ENGAGE ENGINEERING
171 King St • Suite 120 • Peterborough ON • K9J 2R8

April 28th, 2023

Wilburn Archer
2339213 Ontario Ltd.

Attention: Wilburn Archer

Dear Wilburn:

Re: Asphodel-Norwood Medical Centre
35 Industrial Drive, Norwood
Functional Servicing Brief
Engage Engineering Project No. 22056

Engage Engineering Limited (Engage) has been retained to prepare a Functional Servicing Brief in support of the medical center development located at 35 Industrial Drive in Norwood. The purpose of this report is to provide recommendations for sanitary and water servicing for the site to support the Development Agreement for the project.

The subject site is bounded by residential properties to the south and undeveloped grassed area to the north, east and west. The existing total site east of the Spruce Drive right-of-way consists of a 4.58 ha vacant grassed lot. However, the proposed site plan takes up a smaller site area of 0.83 ha. The proposed development includes a 1,119.5 m^2 medical building with associated surface parking and landscaped areas. It is anticipated that the medical center will include a dental office, pharmacy, doctor's office and other office spaces. The proposed Site Plan is included in **Appendix A**.

Sanitary Servicing

Based on a review of available as-constructed drawings, Engage confirmed that there is a 200 mm diameter sanitary sewer in the Spruce Drive Right-of-Way (ROW) south of the site. The approximate location of the existing sanitary sewers is illustrated on the as-constructed drawings included in **Appendix B** and on the proposed Servicing Plan included in **Appendix E**. This development also includes the proposed extension of Spruce Drive from the southern limits of the site into the site area. Within the ROW of the Spruce Drive extension is a proposed 200 mm diameter PVC sanitary sewer which will connect to the existing 200 mm diameter sanitary on Spruce Drive. Sanitary servicing for the proposed development at 35 Industrial Drive will be provided by a 200 mm diameter PVC sanitary sewer connected to the proposed 200 mm diameter sanitary sewer in the ROW of the Spruce Drive extension.

Design criteria to analyze the wastewater flow for the site has been assembled from the MOE and the Township requirements and includes:

- Commercial and Institutional sewage flow of 28 m^3/(ha*day)
- Development area of 0.83 ha
- Infiltration rate of 0.28 L/ha/s for inflow and infiltration

Based on the design criteria above, the proposed sewage flows for the site have been calculated and are summarized in **Table 1** below. The sewage flow calculations are included in **Appendix C**.

Table 1 – Proposed Sewage Flows

Flow Type	Flow (m^3/day)	Flow (L/s)
Commercial/Institutional Flow	23.23	0.27
Infiltration Flow	20.08	0.23
Total Design Flow	43.31	0.50

A sanitary sewer design sheet has been prepared to document flows, pipe capacities and sewer velocities for the proposed sanitary sewer and service to the site. Flows and velocities were calculated based on the design criteria and infiltration presented earlier in this report. The sanitary sewer design sheet is included in **Appendix C**. The results of the analysis are summarized in **Table 2** below.

Table 2 – Sanitary Sewer Capacity Summary

Sanitary Service Location	Manhole ID	Proposed Pipe Diameter (mm) & Material	Capacity Proposed Conditions
Building to Spruce Drive	Building to MH1A	200 PVC	1%
	MH1A to MH2A	200 PVC	2%
	MH2A to MH3A	200 PVC	2%

The results indicate that the proposed sewer infrastructure has adequate capacity to convey flows from the site. All runs of sewer are within the 80% design capacity threshold. Pipe flow velocities were also verified for the proposed condition. Flow conditions do not exceed the minimum 0.6 m/s required for self-cleansing, which is expected given the minimal site flows.

Water Servicing – Domestic Demand

Based on a review of available as-constructed drawings, Engage confirmed there is an existing 150mm diameter watermain on Spruce Drive. As constructed drawings are included in **Appendix B**. Water servicing for the site will be provided by the proposed watermain located in the ROW of the Spruce Drive extension.

Based on a Statistics Canada Profile from 2016, the Township of Asphodel-Norwood has a population of 4,109.

Design criteria to analyze the water demand of the development and municipal water system has been assembled from MOE and Township requirements, and includes:

- Commercial/Institutional water demand of 28 m^3/(ha*day)
- Development area of 0.83 ha
- Maximum day factor of 2.00 (based on a population of 4,109)
- Peak hour factor 3.00 (based on a population of 4,109)
- The minimum pressure of the system shall meet or exceed 40 psi (275 kPa) during normal operating conditions.
- The minimum pressure of the system shall meet or exceed 20 psi (138 kPa) during maximum day plus fire flow conditions.

The results of the water demand calculations are summarized in **Table 3**. Water demand calculations are included in **Appendix D**.

Table 3 –Proposed Water Demand

Flow Type	Flow (L/min)
Average Day Demand	16.4
Maximum Day Demand	32.3
Peak Hour Demand	48.4

Water Servicing – Fire Flow Demand

To confirm there is adequate flow available to meet fire protection requirements of the site, fire flow calculations were completed. Fire flows were calculated based on the 'Water Supply for Public Fire Protection' manual prepared by the Fire Underwriters Survey (FUS) dated 2020. The calculations have been included in **Appendix D**.
The building was classified as combustible construction and was assumed to not have a sprinkler system. The required fire flow based on the FUS calculations was determined

to be 8,000 L/min, or 8,032.3 L/min when combining the required fire flow with the maximum day demand.

An alternative method of calculating the required fire flow for the proposed development applies the Fire Protection Water Supply Guideline from the Ontario Building Code (OBC). Design criteria to determine the required fire flow using the OBC is summarized below:

- Exposure distances greater than 12 m on the north, south, east, and west sides of the proposed development
- The OBC occupancy classification B-3, Care Occupancies
- Confirmed combustible construction
- Building area of 1,192.0 m^2
- Building height of 3.0m

Table 4 below summarizes the OBC required fire flow calculations provided in **Appendix D**.

Table 4 – OBC Required Fire Flow

OBC Variable	Value
Total Spatial Coefficient Values, STot (-)	1.0
Building Volume, V (m^3)	3,576
Minimum Water Supply, Q (L)	90,000
Minimum Flow Rate, F (L/min)	2,700
Maximum Day + Minimum Flow Rate (L/min)	2,732.3

As noted, the required fire flow for the proposed development using the OBC is 2,732.3 L/min, versus 8,032.3 L/min with the FUS.

An existing hydrant is located at 7 Spruce Drive, approximately 110 m away from the proposed development and will be used to establish a datum from which hydrant flows can be established for the proposed development. A new hydrant is proposed along the Spruce Drive extension to service the site.

Site specific hydrant flow testing was not completed for this project. However, the Township of Asphodel Norwood Infrastructure Assessment, prepared in July 2020 by Engage (Project No. 19055), was used to reference hydrant flows measured in 2016. Recorded flows for the existing hydrant at 7 Spruce Drive (assigned hydrant 32 in the 2020 Infrastructure Assessment) are summarized in **Table 5** below. An excerpt from the

Infrastructure Assessment Report with the hydrant flow information is included in **Appendix A**. The municipality has also stated that they would be able to complete an updated hydrant flow test on Spruce Drive to confirm the correct available flows.

Table 5 – Flow and Pressure Test Results

Hydrant	Test Year	Static PSI	Residual PSI	Test Flow (USGPM)	Flow at 20 PSI (USGPM)	Flow at 20 PSI (L/min)
32 – 7 Spruce Drive	2016	54	26	671	745	2,820

As noted, the available flow at 20 psi at hydrant 32 is 2,820 L/min.

The Township also provided data from the 2021 Norwood Water Model, which is included in **Appendix B**. The study shows that under existing conditions with a hydraulic grade line of 242 m, the available fire flow at hydrant 32 is 33 L/s (1,980 L/min). It is understood that the Township is in the process of designing a new standpipe that will increase water pressures and flows within the Village. Within the modelling provided by the Township, there is a proposed conditions with a hydraulic grade line of 255 m representing the proposed standpipe condition. Within this condition the available fire flow at hydrant 32 is 43 L/s (2,580 L/min).

As previously stated, the required fire flow for the proposed development using the OBC is 2,732.3 L/min, versus 8,032.3 L/min with the FUS. These values would typically be compared to the available flow within the system, which are noted as 2,820 L/min within the 2016 hydrant flow test, 1,980 L/min within the existing condition water model, and 2,580 L/min in the proposed standpipe condition water model. None of the available flow scenarios are able to meet the required fire flow per the FUS calculations, however the 2016 hydrant flow test demonstrates that the municipal system is capable of providing the required flows according to the OBC calculations.

The municipality has stated that they would be able to complete an updated hydrant flow test on Spruce Drive to confirm the current available flows. It is recommended that this flow test be completed to confirm the available flows.

Table 6 identifies the flows and pressures available to meet the demand requirements of the development. The flow available at 40 PSI was determined using a Hazen-Williams from the 2016 hydrant flow test information. This calculation is provided in **Appendix D**.

Table 6 – Flows and Pressures

Flow Condition	Flow Required (L/min)	Pressure Required (PSI)	Flow Available (L/min)	Pressure Available (PSI)	Residual Flow Available (L/min)
Average Day Flow	16.4	40	1,747	40	1,730.6
Maximum Day Flow	32.3	40	1,747	40	1,714.7
Peak Hour Flow	48.4	40	1,747	40	1,698.6
Maximum Day + OBC Fire Flow	2,732.3	20	2,820	20	87.7

Summary

In conclusion, it is anticipated that sanitary and water servicing can be provided by the proposed municipal system located in the ROW of the proposed Spruce Drive extension. It is recommended that the municipality complete a hydrant flow test to confirm the current available flows within the system, to confirm if the municipal system is capable of providing the required fire flows for the development.

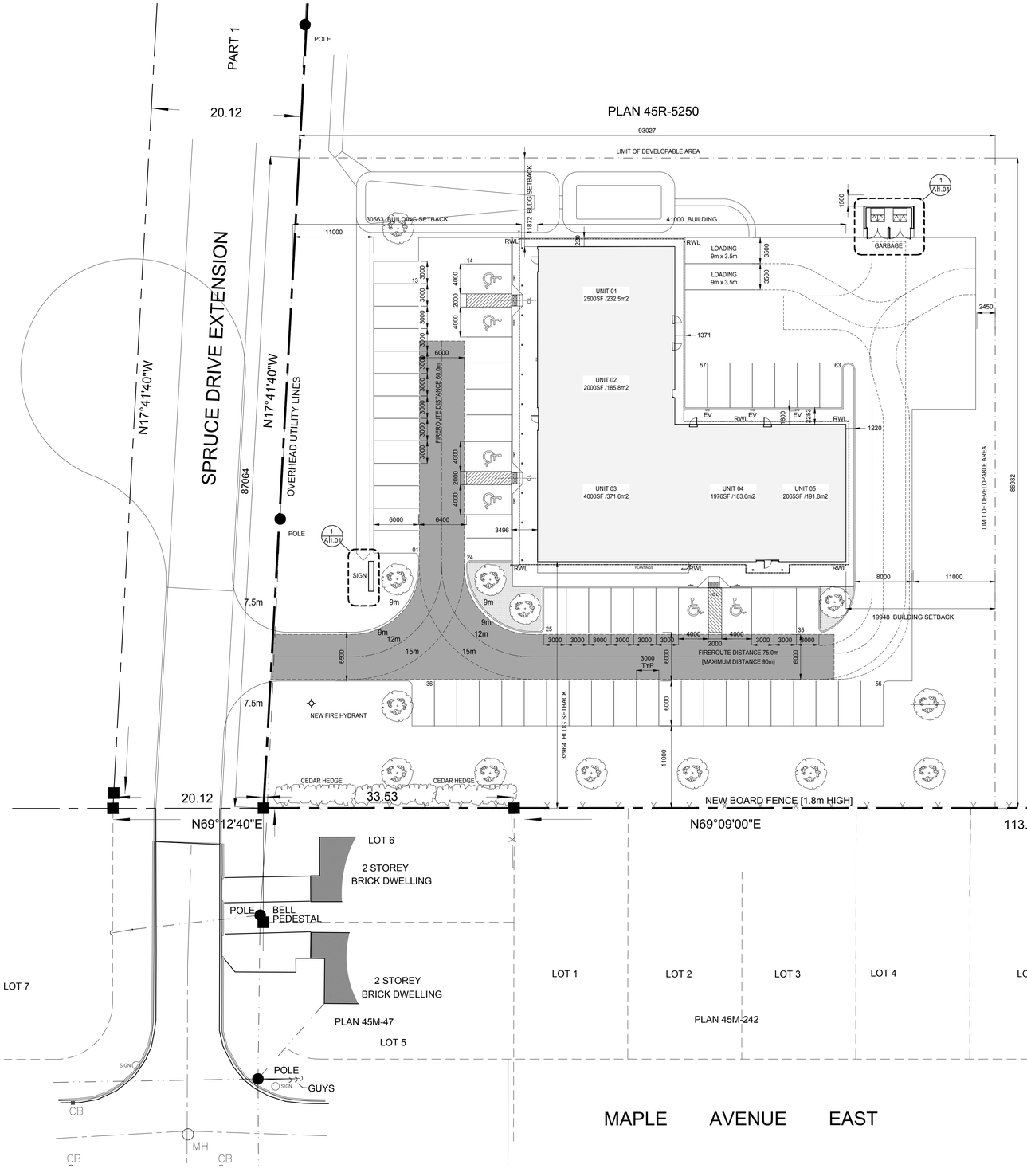
We trust that this letter is sufficient to support the Development Agreement. If you need anything further, please don't hesitate to contact us.

Sincerely,

Serina Ykema-King
Engineering Student

Lucas Parsons, P.Eng.
Project Manager

Appendix A: Site Plan



ZONING SUMMARY
GENERAL INDUSTRIAL ZONE [M1]
[PART OF LOT 'Q', REGISTERED PLAN NO.6]

SITE STATISTICS

TOTAL LOT AREA	45,845.3m2
PROPOSED DEVELOPMENT AREA	8294.8m2 / 0.83 Ha

LOT COVERAGE

ALLOWABLE COVERAGE	
MAXIMUM BUILDING COVERAGE	50%
MINIMUM LANDSCAPE COVERAGE	10%

PROPOSED COVERAGE

BLDG AREA	1192.5m2	[14.4%]
VEHICULAR AREAS	3095.7m2	[37.3%]
LANDSCAPED AREA	4006.6m2	[48.3%]

REQUIRED SETBACKS

FRONT YARD	20m
SIDE YARD	15m
REAR YARD	20m

PROPOSED SETBACKS

FRONT YARD [WEST]	30.6m
SIDE YARD [NORTH]	7.8m
SIDE YARD [SOUTH]	32.9m
REAR YARD [EAST]	19.9m

BUILDING HEIGHT

PERMITTED	12m	
PROPOSED	[T/O ROOF]	20'-0"/ 6.1m
	[MID ROOF]	15'-0"/ 4.6m

REQUIRED PARKING

TYPICAL PARKING SPACE	3m X 6m
BARRIER FREE PARKING SPACE	4m X 6m

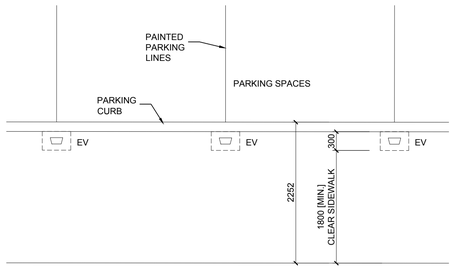
PARKING SPACES REQUIRED	1 SPACE / 18.5m2 CLINIC AREA
BARRIER FREE SPACES REQUIRED	AT LEAST 1 SPACE / SUITE

1 BF SPACE FOR FIRST 20 SPACES + 1 SPACE FOR EACH ADDITIONAL 20 SPACES

DENTAL CLINIC	232.5m2 / 18.5m2	=	13 SPACES [1 BF SPACE]
PHARMACY	185.8m2 / 18.5m2	=	10 SPACES [1 BF SPACE]
FAMILY CLINIC	371.6m2 / 18.5m2	=	20 SPACES [1 BF SPACE]
UNASSIGNED	375.4m2 / 18.5m2	=	20 SPACES [1 BF SPACE]

TOTAL REQUIRED PARKING = 63 SPACES [4 BARRIER FREE]
TOTAL PARKING PROVIDED = 63 SPACES [6 BARRIER FREE]

REQUIRED LOADING SPACES
BUILDING SIZE 279m2 - 7432m2 = 2 LOADING SPACES, 9m x 3.5m
2 LOADING SPACES PROVIDED [9m x 3.5m WIDE]



PARTIAL PLAN: FUTURE EV CHARGER
SCALE: NTS

KEY PLAN

PART 2
LOT 19
PLAN 45R-10506

aside architects inc.
148 Hunter Street W., #201
Peterborough, ON. K9H2K8
t.705.812.2451

ONTARIO ASSOCIATION OF ARCHITECTS
NEIL DEREK CAMPBELL
LICENCE 6425

NORWOOD MEDICAL
Spruce Drive
Norwood, ON

	mm/dd/yy	description
1	04/13/23	PRELIM
2	04/27/23	DEV APPLICATION
3		
4		
5		
6		
7		
8		
8		
9		
10		

SCALE 1:300

SITE PLAN

a 1.0

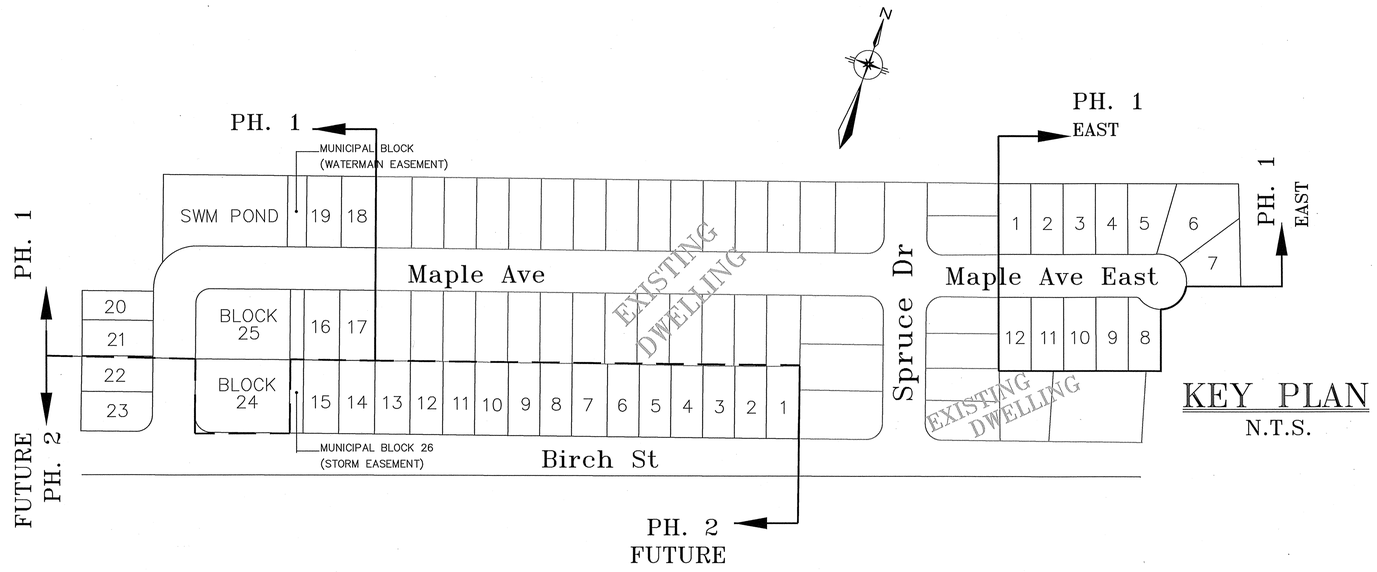
Appendix B: As-Constructed Drawings and Background Information

NORWOOD ESTATES

TOWNSHIP OF ASPHODEL - NORWOOD
COUNTY OF PETERBOROUGH

EAST & WEST SUBDIVISIONS

DRAWINGS LIST:



KEY PLAN
N.T.S.

OWNER:

1087086 ONTARIO INC.

3100 Steeles Ave West, Suite 500
Vaughan, ON L4K 3R1

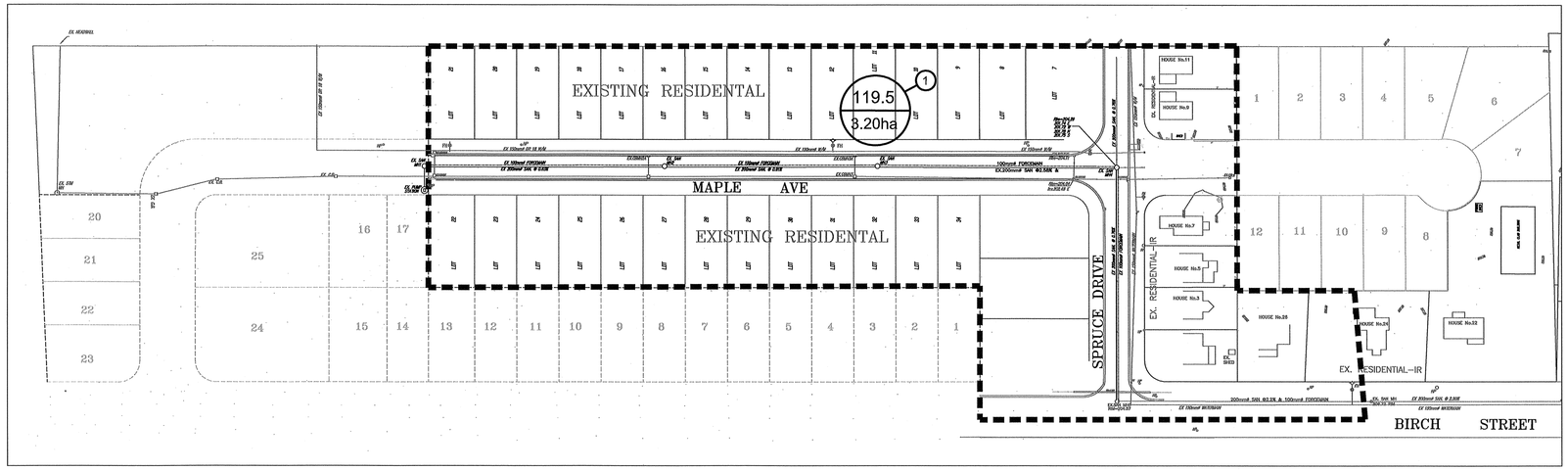
Tel: 905-695-1953
Fax: 905-695-1954

ENGINEER:

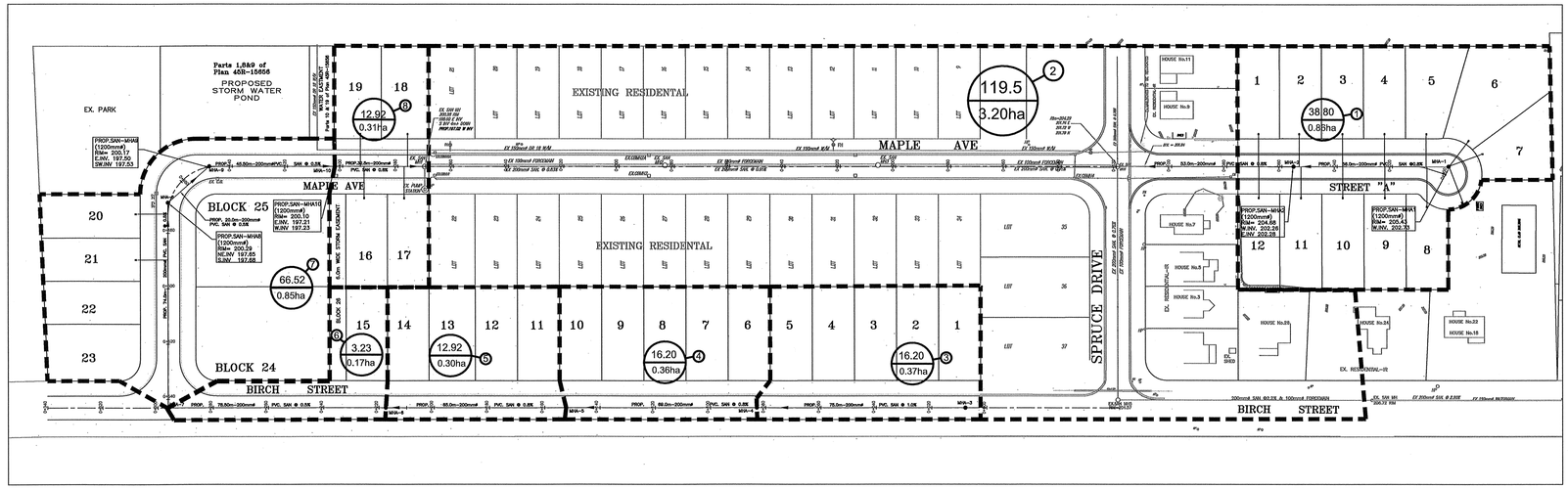
mmk engineering inc
Land Development . Municipal Engineering
Stormwater Management

P.O.BOX. 60061, Oakville, ON L6L 6R4
Tel. 647-938-0770 I Fax. 289-295-0202
mmkenginc@gmail.com

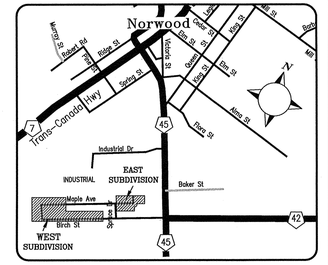
PRE DEVELOPMENT



POST DEVELOPMENT



NOTE:
THE LOCATION OF ALL UNDERGROUND AND ABOVEGROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE LOCATION OF SUCH THINGS ARE NOT GUARANTEED. THE CONTRACTOR MUST INFORM HIMSELF OF THE EXACT LOCATIONS OF ANY UTILITIES AND STRUCTURES BEFORE STARTING CONSTRUCTION. ANY LIABILITIES FOR DAMAGE WILL BE ASSUMED TO THE CONTRACTOR.



LEGEND

42.0 / 0.36 (1)	AREA NO.; POPULATION DENSITY (PERSON); AREA IN HECTARES
	DRAINAGE AREA BOUNDARY
	SANITARY SEWER / DIRECTION OF FLOW
MH–2	PROPOSED MANHOLE
EX. MH	EXISTING SANITARY MANHOLE

BENCHMARK:

BENCHMARK 554B–66 – ELEVATION = 198.057 METRES – FIRST ORDER – (CGVD–1928:1978) – CONCRETE BRIDGE CARRYING HWY 45 OVER THE OUSE CREEK IN THE VILLAGE OF NORWOOD, 259 m SOUTH OF HWY 7 AND 5.8 m WEST OF CENTERLINE OF PAVEMENT. TABLET IS SET HORIZONTALLY IN THE WEST FACE OF THE NORTH ABUTMENT, 5.59 m SOUTH OF THE N.W. CORNER AND 30 cm BELOW COPING.

TOWNSHIP OF ASPHODEL - NORWOOD
COUNTY OF PETERBOROUGH

NORWOOD ESTATES

PRE & POST-DEVELOPMENT SANITARY DRAINAGE PLAN

1087086 ONTARIO INC.

3100 Steeles Ave West, Suite 500
Vaughan, ON L4K 3R1
Tel: 905-695-1953
Fax: 905-695-1954

REVISIONS

No.	Revision	Date	By	Rev.
1	Comments from ORCA & AECOM On Dec.11,2012 & Jan.14,2013	Feb.06,2013	N.P.	A.H.
2	Comments from ORCA & AECOM On Mar.07,2013 & Mar.04,2013	Mar.28,2013	N.P.	A.H.
3	Updated Phasing and Lot & Block Numbers	Mar.28,2016	N.P.	A.H.

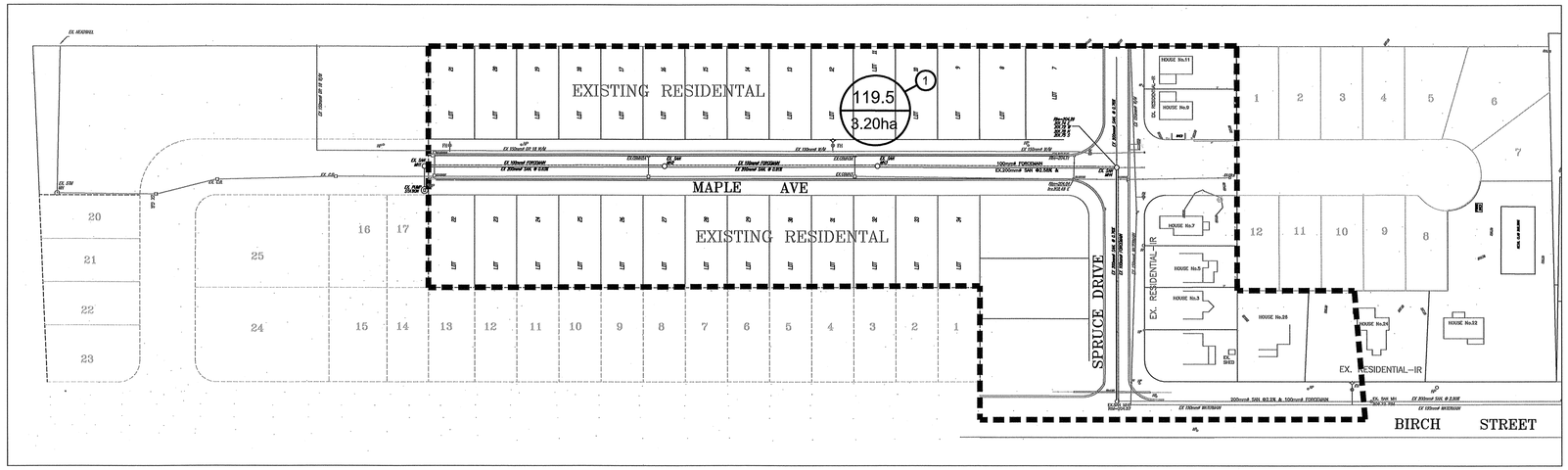
mmk engineering inc.
Land Development, Municipal Engineering
Stormwater Management
P.O.BOX. 60061, Oakville, ON L6L 6R4
Tel. 647-938-0770 | Fax. 289-295-0202 mmkengino@gmail.com

LICENSED PROFESSIONAL ENGINEER
A.E. Hanna
100098882
Mar. 28,2016
PROVINCE OF ONTARIO

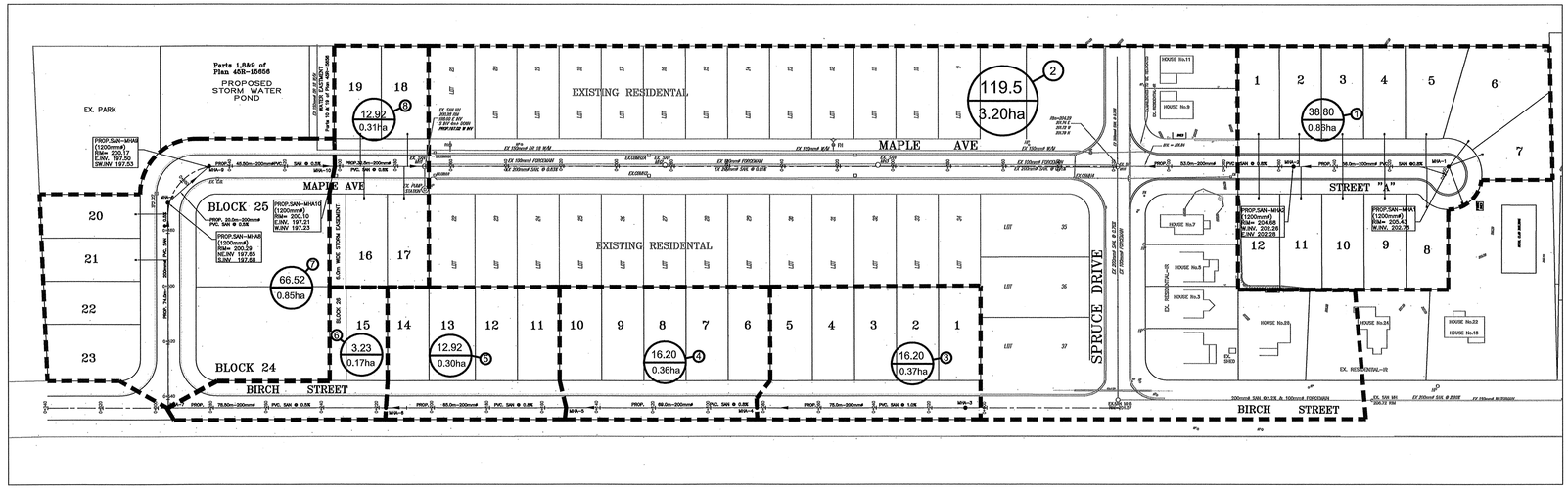
SCALE: HORIZONTAL 1:1000 — 0 10.0 40.0 METRES

DRAWN BY : N.P.	PROJECT No. 803
CHECKED BY: A.H.	
DATE OF PLOT: Mar. 28,2016	DRAWING No. 4
PROJECT COMMENCED ON: SEPTEMBER 2012	

PRE DEVELOPMENT



POST DEVELOPMENT



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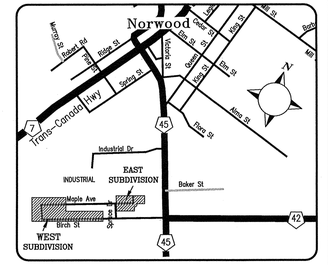

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TOWNSHIP OF ASPHODEL - NORWOOD
COUNTY OF PETERBOROUGH

NORWOOD ESTATES

PRE & POST-DEVELOPMENT SANITARY DRAINAGE PLAN

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LICENSED PROFESSIONAL ENGINEER
A.E. Hanna
100098882
Mar. 28,2016
PROVINCE OF ONTARIO

SCALE: HORIZONTAL 1:1000 — 0 10.0 40.0 METRES

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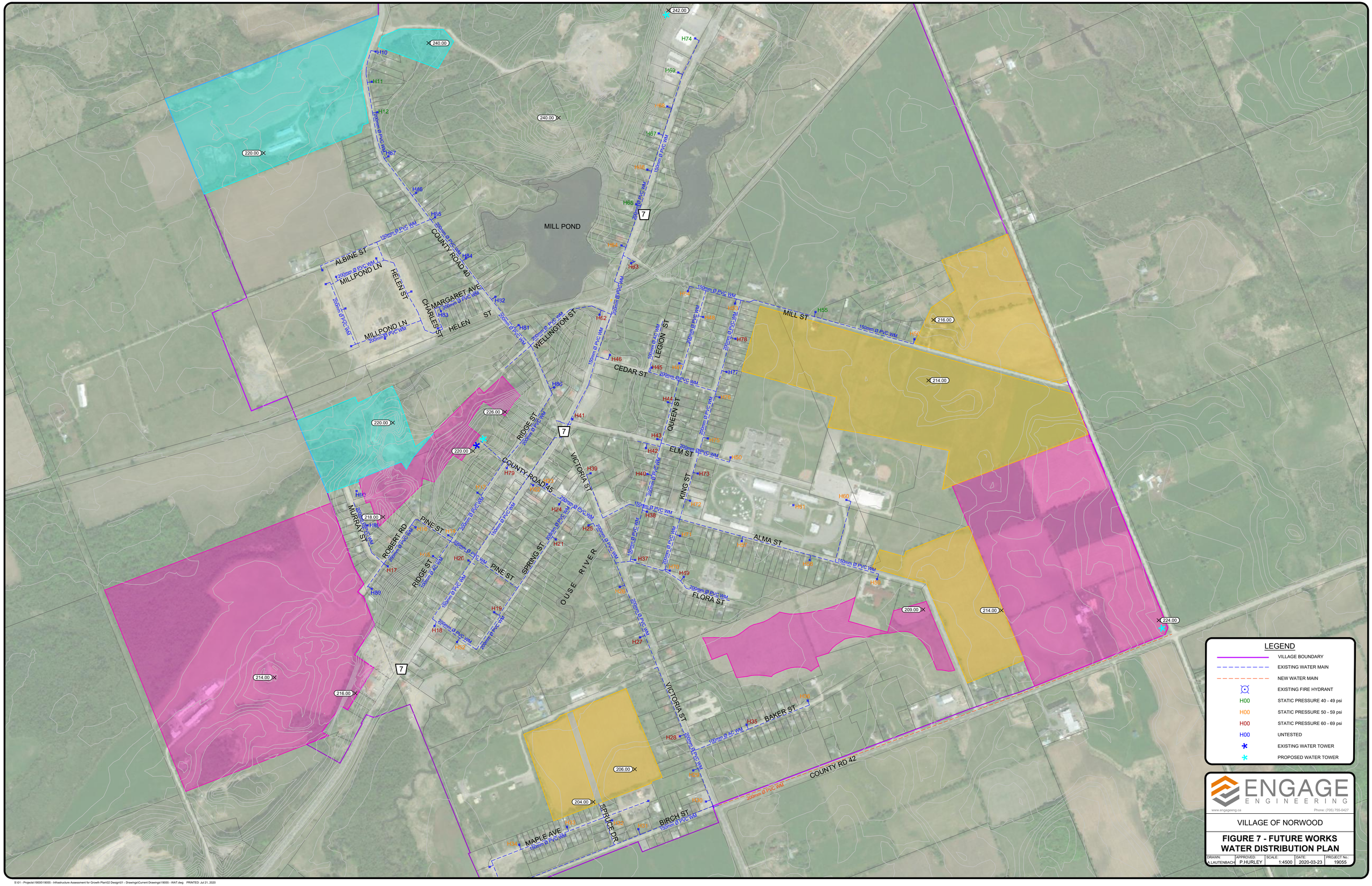


LEGEND

- VILLAGE BOUNDARY
- EXISTING WATER MAIN
- NEW WATER MAIN
- EXISTING FIRE HYDRANT
- H00 STATIC PRESSURE 40 - 49 psi
- H00 STATIC PRESSURE 50 - 59 psi
- H00 STATIC PRESSURE 60 - 69 psi
- H00 UNTESTED
- EXISTING WATER TOWER
- PROPOSED WATER TOWER

ENGAGE ENGINEERING
www.engageeng.ca
Phone: (705) 755-0427

VILLAGE OF NORWOOD

FIGURE 7 - FUTURE WORKS WATER DISTRIBUTION PLAN

DRAWN:	APPROVED:	SCALE:	DATE:	PROJECT No.:
A.LAUTENBACH	P.HURLEY	1:4500	2020-03-23	19055

Township of Asphodel-Norwood
Village of Norwood and TVE **2016**
Fire Hydrant Flows for Colour Coding as per NFPA - USGPM

US Gal per minute	1500 +
US Gal per minute	1000-1500
US Gal per minute	500-1000
US Gal per minute	500 -

Date	Hydrant Number	Street Location	Static Pressure	Pitot Pressure	Residual Pressure	hr Pressure	hf Pressure	1 Port Flow	Total 1 Port Flow at 20 psi
Nov	**10**	159 County Road 40				-20	0	0	0
Nov	**11**	163 County Road 40	46	28	30	26	16	888	1154
Nov	**12**	181 County Rd 40	45	24	31	25	14	822	1124
18-Nov	**13**	52 Ridge Street	52	32	34	32	18	949	1295
Nov	**14**	68 Ridge Street	57	48	53	37	4	1163	3865
Nov	**15**	74 Ridge Street	55	16	52	35	3	671	2529
Nov	**16**	101 Robert Road	55	40	51	35	4	1061	3424
Nov	**17**	113 Robert Road	62	32	46	42	16	949	1598
16-Nov	**18**	Corner of Oak Street & Highway 7	62	18	56	42	6	712	2036
16-Nov	**19**	54 Spring Street	66	36	52	46	14	1007	1914
16-Nov	**20**	4222 Highway 7	62	32	55	42	7	949	2498
16-Nov	**21**	30 Spring Street	60	35	42	40	18	993	1528
16-Nov	**22**	Corner of Highway 7 & County Road 45	58	42	53	38	5	1087	3251
16-Nov	**23**	2369 County Road 45	56	60	38	36	18	1300	1890
16-Nov	**24**	2362 County Road 45	60	54	56	40	4	1233	4275
15-Nov	**25**	2346 County Road 45	64	45	50	44	14	1126	2089
16-Nov	**26**	2324 County Road 45	58	32	50	50	8	949	2553
16-Nov	**27**	2298 County Road 45	63	46	52	43	11	1138	2376

Township of Asphodel-Norwood
Village of Norwood and TVE
Fire Hydrant Flows for Colour Coding as per NFPA - USGPM

Date	Hydrant Number	Street Location	Static Pressure	Pitot Pressure	Residual Pressure	hr Pressure	hf Pressure	1 Port Flow	Total 1 Port Flow at 20 psi
16-Nov	**28**	2272 County Road 45	66	39	58	46	8	1048	2695
16-Nov	**29**	2264 County Road 45	59	38	43	39	16	1034	1673
Nov	**30**	2254 County Road 45	56	40	43	36	13	1061	1839

17-Nov	**31**	22 Birch Street	57	16	26	37	31	671	738
17-Nov	**32**	7 Spruce Street	54	16	26	34	28	671	745
17-Nov	**33**	11 Maple Street	56	22	27	36	29	787	884
18-Nov	**34**	29 Maple Street	58	21	26	38	32	769	844
21-Nov	**35**	16 Baker Street	62	28	41	42	21	888	1291
18-Nov	**36**	40 Baker Street	56	40	43	36	13	1061	1839
17-Nov	**37**	11 Queen Street	60	38	42	40	18	1034	1592
17-Nov	**38**	21 Queen Street	60	40	35	40	25	1061	1368
17-Nov	**39**	38 Victoria Street	62	20	22	42	40	750	770
17-Nov	**40**	30 Queen Street	60	38	49	40	11	1034	2077
18-Nov	**41**	4289 Highway 7	60	25	32	40	28	839	1017
17-Nov	**42**	31 Elm Street	62	32	40	42	22	949	1346
17-Nov	**43**	40 Queen Street	60	30	40	40	20	919	1336
17-Nov	**44**	52 Queen Street	60	35	38	40	22	993	1371
17-Nov	**45**	61 Legion Street	60	12	56	40	4	581	2015
15-Nov	**46**	Highway 7 & Cedar Street	62	40	42	42	20	1061	1584
17-Nov	**47**	62 Queen Street	58	44	40	51	18	1113	1953
17-Nov	**48**	83 Queen Street	58	30	38	38	20	919	1300
17-Nov	**49**	26 Flora Street	63	20	60	43	3	750	3160
21-Nov	**50**	44 Elm Street (Norwood High School)	58	32	38	38	20	949	1342
16-Nov	**51**	Corner of County Road 45 & Birch Street	50	28	30	30	20	888	1105
16-Nov	**52**	55 Oak Street (St.Pauls School)	50	38	38	50	12	1034	2235
16-Nov	**53**	Corner of King Street and Mill Street	50	30	32	30	18	919	1211
17-Nov	**54**	23 Mill Street	58	30	34	38	24	919	1178
21-Nov	**55**	67 Mill Street	48	18	20	28	28	712	712

Township of Asphodel-Norwood

Village of Norwood and TVE

Fire Hydrant Flows for Colour Coding as per NFPA - USGPM

Date	Hydrant Number	Street Location	Static Pressure	Pitot Pressure	Residual Pressure	hr Pressure	hf Pressure	1 Port Flow	Total 1 Port Flow at 20 psi
21-Nov	**56**	106 Mill Street	50	18	18	30	32	712	688
21-Nov	**57**	55 Alma Street	54	32	32	34	22	949	1201
21-Nov	**58**	79 Alma Street	59	20	22	39	37	750	772

21-Nov	**59**	99 Alma Street	52	22	28	32	24	787	919
21-Nov	**60**	Asphodel Norwood Community Centre	54	20	24	34	30	750	803
21-Nov	**61**	Norwood Fair Grounds	50	24	22	30	28	822	853
15-Nov	**62**	Corner of Wellington and Highway 7	60	35	42	40	18	993	1528
15-Nov	**63**	Corner of Mill Street & Highway 7	60	25	30	40	30	839	980
15-Nov	**64**	12 Belmont Street	54	25	26	34	28	839	932
15-Nov	**65**	26 Belmont Street	48	25	24	28	24	839	912
15-Nov	**66**	4388 Highway 7	50	20	22	30	28	750	779
15-Nov	**67**	4420 Highway 7	48	17.5	16	28	32	702	653
15-Nov	**68**	4408 Highway 7	50	25	20	30	30	839	839
15-Nov	**69**	4420Highway 7	48	19	15	28	30	731	705
17-Nov	**70**	11 King Street	58	35	40	38	18	993	1486
17-Nov	**71**	23 King Street	58	38	30	38	28	1034	1220
17-Nov	**72**	27 King Street	58	38	38	38	20	1034	1463
21-Nov	**73**	35 King Street	60	35	40	40	20	993	1443
15-Nov	**74**	4440 Highway 7	49	20	20	29	29	750	750
17-Nov	**75**	43 King Street	58	38	38	38	20	1034	1463
17-Nov	**76**	57 King Street	58	35	34	38	24	993	1272
Nov	**77**	67 King Street				-20	0	0	0
17-Nov	**78**	79 King Street	61	38	48	41	13	1034	1923
Nov	**79**	Corner County Road 40 & Ridge Street	61	37	49	41	12	1021	1982
Nov	**80**	37 County Road 40				-20	0	0	0
Nov	**81**	59 County Road 40				-20	0	0	0
Nov	**82**	77 County Road 40				-20	0	0	0
Nov	**83**	32 Helen Street				-20	0	0	0

Township of Asphodel-Norwood 653

Village of Norwood and TVE 4275

Fire Hydrant Flows for Colour Coding as per NFPA - USGPM

Date	Hydrant Number	Street Location	Static Pressure	Pitot Pressure	Residual Pressure	hr Pressure	hf Pressure	1 Port Flow	Total 1 Port Flow at 20 psi
Nov	**84**	91 County Road 40				-20	0	0	0
Nov	**85**	105 County Road 40				-20	0	0	0
Nov	**86**	123 County Road 40				-20	0	0	0

Nov	**87**	137 County Road 40				-20	0	0	0
Nov	**88**	121 Robert Road				-20	0	0	0
Nov	**89**	6 Murray Street				-20	0	0	0
Nov	**90**	20 Murray Street				-20	0	0	0
Nov	**91**					-20	0	0	0
Nov	**92**					-20	0	0	0
Nov	**93**					-20	0	0	0
Nov	**94**					-20	0	0	0
Nov	**95**					-20	0	0	0
Nov	**96**					-20	0	0	0
Nov	**97**					-20	0	0	0
Nov	**98**					-20	0	0	0
Nov	**99**					-20	0	0	0
Nov	**100**					-20	0	0	0
Nov	**101**					-20	0	0	0
Nov	**102**					-20	0	0	0
Nov	**103**					-20	0	0	0
Nov	**104**					-20	0	0	0
Nov	**105**					-20	0	0	0
Nov	**106**					-20	0	0	0
Nov	**107**					-20	0	0	0
Nov	**108**					-20	0	0	0
Nov	**109**					-20	0	0	0
Nov	**110**					-20	0	0	0

Township of Asphodel-Norwood
Village of Norwood and TVE

Fire Hydrant Flows for Colour Coding as per NFPA - USGPM

Date	Hydrant Number	Street Location	Static Pressure	Pitot Pressure	Residual Pressure	hr Pressure	hf Pressure	1 Port Flow	Total 1 Port Flow at 20 psi
Nov	**111**					-20	0	0	0
Nov	**112**					-20	0	0	0

Norwood Water Model (JLR 29837)

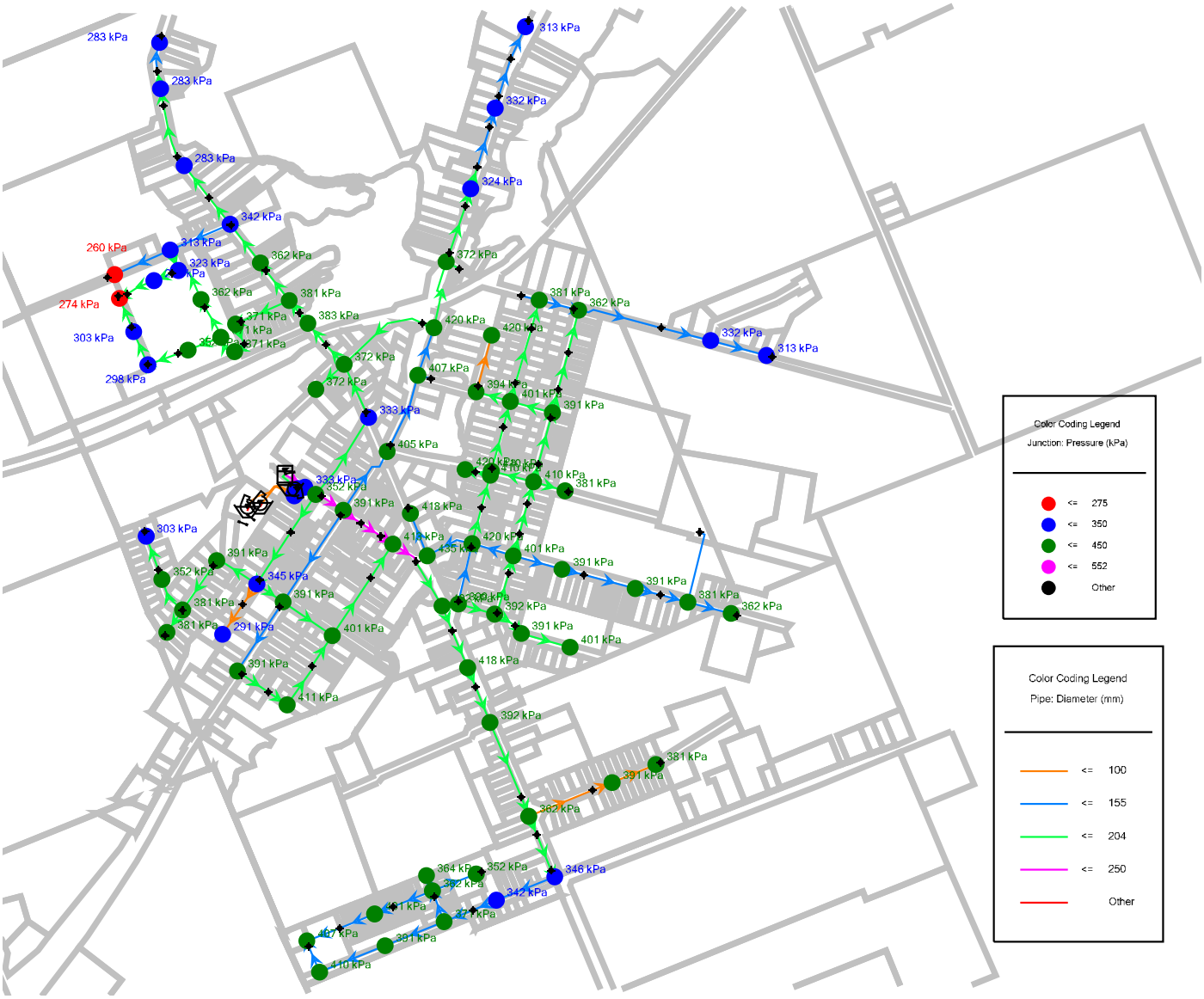
Junctions

Norwood Water Model (JLR 29837)
Junction Elevations

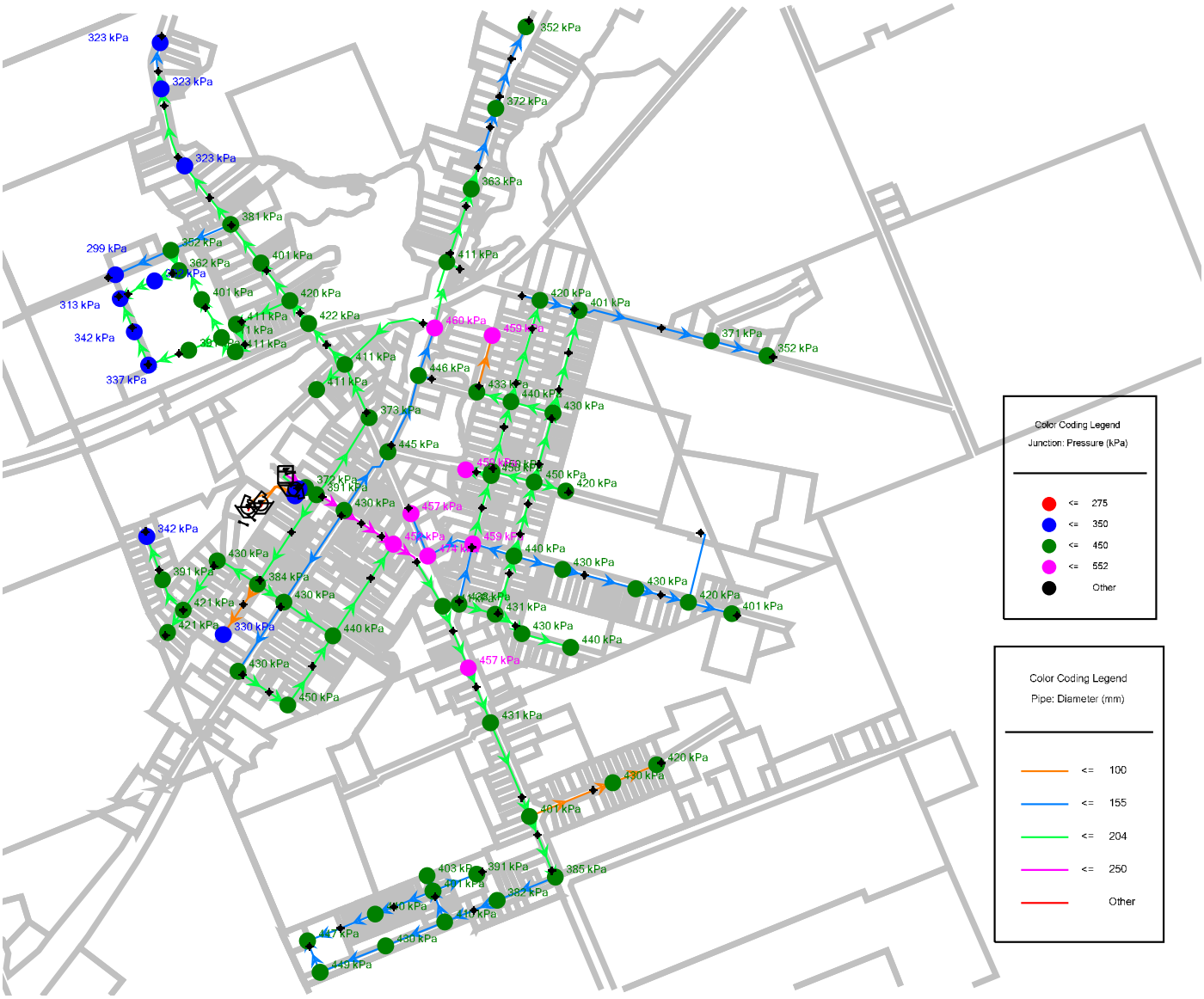
Norwood Water Model (JLR 29837)
Hydrants

Norwood Water Model (JLR 29837)
Hydrant Elevations

Norwood Water Model (JLR 29837)
Average Day Demand - Pressures
Existing Conditions - HGL 242.00 m



Norwood Water Model (JLR 29837)
Average Day Demand - Pressures
Location 1 - HGL 246.00 m



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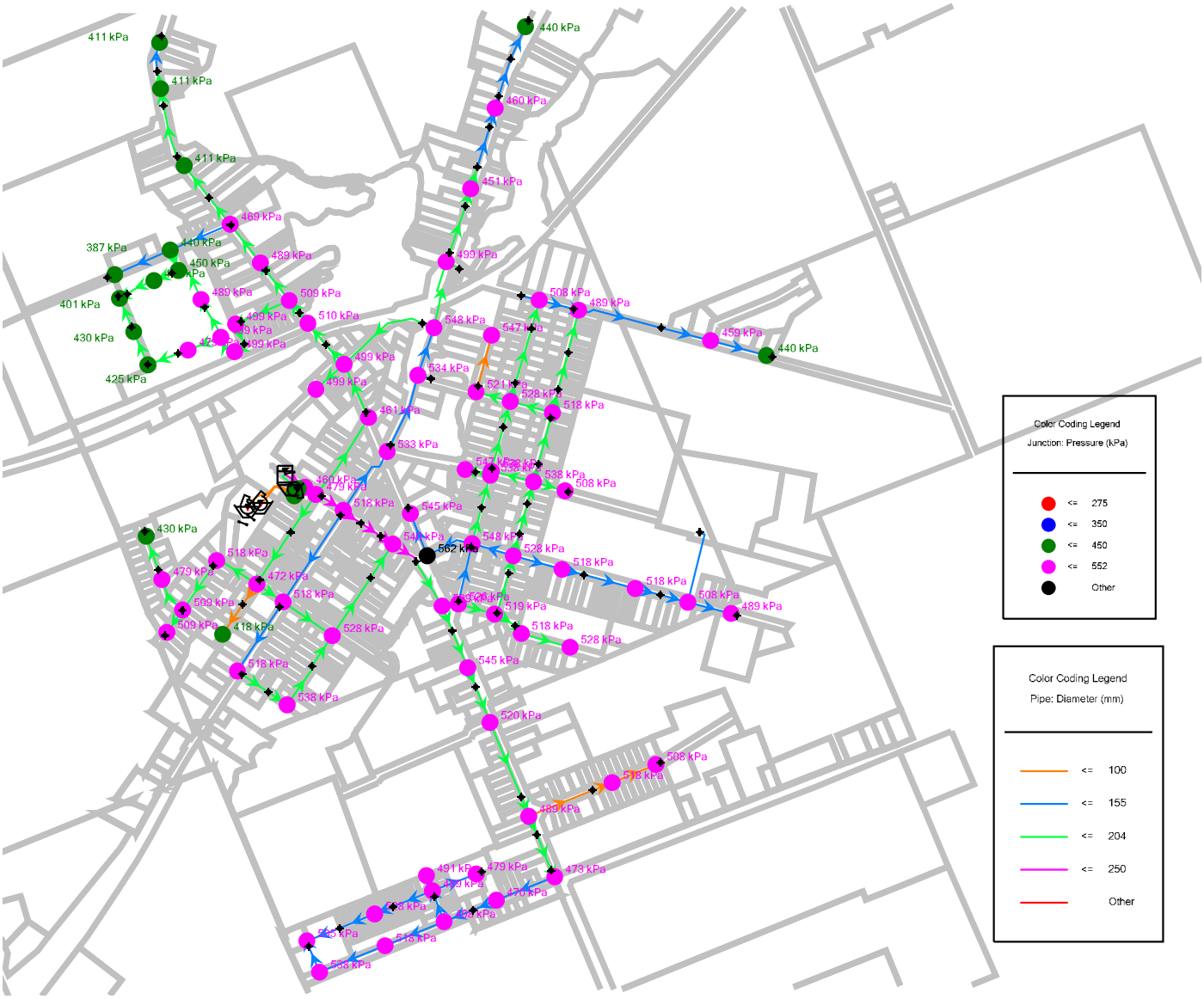
Norwood Water Model (JLR 29837)
Average Day Demand - Pressures
Location 1 - HGL 255.00 m



Norwood - Location 1 - Average Day Demand

LOCATION 1 (HGL 242)		
ID	Label	Pressure
198	J79	260
193	J74	274
203	J84	283
202	J83	283
201	J82	283
128	J9	291
194	J75	293
191	J72	298
192	J73	303
126	J7	303
204	J85	313
197	J78	313
182	J63	313
195	J76	323
180	J61	324
159	J40	332
181	J62	332
120	J1	333
176	J57	333
200	J81	342
166	J47	342
122	J3	345
165	J46	346
174	J55	352
190	J71	352
125	J6	352
121	J2	352
144	J25	362
158	J39	362
196	J77	362
199	J80	362
162	J43	362
172	J53	362
173	J54	364
167	J48	371
189	J70	371
188	J69	371
187	J68	371
179	J60	372
183	J64	372
184	J65	372
164	J45	381
143	J24	381
157	J38	381
152	J33	381
186	J67	381
127	J8	381

LOCATION 1 (HGL 246 LWL)		
ID	Label	Pressure
198	J79	299
193	J74	313
203	J84	323
202	J83	323
201	J82	323
128	J9	330
194	J75	332
191	J72	337
192	J73	342
126	J7	342
204	J85	352
197	J78	352
182	J63	352
195	J76	362
180	J61	363
159	J40	371
181	J62	372
120	J1	372
176	J57	373
200	J81	381
166	J47	382
122	J3	384
165	J46	385
174	J55	391
190	J71	391
125	J6	391
121	J2	391
144	J25	401
158	J39	401
196	J77	401
199	J80	401
162	J43	401
172	J53	401
173	J54	403
167	J48	410
189	J70	411
188	J69	411
187	J68	411
179	J60	411
183	J64	411
184	J65	411
164	J45	420
143	J24	420
157	J38	420
152	J33	420
186	J67	420
127	J8	421

LOCATION 1 (HGL 255 HWL)		
ID	Label	Pressure
198	J79	387
193	J74	401
203	J84	411
202	J83	411
201	J82	411
128	J9	418
194	J75	420
191	J72	425
192	J73	430
126	J7	430
204	J85	440
197	J78	440
182	J63	440
195	J76	450
180	J61	451
159	J40	459
181	J62	460
120	J1	460
176	J57	461
200	J81	469
166	J47	470
122	J3	472
165	J46	473
174	J55	479
190	J71	479
125	J6	479
121	J2	479
144	J25	489
158	J39	489
196	J77	489
199	J80	489
162	J43	489
172	J53	489
173	J54	491
167	J48	498
189	J70	499
188	J69	499
187	J68	499
179	J60	499
183	J64	499
184	J65	499
164	J45	508
143	J24	508
157	J38	508
152	J33	508
186	J67	509
127	J8	509

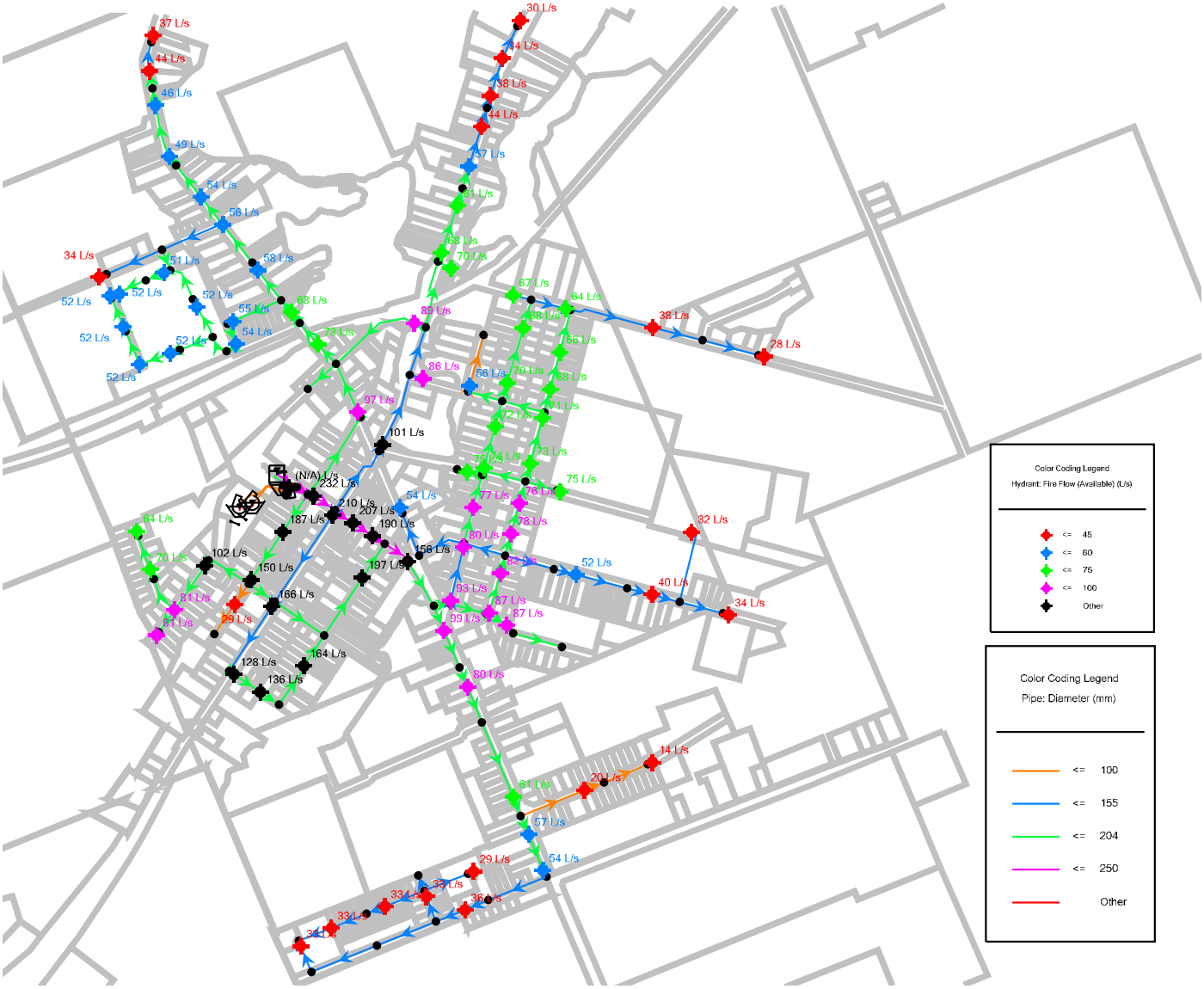
Norwood - Location 1 - Average Day Demand

LOCATION 1 (HGL 242)		
ID	Label	Pressure
124	J5	381
185	J66	383
168	J49	391
163	J44	391
142	J23	391
153	J34	391
141	J22	391
138	J19	391
130	J11	391
129	J10	391
123	J4	391
133	J14	391
137	J18	392
161	J42	392
155	J36	394
136	J17	399
171	J52	401
154	J35	401
140	J21	401
139	J20	401
132	J13	401
135	J16	402
175	J56	405
177	J58	407
170	J51	407
169	J50	410
150	J31	410
151	J32	410
149	J30	410
131	J12	411
134	J15	413
160	J41	418
147	J28	418
156	J37	420
148	J29	420
145	J26	420
178	J59	420
146	J27	435

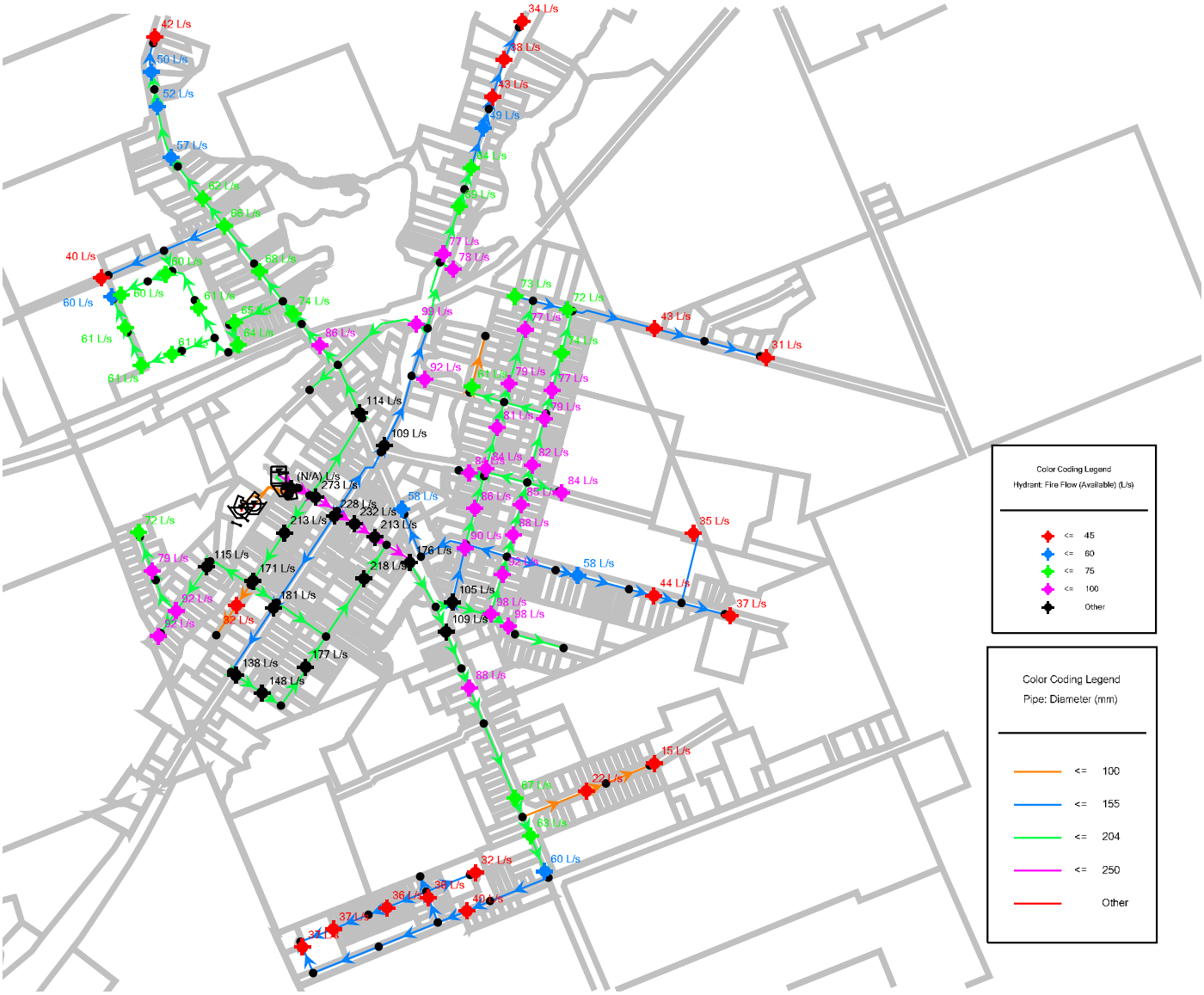
LOCATION 1 (HGL 246 LWL)		
ID	Label	Pressure
124	J5	421
185	J66	422
168	J49	430
163	J44	430
142	J23	430
153	J34	430
141	J22	430
138	J19	430
130	J11	430
129	J10	430
123	J4	430
133	J14	430
137	J18	431
161	J42	431
155	J36	433
136	J17	438
171	J52	440
154	J35	440
140	J21	440
139	J20	440
132	J13	440
135	J16	441
175	J56	445
177	J58	446
170	J51	447
169	J50	449
150	J31	450
151	J32	450
149	J30	450
131	J12	450
134	J15	452
160	J41	457
147	J28	457
156	J37	459
148	J29	459
145	J26	459
178	J59	460
146	J27	474

LOCATION 1 (HGL 255 HWL)		
ID	Label	Pressure
124	J5	509
185	J66	510
168	J49	518
163	J44	518
142	J23	518
153	J34	518
141	J22	518
138	J19	518
130	J11	518
129	J10	518
123	J4	518
133	J14	518
137	J18	519
161	J42	520
155	J36	521
136	J17	526
171	J52	528
154	J35	528
140	J21	528
139	J20	528
132	J13	528
135	J16	529
175	J56	533
177	J58	534
170	J51	535
169	J50	538
150	J31	538
151	J32	538
149	J30	538
131	J12	538
134	J15	540
160	J41	545
147	J28	545
156	J37	547
148	J29	547
145	J26	548
178	J59	548
146	J27	562

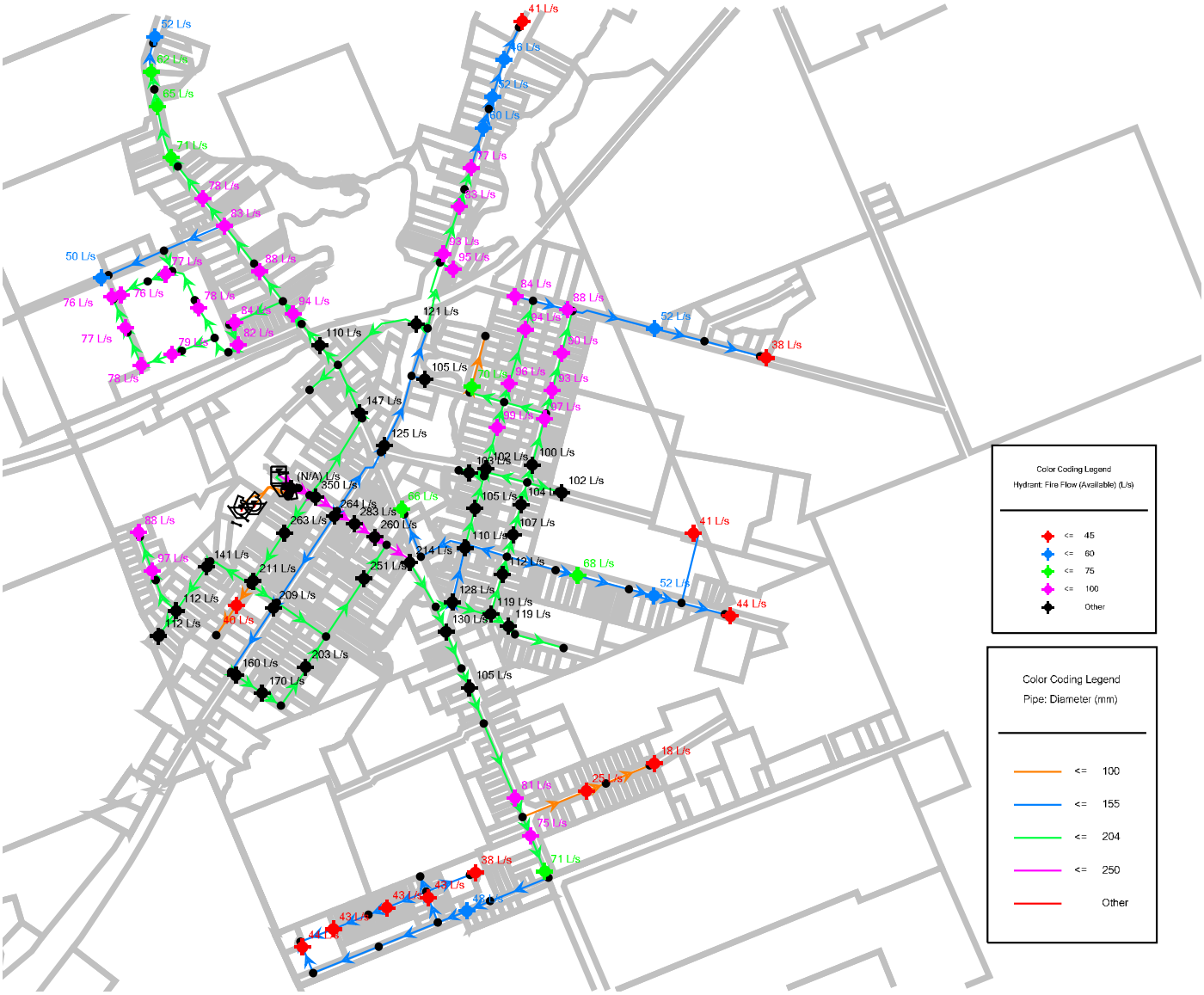
Norwood Water Model (JLR 29837)
Maximum Day Demand - Fire Flows
Existing Conditions - HGL 242.00 m



Norwood Water Model (JLR 29837)
Maximum Day Demand - Fire Flows
Location 1 - HGL 246.00 m



Norwood Water Model (JLR 29837)
Maximum Day Demand - Fire Flows
Location 1 - HGL 255.00 m



Norwood - Location 1 - Maximum Day Demand + Fire Flow

LOCATION 1 (HGL 242)		
ID	Label	Fire Flow
54	H36	14
53	H35	20
86	H56	28
47	H15	29
119	H101	29
98	H74	30
67	H60	32
56	H32	33
57	H33	33
58	H34	33
118	H100	33
97	H69	34
66	H59	34
117	H102	34
55	H31	36
108	H10	37
85	H55	38
96	H68	38
65	H58	40
107	H11	44
95	H67	44
106	H12	46
105	H87	49
115	H105	51
114	H106	52
113	H107	52
112	H108	52
116	H104	52
111	H109	52
110	H110	52
64	H57	52
77	H39	54
52	H30	54
109	H103	54
104	H86	54
101	H83	55
78	H45	56
103	H85	56
94	H66	57
51	H29	57
102	H84	58
50	H28	61
93	H65	61
100	H82	63
45	H90	64

LOCATION 1 (HGL 246 LWL)		
ID	Label	Fire Flow
54	H36	15
53	H35	22
86	H56	31
119	H101	32
47	H15	32
98	H74	34
67	H60	35
56	H32	36
57	H33	36
58	H34	37
118	H100	37
66	H59	37
97	H69	38
117	H102	40
55	H31	40
108	H10	42
85	H55	43
96	H68	43
65	H58	44
95	H67	49
107	H11	50
106	H12	52
105	H87	57
64	H57	58
77	H39	58
52	H30	60
113	H107	60
115	H105	60
114	H106	60
78	H45	61
112	H108	61
116	H104	61
111	H109	61
110	H110	61
104	H86	62
51	H29	63
109	H103	64
94	H66	64
101	H83	65
103	H85	66
50	H28	67
102	H84	68
93	H65	69
45	H90	72
82	H53	72

LOCATION 1 (HGL 255 HWL)		
ID	Label	Fire Flow
54	H36	18
53	H35	25
86	H56	38
119	H101	38
47	H15	40
98	H74	41
67	H60	41
56	H32	43
57	H33	43
58	H34	43
118	H100	44
66	H59	44
97	H69	46
55	H31	48
117	H102	50
65	H58	52
108	H10	52
96	H68	52
85	H55	52
95	H67	60
107	H11	62
106	H12	65
77	H39	66
64	H57	68
78	H45	70
105	H87	71
52	H30	71
51	H29	75
113	H107	76
114	H106	76
112	H108	77
115	H105	77
94	H66	77
104	H86	78
111	H109	78
116	H104	78
110	H110	79
50	H28	81
109	H103	82
93	H65	83
103	H85	83
101	H83	84
81	H54	84
45	H90	88
102	H84	88

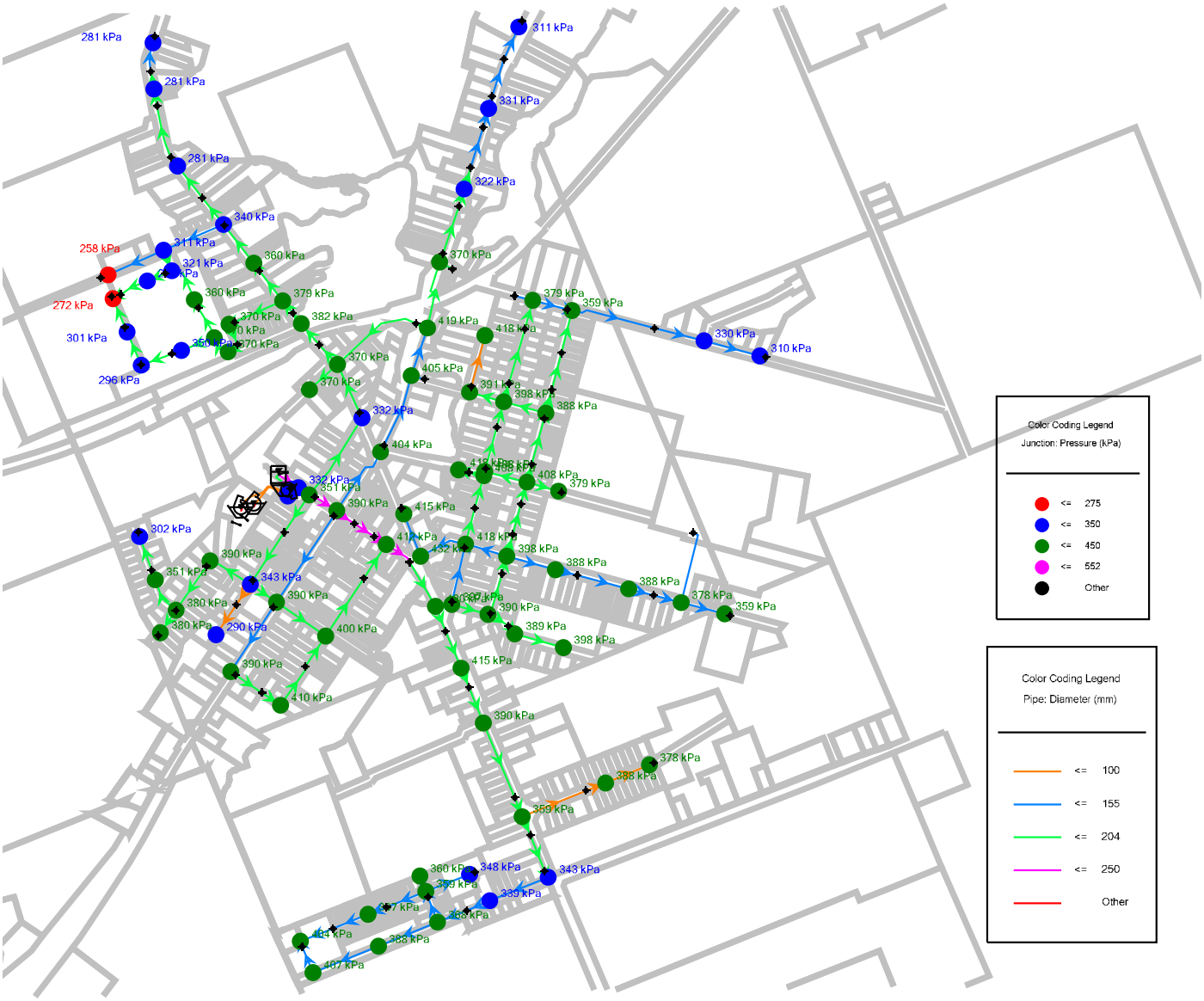
Norwood - Location 1 - Maximum Day Demand + Fire Flow

LOCATION 1 (HGL 242)		
ID	Label	Fire Flow
82	H53	64
84	H78	66
81	H54	67
83	H77	68
92	H64	68
80	H48	68
91	H63	70
79	H47	70
44	H89	70
72	H76	71
73	H44	72
99	H81	73
71	H75	73
74	H43	74
70	H50	75
75	H42	75
69	H73	76
76	H40	77
68	H72	78
49	H27	80
63	H38	80
43	H17	81
42	H88	81
62	H71	82
89	H46	86
60	H70	87
61	H49	87
90	H62	89
59	H37	93
88	H80	97
48	H26	99
87	H41	101
46	H16	102
41	H18	128
40	H52	136
37	H14	150
34	H25	156
39	H19	164
38	H20	166
36	H13	187
33	H24	190
35	H21	197
32	H23	207
31	H22	210
30	H79	232

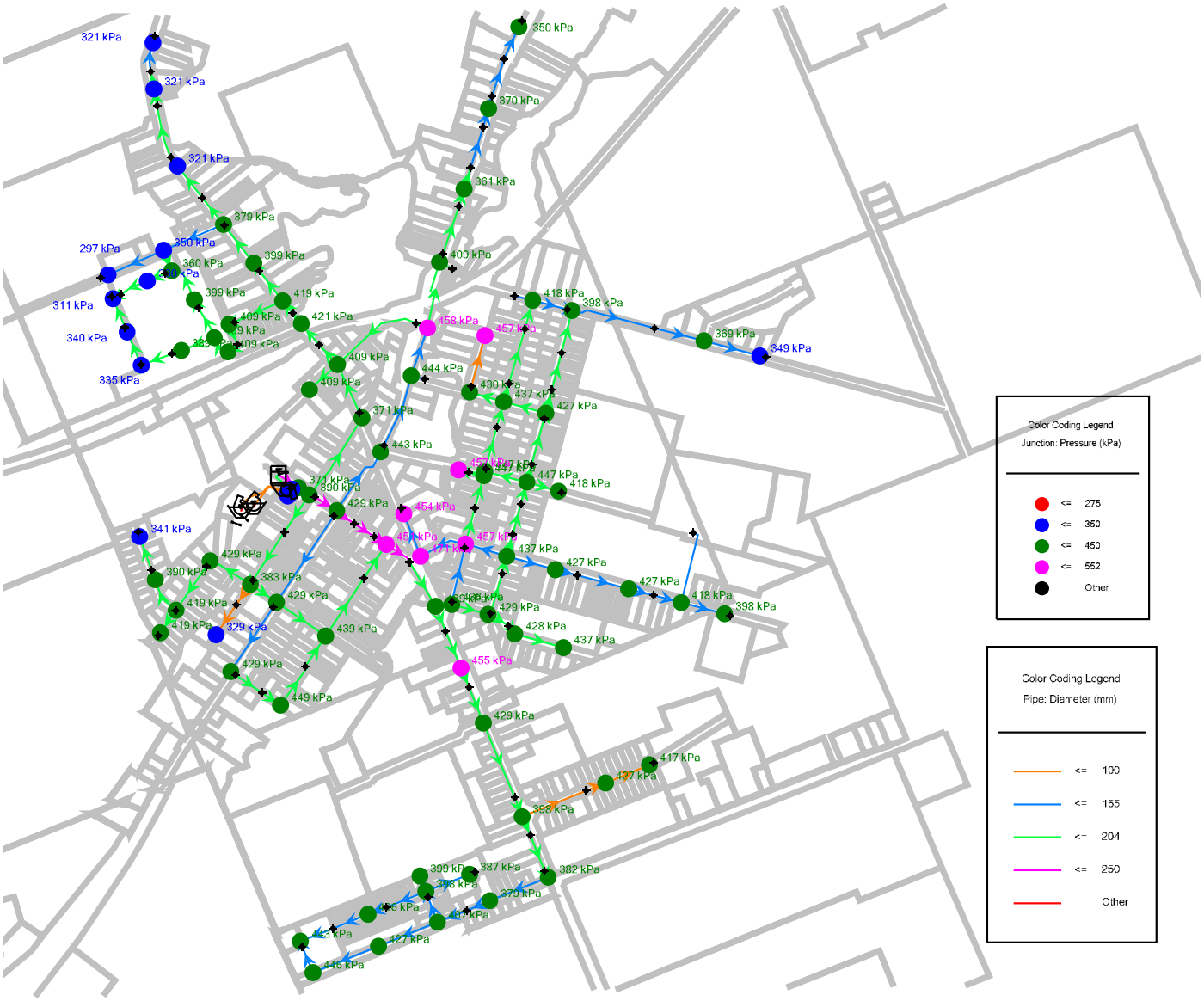
LOCATION 1 (HGL 246 LWL)		
ID	Label	Fire Flow
81	H54	73
100	H82	74
84	H78	74
92	H64	77
83	H77	77
80	H48	77
91	H63	78
79	H47	79
44	H89	79
72	H76	79
73	H44	81
71	H75	82
74	H43	84
70	H50	84
75	H42	84
69	H73	85
99	H81	86
76	H40	86
68	H72	88
49	H27	88
63	H38	90
43	H17	92
42	H88	92
62	H71	92
89	H46	92
60	H70	98
61	H49	98
90	H62	99
59	H37	105
87	H41	109
48	H26	109
88	H80	114
46	H16	115
41	H18	138
40	H52	148
37	H14	171
34	H25	176
39	H19	177
38	H20	181
36	H13	213
33	H24	213
35	H21	218
31	H22	228
32	H23	232
30	H79	273

LOCATION 1 (HGL 255 HWL)		
ID	Label	Fire Flow
82	H53	88
84	H78	90
92	H64	93
83	H77	93
80	H48	94
100	H82	94
91	H63	95
79	H47	96
44	H89	97
72	H76	97
73	H44	99
71	H75	100
74	H43	102
70	H50	102
75	H42	103
69	H73	104
49	H27	105
89	H46	105
76	H40	105
68	H72	107
63	H38	110
99	H81	110
43	H17	112
42	H88	112
62	H71	112
60	H70	119
61	H49	119
90	H62	121
87	H41	125
59	H37	128
48	H26	130
46	H16	141
88	H80	147
41	H18	160
40	H52	170
39	H19	203
38	H20	209
37	H14	211
34	H25	214
35	H21	251
33	H24	260
36	H13	263
31	H22	264
32	H23	283
30	H79	350

Norwood Water Model (JLR 29837)
Peak Hour Demand - Pressures
Existing Conditions - HGL 242.00 m



Norwood Water Model (JLR 29837)
Peak Hour Demand - Pressures
Location 1 - HGL 246.00 m



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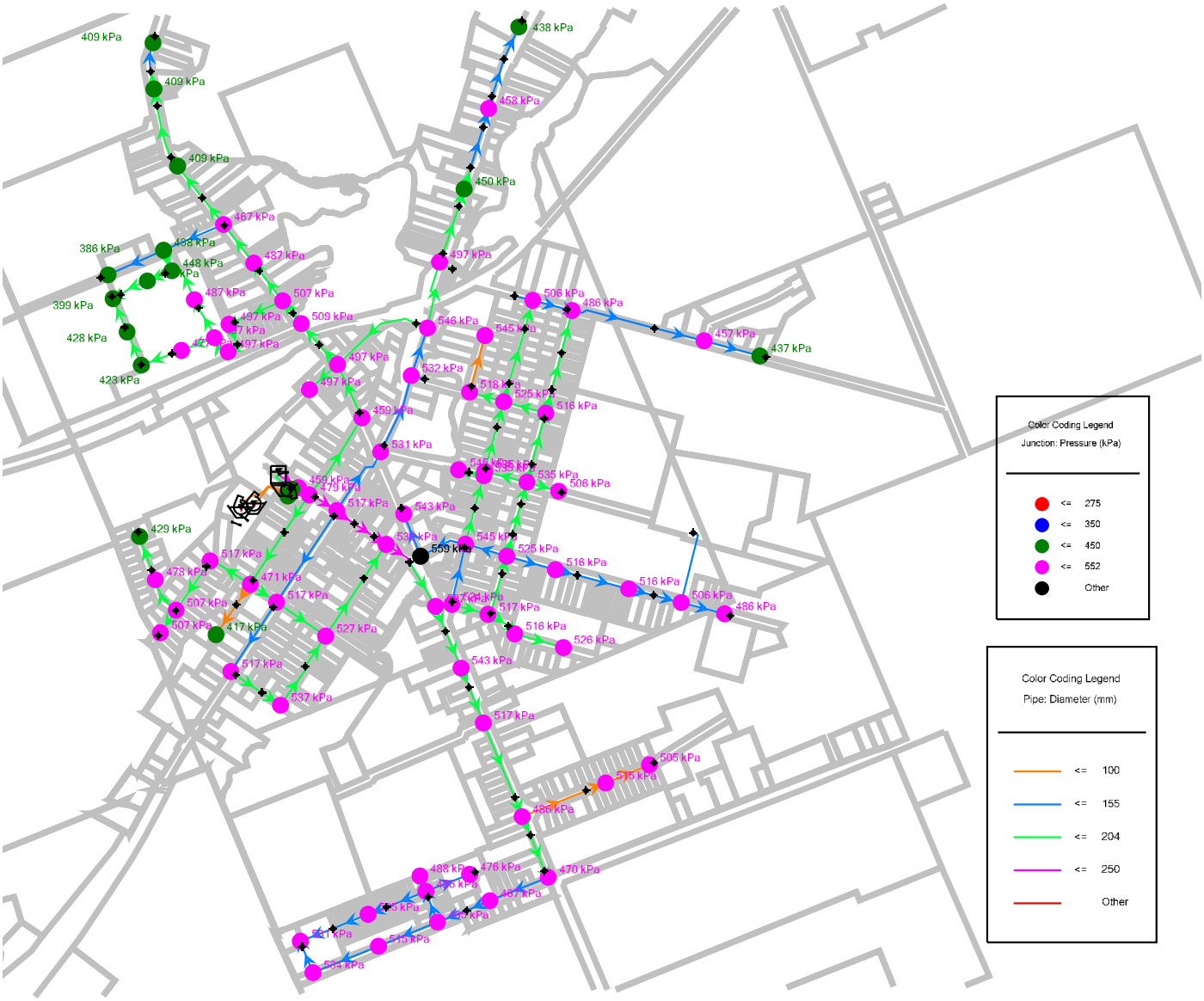
Norwood Water Model (JLR 29837)
Peak Hour Demand - Pressures
Location 1 - HGL 255.00 m



Norwood - Location 1 - Peak Hour Demand

LOCATION 1 (HGL 242)		
ID	Label	Pressure
198	J79	258
193	J74	272
203	J84	281
202	J83	281
201	J82	281
128	J9	290
194	J75	291
191	J72	296
192	J73	301
126	J7	302
204	J85	310
197	J78	311
182	J63	311
195	J76	321
180	J61	322
159	J40	330
181	J62	331
120	J1	332
176	J57	332
166	J47	339
200	J81	340
165	J46	343
122	J3	343
174	J55	348
190	J71	350
125	J6	351
121	J2	351
172	J53	359
144	J25	359
158	J39	359
162	J43	359
196	J77	360
199	J80	360
173	J54	360
167	J48	368
189	J70	370
188	J69	370
187	J68	370
179	J60	370
184	J65	370
183	J64	370
164	J45	378
143	J24	378
157	J38	379
152	J33	379
186	J67	379
127	J8	380

LOCATION 1 (HGL 246 LWL)		
ID	Label	Pressure
198	J79	297
193	J74	311
203	J84	321
202	J83	321
201	J82	321
128	J9	329
194	J75	330
191	J72	335
192	J73	340
126	J7	341
204	J85	349
197	J78	350
182	J63	350
195	J76	360
180	J61	361
159	J40	369
181	J62	370
120	J1	371
176	J57	371
166	J47	379
200	J81	379
165	J46	382
122	J3	383
174	J55	387
190	J71	389
125	J6	390
121	J2	390
172	J53	398
144	J25	398
158	J39	398
162	J43	398
196	J77	399
199	J80	399
173	J54	399
167	J48	407
189	J70	409
188	J69	409
187	J68	409
179	J60	409
184	J65	409
183	J64	409
164	J45	417
143	J24	418
157	J38	418
152	J33	418
186	J67	419
127	J8	419

LOCATION 1 (HGL 255 HWL)		
ID	Label	Pressure
198	J79	386
193	J74	399
203	J84	409
202	J83	409
201	J82	409
128	J9	417
194	J75	418
191	J72	423
192	J73	428
126	J7	429
204	J85	437
197	J78	438
182	J63	438
195	J76	448
180	J61	450
159	J40	457
181	J62	458
120	J1	459
176	J57	459
166	J47	467
200	J81	467
165	J46	470
122	J3	471
174	J55	476
190	J71	477
125	J6	478
121	J2	479
172	J53	486
144	J25	486
158	J39	486
162	J43	486
196	J77	487
199	J80	487
173	J54	488
167	J48	495
189	J70	497
188	J69	497
187	J68	497
179	J60	497
184	J65	497
183	J64	497
164	J45	505
143	J24	506
157	J38	506
152	J33	506
186	J67	507
127	J8	507

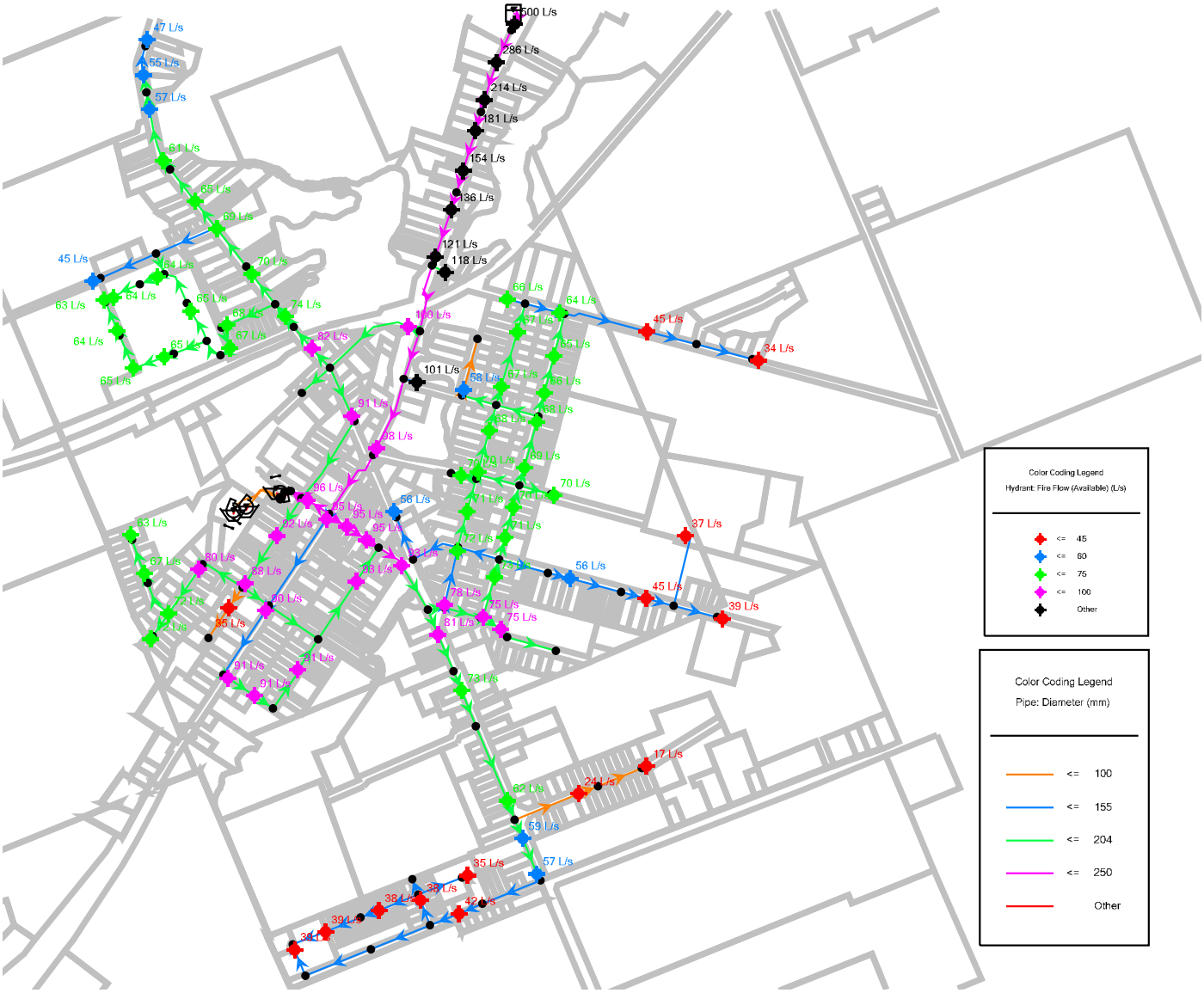
Norwood - Location 1 - Peak Hour Demand

LOCATION 1 (HGL 242)		
ID	Label	Pressure
124	J5	380
185	J66	382
168	J49	388
163	J44	388
142	J23	388
153	J34	388
141	J22	388
138	J19	389
137	J18	390
161	J42	390
130	J11	390
129	J10	390
123	J4	390
133	J14	390
155	J36	391
136	J17	397
171	J52	397
154	J35	398
140	J21	398
139	J20	398
132	J13	400
135	J16	400
170	J51	404
175	J56	404
177	J58	405
169	J50	407
150	J31	408
151	J32	408
149	J30	408
131	J12	410
134	J15	412
147	J28	415
160	J41	415
156	J37	418
148	J29	418
145	J26	418
178	J59	419
146	J27	432

LOCATION 1 (HGL 246 LWL)		
ID	Label	Pressure
124	J5	419
185	J66	421
168	J49	427
163	J44	427
142	J23	427
153	J34	427
141	J22	427
138	J19	428
137	J18	429
161	J42	429
130	J11	429
129	J10	429
123	J4	429
133	J14	429
155	J36	430
136	J17	436
171	J52	436
154	J35	437
140	J21	437
139	J20	437
132	J13	439
135	J16	439
170	J51	443
175	J56	443
177	J58	444
169	J50	446
150	J31	447
151	J32	447
149	J30	447
131	J12	449
134	J15	451
147	J28	454
160	J41	455
156	J37	457
148	J29	457
145	J26	457
178	J59	458
146	J27	471

LOCATION 1 (HGL 255 HWL)		
ID	Label	Pressure
124	J5	507
185	J66	509
168	J49	515
163	J44	515
142	J23	516
153	J34	516
141	J22	516
138	J19	516
137	J18	517
161	J42	517
130	J11	517
129	J10	517
123	J4	517
133	J14	517
155	J36	518
136	J17	524
171	J52	525
154	J35	525
140	J21	525
139	J20	526
132	J13	527
135	J16	527
170	J51	531
175	J56	531
177	J58	532
169	J50	534
150	J31	535
151	J32	535
149	J30	535
131	J12	537
134	J15	539
147	J28	543
160	J41	543
156	J37	545
148	J29	545
145	J26	545
178	J59	546
146	J27	559

Norwood Water Model (JLR 29837)
Maximum Day Demand - Fire Flows
Option 3 with Watermain Upgrades - HGL 255.00 m



Norwood - Location 3 - Maximum Day Demand + Fire Flow

LOCATION 1 (HGL 242)		
ID	Label	Fire Flow
54	H36	14
53	H35	20
86	H56	28
47	H15	29
119	H101	29
98	H74	30
67	H60	32
56	H32	33
57	H33	33
58	H34	33
118	H100	33
97	H69	34
66	H59	34
117	H102	34
55	H31	36
108	H10	37
85	H55	38
96	H68	38
65	H58	40
107	H11	44
95	H67	44
106	H12	46
105	H87	49
115	H105	51
114	H106	52
113	H107	52
112	H108	52
116	H104	52
111	H109	52
110	H110	52
64	H57	52
77	H39	54
52	H30	54
109	H103	54
104	H86	54
101	H83	55
78	H45	56
103	H85	56
94	H66	57
51	H29	57
102	H84	58
50	H28	61
93	H65	61
100	H82	63
45	H90	64

LOCATION 3 (HGL 255 HWL)		
ID	Label	Fire Flow
54	H36	17
53	H35	24
86	H56	34
119	H101	35
47	H15	35
67	H60	37
56	H32	38
57	H33	38
58	H34	39
118	H100	39
66	H59	39
55	H31	42
85	H55	45
65	H58	45
117	H102	45
108	H10	47
107	H11	55
64	H57	56
77	H39	56
106	H12	57
52	H30	57
78	H45	58
51	H29	59
105	H87	61
50	H28	62
45	H90	63
113	H107	63
114	H106	64
115	H105	64
82	H53	64
112	H108	64
116	H104	65
111	H109	65
110	H110	65
84	H78	65
104	H86	65
81	H54	66
83	H77	66
109	H103	67
80	H48	67
44	H89	67
79	H47	67
72	H76	68
101	H83	68
73	H44	68

Norwood - Location 3 - Maximum Day Demand + Fire Flow

LOCATION 1 (HGL 242)		
ID	Label	Fire Flow
82	H53	64
84	H78	66
81	H54	67
83	H77	68
92	H64	68
80	H48	68
91	H63	70
79	H47	70
44	H89	70
72	H76	71
73	H44	72
99	H81	73
71	H75	73
74	H43	74
70	H50	75
75	H42	75
69	H73	76
76	H40	77
68	H72	78
49	H27	80
63	H38	80
43	H17	81
42	H88	81
62	H71	82
89	H46	86
60	H70	87
61	H49	87
90	H62	89
59	H37	93
88	H80	97
48	H26	99
87	H41	101
46	H16	102
41	H18	128
40	H52	136
37	H14	150
34	H25	156
39	H19	164
38	H20	166
36	H13	187
33	H24	190
35	H21	197
32	H23	207
31	H22	210
30	H79	232

LOCATION 3 (HGL 255 HWL)		
ID	Label	Fire Flow
103	H85	69
71	H75	69
74	H43	70
70	H50	70
75	H42	70
102	H84	70
69	H73	70
76	H40	71
68	H72	71
43	H17	72
42	H88	72
63	H38	72
49	H27	73
62	H71	73
100	H82	74
60	H70	75
61	H49	75
59	H37	78
46	H16	80
48	H26	81
99	H81	82
37	H14	88
38	H20	90
41	H18	91
40	H52	91
88	H80	91
39	H19	91
36	H13	92
34	H25	93
35	H21	93
33	H24	95
32	H23	95
31	H22	95
30	H79	96
87	H41	98
90	H62	100
89	H46	101
91	H63	118
92	H64	121
93	H65	136
94	H66	154
95	H67	181
96	H68	214
97	H69	286
98	H74	500

Appendix C: Sanitary Servicing Calculations

Sewage Flows

Project Name:	35 Industrial Drive		**Designed By:**	SYK
Project No:	22056		**Date:**	2023-04-17
Design Criteria				
Commercial/Institutional Sewage Flows:		0.324	L/s/ha (28 m^3/ha/day)	A
Drainage Area		0.83	ha	B
Inflow and Infiltration Rate:		0.28	L/s/ha	C
Calculations				
Commercial/Institutional Sewage Flows:				
	F_{COM} =	A*B		
	=	23235	L/day	
	=	0.27	L/s	
	=	23.23	m³/day	
Inflow and Infiltration Rate:				
	$F_{I\&I}$ =	(H x I)		
	=	20079	L/day	
	=	0.23	L/s	
	=	20.08	m³/day	
Total Proposed Sewage Flows:				
	F_{TOT} =	F_{COM} + $F_{I\&I}$		
	=	43314	L/day	
	=	0.50	L/s	
	=	**43.31**	**m³/day**	

Sanitary Sewer Design Sheet
Proposed + Future

Project Name: 35 Industrial Drive
Project Number: 22056

Flow Rate: 0.32
Infiltration: 0.28
Max Capacity: 80
Location: City of Peterborough

Designed By: SYK
Date: 2023-04-17

Flow	Type	Value	Unit
Commercial	Peak Flow	0.324	L/s/ha

Location			Commercial/Institutional		Area		Flow			Pipe Properties					Hydraulics			
Location/Street Name	From Structure	To Structure	Commercial/Institutional Area(ha)	Cumulative Commercial/Institutional Area (ha)	Catchment Area (ha)	Cumulative Catchment Area (ha)	Commercial/Institutional Peak Flow (L/s)	Infiltration Flow (L/s)	Total Peak Flow (L/s)	Pipe Diameter (mm)	Pipe Slope (%)	Pipe Length (m)	Pipe Material	Mannings 'n'	Velocity in Sewer (m/s)	Pipe Capacity (L/s)	% Capacity	Actual Velocity (m/s)
Building to Spruce Drive	Building	MH1A	0.830	0.830	0.800	0.800	0.27	0.22	0.49	200	2.00	14.5	PVC	0.013	1.48	46.4	1%	0.47
	MH1A	MH2A	0.000	0.830	0.000	0.800	0.27	0.22	0.49	200	1.00	50.5	PVC	0.013	1.04	32.8	2%	0.38
	MH2A	MH3A	0.000	0.830	0.000	0.800	0.27	0.22	0.49	200	0.50	14.4	PVC	0.013	0.74	23.2	2%	0.30

Appendix D: Water Servicing Calculation

Water Demand

Project Name: 35 Industrial Drive
Project No: 22056

Designed By: SYK
Date: 2023-03-21

Design Criteria			
Commercial/Institutional Water Demand	0.324	L/s/ha (28 m^3/ha/day)	A
Site Area	0.83	ha	B
Max. Day Peak Factor (MOE):	2.00		C
Peak Hour Peak Factor (MOE):	3.00		D
Fire Flow:	8,000	L/min	E

Calculations				
Average Day Demand				
	Q_{AVGRES}	=	A x B	
		=	23235	L/day
		=	16.14	L/min
		=	23.2	m^3/day
Maximum Day Demand				
	Q_{MDD}	=	(Q_{AVGRES}) X C	
		=	46469	L/day
		=	32.3	L/min
		=	46.5	m^3/day
Peak Hour Demand				
	Q_{PHD}	=	(Q_{AVGRES}) X D	
		=	69704	L/day
		=	48.4	L/min
		=	69.7	m^3/day
Total Demand (MDD + Fire Flow)				
	Q_{TD}	=	Q_{PHD} + E	
		=	11589704	L/day
		=	8048.4	L/min
		=	**11589.7**	**m^3/day**

Hazen-Williams
Desired Pressure

Project Name: 35 Industrial Drive
Project No: 22056

Designed By: SYK
Date: 2023-04-17

Design Criteria			
GPM to LPM Conversion:	3.785	L/min = 1gpm	A
Field Flow Test:	671	gpm	B
Static Pressure at Residual Hydrant:	54	psi	C
Minimum Operating Pressure:	40	psi	D
Residual Pressure during Flow Test:	26	psi	E

Calculations			
Residual Pressure			
H_R =	C - D		
=	14	psi	
Flow Pressure			
H_F =	C - E		
=	28	psi	
Flow at 40psi			
Q_R =	B x $(H_R/H_F)^{0.54}$		
=	461	gpm	
=	**1747**	**L/min**	

Note: The 2020 Township of Asphodel Norwood Infrastructure Assessment was used to reference hydrant flows measured in 2016

Hazen-Williams
Desired Pressure

Project Name: 35 Industrial Drive
Project No: 22056

Designed By: SYK
Date: 2023-04-17

Design Criteria			
GPM to LPM Conversion:	3.785	L/min = 1gpm	A
Field Flow Test:	671	gpm	B
Static Pressure at Residual Hydrant:	54	psi	C
Minimum Operating Pressure:	20	psi	D
Residual Pressure during Flow Test:	26	psi	E

Calculations			
Residual Pressure			
H_R =	C - D		
=	34	psi	
Flow Pressure			
H_F =	C - E		
=	28	psi	
Flow at 20psi			
Q_R =	B x $(H_R/H_F)^{0.54}$		
=	745	gpm	
=	**2820**	**L/min**	

Note: The 2020 Township of Asphodel Norwood Infrastructure Assessment was used to reference hydrant flows measured in 2016

Preliminary Fire Flow Calculations
Medical Centre - Fire Underwriters Survey Calculations

Project Name:	35 Industrial Road	**Designed By:**	SYK
Project No:	22056	**Date:**	2023-03-21

Criteria

Water Supply for Public Fire Protection (1999)
Fire Underwriters Survey

F=220CvA

F= the required fire flow in litres per minute
C= coefficient related to the type of construction
A= the total floor area in square metres in the building

Calculations

Assumptions

Ordinary Construction

C =	1	From pg. 17	

Total Building Area

A =	1192.13	m^2	As per Site Plan prepared by aside architects inc. dated 2023-03-17

Fire Flow

F =	220C√A	
=	(220*1)√1192.1	
=	7596	L/min
=	8000	L/min (rounded)

Separation Charge

N =	0%	(>30m)
E =	0%	(>30 m)
S =	10%	(21 m)
W =	0%	(>33 m)
Total =	10%	(Max. 75%)

Final Fire Flow

F_{FINAL} =	F x Separation Charge Total(%)	
=	8356	L/min
=	**8000**	**L/min (rounded)**

Notes:

C = 1.5 for wood frame construction (structure essentially all combustible)
1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior)
0.8 for non-combustible construction (unprotected metal structural components, masonry or metal walls)
0.6 for fire-resistive construction (fully protected frame, floors, roof)

Preliminary Fire Flow Calculations
Medical Centre - OBC Calculations

Project Name:	35 Industrial Road	**Designed By:**	SYK
Project No:	22056	**Date:**	2023-03-21

Criteria

Ontario Building Code

Section A3.2.5.7.

$Q = KVS_{Tot}$

Q = minimum supply of water in litres (L)

K = water supply coefficient from Table 1

V = total building volume in cubic metres

S_{tot} = total of spatial coefficient values from property line exposurses on all sides

Calculations

S_{Tot}

$S_{tot} = 1.0 + [(S_{side1}) + (S_{side2}) + (S_{side3}) + \ldots]$

$= 1.0 + 0$

$S_{tot} =$ 1.0

K

Occupancy classification B-3

Assumed combustible construction and minimal fire- resistance ratings

K = 23

V

V =	Area (m^2)	x	Height (m)	=	Volume (m^3)	
Building Volume =	1192.0	x	3.0	=	3576.0	m^3
Total Volume =	3,576	m^3				

Minimum Water Supply (L)

Q = KVS

= 82,248 L

Q = 90,000 L

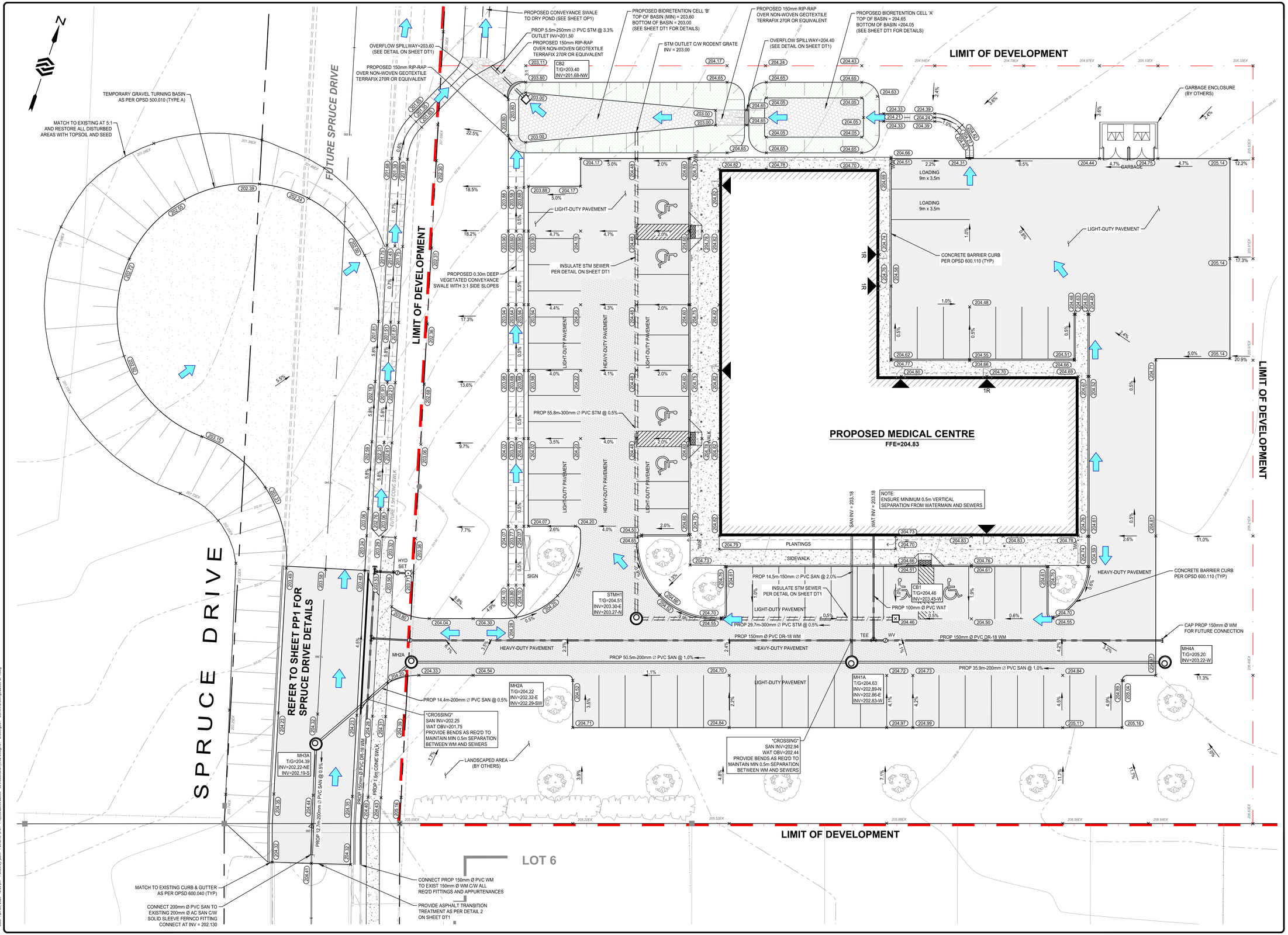
Minimum Flow Rate

From Table 2: Minimum Water Supply Flow Rates (L/min)

F = 2,700 L/min

Notes

Appendix E: Site Servicing and Grading Plan



BENCHMARK

CUT CROSS IN CONCRETE GUTTER ON KEELER COURT AT THE INTERSECTION OF KEELER COURT AND MARYANN LANE. CUT CROSS IS ON THE WEST SIDE OF THE ROAD APPROXIMATELY 100m NORTH OF THE INTERSECTION OF ALBINE STREET AND KEELER COURT.

ELEV: 213.160m

NOTES:

1. ALL CONSTRUCTION AND MATERIALS TO BE IN ACCORDANCE WITH:
   -ONTARIO PROVINCIAL STANDARD DRAWINGS & SPECIFICATIONS
   -APPLICABLE CONTRACT DOCUMENTS AND ALL SPECIFICATIONS REFERENCED HEREIN.
2. THE CONTRACTOR SHALL CONSTRUCT ALL WORK IN ACCORDANCE WITH THE OCCUPATIONAL HEALTH AND SAFETY ACT, HEALTH AND SAFETY REGULATIONS FOR CONSTRUCTION PROJECTS.
3. THE CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS TO EXISTING OR BETTER CONDITION, OR PER THE ENGINEERING AND LANDSCAPE SPECIFICATIONS REFERENCED HEREIN.
4. THE CONTRACTOR SHALL COORDINATE AND PAY FOR ALL TRAFFIC CONTROL AND SAFETY MEASURES IN ACCORDANCE WITH THE ONTARIO TRAFFIC MANUAL, BOOK 7, TEMPORARY CONDITIONS.
5. THE CONTRACTOR SHALL DISPOSE OF ALL WASTE MATERIALS IN ACCORDANCE WITH THE MINISTRY OF THE ENVIRONMENT GUIDELINES AND LOCAL MUNICIPAL BYLAWS.
6. WHERE UTILITIES ARE SHOWN ON THE CONTRACT DRAWINGS, THEIR LOCATION IS APPROXIMATE. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE LOCATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
7. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS TO COMPLETE THE WORK INCLUDING ROAD CUT PERMITS, OCCUPANCY PERMITS, ENCROACHMENT AGREEMENTS.
8. ANY UTILITY POLES THAT MAY BE UNDERMINED BY THE CONSTRUCTION ACTIVITY ARE TO BE BRACED. THE CONTRACTOR SHALL MAKE THE NECESSARY ARRANGEMENTS TO HAVE THE POLES BRACED IN ACCORDANCE WITH THE APPROPRIATE UTILITY REQUIREMENTS.
9. ALL EROSION AND SEDIMENT CONTROL MEASURES IDENTIFIED ON THE CONTRACT DRAWINGS ARE TO BE IN PLACE PRIOR TO THE START OF CONSTRUCTION.
10. ACCESS TO ALL PRIVATE PROPERTIES FRONTING THE CONSTRUCTION SHALL BE MAINTAINED AT ALL TIMES. TEMPORARY ACCESS RESTRICTIONS WILL ONLY BE PERMITTED WHERE REQUIRED TO FACILITATE UNDERGROUND SERVICING, ASPHALT AND CONCRETE PLACEMENT. THE CONTRACTOR SHALL PROVIDE 48 HOURS NOTICE TO THE TOWNSHIP AND THE AFFECTED PROPERTY OWNERS PRIOR TO ACCESS INTERRUPTION.
11. ALL PROPERTY BARS DISTURBED OR DAMAGED DURING CONSTRUCTION SHALL BE REPLACED BY THE CONTRACTOR AT THE CONCLUSION OF THE CONTRACT, AT THEIR EXPENSE.
12. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER.

No.	REVISION	BY	DATE
1.	ISSUED FOR 1ST SUBMISSION	JD	2023-04-28

ENGAGE ENGINEERING
www.engageeng.ca • 171 King Street, Suite 120, Peterborough, ON • Phone: (705) 755-0427

INDUSTRIAL DRIVE MEDICAL BUILDING

TOWNSHIP OF ASPHODEL-NORWOOD

SITE SERVICING & GRADING PLAN

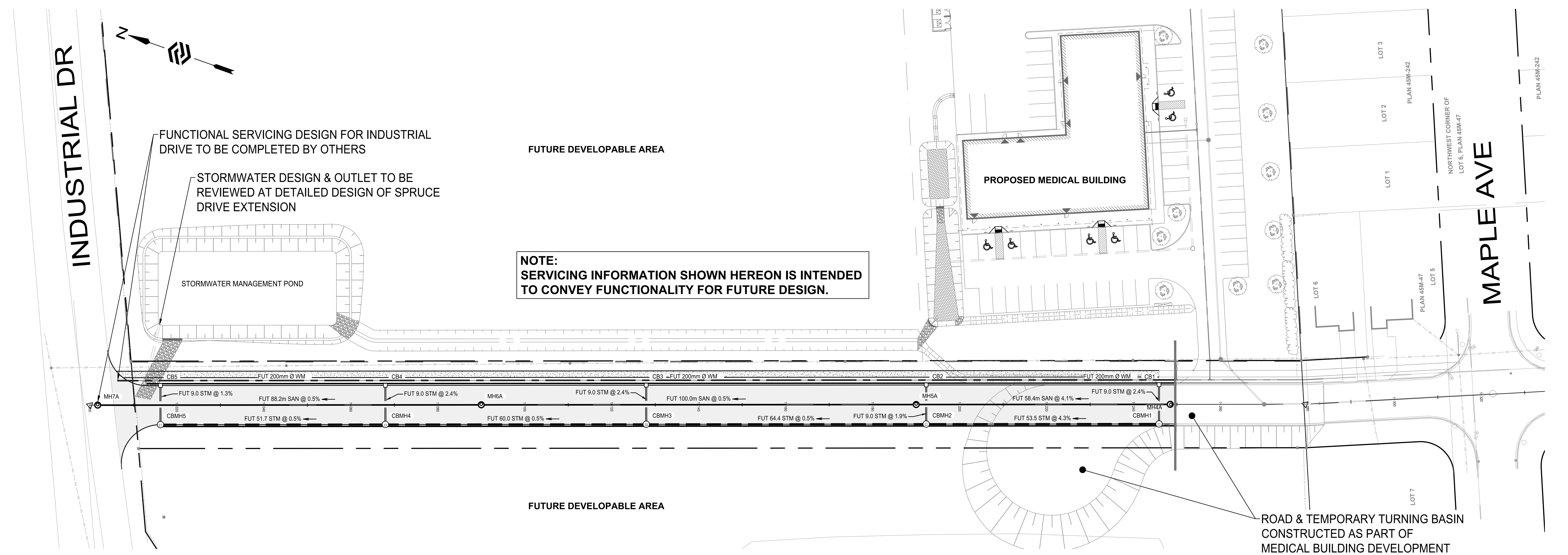
NORWOOD, ONTARIO

DRAWN BY:	J.DUNN
DESIGNED BY:	J.DUNN
APPROVED BY:	L.PARSONS
DATE:	2023-03-29
SCALE:	1:200

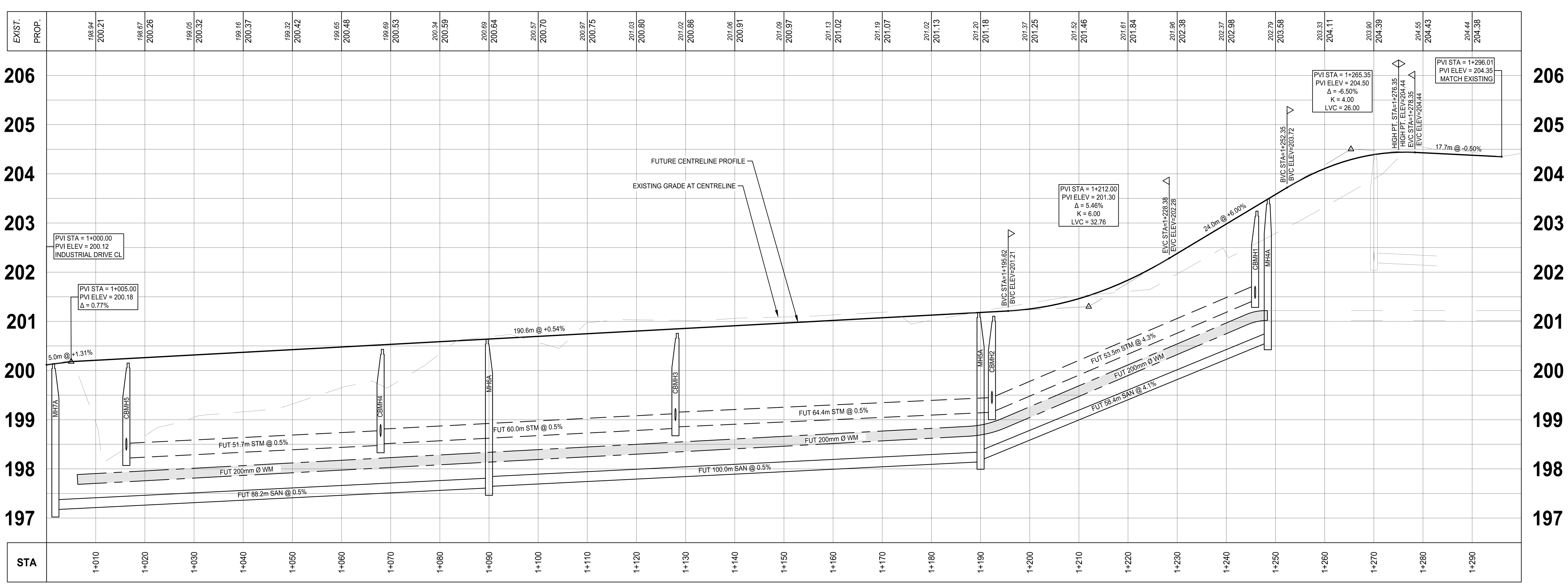
STAMP: LICENSED PROFESSIONAL ENGINEER — L.T.PARSONS — 100516860 — 2023-04-28 — PROVINCE OF ONTARIO

PROJECT NUMBER:	SHEET NAME:	SHEET:
22056	GP1	4 of 6

22056-GP1
Date: Apr. 28, 2023 - 12:26 pm Plotted by: jdunn File name: S:\01 - Projects\22000\22056 - 35 Industrial Drive\02 Design\31 - Drawings\01 - Current Drawing\22056-GP1.dwg



FUTURE SPRUCE DRIVE EXTENSION



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   -APPLICABLE CONTRACT DOCUMENTS AND ALL SPECIFICATIONS REFERENCED HEREIN.
2. THE CONTRACTOR SHALL CONSTRUCT ALL WORK IN ACCORDANCE WITH THE OCCUPATIONAL HEALTH AND SAFETY ACT, HEALTH AND SAFETY REGULATIONS FOR CONSTRUCTION PROJECTS.
3. THE CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS TO EXISTING OR BETTER CONDITION, OR PER THE ENGINEERING AND LANDSCAPE SPECIFICATIONS REFERENCED HEREIN.
4. THE CONTRACTOR SHALL COORDINATE AND PAY FOR ALL TRAFFIC CONTROL AND SAFETY MEASURES IN ACCORDANCE WITH THE ONTARIO TRAFFIC MANUAL, BOOK 7, TEMPORARY CONDITIONS.
5. THE CONTRACTOR SHALL DISPOSE OF ALL WASTE MATERIALS IN ACCORDANCE WITH THE MINISTRY OF THE ENVIRONMENT GUIDELINES AND LOCAL MUNICIPAL BYLAWS.
6. WHERE UTILITIES ARE SHOWN ON THE CONTRACT DRAWINGS, THEIR LOCATION IS APPROXIMATE. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE LOCATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION.
7. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS TO COMPLETE THE WORK INCLUDING ROAD CUT PERMITS, OCCUPANCY PERMITS, ENCROACHMENT AGREEMENTS.
8. ANY UTILITY POLES THAT MAY BE UNDERMINED BY THE CONSTRUCTION ACTIVITY ARE TO BE BRACED. THE CONTRACTOR SHALL MAKE THE NECESSARY ARRANGEMENTS TO HAVE THE POLES BRACED IN ACCORDANCE WITH THE APPROPRIATE UTILITY REQUIREMENTS.
9. ALL EROSION AND SEDIMENT CONTROL MEASURES IDENTIFIED ON THE CONTRACT DRAWINGS ARE TO BE IN PLACE PRIOR TO THE START OF CONSTRUCTION.
10. ACCESS TO ALL PRIVATE PROPERTIES FRONTING THE CONSTRUCTION SHALL BE MAINTAINED AT ALL TIMES. TEMPORARY ACCESS RESTRICTIONS WILL ONLY BE PERMITTED WHERE REQUIRED TO FACILITATE UNDERGROUND SERVICING, ASPHALT AND CONCRETE PLACEMENT. THE CONTRACTOR SHALL PROVIDE 48 HOURS NOTICE TO THE TOWNSHIP AND THE AFFECTED PROPERTY OWNERS PRIOR TO ACCESS INTERRUPTION.
11. ALL PROPERTY BARS DISTURBED OR DAMAGED DURING CONSTRUCTION SHALL BE REPLACED BY THE CONTRACTOR AT THE CONCLUSION OF THE CONTRACT, AT THEIR EXPENSE.
12. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER.

No.	REVISION	BY	DATE
1.	ISSUED FOR 1ST SUBMISSION	JD	2023-04-28

ENGAGE ENGINEERING
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INDUSTRIAL DRIVE MEDICAL BUILDING

TOWNSHIP OF ASPHODEL-NORWOOD

FUNCTIONAL SPRUCE DRIVE EXTENSION

NORWOOD, ONTARIO

DRAWN BY: J.DUNN
DESIGNED BY: J.DUNN
APPROVED BY: L.PARSONS
DATE: 2023-03-29

STAMP: LICENSED PROFESSIONAL ENGINEER — L.T.PARSONS — 100516860 — 2023-04-28 — PROVINCE OF ONTARIO

SCALE: 1:500H 1:50V

PROJECT NUMBER:	SHEET NAME:	SHEET:
22056	PP1	5 of 6

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