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Project No. 21-5089A

Site Servicing and Stormwater Management Report

MIFO New Building

6600 Carrière Street, Ottawa, Ontario



Prepared for

Provencher Roy.
47 Clarence Street, Unit #440
Ottawa, Ontario, K1N 9K1

Revision 4 SUBMISSION June 10, 2025



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1 Introduction

Jp2g Consultants Inc. was retained by Provencher Roy to complete a Site Servicing and Stormwater Management Report suitable for the City of Ottawa Site Plan Control Application, for a new Office Building development located on the south side of Carrière Street east of Orléans Boulevard in Orléans, ON.

The site is approximately **0.82 ha** in size and is bound by Carrière Street on the north property limit. The proposed development includes the construction of a new **2700 m²** Theatre Building, and associated parking and landscaped areas.

A Pre-Consultation meeting was held with City of Ottawa staff on May 9, 2022, to determine the project constraints and requirements. Preconsultation meeting minute notes are available in [Appendix F](#). The following report details the site servicing & stormwater management calculations used for capacity, water quantity and quality control in accordance with the City of Ottawa's requirements.

1.1 Design Drawings

The following reference civil design drawings are included.

- C1 – Site Servicing Plan
- C2 – Grading Plan
- C3 – General Notes and Details
- C4 – General Notes and Details II
- Figure 1 – Pre-Development Storm Drainage Areas
- Figure 2 – Post-Development Storm Drainage Areas
- Figure 3 – Fire Hydrant Coverage Area

2 Objective

This study will outline the servicing requirements for the development and identify the impact of the development on the existing municipal services, including water, storm and sanitary.

The stormwater management plan is to control post-development peak flows to pre-determined levels, and detain onsite, stormwater up to and including the 100-year storm event with a 20% increase of rainfall intensity (hereby referred to as 100-year* storm event) without affecting adjacent lands, and to provide clean runoff to minimize pollution of the downstream receiving watercourse

3 Stormwater Management

3.1 Pre-Development Conditions

The existing site consists of one commercial parcel that includes a parking lot. The parcels are bounded by two existing schools on each side.

3.2 Allowable Release Rate

Based on existing conditions the site appears to be about 60% hard surface, 40% of the site was assumed to be soft surface. Using this data, a pre-development runoff coefficient of 0.62 was calculated. From the Pre-Consultation meeting, if the calculated pre-development runoff coefficient is greater than 0.5, then a pre-development runoff coefficient of 0.5 is to be used. As a result, the pre-development runoff coefficient of 0.50 an allowable release rate of **$Q_{\text{allowable}} = 87.3 \text{ L/s}$** was calculated for the new site based on the pre-development 2-year flow, in accordance with the City of Ottawa requirements, see attached [Appendix B](#). Please refer to [Appendix B](#) Table B.1.2 for areas that are controlled/uncontrolled.



3.3 Post-Development Conditions

The proposed site development includes a new office building, asphalt parking, hard surface walkways, landscaped areas and a bioswale. Site storm drainage will be conveyed through the new on-site storm sewer, a bioswale retention system and connect to the existing **1800mm** storm sewer on Carrière Street in the right of way. An existing storm sewer trunk easement runs along the west side of the site which conveys flows from Jeanne d’Arc Boulevard through to Carrière Street. A new storm manhole will be installed on site and the new storm sewer servicing the building will be by gravity sewer. Flows will be managed to limit the 100-year post-development flow rate to the pre-allocated 2-year release rate identified in section 3.2.

Stormwater runoff from the roof, parking areas and partial green spaces will be collected into the on-site manhole’s, catch basins and bio swale as applicable.

Storm water quantity storage is anticipated on the building roof, parking lot, and underground and will be managed using inlet control devices. The foundation drains will flow unobstructed through the on-site storm sewer system. Foundation drains and perimeter parking lot subdrains will connect to the proposed storm sewer between STMH01 and OGS01 and the interior parking lot sub drains will connect to the proposed storm sewer at CB-1.

The site development area is approximately **0.82 ha** with a post-development average weighted run-off coefficient of **C = 0.74** and **C = 0.83** for the 5-year and 100-year* storm events, respectively. Refer to calculations in **Appendix B**. Stormwater management techniques are required to reduce peak flows from the area, given that post-development peak flows will exceed the pre-development allowable release rate of **87.3L/s**.

3.4 Storm Sewer Pipe Design

Pipe diameter sizing was based on the **5-year** storm event, in accordance with City requirements. Under 5-year conditions, the storm sewers are not in surcharged conditions (i.e. flow/capacity <100%).

3.5 Stormwater Quality Control

Stormwater quality control will be managed by an oil grit separator unit to 80% TSS Removal. The proposed OGS unit is a Stormceptor Model EFO4. Details relating to the proposed OGS can be found in **Appendix H**.

3.6 Stormwater Quantity Control

Post-development peak flows will be detained on the building roof by installing parabolic weirs, (Watts Drainage Adjustable Flow Control for Roof Drains, or equivalent approved product), and ICD’s.

Table 1: Allowable Release Rate Breakdown

| ID | Description | Flows | |
|-------|--------------------------------------|-----------------|------------------|
| | | 5-Year Event | 100-Year Event |
| | Allowable Release Rate (Section 3.2) | 87.3 L/s | 87.3 L/s |
| 1.2.1 | Uncontrolled overland surface flow | 20.4 L/s | 40.2 L/s |
| 1.2.2 | Net-allowable release rate | 66.9 L/s | 47.1 L/s* |

* Note: Must be controlled to net-allowable 100-year.

To meet the net-allowable release rate for storm sewers, post-development flows will be controlled on the building’s roof, in the new parking lot at the West side of the property, and in the South parking lot. The total resulting peak controlled flow is **47.1 L/s** for both the **5-year and 100-year**. which is equal to the net-allowable release rate.



Table 2: Controlled Flow Breakdown

| ID | Description | Controlled Flows | Head (m) | Surface Storage (m ³) | | | Available Storage (m ³) |
|-------|---|------------------|-------------|-----------------------------------|----------------------|---------------------|-------------------------------------|
| | | | | 5-Year Requirement | 100-Year Requirement | 100+20% Requirement | |
| | Net-allowable controlled release rate (Table 1) | 47.3 L/s | | | | | |
| 1.3.2 | Building Roof | 8.8 L/s | 0.15 | 51 | 119 | 150 | 135 |
| 1.3.3 | West Side Parking Lot | 20.0 L/s | 1.82 | 21 | 60 | 79 | 79 |
| 1.3.4 | Rear Parking Lot | 18.3 L/s | 1.08 | 13 | 37 | 48 | 53 |

Refer to [Appendix B](#) for full calculation.

Note: 9.15 L/s is being used to determine storage requirements for the Rear Parking Lot area to compensate for less than maximum head over the ICD over the course of a storm event.

The building roof storage requirements were calculated to be 119m³ for the 100-year storm event and 51m³ for the 5-year storm event. Parabolic weirs (Watts Drainage Adjustable Accutrol Weir for Roof Drains, or equivalent approved product to be confirmed by building mechanical) will be installed at each roof drain, limiting the flow of each restrictor to 0.31 L/s. Scuppers will be supplied on the building roof at 150mm above the roof drain elevation. For 28 roof drains, the total release rate from the building roof will be a maximum of 8.8 L/s. Details relating to the roof drains can be found in [Appendix G](#).

Flow will be restricted at CB1 using an ICD size 84mm. This ICD was sized to provide the restricted 20 L/s of flow through the orifice, at the maximum design head for the surface storage for the 100 year +20% design storm. The maximum ponding depth in the parking lot is up to 340mm which is in accordance with the City of Ottawa requirements. In the event the capacity of this system is exceeded, emergency runoff will overflow onto Carrière Street from the northwest parking lot entrance.

Additional storage will be required for the rear parking lot. Flow is restricted through the rear parking lot storm sewer using an ICD of 90mm at STMH01. This ICD was sized using the upstream obvert of the oversized 1050mm pipe to ensure that sufficient storage within the pipe is provided for the restricted release rate of 18.3 L/s. The 1050mm storm sewer from CBMH01 to STMH-1 allows for the 41m³ of storage required for the rear parking lot. There will be no surface ponding in the rear parking lot for all storms up to and including the 100 design storm, and the oversized pipe was sized to ensure sufficient storage volume to capture the excess runoff from the 100 design storm. There will be surface ponding during the 100+20% design storm, maximum ponding depth in the rear parking lot will be 120mm which is in accordance with the City of Ottawa requirements. The available storage within the rear parking lot is 12m³ and the required surface storage during the 100+20% is 7m³ meaning all storage requirements are met. Refer to [Appendix B](#) for storage calculations.

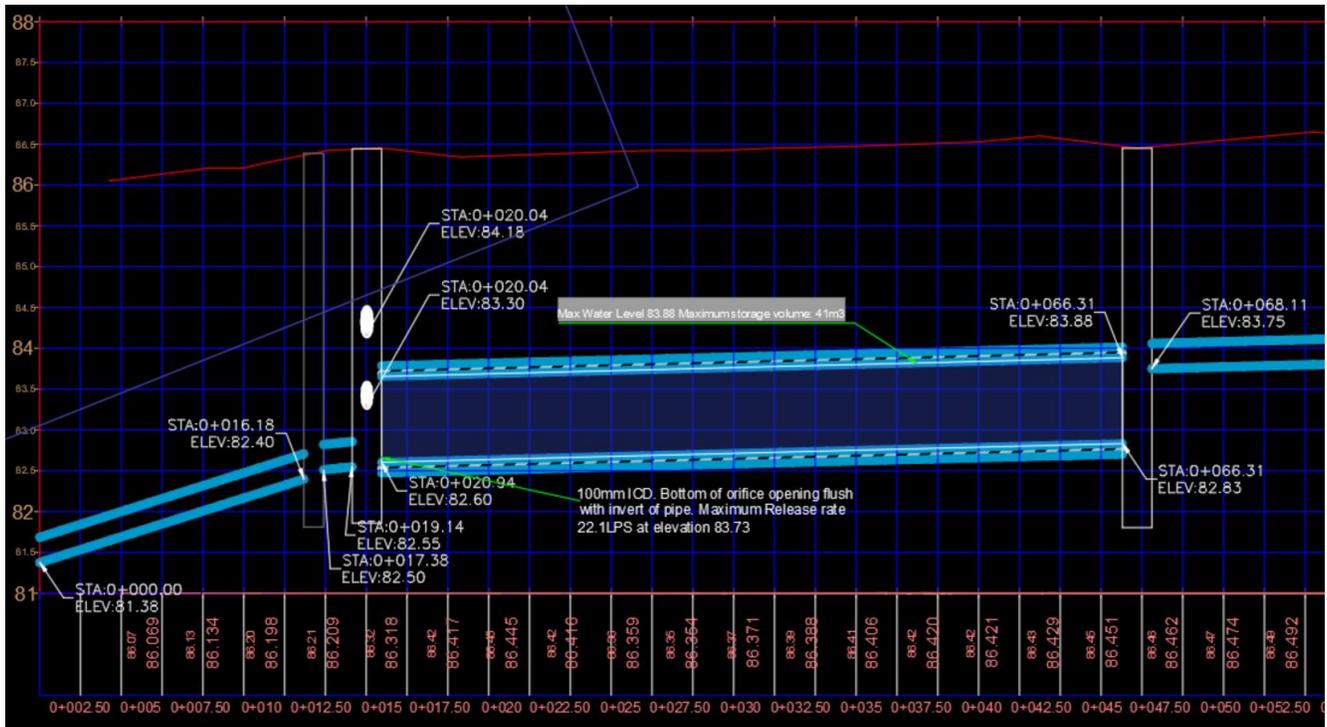


Figure 1: Oversized Storage Pipe Details

4 Sanitary Servicing

A new **200mm** sanitary sewer service will connect to the existing **250mm** sanitary sewer located on the north side of Carrière Street in the City right of way. A new sanitary manhole will be installed on site connecting the building sanitary service to the existing sanitary sewer in the right of way. The new sanitary sewer servicing the building will be installed at a **2.00%** slope conveying sanitary flow from the building to the proposed on site **SAMH-01**, and to the to the existing sanitary sewer on Carrière Street. Refer to drawing **C1 – Site Servicing Plan**.

Peak sanitary flow for the site is calculated to be **0.67 l/s**. The new **200mm** sanitary sewers at minimum **2.00%** slope will have a full flow capacity of **46.4 l/s**.

5 Water

A **150mm** ductile iron watermain exists along Carriere Street. A new **150mm** pvc watermain is proposed to be connected to the existing **150mm** watermain on Carriere Street to supply the building with the required demand.

5.1 Domestic Water Demand

The water demand for the new development is calculated based on Table 4.2 of the *City of Ottawa Design Guidelines for Water Distribution*.

Design Criteria:

- Average daily demand = 28,000 l/gross ha/day
- Gross Hectares = 0.82ha
- Maximum Day Factor = 1.5
- Maximum Hour Factor = 1.8



Average Daily Demand: $\frac{28,000 \text{ l/gross ha/day} \times 0.82\text{ha}}{24 \text{ hrs/day} \times 3600 \text{ s/hr}} = 0.27 \text{ l/s}$

Maximum Daily Demand: $0.27 \text{ l/s} \times 1.5 = 0.41 \text{ l/s}$

Maximum Hour Demand: $0.41 \text{ l/s} \times 1.8 = 0.74 \text{ l/s}$

A new water service will be located at a minimum of **2.4m** below grade for adequate frost protection. This new water service will be connected to the existing **150mm** municipal watermain located on the south side of Carrière Street in the City right of way. A new valve box will be installed at the property line.

5.2 Fire Flow Demand

There are (2) fire hydrants along the frontage of the property which will provide fire protection to the site. The new building will be equipped with an automatic sprinkler system. Based on the Fire Underwriters Survey Method, the fire flow demand for the new building is calculated to be:

Fire Flow Demand: **116.7 l/s** (Refer to Appendix B – Fire Flow Calculations).

The existing 2 fire hydrants on the frontage of the property are both Class AA fire hydrants, within 75m to the exposed building. The total contribution from these fire hydrants is a maximum of 190 l/s, meeting the site's 116.7 l/s requirement based on Table 1 of *Appendix I Ottawa Design Guidelines – Water Distribution*, to be confirmed by boundary conditions upon receipt.

End of Site Servicing and Stormwater Management Report.

Please contact the undersigned should you require any clarification.

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Appendix A - Drawings and Figures

DEMOLITION NOTES

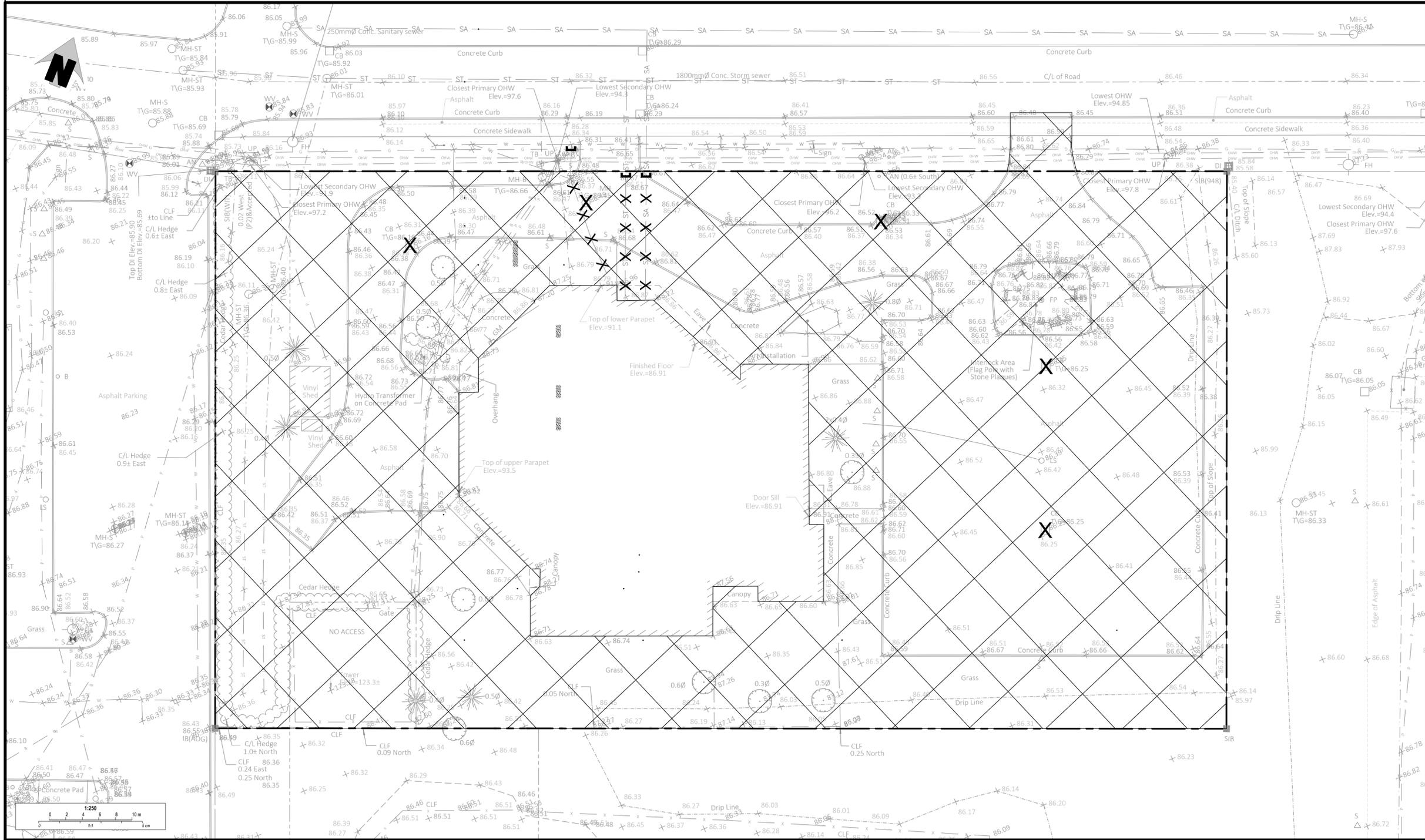
- DEMOLISH AND REMOVE EXISTING ASPHALT, GRANULAR BASE, GRANULAR SUB-BASE, CONCRETE CURBS, WALKWAYS. REFER TO ARCHITECTURAL FOR ADDITIONAL DEMOLITION NOTES.
- DEMOLISH AND REMOVE EXISTING CATCHBASIN/MANHOLES.
- DEMOLISH AND REMOVE EXISTING STORM AND SANITARY SEWER LINES FROM BUILDING TO PROPERTY LINE AND CAP AT PROPERTY LINE. EXISTING LOCATION OF STORM AND SANITARY SHOWN IS APPROXIMATE AND TO BE FIELD CONFIRMED BEFORE DEMOLITION.
- DEMOLISH AND REMOVE EXISTING WATERMAIN FROM BUILDING TO PROPERTY LINE. WATER SERVICE TO BE 'BLANKETED' AT MUNICIPAL WATERMAIN IN ACCORDANCE WITH CITY OF OTTAWA REQUIREMENTS. REFER TO C1 DRAWING.
- REFER TO ARCHITECTURAL, MECHANICAL, ELECTRICAL FOR OTHER SITE SERVICES NOT INCLUDED IN CIVIL DEMOLITION DRAWING.
- REMOVE EXISTING EASTERN ENTRANCE INCLUDING DEPRESSED CURB, CONCRETE SIDEWALK, AND ASPHALT (BOULEVARD AND ENTRANCE).

REMOVALS LEGEND

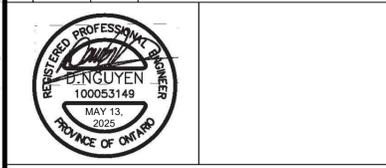
- PROPERTY LINE
- ▨ EXISTING BUILDING
- ▣ REMOVALS INCLUDE ASPHALT, CONCRETE, CONCRETE CURB
- ✕ SA ✕ EXISTING SANITARY SEWER REMOVAL
- ✕ ST ✕ EXISTING STORM SEWER REMOVAL
- ✕ W ✕ EXISTING WATERMAIN REMOVAL
- ✕ ✕ EXISTING CATCHBASIN / MANHOLE REMOVAL

THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWING, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED BEFORE STARTING WORK. THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

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| No. | YYYY-MM-DD | Eng./Drt. | Revision Comments |
|-----|------------|-----------|------------------------------------|
| 2 | 2025-05-13 | DN / WV | SUBMISSION POUR CONTROL DU SITE R3 |
| 2 | 2025-04-10 | DN / LA | ISSUED FOR CONSTRUCTION - SI #001 |
| 1 | 2025-02-12 | DN / RW | ISSUED FOR ADDENDUM 1 |



MIFO
6600 CARRIÈRE STREET,
OTTAWA, ONTARIO
DEMOLITION PLAN



| | |
|-----------------|---------------------------|
| Designed by: ZB | Project No.: 21-5089A |
| Drafted by: ZB | Revision Date: 2025-04-10 |
| Checked by: DN | Approved by: DN |
| Scale: 1:250 | Revision No.: 02 |
| | 21-5089A |

CO

GENERAL NOTES

- DESIGN AND CONSTRUCTION IS TO BE IN ACCORDANCE WITH MOST RECENT ONTARIO BUILDING CODE.
- THE CONTRACTOR IS RESPONSIBLE FOR CHECKING AND VERIFYING ALL DIMENSIONS WITH RESPECT TO SITE CONDITIONS AND ALL MATERIALS TO THE PROJECT. ANY DISCREPANCY SHALL BE REPORTED TO THE ENGINEER.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL MATERIAL RELEVANT TO THE PROJECT.
- ADDITIONAL DRAWINGS MAY BE ISSUED FOR CLARIFICATION TO ASSIST PROPER EXECUTION OF WORK. SUCH DRAWINGS WILL HAVE THE SAME MEANING AND INTENT AS IF THEY WERE INCLUDED WITH THE CONTRACT DOCUMENTS.
- DO NOT SCALE DRAWINGS.
- CONTRACTOR MUST COMPLY WITH LOCAL BY-LAWS, CANADIAN CONSTRUCTION SAFETY CODE AND ALL REGULATIONS SET BY AUTHORITIES HAVING JURISDICTION. IN CASE OF CONFLICT OR DISCREPANCY, THE MORE STRINGENT REQUIREMENTS SHALL APPLY.
- CONTRACTOR RESPONSIBLE FOR OBTAINING ALL REQUIRED UTILITY LOCATES, INSPECTIONS, PERMITS, AND APPROVALS, INCLUDING ALL ASSOCIATED COSTS. LOCATION OF EXISTING UTILITIES ARE APPROXIMATE ONLY AND BASED ON BEST AVAILABLE INFORMATION.
- EXISTING INFRASTRUCTURE INFORMATION IS IN REFERENCE TO TOPOGRAPHICAL SURVEY COMPLETED BY ANNIS, O'SULLIVAN, VOLLEBEK LTD. ON JANUARY 6, 2020 AND INFORMATION FROM GEOOTTAWA.

DRAWING NOTES

- SUPPLY AND INSTALL NEW 3.0m LONG 150mmØ PERFORATED SUB-DRAINS WRAPPED IN GEOTEXTILE SOCK. EXTEND FROM ASSOCIATED STORM SEWER STRUCTURE AT PAVEMENT SUB-GRADE LEVEL AND PROVIDE WATERTIGHT CONNECTION.
- SUBDRAINS SHOULD BE INSTALLED ON THE SIDES OF THE ACCESS ROAD AND PARKING AREA. SEE GEOTECHNICAL NOTES AND REFER TO GEOTECHNICAL REPORT.
- CONNECT WATER, STORM AND SANITARY SERVICES TO BUILDING INTERIOR 1.0m FROM BUILDING FOUNDATION. REFER TO MECHANICAL PLANS.
- BREAK IN AND CONNECT TO EXISTING SANITARY AND PROVIDE WATERTIGHT CONNECTION. APPROXIMATE INVERT ELEVATION OF EXISTING SEWER: 83.43m; TO BE CONFIRMED BY CONTRACTOR PRIOR TO CONSTRUCTION. CONNECTION SHALL BE MADE WITH CORE DRILLING. CONNECTION TO BE CONSTRUCTED AS PER CITY OF OTTAWA DETAIL S11
- BREAK IN AND CONNECT TO EXISTING STORM SEWER AND PROVIDE WATERTIGHT CONNECTION. APPROXIMATE INVERT ELEVATION OF EXISTING SEWER: 81.38m; TO BE CONFIRMED BY CONTRACTOR. CONNECTION SHALL BE MADE WITH CORE DRILLING CONNECTION TO BE CONSTRUCTED AS PER CITY OF OTTAWA DETAIL S11
- EXISTING STORM, SANITARY AND WATER SERVICES CONNECTING TO THE EXISTING BUILDING TO BE CAPPED AT MAIN LINE, TO COORDINATE WITH THE CITY OF OTTAWA AND DRINKING WATER SERVICES.
- SUPPLY AND INSTALL NEW OIL GRIT SEPARATOR UNIT (OGS01) MINIMUM 80% TSS REMOVAL, STORMCEPT EF04 OR APPROVED EQUAL. CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR APPROVAL

DRAWING NOTES CONT.D

- CONNECT NEW 150mmØ x 75.0m LENGTH WATER SERVICE TO EXISTING WATERMAIN AND PROVIDE WATERTIGHT CONNECTION. APPROX. TOP OF WATERMAIN ELEVATION: 83.74m; TO BE CONFIRMED BY CONTRACTOR PRIOR TO CONSTRUCTION. CONTRACTOR TO OBTAIN ALL NECESSARY APPROVALS AND PERMITS REQUIRED. CONNECTION TO EXISTING WATERMAIN IS TO BE VIA THE USE OF AN APPROVED PRE-MANUFACTURED TEE.
- INSTALL NEW DROP STRUCTURE PER OPSD 1003.020.
- SUPPLY AND INSTALL NEW INLET CONTROL DEVICE FLOW REGULATOR AT CATCHBASIN CB-1 OUTLET. MAXIMUM DISCHARGE 20 L/s AT 1.67m HEAD AND ORIFICE DIAMETER AT 85mm. TOP OF CB-1 COVER TO BE 50mm ABOVE FINISHED GRADE.
- UNDERGROUND GEOTHERMAL SYSTEM. REFER TO MECHANICAL.
- CONNECT TRENCH DRAIN TO STORM SEWER.
- INSTALL HEAVY DUTY PRECAST TRENCH DRAIN COMPLETE WITH COVER, 200mm WIDE AND 2.5m LONG WITH HOT DIPPED GALVANIZED FINISH.
- SUPPLY AND INSTALL NEW INLET CONTROL DEVICE FLOW REGULATOR AT STORM MANHOLE: STMH-01 INLET. BOTTOM OF ORIFICE TO BE FLUSH WITH OUTLET OF 1050mm PIPE INVERT. MAXIMUM DISCHARGE 18.3 l/s AT 1.08m HEAD AND ORIFICE DIAMETER AT 91mm.
- INSTALL STORM AND SANITARY SEWER BACKFLOW PREVENTER INSIDE BUILDING PER APPROVED CITY OF OTTAWA PRODUCTS.
- LIGHT STANDARD DISTRIBUTION, REFER TO ELECTRICAL (TYPICAL).
- PERFORATED DRAIN TO BE CONNECTED TO STORM NETWORK
- INSTALL WATERMAIN CROSSING OVER PROPOSED STORM SEWER AS PER CITY OF OTTAWA DETAIL W25.2. ENSURE 0.5m SPACING BETWEEN STORM SEWER AND WATERMAIN. PROVIDE AND INSTALL HI-40 INSULATION AS PER CITY OF OTTAWA DETAIL W22.

Storm Sewer Structure Table

| Manhole No. | Structure OPSD | Top of Frame | Pipe Invert Elevation |
|-------------|------------------|--------------|---|
| CBMH-03 | 1200mm Conc. Ø | 86.55 | IN 84.05 OUT 83.99 |
| CBMH-02 | 1200mm Conc. Ø | 86.48 | IN 83.87 OUT 83.86 |
| CBMH-01 | 1,800mmØ Manhole | 86.45 | IN 83.75 OUT 82.84 |
| STMH-01 | 1,800mmØ Manhole | 86.45 | IN 82.60 IN 84.26 IN 83.30 OUT 82.57 |
| OGS01 | 1200mm Conc. Ø | 86.39 | IN 82.50 OUT 82.44 |
| CB-01 | 1200mm Conc. Ø | 85.97 | OUT 84.52 |
| TD1 | PREFAB | 85.78 | OUT 84.71 |

Sanitary Sewer Structure Table

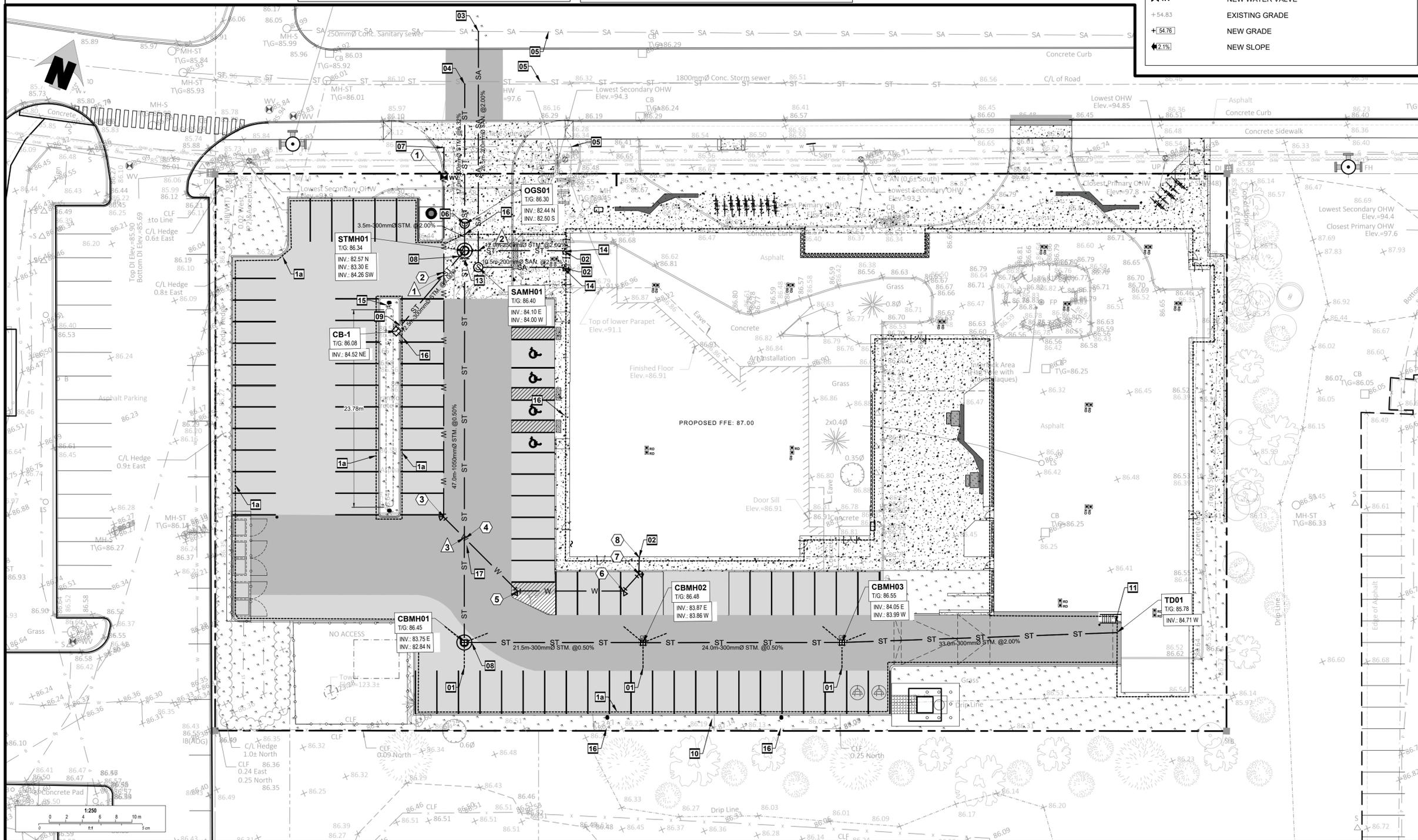
| Manhole No. | Structure OPSD | Top of Frame | Pipe Invert Elevation |
|-------------|-----------------|--------------|-----------------------|
| SAMH - 01 | 1200mmØ Conc. Ø | 86.48 | IN 84.10 OUT 84.00 |

LEGEND

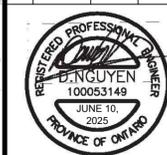
- PROPERTY LINE
- EXISTING BUILDING
- SA --- EXISTING SANITARY SEWER
- ST --- EXISTING STORM SEWER
- W --- EXISTING WATERMAIN
- SA --- NEW SANITARY SEWER
- ST --- NEW STORM SEWER
- W --- NEW WATERMAIN
- NEW LIGHT DUTY ASPHALT
- NEW HEAVY DUTY ASPHALT
- NEW CONCRETE SIDEWALK
- NEW GRASS
- EX-CB EXISTING CATCHBASIN
- EX-CBMH EXISTING CATCHBASIN MANHOLE
- CB-# NEW CATCHBASIN
- CBMH-# NEW CATCHBASIN MANHOLE
- SAMH-# NEW SANITARY MANHOLE
- STMH-# NEW STORM MANHOLE
- WV NEW WATER VALVE
- +54.83 EXISTING GRADE
- +54.76 NEW GRADE
- 2.1% NEW SLOPE

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| No. | YYYY-MM-DD | Eng./Drt. | Revision Comments |
|-----|------------|-----------|------------------------------------|
| 12 | 2025-06-10 | DN / WV | SOUMISSION POUR CONTROL DU SITE R4 |
| 11 | 2025-05-16 | DN / WV | SOUMISSION POUR CONTROL DU SITE R3 |
| 10 | 2025-04-10 | DN / LA | ISSUED FOR CONSTRUCTION - SI #001 |
| 9 | 2025-03-25 | DN / WV | SOUMISSION POUR CONTROL DU SITE R2 |
| 8 | 2025-01-13 | DN / ZB | ISSUED FOR TENDER |
| 7 | 2024-12-20 | DN / ZB | 100% SOUMISSION R2 |
| 6 | 2022-12-09 | DN / ZB | SOUMISSION POUR CONTROL DU SITE |
| 5 | 2022-10-28 | DN / DS | 100% SOUMISSION R1 |
| 4 | 2022-09-30 | DN / DS | 100% SOUMISSION |
| 3 | 2022-09-02 | DN / DS | 99% SOUMISSION |
| 2 | 2022-06-17 | DN / DS | 60% SOUMISSION |
| 1 | 2022-03-04 | DN / RW | PRELIMINAIRE 30% |



MIFO
6600 CARRIÈRE STREET,
OTTAWA, ONTARIO
SITE SERVICING PLAN



12 INTERNATIONAL DRIVE, PEMBROKE, ON
Phone: (613)735-2507, Fax: (613)735-4513
1150 MORRISON DRIVE, SUITE 410, OTTAWA, ON
Phone: (613)828-7800, Fax: (613)828-2600

| | |
|-----------------|----------------------------|
| Designed by: WV | Project No. : 21-5089A |
| Drafted by: WV | Revision Date : 2025-04-10 |
| Checked by: DN | Approved by: DN |
| Scale : 1:250 | Revision No. : 10 |
| | 21-5089A |

C1

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- ADDITIONAL DRAWINGS MAY BE ISSUED FOR CLARIFICATION TO ASSIST PROPER EXECUTION OF WORK. SUCH DRAWINGS WILL HAVE THE SAME MEANING AND INTENT AS IF THEY WERE INCLUDED WITH THE CONTRACT DOCUMENTS.
- DO NOT SCALE DRAWINGS.
- CONTRACTOR MUST COMPLY WITH LOCAL BY-LAWS, CANADIAN CONSTRUCTION SAFETY CODE AND ALL REGULATIONS SET BY AUTHORITIES HAVING JURISDICTION. IN CASE OF CONFLICT OR DISCREPANCY, THE MORE STRINGENT REQUIREMENTS SHALL APPLY.
- CONTRACTOR RESPONSIBLE FOR OBTAINING ALL REQUIRED UTILITY LOCATES, INSPECTIONS, PERMITS, AND APPROVALS, INCLUDING ALL ASSOCIATED COSTS. LOCATION OF EXISTING UTILITIES ARE APPROXIMATE ONLY AND BASED ON BEST AVAILABLE INFORMATION.
- EXISTING INFRASTRUCTURE INFORMATION IS IN REFERENCE TO TOPOGRAPHICAL SURVEY COMPLETED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD. ON JANUARY 6, 2020 AND INFORMATION FROM GEOOTTAWA.

DRAWING NOTES

- INSTALL SILT FENCE IN ACCORDANCE WITH OPSD 219.130 AND PROVIDE SNOW FENCE AROUND EXISTING TREES (REFER TO LANDSCAPE PLAN).
- MATCH EXISTING GRADES AT PROPERTY LINE AND LIMITS OF WORK.
- PROTECT EXISTING ASPHALT AND CONCRETE WALKWAYS DURING CONSTRUCTION.
- CONTRACTOR TO PROTECT EXISTING STRUCTURES DURING CONSTRUCTION.
- TOP OF CB1 TO BE 50mm ABOVE FINISHED GRADE.
- NEW BIOSWALE DETAIL PER LANDSCAPE.
- REMOVE PORTION OF EXISTING SIDEWALK. CONSTRUCT DEPRESSED ENTRANCE AS PER CITY OF OTTAWA STANDARD DETAIL SC7.1 AND SC2. MATCH EXISTING SIDEWALK AT LIMITS OF WORK.
- REINSTATE TRENCH ROAD CUT PER CITY OF OTTAWA STANDARD DETAIL R10. REINSTATEMENT TO BE TO THE SATISFACTION OF THE CITY OF OTTAWA. KEY INTO EXISTING ASPHALT PER DETAIL 5/C3.
- REINSTATE EXISTING CONCRETE BARRIER CURB AS PER CITY OF OTTAWA STANDARD DETAIL SC1.1. MATCH EXISTING ELEVATION
- REINSTATE DISTURBED GRASSED AREA. MATCH SURROUNDING GRADE.
- NEW CURB CUT

GEOTECHNICAL NOTES

- GEOTECHNICAL ENGINEER LICENSED IN THE PROVINCE OF ONTARIO SHALL INSPECT ALL SUBGRADE SURFACES FOR FOOTING AND PAVEMENT STRUCTURES PRIOR TO CONSTRUCTION.
- GEOTECHNICAL INVESTIGATION PROPOSED BUILDING EXPANSION, 6600 CARRIÈRE STREET PREPARED BY PATERSON GROUP INC., REPORT: PG3694-1 REV.2, DATED APRIL 29, 2025.

DRAWING NOTES CONT.

- NEW LIGHT DUTY ASPHALT AS PER DETAIL 1 ON SHEET C3
- NEW HEAVY DUTY ASPHALT AS PER DETAIL 2 ON SHEET C3
- REMOVE PORTION OF EXISTING SIDEWALK, CURB, AND ASPHALT BOULEVARD. REPLACE WITH NEW FULL HEIGHT CONCRETE CURB, ASPHALT GUTTER, AND CONCRETE SIDEWALK AS PER CITY OF OTTAWA DETAILS SC1, SC4, AND SC20.

EROSION AND SEDIMENT CONTROL NOTES

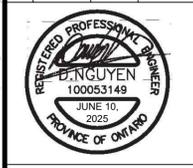
- THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATER COURSE. DURING CONSTRUCTION ACTIVITIES; THIS INCLUDES LIMITING THE AMOUNT OF EXPOSED SOIL, INSTALLING SILT FENCES AND OTHER EFFECTIVE SEDIMENT TRAPS, AND INSTALLING AND MAINTAINING MUD MATS FOR OUTGOING CONSTRUCTION TRAFFIC DURING CONSTRUCTION ACTIVITIES.
- PREVENT SOIL LOSS DURING CONSTRUCTION (BY STORM WATER RUNOFF OR WIND EROSION).
- PREVENT SEDIMENTATION OF STORM SEWERS AND RECEIVING STREAMS.
- PREVENT AIR POLLUTION FROM DUST AND PARTICULATE MATTER.
- INSTALL FILTER BAG INSERT IN ALL STORM MANHOLES AND CATCH BASINS IMPACTED DURING CONSTRUCTION, INCLUDING CATCH BASINS IN THE RIGHT OF WAY.
- SEDIMENT AND EROSION CONTROL MEASURES MAY BE MODIFIED IN THE FIELD AT THE DISCRETION OF THE TOWNSHIP OF NORTH DUNDAS INSPECTOR OR CONSERVATION AUTHORITY.
- STORM WATER PUMPED INTO CITY SERVICE SHALL FLOW THROUGH A FILTER SOCK.
- THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENTATION CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
- CONTRACTOR TO PROVIDE SNOW FENCE PROTECTION FOR EXISTING TREES AS PER THE LANDSCAPE DRAWINGS.

LEGEND

- PROPERTY LINE
- EXISTING BUILDING
- SA --- EXISTING SANITARY SEWER
- ST --- EXISTING STORM SEWER
- W --- EXISTING WATERMAIN
- SA --- NEW SANITARY SEWER
- ST --- NEW STORM SEWER
- W --- NEW WATERMAIN
- NEW LIGHT DUTY ASPHALT (DET1/C3)
- NEW HEAVY DUTY ASPHALT (DET2/C3)
- NEW CONCRETE SIDEWALK
- NEW GRASS
- EX-CB --- EXISTING CATCHBASIN
- EX-CBMH --- EXISTING CATCHBASIN MANHOLE
- CB-# --- NEW CATCHBASIN
- CBMH-# --- NEW CATCHBASIN MANHOLE
- SAMH-# --- NEW SANITARY MANHOLE
- STMH-# --- NEW STORM MANHOLE
- WV --- NEW WATER VALVE
- +54.76 --- EXISTING GRADE
- +54.76 --- NEW GRADE
- 2.1% --- NEW SLOPE
- OVERLAND FLOW ROUTE



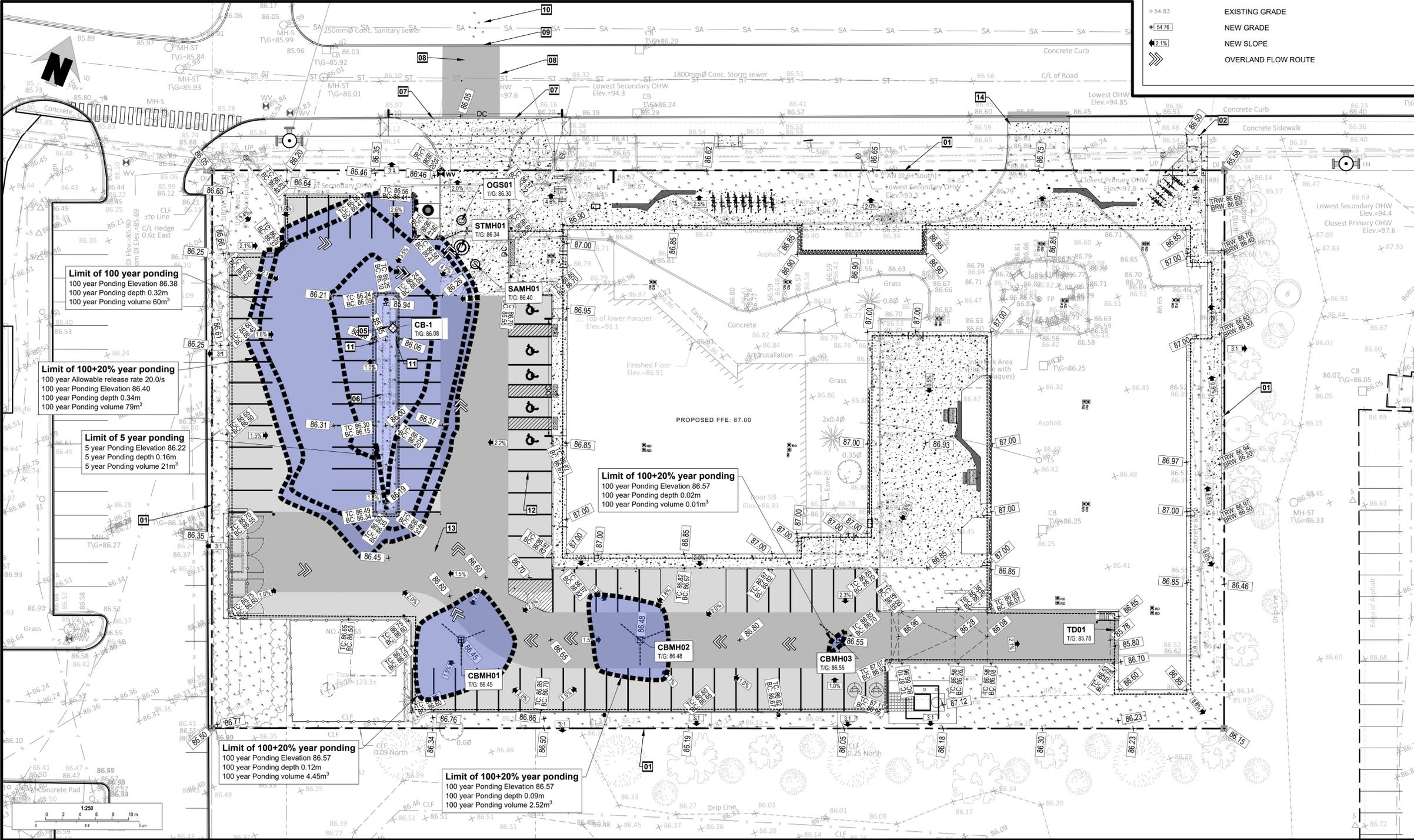
| No. | YYYY-MM-DD | Eng./Drt. | Revision Comments |
|-----|------------|-----------|------------------------------------|
| 12 | 2025-06-10 | DN / WV | SUBMISSION POUR CONTROL DU SITE R4 |
| 11 | 2025-05-16 | DN / WV | SUBMISSION POUR CONTROL DU SITE R3 |
| 10 | 2025-04-10 | DN / LA | ISSUED FOR CONSTRUCTION - SI #001 |
| 9 | 2025-03-25 | DN / WV | SUBMISSION POUR CONTROL DU SITE R2 |
| 8 | 2025-01-13 | DN / ZB | ISSUED FOR TENDER |
| 7 | 2024-12-20 | DN / ZB | 100% SOUMISSION R2 |
| 6 | 2022-12-09 | DN / ZB | SUBMISSION POUR CONTROL DU SITE |
| 5 | 2022-10-28 | DN / DS | 100% SOUMISSION R1 |
| 4 | 2022-09-30 | DN / DS | 100% SOUMISSION |
| 3 | 2022-09-02 | DN / DS | 99% SOUMISSION |
| 2 | 2022-06-17 | DN / DS | 60% SOUMISSION |
| 1 | 2022-03-04 | DN / RW | PRÉLIMINAIRE 30% |



MIFO
6600 CARRIÈRE STREET,
OTTAWA, ONTARIO
SITE GRADING AND DRAINAGE,
EROSION AND SEDIMENT
CONTROL PLAN

Jp2g Consultants Inc.
 ENGINEERS • PLANNERS • PROJECT MANAGERS
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|-----------------|----------------------------|
| Designed by: WV | Project No. : 21-5089A |
| Drafted by: WV | Revision Date : 2025-06-10 |
| Checked by: DN | Approved by: DN |
| Scale : 1:250 | Revision No. : 12 |
| | 21-5089A |



General Notes

- DRAWINGS TO BE READ IN CONJUNCTION WITH ARCHITECTURAL AND LANDSCAPE DRAWINGS
- ALL SERVICES, MATERIALS, CONSTRUCTION METHODS AND INSTALLATIONS SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND REGULATIONS OF THE CITY OF OTTAWA STANDARD SPECIFICATIONS AND DRAWINGS, ONTARIO PROVINCIAL SPECIFICATION STANDARD SPECIFICATION (OPSS) AND ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD), UNLESS OTHERWISE SPECIFIED, TO THE SATISFACTION OF THE CITY AND THE CONSULTANT
- THE POSITION OF EXISTING POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND ABOVEGROUND UTILITIES, STRUCTURES AND APPURTENANCES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWING, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL SATISFY HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM DURING THE COURSE OF CONSTRUCTION. ANY RELOCATION OF EXISTING UTILITIES REQUIRED BY THE DEVELOPMENT OF SUBJECT LANDS IS TO BE UNDERTAKEN AT CONTRACTOR'S EXPENSE.
- THE CONTRACTOR MUST NOTIFY ALL EXISTING UTILITY COMPANY OFFICIALS FIVE (5) BUSINESS DAYS PRIOR TO START OF CONSTRUCTION AND HAVE ALL EXISTING UTILITIES AND SERVICES LOCATED IN THE FIELD OR EXPOSED PRIOR TO THE START OF CONSTRUCTION, INCLUDING BUT NOT LIMITED TO POWER, COMMUNICATION AND GAS LINES.
- ALL TRENCHING AND EXCAVATIONS TO BE IN ACCORDANCE WITH THE LATEST REVISIONS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS AND AS PER THE RECOMMENDATIONS INCLUDED IN THE GEOTECHNICAL REPORT.
- REFER TO ARCHITECTS PLANS FOR BUILDING DIMENSIONS, LAYOUT AND REMOVALS. REFER TO LANDSCAPE PLAN FOR LANDSCAPED DETAILS AND OTHER RELEVANT INFORMATION. ALL INFORMATION SHALL BE CONFIRMED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
- TOPOGRAPHIC SURVEY COMPLETED AND PROVIDED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD. DATED ON JULY 31, 2018. CONTRACTOR TO VERIFY IN THE FIELD PRIOR TO CONSTRUCTION OF ANY WORK AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
- ALL ELEVATIONS ARE GEODETIC AND UTILIZE METRIC UNITS. VERIFY THAT JOB BENCHMARKS HAVE NOT BEEN ALTERED OR DISTURBED.
- ALL GROUND SURFACES SHALL BE EVENLY GRADED WITHOUT PONDING AREAS AND WITHOUT LOW POINTS EXCEPT WHERE APPROVED SWALE OR CATCH BASIN OUTLETS ARE PROVIDED.
- ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW CUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW PAVEMENT. PAVEMENT REINSTATEMENT SHALL BE WITH STEP JOINTS OF 500mm WIDTH MINIMUM.
- ALL DISTURBED AREAS OUTSIDE PROPOSED GRADING LIMITS TO BE RESTORED TO ORIGINAL ELEVATIONS AND CONDITIONS UNLESS OTHERWISE SPECIFIED. ALL RESTORATION SHALL BE COMPLETED WITH THE GEOTECHNICAL REQUIREMENTS FOR BACKFILL AND COMPACTION.
- ABUTTING PROPERTY GRADES TO BE MATCHED UNLESS OTHERWISE SHOWN.
- CONTRACTOR SHALL OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE MUNICIPAL AUTHORITIES PRIOR TO COMMENCING CONSTRUCTION, INCLUDING WATER PERMIT AND ROAD CUT PERMIT.
- MINIMIZE DISTURBANCE TO EXISTING VEGETATION DURING THE EXECUTION OF ALL WORKS.
- REMOVE FROM SITE ALL EXCESS EXCAVATED MATERIAL UNLESS OTHERWISE DIRECTED FROM THE ENGINEER. EXCAVATE AND REMOVE ALL ORGANIC MATERIAL AND DEBRIS LOCATED WITHIN THE PROPOSED BUILDING, PARKING AND ROADWAY LOCATIONS.
- AT PROPOSED UTILITY CONNECTION POINTS AND CROSSINGS (I.E. STORM SEWER, SANITARY SEWER, WATER, ETC.) THE CONTRACTOR SHALL DETERMINE THE PRECISE LOCATION AND DEPTH OF EXISTING UTILITIES AND REPORT ANY DISCREPANCIES OR CONFLICTS TO THE ENGINEER BEFORE COMMENCING WORK.
- CONTRACTOR TO OBTAIN POST-CONSTRUCTION TOPOGRAPHIC SURVEY, COMPLETED BY OLS OR P.ENG CONFIRMING COMPLIANCE WITH DESIGN GRADING AND SERVICING. SURVEY IS TO INCLUDE LOCATION AND INVERTS FOR BURIED UTILITIES.
- ABIDE BY RECOMMENDATIONS OF GEOTECHNICAL REPORT. REPORT ANY VARIATIONS IN OBSERVED CONDITIONS FROM THOSE INCLUDED IN REPORT.
- PROVIDE CCTV INSPECTION REPORT FOR ALL SEWERS AND CATCHBASIN LEADS 200mm DIAMETER AND LARGER. REPEAT CCTV INSPECTION FOLLOWING RECTIFICATION OF ANY DEFICIENCIES.

Notes: Sanitary Sewer and Manholes

- ALL SANITARY SEWER, SANITARY SEWER APPURTENANCES AND CONSTRUCTION METHODS SHALL CONFORM TO THE CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS. PROVIDE CCTV INSPECTION REPORTS FOR ALL NEW SANITARY PIPING. PROVIDE DYE TESTING FOR NEW SERVICES.
- SANITARY SEWER PIPE SIZE 150mm DIAMETER AND GREATER TO BE PVC SDR-35 (UNLESS SPECIFIED OTHERWISE) WITH RUBBER GASKET TYPE JOINTS IN CONFORMANCE WITH CSA B-182.2,3,4.
- SEWER BEDDING AS PER CITY OF OTTAWA DETAIL S6.
- ALL SANITARY MANHOLES 1200mm IN DIAMETER TO BE AS PER OPSD 701.01. FRAME AND COVER TO BE AS PER CITY OF OTTAWA STANDARD S25 AND S24.
- MAINTENANCE HOLE BENCHING AND PIPE OPENING ALTERNATIVES AS PER THE OPSD 701.021
- ANY SANITARY SEWER WITH LESS THAN 2.0m COVER REQUIRES THERMAL INSULATION AS PER CITY OF OTTAWA STANDARD W22, OR APPROVED BY THE ENGINEER.

Parking Lot and Work in Public Rights of Way

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

- PRIOR TO START OF CONSTRUCTION:
 - INSTALL SILT FENCE IN LOCATION SHOWN.
 - INSTALL FILTER FABRIC OR SILT SACK FILTERS IN ALL THE CATCHBASINS AND MANHOLES TO REMAIN DURING CONSTRUCTION WITHIN THE SITE (SEE TYPICAL DETAIL).
 - INSPECT MEASURES IMMEDIATELY AFTER INSTALLATION.
- DURING CONSTRUCTION:
 - MINIMIZE THE EXTENT OF DISTURBED AREAS AND THE DURATION OF EXPOSURE AND IMPACTS TO EXISTING GRADING.
 - 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.
 - PROTECT DISTURBED AREAS FROM OVERLAND FLOW BY PROVIDING TEMPORARY SWALES TO THE SATISFACTION OF THE FIELD ENGINEER. TIE-IN TEMPORARY SWALE TO EXISTING CBS AS REQUIRED.
 - PROVIDE TEMPORARY COVER SUCH AS SEEDING OR MULCHING IF DISTURBED AREA WILL NOT BE REHABILITATED WITHIN 30 DAYS
 - INSPECT SILT FENCES, FILTER FABRIC FILTERS AND CATCH BASIN SUMPS WEEKLY AND WITHIN 24 HOURS AFTER A STORM EVENT. CLEAN AND REPAIR WHEN NECESSARY.
 - DRAWING TO BE REVIEWED AND REVISED AS REQUIRED DURING CONSTRUCTION.
 - EROSION CONTROL FENCING TO BE ALSO INSTALLED AROUND THE BASE OF ALL STOCKPILES.
 - 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).
 - 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).
 - NO ALTERNATE METHODS OF EROSION PROTECTION SHALL BE PERMITTED UNLESS APPROVED BY THE FIELD ENGINEER.
 - CITY ROADWAY AND SIDEWALK TO BE CLEANED OF ALL SEDIMENT FROM VEHICULAR TRACKING AS REQUIRED.
 - DURING WET CONDITIONS, TIRES OF ALL VEHICLES/EQUIPMENT LEAVING THE SITE ARE TO BE SCRAPPED.
 - ANY MUD/MATERIAL TRACKED ONTO THE ROAD SHALL BE REMOVED IMMEDIATELY BY HAND OR RUBBER TIRE LOADER.
 - TAKE ALL NECESSARY STEPS TO PREVENT BUILDING MATERIAL, CONSTRUCTION DEBRIS OR WASTE BEING SPILLED OR TRACKED ONTO ADJACENT PROPERTIES OR PUBLIC STREETS DURING CONSTRUCTION AND PROCEED IMMEDIATELY TO CLEAN UP ANY AREAS SO AFFECTED.
 - 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.
 - 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.

Notes: Watermain

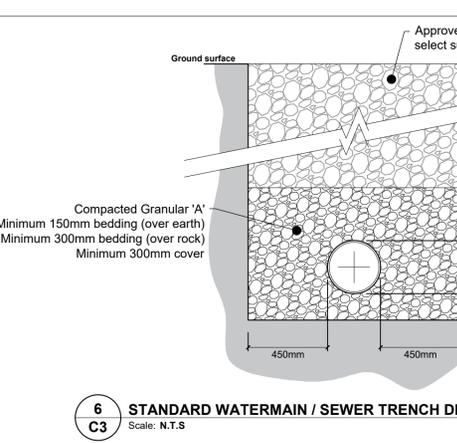
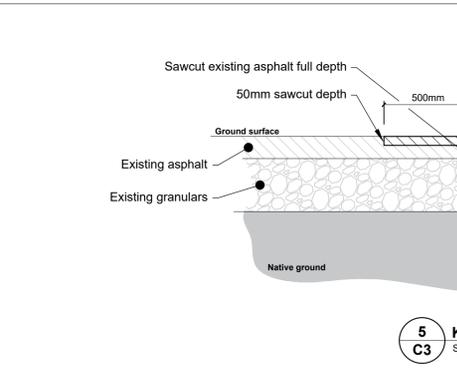
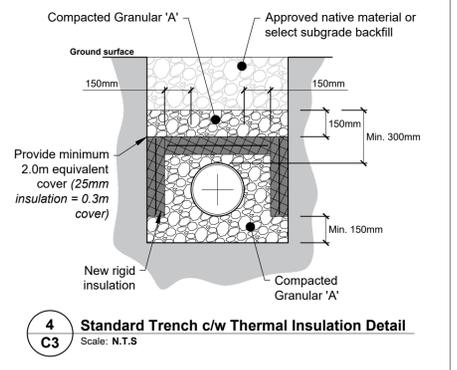
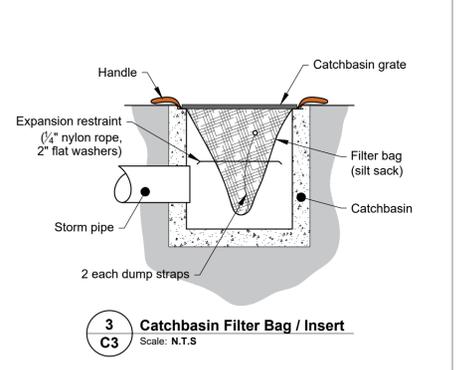
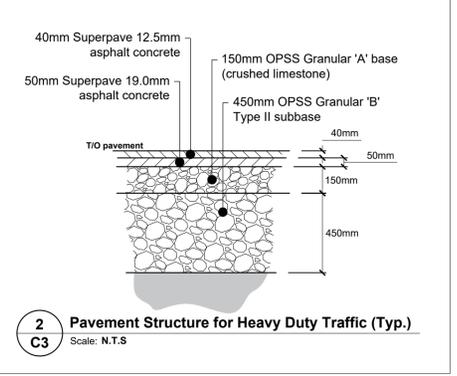
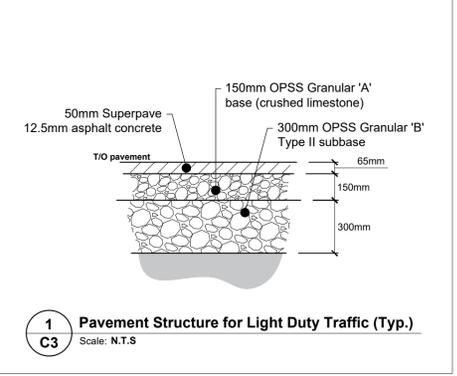
- ALL WATERMAIN AND WATERMAIN APPURTENANCES, MATERIALS, CONSTRUCTION AND TESTING METHODS SHALL CONFORM TO THE CURRENT CITY OF OTTAWA AND MINISTRY OF ENVIRONMENT STANDARDS AND SPECIFICATIONS.
- ALL WATERMAIN 300mm DIAMETER AND SMALLER TO BE POLY VINYL CHLORIDE (PVC) CLASS 150 DR 18 MEETING AWWA SPECIFICATION C900.
- ALL WATERMAIN TO BE INSTALLED AT MINIMUM COVER OF 2.4m BELOW FINISHED GRADE. WHERE WATERMANS CROSS OVER OTHER UTILITIES, A MINIMUM 0.30m CLEARANCE SHALL BE MAINTAINED; WHERE WATERMANS CROSS UNDER OTHER UTILITIES, A MINIMUM 0.50m CLEARANCE SHALL BE MAINTAINED. WHERE THE MINIMUM SEPARATION CANNOT BE ACHIEVED, THE WATERMAIN SHALL BE INSTALLED AS PER CITY OF OTTAWA STANDARDS W25 AND W25.2. WHERE 2.4m MINIMUM DEPTH CANNOT BE ACHIEVED, THERMAL INSULATION SHALL BE PROVIDED AS PER CITY OF OTTAWA STANDARD W22. WHERE A WATERMAIN IS IN CLOSE PROXIMITY TO AN OPEN STRUCTURE, THERMAL INSULATION SHALL BE PROVIDED AS PER CITY OF OTTAWA STANDARD W23.
- CONCRETE THRUST BLOCKS AND MECHANICAL RESTRAINTS ARE TO BE INSTALLED AT ALL TEES, BENDS, HYDRANTS, REDUCERS, ENDS OF MAINS AND CONNECTIONS 100mm AND LARGER, IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS W25.3 & W25.4.
- CATHODIC PROTECTION REQUIRED FOR ALL IRON FITTINGS AS PER CITY OF OTTAWA STANDARD W40 & W42.
- ALL VALVES AND VALVE BOXES AND CHAMBERS, HYDRANTS, AND HYDRANT VALVES AND ASSEMBLES SHALL BE INSTALLED AS PER CITY OF OTTAWA STANDARD
- FIRE HYDRANT LOCATION AND INSTALLATION AS PER CITY OF OTTAWA STANDARD W18 & W19. CONTRACTOR TO PROVIDE FLOW TEST AND PAINTING OF NEW HYDRANT IN ACCORDANCE WITH CITY STANDARDS.
- IF WATER MAIN MUST BE DEFLECTED TO MEET ALIGNMENT, ENSURE THAT THE AMOUNT OF DEFLECTION USED IS LESS THAN HALF THAT RECOMMENDED BY THE MANUFACTURER.

Parking Lot and Work in Public Rights of Way

- CONTRACTOR TO REINSTATE ROAD CUTS AS PER CITY OF OTTAWA DETAIL R10.
- CONTRACTOR TO PREPARE SUBGRADE, INCLUDING PROOFROLLING, TO THE SATISFACTION OF THE GEOTECHNICAL CONSULTANT PRIOR TO THE COMMENCEMENT OF PLACEMENT OF GRANULAR B MATERIAL.
- FILL TO BE PLACED AND COMPACTED PER THE GEOTECHNICAL REPORT REQUIREMENTS.
- CONTRACTOR TO SUPPLY, PLACE AND COMPACT GRANULAR B MATERIAL IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL CONSULTANT. CONTRACTOR TO PROVIDE CONSULTANT WITH SAMPLES OF GRANULAR B MATERIAL FOR TESTING AND CERTIFICATION FROM THE GEOTECHNICAL CONSULTANT THAT THE MATERIAL MEETS THE GRADATION REQUIREMENTS SPECIFIED IN THE GEOTECHNICAL REPORT.
- GRANULAR A MATERIAL TO BE PLACED ONLY UPON APPROVAL BY THE GEOTECHNICAL CONSULTANT OF GRANULAR B PLACEMENT.
- CONTRACTOR TO SUPPLY, PLACE AND COMPACT GRANULAR A MATERIAL IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL CONSULTANT. CONTRACTOR TO PROVIDE CONSULTANT WITH SAMPLES OF GRANULAR A MATERIAL FOR TESTING AND CERTIFICATION FROM THE GEOTECHNICAL CONSULTANT THAT THE MATERIAL MEETS THE GRADATION REQUIREMENTS SPECIFIED IN THE GEOTECHNICAL REPORT.
- ASPHALT MATERIAL TO BE PLACED ONLY UPON APPROVAL BY THE GEOTECHNICAL CONSULTANT OF GRANULAR A PLACEMENT.
- CONTRACTOR TO SUPPLY, PLACE AND COMPACT ASPHALT MATERIAL IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL CONSULTANT. CONTRACTOR TO PROVIDE CONSULTANT WITH SAMPLES OF ASPHALT MATERIAL FOR TESTING AND CERTIFICATION FROM THE GEOTECHNICAL CONSULTANT THAT THE MATERIAL MEETS THE REQUIREMENTS SPECIFIED IN THE GEOTECHNICAL REPORT.
- CONTRACTOR IS RESPONSIBLE FOR ESTABLISHING LINE AND GRADE IN ACCORDANCE WITH THE PLANS, AND FOR PROVIDING THE CONSULTANT WITH VERIFICATION PRIOR TO PLACEMENT.
- ALL EXCESS MATERIAL TO BE HAULED OFFSITE AND DISPOSED OF AT AN APPROVED DUMP SITE. SHOULD THE CONTRACTOR DISCOVER ANY HAZARDOUS MATERIAL, CONTRACTOR IS TO NOTIFY CONSULTANT. CONSULTANT TO DETERMINE APPROPRIATE DISPOSAL METHOD/LOCATION.
- PAVEMENT STRUCTURE (MATERIAL TYPES AND THICKNESS) FOR HEAVY DUTY, LIGHT DUTY AND BASKETBALL COURT AREAS TO BE AS SPECIFIED IN THE GEOTECHNICAL REPORT AND SHOWN ON THE PLANS.

Notes: Storm Sewer and Manholes

- ALL STORM SEWER MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO THE CURRENT CITY OF OTTAWA STANDARDS AND SPECIFICATIONS. PROVIDE CCTV INSPECTION REPORTS FOR ALL NEW STORM SEWERS, SERVICES AND CB LEADS.
- STORM SEWERS 450mm DIAMETER AND SMALLER SHALL BE PVC SDR-35, WITH RUBBER GASKET PER CSA A-257.3.
- STORM SEWER LARGER THAN 450mm SHALL BE REINFORCED CONCRETE CLASS 100.
- SEWER BEDDING AS PER CITY OF OTTAWA DETAIL S6.
- ALL STORM MANHOLES TO BE AS PER STORM STRUCTURE TABLE ON DRAWING C1.
- ANY NEW OR EXISTING STORM SEWER WITH LESS THAN 2.0m COVER REQUIRES THERMAL INSULATION AS PER CITY OF OTTAWA STANDARD W22, OR APPROVED BY THE ENGINEER. CB IN LANDSCAPE AREAS SHALL BE AS PER CITY OF OTTAWA STANDARD S29, S30 AND S31.
- ALL CATCHBASIN LEADS TO BE MINIMUM 200mm DIAMETER AT MINIMUM 1.0% SLOPE UNLESS OTHERWISE SPECIFIED.
- STORM CATCHBASINS AS PER OPSD 705.010 AND FRAME/COVER AS PER CITY STANDARD DRAWINGS S19. STORM CBMH'S AS INDICATED IN TABLE WITH SUMP, ADJUSTMENT SECTIONS SHALL BE AS PER OPSD 704.010.
- INSTALLATION OF FLOW CONTROL ICDS TO BE VERIFIED BY QUALITY VERIFICATION ENGINEER RETAINED BY CONTRACTOR.



| ID | DESCRIPTION | FINISHED GRADE (m) | T/O WATERMAIN (m) |
|----|---------------------|--------------------|-------------------|
| ① | VALVE | 86.20 | 83.75 |
| ② | STORM CROSSING | 86.25 | 83.86 |
| ③ | 45° HORIZONTAL BEND | 86.44 | 84.04 |
| ④ | STORM CROSSING | 86.51 | 84.48 |
| ⑤ | 45° HORIZONTAL BEND | 86.64 | 84.24 |
| ⑥ | 45° HORIZONTAL BEND | 86.68 | 84.28 |
| ⑦ | 45° HORIZONTAL BEND | 86.72 | 84.32 |
| ⑧ | BUILDING CONNECTION | 87.00 | 84.60 |

NOTE: PROVIDE MINIMUM 2.4m COVER OVER T/O WATERMAIN TO FINISHED GRADE, OTHERWISE PROVIDE THERMAL INSULATION HL40 AS PER CITY OF OTTAWA STANDARD DETAIL W22

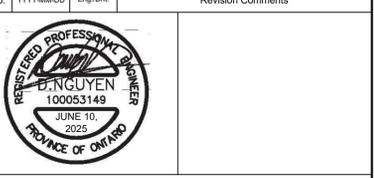
THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWING, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED BEFORE STARTING WORK. THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

DESIGN PROFESSIONAL'S SEAL OR SIGNATURE IS EFFECTIVE ONLY AS TO THAT VERSION OF THIS DOCUMENT AS ORIGINALLY PUBLISHED BY DESIGN PROFESSIONAL. DESIGN PROFESSIONAL IS NOT RESPONSIBLE FOR ANY SUBSEQUENT MODIFICATION, CORRUPTION, OR UNAUTHORIZED USE OF SUCH DOCUMENT. TO VERIFY THE VALIDITY OR APPLICABILITY OF THE SEAL OR SIGNATURE, CONTACT DESIGN PROFESSIONAL.



| No. | YYYY-MM-DD | Eng./Drt. | Revision | Comments |
|-----|------------|-----------|------------------------------------|----------|
| 12 | 2025-06-10 | DN / WV | SUBMISSION POUR CONTROL DU SITE R4 | |
| 11 | 2025-05-16 | DN / WV | SUBMISSION POUR CONTROL DU SITE R3 | |
| 10 | 2025-04-10 | DN / LA | ISSUED FOR CONSTRUCTION - SI #001 | |
| 9 | 2025-03-25 | DN / WV | SUBMISSION POUR CONTROL DU SITE R2 | |
| 8 | 2025-01-13 | DN / ZB | ISSUED FOR TENDER | |
| 7 | 2024-12-20 | DN / ZB | 100% SOUMISSION R2 | |
| 6 | 2022-12-09 | DN / ZB | SUBMISSION POUR CONTROL DU SITE | |
| 5 | 2022-10-28 | DN / DS | 100% SOUMISSION R1 | |
| 4 | 2022-09-30 | DN / DS | 100% SOUMISSION | |
| 3 | 2022-09-02 | DN / DS | 99% SOUMISSION | |
| 2 | 2022-06-17 | DN / DS | 60% SOUMISSION | |
| 1 | 2022-03-04 | DN / RW | PRELIMINAIRE 30% | |

| No. | YYYY-MM-DD | Eng./Drt. | Revision | Comments |
|-----|------------|-----------|------------------------------------|----------|
| 12 | 2025-06-10 | DN / WV | SUBMISSION POUR CONTROL DU SITE R4 | |
| 11 | 2025-05-16 | DN / WV | SUBMISSION POUR CONTROL DU SITE R3 | |
| 10 | 2025-04-10 | DN / LA | ISSUED FOR CONSTRUCTION - SI #001 | |
| 9 | 2025-03-25 | DN / WV | SUBMISSION POUR CONTROL DU SITE R2 | |
| 8 | 2025-01-13 | DN / ZB | ISSUED FOR TENDER | |
| 7 | 2024-12-20 | DN / ZB | 100% SOUMISSION R2 | |
| 6 | 2022-12-09 | DN / ZB | SUBMISSION POUR CONTROL DU SITE | |
| 5 | 2022-10-28 | DN / DS | 100% SOUMISSION R1 | |
| 4 | 2022-09-30 | DN / DS | 100% SOUMISSION | |
| 3 | 2022-09-02 | DN / DS | 99% SOUMISSION | |
| 2 | 2022-06-17 | DN / DS | 60% SOUMISSION | |
| 1 | 2022-03-04 | DN / RW | PRELIMINAIRE 30% | |

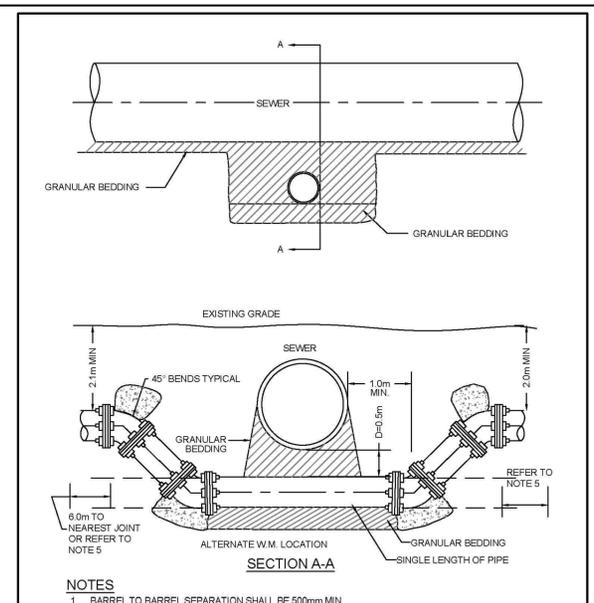
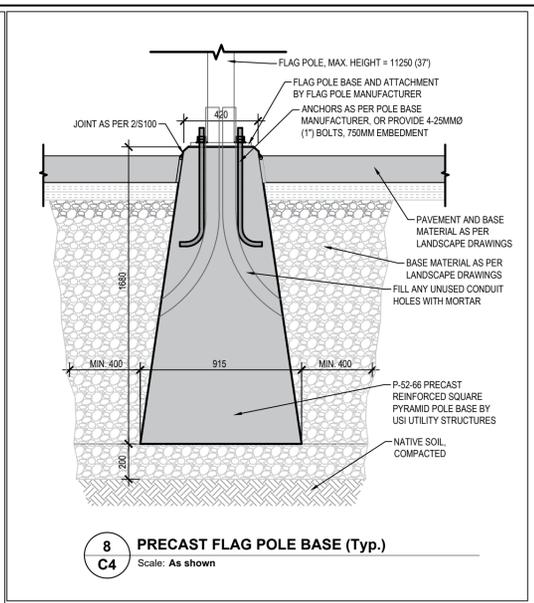
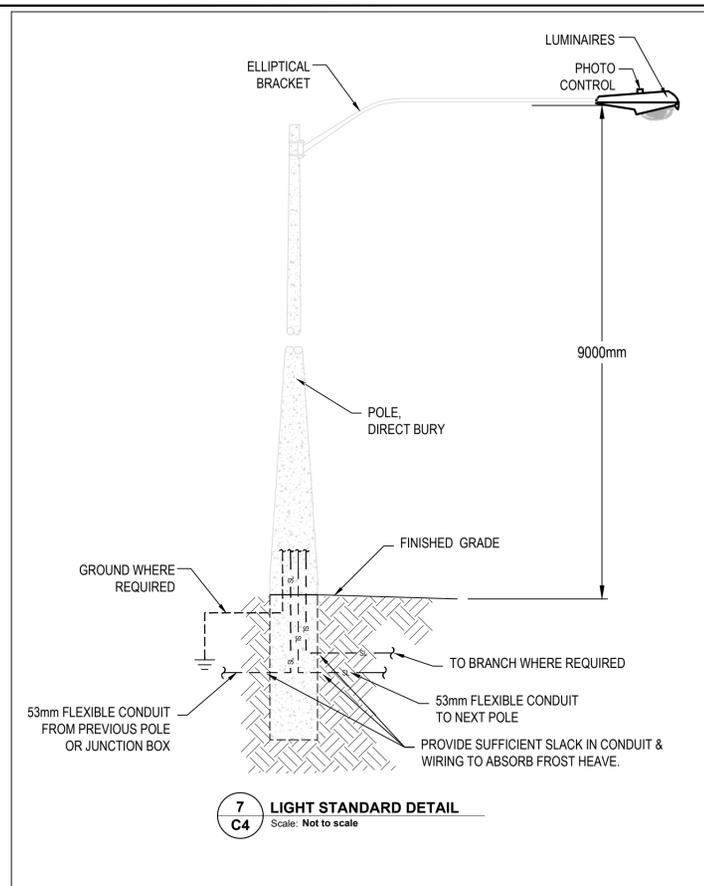


MIFO
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OTTAWA, ONTARIO
 ~
GENERAL NOTES
AND DETAILS I



| | |
|----------------------|-----------------------------------|
| Designed : WV | Project No. : 21-5089A |
| Drafted : WV | Revision Date : 2025-04-10 |
| Checked : DN | Approved : DN |
| Scale : 1:250 | 21-5089A |

C3



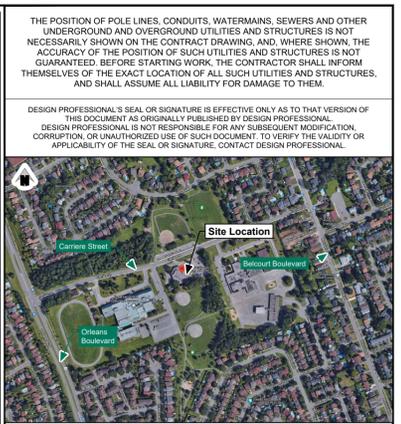
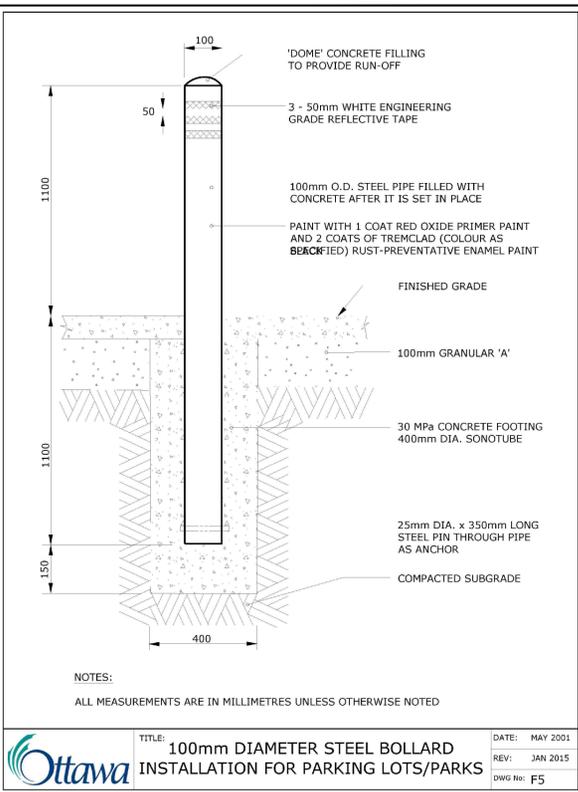
NOTES

1. BARREL TO BARREL SEPARATION SHALL BE 500mm MIN.
2. THRUST BLOCKS FOR MAINS LARGER THAN 400mm SHALL BE AS PER DESIGN.
3. FOR 300mm & 400mm MAINS, BENDS SHALL BE MAX. 22°.
4. CONCRETE SHALL BE 20Mpa.
5. RETAINING RINGS AND/OR THREADED RODS TO BE USED AT ALL JOINTS WHERE CONCRETE THRUST BLOCKS CAN'T BE UTILIZED AND WHERE COUPLING CONNECTIONS ARE MADE LESS THAN 8.0m FROM THE JOINT.
6. THIS STANDARD APPLIES TO WATERMINS 100mm TO 400mm (NOMINAL).

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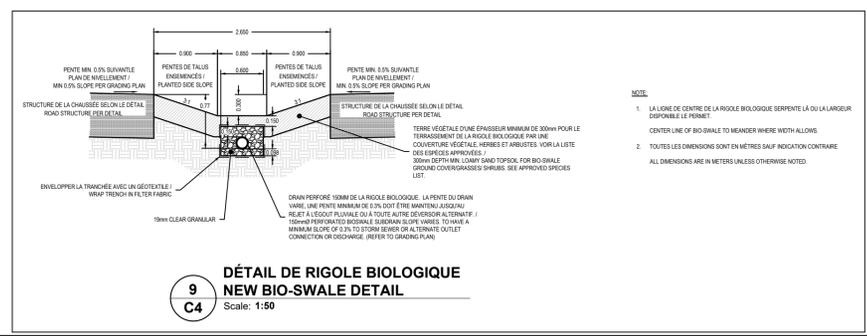
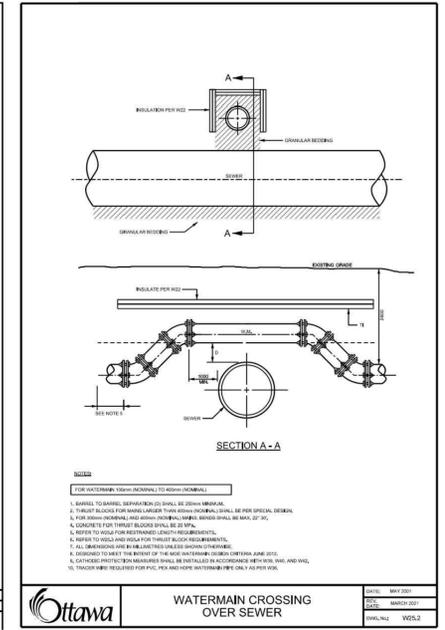
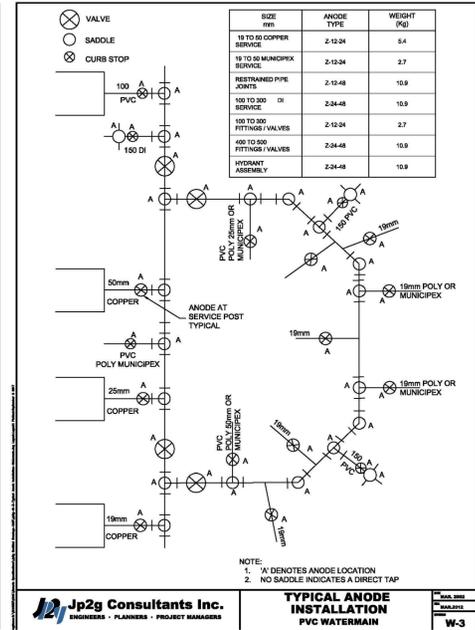
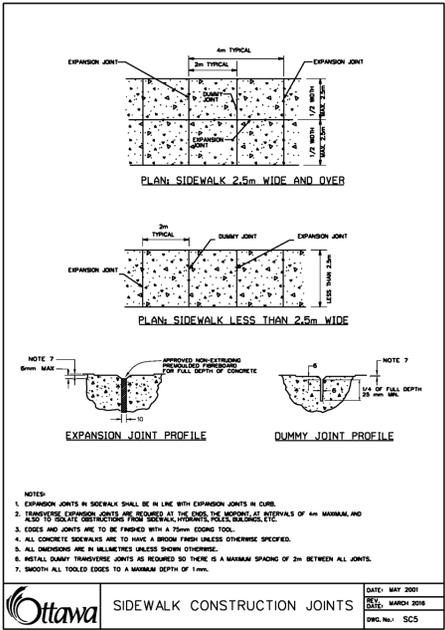
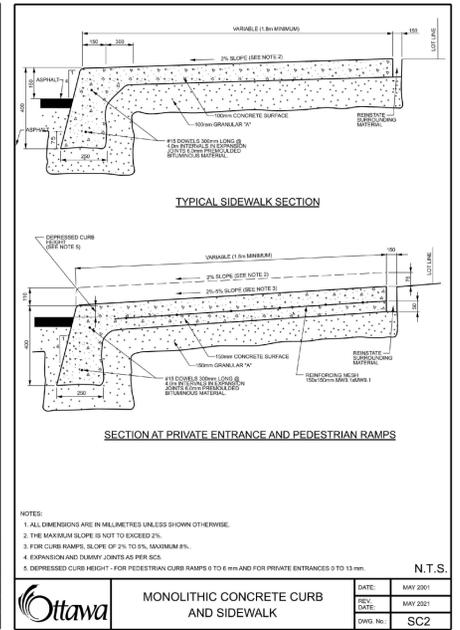
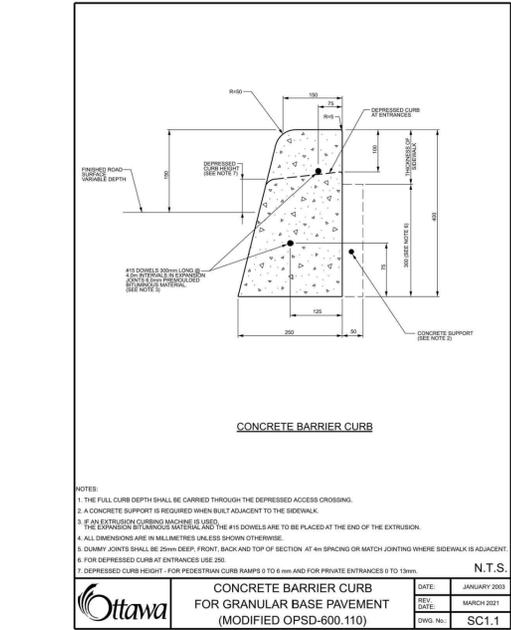
WATERMAIN CROSSING BELOW A SEWER

DATE: MAY 2001
REV: MARCH 2014
DWG No: W-2A



THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWING, AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED BEFORE STARTING WORK. THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

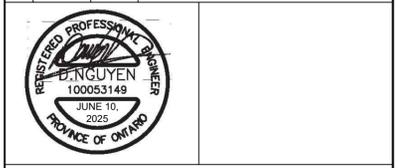
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CROSSING TABLE

| LOCATION | OVER / UNDER | T/G | INVERT | OBVERT | CLEARANCE (m) |
|----------|---------------------------------|-------|---------------|---------------|---------------|
| ▲ | NEW STORM - NEW WATERMAIN | 86.26 | 84.36 (STORM) | 83.86 (WM) | 0.50 |
| ▲ | NEW SANITARY - NEW STORM SEWER | 86.38 | 83.96 (SAN) | 83.54 (STORM) | 0.42 |
| ▲ | NEW WATERMAIN - NEW STORM SEWER | 86.50 | 84.33 (WM) | 83.83 (STORM) | 0.50 |

| | | | |
|-----|------------|-----------|-----------------------------------|
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| 7 | 2024-12-20 | DN / ZB | 100% SOUSSION R2 |
| 6 | 2022-12-09 | DN / ZB | SOUSSION POUR CONTROL DU SITE |
| 5 | 2022-10-28 | DN / DS | 100% SOUSSION R1 |
| 4 | 2022-09-30 | DN / DS | 100% SOUSSION |
| 3 | 2022-09-02 | DN / DS | 99% SOUSSION |
| 2 | 2022-06-17 | DN / DS | 60% SOUSSION |
| 1 | 2022-03-04 | DN / RW | PRELIMINAIRE 30% |
| No. | YYYY-MM-DD | Eng./Drt. | Revision Comments |



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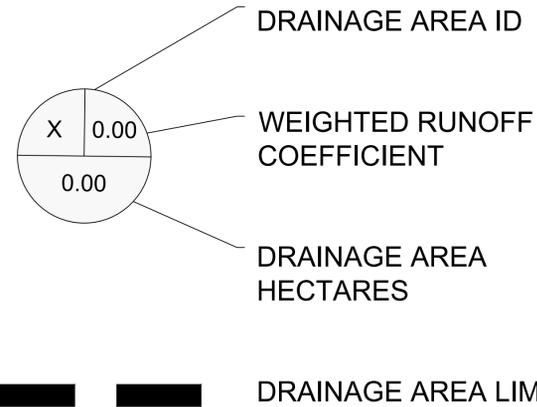
GENERAL NOTES AND DETAILS II

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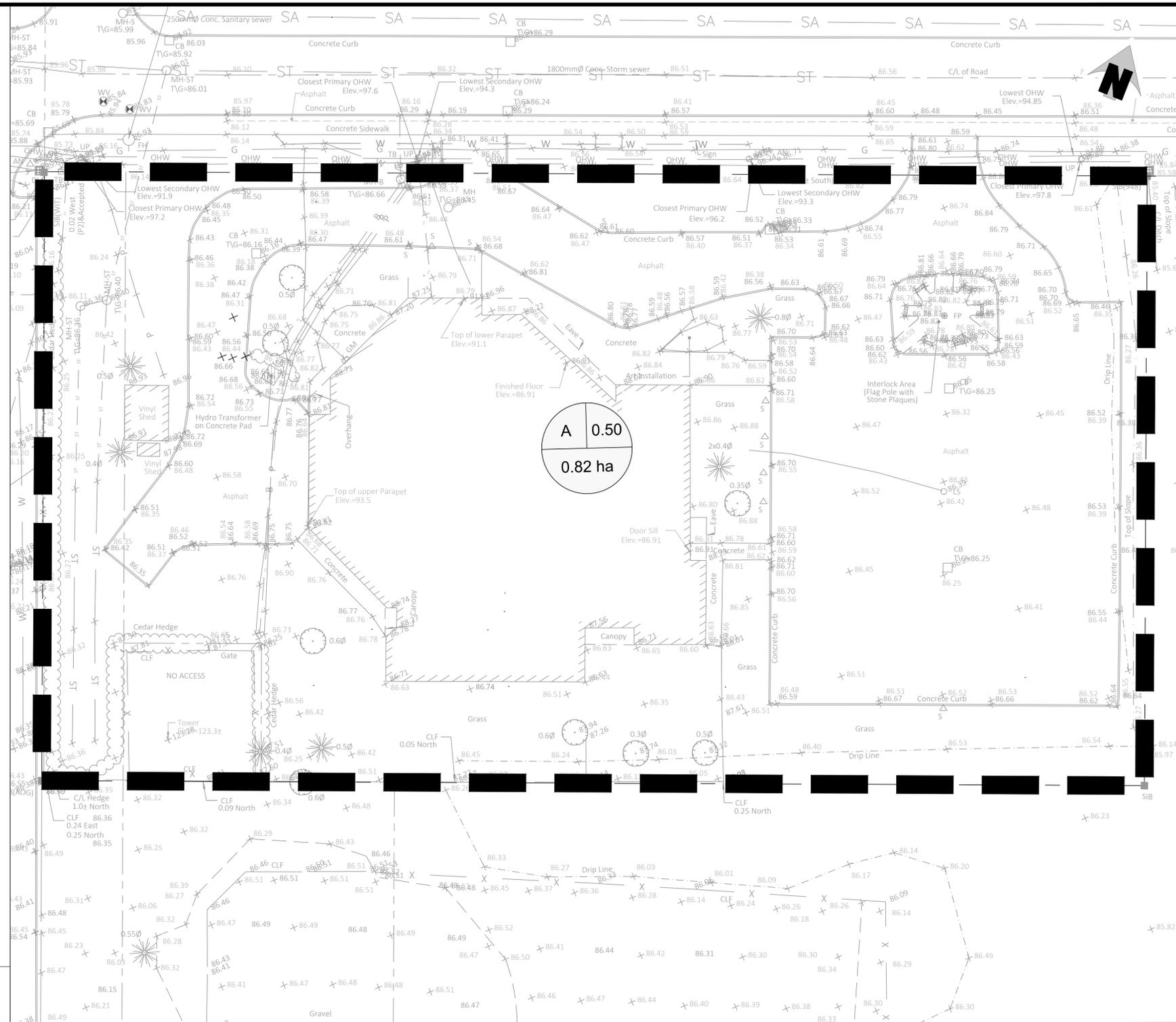
12 INTERNATIONAL DRIVE, PEMBROKE, ON
Phone: (613)735-2507, Fax: (613)735-4513
1150 MORRISON DRIVE, SUITE 410, OTTAWA, ON
Phone: (613)828-7800, Fax: (613)828-2600

| | |
|------------------------|----------------------------------|
| Designed by: WV | Project No.: 21-5089A |
| Drafted by: WV | Revision Date: 2025-04-10 |
| Checked by: DN | Approved by: DN |
| Scale: 1:250 | 21-5089A |

LEGEND



* ALLOWABLE RELEASE RATE = 108.8 l/s .
 * C=0.5 IF CALCULATED PRE-DEVELOPMENT IS GREATER THAN 0.5
 REFER TO PRE-CONSULTING MEETING NOTES : MAY 9th, 2022 .



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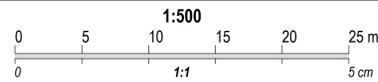
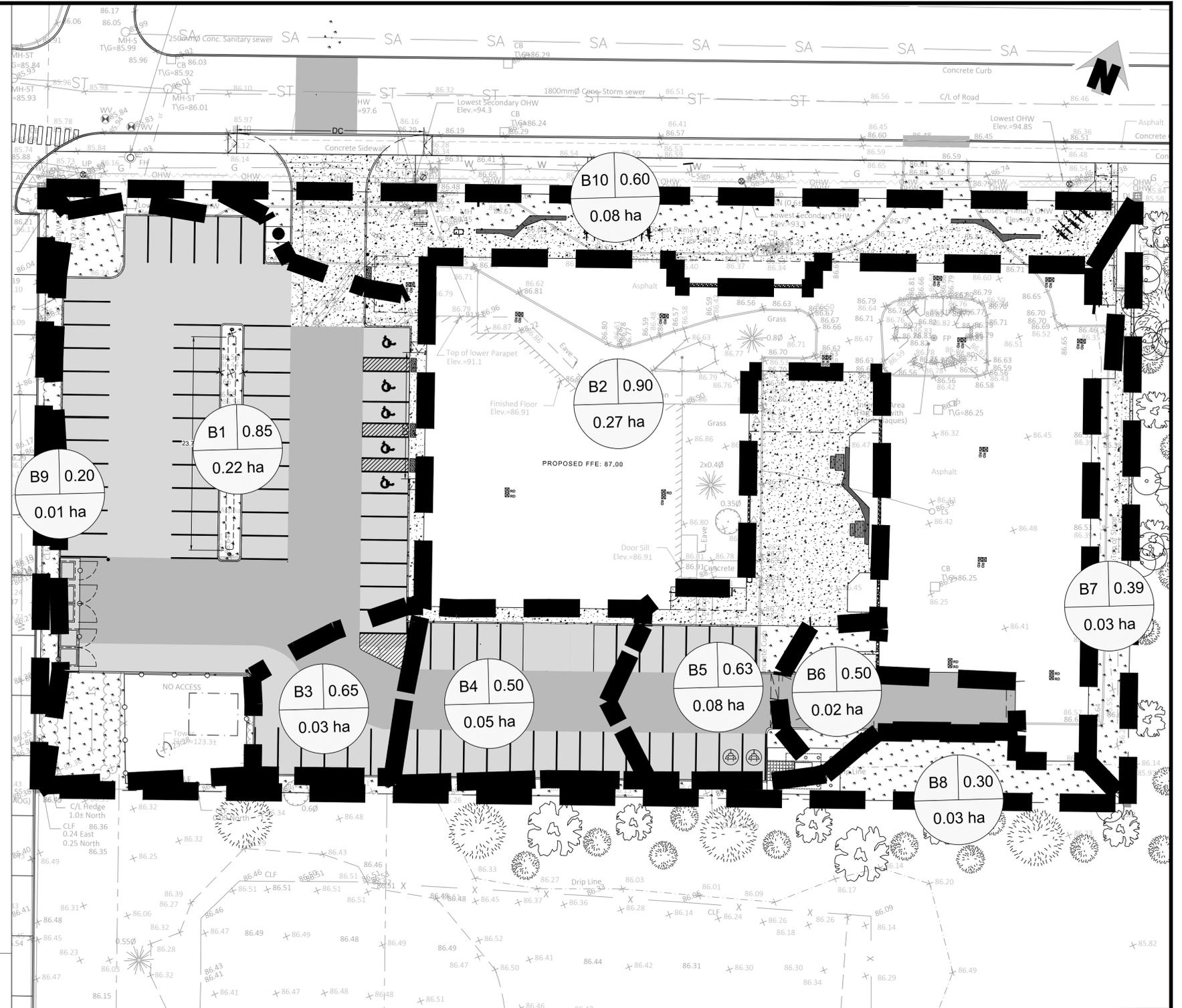
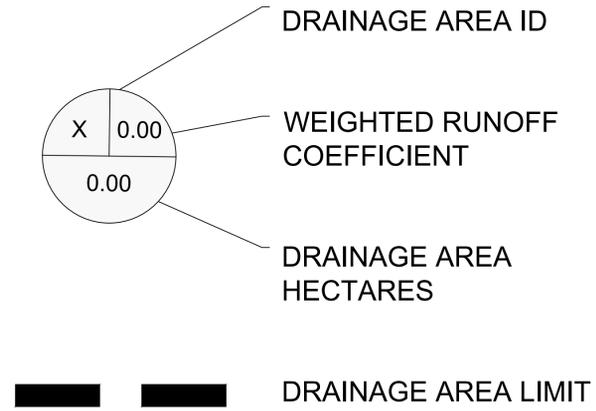
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FIGURE 1 PRE-DEVELOPMENT DRAINAGE AREAS

| | |
|--------------|---------------------------|
| DESIGNED: WV | PROJECT No.: 21-5089 |
| DRAFTED: WV | REVISION DATE: 2025-05-16 |
| CHECKED: AS | APPROVED: AS |
| SCALE: 1:500 | REVISION No.: 3 |

LEGEND



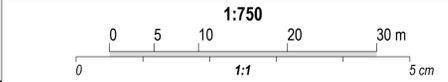
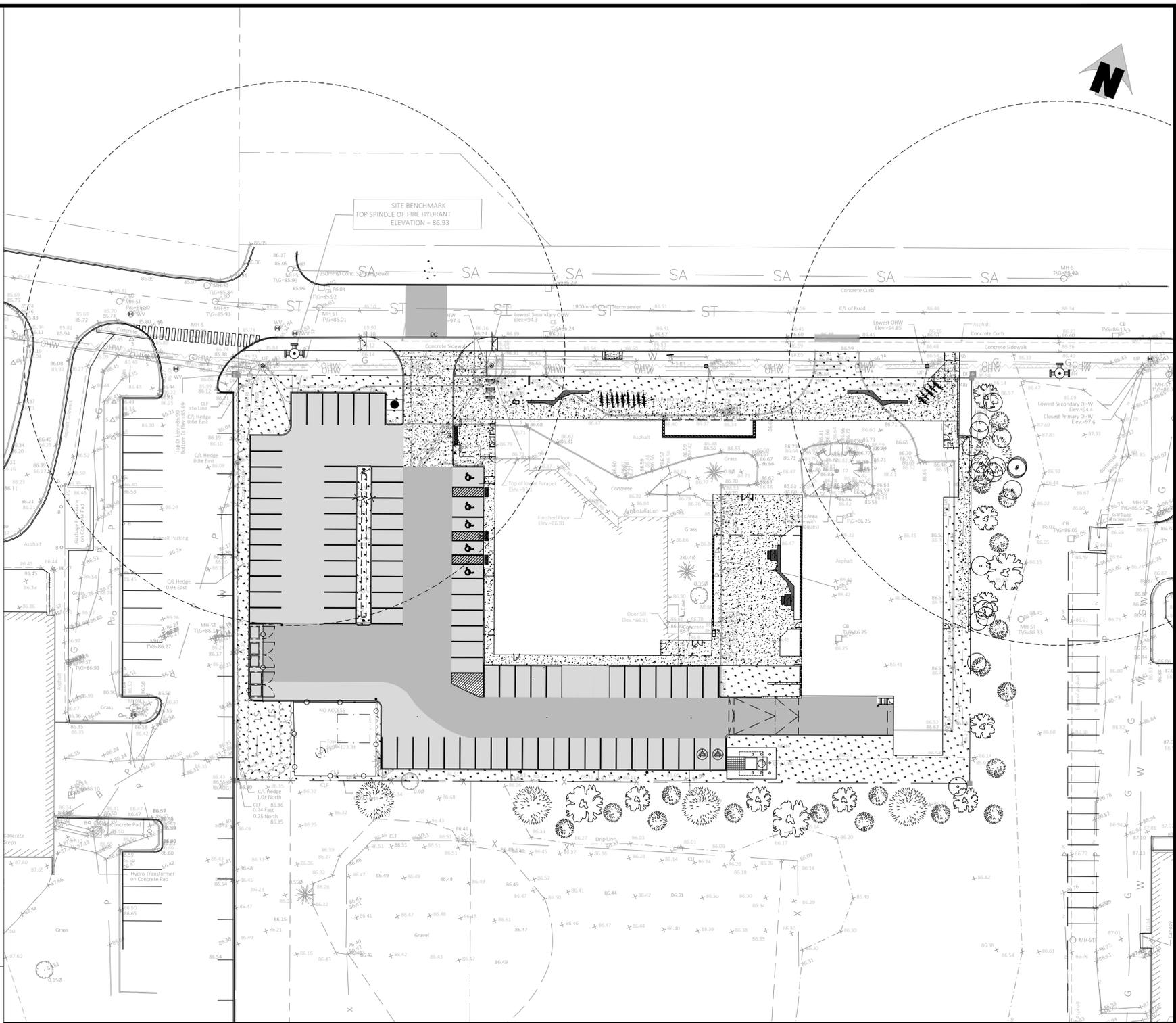
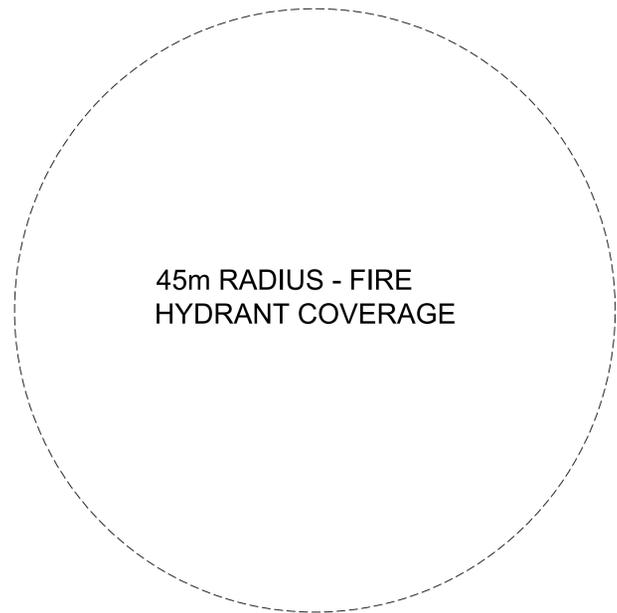
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FIGURE 2 POST-DEVELOPMENT DRAINAGE AREAS

| | |
|--------------|---------------------------|
| DESIGNED: WV | PROJECT No.: 21-5089 |
| DRAFTED: WV | REVISION DATE: 2025-05-16 |
| CHECKED: AS | APPROVED: AS |
| SCALE: 1:500 | REVISION No.: 3 |



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FIGURE 3 FIRE HYDRANT COVERAGE AREA

| | |
|--------------|---------------------------|
| DESIGNED: WV | PROJECT No.: 21-5089A |
| DRAFTED: WV | REVISION DATE: 2025-05-16 |
| CHECKED: AS | APPROVED: AS |
| SCALE: 1:500 | REVISION No.: 3 |



Appendix B - Stormwater Management Calculations

Appendix B - Storm Sewer Design Sheet

B.1.1 - Allowable release rate

| ID | Description | Type | Areas (m ²) | | Total (m ²) | C _{pre-5-yr} | C _{pre-100-yr} * |
|----|------------------|--------------|-------------------------|-------------------|-------------------------|-----------------------|---------------------------|
| | | | C _{0.90} | C _{0.20} | | | |
| A | Property Grounds | uncontrolled | 4943 | 3236 | 8179 | 0.62 | 0.70 |
| | | | 4943 | 3236 | 8179 | 0.50 | 0.63 |

*including 25% increase as per City of Ottawa Sewer Design Guidelines

Estimated time of concentration, t_c = **10.0** minutes

As per Pre-Consultation Meeting, a C = 0.50 is to be used if the pre-development C is greater than 0.5

Based on Ottawa IDF curve, $i_{2\text{-years}}$ = $732.951 / (t_c + 6.199)^{0.810}$
76.8 mm/hr

Total Area, A = **0.82** ha
 Q_{allowable (2-year)} = **87.3** l/s ①

B.1.2 - Post-development release rate

| ID | Description | Type | Areas (m ²) | | Total (m ²) | C _{post-5-yr} | C _{post-100-yr} * |
|-----|---------------------------------|--------------|-------------------------|-------------------|-------------------------|------------------------|----------------------------|
| | | | C _{0.90} | C _{0.20} | | | |
| B1 | Main Parking Lot (bioswale/CB1) | controlled | 2041 | 164 | 2205 | 0.85 | 0.94 |
| B2 | Building Roof | controlled | 2700 | 0 | 2700 | 0.90 | 1.00 |
| B3 | Rear Parking Lot (CBMH01) | controlled | 172 | 95 | 267 | 0.65 | 0.73 |
| B4 | Rear Parking Lot (CBMH02) | controlled | 204 | 276 | 480 | 0.50 | 0.57 |
| B5 | Rear Parking Lot (CBMH03) | controlled | 486 | 298 | 784 | 0.63 | 0.71 |
| B6 | Trench Drain | controlled | 102 | 136 | 238 | 0.50 | 0.57 |
| B7 | East Frontage | uncontrolled | 70 | 185 | 254 | 0.39 | 0.46 |
| B8 | South Frontage | uncontrolled | 48 | 292 | 340 | 0.30 | 0.36 |
| B9 | West Frontage | uncontrolled | 0 | 107 | 105 | 0.20 | 0.25 |
| B10 | North Frontage | uncontrolled | 459 | 347 | 806 | 0.60 | 0.68 |
| | | uncontrolled | 577 | 931 | 1505 | 0.47 | 0.54 |
| | | Total | 6282 | 1900 | 8179 | 0.74 | 0.83 |

*including 25% increase as per City of Ottawa Sewer Design Guidelines

(A) (B) (C) (D) (E)

Calculations for post-development runoff coefficient

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

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

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

Calculations for average weighted runoff coefficient

$$C_{\text{post-5-yr}} = 0.74$$

$$C_{\text{post-100-yr}} = 0.83$$

Estimated time of concentration, t_c = **10.0** minutes

***As per City of Ottawa Sewer Design Guidelines (Section 5.4.5.2)

Based on Ottawa IDF curve, $i_{5\text{-years}}$ = $998.071 / (t_c + 6.053)^{0.814}$
104.2 mm/hr

Based on Ottawa IDF curve, $i_{100\text{-years}}$ = $1735.688 / (t_c + 6.014)^{0.820}$
178.6 mm/hr

B.1.2.1 - Uncontrolled overland surface flow

Total uncontrolled area, B7 - B10 **0.151** ha
 5-year Runoff coefficient, $C_{5\text{-yr-uncontrolled}}$ **0.47**
 100-year Runoff coefficient, $C_{100\text{-yr-uncontrolled}}$ **0.54**

Uncontrolled overland surface Release Rate 5-year **20.4** l/s ②
 Uncontrolled overland surface Release Rate 100-year **40.2** l/s ④

B.1.2.2 - Net-allowable release rate for storm sewers

Q_{net-allowable 5-year} = **66.9** l/s ③ = ①-②
 *Q_{net-allowable 100-year} = **47.1** l/s ⑤ = ①-④ * Must be controlled to net-allowable 100-year

B.1.3 - Post-development Roof Drainage (B2)

B.1.3.1 - Estimated detention Roof

Area **0.270** ha
 5-year Runoff coefficient **0.90**
 100-year Runoff coefficient **1.00**
 Roof Drains **8.8** l/s

Table 1.3.1a - 5-year estimated detention on roof

| | Time (minutes) | $i_{5\text{-years}}$ (mm/hr) | Q_{actual} (l/s) | $Q_{\text{allowable}}$ (l/s) | Q_{stored} (l/s) | V_{stored} (m ³) |
|--|-------------------|---------------------------------|------------------------------|---------------------------------|------------------------------|--|
| | 10 | 104.2 | 70.4 | 8.8 | 61.6 | 37.0 |
| <i>peak V_{stored} →</i> | 15 | 83.6 | 56.4 | 8.8 | 47.6 | 42.9 |
| | 20 | 70.3 | 47.5 | 8.8 | 38.7 | 46.4 |
| | 25 | 60.9 | 41.1 | 8.8 | 32.3 | 48.5 |
| | 30 | 53.9 | 36.4 | 8.8 | 27.6 | 49.7 |
| | 35 | 48.5 | 32.8 | 8.8 | 24.0 | 50.3 |
| | 40 | 44.2 | 29.8 | 8.8 | 21.0 | 50.5 |
| | 45 | 40.6 | 27.4 | 8.8 | 18.6 | 50.3 |
| | 50 | 37.7 | 25.4 | 8.8 | 16.6 | 49.9 |
| | 55 | 35.1 | 23.7 | 8.8 | 14.9 | 49.3 |
| | 60 | 32.9 | 22.3 | 8.8 | 13.5 | 48.4 |

Therefore **51** m³ estimated yard detention

Table 1.3.1b - 100-year estimated detention on roof

| | Time (min) | $i_{100\text{-years}}$ (mm/hr) | Q_{actual} (l/s) | $Q_{\text{allowable}}$ (l/s) | Q_{stored} (l/s) | V_{stored} (m ³) |
|--|---------------|-----------------------------------|------------------------------|---------------------------------|------------------------------|--|
| | 10 | 178.6 | 134.0 | 8.8 | 125.2 | 75.1 |
| | 15 | 142.9 | 107.3 | 8.8 | 98.5 | 88.6 |
| <i>peak V_{stored} →</i> | 20 | 120.0 | 90.0 | 8.8 | 81.2 | 97.5 |
| | 25 | 103.8 | 77.9 | 8.8 | 69.1 | 103.7 |
| | 30 | 91.9 | 69.0 | 8.8 | 60.2 | 108.3 |
| | 35 | 82.6 | 62.0 | 8.8 | 53.2 | 111.7 |
| | 40 | 75.1 | 56.4 | 8.8 | 47.6 | 114.2 |
| | 45 | 69.1 | 51.8 | 8.8 | 43.0 | 116.2 |
| | 50 | 64.0 | 48.0 | 8.8 | 39.2 | 117.6 |
| | 55 | 59.6 | 44.8 | 8.8 | 36.0 | 118.6 |
| | 60 | 55.9 | 42.0 | 8.8 | 33.2 | 119.4 |

Therefore **119** m³ estimated yard detention

Table 1.3.1c - 100-year +20% estimated detention on roof

| | Time (min) | $i_{100\text{-years}}$ (mm/hr) | Q_{actual} (l/s) | $Q_{\text{allowable}}$ (l/s) | Q_{stored} (l/s) | V_{stored} (m ³) |
|--|---------------|-----------------------------------|------------------------------|---------------------------------|------------------------------|--|
| | 10 | 214.3 | 160.8 | 8.8 | 152.0 | 91.2 |
| | 15 | 171.5 | 128.7 | 8.8 | 119.9 | 107.9 |
| <i>peak V_{stored} →</i> | 20 | 143.9 | 108.0 | 8.8 | 99.2 | 119.1 |
| | 25 | 124.6 | 93.5 | 8.8 | 84.7 | 127.1 |
| | 30 | 110.2 | 82.7 | 8.8 | 73.9 | 133.1 |
| | 35 | 99.1 | 74.4 | 8.8 | 65.6 | 137.7 |
| | 40 | 90.2 | 67.7 | 8.8 | 58.9 | 141.3 |
| | 45 | 82.9 | 62.2 | 8.8 | 53.4 | 144.2 |
| | 50 | 76.7 | 57.6 | 8.8 | 48.8 | 146.4 |
| | 55 | 71.5 | 53.7 | 8.8 | 44.9 | 148.2 |
| | 60 | 67.1 | 50.3 | 8.8 | 41.5 | 149.6 |

Therefore **150** m³ estimated yard detention

B.1.4 - Post-development onsite storage in Main Parking Lot (B1)

B.1.3.1 - Estimated detention

Area **0.221** ha
 5-year Runoff coefficient **0.85**
 100-year Runoff coefficient **0.94**
 Release Rate **20.0** l/s **calculated in Visual Otthymo

Table 1.4.1a - 5-year estimated detention in parking area

| | Time (minutes) | $i_{5\text{-years}}$ (mm/hr) | Q_{actual} (l/s) | $Q_{\text{allowable}}$ (l/s) | Q_{stored} (l/s) | V_{stored} (m ³) |
|--|-------------------|---------------------------------|------------------------------|---------------------------------|------------------------------|--|
| | 10 | 104.2 | 54.2 | 20.0 | 34.2 | 20.5 |

| | | | | | | |
|----------------------------|----|------|------|------|------|-------|
| peak V_{stored} → | 15 | 83.6 | 43.4 | 20.0 | 23.4 | 21.1 |
| | 20 | 70.3 | 36.5 | 20.0 | 16.5 | 19.8 |
| | 25 | 60.9 | 31.7 | 20.0 | 11.7 | 17.5 |
| | 30 | 53.9 | 28.0 | 20.0 | 8.0 | 14.5 |
| | 35 | 48.5 | 25.2 | 20.0 | 5.2 | 11.0 |
| | 40 | 44.2 | 23.0 | 20.0 | 3.0 | 7.1 |
| | 45 | 40.6 | 21.1 | 20.0 | 1.1 | 3.0 |
| | 50 | 37.7 | 19.6 | 20.0 | -0.4 | -1.3 |
| | 55 | 35.1 | 18.3 | 20.0 | -1.7 | -5.8 |
| | 60 | 32.9 | 17.1 | 20.0 | -2.9 | -10.4 |

Therefore **21** m³ estimated yard detention

Table 1.4.1b - 100-year estimated detention in parking area

| | Time (min) | $i_{100\text{-years}}$ (mm/hr) | Q_{actual} (l/s) | $Q_{\text{allowable}}$ (l/s) | Q_{stored} (l/s) | V_{stored} (m ³) |
|----------------------------|---------------|-----------------------------------|------------------------------|---------------------------------|------------------------------|--|
| peak V_{stored} → | 10 | 178.6 | 103.3 | 20.0 | 83.3 | 50.0 |
| | 15 | 142.9 | 82.7 | 20.0 | 62.7 | 56.4 |
| | 20 | 120.0 | 69.4 | 20.0 | 49.4 | 59.3 |
| | 25 | 103.8 | 60.1 | 20.0 | 40.1 | 60.2 |
| | 30 | 91.9 | 53.2 | 20.0 | 33.2 | 59.7 |
| | 35 | 82.6 | 47.8 | 20.0 | 27.8 | 58.4 |
| | 40 | 75.1 | 43.5 | 20.0 | 23.5 | 56.4 |
| | 45 | 69.1 | 40.0 | 20.0 | 20.0 | 53.9 |
| | 50 | 64.0 | 37.0 | 20.0 | 17.0 | 51.0 |
| | 55 | 59.6 | 34.5 | 20.0 | 14.5 | 47.9 |
| | 60 | 55.9 | 32.4 | 20.0 | 12.4 | 44.5 |

Therefore **60** m³ estimated yard detention

Table 1.4.1c - 100-year + 20% estimated detention in parking area

| | Time (min) | $i_{100\text{-years}}$ (mm/hr) | Q_{actual} (l/s) | $Q_{\text{allowable}}$ (l/s) | Q_{stored} (l/s) | V_{stored} (m ³) |
|----------------------------|---------------|-----------------------------------|------------------------------|---------------------------------|------------------------------|--|
| peak V_{stored} → | 10 | 214.3 | 124.0 | 20.0 | 104.0 | 62.4 |
| | 15 | 171.5 | 99.2 | 20.0 | 79.2 | 71.3 |
| | 20 | 143.9 | 83.3 | 20.0 | 63.3 | 76.0 |
| | 25 | 124.6 | 72.1 | 20.0 | 52.1 | 78.2 |
| | 30 | 110.2 | 63.8 | 20.0 | 43.8 | 78.9 |
| | 35 | 99.1 | 57.4 | 20.0 | 37.4 | 78.4 |
| | 40 | 90.2 | 52.2 | 20.0 | 32.2 | 77.3 |
| | 45 | 82.9 | 48.0 | 20.0 | 28.0 | 75.5 |
| | 50 | 76.7 | 44.4 | 20.0 | 24.4 | 73.3 |
| | 55 | 71.5 | 41.4 | 20.0 | 21.4 | 70.7 |
| | 60 | 67.1 | 38.8 | 20.0 | 18.8 | 67.8 |

Therefore **79** m³ estimated yard detention

B.1.5 - Post-development onsite storage in Rear Parking Lot (B3 - B6)

B.1.5.1 - Estimated detention

| | | |
|-----------------------------|--------------|-----|
| Area | 0.177 | ha |
| 5-year Runoff coefficient | 0.58 | |
| 100-year Runoff coefficient | 0.66 | |
| Release Rate | 18.3 | l/s |

Table 1.5.1a - 5-year estimated detention in parking area

| | Time (minutes) | $i_{5\text{-years}}$ (mm/hr) | Q_{actual} (l/s) | $Q_{\text{allowable}}$ (l/s) | Q_{stored} (l/s) | V_{stored} (m ³) |
|----------------------------|-------------------|---------------------------------|------------------------------|---------------------------------|------------------------------|--|
| peak V_{stored} → | 10 | 104.2 | 29.8 | 18.3 | 11.5 | 6.9 |
| | 15 | 83.6 | 23.9 | 18.3 | 5.6 | 5.0 |
| | 20 | 70.3 | 20.1 | 18.3 | 1.8 | 2.2 |
| | 25 | 60.9 | 17.4 | 18.3 | -0.9 | -1.3 |
| | 30 | 53.9 | 15.4 | 18.3 | -2.9 | -5.2 |
| | 35 | 48.5 | 13.9 | 18.3 | -4.4 | -9.3 |
| | 40 | 44.2 | 12.6 | 18.3 | -5.7 | -13.6 |
| | 45 | 40.6 | 11.6 | 18.3 | -6.7 | -18.0 |
| | 50 | 37.7 | 10.8 | 18.3 | -7.5 | -22.6 |
| | 55 | 35.1 | 10.0 | 18.3 | -8.3 | -27.2 |
| | 60 | 32.9 | 9.4 | 18.3 | -8.9 | -32.0 |

Therefore **7** m³ estimated yard detention

Table 1.5.1b - 100-year estimated detention in parking area

| Time (min) | i _{100-years} (mm/hr) | Q _{actual} (l/s) | Q _{allowable} (l/s) | Q _{stored} (l/s) | V _{stored} (m ³) |
|---------------|-----------------------------------|------------------------------|---------------------------------|------------------------------|--|
| 10 | 178.6 | 57.9 | 18.3 | 39.6 | 23.7 |
| 15 | 142.9 | 46.3 | 18.3 | 28.0 | 25.2 |
| 20 | 120.0 | 38.9 | 18.3 | 20.6 | 24.7 |
| 25 | 103.8 | 33.6 | 18.3 | 15.3 | 23.0 |
| 30 | 91.9 | 29.8 | 18.3 | 11.5 | 20.6 |
| 35 | 82.6 | 26.8 | 18.3 | 8.5 | 17.8 |
| 40 | 75.1 | 24.3 | 18.3 | 6.0 | 14.5 |
| 45 | 69.1 | 22.4 | 18.3 | 4.1 | 11.0 |
| 50 | 64.0 | 20.7 | 18.3 | 2.4 | 7.3 |
| 55 | 59.6 | 19.3 | 18.3 | 1.0 | 3.4 |
| 60 | 55.9 | 18.1 | 18.3 | -0.2 | -0.7 |

Therefore **25** m³ estimated yard detention

Table 1.3.1c - 100-year + 20% estimated detention in parking area

| Time (min) | i _{100-years} (mm/hr) | Q _{actual} (l/s) | Q _{allowable} (l/s) | Q _{stored} (l/s) | V _{stored} (m ³) |
|---------------|-----------------------------------|------------------------------|---------------------------------|------------------------------|--|
| 10 | 214.3 | 69.4 | 18.3 | 51.1 | 30.7 |
| 15 | 171.5 | 55.6 | 18.3 | 37.3 | 33.5 |
| 20 | 143.9 | 46.6 | 18.3 | 28.3 | 34.0 |
| 25 | 124.6 | 40.4 | 18.3 | 22.1 | 33.1 |
| 30 | 110.2 | 35.7 | 18.3 | 17.4 | 31.4 |
| 35 | 99.1 | 32.1 | 18.3 | 13.8 | 29.0 |
| 40 | 90.2 | 29.2 | 18.3 | 10.9 | 26.2 |
| 45 | 82.9 | 26.8 | 18.3 | 8.5 | 23.1 |
| 50 | 76.7 | 24.9 | 18.3 | 6.6 | 19.7 |
| 55 | 71.5 | 23.2 | 18.3 | 4.9 | 16.1 |
| 60 | 67.1 | 21.7 | 18.3 | 3.4 | 12.4 |

Therefore **34** m³ estimated yard detention

B.1.6 - Post-development onsite storage in Rear Parking Lot (B3 - B6)

B.1.5.1 - Estimated detention

| | | | |
|-----------------------------|--------------|-----|---|
| Area | 0.177 | ha | *Release rate being reduced to half to compensate for less than max head over the course of a storm event. Storage calculations shown below |
| 5-year Runoff coefficient | 0.58 | | |
| 100-year Runoff coefficient | 0.66 | | |
| *Release Rate | 9.15 | l/s | |

Table 1.5.1a - 5-year estimated detention in parking area

| Time (minutes) | i _{5-years} (mm/hr) | Q _{actual} (l/s) | Q _{allowable} (l/s) | Q _{stored} (l/s) | V _{stored} (m ³) |
|-------------------|---------------------------------|------------------------------|---------------------------------|------------------------------|--|
| 10 | 104.2 | 29.8 | 9.2 | 20.7 | 12.4 |
| 15 | 83.6 | 23.9 | 9.2 | 14.7 | 13.3 |
| 20 | 70.3 | 20.1 | 9.2 | 10.9 | 13.1 |
| 25 | 60.9 | 17.4 | 9.2 | 8.3 | 12.4 |
| 30 | 53.9 | 15.4 | 9.2 | 6.3 | 11.3 |
| 35 | 48.5 | 13.9 | 9.2 | 4.7 | 9.9 |
| 40 | 44.2 | 12.6 | 9.2 | 3.5 | 8.4 |
| 45 | 40.6 | 11.6 | 9.2 | 2.5 | 6.7 |
| 50 | 37.7 | 10.8 | 9.2 | 1.6 | 4.9 |
| 55 | 35.1 | 10.0 | 9.2 | 0.9 | 3.0 |
| 60 | 32.9 | 9.4 | 9.2 | 0.3 | 1.0 |

Therefore **13** m³ estimated yard detention

Table 1.5.1b - 100-year estimated detention in parking area

| Time (min) | i _{100-years} (mm/hr) | Q _{actual} (l/s) | Q _{allowable} (l/s) | Q _{stored} (l/s) | V _{stored} (m ³) |
|---------------|-----------------------------------|------------------------------|---------------------------------|------------------------------|--|
| 10 | 178.6 | 57.9 | 9.2 | 48.7 | 29.2 |
| 15 | 142.9 | 46.3 | 9.2 | 37.1 | 33.4 |
| 20 | 120.0 | 38.9 | 9.2 | 29.7 | 35.7 |
| 25 | 103.8 | 33.6 | 9.2 | 24.5 | 36.7 |

| | | | | | | |
|--------------------------------------|----|------|------|-----|------|------|
| peak $V_{\text{stored}} \rightarrow$ | 30 | 91.9 | 29.8 | 9.2 | 20.6 | 37.1 |
| | 35 | 82.6 | 26.8 | 9.2 | 17.6 | 37.0 |
| | 40 | 75.1 | 24.3 | 9.2 | 15.2 | 36.5 |
| | 45 | 69.1 | 22.4 | 9.2 | 13.2 | 35.7 |
| | 50 | 64.0 | 20.7 | 9.2 | 11.6 | 34.7 |
| | 55 | 59.6 | 19.3 | 9.2 | 10.2 | 33.6 |
| | 60 | 55.9 | 18.1 | 9.2 | 9.0 | 32.3 |

Therefore **37** m³ estimated vand detention

Table 1.3.1c - 100-year + 20% estimated detention in parking area

| Time (min) | $i_{100\text{-years}}$ (mm/hr) | Q_{actual} (l/s) | $Q_{\text{allowable}}$ (l/s) | Q_{stored} (l/s) | V_{stored} (m ³) | |
|--------------------------------------|--------------------------------|---------------------------|------------------------------|---------------------------|---------------------------------------|------|
| 10 | 214.3 | 69.4 | 9.2 | 60.3 | 36.2 | |
| 15 | 171.5 | 55.6 | 9.2 | 46.4 | 41.8 | |
| 20 | 143.9 | 46.6 | 9.2 | 37.5 | 45.0 | |
| 25 | 124.6 | 40.4 | 9.2 | 31.2 | 46.8 | |
| 30 | 110.2 | 35.7 | 9.2 | 26.6 | 47.8 | |
| peak $V_{\text{stored}} \rightarrow$ | 35 | 99.1 | 32.1 | 9.2 | 23.0 | 48.2 |
| | 40 | 90.2 | 29.2 | 9.2 | 20.1 | 48.2 |
| | 45 | 82.9 | 26.8 | 9.2 | 17.7 | 47.8 |
| | 50 | 76.7 | 24.9 | 9.2 | 15.7 | 47.1 |
| | 55 | 71.5 | 23.2 | 9.2 | 14.0 | 46.3 |
| | 60 | 67.1 | 21.7 | 9.2 | 12.6 | 45.3 |

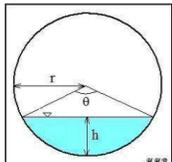
Therefore **48** m³ estimated vand detention

B.1.6 - Site storage

| | 5-year required (m3) | 100-year required (m3) | 100-year +20% required (m3) | Ponding depth (m) | Ponding area (m2) | Max available (m3) |
|------------------|----------------------|------------------------|-----------------------------|-------------------|-------------------|--------------------|
| Roof | 51 | 119 | 150 | 0.15 | 2700 | 135 |
| Main Parking Lot | 21 | 60 | 79 | 0.34 | 860 | 79 |
| Rear Parking Lot | 13 | 37 | 48 | NA | NA | 53* |

*refer to Underground storage calculations & Stage Storage Report

Oversized Pipe Storage for Rear Parking Lot



$$r = \frac{D}{2} \quad h = y$$

$$\theta = 2 \arccos \left(\frac{r-h}{r} \right)$$

$$A = \frac{r^2(\theta - \sin \theta)}{2}$$

$$P = r\theta$$

$$R_h = A/P$$

Figure 2. Partially Full Pipe Flow Parameters (Less than Half Full)

| Diameter (mm) | Pipe Length (m) | Actual Flow (LPS) | Full Flow (LPS) | Q/Qf |
|---------------|-----------------|-------------------|-----------------|------|
| 1050 | 47 | 18 | 1931 | 0.01 |

| h (mm) | Theta | Pipe Area | Area of Flow (m2) | Area of Storage (m2) | Volume Storage (m3) |
|--------|-------|-----------|-------------------|----------------------|---------------------|
| 18 | 1 | 1 | 0.003 | 0.863 | 41 |

*Therefore 41m3 of storage is provided in the 1050mm oversized pipe between CBMH03 and STMH01

B.1.7 - Release rate for site

Release rate

| | | | |
|---|------|-----|-----------------|
| Allowable release rate (5-yr) | 87.3 | l/s | Section B.1.1 |
| Allowable release rate (100-yr) | 87.3 | l/s | Section B.1.1 |
| Uncontrolled flow (100-yr) | 40.2 | l/s | Section B.1.2.1 |
| Controlled release rate at roof drain (100yr) | 8.8 | l/s | Section B.1.2.3 |
| Controlled release rate main parking area (100-yr) | 20.0 | l/s | Section B.1.2.4 |
| Controlled release rate rear parking area (100-yr) | 18.3 | l/s | Section B.1.2.5 |
| Total release rate (100-yr) | 87.3 | l/s | |
| Total release rate (100-yr) < Allowable release rate (5-yr) | OK | | |

STORM SEWER DESIGN SHEET

| LOCATION | | | | CONTRIBUTING AREA | | | | | | | | | FLOW | | | | STORM SEWER DESIGN | | | | | | | | | | |
|--------------------|--------------|-----------|---------|-------------------------------|---------------------|-----------------------------|---------------------|-----------------------------|----------------------|---------------------------------|----------------------|-------------------|----------------------------|-------------------------------------|---------------------------------------|-----------------|--------------------|-----------|-----------|--------------------------|---------------------------------|--------------------------|----------------------------|--------------------------------|--------------------------|----------|--|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 15 | 16 | 18 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | |
| Note | FROM | TO | AREA ID | SEWER TYPE (Lateral or Trunk) | HARD AREA (A1) (ha) | HARD RUNOFF COEFF. (C1) (-) | SOFT AREA (A2) (ha) | SOFT RUNOFF COEFF. (C2) (-) | TOTAL AREA (A3) (ha) | WEIGHTED RUNOFF COEFF. (C3) (-) | SECTION (A3*C3) (ha) | ACC. SECTION (ha) | TIME OF CONCEN. (Tc) (min) | RAINFALL INTENSITY 5-YR (I) (mm/hr) | RAINFALL INTENSITY 100-YR (I) (mm/hr) | FLOW 5-YR (L/s) | LENGTH (m) | SLOPE (%) | DIA. (mm) | FULL FLOW CAPACITY (L/s) | FULL FLOW vs. ACTUAL FLOW (L/s) | FULL FLOW VELOCITY (m/s) | TIME OF FLOW IN PIPE (min) | TIME OF CONCEN AFT. PIPE (min) | FALL IN PIPE SECTION (m) | COMMENTS | |
| Depressed Entrance | Trench Drain | CBMH03 | B6 | Lateral | 0.01 | 0.90 | 0.01 | 0.20 | 0.02 | 0.50 | 0.012 | 0.012 | 10.00 | 104.193 | 178.559 | 3.45 | 33.0 | 2.00% | 300 | 136.76 | 3% | 1.93 | 0.28 | 10.28 | 0.66 | | |
| Parking Lot | CBMH03 | CBMH02 | B5 | Trunk | 0.05 | 0.90 | 0.03 | 0.20 | 0.08 | 0.63 | 0.050 | 0.062 | 10.00 | 104.193 | 178.559 | 17.84 | 24.0 | 0.50% | 300 | 68.38 | 26% | 0.97 | 0.41 | 10.41 | 0.12 | | |
| Parking Lot | CBMH02 | CBMH01 | B4 | Trunk | 0.02 | 0.90 | 0.03 | 0.20 | 0.05 | 0.50 | 0.024 | 0.086 | 10.00 | 104.193 | 178.559 | 24.77 | 21.5 | 0.50% | 300 | 68.38 | 36% | 0.97 | 0.37 | 10.37 | 0.11 | | |
| Parking Lot | CBMH-1 | STMH01 | B3 | Trunk | 0.02 | 0.90 | 0.01 | 0.20 | 0.03 | 0.65 | 0.017 | 0.103 | 10.00 | 104.193 | 178.559 | 18.30 | 47.0 | 0.50% | 1050 | 1930.91 | 1% | 2.23 | 0.35 | 10.35 | 0.24 | | |
| Parking Lot | CB01 | STMH01 | B1 | Lateral | 0.20 | 0.90 | 0.02 | 0.20 | 0.22 | 0.85 | 0.187 | 0.290 | 10.35 | 102.373 | 175.410 | 20.00 | 12.5 | 2.00% | 300 | 136.76 | 15% | 1.93 | 0.11 | 10.46 | 0.25 | | |
| Roof Drains | Building | STMH01 | B2 | Lateral | 0.27 | 0.90 | 0.00 | 0.20 | 0.27 | 0.90 | 0.243 | 0.243 | 10.00 | 104.193 | 178.559 | 8.80 | 16.5 | 2.00% | 250 | 84.10 | 10% | 1.71 | 0.16 | 10.16 | 0.33 | | |
| | STMH01 | OGS01 | | Trunk | | | | | | | | 0.636 | 10.46 | 101.829 | 174.469 | 47.10 | 3.5 | 2.00% | 300 | 136.76 | 34% | 1.93 | 0.03 | 10.49 | 0.07 | | |
| | OGS01 | Mun Conn. | | Trunk | | | | | | | | 0.636 | 10.49 | 101.678 | 174.208 | 47.100 | 17.0 | 6.32% | 300 | 243.10 | 19% | 3.44 | 0.08 | 10.57 | 1.07 | | |

ICD CONTROL

Notes:
Rainfall Data Source: Ottawa CDA RCS 5 Year
Mannings, n = 0.013

Designed By: W.V
Checked By: A.S

Date: 25/03/25
Revision:

Orifice Diameter Calculation

Design Parameters*

Pipe Area Formula: $A = Q/(C(2gh)^{0.5})$

Pipe Diameter Formula: $A = (\pi \cdot d^2)/4$
 $d = \sqrt{4 \cdot A / \pi}$

d = Orifice diameter (m)

A = Pipe area (m²)

C = 0.61

g = 9.81 (m/s²)

h = head of ponding from the centroid of the pipe invert (m)

Q = Max. flow through pipe (l/s)

CB-1

| Elevation at Top of Ponding | Elevation at Pipe Invert | Size of Outlet Pipe | Head from Centroid (h) |
|-----------------------------|--------------------------|---------------------|------------------------|
| (m) | (m) | (mm) | (m) |
| 86.40 | 84.43 | 300.0 | 1.819 |

| Max Flow (Q) | Coefficient (C) | g | Head from Centroid (h) | Pipe Area (A) | Orifice Diameter (d) | Orifice Diameter (d) |
|--------------|-----------------|---------------------|------------------------|-------------------|----------------------|----------------------|
| (l/s) | - | (m/s ²) | (m) | (m ²) | m | mm |
| 20.0 | 0.61 | 9.8 | 1.82 | 0.005 | 0.084 | 84 |

STMH01

*to be placed before inlet side of STMH-01

| Elevation at Obvert of Oversized Pipe | Elevation of Orifice Invert | Orifice Size | Head from Centroid (h) |
|---------------------------------------|-----------------------------|--------------|------------------------|
| (m) | (m) | (mm) | (m) |
| 83.79 | 82.60 | 90.0 | 1.145 |

| Max Flow (Q) | Coefficient (C) | g | Head from Centroid (h) | Pipe Area (A) | Orifice Diameter (d) | Orifice Diameter (d) |
|--------------|-----------------|---------------------|------------------------|-------------------|----------------------|----------------------|
| (l/s) | - | (m/s ²) | (m) | (m ²) | m | mm |
| 18.3 | 0.61 | 9.8 | 1.15 | 0.006 | 0.090 | 90 |

TABLE B1A: Civil 3D Stage Storage Report

| B3 Stage Storage | | | | | | | | | | |
|--------------------|---------|--------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| Project: | | 21-5089 MIFO | | | | | | | | |
| Basin Description: | | | | | | | | | | |
| Contour | Contour | Depth | Increment | Cumulative | Increment | Cumulative | Increment | Cumulative | Increment | Cumulative |
| Elevation | Area | (m) | Volume | Volume | Volume | Volume | Volume | Volume | Volume | Volume |
| | (sq. m) | Avg. End | Conic | Conic | Conic | Conic | Conic | Conic | Conic | Conic |
| | | (cu. m) | (cu. m) | (cu. m) | (cu. m) | (cu. m) | (cu. m) | (cu. m) | (cu. m) | (cu. m) |
| 86.46 | 0.76 | N/A | N/A | N/A | 0 | N/A | 0 | N/A | 0 | 0 |
| 86.47 | 3.07 | 0.01 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| 86.48 | 6.94 | 0.01 | 0.05 | 0.07 | 0.07 | 0.05 | 0.05 | 0.05 | 0.05 | 0.07 |
| 86.49 | 12.36 | 0.01 | 0.1 | 0.17 | 0.17 | 0.1 | 0.1 | 0.1 | 0.1 | 0.16 |
| 86.5 | 19.33 | 0.01 | 0.16 | 0.32 | 0.32 | 0.16 | 0.16 | 0.16 | 0.16 | 0.32 |
| 86.51 | 27.84 | 0.01 | 0.24 | 0.56 | 0.56 | 0.23 | 0.23 | 0.23 | 0.23 | 0.55 |
| 86.52 | 37.9 | 0.01 | 0.33 | 0.89 | 0.89 | 0.33 | 0.33 | 0.33 | 0.33 | 0.88 |
| 86.53 | 49.52 | 0.01 | 0.44 | 1.33 | 1.33 | 0.44 | 0.44 | 0.44 | 0.44 | 1.32 |
| 86.54 | 62.68 | 0.01 | 0.56 | 1.89 | 1.89 | 0.56 | 0.56 | 0.56 | 0.56 | 1.88 |
| 86.55 | 77.4 | 0.01 | 0.7 | 2.59 | 2.59 | 0.7 | 0.7 | 0.7 | 0.7 | 2.58 |
| 86.56 | 93.67 | 0.01 | 0.86 | 3.44 | 3.44 | 0.85 | 0.85 | 0.85 | 0.85 | 3.43 |
| 86.57 | 111.49 | 0.01 | 1.03 | 4.47 | 4.47 | 1.02 | 1.02 | 1.02 | 1.02 | 4.45 |
| 86.58 | 130.69 | 0.01 | 1.21 | 5.68 | 5.68 | 1.21 | 1.21 | 1.21 | 1.21 | 5.66 |
| 86.59 | 151.30 | 0.01 | 1.41 | 7.09 | 7.09 | 1.41 | 1.41 | 1.41 | 1.41 | 7.07 |

| B4 Stage Storage | | | | | | | | | | |
|--------------------|---------|--------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| Project: | | 21-5089 MIFO | | | | | | | | |
| Basin Description: | | | | | | | | | | |
| Contour | Contour | Depth | Increment | Cumulative | Increment | Cumulative | Increment | Cumulative | Increment | Cumulative |
| Elevation | Area | (m) | Volume | Volume | Volume | Volume | Volume | Volume | Volume | Volume |
| | (sq. m) | Avg. End | Conic | Conic | Conic | Conic | Conic | Conic | Conic | Conic |
| | | (cu. m) | (cu. m) | (cu. m) | (cu. m) | (cu. m) | (cu. m) | (cu. m) | (cu. m) | (cu. m) |
| 86.49 | 1.02 | N/A | N/A | N/A | 0 | N/A | 0 | N/A | 0 | 0 |
| 86.5 | 4.13 | 0.01 | 0.03 | 0.03 | 0.03 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| 86.51 | 9.31 | 0.01 | 0.07 | 0.09 | 0.09 | 0.07 | 0.07 | 0.07 | 0.07 | 0.09 |
| 86.52 | 16.58 | 0.01 | 0.13 | 0.22 | 0.22 | 0.13 | 0.13 | 0.13 | 0.13 | 0.22 |
| 86.53 | 25.92 | 0.01 | 0.21 | 0.43 | 0.43 | 0.21 | 0.21 | 0.21 | 0.21 | 0.43 |
| 86.54 | 37.33 | 0.01 | 0.32 | 0.75 | 0.75 | 0.31 | 0.31 | 0.31 | 0.31 | 0.74 |
| 86.55 | 50.83 | 0.01 | 0.44 | 1.19 | 1.19 | 0.44 | 0.44 | 0.44 | 0.44 | 1.18 |
| 86.56 | 66.39 | 0.01 | 0.59 | 1.78 | 1.78 | 0.58 | 0.58 | 0.58 | 0.58 | 1.77 |
| 86.57 | 84.04 | 0.01 | 0.75 | 2.53 | 2.53 | 0.75 | 0.75 | 0.75 | 0.75 | 2.52 |
| 86.58 | 103.76 | 0.01 | 0.94 | 3.47 | 3.47 | 0.94 | 0.94 | 0.94 | 0.94 | 3.45 |
| 86.59 | 125.57 | 0.01 | 1.15 | 4.62 | 4.62 | 1.14 | 1.14 | 1.14 | 1.14 | 4.6 |

| B5 Stage Storage | | | | | | | | | | |
|--------------------|---------|--------------|-----------|------------|-----------|------------|-----------|------------|-----------|------------|
| Project: | | 21-5089 MIFO | | | | | | | | |
| Basin Description: | | | | | | | | | | |
| Contour | Contour | Depth | Increment | Cumulative | Increment | Cumulative | Increment | Cumulative | Increment | Cumulative |
| Elevation | Area | (m) | Volume | Volume | Volume | Volume | Volume | Volume | Volume | Volume |
| | (sq. m) | Avg. End | Conic | Conic | Conic | Conic | Conic | Conic | Conic | Conic |
| | | (cu. m) | (cu. m) | (cu. m) | (cu. m) | (cu. m) | (cu. m) | (cu. m) | (cu. m) | (cu. m) |
| 86.56 | 0.6 | N/A | N/A | N/A | 0 | N/A | 0 | N/A | 0 | 0 |
| 86.57 | 2.44 | 0.01 | 0.02 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| 86.58 | 5.51 | 0.01 | 0.04 | 0.05 | 0.05 | 0.04 | 0.04 | 0.04 | 0.04 | 0.05 |
| 86.59 | 9.82 | 0.01 | 0.08 | 0.13 | 0.13 | 0.08 | 0.08 | 0.08 | 0.08 | 0.13 |

Combined B3, B4, B5 Stage Storage Relationship

| Project: | | | | | | | |
|--------------------|--------------------|-----------|--------------------|-----------|--------------------|-----------|--------------------|
| Basin Description: | | | | | | | |
| B3 | | B4 | | B5 | | COMBINED | |
| Elevation | Incremental Volume | Elevation | Incremental Volume | Elevation | Incremental Volume | Elevation | Incremental Volume |
| 86.46 | 0.00 | 86.46 | | 86.46 | | 86.46 | 0.00 |
| 86.47 | 0.02 | 86.47 | | 86.47 | | 86.47 | 0.02 |
| 86.48 | 0.07 | 86.48 | | 86.48 | | 86.48 | 0.07 |
| 86.49 | 0.16 | 86.49 | 0 | 86.49 | | 86.49 | 0.16 |
| 86.5 | 0.32 | 86.5 | 0.02 | 86.5 | | 86.5 | 0.34 |
| 86.51 | 0.55 | 86.51 | 0.09 | 86.51 | | 86.51 | 0.64 |
| 86.52 | 0.88 | 86.52 | 0.22 | 86.52 | | 86.52 | 1.10 |
| 86.53 | 1.32 | 86.53 | 0.43 | 86.53 | | 86.53 | 1.75 |
| 86.54 | 1.88 | 86.54 | 0.74 | 86.54 | | 86.54 | 2.62 |
| 86.55 | 2.58 | 86.55 | 1.18 | 86.55 | | 86.55 | 3.76 |
| 86.56 | 3.43 | 86.56 | 1.77 | 86.56 | 0 | 86.56 | 5.20 |
| 86.57 | 4.45 | 86.57 | 2.52 | 86.57 | 0.01 | 86.57 | 6.98 |
| 86.58 | 5.66 | 86.58 | 3.45 | 86.58 | 0.05 | 86.58 | 9.16 |
| 86.59 | 7.07 | 86.59 | 4.6 | 86.59 | 0.13 | 86.59 | 11.80 |

 ** SIMULATION:120% of 100 year storm **

 | Bioretention(0034) |
 | IN= 2--> OUT= 3 |
 | DT= 5.0 min |

OUTFLOW: OFF UNDERDRAIN: ON

SURFACE PONDING LAYER:

Max. Ponding Storage(cu.m.)= 127.61

| STAGE (m) | AREA (m2) | STAGE (m) | AREA (m2) |
|-----------|-----------|-----------|-----------|
| 0.000 | 22.551 | 0.500 | 564.000 |
| 0.150 | 70.304 | 0.550 | 794.000 |
| 0.250 | 104.000 | 0.560 | 860.000 |
| 0.400 | 282.000 | 0.000 | 0.000 |
| 0.450 | 393.000 | 0.000 | 0.000 |

MULCH LAYER:

Depth (m)= 0.15 Porosity = 0.20
 Maximum Mulch layer Volume (cu.m.)= 0.61

ENGINEERED SOIL LAYER:

Soil moisture = 0.30 Depth (m)= 0.15
 width (m)= 0.85 Length (m)= 23.78
 Porosity = 0.40 Infiltration (m/hr)= 0.0150
 Maximum Engineered Soil layer Volume(cu.m.)= 1.21

STORAGE LAYER:

Depth (m)= 0.15 Porosity = 0.40
 Seepage (m/hr)= 0.0130
 Maximum Storage layer Volume(cu.m.)= 1.21

UNDERDRAIN LAYER:

| DEPTH (m) | DISCHARGE (cms) | DEPTH (m) | DISCHARGE (cms) |
|-----------|-----------------|-----------|-----------------|
| 0.000 | 0.000 | 0.600 | 0.010 |
| 0.100 | 0.002 | 0.700 | 0.010 |
| 0.200 | 0.005 | 0.800 | 0.011 |
| 0.300 | 0.006 | 0.900 | 0.012 |
| 0.400 | 0.007 | 1.000 | 0.013 |
| 0.500 | 0.009 | 0.000 | 0.000 |

TOTAL AVAILABLE STORAGE:

TOTAL STORAGE=Surface Ponding + Mulch Layer + Engineered soil +Storage Layer(cu.m.)=

NATIVE SOIL LAYER:

Infiltration (m/hr) = 0.0015

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|------------------|-----------|-------------|-------------|-----------|
| INFLOW:ID= 2 | 0.22 | 0.115 | 2.33 | 85.45 |
| UNDERDRAIN:ID= 4 | 0.15 | 0.000 | 4.42 | 78.46 |
| OVERFLOW:ID= 3 | 0.08 | 0.019 | 2.58 | 78.46 |

Volume Reduction Rate[(RVin-RVout)/RVin] (%)= 8.18
 Time to reach Max Ponding storage (Hr)= 4.33
 volume of water for drawdown in LID (cu.m.)= 129.53
 Volume of Max. Water Storage (cu.m.)= 0.80
 Maximum Surface Ponding And Mulch vol(cu.m.)= 128.21
 Maximum Engineered Soil Volume (cu.m.)= 1.21
 Surface Ponding And Mulch Drawdown Time(Hr)= 485.17
 Engineered Soil Drawdown time (Hr)= 489.75
 Calculated Drawdown Time (Hr)= 516.00

 ** SIMULATION:25mm **

 | Bioretention(0034) |
 | IN= 2--> OUT= 3 |
 | DT= 5.0 min |

OUTFLOW: OFF UNDERDRAIN: ON

SURFACE PONDING LAYER:

Max. Ponding Storage(cu.m.)= 127.61

| STAGE (m) | AREA (m2) | STAGE (m) | AREA (m2) |
|-----------|-----------|-----------|-----------|
| 0.000 | 22.551 | 0.500 | 564.000 |
| 0.150 | 70.304 | 0.550 | 794.000 |
| 0.250 | 104.000 | 0.560 | 860.000 |
| 0.400 | 282.000 | 0.000 | 0.000 |

0.450 393.000 | 0.000 0.000

MULCH LAYER:

Depth (m)= 0.15 Porosity = 0.20
Maximum Mulch layer Volume (cu.m.)= 0.61

ENGINEERED SOIL LAYER:

Soil moisture = 0.30 Depth (m)= 0.15
width (m)= 0.85 Length (m)= 23.78
Porosity = 0.40 Infiltration (m/hr) = 0.0150
Maximum Engineered Soil layer Volume(cu.m.)= 1.21

STORAGE LAYER:

Depth (m)= 0.15 Porosity = 0.40
Seepage (m/hr) = 0.0130
Maximum Storage layer volume(cu.m.)= 1.21

UNDERDRAIN LAYER:

Table with 4 columns: DEPTH (m), DISCHARGE (cms), DEPTH (m), DISCHARGE (cms). Rows show discharge values at various depths from 0.000 to 0.500.

TOTAL AVAILABLE STORAGE:

TOTAL STORAGE=Surface Ponding + Mulch Layer + Engineered soil +Storage Layer(cu.m.)=

NATIVE SOIL LAYER:

Infiltration (m/hr) = 0.0015

Table with 5 columns: ID, AREA (ha), QPEAK (cms), TPEAK (hrs), R.V. (mm). Rows include INFLOW:ID= 2, UNDERDRAIN:ID= 4, and OVERFLOW:ID= 3.

Volume Reduction Rate[(RVin-RVout)/RVin] (%)= 12.70
Time to reach Max Ponding storage (Hr)= 4.33
Volume of water for drawdown in LID (cu.m.)= 41.03
Volume of Max. Water Storage (cu.m.)= 0.80
Maximum Surface Ponding And Mulch Vol(cu.m.)= 40.02
Maximum Engineered Soil Volume (cu.m.)= 1.21
Surface Ponding And Mulch Drawdown Time(Hr)= 148.42
Engineered Soil Drawdown time (Hr)= 153.00
Calculated Drawdown Time (Hr)= 179.25

** SIMULATION:C100-6 **

Bioretention(0034) |
| IN= 2--> OUT= 3 |
| DT= 5.0 min |
|-----|
OUTFLOW: OFF UNDERDRAIN: ON

SURFACE PONDING LAYER:

Max. Ponding Storage(cu.m.)= 127.61

Table with 4 columns: STAGE (m), AREA (m2), STAGE (m), AREA (m2). Rows show area values at various stages from 0.000 to 0.450.

MULCH LAYER:

Depth (m)= 0.15 Porosity = 0.20
Maximum Mulch layer Volume (cu.m.)= 0.61

ENGINEERED SOIL LAYER:

Soil moisture = 0.30 Depth (m)= 0.15
width (m)= 0.85 Length (m)= 23.78
Porosity = 0.40 Infiltration (m/hr) = 0.0150
Maximum Engineered Soil layer Volume(cu.m.)= 1.21

STORAGE LAYER:

Depth (m)= 0.15 Porosity = 0.40
Seepage (m/hr) = 0.0130
Maximum Storage layer volume(cu.m.)= 1.21

UNDERDRAIN LAYER:

| DEPTH (m) | DISCHARGE (cms) | DEPTH (m) | DISCHARGE (cms) |
|-----------|-----------------|-----------|-----------------|
| 0.000 | 0.000 | 0.600 | 0.010 |
| 0.100 | 0.002 | 0.700 | 0.010 |
| 0.200 | 0.005 | 0.800 | 0.011 |
| 0.300 | 0.006 | 0.900 | 0.012 |
| 0.400 | 0.007 | 1.000 | 0.013 |
| 0.500 | 0.009 | 0.000 | 0.000 |

TOTAL AVAILABLE STORAGE:

TOTAL STORAGE=Surface Ponding + Mulch Layer + Engineered soil +Storage Layer(cu.m.)=

NATIVE SOIL LAYER:

Infiltration (m/hr) = 0.0015

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|------------------|-----------|-------------|-------------|-----------|
| INFLOW:ID= 2 | 0.22 | 0.094 | 2.33 | 70.01 |
| UNDERDRAIN:ID= 4 | 0.18 | 0.000 | 4.42 | 63.03 |
| OVERFLOW:ID= 3 | 0.04 | 0.005 | 3.25 | 63.03 |

Volume Reduction Rate[(RVin-RVout)/RVin] (%)= 9.96
 Time to reach Max Ponding storage (Hr)= 4.33
 Volume of water for drawdown in LID (cu.m.)= 129.52
 Volume of Max. Water Storage (cu.m.)= 0.80
 Maximum Surface Ponding And Mulch vol(cu.m.)= 128.21
 Maximum Engineered Soil Volume (cu.m.)= 1.21
 Surface Ponding And Mulch Drawdown Time(Hr)= 485.17
 Engineered Soil Drawdown time (Hr)= 489.75
 Calculated Drawdown Time (Hr)= 516.00

 ** SIMULATION:C5-6 **

 | Bioretention(0034) | OUTFLOW: OFF UNDERDRAIN: ON
 | IN= 2--> OUT= 3 |
 | DT= 5.0 min |

SURFACE PONDING LAYER:

Max. Ponding Storage(cu.m.)= 127.61

| STAGE (m) | AREA (m2) | STAGE (m) | AREA (m2) |
|-----------|-----------|-----------|-----------|
| 0.000 | 22.551 | 0.500 | 564.000 |
| 0.150 | 70.304 | 0.550 | 794.000 |
| 0.250 | 104.000 | 0.560 | 860.000 |
| 0.400 | 282.000 | 0.000 | 0.000 |
| 0.450 | 393.000 | 0.000 | 0.000 |

MULCH LAYER:

Depth (m)= 0.15 Porosity = 0.20
 Maximum Mulch layer Volume (cu.m.)= 0.61

ENGINEERED SOIL LAYER:

Soil moisture = 0.30 Depth (m)= 0.15
 width (m)= 0.85 Length (m)= 23.78
 Porosity = 0.40 Infiltration (m/hr) = 0.0150
 Maximum Engineered Soil layer Volume(cu.m.)= 1.21

STORAGE LAYER:

Depth (m)= 0.15 Porosity = 0.40
 Seepage (m/hr) = 0.0130
 Maximum Storage layer volume(cu.m.)= 1.21

UNDERDRAIN LAYER:

| DEPTH (m) | DISCHARGE (cms) | DEPTH (m) | DISCHARGE (cms) |
|-----------|-----------------|-----------|-----------------|
| 0.000 | 0.000 | 0.600 | 0.010 |
| 0.100 | 0.002 | 0.700 | 0.010 |
| 0.200 | 0.005 | 0.800 | 0.011 |
| 0.300 | 0.006 | 0.900 | 0.012 |
| 0.400 | 0.007 | 1.000 | 0.013 |
| 0.500 | 0.009 | 0.000 | 0.000 |

TOTAL AVAILABLE STORAGE:

TOTAL STORAGE=Surface Ponding + Mulch Layer + Engineered soil +Storage Layer(cu.m.)=

NATIVE SOIL LAYER:

Infiltration (m/hr) = 0.0015

| | AREA (ha) | QPEAK (cms) | TPEAK (hrs) | R.V. (mm) |
|------------------|--------------|----------------|----------------|--------------|
| INFLOW:ID= 2 | 0.22 | 0.033 | 2.17 | 39.58 |
| UNDERDRAIN:ID= 4 | 0.22 | 0.000 | 4.42 | 34.79 |
| OVERFLOW:ID= 3 | 0.00 | 0.000 | 0.00 | 0.00 |

| | |
|--|--------|
| Volume Reduction Rate $[(RVin-RVout)/RVin]$ (%)= | 12.10 |
| Time to reach Max Ponding storage (Hr)= | 4.33 |
| Volume of water for drawdown in LID (cu.m.)= | 87.39 |
| Volume of Max. Water Storage (cu.m.)= | 0.80 |
| Maximum Surface Ponding And Mulch Vol (cu.m.)= | 86.15 |
| Maximum Engineered Soil Volume (cu.m.)= | 1.21 |
| Surface Ponding And Mulch Drawdown Time(Hr)= | 324.83 |
| Engineered Soil Drawdown time (Hr)= | 329.42 |
| Calculated Drawdown Time (Hr)= | 355.67 |



Appendix C - Sanitary Servicing Calculations



Appendix D - Fire Flow Demand Calculations

Appendix D- Fire Flow Demand Requirements

D.1.1 - Fire Flow Demand Requirements (Fire Underwriters Survey (FUS Guidelines))

Fire Flow Formula

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

F = Required fire flow (L/min)

C = Coefficient related to the type of construction

C_{1.5} = 1.5 for Type V (Mass Timber) or Type IV-A (Mass Timber)

C_{1.0} = 1.0 for Type III (Ordinary) or Type IV-C (Mass Timber)

C_{0.9} = 0.9 for Type IV-B (Mass Timber)

C_{0.8} = 0.8 for Type IV-A (Mass Timber) or Type II (Noncombustible)

C_{0.6} = 0.6 for Type I (Fire Resistive)

A = Total floor area in square metres

Designed ZB
Checked AS
Dwg. Reference C1
Jp2g project No 21-5089A

New School Building

Design Parameters*

Type of Building Construction = I (Noncombustible)

Floor Area*** = 2700.0 m²

Occupancy and Contents Class Limited combustible

Sprinkler System = Automatic sprinkler system conforming to NFPA standards

Sprinkler Building Coverage = Complete building coverage

Factor of Building Coverage X = 1

Number of Storeys = 3

Exposure Parameters*

| | West | North | East | South | |
|--------------------------|----------|-------|----------|-------|--|
| Separation Distance = | over 30m | NA | over 30m | NA | m |
| Length of Exposed Wall = | NA | NA | NA | NA | m |
| Length-Height Factor = | NA | NA | NA | NA | m-storeys (up to a maximum of 5-storeys) |

| Building Construction | Floor Area** | Coefficient | A Fire Flow (F) | Adjustments (increases or decreases) | | | | | | | | Final Adjusted Fire Flow | Final Adjusted Fire Flow | | |
|--------------------------|--------------|-------------|--------------------|--------------------------------------|----------|---------------------------------|---------|-------------|------|-------|----------------|---------------------------------|---------------------------|---------|-------|
| | | | | B = A +/- % | | C = B x % | | D = B x % | | | | | | | |
| | | | | Occupancy | | Sprinkler | | Exposure*** | | | | | | | |
| | | | % | Adjusted Fire Flow(s) (L/min) | % | Fire Adjustment Flow(s) (L/min) | West | North | East | South | Total Exposure | Fire Adjustment Flow(s) (L/min) | E = B - C + D (L/min)* | (L/s) | |
| Type II (Noncombustible) | 8,100.0 | 0.8 | 16,000.0 | -0.15 | 13,600.0 | 50% | 6,800.0 | 0% | 0% | 0% | 0% | 0% | 0.0 | 7,000.0 | 116.7 |

*Water Supply for Public Protection (Fire Underwriters Survey, 2020).

***Including all stories



Appendix E - Boundary Conditions and Pressure Check

Boundary Conditions 6600 Carrière Street

Provided Information

| Scenario | Demand | |
|----------------------|--------|--------|
| | L/min | L/s |
| Average Daily Demand | 16 | 0.27 |
| Maximum Daily Demand | 25 | 0.41 |
| Peak Hour | 44 | 0.74 |
| Fire Flow Demand #1 | 7,000 | 116.67 |

Location



Results

Connection 1 – Carrière St.

| Demand Scenario | Head (m) | Pressure ¹ (psi) |
|---------------------|----------|-----------------------------|
| Maximum HGL | 130.3 | 62.8 |
| Peak Hour | 127.3 | 58.6 |
| Max Day plus Fire 1 | 115.7 | 42.0 |

Ground Elevation = 86.1 m

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

D.1.2 - Existing Water Boundary Conditions

Water Demands

| | |
|-----------------------------------|------------|
| Average Daily Demand: | 0.27 l/s |
| Maximum Daily Demand: | 0.41 l/s |
| Maximum Hour Demand: | 0.74 l/s |
| Fire Flow Demand: | 116.67 l/s |
| Maximum Daily + Fire Flow Demand: | 117.08 l/s |

Design Parameters

| | |
|------------------------------|--------|
| Pipe Diameter: | 150 mm |
| Pipe Material: | PVC |
| Pipe Length (total network): | 74.6 m |
| Finished Floor Elevation: | 87.00 |
| Pavement (R.O.W.) Elevation: | 86.10 |

Boundary Conditions

| | |
|------------------|---------|
| Max. HGL: | 130.3 m |
| Min HGL: | 127.3 m |
| Max. Day + Fire: | 115.7 m |

Boundary Condition Check

Check water pressure at municipal connection:

| | |
|---------------------------------|-------------|
| Min. HGL - Pavement elevation = | 41.20 m |
| = | 58.59 psi* |
| = | 403.93 kPa* |

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

Pressure at municipal connection

OK

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

| | |
|---|---------------|
| Min. HGL - Finished floor elevation - Friction Loss** = | 40.30 m |
| = | 57.3 psi*** |
| = | 395.09 kPa*** |

**Friction loss calculated using the Hazen-Williams Equation

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

Pressure at building connection (at max. hour demand)

OK

Hazen-Williams Equation for Pressure Loss in Pipes

SI Units

Specified Data

| | | |
|---|-------|---------------------------|
| l = length of pipe (m) | 74.62 | |
| c = Hazen-Williams roughness constant | 150 | |
| q = volume flow (liter/sec) | 0.74 | 0.00074 m ³ /s |
| d_h = inside or hydraulic diameter (mm) | 150 | |

Calculated Pressure Loss

f = friction head loss in mm of water per 100 m of pipe (mm H₂O per 100 m pipe) 1.66

f = friction head loss in kPa per 100 m of pipe (kPa per 100 m pipe) 0.02

Head loss (mm H₂O) 1.24 **0.001239 METERS**

Head loss (kPa) 0.01

Calculated Flow Velocity

v = flow velocity (m/s) 0.04

| Material | Hazen-Williams Coefficient - c - |
|------------------------------------|---------------------------------------|
| ABS - Acrylonite Butadiene Styrene | 130 |
| Aluminum | 130 - 150 |
| Asbestos Cement | 140 |
| Asphalt Lining | 130 - 140 |
| Brass | 130 - 140 |
| Brick sewer | 90 - 100 |
| Cast-Iron - new unlined (CIP) | 130 |
| Cast-Iron 10 years old | 107 - 113 |
| Cast-Iron 20 years old | 89 - 100 |
| Cast-Iron 30 years old | 75 - 90 |
| Cast-Iron 40 years old | 64-83 |
| Cast-Iron, asphalt coated | 100 |
| Cast-Iron, cement lined | 140 |
| Cast-Iron, bituminous lined | 140 |

| | |
|---|-----------|
| Cast-Iron, sea-coated | 120 |
| Cast-Iron, wrought plain | 100 |
| Cement lining | 130 - 140 |
| Concrete | 100 - 140 |
| Concrete lined, steel forms | 140 |
| Concrete lined, wooden forms | 120 |
| Concrete, old | 100 - 110 |
| Copper | 130 - 140 |
| Corrugated Metal | 60 |
| Ductile Iron Pipe (DIP) | 140 |
| Ductile Iron, cement lined | 120 |
| Fiber | 140 |
| Fiber Glass Pipe - FRP | 150 |
| Galvanized iron | 120 |
| Glass | 130 |
| Lead | 130 - 140 |
| Metal Pipes - Very to extremely smooth | 130 - 140 |
| Plastic | 130 - 150 |
| Polyethylene, PE, PEH | 140 |
| Polyvinyl chloride, PVC, CPVC | 150 |
| Smooth Pipes | 140 |
| Steel new unlined | 140 - 150 |
| Steel, corrugated | 60 |
| Steel, welded and seamless | 100 |
| Steel, interior riveted, no projecting rivets | 110 |
| Steel, projecting girth and horizontal rivets | 100 |
| Steel, vitrified, spiral-riveted | 90 - 110 |
| Steel, welded and seamless | 100 |
| Tin | 130 |
| Vitrified Clay | 110 |
| Wrought iron, plain | 100 |
| Wooden or Masonry Pipe - Smooth | 120 |
| Wood Stave | 110 - 120 |



Appendix F - Pre-Consultation & Development Servicing Study Checklist

Summary of the pre-application consultation meeting held on 9 May 2022.

PLANNING

Evode Rwagasore – Evode.Rwagasore@ottawa.ca

Please refer to related email for submission requirements

TRANSPORTATION

Josiane Gervais – Josiane.Gervais@ottawa.ca

Jenny

- Follow Transportation Impact Assessment Guidelines:
 - o Submit a Screening Form at your earliest convenience to josiane.gervais@ottawa.ca. A full Transportation Impact Assessment is required if any of the triggers on the screening form are satisfied.
 - o Start this process asap. The application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
 - o An update to the *TRANS Trip Generation Manual* has been completed (October 2020). This manual is to be utilized for this TIA. A copy of this document can be provided upon request.
- Clear throat length required is 15m off a collector roadway. Ensure this length is provided. The clear throat length is measured from the ends of the driveway curb return radii at the roadway and the point of first conflict on-site.
- TMP includes Transit Priority Measures (Isolated Measures) along Orleans Blvd (Affordable Network).
- As the proposed site is institutional and for general public use, AODA legislation applies.
 - o Ensure all crosswalks located internally on the site provide a TWSI at the depressed curb, per requirements of the Integrated Accessibility Standards Regulation under the AODA.
 - o Clearly define accessible parking stalls and ensure they meet AODA standards (include a 1.5m wide access aisle next to the parking stall and a pedestrian curb ramp at the end of the access aisle, as required).
 - o Please consider using the City's Accessibility Design Standards, which provide a summary of AODA requirements. <https://ottawa.ca/en/city-hall/creating-equal-inclusive-and-diverse-city/accessibility-services/accessibility-design-standards-features#accessibility-design-standards>
- As a reduction in parking is being sought, consider providing TDM measures to support this reduction. Measures may include providing Presto passes to staff, increasing bicycle parking, etc.
- On site plan:
 - o Ensure site access meets the City's Private Approach Bylaw.
 - o Show dimensions for site elements (i.e. lane/aisle widths, access width and throat length, parking stalls, sidewalks, pedestrian pathways, etc.)
 - o Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
 - o Turning movement diagrams required for all accesses showing the largest vehicle to access/egress the site.

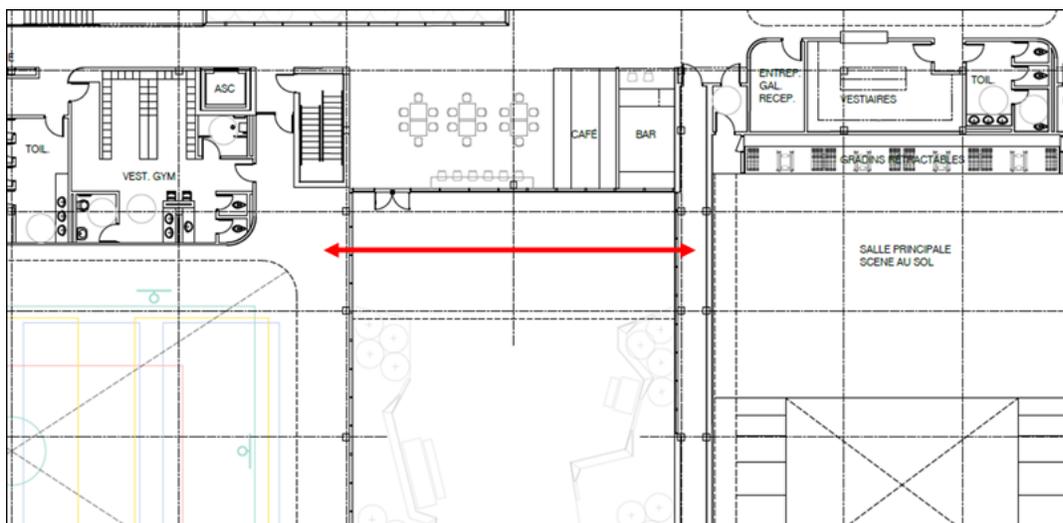
- Turning movement diagrams required for internal movements (loading areas, garbage).
- Show all curb radii measurements; ensure that all curb radii are reduced as much as possible and fall within TAC guidelines (Figure 8.5.1).
- Sidewalk is to be continuous across access as per City Specification 7.1.
- Parking stalls at the end of dead-end parking aisles require adequate turning around space.
- Noise Impact Studies required for the following:
 - Road, as site is on a collector roadway.

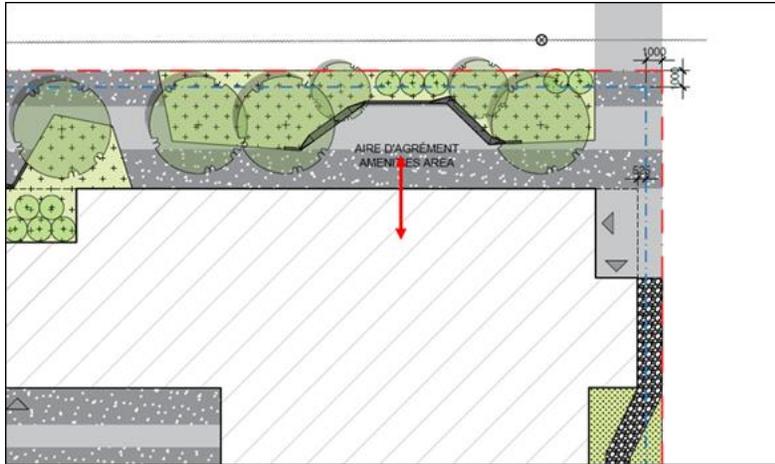
URBAN DESIGN

Jenny

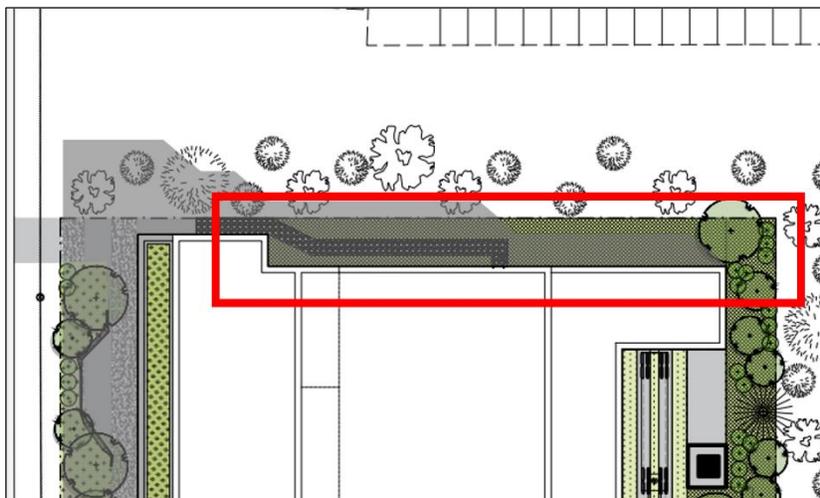
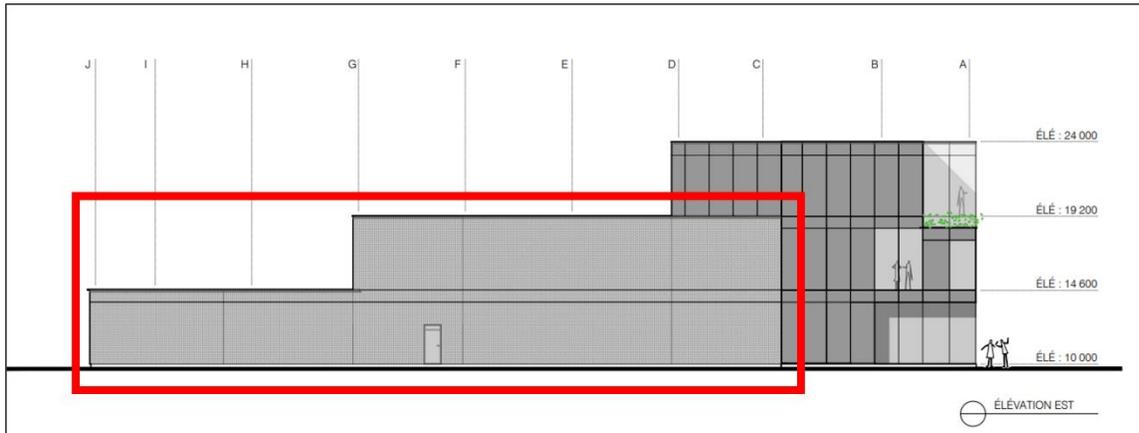
Adrian van Wyk – adrian.vanwyk@ottawa.ca

1. PRUD appreciates the detailed design package submitted and the analysis that has informed the evolution of this design.
2. An Urban Design Brief will be required as part of a complete application. Please see the Terms of Reference attached.
3. The requested reduction in the number of parking spaces required should be accompanied by an increase in the number of bicycle spaces provided.
4. The applicant is encouraged to limit the amount of impervious concrete and asphalt as far as possible.
5. The applicant is encouraged to maximize the number of sustainable design features in this proposal where possible (e.g., light coloured reflective materials, tree planting, green roofs, swales, etc.).
6. Additional entrances are recommended on the ground floor facing the internal courtyard and the foyer facing the front amenity area and to ensure these spaces are well activated and an extension of indoor and outdoor space is created.





7. Care should be taken to ensure that the east side yard is safe and well lit, and a blank wall condition is avoided on the east façade by breaking it up through variation in colour/material/fenestration.



FORESTRY

Mark Richardson – Mark.Richardson@ottawa.ca

- 1) please submit a TCR with their application and a tree permit is needed prior to any removal
- 2) please note that all trees on the property line as well as trees on adjacent properties that are close to the property line must be included in the TCR
- 3) City TCR requirements are sent to you, and include tree planting specifications for the Landscape Plan
- 3a) please note the minimum ad

not Selma

David to ask Marietta, project. for Forrester

TCR requirements:

1. a Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City
 - a. an approved TCR is a requirement of Site Plan approval.
 - b. The TCR may be combined with the LP provided all information is supplied
2. Any removal of privately-owned trees 10cm or larger in diameter, or city-owned trees of any diameter requires a tree permit issued under the Tree Protection Bylaw (Bylaw 2020 – 340); the permit will be based on an approved TCR and made available at or near plan approval.
3. The Planning Forester from Planning and Growth Management as well as foresters from Forestry Services will review the submitted TCR
 - a. If tree removal is required, both municipal and privately-owned trees will be addressed in a single permit issued through the Planning Forester
 - b. Compensation may be required for city owned trees – if so, it will need to be paid prior to the release of the tree permit
4. the TCR must list all trees on site, as well as off-site trees if the CRZ extends into the developed area, by species, diameter and health condition
5. please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)
6. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained
7. All retained trees must be shown, and all retained trees within the area impacted by the development process must be protected as per City guidelines available at [Tree Protection Specification](#) or by searching Ottawa.ca
 - a. the location of tree protection fencing must be shown on the plan
 - b. show the critical root zone of the retained trees
 - c. if excavation will occur within the critical root zone, please show the limits of excavation
8. the City encourages the retention of healthy trees; if possible, please seek opportunities for retention of trees that will contribute to the design/function of the site.
9. For more information on the process or help with tree retention options, contact Mark Richardson mark.richardson@ottawa.ca or on [City of Ottawa](#)

Selma, 100%

LP tree planting requirements: ▲

For additional information on the following please contact tracy.smith@Ottawa.ca

Minimum Setbacks

- Maintain 1.5m from sidewalk or MUP/cycle track or water service laterals.
- Maintain 2.5m from curb
- Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.
- Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing, except where otherwise approved in naturalization / afforestation areas. Adhere to Ottawa Hydro’s planting guidelines (species and setbacks) when planting around overhead primary conductors.

from foundations as well

Tree specifications

- Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
- Maximize the use of large deciduous species wherever possible to maximize future canopy coverage
- Tree planting on city property shall be in accordance with the City of Ottawa’s Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
- Plant native trees whenever possible
- No root barriers, dead-man anchor systems, or planters are permitted.
- No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

Hard surface planting

- Curb style planter is highly recommended
- No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.
- Trees are to be planted at grade

Soil Volume

- Please document on the Landscape Plan that adequate soil volumes can be met:

| Tree Type/Size | Single Tree Soil Volume (m3) | Multiple Tree Soil Volume (m3/tree) |
|----------------|------------------------------|-------------------------------------|
| Ornamental | 15 | 9 |
| Columnar | 15 | 9 |
| Small | 20 | 12 |
| Medium | 25 | 15 |
| Large | 30 | 18 |
| Conifer | 25 | 15 |

Please note that these soil volumes are not applicable in cases with Sensitive Marine Clay.

Sensitive Marine Clay

- Please follow the City’s 2017 Tree Planting in Sensitive Marine Clay guidelines

Tree Canopy Cover

- The landscape plan shall show how the proposed tree planting will replace and increase canopy cover on the site over time, to support the City's 40% urban forest canopy cover target.
- At a site level, efforts shall be made to provide as much canopy cover as possible, through tree planting and tree retention, with an aim of 40% canopy cover at 40 years, as appropriate.
- Indicate on the plan the projected future canopy cover at 40 years for the site.

ENGINEERING

Will Curry – William.Curry@ottawa.ca

Submission required:

- ✓ Site Plan
- ✓ Topographical Plan of Survey Plan with a published Benchmark
- Demolition Plan (include service blanking's at main)
- ✓ Grading & Drainage Plan
- ✓ General Plan of Services
- ✓ Erosion & Sediment Control Plan
- ✓ Catchment Plan (post)
- ✓ Design Brief and Stormwater Management Report
- Geotechnical Report
- TCR & Landscape Plan
- Stationary noise Study

Sometimes combined with Site Servicing Plan

have

by others

- * Storm Easement to be protected as shown on 5R 08061, Part 2. No planting of Trees in the Easement.
- * Title Search required based upon Instrument #. It determines what is permitted.

Consider Earthbin, Ecoloxia or Molok. Waste subsurface containers.

1. Minimum Drawing and File Requirements- All Plans

Plans are to be submitted on standard **A1 size (594mm x 841mm)** sheets, utilizing an appropriate Metric scale (1:200, 1:250, 1:300, 1:400, or 1:500).

Provide individual PDF of the DWGs and for reports please provide one PDF file of the reports.

All PDF documents are to be unlocked and flattened. No reports submitted to be older than 5 years.

SWM Criteria:

- ? Obtain existing Plans/reports geoinformation@ottawa.ca

Design Criteria - Civil Engineer to contact me directly if need be. william.curry@ottawa.ca

Storm Post to pre, C of .5, post tc 10

Onsite, 2-year pipe minimum and store up to 100-year on site. No surface 2-year ponding on site.

Consider LID on site.

Permissible ponding of 350mm for 100-year. No spilling to adjacent sites (prevent uncontrolled to adjacent sites). At 100-year ponding elevation you must spill to City ROW. 100-year Spill elevation must be 300mm lower than any building opening

*The City reserves the right to make changes to any decisions made herein should new information or data present other information.

ENVIRONMENT

Sami Rehman, Environmental Planner – Sami.Rehman@ottawa.ca

- no environmental concerns with this proposal, so I don't think I need to participate.
 - you are encourage them to review the City's Bird-safe Design Guidelines and incorporate bird-safe design elements into their proposal.
-



Appendix G Roof Drain and ICD Product Data Sheets



Adjustable Accutrol Weir

Tag: _____

Adjustable Flow Control for Roof Drains

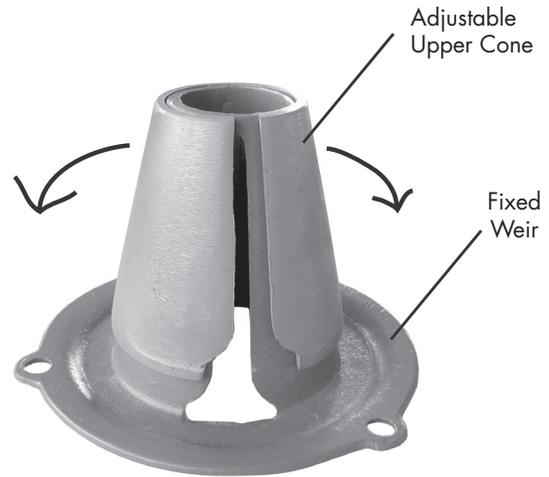
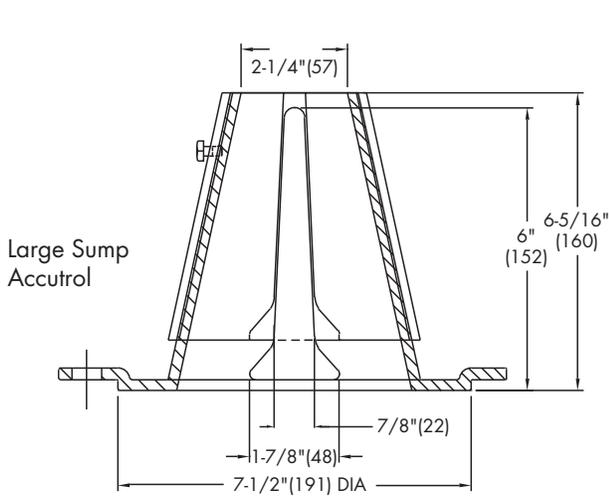
ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the flow rate for depths over 2" of head, set the slot in the adjustable upper cone according to the flow rate required. Refer to Table 1 below.
 Note: Flow rates are directly proportional to the amount of weir opening that is exposed.

EXAMPLE:

For example, if the adjustable upper cone is set to cover 1/2 of the weir opening, flow rates above 2" of head will be restricted to 2-1/2 gpm per inch of head.

Therefore, at 3" of head, the flow rate through the Accutrol Weir that has 1/2 the slot exposed will be:
 [5 gpm (per inch of head) x 2 inches of head] + 2-1/2 gpm (for the third inch of head) = 12-1/2 gpm.



1/2 Weir Opening Exposed Shown Above

TABLE 1. Adjustable Accutrol Flow Rate Settings

| Weir Opening Exposed | 1" | 2" | 3" | 4" | 5" | 6" |
|----------------------|--------------------------------|----|-------|------|-------|----|
| | Flow Rate (gallons per minute) | | | | | |
| Fully Exposed | 5 | 10 | 15 | 20 | 25 | 30 |
| 3/4 | 5 | 10 | 13.75 | 17.5 | 21.25 | 25 |
| 1/2 | 5 | 10 | 12.5 | 15 | 17.5 | 20 |
| 1/4 | 5 | 10 | 11.25 | 12.5 | 13.75 | 15 |
| Closed | 5 | 5 | 5 | 5 | 5 | 5 |

5 GPM * 28 Roof Drains = 140 GPM @ 6" Head (8.8L/s)

Job Name _____
 Job Location _____
 Engineer _____

Contractor _____
 Contractor's P.O. No. _____
 Representative _____

Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Service. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.

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 Canada: Tel: (905) 332-4090 • Fax: (905) 332-7068 • Watts.ca
 Latin America: Tel: (52) 81-1001-8600 • Fax: (52) 81-8000-7091 • Watts.com





Appendix H OGS Data Sheets

