Functional Servicing Report
220 Bradford Street
Condominium Development

Chayell Hospitality Group Inc.

P/N 3266 | February 7, 2020

Skelton Brumwell & Associates Inc.
ENGINEERING PLANNING ENVIRONMENTAL CONSULTANTS

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City of Barrie
220 Bradford Street

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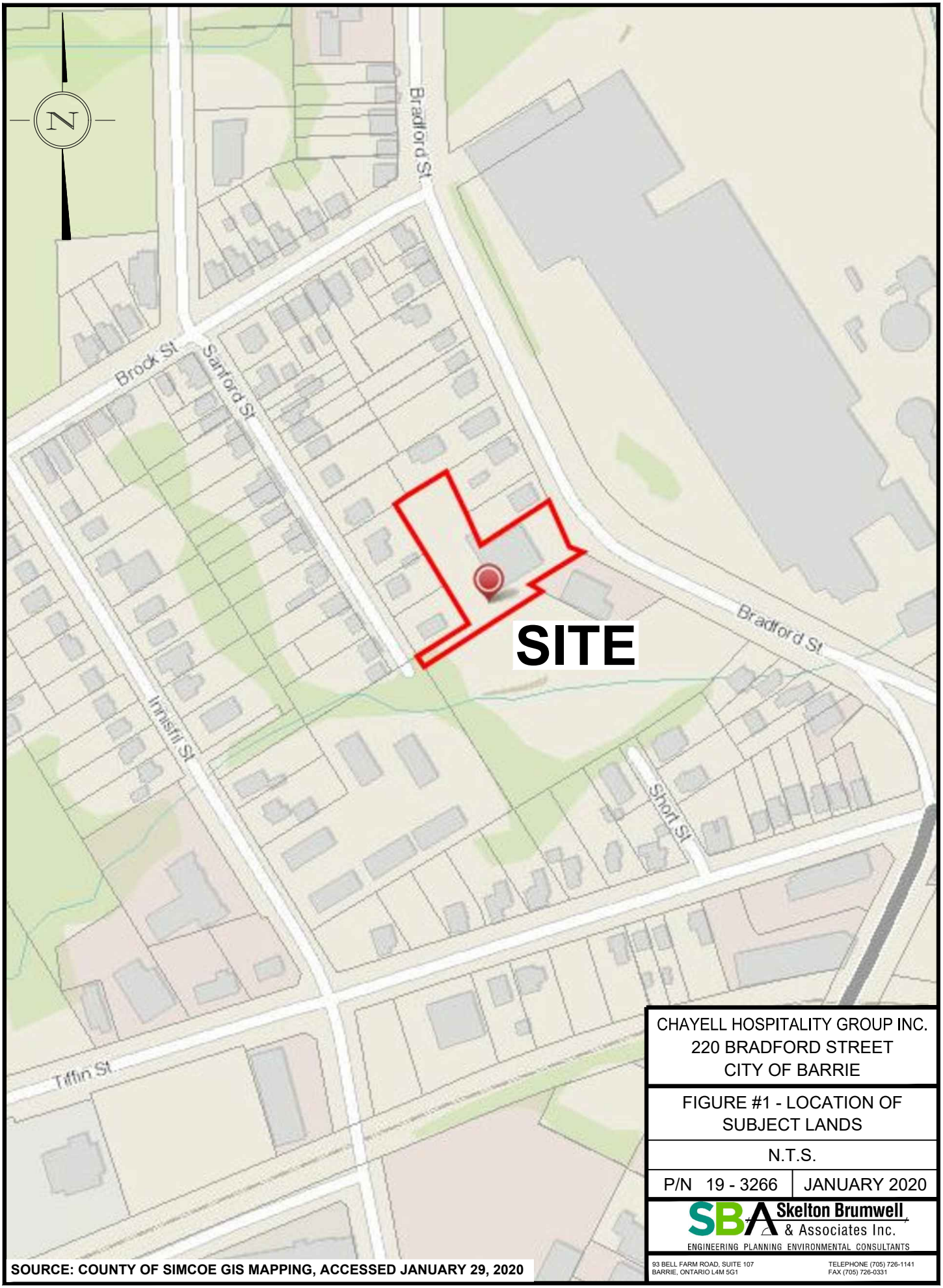
1.0 Introduction

Chayell Hospitality Group Inc. (Chayell) is proposing to develop an existing vacant lot located at 220 Bradford Street in the City of Barrie into a fourteen (14) storey, one hundred and twenty–one (121) unit residential condominium building, complete with several levels of indoor parking. The subject property is located on the west side of Bradford Street, northwest of the intersection of Bradford Street and Essa Road/Tiffin Street.

The property is irregular in shape and comprises an area of approximately 3,442 m^2 (0.34 ha), and the proposed building has a footprint area of approximately 1,908 m^2, which provides about 55% lot coverage.

The subject property is legally described as Part of Lot 26, Concession 5, Geographic Township of Vespra, County of Simcoe, now in the City of Barrie. It is further described as Part of Park Lot 15, and Lots 16, 17, and 18, all on the west side of Bradford Street, Plan 15, and as Part 4 of Registered Plan 51R–7586, all in the City of Barrie. The location is shown on Figure #1 – Location of Subject Lands.

Skelton, Brumwell & Associates Inc. (SBA) has been retained to provide consulting engineering services in support of the redevelopment of the subject property. In support of the proposed Site Plan Application, a Functional Servicing Report for the property has been completed as summarized herein.



SOURCE: COUNTY OF SIMCOE GIS MAPPING, ACCESSED JANUARY 29, 2020

CHAYELL HOSPITALITY GROUP INC.
220 BRADFORD STREET
CITY OF BARRIE

FIGURE #1 - LOCATION OF SUBJECT LANDS

N.T.S.

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2.0 Site Investigation

A site investigation of the existing services along Bradford Street was undertaken by Nathan Keller, CET, on November 26, 2019. The site visit was completed unaccompanied. The weather at the time of the inspection was sunny, with a temperature of approximately 10 °C.

The purpose of the site investigation was to examine the existing site conditions, including observations about the existing municipal services in the area of the proposed development.

3.0 Existing Site Conditions

The existing site is currently vacant; however, there was formerly a used car dealership, auto body shop and a residential dwelling located on the subject lands which were demolished in approximately July 2012. Topographic information for the site was compiled by J.D. Barnes Ltd., dated November 4, 2019, and shows total relief on the site to be in the order of 4.3 metres, falling generally in a south-easterly direction from an elevation of approximately 225.80 metres at the northern part of the property to approximately 221.50 metres at the southern part of the property.

The existing site is accessed via two driveways off of Bradford Street, which has a four–lane cross section at this location with a width of about 14 metres. Sidewalks are present on both sides of the roadway. Bradford Street is defined as an Arterial Road in the City of Barrie's Official Plan.

4.0 Sanitary Sewage System

4.1 Existing Conditions

SBA designed and oversaw the construction of the Hotchkiss Creek Storm Pond and Culvert for the City of Barrie on an adjacent property to the south, and therefore had access to drawings showing the existing municipal services on Bradford Street.

There is an existing 300 mm diameter PVC sanitary main on Bradford Street adjacent to the front (east) property line. The drawings also show that the site is serviced by a 150 mm diameter service lateral at unknown grade. The sanitary main on Bradford Street has a slope of about 0.4%, which would provide a capacity of 0.061 m3/s (61 L/s). The sewer on Bradford Street extends about 80 metres north of Brock Street and also services Brock from Bradford to Innisfil Street and Sanford Street.

4.2 Sanitary Sewage Design Flow

The Site Plan for the proposed development, prepared by Mataj Architects Inc. (Mataj), shows the development to consist of one hundred and twenty–one (121) condominium units, as well as a 97 m^2 retail space on the ground floor.

The City of Barrie Sanitary Sewage Collection System Policies and Design Guidelines (2017) defines a design population for various residential uses based on a population density. The guidelines define "high density" as developments such as apartment dwellings having 54–300 units per hectare. As the proposed development includes 121 units, it would generally be considered a high–density use. The population density for a high–density use would be 1.67 persons per unit (ppu).

Utilizing this information, the design population for the development would be:

Design Population = 1.67 persons per unit x 121 units = 202 people

The City of Barrie guidelines recommend that the sanitary flow for residential uses be calculated using a rate of 225 litres/day/person. The design guidelines also note that for general applications where the site specific (commercial) use is unknown, a minimum average design flow rate of 28 m^3/day/ha should be used for commercial properties.

Based on this information, the average daily flow for the development would be:

Q_{avg} = (202 people x 225 litres/day/person) + (28 m^3/day/ha x 1000 L/m^3 x 0.34 ha)
Q_{avg} = 45,450 L/day + 9,520 L/day
Q_{avg} = 54,970 L/day = 0.64 L/s

The peak factor can be calculated using the Harmon Formula, which provides peaking factors that are representative of peak hourly flows. Based on a design population of 204 people, the peak factor, M, can be calculated as:

$$M = 1 + 14/(4 + P^{0.5}) = 1 + 14/(4+(0.202)^{0.5}) = 4.15$$

Based on a peaking factor 4.15, and applying an extraneous flow rate of 0.1 L/s/ha, the peak sewage flow can be calculated using the formula:

$$Q_p = \frac{PqM}{86.4} + IA$$

where Q_p is the peak domestic sewage flow in L/s;
P is the design population, in thousands;
q is the average daily per capita domestic flow, in L/cap/day;
M is the peaking factor, calculated using the Harmon formula;
I is the unit of peak extraneous flow, in L/ha/s; and,
A is the gross tributary area, in ha.

The peak domestic residential sewage flow is therefore calculated as:

$$Q_{pR} = \frac{(0.202 \text{ people})\ (225 \text{ L/person/day})(4.15)}{86.4} + (0.1 \text{ L/ha/s})(0.34 \text{ ha}) = 2.20 \text{ L/s}.$$

The development also has a commercial component to it, the exact use of which is unknown at this time. In cases where the exact use is unknown, the City of Barrie recommends that a peaking factor of 2.0 be used. Based on that, the peak domestic commercial sewage flow is calculated as:

$$Q_{pC} = ((9{,}520 \text{ L/day} \times 2.0) / 86{,}400 \text{ s/day}) + (0.1 \text{ L/s/ha} \times 0.34 \text{ ha}) = 0.25 \text{ L/s}$$

The site peak domestic sewage flow is therefore:

$$Q_p = Q_{pR} + Q_{pC} = 2.20 \text{ L/s} + 0.25 \text{ L/s} = 2.45 \text{ L/s}$$

The building sewer size will need to be confirmed by the project mechanical engineer as part of the detailed design of the building.

4.3 Sanitary Sewer Requirements

As noted previously, the existing sanitary main along Bradford Street is a 300 mm diameter PVC pipe at a slope of approximately 0.4%. This pipe would have a full flow capacity of 61 L/s, and a full flow velocity of 0.87 m/s.

Based on the calculated peak flow rate of 2.45 L/s, it is anticipated that the existing Bradford Street sanitary main should have sufficient capacity to accommodate the proposed development.

The site is serviced by an existing 150 mm diameter sanitary service at unknown grade. The City of Barrie Sanitary Sewage Collection System Policies and Design Guidelines note that the minimum pipe diameter for residential areas shall be no less than 200 mm in diameter. As such, the existing 150 mm diameter sanitary service should be removed, or, grout filled and abandoned. City of Barrie staff shall confirm their requirements for the existing sanitary service.

The site sanitary sewer is also required to provide sewage velocities of 0.6 m/s–3.0 m/s. Based on this requirement, and the existing topography of the site, the development will require a 200 mm diameter sanitary sewer (minimum) to service the building at a minimum slope of 1.0% in order to provide full flow velocity and full capacity. The building sanitary invert will be confirmed by the project mechanical consultant.

Based on the proposed grading of the site, and the existing sanitary main depth on Bradford Street, it is proposed to construct the site sanitary service as a 200 mm diameter PVC pipe at approximately 3.4% pipe slope, which provides a capacity of 60.5 L/s and a velocity of 1.93 m/s. Refer to SBA drawing 3266–SS for the proposed layout of the sanitary service.

5.0 Water Supply and Distribution

5.1 Existing Conditions

An existing 25 mm copper water service provides domestic water to the property. The service connects to an existing three hundred (300) mm diameter watermain on Bradford Street.

The property is located within the City's Zone 1 pressure zone, which provides servicing to areas generally between the elevations of 219 metres to 245 metres, which is consistent with the survey information provided by J.D. Barnes Ltd.

5.2 Water Demand

The water demand for the proposed development was calculated in part based on the proposed use of the building, including the 121 residential units with a building population calculated at 202 people, and the commercial area. The daily flow was calculated similar to the sanitary flow at 54,970 L/day, or 0.64 L/s. The City of Barrie Water Transmission and Distribution Policies and Design Guidelines specify that watermains shall be sized to provide the fire flow plus maximum daily use.

The maximum daily demand was determined using an applicable maximum day factor from the MOE Design Guidelines for Drinking Water Systems 2008, Table 3–3, Peaking Factors for Drinking–Water Systems Serving Fewer than 500 People. Based on a design population of 202 people, the maximum day factor was calculated to be 4.45, and the maximum daily demand for

the site was calculated to be 2.85 L/s. The City of Barre guidelines do not provide a specific definition for residential multi–use buildings; as such, the fire flow for a residential single–family street value was utilized, at a minimum flow rate of 57 L/s.

As such, the proposed water servicing system must provide a minimum flow of 59.85 L/s, which is the maximum daily demand (2.85 L/s) plus fire flow (57 L/s).

5.3 Hydrant Pressure Test

A hydrant pressure test was undertaken by Vipond on November 27, 2019. The results of the hydrant test are included as Appendix #1 to this report. Based on the results of the test undertaken by Vipond, the existing water distribution system has a static pressure of 78 PSI at the existing hydrant north of the site on Bradford Street at a test flow rate of 690 USGPM (0.044 m^3/s), while a fire pressure of 78 PSI was determined at a test flow rate of 1,786 USGPM (0.11 m^3/s).

5.4 Hydraulic Analysis

A detailed hydraulic network analysis of the proposed water distribution system was undertaken as part of the detailed design of the development. The results of the hydraulic analysis are summarized in Appendix #1.

Based on the hydraulic analysis undertaken, the system can provide a minimum pressure of 23.61 PSI under the maximum daily flow plus fire flow condition, and a maximum pressure of 74.11 PSI, which exceeds the minimum required pressure of 20 PSI.

5.5 Proposed Water Servicing

The proposed water servicing will include a 100 mm diameter domestic water service with a curb stop at the property line and a 200 mm diameter fire service. Both connections will be to the existing 300 mm diameter watermain on Bradford Street. Given the anticipated height of the proposed building, booster pumps may be required to provide the required operating pressure to the upper floors. The need for (and design of) booster pumps will need to be confirmed by the project mechanical consultant.

6.0 Stormwater Management

6.1 Existing Conditions

There is an existing 300 mm diameter concrete storm sewer on the east side of Bradford Street in front of the property, as well as existing catch basins. The storm sewer carries drainage

southward along Bradford Street, and connects into a 1.83 m x 9.75 m concrete box culvert which conveys Hotchkiss Creek across the roadway.

Although the east part of the property appears to drain toward Bradford Street, much of the site drains toward Hotchkiss Creek storm pond which borders much of the southern property line. The pond and culvert across Bradford Street were designed to ensure that ponding for all storms up to and including the Regional (Hazel) Storm is contained within the pond. The maximum water surface in the pond for the Regional Storm was calculated to be 221.98 metres which is just below the lowest elevation of the subject property.

6.2 Stormwater Management Requirements

Further details on the existing storm drainage infrastructure in the area, as well as the detailed stormwater management requirements of the proposed development, are included under separate cover in a report prepared by SBA.

7.0 Traffic

Details on the existing traffic within the area of the proposed development, as well as future traffic volumes and traffic mitigation measures for the proposed development are included under separate cover in a report prepared by SBA.

8.0 Utilities

8.1 Electrical

Staff from our office had previously contracted Alectra Utilities Inc. (formerly Powerstream) to determine the electrical requirements for the site. The electrical distribution system on Bradford Street consists of a 4.16 kV overhead line located on the east side of the road. The closest 44 kV system is located at the intersection of Bradford and Brock Streets. An overhead service currently exists to the south side of the property.

Staff from Alectra previously advised that a 500 kVA pad mount transformer would likely be sufficient for the condominium, which would be fed underground from the 4.16 kV overhead line on the east side of Bradford Street. The power requirements will need to be confirmed by the building electrical engineer at the detailed design stage. If the demand exceeds 750 kVA, a new feed will have to come from the 44 kV line at Bradford and Brock Streets.

The detailed design work for the project will need to include circulation to Alectra in order to coordinate the design and installation of electrical services to the proposed development.

8.2 Natural Gas

Based on our previous work on the Hotchkiss Creek project, it is our understanding that there is an existing 200 mm diameter gas main located on the east side of Bradford Street. We would anticipate that gas service can be provided to the proposed building from the existing gas main.

Staff from Enbridge Gas Distribution Inc. (Enbridge) will need to be circulated during the detailed design of the project in order to coordinate the design and installation of gas service to the proposed development.

8.3 Bell Canada and Rogers Communications

Staff from our office had previously contacted both Bell Canada (Bell) and Rogers Communications (Rogers) as part to determine the existing services within the area, as well as to confirm future requirements. Staff from Bell Canada advised our office in 2012 that there would be no issues with providing copper and fibre optic cabling to the site. There is an overhead Bell service line to the north side of the property, as well as underground Bell cabling (copper and fibre optic) on the west side of Bradford Street in front of the property.

Rogers also advised that there would be no issues with providing servicing to the site.

We note that there is an underground Bell Canada conduit system adjacent to the site, along the west side of Bradford Street. This duct system is significant, with approximately eighteen (18) ducts in the vicinity of the proposed development. Special care will be required during excavation works for installation of new services.

Staff from Bell and Rogers will need to be circulated during the detailed design of the project in order to coordinate the design and installation of communication services to the proposed development.

9.0 Conclusions and Recommendations

Based on the preceding analysis, it is our opinion that the proposed condominium development can be established on the existing commercial property on the west side of Bradford Street, north of the intersection of Bradford Street and Essa Road/Tiffin Street in the City of Barrie. The existing municipal and utility services should be sufficient to meet the requirements of the proposed project.

The requirements for building fire suppression system and Siamese connections will need to be determined at the detailed design stage by the project architect, mechanical consultant and City of Barrie Staff.

The electrical engineer for the building will need to determine the power requirements in order to confirm that the project can be serviced from the existing 4.16 kV overhead line on Bradford Street. Development plans should be provided to Bell Canada, Enbridge Gas, Rogers, and Powerstream, so that they can confirm their servicing requirements, prepare their utility designs and prepare the necessary servicing agreements. The detailed design and construction of site services should be coordinated with the utility companies.

10.0 Disclaimer of Responsibilities to Third Parties

This report was prepared by Skelton, Brumwell & Associates Inc. for the account of Chayell Hospitality Group Inc.

The material in it reflects Skelton, Brumwell & Associates Inc.'s best judgement in light of the information available to it at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties.

Skelton, Brumwell & Associates Inc. accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions based on this report.

All of which is respectfully submitted,

SKELTON, BRUMWELL & ASSOCIATES INC.

Per:

Matt Bertram, P. Eng.

Project Engineer

Appendix #1

Vipond Flow Test Results, November 27, 2019

EPANET 2.0 Analysis

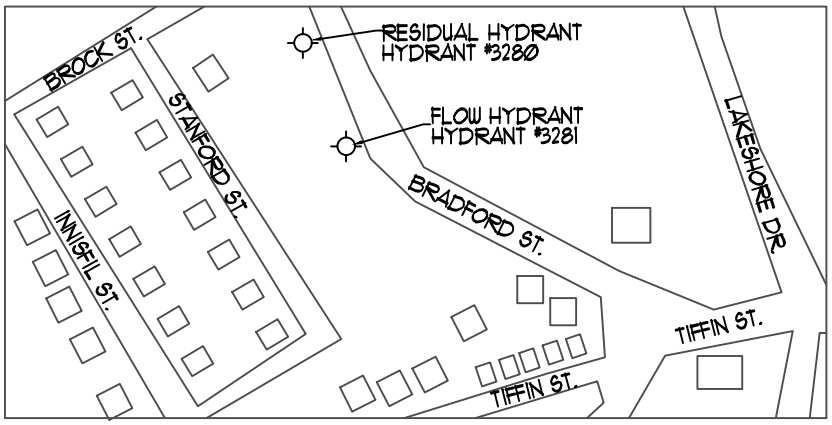
FLOW TEST RESULTS

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

DATE : NOVEMBER 27,2019 TIME : 9:15AM

LOCATION : 220 BRADFORD STREET
BARRIE
ONTARIO

TEST BY : VIPOND FIRE PROTECTION AND LOCAL PUC



STATIC PRESSURE : 78 PSI UNDERGROUND TYPE & SIZE : 300mm PVC

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	78	60	690
2	1	2 1/2"	0.90	78	32	954
3	2	2 1/2"	0.90	78	28	1786

FIRST FOR FIRE, LIFE SAFETY & SECURITY

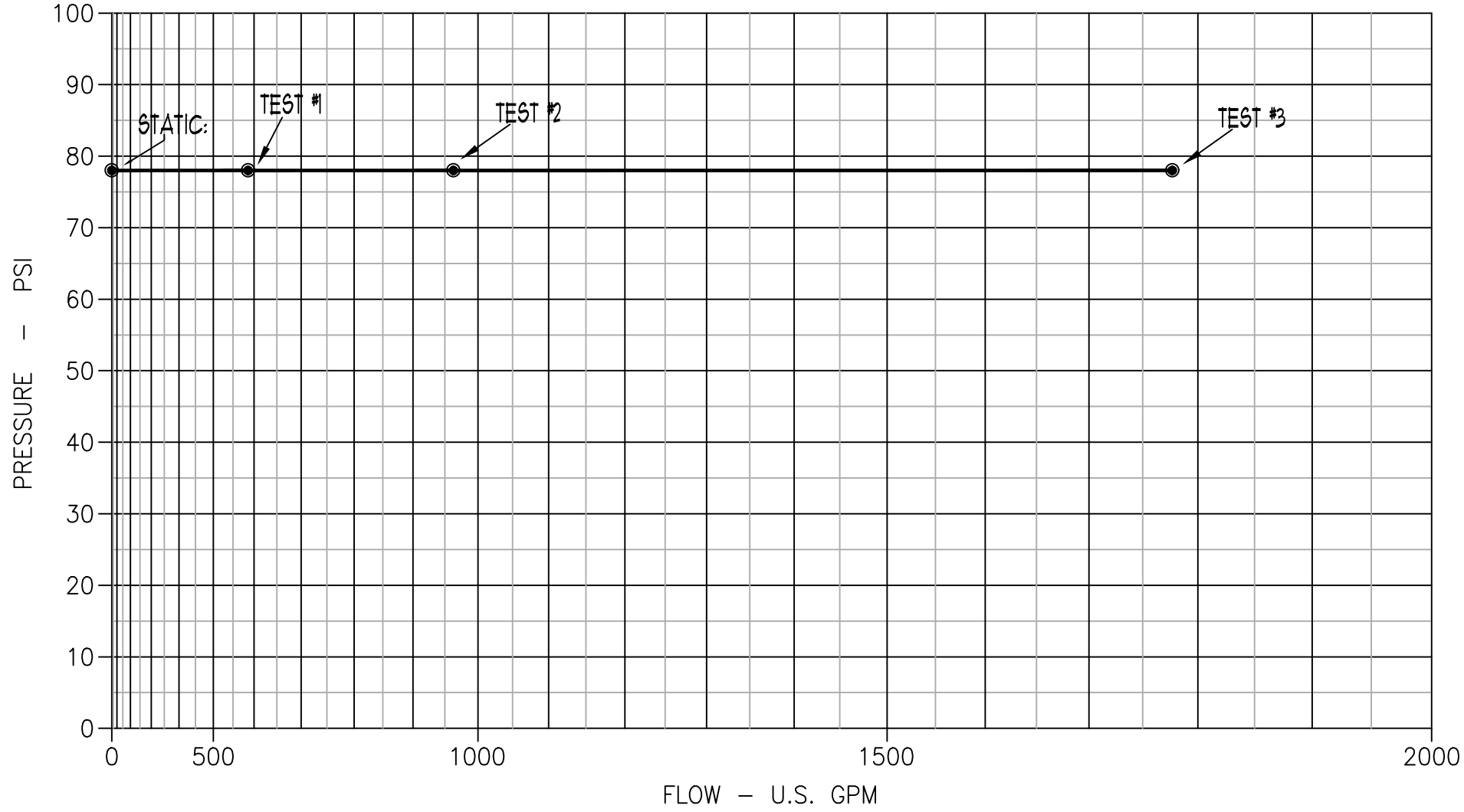
VIPOND INC

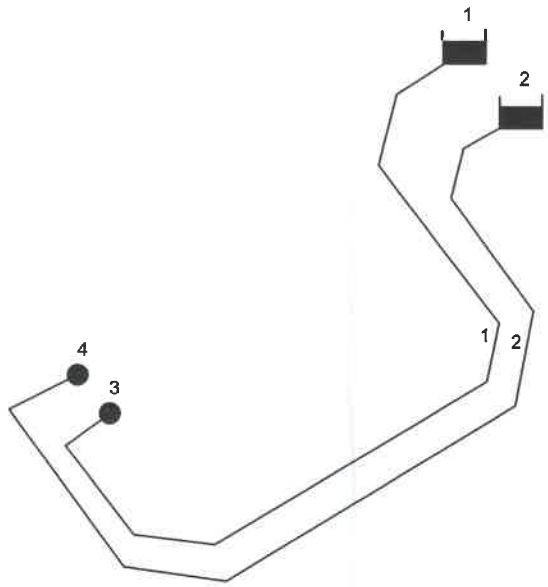
est. 1945

220 BRADFORD STREET	
BARRIE	
ONTARIO	

BY :	LEN K.
VIPOND OFFICE :	BARRIE
TEST BY :	VIPOND & PUC
DATE :	NOVEMBER 27, 2019

STATIC:		RESIDUAL:		FLOW:
78 PSI	TEST#1	78 PSI	@	690 GPM
	TEST#2	78 PSI	@	954 GPM
	TEST#3	78 PSI	@	1786 GPM




1
2
1
2
4
3

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*                            E P A N E T                                *
*                     Hydraulic and Water Quality                       *
*                     Analysis for Pipe Networks                        *
*                          Version 2.0                                  *
*************************************************************************
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Input File: 3266 max day plus fire.net

220 Bradford Street

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	1	3	87.8	100
2	2	4	88.8	200

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality	
3	2.85	277.63	54.21	0.00	
4	57.00	275.54	52.12	0.00	
1	-2.85	277.90	0.00	0.00	Reservoir
2	-57.00	277.90	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	2.85	0.36	3.03	Open
2	57.00	1.81	26.58	Open