CAPITAL ENGINEERING GROUP LTD

Municipal / Environmental / Land Development

SERVICING AND STORMWATER MANAGEMENT REPORT
ST. MARTIN DE PORRES CATHOLIC SCHOOL
20 MCKITRICK DRIVE
CITY OF OTTAWA
Revised August 7, 2020

EXISTING CONDITIONS

This site is located on the east side of McKitrick Drive south of the intersection with Castlefrank Road, in the former City of Kanata which is now within the City of Ottawa Metropolitan area. The lot is irregular in shape with 130 m frontage along McKitrick Drive. The total site area is roughly 3 hectares.

The property is currently developed with an existing school building, bus layby along McKitrick frontage, paved parking at the northwest corner and paved play areas around the building. A cluster of 10 portable classrooms are located in the landscaped area south of the school building. The remainder of the site is landscaped playing fields.

The existing school is serviced by sanitary, storm and water services, all connected to the existing municipal infrastructure located along McKitrick Drive. The municipal infrastructure includes a 250 mm sanitary, 525 mm storm and 200 mm watermain. The services enter the building near the main entrance to the school.

Drainage from the landscaped area in front of the school and the existing bus layby is captured by two catch basins located in the layby. The catch basins lead to a CBMH in front which is connected to the storm sewer on McKtrick Drive. A flow control device is installed in the CBMH to limit the outflow rate from this area.

There is also an existing catch basin near the northwest corner of the building with a separate connection to the municipal storm sewer on McKtrick Drive. It collects drainage from the adjacent parking area as well as the access laneway and adjacent play area on the north side of the school. The municipal storm sewer flows southwesterly along McKitrick Drive then southerly along Rickey Place, eventually outletting to Carp River.

The existing portables and play areas at the back and south side of the school building as well as the adjacent playing fields all sheet drain in the easterly and / or southerly directions towards the Carp River

PROPOSED DEVELOPMENT

The School Board proposes to build additional parking, and increase the number of portables (18 total) to accommodate projected future student enrolment. The new paved parking will be located adjacent to the existing access lane on the north side of the school building. It will

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consist of two rows of parking spaces with a common laneway, for a combined area of 490 m^2. Barrier curbs will be installed around the exterior perimeter.

The existing and future portable classrooms will all be located on the south side of the school building. They will be clustered in east/west rows with 1 m separation between individual portables and 6 m separation between the rows. They will all be located outside the Mississippi Valley Conservation Authority's regulation limits as well as the minimum 30 m setback from the Carp River. The regulation limit mapping was provided by MVCA.

FIRE FLOW COVERAGE FOR THE PORTABLES

A fire hydrant will be installed at the back of the school building to provide fire flow coverage for the portables, as required by the building code if the number exceeds 12. The new hydrant will be connected to the existing watermain on McKitrick Drive using a 150 mm diameter pressure pipe.

The required fire flow for the portables can be calculated using the Fire Underwriters Survey Guidelines (1999) and Ontario Building Code as follows.

Fire Underwriters Survey Guidelines (1999).

$$F = 220\ C\ A^{0.5}$$

Where F is the required fire flow in liters per minute
C = 1.5 for wood frame construction
A is the floor area of the portables – 6 per row = 71.3 x 6 = 428 m^2

F1 = 6,827 L/minute (round up to 7,000)

Separation from the school building and between the rows is 6 m and from the nearest residence is 16 m. The percentage increase for exposure is 20 % each for the north and south sides and 15 % on the west side, adding up to a total of 55 % – Add 3,850 L/minute

F2 = 7,000 + 3,850 = 10,850 L/minute (**round up to 11,000**)

Ontario Building Code

Area per row of 6 portables 428 m^2

From Table 2 of Appendix A-3.2.5.7 - for one storey building less than 600 m^2
Minimum flow rate is 1,800 Liters per minute

The required minimum fire flow rate using OBC guidelines is 1,800 L/minute

The Hydraulic Grade line in the water network on McKitrick Drive, for the fire flow of 1,800 L/minute (30 L/s) is 157.1 m. Please refer to the attached Boundary Conditions provided by the City.

The ground elevation at the portables is around 101.00 m. Head loss in the hydrant lead is about 4.2 m (6 psi). This results in a residual pressure of 51.9 m (74 psi), which exceed the Building Code requirements.

POST DEVELOPMENT GRADING AND DRAINAGE

The post development grading and drainage design is indicated on the Servicing, Drainage and Erosion & Sediment Control Plan (CEGL 201001 – G1) prepared by Capital Engineering Group Ltd.

The existing catch basin near the northwest corner of the school building will be replaced with a new CBMH. A new catch basin lead will be extended northeasterly to collect drainage from the proposed parking area. A flow control device will be installed at the new CB to limit the post development outflow rate to meet the SWM criteria.

The new and existing portable classrooms will be placed on existing grades and separated to maintain the current drainage patterns.

STORMWATER MANAGEMENT

Criteria

The City of Ottawa requires that post development runoff from this site be subject to SWM quantity control (see attached pre-application consultation notes). The City criteria for the proposed parking area are outlined as follows:

- Post development runoff to be based on the 5 year storm event
- Runoff coefficient equivalent to pre-development conditions or 0.5, whichever is less.
- Time of concentration not to be less than 10 minutes
- Flows in excess of the 5 year release rate, up to the 100 year storm event, to be retained on site

Subsequent comments were also provided by the Mississippi Valley Conservation Authority, to address the water quality control measures. MVCA would like to achieve 70 % total suspended solids removal for the site as a whole, and set a minimum infiltration target of 73 mm.

The City and MVCA also requires that the portable classrooms not interfere with existing stormwater management measures or overland flow paths.

Quantity Control - Proposed Parking

The 5 year predevelopment peak flow is calculated using the Rational Method, as follows:

$$Q = 2.78\ CIA$$

Where C is the runoff coefficient
The soil condition at the new parking area is silty clay with a flat slope (less than 5 %). The Ottawa Sewer Design Guidelines (Table 5.7) recommends a C value of 0.30 (0.375 for the 100 year storm). **This value is less than 0.5 and will governs in this case.**

I is the rainfall intensity for a given time of concentration (Tc)
Tc of 20 minutes will be used in our SWM calculations. This exceeds the 10 minute minimum.
The rainfall intensities are I_5 = 70 mm/hr and I_{100} = 120 mm/hr

A is the drainage area in hectares = 0.049 hectares

Q_5 = 2.78 x 0.30 x 70 x 0.049 = 2.9 l/s
Q_{100} = 2.78 x 0.375 x 120 x 0.049 = 6.1 l/s

Outflow Rate

In order to provide proper grading for the new parking area (based on the existing topography), the southern strip of the new pavement (roughly 130 m^2) must be sloped towards the existing laneway. It is impractical to provide flow control for this area, so drainage will be directed to the existing catch basin with no restrictions. To offset the increased flow, the flow rate from the remainder of the parking area will be over restricted to roughly 40 percent of the predevelopment 5 year rate calculated above.

The outflow rate from the new CB will be limited to 1.2 l/s.

On Site Retention

The drainage area subject to flow control is 355 m^2, with a runoff coefficient of C = 0.9 and C = 1.00 for the 5 and 100 year storm events respectively.

The attached spreadsheet provides detailed calculations of the required on site retention volumes during major storm events. The maximum retention volumes during the 5 and 100 year storm events are calculated to be approximately 6 m^3 and 15 m^3 respectively.

The outflow rate will be limited to 1.2 L/s by installing a Hydrovex 32SVHV-1 flow restrictor in the outlet pipe of the new CB. The hydraulic head at the CB during the 100 year storm event is 1.55 m. Please refer to the attached head versus flow curves provided by the supplier.

On site retention will be accommodated by surface ponding. The ponding area is 355 m^2, with a maximum ponding depth of 0.15 m. The available storage capacity is 18 m^3.

Quantity Control - Portables

As mentioned above, the portables are physically separated to maintain the current sheet drainage towards the Carp River.

The predevelopments drainage area where the portables are located is broken down as follows

Portables classrooms	710 m^2
Interconnecting gravel pathways	700 m^2
Paved laneway adjacent to the school	750 m^2
Landscaped areas adjacent to Carp River	7,840 m^2
Total Area	10,000 m^2
Runoff Coefficient	0.42

The 8 additional portables will take up 570 m^2 and increase the runoff coefficient to 0.45.

$Q_{5\ pre} = 2.78 \times 0.42 \times 70 \times 1.0 = 82$ l/s
$Q_{5\ post} = 2.78 \times 0.45 \times 70 \times 1.0 = 87$ l/s

The increase in the post development flow is marginal and will not adversely impact the current drainage to Carp River. In our opinion, introducing on site flow controls for this area is not warranted.

Quality Control

Quality control of the runoff is achieved by effective on site Best Management Practices.

The existing asphalt surfaces adjacent to the school building as well as the portable classrooms and connecting pathways all sheet drain across a wide landscaped zone before the runoff reaches the Carp River. The combined area of this zone is approximately 2 ha, including 4,700 m^2 of hard surfaces.

The remainder of the site drainage areas are directed to the storm sewer network. They include

School building	3,500 m^2
Asphalt and concrete	2,900 m^2
Front landscaping	3,600 m^2

Sheet drainage through landscaped areas or "vegetated filter strips" can trap up to 95 % of sediments. Please refer to an experiment conducted in 2006, by the Guelph Turfgrass Institute in collaboration with the Water Monitoring Section of the Ministry of Environment. A copy of the summary page is appended for reference.

TSS removals from hard surfaces are estimated as follows:

Sheet drainage to adjacent landscaping	4,700 m^2	95 %
Roof Drainage	3,500 m^2	95 %
Direct drainage to storm sewers	2,900 m^2	0%

The average TSS removal based on the above noted breakdown exceeds 70 %. This average will increase to above 85 % if the landscaped areas are included in the calculations

Infiltration

As detailed in the previous sections, the total site area is approximately 3 hectares, made up of 1.1 ha hard surfaces and 1.9 ha of landscaping.

The geotechnical report indicates that the soil condition on this site is silty clay. Table 3.1 of the MOE SWM Planning and Design Manual (attached) estimates that, under the urban lawn category, the annual infiltrations for silt loam and clay loam are 184 mm and 164 mm or an average of 173 mm.

Applying the above noted estimates to the landscaped areas and using zero (0) for the hard surfaces will result in a combined annual infiltration for the site of 110 mm. This exceeds the 73 mm target set by MVCA.

EROSION AND SEDIMENT CONTROL

Erosion and sediment control measures will be put in place prior construction to minimize off site silt runoff. The measures will conform to MOE Guideline B-6, "Guidelines for Evaluating Construction Activities Impacting on Water Resources".

Erosion and Sediment installations are detailed on drawing CEGL 201001-G1. They will remain in place until pavement and landscaping works are completed.

SUMMARY/CONCLUSION

The proposed site services are designed in accordance with the City of Ottawa design guidelines.

Fire flow coverage for the proposed portables meets the requirements of the Ontario Building Code.

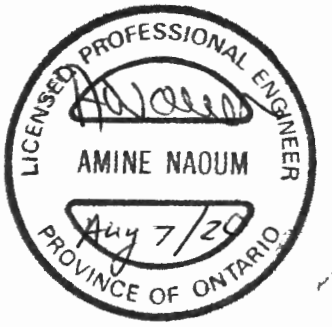
On-site stormwater management has been implemented for the site, in accordance with directions provided by the City of Ottawa and MVCA. The SWM measures are summarized as follows

- Post development runoff from the new parking area is restricted to the 5 year storm event, with a runoff coefficient equivalent to predevelopment conditions of C = 0.30. Flows in excess of the 5 year release rate, up to the 100 year storm event, will be retained on site
- The additional portables will not adversely impact the current sheet drainage to Carp River

- Quality control of the runoff is achieved by directing the majority of drainage across landscaped buffer zones to obtain the required 70 % TSS removal
- The estimated overall yearly infiltration for the site exceeds the minimum target of 73 mm.

Prepared by
Capital Engineering Group Ltd.

Andy Naoum, P.Eng.
Senior Consultant



Mississippi Valley Conservation Authority

Ontario Regulation 153/06

20 McKitrick

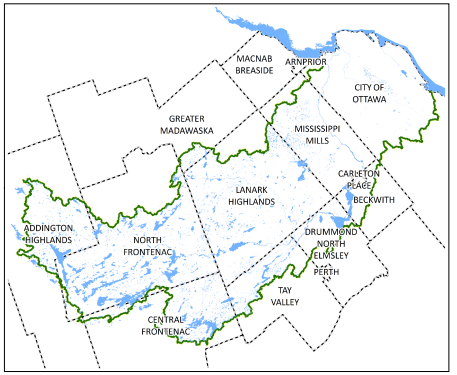
Legend

- 1m Contours
- 1:100 yr Flood Plain
- Floodplain Study Limit
- MVCA Regulation Limit
- Property - Parcels
- Ownership Parcels
- Lot - Conc.
- Township Wards

0 0.04 0.08
km
1:2,000

N
W E
S

Projection: UTM Zone 18- NAD 83 Datum



This map is produced in part with data provided by the Ontario Geographic Data Exchange under License with the Ontario Ministry of Natural Resources and the Queen's Printer for Ontario, 2019

Imagery @ Fugro Geospatial, May 2014

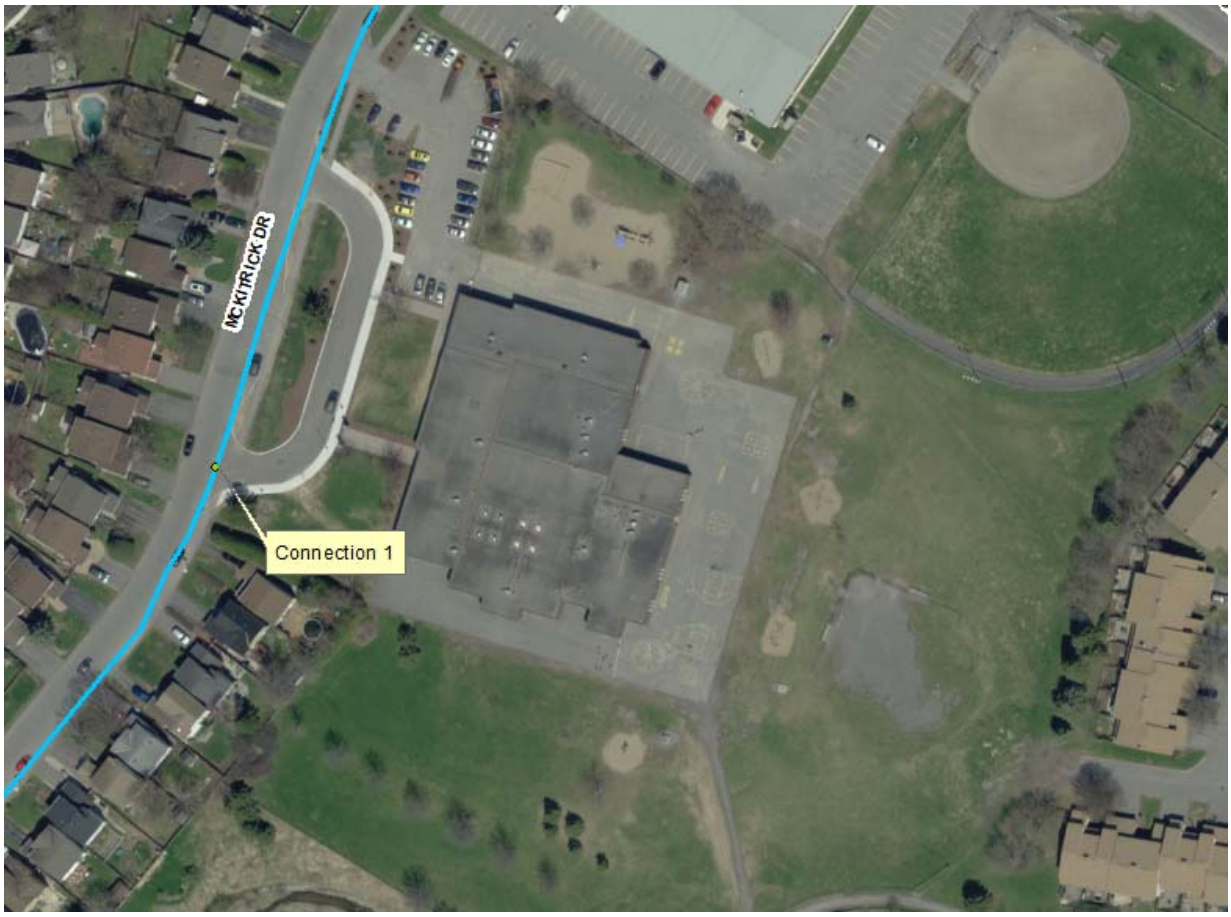
Date: 2/14/2019

Boundary Conditions
20 McKitrick Drive

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	53	0.89
Maximum Daily Demand	80	1.33
Peak Hour	144	2.40
Fire Flow Demand #1	1,800	30.00

Location



Results

Connection 1 – McKitrick Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	161.3	86.0
Peak Hour	156.2	78.8
Max Day plus Fire 1	157.1	80.0

[1] Ground Elevation = 100.8 m

Notes:

1. A second watermain connection is required to decrease vulnerability of the water system in case of breaks.
2. As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:
    a. If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
    b. Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.

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. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

File Number: PC2020-0090

April 30, 2020

Capital Engineering Group Ltd.
110 Dossetter Way
Ottawa, ON K1G 4S5
Attention: Andy Naoum

Sent via email [cegl@rogers.com]

Subject: Pre-Application Consultation
20 McKitrick Drive, Ottawa, ON

Dear Mr. Naoum,

The Planning, Infrastructure and Economic Development Department has received a request from Capital Engineering Group Ltd. on behalf of Ottawa Catholic School Board for a Pre-Application Consultation regarding 20 McKitrick Drive (St. Martin de Porres School).

Proposed Development

The applicant is proposing to add several additional portables to the site and expand the existing surface parking area by 21 spaces.

Required Application Submissions

The following applications will be required to permit the proposed development:

- Site Plan Control (Standard, Staff Approval)

More information on the process, timeline and fees for the different applications can be found here.

The required Plans & Study List for application submission has been attached.

Staff Comments

Below are staff's preliminary comments based on the information available at the time of the Pre-Application Consultation request submission:

Planning:

1. The subject site is zoned I1A H(15) – Minor Institutional, Subzone A, Maximum Height 15 metres, as per the City's Zoning By-law

2. Please note that the requirement for Site Plan Control is triggered by the proposed increase in parking. As per Section 5.4 of the Site Plan Control By-law, the enlargement of a surface parking area that adds more than nine spaces requires Site Plan Control.

3. A portion of the site is located within the Carp River floodplain. Please note that development is prohibited within any area subject to a floodplain overlay, as per Section 58 of the Zoning By-law. No portables should be located within this area.

4. Please note that development in a flood plain is regulated under the Conservation Authorities Act, and, in addition to a building permit from the municipality under the Building Code Act, will require a permit from the Conservation Authority or other authority having jurisdiction over the flood plain. A portion of the site falls within the Regulations Limits of the Mississippi Valley Conservation Authority (MVCA). Please confirm permit requirements for any proposed portables located within the regulation limits area with the MVCA.

5. Please note that minimum setbacks from watercourses are required as per Section 69 of the Zoning By-law. No buildings and structures (i.e. proposed portables) shall be located closer than:

    a) 30 m to the normal high-water mark of any watercourse or waterbody, or
    b) 15 m to the top of the bank of any watercourse or waterbody, whichever is the greater.

6. Please ensure the proposed development complies with all applicable parking requirements, the number of required spots is listed below:

    - Vehicle Parking: 1.25 per classroom, including portable classrooms (D08-02-19/A-00018)
    - Bicycle Parking: 1 per 100m^2 of gross floor area

Urban Design:

1. For the northern two parking spaces (10, 21) in the new parking lot, there may be some issue with backing out of the space, especially with space 21

Feel free to contact Melanie Knight, Planner (Urban Design), for follow-up questions by email at melanie.knight@ottawa.ca.

Engineering:

1. The Servicing Study Guidelines for Development Applications are available at the following address: http://ottawa.ca/en/development-application-review-process-0/servicing-study-guidelines-development-applications

2. Servicing and site works shall be in accordance with the following documents:

   - Ottawa Sewer Design Guidelines (October 2012)
   - Ottawa Design Guidelines – Water Distribution (2010)
   - Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
   - City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
   - City of Ottawa Environmental Noise Control Guidelines (January 2016)
   - City of Ottawa Park and Pathway Development Manual (2012)
   - City of Ottawa Accessibility Design Standards (2012)
   - Ottawa Standard Tender Documents (latest version)
   - Ontario Provincial Standards for Roads & Public Works (2013)

3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 ext.44455).

4. Stormwater management will need to be provided for the proposed works. Additionally, it should be demonstrated and discussed in the SWM Report that the proposed portables will not interfere with any existing stormwater management measures or overland flow paths. The Stormwater Management Criteria, for the subject site, is to be based on the following:

   i. The 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
   ii. The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).
   iii. A calculated time of concentration (Cannot be less than 10 minutes).
   iv. Flows to the storm sewer in excess of the 5-year storm release rate, up to and including the 100-year storm event, must be detained on site.

5. It should be demonstrated that adequate fire protection exists for the addition of the proposed and future portables. If it is deemed that additional fire protection is

required, a water boundary condition request should be made. Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:

i. Location of service
ii. Type of development and the amount of fire flow required (as per FUS, 1999).
iii. Average daily demand:_____l/s.
iv. Maximum daily demand:_____l/s.
v. Maximum hourly daily demand:_____l/s.

6. The 2013 Geotechnical report can is considered sufficient given the scale of the proposed development. However, please note that as the 2013 geotechnical analysis did not take the proposed location of additional parking into account, boreholes were not drilled in that area. Therefore, a geotechnical inspection during the construction phase of the development will be required as a condition of approval, if granted, to ensure that the 2013 recommendations are adequate.

Feel free to contact Justin Armstrong, Infrastructure Project Manager, for follow-up questions by email at justin.armstrong@ottawa.ca

Transportation:

1. No comments.

Feel free to contact Mike Giampa, Transportation Project Manager, for follow-up questions by email at mike.giampa@ottawa.ca

Fire Services:

1. Please note that the Fire Code does not specifically deal with school portables.

2. The Ontario Building Code has specific requirements related to portable classrooms. These requirements largely revolve around the spacing of the portables, as well the total number of portables. Once the total number of portables on a site exceeds 12, the requirements become more significant (e.g. fire alarm systems, fire access routes, fire hydrants, etc.)

3. Please review the sections of the OBC:

   - 3.9.3.1. Building Areas (1) & (2);
   - 3.9.3.2. Spatial Separations (1) & (2);
   - 3.9.3.3. Fire Alarm Systems (1) - (3);
   - 3.9.3.4. Provisions for Firefighting (1);
   - 3.9.3.5. Portable Fire Extinguishers (1);

- 3.9.3.6. Means of Egress (1);
- 3.9.3.7. Fuel-Fired Appliances (1) - (4);
- 3.9.3.8. Washroom Facilities (1); and,
- 3.9.3.9. Barrier-Free Access (1).

Environmental Planning:

1. No Environmental Impact Statement (EIS) is required; however, please address Section 4.7.3 of the Official Plan (OP) in your planning rationale.

    - Demonstrate that the proposed development is clear of the floodplain and other setbacks – refer to other studies (e.g. Geotechnical Investigation, etc.), and provide a diagram showing all setbacks identified in the OP.

    - Identify how stormwater management will be managed, as the proposed development will result in an increase in impervious surfaces on the site.

2. Consider implementing some low impact development (LID) measures into site design.

3. Please consider additional opportunities for tree planting on the site. The City has a target of 30% urban tree canopy cover and adding more trees (and other vegetation), especially along the watercourse. This would greatly benefit the tree canopy, as well as the Carp River.

Feel free to contact Sami Rehman, Environmental Planner, for follow-up questions by email at sami.rehman@ottawa.ca

Forestry:

1. 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.

2. Any removal of privately-owned trees 10cm or larger in diameter requires a tree permit issued under the Urban Tree Conservation Bylaw; the permit is based on the approved TCR.

3. Any removal of City-owned trees will require the permission of Forestry Services who will also review the submitted TCR.

4. For this site, the TCR may be combined with the Landscape Plan provided all information is clearly displayed.

5. The TCR must list all trees on site by species, diameter and health condition – separate stands of trees may be combined using averages.

6. The TCR must address all trees with a critical root zone that extends into the developable area – all trees that could be impacted by the construction that are outside the developable area need to be addressed.

7. 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.

8. If trees are to be removed, the TCR must clearly show where they are, and document the reason they can not be retained – please provide a plan showing retained and removed treed areas.

9. All retained trees must be shown and all retained trees within the area impacted by the development process must be protected as per City guidelines listed on Ottawa.ca

    - The location of tree protection fencing must be shown on a plan
    - Include distance indicators from the trunk of the retained tree to the nearest part of the tree protection fencing
    - Show the critical root zone of the retained trees
    - If excavation will occur within the critical root zone, please show the limits of excavation and calculate the percentage of the area that will be disturbed

10. The City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.

11. Please ensure newly planted trees have an adequate soil volume for their size at maturity.

Feel free to contact Mark Richardson, Planning Forester, for follow-up questions by email at mark.richardson@ottawa.ca

External Agencies

Mississippi Valley Conservation Authority:

1. The subject lands abut a portion of the Carp River/ Carp Creek that flows through the Glen Cairn neighborhood in Kanata South.

2. The portable classrooms must be located a minimum of 30 metres from the watercourse. The setback of the portable classrooms from the watercourse is not marked on the concept plan but based on the scale they appear to be closer than 30 metres. Further submissions should include the setback from the watercourse on the plans.

3. The Conservation Authority does not support institutional uses such as schools within floodplains, as outlined the Provincial Policy Statement, policy 3.1.5. The portable classrooms must be located outside of the 100-year flood plain.

4. MVCA provided comments on the Minor Variance application to reduce the number of parking spaces per classroom, due to the introduction of more portable classrooms last year. Please see map at the bottom of previous comments, which identifies the floodplain on the subject property. The limit of the regulated area is an additional 15 metres from the floodplain. MVCA recommends that the portable classrooms be located outside of the regulation limit.

Next Steps

Please refer to the links to "Guide to preparing studies and plans" and fees for further information. Additional information is available related to building permits, development charges, and the Accessibility Design Standards. Be aware that other fees and permits may be required, outside of the development review process. You may obtain background drawings by contacting informationcentre@ottawa.ca.

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

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

Sincerely,

Colette Gorni
Planner
Development Review West
City of Ottawa
110 Laurier Avenue West, 4th Floor
Ottawa, ON K1P 1J1
Tel.: 613-580-2424, ext. 21239
colette.gorni@ottawa.ca

Enclosures: Required Plans & Study List

CC: Justin Armstrong, Infrastructure Project Manager, City of Ottawa
Mike Giampa, Transportation Project Manager, City of Ottawa
Melanie Knight, Planner (Urban Design), City of Ottawa
Sami Rehman, Planner (Environmental), City of Ottawa
Allan Evans, Fire Prevention Engineer, City of Ottawa

Andy Naoum

From: Erica Ogden <eogden@mvc.on.ca>
Sent: August 6, 2020 3:34 PM
To: Andy Naoum
Cc: 'Randy Leafloor'
Subject: RE: Pre-con Follow-up - 20 McKitrick Drive

Hello Andy,

Following up on our phone call last week, I have spoken with our engineer with regards to our comment below.

iv) Please confirm existing water quality treatment on site and provide a method of achieving 70% long term total suspended solids removal.

The revised report should include details regarding water quality to demonstrate the existing and post-development water quality measures that provide an overall treatment of 70% total suspended solids removal for the site as a whole. We are not requesting a OGS/Stormceptor be included in the plan. The existing runoff flow pathways should be described in the report and compared to the post-development flow pathways.

Thank you,

Erica C. Ogden, MCIP, RPP | Environmental Planner | Mississippi Valley Conservation Authority
10970 Highway 7, Carleton Place, ON K7C 3P1
www.mvc.on.ca |c. 613 451 0463 |o. 613 253 0006 ext. 229| eogden@mvc.on.ca

---

From: Andy Naoum <cegl@rogers.com>
Sent: July 31, 2020 9:50 AM
To: Erica Ogden <eogden@mvc.on.ca>
Cc: 'Randy Leafloor' <randy.leafloor@ocsb.ca>
Subject: RE: Pre-con Follow-up - 20 McKitrick Drive

Hi Erica,

Please give me a call when you have a minute.

I wanted to discuss the MVCA comments for this site. Specifically Comment iv.

Thanks,

Andy Naoum, P.Eng.Thanks,
Capital Engineering Group Ltd.
(613) 739-0776

From: Erica Ogden [mailto:eogden@mvc.on.ca]
Sent: April 30, 2020 5:50 PM
To: Gorni, Colette <colette.gorni@ottawa.ca>; Andy Naoum <cegl@rogers.com>
Cc: randy.leafloor@ocsb.ca
Subject: RE: Pre-con Follow-up - 20 McKitrick Drive

Hello Andy,

Please find attached a pdf map of the regulation limit and floodplain on the property. I have also provided a link to our online map which you may find helpful.

Regulation Map

If you have any questions, please feel free to contact me.

Thank you,

Erica C. Ogden, MCIP, RPP | Environmental Planner | Mississippi Valley Conservation Authority
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STORMWATER MANAGEMENT CALCULATIONS
ST. MARTIN DE PORRES
20 MCKITRICK DRIVE
June 8 / 2020

ON SITE RETENTION FOR 5 YEAR STORM	AREA	RUNOFF	2.78 CA	DURATION	INTENSITY	PEAK FLOW	OUTFLOW	RETENTION	STORED
	(ha)	COEFF.		(min)	(mm/hr)	(L/s)	RATE(L/s)	RATE(L/s)	VOLUME(m3)
	0.036	0.90	0.09	5	141	12.54	1.20	11	3.40
	0.036	0.90	0.09	10	104	9.25	1.20	8	4.83
	0.036	0.90	0.09	15	84	7.42	1.20	6	5.60
	0.036	0.90	0.09	20	70	6.24	1.20	5	6.05
	0.036	0.90	0.09	25	61	5.41	1.20	4	6.31
	0.036	0.90	0.09	30	54	4.79	1.20	4	**6.46**
	0.036	0.90	0.09	70	29	2.61	1.20	1	5.92

ON SITE RETENTION FOR 100 YEAR STORM	AREA	RUNOFF	2.78 CA	T of C	INTENSITY	PEAK FLOW	OUTFLOW	RETENTION	STORED
	(ha)	COEFF.		(min)	(mm/hr)	(L/s)	RATE(L/s)	RATE(L/s)	VOLUME(m3)
	0.036	1.00	0.10	5	243	23.95	1.20	23	6.83
	0.036	1.00	0.10	10	179	17.62	1.20	16	9.85
	0.036	1.00	0.10	15	143	14.10	1.20	13	11.61
	0.036	1.00	0.10	20	120	11.84	1.20	11	12.77
	0.036	1.00	0.10	25	104	10.25	1.20	9	13.57
	0.036	1.00	0.10	30	92	9.07	1.20	8	14.16
	0.036	1.00	0.10	60	56	5.52	1.20	4	**15.54**
	0.036	1.00	0.10	90	41	4.06	1.20	3	15.43

John Meunier - Hydrovex SVHV ICD Curves

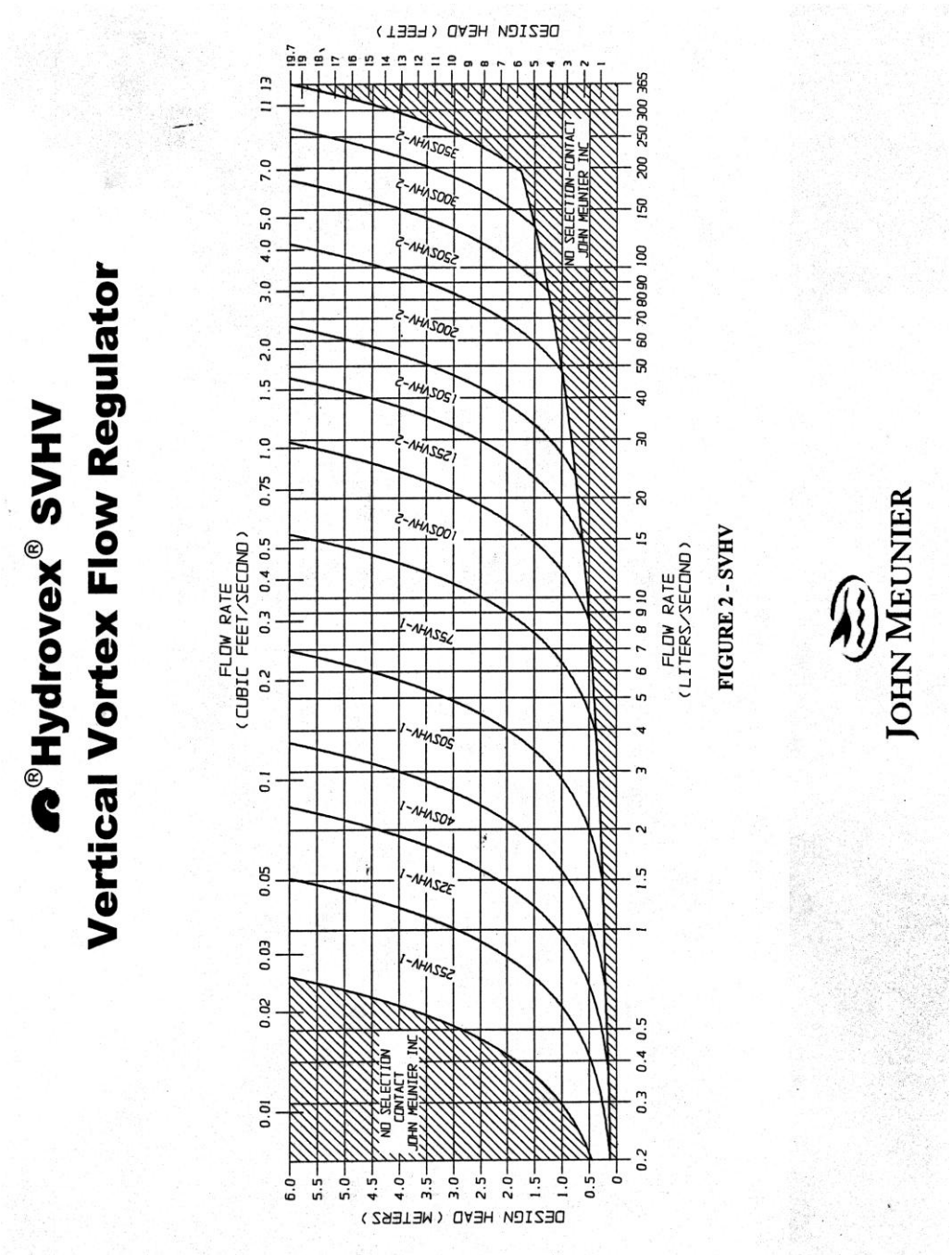

FIGURE 2 - SVHV

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Effectiveness of Vegetative Filter Strips in Removal of Sediments from Overland Flow

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Many forms of natural heritage manifested as streams, rivers, ponds, lakes and wetlands play an integral role in maintaining natural beauty, health and a high quality of life. Agricultural intensification in southern Ontario has contributed to elevated sediments, nutrient and bacteria levels in water bodies. Vegetative filter strips (VFS) are control measures that can partially remove sediments and pollutants adhered to sediments from overland runoff before entering water bodies. The objective of this study was to determine the effect of vegetation type, width of the filter strip, runoff flow rate and inflow sediment characteristics on effectiveness of the VFS in removing pollutants from runoff. The results show that sediment removal efficiency increased from 50 to 98% as the width of the filter increased from 2.5 to 20 m. In addition to the width of the filter strip, grass type and flow rate were also significant factors. This study indicates that the first five (5) metres of a filter strip are critical and effective in removal of suspended sediments. More than 95% of the aggregates larger than 40 µm in diameter were trapped within the first five metres of the filter strip.

Key words: **vegetative filter strips, water quality, stormwater management**

Introduction

The *Clean Water Act* and the *Nutrient Management Act* passed recently in the Ontario legislature have put in motion a massive science-based effort to better understand and protect our drinking water sources. Sediment, nitrogen, phosphorus and bacteria are primary pollutants associated with surface runoff from agricultural fields (McLeod and Hegg 1984; Edwards et al. 1983). Environmental concern related to nutrient loss and appearance of sediments and sediment-bound contaminants at higher than recommended levels in water systems can be addressed by adopting better management options. Major investments are being made in Ontario to control point and non-point pollution sources.

During the recent past, vegetative filter strips (VFS) have become an important best management practice (BMP) to control pollutant transport by stormwater runoff and are used widely in the United States to enhance the quality of stream ecosystems (Schellinger and Clausen 1992; Mickelson and Baker 1993; Chaubey et al. 1994; Patty et al. 1997; Egball et al. 2000; Fajardo et al. 2001; Boyd et al. 2003). Numerous studies have clearly advocated the effectiveness of vegetative filter strips as the first defense mechanism in the multi-tier approach of reducing pollutant transport from agricultural fields.

Dickey and Vanderholm (1981) studied feedlot runoff and found that VFS can remove up to 95% (on mass basis) of nutrients and oxygen-demanding materials from the incoming runoff with concentration reductions of up to 80%. However, Dillaha et al. (1988) observed a significant reduction in the sediment trapping efficiency of VFS when flow regimes changed from uniform to concentrated flow. Lammers et al. (1991) also observed similar results in a survey of buffer strips in Virginia and concluded that buffer strips were not very effective when water collects in natural drainage ways prior to crossing the buffer strips.

Chaubey et al. (1994) observed a mass reduction of total suspended solids (TSS) and total phosphorus (TP) in surface runoff by 66 and 27%, respectively, with a 4.6-m wide filter strip. They also observed an improvement in the ammonia and P removal from swine lagoon effluent with an increase in filter strip width. Such reductions can be attributed to a decrease in flow velocity and the retarding effect of vegetation; however, the reductions in the concentration of soluble pollutants were not as significant (Edwards et al. 1996; Srivastava et al. 1996; Robinson et al. 1996; Lim et al. 1998).

Schmitt et al. (1999) suggested that VFS were more effective in the reduction of particulate pollutant concentration but have less effect on the concentration of soluble pollutants. They investigated the performance of different filter strip widths and concluded that filter strips of 7.5 and 15 m in width can result in 76 and 93% sediment removal efficiencies.

Oelbermann and Gordon (2000) evaluated the performance of the VFS by comparing the pollutant con-

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Table 3.1: Hydrologic Cycle Component Values

	Water Holding Capacity mm	Hydrologic Soil Group	Precipitation mm	Evapo-transpiration mm	Runoff mm	Infiltration* mm
Urban Lawns/Shallow Rooted Crops (spinach, beans, beets, carrots)						
Fine Sand	50	A	940	515	149	276
Fine Sandy Loam	75	B	940	525	187	228
Silt Loam	125	C	940	536	222	182
Clay Loam	100	CD	940	531	245	164
Clay	75	D	940	525	270	145
Moderately Rooted Crops (corn and cereal grains)						
Fine Sand	75	A	940	525	125	291
Fine Sandy Loam	150	B	940	539	160	241
Silt Loam	200	C	940	543	199	199
Clay Loam	200	CD	940	543	218	179
Clay	150	D	940	539	241	160
Pasture and Shrubs						
Fine Sand	100	A	940	531	102	307
Fine Sandy Loam	150	B	940	539	140	261
Silt Loam	250	C	940	546	177	217
Clay Loam	250	CD	940	546	197	197
Clay	200	D	940	543	218	179
Mature Forests						
Fine Sand	250	A	940	546	79	315
Fine Sandy Loam	300	B	940	548	118	274
Silt Loam	400	C	940	550	156	234
Clay Loam	400	CD	940	550	176	215
Clay	350	D	940	549	196	196

Notes: Hydrologic Soil Group A represents soils with low runoff potential and Soil Group D represents soils with high runoff potential. The evapotranspiration values are for mature vegetation. Streamflow is composed of baseflow and runoff.

* *This is the total infiltration of which some discharges back to the stream as base flow. The infiltration factor is determined by summing a factor for topography, soils and cover.*

Topography	Flat Land, average slope < 0.6 m/km	0.3
	Rolling Land, average slope 2.8 m to 3.8 m/km	0.2
	Hilly Land, average slope 28 m to 47 m/km	0.1
Soils	Tight impervious clay	0.1
	Medium combinations of clay and loam	0.2
	Open Sandy loam	0.4
Cover	Cultivated Land	0.1
	Woodland	0.2