REPORT
PROJECT: 115496-5.2.2

ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES THE MEADOWS IN HALF MOON BAY - PHASE 7&8 3640 GREENBANK ROAD

Prepared for TAMARACK (NEPEAN) CORPORATION
by IBI GROUP

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1 INTRODUCTION

1.1 Purpose

The purpose of this report is to investigate and confirm the adequacy of public services for the proposed site. This report will review major municipal infrastructure including water supply, wastewater collection and disposal and management of stormwater. This report will also include a Sedimentation and Erosion Control Plan. A review of traffic components will be the subject of a separate report.

This report is being prepared as a technical document in support of the subdivision draft plan submission, and was prepared in accordance with the November 2009 “Servicing Study Guidelines for Development Applications” in the City of Ottawa. **Appendix A** contains a customized copy of those guidelines which can be used as a quick reference for the location of each of the guideline items within the study report.

1.2 Subject Property

The property, referred to as Phase 7&8 of the Meadows in Half Moon Bay (The Meadows), is generally located adjacent to the south west limit of the Barrhaven South development area, and covers approximately 19.4 ha. The property is located west of the future Greenback Road realignment, north of aggregate extraction site, east of undeveloped lands and south of an existing protected woodlot and a proposed secondary school block, which is within the adjacent proposed Mattamy Homes Half Moon Bay West development. See **Figure 1.1** for further details regarding the site location

The proposed development, municipally known as 3640 Greenbank Road, will include a mixture of various residential types including singles, semis and traditional and back-to-back townhouse units. The development will also include a park and a school block. The current proposed draft plan of subdivision for the Meadows Phase 5 lands is shown on **Figure 1.2**.

1.3 Background

The Barrhaven South development Area was the subject of major study for several years to develop a comprehensive strategy to expand the urban boundary of Barrhaven to the south. This planning process culminated in the preparation of the Barrhaven South Community Design Plan which was completed in September 2006. In support of the Design Plan, the City also prepared a Master Servicing Study (MSS) which details the development of a preferred servicing strategy for the new development area. This Master Servicing Study was completed in June 2007 and outlines a servicing strategy for water, wastewater and stormwater which allows for the orderly and cost effective phased development of the proposed design plan. It should be noted that the MSS has subsequently been amended by the City, which was finalized in October 2017. All references in this document related to the Barrhaven South Master Servicing Study (BSMSS) shall be to the October 2017 or the July 2018 Barrhaven South Master Servicing Study Addendum (BSMSSA) document unless noted otherwise.

For reference, a copy of the Stantec 2017 Figure 3-3 - Barrhaven South Community Design Plan – Land Use Plan is included in **Appendix A**. Immediately following the Stantec figure 3-3, a sketch has been provided that identifies a minor change to the community design plan, the 7.5 ha Public Secondary School block has been shifted south of Cambrian Road and is now immediately adjacent to Tamarack Home’s Meadows Phase 5 development. A copy of FIG-1, Barrhaven South MSS Study Area Boundary, from the 2017 BSMSS, is also included in **Appendix A**.

1.4 Previous Studies

The following reports were reviewed prior to completion of this assessment:

- Barrhaven South Master Servicing Study Addendum (BSMSSA) for Half Moon Bay West Subdivision Phase 1 – Mattamy Home prepared by DSEL, July 13, 2018
- Barrhaven South Master Servicing Study Addendum (BSMSS) prepared by Stantec, October 12, 2017
- Design Brief – Clarke Stormwater Management Pond prepared by DSEL & JFSA, October 19, 2017
- Design Brief – Half Moon Bay West Subdivision, Mattamy Homes prepared by DESL, March 9, 2018
- Barrhaven South Master Servicing Study prepared by Stantec, June 2007
- Ottawa Sewer Design Guidelines – City of Ottawa, October 2012 *(City Standards)*
    - Technical Bulletin ISDTB-2014-01, Revisions to Ottawa Design Guidelines – Sewer, City of Ottawa, February 5, 2014
    - Technical Bulletin PIEDTB-2016-01, Revisions to Ottawa Design Guidelines – Sewer, City of Ottawa, September 6, 2016
    - Technical Bulletin ISDTB-2018-01, Revisions to Ottawa Design Guidelines – Sewer, City of Ottawa, March 21, 2018
- Ottawa Design Guidelines – Water Distribution, City of Ottawa, July 2010 *(Water Supply Guidelines)*
    - Technical Bulletin ISD-2010-2, City of Ottawa, December 15, 2010
    - Technical Bulletin ISDTB-2014-02, City of Ottawa, May 27, 2014

1.5 Existing Infrastructure

Figure 1.3 shows the location of municipal infrastructure. The figure identifies services that are existing, proposed through the BSMSS, and proposed through Mattamy Homes' Half Moon Bay West – Phase 1 detailed design, prepared by DSEL. Generally the subject site will connect to storm, sanitary and water services that are proposed to be constructed within the north-south collector road, shown on Mattamy's adjacent development plans as Street 1B.

It should be noted that the Street 1B services and roadway are not currently proposed in the Half Moon Bay West – Phase 1 works. As the subject site requires the installation of both Mattamy Homes Half Moon Bay West Phase 1 and the Street 1B infrastructure to proceed with its development, the proponent may be required to enter into a front ending agreement with Mattamy Homes for the construction of Street 1B roadway and municipal services to facilitate the Meadow's Phase 7&8 development. Hence, discussion in the individual service sections below will assume that municipal services have been brought, or will be brought to the Meadows Phase 7&8 limit of development.

Demand and flow allocations for development of the subject lands have been carried in the design of the proposed downstream storm, sanitary and water services completed (or to be completed) by others. The service specific sections below will identify that development of the subject lands will be completed in accordance with the allocations made by others for the subject site.

1.6 Phasing

It is anticipated the detailed design and construction of the subject lands will be complete in phases. **Figure 1.4** shows the current concept of the phasing plan.

1.7 Pre-Consultation

A pre-consultation meeting was held with the City of Ottawa in April 2017. The formal meeting notes issued for the meeting are included in **Appendix A**, some of the topics reviewed included the following:

- Planning
- Transportation/Transit
- Environment
- Parks
- Engineering and Servicing
- Geotechnical
- Assessment of Adequacy of Public Services Report

1.8 Existing Topography

The property generally slopes from south-west to north-east with the lowest portion of the site being the north-east corner which abuts the future Greenbank Road ROW and the adjacent proposed school block. Contours for the property range between 102 and 93 meters. **Figure 1.5** shows the general topography of the subject property.

1.9 Geotechnical Considerations

A geotechnical investigation was completed by Paterson Group Inc., report PG4242-1 Revision 1 dated December 6, 2018, for the subject site. Subsoil and groundwater conditions were determined by means of test pits and boreholes.

Among other items, the report recommendations also reviewed the following:

- Site grading;
- Foundation design;
- Pavement structure;
- Sewer and Watermain Construction;
- Groundwater Control;
- Confirmation of Grade Raise limits

With respect to grade raise limits, the report recommended a grade raise limitation of 1.0 meter for the northern portion of the site and unlimited grade raise for the remainder. For reference, Figure PG4242-2 from the Paterson Report is included in **Appendix A**.

2 WATER SUPPLY

2.1 Existing Conditions

Figure 1.3 shows the location of existing and proposed watermains in the vicinity of the site. To the north an existing 406 mm watermain is located on Cambrian Road currently capped west of Seeley's Bay Street. East of the site there are existing mains in the residential developments recently constructed as The Meadows Phase 4 site which is immediately east of the Phase 7&8 site. A 200 mm diameter watermain has been extended along Jackdaw Road as shown on **Figure 1.3**.

2.2 Master Servicing Study

The Barrhaven South Master Servicing Study Addendum provides trunk watermains in the Barrhaven South Community. A copy of the Water Servicing Plan Drawing No. A-8 is included in **Appendix B**. The plans show the 406 mm watermain extended west on Cambrian Road with a 305 mm watermain running south on the collector road Street 1 through the Phase 7&8 site to the south and extending east through Phase 7&8 to connect with the proposed 305 mm watermain on Future Greenbank Road. As the construction of Future Greenbank Road is several years away, the proposed 305 mm watermain is not included in the watermain analysis for Phase 7&8.

2.3 Design Criteria

2.3.1 Water Demands

Water demands have been calculated for the full development including just Phase 7. Per unit population density and consumption rates are taken from Tables 4.1 and 4.2 at the Ottawa Design Guidelines – Water Distribution and are summarized as follows:

- Single Family 3.4 person per unit
- Townhouse and Semi-Detached 2.7 person per unit
- Average Apartment 1.8 person per unit
- Residential Average Day Demand 350 l/cap/day
- Residential Peak Daily Demand 875 l/cap/day
- Residential Peak Hour Demand 1,925 l/cap/day
- ICI Average Day Demand 50,000 l/gross ha/day
- ICI Peak Daily Demand 75,000 l/gross ha/day
- ICI Peak Hour Demand 135,000 l/gross ha/day

Residential units in the subject site consist of single family lots, back to back and street townhouses, a school block is also included in this development. A watermain demand calculation sheet is included in **Appendix B** and the total water demands are summarized as follows:

- Average Day 6.47 l/s
- Maximum Day 14.55 l/s
- Peak Hour 31.04 l/s

2.3.2 System Pressure

The Ottawa Design Guidelines – Water Distribution (WDG001), July 2010, City of Ottawa, Clause 4.2.2 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 Clause 4.2.2 of 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 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). Pressure reduction controls will be required for buildings where it is not possible/feasible to maintain the system pressure below 552 kPa.

2.3.3 Fire Flow Rates

In the recent Technical Bulletin 'ISDTB-2014-02, Revisions to Ottawa Design Guidelines – Water', the fire flow requirements for single detached dwellings and traditional town and row houses can be capped at 10,000 l/min provided that there is a minimum separation of 10 meters between the backs of adjacent units and that the town and row house blocks are limited to 600 square meters of building areas and seven dwelling units. The single family and street townhouses in this development meet the requirements of ISDTB-2014-02, the fire flow rate of 10,000 l/min (166.7 l/s) is used in the fire flow analysis for single family and townhouse units.

There are several locations where the rear of the house or townhouse block faces the side of an adjacent unit. At these locations the distance between the rear and side of the adjacent building is less than 10 meters which appears to violate item 4.1 of Technical Bulletin ISDTB-2014-02 which requires a 10 meter separation between the backs of the adjacent units. Without the 10,000 l/min cap the Fire Underwriters Survey (FUS) method of determining fire flow rates cannot be used as wood frame buildings separated by less than 3 meters is considered on fire unit. As the side yard distances between houses are usually less than 3 meters then all adjacent houses are considered one fire unit which results in a very large fire flow which is impractical to achieve. In order to keep the 10,000 l/min fire flow cap the side wall of a building which is less than 10 meters from an adjacent rear facing building is to be constructed as a fire wall. The locations of the buildings requiring a fire wall construction is shown on **Figure 2.1**.

As the back to back townhouses do not meet the requirements of ISDTB-2014-02, fire flow calculations using the Fire Underwriters Survey (FUS) method are required. Calculations for the 10 unit block and 8 unit block with the most exposures have been carried out. In order to reduce the fire flow, the builder has decided to use "ordinary construction" as defined by the FUS as follows:

Ordinary Construction – Any structure having exterior walls of masonry or such non-combustible material, in which the other structural members, including but not limited to columns, floors, roofs, beams, girders, and joists, are wholly or partly of wood or other combustible material.

With the use of non-combustible exterior walls the highest fire demand is 11,000 l/min for the 10 unit block and 10,000 l/min for the 8 unit blocks.

2.3.4 Boundary Conditions

The City of Ottawa has provided two boundary conditions, one at Cambrian and Seeley's Bay Street and the second one at Dowitcher Grove and Brambling Way. Two separate conditions were given for max day plus fire scenario, one for 10,000 l/min fire flow which will be used for the single family, street townhouses and 8 unit back to back townhouses and a second condition for a fire flow of 17,000 l/min used for the school block and 10 unit back to back townhouse.

A separate set of boundary conditions is provided for the existing Barrhaven pressure zone and for the future pressure zone 3C. In the hydraulic analysis, the boundary conditions for the existing Barrhaven pressure zone for the maximum HGL and peak hour conditions are used as they represent the worst case, highest maximum HGL and lowest peak hour. For the fire flow analysis, the future Zone 3C max day plus fire boundary conditions are the worst case and used in the analysis. A copy of the boundary conditions is included in **Appendix B** and summarized as follows:

DEMAND SCENARIO	EXISTING BARRHAVEN PRESSURE ZONE	FUTURE PRESSURE ZONE 3C
Connection 1 – Cambrian Road at Seeley's Bay		
Max HGL	157.4 m	147.7 m
Peak Hour	139.9 m	144.4 m
Max Day & Fire (10,000 l/min)	144.4 m	141.6 m
Max Day & Fire (17,000 l/min)	133. 9 m	135.1 m
Connection 2 – Brambling Way at Dowitcher Grove		
Max HGL	157.4 m	147.7 m
Peak Hour	137.8 m	144.3 m
Max Day & Fire (10,000 l/min)	139.5 m	133.1 m
Max Day & Fire (17,000 l/min)	121.1 m	113.4 m

2.3.1 Hydraulic Model

A computer model for the subject development has been developed using the H20 MAP Version 6.0 program produced by MWH Soft Inc. The model includes the boundary conditions and the proposed watermains on Cambrian Road, Street 1b and the Meadows Phase 4 proposed watermains.

2.4 Proposed Water Plan

2.4.1 Modeling Results

The hydraulic model was run under basic day, maximum day with fire flows and under peak hour conditions. Water pipes are sized to provide sufficient pressure and to deliver the required fire flows. During the design stage all mains are tested at the minimum 150 mm diameter size, while the pressure criteria is met with the minimum sized mains the fire flow requirement is not achieved at all locations. The main sizes are increased in an iterative process until the fire flow results are

sufficient. The model is run for the full development and for Phase 7 only. The phasing for this site is shown on **Figure 1.4**.

Results of the hydraulic model are include in **Appendix B** and summarized as follows:

Scenario	**Full Development**	**Phase 1 Only**
Basic Day (Max HGL) Pressure Range	567.3 - 618.7 kPa	567.3 - 618.8 kPa
Peak Hour Pressure Range	393.6 – 445.4 kPa	394.9 – 446.6 kPa
Max Day + 10,000 l/min Fire Flow Minimum Flow	167.1 l/s	167.2 l/s
Max Day + 17,000 l/min Fire Flow Minimum Flow	206.7 l/s school block	
	185.4 l/s back to back townhouse	175.9 l/s back to back townhouse

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

Maximum Pressure — All nodes have basic day pressures over 552 kPa, therefore pressure reducing control is required for this development. There are no pressures in the system above 689 kPa.

Minimum Pressure — All nodes in the model exceed the minimum value of 276 kPa (40 psi).

Fire Flow — All projected fire flows for the single family lots, street townhouses and school block exceed the required flows. For the 10 unit back to back townhouse the fire flow matches the required fire flow under the full development scenario but with Phase 1 only the minimum fire flow falls to 175.3 l/s which is marginally below the FUS calculated rate of 183.3 l/s. The fire flow analysis for the 10 unit back to back townhouse was conducted with the 17,000 l/min (283.3 l/s) boundary condition so it can be expected that the projected fire flow would exceed the requirement with a boundary condition of 11,000 l/min (183.3 l/s).

2.4.2 Watermain Layout

Figure 2.1 shows the preliminary Water Plan for the proposed development.

As per the Barrhaven South MSS, a 305 mm watermain is extended along Street 1 and a 305 mm watermain extends from Street 1 through Phase 7 to connect to the proposed watermain on Jackdaw Road and to the future 305 mm watermain on Future Greenbank Road. All other mains in the development are a combination of 150, 200 and 250 mm watermain required to meet the required fire flows.

3 SANITARY SEWERS

3.1 Existing Conditions

The South Nepean Collector Sewer is the wastewater outlet for Barrhaven South including the subject property. In 2008, a developer's group front ended the construction of the extension of the west arm of this collector sewer along the south side of the Jock River to existing Greenbank Road, and southerly in Greenbank Road to just south of Cambrian Road.

In accordance with the approved Master Servicing Study in 2009, Mattamy Homes extended a trunk sewer in Cambrian Road which has been constructed up to the Cambrian Road–Future Greenbank intersection.

3.2 Barrhaven South MSS

The BSMSSA provides sanitary sewer alignments and sizing along with drainage areas for the Barrhaven South community. The Meadows Phase 5 lands are included in the BSMSSA as external drainage areas tributary to MH 500A. The BSMSSA drainage area plan and sewer design sheets have been included in **Appendix C**. As noted above, the Barrhaven South community, inclusive of the subject lands, are included in the South Nepean Collector Sewer drainage area.

3.3 Half Moon Bay West Detail Design and BSMSS Addendum

The detailed design plans for Mattamy Homes' Half Moon Bay West subdivision show that during Phase 1 works the sanitary trunk sewer will be extended westward within Cambrian Road from the future Greenbank intersection to the Cambrian Road-Street 1B intersection. As noted earlier in Section 1.5, the subject lands will outlet to a sanitary sewer within Half Moon Bay West's Street 1B.

A sanitary flow allocation for all Meadows Phase 7&8 lands has been carried by Mattamy in their design of the HMBW subdivision. A copy of the Half Moon Bay West sanitary sewer design sheet and drainage area plan with the Meadows Phase 7&8 area and flows highlighted has been included in **Appendix C**. Additionally, the Barrhaven South Master Servicing Study Addendum completed in July 2018 also shows flows from the Tamarack Phase 7&8 lands routing northwards along Street 1B to the collector proposed within Cambrian Road.

Review of the sanitary sewer design sheet and drainage area plan for Half Moon Bay West confirms that 32.7 Ha of Tamarack Homes' Meadows Phase 7&8 lands have been accounted for in their sanitary sewer flows. A sanitary flow calculation for the Meadows Phase 7&8 development, which can be found in **Appendix C**, has been completed to estimate the total flows from the site.

The Meadows sanitary flow calculation confirms the Meadows Phase 7&8 flow allocation carried within the Half Moon Bay West sanitary sewer system is adequate to facilitate the ultimate buildout of Tamarack's Meadows Phase 7&8 development.

3.4 Design Criteria

The estimated wastewater flows from the subject site are based on the recently approved City of Ottawa design criteria identified in Technical Bulletin ISTB-2018-01. Among other items, these include:

- Average residential flow = 280 l/c/d
- Peak residential flow factor = (Harmon Formula) x 0.80
- Average commercial flow = 28,000 l/s/ha

- Average institutional flow = 28,000 l/s/ha
- Peak ICI flow factor = 1.5 if ICI area is ≤ 20% total area
  1.0 if ICI area is > 20% total area
- Inflow and Infiltration Rate = 0.33 l/s/ha
- Minimum Full Flow Velocity = 0.60 m/s
- Maximum Full Flow Velocity = 3.0 m/s
- Minimum Pipe Size = 200 mm diameter

The following density rates are estimated for the subject site:

- Single units = 3.4
- Semi units = 2.7
- Townhouse and back to back units = 2.7
- Apartment units = 1.8

3.5 Recommended Sanitary Plan

The proposed sanitary sewer layout plan for the Meadows Phase 7&8 development is shown on **Figure 3.1** in **Appendix C**.

The sanitary sewer is deepest at the connection to Cambrian Road, here there is 4.9m of cover over the pipe. Cover over the pipe remains in the 3.5m to 4.5m range throughout the subdivision; however, as the sewer approaches the east limit of the site cover is reduced to approximately 2.8m above obvert.

Given the depth of sanitary sewer, at this time it is not anticipated that high level sewers, sanitary maintenance hole landings or pipe insulation will be necessary for this development. Pipe obverts and cover are to be confirmed at the detailed design phase.

4 STORMWATER MANAGEMENT

4.1 Existing Conditions

As mentioned in section 1.2, the Meadows Phase 7&8 development is located in the Barrhaven South community area. The approved Master Servicing Study, the BSMSS, for these lands recommends the construction of five stormwater management facilities and associated sewer systems to provide stormwater management for the Barrhaven South lands. Currently, the Corrigan and Todd SWM facilities are operational.

The West Clarke drain, formerly located in the vicinity of the Meadows Phase 7&8 lands, and with approval through the Department of Fisheries and Oceans and the Rideau Valley Conservation Authority, was recently redirected and infilled by others. A temporary drainage system to replace the West Clarke drain has been constructed and traverses both the east and north boundaries of the subject site before continuing northward across Mattamy lands towards the Jock River.

4.2 Barrhaven South MSS

The report provides a high level analysis for the stormwater management needs to facilitate the growth of the Barrhaven South community. The report highlights the Jock River as the ultimate receiving watercourse and identifies the City design criteria to be used for modelling and design and identifies the location of the proposed and existing stormwater ponds to service the Barrhaven South community and provides anticipated catchment areas.

FIG4.5 – SWM Ponds Catchment Areas taken from the BSMSS can be found in **Appendix D**. The figure shows that the whole of the Meadows Phase 5 lands are contained within the future Clarke Pond drainage area.

4.3 Clarke Pond

Clarke pond, located within the Mattamy Homes' Half Moon Bay West Phase 1 lands, has been designed by DSEL and JFSA and is currently under review by the City of Ottawa. The pond location within the Mattamy Lands is shown on the Figure 1 by DSEL and JFSA, which is located in **Appendix D**. As noted in section 4.2, the whole of the Meadows Phase 7&8 lands are contained within the Clarke Pond drainage area, a figure from DSEL and JFSA identifying proposed drainage areas is also included in **Appendix D**.

It is anticipated that at the time of detailed design for the Meadows Phase 7&8 lands, modelling files will be available to allow the analysis and detailed design of the subject site which are tributary to the Clarke Pond.

4.4 Half Moon Bay West Detail Design

The detailed design plans for Mattamy Homes' Half Moon Bay West subdivision show that during Phase 1 works a storm trunk sewer will be installed from the west cell of the proposed Clarke Pond and constructed southwards along Mattamy's Street 1A terminating just south of the Street 1A-Cambiran Road intersection. The HMBW Phase 1 storm drainage area plan, confirming flows from the Meadows Phase 5 lands are included in the design of these storm trunk sewers, has been included in **Appendix D**.

4.5 Minor Storm Sewer Design Criteria

The minor system storm sewers for the subject site are proposed to be sized based on the rational method, applying standards of both the City of Ottawa and MOECC. Some of the key criteria for this site include the following:

- Sewer Sizing: Rational Method
- Design Return Period: 1:2 year (local streets)
  1:5 year (collector streets)
  1:10 year (arterial roads)
- Initial Time of Concentration 10 minutes
- Manning's: 0.013
- Minimum Velocity: 0.80 m/s
- Maximum Velocity: 3.00 m/s
- Minimum Slope:

PIPE DIAMETER (MM)	SLOPE (%)
250	0.432
300	0.340
375	0.250
450	0.195
525	0.160
600	0.132
675	0.113
750 and larger	0.100

- Runoff Coefficients (to be confirmed at detailed design stage):

LAND USE		RUNOFF COEFFICIENT
Residential	Low Density	0.65
	Medium Density	0.70
	High Density	0.80
Commercial		0.75
Green Space		0.30
Institutional		0.75
Park		0.20
Transitway		0.82
Arterial Road		0.82
Collector Road		0.82

4.6 Recommended Minor Storm Plan

Figure 4.1 located in **Appendix D** shows the on-site minor storm layout plan for this development. A connection from the on-site storm sewers to the storm sewers constructed by Mattamy Homes during the Phase 1 of the Half Moon Bay West development will be made. The minor flows from

the Meadows Phase 7&8 site will be conveyed via storm sewer north via street 1B and street 1A and outletting to the western cell of the proposed Clarke Pond. The on-site storm sewers will be sized to accommodate storm drainage as per the guidelines described in section 4.4 and in concert with the BSMSS. A preliminary storm sewer design sheet used to estimate the on-site trunk storm sewers has also been included in **Appendix D**.

4.7 Dual Drainage

Development of the subject site will include a stormwater strategy using the dual drainage system. The system features a combination of on-site detention (surface ponding) with inlet control devices (ICDs) and direct conveyance with no ponding. It accommodates both minor and major stormwater runoff. During frequent storms the effective runoff collected by catchment areas is directly released via catch basin inlets into the network of storm sewers, called the minor system. During less frequent storms, the balance of the flow (in excess of the minor flow) is accommodated by a system of rear yard swales and street segments called the major system. The main advantage of this arrangement is its ability to adjust the rate of total inflow into the minor system to satisfy the required level of service as a function of the local applicable design constraints. The required total inflow is typically maintained by the restriction of the capacity and the density of the inlets directly connected into this system. As noted, during less frequent storms, the balance of the flow is accommodated by the major system. Typically, this accommodation is achieved by the attenuation on catchment surfaces called on-site detention and/or direct conveyance of the flow to a recipient.

Cambrian Road, an arterial road, is a constraint with respect to conveyance of major flow across the road's surface. Specifically, as an arterial road, there should be no cross flow during events up to the 100 year event. As such, the major flow from the site will be conveyed in part to the Clarke pond via the proposed storm network and/or via a drainage feature along Cambrian Road to the Jock River as per the BSMSS. However, the major flow from both the proposed school and park blocks will be controlled on site.

5 SITE GRADING

Ultimately, the grading of the subject site must take into account the proposed elevation of Future Greenbank Road as noted in the Environmental Assessment for that section of roadway and the abutting properties to the north and south.

Hence, a preliminary macro grading plan has been prepared to confirm that the site can be graded to respect these above-noted boundary conditions as a function of the proposed storm and sanitary sewer inverts, existing ground elevations, grade raise restrictions and major flow routing requirements and to identify any constraints prior to the detailed design phase.

It should be noted that based on the applicable grade raise restrictions, on-site conditions and proposed infrastructure, a portion of the property will require a surcharge program and/or the use of lightweight fill and/or other alternative construction measures.

The preliminary macro grading plan is shown of **Figure 5.1** and can be found in **Appendix E**. For reference, a copy of Drawing A-2 Macro Grading Plan from the 2017 BSMSS report is additionally included in **Appendix E**.

6 EROSION AND SEDIMENTATION CONTROL PLAN

During construction, existing conveyance systems and water courses can be exposed to sediment loading. Development of a subdivision such as the subject site can potentially create deleterious material which can enter the natural environment and gain access to fish and amphibian habitat. In order to prevent site generated sediments from entering the environment, an Erosion and Sedimentation Control Plan (ESCP) will be implemented prior to development. Although a generic ESCP can be developed as part of this report and subsequent Design Briefs, the final plan will be developed and implemented by the Owner's general contractor.

The erosion and sedimentation control strategy for the subject site could include erection of silt fences, straw bale barriers and rock check dams. These measures will ensure protection of both adjacent developments and the natural environment adjacent to and downstream of the site.

Other elements of an ESCP could also include installation of bulkhead barriers at the nearest existing downstream manholes to ensure deleterious material does not gain access to those sewers and potentially the proposed Clarke Pond. Also, the final ESCP will incorporate features to deal with disposal of any taken water. Some of the features or general requirements are sometimes conditions of a Permit To Take Water.

A copy of a potential Erosion and Sedimentation Control Plan (ESCP) is shown on **Figure 6.1**, which is included in **Appendix E**.

7 APPROVALS AND PERMIT REQUIREMENTS

7.1 City of Ottawa

The City of Ottawa will review all development documents including final working drawings and related reports. Upon completion, the City will approve the local watermains, under Permit No. 008-202; submit the sewer extension MECP application to the province and eventually issue a Commence Work Notification.

7.2 Province of Ontario

The Ministry of Environment, Conservation and Parks (MECP) will approve the local sewers under Section 53 of the Ontario Water Resources Act and issue an Environmental Compliance Approval. A Permit To Take Water may also need to be issued by the MECP.

7.3 Conservation Authority

The Rideau Valley Conservation Authority will be contacted prior to the detail design stage to confirm if any permits are required from the agency during construction of the subdivision works.

7.4 Federal Government

There are no required permits, authorizations or approvals needed expressly for this development from the federal government.

8 CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusion

While some infrastructure which is needed to service the subject site already exists, the development plan will include expansion and extension of infrastructure to adequately service the site with water supply, wastewater collection and disposal and management of stormwater runoff in accordance with the current BSMSS.

The extension of the existing watermains through the subject site will provide a reliable source of both drinking water and fire flows.

The ultimate outlet wastewater sewer system is already in place, and a new stormwater management facility, Clarke Pond, is currently under design and once constructed will provide the necessary treatment for runoff from the subject site.

Therefore, including both existing and proposed major infrastructure there will be suitable public services put in place to service the subject site.

8.2 Recommendation

From an assessment of major municipal infrastructure perspective, it is recommended that the development application for the Tamarack Homes – Meadows Phase 7&8 lands be accepted and that development of the property move forward.

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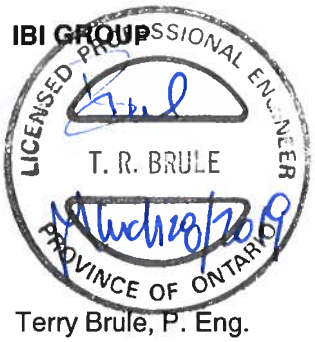

Terry Brule, P. Eng.
Associate

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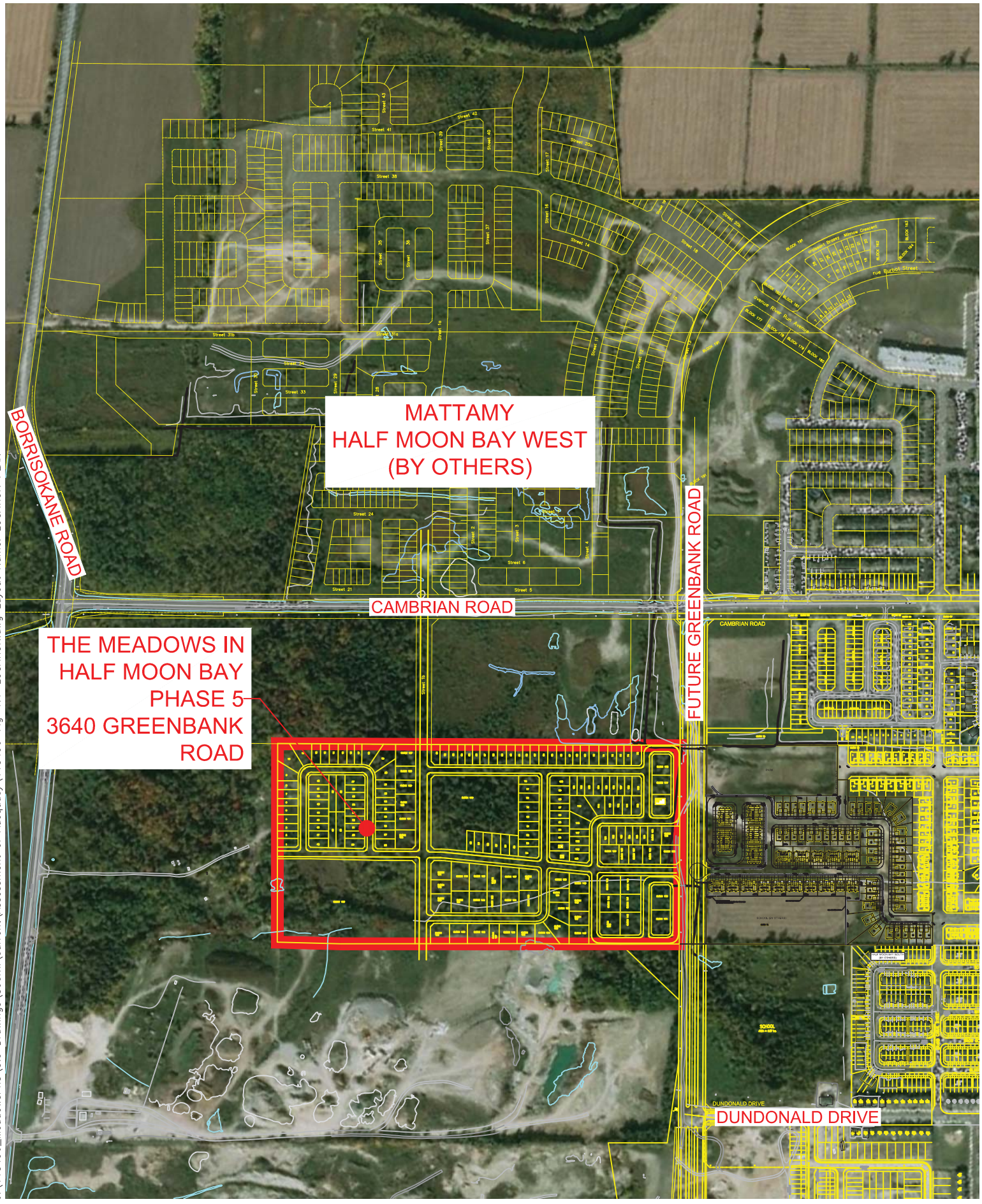


J:\115496_MeadowsPh5\5.9 Drawings\59civil\current\Assessment of Adequacy\115496-Fig-1.1-LOCATION.dwg Layout Name: LOCATION PLAN

Project Title	Drawing Title	Sheet No.
THE MEADOWS IN HALF MOON BAY PHASE 7&8	SITE LOCATION	FIG. 1.1 REV. 2

APPROVED UNDER SECTION 5 OF THE PLANNING ACT BY THE CITY OF OTTAWA THIS ____ DAY OF _____, 20___

STEPHEN WILLIS, MCIP, RPP, 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 _____, 2019 AND ENTERED IN THE PARCEL REGISTER FOR PROPERTY IDENTIFIER 04592-2486, 04592-2811, AND THE REQUIRED CONSENTS ARE REGISTERED AS PLAN DOCUMENT NUMBER OC-_____.

REPRESENTATIVE FOR LAND REGISTRAR

THIS PLAN COMPRISES OF PART OF PIN 04592-2486 AND PART OF PIN 04592-2811.
PART OF BLOCK 183 AND STREET 6 ; SUBJECT TO EASEMENT OVER PART 4 ON PLAN 4R-29284 AS IN OC1769117 AND SUBJECT TO EASEMENT OVER PART 1 ON PLAN 4R-29551 AS IN OC1797333.

PLAN OF SUBDIVISION of

PART OF LOTS 9 AND 10 CONCESSION 3 (RIDEAU FRONT)

(GEOGRAPHIC TOWNSHIP OF NEPEAN)

AND BLOCK 72 REGISTERED PLAN 4M-XXXX CITY OF OTTAWA

Scale 1:1250

0 10 20 40 60 80 METRES

METRIC CONVERSION

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

GRID SCALE CONVERSION

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999933.

BEARING NOTE

BEARINGS ARE GRID, DERIVED FROM CAN-NET VRS NETWORK GPS OBSERVATIONS ON NCC HORIZONTAL CONTROL MONUMENTS 19773035 AND 19680191, CENTRAL MERIDIAN, 76° 30' WEST LONGITUDE MTM ZONE 9, NAD83 (ORIGINAL).

19773035 N:5006060.42 E:324888.04
19680191 N:5033564.26 E:388064.94

OBSERVED REFERENCE POINTS DERIVED FROM THE CAN-NET VRS NETWORK GPS OBSERVATIONS ON NCC HORIZONTAL CONTROL MONUMENTS 19773035 AND 19680191, CENTRAL MERIDIAN, 76° 30' WEST LONGITUDE MTM ZONE 9, NAD83 (ORIGINAL). COORDINATES TO URBAN ACCURACY PER SEC 14(2) OF O.REG. 216/10

ORP ID	NORTHING	EASTING
⊗	5012066.56	363839.78
⊕	5011546.28	363552.10

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

LEGEND

	DENOTES	
■	–	FOUND MONUMENTS
□	–	SET MONUMENTS (IB) UNLESS OTHERWISE STATED
IB	–	IRON BAR
IB#	–	ROUND IRON BAR
SIB	–	STANDARD IRON BAR
SSIB	–	SHORT STANDARD IRON BAR
CC	–	CUT CROSS
CP	–	CONCRETE PIN
WIT	–	WITNESS
PIN	–	PROPERTY IDENTIFICATION NUMBER
MEAS	–	MEASURED
PROP	–	PROPORTIONED
OU	–	ORIGIN UNKNOWN
SG	–	STANTEC GEOMATICS LTD.
ORP	–	OBSERVED REFERENCE POINT
•	–	•
•	–	•
•	–	•

OWNER'S CERTIFICATE PART OF PIN 04592-2486
PART OF PIN 04592-2811

THIS IS TO CERTIFY THAT :

1. LOTS 1 TO 126, BOTH INCLUSIVE, BLOCKS 127 TO 181, BOTH INCLUSIVE, THE STREETS, NAMELY 1 TO 10, AND RESERVES, NAMELY BLOCKS 182, 183, 184, 185, 186, 187, 188 AND 189, HAVE BEEN LAID OUT IN ACCORDANCE WITH OUR INSTRUCTIONS.
2. THE STREETS ARE DEDICATED TO THE CITY OF OTTAWA AS PUBLIC HIGHWAYS.

DATE

CHRISTOPHER TAGGART
TAMARACK (NEPEAN) CORPORATION
I HAVE THE AUTHORITY TO BIND THE CORPORATION

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.

THE SURVEY WAS COMPLETED ON THE DAY OF , 2019

DATE

BRIAN J. WEBSTER
ONTARIO LAND SURVEYOR

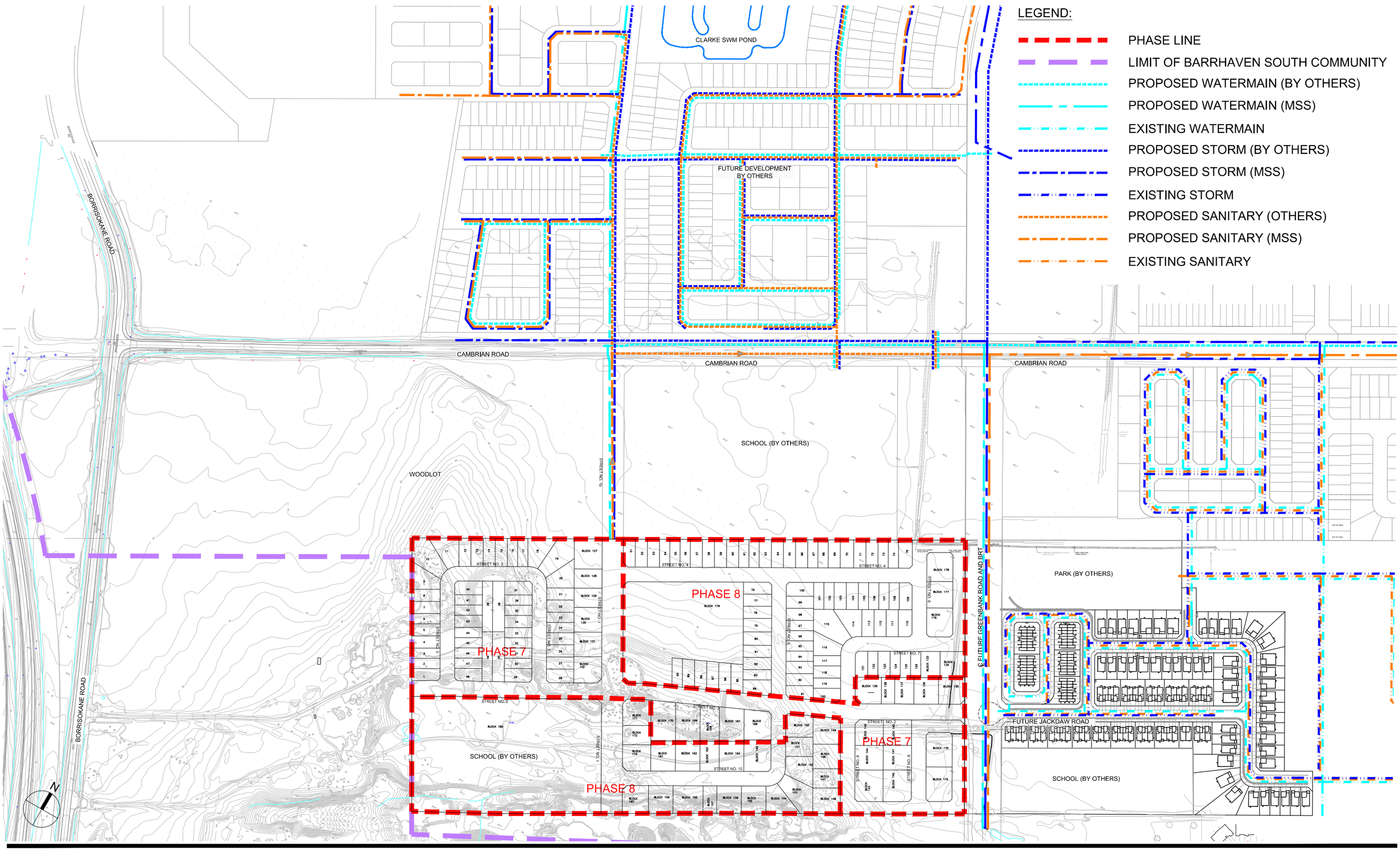
Stantec

Stantec Geomatics Ltd.
CANADA LANDS SURVEYORS
ONTARIO LAND SURVEYORS
1331 CLYDE AVENUE, SUITE 400
OTTAWA, ONTARIO, K2C 3G4
TEL. 613.722.4420 FAX. 613.722.2799
ottawa@stantec.com

DRAWN: CEC	CHECKED: *	PM: FP	FIELD: *	PROJECT No.: 161613817-132

CURVE TABLE				
LOT/BLOCK	RADIUS	ARC	CHORD	BEARING
9	20.00	5.55	5.53	N21°58'10"W
10	20.00	13.63	13.37	N5°30'20"E
11	20.00	12.29	12.10	N42°38'15"E
18	20.00	9.97	9.87	N74°31'30"E
19	20.00	13.93	13.65	N71°14'30"W
20	20.00	7.52	7.47	N40°31'30"W
114	20.00	7.76	7.71	N49°03'35"E
115	20.00	13.38	13.14	N18°50'15"E
116	20.00	10.27	10.16	N15°02'45"W
152	20.00	6.32	6.30	N20°42'00"W
153	20.00	13.99	13.71	N08°23'55"E
154	20.00	11.10	10.96	N44°20'25"E
171	82.00	6.25	6.24	N62°25'30"E
179	100.00	9.28	9.27	N62°54'00"E

Scale	Project Title	Drawing Title	Sheet No.
IBI	THE MEADOWS IN HALF MOON BAY PHASE 7&8	DRAFT PLAN	FIG. 1.2 REV. 2
N.T.S.			



J:\115496_MeadowsPh5\5.9 Drawings\5.9civil\current\Assessment of Adequacy\115496-Fig-1.3-EXISTING.dwg Layout Name: EXISTING SERVICES Plot Scale: 1:8.704 Plotted At: 3/29/2019 Last Saved By: James.Bottison Last Saved At: Mar. 29, 19

IBI

Scale

N.T.S.

Project Title

THE MEADOWS IN HALF MOON BAY
PHASE 7&8

Drawing Title

LOCATION OF EXISTING MAJOR MUNICIPAL INFRASTRUCTURE

Sheet No.

FIG. 1.3
REV. 2

LEGEND:

PHASE LINE

WOODLOT

SCHOOL (BY OTHERS)

(FUTURE DEVELOPMENT BY OTHERS)

BLOCK 192

STREET NO. 1b

Street 1b

STREET NO. 3

STREET NO. 4

STREET NO. 1

STREET NO. 2

STREET NO. 3

STREET NO. 4

STREET NO. 5

STREET NO. 6

STREET NO. 7

STREET NO. 8

STREET NO. 9

STREET NO. 10

PHASE 7

PHASE 8

PHASE 8

PHASE 7

SCHOOL (BY OTHERS)

FUTURE GREENBANK ROAD AND BRT

FUTURE JA

BLOCK 127
BLOCK 128
BLOCK 129
BLOCK 130
BLOCK 131
BLOCK 132
BLOCK 133
BLOCK 134
BLOCK 135
BLOCK 136
BLOCK 137
BLOCK 138
BLOCK 139
BLOCK 140
BLOCK 141
BLOCK 142
BLOCK 143
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BLOCK 179
BLOCK 180

N

Scale	Project Title	Drawing Title	Sheet No.
N.T.S.	THE MEADOWS IN HALF MOON BAY PHASE 7&8	PHASING PLAN	FIG. 1.4 REV. 2

LEGEND:

LIMIT OF DEVELOPMENT

CAMBRIAN ROAD

BLOCK 608

BLOCK 609

SCHOOL (BY OTHERS)

WOODLOT

PARK (BY OTHERS)

FUTURE GREENBANK ROAD AND BRT

FUTURE JACKDAW ROAD

BORRISOKANE ROAD

STREET NO. 1

STREET NO. 2

STREET NO. 3

STREET NO. 4

STREET NO. 6

STREET NO. 7

STREET NO. 8

STREET NO. 9

STREET NO. 10

BLOCK 74

BLOCK 78

Scale	Project Title	Drawing Title	Sheet No.
N.T.S.	THE MEADOWS IN HALF MOON BAY PHASE 7&8	SITE TOPOGRAPGY	FIG. 1.5 REV. 2

APPENDIX A

Development Servicing Study Checklist

The following table is a customized copy of the current City of Ottawa's Development Servicing Study Checklist. It is meant to be a quick reference for location of each of the items included on the list. The list contains the various item description and the study section in which the topic is contained.

GENERAL CONTENT

	ITEM DESCRIPTION	LOCATION
	Executive Summary (for larger reports only)	N/A
√	Date and revision number of the report	Front Cover
√	Location Map and plan showing municipal address, boundary, and layout of proposed development.	Report Title, Figure 1.1, Section 1.4
√	Plan showing the site and location of all existing services.	Figure 1.3
√	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.	Section 1.4, Appendix A, Figure 1.2
√	Summary of Pre-consultation Meeting with City and other approval agencies.	Section 1.7, Appendix A
√	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 defendable design criteria.	Sections 1.3, 2.2, 3.2, 4.2
√	Statement of objectives and servicing criteria	Section 1.3, 2.3, 3.4 & 4.3, 4.4, 4.5, 4.6
√	Identification of existing and proposed infrastructure available in the immediate area.	Figure 1.3
√	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).	N/A
√	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.	Section 5 Figure 5.1
√	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.	N/A
	Proposed phasing of the development, if applicable.	Section 1.6, Figure 1.4
√	Reference to geotechnical studies and recommendations concerning servicing.	Section 1.9 Appendix A

√	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	Noted

DEVELOPMENT SERVICING REPORT: WATER

	ITEM DESCRIPTION	LOCATION
√	Confirm consistency with Master Servicing Study, if available	Section 2.2
√	Availability of public infrastructure to service proposed development	Section 2.1
√	Identification of system constraints – external water needed	Sections 2.2
√	Identify boundary conditions	N/A
√	Confirmation of adequate domestic supply and pressure	Section 2.4 & Appendix B
√	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.	Section 2.2
√	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.	Section 2.2 Appendix B
	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defining phases of the project including the ultimate design.	Section 2.4
	Address reliability requirements such as appropriate location of shut-off valves.	Detail Design
√	Check on the necessity of a pressure zone boundary modification.	N/A
√	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.	Section 2.2
√	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.	Detail Design
√	Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities and timing of implementation.	N/A
√	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 2.3
√	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	Detailed Design

DEVELOPMENT SERVICING REPORT: WASTEWATER

	ITEM DESCRIPTION	LOCATION
√	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).	Section 3.4
√	Confirm consistency with Master Servicing Study and/or justifications for deviations.	Section 3.2
√	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 condition of sewers.	Detail Design
√	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 3.3, Appendix C
√	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)	Section 3.3
	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix "C") format.	Detail Design
√	Description of proposed sewer network including sewers, pumping stations and forcemains.	Section 3.5 Figure 3.1
√	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).	Section 1.9
√	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
√	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
√	Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
√	Special considerations such as contamination, corrosive environment etc.	Detail Design

DEVELOPMENT SERVICING REPORT: STORMWATER CHECKLIST

	ITEM DESCRIPTION	LOCATION
√	Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 4.1, 4.2, 4.3
√	Analysis of available capacity in existing public infrastructure.	Section 4.3, 4.4,
√	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Figure 1.3, Figure 4.1, Appendix D

√	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.	Section 4.2, 4.3
√	Water quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 4.2, 4.3
√	Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	Section 4.2, 4.3, 4.4
√	Set-back from private sewage disposal systems.	N/A
√	Watercourse and hazard lands setbacks.	N/A
√	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Section 1.7
√	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
√	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	Section 4.3 Detail Design
√	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	Section 4.1
	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.	Detail Design
√	Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
√	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Section 4.5, 4.6, Appendix D
	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.	N/A
√	Identification of potential impacts to receiving watercourses	N/A
√	Identification of municipal drains and related approval requirements.	Section 4.1
√	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Detail Design
√ √	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Detail Design
	Inclusion of hydraulic analysis including hydraulic grade line elevations.	Detailed Design
√	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 6
√	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.	N/A
√	Identification of fill constraints related to floodplain and geotechnical investigation.	Section 1.9,

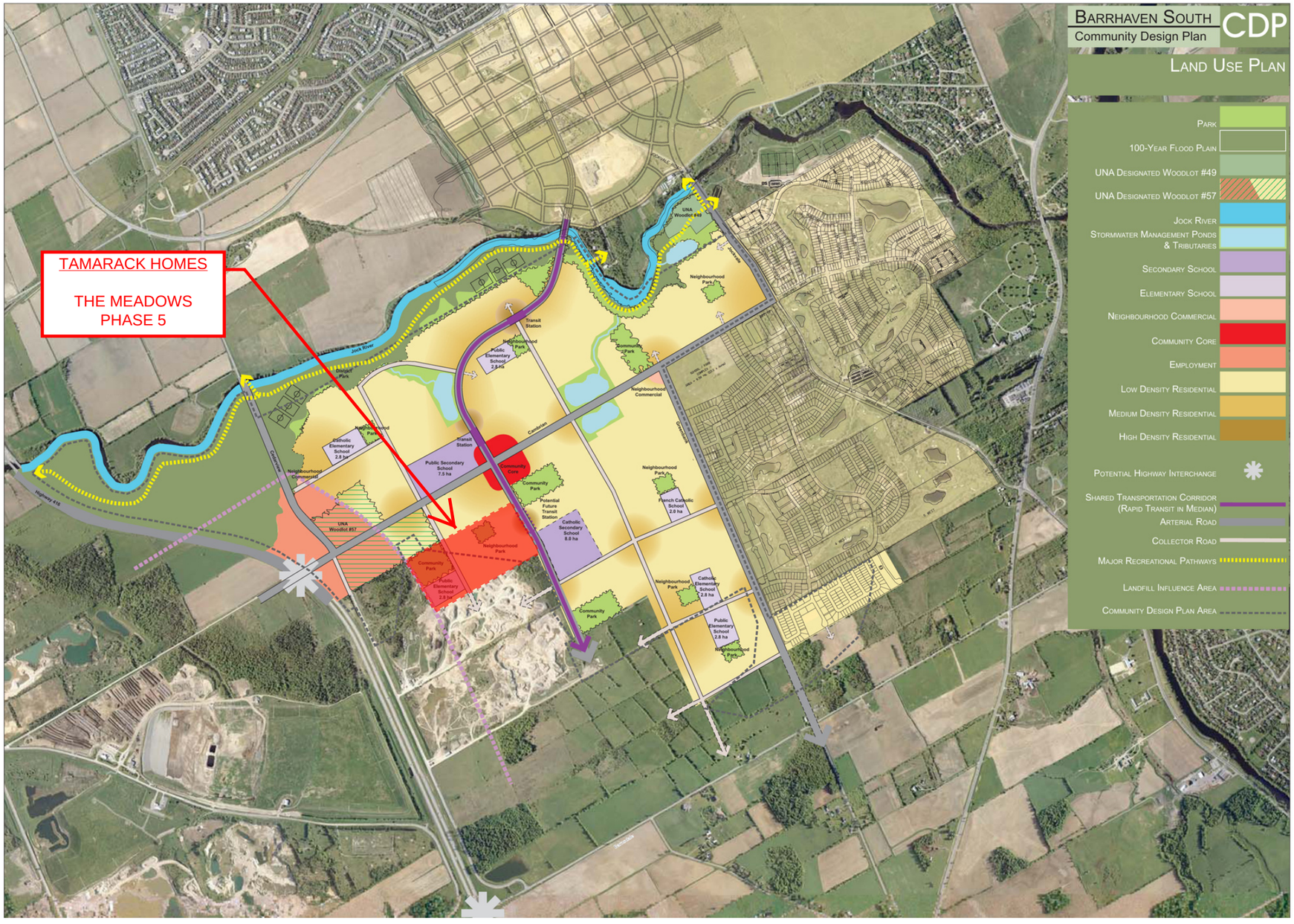
APPROVAL AND PERMIT REQUIREMENTS: CHECKLIST

	ITEM DESCRIPTION	LOCATION
√	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.	Section 1.7
	Application for Certification of Approval (CofA) under the Ontario Water resources Act.	Detail Design
√	Changes to Municipal Drains	N/A
√	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	Section 7

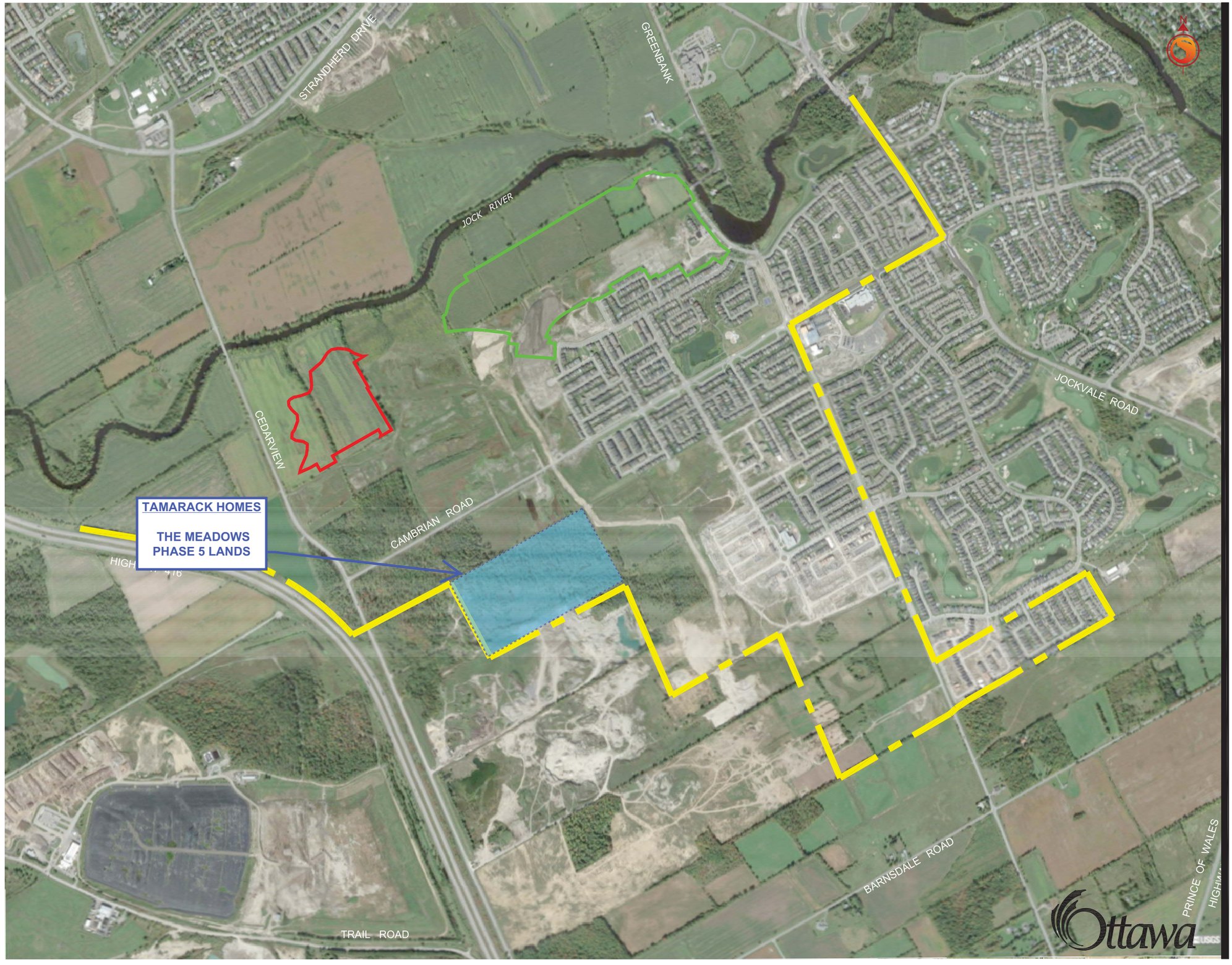
CONCLUSION CHECKLIST

	ITEM DESCRIPTION	LOCATION
√	Clearly stated conclusions and recommendations	Section 8.1 & 8.2
	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.	Detail Design
√	All draft and final reports shall be signed and stamped by professional Engineer registered in Ontario.	Completed

Figure 3-3: Barrhaven South Community Design Plan




Relotted as residential
Public Secondary School
6.1ha
Cedarview
Cambrian
Catholic Elementary School (2.8 ha)
NP1
Community Core (1.28 ha)
Community Core (2.04 ha)
CP3
Woodlot Area (7.66 ha)
Employment
Woodlot Area (10.24 ha)
Employment
CP2
Public Elementary School (2.8 ha)
Secondary School - Optional Location (8.0 ha)
CP4
AGGREGATE PIT
(30.5 ha)
TAMARACK HOMES
THE MEADOWS
PHASE 5



Stantec

Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613.722.4420
www.stantec.com

Legend

- LIMIT OF CDP BOUNDARY
- LIMIT OF CEDARVIEW POND DRAINAGE BOUNDARY
- LIMIT OF GREENBANK POND DRAINAGE BOUNDARY

Notes

1. CLARKE POND IS CURRENTLY BEING DESIGNED BY JFSA/DSEL. AVAILABLE DESIGN INFORMATION FOR THE CLARKE POND WILL BE PROVIDED AS AN APPENDIX.

Revision	By	Appd.	YY.MM.DD
2 REVISED AS PER CITY COMMENTS	ST	AP	17.09.29
1 ISSUED FOR MSS ADDENDUM	ST	AP	14.11.26

File Name: 163400999-WM.DWG | Dwn. ST | Chkd. AP | Dsgn. ST | YY.MM.DD 14.11.21

Permit-Seal

Client/Project
CITY OF OTTAWA

BARRHAVEN SOUTH MASTER SERVICING STUDY ADDENDUM
Ottawa, ON

Title
OVERALL BARRHAVEN SOUTH AREA

Project No.	Scale	Drawing No.	Sheet	Revision
163400999	1:15000 (0 150 450 750m)	FIG-1	1 of 1	2

CAMBRIAN ROAD

BORRISOKANE ROAD

N

LEGEND:

- BOREHOLE LOCATION, CURRENT INVESTIGATION
- TEST PIT LOCATION, CURRENT INVESTIGATION
- BOREHOLE LOCATION, PATERSON GROUP REPORT PG0214, 2009
- TEST PIT LOCATION, PATERSON GROUP REPORT PG0214, 2009
- BOREHOLE WITH MONITORING WELL LOCATION, PATERSON GROUP REPORT PE0156, 2004
- 93.78 GROUND SURFACE ELEVATION (m)

TEST HOLE LOCATIONS (CURRENT INVESTIGATION) AND GROUND SURFACE ELEVATIONS PROVIDED BY STANTEC GEOMATICS LTD.

GRADE RAISE

UP TO 1.0m

BH 6-09
94.00

TP 8
99.50

TP 10
99.00

TP 7-18
97.89

BH 3-18
95.74

TP 5
94.22

BH 1-18/TP 2-18
93.78

TP 1-18
93.42

TP 12
96.33

TP 7
97.75

TP 6
99.11

TP 4
97.88

BH 3

TP 13
95.48

TP 11
98.98

TP 9
98.73

BH 5-09
93.35

BH 2-18
97.02

TP 3
103.11

TP 2
97.95

TP 1
95.00

BH 3
94.97

TP 5-18
96.86

GRAVEL TRAIL

TP 6-18
97.26

NO GRADE RAISE
RESTRICTION

TP 4-18
97.13

TP 3-18
96.11

SCALE: 1:3000

0 25 50 75 100 125 150 200m

patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL
0			

TAMARACK DEVELOPMENTS

GEOTECHNICAL INVESTIGATION
PROP. RESIDENTIAL DEVELOPMENT - THE MEADOWS - BORRISOKANE RD.
OTTAWA, ONTARIO

Title:

PERMISSIBLE GRADE RAISE PLAN

Scale: 1:3000	Date: 01/2018
Drawn by: MPG	Report No.: PG4242-1
Checked by: CB	Dwg. No.: PG4242-2
Approved by: DJG	Revision No.: 0

p:\autocad drawings\geotechnical\pg42xx\pg4242-1 thlp.dwg

From: Moore, Sean [mailto:Sean.Moore@ottawa.ca]
Sent: April-27-17 3:01 PM
To: Michelle Taggart <mtaggart@taggart.ca>
Subject: Tamarack Barrhaven Half Moon Bay West

Michelle,

In regards to our preconsult Tamarack's piece of land in the Barrhaven South CDP I wanted to touch base a couple of matters.

- Once you discuss the parkland distribution and overall park plan with Mattamy you can revise you draft plan (if necessary)
- I've attached a concept which illustrates how the road pattern could address the relocated school block, and I think it shows little impact on Tamarack's lands.
- A brief paragraph stating the reasoning behind this modification, and clearly explain the traffic circulation/mobility and connectivity may or may not be impacted is what we would need to officially support the removal of an access to the future Greenbank.
- Going through the CDP there are policies (Section 7.8) which deal with the adjacent existing Sand and Gravel Resource. The sand and gravel resource lands are going through a CDP exercise (with Cheryl Brouillard) however these will likely remain sand and gravel resource in the CDP. You will need to address the proximity of your lands to this operation (within 300 metres) and provide evidence through a Resource Impact Assessment that residential has no adverse impact on the resource and its operation. This study is to be completed with the operator's input and to be reviewed by the MNR as well.

Thus, given the Tamarack lands are within 300 metres of this designation and an active operation, you will either need to a) wait for the resource to be exhausted or b) provide the Mineral Resource Impact Assessment Study to demonstrate there is no negative impact on the resource, in consultation with the MNR and the Sand and Gravel operator.

List of required Plans/Reports with your applications:

Required Plans/Studies:

- Draft Plan of Subdivision (50 copies)
- Survey Plan (2 copies)
- Planning Rationale, with Integrated Environmental Review (4 copies)
- Preliminary Grading/Drainage Plan (6 copies)
- Serviceability Study (6 copies)
- Community Transportation Study (7 copies)
- Noise Feasibility Study (3 copies)
- Geotechnical Study (4 copies)
- Phase 1 ESA (5 copies) – to conformity with OReg 153/04
- Tree Conservation Report (5 copies) TCR should be integrated with EIS
- Environmental Impact Statement (11 copies) EIS should be integrated with TCR
- Mineral Resource Impact Assessment Study (4 copies)
- Archaeological Resource Assessment (3 copies)

All required plans & reports are to be provided in digital format (.pdf) at application submission in addition to any required hard copies.

Link to Plan of Subdivision application form:
https://app06.ottawa.ca/online_services/forms/ds/Application_for_Subdivision_en.pdf

Link to Zoning By-law Amendment application form:
https://app06.ottawa.ca/online_services/forms/ds/Application_for_Zoning_Amendment_en.pdf

Preliminary Staff Comments:

- Overall we support the street layout as it respects the CDP – ab description from your Transportation consultant advising there are no impacts with the removal of an access to future Greenbank Road would satisfy us in your street network design.
- Please coordinate parks planning with Glenview Homes and Mattamy Homes with an overall parks facility fit plan, and update your proposed draft plan accordingly.
- The 300m distance from a sand/gravel resource must be respected, and thus to develop within the 300m a Resource Impact Study is required to determine the impacts on introducing sensitive land uses in proximity to the sand and gravel resource is required
- I am also attaching a copy of the draft MNR Mineral Aggregate Resources Reference Manual which gives general guidance with respect to impact assessment considerations involving mineral aggregate sites.
- Ensure the plan of subdivision respects the Landfill Zone of Influence (see attached pdf) and the Policies of the CDP (Section 7.7), and note lands beyond the 500 metres and within 1000 metres will require warning notices on title regarding potential odour impacts / and requirements for fully sealed units / AC units. Any development within the 500 metres must comply with Section 3.8 of the Official Plan (Solid Waste Disposal Sites), where a study must be provided that demonstrates the solid waste disposal site will not have unacceptable effects on the proposed development.
- A node of 'apartments' (High Density Residential) is noted in the demonstration plan for the CDP abutting the future Greenbank Road. We will be looking for products in this area of your draft plan that meet the density requirements of the CDP (see Section 5.2.2 of the CDP)
- We will require a 37.5 m ROW protection from Cambrian to Barnsdale for the future Greenbank Road
- Please consult with the Rideau Valley Conservation Authority (Glen MacDonald, 613-692-3571 ext. 1133)
- Please design engineering in conformity with the Barrhaven South Master Servicing Study – prepared by Stantec June 2007 and draft November 2014 addendum

Some of the background policies on the adjacent Mineral Resource:

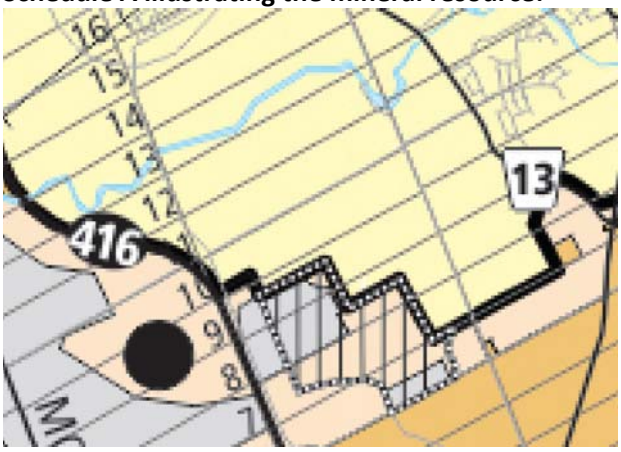
Section 7.8 Sand and Gravel Resource Area (Barrhaven South CDP):
http://ottawa.ca/en/city-hall/planning-and-development/community-plans-and-design-guidelines/community-plans-and-studies/community-design-plans/barrhaven-south-community-design-plan#P322_28108

OPA150 Policies:

Development Restriction on Adjacent Lands
9. New development will not be approved within 500 metres of a Bedrock Resource Area or within 300 metres of a Sand and Gravel Resource Area, unless it can be demonstrated that such development will not conflict with future mineral aggregate extraction. Examples of conflicting land uses are new sensitive land uses that conflict with mineral aggregate extraction. These include but are not necessarily limited to:
a. the creation of new lots;
b. rezoning to permit dwellings or lodging places (motels, camp grounds, nursing homes, etc.); and
c. farming or small-scale business uses where animals, equipment or employees are affected by pit or quarry activities.

10. New development may be approved within 500 metres of an existing licensed bedrock quarry or within 300 metres of an existing sand and gravel pit it can be demonstrated that the existing mineral aggregate operation, and potential future expansion of the operation in depth or extent, will not be affected by the development.
11. The Ministry of Natural Resources will be consulted in review of studies necessary.
12. Where the City approves the development of land in accordance with the policies above, the City may impose conditions to ensure the development provides adequate buffering and/or separation between the new proposed use and the mineral aggregate area/operation.

Schedule A illustrating the mineral resource:



Regards,

Sean Moore MCIP, RPP
Planner III **|** Urbaniste III
Development Review (South Services) **|** Examen des projets d'aménagement (services sud)
Planning, Infrastructure and Economic Development **|** Services de planification, d'infrastructure et de développement économique

City of Ottawa | Ville d'Ottawa
☎ 613.580.2424 ext./poste 16481
ottawa.ca/planning / ottawa.ca/urbanisme

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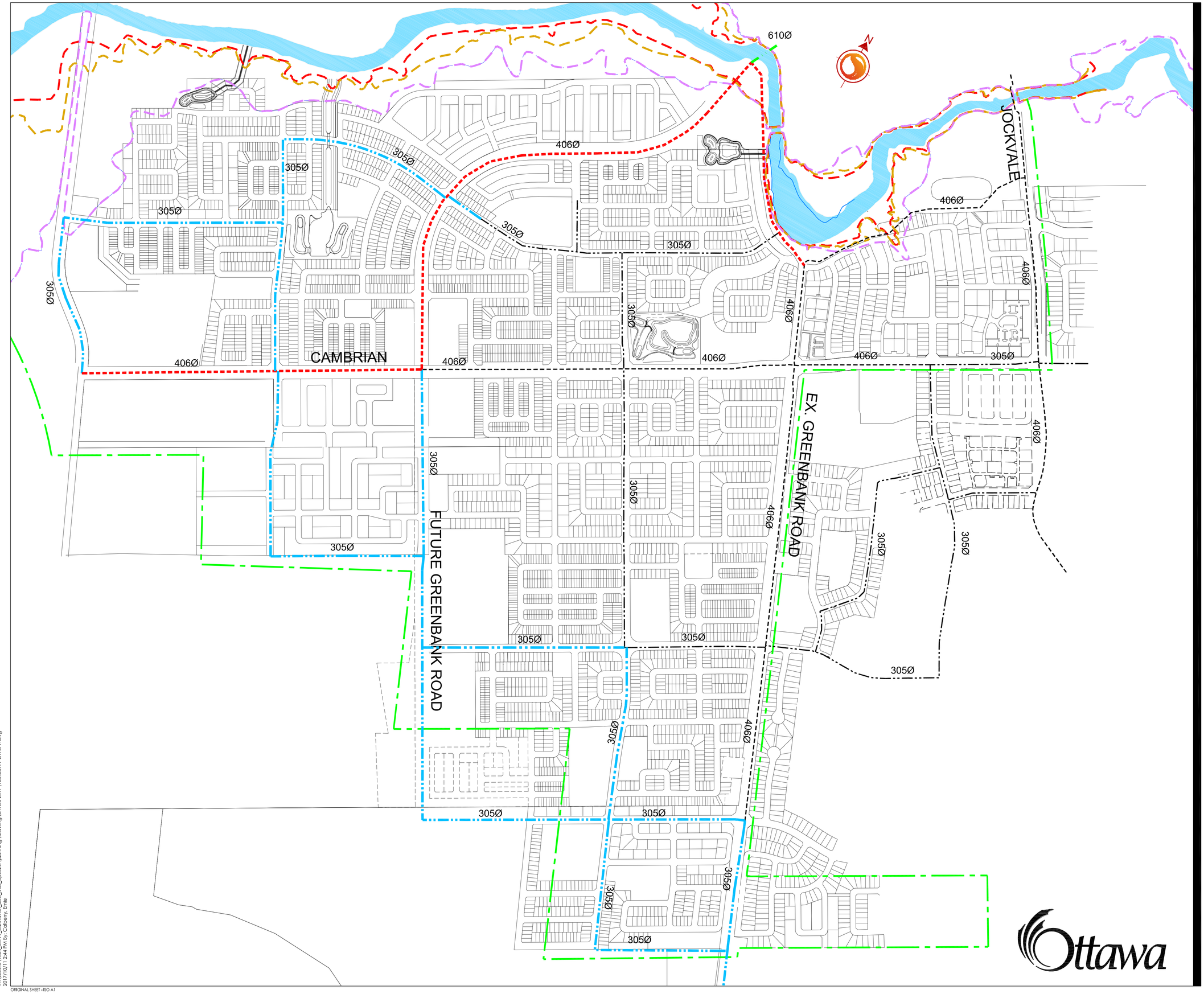
APPENDIX B



Stantec

Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613.722.4420
www.stantec.com

Legend

- EXISTING 305Ø WATERMAIN
- EXISTING 406Ø WATERMAIN
- FUTURE 305Ø WATERMAIN
- FUTURE 406Ø WATERMAIN
- FUTURE 610Ø WATERMAIN
- 10 YEAR FLOOD LINE
- 25 YEAR FLOOD LINE
- 100 YEAR FLOOD LINE
- LIMIT OF CDP BOUNDARY
- 106.20 / 106.00 PROPOSED / EXISTING ELEVATION

Notes

1. THE LOCATION OF UTILITIES IS APPROXIMATE ONLY, THE EXACT LOCATION SHOULD BE DETERMINED BY CONSULTING THE MUNICIPAL AUTHORITIES AND UTILITY COMPANIES CONCERNED. THE CONTRACTOR SHALL PROVE THE LOCATION OF UTILITIES AND SHALL BE RESPONSIBLE FOR ADEQUATE PROTECTION FROM DAMAGE.
2. CONCEPTUAL GRADING BASED ON AVAILABLE GRADE RAISE RESTRICTIONS, CONTOUR MAPPING, AND PRELIMINARY PROFILES FOR THE GREENBANK ROAD REALIGNMENT.

2	REVISED AS PER CITY COMMENTS	ST	KA	17.10.11
1	ISSUED FOR MSS ADDENDUM	ST	KA	14.11.28
Revision		By	Appd.	YY.MM.DD
File Name: 163400999-DWG 9.DWG		ST	AP	KA	14.11.21
		Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
CITY OF OTTAWA

BARRHAVEN SOUTH MASTER SERVICING STUDY ADDENDUM
Ottawa, ON

Title
WATER SERVICING PLAN

Project No.	Scale	Drawing No.	Sheet	Revision
163400999	1:5000 (0 50 150 250m)	A-8	9 of 9	2

Ottawa

LEGEND:

- PROPOSED WATERMAIN (BY OTHERS)
- PROPOSED WATERMAIN (MSS)
- EXISTING WATERMAIN
- PROPOSED WATERMAIN (IBI)
- POTENTIAL FIREWALL (IBI)

CAMBRIAN ROAD

STREET NO. 1

STREET NO. 2

STREET NO. 3

STREET NO. 4

STREET NO. 5

STREET NO. 7

STREET NO. 8

STREET NO. 9

STREET NO. 10

BLOCK 192

WOODLOT

SCHOOL (BY OTHERS)

PARK (BY OTHERS)

PARK SERVICE LOCATION TO BE CONFIRMED AT DETAILED DESIGN

POSSIBLE SECOND WATER CONNECTION

FUTURE JACKDAW ROAD

C FUTURE GREENBANK ROAD AND BRT

POSSIBLE SERVICE FOR FUTURE SCHOOL TO CONNECT TO STREET NO. 9 ON INTERIM BASIS WITH ULTIMATE CONNECTION TO FUTURE GREENBANK

J:\115496_MeadowsPh5\5.9 Drawings\59civil\current\Assessment of Adequacy\115496-Fig-2.1-WATER.dwg Layout Name: FIG 2.1 WATER PLAN Plot Scale: 1:8.704 Plotted At: 3/29/2019 Last Saved By: JamesBattison Last Saved At: Mar. 29, 19

Scale	Project Title	Drawing Title	Sheet No.
N.T.S.	THE MEADOWS IN HALF MOON BAY PHASE 7&8	CONCEPTUAL WATER PLAN	FIG. 2.1 REV. 2

Boundary Conditions for Meadows Phase 5

Information Provided:
Date provided: March 2018

Scenario	Demand	
	L/min	L/s
Average Daily Demand	248.4	4.14
Maximum Daily Demand	621.6	10.36
Peak Hour	1365.6	22.76
Fire Flow Demand #1	10000	166.67
Fire Flow Demand #2	17000	283.33

Location:

Results

Connection 1 - Cambrian Road

Demand Scenario	Existing Barrhaven PZ		Future Zone 3C	
	Head (m)	Pressure[1] (psi)	Head (m)	Pressure[1] (psi)
Maximum HGL	157.4	89.9	147.7	76.2
Peak Hour	139.9	65.0	144.4	71.4
Max Day plus Fire (10,000 l/min)	144.4	71.4	141.6	67.4
Max Day plus Fire (17,000l/min)	133.9	56.5	135.1	58.2

[1] Ground Elevation = 94.2 m

Connection 2 - Brambling Way

Demand Scenario	Existing Barrhaven PZ		Future Zone 3C	
	Head (m)	Pressure[1] (psi)	Head (m)	Pressure[1] (psi)
Maximum HGL	157.4	89.7	147.7	76.1
Peak Hour	139.8	64.8	144.3	71.2
Max Day plus Fire (10,000 l/min)	139.5	64.3	133.1	55.3
Max Day plus Fire (17,000l/min)	121.1	38.2	113.4	27.3

[1] Ground Elevation = 94.2 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.

IBI GROUP
333 PRESTON STREET
OTTAWA, ONTARIO
K1S 5N4

WATERMAIN DEMAND CALCULATION SHEET

PROJECT : THE MEADOWS - PHASE 5
BARRHAVEN SOUTH
LOCATION : CITY OF OTTAWA

FILE: 105496-5.7
DATE PRINTED: 5-Dec-18
DESIGN: LME
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	TOWN/SEMI UNITS	MIXED USED (ha)	POPULATION	INDUST. (ha)	COMM. (ha)	INSTIT. (ha)	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	RESIDENTIAL	ICI	TOTAL	
PHASE 1																	
A-010		6		16				0.07		0.07	0.16		0.16	0.36		0.36	11,000
A-015		14		38				0.15		0.15	0.38		0.38	0.84		0.84	11,000
A-020	12			41				0.17		0.17	0.41		0.41	0.91		0.91	10,000
A-025	2	15		47				0.19		0.19	0.48		0.48	1.05		1.05	10,000
A-030	2	14		45				0.18		0.18	0.45		0.45	0.99		0.99	10,000
A-035		12		32				0.13		0.13	0.33		0.33	0.72		0.72	10,000
A-050		17		46				0.19		0.19	0.46		0.46	1.02		1.02	10,000
A-055		14		38				0.15		0.15	0.38		0.38	0.84		0.84	11,000
A-060		9		24				0.10		0.10	0.25		0.25	0.54		0.54	11,000
A-065	3	11		40				0.16		0.16	0.40		0.40	0.89		0.89	11,000
A-105	4	9		38				0.15		0.15	0.38		0.38	0.84		0.84	10,000
B-015		8		22				0.09		0.09	0.22		0.22	0.48		0.48	10,000
B-020		10		27				0.11		0.11	0.27		0.27	0.60		0.60	10,000
B-030	23			78				0.32		0.32	0.79		0.79	1.74		1.74	10,000
B-035	14			48				0.19		0.19	0.48		0.48	1.06		1.06	10,000
B-040	14			48				0.19		0.19	0.48		0.48	1.06		1.06	10,000
PHASE 2																	
A-040		20		54				0.22		0.22	0.55		0.55	1.20		1.20	10,000
A-045		22		59				0.24		0.24	0.60		0.60	1.32		1.32	10,000
A-070		12		32				0.13		0.13	0.33		0.33	0.72		0.72	11,000
A-075	4	8		35				0.14		0.14	0.36		0.36	0.78		0.78	11,000
A-080	9			31				0.12		0.12	0.31		0.31	0.68		0.68	10,000
A-085	14			48				0.19		0.19	0.48		0.48	1.06		1.06	10,000
A-095	10			34				0.14		0.14	0.34		0.34	0.76		0.76	10,000
A-100	16			54				0.22		0.22	0.55		0.55	1.21		1.21	10,000
B-010		16		43			2.81	0.18	1.63	1.80	0.44	2.44	2.88	0.96	4.39	5.35	12,500
B-015	3	10		37				0.15		0.15	0.38		0.38	0.83		0.83	10,000
B-020	6	12		53				0.21		0.21	0.53		0.53	1.18		1.18	10,000
B-030	8			27				0.11		0.11	0.28		0.28	0.61		0.61	10,000
B-035	9			31				0.12		0.12	0.31		0.31	0.68		0.68	10,000
B-040	9			31				0.12		0.12	0.31		0.31	0.68		0.68	10,000
TOTALS	**162**	**239**		**1,196**						**6.47**			**14.55**			**31.04**	
MEADOWS PHASE 4																	
J-001	4			14				0.06		0.06	0.14		0.14	0.30		0.30	10,000
J-020	17			58				0.23		0.23	0.59		0.59	1.29		1.29	10,000
J-021	16			54				0.22		0.22	0.55		0.55	1.21		1.21	10,000
J-022			3	5				0.02		0.02	0.05		0.05	0.12		0.12	10,000
J-023			9	16				0.07		0.07	0.16		0.16	0.36		0.36	10,000
J-024			21	38				0.15		0.15	0.38		0.38	0.84		0.84	10,000
J-025			9	16				0.07		0.07	0.16		0.16	0.36		0.36	10,000
J-026			13	23				0.09		0.09	0.24		0.24	0.52		0.52	10,000
J-027			25	45				0.18		0.18	0.46		0.46	1.00		1.00	10,000
J-028		2	12	27				0.11		0.11	0.27		0.27	0.60		0.60	10,000

POPULATION DENSITY

Single Family	3.4	persons/unit
Semi Detached & Townhouse	2.7	persons/unit
High Density	1.8	persons/unit
Mixed Used	130	persons/ha

WATER DEMAND RATES

Residential	350	l/cap/day
ICI	50,000	l/ha/day

PEAKING FACTORS

Maximum Daily		
Residential	2.5	x avg. day
ICI	1.5	x avg. day
Maximum Hourly		
Residential	2.2	x max. day
ICI	1.8	x max. day

FIRE DEMANDS

Single Family & Townhouses	10,000 l/min (166.7 l/s)
10 unit Back to Back Townhouses	11,000 l/min (183.3 l/s)
ICI	12,500 l/min (208.3 l/s)

Fire Flow Requirement from Fire Underwriters Survey

South - End - 10 Units

Back to Back Townhouses	width	32.9	m
	depth	18.1	m
	stories	3	
		1,786.5	m^2

$F = 220C\sqrt{A}$

C	1.0		C =	1.5 wood frame
A	1,786	m^2		1.0 ordinary
				0.8 non-combustible
F	9,299	l/min		0.6 fire-resistive
use	9,000	l/min		

Occupancy Adjustment

		-25%	non-combustible
		-15%	limited combustible
Use	-15%	0%	combustible
		+15%	free burning
Adjustment	-1350 l/min	+25%	rapid burning
Fire flow	7,650 l/min		

Sprinkler Adjustment

Use	
Adjustment	0 l/min

Exposure Adjustment

Building Face	Separation	Charge
Front	21.7	10%
Rear	55	0%
Left Side	22	10%
Right Side	4	20%
Total		40%
Adjustment		3,060 l/min
Total adjustment		3,060
Fire flow		10,710 l/min
Use		**11,000 l/min**
		183.3 l/s

Separation	Charge
0 to 3m	+25%
3.1 to 10m	+20%
10.1 to 20m	+15%
20.1 to 30m	+10%
30.1 to 45m	+5%

Fire Flow Requirement from Fire Underwriters Survey

Building Floor Area North - Center (8 Units)

Back to Back Townhouses	width	26.3	m
	depth	18.1	m
	stories	3	
		1,428.1	m^2

$F = 220C\sqrt{A}$

C	1.0		C =	1.5 wood frame
A	1,428	m^2		1.0 ordinary
				0.8 non-combustible
F	8,314	l/min		0.6 fire-resistive
use	8,000	l/min		

Occupancy Adjustment

			-25%	non-combustible
			-15%	limited combustible
Use	-15%		0%	combustible
			+15%	free burning
Adjustment	-1200	l/min	+25%	rapid burning
Fire flow	6,800	l/min		

Sprinkler Adjustment

Use		
Adjustment	0	l/min

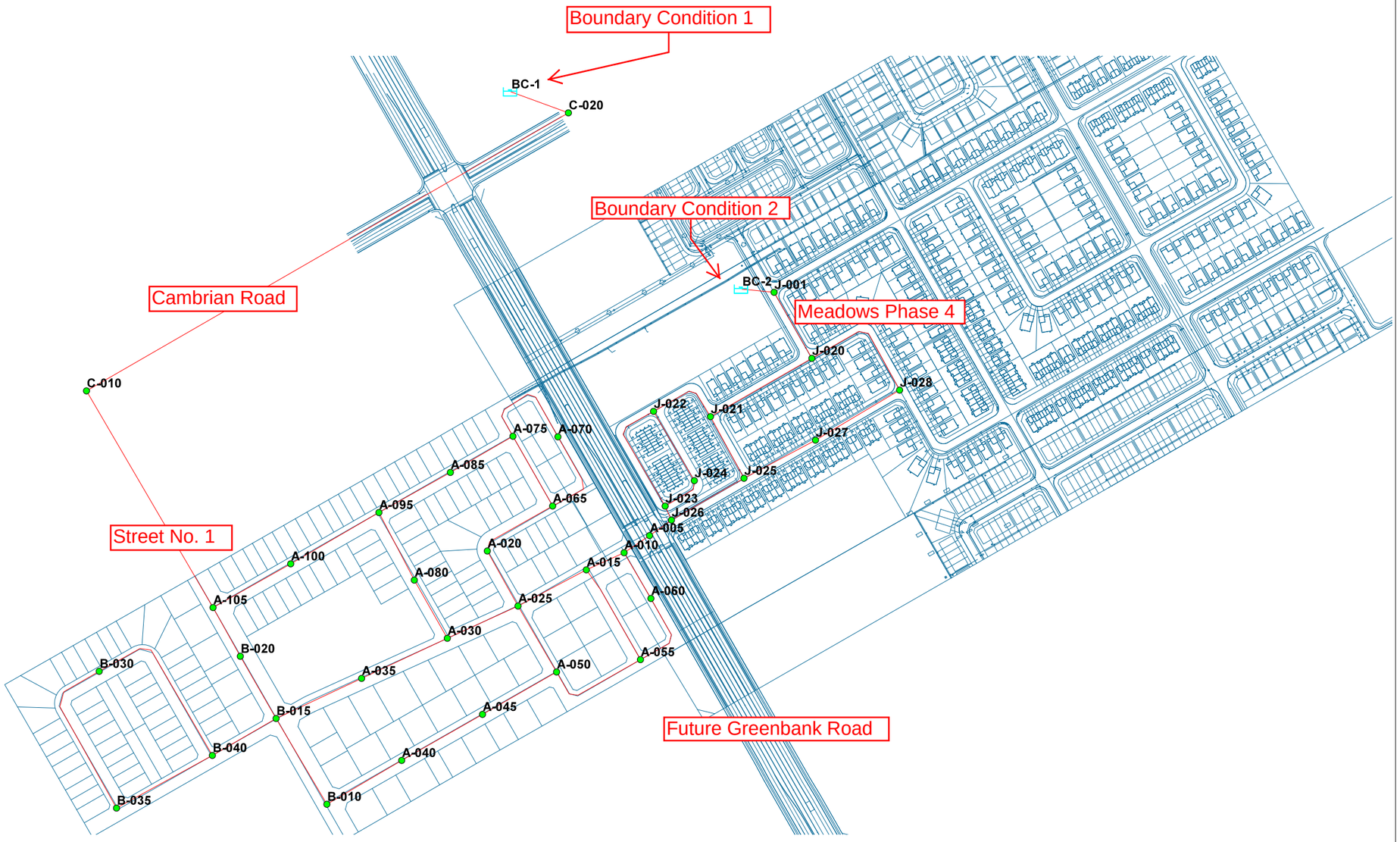
Exposure Adjustment

Building Face	Separation	Charge
Front	21.7	10%
Rear	55	0%
Left Side	4	20%
Right Side	4	20%
Total		50%

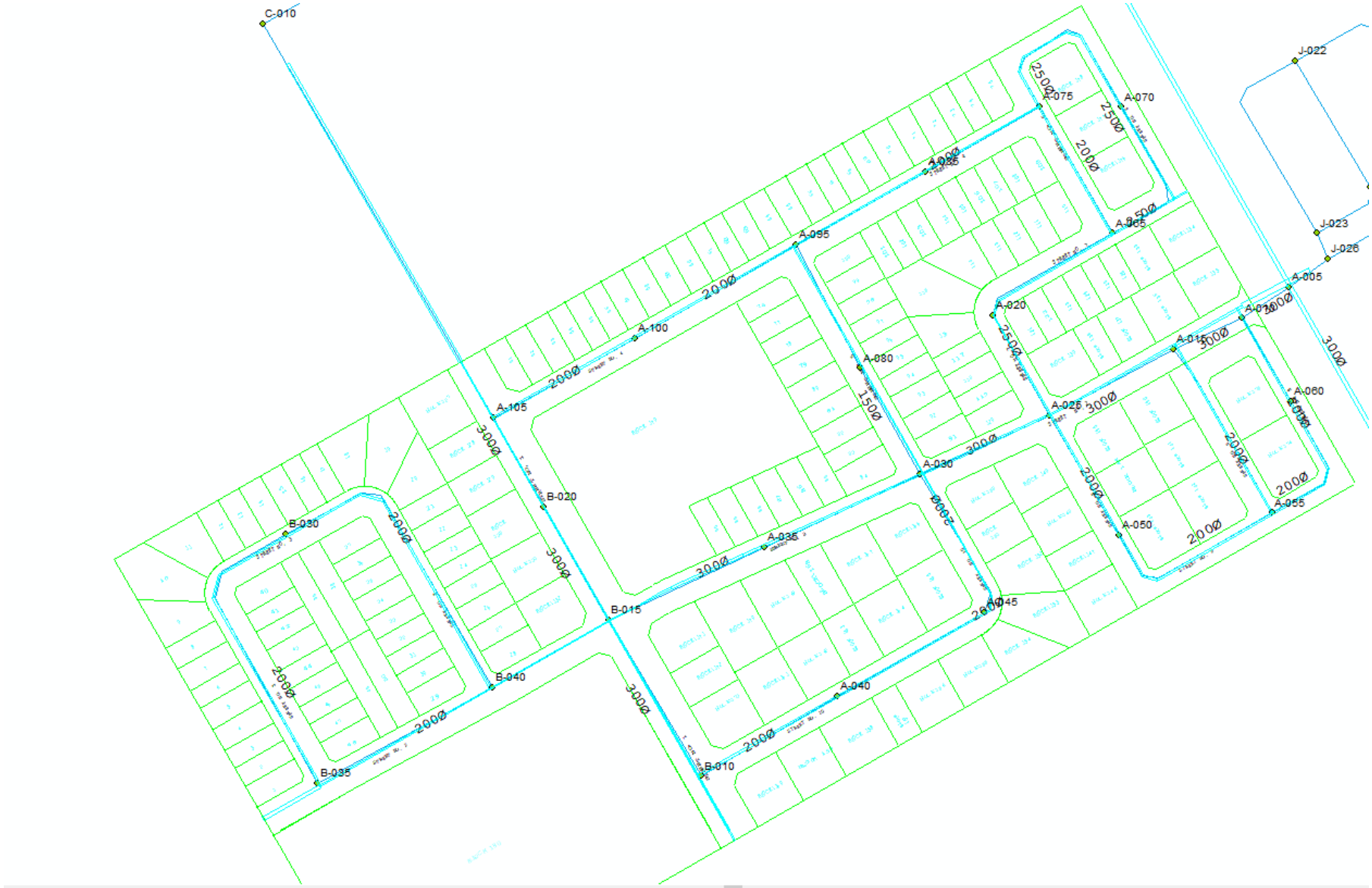
Separation	Charge
0 to 3m	+25%
3.1 to 10m	+20%
10.1 to 20m	+15%
20.1 to 30m	+10%
30.1 to 45m	+5%

Adjustment	3,400	l/min
Total adjustment	3,400	
Fire flow	10,200	l/min
Use	**10,000**	**l/min**
	166.7	**l/s**

NODE ID'S



Date: Wednesday, December 05, 2018


C-010
J-022
J-023
J-026
A-005
A-010
A-015
A-020
A-025
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A-050
A-055
A-060
A-065
A-070
A-075
A-080
A-085
A-090
A-095
A-100
A-105
B-010
B-015
B-020
B-030
B-035
B-040
250Ø
200Ø
300Ø
150Ø

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	A-005	0.00	95.00	157.39	611.37
2	☐	A-010	0.07	95.25	157.39	608.92
3	☐	A-015	0.15	95.20	157.39	609.41
4	☐	A-020	0.17	95.20	157.39	609.41
5	☐	A-025	0.19	95.60	157.39	605.49
6	☐	A-030	0.18	96.00	157.39	601.57
7	☐	A-035	0.13	96.50	157.39	596.67
8	☐	A-040	0.22	98.00	157.39	581.97
9	☐	A-045	0.24	97.50	157.39	586.87
10	☐	A-050	0.19	97.20	157.39	589.81
11	☐	A-055	0.15	96.25	157.39	599.12
12	☐	A-060	0.10	96.00	157.39	601.57
13	☐	A-065	0.16	94.70	157.39	614.31
14	☐	A-070	0.13	94.70	157.39	614.31
15	☐	A-075	0.14	94.65	157.39	614.80
16	☐	A-080	0.12	94.60	157.39	615.29
17	☐	A-085	0.19	94.50	157.39	616.27
18	☐	A-095	0.14	95.50	157.39	606.47
19	☐	A-100	0.22	94.35	157.39	617.74
20	☐	A-105	0.15	94.25	157.39	618.73
21	☐	B-010	1.80	98.50	157.39	577.07
22	☐	B-015	0.15	96.80	157.39	593.73
23	☐	B-020	0.21	95.25	157.39	608.93
24	☐	B-030	0.11	97.25	157.39	589.32
25	☐	B-035	0.12	99.50	157.39	567.27
26	☐	B-040	0.12	98.00	157.39	581.97
27	☐	C-010	0.00	94.00	157.40	621.24
28	☐	C-020	0.00	94.20	157.40	619.31
29	☐	J-001	0.06	94.80	157.40	613.43
30	☐	J-020	0.23	95.25	157.39	608.96
31	☐	J-021	0.22	95.60	157.39	605.50
32	☐	J-022	0.03	95.80	157.39	603.54
33	☐	J-023	0.10	95.60	157.39	605.49
34	☐	J-024	0.10	96.00	157.39	601.58
35	☐	J-025	0.14	95.50	157.39	606.48
36	☐	J-026	0.23	95.80	157.39	603.53
37	☐	J-027	0.27	95.90	157.39	602.57
38	☐	J-028	0.15	96.25	157.39	599.15

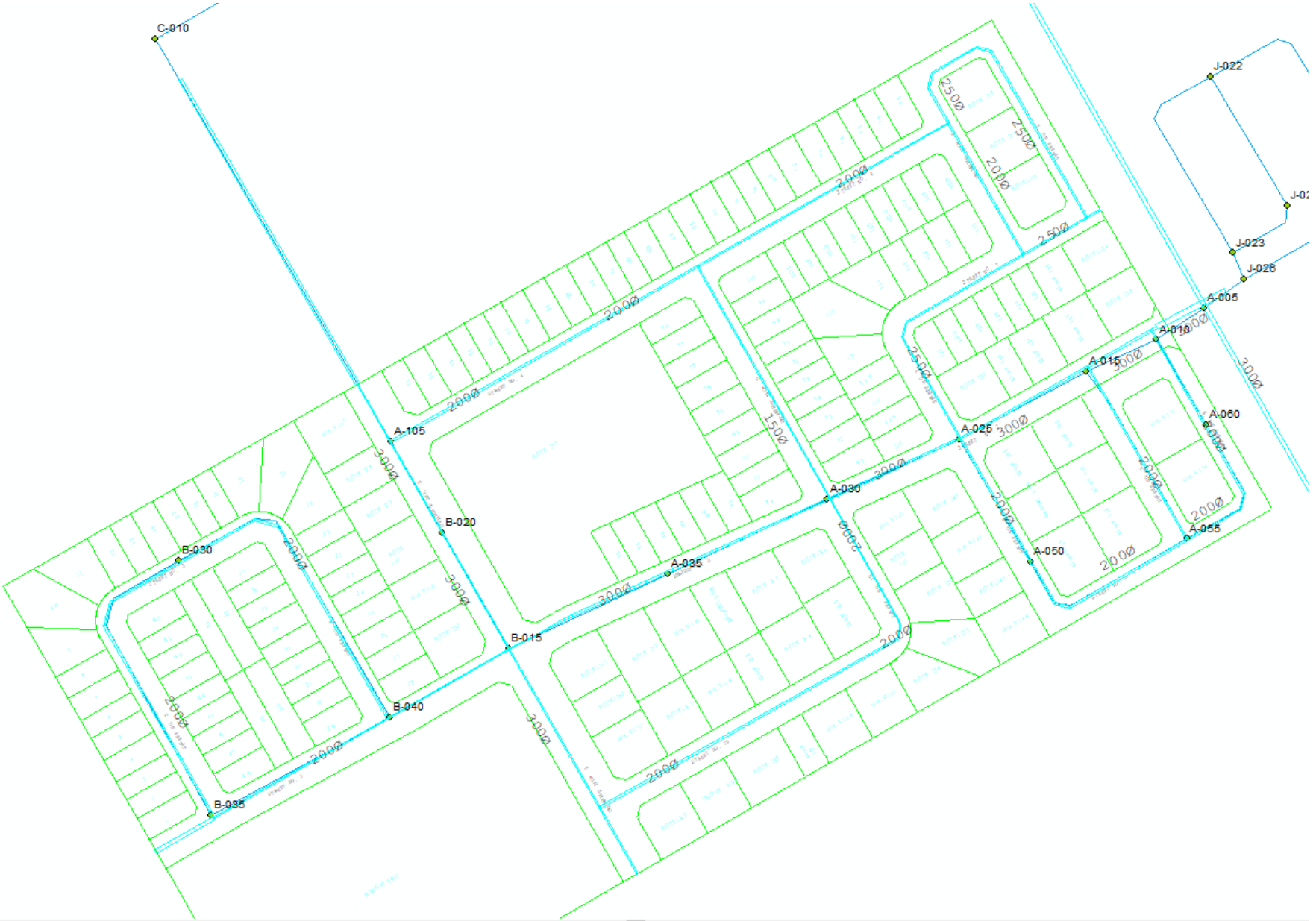
		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	A-005	0.00	95.00	139.66	437.66
2	☐	A-010	0.36	95.25	139.66	435.20
3	☐	A-015	0.84	95.20	139.66	435.69
4	☐	A-020	0.91	95.20	139.66	435.68
5	☐	A-025	1.05	95.60	139.66	431.77
6	☐	A-030	0.99	96.00	139.66	427.86
7	☐	A-035	0.72	96.50	139.67	422.99
8	☐	A-040	1.20	98.00	139.66	408.25
9	☐	A-045	1.32	97.50	139.66	413.15
10	☐	A-050	1.02	97.20	139.66	416.09
11	☐	A-055	0.84	96.25	139.66	425.40
12	☐	A-060	0.54	96.00	139.66	427.85
13	☐	A-065	0.89	94.70	139.66	440.58
14	☐	A-070	0.72	94.70	139.66	440.57
15	☐	A-075	0.78	94.65	139.66	441.07
16	☐	A-080	0.68	94.60	139.66	441.58
17	☐	A-085	1.06	94.50	139.66	442.55
18	☐	A-095	0.76	95.50	139.67	432.79
19	☐	A-100	1.21	94.35	139.68	444.21
20	☐	A-105	0.84	94.25	139.70	445.40
21	☐	B-010	5.35	98.50	139.66	403.37
22	☐	B-015	0.83	96.80	139.67	420.08
23	☐	B-020	1.18	95.25	139.69	435.45
24	☐	B-030	0.61	97.25	139.67	415.64
25	☐	B-035	0.68	99.50	139.67	393.59
26	☐	B-040	0.68	98.00	139.67	408.30
27	☐	C-010	0.00	94.00	139.83	449.08
28	☐	C-020	0.00	94.20	139.90	447.82
29	☐	J-001	0.30	94.80	139.80	440.95
30	☐	J-020	1.29	95.25	139.71	435.71
31	☐	J-021	1.21	95.60	139.68	431.91
32	☐	J-022	0.18	95.80	139.67	429.88
33	☐	J-023	0.54	95.60	139.67	431.82
34	☐	J-024	0.54	96.00	139.67	427.90
35	☐	J-025	0.78	95.50	139.67	432.87
36	☐	J-026	1.26	95.80	139.67	429.85
37	☐	J-027	1.50	95.90	139.68	428.99
38	☐	J-028	0.84	96.25	139.69	425.68

Max Day + Fire (10,000 l/min) - Fireflow 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	☐	A-010	183.37	408.60	A-060	138.08	110.09	407.05	139.96	141.88
2	☐	A-015	183.45	412.27	A-055	137.50	110.28	410.21	139.96	142.51
3	☐	A-020	166.87	355.03	A-020	139.96	109.48	355.03	139.96	139.96
4	☐	A-025	166.89	420.26	A-050	127.71	110.23	409.79	139.96	152.41
5	☐	A-030	166.88	421.62	A-045	137.93	111.58	419.83	139.96	142.09
6	☐	A-035	166.83	411.32	A-035	139.96	110.78	411.32	139.96	139.97
7	☐	A-040	166.92	275.90	A-040	139.96	112.28	275.90	139.96	139.96
8	☐	A-045	166.94	283.04	A-045	139.96	111.78	283.04	139.96	139.96
9	☐	A-050	166.89	294.20	A-050	139.96	111.48	294.20	139.96	139.96
10	☐	A-055	183.45	329.68	A-055	139.96	110.53	329.68	139.96	139.96
11	☐	A-060	183.40	317.56	A-060	139.96	110.28	317.56	139.96	139.96
12	☐	A-065	183.46	318.96	A-065	139.96	108.98	318.96	139.96	139.96
13	☐	A-070	183.43	292.52	A-070	139.96	108.98	292.52	139.96	139.96
14	☐	A-075	183.44	303.72	A-075	139.96	108.93	303.72	139.96	139.96
15	☐	A-080	166.82	209.33	A-080	139.96	108.88	209.33	139.96	139.96
16	☐	A-085	166.89	285.42	A-085	139.96	108.78	285.42	139.96	139.96
17	☐	A-095	166.84	298.37	A-095	139.96	109.78	298.37	139.96	139.96
18	☐	A-100	166.92	311.55	A-100	139.96	108.63	311.55	139.96	139.97
19	☐	A-105	166.85	490.39	B-035	98.47	109.55	449.56	139.96	183.34
20	☐	B-010	251.80	359.59	B-010	139.96	112.78	359.59	139.96	139.96
21	☐	B-015	166.85	424.12	B-035	113.50	111.08	400.62	139.96	166.43
22	☐	B-020	166.91	454.44	B-035	108.31	110.55	424.77	139.96	172.93
23	☐	B-030	166.81	168.84	B-030	139.96	111.53	168.84	139.96	139.96
24	☐	B-035	166.82	167.14	B-035	139.96	113.78	167.14	139.96	139.96
25	☐	B-040	166.82	214.93	B-035	125.26	112.28	207.82	139.96	154.66
26	☐	J-001	166.76	2,749.03	J-001	139.99	109.09	2,749.20	139.96	139.96
27	☐	J-020	166.93	413.04	J-020	139.96	109.53	413.04	139.96	139.96
28	☐	J-021	166.92	357.45	J-021	139.96	109.88	357.45	139.96	139.96
29	☐	J-022	166.73	324.18	J-022	139.96	110.08	324.18	139.96	139.96
30	☐	J-023	166.80	353.67	J-023	139.96	109.88	353.67	139.96	139.96
31	☐	J-024	166.80	301.13	J-024	139.96	110.28	301.13	139.96	139.96
32	☐	J-025	166.84	348.07	J-025	139.96	109.78	348.07	139.96	139.96
33	☐	J-026	166.93	383.06	J-026	139.96	110.08	383.07	139.96	139.96
34	☐	J-027	166.97	275.46	J-027	139.96	110.18	275.46	139.96	139.96
35	☐	J-028	166.85	265.17	J-028	139.96	110.53	265.17	139.96	139.92

Max Day + Fire (17,000 l/min) - Fireflow 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	☐	A-010	183.37	283.91	A-060	136.95	109.98	279.83	139.96	143.01
2	☐	A-015	183.45	288.61	A-055	133.57	109.88	279.76	139.96	146.54
3	☐	A-055	183.45	197.23	A-055	139.96	110.53	197.23	139.96	139.96
4	☐	A-060	183.40	188.61	A-060	139.96	110.28	188.61	139.96	139.96
5	☐	A-065	183.46	203.40	A-065	139.96	108.98	203.40	139.96	139.96
6	☐	A-070	183.43	185.36	A-070	139.96	108.98	185.36	139.96	139.97
7	☐	A-075	183.44	193.83	A-075	139.96	108.93	193.83	139.96	139.96
8	☐	B-010	251.80	206.71	B-010	139.96	112.78	206.71	139.96	139.97


C-010
J-022
J-023
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A-010
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A-060
A-105
B-020
B-030
B-040
B-035
B-015
250Ø
200Ø
300Ø
150Ø

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	A-005	0.00	95.00	157.40	611.44
2	☐	A-010	0.07	95.25	157.40	608.99
3	☐	A-015	0.15	95.20	157.40	609.48
4	☐	A-025	0.19	95.60	157.40	605.56
5	☐	A-030	0.18	96.00	157.40	601.64
6	☐	A-035	0.13	96.50	157.40	596.74
7	☐	A-050	0.19	97.20	157.40	589.88
8	☐	A-055	0.15	96.25	157.40	599.19
9	☐	A-060	0.10	96.00	157.40	601.64
10	☐	A-105	0.15	94.25	157.40	618.80
11	☐	B-015	0.15	96.80	157.40	593.81
12	☐	B-020	0.21	95.25	157.40	609.00
13	☐	B-030	0.11	97.25	157.40	589.40
14	☐	B-035	0.12	99.50	157.40	567.35
15	☐	B-040	0.12	98.00	157.40	582.05
16	☐	C-010	0.00	94.00	157.40	621.26
17	☐	C-020	0.00	94.20	157.40	619.31
18	☐	J-001	0.06	94.80	157.40	613.43
19	☐	J-020	0.23	95.25	157.40	609.00
20	☐	J-021	0.22	95.60	157.40	605.56
21	☐	J-022	0.03	95.80	157.40	603.60
22	☐	J-023	0.10	95.60	157.40	605.56
23	☐	J-024	0.10	96.00	157.40	601.64
24	☐	J-025	0.14	95.50	157.40	606.54
25	☐	J-026	0.23	95.80	157.40	603.60
26	☐	J-027	0.27	95.90	157.40	602.62
27	☐	J-028	0.15	96.25	157.40	599.20

		ID	Demand (L/s)	Elevation (m)	Head (m)	Pressure (kPa)
1	☐	A-005	0.00	95.00	139.77	438.75
2	☐	A-010	0.36	95.25	139.77	436.31
3	☐	A-015	0.84	95.20	139.78	436.80
4	☐	A-025	1.05	95.60	139.78	432.90
5	☐	A-030	0.99	96.00	139.78	429.03
6	☐	A-035	0.72	96.50	139.79	424.21
7	☐	A-050	1.02	97.20	139.78	417.20
8	☐	A-055	0.84	96.25	139.77	426.51
9	☐	A-060	0.54	96.00	139.77	428.96
10	☐	A-105	0.84	94.25	139.82	446.55
11	☐	B-015	0.83	96.80	139.80	421.35
12	☐	B-020	1.18	95.25	139.81	436.65
13	☐	B-030	0.61	97.25	139.79	416.91
14	☐	B-035	0.68	99.50	139.79	394.86
15	☐	B-040	0.68	98.00	139.80	409.56
16	☐	C-010	0.00	94.00	139.87	449.50
17	☐	C-020	0.00	94.20	139.90	447.82
18	☐	J-001	0.30	94.80	139.80	440.96
19	☐	J-020	1.29	95.25	139.78	436.35
20	☐	J-021	1.21	95.60	139.77	432.86
21	☐	J-022	0.18	95.80	139.77	430.90
22	☐	J-023	0.54	95.60	139.77	432.86
23	☐	J-024	0.54	96.00	139.77	428.94
24	☐	J-025	0.78	95.50	139.77	433.83
25	☐	J-026	1.26	95.80	139.77	430.90
26	☐	J-027	1.50	95.90	139.77	429.91
27	☐	J-028	0.84	96.25	139.77	426.50

Phase 1 Max Day + Fire (10,000 l/min) - Fireflow 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	☐	A-010	183.37	377.00	A-060	136.90	109.97	374.68	139.96	143.07
2	☐	A-015	183.45	378.81	A-050	135.64	111.04	375.39	139.96	144.52
3	☐	A-025	166.89	382.50	A-050	127.71	110.23	372.92	139.96	152.41
4	☐	A-030	166.88	389.18	A-030	139.96	110.28	389.18	139.96	139.96
5	☐	A-035	166.83	400.84	A-035	139.96	110.78	400.84	139.96	139.96
6	☐	A-050	166.89	278.84	A-050	139.96	111.48	278.84	139.96	139.96
7	☐	A-055	183.45	310.11	A-055	139.96	110.53	310.11	139.96	139.96
8	☐	A-060	183.40	300.29	A-060	139.96	110.28	300.29	139.96	139.96
9	☐	A-105	166.85	485.47	B-035	104.71	110.19	450.76	139.96	177.83
10	☐	B-015	166.85	419.64	B-035	113.50	111.08	396.54	139.96	166.43
11	☐	B-020	166.91	454.63	B-035	107.32	110.45	424.30	139.96	173.97
12	☐	B-030	166.81	168.91	B-030	139.96	111.53	168.91	139.96	139.96
13	☐	B-035	166.82	167.23	B-035	139.96	113.78	167.23	139.96	139.96
14	☐	B-040	166.82	214.71	B-035	125.26	112.28	207.64	139.96	154.66
15	☐	J-001	166.76	2,742.59	J-001	139.99	109.09	2,742.76	139.96	139.96
16	☐	J-020	166.93	402.72	J-020	139.96	109.53	402.73	139.96	139.96
17	☐	J-021	166.92	344.83	J-021	139.96	109.88	344.83	139.96	139.96
18	☐	J-022	166.73	312.54	J-022	139.96	110.08	312.54	139.96	139.96
19	☐	J-023	166.80	337.94	J-023	139.96	109.88	337.94	139.96	139.96
20	☐	J-024	166.80	290.98	J-024	139.96	110.28	290.98	139.96	139.96
21	☐	J-025	166.84	335.57	J-025	139.96	109.78	335.57	139.96	139.96
22	☐	J-026	166.93	362.26	J-026	139.96	110.08	362.26	139.96	139.96
23	☐	J-027	166.97	269.98	J-027	139.96	110.18	269.98	139.96	139.96
24	☐	J-028	166.85	260.70	J-028	139.96	110.53	260.70	139.96	139.94

Phase 1 Max Day + Fire (17,000 l/min) - Fireflow Report

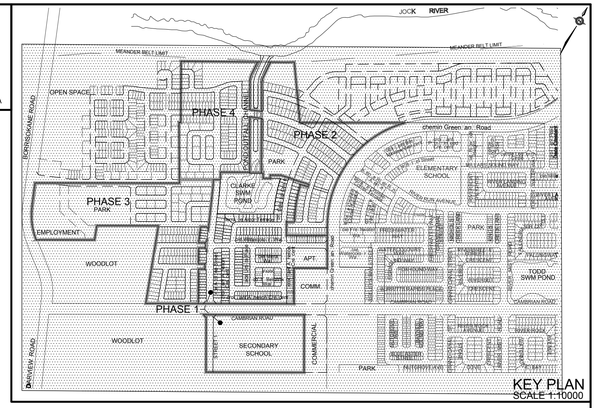
		ID	Total Demand (L/s)	Available Flow at Hydrant (L/s)	Critical Node ID	Critical Node Pressure (kPa)	Critical Node Head (m)	Design Flow (L/s)	Design Pressure (kPa)	Design Fire Node Pressure (kPa)
1	☐	A-010	183.37	256.25	A-060	136.03	109.88	251.18	139.96	143.95
2	☐	A-015	183.45	259.28	A-055	132.84	109.81	249.92	139.96	147.27
3	☐	A-055	183.45	184.35	A-055	139.96	110.53	184.35	139.96	139.97
4	☐	A-060	183.40	175.92	A-060	139.96	110.28	175.92	139.96	139.96

APPENDIX C

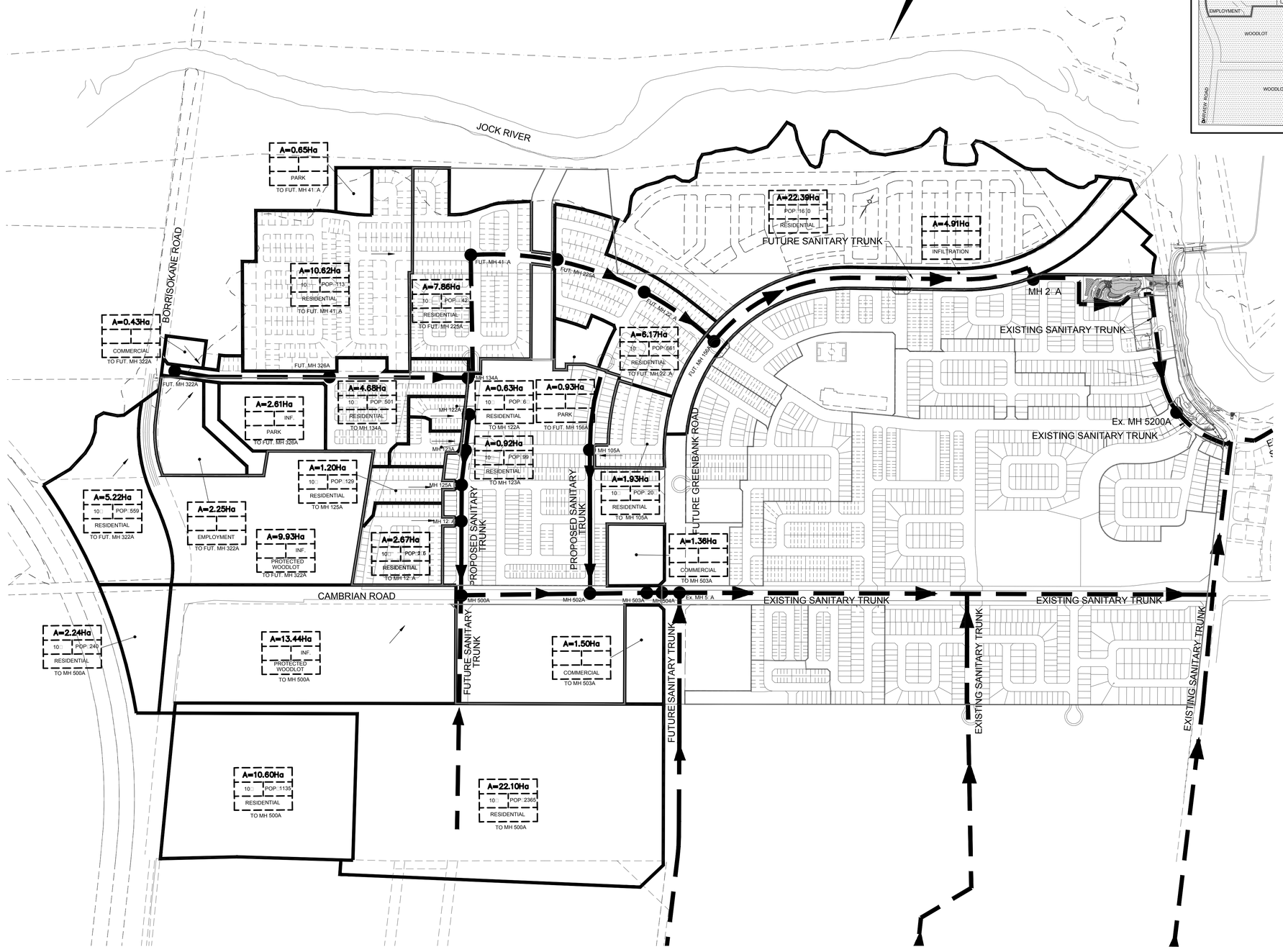
APPROVED ☐ REFUSED ☐

THIS ____ DAY OF_____, 20____

JEFF SHILLINGTON, P.ENG
PROJECT MANAGER – SOUTH BRANCH
PLANNING, INFRASTRUCTURE & ECONOMIC
DEVELOPMENT DEPARTMENT, CITY OF OTTAWA



KEY PLAN
SCALE 1:10000



LEGEND

SANITARY DRAINAGE BOUNDARY

EXTERNAL AREA IN HECTARES — A=53.63
EXTERNAL POPULATION — 10 POP: 5 398
DENSITY (PERSONS/HECTARE)
EXTERNAL LAND USE — RESIDENTIAL

MAINTENANCE HOLE — MH202A
CAP

TOPOGRAPHIC INFORMATION

TOPOGRAPHIC INFORMATION PROVIDED BY J.D. BARNES LIMITED, PROJECT No. 16-10-100-00. SURVEY DATED FEBRUARY 22, 2017. CITY OF OTTAWA 2K MAPPING, RECEIVED ON JANUARY 18, 2016.

LEGAL INFORMATION

CALCULATED DRAFT PLAN PROVIDED BY J.D. BARNES LIMITED, PROJECT No. 16-10-100-00-ph1 (HALF MOON BAY WEST PHASE 1), RECEIVED ON JULY 13, 2018.

2nd SUBMISSION 18-07-13

NOT FOR CONSTRUCTION

BENCH MARK No. 00820010126

POINT IS LOCATED 1.65km NORTH OF BARNSDALE ROAD AND 5km SOUTH OF FALLOWFIELD ROAD ON HIGHWAY 416 NORTH OF KEMPTVILLE. THE POINT IS SET EAST OF THE NORTHBOUND LANE IN THE GRASSY SHOULDER.
ELEVATION : 96.923 m

No.	BY	DATE	DESCRIPTION	BY
2	W.L.	18-07-13	2nd SUBMISSION	
1	W.L.	18-03-09	1st SUBMISSION	

Ottawa CITY OF OTTAWA

PROJECT No. 16-888

LICENSED PROFESSIONAL ENGINEER
W. LIU
100167932
18-07-15
PROVINCE OF ONTARIO

EXTERNAL SANITARY DRAINAGE PLAN

HALF MOON BAY WEST SUBDIVISION
PHASE 1

DSEL
david schaeffer engineering ltd
120 Iver Road, Unit 103
Stittsville, ON K2S 1E9
Tel. (613) 360-1556
Fax. (613) 361-1313
www.DSEL.ca

DRAWN BY: V.W./S.L.	CHECKED BY: P.P./C.M.	DRAWING NO.	SHEET NO.
DESIGNED BY: W.L./C.M.	CHECKED BY: K.M.		38
SCALE: 1:4000	DATE: MARCH 2018		

CITY FILE No. D0 16 16 0023 P1 CITY PLAN No. 115-6

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION									COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
place Umbra Place																													
	117A	107A	0.24	7		7.00	19	0.24	19	4.00	0.31								0.24	0.24	0.07	0.38	68.0	200	0.65	26.44	0.01	0.84	0.27
To voie Watercolours Way, Pipe 107A - 111A								0.24	19											0.24									
	119A	117A	0.48	17		17.00	46	0.48	46	4.00	0.75								0.48	0.48	0.13	0.88	80.5	200	0.65	26.44	0.03	0.84	0.37
To voie Merak Way, Pipe 117A - 118A								0.48	46											0.48									
voie Merak Way																													
Contribution From place Umbra Place, Pipe 119A - 117A								0.48	46										0.48	0.48									
			0.24					0.72	46										0.24	0.72									
	117A	118A	0.40	11		11.00	30	1.12	76	4.00	1.23								0.40	1.12	0.31	1.54	106.5	200	0.70	27.44	0.06	0.87	0.48
To croissant Aphelion Crescent, Pipe 118A - 120A								1.12	76											1.12									
voie Watercolours Way																													
	107A	108A	0.27	8		8.00	22	0.27	22	4.00	0.36								0.27	0.27	0.08	0.44	70.0	200	0.65	26.44	0.02	0.84	0.33
To croissant Aphelion Crescent, Pipe 108A - 112A								0.27	22											0.27									
	109A	110A	0.45	13		13.00	36	0.45	36	4.00	0.58								0.45	0.45	0.13	0.71	92.5	200	0.65	26.44	0.03	0.84	0.37
Apartment Block			0.93	90		90.00	243	0.93	243	4.00	3.94								0.93	0.93	0.26	4.20	11.0	200	1.00	32.80	0.13	1.04	0.71
	110A	111A	0.16	4		4.00	11	1.54	281	4.00	4.55								0.16	1.54	0.43	4.98	45.0	200	0.40	20.74	0.24	0.66	0.54
To croissant Aphelion Crescent, Pipe 111A - 118A								1.54	281											1.54									
Contribution From place Umbra Place, Pipe 117A - 107A								0.24	19										0.24	0.24									
	107A	111A	0.63	23		23.00	63	0.87	82	4.00	1.33								0.63	0.87	0.24	1.57	106.0	200	0.65	26.44	0.06	0.84	0.46
To croissant Aphelion Crescent, Pipe 111A - 118A								0.87	82											0.87									
terrasse Alcor Terrace																													
	103A	104A	0.60	14	14.00		48	0.60	48	4.00	0.78								0.60	0.60	0.17	0.95	80.0	200	0.65	26.44	0.04	0.84	0.40
	104A	105A	0.53	13	13.00		45	1.13	93	4.00	1.51								0.53	1.13	0.32	1.83	80.5	200	0.40	20.74	0.09	0.66	0.41
To bois Celestial Grove, Pipe 105A - 111A								1.13	93											1.13									
	103A	106A	0.15	2	2.00		7	0.15	7	4.00	0.11								0.15	0.15	0.04	0.15	10.5	200	0.65	26.44	0.01	0.84	0.27
	106A	108A	0.26	5	5.00		17	0.41	24	4.00	0.39								0.26	0.41	0.11	0.50	64.0	200	0.65	26.44	0.02	0.84	0.33
To croissant Aphelion Crescent, Pipe 108A - 112A								0.41	24											0.41									
Contribution From Phase 2, Pipe PLUG - 105A								1.93	207										1.93	1.93									
PLUG		105A						1.93	207	4.00	3.35								0.00	1.93	0.54	3.89	9.0	200	0.35	19.40	0.20	0.62	0.48
To bois Celestial Grove, Pipe 105A - 111A								1.93	207											1.93									
cours Bellatrix Walk																													
Contribution From croissant Aphelion Crescent, Pipe 112A - 113A								1.67	136										1.67	1.67									
	113A	119A	0.20	9		9.00	25	1.87	161	4.00	2.61								0.20	1.87	0.52	3.13	70.0	250	0.25	29.73	0.11	0.61	0.40
	119A	120A	0.30	13		13.00	36	2.17	197	4.00	3.19								0.30	2.17	0.61	3.80	107.0	250	0.25	29.73	0.13	0.61	0.41
To croissant Aphelion Crescent, Pipe 120A - 121A								2.17	197											2.17									

DESIGN PARAMETERS

Park Flow =	9300	L/ha/day
Average Daily Flow =	350	L/p/day
Comm/Inst Flow =	50000	L/ha/day
Industrial Flow =	35000	L/ha/day
Max Res. Peak Factor =	4.00	
Commercial/Inst./Park Peak Factor =	1.50	

Industrial Peak Factor = as per MOE Graph
Extraneous Flow = 0.280 L/s/ha
Minimum Velocity = 0.600 m/s
Manning's n = (Conc) 0.013 (Pvc) 0.013
Townhouse coeff= 2.7
Single house coeff= 3.4

Designed: P.P.
Checked: W.L.
Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 36, 37 & 38

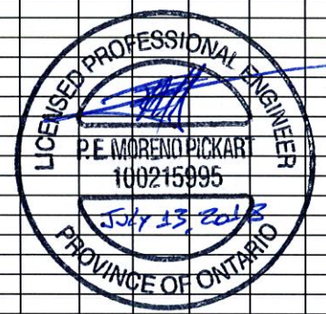
PROJECT: **Half Moon Bay West - Phase 1**
LOCATION: **City of Ottawa**
File Ref: 16-888
Date: July, 2018
Sheet No. 1 of 3

888_san2.xlsx

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION									COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT	PEAK FLOW (l/s)	AREA (ha)	ACCU AREA (ha)	AREA (ha)	ACCU AREA (ha)	AREA (ha)	ACCU AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL (FULL) (m/s)	VEL (ACT.) (m/s)
bois Celestial Grove																												
	100A	101A	0.40	8	8.00		28	0.40	28	4.00	0.45								0.40	0.40	0.11	0.56	50.5	200	0.65	26.44	0.02	0.84	0.33
	101A	102A	0.38	9	9.00		31	0.78	59	4.00	0.96								0.38	0.78	0.22	1.18	48.0	200	0.35	19.40	0.06	0.62	0.34
	102A	105A	0.20	4	4.00		14	0.98	73	4.00	1.18								0.20	0.98	0.27	1.45	46.5	200	0.35	19.40	0.07	0.62	0.35
Contribution From terrasse Alcor Terrace, Pipe 104A - 105A								1.13	93										1.13	2.11									
Contribution From terrasse Alcor Terrace, Pipe PLUG - 105A								1.93	207										1.93	4.04									
	105A	111A	0.10					4.14	373	4.00	6.04								0.10	4.14	1.16	7.20	70.0	200	0.35	19.40	0.37	0.62	0.57
To croissant Aphelion Crescent, Pipe 111A - 118A								4.14	373											4.14									
croissant Aphelion Crescent																												
Contribution From terrasse Alcor Terrace, Pipe 106A - 108A								0.41	24										0.41	0.41									
Contribution From voie Watercolours Way, Pipe 107A - 108A								0.27	22										0.27	0.68									
	108A	112A	0.50	13	13.00		45	1.18	91	4.00	1.47								0.50	1.18	0.33	1.80	75.5	200	0.35	19.40	0.09	0.62	0.38
	112A	113A	0.49	13	13.00		45	1.67	136	4.00	2.20								0.49	1.67	0.47	2.67	72.0	200	0.35	19.40	0.14	0.62	0.43
To cours Bellatrix Walk, Pipe 113A - 119A								1.67	136											1.67									
	113A	114A	0.16	4	4.00		14	0.16	14	4.00	0.23								0.16	0.16	0.04	0.27	36.0	200	0.65	26.44	0.01	0.84	0.27
	114A	115A	0.05	1	1.00		4	0.21	18	4.00	0.29								0.05	0.21	0.06	0.35	11.0	200	0.65	26.44	0.01	0.84	0.27
	115A	116A	0.22	11		11.00	30	0.43	48	4.00	0.78								0.22	0.43	0.12	0.90	81.0	200	0.65	26.44	0.03	0.84	0.37
	116A	121A	0.24	11		11.00	30	0.67	78	4.00	1.26								0.24	0.67	0.19	1.45	88.5	200	0.90	31.12	0.05	0.99	0.51
To Cambrian Road, Pipe 121A - 502A								0.67	78											0.67									
Contribution From bois Celestial Grove, Pipe 105A - 111A								4.14	373										4.14	4.14									
Contribution From voie Watercolours Way, Pipe 107A - 111A								0.87	82										0.87	5.01									
Contribution From voie Watercolours Way, Pipe 110A - 111A								1.54	281										1.54	6.55									
	111A	118A	0.11					6.66	736	3.88	11.57								0.11	6.66	1.86	13.43	68.0	300	0.20	43.25	0.31	0.61	0.54
Contribution From voie Merak Way, Pipe 117A - 118A								1.12	76										1.12	7.78									
	118A	120A	0.47	17		17.00	46	8.25	858	3.84	13.35								0.47	8.25	2.31	15.66	80.0	300	0.20	43.25	0.36	0.61	0.56
Contribution From cours Bellatrix Walk, Pipe 119A - 120A								2.17	197										2.17	10.42									
	120A	121A	0.17	5		5.00	14	10.59	1069	3.78	16.37								0.17	10.59	2.97	19.34	43.5	300	0.20	43.25	0.45	0.61	0.59
Contribution From croissant Aphelion Crescent, Pipe 116A - 121A								0.67	78										0.67	11.26									
	121A	502A	0.03	1		1.00	3	11.29	1150	3.76	17.52								0.03	11.29	3.16	20.68	30.0	300	0.20	43.25	0.48	0.61	0.60
To Cambrian Road, Pipe 502A -503A								11.29	1150											11.29									
rue Apolune Street																												
	129A	130A	0.19	3	3.00		11	0.19	11	4.00	0.18								0.19	0.19	0.05	0.23	36.5	200	0.65	26.44	0.01	0.84	0.27
	130A	131A	0.24	6	6.00		21	0.43	32	4.00	0.52								0.24	0.43	0.12	0.64	63.0	200	0.35	19.40	0.03	0.62	0.27
	131A	132A	0.51	9	9.00		31	0.94	63	4.00	1.02								0.51	0.94	0.26	1.28	116.0	250	0.25	29.73	0.04	0.61	0.29
	132A	501A	0.35	8	8.00		28	1.29	91	4.00	1.47								0.35	1.29	0.36	1.83	111.5	250	0.25	29.73	0.06	0.61	0.34
To Cambrian Road, Pipe 501A - 5010A								1.29	91											1.29									
Contribution From Phase 3 Future Street 28, Pipe PLUG - 122A								0.63	68										0.63	0.63									
	PLUG	122A	0.02					0.65	68	4.00	1.10								0.02	0.65	0.18	1.28	10.0	200	0.35	19.40	0.07	0.62	0.35
	122A	123A	0.07					0.72	68	4.00	1.10								0.07	0.72	0.20	1.30	71.0	250	0.25	29.73	0.04	0.61	0.29



DESIGN PARAMETERS

Park Flow =	9300	L/ha/day
Average Daily Flow =	350	L/p/day
Comm/Inst Flow =	50000	L/ha/day
Industrial Flow =	35000	L/ha/day
Max Res. Peak Factor =	4.00	
Commercial/Inst./Park Peak Factor =	1.50	

Industrial Peak Factor = as per MOE Graph
Extraneous Flow = 0.280 L/s/ha
Minimum Velocity = 0.600 m/s
Manning's n = (Conc) 0.013 (Pvc) 0.013
Townhouse coeff= 2.7
Single house coeff= 3.4

Designed: P.P.
Checked: W.L.
Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 36, 37 & 38

PROJECT: **Half Moon Bay West - Phase 1**
LOCATION: **City of Ottawa**
File Ref: 16-888
Date: July, 2018
Sheet No. 2 of 3

888_san2.xlsx

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION									COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	UNITS Singles	UNITS Townhouse	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL (FULL) (m/s)	VEL (ACT.) (m/s)
Contribution From Phase 3 Future Street 27, Pipe PLUG - 123A								0.92	99										0.92	1.64									
	PLUG	123A	0.01					0.93	99	4.00	1.60								0.01	0.93	0.26	1.86	10.0	200	0.35	19.40	0.10	0.62	0.39
	123A	124A	0.22	5	5.00		17	1.87	184	4.00	2.98								0.22	1.87	0.52	3.50	62.5	250	0.25	29.73	0.12	0.61	0.41
	124A	125A	0.01					1.88	184	4.00	2.98								0.01	1.88	0.53	3.51	6.5	250	0.25	29.73	0.12	0.61	0.41
Contribution From Phase 3 Fut. Street 13, Pipe PLUG - 125A								1.20	129										1.20	3.08									
	PLUG	125A						1.20	129	4.00	2.09								0.00	1.20	0.34	2.43	10.0	200	0.35	19.40	0.13	0.62	0.42
	125A	127A	0.23	5	5.00		17	3.31	330	4.00	5.35								0.23	3.31	0.93	6.28	72.0	250	0.25	29.73	0.21	0.61	0.48
Contribution From Phase 3 Fut. Street 12, Pipe PLUG - 127A								2.67	286										2.67	5.98									
	PLUG	127A						2.67	286	4.00	4.63								0.00	2.67	0.75	5.38	15.0	200	0.35	19.40	0.28	0.62	0.53
	127A	128A	0.25	6	6.00		21	6.23	637	3.92	10.12								0.25	6.23	1.74	11.86	73.5	250	0.25	29.73	0.40	0.61	0.57
			0.05					6.28	637										0.05	6.28									
	128A	500A	0.21	5	5.00		17	6.49	654	3.91	10.36								0.21	6.49	1.82	12.18	76.0	250	0.25	29.73	0.41	0.61	0.58
To Cambrian Road, Pipe 500A - 501A								6.49	654											6.49									
Cambrian Road																													
Contribution From External								34.94	3740										34.94	34.94									
Contribution From External								13.44											13.44	48.38									
Contribution From rue Apolune Street, Pipe 128A - 500A								6.49	654										6.49	54.87									
	500A	501A	0.48					55.35	4394	3.30	58.74								0.48	55.35	15.50	74.24	6.5	375	0.25	87.67	0.85	0.79	0.88
Contribution From rue Apolune Street, Pipe 132A - 501A								1.29	91										1.29	56.64									
	501A	5010A	0.95					57.59	4485	3.29	59.77								0.95	57.59	16.13	75.90	124.0	450	0.12	98.76	0.77	0.62	0.68
	5010A	502A						57.59	4485	3.29	59.77								0.00	57.59	16.13	75.90	124.0	450	0.12	98.76	0.77	0.62	0.68
Contribution From croissant Aphelion Crescent, Pipe 121A - 502A								11.29	1150										11.29	68.88									
School														6.05	6.05			5.25	6.05	6.05	1.69	6.94	16.5	200	1.00	32.80	0.21	1.04	0.82
	502A	503A	0.42					69.30	5635	3.20	73.05				6.05			5.25	0.42	75.35	21.10	99.40	111.5	450	0.17	117.55	0.85	0.74	0.83
Future Commercial Block												1.36	1.36					1.18	1.36	1.36	0.38	1.56	25.5	200	1.00	32.80	0.05	1.04	0.54
Future Commercial Block												1.50	1.50					1.30	1.50	1.50	0.42	1.72	17.0	200	1.00	32.80	0.05	1.04	0.54
	503A	504A	0.20					69.50	5635	3.20	73.05		2.86		6.05			7.73	0.20	78.41	21.95	102.73	29.5	450	0.17	117.55	0.87	0.74	0.84
To Cambrian Road, Ex. Pipe 504A - 57A								69.50	5635				2.86		6.05					78.41									

DESIGN PARAMETERS

Park Flow =	9300	L/ha/day
Average Daily Flow =	350	L/p/day
Comm / Inst Flow =	50000	L/ha/day
Industrial Flow =	35000	L/ha/day
Max Res. Peak Factor =	4.00	
Commercial / Inst. / Park Peak Factor =	1.50	

Industrial Peak Factor = as per MOE Graph
Extraneous Flow = 0.280 L/s/ha
Minimum Velocity = 0.600 m/s
Manning's n = (Conc) 0.013 (PVC) 0.013
Townhouse coeff= 2.7
Single house coeff= 3.4

Designed: P.P.
Checked: W.L.
Dwg. Reference: Sanitary Drainage Plan, Dwgs. No. 36, 37 & 38

PROJECT: **Half Moon Bay West - Phase 1**
LOCATION: **City of Ottawa**
File Ref: 16-888
Date: July, 2018
Sheet No. 3 of 3

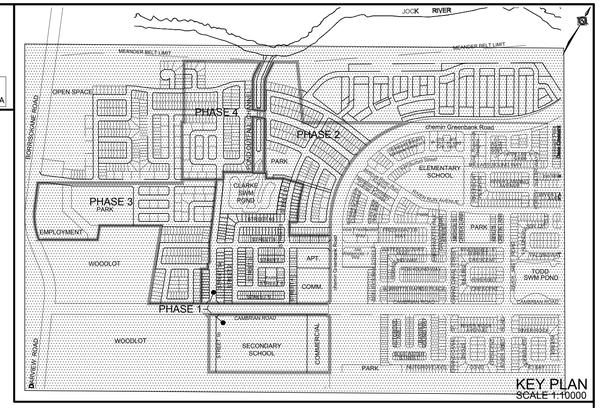
888_san2.xlsx

APPROVED ☐ REFUSED ☐

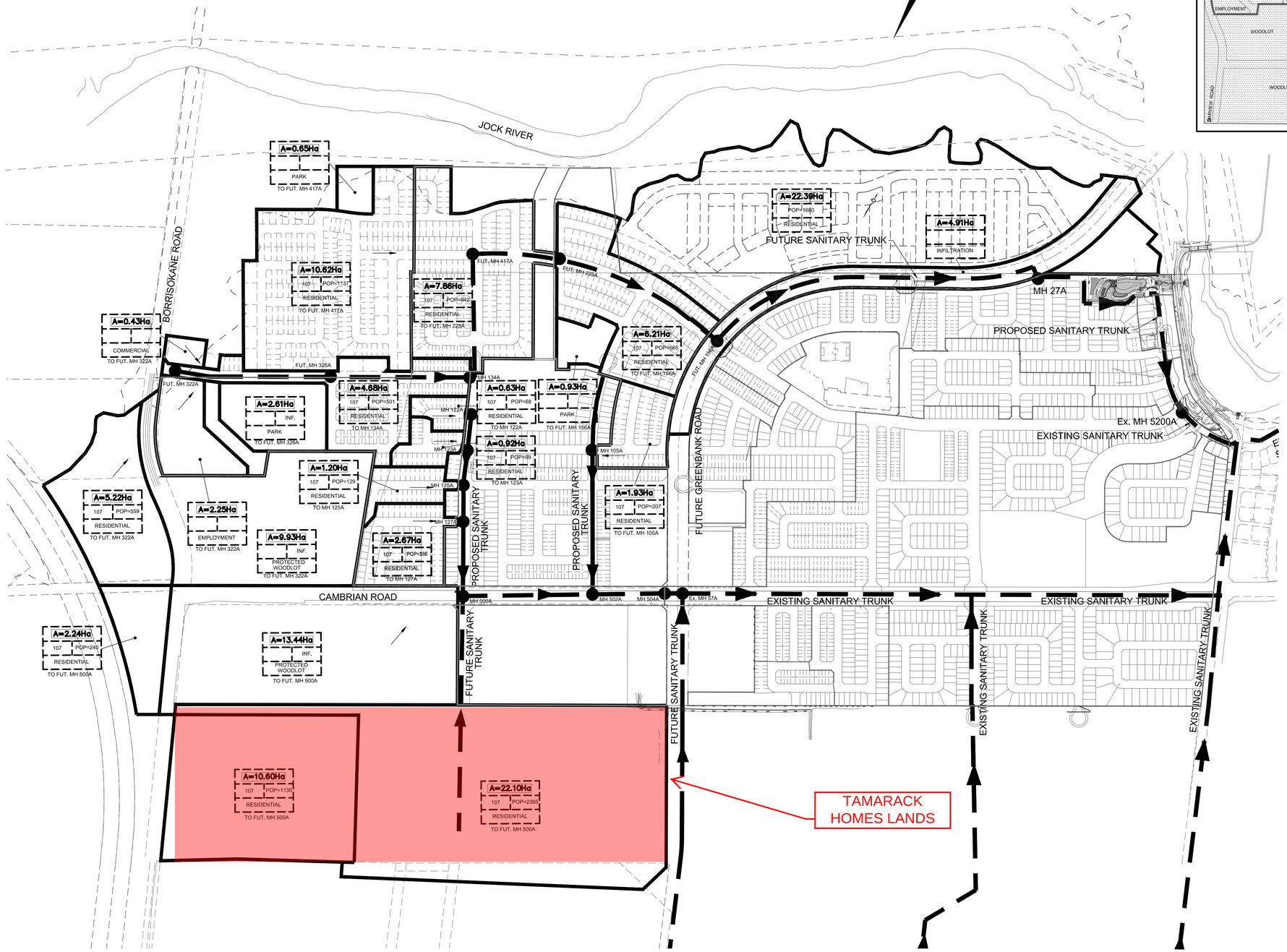
THIS ____ DAY OF _____, 20____

JEFF SHILLINGTON, P.ENG

PROJECT MANAGER – SOUTH BRANCH PLANNING, INFRASTRUCTURE & ECONOMIC DEVELOPMENT DEPARTMENT, CITY OF OTTAWA



KEY PLAN
SCALE 1:10000



LEGEND

SANITARY DRAINAGE BOUNDARY

EXTERNAL AREA IN HECTARES — A=53.63

EXTERNAL POPULATION

DENSITY (PERSONS/HECTARE) — 107 POP=5739

EXTERNAL LAND USE — RESIDENTIAL

MAINTENANCE HOLE — MH202A

CAP

TOPOGRAPHIC INFORMATION

TOPOGRAPHIC INFORMATION PROVIDED BY J.D. BARNES LIMITED, PROJECT No. 16-10-100-00. SURVEY DATED FEBRUARY 22, 2017. CITY OF OTTAWA 2K MAPPING, RECEIVED ON JANUARY 18, 2016.

LEGAL INFORMATION

CALCULATED DRAFT PLAN PROVIDED BY J.D. BARNES LIMITED, PROJECT No. 16-10-100-00-pht (HALF MOON BAY WEST PHASE 1), RECEIVED ON FEBRUARY 20, 2018.

1st SUBMISSION 18-03-09

NOT FOR CONSTRUCTION

BENCH MARK No. 00820010126

POINT IS LOCATED 1.65km NORTH OF BARNSDALE ROAD AND 5km SOUTH OF FALLOWFIELD ROAD ON HIGHWAY 416 NORTH OF KEMPTVILLE. THE POINT IS SET EAST OF THE NORTHBOUND LANE IN THE GRASSY SHOULDER.

ELEVATION 96.923 m

No.	BY	DATE	DESCRIPTION	BY
1	W.L.	18-03-09	1st SUBMISSION	

Ottawa

CITY OF OTTAWA

PROJECT No. 16-888

W. LIU 100167932 18-05-07 PROFESSIONAL ENGINEERS PROVINCE OF ONTARIO

© DSEL

EXTERNAL SANITARY DRAINAGE PLAN

HALF MOON BAY WEST SUBDIVISION
PHASE 1

DSEL
david schaeffer engineering ltd
120 l ier Road Unit 103
Stitt ille ON K2S 1E9
Tel. (613) 36 0 56
Fax. (613) 36 1 3
www.DSEL.ca

DRAWN BY:	V.W./S.L.	CHECKED BY:	W.L./C.M.	DRAWING NO.	SHEET NO.
DESIGNED BY:	P.P.	CHECKED BY:	K.M.		36
SCALE:	1: 4000	DATE:	MARCH 2018		

CITY FILE No. D07-16-16-0023-P1 CITY PLAN No. 1 5 6

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION							COMM		INSTIT		PARK		C+I+I	INFILTRATION					PIPE						
STREET	FROM M.H.	TO M.H.	AREA (ha)	UNITS	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap (%)	VEL. (FULL) (m/s)	VEL. (ACT.) (m/s)
Contribution From Phase 3 Future Street 27, Pipe PLUG - 123A						0.92	99										0.92	1.64									
	PLUG	123A	0.01			1.65	99	4.00	1.60								0.01	0.93	0.26	1.86	10.0	200	0.35	19.40	0.10	0.62	0.09
	123A	124A	0.22	5	17	1.87	184	4.00	2.98								0.22	1.87	0.52	3.50	62.5	250	0.25	29.73	0.12	0.61	0.10
	124A	125A				1.87	184	4.00	2.98								0.00	1.87	0.52	3.50	6.5	250	0.25	29.73	0.12	0.61	0.10
Contribution From Phase 3 Future Street 26, Pipe PLUG - 125A						1.20	129										1.20	3.07									
	PLUG	125A	0.01			3.08	129	4.00	2.09								0.01	1.21	0.34	2.43	10.0	200	0.35	19.40	0.13	0.62	0.10
	125A	127A	0.23	5	17	3.31	330	4.00	5.35								0.23	3.31	0.93	6.28	72.0	250	0.25	29.73	0.21	0.61	0.11
Contribution From Phase 3 Future Street 24, Pipe PLUG - 127A						2.67	286										2.67	5.98									
	PLUG	123A				5.98	286	4.00	4.63								0.00	2.67	0.75	5.38	15.0	200	0.35	19.40	0.28	0.62	0.13
	127A	128A	0.25	6	21	6.23	637	3.92	10.12								0.25	6.23	1.74	11.86	73.5	250	0.25	29.73	0.40	0.61	0.15
			0.05			6.28	637										0.05	6.28									
	128A	500A	0.21	5	17	6.49	654	3.91	10.36								0.21	6.49	1.82	12.18	76.0	250	0.25	29.73	0.41	0.61	0.15
To Cambrian Road, Pipe 500A - 501A						6.49	654											6.49									
Cambrian Road																											
Contribution From External						34.94	3740										34.94	34.94									
Contribution From External						13.44											13.44	48.38									
Contribution From Street 1a, Pipe 128A - 500A						6.49	654										6.49	54.87									
	500A	501A	0.48			55.35	4394	3.30	58.74								0.48	55.35	15.50	74.24	6.5	375	0.25	87.67	0.85	0.79	0.24
Contribution From Street 1a, Pipe 132A - 501A						1.29	91										1.29	56.64									
	501A	5010A	0.95			57.59	4485	3.29	59.77								0.95	57.59	16.13	75.90	124.0	450	0.12	98.76	0.77	0.62	0.18
	5010A	502A				57.59	4485	3.29	59.77								0.00	57.59	16.13	75.90	124.0	450	0.12	98.76	0.77	0.62	0.18
Contribution From Street 4, Pipe 121A - 502A						11.26	1410										11.26	68.85									
School												6.07	6.07			5.27	6.07	6.07	1.70	6.97	16.0	200	0.50	23.19	0.30	0.74	0.16
	502A	503A	0.42			69.27	5895	3.18	75.94				6.07			5.27	0.42	75.34	21.10	102.31	111.5	450	0.17	117.55	0.87	0.74	0.23
Commercial Block										1.36	1.36					1.18	1.36	1.36	0.38	1.56	25.5	200	0.50	23.19	0.07	0.74	0.10
Commercial Block										1.50	1.50					1.30	1.50	1.50	0.42	1.72	16.0	200	0.50	23.19	0.07	0.74	0.10
	503A	504A	0.02			69.29	5895	3.18	75.94		2.86		6.07			7.75	0.02	78.22	21.90	105.59	29.5	450	0.17	117.55	0.90	0.74	0.23

FLOW FROM 30.62 Ha - MEADOWS PHASE 5 LANDS

LICENSED PROFESSIONAL ENGINEER
W. LU
100167932
PROVINCE OF ONTARIO

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.10764	Industrial Peak Factor = as per MOE Graph			
Average Daily Flow =	350	l/p/day		Extraneous Flow =	0.280	L/s/ha	
Comm/Inst Flow =	50000	L/ha/da	0.5787	Minimum Velocity =	0.600	m/s	
Industrial Flow =	35000	L/ha/da	0.40509	Manning's n = (Conc)	0.013	(Pvc)	0.013
Max Res. Peak Factor =	4.00			Townhouse coeff=	2.7		
Commercial/Inst./Park Peak Factor =	1.50			Single house coeff=	3.4		
Institutional =	0.58	l/s/Ha					

Designed: P.P.	PROJECT: Half Moon Bay West - Phase 1		
Checked: W.L.	LOCATION: City of Ottawa		
Dwg. Reference: Sanitary Drainage Plan. Dwgs. No. 34, 35 & 36	File Ref: 16-888	Date: March, 2018	Sheet No. 3 of 3

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

SANITARY SEWER DESIGN SHEET

The Meadows in Half Moon Bay - Phase 5
CITY OF OTTAWA
Tamarack Homes

LOCATION				RESIDENTIAL										ICI AREAS								INFILTRATION ALLOWANCE			FIXED FLOW (L/s)		TOTAL FLOW	PROPOSED SEWER DESIGN						
				AREA	UNIT TYPES				AREA	POPULATION		RES	PEAK	AREA (Ha)						ICI	PEAK	AREA (Ha)		FLOW				CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	AVAILABLE CAPACITY	
STREET	AREA ID	FROM MH	TO MH	w/ Units (Ha)	SF	SD	TH	APT	w/o Units (Ha)	IND	CUM	PEAK FACTOR	FLOW (L/s)	INSTITUTIONAL		COMMERCIAL		INDUSTRIAL		PEAK FACTOR	FLOW (L/s)	IND	CUM	(L/s)	IND	CUM	(L/s)	(L/s)	(m)	(mm)	(%)	(full) (m/s)	L/s	(%)
														IND	CUM	IND	CUM	IND	CUM															
Meadows Phase 5	A1													2.95	2.95	0.00	0.00	0.00	0.00	1.00	0.96	2.95	2.95	0.97	0.00	0.00	1.93	19.66	50.00	200	0.33	0.606	17.73	90.18%
Meadows Phase 5	A2						42		1.23	113.4	113.4	3.58	1.32	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.23	1.23	0.41	0.00	0.00	1.72	19.66	50.00	200	0.33	0.606	17.93	91.24%
Meadows Phase 5	Main										113.4	3.58	1.32	0.00	2.95	0.00	0.00	0.00	0.00	1.00	0.96	0.00	4.18	1.38	0.00	0.00	3.65	19.66	50.00	200	0.33	0.606	16.00	81.42%
Meadows Phase 5	A3, EXT				48		23		14.67	1360.3	1360.3	3.17	13.97	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	14.67	14.67	4.84	0.00	0.00	18.81	35.64	50.00	250	0.33	0.703	16.83	47.23%
Meadows Phase 5	A4				23		134		7.17	440.0	440.0	3.40	4.85	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	7.17	7.17	2.37	0.00	0.00	7.22	19.66	50.00	200	0.33	0.606	12.44	63.28%
Meadows Phase 5	Main										1913.7	3.08	19.10	0.00	2.95	0.00	0.00	0.00	0.00	1.00	0.96	0.00	26.02	8.59	0.00	0.00	28.65	35.64	50.00	250	0.33	0.703	6.99	19.62%
Meadows Phase 5	A5				53		24		4.95	245.0	245.0	3.49	2.77	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	4.95	4.95	1.63	0.00	0.00	4.41	19.66	50.00	200	0.33	0.606	15.25	77.59%
Meadows Phase 5	Main									0.0	2158.7	3.05	21.32	0.00	2.95	0.00	0.00	0.00	0.00	1.00	0.96	0.00	30.97	10.22	0.00	0.00	32.50	57.95	50.00	300	0.33	0.794	25.45	43.92%

Design Parameters:

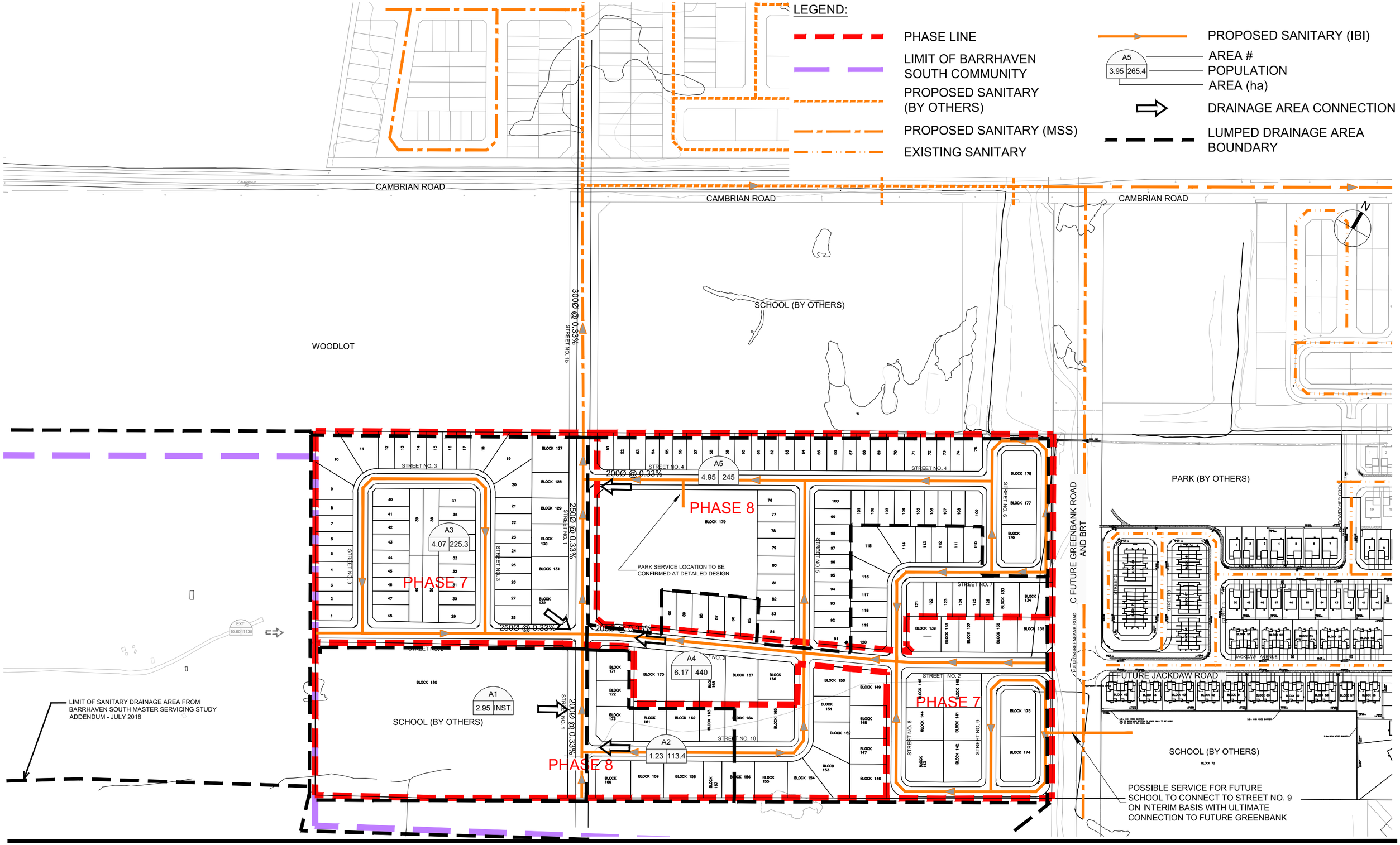
Residential			ICI Areas		
SF	3.4	p/p/u	INST	28,000 L/Ha/day	1.0
TH/SD	2.7	p/p/u	COM	28,000 L/Ha/day	1.0
APT	1.8	p/p/u	IND	35,000 L/Ha/day	MOE Chart
Other	107	p/p/Ha		17000 L/Ha/day	

Notes:
1. Mannings coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 200 L/day
3. Infiltration allowance: 0.33 L/s/Ha
4. Residential Peaking Factor:
Harmon Formula = 1+(14/(4+(P/1000)^0.5))0.8
where K = 0.8 Correction Factor
5. Commercial and Institutional Peak Factors based on total area,
1.5 if greater than 20%, otherwise 1.0

Designed: JEB
Checked: TRB
Dwg. Reference: FIG. 3.1

No.	Revision	Date
1.	The Meadows - Phase 5 - Adequacy of Public Services - Submission No. 1	2018-04-06
2.	The Meadows - Phase 5 - Adequacy of Public Services - Submission No. 2	2018-12-05
3.	The Meadows - Phase 5 - Adequacy of Public Services - Submission No. 3	2019-03-28

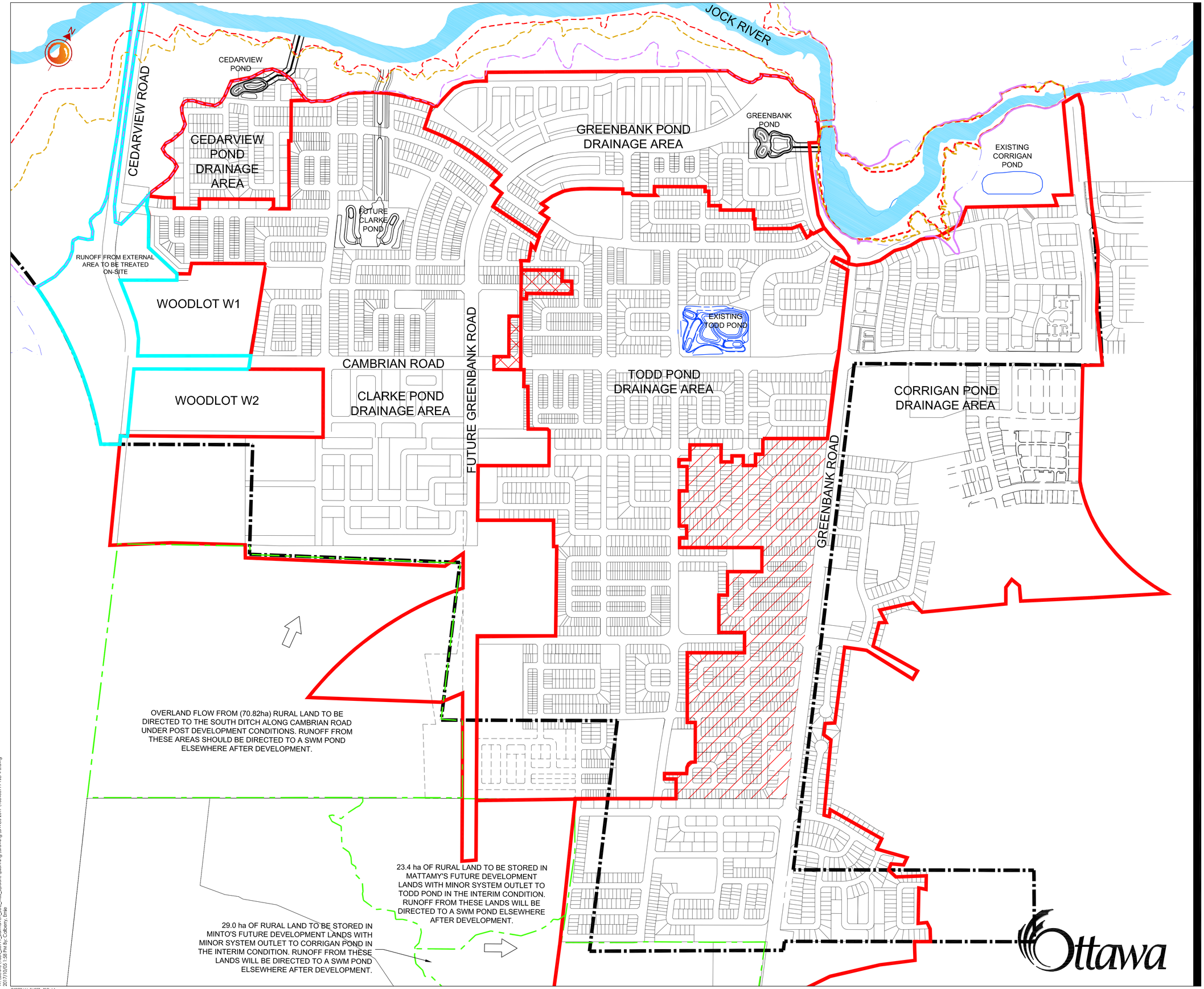
File Reference: 115496.5.7.1
Date: 2018-04-06
Sheet No: 1 of 1



J:\115496_MeadowsPh5\5.9 Drawings\59civil\current\Assessment of Adequacy\115496-Fig-3.1-SANITARY.dwg Layout Name: FIG. 3.1 SANITARY PLAN Plot Scale: 1:8.704 Plotted At: 3/29/2019 Last Saved By: James.Batison Last Saved At: Mar. 28, 19

Scale	Project Title	Drawing Title	Sheet No.
N.T.S.	THE MEADOWS IN HALF MOON BAY PHASE 7&8	CONCEPTUAL SANITARY PLAN	FIG. 3.1 REV. 2

APPENDIX D



Stantec

Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613.722.4420
www.stantec.com

Legend

- 10 YEAR FLOOD LINE
- 25 YEAR FLOOD LINE
- 100 YEAR FLOOD LINE
- LIMIT OF CDP BOUNDARY
- WOOD LOT
- MINOR SYSTEM DRAINAGE BOUNDARY
- ON-SITE TREATMENT AREA
- EXISTING SWM POND
- PROPOSED SWM POND
- MAJOR TO TODD POND MINOR TO CORRIGAN POND
- MAJOR TO CLARKE POND MINOR TO TODD POND
- EXTERNAL RURAL DRAINAGE AREA BOUNDARY

Notes

1. DRAINAGE BOUNDARIES FOR EXISTING TODD AND CORRIGAN PONDS BASED ON LATEST TODD POND MODEL/KEEPER ANALYSIS.
2. FUTURE CLARKE POND DRAINAGE AREA BASED ON LATEST DESIGN BRIEF.

2	ISSUED FOR MSS ADDENDUM	ST	AP	17.10.06
Revision		By	Appd.	YY.MM.DD

File Name:	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
CITY OF OTTAWA

BARRHAVEN SOUTH MASTER SERVICING STUDY ADDENDUM
Ottawa, ON

Title
SWM PONDS CATCHMENT AREAS

Project No.	Scale	Drawing No.	Sheet	Revision
163400999	1:5000 (0 50 150 250m)	FIG. 4.5	5 of 5	2

W:\active\163_0999_barrhaven_SUC_MSS_Update\planning\drawing\DWGS 2017\163400999-RG 4-5.dwg
2017/10/03 1:38 PM By: CaBlenny, Emie

ORIGINAL SHEET - ISO A1

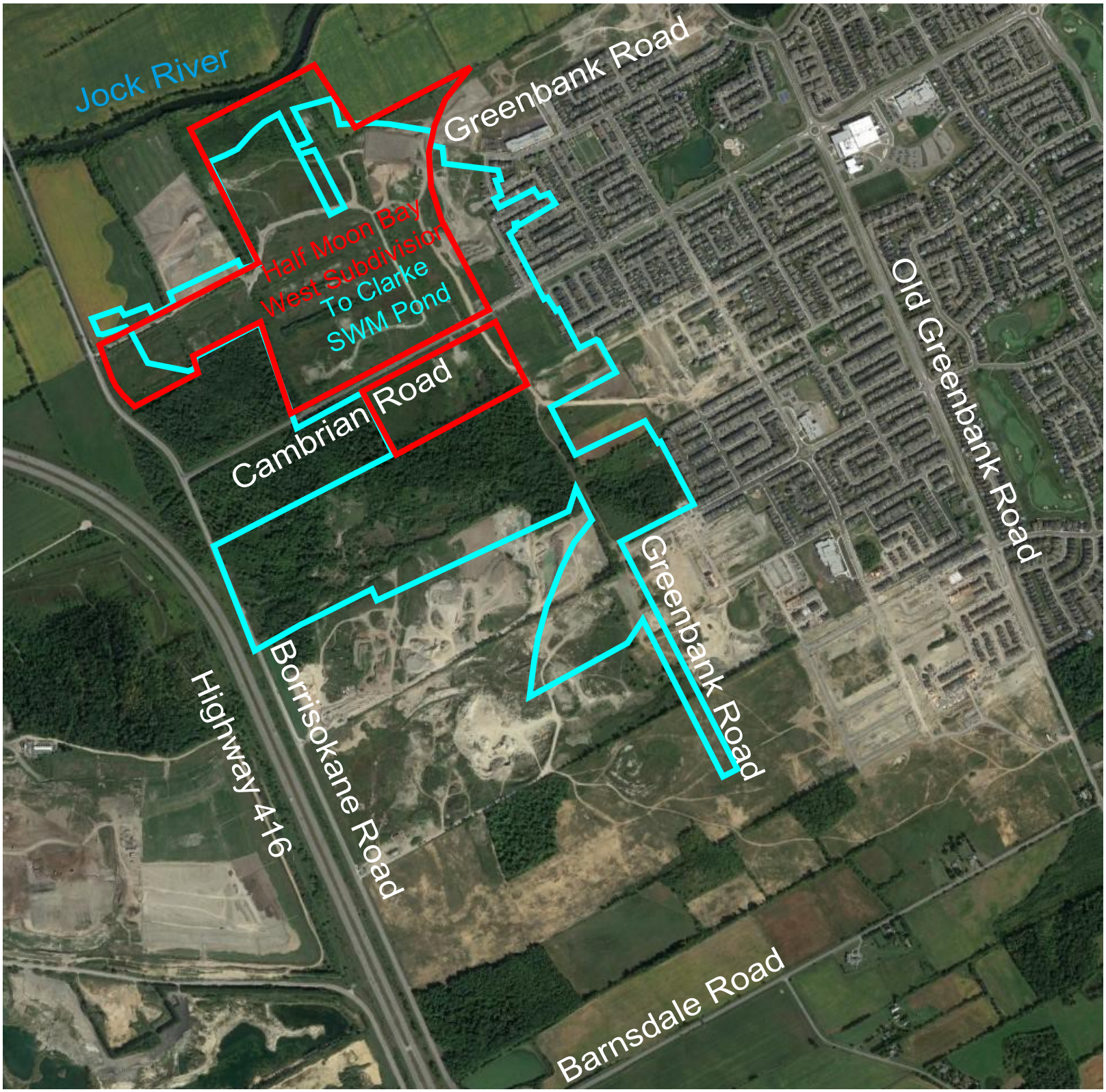
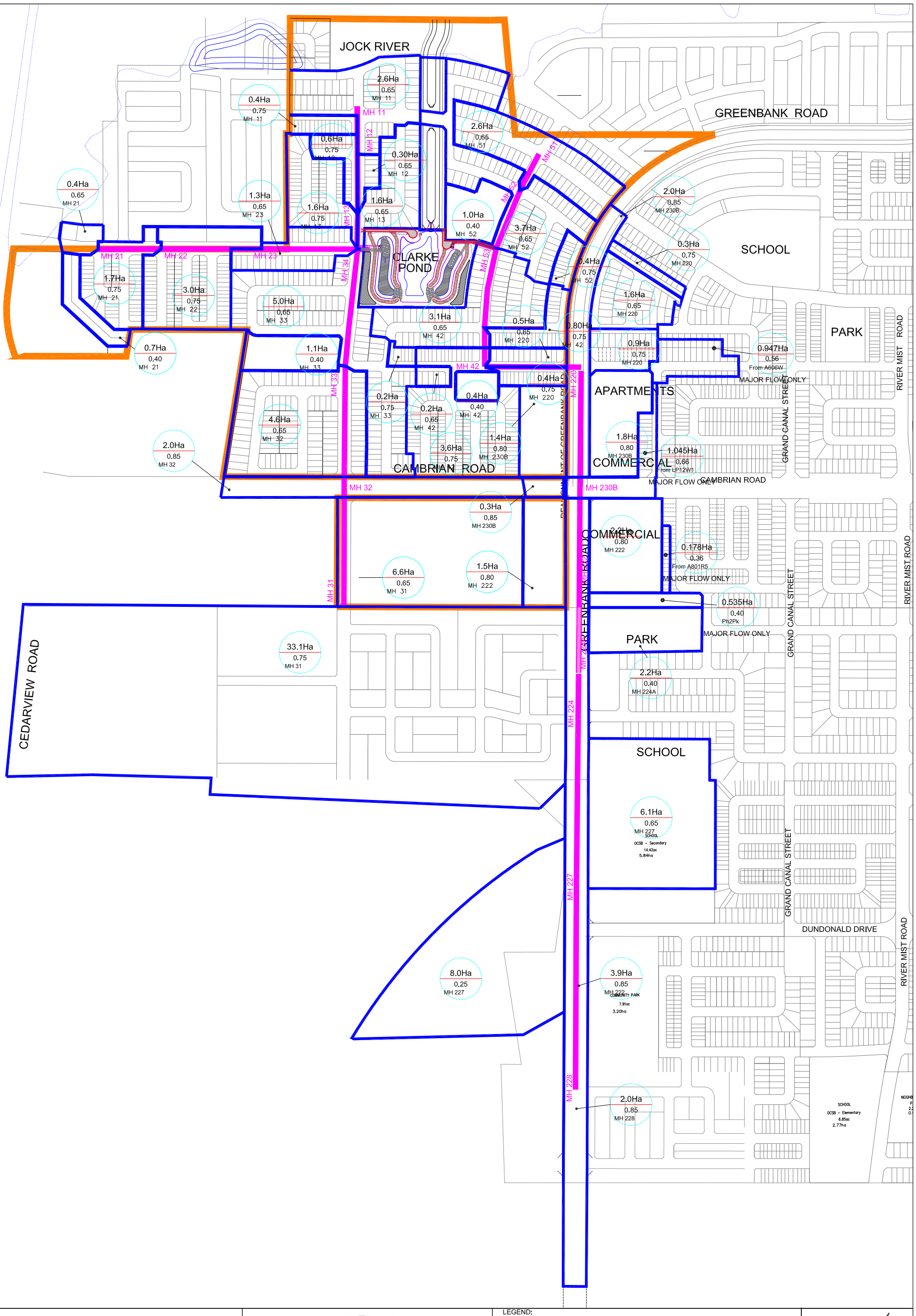


Figure 1:General Location of Subject Site



J.F. Sabourin and Associates Inc.
WATER RESOURCES AND ENVIRONMENTAL CONSULTANTS
GATINEAU (819) 243-6858
OTTAWA (613) 836-3884

CLIENT :
david schaeffer engineering ltd
600 ALDEN ROAD., SUITE 500
MARKHAM, ONTARIO,. L3R 0E7
(905) 475-3080

PROJECT :
HALF MOON BAY WEST SUBDIVISION

SCALE:
0 50 100 150 200 250 300 350m

TITLE :
PROPOSED DRAINAGE AREA
TO SWM FACILITY

FIGURE 2

No.	BY	DATE	DESCRIPTION	BY

LEGEND:
- LIMITS OF SUBDIVISION
- SUBCATCHMENT BOUNDARY
- 8.0HA / 0.25 / MH227 — SUB-CATCHMENT AREA, RUNOFF COEFFICIENT, UPSTREAM MANHOLE

DESIGNED :	
DRAWN :	LP
VERIFIED :	JFS
APPROVED :	JFS
DATE	PROJECT No.
Apr/17	598(07)-16

APPROVED ☐ REFUSED ☐

THIS ___ DAY OF ___, 20___

JEFF SHILLINGTON, P.ENG

PROJECT MANAGER – SOUTH BRANCH
PLANNING, INFRASTRUCTURE & ECONOMIC
DEVELOPMENT DEPARTMENT, CITY OF OTTAWA

REFER TO DWG No. 3

HALF MOON BAY SUBDIVISION □PHASE 1
REFER TO
DAVID SCHAEFFER ENGINEERING LIMITED
PROJECT No. 0□314

KEY PLAN
SCALE 1:10000

LEGEND

- STORM DRAINAGE BOUNDARY
- SUB-DRAINAGE BOUNDARY
- STORM DRAINAGE BOUNDARY (OTHER PHASES)
- STORM FREQUENCY
- UPSTREAM MH TO DOWNSTREAM MH
- AREA IN HECTARES
- RUNOFF COEFFICIENT
- EXTERNAL 2.78AC =
- EXTERNAL TIME OF CONCENTRATION
- EXTERNAL BLENDED RUNOFF COEFFICIENT
- EXTERNAL STORM FREQUENCY
- UPSTREAM MH TO DOWNSTREAM MH
- AREA IN OTHER PHASES IN HECTARES
- RUNOFF COEFFICIENT
- STREET CATCHBASIN & LEAD
- STREET CATCHBASIN WITH CLOSED LID & LEAD
- MAINTENANCE HOLE
- CURB INLET CATCHBASIN & LEAD
- CATCHBASIN / MAINTENANCE HOLE
- INTERCONNECTED CATCH BASIN & LEADS
- CAP
- OVERLAND FLOW DIRECTION
- EXTERNAL OVERLAND FLOW DIRECTION
- EMERGENCY OVERLAND FLOW DIRECTION

TOPOGRAPHIC INFORMATION

TOPOGRAPHIC INFORMATION PROVIDED BY J.D. BARNES LIMITED,
PROJECT No. 16-10-100-00. SURVEY DATED FEBRUARY 22, 2017.
CITY OF OTTAWA 2K MAPPING, RECEIVED ON JANUARY 18, 2016.

LEGAL INFORMATION

CALCULATED DRAFT PLAN PROVIDED BY J.D. BARNES LIMITED, PROJECT No.
16-10-100-00-ph1 (HALF MOON BAY WEST PHASE 1), RECEIVED ON FEBRUARY 20, 2018.

1st SUBMISSION 18-03-09

NOT FOR CONSTRUCTION

BENCH MARK No. 00820010126

POINT IS LOCATED 1.65km NORTH OF BARNSDALE ROAD AND 5km SOUTH OF FALLOWFIELD ROAD ON HIGHWAY 416 NORTH OF KEMPTVILLE. THE POINT IS SET EAST OF THE NORTHBOUND LANE IN THE GRASSY SHOULDER.

ELEVATION □ 96.923 m

No.	BY	DATE	DESCRIPTION	BY
1	W.L.	18-03-09	1st SUBMISSION	

CITY OF OTTAWA

PROJECT No. 16-888

W. LIU
100167932
18-03-09

STORM DRAINAGE PLAN & EXTERNAL PRE-DEVELOPMENT DRAINAGE PLAN

M□□□□M□□
□□□□M□□□□□□□
□□M□□□□□

HALF MOON BAY WEST SUBDIVISION
PHASE 1

DSEL
david schaeffer engineering ltd
120 I er Road Unit 103
Stitt ille ON K2S 1E9
Tel. (613) 36 0 56
Fax. (613) 36 □1 3
www.DSEL.ca

DRAWN BY:	V.W./S.L.	CHECKED BY:	W.L./C.M.	DRAWING NO.	SHEET NO.
DESIGNED BY:	P.P.	CHECKED BY:	K.M.		38
SCALE:	1:1000	DATE:	MARCH 2018		

CITY FILE No. D0□16□16□0023□P1 CITY PLAN No. □1□5□6

EXTERNAL PRE-DEVELOPMENT
STORM DRAINAGE PLAN
SCALE: 1:6000

IBI GROUP
400-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
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ibigroup.com

STORM SEWER DESIGN SHEET

The Meadows in Half Moon Bay - Phase 5
CITY OF OTTAWA
Tamarack Homes

LOCATION				AREA (Ha)										RATIONAL DESIGN FLOW												SEWER DATA								
STREET	AREA ID	FROM	TO	C= 0.20	C= 0.25	C= 0.40	C= 0.65	C= 0.57	C= 0.65	C= 0.69	C= 0.70	C= 0.76	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) DIA	W	H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (2yr) (L/s)	(%)
Meadows Phase 5	A1						2.95							5.33	5.33	10.00	0.00	10.00	76.81	104.19	122.14	178.56	409.42	555.42	651.10	951.84		409.42	731.45	82.50	900			0.15	1.114	322.03	44.03%
Meadows Phase 5	A2						1.22							2.20	2.20	10.00	0.00	10.00	76.81	104.19	122.14	178.56	169.32	229.70	269.27	393.64		169.32	248.09	36.00	600			0.15	0.850	78.77	31.75%
Meadows Phase 5	Main													0.00	7.54	10.00	0.00	10.00	76.81	104.19	122.14	178.56	578.74	785.11	920.36	1,345.48		578.74	731.45	37.00	900			0.15	1.114	152.71	20.88%
Meadows Phase 5	A3, EXT						14.67							26.51	26.51	10.00	0.00	10.00	76.81	104.19	122.14	178.56	2,036.00	2,762.02	3,237.82	4,733.37		2,036.00	2,856.14	37.00	1500			0.15	1.566	820.14	28.71%
Meadows Phase 5	A4						6.32							11.42	11.42	10.00	0.00	10.00	76.81	104.19	122.14	178.56	877.13	1,189.91	1,394.89	2,039.19		877.13	1,575.26	37.00	1200			0.15	1.349	698.13	44.32%
Meadows Phase 5	Main													0.00	45.46	10.00	0.00	10.00	76.81	104.19	122.14	178.56	3,491.87	4,737.04	5,553.07	8,118.03		3,491.87	4,644.39	37.00	1800			0.15	1.768	1152.52	24.82%
Meadows Phase 5	A5						4.81							8.69	8.69	10.00	0.00	10.00	76.81	104.19	122.14	178.56	667.56	905.61	1,061.62	1,551.98		667.56	905.48	37.00	975			0.15	1.175	237.92	26.28%
Meadows Phase 5	Main													0.00	54.16	10.00	0.00	10.00	76.81	104.19	122.14	178.56	4,159.44	5,642.66	6,614.69	9,670.01		4,159.44	8,420.84	37.00	2250			0.15	2.052	4261.40	50.61%

Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 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

Notes:
1. Mannings coefficient (n) = 0.013

Designed: JEB
Checked: TRB
Dwg. Reference: FIG. 4.1

No.	Revision	Date
1.	The Meadows - Phase 5 - Aqequacy of Public Services - Submission No. 2	2018-12-05
2.	The Meadows - Phase 5 - Aqequacy of Public Services - Submission No. 3	2019-03-28

File Reference: 115496.5.7.1
Date: 2018-12-05
Sheet No: 1 of 1

LEGEND:

- PHASE LINE
- LIMIT OF BARRHAVEN SOUTH COMMUNITY
- PROPOSED STORM (BY OTHERS)
- PROPOSED STORM (MSS)
- EXISTING STORM
- PROPOSED STORM (IBI)
- A5 / 0.65 | 3.81 — AREA # / AREA (ha) / "C" VALUE
- DRAINAGE AREA CONNECTION
- LUMPED DRAINAGE AREA BOUNDARY

CAMBRIAN ROAD

WOODLOT

SCHOOL (BY OTHERS)

LIMIT OF CLARKE POND DRAINAGE AREA FROM BARRHAVEN SOUTH MASTER SERVICING STUDY ADDENDUM - JULY 2018

2250Ø @ 0.15% STREET NO. 1

STREET NO. 3

STREET NO. 4

STREET NO. 2

STREET NO. 10

STREET NO. 5

STREET NO. 6

STREET NO. 7

STREET NO. 8

STREET NO. 9

975Ø @ 0.15%

1800Ø @ 0.15%

1500Ø @ 0.15%

1200Ø @ 0.15%

900Ø @ 0.15%

600Ø @ 0.15%

A1 0.65 | 2.95

A2 0.65 | 1.22

A3 0.65 | 4.07

A4 0.65 | 6.32

A5 0.65 | 4.81

PHASE 7

PHASE 8

PARK SERVICE LOCATION TO BE CONFIRMED AT DETAILED DESIGN

SCHOOL (BY OTHERS)

EXISTING DIVERTED CLARKE DRAIN TO BE ABANDONED

PROPOSED ENTOMBMENT OF EXISTING DIVERTED CLARKE DRAIN

PARK (BY OTHERS)

FUTURE GREENBANK ROAD AND BRT

FUTURE JACKDAW AVENUE

POSSIBLE SERVICE FOR FUTURE SCHOOL TO CONNECT TO STREET NO. 9 ON INTERIM BASIS WITH ULTIMATE CONNECTION TO FUTURE GREENBANK

N

J:\115496_MeadowsPh5\5.9 Drawings\59civil\current\Assessment of Adequacy\115496-Fig-4.1-STORM.dwg Layout Name: FIG. 4.1 STORM PLAN Plot Scale: 1:8.704 Plotted At: 3/29/2019 Last Saved By: James.Batiston Last Saved At: Mar. 29, 19

Scale	Project Title	Drawing Title	Sheet No.
N.T.S.	THE MEADOWS IN HALF MOON BAY PHASE 7&8	CONCEPTUAL STORM PLAN	FIG. 4.1 REV. 2

APPENDIX E

CEDARVIEW POND

CEDARVIEW ROAD

CLARKE POND
(CURRENTLY
UNDER DESIGN
BY JFSA/DSEL)

GREENBANK
POND

EXISTING
CORRIGAN POND

JOCK RIVER

EXISTING
TODD POND

CAMBRIAN ROAD

GREENBANK ROAD

HIGHWAY 416

WOODLOT W1

WOODLOT W2

OVERLAND FLOW FROM (70.82ha) RURAL LAND TO BE DIRECTED TO THE SOUTH DITCH ALONG CAMBRIAN ROAD UNDER POST DEVELOPMENT CONDITIONS. RUNOFF FROM THESE AREAS SHOULD BE DIRECTED TO A SWM POND ELSEWHERE AFTER DEVELOPMENT.

23.4 ha OF RURAL LAND TO BE STORED IN MATTAMY'S FUTURE DEVELOPMENT LANDS WITH MINOR SYSTEM OUTLET TO TODD POND IN THE INTERIM CONDITION. RUNOFF FROM THESE LANDS WILL BE DIRECTED TO A SWM POND ELSEWHERE AFTER DEVELOPMENT.

29.0 ha OF RURAL LAND TO BE STORED IN MINTO'S FUTURE DEVELOPMENT LANDS WITH MINOR SYSTEM OUTLET TO CORRIGAN POND IN THE INTERIM CONDITION. RUNOFF FROM THESE LANDS WILL BE DIRECTED TO A SWM POND ELSEWHERE AFTER DEVELOPMENT.

NOTE:

1. GEOTECHNICAL DATA OBTAINED FROM GOLDERS. REPORT NO.11-1121-005. DRAWING No. 1 "PERMISSIBLE GRADE RAISES" DATED OCT. 2014.
2. CONCEPTUAL GRADING BASED ON AVAILABLE GRADE RAISE RESTRICTIONS CONTOUR MAPPING AND LATEST PROFILES FOR THE GREENBANK REALIGNMENT.
3. PROPOSED GRADES ESTABLISHED TO MEET AVAILABLE GRADE RAISE RESTRICTIONS, WHILE PROVIDING ACCEPTABLE COVER OVER THE STORM SEWERS AND PROVIDING AN OVERLAND FLOW OUTLET. PROPOSED GRADING IS EXPECTED TO CHANGE DURING DETAILED DESIGN SUBJECT TO PRE-LOADING AND/OR USING ENGINEERED LIGHT WEIGHT FILL.

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2017/10/06 2:07 PM By: Catherine Emile

ORIGINAL SHEET - ISO A1

Stantec

Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613.722.4420
www.stantec.com

Legend

- OVERLAND FLOW DIRECTION
- SWM POND DRAINAGE BOUNDARY
- ALTERNATIVE HOUSE DESIGN REQUIRED SUBJECT TO FILL RESTRICTIONS AND/OR 100 YEAR HYDRAULIC GRADELINE. FURTHER GEOTECHNICAL INVESTIGATION REQUIRED DURING DETAILED DESIGN
- MAX 0.5m — MAX FILL DEPTH OF 0.5m
- MAX 0.7m — MAX FILL DEPTH OF 0.7m
- MAX 0.75m — MAX FILL DEPTH OF 0.75m
- MAX 0.8m — MAX FILL DEPTH OF 0.8m
- MAX 0.9m — MAX FILL DEPTH OF 0.9m
- MAX 1.0m — MAX FILL DEPTH OF 1.0m
- MAX 1.1m — MAX FILL DEPTH OF 1.1m
- MAX 1.2m — MAX FILL DEPTH OF 1.2m
- MAX 1.4m — MAX FILL DEPTH OF 1.4m
- MAX 2.0m — MAX FILL DEPTH OF 2.0m
- MAX 2.5m — MAX FILL DEPTH OF 2.5m
- MAX 3.0m — MAX FILL DEPTH OF 3.0m
- NO DATA — NO DATA - ADDITIONAL GEOTECHNICAL DATA REQUIRED
- 10 YEAR FLOOD LINE
- 25 YEAR FLOOD LINE
- 100 YEAR FLOOD LINE
- LIMIT OF CDP BOUNDARY
- WOOD LOT
- 106.20 / 106.00 — PROPOSED ELEVATION / EXISTING ELEVATION
- EXTERNAL RUNOFF DIRECTION
- EXTERNAL RURAL DRAINAGE AREA BOUNDARY

2	REVISED AS PER CITY COMMENTS	ST	AP	17.10.06
1	ISSUED FOR MSS ADDENDUM	ST	AP	14.11.28
Revision		By	Appd.	YY.MM.DD
File Name: 163400999-WM.DWG		ST	AP	AP	14.11.21
		Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

Client/Project
CITY OF OTTAWA

BARRHAVEN SOUTH MASTER SERVICING STUDY ADDENDUM
Ottawa, ON

Title
BARRHAVEN SOUTH MASTER GRADING PLAN

Project No.	Scale	Revision
163400999	1:5000 (0, 50, 150, 250m)	
Drawing No.	Sheet	
A-2	2 of 9	2

LEGEND:

- PHASE LINE
- LIMIT OF BARRHAVEN SOUTH COMMUNITY
- 95.00 PROPOSED MACRO GRADES
- *95.00* PROPOSED GRADES (BY OTHERS)
- MAJOR OVERLAND FLOW ROUTE
- TERRACING 3:1

N

94.00
CAMBRIAN ROAD
93.60
CAMBRIAN ROAD
93.22
92.98
94.10
SCHOOL (BY OTHERS)
STREET NO. 1b
WOODLOT
EXISTING DIVERTED CLARKE DRAIN TO BE ABANDONED
PROPOSED ENTOMBMENT OF EXISTING DIVERTED CLARKE DRAIN
94.50
93.16
95.35
95.40
STREET NO. 3
STREET NO. 4
STREET NO. 4
98.00
97.85
94.75
94.90
95.00
95.25
PARK (BY OTHERS)
PHASE 8
BLOCK 179
NO DRAINAGE FROM SUBDIVISION TO BE PERMITTED THROUGH PARK BLOCK, ANY TERRACING OR RETAINING WALLS NECESSARY ARE REQUIRED TO BE LOCATED ON PRIVATE LAND
STREET NO. 6
STREET NO. 1
STREET NO. 3
STREET NO. 5
95.25
95.50
95.40
95.35
95.55
93.68
95.68
95.81
94.40
95.78
97.10
97.20
97.00
PHASE 7
STREET NO. 7
FUTURE GREENBANK ROAD
5% AND BRT
98.50
97.50
96.85
97.40
96.00
95.45
95.55
95.25
95.60
95.65
95.00
94.97
FUTURE JACKDAW ROAD
STREET NO. 2
STREET NO. 2
STREET NO. 1
STREET NO. 10
STREET NO. 8
STREET NO. 9
PHASE 7
SCHOOL (BY OTHERS)
96.95
97.15
97.20
97.00
96.25
96.50
96.29
PHASE 8
97.00

J:\115496_MeadowsPh5\5.9 Drawings\59civil\current\Assessment of Adequacy\115496-Fig-5.1-GRADING.dwg Layout Name: FIG. 5.1 GRADING PLAN Plot Scale: 1:8.704 Plotted At: 3/29/2019 Last Saved By: JamesBattison Last Saved At: Mar. 28, 19

Scale	Project Title	Drawing Title	Sheet No.
N.T.S.	THE MEADOWS IN HALF MOON BAY PHASE 7&8	PROPOSED MACRO GRADING PLAN	FIG. 5.1 REV. 2

APPENDIX F

LEGEND:

LIGHT DUTY SILT FENCE

TEMPORARY MUD MAT

STRAW BALE CHECK DAM

WOODLOT

SCHOOL (BY OTHERS)

EXISTING DIVERTED CLARKE DRAIN TO BE ABANDONED

PROPOSED ENTOMBMENT OF EXISTING DIVERTED CLARKE DRAIN

CAMBRIAN ROAD

FUTURE GREENBANK ROAD AND BRT

FUTURE JACKDAW ROAD

PARK (BY OTHERS)

SCHOOL (BY OTHERS)

BLOCK 608

BLOCK 609

BLOCK 603

STREET NO. 1

STREET NO. 1b

STREET NO. 2

STREET NO. 3

STREET NO. 4

STREET NO. 5

STREET NO. 6

STREET NO. 7

STREET NO. 8

STREET NO. 9

STREET NO. 10

Scale	Project Title	Drawing Title	Sheet No.
N.T.S.	THE MEADOWS IN HALF MOON BAY PHASE 7&8	EROSION & SEDIMENTATION CONTROL PLAN	FIG. 6.1 REV. 2