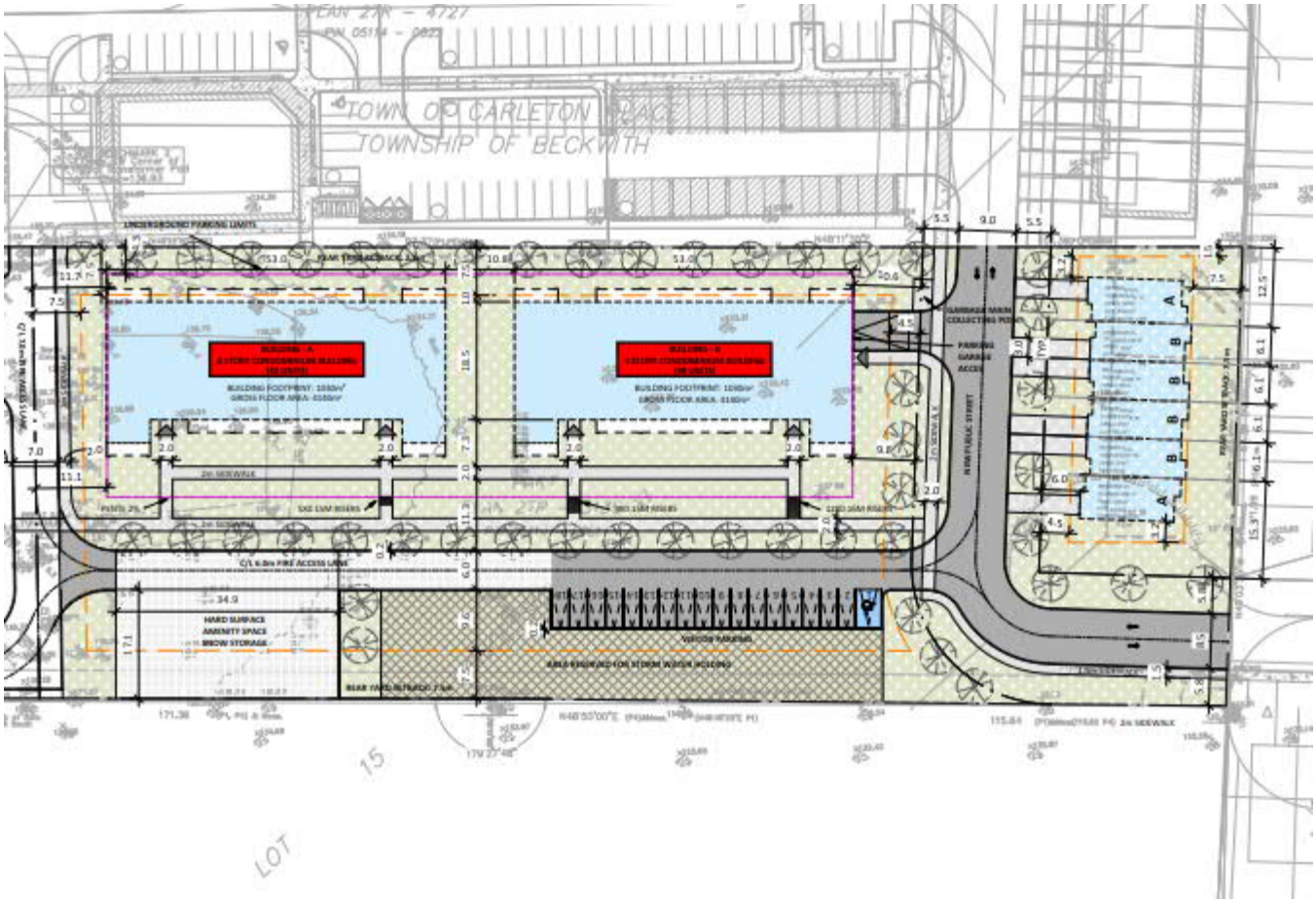
SERVICING AND STORMWATER MANAGEMENT REPORT - 355 FRANKTOWN ROAD



Project No.: CCO-22-0402

Prepared for:

11309455 Canada Inc
190 Lisgar St,
Ottawa, ON K2P 0C4

Prepared by:

McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road
Carp, ON K0A 1L0

July 15, 2022

McINTOSH PERRY

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1.0 PROJECT DESCRIPTION

1.1 Purpose

McIntosh Perry (MP) has been retained by the 11309455 Canada Inc to prepare this Servicing and Stormwater Management Report in support of the site plan approval for the proposed development at 355 Franktown Road within the Town of Carleton Place.

The main purpose of this report is to demonstrate that the proposed development has access to sufficient public services in accordance with the recommendations and guidelines provided by the Town of Carleton Place (Town), the Mississippi Valley Conservation Authority (MVCA) and the Ministry of the Environment, Conservation and Parks (MECP). This report will address access to water, sanitary and storm servicing for the development, ensuring that existing services will adequately service the proposed development.

1.2 Site Description

The property is located at 355 Franktown Road in the Town of Carleton Place. The subject land covers approximately 1.27 ha and is located between the proposed second phase of Coleman Street Subdivision and Franktown Road.

The existing site is currently undeveloped, consisting of wooded and grassed areas. Adjacent lots to the north and south are also undeveloped. Coleman Street Subdivision Phase 2 flanks the eastern portion of the property and existing commercial and residential developments along Franktown Road are located to the west.

The development proposes two 4-Storey condominium buildings on the on the western portion of the property and six townhouses on the eastern portion of the property. The condominium buildings will be separated from the townhouse blocks by a public ROW. The future ROW will connect the proposed development to the lands to the north and eventually to the Coleman subdivision via the lands to the south.

2.0 BACKGROUND DOCUMENTS

Background documents available under separate cover include:

- JLR Watermain Capacity – Future Development_Final (Dated September 16, 2013 completed by J.L. Richards & Associates Ltd.)
- Functional Servicing Report – 347 Franktown Road (Dated August 13, 2021 completed by Mcintosh Perry Consulting Engineers Ltd.)
- Servicing and Stormwater Management Report – 347 Franktown Road (Date June 22, 2022 completed by Mcintosh Perry Consulting Engineers Ltd.)

3.0 WATERMAIN

3.1 Existing Watermain

The following subsections outline the existing water infrastructure within Franktown Road and the proposed infrastructure within Coleman Street Subdivision Phase 2.

3.1.1 Franktown Road

There is an existing 300 mm diameter watermain, that runs north along Franktown Road, ending in a stub located at Findlay Avenue. Just before the stub there is a hydrant that services the existing commercial development adjacent to the subject site.

3.1.2 Coleman Street Subdivision

Although not yet constructed, the infrastructure within the proposed Coleman Street Subdivision Phase 2 is anticipated to be constructed prior to the proposed construction of the subject property. There is a proposed 200 mm diameter watermain that services the subdivision. The design of the Coleman Street Subdivision Phase 2 has taken the future development into account with stubs extending westward from the subdivision located both northeast and southeast of the subject site.

3.2 Proposed Watermain

The existing 200 mm watermain within Coleman Street Subdivision Phase 2 will be extended along the future municipal road. In accordance with the Watermain Capacity – Future Development provided by the Town of Carleton Place, a new 200m watermain is proposed to connect the extended main within the future municipal ROW. A 150mm PVC water lateral will extend from the proposed 200mm watermain to service the condo buildings, as shown on C102. The townhouse block will be serviced via 19mm copper 'k' type laterals extending from the 200mm watermain within the future municipal road.

The Fire Underwriters Survey 2020 (FUS) method was utilized to determine the required fire flow for the proposed Phase 1 development. All buildings in the development were evaluated for the worst-case scenario fire flow scenario. It was determined that the eastern condo building is the worst case. Detailed water and fire calculations for the development can be found in Appendix 'C' of this report.

The 'C' factor (type of construction) for the FUS calculation was determined to be 1 (ordinary construction). The total floor area ('A' value) for the FUS calculation was determined to be 4140.0 m^2. The results of the calculations yielded a required fire flow of 9,000 L/min. The detailed calculations for the FUS can be found in Appendix 'C'.

The water demands for the proposed building have been calculated to adhere to the Ottawa Design Guidelines – Water Distribution manual and can be found in Appendix 'C'. Table 1, below, summarizes the design criteria and calculated demands.

Table 1: Water Supply Design Criteria and Water Demands

Water Demand Rate (Residential)	280 L/c/day
Average Apartment	1.8 Persons/unit
Townhouse	2.7 Persons/unit
Residential Peaking Factor (Day)	4.9 x avg. day
Residential Peaking Factor (Hour)	7.4 x max. day
Site Area (ha)	1.27
Average Day Demand (L/s)	0.61
Maximum Daily Demand (L/s)	3.00
Peak Hourly Demand (L/s)	4.53
FUS Fire Flow Requirement (L/s)	150.00
Max Day + Fire Flow (L/s)	153.00

With reference to the Watermain Capacity – Future Development Pg. 18, pressures under peak demand were analyzed and a water model was completed using Bentley's WaterCAD based on those conditions. The results determined that the proposed 200mm watermain can adequately service the proposed development and provide sufficient fire flow since the proposed Hydrant H-3 and H-4 produced available fire flows of 11,776 L/min and 11,115 L/min, respectively. Refer to drawing C101 for Hydrant locations. The results are available in Appendix 'C' of this report.

The normal operating pressure range is anticipated to be 449 kPa to 462 kPa and will not be less than 275 kPa (40 psi) or exceed 689 kPa (100 psi). The proposed watermain will meet the minimum required 20 psi (140 kPa) at the ground level under maximum day demand and fire flow conditions. Table 2, below, summarizes the water pressure at junctions per scenario.

Table 2: Water Pressure at Junctions per Scenario

Junction	Average Day (psi)	Peak Hourly (psi)	Max. Day + Fire Flow (psi)
J-1	66.65	66.32	67.51
J-2	65.83	65.54	66.37
J-3	65.65	65.37	66.12
J-4	65.65	65.37	66.12
J-5	65.10	64.86	66.36
J-6	67.06	66.84	67.63
J-7	63.71	63.45	63.57

To provide fire flow to the proposed internal fire suppression system, a private hydrant (H-4) within 45m of the siamese connection is proposed. A hydrant summary based on the water model can be seen in Table 3, below.

Table 3: Fire Protection Confirmation

Building	Fire Flow Demand (L/min.)	Fire Hydrant H-3 (L/min.)	Fire Hydrant H-4 (L/min.)	Combined Fire Flow (L/min.)
355 Franktown Road	9,000	11,776	11,115	>9,000

4.0 SANITARY DESIGN

4.1 Existing Sanitary Sewer

Although not yet constructed, Coleman Street Subdivision Phase 2 has a proposed 200 mm diameter sanitary sewer with stubs located to the northeast and southeast of the subject site.

4.2 Proposed Sanitary Sewer

The 200 mm sanitary sewer stub within Coleman Street Subdivision is proposed to be extended along the future municipal road to service the subject property. A 200 mm sanitary sewer is proposed to be extended from the municipal road within the drive aisles bounding the condo buildings. Each building will be serviced by 135mm sanitary laterals extending from the 200mm sewer within the drive aisle. The proposed sewer will also service the existing mall to the west. Each townhouse will be serviced by 135mm sanitary laterals extending from the 200mm sewer within the future municipal road. Refer to drawing C102.

The peak design flow was calculated for the proposed site using the Ottawa Sewer Design Guidelines (SDG). Design criteria used in the sanitary demand calculation can be seen in Table 4, below.

Table 4: Sanitary Design Criteria

Average Apartment	1.8 persons/unit
Townhouse	2.7 persons/unit
Average Daily Demand	280 L/day/person
Residential Peaking Factor	3.53
Commercial Peaking Factor	1.50
Extraneous Flow Allowance	0.33 L/s/ha

Table 5, below, summarizes the estimated wastewater flow from the proposed development. Refer to Appendix 'D' for detailed calculations.

Table 5: Summary of Estimated Sanitary Flow

Average Dry Weather Flow	0.91 L/s
Peak Dry Weather Flow	2.58L/s
Peak Wet Weather Flow	2.93 L/s

Based on the calculation provided in the Coleman Street Subdivision Phase 2 Servicing Report and the results shown in Table 5, above, it is anticipated that there will be no downstream capacity concerns. Flow from the

subject site has been accounted for in the Coleman Street Subdivision design, as demonstrated by the calculation sheet included in Appendix 'D'.

Further downstream of Coleman Street Subdivision Phase 2 a sanitary sewer upgrade is to take place as per "CCO-18-0360-01 - Offsite Sanitary Servicing Memo_Rev1" (See Appendix 'D' for full memorandum). Flows from the subject site were taken into consideration in the memorandum at a rate of 60 pp/ha which corresponds to a flow rate of 6.26 L/s for the site and adjacent development north of the site. The existing mall and proposed apartments within the site will generate a flow rate of 3.51 L/s. The adjacent Chadha development to the north of the site and the proposed block of townhouses will generate a flow of 6.02 L/s. The total flow for the proposed development, existing mall and Chadha development is 9.53 L/s, which is 3.27 L/s greater than the 6.26 L/s previously considered for the site. However, based on the capacity shown for the proposed sanitary sewer upgrade in the memorandum, the additional 3.27 L/s of flow can be accommodated and therefore no capacity issues are anticipated given the upgrade is completed. Sanitary sizing calculations can be found in Appendix 'D'.

5.0 STORM DESIGN

5.1 Existing Storm Sewer

There is no existing storm infrastructure within the subject property. Stormwater runoff currently sheet drains to the southeast where it is collected by the existing creek. The existing mall adjacent to the site currently outlets to a storm water management area within the development. There is a 975mm concrete storm sewer to be extended from the Coleman Phase 2 subdivision. The 975mm sewer is tributary to an existing creek southeast of the site.

5.2 Proposed Storm Sewer

The proposed development will be serviced by a new storm network extended from the future 975mm storm sewer within the future municipal road. The creek tributary to the 975mm storm sewer is being regraded in order to accommodate storm flows from Coleman Street Subdivision Phase 2. A new outlet to the creek is proposed to accommodate flows from the proposed development. In the creek's reconstruction flows from the subject site will also be considered. As existing flows from the adjacent mall currently flow to the site, they will also be considered in the proposed storm water management network and restricted.

Runoff from the condo buildings, drive aisle, rear yard, existing mall and southern landscaped area will be captured and restricted.

Flow attenuation for the above-mentioned areas will be provided via a 145mm plug style orifice located at H-MH2. Flows greater than the allowable release rate will be stored in a landscape area complete with a 2.00m weir at the southeast of the site.

Runoff from the townhouses and the proposed municipal road will sheet drain without attenuation to the future municipal Row.

6.0 STORMWATER MANAGEMENT

6.1 Design Criteria and Methodology

Stormwater management for the proposed site will be maintained through attenuated surface storage provided in a landscape area the southeast of the site. Catch basins will be collect runoff from at-grade areas within the site. The quantitative and qualitative properties of the storm runoff for both the pre & post development flows are further detailed below. The post-development 5 and 100-year flows will be restricted to the pre-development 5 and 100-year flows.

6.2 Runoff Calculations

Runoff calculations presented in this report are derived using the Rational Method, given as:

$$Q = 2.78CIA \quad \text{(L/s)}$$

Where C = Runoff coefficient

I = Rainfall intensity in mm/hr (City of Ottawa IDF curves)

A = Drainage area in hectares

It is recognized that the Rational Method tends to overestimate runoff rates. As a result, the conservative calculation of runoff ensures that any stormwater management facility sized using this method is anticipated to function as intended.

The following coefficients were used to develop an average C for each area:

Roofs/Concrete/Asphalt	0.90
Gravel	0.60
Undeveloped and Grass	0.20

As per the City of Ottawa - Sewer Design Guidelines, the 5-year balanced 'C' value must be increased by 25% for a 100-year storm event to a maximum of 1.0.

The time of concentration (Tc) used for pre-development and post-development shall be calculated using a Tc of 10 minutes.

6.3 Pre-Development Drainage

The existing site drainage limits are demonstrated on the Pre-Development Drainage Area Plan. A summary of the Pre-Development Runoff Calculations can be found in Table 6, below.

Table 6: Pre- Development Runoff Summary

Drainage Area	Area (ha)	Runoff Coefficient (5-Year)	Runoff Coefficient (100-Year)	5-year Peak Flow (L/s)	100-year Peak Flow (L/s)
A1	1.33	0.20	0.25	77.11	165.18
A2	0.64	0.20	0.25	37.20	79.68

See CCO-22-0402 - PRE in Appendix 'E' and Appendix 'G' for calculations.

6.4 Post-Development Drainage

The proposed site drainage limits are demonstrated on the Post-Development Drainage Area Plan. See CCO-22-0402 - POST in Appendix 'F' of this report for more details. A summary of the Post-Development Runoff Calculations can be found in Table 7, below.

Table 7: Post Development Flow Rate

Drainage Area	Area (ha)	Runoff Coefficient (5-Year)	Runoff Coefficient (100-Year)	5-year Peak Flow (L/s)	100-year Peak Flow (L/s)
B1	0.23	0.56	0.63	37.08	72.14
B2	0.78	0.60	0.68	136.49	264.49
B3	0.64	0.84	0.93	155.69	297.25
B4	0.32	0.56	0.63	51.62	100.44
Total	1.97			380.87	734.32

See Appendix 'G' for calculations. Runoff for area B1-B3 will be restricted before draining to the sewer within the future municipal ROW. The flow will be controlled through the use of a 145mm plug style ICD. Runoff from areas B4 will leave the site unrestricted. Quantity and quality control will be further detailed in Sections 6.5 and 6.6.

6.5 Quantity Control

The total post-development runoff for this site has been restricted to match the 5-year and 100-year pre-development flow rates calculated with a combined C value. (See Appendix 'B' for pre-consultation notes). These values create the following allowable release rate and storage volumes for the development site.

Table 8: Allowable Release Rate Summary

Drainage Area	Area (ha)	Runoff Coefficient 5-Year	Runoff Coefficient 100-Year	Required Restricted Flow 5-Year (L/s)	Required Restricted Flow 100-Year (L/s)
A1	1.33	0.20	0.25	77.11	165.18
A2	0.64	0.20	0.25	37.20	79.68
Total	1.97			114.30	244.86

See Appendix 'G' for calculations.

Reducing site flows will be achieved using a flow restriction and will create the need for onsite storage. Runoff from area B1 to B3 will be restricted as shown in Table 9, below.

Table 9: Post-Development Restricted Runoff Summary

Drainage Area	Post Development Unrestricted Flow (L/s)		Post Development Restricted Flow (L/s)		
	5-Year	100-Year	5-Year	100-Year	
B1	37.08	72.14	59.49	132.32	Restricted – ICD
B2	136.49	264.49			
B3	155.69	297.25			
B4	51.62	100.44	51.62	100.44	Unrestricted
Total	380.87	734.32	111.11	232.75	

See Appendix 'G' for calculations.

Runoff from areas B1 to B3 will be restricted using an ICD within HMH2. This will backup stormwater runoff from the site to a landscape area southeast of the site. The area will pond to elevations of 133.17 and 133.47 for the 5-year and 100-year storms, respectively. The landscape area will be complete with a 2.00m earth weir.

A storage summary can be seen in Table 10, below.

Table 10: Storage Summary

Drainage Area	Storage Required (m^3)	Storage Available (m^3)	Storage Required (m^3)	Storage Available (m^3)
	5-Year		100-Year	
B1	199.5	203.1	354.3	359.3
B2				
B3				

6.6 Quality Control

The development of this lot will employ Best Management Practices (BMP's) wherever possible. The intent of implementing stormwater BMP's is to ensure that water quality and quantity concerns are addressed at all stages of development. BMP's at this site will be implemented at the lot level. Lot level BMP's typically include temporary retention of the parking lot runoff, minimizing ground slopes and maximizing landscaped areas.

A quality treatment unit has been sized to provide a TSS removal rate of 80% as per the Mississippi Valley Conservation Authority (MVCA) requirements. The Oil and Grit Separator (OGS) will provide a water quality of at least 80% TSS. The OGS Unit shall be placed downstream of the restriction unit to provide the required water quality treatment for the site runoff before discharging to the existing creek southeast of the site.

7.0 EROSION AND SEDIMENT CONTROL

7.1 Temporary Measures

Before construction begins, temporary silt fence, straw bale or rock flow check dams will be installed at all natural runoff outlets from the property. It is crucial that these controls be maintained throughout construction and inspection of sediment and erosion control will be facilitated by the Contractor or Contract Administration staff throughout the construction period.

Silt fences will be installed where shown on the final engineering plans, specifically along the downstream property limits. The Contractor, at their discretion or at the instruction of the City, Conservation Authority or the Contract Administrator shall increase the quantity of sediment and erosion controls on-site to ensure that the site is operating as intended and no additional sediment finds its way off site. The rock flow, straw bale & silt fence check dams and barriers shall be inspected weekly and after rainfall events. Care shall be taken to properly remove sediment from the fences and check dams as required. Fibre roll barriers are to be installed at all existing curb inlet catchbasins and filter fabric is to be placed under the grates of all existing catchbasins and manholes along the frontage of the site and any new structures immediately upon installation. The measures for the existing/proposed structures are to be removed only after all areas have been paved. Care shall be taken at the removal stage to ensure that any silt that has accumulated is properly handled and disposed of. Removal of silt fences without prior removal of the sediments shall not be permitted.

Although not anticipated, work through winter months shall be closely monitored for erosion along sloped areas. Should erosion be noted, the Contractor shall be alerted and shall take all necessary steps to rectify the situation. Should the Contractor's efforts fail at remediating the eroded areas, the Contractor shall contact the City and/or Conservation Authority to review the site conditions and determine the appropriate course of action. As the ground begins to thaw, the Contractor shall place silt fencing at all required locations as soon as ground conditions warrant. Please see the Site Grading, Drainage and Sediment & Erosion Control Plan for additional details regarding the temporary measures to be installed and their appropriate OPSD references.

7.2 Permanent Measures

It is expected that the Contractor will promptly ensure that all disturbed areas receive topsoil and seed/sod and that grass be established as soon as possible. Any areas of excess fill shall be removed or levelled as soon as possible and must be located a sufficient distance from any watercourse to ensure that no sediment is washed out into the watercourse. As the vegetation growth within the site provides a key component to the control of sediment for the site, it must be properly maintained once established. Once the construction is complete, it will be up to the landowner to maintain the vegetation and ensure that the vegetation is not overgrown or impeded by foreign objects.

8.0 SUMMARY

- Two new condominium buildings and a block of townhouses are proposed at 355 Franktown Road.
- A new 200mm water main will be extended from the proposed Phase 2 of Coleman Subdivision to Franktown Road.
- The FUS method estimated fire flow indicated 9,000 L/min is required for the proposed development.
- Based on boundary conditions provided by the Town, the proposed 200 mm watermain and two private hydrants in the vicinity of the development are capable of meeting daily and fire flow demands.
- A new 200mm sewer main will be installed and connected to the proposed stub at phase 2 of Coleman Subdivision
- The development is anticipated to have a peak wet weather flow of 2.93 L/s. A proposed 200 mm diameter sanitary main will collect and outlet flow to the proposed 200 mm diameter sanitary stub located within Phase 2 of the Coleman Street Subdivision. 135mm services will service the block of townhouses, extending from the Phase 2 Coleman sewer. Based on the sanitary analysis conducted in the Coleman Street Subdivision Phase 2 Servicing Report, the subdivisions sanitary network has sufficient capacity for the subject site's flow.
- A new storm system will be installed on-site to capture storm runoff and restrict flows to pre-development rates. The new storm system will discharge future sewer located within Phase 2 of the Coleman Street Subdivision.
- Storage for the 5 and 100-year storm events will be provided via surface storage.

9.0 RECOMMENDATION

Based on the information presented in this report, we recommend that Town of Carleton Place approve this Servicing and Stormwater Management Report in support of the proposed development at 355 Franktown Road.

This report is respectfully being submitted for approval.

Regards,

McIntosh Perry Consulting Engineers Ltd.

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10.0 STATEMENT OF LIMITATIONS

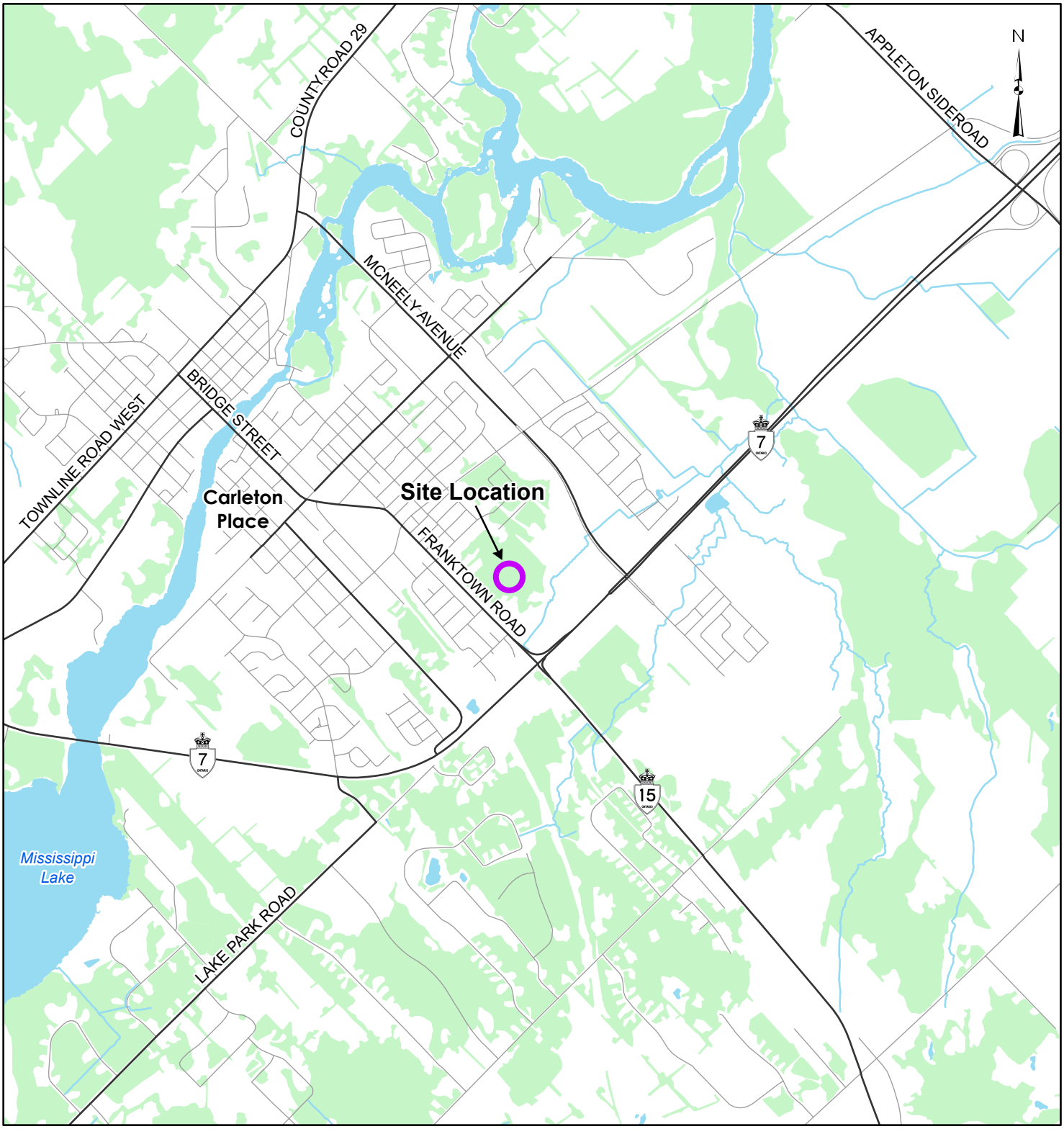
This report was produced for the exclusive use of the 11309455 Canada Inc group. The purpose of the report is to assess the existing stormwater management system and provide recommendations and designs for the post-construction scenario that are in compliance with the guidelines and standards from the Ministry of the Environment, Parks and Climate Change, Town of Carleton Place and local approval agencies. McIntosh Perry reviewed the site information and background documents listed in Section 2.0 of this report. While the previous data was reviewed by McIntosh Perry and site visits were performed, no field verification/measures of any information were conducted.

Any use of this review by a third party, or any reliance on decisions made based on it, without a reliance report is the responsibility of such third parties. McIntosh Perry accepts no responsibility for damages, if any, suffered by any third party as a result of decisions or actions made based on this review.

The findings, conclusions and/or recommendations of this report are only valid as of the date of this report. No assurance is made regarding any changes in conditions subsequent to this date. If additional information is discovered or becomes available at a future date, McIntosh Perry should be requested to re-evaluate the conclusions presented in this report, and provide amendments, if required.

APPENDIX A
KEY PLAN

McINTOSH PERRY



LEGEND

- Site Location
- Local Road
- Major Road
- Watercourse
- Waterbody
- Wooded Area

1,000 500 0 1,000

Scale 1:30,000 Metres

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2021.

CLIENT: HEAFEY GROUP

PROJECT: 355 FRANKTOWN ROAD

TITLE: SITE LOCATION

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A1L0
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PROJECT NO: CCO-22-0402	
Date	Aug., 09, 2021
GIS	EU
Checked By	NV

FIGURE: 1

APPENDIX B
BACKGROUND DOCUMENTS

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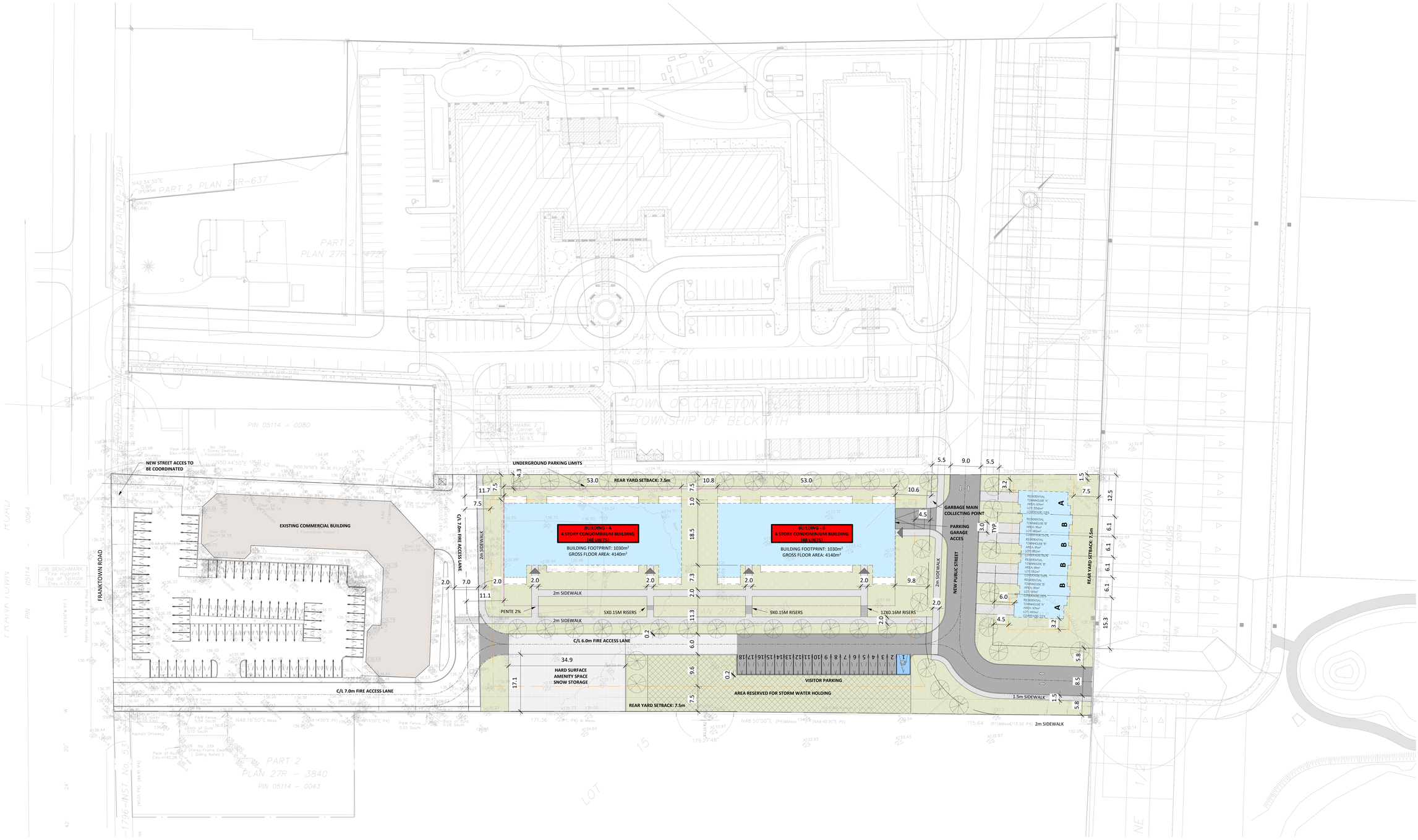

355 FRANKTOWN DEVELOPMENT
96 CONDOMINIUMS UNITS
6 FREEHOLD TOWNHOUSES

102 UNITS TOTAL

PARKINGS
VISITOR: 18
UNDERGROUND: 130
TOTAL: 148

FOR INFORMATION
IN PROGRESS
JUNE 30, 2022

C:\Users\lmiroux\Documents\21006_DEV-FRANKTOWN_CENTRAL_R21_lmiroux.rvt

Project

Franktown Development

355 Franktown Rd
Carleton Place, ON K7C 4M6

Owner

Architect

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—
3070, CHEMIN DES QUATRE-BOURGEOIS
QUÉBEC (QC) G1W 2K4
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Mechanic-electricity

Landscape architect

Structural engineer

Designer

Seal

Seal

Revision

N°	Description	Date

Reference

A: Detail number
B: Number of the sheet where it is detailed

Note

Before starting work the contractor will have to check all dimensions and site conditions and notify the architect in writing if there is a discrepancy. This document and its content are protected by copyright laws and any copying is prohibited unless granted permission by the architect.

Date: 2022-06-30
Scale: 1 : 400
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Draw by: P-POMERLEAU

Title: SITE PLAN

Sheet: A101

APPENDIX C
WATERMAIN CALCULATIONS

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CCO-22-0402 - 355 Franktown - Water Demands - BLDG A

Project:	355 Franktown
Project No.:	CCO-22-0402
Designed By:	RRR
Checked By:	NBV
Date:	July 13, 2022
Site Area:	1.27 gross ha

Residential	NUMBER OF UNITS		UNIT RATE	
Single Family		homes	3.4	persons/unit
Semi-detached		homes	2.7	persons/unit
Townhouse		homes	2.7	persons/unit
Bachelor Apartment		units	1.4	persons/unit
1 Bedroom Apartment		units	1.4	persons/unit
2 Bedroom Apartment		units	2.1	persons/unit
3 Bedroom Apartment		units	3.1	persons/unit
Average Apartment	48	units	1.8	persons/unit
Total Population	87	persons		
Commercial		m2		
Industrial - Light		m2		
Industrial - Heavy		m2		

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	280	L/c/d
Industrial - Light	35,000	L/gross ha/d
Industrial - Heavy	55,000	L/gross ha/d
Shopping Centres	2,500	L/(1000m² /d
Hospital	900	L/(bed/day)
Schools	70	L/(Student/d)
Trailer Park with no Hook-Ups	340	L/(space/d)
Trailer Park with Hook-Ups	800	L/(space/d)
Campgrounds	225	L/(campsite/d)
Mobile Home Parks	1,000	L/(Space/d)
Motels	150	L/(bed-space/d)
Hotels	225	L/(bed-space/d)
Tourist Commercial	28,000	L/gross ha/d
Other Commercial	28,000	L/gross ha/d

AVERAGE DAILY DEMAND	Residential	0.28	L/s
	Commerical/Industrial/ Institutional	0.00	L/s

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MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	9.5	x avg. day	L/c/d
Industrial	1.5	x avg. day	L/gross ha/d
Commercial	1.5	x avg. day	L/gross ha/d
Institutional	1.5	x avg. day	L/gross ha/d
MAXIMUM DAILY DEMAND	Residential	2.68	L/s
	Commerical/Industrial/ Institutional	0.00	L/s

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	14.3	x avg. day	L/c/d
Industrial	1.8	x max. day	L/gross ha/d
Commercial	1.8	x max. day	L/gross ha/d
Institutional	1.8	x max. day	L/gross ha/d
MAXIMUM HOUR DEMAND	Residential	4.03	L/s
	Commerical/Industrial/ Institutional	0.00	L/s

WATER DEMAND DESIGN FLOWS PER UNIT COUNT
CITY OF OTTAWA - WATER DISTRIBUTION GUIDELINES, JULY 2010

AVERAGE DAILY DEMAND	0.28	L/s
MAXIMUM DAILY DEMAND	2.68	L/s
MAXIMUM HOUR DEMAND	4.03	L/s

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McINTOSH PERRY

CCO-22-0402 - 355 Franktown - Water Demands - BLDG B

Project:	355 Franktown
Project No.:	CCO-22-0402
Designed By:	RRR
Checked By:	NBV
Date:	July 13, 2022
Site Area:	1.27 gross ha

Residential	NUMBER OF UNITS		UNIT RATE	
Single Family		homes	3.4	persons/unit
Semi-detached		homes	2.7	persons/unit
Townhouse		homes	2.7	persons/unit
Bachelor Apartment		units	1.4	persons/unit
1 Bedroom Apartment		units	1.4	persons/unit
2 Bedroom Apartment		units	2.1	persons/unit
3 Bedroom Apartment		units	3.1	persons/unit
Average Apartment	48	units	1.8	persons/unit
Total Population	87	persons		
Commercial		m2		
Industrial - Light		m2		
Industrial - Heavy		m2		

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	280	L/c/d
Industrial - Light	35,000	L/gross ha/d
Industrial - Heavy	55,000	L/gross ha/d
Shopping Centres	2,500	L/(1000m² /d
Hospital	900	L/(bed/day)
Schools	70	L/(Student/d)
Trailer Park with no Hook-Ups	340	L/(space/d)
Trailer Park with Hook-Ups	800	L/(space/d)
Campgrounds	225	L/(campsite/d)
Mobile Home Parks	1,000	L/(Space/d)
Motels	150	L/(bed-space/d)
Hotels	225	L/(bed-space/d)
Tourist Commercial	28,000	L/gross ha/d
Other Commercial	28,000	L/gross ha/d

AVERAGE DAILY DEMAND	Residential	0.28	L/s
	Commerical/Industrial/ Institutional	0.00	L/s

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MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	9.5	x avg. day	L/c/d
Industrial	1.5	x avg. day	L/gross ha/d
Commercial	1.5	x avg. day	L/gross ha/d
Institutional	1.5	x avg. day	L/gross ha/d
MAXIMUM DAILY DEMAND	Residential	2.68	L/s
	Commerical/Industrial/ Institutional	0.00	L/s

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	14.3	x avg. day	L/c/d
Industrial	1.8	x max. day	L/gross ha/d
Commercial	1.8	x max. day	L/gross ha/d
Institutional	1.8	x max. day	L/gross ha/d
MAXIMUM HOUR DEMAND	Residential	4.03	L/s
	Commerical/Industrial/ Institutional	0.00	L/s

WATER DEMAND DESIGN FLOWS PER UNIT COUNT
CITY OF OTTAWA - WATER DISTRIBUTION GUIDELINES, JULY 2010

AVERAGE DAILY DEMAND	0.28	L/s
MAXIMUM DAILY DEMAND	2.68	L/s
MAXIMUM HOUR DEMAND	4.03	L/s

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McINTOSH PERRY

CCO-22-0402 - 355 Franktown - Water Demands - BLDG B

Project:	355 Franktown
Project No.:	CCO-22-0402
Designed By:	RRR
Checked By:	NBV
Date:	July 13, 2022
Site Area:	1.27 gross ha

Residential	NUMBER OF UNITS		UNIT RATE	
Single Family		homes	3.4	persons/unit
Semi-detached		homes	2.7	persons/unit
Townhouse	6	homes	2.7	persons/unit
Bachelor Apartment		units	1.4	persons/unit
1 Bedroom Apartment		units	1.4	persons/unit
2 Bedroom Apartment		units	2.1	persons/unit
3 Bedroom Apartment		units	3.1	persons/unit
Average Apartment		units	1.8	persons/unit

Total Population 17 persons

Commercial m2
Industrial - Light m2
Industrial - Heavy m2

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	280	L/c/d
Industrial - Light	35,000	L/gross ha/d
Industrial - Heavy	55,000	L/gross ha/d
Shopping Centres	2,500	L/(1000m² /d
Hospital	900	L/(bed/day)
Schools	70	L/(Student/d)
Trailer Park with no Hook-Ups	340	L/(space/d)
Trailer Park with Hook-Ups	800	L/(space/d)
Campgrounds	225	L/(campsite/d)
Mobile Home Parks	1,000	L/(Space/d)
Motels	150	L/(bed-space/d)
Hotels	225	L/(bed-space/d)
Tourist Commercial	28,000	L/gross ha/d
Other Commercial	28,000	L/gross ha/d

AVERAGE DAILY DEMAND	Residential	0.06	L/s
	Commerical/Industrial/ Institutional	0.00	L/s

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MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	9.5	x avg. day	L/c/d
Industrial	1.5	x avg. day	L/gross ha/d
Commercial	1.5	x avg. day	L/gross ha/d
Institutional	1.5	x avg. day	L/gross ha/d
MAXIMUM DAILY DEMAND	Residential	0.52	L/s
	Commerical/Industrial/ Institutional	0.00	L/s

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	14.3	x avg. day	L/c/d
Industrial	1.8	x max. day	L/gross ha/d
Commercial	1.8	x max. day	L/gross ha/d
Institutional	1.8	x max. day	L/gross ha/d
MAXIMUM HOUR DEMAND	Residential	0.79	L/s
	Commerical/Industrial/ Institutional	0.00	L/s

WATER DEMAND DESIGN FLOWS PER UNIT COUNT
CITY OF OTTAWA - WATER DISTRIBUTION GUIDELINES, JULY 2010

AVERAGE DAILY DEMAND	0.06	L/s
MAXIMUM DAILY DEMAND	0.52	L/s
MAXIMUM HOUR DEMAND	0.79	L/s

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McINTOSH PERRY

CCO-22-0402 - 355 Franktown - Water Demands - Total

Project:	355 Franktown
Project No.:	CCO-22-0402
Designed By:	RRR
Checked By:	NBV
Date:	July 13, 2022
Site Area:	1.27 gross ha

Residential	NUMBER OF UNITS		UNIT RATE	
Single Family		homes	3.4	persons/unit
Semi-detached		homes	2.7	persons/unit
Townhouse	6	homes	2.7	persons/unit
Bachelor Apartment		units	1.4	persons/unit
1 Bedroom Apartment		units	1.4	persons/unit
2 Bedroom Apartment		units	2.1	persons/unit
3 Bedroom Apartment		units	3.1	persons/unit
Average Apartment	96	units	1.8	persons/unit
Total Population	189	persons		
Commercial		m2		
Industrial - Light		m2		
Industrial - Heavy		m2		

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	280	L/c/d
Industrial - Light	35,000	L/gross ha/d
Industrial - Heavy	55,000	L/gross ha/d
Shopping Centres	2,500	L/(1000m² /d
Hospital	900	L/(bed/day)
Schools	70	L/(Student/d)
Trailer Park with no Hook-Ups	340	L/(space/d)
Trailer Park with Hook-Ups	800	L/(space/d)
Campgrounds	225	L/(campsite/d)
Mobile Home Parks	1,000	L/(Space/d)
Motels	150	L/(bed-space/d)
Hotels	225	L/(bed-space/d)
Tourist Commercial	28,000	L/gross ha/d
Other Commercial	28,000	L/gross ha/d

AVERAGE DAILY DEMAND	Residential	0.61	L/s
	Commerical/Industrial/ Institutional	0.00	L/s

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MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	4.9	x avg. day	L/c/d
Industrial	1.5	x avg. day	L/gross ha/d
Commercial	1.5	x avg. day	L/gross ha/d
Institutional	1.5	x avg. day	L/gross ha/d
MAXIMUM DAILY DEMAND	Residential	3.00	L/s
	Commerical/Industrial/ Institutional	0.00	L/s

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT		UNITS
Residential	7.4	x avg. day	L/c/d
Industrial	1.8	x max. day	L/gross ha/d
Commercial	1.8	x max. day	L/gross ha/d
Institutional	1.8	x max. day	L/gross ha/d
MAXIMUM HOUR DEMAND	Residential	4.53	L/s
	Commerical/Industrial/ Institutional	0.00	L/s

WATER DEMAND DESIGN FLOWS PER UNIT COUNT
CITY OF OTTAWA - WATER DISTRIBUTION GUIDELINES, JULY 2010

McINTOSH PERRY

AVERAGE DAILY DEMAND	0.61	L/s
MAXIMUM DAILY DEMAND	3.00	L/s
MAXIMUM HOUR DEMAND	4.53	L/s

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McINTOSH PERRY

CCO-22-0402 - 355 Franktown - Fire Underwriters Survey

Project:	355 Franktown
Project No.:	CCO-22-0402
Designed By:	RRR
Checked By:	NBV
Date:	July 13, 2022

From the Fire Underwriters Survey (2020)

From Part II – Guide for Determination of Required Fire Flow Copyright I.S.O.:
City of Ottawa Technical Bulletin ISTB-2018-02 Applied Where Applicable

A. BASE REQUIREMENT (Rounded to the nearest 1000 L/min)

F = 220 x C x √A Where: F = Required fire flow in liters per minute
C = Coefficient related to the type of construction.
A = The total floor area in square meters (including all storey's, but excluding basements at least 50 percent below grade) in the building being considered.

Construction Type: Ordinary Construction

C	1	A	4,140.0 m^2	
	Total Floor Area (per the 2020 FUS Page 20 - Total Effective Area)		4,140.0 m^2	*Unprotected Vertical Openings

Calculated Fire Flow	14,155.4 L/min
	14,000.0 L/min

B. REDUCTION FOR OCCUPANCY TYPE (No Rounding)

From Page 24 of the Fire Underwriters Survey:

Non-Combustible	-25%

Fire Flow	10,500.0 L/min

C. REDUCTION FOR SPRINKLER TYPE (No Rounding)

Standard Water Supply Sprinklered	-40%

Reduction	-4,200.0 L/min

D. INCREASE FOR EXPOSURE (No Rounding)

	Separation Distance (m)	Cons.of Exposed Wall	Length Exposed Adjacent Wall (m)	Height (Stories)	Length-Height Factor	
Exposure 1	10.1 to 20	Ordinary - Mass Timber (Unprotected)	29	2	58.0	7%
Exposure 2	3.1 to 10	Ordinary - Mass Timber (Unprotected)	19	4	76.0	13%
Exposure 3	Over 30 m	Ordinary - Mass Timber (Unprotected)	15	2	30.0	0%
Exposure 4	10.1 to 20	Fire Resistive - Non Combustible (Unprotected Openings)	34	1	34.0	4%
					% Increase*	24%

Increase*	2,520.0 L/min

E. Total Fire Flow (Rounded to the Nearest 1000 L/min)

Fire Flow	8,820.0 L/min
Fire Flow Required**	9,000.0 L/min

*In accordance with Part II, Section 4, the Increase for separation distance is not to exceed 75%
**In accordance with Section 4 the Fire flow is not to exceed 45,000 L/min or be less than 2,000 L/min

McINTOSH PERRY

CCO-22-0402 - 355 Franktown - Fire Underwriters Survey

Project:	355 Franktown
Project No.:	CCO-22-0402
Designed By:	RRR
Checked By:	NBV
Date:	July 13, 2022

From the Fire Underwriters Survey (2020)

From Part II – Guide for Determination of Required Fire Flow Copyright I.S.O.:
City of Ottawa Technical Bulletin ISTB-2018-02 Applied Where Applicable

A. BASE REQUIREMENT (Rounded to the nearest 1000 L/min)

F = 220 x C x √A Where: F = Required fire flow in liters per minute
C = Coefficient related to the type of construction.
A = The total floor area in square meters (including all storey's, but excluding basements at least 50 percent below grade) in the building being considered.

Construction Type: Ordinary Construction

C: 1 — A: 4,140.0 m^2

Total Floor Area (per the 2020 FUS Page 20 - Total Effective Area): 4,140.0 m^2 *Unprotected Vertical Openings

Calculated Fire Flow	14,155.4 L/min
	14,000.0 L/min

B. REDUCTION FOR OCCUPANCY TYPE (No Rounding)

From Page 24 of the Fire Underwriters Survey:

Non-Combustible	-25%
Fire Flow	10,500.0 L/min

C. REDUCTION FOR SPRINKLER TYPE (No Rounding)

Standard Water Supply Sprinklered	-40%
Reduction	-4,200.0 L/min

D. INCREASE FOR EXPOSURE (No Rounding)

	Separation Distance (m)	Cons.of Exposed Wall	Length Exposed Adjacent Wall (m)	Height (Stories)	Length-Height Factor	
Exposure 1	Over 30 m	Ordinary - Mass Timber (Unprotected)	16	2	32.0	0%
Exposure 2	Over 30 m	Ordinary - Mass Timber (Unprotected)	38	2	76.0	0%
Exposure 3	Over 30 m	Ordinary - Mass Timber (Unprotected)	15	2	30.0	0%
Exposure 4	3.1 to 10	Fire Resistive - Non Combustible (Unprotected Openings)	19	4	76.0	9%
					% Increase*	9%

Increase*	945.0 L/min

E. Total Fire Flow (Rounded to the Nearest 1000 L/min)

Fire Flow	7,245.0 L/min
Fire Flow Required**	7,000.0 L/min

*In accordance with Part II, Section 4, the Increase for separation distance is not to exceed 75%
**In accordance with Section 4 the Fire flow is not to exceed 45,000 L/min or be less than 2,000 L/min

McINTOSH PERRY

CCO-22-0402 - 355 Franktown - Fire Underwriters Survey

Project:	355 Franktown
Project No.:	CCO-22-0402
Designed By:	RRR
Checked By:	NBV
Date:	July 13, 2022

From the Fire Underwriters Survey (2020)

From Part II – Guide for Determination of Required Fire Flow Copyright I.S.O.:
City of Ottawa Technical Bulletin ISTB-2018-02 Applied Where Applicable

A. BASE REQUIREMENT (Rounded to the nearest 1000 L/min)

F = 220 x C x √A Where: F = Required fire flow in liters per minute
C = Coefficient related to the type of construction.
A = The total floor area in square meters (including all storey's, but excluding basements at least 50 percent below grade) in the building being considered.

Construction Type: Ordinary Construction

C: 1 — A: 1,132.0 m^2

Total Floor Area (per the 2020 FUS Page 20 - Total Effective Area): 1,132.0 m^2 *Unprotected Vertical Openings

Calculated Fire Flow	7,401.9 L/min
	7,000.0 L/min

B. REDUCTION FOR OCCUPANCY TYPE (No Rounding)

From Page 24 of the Fire Underwriters Survey:

Non-Combustible	-25%
Fire Flow	5,250.0 L/min

C. REDUCTION FOR SPRINKLER TYPE (No Rounding)

Standard Water Supply Sprinklered	-40%
Reduction	-2,100.0 L/min

D. INCREASE FOR EXPOSURE (No Rounding)

	Separation Distance (m)	Cons.of Exposed Wall	Length Exposed Adjacent Wall (m)	Height (Stories)	Length-Height Factor	
Exposure 1	3.1 to 10	Ordinary - Mass Timber (Unprotected)	15	2	30.0	11%
Exposure 2	Over 30 m	Ordinary - Mass Timber (Unprotected)	20	2	40.0	0%
Exposure 3	Over 30 m	Ordinary - Mass Timber (Unprotected)	20	2	40.0	0%
Exposure 4	Over 30 m	Fire Resistive - Non Combustible (Unprotected Openings)	19	4	76.0	0%
					% Increase*	11%

Increase*	577.5 L/min

E. Total Fire Flow (Rounded to the Nearest 1000 L/min)

Fire Flow	3,727.5 L/min
Fire Flow Required**	4,000.0 L/min

*In accordance with Part II, Section 4, the Increase for separation distance is not to exceed 75%
**In accordance with Section 4 the Fire flow is not to exceed 45,000 L/min or be less than 2,000 L/min

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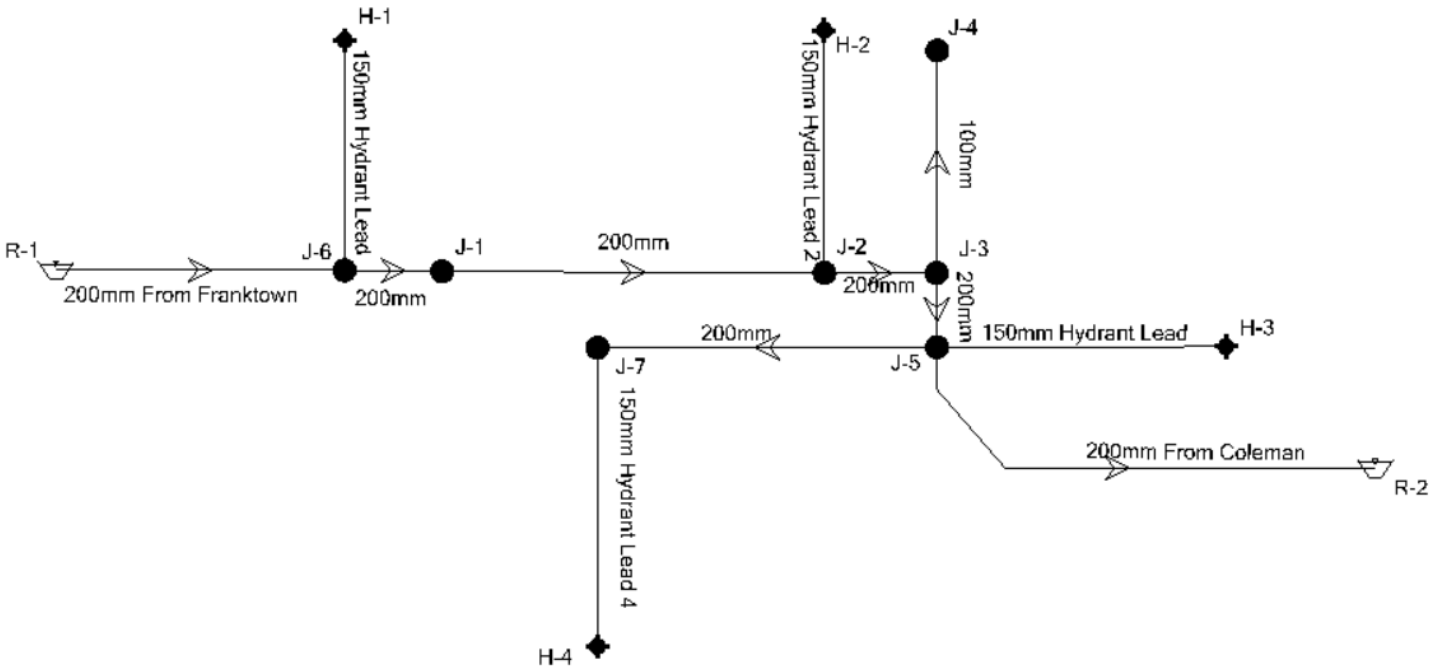

H-1
150mm Hydrant Lead
H-2
150mm Hydrant Lead 2
J-4
100mm
R-1
J-6
J-1
200mm
J-2
J-3
200mm From Franktown
200mm
200mm
200mm
200mm
150mm Hydrant Lead
H-3
J-7
J-5
150mm Hydrant Lead 4
200mm From Coleman
R-2
H-4

Active Scenario: Average Day - Existing Conditions

Label	Elevation (m)	Demand (L/min)	Pressure (psi)	Hydraulic Grade (m)
J-1	131.50	63.00	66.65	178.45
J-4	131.50	4.80	65.65	177.75
J-3	131.50	0.00	65.65	177.75
J-5	131.50	3.60	65.10	177.36
J-2	131.50	0.00	65.83	177.87
J-6	131.50	0.00	67.06	178.75
J-7	132.48	36.60	63.71	177.36

Active Scenario: Peak Hourly - Existing Conditions

Label	Elevation (m)	Demand (L/min)	Pressure (psi)	Hydraulic Grade (m)
J-1	131.50	344.40	66.32	178.22
J-4	131.50	27.00	65.37	177.55
J-3	131.50	0.00	65.37	177.55
J-5	131.50	47.40	64.86	177.19
J-2	131.50	0.00	65.54	177.67
J-6	131.50	0.00	66.84	178.59
J-7	132.48	271.80	63.45	177.18

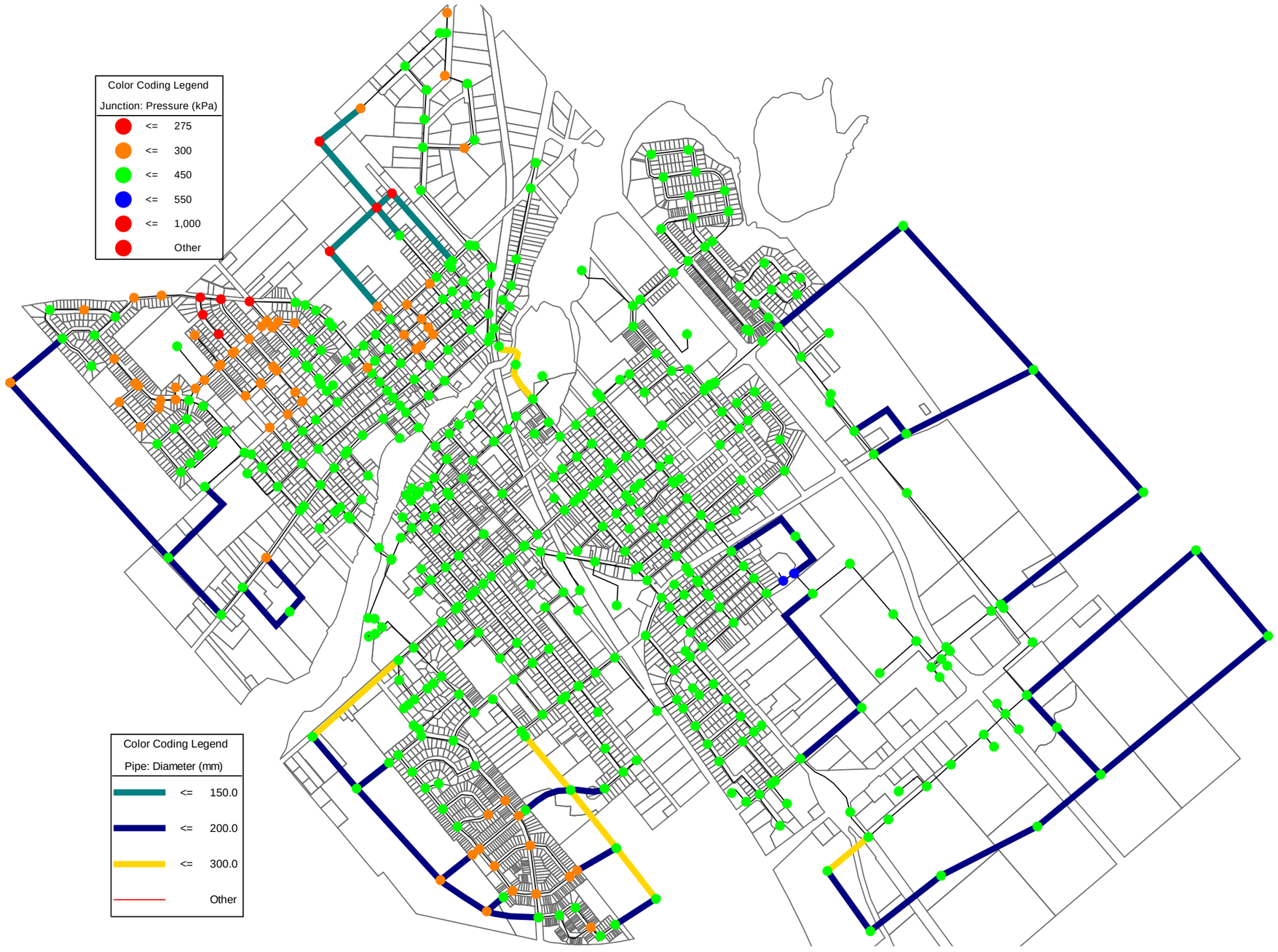
Active Scenario: Max Day + Fire Flow - Existing Conditions

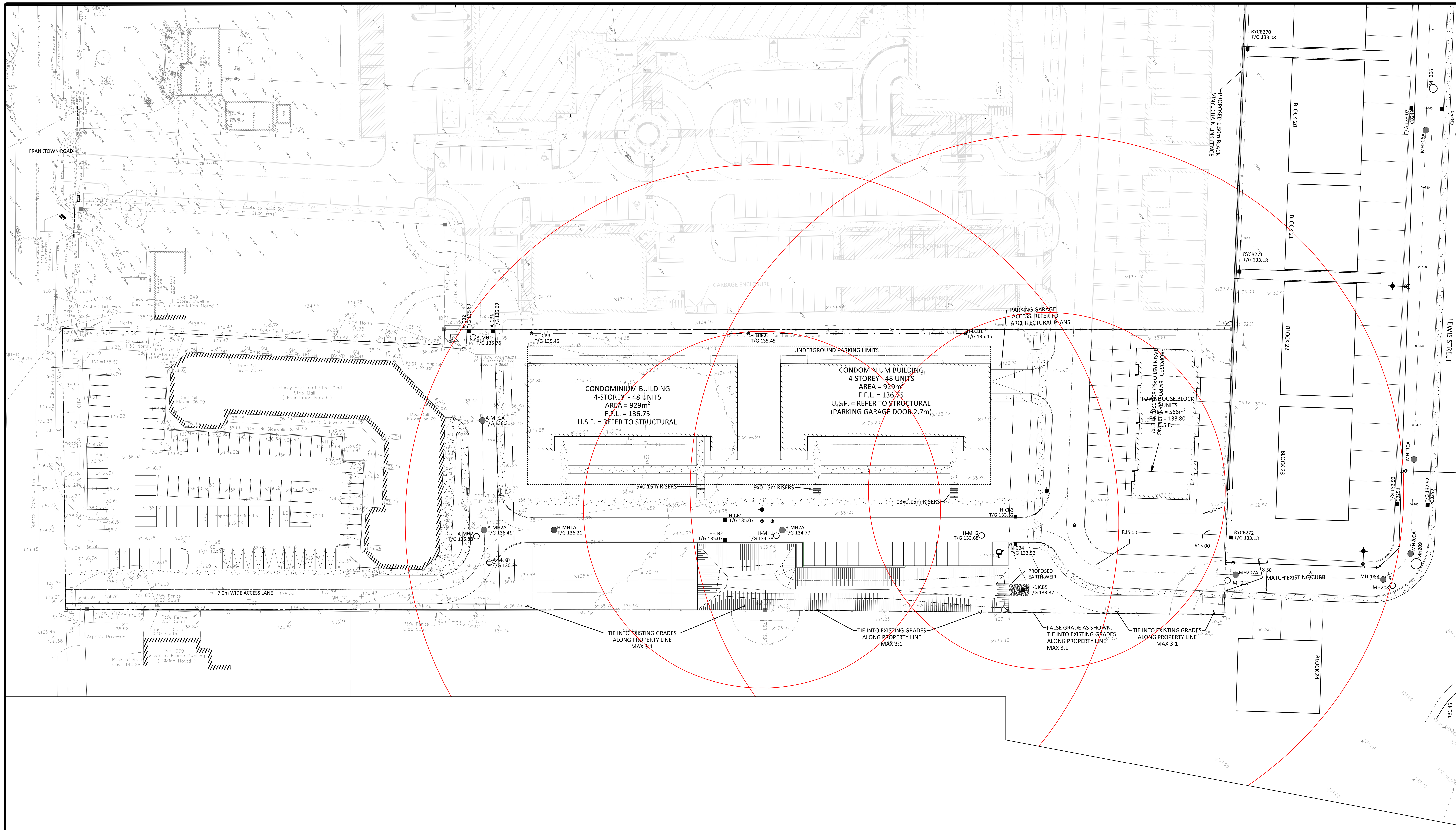
Label	Elevation (m)	Demand (L/min)	Pressure (psi)	Hydraulic Grade (m)
J-1	131.50	156.00	66.52	178.36
J-4	131.50	12.00	65.52	177.66
J-3	131.50	0.00	65.52	177.66
J-5	131.50	31.20	64.97	177.27
J-2	131.50	0.00	65.70	177.78
J-6	131.50	0.00	66.98	178.68
J-7	132.48	180.00	63.57	177.27

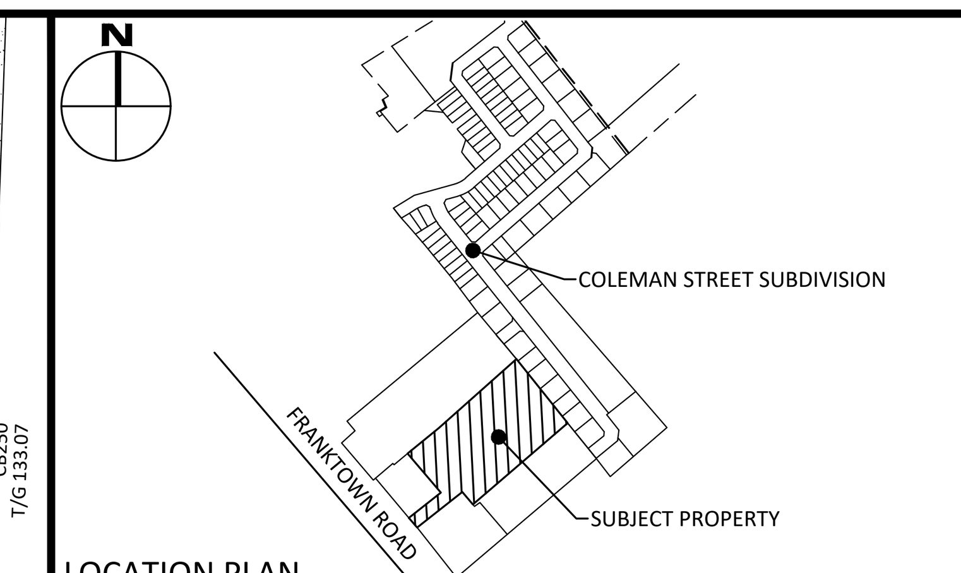
Active Scenario: Max Day + Fire Flow - Existing Conditions

Label	Is Fire Flow Run Balanced?	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (L/min)	Fire Flow (Available) (L/min)	Pressure (psi)	Elevation (m)	Demand (L/min)	Pressure (Residual Lower Limit) (psi)
H-2	True	True	9,000.00	16,991.64	64.99	132.00	0.00	20.00
H-1	True	True	9,000.00	18,952.98	66.27	132.00	0.00	20.00
H-4	True	True	9,000.00	11,114.89	59.71	135.20	0.00	20.00
H-3	True	True	9,000.00	11,776.25	62.05	133.56	0.00	20.00

Active Scenario: Peak Hour - Build-out







LOCATION PLAN

LEGEND

BARRIER CURB / CURB DEPRESION		SILT FENCE BARRIER (AS PER OPSD 219.130)	
MOUNTABLE CURB		STRAW BALE CHECK DAM (AS PER OPSD 219.180)	
EASEMENT		SEDIMENT CONTROL DEVICE	
ASPHALT		BUILDING ENTRANCE / OVERHEAD DOOR	
RETAINING WALL		REMOTE WATER METER	
CONCRETE SIDEWALK		WATER METER	
PAVING STONE		MISC. ROCK BOULDER	
STORM MANHOLE		SEDIMENT CONTROL DEVICE	
CATCHBASIN OR DITCH INLET			
LANDSCAPE CATCHBASIN			
SANITARY MANHOLE			
PERFORATED PIPE IN SWALES			
WATER VAVLE/CHAMBER			
FIRE HYDRANT			
CENTRELINE OF SWALE			
SLOPING AT 3:1 (UNLESS SPECIFIED)			
PROPOSED ELEVATION / EXISTING ELEVATION			
SWALE ELEVATION			
TOP OF WALL ELEVATION / BOTTOM OF WALL ELEVATION			
EMERGENCY OVERLAND FLOW ROUTE			
AREA DRAIN			
METER/REMOTE METER			
DOWNSPOUT			

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

No.	Revisions	Date
1	ISSUED FOR REVIEW	APR. 06, 2022

Check and verify all dimensions before proceeding with the work — Do not scale drawings

SCALE 1 : 150 — 0, 5, 10, 15 Metres

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Stamp:

Client:

Project:

355 FRANKTOWN ROAD
CARLETON PLACE, ONTARIO

Drawing Title:

HYDRANT COVERAGE PLAN

Scale:	1:500	Project Number:	CCO-22-0402
Drawn By:	N.V		
Checked By:	R.F	Drawing Number:	HYD
Designed By:	N.V		

APPENDIX D
SANITARY CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

CCO-22-0402 - 355 Franktown - Sanitary Demands

Project:	355 Franktown
Project No.:	CCO-22-0402
Designed By:	R.R.R.
Checked By:	N.B.V.
Date:	11/12/2021

Site Area	1.27	Gross ha		
Townhouse	0		2.70	Persons per unit
Apartment	48		1.80	Persons per unit

Total Population	87	Persons
Commercial Area	0.00	m^2
Amenity Space	0.00	m^2

DESIGN PARAMETERS

Institutional/Commercial Peaking Facto	1.5	*Check technical bulleting (Either use 1.0 or 1.5)
Residential Peaking Factor	3.61	* Using Harmon Formula = 1+(14/(4+P^0.5))*0.8
		where P = population in thousands, Harmon's Correction Factor = 0.8
Mannings coefficient (n)	0.013	
Demand (per capita)	280	L/day
Infiltration allowance	0.33	L/s/Ha

EXTRANEOUS FLOW ALLOWANCES

Infiltration / Inflow	Flow (L/s)
Dry	0.06
Wet	0.36
Total	0.42

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	POPULATION / AREA	Flow (L/s)
Residential	280	L/c/d	87	0.28
Industrial - Light**	35,000	L/gross ha/d		0
Industrial - Heavy**	55,000	L/gross ha/d		0
Commercial / Amenity	2,800	L/(1000m^2 /d)	0.00	0.00
Hospital	900	L/(bed/day)		0
Schools	70	L/(Student/d)		0
Trailer Parks no Hook-Ups	340	L/(space/d)		0
Trailer Park with Hook-Ups	800	L/(space/d)		0
Campgrounds	225	L/(campsite/d)		0
Mobile Home Parks	1,000	L/(Space/d)		0
Motels	150	L/(bed-space/d)		0
Hotels	225	L/(bed-space/d)		0
Office	75	L/7.0m^2/d		0
Tourist Commercial	28,000	L/gross ha/d		0
Other Commercial	28,000	L/gross ha/d		0

AVERAGE RESIDENTIAL FLOW	0.28	L/s
PEAK RESIDENTIAL FLOW	1.02	L/s
AVERAGE ICI FLOW	0.00	L/s
PEAK INSTITUTIONAL/COMMERCIAL FLOW	0.00	L/s
PEAK INDUSTRIAL FLOW	0.00	L/s
TOTAL PEAK ICI FLOW	0.00	L/s

TOTAL SANITARY DEMAND

TOTAL ESTIMATED AVERAGE DRY WEATHER FLOW	0.35	L/s
TOTAL ESTIMATED PEAK DRY WEATHER FLOW	1.08	L/s
TOTAL ESTIMATED PEAK WET WEATHER FLOW	1.44	L/s

** PEAK INDUSTRIAL FLOW PER CITY OF OTTAWA SEWER DESIGN GUIDELINES APPENDIX 4B

McINTOSH PERRY

CCO-22-0402 - 355 Franktown - Sanitary Demands

Project:	355 Franktown
Project No.:	CCO-22-0402
Designed By:	R.R.R.
Checked By:	N.B.V.
Date:	11/12/2021

Site Area	1.27	Gross ha		
Townhouse	0		2.70	Persons per unit
Apartment	48		1.80	Persons per unit

Total Population	87	Persons
Commercial Area	0.00	m^2
Amenity Space	0.00	m^2

DESIGN PARAMETERS

Institutional/Commercial Peaking Facto	1.5	*Check technical bulleting (Either use 1.0 or 1.5)
Residential Peaking Factor	3.61	* Using Harmon Formula = 1+(14/(4+P^0.5))*0.8
		where P = population in thousands, Harmon's Correction Factor = 0.8
Mannings coefficient (n)	0.013	
Demand (per capita)	280	L/day
Infiltration allowance	0.33	L/s/Ha

EXTRANEOUS FLOW ALLOWANCES

Infiltration / Inflow	Flow (L/s)
Dry	0.06
Wet	0.36
Total	0.42

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	POPULATION / AREA	Flow (L/s)
Residential	280	L/c/d	87	0.28
Industrial - Light**	35,000	L/gross ha/d		0
Industrial - Heavy**	55,000	L/gross ha/d		0
Commercial / Amenity	2,800	L/(1000m^2 /d)	0.00	0.00
Hospital	900	L/(bed/day)		0
Schools	70	L/(Student/d)		0
Trailer Parks no Hook-Ups	340	L/(space/d)		0
Trailer Park with Hook-Ups	800	L/(space/d)		0
Campgrounds	225	L/(campsite/d)		0
Mobile Home Parks	1,000	L/(Space/d)		0
Motels	150	L/(bed-space/d)		0
Hotels	225	L/(bed-space/d)		0
Office	75	L/7.0m^2/d		0
Tourist Commercial	28,000	L/gross ha/d		0
Other Commercial	28,000	L/gross ha/d		0

AVERAGE RESIDENTIAL FLOW	0.28	L/s
PEAK RESIDENTIAL FLOW	1.02	L/s
AVERAGE ICI FLOW	0.00	L/s
PEAK INSTITUTIONAL/COMMERCIAL FLOW	0.00	L/s
PEAK INDUSTRIAL FLOW	0.00	L/s
TOTAL PEAK ICI FLOW	0.00	L/s

TOTAL SANITARY DEMAND

TOTAL ESTIMATED AVERAGE DRY WEATHER FLOW	0.35	L/s
TOTAL ESTIMATED PEAK DRY WEATHER FLOW	1.08	L/s
TOTAL ESTIMATED PEAK WET WEATHER FLOW	1.44	L/s

** PEAK INDUSTRIAL FLOW PER CITY OF OTTAWA SEWER DESIGN GUIDELINES APPENDIX 4B

McINTOSH PERRY

CCO-22-0402 - 355 Franktown - Sanitary Demands

Project:	355 Franktown
Project No.:	CCO-22-0402
Designed By:	R.R.R.
Checked By:	N.B.V.
Date:	11/12/2021

Site Area	1.27	Gross ha		
Townhouse	6		2.70	Persons per unit
Apartment	0		1.80	Persons per unit
Total Population	17	Persons		
Commercial Area	0.00	m^2		
Amenity Space	0.00	m^2		

DESIGN PARAMETERS

Institutional/Commercial Peaking Facto	1.5	*Check technical bulleting (Either use 1.0 or 1.5)
Residential Peaking Factor	3.71	* Using Harmon Formula = 1+(14/(4+P^0.5))*0.8
		where P = population in thousands, Harmon's Correction Factor = 0.8
Mannings coefficient (n)	0.013	
Demand (per capita)	280	L/day
Infiltration allowance	0.33	L/s/Ha

EXTRANEOUS FLOW ALLOWANCES

Infiltration / Inflow	Flow (L/s)
Dry	0.06
Wet	0.36
Total	0.42

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	POPULATION / AREA	Flow (L/s)
Residential	280	L/c/d	17	0.06
Industrial - Light**	35,000	L/gross ha/d		0
Industrial - Heavy**	55,000	L/gross ha/d		0
Commercial / Amenity	2,800	L/(1000m^2 /d)	0.00	0.00
Hospital	900	L/(bed/day)		0
Schools	70	L/(Student/d)		0
Trailer Parks no Hook-Ups	340	L/(space/d)		0
Trailer Park with Hook-Ups	800	L/(space/d)		0
Campgrounds	225	L/(campsite/d)		0
Mobile Home Parks	1,000	L/(Space/d)		0
Motels	150	L/(bed-space/d)		0
Hotels	225	L/(bed-space/d)		0
Office	75	L/7.0m^2/d		0
Tourist Commercial	28,000	L/gross ha/d		0
Other Commercial	28,000	L/gross ha/d		0

AVERAGE RESIDENTIAL FLOW	0.06	L/s
PEAK RESIDENTIAL FLOW	0.20	L/s
AVERAGE ICI FLOW	0.00	L/s
PEAK INSTITUTIONAL/COMMERCIAL FLOW	0.00	L/s
PEAK INDUSTRIAL FLOW	0.00	L/s
TOTAL PEAK ICI FLOW	0.00	L/s

TOTAL SANITARY DEMAND

TOTAL ESTIMATED AVERAGE DRY WEATHER FLOW	0.12	L/s
TOTAL ESTIMATED PEAK DRY WEATHER FLOW	0.27	L/s
TOTAL ESTIMATED PEAK WET WEATHER FLOW	0.62	L/s

** PEAK INDUSTRIAL FLOW PER CITY OF OTTAWA SEWER DESIGN GUIDELINES APPENDIX 4B

McINTOSH PERRY

CCO-22-0402 - 355 Franktown - Sanitary Demands Existing Mall

Project:	355 Franktown
Project No.:	CCO-22-0402
Designed By:	R.R.R.
Checked By:	N.B.V.
Date:	11/12/2021

Site Area	0.73	Gross ha		
Townhouse	6		2.70	Persons per unit
Apartment	0		1.80	Persons per unit
Total Population	0	Persons		
Commercial Area	7299.18	m^2		
Amenity Space	0.00	m^2		

DESIGN PARAMETERS

Institutional/Commercial Peaking Facto	1.5	*Check technical bulleting (Either use 1.0 or 1.5)
Residential Peaking Factor	3.71	* Using Harmon Formula = 1+(14/(4+P^0.5))*0.8
		where P = population in thousands, Harmon's Correction Factor = 0.8
Mannings coefficient (n)	0.013	
Demand (per capita)	280	L/day
Infiltration allowance	0.33	L/s/Ha

EXTRANEOUS FLOW ALLOWANCES

Infiltration / Inflow	Flow (L/s)
Dry	0.04
Wet	0.20
Total	0.24

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	POPULATION / AREA	Flow (L/s)
Residential	280	L/c/d	0	0.00
Industrial - Light**	35,000	L/gross ha/d		0
Industrial - Heavy**	55,000	L/gross ha/d		0
Commercial / Amenity	2,800	L/(1000m^2 /d)	7299.18	0.24
Hospital	900	L/(bed/day)		0
Schools	70	L/(Student/d)		0
Trailer Parks no Hook-Ups	340	L/(space/d)		0
Trailer Park with Hook-Ups	800	L/(space/d)		0
Campgrounds	225	L/(campsite/d)		0
Mobile Home Parks	1,000	L/(Space/d)		0
Motels	150	L/(bed-space/d)		0
Hotels	225	L/(bed-space/d)		0
Office	75	L/7.0m^2/d		0
Tourist Commercial	28,000	L/gross ha/d		0
Other Commercial	28,000	L/gross ha/d		0

AVERAGE RESIDENTIAL FLOW	0.00	L/s
PEAK RESIDENTIAL FLOW	0.00	L/s
AVERAGE ICI FLOW	0.24	L/s
PEAK INSTITUTIONAL/COMMERCIAL FLOW	0.35	L/s
PEAK INDUSTRIAL FLOW	0.00	L/s
TOTAL PEAK ICI FLOW	0.35	L/s

TOTAL SANITARY DEMAND

TOTAL ESTIMATED AVERAGE DRY WEATHER FLOW	0.27	L/s
TOTAL ESTIMATED PEAK DRY WEATHER FLOW	0.39	L/s
TOTAL ESTIMATED PEAK WET WEATHER FLOW	0.60	L/s

** PEAK INDUSTRIAL FLOW PER CITY OF OTTAWA SEWER DESIGN GUIDELINES APPENDIX 4B

McINTOSH PERRY

CCO-22-0402 - 355 Franktown - Sanitary Demands Total

Project:	355 Franktown
Project No.:	CCO-22-0402
Designed By:	R.R.R.
Checked By:	N.B.V.
Date:	11/12/2021

Site Area	1.27	Gross ha		
Townhouse	6		2.70	Persons per unit
Apartment	96		1.80	Persons per unit

Total Population	189	Persons
Commercial Area	7299.18	m^2
Amenity Space	0.00	m^2

DESIGN PARAMETERS

Institutional/Commercial Peaking Facto	1.5	*Check technical bulleting (Either use 1.0 or 1.5)
Residential Peaking Factor	3.53	* Using Harmon Formula = 1+(14/(4+P^0.5))*0.8
		where P = population in thousands, Harmon's Correction Factor = 0.8
Mannings coefficient (n)	0.013	
Demand (per capita)	280	L/day
Infiltration allowance	0.33	L/s/Ha

EXTRANEOUS FLOW ALLOWANCES

Infiltration / Inflow	Flow (L/s)
Dry	0.06
Wet	0.36
Total	0.42

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS	POPULATION / AREA	Flow (L/s)
Residential	280	L/c/d	189	0.61
Industrial - Light**	35,000	L/gross ha/d		0
Industrial - Heavy**	55,000	L/gross ha/d		0
Commercial / Amenity	2,800	L/(1000m² /d)	7299.18	0.24
Hospital	900	L/(bed/day)		0
Schools	70	L/(Student/d)		0
Trailer Parks no Hook-Ups	340	L/(space/d)		0
Trailer Park with Hook-Ups	800	L/(space/d)		0
Campgrounds	225	L/(campsite/d)		0
Mobile Home Parks	1,000	L/(Space/d)		0
Motels	150	L/(bed-space/d)		0
Hotels	225	L/(bed-space/d)		0
Office	75	L/7.0m^2/d		0
Tourist Commercial	28,000	L/gross ha/d		0
Other Commercial	28,000	L/gross ha/d		0

AVERAGE RESIDENTIAL FLOW	0.61	L/s
PEAK RESIDENTIAL FLOW	2.16	L/s
AVERAGE ICI FLOW	0.24	L/s
PEAK INSTITUTIONAL/COMMERCIAL FLOW	0.35	L/s
PEAK INDUSTRIAL FLOW	0.00	L/s
TOTAL PEAK ICI FLOW	0.35	L/s

TOTAL SANITARY DEMAND

TOTAL ESTIMATED AVERAGE DRY WEATHER FLOW	0.91	L/s
TOTAL ESTIMATED PEAK DRY WEATHER FLOW	2.58	L/s
TOTAL ESTIMATED PEAK WET WEATHER FLOW	2.93	L/s

** PEAK INDUSTRIAL FLOW PER CITY OF OTTAWA SEWER DESIGN GUIDELINES APPENDIX 4B

SANITARY SEWER DESIGN SHEET

PROJECT:
LOCATION: 355 Franktown Road
CLIENT: Heafy Group

McINTOSH PERRY

LOCATION				RESIDENTIAL									ICI AREAS							INFILTRATION ALLOWANCE			FLOW	SEWER DATA						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	**22**	23	24	25	26	27	28	29	30	**31**
STREET	AREA ID	FROM MH	TO MH	UNIT TYPES				AREA (ha)	POPULATION		PEAK FACTOR	PEAK FLOW (L/s)	AREA (ha)						PEAK FLOW (L/s)	AREA (ha)		FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	AVAILABLE CAPACITY	
				1-BED	2-BED	TH	APT		IND	CUM			INSTITUTIONAL		COMMERCIAL		INDUSTRIAL			IND	CUM								L/s	(%)
													IND	CUM	IND	CUM	IND	CUM											
		MH101A	MH102A	152			70	1.92	338.8	339	3.44	4.73	0.42	0.42	0.04	0.04		0.00	0.22	2.38	2.38	0.78	5.73	19.36	129.34	200	0.32	0.597	13.62	70.38
	Chadha Lands																												
		MH105A	MH102A			12		0.26	32.4	32	3.68	0.48	0.00	0.00		0.00		0.00	0.00	0.26	0.26	0.09	0.57	19.36	87.61	200	0.32	0.597	18.79	97.06
	Heafy Lands	MH102A	MH103A			12		0.28	32.4	404	3.42	5.59	0.42	0.42		0.00		0.00	0.20	0.70	0.70	0.23	6.02	19.36	90.35	200	0.32	0.597	13.34	68.90
	Mall Lands	A-MH1A	A-MH2A												0.73	0.73		0.00	0.35	0.73	0.73	0.24	0.60	24.19	28.18	200	0.50	0.746	23.60	97.54
	Heafy Lands	A-MH2A	H-MH1A													0.73		0.00	0.35	1.34	2.07	0.68	1.04	24.19	75.17	200	0.50	0.746	23.16	95.71
	Heafy Lands	H-MH1A	MH103A				96		172.8	173	3.54	2.48				0.73		0.00	0.35	0.00	2.07	0.68	3.51	24.19	71.63	200	0.50	0.746	20.68	85.48
	Municipal Road	MH103A	MH104A									8.06							0.56			0.91	9.53	19.36	12.90	200	0.32	0.597	9.82	50.75

Design Parameters:

Residential

1-BED	1.4	p/p/u
TH/SD	2.7	p/p/u
2-BED	1.4	p/p/u
Apt	1.8	p/p/u
Other	60	p/p/Ha

ICI Areas

			Peak Factor
INST	28,000	L/Ha/day	1.5
COM	28,000	L/Ha/day	1.5
IND	35,000	L/Ha/day	MOE Chart

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 350 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
Harmon Formula = 1+(14/(4+P^0.5)*0.8)
where P = population in thousands

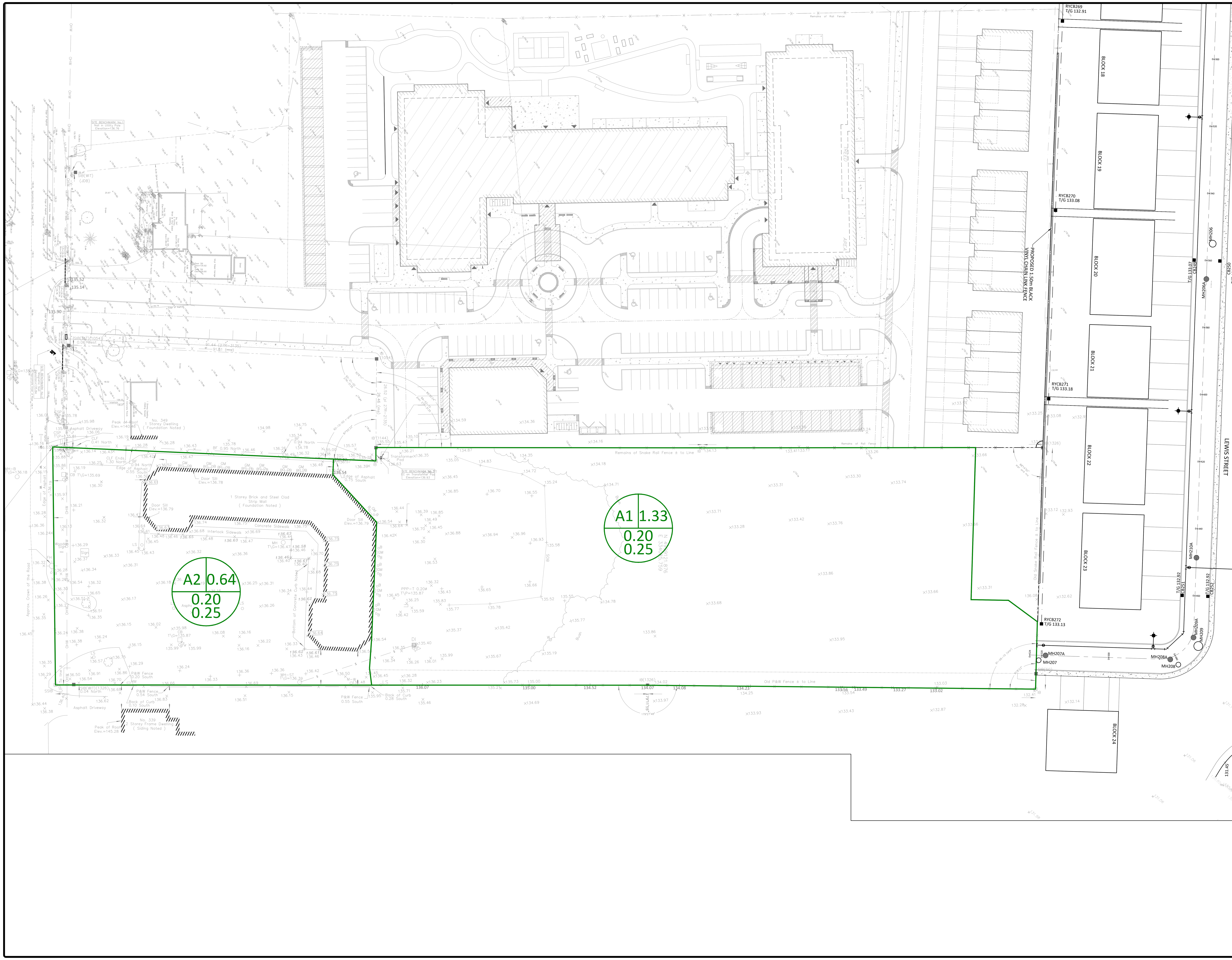
Designed: RRR
Checked: NBV
Project No.: CCO-22-0025

No.	Revision	Date
1.	ISSUED FOR REVIEW	2022-07-15

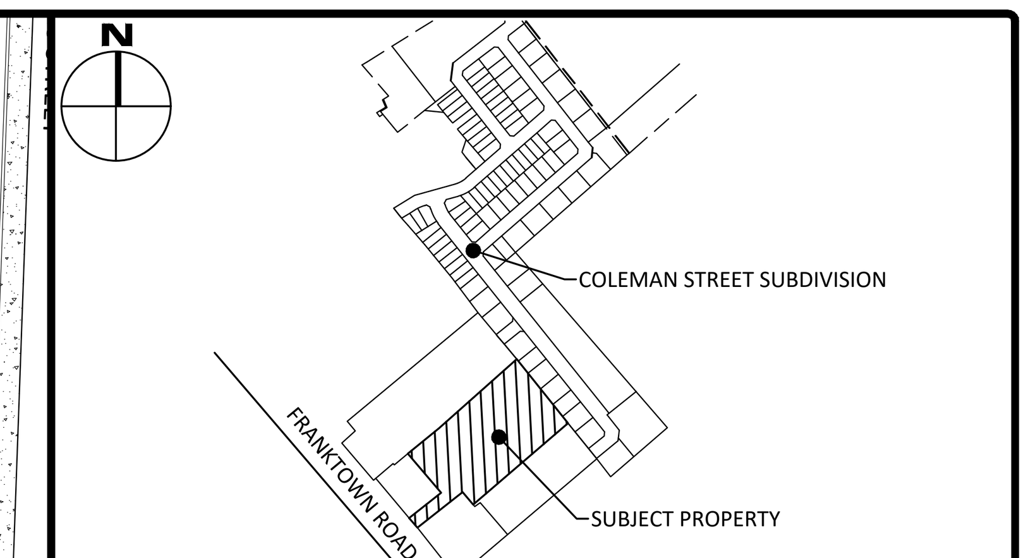
Sheet No:
1 of 1

APPENDIX E
PRE-DEVELOPMENT DRAINAGE PLAN

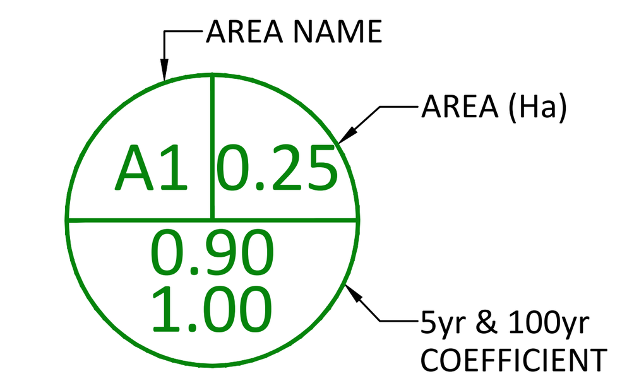
McINTOSH PERRY



LOCATION PLAN



LEGEND



FOR REVIEW ONLY
NOT FOR CONSTRUCTION

No.	Revisions	Date
1	ISSUED FOR REVIEW	JUNE 30, 2022

Check and verify all dimensions before proceeding with the work

Do not scale drawings

SCALE 1 : 150
0 5 10 15 Metres

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A 1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

Stamp:

Client:

Project:

355 FRANKTOWN ROAD
CARLETON PLACE, ONTARIO

Drawing Title:

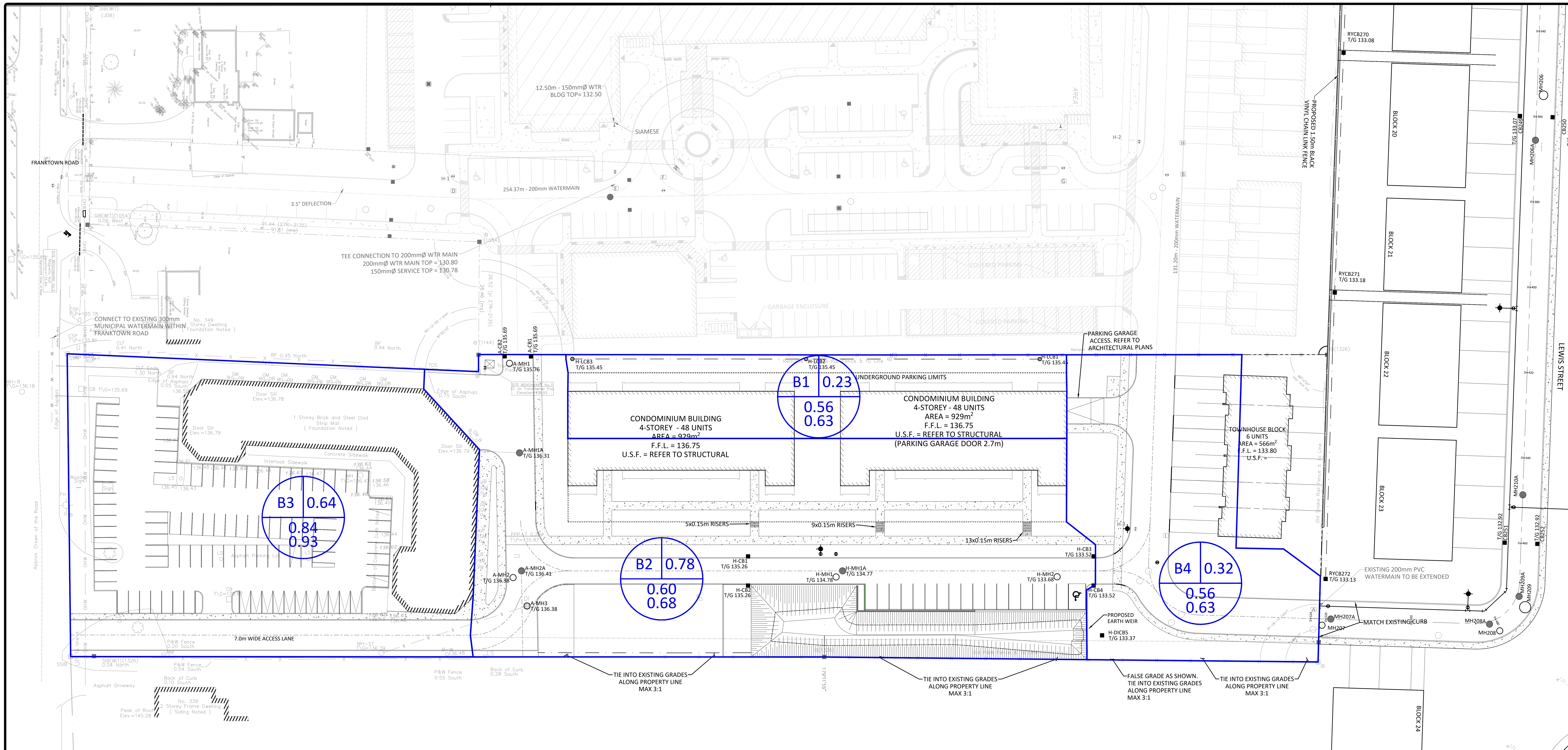
PRE-DEVELOPMENT DRAINAGE PLAN

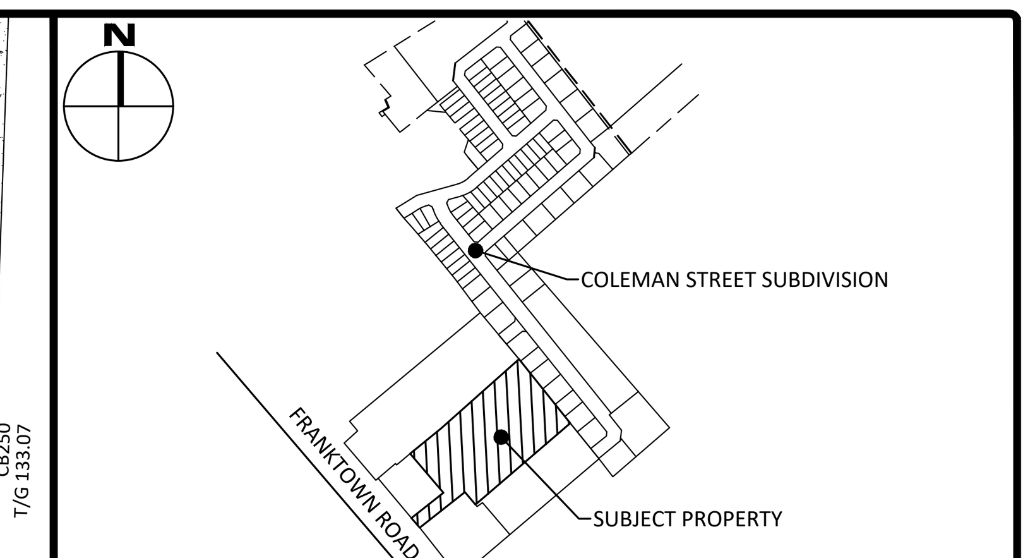
Scale: 1:500	Project Number: CCO-22-0402
Drawn By: N.V	
Checked By: R.F	Drawing Number: PRE
Designed By: N.V	

FILENAME: U:\Ottawa\01 Project - Proposals\2022 Jobs\CCO\CCO-22-0402 Heafey_Sub'd_355 Franktown Road, Carleton Place\12 - Drawings\CCO-22-0402 Presentation.dwg
LAST SAVED: Wednesday, July 13, 2022 LAST SAVED BY: cdolmeau
LAST PLOTTED: Wednesday, July 13, 2022 CTB FILE USED: ---

APPENDIX F
POST-DEVELOPMENT DRAINAGE PLAN

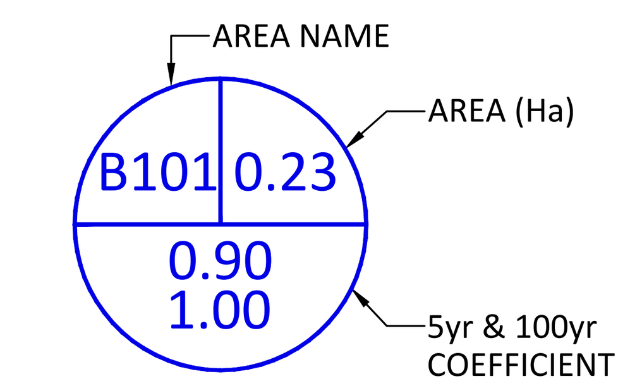
McINTOSH PERRY





LOCATION PLAN

LEGEND



No.	Revisions	Date
1	ISSUED FOR REVIEW	JULY 14, 2022

Check and verify all dimensions before proceeding with the work

Do not scale drawings

SCALE 1 : 150

0 5 10 15 Metres

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Stamp:

Client:

Project:

355 FRANKTOWN ROAD
CARLETON PLACE, ONTARIO

Drawing Title:

POST-DEVELOPMENT DRAINAGE PLAN

Scale:	1:500	Project Number:	CCO-22-0402
Drawn By:	N.V		
Checked By:	R.F	Drawing Number:	POST
Designed By:	N.V		

APPENDIX G
STORMWATER MANAGEMENT CALCULATIONS

McINTOSH PERRY

Tc (min)	Intensity (mm/hr)		
	5-Year	100-Year	
10	104.2	178.6	PRE-DEVELOPMENT
10	104.2	178.6	POST-DEVELOPMENT

C-Values	
Impervious	0.90
Gravel	0.60
Pervious	0.20

Pre-Development Runoff Coefficient

Drainage Area	Area (ha)	Impervious Area (m^2)	Gravel (m^2)	Pervious Area (m^2)	Average C (5-year)	Average C (100-year)
A1	1.33	0	0	13,310	0.20	0.25
A2	0.64	0	0	6,421	0.20	0.25

Pre-Development Runoff Calculations

Drainage Area	Area (ha)	C 5-Year	C 100-Year	Tc (min)	Q (L/s)	
					5-Year	100-Year
A1	1.33	0.20	0.25	10	77.11	165.18
A2	0.64	0.20	0.25	10	37.20	79.68
Total	1.97				77.11	165.18

Post-Development Runoff Coefficient

Drainage Area	Area (ha)	Impervious Area (m^2)	Gravel (m^2)	Pervious Area (m^2)	Average C (5-year)	Average C (100-year)	
B1	0.23	1,174	0	1,117	0.56	0.63	North
B2	0.78	4,496	0	3,329	0.60	0.68	South
B3	0.64	5,844	0	577	0.84	0.93	Mall
B4	0.32	1,633	0	1,561	0.56	0.63	Townhouse and Municipal Road

Post-Development Runoff Calculations

Drainage Area	Area (ha)	C 5-Year	C 100-Year	Tc (min)	Q (L/s)		
					5-Year	100-Year	
B1	0.23	0.56	0.63	10	37.08	72.14	Rear Swale / Building
B2	0.78	0.60	0.68	10	136.49	264.49	Front Building and Road
B3	0.64	0.84	0.93	10	155.69	297.25	Mall
B4	0.32	0.56	0.63	10	51.62	100.44	Townhouse and Municipal Road
Total	1.97				380.87	734.32	

Required Restricted Flow

Drainage Area	Area (ha)	C 5-Year	C 100-Year	Tc (min)	Q (L/s)	Q (L/s)
					5-Year	100-Year
A1	1.33	0.20	0.25	10	77.11	165.18
A2	0.64	0.20	0.25	10	37.20	79.68
Total	1.97				114.30	244.86

Post-Development Restricted Runoff Calculations

Drainage Area	Unrestricted Flow (L/S)		Restricted Flow (L/S)		Storage Required (m^3)		Storage Provided (m^3)	
	5-year	100-Year	5-Year	100-Year	5-Year	100-Year	5-Year	100-Year
B1	37.08	72.14	59.49	132.32	199.5	354.3	203.1	359.3
B2	136.49	264.49						
B3	155.69	297.25						
B4	51.62	100.44	51.62	100.44	x	x	x	x
Total	380.87	734.32	111.11	232.75	199.51	354.26	203.11	359.33

Storage Requirements for Area B1, B2, B3

5-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B1, B2, B3	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	104.2	329.28	59.49	269.79	161.87
15	83.6	264.18	59.49	204.69	184.22
20	70.3	222.15	59.49	162.66	195.20
25	60.9	192.45	59.49	132.96	199.44
30	53.9	170.33	59.49	110.84	199.51
35	48.5	153.26	59.49	93.77	196.93
40	44.2	139.68	59.49	80.19	192.45
45	40.6	128.30	59.49	68.81	185.79
50	37.7	119.14	59.49	59.65	178.94
Maximum Storage Required 5-year =				199.5	m^3

100-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B1, B2, B3	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	178.6	634.03	132.32	501.71	301.03
15	142.9	507.29	132.32	374.98	337.48
20	120.0	426.00	132.32	293.68	352.42
25	103.8	368.49	132.32	236.17	354.26
30	91.9	326.24	132.32	193.93	349.07
35	82.6	293.23	132.32	160.91	337.92
40	75.1	266.60	132.32	134.29	322.29
45	69.1	245.30	132.32	112.99	305.07
50	64.0	227.20	132.32	94.88	284.65
Maximum Storage Required 100-year =				354.3	m^3

5-Year Storm Event Storage Summary

		Water Elev. (m) =		133.17
Location	BOTTOM	Area (m^2)	Depth (m)	Volume (m^3)
POND	132.40	447.0	0.77	203.1

ICD Location	INV. (out)	Head (m)
H-MH2	131.26	1.84

Storage Available (m^3) =	203.1
Storage Required (m^3) =	199.5

*Available Storage calculated from AutoCAD

100-Year Storm Event Storage Summary

		Water Elev. (m) =		133.47
Location	BOTTOM	Area (m^2)	Depth (m)	Volume (m^3)
POND	132.40	596.0	1.07	359.3

ICD Location	INV. (out)	Head (m)
H-MH2	131.26	2.14

Storage Available (m^3) =	359.3
Storage Required (m^3) =	354.3

*Available Storage calculated from AutoCAD

For Orifice Flow, C= 0.60
For Weir Flow, C= 1.84

	Orifice 1	Orifice 2	Weir 1	Weir 2
invert elevation	131.26	X	133.40	X
center of crest elevation	131.33	X		X
orifice width / weir length	145 mm	X	2.00 m	X
weir height				X
orifice area (m^2)	0.017	X	x	X

Elevation Discharge Table - Storm Routing

Elevation	Orifice 1		Orifice 2		Weir 1		Weir 2		Total	
	H [m]	Q [m^3/s]	H [m]	Q [m^3/s]	H [m]	Q [m^3/s]	H [m]	Q [m^3/s]	Q [L/s]	
131.26	x	x	x	x	x	x	x	x	0.00	
131.27	x	x	x	x	x	x	x	x	0.00	
131.28	x	x	x	x	x	x	x	x	0.00	
131.29	x	x	x	x	x	x	x	x	0.00	
131.30	x	x	x	x	x	x	x	x	0.00	
131.31	x	x	x	x	x	x	x	x	0.00	
131.32	x	x	x	x	x	x	x	x	0.00	
131.33	x	x	x	x	x	x	x	x	0.00	
131.34	0.01	0.00	x	x	x	x	x	x	3.80	
131.35	0.02	0.01	x	x	x	x	x	x	5.81	
133.11	1.78	0.06	x	x	x	x	x	x	58.51	
133.12	1.79	0.06	x	x	x	x	x	x	58.67	
133.13	1.80	0.06	x	x	x	x	x	x	58.84	
133.14	1.81	0.06	x	x	x	x	x	x	59.00	
133.15	1.82	0.06	x	x	x	x	x	x	59.16	
133.16	1.83	0.06	x	x	x	x	x	x	59.33	
133.17	1.84	0.06	x	x	x	x	x	x	59.49	5-Year
133.18	1.85	0.06	x	x	x	x	x	x	59.65	
133.19	1.86	0.06	x	x	x	x	x	x	59.81	
133.40	2.07	0.06	x	x	x	x	x	x	63.10	
133.41	2.08	0.06	x	x	0.01	0.00	x	x	66.94	
133.42	2.09	0.06	x	x	0.02	0.01	x	x	73.82	
133.43	2.10	0.06	x	x	0.03	0.02	x	x	82.68	
133.44	2.11	0.06	x	x	0.04	0.03	x	x	93.15	
133.45	2.12	0.06	x	x	0.05	0.04	x	x	105.01	
133.46	2.13	0.06	x	x	0.06	0.05	x	x	118.10	
133.47	2.14	0.06	x	x	0.07	0.07	x	x	132.32	100-Year
133.48	2.15	0.06	x	x	0.08	0.08	x	x	147.58	
133.49	2.16	0.06	x	x	0.09	0.10	x	x	163.82	
133.50	2.17	0.06	x	x	0.10	0.12	x	x	180.98	
133.51	2.18	0.06	x	x	0.11	0.13	x	x	199.02	
133.52	2.19	0.06	x	x	0.12	0.15	x	x	217.88	
133.53	2.20	0.07	x	x	0.13	0.17	x	x	237.55	
133.54	2.21	0.07	x	x	0.14	0.19	x	x	257.97	
133.55	2.22	0.07	x	x	0.15	0.21	x	x	279.14	
133.56	2.23	0.07	x	x	0.16	0.24	x	x	301.02	

Notes:
1. For Orifice Flow, User is to Input an Elevation Higher than Crown of Orifice.
2. Orifice Equation: $Q = cA(2gh)^{1/2}$
3. Weir Equation: $Q = CLH^{3/2}$
4. These Computations Do Not Account for Submergence Effects Within the Pond Riser.
5. H for orifice equations is depth of water above the centroide of the orifice.
6. H for weir equations is depth of water above the weir crest.

STORM SEWER DESIGN SHEET

PROJECT: CCO-22-0402
LOCATION: 355 Franktown
CLIENT: Heafy Group

McINTOSH PERRY

LOCATION				CONTRIBUTING AREA (ha)				RATIONAL DESIGN FLOW											SEWER DATA								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
Phase	AREA ID	FROM MH	TO MH	C-VALUE	AREA	INDIV AC	CUMUL AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm)			SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (5yr)	
																					DIA	W	H			(L/s)	(%)
	Chadha Lands	MH105	MH106	X	X	2.02	2.02	10.00	1.38	11.38	104.19	122.14	178.56	585.83				585.83	842.96	90.58	975			0.13	1.094	257.13	30.50%
	B1	H-LCB1	H-LCB2	0.55	0.12	0.06	0.06	10.00	0.74	10.74	104.19	122.14	178.56	18.73				18.73	62.04	54.72	250			1.00	1.224	43.31	69.81%
		H-LCB2	H-LCB3	0.57	0.11	0.06	0.13	10.74	0.74	11.49	100.42	117.69	172.02	35.64				35.64	62.04	54.72	250			1.00	1.224	26.40	42.55%
		H-LCB3	A-CB1			0.00	0.13	11.49	0.13	11.62	96.93	113.59	166.00	34.40				34.40	62.04	9.29	250			1.00	1.224	27.63	44.54%
	B2	A-CB1	A-CB2	0.58	0.06	0.03	0.16	11.62	0.08	11.70	96.37	112.92	165.02	43.56				43.56	100.88	7.00	300			1.00	1.383	57.33	56.83%
	B2	A-CB2	A-MH1	0.76	0.05	0.04	0.20	11.70	0.03	11.73	95.99	112.49	164.38	53.85				53.85	100.88	2.24	300			1.00	1.383	47.03	46.62%
	B2	A-MH1	A-MH2			0.00	0.20	11.73	0.53	12.25	95.87	112.35	164.17	53.78				53.78	182.91	50.66	375			1.00	1.604	129.13	70.60%
	B3	A-MH3	A-MH2	0.84	0.64	0.54	0.54	10.00	0.07	10.07	104.19	122.14	178.56	155.69				155.69	182.91	6.98	375			1.00	1.604	27.22	14.88%
	B2	A-MH2	H-MH1	0.59	0.67	0.40	1.14	10.07	0.81	10.88	103.81	121.69	177.90	327.96				327.96	452.94	75.63	600			0.50	1.552	124.98	27.59%
	B2	H-MH1	H-MH2			0.00	1.14	10.88	0.56	11.44	99.74	116.90	170.86	315.10				315.10	452.94	51.69	600			0.50	1.552	137.84	30.43%
	B2	H-MH2	MH106			0.00	1.14	11.44	0.21	11.65	97.16	113.86	166.39	306.94				306.94	452.94	19.42	600			0.50	1.552	146.01	32.24%
		MH106	MH107				3.16	11.65	1.37	13.02	96.22	112.76	164.77	845.01				845.01	846.20	90.58	975			0.13	1.098	1.18	0.14%
	B4	MH107	MH108	0.56	0.32	0.18	3.34	13.02	0.17	13.20	90.54	106.07	154.95	839.95				839.95	1,031.09	11.91	1050			0.13	1.154	191.14	18.54%
		MH108	MH109				3.34	13.20	0.51	13.70	89.88	105.29	153.81	833.83				833.83	842.96	33.23	975			0.13	1.094	9.13	1.08%
		MH109	MH110				3.34	13.70	0.45	14.15	88.00	103.08	150.56	816.39				816.39	842.96	29.35	975			0.13	1.094	26.57	3.15%
		MH110	EX. Pond				3.34	14.15	0.49	14.64	86.41	101.21	147.82	801.65				801.65	842.96	32.33	975			0.13	1.094	41.31	4.90%
	Storm Outlet to Pond	H-MH2	Outlet				1.14	11.44	0.14	11.58	97.16	113.86	166.39	306.94				306.94	317.25	12.04	525			0.50	1.420	10.31	3.25%
	Storm Inlet from Pond	H-DIBC5	Tee					0.00	0.14	0.14	230.48	271.61	398.62	0.00			132.32	132.32	184.73	13.30	375			1.02	1.620	52.41	28.37%

Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) = 0.013

Designed:

Checked:

Project No.:

No.	Revision	Date
1.	ISSUED FOR REVIEW	2022-07-15

Date: 2022-07-15

Sheet No: 1 of 1