MAPLE STREET DEVELOPMENT

SERVICING DESIGN REPORT

Prepared For: SZAM Capital Partners

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83 North Park Street
Belleville, ON K8P 2Y6

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INTRODUCTION

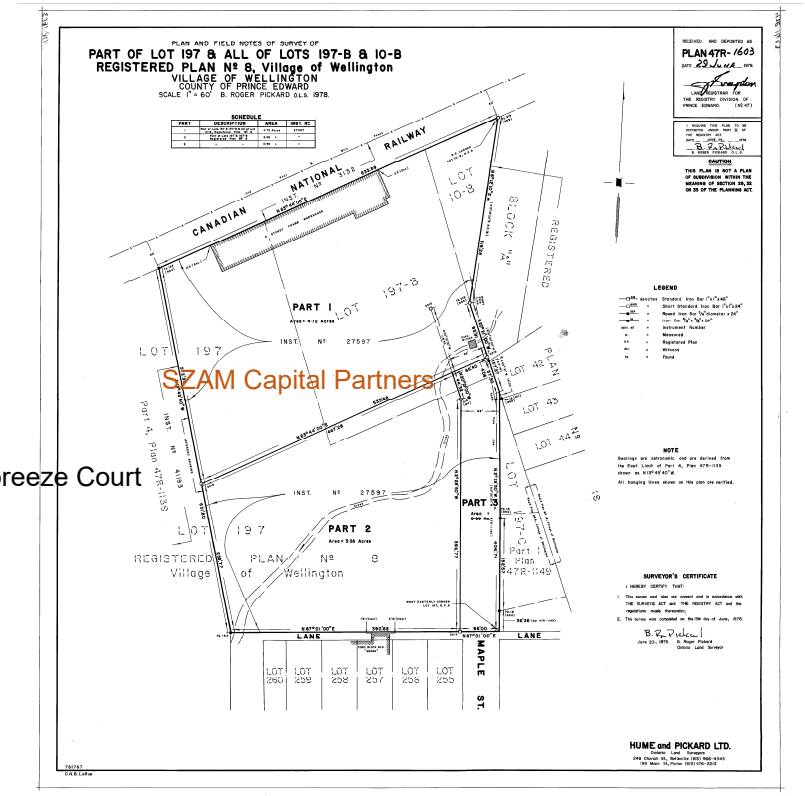
This Servicing Design Report is prepared in support of Engineering Approval and Ministry of the Environment, Conservation and Parks Approval for the development of 80 Maple Street located in the Village of Wellington, in the Municipality of Prince Edward County. These applications will be made on behalf of SZAM Capital Partners.

The proposed project is located within Part of Lot 197 and 197-B, and all of Lot 10-B, Registered Plan 8, Village of Wellington, Municipality of Prince Edward County being Part 1 on Plan 47R-1603 as illustrated in Figure 1 – Plan of Survey. Road access to the property will be from Lakebreeze Court and extension northerly of Street A which will be constructed as part of the overall development in this area.

Original planning for this area was completed in the form of a Secondary Plan by IBI Group for the Village of Wellington.

The lands north of the development are tilled farm fields with a recreational (Millennium) trail traversing between. There is a potential for residential development to the north.

The area of lands to be developed is approximately 1.34ha. The proposed development will included 96 stacked townhouse units comprised of six buildings, lands for stormwater management facilities, and open amenity space. The anticipated population could be 240 people in this development.



Lakebreeze Court

Figure 1 – Plan of Survey

1.0 SITE DESCRIPTION

A major portion of the site has a gentle slope towards the south, while the northerly portion drains towards the east both of which outlet to Lane Creek which traverses along the east and south property boundaries.

The site has remained in its current condition for approximately ten years based on Google imagery.

2.0 EXISTING SERVICING

There are existing services to the site, although there is no documentation of sanitary sewer services and there is a fire hydrant located on site.

2.1 Sanitary Sewer Servicing

The existing sanitary sewer on Maple Street appears to end adjacent to the existing apartment complex south of the site at MH352. The sanitary sewer on Lakebreeze Court to the west ends at Lakebreeze Terrace complex at MH368.

2.2 Water Distribution

A 200mm diameter watermain is installed on Maple Street and Lakebreeze Court; however it is unclear how the service extends to the fire hydrant within the site.

2.3 Storm Sewer Servicing

The majority of storm sewer run-off from Lakebreeze Court is collected in a SWM facility constructed with the development of that subdivision. There are no storm sewers existing within the site.

2.4 Utility Servicing

Utility services to the area have been provided to date by Hydro One, Bell Canada, Cable and Enbridge Gas for electricity, telephone/internet communication, cable television and natural gas respectively.

2.5 Road Access

This new development will have direct access to a public road system which is maintained on a year-round basis by the Municipality. The westerly access point would be an extension of Lakebreeze Court, while the easterly driveway would be eliminated and converted to life style trail access. The access road will be designated as urban local roads, and will be designed using 20m cross sections.

3.0 PROPOSED SERVICING

3.1 Sanitary Sewer Design

The Municipality anticipates a trunk sewer be installed along the Millennium Trail to the north of the site. The sanitary sewer connection for the site would be provided to tie into this feeder main.

200mm PVC sanitary sewer mains are proposed throughout the development with a minimum full pipe velocity of 0.6m/s. Residential design parameters for the development include 280L/cap/day, residential densities of 3 persons per lot, 2.5 persons per unit and extraneous flows of 0.28L/sec.ha.

Design flow calculations and the accompanying Sanitary Drainage Area Plan are included in Appendix A.

3.2 Water Distribution System

The Municipality anticipates a trunk watermain be installed along the Millennium Trail to the north of the site. The watermain connection for the site would be provided to tie into this feeder main.

The proposed watermain will be PVC DR 18, class 150 and range in size from 200mm along the main connection feed and initial internal lines to provide fire flows, while the balance of the site would be 150mm and a further reduction in size to 100mm servicing not more than 20 dwellings.

Based on the review of the capacity of the system by the Municipality, it is our understanding adequate average day, maximum day flows will be attainable. Minimum fire flows of 6,600L/min (110L/s) would also be available.

3.3 Storm Sewer Design

Stormwater will be directed into the storm sewer system in two manners; the streets are proposed to be constructed to allow stormwater to be conveyed along the road to the sewer system, and grassed swales in the rear yards will direct the surface flows into catchbasins or ditch inlets and into the storm sewer system. The pipe network will be designed to accommodate 1:5 year storm events.

Rainfall Intensity Duration Frequency (IDF) data for Wellington is as follows:

5 Year Storm $I=28.1\ t^{-0.699}$

100 Year Storm $I=46.8\ t^{-0.699}$

The slopes of pipes for catchbasin laterals may be high but the actual peak flow in the pipe will be less recommended range of 6.0 m/s.

The section of storm sewer connecting to an Oil-Grit Separator (OGS) has a steep slope as the inlet to the OGS is constructed lower than the outlet resulting in this section of pipe being submerged. The length of pipe is short to minimize the amount of pipe submerged. The velocity of flow in the pipe would be comparable to the flow in the outlet pipe, being less than 6m/s.

Storms sewer system has been designed to convey the 100yr storm event to the stormwater management facility.

Detailed storm sewer calculations have been provided in Appendix B.

Stormwater from the development will be collected and treated on site in such that the final outflow will meet Ministry of Environment, Conservation Authority, Bay of Quinte Remedial Action Plan and Municipal approvals. Stormwater management facilities (SWM) will be constructed to provide end of pipe quality and quantity control as necessary.

The SWM facility in conjunction with lot level controls, sedimentation and erosion control practices during construction of the roads and services as well as the dwellings will provide protection to the Lane Creek and Lake Ontario.

4.0 STORMWATER MANAGEMENT

As typical in any development, quality and quantity control strategies must be considered and employed for the lands under consideration. Treatment to Level 1 Enhanced Quality Treatment Protection according to MOE Stormwater Management, Planning and Design Manual (2003) guidelines, and Bay of Quinte Remedial Action Plan is to be provided.

4.1 Proposed Conditions

The proposed drainage pattern has been divided into five catchment areas. Table 1 provides a brief summary of each catchment area, while the limits of each are shown in Drawing Map/80-St1 Appendix C along with calculations for the percentage of impervious cover for each catchment area.

Table 1 - Summary of Catchment Areas

Catchment ID	Description	Area (ha.)	Imperviousness
100	80 Maple Street – consists of stacked townhouse residential development	0.94	74%
200	Street A – consists of urban road cross section	0.05	31%
300	North Drainage Area – consists of stacked townhouse residential development	0.47	22%
400	South Drainage Area – consists of stacked townhouse residential development	0.16	20%
500	West front yards Street A – consists of stacked townhouse residential development and urban road cross section	0.30	59%

Catchment area 100 drains from the north west to the south east in keeping with the original drainage patterns of the site. Stormwater runoff from these areas will undergo a 2-step end of pipe treatment process. Runoff will initially be treated through an Oil-Grit Separator (OGS) units, and then discharged towards flow spreader berms. Vegetated filter strips will be placed between the spreader berms and the Lane Creek to promote sheet flow conveyance to the creek.

The drainage area for the proposed street has been designated as Catchment 200 and encompasses the municipal road allowance. Since this is a very small area it will remain untreated and uncontrolled to the outlet at Lane Creek. Rip-rap with filter cloth will be placed along the outlet of the pipe to provide limited end of pipe treatment for sediments.

The North Drainage Area Catchment 300 area outlets below the SWM Facility. Since runoff from these areas will not be directed through the Oil-Grit Separators and there is very little change from the pre-development to post-development characteristics it will discharge uncontrolled and untreated to Lane Creek.

Catchment 400 –South Drainage Area will remain as sheet flow untreated and uncontrolled to Lane Creek with compensation made within Area 100 facility. The lands within this catchment area remain relatively unchanged from pre-development conditions.

Catchment 500 area consists of the front yard drainage from the site and drainage along Street A. Municipal drainage is to remain on municipal property and is not directed through the site.

4.2 Stormwater Quality Control

The stormwater management system receives runoff from an area of 0.94ha directed along the internal driveways. This area is comprised of stacked townhouse blocks and associated parking lots. The system is to be designed to provide Level 1 Enhanced Quality Treatment for the catchment areas. Oil-Grit Separator in series with quantity storage have been chosen as the end-of-pipe treatment method. The Oil-Grit Separator is labelled SQU-105 on the drawings.

Quality storm event has been calculated base on Ministry of the Environment Stormwater Management Planning and Design Manual (2003):

$$Q = \frac{C\ i\ A}{360} \qquad \text{where } i = 43C+5.9 \qquad Q = \frac{0.72x36.86x0.9354}{360}$$

Quality Storm Event = 0.069m^3/s or 69L/s

Hydro International Downstream Defender DD6 (1800mm diameter) model or equal will receive runoff only from subcatchment 100, area 0.94 ha. For the quality storm event having a Design WQ Flow of 96 L/s, the Total Suspended Solids (TSS) Removal Efficiency will be 83.2% with particle size of 50 micron. The DD6 Downstream Defender is designed with a standard sediment storage volume of 1.61 m^3. Given a sediment loading rate of 1.4 m^3/ha/yr, the sediment storage volume will be more than sufficient to allow cleaning to take place on an annual basis. Additional treatment to achieve the MECP Level 1 threshold of 80% TSS removal of materials 50 microns in size is therefore not required.

The DD6 Downstream Defender OGS will also be able to provide a Total Net Annual Removal Efficiency of 98.0%.During Peak Flow of 210 L/s in the storm sewer, the Downstream Defender OGS

will still provide 77.3% TSS Removal Efficiency for full flow. Calculations for the OGS Unit has been provided in Appendix C.

4.3 Stormwater Quantity Control

The OGS unit will outlet into the storage area providing storage volumes for the 5yr and 100yr storm events prior to outlet to Lane Creek.

Stormwater will be retained to a maximum storage volume of 357m^3. The maximum depth of water would be 750mm, after which it will begin to spill over the top of the overflow spillway and sheet flow to Lane Creek. The 5yr storm event would require 94.9cu.m storage to a depth of 280mm, while the 100yr storm event would require 176.4cu.m to a depth of 450mm. Outlet flows are designed to be controlled by a series of outlet structures fitted with orifice control plates. These structures will control flows from the site to the pre-development allowable rates while allowing complete facility draw down. Since catchment area 401 discharges uncontrolled the calculated allowable flows from catchment 100 have been reduced to compensate for this. Ditch inlet DI-SWM1 will provide control to the 5yr level of 24.5L/s with a 124mmØ orifice while DI-SWM2 will provide outflow of 12.5L/s with an 85mmØ with a combined outflow of 40.7L/s for the 100yr event. Orifice discharge calculations are provided in Appendix C while construction details are provided on the SWM Facility Drawing Map/80-05 in Appendix D.

5.0 EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

A number of erosion and sediment control measures can be established during construction. These measures are as follows:

- Minimize the area of soil exposed at any time.
- Apply soil cover as soon as possible after soil is disturbed.
- Sediment will be intercepted as close to the source as possible. Proposed sediment control would include covering catchbasin and ditch inlets with filter cloth, installing straw bale check dams or crushed stone filter berms in drainage swales, and installing sediment control fences around disturbed areas of building lots before construction begins.
- Ensure the sediment control structures are properly constructed, inspected and maintained during its use,
- Control dust during construction with application of dust suppressants to gravel roads as required, and periodic sweeping of paved roads.
- If dewatering is required, pumped water to be discharged to sediment traps to reduce the amount of sediment sent to storm sewers and ditch inlets,
- Stockpiles expected to remain for a significant length of time should be temporarily covered with a vegetative mulch,
- Inspect and remove sediment from sumps in downstream catchbasins and ditch inlets within the development as required.

6.0 SUMMARY

This design brief has been prepared to assist in municipal and Ministry of the Environment approvals for this development and is to be read in conjunction with Engineering Drawings prepared by van MEER limited included in Appendix D.

van **MEER** limited

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Pres.

Sue Sampson
Manager Design Approvals

Appendix A

Sanitary Sewer Design

Sanitary Sewer Design Sheets

Sanitary Sewer Design Drawings

Drainage Area Plan	Drawing Map/80-Sa1

Appendix B

Storm Sewer Design

Storm Sewer Design Sheets

Storm Sewer Design Drawings
- Pre-development Drainage Areas
- Post-development Drainage Areas — Drawing Map/80-St1

Ontario IDF Curve Look-up

Appendix C

Stormwater Management – Design

Imperviousness Calculations

Tc Calculations

Storage Requirement Calculations

Storage Provided Calculations

Stage Storage Discharge Calculations

Hydro International Downstream Defender Sizing

Hydro International Downstream Defender Operation & Maintenance Manual

Appendix D

Engineering Drawings

Drawing Name	Drawing Number
Site Development Plan Stacked Townhouse Development	Map/80-01
Site Servicing Plan Construction Notes	Map/80-02
Site Grading Plan Site Grading Details	Map/80-03
Lakebreeze Court / Street A Plan/Profile Sta. 0+100 to 0+260 Road Construction Details	Map/80-04
Lakebreeze Court Plan/Profile Sta. 0+000 to 0+040 SWM Facility Details	Map/80-05