



**Half Moon Bay South Phase 5 –
Functional Servicing Report**

Project #160401476

February 15, 2019

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HALF MOON BAY SOUTH PHASE 5 – FUNCTIONAL SERVICING REPORT

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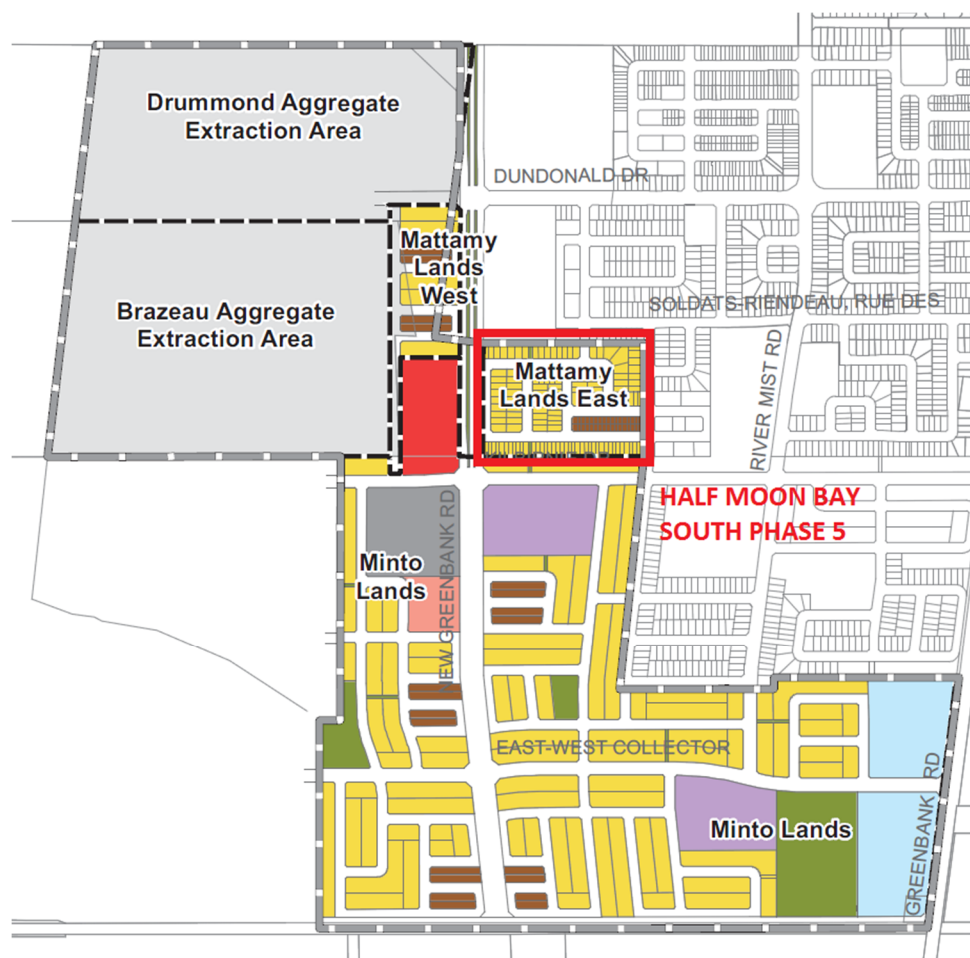
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Introduction
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1.0 INTRODUCTION

Mattamy Homes Ltd. has commissioned Stantec Consulting Ltd. to prepare the following Functional Servicing Report for Phase 5 of the Half Moon Bay South Subdivision. The subject property is located northwest of the intersection of Kilbirnie Drive and Alex Polowin Avenue within the Barrhaven South Urban Expansion Area (BSUEA). The property is currently zoned Mineral Aggregate Reserve Zone (MR1) and is bordered by Alex Polowin Avenue to the east, Soldats-Riendeau Street and a community park to the north, the future extension of Kilbirnie Drive to the south, and the future location of the Realigned Greenbank Road to the west. The property is indicated in **Figure 1**. The proposed residential development comprises approximately 5.6ha of land, and contains a mixture of townhomes, slab-on-grade townhomes, and single family units.

Figure 1: Approximate Location of Half Moon Bay South Phase 5 Draft Plan Area



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Introduction

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1.1 OBJECTIVE

The intent of this report is to build on the servicing principles outlined in the Half Moon Bay South Phase 4 Servicing Report, and later updated for the Barrhaven South Urban Expansion Area Master Servicing Study (BSUEA MSS) to create a servicing strategy specific to the subject property. The report will establish criteria for future detailed design of the subdivision, in accordance with the associated background studies, City of Ottawa guidelines, and all other relevant regulations.



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Background
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2.0 BACKGROUND

The following documents were referenced in the preparation of this report:

- Half Moon Bay South Phase 4 Servicing Report, *Stantec Consulting Ltd.*, August 25, 2015.
- Master Servicing Study – Barrhaven South Urban Expansion Area, *J.L. Richards & Associates Ltd.*, May 4, 2018.
- Geotechnical Investigation – Proposed Residential Development Half Moon Bay South (Phase 5), *Paterson Group Inc.*, February 8, 2019.
- Todd Pond Model Keeper Analysis (Re-Assessment of Existing System Capacity), *J.F. Sabourin & Associates Inc.*, April 2015.
- Quinn's Pointe Development Site Servicing Report, *J.L. Richards & Associates Ltd.*, August 2015.
- City of Ottawa Sewer Design Guidelines, 2nd Ed., City of Ottawa, October 2012
- City of Ottawa Design Guidelines – Water Distribution, Infrastructure Services Department, City of Ottawa, First Edition, July 2010



3.0 POTABLE WATER ANALYSIS

3.1 BACKGROUND

The proposed development is located within BARR of the City of Ottawa's water distribution system, which is fed from Pressure Zone 2W by 400mm mains within Greenbank and Cambrian Road, and a 300mm main along River Mist Road. The Barrhaven Reservoir provides balancing storage for peak flows and demands from the region.

A 250mm watermain along Fameflower Street to the north has been stubbed for extension within the proposed development, and a 200mm watermain exists along Alex Polowin Drive for connections for looping requirements.

3.2 PROPOSED WATERMAIN SIZING AND LAYOUT

The proposed watermain alignment and sizing for this development is shown on **Drawing SSP-1** with 203mm diameter piping. It should be noted that the pipe layout and sizing for the development is preliminary and is to be verified upon detailed hydraulic analysis for the development area.

3.2.1 Ground Elevations

The proposed ground elevations of the development range from approximately 100m to 107m. Preliminary grading and elevations have been determined for the site and included on **Drawing GP-1**.

3.2.2 Water Demand

The current draft plan for the Half Moon Bay South Phase 5 Development calls for a total of 67 single units, 65 townhouse units, 32 slab-on-grade townhouse units, and an estimated population of 490 persons. The site is bound by existing development to the north and east, the future Realigned Greenbank Road and watermain extension to the west and the future development to the south without frontage on the subdivision lands. As such, no additional development is expected to place demands on the watermains proposed for the development.

Water demands for the development were estimated using the City of Ottawa's Water Distribution Design Guidelines. For residential developments, the average day (AVDY) per capita water demand is 350 L/cap/d. For maximum day (MXDY) demand, AVDY was multiplied by a factor of 2.5 and for peak hour (PKHR) demand, MXDY was multiplied by a factor of 2.2. The calculated residential water consumption is represented in **Table 1** below:



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Potable Water Analysis
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Table 1: Residential Water Demands

Unit Type	Units	Person/Unit	Population	AVDY (L/s)	MXDY (L/s)	PKHR (L/s)
Singles	67	3.4	227.8	0.92	2.31	5.08
Townhomes	97	2.7	261.9	1.06	2.65	5.84
		Total	489.7	1.98	4.96	10.91

Potable water supply will be connected to the existing watermain located on Fameflower Street and Alex Polowin Drive. **Drawing SSP-1** shows the location of the connection points to the existing watermain.

It is anticipated that the development will proceed as a single phase. Should the development be phased at construction, multiple connections can be made to the surrounding 200mm watermain to meet City guidelines for looping and water quality.

3.3 HYDRAULIC ASSESSMENT

A hydraulic model was built by J.L. Richards and Associates Ltd. for the BSUEA Master Servicing Study in consideration of domestic demands from the urban expansion area. The model assumes a single proposed 200mm main through the development along with connections to the Alex Polowin and Fameflower Street watermain. The model was assessed based on 2016 static boundary conditions to meet minimum servicing requirements (basic day and peak hour demands). A fire flow analysis was also performed under maximum day conditions (see **Appendix A** for excerpts).

3.3.1 Allowable Pressures

The City of Ottawa Water Distribution Design Guidelines state that the desired range of system pressures under normal demand conditions (i.e. basic day, maximum day, and peak hour) should be in the range of 350 to 552 kPa (50 to 80 psi) and no less than 275kPa (40 psi) at the ground elevation in the streets (i.e. at hydrant level). The maximum pressure at any point in the distribution system is to be no higher than 552kPa (80 psi). As per the Ontario Building Code & Guide for Plumbing, if pressures greater than 552kPa (80 psi) are anticipated, pressure relief measures are required. Under emergency fire flow conditions, the minimum pressure in the distribution system is allowed to drop to 138kPa (20 psi).

3.3.2 Fire Flow

The Master Servicing Study model assessed a maximum fire flow of 13,000 L/min for the area based on Fire Underwriters Survey (FUS) requirements, and used a minimum requirement of 10,000L/min for residential areas where the 13,000 L/min target could not be achieved.

It should be noted that as per the City's most recent technical bulletin in regards to fire flow (ISDTB-2014-02) for traditional side-by-side towns and row houses constructed in accordance with the OBC, the fire flow requirement shall be capped at 10,000 L/min. As such, nodes that are able to meet the 13,000 L/min fire flow are expected to perform more than adequately for the proposed development.



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Potable Water Analysis

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Two nodes within the 2016 model within Half Moon Bay South Phase 5 development area are noted as not being able to meet the 13,000 L/min fire flow demand. These nodes lie at the extreme west of the development, and were able to meet the fire flow cap of 10,000L/min per the aforementioned technical bulletin (see **Appendix A** for details).

Fire flow assessment will be required at the detailed design phase in which local watermains are checked for their ability to provide the objective FUS fire flows, which in turn will be determined based on final unit layouts. Smaller, local internal watermains will need to be assessed and verified as development planning proceeds based on updated boundary conditions for the region.

3.4 POTABLE WATER SUMMARY

The proposed piping alignment and sizing is capable of achieving the required level of service in the subdivision. Based on the hydraulic analysis created at the Master Servicing level, the following conclusions were made:

- The proposed water distribution system is recommended to include 203mm diameter pipes;
- During peak hour conditions, the proposed system is capable of operating above the minimum pressure objective of 276kPa (40psi);
- During fire conditions, the proposed system is capable of providing sufficient fire flows (13,000L/min and above) while maintaining a residual pressure of 138kPa (20 psi) in the majority of the development. Sizing of internal mains on local streets will be coordinated to ensure a minimum fire flow of 10,000 L/min will be achieved.



4.0 WASTEWATER SERVICING

As indicated in the BSUEA Master Servicing Study, wastewater servicing for the Half Moon Bay South Phase 5 development is conveyed to sewer connection points at Fameflower Street and Alex Polowin Avenue, ultimately to a 375mm via a free flow gravity trunk running along River Mist Road to the 900mm trunk sanitary sewer on Greenbank Road. The MSS outlines a 14.4 L/s residual capacity in the River Mist sewer prior to inclusion of the BSUEA areas, increasing to 30.5 L/s with their inclusion in consideration of reduction of the anticipated average daily residential flow from 350L/cap to 280L/cap per recent revisions to the City of Ottawa's Sewer Design Guidelines. The MSS also outlines the sanitary servicing requirements for the subject property, which identify population estimates for the proposed development based on assumptions made during the preparation of the Half Moon Bay South Phase 4 Servicing Report. The previously assumed Sanitary Drainage Plan for the area is included in **Appendix B**.

The Half Moon Bay South Phase 4 Servicing Report identifies a future population of 451, which includes drainage from the entirety of the Phase 5 development and will be required to provide an outlet for 2.13ha of future commercial lands west of Realigned Greenbank Road based on drainage boundaries identified within the BSUEA Master Servicing Study.

4.1 DESIGN CRITERIA

As outlined in the City's Sewer Design Guidelines, the following design parameters were used to calculate estimated wastewater flow rates and to preliminarily size on-site sanitary sewers:

- Minimum Full Flow Velocity – 0.6 m/s
- Maximum Full Flow Velocity – 3.0 m/s
- Manning's roughness coefficient for all smooth walled pipes – 0.013
- Single Family Persons per unit – 3.4
- Townhouse Persons per unit – 2.7
- Extraneous Flow Allowance – 0.33 L/s/ha
- Residential Average Flows – 280 L/cap/day
- Commercial/Mixed Use Flows – 28,000 L/ha/day
- Manhole Spacing – 120 m
- Minimum Cover – 2.5m
- Harmon Correction Factor – 0.8

In addition, a residential peak factor based on Harmon's Equation was used to determine the peak design flows. Institutional and commercial areas were assigned a peaking factor of 1.5 per Ottawa's Sewer Design Guidelines.

Per the Master Servicing Study, an external commercial contributing area of 2.13ha has been applied to SAN 226 in anticipation of a future connection to lands west of the realigned Greenbank Road (see **Drawing SA-1**).



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Wastewater Servicing
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4.2 PROPOSED SERVICING

The Half Moon Bay South Phase 5 development will be serviced by a network of gravity sewers which will direct wastewater flows north to the existing sewer stub within Fameflower Street, and west to the sanitary sewer within Alex Polowin Avenue within the previous development phase. Flows from external lands to the west will also be conveyed through the subject property as directed in the MSS. The proposed sanitary sewer design sheet and associated Sanitary Drainage Area Plan can be found in **Appendix B & Appendix E** respectively. The proposed sanitary sewer design indicates 2 connection points to the recently constructed Alex Polowin Avenue.

The connection points and associated flows are summarized in **Table 2** below and have been coordinated with the latest plans for Half Moon Bay South Phase 4. Anticipated peak flows and previously allocated peak flows for the available connection points are noted in **Table 2**. It is of note that the previous phase of development assumed more conservative sewer inflows per capita, therefore, the minor increase in estimated population and the additional commercial drainage area are not expected to have a negative impact on functionality of the downstream system to the River Mist sewer and is well within available sewer capacity.

Table 2: Wastewater Connections to Half Moon Bay South Phase 4

MH ID	Per HMBS Phase 4			Proposed HMBS Phase 5			Sewer Dia. (mm)
	Total Area (ha)	Pop.	Peak Flow (L/s)	Total Area (ha)	Pop.	Peak Flow (L/s)	
217	2.72	207	4.1	5.51	230	5.5	200
152	4.66	393	7.7	4.01	409	5.9	200
Total	7.38	600	11.8	9.52	639	10.4	200



5.0 STORMWATER MANAGEMENT

5.1 EXISTING CONDITIONS

The proposed development site measures approximately 5.6 ha in area and is currently undeveloped. Historically, the site maintains a gradual downward slope to the northeast, with approximately 10.6m in grade change from southwest corner to northeast. The site is bound by the future location of realigned Greenbank Road to the west, existing Alex Polowin Avenue to the east, and existing and future residential lands to the south and north respectively. Future developments to the south and west are identified as within the Barrhaven South Urban Expansion Area per the BSUEA Master Servicing Study. Existing grades are provided on the conceptual grading plan (**Drawing GP-1**). Flows from the site currently progress towards a temporary ditch inlet catchbasin directing flows to storm sewers within Alex Polowin, River Mist Road, and ultimately to the downstream Todd Pond for treatment prior to discharge to the Jock River.

5.2 STORMWATER MANAGEMENT DESIGN

5.2.1 Proposed Conditions

The proposed residential development contains a mixture of townhome and single family units. The Todd stormwater management Pond is located offsite to the northeast of the property. Site sewers and overland flow for the entirety of the site are to outlet to the existing Todd Pond, with drainage areas roughly divided in southern and northern halves to utilize existing sewers/stubs previously installed at access intersections for the proposed development. Inlet control devices and road sag storage points will be used to restrict inflow rates to the sewer and to provide attenuating surface storage as described in the stormwater management report for Phase 4 (Stantec, 2015) and mirrored in the BSUEA MSS.

As noted in the Todd Pond Model Keeper Analysis Re-Assessment of Existing System Capacity report (JFSA, 2015), development of the Half Moon Bay South Phase 5 area requires a weir expansion from 30m to 48m in length to occur within the Todd Pond prior to development of the area. Weir expansion is required to attenuate the increased peak discharge expected from the Phase 5 lands above the 350L/s peak discharge rate noted in JFSA's memo without subjecting existing areas of Half Moon Bay to additional overland flow depth or deleterious surcharge of existing downstream sewers.

Additionally, as noted in the stormwater management report for Half Moon Bay South Phase 4 (Stantec, 2015), areas of unrestricted minor system capture to the Todd system exist along the downstream River Mist sewer within drainage areas ST637A, ST627A, and ST613A (see **Drawing SD-1** within **Appendix E** for downstream storm drainage areas) and were constructed as part of Phase 1A of the development prior to City of Ottawa requirements to analyze the effects of a climate change event on the system. As a result, during the 100yr + 20% event under the buildout scenario including Phase 5, a considerable sewer surcharge is experienced in these areas. To reduce the surcharge to manageable levels, it is recommended to install ICDs on each unrestricted catchbasin lead within area ST627A (6 ICDs restricted



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to 67L/s each) and area ST637A (8 ICDs restricted to 86L/s each) prior to development of Phase 5 to permit major system routing for additional flows over that experienced during a regular 100 year event.

5.2.2 Design Methodology

The design methodology for the SWM component of the development is as follows:

General

- Use of the dual drainage principle (City of Ottawa).
- Wherever feasible and practical, site-level measures should be used to reduce and control the volume and rate of runoff (City of Ottawa).
- Assess impact of 2-year storm (using 3-Hour Chicago design event), 5-year storm, and the worst case 100-year storm events in addition to the 100-year events outlined in the City of Ottawa Sewer Design Guidelines, and climate change scenarios with a 20% increase of rainfall intensity, on the major & minor drainage system (City of Ottawa).

Storm Sewer & Inlet Controls

- Size storm sewers to convey 5-year storm event under free-flow conditions using 2012 City of Ottawa I-D-F parameters. (City of Ottawa / HMBS Phase 4)
- Restrict inflows to the sewer to the 5-year rate or as required to a minimum capture rate of the 2-year event peak runoff. (City of Ottawa / HMBS Phase 4)
- Analysis to be conducted using the 100-Year 24-Hour SCS distribution and 3-Hour Chicago events (City of Ottawa).
- 100-year Storm HGL to be a minimum of 0.30 m below building foundation footing (City of Ottawa).
- Maximum 'climate change' HGL to be lower than proposed basement elevations (City of Ottawa Sewer Design Guidelines (2012)).

Surface Storage & Overland Flow

- No rear-yard ponding volumes to be accounted for in SWM model preparation (City of Ottawa).
- The product of depth times velocity on streets not to be greater than 0.6 during the 100-year storm (City of Ottawa).
- Building openings to be above the 100-year water level (City of Ottawa).
- Total maximum depth of flow under static and dynamic conditions shall be less than 0.35m (City of Ottawa).
- Major and minor flow to be conveyed to Todd Pond for quality and quantity control (Todd Pond Model Keeper Analysis).
- Provide adequate emergency overflow conveyance off-site (City of Ottawa).

The site is to be designed using the “dual drainage” principle, whereby the minor (pipe) system in local roads is designed to convey the peak rate of runoff from the 5-year design storm and runoff from larger events is conveyed by both minor (pipe) and major (overland) channels, such as roadways and walkways, safely off site without impacting proposed or existing downstream properties.

In keeping with the 5-year inlet restriction criterion (5-year for collector streets, 10-year for arterial roads), inlet control devices (ICDs) or orifice plates will be specified during the detailed design stage for all street



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and rear yard catchbasins to limit the inflow to the minor system. Restricted inlet rates to the sewer are necessary to prevent the hydraulic grade line from surcharging storm sewers into basements during major storms.

Drawing SD-1 outlines the proposed storm sewer alignment and drainage divides. The major system flows generated from larger events will be safely conveyed to Fameflower Street and Alex Polowin Avenue, and ultimately to the Todd SWM Pond by engineered (overland) channels such as roadways and walkways. Details of overland flow routes to the Todd Pond through further Mattamy and Tamarack owned lands to the north can be found in JFSA's Todd Pond Model Keeper Analysis.

Per the DDSWMM model prepared as part of the approved Servicing Report for Half Moon Bay South Phase 4 (Stantec, 2015), it is intended to capture approximately 1053L/s peak flow to the minor system during the 100-year design event (see **Table 3** below per the Phase 4 Servicing Report). Road segments modeled as part of Phase 5 are identified as ST665A and above as well as ST720A and above. The DDSWMM model has already accounted for capture of the rear yard areas at the northern and eastern boundaries of the site (Areas 720B, 655B), as well as runoff from units proposed to front onto the existing Alex Polowin Avenue (Areas 655A, 656A). A minimal major system static storage volume of 8.2m³ was assumed for the entirety of Phase 5 and will be provided within proposed roadways as part of detailed design for the subdivision. Remaining catchment areas on-site will be restricted to meet a maximum minor system capture rate of 1053L/s for all storm events.

Table 3: DDSWMM Model Parameters Attributed to Phase 5 Areas per HMBS Phase 4 Servicing Report

Segment ID	Max. Capture (L/s)	Storage Used (m ³)	Static Ponding Depth (cm)	Total Flow Depth (cm)
ST669A	67	0	5	6
ST665A	64	0.5	0	9
ST670A	84	0.7	0	8.6
ST670B	32	0	0	17.7
ST728A	67	0	5	7.7
ST726A	55	0	0	7.1
ST726B	42	0	5	18.8
ST725A	96	0.5	0	6.9
ST724A	84	0.7	15	9
ST724B	42	0	14	19
ST722A	74	1	15	7.7
ST720A	22	2.3	15	3.5
ST667A	54	1	0	10
ST666B	32	0	-	-
ST666A	64	0.5	-	-
ST673A	55	0	0	5.5



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ST672A	55	0	18	6.2
ST672B	32	0	0	16.1
ST723A	32	1	0	4
TOTAL	1053	8.2		

5.3 DEVIATIONS FROM MASTER SERVICING STUDY

The Master Servicing Study for the Barrhaven South Urban Expansion Area (J.L. Richards & Associates, 2018) demonstrates both a conventional storm servicing strategy as detailed above, as well as a scenario considering an Etobicoke Exfiltration System (EES) to detain and infiltrate the 22mm event. The EES scenario was presented as an alternative option to provide a potential pond size reduction within Minto-owned lands to limit required downstream proposed wet pond sizing, or to replace with a dry pond end of pipe system. As the Phase 5 lands discharge to an existing stormwater management facility that maintains sufficient permanent pool volume to provide quality control for the region, construction of an EES within Phase 5 will not provide a cost savings to downstream infrastructure. The site forms part of the Jock River subwatershed, which has not identified baseflow concerns apart from low flow augmentation from the downstream SWM ponds. As such, an EES system has not been considered for Phase 5 lands at this stage of development.



Grading
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6.0 GRADING

The Half Moon Bay South Phase 5 lands drain predominantly from southwest to northeast. Existing drainage for the development has been intercepted via ditch inlet catchbasin and routed to Todd Pond as part of construction of previous phases of Half Moon Bay South. Rural drainage further south of the property has been intercepted by the Quinn's Pointe development to the south as shown in **Appendix E**. The Barrhaven South Urban Expansion Area Master Servicing Study and Half Moon Bay South Phase 4 reports provided anticipated grading for the development which have been included for reference in **Appendix E**. Anticipated road grades for the Realigned Greenbank Road have been sourced from preliminary profiles prepared as part of the EA for the roadway. For the purposes of this report a conceptual grading plan has also been prepared which takes into account anticipated overland flow conveyance, cover over proposed sewers, and grade raise restrictions as identified in the geotechnical investigation (see **Section 10.0**). The conceptual grading plan has been provided for reference in **Appendix E**. A detailed grading design will be developed at the time of final design. Detailed grading will adhere to all requirements as outlined in the City of Ottawa guidelines.



7.0 UTILITIES

7.1 HYDRO

Accessible Hydro infrastructure exists within adjacent rights-of-way constructed as part of previous phases of the Half Moon Bay South development and supplied via plant within Greenbank Road and a temporary pole line extending south from Cambrian Road along the future realigned Greenbank Road right-of-way. Exact size, location and routing of hydro utilities will be finalized after design circulation. Transformer locations and positioning of required utility easements will be identified in the detailed design stage.

7.2 ENBRIDGE GAS

Similarly to Hydro, the Phase 5 development may be serviced by existing infrastructure at Cambrian Road via plant within previous phases of Half Moon Bay South. Phase 5 lands will be serviced by main lines located within River Mist Road and Dundonald Drive via lands to the north. Exact size, location and routing of gas infrastructure will be finalized after design circulation.

7.3 TELECOMMUNICATIONS

Bell and Rogers will be able to service Phase 5 lands from Greenbank Road via existing plant within the previously approved/constructed phases of Half Moon Bay South. Both Bell and Rogers will require easements for their respective utility cabinets and vaults, the exact size and location of which is to be identified as part of the Composite Utility Planning process following design circulation.



Approvals
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8.0 APPROVALS

Ontario Ministry of Environment, Conservation, and Parks (MECP) Environmental Compliance Approvals (ECAs, formerly Certificates of Approval (CofA)) under the Ontario Water Resources Act will be required for proposed on-site storm and sanitary sewers and inlet control devices (Transfer of review) for the proposed development. The Rideau Valley Conservation Authority should be circulated on such submissions so that CA sign-off may be given and submission of the ECAs may proceed. The existing site was previously intercepted by the former Clarke Municipal Drain. The drain was abandoned by City Council in 2007 to serve as a local drainage ditch for rural area. A separate permit for compensation and filling of the ditches was received from the Department of Fisheries and Oceans (DFO), and filling was completed as part of previous phases of development via Alteration to Watercourses permit through the Rideau Valley Conservation Authority (RVCA).

Design and construction of the Realigned Greenbank Road is by others and is not anticipated to occur within the timeline to construct HMBS Phase 5.

A Permit to Take Water (reference no. 8167-7K7RQV) for the area was previously obtained from the Ministry of the Environment on January 16, 2009, however, the permit appears to have expired. The geotechnical consultant shall determine whether a further PTTW is required at the detailed design stage / prior to construction.



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Erosion Control
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9.0 EROSION CONTROL

Erosion and sediment controls must be in place during construction. The following recommendations to the contractor will be included in contract documents.

1. Implement best management practices to provide appropriate protection of the existing and proposed drainage system and the receiving water course(s).
2. Limit extent of exposed soils at any given time.
3. Re-vegetate exposed areas as soon as possible.
4. Minimize the area to be cleared and grubbed.
5. Protect exposed slopes with plastic or synthetic mulches.
6. Provide sediment traps and basins during dewatering.
7. Install sediment traps (such as SiltSack® by Terrafix) between catch basins and frames.
8. Plan construction at proper time to avoid flooding.

The contractor will, at every rainfall, complete inspections and guarantee proper performance. The inspection is to include:

9. Verification that water is not flowing under silt barriers.
10. Clean and change silt traps at catch basins.

Refer to **Drawing EC-1** included in **Appendix E** for the proposed location of silt fences, cutoff swales, temporary sediment basins and other erosion control structures.



10.0 GEOTECHNICAL INVESTIGATION

A geotechnical investigation for the development was completed by Paterson Group Inc. on February 8, 2019. The report summarizes the existing soil conditions within the subject area and construction recommendations. For details which are not summarized below, please see the original Paterson report included in **Appendix D**.

Subsurface soil conditions within the subject area were determined through field investigations in February 2019, and through previous field programs in March and December 2015. In total, 10 test pits and 4 boreholes were excavated throughout the subject lands. In general soil stratigraphy consisted of topsoil and/or a thin silty clay fill layer followed by a loose to compact silty sand. Bedrock was estimated to occur at depths of 15 – 25m. The thickness of the existing topsoil ranged from 100 to 600mm.

No groundwater was encountered within test pits dug as part of the 2019 investigation. It is therefore not expected that construction will occur below the existing groundwater table and therefore a permit to take water is unlikely to be a requirement.

Based on the observed soil conditions, no grade raise restriction has been recommended for the proposed development area.



11.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the preceding information, the following conclusions are summarized below:

11.1 POTABLE WATER ANALYSIS

- During peak hour conditions, the proposed system is expected to operate above the minimum pressure objective of 276kPa (40psi);
- The proposed system is capable of providing sufficient fire flow while maintaining a residual pressure of 138kPa (20 psi) in all areas based on hydraulic analysis done at the Master Servicing level. A final hydraulic analysis is to be completed at time of detailed design;

11.2 WASTEWATER SERVICING

The Half Moon Bay South Phase 5 subdivision will be serviced by a network of gravity sewers which will direct wastewater flows northerly and easterly through the Alex Polowin and Fameflower sewers, and ultimately to the Greenbank Road trunk via River Mist Road. External commercial lands to the west will also be conveyed through the subject property as directed in the MSS. The proposed sanitary sewer design indicates 3 connection points to the existing sewers, with a total estimated peak outflow of 10.4L/s including flow from areas west of Realigned Greenbank Road. No increases in peak outflows are proposed for the development beyond that identified in the MSS.

11.3 STORMWATER MANAGEMENT

- The proposed stormwater management plan is in compliance with the goals specified in the background reports and the 2012 City of Ottawa Sewer Guidelines.
- Inlet control devices will be proposed to limit inflow from the site area into the minor system to the 5-year storm event based on City of Ottawa IDF curves.
- The storm sewer hydraulic grade line will be maintained at least 0.30 m below the underside of footing in the subdivision during design storm events up to the 100-year storm.
- All dynamic surface water depths are to be less than 0.35 m during all storm events up to the 100-year storm.
- Quality treatment of runoff and quantity control for the development will be provided by the existing downstream Todd Pond adjacent to the Jock River. The proposed site design will maintain an emergency overland flow route to the pond via River Mist Road.

11.4 GRADING

A conceptual grading plan has been prepared taking into account required overland flow conveyance, cover over sewers, hydraulic grade line requirements, and grade raise restrictions (if any) as identified in the geotechnical investigation. A detailed grading design will be developed at the time of final design. Detailed grading will adhere to all requirements as outlined in the City of Ottawa guidelines.



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11.5 UTILITIES

Utility infrastructure exists in the general area of the subject site. Exact size, location and routing of utilities will be finalized at the detailed design stage.

