

Report  
Project: 125506-6.4.3

# PATHWAYS PHASE 3 - BLOCK 60 SERVICING BRIEF

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Prepared for Leitrim South Holdings Inc.  
by IBI GROUP

May 2021

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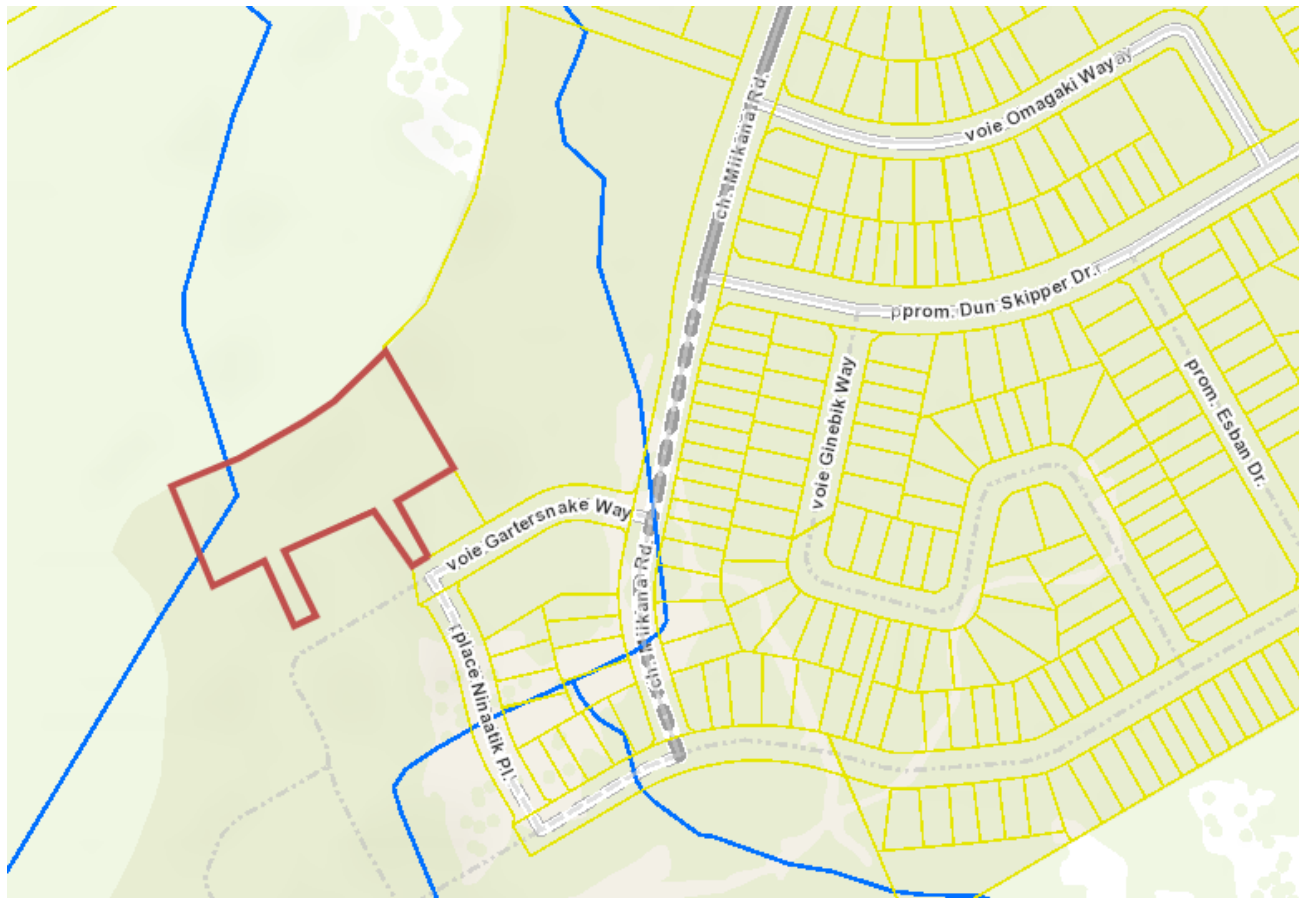


# 1 INTRODUCTION

Pathways Block 60 is located in the southern portion of the Leitrim Development Area (LDA) and is part of the Pathways at the Findlay Creek subdivision. IBI Group Professional Services Inc. (IBI Group) has been retained to provide professional engineering services for Block 60. The subject site is approximately 0.9 ha and consists of 26 townhouse units. The site consists of freehold frontage onto a 6.7m wide private street. There will be a common elements agreement in place for the shared elements of the site.

Block 60 is bounded by natural environmental area to the North and West, Gartersnake Way and Future Pathways Phase 3 lands to the south, and a future municipal Park, Miikana Road and future Pathways Phase 2 lands to the east. Refer to key plan on **Figure 1.1** for block location.

**Figure 1.1 Site Location**



The proposed servicing design conforms to current City of Ottawa and MECP design criteria, and no pre-consultation meetings were requested from the Rideau Valley Conservation Authority (RVCA) or the Ontario Ministry of Environment, Conservation and Parks (MECP).

## 1.1 Guidelines and Standards

This evaluation takes into consideration the City of Ottawa Sewer Design Guidelines (OSDG) (October 2012), and the February 2014 Technical Bulletin ISDTB-2014-01, the September 2016 Technical Bulletin PIEDTB-2016-01, the June 2018 Technical Bulletin ISTB-2018-04, October 2019 Technical Bulletin 2019-01, and the July Technical Bulletin 2019-02.

It also considers the City of Ottawa Water Distribution Design Guidelines (OWDDG), and the 2010 Technical Bulletin 2010-02, the 2014 Technical Bulletin 2014-02, and the 2018 Technical Bulletin 2018-02.

All specifications are as per current City of Ottawa standards and specifications, and Province of Ontario (OPSS/D) standards, specifications and drawings.

## 1.2 Pre-Consultation Meeting

The City of Ottawa hosted a virtual pre-consultation meeting on August 11th, 2020. Notes of the meeting are provided in **Appendix A**. There were no major engineering concerns flagged in this meeting. The City of Ottawa Servicing Study Checklist has also been included in **Appendix A**.

## 1.3 Environmental Issues

There are no environmental issues related to this site, as all environmental concerns were dealt with as part of the applicants Pathways Phase 2 & 3 subdivision approval.

There are no existing watercourses or drainage features associated with this site, however the site is immediately adjacent to the Leitrim Natural Environment Area.

## 1.4 Geotechnical Concerns

Golder was retained by Leitrim South Holdings Inc. to review the grading plan to ensure that the recommendations with its original report for the subject area. There were no particular design concerns for this development, although bedrock was noted at shallow depths.

## 2 WATER DISTRIBUTION

### 2.1 Existing Conditions

There is an existing 250mm watermain in Gartersnake Way in Pathways Phase 2 to the south of the site, which is proposed to continue west on Gartersnake Way in Pathways Phase 3 to the south west of the site. The proposed development was considered in the water model for the Pathways Phase 2 and 3 development.

### 2.2 Design Criteria

#### 2.2.1 Water Demands

Block 60 consists of 26 townhouse units. Per unit population density and consumption rates are taken from **Tables 4.1** and **4.2** of the Ottawa Design Guidelines – Water Distribution and are summarized as follows:

- Semi Detach/Townhouse 2.7 person per unit
- Average Day Demand 350 l/cap/day
- Peak Daily Demand 875 l/cap/day
- Peak Hour Demand 1,925 l/cap/day

A water demand calculation sheet is included in **Appendix B** and the total water demands are summarized as follows:

- Average Day 0.28 l/s
- Maximum Day 0.71 l/s
- Peak Hour 1.56 l/s

#### 2.2.2 System Pressures

The 2010 City of Ottawa Water Distribution Guidelines states that the preferred practice for design of a new distribution system is to have normal operating pressures range between 345 kPa (50 psi) and 552 kPa (80 psi) under maximum daily flow conditions. Other pressure criteria identified in the guidelines are as follows:

- |                  |  |
|------------------|--|
| Minimum Pressure | Minimum system pressure under peak hour demand conditions shall not be less than 276 kPa (40 psi).   |
| Fire Flow        | During the period of maximum day demand, the system pressure shall not be less than 140 kPa (20 psi) during a fire flow event.   |
| Maximum Pressure | Maximum pressure at any point in the distribution system in unoccupied areas shall not exceed 689 kPa (100 psi). In accordance with the Ontario Building/Plumbing Code the maximum pressure should not exceed 552 kPa (80 psi) in occupied areas. Pressure reduction controls may be required for buildings where it is not possible/feasible to maintain the system pressure below 552 kPa. |

### 2.2.3 Fire Flow Rate

A Fire Underwriters Survey has been carried out on a representative block to determine the fire flow for the site. The calculations result in a fire flow of 9,000 l/min; a copy of the FUS calculation is included in **Appendix B**.

### 2.2.4 Boundary Conditions

The City of Ottawa has provided hydraulic boundary conditions two locations in Pathways Phase 2. The City has provided existing condition and SUC Zone reconfiguration boundary conditions. The existing condition has the highest maximum HGL value and is used in the analysis to determine maximum pressure while the SUC Zone reconfiguration value has the lower values for peak hour and fire and is used in the analysis. A copy of the Boundary Condition is included in **Appendix B** and summarized as follows:

CRITERIA	HYDRAULIC HEAD	
	CONNECTION 1 Milkana @ Dun Skipper	CONNECTION 2 Dun Skipper @ Esban
Max HGL (Basic Day)	155.9 m	155.9 m
Peak Hour	143.7 m	143.7 m
Max Day + Fire (9,000 l/m)	136.6 m	136.9 m

### 2.2.5 Hydraulic Model

A computer model for the Block 60 water distribution system has been developed using the InfoWater SA program. The model includes the boundary conditions provided by the City of Ottawa and a portion of Pathways Phase 2 and 3 and Pathways South Phase 2 watermains.

## 2.3 Proposed Water Plan

### 2.3.1 Hydraulic Analysis

The hydraulic model was run under basic day conditions with the existing boundary condition to determine the maximum pressure for the site. The minimum pressure for the site is determined in the peak hour analysis using the SUC Zone reconfiguration boundary condition. There are two fire hydrants in the site and they are represented by nodes B1 and B2 in the model; the model was run under the max day plus fire (9,000 l/min) SUC Zone Reconfiguration Boundary condition to determine the design fire flow at the hydrant locations. Results of the analysis for the Block 60 site are summarized in Section 2.3.2 and the water model schematic and model results are included in **Appendix B**.

### 2.3.2 Summary of Results

Results of the hydraulic analysis for Block 60 are summarized as follows:

Pressures (kPa)

- Basic Day (Max HGL) 576.2 – 579.1
- Peak Hour 456.2 – 459.2

Residual Pressure @ 9,000 l/min. Fire Flow (kPa) 306.1 – 309.3

A comparison of the results and design criteria is summarized as follows:

- Maximum Pressure All nodes have basic day pressure above 552 kPa for existing conditions; therefore, pressure reducing control is required for this site.
- Minimum Pressure All nodes exceed the minimum requirement of 276 kPa during peak hour conditions for the SUC Zone configuration.
- Fire Flow The model was run with a fire flow of 9,000 l/min under the SUC Zone Reconfiguration. The residual pressures at both nodes exceed the minimum requirement of 276 kPa.

## 3 WASTEWATER

### 3.1 Existing Conditions

The Leitrim Pump Station is the wastewater outlet for all developed lands within the LDA, including the subject property. In 2002, the City constructed the station, associated forcemains and outlet sewers in Bank Street and Conroy Road. Sewage from the LDA outlets to the Conroy Road Trunk Sewer eventually discharging to a sewage treatment plant located near the Ottawa River. The Pathways Phase 1 report prepared by IBI Group dated July 2017 confirmed that the existing 375mm sewer in Kelly Farm Drive has sufficient capacity for the Pathways at Findlay Creek property inclusive of the proposed development.

#### 3.1.1 Verification of Existing Sanitary Sewer Capacity

There is an existing 200mm sanitary sewer in Gartersnake Way, which connects to the existing sanitary sewer in Miikana Road, then to the 375 mm diameter sub-trunk sewer in Kelly Farm Drive. In the previous Pathways Phase 2 report, the design for Block 60 was for 22 townhouses, with an allocated population of 59.4 people, a site area of 0.93 and a total flow of 1.01 L/s, see **Appendix B** for excerpts from the Phase 2 report.

For the subject development, the total proposed population is 70.2, area 0.96Ha and a total flow of 1.14L/s. This represents a total peaking flow increase of **0.13L/s** when compared to the Phase 2 allocation. Upon reviewing the proposed and existing sewers from the subject site to the Pathways Phase 1 connection at Miikana and Kelly Farm Drive, all sewers have a residual theoretical design capacity greater than the increase in flow resulting for the 4 additional units in this development. The increase in flow on the existing system is considered negligible, and the subject development will have no negative impacts on downstream infrastructure.

### 3.2 Proposed Sewers

All on-site sewers have been designed to City of Ottawa and MOE design criteria which include but are not limited to the below listed criteria. A copy of the detailed sanitary tributary area plan 400 and the sanitary sewer design sheets are included in **Appendix B** illustrate the population densities and sewers which provide the necessary outlets.

#### 3.2.1 Design Flow:

Average Residential Flow	-	280 l/cap/day
Peak Residential Factor	-	Harmon Formula
Infiltration Allowance	-	0.33 l/sec/Ha
Minimum Pipe Size	-	200mm diameter

#### 3.2.2 Population Density:

Semi-Detached & Townhouse	-	2.7 person/unit
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## 4 SITE STORMWATER MANAGEMENT

### 4.1 Objective

The purpose of this evaluation is to prepare the dual drainage design, including the minor and major system, for the Block 60 development. The design includes the assignment of inlet control devices, on-site storage, maximum depth of surface ponding and hydraulic grade line analysis. The evaluation takes into consideration the City of Ottawa Sewer Design Guidelines (OSDG) (October 2012), the February 2014 Technical Bulletin ISDTB-2014-01, the September 2016 Technical Bulletin PIEDTB-2016-01 and the June 2018 Technical Bulletin ISTB-2018-04.

### 4.2 Existing Conditions

The subject development is tributary to the Miikana Road storm sewer, which was approved for construction for the Pathways Phase 2 development. Subsequent to the approval of Phase 2, the stormwater management analysis for Pathways Phase 3 included an updated tributary allocation into the Miikana Road storm sewer. As part of that approval, a 600mm diameter storm sewer was approved for the subject block. The subject block is referenced as "EXT 5", or BLK 6018 in the Pathways Phase 2 & 3 design. A copy of the design sheet, and approved drainage area plan for Phase 3 have been included in **Appendix D**.

Additionally, the Pathways Phase 3 stormwater management identified a minor system restriction for this site to be the 5 year modelled flow of **187 l/s**. An excerpt from the Phase 3 report has been included in **Appendix D**.

### 4.3 Design Criteria

The stormwater system was designed following the principles of dual drainage, making accommodations for both major and minor flow.

Some of the key criteria include the following:

- Design Storm 1:2 year return (Ottawa)  
(It should be noted that the overall Pathways Site utilized 1:5 year return storm for minor system release from the subject site, further details are provided in Section 4.4 and 4.5.2)
- Rational Method Sewer Sizing
- Initial Time of Concentration 10 minutes
- Runoff Coefficients
  - Front Yards C = 0.57
  - Rear Yards C = 0.76
- Pipe Velocities 0.80 m/s to 3.0 m/s
- Minimum Pipe Size 250 mm diameter  
(200 mm CB Leads)

### 4.4 System Concept

According to the Pathways Phase 3 report prepared by IBI Group dated July 2017, the development of the adjacent downstream properties included the expected stormwater servicing needs of the subject property. The existing storm sewers constructed adjacent to the site were oversized to provide the needed capacity for minor storm runoff from the subject site. Minor storm

runoff from the subject site will connect to the existing 600 mmØ sewer stub that connects to the existing 900mmØ trunk storm sewer in Gartersnake Way.

#### 4.4.1 Dual Drainage Design

The dual drainage system proposed for the subject site will accommodate both major and minor stormwater runoff. Minor flow from the subject site will be conveyed through the storm sewer network and discharge into the existing 600 mmØ sewer stub that connects to the existing 900mm Ø trunk storm sewer in Gartersnake Way.

The balance of the surface flow not captured by the minor system will be conveyed via the major system. Where possible, storage will be provided in surface sags or low points within the roadway. Storage will also be provided within oversized storm pipes. Once the maximum storage is utilized, the excess flow will cascade to the next downstream street sag. Major flow from street segments up to 100-year storm event will be restricted and detained on-site, major flow above and beyond the 5 year event from the two rear yard segments will be overflow to the NEA to the north once on-site surface ponds have reach capacity.

The existing Pathways Phase 2 and 3 modelling identified major overland flow being directed from Block 60 out to Gartersnake Way via the eastern private entrance road. However, based on the proposed grades from Phase 2/3, overflow to the public street is not possible, rather the emergency overland flow route is easterly, towards the future park lands. Given the 100 year retention within the proposed site plan, there are no negative impacts on the existing drainage for these rear yards.

#### 4.4.2 Proposed Minor System

Using the criteria identified in Section 4.3, the proposed on-site storm sewers were sized accordingly. A detailed storm sewer design sheet and the associated storm sewer drainage area plan is included in **Appendix C**. The general plan of services, depicting all on-site storm sewers can be found in **Appendix A**.

The owner of the site will be responsible for regular maintenance of the on-site sewers, catch basins and inlet control devices (ICDs). Maintenance includes but is not limited to the cost of regular cleaning of the structures and ICDs as necessary. The site owner will also be responsible for replacement of damaged or missing catch basin structures, grates or ICDs as needed.

### 4.5 Stormwater Management

#### 4.5.1 Water Quality Control

The subject site is part of the larger development referred to as the Leitrim Development Area. The stormwater management strategy was outlined in the following reports:

- Addendum to Leitrim Development Area Stormwater Management Environmental Study Report and Pre-Design Volumes 1 and II (IBI Group, July 2005);
- Design Brief and Amendment to MOE Certificate of Approval Findlay Creek Village Stormwater Facility (IBI Group, July 2005);
- Final Serviceability Report Leitrim Development Area City of Ottawa (IBI Group, March 2007).
- 2016 Final Updated Serviceability Report (Class EA OPA76 Areas 8a, 9a and 9b) Leitrim Development Area (IBI Group, September 2016)

The subject site is part of the drainage area which ultimately discharges into the existing Findlay Creek Village Stormwater Facility. The Findlay Creek Village Stormwater Facility was constructed



in 2006 and provides water quality control to an Enhanced Level of Protection according to MOE Stormwater Management Planning and Design Guidelines (March 2003).

#### 4.5.2 Water Quantity Control

The subject site will be limited to a maximum minor system release rate of **187 L/s** based on the Pathways Phase 3 Servicing Brief, reference information is provided within **Appendix D**. This will be achieved through a combination of inlet control devices (ICD's) at inlet locations, surface storage where possible and underground storage in oversized storm pipes where required.

There are 2 small locations where water is left to discharge uncontrolled from the subject property. The uncontrolled release can be calculated as follows;

**Uncontrolled Release, where  $Q_{uncontrolled} = 2.78(C \times i_{100yr} \times A_{uncontrolled})$**

C	=Runoff Coefficient	=0.25
T <sub>c</sub>	=Time of Concentration	=10min
i <sub>100yr</sub>	=100yr intensity (1735.688 / (T <sub>c</sub> + 6.014) <sup>0.820</sup> )	=178.56
A <sub>unc</sub>	=Area uncontrolled	=0.015Ha
<b>Q<sub>uncontrolled</sub></b>		<b>=1.86 L/s</b>

The Maximum allowable release rate from the site can be determined by subtracting the Uncontrolled release rate from the minor system restricted flow rate.

$$Q_{max} = Q_{restricted} - Q_{uncontrolled}$$

$$Q_{max} = 187 \text{ L/s} - 1.86 \text{ L/s}$$

$$Q_{max} = 185.14 \text{ L/s}$$

Surface flows in excess of the site's allowable release rate will be stored on site in strategic surface storage areas or oversized underground pipes and gradually released into the minor system to respect the site's allowable release rate. The maximum surface retention depth located within the developed areas will be limited to 300mm during a 1:100 year event as show on the ponding plan located in **Appendix C** and grading plans located in **Appendix D**. Overland flow routes will be provided in the grading to permit emergency overland flow.

The modified rational method was used to evaluate the on-site stormwater management. There are no uncontrolled, or unrestricted areas on this site, as would commonly be found on most medium density development blocks. Therefore, the total restricted flow rate through the minor system will be the design flow rate of **185.14 l/s**. This will be achieved by the used of Inlet Control Devices (ICD's) placed in all on-site catchbasins. A summary of the ICD's, their corresponding storage requirements, storage availability, and associated drainage areas has been provided below.

DRAINAGE AREA	ICD RESTRICTED FLOW (L/s)	100 YEAR STORAGE REQUIRED (m <sup>3</sup> )	SURFACE STORAGE PROVIDED (m <sup>3</sup> )	OVERFLOW
R3	35	15.89	11.99	3.90*
R4	35	4.61	4.61	13.22*
S2	90	32.92	21.44	11.48
S5	25	40.49	52.10*	0
<b>TOTAL</b>	<b>185</b>	<b>93.91</b>	<b>90.14**</b>	<b>0</b>

\*Overflow only during major storm events, directed to NEA with no negative impact on downstream storm sewer system

\*\*Area S5 storage provided includes 29.67m<sup>3</sup> of surface storage and 22.43m<sup>3</sup> of underground storage which is provided by a pre-manufactured storage system, Stormtech SC-310 or an approved equivalent.

### 4.5.3 2 Year Ponding

A review of the 2 year ponding has been completed using the modified rational method. A summary of each drainage area has been provided below.

DRAINAGE AREA	Total 2-Year Ponding Volume (m3)	Comment
R3	0.62	Rear-Yard, 2 yr ponding is permitted, although volume of storage provided by subdrains and catchbasins exceeds 2 year required storage.
R4	0.62	Rear-Yard, 2 yr ponding is permitted, although volume of storage provided by subdrains and catchbasins exceeds 2 year required storage.
S2	0.80	Street CBs have a storage volume of 0.47m3, based on a 600mmx600mm structure with a standard depth of 1.3m from T/G to CL of ICD. There are 2 CB's in this area; thus the total storage provided by the CB's is 0.94m3, which exceeds the 2 year volume required.
S5	6.17	This area is controlled at MH6, and there is 22.43m3 of sub-surface storage provided in this area. The required ponding is provided underground, not on the street.

Based on the above, there will be no surface ponding in the 2 year event.

### 4.6 Storm Hydraulic Grade Line

The Pathways Phase 2 report indicates that the 100 year hydraulic grade line (HGL) in Bulkhead 6018N **93.68**, refer to **Appendix D** for the excerpt from the Pathways Phase 2 HGL analysis. The HGL has been extended through the subject site have been calculated as follows:

LOCATION	MH #	USF ELEV (M)	STORM HGL (M)	FREEBOARD (M)
Gartersnake	BLK6018N	-	93.450	-
Block 5	MH 5	94.32	93.680	0.640
Block 4	MH 4	94.64	93.749	0.891
Block 3	MH 3	94.49	93.883	0.607
Block 2	MH 2	94.79	94.284	0.506
Block 1	MH 1	95.43	94.284	1.146

All underside of footing elevations have been designed to provide a minimum of 300mm separation between the greater of governing pipe overtop or governing HGL. A copy of the storm HGL analysis for Block 60 is provided in **Appendix D**.

## 5 SOURCE CONTROLS

### 5.1 General

On site level or source control management of runoff will be provided to provide quality control for the subject lands. Such controls or mitigative measures are proposed for the development not only for final development but also during construction and build out. Some of these measures are:

- flat lot grading;
- split lot drainage;
- Roof-leaders to vegetated areas;
- vegetation planting; and
- groundwater recharge.

### 5.2 Lot Grading

There is an elevation difference of approximately 2m from southwest to northeast in Block 60. In accordance with local municipal standards, the parking lots will be graded northeast between 1.5% and 5.0%. Most landscaped area drainage will be directed into a swale drainage system, and connects to the storm sewer system. Typically swales will have slopes larger than 1.5% with subdrains. Copies of the grading plans have been included in **Appendix D**.

### 5.3 Roof Leaders

This development will consist of stacked homes and apartments. It is proposed that roof leaders from these units be constructed such that runoff is directed to grass areas adjacent to the units. This will promote water quality treatment through settling, absorption, filtration and infiltration and a slow release rate to the conveyance network.

### 5.4 Vegetation

As with most subdivision agreements, the developer will be required to complete a vegetation and planting program. Vegetation throughout the development including planting along roadsides and within public parks provides opportunities to re-create lost natural habitat.

## 6 CONVEYANCE CONTROLS

### 6.1 General

Besides source controls, the development also proposes to use several conveyance control measures to improve runoff quality. These will include:

- flat vegetated swales;
- catchbasin and maintenance hole sumps; and
- pervious rear yard drainage.

### 6.2 Flat Vegetated Swales

The development will make use of relatively flat vegetated swales where possible to encourage infiltration and runoff treatment.

### 6.3 Catchbasins

All catchbasins within the development, either rear yard or street, will be constructed with minimum 600 mm deep sumps. These sumps trap pollutants, sand, grit and debris which can be mechanically removed prior to being flushed into the minor pipe system. Both rear yard and street catchbasins will be fabricated to OPSD 705.010 or 705.020. All storm sewer maintenance holes servicing local sewers less than 900 mm diameter shall be constructed with a 300 mm sump as per City standards.

### 6.4 Pervious Landscaped Area Drainage

Some of the landscaped area swales make use of a filter wrapped perforated drainage pipe constructed below the rear yard swale. This perforated system is designed to provide some ground water recharge and generally reduce both volumetric and pollutant loadings that enter the minor pipe system.

## 7 SEDIMENT AND EROSION CONTROL PLAN

### 7.1 General

During construction, existing stream and conveyance systems can be exposed to significant sediment loadings. Although construction is only a temporary situation, it is proposed to introduce a number of mitigative construction techniques to reduce unnecessary construction sediment loadings. These will include:

- groundwater in trench will be pumped into a filter mechanism prior to release to the environment;
- bulkhead barriers will be installed at the nearest downstream manhole in each sewer which connects to an existing downstream sewer;
- seepage barriers will be constructed in any temporary drainage ditches; and
- silt sacks will remain on open surface structure such as manholes and catchbasins until these structures are commissioned and put into use.

### 7.2 Trench Dewatering

During construction of municipal services, any trench dewatering using pumps will be discharged into a filter trap made up of geotextile filters and straw bales similar in design to the OPSD 219.240 Dewatering Trap. These will be constructed in a bowl shape with the fabric forming the bottom and the straw bales forming the sides. Any pumped groundwater will be filtered prior to release to the existing surface runoff. The contractor will inspect and maintain the filters as needed including sediment removal and disposal and material replacement as needed.

### 7.3 Bulkhead Barriers

At the first manhole constructed immediately upstream of an existing sewer, a ½ diameter bulkhead will be constructed over the lower half of the outletting sewer. This bulkhead will trap any sediment carrying flows, thus preventing any construction –related contamination of existing sewers. The bulkheads will be inspected and maintained including periodic sediment removal as needed.

### 7.4 Seepage Barriers

These barriers will consist of both the Light Duty Straw Bale Barrier as per OPSD 219.100 or the Light Duty Silt Fence Barrier as per OPSD 219.110 and will be installed in accordance with the sediment and erosion control drawing. The barriers are typically made of layers of straw bales or geotextile fabric staked in place. All seepage barriers will be inspected and maintained as needed.

### 7.5 Surface Structure Filters

All catchbasins, and to a lesser degree manholes, convey surface water to sewers. However, until the surrounding surface has been completed these structures will be covered to prevent sediment from entering the minor storm sewer system. Until rear yards are sodded or until streets are asphalted and curbed, all catchbasins and manholes will be equipped with geotextile filter socks. These will stay in place and be maintained during construction and build until it is appropriate to remove them.

## 7.6 Stockpile Management

During construction of any development similar to that being proposed both imported and native soils are stockpiled. Mitigative measures and proper management to prevent these materials entering the sewer systems is needed.

During construction of the deeper municipal services, water, sewers and service connections, imported granular bedding materials are temporarily stockpiled on site. These materials are however quickly used up and generally before any catchbasins are installed. Street catchbasins are installed at the time of roadway construction and rearyard catchbasins are usually installed after base course asphalt is placed.

Contamination of the environment as a result of stockpiling of imported construction materials is generally not a concern since these materials are quickly used and the mitigative measures stated previously, especially the use of filter fabric in catchbasins and manholes help to manage these concerns.

The roadway granular materials are not stockpiled on site. They are immediately placed in the roadway and have little opportunity of contamination. Lot grading sometimes generates stockpiles of native materials. However, this is only a temporary event since the materials are quickly moved off site.

The construction of this development will involve a substantial rock blasting, breaking and crushing operation. Given the existing topography, a substantial cut and fill operation is required in order to construct a development that meets City Standards. As part of this operation, materials will be manipulated onsite, and provided the sediment and erosion control measures are in place, are generally inconsequential to the surrounding environment.

## 8 ROADS AND NOISE ATTENUATION

Vehicular access to Block 60 is provided by two private entrances from Gartersnake Way.

There are no sidewalks or pathways proposed within the development. Pedestrian access to the site will be via the private roadway.

The site has been designed in order to provide curbside municipal waste disposal.

There are no bus routes proposed within Block 60.

There are no collector streets or nearby noise sources that would trigger an environmental noise assessment.

### 8.1 Aircraft Sound Levels

As stated in Section 2.1, the site is within the Airport Vicinity Development Zone (AVDZ), the limit of the AVCZ is shown on Figure 2. The site however is outside of the 25 NEF/NEP contour line so the building components and ventilation requirements of Part 6 Prescribed Measures for Aircraft Noise of the Guidelines do not apply. A warning clause is required for the residential units inside the AVDZ.

Warning clause for aircraft noise is as follows:

“Purchasers/tenants are advised that due to the proximity of the airport, noise from the airport and individual aircraft may at times interfere with outdoor or indoor activities”.

## 9 SOILS

Golder Associates Ltd. was retained to prepare a geotechnical investigation for the proposed mixed use development for the Pathways Phase 2& 3. The objectives of the investigation were to prepare a report to:

- Determine the subsoil and groundwater conditions at the site by means of test pits and boreholes and;
- To provide geotechnical recommendations pertaining to design of the proposed development including construction considerations.

The geotechnical report 20142688-1148-001 was prepared by Golder Associates Ltd. in January 2021. The report contains recommendations which include but are not limited to the following:

- The maximum permissible grade raise is 4.0m
- In areas where finished grade exceeds grade raise limits, geotechnical reviews are required
- Fill placed below the foundations to meet OPSS Granular 'A' or Granular 'B' Type II placed in 300 mm lifts compacted to 98% SPMDD.
- Fill for roads to be suitable native material in 300mm lifts compared to 95% SPMDD

Pavement Structure:

LOCAL ROAD	THICKNESS
Asphaltic Concrete	90mm
OPSS Granular A Base	150mm
OPSS Granular B Type II Subbase	400mm

- Pipe bedding and cover; bedding to be minimum 150 mm OPSS Granular 'A' up to spring line of pipe. Cover to be 300 mm OPSS A (PUC and concrete pipes) or sand for concrete pipes. Both bedding and cover to be placed in maximum 225 mm lifts compacted to 95% SPMDD.

In general the grading plan for Block 60 adheres to the grade raise constraints noted above. A copy of the grading plans is included in **Appendix E**. The site does not pose any significant grade raise; thus a grading plan review letter is not required for this development.



## 10 RECOMMENDATIONS

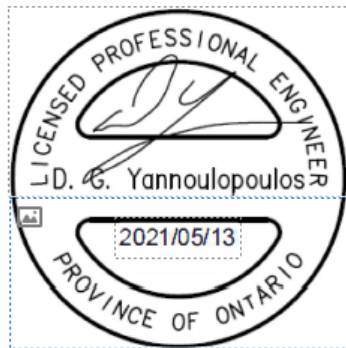
Water, wastewater and stormwater systems required to develop Pathways Block 60 will be designed in accordance with MOE and City of Ottawa's current level of service requirements.

The use of lot level controls, conveyance controls and end of pipe controls outlined in the report will result in effective treatment of surface stormwater runoff from the site. Adherence to the proposed sediment and erosion control plan during construction will minimize harmful impacts on surface water.

Final detail design will be subject to governmental approval prior to construction, including but not limited to the following:

- Block 60 Commence Work Order: City of Ottawa
- ECA for Sewage Works: MOECP Transfer of Review by City of Ottawa
- Block 60 Watermain Approval: City of Ottawa
- Block 60 Commence Work Order (utilities): City of Ottawa

Report prepared by:



Demetrius Yannouloupoulos, P.Eng.  
Director

A handwritten signature in blue ink, appearing to read "Ryan Magladry".

Ryan Magladry, C.E.T.  
Project Manager

# **APPENDIX A**

AOV Plan of Subdivision for the Pathways at the Findlay Creek  
Site Plan for Pathways Block 60  
125506-001 - General Plan of Services

**CURVE SCHEDULE**

NUM.	LOCATION	RADIUS	ARC	CHORD	BEARING
C1	Block 7 / 9	58.00	17.14	17.08	N 22°33'50" W
C2	Block 8 / 9	100.00	29.55	29.44	N 22°33'50" W
C3	Lot 55	50.00	8.30	8.30	N 79°02'55" W

APPROVED UNDER SECTION 51 OF THE PLANNING ACT BY THE CITY OF OTTAWA.  
THIS \_\_\_\_\_ DAY OF \_\_\_\_\_ 2020.

STEPHEN WILLIS, GENERAL MANAGER  
PLANNING INFRASTRUCTURE AND ECONOMIC DEVELOPMENT DEPARTMENT  
CITY OF OTTAWA

**PLAN 4M-**  
I CERTIFY THAT THIS PLAN IS REGISTERED IN THE LAND REGISTRY OFFICE FOR THE LAND TITLES DIVISION OF OTTAWA-CARLETON NO. 4 AT \_\_\_\_\_ O'CLOCK ON THE \_\_\_\_\_ DAY OF \_\_\_\_\_ AND ENTERED IN THE PARCEL REGISTER FOR PROPERTY IDENTIFIERS 04328-4223 AND 04328-xxxx AND THE REQUIRED CONSENTS ARE REGISTERED AS PLAN DOCUMENT NO. \_\_\_\_\_

REPRESENTATIVE FOR LAND REGISTRAR

This plan comprises all of PIN 04328-xxxx and part of PIN 04328-4223.

**PLAN OF SUBDIVISION OF PART OF LOTS 21 and 22 CONCESSION 4 ( RIDEAU FRONT )**  
Geographic Township of Gloucester and  
**BLOCK 208**  
**REGISTERED PLAN 4M-XXXX**  
**CITY OF OTTAWA**  
Surveyed by Annis, O'Sullivan, Vollebek Ltd.  
Scale 1 : 1000

**Metric**  
DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

**SURVEYOR'S CERTIFICATE**  
I CERTIFY THAT:  
1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the Land Titles Act and the regulations made under them.  
2. The Survey was completed on the \_\_\_\_\_ day of \_\_\_\_\_, 2020.

Date \_\_\_\_\_ T. Hartwick  
Ontario Land Surveyor

**OWNER'S CERTIFICATE**  
THIS IS TO CERTIFY THAT:  
1. Lots 1 to 54, both inclusive, Part of Lots 55 and 56, Blocks 57 to 65, both inclusive and the Streets, namely, voie Gartersnake Way and avenue Paakanaak Avenue have been laid out in accordance with our instructions.  
2. The Streets are dedicated as public highways to City of Ottawa.

Dated the \_\_\_\_\_ day of \_\_\_\_\_, 2020. David Kardish  
Leitrim South Holdings Inc.  
I have authority to bind the corporation.

**OWNER'S CERTIFICATE**  
THIS IS TO CERTIFY THAT:  
1. Part of Lots 55 & 56.

Dated the \_\_\_\_\_ day of \_\_\_\_\_, 2020. David Kardish  
Pathways South Regional Inc.  
I have authority to bind the corporation.

**NOTES AND LEGEND**

- denotes Survey Monument Planted.
- denotes Survey Monument Found
- SIB - Standard Iron Bar.
- SSIB - Short Standard Iron Bar.
- IB - Iron Bar.
- (AOG) - Annis, O'Sullivan, Vollebek Ltd.
- P&W - Post & Wire
- (P1) - Plan 4R-29621
- (P2) - Plan 4R-29630
- (P3) - Registered Plan 4M-1618

Distances shown on curved limits are Arc distances unless otherwise noted.  
Bearings and distances illustrated on this plan, between found survey monuments, are consistent with (P3).

Distances shown on this plan are ground distances and can be converted to grid distances by multiplying by the combined scale factor of 0.99966.

Bearings are grid, derived from Can-Net 2016 Real Time Network GPS observations referenced to Specified Control Points 01919760735 and 01919871649, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

Coordinates are derived from Can-Net 2016 Real Time Network GPS observations referenced to Specified Control Points 01919760735 and 01919871649, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

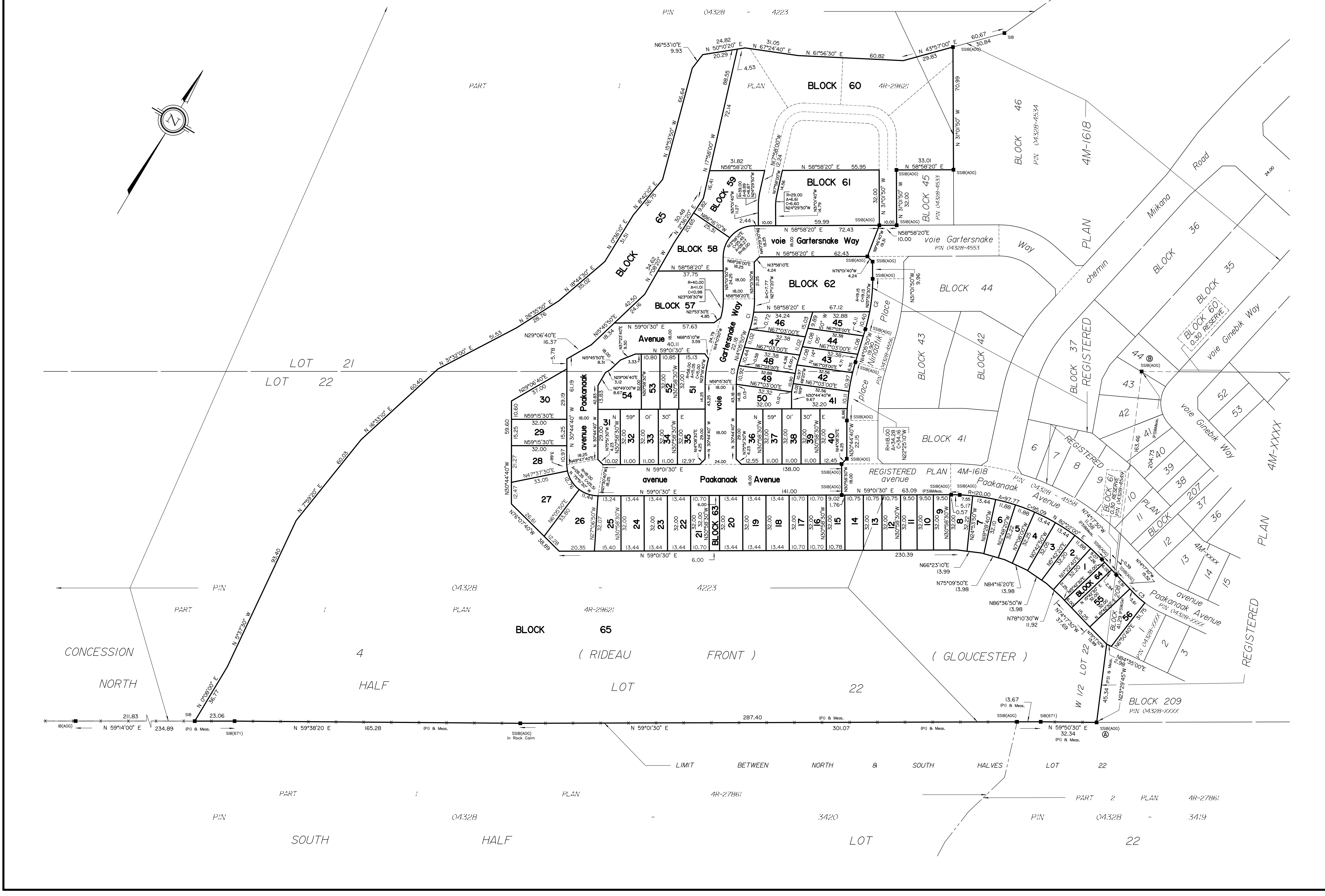
Coordinate values are to urban accuracy in accordance with O. Reg. 216/10.

. 01919760735	Northing	5026903.34	Eastings	376968.72
. 01919871649	Northing	5007189.87	Eastings	372435.05
. Point A	Northing	5018553.24	Eastings	375471.54
. Point B	Northing	5018741.00	Eastings	375389.92

Caution: Coordinates cannot, in themselves, be used to re-establish corners or boundaries shown on this plan.

**ANNIS, O'SULLIVAN, VOLLEBEK LTD.**  
14 Concourse Gate, Suite 500  
Nepean, Ont. K2E 7S6  
Phone: (613) 727-0850 / Fax: (613) 727-1079  
Email: info@anniso.com

Ontario Land Surveyors (Lic. No. 17533-19 Regional P1 L1s 21 22 C4 RF GL SIB D7)





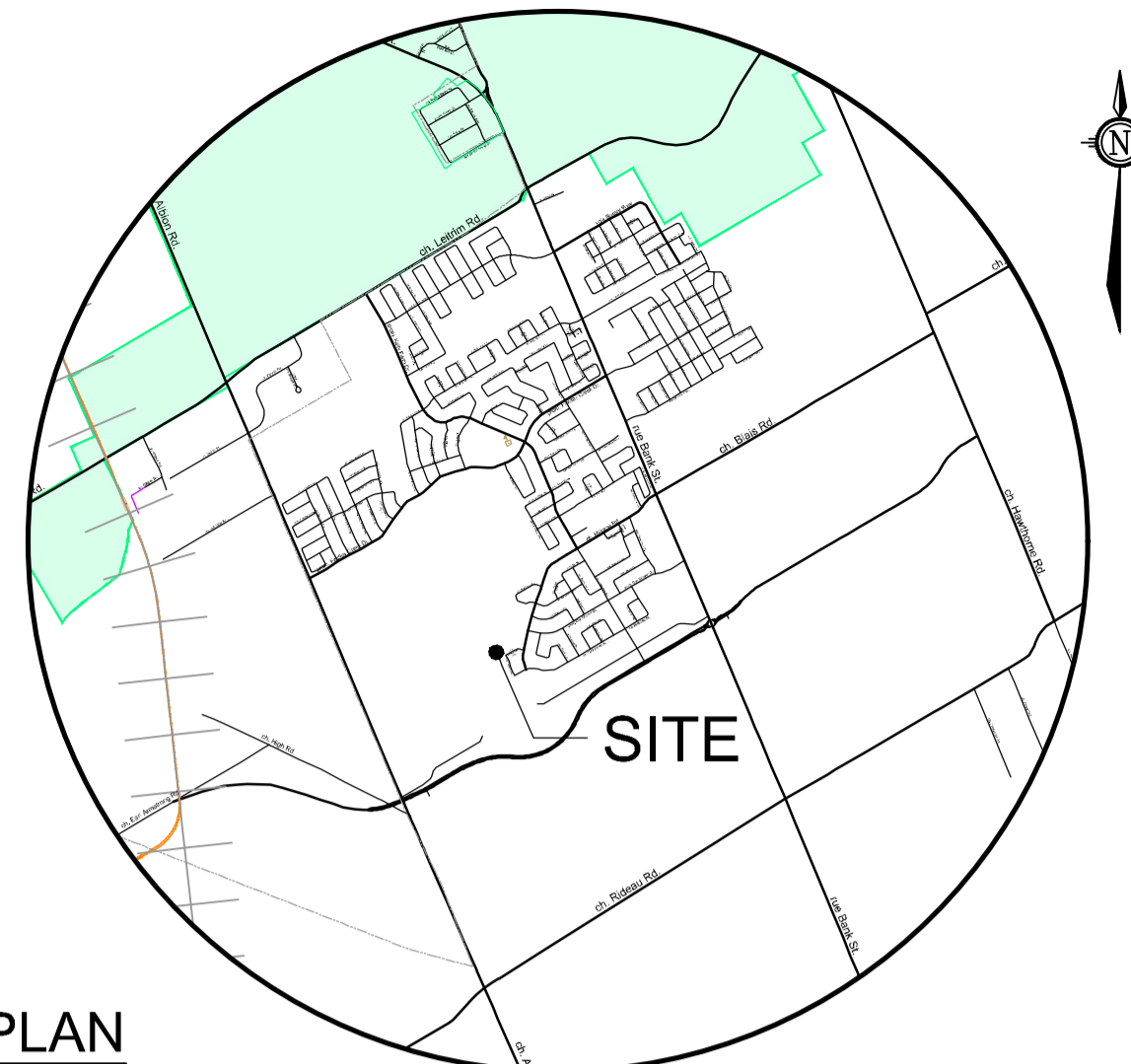
**LEGEND**

- PROPOSED FIRE ROUTE
- HYDRANT CW VALVE & LEAD
- CATCH BASIN
- CATCH BASIN MANHOLE
- SANITARY MANHOLE
- STORM MANHOLE
- ROGERS PEDESTAL
- BELL PEDESTAL
- REAR YARD DRAIN
- STREET LIGHT
- TRANSFORMER
- COMMUNITY MAILBOX
- DEPRESSED CURB
- PROPOSED ASPHALT SURFACE

**Pathways at Findlay Creek, Block 60 - Zoning Table**

ZONING PROVISIONS - City of Ottawa Zoning By-law 2008-250

PROVISION	REQUIRED	PROPOSED
<b>RESIDENTIAL FOURTH DENSITY, SUBZONE Z (R4Z (2370))</b>		
MIN LOT WIDTH (m)	18	10.3
MIN LOT AREA (m <sup>2</sup> )	1,400	9514.78
MAX BUILDING HEIGHT (m)	11	TBD
MIN FRONT YARD SETBACK (m)	3	33.81
MIN CORNER SIDE YARD SETBACK (m)	3	N/A
MIN REAR YARD SETBACK (m)*	6	6
MIN INTERIOR SIDE YARD SETBACK (m)	1.2, but in the case of an abutting vacant lot, a minimum required interior side yard of 1.8	1.8
<b>PARKING RATES</b>		
MIN PARKING SPACE RATE	1 per dwelling unit	1 per dwelling unit
MIN VISITOR PARKING SPACE RATE	0.2 per dwelling unit	1 per dwelling unit
<b>PLANNED UNIT DEVELOPMENT</b>		
MIN WIDTH OF PRIVATE WAY (m)	6	6.7
MIN SETBACK FOR ANY WALL OF A RESIDENTIAL USE BUILDING TO A PRIVATE WAY (m)	1.8	6.52
MIN SETBACK FOR ANY GARAGE OR CARPORT ENTRANCE FROM A PRIVATE WAY (m)	5.2	5.39
MIN SEPARATION AREA BETWEEN BUILDINGS WITHIN A PUD - WHERE THE HEIGHT OF ABUTTING BUILDINGS IS LESS THAN OR EQUAL TO 14.5M (m)	1.2	3.73



KEYPLAN  
NOT TO SCALE

# SITE PLAN

## BLOCK 60

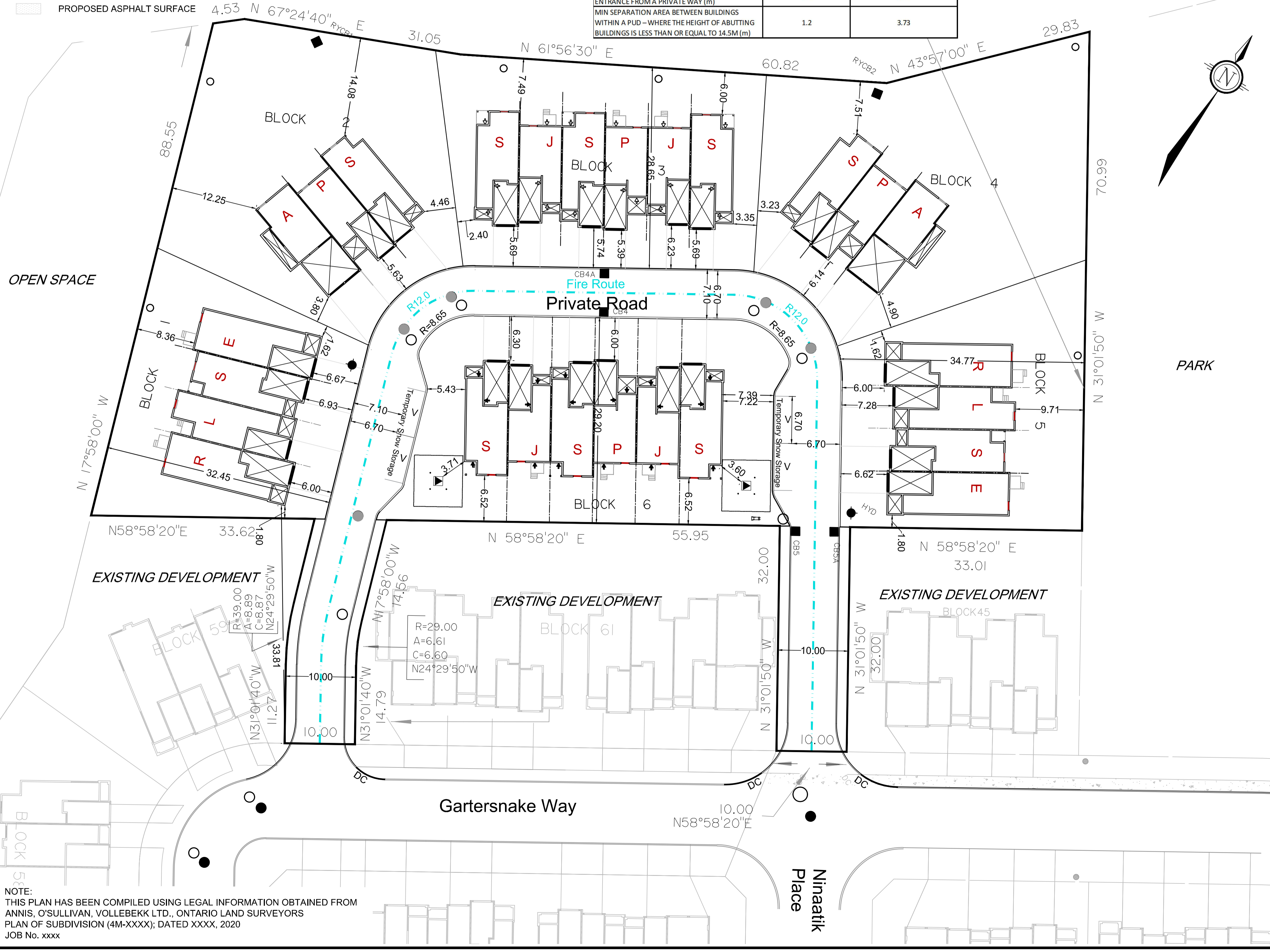
PART OF LOTS 21 & 22  
CONCESSION 4 (Rideau Front)  
TOWNSHIP OF GLOUCESTER  
Now CITY OF OTTAWA  
BLOCK 60, PLAN 4M-XXXX



No.	REVISION	DATE	BY
3	UPDATED UNITS	MAR 30/21	JL
2	UPDATED UNITS	FEB 10/21	JL
1	ISSUED FOR COORDINATION	DEC 18/20	JL

**NOVATECH**  
Engineers, Planners & Landscape Architects  
Suite 200, 240 Michael Cowpland Drive  
Ottawa, Ontario, Canada K2M 1P6  
Telephone: (613) 254-9643  
Facsimile: (613) 254-5867  
Website: www.novatech-eng.com

ISSUED  
**MARCH, 2021**  
PROJECT No.  
**120015**  
DRAWING No.  
**120015-SP**



NOTE:  
THIS PLAN HAS BEEN COMPILED USING LEGAL INFORMATION OBTAINED FROM  
ANNIS, O'SULLIVAN, VOLLEBEKK LTD., ONTARIO LAND SURVEYORS  
PLAN OF SUBDIVISION (4M-XXXX); DATED XXXX, 2020  
JOB No. xxxx

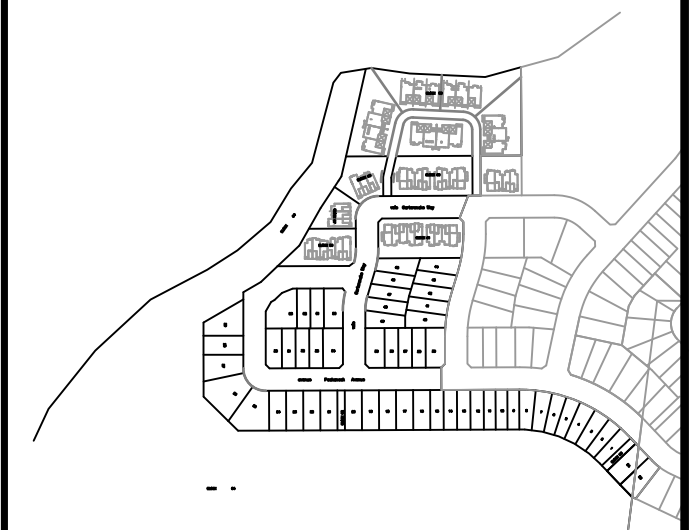
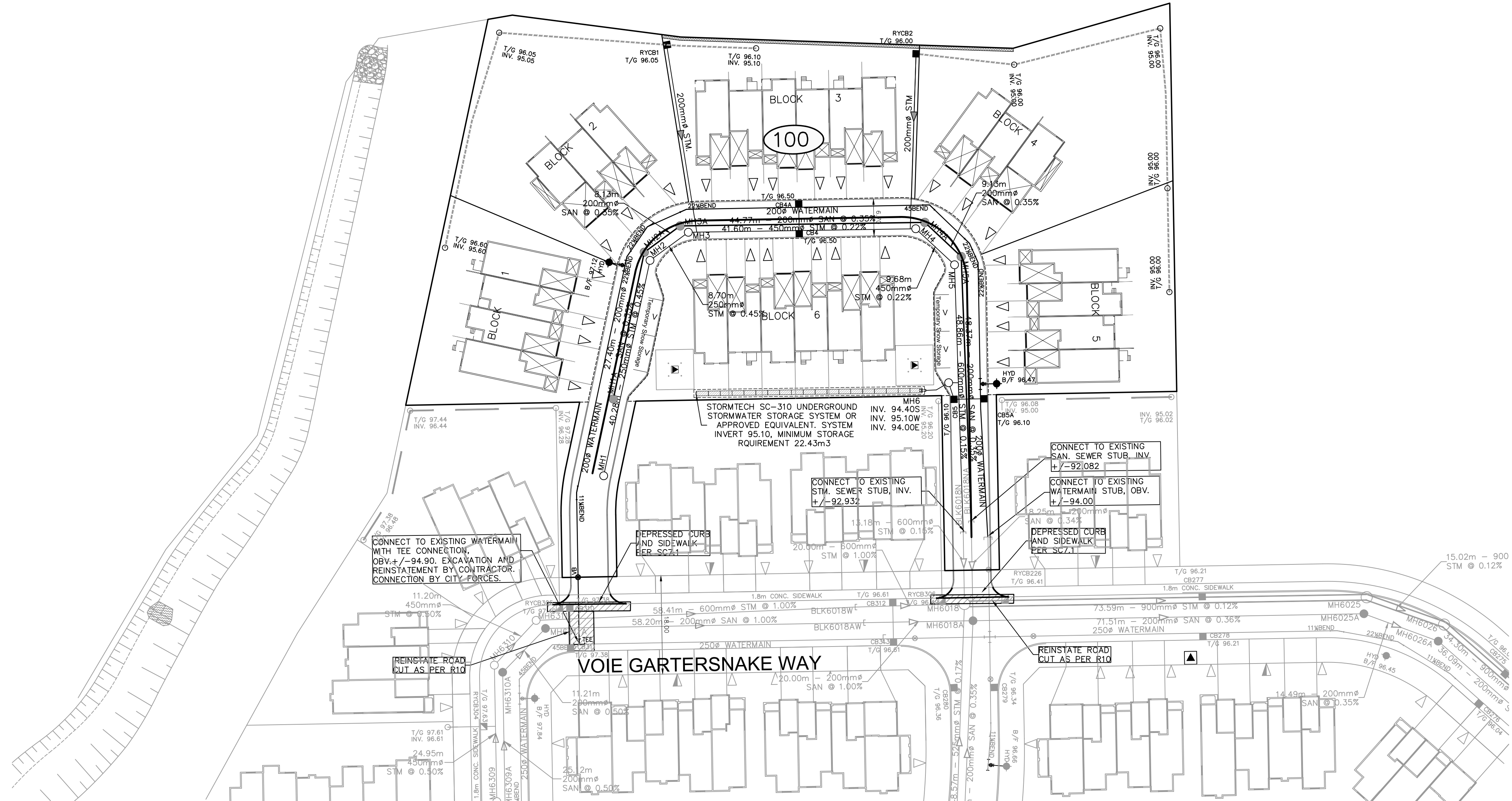
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DXX-XX-XX-XXXX

#xxxxx



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 Plot Scale: 1:25.4  
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1	SUBMISSION No.1 FOR CITY REVIEW	D.G.V.	2021-05-13
No.	REVISIONS	By	Date

**LETRIM SOUTH HOLDINGS INC.**

**IBI GROUP**  
 400 - 333 Preston Street  
 Ottawa ON K1S 5N4 Canada  
 tel 613 225 1311 fax 613 225 9868  
 ibigroup.com

Project Title

**pathways**  
 at FINDLAY CREEK  
 BLOCK 60

Professional Engineer  
 Y. Yannouloupoulos  
 2105/13  
 PROVINCE OF ONTARIO

Drawing Title

**GENERAL PLAN OF SERVICES**

Scale

1:500

Design	R.M.	Date	OCTOBER 2020
Drawn	M.M.	Checked	K.H.
Project No.	125506	Drawing No.	001

DXX-XX-XXXX-XXXX

#XXXXX

**Fw: Pre-consult recap - Pathway Ph3 Block 60**

Ryan Magladry &lt;rmagladry@IBIGroup.com&gt;

Mon 1/25/2021 11:31 AM

To: Ryan Magladry &lt;rmagladry@IBIGroup.com&gt;

 3 attachments (11 MB)

D02-02-15-0072 Environmental Impact Statement and Tree Conservation Report.pdf; DesignBrief\_TOR\_Pathways Phase 3.pdf; Pre-con Applicant's Study and Plan Identification List.pdf;

Ryan Magladry CET

WORKING REMOTELY

REACHABLE ON CELL @ 613.795.5610

Project Manager

**IBI GROUP**

400-333 Preston Street

Ottawa ON K1S 5N4 Canada

tel +1 613 225 1311 ext 64061 fax +1 613 225 9868



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**From:** Evan Garfinkel <egarfinkel@regionalgroup.com>**Sent:** Tuesday, August 18, 2020 4:11 PM**To:** Greg Winters <G.Winters@novatech-eng.com>; James Ireland <j.ireland@novatech-eng.com>; Ryan Magladry <rmagladry@IBIGroup.com>**Subject:** FW: Pre-consult recap - Pathway Ph3 Block 60

Greg, James, Ryan.

Please see attached and below. I'm going to work to put together a schedule in the coming week and hope to circulate that soon.

Talk soon.

**Evan Garfinkel**

Coordinator, Land Development

**Regional Group**

1737 Woodward Drive

Ottawa, ON K2C 0P9

T: 613-230-2100 x 6004

C: 613-884-5574

[egarfinkel@regionalgroup.com](mailto:egarfinkel@regionalgroup.com)[www.regionalgroup.com](http://www.regionalgroup.com)

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**From:** Gervais, Melanie <Melanie.Gervais@ottawa.ca>**Sent:** Tuesday, August 18, 2020 4:02 PM**To:** Evan Garfinkel <egarfinkel@regionalgroup.com>**Subject:** Pre-consult recap - Pathway Ph3 Block 60**External Email – Confirm Sender and Beware of Links and Attachments**

Hi Evan,

Please find below a recap of our pre-consultation meeting. Please note that during the COVID-19 pandemic the department is accepting electronic applications. Please send pdfs of your submission material (including a scanned copy of the application form) to [planningcirculations@ottawa.ca](mailto:planningcirculations@ottawa.ca) (and cc myself). They will create the file number and upload the files to the proper location. Following the receipt of the electronic submission I will send you an email with your new file number and the process for submitting payment.

**Planning:**

You will need to submit a New - Complex Site Plan application with a fee of \$35,487.53 + engineering review fees + \$1,015 (Conservation Authority fee).

The property is zoned R4Z[2370] (Residential Fourth Density Subzone Z Exception 2370), the zoning provisions for R4Z can be found [here](#) and all the provisions for Planned Unit Developments can be found [here](#). Below is an excerpt of Table 162A with non-applicable sections removed. The applicable endnotes are also below.

I Sub-Zone	II Prohibited Uses	III Principal Dwelling Types	IV Minimum Lot Width (m)	V Minimum Lot Area (m <sup>2</sup> )	VI Maximum Building Height (m)	VII Minimum Front Yard Setback (m)	VIII Minimum Corner Side Yard Setback (m)	IX Minimum Rear Yard Setback (m)	X Minimum Interior Side Yard Setback (m)	XI End-notes (see Table 162B)	
Z	None	Planned unit development	18	1,400	as per dwelling type	3 <sup>10</sup>	3 <sup>10</sup>	varies <sup>1</sup>	varies <sup>1</sup>	1, 10, 16	
		Semi-detached	7	190	11 <sup>18,20</sup>	3 <sup>10</sup>	3 <sup>10</sup>	6	0.9	10, 16, 18	
		Townhouse	6	150	11 <sup>18,20</sup>	3 <sup>10</sup>	3 <sup>10</sup>	6	1.2	10, 16, 18	

Endnotes:

- 1
- Despite the definitions of rear yard and interior side yard, buildings in a PUD must be located so that they are set back,
- a. an amount equal to the minimum required rear yard setback for the dwelling type proposed, from a lot line where it abuts a rear yard on an abutting lot but need not exceed 7.5 metres,
  - b. an amount equal to the minimum required interior side yard setback for the dwelling type proposed, from a lot line where it abuts a side yard on an abutting lot for the first 18 metres back from the street and 25 percent of the lot depth for the remainder, to a maximum 7.5 metres, and
  - c. in the case of an abutting vacant lot, a minimum required interior side yard of 1.8 metres, and a minimum required rear yard setback based on the minimum rear yard setback applicable to the dwelling type proposed to be located within the PUD adjacent to the rear lot line.

A Minor Variance would be required to rectify endnote 1.

Proper landscaping will be required on site. This includes the addition of trees along the street edge. Please note that all Landscape Plans need to be stamped by a Landscape Architect. A cross-section of the private street is recommended to ensure the width can accommodate servicing, utilities and trees.

The Planning Rationale will have to explain the proposal, review the applicable Official Plan and CDP policies, if applicable, review the applicable Zoning By-law provisions and review the Accessibility Design Standards.

Please see the attached list identifying the submission requirements. Although the list identifies numbers of paper copies these are **not** required at this time.

**Urban Design:**

- A Design Brief is required for the site plan control application. The Terms of Reference for the Design Brief is attached for convenience.
- With respect to the design concept:
  - Consideration should be given to the provision of a pedestrian pathway to link the proposed development and the new municipal park. A possible location for the pathway may be between Block 6 and Block 45.
  - Consideration may also be given to the provision of a pathway to link the proposed development and the conservation area if a pathway system exists or is proposed to allow access to the conservation area.
  - Please maximize opportunities for street trees through a careful examination of both the plan view design and cross section design of the private street.
  - Considerations may be given to rebalancing the allocation of front yard and rear yard for Blocks 1, 2, 5 and 6 if more spaces are required for accommodating street trees, which are often in competition with utilities. The backyard of these Blocks appears to be very generous and there are rooms to move around the buildings in order to create more spaces in the front. The intent to create a consistent front yard setback is appreciated. However, given the lot and street configuration the design may envision a cluster of buildings rather than a row of buildings along a U-shape street.
  - Considerations should be given the visitor parking. The proposed double driveways are quite shallow and can hardly accommodate additional vehicles if needed.
  - The design presented at the meeting is slightly different from the design circulated prior to the meeting. The design presented at the meeting shows a few buildings with a double garage projecting out from the building façade. Generally, a design with a projected garage does not contribute to the quality of public realm design and should be avoided.

**Engineering:**



**Site Servicing Study:**

- Prior to submitting the servicing report the consultant should contact John Sevigny and request boundary conditions for the watermain design. The consultant will need to provide the type of development, fire flow required (including the FUS calculations), average day demand, maximum day demand and maximum hour demand as well as a location plan showing the points of connection to the public system.
- The storm water management design is to follow the design parameters from the Pathways Phase 3 Design Brief.

**Geotechnical Study:**

- Containing detailed information on geotechnical matters and recommendations (i.e. pavement, foundation, bedding construction etc.).
- Sensitive Marine Clay (SMC) is widely found across Ontario – geotechnical reports should include Atterberg Limits, consolidation testing, sensitivity values, and vane shear test results (at a minimum) with a discussion for proposals in areas containing SMC; If SMC exists then the tree planting restrictions are to be discussed and follow the City's most current tree planting guidelines.

**Exterior Site Lighting Letter**

- This requirement was not mentioned in the pre-consult however it would be appreciated if we could have it at the time of submission. That being said, we would not deem the application incomplete if it was the only thing missing from the submission.
- The letter is to be certified by a qualified engineer confirming the site lighting design a) meets the criteria for Full Cut-off (Sharp cut-off) Classification, as recognized by the Illuminating Engineering Society of North America (IESNA or IES) AND b) the site lighting spillage will be minimal (i.e. 0.5 foot-candle is normally the maximum allowable spillage).

**Engineering Drawings:**

- The following are the engineering plans that are required with the submission. The link below outlines the requirements for the plans <https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans>
  - Site Servicing Plan
  - Grading and Drainage Plan (ponding if applicable)
  - Erosion and Sediment Control Plan (can be combined with the grading plan)
  - Plan and Profile Drawings
  - Stormwater and Sanitary Drainage Area Plans

A couple items to make note of are:

- All reports should follow the City's Guides for Preparing Studies and plans – these guides can be found at standard for <https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#standards-policies-and-guidelines>
- In terms of the MECP ECA requirement, since the site will be free-hold, the ECA will be required however, the City currently has the opportunity to request that the works be completed under the transfer of review process.

**Transportation:**

- Traffic Impact Assessment Guidelines Screening Form was reviewed. A TIA is not required for this application.
- On site plan:
  - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
  - Turning movement diagrams required for all accesses showing the largest vehicle to access/egress the site.
  - Turning movement diagrams required for internal movements (garbage truck, emergency vehicles).
  - Show sight-lines at the accesses, due to the curvature in Gartersnake Way.
  - Show all curb radii measurements; ensure that all curb radii are reduced as much as possible
  - Show lane/aisle widths.
  - Consider providing a pedestrian pathway on-site along the private street that would connect to the sidewalk along Gartersnake Way.
  - Sidewalk is to be continuous across accesses as per City Specification 7.1.
  - Grey out any area that will not be impacted by this application.
- AODA legislation is in effect for all organizations, please ensure that the design conforms to these standards.
- Noise Impact Study required for the following:
  - Aircraft, site is within Airport Vicinity Development Zone.

**Environmental Planner:**

The subdivision did have a large EIS at the subdivision, a memo confirming that the mitigations still apply would be appropriate. The SNC may have more requirements due to the significant wetland – EP zone to the east and west.

Landscaping will need to include only native species.

**Planning Forester:**

A Tree Conservation Report will be required if there are trees to be removed; please contact Mark Richardson for information on permitting and TCR requirements.

Attached is the Tree Conservation Report from the subdivision application. Map 2 identifies Tree #1 as a notable tree within Miikana Park (Park Block 46 on Plan 4M-1618). This tree is located in proximity to Block 60, although the distance from the lot line is difficult to assess from the drawing. The tree is a 50cm dbh, 20m high, white spruce in good condition. It would be helpful if the landscape plan for the site plan application could identify the location of Tree #1 relative to the boundary of Block 60 and also show the tree protection measures to be implemented by the contractor if the tree is close enough to the lot line to be at risk of damage during construction.

**South Nation Conservation:**

O. Reg. 170/06: The EMP indicates a mapped watercourse for the site and the Leitrim Core Provincially Significant Wetland (PSW) adjacent to the north. Any interference with a watercourse or development within 120m of the wetland may require a permit under O. Reg. 170/06 and restrictions may apply.

EIS/TOR: the 2016 study or site specific study is requested. To obtain a permit, the study must demonstrate no negative hydrologic impacts to the provincially significant wetland. The study is also expected to prescribe appropriate mitigation of impacts, both during and following



construction, to the adjacent wetland. Please provide this study to South Nation Conservation (SNC) for review. A memo that pulls the relevant information from the EIS/TOR is fine but I don't believe it will be sufficient for the permit because I don't believe it specifically discusses the hydrologic impacts to the PSW and watercourse. The CA regulations apply to the majority of this property and I want to be sure that we don't have difficulty issuing the permit down the road. I suspect that fill we be necessary for the development and stormwater will be directed away from the wetland, so the memo should be aware of the proposed stormwater design.

Stormwater management must conform to the finalized storm water management design for Phase 3. SNC has recently reviewed and commented on the following study. Any deviation from the finalized study will require an additional review by SNC.

- DESIGN BRIEF PATHWAYS AT FINDLAY CREEK 4800 BANK STREET PHASE 3 LEITRIM DEVELOPMENT AREA. Prepared by IBI. Dated May 2020. Signed, stamped and dated May 7, 2020.

The applicant is responsible for addressing all applicable conditions of draft approval from the DRAFT Conditions Extension of April 11, 2017. It is recommended that the applicant and review agencies be provided with a copy of the condition list with the appropriate conditions highlighted.

Please contact James Holland at SNC for any clarifications, [jholland@nation.on.ca](mailto:jholland@nation.on.ca).

\*\*\*\*\*

If you require any clarifications on the above, do not hesitate to contact me.

Regards,

*Mélanie Gervais MCIP, RPP*

*Planner / Urbaniste*

*Development Review /*

*Examen des demandes d'aménagement*

*Planning, Infrastructure and Economic Development Department /*

*Services de la planification, de l'infrastructure et du développement économique*

*City of / Ville d'Ottawa*

*110, avenue Laurier Avenue West / Ouest,*

*4th Floor / 4ième étage*

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## Servicing study guidelines for development applications

### 4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

#### 4.1 General Content

- Executive Summary (for larger reports only).
- Date and revision number of the report.
- Location map and plan showing municipal address, boundary, and layout of proposed development.
- Plan showing the site and location of all existing services.
- Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.
- Summary of Pre-consultation Meetings with City and other approval agencies.
- Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defensible design criteria.
- Statement of objectives and servicing criteria.
- Identification of existing and proposed infrastructure available in the immediate area.
- Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).
- Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.
- Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.
- Proposed phasing of the development, if applicable.

- Reference to geotechnical studies and recommendations concerning servicing.
  
- All preliminary and formal site plan submissions should have the following information:
  - Metric scale
  
  - North arrow (including construction North)
  
  - Key plan
  
  - Name and contact information of applicant and property owner
  
  - Property limits including bearings and dimensions
  
  - Existing and proposed structures and parking areas
  
  - Easements, road widening and rights-of-way
  
  - Adjacent street names

#### **4.2 Development Servicing Report: Water**

- Confirm consistency with Master Servicing Study, if available
- Availability of public infrastructure to service proposed development
- Identification of system constraints
- Identify boundary conditions
- Confirmation of adequate domestic supply and pressure
- Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.
- Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.
- Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design
- Address reliability requirements such as appropriate location of shut-off valves
- Check on the necessity of a pressure zone boundary modification.
- Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range

- Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.
- Description of off-site required feeder mains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.
- Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.
- Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

### **4.3 Development Servicing Report: Wastewater**

- Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).
- Confirm consistency with Master Servicing Study and/or justifications for deviations.
- Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.
- Description of existing sanitary sewer available for discharge of wastewater from proposed development.
- Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)
- Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.
- Description of proposed sewer network including sewers, pumping stations, and forcemains.
- Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).
- Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.
- Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.
- Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.
- Special considerations such as contamination, corrosive environment etc.

#### 4.4 Development Servicing Report: Stormwater Checklist

- Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)
- Analysis of available capacity in existing public infrastructure.
- A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.
- Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.
- Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.
- Description of the stormwater management concept with facility locations and descriptions with references and supporting information.
- Set-back from private sewage disposal systems.
- Watercourse and hazard lands setbacks.
- Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.
- Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.
- Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.
- Any proposed diversion of drainage catchment areas from one outlet to another.
- Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100 year return period storm event.
- Identification of potential impacts to receiving watercourses
- Identification of municipal drains and related approval requirements.
- Descriptions of how the conveyance and storage capacity will be achieved for the development.
- 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.

- Inclusion of hydraulic analysis including hydraulic grade line elevations.
- Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
- Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.
- Identification of fill constraints related to floodplain and geotechnical investigation.

#### **4.5 Approval and Permit Requirements: Checklist**

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

- Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.
- Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.
- Changes to Municipal Drains.
- Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

#### **4.6 Conclusion Checklist**

- Clearly stated conclusions and recommendations
- Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.
- All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario

# **APPENDIX B**

Water Distribution Model



IBI GROUP  
 333 PRESTON STREET  
 OTTAWA, ONTARIO  
 K1S 5N4

WATERMAIN DEMAND CALCULATION SHEET

PROJECT : Pathways Block 60  
 CLIENT : Pathways Leirim Inc.

FILE: 125506-6.4.4  
 DATE PRINTED: 28-Jan-21  
 DESIGN: RM  
 PAGE: 1 OF 1

NODE	RESIDENTIAL				NON-RESIDENTIAL (ICI)			AVERAGE DAILY DEMAND (l/s)			MAXIMUM DAILY DEMAND (l/s)			MAXIMUM HOURLY DEMAND (l/s)			FIRE DEMAND (l/min)
	SINGLE FAMILY UNITS	Semi Detached Townhouse UNITS	Appartment UNITS	POPULATION	INDUST. (ha)	COMM. (ha)	INSTIT. (ha)	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	
	B1		8		21.60				0.09		0.09	0.22		0.22	0.48		
B2		9		24.30				0.10		0.10	0.25		0.25	0.54		0.54	9,000
Total										0.19			0.46			1.02	

POPULATION DENSITY		WATER DEMAND RATES		PEAKING FACTORS		FIRE DEMANDS	
Single Family	3.4 persons/unit	Residential	350 l/cap/day	Maximum Daily		Single Family	10,000 l/min (166.7 l/s)
				Residential	2.5 x avg. day		
		Commercial Shopping Center		Commercial	1.5 x avg. day	Semi Detached &	
Semis & towns	2.7 persons/unit		2,500 L/(1000m <sup>2</sup> /day)	Maximum Hourly		Townhouse	9,000 l/min (150 l/s)
				Residential	2.2 x max day		
Apartments	1.8 persons/unit			Commercial	1.8 x max day	Medium Densit	15,000 l/min (250 l/s)



## Boundary Conditions Pathways Block 60

### Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	11.40	0.19
Maximum Daily Demand	27.60	0.46
Peak Hour	61.20	1.02
Fire Flow Demand 1	9,000.00	150

### Location



### Results – Existing Conditions

#### Connection 1 – Mikana Rd.

Demand Scenario	Head (m)	Pressure <sup>1</sup> (psi)
Maximum HGL	155.9	86.3
Peak Hour	147.5	74.3
Max Day plus Fire 1	139.3	62.7

<sup>1</sup> Ground Elevation = 95.2 m

### Connection 2 – Esban Dr.

Demand Scenario	Head (m)	Pressure <sup>1</sup> (psi)
Maximum HGL	155.9	84.3
Peak Hour	147.5	72.3
Max Day plus Fire 1	139.5	61.0

<sup>1</sup> Ground Elevation = 96.6 m

### Results – SUC Zone Reconfiguration

#### Connection 1 – Dun Skipper Dr.

Demand Scenario	Head (m)	Pressure <sup>1</sup> (psi)
Maximum HGL	147.0	73.7
Peak Hour	143.7	69.0
Max Day plus Fire 1	136.6	58.9

<sup>1</sup> Ground Elevation = 95.2 m

#### Connection 2 – Esban Dr.

Demand Scenario	Head (m)	Pressure <sup>1</sup> (psi)
Maximum HGL	147.0	71.7
Peak Hour	143.7	67.0
Max Day plus Fire 1	136.9	57.3

<sup>1</sup> Ground Elevation = 96.6 m

### Notes

1. As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:
  - a. If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
  - b. Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.

### Disclaimer

*The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.*

## Fire Flow Requirement from Fire Underwriters Survey

### Pathways Block 60 - BLK 3

#### Building Floor Area

Area	17.0 m
depth	30.0 m
stories	1
Area	510.0 m <sup>2</sup>

$$F = 220C\sqrt{A}$$

C	1.5	C =	1.5 wood frame
A	510 m <sup>2</sup>		1.0 ordinary
F	7,452 l/min		0.8 non-combustile
use	7,000 l/min		0.6 fire-resistive

#### Occupancy Adjustment

Use	-15%	-25% non-combustile
		-15% limited combustile
		0% combustile
		+15% free burning
		+25% rapid burning
Adjustment	-1050 l/min	
Fire flow	5,950 l/min	

#### Sprinkler Adjustment

Use	0%
Adjustment	0 l/min

#### Exposure Adjustment

Building Face	Separation (m)	Adjacent Exposed Wall			Exposure Charge *
		Length	Stories	L*H Factor	
north	>45	0.0	0	0	0%
east	3.2	17.0	1	17	17%
south	18.9	30.0	1	30	13%
west	7.4	17.0	1	17	17%

Total 47%

Adjustment 2,797 l/min

Total adjustments 2,797 l/min

Fire flow 8,747 l/min

**Use 9,000 l/min**

**150.0 l/s**

\* Exposure charges from Technical Bulletin ISTB 2018-02 Appendix H (ISO Method)

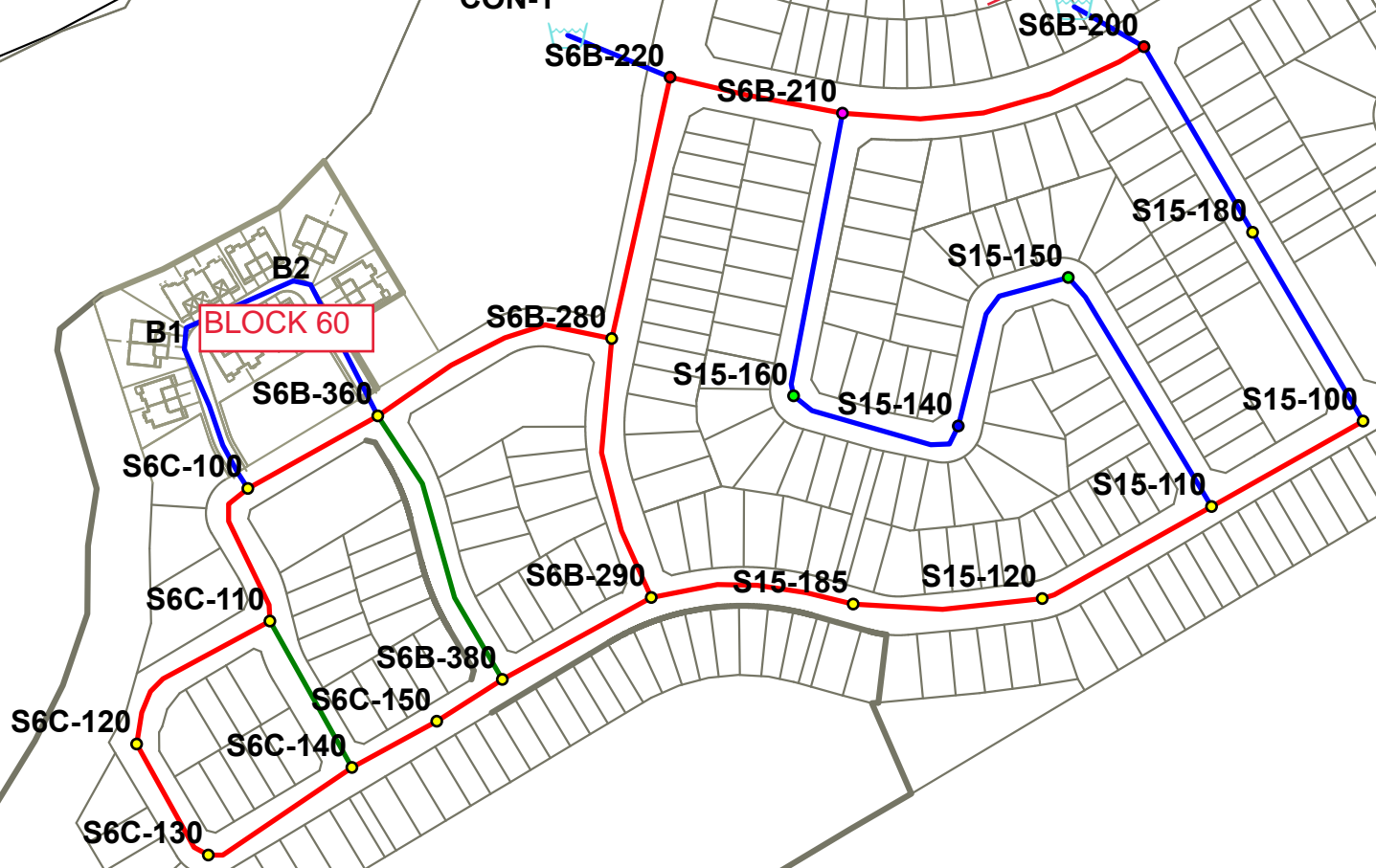
# BLOCK 60 WATER MODEL

BOUNDARY  
CONDITIONS

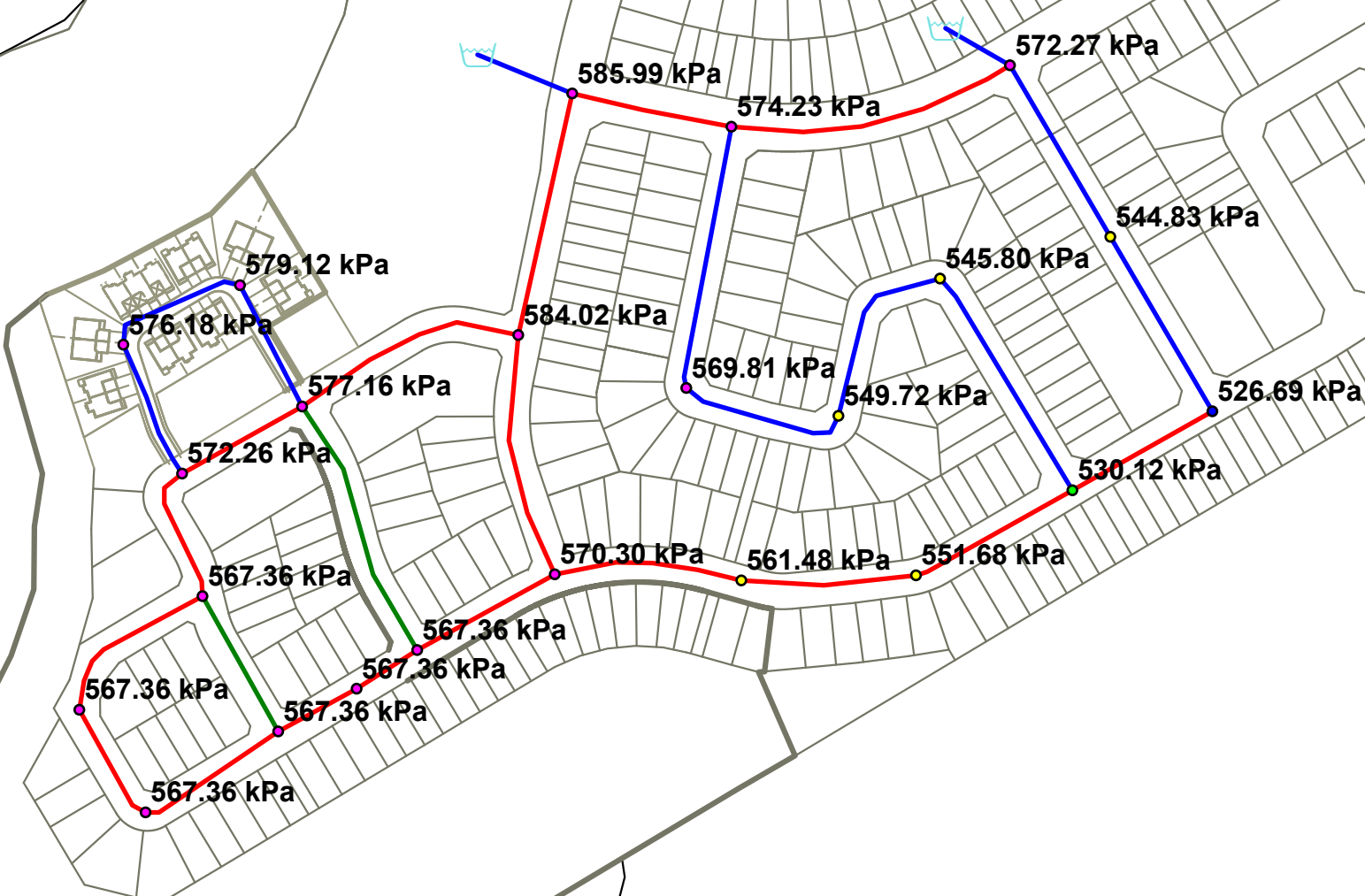
CON-1

CON-2

BLOCK 60

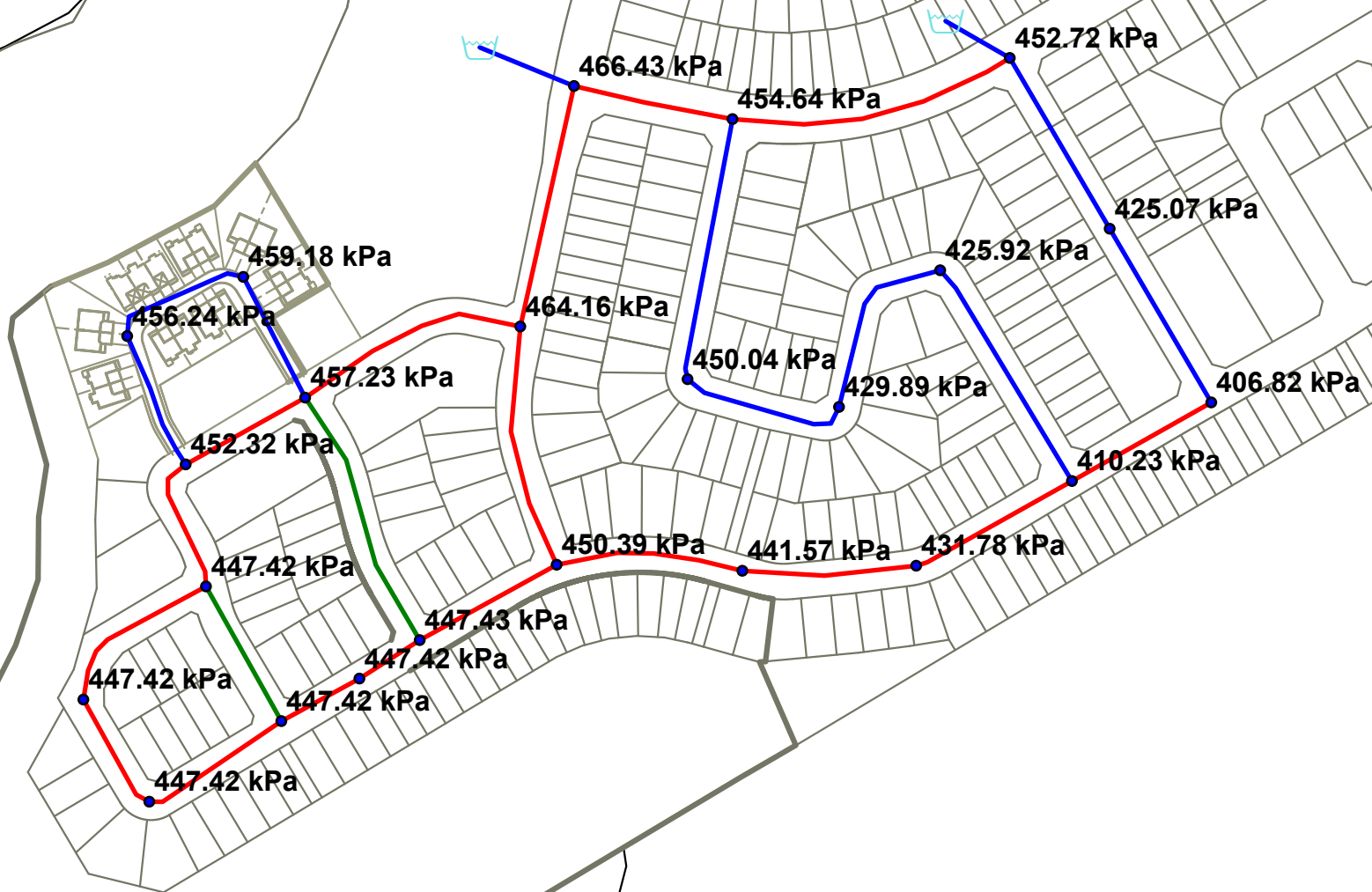


BASIC DAY PRESSURES - EXISTING CONDITIONS

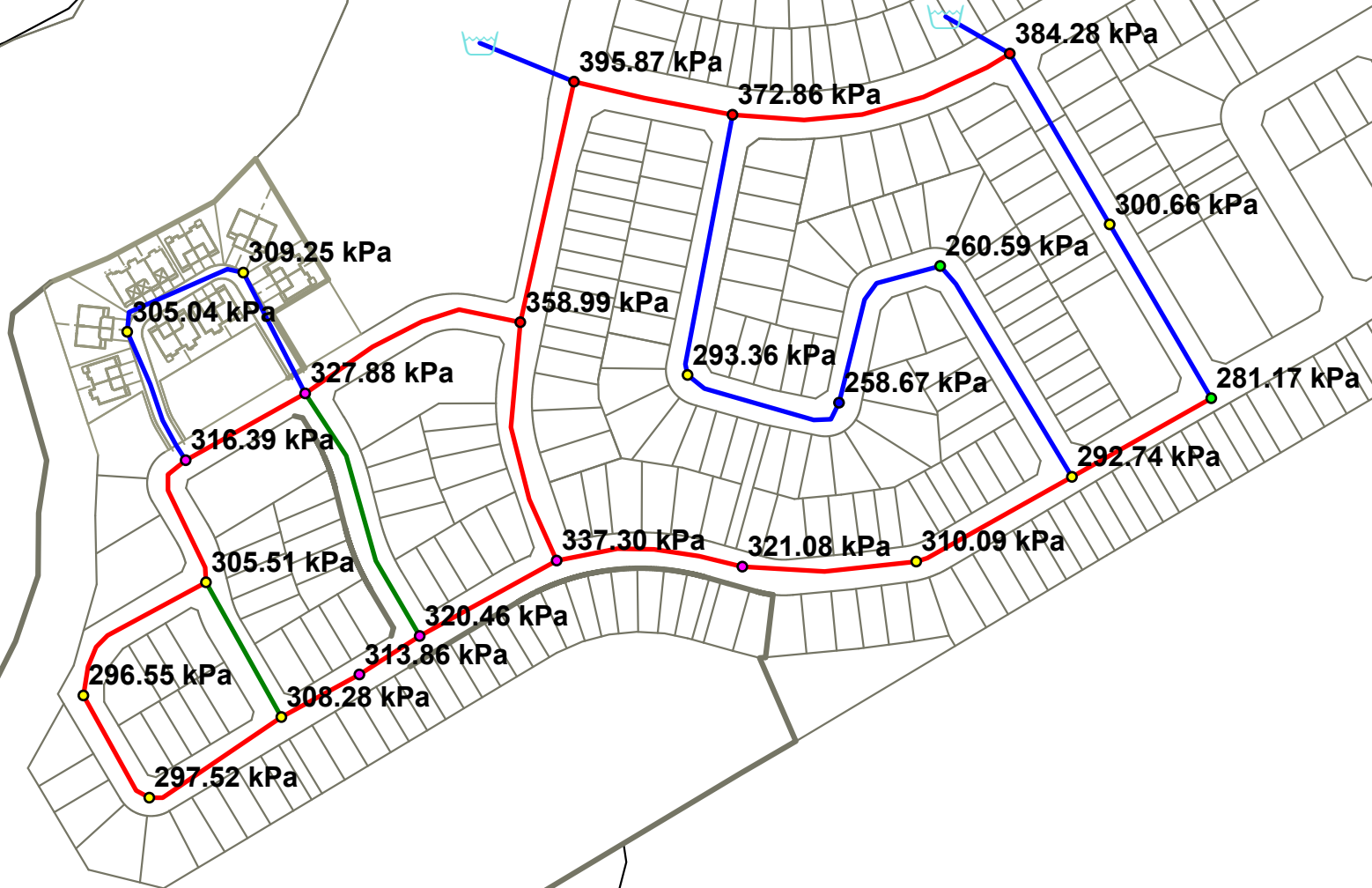




PEAK HOUR SUC ZONE RECONFIGURATION



**MAX DAY + FIRE (9,000 l/min) RESIDUAL PRESSURES SUC ZONE RECONFIGURATION**



Basic Day - Existing Conditions - Junction Report

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)	Water Age (hrs)
1	<input type="checkbox"/>	B1	0.09	97.10	155.90	576.18	0.00
2	<input type="checkbox"/>	B2	0.10	96.80	155.90	579.12	0.00
3	<input type="checkbox"/>	S15-100	0.22	102.15	155.90	526.69	0.00
4	<input type="checkbox"/>	S15-110	0.19	101.80	155.90	530.12	0.00
5	<input type="checkbox"/>	S15-120	0.19	99.60	155.90	551.68	0.00
6	<input type="checkbox"/>	S15-140	0.11	99.80	155.90	549.72	0.00
7	<input type="checkbox"/>	S15-150	0.23	100.20	155.90	545.80	0.00
8	<input type="checkbox"/>	S15-160	0.21	97.75	155.90	569.81	0.00
9	<input type="checkbox"/>	S15-180	0.26	100.30	155.90	544.83	0.00
10	<input type="checkbox"/>	S15-185	0.15	98.60	155.90	561.48	0.00
11	<input type="checkbox"/>	S6B-200	0.21	97.50	155.90	572.27	0.00
12	<input type="checkbox"/>	S6B-210	0.34	97.30	155.90	574.23	0.00
13	<input type="checkbox"/>	S6B-220	0.08	96.10	155.90	585.99	0.00
14	<input type="checkbox"/>	S6B-280	0.25	96.30	155.90	584.02	0.00
15	<input type="checkbox"/>	S6B-290	0.19	97.70	155.90	570.30	0.00
16	<input type="checkbox"/>	S6B-360	0.19	97.00	155.90	577.16	0.00
17	<input type="checkbox"/>	S6B-380	0.11	98.00	155.90	567.36	0.00
18	<input type="checkbox"/>	S6C-100	0.24	97.50	155.90	572.26	0.00
19	<input type="checkbox"/>	S6C-110	0.16	98.00	155.90	567.36	0.00
20	<input type="checkbox"/>	S6C-120	0.06	98.00	155.90	567.36	0.00
21	<input type="checkbox"/>	S6C-130	0.11	98.00	155.90	567.36	0.00
22	<input type="checkbox"/>	S6C-140	0.11	98.00	155.90	567.36	0.00
23	<input type="checkbox"/>	S6C-150	0.11	98.00	155.90	567.36	0.00



Peak Hour - Zone Reconfiguration - Junction Report

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)	Water Age (hrs)
1	<input type="checkbox"/>	B1	0.48	97.10	143.66	456.24	0.00
2	<input type="checkbox"/>	B2	0.54	96.80	143.66	459.18	0.00
3	<input type="checkbox"/>	S15-100	1.21	102.15	143.67	406.82	0.00
4	<input type="checkbox"/>	S15-110	1.06	101.80	143.66	410.23	0.00
5	<input type="checkbox"/>	S15-120	1.06	99.60	143.66	431.78	0.00
6	<input type="checkbox"/>	S15-140	0.61	99.80	143.67	429.89	0.00
7	<input type="checkbox"/>	S15-150	1.29	100.20	143.67	425.92	0.00
8	<input type="checkbox"/>	S15-160	1.14	97.75	143.68	450.04	0.00
9	<input type="checkbox"/>	S15-180	1.42	100.30	143.68	425.07	0.00
10	<input type="checkbox"/>	S15-185	0.83	98.60	143.66	441.57	0.00
11	<input type="checkbox"/>	S6B-200	1.14	97.50	143.70	452.72	0.00
12	<input type="checkbox"/>	S6B-210	1.89	97.30	143.70	454.64	0.00
13	<input type="checkbox"/>	S6B-220	0.45	96.10	143.70	466.43	0.00
14	<input type="checkbox"/>	S6B-280	1.39	96.30	143.67	464.16	0.00
15	<input type="checkbox"/>	S6B-290	1.06	97.70	143.66	450.39	0.00
16	<input type="checkbox"/>	S6B-360	1.02	97.00	143.66	457.23	0.00
17	<input type="checkbox"/>	S6B-380	0.61	98.00	143.66	447.43	0.00
18	<input type="checkbox"/>	S6C-100	1.32	97.50	143.66	452.32	0.00
19	<input type="checkbox"/>	S6C-110	0.89	98.00	143.66	447.42	0.00
20	<input type="checkbox"/>	S6C-120	0.30	98.00	143.66	447.42	0.00
21	<input type="checkbox"/>	S6C-130	0.61	98.00	143.66	447.42	0.00
22	<input type="checkbox"/>	S6C-140	0.61	98.00	143.66	447.42	0.00
23	<input type="checkbox"/>	S6C-150	0.61	98.00	143.66	447.42	0.00

Peak Hour - Zone Reconfiguration - Pipe Report

		ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/k-m)	Status	Flow Reversal Count	Water Age (hrs)
1	<input type="checkbox"/>	P57	S6C-100	B1	71.23	204.00	110.00	-0.05	0.00	0.00	0.00	Open	0	0.00
2	<input type="checkbox"/>	P53	B2	B1	72.15	204.00	110.00	0.53	0.02	0.00	0.00	Open	0	0.00
3	<input type="checkbox"/>	P61	S6B-220	CON-1	1.00	204.00	110.00	-12.83	0.39	0.00	1.27	Open	0	0.00
4	<input type="checkbox"/>	P63	S6B-200	CON-2	1.00	204.00	110.00	-8.71	0.27	0.00	0.62	Open	0	0.00
5	<input type="checkbox"/>	2003	S15-100	S15-110	80.40	250.00	110.00	2.33	0.05	0.00	0.02	Open	0	0.00
6	<input type="checkbox"/>	2005	S15-110	S15-120	89.24	250.00	110.00	2.18	0.04	0.00	0.02	Open	0	0.00
7	<input type="checkbox"/>	2015	S15-150	S15-140	96.88	204.00	110.00	-2.20	0.07	0.00	0.05	Open	0	0.00
8	<input type="checkbox"/>	2021	S15-110	S15-150	125.30	204.00	110.00	-0.91	0.03	0.00	0.01	Open	0	0.00
9	<input type="checkbox"/>	2011	S6B-210	S15-160	133.38	204.00	110.00	3.95	0.12	0.02	0.14	Open	0	0.00
10	<input type="checkbox"/>	2013	S15-140	S15-160	85.90	204.00	110.00	-2.81	0.09	0.01	0.08	Open	0	0.00
11	<input type="checkbox"/>	2001	S15-100	S15-180	101.35	204.00	110.00	-3.54	0.11	0.01	0.12	Open	0	0.00
12	<input type="checkbox"/>	P35	S15-120	S15-185	87.69	250.00	110.00	1.12	0.02	0.00	0.01	Open	0	0.00
13	<input type="checkbox"/>	2047	S6B-290	S15-185	94.82	250.00	110.00	-0.29	0.01	0.00	0.00	Open	0	0.00
14	<input type="checkbox"/>	P33	S15-180	S6B-200	99.56	204.00	110.00	-4.96	0.15	0.02	0.22	Open	0	0.00
15	<input type="checkbox"/>	1471	S6B-200	S6B-210	146.06	250.00	110.00	2.62	0.05	0.00	0.02	Open	0	0.00
16	<input type="checkbox"/>	1469	S6B-210	S6B-220	81.42	250.00	110.00	-3.22	0.07	0.00	0.04	Open	0	0.00
17	<input type="checkbox"/>	1517	S6B-290	S6B-280	124.29	250.00	110.00	-3.50	0.07	0.01	0.04	Open	0	0.00
18	<input type="checkbox"/>	1515	S6B-220	S6B-280	124.10	250.00	110.00	9.15	0.19	0.03	0.25	Open	0	0.00
19	<input type="checkbox"/>	1541	S6B-280	S6B-290	78.68	250.00	110.00	-2.73	0.06	0.00	0.03	Open	0	0.00
20	<input type="checkbox"/>	1533	S6B-280	S6B-360	120.14	250.00	110.00	4.26	0.09	0.01	0.06	Open	0	0.00
21	<input type="checkbox"/>	P55	B2	S6B-360	68.36	204.00	110.00	-1.07	0.03	0.00	0.01	Open	0	0.00
22	<input type="checkbox"/>	1519	S6B-380	S6B-360	136.30	155.00	100.00	-0.07	0.00	0.00	0.00	Open	0	0.00
23	<input type="checkbox"/>	P51	S6C-150	S6B-380	35.92	250.00	110.00	-2.19	0.04	0.00	0.02	Open	0	0.00
24	<input type="checkbox"/>	P37	S6B-360	S6C-100	68.88	250.00	110.00	2.09	0.04	0.00	0.02	Open	0	0.00
25	<input type="checkbox"/>	P39	S6C-100	S6C-110	70.09	250.00	110.00	0.83	0.02	0.00	0.00	Open	0	0.00
26	<input type="checkbox"/>	P43	S6C-110	S6C-120	89.78	250.00	110.00	0.14	0.00	0.00	0.00	Open	0	0.00
27	<input type="checkbox"/>	P45	S6C-130	S6C-120	62.22	250.00	110.00	0.16	0.00	0.00	0.00	Open	0	0.00
28	<input type="checkbox"/>	P41	S6C-110	S6C-140	77.62	155.00	100.00	-0.20	0.01	0.00	0.00	Open	0	0.00
29	<input type="checkbox"/>	P47	S6C-130	S6C-140	78.88	250.00	110.00	-0.77	0.02	0.00	0.00	Open	0	0.00
30	<input type="checkbox"/>	P49	S6C-140	S6C-150	44.68	250.00	110.00	-1.58	0.03	0.00	0.01	Open	0	0.00

Max Day + Fire (9,000 l/min) - Zone Reconfiguration - Fireflow Design Report

		ID	Total Demand (L/s)	Available Flow at Hydrant (L/s)	Critical Node ID	Critical Node Pressure (kPa)	Critical Node Head (m)	Design Flow (L/s)	Design Pressure (kPa)	Design Fire Node Pressure (kPa)
1	<input type="checkbox"/>	B1	150.22	273.80	B1	139.96	111.38	273.80	139.96	139.97
2	<input type="checkbox"/>	B2	150.25	277.95	B2	139.96	111.08	277.95	139.96	139.97
3	<input type="checkbox"/>	S15-100	167.22	328.67	S15-100	139.96	116.43	328.67	139.96	139.97
4	<input type="checkbox"/>	S15-110	167.15	361.64	S15-110	139.96	116.08	361.64	139.96	139.97
5	<input type="checkbox"/>	S15-120	167.15	365.91	S15-120	139.96	113.88	365.91	139.96	139.97
6	<input type="checkbox"/>	S15-140	166.95	253.20	S15-140	139.96	114.08	253.20	139.96	139.96
7	<input type="checkbox"/>	S15-150	167.26	259.32	S15-150	139.96	114.48	259.32	139.96	139.96
8	<input type="checkbox"/>	S15-160	167.19	288.50	S15-160	139.96	112.03	288.50	139.96	139.96
9	<input type="checkbox"/>	S15-180	167.32	347.07	S15-180	139.96	114.58	347.07	139.96	139.96
10	<input type="checkbox"/>	S15-185	167.05	379.84	S15-185	139.96	112.88	379.84	139.96	139.97
11	<input type="checkbox"/>	S6B-200	167.19	3,009.25	S6B-200	140.00	111.79	3,009.47	139.96	139.96
12	<input type="checkbox"/>	S6B-210	167.53	810.88	S6B-210	139.96	111.58	810.88	139.96	139.96
13	<input type="checkbox"/>	S6B-220	166.88	3,080.31	S6B-220	140.00	110.39	3,080.54	139.96	139.92
14	<input type="checkbox"/>	S6B-280	167.30	487.03	S6C-110	134.58	111.73	481.14	139.96	145.64
15	<input type="checkbox"/>	S6B-290	167.15	423.40	S6B-290	139.96	111.98	423.40	139.96	139.98
16	<input type="checkbox"/>	S6B-360	167.14	361.99	S6B-360	139.96	111.28	361.99	139.96	139.98
17	<input type="checkbox"/>	S6B-380	166.95	361.71	S6B-380	139.96	112.28	361.71	139.96	139.98
18	<input type="checkbox"/>	S6C-100	167.27	338.41	S6C-100	139.96	111.78	338.41	139.96	139.97
19	<input type="checkbox"/>	S6C-110	167.08	319.10	S6C-110	139.96	112.28	319.10	139.96	139.97
20	<input type="checkbox"/>	S6C-120	166.81	299.05	S6C-120	139.96	112.28	299.05	139.96	139.97
21	<input type="checkbox"/>	S6C-130	166.95	301.15	S6C-130	139.96	112.28	301.15	139.96	139.97
22	<input type="checkbox"/>	S6C-140	166.95	325.78	S6C-140	139.96	112.28	325.78	139.96	139.97
23	<input type="checkbox"/>	S6C-150	166.95	340.91	S6C-150	139.96	112.28	340.91	139.96	139.97

# **APPENDIX C**

Sanitary Sewer Design Sheet  
125506-400 - Sanitary Drainage Plan  
Pathways Phase 2 Sanitary Design Sheet  
Pathways Phase 2 Sanitary Drainage Area Plan







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**SANITARY SEWER DESIGN SHEET**

Pathways at Findlay Creek Phase 2  
 CITY OF OTTAWA  
 Regional Group

LOCATION				RESIDENTIAL										ICI AREAS								INFILTRATION ALLOWANCE				FIXED FLOW (L/s)		TOTAL FLOW (L/s)	PROPOSED SEWER DESIGN					
STREET	AREA ID	FROM MH	TO MH	AREA w/ Units (Ha)	UNIT TYPES				AREA w/o Units (Ha)	POPULATION		RES PEAK FACTOR	PEAK FLOW (L/s)	INSTITUTIONAL		COMMERCIAL		INDUSTRIAL		ICI PEAK FACTOR	PEAK FLOW (L/s)	AREA (Ha)		FLOW (L/s)	IND	CUM	TOTAL FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	DIA (mm)	SLOPE (%)	VELOCITY (full) (m/s)	AVAILABLE CAPACITY	
					SF	SD	TH	APT		IND	CUM			IND	CUM	IND	CUM	IND	CUM			IND	CUM										L/s	IND
Wabikon Crescent	MH6070A	MH6070A	MH6071A	0.28			7			18.9	18.9	3.71	0.23	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.28	0.28	0.09	0.00	0.00	0.32	27.59	35.86	200	0.65	0.851	27.27	98.84%
Wabikon Crescent	MH6071A	MH6071A	MH6072A	0.31			9			24.3	43.2	3.66	0.51	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.31	0.59	0.19	0.00	0.00	0.71	20.24	48.19	200	0.35	0.624	19.54	96.51%
Wabikon Crescent	MH6072A	MH6072A	MH6073A	0.37			10			27.0	70.2	3.63	0.82	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.37	0.96	0.32	0.00	0.00	1.14	20.24	35.65	200	0.35	0.624	19.10	94.36%
Wabikon Crescent	MH6073A	MH6073A	MH6074A	0.15			2			5.4	75.6	3.62	0.89	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.15	1.11	0.37	0.00	0.00	1.25	20.24	13.11	200	0.35	0.624	18.99	93.81%
Wabikon Crescent	MH6074A	MH6074A	MH6075A	0.88			27			72.9	148.5	3.55	1.71	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.88	1.99	0.66	0.00	0.00	2.37	20.24	115.32	200	0.35	0.624	17.88	88.31%
Wabikon Crescent	MH6075A	MH6075A	MH6076A	0.17			3			8.1	156.6	3.55	1.80	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.17	2.16	0.71	0.00	0.00	2.51	20.24	16.03	200	0.35	0.624	17.73	87.58%
Wabikon Crescent	MH6076A	MH6076A	MH6080A						0.06	0.0	156.6	3.55	1.80	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.06	2.22	0.73	0.00	0.00	2.53	20.24	41.03	200	0.35	0.624	17.71	87.49%
Miikana	MH6079A	MH6079A	MH6080A	0.80			21			56.7	56.7	3.64	0.67	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.80	0.80	0.26	0.00	0.00	0.93	30.60	99.58	200	0.80	0.944	29.67	96.95%
Miikana	MH6080A	MH6080A	MH6081A	0.92			25			67.5	280.8	3.47	3.16	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.92	3.94	1.30	0.00	0.00	4.46	45.12	118.42	300	0.20	0.618	40.66	90.11%
Miikana	MH6081A	MH6081A	MH6082A	0.19			3			8.1	288.9	3.47	3.25	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.19	4.13	1.36	0.00	0.00	4.61	45.12	33.86	300	0.20	0.618	40.51	89.78%
Miikana	MH6082A	MH6082A	MH6083A	0.83			27			72.9	361.8	3.43	4.03	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.83	4.96	1.64	0.00	0.00	5.66	45.12	95.47	300	0.20	0.618	39.45	87.45%
Miikana	MH6083A	MH6083A	XBLK6105AV	0.70			23			62.1	423.9	3.41	4.68	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.70	5.66	1.87	0.00	0.00	6.55	45.12	92.36	300	0.20	0.618	38.57	85.48%
Gartersnake Way	EXT-6	BLK6018A	MH6018A	1.88	12					108.3	108.3	3.59	1.26	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.88	1.88	0.62	0.00	0.00	1.88	20.24	20.00	200	0.35	0.624	18.36	90.72%
Place Ninaatik	MH6021A	MH6021A	MH6022A	0.49	8					27.2	27.2	3.69	0.33	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.49	0.49	0.16	0.00	0.00	0.49	41.91	52.92	200	1.50	1.292	41.42	98.84%
Place Ninaatik	MH6022A	MH6022A	MH6018A	0.12	1					3.4	30.6	3.68	0.37	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.12	0.61	0.20	0.00	0.00	0.57	20.24	47.03	200	0.35	0.624	19.68	97.20%
Future Private Road	BLK6018NA	BLK6018NA	MH6018A	0.93			22			59.4	59.4	3.64	0.70	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.93	0.93	0.31	0.00	0.00	1.01	20.24	41.00	200	0.35	0.624	19.24	95.02%
Gartersnake Way	MH6025A	MH6025A	MH6026A	0.16			3			8.1	236.1	3.50	2.68	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.16	4.01	1.32	0.00	0.00	4.00	20.24	35.84	200	0.35	0.624	16.24	80.25%
Paakanaak Avenue	EXT-5	BLK6003A	MH6003A	1.40	22					74.8	74.8	3.62	0.88	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.40	1.40	0.46	0.00	0.00	1.34	20.24	20.00	200	0.35	0.624	18.90	93.38%
Paakanaak Avenue	MH6003A	MH6003A	MH6004A	0.47	8					27.2	102.0	3.59	1.19	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.47	1.87	0.62	0.00	0.00	1.80	20.24	58.90	200	0.35	0.624	18.44	91.08%
Paakanaak Avenue	MH6004A	MH6004A	MH6008A	0.13	2					6.8	108.8	3.59	1.26	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.13	2.00	0.66	0.00	0.00	1.92	20.24	19.95	200	0.35	0.624	18.32	90.49%
Paakanaak Avenue	EXT-1	BLK6005A	BLK6005A	2.18	35					119.0	119.0	3.58	1.38	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	2.18	2.18	0.72	0.00	0.00	2.10	20.24	0.01	200	0.35	0.624	18.14	89.63%
Paakanaak Avenue	MH6005A	BLK6005A	MH6006A	0.13	2					6.8	125.8	3.57	1.46	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.13	2.31	0.76	0.00	0.00	2.22	20.24	15.82	200	0.35	0.624	18.02	89.04%
Paakanaak Avenue	MH6006A	MH6006A	MH6007A	0.35	5					17.0	142.8	3.56	1.65	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.35	2.66	0.88	0.00	0.00	2.52	20.24	38.14	200	0.35	0.624	17.72	87.53%
Paakanaak Avenue	MH6007A	MH6007A	MH6008A	0.18	3					10.2	153.0	3.55	1.76	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.18	2.84	0.94	0.00	0.00	2.70	20.24	27.36	200	0.35	0.624	17.55	86.67%
Miikana Road	MH6008A	MH6008A	MH6030A	0.34	4					13.6	275.4	3.48	3.10	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.34	5.18	1.71	0.00	0.00	4.81	41.91	68.18	200	1.50	1.292	37.10	88.52%
Miikana Road	MH6030A	MH6030A	MH6031A	0.18	3					10.2	285.6	3.47	3.21	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.18	5.36	1.77	0.00	0.00	4.98	40.49	23.29	200	1.40	1.248	35.51	87.70%
Miikana Road	MH6031A	MH6031A	MH6032A	0.14	3					10.2	295.8	3.46	3.32	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.14	5.50	1.82	0.00	0.00	5.14	20.24	34.19	200	0.35	0.624	15.11	74.63%
Miikana Road	MH6032A	MH6032A	MH6033A	0.30	5					17.0	548.9	3.36	5.98	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.30	9.81	3.24	0.00	0.00	9.22	20.24	62.82	200	0.35	0.624	11.02	54.46%
Miikana Road	MH6033A	MH6033A	MH6050A	0.29	4					13.6	562.5	3.36	6.12	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.29	10.10	3.33	0.00	0.00	9.45	20.24	62.82	200	0.35	0.624	10.79	53.30%
Ginebik Way	EXT-2	BLK6037A	BLK6037A	2.60	44					149.6	149.6	3.55	1.72	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	2.60	2.60	0.86	0.00	0.00	2.58	20.24	0.01	200	0.35	0.624	17.66	87.25%
Ginebik Way	BLK6037A	BLK6037A	MH6038A	0.49	8					27.2	176.8	3.53	2.02	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.49	0.49	0.16	0.00	0.00	2.19	20.24	53.10	200	0.35	0.624	18.06	89.20%
Ginebik Way	MH6038A	MH6038A	MH6051A	0.37	6					20.4	197.2	3.52	2.25	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.37	0.86	0.28	0.00	0.00	2.53	20.24	60.90	200	0.35	0.624	17.71	87.48%
Dun Skipper	MH6052A-1	MH6052A-1	MH6051A	0.51	8					27.2	27.2	3.69	0.33	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.51	0.51	0.17	0.00	0.00	0.49	48.39	69.23	200	2.00	1.492	47.90	98.98%
Dun Skipper	MH6051A	MH6051A	MH6050A	0.26	3					10.2	234.6																							







# APPENDIX D

Storm Sewer Design Sheet  
125506-500 - Storm Drainage Plan  
125506-600 - Ponding Plan  
Pathways Phase 2 Storm Design Sheet  
Pathways Phase 2 Storm Drainage Area Plan  
Pathways Phase 3 Storm Drainage Area Plan  
Pathways Phase 3 Excerpt Table 5.4 SWM Criteria  
Modified Rational Method on-site SWM calculations  
On-site Underground Storage System  
Storm HGL Calculations  
Pathways Phase 2 HGL Reference



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**STORM SEWER DESIGN SHEET**

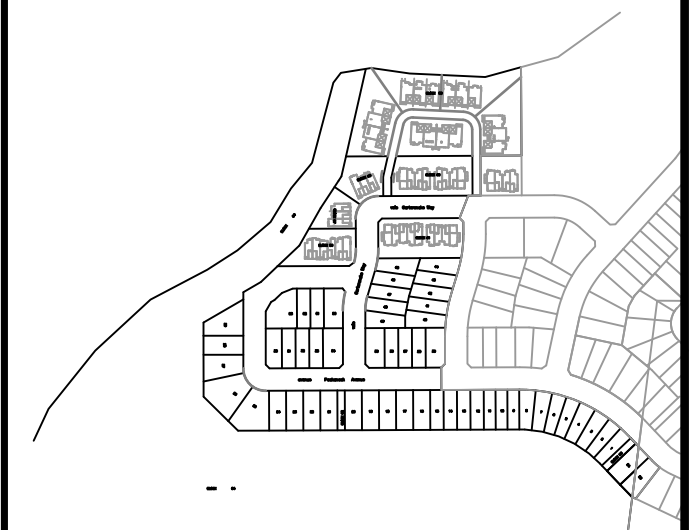
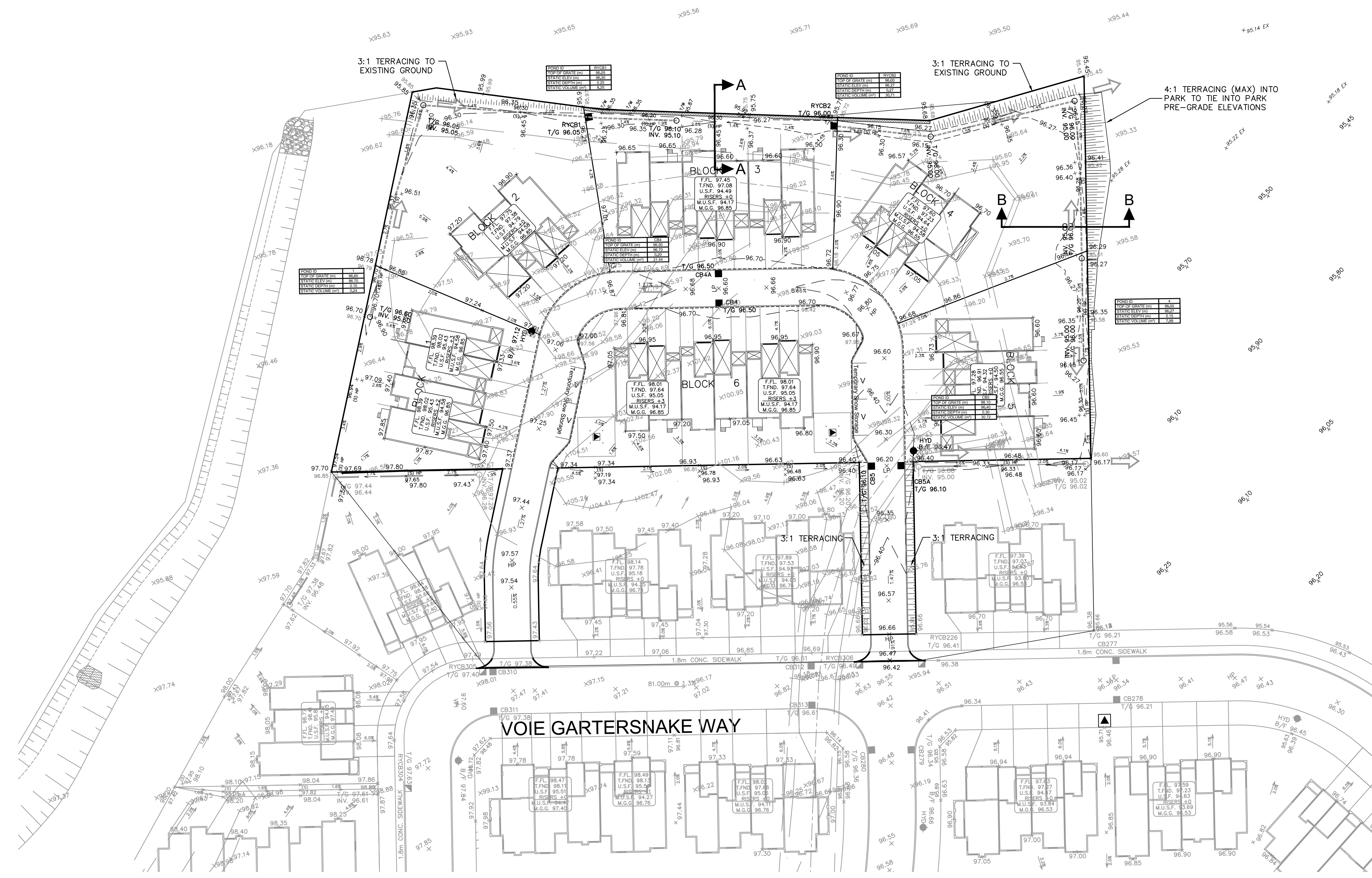
Pathways Phase 3 - Block 60  
 City of Ottawa  
 Leitrim South Holdings Ltd.

LOCATION				AREA (Ha)											RATIONAL DESIGN FLOW														SEWER DATA																	
STREET	AREA ID	FROM	TO	C=	C=	C=	C=	C=	C=	C=	C=	C=	C=	IND	CUM	INLET	TIME	TOTAL	i (2)	i (5)	i (10)	i (100)	2yr PEAK	5yr PEAK	10yr PEAK	100yr PEAK	FIXED FLOW		DESIGN	CAPACITY	LENGTH	PIPE SIZE (mm)			SLOPE	VELOCITY	AVAIL CAP (2yr)									
				0.20	0.25	0.40	0.50	0.57	0.65	0.69	0.70	0.76	0.80	2.78AC	2.78AC	(min)	IN PIPE	(min)	(mm/hr)	(mm/hr)	(mm/hr)	(mm/hr)	FLOW (L/s)	FLOW (L/s)	FLOW (L/s)	FLOW (L/s)	IND	CUM	FLOW (L/s)			(L/s)	(m)	DIA			W	H	(%)	(m/s)	(L/s)	(%)				
EQ Block 60		MH1	MH2											0.00	0.00	10.00	0.82	10.82	76.81	104.19	122.14	178.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.62	40.28	250				0.45	0.821	41.62	100.00%							
EQ Block 60		MH2	MH3											0.00	0.00	10.82	0.18	10.99	73.80	100.06	117.28	171.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.62	8.70	250				0.45	0.821	41.62	100.00%							
EQ Block 60		MH3	MH4					0.19						1.00	1.00	10.99	0.82	11.81	73.19	99.22	116.29	169.96	73.06	99.05	116.09	169.67	125.00	125.00	73.06	139.51	41.60	450				0.22	0.850	66.44	47.63%							
EQ Block 60		MH4	MH5					0.19						0.30	1.30	11.81	0.19	12.00	70.49	95.52	111.92	163.55	91.59	124.11	145.43	212.51	35.00	160.00	91.59	139.51	9.68	450				0.22	0.850	47.91	34.35%							
EQ Block 60		MH5	EXBLKHDN											0.30	1.60	12.00	0.96	12.96	69.89	94.70	110.96	162.14	111.49	151.06	177.00	258.63	25.00	185.00	111.49	248.09	48.86	600				0.15	0.850	136.59	55.06%							
								0.38						1.60	TRUE																															
														A=	0.85																															
														Avg C=	0.68																															
		EXBLKHDN	EXMH6018											0.00	1.60	12.96	0.26	13.22	67.05	90.79	106.37	155.39	106.96	144.83	169.67	247.87	0.00	0.00	106.96	248.09	13.18	600				0.15	0.850	141.13	56.89%							
		EXMH6311	EXBLKHDW											0.00	0.00	0.00	0.44	0.44	167.22	230.48	271.61	398.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	640.56	58.39	600				1.00	2.195	640.56	100.00%							
Gartersnake Way		EXBLKHDW	EXMH6018											0.00	0.00	0.44	0.15	0.60	158.12	217.59	256.29	376.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	640.56	19.98	600				1.00	2.195	640.56	100.00%							
Ninaatik Place		EXMH6022	EXMH6018											0.00	0.00	0.60	0.89	1.49	155.25	213.54	251.48	368.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	264.11	48.57	600				0.17	0.905	264.11	100.00%							
		EXMH6018	EXMH6025											0.00	1.60	0.00	1.23	1.23	167.22	230.48	271.61	398.62	266.75	367.66	433.26	635.86	0.00	0.00	266.75	654.22	73.59	900				0.12	0.996	387.48	59.23%							
<b>Definitions:</b> 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 = 732.951 / (TC+6.199)^0.810] 2 YEAR [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				<b>Notes:</b> 1. Mannings coefficient (n) = 0.013											<b>Designed:</b> RM											<b>No.</b> 1.							<b>Revision</b> Design Brief - Submission No. 1							<b>Date</b> 2021-05-10						
				<b>Checked:</b> DY											<b>Dwg. Reference:</b> 125506-500																															
																										<b>File Reference:</b> 125506-6.04.04							<b>Date:</b> 2021-05-10							<b>Sheet No:</b> 1 of 1						





A:\125506\_Planwork\125506\_Ponding\125506\_Ponding\_Plan.dwg Plot Scale: 1:25.4 Plotted At: 2021-08-11 Unit: Scaled By: mmbur Unit Scaled At: 2021-08-10



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1	SUBMISSION No.1 FOR CITY REVIEW	D.G.V.	2021-05-13
No.	REVISIONS	By	Date

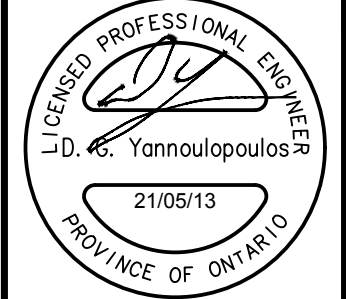
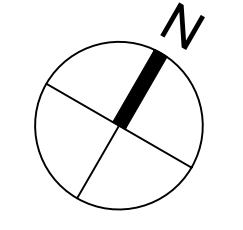
**LEITRIM SOUTH HOLDINGS INC.**

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Project Title

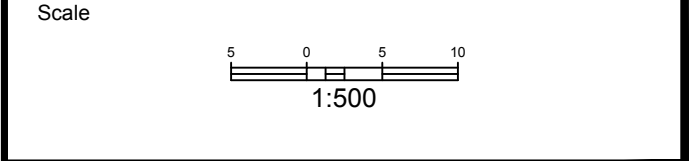


at FINDLAY CREEK  
 BLOCK 60

Drawing Title

**PONDING PLAN**



Design	R.M.	Date	OCTOBER 2020
Drawn	M.M.	Checked	K.H.
Project No.	125506	Drawing No.	600

XXX-XX-XXXX

#XXXXX







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**LEGEND**

Black text 2 year event curve design  
 Red text 5 year event curve design (Mikana Road, Dun Skipper Drive)  
 Blue text 100 year even curve design (DI 1)  
 EXBLK3171 Existing infrastructure, shown for information only

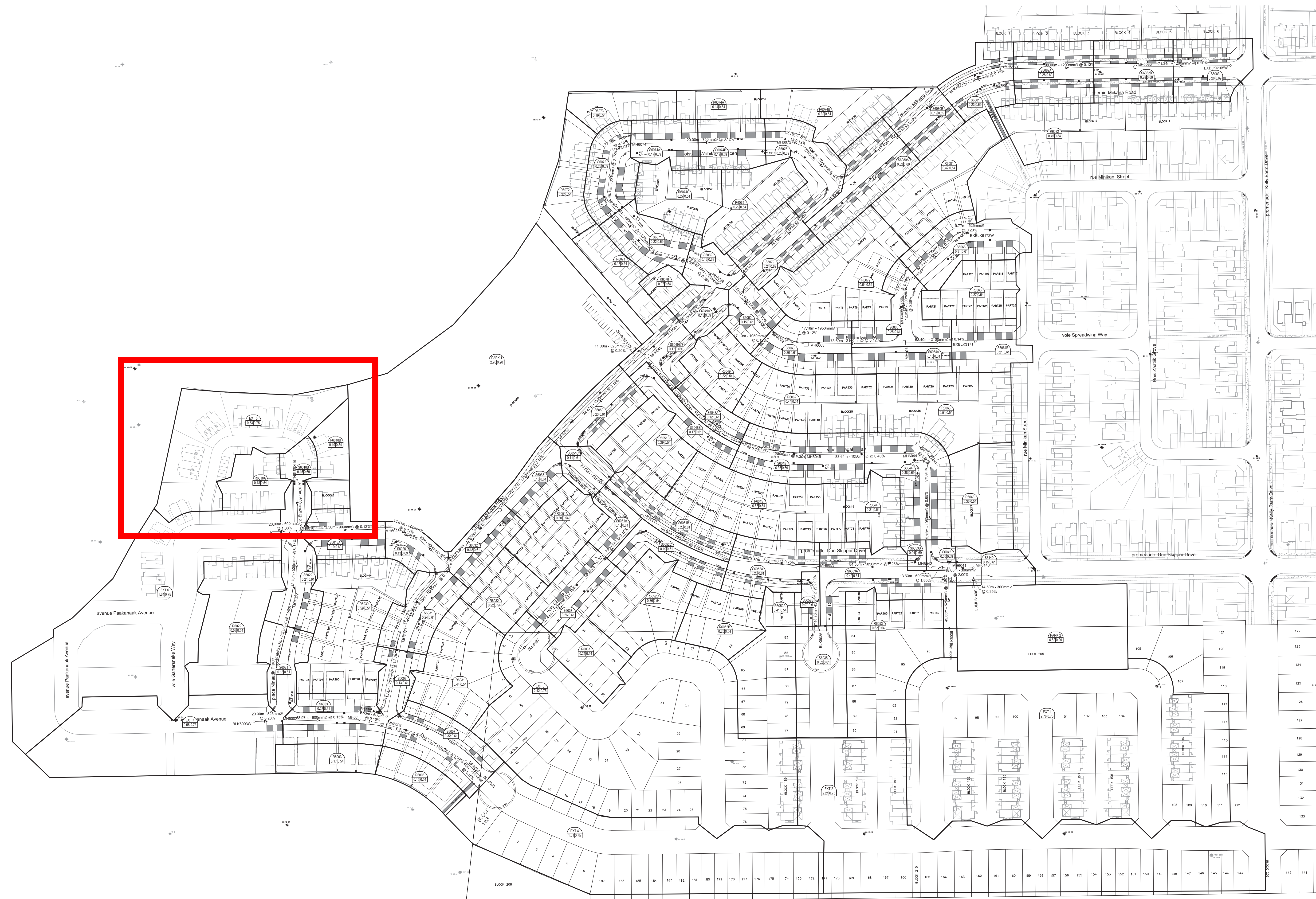
**STORM SEWER DESIGN SHEET**

Pathways at Findlay Creek Phase 2  
 City of Ottawa  
 Regional Group

STREET	LOCATION			AREA (Ha)										RATIONAL DESIGN FLOW										SEWER DATA														
	AREA ID	FROM	TO	C=0.20	C=0.25	C=0.40	C=0.50	C=0.54	C=0.61	C=0.69	C=0.70	C=0.75	C=0.80	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	2yr PEAK FLOW (L/s)	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 (2yr)		
																														DIA	W	H			(L/s)	(%)		
Omagaki	S6042	MH6042	MH6043										0.05	0.10	11.50	16.70	0.49	17.18	58.03	78.45	91.84	134.08	667.28				953.44	2,296.77	75.12	1050				0.65	2.570	1343.33	58.49%	
Omagaki		MH6042	MH6043											0.00	3.52	15.69	0.49	16.18	60.19	81.40	95.31	139.17	286.16				953.44	2,296.77	75.12	1050				0.65	2.570	1343.33	58.49%	
Omagaki	R6043	MH6043	MH6044					0.36						0.54	12.04	17.18	0.09	17.28	57.05	77.10	90.26	131.76	686.82				967.87	2,296.77	13.96	1050				0.65	2.570	1328.90	57.86%	
Omagaki		MH6043	MH6044											0.00	3.52	16.18	0.09	16.27	59.13	79.94	93.60	136.66	281.04				967.87	2,296.77	13.96	1050				0.65	2.570	1328.90	57.86%	
Omagaki	S6044, R6044	MH6044	MH6045					0.21		0.38				1.04	13.08	17.28	0.69	17.97	56.87	76.86	89.98	131.34	744.06				1,024.18	1,801.74	83.64	1050				0.40	2.016	777.56	43.16%	
Omagaki		MH6044	MH6045											0.00	3.52	16.27	0.69	16.96	58.93	79.68	93.29	136.20	280.12				1,024.18	1,801.74	83.64	1050				0.40	2.016	777.56	43.16%	
Omagaki	S6045, R6045	MH6045	MH6046					0.57		0.36				1.55	14.63	17.97	0.32	18.29	55.55	75.05	87.85	128.23	812.66				1,085.90	1,560.35	33.53	1050				0.30	1.746	474.45	30.41%	
Omagaki		MH6045	MH6046											0.00	3.52	16.96	0.32	17.28	57.50	77.72	90.99	132.83	273.24				1,085.90	1,560.35	33.53	1050				0.30	1.746	474.45	30.41%	
Omagaki		MH6046	MH6047											0.00	14.63	18.29	0.32	18.60	54.96	74.25	86.91	126.84	804.04				1,074.23	1,560.35	33.15	1050				0.30	1.746	486.12	31.15%	
Omagaki		MH6046	MH6047											0.00	3.52	17.28	0.32	17.59	56.87	76.85	89.97	131.33	270.19				1,074.23	1,560.35	33.15	1050				0.30	1.746	486.12	31.15%	
Omagaki		MH6047	MH6048											0.00	14.63	18.60	0.25	18.85	54.39	73.47	86.00	125.50	795.72				1,062.96	2,014.40	33.53	1050				0.50	2.254	951.44	47.23%	
Omagaki		MH6047	MH6048											0.00	3.52	17.59	0.25	17.84	56.25	76.02	88.99	129.89	267.24				1,062.96	2,014.40	33.53	1050				0.50	2.254	951.44	47.23%	
Omagaki	S6048A-B	MH6048	MH6049							0.29				0.56	15.19	18.85	0.33	19.18	53.96	72.86	85.30	124.47	819.35				1,084.33	2,014.40	44.78	1050				0.50	2.254	930.07	46.17%	
Omagaki		MH6048	MH6049											0.00	3.52	17.84	0.33	18.17	55.78	75.37	88.23	128.78	264.98				1,084.33	2,014.40	44.78	1050				0.50	2.254	930.07	46.17%	
PARK	PARK 1	BLK6049	MH6049	2.70										1.50	1.50	10.00	0.20	10.20	76.81	104.19	122.14	178.56	115.30	156.41				115.30	200.65	11.00	525				0.20	0.898	85.35	42.54%
Mikana		MH6049	MH6060											0.00	37.02	19.27	0.77	20.04	53.24	71.90	84.14	122.78	1,970.63				2,750.11	4,644.39	81.99	1800				0.15	1.768	1894.29	40.79%	
Mikana	S6049A-B, R6049	MH6049	MH6060					0.22		0.30				0.91	10.84	19.27	0.77	20.04	53.24	71.90	84.14	122.78	779.47				2,750.11	4,644.39	81.99	1800				0.15	1.768	1894.29	40.79%	
Spreadwing	S6060	MH6060	MH6061						0.15					0.25	37.27	20.04	0.42	20.46	51.96	70.16	82.10	119.79	1,936.71				2,697.33	5,142.48	41.59	1950				0.12	1.668	2445.15	47.55%	
Spreadwing		MH6060	MH6061											0.00	10.84	20.04	0.42	20.46	51.96	70.16	82.10	119.79	760.63				2,697.33	5,142.48	41.59	1950				0.12	1.668	2445.15	47.55%	
Spreadwing		MH6061	MH6062											0.00	37.27	20.46	0.17	20.63	51.31	69.26	81.05	118.25	1,912.22				2,663.13	5,142.48	17.10	1950				0.12	1.668	2479.35	48.21%	
Spreadwing		MH6061	MH6062											0.00	10.84	20.46	0.17	20.63	51.31	69.26	81.05	118.25	750.91				2,663.13	5,142.48	17.10	1950				0.12	1.668	2479.35	48.21%	
Spreadwing	R6062	MH6062	MH6063					0.44						0.66	37.93	20.63	0.17	20.80	51.04	68.90	80.62	117.62	1,936.06				2,683.06	5,142.48	17.18	1950				0.12	1.668	2459.43	47.83%	
Spreadwing		MH6062	MH6063											0.00	10.84	20.63	0.17	20.80	51.04	68.90	80.62	117.62	746.99				2,683.06	5,142.48	17.18	1950				0.12	1.668	2459.43	47.83%	
Spreadwing	S6063, R6063	MH6063	MH6064					0.51	0.26					1.21	39.14	20.80	0.70	21.50	50.78	68.54	80.20	117.01	1,987.35				2,730.46	6,266.12	73.60	2100				0.12	1.753	3535.66	56.43%	
Spreadwing		MH6063	MH6064											0.00	10.84	20.80	0.70	21.50	50.78	68.54	80.20	117.01	743.10				2,730.46	6,266.12	73.60	2100				0.12	1.753	3535.66	56.43%	
Spreadwing	S6064A-B	MH6064	EXBLK3171											0.61	39.75	21.50	0.47	21.97	49.74	67.12	78.53	114.56	1,976.94				2,704.64	6,768.18	53.01	2100				0.14	1.893	4063.54	60.04%	
Spreadwing		MH6064	EXBLK3171											0.00	10.84	21.50	0.47	21.97	49.74	67.12	78.53	114.56	727.70				2,704.64	6,768.18	53.01	2100				0.14	1.893	4063.54	60.04%	
Spreadwing		EXBLK3171	MH6171											0.00	39.75	21.97	0.36	22.32	49.07	66.21	77.46	112.99	1,950.36				2,668.18	6,768.18	40.39	2100				0.14	1.893	4099.99	60.58%	
Spreadwing		EXBLK3171	MH6171											0.00	10.84	21.97	0.36	22.32	49.07	66.21	77.46	112.99	717.82				2,668.18	6,768.18	40.39	2100				0.14	1.893	4099.99	60.58%	
Viceroy	S6065	MH6065	MH6066						0.25					0.42	0.42	10.00	0.26	10.26	76.81	104.19	122.14	178.56	32.56				32.56	60.53	12.95	300				0.36	0.830	27.97	46.21%	
Viceroy	R6066	MH6066	MH6067											0.41	0.83	10.26	0.24	10.50	75.82	102.84	120.55	176.21	62.88				62.88	96.79	12.33	375				0.28	0.849	33.91	35.04%	
Viceroy		MH6067	MH6068						0.31					0.53	1.35	10.50	0.97	11.47	74.93	101.61	119.10	174.09	101.53				101.53	148.72	52.48	450				0.25	0.906	47.19	31.73%	
Viceroy	S6068	MH6068	EXBLK6172W											0.00	1.35	11.47	0.16	11.63	71.59	97.03	113.71	166.17	97.01				97.01	210.44	8.99	525				0.22	0.942	113.43	53.90%	
Viceroy		EXBLK6172W	MH6172											0.00	1.35	11.63	0.72	12.35	71.08	96.32	112.87	164.94	96.31				96.31	210.44	40.78	525				0.22	0.942	114.13	54.24%	
Wabikon	S6069	MH6069																																				

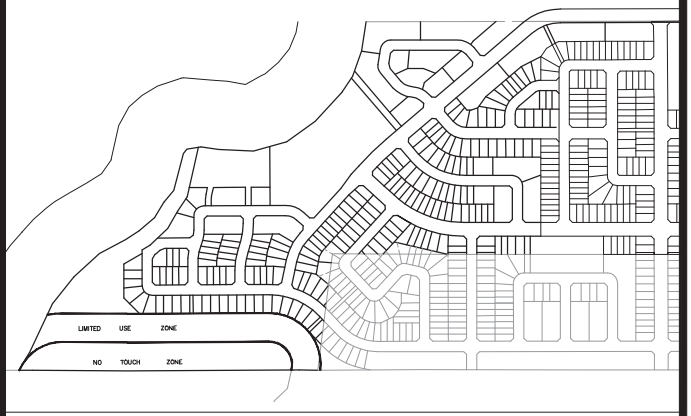


J:\33956-remenovb\5.9\_avepaak\5\plan\layouts\p2\1500\_STORM\_DRAINAGE\_PLAN.dwg Layout Name: 510 Plot Size: AIA STANDARD-HALF CTB Plot Scale: 1:500 Printed At: 9/9/2019 4:27 PM Last Saved By: mmhine Last Saved At: Feb. 27, 19



**LEGEND:**

	AREA NUMBER
	RUNOFF COEFFICIENT
	AREA IN HECTARES
	AREA BOUNDARY



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3	SUBMISSION No. 3 FOR CITY REVIEW	J.I.M.	2019.09.10
2	SUBMISSION No. 2 FOR CITY REVIEW	J.I.M.	2019.07.17
1	SUBMISSION No. 1 FOR CITY REVIEW	J.I.M.	2019.02.28
No.	REVISIONS	By	Date

**LEITRIM SOUTH HOLDINGS INC.**

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Project Title

pathways  
at FINDLAY CREEK  
PHASE 2

**Drawing Title**

**STORM DRAINAGE AREA PLAN**

Scale 1 : 1000

Design	K.H.	Date	FEBRUARY 2019
Drawn	M.M.	Checked	J.I.M.
Project No.	33956	Drawing No.	510

D07-16-03-0018PH2







DRAINAGE AREA ID	CONTINUOUS /SAG <sup>(1)(2)</sup>	ROAD TYPE	MINOR SYSTEM DESIGN TARGET (BASED ON ROAD TYPE)		ICD (L/S)	NOTES
			MINOR SYSTEM DESIGN STORM	GENERATED FLOW ON INDIVIDUAL SEGMENT SIMULATED (L/S)		
<b>Total restricted flow (ICD flow) - Street Segments (L/s)</b>					<b>190</b>	
<b>Rear Yards Segments</b>						
R6300	Rear Yard	Rear Yard	2	14	16	
R6301	Rear Yard	Rear Yard	2	22	22	
R6302	Rear Yard	Rear Yard	2	16	17	
R6306	Rear Yard	Rear Yard	2	21	22	
R6309	Rear Yard	Rear Yard	2	7	17	
R6311A	Rear Yard	Rear Yard	2	13	17	
R6311B	Rear Yard	Rear Yard	2	20	26	
<b>Total restricted flow (ICD flow) – Rear Yard Segments (L/s)</b>					<b>137</b>	

(1) Capture on continuous grade is limited to capacity of grate.

(2) The minor flow restriction has been increased in sags to allow full capture of overflow from upstream segments on continuous grade during the design storm event without ponding.

For external development north of Phase 3 Pathways at Findlay Creek which will require a separate site stormwater design and analysis, the following table summarizes the assumed inflow rate and minimum on-site storage required for their design.

**Table 5.4 Summary of Minimum On-Site Storage and Minor System Inflow Rate for External Development Lands North of Phase 3 Pathways**

DRAINAGE AREA ID	AREA (HA)	LAND USE	IMP RATIO	MINIMUM ON-SITE STORAGE REQUIRED (CU-M)*	MINOR SYSTEM INFLOW RATE (L/S)
EXT5	0.86	Residential	0.94	54.2	187

\* The on-site storage noted was used to evaluate the areas in Phase 2 Pathways. As a minimum this on-site storage should be provided.

The storage available on-site and its maximum depth and the results of the DDSWMM evaluation for the subject site are presented in **Table 5.5**. The ponding plan for the subject site is presented on **Drawing 33956-620**. The DDSWMM output files are presented in **Appendix E**.

**Table 5.5 Summary of On-Site Storage during the Target Minor System Design Storm**

DRAINAGE AREA ID	MINOR SYSTEM DESIGN STORM	AVAILABLE STATIC STORAGE (CU-M)	TOTAL STORAGE USED (CU-M)	OVERFLOW (L/S)
S6302	2	5.53	0.00	0.00
S6305	2	33.79	0.00	0.00
S6306	2	6.32	0.00	0.00

The results of the on-site detention analysis show that during the restricted inflow rate of the 2 year storm event, there is no ponding on the subject site.



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**PROJECT:** PROJECT  
**DATE:** 2021-05-10  
**FILE:** 125506-6.4.4  
**REV #:** -  
**DESIGNED BY:** RM  
**CHECKED BY:** RM

## STORMWATER MANAGEMENT

### Formulas and Descriptions

$$i_{2yr} = 1:2 \text{ year Intensity} = 732.951 / (T_c + 6.199)^{0.810}$$

$$i_{5yr} = 1:5 \text{ year Intensity} = 998.071 / (T_c + 6.053)^{0.814}$$

$$i_{100yr} = 1:100 \text{ year Intensity} = 1735.688 / (T_c + 6.014)^{0.820}$$

$T_c$  = Time of Concentration (min)

$C$  = Average Runoff Coefficient

$A$  = Area (Ha)

$Q$  = Flow =  $2.78CiA$  (L/s)

### Maximum Allowable Release Rate

*Restricted Flowrate (based on 85 L/s/Ha)*

$$EXT5 = 187.000 \text{ L/s} \quad \text{From Pathways Phase 3}$$

$Q_{restricted} =$	187.00 L/s
--------------------	------------

*Uncontrolled Release ( $Q_{uncontrolled} = 2.78 * C * i_{100yr} * A_{uncontrolled}$ )*

$$C = 0.25$$

$$T_c = 10 \text{ min}$$

$$i_{100yr} = 178.56 \text{ mm/hr}$$

$$A_{uncontrolled} = 0.015 \text{ Ha}$$

$Q_{uncontrolled} =$	1.86 L/s
----------------------	----------

*Maximum Allowable Release Rate ( $Q_{max \text{ allowable}} = Q_{restricted} - Q_{uncontrolled}$ )*

$Q_{max \text{ allowable}} =$	185.14 L/s
-------------------------------	------------

**MODIFIED RATIONAL METHOD (100-Year & 2-Year Ponding)**

<b>Drainage Area</b>		<b>R3</b>			
Area (Ha)	0.190				
C =	0.68	Restricted Flow $Q_r$ (L/s)= 35.00			
<b>100-Year Ponding</b>					
$T_c$ Variable (min)	$i_{100yr}$ (mm/hour)	Peak Flow $Q_p=2.78xCi_{100yr}A$ (L/s)	$Q_r$ (L/s)	$Q_p-Q_r$ (L/s)	Volume 100yr ( $m^3$ )
-1	462.72	167.18	35.00	132.18	-7.93
4	262.41	94.80	35.00	59.80	14.35
9	188.25	68.01	35.00	33.01	<b>17.83</b>
14	148.72	53.73	35.00	18.73	15.73
19	123.87	44.75	35.00	9.75	11.12

<b>Storage (<math>m^3</math>)</b>				
Overflow	Required	Surface	Sub-surface	Balance
0.00	17.83	8.25	0	9.58

overflows to: R4

<b>Drainage Area</b>		<b>R3</b>			
Area (Ha)	0.190				
C =	0.57	Restricted Flow $Q_r$ (L/s)= 35.00			
<b>2-Year Ponding</b>					
$T_c$ Variable (min)	$i_{2yr}$ (mm/hour)	Peak Flow $Q_p=2.78xCi_{2yr}A$ (L/s)	$Q_r$ (L/s)	$Q_p-Q_r$ (L/s)	Volume 2yr ( $m^3$ )
0	167.22	50.35	35.00	15.35	0.00
1	148.14	44.60	35.00	9.60	0.58
2	133.33	40.14	35.00	5.14	<b>0.62</b>
3	121.46	36.57	35.00	1.57	0.28
4	111.72	33.64	35.00	-1.36	-0.33

<b>Storage (<math>m^3</math>)</b>				
Overflow	Required	Surface	Sub-surface	Balance
0.00	0.62	8.25	0	0.00

overflows to: R4

<b>Drainage Area</b>		<b>R4</b>			
Area (Ha)	0.190				
C =	0.68	Restricted Flow $Q_r$ (L/s)= 35.00			
<b>100-Year Ponding</b>					
$T_c$ Variable (min)	$i_{100yr}$ (mm/hour)	Peak Flow $Q_p=2.78xCi_{100yr}A$ (L/s)	$Q_r$ (L/s)	$Q_p-Q_r$ (L/s)	Volume 100yr ( $m^3$ )
-1	462.72	167.18	35.00	132.18	-7.93
4	262.41	94.80	35.00	59.80	14.35
9	188.25	68.01	35.00	33.01	<b>17.83</b>
14	148.72	53.73	35.00	18.73	15.73
19	123.87	44.75	35.00	9.75	11.12

<b>Storage (<math>m^3</math>)</b>				
Overflow	Required	Surface	Sub-surface	Balance
9.58	27.41	38.70	0	0.00

overflows to: NEA/Park

<b>Drainage Area</b>		<b>R4</b>			
Area (Ha)	0.190				
C =	0.57	Restricted Flow $Q_r$ (L/s)= 35.00			
<b>2-Year Ponding</b>					
$T_c$ Variable (min)	$i_{2yr}$ (mm/hour)	Peak Flow $Q_p=2.78xCi_{2yr}A$ (L/s)	$Q_r$ (L/s)	$Q_p-Q_r$ (L/s)	Volume 2yr ( $m^3$ )
0	167.22	50.35	35.00	15.35	0.00
1	148.14	44.60	35.00	9.60	0.58
2	133.33	40.14	35.00	5.14	<b>0.62</b>
3	121.46	36.57	35.00	1.57	0.28
4	111.72	33.64	35.00	-1.36	-0.33

<b>Storage (<math>m^3</math>)</b>				
Overflow	Required	Surface	Sub-surface	Balance
0.00	0.62	38.70	0	0.00

overflows to: NEA/Park

Drainage Area		S2			
Area (Ha)	0.330	Restricted Flow $Q_r$ (L/s)= 90.00			
C =	0.91				
100-Year Ponding					
$T_c$ Variable (min)	$i_{100yr}$ (mm/hour)	Peak Flow $Q_p=2.78xCi_{100yr}A$ (L/s)	$Q_r$ (L/s)	$Q_p-Q_r$ (L/s)	Volume 100yr ( $m^3$ )
0	398.62	333.51	90.00	243.51	0.00
5	242.70	203.06	90.00	113.06	33.92
10	178.56	149.39	90.00	59.39	<b>35.64</b>
15	142.89	119.56	90.00	29.56	26.60
20	119.95	100.36	90.00	10.36	12.43

Storage ( $m^3$ )				
Overflow	Required	Surface	Sub-surface	Balance
0.00	35.64	21.44	0	14.20

overflows to: S5

Drainage Area		S2			
Area (Ha)	0.330	Restricted Flow $Q_r$ (L/s)= 90.00			
C =	0.76				
2-Year Ponding					
$T_c$ Variable (min)	$i_{2yr}$ (mm/hour)	Peak Flow $Q_p=2.78xCi_{2yr}A$ (L/s)	$Q_r$ (L/s)	$Q_p-Q_r$ (L/s)	Volume 2yr ( $m^3$ )
-1	192.83	134.45	90.00	44.45	-2.67
0	167.22	116.59	90.00	26.59	0.00
1	148.14	103.29	90.00	13.29	<b>0.80</b>
2	133.33	92.96	90.00	2.96	0.36
3	121.46	84.69	90.00	-5.31	-0.96

Storage ( $m^3$ )				
Overflow	Required	Surface	Sub-surface	Balance
0.00	0.80	21.44	0	0.00

overflows to: S5

Drainage Area		S5			
Area (Ha)	0.140	Restricted Flow $Q_r$ (L/s)= 25			
C =	0.91	50% Restricted Flow $Q_r$ (L/s)= 12.50			
100-Year Ponding					
$T_c$ Variable (min)	$i_{100yr}$ (mm/hour)	Peak Flow $Q_p=2.78xCi_{100yr}A$ (L/s)	$Q_r$ (L/s)	$Q_p-Q_r$ (L/s)	Volume 100yr ( $m^3$ )
15	142.89	50.72	12.50	38.22	34.40
20	119.95	42.58	12.50	30.08	36.09
25	103.85	36.86	12.50	24.36	<b>36.54</b>
30	91.87	32.61	12.50	20.11	36.20
35	82.58	29.31	12.50	16.81	35.30

Storage ( $m^3$ )				
Overflow	Required	Surface	Sub-surface	Balance
14.20	50.74	30.72	22.43	0.00

Stormtech SC-310 or approved equal

overflows to: R6018B/Park

Drainage Area		S5			
Area (Ha)	0.140	Restricted Flow $Q_r$ (L/s)= 12.50			
C =	0.76				
2-Year Ponding					
$T_c$ Variable (min)	$i_{2yr}$ (mm/hour)	Peak Flow $Q_p=2.78xCi_{2yr}A$ (L/s)	$Q_r$ (L/s)	$Q_p-Q_r$ (L/s)	Volume 2yr ( $m^3$ )
7	90.66	26.82	12.50	14.32	6.01
8	85.46	25.28	12.50	12.78	6.13
9	80.87	23.92	12.50	11.42	<b>6.17</b>
10	76.81	22.72	12.50	10.22	6.13
11	73.17	21.64	12.50	9.14	6.03

Storage ( $m^3$ )				
Overflow	Required	Surface	Sub-surface	Balance
0.00	6.17	30.72	22.43	0.00

overflows to: R6018B/Park

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	



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## SC-310 STORMTECH CHAMBER SPECIFICATIONS

- CHAMBERS SHALL BE STORMTECH SC-310.
- CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE OR POLYETHYLENE COPOLYMERS.
- CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2922 (POLETHYLENE) OR ASTM F2418-16a (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
- THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
- CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
  - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
  - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 50 mm (2").
  - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2922 SHALL BE GREATER THAN OR EQUAL TO 400 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
- ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
  - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
  - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
  - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2922 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
- CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

## IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-310 SYSTEM

- STORMTECH SC-310 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
- STORMTECH SC-310 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
- CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
  - STONESHOOTER LOCATED OFF THE CHAMBER BED.
  - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
  - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
- THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
- JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
- MAINTAIN MINIMUM - 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.
- EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE 20-50 mm (3/4-2").
- THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
- ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

## NOTES FOR CONSTRUCTION EQUIPMENT

- STORMTECH SC-310 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
- THE USE OF CONSTRUCTION EQUIPMENT OVER SC-310 & SC-740 CHAMBERS IS LIMITED:
  - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
  - NO RUBBER TIRE LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
  - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH SC-310/SC-740/DC-780 CONSTRUCTION GUIDE".
- FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

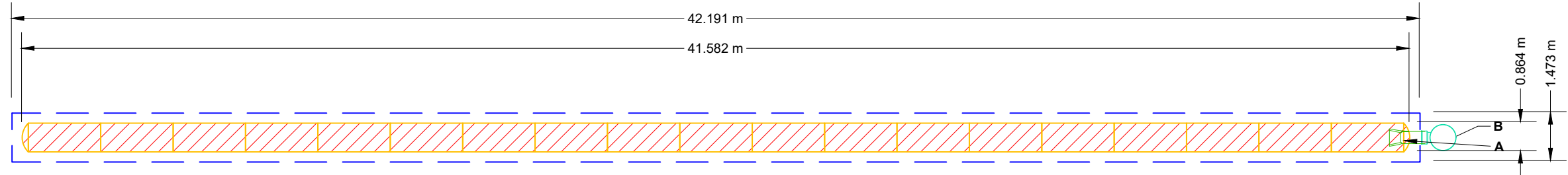
**USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.**

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT		PROPOSED ELEVATIONS	
19	STORMTECH SC-310 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	97.997
2	STORMTECH SC-310 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	96.168
152	STONE ABOVE (mm)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	96.016
152	STONE BELOW (mm)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	96.016
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	96.016
22.4	INSTALLED SYSTEM VOLUME (m <sup>3</sup> ) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	95.711
		TOP OF SC-310 CHAMBER:	95.559
		300 mm ISOLATOR ROW PLUS INVERT:	95.175
		BOTTOM OF SC-310 CHAMBER:	95.152
62.2	SYSTEM AREA (m <sup>2</sup> )	BOTTOM OF STONE:	95.000
87.3	SYSTEM PERIMETER (m)		

PART TYPE		ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP		A	300 mm BOTTOM PREFABRICATED END CAP, PART#: SC310EPE12BR / TYP OF ALL 300 mm ISOLATOR ROW PLUS CONNECTIONS	23 mm	
NYLOPLAST (INLET W/ ISO PLUS ROW)		B	750 mm DIAMETER (610 mm SUMP MIN)		

\*INVERT ABOVE BASE OF CHAMBER



- ISOLATOR ROW PLUS (SEE DETAIL)
- NO WOVEN GEOTEXTILE
- BED LIMITS

**NOTES**

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

<b>StormTech</b> <small>Dedication • Retention • Water Quality</small> 520 CROMWELL AVENUE   ROCKY HILL   CT   06067 860-529-8188   888-892-2894   WWW.STORMTECH.COM	<b>StormTech</b> <small>Dedication • Retention • Water Quality</small> 4840 TRUEMAN BLVD HILLIARD, OH 43026 1-800-733-7473	<b>Scale</b> SCALE = 1 : 150	<b>PATHWAYS BLK 60</b> OTTAWA, ON DATE: 12/7/2020 PROJECT #:
REV DRW CHK	DESCRIPTION	DRAWN: RM CHECKED: N/A	

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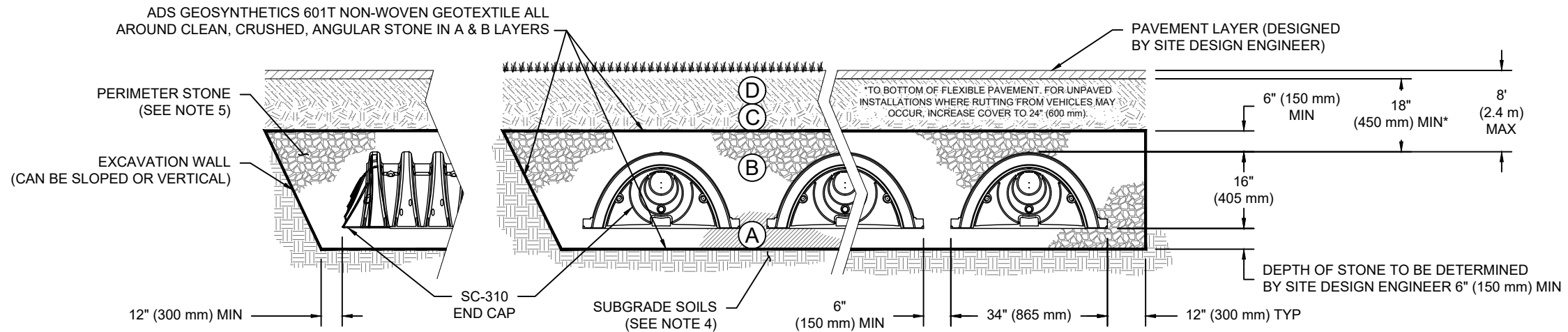


## ACCEPTABLE FILL MATERIALS: STORMTECH SC-310 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	<b>FINAL FILL:</b> FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	<b>INITIAL FILL:</b> FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE.  MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145 <sup>1</sup> A-1, A-2-4, A-3  OR  AASHTO M43 <sup>1</sup> 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	<b>EMBEDMENT STONE:</b> FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43 <sup>1</sup> 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	<b>FOUNDATION STONE:</b> FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43 <sup>1</sup> 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. <sup>2,3</sup>

**PLEASE NOTE:**

- THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
- STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
- WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
- ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



**NOTES:**

- CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2922 (POLETHYLENE) OR ASTM F2418-16a (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- SC-310 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
- PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
- REQUIREMENTS FOR HANDLING AND INSTALLATION:
  - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
  - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
  - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2922 SHALL BE GREATER THAN OR EQUAL TO 400 LBS/IN/IN. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

PATHWAYS BLK 60 OTTAWA, ON	DRAWN: RM	DATE: 12/7/2020	CHECKED: N/A
DESCRIPTION	CHK	REV	DRW
REV	DRW	CHK	DESCRIPTION

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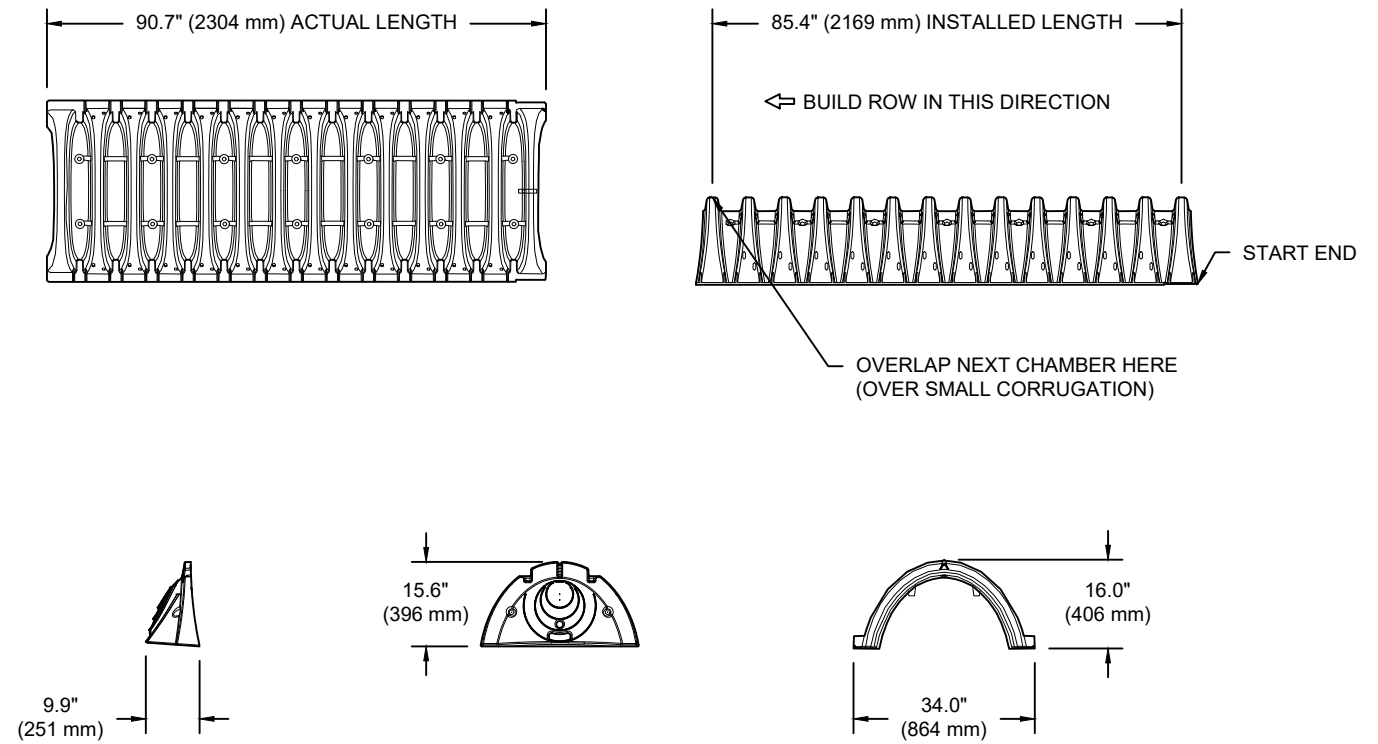
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SHEET  
**3 OF 6**



# SC-310 TECHNICAL SPECIFICATION

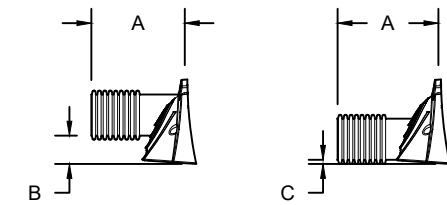
NTS



### NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	34.0" X 16.0" X 85.4"	(864 mm X 406 mm X 2169 mm)
CHAMBER STORAGE	14.7 CUBIC FEET	(0.42 m <sup>3</sup> )
MINIMUM INSTALLED STORAGE*	31.0 CUBIC FEET	(0.88 m <sup>3</sup> )
WEIGHT	35.0 lbs.	(16.8 kg)

\*ASSUMES 6" (152 mm) ABOVE, BELOW, AND BETWEEN CHAMBERS



PRE-FAB STUB AT BOTTOM OF END CAP WITH FLAMP END WITH "BR"  
 PRE-FAB STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"  
 PRE-FAB STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"  
 PRE CORED END CAPS END WITH "PC"

PART #	STUB	A	B	C
SC310EPE06T / SC310EPE06TPC	6" (150 mm)	9.6" (244 mm)	5.8" (147 mm)	---
SC310EPE06B / SC310EPE06BPC			---	0.5" (13 mm)
SC310EPE08T / SC310EPE08TPC	8" (200 mm)	11.9" (302 mm)	3.5" (89 mm)	---
SC310EPE08B / SC310EPE08BPC			---	0.6" (15 mm)
SC310EPE10T / SC310EPE10TPC	10" (250 mm)	12.7" (323 mm)	1.4" (36 mm)	---
SC310EPE10B / SC310EPE10BPC			---	0.7" (18 mm)
SC310EPE12B	12" (300 mm)	13.5" (343 mm)	---	0.9" (23 mm)
SC310EPE12BR	12" (300 mm)	13.5" (343 mm)	---	0.9" (23 mm)

ALL STUBS, EXCEPT FOR THE SC310EPE12B ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

\* FOR THE SC310EPE12B THE 12" (300 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 0.25" (6 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL

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PROJECT #:	CHECKED: N/A

REV	DRW	CHK	DESCRIPTION

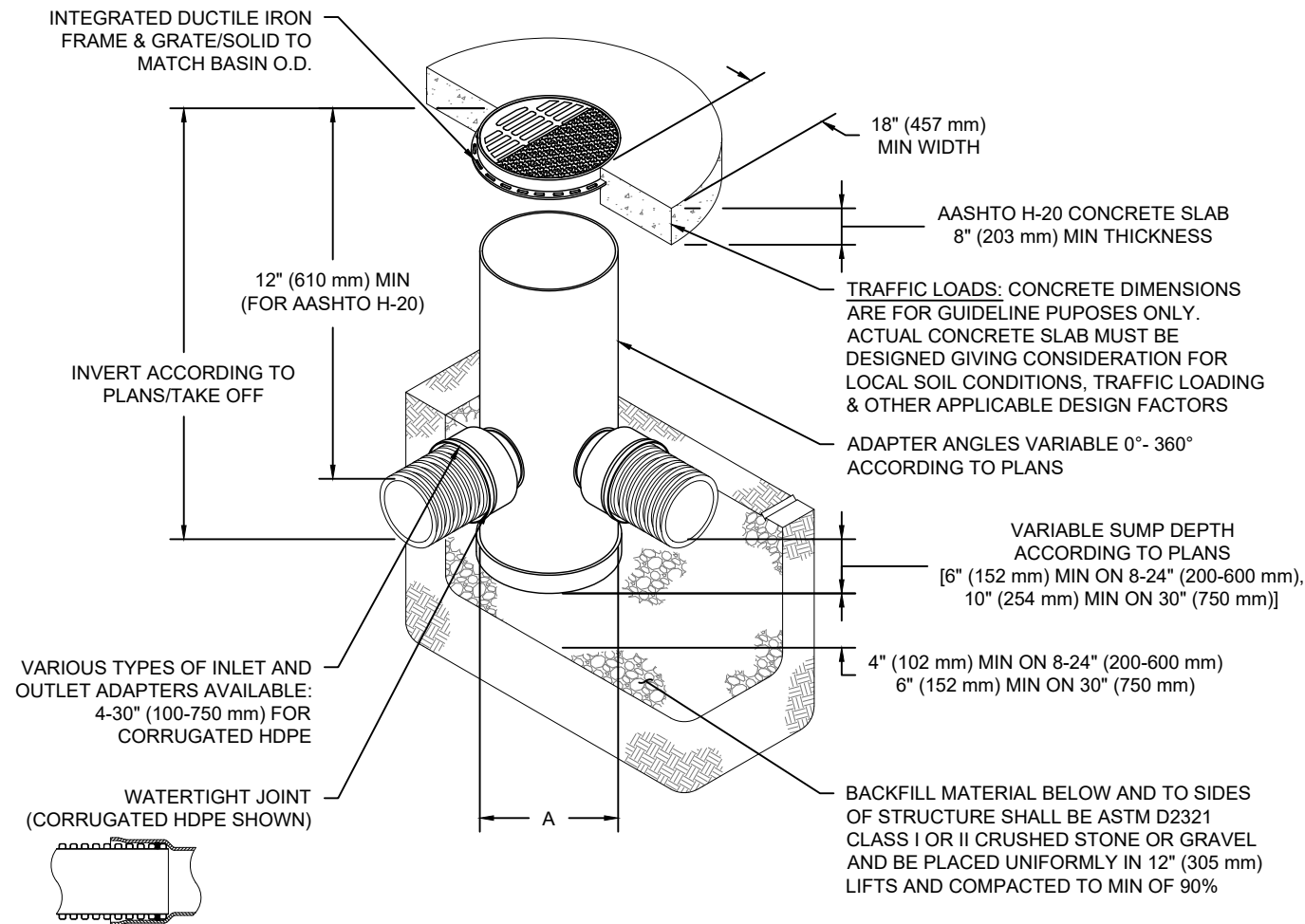
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# NYLOPLAST DRAIN BASIN

NTS



## NOTES

- 8-30" (200-750 mm) GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
- 12-30" (300-750 mm) FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
- DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS
- DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
- FOR COMPLETE DESIGN AND PRODUCT INFORMATION: [WWW.NYLOPLAST-US.COM](http://WWW.NYLOPLAST-US.COM)
- TO ORDER CALL: **800-821-6710**

A	PART #	GRATE/SOLID COVER OPTIONS		
8" (200 mm)	2808AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
10" (250 mm)	2810AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
12" (300 mm)	2812AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
15" (375 mm)	2815AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
18" (450 mm)	2818AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
24" (600 mm)	2824AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
30" (750 mm)	2830AG	PEDESTRIAN AASHTO H-20	STANDARD AASHTO H-20	SOLID AASHTO H-20

PATHWAYS BLK 60  
OTTAWA, ON

REV	DRW	CHK	DESCRIPTION

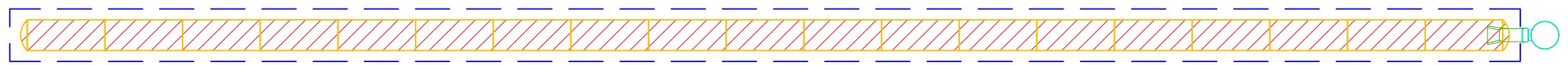
3130 VERONA AVE  
BUJFORD, GA 30518  
PHN (770) 932-2443  
FAX (770) 932-2490  
[www.nyloplast-us.com](http://www.nyloplast-us.com)



4840 TRUJEMAN BLVD  
HILLIARD, OH 43026  
1-800-733-7473



DATE: 12/7/2020  
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CHECKED: N/A  
PROJECT #:  
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**STORM HYDRAULIC GRADE LINE DESIGN SHEET**  
**Pathways Phase 3 - Block 60**  
**CITY OF OTTAWA**  
**Leitrim South Holdings Inc.**

JOB #: 125506-6.4.4  
 DATE: 2021-05-11  
 DESIGN: RM  
 CHECKED: RM  
 REV #: -

FRICITION LOSS				MANNING FORMULA - FLOWING FULL						
	FROM MH	TO MH	PIPE ID	DIA (m)	Area (m2)	Perim. (m)	Slope (%)	Hyd.R. (m)	Vel. (m/s)	Q (l/s)
<b>Block 60</b>	<b>BLK6018</b>	<b>5</b>		0.6	0.28	1.88	0.150	0.15	0.84	237.21
INVERT ELEVATION (m)	92.859	92.932		HYDRAULIC SLOPE = 0.47 %						
OBVERT ELEVATION (m)	93.459	93.532		DESIGN FLOW TO FULL FLOW RATIO (Q) 0.780						
DIAMETER (mm)				DESIGN FLOW DEPTH = 0.396						
LENGTH (m)				600						
FLOW (l/s)				48.9						
HGL (m) ***	<b>93.450</b>	<b>93.494</b>	<b>0.044</b>	<div style="border: 1px solid black; padding: 5px;">           Head loss in manhole simplified method p. 71 (MWDM)            fig1.7.1, Kratio = 0.75 for 45 bends <span style="float: right;">K<sub>L</sub>=0.75</span>            Velocity = Flow / Area = <span style="float: right;">0.65 m/s</span>            HL = K<sub>L</sub> * V<sup>2</sup>/ 2g         </div>						
MANHOLE COEF K= 0.75	LOSS (m)	0.016								
TOTAL HGL (m)		<b>93.680</b>								
MAX. SURCHARGE (mm)		<b>148</b>								

FRICITION LOSS				MANNING FORMULA - FLOWING FULL						
	FROM MH	TO MH	PIPE ID	DIA (m)	Area (m2)	Perim. (m)	Slope (%)	Hyd.R. (m)	Vel. (m/s)	Q (l/s)
<b>Block 60</b>	<b>5</b>	<b>4</b>		0.45	0.16	1.41	0.220	0.11	0.83	132.73
INVERT ELEVATION (m)	93.112	93.133		HYDRAULIC SLOPE = 0.72 %						
OBVERT ELEVATION (m)	93.562	93.583		DESIGN FLOW TO FULL FLOW RATIO (Q) 1.205						
DIAMETER (mm)				DESIGN FLOW DEPTH = 0.450						
LENGTH (m)				450						
FLOW (l/s)				9.7						
HGL (m) ***	<b>93.680</b>	<b>93.711</b>	<b>0.031</b>	<div style="border: 1px solid black; padding: 5px;">           Head loss in manhole simplified method p. 71 (MWDM)            fig1.7.1, Kratio = 0.75 for 45 bends <span style="float: right;">K<sub>L</sub>=0.75</span>            Velocity = Flow / Area = <span style="float: right;">1.01 m/s</span>            HL = K<sub>L</sub> * V<sup>2</sup>/ 2g         </div>						
MANHOLE COEF K= 0.75	LOSS (m)	0.039								
TOTAL HGL (m)		<b>93.749</b>								
MAX. SURCHARGE (mm)		<b>166</b>								

FRICITION LOSS				MANNING FORMULA - FLOWING FULL						
	FROM MH	TO MH	PIPE ID	DIA (m)	Area (m2)	Perim. (m)	Slope (%)	Hyd.R. (m)	Vel. (m/s)	Q (l/s)
<b>Block 60</b>	<b>4</b>	<b>3</b>		0.45	0.16	1.41	0.220	0.11	0.84	134.01
INVERT ELEVATION (m)	93.133	93.225		HYDRAULIC SLOPE = 0.32 %						
OBVERT ELEVATION (m)	93.583	93.675		DESIGN FLOW TO FULL FLOW RATIO (Q) 1.194						
DIAMETER (mm)				DESIGN FLOW DEPTH = 0.450						
LENGTH (m)				450						
FLOW (l/s)				160.00						
HGL (m) ***	<b>93.749</b>	<b>93.880</b>	<b>0.131</b>	<div style="border: 1px solid black; padding: 5px;">           Head loss in manhole simplified method p. 71 (MWDM)            straight through <span style="float: right;">K<sub>L</sub>=0.05</span>            Velocity = Flow / Area = <span style="float: right;">1.01 m/s</span>            HL = K<sub>L</sub> * V<sup>2</sup>/ 2g         </div>						
MANHOLE COEF K= 0.05	LOSS (m)	0.003								
TOTAL HGL (m)		<b>93.883</b>								
MAX. SURCHARGE (mm)		<b>208</b>								

FRICITION LOSS				MANNING FORMULA - FLOWING FULL						
	FROM MH	TO MH	PIPE ID	DIA (m)	Area (m2)	Perim. (m)	Slope (%)	Hyd.R. (m)	Vel. (m/s)	Q (l/s)
<b>Block 60</b>	<b>3</b>	<b>2</b>		0.25	0.05	0.79	0.450	0.06	0.81	39.80
INVERT ELEVATION (m)	93.425	93.464		HYDRAULIC SLOPE = 4.61 %						
OBVERT ELEVATION (m)	93.675	93.714		DESIGN FLOW TO FULL FLOW RATIO (Q) 3.141						
DIAMETER (mm)				DESIGN FLOW DEPTH = 0.250						
LENGTH (m)				250						
FLOW (l/s)				8.7						
HGL (m) ***	<b>93.883</b>	<b>94.268</b>	<b>0.385</b>	<div style="border: 1px solid black; padding: 5px;">           Head loss in manhole simplified method p. 71 (MWDM)            straight through <span style="float: right;">K<sub>L</sub>=0.05</span>            Velocity = Flow / Area = <span style="float: right;">2.55 m/s</span>            HL = K<sub>L</sub> * V<sup>2</sup>/ 2g         </div>						
MANHOLE COEF K= 0.05	LOSS (m)	0.017								
TOTAL HGL (m)		<b>94.284</b>								
MAX. SURCHARGE (mm)		<b>570</b>								



**STORM HYDRAULIC GRADE LINE DESIGN SHEET**  
**Pathways Phase 3 - Block 60**  
**CITY OF OTTAWA**  
 Leitrim South Holdings Inc.

JOB #: 125506-6.4.4  
 DATE: 2021-05-11  
 DESIGN: RM  
 CHECKED: RM  
 REV #: -

FRICTION LOSS				MANNING FORMULA - FLOWING FULL							
	FROM MH	TO MH	PIPE ID	DIA (m)	Area (m <sup>2</sup> )	Perim. (m)	Slope (%)	Hyd.R. (m)	Vel. (m/s)	Q (l/s)	
<b>Block 60</b>	<b>2</b>	<b>1</b>		0.25	0.05	0.79	0.450	0.06	0.81	39.84	
INVERT ELEVATION (m)	93.484	93.665		HYDRAULIC SLOPE = 0.00 %							
OBVERT ELEVATION (m)	93.734	93.915		DESIGN FLOW TO FULL FLOW RATIO (Q <sub>f</sub> ) = 0.000							
DIAMETER (mm)				250	DESIGN FLOW DEPTH = 0.003						
LENGTH (m)				40.3							
FLOW (l/s)				0.00							
HGL (m) ***	<b>94.284</b>	<b>94.284</b>	<b>0.000</b>	<div style="border: 1px solid black; padding: 5px;">           Head loss in manhole simplified method p. 71 (MWDM)            straight through <span style="float: right;">K<sub>L</sub>=0.05</span>            Velocity = Flow / Area = <span style="float: right;">0.00 m/s</span>            HL = K<sub>L</sub> * V<sup>2</sup>/ 2g         </div>							
MANHOLE COEF K= 0.05	LOSS (m)	0.000									
TOTAL HGL (m)		<b>94.284</b>									
MAX. SURCHARGE (mm)		<b>369</b>									

FRICTION LOSS				MANNING FORMULA - FLOWING FULL							
	FROM MH	TO MH	PIPE ID	DIA (m)	Area (m <sup>2</sup> )	Perim. (m)	Slope (%)	Hyd.R. (m)	Vel. (m/s)	Q (l/s)	
<b>Block 60</b>	<b>1</b>	<b>DUMMY</b>		0.2	0.03	0.63	0.450	0.05	0.00	0.00	
INVERT ELEVATION (m)	93.665	93.665		HYDRAULIC SLOPE = #DIV/0! %							
OBVERT ELEVATION (m)	93.865	93.865		DESIGN FLOW TO FULL FLOW RATIO (Q <sub>f</sub> ) = #DIV/0!							
DIAMETER (mm)				200	DESIGN FLOW DEPTH = #DIV/0!						
LENGTH (m)				10.0							
FLOW (l/s)				0.00							
HGL (m) ***	<b>94.284</b>	<b>94.284</b>	<b>0.000</b>	<div style="border: 1px solid black; padding: 5px;">           Head loss in manhole simplified method p. 71 (MWDM)            straight through <span style="float: right;">K<sub>L</sub>=0.05</span>            Velocity = Flow / Area = <span style="float: right;">0.00 m/s</span>            HL = K<sub>L</sub> * V<sup>2</sup>/ 2g         </div>							
MANHOLE COEF K= 0.05	LOSS (m)	0.000									
TOTAL HGL (m)		<b>#DIV/0!</b>									
MAX. SURCHARGE (mm)		<b>#DIV/0!</b>									

noted that the establishment of the sanitary scenarios discussed in **Section 5.5.1**, result in slight or negligible difference in the storm HGL.

As noted in **Section 5.5.2**, the node annotation for storm sewers include an 'S' or 'MH' before the identifying manhole (XPSWMM node S6171 is storm manhole MH6171).

**Table 5.10 Storm Hydraulic Grade Line - Local Sewers within Phase 2 Pathways at Findlay Creek for the 100 Year 3 Hour Chicago and 100 Year 3 Hour Chicago increased by 20% Storm Events**

XPSWMM NODE	USF (M)	STORM HYDRAULIC GRADE LINE							
		100 YEAR 3 HOUR CHICAGO				100 YEAR 3 HOUR CHICAGO + 20%			
		RARE EVENT SANITARY FLOW		ANNUAL EVENT SANITARY FLOW		RARE EVENT SANITARY FLOW		ANNUAL EVENT SANITARY FLOW	
		HGL (M)*	USF-HGL (M)	HGL (M)*	USF-HGL (M)	HGL (M)*	USF-HGL (M)	HGL (M)*	USF-HGL (M)
MH6006	96.73	94.99	1.74	94.99	1.74	94.99	1.74	94.99	1.74
MH6007	96.48	94.96	1.52	94.96	1.52	94.96	1.52	94.96	1.52
MH6004	96.21	95.06	1.15	95.06	1.15	95.06	1.15	95.06	1.15
MH6003	96.73	95.23	1.50	95.23	1.50	95.23	1.50	95.23	1.50
BLK6003W	96.73	95.25	1.48	95.25	1.48	95.25	1.48	95.25	1.48
MH6026	94.48	93.45	1.03	93.46	1.02	93.74	0.74	93.76	0.72
MH6025	94.53	93.47	1.06	93.48	1.05	93.77	0.76	93.79	0.74
MH6018	94.58	93.56	1.02	93.58	1.00	93.87	0.71	93.89	0.69
BLK6018W	N/A	93.57	n/a	93.58	n/a	93.88	n/a	93.89	n/a
BLK6018N	N/A	93.67	n/a	93.68	n/a	93.98	n/a	94.00	n/a
MH6022	94.78	93.73	1.05	93.75	1.03	94.05	0.73	94.06	0.72
MH6021	95.18	94.43	0.75	94.43	0.75	94.43	0.75	94.43	0.75
MH6051	95.23	93.29	1.94	93.30	1.93	93.64	1.59	93.67	1.56
MH6038	95.68	94.12	1.56	94.12	1.56	94.12	1.56	94.12	1.56
MH6052	96.38	95.27	1.11	95.27	1.11	95.28	1.10	95.28	1.10
MH6052A	96.38	95.17	1.21	95.18	1.20	95.17	1.21	95.17	1.21
MH6053	96.23	94.66	1.57	94.75	1.48	94.91	1.32	94.92	1.31
MH6042	96.18	94.58	1.60	94.60	1.58	94.87	1.31	94.88	1.30
MH6041	N/A	95.74	n/a	95.74	n/a	95.76	n/a	95.76	n/a
MH6140	N/A	96.27	n/a	96.27	n/a	96.31	n/a	96.32	n/a
BLK6140S	N/A	96.65	n/a	96.65	n/a	96.69	n/a	96.71	n/a
MH6043	95.73	94.24	1.49	94.26	1.47	94.51	1.22	94.53	1.20
MH6044	95.28	94.16	1.12	94.18	1.10	94.42	0.86	94.43	0.85
MH6045	95.13	93.84	1.29	93.86	1.27	94.08	1.05	94.11	1.02
MH6046	95.13	93.67	1.46	93.69	1.44	93.91	1.22	93.93	1.20
MH6047	94.93	93.73	1.20	93.75	1.18	93.98	0.95	94.00	0.93
BLK6049	N/A	93.16	n/a	93.18	n/a	93.42	n/a	93.44	n/a
MH6069	N/A	92.79	n/a	92.79	n/a	92.79	n/a	92.79	n/a

# **APPENDIX E**

125506-900 - Erosion and Sediment Control Plan  
125506-200 - Grading Plan







