ELM DEVELOPMENT CORP.

430 OTTAWA STREET – SITE PLAN CONTROL APPROVAL

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

MARCH 27, 2023

COPY

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ELM DEVELOPMENT CORP.

SERVICING REPORT (REVISION 02)

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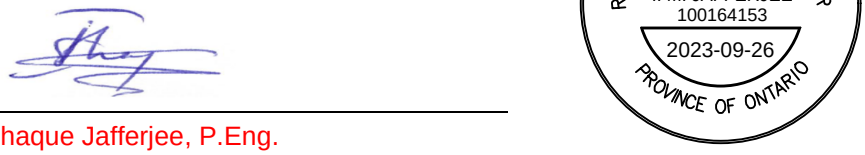

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APPENDICES

1 INTRODUCTION

WSP Canada Inc. (WSP) was retained by Elm Development Corp. to complete a Functional Servicing and Stormwater Management Report for a site redevelopment at a property located 430 Ottawa in the Town of Mississippi Mills (Almonte), Ontario (the Development Site). As part of the site plan control approval process, a functional servicing and stormwater management report is required to identify the proposed infrastructure to service the development.

1.1 PURPOSE OF THE REPORT

This report presents the servicing scheme for the site. Design criteria, analysis, and design recommendations are identified for the following municipal infrastructure systems:

- Municipal water distribution system;
- Municipal sanitary sewer system;
- Storm sewer systems and stormwater management facilities
- Erosion and sediment control.

Servicing criteria forms, infrastructure analyses, and preferred servicing strategies are discussed in the following sections of this report.

1.2 BACKGROUND INFORMATION

Pertinent background information obtained from previous reports and plans as it relates to this development include:

- Applicant's Study and Plan Identification List from Town of Mississippi Mills (December 2021)
- Applicant's Study and Plan Identification List from Town of Mississippi Mills (November 2022)
- The latest site plan and building elevations (Vandenberg & Wilderboer Architects, March 2023)
- The latest legal plan (Callon & Dietz, February 2023)
- The previous stormwater management report (AECOM, May 2011)
- The previous Grading & Drainage drawing (AECOM, July 2004)
- The previous Grading and Drainage drawing - C01 (AECOM, November 2011)
- The previous technical memo – Almonte Square Official Plan Amendment Existing Site Service (AECOM, January 2015)
- Ottawa Street Reconstruction Drawings (P-3 & P-4) (Jp2g Consultants Inc., July 2008)
- Geotechnical Investigation Report (Toronto Inspection Ltd., November 2022)
- Hydrogeological Study (Franz Environmental Inc., November 2014)
- Landscape Plan (Nak Design Strategies, March 2023)
- Master Plan Update Report – Final Municipal of Mississippi Mills Almonte Ward Water and Wastewater Infrastructure (J.L.Richards & Associate Ltd., February 2018)

The onsite topographic survey has been completed by GeoVera in December 2022 with geodetic system referred to NAD83 CSRS (2010) datum for coordinates and the CGVD-1928:78 vertical datum for elevations (benchmark 0011968U069). The provided topographic plan was used to create the existing ground surface and the based site plan for this study.

1.3 PROJECT AREA

The development site is located within the Almonte Ward in the Town of Mississippi Mills, approximately 45 km west of the City of Ottawa. The development site measures 2.55 ha in area and is sited on the north of Ottawa Street, approximately 250 m west of Ramsay Concession 11 A, and 40 m east of Saddler Drive.

The existing site was a commercial plaza with a L shaped building, including a number of retail stores, with paved driveways, parking lots, and grassed areas. A row of existing townhome buildings is located northwest of the development site and a coffee shop is sited in the southwest corner of the development site and followed by Sadler Street. The location of the development site is presented in Figure 1.1.

Figure 1.1: Location of the Development Site

The latest Draft plan certified by Callon & Dietz, Ontario Land Surveyor, dated on February 2, 2023, is included in **Appendix A**.

The site development is proposed with two phases. Phase 1 will include a one-storey commercial building with its associated parking and driveway, located at the southwest corner of the development site. Phase 2 will include a one-storey commercial building and a four-storey residential apartment. Following sections of this report provide detailed discussions on the servicing design and the stormwater management design

for both the ultimate solution at the full development stage and the interim solution at the Phase 1 development stage.

The proposed paving, grading, and underground servicing are shown on the engineering drawings included in **Appendix B**.

2 WATER DISTRIBUTION SYSTEM

A looped water distribution system will be proposed for the development site. At the full development stage, the proposed water system will include approximately 200 m of 200 mm diameter PVC DR18 watermain, four (4) fire hydrants, and two (2) connections to the existing 250 mm diameter watermain along south side of Ottawa Street. Note that all watermain and associated structures within the right-of-way will be considered municipal infrastructure post-development.

2.1 WATER SYSTEM DESIGN CRITERIA

As discussed with the Town of Mississippi Mills, the City of Ottawa Design Guidelines was used to analyze and design the water distribution system. And the following design parameters and assumptions were applied for this study:

- Hazen-Williams coefficient: C = 110 (200 mm to 250 mm diameter watermain)
- Residential water consumption rate: 280 litres/capita/day[JI1]
- Population density (residential): 1.8 persons / average apartment unit
- Commercial water consumption rate: 28,000 L/gross ha/day
- Peak hour factor:
    - Residential: 7.4 (from MECP Design Guideline for Drinking Water System, Table 3-3)
    - Commercial: 2.7
- Maximum day demand factor:
    - Residential: 4.9 (from MECP Design Guideline for Drinking Water System, Table 3-3)
    - Commercial: 1.5
- Maximum system pressure: 552 kPa (80 psi)
- Minimum system pressure under peak hour demand: 276 kPa (40 psi)
- Minimum system pressure under fire flow conditions: 140 kPa (20 psi)

The fire flow calculation for the development site was based on the Water Supply for Public Fire Protection by Fire Underwriter Survey 2020 (FUS).

2.2 EXISTING WATER SYSTEM AND BOUNDARY CONDITIONS

The existing site was serviced by a 150 mm diameter watermain which was connected to the existing 250 mm diameter watermain on Ottawa Street. The topographic survey and the existing site plan show that two existing fire hydrants onsite to provide fire protection on the existing building. It is our understanding that the existing water distribution, including 150 mm diameter watermain, water services, and the onsite fire hydrants, will be abandoned or removed for the future development.

The hydraulic boundary conditions at the two proposed connections on the existing 250 mm WM on Ottawa Street were provided by J. L. Richard & Associates Limited (JLR). The correspondence for the water distribution boundary information is included in **Appendix C** and the details are summarized in Table 2.1.

Table 2.1: Existing Water Distribution Boundary Conditions

Connection Location	Flow (L/s)	Pressure (kPa)	HGL (m)
Ottawa Street @ West Connection (ground elevation: 139.78)	1.19 (ADD)	400	180.62
	7.47 (PHD)	386	179.19
	54.87 (MDD+50 FF)	365	177.09
	104.87 (MDD+100 FF)	307	171.13
	116.87 (MDD+112 FF)	288	169.26
	119.87 (MDD+115 FF)	284	168.77
	154.87 (MDD+150 FF)	220	162.26
Ottawa Street @ East Connection (ground elevation: 140.28)	1.19 (ADD)	395	180.62
	7.47 (PHD)	381	179.19
	54.87 (MDD+50 FF)	359	176.95
	104.87 (MDD+100 FF)	297	170.66
	116.87 (MDD+112 FF)	278	168.68
	119.87 (MDD+115 FF)	273	168.20
	154.87 (MDD+150 FF)	206	161.35

2.3 WATER SYSTEM ANALYSIS

A water distribution model was developed using Bentley WaterGEMS CONNECT (version 10.03.01.08) to analyze system behaviour to meet estimated domestic water demands and fire flow requirements.

The proposed water network for the development site at the full development stage is shown in Figure 2.1.

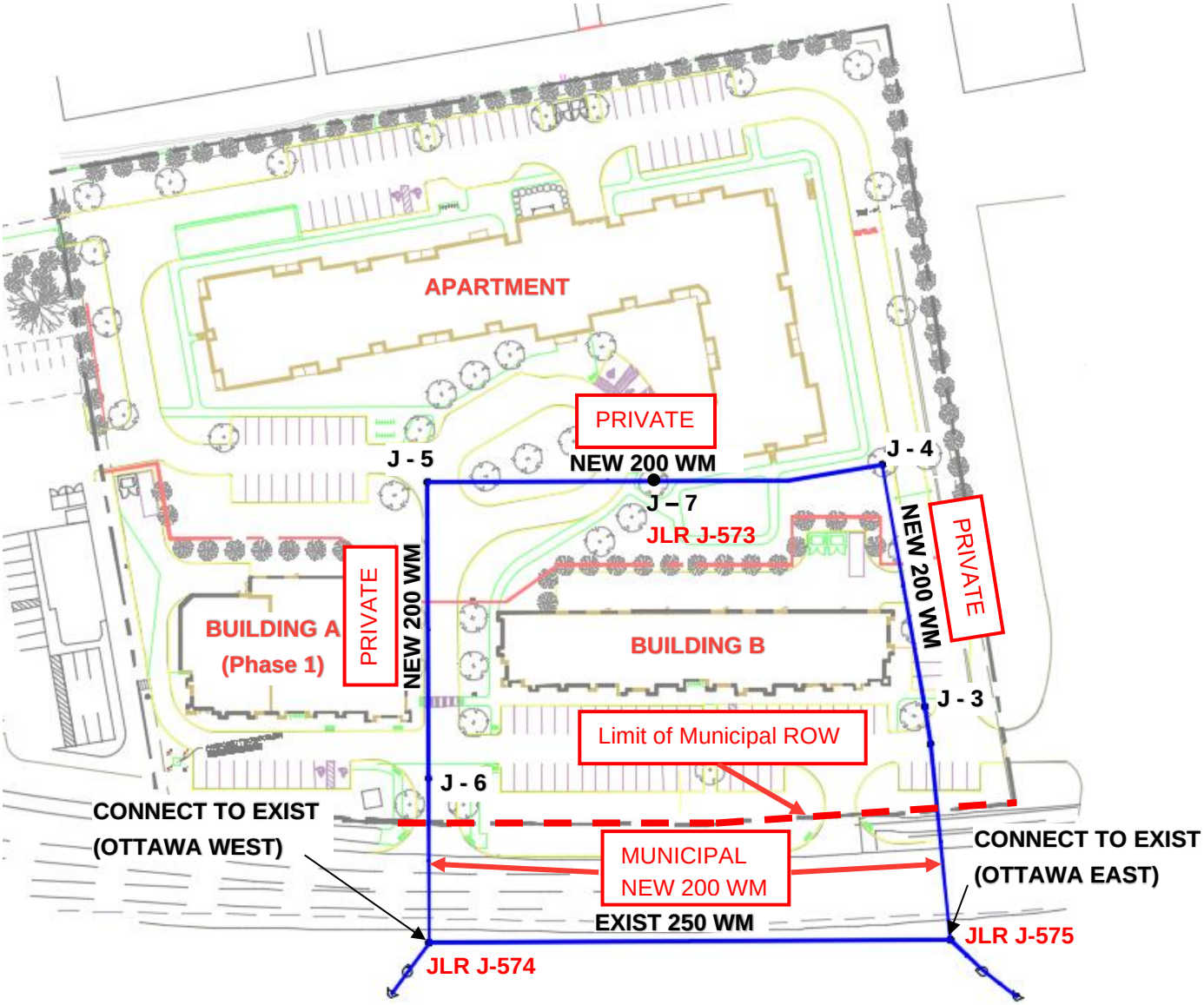


Figure 2.1: Water Distribution Model Schematic

Given the design parameters, the proposed water distribution system can meet the required operating criteria. The modeling results are summarized in Table 2.2.

Table 2.2: Summary of Modeling System Pressure

Scenario	Flow (L/s)	Maximum Pressure (kPa)	Average Pressure (kPa)	Minimum Pressure (kPa)
Average Day Demand (ADD)	1.19	397	397	397
Maximum Day Demand (MDD)	4.87	388	388	388
Peak Hour Demand (PHD)	7.47	383	383	383

The available fire flows at each modeled junction within the development site are shown in Table 2.3.

Table 2.3: Summary of Modeled Available Fire Flows

Junction	Available Fire Flow (L/s)
J-3	165.7
J-4	156.8
J-7	154.87
J-5	150.9
J-6	152.9

The fire flow analysis indicated that the available fire flows for the development site range from 9,060 L/min (151 L/s) to 9,940 L/min (165.7 L/s). WSP provided a technical memo on March 06, 2023, regarding to the required fire protection flows for the development site. The memo indicated that the calculated fire flows range from 6,000 L/min to 12,000 L/min depending on the building construction types and other configurations. And the memo also indicated that in order to meet the fire flow requirement as calculated per FUS standards, the proposed buildings should be considered an ordinary construction type as minimum. Detailed modeling analysis reports and the previous fire flow analysis technical memo are included in **Appendix C**.

2.3.1 Phase 1 Development

The proposed water distribution system for the Phase 1 development includes approximately 75 m of 200 mm diameter watermain connecting to the existing 250mm diameter watermain on Ottawa Street, and one fire hydrant assembly near the modeled Junction of J-6 as shown in Figure 2-1. The fire analysis for Phase 1 development site indicated that the available fire flow at J-6 is 9,770 L/min (162.9 L/s). The required fire protection flow for Building A is 8,000 L/min (see the previous technical memo in **Appendix C**).

According to FUS standard, at least two (2) fire hydrants are required to provide 8,000 L/min fire protection flow to Building A. In addition to the proposed onsite fire hydrant, there is an existing fire hydrant crossing Ottawa Street. The distance between the existing fire hydrant and front line of building A is about 53 m. The existing fire hydrant can be used to provide fire protection flow for Building A.

2.3.2 Phasing Plan

The proposed watermain for the Phase 1 interim development shall end with a valve and cap at the northern extent of the Phase 1 limits. Full site development in Phase 2 shall remove the cap and extend the watermain to provide service connections to the proposed residential building and Building B. The watermain will connect to the existing 250 mm diameter watermain along the south side of Ottawa Street providing a looped system for the site in its ultimate development state.

3 SANITARY SEWER SYSTEM

The proposed sanitary sewer system for the development site includes approximately 120 m of 200 mm diameter sanitary sewers and two manholes at the full development stage. The proposed onsite sewer system will be connected to the existing 200 mm diameter sanitary sewer on Ottawa Street. The invert of the 200mm diameter tie-in sanitary sewer measures 136.24 m. Note that all proposed sanitary sewers and associated structures within the right-of-way will be considered municipal infrastructure post-development.

3.1 SANITARY SEWER DESIGN CRITERIA

Sanitary flows for the proposed development are based on the following parameters and design criteria as outlined in the City of Ottawa Design Guidelines and the current Ministry of Environment, Conservation and Parks (MECP) Design Guidelines for Sewage Works:

- Hazen-Williams coefficient: C = 110 (200 mm to 250 mm diameter watermain)
- Residential wastewater generation rate: 280 litres/capita/day
- Population density (residential): 1.8 persons / average apartment unit
- Commercial water wastewater generation rate: 28,000 L/gross ha/day
- Extraneous inflow and infiltration allowance: 0.33 L/sec/ha
- Sewer flow peak factor based on Harmon Formula; maximum is 4.0
- Peak design flow = peak domestic sewage flow + extraneous flows
- Sewer pipe selection is based on a minimum full flow velocity of 0.6 m/s. The minimum pipe dimeter is 200 mm with a Manning's n value of 0.013.
- The outlet of the sewage flow at the 200 mm diameter sanitary sewer of development site is assumed to be a free flow – normal depth discharge condition.

3.2 SANITARY SEWER SYSTEM DESIGN

A summary of the sanitary flows that are estimated to be generated by the development are presented in Table 3.1. Detailed calculations are included in **Appendix D**.

Table 3.1: Summary of Estimated Sanitary Flows at Full Development Stage

	Value
Average domestic sanitary flow	1.01 L/s
Peak domestic sanitary flow	2.97 L/s
Extraneous inflow and infiltration	0.83 L/s
Peak design flow	3.81 L/s

3.2.1 Phase 1 Development

The proposed sanitary sewer system at Phase 1 development stage includes approximately 58 m of 200 mm diameter sewer and one (1) manhole to be installed south side of Building A. The onsite sanitary sewer system needs to be connected to the existing 200 mm diameter sewer main on Ottawa Street. The Estimated sanitary flows from Phase 1 development stage are summarized in Table 3.2.

Table 3.2: Summary of Estimated Sanitary Flows at Phase 1 Development Stage

	Value
Average domestic sanitary flow	0.13 L/s
Peak domestic sanitary flow	0.20 L/s
Extraneous inflow and infiltration	0.13 L/s
Peak design flow	0.33 L/s

3.2.2 Phasing Plan

Full site development in Phase 2 shall extend the Phase 1 sanitary sewer approximately 59 m north to a second manhole and a 5 m service to the proposed residential building. Proposed Building B shall be serviced from the existing capped service installed as part of Phase 1.

3.3 EXISTING MUNICIPAL SANITARY SEWER CAPACITY REVIEW

JLR has been contacted to review the available capacity of the existing 200mm sanitary sewer on Ottawa Street. The model results indicated that the existing 200mm sanitary sewer on Ottawa Street has sufficient capacity to accommodate the sewage flow generated from the project area for both dry weather flow event and 25-year storm event. A copy of the correspondences between the applicants and JLR, the Municipality's representatives are included in **Appendix D**.

4 STORM SEWER AND STORMWATER MANAGEMENT

4.1 OVERVIEW

Following sections of the report examines the potential water quality and water quantity impacts of the development site and summarizes how each will be addressed in accordance with the City of Ottawa Design Guidelines and MECP Stormwater Management Planning and Design Manual. Note that all proposed storm sewers and associated structures within the right-of-way will be considered municipal infrastructure post-development.

4.1.1 Stormwater Management Plan Objectives

The objectives of the stormwater management plan are as follows:

- **Quantity Control** – the proposed development will increase the imperviousness of the site. The post-development flow will need to be restricted to pre-development flow for both 5-year and 100-year design storm events.
- **Quality Control** – the proposed development is required to meet the MECP's Enhanced Level (80% TSS Removal). This will be addressed with an oil/grit separator using a Stormceptor or approved equivalent.
- **Erosion Control** – appropriate erosion and sediment controls will be implemented during the construction phase. Refer to the Erosion & Sedimentation Control Plan provided in Appendix B for details.

4.2 DESIGN CRITERIA

The following sections outline the stormwater management design criteria used in this study.

4.2.1 Rainfall Intensity

Rainfall Intensity-Duration-Frequency (IDF) curves equation were derived from the City of Ottawa Sewer Design Guideline. 2-year design storm, 5-year design storm, and 100-year design storm curve equations and IDF parameters are listed below:

2-year Intensity = 732.951 / (Time in min + 6.199) $^{0.810}$

5-year Intensity = 998.071 / (Time in min + 6.053) $^{0.814}$

100-year Intensity = 1735.688 / (Time in min + 6.014)$^{0.820}$

4.2.2 Storm Sewer Design Parameters

The storm sewer design for the development is based on the following parameters:

- Pipe sizes were determined based on the 5-year design storm, with full pipe capacity and no surcharging permitted.
- Manning's "n" value:
  - 0.013 for the storm sewer pipes regardless of pipe material
  - 0.024 for the corrugated metal pipe culvert
- Minimum storm sewer pipe size is 375 mm, and minimum catch basin lead size is 200 mm.
- Pipe diameter and slope are based on providing a minimum full flow velocity of 0.8 m/sec.
- Maximum allowable flow depth permitted within the parking lot and pavement area is 300 mm.

4.2.3 Runoff Coefficients and Imperviousness

Surface runoff coefficients (C-Value) for various land uses are as follow per the City of Ottawa Sewer Design Guideline:

- Paved areas and roof: 0.90
- Gravel surface: 0.70
- Grassland: 0.20
- For 100-year design storms, add 25% to C values

The following equation was used to determine a blended runoff coefficient when a land consists of a mixture of impervious and pervious areas:

$$imp = \frac{\text{impervious area}}{\text{total area}}$$

$$C = imp \times C_{impervious} + (1 - imp) \times C_{pervious}$$

4.3 EXISTING SITE DRAINAGE

The existing site was a commercial plaza with a L-shaped building, including a number of retail stores, with paved driveways, parking lots, and grassed areas. The previous stormwater management report (AECOM, May 5, 2011) summarized the existing site drainage conditions and provided the discussion of the maximum allowable discharges from the existing site under both the pre-development condition and the post-development condition as per the TSH Site Plan submission of April 2004.

AECOM's report indicated that *the 1-5 year and the 1-100 year pre-development flows from the site are 92 L/s and 156 L/s, respectively. Post-development flows, attenuated by parking lot, SWM Pond and ditch*

storage, are 89 L/s and 155 L/s. The detailed discussion refers to AECOM's report which is included in **Appendix E**.

For this study, the post-development runoffs from the development site are restricted to the maximum allowable discharge rates:

- **5-year: 89 L/s**
- **100-year: 155 L/s**

4.4 POST-DEVELOPMENT DRAINAGE

Storm sewer systems are proposed to convey runoff from the development site and discharge to the existing 750 mm diameter storm sewer on Ottawa Street. Per the design criteria, storm sewer pipes were sized for the 5-year design storm, with full pipe capacity and no surcharging permitted. A total of 510 m of storm sewers are included, and pipe size diameters range from 375 mm to 600 mm. Proposed storm sewers and manholes are shown in Drawing C-01 in **Appendix B**. A storm sewer calculation sheet is included in **Appendix E**.

Based on the site lot grading design, 28 drainage sub-catchments were identified and shown in the sketch of Post-Development Drainage Plan in **Appendix E**.

Runoff generated in sub-catchments S-25, S-26, S-27, and S-28 overland flow (unrestrictedly) to the existing watercourses outside of the development site. The total area of the unrestrained sub-catchments is 0.037 ha and the composited runoff coefficient is 0.30. Estimated post-development peak runoffs from the unrestricted sub-catchments under the 5-year and the 100-year design storms are summarized in Table 4-1.

Table 4-1: Post-development 5-Year and 100-Year Unrestricted Peak Runoffs

SUB_CATCHMENT	T_C (min)	INTENSITY (mm/hr)	C-VALUE	PEAK RUNOFF (L/s)
5-Year	14.5	85.2	0.30	2.6
100-Year	14.5	145.8	0.36*	5.4

* C-values are increased by 25% for the 100-year design storm

Runoff generated in sub-catchments S-1 through S-24 are collected by the proposed storm sewer systems and discharge to the existing 750 mm diameter storm sewer on Ottawa Street at restricted flow rates. The total area of the restrained sub-catchments is 2.513 ha and the composited runoff coefficient is 0.65.

The total peak discharge from the development site, including both the restricted sub-catchments and the unrestricted sub-catchments, is restricted to the existing site conditions under both the 5-year and the 100-year design storms. To restrict the post-development flow to the existing peak flow rates, a 173 mm diameter orifice will be installed at the proposed storm sewer manhole, which is located the upstream to the proposed Oil/Grit Separator (OGS). The excessive runoff will be temporarily stored in the parking lots and green space areas.

The peak discharge from the development site under the 5-year design rainfall is 88.5 L/s, including 2.6 L/s of the unrestricted flow and 85.9 L/s of the restricted flow. The required onsite storage for the 5-year rainfall is 280.3 m^3 at a ponding elevation of 140.43 m. The peak discharge from the development site under the 100-year design rainfall is 94.0 L/s, including 5.4 L/s of the unrestricted flow and 88.6 L/s of the restricted flow. The required onsite storage for the 100-year rainfall is 697.6 m^3 at a ponding elevation of 140.55 m. The ponding depth for 5-year and 100-year rainfall events are 0.18m and 0.30m, respectively.

Table 4-2 summarizes the estimated peak discharges and the required onsite storages under 5-year and 100-year design rainfalls. The estimated ponding boundaries are shown on Drawing C-02 in Appendix B.

Table 4-2: Post-development Restricted Discharges and Required Storages

DESIGN STORMS	5-YEAR STORM	100-YEAR STORM
Existing Peak Discharge (L/s)*	89.0	155.0
Post-development Peak Discharge (L/s)	**88.5**	**94.0**
- Unrestricted (L/s)	2.6	5.4
- Restricted (L/s)	85.9	88.6
Required Onsite Storage (m^3)	**280.3**	**697.6**

*Existing peak discharge rates are from the previous AECOM's report.

The maximum available onsite storage is 797.4 m^3 at a spill elevation of 140.55 m. The estimated ponding boundaries are shown in Drawing C-01 in **Appendix B**.

4.4.1 Phase 1 Development

The proposed drainage boundary of Phase 1 development site is shown in Drawing C-03 in **Appendix B**. The drainage area of Phase 1 development is 0.343 ha with an 81% of imperviousness. As per AECOM's report Table 1, the existing drainage catchment which contributes to the existing 750 mm diameter storm sewer on Ottawa Street, measures 1.36 ha with an 85% of imperviousness. The modeled peak discharges are 56 L/s and 114 L/s for 5-year rainfall and 100-year rainfall, respectively.

Under Phase 1 development stage, most of the existing onsite storm sewer system including the runoff retention facilities and inflow control devices (ICD) will be retained, except for one existing catchbasin and 250 mm diameter catchbasin lead, which is located in the proposed Phase 1 development site.

Similar to the full development stage, runoffs generated from Phase 1 development need to be restricted to equal or less than the peak discharges under the existing site conditions. The maximum discharges under Phase 1 development stage were converted from the existing peak discharges as indicated in AECOM's report Table 1 as per the drainage area and the development site imperviousness. Table 4-3 details restricted discharge calculation from Phase 1 development.

Table 4-3: Maximum Discharges from Phase 1 Development

DESIGN STORMS	5-YEAR STORM	100-YEAR STORM
Existing catchment area (ha)*	1.36	
Existing imperviousness percentage*	85%	
Existing peak discharge (L/s)	56	114
Phase 1 catchment area (ha)	0.34	
Phase 1 imperviousness percentage	81%	
Phase 1 maximum discharge (L/s)	13.5	27.4

*Existing peak discharge rates are from the previous AECOM's report (Table 1).

To restrict the post-development flow to the existing peak flow rates, a 75 mm diameter orifice will be installed at the proposed storm sewer manhole, which is located the upstream to the Oil/Grit Separator (OGS). The excessive runoff will be temporarily stored in the parking lots of Phase 1 development site.

The peak discharge from the development site under the 5-year design rainfall is 16.0 L/s. The required onsite storage for the 5-year rainfall is 47.0 m^3 at a ponding elevation of 140.40 m. The peak discharge from the development site under the 100-year design rainfall is 16.4 L/s. The required onsite storage for the 100-year rainfall is 84.7 m^3 at a ponding elevation of 140.50 m. The ponding depth for 5-year and 100-year rainfall event are 0.15m and 0.25m, respectively.

Table 4-4 summarizes the estimated peak discharges and the required onsite storages under 5-year and 100-year design rainfalls. The estimated ponding boundaries are shown on Drawing C-03 in **Appendix B**.

Table 4-4: Post-development Restricted Discharges and Required Storages for Phase 1 Development

DESIGN STORMS	5-YEAR STORM	100-YEAR STORM
Existing Peak Discharge from Table 4-3 (L/s)	13.5	27.4
Post-development Peak Discharge (L/s)	16.0	16.4
Required Onsite Storage (m^3)	47.0	84.7

The maximum available onsite storage for the Phase 1 development is 153.2 m^3 at a spill elevation of 140.50 m. The estimated ponding boundaries are shown in Drawing C04 in **Appendix B**.

4.4.2 Phasing Plan

All grades along the proposed Phase 1 limits are to tie-into existing elevations, with on-site grading established such that runoff produced within the Phase 1 development is contained within the site limits.

The storm sewer installed during Phase 1 shall be the primary discharge point for new sewers installed as part of the Phase 2 ultimate development state. The 75 mm orifice plate installed on Storm Manhole 04 during the Phase 1 development shall be replaced by 173 mm orifice plate to ensure quantity control conditions are met in the ultimate development state.

4.5 QUALITY CONTROL

The quality control for drainage areas within the development site shall be an enhanced level with a long-term removal rate of at least 80% total suspended sediments (TSS) per the application's plan and study identification list (Mississippi Mills, November 14, 2022).

Runoff generated from the development site will be collected by the proposed storm sewer system and discharge to the existing 750 mm diameter storm sewer on Ottawa Street. Total drainage area of these sub-catchments to the treatment unit is 2.513 ha. The estimated runoff coefficient is 0.65.

A Stormceptor EFO8 oil/grit separator is proposed to provide stormwater quality control to remove greater than 80% of the long-term average total suspended solids from runoff collected by the storm sewer system. The proposed Stormceptor EFO8 is sized to meet the quality control objectives for both the interim Phase 1 and ultimate Phase 2 development. The design capacity of Stormceptor EFO8 is outlined below.

- Estimated Water Quality Flow Rate: 52.7 L/s
- Maintenance Sediment Depth: 610 mm
- Maximum Sediment Capacity: 8,780 L
- Maximum Hydrocarbon Storage Capacity: 1,070 L

Stormceptor design details are included in Appendix E.

4.6 EROSION AND SEDIMENT CONTROL

Erosion and sediment controls must be in place during both Phases of site development. Recommendations to the contractor for the Phase 1 development are included on the erosion and sediment control drawing C05 in **Appendix B**. Additional measures shall be established at the time of Phase 2 ultimate development.

Regular monitoring and inspection of the silt mitigation measures and/or devices are critical during site construction until all vegetation is established, and construction activity is complete. This inspection will ensure that any breach of the silt mitigation measures is immediately identified and able to be reinstated and/or remedied in a timely fashion. During the spring freshet and during major storm events, the inspections may have to be more frequent.

A contingency plan should also be in place to ensure the response to any problems can be immediate. This plan shall include:

1. Generic plans for constructing temporary berms, check dams, and new sedimentation control ponds if any emergency measures are required;
2. The necessary equipment (excavator, loader, pumps and hoses) and supplies (silt fencing, clear stone, straw bales and dry sand stock piles) on hand during construction, and check for operational efficiency of the installations daily;
3. A list of contact names and telephone numbers of equipment operators and laborers who can be called upon to make emergency repairs; and
4. A list of emergency contact names and telephone numbers.

If repairs are required for any component of the silt mitigation installations, the work must be performed in a timely manner. The on-site inspector will have the authority to ensure the required works are performed immediately, and to issue a “Stop Work Order” if necessary.

In the event of a spill, or failure of the water quality control measures, the MECP spill reporting procedures shall be used to report any unexpected discharge of silt, sediment, and/or other deleterious substance. The MECP 24-hour spill line is 1-800-268-6060.

5 SUMMARY

5.1 WATER SUPPLY SERVICING

Average day, maximum day, and peak hour demands under the full development conditions are 1.19 L/s, 4.87 L/s, and 7.47 L/s respectively. A looped 200 mm diameter water distribution system is proposed to connect to the existing 250 mm diameter watermain on Ottawa Street. The required fire protection flow is 8,000 L/min. The modeling analysis indicated that the existing water distribution system has sufficient capacity to provide domestic flow and fire flow to the development site for both the Phase 1 development stage and the full development stage.

5.2 SANITARY SEWER SERVICING

The peak design sewage flow under the full development stage is 4.44 L/s, which includes 3.61 L/s peak domestic sewage flow and 0.83 L/s of extraneous inflow and infiltration. The collected sewage from the development site will discharge to the existing 200 mm diameter sanitary sewer on Ottawa Street.

5.3 STORMWATER MANAGEMENT

Storm sewer systems are proposed to convey runoff from the development site and discharge to the existing 750 mm diameter storm sewer on Ottawa Street. Runoffs generated from the development site will be restricted to equal or less than the existing peak discharge rates as specified in AECOM's report. The excessive runoffs will be temporarily stored onsite.

Design peak discharge and required onsite storages under 5-year and 100-year design rainfalls are summarized in Table 5-1 and Table 5-2 for the full development stage and the Phase 1 development stage, respectively.

Table 5-1: Stormwater Quantity Control at Full Development Stage

RAINFALL EVENTS	MAX ALLOWABLE DISCHARGE (L/s)	DESIGN PEAK DISCHARGE (L/s)	ESTIMATED STORAGE (m^3)	PONDING ELEVATION (m)	PONDING DEPTH (m)
5-Year	89.0	88.5	280.3	140.43	0.18
100-Year	155.0	94.0	697.6	140.55	0.30

Table 5-2: Stormwater Quantity Control at Phase 1 Development Stage

RAINFALL EVENTS	MAX ALLOWABLE DISCHARGE (L/s)	DESIGN PEAK DISCHARGE (L/s)	ESTIMATED STORAGE (m^3)	PONDING ELEVATION (m)	PONDING DEPTH (m)
5-Year	13.5	16.0	47.0	140.40	0.15
100-Year	27.4	16.4	84.7	140.50	0.25

Through the implementation of the Stormwater Plan presented, there will be no increase in peak stormwater flow rates conveyed off-site during minor and major storm events. Additionally, A Stormceptor EFO8 oil/grit separator is proposed to provide stormwater quality control to remove greater than 80% of the long-term average total suspended solids from runoff collected by the storm sewer system.

6 CLOSING

We trust that this Servicing Report is suitable to support the site development agreement process for the proposed 430 Ottawa Street development. If you require any additional information, or have any comments or concerns, please do not hesitate to contact our office.

APPENDIX

A

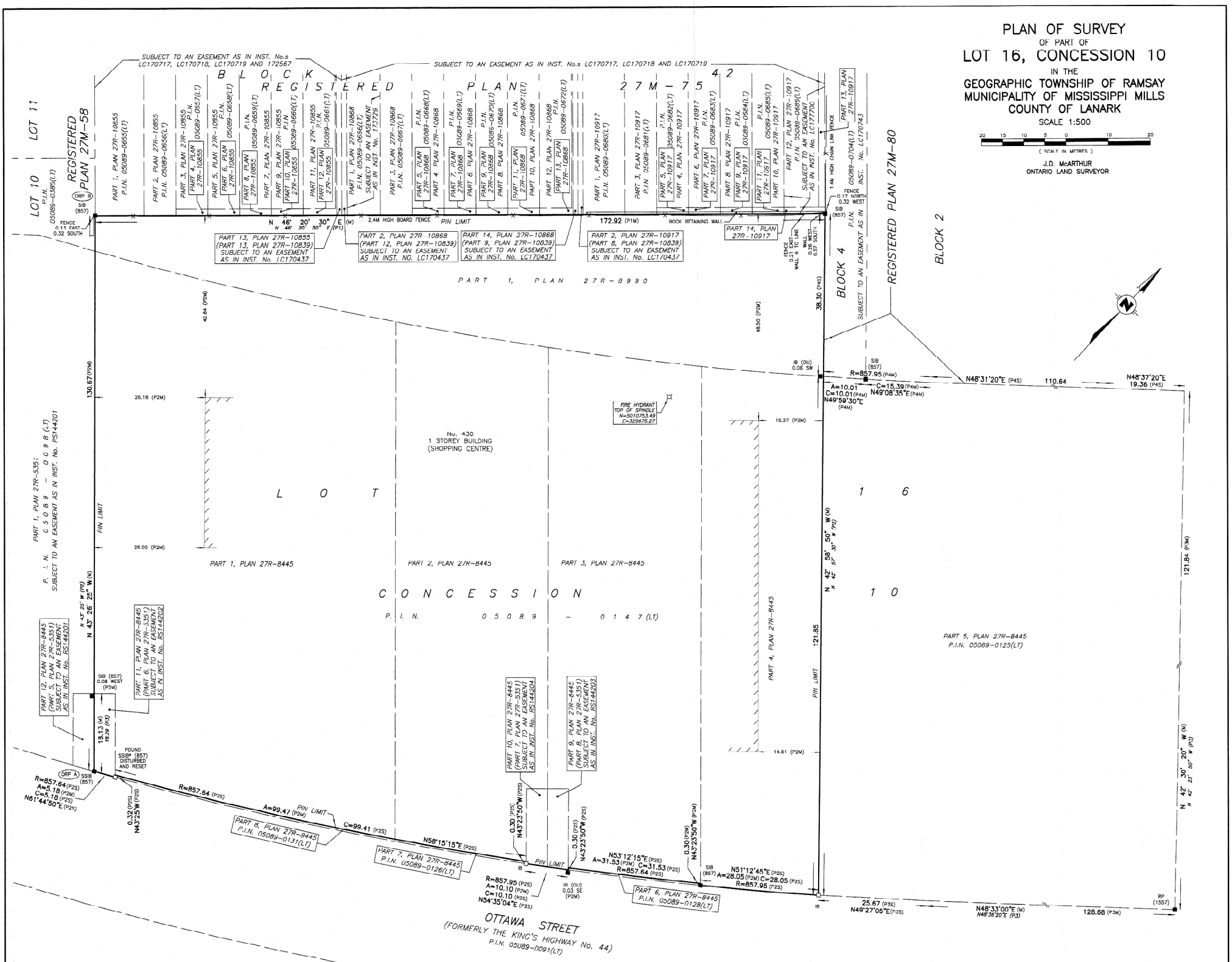
DRAFT PLAN BY CALLON & DIETZ (FEB 2023)

PLAN OF SURVEY
OF PART OF
LOT 16, CONCESSION 10
IN THE
GEOGRAPHIC TOWNSHIP OF RAMSAY
MUNICIPALITY OF MISSISSIPPI MILLS
COUNTY OF LANARK

SCALE 1:500

20 15 10 5 0 10 20
(SCALE IN METRES)

J.D. McARTHUR
ONTARIO LAND SURVEYOR



LEGEND:

□	DENOTES	SURVEY MONUMENT SET
■	"	SURVEY MONUMENT FOUND
SIB	"	STANDARD IRON BAR
SSIB	"	SHORT STANDARD IRON BAR
SSIB*	"	0.30m SHORT STANDARD IRON BAR
IB	"	IRON BAR
RIB	"	ROUND IRON BAR
RP	"	ROUND PIPE
CC	"	CUT CROSS
OU	"	ORIGIN UNKNOWN
ORP	"	OBSERVED REFERENCE POINT
WIT	"	WITNESS
M	"	MEASURED
(857)	"	FAIRHALL, MOFFATT & WOODLAND LIMITED
(1557)	"	ADAM KASPRZAK, O.L.S.
P1	"	REGISTERED PLAN 27M-75
P2	"	SURVEYORS REAL PROPERTY REPORT BY (857) DATED JANUARY 7, 2011
P3	"	PLAN 26R-8445
P4	"	REGISTERED PLAN 27M-80
SE	"	SOUTHEAST
SW	"	SOUTHWEST
NW	"	NORTHWEST

BEARING NOTE

BEARINGS ARE MTM GRID, DERIVED FROM OBSERVED REFERENCE POINTS A & B, BY REAL TIME NETWORK (RTN) OBSERVATIONS, MTM ZONE 9, CENTRAL MERIDIAN 76°30'00"W, NAD83 (CSRS)(2010.)

FOR BEARING COMPARISONS, A ROTATION OF 0°09'51 COUNTER CLOCKWISE WAS APPLIED TO THE BEARINGS ON P3

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999907

INTEGRATION DATA

OBSERVED REFERENCE POINTS (ORP'S) DERIVED FROM REAL TIME NETWORK OBSERVATIONS (RTN) AND ARE REFERRED TO MTM ZONE 9 NAD83 (CSRS)(2010) COORDINATES COMPLY WITH URBAN ACCURACY PER SEC.14 (2) OF O. REG. 216/10

POINT ID	NORTHING	EASTING
ORP A	5010595.84	329637.14
ORP B	5010690.70	329547.31

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:

(1) THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND LAND TITLES ACT, AND THE REGULATIONS MADE UNDER THEM.

(2) THE SURVEY WAS COMPLETED ON THE 20th DAY OF JANUARY , 2023

FEBRUARY 2, 2023
DATE

J.D. McARTHUR
ONTARIO LAND SURVEYOR

THIS PLAN OF SURVEY RELATES TO AOLS PLAN SUBMISSION FORM NUMBER 2200615.

METRIC: DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

O:\jobs\1 JOBS CALLON DIETZ\2023\23-1928 ELM Developments - 430 Ottawa St. Almonte\Drawing\23-1928.dwg February 2, 2023

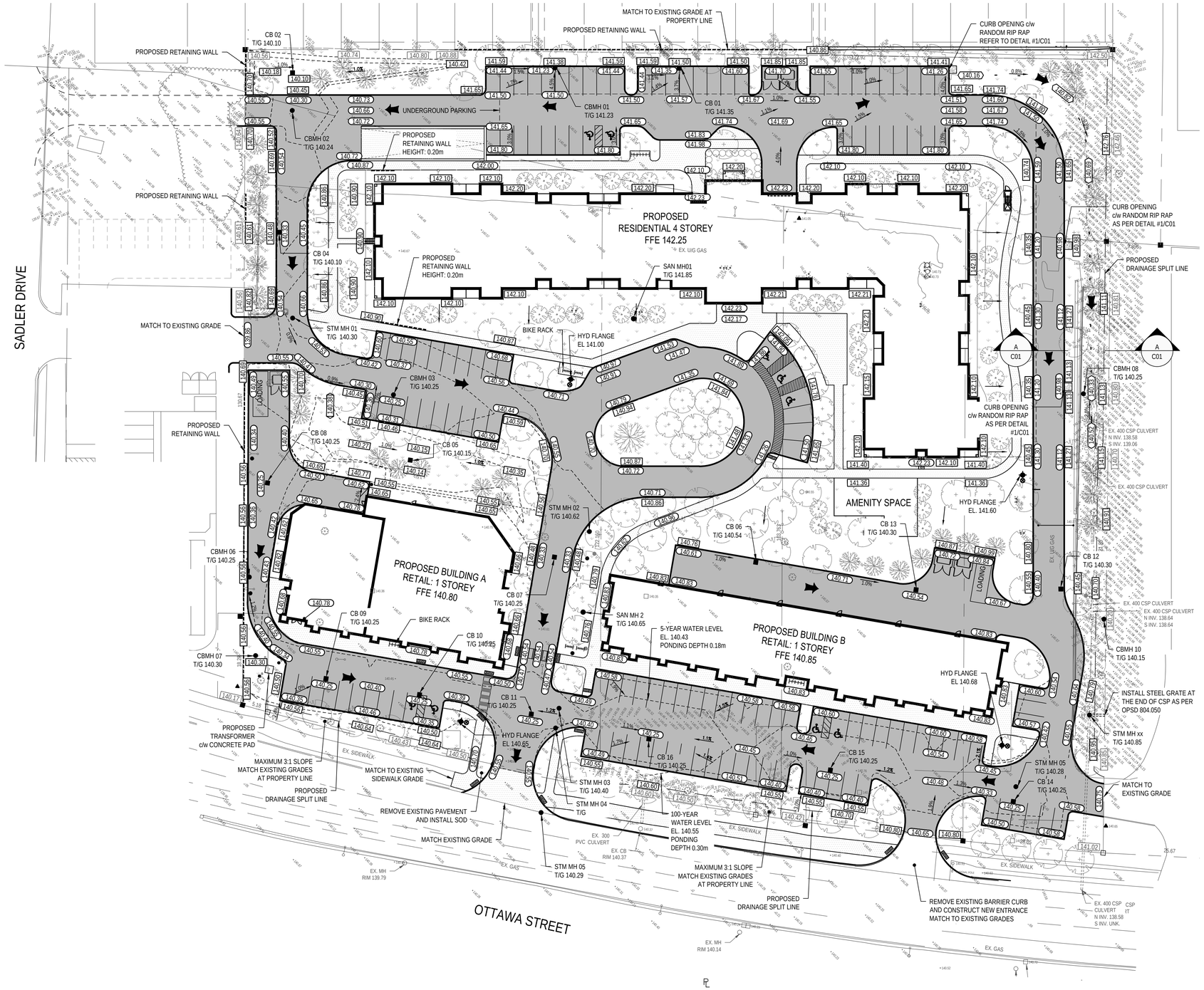
Callon Dietz INCORPORATED
ONTARIO LAND SURVEYORS
CARLETON PLACE LONDON NORTH BAY
info@callondietz.com callondietz.com

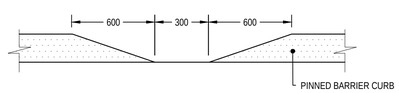
ISO 9001 REGISTERED

SURVEY BY: MP	DRAWN BY: NJ	FILE No: 23-1928	PLAN No: X-3331

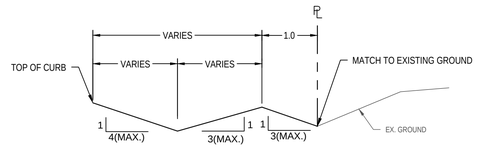
APPENDIX

B CIVIL DESIGN DRAWINGS





1/C01 CURB OPENING DETAIL
SCALE: NTS



A-A/C01 PROPOSED DITCH SECTION
SCALE: NTS

NOTES:

1. ALL WORK TO BE COORDINATED WITH OTHER PLANS FOR THIS SITE. REFER TO M AND E DRAWINGS FOR GAS, ELECTRICAL, PLUMBING AND COMMUNICATION SERVICES. ARCHITECTURAL SITE PLAN TO BE USED FOR SITE LAYOUT AND PHASING. ARCHITECTURAL DRAWINGS AND SPECIFICATIONS PROVIDE THE PAVEMENT DESIGN.
2. LOCATION OF SERVICES, CHAMBERS, UTILITIES AND ALL UNDERGROUND WORKS ARE APPROXIMATE. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF ALL SERVICES, UTILITIES, AND UNDERGROUND STRUCTURES PRIOR TO ANY CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR PROTECTION AND REINSTATEMENT.
3. THE CONTRACTOR IS RESPONSIBLE FOR ALL REMOVALS NECESSARY TO SATISFY ENGINEERING WORKS.
4. CONTRACTOR RESPONSIBLE FOR OBTAINING ROAD CUT PERMIT, AND PROVIDING ALL ASSOCIATED TRAFFIC CONTROL. CONTRACTOR TO RECORD VERTICAL AND HORIZONTAL LOCATION OF ALL UNDERGROUND WORKS FOR RECORD DRAWINGS.
5. CONTRACTOR TO PROVIDE POST CONSTRUCTION TOPOGRAPHIC SURVEY COMPLETED BY OLS OR PROFESSIONAL ENGINEER RETAINED BY CONTRACTOR CONFIRMING COMPLIANCE WITH GRADING AND SERVICING DESIGN. SURVEY TO INCLUDE SEWER INV.ERTS. SURVEY LEVEL OF DETAIL TO MATCH THAT OF GRADING DESIGN PLANS.
6. REFER TO ARCHITECTURAL PLANS FOR PHASING AND STAGING OF CONSTRUCTION. REFER TO SITE PLAN FOR PAVING LIMITS AND TYPES, INCLUDING SIDEWALK REQUIREMENTS.
7. ROAD ENTRANCES TO BE CONSTRUCTED IN ACCORDANCE WITH SITE PLAN.
8. ASPHALT AND GRANULARS:
   - 8.1. ALL MATERIALS MUST CONFORM TO MUNICIPALITY AND ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS. REFER TO TESTING SECTION FOR GEOTECHNICAL REQUIREMENTS AND A LIST OF SUBMITTALS.
   - 8.2. HOT MIX ASPHALT SHALL BE INSTALLED IN ACCORDANCE WITH OPSS 310.
   - 8.3. COMPACTION OF ASPHALT SHALL BE IN ACCORDANCE WITH TABLE 10 OF OPSS 310.
   - 8.4. ALL SAWCUTS SHALL BE STRAIGHT MATCH LINES BETWEEN THE EXISTING PAVEMENT AND NEW PAVEMENT. KEY GRIND A MINIMUM 0.50m WIDE BY 40mm DEEP EDGE WHEN TYING INTO EXISTING ASPHALT AND SEAL JOINTS WITH DENSO ASPHALT REINSTATEMENT TAPE.
   - 8.5. COMPACTION OF BASE AND SUBBASE MATERIALS SHALL BE TO 100% SPMDD.
9. CONCRETE CURBS SHALL BE INSTALLED IN ACCORDANCE WITH OPSD 600.110.
10. CONCRETE SIDEWALKS SHALL BE INSTALLED IN ACCORDANCE WITH OPSD 310.010. ASPHALT SIDEWALKS SHALL BE IN INSTALLED IN ACCORDANCE WITH CITH OF OTTAWA DETAIL SC20.
11. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
12. DRAWING COORDINATES ARE ZONE 18 UTM NAD83.

RECOMMENDED MINIMUM PAVEMENT STRUCTURE

PAVEMENT STRUCTURE		HEAVY DUTY MATERIALS FIRE ROUTES	LIGHT DUTY PARKING
ASPHALTIC CONCRETE	OPSS HL3 OR EQUIVALENT	40mm	65mm
	OPSS HL8 OR EQUIVALENT	60mm	-
BASE	OPSS GRANULAR A OR 20mm CRUSHER-RUN	150mm	150mm
SUB-BASE	OPSS GRANULAR B OR 50mm CRUSHER-RUN	300mm	200mm

METRIC

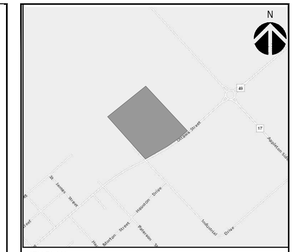
WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

BENCHMARK (B.M.)

SOUTHWEST CORNER, SOUTHEAST CORNER AND ON UTILITY BOX NORTH OF BUILDING.

ISSUED FOR REVIEW

EXISTING	LEGEND-PLAN	PROPOSED
150 WM	WATER MAIN	150 WM
300 STM	STORM SEWER	300 STM
250 SAN	SANITARY SEWER	250 SAN
G	GAS	
PO	POWER OVERHEAD HYDRO	
	CURB	
	EDGE OF PAVEMENT	
	CULVERT	
	PROPERTY LINE	
	WOODEN FENCE	
59.367	GROUND ELEVATION	
00.00	ROAD ELEVATION	00.00
00.00	LOT ELEVATION	00.00
00.00	DITCH/SWALE ELEVATION	00.00
	FLOW DIRECTION	
	SWALE FLOW DIRECTION	
	OVERLAND DRAINAGE ARROW	
	HYDRO POLE	
	PLUG	
	VALVE	
	HYDRANT	
	MANHOLE	
	CATCHMENT BOUNDARY	
	TOPSOIL AND SOD	
	RIP RAP	
	CONCRETE	
	HEAVY DUTY ASPHALT	
	LIGHT DUTY ASPHALT	



KEY PLAN

REVISION:

REV.	DATE	DESCRIPTION	BY
0B	2023-07-14	REVISED AS PER MUNICIPALITY COMMENTS	J.Z.
0A	2023-03-27	ISSUED FOR SPA	J.Z.

SEAL:

LICENSED PROFESSIONAL ENGINEER
J. W. ZHANG
100155766
2023-07-14
PROVINCE OF ONTARIO

ORIGINAL SCALE: 1:400
DESIGNED BY: J.Z.
ASSISTED BY: --
DRAWN BY: L.T.
MODIFIED BY: --
APPROVED BY: --
DATE: 2022-12-12
IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
25mm
DISCIPLINE: CIVIL

WSP Canada Inc.
2611 Queensview Drive, Suite 300 Ottawa, Ontario K2B 8K2
T 613-829-28-00| www.wsp.com

PROJECT NUMBER: 221-06853-00

CLIENT: ELM DEVELOPMENTS

CLIENT REF. #: --

PROJECT: 430 OTTAWA STREET ALMONTE, ONTARIO

TITLE: OVERALL SITE GRADING PLAN

DRAWING NUMBER: C01
REV.: 0B

CTB: wsp-ONAblack4all.ctb
PLOTTED: 2023-07-28 - 9:38 AM
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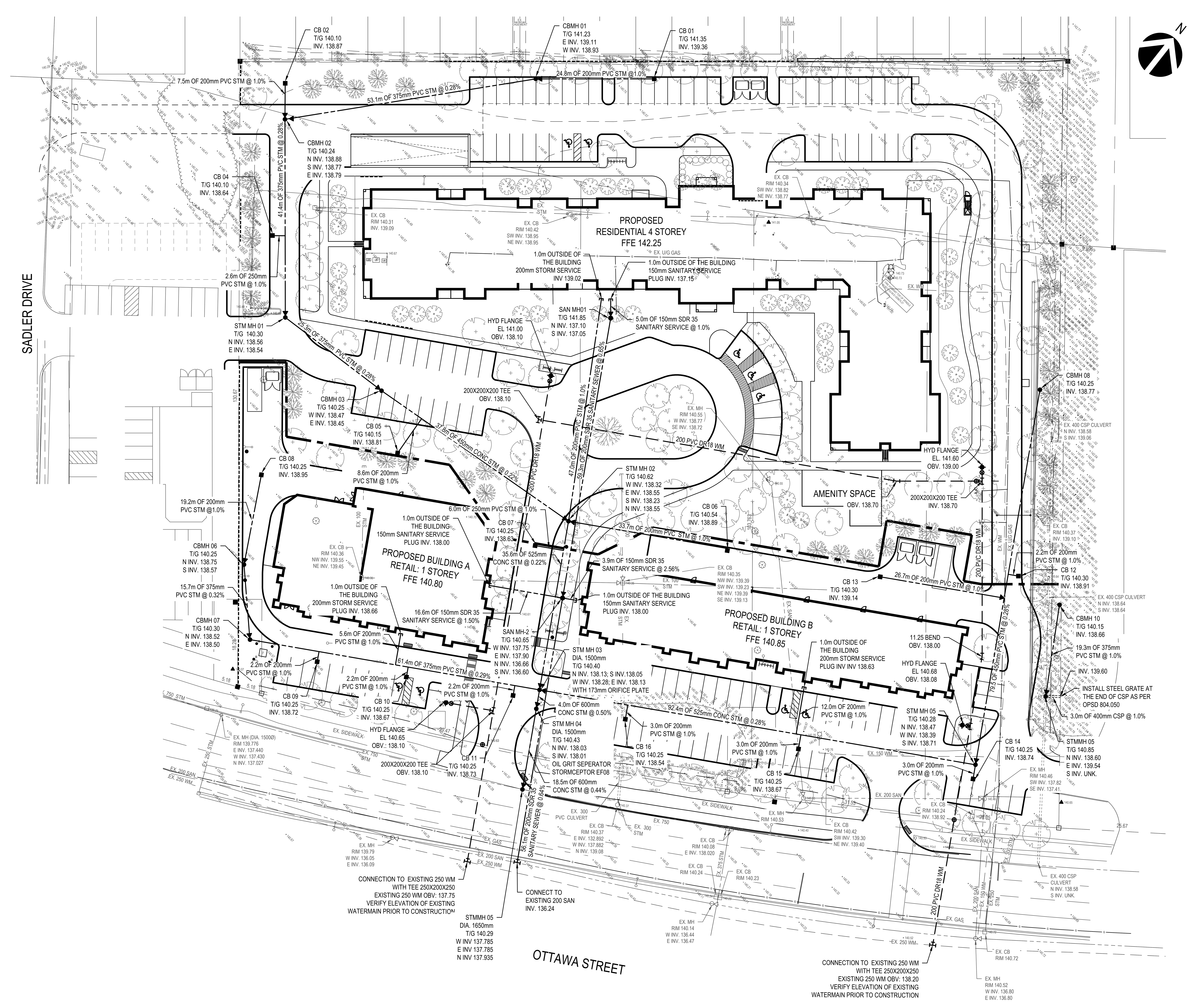


METRIC

WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

BENCHMARK (B.M.)

SOUTHWEST CORNER, SOUTHEAST CORNER AND ON UTILITY BOX NORTH OF BUILDING.

ISSUED FOR REVIEW

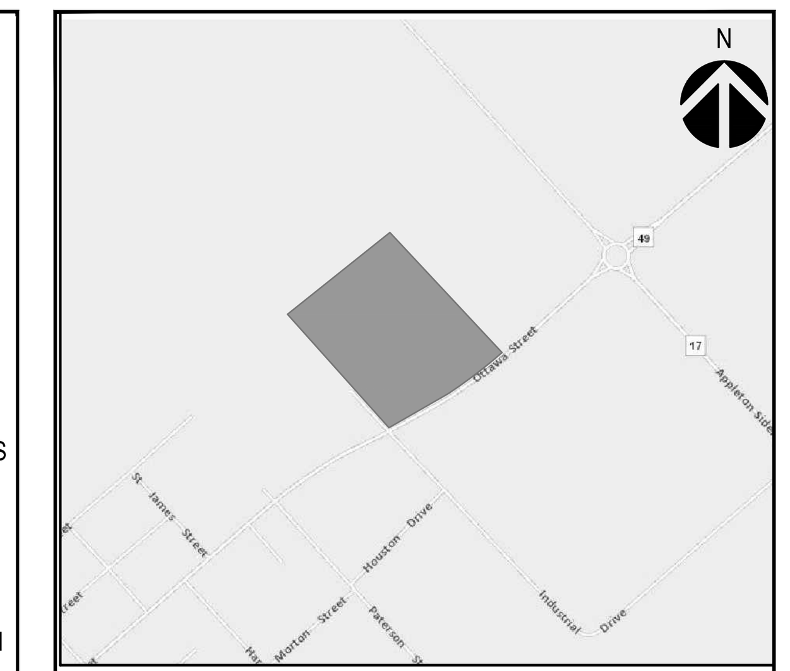
SEWER NOTES

1. CONSTRUCT SEWERS AND APPURTENANCES AS PER MINISTRY OF THE ENVIRONMENT STANDARDS. CONFIRM EXISTING TIE IN ELEVATIONS PRIOR TO CONSTRUCTION. SEWER TRENCH SHALL INCLUDE BEDDING AS PER OPSD 802.010. COMPACTION TO BE A MINIMUM OF 95% SPMDD FOR PIPE AND DRAINAGE STRUCTURE BEDDING AND BACKFILL. GRANULAR BEDDING AND COVER DEPTHS TO BE 300mm AND 300mm RESPECTIVELY. USE VIRGIN GRANULAR A MATERIAL, PLACED IN MAXIMUM 150mm THICK LIFTS.
2. PVC STORM SEWERS AND CATCH BASIN LEADS TO BE PVC DR 35 CERTIFIED TO CAN/CSA-B182.2.
3. PROVIDE FLEXIBLE BOOT CONNECTION FOR ALL PVC SEWER CONNECTIONS AT MANHOLES.
4. STORM CATCHBASINS (CB) TO BE AS PER OPSD 705.010 WITH FRAMES AND ROUND GRATE AS PER OPSD 400.070. SUMP TO BE 600mm.
5. SEWERS AND SERVICES SHALL BE CONSTRUCTED WITH A MINIMUM CLEARANCE OF 2.0m FROM TREES AND UTILITY PLANT.
6. ALL MANHOLES TO BE 1200mm DIA. AS PER OPSD 701.010 EXCEPT AS NOTED BELOW. STORM MANHOLES TO HAVE 300mm MINIMUM SUMP BELOW LOW INV.ERT. SANITARY MANHOLES TO BE BENCHED AS PER OPSD 701.021.
7. CBMH FRAMES AND ROUND GRATES AS PER OPSD 400.070. SANITARY MANHOLES TO HAVE FRAME AND COVER AS PER TYPE A, OPSD 401.010. STORM MANHOLE TO HAVE TYPE B COVER AND FRAME AS PER OPSD 401.010.
8. PROVIDE CAMERA INSPECTION OF ALL SEWERS FOLLOWING COMPLETION OF CONSTRUCTION AND PROVIDE TO ENGINEER. MAINTAIN SEWERS IN CLEAN CONDITION UNTIL OWNER ACCEPTANCE.
9. COORDINATE WITH MECHANICAL CONTRACTOR AND PROVIDE DYE TEST CERTIFIED BY PROFESSIONAL ENGINEER (RETAINED BY CONTRACTOR) ON BUILDING STORM AND SANITARY SEWER SERVICES TO CONFIRM THAT NO CROSS CONNECTIONS OCCUR ON WORKS BEING CONSTRUCTED IN THIS CONTRACT.
10. ALL PROPOSED SANITARY SEWERS AND ASSOCIATED STRUCTURES WITHIN THE RIGHT-OF-WAY WILL BE CONSIDERED MUNICIPAL INFRASTRUCTURE POST

WATERMAIN NOTES:

1. THE CONTRACTOR SHALL CONFIRM THE LOCATION, ELEVATION, SIZE, AND TYPE OF THE EXISTING WATERMAIN WITHIN THE WORK AREA PRIOR TO CONNECTION. THE CONTRACTOR SHALL PREPARE AND SUBMIT A DETAILED PLAN TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ORDERING FITTINGS. THE PLAN SHALL DETAIL THE TYPE, MAKE AND LOCATION OF ALL PROPOSED FITTINGS, RESTRAINTS AND ASSOCIATED APPURTENANCES. THE PLAN SHALL ALSO DETAIL THE PROPOSED DISINFECTION PROCEDURES, SEQUENCING AND DURATION OF WORK REQUIRED FOR THE REALIGNMENT OF THE WATERMAIN. DISINFECTION PROCEDURE SHALL FOLLOW THE REQUIREMENTS OF OPSS 441 AND TOWN STANDARDS.
2. CONTRACTOR SHALL COORDINATE TIMING AND DURATION OF SERVICE DISRUPTIONS WITH THE TOWN AND AFFECTED LAND OWNERS AND SHALL PROVIDE WRITTEN NOTIFICATION A MINIMUM OF TWO WEEKS PRIOR TO ANY PROPOSED DISRUPTION. NO WORK AFFECTING THE WATER OR OTHER MUNICIPAL SERVICES MAY COMMENCE UNTIL THE CONTRACTOR HAS RECEIVED WRITTEN APPROVAL FROM THE TOWN OR ENGINEER.
3. CONTRACTOR TO PROVIDE TEMPORARY POTABLE WATER SERVICES IN ACCORDANCE WITH OPSS MUNI 493.
4. WATERMAIN, VALVES AND HYDRANTS SHALL BE INSTALLED AS PER OPSS 441 AND TOWN STANDARDS.
5. WATERMAINS AND SERVICES SHALL HAVE MINIMUM 2.40m COVER IN ALL DIRECTIONS AT ALL TIMES.
6. WATERMAIN PIPE SHALL BE CSA CERTIFIED IN ACCORDANCE WITH AWWA C900 DR18.
7. WATER SERVICE LATERALS SHALL BE 25mm TYPE K COPPER AND SHALL BE INSTALLED PER OPSS 441.
8. GATE VALVES AS PER AWWA C509.
9. VALVE BOXES SHALL BE A 130mm DIAMETER SLIDE VALVE BOX COMPLETE WITH CASE IRON CAP AS SUPPLIED BY BIBBY-STE-CROIX OR APPROVED EQUAL.
10. CORROSION PROTECTION TO BE PROVIDED ACCORDING TO OPSD 1109.011 AND OPSS 442.
11. TRACER WIRE TO BE INSTALLED ALONG ALL NEW WATERMAINS. TRACER WIRE IS TO BE CONTINUOUS (UNSPLICED) AND SHALL BE SECURED TO THE PIPE USING FIBERGLASS TAPE OR PLASTIC TIE WRAPS, AND FASTENED TO A BOLT ON VALVES IN VALVE BOXES.
12. CONNECTION TO THE EXISTING 250mm WATERMAIN SHALL BE COORDINATED WITH THE ENGINEER AND TOWN. THE CONTRACTOR SHALL SUPPLY ALL MATERIALS AND EQUIPMENT REQUIRED TO MAKE THE CONNECTION. AT NO TIME SHALL THE CONTRACTOR OPERATE VALVES WITHIN THE TOWN DISTRIBUTION SYSTEM. THIS FUNCTION SHALL BE CARRIED OUT BY THE TOWN ONLY. ALL FEES CHARGED BY THE TOWN SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
13. CONTRACTOR TO BACKFILL WITH SUITABLE NATIVE MATERIAL SIMILAR TO ADJACENT GROUND UP TO THE SUB-BASE GRANULAR FILL. BACKFILL MATERIAL SHALL BE PLACED IN LAYERS NOT EXCEEDING 200mm AND COMPACTED ACCORDING TO OPSS 501 AND APPROVED BY THE GEOTECHNICAL CONSULTANT.

EXISTING	LEGEND-PLAN	PROPOSED
150 WM	WATER MAIN	150 WM
300 STM	STORM SEWER	300 STM
250 SAN	SANITARY SEWER	250 SAN
G	GAS	
PO	POWER OVERHEAD HYDRO	
	CURB	
	EDGE OF PAVEMENT	
	CULVERT	
	PROPERTY LINE	
	WOODEN FENCE	
59.367	GROUND ELEVATION	
(00.00)	ROAD ELEVATION	(00.00)
(00.00)	LOT ELEVATION	(00.00)
(00.00)	DITCH/SWALE ELEVATION	(00.00)
	FLOW DIRECTION	
	SWALE FLOW DIRECTION	
	OVERLAND DRAINAGE ARROW	
	HYDRO POLE	
	PLUG	
	VALVE	
	HYDRANT	
	MANHOLE	
	CATCHMENT BOUNDARY	
	TOPSOIL AND SOD	
	RIP RAP	
	CONCRETE	
	HEAVY DUTY ASPHALT	
	LIGHT DUTY ASPHALT	



KEY PLAN

REVISION:

REV	DATE	DESCRIPTION	BY
0B	2023-07-14	REVISED AS PER MUNICIPALITY COMMENTS	J.Z.
0A	2023-03-27	ISSUED FOR SPA	J.Z.

SEAL:

LICENSED PROFESSIONAL ENGINEER
J. W. ZHANG
100155766
2023-07-14
PROVINCE OF ONTARIO

ORIGINAL SCALE: 1:400
DATE: 2022-12-12
DESIGNED BY: J.Z.
ASSISTED BY: --
DRAWN BY: L.T.
MODIFIED BY: --
APPROVED BY: --

IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
25mm

DISCIPLINE: CIVIL

WSP Canada Inc.
2611 Queensview Drive, Suite 300 Ottawa, Ontario K2B 8K2
T 613-829-28-00| www.wsp.com

PROJECT NUMBER: 221-06853-00

CLIENT:

ELM DEVELOPMENTS

CLIENT REF. #: --

PROJECT:

430 OTTAWA STREET
ALMONTE, ONTARIO

TITLE:

OVERALL SITE SERVICING PLAN

DRAWING NUMBER: C02
REV. 0B

FILE: v:\10-13 me 2022 projects\221-06853-00 - 430 ottawa st - spa\14.0 tech_prof services\14.6_civil\3. drawings\working drawings\civil\2 working drawings\sheets\221-06853-c01-c02.dwg
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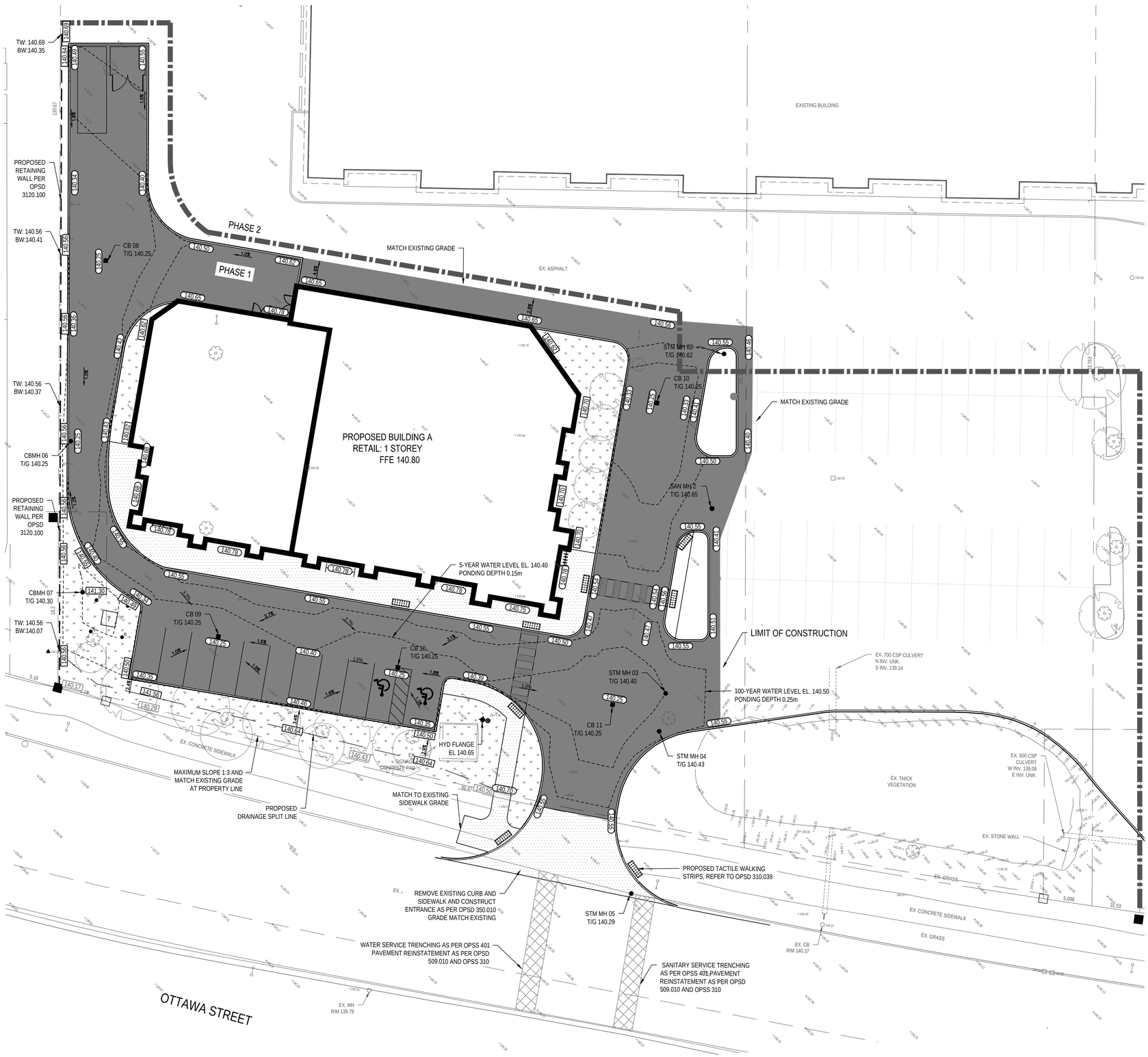


NOTES:

1. ALL WORK TO BE COORDINATED WITH OTHER PLANS FOR THIS SITE. REFER TO M AND E DRAWINGS FOR GAS, ELECTRICAL, PLUMBING AND COMMUNICATION SERVICES. ARCHITECTURAL SITE PLAN TO BE USED FOR SITE LAYOUT AND PHASING. ARCHITECTURAL DRAWINGS AND SPECIFICATIONS PROVIDE THE PAVEMENT DESIGN.
2. LOCATION OF SERVICES, CHAMBERS, UTILITIES AND ALL UNDERGROUND WORKS ARE APPROXIMATE. CONTRACTOR TO VERIFY LOCATION AND ELEVATION OF ALL SERVICES, UTILITIES, AND UNDERGROUND STRUCTURES PRIOR TO ANY CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR PROTECTION AND REINSTATEMENT.
3. THE CONTRACTOR IS RESPONSIBLE FOR ALL REMOVALS NECESSARY TO SATISFY ENGINEERING WORKS.
4. CONTRACTOR RESPONSIBLE FOR OBTAINING ROAD CUT PERMIT, AND PROVIDING ALL ASSOCIATED TRAFFIC CONTROL. CONTRACTOR TO RECORD VERTICAL AND HORIZONTAL LOCATION OF ALL UNDERGROUND WORKS FOR RECORD DRAWINGS.
5. CONTRACTOR TO PROVIDE POST CONSTRUCTION TOPOGRAPHIC SURVEY COMPLETED BY OLS OR PROFESSIONAL ENGINEER RETAINED BY CONTRACTOR CONFIRMING COMPLIANCE WITH GRADING AND SERVICING DESIGN. SURVEY TO INCLUDE SEWER INVERTS. SURVEY LEVEL OF DETAIL TO MATCH THAT OF GRADING DESIGN PLANS.
6. REFER TO ARCHITECTURAL PLANS FOR PHASING AND STAGING OF CONSTRUCTION. REFER TO SITE PLAN FOR PAVING LIMITS AND TYPES, INCLUDING SIDEWALK REQUIREMENTS.
7. ROAD ENTRANCES TO BE CONSTRUCTED IN ACCORDANCE WITH SITE PLAN.
8. ASPHALT AND GRANULARS:
   - 8.1. ALL MATERIALS MUST CONFORM TO THE MUNICIPALITY AND ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS. REFER TO TESTING SECTION FOR GEOTECHNICAL REQUIREMENTS AND A LIST OF SUBMITTALS.
   - 8.2. HOT MIX ASPHALT SHALL BE INSTALLED IN ACCORDANCE WITH OPSS 310.
   - 8.3. COMPACTION OF ASPHALT SHALL BE IN ACCORDANCE WITH TABLE 10 OF OPSS 310.
   - 8.4. ALL SAWCUTS SHALL BE STRAIGHT MATCH LINES BETWEEN THE EXISTING PAVEMENT AND NEW PAVEMENT. KEY GRIND A MINIMUM 0.50m WIDE BY 40mm DEEP EDGE WHEN TYING INTO EXISTING ASPHALT AND SEAL JOINTS WITH DENSO ASPHALT REINSTATEMENT TAPE.
   - 8.5. COMPACTION OF BASE AND SUBBASE MATERIALS SHALL BE TO 100% SPMDD.
9. CONCRETE CURBS SHALL BE INSTALLED IN ACCORDANCE WITH OPSD 600.110.
10. CONCRETE SIDEWALKS SHALL BE INSTALLED IN ACCORDANCE WITH OPSD 310.010.
11. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE INDICATED.
12. DRAWING COORDINATES ARE ZONE 18 UTM NAD83.

RECOMMENDED MINIMUM PAVEMENT STRUCTURE			
PAVEMENT STRUCTURE		HEAVY DUTY MATERIALS FIRE ROUTES	LIGHT DUTY PARKING
ASPHALTIC CONCRETE	OPSS HL3 OR EQUIVALENT	40mm	65mm
	OPSS HL8 OR EQUIVALENT	60mm	-
BASE	OPSS GRANULAR A OR 20mm CRUSHER-RUN	150mm	150mm
SUB-BASE	OPSS GRANULAR B OR 50mm CRUSHER-RUN	300mm	200mm

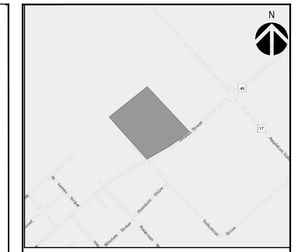
EXISTING	LEGEND-PLAN	PROPOSED
150 WM	WATER MAIN	150 WM
300 STM	LAND DRAINAGE SEWER	300 STM
250 SAN	WASTE WATER SEWER	250 SAN
G	GAS	
PO	POWER OVERHEAD HYDRO	
	CURB	
	EDGE OF PAVEMENT	
	CULVERT	
	PROPERTY LINE	
	WOODEN FENCE	
59.367	GROUND ELEVATION	
00.00	ROAD ELEVATION	00.00
00.00	LOT ELEVATION	00.00
00.00	DITCH/SWALE ELEVATION	00.00
	FLOW DIRECTION	
	SWALE FLOW DIRECTION	
	DOWNSPOUT	D.S.
HP	HYDRO POLE	
	PLUG	
	VALVE	
	HYDRANT	
	MANHOLE	
	CATCHMENT BOUNDARY	
	TOPSOIL AND SOD	
	CONCRETE	
	HEAVY DUTY ASPHALT	
	LIGHT DUTY ASPHALT	

METRIC

WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

BENCHMARK (B.M.)

SOUTHWEST CORNER, SOUTHEAST CORNER AND ON UTILITY BOX NORTH OF BUILDING.



KEY PLAN

ISSUED FOR REVIEW

REVISION:

REV.	DATE	DESCRIPTION	BY
0C	2023-09-26	REVISED AS PER MUNICIPALITY COMMENTS	I.J.
0B	2023-07-14	REVISED AS PER MUNICIPALITY COMMENTS	J.Z.
0A	2023-03-27	ISSUED FOR SPA	J.Z.

SEAL:

REGISTERED PROFESSIONAL ENGINEER
I. M. JAPPERJEE
100164153
2023-09-26
PROVINCE OF ONTARIO

ORIGINAL SCALE: 1:200
DATE: 2022-12-12
DESIGNED BY: J.Z.
ASSISTED BY: --
DRAWN BY: L.T.
MODIFIED BY: I.J.
APPROVED BY: --

IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.

25mm

DISCIPLINE: CIVIL

WSP Canada Inc.
2611 Queensview Drive, Suite 300 Ottawa, Ontario K2B 8K2
T 613-829-28-00| www.wsp.com

PROJECT NUMBER: 221-06853-00

CLIENT: ELM DEVELOPMENTS

CLIENT REF. #: --

PROJECT: 430 OTTAWA STREET
ALMONTE, ONTARIO

TITLE: PHASE 1
LOT GRADING PLAN

DRAWING NUMBER: C03
REV.: 0C

CTB: wsp-24x36x5.full.ctb
PLOTTED: 2023-09-26 - 4:04 PM
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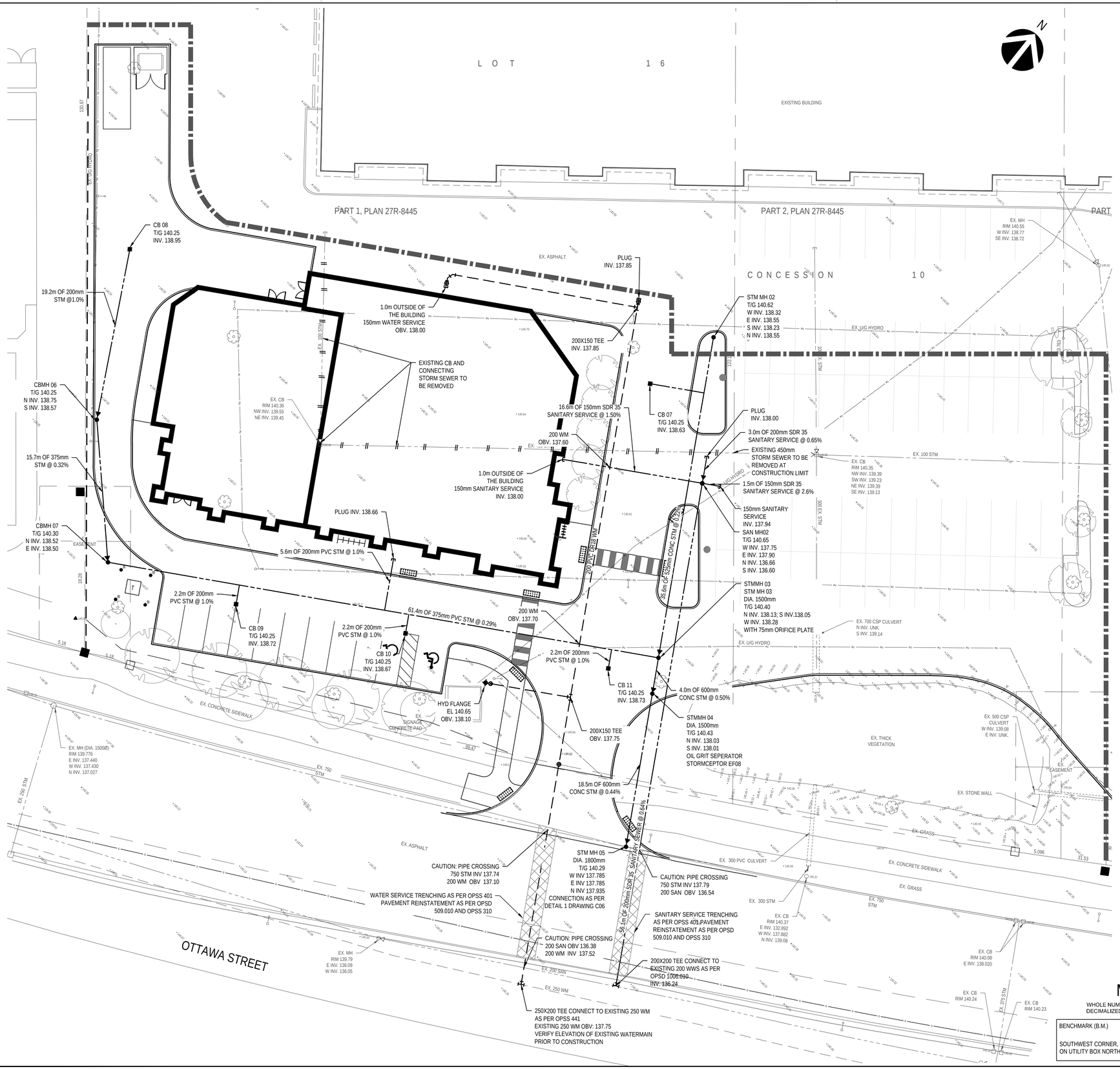

SEWER NOTES

1. CONSTRUCT SEWERS AND APPURTENANCES AS PER MINISTRY OF THE ENVIRONMENT STANDARDS. CONFIRM EXISTING TIE IN ELEVATIONS PRIOR TO CONSTRUCTION. SEWER TRENCH SHALL INCLUDE BEDDING AS PER OPSD 802.010. COMPACTION TO BE A MINIMUM OF 95% SPMDD FOR PIPE AND DRAINAGE STRUCTURE BEDDING AND BACKFILL. GRANULAR BEDDING AND COVER DEPTHS TO BE 300mm AND 300mm RESPECTIVELY. USE VIRGIN GRANULAR A MATERIAL, PLACED IN MAXIMUM 150mm THICK LIFTS.
2. PVC STORM SEWERS AND CATCH BASIN LEADS TO BE PVC DR 35 CERTIFIED TO CAN/CSA-B182.2.
3. PROVIDE FLEXIBLE BOOT CONNECTION FOR ALL PVC SEWER CONNECTIONS AT MANHOLES.
4. STORM CATCHBASINS (CB) TO BE AS PER OPSD 705.010 WITH FRAMES AND ROUND GRATE AS PER OPSD 400.070. SUMP TO BE 600mm.
5. SEWERS AND SERVICES SHALL BE CONSTRUCTED WITH A MINIMUM CLEARANCE OF 2.0m FROM TREES AND UTILITY PLANT.
6. ALL MANHOLES TO BE 1200mm DIA. AS PER OPSD 701.010 EXCEPT AS NOTED BELOW. STORM MANHOLES TO HAVE 300mm MINIMUM SUMP BELOW LOW INVERT. SANITARY MANHOLES TO BE BENCHED AS PER OPSD 701.021.
7. CBMH FRAMES AND ROUND GRATES AS PER OPSD 400.070. SANITARY MANHOLES TO HAVE FRAME AND COVER AS PER TYPE A, OPSD 401.010. STORM MANHOLE TO HAVE TYPE B COVER AND FRAME AS PER OPSD 401.010.
8. PROVIDE CAMERA INSPECTION OF ALL SEWERS FOLLOWING COMPLETION OF CONSTRUCTION AND PROVIDE TO ENGINEER. MAINTAIN SEWERS IN CLEAN CONDITION UNTIL OWNER ACCEPTANCE.
9. COORDINATE WITH MECHANICAL CONTRACTOR AND PROVIDE DYE TEST CERTIFIED BY PROFESSIONAL ENGINEER (RETAINED BY CONTRACTOR) ON BUILDING STORM AND SANITARY SEWER SERVICES TO CONFIRM THAT NO CROSS CONNECTIONS OCCUR ON WORKS BEING CONSTRUCTED IN THIS CONTRACT.
10. ALL PROPOSED SERVICES AND ASSOCIATED STRUCTURES WITHIN THE RIGHT-OF-WAY WILL BE CONSIDERED MUNICIPAL INFRASTRUCTURE POST.

WATERMAIN NOTES:

1. THE CONTRACTOR SHALL CONFIRM THE LOCATION, ELEVATION, SIZE, AND TYPE OF THE EXISTING WATERMAIN WITHIN THE WORK AREA PRIOR TO CONNECTION. THE CONTRACTOR SHALL PREPARE AND SUBMIT A DETAILED PLAN TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ORDERING FITTINGS. THE PLAN SHALL DETAIL THE TYPE, MAKE AND LOCATION OF ALL PROPOSED FITTINGS, RESTRAINTS AND ASSOCIATED APPURTENANCES. THE PLAN SHALL ALSO DETAIL THE PROPOSED DISINFECTION PROCEDURES, SEQUENCING AND DURATION OF WORK REQUIRED FOR THE REALIGNMENT OF THE WATERMAIN. DISINFECTION PROCEDURE SHALL FOLLOW THE REQUIREMENTS OF OPSS 441 AND THE MUNICIPALITY STANDARDS.
2. CONTRACTOR SHALL COORDINATE TIMING AND DURATION OF SERVICE DISRUPTIONS WITH THE MUNICIPALITY AND AFFECTED LAND OWNERS AND SHALL PROVIDE WRITTEN NOTIFICATION A MINIMUM OF TWO WEEKS PRIOR TO ANY PROPOSED DISRUPTION. NO WORK AFFECTING THE WATER OR OTHER MUNICIPAL SERVICES MAY COMMENCE UNTIL THE CONTRACTOR HAS RECEIVED WRITTEN APPROVAL FROM THE MUNICIPALITY OR ENGINEER.
3. CONTRACTOR TO PROVIDE TEMPORARY POTABLE WATER SERVICES IN ACCORDANCE WITH OPSS MUNI 493.
4. WATERMAIN, VALVES AND HYDRANTS SHALL BE INSTALLED AS PER OPSS 441 AND THE MUNICIPALITY STANDARDS.
5. WATERMAINS AND SERVICES SHALL HAVE MINIMUM 2.40m COVER IN ALL DIRECTIONS AT ALL TIMES.
6. WATERMAIN PIPE SHALL BE CSA CERTIFIED IN ACCORDANCE WITH AWWA C900 DR18.
7. GATE VALVES AS PER AWWA C509.
8. VALVE BOXES SHALL BE A 130mm DIAMETER SLIDE VALVE BOX COMPLETE WITH CASE IRON CAP AS SUPPLIED BY BIBBY-STE-CROIX OR APPROVED EQUAL.
9. CORROSION PROTECTION TO BE PROVIDED ACCORDING TO OPSD 1109.011 AND OPSS 442.
10. TRACER WIRE TO BE INSTALLED ALONG ALL NEW WATERMAINS. TRACER WIRE IS TO BE CONTINUOUS (UNSPLICED) AND SHALL BE SECURED TO THE PIPE USING FIBERGLASS TAPE OR PLASTIC TIE WRAPS, AND FASTENED TO A BOLT ON VALVES IN VALVE BOXES.
11. CONNECTION TO THE EXISTING 150mm WATER SERVICE SHALL BE COORDINATED WITH THE ENGINEER AND THE MUNICIPALITY. THE CONTRACTOR SHALL SUPPLY ALL MATERIALS AND EQUIPMENT REQUIRED TO MAKE THE CONNECTION. AT NO TIME SHALL THE CONTRACTOR OPERATE VALVES WITHIN THE MUNICIPALITY DISTRIBUTION SYSTEM. THIS FUNCTION SHALL BE CARRIED OUT BY THE MUNICIPALITY ONLY. ALL FEES CHARGED BY THE MUNICIPALITY SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
12. CONTRACTOR TO BACKFILL WITH SUITABLE NATIVE MATERIAL SIMILAR TO ADJACENT GROUND UP TO THE SUB-BASE GRANULAR FILL. BACKFILL MATERIAL SHALL BE PLACED IN LAYERS NOT EXCEEDING 200mm AND COMPACTED ACCORDING TO OPSS 501 AND APPROVED BY THE GEOTECHNICAL CONSULTANT.

EXISTING	LEGEND-PLAN	PROPOSED
150 WM	WATER MAIN	150 WM
300 STM	LAND DRAINAGE SEWER	300 STM
250 SAN	WASTE WATER SEWER	250 SAN
G	GAS	
PO	POWER OVERHEAD HYDRO	
	CURB	
	EDGE OF PAVEMENT	
	CULVERT	
	PROPERTY LINE	
	WOODEN FENCE	
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	HYDRO POLE	
	PLUG	
	VALVE	
	HYDRANT	
	MANHOLE	
	CATCHMENT BOUNDARY	
	TOPSOIL AND SOD	
	CONCRETE	
	HEAVY DUTY ASPHALT	
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METRIC

WHOLE NUMBERS INDICATE MILLIMETRES
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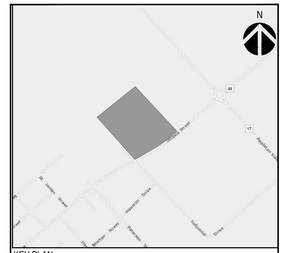
BENCHMARK (B.M.)

SOUTHWEST CORNER, SOUTHEAST CORNER AND ON UTILITY BOX NORTH OF BUILDING.



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0A	2023-03-27	ISSUED FOR SPA	J.Z.

SEAL:

REGISTERED PROFESSIONAL ENGINEER
I. M. JAPPERJEE
100164153
2023-09-26
PROVINCE OF ONTARIO

ORIGINAL SCALE: 1:200
DESIGNED BY: I.J.
ASSISTED BY: --
DRAWN BY: L.T.
MODIFIED BY: I.J.
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DATE: 2022-12-12

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25mm

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PROJECT NUMBER: 221-06853-00

CLIENT: ELM DEVELOPMENTS

CLIENT REF. #: --

PROJECT: 430 OTTAWA STREET
ALMONTE, ONTARIO

TITLE: PHASE 1
LOT SERVICING PLAN

DRAWING NUMBER: C04

REV.: 0C

CTB: wsp-2k4.ctb
PLOTTED: 2023-09-26 - 4:04 PM
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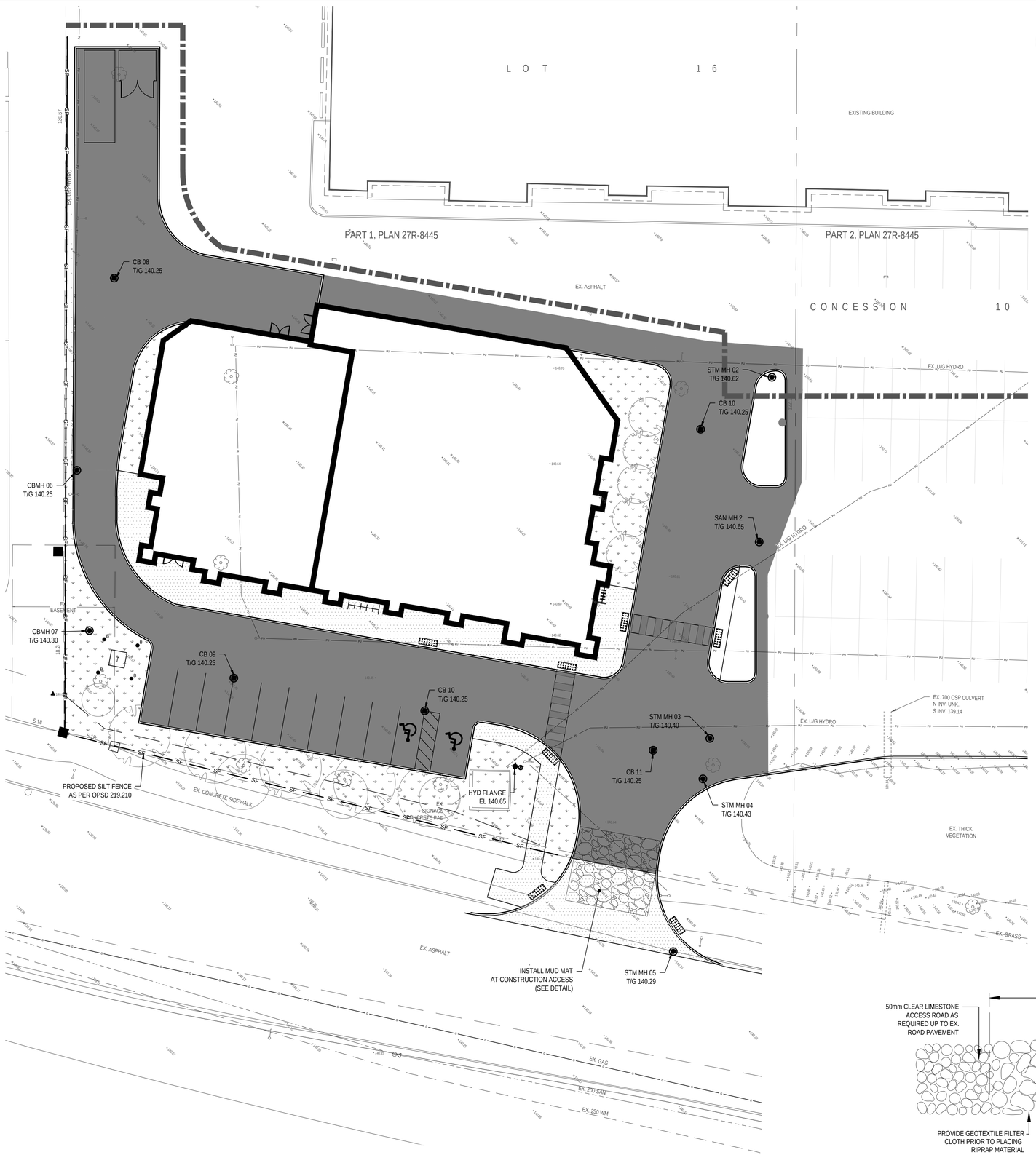
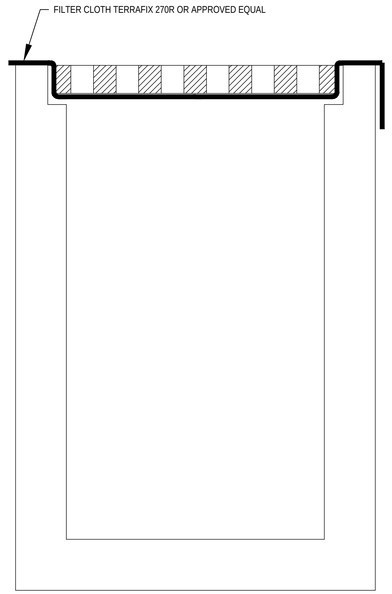
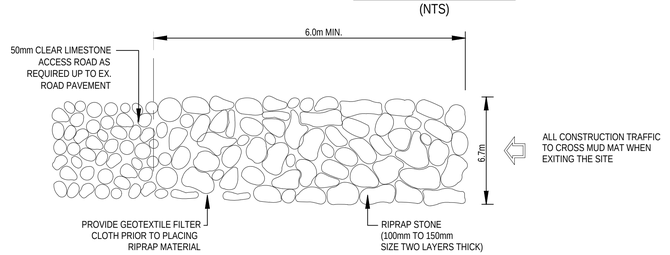




FILTER CLOTH CATCHBASIN OR MANHOLE
SEDIMENT CONTROL DEVICE
(NTS)



MUD MAT DETAIL - PLAN VIEW
(NTS)

NOTES: EROSION AND SEDIMENT CONTROL

** CONTRACTOR IS RESPONSIBLE FOR ALL INSTALLATION, MONITORING, REPAIR AND REMOVAL OF ALL EROSION AND SEDIMENT CONTROL FEATURES. **

1. PRIOR TO START OF CONSTRUCTION:

1.1. INSTALL SILT FENCE IN LOCATION SHOWN ON DWG C05.
1.2. INSTALL FILTER FABRIC OR SILT SACK FILTERS IN ALL THE CATCHBASINS AND MANHOLES TO REMAIN DURING CONSTRUCTION WITHIN THE SITE (SEE TYPICAL DETAIL).
1.3. INSPECT MEASURES IMMEDIATELY AFTER INSTALLATION.

2. DURING CONSTRUCTION:

2.1. MINIMIZE THE EXTENT OF DISTURBED AREAS AND THE DURATION OF EXPOSURE AND IMPACTS TO EXISTING GRADING.
2.2. PERIMETER VEGETATION TO REMAIN IN PLACE UNTIL PERMANENT STORM WATER MANAGEMENT IS IN PLACE. OTHERWISE, IMMEDIATELY INSTALL SILT FENCE WHEN THE EXISTING SITE IS DISTURBED AT THE PERIMETER.
2.3. PROTECT DISTURBED AREAS FROM OVERLAND FLOW BY PROVIDING TEMPORARY SWALES TO THE SATISFACTION OF THE FIELD ENGINEER. TIE-IN TEMPORARY SWALE TO EXISTING CB'S AS REQUIRED.
2.4. PROVIDE TEMPORARY COVER SUCH AS SEEDING OR MULCHING IF DISTURBED AREA WILL NOT BE REHABILITATED WITHIN 30 DAYS.
2.5. INSPECT SILT FENCES, FILTER FABRIC FILTERS AND CATCH BASIN SUMPS WEEKLY AND WITHIN 24 HOURS AFTER A STORM EVENT. CLEAN AND REPAIR WHEN NECESSARY.
2.6. DRAWING TO BE REVIEWED AND REVISED AS REQUIRED DURING CONSTRUCTION.
2.7. EROSION CONTROL FENCING TO BE ALSO INSTALLED AROUND THE BASE OF ALL STOCKPILES.
2.8. DO NOT LOCATE TOPSOIL PILES AND EXCAVATION MATERIAL CLOSER THAN 2.5m FROM ANY PAVED SURFACE, OR ONE WHICH IS TO BE PAVED BEFORE THE PILE IS REMOVED. ALL TOPSOIL PILES ARE TO BE SEEDED IF THEY ARE TO REMAIN ON SITE LONG ENOUGH FOR SEEDS TO GROW (LONGER THAN 30 DAYS).
2.9. CONTROL WIND-BLOWN DUST OFF SITE BY SEEDING TOPSOIL PILES AND OTHER AREAS TEMPORARILY (PROVIDE WATERING AS REQUIRED AND TO THE SATISFACTION OF THE ENGINEER).
2.10. NO ALTERNATE METHODS OF EROSION PROTECTION SHALL BE PERMITTED UNLESS APPROVED BY THE FIELD ENGINEER.
2.11. CITY ROADWAY AND SIDEWALK TO BE CLEANED OF ALL SEDIMENT FROM VEHICULAR TRACKING AS REQUIRED.
2.12. DURING WET CONDITIONS, TIRES OF ALL VEHICLES/EQUIPMENT LEAVING THE SITE ARE TO BE SCRAPED.
2.13. ANY MUD/MATERIAL TRACKED ONTO THE ROAD SHALL BE REMOVED IMMEDIATELY BY HAND OR RUBBER TIRE LOADER.
2.14. TAKE ALL NECESSARY STEPS TO PREVENT BUILDING MATERIAL, CONSTRUCTION DEBRIS OR WASTE BEING SPILLED OR TRACKED ONTO ABUTTING PROPERTIES OR PUBLIC STREETS DURING CONSTRUCTION AND PROCEED IMMEDIATELY TO CLEAN UP ANY AREAS SO AFFECTED.
2.15. ALL EROSION CONTROL STRUCTURE TO REMAIN IN PLACE UNTIL ALL DISTURBED GROUND SURFACES HAVE BEEN STABILIZED EITHER BY PAVING OR RESTORATION OF VEGETATIVE GROUND COVER.
2.16. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.

METRIC

WHOLE NUMBERS INDICATE MILLIMETRES
DECIMALIZED NUMBERS INDICATE METRES

BENCHMARK (B.M.)

SOUTHWEST CORNER, SOUTHEAST CORNER AND ON UTILITY BOX NORTH OF BUILDING.

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	EDGE OF PAVEMENT	
	CULVERT	
	PROPERTY LINE	
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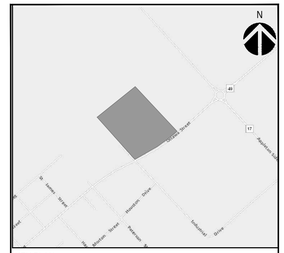
	VALVE	
	HYDRANT	
	MANHOLE	
	CATCHMENT BOUNDARY	
	TOPSOIL AND SOD	
	CONCRETE	
	HEAVY DUTY ASPHALT	
	LIGHT DUTY ASPHALT	
	SILT FENCE	SF
	MUD MAT	
	FILTER CLOTH	



ISSUED FOR REVIEW

REVISION:

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PROJECT NUMBER: 221-06853-00

CLIENT:

ELM DEVELOPMENTS

CLIENT REF. #: --

PROJECT:

430 OTTAWA STREET
OTTAWA, ONTARIO

TITLE:

EROSION AND SEDIMENT CONTROL PLAN

DRAWING NUMBER: C05
REV.: 0C

CTB: wsp-2ab5ks5.ctb
FILE: v:\10-13 mc 2022 projects\221-06853-00 - 430 ottawa st - spa\14.0 tech_prof services\14.6_civil\3. drawings\working drawings\civil\2 working drawings\sheets\221-06853-c03-c05.dwg
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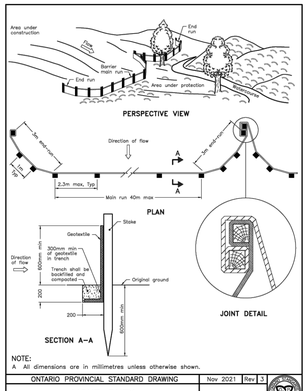
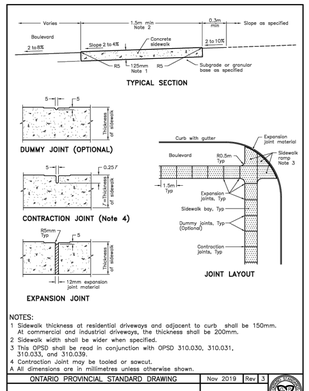


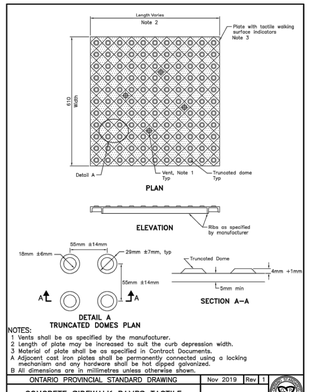
NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2021	Rev 3
LIGHT–DUTY SILT FENCE BARRIER		OPSD 219.110



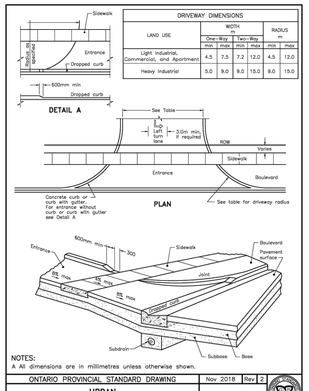
NOTES:
1 Sidewalk thickness at residential driveways and adjacent to curb shall be 150mm. At commercial and industrial driveways, the thickness shall be 200mm.
2 Sidewalk width shall be wider when specified.
3 This OPSD shall be read in conjunction with OPSD 310.030, 310.031, 310.033, and 310.039.
4 Contraction Joint may be tooled or sawcut.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev 3
CONCRETE SIDEWALK		OPSD 310.010



NOTES:
1 Vents shall be as specified by the manufacturer.
2 Length of plate may be increased to suit the curb depression width.
3 Material of plate shall be as specified in Contract Documents.
A Adjacent cast iron plates shall be permanently connected using a locking mechanism and any hardware shall be hot dipped galvanized.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev 1
CONCRETE SIDEWALK RAMPS TACTILE WALKING SURFACE INDICATORS COMPONENT		OPSD 310.039



Light Industrial, Commercial, and Apartment	4.5	7.5	7.2	12.0	4.5	12.0
Heavy Industrial	9.0	9.0	9.0	15.0	9.0	15.0

NOTES:
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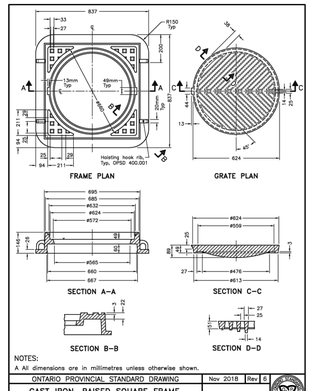
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 2
URBAN INDUSTRIAL, COMMERCIAL, AND APARTMENT ENTRANCES		OPSD 350.010



NOTES:
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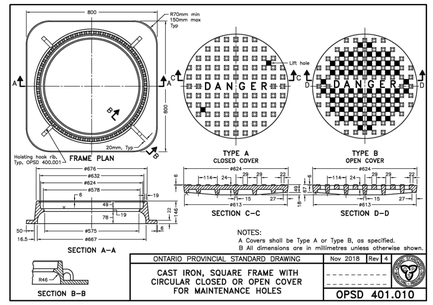
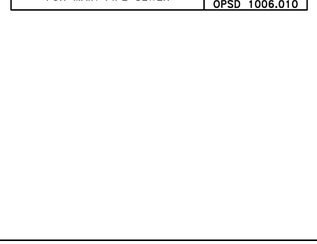
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 8
CAST IRON, RAISED SQUARE FRAME WITH CIRCULAR FLAT GRATE FOR CATCH BASINS, HERRING BONE OPENINGS		OPSD 400.070



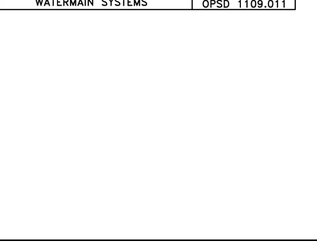
NOTES:
A Covers shall be Type A or Type B, as specified.
B All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2018	Rev 1
CAST IRON, SQUARE FRAME WITH CIRCULAR CLOSED OR OPEN COVER FOR MAINTENANCE HOLES		OPSD 401.010



NOTES:
1 Hot mix asphalt type and thickness as specified. The surface course shall not be less than 40mm.
2 Dowels shall be installed at 300mm intervals along all transverse faces. The dowel bars shall be placed mid–depth of the specified slab thickness and parallel to the longitudinal axis and the horizontal plane of the pavement within the following tolerances:
a) Vertical Alignment: ± 15mm along the length of the dowel bar.
b) Horizontal Alignment: ± 15mm along the length of the dowel bar.
c) Side Shift: The centre of the dowel bar shall lie within ± 40mm from the transverse joint.
Tie bars shall be installed at 600mm intervals along all longitudinal faces and shall be aligned perpendicular to the longitudinal axis of the pavement. The tie bars shall be installed within a tolerance of ± 15mm from the specified depth.
Where reinforcement is present, dowel and tie bars may be adjusted 25mm horizontally and raised or lowered 10mm to avoid drilling reinforcement.
All dowels and tie bars shall be set with epoxy grout.
3 If the total pavement thickness is less than 80mm, step joint is not required.
4 Joint treatment as specified.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2020	Rev 3
PAVEMENT REINSTATEMENT FOR UTILITY CUTS		OPSD 509.010

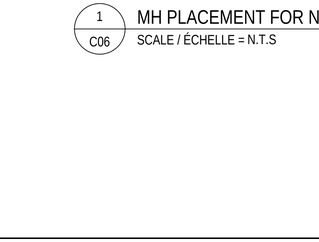


NOTES:
1 When sidewalk is continuously adjacent, the dropped curb at entrances shall be reduced to 75mm.
2 For slipforming procedure a 5R batter is acceptable.
A Treatment at entrances shall be according to OPSD 351.010.
B Outlet treatment shall be according to the OPSD 610 Series.
C The transition from one curb type to another shall be a minimum length of 3.0m, except in conjunction with guide rail where it shall be according to the OPSD 900 Series.
D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2012	Rev 2
CONCRETE BARRIER CURB		OPSD 600.110

NOTES:
1 The sump is measured from the lowest invert.
A Granular backfill shall be placed to a minimum thickness of 300mm all around the maintenance hole.
B Precast concrete components shall be according to OPSD 701.030, 701.031, or 701.032.
C Structure exceeding 5.0m in depth shall include safety platform according to OPSD 404.020.
D Pipe support according to OPSD 708.020.
E For benching and pipe opening details, see OPSD 701.021.
F For adjustment unit and frame installation, see OPSD 704.010.
G All dimensions are nominal.
H All dimensions are in millimetres unless otherwise shown.

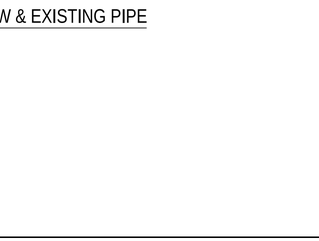
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 5
PRECAST CONCRETE MAINTENANCE HOLE 1200mm DIAMETER		OPSD 701.010



MAXIMUM SIZE HOLE IN THE WALL IN PRECAST RISER SECTIONS						
Maintenance Hole Diameter	No. 1–4	No. 5 and 6	No. 8	Note 2		
				Inlet Hole	Outlet Hole	
1200	700	860	780	700	860	
1500	860	1220	980	860	1170	
1800	1220	1485	1220	1220	1485	
2400	1485	2020	1760	1485	2020	
3000	1930	2450	2300	1930	2450	
3600	2470	3085	2730	2470	3085	

NOTES:
1 Slopes shall be maintained from the outlet hole opening for top of benching.
A Concrete for benching shall be 30MPa.
B When benching is hand–finished, it shall be given wood float finish, channel shall be given steel trowel finish, and edges shall be tooled with 10mm radius.
C Benching slope and height shall be as specified.
D When specified, maintenance holes that are 1200mm in diameter with a uniform channel for 200 or 250mm pipe may be prebenched at the manufacturer with standardized benching slope and channel orientation.
E All dimensions are nominal.
F All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 4
MAINTENANCE HOLE BENCHING AND PIPE OPENING ALTERNATIVES		OPSD 701.021



ALTERNATIVE	DIMENSION
A	1980
B	1830
C	1520
D	1380

NOTES:
A Outlet hole size 525mm diameter maximum, location as required.
B 200mm diameter knockout to accommodate subdrain. Knockout shall be 60mm deep.
C Centre reinforcing in base slab and walls ±20mm.
D Granular backfill shall be placed to a minimum thickness of 300mm all around the catch basin.
E Frame, grate, and adjustment units shall be installed according to OPSD 704.010.
F Pipe support shall be according to OPSD 708.020.
G All dimensions are nominal.
H All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2019	Rev 4
PRECAST CONCRETE CATCH BASIN 600x600mm		OPSD 705.010

NOTES:
1 Height of fill is measured from the finished surface to top of pipe.
2 The pipe bed shall be compacted and shaped to receive the bottom of the pipe.
3 Pipe culvert frost treatment shall be according to OPSD 803.030 and 803.031.
4 Condition of excavation is symmetrical about centreline of pipe.
A Granular material placed in the haunch area shall be compacted prior to placing and compacting the remainder of the embedment material.
B Soil types as defined in the Occupational Health and Safety Act and Regulations for Construction Projects.
C All dimensions are in metres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 3
FLEXIBLE PIPE EMBEDMENT AND BACKFILL EARTH EXCAVATION		OPSD 802.010

NOTES:
1 Sewer service connections to the main pipe sewer shall be made using factory made tees, strap–on–saddles, or other approved saddles.
2 Vertical risers shall be as specified.
3 Cap or plug at property line shall be adequately braced.
A Maintenance holes shall be used at the main sewer to connect service connections greater than 200mm.
B For new construction, saddles shall be installed on the main pipe before that pipe is laid.
C Approved cut–in tool shall be used for field made connections.
D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2021	Rev 4
SEWER SERVICE CONNECTIONS FOR MAIN PIPE SEWER		OPSD 1006.010

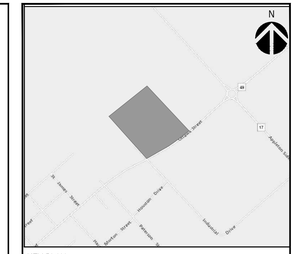
NOTES:
1 Anode shall be placed at least 1.0m away from the water system pipe and appurtenances and as deep as the bottom of the pipe and appurtenances or as specified in Contract Documents.
2 Anode connecting wire shall be loosely wrapped around pipes and fittings and knotted.
3 Protective coating shall be applied to all thermite welds.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2020	Rev 3
CATHODIC PROTECTION FOR PVC WATERMAIN SYSTEMS		OPSD 1109.011

NOTES:
1 Walls shall be founded on undisturbed soil having a minimum bearing capacity at ultimate limit states of 200kPa for Type I and 300kPa for Type II and Type III.
2 Excavation for toe walls shall be backfilled with free draining granular material.
3 10mm preformed joint filler, Type A, non–extruding and resilient bituminous type as specified.
4 Cold applied rubber asphalt joint sealing compound.
5 Where specified, wall drains shall be installed as per OPSD 3190.100.
6 150mm dia perforated pipe subdrain wrapped in geotextile.
A Maximum height of slope above top of wall is 4m.
B Concrete for toe walls shall be 30MPa.
C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2010	Rev 2
WALLS RETAINING CONCRETE TOE WALL		OPSD 3120.100

1 / C06 MH PLACEMENT FOR NEW & EXISTING PIPE
SCALE / ÉCHELLE = N.T.S



ISSUED FOR REVIEW

REVISION:			
0C	2023-09-26	REVISED AS PER MUNICIPALITY COMMENTS	I.J.
REV.	DATE	DESCRIPTION	BY

SEAL:

REGISTERED PROFESSIONAL ENGINEER
I. M. JAFFERJEE
100164153
2023-09-26
PROVINCE OF ONTARIO

ORIGINAL SCALE: --
DESIGNED BY: S.M.
ASSISTED BY: --
DRAWN BY: S.M.
MODIFIED BY: --
APPROVED BY: I.J.
DISCIPLINE: CIVIL

DATE: 2022-12-12

IF THIS BAR IS NOT 25mm LONG, ADJUST YOUR PLOTTING SCALE.
25mm

WSP Canada Inc.
2611 Queensview Drive, Suite 300 Ottawa, Ontario K2B 8K2
T 613-829-28-00| www.wsp.com

PROJECT NUMBER: 221-06853-00
CLIENT: ELM DEVELOPMENTS
CLIENT REF. #: --

PROJECT: 430 OTTAWA STREET OTTAWA, ONTARIO
TITLE: STANDARD DETAILS

DRAWING NUMBER: C06
REV. 0C

CTB: wsp-2bit-back-full.ctb
PLOTTED: 2023-09-26 - 4:05 PM
FILE: v:\10-13.rre 2022 projects\221-06853-00 - 430 ottawa st. - spa\14.0 tech_prof services\14.6_civil\3. drawings\working \drawings\civil\02 working drawings\sheets\221-06853-c06.dwg

APPENDIX

C WATER DISTRIBUTION SYSTEM

TECHNICAL MEMORANDUM

TO: Shan Goel, Elm Development Corp

FROM: Zhidong Pan, M.Eng., P.Eng.

SUBJECT: **430 Ottawa Street Site Plan Control Approval**

DATE: **March 06, 2023**

WSP Canada Inc. (WSP) was retained by Elm Development Corp to complete an engineering servicing design for a development site at 430 Ottawa Street in the Town of Almonte, Municipality of Mississippi Mills, Ontario.

The purpose of this technical memorandum is to summarize all findings from review of the existing water distribution system boundary conditions, fire protection flow calculation for the proposed buildings on site, and hydraulic modeling results for fire flow analysis.

The development site is located at the northeast corner of the intersection of Ottawa Street and Sadler Drive, Almonte. There is an existing 250 mm diameter watermain along south side of Ottawa Street. The proposed water system includes a looped 200 mm diameter PCV DR18 watermain and two connections to the existing 250 mm watermain on Ottawa Street.

EXISTING WATER DISTRIBUTION SYSTEM CAPACITY

J. L. Richard & Associates Limited (JLR) provided an email on March 1st, 2023, regarding to the hydraulic boundary conditions at the two proposed connections on the existing 250 mm WM on Ottawa Street. The email indicated that the existing water distribution system can provide the maximum 112 L/s (6,720 L/min) fire flow for the assumed 150 mm diameter looped onsite water system and the maximum of 155 L/s (9,300 L/min) fire flow for the assumed 200 mm diameter looped onsite water system. The email also states that the estimated maximum flow flows were simulated using the Municipality's existing hydraulic water model (2017). JLR's email is included in Appendix A.

REQUIRED FIRE PROTECTION FLOW CALCULATION

The required fire protection flows were calculated based on the provided building configurations including floor area, stories, construction type, occupancy types, sprinkler system, etc., and the Water Supply for Public Fire Protection by Fire Underwriters Survey 2020 (FUS).

The required fire flows for proposed building onsite are summarized in Table 1. Detailed fire flow calculation is included in Appendix B.

Table 1: Calculated Fire Flows

Building	Floor Area (m2)	Stories	Construction Type			Occupancy Type	Fully Supervised Spingkler	Estimated Fire Flow (L/Min)
			Wood Combustible	Ordinary	Non combustible	Limited Combustible		
Building A	1149	1	yes			yes		12000
				yes		yes		8000
Building B	1200	1	yes			yes		11000
				yes		yes		8000
Residential Building	1800	4	yes			yes	yes	12000
				yes		yes	yes	8000
					yes	yes	yes	6000

Building A

Building A is a one-story retail store as classified under OBC 3.2.2.61. The construction type of Building A can be either wood frame combustible or ordinary construction (min 1.0 hr fire resistance rate for exterior wall, non fire resistance for interior walls, floors, or roofs). Occupancy type of Build A is assumed to be limited combustible as Group E Mercantile shops / stores. Building A is non sprinklered. The calculated fire flows for Building A are **8,000 L/min** as the assumed Ordinary construction and **12,000 L/min** as the assumed wood frame combustible construction.

Building B

Building B is a one-story retail store as classified under OBC 3.2.2.61. The construction type of Building A can be either wood frame combustible or ordinary construction (min 1.0 hr fire resistance rate for exterior wall, non fire resistance for interior walls, floors, or roofs). Occupancy type of Build B is assumed to be limited combustible as Group E Mercantile shops / stores. Building B is non sprinklered. The calculated fire flows for Building B are **8,000 L/min** as the assumed Ordinary construction and **12,000 L/min** as the assumed wood frame combustible construction.

Residential Building

The proposed residential building (RB) is a four-story building as classified under OBC 3.2.2.45. The construction type of RB can be either wood frame combustible, ordinary construction (min 1.0 hr fire resistance rate for exterior wall, non fire resistance for interior walls, floors, or roofs), or non-combustible (all structural elements, walls, arches, floors, and roofs are constructed with a minimum 1 hr fire resistance rating and are constructed with non-combustible, non-protected vertical openings). Occupancy type of RB is assumed to be limited combustible as Group C Residential. RB is assumed to be protected by the fully supervised sprinkler system. The maximum floor area of 1,800 m^2 is assumed for the fire flow calculation. And it is also assumed that the RB will be subdivided by a vertical firewall with a fire resistance rating of not less than 2 hrs, and meeting OBC requirements. The calculated fire flows for Building B are **8,000 L/min** as the assumed Ordinary construction, **12,000 L/min** as the assumed wood frame combustible construction, and **6,000 L/min** as the assumed non-combustible construction.

HYDRAULIC MODELING ANALYSIS

The hydraulic modeling fire flow analysis was conducted by using Bentley WaterGEMS modeling software to simulate the available fire flows based on the provided water system boundary conditions. The modeling results indicated that the available fire flows for development site range from **9,060 L/min** (151 L/s) to **9,940 L/min** (165.7 L/s) under the maximum day demand scenario and the minimum system residual pressure of 140 kPa (20 psi). The modeling results are included in Appendix C.

RECOMMENDATIONS

The fire flow analysis indicated that the available fire flows for the development site range from **9,060 L/min** (151 L/s) to **9,940 L/min** (165.7 L/s). In order to meet the fire flow requirements as calculated per FUS standards, the proposed buildings should be considered an ordinary construction as minimum and with all other configurations as discussed in this memo.

Sincerely,

WSP Canada Inc.

Prepared by:

Zhidong Pan, M.Eng., P.Eng
Senior Municipal Engineer

Appendices:
Appendix A – Boundary Conditions
Appendix B – Fire flow calculation sheets
Appendix C – Modeling Results

MEMO - APPENDIX

A BOUNDARY CONDITIONS

Zhang, Jingwei

From: Annie Williams <awilliams@jlrichards.ca>
Sent: Wednesday, March 1, 2023 11:39 AM
To: Zhang, Jingwei
Cc: David Shen; 'Shan Goel'; Jason D'Elia; Mark Buchanan
Subject: RE: 430 Ottawa St SPA - Confirmation of Civil Criteria
Attachments: 29920-014 WaterCAD Schematics.pdf

Good morning Jingwei,

Please find attached the requested hydraulic boundary conditions for two (2) connections to the existing 250 mm watermain at 430 Ottawa Street as requested by the Developer's Engineer.

The proposed development ("430 Ottawa Street") located within the Municipality of Mississippi Mills (Municipality), was simulated using the Municipality's existing hydraulic water model (2017) to determine hydraulic boundary conditions based on theoretical water demands provided by the Developer's Engineer (refer to attached). Table 1 summarizes the theoretical water demands that were included in the model. The elevations at the model junctions were approximated using the information from the model and Google Earth. The development was modelled with both a 150 mm and 200 mm watermain loop through the center of the site. Also included for the Developer's consideration is the expected level of service for three (3) different fire flow scenarios for both the 150 mm and 200 mm watermain loops (refer to Table 2 and 3). **It is noted that the simulated maximum available fire flow is 112 L/s for the 150 mm watermain loop and 155 L/s for the 200 mm watermain loop based on maintaining a minimum pressure of 140 kPa (20 psi) in the system.**

Table 1: Theoretical Water Demands

430 Ottawa St.	Avg Day (L/s)	Max Day (L/s)	Peak Hour (L/s)
Junction Node J-573 (Elev. 141.00 mm)	1.19	4.87	7.47

The hydraulic boundary conditions have been generated at the requested connection locations labelled as node J-574 and node J-575 in the model and are summarized in Table 2 and Table 3 (refer to attached WaterCAD model outputs).

Table 2: 430 Ottawa Street Boundary Conditions – 150 mm Watermain Loop (MAX. AVAILABLE FIRE FLOW 112 L/s)

Demand Scenario	Connection 1		Connection 2	
	Junction Node J-574 (Elev. 139.78 m)		Junction Node J-575 (Elev. 140.28 m)	
	Pressure (kPa)	HGL (m)	Pressure (kPa)	HGL (m)
Average Day	400	180.62	395	180.62
Max Day + Fire Flow (112 L/s)	288	169.26	278	168.68
Max Day + Fire Flow (100 L/s)	307	171.13	297	170.66
Max Day + Fire Flow (50 L/s)	365	177.09	359	176.95
Peak Hour	386	179.19	381	179.19

Table 3: 430 Ottawa Street Boundary Conditions – 200 mm Watermain Loop (MAX. AVAILABLE FIRE FLOW 155 L/s)

Demand Scenario	Connection 1		Connection 2	
	Junction Node J-574 (Elev. 139.78 m)		Junction Node J-575 (Elev. 140.28 m)	
	Pressure (kPa)	HGL (m)	Pressure (kPa)	HGL (m)
Average Day	400	180.62	395	180.62
Max Day + Fire Flow (150 L/s)	220	162.26	206	161.35

Max Day + Fire Flow (115 L/s)	284	168.77	273	168.20
Max Day + Fire Flow (100 L/s)	307	171.13	298	170.69
Peak Hour	386	179.19	381	179.19

Note that the foregoing model results are for current conditions and are based on computer model simulation. We have not reviewed the adequacy of the domestic demand nor the fire flow requirements for the proposed development, which remains the responsibility of the Developer's Engineer.

Disclaimer: The model results are based on current simulated operation of the Municipality's water distribution system and sewer collection system. The computer model simulations are based on the best information available at this time. The operation of the systems can change on a regular basis, resulting in a variation in the boundary conditions. It is further noted that the operational characteristics of the water supply and wastewater collection systems and physical properties of the watermains and sewers can change and/or deteriorate over time. These changes may affect the supply and collection characteristics of the systems and the assumptions made in developing the models, which in turn could lead to variations in the simulation results. This should be considered by any third party undertaking simulation of system upgrades.

Should you have any questions or require anything further, please do not hesitate to contact us.

Regards,
Annie

Annie Williams, P.Eng.
Civil Engineer

J.L. Richards & Associates Limited
1000-343 Preston Street, Ottawa, ON K1S 1N4
Direct: 343-803-4523

From: Zhang, Jingwei <Jingwei.Zhang@wsp.com>
Sent: February 17, 2023 7:28 AM
To: Annie Williams <awilliams@jlrichards.ca>
Cc: David Shen <dshen@mississippimills.ca>; 'Shan Goel' <sgoel@elmdevelopments.com>; Jason D'Elia <j.delia@elmdevelopments.com>; Mark Buchanan <mbuchanan@jlrichards.ca>
Subject: RE: 430 Ottawa St SPA - Confirmation of Civil Criteria

Hi Annie,

Thank you for your reply.

The new development site includes two commercial buildings and a 4-story residential building. Refer to the attached conceptual site plan.

Required steady state water demands for the new development site are listed below.

Scenarios	**Estimated Demand (L/s)**
Average Day Demand	1.19
Maximum Day Demand	4.87

Peak Hour Demand	7.47

We are currently under the conceptual design stage, and the required fire protection flow for future development is not finalized. And that was the reason we reach out the Town for the existing water distribution system boundary conditions at this moment. We need to know what is the maximum system capacity at the proposed two connections, then we will work with architect, mechanical, and other disciplines to determine the building configurations, such as construction type, occupancy, sprinkler, the maximum fire zone, etc. After that we can finalize the fire flow calculations. The existing boundary condition is critical and a prerequisites for the fire flow calculations. We don't want to just provide a wide range of the fire flows which we will have to revise later when the boundary condition becomes a constraint.

What we want from the Town or J.L. Richards (for fire flow + MDD) is a set of demand vs pressure curve at each connection **under the maximum day scenario**, e.g.

Flow (L/s)	**Pressure (kPa)**
0	-
5	-
10	-
15	-
20	-
25	-
…	140

We are going to build a water distribution model for the development site and use the provided boundary conditions (Demand vs pressure curves) to review the required water main size and if the looped system is necessary or not, etc.

I hope I clarify our requirements for the boundary conditions. If you have further questions please let us know.

The fee has been approved by our client, please send the invoice to the town once the boundary conditions are provided.

We have a strict timeline for this project, please provide the required boundary condition as your earliest convenience.

Thanks,

Jingwei Zhang, M.Eng., P.Eng., PMP
Senior Project Engineer
Municipal Engineering - Ottawa

T+ 1 613-690-1245

WSP Canada Inc.
2611 Queensview Drive, Suite 300
Ottawa, Ontario,
K2B 8K2 Canada

wsp.com

From: Annie Williams <awilliams@jlrichards.ca>
Sent: Tuesday, February 14, 2023 1:45 PM
To: Zhang, Jingwei <Jingwei.Zhang@wsp.com>
Cc: David Shen <dshen@mississippimills.ca>; 'Shan Goel' <sgoel@elmdevelopments.com>; Jason D'Elia

<j.delia@elmdevelopments.com>; Mark Buchanan <mbuchanan@jlrichards.ca>
Subject: RE: 430 Ottawa St SPA - Confirmation of Civil Criteria

Hi Jingwei,

We have reviewed your boundary condition request for 430 Ottawa Street and we would kindly request the following information:

- Please provide the updated water demands (as approved by David Shen) as we have not received this information.
- Please confirm whether a looped watermain is proposed on the site, or if these are 2 separate water services. What diameter watermain is being proposed? Are both connections being used to service one single building?
- What is the development being proposed? If you could send a Site Plan for reference this may be helpful.

We would be happy to provide you with hydraulic boundary conditions from the Municipality's water model at the two (2) requested connection locations. Per our typical boundary condition request procedures, we propose to provide you with the following table (information to be obtained from the model under steady-state scenarios):

Demand Scenario	Connection 1		Connection 2	
	Pressure (kPa)	HGL (m)	Pressure (kPa)	HGL (m)
Average Day				
Maximum Day				
Maximum Day + Fire Flow				
Peak Hour				

We work for the Municipality and we will bill by the hour to an upset limit of **$2,500** (excl. disbursement and tax).

We can provide these boundary conditions within 10 business days upon receiving approval from the Municipality to proceed. Please let us know if you are in agreement with the above.

Thank you,
Annie

Annie Williams, P.Eng.
Civil Engineer

J.L. Richards & Associates Limited
1000-343 Preston Street, Ottawa, ON K1S 1N4
Direct: 343-803-4523

From: Zhang, Jingwei <Jingwei.Zhang@wsp.com>
Sent: February 9, 2023 3:22 PM
To: Mark Buchanan <mbuchanan@jlrichards.ca>
Cc: David Shen <dshen@mississippimills.ca>; 'Shan Goel' <sgoel@elmdevelopments.com>; Jason D'Elia <j.delia@elmdevelopments.com>
Subject: RE: 430 Ottawa St SPA - Confirmation of Civil Criteria

Hi Mark,

We are working on grading and servicing design for 430 Ottawa Street in Almonte and looking for water boundary conditions at the two main connections as shown in the screenshot below. One main connection (Connection 1) is at the connection of the existing 150mm water service pipe and the other (Connection 2) is approximately 99.6m west of Connection 1. Could you provide the available flow and pressure curve for two connections being flowed concurrently for the following scenarios?

- Average day water demand (ADD)
- Maximum day water demand (MDD)
- Maximum day water demand + Fire (MDD + Fire)
- Peak hour water demand (PHD)

Please provide a quote for this boundary request before the modelling checking.

Thanks,

Jingwei Zhang, M.Eng., P.Eng., PMP
Senior Project Engineer
Municipal Engineering - Ottawa

T+ 1 613-690-1245

WSP Canada Inc.
2611 Queensview Drive, Suite 300

Ottawa, Ontario,
K2B 8K2 Canada

wsp.com

From: David Shen <dshen@mississippimills.ca>
Sent: Thursday, January 5, 2023 11:47 AM
To: Zhang, Jingwei <Jingwei.Zhang@wsp.com>; 'Shan Goel' <sgoel@elmdevelopments.com>; Jason D'Elia <j.delia@elmdevelopments.com>
Cc: Mark Buchanan <mbuchanan@jlrichards.ca>
Subject: RE: 430 Ottawa St SPA - Confirmation of Civil Criteria

Hi Jingwei,

I have reviewed WSP calculation on water/wastewater planning and I am ok with your result.

As mentioned, the next step is I am connecting you and Mark (J.L.Richards). You write an email to Mark summarizing your flowrates (up to you to show your calculation details or not, as I gave the greenlight already), and a figure illustrating your proposed connection points.

Mark, please provide a fee estimate to WSP. Once agreed, you can do the modelling check.

Thanks!

David Shen, P.Eng.
Director, Development Services and Engineering
Municipality of Mississippi Mills
dshen@mississippimills.ca
613-880-5996
Website: www.mississippimills.ca

From: Zhang, Jingwei <Jingwei.Zhang@wsp.com>
Sent: December 29, 2022 9:11 PM
To: David Shen <dshen@mississippimills.ca>
Subject: RE: 430 Ottawa St SPA - Confirmation of Civil Criteria

Hi David,

Please find attached revised water and wastewater calculations for review. And also please provide the water boundary condition for this site and confirm that the existing sanitary sewer on Ottawa Street has a sufficient capacity to accommodate the peak sewerage flow from this site.

Thanks,

Jingwei Zhang, M.Eng., P.Eng., PMP
Senior Project Engineer
Municipal Engineering - Ottawa

T+ 1 613-690-1245

WSP Canada Inc.
2611 Queensview Drive, Suite 300
Ottawa, Ontario,
K2B 8K2 Canada

wsp.com

From: McCaughey, Stephen <Stephen.Mccaughey@wsp.com>
Sent: Tuesday, December 6, 2022 2:08 PM
To: David Shen <dshen@mississippimills.ca>; Zhang, Jingwei <Jingwei.Zhang@wsp.com>
Cc: Robert Smith <smithr@mississippimills.ca>; Cory Smith <csmith@mississippimills.ca>
Subject: RE: 430 Ottawa St SPA - Confirmation of Civil Criteria

Hi David,

Thanks for the comments, we'll have the revised demand estimates shortly. Yes as noted we'll have more detailed information once it comes time for the formal submission, in coordination with the architect for specifics of unit count, etc. We wanted to get initial estimates in for coordination.

Also confirming on my other question: will hydrant testing be required for SPA or will the township's water model provide sufficient evidence of capacity?

Thank you,

Stephen McCaughey, P.Eng., PMP
T +1 613-690-3955 (Direct)
T +1 613-829-2800 (Office)

From: David Shen <dshen@mississippimills.ca>
Sent: Friday, November 25, 2022 11:02 AM
To: McCaughey, Stephen <Stephen.Mccaughey@wsp.com>
Cc: Robert Smith <smithr@mississippimills.ca>; Cory Smith <csmith@mississippimills.ca>
Subject: RE: 430 Ottawa St SPA - Confirmation of Civil Criteria

Hi Stephen,

I received this email and your follow-up emails.

Your used an average population multiplying unit number to get your residential population. At this stage, it is fine. In the following submission, please update to each type of the unit density multiplying unit number and sum up.

Your water calculation looks good, the content meets the Municipality's requirement. But I would like to ask you go back and check your calculation. The Maximum (or Peak) hour demand calculation uses the ADD as a base to multiple peaking factor. You can confirm within your firm.

Your wastewater calculation looks good, the content meets the Municipality's requirement. Seems you did not include the commercial building B calculation although there is a summary at the bottom.

For wastewater, if you plan to connect the municipal system twice at two locations, you will need, at a later stage when you figure out the building internal plumbing routing, submit calculation result per each connection.

At a later stage, please include a brief description of your proposed water/wastewater connections to the municipal system, including the existing municipal pipe size (w/ww), slope and proposed connection elevation (ww), manhole up/down stream (ww), and hydrant, VB/VC close by (w).

Please resubmit your calculation results to me, and we can arrange J.L.Richards to check the system capacity for you. I don't need all information I mentioned at this stage (if I label "at a later stage", you are fine for now).

David Shen, P.Eng.
Director, Development Services and Engineering
Municipality of Mississippi Mills
dshen@mississippimills.ca
613-880-5996
Website: www.mississippimills.ca

Mississippi Mills

From: McCaughey, Stephen <Stephen.Mccaughey@wsp.com>
Sent: November 21, 2022 9:38 AM
To: David Shen <dshen@mississippimills.ca>
Cc: Robert Smith <smithr@mississippimills.ca>; Cory Smith <csmith@mississippimills.ca>
Subject: RE: 430 Ottawa St SPA - Confirmation of Civil Criteria

Hello David,

We met at the meeting last week to discussed 430 Ottawa Street. Following that discussion I wanted to provide the sanitary and water demand estimates seeking confirmation of capacity of the existing infrastructure. The existing Master Plan that is publicly available only provides general summaries of capacities that is difficult to state definitively for the purposes of our site plan.

Water:

Avg day: 1.01 L/s
Peak hr: 26.64 L/s
Max day + fire flow: 203.52 L/s

Sanitary:

Peak: 3.81 L/s

Thank you,

Stephen McCaughey, P.Eng., PMP
T +1 613-690-3955 (Direct)
T +1 613-829-2800 (Office)

wsp

From: McCaughey, Stephen
Sent: Tuesday, October 11, 2022 3:41 PM
To: Cory Smith <csmith@mississippimills.ca>
Cc: Robert Smith <smithr@mississippimills.ca>
Subject: RE: 430 Ottawa St SPA - Confirmation of Civil Criteria

Thank you Cory,

I did find the 2018 Master Plan, which has discussions of both potable water and sanitary capacities but only indicated the summaries. Does the township have the water model or sanitary sewer design sheets from the Master Plan to better define the servicing capacity at our site in question. Also, noting that the Master Plan recommended immediate and short-term work to address capacity issues, can you confirm if any of the work, in the vicinity of our site, has been since completed? Alternatively if we can coordinate with JL Richards for the information, we understand they're acting as the township's third-party engineers.

Also to confirm for the stormwater criteria, we will be designing to "enhanced" quality control (80% TSS removal), correct? What is the quantity control requirements (pre- to post-development up to 100yr; reduction to 5-yr pre-development; etc)?

Much appreciated,

Stephen McCaughey, P.Eng., PMP
T +1 613-690-3955 (Direct)
T +1 613-829-2800 (Office)

From: Cory Smith <csmith@mississippimills.ca>
Sent: Wednesday, October 05, 2022 3:13 PM
To: McCaughey, Stephen <Stephen.Mccaughey@wsp.com>; Robert Smith <smithr@mississippimills.ca>
Subject: RE: 430 Ottawa St SPA - Confirmation of Civil Criteria

See below.

Cory Smith, C.Tech.
Director of Roads and Public Works
Municipality of Mississippi Mills
3131 Old Perth Rd.
P.O. Box 400
Almonte, ON
K0A 1A0
csmith@mississippimills.ca
(613)256-2064 x401

From: McCaughey, Stephen <Stephen.Mccaughey@wsp.com>
Sent: October 5, 2022 3:04 PM
To: Robert Smith <smithr@mississippimills.ca>
Cc: Cory Smith <csmith@mississippimills.ca>
Subject: RE: 430 Ottawa St SPA - Confirmation of Civil Criteria
Importance: High

Hi Robert,

Following up on my below questions for clarification of the civil design criteria for 430 Ottawa St

Thank you!

Stephen McCaughey, P.Eng., PMP
T +1 613-690-3955 (Direct)
T +1 613-829-2800 (Office)

From: McCaughey, Stephen
Sent: Thursday, September 08, 2022 10:03 AM
To: Robert Smith <smithr@mississippimills.ca>
Cc: Cory Smith <csmith@mississippimills.ca>
Subject: RE: 430 Ottawa St SPA - Confirmation of Civil Criteria

Thank you Robert,

Can you also confirm the below clarifications for design criteria?

- Are there watermain boundary conditions we can work with to verify watermain pressure during domestic and fire demands?
  No
- Does the municipality have existing sanitary capacity information in order to validate the additional sanitary demand?
  There is no recent information available. Please review our water wastewater master plan.
  https://www.mississippimills.ca/en/municipal-hall/plans-studies-and-reports.aspx#?cludoquery=master%20plan&cludopage=2&cludorefurl=https%3A%2F%2Fwww.mississippimills.ca%2Fen%2Fmunicipal-hall%2Fplans-studies-and-reports.aspx&cludorefpt=Plans%2C%20Studies%20and%20Reports%20-%20Mississippi%20Mills&cludoinputtype=standard

- What are the storm quantity and quality control criteria? Since the work will be done in stages (new commercial in before existing commercial demolished, followed by residential construction) does the stormwater management need to be implemented during the interim stage (addressing the stormwater of the new construction) or for the final condition?
  We will be looking for enhanced levels.

Thank you,

Stephen McCaughey, P.Eng., PMP
T +1 613-690-3955 (Direct)
T +1 613-829-2800 (Office)

From: Robert Smith <smithr@mississippimills.ca>
Sent: Wednesday, September 07, 2022 4:33 PM
To: McCaughey, Stephen <Stephen.Mccaughey@wsp.com>
Cc: Cory Smith <csmith@mississippimills.ca>
Subject: RE: 430 Ottawa St SPA - Confirmation of Civil Criteria

Hi Stephen,

Please see attachments to this email consisting of construction drawings for Ottawa Street and the original site plan for 430 Ottawa Street

Robert Smith, C.Tech.
Roads and Public Works Technologist
Municipality of Mississippi Mills
3131 Old Perth Rd.
P.O. Box 400
Almonte, ON
K0A 1A0
smithr@mississippimills.ca
(613)256-2064 x404

From: Robert Smith
Sent: September 2, 2022 3:49 PM
To: McCaughey, Stephen <Stephen.Mccaughey@wsp.com>
Cc: Cory Smith <csmith@mississippimills.ca>
Subject: RE: 430 Ottawa St SPA - Confirmation of Civil Criteria

Hi Stephen,

Apologies for the delay in getting back to you, it's been one of those weeks.

I've done some digging this afternoon for existing servicing drawings for this area and haven't come across anything yet. I've attached a snip of existing servicing to the lot from our GIS which shows the main as 150mm pvc in blue, 200mm pvc sanitary in red, nothing labeled for the storm outfall.

Sadly this is all I can provide in Cory's absence, which I'm sure he can provide additional information to you next week

Regards,

Robert Smith, C.Tech.
Roads and Public Works Technologist
Municipality of Mississippi Mills
3131 Old Perth Rd.
P.O. Box 400

Almonte, ON
K0A 1A0
smithr@mississippimills.ca
(613)256-2064 x404

From: McCaughey, Stephen <Stephen.Mccaughey@wsp.com>
Sent: August 31, 2022 10:19 AM
To: Robert Smith <smithr@mississippimills.ca>
Cc: Cory Smith <csmith@mississippimills.ca>
Subject: RE: 430 Ottawa St SPA - Confirmation of Civil Criteria

Also, confirming if the municipality has any existing servicing drawings of the site or immediately in front on Ottawa St.

Thank you,

Stephen McCaughey, P.Eng., PMP
T +1 613-690-3955 (Direct)
T +1 613-829-2800 (Office)

From: McCaughey, Stephen
Sent: Wednesday, August 31, 2022 9:53 AM
To: 'smithr@mississippimills.ca' <smithr@mississippimills.ca>
Subject: FW: 430 Ottawa St SPA - Confirmation of Civil Criteria

Hello Robert, I understand Cory is currently away. I'm working on a site plan application for 430 Ottawa St wondering if you can help answer my below questions about the civil criteria in Cory's absence.

Thank you very much,

Stephen McCaughey, P.Eng., PMP
T +1 613-690-3955 (Direct)
T +1 613-829-2800 (Office)

From: McCaughey, Stephen
Sent: Wednesday, August 31, 2022 9:50 AM
To:
Subject: 430 Ottawa St SPA - Confirmation of Civil Criteria

Hello Cory,

I'm working on the civil scope of the 430 Ottawa St. site plan approval under development, the site had previously undergone zoning amendment. I have the pre-consultation notes and there were some initial questions I wanted to clarify:

- Are there watermain boundary conditions we can work with to verify watermain pressure during domestic and fire demands?

- Does the municipality have existing sanitary capacity information in order to validate the additional sanitary demand?
- What are the storm quantity and quality control criteria? Since the work will be done in stages (new commercial in before existing commercial demolished, followed by residential construction) does the stormwater management need to be implemented during the interim stage (addressing the stormwater of the new construction) or for the final condition?

Thank you very much,

Stephen McCaughey, P.Eng., PMP
Project Engineer
Municipal Infrastructure

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300-2611 Queensview Drive
Ottawa, Ontario
K2B 8K2 Canada

wsp.com

-LAEmHhHzdJzBlTWfa4Hgs7pbKI

MEMO - APPENDIX

B FIRE FLOW CALCULATION

BUILDING AREAS:

RESIDENTIAL: 124 UNITS
COMMERCIAL: 1200m^2 + 1200m^2 = 2400m^2 (25833ft^2)

PARKING REQUIRED:
RESIDENTIAL: 124 @ 1.4 SPACES/UNIT:
124 X 1.4 = 174 SPACES
COMMERCIAL: 2400m^2 @ 2.5 SPACES/100m^2:
2400 x 2.5/100 = 60 SPACES

PARKING SHOWN:
RESIDENTIAL: 46 SURFACE SPACES
(ALL NORTH OF RESIDENTIAL)
127 UNDERGROUND PARKING
20 VISITORS PARKING
193 TOTAL
COMMERCIAL: 68 SPACES

LANDSCAPE AREAS:

RESIDENTIAL:
BUILDING FOOTPRINT: 2941m^2
PARKING, DRIVEWAYS: 4910m^2
LANDSCAPE: 8619m^2
TOTAL: 16470m^2
LANDSCAPE: 52%

COMMERCIAL:
BUILDING FOOTPRINT: 2349m^2
PARKING, DRIVEWAYS: 3944m^2
LANDSCAPE: 2681m^2
TOTAL: 8974m^2
LANDSCAPE: 30%

NO.	REVISION	DATE
1	ISSUED FOR REVIEW	2022-11-17

CONSTRUCTION

Vandenberg & Wildeboer
A·R·C·H·I·T·E·C·T·S
www.vwarchitects.ca Telephone: 613.287.0144 Facsimile: 613.271.8669 mail@vwarchitects.ca
•THE OLD STONE LODGE • 980 FLAMBOROUGH WAY • OTTAWA (KANATA) • ONTARIO • K2K 3H9•

PROJECT TITLE
ALMONTE OTTAWA ST. DEVELOPMENT
####

DRAWING TITLE
SITE PLAN

DESIGNED BY: RV
DRAWN BY: JN/DV
START DATE: 2019
SCALE: As Noted
PROJECT NO. 1922

DRAWING No.
A001

PLOT DATE: November 17, 2022

Fire Protection Flow Calculation Sheet

Building A -Wood Frame Combustible

Project Name:	430 Ottawa St SPA	Prepared by:	Zhidong Pan
Project Number:	221-06853-00	Date:	3/3/2023

1. Initial estimate of fire flow

1.1 Total Building Floor Area (A)

-Basement if 50% above grade	-
-First floor	1,149
-Second floor	-
-Third floor	-
Total A (m2)	1,149

1.2 Construction Type — C-value

1. Type V Wood frame (structure essentially all combustible) — 1.5

1.3 Required fire flow

F = 220 C $A^{0.5}$ (L/min) — 11,000

☐ Wood Shingle ☐ Wood Shake — -

F1 (L/min) = **11,000**

2. Building occupancy charge

2.1 Occupancy Type — Charge

2. Limited Combustible — -15%

2.2 Required fire flow

F2 (L/min) **9,350**

3. Sprinkler system reduction

3.1 Automatic sprinkler system — Reduction

4. Non-sprinkler system — 0

3.2 Fire flow reduction

ΔF3 (L/min) -

4. Exposure structures

Structure Separation (m)	Number of Exposure Structures	Charge (%)	Add Fire Flow (L/min)
0 - 3	0	25%	-
3.1 - 10	0	20%	-
10.1 - 20	2	15%	2,805
20.1 - 30	0	10%	-
30.1 - 45	0	0%	-
ΔF4 (L/min)			**2,805**

5. Final estimate of fire flow

F = F2 - ΔF3 + ΔF4 (L/min) **12,000**

Fire Protection Flow Calculation Sheet

Building A - Ordinary Construction

Project Name:	430 Ottawa St SPA	Prepared by:	Zhidong Pan
Project Number:	221-06853-00	Date:	3/3/2023

1. Initial estimate of fire flow

1.1 Total Building Floor Area (A)

-Basement if 50% above grade	-
-First floor	1,149
-Second floor	-
-Third floor	-
Total A (m2)	1,149

1.2 Construction Type — C-value

6. Type III Ordinary Construction	1

1.3 Required fire flow

F = 220 C $A^{0.5}$ (L/min)	7,000
☐ Wood Shingle ☐ Wood Shake	-
F1 (L/min) =	**7,000**

2. Building occupancy charge

2.1 Occupancy Type — Charge

2. Limited Combustible	-15%

2.2 Required fire flow

F2 (L/min)	**5,950**

3. Sprinkler system reduction

3.1 Automatic sprinkler system — Reduction

4. Non-sprinkler system	0

3.2 Fire flow reduction

ΔF3 (L/min)	-

4. Exposure structures

Structure Separation (m)	Number of Exposure Structures	Charge (%)	Add Fire Flow (L/min)
0 - 3	0	25%	-
3.1 - 10	0	20%	-
10.1 - 20	2	15%	1,785
20.1 - 30	0	10%	-
30.1 - 45	0	0%	-
ΔF4 (L/min)			**1,785**

5. Final estimate of fire flow

F = F2 - ΔF3 + ΔF4 (L/min)	**8,000**

Fire Protection Flow Calculation Sheet

Building B -Wood Frame Combustible

Project Name:	430 Ottawa St SPA	Prepared by:	Zhidong Pan
Project Number:	221-06853-00	Date:	3/3/2023

1. Initial estimate of fire flow

1.1 Total Building Floor Area (A)

-Basement if 50% above grade	-
-First floor	1,200
-Second floor	-
-Third floor	-
Total A (m2)	1,200

1.2 Construction Type

	C-value
1. Type V Wood frame (structure essentially all combustible)	1.5

1.3 Required fire flow

$F = 220\ C\ A^{0.5}$ (L/min)	11,000
☐ Wood Shingle ☐ Wood Shake	-
F1 (L/min) =	**11,000**

2. Building occupancy charge

2.1 Occupancy Type

	Charge
2. Limited Combustible	-15%

2.2 Required fire flow

F2 (L/min)	**9,350**

3. Sprinkler system reduction

3.1 Automatic sprinkler system

	Reduction
4. Non-sprinkler system	0

3.2 Fire flow reduction

ΔF3 (L/min)	-

4. Exposure structures

Structure Separation (m)	Number of Exposure Structures	Charge (%)	Add Fire Flow (L/min)
0 - 3	0	25%	-
3.1 - 10	0	20%	-
10.1 - 20	1	15%	1,403
20.1 - 30	0	10%	-
30.1 - 45	0	0%	-
ΔF4 (L/min)			**1,403**

5. Final estimate of fire flow

F = F2 - ΔF3 + ΔF4 (L/min)	**11,000**

Fire Protection Flow Calculation Sheet

Building B - Ordinary Construction

Project Name:	430 Ottawa St SPA	Prepared by:	Zhidong Pan
Project Number:	221-06853-00	Date:	3/3/2023

1. Initial estimate of fire flow

1.1 Total Building Floor Area (A)

-Basement if 50% above grade	-
-First floor	1,200
-Second floor	-
-Third floor	-
Total A (m2)	1,200

1.2 Construction Type

	C-value
6. Type III Ordinary Construction	1

1.3 Required fire flow

$F = 220\ C\ A^{0.5}$ (L/min)	8,000
☐ Wood Shingle ☐ Wood Shake	-
F1 (L/min) =	**8,000**

2. Building occupancy charge

2.1 Occupancy Type

	Charge
2. Limited Combustible	-15%

2.2 Required fire flow

F2 (L/min)	**6,800**

3. Sprinkler system reduction

3.1 Automatic sprinkler system

	Reduction
4. Non-sprinkler system	0

3.2 Fire flow reduction

ΔF3 (L/min)	-

4. Exposure structures

Structure Separation (m)	Number of Exposure Structures	Charge (%)	Add Fire Flow (L/min)
0 - 3	0	25%	-
3.1 - 10	0	20%	-
10.1 - 20	1	15%	1,020
20.1 - 30	0	10%	-
30.1 - 45	0	0%	-
ΔF4 (L/min)			**1,020**

5. Final estimate of fire flow

F = F2 - ΔF3 + ΔF4 (L/min)	**8,000**

Fire Protection Flow Calculation Sheet

Residential Building -Wood Frame Combustible

Project Name:	430 Ottawa St SPA	Prepared by:	Zhidong Pan
Project Number:	221-06853-00	Date:	3/3/2023

1. Initial estimate of fire flow

1.1 Total Building Floor Area (A)

-Basement if 50% above grade	-
-First floor	1,800
-Second floor	1,800
-Third floor	1,800
-Fourth floor	1,800
Total A (m2)	7,200

1.2 Construction Type

1. Type V Wood frame (structure essentially all combustible)	C-value 1.5

1.3 Required fire flow

F = 220 C $A^{0.5}$ (L/min) 28,000

☐ Wood Shingle ☐ Wood Shake -

F1 (L/min) = **28,000**

2. Building occupancy charge

2.1 Occupancy Type

2. Limited Combustible	Charge -15%

2.2 Required fire flow

F2 (L/min) **23,800**

3. Sprinkler system reduction

3.1 Automatic sprinkler system

3. Fully supervised system	Reduction 0.5

3.2 Fire flow reduction

ΔF3 (L/min) **11,900**

4. Exposure structures

Structure Separation (m)	Number of Exposure Structures	Charge (%)	Add Fire Flow (L/min)
0 - 3	0	25%	-
3.1 - 10	0	20%	-
10.1 - 20	0	15%	-
20.1 - 30	0	10%	-
30.1 - 45	0	0%	-
ΔF4 (L/min)			-

5. Final estimate of fire flow

F = F2 - ΔF3 + ΔF4 (L/min) **12,000**

Fire Protection Flow Calculation Sheet

Residential Building -Ordinary Construction

Project Name:	430 Ottawa St SPA	Prepared by:	Zhidong Pan
Project Number:	221-06853-00	Date:	3/3/2023

1. Initial estimate of fire flow

1.1 Total Building Floor Area (A)

-Basement if 50% above grade	-
-First floor	1,800
-Second floor	1,800
-Third floor	1,800
-Fourth floor	1,800
Total A (m2)	7,200

1.2 Construction Type — C-value

6. Type III Ordinary Construction — 1

1.3 Required fire flow

F = 220 C $A^{0.5}$ (L/min) — 19,000

☐ Wood Shingle ☐ Wood Shake — -

F1 (L/min) = **19,000**

2. Building occupancy charge

2.1 Occupancy Type — Charge

2. Limited Combustible — -15%

2.2 Required fire flow

F2 (L/min) **16,150**

3. Sprinkler system reduction

3.1 Automatic sprinkler system — Reduction

3. Fully supervised system — 0.5

3.2 Fire flow reduction

ΔF3 (L/min) **8,075**

4. Exposure structures

Structure Separation (m)	Number of Exposure Structures	Charge (%)	Add Fire Flow (L/min)
0 - 3	0	25%	-
3.1 - 10	0	20%	-
10.1 - 20	0	15%	-
20.1 - 30	0	10%	-
30.1 - 45	0	0%	-
ΔF4 (L/min)			-

5. Final estimate of fire flow

F = F2 - ΔF3 + ΔF4 (L/min) **8,000**

Fire Protection Flow Calculation Sheet

Residential Building - Non-combustible

Project Name:	430 Ottawa St SPA	Prepared by:	Zhidong Pan
Project Number:	221-06853-00	Date:	3/3/2023

1. Initial estimate of fire flow

1.1 Total Building Floor Area (A)

-Basement if 50% above grade	-
-First floor	1,800
-Second floor	1,800
-Third floor	1,800
-Fourth floor	1,800
Total A (m2)	7,200

1.2 Construction Type

7. Type II Non-combustible Construction	C-value 0.8

1.3 Required fire flow

F = 220 C $A^{0.5}$ (L/min)	15,000
☐ Wood Shingle ☐ Wood Shake	-
F1 (L/min) =	**15,000**

2. Building occupancy charge

2.1 Occupancy Type

2. Limited Combustible	Charge -15%

2.2 Required fire flow

F2 (L/min)	**12,750**

3. Sprinkler system reduction

3.1 Automatic sprinkler system

3. Fully supervised system	Reduction 0.5

3.2 Fire flow reduction

ΔF3 (L/min)	**6,375**

4. Exposure structures

Structure Separation (m)	Number of Exposure Structures	Charge (%)	Add Fire Flow (L/min)
0 - 3	0	25%	-
3.1 - 10	0	20%	-
10.1 - 20	0	15%	-
20.1 - 30	0	10%	-
30.1 - 45	0	0%	-
ΔF4 (L/min)			-

5. Final estimate of fire flow

F = F2 - ΔF3 + ΔF4 (L/min)	**6,000**

MEMO - APPENDIX

C MODELING RESULTS

FlexTable: Junction Table (Current Time: 0.000 hours) (430_OttawaSt_SPA_WaterModel_20230303.wtg)

	Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)	Fire Flow (Available) (L/s)
30: CON-1	CON-1	139.78	0.00	179.71	391	184.33
41: CON-2	CON-2	140.28	0.00	179.71	386	154.95
31: J-2	J-2	140.03	0.00	179.71	388	167.73
33: J-3	J-3	140.03	0.24	179.71	388	165.70
35: J-4	J-4	140.03	0.00	179.71	388	156.76
37: J-5	J-5	140.03	4.43	179.70	388	150.95
39: J-6	J-6	140.03	0.20	179.70	388	152.88

APPENDIX

D

SANITARY SEWER DESIGN CALCULATION SHEET

SANITARY SEWAGE - PROPOSED SANITARY FLOWS

Average Wastewater Flows:		
Residential	280	L/c/d
Commercial	28,000	L/gross ha/d
Institutional	28,000	L/gross ha/d
Light Industrial	35,000	L/gross ha/d
Heavy Industrial	55,000	L/gross ha/d

Peaking Factors:	
Residential	Harmon Equation
Commercial (>20% Area)	1.5
Commercial (<20% Area)	1.0
Institutional (>20% Area)	1.5
Institutional (<20% Area)	1.0
Industrial	Per Figure in Appendix 4-B

$$P.F. = 1 + \left(\frac{14}{4 + \left(\frac{P}{1000}\right)\text{^}0.5}\right) * \mathrm{K}$$

where P = population
K = correction factor = 0.8

Peak Extraneous Flows:	
Infiltration Allowance	0.33
Less than 10 ha:	
Foundation Drain Allowance	5.0
10 ha - 100 ha:	
Foundation Drain Allowance	3.0
Greater than 100 ha:	
Foundation Drain Allowance	2.0

Unit Type	**Person Per Unit**	Unit Count
Single Family	3.4	
Semi-detached	2.7	
Duplex	2.3	
Townhouse (row)	2.7	
Apartments:		
Bachelor	1.4	
1 Bedroom	1.4	
2 Bedroom	2.1	
3 Bedroom	3.1	
Average Apt.	1.8	124
	Total Population:	**223**
	Residential Area (ha):	1.6
	Commercial A Area (ha):	0.4
	Commercial B Area (ha):	0.5
	Total Area (ha)	**2.54**

	Residential Building			**Commercial Building A**			**Commercial Building B**		
Demand Type=	**Residential**			**Commercial**			**Commercial**		
Average Day Demand=	280		L/c/d	28,000		L/gross ha/d	28,000		L/gross ha/d
Population	**223**			**0**			**0**		
Site Area (ha)	**1.648**			**0.404**			**0.491**		
	280	x	223	28,000	x	0	28,000	x	0
	62,496		L/day	11,313		L/day	13,760		L/day
Average Daily Flow=	**0.72**		**L/s**	**0.13**		**L/s**	**0.16**		**L/s**
Peaking Factor Type	Residential			Commercial			Commercial		
Peaking Factor	3.50		*Max=4	1.50		*Max=4	1.50		*Max=4
	3.50	x	average day	1.50	x	average day	1.50	x	average day
	3.50	x	62,496	1.50	x	11,313	1.50	x	13,760
	219,000		L/day	16,970		L/day	20,641		L/day
Peak Daily Flow=	**2.53**		**L/s**	**0.20**		**L/s**	**0.24**		**L/s**
Infiltration Allowance	0.33			0.33			0.33		
	0.33	x	lot area	0.33	x	lot area	0.33	x	lot area
	0.33	x	1.6	0.33	x	0.4	0.33	x	0.5
Peak Extraneous Flow=	**0.54**		**L/s**	**0.13**		**L/s**	**0.16**		**L/s**
	peak daily flow	+	extraneous flow	peak daily flow	+	extraneous flow	peak daily flow	+	extraneous flow
	2.53	+	0.54	0.20	+	0.13	0.24	+	0.16
Total Peak Design Flow=	**3.08**		**L/s**	**0.33**		**L/s**	**0.40**		**L/s**

Residential Peak Design Flow =	**3.08**	**L/s**
Commercial Building A Peak Design Flow =	**0.33**	**L/s**
Commercial Building B Peak Design Flow =	**0.40**	**L/s**
Total Peak Design Flow =	**3.81**	**L/s**

430 Ottawa Street SPA_Sanitary Sewer System Design Sheet

7-Mar-23

Mannings	0.013	
Sewage/dwelling unit	350	lpcd
MH Flow Allowance	0	l/min/manhole
WT Flow Allowance	0	l/min/dwelling

			DOMESTIC WASTEWATER FLOWS																EXTRANEOUS WASTEWATER FLOWS															
			POPULATION BASED						AREA BASED								TOTAL DOMESTIC FLOWS		AREA BASED					TOTAL	GRAND TOTALS		Designed Slopes							
Pipe	US Manhole	DS Manhole	Population	U/S Population	Total Population	Average Population Based Domestic Flow (l/s)	Harmon Factor	Peak Population Based Domestic Flow (l/s)	Land Use	Area (ha)	Area Based Wastewater Flow Allowance (L/Ha/day)	Catchment Area Based Average Domestic Flow (l/s)	Upstream Area Based Average Domestic Flow (l/s)	Total Area Based Average Domestic Flow (l/s)	Area Based Flow Peaking Factor	Catchment Area Based Domestic Peak Flow (l/s)	Upstream Area Based Peak Domestic Flow (l/s)	Total Area Based Peak Domestic Flow (l/s)	Total Average Domestic Flow (l/s)	Total Peak Domestic Flow (l/s)	U/S Area (Ha)	Total Area (Ha)	Area Based Extraneous Flow Allowance (L/Ha/s)	Catchment Area Based Extraneous Flow (l/s)	Upstream Area Based Extraneous Flow (l/s)	Total Area Based Extraneous Flow (l/s)	Total Extraneous Flow (l/s)	TOTAL AVERAGE FLOW (l/s)	TOTAL PEAK FLOW (l/s)	Length	Diameter (mm)	Slope	Full Capacity (l/sec)	% Full Flow (Average)	% Full Flow (Peak)	Full flow Velocity (m/s)	U/S Invert (m)	D/S Invert (m)	RIM (m)	Depth (m)
1	WWS-MH1	WWS-MH2	223	0	223	0.90	3.50	3.17	Residential	1.65	0	0.00	0.00	0.00		0.00	0.00	0.00	0.90	3.17	0.00	1.65	0.33	0.54	0.00	0.54	0.54	1.45	3.71	59.3	200	0.65%	26.52	5.5%	14.0%	0.84	137.05	136.66	141.85	4.80
2	WWS-MH2	CONNECTION	0	223	223	0.90	3.50	3.17	Commercial	0.90	28,000	0.29	0.00	0.29	1.50	0.44	0.00	0.44	1.19	3.60	1.65	2.54	0.33	0.30	0.54	0.84	0.84	2.03	4.44	57.5	200	0.62%	25.91	7.8%	17.1%	0.83	136.60	136.24	140.65	4.05

*Full Capacity calculated using Mannings equation: $Q = Cm/n*A*R^{2/3}*S^{1/2}$ Cm = 1.0 (S.I)

Zhang, Jingwei

From: Annie Williams <awilliams@jlrichards.ca>
Sent: Friday, July 7, 2023 5:21 PM
To: Zhang, Jingwei; David Shen
Cc: Mark Buchanan; Shan Goel; Jason D'Elia; Bobby Pettigrew; Mathieu Lacelle
Subject: RE: 430 Ottawa Street SPA - Sanitary flow modelling check

Hi Jingwei, David,

In response to the email from Jingwei Zhang (June 22, 2023), one scenario was assessed based on the future servicing requirements outlined in the email. The scenario used the flow breakdown provided by WSP in the corresponding email.

In previous email correspondences, the approved flow for the Ottawa Street development was 4.44 L./s. This value accounted for peak daily flows and extraneous flows from the proposed residential and commercial buildings and used a peaking factor of 4 for the residential and 1.5 for the commercial flows.

Since the extent of the sanitary sewer infrastructure will not change significantly with the proposed site concept, the portion of the 4.44 L/s attributed to extraneous flows has been removed from the proposed flow and the calibrated extraneous flows for the area, already present in the model, will be used to represent the I&I component.

The master planning level modelling being carried out applies a calibrated daily flow pattern to provide a dynamic input into the model, therefore the average flow based on population and commercial area will be used rather than peak flow rates incorporating the peaking factor. To calculate the average flows from the proposed retrofit project, population and area values were extracted directly from the site servicing report. A population of 223 and an ICI area of 0.9 ha were used with parameters agreed upon with the municipality for in the Mississippi Mills Master Plan. The resulting average flows generated by the proposed development is 1.195 L/s, which represents the sum of average daily flows for the proposed residential and commercial buildings. The following scenario was assessed in the dynamic calibrated trunk sewer sanitary model:

Location:	**SA4MH-109, Northeast of the intersection of Sadler Drive and Ottawa Street**	**Total**
Scenario 1	full buildout population (223 population, 0.9 ha total ICI Area, no extraneous area due to retrofit)	full buildout population (223 population, 0.9 ha total ICI Area, no extraneous area due to retrofit)

In assessing future capacity two constraints were assessed:

- Maintaining free flow capacity in the dry weather flow scenario; and,
- Maintaining 1.8 metre freeboard to the ground elevation in the 1:25 year return period event storm to protect basements. Where the current sewer is already within the basement elevation the HGL is restricted to 0.3m above the sewer.

In summary:

DWF Event Scenarios:

- No capacity concerns under the DWF event have been triggered by the 430 Ottawa Street Development in the dynamic calibrated dry weather flow event for **Scenario 1** above.

25-year Storm Events:

- No capacity concerns under the 25-year storm event have been triggered by the 430 Ottawa Street Development in the dynamic calibrated dry weather flow event for Scenario 1 above. The proposed development flows do not impact areas of concern under the existing condition.

Note that the foregoing model results are for current conditions and are based on computer model simulation. We have not reviewed the adequacy of the wastewater flow calculations for the proposed development, which remains the responsibility of the Developer's Engineer.

The model results are based on current simulated operation of the Municipality's sewer collection system. The computer model simulations are based on the best information available at this time. The operation of the system can change on a regular basis, resulting in a variation in the boundary conditions. It is further noted that the operational characteristics of the wastewater collection system and physical properties of the sewers can change and/or deteriorate over time. These changes may affect the collection characteristics of the system and the assumptions made in developing the model, which in turn could lead to variations in the simulation results. This should be considered by any third party undertaking simulation of system upgrades.

Any questions on the above let us know,
Annie

Annie Williams, P.Eng.
Civil Engineer

J.L. Richards & Associates Limited
1000-343 Preston Street, Ottawa, ON K1S 1N4
Direct: 343-803-4523

From: Mark Buchanan <mbuchanan@jlrichards.ca>
Sent: Thursday, June 22, 2023 3:01 PM
To: Zhang, Jingwei <Jingwei.Zhang@wsp.com>
Cc: Shan Goel <sgoel@elmdevelopments.com>; Jason D'Elia <j.delia@elmdevelopments.com>; Annie Williams <awilliams@jlrichards.ca>; David Shen <dshen@mississippimills.ca>
Subject: RE: 430 Ottawa Street SPA - Sanitary flow modelling check

Understood. Thanks for confirming Jingwei.

Mark

From: Zhang, Jingwei <Jingwei.Zhang@wsp.com>
Sent: Thursday, June 22, 2023 2:47 PM
To: Mark Buchanan <mbuchanan@jlrichards.ca>
Cc: Shan Goel <sgoel@elmdevelopments.com>; Jason D'Elia <j.delia@elmdevelopments.com>; Annie Williams <awilliams@jlrichards.ca>; David Shen <dshen@mississippimills.ca>
Subject: RE: 430 Ottawa Street SPA - Sanitary flow modelling check

Hi Mark,

The peak design flow of 4.44 L/s was confirmed. Please use this number for the modelling check.

Thanks,

Jingwei Zhang, M.Eng., P.Eng., PMP
Senior Project Engineer
Municipal Engineering - Ottawa

T+ 1 613-690-1245

WSP Canada Inc.
2611 Queensview Drive, Suite 300
Ottawa, Ontario,
K2B 8K2 Canada

wsp.com

From: Zhang, Jingwei
Sent: Thursday, June 22, 2023 9:08 AM
To: David Shen <dshen@mississippimills.ca>
Cc: Shan Goel <sgoel@elmdevelopments.com>; Jason D'Elia <j.delia@elmdevelopments.com>; Annie Williams <awilliams@jlrichards.ca>; Mark Buchanan <mbuchanan@jlrichards.ca>
Subject: RE: 430 Ottawa Street SPA - Sanitary flow modelling check

Hi David,

The peak design flow of 4.4 L/s was calculated based on Ottawa Design Guidelines - Sewer October 2012 as requested by the town. It was reviewed and approved by the town. I have attached the detail calculation spreadsheet and the corresponding email to this email.

Please let me know if you have any questions.

Thanks,

Jingwei Zhang, M.Eng., P.Eng., PMP
Senior Project Engineer
Municipal Engineering - Ottawa

T+ 1 613-690-1245

WSP Canada Inc.
2611 Queensview Drive, Suite 300
Ottawa, Ontario,
K2B 8K2 Canada

wsp.com

From: Mark Buchanan <mbuchanan@jlrichards.ca>
Sent: Thursday, June 22, 2023 8:39 AM
To: David Shen <dshen@mississippimills.ca>; Zhang, Jingwei <Jingwei.Zhang@wsp.com>
Cc: Shan Goel <sgoel@elmdevelopments.com>; Jason D'Elia <j.delia@elmdevelopments.com>; Annie Williams <awilliams@jlrichards.ca>
Subject: RE: 430 Ottawa Street SPA - Sanitary flow modelling check

Thanks David,

Agreed, this is a straightforward run, but we'll hang tight until the peak flow is confirmed.

Jingwei: Please confirm the peak flow we are to input in the model.

Regards,
Mark

Mark Buchanan, P.Eng.
Associate
Senior Environmental Engineer

J.L. Richards & Associates Limited
1000-343 Preston Street, Ottawa, ON K1S 1N4
Direct: 343-804-5349

From: David Shen <dshen@mississippimills.ca>
Sent: Thursday, June 22, 2023 8:30 AM
To: Zhang, Jingwei <Jingwei.Zhang@wsp.com>; Mark Buchanan <mbuchanan@jlrichards.ca>
Cc: Shan Goel <sgoel@elmdevelopments.com>; Jason D'Elia <j.delia@elmdevelopments.com>
Subject: RE: 430 Ottawa Street SPA - Sanitary flow modelling check

Hi Mark,

The file of 430 Ottawa has been analyzed on water side, but not wastewater side.

Jingwei, can you ensure you are using the correct version of peak flow that was discussed yesterday (since there are more than one version).

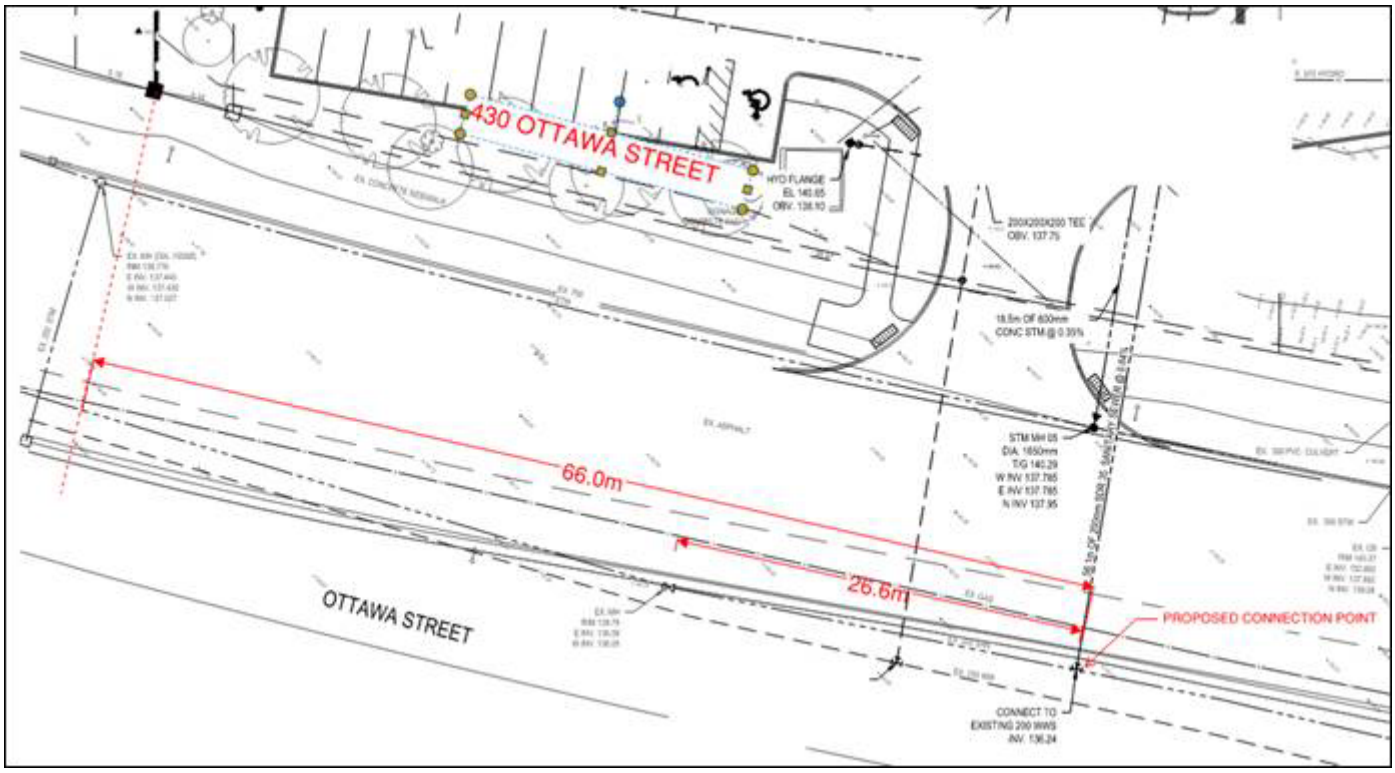
The analysis should be very straightforward.

Thanks!
David

From: Zhang, Jingwei <Jingwei.Zhang@wsp.com>
Sent: Thursday, June 22, 2023 7:03 AM
To: Mark Buchanan <mbuchanan@jlrichards.ca>
Cc: David Shen <dshen@mississippimills.ca>; Shan Goel <sgoel@elmdevelopments.com>; Jason D'Elia <j.delia@elmdevelopments.com>
Subject: 430 Ottawa Street SPA - Sanitary flow modelling check

Hi Mark,

Could you do a modeling check to see if the existing 200 sanitary sewer on Ottawa Street has sufficient capacity to accommodate a total peak flow of 4.44 L/s from this site? As shown in the screenshot below, the proposed connection point at the existing 200 sanitary sewer is 26.6m away from the nearest downstream manhole and 66m from the west property line.



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

Thanks,

Jingwei Zhang, M.Eng., P.Eng., PMP
Senior Project Engineer
Municipal Engineering - Ottawa

T+ 1 613-690-1245

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K2B 8K2 Canada

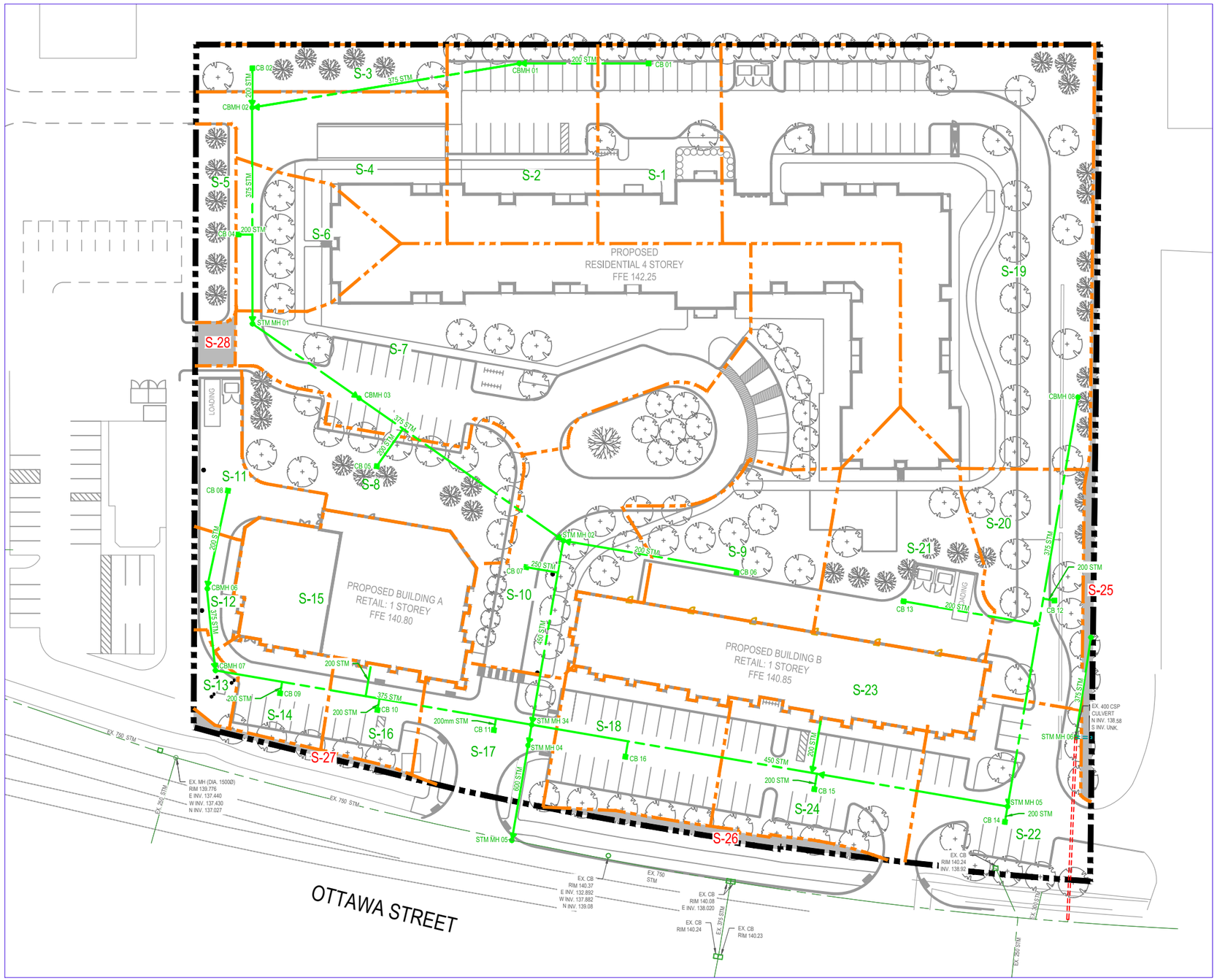
wsp.com

-LAEmHhHzdJzBlTWfa4Hgs7pbKl

APPENDIX

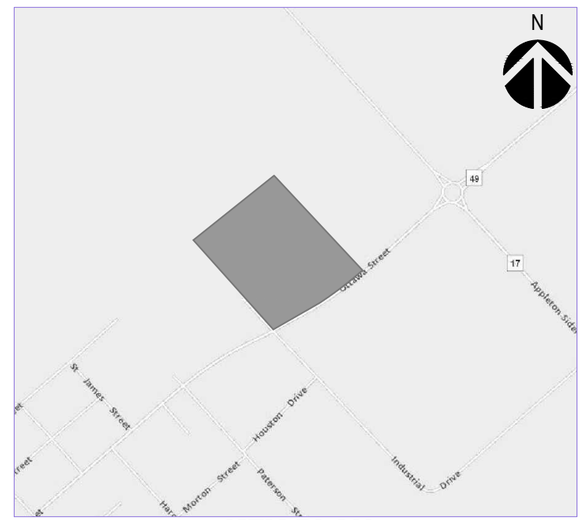
E

STORMWATER MANAGEMENT



LEGEND

- DRAINAGE STUDY BOUNDARY LINE
- POST-DEVELOPMENT SUB-CATCHMENT SPLIT LINE
- PROPOSED STORM SEWER
- PROPOSED CULVERT
- EXISTING CULVERT
- PROPOSED MH / CB
- S-25 UNCONTROLLED SUB-CATCHMENT ID
- S-25 CONTROLLED SUB-CATCHMENT ID



KEY PLAN

2011 QUEENSVIEW DRIVE
OTTAWA, ONTARIO
CANADA K2B 8K2
T. 613.829.2800
F. 613.829.8299
WWW.WSP.COM

430 OTTAWA STREET
POST-DEVELOPMENT DRAINAGE PLAN

SCALE:	DATE:	SKETCH No.
1:400	MARCH 27, 2023	SKETCH 1

STORM SEWER CALCULATION SPREADSHEET

Job Name: 430 Ottawa Street - SPA
430 Ottawa Street, Almonte, ON
Job Number: 221-06853-00
Date: 13-Jul-2023

Design Storm: City of Ottawa 5 year Design Storm
Calculation Method: Rational Method

U/S MH	D/S MH	Catchment ID	Catchment Area (m^2)	Total Time (min)	Rainfall Intensity (mm/hr)	Peak Flow (m^3/s)	Pipe Diameter (mm)	Pipe Length (m)	Pipe Slope (%)	Manning's "n"	Capacity (m^3/s)	Velocity (m/s)	Travel Time (min)	Invert U/S MH (m)	Invert D/S MH (m)	Manhole Drop (m)	Ground U/S MH (m)	Cover U/S MH (m)	Q/Q full Ratio %
CB01	CBMH01	S-1	902	10.00	104.19	0.0188	200	24.8	1.00%	0.013	0.0328	1.04	0.40	139.360	139.112	0.18	141.35	1.99	57.4%
CBMH01	CBMH02	S-2	1098	10.40	102.15	0.0411	375	53.1	0.28%	0.013	0.0934	0.85	1.05	138.932	138.781	0.10	141.23	2.30	44.0%
CB2	CBMH02	S-3	435	10.00	104.19	0.0025	200	7.5	1.00%	0.013	0.0328	1.04	0.12	138.865	138.790	0.18	141.10	2.23	7.7%
CBMH02	Main 1	S-4	895	11.44	97.15	0.0617	375	24.3	0.29%	0.013	0.0944	0.85	0.47	138.681	138.610	0.00	140.24	1.56	65.3%
CB 03	CB 04	S-5	292	10.00	104.19	0.0017	200	4.0	1.00%	0.013	0.0328	1.04	0.06	138.700	138.660	0.02	140.10	1.40	5.2%
CB 04	Main 1	S-6	631	10.06	103.86	0.0099	200	3.0	1.00%	0.013	0.0328	1.04	0.05	138.640	138.610	0.00	140.33	1.69	30.2%
Main 1	STM MH01			11.92	95.06	0.0694	375	17.1	0.29%	0.013	0.0944	0.85	0.33	138.610	138.561	0.02	140.39	1.78	73.5%
STM MH01	CBMH03			12.25	93.64	0.0684	375	25.3	0.28%	0.013	0.0928	0.84	0.50	138.541	138.470	0.02	140.30	1.76	73.7%
CBMH03	Main 2	S-7	2833	12.75	91.60	0.1192	450	10.2	0.27%	0.013	0.1484	0.93	0.18	138.450	138.422	0.00	140.25	1.80	80.3%
CB 05	Main 2	S-8	927	10.00	104.19	0.0054	200	8.6	1.00%	0.013	0.0328	1.04	0.14	138.808	138.722	0.30	140.15	1.34	16.4%
Main 2	STM MH02			12.93	90.89	0.1229	450	37.6	0.27%	0.013	0.1484	0.93	0.67	138.422	138.320	0.10	140.00	1.58	82.8%
CB 06	STM MH02	S-9	871	10.00	104.19	0.0127	200	33.7	1.00%	0.013	0.0328	1.04	0.54	138.887	138.550	0.33	140.54	1.65	38.8%
STM MH02	Main 3			13.60	88.35	0.1303	525	6.2	0.28%	0.013	0.2276	1.05	0.10	138.225	138.208	0.00	140.62	2.39	57.3%
CB07	Main 3	S-10	2751	10.00	104.19	0.0485	250	6.0	1.00%	0.013	0.0595	1.21	0.08	138.628	138.568	0.36	140.25	1.62	81.5%
Main 3	STM MH03			13.70	88.00	0.1707	525	29.6	0.28%	0.013	0.2276	1.05	0.47	138.208	138.125	0.08	140.40	2.19	75.0%
CB08	CBMH06	S-11	453	10.00	104.19	0.0100	200	19.2	1.00%	0.013	0.0328	1.04	0.31	138.942	138.750	0.18	140.25	1.31	30.5%
CBMH06	CBMH07	S-12	198	10.31	102.60	0.0136	375	15.7	0.32%	0.013	0.0992	0.90	0.29	138.570	138.520	0.02	140.25	1.68	13.7%
CBMH07	Main 4	S-13	108	10.60	101.14	0.0140	375	13.0	0.29%	0.013	0.0936	0.85	0.26	138.500	138.463	0.00	140.25	1.75	14.9%

CB 09	Main 4	S-14	463	10.00	104.19	0.0110	200	2.2	1.00%	0.013	0.0328	1.04	0.04	138.715	138.693	0.23	140.25	1.54	33.5%
Main 4	Main 5			10.60	101.14	0.0246	375	16.2	0.29%	0.013	0.0936	0.85	0.32	138.463	138.417	0.00	140.30	1.84	26.3%
Building A	Main 5	S-15	1164	10.00	104.19	0.0303	200	5.6	1.00%	0.013	0.0328	1.04	0.09	138.658	138.602	0.19	140.45	1.79	92.4%
Main 5	Main 6			10.92	99.59	0.0532	375	2.7	0.29%	0.013	0.0936	0.85	0.05	138.417	138.409	0.00	140.30	1.88	56.9%
CB 10	Main 6	S-16	350	10.00	104.19	0.0073	200	2.2	1.00%	0.013	0.0328	1.04	0.04	138.661	138.639	0.23	140.25	1.59	22.4%
Main 6	Main 7			10.97	99.34	0.0601	375	22.6	0.29%	0.013	0.0936	0.85	0.44	138.409	138.345	0.00	140.30	1.89	64.2%
CB 11	Main 7	S-17	606	10.00	104.19	0.0126	200	2.2	1.00%	0.013	0.0328	1.04	0.04	138.597	138.575	0.23	140.25	1.65	38.6%
Main 7	STM MH03			11.41	97.27	0.0707	375	22.6	0.29%	0.013	0.0936	0.85	0.44	138.345	138.280	0.23	140.30	1.96	75.5%
CBMH08	Main 8	S-19	4157	10.00	104.19	0.0689	450	39.1	0.28%	0.013	0.1506	0.95	0.69	138.696	138.587	0.00	140.25	1.55	45.7%
CB 12	Main 8	S-20	874	10.00	104.19	0.0142	200	2.2	1.00%	0.013	0.0328	1.04	0.04	138.909	138.887	0.30	140.30	1.39	43.4%
Main 8	Main 9			10.69	100.69	0.0803	450	5.0	0.28%	0.013	0.1506	0.95	0.09	138.587	138.573	0.00	140.40	1.81	53.3%
CB 13	Main 9	S-21	1091	10.00	104.19	0.0186	200	26.7	1.00%	0.013	0.0328	1.04	0.43	139.140	138.873	0.30	140.30	1.16	56.7%
Main 9	STM MH05			10.78	100.26	0.0979	450	38.3	0.28%	0.013	0.1506	0.95	0.67	138.573	138.466	0.08	140.40	1.83	65.0%
CB 14	STM MH05	S-22	997	10.00	104.19	0.0213	200	3.0	1.00%	0.013	0.0328	1.04	0.05	138.741	138.711	0.33	140.25	1.51	65.0%
STM MH05	Main 10			11.45	97.11	0.1147	525	37.0	0.28%	0.013	0.2284	1.05	0.58	138.386	138.281	0.00	140.40	2.01	50.2%
CB 15	Main 10	S-24	997	10.00	104.19	0.0218	200	3.0	1.00%	0.013	0.0328	1.04	0.05	138.671	138.641	0.36	140.30	1.63	66.5%
Building B	Main 10	S-23	1200	10.00	104.19	0.0313	200	10.0	1.00%	0.013	0.0328	1.04	0.16	138.631	138.531	0.25	140.60	1.97	95.3%
Main 10	Main 11			12.03	94.55	0.1598	525	36.7	0.28%	0.013	0.2284	1.05	0.58	138.281	138.178	0.00	140.40	2.12	70.0%
CB 16	Main 11	S-18	841	10.00	104.19	0.0186	200	3.0	1.00%	0.013	0.0328	1.04	0.05	138.538	138.508	0.33	140.30	1.76	56.8%
Main 11	STM MH03			12.61	92.15	0.1722	525	18.7	0.28%	0.013	0.2284	1.05	0.30	138.178	138.125	0.08	140.40	2.22	75.4%
STM MH03	STM MH04			14.17	86.33	0.3915	600	4.0	0.50%	0.013	0.4342	1.54	0.04	138.050	138.030	0.02	140.25	2.20	90.2%
STM MH04	EX STM MH			14.22	86.18	0.3908	600	17.1	0.44%	0.013	0.4073	1.44	0.20	138.010	137.935	0.08	140.55	2.54	96.0%
														ex 750 conc	137.785				

430 Ottawa Street SPA

430 Ottawa Street, Almonte, ON

Project: 221-06853-00

Date: March 27, 2023

ON-Site Storage Calculation - Storage Required for the Entire Site

5-Year Maximum Allowable Release Rate from the Site:

89.0 L/s

100-Year Maximum Allowable Release Rate from the Site:

155.0 L/s

Post Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	**Surface**	**Ha**	**"C"**	**C_{avg}**	**"C" x 1.25**	**$C_{100\ avg}$**
Total	Roof	0.237	0.90	**0.64**	0.99	**0.72**
2.551	Pavement	1.383	0.90		0.99	
	Grass	0.931	0.20		0.25	

*Areas are approximate based on Architectural site plan and Storm Draiange Area Plan

QUANTITY STORAGE REQUIREMENTS - 5 Year

2.551 = Area(ha)

0.64 = C

89.0 l/s = max allowable release rate

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd m^3	Storage Avail m^3
	10	104.19	472.81	89.00	383.81	230.29	797.40
	20	70.25	318.79	89.00	229.79	275.75	797.40
	30	**53.93**	**244.72**	**89.00**	**155.72**	**280.29**	**797.40**
5 YEAR	40	44.18	200.50	89.00	111.50	267.61	797.40
	50	37.65	170.86	89.00	81.86	245.59	797.40
	60	32.94	149.49	89.00	60.49	217.77	797.40

QUANTITY STORAGE REQUIREMENTS - 100 Year

2.551 = Area(ha)

0.72 = *C

94.0 l/s = max allowable release rate

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd m^3	Storage Avail m^3
	10	178.56	911.56	93.99	817.57	490.54	797.40
	20	119.95	612.36	93.99	518.37	622.04	797.40
100 YEAR	30	91.87	468.99	93.99	375.01	675.01	797.40
	40	75.15	383.62	93.99	289.63	695.12	797.40
	50	63.95	326.49	93.99	232.50	**697.51**	**797.40**
	60	55.89	285.35	93.99	191.36	688.89	797.40
	70	49.79	254.18	93.99	160.19	672.80	797.40
	80	44.99	229.68	93.99	135.69	651.33	797.40

Equations:

Flow Equation

Q = 2.78 x C x I x A

Where:

C is the runoff coefficient

I is the intensity of rainfall, City of Ottawa IDF

A is the total drainage area

430 Ottawa Street SPA

430 Ottawa Street, Almonte, ON
Project: 221-06853-00
Date: March 27, 2023

ON-Site Storage Calculation - Storage Required for Phase 1

5-Year Maximum Allowable Release Rate from the Site:

13.5 L/s

100-Year Maximum Allowable Release Rate from the Site:

27.4 L/s

Post Dev run-off Coefficient "C"

			2 & 5 Year Event		100 Year Event	
Area	**Surface**	**Ha**	**"C"**	**C_{avg}**	**"C" x 1.25**	**$C_{100\ avg}$**
Total	Roof	0.117	0.90	**0.77**	0.99	**0.85**
0.343	Pavement	0.162	0.90		0.99	
	Grass	0.065	0.20		0.25	

*Areas are approximate based on Architectural site plan and Storm Draiange Area Plan

QUANTITY STORAGE REQUIREMENTS - 5 Year

0.343 = Area(ha)
0.77 = C
13.5 l/s = max allowable release rate

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd m^3	Storage Avail m^3
	10	104.19	76.50	13.50	63.00	37.80	153.20
	20	70.25	51.58	13.50	38.08	45.70	153.20
	30	**53.93**	**39.60**	**13.50**	**26.10**	**46.97**	**153.20**
5 YEAR	40	44.18	32.44	13.50	18.94	45.46	153.20
	50	37.65	27.65	13.50	14.15	42.44	153.20
	60	32.94	24.19	13.50	10.69	38.48	153.20

QUANTITY STORAGE REQUIREMENTS - 100 Year

0.343 = Area(ha)
0.85 = *C
27.4 l/s = max allowable release rate

Return Period	Time (min)	Intensity (mm/hr)	Flow Q (L/s)	Controlled Runoff (L/s)	Net Runoff To Be Stored (L/s)	Storage Req'd m^3	Storage Avail m^3
	10	178.56	144.72	27.40	117.32	70.39	153.20
	20	119.95	97.22	27.40	69.82	83.79	153.20
100 YEAR	**30**	**91.87**	**74.46**	**27.40**	**47.06**	**84.71**	**153.20**
	40	75.15	60.91	27.40	33.51	80.41	153.20
	50	63.95	51.84	27.40	24.44	73.31	153.20
	60	55.89	45.30	27.40	17.90	64.45	153.20
	70	49.79	40.35	27.40	12.95	54.41	153.20
	80	44.99	36.47	27.40	9.07	43.51	153.20

Equations:

Flow Equation

Q = 2.78 x C x I x A

Where:

C is the runoff coefficient

I is the intensity of rainfall, City of Ottawa IDF

A is the total drainage area

Stormceptor®

FORTERRA

Stormceptor® EF Sizing Report

STORMCEPTOR®
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

03/27/2023

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA CDA RCS
Climate Station Id:	6105978
Years of Rainfall Data:	20

Site Name:	430 Ottawa Street

Drainage Area (ha):	2.513
Runoff Coefficient 'c':	0.65

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	52.72
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	Yes
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	88.60
Peak Conveyance (maximum) Flow Rate (L/s):	
Site Sediment Transport Rate (kg/ha/yr):	

Project Name:	430 Ottawa Street
Project Number:	211-06853-00
Designer Name:	Kathryn Kerker
Designer Company:	WSP
Designer Email:	kathryn.kerker@wsp.com
Designer Phone:	613-690-1206
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	63
EFO6	77
EFO8	86
EFO10	90
EFO12	95

Recommended Stormceptor EFO Model: EFO8

Estimated Net Annual Sediment (TSS) Load Reduction (%): 86

Water Quality Runoff Volume Capture (%): > 90

imbrium

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterwavs.

PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

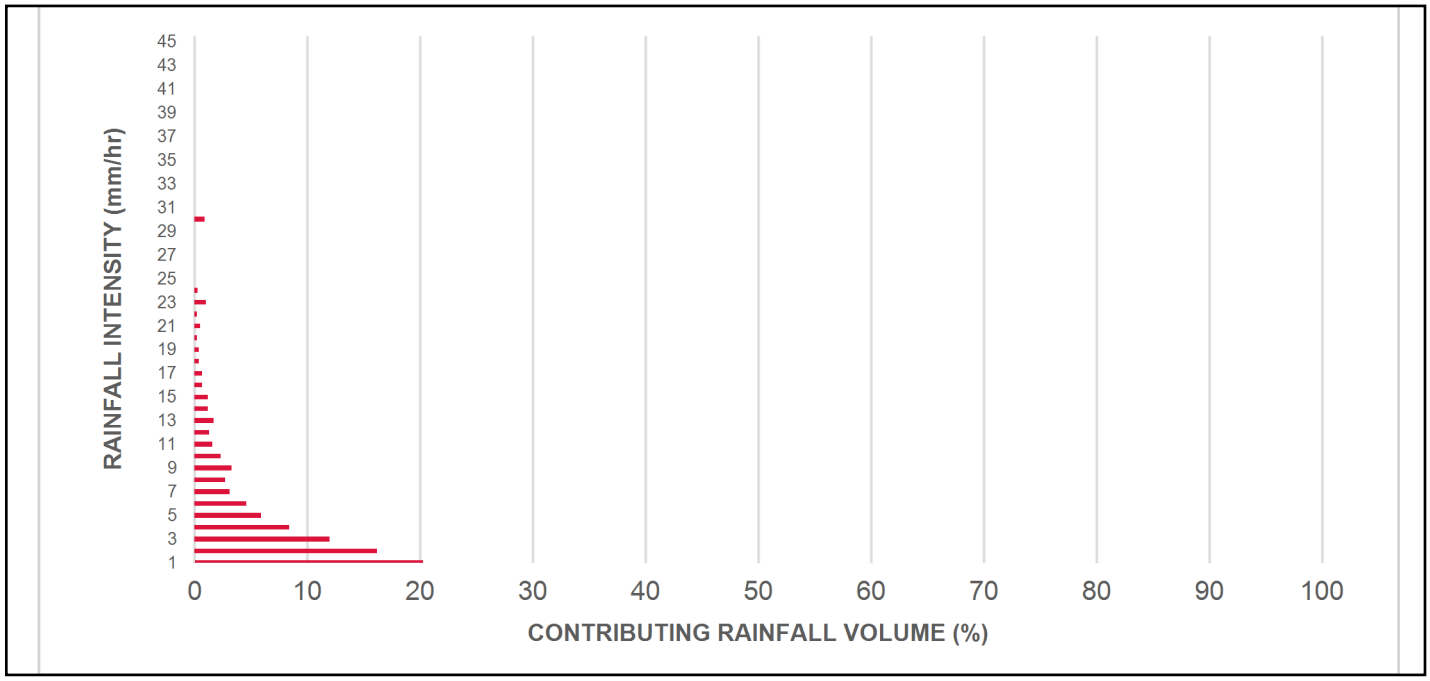
imbrium

Upstream Flow Controlled Results

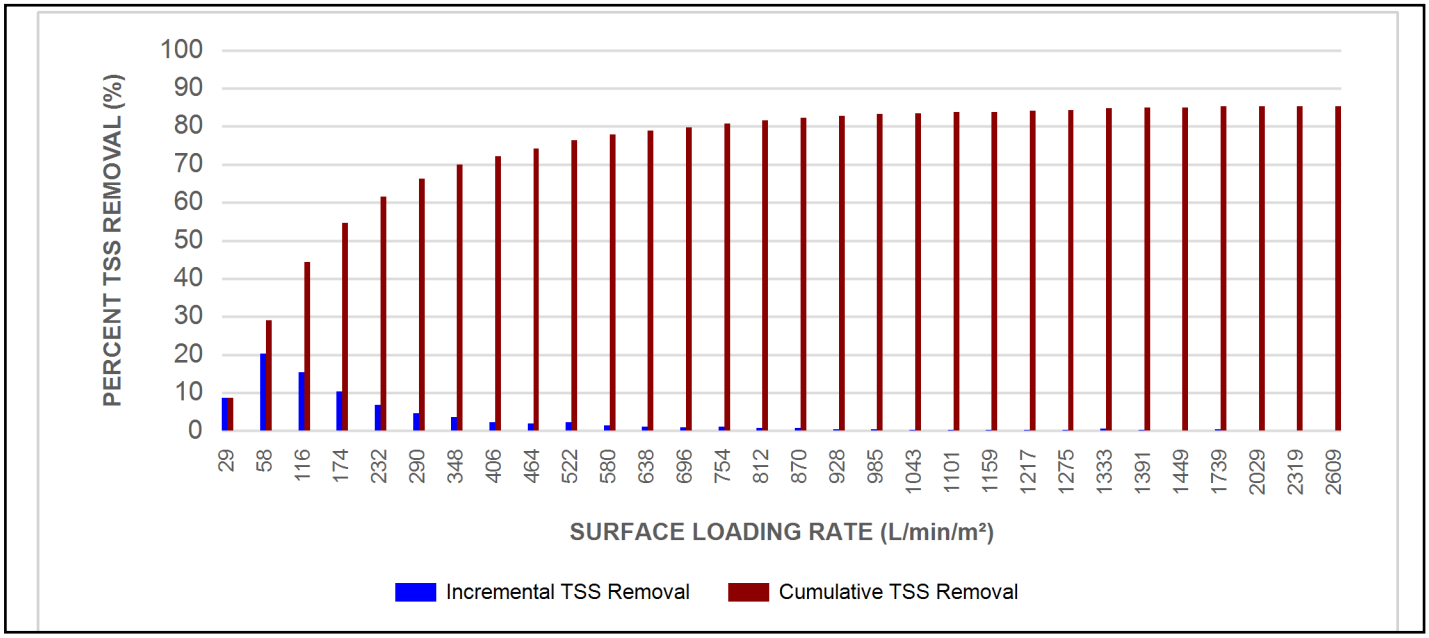
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.5	8.6	8.6	2.27	136.0	29.0	100	8.6	8.6
1	20.3	29.0	4.54	272.0	58.0	100	20.3	29.0
2	16.2	45.2	9.08	545.0	116.0	95	15.3	44.3
3	12.0	57.2	13.62	817.0	174.0	87	10.4	54.7
4	8.4	65.6	18.16	1090.0	232.0	82	6.9	61.6
5	5.9	71.6	22.70	1362.0	290.0	79	4.7	66.3
6	4.6	76.2	27.25	1635.0	348.0	77	3.5	69.9
7	3.1	79.3	31.79	1907.0	406.0	74	2.3	72.1
8	2.7	82.0	36.33	2180.0	464.0	71	1.9	74.1
9	3.3	85.3	40.87	2452.0	522.0	68	2.3	76.4
10	2.3	87.6	45.41	2725.0	580.0	66	1.5	77.9
11	1.6	89.2	49.95	2997.0	638.0	64	1.0	78.9
12	1.3	90.5	54.49	3270.0	696.0	64	0.8	79.7
13	1.7	92.2	59.03	3542.0	754.0	63	1.1	80.8
14	1.2	93.5	63.57	3814.0	812.0	63	0.8	81.6
15	1.2	94.6	68.11	4087.0	870.0	63	0.7	82.3
16	0.7	95.3	72.66	4359.0	928.0	62	0.4	82.7
17	0.7	96.1	77.20	4632.0	985.0	62	0.5	83.2
18	0.4	96.5	81.74	4904.0	1043.0	61	0.2	83.4
19	3.5	100.0	86.28	5177.0	1101.0	59	2.1	85.5
20	0.0	100.0	89.00	5340.0	1136.0	59	0.0	85.5
21	0.0	100.0	89.00	5340.0	1136.0	59	0.0	85.5
22	0.0	100.0	89.00	5340.0	1136.0	59	0.0	85.5
23	0.0	100.0	89.00	5340.0	1136.0	59	0.0	85.5
24	0.0	100.0	89.00	5340.0	1136.0	59	0.0	85.5
25	0.0	100.0	89.00	5340.0	1136.0	59	0.0	85.5
30	0.0	100.0	89.00	5340.0	1136.0	59	0.0	85.5
35	0.0	100.0	89.00	5340.0	1136.0	59	0.0	85.5
40	0.0	100.0	89.00	5340.0	1136.0	59	0.0	85.5
45	0.0	100.0	89.00	5340.0	1136.0	59	0.0	85.5
Estimated Net Annual Sediment (TSS) Load Reduction =								**86 %**

Climate Station ID: 6105978 *Years of Rainfall Data*: 20

RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

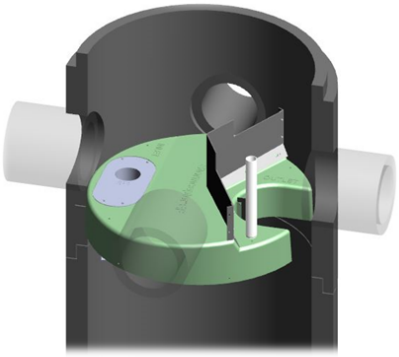
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

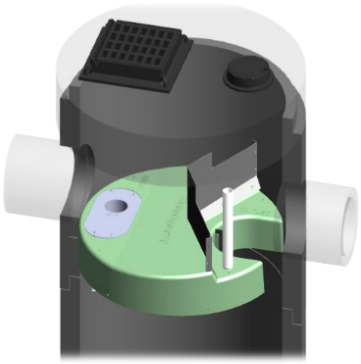
DESIGN FLEXIBILITY

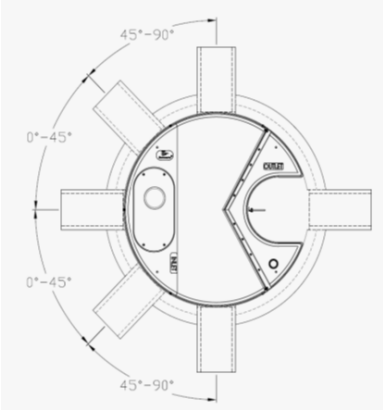
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall

remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

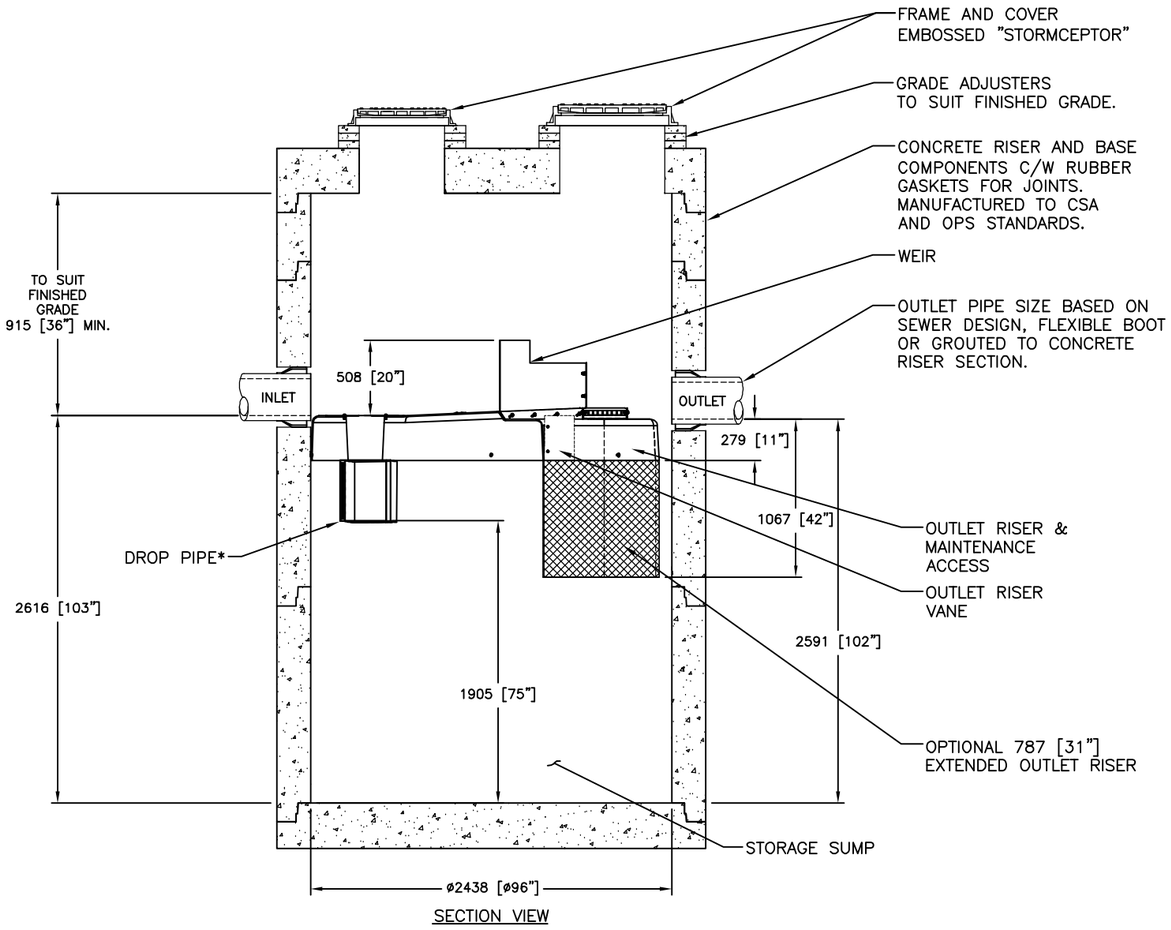
3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to

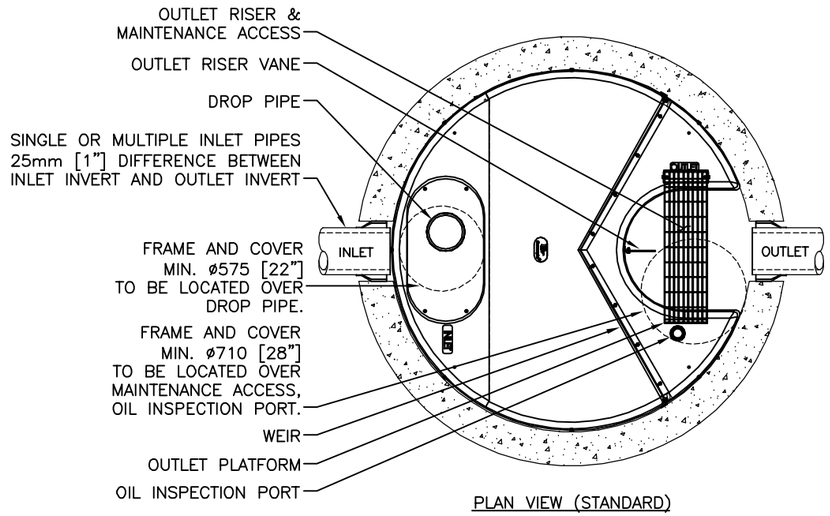
assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

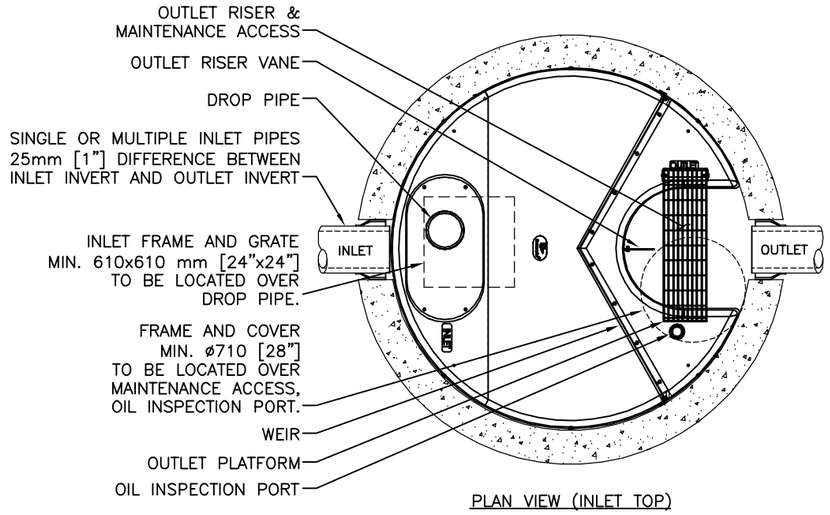
DRAWING NOT TO BE USED FOR CONSTRUCTION



SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF8 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO8 (OIL CAPTURE CONFIGURATION).

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EFO8				
STRUCTURE ID					*
HYDROCARBON STORAGE REQ'D (L)					*
WATER QUALITY FLOW RATE (L/s)					*
PEAK FLOW RATE (L/s)					*
RETURN PERIOD OF PEAK FLOW (yrs)					*
DRAINAGE AREA (HA)					*
DRAINAGE AREA IMPERVIOUSNESS (%)					*
PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

MARK	DATE	REVISION DESCRIPTION	BY
1	6/8/18	OUTLET PLATFORM	JSK
0	5/26/17	INITIAL RELEASE	JSK

Stormceptor® EF

SCALE = NTS

imbrium®
407 FAIRVIEW DRIVE, WHITBY, ON L1N 9A9
TF 800-565-6801 CA 416-665-8600 INTL +1-416-665-8600

DATE:	10/13/2017
DESIGNED: JSK	DRAWN: JSK
CHECKED: BSF	APPROVED: *
PROJECT No.: EFO8	SEQUENCE No.: *
SHEET:	1 OF 1