Servicing and Stormwater Management Report: 36 & 40 Jamie Avenue

Stantec Project No. 160401647

August 21, 2023

Prepared for:

Star Motors of Ottawa

Prepared by:

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1.0 INTRODUCTION

Stantec Consulting Ltd. has been commissioned by Star Motors of Ottawa to prepare the following servicing and stormwater management (SWM) report in support of a site plan control application in respect of the proposed redevelopment for the properties known municipally as 36 and 40 Jamie Avenue. The properties are located in the Merivale Industrial Area in the City of Ottawa and are currently occupied by two separate buildings owned by Star Motors. The redevelopment will involve the amalgamation of the existing buildings by introducing a building addition between the existing buildings. The building is proposed to function as an autobody shop.

The subject property is approximately 0.38ha in area containing two existing buildings, site access and 20 surface parking spaces. The architect (Brian K. Clark) has prepared a proposed site plan to support the site plan control application (see **Appendix B**). The site plan shows 20 surface parking areas and the amalgamation of the two existing buildings on Lot 9 & Lot 10 into one new building. The new building will continue to be serviced by the existing municipal water and wastewater infrastructure on Jamie Avenue.

Figure 1 : Key Plan

1.1 OBJECTIVE

This servicing and stormwater management report has been prepared to demonstrate that the existing municipal infrastructure servicing the project site is sufficient to meet the servicing requirements of the redevelopment while adopting the most suitable stormwater management approach that complies with the City of Ottawa guidelines and applicable environmental laws required for the site plan control application.

Criteria and constraints provided by the City of Ottawa in previous consultations as well as existing site conditions have been used as a basis for the design and the preparation of this brief. Specific elements and potential development constraints to be addressed are as follows:

- Potable Water Servicing
    - Estimate water demands for the proposed redevelopment which will be serviced by an existing 305mm diameter ductile iron watermain fronting the site along Jamie Avenue.
    - Watermain servicing for the redevelopment is to be able to provide average day and maximum day and peak hour demands (i.e., non-emergency conditions) at pressures within the acceptable range of 50 to 80 psi (345 to 552 kPa).
    - Under fire flow (emergency) conditions with maximum day demands, the water distribution system is to maintain a minimum pressure greater than 20 psi (140 kPa).
    - The existing water service connections and fire hydrant fronting the site will provide potable water and emergency fire flow.
    - The new building will be fed by the internal plumbing of the existing building at 40 Jamie Avenue.
- Wastewater Servicing
    - Estimate wastewater flows contributed by the redevelopment and demonstrate service connection to the existing 250mm diameter sanitary sewer on Jamie Avenue.
- Prepare a grading plan in accordance with the proposed site plan and existing grades.
- Stormwater Management and Servicing
    - Establish per pre-consultation with City of Ottawa staff that as no predevelopment stormwater controls for the site currently exist, and that the predevelopment impervious ratio for the site is not being increased, existing stormwater management is not impacted by the redevelopment and will not require further control.
    - Estimate post development peak 100-year flows to existing downstream systems.

Drawing SSGP-1 shows general arrangement and details of the existing services on the site.

2.0 REFERENCES

Documents referenced in preparation of this Servicing and stormwater management report for 36 and 40 Jamie Avenue include:

- *City of Ottawa Sewer Design Guidelines*, 2nd Edition, City of Ottawa, October 2012.
- *City of Ottawa Design Guidelines – Water Distribution*, 1st Edition, Infrastructure Services Department, City of Ottawa, July 2010.
- *Geotechnical Investigation – Proposed Building Addition*, 36 and 40 Jamie Avenue, Ottawa, Ontario, Paterson Group, February 16, 2021.
- *Technical Bulletin ISDTB-2014-02 Revision to Ottawa Design Guidelines – Water*, City of Ottawa, May 2014.
- *Technical Bulletin PIEDTB-2016-01 Revisions to Ottawa Design Guidelines – Sewer,* City of Ottawa, September 2016.
- *Technical Bulletin ISTB-2018-01 Revision to Ottawa Design Guidelines – Sewer,* City of Ottawa, March 2018.
- *Technical Bulletin ISTB-2018-02 Revision to Ottawa Design Guidelines – Water Distribution,* City of Ottawa, March 2018.
- *Technical Bulletin ISTB-2021-03 Revision to Ottawa Design Guidelines – Water Distribution,* City of Ottawa, August 2021.

3.0 POTABLE WATER SERVICING

3.1 BACKGROUND

The subject site is located within the City of Ottawa's 2W2C pressure zone. The site is currently serviced by existing connections to the 305mm diameter ductile iron watermain fronting the site on Jamie Avenue for each existing building. There is also an existing hydrant fronting the site. It is anticipated that potable water demand and emergency fire flow requirements for the site will be met by these facilities.

3.2 WATER DEMANDS

3.2.1 Industrial Water Demands

Water demand for the redevelopment was estimated based on the gross site area of the development (see **Appendix B**). The overall site area encompassing both existing buildings as well as the building addition is approximately 0.38ha. **Table 3-1** below summarises the water demand of the redevelopment.

Table 3–1: Estimated Water Demands

Building ID	Site Area (ha)	Daily Demand Rate (L/ha/d)	Average Day Demand (L/s)	Max. Day Demand (L/s)	Peak Hour Demand (L/s)
Total Site	0.38	55,000	0.24	0.36	0.65

The City of Ottawa's *Water Distribution Guidelines* (2010) were used to estimate the industrial water demand for the proposed redevelopment. An average daily rate of 55000 L/ha/d for generic heavy industrial use was applied to the site to coincide with the site's existing zoning description.

Per the City of Ottawa's *Water Distribution Guidelines*, peaking factors of 1.5 were applied to the average day demands to calculate maximum day demands while peaking factors of 1.8 were applied to the maximum day demands to calculate the peak hour demands for the entire site.

The 150mm water service line for the existing building at 40 Jamie is to be maintained for the current development. Water for the building addition as well as 36 Jamie is proposed to be fed through building plumbing from within the 40 Jamie Avenue building. The existing small diameter domestic water services at 36 Jamie and at 40 Jamie are to be abandoned and blanked at the main. In this manner, the three building areas will be serviced by a single connection to the municipal watermain with one meter location for the overall building.

3.2.2 Fire Flow Demands

Fire flow requirements for the development were estimated using the Water Supply for Public Fire Protection guide (2020) as produced by Fire Underwriters Survey (FUS) which provides guidance in evaluating fire protection water supply to new development.

Based on the overall building size in consideration of the building addition and Group F, Division 2 occupancy per the Ontario Building Code (OBC), the building was considered as non-combustible without vertical protected openings per FUS criteria. No internal fire walls were considered for the new building addition. As the existing exterior walls for the two existing buildings will likely be re-used in place for the internal building addition (subject to future building permit application), this is a conservative assumption with respect to required fire flows. A 'free-burning' occupancy charge was applied for the proposed building due to presence of an existing paint spray booth, and a reduction for the proposed sprinkler system was applied. Per results of calculations in **Appendix A.2**, the required fire flow for the development is estimated at 7,000L/min.

3.2.3 Boundary Conditions

A boundary condition request was made to City of Ottawa staff between January and February 2021 based on a conservatively estimated required fire flow of 9,000L/min (150L/s). **Table 3–2** below demonstrates boundary conditions received from the city in February 2021.

Table 3–2: Boundary Conditions for 36 & 40 Jamie Avenue

Scenarios	Boundary conditions (February 2021)
Minimum HGL	124.9 m
Maximum HGL	132.9 m
Max Day + Fire Flow (150 L/s)	127.1 m

Based on the provided boundary conditions and finished floor elevation at the subject site estimated at 88.60m, a residual pressure of **55 psi** will be available during fire flow conditions. This well exceeds the minimum required pressure during fire flow conditions of 20 psi, indicating that there is sufficient fire flow available to service the proposed development. It is of note that the 127.1m boundary condition for fire flow is conservative given the estimated required fire flow of 7,000 L/min per FUS calculations above.

On-site pressures are expected to range from **52 psi** to **63 psi** under normal operating conditions. These values are within of the normal operating pressure range as defined by City of Ottawa design guidelines (desired **50** to **80** psi and not less than **40 psi**). Since the proposed building is a 2-storey building, an additional head loss of **34.5 kPa (5 psi**) is expected for every additional storey above ground elevation resulting in a residual pressure of **47 psi**. Therefore, sufficient pressure is expected at upper building levels without need for additional booster (jet) pumps for internal plumbing.

Based on these results, there is currently sufficient supply and pressure in the water distribution system to meet the demands of the expected addition to the existing buildings.

4.0 WASTEWATER SERVICING

4.1 BACKGROUND

The subject site is contained within a separated sewer area in the Merivale Industrial Area. An existing 250 mm diameter PVC sanitary sewer fronts the site on Jamie Avenue. This sanitary sewer collects wastewater from the existing buildings on 36 and 40 Jamie Avenue, each with separate connections to the sewer. The new addition will be serviced via new connection to the 250mm main within Jamie Avenue. The new sanitary lateral is to be complete with backwater valve per City of Ottawa / OBC requirements, and the existing sanitary sewer laterals for 36 and 40 Jamie are to be abandoned. Building internal plumbing will be reconfigured to allow discharge to the singular sewer service connection. **Drawing SSGP-1** shows the proposed wastewater service connection for the development.

4.2 DESIGN CRITERIA

Through consultation with the City of Ottawa as shown in **Appendix C.1**, it was determined that the proposed addition must be serviced through the existing buildings and the design must demonstrate that the existing services can accommodate the additional demand or upsizing the existing services.

Therefore, the peak sanitary discharge from the site was calculated based on the unit mix provided in the site plan (**Appendix B**).

As outlined in the City of Ottawa's *Sewer Design Guidelines*, the following criteria were used to calculate estimated wastewater flow rates for the site.

- Average wastewater generation (Heavy industrial flow) - 55,000 L/gross ha/ day
- Peaking factor - 2.4 (Industrial areas per OSDG)
- Extraneous flow allowance - 0.33 l/s/ha

4.3 ANALYSIS

The overall building will be serviced via single 150mm building service discharging to the 250mm sewer within Jamie Avenue. An oil/grit separator is proposed to be installed within the building for treatment of discharged flows to the sanitary sewer service connection. Existing sewer service laterals for buildings at 36 and 40 Jamie Avenue are to be abandoned.

A sanitary sewer design sheet was prepared and is included in **Appendix C.2.** The estimated wastewater flows to be generated are based on the gross area of the development for conservatism. Peaking factor and extraneous flow contributions were estimated based on the City of Ottawa's *Sewer Design Guidelines*. The peak wastewater flows were calculated to be 0.71L/s.

The anticipated wastewater peak flow generated from the proposed development is summarized in **Table 4**–1:

Wastewater Servicing

Table 4–1 - Estimated Total Wastewater Peak Flow

Heavy Industrial Use Areas				
Area ID	**Area (ha)**	**Peak Factor**	**Peak Flow (L/s)**	**Infiltration Flow (L/s)**
Overall Site	0.38	2.4	0.58	0.13
Total Wastewater peak flows				**0.71**

1. Design peak flow based on 55,000 L/ha/day flow calculated using gross site area.
2. Peak factor of industrial areas taken as 2.4 as per City guidelines.
3. Infiltration design flow equals 0.33 L/s/ha.

The design sheet within **Appendix C.2** demonstrates that the proposed 150mm diameter sanitary service to the Jamie Avenue sewer is sufficient to accommodate the proposed wastewater flows.

5.0 STORMWATER MANAGEMENT

5.1 OBJECTIVES

The goal of this stormwater servicing and stormwater management (SWM) plan is to determine the measures necessary to control the quantity and quality of stormwater released from the proposed redevelopment, to meet the criteria established during the consultation process with City of Ottawa and Rideau Valley Conservation Authority (RVCA), and to provide sufficient details required for approval and construction.

5.2 EXISTING CONDITIONS AND SWM CRITERIA

The proposed re-development area (0.38 ha) currently consists of two existing buildings separated by an asphalt parking area. Under existing conditions, the two buildings both maintain a single service connection each to the 900mm storm sewer within Jamie Avenue, and a pair of interconnected catch basins exist onsite to capture drainage from on-site paved areas, and that discharge directly to the Jamie Avenue sewer. No stormwater management appears to exist within the existing development area to limit inflows to the existing 900mm storm sewer on Jamie Avenue. A portion of runoff the north and eastern property limits sheet flows uncontrolled to the existing Jamie Avenue Right-of-Way.

Drawing SSGP-1 details the existing stormwater drainage plan for the site, and outlines subcatchment limits for the existing catch basins and building service laterals.

The existing drainage plan will be maintained as much as the grading and construction permits.

The Stormwater Management (SWM) criteria for the subject site is based on pre-application consultation comments in **Appendix D.2** as provided by the City of Ottawa in November 2020 as follows:

i. The city will not require stormwater management if the impervious area being built on does not already provide stormwater management, and providing the impervious area of the development is not increased.
ii. Should the above not be achieved, quantity control is required to restrict peak site release rates of the 100 - year post development storm events to that the 5 – year storm event under existing conditions to a maximum allowable runoff coefficient (C) of 0.5.
iii. Storm event parameters are to use that described within Ottawa's Sewer Design Guidelines (OSDG) using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.

Other criteria considered in the SWM design are described in Section 5 of the Ottawa Sewer Design Guidelines (October 2012) including all subsequent technical bulletins.

The new building location under existing conditions consists entirely of an impervious asphalt parking of approx. 0.07ha with no stormwater management and runoff C=0.90. Based on the City's pre-consultation criteria, no further quantity control is required for the development.

5.3 STORMWATER MANAGEMENT DESIGN

The proposed building service has been sized via rational method storm sewer design sheet included as part of **Appendix D.1**. Building roof drains are proposed without additional inlet controls, the locations of which will be coordinated with the building's architect and mechanical engineer to help size the internal plumbing system appropriately. As such, the design sheet has been prepared under consideration of roof drain sizing per the Ontario Building Code section 7.4.10.4 (equating to at most a 25mm rainfall volume over 15 minutes, or 100mm/hr) for runoff from both the proposed new rooftop and existing rooftop areas. The proposed building service is to provide an outlet for all building areas, enabling the existing service laterals at 36 and 40 Jamie Avenue to be abandoned.

Groundwater levels are observed at 82.55m which is 4 meters lower than the proposed USF at 86.80m based on geotechnical investigation by Paterson Group. The investigation mentions the foundation drain is optional, however should a foundation drain be installed, the proposed storm service can support a gravity outlet to the sewer.

Peak site discharge under both existing and post-development conditions can be determined as follows:

$$Q = 2.78\,(C)(I)(A)$$

Where:
$Q = peak\ flow\ rate, L/s$
$C = site\ runoff\ coefficient$
$I = rainfall\ intensity, mm/hr\ (per\ City\ of\ Ottawa\ IDF\ curves)$
$A = drainage\ area, ha$

$$100 - year\ Intensity\ (mm/hr) = \frac{1735.688}{(10 + 6.014)^{0.820}} = 178.6\ mm/hr$$

$$Q = 2.78(0.90)(178.6mm/hr)(0.380\ ha) = \mathbf{169.7\ L/s}$$

The RVCA confirmed that no enhanced water quality protection (80% TSS removal) is required for the site as there is a municipal stormwater management pond downstream providing quality protections for the site, correspondence with the RVCA is included in **Appendix D.3.**

Existing site grading and overland flow paths will be maintained as much as possible and will not be affected by the redevelopment including parking, access road areas and all uncontrolled areas as described in **section 5.2** above. The site maintains an overland flow route to Jamie Avenue under both existing and post-development conditions.

5.3.1 Water Quality Control

The RVCA confirmed that further quality control is not required for the site as there is a municipal stormwater management pond downstream providing quality protection for the area. Correspondence with the RVCA is included in **Appendix D.3.**

6.0 SITE GRADING AND DRAINAGE

The proposed development site measures approximately 0.38 ha in area and consists of two existing buildings, site access areas, and 20 surface parking stalls. The site is relatively flat, with surface grades predominantly sloping from south to north and east to west. Western portions of the development include two catch basins which capture surface flows from site areas further east and south, while lands near the northerly and easterly property boundaries sheet flow to the Jamie Avenue Right-of-Way.

Existing site grading and drainage paths will be maintained as much as possible and will not be affected by the proposed re-development. As recommended by the geotechnical investigation by Paterson Group, topsoil and deleterious fill, such as soils containing organic materials or construction debris/remnants, should be stripped from under any buildings, paved areas, pipe bedding, and other settlement sensitive structures prior to construction.

Please refer to **Drawing SSGP-1** for the conceptual site grading plan, which maintains the general drainage pattern of the existing condition site and provides an emergency overland flow route to Jamie Avenue per requirements of the OSDG.

7.0 UTILITIES

The site is within a mature neighbourhood and currently serviced by existing utilities providing natural gas and fibre optics telecommunication services. The site will continue to be serviced through connection to these existing services.

There is an existing hydro transformer on a concrete pad with hydro lines fronting the site. A locate information request has been forwarded to OntarioOneCall, see confirmation in **Appendix D.4**

Should an additional connection to an existing utility be required, detailed design of the required utility service will be completed by the respective utility company.

8.0 EROSION CONTROL DURING CONSTRUCTION

In order to protect downstream water quality and prevent sediment build up in catch basins and storm sewers, erosion and sediment control measures must be implemented during construction. The following recommendations will be included in the contract documents and communicated to the Contractor.

1. Implement best management practices to provide appropriate protection of the existing and proposed drainage system and the receiving water course(s).
2. Limit the extent of the 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 geotextiles, geogrid, or synthetic mulches.
6. Provide sediment traps and basins during dewatering works.
7. Install sediment traps (such as SiltSack® by Terrafix) between catch basins and frames.
8. Schedule the construction works at times which avoid flooding due to seasonal rains.

The Contractor will also be required to complete inspections and guarantee the proper performance of their erosion and sediment control measures at least after every rainfall. The inspections are to include:

- Verification that water is not flowing under silt barriers.
- Cleaning and changing the sediment traps placed on catch basins.

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

9.0 GEOTECHNICAL INVESTIGATION

Paterson Group (Paterson) was commissioned by Star Motors of Ottawa to conduct a geotechnical investigation for the proposed building addition to be located at 36 and 40 Jamie Avenue in the City of Ottawa. Results of the geotechnical investigation are summarized below. For additional information, see report excerpts included as part of **Appendix E.1**.

The objective of the geotechnical investigation was determining the subsoil and groundwater conditions at this site by means of test pits as well as to provide geotechnical recommendations pertaining to design of the proposed development including construction considerations which may affect the design.

The ground surface across the subject site is relatively flat and at grade with the surrounding roadways and properties. Currently, a 2-storey building occupies the west portion of the site, and a one storey building occupies the east portion of the site, while the rest of the site serves as a private at-grade parking for the existing buildings. The subject site is bordered by Jamie Avenue to the north, and by one to two storey buildings with associated parking lots to the other sides.

Generally, the soil profile at the test hole locations consists of asphaltic concrete layer and fill material overlying a deep dense silty sand layer. Based on available geological mapping, the bedrock in the subject area consists of sandstone and dolomite of the March formation, with an overburden drift thickness of 15 to 25 m depth.

Groundwater levels were measured during the current investigation on January 28, 2021 within the installed monitoring wells. The measured groundwater levels are presented in report in **Appendix 0** below. The long-term groundwater table is expected to range between 5 to 6 m below existing grade.

Fill placed for grading beneath the building areas should consist, unless otherwise specified, of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II. The imported fill material should be tested and approved prior to delivery. The fill should be placed in maximum 300 mm thick loose lifts and compacted by suitable compaction equipment. Fill placed beneath the building should be compacted to a minimum of 98% of the standard Proctor maximum dry density (SPMDD). With the removal of all topsoil and deleterious fill from within the footprint of the proposed buildings, the native soil surface will be considered to be an acceptable subgrade on which to commence backfilling for floor slab construction. Any soft areas should be removed and backfilled with appropriate backfill material prior to placing any fill. OPSS Granular B Type II, with a maximum particle size of 50 mm, are recommended for backfilling below the floor slab. For any structures with slab-on-grade construction, the upper 200 mm of sub-slab fill is recommended to consist of OPSS Granular A crushed stone. All backfill material within the footprint of the proposed buildings should be placed in maximum 300 mm thick loose layers and compacted to a minimum of 98% of the SPMDD.

9.1.1 Pavement Design

Car only parking areas, driveways and access lanes are anticipated at this site. The proposed pavement structures are shown in **Table 9–1** and **Table 9–2**.

Table 9–1: Recommended Pavement Structure - Driveways and Car Only Parking Areas

Thickness (mm)	Material Description
50	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 - Either fill, in situ soil or OPSS Granular B Type I or II material placed over in situ soil or fill	

Table 9–2: Recommended Pavement Structure - Access Lanes

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
400	SUBBASE - OPSS Granular B Type II SUBGRADE
SUBGRADE - Either fill, in situ soil, or OPSS Granular B Type I or II material placed over in situ soil or fill.	

9.1.2 Design and Construction Precautions

Construction recommendations below are as per the Paterson Group geotechnical investigation. Please see report excerpts within **Appendix E.1** for further details. A perimeter foundation drainage system is considered optional for the proposed building. The system should consist of a 100 to 150 mm diameter perforated corrugated plastic pipe, surrounded on all sides by 150 mm of 10 mm clear crushed stone, placed at the footing level around the exterior perimeter of the structure. The clear stone should be wrapped in a non-woven geotextile. The pipe should have a positive outlet, such as a gravity connection to the storm sewer or sump pump pit.

Precautions must be taken if winter construction is considered for this project. The subsoil conditions at this site consist of frost susceptible materials. In the presence of water and freezing conditions, ice could form within the soil mass. Heaving and settlement upon thawing could occur.

In the event of construction during below zero temperatures, the founding stratum should be protected from freezing temperatures by the use of straw, propane heaters and tarpaulins or other suitable means. In this regard, the base of the excavations should be insulated from sub-zero temperatures immediately

upon exposure and until such time as heat is adequately supplied to the building and the footings are protected with sufficient soil cover to prevent freezing at founding level.

10.0 APPROVALS/PERMITS

As the development site will not include a private stormwater management facility, nor does the development propose additional private storm or sanitary sewer infrastructure beyond establishment of a new service connection to suit the proposed building addition, an Environmental Compliance Approval (ECA) under the Ontario Water Resources Act (OWRA) is not a requirement per exemptions under O.Reg. 525/98.

If the ground or surface water volumes being pumped during the construction phase are between 50,000 and 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR). A minimum of two to four weeks should be allotted for completion of the EASR registration and the preparation of the Water Taking and Discharge Plan by a Qualified Person as stipulated under O.Reg. 63/16. A Permit to Take Water (PTTW) through the MECP would be required for dewatering in excess of 400,000 L/day, which is unlikely for this site. However, if a PTTW is required as determined by the geotechnical consultant, at least 4 to 5 months should be allowed for completion of the application and issuance of the permit by the MECP. If blasting is used to remove the bedrock as part of the excavation for the building foundation, prior approval is required from the owners/operators of any water storage reservoir, pumping station, and water works transformer station within 200 m of the site.

11.0 CONCLUSIONS

11.1 WATER SERVICING

Based on the supplied boundary conditions for existing watermain and calculated domestic and fire flow demands for the subject site, the existing watermain on Jamie avenue has sufficient capacity to sustain the required domestic and emergency fire flow demands by the proposed addition to the existing buildings.

11.2 WASTEWATER SERVICING

The subject site is contained within a separated sewer area in the Merivale Industrial Area. An existing 250 mm diameter PVC sanitary sewer fronts the site on Jamie avenue. This sanitary sewer collects wastewater from the existing buildings on 36 and 40 Jamie avenue, each with separate connections to the sewer. Existing sanitary sewer laterals are proposed to be abandoned. The overall building will be serviced via a new 150mm service lateral complete with backwater valve.

11.3 STORMWATER SERVICING AND MANAGEMENT

The imperviousness ratio of the site is not being increased by the proposed development, and no existing stormwater management exists within the current development area. The overall building will be serviced via a new 250mm service lateral complete with backwater valve. No quantity control measures are required for the proposed development per pre-consultation notes with City of Ottawa staff.

The RVCA confirmed that water quality protection is not required for the site as there is a municipal stormwater management pond downstream providing quality protection for the area.

11.4 GEOTECHNICAL CONSIDERATIONS

A geotechnical investigation was conducted by Paterson to determine the subsurface properties of the site, including groundwater elevations. A set of recommendations are provided in the investigation to serve as geotechnical guidance for the design and construction of the proposed development.

11.5 GRADING

The proposed development site measures approximately 0.38 ha in area and consists of two existing buildings, site access and 20 surface parking stalls. The site grading and drainage will be maintained per existing conditions to the fullest extent possible. Site grading maintains an overland flow route to the adjacent Jamie Avenue ROW.

11.6 UTILITIES

The site is within a mature neighbourhood and currently serviced by existing utilities providing natural gas and fibre optics telecommunication services. The site will continue to be serviced through connection to these existing services.

APPENDICES

Appendix A POTABLE WATER SERVICING

A.1 WATER DEMAND CALCULATIONS

36 & 40 Jamie Avenue (Auto Body Shop) - Water Demand Estimates

Based on a Site Plan provided by Architect - Brian K. Clark

Demand type

Heavy Industrial use

Building ID	Commercial Area (m^2)	Daily Demand Rate (L/ha/d)[1]	Avg. Day Demand [2]		Max. Day Demand [2]		Peak Hour Demand [2]	
			(L/min)	(L/s)	(L/min)	(L/s)	(L/min)	(L/s)
Jamie 36 & 40	3,800.00	55000	14.5	0.24	21.8	0.36	39.2	0.65
Total Site :	**3,800.00**	**-**	**14.5**	**0.24**	**21.8**	**0.36**	**39.2**	**0.65**

1 Water demand for the site is based on an Average Day Demand for Industrial use sourced from Table 4.2 of the City of Ottawa Water Distribution Design Guidelines (2010).

2 City of Ottawa water demand criteria was used to estimate peak demand rates for industrial use are as follows:

maximum daily demand rate = 1.5 x average day demand rate

peak hour demand rate = 1.8 x maximum day demand rate

A.2 FIRE FLOW REQUIREMENTS PER FUS CRITERIA

FUS Fire Flow Calculation Sheet - 2020 FUS Guidelines

Stantec Project #: 160401647
Project Name: 36-40 Jamie Avenue
Date: 3/7/2023
Fire Flow Calculation #: 1
Description: OBC Building Classification - F-2, assumes no internal fire walls.

Notes: Floor areas per Site plan drawing by Brian K Clark Architect

Step	Task	Notes										Value Used	Req'd Fire Flow (L/min)
1	Determine Type of Construction	Type II - Noncombustible Construction / Type IV-A - Mass Timber Construction										0.8	-
2	Determine Effective Floor Area	Sum of Two Largest Floors + 50% of Eight Additional Floors					Vertical Openings Protected?					NO	-
		2068	139									2207	-
3	Determine Required Fire Flow	($F = 220 \times C \times A^{1/2}$). Round to nearest 1000 L/min										-	8000
4	Determine Occupancy Charge	Free-Burning										15%	9200
5	Determine Sprinkler Reduction	Conforms to NFPA 13										-30%	-3680
		Standard Water Supply										-10%	
		Not Fully Supervised or N/A										0%	
		% Coverage of Sprinkler System										100%	
6	Determine Increase for Exposures (Max. 75%)	Direction	Exposure Distance (m)	Exposed Length (m)	Exposed Height (Stories)	Length-Height Factor (m x stories)	Construction of Adjacent Wall	Firewall / Sprinklered ?				-	-
		North	> 30	45.5	2	81-100	Type I-II - Unprotected Openings	NO				0%	1564
		East	10.1 to 20	44.1	2	81-100	Type I-II - Unprotected Openings	NO				7%	
		South	3.1 to 10	45.5	2	81-100	Type I-II - Unprotected Openings	NO				10%	
		West	> 30	44.1	2	81-100	Type I-II - Unprotected Openings	NO				0%	
7	Determine Final Required Fire Flow	Total Required Fire Flow in L/min, Rounded to Nearest 1000L/min											7000
		Total Required Fire Flow in L/s											116.7
		Required Duration of Fire Flow (hrs)											2.00
		Required Volume of Fire Flow (m^3)											840

A.3 BOUNDARY CONDITIONS

Nwanise, Nwanise

From: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Sent: Thursday, February 25, 2021 9:19 AM
To: Nwanise, Nwanise
Cc: Rathnasooriya, Thakshika; Kilborn, Kris; Sharp, Mike
Subject: RE: 160401647 - 36 & 40 Jamie ave. Hydraulic Boundary Conditions Request
Attachments: 36-40 Jamie February 2021.pdf

Good morning,

The following are boundary conditions, HGL, for hydraulic analysis at 36-40 Jamie (zone 2W2C) assumed to be connected to the 305 mm on Jamie Ave (see attached PDF for location).

Minimum HGL = 124.9 m

Maximum HGL = 132.9 m

Max Day + Fire Flow (150 L/s) = 127.1 m

These are for current conditions and are based on computer model simulation.

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.

Rubina

Rubina Rasool, E.I.T.
Project Manager
Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique
Development Review - West Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue Laurier Ouest. Ottawa (Ontario) K1P 1J1
rubina.rasool@ottawa.ca

From: Nwanise, Nwanise <Nwanise.Nwanise@stantec.com>
Sent: February 24, 2021 1:53 PM
To: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Cc: Rathnasooriya, Thakshika <Thakshika.Rathnasooriya@stantec.com>; Kilborn, Kris <kris.kilborn@stantec.com>; Sharp, Mike <Mike.Sharp@stantec.com>
Subject: RE: 160401647 - 36 & 40 Jamie ave. Hydraulic Boundary Conditions Request

Good afternoon,

Thank you for confirming the status of our request, we look forward to hearing from you soon.

Regards,

Nwanise Nwanise, EIT
Engineering intern, Community Development

Direct: (647) 400-1759
Mobile: (647) 400-1759
nwanise.nwanise@stantec.com

Stantec
400 - 1331 Clyde Avenue
Ottawa ON K2C 3G4

From: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Sent: Wednesday, February 24, 2021 1:37 PM
To: Nwanise, Nwanise <Nwanise.Nwanise@stantec.com>
Cc: Rathnasooriya, Thakshika <Thakshika.Rathnasooriya@stantec.com>; Kilborn, Kris <kris.kilborn@stantec.com>; Sharp, Mike <Mike.Sharp@stantec.com>
Subject: RE: 160401647 - 36 & 40 Jamie ave. Hydraulic Boundary Conditions Request

Good afternoon,

I have not received an update from Water Services and the current turn around time has been 2-3 weeks.

Thanks,

Rubina

Rubina Rasool, E.I.T.
Project Manager
Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique
Development Review - West Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue Laurier Ouest. Ottawa (Ontario) K1P 1J1
rubina.rasool@ottawa.ca

From: Nwanise, Nwanise <Nwanise.Nwanise@stantec.com>
Sent: February 22, 2021 4:08 PM
To: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Cc: Rathnasooriya, Thakshika <Thakshika.Rathnasooriya@stantec.com>; Kilborn, Kris <kris.kilborn@stantec.com>; Sharp, Mike <Mike.Sharp@stantec.com>
Subject: RE: 160401647 - 36 & 40 Jamie ave. Hydraulic Boundary Conditions Request

Hi Rubina,

Hope this meets you well. I would like to request a general status update on the hydraulic boundary conditions request sent out on 2021/01/27 for 36 & 40 Jamie avenue site.

We are preparing an adequacy of services report and SWM brief in respect of a site plan control application for the site and your response would help us to complete key aspects of our design.

Attached is a copy of the original email with location map, water demand and fire flow calculations.

Hope to hear from you soon.

Thanks,

Nwanise Nwanise, EIT
Engineering intern, Community Development

Direct: (647) 400-1759
Mobile: (647) 400-1759
nwanise.nwanise@stantec.com

Stantec
400 - 1331 Clyde Avenue
Ottawa ON K2C 3G4

This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

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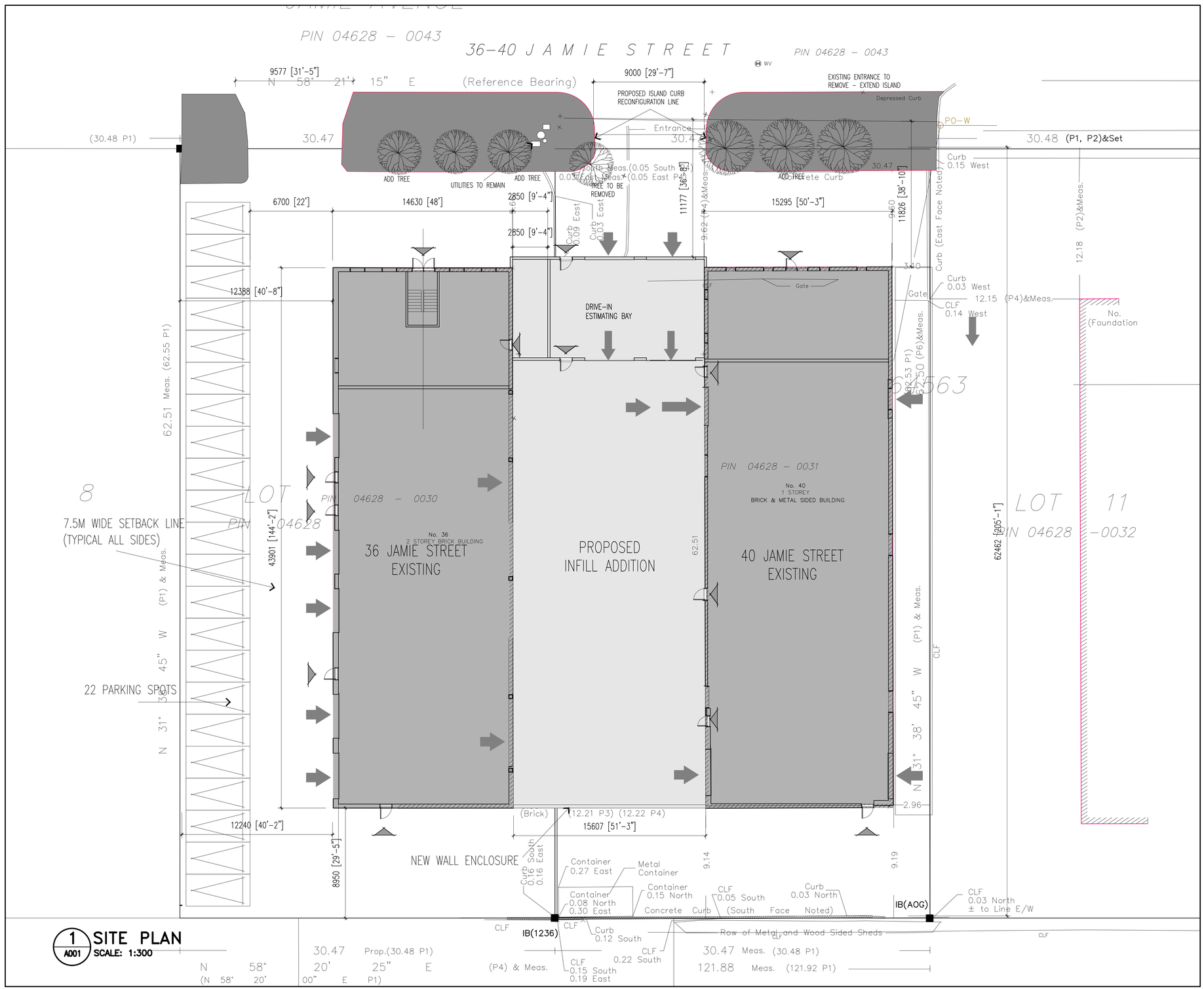
'

Appendix B PROPOSED SITE PLAN



1 A001 **SITE PLAN**
SCALE: 1:300

DRAWING NOTES

NOTES

It is the responsibility of the appropriate contractor to check and verify all dimensions on site and report all errors and or omissions to the Architect.

All contractors must comply with all pertinent codes and by–laws.

Do not scale drawings.

This drawing may not be used for construction until signed by the Architect.

LOCATION MAP

LEGAL DESCRIPTION

no.	date	revision
2		
1	25 AUG. 21	ISSUED FOR SPC REVIEW

Stamp:

brian k. clark
A·R·C·H·I·T·E·C·T
141 Catherine Street, Suite 102
Ottawa, Ontario K2P 1C3
TEL•(613) 238-7412 • FAX-238-1799
Email•bkclarkarchitect@on.aibn.com

Project:

STAR COLLISION
36–40 JAMIE STREET
OTTAWA, ONTARIO

OTTAWA ONTARIO

Drawing:

SITE PLAN

Project No.	Drawn By:	Scale:
2006	DK/DC	1:150

North Arrow:

Date: 25 AUG. 2021

Drawing No.

A001

Appendix C WASTEWATER SERVICING

C.1 PRECONSULTATION WITH CITY OF OTTAWA

APPLICANT'S STUDY AND PLAN IDENTIFICATION LIST

Legend: **S** indicates that the study or plan is required with application submission.
A indicates that the study or plan may be required to satisfy a condition of approval/draft approval.

For information and guidance on preparing required studies and plans refer here:

S/A	Number of copies	ENGINEERING		S/A	Number of copies
S	5	1. Site Servicing Plan	2. Site Servicing Study	S	3
S	5	3. Grade Control and Drainage Plan	4. Geotechnical Study	S	3
	2	5. Composite Utility Plan	6. Groundwater Impact Study		3
	3	7. Servicing Options Report	8. Wellhead Protection Study		3
	4	9. Transportation Impact Assessment (TIA) *Provide an addendum to the original report	10.Erosion and Sediment Control Plan	S	3
S	3	11.Storm water Management Report / Brief	12.Hydro geological and Terrain Analysis		3
	3	13.Hydraulic Water main Analysis	14.Noise (Stationary)		3
	PDF only	15.Roadway Modification Functional Design	16.Confederation Line Proximity Study		3

S/A	Number of copies	PLANNING / DESIGN / SURVEY		S/A	Number of copies
	15	17.Draft Plan of Subdivision	18.Plan Showing Layout of Parking Garage		2
	5	19.Draft Plan of Condominium	20.Planning Rationale	S	3
S	10	21.Site Plan	22.Minimum Distance Separation (MDS)		3
	15	23.Concept Plan Showing Proposed Land Uses and Landscaping	24.Agrology and Soil Capability Study		3
	3	25.Concept Plan Showing Ultimate Use of Land	26.Cultural Heritage Impact Statement		3
S	3	27.Landscape Plan	28.Archaeological Resource Assessment Requirements: **S** (site plan) **A** (subdivision, condo)		3
S	1	29.Survey Plan	30.Shadow Analysis		3
S	3	31.Architectural Building Elevation Drawings (dimensioned)	32.Design Brief (includes the Design Review Panel Submission Requirements)	S	Available online
	3	33.Wind Analysis			

S/A	Number of copies	ENVIRONMENTAL		S/A	Number of copies
S	3	34.Phase 1 Environmental Site Assessment	35.Impact Assessment of Adjacent Waste Disposal/Former Landfill Site		3
	3	36.Phase 2 Environmental Site Assessment (depends on the outcome of Phase 1)	37.Assessment of Landform Features		3
	3	38.Record of Site Condition	39.Mineral Resource Impact Assessment		3
	3	40.Tree Conservation Report	41.Environmental Impact Statement / Impact Assessment of Endangered Species		3
	3	42.Mine Hazard Study / Abandoned Pit or Quarry Study	43.Integrated Environmental Review (Draft, as part of Planning Rationale)		3

S/A	Number of copies	ADDITIONAL REQUIREMENTS		S/A	Number of copies
	1	44. Applicant's Public Consultation Strategy (may be provided as part of the Planning Rationale)	45. Site Lighting Plan & Certificate	S	1

Meeting Date: November 5, 2020

Application Type: *Site Plan Control*

File Lead (Assigned Planner): Laurel McCreight

Infrastructure Approvals PM: Rubina Rasool

Site Address (Municipal Address): 36 &40 Jamie

*Preliminary Assessment: 1☐ 2☐ 3☐ 4☐ 5

*One (1) indicates that considerable major revisions are required before a planning application is submitted, while five (5) suggests that proposal appears to meet the City's key land use policies and guidelines. **This assessment is purely advisory and does not consider technical aspects of the proposal or in any way guarantee application approval.**

It is important to note that the need for additional studies and plans may result during application review. If following the submission of your application, it is determined that material that is not identified in this checklist is required to achieve complete application status, in accordance with the Planning Act and Official Plan requirements, the* Planning, Infrastructure and Economic Development Department *will notify you of outstanding material required within the required 30 day period. Mandatory pre-application consultation will not shorten the City's standard processing timelines, or guarantee that an application will be approved. It is intended to help educate and inform the applicant about submission requirements as well as municipal processes, policies, and key issues in advance of submitting a formal development application. This list is valid for one year following the meeting date. If the application is not submitted within this timeframe the applicant must again pre-consult with the Planning, Infrastructure and Economic Development Department.

From: McCreight, Laurel
To: Smith, Molly
Subject: Pre-Consultation Follow-up: 36 & 40 Jamie
Date: Thursday, November 12, 2020 1:28:12 PM
Attachments: Plans & Study List.pdf
Jamie, 36-40 Design Brief.pdf

Hi Molly,

Please refer to the below regarding the Pre-Application for 36 & 40 Jamie for a Site Plan Control Application for a building addition to two existing buildings. I have also attached the required Plans & Study List for application submission.

An email was sent providing instructions on how to pay the fee for the pre-application consultation.

Below are staff's preliminary comments based on the information available at the time of the pre-consultation meeting:

Planning / Urban Design

- This proposal is in its early stages so the high-level comments reflect that and the lack of detailed drawings (site plan, landscape plan and elevations).
- It is recommended to continue the existing facade treatment of masonry to connect the two existing buildings together.
- It is recommended that the right of way in-front of the new addition be considered more closely (maintain the existing street tree, indicate the existing hydro pole, consolidate and minimize the curb cuts and access points on the site)
- Consider shifting the new vehicular entrance to align with these consolidated street works.
- It is encouraged to find new opportunities to introduce new and support existing landscaping and soft permeable surfaces.
- A Design Brief is a required submittal for all site plan applications.
    - Please see the Design Brief Terms of Reference provided for details.
- Please merge the properties on title.
- Cash-in-lieu of Parkland will be required.
- You are encouraged to contact the Ward Councillor, Councillor Keith Egli, about the proposal.

Engineering

Water

- Water District Plan No: 364-021
- Existing public services: Jamie Ave – 305 mm DI

Boundary Conditions:

- Civil consultant must request boundary conditions from the City's assigned Project Manager prior to first submission.
    - Water boundary condition requests must include the location of the service(s) and the expected loads required by the proposed developments. Please provide all the

following information:

- Location of service(s)
- Type of development and the amount of fire flow required (as per FUS, 1999).
- Average daily demand: ___ l/s.
- Maximum daily demand: ___l/s.
- Maximum hourly daily demand: ___ l/s.

- Fire protection (Fire demand, Hydrant Locations)

- The proposed addition must be serviced through the existing building. The design must demonstrate the existing services can accommodate the additional demand or upsizing the existing services.

Sanitary Sewer

- Existing public services: Jamie Ave – 250 mm PVC
- The proposed addition must be serviced through the existing building. The design must demonstrate the existing services can accommodate the additional demand or upsizing the existing services.

Storm

- Existing public services: Jamie Ave – 900 mm Concrete
- Quality Control: Rideau Valley Conservation Authority to confirm quality control requirements.
- Quantity Control: Quantity control will be required for the area of the proposed addition.
- Allowable Runoff coefficient (C): 0.5
- Allowable flowrate: Control the 100-year storm events to the 5-year storm event
- Ministry of Environment, Conservation and Parks (MECEP)
  - All development applications should be considered for an Environmental Compliance Approval, under MECP regulations.
    - A direct submission ECA will be required for the proposed work as per O. Reg. 525/98 Section 53.3(a), (c), and (d): stormwater management that is services more than one parcel of land, services industrial lands, located on industrial lands.
    - Pre-consultation with local District office of MECP is recommended for direct submission.
    - Consultant completes an MECP request form for a pre-consultation. Sends request to moeccottawasewage@ontario.ca
    - ECA applications are required to be submitted online through the MECP portal. A business account required to submit ECA application. For more information visit https://www.ontario.ca/page/environmental-compliance-approval
    - NOTE: Site Plan Approval is required before any Ministry of the Environment and Climate Change (MOECC) application is sent.

References and Resources

- As per section 53 of the Professional Engineers Act, O. Reg 941/40, R.S.O. 1990, all documents prepared by engineers must be signed and dated on the seal.
- All required plans are to be submitted on standard A1 size sheets (594mm x 841mm) sheets, utilizing a reasonable and appropriate metric scale as per City of Ottawa Servicing and Grading Plan Requirements: title blocks are to be placed on the right of the sheets and not along the bottom. Engineering plans may be combined, but the Site Plans must be provided separately. Plans shall include the survey monument used to confirm datum. Information shall be provided to enable a non-surveyor to locate the survey monument presented by the consultant.
- All required plans & reports are to be provided in *.pdf format (at application submission and for any, and all, re-submissions)
- Please find relevant City of Ottawa Links to Preparing Studies and Plans below:
- https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#standards-policies-and-guidelines
- To request City of Ottawa plan(s) or report information please contact the City of Ottawa Information Centre:

  InformationCentre@ottawa.ca<mailto:InformationCentre@ottawa.ca>
  (613) 580-2424 ext. 44455
- geoOttawa: http://maps.ottawa.ca/geoOttawa/

Please contact Infrastructure Project Manager Rubina Rasool for follow-up questions.

Transportation

- Please fill out the TIA Screening Form
- Please do not have cars parked in the accesses
- On site plan:
  - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
  - Turning templates will be required for all accesses showing the largest vehicle to access the site; required for internal movements and at all access (entering and exiting and going in both directions).
  - Show all curb radii measurements; ensure that all curb radii are reduced as much as possible
  - Show lane/aisle widths.
  - Provide dedicated pedestrian paths.
  - Grey out any area that will not be impacted by this application.

Please contact Transportation Project Manager, Mike Giampa for follow-up questions.

-

Other

Please refer to the links to "Guide to preparing studies and plans" and fees for general information. Additional information is available related to building permits, development charges, and the Accessibility Design Standards. Be aware that other fees and permits may be required, outside of the

development review process. You may obtain background drawings by contacting informationcentre@ottawa.ca.

These pre-consultation comments are valid for one year. If you submit a development application(s) after this time, you may be required to meet for another pre-consultation meeting and/or the submission requirements may change. You are as well encouraged to contact us for a follow-up meeting if the plan/concept will be further refined.

Please do not hesitate to contact me if you have any questions.

Regards,
Laurel

Laurel McCreight MCIP, RPP
Planner
Development Review West
Urbaniste
Examen des demandes d'aménagement ouest

City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 16587
ottawa.ca/planning / ottawa.ca/urbanisme

C.2 SANITARY SEWER CALCULATION SHEET

Stantec

SITE:

Star Motors of Ottawa
36 & 40 Jamie Avenue, Ottawa, ON

DATE: 2023-03-07
REVISION: 2
DESIGNED BY: DT
CHECKED BY: RT

SANITARY SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: 160401647

DESIGN PARAMETERS

MAX PEAK FACTOR (RES.)=	4.0	AVG. DAILY FLOW / PERSON	280	l/p/day	MINIMUM VELOCITY	0.60	m/s
MIN PEAK FACTOR (RES.)=	2.0	COMMERCIAL	28,000	l/ha/day	MAXIMUM VELOCITY	3.00	m/s
PEAKING FACTOR (INDUSTRIAL):	2.4	INDUSTRIAL (HEAVY)	55,000	l/ha/day	MANNINGS n	0.013	
PEAKING FACTOR (ICI >20%):	1.5	INDUSTRIAL (LIGHT)	35,000	l/ha/day	BEDDING CLASS	B	
PERSONS / AVG. APARTMENT	1.8	INSTITUTIONAL	28,000	l/ha/day	MINIMUM COVER	2.50	m
PERSONS / 1 BEDROOM	1.4	INFILTRATION	0.33	l/s/Ha	HARMON CORRECTION FACTOR	0.8	
PERSONS / 2 BEDROOM	2.1						

LOCATION			RESIDENTIAL AREA AND POPULATION								COMMERCIAL		INDUSTRIAL (L)		INDUSTRIAL (H)		INSTITUTIONAL		GREEN / UNUSED		C+I+I	INFILTRATION			TOTAL	PIPE								
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA	APARTMENT	1 BEDROOM	2 BEDROOM	POP.	CUMULATIVE AREA	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	AREA	ACCU. AREA	PEAK FLOW	TOTAL AREA	ACCU. AREA	INFILT. FLOW	FLOW	LENGTH	DIA	MATERIAL	CLASS	SLOPE	CAP. (FULL)	CAP. V PEAK FLOW	VEL. (FULL)	VEL. (ACT.)
			(ha)					(ha)			(l/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(l/s)	(ha)	(ha)	(l/s)	(l/s)	(m)	(mm)			(%)	(l/s)	(%)	(m/s)	(m/s)
BLDG	BLDG	SAN STUB	0.00	0	0	0	0	0.00	0	4.00	0.00	0.00	0.00	0.00	0.00	0.38	0.38	0.00	0.00	0.00	0.00	0.58	0.380	0.38	0.13	0.71	6.9	150	PVC	SDR 35	1.00	15.3	**4.61%**	0.86	0.37
SITE TOTAL																																			

Notes:

1. Site area taken from site plan provided by Brian K. Clark.
2. Building addition to be serviced by a single sanitary sewer outlet, existing services for 36 and 40 Jamie Avenue to continue operation per existing conditions.

Appendix D STORMWATER SERVICING AND MANAGEMENT

D.1 STORM SEWER DESIGN SHEET

Stantec

	36-40 Jamie Avenue
DATE:	2023-08-21
REVISION:	3
DESIGNED BY:	DT
CHECKED BY:	PM

STORM SEWER DESIGN SHEET
(City of Ottawa)

FILE NUMBER: 160401647

DESIGN PARAMETERS

$I = a / (t+b)^c$ (As per City of Ottawa Guidelines, 2012)

	1:2 yr	1:5 yr	1:10 yr	1:100 yr
a =	732.951	998.071	1174.184	1735.688
b =	6.199	6.053	6.014	6.014
c =	0.810	0.814	0.816	0.820

MANNING'S n = 0.013 BEDDING CLASS = B
MINIMUM COVER: 2.00 m
TIME OF ENTRY 10 min

LOCATION			DRAINAGE AREA																					PIPE SELECTION											
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA (2-YEAR) (ha)	AREA (5-YEAR) (ha)	AREA (10-YEAR) (ha)	AREA (100-YEAR) (ha)	AREA (ROOF) (ha)	C (2-YEAR) (-)	C (5-YEAR) (-)	C (10-YEAR) (-)	C (100-YEAR) (-)	A x C (2-YEAR) (ha)	ACCUM AxC (2YR) (ha)	A x C (5-YEAR) (ha)	ACCUM. AxC (5YR) (ha)	A x C (10-YEAR) (ha)	ACCUM. AxC (10YR) (ha)	A x C (100-YEAR) (ha)	ACCUM. AxC (100YR) (ha)	T of C (min)	$I_{2\text{-YEAR}}$ (mm/h)	$I_{5\text{-YEAR}}$ (mm/h)	$I_{10\text{-YEAR}}$ (mm/h)	$I_{100\text{-YEAR}}$ (mm/h)	I_{BLDG} (mm/hr)	ACCUM. $Q_{CONTROL}$ (L/s)	Q_{ACT} (CIA/360) (L/s)	LENGTH (m)	PIPE WIDTH OR DIAMETEI (mm)	PIPE HEIGHT (mm)	PIPE SHAPE (-)	MATERIAL (-)	CLASS (-)	SLOPE %	Q_{CAP} (FULL) (L/s)	% FULL (-)	VEL. (FULL) (m/s)	VEL. (ACT) (m/s)	TIME OF FLOW (min)
R1A, EXR1, EXR2	BLDG	STM 1	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.90	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	100.0	55.6	55.6	6.1	250	250	CIRCULAR	PVC	-	1.00	60.4	**91.98%**	1.22	1.25	0.08
	STM 1	EX STM	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.08	76.49	103.76	121.64	177.82	0.0	55.6	55.6	19.9	250	250	CIRCULAR	PVC	-	1.00	60.4	**91.98%**	1.22	1.25	0.27
																				10.35									900	900									

D.2 CORRESPONDENCE WITH CITY ON STORMWATER CRITERIA

From: McCreight, Laurel
To: Smith, Molly
Subject: FW: Pre-Application Consultation Request - 36 and 40 Jamie Avenue
Date: Monday, November 16, 2020 11:52:03 AM

Hi Molly,

Please see the below from infrastructure.

Thanks,
Laurel

From: Rasool, Rubina <Rubina.Rasool@ottawa.ca>
Sent: November 16, 2020 11:49 AM
To: McCreight, Laurel <Laurel.McCreight@ottawa.ca>
Subject: RE: Pre-Application Consultation Request - 36 and 40 Jamie Avenue

Good day Laurel,

Asset Management followed-up this morning with regards to the site. We would not require stormwater management if the impervious area being built on does not already provide stormwater management. The servicing brief can discuss the impervious ratio is not being increased and therefore stormwater management would not be required.

Thanks,

Rubina

Rubina Rasool, E.I.T.
Project Manager
Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique
Development Review - West Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue Laurier Ouest. Ottawa (Ontario) K1P 1J1
rubina.rasool@ottawa.ca
'

'

D.3 CORRESPONDENCE WITH RVCA ON STORMWATER QUALITY CONTROL

From: Eric Lalande
To: Nwanise, Nwanise
Cc: Kilborn, Kris; Rathnasooriya, Thakshika; Sharp, Mike
Subject: RE: 160401647 -36 & 40 Jamie Avenue - RVCA Stormwater Quality Control Criteria
Date: Tuesday, January 26, 2021 3:19:09 PM

Hello Nwanise,

The RVCA required enhanced level protection (80% TSS removal) prior to the downstream outlet. It would appear that there is a municipal stormwater management pond downstream providing quality protections for the site. As such, no quality protection is required on-site.

Thank you,

Eric Lalande, MCIP, RPP
Planner, RVCA
613-692-3571 x1137

From: Nwanise, Nwanise <Nwanise.Nwanise@stantec.com>
Sent: Tuesday, January 26, 2021 9:51 AM
To: Eric Lalande <eric.lalande@rvca.ca>
Cc: Kilborn, Kris <kris.kilborn@stantec.com>; Rathnasooriya, Thakshika <Thakshika.Rathnasooriya@stantec.com>; Sharp, Mike <Mike.Sharp@stantec.com>
Subject: 160401647 -36 & 40 Jamie Avenue - RVCA Stormwater Quality Control Criteria

Good morning Eric,

Stantec is preparing a civil engineering design submission in support of a site plan control application for a building addition to two existing buildings on 36 & 40 Jamie Avenue in the City of Ottawa (indicated as Lot 9 & 10 in attached site plans).

In our pre-application consultation, the City has directed us to consult with you before the submission of our engineering package to confirm the stormwater quality control requirement (s) for the site. May you please provide us with this information?

Below is a list of some key site information:

i. The development is an addition to the two existing buildings on 36 & 40 Jamie avenue connecting both buildings to become one, we anticipate that the proposed addition would be serviced through the existing building's facilities.
ii. There is an existing 900mm concrete storm sewer fronting the site on Jamie avenue.
iii. The proposed building is an automobile body shop of Group F and Division 2 occupancy (i.e. medium hazard industrial)
iv. 20 surface parking spots are proposed on the west corner of Lot 9.
v. Stormwater quantity control for the site is anticipated to be provided via rooftop storage and an underground stormwater storage tank/ cistern (yet to be determined) both controlled by ICDs to achieve a minimum water quality & target release rate.
vi. The City of Ottawa has indicated that the allowable stormwater release rate is to be calculated

using:

- Allowable Runoff coefficient (C): 0.5.
- Allowable flowrate: Control the 100-year storm events to the 5-year storm event.

Thank you in advance for your help.

Please let me know if you require any additional information from our end.

Regards,

Nwanise Nwanise, EIT
Engineering intern, Community Development

Direct: (647) 400-1759
Mobile: (647) 400-1759
nwanise.nwanise@stantec.com

Stantec
400 - 1331 Clyde Avenue
Ottawa ON K2C 3G4

D.4 LOCATE REQUEST FROM ONTARIO ONE CALL

Nwanise, Nwanise

From: solutions@on1call.com
Sent: Friday, January 28, 2022 2:41 PM
To: Nwanise, Nwanise
Subject: Request 2022059482
Attachments: MapSelection_28012022_14382350.jpg

LOCATE REQUEST CONFIRMATION

REQUEST #:	REQUEST PRIORITY:	REQUEST TYPE: REGULAR	WORK TO BEGIN DATE:
2022059482	**PLANNING**		**02/04/2022**
Update of Request #	**Project #:**	**Call Date: 01/28/2022 02:32:27 PM**	**Transmit Date: 01/28/2022 02:40:22 PM**

REQUESTOR'S CONTACT INFORMATION	
Contractor ID: 381141	
Contact Name: NWANISE ETIENAM NWANISE	**Contact Name:**
Company Name: STANTEC CONSULTING LTD.	**Contact #:**
Address: - 1331 CLYDE AVE, OTTAWA, ON, K2C 3G4	
Email: nwanise.nwanise@stantec.com	
Primary Phone #: (647) 400-1759	
Cell Phone #:	

DIG INFORMATION		
Region/County: OTTAWA		**Work End Date:**
Community:	**Reason for Work:** DESIGN AND PLANNING	
City: OTTAWA		
Address: 36, JAMIE AVE		
Intersecting Street 1: SUNDERLAND ST		
Intersecting Street 2: MERIVALE RD		

ADDITIONAL INFORMATION	QUALIFYING INFORMATION
A BUILDING ADDITION IS BEING PROPOSED IN BETWEEN 36 AND 40 JAMIE AVENUE	

MEMBERS NOTIFIED: The following owners of underground infrastructure in the area of your excavation site have been notified.		
Member Name	**Station Code**	**Initial Status**
BELL CANADA - PLANNING (BCPRE)	BCPRE	Notification sent

MAP SELECTION: Map Selection provided by the excavator through Ontario One Call's map tool or through agent interpretation by

Name: 36 and 40 Jamie Ave
Start Date: 2022/02/04

Area: 4716.00sq. m

Appendix E EXTERNAL REPORTS

GEOTECHNICAL INVESTIGATION BY PATERSON (FEBUARY 2022)

Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

Archaeological Services

Paterson Group Inc.
Consulting Engineers
154 Colonnade Road South
Ottawa (Nepean), Ontario
Canada K2E 7J5

Tel: (613) 226-7381
Fax: (613) 226-6344
www.patersongroup.ca

patersongroup

Geotechnical Investigation

Proposed Building Addition
36 and 40 Jamie Avenue
Ottawa, Ontario

Prepared For

Star Motors of Ottawa

February 16, 2021

Report: PG5634-1

Table of Contents

PAGE

Appendices

1.0 Introduction

Paterson Group (Paterson) was commissioned by Star Motors of Ottawa to conduct a geotechnical investigation for the proposed building addition to be located at 36 and 40 Jamie Avenue in the City of Ottawa (refer to Figure 1 - Key Plan in Appendix 2 of this report).

The objective of the geotechnical investigation was to:

- Determine the subsoil and groundwater conditions at this site by means of test pits.
- Provide geotechnical recommendations pertaining to design of the proposed development including construction considerations which may affect the design.

The following report has been prepared specifically and solely for the aforementioned project which is described herein. It contains our findings and includes geotechnical recommendations pertaining to the design and construction of the subject development as they are understood at the time of writing this report.

2.0 Proposed Development

It is understood that the proposed building addition will consist of a two storey building addition. An associated parking and landscaped area are also anticipated as part of the proposed building addition. It is expected that the proposed building will be municipally serviced.

3.0 Method of Investigation

3.1 Field Investigation

Field Program

The field program for the current geotechnical investigation was carried out on January 22, 2021 and consisted of advancing a total of three (3) boreholes to a maximum depth of 8.2 m below existing ground surface. The test hole locations were distributed in a manner to provide general coverage of the subject site and taking into consideration underground utilities and site features. The test holes locations are shown on Drawing PG5634-1 - Test Hole Location Plan included in Appendix 2.

The test holes were completed using a low clearance drill rig operated by a two-person crew. All fieldwork was conducted under the full-time supervision of Paterson personnel under the direction of a senior engineer. The drilling procedure consisted of drilling to the required depths at the selected locations, and sampling and testing the overburden.

Sampling and In Situ Testing

The soil samples were recovered from the auger flights and using a 50 mm diameter split-spoon sampler. The samples were initially classified on site, placed in sealed plastic bags and transported to our laboratory. The depths at which the auger and split-spoon were recovered from the boreholes are shown as AU and SS, respectively, on the Soil Profile and Test Data sheets in Appendix 1.

The Standard Penetration Test (SPT) was conducted in conjunction with the recovery of the split-spoon samples. The SPT results are recorded as “N” values on the Soil Profile and Test Data sheets. The “N” value is the number of blows required to drive the split-spoon sampler 300 mm into the soil after a 150 mm initial penetration using a 63.5 kg hammer falling from a height of 760 mm.

The subsurface conditions observed in the test holes were recorded in detail in the field. The soil profiles are logged on the Soil Profile and Test Data sheets in Appendix 1 of this report.

Sample Storage

All samples will be stored in the laboratory for a period of one (1) month after issuance of this report. They will then be discarded unless we are otherwise directed.

Groundwater

Monitoring wells were installed in all boreholes to permit monitoring of the groundwater levels subsequent to the completion of the sampling program.

3.2 Field Survey

The test hole locations were selected by Paterson to provide general coverage of the proposed development, taking into consideration the existing site features and underground utilities. The test hole locations and ground surface elevation at each test hole location were surveyed by Paterson using a handheld GPS and referenced to a geodetic datum. The location of the test holes and ground surface elevation at each test hole location are presented on Drawing PG5634-1 - Test Hole Location Plan in Appendix 2.

3.3 Laboratory Testing

Soil samples were recovered from the subject site and visually examined in our laboratory to review the results of the field logging. Soil samples will be stored for a period of one month after this report is completed, unless otherwise directed.

3.4 Analytical Testing

One (1) soil sample was submitted for analytical testing to assess the corrosion potential for exposed ferrous metals and the potential of sulphate attacks against subsurface concrete structures, one of which was collected from test hole BH1-SS2. The sample was submitted to determine the concentration of sulphate and chloride, the resistivity, and the pH of the samples. The results are presented in Appendix 1 and are discussed further in Subsection 6.7.

4.0 Observations

4.1 Surface Conditions

The ground surface across the subject site is relatively flat and at grade with the surrounding roadways and properties. Currently, a 2 storey building occupies the west portion of the site and a one storey building occupies the east portion of the site, while the rest of the site serves as a private at-grade parking for the existing buildings.

The subject site is bordered by Jamie Avenue to the north, and by one to two storey commercial buildings with associated parking lots to the other sides.

4.2 Subsurface Profile

Overburden

Generally, the soil profile at the test hole locations consists of asphaltic concrete layer and fill material overlying a deep dense silty sand layer. Reference should be made to the Soil Profile and Test Data sheets in Appendix 1 for the details of the soil profile encountered at each test hole location.

Bedrock

Based on available geological mapping, the bedrock in the subject area consists of sandstone and dolomite of the March formation, with an overburden drift thickness of 15 to 25 m depth.

4.3 Groundwater

Groundwater levels were measured during the current investigation on January 28, 2021 within the installed monitoring wells. The measured groundwater levels are presented in Table 1 below. The long-term groundwater table is expected to range between 5 to 6 m below existing grade.

Table 1 – Summary of Groundwater Levels				
Test Hole Number	**Ground Surface Elevation (m)**	**Measured Groundwater Level / Groundwater Infiltration for Test Pits**		**Dated Recorded**
		Depth (m)	**Elevation (m)**	
BH 1-21	88.93	6.38	82.55	January 28, 2021
BH 2-21	89.00	6.41	82.59	
BH 3-21	88.56	5.97	82.59	
Note: The ground surface elevation at each borehole location was surveyed using a handheld GPS referenced to a geodetic datum.				

It should be noted that groundwater levels are subject to seasonal fluctuations. Therefore, the groundwater levels could vary at the time of construction.

5.0 Discussion

5.1 Geotechnical Assessment

It is anticipated that the proposed building will be founded by conventional shallow foundations placed directly over a compact to dense silty sand bearing surface.

The above and other considerations are further discussed in the following sections.

5.2 Site Grading and Preparation

Stripping Depth

Topsoil and deleterious fill, such as those containing organic materials, or construction debris/remnants should be stripped from under any buildings, paved areas, pipe bedding and other settlement sensitive structures.

Fill Placement

Fill placed for grading beneath the building areas should consist, unless otherwise specified, of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II. The imported fill material should be tested and approved prior to delivery. The fill should be placed in maximum 300 mm thick loose lifts and compacted by suitable compaction equipment. Fill placed beneath the building should be compacted to a minimum of 98% of the standard Proctor maximum dry density (SPMDD).

Non-specified existing fill along with site-excavated soil could be placed as general landscaping fill where settlement of the ground surface is of minor concern. These materials should be spread in lifts with a maximum thickness of 300 mm and compacted by the tracks of the spreading equipment to minimize voids. If excavated brown silty sand, free of organics and deleterious materials, is to be used to build up the subgrade level for areas to be paved, it is recommended that the material be placed under dry conditions and in above freezing temperatures. The silty sand fill should be compacted in thin lifts using a suitable compaction equipment for the lift thickness by making several passes and approved by Paterson personnel.

Non-specified existing fill and site-excavated soils are not suitable for placement as backfill against foundation walls, unless used in conjunction with a geocomposite drainage membrane, such as Miradrain G100N or Delta Drain 6000.

5.3 Foundation Design

Bearing Resistance Values

Footings placed on an undisturbed, compact silty sand bearing surface can be designed using a bearing resistance value at serviceability limit states (SLS) of **120 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **200 kPa**.

It is recommended for areas where the silty sand is noted to be in a loose state of compaction that the bearing surface be proof-rolled using a suitably sized vibratory roller making several passes under dry and above freezing conditions. Paterson personnel should complete periodic inspections during the proof-rolling operations.

An undisturbed soil bearing surface consists of one from which all topsoil and deleterious materials, such as loose, frozen or disturbed soil, whether in situ or not, have been removed, in the dry, prior to the placement of the concrete for the footings.

Lateral Support

The bearing medium under footing-supported structures is required to be provided with adequate lateral support with respect to excavations and different foundation levels. Adequate lateral support is provided to the loose to compact silty sand above the groundwater table when a plane extending down and out from the bottom edge of the footing at a minimum of 1.5H:1V passes only through in situ soil of the same or higher capacity as the bearing medium soil.

Settlement

The total and differential settlements will be dependent on characteristics of the proposed buildings. For design purposes, the total and differential settlements are estimated to be 25 and 20 mm, respectively. A post-development groundwater lowering of 0.5 m was assumed.

5.4 Design for Earthquakes

The site class for seismic site response can be taken as **Class D** for this area and the foundations being considered at this site. Reference should be made to the latest revision of the Ontario Building Code (OBC) 2012 for a full discussion of the earthquake design requirements.

5.5 Slab-on-Grade Construction

With the removal of all topsoil and deleterious fill from within the footprint of the proposed buildings, the native soil surface will be considered to be an acceptable subgrade on which to commence backfilling for floor slab construction.

Any soft areas should be removed and backfilled with appropriate backfill material prior to placing any fill. OPSS Granular B Type II, with a maximum particle size of 50 mm, are recommended for backfilling below the floor slab.

For any structures with slab-on-grade construction, the upper 200 mm of sub-slab fill is recommended to consist of OPSS Granular A crushed stone. All backfill material within the footprint of the proposed buildings should be placed in maximum 300 mm thick loose layers and compacted to a minimum of 98% of the SPMDD.

5.6 Pavement Design

Car only parking areas, driveways and access lanes are anticipated at this site. The proposed pavement structures are shown in Tables 2 and 3.

Table 2 - Recommended Pavement Structure - Driveways and Car Only Parking Areas

Thickness (mm)	Material Description
50	**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 - Either fill, in situ soil or OPSS Granular B Type I or II material placed over in situ soil or fill	

Table 3 - Recommended Pavement Structure - Access Lanes

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
400	**SUBBASE** - OPSS Granular B Type II
SUBGRADE - Either fill, in situ soil, or OPSS Granular B Type I or II material placed over in situ soil or fill.	

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for this project.

If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type II material. Weak subgrade conditions may be experienced over service trench fill materials. This may require the use of a geotextile, thicker subbase or other measures that can be recommended at the time of construction as part of the field observation program.

The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 100% of the material's SPMDD using suitable vibratory equipment.

6.0 Design and Construction Precautions

6.1 Foundation Drainage and Backfill

Foundation Drainage

A perimeter foundation drainage system is considered optional for the proposed building. The system should consist of a 100 to 150 mm diameter perforated corrugated plastic pipe, surrounded on all sides by 150 mm of 10 mm clear crushed stone, placed at the footing level around the exterior perimeter of the structure. The clear stone should be wrapped in a non-woven geotextile. The pipe should have a positive outlet, such as a gravity connection to the storm sewer or sump pump pit.

Foundation Backfill

Backfill against the exterior sides of the foundation walls should consist of free-draining, non-frost susceptible granular materials. The greater part of the site excavated materials will be frost susceptible and, as such, are not recommended for re-use as backfill against the foundation walls, unless used in conjunction with a drainage geocomposite, such as Delta Drain 6000, connected to the perimeter foundation drainage system. Imported granular materials, such as clean sand or OPSS Granular B Type I granular material, should otherwise be used for this purpose.

6.2 Protection of Footings Against Frost Action

Perimeter footings of heated structures are required to be insulated against the deleterious effects of frost action. A minimum of 1.5 m of soil cover alone, or a minimum of 0.6 m of soil cover, in conjunction with foundation insulation, should be provided.

Exterior unheated footings, such as those for isolated exterior piers, are more prone to deleterious movement associated with frost action than the exterior walls of the structure proper and require additional protection, such as soil cover of 2.1 m or a combination of soil cover and foundation insulation.

6.3 Excavation Side Slopes

Open Cut Excavation

The side slopes of excavations in the soil and fill overburden materials should either be cut back at acceptable slopes or should be retained by shoring systems from the start of the excavation until the structure is backfilled. It is assumed that sufficient room will be available in selected areas of the excavation to be undertaken by open-cut methods (i.e. unsupported excavations).

The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be cut back at 1H:1V or flatter. The flatter slope is required for excavation below groundwater level. The subsoil at this site is considered to be mainly a Type 2 and 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects.

Excavated soil should not be stockpiled directly at the top of excavations and heavy equipment should be kept away from the excavation sides.

Slopes in excess of 3 m in height should be periodically inspected by the geotechnical consultant in order to detect if the slopes are exhibiting signs of distress.

It is recommended that a trench box be used at all times to protect personnel working in trenches with steep or vertical sides. It is expected that services will be installed by “cut and cover” methods and excavations will not be left open for extended periods of time.

Underpinning

Founding conditions of adjacent structures bordering the footprint of the proposed building should be assessed and underpinning requirements should be evaluated.

6.4 Pipe Bedding and Backfill

Bedding and backfill materials should be in accordance with the most recent Material Specifications and Standard Detail Drawings from the Department of Public Works and Services, Infrastructure Services Branch of the City of Ottawa. At least 150 mm of OPSS Granular A should be used for pipe bedding for sewer and water pipes. The bedding should extend to the spring line of the pipe. Cover material, from the spring line to at least 300 mm above the obvert of the pipe, should consist of OPSS Granular A or Granular B Type II with a maximum size of 25 mm. The bedding and cover materials should be placed in maximum 225 mm thick lifts compacted to 95% of the material's standard Proctor maximum dry density.

It should generally be possible to re-use the upper portion of the dry to moist (not wet) silty sand above the cover material if the excavation and filling operations are carried out in dry weather conditions. Any stones greater than 200 mm in their longest dimension should be removed from these materials prior to placement. Well fractured bedrock should be acceptable as backfill for the lower portion of the trenches when the excavation is within bedrock provided the rock fill is placed only from at least 300 mm above the top of the service pipe and that all stones are 300 mm or smaller in their longest dimension.

The backfill material within the frost zone (about 1.8 m below finished grade) should match the soils exposed at the trench walls to reduce potential differential frost heaving. The backfill should be placed in maximum 225 mm thick loose lifts and compacted to a minimum of 95% of the material's SPMDD.

6.5 Groundwater Control

Groundwater Control for Building Construction

Based on our observations, it is anticipated that groundwater infiltration into the excavations should be low to moderate and controllable using open sumps. Pumping from open sumps should be sufficient to control the groundwater influx through the sides of shallow excavations. The contractor should be prepared to direct water away from all bearing surfaces and subgrades, regardless of the source, to prevent disturbance to the founding medium.

Permit to Take Water

It is anticipated that groundwater infiltration into the excavation should be low to moderate and controllable using open sumps. Pumping from open sumps should be sufficient to control the groundwater influx through the sides of the shallow excavation. The contractor should be prepared to direct water away from all bearing surfaces and subgrades, regardless of the source, to prevent disturbance to the founding medium.

A temporary Ministry of the Environment, Conservation and Parks (MECP) permit to take water (PTTW) may be required for this project if more than 400,000 L/day of ground and/or surface water is to be pumped during the construction phase. A minimum 4 to 5 months should be allowed for completion of the PTTW application package and issuance of the permit by the MECP.

For typical ground or surface water volumes being pumped during the construction phase, typically between 50,000 to 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR). A minimum of two to four weeks should be allotted for completion of the EASR registration and the Water Taking and Discharge Plan to be prepared by a Qualified Person as stipulated under O.Reg. 63/16. If a project qualifies for a PTTW based upon anticipated conditions, an EASR will not be allowed as a temporary dewatering measure while awaiting the MECP review of the PTTW application.

6.6 Winter Construction

Precautions must be taken if winter construction is considered for this project.

The subsoil conditions at this site consist of frost susceptible materials. In the presence of water and freezing conditions, ice could form within the soil mass. Heaving and settlement upon thawing could occur.

In the event of construction during below zero temperatures, the founding stratum should be protected from freezing temperatures by the use of straw, propane heaters and tarpaulins or other suitable means. In this regard, the base of the excavations should be insulated from sub-zero temperatures immediately upon exposure and until such time as heat is adequately supplied to the building and the footings are protected with sufficient soil cover to prevent freezing at founding level.

Trench excavations and pavement construction are also difficult activities to complete during freezing conditions without introducing frost in the subgrade or in the excavation walls and bottoms. Precautions should be taken if such activities are to be carried out during freezing conditions. Additional information could be provided, if required.

6.7 Corrosion Potential and Sulphate

The results of analytical testing show that the sulphate content is less than 0.1%. This result is indicative that Type 10 Portland cement (normal cement) would be appropriate for this site. The chloride content and the pH of the sample indicate that they are not significant factors in creating a corrosive environment for exposed ferrous metals at this site, whereas the resistivity is indicative of a moderate to slightly aggressive corrosive environment.

7.0 Recommendations

It is a requirement for the foundation design data provided herein to be applicable that the following material testing and observation program be performed by the geotechnical consultant.

- Observation of all bearing surfaces prior to the placement of concrete.
- Sampling and testing of the concrete and fill materials.
- Periodic observation of the condition of unsupported excavation side slopes in excess of 3 m in height, if applicable.
- Complete a full inspection program of the installation of the perimeter and underfloor drainage system during construction.
- Observation of all subgrades prior to backfilling.
- Field density tests to determine the level of compaction achieved.
- Sampling and testing of the bituminous concrete including mix design reviews.

A report confirming that these works have been conducted in general accordance with our recommendations could be issued upon the completion of a satisfactory inspection program by the geotechnical consultant.

8.0 Statement of Limitations

The recommendations provided are in accordance with the present understanding of the project. Paterson requests permission to review the recommendations when the drawings and specifications are completed.

A soils investigation is a limited sampling of a site. Should any conditions at the site be encountered which differ from those at the test locations, Paterson requests immediate notification to permit reassessment of our recommendations.

The recommendations provided herein should only be used by the design professionals associated with this project. They are not intended for contractors bidding on or undertaking the work. The latter should evaluate the factual information provided in this report and determine the suitability and completeness for their intended construction schedule and methods. Additional testing may be required for their purposes.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than Star Motors of Ottawa or their agents is not authorized without review by Paterson for the applicability of our recommendations to the alternative use of the report.

Paterson Group Inc.

Maha Saleh, P.Eng. (Provisional) David J. Gilbert, P.Eng

Report Distribution:

- ❑ Star Motors of Ottawa (3 copies)
- ❑ Paterson Group (1 copy)