SITE SERVICING & STORMWATER MANAGEMENT REPORT
SHEPHERDS OF GOOD HOPE
765 MONTREAL ROAD, OTTAWA

Project No.: CP-17-0199
City No.:

Prepared for:

CSV Architects
402-1066 Somerset Street West
Ottawa, ON
K1Y 4T3

Prepared by:

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

Rev. 1 – April 13, 2018

McINTOSH PERRY

TABLE OF CONTENTS

1.0 PROJECT DESCRIPTION

1.1 Purpose

This report will address the water, sanitary and storm sewer servicing along with the stormwater management treatment associated with the proposed 4-storey multi-unit residential building for the Shepherds of Good Hope located at 765 Montreal Road, within the City of Ottawa.

This report should be read in conjunction with the following drawings:

- CP-18-0014 C101 – Site Grading and Drainage Plan
- CP-18-0014 C102 – Site Servicing and Sediment & Erosion Control Plan.

1.2 Site Description

The proposed property is described as Part 2 of Lot 6 on Registered Plan 486 City of Ottawa and has an area of approximately 0.15ha. The property is located in Ward 13 – Rideau-Rockcliffe. The site currently consists of a single family home, various retaining walls and dense vegetation. The current zoning classification for the site is Mixed Use/Commercial Zones AM10[2201].

The site (765 Montreal Road) is bound by an existing residential dwelling (591 Lang's Road) to the north, Lang's Road corridor to the west, Montreal Road corridor to the south and undeveloped Open Space & Leisure Zones (569 Lang's Road) to the east see ***Figure 1 – Key Map*** on the next page.

The proposed development consists of a standalone 723m^2 multi-unit residential building complete with a parking area, an amenity area, bicycle parking, garbage enclosure, secure access gate and a private entrance from Lang's Road.

The proposed building will be located along the south property line fronting Montreal Road. The building will have four storeys consisting of 48 units, a dining area, kitchen, nursing office, laundry facility and various entertainment rooms. A full basement is proposed, but will only be used for storage and mechanicals. The basement will not be accessible to the public. Parking will be located along the north face of the building. Due to existing elevations a structural retaining wall will extend along the north limit of the parking lot/amenity area to the north eastern corner of the building. The east face of the building will act as a retaining wall and allow the building to tie into existing elevations on the east property line.

Figure 1 – Key Map

2.0 BACKGROUND STUDIES

Background studies and information available for the proposed site include, City of Ottawa as-built drawings, a topographical survey and a Phase I Environmental Site Assessment (ESA).

As-built drawings of existing services within the vicinity of the proposed site were reviewed in order to determine accurate servicing and stormwater management schemes for the site.

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:

- Designated Substance Survey – Vacant Residential Property, 765 Montreal Road completed by Paterson Group Inc., dated November 15, 2016. (Ref. #: PE3915-LET.01)
- Phase I Environmental Site Assessment – 765 Montreal Road completed by Paterson Group Inc., dated December 5, 2016. (Ref. #: PE3915-1)

3.0 PRE-CONSULTATION SUMMARY

A pre-consultation meeting was conducted on September 19, 2017 regarding the proposed site. The notes, including specific design parameters from the City of Ottawa, can be found in ***Appendix A***.

4.0 EXISTING SERVICES

The proposed site will connect to existing sewers within the Montreal Road corridor. Existing property services will be removed and capped at the mains.

4.1 Water Servicing

Montreal Road has a 400mm dia. watermain including valve chambers and hydrants. No water services are present within the Lang's Road corridor.

4.2 Sanitary Sewer

An existing 300mm dia. sanitary sewer flows west along Montreal Road. Lang's Road has a 250mm dia. sanitary sewer running south towards manholes in Montreal Road.

4.3 Storm Sewer

An existing 525mm dia. storm sewer flows west along Montreal Road. No storm sewers are present within the Lang's Road corridor along the proposed property.

5.0 PROPOSED SERVICING

5.1 Water Servicing

A new 50mm dia. water service will be connected to the existing 400mm dia. watermain in Montreal Road. The water service will come with a valve located at the property line of the road widening for Montreal Road in front of the building.

The proposed building will be equipped with a sprinkler system for fire protection. The required fire flow plus max. day demand from the *Fire Underwriters Survey* is 14,000L/min see ***Appendix B*** for calculations.

The water demands for the proposed building have been calculated to adhere to the *Ottawa Design Guidelines – Water Distribution* manual and are as follows;

- Average daily demand is 0.21L/s,
- Maximum daily demand is 0.48L/s and,
- Maximum hourly demand is 1.02L/s.

The demand calculations can be found in ***Appendix B***.

5.2 Sanitary Sewer

A new 135mm dia. sanitary sewer service will connect to the existing 300mm dia. sanitary sewer in Montreal Road to service the site. *The City of Ottawa - Sewer Design Guidelines, Second Edition dated October 2012 Section 4.4.4.7* states that a monitoring manhole is required just inside the property line for multi-residential buildings. The proposed building has a 0.0m setback from the property line fronting Montreal Road therefore a monitoring manhole is proposed within the road widening for Montreal Road. The proposed location for the monitoring manhole will not conflict with any existing services. Underground Bell utility lines will be disturbed and redirected around the proposed manhole. The contractor will complete locates and contact a Bell representative to determine the best possible course of action to the disturbed underground utilities.

The peak design flows for the proposed building were calculated using criteria from the *City of Ottawa – Sewer Design Guidelines, Second Edition dated October 2012*. The proposed site (0.15ha) will generate a flow of 0.15L/s, see the ***Sanitary Flow Calculations*** sheet in ***Appendix C*** for details.

5.3 Storm Sewer

A 200mm dia. storm sewer will carry the restricted flow from the parking lot catchbasin (CB1) to an intermediate catchbasin (CB2) before running south along the west property line to another intermediate catchbasin (CB3) at the south west property corner. The pipe run between CB2 & CB3 will be coordinated with the structural engineer to determine the effects on the proposed foundation from the pipe running within close proximity. From CB3 the sewer will flow towards a monitoring manhole (MH4) which will also collect the storm flow from the building and foundation weeping tile. The monitoring manhole will be located next to the sanitary monitoring manhole within the road widening limits of Montreal Road. From the manhole a 250mm dia. storm sewer will “tee” into the existing 525mm dia. storm sewer within Montreal Road.

The new storm sewer system and restriction device details will be further discussed in ***Section 6.0 Stormwater Management***.

6.0 STORMWATER MANAGEMENT

Stormwater management for the proposed site will be maintained through positive drainage away from the proposed building and into a new underground storm sewer system. The parking lot will provide the appropriate storage for the 5 & 100 year storm events. The storm system will capture the parking lot runoff and direct the flow to a restriction device located within the outlet pipe of CB1. The restricted flow will then travel around the building to the monitoring manhole where it will meet the building service/restricted flow from the roof before connecting to the existing sewer located in Montreal Road.

The emergency overland flow route for the proposed site will be directed towards the private entrance located off Lang’s Road before flowing towards the existing road catchbasins on Lang’s Road just before the intersection at Montreal Road.

The quantitative and qualitative properties of the storm runoff for both the pre & post development flows are further detailed below.

6.1 Design Methodology

Runoff calculations in this report are derived using the Rational Method:

Q = 2.78 C * I * A

Where;

2.78	= Factor to convert Hectares and rainfall intensity to (L/s)
Q	= flow (L/s)
C	= Runoff coefficient
I	= Rainfall intensity (mm/hr)
A	= Drainage area (ha)

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 are expected to function as intended.

In accordance with the *City of Ottawa – Sewer Design Guidelines, Second Edition dated October (OSDG)*, the following runoff coefficients were used to develop a balanced 'C' factor for each drainage area:

Building roofs, asphalt and concrete surfaces	C = 0.90
Gravel surfaces	C = 0.60
Grass, landscaped and undeveloped surfaces	C = 0.20

As per the OSDG, the 5yr balanced "C" value must be increased by 25% (to a maximum 1.0) for a 100yr storm event.

As per the pre-consultation meeting with the City, the allowable 100yr flow is to be controlled to the 5yr event at a Time of Concentration (Tc) of 10min and a "C" of 0.50. The post-development flows have been based on the current City of Ottawa IDF Curve as per the OSDG.

6.2 Site Drainage

6.2.1 Pre-Development Drainage

The existing site drainage limits are demonstrated on the ***Pre-Development Drainage Area Plan (CP-18-0014-PRE)*** and can be found in ***Appendix D***. A summary of the Pre-Development Runoff Coefficient Calculations can be found below.

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	0.15	0.50	0.63	10	104.2	178.6	21.66	46.40
Total	**0.15**						**21.66**	**46.40**

*See **Appendix F** for calculations.*

6.2.2 Post-Development Drainage

The proposed site drainage limits are demonstrated on the ***Post-Development Drainage Area Plan (CP-18-0014-POST)*** and can be found in ***Appendix E***. A summary of the Post-Development Runoff Coefficient Calculations can be found below.

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	0.07	0.90	1.00	10	104.2	178.6	19.02	36.21
B2	0.05	0.66	0.74	10	104.2	178.6	10.26	19.79
B3	0.02	0.67	0.75	10	104.2	178.6	4.42	8.52
Total	**0.15**						**33.69**	**64.52**

*See **Appendix F** for calculations*.

Runoff for area "B1" will be captured and restricted by roof drains before flowing to the existing sewer in Montreal Road. Area "B2" will be captured by the storm sewer system and restricted by an inlet control device (ICD) located in CB1 before it outlets to the existing sewer in Montreal Road. Area "B3" will be unrestricted and unable to be captured by the proposed storm system. The ICD in CB1 will account for the unrestricted flow leaving the site and over restrict the captured flow. See ***Appendix F*** for details.

6.3 Quantity Control

The post-development 100-year flow must be restricted to the 5-year pre-development flow with a "C" of 0.50 and time of concentration (Tc) of 20 minutes as requested by the City of Ottawa in the pre-consultation meeting. In a follow up discussion with the City, the "Tc" was reduced to 10 minutes for the proposed site as the Airport Formula actual "Tc" is under 10 minutes. Correspondence between the engineer and City related to the "Tc" can be found in ***Appendix A***.

Reducing site flows will be achieved using flow restrictions and will create the need for onsite storage. Runoff from area "B1" and "B2" will be restricted and stored as shown in the table below.

Post-Development Restricted Runoff Calculations

Drainage Area	Unrestricted Flow (L/s)		Restricted Flow (L/s)		Storage Required (m^3)		Storage Provided (m^3)		
	5-Year	100-Year	5-Year	100-Year	5-Year	100-Year	5-Year	100-Year	
B1	19.02	36.21	2.52	5.04	13.31	16.11	12.56	15.47	*RESTRICTED*
B2	10.26	19.79	7.96	8.11	6.71	12.87	7.46	13.50	*RESTRICTED*
B3	4.43	8.52	4.42	8.52	-	-	-	-	*UNRESTRICTED*
Total	**33.69**	**64.52**	**14.90**	**21.66**	**20.02**	**28.97**	**20.02**	**28.97**	

*See **Appendix F** for calculations*.

Runoff from area "B1" will be restricted by six roof drains before discharging to the proposed storm monitoring manhole. The total flow leaving the roof will be restricted to 2.52L/s and 5.04L/s during the 5-year and 100-year storm events, respectively. This will result in roof ponding depths of 35mm and 70mm for the 5-year and 100-year storm events, respectively. Emergency roof scuppers will be installed to ensure ponding does not exceed the proposed ponding limits.

Runoff from areas "B2" will be restricted in CB1 by an IPEX Low/Medium Flow or an approved equivalent ICD. The ICD will restrict the 5-year and 100-year storm events to 7.96L/s and 8.11L/s. The restriction will create a Water Surface Elevation (WSEL) of 90.47m and 90.52m for the 5-year and 100-year storm events. This will result in ponding depths of 0.20m for the 5-year storm and 0.25m for the 100-year storm. The ponding area will be located above CB1 in the parking lot.

In the event that there is a rainfall above the 100-year storm event, or a blockage within the storm sewer system, an emergency overland flow route has been provided so that the storm water runoff will be conveyed towards the entrance at Lang's Road.

*For more details on restrictions and ponding, see **Appendix F**.*

6.4 Quality Control

The development of this site will employ Best Management Practices (BMP's) wherever possible. The intent of implementing stormwater BMP's is to ensure that water quality and quantity concerns are addressed at all stages of development. Site level BMP's typically include temporary retention of the parking lot runoff, minimizing ground slopes and maximizing landscaped areas. Some of these BMP's cannot be provided for this site due to site constraints and development requirements.

Discussions with the Rideau Valley Conservation Authority (RVCA) concluded that the existing storm sewer in Montreal Road is over 3.0km upstream of a direct outlet to a watercourse and that on-site water quality control measures would not be required.

7.0 SEDIMENT & EROSION CONTROL

The contractor is responsible for ensuring sediment & erosion control measures are installed in accordance with the Site Servicing and Sediment & Erosion Control Plan as indicated. Silt fence barriers and CB filter socks should be installed on site where indicated before construction or earth-moving operations begin.

Any new structures will also be controlled immediately upon installation. The contractor will be responsible for inspecting and maintaining all sediment & control measures throughout construction of the proposed site. They are to be removed only after all areas have been paved. Care shall be taken at the removal stage to ensure that any sediment that has accumulated is properly handled and disposed of properly. Removal of sediment & control measures without prior removal of sediment shall not be permitted.

At the discretion of the project manager, municipal staff or conservation authority, additional sediment control devices shall be installed at designated locations.

8.0 SUMMARY

- A new 730m^2 multi-unit residential building will be constructed along the south property line at 765 Montreal Road.
- A new 50mm dia. water service will connect into the existing 400mm dia. watermain in Montreal Road to service the site.
- A new 135mm dia. sanitary service and monitoring manhole will connect to the existing 300mm dia. sanitary sewer in Montreal Road.
- A new 250mm dia. storm sewer and monitoring manhole will connect to the existing 525mm dia. storm sewer in Montreal Road.
- A new storm sewer network will be installed to control runoff from the proposed site and connect to the storm service monitoring manhole.
- Storage for the 5-year and 100-year storm events will be provided within the proposed site above CB1 and on the roof top.
- Quality Control is not required for this site.

9.0 RECOMMENDATION

McIntosh Perry Consulting Engineers Ltd. recommends that the information provided in this report and information identified on the corresponding drawings (C101 & C102) is sufficient for review and approval of the proposed civil design.

The information provided has been reviewed and certified by the undersigned.

Yours truly,

Peter Kirkimtzis
Civil Engineering Technologist
613-836-2184 Ext. 2262
p.kirkimtzis@mcintoshperry.com

Ryan Kennedy, P. Eng.
Practice Area Lead, Land Development
613-836-2184 Ext.2243
R.Kennedy@mcintoshperry.com

10.0 STATEMENT OF LIMITATIONS

This report was produced for the exclusive use of CSV Architects. 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 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: PRE-CONSULTATION NOTES

MINUTES
Pre-Application Consultation Meeting
Address: 765 Montreal Road
Date: September 19t^{h}, 2017
Time: 10:30am-12:00pm
Location: Room 4102 E, 110 Laurier Avenue W.
City Contact: Andrew McCreight

City of Ottawa Staff Present: Andrew McCreight (Planner), Richard Buchanan (Infrastructure PM), Mark Richardson (Forestry), Seana Turkington (Co-op Student).

Invitees Present: Jamie Hackett (Shepherds of Good Hope), Lindy Rosko (Shepherds of Good Hope), Jessie Smith (CSV Architects), Anthony Leaning (CSV Architects), Ian Fisher (Fairhaven Community Association).

1.0 Introductions & Confirmation that Non-Disclosure Agreement has been signed

Ian Fisher, Al Crosby and Berry Debruijn of the Fairhaven Community Association have all signed a NDA. Ian attended the meeting on behalf of the group. Should the Shepherds of Good Hope wish to include more residents in the discussion of the proposal, that must be declared in writing and sent to the City to waive the NDA.

2.0 Overview of Proposal (CSV Architects and Shepherds of Good Hope)

- The Shepherds of Good Hope is looking to construct a 48-unit, supportive housing development for all genders. The mid-rise apartment building will provide long term beds to those transitioning out of shelters and back into the community. Medical personnel and staff will be available to the residents of the building 24/7.
- Each of the 48-units will be self-contained dwelling unit equipped with a living space (which includes a bedroom), a bathroom, and a kitchen. There will be a communal kitchen for residents on the ground floor as well as other amenity spaces such as a library and internet room.
- The Shepherds of Good Hope have found the 48-unit studio apartment model to be successful, and surrounding communities are normally supportive.
- The security of the residents within the development is of the utmost importance, hence the provision of a security access gate. Two gate entrances will be provided; one for pedestrians and another for vehicles for access from Lang's Rd.
- Accessibility of the site is key. The building will be accessed off of Montreal Road via stairs, and off of Lang's Road via stairs and a ramp access for those who have limited mobility.
- Parking and amenity areas have been strategically placed near the building.
- A retaining wall is needed on site.
- It is not anticipated that residents will have cars or require parking spaces. A Minor Variance will be sought to allow the number of parking spaces required to be reduced from 18 (0.5 spaces per unit, 0.5 (36) =18) to 14. The 14 parking spaces are anticipated to be used by visitors and staff, as opposed to residents.

- Two Sections of the Ground Floor: 1) the Amenity Space for Residents and Staff only; 2) the meeting space for use by staff and residents, as well as members of the community. The proposed community space on the ground floor of the building will be more of a business and personal services space as opposed to a community centre.
- The full basement (recommended by an engineer due to the quality of soil on site) will be used for storage, laundry, and mechanical and electric needs. It is not anticipated at this time that the basement will be used for anything but, the aforementioned. The basement will not be accessible to the general public.

3.0 Preliminary Comments from City

- **Planning Comments (Provided by Andrew McCreight)**
    - Will the nursing area be exclusively for residents or is it accessible by the public? Health staff to be on-site 24/7, exclusively for residents.
    - Please send a list of comparable developments within the City (mentioned by CSV, and look at The Oaks on Merivale).
    - Please examine the hydro setbacks/radii at the front of the property, as these setbacks might impact the design of the building. Should a formal Site Plan Control application be submitted, please ensure that these setbacks are shown on the Site Plan. Would be a good idea to talk to hydro regarding setbacks prior to Site Plan submission.
    - Is it possible to acquire 591 Lang's Road (property at rear of site)? Response: The Shepherds of Good Hope are currently discussing the possibility of purchasing the property, however, the family currently residing there are having some difficulties. Talks will continue once that is resolved within the family.
    - Should 591 Lang's Road end up being acquired post-Site Plan submission, a site plan revision will be made to incorporate the new parcel of land. Should this happen, the file will be subject to a re-circulation fee, and all submitted plans and studies would require amendments accordingly.
    - Please note that the proposed walkways along the side of the building along need to be within the property line.
    - a Minor Variance should only be submitted once the Site Plan submission is in the comments phase. This will avoid the risk of possible changes to the proposal that could impact requested variances.
- **Urban Design Comments**
    - This abutting site is heavily forested and owned by hydro, with plans for the property unknown. As such, please examine the building interface with potential open space areas.
    - Regarding the retaining wall, it would be good if the wall were softened and incorporated into the landscape, as opposed to looking and feeling like a large engineered wall. Consider possible materials of wall in relation to the building and open space, and terrace where possible.
    - The Site Plan application is subject to the Urban Design Review Panel (UDRP). A formal presentation, open to the public, to UDRP will be required.

- Since this Site Plan will be subject to UDRP, please show the interaction and animation of the building in relation to the surrounding community and in relation to Lang's Road and Montreal Road, as well as the Fairhaven community.

- **Comments – Post Meeting (Andrew)**
  - Overall, the preliminary proposal generally shows good potential for consistency with the Official Plan, Arterial Mainstreet designation and AM10 zone. As the proposal is further developed, urban design and compatibility will be important, as well as having a better understanding of the overall use and function of the building.
  - Further clarification is required on the "community space" function at the front (Montreal) of the building, and understood from a land use perspective.
  - Review the AM10 zone for the active frontage provisions. The dialogue at the meeting surrounding ample glazing and principal entrances is appreciated, but the design needs to be further evolved to evaluate if compliance has been met.
  - Further development the building design. The preliminary concept shows as a 5-storey "box". Refinement on the materiality and massing break-up is needed to truly understand the design and built form and fits within its surroundings. Entrances should active and animated with clear visibility and prominence in the design.

- **Engineering Comments (Provided by Richard Buchanan)**

  - Remove the private walkways from the city lands.
  - Move the accessible ramp further north.
  - Drainage from the parking area is not permitted through the building.
  - Storm sewer may need to be extended down Lang to Montreal Road
  - St and San can then come off Lang.
  - Storm sewer needs MOECC approval, transfer of review.
  - Stormwater Management Criteria - C=0.5 - 1:5 year storm event control up to 1:100 year storm event.
  - S/W along Lang Road up to the entrance is required.
  - Existing services need to be capped and blanked at the main
  - Please note that Lang's Road currently only has sanitary sewer lines.
  - Note that any stormwater management system must incorporate drainage for the parking area.
  - A Noise Study is required.
  - Phase I ESA completed in 2016. Include a brief cover letter explaining any and all relevant events within the last year. The ESA is good for a period of 2 years.
  - Sidewalks built on site must be built to City standards.
  - A lighting study will be required, with conditions of approval for a site lighting certificate.
  - A Geotechnical Study as well as a Slope Stability Study is required.

- Please contact the City regarding water pressure and request boundary conditions.

- **Transportation Comments (Provided by Wally Dubyk)**
  - Montreal Road is designated as an Arterial road within the City's Official Plan with a ROW protection of 37.5 metres. The ROW limits are to be shown on all the drawings and the offset distance (18.75 metres) to be dimensioned from the existing centerline of pavement.

  - ROW interpretation – Land for a road widening will be taken equally from both sides of a road, measured from the centreline in existence at the time of the widening if required by the City. The centreline is a line running down the middle of a road surface, equidistant from both edges of the pavement. In determining the centreline, paved shoulders, bus lay-bys, auxiliary lanes, turning lanes and other special circumstances are not included in the road surface.
  - A 5.0 metres x 5.0 metres sight triangle would be required at the intersection of Montreal Road and Lang's Road and is to be shown on all drawings. When the City widens Montreal Road the sight triangle would provide an area for relocating the traffic signal pole.
  - The developer is to follow the new TIA guidelines;
  - The TIA (Transportation Impact Assessment) Guidelines (2017) were approved by Transportation Committee and City Council on June 14, 2017. The final French version and accessible TIA Guidelines will be available in August 2017. The draft version of the TIA Guidelines (2017) that are posted on the web are now to be used for the TIA Submission for development applications.
  - The following list highlights the significant changes to the 2006 TIA Guidelines
  - A Screening Test (Step 1) quickly determines if a transportation study is required. Consultants should fill in the form in Appendix B.
  - Study Scope (Step 2) is site specifically tailored; there are no longer three defined types of TIA reports. Scoping report is required and needs to be signed off by TPM before the consultant moves on to Forecasting volumes.
  - Sign off from City Transportation Project Manager is required at key points in the review process prior to TIA Submission (Step 5). See Figure 1 on page 9 for a good flow chart of the process.
  - Multi Modal Level of Service (MMLOS) and Complete Street analysis is required to assess the impact of all modes of travel rather than just vehicle traffic.
  - There is no longer a requirement for consultant pre-approval. Consultants must now sign and submit the Credentials Form included in the Appendix A with each TIA report.
  - The TIA Submission (report, drawings and/or monitoring plan) is required **with** the development application. See

http://documents.ottawa.ca/sites/documents.ottawa.ca/files/tia_guidelines_en.pdf

- Please contact Wally Dubyk, wally.dubyk@ottawa.ca ext.13783 for any questions.

- **Forestry Comments (Provided by Mark Richardson)**
  - A Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City; an approved TCR is a requirement of Site Plan Approval
  - Any removal of privately-owned trees 10cm or larger in diameter require a tree permit issued under the Urban Tree Conservation Bylaw; the permit is based on the approved TCR
  - In this case, the TCR may be combined with the Landscape Plan, and must list all trees on site by species, diameter and health condition.
  - The TCR must address all trees on adjacent properties that have a critical root zone which extends into the developable area.
  - If trees are to be removed, the TCR must clearly show where they are and document the reason they can not be retained
  - All retained trees must also be shown and all retained trees within the area impacted by the development process must be protected as per the City guidelines listed on Ottawa.ca
  - Trees with a trunk that crosses/touches a property line are considered co-owned by both property owners; permission from the adjoining property owner must be obtained prior to the removal of co-owned trees
  - The City encourages the retention of healthy trees wherever possible; please ask your design/planning team to find opportunities for retention wherever possible if the trees are healthy and will contribute to the design/function of the site. For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca .

  - The removal of City-owned trees will require the permission of Forestry Services who will also review the submitted TCR; note that Forestry Services may ask for compensation for any City-owned tree that has to be removed.

4.0 Preliminary Comments from Community Association Representative

- The Fairhaven Community Association is comprised of approximately 22 units.
- Residents will be concerned about the height of the building, shadows, and traffic.
- Due to the narrow ROW along Lang's Road, there are significant safety concerns.

- There are various generations living with the Fairhaven Community. Residents may be concerned about how the clientele at the proposed development will integrate with the community.
- How can the Fairhaven Community best support the residents to be living at the Shepherds of Good Hope building?
- Please note that this area has septic and well systems that are rather old and fragile. Ensure protection during construction.

5.0 Next Steps

- File lead to send a follow-up email with a list of required plans and studies for an application.
- File lead to confirm if the subject site is within the Airport's Noise Influence Zone.
  - No requirement. Outside the area of Rockcliffe Airport and no concern with proposed height. Taller building existed between the proposed development site and airport.
- RFP submission from Shepherds of good Hope due in early October, with the successful candidate being announced in December. Should the Shepherds of Good Hope be given the grant, a formal application will be submitted in the New Year. If not, expect a similar pre-consultation in the following year.

Peter Kirkimtzis

From: Buchanan, Richard <Richard.Buchanan@ottawa.ca>
Sent: Monday, April 9, 2018 2:21 PM
To: Peter Kirkimtzis
Subject: RE: 765 Montreal Road

Hi Peter

10 minutes would be the minimum.

Richard Buchanan, CET

Project Manager, Development Approvals
Planning, Infrastructure and Economic Development Department
Planning & Growth Management Branch
City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 27801
ottawa.ca/planning / ottawa.ca/urbanisme

From: Peter Kirkimtzis <p.kirkimtzis@mcintoshperry.com>
Sent: Monday, April 09, 2018 1:25 PM
To: Buchanan, Richard <Richard.Buchanan@ottawa.ca>
Cc: Tyler Ferguson <t.ferguson@mcintoshperry.com>
Subject: 765 Montreal Road

Hi Richard,

We have reviewed the stormwater management criteria for the site at 765 Montreal Road. Based on the historical use of the site, the time of concentration (20min) seems rather high. Using the images available within geoOttawa, the site has been a residential dwelling with grass and vegetation for quite some time. We calculated a time of concentration based on the Airport formula as per the below for the site.

Tc = (3.26(1.1-c)L^0.5/S^0.33)

c = 0.50 Runoff Coefficient
L = 26 m (Watershed length)
S = 5.2% (Average slope of watershed)

The result of this calculation produced a time of concentration for the existing site of 6 minutes. With this in mind we are wondering if it would be possible to reduce the time of concentration for pre-development flow. Can the Tc for pre-development be changed from 20 minutes to 10 minutes? The "C" factor of 0.5 would remain.

Let us know your thoughts of changing the Tc for this site.

Thanks,

Peter Kirkimtzis
Civil Engineering Technologist

APPENDIX B: WATERMAIN FLOW & FIRE CALCULATIONS

McINTOSH PERRY

765 Montreal Road - FUS Fire Calculations

1. 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.

2. Determine Ground Floor Area

As provided by the Architect:

Floor Area (One Floor)	=	676.00	m^2
Total Floor Area	**=**	**2,704.00**	**m^2**

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

3. Calculate Required Fire Flow

F = 220 x C x √A

C = 1.50

A = 2,704.00

F = 220.00 X 1.50 X √ 2704.00

F = 17,160.00 L/min.

4. Determine Height in Storeys

From Architectural Drawings:

Number of Storeys = 4.00

5. Determine Increase or Decrease Based on Occupancy

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

Low Hazard

No Change

F = 17,160.00 L/min.

6. 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 installed with a fully automated, standardized with the City of Ottawa Fire Department and fully supervised.
- Therefore 23,170 L/min – 50% (The building is sprinklered with a standard system and fire department hose lines)

F = 8,580.00 L/min.

7. 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 6.5m & 15m respectfully.
- There are no existing buildings surrounding the remainder of the site that are within 45m.
- Therefore the charge for exposure is 35% of the value obtained in Step 5.
- equals #6 Total + (#5 Total x 30%)

F = 13,728.00 L/min.

Therefore, after rounding to the nearest 1,000 L/min, the total required fire flow for the development is 14,000 L/min (3,698 GPM).

765 Montreal Road - Water Demands

McINTOSH PERRY

Project:	765 Montreal Road
Project No.:	CP-18-0014
Designed By:	P.G.K.
Checked By:	
Date:	Mar. 29, 2018
Site Area:	0.15 gross ha
Population	**28 x 1Brd units units - (28 x 1.4) = 39.2**

1 Commercial Unit

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
Othe Commercial	28,000	L/gross ha/d
AVERAGE DAILY DEMAND	**0.16**	**L/s**

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
Othe Commercial	***28,000***	***L/gross ha/d***
AVERAGE DAILY DEMAND	**0.049**	**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	**0.41**	**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	**0.073**	**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	**0.89**	**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	**0.131**	**L/s**

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

APPENDIX C: SANITARY SEWER CALCULATIONS

McINTOSH PERRY

McINTOSH PERRY

Project:	CP-18-0014 – 765 Montreal Road
Designed By:	P.G.K.
Checked By:	R.P.K.
Date:	April 6, 2018

Re: Sanitary Flow Calculations

1. Building Occupancy

The maximum number of bedroom units will be 48 units as per the floors plans and the attached unit break down from the architect.

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 Dwelling unit of 1 bedrooms
  = 275 Liters/Dwelling/Day

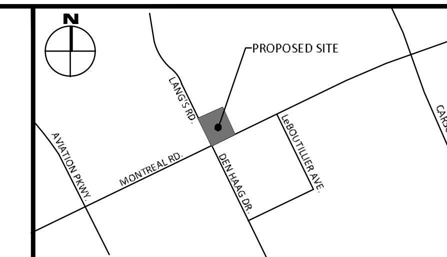
3. Peak Flow (Q/p)

- Q(p) = F x P Where:
  F = 275 Litres/Dwelling/Day (as per City of Ottawa Sewer Design Guidelines)
  P = 48 Units (as per Site Plan)
- Therefore, Q(p) = (275) x (48) = **13,200 L/Day (0.153 L/sec)**

115 Walgreen Road, R.R.3. Carp, ON K0A 1L0 | T. 613-836-2184 | F. 613-836-3742
info@mcintoshperry.com | www.mcintoshperry.com

APPENDIX D: PRE-DEVELOPMENT PLAN

McINTOSH PERRY



LOCATION PLAN

LEGEND

BARRIER CURB (GUTTERLINE & TOP OF CURB)	HYDRO UNDERGROUND
MOUNTABLE CURB (GUTTERLINE)	BELL UNDERGROUND
EASEMENT	CABLE UNDERGROUND
MH7 STORM MANHOLE	GAS UNDERGROUND
CB6 DI6 CATCHBASIN OR DITCH INLET	SECONDARY SERVICES c/w HYDRO METER
MH7A SANITARY MANHOLE	OVERHEAD WIRES
PERFORATED PIPE IN SWALES	HYDRO TRANSFORMER
WATER VAVLE/CHAMBER	HYDRO KIOSK
HYD FIRE HYDRANT	BELL PEDESTAL
CENTRELINE OF SWALE	CABLE PEDESTAL
SLOPING AT 3:1 (UNLESS SPECIFIED)	STREETLIGHT
101.50 PROPOSED ELEVATION / 99.85 EXISTING ELEVATION	
101.35 (s) SWALE ELEVATION	
SILT FENCE (AS PER OPSD 219.130)	
STRAW BALE CHECK DAM (AS PER OPSD 219.180)	
EMERGENCY OVERLAND FLOW ROUTE	

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

No.	Revision/Issue	Date
1	ISSUED FOR SITE PLAN APPROVAL	APR. 13, 2018

Check and verify all dimensions before proceeding with the work — Do not scale drawings

SCALE 1 : 150 (0 5 10 15 Metres)

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A 1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

Stamp:

Client:
CSV ARCHITECTS
402-1066 SOMERSET STREET WEST
OTTAWA, ON
K1Y 4T3

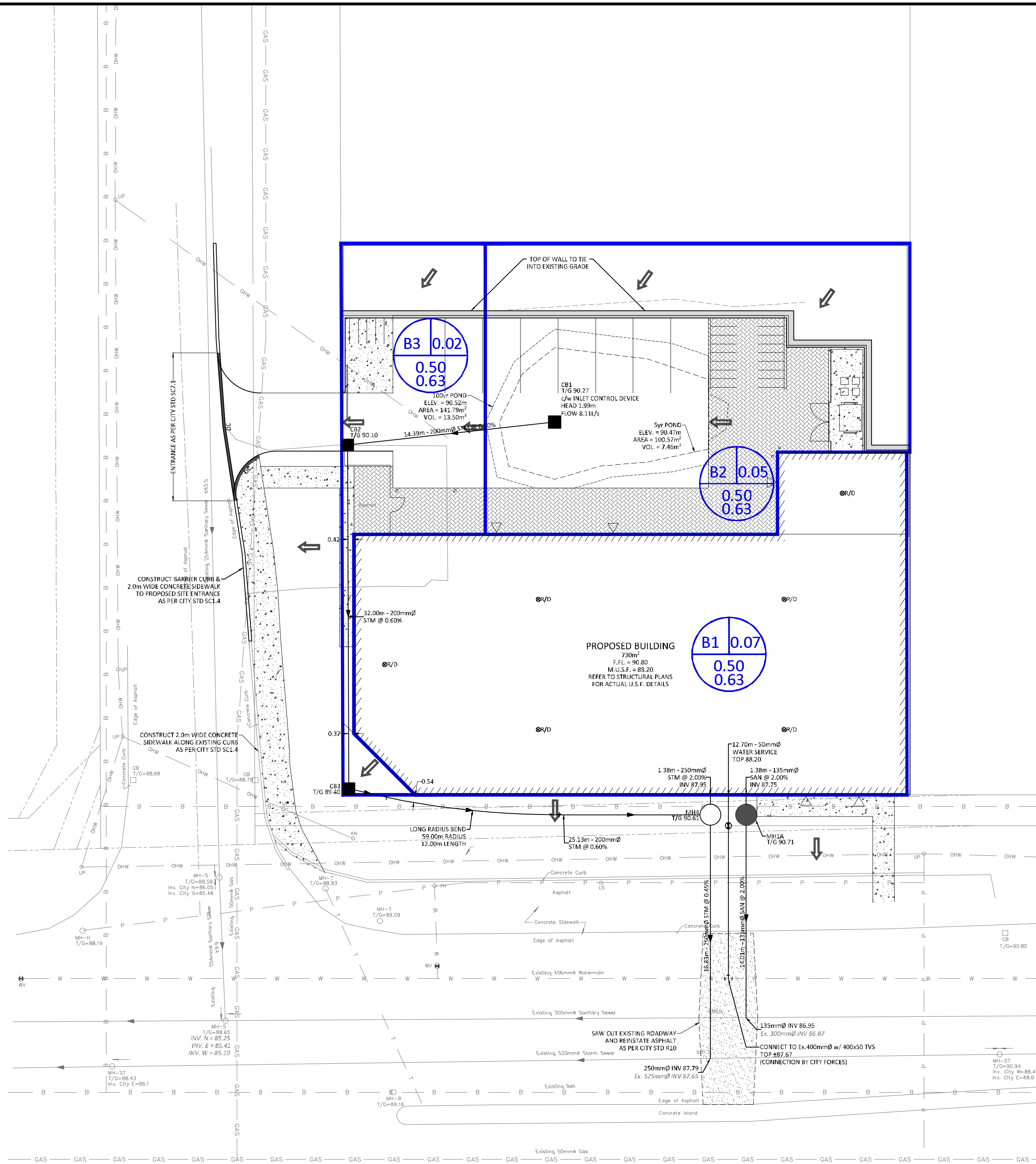
Project:
765 MONTREAL ROAD
SHEPHERDS OF GOOD HOPE
OTTAWA ONTARIO

Drawing Title:
PRE-DEVELOPMENT
DRAINAGE AREA PLAN

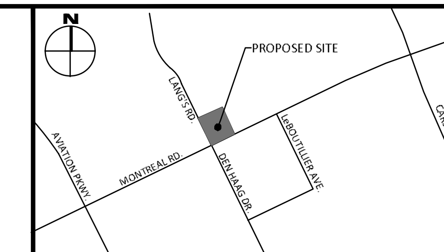
Scale: 1:150	Project Number: CP-18-0014
Drawn by: P.G.K.	
Checked By: R.P.K.	Drawing Number: PRE
Designed By: P.G.K.	

APPENDIX E: POST-DEVELOPMENT PLAN

McINTOSH PERRY



STM STRUCTURE TABLE				
NAME	RIM ELEV.	INVERT IN	INVERT OUT	DESCRIPTION
CB1	90.27		SW88.426	GRATE CITY STD S19 FRAME CITY STD S19 STRUCTURE OPSD 705.010
CB2	90.10	NE88.340	SE88.280	GRATE CITY STD S19 FRAME CITY STD S19 STRUCTURE OPSD 705.010
CB3	89.40	NW88.137	E88.077	GRATE CITY STD S19 FRAME CITY STD S19 STRUCTURE OPSD 705.010
MH4	90.61	SW87.926 NW87.922	SE87.866	GRATE CITY STD S24.1 FRAME CITY STD S25 STRUCTURE OPSD 701.010



LOCATION PLAN

LEGEND

- BARRIER CURB (GUTTERLINE & TOP OF CURB)
- MOUNTABLE CURB (GUTTERLINE)
- EASEMENT
- MH7 STORM MANHOLE
- CB6 DI6 CATCHBASIN OR DITCH INLET
- MH7A SANITARY MANHOLE
- PERFORATED PIPE IN SWALES
- WATER VAVLE/CHAMBER
- HYD FIRE HYDRANT
- CENTRELINE OF SWALE
- SLOPING AT 3:1 (UNLESS SPECIFIED)
- 101.50 / 99.85 PROPOSED ELEVATION / EXISTING ELEVATION
- 101.35 (s) SWALE ELEVATION
- SILT FENCE (AS PER OPSD 219.130)
- STRAW BALE CHECK DAM (AS PER OPSD 219.180)
- EMERGENCY OVERLAND FLOW ROUTE
- H HYDRO UNDERGROUND
- B BELL UNDERGROUND
- C CABLE UNDERGROUND
- G GAS UNDERGROUND
- M SECONDARY SERVICES c/w HYDRO METER
- OHW OVERHEAD WIRES
- HYDRO TRANSFORMER
- K HYDRO KIOSK
- B BELL PEDESTAL
- C CABLE PEDESTAL
- STREETLIGHT

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

No.	Revision/Issue	Date
1	ISSUED FOR SITE PLAN APPROVAL	APR. 13, 2018

Check and verify all dimensions before proceeding with the work — Do not scale drawings

SCALE 1 : 150 (0, 5, 10, 15 Metres)

McINTOSH PERRY
115 Walgreen Road, RR3, Carp, ON K0A 1L0
Tel: 613-836-2184 Fax: 613-836-3742
www.mcintoshperry.com

Stamp:

Client:
CSV ARCHITECTS
402-1066 SOMERSET STREET WEST
OTTAWA, ON
K1Y 4T3

Project:
765 MONTREAL ROAD
SHEPHERDS OF GOOD HOPE
OTTAWA ONTARIO

Drawing Title:
POST-DEVELOPMENT DRAINAGE AREA PLAN

Scale:	1:150	Project Number:	CP-18-0014
Drawn by:	P.G.K.		
Checked By:	R.P.K.	Drawing Number:	POST
Designed By:	P.G.K.		

APPENDIX F: STORMWATER CALCULATIONS

McINTOSH PERRY

CP-18-0014 - 765 Montreal Road - Runoff Calculations

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	0.15	0.50	0.63	10	104.2	178.6	21.66	46.40
Total	0.15						21.66	46.40

Post-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)
B1	0.07	729.53	0.90	0.00	0.60	0.00	0.20	0.90	1.00
B2	0.05	352.28	0.90	0.00	0.60	185.51	0.20	0.66	0.74
B3	0.02	152.76	0.90	0.00	0.60	75.18	0.20	0.67	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	0.07	0.90	1.00	10	104.2	178.6	19.02	36.21
B2	0.05	0.66	0.74	10	104.2	178.6	10.26	19.79
B3	0.02	0.67	0.75	10	104.2	178.6	4.42	8.52
Total	0.15						33.69	64.52

Required Restricted Flow

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	0.15	0.50	0.63	10	104.2	178.6	21.66	46.40

*City of Ottawa allowable 100-year flow to be controlled to 5-year event at Tc = 10min and C = 0.50
as per pre-consultation meeting

Post-Development Restricted Runoff Calculations

Drainage Area	Unrestricted Flow (L/s)		Restricted Flow (L/s)		Storage Required (m^3)		Storage Provided (m^3)		
	5-Year	100-Year	5-Year	100-Year	5-Year	100-Year	5-Year	100-Year	
B1	19.02	36.21	2.52	5.04	13.31	16.11	12.56	15.47	
B2	10.26	19.79	7.96	8.11	6.71	12.87	7.46	13.50	*RESTRICTED*
B3	4.42	8.52	4.42	8.52	-	-	-	-	*UNRESTRICTED*
Total	33.69	64.52	14.90	21.66	20.02	28.97	20.02	28.97	

CP-18-0014 - 765 Montreal Road - STORAGE REQUIREMENTS

Storage Requirements for Area B1

5-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
25	60.9	11.12	2.52	8.60	12.89
30	53.9	9.84	2.52	7.32	13.18
35	48.5	8.86	2.52	6.34	13.31
40	44.2	8.06	2.52	5.54	13.31
45	40.6	7.42	2.52	4.90	13.22
50	37.7	6.87	2.52	4.35	13.06
55	35.1	6.41	2.52	3.89	12.84

Maximum Storage Required 5-Year (m^3) =	13.31

100-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	144.9	29.39	5.04	24.35	14.61
15	110.1	22.33	5.04	17.29	15.56
20	90.6	18.37	5.04	13.33	16.00
25	77.8	15.78	5.04	10.74	16.11
30	68.8	13.95	5.04	8.91	16.04
35	62.0	12.57	5.04	7.53	15.82
40	56.6	11.48	5.04	6.44	15.45

Maximum Storage Required 100-Year (m^3) =	16.11

CP-18-0014 - 765 Montreal Road - STORAGE REQUIREMENTS

Storage Requirements for Area B2

5-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	104.2	19.02	7.96	11.06	6.63
11	99.2	18.11	7.96	10.15	6.70
12	94.7	17.28	7.96	9.32	6.71
13	90.6	16.54	7.96	8.58	6.69
14	86.9	15.87	7.96	7.91	6.64
15	83.6	15.25	7.96	7.29	6.56
16	80.5	14.69	7.96	6.73	6.46

Maximum Storage Required 5-Year (m^3) =	6.71

100-Year Storm Event

Tc (min)	I (mm/hr)	Runoff (L/s)	Allowable Outflow (L/s)	Runoff to be Stored (L/s)	Storage Required (m^3)
10	144.9	29.39	8.11	21.28	12.77
11	135.8	27.54	8.11	19.44	12.83
12	128.0	25.96	8.11	17.85	12.85
13	121.3	24.60	8.11	16.49	12.87
14	115.3	23.38	8.11	15.28	12.83
15	110.1	22.33	8.11	14.22	12.80
16	105.4	21.38	8.11	13.27	12.74

Maximum Storage Required 100-Year (m^3) =	12.87

Storage Occupied In Area B2

5-Year Storm Event

Water Elevation (m) =		90.47	OUTLET INVERT (m)	Area (m^2)	Depth (m)	Head (m)	Volume (m^3)
Structure	T/G (m)	Pipe dia. (mm)					
CB1	90.27	200	88.43	100.57	0.20	1.94	7.46

Storage Available (m^3) = 7.46	*
Storage Required (m^3) = 6.71	

100-YEAR STORM EVENT

Water Elevation (m) =		90.52	OUTLET INVERT (m)	Area (m^2)	Depth (m)	Head (m)	Volume (m^3)
Structure	T/G (m)	Pipe dia. (mm)					
CB1	90.27	200	88.43	141.79	0.25	1.99	13.50

Storage Available (m^3) = 13.50	*
Storage Required (m^3) = 12.87	

*Available Storage calculated from AutoCAD

Roof Drain Flow For Flat Roof B1

Flow Rate Vs. Build-Up (One Weir)	
Depth (mm)	Flow (L/s)
15	0.18
20	0.24
25	0.30
30	0.36
35	0.42
40	0.48
45	0.54
50	0.60
55	0.66

*Roof Drain model to be Accutrol Weirs, See attached sheets
*Roof Drain Flow information taken from Watts Drainage website

CALCULATING ROOF FLOW EXAMPLES

1 roof drain during a 5 year storm
elevation of water = 25mm
Flow leaving 1 roof drain = (1 x 0.30 L/s) = 0.30 L/s

1 roof drain during a 100 year storm
elevation of water = 50mm
Flow leaving 1 roof drain = (1 x 0.60 L/s) = 0.60 L/s

4 roof drains during a 5 year storm
elevation of water = 25mm
Flow leaving 4 roof drains = (4 x 0.30 L/s) = 1.20 L/s

4 roof drains during a 100 year storm
elevation of water = 50mm
Flow leaving 4 roof drains = (4 x 0.60 L/s) = 2.40 L/s

	Roof Drain Flow		
	Flow (L/s)	Storage Depth (mm)	Total Flow (L/s)
	0.18	15	1.08
	0.24	20	1.44
	0.30	25	1.80
	0.36	30	2.16
5-Yr	0.42	35	2.52
	0.48	40	2.88
	0.54	45	3.24
	0.60	50	3.60
	0.66	55	3.96
	0.72	60	4.32
	0.78	65	4.68
100-Yr	0.84	70	5.04
	0.90	75	5.40
	0.96	80	5.76
	1.02	85	6.12
	1.08	90	6.48
	1.14	95	6.84
	1.20	100	7.20
	1.26	105	7.56
	1.32	110	7.92
	1.38	115	8.28
	1.44	120	8.64
	1.50	125	9.00
	1.56	130	9.36
	1.62	135	9.72
	1.68	140	10.08
	1.74	145	10.44
	1.80	150	10.80

Note: The flow leaving through a restricted roof drain is based on flow vs. head information

STORM SEWER DESIGN SHEET

PROJECT: 765 MONTREAL ROAD
LOCATION: CITY OF OTTAWA
CLIENT: CSV ARCHITECTS

McINTOSH PERRY

LOCATION				CONTRIBUTING AREA (ha)								RATIONAL DESIGN FLOW											SEWER DATA								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
STREET	AREA ID	FROM MH	TO MH	C-VALUE						INDIV AC	CUMUL AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm)			SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (5yr)	
				0.20	0.50	0.60	0.70	0.80	0.90																DIA	W	H			(L/s)	(%)
	B2	CB1	CB2		0.05					0.03	0.03	10.00	0.29	10.29	104.19	122.14	178.56	7.24				7.24	26.50	14.39	200			0.60	0.817	19.26	72.68%
		CB2	CB3							0.00	0.03	104.19	0.65	104.85	21.71	25.31	36.72	1.51				1.51	26.50	32.00	200			0.60	0.817	25.00	94.31%
		CB3	MH4							0.00	0.03	21.71	0.51	22.22	66.71	78.05	113.85	4.64				4.64	26.50	25.13	200			0.60	0.817	21.87	82.51%
	B1	BUILDING	MH4		0.07					0.04	0.04	10.00	0.01	10.01	104.19	122.14	178.56	10.14				10.14	87.74	1.38	250			2.00	1.731	77.60	88.44%
		MH4	*Ex.525mm*							0.00	0.06	104.19	0.16	104.36	21.71	25.31	36.72	3.62				3.62	87.74	16.83	250			2.00	1.731	84.11	95.87%

Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) = 0.013

Designed: P.G.K.
Checked: R.P.K.
Project No.: CP-18-0014

No.	Revision	Date
1.	ISSUED FOR SITE PLAN APPROVAL	APR. 13, 2018

Sheet No: 1 of 1

APPENDIX G: 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.	Section 1.2 – Figure 1 Key Map Appendix D
☐ Plan showing the site and location of all existing services.	Site Servicing and Sediment & Erosion Control Plan (C101)
☐ 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
☐ Statement of objectives and servicing criteria.	Section 3.0

☐ Identification of existing and proposed infrastructure available in the immediate area.	Section 4.0
☐ 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).	N/A
☐ 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 and Drainage Plan (C102)
☐ 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
☐ 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	Plans C101 & C102

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

☐ 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
☐ 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
☐ 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.	Appendix D Appendix E
☐ 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
☐ 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
☐ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	Section 6.0
☐ 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.	N/A
☐ 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 Appendix F
☐ Any proposed diversion of drainage catchment areas from one outlet to another.	Section 6.0
☐ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Section 6.0
☐ 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
☐ 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 and Drainage Plan (C102)
☐ 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
☐ 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 Section 9.0
☐ 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