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FUNCTIONAL SERVICING REPORT

AT

123 Highway 47,
Uxbridge, ON

PREPARED FOR:

123 Highway 47 Inc.

Nov 25th, 2023

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1. INTRODUCTION

King EPCM (the Engineer) was retained by 123 Highway 47 Inc. (the Client) to carry out civil engineering designs for a proposed industrial sub-division at 123 Highway 47, Township of Uxbridge, Regional Municipality of Durham, Ontario (the site).

The purpose of this report is to review the functional servicing requirements of the proposed industrial sub-division Lots. This report details King EPCM's review of existing municipal watermain at intersection of Paisley Ln and Durham Regional Highway 47, proposed stormwater sewer designs, sanitary considerations, and other recommendations.

This report was prepared for the Client, 123 Highway 47 Inc, for the property owners, and any related site-specific engineers, designers, and contractors. This report is considered an intellectual property of King EPCM, and third party use of this report, including reliance, in-part or full, is prohibited without written consent from King EPCM.

1.1. PROPERTY INFORMATION

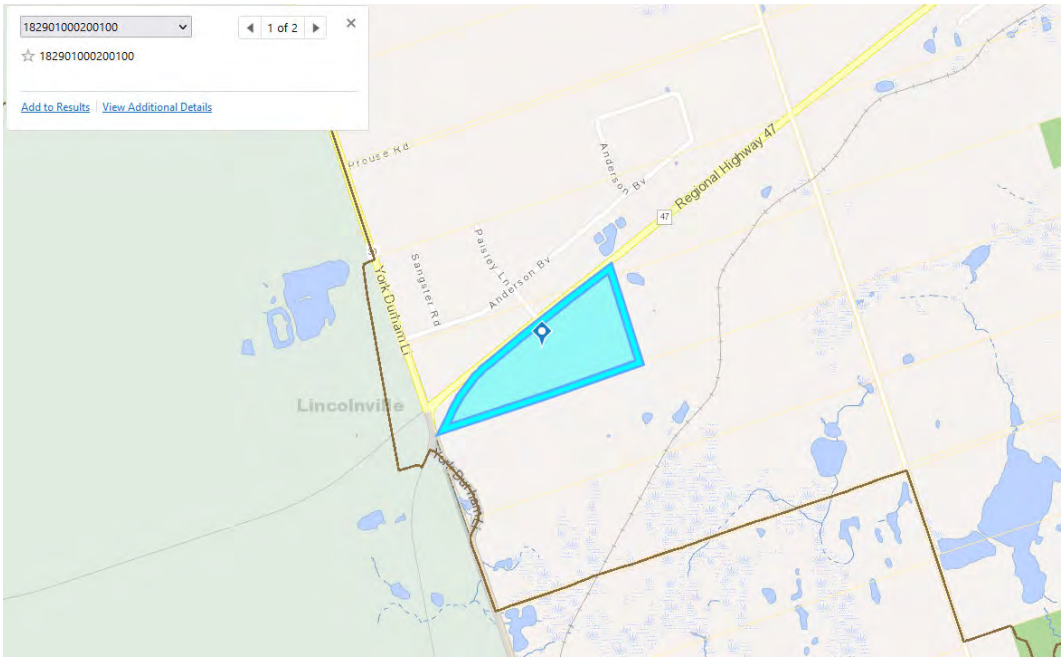


Figure 1 - 123 Highway 47, Township of Uxbridge

The site is located at the municipal address of 123 Highway 47, Township of Uxbridge, Regional Municipality of Durham. The site can also be referenced as:

PT LTS 13 & 14 CON 1 UXBRIDGE PT 1 PL 40R5008 EXCEPT PT 1 PL 40R23365;UXBRIDGE, REGIONAL MUNICIPALITY OF DURHAM
PIN: 26830-0118 (LT)

The site property is considered rural agricultural and with a single residential dwelling and several large barns. The property is generally bound by York Durham Line at the west and Durham Regional Highway 47 along the north, with a steep slope and forested area long the east, and agricultural farmland further to the south. The property is generally considered mildly graded, with a combination of shallow and steep slopes, mostly draining to the east / southeast.

1.2.PROPOSED DEVELOPMENTS

The purpose of this report is to provide review of existing municipal services and provide recommendations on development constraints and other design information. The project proposes an industrial sub-division, composed of fourteen (14) industrial lots, and two other lots for proposed municipal road and a proposed stormwater management dry-pond. See Appendix I for detailed Site Plans.

2. WATER SUPPLY

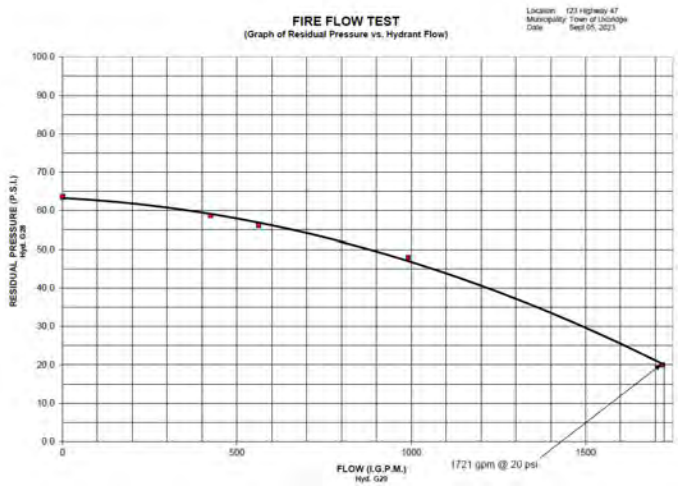
2.1.EXISTING WATERMAIN

Water services are currently not available at the Subject Proprety, but could easily be brought onto site via extension of existing services at the north side of the intersection of Paisley Lane and Durham Regional Highway 47 (Hwy 47). The water supply along the north side is managed and operated by the Regional Municipality of Durham (Durham Region), Works Department, Water Supply System, and sourced from a local muncipal deep water well called Uxville Water Well.

Engineering records were obtained from Durham Region (see Appendix II), and a recent hydrant flow test was performed in 2023 at Paisley Lane fire hyrant, approximately 60m north of the subject property. The pressurized water system from that hydrant test is the upstream segment of the proposed watermain system, and is considered sufficient for initial capacity review and design purposes.

Summary of existing watermain details:

- There are two wells in the system: Uxville Well #1 and Well #2, located at 15 Anderson Blvd, Uxbridge, with an elevated tank system at 69 Anderson Blvd, Uxbridge, ON. The Permit To Take Water (PTTW) for the combined system is 1,898m2/day.
- The proposed extension is located at a dead-end water-main at the intersection of Paisley Ln and Hwy 47
- Existing watermain is constructed from 300mm Class-150 PVC (DR27.5), with minimum burial depth at 1.8m below grade as per Durham Region standards
- Fire hydrant #G29 is the final end-segment of the existing watermain system along Paisley L, approximately 60m north of the Subject Property, as described in Map #A22 in Durham Region Water Supply System (see in Appendix II)
- Hydrant test flows were conducted at #G29 (with pressure readings from the hydrant upstream at G28), proposed for an extension past Hwy 47 and into Subject Property



Hydrant G29 - Imperial		Hydrant G29 - Metric	
FLOW AT HYD. G29 (IGPM)	RESID. PRESSURE AT HYD. G29, CALC FROM HYD. G28 (PSI)	FLOW AT HYD. G29 (L/min)	RESID. PRESSURE AT HYD. G29, CALC FROM HYD. G28 (kPa)
0	63.6	0	438.5
424	58.7	1928	404.7
562.5	56.2	2557	387.5
990.9	47.9	4505	330.3
1721	20	7824	137.9

Figure 2 - Fire Flow Test at Hyd #G29

2.2.WATER & FIRE FLOW DEMANDS

2.2.1. SANITARY AND INDUSTRIAL WATER DEMANDS

As the subject property does not have any municipal sanitary sewer systems, the proposed industrial sub-division can only accomodate "dry industrial uses". Water consumption is strictly limited to sanitary uses, which in-turn is limited by the sizes and limitations of on-site sanitary sewage systems (private septic systems).

The project has a proposed fourteen (14) separate individual lots, and each lot is limited to a maximum of 10,000L/day or 10m3 L/day of sanitary sewage discharge. Base on the above limitations, the proposed fourteen (14) lots can expect a maximum water usage of 140m3/day, or an average load of 5833L/hour.

Peak demand of these sanitary waters may be assumed to be shortened into nominal 8 hour day time working hours, or 17,500L/hour.

It is acknolwedged that these proposed industrial lots may not use significant amounts of processing water, as there are no sanitary sewers for discharge of industrial waters, nor are there any additional source water capacities by Uxville Water Well PTTW. This calculation approach has been confirmed to be acceptable by Durham Region engineering department, as per mulitple email discussions.

2.2.2. FIRE FLOW DEMANDS

Firefighting values are based on “2020 Water Supply for Fire Protection, A Guide to Recommended Practice" issued by the Fire Underwriters Survey (FUS) of the Insurance Bureau of Canada. When assessing “water distributions systems” for fire insurance grading purposes, FUS uses the Basic Fire Flows (BFF) to review the reliability and adequacy of the water distribution system to consistently deliver the required fire flows across the zone or community.

Normally, the BFF is selected to be adequate for the vast majority (90%) of risks in the area. Historically, the fifth highest Required Fire Flow (RFF) in the community or response zone was used when assessing the adequacy and reliability of public fire protection in a community or response zone.

$$RFF = 200\ C\ A^{0.5}$$

RFF = Required Fire Flow in litres per minute (LPM)
C = Construction Coefficient related to the type of construction of the building
A = Total effective floor area in square metres of the building

Based on the current industrial sub-division proposal, most buildings are to be designed for industrial warehouses, light-industrial manufacturing, or heavy-industrial buildings. These buildings would most AT MINIMUM be built using 1-hour fire resistance rating (C = 0.8 for Type II Noncombustible Construction). On average, industrial warehouses & steel-based buildings would be built using steel and sheet-sidings for 2-hour fire resistance ratings (C=0.6 for Type I Fire Resistive Construction). <u>For the purposes of RFF and sub-division water supply evaluation, it will be assumed that BFF shall be using 2-hour fire resistance ratings.</u>

For each proposed lot, a maximum building footprint can be estimated due to the stormwater management runoff and septic bed area requirements.

- Based on total lot sizing, Lot #6 is the fifth largest at Lot Area of 9952m2
- At 35% building coverage of entire lot, Lot 6 has an estimated building footprint of 3505m2

$$RFF = BFF = 200 * 0.6 * 3505^{0.5} = 7104\ LPM$$
$$BFF\ (rounded) = 7000\ LPM$$

Based on the current industrial sub-division, the exact determination of Occupancy and Contents Adjustment Factor is difficult at best but otherwise unknown. For the sake of simplicity and determination of BFF, it is assumed that there is a +15% adustments required assuming “Free Burning Contents – includes merchandise or materials, including furniture, stock, or equipment, which burns freely, constituting an active fuel”.

BFF * Occupancy & Contents Adjustment Factor = 7000 * 115% = 8050LPM

In general, Durham Region requires all industrial lots to have two separate water services – sanitary water service and firefighting water supply. It is reasonable to assume that all industrial lots and future industrial buildings within the sub-division will be required to have an automatic sprinkler system, which gives a 50% reduction to the RFF / BFF calculations.

BFF * Automatic Sprinkler Protection = 8050 * (1 - 50% credit) = 4025 LPM

There is additional Exposure Adjustment Charge based on the proximity of the subject building to an exposed risk. In the case of the proposed sub-division, the primary risk would be fire within

one industrial building transferring to a neighbouring building. However, Exposure Adjustment Charge can be waived if both the subject building and the exposed building are fully protected with automatic sprinkler systems. In this case, Expore Adjustment Charge has been waived as all proposed buildings are considered to be sprinklers.

After final rounding to the nearest 1,000 LPM, as per “2020 Water Supply for Fire Protection, A Guide to Recommended Practice", the BFF for the sub-diviison is 4000 LPM.

2.2.3. TOTAL DEMAND VS EXISTING CAPACITY

Based on Table 2, the combined total water demand for the proposed sub-division will have a peak hour rate of approximately 4,300 LPM, at a minimum pressure of 150kPa.

Table 1 - Summary of Sanitary Water & Fire Flow Demand of Sub-division

Sanitary Water & Fire Flow Demand				
Water Use	Average day (m3/day)	Max day (m3/ha/day)	Max day (L/min)	Peak Hour (L/min)
Sanitary (Industrial)	140	140	97	292
Firefighting			4000	4000
Total	140	140	4097	4292

Based on the above Figure 2 hydrant test at #G29, the watermain system has a total capacity of 4505LPM at 330kPa, which is significantly higher than the sub-division requirement of 4300LPM at 150kPa.

2.3.PROPOSED WATERMAIN

The proposed watermain servicing for the proposed industrial sub-division is to have a straight extension from G29, with the following major segments:

- Segment #1 – south extension from hydrant G29, 250 linear m
- Segement #2 – east arm, 440 linear m and dead-end at eastern intersection with Hwy 47
- Segment #3 – west arm, 315 linear m and dead-ends at end of road cul-de-sac

The proposed watermain system for the industrial sub-division is 300mm C900, Class 235 (DR18) PVC pipe. A total of 1,005 metres of PVC pipe is proposed for the sub-division, generally along the east side or north side of each proposed municipal roadway. The watermain is generally located 1m offset from the edge of asphalt, in close proximity of the roadside open swales, and at minimum 1.8m below grade.

Based on the Figure 2 above, there is an estimated 4,505 LPM at 330kPa at the northern intersection of the proposed sub-division at existing hydrant G#29.

Several critical points in the proposed water supply system has been calculated for theoretical pressure & flow rates, through friction loss of proposed pipe lengths, as well as equivalent lengths due to pipe fittings such as pipe tees, gate valves, elbows, and other pipe fittings. The following summary is based on 4,300 LPM for Peak Hour water supply considerations. Detail calculations & charts are found in Appendix III.

- FH G29 (existing fire hydrant for proposed extension) 4,300 LPM at 330kPa
- FH 03 (intersection of Road A & Road B) 4,300 LPM at 410kPa
- FH 09 (east end at Road B with intersection of Hwy 47) 4,300 LPM at 350kPa
- FH 13 (west end at Road B) 4,300 LPM at 380kPa
- FH 04 (lowest elevation in the system, check for statics kpa) 0 LPM at 539kPa

3. SANITARY SEWAGE SERVICING

Based on the results from Appendix IV - In-situ Infiltration Testing and Sieve Analysis, the native soil characteristic of most boreholes all have an average septic T-time of 9 ~ 11min/cm.

Based on the Durham Region “Drilled Wells and Lot Sizing Policy”, septic bed areas must be considered based on the proposed sewage system flow rate and the tested on-site soil conditions. For the proposed industrial sub-division, each industrial lot is initially estimated to have a maximum sewage discharge of 10,000L/day.

As per Durham Region’s vacant lot sizing chart:

- Lot 1 – Lot 12, soil type is consider as 1 < T < 20, loading rate of 10L/m2/day
- Lot 1 – Lot 12, A = (Q = 10,000L/day) / (10L/m2/day) = 1000m2; reserve area x2
- Lot 1 – Lot 12, total Sewage System Area = 1000m2 x 2 = 2000m2
- Lot 13 – Lot 14, soil type is considered as 35 < T < 50, loading rate of 6L/m2/day
- Lot 13 – Lot 14, A = (Q = 6,000L/day) / (6L/m2/day) = 1000m2; reserve area x2
- Lot 13 – Lot 14, total Sewage System Area = 1000m2 x 2 = 2000m2

Based on Lot Sizing review, the proposed fourteen (14) lots range from a minimum of 5911m2 to a maximum of 43,172m2, with a median area of around 8700m2. The above septic bed requirement of 2000m2 is approx 23% of a median lot, which is generally reasonable in combination with a building with 35% coverage over the entire site.

In summary, the Engineer believes that the current site soil condition is conducive to on-site sanitary sewage systems, as described in OBC Section 8, with additional details described in a separate Hydrogeology Report.

Additional details are found in Appendix IV.

4. STORMWATER MANAGEMENT

This site is located within the Hummocky Halton Till Plain physiographic region and Reesor Creek Subwatershed, it was a net recharge zone, and it was located on a low-lying land south of Durham Regional Highway 47 with shallow slope from northeast to southwest and southeast. The site is under agricultural cultivation. There is a Key Natural Heritage Feature (woodland) on the eastern portion of the site. The site is also located within the CTC Source Protection Plan Area, and within an area of significant groundwater recharge. Portions of the site are within the TRCA-regulated area for the Duffins Creek Watershed. The Duffins watershed is situated on the south flank of the Oak Ridges Moraine and drains southward towards Lake Ontario.

The material of the site is mainly sandy clay with a medium permeability, except in the east portion, in front of the woodland area, with a low permeability. The subject land is currently vacant, and it was used as farmland, with only three buildings in the north portion, with around 1% TIMP.

The Figure 3 below shows the proposed site plan. In general, the proposed site plan proposes a Total Impervious of 80% in each of the fourteen (14) proposed Lots. The eastern forested slope area is undeveloped, while a stormwater dry pond is proposed in the southeast corner. There are two catchment areas: WEST Catchment, Lot #1 at the southwest corner is uncontrolled, while EASTERN Lots (all other Lots) drain into the dry pond.

Figure 3 - Proposed Site Plan

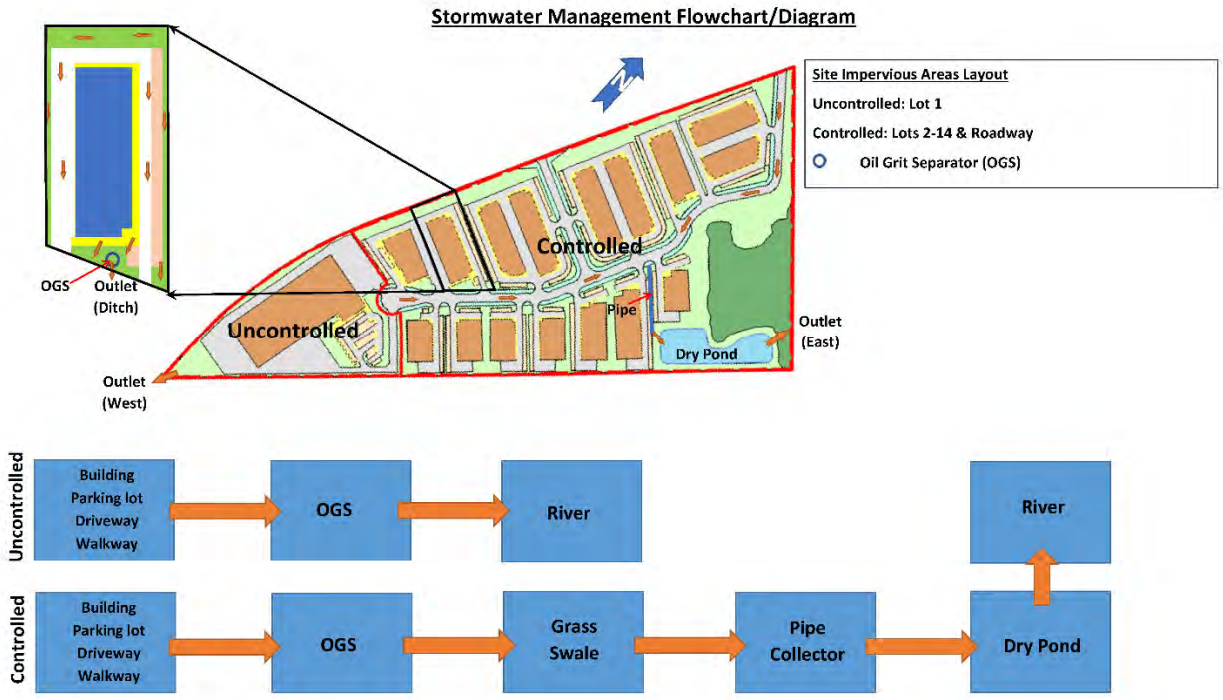


Figure 4 – Proposed Stormwater Management Flowchart

4.1.PRE-DEVELOPMENT CONDITIONS

Based on the Township of Uxbridge requirements, the Regional Storm is the Timmins Storm event, with data from Design Criteria Standard Drawings of Township of Uxbridge, with A, B, C values of 3-parameter Chicago distribution design storm as Intensity = $a / (t+b)^c$.

See Table 4: Chicago Distribution Design Storm Parameters and Rainfall Amounts cited in the "Design Criteria Standard Drawings", Township of Uxbridge (Drawing No. US-600, March 1989) (Appendix VI).

Table 2 - Township of Uxbridge Chicago Distribution Storm Parameters

Return Period	2 Year	5 Year	10 Year	25 Year	100 Year
A	645	904	1065	1243	1799
B	5	5	5	4	5
C	0.786	0.788	0.788	0.787	0.810

	Return Period (year)					
IDF Parameters	2	5	10	25	50	100
a	645	904	1065	1243	1540	1799
b	5	5	5	4	4.5	5
c	0.786	0.788	0.788	0.787	0.8	0.81
Duration						
5 min	105.57	147.29	173.52	220.54	254.30	278.63
10 min	76.76	107.01	126.06	155.76	181.31	200.63
15 min	61.23	85.30	100.49	122.49	143.05	158.93
30 min	39.44	54.88	64.66	77.48	90.63	101.00
1 hr	24.24	33.70	39.70	47.10	54.94	61.17
2 hr	14.50	20.13	23.71	27.99	32.46	36.02
4 hr	8.54	11.84	13.95	16.43	18.92	20.88
6 hr	6.25	8.65	10.19	11.99	13.75	15.12
12 hr	3.64	5.04	5.93	6.98	7.93	8.67
24 hr	2.12	2.93	3.45	4.05	4.57	4.96

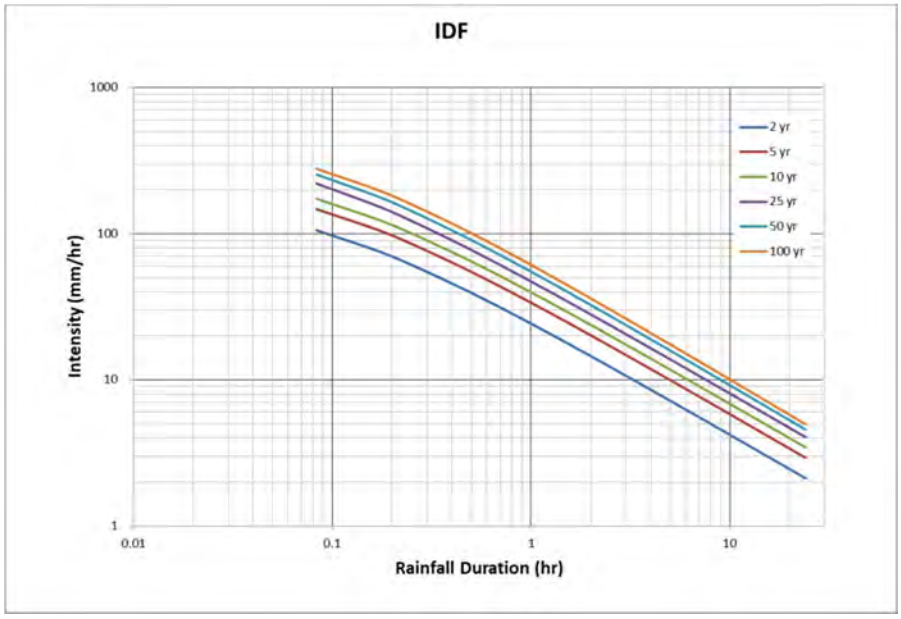


Figure 5 - Intensity-Duration-Frequency (IDF) curves calculated from Table above

4.2.POST-DEVELOPMENT CONDITIONS

Below is a summary of the proposed site conditions:

- Total site surface area = 24.1 ha
- Total pervious surface area (landscape) = 4.9 ha (20%)
- Total impervious surface area (TIMP) = 19.2 ha (80%)

- 77,862m^2 – new buildings
- 98,027m^2 – new roadways and Parking Lot
- 9973m^2 – new walkway

- The rooftop downspouts either discharge onto the landscaped (grass) area and then overflow onto the roadside ditch and direct to the pond through a culvert or connect to the catchbasins on each lot and direct to the roadside ditch.
- The parking lot and driveway runoffs are captured by on-site catchbasins located within the lots and discharged to the proposed roadside ditch through an OGS unit in each lot for pre-treatment purposes. Then it will be directed to the SWM dry pond through a pipe culvert, located in the easement of Lots 13 and 14.
- Post-development peak flow conditions are calculated as follows:
- Peak flow rate Modified Rational Formula: Qp = (0.001/3600) * A * C * Ca * i
  - A = Total area = 24.1 ha
  - A_{west} = West catchment area (uncontrolled) in m^2 = 4.37 ha
  - A_{east} = East catchment area (controlled) = 19.76 ha
  - C = runoff coefficients = 0.78 for both uncontrolled and controlled catchment areas. See Appendix X for more details.
  - Ca = Antecedent Precipitation Factor = 1.0 for 2, 5, and 10 years, 1.10 for 25 years, 1.20 for 50 years, and 1.25 for 100 years.
  - i = average rainfall intensity in mm/hour using the Township's Rational Method with A, B, and C values of the 3-parameters design storm.

- Time of Concentration:
  - Bransby Williams Method if $C > 0.4$, $S_w = 2\%$, $L = 345$ m, $A = 4.37$ ha, C = 0.78: ***Tc* = 14.8 min (WEST Catchment or Lot # 1)**
  - Bransby Williams Method if $C > 0.4$, $S_w = 1$ - 2%, L = Variable, $A = 0.59$ – 2.1 ha, C = 0.84 – 0.93: ***Tc* < 10 min (EASTERN Lots # 2 - 14)** ⟹ **(Tc_{min} = 10 min)**
  - Bransby Williams Method if $C > 0.4$, $S_w = 2\%$, $L = 399$ m, $A = 2.22$ ha, C = 0.67: ***Tc* = 18.3 min (Roadway Catchment)**
  - Airport Method if $C < 0.4$, $S_w = 1.5\%$, $L = 468$ m, $A = 4.2$ ha, C = 0.23: ***Tc* = 47.5 min (Pond Catchment)**

- See Table 6: Post-development peak flows for the 1:2-year through 1:100-year design storms based on the Township's Rational Method along with appropriate pre-development peaks flow for each sub-catchment (lot). The Modified Rational Method calculations are included in Appendix XI for reference.

Table 3 – Proposed peak flows based on the Modified Rational Method

Design Storm	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Intensity for post-development (mm/hr) (UNCONTROLLED)	61.8	86.1	101.4	122.8	144.5	160.5
Post-Development Peak Flows (cms) (UNCONTROLLED)	0.6 (0.4)	0.8 (0.5)	1.0 (0.6)	1.3 (0.8)	1.6 (1.0)	1.9 (1.1)
Intensity for post-development (CONTROLLED) (mm/hr)	76.8	107.0	126.1	154.6	181.3	200.6
Post-Development Peak Flows (cms) (CONTROLLED)	3.3 (1.50)	4.6 (2.09)	5.4 (2.47)	7.3 (3.26)	9.3 (4.19)	10.7 (4.86)
Total Post-Development Peak Flows (cms) (Before Mitigation)	3.9 (1.86)	5.4 (2.59)	6.4 (3.05)	8.6 (4.03)	10.9 (5.18)	12.6 (6.0)
Allowable Post-Development Peak Flows (cms)	1.27	1.77	2.09	2.75	3.54	4.10

Note: (*0.4*) denotes pre-development peak flow.
* Allowable Peak Flow = Total Pre-dev. Peak flow – Uncontrolled Post-dev. Peak Flow

Table 4 – SWM Dry Pond Release Rates and Water Levels

Return Period (year)	2	5	10	25	50	100
Peak Flow (l/s)	70.0	209.0	339.0	664.2	1169.7	1582.0
Storage Volume (m^3)	4321.4	4743.4	5025.3	5611.4	6379.4	6950.0
Water Elevation (m)	329.73	329.83	329.90	330.04	330.21	330.32

4.3.MINOR AND MAJOR STORM CONVEYANCE

The minor system conveyance is for flows below 5 year storm event (i.e., 11.84mm/hr precipitation in 4 hour). Given that each proposed Lot has a TIMP of 80%, all minor storms have been designed to be conveyed into the road-side grass ditch for conveyance into the stormwater management pond. The major system conveyance are for flows between 5 and 100 year storm events, and is the same for pre-development and post-development, generally flowing from each individual lot into the roadside ditch for conveyance.

Swales are one of several LIDs for the treatment of stormwater runoff from project areas that are anticipated to produce pollutants of concern (e.g., roadways). Grass swales are vegetated, typically trapezoidal channels, which receive and convey stormwater flows while meeting water quality criteria and other flow criteria.

- Flatbed swales along both sides of new roadways are sized to convey minor and major flows (1:5 to 1:100 years) using Uxbridge's IDF curve values.
- Swales are designed at 0.7 m depth, 0.8 m bottom width at 3H:1V sloped sides, cross-sectional area of 2.03 m^2.
- Swales grade at roughly 0.5-1.2%, and it is recommended to plant grass and forb in the channel bed and banks to retain their long-term shape. See Appendix XI for swale design information.
- Swales collect stormwater from all impermeable municipal roadways as well as stormwater overflow from each lot in the Eastern Catchment.

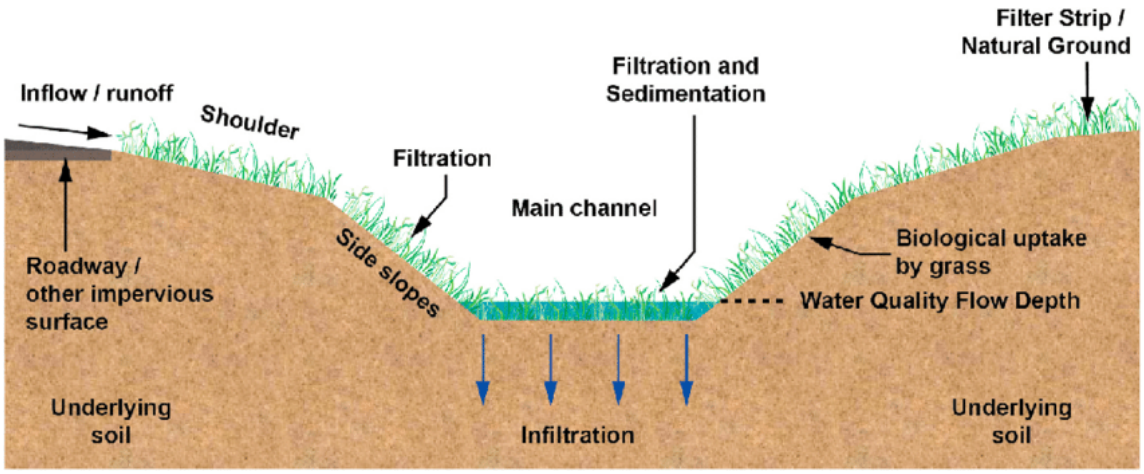


Figure 6 - Grass Swale Conveyance Diagram

5. GRADING

Based on the topographic survey of the subject property, the property contains a variety of slopes, from gentle slopes of 2% all the way up to 15% in small confined ridges. Significant earthworks & re-grading of the subject property will be required for all of the current agricultural areas (Landform Conservation Category 2), while the eastern boundary forested area will be preserved with very minor disturbance (Landform Conservation Category 1). Furthermore, as the subject property is currently an agricultural property, there is an estimated 0.3 of disturbed moist topsoil that need to be stripped out, and backfill brought onto site. These topsoils would need to be stockpiled or alternatively exported from the subject property.

Each individual lot is graded at approx. 2% towards the central municipal road grass swale, while the municipal road and swale are at 0.5% ~ 5% grade.

6. SUMMARY

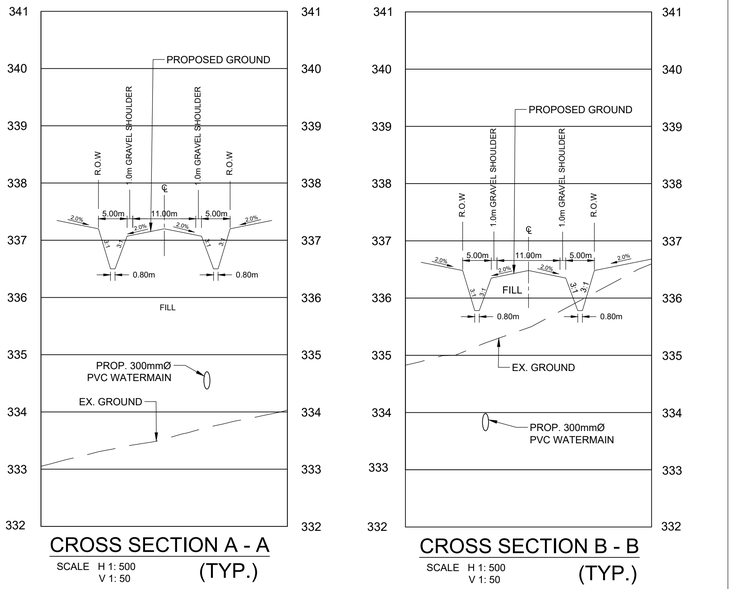
The subject property is currently an agricultural land-use property with significant amounts of varied different grades. Water service is available at the north side of the intersection of Paisley Ln and Durham Regional Highway 47 and there are sufficient pressures and volumes for the proposed industrial sub-division. Sanitary service will be on-site sanitary systems (septic beds), with current reserve area of 1000m2 based on Durham Region standards.

Stormwater management can be considered as two zones: Lot #1 western area is uncontrolled and flow west, while all other pieces of the property drains to the central municipal road grass swale. The swales then conveys all stormwater to the southeast corner of the property into a dry-pond.

This report has been prepared for the sole use of 123 Highway 47 Inc. or any project relevant approval authorities. King EPCM accepts no liability for claims arising from the use of this report, or from actions taken or decisions made as a result of this report, by parties other than the Client.

Tony Wang, P. Eng
Principal Engineer
King EPCM

APPENDIX I – SITE GRADING PLAN & SITE SERVICING PLAN



CROSS SECTION A - A

SCALE H 1: 500
V 1: 50 (TYP.)

CROSS SECTION B - B

SCALE H 1: 500
V 1: 50 (TYP.)

GENERAL NOTES:

- THIS IS NOT A PLAN OF SURVEY. BOUNDARY, PLANS, AND DISTANCES SHOWN HEREON ARE COMPILED FROM REGISTRY OFFICE RECORDS AND BEST FIT TO FIELDWORK USING PREVIOUS TOPOGRAPHIC DETAIL FROM KING EPCM
- ELEVATION AND DISTANCES ARE IN METERS UNLESS OTHERWISE NOTED
- ELEVATIONS ARE GEODETIC HT_2(2010) AND ARE DERIVED FROM CAN-NET VRS NETWORK
- THIS DRAWING IS PREPARED IN UTM NAD 83 ZONE 17 (CSRS 2010). BOUNDARY IS APPROXIMATE AND HAS NOT BEEN CONFIRMED IN THE FIELD
- HORIZONTAL COORDINATES IN THIS DRAWING ARE IN GRID COORDINATES AND CAN BE SCALED UP TO GROUND USING A SCALE FACTOR OF 1.0002. SCALING THE DRAWING UNIFORMLY MAY CAUSE DISCREPANCIES IN ELEVATION DATA
- BACKGROUND IMAGE FROM YORKMAPS AERIAL IMAGERY DATED 2017
- TRCA REGULATED LIMIT DERIVED FROM TRCA REGULATION MAPPING IMAGERY
- DIGITAL DRAWING IS PROVIDED AS-IS AND DOES NOT HAVE ANY GUARANTEE OR WARRANTY FROM KING EPCM
- ORIGINAL TREE CROWNLINE OBSERVED MAY 9, 2023; TRCA STAKING OBSERVED JULY 13, 2023 BY KING EPCM.

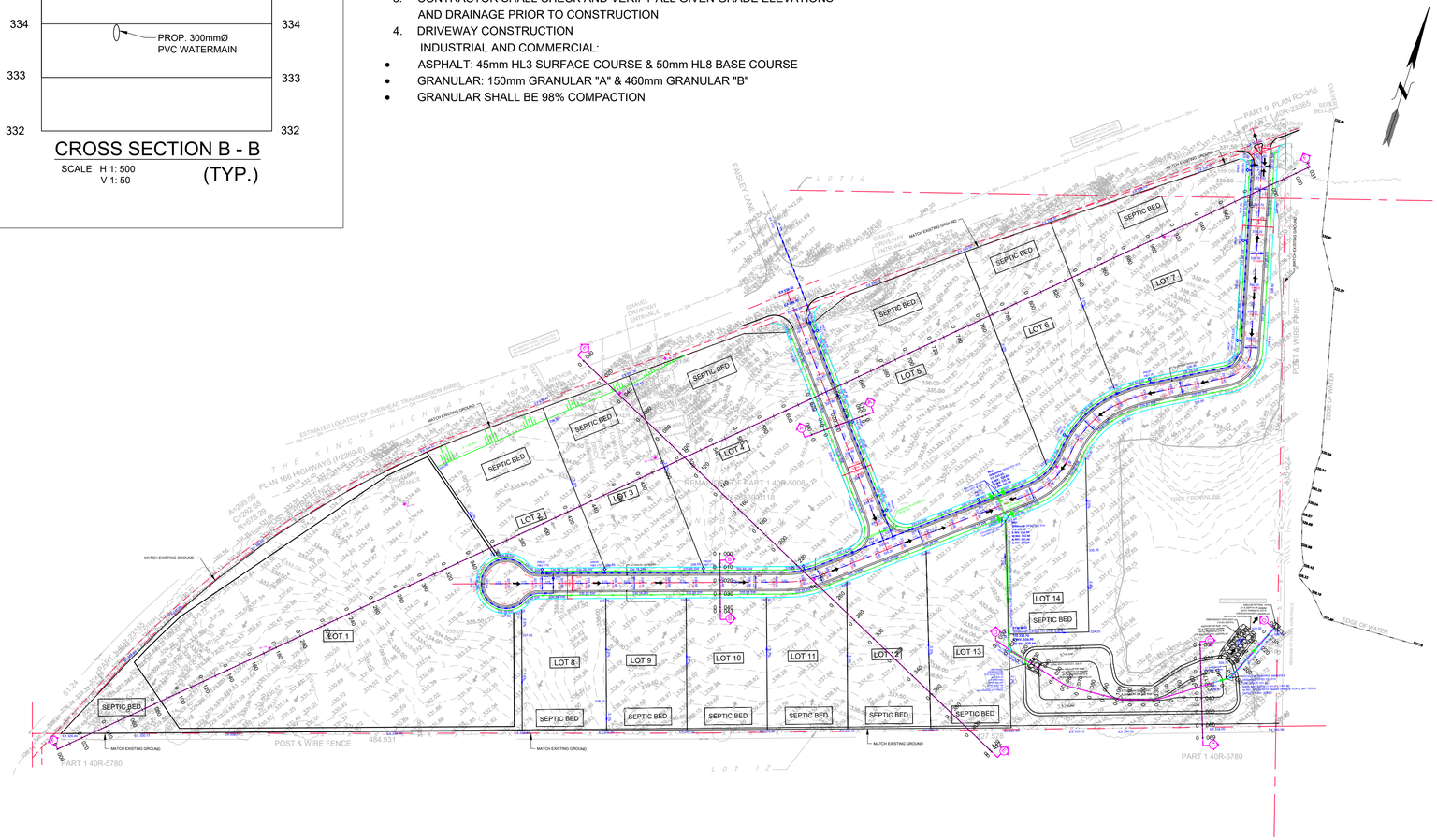
1. CONTRACTOR TO BE RESPONSIBLE TO ENSURE THAT THIS LOT AND ADJOINING AREAS OF SITE ARE KEPT CLEAN AND FREE OF CONSTRUCTION DEBRIS, AND THAT ROADWAYS ARE KEPT CLEAN OF MUD AND DEBRIS
2. ALL MEASUREMENTS STATED IN METERS, PIPE SIZES IN MILLIMETERS, UNLESS OTHERWISE SPECIFIED EQUIVALENTS
3. CONTRACTOR SHALL CHECK AND VERIFY ALL GIVEN GRADE ELEVATIONS AND DRAINAGE PRIOR TO CONSTRUCTION
4. DRIVEWAY CONSTRUCTION

INDUSTRIAL AND COMMERCIAL:

- ASPHALT: 45mm HL3 SURFACE COURSE & 50mm HL8 BASE COURSE
- GRANULAR: 150mm GRANULAR "A" & 460mm GRANULAR "B"
- GRANULAR SHALL BE 98% COMPACTION

LEGEND:

EX 339.20	EXISTING ELEVATION
339.20	PROPOSED ELEVATION
339.20 SW	PROPOSED CL SWALE ELEVATION
INV. 339.20	PROPOSED SWALE INVERT ELEVATION
	EXISTING SURFACE FLOW ROUTE
	PROPOSED SURFACE FLOW ROUTE
339	EXISTING ELEVATION CONTOUR LINES
	R.O.W.
	PROPOSED CENTERLINE SWALE
WATER	PROPOSED WATERMAIN
	PROPOSED HYDRANT
	PROPOSED GATE VALVE
BH 106	BOREHOLE
DICB	DITCH INLET CATCHBASIN
DCB	DOUBLE CATCHBASIN
HP	HYDRO POLE
MH	MANHOLE
HO	OVERHEAD UTILITY WIRE
	GUY ANCHOR
	LEGAL PROPERTY BOUNDARY
	TREE CROWNLINE



SCALE 1:2000
1cm = 20m

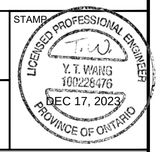
0m 100m 200m

Municipality Notes

DRAWN
K.L.

DATE
DEC. 15, 2023

STAMP



KEY MAP

N.T.S.

KING EPCM
3780 14th Ave., Unit 211
Markham, ON, L3R 9Y5
www.KingEPCM.com
647-459-5647

CLIENT
123 HWY 47 INC.

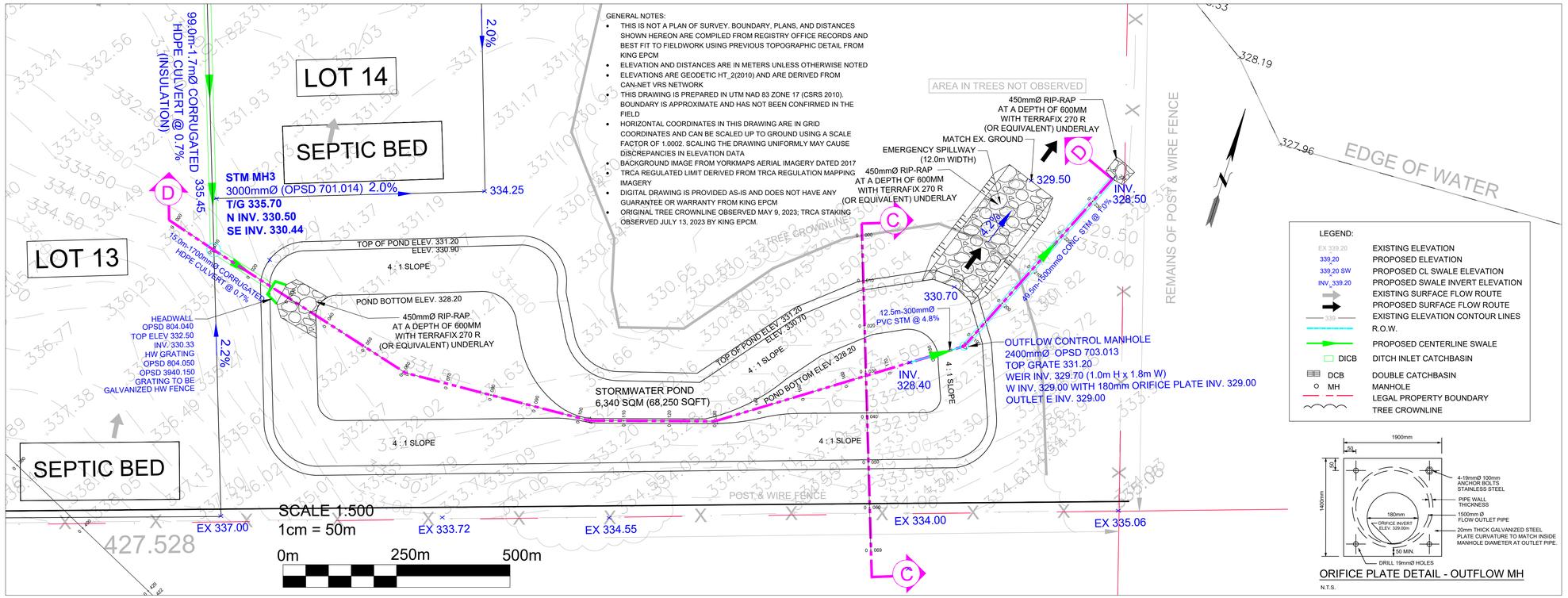
PROJECT NAME
123 HIGHWAY 47

PROJECT LOCATION
123 HIGHWAY 47
LEGAL DESCRIPTION: PT LTS 13 & 14 CON 1 UXBRIDGE PT 1 PL 40R5008 EXCEPT PT 1 PL 40R23365; UXBRIDGE, PIN 26830-0118

PRINT TITLE
SITE GRADING AND SITE SERVICING PLAN

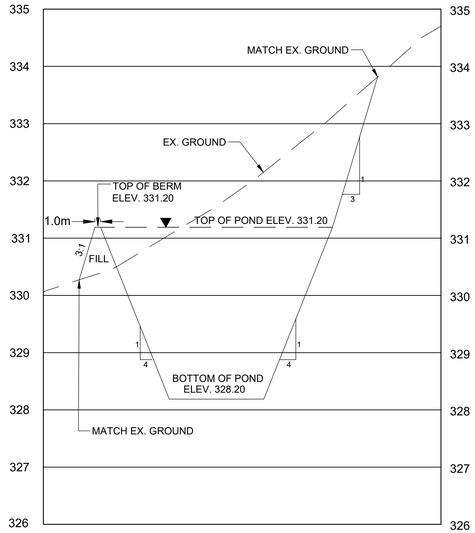
FILE No.
EGR 1.1

No.	ISSUED FOR:	DATE	DRAW BY	CHECK
V16	ISSUED TO CLIENT	DEC 15, 2023	KL	TW



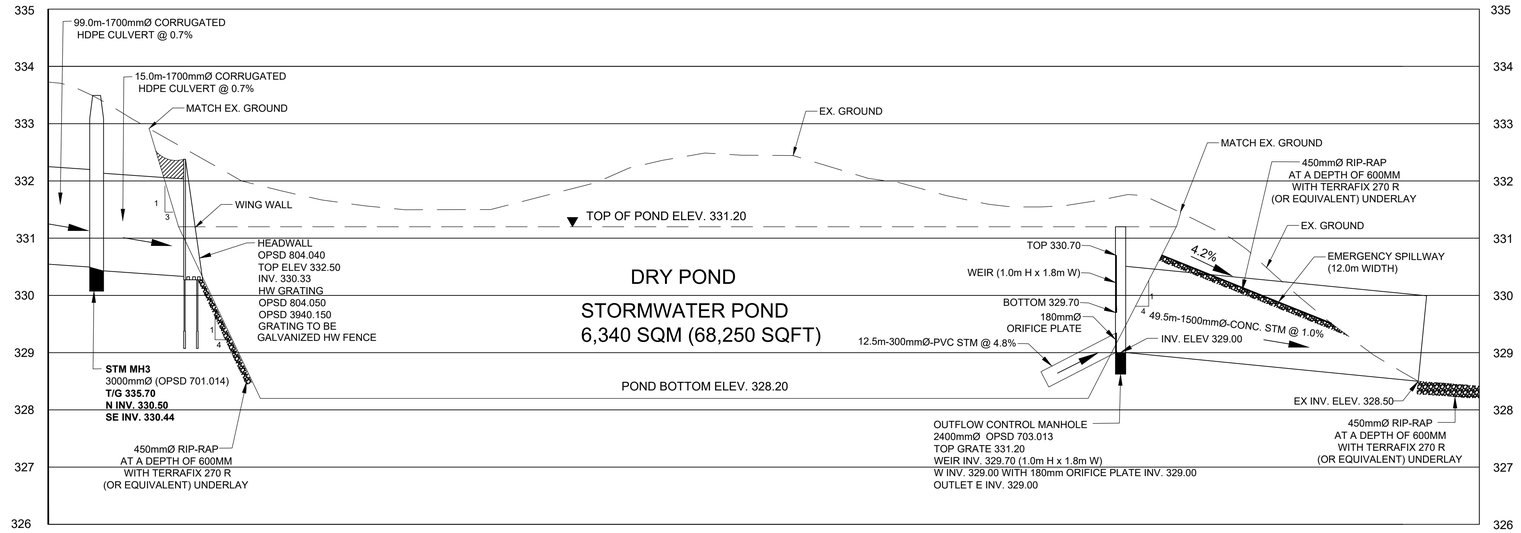
ORIFICE PLATE DETAIL - OUTFLOW MH

N.T.S.



CROSS SECTION C - C

SCALE H 1: 500
V 1: 50



CROSS SECTION D - D

SCALE H 1: 500
V 1: 50

Municipality Notes

DRAWN: K.L.

DATE: DEC 14, 2023

STAMP: LICENSED PROFESSIONAL ENGINEER Y. T. WANG 100228476 DEC 17, 2023 PROVINCE OF ONTARIO

KEY MAP

N.T.S.

KING EPCM
3780 14th Ave., Unit 211
Markham, ON, L3R 9Y5
www.KingEPCM.com
647-459-5647

CLIENT: 123 HWY 47 INC.

PROJECT NAME: **123 HIGHWAY 47**

PROJECT LOCATION: 123 HIGHWAY 47
LEGAL DESCRIPTION: PT LTS 13 & 14 CON 1 UXBRIDGE PT 1 PL 40R5008 EXCEPT PT 1 PL 40R23365; UXBRIDGE, PIN 26830-0118

PRINT TITLE: **STORMWATER MANAGEMENT FACILITY POND**

FILE No.: EGR 1.2

No.	ISSUED FOR:	DATE	DRAW BY	CHECK
V1	ISSUED TO CLIENT	DEC 14, 2023	KL	TW

GENERAL NOTES:

- THIS IS NOT A PLAN OF SURVEY. BOUNDARY, PLANS, AND DISTANCES SHOWN HEREON ARE COMPILED FROM REGISTRY OFFICE RECORDS AND BEST FIT TO FIELDWORK USING PREVIOUS TOPOGRAPHIC DETAIL FROM KING EPCM
- ELEVATION AND DISTANCES ARE IN METERS UNLESS OTHERWISE NOTED
- ELEVATIONS ARE GEODETIC HT_2(2010) AND ARE DERIVED FROM CAN-NET VRS NETWORK
- THIS DRAWING IS PREPARED IN UTM NAD 83 ZONE 17 (CSRS 2010). BOUNDARY IS APPROXIMATE AND HAS NOT BEEN CONFIRMED IN THE FIELD
- HORIZONTAL COORDINATES IN THIS DRAWING ARE IN GRID COORDINATES AND CAN BE SCALED UP TO GROUND USING A SCALE FACTOR OF 1.0002. SCALING THE DRAWING UNIFORMLY MAY CAUSE DISCREPANCIES IN ELEVATION DATA
- BACKGROUND IMAGE FROM YORKMAPS AERIAL IMAGERY DATED 2017
- TRCA REGULATED LIMIT DERIVED FROM TRCA REGULATION MAPPING IMAGERY
- DIGITAL DRAWING IS PROVIDED AS-IS AND DOES NOT HAVE ANY GUARANTEE OR WARRANTY FROM KING EPCM
- ORIGINAL TREE CROWNLINE OBSERVED MAY 9, 2023; TRCA STAKING OBSERVED JULY 13, 2023 BY KING EPCM.

1. CONTRACTOR TO BE RESPONSIBLE TO ENSURE THAT THIS LOT AND ADJOINING AREAS OF SITE ARE KEPT CLEAN AND FREE OF CONSTRUCTION DEBRIS, AND THAT ROADWAYS ARE KEPT CLEAN OF MUD AND DEBRIS
2. ALL MEASUREMENTS STATED IN METERS, PIPE SIZES IN MILLIMETERS, UNLESS OTHERWISE SPECIFIED EQUIVALENTS
3. CONTRACTOR SHALL CHECK AND VERIFY ALL GIVEN GRADE ELEVATIONS AND DRAINAGE PRIOR TO CONSTRUCTION

LEGEND:

EX 339.20	EXISTING ELEVATION
339.20 SW	PROPOSED CL SWALE ELEVATION
INV. 339.20	PROPOSED SWALE INVERT ELEVATION
	EXISTING SURFACE FLOW ROUTE
	PROPOSED SURFACE FLOW ROUTE
339	EXISTING ELEVATION CONTOUR LINES
	R.O.W.
	PROPOSED CENTERLINE SWALE
	DRAINAGE AREAS
	DRAINAGE AREAS
	RUNOFF COEFFICIENT
BH 106	BOREHOLE
DICB	DITCH INLET CATCHBASIN
DCB	DOUBLE CATCHBASIN
HP	HYDRO POLE
MH	MANHOLE
HO	OVERHEAD UTILITY WIRE
	GUY ANCHOR
	LEGAL PROPERTY BOUNDARY
	TREE CROWNLINE

SCALE 1:2000
1cm = 20m

0m 100m 200m

Municipality Notes

DRAWN: **K.L.**

DATE: **DEC. 18, 2023**

STAMP: LICENSED PROFESSIONAL ENGINEER — Y. T. MING — 100228078 — PROVINCE OF ONTARIO — DEC 18, 2023

KEY MAP

N.T.S.

KING EPCM
3780 14th Ave., Unit 211
Markham, ON, L3R 9Y5
www.KingEPCM.com
647-459-5647

CLIENT: 123 HWY 47 INC.

PROJECT NAME: **123 HIGHWAY 47**

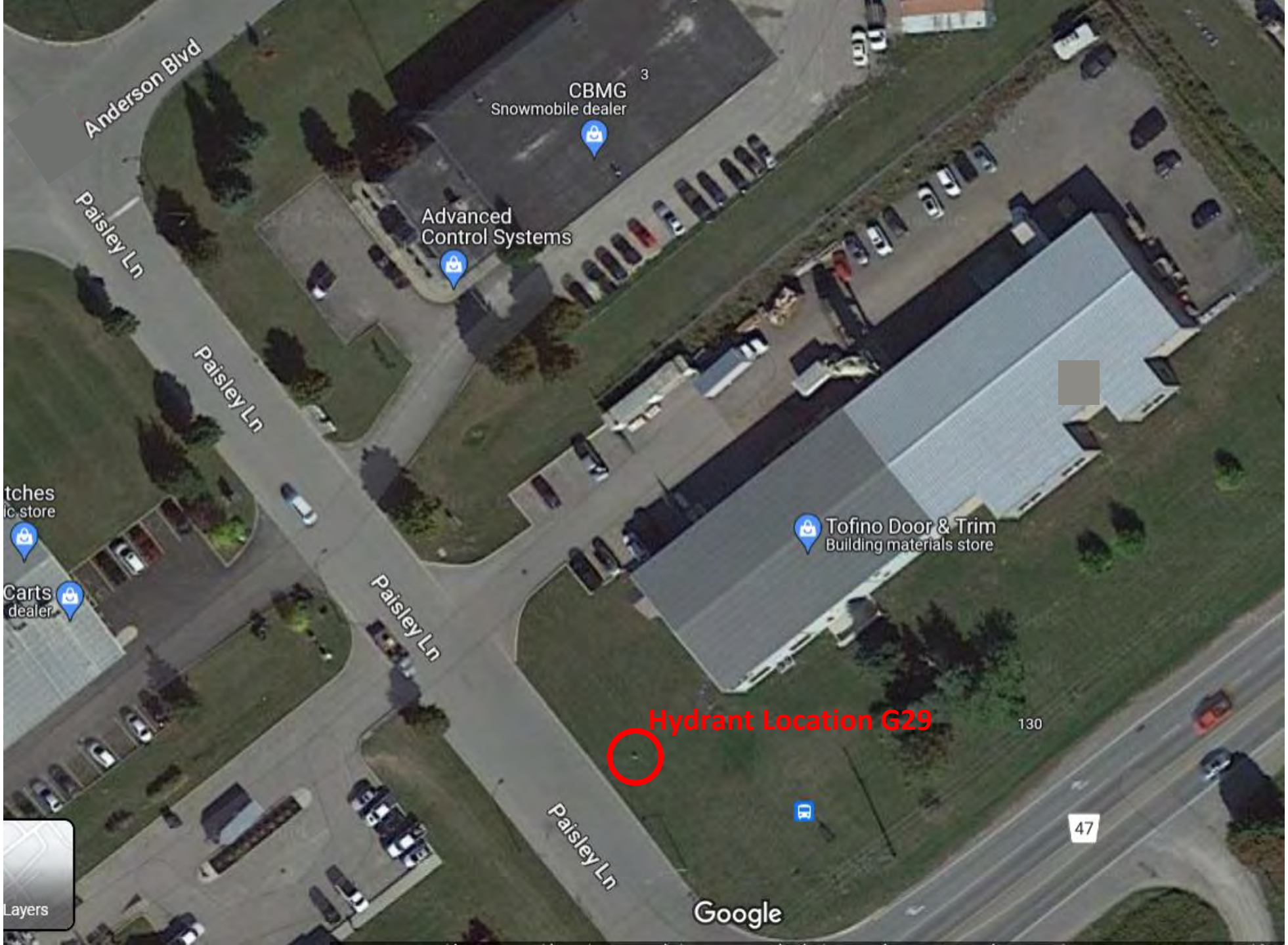
PROJECT LOCATION: 123 HIGHWAY 47
LEGAL DESCRIPTION: PT LTS 13 & 14 CON 1 UXBRIDGE PT 1 PL 40R5008 EXCEPT PT 1 PL 40R23365; UXBRIDGE, PIN 26830-0118

PRINT TITLE: **DRAINAGE PLAN**

FILE No.: EGR 1.3

No.	ISSUED FOR:	DATE	DRAW BY	CHECK
V16	ISSUED TO CLIENT	DEC 18, 2023	KL	TW

APPENDIX II – DURHAM REGION WATER SUPPLY SYSTEM ENGINEERING RECORDS & HYDRANT TEST


Anderson Blvd
CBMG
Snowmobile dealer
Advanced
Control Systems
Paisley Ln
Paisley Ln
Paisley Ln
Paisley Ln
Tofino Door & Trim
Building materials store
Hydrant Location G29
130
47
Google
Layers

THE REGIONAL MUNICIPALITY OF DURHAM

WORKS DEPARTMENT

FLOW TEST SUMMARY AND RESULTS

Requested by:	Richard Ramos	Account No.:	
Company:	123 Highway 47 Inc.		
Address:	9050 Yonge St, Suite 207	Telephone:	416-854-7419
	Richmond Hill, ON	Email:	rramos@costonegroup.com
	L4C 9S6		
Test Location:	123 Highway 47		
Municipality:	Town of Uxbridge		
Date:	05-Sep-23	Time:	10:00AM
Conducted by:	JA		

Flow Hydrant: G29

Monitoring Hydrant: G28

Nozzle Size (in.)	Residual Pressure (p.s.i.)		Pitot Guage	
	Field Reading @ Monitoring Hydrant	Actual @ Flow Hydrant (adjusted)*	Pressure (p.s.i.)	Flow (i.g.p.m.)
STATIC	62.2	63.6		0.0
1-1/2	57.3	58.7	58.2	424.0
1-3/4	54.8	56.2	55.3	562.5
2-1/2	46.5	47.9	50.1	990.9

* Calculation based on gain/loss in pressure due to elevation difference between flow & monitoring hydrants

Hydrant Elevations (ft.)	
Flow Hydrant:	1118.8
Static Hydrant:	1122.1
Difference:	-3.3
Pressure Diff. (p.s.i.):	-1.4

Comments:

Flow for 1-1/2 & 1-3/4 nozzle calculated using Discharge of smooth nozzles

Flow for 2-1/2 nozzle calculated using Discharge for circular outlets

Results	
Static Pressure	63.6
Flow at 20 p.s.i. (I.g.p.m.):	1721 (approx.)
Checked by:	

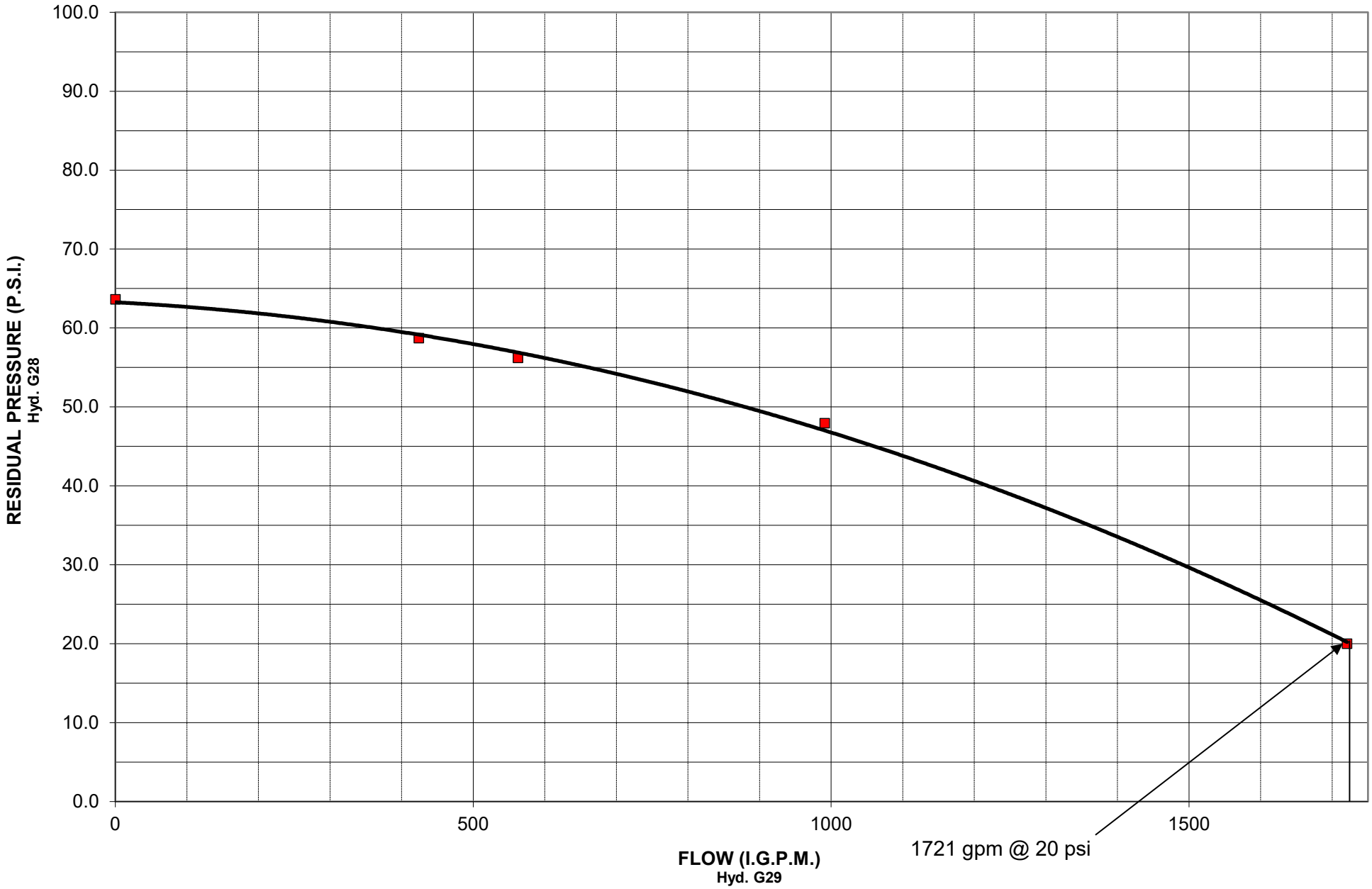
Disclaimer for Fire Flow Tests

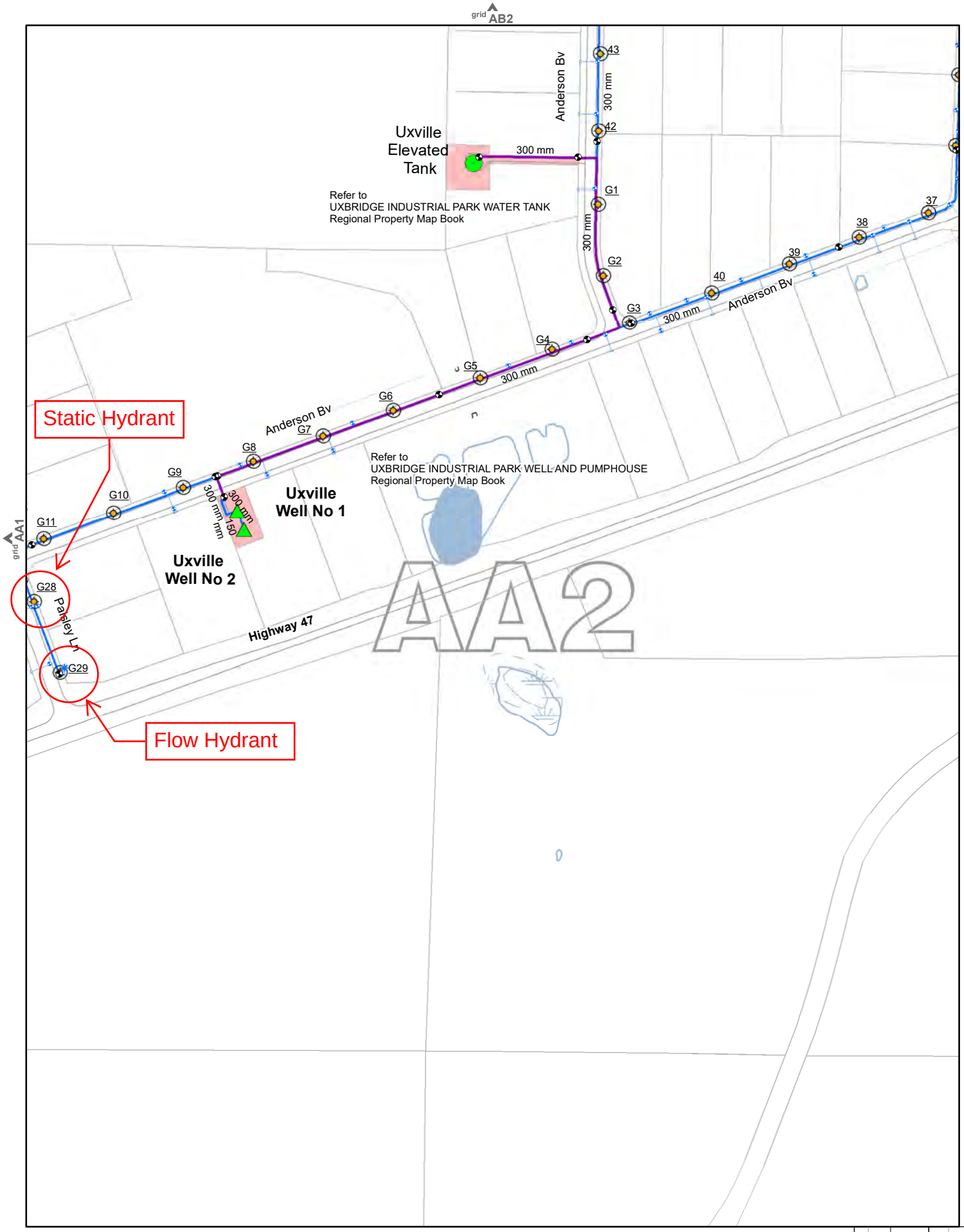
While the Regional Municipality of Durham (hereinafter referred to as the "Region") makes every effort to ensure that the information contained herein is accurate and up to date, the Region shall not be held liable for improper or incorrect use of the data and information described and/or contained herein. The user must make his/her own determination as to its accuracy and suitability for the user's own use. The data, information and related graphics contained herein are not legal documents and are not intended to be used as such. The user hereby recognizes that the information and data are dynamic and may change over time without notice. The Region makes no commitment to update the information or data contained herein. The user recognizes and acknowledges that the data and information provided by the Region was acquired by the Region for a specific purpose and this information may be inaccurate or unreliable if used for other purposes. The Region is not responsible for your use or reliance upon this information. The Region does not warrant or guarantee the results of the use of the information provided to you by the Region in terms of correctness, accuracy, reliability, completeness, usefulness, timeliness or otherwise. The entire risk as to the results of any information obtained from the Region is entirely assumed by the recipient.

Location: 123 Highway 47
Municipality: Town of Uxbridge
Date: Sept 05, 2023

FIRE FLOW TEST

(Graph of Residual Pressure vs. Hydrant Flow)





The Regional Municipality of Durham
Works Department
Water Supply System

UXBRIDGE (Uxville)

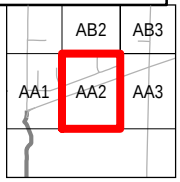
1:5,000

0 25 50 100 150 200 Meters

All dimensions are in mm unless otherwise noted.

April 21, 2023

Servicing Note:
THIS MAP DEPICTS LOCAL PROXIMITY OF SERVICES ONLY. IT IS NOT TO BE USED TO DETERMINE INDIVIDUAL SITE SERVICING AVAILABILITY OR AVAILABILITY OF CAPACITY WITHIN THE SYSTEM. FOR DETAILED SITE SERVICING INFORMATION PLEASE CONTACT THE DEVELOPMENT APPROVALS SECTION OF THE WORKS DEPARTMENT.

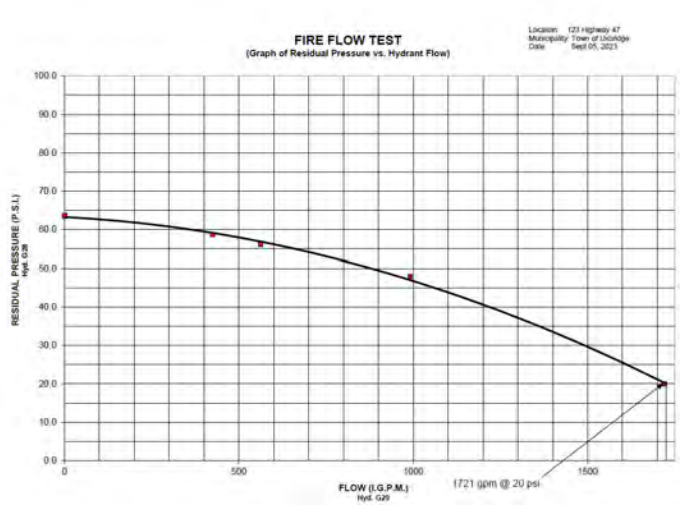


APPENDIX III- WATER SERVICE PRESSURE / FLOW RATE CALCULATIONS

Watermain pressures and flow volumes are calculated based on single-line linear pressured watermain, with the following calculation methods:

$$Calculated\ Pressure\ at\ Designed\ Location\ for\ each\ Specific\ Flow\ Rate = Existing\ Pressure + \Delta\ Elevation\ Head + Flow\ Friction\ Loss + Friction\ Loss\ from\ Pipe\ Fittings$$

Existing Pressure is found as per Figure 2, as per Durham Region Hydrant Test Data:



Hydrant G29 - Imperial		Hydrant G29 - Metric	
FLOW AT HYD. G29 (IGPM)	RESID. PRESSURE AT HYD. G29, CALC FROM HYD. G28 (PSI)	FLOW AT HYD. G29 (L/min)	RESID. PRESSURE AT HYD. G29, CALC FROM HYD. G28 (kPa)
0	63.6	0	438.5
424	58.7	1928	404.7
562.5	56.2	2557	387.5
990.9	47.9	4505	330.3
1721	20	7824	137.9

Δ Elevation Head is found as per the designed elevation difference between each calculation point:

From	Upstream Elev. (Inv)	To	Downstream Elev. (Inv.)
FH G29	339.11	FH 03	330.05
FH 03	330.05	FH 09	334.95
FH 03	330.05	FH 13	332.6
FH 03	330.05	FH 04	328.6

Friction Loss from Pipe Fittings are both calculated based on Equivalent Length of straight pipe, based on Table 9.1 of *Handbook of PVC Pipe Design and Construction, 2013, Uni-Bell PVC Pipe Association*. For each proposed pipe fitting (elbows, thru tees or branch tees), an equivalent length of straight pipe can be calculated. This equivalent length is then added onto the total pipe length between each calculation point.

	Pipe Fitting Counts			
From	45° or less elbows, std	std tee, thru flow (hydrants)	std tee, branch flow	gate valve
FH G29	0	3	0	2
FH 03	6	5	1	2
FH 03	3	3	1	2
FH 03	1	0	1	2

Table 9.1 Friction loss of water in pipe fittings in terms of equivalent length (L), feet of straight pipe

Pipe size, in.	Approx inside diam, in.	Friction factor	Gate Valve --- full open	90° Elbow	Long radius 90° or 45° std elbow	Std tee --- thru flow	Std tee --- branch flow	Close return bend	Swing check valve --- Full open	Angle valve --- Full open	Globe valve --- Full open	Butterfly valve	90° welding elbow r/d = 1	90° welding elbow r/d = 2	Miter bend 45°	Miter bend 90°
0.5	0.622	0.027	0.41	1.55	0.83	1.04	3.11	2.59	5.18	7.78	17.6					
0.75	0.824	0.025	0.55	2.06	1.10	1.37	4.12	3.43	6.86	10.3	23.3					
1	1.049	0.023	0.70	2.62	1.40	1.75	5.25	4.37	8.74	13.1	29.7	–	–	–	–	–
1.25	1.380	0.022	0.92	3.45	1.84	2.30	6.90	5.75	11.5	17.3	39.1					
1.5	1.610	0.021	1.07	4.03	2.15	2.68	8.05	6.71	13.4	20.1	45.6					
2	2.067	0.019	1.38	5.17	2.76	3.45	10.3	8.61	17.2	25.8	58.6	7.75	3.45	2.07	2.58	10.3
2.5	2.469	0.018	1.65	6.17	3.29	4.12	12.3	10.3	20.6	30.9	70.0	9.26	4.12	2.47	3.08	12.3
3	3.068	0.018	2.04	7.67	4.09	5.11	15.3	12.8	25.5	38.4	86.9	11.5	5.11	3.07	3.84	15.3
4	4.026	0.017	2.68	10.1	5.37	6.71	20.1	16.8	33.6	50.3	114	15.1	6.71	4.03	5.03	20.1
5	5.047	0.016	3.36	12.6	6.73	8.41	25.2	21.0	42.1	63.1	143	18.9	8.41	5.05	6.31	25.2
6	6.065	0.015	4.04	15.2	8.09	10.1	30.3	25.3	50.5	75.8	172	22.7	10.1	6.07	7.58	30.3
8	7.981	0.014	5.32	20.0	10.6	13.3	39.9	33.3	33.3	99.8	226	29.9	13.3	7.98	9.98	39.9
10	10.02	0.014	6.68	25.1	13.4	16.7	50.1	41.8	41.8	125	284	29.2	16.7	10.0	12.5	50.1
12	11.938	0.013	7.96	29.8	15.9	19.9	59.7	49.7	49.7	149	338	34.8	19.9	11.9	14.9	59.7
14	13.124	0.013	8.75	32.8	17.5	21.8	65.6	54.7	54.7	164	372	38.3	21.8	13.1	16.4	65.6
16	15.00	0.013	10.0	37.5	20.0	25.0	75.0	62.5	62.5	188	425	31.3	25.0	15.0	18.8	75.0
18	16.876	0.012	16.9	42.2	22.5	28.1	84.4	70.3	70.3	210	478	35.2	28.1	16.9	21.1	84.4
20	18.814	0.012	12.5	47.0	25.1	31.4	94.1	78.4	78.4	235	533	39.2	31.4	18.8	23.5	94.1
24	22.628	0.012	15.1	56.6	30.2	37.7	113	94.3	94.3	283	641	47.1	37.7	22.6	28.3	113
30	28	0.011	18.7	70	37.3	46.7	140	117	–	–	–	–	46.7	28	35	140
36	34	0.011	22.7	85	45.3	56.7	170	142					56.7	34	43	170
42	40	0.010	26.7	100	53.3	66.7	200	167	–	–	–	–	66.7	40	50	200
48	46	0.010	30.7	115	61.3	76.7	230	192					76.7	46	58	230
L/D			8	30	16	20	60	50	0.5 to 6 = 100 28 to 48 = 50	150	340	–	20	12	15	60

Calculated from data in Crane Co. – Technical Paper 410. $K = f\frac{L}{D}$, $f = \frac{KD}{L}$, $L = \frac{KD}{f}$, where D is inside pipe diameter in feet.

Flow Friction Loss is based on Table 9.3 of *Handbook of PVC Pipe Design and Construction, 2013, Uni-Bell PVC Pipe Association*, for each given flow rate (L/min), there is a calculated pressure drop of X kPa/100m of proposed total pipe (actual pipe length + equivalent length from pipe fittings). The flow friction loss is calculated from the Hazel-Williams equation by the design handbook, with H-W flow coefficient C = 150 for a proposed design of 300mm diameter PVC pipe.

					Equivalent Pipe Lengths		
From	Upstream Elev. (Inv)	To	Downstream Elev. (Inv.)	300mm CL-235 PVC Watermain Pipe Length (m)	Equivalent Pipe Length from Pipe Fitting Friction Loss (m)	300mm CL-235 PVC Total Equivalent Pipe Length (m)	Elevation head difference (kPa)
FH G29	339.11	FH 03	330.05	250	23	273	89
FH 03	330.05	FH 09	334.95	440	82	522	-48
FH 03	330.05	FH 13	332.6	315	56	371	-25
FH 03	330.05	FH 04	328.6	70	28	98	14

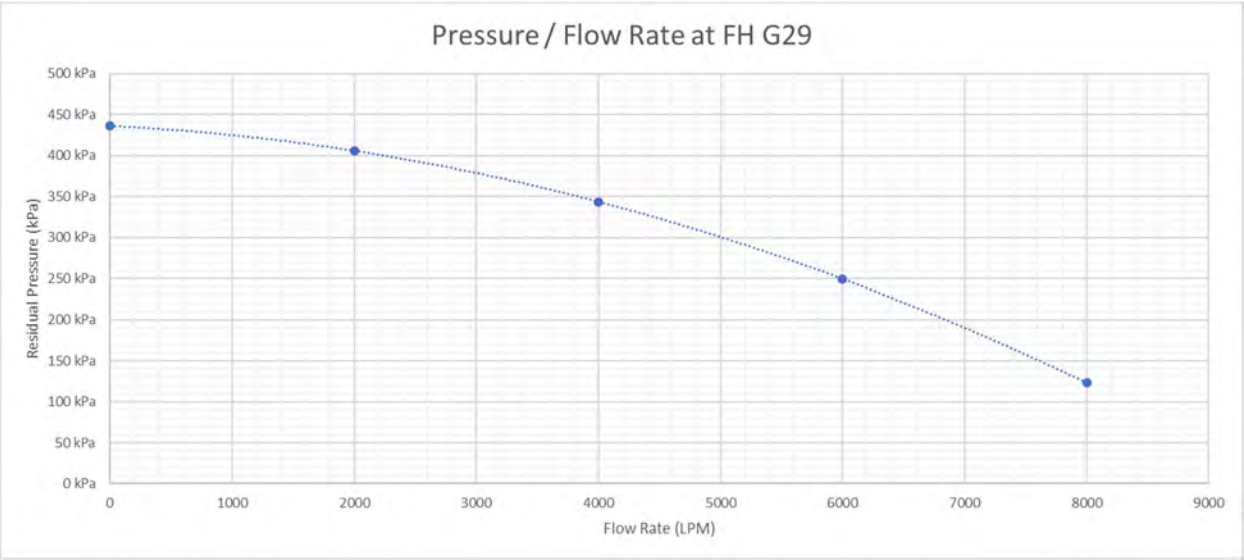
Table 9.3 Flow friction loss, AWWA C900 and C905 CIOD PVC pipe (*continued*)

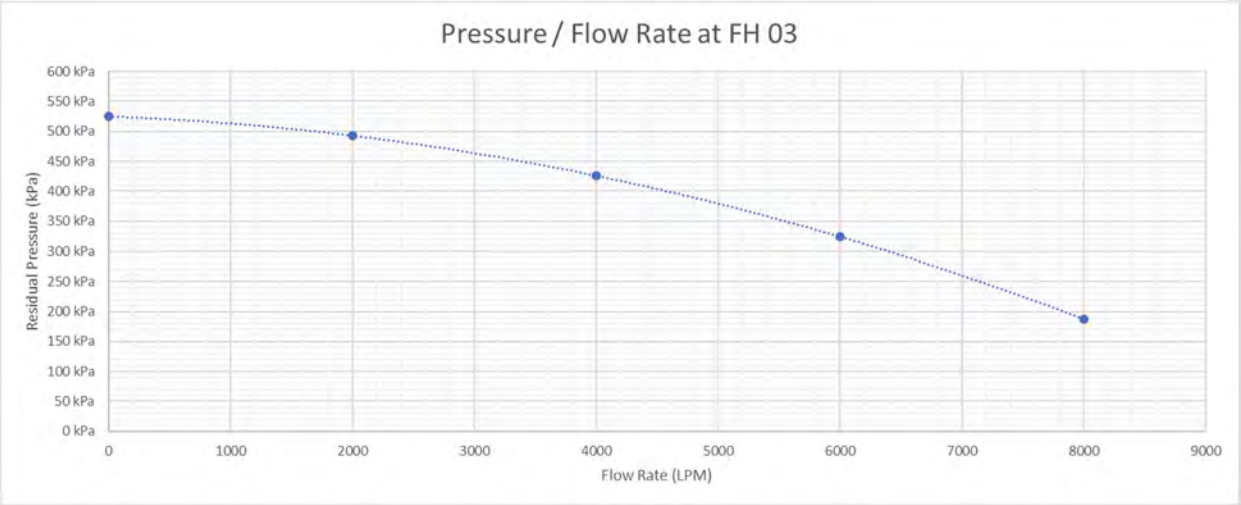
12 in. CIOD (AWWA C900)									
Flow, gpm	DR 25 Pressure class 165 psi			DR 18 Pressure class 235 psi			DR 14 Pressure class 305 psi		
	Velocity, ft/s	Pressure drop		Velocity, ft/s	Pressure drop		Velocity, ft/s	Pressure drop	
		ft H_2O/100 ft	psi/100 ft		ft H_2O/100 ft	psi/100 ft		ft H_2O/100 ft	psi/100 ft
200	0.560	0.00980	0.00424	0.602	0.0117	0.00506	0.652	0.0141	0.00613
250	0.700	0.0148	0.00641	0.753	0.0177	0.00764	0.815	0.0214	0.00926
300	0.841	0.0207	0.00898	0.904	0.0247	0.0107	0.978	0.0300	0.0130
350	0.981	0.0276	0.0119	1.05	0.0329	0.0142	1.14	0.0398	0.0173
400	1.12	0.0353	0.0153	1.20	0.0421	0.0182	1.30	0.0510	0.0221
500	1.40	0.0534	0.0231	1.51	0.0636	0.0276	1.63	0.0771	0.0334
600	1.68	0.0748	0.0324	1.81	0.0892	0.0386	1.96	0.108	0.0468
700	1.96	0.0994	0.0431	2.11	0.119	0.0514	2.28	0.144	0.0622
800	2.24	0.127	0.0551	2.41	0.152	0.0657	2.61	0.184	0.0796
1,000	2.80	0.192	0.0833	3.01	0.229	0.0993	3.26	0.278	0.120
1,200	3.36	0.270	0.117	3.61	0.321	0.139	3.91	0.389	0.169
1,400	3.92	0.358	0.155	4.22	0.428	0.185	4.56	0.518	0.224
1,600	4.48	0.459	0.199	4.82	0.547	0.237	5.22	0.663	0.287
2,000	5.60	0.694	0.300	6.02	0.827	0.358	6.52	1.00	0.434
2,400	6.72	0.972	0.421	7.23	1.16	0.502	7.82	1.40	0.608
2,800	7.85	1.29	0.560	8.43	1.54	0.667	9.13	1.87	0.808
3,200	8.97	1.65	0.716	9.64	1.97	0.854	10.4	2.39	1.03
3,600	10.1	2.06	0.891	10.8	2.45	1.06	11.7	2.97	1.29

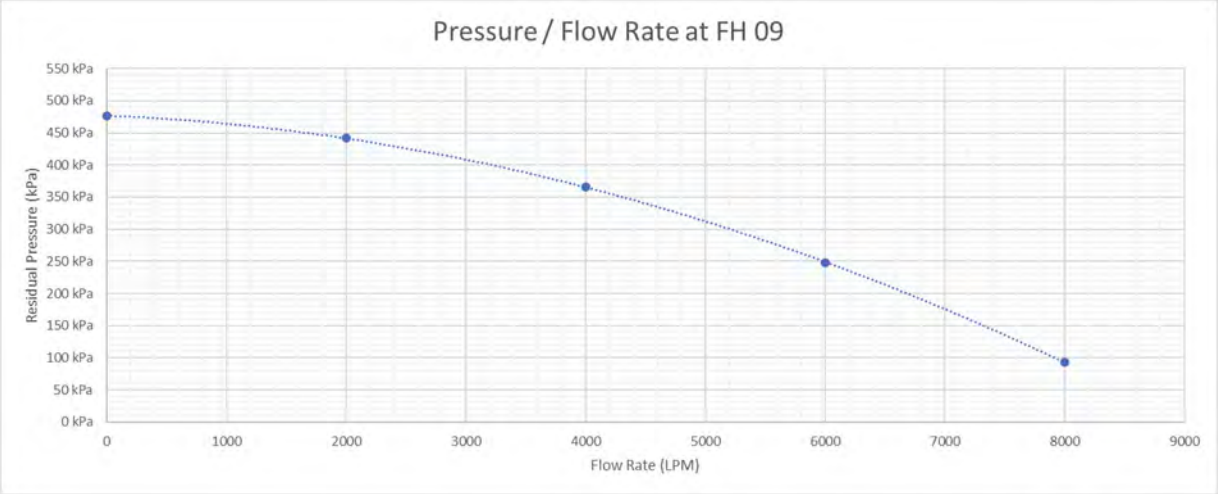
Notes:
1. Table is based on Equations 9.2 through 9.5, using C = 150.
2. Friction-loss values are based on average $D_i = D_o - (2 \times 106\% \times t_{min}) = D_o - (2.12 \times t_{min})$, where:
   D_i = pipe inside diameter, in.
   D_o = pipe outside diameter, in.
   t_{min} = minimum wall thickness, in.

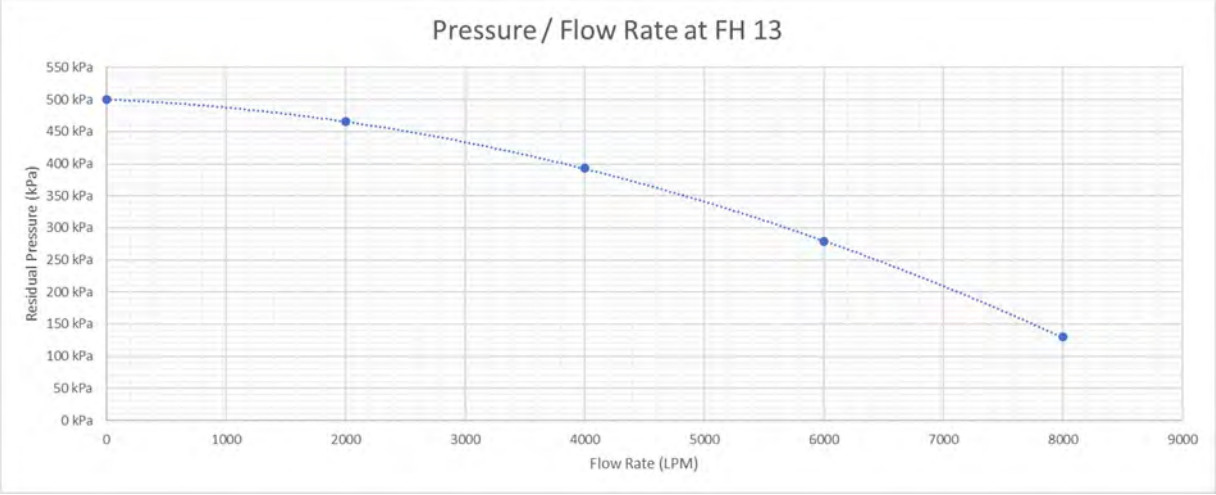
In summary, the following Table and Diagrams show the calculated flows and pressures:

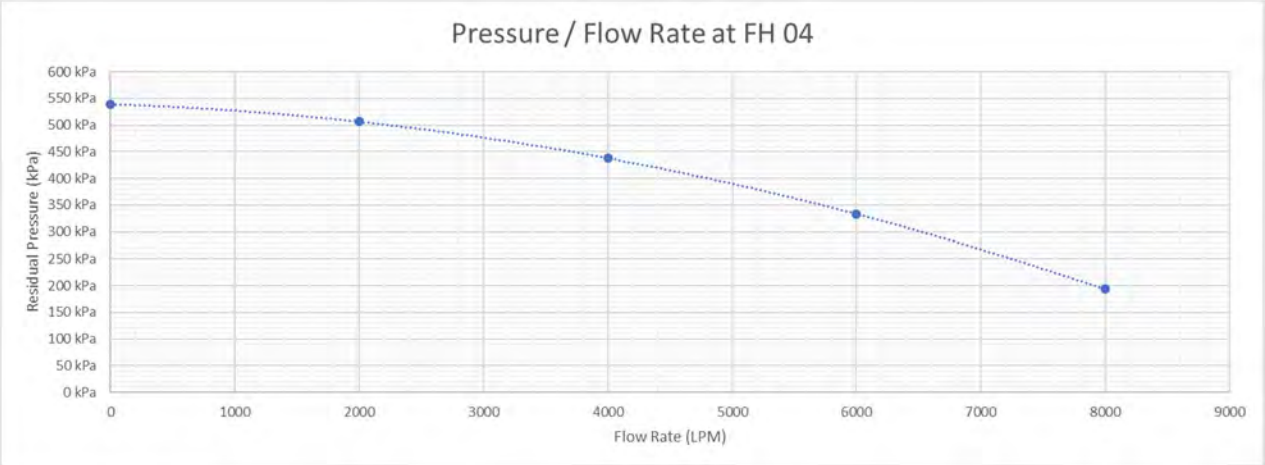
	0.000 kpa loss/100m	0.623 kpa loss/100m	2.243 kpa loss/100m	5.353 kpa loss/100m	8.899 kpa loss/100m
	kpa loss per 100m	kpa loss per 100m	kpa loss per 100m	kpa loss per 100m	kpa loss per 100m
	Pressure at Flow Rate (kPa)				
	0	2,000 LPM	4,000 LPM	6,000 LPM	8,000 LPM
FH G29	436 kPa	406 kPa	344 kPa	249 kPa	123 kPa
FH 03	525 kPa	493 kPa	426 kPa	324 kPa	188 kPa
FH 09	477 kPa	442 kPa	367 kPa	248 kPa	93 kPa
FH 13	500 kPa	466 kPa	393 kPa	279 kPa	130 kPa
FH 04	539 kPa	507 kPa	438 kPa	333 kPa	193 kPa




Pressure / Flow Rate at FH 03
Residual Pressure (kPa)
600 kPa
550 kPa
500 kPa
450 kPa
400 kPa
350 kPa
300 kPa
250 kPa
200 kPa
150 kPa
100 kPa
50 kPa
0 kPa
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
Flow Rate (LPM)


Pressure / Flow Rate at FH 09
Residual Pressure (kPa)
550 kPa
500 kPa
450 kPa
400 kPa
350 kPa
300 kPa
250 kPa
200 kPa
150 kPa
100 kPa
50 kPa
0 kPa
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
Flow Rate (LPM)


Pressure / Flow Rate at FH 13
Residual Pressure (kPa)
550 kPa
500 kPa
450 kPa
400 kPa
350 kPa
300 kPa
250 kPa
200 kPa
150 kPa
100 kPa
50 kPa
0 kPa
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
Flow Rate (LPM)


Pressure / Flow Rate at FH 04
Residual Pressure (kPa)
600 kPa
550 kPa
500 kPa
450 kPa
400 kPa
350 kPa
300 kPa
250 kPa
200 kPa
150 kPa
100 kPa
50 kPa
0 kPa
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
Flow Rate (LPM)

APPENDIX IV- IN-SITU INFILTRATION TESTS


Trofino Door & Trim
A.T.C. Corral
Anderson Blvd
Townline Self Storage
47
123 Durham Regional Hwy 47
Stanmore Equipment
INF102
INF101
INF103
INF104

Engineering Technologies Canada Ltd.

OWNER'S NAME: _____

SITE LOCATION: 123 Durham Regional Hwy 47

PID #: _____

TEST PIT#: INF101

TECHNICIAN: Leng

DATE: June 16 2023

WEATHER/TEMPERATURE: Cloudy, 22C

FIELD PERMEABILITY TEST #:

D - reservoir diameter (cm)	Standard	Soil Texture	Clayey sand
d - well hole diameter (cm)		Soil Structure	
H - height of water in well (cm)		α*(cm-1)	
Depth below ground surface(cm)		C - Factor	

TIME (min)	(1)CHANGE IN TIME (min)	RESERVOIR WATER LEVEL (WL) (cm)	(2)CHANGE IN WL (cm)	(2) / (1) RATE OF FALL (R) (cm/min)
0		39.9		
1	1	39.7	0.2	0.2
2	1	39.5	0.2	0.2
3	1	39.3	0.2	0.2
4	1	39	0.3	0.3
5	1	38.8	0.2	0.2
6	1	38.6	0.2	0.2
7	1	38.3	0.3	0.3
8	1	38.1	0.2	0.2
9	1	37.9	0.2	0.2
10	1	37.7	0.2	0.2

uasi Steady-State Rate of Fall(R) = 0.2 cm/min

Engineering Technologies Canada Ltd.

OWNER'S NAME: _____

SITE LOCATION: 123 Durham Regional Hwy 47

PID #: _____

TEST PIT#: INF102

TECHNICIAN: Leng

DATE: June 16 2023

WEATHER/TEMPERATURE: Cloudy, 18C

FIELD PERMEABILITY TEST #:

D - reservoir diameter (cm)	Slow tube	Soil Texture	Sandy clay
d - well hole diameter (cm)		Soil Structure	
H - height of water in well (cm)		α*(cm-1)	
Depth below ground surface(cm)		C - Factor	

TIME (min)	(1)CHANGE IN TIME (min)	RESERVOIR WATER LEVEL (WL) (cm)	(2)CHANGE IN WL (cm)	(2) / (1) RATE OF FALL (R) (cm/min)
0		24.7		
5	5	24.9	-0.2	0.0
10	5	24.5	0.4	0.08
15	5	24.2	0.3	0.06
20	5	24.1	0.1	0.02
25	5	24	0.1	0.02
30	5	23.9	0.1	0.02
35	5	23.8	0.1	0.02
40	5	23.7	0.1	0.02
45	5	23.6	0.1	0.02
50	5	23.5	0.1	0.02
55	5	23.4	0.1	0.02
60	5	23.3	0.1	0.02

uasi Steady-State Rate of Fall(R) = 0.02 cm/min

Engineering Technologies Canada Ltd.

OWNER'S NAME: _____

SITE LOCATION: 123 Durham Regional Hwy 47

PID #: _____

TEST PIT#: INF103

TECHNICIAN: Leng

DATE: June 16 2023

WEATHER/TEMPERATURE: Cloudy, 18C

FIELD PERMEABILITY TEST #:

D - reservoir diameter (cm)	Standard	Soil Texture	Clayey sand
d - well hole diameter (cm)		Soil Structure	
H - height of water in well (cm)		α*(cm-1)	
Depth below ground surface(cm)		C - Factor	

TIME (min)	(1)CHANGE IN TIME (min)	RESERVOIR WATER LEVEL (WL) (cm)	(2)CHANGE IN WL (cm)	(2) / (1) RATE OF FALL (R) (cm/min)
0		42.9		
1	1	42.8	0.1	0.1
2	1	42.7	0.1	0.1
3	1	42.6	0.1	0.1
4	1	42.5	0.1	0.1
5	1	42.4	0.1	0.1
6	1	42.3	0.1	0.1
7	1	42.2	0.1	0.1
8	1	42.1	0.1	0.1
9	1	42	0.1	0.1
10	1	41.9	0.1	0.2
11	1	41.9	0.0	0.0
12	1	41.8	0.1	0.1
13	1	41.7	0.1	0.1
14	1	41.6	0.1	0.1
15	1	41.5	0.1	0.1

uasi Steady-State Rate of Fall(R) = 0.1 cm/min

Engineering Technologies Canada Ltd.

OWNER'S NAME: _____

SITE LOCATION: 123 Durham Regional Hwy 47

PID #: _____

TEST PIT#: INF104

TECHNICIAN: Leng

DATE: June 16 2023

WEATHER/TEMPERATURE: Cloudy, 22C

FIELD PERMEABILITY TEST #:

D - reservoir diameter (cm)	Standard	Soil Texture	Clayey sand
d - well hole diameter (cm)		Soil Structure	
H - height of water in well (cm)		α*(cm-1)	
Depth below ground surface(cm)		C - Factor	

TIME (min)	(1)CHANGE IN TIME (min)	RESERVOIR WATER LEVEL (WL) (cm)	(2)CHANGE IN WL (cm)	(2) / (1) RATE OF FALL (R) (cm/min)
0		32		
1	1	31.9	0.1	0.1
2	1	31.7	0.2	0.2
3	1	31.5	0.2	0.2
4	1	31.3	0.2	0.2
5	1	31.1	0.2	0.2
6	1	30.9	0.2	0.2

uasi Steady-State Rate of Fall(R) = 0.2 cm/min

APPENDIX V –STORMWATER DRAINAGE PLAN