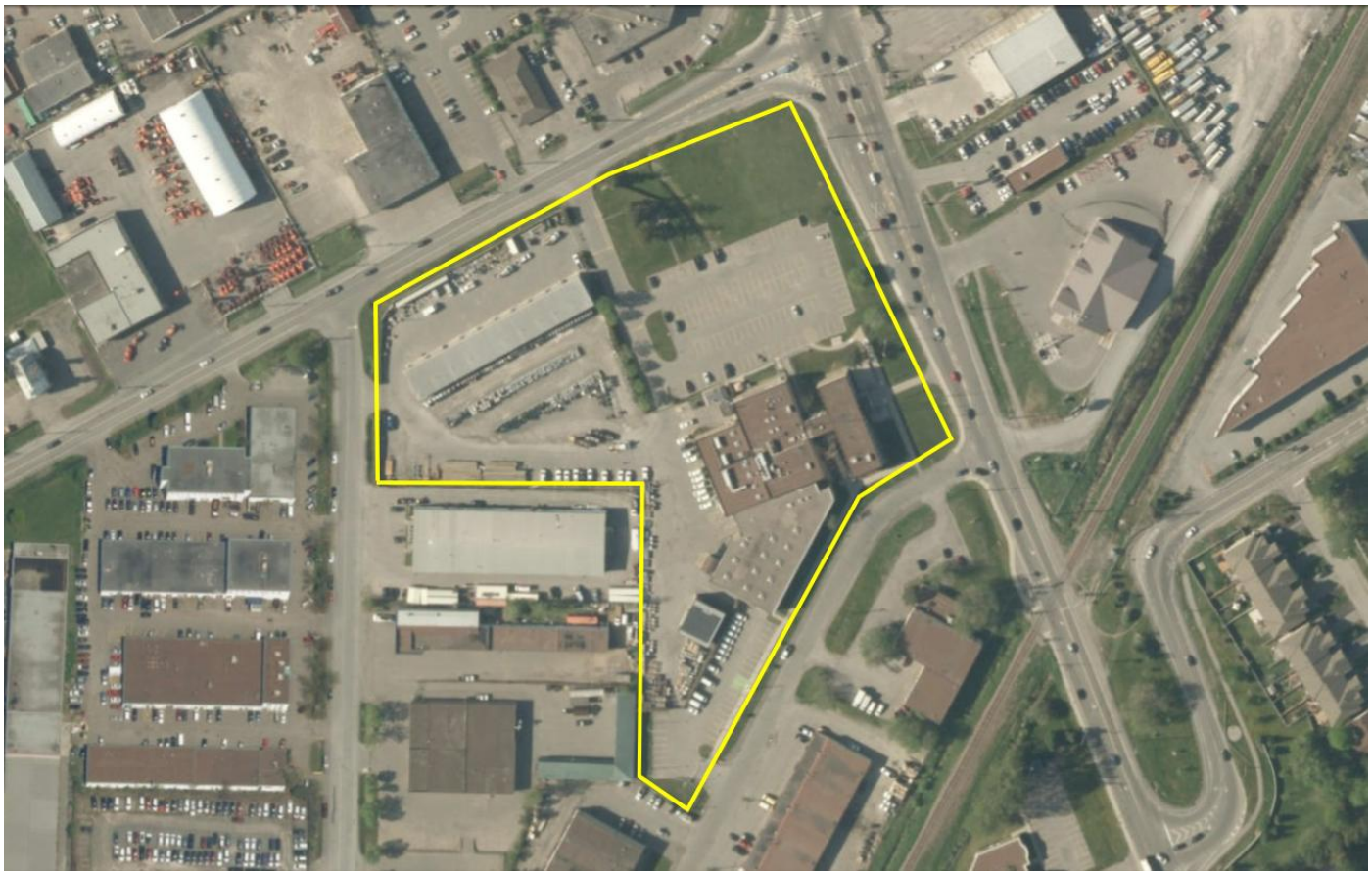
ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES
1970 MERIVALE ROAD & 22 SLACK ROAD



Project No.: CP-18-0501

Prepared for:

Butler Group
1 Laser Street
Ottawa, ON K2E 7V1

Prepared by:

McIntosh Perry Consulting Engineers Ltd.
115 Walgreen Road
Carp, ON K0A 1L0

May 23th, 2019

McINTOSH PERRY

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1.0 PROJECT DESCRIPTION

1.1 Purpose

McIntosh Perry (MP) has been retained by Butler Group to prepare this Assessment of Adequacy of Public Services Report in support of the Major Zoning By-law Amendment application process for the proposed renovations at 1970 Merivale Road and 22 Slack Road within the City of Ottawa.

The main purpose of this report is to present a servicing design for the development in accordance with the recommendations and guidelines provided by the City of Ottawa (City), the Rideau Valley Conservation Authority (RVCA) and the Ministry of the Environment, Conservation and Parks (MECP). This report will address the water, sanitary and storm sewer servicing for the development, ensuring that existing services will adequately service the proposed development.

1.2 Site Description

The property is located at 1970 Merivale Road and 22 Slack Road in the City of Ottawa. It is described as Lots 26 and 27 Block B and Part of Blocks A and D, Registered Plan 402691, Block D, Registered Plan 493738, City of Ottawa. The land in question covers approximately 30,700 m^2 (3.07 ha) and is located at the intersection of Merivale Road and Slack Road. See Site Location Plan in Appendix 'A' for more details.

The existing site is currently developed with a two-storey office and storage building and two separated garages previously belonging to Hydro Ottawa. The site has existing entrances on Slack Road, Capital Drive, and Grenfell Crescent. The existing site is serviced with sanitary, water and storm services. The proposed development consists of the conversion of the existing site for different use. There currently are no changes proposed to the exterior of the buildings. The existing entrances, yard and parking will be maintained.

2.0 BACKROUND STUDIES

Background studies that have been completed for the proposed site include a topographical survey, Phase I Environmental Site Assessment (ESA) by Pinchin Ltd. A topographic survey of the site was completed by Farley, Smith & Denis Surveying Ltd.

The following reports have previously been completed and are available under separate cover:

- Phase One Environmental Site Assessment completed by Pinchin Ltd., dated June 12th, 2018.
- Drain CCTV Inspection Report by Clean Water Works, dated April 4th & 29th, 2019.

3.0 PRE-CONSULTATION SUMMARY

A pre-consultation meeting was conducted with the City regarding the proposed site on March 23, 2019. The notes from the City can be found in Appendix 'B'.

4.0 WATERMAIN

4.1 Existing Watermain

The following subsections describe the existing City water infrastructure within the municipal right-of-way (ROW) surrounding the site.

4.1.1 *Merivale Road*

There is an existing 305mm diameter ductile iron watermain within Merivale Road. The back portion of the existing two-storey office and storage building is serviced via an existing 203mm diameter water service to this watermain. There are existing fire hydrants along Merivale Road both north and south of the site, though only the two south of the site are within 150m of the site.

4.1.2 *Slack Road*

There is an existing 305mm diameter cast iron watermain within Slack Road. There are no existing connections to this watermain from the property, although, there are three available hydrants fronting the property.

4.1.3 *Grenfell Crescent*

There is an existing 203mm diameter cast iron watermain within Grenfell Crescent. The existing large separated garage has an existing water service extended from this main. There are existing fire hydrants along Grenfell Crescent, though only one of them is within 150m of the site.

4.1.4 *Capital Drive*

There is an existing 203mm diameter ductile iron watermain within Capital Drive. The existing front portion of the two-storey office and storage building is serviced via an existing 152mm diameter water service from this watermain. There is an existing fire hydrant along Capital Drive within the frontage of the property.

4.2 Proposed Watermain

The following subsections outline the existing water demands for 1970 Merivale Road and 22 Slack Road respectively.

4.2.1 *1970 Merivale Road*

The existing water services from the rear addition and original front of the two-storey office and storage building will remain and service that portion of the building. The building is currently equipped with a 203 mm diameter service extending from the rear addition to the 305 mm diameter watermain within Merivale Road, as well as a 152 mm diameter service extending to the 203 mm diameter watermain within Capital Drive. The existing fire hydrants within Merivale Road and Capital Drive will provide the fire protection for the subject property.

The Fire Underwriters Survey 1999 (FUS) method was utilized to determine the required fire flow for the site. The ‘C’ factor (type of construction) for the FUS calculation was determined to be 0.8 (non-combustible

construction). The total floor area ('A' value) for the FUS calculation was determined to be 3,800 m^2. The results of the calculations yielded a required fire flow of 10,000 L/min. A required fire flow of 9,000 L/min was calculated using the Ontario Building Code (OBC) requirements. The detailed calculations for the FUS and OBC can be found in Appendix 'C'.

The water demands for the proposed building have been calculated to adhere to the *Ottawa Design Guidelines – Water Distribution* manual and can be found in Appendix 'C'. The results have been summarized below:

Table 1: 1970 Merivale Road Water Demands

Water Demand Rate (Industrial Light)	35,000 L/gross ha/day
Site Area (ha)	1.25
Average Day Demand (L/s)	0.51
Maximum Daily Demand (L/s)	0.76
Peak Hourly Demand (L/s)	1.37
FUS Fire Flow Requirement (L/s)	166.67
Max Day + Fire Flow (L/s)	167.43

Boundary conditions have been provided by the City of Ottawa for the current conditions and are available in Appendix 'C'. A water model was completed using Bentley's WaterCAD based on the water demands for the Development. The results determined that the assumed existing 305mm and 203mm watermain within Merivale Road and Capital Drive, respectively, can adequately service the proposed development and the existing fire hydrant on Capital Drive can provide sufficient fire flow. The model has determined an available fire flow of 11,096.07 L/min for the site (provided for information purposes only). The results are available in Appendix 'C' of this report.

4.2.1 *22 Slack Road*

The existing water service from the garage will remain and service the building. The building is currently equipped with a 25 mm diameter service extending from the southwest corner of the building to the 203 mm diameter watermain within Grenfell Crescent. The existing fire hydrants within Merivale Road and Grenfell Crescent will provide the fire protection for the subject property.

The Fire Underwriters Survey 1999 (FUS) method was utilized to determine the required fire flow for the site. The 'C' factor (type of construction) for the FUS calculation was determined to be 0.8 (non-combustible construction). The total floor area ('A' value) for the FUS calculation was determined to be 1007.25 m^2. The results of the calculations yielded a required fire flow of 6,000 L/min. A required fire flow of 2,700 L/min was calculated using the Ontario Building Code (OBC) requirements. The detailed calculations for the FUS and OBC can be found in Appendix 'C'.

The water demands for the proposed building have been calculated to adhere to the *Ottawa Design Guidelines – Water Distribution* manual and can be found in Appendix 'C'. The results have been summarized below:

Table 2: 22 Slack Road Water Demands

Water Demand Rate (Industrial Light)	35,000 L/gross ha/day
Site Area (ha)	1.81
Average Day Demand (L/s)	0.73
Maximum Daily Demand (L/s)	1.10
Peak Hourly Demand (L/s)	1.98
FUS Fire Flow Requirement (L/s)	100
Max Day + Fire Flow (L/s)	101.10

Boundary conditions have been provided by the City of Ottawa for the current conditions and are available in Appendix 'C'. A water model was completed using Bentley's WaterCAD based on the water demands for the Development. The results determined that using the estimated per gross site hectarage flow for an industrial site the existing 25 mm service lateral can support the average day scenario and the maximum day plus fire flow. Reversely, the peak hourly results determined negative pressure. It is suggested that the serviceability of this service be determined once specific use and the associated water demand is determined from a mechanical engineer. The existing fire hydrant on Slack Road can provide sufficient fire flow. The model has determined an available fire flow of 14,316.68 L/min for the site (provided for information purposes only). The results are available in Appendix 'C' of this report.

5.0 SANITARY DESIGN

5.1 Existing Sanitary Sewer

The following subsections describe the existing City sanitary infrastructure within the municipal right-of-way (ROW) surrounding the site.

5.1.1 *Merivale Road*

There is an existing 300mm diameter asbestos concrete sanitary sewer within Merivale Road as well as a 450mm diameter asbestos concrete sanitary sewer farther to the east within the ROW. The front portion of the existing two-storey office and storage building at 1970 Merivale Road is serviced by an existing sanitary service towards Merivale Road. The location and condition of the existing service is to be confirmed within a CCTV inspection.

5.1.2 *Slack Road*

There is an existing 300mm diameter concrete sanitary sewer within Slack Road.

5.1.3 *Grenfell Crescent*

There is an existing 250mm diameter clay sanitary sewer within Grenfell Crescent. The existing garage at 22 Slack Road is serviced via an existing 150mm sanitary service extended from the main.

5.1.4 *Capital Drive*

There is an existing 250mm diameter asbestos concrete sanitary sewer within Capital Drive. There is no sanitary service connection to this main as the smaller garage's sewage flows from a sanitary sump pit through a pressurized drain pipe into the existing two-storey office and storage building before discharging to the 300mm diameter main within Merivale Road.

5.2 Proposed Sanitary Sewer

The following subsections outlines the existing sanitary demands for 1970 Merivale Road and 22 Slack Road respectively.

5.2.1 *1970 Merivale Road*

The peak design flow was calculated for the proposed site using the Ottawa Sewer Design Guidelines (SDG) and was determined to be 0.156 L/s. These flows were obtained using the number of employees as identified in Appendix 4-A of the SDG (See Appendix 'D' for detailed calculation).

A 150mm diameter lateral determined by a CCTV inspection lateral currently services the site. The current capacity of the 150mm diameter sewer is of 15.89 L/s at an assumed 1% slope. Therefore, the existing 150 mm diameter lateral has sufficient capacity to convey the anticipated flows. It is anticipated that there will be no issues with capacity constraints within the proposed lateral or within the existing sanitary main within Merivale Road as the amount of flow leaving the site is minimal.

5.2.2 *22 Slack Road*

The peak design flow was calculated for the proposed site using the Ottawa Sewer Design Guidelines (SDG) and was determined to be 0.026 L/s. These flows were obtained using the service station calculations identified in Appendix 4-A of the SDG (See Appendix 'D' for detailed calculation).

A 150mm diameter lateral determined by a CCTV inspection currently services the site. The current capacity of the 150mm diameter sewer is of 15.89 L/s at an assumed 1% slope. Therefore, the existing 150 mm diameter lateral has sufficient capacity to convey the anticipated flows. It is anticipated that there will be no issues with capacity constraints within the proposed lateral or within the existing sanitary main within Grenfell Crescent as the amount of flow leaving the site is minimal.

6.0 STORM DESIGN

6.1 Existing Storm Sewer

The following subsections describe the existing City storm infrastructure within the municipal right-of-way (ROW) surrounding the site.

6.1.1 *Merivale Road*

There is an existing 900mm diameter concrete storm sewer within Merivale Road. The front portion of the existing two-storey office and storage building is serviced by an existing storm service directed towards Merivale Road. The location and condition of the existing service is to be confirmed within a CCTV inspection.

6.1.2 *Slack Road*

There is no storm sewer infrastructure within the Slack Road ROW, though ditch drainage and culverts are present. It is also noted that a perforated subdrain underneath the asphalt area north of the large separated garage is present that discharges at two locations to the ditch within Slack Road.

6.1.3 *Grenfell Crescent*

There is no storm sewer infrastructure within the Grenfell Crescent ROW, though ditch drainage and culverts are present. It is also noted that there is a drain discharge to the ditch just north of the private approach on Grenfell Crescent.

6.1.4 *Capital Drive*

There is an existing 750mm diameter concrete storm sewer within Capital Drive. An existing connection is present to the storm sewer main near the parking lot provided on Capital Drive.

6.2 Proposed Storm Sewer

The existing storm service lateral for both the front and rear of the existing two-storey office and storage building on 1970 Merivale Road shall be maintained and continue to service the subject site. The other building located on 22 Slack Road does not have a storm service to the building.

7.0 STORMWATER MANAGEMENT

7.1 Design Criteria and Methodology

Stormwater management for the proposed site will be maintained through positive drainage away from the building and towards the adjacent ROW's. The quantitative and qualitative properties of the storm runoff for both the pre & post development flows are further detailed below. In summary, since there are no external changes proposed to the site, no quantity or quality control has been proposed for this development.

7.2 Runoff Calculations

Runoff calculations presented in this report are derived using the Rational Method, given as:

$$Q = 2.78CIA \text{ (L/s)}$$

Where C = Runoff coefficient

I = Rainfall intensity in mm/hr (City of Ottawa IDF curves)

A = Drainage area in hectares

It is recognized that the Rational Method tends to overestimate runoff rates. As a result, the conservative calculation of runoff ensures that any stormwater management facility sized using this method is expected to function as intended.

The following coefficients were used to develop an average C for each area:

Roofs/Concrete/Asphalt	0.90
Gravel	0.60
Undeveloped and Grass	0.20

As per the *City of Ottawa - Sewer Design Guidelines*, the 5-year balanced 'C' value must be increased by 25% for a 100-year storm event to a maximum of 1.0.

As the proposed site conditions will remain unchanged from pre-development, the time of concentration (Tc) used for pre-development and post-development shall be calculated using a Tc of 10 minutes.

7.3 Site Drainage

The proposed change in permitted uses of the existing site does not induce any changes to the lot. Therefore, the pre-development and post-development drainage areas and runoff flows will be the same.

For the purpose of this report, the site will be taken as drainage area A1, A2/B1, B2 relating to 1970 Merivale Road and 22 Slack Road respectively.

Table 3: Pre and Post Development Runoff Summary

Drainage Area	Area (ha)	Runoff Coefficient (5-Year)	Runoff Coefficient (100-Year)	5-year Peak Flow (L/s)	100-year Peak Flow (L/s)
A1/B1	1.26	0.74	0.83	269.77	517.74
A2/B2	1.81	0.65	0.75	341.74	671.67
Total	3.08			611.51	1189.42

See Appendix 'E' for calculations.

Flow and direction of runoff will remain unchanged for the proposed development; no changes to the storm servicing will be required.

8.0 SUMMARY

- The existing site will remain unchanged. A major zoning by-law amendment is proposed for the subject site.
- The existing water and sanitary services within the subject property are to remain.
- There are no external changes to the site; as such no quantity or quality control has been proposed for this development.

9.0 RECOMMENDATION

Based on the information presented in this report, we recommend that City of Ottawa approve this Assessment of Adequacy of Public Services in support of the proposed supplemental permitted uses 1970 Merivale Road and 22 Slack Road.

This report is respectfully being submitted for approval.

Regards,

McIntosh Perry Consulting Engineers Ltd.

Ryan Kennedy, P.Eng.
Practice Area Lead, Land Development
T: 613.903.5766
E: r.kenndy@mcintoshperry.com

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10.0 STATEMENT OF LIMITATIONS

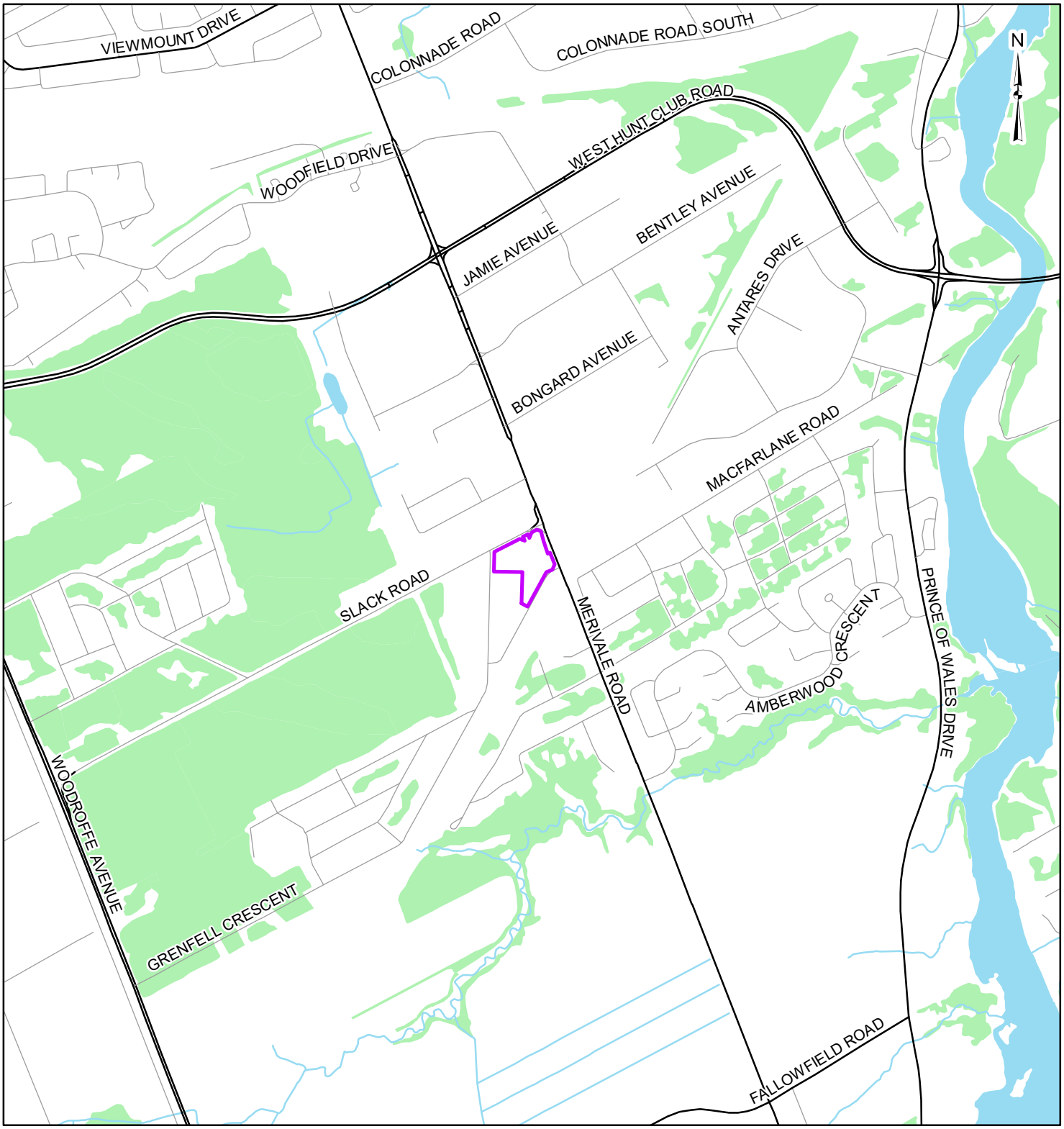
This report was produced for the exclusive use of Butler Group. The purpose of the report is to assess the existing stormwater management system and provide recommendations and designs for the post-construction scenario that are in compliance with the guidelines and standards from the Ministry of the Environment, Parks and Climate Change, City of Ottawa and local approval agencies. McIntosh Perry reviewed the site information and background documents listed in Section 2.0 of this report. While the previous data was reviewed by McIntosh Perry and site visits were performed, no field verification/measures of any information were conducted.

Any use of this review by a third party, or any reliance on decisions made based on it, without a reliance report is the responsibility of such third parties. McIntosh Perry accepts no responsibility for damages, if any, suffered by any third party as a result of decisions or actions made based on this review.

The findings, conclusions and/or recommendations of this report are only valid as of the date of this report. No assurance is made regarding any changes in conditions subsequent to this date. If additional information is discovered or becomes available at a future date, McIntosh Perry should be requested to re-evaluate the conclusions presented in this report, and provide amendments, if required.

APPENDIX A
SITE LOCATION PLAN

McINTOSH PERRY



LEGEND

- Site Location
- Local Road
- Major Road
- Watercourse
- Waterbody
- Wooded Area

REFERENCE

GIS data provided by the Ontario Ministry of Natural Resources and Forestry, 2019.

750 375 0 750

Scale 1:20,000 Metres

CLIENT: BUTLER GROUP

PROJECT: 1970 MERIVALE ROAD & 22 SLACK ROAD

TITLE: SITE LOCATION

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

PROJECT NO:CP-18-0501		FIGURE:
Date	May., 08, 2019	1
GIS	LC	
Checked By	SL	

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APPENDIX B
CITY OF OTTAWA PRE-CONSULTATION NOTES

McINTOSH PERRY

File Number: PC 2018-0079
March 23, 2018

22 Slack and 1970 Merivale
Pre-Consultation Meeting Minutes

Location: Room 4106E, City Hall
Date: March 23, 10am to 11am

Attendee	Role	Organization
Stream Shen	Planner	City of Ottawa
Mark Fraser	Project Manager (Engineer)	
Rosanna Baggs	Project Manager (Transportation)	
Justin Marr	Planning Assistant	
Lynn Norton	Prospective Owner	Butler Group
Brian Casagrande	Planner	FOTENN
Scott Alain	Planner	

Comments from Applicant

1. The applicant is proposing a rezoning application to permit a range of uses including motor vehicle and RV storage and sales, medical facility, office and smaller ancillary commercial components. Within the short term, the applicant indicated the site will be used for RV storage and service.
2. The existing uses are currently legal non-conforming.
3. The applicant indicated that the total land area is approximately eight acres with 75,000 square feet of building gross floor area, which include 45,000 to 50,000 square feet of office and the remainder being warehouse and 23 service bays.
4. Hydro Ottawa currently own the property and the applicant has a conditional purchase and sales agreement with Hydro Ottawa that needs to be executed within 120 days. The applicant is hoping to pursue the rezoning applicant to permit the above uses prior to final sales.
5. Hydro Ottawa will vacate the premise on September 2019, at which time, the buildings will be internally retrofitted to allow for the new uses. No exterior site alteration is proposed at this time. There may be future changes to the building footprint but that will be subject to a new pre-consultation.

File Number: PC 2018-0079
March 23, 2018

Planning Comments

1. This is a formal pre-consultation for a Major Zoning By-law Amendment application for 22 Slack Road and 1970 Merivale Road. Application form, timeline and fees can be found here.
2. Please review and conform to the basic plans and studies requirements outlined here.
3. Please review Section 3.6.5 Urban Employment Area designation under the City's Official Plan and conform to all applicable OP policies.
4. Depending on the final list of requested uses, staff will recommend the appropriate industrial zoning for the amendment. Any proposed commercial component needs to be limited in size and ancillary in nature as the OP policies.
5. The property falls under the Airport Vicinity Development Zone, depending on the requested uses, appropriate noise mitigation measurement will need to be taken.
6. Please confirm that the proposed new uses will not trigger a Site Plan application.
7. Please consult with the Ward Councillor prior to application submission.
8. The pre-consultation meeting comments and list of required plans and studies will lapse on March 23, 2019.

Engineering Comments

1. Please confirm with the Ministry of Environment and Climate Change on whether an existing Environmental Compliance Approval or Certificate of Approval is available for the site. If one is not available, please contact the Ministry on proper action to address this deficiency.

Transportation Comments

2. A noise study may be required depending on the proposed uses.
3. There is a ROW protection of 26m for Slack Road and 37.5m for Merivale Road.
4. Based on the info provide the screening form is sufficient and no further action is required. If anything changes from what is presented in the Traffic Impact Assessment screening form a revised Traffic Impact Assessment screening form will be required and a Traffic Impact Assessment if the revision demonstrates one is needed.

Please contact me at Stream.Shen@ottawa.ca or at 613-580-2424 ext. 24488 if you have any questions.

Sincerely,

Stream Shen MCIP RPP
Planner II
Development Review - West

APPENDIX C
WATERMAIN CALCULATIONS

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CP-18-0501 - 1970 MERIVALE ROAD - Water Demands

Project:	1970 MERIVALE ROAD
Project No.:	CP-18-0501
Designed By:	S.V.L.
Checked By:	R.P.K.
Date:	05/03/2019
Site Area:	1.25 gross ha

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	350	L/c/d
Industrial - Light	*35,000*	*L/gross ha/d*
Industrial - Heavy	55,000	L/gross ha/d
Shopping Centres	2,500	L/(1000m² /d
Hospital	900	L/(bed/day)
Schools	70	L/(Student/d)
Trailer Parks no Hook-Ups	340	L/(space/d)
Trailer Park with Hook-Ups	800	L/(space/d)
Campgrounds	225	L/(campsite/d)
Mobile Home Parks	1,000	L/(Space/d)
Motels	150	L/(bed-space/d)
Hotels	225	L/(bed-space/d)
Tourist Commercial	28,000	L/gross ha/d
Other Commercial	28,000	L/gross ha/d
AVERAGE DAILY DEMAND	0.51	L/s

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	2.5 x avg. day	L/c/d
Industrial	*1.5 x avg. day*	*L/gross ha/d*
Commercial	1.5 x avg. day	L/gross ha/d
Institutional	1.5 x avg. day	L/gross ha/d
MAXIMUM DAILY DEMAND	0.76	L/s

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	2.2 x max. day	L/c/d
Industrial	*1.8 x max. day*	*L/gross ha/d*
Commercial	1.8 x max. day	L/gross ha/d
Institutional	1.8 x max. day	L/gross ha/d
MAXIMUM HOUR DEMAND	1.37	L/s

WATER DEMAND DESIGN FLOWS PER UNIT COUNT
CITY OF OTTAWA - WATER DISTRIBUTION GUIDELINES, JULY 2010

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CP-18-0501 - 1970 MERIVALE ROAD - OBC Fire Calculations

Project:	1970 MERIVALE ROAD
Project No.:	CP-18-0501
Designed By:	S.V.L.
Checked By:	R.P.K.
Date:	05/03/2019

Ontario 2006 Building Code Compendium (Div. B - Part 3)

Water Supply for Fire-Fighting - Residential House

Building is classified as Group : D, F-3 (from table 3.2.2.55)
Building is of combustible construction with fire separations and fire resistance ratings provided in accordance with Subsection 3.2.2., including loadbearing walls, columns and arches. Noncombustible construction may be used in lieu of fire-resistance rating where permitted in Subsection 3.2.2.
From Div. B A-3.2.5.7. of the Ontario Building Code - 3. Building On-Site Water Supply:

(a) Q = K x V x Stot

where:

Q = minimum supply of water in litres

K = water supply coefficient from Table 1

V = total building volume in cubic metres

Stot = total of spatial coefficient values from the property line exposures on all sides as obtained from the formula:

Stot = 1.0 + [Sside1+Sside2+Sside3+...etc.]

K	22	(from Table 1 pg A-31) (Worst case occupancy {F-3} 'K' value used)
V	20,839	(Total building volume in m³.)
Stot	1.3	(From figure 1 pg A-32)
Q =	596,001.12 L	

			From Figure 1 (A-32)
Snorth	8	m	0.2
Seast	7.7	m	0.2
Ssouth	61.5	m	0.0
Swest	16	m	0.0

*approximate distances

From Table 2: Required Minimum Water Supply Flow Rate (L/s)

9000 L/min (if Q > 270,00 L)
2378 gpm

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info@mcintoshperry.com | www.mcintoshperry.com

CP-18-0501 - 1970 MERIVALE ROAD - Fire Underwriters Survey (FUS) Fire Calculations

Project:	1970 MERIVALE ROAD
Project No.:	CP-18-0501
Designed By:	S.V.L.
Checked By:	R.P.K.
Date:	05/03/2019

From the Fire Underwriters Survey (1999)

From Part II – Guide for Determination of Required Fire Flow Copyright I.S.O.:

F = 220 x C x √A Where:

F = Required fire flow in liters per minute

C = Coefficient related to the type of construction.

A = The total floor area in square meters (including all storey's, but excluding basements at least 50 percent below grade) in the building being considered.

A. Determine The Coefficient Related To The Type Of Construction

The building is considered to be of ordinary construction type. Therefore,

C = 0.80

B. Determine Ground Floor Area

As provided by the Architect:

Floor Area (One Floor) = 3,800.00 m²

A = 7,600.00 m²

This floor area represents the final build-out of the development; as outlined on the Site Plan drawing.

C. Determine Height in Storeys

From Architectural Drawings:

Number of Storeys = 2.00

D. Calculate Required Fire Flow

F = 220 x C x √A

F = 220.00 X 0.80 X √ 7600.00

F = 15,343.32 L/min.

F = 15,000.00 L/min.

E. Determine Increase or Decrease Based on Occupancy

From note 2, Page 18 of the Fire Underwriter Survey:

Limited-combustible (C-2)

-15%

Occupational Decrease = 2,250.00 L/min.

F = 12,750.00 L/min.

F. Determine the Decrease, if any for Sprinkler Protection

From note 3, Page 18 of the Fire Underwriter Survey:

- The flow requirement may be reduced by up to 50% for complete automatic sprinkler protection depending upon adequacy of the system.
- The credit for the system will be a maximum of 30% for an adequately designed system conforming to NFPA 13 and other NFPA sprinkler standards.
- Additional credit of 10% if water supply is standard for both the system and fire department hose lines
- If sprinkler system is fully supervised system, an additional 10% credit is granted
- The entire building is installed with a fully automated, standardized with the City of Ottawa Fire Department and fully supervised.
- Therefore the value obtained in Step E will be reduced.

Reduction = 12,750.00 L/min. X 30%

Reduction = 3,825.00 L/min.

G. Determine the Total Increase for Exposures

From note 4, Page 18 of the Fire Underwriter Survey:

- Exposure distance to the existing buildings to the north & south of the proposed building is approximately 140m & 84.5m respectfully.
- Exposure distance to the existing buildings to the west & east of the proposed building is approximately 41.5m & 48m respectfully.
- Therefore the charge for exposure is 5% of the value obtained in Step E.

Increase = 12,750.00 L/min. X 5%

Increase = 637.50 L/min.

H. Determine the Total Fire Demand

- To the answer obtained in E, substract the value obtained in F and add the value obtained in G
- Fire flow should be no less than 2,000L/min. and the maximum value shoul not exceed 45,000L/min.

F = 12,750.00 L/min. - 3,825.00 L/min. + 637.50 L/min.
F = 9,562.50 L/min.
F = 10,000.00 L/min.

Therefore, after rounding to the nearest 1,000 L/min, the total required fire flow for the development is 10000 L/min (2642 GPM).

McINTOSH PERRY

CP-18-0501 - 22 SLACK ROAD - Water Demands

Project:	22 SLACK ROAD
Project No.:	CP-18-0501
Designed By:	S.V.L.
Checked By:	R.P.K.
Date:	05/03/2019
Site Area:	1.81 gross ha

AVERAGE DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	350	L/c/d
Industrial - Light	*35,000*	*L/gross ha/d*
Industrial - Heavy	55,000	L/gross ha/d
Shopping Centres	2,500	L/(1000m² /d
Hospital	900	L/(bed/day)
Schools	70	L/(Student/d)
Trailer Parks no Hook-Ups	340	L/(space/d)
Trailer Park with Hook-Ups	800	L/(space/d)
Campgrounds	225	L/(campsite/d)
Mobile Home Parks	1,000	L/(Space/d)
Motels	150	L/(bed-space/d)
Hotels	225	L/(bed-space/d)
Tourist Commercial	28,000	L/gross ha/d
Other Commercial	28,000	L/gross ha/d
AVERAGE DAILY DEMAND	0.73	L/s

MAXIMUM DAILY DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	2.5 x avg. day	L/c/d
Industrial	*1.5 x avg. day*	*L/gross ha/d*
Commercial	1.5 x avg. day	L/gross ha/d
Institutional	1.5 x avg. day	L/gross ha/d
MAXIMUM DAILY DEMAND	1.10	L/s

MAXIMUM HOUR DEMAND

DEMAND TYPE	AMOUNT	UNITS
Residential	2.2 x max. day	L/c/d
Industrial	*1.8 x max. day*	*L/gross ha/d*
Commercial	1.8 x max. day	L/gross ha/d
Institutional	1.8 x max. day	L/gross ha/d
MAXIMUM HOUR DEMAND	1.98	L/s

WATER DEMAND DESIGN FLOWS PER UNIT COUNT
CITY OF OTTAWA - WATER DISTRIBUTION GUIDELINES, JULY 2010

McINTOSH PERRY

CP-18-0501 - 22 SLACK ROAD - OBC Fire Calculations

Project:	22 SLACK ROAD
Project No.:	CP-18-0501
Designed By:	S.V.L.
Checked By:	R.P.K.
Date:	05/03/2019

Ontario 2006 Building Code Compendium (Div. B - Part 3)

Water Supply for Fire-Fighting - Residential House

Building is classified as Group : F-3 (from table 3.2.2.55)
Building is of noncombustible construction with fire separations and fire-resistance ratings provided in accordance with subsections 3.2.2., including loadbearing walls, columns and arches

From Div. B A-3.2.5.7. of the Ontario Building Code - 3. Building On-Site Water Supply:

(a) Q = K x V x Stot

where:

Q = minimum supply of water in litres

K = water supply coefficient from Table 1

V = total building volume in cubic metres

Stot = total of spatial coefficient values from the property line exposures on all sides as obtained from the formula:

Stot = 1.0 + [Sside1+Sside2+Sside3+...etc.]

K	12	(from Table 1 pg A-31) (Worst case occupancy {C} 'K' value used)
V	6,908	(Total building volume in m³.)
Stot	1.0	(From figure 1 pg A-32)
Q =	82,892.65 L	

			From Figure 1 (A-32)
Snorth	25	m	0.0
Seast	60	m	0.0
Ssouth	10	m	0.0
Swest	36	m	0.0

*approximate distances

From Table 2: Required Minimum Water Supply Flow Rate (L/s)

2700 L/min (if Q ≤ 108,000 L)
713 gpm

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CP-18-0501 - 22 SLACK ROAD - Fire Underwriters Survey (FUS) Fire Calculations

Project:	22 SLACK ROAD
Project No.:	CP-18-0501
Designed By:	S.V.L.
Checked By:	R.P.K.
Date:	05/03/2019

From the Fire Underwriters Survey (1999)

From Part II – Guide for Determination of Required Fire Flow Copyright I.S.O.:

F = 220 x C x √A Where:

F = Required fire flow in liters per minute

C = Coefficient related to the type of construction.

A = The total floor area in square meters (including all storey's, but excluding basements at least 50 percent below grade) in the building being considered.

A. Determine The Coefficient Related To The Type Of Construction

The building is considered to be of ordinary construction type. Therefore,

C = 0.80

B. Determine Ground Floor Area

As provided by the Architect:

Floor Area (One Floor) = 1,007.25 m²

A = 1,007.25 m²

This floor area represents the final build-out of the development; as outlined on the Site Plan drawing.

C. Determine Height in Storeys

From Architectural Drawings:

Number of Storeys = 1.00

D. Calculate Required Fire Flow

F = 220 x C x √A

F = 220.00 X 0.80 X √ 1007.25

F = 5,585.75 L/min.

F = 6,000.00 L/min.

E. Determine Increase or Decrease Based on Occupancy

From note 2, Page 18 of the Fire Underwriter Survey:

Combustible (C-3)

0%

Occupational Decrease = 0.00 L/min.

F = 6,000.00 L/min.

F. Determine the Decrease, if any for Sprinkler Protection

From note 3, Page 18 of the Fire Underwriter Survey:

- The flow requirement may be reduced by up to 50% for complete automatic sprinkler protection depending upon adequacy of the system.
- The credit for the system will be a maximum of 30% for an adequately designed system conforming to NFPA 13 and other NFPA sprinkler standards.
- Additional credit of 10% if water supply is standard for both the system and fire department hose lines
- If sprinkler system is fully supervised system, an additional 10% credit is granted
- The entire building will be not installed with a fully automated, standardized with the City of Ottawa Fire Department and fully supervised.
- Therefore the value obtained in Step E will not be reduced.

Reduction = 6,000.00 L/min. X 0%

Reduction = 0.00 L/min.

G. Determine the Total Increase for Exposures

From note 4, Page 18 of the Fire Underwriter Survey:

- Exposure distance to the existing buildings to the south of the proposed building is approximately 44m.
- There are no other buildings within 45m of the subject building.
- Therefore the charge for exposure is 5% of the value obtained in Step E.

Increase = 6,000.00 L/min. X 5%

Increase = 300.00 L/min.

H. Determine the Total Fire Demand

- To the answer obtained in E, substract the value obtained in F and add the value obtained in G
- Fire flow should be no less than 2,000L/min. and the maximum value shoul not exceed 45,000L/min.

F = 6,000.00 L/min. - 0.00 L/min. + 300.00 L/min.
F = 6,300.00 L/min.
F = 6,000.00 L/min.

Therefore, after rounding to the nearest 1,000 L/min, the total required fire flow for the development is 6000 L/min (1585 GPM).

From: Fraser, Mark <Mark.Fraser@ottawa.ca>
Sent: May 17, 2019 1:18 PM
To: Sean Leflar
Cc: Tyler Ferguson; Shen, Stream; Surprenant, Eric
Subject: RE: 1970 Merivale Road & 22 Slack Road: Request for Boundary Conditions
Attachments: 1970 Merivale & 22 Slack - Sketch for Bound. Cond..pdf; CP-18-0501 - Watermain Calcs (22 Slack).pdf; CP-18-0501 - Watermain Calcs (1970 Merivale).pdf; 1970 Merivale and 22 Slack May 2019.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Sean,

The following are boundary conditions, HGL, for hydraulic analysis at 1970 Merivale and 22 Slack (zone 2W) assumed to be connected to the 203mm on Capital Drive and 305mm on Merivale (1970 Merivale connections) and to the 203mm on Grenfell Crescent (22 Slack connection). See attached PDF for connection locations.

Minimum HGL = 126.4m, same at all connections
Maximum HGL = 133.8m, same at all connections
MaxDay + Fireflow (167L/s) = 121.0m at the Capital Drive connection
MaxDay + Fireflow (167L/s) = 126.0m at the Merivale connection
MaxDay + Fireflow (100L/s) = 124.5m at the Grenfell Crescent connection

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.

If you have any questions please let me know.

Regards,

Mark Fraser
Project Manager, Planning Services
Development Review West Branch
City of Ottawa | Ville d'Ottawa
Planning, Infrastructure and Economic Development Department
110 Laurier Avenue West. 4th Floor, Ottawa ON, K1P 1J1
Tel:613.580.2424 ext. 27791
Fax: 613-580-2576
Mail: Code 01-14
Email: Mark.Fraser@ottawa.ca

From: Sean Leflar <s.leflar@mcintoshperry.com>
Sent: May 14, 2019 2:08 PM
To: Surprenant, Eric <Eric.Surprenant@ottawa.ca>
Cc: Tyler Ferguson <t.ferguson@mcintoshperry.com>; Shen, Stream <Stream.Shen@ottawa.ca>; Fraser, Mark <Mark.Fraser@ottawa.ca>
Subject: RE: 1970 Merivale Road & 22 Slack Road: Request for Boundary Conditions

G
A
E

T

you for the confirmation. I look forward to hearing the results from Mark.

Regards,

Sean Leflar
Civil Engineering Technologist
115 Walgreen Road, R.R. 3, Carp, ON K0A 1L0
T. 613.903.5790 | **F.** 613.836.3742
s.leflar@mcintoshperry.com | www.mcintoshperry.com

From: Surprenant, Eric <Eric.Surprenant@ottawa.ca>
Sent: May 14, 2019 2:06 PM
To: Sean Leflar <s.leflar@mcintoshperry.com>
Cc: Tyler Ferguson <t.ferguson@mcintoshperry.com>; Shen, Stream <stream.shen@ottawa.ca>; Fraser, Mark <mark.fraser@ottawa.ca>
Subject: RE: 1970 Merivale Road & 22 Slack Road: Request for Boundary Conditions

Hi Sean,

The Boundary conditions request has been made and Mark will forward to as soon as they are made available.
Thanks
Eric Surprenant

From: Sean Leflar <s.leflar@mcintoshperry.com>
Sent: May 14, 2019 12:05 PM
To: Surprenant, Eric <Eric.Surprenant@ottawa.ca>
Cc: Tyler Ferguson <t.ferguson@mcintoshperry.com>; Shen, Stream <Stream.Shen@ottawa.ca>
Subject: RE: 1970 Merivale Road & 22 Slack Road: Request for Boundary Conditions

I would like to take a quick moment and follow up with you regarding the boundary conditions for 1970 Merivale Road and 22 Slack Road. Information is available below for you reference.

Thank you,

Sean Leflar
Civil Engineering Technologist
115 Walgreen Road, R.R. 3, Carp, ON K0A 1L0
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s.leflar@mcintoshperry.com | www.mcintoshperry.com

From: Shen, Stream <Stream.Shen@ottawa.ca>
Sent: May 8, 2019 3:04 PM
To: Sean Leflar <s.leflar@mcintoshperry.com>
Cc: Tyler Ferguson <t.ferguson@mcintoshperry.com>; Surprenant, Eric <Eric.Surprenant@ottawa.ca>
Subject: RE: 1970 Merivale Road & 22 Slack Road: Request for Boundary Conditions

Hi Sean,

Eric Surprenant will be assisting with the boundary condition request.

Thanks,

Stream

From: Sean Leflar <s.leflar@mcintoshperry.com>
Sent: May 07, 2019 11:56 AM
To: Shen, Stream <Stream.Shen@ottawa.ca>
Cc: Tyler Ferguson <t.ferguson@mcintoshperry.com>
Subject: 1970 Merivale Road & 22 Slack Road: Request for Boundary Conditions

have conducted water demand and fire flow calculations with the information available and would like to request boundary conditions for the development located at 1970 Merivale Road and 22 Slack Road. Can you please confirm which City Engineering Reviewer will be on the file?

The development includes adding permitted uses to the zoning of the property and possibly severing the property. I have attached a location map showing the subject site showing the approximate location of the water services as well as the calculations. If you could please provide boundary conditions for Merivale Road as well as Slack Road?

Please find the below water demands to obtain boundary conditions.

	1970 Merivale Road	22 Slack Road
Type of Development:	Industrial Light	Industrial Light
Location of Service:	Merivale Road & Capital Drive	Grenfell Crescent
Amount of Fire Flow Required (FUS):	10,000 L/min	6,000 L/min
Site Area (ha):	1.25	1.81
Average Daily Demand (L/sec):	0.51	0.73
Maximum Daily Demand (L/sec):	0.76	1.10
Maximum Hourly Demand (L/sec):	1.37	1.98

If you require any further information or have any questions, please feel free to contact me.

Thank you,

Sean Leflar
Civil Engineering Technologist
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'

Avg. Day (1970 Merivale)

Label	Elevation (m)	Demand (L/min)	Pressure (psi)	Hydraulic Grade (m)
BLDG-B	89.17	25.70	63.4	133.80
J-20	89.40	0.00	63.0	133.80
BLDG-F	88.89	4.90	63.7	133.80

Peak Hourly (1970 Merivale)

Label	Elevation (m)	Demand (L/min)	Pressure (psi)	Hydraulic Grade (m)
BLDG-B	89.17	69.05	52.8	126.40
J-20	89.40	0.00	52.5	126.40
BLDG-F	88.89	13.15	53.2	126.40

Max. Day + Fire Flow (1970 Merivale)

Label	Is Fire Flow Run Balanced?	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (L/min)	Fire Flow (Available) (L/min)	Pressure (psi)	Elevation (m)
H-3	True	True	10,000.00	11,096.07	44.6	89.59
BLDG-B	False	False	10,000.00	(N/A)	52.3	89.17
J-20	False	False	10,000.00	(N/A)	50.8	89.40
BLDG-F	False	False	10,000.00	(N/A)	45.6	88.89

Avg. Day (22 Slack)

Label	Elevation (m)	Demand (L/min)	Pressure (psi)	Hydraulic Grade (m)
J-26	89.00	0.00	63.6	133.80
BLDG	89.43	43.80	52.4	126.32

Peak Hourly (22 Slack)

Label	Elevation (m)	Demand (L/min)	Pressure (psi)	Hydraulic Grade (m)
J-26	89.00	0.00	53.1	126.40
BLDG	89.43	118.80	-14.9	78.96

Max. Day + Fire Flow (22 Slack)

Label	Is Fire Flow Run Balanced?	Satisfies Fire Flow Constraints?	Fire Flow (Needed) (L/min)	Fire Flow (Available) (L/min)	Pressure (psi)	Elevation (m)
H-4	True	True	6,000.00	14,316.68	50.2	89.15
J-26	False	False	6,000.00	(N/A)	50.4	89.00
BLDG	False	False	6,000.00	(N/A)	27.1	89.43

APPENDIX D
SANITARY SEWER CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

Project:	CP-18-0501 -1970 Merivale Road
Designed By:	SVL
Checked By:	RPK
Date:	May 07, 2019

Re: Sanitary Flow Calculations

1. Building Occupancy

The maximum number of employees will be 180 units as per the information provided by the client.

2. Daily Volume in Litres

As per the extract of the City of Ottawa Sewer Design Guidelines, Appendix 4-A; Daily Sewage Flow for Employees – Various Locations;

- Various buildings and places of Employment – e.g. store employees, office workers – depends on facilities.

  = 75 Liters/Person/Day

3. Peak Flow (Q/p)

- Q(p) = F x P

  Where:
  F = 75 Litres/Person/Day (as per City of Ottawa Sewer Design Guidelines)
  $P_{2\text{-BED}}$ = 180 Employees (as per information provided)
- Therefore, Q(p) = (75) + (180) = **13,500 L/Day (0.156 L/sec)**

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McINTOSH PERRY

Project:	CP-18-0501 – 22 Slack Road
Designed By:	SVL
Checked By:	RPK
Date:	May 07, 2019

Re: Sanitary Flow Calculations

1. Building Occupancy

The building is used as a service station for the Hydro Ottawa trucks. The maximum number of employees will be 20 persons per 24 hours. Assuming two employees per truck, 10 trucks will be serviced daily. The building is also equipped with 5 floor catchbasins with oil and grit separators.

2. Daily Volume in Litres

As per the extract of the City of Ottawa Sewer Design Guidelines, Appendix 4-A; Daily Sewage Flow for Dwellings;

- Each Vehicle serviced
  = 40 Liters/Day/Vehicle
- Each Catchbasin in garage floor
  = 375 Liters/Catchbasin/Day

3. Peak Flow (Q/p)

- $Q_{Truck}(p) = F_{Truck} \times P_{Truck}$ Where:
  F_{Truck} = 40 Litres/Vehicle/Day (as per City of Ottawa Sewer Design Guidelines)
  P_{Truck} = 10 Trucks
- Therefore, $Q_{Truck}(p) = (40) \times (10) =$ 400 L/Day (0.005 L/sec)
- $Q_{CB}(p) = F_{CB} \times P_{CB}$ Where:
  F_{CB} = 375 Litres/Catchbasin/Day (as per City of Ottawa Sewer Design Guidelines)
  P_{CB} = 5 Catchbasins (as per Site Visit)
- Therefore, $Q_{CB}(p) = (375) \times (5) =$ 1,875 L/Day (0.023 L/sec)
- $Q_{TOTAL}(p) = Q_{Truck} + Q_{CB}$ Where:
  Q_{Truck} = 400 L/Day
  Q_{CB} = 1,875 L/Day
- Therefore, $Q_{TOTAL}(p) = (400) + (1,875) =$ **2,275 L/Day (0.026 L/sec)**

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APPENDIX E
STORMWATER MANAGEMENT CALCULATIONS

McINTOSH PERRY

CP-18-0501 - 1970 MERIVALE ROAD & 22 SLACK ROAD - Runoff Calculations

Pre-Development Runoff Coefficient

Drainage Area	Area (ha)	Impervious Area (m^2)	C	Gravel Area (m^2)	C	Pervious Area (m^2)	C	Average C (5-Year)	Average C (100-Year)
A1	1.26	9694.36	0.90	0.00	0.60	2942.80	0.20	0.74	0.83
A2	1.81	9732.08	0.90	3398.56	0.60	5000.19	0.20	0.65	0.75

Pre-Development Runoff Calculations

Drainage Area	Area (ha)	C (5-Year)	C (100-Year)	Tc (min)	I (mm/hr)		Q (L/s)	
					5-Year	100-Year	5-Year	100-Year
A1	1.26	0.74	0.83	10	104.2	178.6	269.77	517.74
A2	1.81	0.65	0.75	10	104.2	178.6	341.74	671.67
Total	**3.08**						**611.51**	**1189.42**

Post-Development Runoff Coefficient

Drainage Area	Area (ha)	Impervious Area (m^2)	Runoff Coefficient	Gravel Area (m^2)	Runoff Coefficient	Pervious Area (m^2)	Runoff Coefficient	Average C (5-Year)	Average C (100-Year)
B1	1.26	9694.36	0.90	0.00	0.60	2942.80	0.20	0.74	0.83
B2	1.81	9732.08	0.90	3398.56	0.60	5000.19	0.20	0.65	0.75

Post-Development Runoff Calculations

Drainage Area	Area (ha)	C (5-Year)	C (100-Year)	Tc (min)	I (mm/hr)		Q (L/s)	
					5-Year	100-Year	5-Year	100-Year
B1	1.26	0.74	0.83	10	104.2	178.6	269.77	517.74
B2	1.81	0.65	0.75	10	104.2	178.6	341.74	671.67
Total	**3.08**						**611.51**	**1189.42**

APPENDIX F
CITY OF OTTAWA DESIGN CHECKLIST

McINTOSH PERRY

City of Ottawa

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

Criteria	Location (if applicable)
☐ Executive Summary (for larger reports only).	N/A
☐ Date and revision number of the report.	On Cover
☐ Location map and plan showing municipal address, boundary, and layout of proposed development.	Appendix E
☐ Plan showing the site and location of all existing services.	Site Servicing Plan (C102)
☐ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	1.1 Purpose 1.2 Site Description 6.0 Stormwater Management
☐ Summary of pre-consultation meetings with City and other approval agencies.	Appendix A
☐ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	1.1 Purpose 1.2 Site Description 6.0 Stormwater Management
☐ Statement of objectives and servicing criteria.	3.0 Pre-Consultation Summary

☐ Identification of existing and proposed infrastructure available in the immediate area.	N/A
☐ Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	Site Grading, Drainage, Sediment & Erosion Control Plan (C101)
☐ Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Site Grading, Drainage, Sediment & Erosion Control Plan (C101)
☐ Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
☐ Proposed phasing of the development, if applicable.	N/A
☐ Reference to geotechnical studies and recommendations concerning servicing.	Section 2.0 Backround Studies
☐ All preliminary and formal site plan submissions should have the following information: ○ Metric scale ○ North arrow (including construction North) ○ Key plan ○ Name and contact information of applicant and property owner ○ Property limits including bearings and dimensions ○ Existing and proposed structures and parking areas ○ Easements, road widening and rights-of-way ○ Adjacent street names	Site Grading, Drainage, Sediment & Erosion Control Plan (C101)

4.2 Development Servicing Report: Water

Criteria	Location (if applicable)
☐ Confirm consistency with Master Servicing Study, if available	N/A
☐ Availability of public infrastructure to service proposed development	N/A
☐ Identification of system constraints	N/A
☐ Identify boundary conditions	N/A
☐ Confirmation of adequate domestic supply and pressure	N/A
☐ Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Appendix B
☐ Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	N/A
☐ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
☐ Address reliability requirements such as appropriate location of shut-off valves	N/A
☐ Check on the necessity of a pressure zone boundary modification.	N/A
☐ Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range	N/A

☐ Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	N/A
☐ Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
☐ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Appendix B
☐ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A

4.3 Development Servicing Report: Wastewater

Criteria	Location (if applicable)
☐ Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	N/A
☐ Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A
☐ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A
☐ Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 5.2 Sanitary Sewer

☐ Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	N/A
☐ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	N/A
☐ Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 5.2 Sanitary Sewer
☐ Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A
☐ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
☐ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
☐ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
☐ Special considerations such as contamination, corrosive environment etc.	N/A

4.4 Development Servicing Report: Stormwater Checklist

Criteria	Location (if applicable)
☐ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 6.0 Stormwater Management
☐ Analysis of available capacity in existing public infrastructure.	N/A
☐ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Pre & Post-Development Plans
☐ Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5-year event (dependent on the receiving sewer design) to 100-year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Section 6.0 Stormwater Management
☐ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 6.0 Stormwater Management
☐ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	Section 6.0 Stormwater Management
☐ Set-back from private sewage disposal systems.	N/A
☐ Watercourse and hazard lands setbacks.	N/A
☐ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	N/A
☐ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
☐ Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5-year return period) and major events (1:100-year return period).	Appendix F

☐ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	Site Grading, Drainage, Sediment & Erosion Control Plan
☐ Calculate pre-and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Section 6.0 Stormwater Management Appendix F
☐ Any proposed diversion of drainage catchment areas from one outlet to another.	Section 6.0 Stormwater Management
☐ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Section 6.0 Stormwater Management
☐ If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	Appendix A
☐ Identification of potential impacts to receiving watercourses	N/A
☐ Identification of municipal drains and related approval requirements.	N/A
☐ Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 6.0 Stormwater Management
☐ 100-year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Site Grading, Drainage, Sediment & Erosion Control Plan (C101)
☐ Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A

☐ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 7.0 Sediment & Erosion Control
☐ Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
☐ Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

Criteria	Location (if applicable)
☐ Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	N/A
☐ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
☐ Changes to Municipal Drains.	N/A
☐ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

4.6 Conclusion Checklist

Criteria	Location (if applicable)
☐ Clearly stated conclusions and recommendations	Section 8.0 Summary Section 9.0 Recommendations
☐ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	All are stamped
☐ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	All are stamped