDING AS PER BSD-505
2. BOTH THE FIRE SERVICE AND DOMESTIC SERVICE ARE TO BE PROVIDED WITH BACK FLOW PREVENTION DEVICE AS PER CITY BY-LAW 2017-212

EX. WATER SERVICE (TO BE ABANDONED)

SAWCUT EX. ASPHALT AND RESTORE TO ORIGINAL CONDITION COMPLETE WITH LAP JOIN (SEE DETAIL 'A' ON DWG DE-1)

CONNECT TO EXISTING 300mmø WATERMAIN USING TAPPING SLEEVE AND VALVE BOX

150mmø DOMESTIC SERVICE

200mmø FIRE SERVICE

WM PLUG

DCB
T/G: 231.28
N.INV: 230.25

CROSSING #1
SURFACE ELEV: 231.96
WM INV: 230.29
SAN OBV: 229.86
(SANITARY INVERT TO BE CONFIRMED DURING CONSTRUCTION)

CROSSING #2
SURFACE ELEV: 231.93
WM INV: 230.28
SAN OBV: 229.83
(SANITARY INVERT TO BE CONFIRMED DURING CONSTRUCTION)

EX. WATER SERVICE (TO BE ABANDONED)

EXISTING U/G ELECTRICAL (TRAFFIC SIGNAL)

1.9m 300ø PVC STORM LEAD @ 2.0% CONNECT TO EX. STM SEWER WITH 300x300 TEE (SHOP DRAWING TO BE PROVIDED PRIOR TO INSTALLATION) @ 230.07±

EX. STM MH
T/G:231.39
E INV:229.93
N INV:230.35
S INV:229.90

EX. 41.8m 300mmø STORM SEWER @ 7.8%

EX. 300mmø CONCRETE STORM SEWER

EX. SAN MH
T/G:231.62
E. INV:228.97
N INV:228.57
S INV:228.52

EX. 250mmø PVC SANITARY SEWER

EX. 150mmø WATERMAIN (ABANDONED)

EXISTING U/G ELECTRICAL (TRAFFIC SIGNAL)

EX. WATER SERVICE

DRIVEWAY

PLUG AND ABANDON ALL EX. SANITARY SERVICES

EX. CBMH1 T/G:227.91 S INV:226.55 N INV:226.61 W INV: 226.79

REPLACE EX CBMH CAP AND GRATE WITH MH CAP AND LID T/G: 228.24

3.0m 300mmø PVC SANITARY SEWER @ 2.0%

LOWER 150mmø WATERMAIN TO SUIT SANITARY SERVICE CONNECTION (TO BE CONFIRMED DURING CONSTRUCTION)

CONNECT PROP. FIRE DEPARTMENT CONNECTION TO BUILDING

SAN INV: 225.58

REPLACE EX. CBMH CAP AND GRATE WITH MH CAP AND LID T/G: 226.12

EX. CB T/G: 225.92 E INV: 224.56 W INV: 224.56

EX. 150mm WATERMAIN TO BE REMOVED (DUNLOP STREET WORKS)

28.7m

PLANTER BOX (TYP.) REFER TO LANDSCAPE PLANS

2.9m 300mmø PVC STORM SEWER @ 2.5%

45° VERTICAL BEND

1200ø SANMH2
T/G: 227.66
E INV: 225.52
W INV: 225.52

EX. 32.8m 300mmø STORM SEWER @ 5.3%

EX. 300mmø STORM SEWER

EX. CBMH3 T/G:226.01 S INV:224.78 N INV:224.60 W INV:224.82

EX. 150mmø WATERMAIN

EX. 150mmx300mm REDUCER (DUNLOP STREET WORKS)

EX. DCBMH1 T/G 225.29 N.INV. 223.79 S.INV. 223.61

ADJUST DCBMH LID AS REQUIRED TO SUIT CURB TRANSITION

EX. 450mm STM SEWER

EX. FIRE HYDRANT

CROSSING #5
SURFACE ELEV: 228.20
STM INV: 226.86
WM OBV: 226.63
(WATERMAIN OBVERT TO BE CONFIRMED DURING CONSTRUCTION)

CBMH1
T/G: 228.04
W INV: 226.86
E INV: 226.89

7.1m 300mmø PVC SANITARY SEWER @ 2.0%

45° VERTICAL BEND

CROSSING #7
SURFACE ELEV: 227.64
SAN INV: 225.48
WM OBV: 224.98

CROSSING #6
SURFACE ELEV: 227.65
STM INV: 226.13
SAN OBV: 225.82
(STORM INVERT TO BE CONFIRMED DURING CONSTRUCTION)

LOCATION AND DEPTH OF GAS MAIN TO BE CONFIRMED PRIOR TO CONSTRUCTION AND IS TO BE RELOCATED AS REQUIRED

EX. 300mmø PVC SANITARY SEWER @ 5.6%

EX. CENTRELINE OF ASPHALT

SAWCUT EX. ASPHALT AND RESTORE TO ORIGINAL CONDITION COMPLETE WITH LAP JOIN (SEE DETAIL 'A' ON DE-1)

1200ø SANMH1
(SHOP DRAWING TO BE PROVIDED FOR DOGHOUSE MANHOLE PRIOR TO INSTALLATION)
T/G: 227.61
E INV: 225.37
N INV: 225.33
S INV: 225.31
(SANITARY INVERTS TO BE CONFIRMED DURING CONSTRUCTION)

EX. CONCRETE STORM SEWER

EX. WATER SERVICE

EX. CB

EX. CONCRETE STORM SEWER

EX. WATER SERVICE

EX. CB

+/- 20.11 ROW

EX. SANMH T/G:231.62 N.INV:222.56 DROP INV to 221 S INV: 221.75

EX. 300mm WATERMAIN (DUNLOP STREET WORKS)

EX. FIRE HYDRANT

NOTE:
1. ALL EX. WATER SERVICES ARE TO BE ABANDONED BY CUTTING OFF THE SERVICE AT THE WATERMAIN CONNECTION
2. ALL INVERTS TO BE CONFIRMED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION

BENCHMARKS

TBM #1
ELEVATION:225.99

DESCRIPTION: TOP OF THE SPINDLE OF FIRE HYDRANT @ EAST SIDE OF OWEN STREET

VERTICAL BENCHMARK: 03120030003 (2nd ORDER)
ELEVATION: 241.012

BENCHMARKS

VERTICAL BENCHMARK: 0011931U455S (1st ORDER)
ELEVATION: 228.735

HORIZONTAL BENCHMARK: 03120040046 (2nd ORDER)
NORTHING: 4916082.772
EASTING: 603662.430

HORIZONTAL BENCHMARK: 01019860463 (2nd ORDER)
ELEVATION: 250.63

No.	REVISION DESCRIPTION	DATE
1.	FIRST SUBMISSION	SEP 23/22

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
D. J. REID
100225660
Sept 23/22
PROVINCE OF ONTARIO

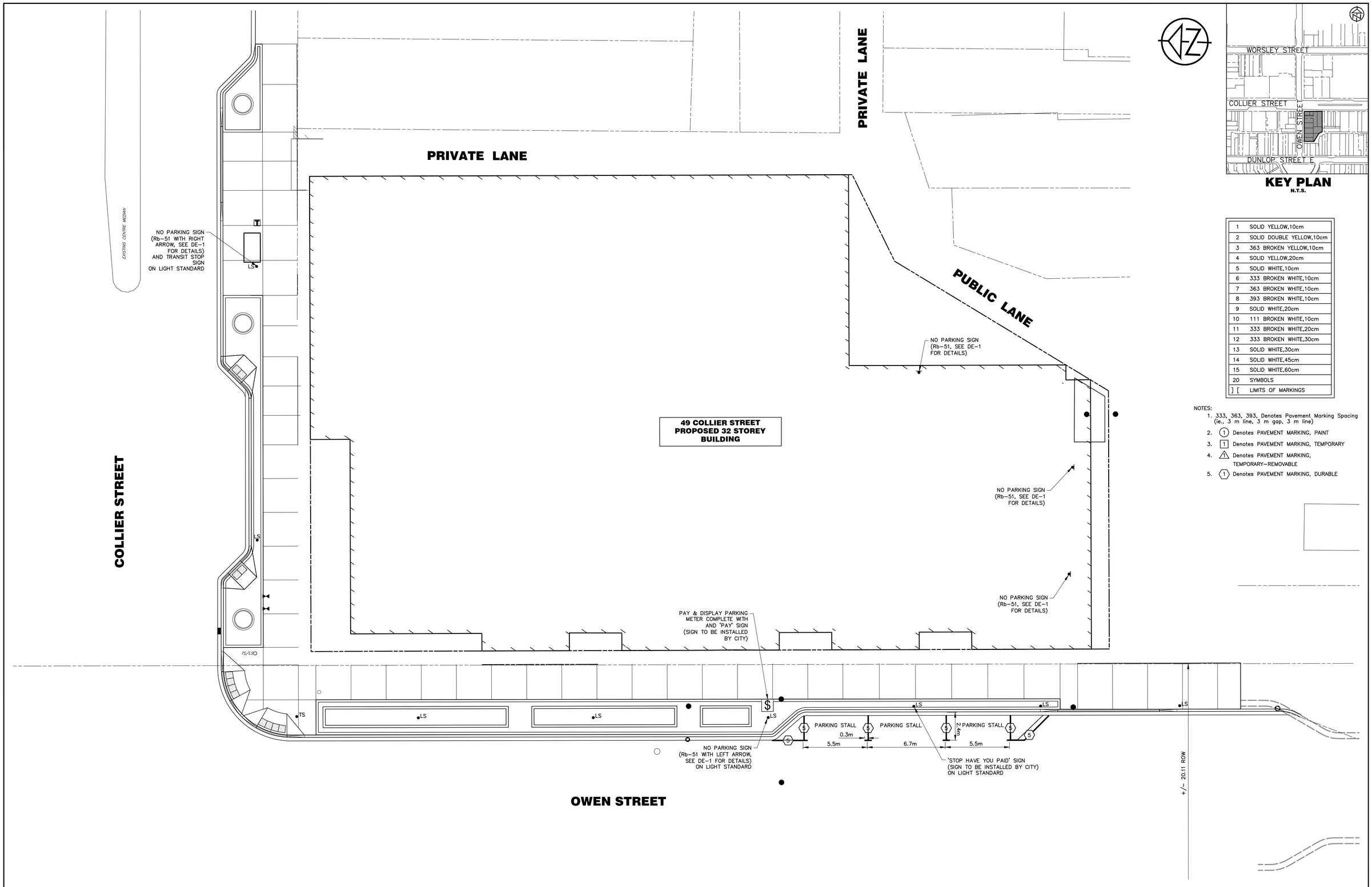
49 COLLIER STREET
CITY OF BARRIE

TATHAM ENGINEERING

SITE SERVICING

DESIGN: LCG	FILE: 422442	DWG: SS-1
DRAWN: LCG	DATE: JUNE 2022	
CHECK: DJR	SCALE: 1:150	

Drawing Name: 422442-SS01.dwg, Plotted: Sep 23, 2022



KEY PLAN
N.T.S.

1	SOLID YELLOW,10cm
2	SOLID DOUBLE YELLOW,10cm
3	363 BROKEN YELLOW,10cm
4	SOLID YELLOW,20cm
5	SOLID WHITE,10cm
6	333 BROKEN WHITE,10cm
7	363 BROKEN WHITE,10cm
8	393 BROKEN WHITE,10cm
9	SOLID WHITE,20cm
10	111 BROKEN WHITE,10cm
11	333 BROKEN WHITE,20cm
12	333 BROKEN WHITE,30cm
13	SOLID WHITE,30cm
14	SOLID WHITE,45cm
15	SOLID WHITE,60cm
20	SYMBOLS
] [	LIMITS OF MARKINGS

NOTES:
1. 333, 363, 393, Denotes Pavement Marking Spacing (ie., 3 m line, 3 m gap, 3 m line)
2. (1) Denotes PAVEMENT MARKING, PAINT
3. [1] Denotes PAVEMENT MARKING, TEMPORARY
4. <1> Denotes PAVEMENT MARKING, TEMPORARY-REMOVABLE
5. (1) Denotes PAVEMENT MARKING, DURABLE

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BENCHMARKS

TBM #1
ELEVATION:225.99

DESCRIPTION: TOP OF THE SPINDLE OF FIRE HYDRANT @ EAST SIDE OF OWEN STREET

VERTICAL BENCHMARK: 03120030003 (2nd ORDER)
ELEVATION: 241.012

BENCHMARKS

VERTICAL BENCHMARK: 0011931U455S (1st ORDER)
ELEVATION: 228.735

HORIZONTAL BENCHMARK: 03120040046 (2nd ORDER)
NORTHING: 4916082.772
EASTING: 603662.430

HORIZONTAL BENCHMARK: 01019860463 (2nd ORDER)
ELEVATION: 250.63

No.	REVISION DESCRIPTION	DATE
1.	FIRST SUBMISSION	SEP 23/22

ENGINEER STAMP

LICENSED PROFESSIONAL ENGINEER
D. J. REID
100225660
Sept 23/22
PROVINCE OF ONTARIO

49 COLLIER STREET
CITY OF BARRIE

PAVEMENT MARKING PLAN

TATHAM ENGINEERING

DESIGN: LCG	FILE: 422442	DWG:	
DRAWN: LCG	DATE: JUNE 2022	**PM-1**	
CHECK: DJR	SCALE: 1:150		

Drawing Name: 422442-PM-1.dwg, Plotted: Sep 23, 2022