Holiday Inn Express

Fire Flow Analysis

Project Location:
326 Bryne Drive, Barrie, ON

Prepared for:
2599974 Ontario Inc.
204 Cooks Mill Crescent, Vaughan, ON

Prepared by:
MTE Consultants
520 Bingemans Centre Drive
Kitchener, ON N2B 3X9

March 31, 2020

MTE File No.: 45303-100

Engineers, Scientists, Surveyors.

Contents

Tables

Appendices

Drawings

1.0 Introduction

MTE Consultants Inc. has been retained by 2599974 Ontario Inc. to conduct a fire flow analysis for the proposed Holiday Inn Express hotel development to be constructed at 326 Bryne Drive in the City of Barrie. The proposed development for the site will include construction of the hotel building and associated parking areas and driveways entrances off of Bryne Drive. Servicing works include the installation sanitary, storm and water services for the proposed building as well as a private hydrant located at the south west corner of the proposed building.

The purpose of this report is to confirm the available fire flows and residual pressure from the existing 300mm diameter watermain along Bryne Drive.

2.0 Water Distribution

The development will be serviced from an existing 300mm diameter watermain located within the Bryne Drive right-of-way. A 150mm diameter dedicated fire water service is proposed to tee off of the existing municipal main and enter the site south of the proposed building. For firefighting purposes, one onsite hydrant is proposed to be installed along the proposed 150mm diameter fire water service.

The pressures and flows must be sufficient for firefighting conditions as established by the Ontario Building Code (2012). The minimum residual pressure under fire fighting conditions is 140kPa (20.3 psi) per OBC 2012 A-3.2.5.7 3(b).

For this design, we have utilized the information obtained from the municipal hydrants located on Bryne Drive. The following table illustrates the results of the testing completed by Vipond Inc.

Table 2.1 - Results Of Flow Test Completed (March 24, 2020)

Results of Flow Test Completed					
Test #	Outlet Inside Dia. (in.)	Number of Outlets	Pitot Pressure (PSI)	Residual Pressure (PSI)	Flow @ Residual (gal/min)
1	1.75	1	46	64	604
2	2.5	1	26	62	860
3	2.5	2	22	60	1,582

Refer to Appendix A for the information obtained by Vipond Inc.

3.0 Analysis of On-Site Fire Protection

The building will be analyzed for fire water supply requirements using the OBC 2012. The analysis will determine if the theoretical pressure of the proposed onsite fire hydrant is acceptable for firefighting.

Using the OBC 2012:

- Building Classification: Group C
- Calculate: $Q = KVS_{tot}$ (Table 1 of OBC 2012 Appendix A-3.2.5.7.(3) & Table 2)

  K = water supply coefficient (A-3.2.5.7 Table 1)
  V = volume of building (m^3)
  S_{tot} = 1 + total spatial coefficients

Table 3.1 - Water Demand

Water Demand						
Building	Building Area (m^2)	Building Volume (m^3)	K	S_{tot}	Q (litres)	Required min. water supply flow rate (litres/min)*
Proposed Building	1,000	21,000	16	1.0	336,000	9,000

* From Table 2 of OBC 2012 Appendix A-3.2.5.7

Therefore, the required minimum water supply flow rate is **9,000 litres/min** for the proposed building. This is the maximum flow rate specified by the Ontario Building Code.

The residual pressure at the proposed hydrant was calculated to be 205.0kPa for a flow rate of 9,000 litres/min, which is greater than the minimum allowable pressure of 140kPa per OBC 2012. Refer to Appendix B for calculations.

4.0 Conclusions and Recommendations

Based on the flow tests provided by Vipond Inc. it can be concluded that the minimum water supply flow rate of 9,000 litres/min can be delivered to the proposed hydrant on the subject site with a residual pressure (at the nozzle of the hydrant) under fire fighting conditions of 205.0kPa for 9,000 litres/min, thus meeting the minimum requirements of the Ontario Building Code (2012).

All of which is respectfully submitted,

MTE CONSULTANTS INC.

Chelsea Hiebert

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CAH:
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Appendix A

Flow Test Results

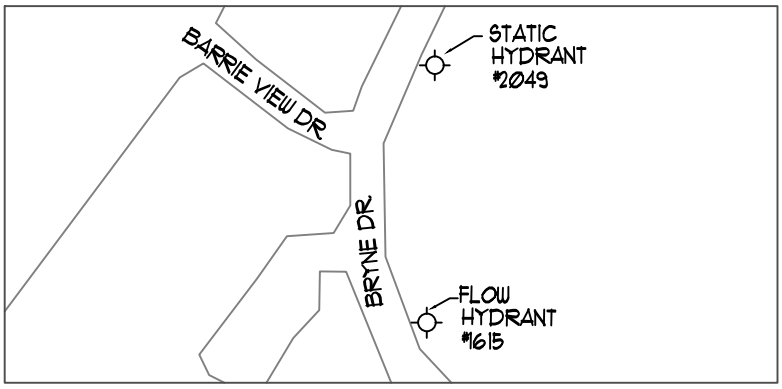
FLOW TEST RESULTS

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

DATE : MARCH 24,2020 TIME : 11:30 AM

LOCATION : 326 BRYNE DRIVE
BARRIE
ONTARIO

TEST BY : VIPOND FIRE PROTECTION AND LOCAL PUC



STATIC PRESSURE : 65 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	64	46	604
2	1	2 1/2"	0.90	62	26	860
3	2	2 1/2"	0.90	60	22	1582

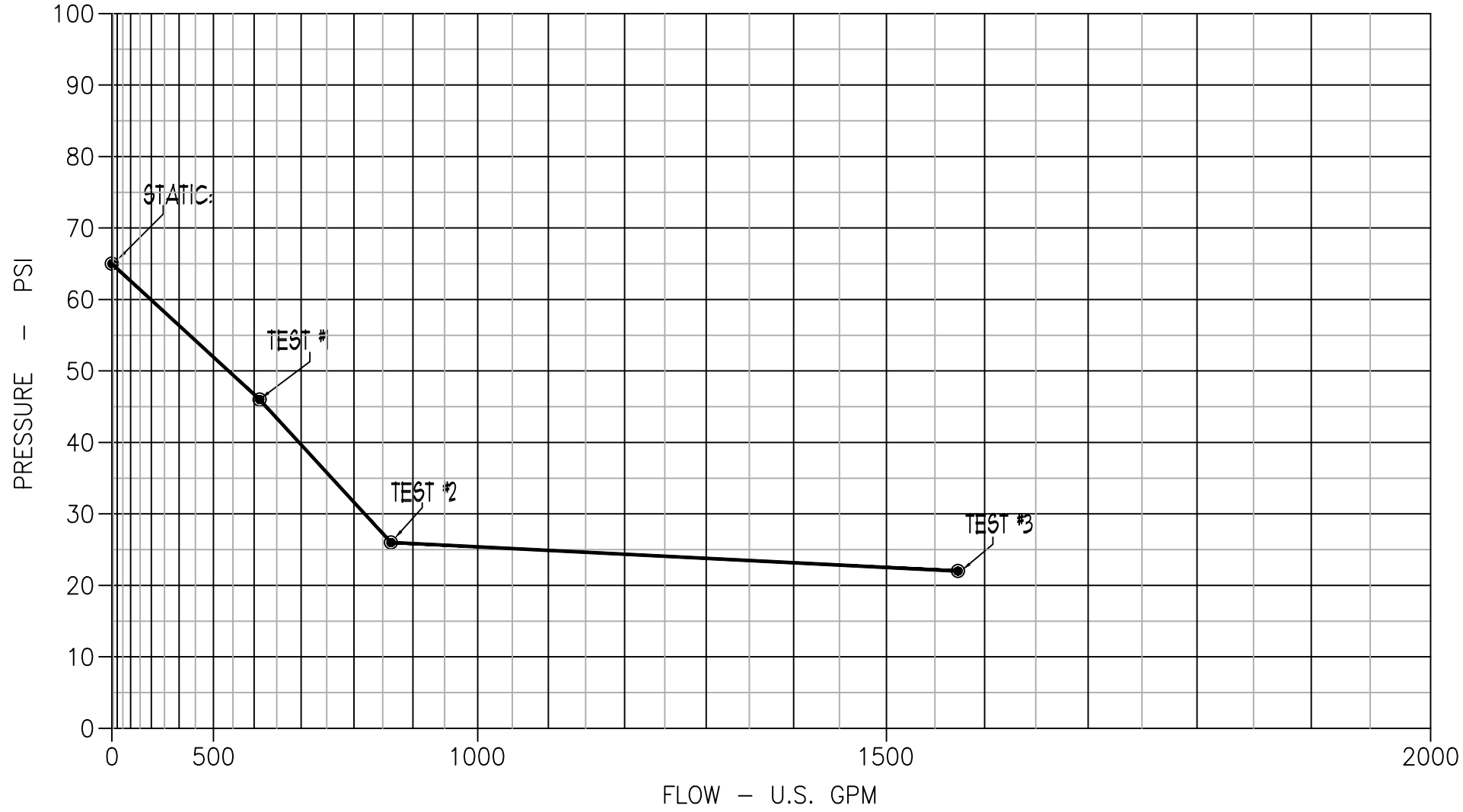
FIRST FOR FIRE, LIFE SAFETY & SECURITY

VIPOND INC

est. 1945

326 BRYNE DRIVE		BY :	LEN K.
BARRIE		VIPOND OFFICE :	BARRIE
ONTARIO		TEST BY :	VIPOND & PUC
		DATE :	MARCH 24,2020

STATIC:		RESIDUAL:		FLOW:
50 PSI	TEST#1	46 PSI	@	604 GPM
	TEST#2	26 PSI	@	860 GPM
	TEST#3	22 PSI	@	1582 GPM



Appendix B

Calculations

Barrie Holiday Inn Express

FIRE FLOW ANALYSIS

Barrie, Ontario

Project Number: 45303-100
Date: March 27, 2019
Design By: CAH
File: Q:\45303\100\Fire Flow\45303-100_Fire Flow Analysis_2020-03-27.xlsx

CALCULATION OF RESIDUAL PRESSURE AT ON-SITE HYDRANT

1. Boundary Conditions (Based on Fire Flow Test Results):

	Metric		Imperial		
P0 - Starting Pressure	45.71	*m*	65	*psi*	
P1 - Pressure at Q1	42.19	*m*	60	*psi*	
Q1 - From Fire Flow Test	5989	*L/min*	1582	*U.S. gal/min*	
Q2 - Required Flow	9000	*L/min*	2378	*U.S. gal/min*	From: Water Demand calculations by MTE
P-loss 1	3.52	*m*	5	*psi*	
P-loss 2	7.48	*m*	11	*psi*	
P2 - Residual Pressure	**38.23**	***m***	**54**	***psi***	Extrapolated from Fire Flow Test Results

2. Friction Losses Through Water Service:

Hazen-Williams Equation	Metric		Imperial	
C_{hw} = Pipe Friction Factor	150		150	
k = conversion factor	10.675		4.727	
n = constant	1.852		1.852	
m = constant	4.8704		4.8704	
Q = Flow	9000	L/min		
Q = Flow	0.15	m^3/s	2378	*U.S. gal/min*
d = Pipe Diameter	150	mm	5.91	in
	0.15	m		
p = Loss/Length	0.3056	m/m	0.1324	psi/ft
Length	29.5	m	97	ft
Loss	**9.01**	**m**	**12.8**	**psi**
Total Loss	**88**	**kPa**		

3. Friction Losses Through Apurtenances:

Apurtenances	Number	K	Velocity	Head Loss	Total Loss	
			m/s	*m*	*m*	*psi*
Elbow (22.5°) - 150mm dia.	1	0.084	8.488	0.308	0.308	0.439
150mm Tee (branch)	2	0.900	8.488	3.305	6.610	9.399
Valve - 150mm dia.	2	0.120	8.488	0.441	0.881	1.253
Total Minor Losses					**7.800**	**11.091**

4. Elevation - Elevational differences from existing hydrant to proposed hydrant

	Metric		Imperial	
Elevation at Boundary (i.e. Residual Hydrant):	303.5	m	996	ft
Elevation at Site Hydrant:	304.00	m	997	ft
Elevation Difference = Loss/Gain	**0.5**	**m**	**0.7**	**psi**

ANALYSIS SUMMARY

Total Losses	**17.315**	**m**			
	169.86	**kPa**	**24.6**	**psi**	
Residual Pressure after Losses	**20.92**	**m**			
	205	**kPa**	**29.8**	**psi**	**PASS**
Allowable Residual Pressure	*140*	*kPa*	*20.3*	*psi*	

MTE FILE No: 45303-100-C1.1

EXISTING CONDITIONS PLAN

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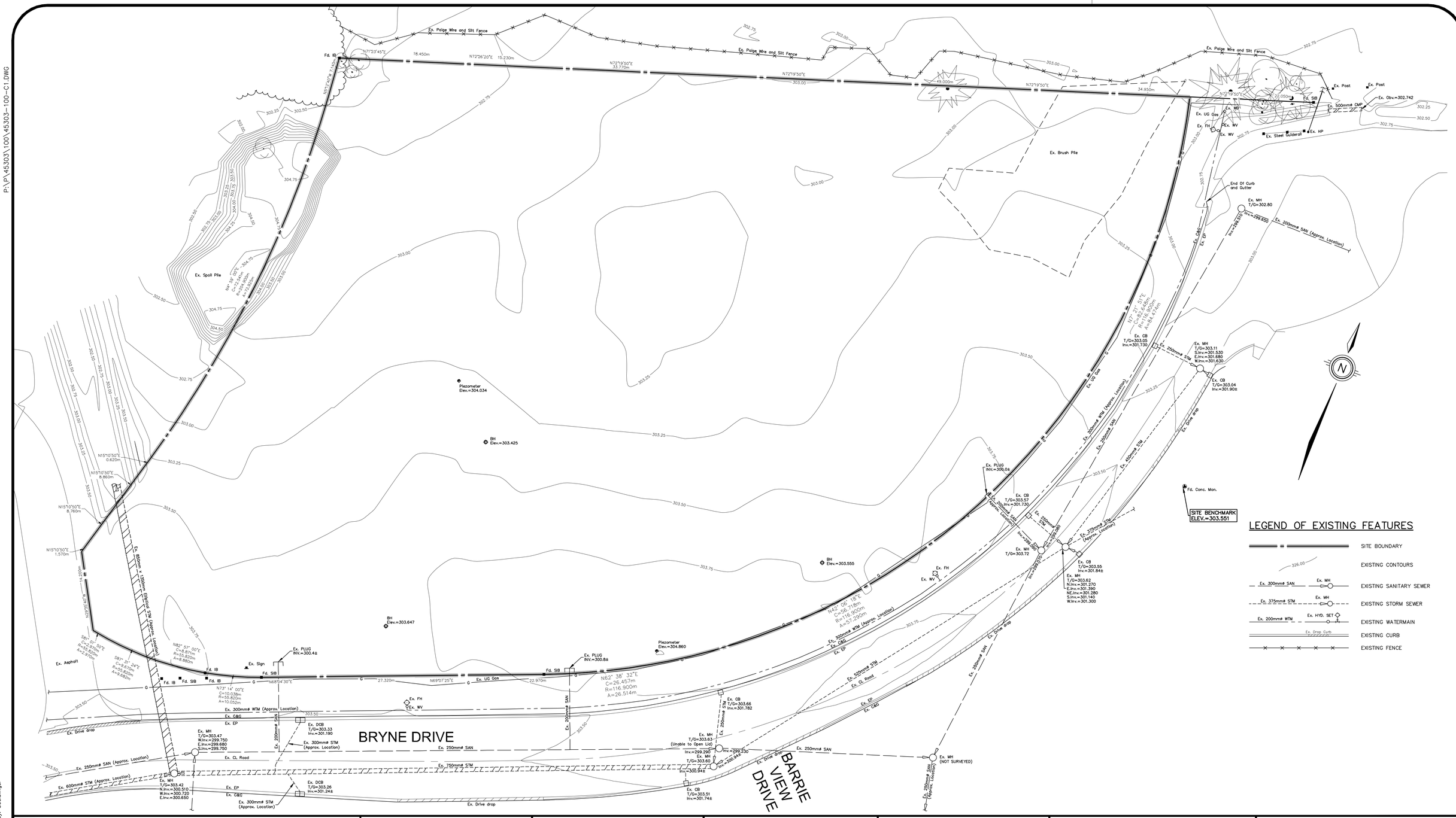


LEGEND OF EXISTING FEATURES

- SITE BOUNDARY
- EXISTING CONTOURS (326.00)
- EXISTING SANITARY SEWER (Ex. 300mmø SAN, Ex. MH)
- EXISTING STORM SEWER (Ex. 375mmø STM, Ex. MH)
- EXISTING WATERMAIN (Ex. 200mmø WTM, Ex. HYD. SET)
- EXISTING CURB (Ex. Drop Curb)
- EXISTING FENCE

NOTE:

1. PROPERTY-LINE IS APPROXIMATE ONLY AND IS TAKEN FROM PLAN PREPARED BY EPLETT & WOROBEC SURVEYING LTD. DATED OCTOBER 23, 1995 AND FEBRUARY 24, 2010.
2. INVERTS DENOTED WITH "±" ARE TAKEN FROM AS-RECORDED PLAN AND PROFILE DRAWINGS COMPLETED BY SKELTON BRUMWELL & ASSOCIATES INC. DATED OCTOBER, 1995 AND ARE CONSIDERED APPROXIMATE ONLY. CONTRACTOR TO FIELD VERIFY AND REPORT ANY DISCREPANCIES TO ENGINEER.
4. THIS PLAN IS PART OF A SET OF PLANS WHICH COMPRISE OF THE FOLLOWING: C1.1, C2.1, C2.2, C2.3, C2.4 AND THE SWM REPORT.

CITY OF BARRIE CONTROL MONUMENTS:

(1) MONUMENT # 03120080046
TYPE: BRASS TABLET
ELEVATION: 303.551

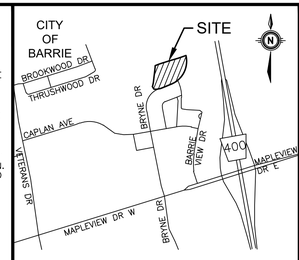
(2) MONUMENT # 03120080048
TYPE: BRASS TABLET
ELEVATION: 302.523

NOTE TO CONTRACTOR :

DO NOT SCALE DRAWINGS.

CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

THE OWNER/ARCHITECT/CONTRACTOR IS ADVISED THAT M.T.E. CONSULTANTS INC. CANNOT CERTIFY ANY COMPONENT OF THE SITE WORKS NOT INSPECTED DURING CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO NOTIFY M.T.E. CONSULTANTS INC. PRIOR TO COMMENCEMENT OF CONSTRUCTION TO ARRANGE FOR INSPECTION.



KEY PLAN N.T.S.

No.	REVISION	BY	DATE
8.			
7.			
6.			
5.			
4.			
3.			
2.	Revised per City comments	JPL	MAR.31/20
1.	ISSUED FOR APPROVAL	JPL	DEC.12/19

GEODETIC BM ELEV. =303.551 m
BRASS TABLET LOCATED ON EAST LIMIT OF BRYNE DRIVE ON SOUTH SIDE OF ENTRANCE TO #311 BRYNE DRIVE. NOTE: A PROTECTIVE WATER VALVE COVER HAS BEEN PLACED OVER MONUMENT CAP.

SITE BENCHMARK ELEV. = m
SEE ABOVE.

LICENSED PROFESSIONAL ENGINEER
J.P. LERCH
100169016
2020-03-31
Digital Original
PROVINCE OF ONTARIO

CLIENT
2599974 ONTARIO INC.
204 COOKS MILL CRESCENT VAUGHAN

PROJECT
HOLIDAY INN EXPRESS
326 BRYNE DRIVE BARRIE

DRAWING
EXISTING CONDITIONS PLAN

MTE
Engineers, Scientists, Surveyors
(519) 743-6500 www.mte85.com

Project Manager: J.LERCH	Project No.: 45303-100
Design By:	Checked By:
Drawn By: DDK	Checked By: SCG
Surveyed By: MTE	Drawing No.: C1.1
Date: Jan.25/19	
Scale: 1:300	Sheet 1 of 5

March 31, 2020 — 1:54 p.m. — Plotted By: SGeidlinger

MTE FILE No: 45303-100-C2.1

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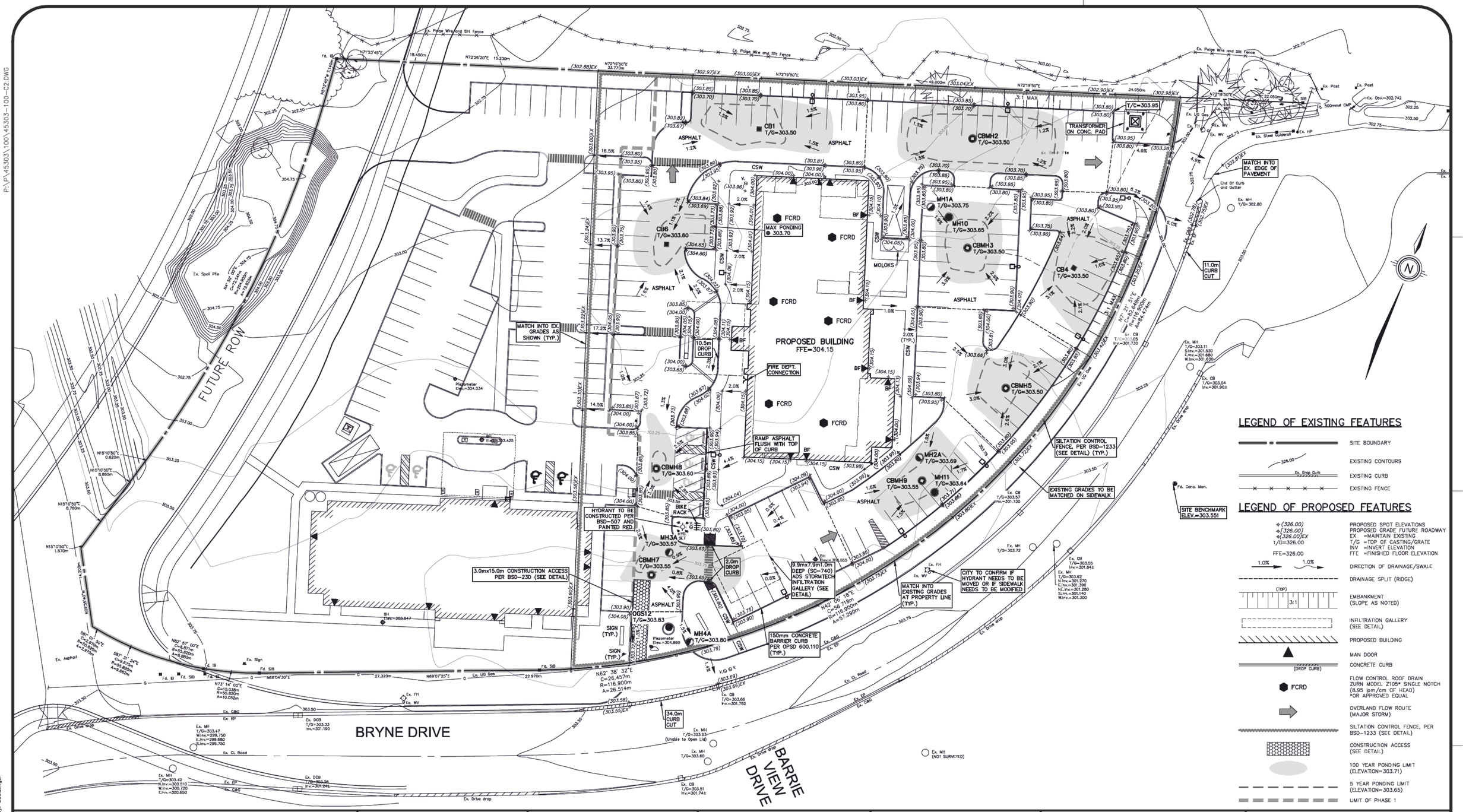
March 31, 2020 – 2:07 p.m. – Plotted By: SGeidinger



LEGEND OF EXISTING FEATURES

- SITE BOUNDARY
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- EXISTING CURB (Ex. Drop Curb)
- EXISTING FENCE

LEGEND OF PROPOSED FEATURES

- PROPOSED SPOT ELEVATIONS: +(326.00)
- PROPOSED GRADE FUTURE ROADWAY: +(326.00)EX
- EX =MAINTAIN EXISTING
- T/G =TOP OF CASTING/GRATE: T/G=326.00
- INV =INVERT ELEVATION
- FFE =FINISHED FLOOR ELEVATION: FFE=326.00
- DIRECTION OF DRAINAGE/SWALE: 1.0% 1.0%
- DRAINAGE SPLIT (RIDGE)
- EMBANKMENT (SLOPE AS NOTED): (TOP) 3:1
- INFILTRATION GALLERY (SEE DETAIL)
- PROPOSED BUILDING
- MAN DOOR
- CONCRETE CURB (DROP CURB)
- FCRD: FLOW CONTROL ROOF DRAIN ZURN MODEL Z105* SINGLE NOTCH (8.95 lpm/cm OF HEAD) *OR APPROVED EQUAL
- OVERLAND FLOW ROUTE (MAJOR STORM)
- SILTATION CONTROL FENCE, PER BSD-1233 (SEE DETAIL)
- CONSTRUCTION ACCESS (SEE DETAIL)
- 100 YEAR PONDING LIMIT (ELEVATION=303.71)
- 5 YEAR PONDING LIMIT (ELEVATION=303.65)
- LIMIT OF PHASE 1

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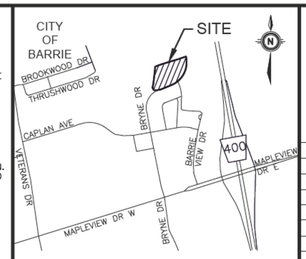

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Scale: 1:300	Sheet 2 of 5