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December 17, 2018

City of Ottawa
Development Review - Urban Services Branch
Planning and Growth Management Department
110 Laurier Avenue West, 4th Floor, Ottawa, ON, K1P 1J1

Attention Steve Gauthier, Planner II

Re Elmdale Public School Addition, 49 Iona Street, Ottawa, ON
Site Servicing and Stormwater Management Brief

Dear Steve:

We provide the following Site Servicing and Stormwater Management Brief in accordance with the City of Ottawa Site Plan Control Application requirements for the Ottawa Carleton District School Board's (OCDSB) proposed Elmdale Public School Addition at 49 Iona Street, Ottawa, see attached City of Ottawa Pre-consultation meeting notes in **Appendix A**. The purpose of the report is to confirm that existing site services, including water, storm and sanitary, can support the increased demand from the proposed re-development of the site.

Reference documents

- C1 - Site Servicing Pan, C2 - Site Grading and Drainage, Erosion and Sediment Control Plan, and C3 - Details Plan, by Jp2g Consultants Inc., December 17, 2018.
- Topographical Survey by Farley, Smith & Denis Surveying Ltd., October 5, 2018, File No. 498-18.

Background

The existing school property is located on a 1.15 ha lot, fronting onto Iona Street, Clarendon Avenue, and Java Street. The proposed site development includes the construction of a 690 m^2 two-storey, building addition adjacent to the west of the school and an associated walkway.

Servicing

1.1 Storm Servicing

Based on record drawings, the existing school roof is currently serviced by a 150mm diameter combined sewer service that discharges roof drainage and sanitary sewage from the existing school to Java Street. Refer to **Figure 1** for the site's full storm sewer network. Based on record drawings, it appears that the existing school does not connect to the municipal storm system. The site itself sheet drains to the right-of-way catchbasins.

The proposed renovations will include the separation of the sanitary and storm (roof drains) from the existing school building. The proposed addition roof, parking lot, landscaped area, as well as the existing roof will connect to a new storm sewer network and ultimately connect to Java Street municipal storm sewer. New structures will include one catchbasin, three catch basin manholes, and two manholes. Drainage from the catchbasins, existing roof, and addition roof will discharge to STMH-1. Currently, pre-development flows are directed overland to the storm sewer system in the right of way on Java Street and Iona Street. Stormwater quantity control will be achieved using three flow control roof drains on the proposed addition roof as well as flow controls in CBMH-2 and CBMH-3. The existing roof cannot support the weight of stormwater. Therefore, tree sections of 20m (60m total) 900mm diameter HDPE sewers are proposed for underground stormwater storage. Stormwater management calculations are included in **Appendix B**.

1.2 Stormwater Management

Storm drainage calculations for the entire site are not included in this report and are for only the development area; stormwater management calculations can be found in **Appendix B**. The development areas, as shown on **Figure 1** and **Figure 2**, includes the pre- and post- storm water management drainage areas.

Stormwater management calculations provided within this report only include the development area (A1 – A4) parameters. A4 will represent the existing school building which currently discharges to the sanitary sewer on Java Street. The proposed renovations will include the separation of the sanitary and storm (roof drains) from the existing school building. Therefore, there will be an increase in stormwater to the municipal storm sewer and a decrease to the municipal sanitary sewer. Decreasing the sanitary flows will benefit the City of Ottawa by reducing the sanitary treatment volume. Based on pre-development conditions, the average runoff coefficient for the development area is **C=0.70**. In accordance with City of Ottawa requirements the allowable release rate for this site is to be restricted to the 5-year storm event. The pre-development area was divided into four drainage areas and analysed separately according to areas that will be altered from soft to hard surface.

Based on the 5-year design storm, a rainfall intensity of 104.2 mm/hr (t_c=10 min.), and a proposed drainage area (A1 – A4) of **0.6162 ha**, the 5-year allowable release rate is: **$Q_{allowable}$ = 2.78 x 0.70 x 104.2 mm/hr x 0.616 ha = 124.7 l/s**.

The roof drains from the proposed addition connect externally to a 250mm diameter storm sewer lateral and ultimately to the new storm sewer system in the parking lot at a controlled release rate of 5.0 l/s for the 1:100-year event. The proposed 300mm diameter storm sewer from the parking lot will ultimately connects to the 300mm diameter municipal storm sewer on Java Street.

As noted above, the development area is approximately **0.616 ha** and has a post-development average weighted runoff coefficient of **C=0.70** and **C=0.79** for the 5-year and 100-year events, respectively. Stormwater management techniques are required to reduce peak flows from the development area, given that post-development peak flows will exceed the 5-year allowable release rate. Overall onsite storage requirements for the development area were calculated to be **18m^3** and **72m^3** for the 5-year and 100-year events, respectively.

Post-development peak flows will also be detained on the proposed two-storey addition roof by installing flow control roof drains at the proposed roof drains limiting the total flow from the roof to **5.0 l/s**. The three roof drains for the new two-storey addition will outlet the proposed building addition through a 250mm diameter storm sewer and connect to the proposed 300mm diameter storm sewer in the parking lot. On the roof, the restricted flow will create rooftop storage of **9 m^3** (90mm ponding depth) and **23 m^3** (130mm ponding depth) for the 5-year and 100-year event, respectively. Based on the maximum ponding depth of 150mm on the roof, the total available storage is approximately **27 m^3**, which is sufficient to accommodate the 100-year event. Refer to Appendix B, Table B.1.4 – Site Storage for ponding calculations.

At CBMH-2, the restricted flow rate of **10.0 l/s** with 50mm of above ground ponding. The remaining required storage will be stored in two 30.0m 900mm diameter HDPE sewer at an estimated volume of **38.0 m^3** and **43 m^3** (38.0m^3 underground and 5m^3 above ground) for the 5-year and 100-year events, respectively, which is sufficient to accommodate the 100-year event.

At CBMH-3, the restricted flow rate of **65.0 l/s** with no above ground ponding. The remaining required storage will be stored in three 20.0m 900mm diameter HDPE sewer at an estimated volume of **38.0 m^3** for the 5-year and 100-year events, which is sufficient to accommodate the 100-year event.

The proposed release rate for the development area during the 100-year event, which includes only controlled flows from the proposed addition roof, was calculated to be **8.88 l/s**. Therefore, the proposed release rate is within the allowable release rate for this development area, determined to be **9.1 l/s**.

Stormwater management calculations/analysis for the entire site was not included in the scope of work, therefore the overland flow route cannot be confirmed. However, based on the topographical survey data, it appears that the direction of the overland flow route follows the alignment of the site's access road towards Greenbank Rd.

1.3 Sanitary Servicing

Based on record drawings, the existing Elmdale Public School site is currently serviced by a 150mm diameter sanitary service that discharges from the existing school to the existing 225mm diameter municipal sanitary sewer on Java Street. The existing sanitary system is a combined system that outlets the sanitary waste from the school as well as the existing buildings roof drains. The proposed renovations will include the separation of the sanitary and storm (roof drains) from the existing school building. The existing building roof drains will outlet to the new stormwater management system in the proposed parking lot. The existing 150mm diameter sanitary sewer will continue to service the existing school building but will exclude the existing storm roof drain discharge resulting in a reduced sanitary treatment volume. A second sanitary sewer connection is proposed to service the proposed addition. The proposed 200mm diameter sanitary sewer will outlet the proposed addition at a slope of 2.0% and connect to the 225mm diameter municipal sanitary sewer on Java Street.

The peak sanitary flows for the entire site (1.153 ha) were calculated to be 0.56 l/s or 0.28 l/s for each section of sewer (Refer to **Appendix C** - Sanitary Sewer Design Sheet). The existing 150mm diameter sanitary service slope is unknown and assumed to be 0.5%; therefore, it will have a full flow capacity of 10.8 l/s, which will be reduced from the existing conditions. The proposed 200mm diameter sanitary service will have a full flow capacity of 46.4 l/s which is adequate to handle the proposed development sanitary flows. There will be a decrease in the sanitary flows to the existing municipal sanitary sewer.

1.4 Water Servicing

Based on record drawings, the existing Elmdale Public School site is currently serviced by a 100mm diameter water service connected to the 150mm diameter municipal watermain on Iona Street. The existing 100mm diameter watermain will be upgraded to a 150mm diameter watermain for this redevelopment project to accommodate a sprinkler system in the existing school and the proposed addition.

Water requirements were provided to the City of Ottawa for the hydraulic analysis of the boundary conditions for the school site. The water demand for the proposed school was calculated based on Table 4.2 from the City of Ottawa Design Guidelines for Water Distribution. The calculations are based on the following criteria:

- Average daily demand for schools = 70 l/student/day
- School day = 8 hours
- School occupancy = 591 persons (staff and students)

Average Daily Demand: $\frac{70 \text{ l/student/day} \times 591 \text{ persons}}{8 \text{ hrs/day} \times 3600 \text{ s/hr}} = 1.44 \text{ l/s}$

Maximum Daily Demand: 1.44 l/s x 1.5 = 2.15 l/s

Maximum Hour Demand: 2.15 l/s x 1.8 = 3.88 l/s

1. Average daily demand: 1.44 L/s.
2. Maximum daily demand: 2.15 L/s.
3. Maximum hourly daily demand: 3.88 L/s.

Based on the Fire Underwriters Survey Method, the fire flow demand for the school was calculated to be: 216.7 L/s (refer to **Appendix D** – Fire Flow Calculations AND Boundary Conditions). The existing building and proposed building addition will be equipped with a sprinklers system.

The above water demand requirements were provided to the City of Ottawa for the hydraulic analysis of the boundary conditions at the proposed institutional development location. The following Boundary Conditions, included in **Appendix D**, were returned from a previous set of water requirements:

Minimum HGL = 108.0m
Maximum HGL = 115.0m
Available Flow @ 20psi = 70 L/s assuming a ground elevation of 70.8m

In accordance with the City of Ottawa Technical Bulletin ISTB-2018-02 issued March 21, 2018, no new hydrants will be required as part of this project. Refer to **Appendix D** for existing hydrant locations. Two municipal hydrants are within 150m of the existing school and one municipal and one private hydrant are within 75m of the existing school. Combined the hydrants can provide a total of 316.6 l/s (63.3 l/s + 63.3 l/s + 95 l/s + 95 l/s), which exceeds the required fire flow of 216 L/s.

1.5 Agency Approvals

We understand that ultimately, the receiving watercourse for this site is the Ottawa River. Based on correspondence with the Rideau Valley Conservation Authority (RVCA), attached in **Appendix E**, given the distance to the watercourse outlet, onsite water quality controls would have a negligible impact on surface water improvement.

End of Site Servicing and Stormwater Management Brief

Sarah McLaughlin, P.Eng.
Civil Engineer

Att. Appendix A – City of Ottawa Pre-consultation meeting notes
Appendix B – Stormwater Management Calculations
Appendix C – Sanitary Service Calculations and Coordination
Appendix D – Fire Flow Calculations and Boundary Conditions
Appendix E – RVCA Correspondence, dated November 29, 2018

LEGEND

PRE DEVELOPMENT DRAINAGE BOUNDARY

DRAINAGE AREA LABEL

REFERENCE NUMBER — A1 — 0.23 (RUNOFF COEFFICIENT (5 YEAR)) — 0.29 (RUNOFF COEFFICIENT (100 YEAR)) — 0.407 ha (AREA)

SAMH-2 TG:71.48

STMH-2 TG:71.50

SAMH-1 TG:71.80

STM 1 TG:7 5

CBMH-1 TG:71.50

CBMH-2 TG:71.50

CBMH-3 TG:71.65

CB-1 TG:71.70

Maximum 4:1 slope

A2 | 0.90 | 1.00 | 0.091 ha

A3 | 0.52 | 0.62 | 0.329 ha

A1 | 0.9 | 1.0 | 0.025 ha

A4 | 0.90 | 1.00 | 0.174 ha

1:500

0 5 10 15 20 25 m

0 1:1 5 cm

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ELMDALE PUBLIC SCHOOL

49 IONA STREET, OTTAWA, ONTARIO

FIGURE 1: PRE-DEVELOPMENT STORMWATER MANAGEMENT SUB-DRAINAGE AREAS

Designed : SM		Project No. : 18-1065A
Drafted : RW		Revision Date : 2018-12-17
Checked :	Approved :	Revision No. : 1
Scale : 1:500		

Folder: J:\1-MULTIDISCIPLINE\2018\18-1065A - CUHACI - ELMDALE PS - ADDITION AND RENOVATION\05 DRAWINGS\1 ONGOING | Drawing: C1&C2 site servicing and grading plan Elmdale.dwg | Layout: Pre-development drainage | Print date: 9:52 AM December 18, 2018

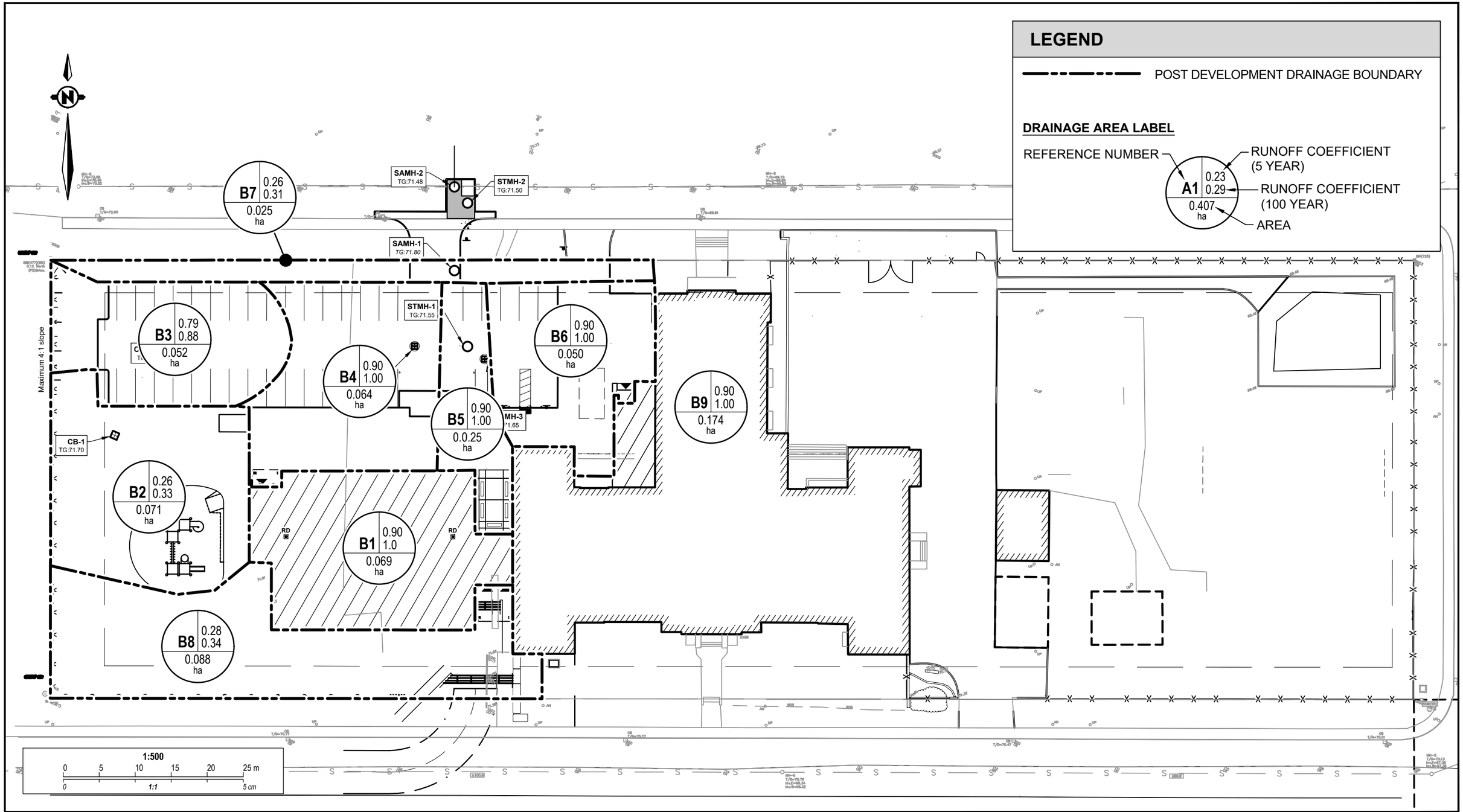

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FIGURE 2: POST-DEVELOPMENT STORMWATER MANAGEMENT SUB-DRAINAGE AREAS

Designed : SM		Project No. : 18-1065A
Drafted : RW		Revision Date : 2018-12-17
Checked :	Approved :	Revision No. : 1
Scale : 1:500		

Appendix A - Record of Pre-Consultation

APPLICANT'S STUDY AND PLAN IDENTIFICATION LIST

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

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

http://ottawa.ca/en/development-application-review-process-0/guide-preparing-studies-and-plans

S/A	Number of copies	ENGINEERING		S/A	Number of copies
S	15	1. Site Servicing Plan	2. Site Servicing Study / Brief	S	3
S	15	3. Grade Control and Drainage Plan	4. Geotechnical Study / Slope Stability Study	S	3
		5. Composite Utility Plan	6. Groundwater Impact Study		
		7. Servicing Options Report	8. Wellhead Protection Study		
TBD	3	9. Transportation Impact Study / Brief	10.Erosion and Sediment Control Plan / Brief	S	3
S	3	11.Storm water Management Report / Brief	12.Hydro geological and Terrain Analysis		
		13.Hydraulic Water main Analysis	14.Noise / Vibration Study (If on-site stationary noise source)		
		15.Roadway Modification Design Plan	16.Confederation Line Proximity Study		

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

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

S/A	Number of copies	ADDITIONAL REQUIREMENTS		S/A	Number of copies
		43.	44.		

Meeting Date: November 1, 2018

Application Type: Site Plan Control

File Lead (Assigned Planner): Steve Gauthier

Infrastructure Approvals Project Manager: Jessica Valic

Site Address (Municipal Address): 49 Iona Street

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

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

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

Appendix B - Stormwater Management Calculations

Elmdale Public School, 49 Iona Street, Ottawa, Ontario

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B.1.1 - Allowable release rate

ID	Description	Type	Areas (m^2) $C_{0.90}$	$C_{0.50}$	$C_{0.20}$	Total (m^2)	$C_{pre\text{-}2\text{-}yr}$	$C_{pre\text{-}100\text{-}yr}$*
A1	Existing Addition	uncontrolled	225	0	0	225	0.90	1.00
A2	Area draining to Java Street	uncontrolled	910	0	0	910	0.90	1.00
A3	Area draining to Iona Street	uncontrolled	955	1320	1010	3285	0.52	0.62
A4	Existing School	uncontrolled	1735	0	0	1735	0.90	1.00
			3825	1320	1010	6155	0.70	0.80

Using the Rational Method, the maximum allowable release rate is therefore:

Total Area, A =	0.616	ha
Runoff coefficient, C =	0.70	
Estimated time of concentration, t_c =	10.0	minutes
Based on Ottawa IDF curve, $i_{5\text{-years}}$ =	$998.071/ (t_c+6.053)^{0.814}$	
	104.2	mm/hr

$Q_{allowable}$ = *Q = 2.78 C x i x A*

$Q_{allowable\ (5\text{-year})***}$ = 124.7 l/s

C is the Runoff Coefficient
i is the intensity in mm/hr
A is the area in hectares (ha)

****In accordance with City of Ottawa requirements, the allowable release rate for this site is based on the 5-yr storm*

B.1.2 - Post-development release rate

			A	B	C	D		
			Areas (m^2)					
ID	Description	Type	$C_{0.90}$	$C_{0.50}$	$C_{0.20}$	Total (m^2)	$C_{post\text{-}2\text{-}yr}$	$C_{post\text{-}100\text{-}yr}$*
B1	Proposed new addition	controlled	690	0	0	690	0.90	1.00
B2	Soft area draining to Java Street	controlled	0	150	555	705	0.26	0.33
B3	Hard area draining to Java Street - west parking lot	controlled	440	0	80	520	0.79	0.88
B4	Hard area draining to Java Street - centre parking lot	controlled	635	0	0	635	0.90	1.00
B5	Hard area draining to Java Street - centre parking lot	controlled	250	0	0	250	0.90	1.00
B6	Hard area draining to Java Street - east parking lot	uncontrolled	495	0	0	495	0.90	1.00
B7	Soft area adjacent to parking lot draining to Java Street	uncontrolled	20	0	225	245	0.26	0.31
B8	Soft area draining to Iona Street	uncontrolled	100	15	765	880	0.28	0.34
B9	Existing School	controlled	1735	0	0	1735	0.90	1.00
			4365	165	1625	6155	0.70	0.79

Calculations for post-development runoff coefficient

$C_{post\text{-}5\text{-}yr\ (col.\ D)}$ =(column A * 0.9 + column B * 0.5 + column C * 0.2) / column D

$C_{post\text{-}100\text{-}yr\ (col.\ E)}$ =(column A * 1.0 + column B * 0.5*1.25 + column C * 0.2*1.25) / column D

note: 0.90 x 1.25 = 1.125, use max. 1.0

Calculations for average weighted runoff coefficient

$C_{post\text{-}5\text{-}yr}$ =((6915*0.9)+(430*0.5)+(2045*0.2))/9390 0.70

$C_{post\text{-}100\text{-}yr}$ =((6915*1.0)+(430*0.5*1.25)+(2045*0.2*1.25))/9390 0.79

Estimated time of concentration, t_c =	10.0	minutes	Minimum allowable value as per City of Ottawa Sewer Design Guidelines (Section 5.4.5.2)
Based on Ottawa IDF curve, $i_{5\text{-years}}$ =	$998.071/ (t_c+6.053)^{0.814}$		
	104.2	mm/hr	
Based on Ottawa IDF curve, $i_{100\text{-years}}$ =	$1735.688/ (t_c+6.014)^{0.820}$		
	178.6	mm/hr	

B.1.2.1 - uncontrolled flow

Total uncontrolled area (B5, B6, & B7) =	0.162	ha
5-year Runoff coefficient, C =	0.47	
100-year Runoff coefficient, C =	0.54	
Estimated time of concentration, t_c =	10.0	minutes

$Q_{uncontrolled\ 5\text{-}year}$ =	22.0	l/s	②
$Q_{net\text{-}allowable\ 5\text{-}year}$ =	102.7	l/s	③ = ①-②
$Q_{uncontrolled\ 100\text{-}year}$ =	43.3	l/s	④
$Q_{net\text{-}allowable\ 100\text{-}year}$ =	81.4	l/s	⑤ = ①-④

B.1.3 - Post-development onsite storage

B.1.3.1 - Overall onsite storage requirements

Total controlled development area	0.454	ha	
5-year Runoff coefficient, C	0.79		
100-year Runoff coefficient, C	0.88		
net-allowable 5-year release rate	80.00	l/s	⑤

Table 1.3.1a - 5-year onsite storage requirements

	Time (minutes)	$i_{5\text{-years}}$ (mm/hr)	Q_{actual} (l/s)	$Q_{allowable}$ (l/s)	Q_{stored} (l/s)	V_{stored} (m^3)
	4	152.5	151.7	80.0	71.7	17.2
peak Vstored --->	5	141.2	140.4	80.0	60.4	18.1
	6	131.6	130.8	80.0	50.8	18.3
	10	104.2	103.6	80.0	23.6	14.2
	15	83.6	83.1	80.0	3.1	2.8
	20	70.3	69.9	80.0	-10.1	-12.2
	25	60.9	60.6	80.0	-19.4	-29.2
	30	53.9	53.6	80.0	-26.4	-47.5
	35	48.5	48.2	80.0	-31.8	-66.7
	40	44.2	43.9	80.0	-36.1	-86.6
	45	40.6	40.4	80.0	-39.6	-106.9
	50	37.7	37.4	80.0	-42.6	-127.7
	55	35.1	34.9	80.0	-45.1	-148.7
	60	32.9	32.8	80.0	-47.2	-170.1

Therefore 18 m^3 of onsite storage required during 2-year event

Table 1.3.1b - 100-year onsite storage requirements

	Time (min)	$i_{100\text{-years}}$ (mm/hr)	Q_{actual} (l/s)	$Q_{allowable}$ (l/s)	Q_{stored} (l/s)	V_{stored} (m^3)
	9	188.3	209.5	80.0	129.5	69.9
peak V_{stored} --->	11	169.9	189.1	80.0	109.1	72.0
	13	155.1	172.6	80.0	92.6	72.2
	15	142.9	159.0	80.0	79.0	71.1
	20	120.0	133.5	80.0	53.5	64.2
	25	103.8	115.6	80.0	35.6	53.4
	30	91.9	102.2	80.0	22.2	40.0
	35	82.6	91.9	80.0	11.9	25.0
	40	75.1	83.6	80.0	3.6	8.7
	45	69.1	76.8	80.0	-3.2	-8.5
	50	64.0	71.2	80.0	-8.8	-26.5
	55	59.6	66.4	80.0	-13.6	-45.0
	60	55.9	62.2	80.0	-17.8	-64.1

Therefore 72 m^3 of onsite storage required during 100-year event

B.1.3.2 - Estimated detention created by installing roof weirs (B1)

Total flow controlled roof area	0.069	ha	
5-year Runoff coefficient, C	0.90		
100-year Runoff coefficient, C	1.00		
Install weirs at each of the roof drains	5.00	l/s	*Flow Control Roof Drain*

Table 1.3.2a - 5-year estimated detention on new 2-storey roof

	Time (minutes)	$i_{5\text{-years}}$ (mm/hr)	Q_{actual} (l/s)	$Q_{allowable}$ (l/s)	Q_{stored} (l/s)	V_{stored} (m^3)
	5	141.2	24.4	5.0	19.4	5.8
	10	104.2	18.0	5.0	13.0	7.8
	15	83.6	14.4	5.0	9.4	8.5
peak V_{stored} --->	20	70.3	12.1	5.0	7.1	8.6
	25	60.9	10.5	5.0	5.5	8.3
	30	53.9	9.3	5.0	4.3	7.8

Therefore 9 m^3 estimated roof detention

Table 1.3.2b - 100-year estimated detention on new 2-storey roof

	Time (min)	$i_{100\text{-years}}$ (mm/hr)	Q_{actual} (l/s)	$Q_{allowable}$ (l/s)	Q_{stored} (l/s)	V_{stored} (m^3)
	10	178.6	34.3	5.0	29.3	17.6
	15	142.9	27.4	5.0	22.4	20.2
	20	120.0	23.0	5.0	18.0	21.6
	25	103.8	19.9	5.0	14.9	22.4
	30	91.9	17.6	5.0	12.6	22.7
peak V_{stored} --->	35	82.6	15.8	5.0	10.8	22.8
	40	75.1	14.4	5.0	9.4	22.6
	45	69.1	13.2	5.0	8.2	22.3
	50	64.0	12.3	5.0	7.3	21.8
	55	59.6	11.4	5.0	6.4	21.2
	60	55.9	10.7	5.0	5.7	20.6

Therefore 23 m^3 estimated roof detention

B.1.3.3 - Estimated detention created by installing flow restrictor at CBMH-2 (B2, B3 & B4) outlet in parking area

Total controlled area	0.186	ha	
5-year Runoff coefficient, C	0.63		
100-year Runoff coefficient, C	0.71		
Install flow control at CBMH-2 outlet	10.0	l/s	*2.56m head*

Table 1.3.3a - 5-year estimated detention in parking area

	Time (minutes)	$i_{5\text{-years}}$ (mm/hr)	Q_{actual} (l/s)	$Q_{allowable}$ (l/s)	Q_{stored} (l/s)	V_{stored} (m^3)
	2	182.7	59.4	10.0	49.4	5.9
	3	166.1	54.0	10.0	44.0	7.9
	4	152.5	49.6	10.0	39.6	9.5
peak V_{stored} --->	10	104.2	33.9	10.0	23.9	14.3
	15	83.6	27.2	10.0	17.2	15.4
	20	70.3	22.8	10.0	12.8	15.4
	25	60.9	19.8	10.0	9.8	14.7
	30	53.9	17.5	10.0	7.5	13.6
	35	48.5	15.8	10.0	5.8	12.1

Therefore 15 m^3 estimated yard detention

Table 1.3.3b - 100-year estimated detention in parking area

	Time (min)	$i_{100\text{-years}}$ (mm/hr)	Q_{actual} (l/s)	$Q_{allowable}$ (l/s)	Q_{stored} (l/s)	V_{stored} (m^3)
	9	188.3	69.5	10.0	59.5	32.1
	11	169.9	62.7	10.0	52.7	34.8
	12	162.1	59.9	10.0	49.9	35.9
	13	155.1	57.3	10.0	47.3	36.9
peak V_{stored} --->	20	120.0	44.3	10.0	34.3	41.2
	30	91.9	33.9	10.0	23.9	43.1
	40	75.1	27.7	10.0	17.7	42.6
	50	64.0	23.6	10.0	13.6	40.8
	60	55.9	20.6	10.0	10.6	38.3

Therefore 43 m^3 estimated yard detention

B.1.3.4 - Estimated detention created by installing flow restrictor at CBMH-3 (B5 & B9) outlet in parking area

Total controlled area	0.199	ha	
5-year Runoff coefficient, C	0.90		
100-year Runoff coefficient, C	1.00		
Install flow control at CBMH-3 outlet*	65.0	l/s	*0.0m head*

Table 1.3.4a - 5-year estimated detention in parking area

	Time (minutes)	$i_{5\text{-years}}$ (mm/hr)	Q_{actual} (l/s)	$Q_{allowable}$ (l/s)	Q_{stored} (l/s)	V_{stored} (m^3)
	2	182.7	90.7	65.0	25.7	3.1
peak V_{stored} --->	3	166.1	82.5	65.0	17.5	3.1
	4	152.5	75.7	65.0	10.7	2.6
	10	104.2	51.7	65.0	-13.3	-8.0
	15	83.6	41.5	65.0	-23.5	-21.2
	20	70.3	34.9	65.0	-30.1	-36.1
	25	60.9	30.2	65.0	-34.8	-52.1
	30	53.9	26.8	65.0	-38.2	-68.8
	35	48.5	24.1	65.0	-40.9	-85.9

Therefore 3 m^3 estimated yard detention

Table 1.3.4b - 100-year estimated detention in parking area

	Time (min)	$i_{100\text{-years}}$ (mm/hr)	Q_{actual} (l/s)	$Q_{allowable}$ (l/s)	Q_{stored} (l/s)	V_{stored} (m^3)
	8	199.2	109.9	65.0	44.9	21.6
peak V_{stored} --->	9	188.3	103.9	65.0	38.9	21.0
	10	178.6	98.5	65.0	33.5	20.1
	12	162.1	89.5	65.0	24.5	17.6
	13	155.1	85.6	65.0	20.6	16.1
	20	120.0	66.2	65.0	1.2	1.4
	30	91.9	50.7	65.0	-14.3	-25.7
	40	75.1	41.5	65.0	-23.5	-56.5
	50	64.0	35.3	65.0	-29.7	-89.1
	60	55.9	30.8	65.0	-34.2	-123.0

Therefore 22 m^3 estimated yard detention

B.1.4 - Site storage

	5-year event	100-year event		
overall storage requirements	18	72	m^3	*Table B.1.3.1*
estimated roof detention	9	23	m^3	*Table B.1.3.2*
roof ponding depth	0.09	0.13	m	*maximum allowable: 0.15m*
estimated roof ponding volume	9	23	m^3	*pyramid equation (V=roof area*ponding depth/3)*
estimated soft area detention	15	43	m^3	*Table B.1.3.3*
soft area ponding depth	0.00	0.05	m	*maximum allowable: 0.3m*
estimated soft area ponding volume	0	3	m^3	*pyramid equation (V=roof area*ponding depth/3)*
hard area (west parking lot) ponding depth	0.00	0.05	m	*maximum allowable: 0.3m*
estimated hard area (west parking lot) ponding volume	0	2	m^3	*pyramid equation (V=roof area*ponding depth/3)*
estimated underground storage between CBMH-1 and CBMH-2	38	38		*V = L*pi*r^2*
estimated parking lot detention	3	22	m^3	*Table B.1.3.4*
parking lot ponding depth	0.00	0.00	m	*maximum allowable: 0.3m*
estimated parking lot ponding volume	0	0	m^3	*pyramid equation (V=roof area*ponding depth/3)*
estimated underground storage at CBMH-3	38	38		*V = L*pi*r^2*
Total available onsite storage > overall storage requirements	OK	OK		
Total available onsite storage > estimated detention	OK	OK		

B.1.5 - Release rate for site

Release rate		
Allowable release rate (5-yr)	124.68	*Section B.1.1*
Uncontrolled release rate for (100-yr)	43.28	*Section B.1.2.1*
Controlled release rate at roof (100-yr)	5.00	*Section B.1.3.2*
Controlled release rate at CB-3 (100-yr)	10.00	*Section B.1.3.3*
Controlled release rate at CB-3 (100-yr)	65.00	*Section B.1.3.4*
Total release rate (100-yr)	123.28	*CRR*
Total release rate (100-yr) < Allowable release rate (5-yr)	OK	

B.2.1 - Storm Sewer Design Sheet

Jp2g Consultants Inc.
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Project Name: Elmdale Public School, 49 Iona Street, Ottawa, Ontario

Definitions		Rational Method	Notes
Manning's Coefficient =	0.013	Q = 2.78 CIA (l/s), where	1) Used City of Ottawa IDF Curve
Return Frequency (yrs) =	5	C= Runoff Coefficient	2) Min. velocity = 0.8 m/sec
1 acre = 0.4047 hectares		i = Rainfall Intensity (mm/hr)	3) Max. velocity = 6.0 m/sec
		A = Areas in Hectares (ha)	

Designed SM
Checked
Dwg. Reference C1
Jp2g project No 18-1065A

LOCATION		AREA (ha)			FLOW							SEWER DATA							
From	To	C= 0.90	C= 0.50	C= 0.20	Individual 2.78CA	Cum. 2.78CA	tc (min.)	$i_{5\ years}$ (mm/hr)	$i_{100\ years}$ (mm/hr)	$Flow_{5\ years}$ (l/s)	$Flow_{100\ years}$ (l/s)	Dia. (mm)	Slope (%)	Length (m)	Capacity (full) (l/s)	Velocity (full) (m/s)	Sect.Time (minutes)	Tot. Time (minutes)	Utilization (%)
proposed roof	STMH-1	0.069	0.000	0.000	0.17	0.17	10.0	104.2	178.6	5.0	5.0	250	1.0	16.7	59.5	1.2	0.2	10.2	8
CB-1	CBMH-1	0.000	0.015	0.056	0.05	0.05	10.0	104.2	178.6	5.4	9.2	250	1.0	14.9	59.5	1.2	0.2	10.2	9
CBMH-1	CBMH-2	0.044	0.000	0.008	0.11	0.17	10.2	103.1	176.7	17.1	29.4	250	1.0	30.6	59.5	1.2	0.4	10.6	29
CBMH-2	STMH-1	0.064	0.000	0.000	0.16	0.33	10.6	101.0	173.0	10.0	10.0	300	1.0	7.3	96.7	1.4	0.1	10.7	10
existing roof	CBMH-3	0.087	0.000	0.000	0.22	0.22	10.0	104.2	178.6	22.6	38.8	300	2.0	19.7	136.7	1.9	0.2	10.2	17
existing roof	CBMH-3	0.087	0.000	0.000	0.22	0.22	10.0	104.2	178.6	22.6	38.8	300	0.5	20.0	68.4	1.0	0.3	10.3	33
CBMH-3	STMH-1	0.025	0.000	0.000	0.06	0.50	10.2	103.3	177.0	65.0	65.0	300	0.5	2.9	68.4	1.0	0.0	10.2	95
STMH-1	STMH-2	0.000	0.000	0.000	0.00	0.99	10.7	100.6	172.3	80.0	80.0	300	1.0	20.0	96.7	1.4	0.2	11.0	83

Flow control installed at outlet

Appendix C – Sanitary Service Calculations and Coordination

Jp2g Consultants Inc.
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Appendix C - Sanitary Sewer Design Sheet

C.1.1 - Peak Flow Design Based on Site Area - Existing 150mm dia Connection

Definitions

Manning's Coefficient (n) = 0.013

Manning's Formula

$Q = A*R^{2/3}*S^{1/2}/n$ (l/s), where

A = Areas in Hectares (ha)

R = Hydraulic Radius (m)

S = Slope

Design Parameters*

1) Average Daily Flow = 280 L/p/day

2) Commercial/Institutional Flow = 28,000 L/ha/day

3) Maximum Residential Peak Factor = 4

4) Commercial/Institutional Peak Factor = 1.50

5) Extraneous Flow = 0.33L/s/ha

6) Minimum Velocity = 0.76 m/s

Location		Institutional Flow			Infiltration Flow			Total Flow	Sewer Data					
		Area (ha)		Peak Flow	Area (ha)		Inf. Flow		Length	Dia.	Slope*	Capacity	Velocity	Utilization
From	To	Individual	Cumulative	(l/s)	Individual	Cumulative	(l/s)	(l/s)	(m)	(mm)	(%)	(full) (l/s)	(full) (m/s)	(%)
School	ROW	1.153	1.153	0.56	1.153	1.153	0.38	0.94	51.0	150	0.5	10.8	0.6	8.7

*Slope of sanitary sewer is unknown - 0.5% assumed

C.1.2 - Peak Flow Design Based on Site Area - Proposed 200mm dia Connection

Location		Institutional Flow			Infiltration Flow			Total Flow	Sewer Data					
		Area (ha)		Peak Flow	Area (ha)		Inf. Flow		Length	Dia.	Slope*	Capacity	Velocity	Utilization
From	To	Individual	Cumulative	(l/s)	Individual	Cumulative	(l/s)	(l/s)	(m)	(mm)	(%)	(full) (l/s)	(full) (m/s)	(%)
School	ROW	1.153	1.153	0.56	1.153	1.153	0.38	0.94	51.0	200	2.0	46.4	1.5	2.0

Appendix D – Fire Flow Calculations and Boundary Conditions

From: Valic, Jessica
To: Sarah McLaughlin
Subject: RE: Elmdale Public School boundary conditions
Date: Friday, November 16, 2018 3:41:55 PM
Attachments: image001.png
49 Iona Nov 2018.pdf

Hello Sarah,

As requested. Have a great weekend.

The following are boundary conditions, HGL, for hydraulic analysis at 49 Iona (zone 1W) assumed to be connected to the 152mm on Iona (see attached PDF for location).

Minimum HGL = 108.0m

Maximum HGL = 115.0m

Available Flow @ 20psi = 70 L/s assuming a ground elevation of 70.8m

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

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

Regards,

Jessica Valic, E.I.T.
Engineering Intern
Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique
Development Review - Central
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 15672
jessica.valic@ottawa.ca

From: Sarah McLaughlin <SarahM@jp2g.com>
Sent: Friday, November 09, 2018 10:36 AM
To: Valic, Jessica <jessica.valic@ottawa.ca>
Cc: David Nguyen <davidn@jp2g.com>
Subject: Elmdale Public School boundary conditions

Hi Jessica,

Please see attached fire flow demand calculations for Elmdale Public School. We would like to request boundary conditions for the school based on the following calculations:

Average Daily Demand: 70 l/student/day x 591 students = 1.44 l/s
8 hrs/day x 3600 s/hr

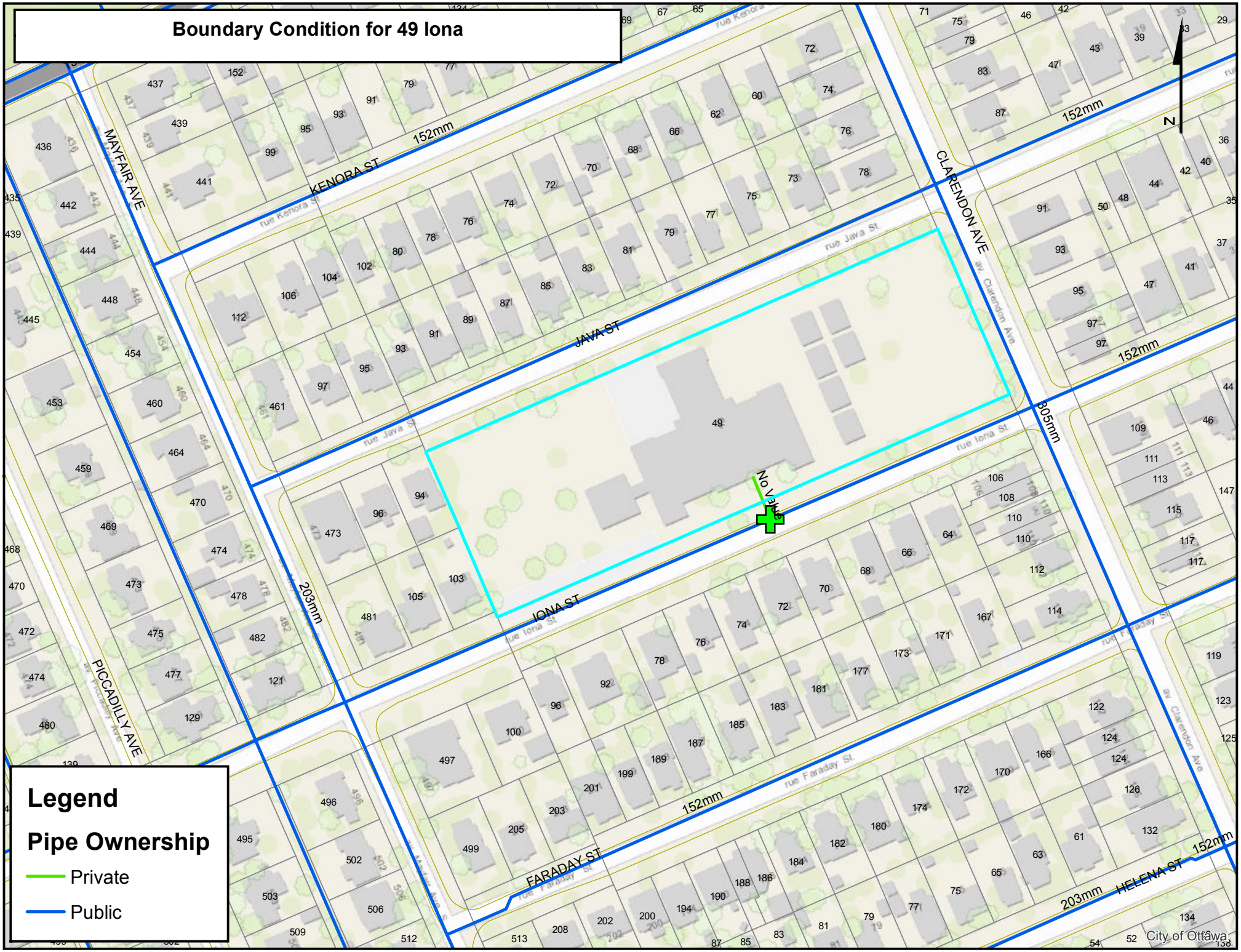
Maximum Daily Demand: 1.44 l/s x 1.5 = 2.15 l/s

Maximum Hour Demand: 2.15 l/s x 1.8 = 3.88 l/s

Thank you,

Sarah McLaughlin, P.Eng.
Civil Engineer
Jp2g Consultants Inc.

Email: sarahm@jp2g.com | Web: www.jp2g.com
T: 613.828.7800 x230 | F: 613.828.2600
1150 Morrison Drive, Suite 410, Ottawa, Ontario, K2H 8S9


Boundary Condition for 49 Iona
KENORA ST
MAYFAIR AVE
CLARENDON AVE
JAVA ST
IONA ST
FARADAY ST
HELENA ST
PICCADILLY AVE
152mm
203mm
805mm
No Valve
49
N
Legend
Pipe Ownership
Private
Public
City of Ottawa

Elmdale Public School, 49 Iona Street, Ottawa, Ontario

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Appendix B - Water Demand

B.1.1 - Fire Flow Demand Requirements

Design Parameters*

Estimated Fire Flow Formula: $F=220*C*A^{1/2}$(L/min)

F = Required fire flow (L/min)
C = Coefficient related to the type of construction
$C_{1.5}$ = 1.5 for wood frame construction (structure essentially all combustible)
$C_{1.0}$ = 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior)
$C_{0.8}$ = 0.8 for non-combustible construction (unprotected metal structural components, masonry or metal walls)
$C_{0.6}$ = 0.6 for fire-resistive construction (fully protected frame, floors, roof)
A = Total floor area in square metres

Floor Area
existing building footprint: 1735m2
2 storey building : 245*2 = 490
3 storey building : 1490*3 = 4470
proposed addition footprint: 690m2
3 storey building : 690*3 = 2070
Total: 7030

Adjustments to the calculated fire flow are based on: reduction for low fire hazard occupancy (school), reduction for automatic sprinkler protection, and an increase for exposures for residences within 45 metres on two sides of the school.
The table below summarizes the adjustments made to the basic fire flow.

Building Construction	Floor Area	C	1	2		3		4		Final Adjusted Fire Flow	Final Adjusted Fire Flow
			Fire Flow (F)	Occupancy		Sprinkler**		Exposure***			
non-combustible construction	(m^2)		(L/min)	%	Adjusted Fire Flow(s) (L/min)	%	Adjusted Fire Flow(s) (L/min)	%	Adjusted Fire Flow(s) (L/min)	(L/min)	(L/s)
	7,030.0	0.8	15,000.0	-15.0	12,750.0	-30.0	-3,825.0	30.0	3,825.0	13,000.0	216.7

*Water Supply for Public Protection (Fire Underwriters Survey, 1999).
**The entire building is sprinklered and monitored.

D.1.2 - Existing Water Boundary Conditions

Water Demands

Average Daily Demand:	1.44	l/s
Maximum Daily Demand:	2.15	l/s
Maximum Hour Demand:	3.88	l/s
Fire Flow Demand:	216.67	l/s
Maximum Daily + Fire Flow Demand:	218.82	l/s

Design Parameters

Pipe Diameter:	150	mm
Pipe Material:	PVC	
Pipe Length	10.0	m
Finished Floor Elevation:	72.40	
Pavement (R.O.W.) Elevation:	70.80	

Boundary Conditions

Max. HGL:	108	m
Min HGL:	115	m
Max. Day + Fire:	100	m

Boundary Condition Check

Check water pressure at municipal connection:

Min. HGL - Pavement elevation =	44.20	m
=	62.85	psi*
=	433.34	kPa*

*Normal operating pressure ranges between 345 kPa (50 psi) and 552 kPa (80 psi) under a condition of maximum daily flow as per City of Ottawa Design Guidelines - Water Distribution (Section 4.2.2)

Pressure at municipal connection OK

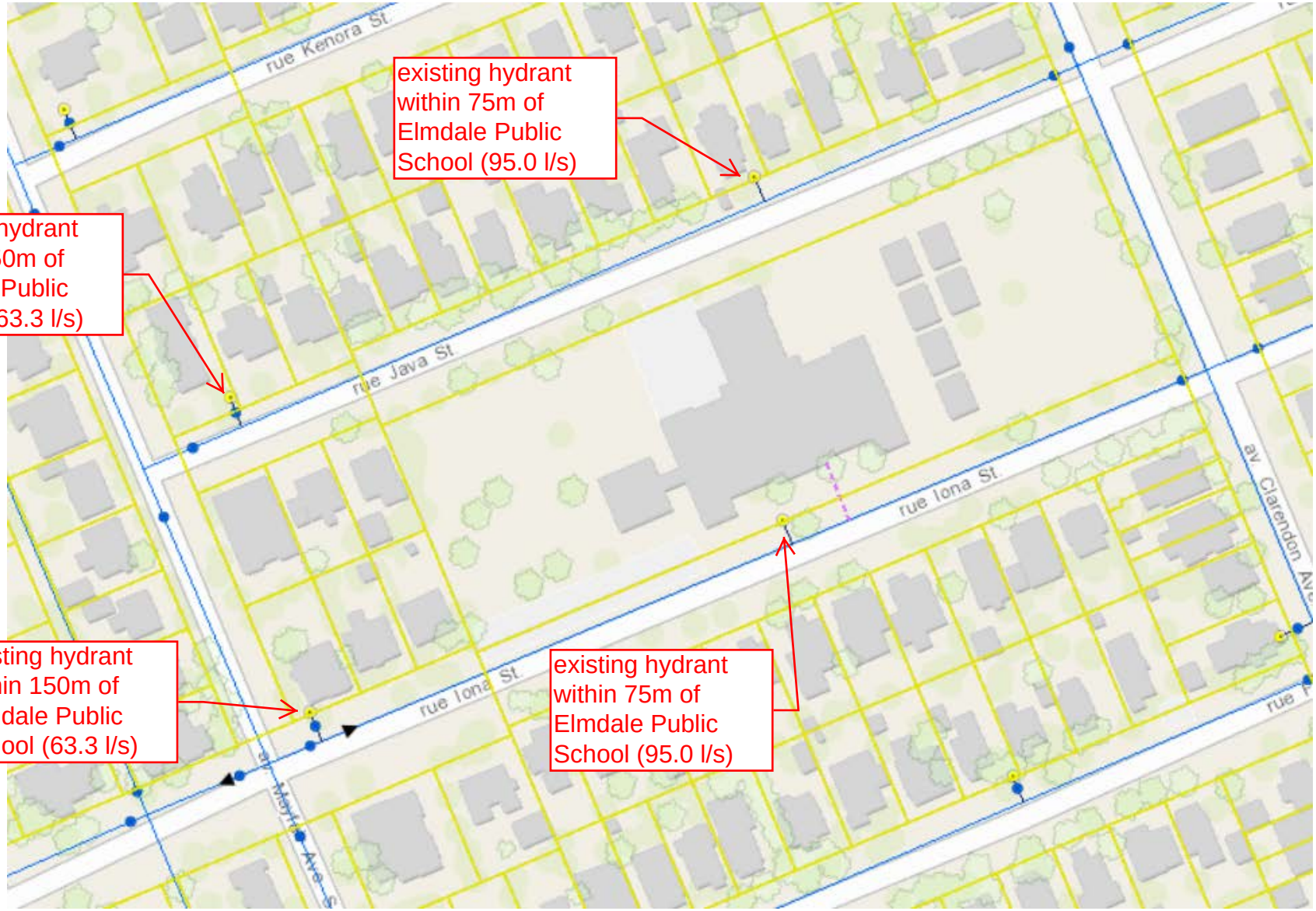
Check water pressure at building connection (at max. hour demand):

Min. HGL - Finished floor elevation - Friction Loss** =	42.59	m
=	60.57	psi***
=	417.59	kPa***

**Friction loss calculated using the Hazen-Williams Equation

***Under maximum hourly demand conditions the pressures shall not be less than 276 kPa (40 psi) as per City of Ottawa Design Guidelines - Water Distribution (Section 4.2.2)

Pressure at building connection (at max. hour demand) OK


existing hydrant within 75m of Elmdale Public School (95.0 l/s)
existing hydrant within 150m of Elmdale Public School (63.3 l/s)
existing hydrant within 150m of Elmdale Public School (63.3 l/s)
existing hydrant within 75m of Elmdale Public School (95.0 l/s)
rue Kenora St
rue Java St
rue Iona St
rue Iona St
av Clarendon Ave
av Merrill Ave S

Appendix E – RVCA Correspondence

From: Jamie Batchelor
To: Sarah McLaughlin
Cc: Eric Lalande; David Nguyen
Subject: RE: 49 Iona Street, Ottawa Site Plan Control Application
Date: Thursday, November 29, 2018 3:39:09 PM
Attachments: image005.png

Good Afternoon Sarah,

We note that the site outlets to an existing storm sewer which runs more than 2 km to an outlet to a watercourse with no municipal treatment for quality provided. In the opinion of the RVCA, the distance to the outlet is sufficiently far that onsite water quality controls would have a negligible impact on surface water improvement. The RVCA would therefore accept that runoff from the site does not require any additional quality control measures.

Jamie Batchelor, MCIP,RPP
Planner
jamie.batchelor@rvca.ca

Rideau Valley Conservation Authority
3889 Rideau Valley Drive
PO Box 599, Manotick ON K4M 1A5
T 613-692-3571 | 1-800-267-3504 F 613-692-0831 | www.rvca.ca

From: Sarah McLaughlin <SarahM@jp2g.com>
Sent: Wednesday, November 07, 2018 2:29 PM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Eric Lalande <eric.lalande@rvca.ca>; David Nguyen <davidn@jp2g.com>
Subject: 49 Iona Street, Ottawa Site Plan Control Application

Hi Jamie,

We are currently providing Civil Engineering services for the construction of an addition at Elmdale Public School located at 49 Iona Street, Ottawa, located in Fisher Park area of Ottawa, as shown on the attached map, below. The new addition will be located adjacent to the west side of the building. The addition we be located over the existing addition (to be removed) and hard surface play yard. Additionally, the parking lot on Iona will be eliminated and relocated to be accessed from Java Street. The proposed site plan is attached for your reference. As part of the Site Plan Control Application, the City has asked that we contact the RVCA to enquire about whether there are any quality control issues to consider in the stormwater management component of the application. Please advise whether there are any further matters we need to consider in preparing the Site Plan Application.

Thank you,

Sarah McLaughlin, P.Eng.

Civil Engineer
Jp2g Consultants Inc.

Email: sarahm@jp2g.com | Web: www.jp2g.com
T: 613.828.7800 x230 | F: 613.828.2600
1150 Morrison Drive, Suite 410, Ottawa, Ontario, K2H 8S9

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