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SERVICING BRIEF

**PROPOSED HILAN VILLAGE
RESIDENTIAL SUBDIVISION
38 CARSS STREET, ALMONTE, ONTARIO**

Prepared For:
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PROJECT #: 210864

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1 INTRODUCTION

Kollaard Associates was retained by Westview Projects Inc. to complete a servicing brief in support of the approval of the proposed draft plan for a residential subdivision development in the community of Almonte, Municipality of Mississippi Mills, Ontario. For the purposes of this report, Carss Street is considered to be oriented along an east west axis. The proposed residential development is located along the north side of Carss Street at the north side of the existing town of Almonte immediately east of the Mississippi River.

The proposed residential development site consists of an about 7.4 hectare parcel of land severed from an about 8.9 hectare parcel of land. The retained about 1.5 hectare parcel contains an existing single family dwelling, is accessed from Carss Street and is outside of the scope of this letter. The subject site has a frontage of about 66 metres on Carss Street and extends north from Carss Street along the east side of the retained parcel for a distance of about 103 metres. The subject site extends an additional about 332 metres north from this point and occupies the entire space between the former Canadian Pacific Railway line on the east and the normal water level of the Mississippi River on the west.

Westview Projects Inc is proposing a residential development consisting of a mixture of single family dwellings, semi-detached dwellings and rowhouse development for a total of some 139 units. The proposed development will be serviced by municipal water and by municipal sanitary and storm sewers. It is understood that a pumping station will be required to facilitate the sanitary sewer.

This brief will summarize the servicing requirement aspects of the proposed development with respect to water and sanitary requirements and summarize the water and sanitary design intended to meet the proposed development requirements. The brief will also provide a summary of the stormwater management design.

1.1 Background

The retained parcel of land contains a single family dwelling which is provided with private water and sanitary services. There are no municipal sanitary, water or storm services in the immediate vicinity of the site.

There are no stormwater management facilities associated with the site. Runoff from the existing site is directed to the Mississippi River by a mixture of sheet flow and shallow concentrated flow as well as flow in an existing swale which crosses from the subject site through the retained parcel.



The proposed development has a total area of about 7.4 hectares and is presently unoccupied. The site has a total average depth between the former railway line and normal water level in the Mississippi River of about 203 metres. Of this depth an average of about 74 metres is occupied by the valley slope of the Mississippi River. The site has a width along the former railway line of about 435 metres resulting in a table land above the valley slope of about 5.2 hectares.

The table land above the valley slope is covered with a mixture of cultural meadow, thicket and woodland with a small portion used for agricultural purposes. The valley slope to the Mississippi River is densely treed. The Mississippi River adjacent the site has a well defined river channel contained within the river valley.

There is some residential development south of Carss Street and east of the former railway. It is understood that there is a current application for a residential subdivision to be located on the remaining undeveloped land between the east side of the subject site and Martin Street.

1.2 Proposed Development

The proposed development will consist of a mixture of single family dwellings, semi-detached dwellings and rowhouse development. An entrance street (Street 1) will extend, parallel to the former railway, from Carss Street to the north end of the site. Two crescents (Street 2 and Street 3) will extend towards the top of the valley slope from Street 1. The first Crescent, (Street 2) will contain about 13 units inside the crescent and a total of about 9 units along the south and west side of the crescent. The north side of the first crescent will be adjacent a park block. The second crescent (Street 3) will begin immediately north of the park block and will contain about 16 units inside the crescent. There will be a total of about 13 units along the west and north sides of the crescent.

The proposed development will contain two additional park blocks. The first park block (Park Block 1) will be located at Carss Street between the east side of Street 1 and the former railway and will extend about 37 meters north from Carss Street. The second park block (Park Block 2) will be located at the southwest corner of the intersection of Street 2 and Street 1. The proposed property line along the south side of this park block will be in line with the north property line of the retained parcel.



1.3 Proposed Servicing

The proposed development will be serviced by means of municipal water and municipal sanitary sewers. The stormwater requirements will be addressed with stormwater management facility developed for the site which discharges to the Mississippi River to the west of the site.

The existing municipal water services will be extended from offsite and looped through the proposed development to ensure there is adequate water available and to increase the looping within the Municipal system.

Internal sanitary services will be provided by means of sanitary sewers directing flow by gravity to a sanitary lift station to be located in Park Block 2. The sanitary lift station will discharge to the existing municipal sewer system by means of a triplex pump system and force mains.

2 SANITARY SERVICES

As previously indicated, the proposed development will consist of a mixture single family dwellings, semi-detached dwellings and rowhouse development. There is also potential for 3 apartment building blocks to be constructed at the northeast corner of the site. As such this potential has been included in the analysis.

As previously indicated, there are no municipal sanitary sewers within the adjacent Carss Street or within proximity to the site which would facilitate the connection to the municipal system by means of a gravity sewer.

The proposed sanitary sewer within the development will consist of 250 mm diameter SDR 28 gasketed pipe. The pipe will be placed a minimum of 2.1 metre below the surface of the street and will discharge by gravity to a sanitary lift station to be located in Park Block 2.

The sanitary lift station will consist of a pre-engineered pump station with an expected internal diameter of 2.5 metres. The station will have a depth of about 6.0 metres and will be equipped with three identical submersible pumps. Each pump will be connected to one of two force mains which will be used to convey the sanitary discharge from the pump station to the existing municipal sewer. The second force main will be installed for redundancy. The sanitary pumps will be designed to discharge the peak sanitary demand at a minimum vertical head of 12 metres and a force main length of 425 metres. This provides a margin of 2 metres vertically and 25 metres horizontally. The force main will consist of smooth wall polyethylene pressure pipe.



It is anticipated that the sanitary forcemain will connect to the municipal gravity sewer system at about the intersection of Union Street N and Brookdale Street. It is understood that the Municipality of Mississippi Mills will be upgrading the sanitary sewer along Union Street. The exact connection point is therefore not known at this time. It is understood that this work will likely be completed in the year 2024.

It is understood that there are additional lands north and east of the proposed Hilan Village development site that are within the village boundaries. As such there is a potential for future offsite development. It is understood that this potential future offsite development may connect to the proposed sanitary sewer system within the Hilan Village development. It is also understood that the municipality is anticipating the installation of a sanitary sewer along the north end of Union Street and along Carss Street that may flow by gravity to the sanitary sewer system within the proposed development. A review of the adjacent offsite area available for potential future development indicates that the total offsite area appears to be similar in size to the area of the proposed development.

The sanitary flow from the proposed development and offsite area was calculated as follows:

Proposed Subdivision (Residential)

Total domestic pop:

Single Family Dwellings (41)	x 3.1 ppu:	= 139.4
Semi-detach and Duplex (19)	x 2.7 ppu:	= 51.3
Rowhouse (townhome) (31)	x 2.7 ppu:	= 83.7
<u>*Apartment Block (57)</u>	<u>x 2.1 ppu:</u>	<u>= 119.7</u>
Total:		= 394.1 rounded to 395

*The 57 apartment units represents three 19 unit apartment buildings. It is noted that each apartment building would be constructed in place of 4 rowhouse buildings. The units from both the rowhouse and the apartment building have been included in the calculation.

$$Q_{\text{Domestic}} = 395 \times 280 \text{ L/person/day} \times (1/86,400 \text{ sec/day}) = 1.28 \text{ L/sec}$$

$$\text{Peaking Factor} = 1 + \frac{14}{4 + (57/1000)^{0.5}} \times 0.8 = 3.42 - \text{maximum } 4.0$$

$$Q_{\text{Peak Domestic Development}} = 1.28 \text{ L/sec} \times 3.42 = 4.38 \text{ L/sec}$$



Infiltration

$$Q_{\text{Infiltration}} = 0.33 \text{ L/ha/sec} \times 3.3 \text{ ha} = 1.09 \text{ L/sec}$$

$$\text{Total Peak Sanitary Flow from Development} = 4.38 + 1.09 = 5.47 \text{ L/sec}$$

Proposed Flows from Offsite

Since the potential total off site area appears to be similar in size to the proposed development the flow from the proposed development was doubled.

$$Q_{\text{Peak offsite}} = Q_{\text{Peak Domestic Development}} = 4.38 \text{ L/sec}$$

$$Q_{\text{infiltration offsite}} = Q_{\text{Infiltration Development}} = 1.09 \text{ L/sec}$$

Total peak sanitary sewer flow to the Sanitary pump station.

$$Q_{\text{peak}} = 2 \times 4.38 + 2 \times 1.09 = 10.93 \text{ L/sec}$$

Pump Station Design Capacity

It is anticipated that the pump station will receive a peak flow of 10.93 L/sec rounded to 11 L/sec.

The pump station should be designed to have a firm capacity equal to the design peak flow rate into the pump station. That is each of the three pumps should have a capacity of one half of the design peak inflow or 5.5 L/sec.

3 WATER SERVICES

3.1 Watermain and Connection

The proposed development will be serviced from a watermain that will be extended along Union Street N from Brookdale Street. It is anticipated that the watermain extended from Brookdale Street will consist of 200 mm diameter PVC Class 235 (DR18) pressure pipe. The 200 mm main will be extended along Street 1 of the development and stubbed near the north property line of the development. 200 mm watermains will be looped around each crescent and will be connected to the 200 mm watermain installed in Street 1 at 2 locations. A 200 mm watermain will be extended up the unopened Lansdowne Road allowance and connected to the watermain along Mitcheson Street completing a loop in the municipal system.



3.2 Residential Water Demand

The water demand for the proposed development was calculated based on the City of Ottawa Water Distribution Design Guidelines as follows:

Residential Average Daily Demand = 280 L/c/d.

From above, the estimated number of persons in the proposed development is 395

- Average daily demand of 280 L/c/day x 395 persons = 110,60 Litres/day or 1.28 L/s
- Maximum daily demand (factor of 2.5) is 1.28 L/s x 2.5 = 3.2 L/s
- Peak hourly demand (factor of 2.2) = 3.2 L/s x 2.2 = 7.04 L/s

It is noted that a flow rate of 7.04 L/s will result in a marginal drop in pressure in the proposed water main within the development.

3.3 Fire Flow

Fire flow protection requirements were calculated in accordance with City of Ottawa Technical Bulletin ISTB-2021-03. That is: "The requirements for levels of fire protection on private property in urban areas are covered in the Ontario Building Code (OBC). If this approach yields a fire flow greater than 9,000 L/min then the Fire Underwriter's Survey methodology shall be used. The fire flow requirements calculated using the OBC are 6300 L/min, or 105 L/s. Since this demand is less than 9,000 L/min the OBC calculation will be used.

3.4 Fire Hydrant Spacing

The proposed development will consist of a mix of single family and multifamily residential. The maximum recommended fire hydrant spacing by the Fire Underwriters Survey for multi-family residential is 90 m and for single family residential is 180 metres. The Fire Underwriters Survey further provides additional guidance in the table titled "Standard Hydrant Distribution" which provides the number and spacing of hydrants based on fire flow demand. Using the Standard Hydrant Distribution table with a fire flow requirement of 6000 L/sec, the average area per hydrant is 14,000 m². The next flow increment is 8000 L/sec with an average area per hydrant of 13,000 m². Since the design flow requirement of 6300 L/sec is greater than 6000 L/sec an average area per hydrant of 13,000 m² was used to determine the hydrant spacing.

The hydrants will be spaced at a maximum of 110 metres apart with most of the hydrants being spaced between 90 and 100 metres apart. In all cases the maximum service area per hydrant is



limited to less than 9,000 m² which is much less than the average recommended area per hydrant.

3.5 Sufficiency of Existing Municipal System.

Kollaard Associates requested boundary information from the Municipality of Mississippi Mills with respect to the available water supply and pressure at the proposed connection points. It is understood that this information is not accurately available as Mississippi Mills is upgrading the existing system. The upgrades will be completed as the proposed residential subdivision becomes developed. The Municipality of Mississippi Mills has stated that there will be sufficient water supply and pressure once the upgrades to the system are complete.

4 STORMWATER DESIGN

The stormwater design for the proposed development is provided the report prepared by Kollaard Associates Inc.: Hilan Village *Conceptual Stormwater Management Plan dated March 30, 2022*.

The stormwater management facility will consist of a system of storm sewers which will convey the stormwater runoff to hydrodynamic stormwater treatments units which will provide an enhanced level of treatment for the runoff. The discharge from the treatment units will be directed by means of a combination of constructed and existing open channels or swales on the Mississippi River Valley Slope. The constructed and existing water courses will extend from the developed area of the site to the normal water level of the Mississippi River. The open channels will be designed to prevent erosion of the valley slope and to minimize the impact of the discharge on the Mississippi River.

The stormwater management facility has been designed to provide quality control in accordance with criteria provided by the Mississippi Valley Conservation Authority (MVCA).

Due to the proximity of the site to the Mississippi River, there are no quantity control restrictions with respect to controlling the post development runoff rate or runoff volume directed from the development to the river. The post-development quantity control design is intended to ensure that the proposed stormwater facility can accommodate all flows arising from the design storms without impact to the adjacent offsite areas and without negatively impacting the proposed dwellings within the development. The quantity control design is also intended to insure that the discharge from the storm sewer system will have no long term negative impact to the Mississippi River valley slope.



4.1 Stormwater Design Summary

Quantity

The proposed stormwater management design has been completed to accommodate runoff generated on the offsite area extending east of the former railway to Martin Street and extending north from Carss Street to the unopened Lansdowne Road allowance. This runoff currently is directed by means of 2 culverts crossing through the former railway bed to an existing swale which crosses the site. The existing swale crosses the site, flows parallel to Carss Street for a short distance then crosses the retained parcel to discharge into the Mississippi River.

The proposed development will eliminate the portion of the existing swale which crosses the site. As such the proposed stormwater facility will be designed to collect the discharge from the culverts and accommodate it within the storm sewer system. This flow will be combined with internal flows and treated by means of a hydrodynamic oil and grit separator located within Park Block 2 of the development. Discharge from this treatment unit will be directed by means of a storm sewer to an open channel located along the rear of the lots adjacent to the retained parcel.

Runoff from catchment areas which include the second crescent will be collected by means of storm sewers along Street 3 and a portion of Street 1. These sewers will direct the runoff to a hydrodynamic oil and grit separator to be located at the southwest corner of Street 3. Discharge from this treatment unit will be directed to a proposed open channel to be constructed in the Park Block 3. This open channel will extend along the north side of the park block to the top of slope where it will discharge into an existing channel.

Runoff from catchment areas which include the first crescent will be collected by means of storm sewers along Street 2 and will direct the runoff to a hydrodynamic oil and grit separator to be located at the northwest corner of Street 2. Discharge from this treatment unit will be directed to the above mentioned proposed open channel in the Park Block 3.

The open channels will be constructed with a bottom width ranging from 0.5 to 1.0 metres and will have side slopes ranging from 3H:1V to 2H:1V. The bottoms of the open channels will consist of bedrock or of a coarse gravel and geotextile liner protected by large size riprap. The side slopes of the open channel will be protected by a geotextile liner and large size riprap. The riprap will be placed to ensure that the individual pieces of riprap are protected from horizontal displacement by interlocking with the adjacent riprap. The channels will be designed to resist erosion resulting from the flows generated during a 100 year storm event.

Riprap ranging in size from about 10 kg to 100 kg will be placed at select locations along the side slopes of the existing channel receiving the discharge from the constructed channel in Park



Block 3. The riprap will be placed at locations not currently protected by natural rock formations and bedrock.

Quality

The proposed storm sewer system will discharge to the open channels through stormwater treatment units designed to meet the required quality control standards. In addition, potential pollutants will be reduced at the source by best management practises. Coarse pollutants will be partially removed by sedimentation within the catch basin and maintenance hole sumps. Stormwater treatment to 80 percent total suspended solids removal will be provided by Hydrodynamic vortex separators such as the CDS treatment unit designed to treat 100 percent of the flow generated during a quality control storm event.

5 EROSION AND SEDIMENT CONTROL

An erosion and sediment control plan will be prepared and implemented at least equal to the stated minimum requirements and to the satisfaction of the Municipality of Mississippi Mills and the Mississippi Valley Conservation Authority, appropriate to the site conditions, prior to undertaking any site alterations (filling, grading, removal of vegetation, etc.) and during all phases of site preparation and construction in accordance with the current best management practices for erosion and sediment control.



6 CONCLUSIONS

The water and sanitary demands for the proposed development will be met by municipal services.

The sanitary requirements will be met with an onsite gravity sewer system which will direct the sanitary flows to a sanitary lift station in Park Block 2. The sanitary lift station will be designed to accommodate the flows from the proposed development and adjacent future development.

The sanitary lift station will consists of a pre-engineered pump station complete with triplex pumps discharging to the municipal gravity sewer system along Union Street.

The residential water demand will be met by the installation of 200 mm diameter PVC watermains looped to the existing municipal system along Union Street and Mitcheson Street. The proposed loop will add redundancy to the municipal system and ensure that the water supply to the proposed development is not from a single feed.

Stormwater management will be completed by providing treatment by means of hydrodynamic oil grit separation units. The storm water management system will be designed to accommodate the design storms with no negative impact to the surrounding areas or proposed dwellings. The outlet channels will be designed to ensure the Mississippi River Valley slope is protected from erosion.

Erosion and sedimentation shall be controlled during development.

We trust that this brief provides sufficient information for your present purposes. If you have any questions concerning this brief please do not hesitate to contact our office.

Sincerely,
Kollaard Associates, Inc.



Steven deWit, P.Eng.