Functional Servicing Report

Mapleview Friday Corporation

947 Mapleview Drive East
Barrie, Ontario

PEARSON ENGINEERING

PEARSONENG.COM

January 2022

19057

City of Barrie File No.
D28-063-2021

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Functional Servicing Report
mapleview friday corporation, Barrie

1. Introduction

PEARSON Engineering Ltd. (PEARSON) has been retained by Mapleview Friday Corporation (Client) to provide engineering services for the Residential Development located at 947 Mapleview Drive East in the Hewitts Annexed Lands in the City of Barrie (City). The subject property is bound by Mapleview Drive East to the north and future residential subdivisions to the east, south and west and can be seen in Figure 1.

The subject site is approximately 1.05 ha in size fronts onto Mapleview Drive East to the north and farmland to the east, west and south. The subject site is currently vacant and slopes gently from north to south away from Mapleview Drive.

This report assesses the existing municipal infrastructure in the vicinity of the Project, the Stormwater Management (SWM) facilities and internal services required to service the proposed Project. The report also includes design calculations and a brief outline of the proposed internal services, as well as comments regarding the ability of the various secondary utilities to service the site. This review has been completed in conjunction with the Hewitt's Secondary Plan Area SIS and servicing concepts have been reviewed with the Landowner's Group and neighbouring subdivision stakeholders.

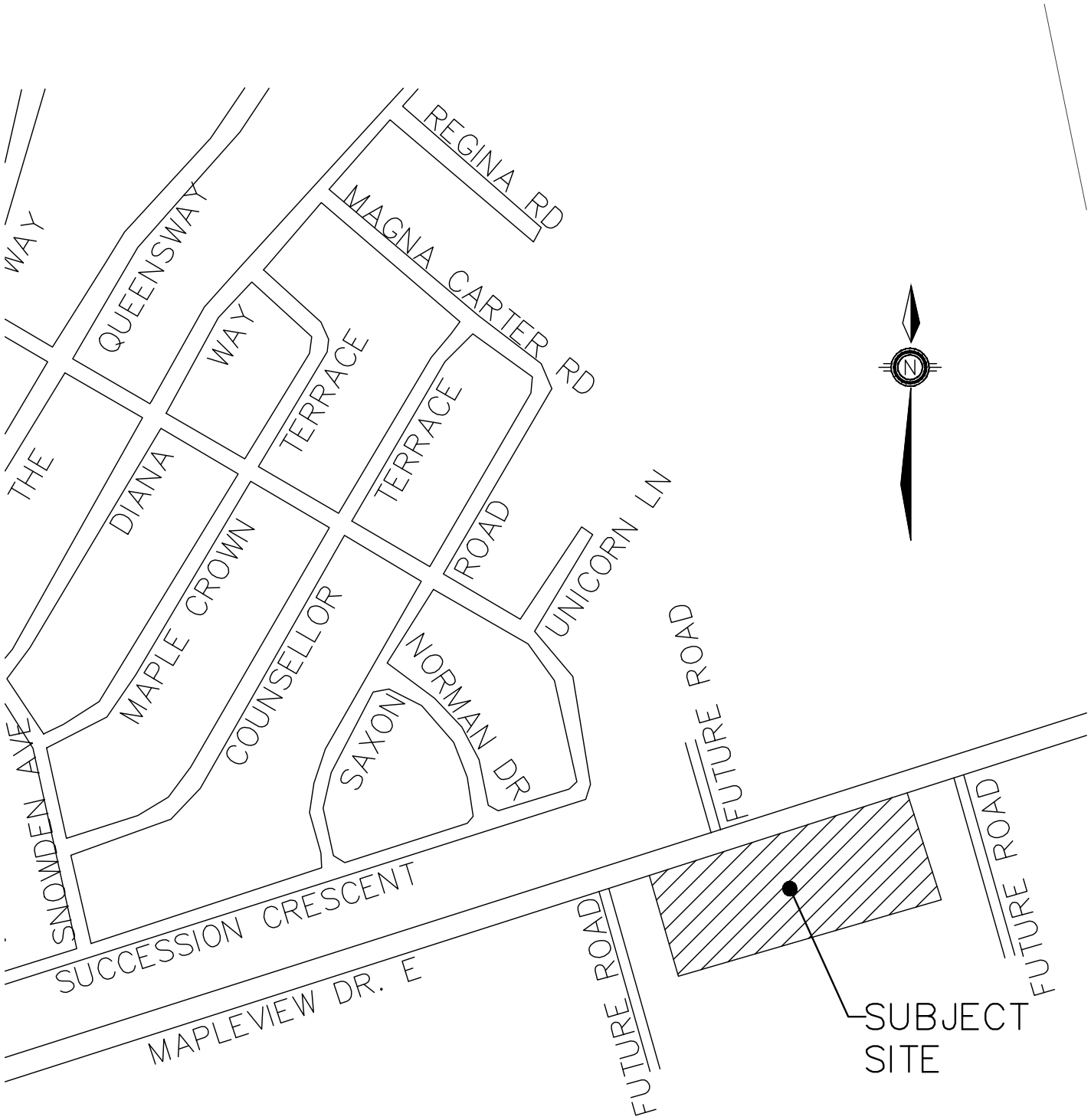
2. Supporting Documents

The following documents have been referenced in the preparation of this report:

- Ministry of the Environment, Design Guidelines for Sewage Works – 2008
- Ministry of the Environment, Design Guidelines for Drinking-Water Systems - 2008
- Ministry of the Environment, Stormwater Management Planning and Design Manual, March 2003
- City of Barrie, Sanitary Design Policy and Guidelines
- City of Barrie, Urban Design Manual
- City of Barrie, Storm Drainage and Stormwater Management Policies and Design Guidelines.
- Lake Simcoe Region Conversation Authority Technical Guidelines for Stormwater Management Submissions, September 2016

3. Design Population

The proposed development is to consist of a 6-storey residential building with a total of 96 units, including 15 lofts, 55 one-bedroom, 26 two-bedroom and a tenant (commercial) area of approximately 293 m². Based on City of Barrie residential flows data, a design population of 2.57 persons per unit for the townhouse units and 1.67 persons per unit for the apartments has been utilized. This results in a maximum projected design population of 170 persons for the development. Refer to Appendix A for calculations.



MAPLEVIEW FRIDAY CORPORATION
947 MAPLEVIEW DRIVE EAST
BARRIE, ON

SITE LOCATION PLAN

PEARSON ENGINEERING
PEARSONENG.COM PH. 705.719.4785

DESIGNED BY	AMC	HORIZ SCALE	NTS	PROJECT #	19057
DRAWN BY	AMC	VERT SCALE	NTS	DRAWING #	FIG-1
CHECKED BY	MWD	DATE	JULY 2019	REVISION #	0

4. Water Supply and Distribution

4.1. Water Servicing Design Criteria

The site is to have a total population of 170 persons plus 293 m² of commercial space. Utilizing the City of Barrie Guidelines for Domestic Water Use of 225 L/capita/day and Commercial Water Use of 28000 L/ha/d, an Average Day Demand (ADD) of 0.45 L/s and a Commercial Demand of 0.01 L/s is required for the development. The Peak Rate factor of 7.40 was used in calculating a Peak Hour Demand (PHD) of 3.35 L/s for the development. Calculations for the domestic and commercial water requirements for the site can be found in Appendix A.

4.2. Internal Water Distribution System

The Project will be serviced by municipal water for domestic and fire service and designed as per City standards. A new 300 mm diameter municipal watermain has been installed as part of the Mapleview Drive East works and is currently in final commissioned (June 2021) through R.J. Burnside & Associates Limited (Burnside) and the Landowner's Group. The site will be serviced by connecting to the existing 300 mm diameter watermain with a 150 mm diameter domestic service connection and a 250 mm diameter fire service connection.

As per the direction of the Landowner's Group, Schaeffer's Engineering reviewed the existing watermain distribution system with respect to the City's water treatment and supply capacity to ensure the water treatment plant has allocation for the proposed development. Fire flow requirements were calculated with the FUS method based on the available information and the report recommends a fire watermain connection size of 250mm to adequately service the development. Detailed water supply report can be found in Appendix D. The proposed layout of the watermain can be seen on Figure 2 – Water Servicing Plan.

5. Sanitary Servicing

5.1. Sanitary Design Criteria

The site is to have a total population of 170 persons plus 293 m² commercial. Utilizing the City of Barrie Guidelines for domestic sewer use of 225 L/capita/day and Commercial Water Use of 28000 L/ha/d, an Average Daily Flow (ADF) of 0.45 L/s and commercial flow of 0.01 L/s was calculated. Using a Peaking Factor of 4 and an infiltration allowance of 0.24 L/s/ha, a total peak flow of 2.05 L/s was calculated for the project site.

5.2. Internal Sanitary Sewer System

The sanitary sewers will be constructed in accordance with the City of Barrie's Engineering Standards and the Ministry of the Environment, Conservation and Parks (MECP) guidelines in order to service the Project. The proposed sanitary sewer system for this Project is to convey sanitary flow to the proposed sanitary sewer on Mapleview Drive East. The sanitary system will drain by a 200 mm diameter gravity sanity sewer to a proposed manhole inside the site before draining to the new proposed infrastructure in Mapleview Drive East. Refer to Figure 3 – Sanitary Servicing Plan for the proposed sanitary servicing layout. Design coordination with the Phase 2 sewer design has been completed.

We suggest that the City review the sanitary design flow from this Project with respect to the City's sanitary treatment capacities and confirm that capacity allocation is available for this development.

LEGEND

SITE BOUNDARY
FIRE HYDRANT
WATER VALVE
WATERMAIN
WATER SERVICE

DOMESTIC AND FIRE SERVICE CONNECTIONS TO EX. 300mm PVC W/M BY TAPPING SLEEVE AND VALVE

MAPLEVIEW DRIVE EAST

PROP. 3.0m MULTI USE TRAIL

EX. 300mmØ PVC WM

m Ø WATERMAIN

DOMESTIC AND FIRE SERVICES TO BE TERMINATED ON P/L WITH A CAP C/W 50mm BLOW OFF ON EACH SERVICE BOTH SERVICES TO BE MECHANICALLY RETRAINED FROM W/M TO P/L

PROP. 250mmØ FIRE SERVICE
PROP. 150mmØ DOMESTIC SERVICE

900sm WIDENING

PROP. 3.0m CONC SIDEWALK

LANDSCAPE BUFFER

NOTE: BUILDING FOOTINGS TO BE OUTSIDE OF THE AREA OF INFLUENCE FOR MUNICIPAL SANITARY MAIN. REFER TO STRUCTURAL DETAILS

RESIDENTIAL TOWNHOUSES
FFE 260.95

COMMERCIAL
FFE 261.15

CONCRETE SIDEWALK

CONCRETE SIDEWALK

LIMITS OF UPPER LEVEL

RESIDENTIAL TOWNHOUSES
FFE 260.50

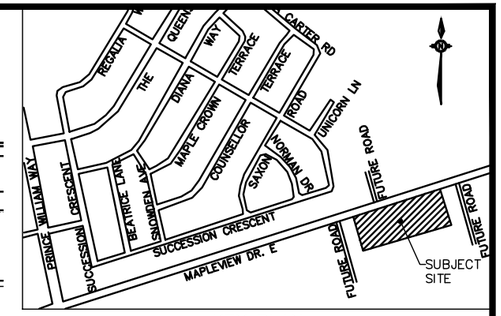
LIMITS OF UPPER LEVEL

LOADING ZONE

MULTI-USE TRAIL

MULTI-USE TRAIL

GARAGE



KEY PLAN
NTS

BENCHMARK
ELEVATION NOTE
ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE DERIVED USING GPS TECHNOLOGY AND THE CAN-NET VRS NETWORK. LOCAL TBM IS THE TOP OF THE SIB LOCATED AT THE NORTH WEST CORNER OF THE PROPERTY HAVING AN ELEVATION OF 258.62
BEARING NOTE
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NO.	REVISION NOTE	DATE	BY

MAPLEVIEW FRIDAY CORPORATION
947 MAPLEVIEW DRIVE EAST
BARRIE, ON

WATER SERVICING PLAN

PEARSON ENGINEERING
PEARSONENG.COM PH. 705.719.4785

DESIGNED BY	AMC	HORIZ SCALE	1:500	PROJECT #	19057
DRAWN BY	AMC	VERT SCALE		DRAWING #	FIG-2
CHECKED BY	MWD	DATE	JULY 2019	REVISION #	0

LEGEND

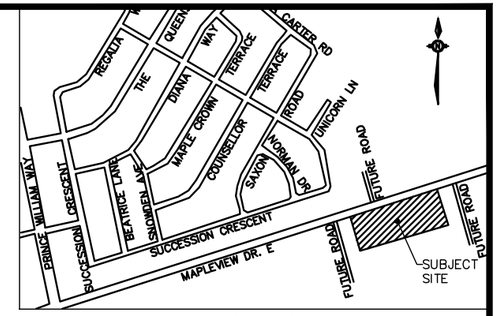
- SITE BOUNDARY
- MH — EX SANITARY MANHOLE
- SAN MH — PROP SANITARY MANHOLE
- SANITARY SEWER

MAPLEVIEW DRIVE EAST

PROP. 3.0m MULTI USE TRAIL

EX. 34.6m – 200mmø SAN.

EX. 37.5m – 200mmø SAN.



KEY PLAN
NTS

SAN SAH33885 (1200mmø)
T/G 260.98
W INV. 252.55
E INV. 252.58
S INV. 254.18
N INV. 255.43

58.9m – 450mmø SAN. @ 0.40% (BY OTHERS)

SAH33883

9.05m WIDENING

98.8m – 450mmø SAN. @ 0.40% (BY OTHERS)

2.7m – 200mmø SAN. @ 2.20% (BY OTHERS)

CONNECT TO SAN PLUG
N. INV 254.24

2.9m – 200mmø SAN. @ 2.20%

PROP. 3.0m CONC SIDEWALK

LANDSCAPE BUFFER

NOTE: BUILDING FOOTINGS TO BE OUTSIDE OF THE AREA OF INFLUENCE FOR MUNICIPAL SANITARY MAIN. REFER TO STRUCTURAL DETAILS

RESIDENTIAL TOWNHOUSES
FFE 260.95

COMMERCIAL
FFE 261.15

SAN CAP
INV. 259.00

9.3m – 200mmø SAN. @ 10.00%

SAN MH1 (1200mmø)
c/w DROP STRUCTURE
T/G 260.97
N INV. 254.30
SW INV. 258.07

CONCRETE SIDEWALK

CONCRETE SIDEWALK

LIMITS OF UPPER LEVEL

RESIDENTIAL TOWNHOUSES
FFE 260.50

LIMITS OF UPPER LEVEL

LOADING ZONE

MULTI-USE TRAIL

MULTI-USE TRAIL

GARAGE

BENCHMARK
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NO.	REVISION NOTE	DATE	BY

MAPLEVIEW FRIDAY CORPORATION
947 MAPLEVIEW DRIVE EAST
BARRIE, ON

SANITARY SERVICING PLAN

PEARSON ENGINEERING
PEARSONENG.COM PH. 705.719.4785

DESIGNED BY	AMC	HORIZ SCALE	1:500	PROJECT #	19057
DRAWN BY	AMC	VERT SCALE		DRAWING #	FIG-3
CHECKED BY	MWD	DATE	JULY 2019	REVISION #	0

6. Stormwater Management

A key component of the development is the need to address environmental and related SWM issues. These are examined in a framework aimed at meeting the City, Lake Simcoe Region Conservation Authority (LSRCA) and Ministry of the Environment, Conservation and Parks (MECP) requirements. SWM parameters have evolved from an understanding of the location and sensitivity of the site's natural systems. This FSR focuses on the necessary measures to satisfy the MECP's SWM requirements.

It is understood the objectives of the SWM plan are to:

- Protect life and property from flooding and erosion
- Maintain water quality for ecological integrity, recreational opportunities etc.
- Protect and maintain groundwater flow regime(s).
- Protect aquatic and fishery communities and habitats.
- Maintain and protect significant natural features.

6.1. Analysis Methodology

The design of the SWM Facilities for this site has been conducted in accordance with:

- The Ministry of the Environment Stormwater Management Planning and Design Manual, March 2003
- City of Barrie, Storm Drainage and Stormwater Management Policies and Design Guidelines, December 2017
- Lake Simcoe Region Conversation Authority Technical Guidelines for Stormwater Management Submissions, September 2016

In order to design the facilities to meet City, LSRCA and MECP requirements, it is essential to select the appropriate modeling methodology for the storm system design. Given the size of the site, the Modified Rational Method is appropriate for the design for the SWM system.

6.2. Proposed Storm Drainage System

The Hewitt's Landowner's SIS designated the Project site as part of the Phase 1 lands, as seen in Burnside drawing Figure 11 in Appendix C, as part of catchment area 12 which was designated to the SWMF#12 which is part of the Phase 3 development. Through discussions with the Landowner's Group, Burnside Engineering and Schaffer's Engineering we are proposing primarily draining to SWMF#11. Flows from the Project site have been allowed for in Schaffer's latest submission for 883 Mapleview Drive East and design requirements have been coordinated with Burnside Engineering for the pipe crossing Mapleview Drive East that is taking flows from 970 Mapleview to SWMF#11.

The total impervious area of the site has increased as the current site is undeveloped. The pre-development CN is 60 and post-development is 96. Calculations are provided for in Appendix B.

According to Schaffer's SWM Report for 883 Mapleview and the SWMF#11 the pond has been sized to accommodate flows from 42.08 ha of drainage area, of which this Project site is contributing 0.96 ha. The Schaffer's figures 2.2 and 2.3 showing the Project site included to SWMF#11 for both Minor and Major systems can be found in Appendix C.

As SWMF#11 has been sized to accommodate the flows and includes centralized LID measures at the pond, no onsite controls have been implemented for quantity control or quality control.

Figure 5 shows the proposed catchment areas. Catchment areas 2 to 4 will be sent to SWMF#11 through the Mapleview Drive East connection. Catchment area 1 will drain overland to Street 'C' in the Mapleview South subdivision to SWMF#12 as originally designated, which is only 6% of the original area to go to that pond. This design is being coordinated with Jones Engineering as that subdivision design is currently underway.

6.3. Volume Control

Since the project site meets the definition of Major Development as per LSRCA Guidelines, considerations were taken to meet the volume control criteria detailed in section 2.2.2. The LSRCA guidelines state that for a new development that creates 0.50 ha or more of impervious surfaces, 25 mm of runoff over the total impervious area of the site is to be retained and treated on site, with flexible alternatives if this criterion cannot be met. The 25 mm storm event over the site's impervious area is a total volume of 188.25 m^3, which is accounted for in the SWMF#11 as per the Schaffer's SWM Report.

The Schaffer's SWM Report identifies that in order to meet the LSRCA volumetric control requirements, a perforated pipe infiltration system has been proposed adjacent to the SWMF#11. As part of the volumetric control the extended detention volume from the pond will also discharge to the Sand Filtration Bed as outlined in the Schaffer's SWM Report.

6.4. Water Balance

Since the post development state will increase the imperviousness of the site, considerations were taken in regards to groundwater recharge. Under pre-development conditions, the project site had an annual recharge volume of 1942 m^3. With the increased imperviousness of the site, this recharge will be reduced to 547 m^3, resulting in a deficit volume of 1,395 m^3.

In order to infiltrate the deficit of 1,395 m^3, the building will drain into a bioretention filter facility which is sized to infiltrate the 25 mm storm from the rooftop area.

Water balance calculations demonstrate that 24 m^3 of infiltration is required in order to infiltrate the annual deficit of 1,395 m^3, however City of Barrie minimum criteria is 5 mm across the total development area resulting in a minimum volume of 48 m^3. This volume can be achieved in the bioretention area. Preliminary infiltration was reviewed by PML and in-situ testing will be initiated for the FSR design level once initial site concept is approved. Ongoing groundwater monitoring is being completed by PML with the latest readings completed May 26, 2020 with readings 2.4m to 4.1m below existing grade, which is consistent with the readings completed in 2019. Calculations can be found in Appendix B and further calculations will be completed at detailed design.

6.5. Phosphorus Calculations

Local conservation authorities have determined the importance of reducing phosphorus levels in water courses in this area. The reduction was based on conservative values derived from the LSRCA. As such, best efforts are to be employed in order to reduce phosphorus levels to pre-development levels or better.

The existing site generates approximately 0.18 kg of phosphorus annually and the proposed Project will generate approximately 1.19 kg of phosphorus annually if uncontrolled. Best efforts will be used in order to reduce the phosphorus loading as much as is reasonably possible.

MAPLEVIEW DRIVE EAST

LEGEND

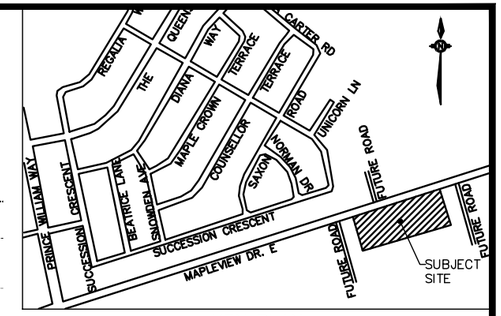
SITE BOUNDARY

OVERLAND FLOW DIRECTION

CATCHMENT BOUNDARY

CATCHMENT AREA: 1 | 0.75 | 1.00 ha — RUNOFF COEFFICIENT

AREA IN HECTARES



KEY PLAN
NTS

EX C/L DITCH

EX C/L ROAD

EX EDGE OF PAVEMENT

EX 13.8m 675ø CONC.STM @ 0.8% (TO BE REMOVED)

EX STM MH (TO BE REMOVED)
W INV 256.13
N INV 256.24
S INV 257.23

EX STM MH

EX 0.4mø CULVERT (TO BE REMOVED)
W INV 258.22
E INV 258.15

EX 4.5m 450ø C.STM @ 0.35% (TO BE REMOVED)

EX 0.4mø CULVERT
W INV 259.98
E INV 260.06

EX 0.4mø CULVERT
W INV 260.28
E INV 260.22

EX GRAVEL DRIVE

ASPHALT DRIVE

MAILBOX

GW

BPED

TREED AREA

EX. DITCH INLET CATCHBASIN (TO BE REMOVED)
GRATE 258.39
N INV 257.25

1 | 0.16 | 0.96 ha

EX TREED AREA

GARAGE

258.50 259.00 259.50 260.00 260.50

BENCHMARK
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NO.	REVISION NOTE	DATE	BY

MAPLEVIEW FRIDAY CORPORATION
947 MAPLEVIEW DRIVE EAST
BARRIE, ON

PRE-DEVELOPMENT STORM DRAINAGE PLAN

PEARSON ENGINEERING
PEARSONENG.COM PH. 705.719.4785

DESIGNED BY	AMC	HORIZ SCALE	1:500	PROJECT #	19057
DRAWN BY	AMC	VERT SCALE		DRAWING #	FIG-4
CHECKED BY	MWD	DATE	JULY 2019	REVISION #	0

LEGEND

SITE BOUNDARY

OVERLAND FLOW DIRECTION

CATCHMENT BOUNDARY

CATCHMENT AREA — 1 | 0.75 | 1.00 ha — RUNOFF COEFFICIENT — AREA IN HECTARES

UG

MAPLEVIEW DRIVE EAST

15.9m – 200mmø STM. @ 0.63%

PROP. 3.0m MULTI USE TRAIL

18.1m – 1200mmø STM. @ 3.92%

EX. 13.8m 675ø CONC.STM @ 0.8% (TO BE REMOVED)

EX STM MH (TO BE REMOVED) W INV 256.13 N INV 256.24 S INV 257.13

STM MH1106

83.5m – 1200mmø STM. @ 1.26%

7.7m – 1200mmø STM. @ 0.39%

21.5m – 525mmø

76.0m – 1200mmø STM. @ 0.49%

STM MH1107

STM MH4 (1500mmø)
T/G 259.37
S INV. 256.72

1200mmø STM INV. 256.07

17.6m – 600mmø STM. @ 2.46%

EX. 4.5m 450ø C.STM @ 0.35% BE REMOVED)

9.05m WIDENING

PROP. 3.0m CONC SIDEWALK

LANDSCAPE BUFFER

STM MH1
T/G 259.42
S INV. 257.12
N INV. 257.15

EX. DITCH INLET CATCHBASIN (TO BE REMOVED) GRATE 258.39 N INV 257.25

NOTE: BUILDING FOOTINGS TO BE OUTSIDE OF THE AREA OF INFLUENCE FOR MUNICIPAL SANITARY MAIN. REFER TO STRUCTURAL DETAILS

RESIDENTIAL TOWNHOUSES FFE 260.95

COMMERCIAL FFE 261.15

PROP 0.25m WIDE FLAT BOTTOM SWALE

CONCRETE SIDEWALK

CONCRETE SIDEWALK

51.8m – 600mmø STM. @ 0.50%

RESIDENTIAL TOWNHOUSES FFE 260.50

LIMITS OF UPPER LEVEL

3 | 0.92 | 0.42 ha

LIMITS OF UPPER LEVEL

2 | 0.89 | 0.30 ha

STM CB2
T/G 260.00
S INV. 258.19

PROP SUBDRAIN

STM CB1
T/G 260.00
S INV. 258.84

PROP SUBDRAIN

6.9m – 375mmø STM. @ 1.00%

50.1m – 375mmø STM. @ 1.00%

7.4m – 375mmø STM. @ 1.00%

STM MH2 (1200mmø)
T/G 260.09
N INV. 258.12
SW INV. 258.05
E INV. 258.12

STM MH1 (1200mmø)
T/G 260.14
W INV. 258.62
N INV. 258.77

4 | 0.29 | 0.08 ha

LOADING ZONE

32.5m – 525mmø STM. @ 0.90%

18.0m – 525mmø STM. @ 0.89%

1 | 0.34 | 0.16 ha

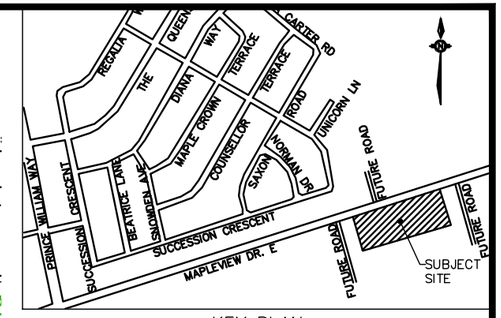
MULTI-USE TRAIL

MULTI-USE TRAIL

STM CBMH2 (1200mmø)
T/G 259.90
E INV. 257.53
N INV. 257.38

STM MH3 (1500mmø)
T/G 260.24
NE INV. 257.89
W INV. 257.82

GARAGE



KEY PLAN
NTS

BENCHMARK
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MAPLEVIEW FRIDAY CORPORATION
947 MAPLEVIEW DRIVE EAST
BARRIE, ON

POST DEVELOPMENT STORM CATCHMENT PLAN

PEARSON ENGINEERING
PEARSONENG.COM PH. 705.719.4785

DESIGNED BY	AMC	HORIZ SCALE	1:500	PROJECT #	19057
DRAWN BY	AMC	VERT SCALE		DRAWING #	FIG-5
CHECKED BY	MWD	DATE	JULY 2019	REVISION #	0

LEGEND

- SITE BOUNDARY
- 254.63 PROPOSED ELEVATION
- 254.09 EXISTING ELEVATION
- 1.5% PROPOSED GRADE

MAPLEVIEW DRIVE EAST

PROP. 3.0m MULTI USE TRAIL

STM MH1106

STM MH1107

EX STM MH

BPED

PROP. 3.0m CONC SIDEWALK

LANDSCAPE BUFFER

NOTE: BUILDING FOOTINGS TO BE OUTSIDE OF THE AREA OF INFLUENCE FOR MUNICIPAL SANITARY MAIN. REFER TO STRUCTURAL DETAILS

RESIDENTIAL TOWNHOUSES FFE 260.95

COMMERCIAL FFE 261.15

CONCRETE SIDEWALK

LIMITS OF UPPER LEVEL

RESIDENTIAL TOWNHOUSES FFE 260.50

LIMITS OF UPPER LEVEL

GRADING ZONE

MULTI-USE TRAIL

GARAGE

4.33m

4.14m

259.38 259.18 | 259.50 259.36 | 259.66 259.54 | 259.78 259.74 | 259.91 259.93 | 260.17 260.16 | 260.43 260.44 | 260.69 260.79 | 260.96

259.57 258.62 | 259.86 259.00 | 260.02 259.24 | 261.15 259.91

259.07 258.82 | 259.42 258.62 | 260.50 | 260.50 | 261.15 | 261.75

259.76 258.75 | 259.51 | 259.83 258.71 | 259.63 | 259.95 258.85 | 259.75 | 260.07 258.98

260.45 | 260.30 | 260.50 | 260.32 | 260.95 | 261.15 | 260.95

260.00 | 260.00 | 260.00 | 260.00

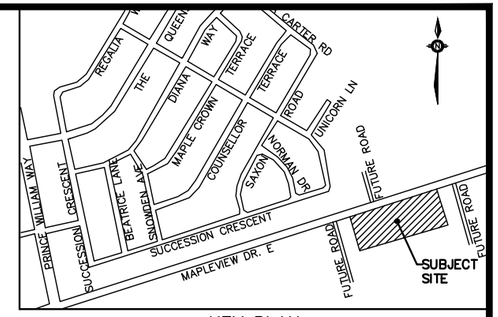
259.86 | 260.50 259.30 | 260.30 258.82 | 260.23 | 260.30 | 260.19 258.98 | 260.03 259.19 | 260.38 | 259.91 259.04 | 259.80 258.84 | 259.69 258.93 | 259.58 259.52 | 260.50 | 260.55 | 260.08 | 258.96

260.18 259.78 | 259.41 259.32

1.0% | 1.1% | 3.8% | 5.1%

259.00 | 258.50 | 260.50 | 261.00

KEY PLAN NTS



BENCHMARK

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947 MAPLEVIEW DRIVE EAST
BARRIE, ON

SITE GRADING PLAN

PEARSON ENGINEERING
PEARSONENG.COM PH. 705.719.4785

DESIGNED BY	AMC	HORIZ SCALE	1:500	PROJECT #	19057
DRAWN BY	AMC	VERT SCALE		DRAWING #	FIG-6
CHECKED BY	MWD	DATE	JULY 2019	REVISION #	0

To minimize the amount of phosphorus discharged from the site, a treatment train approach is to be utilized. Rooftop runoff and stormwater runoff from the parking lot will be conveyed to a bioretention trench as well as catch basins complete with sumps to capture larger particles. Storm runoff will be infiltrated in the bioretention area to reduce post-development peak flows and phosphorous levels. The downstream SWMF will also provide additional removal.

The following Table 3 details the anticipated phosphorus loadings for the pre and post-development conditions.

Table 3: Phosphorus Loadings

	Total P (kg)
Pre-Development	0.18
Uncontrolled Post-Development	1.19
Controlled Post-Development	0.37

The post-development site has an increase of total phosphorus. Detailed calculations can be found in Appendix B.

7. Secondary Utilities

Given the location of the subject site and discussions with the Landowner's Group engineering team, it is anticipated that secondary utilities (hydro, cable, phone and gas will be readily available to service the site. This will be investigated further in the near future and utilities will be contacted as the project progresses.

8. Conclusions

A 250mm diameter watermain connection will be provided for the project as per the Infowater Modeling Brief by Schaffers.

The SWM design for this project considers the existing site conditions have been proposed for volume control.

Low Impact Development features will be implemented in order to reduce the post development phosphorous loading for the site, as well as improve the site's stormwater quality. Rooftop infiltration is proposed to achieve water balance for the site.

The analysis and conceptual design outlined in this report demonstrates that the servicing is feasible.

All of which is respectfully submitted,

Pearson Engineering Ltd.

Taylor Arkell, P. Eng
Senior Project Manager

Gary Pearson, P.Eng.
Principal

Appendix A

Water and Sanitary Servicing Calculations

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947 Mapleview Drive East
Water Flow Calculations

Design Criteria

Demand per capita (Q):	225 L/cap/day	
Peak Rate Factor (Max. Hour)	7.40	(Table 3-3: Peaking Factors, MOE Design Guidelines for Drinking-Water Systems)
Max. Day Factor	4.9	(Table 3-3: Peaking Factors, MOE Design Guidelines for Drinking-Water Systems)

Site Data

Description	Density	Units	Flow Rate	Peaking Factors
Loft	2.34 people/unit	15 units	225 L/cap/d	MAX DAY FACTOR* 4.90
Apartment	1.67 people/unit	81 units	225 L/cap/d	
Commerical	293 m²	1 unit	28,000 L/ha/d	PEAK RATE FACTOR* 7.40
				*From MOE Manual based on Population of 150

Calculate Population

Pop. Townhouses	=	2.34	x	15				
Pop. Apartments	=	1.67	x	81				
Pop. Total	=	170	people					

Calculate Average Day Demand (ADD)

ADD	=	225	x	170	+	2.8	x	293
ADD	=	39,154	L/day					
ADD	=	0.45	L/s					

Calculate Commercial Flows

$Q_{Commercial}$	=	0.03	x	28,000
	=	820	L/day	
	=	0.01	L/s	

Calculate Max Day Flow

MDF	=	0.45	x	4.90
MDF	=	2.22	L/s	

Calculate Peak Hour Demand

PHD	=	0.45	x	7.40
PHD	=	3.35	L/s	

947 Mapleview Drive East
Sanitary Flow Calculations

Design Criteria

Flow per capita (Q):	225 L/cap/day	
Peak Flow	7.4	(Table 3-3: Peaking Factors, MOE Design Guidelines for Drinking-Water Systems)
Peaking Factor (Harmon Formula)	4.9	(Table 3-3: Peaking Factors, MOE Design Guidelines for Drinking-Water Systems)
		Where: 2 <= "M" <= 4

Site Data

Description	Density	Units	Flow Rate
Loft	2.34 people/unit	15 units	225 L/cap/d
Apartment	1.67 people/unit	81 units	225 L/cap/d
Commerical	293 m²	1 unit	28,000 L/ha/d

Calculate Population

Pop. Townhouses	=	2.34	x	15
Pop. Apartments	=	1.67	x	81
Pop. Total	=	170	people	

Calculate Commercial Flows

$Q_{Commercial}$	=	0.0293	x	28,000
	=	820	L/day	
	=	0.01	L/s	

Calculate Average Daily Flows

ADF (L/s)	=	225	x	170	+	820
ADF (L/s)	=	39,154	L/day			
ADF (L/s)	=	0.45	L/s			

Calculate Peaking Factor

$$M = 1 + \frac{14}{4 + \left(\frac{170}{1{,}000}\right)^{0.5}} + 0.1 * 0.12$$

M	=	4.18	
		Use Max Peaking Factor 4	

Infiltration allowance as per Barrie standards :

Infiltration Allowance	=	0.23	x	1.05
	=	0.24	L/s	

Calculate Peak Flow

Qp	=	0.45	x	4.00
	=	1.81	L/s	
Qp (Inc. Infiltration Allowance)	=	2.05	L/s	

Appendix B

Stormwater Management Calculation

947 Mapleview Drive East
Calculation of Runoff Coefficients

Runoff Coefficient	=	0.15	0.95	0.95	0.60	0.95		Weighted
Surface Cover	=	Grass	Asphalt	Building	Gravel	Conc.		Runoff Coefficient
Post-Development	Total Area (m^2)	Area (m^2)	Area (m^2)	Area (m^2)	Area (m^2)	Area (m^2)		
1	1692	1284	266	0	0	142		0.34
2	2933	206	2181	369	0	177		0.89
3	4165	144	2223	1596	0	202		0.92
4	838	692	0	0	0	146		0.29
Post Total	9628	2326	4670	1965	0	667		0.76

947 Mapleview Drive East
Calculation of CN Number

Runoff Coefficient	=	59	100	100	100		CN Number
Surface Cover	=	Grass	Asphalt	Building	Conc.		
Pre-Development	Total Area (m^2)	Area (m^2)	Area (m^2)	Area (m^2)	Area (m^2)		
1	7793	7793	0	0	0		59
2	1835	1835	0	0	0		59
Pre Total	9628	9628	0	0	0		59
Post-Development	Total Area (m^2)	Area (m^2)	Area (m^2)	Area (m^2)	Area (m^2)		
1	1692	1284	266	0	142		69
2	2933	206	2181	369	177		97
3	4165	144	2223	1596	202		99
4	838	692	0	0	146		66
Post Total	9628	3014	4670	1965	813		96

947 Mapleview Drive East
Post-Development Peak Flows

Barrie

Storm Event (yrs)	Coeff A	Coeff B	Coeff C
2	**678.09**	**4.70**	**0.78**
5	**853.61**	**4.70**	**0.77**
10	**975.87**	**4.70**	**0.76**
25	**1146.28**	**4.92**	**0.76**
50	**1236.15**	**4.70**	**0.75**
100	**1426.41**	**5.27**	**0.76**

Modified Rational Method
Q = CiCIA / 360

Where:

- Q - Flow Rate (m^3/s)
- C - Rational Method Runoff Coefficient
- I - Storm Intensity (mm/hr)
- A - Area (ha.)
- Ci - Peaking Coefficient

	Uncontrolled to Rear	Controlled to Mapleview
Area Number	Area 1	Areas 2 to 4
Area	0.17 ha	0.79 ha
Runoff Coefficient	0.34	0.70
Time of Concentration	10 min	10 min
Return Rate	2 year	2 year
Peaking Coefficient (Ci)	1.00	1.00
Rainfall Intensity	83.1 mm/hr	83.1 mm/hr
Post-Development Peak Flow	0.01 m^3/s	0.13 m^3/s
Return Rate	5 year	5 year
Peaking Coefficient (Ci)	1.00	1.00
Rainfall Intensity	108.9 mm/hr	108.9 mm/hr
Post-Development Peak Flow	0.018 m^3/s	0.168 m^3/s
Return Rate	10 year	10 year
Peaking Coefficient (Ci)	1.00	1.00
Rainfall Intensity	126.5 mm/hr	126.5 mm/hr
Post-Development Peak Flow	0.020 m^3/s	0.195 m^3/s
Return Rate	25 year	25 year
Peaking Coefficient (Ci)	1.10	1.10
Rainfall Intensity	148.2 mm/hr	148.2 mm/hr
Post-Development Peak Flow	0.026 m^3/s	0.251 m^3/s
Return Rate	50 year	50 year
Peaking Coefficient (Ci)	1.20	1.20
Rainfall Intensity	164.2 mm/hr	164.2 mm/hr
Post-Development Peak Flow	0.032 m^3/s	0.304 m^3/s
Return Rate	100 year	100 year
Peaking Coefficient (Ci)	1.25	1.25
Rainfall Intensity	180.2 mm/hr	180.2 mm/hr
Post-Development Peak Flow	0.036 m^3/s	0.347 m^3/s

947 Mapleview Drive East
Phosphorus Budget Calculations

Barrie Creek	Quarry	Cropland	High Intensity Commercial / Industrial	High Intensity Residential
Phosphorus Export (kg/ha/year)	0.08	0.19	1.82	1.32

Pre-Development Condition:

	Quarry	Cropland	High Intensity Commercial / Industrial	High Intensity Residential
Area (ha)	0.00	0.96	0.00	0.00
Total P (kg)	0.00	0.18	0.00	0.00

Total Pre-Development P (kg): 0.18

Post-Development Condition (Uncontrolled):

Total Area	Quarry	Cropland	High Intensity Commercial / Industrial	High Intensity Residential
Area (ha):	0.00	0.00	0.04	0.85
Total P (kg) :	0.00	0.00	0.07	1.12

Total Post-Development (kg): 1.19

Post-Development Condition :

Area draining to SWM Pond	Quarry	Cropland	High Intensity Commercial / Industrial	High Intensity Residential
Area (ha):	0.00	0.00	0.00	0.25
Total P (kg) :	0.00	0.00	0.00	0.33

Area draining to Bioretention trench and SWM Pond	Quarry	Cropland	High Intensity Commercial / Industrial	High Intensity Residential
Area (ha):	0.00	0.00	0.04	0.85
Total P (kg) :	0.00	0.00	0.07	1.12

Sand or Media Filters	
Total P (kg):	1.19
Sand or Media Filters Proficiency (%):	45
P Removed (kg):	0.54
P Remaining (kg):	0.66

Wet Detention Ponds	
Total P (kg):	0.99
Wet Detention Ponds Proficiency (%):	63
P Removed (kg):	0.62
P Remaining (kg):	0.37

Total Site P (kg): 0.37

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947 Mapleview Drive East
Pre Development Water Balance

Catchment Designation	Site			
	Grassed	Impervious	Total	
Area	9628	0	9628	
Pervious Area	9628	0	9628	
Impervious Area	0	0	0	
Infiltration Factors				
Topography Infiltration Factor	0.3	0.3		(From MOE Table 3.1 for Rolling Land)
Soil Infiltration Factor	0.3	0.3		(From MOE Table 3.1 for an average value between Medium combinations of clay and loam and Open sandy loam)
Land Cover Infiltration Factor	0.0	0.2		
MOE Infiltration Factor	0.6	0.8		
Actual Infiltration Factor	0.6	0.8		
Run-Off Coeffiecient	0.4	1.0		
Runoff from Impervious Surfaces*	0.0	0.8		
Inputs (per Unit Area)				
Precipitation	932.9	932.9		(Precipitation values from Environment Canada)
Run-On	0.0	0.0		
Other Inputs	0.0	0.0		
Total Inputs	932.9	932.9		
Outputs (per Unit Area)				
Precipitation Surplus	336.2	746.3	336	
Net Surplus	336.2	746.3	336	
Evapotranspiration	596.7	186.6	597	(Evapotranspiration values from Table 5-2 in the City of Barrie Tier Three Recharge Estimation, dated June 2012)
Infiltration	201.7	0.0	202	
Rooftop Infiltration	0.0	0.0	0	
Total Infiltration	201.7	0.0	202	
Runoff Pervious Areas	134.5	0.0	134	
Runoff Impervious Areas	0.0	746.3	746	
Total Runoff	134.5	746.3	881	
Total Outputs	932.9	932.9	1866	
Difference (Inputs - Outputs)	0.0	0.0	0	
Inputs (Volumes)				
Precipitation	8982	0	8982	
Run-On	0	0	0	
Other Inputs	0	0	0	
Total Inputs	8982	0	8982	
Outputs (Volumes)				
Precipitation Surplus	3236	0	3236	
Net Surplus	3236	0	3236	
Evapotranspiration	5745	0	5745	
Infiltration	1942	0	1942	
Rooftop Infiltration	0	0	0	
Total Infiltration	1942	0	1942	
Runoff Pervious Areas	1295	0	1295	
Runoff Impervious Areas	0	0	0	
Total Runoff	1295	0	1295	
Total Outputs	8982	0	8982	
Difference (Inputs - Outputs)	0	0	0	

Note: Highlighted cells are input cells.

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947 Mapleview Drive East
Post Development Water Balance (No Infiltration)

Catchment Designation	Site				
	Grassed	Impervious	Building	Total	
Area	2326	5337	1965	9628	
Pervious Area	2326	0	0	2326	
Impervious Area	0	5337	1965	7302	
Infiltration Factors					
Topography Infiltration Factor	0.3	0.0	0.0		(From MOE Table 3.1 for Rolling Land)
Soil Infiltration Factor	0.3	0.0	0.0		(From MOE Table 3.1 for an average value between Medium combinations of clay and loam and Open sandy loam)
Land Cover Infiltration Factor	0.0	0.0	0.0		
MOE Infiltration Factor	0.6	0.0	0.0		
Actual Infiltration Factor	0.6	0.0	0.0		
Run-Off Coeffiecient	0.4	1.0	1.0		
Runoff from Impervious Surfaces*	0.0	0.8	0.8		
Inputs (per Unit Area)					
Precipitation	932.9	932.9	932.9	932.9	(Precipitation values from Environment Canada)
Run-On	0	0	0	0	
Other Inputs	0	0	0	0	
Total Inputs	932.9	932.9	932.9	932.9	
Outputs (per Unit Area)					
Precipitation Surplus	336.2	746.3	746.3	647.2	
Net Surplus	336.2	746.3	746.3	647.2	
Evapotranspiration	596.7	186.6	186.6	285.7	(Evapotranspiration values from Table 5-2 in the City of Barrie Tier Three Recharge Estimation, dated June 2012)
Infiltration	201.7	0.0	0.0	48.7	
Rooftop Infiltration	0.0	0.0	0.0	0.0	
Total Infiltration	201.7	0.0	0.0	48.7	
Runoff Pervious Areas	134.5	0.0	0.0	32.5	
Runoff Impervious Areas	0.0	746.3	746.3	566.0	
Total Runoff	134.5	746.3	746.3	598.5	
Total Outputs	932.9	932.9	932.9	932.9	
Difference (Inputs - Outputs)	0.0	0.0	0.0		
Inputs (Volumes)					
Precipitation	2170	4979	1833	8982	
Run-On	0	0	0	0	
Other Inputs	0	0	0	0	
Total Inputs	2170	4979	1833	8982	
Outputs (Volumes)					
Precipitation Surplus	782	3983	1467	6232	
Net Surplus	782	3983	1467	6232	
Evapotranspiration	1388	996	367	2750	
Infiltration	469	0	0	469	
Rooftop Infiltration	0	0	0	0	
Total Infiltration	469	0	0	469	
Runoff Pervious Areas	313	0	0	313	
Runoff Impervious Areas	0	3983	1467	5450	
Total Runoff	313	3983	1467	5762	
Total Outputs	2170	4979	1833	8982	
Difference (Inputs - Outputs)	0	0	0	0	

Note: Highlighted cells are input cells.

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947 Mapleview Drive East
Post Development Water Balance (With Infiltration)

Catchment Designation	Site			
	Grassed	Impervious	Building (With Infiltration)	Total
Area	2326	5337	1965	9628
Pervious Area	2326	0	0	2326
Impervious Area	0	5337	1965	7302
Infiltration Factors				
Topography Infiltration Factor	0.3	0	0	(From MOE Table 3.1 for Rolling Land)
Soil Infiltration Factor	0.3	0	0	(From MOE Table 3.1 for an average value between Medium combinations of clay and loam and Open sandy loam)
Land Cover Infiltration Factor	0.1	0	0	
MOE Infiltration Factor	0.7	0	0	
Actual Infiltration Factor	0.7	0	0	
Run-Off Coeffiecient	0.3	1	1	
Runoff from Impervious Surfaces*	0	0.8	0.8	
Inputs (per Unit Area)				(Precipitation values from Environment Canada)
Precipitation	932.9	932.9	932.9	932.9
Run-On	0	0	0	0
Other Inputs	0	0	0	0
Total Inputs	932.9	932.9	932.9	932.9
Outputs (per Unit Area)				
Precipitation Surplus	336.2	746.3	746.3	647.2
Net Surplus	336.2	746.3	746.3	647.2
Evapotranspiration	596.7	186.6	186.6	285.7 (Evapotranspiration values from Table 5-2 in the City of Barrie Tier Three Recharge Estimation, dated June 2012)
Infiltration	235.3	0.0	0.0	56.8
Rooftop Infiltration	0.0	0.0	**710.0**	144.9 Depth of rainfall over the rooftop required to be infiltrated to achieve water balance.
Total Infiltration	235.3	0.0	710.0	201.8
Runoff Pervious Areas	100.8	0.0	0.0	24.4
Runoff Impervious Areas	0.0	746.3	36.3	421.1
Total Runoff	100.8	746.3	36.3	445.5
Total Outputs	932.9	932.9	932.9	932.9
Difference (Inputs - Outputs)	0.0	0.0	0.0	0.0
Inputs (Volumes)				
Precipitation	2170	4979	1833	8982
Run-On	0	0	0	0
Other Inputs	0	0	0	0
Total Inputs	2170	4979	1833	8982
Outputs (Volumes)				
Precipitation Surplus	782	3983	1467	6232
Net Surplus	782	3983	1467	6232
Evapotranspiration	1388	996	367	2750
Infiltration	547	0	0	547
Rooftop Infiltration	0	0	1395	1395
Total Infiltration	547	0	1395	1942
Runoff Pervious Areas	235	0	0	235
Runoff Impervious Areas	0	3983	71	4054
Total Runoff	235	3983	71	4289
Total Outputs	2170	4979	1833	8982
Difference (Inputs - Outputs)	0	0	0	0

Note: Highlighted cells are input cells.

947 Mapleview Drive East
Water Balance Calculations

Annual Rainfall Depth Required

Depth of Rainfall Required	=	710.0	mm	(From Post-Development Water Balance (With Infiltration))

Find Percent of Annual Rainfall that Required Rainfall Depth represents:

Annual Rainfall for Study Area	=	932.9	mm
% Annual Rainfall	=	710.0	mm
		932.9	mm
	=	76%	

From MOE Figure C-2, 76% of annual rainfall occurs for storm events of 12mm or less.

Find storage volume required for rainfall events of 7 mm to Rooftop Infiltration Gallery:

Roof Top Area	=	1,965	m^2		
Rainfall Depth	=	12	mm		
Storage Volume Required	=	A	x	D	
	=	1,965	x	12	
	=	24	m^3		

Minimum Infiltration Volume as per City of Barrie Storm Drainage and Stormwater Management Policies and Design Guidelines Section 4.1.3 is as follows:

Storage Volume Required	=	Site Area	x	5	mm
	=	9,628	x	0.005	
	=	48	m^3		

It is proposed to infiltrate 48 m3 in a bioretention trench which is equivalent to the 24 mm storm over the rooftop area to meet the City of Barrie Criteria. Therefore, water balance for the site is achieved.

947 Mapleview Drive East
Bioretention Filter Calculations

Storage Volume Required Using 5mm Across the Site Storm Event

Site Area (A)	=	9,628	m^2
Storm Event (D)	=	5.0	mm
Volume (V)	=	AxD	
V	=	48	m^3

Calculate Design Infiltration Rate

Infiltration Rate at the bottom of the BMP	=	25	mm/hr
Infiltration Rate at the least permeable soil	=	25	mm/hr
Ration of mean measured Infiltration Rates	=	25 / 25	
	=	1	
Safety correction factor	=	2.5	
Design Infiltration Rate (i)	=	25 / 2.5	
	=	10.0	mm/hr

Maximum Allowable Depth for bioretention filter as per TRCA requirements is as follows:

Design Infiltration Rate (i)	=	10.0	mm/hr
Drawdown time (t_s)	=	48	hr
Porosity (V_r)	=	0.4	for clear stone
Maximum Depth ($d_{r\,max}$)	=	$i \times t_s$ / V_r	
	=	1200	mm

Infiltration Trench Bottom Area for bioretention filter as per TRCA requirements is as follows:

Water Quality Volume (WQV)	=	48.1	m^3
		1	total soakaway pits
		48.1	m^3
Stone Reservoir Depth (d_r)	=	0.60	m
Porosity (V_r)	=	0.40	for clear stone
Footprint Surface Area (A_f)	=	WQV / $d_r \times V_r$	
	=	200.6	m^2

Q = 0.0028*C*I*A (m^3/s)

C = Runoff Coefficient

I = Rainfall Intensity = A/(Time+B)^C

A = Area (ha)

947 Mapleview Drive East
Storm Sewer Design Sheet
100-Year Storm Event

DATE: 18-Jan-22

FILE: 19057

CONTRACT/PROJECT: 947 Mapleview Drive

Areas	Manhole		Length	Increment			Total	Flow Time (min)		I	Total Q	S	D	Q Full	V Full
	From	To	(m)	C	A	CA	CA	TO	IN	(mm/h)	(m^3/s)	(%)	(mm)	(m^3/s)	(m/s)
Area 2	CB1	MH1	7.4	0.89	0.29	0.26	0.26	10.00	0.08	180.15	0.13	1.00	375.0	0.18	1.59
Area 3	MH1	MH2	50.1	0.92	0.42	0.38	0.65	10.08	0.47	179.46	0.32	0.80	525.0	0.38	1.78
-	MH1	MH3	18.0	0.00	0.00	0.00	0.65	10.55	0.16	175.40	0.31	0.90	525.0	0.41	1.88
Area 4	MH3	CBMH2	32.5	0.29	0.08	0.02	0.67	10.71	0.35	174.07	0.32	0.52	600.0	0.44	1.57
-	CBMH2	DI1	51.8	0.00	0.00	0.00	0.67	11.05	0.56	171.27	0.32	0.50	600.0	0.43	1.54
-	DI1	MH4	17.6	0.00	0.00	0.00	0.67	11.61	0.14	166.92	0.31	1.00	600.0	0.61	2.17
-	MH2	Ex. MH	8.7	0.00	0.00	0.00	0.67	11.75	0.07	165.92	0.31	1.00	600.0	0.61	2.17

946 Mapleview Drive East
Swale Capacity Calculations

Calculate 100 Year Peak Flow

Rainfall Intensity (I)	=	$A \times (Time)^B$	
	=	$0.75 \times (10/60)^{-0.699}$	
	=	162.70	mm/hr (100 Year Storm Intensity)
Contributing Area (A)	=	0.71	ha
Peaking Coefficient (C_i)	=	1.25	
Runoff Coefficient (C)	=	0.91	
Total Flow (Q)	=	$\frac{C_i CIA}{360}$	
		0.36	m^3/s

Calculate Swale Capacity

Swale Geometry

Left Bank Slope	=	33.00	%
Right Bank Slope	=	33.00	%
Bottom Width	=	0.00	m
Longitudinal Slope	=	1.00	%
Manning's "n"	=	0.030	
Total Depth of Swale	=	0.30	m
Left Bank Length	=	0.91	m
Right Bank Length	=	0.91	m
Top Width	=	1.82	
Wetted Area	=	0.273	sq.m.
Wetted Perimeter	=	1.915	m

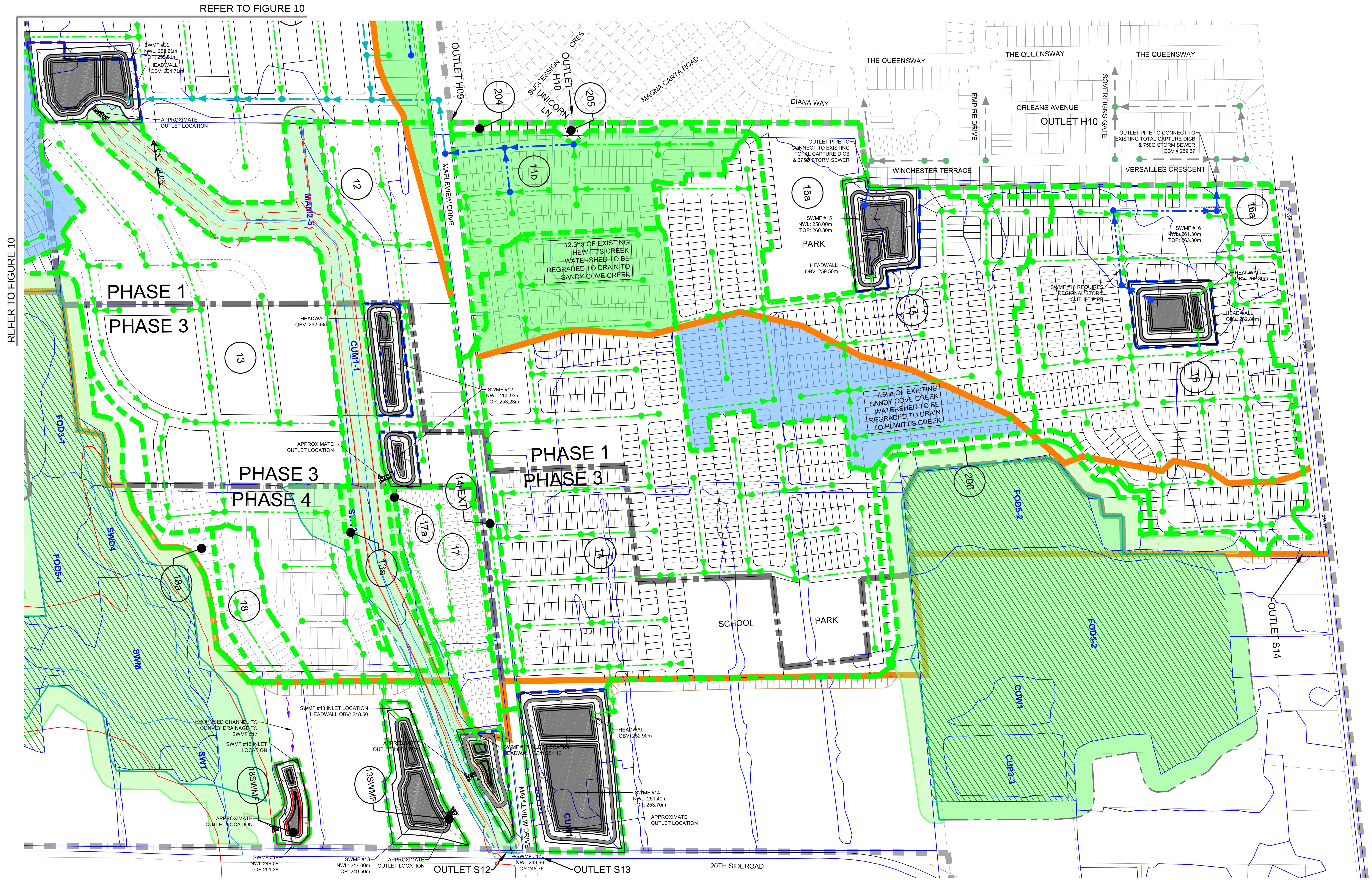
Swale Capacity

Hydraulic Radius	=	0.142	
Velocity	=	0.909	m/s
Total Swale Capacity	=	0.25	m^3/s

Therefore, the swale has sufficient capacity to convey the 100 year storm event.

Appendix C

Engineering Drawings


REFER TO FIGURE 10
REFER TO FIGURE 10
PHASE 1
PHASE 3
PHASE 3
PHASE 4
PHASE 1
PHASE 3
OUTLET H09
OUTLET H10
OUTLET S12
OUTLET S13
OUTLET S14
MAPLEVIEW DRIVE
THE QUEENSWAY
DIANA WAY
ORLEANS AVENUE
WINCHESTER TERRACE
VERSAILLES CRESCENT
EMPIRE DRIVE
SOVEREIGNS GATE
MAGNA CARTA ROAD
SUCCESSION CRES
UNICORN LN
20TH SIDEROAD
SCHOOL
PARK
12.3ha OF EXISTING HEWITT'S CREEK WATERSHED TO BE REGRADED TO DRAIN TO SANDY COVE CREEK
7.6ha OF EXISTING SANDY COVE CREEK WATERSHED TO BE REGRADED TO DRAIN TO HEWITT'S CREEK
OUTLET PIPE TO CONNECT TO EXISTING TOTAL CAPTURE DICB & 675Ø STORM SEWER
OUTLET PIPE TO CONNECT TO EXISTING TOTAL CAPTURE DICB & 750Ø STORM SEWER OBV = 259.37
SWMF #15 NWL: 258.00m TOP: 260.30m
SWMF #16 NWL: 261.30m TOP: 263.30m
SWMF #15 REQUIRES REGIONAL STORM OUTLET PIPE
SWMF #12 NWL: 250.93m TOP: 253.23m
SWMF #14 NWL: 251.40m TOP: 253.70m
SWMF #13 NWL: 247.00m TOP: 249.50m
SWMF #17 NWL 249.96 TOP 248.76
SWMF #18 NWL 249.08 TOP 251.38
SWMF #13 INLET LOCATION HEADWALL OBV: 248.50
PROPOSED CHANNEL TO CONVEY DRAINAGE TO SWMF #17
SWMF #18 INLET LOCATION
APPROXIMATE OUTLET LOCATION
FOD3-1
FOD5-1
FOD5-2
SWD4
SWM
SWT
CUM1
CUM1-1
CUP3-3
204
205
206
11b
12
13
13a
14
14-EXT
15
15a
16
16a
17
17a
18
18a
13SWMF
18SWMF

LEGEND

NHS LIMITS	2031 PHASE LIMITS
NHS BUFFER LIMITS	EXISTING 100 YR FLOOD LIMITS
100 YEAR CAPTURE AREA	EXISTING REGIONAL FLOOD LIMITS
	PROPOSED 100 YR FLOOD LIMITS
	PROPOSED REGIONAL FLOOD LIMITS
	PROPOSED DRAINAGE BOUNDARY
	ORIGINAL WATERSHED BOUNDARY

DASHED FLOOD LINES ARE APPROXIMATE ONLY, BASED ON INTERPOLATED DATA BETWEEN FINGERLAKES AND 1091369 ONTARIO INC. DETAILED TOPOGRAPHIC DATA. FLOODLINES ARE SUBJECT TO CHANGE BASED ON ADDITION OF DETAILED TOPOGRAPHIC SURVEY.

FLOW DIRECTION

STORM SEWER SYSTEM
- 100 YR CAPTURE SEWER, MANHOLE
- 100YR CONVEYANCE SYSTEM WITH 5YR CAPTURE
- 5 YR CAPTURE SEWER, MANHOLE
- EXISTING STORM SEWER, MANHOLE

NOTE:
THE REGULATORY EVENT IS THE REGIONAL STORM EVENT

0 40 80 160 240 320
Metres

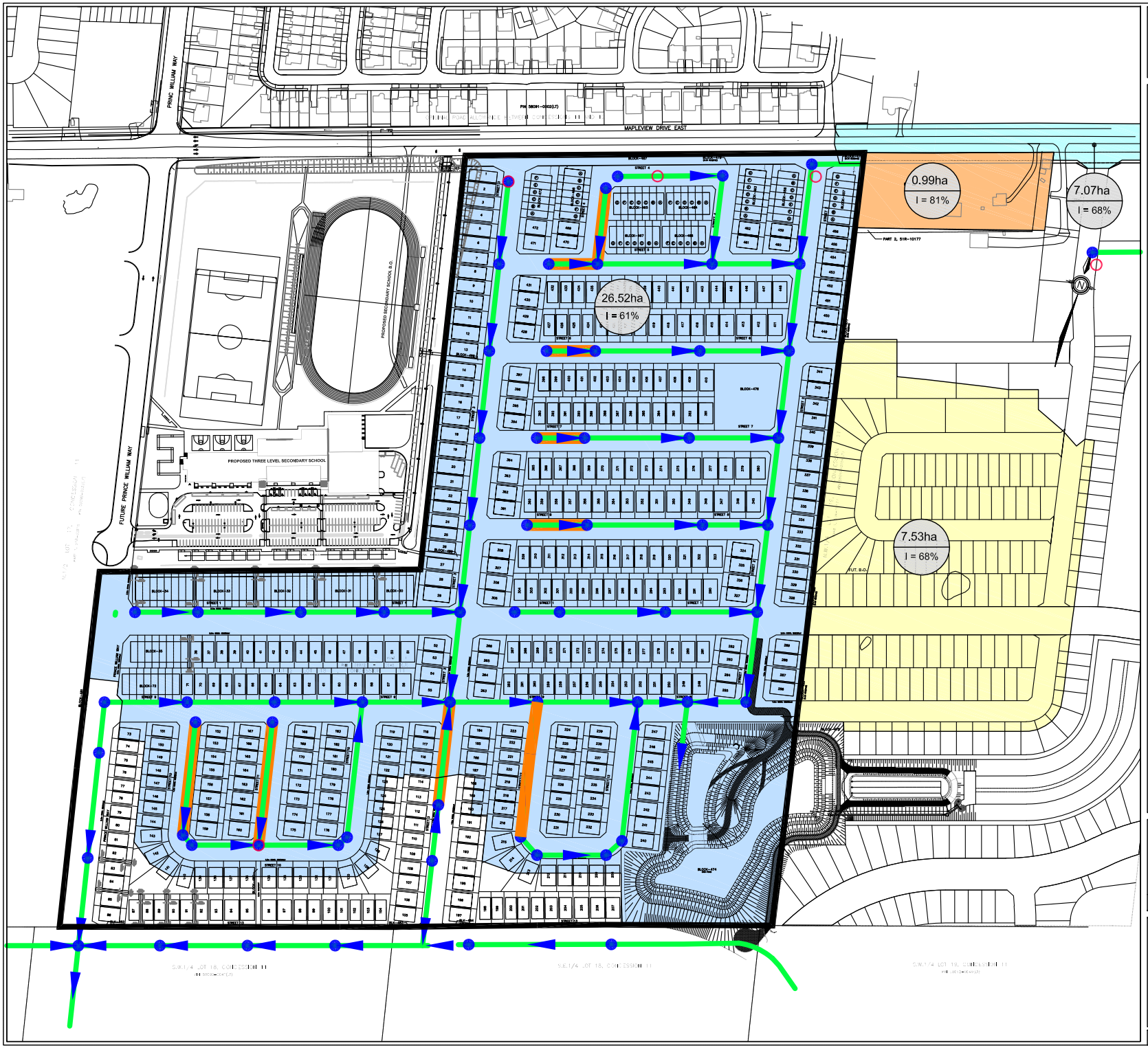
NOTE: *SCALE ONLY VALID FOR 24" x 36" SIZED PLOTS*
THE REGULATORY EVENT IS THE REGIONAL STORM EVENT

BURNSIDE

Client: HEWITT'S CREEK LANDOWNERS GROUP INC.

Figure Title: HEWITT'S SECONDARY PLAN AREA SUBWATERSHED IMPACT STUDY PROPOSED STORM SEWER PLAN (3 OF 3)

Drawn	Checked	Date	Figure No.
BH	CC	17/09/14	FIG 11
Scale: H 1:3,000*		Project No.: 300032860	



EAST ANNEXATION LANDS
MAPLEVIEW DRIVE EAST

LEGEND

- SUBJECT SITE
- PROPOSED STORM SEWERS
- PERFORATED PIPE
- MINOR SYSTEM DRAINAGE AREA
- 28.0ha, I = 60% — DRAINAGE AREA IMPERVIOUSNESS
- DENOTES 100-YEAR MAJOR SYSTEM FULL CAPTURE
- 7.53ha EXTERNAL DRAINAGE AREA FROM REINO MAPLEVIEW SOUTH DEVELOPMENT
- 0.99ha EXTERNAL DRAINAGE AREA FROM AWAN GROUP RESIDENTIAL DEVELOPMENT
- 7.07ha EXTERNAL DRAINAGE AREA FROM MAPLEVIEW DR E RAOD WIDENING AND RESIDENTIAL SUBDIVISION NORTH OF MAPLEVIEW DR E

SCHAEFFERS
CONSULTING ENGINEERS
6 Ronrose Drive, Concord, Ontario L4K 4R3
Tel: (905) 738-6100 Email: general@schaeffers.com
www.schaeffers.com

FIGURE 2.2
MINOR SYSTEM
STORM SERVICING PLAN

2018-4692	MARCH 2020	SCALE: N.T.S.

EAST ANNEXATION LANDS
MAPLEVIEW DRIVE EAST

LEGEND

- SUBJECT SITE
- PROPOSED STORM SEWERS
- DENOTES 100-YEAR MAJOR SYSTEM FULL CAPTURE
- 28.0ha / I = 60% — DRAINAGE AREA IMPERVIOUSNESS
- 26.52ha FROM 883 MAPLEVIEW DRIVE EAST PROPOSED SUBDIVISION
- 3.63ha OF EXISTING SANDY COVE CREEK TO DRAIN TO HEWITT'S CREEK DUE TO GRADING CONSTRAINTS
- 7.53ha EXTERNAL DRAINAGE AREA FROM REINO MAPLEVIEW SOUTH DEVELOPMENT
- 0.91ha UNCONTROLLED BACKYARD TO WATERCOURSE
- 0.99ha EXTERNAL DRAINAGE AREA FROM AWAN GROUP RESIDENTIAL DEVELOPMENT
- 7.07ha EXTERNAL DRAINAGE AREA FROM MAPLEVIEW DR E RAOD WIDENING AND RESIDENTIAL SUBDIVISION NORTH OF MAPLEVIEW DR E

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FIGURE 2.3
MAJOR SYSTEM
STORM SERVICING PLAN

2018-4692	MARCH 2020	SCALE: N.T.S.

Appendix D

Water Supply Report

November 9, 2021

Person Engineering
48 Alliance Blvd, Suite B7
Barrie, ON
L4M 5K3

SCHAEFFERS
CONSULTING ENGINEERS

6 Ronrose Drive, Vaughan, Ontario L4K 4R3
Tel: (905) 738-6100 Fax: (905) 738-6875
Tor. Line: (416) 213-5590 E-mail: general@schaeffers.com

Attention: Ms. April Cleaves, B.A. Tech., C.E.T.
Project Manager

Dear Ms. Cleaves,

RE: InfoWater Modeling Brief
Water Supply Scheme for 947 Mapleview Drive East
City of Barrie

---

1. Introduction

Schaeffer & Associates Ltd. have been retained by Mapleview Friday Corporation to provide a water supply analysis for the 947 Mapleview Drive Residential Development. The subject site is bounded by Mapleview Drive to the north, future and existing residential developments to the south, east, and west.

2. Scope of Work

The client has asked Schaeffer & Associates Ltd. to prepare a water supply model to analyze water supply for the proposed residential development. The analysis would confirm watermain sizing, water turnover rates, domestic and fire flow and pressures at the services. Proposed connections include one 150mmØ domestic service connection and one 200mmØ fire service connection to the existing 300mmØ watermain on Mapleview Drive East. The two connections have been analyzed to ensure water supply demands and fire flow requirements are met.

Schaeffer & Associates Ltd. will use the latest City of Barrie InfoWater water supply model to support the water supply analysis. The development draft servicing and grading plan *Mapleview Friday Corporation Residential Development, 947 Mapleview Drive East, Barrie*, dated July 30, 2021 was supplied by Pearson Engineering. Development floor plans and unit count supplied by Lett Architects Inc.

3. Water Supply Design Criteria

The City of Barrie and MOE design criteria were applied to determine the required flows and confirm the required pressures being achieved throughout the water supply system.

- Water demand was calculated using an average daily demand of 225 l/cap/day and population density of 2.571 ppu for medium density residential units (townhouse loft units), 1.67 persons per unit for apartment units.

- Max Day demand peaking factor of 2 was used in the Max Day Demand + Fire Flow scenario while the rest of the analysis used the City of Barrie Demand Patterns PAT2S-CAL-RES for the residential areas.

- The latest fire protection demands are: minimum 100 l/s at 20 psi for residential single units, minimum 155 l/s at 20 psi for townhouses, minimum 200 l/s at 20 psi for High Density residential areas. It is recommended to do a Water Supply for Public Fire Protection calculation per Fire Underwriters Survey guidelines (latest document is 2019 draft report). Preliminary FUS calculations were performed based on the following assumptions:

    - Non-combustible construction type (1.5 coefficient), limited combustible occupancy (-15% factor), NFPA13 compliant sprinklers (-30% factor), exposures of approximately 20%. Vertical openings and exterior communications assumed unprotected (fire area equals two largest floors and 50% of the floor area above them up to eight). Per the FUS calculation the required fire flow is 12,000 L/min or 200 l/s.

- Maximum velocity of 5 m/s in a watermain during the fire flow conditions, as per the City of Barrie recommendation.

- Hazen-Williams formula was applied for computing the size of watermain pipes. The actual Hazen-Williams “C” values used in the WaterCAD model are listed in **Table 1.**

Table 1: Hazen-Williams Coefficients

Pipe Diameter(mm)	Hazen-Williams Coefficient
150	100
200 – 250	110
300 – 450	120
600 and larger	130

- The boundary condition for the InfoWater model was adopted from the City of Barrie Water Supply Model. In the model scenario "2020ADD, 2016 Calibration" the boundary condition ranged from 303.02m to 310.64m. This corresponds to pressure of 60 psi to 73 psi. This boundary condition is confirmed by two hydrant tests performed on Mapleview Drive East, west of the subject site. A hydrant test from August 2021 reported a static pressure of 72 psi, and the test from May 2018 reported a static pressure of 79 psi.

4. Water Supply Analysis and Results

Subject site will consist of approximately 15 townhouse loft units, 55 1-bedroom units, 26 2-bedroom units, and a tenant (commercial) area of approximately 293 m^2. The site is proposed to be serviced from the 300mmØ watermain on Mapleview Drive East with a 150mmØ domestic service connection and a 200mmØ fire service connection.

The analysis revealed that the residential demands are satisfied with the proposed 150mmØ service connection. The proposed 200mmØ fire service connection can supply 157 l/s at 47 psi and maximum velocity of 5 m/s, therefore it is advised to increase the fire service connection to 250mmØ. The 250mmØ fire service connection can supply fire flow of 200 l/s at 43 psi and velocity under 5 m/s. The 300mmØ watermain on Mapleview Drive East can deliver fire flows of above 315 l/s, therefore the hydrants on Mapleview Drive East in conjuction with the fire service connection can satisfy the fire flow requirement.

Model layout and modelling results are shown in the Attachment.

5. Water Age Analysis

Watermain and junction water age was modeled in InfoWater (scenario *2021ADD_EX*,

WQ_WATER_AGE simulation option, *WQ_WA, Water Age Analysis 240hrs* time setting) to ensure the sufficient renewal of the potable water system will be happening in the proposed connections. The required water age is 3 to 5 days. The demand pattern PAT2S-CAL-RES was used in the analysis.

The maximum junction water age recorded in InfoWater water age simulation is 17 hours (0.71 days) and the maximum watermain water age is 16 hours (0.67 days) at full occupancy and proposed servicing.

6. Conclusion

The residential demand requirements are satisfied with the proposed 150mmØ domestic service connection to the Residential Development at 947 Mapleview Drive East. The proposed 200mmØ fire service connection can supply 157 l/s at the pressure of 46 psi and maximum velocity of 5 m/s. Therefore, it is advised to increase the fire service connection size to 250mmØ. The 250mmØ fire service connection can satisfy the fire flow requirements. The existing 300mmØ watermain on Mapleview Drive East can supply fire flows of above 315 l/s. Fire flow requirements were calculated with the FUS method based on the available information and the latest FUS report. Water age simulations showed satisfactory water age at full occupancy and with the proposed servicing. The boundary conditions from the City of Barrie model have been confirmed with two hydrant tests.

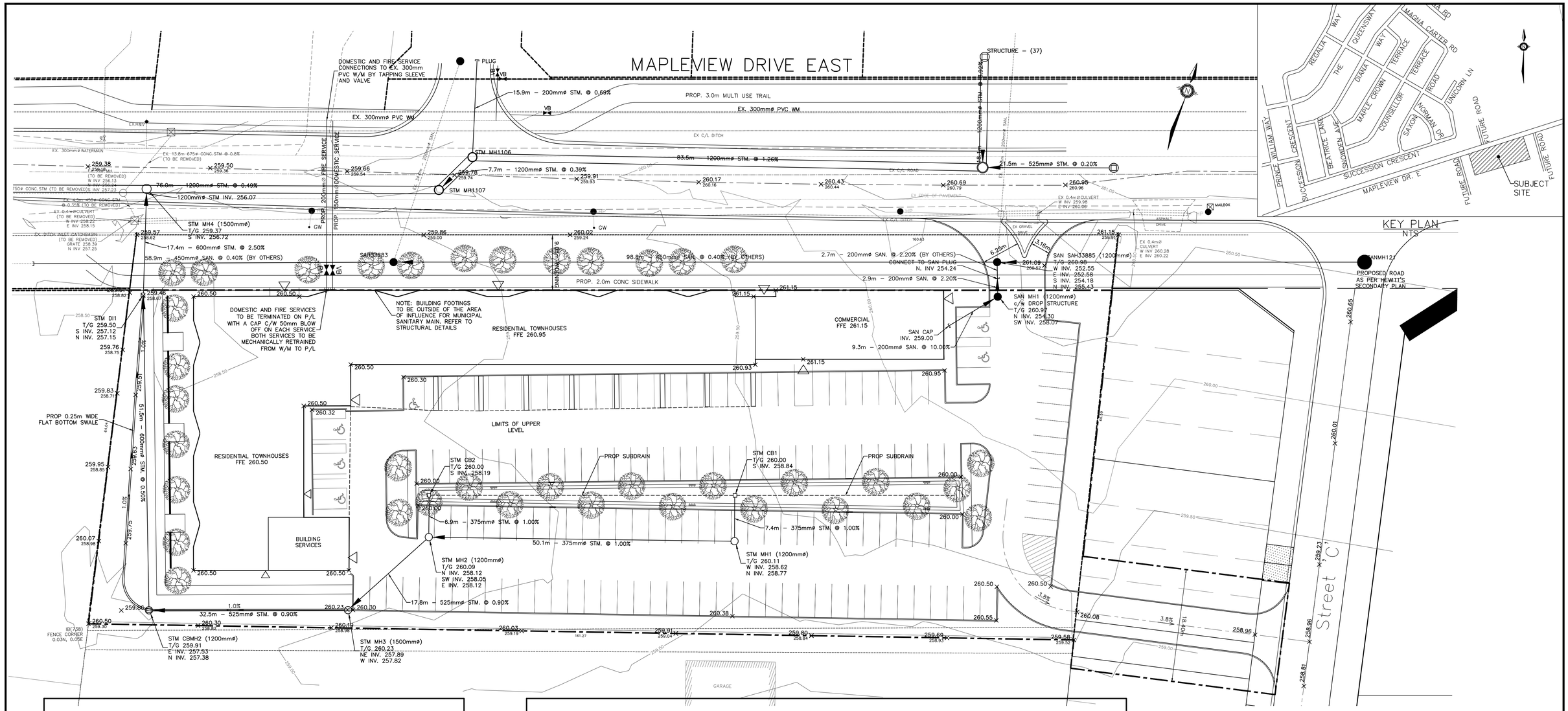
Should you have questions or comments, please do not hesitate to contact the undersigned.

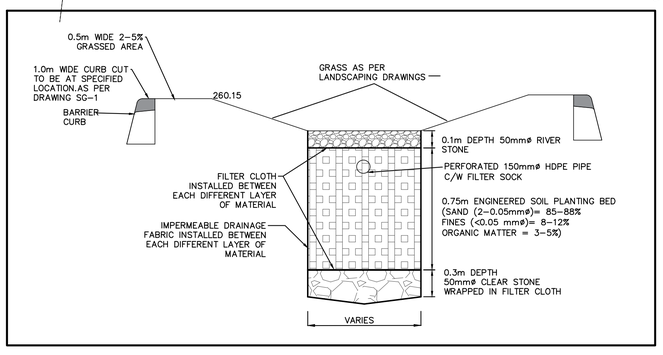
Respectfully Submitted,

SCHAEFFERS CONSULTING ENGINEERS

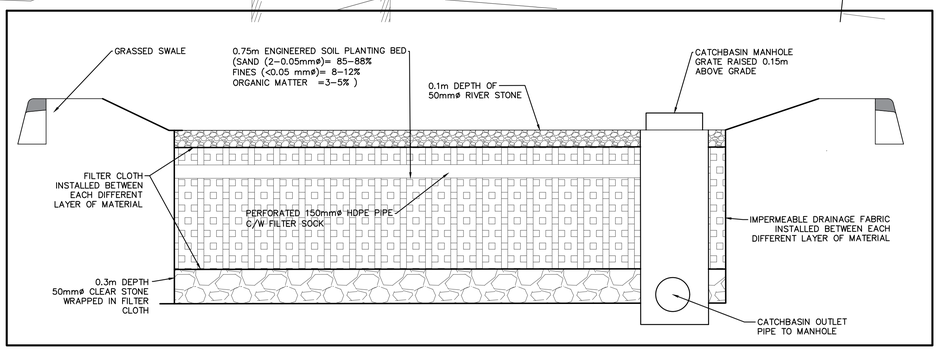
Bogdan Pavlovic, **MESc., P.Eng.**
Water Resources Engineer

Water Supply
Background Information





SECTION A
BIORETENTION FILTER
NTS



DETAIL
BIORETENTION TRENCH – PROFILE VIEW
NTS

FOR SERVICE CONNECTION COORDINATION PURPOSES ONLY. INTERNAL SITE DESIGN PENDING APPROVALS

NO.	REVISION NOTE	DATE	BY

BENCHMARK
ELEVATION NOTE
ELEVATIONS SHOWN HEREON ARE GEODETIC AND ARE DERIVED USING GPS TECHNOLOGY AND THE CAN–NET VRS NETWORK. LOCAL TBM IS THE TOP OF THE SIB LOCATED AT THE NORTH WEST CORNER OF THE PROPERTY HAVING AN ELEVATION OF 258.62
BEARING NOTE
BEARINGS SHOWN HEREON ARE UTM GRID BEARINGS AND ARE DERIVED FROM OBSERVED REFERENCE POINTS A AND B BY REAL TIME NETWORK OBSERVATIONS, AND ARE REFERRED TO THE CENTRAL MERIDIAN 81°W IN ZONE 17, AND ARE BASED ON NAD 83(CSRS)(2010 EPOCH).

MAPLEVIEW FRIDAY CORPORATION
RESIDENTIAL DEVELOPMENT
947 MAPLEVIEW DRIVE EAST, BARRIE

DRAFT SERVICING AND GRADING PLAN

PEARSON ENGINEERING
PEARSONENG.COM PH. 705.719.4785

DESIGNED BY	MWD	HORIZ SCALE 1:300	PROJECT # 19057
DRAWN BY	AMC	VERT SCALE	DRAWING # SP–1
CHECKED BY	GMP	DATE JULY 2019	REVISION # 0

FLOW TEST RESULTS

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

DATE : AUG 17, 2021 TIME : 11:00 AM

LOCATION : 883 MAPLEVIEW DR EAST
BARRIE
ONTARIO

TEST BY : VIPOND FIRE PROTECTION AND LOCAL PUC

STATIC PRESSURE : 72 PSI

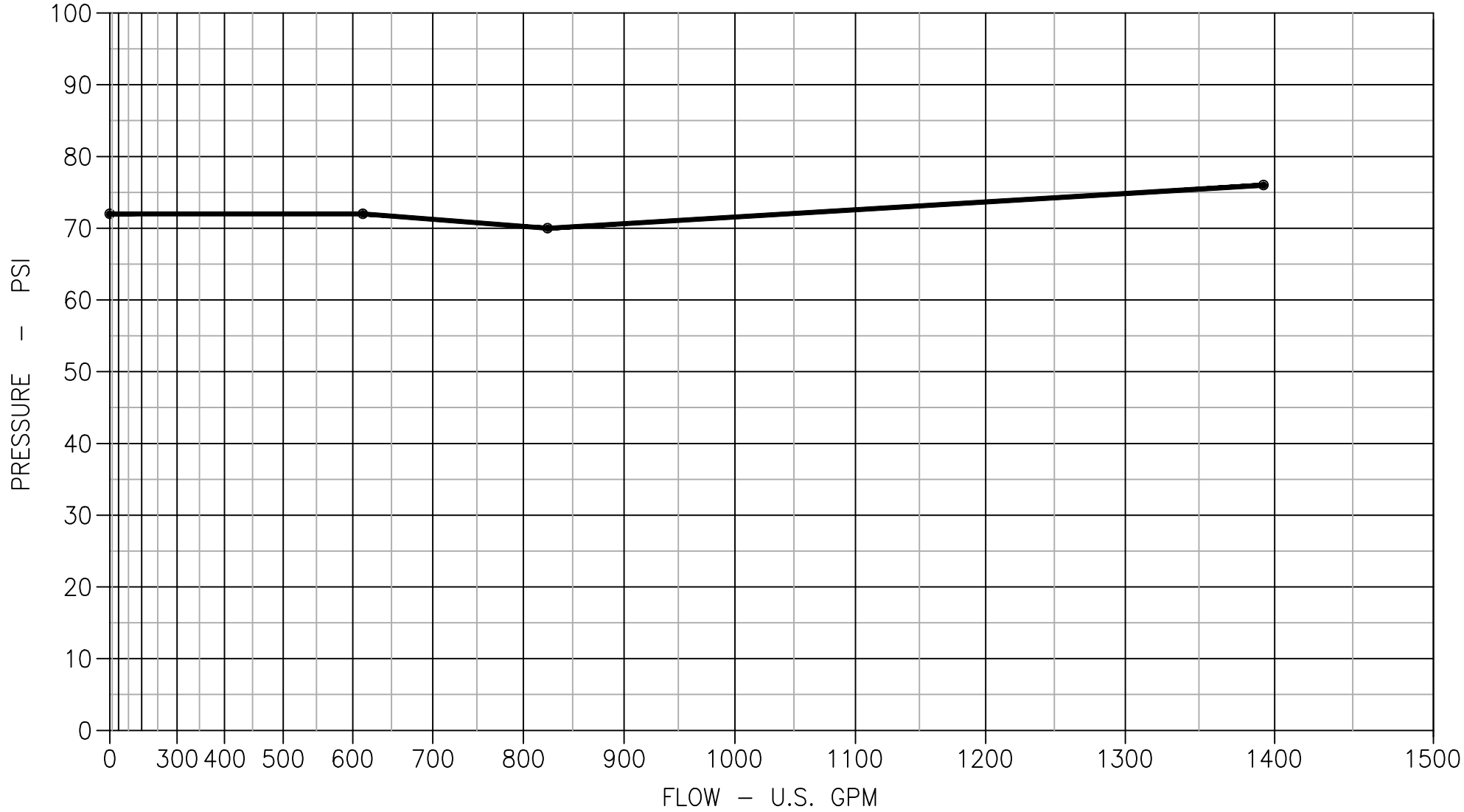
TEST NO.	NO. OF NOZZLES	NOZZLE DIAMETER (INCHES)	DISCHARGE CO-EFFICIENT	RESIDUAL PRESSURE (PSI)	PITOT PRESSURE (PSI)	DISCHARGE (U.S.GPM)
1	1	1-3/4	0.995	72	48	617
2	1	2-1/2	0.9	70	24	826
3	2	2-1/2	0.9	76	17	1390

FIRST FOR FIRE, LIFE SAFETY & SECURITY

VIPOND INC est. 1945

883 MAPLEVIEW DR, EAST	BY : KRYSTIAN KRASON
BARRIE	OFFICE : BARRIE
ONTARIO	TEST BY : VIPOND & PUC
	DATE : AUG 17, 2021

STATIC:		RESIDUAL:		FLOW:
72 PSI	TEST#1	72 PSI	@	617 GPM
	TEST#2	70 PSI	@	826 GPM
	TEST#3	76 PSI	@	1390 GPM



Bogdan Pavlovic

From: Mike Flis <MFlis@jonesconsulting.com>
Sent: Wednesday, June 10, 2020 8:39 AM
To: Bogdan Pavlovic
Subject: FW: Prince William Way Water Hydrant Testing

Hello Bogdan,

Please see below the info from the latest hydrant testing. Let me know if this information is sufficient, or if you need to arrange your own hydrant test.

Regards,

Michael Flis, P.Eng.
Project Engineer
The Jones Consulting Group Ltd.
229 Mapleview Drive East, Unit 1 Barrie, ON L4N 0W5
Phone (705) 734-2538 ext 297 Fax (705) 734-1056
Mobile (705) 715-4488
Email mflis@jonesconsulting.com
http://www.jonesconsulting.com

From: Whelan, Chris [mailto:cwhelan@scdsb.on.ca]
Sent: June 9, 2020 5:14 PM
To: Mike Flis <MFlis@jonesconsulting.com>
Subject: FW: Prince William Way Water Hydrant Testing

Hi Mike,
See below for the hydrant test as requested.
Regards,
Chris Whelan
Project Coordinator | Design & Construction
Simcoe County District School Board
p: 705-734-6363 x11309 | c: 705-715-6319
cwhelan@scdsb.on.ca

From: David Carere <DavidC@pre-eng.com>
Sent: Tuesday, June 9, 2020 4:25 PM
To: Whelan, Chris <cwhelan@scdsb.on.ca>
Cc: Del Cordeiro (DCordeiro@zasa.com) <DCordeiro@zasa.com>; Yama Asad <YAsad@zasa.com>
Subject: RE: Prince William Way Water Hydrant Testing

Hi Chris,

Sorry for the delayed response. The results from General Sprinklers test are below. Note these results are from Mapleview as that is the closest existing hydrant location. The sprinkler designers had to take the pressure noted below and decrease it in order to account for the pressure loss going from Mapleview all the way to school. So, don't use this value as a supply value to the school, as that value would be less.

– FLOW TEST: – DONE BY GSI
– DATE: MAY 2018
– LOCATION: 225 PRINCE WILLIAM WAY, BARRIE, ONTARIO
– STATIC PRESSURE: 79 PSI
– RESIDUAL PRESSURE: 75 PSI @ 670 USGPM
– RESIDUAL PRESSURE: 75 PSI @ 780 USGPM
– RESIDUAL PRESSURE: 75 PSI @ 1393 USGPM

Thanks,

David Carere, BASc
Project Manager | Pre-Eng Contracting Ltd.
905 738-6866

From: Whelan, Chris [mailto:cwhelan@scdsb.on.ca]
Sent: Friday, June 05, 2020 2:45 PM
To: David Carere
Cc: Del Cordeiro (DCordeiro@zasa.com); Yama Asad
Subject: FW: Prince William Way Water Hydrant Testing

Hi David,

If I remember correctly General Sprinklers performed a hydrant test last fall on the hydrant closest to our site. Can you pass that data along for use by my PWW consultant, please.

Thanks,
Chris

Chris Whelan
Project Coordinator | Design & Construction
Simcoe County District School Board
p: 705-734-6363 x11309 | c: 705-715-6319
cwhelan@scdsb.on.ca

From: Mike Flis <MFlis@jonesconsulting.com>
Sent: Friday, June 5, 2020 2:24 PM
To: Whelan, Chris <cwhelan@scdsb.on.ca>
Subject: Prince William Way Water Hydrant Testing

Hello Chris,

Schaeffers Engineering is asking if we have a recent hydrant test near the site, or if he should organize a test. I wanted to check with you because I thought there was someone inquiring about water pressures recently.

Please let me know at your earliest convenience.

Thanks,

Michael Flis, P.Eng.

Project Engineer
The Jones Consulting Group Ltd.
229 Mapleview Drive East, Unit 1 Barrie, ON L4N 0W5
Phone (705) 734-2538 ext 297 Fax (705) 734-1056
Mobile (705) 715-4488
Email mflis@jonesconsulting.com
http://www.jonesconsulting.com

Please note that The Jones Consulting Group will be blocking all emails containing compressed attachments with file extensions such as .zip or .rar. When sending a .zip file please rename the extension to .zi_ or use an FTP site.

RESTRICTED ACCESS BUSINESS OPERATIONS

As the health and safety of our clients, suppliers, staff and families is our top priority during this period of uncertainty, commencing April 5th 2020, and until further notice, the Jones Consulting Group Ltd. office will be closed.

We are closely monitoring the situation and are following the practices recommended by local and international authorities to minimize the risk of exposure to the novel coronavirus (COVID-19) while doing everything in our power to ensure that our services continue uninterrupted.

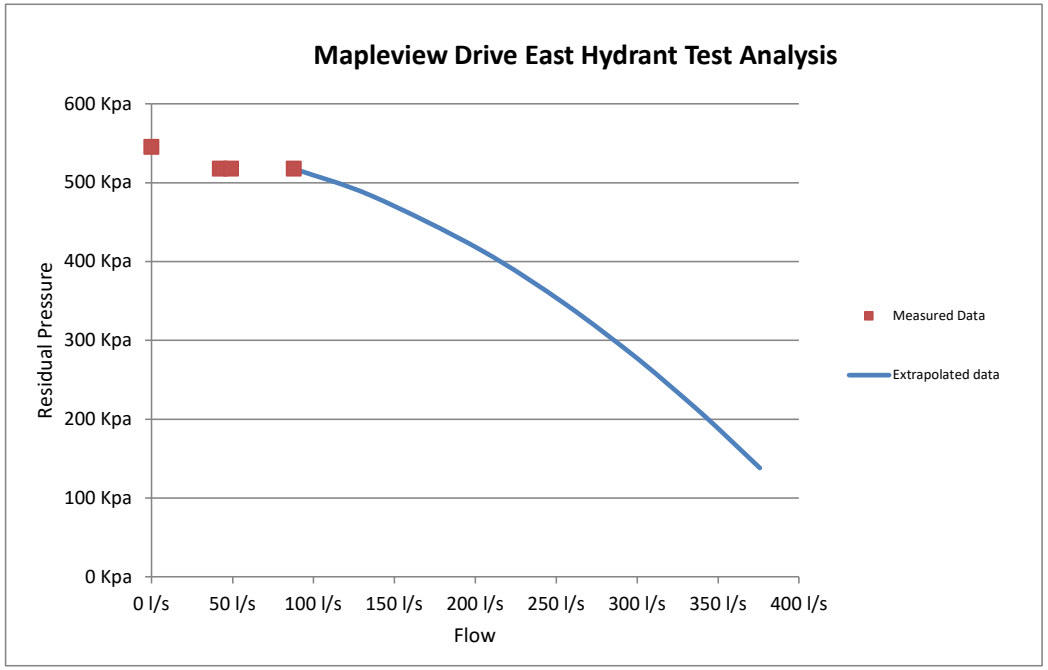
Therefore, please note, until further notice, the Jones Consulting Group staff will be working remotely and will respond by e-mail and/or phone only. The office access will be closed.

We remain committed to providing the service you have come to expect from us, however, during this time, the Jones Consulting Group Ltd. may be rescheduling non-essential or non-urgent services as deemed appropriate in order to reduce exposure to the virus and protect everyone's health.

---

947 Mapleview Drive East
Project No. 5133
Test 2 - GSI
Flow Test Results of May 2018
Location: Residual: Prince William Way and Mapleview Drive East
Flow:

Test Results			
Flow US. GPM	Residual Pressure psi	Flow L/s	Residual Presure kPa
0	79	0	545
670	75	42	518
780	75	49	518
1393	75	88	518



For a total required flow demand of **200 L/s**
the equivalent residual pressure is

417 **kPa**

60 **psi**

For a residual pressure of **20 psi**
or **140 kPa** the equivalent flow is

375 **L/s**

5945 **USGPM**

4949 **IGPM**

1 USG = 3.785 litres
1 IG = 4.546 litres
1 psi = 6.9 kpa

Water Demands, FUS, Water Age Analysis

Project: ***2021-5113***
947 Mapleview Drive East
City of Barrie

SCHAEFFERS
CONSULTING ENGINEERS

Water Supply Calculation

*Fire Protection:	12000 L/min	200 L/s
Average Daily Demand:	225 L/capita/day	
Commercial Flow:	28 m^3/day/ha	

Population & Average Day Demand

Unit Type	Population Density	Unit Count	Area (m^2)	Population	Average Day Demand (l/s)‡
Townhouse loft	2.571	15		39	**0.102**
1-bedroom	1.67	55		92	**0.240**
2-bedroom	1.67	26		44	**0.115**
Commercial			293		**0.009**
Total		96	293	175	**0.465**

Maximum Day + Fire Flow

Land Use	Average Day Demand (L/s)‡	Max. Hour Demand Peaking Factor†	Max Hour Demand (L/s)	Max Day Demand Peaking Factor†	Max Day Demand (L/s)	Fire Flow* (L/s)	Total Flow (L/s)
Total	0.47	3.0	**1.40**	2.0	**0.93**	200	**200.93**

**based on FUS Fire Flow Calculations*

FUS Fire Flow for 947 Mapleview Drive East

A = Type of Construction

Type of Construction:	C	Description
Wood Frame	1.5	(essentially all combustible)
Ordinary	1	(brick/masonry walls, combustible interior)
Non-Combustible	0.8	(unprotected metal structure, masonry/metal walls)
Fire-Resistive	0.6	(fully protected frame, roof, floors)

Construction Coefficient: **0.8**

B = Largest Floor

Area: 2493 square metres (of largest floor)

C = Height (storeys)

Height: 6 Storeys

D = Fire Flow (000's)

GFA*	8,100	square metres
Construction Type	0.8	
Fire Flow	15,840	L/min.

-> Fire Flow **16,000** **L/min.**

Note: FUS guide specifically states round off to 1000's

E = Occupancy Factor

Fire Hazard of Contents	**Charge**
Non-Combustible	-25%
Limited Combustible	-15%
Combustible	0%
Free Burning	15%
Rapid Burning	25%

Occupancy Factor -15%

Fire Flow **13,600** **L/min.**

F = Sprinkler Factor

Sprinkler System	**Charge**
n/a	0%
NFPA 13 System	-30%
Fully Supervised System	-50%

Sprinkler Factor: -30%

G = Exposure Factor As per FUS, Water Supply for Public Fire Protection (2019)

Separation	**Maximum Charge**
0 to 3 m	25%
3.1 to 10 m	20%
10.1 to 20 m	15%
20.1 to 30 m	10%
Over 30m	0%

Category	Separation	Exposed Face Area	Construction Type	Charge
North	>30m separation			0%
West	assumed 20-30m	Assumed Length-Height Ratio>100m	Type V assumed	10%
South	assumed 20-30m	Assumed Length-Height Ratio>100m	Type V assumed	10%
East	>30m separation			0%

**See attached Exposure Factor Table for detailed selection

Exposure Factor 20% (no more than 75%)

H - Net Fire Flow Required

	Charge
F + G Factors	-10%

12240 L/min.

Fire Flow: 12000 L/min.

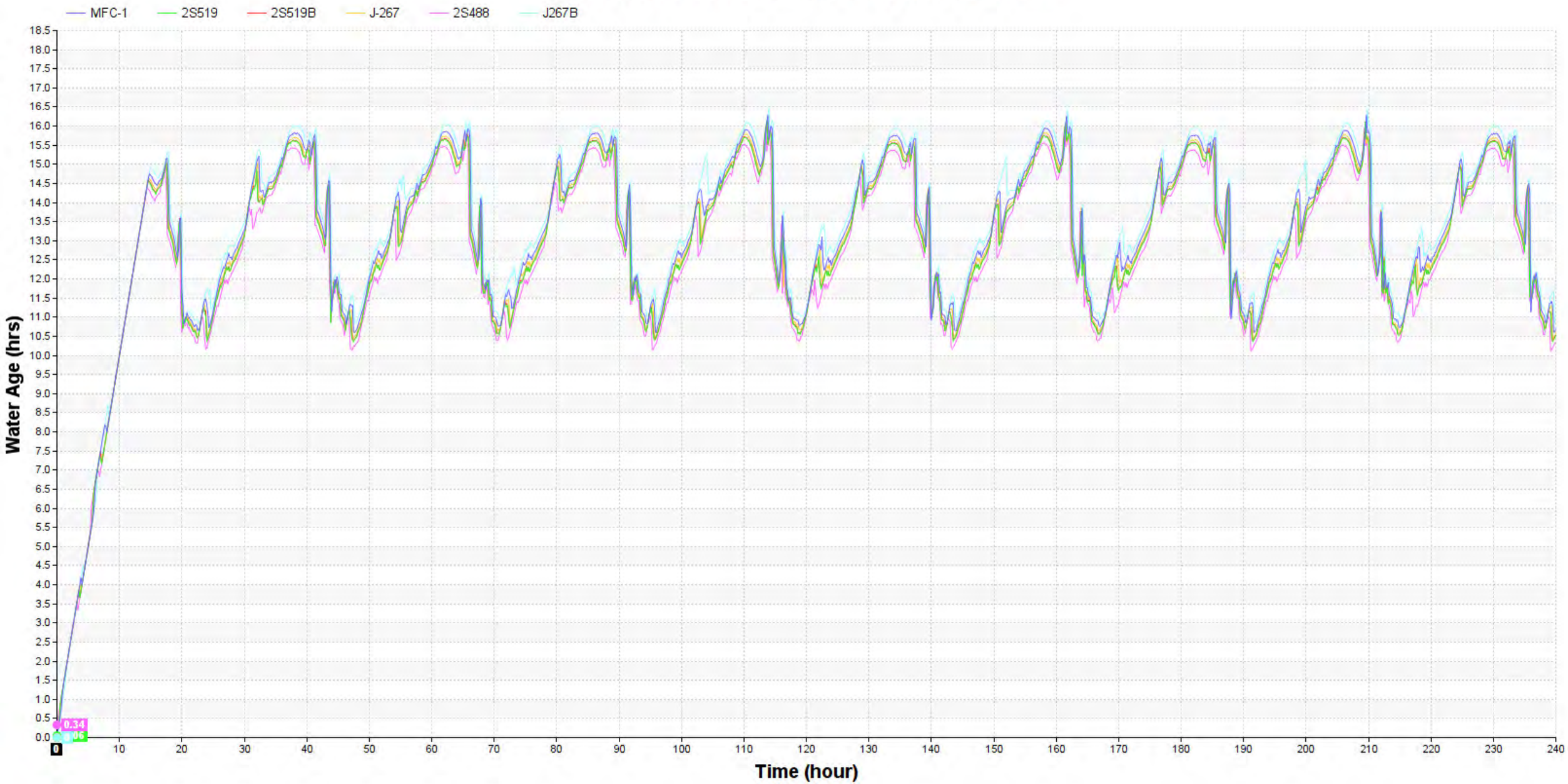
Note: FUS guide specifically states round off to 1000's

200 L/s

3170 USGPM

		ID	Max.Value (hrs)	Max.Time (hrs.)	Min.Value (hrs)	Min.Time (hrs.)	Average (hrs)	Difference (hrs)
1	☐	MFC-1	16.29	113:50	0.00	00:00	13.14	16.29
2	☐	2S519	16.13	113:40	0.06	00:00	12.92	16.07
3	☐	2S519B	16.13	113:40	0.00	00:00	12.94	16.13
4	☐	J-267	16.12	113:40	0.00	00:00	13.01	16.12
5	☐	2S488	15.96	113:30	0.34	00:00	12.73	15.62
6	☐	J267B	16.46	114:00	0.00	00:00	13.35	16.46

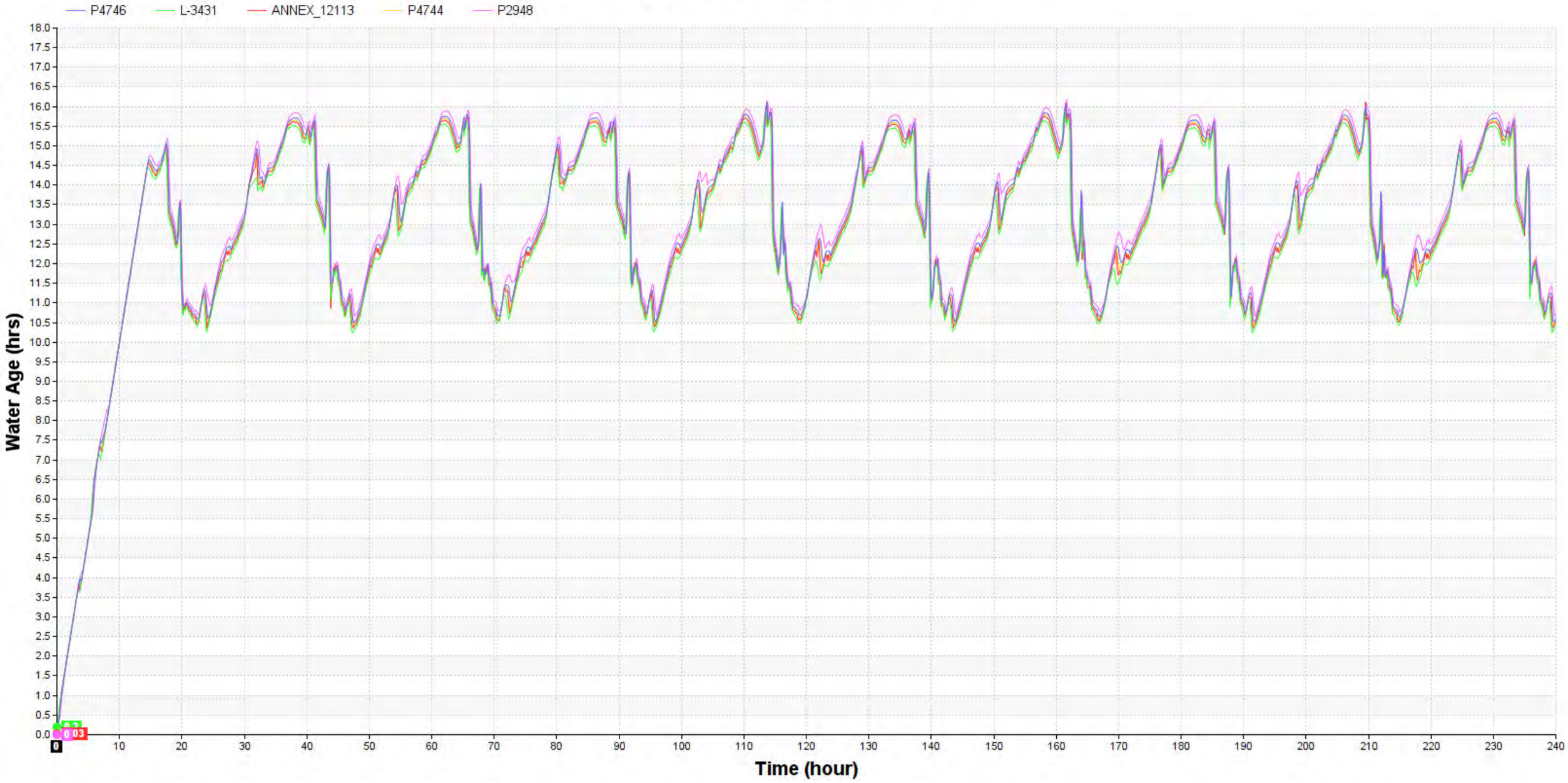
Junction MFC-1,2S519,...,J267B



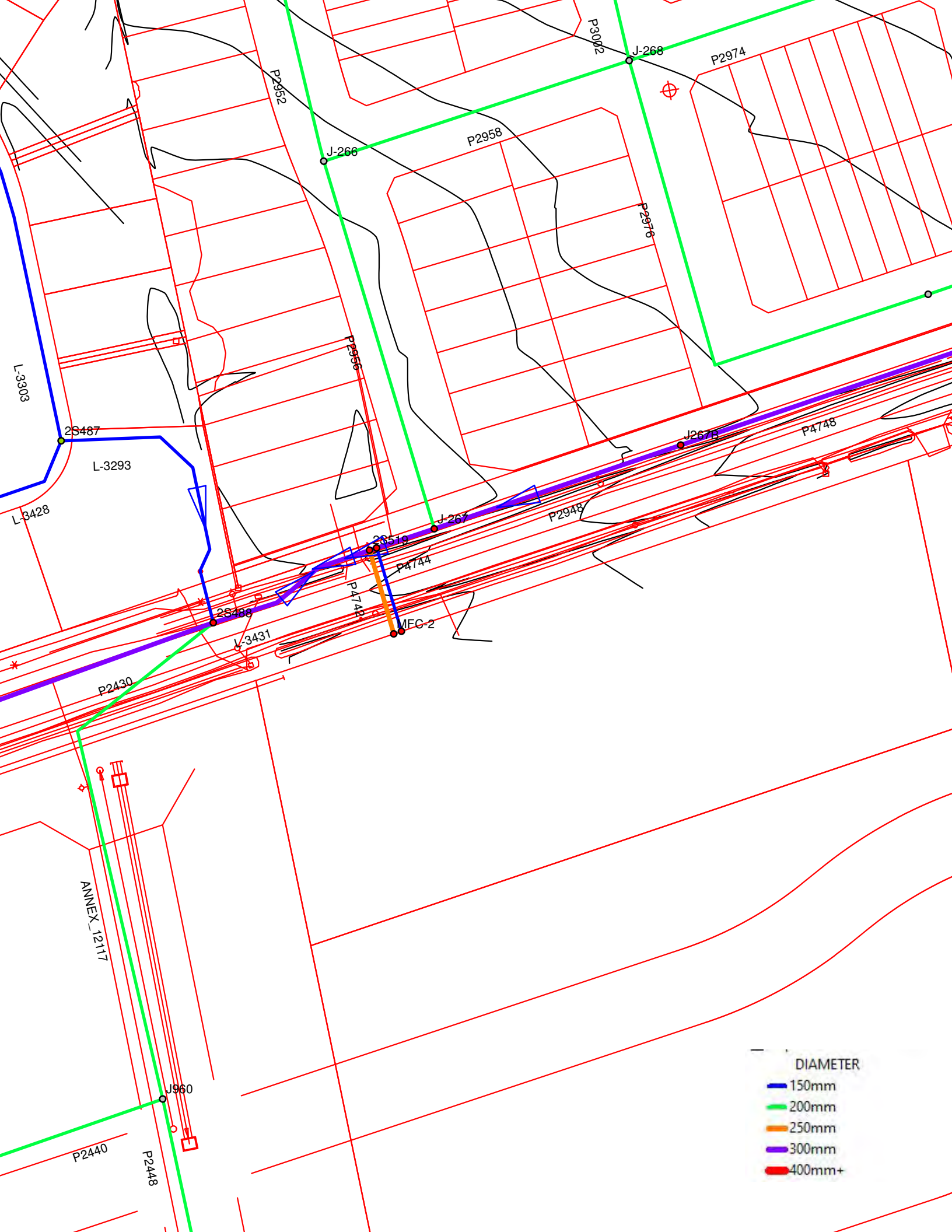
947 Mapleview Drive East Watermain Water Age

		ID	Max.Value (hrs)	Max.Time (hrs.)	Min.Value (hrs)	Min.Time (hrs.)	Average (hrs)	Difference (hrs)
1	☐	P4746	16.11	113:40	0.00	00:00	13.03	16.11
2	☐	L-3431	15.95	113:30	0.20	00:00	12.82	15.75
3	☐	ANNEX_12113	16.13	113:40	0.03	00:00	12.93	16.10
4	☐	P4744	16.12	113:40	0.00	00:00	12.97	16.12
5	☐	P2948	16.17	161:40	0.00	00:00	13.17	16.17

Pipe P4746,L-3431,...,P2948



InfoWater Modelling Results


P3002
J-268
P2974
P2952
J-266
P2958
P2976
P2956
L-3303
2S487
L-3293
L-3428
J267B
P4748
P2948
J-267
2S519
P4744
P4746
2S488
MFC-2
L-3431
P2430
ANNEX_12117
J960
P2440
P2448
DIAMETER
150mm
200mm
250mm
300mm
400mm+

	ID	Max.Value (L/s)	Max.Time (hrs.)	Min.Value (L/s)	Min.Time (hrs.)	Average (L/s)	Difference (L/s)
1	MFC-1	0.96	119:00	0.07	44:00	0.44	0.89
2	2S519	0.01	122:00	0.00	43:00	0.00	0.01
3	2S519B	0.00	00:00	0.00	00:00	0.00	0.00
4	J-267	0.16	119:00	0.01	44:00	0.08	0.15
5	2S488	0.00	00:00	0.00	00:00	0.00	0.00
6	J267B	0.00	00:00	0.00	00:00	0.00	0.00

		ID	Max.Value (m)	Max.Time (hrs.)	Min.Value (m)	Min.Time (hrs.)	Average (m)	Difference (m)
1	☐	MFC-1	310.62	02:00	303.02	246:00	307.41	7.60
2	☐	2S519	310.62	02:00	303.02	246:00	307.41	7.60
3	☐	2S519B	310.62	02:00	303.02	246:00	307.41	7.60
4	☐	J-267	310.62	02:00	303.02	246:00	307.41	7.60
5	☐	2S488	310.62	02:00	303.03	246:00	307.41	7.60
6	☐	J267B	310.62	02:00	303.02	246:00	307.41	7.60

	ID	Max.Value (psi)	Max.Time (hrs.)	Min.Value (psi)	Min.Time (hrs.)	Average (psi)	Difference (psi)
1	MFC-1	71.25	02:00	60.45	246:00	66.69	10.80
2	2S519	72.90	02:00	62.10	246:00	68.34	10.80
3	2S519B	72.89	02:00	62.09	246:00	68.32	10.80
4	J-267	72.80	02:00	62.00	246:00	68.24	10.80
5	2S488	73.39	02:00	62.59	246:00	68.82	10.80
6	J267B	72.45	02:00	61.64	246:00	67.88	10.80

		ID	Max.Value (L/s)	Max.Time (hrs.)	Min.Value (L/s)	Min.Time (hrs.)	Average (L/s)	Difference (L/s)
1	☐	P4746	0.96	119:00	0.07	44:00	0.44	0.89
2	☐	L-3431	8.22	122:00	0.59	333:00	3.79	7.63
3	☐	ANNEX_12113	8.21	122:00	0.59	333:00	3.79	7.62
4	☐	P4744	7.25	122:00	0.52	333:00	3.34	6.73
5	☐	P2948	7.09	122:00	0.51	333:00	3.27	6.58

947 Mapleview Drive East Area Watermain Headloss/km

		ID	Max.Value (m/k-m)	Max.Time (hrs.)	Min.Value (m/k-m)	Min.Time (hrs.)	Average (m/k-m)	Difference (m/k-m)
1	☐	P4746	0.06	119:00	0.00	44:00	0.02	0.06
2	☐	L-3431	0.07	119:00	0.00	45:00	0.02	0.07
3	☐	ANNEX_12113	0.06	118:00	0.00	00:00	0.02	0.06
4	☐	P4744	0.05	118:00	0.00	44:00	0.01	0.05
5	☐	P2948	0.05	119:00	0.00	44:00	0.01	0.05

		ID	Max.Value (m/s)	Max.Time (hrs.)	Min.Value (m/s)	Min.Time (hrs.)	Average (m/s)	Difference (m/s)
1	☐	P4746	0.05	119:00	0.00	44:00	0.03	0.05
2	☐	L-3431	0.12	122:00	0.01	333:00	0.05	0.11
3	☐	ANNEX_12113	0.12	122:00	0.01	333:00	0.05	0.11
4	☐	P4744	0.10	122:00	0.01	333:00	0.05	0.10
5	☐	P2948	0.10	122:00	0.01	333:00	0.05	0.09

947 Mapleview Drive East Max Day Demand + Fire Flow

		ID	Static Demand (L/s)	Static Pressure (psi)	Static Head (m)	Fire-Flow Demand (L/s)	Residual Pressure (psi)	Hydrant Available Flow (L/s)	Hydrant Pressure at Available Flow (psi)	Critical Pipe ID at Available Flow	Critical Pipe Velocity at Available Flow (m/s)
1	☐	2S488	0.00	65.28	304.92	200.00	48.45	345.10	20.00	L-3293	3.49
2	☐	2S519	0.01	64.80	304.92	200.00	46.97	332.23	20.00	L-3431	4.00
3	☐	2S519B	0.00	64.79	304.92	200.00	46.92	331.80	20.00	ANNEX_12113	4.00
4	☐	J-267	0.00	64.70	304.92	200.00	46.54	328.45	20.00	P4744	3.95
5	☐	J267B	0.00	64.34	304.92	200.00	44.95	315.27	20.00	P2948	3.75
6	☐	MFC-2	0.00	63.15	304.92	200.00	43.14	245.43	34.14	P4742	5.00