SERVICING & STORMWATER MANAGEMENT REPORT
MILL VALLEY RETIREMENT COMMUNITY

MILL VALLEY LIVING

ACTIVE ADULT COMMUNITY

Project No.: CCO-20-0034

Prepared for:

Houchaimi Holdings Inc.
21 Hampel Crescent
Stittsville, ON
K2S 1E4

Prepared by:

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115 Walgreen Road
Carp, ON
K0A 1L0

July 28, 2021

McINTOSH PERRY

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1.0 PROJECT DESCRIPTION

1.1 Purpose

McIntosh Perry has been retained by Houchaimi Holdings Inc. to prepare this Servicing and Stormwater Management Report in support of the Site Plan Control process for the proposed Mill Valley Retirement Community, located in the Municipality of Mississippi Mills.

The main purpose of this report is to present a servicing design for the development in accordance with the recommendations and guidelines provided by the Municipality of Mississippi Mills (Municipality), the Mississippi Valley Conservation Authority (MVCA), and the Ministry of the Environment, Conservation and Parks (MECP). This report will address the water, sanitary and storm sewer servicing for the development, ensuring that existing and available services will adequately service the proposed development.

This report should be read in conjunction with the following drawings:

- CCO-20-0034, C101 – Site Grading and Drainage Plan, and
- CCO-20-0034, C102 – Site Servicing Plan.

1.2 Site Description

The property is located southeast of Industrial Drive between Appleton Side Road and Paterson Street. It is described on the Draft Plan of Subdivision as Part of the East Half Lot 14, Concession 10, Geographic Township of Ramsay, Municipality of Mississippi Mills, County of Lanark. The development area for the proposed works is approximately 3.41 ha.

See Site Location Plan in Appendix 'A' for more details.

The existing site is currently undeveloped grassland with trees. There is an existing sanitary forcemain crossing through the site along a portion of the northwest property limit that runs from the existing Orchard View by the Mississippi Retirement Community through to the Industrial Drive gravity sewer. There is no other known infrastructure within the site.

The proposed development will be bisected by a new public right-of-way known as *Gerry Emon Road*. The larger portion of the remaining site to the northeast of the right-of-way consists of a 1,425m², four storeys, 48-unit seniors apartment building with a drop off lane, parking and amenity areas. Also, surrounding the apartment building is a private roadway with seven townhouse blocks combining to make twenty-seven townhouse units. The smaller section of the remaining site to the southwest of the right-of-way will consist of four townhouse blocks and a semi-detached block for a total of 18 units.

Gerry Emon Road will extend to Industrial Drive and will form the entrance to the site.

2.0 BACKROUND STUDIES

Background studies that have been completed for the proposed site include Mississippi Mills as-built drawings, a topographical survey and a geotechnical report.

As-built drawings of existing services within the vicinity of the proposed site were reviewed in order to determine accurate servicing and stormwater management schemes for the site.

A topographic survey of the site was completed by Annis, O'Sullivan Vollebekk.

3.0 PRE-CONSULTATION SUMMARY

A pre-consultation meeting was conducted on June 17, 2021 regarding the proposed site. Specific design parameters to be incorporated within this design include the following:

- Pre-development and post-development flows shall be calculated using a time of concentration (Tc) of 20 minutes and 10 minutes, respectively.
- Control 5 through 100-year post-development flows to the 5-year pre-development flows with a combined C value to a maximum of 0.50.
- Quality control is required to be provided for this site (80% TSS Removal) as per MVCA requirements.

The notes can be found in Appendix 'B'.

4.0 WATERMAIN

4.1 Existing Watermain

There is an existing 250mm diameter PVC watermain within Industrial Drive. The watermain services the adjacent properties as well as the fire hydrants along Industrial Drive. Industrial Drive is immediately downstream of the Town's main groundwater pump station and elevated water storage tank.

4.2 Proposed Watermain

A new 250mm diameter PVC watermain is proposed to be extended from Industrial Drive down the Gerry Emon Road right-of-way to service the site. The watermain will also extend to the end of the right-of-way to service future development land. The watermain will loop within the private site with sizes ranging from 150 mm to 250 mm within the site. Four hydrants have been proposed within the ROW. There are also two private hydrants proposed on the site. The watermain is designed to have a minimum of 2.4m cover.

The Fire Underwriters Survey 1999 (FUS) method was utilized to determine the required fire flow for the site. The results of the calculations yielded a total required fire flow of 16,000 L/min. The detailed calculations for the FUS can be found in Appendix 'C'.

The water demands for the proposed development have been calculated to adhere to the *Ottawa Design Guidelines – Water Distribution* manual and can be found in Appendix 'C'. The results have been summarized below:

Table 1: Water Demands

	Main Building	Blocks
Population	68	130
Residential	350 L/c/day	350 L/c/day
Average Day Demand (L/s)	0.28	0.53
Maximum Daily Demand (L/s)	0.69	1.32
Peak Hourly Demand (L/s)	1.52	2.90
FUS Fire Flow Requirement (L/min)	5,000	11,000

Boundary Conditions have been requested however were not available at the time of submission. Once boundary conditions are obtained, the subject property will be hydraulically modelled using WaterCAD to confirm the system has adequate capacity for the proposed development and the required fire flows can be met.

To confirm the adequacy of fire flow to protect the proposed development, public and private fire hydrants within 150 m of the proposed building were analysed per City of Ottawa ISTB 2018-02 Appendix I Table 1. The results are demonstrated below.

Table 2: Fire Protection Confirmation

Building	Fire Flow Demand (L/min.)	Fire Hydrant(s) within 75m	Fire Hydrant(s) within 150m	Combined Fire Flow (L/min.)
Proposed Site	16,000	3	2	24,700

5.0 SANITARY DESIGN

5.1 Existing Sanitary Sewer

There is an existing 300mm diameter PVC sanitary main within Industrial Drive.

5.2 Proposed Sanitary Sewer

A new 300 mm diameter gravity sanitary sewer will be connected to the existing 300 mm diameter sanitary sewer within Industrial Drive and will be extended along Gerry Emon Road through the extent of the site.

The remainder of the private site will be serviced with 250mm diameter mains designed with a minimum full flow target velocity (cleansing velocity) of 0.6 m/s and a full flow velocity of not more than 3.0 m/s. This may not be feasible on every length of pipe, as the capture area for the uppermost mains in the system is relatively small. This issue has been dealt with by increasing the slopes of the sanitary sewers on the uppermost mains. Design parameters for the site include an infiltration rate of 0.33 L/s/Ha.

See *Sanitary Sewer Design Sheet* in Appendix 'D' of this report for more details.

6.0 STORM SEWER DESIGN

6.1 Existing Storm Sewers

It is assumed that the subject site contains no stormwater infrastructure and as such it is assumed that there are no stormwater management controls for flow attenuation. There are also no storm sewers available within Industrial Drive. Runoff from the site is currently directed overland to the vacant field at the southeast of the site. Refer to figure PRE for further information located within Appendix E.

6.2 Proposed Storm Sewers

A new sewer network will be placed throughout the site. The new pipe network will collect storm flows and direct runoff to a temporary storage area which will be constructed offsite. The storage area will be constructed adjacent to the southeast property line and its primary purpose is to provide temporary stormwater management storage for the proposed site. Runoff collected in the storage area will be restricted before outletting through a weir. The storm service from the proposed building will be connected to the proposed on-site storm system.

The storm sewers will range from 200 mm to 825 mm in diameter throughout the subject property. The minor storm sewers will be sized for the 5-year flow without any restriction. A storm sewer design sheet was created using the rational method and City of Ottawa 5-year storm event.

The storm design sheet calculates the proper sizing of the storm pipes within the development. Drainage area information, along with respective pipe slopes and other necessary information was utilized to evaluate the performance of the storm sewer network. The time of concentration calculated for the storm sewer system is based on a 10 minute inlet time at the uppermost sewer run. Within the design sheet, pipe capacities and associated full flow velocities have been calculated. The design flow (peak flow) was checked against the theoretical capacity to ensure that each storm sewer pipe can convey the 5-year unrestricted flow.

All stormwater runoff from the subject site will be directed to an oil-grit-separator (OGS) unit prior to discharge to the temporary ponding area in order to achieve the target 80% TSS removal rate.

See CCO-20-0034 - *POST* and *Storm Sewer Design Sheet* in Appendix 'F' of this report for more details. The Stormwater Management design for the subject property will be outlined in Section 6.0.

7.0 PROPOSED STORMWATER MANAGEMENT

7.1 Design Criteria and Methodology

Stormwater management for the proposed site will be maintained through positive drainage away from the proposed building and into a new underground storm sewer system. The storm system will capture the site runoff and direct the flow to a temporary storage pond. The emergency overland flow route for the proposed site will be directed south towards the vacant land to the southeast. The quantitative and qualitative properties of the storm runoff for both the pre & post development flows are further detailed below. Stormwater Best Management Practices (SWM BMP's) will be implemented at the "Lot level", "Conveyance" and "End of Pipe" locations. These concepts will be explained further in Section 7.6.

In summary, the following design criteria have been employed in developing the stormwater management design for the site:

Quality Control

- The site has been designed to achieve an 80% total suspended solids removal (***enhanced*** level) using a proposed oil/grit separator.

Quantity Control

- Post-development flow 5/100-year is be restricted to match the 5-year pre-development flow with a maximum C value of 0.50.

7.2 Runoff Calculations

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

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

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 SWM facility sized using this method is expected 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.

7.3 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 below.

Table 3: 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	3.41	0.20	0.25	133.19	284.28

See CCO-20-0034 - *PRE* in Appendix 'E' and Appendix 'G' for calculations.

7.4 Post-Development Drainage

The proposed site drainage limits are demonstrated on the Post-Development Drainage Area Plan. See CCO-20-0034 - *POST* in Appendix 'F' of this report for more details. A summary of the Post-Development Runoff Calculations can be found below.

Table 4: Post-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)
B1	0.55	0.55	0.63	87.82	171.01
B2	0.46	0.62	0.70	82.51	159.65
B3	0.40	0.49	0.56	56.47	110.77
B4	0.34	0.72	0.80	70.63	135.71
B5	0.56	0.59	0.67	96.35	186.84
B6	0.15	0.51	0.58	22.17	43.37
B7	0.28	0.52	0.59	42.11	82.29
B8	0.59	0.43	0.49	72.97	144.44
UNCONTROLLED	0.08	0.20	0.25	4.63	9.93
Total	**3.41**			**535.67**	**1044.02**

See Appendix 'G' for calculations. Runoff for areas B1-B8 will be restricted within the temporary ponding area before being outlet. The required storage will be provided within the temporary ponding area adjacent to the

site. The flow will be controlled by a weir. The restriction device will account for the unrestricted flow leaving the site. This quantity and quality control will be further detailed in Sections 7.5 and 7.6.

7.5 Quantity Control

The total post-development runoff for this site has been restricted to match the 5-year pre-development flow rate with a combined C value of 0.50. (See Appendix 'B' for pre-consultation notes). These values create the following allowable release rate and storage volumes for the development site.

See Appendix 'G' for calculations.

Reducing site flows will be achieved using flow restrictions and will create the need for onsite storage. Runoff from areas B1 to B8 will be restricted as shown in the table below.

Table 5: 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	87.82	171.01	37.33	122.23
B2	82.51	159.65		
B3	56.47	110.77		
B4	70.63	135.71		
B5	96.35	186.84		
B6	22.17	43.37		
B7	42.11	82.29		
B8	72.97	144.44		
UNRESTRICTED	4.63	9.93	4.93	9.93
Total	**535.67**	**1044.02**	**41.97**	**132.15**

See Appendix 'G' for calculations.

The total flow leaving Areas B1 to B8 will be 37.33 L/s and 122.23 L/s during the 5 and 100-year storm events, respectively. This will result in ponding depths of 0.80 and 1.00 m for the 5 and 100-year storm events. All of the storage required for the site will be located in the temporary ponding area.

See below table for details of the required and provided storage volumes.

Table 6: Storage Summary

Drainage Area	Depth of Ponding (m)	Storage Required (m^3)	Storage Available (m^3)	Depth of Ponding (m)	Storage Required (m^3)	Storage Available (m^3)
	5-Year			100-Year		
B1 – B8	0.80	472.53	750.48	1.00	577.82	759.00

See Appendix 'G' for calculations.

In the event that there is a rainfall above the 100 year storm event, or a blockage within the storm sewer system, an emergency overland flow route has been provided so that the storm water runoff will be conveyed towards the southeast to the adjacent property.

7.6 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. Lot level BMP's typically include temporary retention of the parking lot runoff, minimizing ground slopes and maximizing landscaped areas. Some of these BMP's cannot be provided for this site due to site constraints and development requirements.

A quality treatment unit has been sized to provide a TSS removal rate of 80% as per MVCA requirements. The treatment unit will provide a water quality of at least 80% TSS. The treatment unit shall be placed downstream of the restriction unit in order to provide the required water quality treatment for the site runoff before discharging. Detailed sizing information for the treatment unit have been requested from the manufacturer but are not available at this time.

The flow being discharged from the pond will be directed to a level spreader. Level spreaders are generally used to convey runoff as sheet flow. The level spreader has been designed as a berm where flow will spill over the length of the berm reducing the effects of a concentrated outlet for the site. The runoff will then discharge as sheet flow across undeveloped lands owned by the proponent. Ultimately, it is intended that the temporary storage area and level spreader be abandoned upon the development of the future lands. Runoff from the site will then be intercepted by future municipal sewers and directed to a new stormwater management facility. The proposed system will function as intended until such time.

The combination of the above BMP's and the proposed flow control measures will aid in the thermal protection of the natural environment.

8.0 EROSION AND SEDIMENT CONTROL

8.1 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 is 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.

8.2 Permanent Measures

Rip-rap will be placed at all locations that have the potential for concentrated flow. It is crucial that the Contractor ensure that the geotextile is keyed in properly to ensure runoff does not undermine the rip rapped area. Additional rip rap is to be placed at erosion prone locations as identified by the Contractor / Contract Administrator / City or Conservation Authority.

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.

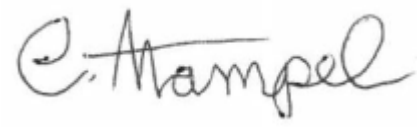
9.0 RECOMMENDATION

Based on the information presented in this report, we recommend that the Municipality of Mississippi Mills approve this Servicing and Stormwater Management Report in support of the proposed Mill Valley Retirement Community.

This report is respectfully being submitted for approval.

Regards,

McIntosh Perry Consulting Engineers Ltd.



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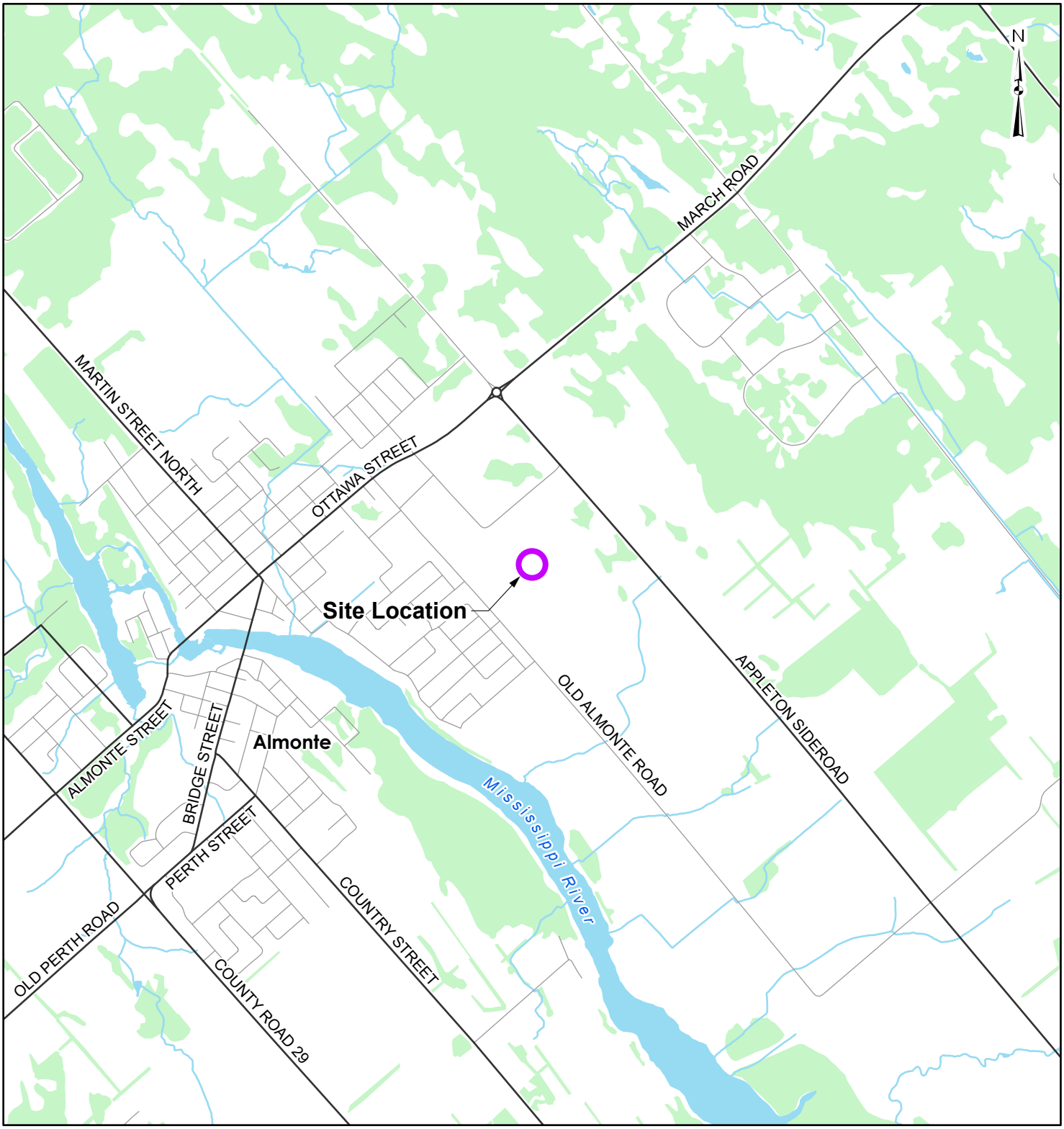
APPENDIX A
SITE LOCATION PLAN



LEGEND

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

600 300 0 600

Scale 1:25,000 Metres

REFERENCE

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

CLIENT: HOUCHAIMI HOLDINGS INC.

PROJECT: MILL VALLEY RETIREMENT COMMUNITY

TITLE: LOCATION PLAN

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

PROJECT NO:	CCO-20-0034
Date	Jul., 26, 2021
GIS	EU
Checked By	CH

FIGURE: 1

C:\Users\e.ungun\McIntosh Perry\GIS - Documents\Projects\2020\CCO\CCO-20-0034 Houchaimi Holdings – Mill Valley Retirement\Key Maps\LandDevelopment\CCO-20-0034_01_LocationPlan.aprx

APPENDIX B
PRE-CONSULTATION NOTES

McINTOSH PERRY

Charissa Hampel

From: Julie Stewart <jstewart@lanarkcounty.ca>
Sent: July 16, 2021 3:39 PM
To: Benjamin Clare
Cc: Billy Houchaimi; Ryan Kennedy; Vithulan Vivekanandan
Subject: RE: Mill Valley Retirement Community - Draft Plan of Subdivision - Pre-Con Request

Hi
At this point Ben, please feel free to submit what you have indicated and when I conduct a thorough review, if I require anything further I will advise.

Thank you,
Julie

From: Benjamin Clare <b.clare@mcintoshperry.com>
Sent: July 16, 2021 2:53 PM
To: Julie Stewart <jstewart@lanarkcounty.ca>
Cc: Billy Houchaimi <billy@houchaimi.com>; Ryan Kennedy <r.kennedy@mcintoshperry.com>; Vithulan Vivekanandan <V.Vivekanandan@McIntoshPerry.com>
Subject: RE: Mill Valley Retirement Community - Draft Plan of Subdivision - Pre-Con Request

Good afternoon Julie,

Apologies for sending this right before you're off for a week of vacation.

This e-mail is to follow-up from the June 17 Pre-Consultation meeting we had, and to let you know that we're actively working on Draft Plan of Subdivision and Site Plan Control application packages. As it stands, we're targeting submissions sometime next week.

As you'll recall, during Pre-Consultation much of the discussion focused on problem solving re: stormwater management, and stickhandling how the municipal parcel connecting to Industrial would become a public right-of-way. I'm happy to report that we've been engaging with the Municipality, and these matters have largely been sorted. Stormwater will be controlled on-site and will be treated before outletting to a ditch to the southeast, eventually connecting to Paterson Street. As for the public right-of-way, we have municipal concurrence that the Planning Act processes will satisfy EA requirements in this instance (thereby exempting the EA process), provided the entirety of the area being developed is acknowledged on submission materials.

During Pre-Consultation, you suggested that standard submission requirements would apply, but unfortunately we did have time to discuss a specific list. As such, we're providing you with a list of materials we're planning on including within our Draft Plan submission package. We'll also copy you on the Site Plan Control submission package to ensure you have access to everything you might need.

<u>Plans/Reports/Etc. to be Submitted</u>

1. Subdivision Application Form & Fee
2. Draft Plan of Subdivision

3. PIN Abstract
4. Planning Rationale
5. Functional Servicing Report
6. Traffic Study

Please let me know if you'd like to discuss. Understand you're probably wrapping things up, but I should be available until 5pm.

Thanks very much, and I hope you have a lovely break from the grind!

Benjamin Clare, MCIP, RPP

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McINTOSH PERRY

From: Benjamin Clare <b.clare@mcintoshperry.com>
Sent: June 1, 2021 3:59 PM
To: Julie Stewart <jstewart@lanarkcounty.ca>
Cc: Marc Rivet <mrivet@jlrichards.ca>; Cory Smith <csmith@mississippimills.ca>; Billy Houchaimi <billy@houchaimi.com>; Ryan Kennedy <r.kennedy@mcintoshperry.com>
Subject: Mill Valley Retirement Community - Draft Plan of Subdivision - Pre-Con Request

Good afternoon Julie,

Further to the recent Official Plan Amendment for the subject lands (County File No. 0931-OP-21001) and the concurrent Zoning By-law Amendment (Mississippi Mills File No. Z-18-20), which have established the proposed uses as permitted, we are now moving forward with other aspects of approvals.

The purpose of this e-mail is to request a Pre-Consultation meeting with relevant Staff to discuss a Draft Plan of Subdivision Application that will seek to:

(1) Create a new north-south municipal road that will connect Industrial Avenue to the future Area 2 subdivision lands.
(2) Subdivide the lands in general accordance with the attached sketch (provided for Pre-Con only), and separate them from the overall holding.

We have discussed incorporating the new north-south public road in some detail with Town Staff, but to my knowledge this hasn't yet been formally raised at the County level. It is acknowledged that this is somewhat of a departure from initial project discussions, but we are confident that this change is positive.

As shown on the attached sketch, the new municipal road will bisect the subject lands, triggering the need for the subdivision approvals process. The subdivision process can also be relied upon in this instance to subdivide the retirement home portion of the property from the broader holding, and to create blocks for future Part Lot Control for the bungalow townhomes west of the public road. Part 4 on Plan 27R-7754 (dashed-in on the sketch) is municipally-owned, and will be upgraded subject to an "external works agreement" (or equivalent) with the municipality and in accordance with the detailed engineering design. Utility coordination will be required, and I believe preliminary discussions have already been initiated between the municipality and Mississippi River Power.

Could you please respond with your availability, to enable us to discuss the particulars as soon as possible? I believe most submission requirements will already be covered off by way of the concurrent Site Plan process, but it would also be of benefit to establish any discrepancies during our discussion.

Many thanks Julie,
Ben

Benjamin Clare, MCIP, RPP
Practice Area Lead, Planning Services
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McINTOSH PERRY

BEST MANAGED COMPANIES Platinum member

From: Julie Stewart <jstewart@lanarkcounty.ca>
Sent: May 18, 2021 2:29 PM
To: Benjamin Clare <b.clare@mcintoshperry.com>; Billy Houchaimi <billy@houchaimi.com>; Marc Rivet <mrivet@jlrichards.ca>; Ken Kelly <kkelly@mississippimills.ca>; 'debmerrithew@yahoo.ca' <debmerrithew@yahoo.ca>; 'munro5154@gmail.com' <munro5154@gmail.com>; Tracy Julian <tracyejulian@gmail.com>; 'gillmorris@bell.net' <gillmorris@bell.net>
Subject: Municipality of Mississippi Mills Official Plan Amendment No. 27

Please see the attached Notice of Decision for the Municipality of Mississippi Mills Official Plan Amendment No. 27.

ADDITIONAL INFORMATION
Additional information about the application and the decision is available upon request to the County Planner at plan@lanarkcounty.ca or via phone 613-267-4200 ext. 1520.

Julie Stewart, MCIP RPP
County Planner

99 Christie Lake Road
Perth, ON K7H 3C6
(613)267-4200 ext. 1520
jstewart@lanarkcounty.ca
www.lanarkcounty.ca

APPENDIX C
WATERMAIN CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

CCO-20-0034 - Mill Valley Retirement Community - Water Demands

	Main Building	
Project:	Mill Valley Retirement Community	
Project No.:	CCO-20-0034	
Designed By:	CDH	
Checked By:	RPK	
Date:	July 23, 2021	
Site Area:	3.41 gross ha	
Population:	48 units x 1.4 ppu	68.00

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	350	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 Parks 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
Othe Commercial	28,000	L/gross ha/d
AVERAGE DAILY DEMAND	0.28	L/s
	16.53	L/min

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	2.5 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	0.69	L/s
	41.32	L/min

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	2.2 x max. 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	1.52	L/s
	90.90	L/min

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

McINTOSH PERRY

CCO-20-0034 - Mill Valley Retirement Community - Water Demands

	Blocks	
Project:	Mill Valley Retirement Community	
Project No.:	CCO-20-0034	
Designed By:	CDH	
Checked By:	RPK	
Date:	July 23, 2021	
Site Area:	3.41 gross ha	
Population:	48 units x 2.7 ppu	130.00

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	350	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 Parks 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
Othe Commercial	28,000	L/gross ha/d
AVERAGE DAILY DEMAND	0.53	L/s
	31.60	L/min

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	2.5 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	1.32	L/s
	78.99	L/min

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	2.2 x max. 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	2.90	L/s
	173.78	L/min

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

McINTOSH PERRY

CCO-21-2319 - 2445 Don Reid Drive - Fire Underwriters Survey (FUS) Fire Calculations

	Main Building
Project:	Mill Valley Retirement Community
Project No.:	CCO-20-0034
Designed By:	CDH
Checked By:	RPK
Date:	July 23, 2021

From the Fire Underwriters Survey (1999)

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

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 Non-Combustible Construction

C 0.8 **A** 2136.0 m^2

Caluclated Fire Flow	**8134.2 L/min**
	8000.0 L/min

B. REDUCTION FOR OCCUPANCY TYPE (No Rounding)

From note 2, Page 18 of the Fire Underwriter Survey:

Limited Combustible -15%

Fire Flow	**6800.0 L/min**

C. REDUCTION FOR SPRINKLER TYPE (No Rounding)

Automatic Sprinklered -30%

Reduction	**-2040 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	<45	Non-Combustible			0	0%
Exposure 2	<45	Non-Combustible			0	0%
Exposure 3	30.1 to 45	Non-Combustible			0	5%
Exposure 4	<45	Non-Combustible			0	0%
					% Increase*	**5%**

Increase*	**340.0 L/min**

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

Fire Flow	**5100.0 L/min**
Fire Flow Required**	**5000.0 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-21-2319 - 2445 Don Reid Drive - Fire Underwriters Survey (FUS) Fire Calculations

	Blocks
Project:	Mill Valley Retirement Community
Project No.:	CCO-20-0034
Designed By:	CDH
Checked By:	RPK
Date:	July 23, 2021

From the Fire Underwriters Survey (1999)

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

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 Wood Frame

C 1.5 **A** 529.2 m^2

Caluclated Fire Flow	**7591.6 L/min**
	8000.0 L/min

B. REDUCTION FOR OCCUPANCY TYPE (No Rounding)

From note 2, Page 18 of the Fire Underwriter Survey:
Limited Combustible -15%

Fire Flow	**6800.0 L/min**

C. REDUCTION FOR SPRINKLER TYPE (No Rounding)

Non-Sprinklered 0%

Reduction	**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	Non-Combustible			0	20%
Exposure 2	10.1 to 20	Non-Combustible			0	15%
Exposure 3	3.1 to 10	Non-Combustible			0	20%
Exposure 4	<45	Non-Combustible			0	0%
					% Increase*	**55%**

Increase*	**3740.0 L/min**

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

Fire Flow	**10540.0 L/min**
Fire Flow Required**	**11000.0 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

APPENDIX D
SANITARY CALCULATIONS

McINTOSH PERRY

SANITARY SEWER DESIGN SHEET

PROJECT: Mill Valley Retirement Community
LOCATION: Almonte, ON
CLIENT: Houchaimi Holdings Inc.

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	
				SF	SD	TH	APT		IND	CUM			INSTITUTIONAL		COMMERCIAL		INDUSTRIAL			IND	CUM								L/s	(%)
													IND	CUM	IND	CUM	IND	CUM											
	FUTURE SUBDIVISION		17A						0.0	0.0	4.00	0.00		0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.00							
		17A	16A		2	1			8.1	8.1	4.00	0.11		0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.11	45.12	41.00	300	0.20	0.618	45.01	99.77
		23A	24A			4			10.8	10.8	4.00	0.14		0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.14	31.02	12.30	250	0.25	0.612	30.88	99.55
		24A	16A			9			24.3	35.1	4.00	0.46		0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.46	31.02	95.60	250	0.25	0.612	30.56	98.53
		16A	15A			8			21.6	64.8	4.00	0.84		0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.84	45.12	69.95	300	0.20	0.618	44.28	98.14
		15A	14A			7	48		129.3	194.1	4.00	2.52		0.00		0.00		0.00	0.00	0.00	0.00	0.00	2.52	45.12	69.95	300	0.20	0.618	42.60	94.42
		23A	22A			7			18.9	18.9	4.00	0.25		0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.25	31.02	65.60	250	0.25	0.612	30.77	99.21
		22A	21A			7			18.9	37.8	4.00	0.49		0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.49	31.02	65.60	250	0.25	0.612	30.53	98.42
		21A	14A						0.0	37.8	4.00	0.49		0.00		0.00		0.00	0.00	0.00	0.00	0.00	0.49	31.02	102.40	250	0.25	0.612	30.53	98.42
		14A	13A						0.0	231.9	4.00	3.01		0.00		0.00		0.00	0.00	0.00	0.00	0.00	3.01	45.12	82.10	300	0.20	0.618	42.11	93.34
		13A	12A						0.0	231.9	4.00	3.01		0.00		0.00		0.00	0.00	0.00	0.00	0.00	3.01	45.12	82.10	300	0.20	0.618	42.11	93.34
		12A	11A						0.0	231.9	4.00	3.01		0.00		0.00		0.00	0.00	0.00	0.00	0.00	3.01	45.12	9.80	300	0.20	0.618	42.11	93.34
		11A	*10A*						0.0	231.9	4.00	3.01		0.00		0.00		0.00	0.00	0.00	0.00	0.00	3.01	45.12	12.00	300	0.20	0.618	42.11	93.34

Design Parameters:

Residential			ICI Areas			
						Peak Factor
SF	3.4	p/p/u				
TH/SD	2.7	p/p/u	INST	28,000	L/Ha/day	1.5
APT	2.3	p/p/u	COM	28,000	L/Ha/day	1.5
Other	60	p/p/Ha	IND	35,000	L/Ha/day	MOE Chart

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 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: P.G.K.

Checked: R.P.K.

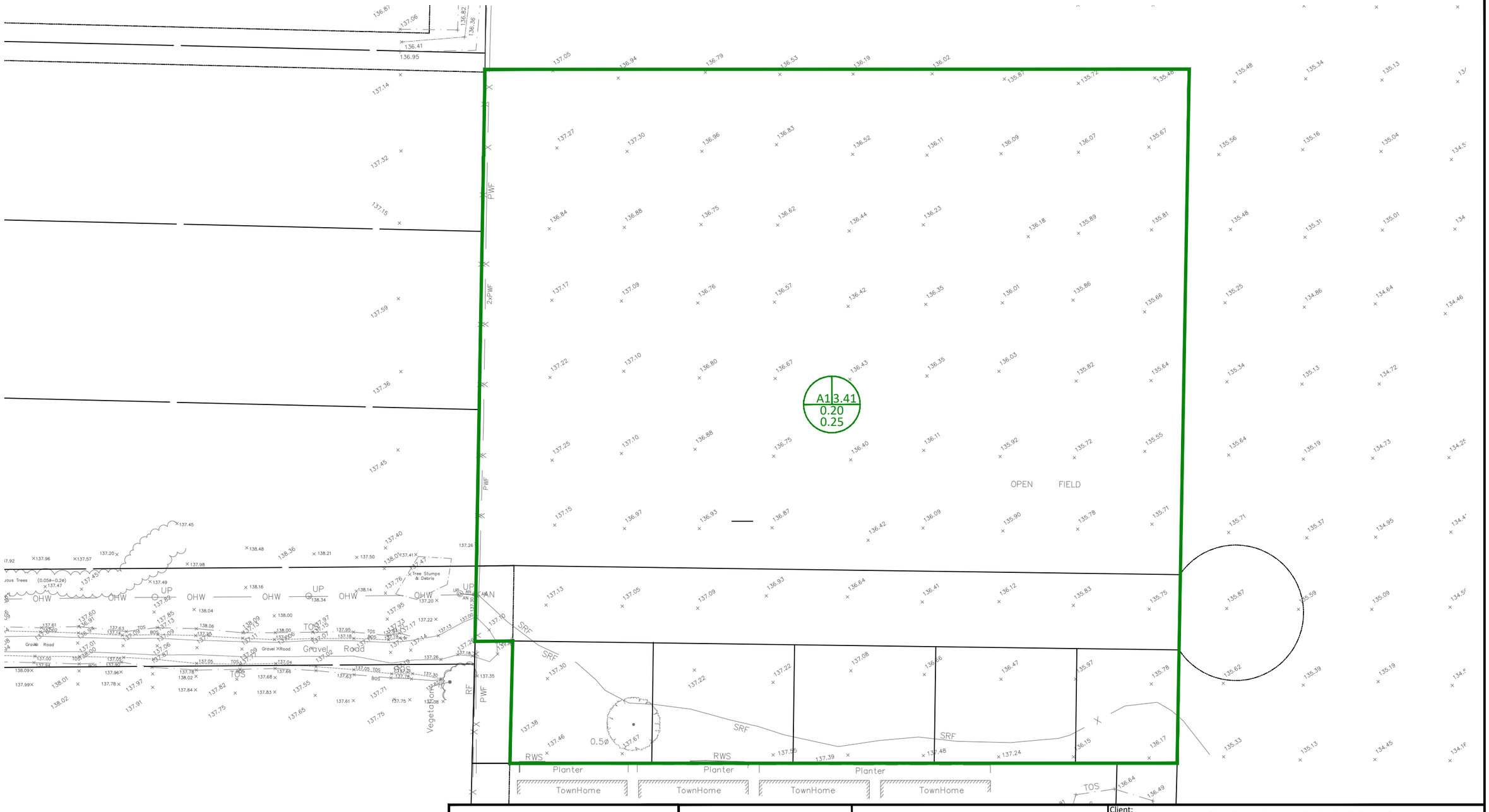
Project No.: CCO-20-0034

No.	Revision	Date
1.	ISSUED FOR MUNICIPAL REVIEW	JUL. 28, 2021

Sheet No: 1 of 1

APPENDIX E
PRE-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY



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

Client: HOUCHAIMI HOLDINGS INC.
21 HAMPEL CRES. STITTSVILLEM ON K2S 1E4

Project: MILL VALLEY RETIREMENT COMMUNITY
GERRY EMON ROAD

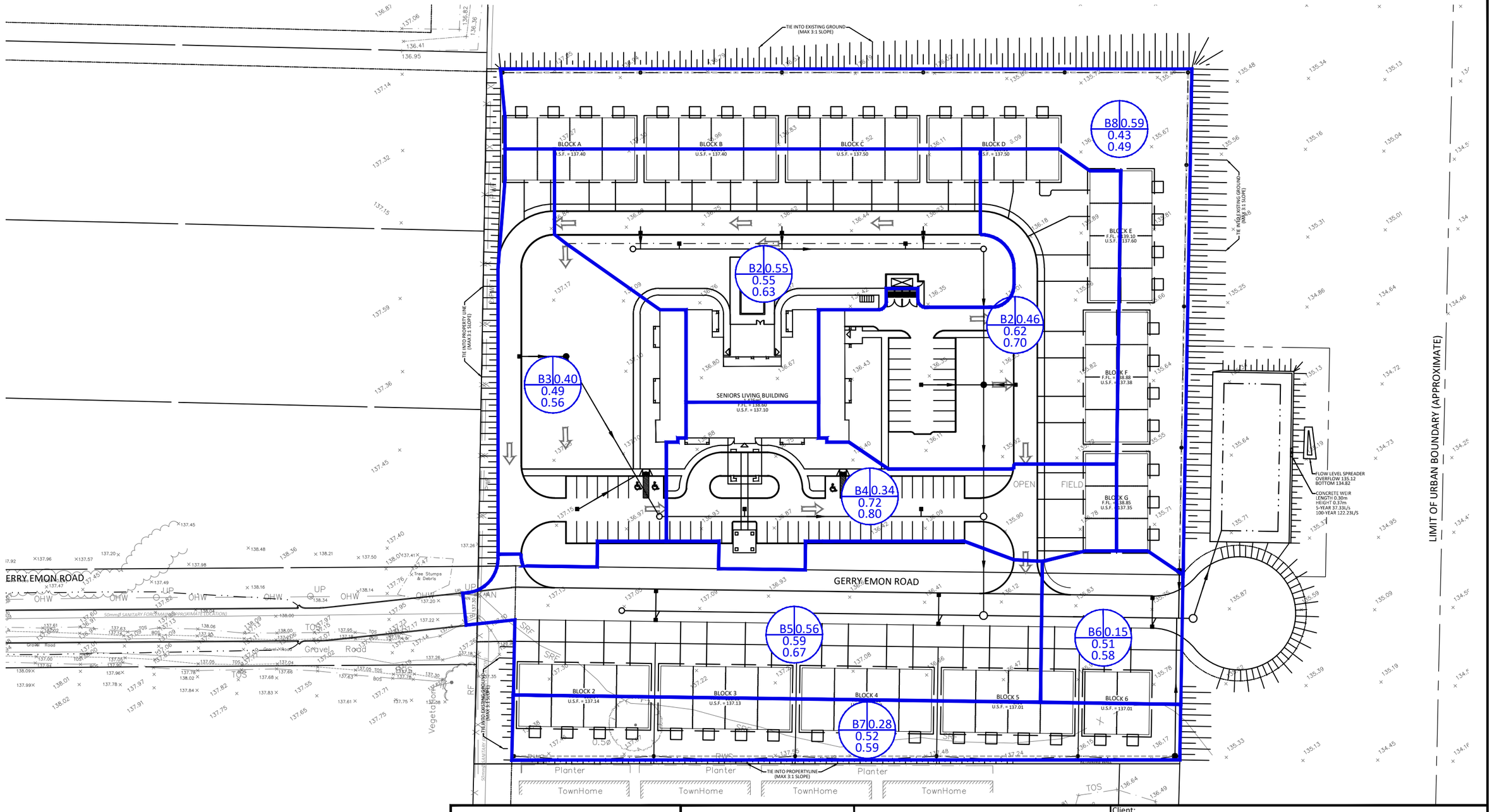
Drawing Title: PRE-DEVELOPMENT DRAINAGE AREA PLAN

Drawn by:	Checked By:			
P.G.K.	R.P.K.			Drawing Number:
Scale:	Project Number:			PRE
1:1000	CCO-20-0034	No.	Revisions	Date

FILENAME: U:\Ottawa\01 Project - Proposals\2020 Jobs\CCO\CCO-20-0034 Houchaimi Holdings - Seniors Residence\Drawings\CCO-20-0034_Presentation.dwg
LAST SAVED: Friday, July 23, 2021 LAST SAVED BY: p.kirkmitis
LAST PLOTTED: Friday, July 23, 2021 STYLE TABLE USED: —

APPENDIX F
POST-DEVELOPMENT DRAINAGE PLAN

McINTOSH PERRY



SCALE 1 : 1000

0 25 50 75 100 Metres

LOCATION I.D. — AREA (ha)

B8 0.59
0.43
0.49

COEFFICIENT
5-YEAR
100-YEAR

N

McINTOSH PERRY
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Client: HOUCHAIMI HOLDINGS INC.
21 HAMPEL CRES. STITTSVILLEM ON K2S 1E4

Project: MILL VALLEY RETIREMENT COMMUNITY
GERRY EMON ROAD

Drawing Title: POST-DEVELOPMENT DRAINAGE AREA PLAN

Drawn by:	Checked By:			
P.G.K.	R.P.K.			Drawing Number:
Scale:	Project Number:			POST
1:1000	CCO-20-0034	No.	Revisions	Date

FILENAME: U:\Ottawa\01 Project - Proposal\2020 Jobs\CCO\CCO-20-0034 Houchaimi Holdings - Seniors' Residence\Drawings\CCO-20-0034_Presentation.dwg
LAST SAVED: Friday, July 23, 2021 LAST SAVED BY: p.kinkmtzs
LAST PLOTTED: Friday, July 23, 2021 CTB FILE: CCO.ctb

APPENDIX G
STORMWATER MANAGEMENT CALCULATIONS

McINTOSH PERRY

Tc (min)	Intensity (mm/hr)		
	5-Year	100-Year	
20	70.3	120.0	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	Impervious Area (m^2)	Gravel (m^2)	Pervious Area (m^2)	Average C (5-year)	Average C (100-year)
A1	0	0	34,100	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	3.41	0.20	0.25	20	133.19	284.28
Total	3.41				133.19	284.28

Post-Development Runoff Coefficient

Drainage Area	Impervious Area (m^2)	Gravel (m^2)	Pervious Area (m^2)	Average C (5-year)	Average C (100-year)
B1	2,760	0	2,740	0.55	0.63
B2	2,755	0	1,845	0.62	0.70
B3	1,642	0	2,358	0.49	0.56
B4	2,512	0	888	0.72	0.80
B5	3,152	0	2,448	0.59	0.67
B6	665	0	835	0.51	0.58
B7	1,277	0	1,523	0.52	0.59
B8	1,913	0	3,987	0.43	0.49
UNRESTRICTED		0	800	0.20	0.25

Post-Development Runoff Calculations

Drainage Area	Area (ha)	C 5-Year	C 100-Year	Tc (min)	Q (L/s)	
					5-Year	100-Year
B1	0.55	0.55	0.63	10	87.82	171.01
B2	0.46	0.62	0.70	10	82.51	159.65
B3	0.40	0.49	0.56	10	56.47	110.77
B4	0.34	0.72	0.80	10	70.63	135.71
B5	0.56	0.59	0.67	10	96.35	186.84
B6	0.15	0.51	0.58	10	22.17	43.37
B7	0.28	0.52	0.59	10	42.11	82.29
B8	0.59	0.43	0.49	10	72.97	144.44
UNCONTROLLED	0.08	0.20	0.25	10	4.63	9.93
Total	3.41				535.67	1044.02

Required Restricted Flow

Drainage Area	Area (ha)	C 5-Year	Tc (min)	Q (L/s) 5-Year
A1	3.41	0.20	20	133.19

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	87.82	171.01	37.33	122.23	472.53	750.48	577.82	759.00
B2	82.51	159.65						
B3	56.47	110.77						
B4	70.63	135.71						
B5	96.35	186.84						
B6	22.17	43.37						
B7	42.11	82.29						
B8	72.97	144.44						
UNCONTROLLED	4.63	9.93	4.63	9.93	-	-	-	-
Total	535.67	1044.02	41.97	132.15	472.53	750.48	577.82	759.00

CCO-20-0034 - Mill Valley Retirement Community - SWM Calculations

Storage Requirements for Area B1 - B8

5-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B1	Runoff (L/s) B2	Runoff (L/s) B3	Runoff (L/s) B4	Runoff (L/s) B5	Runoff (L/s) B6	Runoff (L/s) B7	Runoff (L/s) B8	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	104.2	87.83	82.51	56.47	70.63	96.36	22.17	42.12	72.97	37.33	493.74	296.24
15	83.6	70.47	66.20	45.31	56.67	77.31	17.79	33.79	58.55	37.33	388.74	349.87
20	70.3	59.26	55.67	38.10	47.65	65.01	14.96	28.41	49.23	37.33	320.96	385.15
25	60.9	51.33	48.23	33.00	41.28	56.32	12.96	24.61	42.65	37.33	273.05	409.58
30	53.9	45.43	42.68	29.21	36.54	49.84	11.47	21.79	37.75	37.33	237.37	427.27
35	48.5	40.88	38.41	26.28	32.88	44.85	10.32	19.60	33.97	37.33	209.85	440.69
40	44.2	37.26	35.00	23.95	29.96	40.87	9.41	17.86	30.95	37.33	187.94	451.05
45	40.6	34.22	32.15	22.00	27.52	37.54	8.64	16.41	28.43	37.33	169.59	457.89
50	37.7	31.78	29.85	20.43	25.56	34.86	8.02	15.24	26.40	37.33	154.81	464.43
55	35.1	29.59	27.80	19.02	23.79	32.46	7.47	14.19	24.58	37.33	141.56	467.14
60	32.9	27.73	26.05	17.83	22.30	30.42	7.00	13.30	23.04	37.33	130.35	469.24
65	31.0	26.13	24.55	16.80	21.01	28.67	6.60	12.53	21.71	37.33	120.66	470.58
70	29.4	24.78	23.28	15.93	19.93	27.19	6.26	11.88	20.59	37.33	112.51	472.53
75	27.9	23.52	22.09	15.12	18.91	25.80	5.94	11.28	19.54	37.33	104.86	471.88
80	26.6	22.42	21.06	14.42	18.03	24.60	5.66	10.75	18.63	37.33	98.24	471.54
85	25.4	21.41	20.11	13.77	17.22	23.49	5.41	10.27	17.79	37.33	92.12	469.82

Maximum Storage Required 5-year =	472.53 m^3

100-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s) B1	Runoff (L/s) B2	Runoff (L/s) B3	Runoff (L/s) B4	Runoff (L/s) B5	Runoff (L/s) B6	Runoff (L/s) B7	Runoff (L/s) B8	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	178.6	171.05	159.69	110.80	135.75	186.89	43.38	82.31	144.47	122.23	912.10	547.26
15	142.9	136.86	127.77	88.65	108.61	149.53	34.71	65.86	115.59	122.23	705.35	634.82
20	120.0	114.93	107.29	74.44	91.21	125.57	29.15	55.30	97.07	122.23	572.73	687.28
25	103.8	99.41	92.81	64.39	78.89	108.62	25.21	47.84	83.96	122.23	478.91	718.37
30	91.9	88.01	82.17	57.01	69.85	96.16	22.32	42.35	74.34	122.23	409.99	737.99
35	82.6	79.11	73.85	51.24	62.78	86.43	20.06	38.07	66.82	122.23	356.14	747.89
40	75.1	71.92	67.15	46.59	57.08	78.58	18.24	34.61	60.75	122.23	312.70	750.48
45	69.1	66.18	61.78	42.87	52.52	72.31	16.78	31.85	55.90	122.23	277.95	750.47
50	64.0	61.29	57.22	39.70	48.64	66.97	15.55	29.49	51.77	122.23	248.42	745.25
55	59.6	57.08	53.29	36.97	45.30	62.36	14.48	27.47	48.21	122.23	222.94	735.69
60	55.9	53.54	49.98	34.68	42.49	58.49	13.58	25.76	45.22	122.23	201.51	725.43
65	52.6	50.38	47.03	32.63	39.98	55.04	12.78	24.24	42.55	122.23	182.40	711.35
70	49.8	47.69	44.53	30.89	37.85	52.11	12.10	22.95	40.28	122.23	166.18	697.96

Maximum Storage Required 100-year =	750.48 m^3

5-Year Storm Event Surface Ponding Storage Summary

		Water Elev. (m) =		136.00
Location	Area (m^2)	Depth (m)	Head (m)	Volume (m^3)
Pond	867.24	0.80	-	577.82

100-Year Storm Event Surface Ponding Storage Summary

		Water Elev. (m) =		136.20
Location	Area (m^2)	Depth (m)	Head (m)	Volume (m^3)
Pond	945.00	1.00	-	759.00

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

	Orifice 1	Orifice 2	Weir 1	Weir 2
invert elevation	x	X	135.83	x
center of crest elevation	x	X	x	X
orifice width / weir length	x	X	0.30 m	x
weir height	X	X	0.37 m	x
orifice area (m^2)	x	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]	
135.84	x	x	x	x	0.01	0.00	x	x	0.26	
135.85	x	x	x	x	0.02	0.00	x	x	1.12	
135.86	x	x	x	x	0.03	0.00	x	x	2.31	
135.87	x	x	x	x	0.04	0.00	x	x	3.77	
135.88	x	x	x	x	0.05	0.01	x	x	5.45	
135.89	x	x	x	x	0.06	0.01	x	x	7.32	
135.90	x	x	x	x	0.07	0.01	x	x	9.36	
135.91	x	x	x	x	0.08	0.01	x	x	11.57	
135.92	x	x	x	x	0.09	0.01	x	x	13.92	
135.93	x	x	x	x	0.10	0.02	x	x	16.42	
135.94	x	x	x	x	0.11	0.02	x	x	19.05	
135.95	x	x	x	x	0.12	0.02	x	x	21.81	
135.96	x	x	x	x	0.13	0.02	x	x	24.69	
135.97	x	x	x	x	0.14	0.03	x	x	27.69	
135.98	x	x	x	x	0.15	0.03	x	x	30.79	
135.99	x	x	x	x	0.16	0.03	x	x	34.01	
136.00	x	x	x	x	0.17	0.04	x	x	37.33	5-Year
136.01	x	x	x	x	0.18	0.04	x	x	40.76	
136.02	x	x	x	x	0.19	0.04	x	x	44.28	
136.03	x	x	x	x	0.20	0.05	x	x	47.90	
136.04	x	x	x	x	0.21	0.05	x	x	51.61	
136.05	x	x	x	x	0.22	0.06	x	x	55.41	
136.06	x	x	x	x	0.23	0.06	x	x	59.31	
136.07	x	x	x	x	0.24	0.06	x	x	63.29	
136.08	x	x	x	x	0.25	0.07	x	x	67.35	
136.09	x	x	x	x	0.26	0.07	x	x	71.50	
136.10	x	x	x	x	0.27	0.08	x	x	75.73	
136.11	x	x	x	x	0.28	0.08	x	x	80.04	
136.12	x	x	x	x	0.29	0.08	x	x	84.43	
136.13	x	x	x	x	0.30	0.09	x	x	88.89	
136.14	x	x	x	x	0.31	0.09	x	x	93.44	
136.15	x	x	x	x	0.32	0.10	x	x	98.05	
136.16	x	x	x	x	0.33	0.10	x	x	102.75	
136.17	x	x	x	x	0.34	0.11	x	x	107.51	
136.18	x	x	x	x	0.35	0.11	x	x	112.34	
136.19	x	x	x	x	0.36	0.12	x	x	117.25	
136.20	x	x	x	x	0.37	0.12	x	x	122.23	100-Year

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.