

**Servicing and Stormwater
Management Brief - Alta Vista
Ridge - 1740 St-Laurent
Boulevard**

Project # 160401493



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SERVICING AND STORMWATER MANAGEMENT BRIEF - ALTA VISTA RIDGE - 1740 ST-LAURENT BOULEVARD

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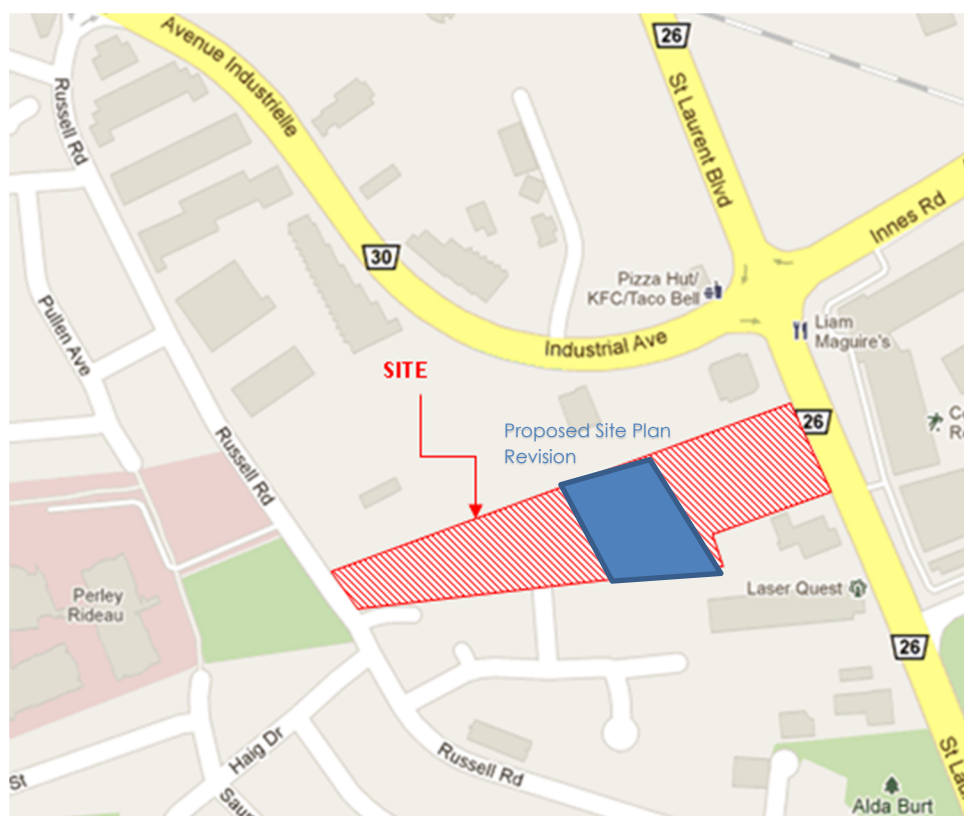
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1.0 BACKGROUND

Stantec Consulting Ltd. has been retained by Le Groupe Heafey to complete a Servicing and Stormwater Management (SWM) Brief in support of a site plan amendment at 1740 St. Laurent Boulevard. The site location is illustrated in **Figure 1** below. The proposed amendment is to support a change in use for Blocks 8-11 as well as minor changes to Block 12 from the original site servicing plan approved in 2012 (see **Drawing OSP-1** in **Appendix F**).

Figure 1– Site location



Blocks 8-11 have been changed from proposed 82 stacked townhome units to a proposed 8 storey apartment building. The proposed apartment building will increase the unit count from 82 townhomes to 192 apartment units, amongst other minor changes.

The footprint of Block 12 has had undergone minor changes to the outline of the building. However, the apartment unit count, number of storeys and building height have not changed.

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As such, the fire flow requirements, domestic water demand, sanitary flows and roof storage availability remain unchanged.

The purpose of this brief is to demonstrate that the site plan development with the proposed revisions will be adequately serviced by the existing infrastructure approved and installed as part of the existing site plan approval. As noted above, the changes to Block 12 will not have any impact on the previously approved servicing requirements. As such, the focus of the discussion in the following sections will be on the changes to Blocks 8-11.

The proposed overall servicing plan, **SSP-1**, reflecting the revisions to the site plan is included in **Appendix E**.

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2.0 REFERENCES

Documents referenced in preparation of this amendment include:

- Servicing Report, Alta Vista Ridge – 1740 St-Laurent Boulevard, Ottawa Ontario. Stantec Consulting Ltd., Revision #2 – April 18, 2012
- Alta Vista Ridge -1740 St-Laurent Boulevard, Ottawa, ON, Le Groupe Heafey Stormwater Management Report, April 18, 2012
- City of Ottawa Sewer Design Guidelines, City of Ottawa, 2014
- City of Ottawa Design Guidelines – Water Distribution, Infrastructure Services Department, City of Ottawa, First Edition, July 2010.
- Geotechnical Investigation – Proposed Alta Vista Ridge Residential Development – 1757 Russell Road, Ottawa, Ontario. EXP, August 5th, 2011

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3.0 AVAILABLE MUNICIPAL INFRASTRUCTURE

3.1 WATER SERVICING

Water demand calculations and hydraulic modeling were completed as part of the original Servicing Report based on the site plan at the time of analysis. The site plan changes propose 192 apartment building units as opposed to the originally proposed 82 townhome units. The proposed apartment building will be serviced by the existing 150mm water service fed from the existing 300mm private watermain which were both installed as part of the overall site servicing.

A summary of the changes in residential water demands is displayed below in **Table 1**. The detailed water demand calculations can be found in **Appendix A**. The water demands for the original site servicing plan can be found in **Appendix F**, for the purpose of comparison.

Table 1 - Water Demand Summary Table for Proposed Building

Site plan area	Unit type	Unit count	Conversion factor (pers/unit)	Population	AVG Day Demand (L/S)	Max Day Demand (L/s)	Peak Hour Demand (L/s)
Original	Townhome (Blocks 8-11)	82	2.7	222	0.9	2.2	4.9
Revised	Apartment (Proposed Building)	192	1.8	346	1.4	3.5	7.7

As demonstrated with the results summarized in **Table 1** above, the increase in water demand as a result of the site plan changes is minor. Hydraulic analysis results are presented in section 3.1.1 below.

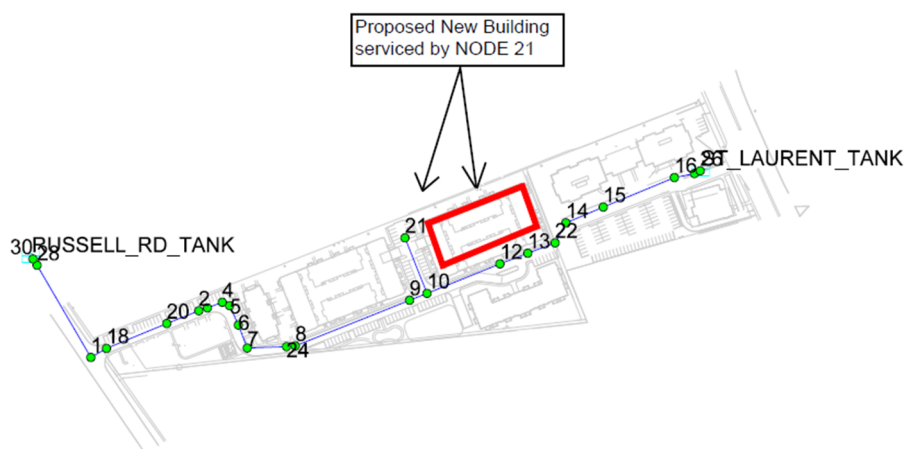
3.1.1 Hydraulic Analysis

In order to confirm the pressure in the system had the capacity to service the additional units, a hydraulic analysis, via H₂O Map was performed. The model from the original site plan was used with revised demand values at the affected node. The layout used to model the watermain network is displayed in **Figure 2** below and indicates the affected node 21. The connection point is proposed to feed off of the existing 300mm private watermain, node 21.

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Figure 2 - Hydraulic Model with Indicated Changes



Results from the hydraulic analysis at node 21 demonstrate a minimum pressure of 47.4 psi and a maximum pressure of 65.3 psi. These maximum and minimum pressure values fall within the design criteria 40-80 psi set out by the City of Ottawa Water Distribution Guidelines. The detailed hydraulic analysis results and related figures can be found in **Appendix A**. The results from the original hydraulic analysis can be found in **Appendix F**, for the purpose of comparison.

The proposed building, due to the increase in height will suffer an increased pressure loss at its higher stories and will therefore require jet pumps to compensate for this pressure loss. However, this was already recommended for buildings over 3 stories in the previously approved servicing report.

As demonstrated by the results provided above, the existing water servicing for the development is sufficient to meet domestic water needs.

3.1.2 Fire flows

A FUS (Fire Underwriter Survey) calculation for the newly proposed building was performed to evaluate the change in fire flow from in the affected area. The calculations indicated a decrease in fire flow demand to 6,000 (L/min), from the original 7,000 (L/min), for Block 11, the worst-case scenario based on the previously approved design. This reduction in required flow is due to the fact that an 8 storey building, under the O.B.C. guidelines, is required to be partitioned with a 2-hour firewall at every floor, fully sprinklered and the type of construction must be non-combustible.

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Given these factors, although the building size is larger, its calculated fire flow demand decreased from what was previously approved. For further detail, the FUS calculations can be found in **Appendix A**, and the FUS calculations for Block 11 for the original site servicing plan can be found in **Appendix F**.

As demonstrated by the results provided above, the existing water servicing for the development is sufficient to meet fire protection requirements.

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Wastewater Servicing
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4.0 WASTEWATER SERVICING

Wastewater servicing for the proposed building was assessed to determine whether the existing wastewater collection system has the capacity to handle the new design flows. The design population for the site has increased based on the higher number of units proposed. As noted previously, the original site plan proposed 82 townhouse units in Blocks 8-11 whereas the site plan amendment proposes 192 apartment units in one apartment building.

A recent amendment in the City of Ottawa Sewer Design Guidelines reduced the sanitary outflow conversion rate from 350L/c/day to 280 L/c/day. This reduction in per capita design flow applied to the proposed site plan changes actually results in a decrease in the total design flow for the affected portion of the site from 7.71 L/s to 7.52 L/s. It should be noted that there was no change to the sanitary drainage area therefore the infiltration contribution remains the same.

The sanitary design sheet for the current servicing design is included in **Appendix B**. The sanitary drainage area plan, **SA-1** is included in **Appendix E**. The sanitary design sheet and Sanitary drainage area plan for the original site plan can be found in **Appendix F**. It should be noted that the proposed building and Blocks 4-6 to the west form part of the same drainage area as depicted on the plans. forms only part of the sanitary drainage area. Results are provided in **Table 2** below.

Table 2 – Revised Sanitary Drainage Area Peak Outflow Summary

Scenario	Units	Population	Conversion Factor	Total Outflow
Proposed Building (formerly Blocks 8-11)	192 Apartment Units	567	280 L/c/day	7.52 L/s
Remainder of Drainage Area (Blocks 4-6)	82 Town Units			

The proposed site plan changes reflect a decrease in peak outflow. As such, the existing 200mm sanitary sewer and downstream network have the capacity to service the proposed development.

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5.0 STORMWATER MANAGEMENT AND SERVICING

A Stormwater Management report was prepared and submitted concurrently with revision 2 of the Servicing Report dated April 18th, 2012. The approved design uses a combination of rooftop storage, surface storage and a dry pond with a controlled outlet to meet the allowable release rate of 379 L/s for the overall development. Rooftop controls were proposed for Blocks 8-11 of the original development to control runoff to 16 l/s during the 100 year event. The remainder of the contributing area (0.882 ha) had a runoff coefficient of 0.64 and the stormwater flow generated was designed to contribute to the downstream collection system and stormwater management pond. Please see *Alta Vista Ridge -1740 St-Laurent Boulevard, Ottawa, ON, Le Groupe Heafey Stormwater Management Report, April 18, 2012* for more details on the stormwater design.

The proposed revisions to the site plan replace Blocks 8-11 with an 8 storey apartment building with a landscaped courtyard. Rooftop controls are proposed that will control the runoff from the building to no more than 16 l/s and the overall runoff generated by the site to the stormwater management pond must be less than that proposed in the approved design.

The proposed changes to the site plan result in an overall reduction in the imperviousness of the site as can be seen by comparing the drainage area plans included in Appendix C. The impervious area is directly related to runoff. The greater the impervious area, the more runoff is generated. As such, the overall reduction in impervious area will result in a lower contributing stormwater flow to the dry pond.

Table 3 below shows a summary of the change in AC value of the affected areas. The table values were derived from the proposed **SD-1 Drawing** and the original **SD-1 Drawing** found in **Appendix E** and **Appendix F** respectively.

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Table 3 – Stormwater Drainage Comparison Based on AC Values

		Affected Subcatchment IDs	Area (ha)	Runoff Coefficient (C-value)	AC Value	Total AC Value
Outlet 1	Original Site Plan	C1	0.223	0.9	0.20	0.61
		116	0.383	0.76	0.29	
		105	0.138	0.83	0.11	
	Revised Site Plan	C1	0.223	0.9	0.20	0.56
		116	0.317	0.76	0.24	
		105	0.21	0.55	0.12	
Outlet 2	Original Site Plan	UNC2	0.084	0.56	0.05	0.08
		103B	0.054	0.56	0.03	
	Revised Site Plan	UNC2	0.084	0.2	0.02	0.03
		103B	0.042	0.2	0.01	

Based on the results shown in **Table 3** the AC Values for outlet 1 is reduced from 0.61 to 0.56 and outlet 2 is reduced from 0.08 to 0.03. This demonstrates that the proposed site plan changes result in a decrease in impervious area. Given that impervious area is directly related to stormwater runoff, the existing storm sewer network has the capacity to service the proposed development.

The proposed building will have rooftop storage controlled to the previously approved allowable release rate of 16 L/s for a 100 year storm. The roof storage has been designed with a release rate of 15.58 L/s meeting the required criteria via 17 Accutrol roof drains 25% open. The storage depth will be to a maximum of 0.14 m which also falls under the maximum acceptable depth of 0.15m. Further, the maximum available rooftop storage for the proposed building is 90.8 m³ which is greater than the storage capacity available with the original site plan, 78 m³.

A comparison of the rooftop storage design for the amended site plan and original site plan is included in **Table 4** below. Roof design sheets are included in **Appendix C** and design sheets from the original site servicing design are included in **Appendix F**.

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Table 4 - Rooftop Storage Release Rate Comparison

	Subcatchment ID	Allowable Release Rate (100yr Storm)	Available Storage
Original Site Plan	C2	16 L/s	78 m ³
Revised Site Plan	ROOF (was C2)	15.6 L/s	90.8 m ³

The reduction in impervious area and associated runoff as well as the increase in rooftop storage available demonstrate that the existing storm sewer network and dry pond have the capacity to service the proposed development site.

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Grading and Drainage
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6.0 GRADING AND DRAINAGE

The grading and drainage for the overall site has been previously approved. The design satisfies the stormwater management requirements and grade raise restrictions for the site. Site grading has been established to provide an overland flow route required for stormwater management directed in its majority towards St-Laurent Boulevard. Grades along the property lines of the site have been set to tie smoothly into the existing grades. However, an engineered retaining wall is required along the southern property line in order to lower the grade along the southern edge of the site.

The grading for the land affected by the proposed site plan changes was designed to work cohesively with the overall site drainage system. The land at the south and west faces of the new apartment building are graded to route the overland flow away from the building and into the adjacent roadway, directed flow into the overall site drainage system. The north face of the building drains uncontrolled to the northern property line respecting the previously approved drainage pattern. The eastern side of the building currently drains toward the neighbouring undeveloped parcel.

See the attached grading plan shown on **Drawing GP-1** in **Appendix E** for details.

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Approvals
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7.0 APPROVALS

The subject site is not adjacent to any floodplain or watercourse, and no modifications are proposed that would require an application for alteration of a watercourse from the local Conservation Authority under the Lakes and Rivers Improvement Act. There are no municipal drains adjacent to this site and no other approvals are required from other regulatory agencies.

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Geotechnical Investigation
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8.0 GEOTECHNICAL INVESTIGATION

A geotechnical investigation was conducted by exp Services Inc. in July 2011. As stated in the "Geotechnical Investigation - Proposed Alta Vista Ridge Residential Development" prepared by exp Services Inc. and dated August 5, 2011. The subsurface profile across the site consists of pavement structure overlaying fill to depths of 0.6 to 2.3m. A hard, stiff silty clay lens was located beneath the fill. Firm to hard/loose to very dense clayey silt to silty sand till was encountered to depths of 6.1 to 10.2 m. A till/weathered shale complex was encountered below the till and overlaid inferred bedrock at depths of 5.2 to 10.2m. Shale bedrock was confirmed in two boreholes.

Groundwater levels were measured from standpipes in boreholes BH5, BH7, BH8, and BH12. Groundwater levels recorded on between July 12th and 29th, 2011 ranged from 2.5 to 6.5m below the existing ground surface and are subject to seasonal fluctuations (see **Appendix D** for excerpts from the preliminary geotechnical report). Due to the observed water table, a moderate groundwater inflow rate could be encountered within deep excavations for services. It is anticipated that pumping from open sumps will be sufficient to control groundwater inflow from sides of excavations.

Practical refusal to excavation was encountered between 5.2 and 13.0m below the existing terrain. Shale bedrock was confirmed below the refusal depth.

Based on the geotechnical investigation, grade raises are recommended to be limited to 1.0m in the area of Blocks 1 and 2 and 2.0m for the remainder of the site.

All building footings are to be founded on native soils. A minimum of 1.5 m earth cover over the footings is to be provided to ensure frost protection.

Pavement structures for driveways and access routes to future blocks, as well as local roadways are provided in **Table 5** and **Table 6** below.

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Table 5 - Recommended Pavement Structure

Thickness (mm)	Material Description
75	Wear Course – HL-3 or Superpave 12.5 Asphaltic Concrete
150	Base – OPSS Granular A Crushed Stone
300	Subbase – OPSS Granular B Type II
-	Subgrade – Fill, silty clay and till

Table 6 - Recommended Pavement Structure: Local Roadways

Thickness (mm)	Material Description
40	Wear Course – HL-3 or Superpave 12.5 Asphaltic Concrete
50	Binder Course – HL-8 or Superpave 19.0 Asphaltic Concrete
150	Base – OPSS Granular A Crushed Stone
450	Subbase – OPSS Granular B Type II
-	Subgrade – Fill, silty clay and till

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Erosion and Sediment Control During Construction
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9.0 EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

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.
9. Installation of a mud mat to prevent mud and debris from being transported off site.
10. Installation of a silt fence to prevent sediment runoff.

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

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

Refer to **Drawing EC/DS-1** for the proposed location of silt fences, and other erosion control structures.

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Utilities

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10.0 UTILITIES

All utilities (Hydro Ottawa, Bell Canada, Rogers Ottawa, and Enbridge Gas) have existing plants in the area. The site will be serviced through connection to these existing services. Detailed design of the required utility services will be further investigated as part of the composite utility planning process following design circulation.

Conclusion
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11.0 CONCLUSION

11.1 POTABLE WATER

The proposed residential development is now partially constructed and provides a 300mm watermain that will feed the service connection to the proposed 8 storey apartment building on site. The hydraulic modelling results, which reflected the change in water demands due to the proposed site changes demonstrate that the existing private watermain can adequately meet domestic water servicing needs. This was determined by having observed no measurable pressure change at the affected node. The FUS calculations to estimate fire flow requirements for the building result in 6,000 L/min, which is a lesser amount than what was measured for the buildings that occupied the affected area on the original site plan. The watermain network has sufficient capacity to provide both the required domestic and emergency fire flows for the proposed development. As noted for the original site plan, jet pumps will be required for buildings above three stories.

11.2 SANITARY SERVICING

The sanitary sewer network is sufficiently sized to service the proposed development. It was determined that, although the overall population of the site has increased, the design flows have decreased due to changes to the City of Ottawa design criteria.

11.3 STORMWATER SERVICING

The proposed stormwater management plan is in compliance with the goals specified through consultation with the City of Ottawa, as well as local standards as part of the previous approved site plan. It was determined that the proposed site changes would reduce the impervious area of the affected portion of the site. This is demonstrated by a reduced AC value, which will result in a decrease in stormwater runoff. It was also demonstrated that with the rooftop storage of the proposed building will control the release rates to the same rate as what was previously set out in the original site servicing plan and provide additional storage. The existing storm sewer network has the capacity to service the proposed development.

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11.4 GRADING

Grading for the site has been designed to provide an overland flow route as per City standards and reflects the grade raise restrictions recommended in the "*Geotechnical Investigation– Proposed Alta Vista Ridge Residential Development*" by exp Services Inc.. Erosion and sediment control measures will be implemented during construction to reduce the impact on existing facilities. Grading for the proposed changes to the site work cohesively with the overland drainage system previously approved.

11.5 APPROVALS

Approval is required for civil works prior to site plan approval. No additional approval requirements from other agencies are expected at this time.