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June 6TH 2025

Project Number 1427-005-25

Functional Servicing Brief

Regarding:

Proposed 4 Storey Addition
259 King Street,
Midland, Ontario

Prepared on behalf of:

Redwood Park Communities

By:

GERRITS ENGINEERING LIMITED
222 Mapleview Dr. W., Suite 300
Barrie, ON L4N 9E7

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APPENDICES

LIST OF FIGURES & DRAWINGS

1. Introduction

Gerrits Engineering Ltd. (GEL) has been retained by Redwood Park Communities (Client) to provide engineering services for a 4 Storey Addition located at 259 King Street in Midland, Ontario.

This Functional Servicing Brief (FSR) has been prepared in support of the Zoning By-Law Amendment Application prepared by ISM Architects INC. to demonstrate how the proposed development can be serviced by the surrounding upgraded municipal infrastructure. In particular this FSR will examine the property's conceptual servicing with relation to Water Supply, Sanitary flows, Fire Underwriting survey and Stormwater Management.

1.1. Supporting & Reference Documents

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

- Ministry of the Environment, Guidelines for the Design of Sanitary Sewage Works and Water Works – 2008
- Ministry of the Environment, Stormwater Management Planning and Design Manual, March 2003
- Ministry of the Environment, Design Guidelines for Drinking-Water Systems, 2008
- Ontario Building Code 2012 (O.B.C.)
- Township of Midland Engineering Design Standards, April 2024
- NVCA, Nottawasaga Valley Conservation Authority, NVCA Stormwater Technical Guide, December 2013
- Fire Underwriters Survey 2020

1.2. Subject Property

The proposed residential development is approximately 0.05 Ha in area and generally rectangular in shape. It is legally described as 259 King Street, North East of Side King Street, part of lot 3, Registered Plan 166, Town of Midland, County of Simcoe. The site is one lot and consists of a 2-storey commercial building with a residential units on the second floor. The site, in its existing state, slopes stormwater away from the commercial/residential building, spilling on to the right of way. The topographical information is based on a survey completed by Rudy Mak Surveying Ltd, dated April 4, 2025, as well as Google Earth, and aerial map information from Simcoe County GIS.

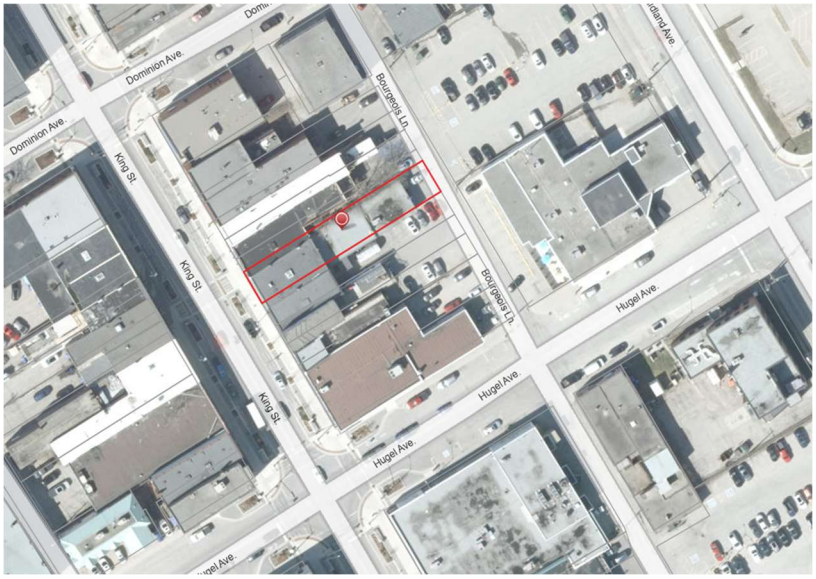


Figure 1 - Subject Property (Red)

1.3. Proposed Land Use

The existing two story developed site area on the southwest side described in section 1.2 is to remain, the proponent is seeking to further develop the northwest area with the construction of a new 4-storey commercial/residential building. The proposed addition will incorporate about 203 sq.m. of commercial space and 15 new 1-bedroom units. The existing and proposed structure will utilize upgraded municipal services to meet the Township of Midland standards.

2. Servicing

2.1. Overview

Based on as-built data provided by the Town, there are existing municipal services provided to the existing structure. Therefore, it is proposed to analyze the existing municipal services for the proposed development and determine if they are sufficient for the proposed future usage.

2.2. Design Criteria

As defined by the Township, a summary of the water and wastewater design criteria is as follows:

Serviced Population

- Residential (Proposed 15 units @ 2.0 ppu) = 30 persons
- Residential (Ex. 3 Bedroom Apartment @ 2.0 pp/room) = 6 persons
- Extraneous Flows (Peak): = 0.23L/S/ha

Wastewater Criteria Information from MECP design guidelines 2.1

- Residential Rate = 450 L/C/day
- Commercial Rate = 2.5L/day/m2
- Extraneous flows = 0.23 L/s/ha
- Peak Factor (residential and commercial) = Harmon

  $M = 1 + \frac{14}{4+P^{0.5}} = 4.35 = 4.0$ (Maximum)

Water Criteria from Midland Engineering standards and MECP

- Average Day Demand (ADD) Residential (New Development) = 450 L/c/d
- Average Day Demand (ADD) Commercial = 2.5L/day/m2
- Max Day Factor (MDD) = 2.0
- Peak Hour factor (PH) = 4.5
- Minimum pressure in system at PH = 275 kPa
- Maximum pressure under Static Load = 550 kPa
- Minimum pressure in system at Peak Hour demand = 275 kPa
- Minimum pressure in system at Fire + MDD = 140 kPa

3. Sanitary Servicing

The projected daily average and peak sewage flows from the subject property are summarized in the table below.

Table 1 – Design Wastewater Flows

Average Daily Demand (Design)	18.2	m^3/d
	0.21	L/s
Peak Hour Flow (Design)	68.2	m^3/d
	0.79	L/s

3.1. Sanitary Capacity Review

It is proposed to utilize the existing sanitary service connections from King Street. Based on as-built data provided by the Town, there is a 5-inch (125mm) diameter sanitary service servicing the existing building. Assuming a slope of 1% from the existing building to the mainline sewer, a 125mm diameter PVC pipe will be able to convey approximately 9.4 L/s. The anticipated peak flow of 0.79 L/s is well within the capacity range of the service connection in question. Therefore, it is recommended to maintain the use the existing sanitary service at this time.

4. Water Supply and Distribution

4.1. Existing Water System Analysis

The existing water servicing for this Development has been considered from an internal perspective. An analysis of the onsite demands has been completed, as per the Town of Midland and the MOE guidelines and includes the design criteria previously discussed. The projected daily average, maximum day, and peak hourly flows from the subject property are summarized in the table below:

Table 2 – Design Water Flows

Average Daily Demand (Design)	17.1	m^3/d
	0.20	L/s
Maximum Day Demand (Design)	34.3	m^3/d
	0.40	L/s
Peak Hour Flow (Design)	65.0	m^3/d
	0.75	L/s

4.2. Internal Water Distribution System

It is proposed to replace the existing 25mm water service connection from King Street to a 50mm connection. Upsizing this connection will ensure the velocity within the water pipe will be well within acceptable ranges, thus reducing potential pressure losses as a result of dynamic actions. The replacement will be completed as per Town of Midland and MECP guidelines.

4.3. Fire Flow Requirement

It is proposed to utilize the existing fire hydrant located across King Street for this development. According to the Township's Engineering Development Design Standards, the maximum spacing for hydrants in higher-density residential areas is 90 m. The existing hydrant is located approximately 21 m from the existing structure, measured from the center of the hydrant to the center of the structure. There is also an existing 150 mm fire line. Therefore, it is recommended to maintain the use of both the existing hydrant and the 150 mm fire line at this time.

5. Storm Drainage and Stormwater Management

A key component of the Development is the need to address environmental and related Stormwater Management (SWM) issues. These are examined in a framework aimed at meeting the Town of Midland and MOE requirements. SWM parameters have evolved from an understanding of the location and sensitivity of the site's natural systems.

It is understood that 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.
- Protect and provide diverse recreational opportunities that are in harmony with the environment.

5.1. Existing Drainage Conditions

The subject property is approximately 0.05 Ha in size and currently has an existing building coverage most of the property. Currently all stormwater is controlled and directed to King Street (southwest) and Bourgeois Lane (northeast). Base on our review of the mapping, topography across the site is relatively flat. The entire site generally slopes towards the right of way on King Street, while a small asphalt area is directed towards Bourgeois Lane.

Using the Midland Engineering and Design Guidelines, the existing site statistics produce the following weighted runoff coefficient:

Asphalt	=	76 m^2	R	=	0.95	AR	=	72.2
Concrete	=	25 m^2	R	=	0.95	AR	=	23.6
Building Roof	=	424 m^2	R	=	0.95	AR	=	402.6
					Total	AR	=	498.4

Site Area = 525 m^2 AR = 498.4m^2 Weighted R = 0.95

5.2. Proposed Drainage Conditions

The proposed development will slightly increase the imperviousness of the site and it is important to quantify this change to determine if quantity control requirements are required. As per the proposed site's statistics, the post development weighted runoff coefficient is:

Interlock	=	26 m^2	R	=	0.95	AR	=	24.7
Asphalt	=	0 m^2	R	=	0.95	AR	=	0.0
Concrete	=	25 m^2	R	=	0.95	AR	=	23.4
Building Roof	=	474 m^2	R	=	0.95	AR	=	450.3
					Total	AR	=	498.4

Site Area = 525 m^2 AR = 498.4m^2 Weighted R = 0.95

5.3. Hydrology Model Results

Given the size of the site, the Modified Rational Method will be used to determine the existing and anticipated SWM release rates:

Catchment Area	=	approx. 0.05 ha
Runoff Coefficient	=	0.95 (existing condition)
	=	0.95 (proposed condition)
Time of Concentration (tc)	=	10 minutes
Rainfall Intensity	=	Township Midland IDF Curve Parameters
Peaking Factor (Ci)	=	1.00 (2-10 year design periods)
	=	1.10 (25 year design period)
	=	1.20 (50 year design period)
	=	1.25 (100 year design period)
Peak Runoff Rate (Qr)	=	$C \times I \times A \times 360^{-1}$

Applying the above results in the following release rates:

Table 1: Existing & Post Development Uncontrolled Release Rates

	2 year (m^3/s)	5 year (m^3/s)	10 year (m^3/s)	25 year (m^3/s)	50 year (m^3/s)	100 year (m^3/s)
Existing Condition (release rate)	.01	.01	.02	.02	.03	.03
Post Development (release rate)	.01	.01	.02	.02	.03	.03

When reviewing the pre and post development condition, there is no increase in imperviousness. Therefore, no quantity control measures or are recommended at this time. It should also be noted that quality control measures will be not be proposed for this site.

5.4. Erosion and Sediment Control

To ensure Stormwater runoff quality is controlled during construction, an erosion and sediment control strategy will be implemented to mitigate transportation of silt off-site to the existing roads and sewers. It is imperative that effective controls be put in place and maintained until all areas are stabilized with surface cover. All erosion and sediment control Best Management Practices (BMP) shall be designed, constructed and maintained in accordance with the Township of Essa's erosion control requirements.

Items that will be addressed for both temporary and permanent erosion and sediment controls are based on the following:

- Site location description and area;
- Existing and proposed land use;
- Vegetative cover;
- Existing drainage routes;
- Proposed site works;
- Proposed outlets;
- Permits required;
- Sediment filters and barriers - silt fences;
- Construction entrance location;
- Protection to catch basins and ditch inlets;

To prevent construction generated sediments from entering the storm sewers or leaving the site by overland flow, the following measures should be implemented during the construction phase:

- Temporary sediment control fencing should be erected around the perimeter of the grading activities.
- Temporary sediment fabric and stone filters should be installed on existing and proposed catch basins until surface cover and vegetation has been stabilized.
- Construction during drier months should be monitored for wind-borne transport of sediments. At the direction of the engineer, the contractor may be directed to water down exposed earth areas with an aqueous solution of calcium chloride.
- All disturbed areas not under immediate construction for 30 days, or not intended for building activities within a 3-month time period, should be stabilized with seeding.
- Built up sediment should be removed and disposed off-site at least once a month, or more frequently as directed by the engineer.

6. Conclusions

A summary of the servicing recommendations are as follows:

- **Water Servicing –** it is proposed to upgrade the existing 25mm municipal services for the proposed development to a 50mm service.
- **Fire Service -** it is proposed to utilize the existing Hydrant and fire line for the proposed development.
- **Sanitary Servicing –** it is proposed to utilize the existing municipal services for the proposed development
- **Stormwater Drainage and Management** – there is no difference in stormwater runoff from the pre & post development condition, therefore, no additional Quantity and Quality are recommended at this time. Quality control criteria will be satisfied via infiltration.

The analysis and conceptual design outlined in this report demonstrates that the proposed Development is feasible, based on sound engineering principles and, the development will become a cohesive part of the Town of Midland.

All of which is respectfully submitted,

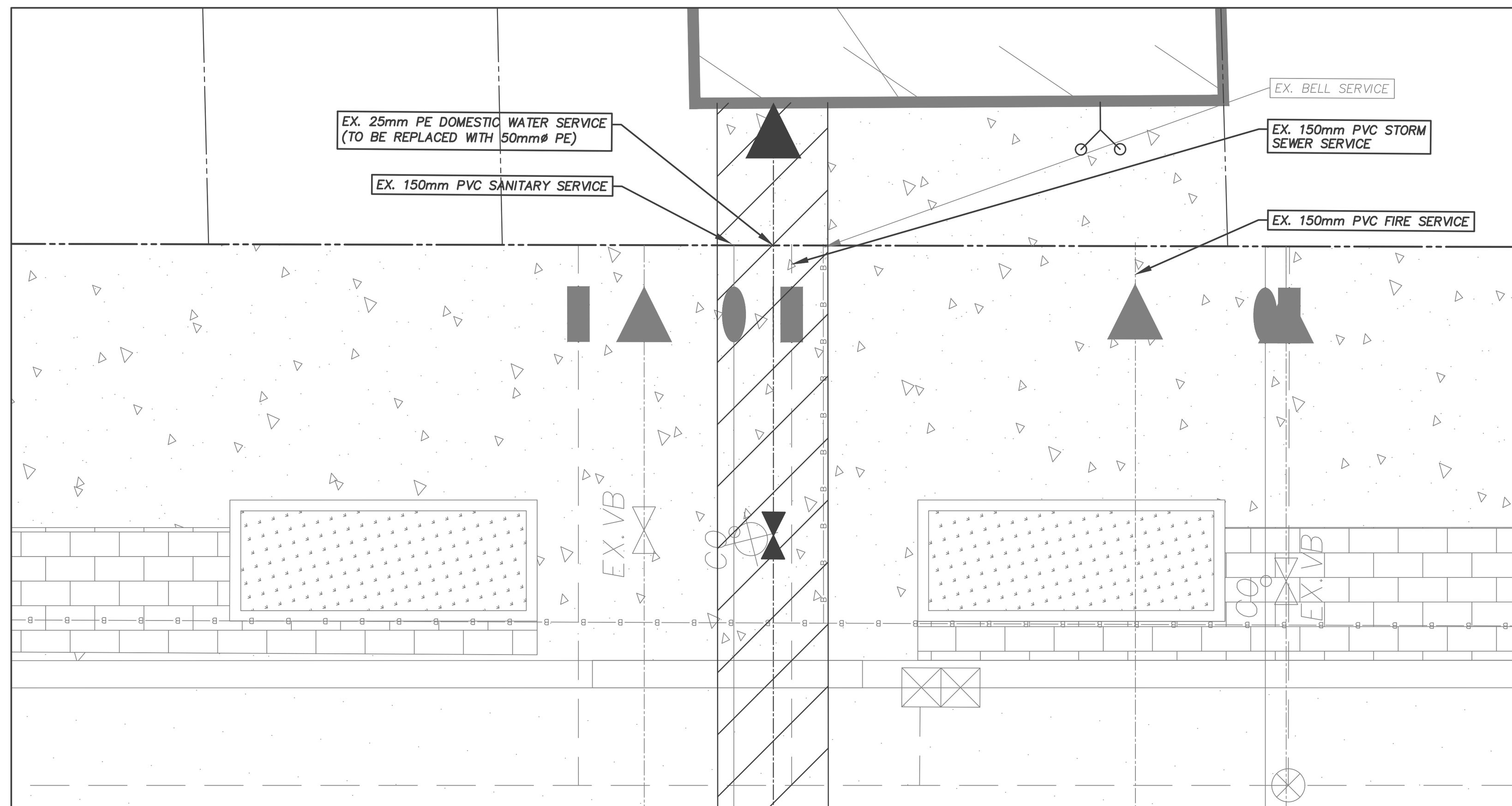
Gerrits Engineering Ltd.

Kevin Filion, C.E.T.
Civil Design Manager

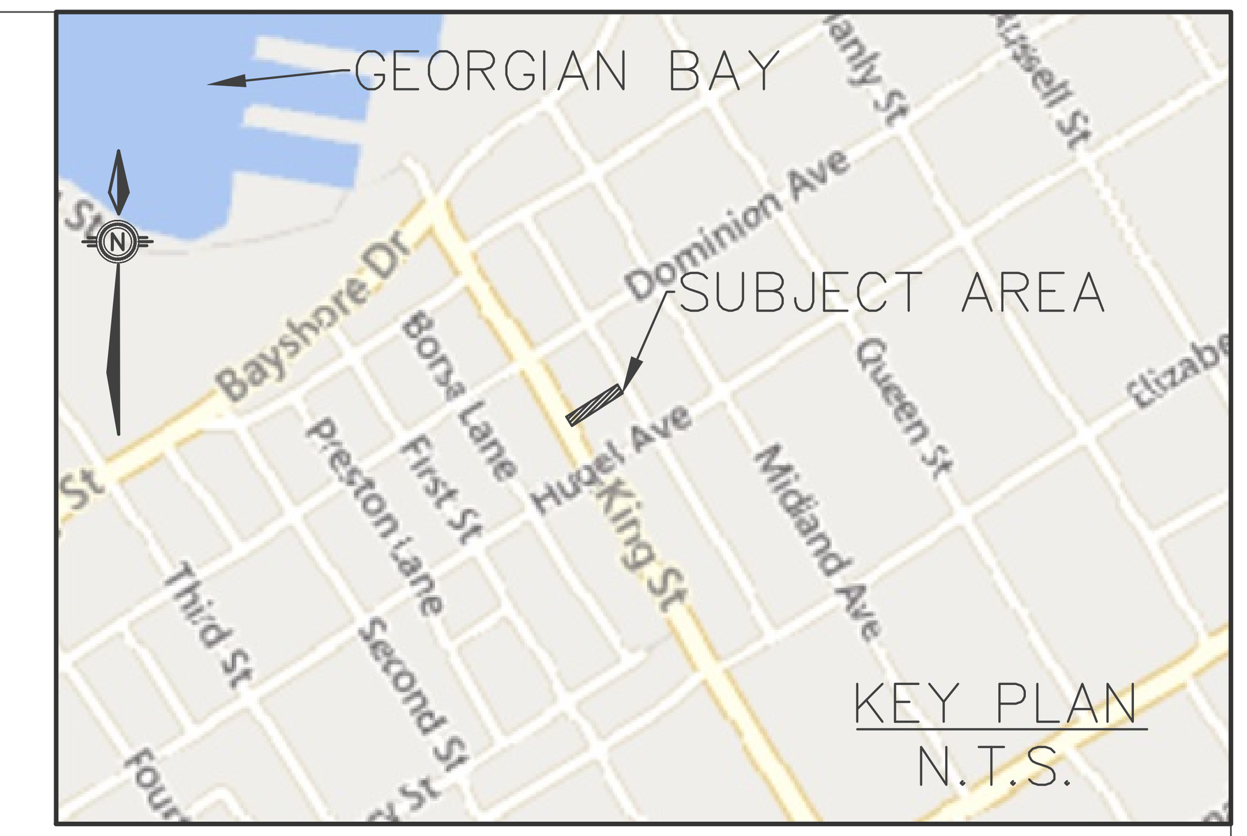
Jeff McCuaig, P.Eng.
Civil Engineer

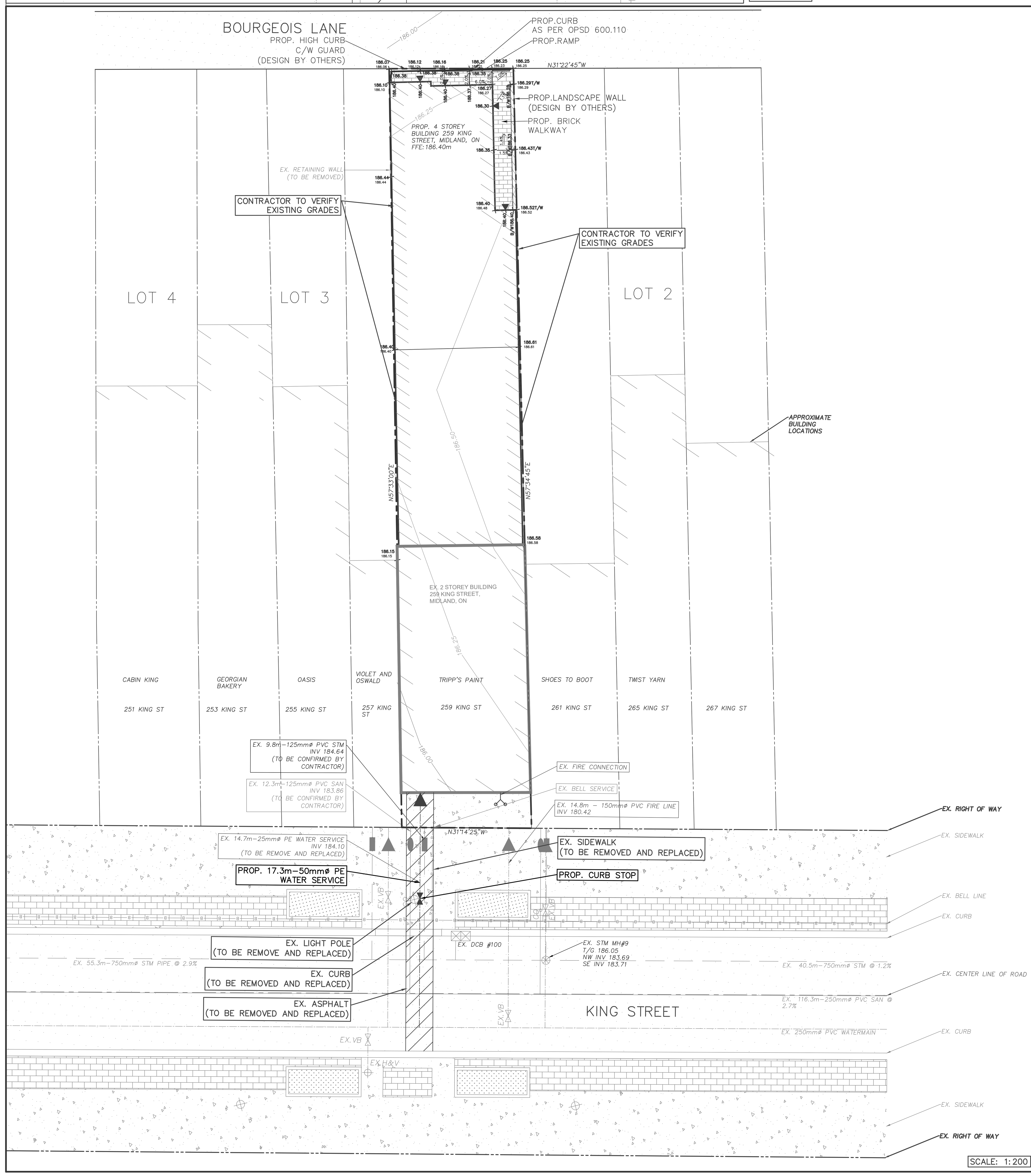
Appendix A

Figures & Drawings



259 KING STREET SERVICES			
	DIAMETER (mm)	MATERIAL	INVERT AT PL (m)
WATER SERVICE	25	PE	184.00
SANITARY SERVICE	125	PVC	183.86
STORM SERVICE	125	PVC	184.64
FIRE LINE	150	PVC	180.42





LEGEND

GARDEN AREA
LIGHT DUTY ASPHALT AREA
CONCRETE AREA
INTERLOCKING AREA

SANITARY SERVICE
STORM SERVICE
WATER SERVICE
GAS LINE
ABOVE HYDRO LINE
HYDRO LINE
BELL LINE
SANITARY CLEAN–OUT
FIRE CONNECTION
EXISTING SANITARY MAINTENANCE HOLE
EXISTING STREET LIGHTING POLE

SERVICE CAP
EXISTING CURB STOP
WATERMAIN CROSS
WATERMAIN TEE
EXISTING VALVE BOX
EXISTING FIRE HYDRANT
EXISTING CATCH BASIN
EXISTING DOUBLE CATCH BASIN
STORM CLEAN–OUT
MANDOOR
OVERHEAD DOOR

220.75 PROPOSED ELEVATION
220.75 EXISTING ELEVATION
2.0% PROPOSED GRADE
T/W–TOP WALL
B/W–BOTTOM WALL
OVERLAND FLOW ROUTE
3:1 SLOPE (OR AS LABELED)
SWALE
HIGH POINT
2R RISERS

1. DRAWINGS

1. THE NOTES ON THIS SHEET APPLY TO ALL WORKS UNDER THIS CONTRACT UNLESS OTHERWISE NOTED ON THE SPECIFIC DETAIL DWGS.
2. THE STANDARD DRAWINGS OF THE LOCAL MUNICIPALITY , ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS (OPSS) AND THE ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) CONSTITUTE PART OF THE PLANS OF THIS CONTRACT.
3. ORDER OF PRECEDENCE OF STANDARD DRAWINGS IS FIRSTLY THE LOCAL MUNICIPALITY AND SECONDLY ONTARIO PROVINCIAL STANDARD DRAWINGS.
4. THE STANDARD DRAWINGS INCLUDED WITH THESE PLANS ARE PROVIDED FOR CONVENIENCE ONLY AND ARE NOT TO BE CONSTRUED TO BE A COMPLETE SET FOR THE PURPOSE OF THE CONTRACT. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN ALL RELEVANT STANDARD DRAWINGS AND SPECIFICATIONS AS REQUIRED FOR THIS CONTRACT.

2. MEASUREMENTS

1. ALL DIMENSIONS ARE IN METRES, EXCEPT PIPE DIAMETERS, WHICH ARE IN MILLIMETRES, UNLESS SPECIFIED OTHERWISE.
2. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION, AND ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER.

3. GENERAL

1. EXISTING SERVICES AND UTILITIES SHOWN ON THESE CONTRACT DRAWINGS ARE BASED ON THE BEST INFORMATION AVAILABLE AND THEIR LOCATIONS ARE NOT GUARANTEED. THE CONTRACTOR SHALL INTERPRET THIS INFORMATION AS THEY WISH WITH THE UNDERSTANDING THAT THE OWNER DISCLAIMS ALL RESPONSIBILITY FOR ITS ACCURACY AND/OR SUFFICIENCY. THE CONTRACTOR IS REQUIRED TO NOTIFY THE VARIOUS UTILITY COMPANIES 48 HOURS PRIOR TO THE COMMENCEMENT OF ANY WORK.
2. NATIVE MATERIAL, SUITABLE FOR BACKFILL, SHALL BE COMPACTED TO 95% STANDARD PROCTOR MAXIMUM DRY DENSITY.
3. GRANULAR MATERIAL, USED FOR BACKFILL, SHALL BE PLACED IN LAYERS 150mm IN DEPTH MAXIMUM AND COMPACTED TO 100% STANDARD PROCTOR MAXIMUM DRY DENSITY.
4. ALL DISTURBED AREAS ARE TO BE REINSTATED TO THEIR ORIGINAL CONDITION OR BETTER, AS DETERMINED BY THE ENGINEER. ALL GRASS AND VEGETATION COVERED AREAS SHALL BE RESTORED BY PLACING 200mm OF APPROVED TOPSOIL AND NURSERY SOD UNLESS NOTED OTHERWISE.

4. PARKING LOT

1. NATIVE SUBGRADE TO BE COMPACTED TO MINIMUM 98% STANDARD PROCTOR MAXIMUM DRY DENSITY.
2. PAVEMENT STRUCTURE TO BE CONFIRMED BY GEOTECHNICAL ENGINEER PRIOR TO START OF CONSTRUCTION
3. THE PARKING LOT PAVEMENT STRUCTURE SHALL CONSIST OF THE FOLLOWING:

LIGHT DUTY	HEAVY DUTY
– 40mm SP12.5	– 50mm SP12.5
– 50mm SP19	– 100mm SP19
– 150mm GRANULAR "A"	– 150mm GRANULAR "A"
– 300mm GRANULAR "B"	– 450mm GRANULAR "B"

5. SEWERS

1. INTERNAL SANITARY SEWERS AND LATERALS TO BE MINIMUM 150mm DIAMETER PVC DR 28 WITH JOINTS CONFORMING TO CSA STANDARD A257.3.
2. SEWERS SHALL BE CONSTRUCTED WITH BEDDING AS PER OPSD 802.010 (GRANULAR 'A' EMBEDMENT MATERIAL), UNLESS APPROVED OTHERWISE BY THE ENGINEER.
3. PRECAST MANHOLES SHALL BE 1200mm DIAMETER UNLESS OTHERWISE SPECIFIED, AND SHALL BE IN ACCORDANCE WITH OPSD 701.010. FRAME AND GRATE TO BE "TYPE A" CLOSED COVER AND TO CONFORM TO OPSD 401.010.
4. MANHOLE TOPS ARE TO BE SET TO FINAL GRADE.
5. PIPE INVERTS AND OBVERTS DO NOT ACCOUNT FOR PIPE MATERIAL AND OR WALL THICKNESS.

6. WATERMAINS

1. THE MINIMUM HORIZONTAL SEPARATION BETWEEN THE WATERMAIN AND THE SANITARY/STORM SEWER IS TO BE 2.5 METERS.
2. A MINIMUM OF 0.5m VERTICAL CLEARANCE BETWEEN THE WATERMAIN, SANITARY, STORM AND/OR ALL UTILITIES MUST BE KEPT, WHILE STILL MAINTAINING A MINIMUM DEPTH OF COVER AT ALL TIMES. WHERE WATERMAIN CONFLICTS WITH SEWER PIPE, DEFLECT WATERMAIN HORIZONTALLY OR VERTICALLY TO OBTAIN MINIMUM COVER AND VERTICAL CLEARANCE.
3. WATERMAINS SHALL BE PVC DR 18 AND INSTALLED WITH A MINIMUM COVER OF 1.7m (MEASURED FROM FINISHED GRADE TO TOP OF WATERMAIN). IF MINIMUM COVER CAN NOT BE ACHIEVED, INSULATION AS PER DETAIL PROVIDED.
4. WATERMAIN SHALL BE CONSTRUCTED WITH BEDDING AS PER OPSD 802.010 (GRANULAR 'A' EMBEDMENT MATERIAL) FOR FLEXIBLE PIPES.
5. COPPER WATER SERVICES 25mm DIA. SHALL BE EMBEDDED IN SAND 100mm ABOVE AND BELOW TO CONFORM TO OPSS 1104.010.
6. WATERMAIN BEDDING SHALL ADHERE TO THE MUNICIPAL STANDARD AND BE PLACED MIN 150mm BELOW AND 300mm ABOVE THE WATERMAIN.
7. CONCRETE THRUST BLOCKS ARE TO BE INSTALLED AT ALL TEES, BENDS, HYDRANTS, ENDS OF MAINS AND CONNECTIONS 100mm AND LARGER AS PER STANDARD DRAWINGS. ALL BENDS TO BE MECHANICALLY RESTRAINED.
8. ALL JOINTS MUST BE MECHANICALLY RESTRAINED AND THRUST BLOCKED (OPSD 1103.010)
9. ANY EXISTING, ON SITE, WATER WELLS MUST BE DECOMMISSIONED.
10. WHERE A COPPER SERVICE MUST BE JOINED UNDER THE FLOOR, THE COPPER SHALL BE JOINED BY SILVER SOLDER CONNECTION ONLY.
11. ALL SERVICE PIPE MATERIAL MUST BE DUCTILE IRON AND MECHANICALLY FROM THE RESTRAINING FLANGE TO A MINIMUM OF 3 METERS OUTSIDE THE FOUNDATION. ALL DUCTILE SHALL BE POLY WRAPPED FOR ADDED PROTECTION.
12. OPERATION OF FIRE HYDRANTS AND VALVES ON POTABLE WATER BY OTHER THAN MUNICIPAL CITY DEPARTMENT IS PROHIBITED.
13. THE CITY WILL SWAB, CHLORINATE AND FLUSH ALL NEW SERVICES. THE CONTRACTOR SHALL PERFORM PRESSURE TEST WITH WATER FIELD COORDINATOR WITNESSING.
14. EXTERNAL CONTRACTOR TO COORDINATE WITH INTERNAL CONTRACTOR ON ALL INSTALLATION, SWABBING, CHLORINATING AND TESTING WITNESSED BY WATER FIELD SERVICES COORDINATOR.
15. MECHANICAL RESTRAINTS WILL BE REQUIRED ON ALL HYDRANTS. A MINIMUM OF TWO PIPE LENGTHS OF EITHER SIDE OF THE HYDRANT TEE CONNECTION. HYDRANTS TO BE PAINTED RED.
16. TRACING WIRE (#12 TWU STRANDED COPPER) TO BE INSTALLED ON THE TOTAL LENGTH OF ALL PVC WATERMAINS AND BROUGHT UP AT EACH HYDRANT AND CONNECTED TO FLANGE BOLT.
17. SERVICE CONNECTIONS SHALL BE PLACED AT A MINIMUM SEPARATION OF 1.0m AND A MINIMUM OF 0.6m FROM JOINTS.
18. CONTRACTOR TO PROVIDE PLAN FOR REMOVING CHLORINATED WATER FROM SITE.
19. A CHLORINATION TAIL SHALL BE INSTALLED JUST BEHIND TAPPING VALVE TO FACILITATE CHLORINATING SERVICE, TO BE REMOVED AFTER TESTING.
20. PIPE INVERTS AND OBVERTS DO NOT ACCOUNT FOR PIPE MATERIAL AND OR WALL THICKNESS.

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No.	Issuance Description	YY/MM/DD
1.	SITE PLAN APPROVAL	25/06/06
2.	-	-
3.	-	-
4.	-	-
5.	-	-

BEARING NOTE
BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE POINTS, BY REAL TIME NETWORK (RTN) OBSERVATIONS, UTM ZONE 17, NAD83 (CSRS) (2010 EPOCH).

ISSUED FOR:

SITE PLAN APPROVAL

DRAWINGS ARE "ISSUED FOR APPROVAL" AND ARE NOT TO BE USED FOR PERMIT APPLICATIONS OR CONSTRUCTION UNTIL SO AUTHORIZED BY THE CONSULTANT.

Client: REDWOOD PARK COMMUNITIES

Project: 259 KING ST. MIDLAND , ON L4R 3M4

Drawing: SITE SERVICING PLAN & SITE GRADING PLAN

Project No.	1427-005-25	Designed by: KF	Checked by: KF
Scale:	AS NOTED	Drawn by: BB	Approved by: JDM

Orientation

Stamp: LICENSED PROFESSIONAL ENGINEER J.D.J. McCusig 100064895 2025/06/06 PROVINCE OF ONTARIO

Drawing No.: SS & SG-1

Appendix B

Design Calculations

Gerrits ENGINEERING

SANITARY SERVICING DEMAND

Reference Documents

MECP Design Guidelines for Sewage Works (2008)

Design Criteria

Total Site Area (ha)	0.0525

Residential Site

Residential Area (ha)	0.0525
Ex. 3 Bedroom Apartment	6 per
Units	15.0
Persons per unit	2.0
Total Population	36
Per Capita Flow (L/cap/day)	450

Commecial Site

Commercial Area (m2)	376
Commercial Rate (L/D/m2)	2.50
Commercial Peak Factor	2.5

Formulae

Total Sewage Flows

Average Daily Demand= P*q

Peak Demand, $Q = ((P*q_r*M) / 86.4) + Q_c + I*A$

Harmon Peaking Factor, $M = 1 + (14 / (4+(P/1000)^{0.5}))$

Where:

P= population in thousands

q= Average Daily per capita domestic flow (L/cap*d)

Q_r= Peak domestic flow (L/s)

Q_c= Peak commercial flow (L/s)

I= Peak extraneous flows (L/ha*s)

A= Gross Area tributary in hectares

M= Harmon Formula Peaking Factor ($2 \leq M \geq 4$)

PEAK SANITARY SERVICING DEMAND

DESCRIPTION		DOMESTIC FLOW				COMMERCIAL FLOW				INFILTRATION			TOTAL
Location	Occupancy	Total Population	Harmon Factor	Per Capita Flow (l/cap/day)	Domestic Flow (L/s)	Total Commercial Area (m2)	Commercial Rate (L/D/m2)	Peaking Factor	Commercial Flow (L/s)	Total Area (ha)	Infiltration Rate (L/ha/sec)	Infiltration Flow (L/s)	Total Flow (L/s)
Building 1	Mixed Use	36	4.0	450	0.75	376	2.50	2.50	0.03	0.05	0.23	0.01	0.79

Gerrits ENGINEERING

WATER SERVICING DEMAND

Reference Documents

MECP Design Guidelines for Drinking Water Systems (2008)
Insert Applicable Municipal Guidelines

Notes

The existing building flow rate is based on the historical water useage calculated from the annual billing from May 2024 to May 2025, and has been factored for 251 working days and an operational period of 8 hours per working day, to provide conservative estimates. This method is in accordance with the refrenced MECP document Section 3.4.3

Design Criteria

Total Site Area (ha)	0.0525

Proposed Building	
Residential Area (ha)	0.0525
Units	15
Persons per unit	2.0
Total Population	30
Per Capita Flow (L/cap/day)	450
Commercial Space (sq.m.)	203

Existing Building	
3 Bedroom Apartment (Pop)	6.0
Per Capita Flow (L/cap/day)	450
Commercial Space (sq.m.)	173

Formulae

Water Demand

$ADD = (P*q_r) + (q_c*A)$

$MDD = (MDF_r*P*q_r) + (MDF_c*q_c*A)$

$PHD = (PHF_r*P*q_r) + (PHF_c*q_c*A)$

Where:
P= population (persons)
q= flow rate (units vary)
A= Area (ha)

MDF= Max Day Factor
PHF= Peak Hour Factor

AVERAGE DAY DEMAND

DESCRIPTION		PROPOSED DEVELOPMENT								TOTAL
Location	Occupancy	Total Population	Factor	Per Capita Flow (l/cap/day)	Domestic Flow (L/s)	Total Commercial Floor Area (m2)	Factor	Commercial Water Useage (L/s)		Total Flow (L/s)
Building 1	Mixed Use	36	1.0	450	0.19	376	1.0	0.01		0.20

MAX DAY DEMAND

DESCRIPTION		PROPOSED DEVELOPMENT								TOTAL
Location	Occupancy	Total Population	Factor	Per Capita Flow (l/cap/day)	Domestic Flow (L/s)	Total Existing Floor Area (m2)	Factor	Commercial Water Useage (L/s)		Total Flow (L/s)
Building 1	Mixed Use	36	2.00	450	0.38	376	2.00	0.02		0.40

PEAK HOUR DEMAND

DESCRIPTION		PROPOSED DEVELOPMENT								TOTAL
Location	Occupancy	Total Population	Factor	Per Capita Flow (l/cap/day)	Domestic Flow (L/s)	Total Existing Floor Area (m2)	Factor	Commercial Water Useage (L/s)		Total Flow (L/s)
Building 1	Mixed Use	30	4.5	450	0.70	376	4.5	0.05		0.75

Gerrits ENGINEERING

PRE AND POST DEVELOPMENT RELEASE RATES

IDF Curve Parameters

Storm Event	Coeff A	Coeff B	Coeff C
2-Year	807.44	6.75	0.828
5-Year	1135.4	7.5	0.841
10-Year	1387	7.97	0.852
25-Year	1676.2	8.3	0.858
50-Year	1973.1	9	0.868
100-Year	2193.1	9.04	0.871

Site Statistics

Predevelopment	
Total Site Area (ha)	0.05
Runoff Coefficient, C	0.95
Time of Concentration (mins)	10

Post Development	
Total Site Area (ha)	0.05
Runoff Coefficient, C	0.95
Time of Concentration (mins)	10

Formulae

Rainfall Intensity, I (mm/hr)= A/(tc+B)^C

Release Rate, Q (m^3/s)=C_iCIA/360

Where:

t_c=Time of Concentration (min)

C_i= Peaking Coefficient

C= Runoff Coefficient

I= Rainfall Intesity (mm/hr)

A= Area (ha)

PREDEVELOPMENT RELEASE RATES

Return Rate	Peaking Coefficient, C_i	Runoff Coefficient, C	Rainfall Intensity (mm/hr)	Release Rate (m^3/s)
2-Year	1	0.95	78.28	0.01
5-Year	1	0.95	102.27	0.01
10-Year	1	0.95	118.36	0.02
25-Year	1.1	0.95	138.40	0.02
50-Year	1.2	0.95	153.18	0.03
100-Year	1.25	0.95	168.45	0.03

POST DEVELOPMENT RELEASE RATES

Return Rate	Peaking Coefficient, C_i	Runoff Coefficient, C	Rainfall Intensity (mm/hr)	Release Rate (m^3/s)
2-Year	1	0.95	78.28	0.01
5-Year	1	0.95	102.27	0.01
10-Year	1	0.95	118.36	0.02
25-Year	1.1	0.95	138.40	0.02
50-Year	1.2	0.95	153.18	0.03
100-Year	1.25	0.95	168.45	0.03