Stormwater Management Report and Servicing Brief

Proposed Halo Car Wash
Lancelot Drive & Hunt Club Rd.
Nepean, Ontario

Prepared for:

Halo Car Wash Inc.
18 Adelaide Street
Maxville, ON
K0C 1T0

Attention: Mr. Jordan Lupovici

LRL File No.: 240272

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1 INTRODUCTION AND SITE DESCRIPTION

LRL Associates Ltd. was retained by Halo Car Wash Inc. to complete a Stormwater Management Analysis and Servicing Brief for the construction of a car-wash development located at the North of Lancelot Drive and Hunt Club Road intersection, Nepean, Ontario. The property is legally described as Part of Lot 28, Concession 1 (Rideau Front), geographic Township of Nepean and Zoning AM-10 – Light Industrial. The location of the proposed development can be viewed in Figure 1.

Figure 1: Aerial View of Proposed Development

The development proposes construction of a Halo Tunnel Car Wash (±513 sqm). The site will be accessible from a 9.0 m wide entrance located off Lancelot Drive. For additional details of the proposed development, refer to Site Plan C201 included in Appendix E. For Geotechnical considerations related to site servicing and pavement structures, refer to the Geotechnical Investigation report prepared by SLT (March 24, 2024).

This report has been prepared in consideration of the terms and conditions noted above and with the civil drawings prepared for the proposed new development. Should there be any changes in

the design features, which may relate to the stormwater management and servicing considerations, LRL Associates Ltd. should be advised to review the report recommendations.

2 EXISTING SITE AND DRAINAGE DESCRIPTION

The subject site measures approximately 0.346 ha and is currently occupied with a paved parking lot, with minimal landscaping. Elevations of existing site range between 87.50 near the southwest corner to 88.90 at the northeast corner of the site.

City of Ottawa mapping (geoOttawa) indicates the following infrastructures located within the adjacent right-of-way:

Lancelot Drive

- 305 mm diameter PVC watermain
- 250 mm diameter PVC sanitary sewer
- 900 mm diameter concrete storm sewer.

The design intentions are to connect sanitary, storm and water off existing infrastructure on Lancelot Drive.

3 SCOPE OF WORK

As per applicable guidelines, the scope of work includes the following:

Stormwater management

- Calculate the allowable stormwater release rate.
- Calculate the anticipated post-development stormwater release rates.
- Demonstrate how the target quantity control objectives will be achieved.
- Demonstrate how the target quality control objectives will be achieved.

Water services

- Calculate the expected water supply demand at average and peak conditions.
- Calculate the required fire flow as per the Fire Underwriters Survey (FUS) method.
- Confirm the adequacy of water supply and pressure during peak flow and fire flow.
- Describe the proposed water distribution network and connection to the existing system.

Sanitary services

- Describe the existing sanitary sewers available to receive wastewater from the proposed development.

- Calculate peak flow rates from the proposed development.
- Describe the proposed sanitary sewer system.

4 REGULATORY APPROVALS

Given the industrial use of the proposed building, an Environmental Compliance Approval (ECA) is expected to be required for the proposed stormwater management work within the site. A Permit to Take Water is not anticipated to be required for pumping requirements for sewer installation. The Rideau Valley Conservation Authority (RVCA) will need to be consulted to obtain municipal approval for site development. No other approval requirements from other regulatory agencies are anticipated.

5 WATER SUPPLY AND FIRE PROTECTION

5.1 Existing Water Supply Services

The subject property is located to the east of an existing 305 mm dia. watermain along Lancelot Drive.

5.2 Water Supply Servicing Design

Since the average water demand exceeds 50 m^3/day, a looped system is proposed to ensure redundancy. The proposed water servicing network includes two (2) 100 mm dia. water service lines, which will be connected to the existing 300 mm dia. watermain on Lancelot Dr. at the north end of the site. For water servicing layout, refer to Site Servicing Plan C401 in Appendix E.

Table 1 summarizes the City of Ottawa Design Guidelines design parameters employed in the preparation of the water demand estimate.

Table 1: City of Ottawa Water Servicing Design Parameters

Design Parameters	Value
Average Day Demand - Commercial	28,000 L/gross ha/day
Average Day Demand - Light Industrial	35,000 L/gross ha/day
Maximum Day Demand-Commercial/Industrial	1.5 × Average Day Demand

Maximum Hour Demand-Commercial/Industrial	1.8 × Maximum Day Demand
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
The maximum pressure in the distribution system shall not exceed	552 kPa (80 psi)
Desired operating pressure during Maximum Day Flow	345 kPa (50 psi) to 552 kPa (80 psi)
Minimum allowable pressure during Peak Hour Flow	275 kPa (40 psi)
Minimum allowable pressure during Fire Flow Conditions	140 kPa (20 psi)

Below is a summary of anticipated water demands calculated by using the parameters mentioned in Table 1 together with anticipated car wash demand. Refer to Appendix B for calculation details.

- Average Day Demand = 1.23 L/s
- Maximum Day Demand = 2.19 L/s
- Peak Hour Demand = 6.54 L/s

The City of Ottawa provided boundary conditions associated with the estimated water demand (correspondence included in Appendix B). Table 2 below summarizes the boundary conditions for the proposed development. Based on the boundary conditions HGL, the residual pressures at the proposed service entry at Halo Car wash is calculated as described in Section 5.3 below.

Table 2: Summary of Boundary Conditions

Design Parameters	**Connection 1 @ Lancelot Dr**	**Connection 2 @ Merivale Rd.**
	HGL (m H_2O)	**HGL (m H_2O)**
Minimum HGL	126.0	126.0
Maximum HGL	132.3	132.3
Max Day + Fire Flow	127.2	127.3

The estimated fire flow for the proposed building was determined in accordance with Fire Underwriters Survey (FUS) using the following formula:

$$F = 220C\sqrt{A}$$

where,

F = The required fire flow (L/min)

C = Coefficient related to the type of construction

A = The total floor area (m^2)

The estimated fire flow demand is calculated 5000 L/min, see Appendix B for calculation details. The two (2) fire hydrants located at the northeast and southwest corners of the site are expected to provide required fire flow. These fire hydrants are shown on the Servicing Plan C401.

Table 3 below summarizes the aggregate fire flow of the contributing fire hydrants in proximity to the proposed subject site based on Table 18.5.4.3 of *ISTB-2018-02*.

Table 3: Fire Protection Summary Table

Fire Flow Demand (L/min)	Fire Hydrant(s) within 76m	Available Combined Fire Flow (L/min)
5000	2	2x5678=11,356

The total available fire flow from the contributing fire hydrants is equal to 11,356 L/min, which is sufficient to provide adequate fire flow for the proposed development.

5.3 Water Distribution Network Hydraulic Modeling

To provide redundancy, the subject site is proposed to be serviced by two (2) connections, separated by an isolation valve. To study the behavior of the network and obtain operating pressure under different flow scenarios, the proposed network was modeled and analyzed using EPANET software (Version 2.2). The hydraulic model uses two supply reservoirs with HGL provided by City Boundary Conditions at different flow scenarios. The first connection is represented by Reservoir R1 at Lancelot Dr whereas the second connection is represented by Reservoir R2 at Merivale Rd. A total of three (3) scenarios were analyzed, as summarized below:

Scenario 1 - Average Day Demand

The anticipated average day demands were applied to the service entry nodes (J6 & J7) of the proposed Car Wash building. The residual pressures, calculated using EPANET hydraulic analysis, ranged from 61.19 – 62.44 psi. As the residual maximum pressure is less than 80 psi, a pressure reducing valve is not required.

Scenario 2 - Peak Hour Demand

Under peak hour conditions, the minimum pressure observed was 52.22 psi, which is greater than the required minimum of 40 psi, and therefore acceptable.

Scenario 3 - Fire Flow Condition

A designed fire flow of 5700 L/min (1505.78 GPM) was applied to the fire hydrant node J14(FH), with the maximum day domestic demand applied simultaneously at the service entry nodes (J6 & J7). The minimum pressure obtained in this condition is 47.96 psi, which is greater than the required minimum of 20 psi, and therefore acceptable.

For detailed modeling results, refer to Appendix B.

6 SANITARY SERVICE

6.1 Existing Sanitary Sewer Services

There is an existing 250 mm dia. sanitary sewer along Lancelot Drive at the north/west end of the subject site.

6.2 Sanitary Sewer Servicing Design

The proposed development will be serviced via 150 mm dia. sanitary sewers which will be connected to the existing 250mm dia. sanitary sewer on Lancelot Dr. Refer to Servicing Plan C401 for the proposed sanitary servicing layout. Table 4 summarizes the City of Ottawa Design Guidelines design parameters used in the estimation of wastewater flow.

Table 4: City of Ottawa Wastewater Design Parameters

Design Parameters	Value
Commercial Average Flow	28,000 L/gross ha/day

Average Light Industrial Flow	35,000 L/gross ha/day
Commercial Peak Factor	1.5
Industrial Peak Factor	Appendix 4-B (City Guidelines-Sewer)
Infiltration Allowance (Dry Weather)	0.05 L/s/gross ha
Infiltration Allowance (Wet Weather)	0.28 L/s/gross ha
Total Infiltration Allowance	0.33 L/s/gross ha

Based on these parameters, City of Ottawa's Appendix 4-A (Daily Sewage Flow for Various Types of Establishments), and the car wash estimated water uses information as per Halo Car Wash, the anticipated post-development peak design wastewater flow for the subject site is calculated 6.26 L/s. Refer to Appendix C for calculation details.

7 STORMWATER MANAGEMENT

7.1 Existing Stormwater Infrastructure

There is an existing 900 mm concrete storm sewer along the west extent of the site (Lancelot Drive). In pre-development conditions, the stormwater runoff would flow uncontrolled through a series of existing catch basin and PVC storm lead to the existing sewer. Refer to Appendix D for pre- and post-development catchment information, as well as as-built drawings in Appendix F.

7.2 Design Criteria

The stormwater management criteria for this development is based on pre-consultation meeting with the City of Ottawa officials, the City of Ottawa Sewer Design Guidelines, 2012 (City standards), as well as the Ministry of the Environment's Stormwater Management, Planning and Design Manual, 2003.

7.2.1 Water Quality

For quality control, based on the pre-consultation meeting note, the subject site is required to provide an enhanced water quality protection (80% TSS removal). To meet water quality objectives, the proposed stormwater management system includes an Oil/Grit Separator (OGS), specifically the Stormceptor Model EFO4 (or approved equivalent). The proposed unit features the following capacities:

- Maximum Sediment Capacity = 1,190 L
- Maximum Hydrocarbon Storage Capacity = 265 L

Greater details of the proposed treatment unit can be found in Appendix D.

7.2.2 Water Quantity

The allowable release rate for the subject site has been calculated to 5-yr pre-development level and was determined 50.04 L/s. The post-development storm events up to and including 100-yr storm will be controlled to 5-yr pre-development level or lower. For calculations, refer to STM design calculation sheets in Appendix D.

7.3 Method of Analysis

The modified Rational Method has been used to calculate the peak flow rate from the proposed site and to quantify the storage required for quantity control for the proposed development.

$$\boldsymbol{Q = 2.78CIA}$$

Where,

Q = Flow (L/s)

C = Runoff Coefficient

I = Rainfall Intensity (mm/hr), determined from the City of Ottawa IDF curves

A = Area (ha)

Refer to Appendix D for runoff and storage calculations.

7.4 Proposed Stormwater Quantity Controls

The proposed stormwater management quantity control for this development will be accomplished using two (2) Inlet Control Devices (ICD). Storage required, due to quantity control measures, will be accommodated through surface storage within the parking lot. A network of storm sewers is proposed to service the site which will outlet to the existing sewer along Lancelot Drive. Refer to Site Servicing Plan C401 and Appendix D for calculation details.

The existing site is delineated by catchments ECA-01 which currently drains uncontrolled towards the west and outlet to the existing catch basins. Refer to Pre-development Watershed Plan C701 (Appendix E).

The site has been analyzed, and post-development watersheds have been allocated. A few watersheds (CA-07 to CA-09) consisting of minimal concrete and grass area will flow un-controlled off the site. For additional details, refer to Post-development Watershed Plan C702 (Appendix E). Table 5 summarizes post-development drainage areas. Additional details and calculations can be found in Appendix D.

Table 5: Post-development Drainage Areas and Runoff Coefficients

Catchments	Area (ha)	Weighted Runoff Coefficient (C)
CA-01 (controlled)	0.048	0.90
CA-02 (controlled)	0.078	0.85
CA-03 (controlled)	0.008	0.20
CA-04 (controlled)	0.045	0.84
CA-05 (controlled)	0.078	0.79
CA-06 (controlled)	0.073	0.78
CA-07 (uncontrolled)	0.003	0.90
CA-08 (uncontrolled)	0.001	0.90
CA-09 (uncontrolled)	0.013	0.22
Total	**0.346**	**0.79**

Overland flow in Halo Car Wash area within watersheds CA-01 to CA-06 will be captured by a several CB/CBMHs. An 83 mm diameter orifice is proposed at STM CBMH06 to restrict the collected runoff and control the release rate at 22.97 L/s (design head = 2.47 m). In addition, an 80 mm diameter is proposed at STM CBMH03 to limit the runoff discharge at 23.41 L/s (design head=2.97 m). The orifice design calculations are provided in Appendix D.

Table 6 summarizes the release rates, storage volume required and available storage in the proposed site. Refer to Appendix D for runoff and storage calculation details.

Table 6: Summary of Stormwater Release Rates & Storage (100-yr)

Catchments	Area (ha)	Release Rate (L/s)	Storage Required (m^3)	Storage Provided (m^3)
Controlled by ICD #1 (CA-01 to CA-04)	0.179	22.97	38.86	44.20
Controlled by ICD #2 (CA-05 to CA-06)	0.151	23.41	26.15	33.04
Uncontrolled (CA-07 to CA-09)	0.016	3.29	N/A	N/A
Total	**0.346**	**49.67**	**65.01**	**77.24**

The runoff exceeding the allowable release rate will be stored on-site via surficial ponding. For 100-yr storm event, it is calculated that a total of 65.01 m^3 of storage will be required to attenuate flows to the allowable release rate of 46.38 L/s (controlled release). The required storage will be accommodated through surface ponding in the parking lot which will provide 77.24 m^3 of total storage, thus exceeds the required storage. It is important to note that the required storage for 2-yr storm will be accommodated underground within the pipes and storm structures. The storm events greater than 100-yr will flow overland towards Lancelot Drive from the spillover point provided at 100-yr HWL elevation of 87.80, refer to Grading Plan (C301). The maximum ponding elevation and depths can be found on Stormwater Management Plan C601 (Appendix E).

8 EROSION AND SEDIMENT CONTROL

During construction, erosion and sediment controls will be provided primarily via a sediment control fence to be erected along the perimeter of the site where runoff has the potential of leaving the site. Inlet sediment control devices are also to be provided in any catch basin and/or manholes in and around the site that may be impacted by the site construction. Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification OPSS.MUNI 805. Refer to Erosion and Sediment Control Plan C101 for additional details.

9 CONCLUSION

This Stormwater Management and Servicing Report for the proposed development located near the intersection of Lancelot Drive & Hunt Club Road presents the rationale and details for the servicing requirements for the subject property. In accordance with the report objectives, the servicing requirements for the development are summarized below.

Water Service

- The anticipated maximum hour demand of the proposed development is 6.54 L/s.
- The maximum required fire flow is 83.3 L/s, calculated using the FUS method.
- Two fire hydrants in proximity to the subject site will service the proposed development.
- The proposed development will be serviced with two (2) new 100 mm dia. water servicing which will connect to the existing 305 mm dia. watermain along Lancelot Drive.
- Boundary conditions received from the City of Ottawa show that adequate pressure is available to service the proposed development.

Sanitary Service

- The anticipated sanitary flow from the proposed development is 6.26 L/s.
- The proposed development will be serviced by a network of 150 mm dia. sanitary sewers which will connect to the existing 250 mm dia. SAN sewer along Lancelot Drive.

Stormwater Management

- The stormwater quality control requirements of 80% TSS removal will be achieved with the installation of an OGS (Stormceptor EFO4 or approved equivalent).
- The 100-yr post-development storm water release rates from the proposed development will remain below the allowable limit of 50.04 L/s.
- Stormwater quantity control objectives will be met by restricting the release rate to
    - 22.97 L/s (ICD#1) and stormwater surface storage within the south parking lot which will provide a total storage of 44.20 m^3.
    - 23.41 L/s (ICD#2) and stormwater surface storage within the north parking lot which will provide a total storage of 33.04 m^3.

10 REPORT CONDITIONS AND LIMITATIONS

The report conclusions are applicable only to this specific project described in the preceding pages. Any changes, modifications or additions will require a subsequent review by LRL Associates Ltd. to ensure the compatibility with the recommendations contained in this document.

If you have any questions or comments, please contact the undersigned.

Prepared by:

LRL Associates Ltd.

Maxime Longtin
Civil Engineering Technologist

Mohan Basnet, P.Eng.
Civil Engineer

APPENDIX A

Pre-consultation / Correspondance

File No.: PC2024-0451

November 20, 2024

Jonah Bonn
Landscope Ltd.
Via email: jbonn@firstbay.ca

Subject: Pre-Consultation: Meeting Feedback
Proposed Site Plan Control Application – 585 West Hunt Club

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on November 7, 2024.

Pre-Consultation Preliminary Assessment

1 ☐	**2** ☐	**3** ☒	**4** ☐	**5** ☐

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

Next Steps

1. A review of the proposal and materials submitted for the above-noted preconsultation has been undertaken. Please consider proceeding to a Phase 2 preconsultation. Fill in the Pre-consultation Application Form and submit it together with the necessary studies and/or plans to planningcirculations@ottawa.ca.

2. In your subsequent pre-consultation submission, please ensure that all comments or issues detailed herein are addressed. A detailed cover letter stating how each issue has been addressed must be included with the submission materials. Please coordinate the numbering of your responses within the cover letter with the comment number(s) herein.

3. Please note, if your development proposal changes significantly in scope, design, or density, you may be recommended to complete or repeat the pre-consultation process before filing an Official application.

Supporting Information and Material Requirements

1. The attached **Study and Plan Identification List** outlines the information and material that has been identified, during this phase of pre-consultation, as either required (R) or advised (A) as part of a future complete application submission.

a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.

Consultation with Technical Agencies

1. You are encouraged to consult with technical agencies early in the development process and throughout the development of your project concept. A list of technical agencies and their contact information is enclosed.

Planning

Policy

1. The subject lands are located in the Outer Urban Transect and designated Neighbourhood.

    a. Hunt Club Road is designated as a Scenic Route pursuant to schedule C13.

2. Section 4.8.2 of the Official Plan identifies that development shall create opportunities for tree planting. Please review the site for opportunities for increased landscaping area and in particular tree planting.

    a. A landscaped buffer should be provided on the north, east, and south property lines to screen the vacuum stalls and queuing lanes from the adjacent properties.

Zoning

1. Please confirm if the subject site is considered one lot for zoning purposes with the remainder of 585 West Hunt Club Rd. as per Section 93 of Zoning By-law 2008-250. Please identify within the design brief and zoning confirmation report.

    a. Section 93 "(1) A group of occupancies located in an AM – Arterial Mainstreet Zone, GM – General Mixed-Use Zone, LC – Local Commercial Zone, MC – Mixed-Use Centre Zone, MD – Mixed-Use Downtown Centre Zone, IG – General Industrial Zone, IH – Heavy Industrial Zone, IL – Light Industrial Zone, or IP – Business Park Industrial Zone, or RC – Rural Commercial Zone that: (By-law 2013-58)

        i. (a) are designed, developed and managed, including site access and infrastructure servicing, as a unit whether by a single owner or a group of owners or tenants acting in collaboration;

ii. (b) are made up entirely of uses permitted or lawfully non-conforming on the site, and has either:

1. (i) a common parking lot or parking garage or a combination thereof; or

2. (ii) a group of parking lots or parking garages or a combination thereof which ar emanaged as a unit by the same owner, owners or tenants of the occupanies required in clause (a) above, and are on the same lot or lots as the occupancies required in clause (a) above;

Shall be considered as one lot for the purposes of applying zoning provisions and regulations. (OMB Order, File #PL080959 issued June 1, 2010)."

2. Additional information on the specifics of the site and the proposal are required for an in-depth zoning analysis and for comment on zoning conformity, including confirmation on whether the site is considered one lot for zoning purposes.

3. The subject site is zoned Arterial Mainstreet – Subzone 10 in the City of Ottawa Zoning By-Law 2008-250. Please refer to Sections 185-186 for the applicable zoning provisions.

    a. A car wash is a permitted use in the AM10 Subzone.

    b. The intention of the AM10 subzone is to orient development towards the street and provide strong engagement with the public realm. Please review site configuration and landscaping options that engage with the surrounding street and provide a stronger relationship with the public realm and the direction of the AM10 zone.

4. The proposal is subject to Section 112: Drive Through Facilities, for conveyor type car wash.

5. Provide dimensions of queuing spaces. Please refer to Section 112 of the Zoning By-Law for provisions for drive-through facilities and queuing requirements.

6. Parking requirements

    a. There are no minimum parking requirements for a drive-through facility.

    b. Please identify any parking that is to be provided, and include the stall dimensions.

Other

7. It is understood that the existing Hydro pole on the site is intended be relocated. Please be advised that clearance from Hydro Ottawa regarding the relocation of the infrastructure will be required as a condition of approval.

Required Applications

8. Site Plan Control - Standard

    a. Application subtype to be confirmed upon receipt of further information, including gross floor area.

9. Further applications may be required for the proposal, subject to receipt of additional site information.

Feel free to contact Amanda Davidson, Planner, for follow up questions.

Urban Design

Submission Requirements:

10. Urban Design Brief will be required. Please see attached customized Terms of Reference to guide the preparation.

    a. The Urban Design Brief should be structured by generally following the headings highlighted under Section 3 – Contents of these Terms of Reference.

11. Additional drawings and studies are required as shown on the ASPIL. Please follow the terms of references (Planning application submission information and materials | City of Ottawa) the prepare these drawings and studies. These include:

    a. Site Plan

    b. Landscape Plan

    c. Elevations

    d. Design Brief

Comments

12. Please try and make room on the north property edge for landscaping. Preferably small or columnar trees could be planted, if not possible, shrubs and perennials. Keep in mind that services cannot be located under this landscape area so that plantings are viable.

13. Please utilize the larger landscape areas for larger trees.

14. Ensure that the north building façade provides architectural interest given its exposed to the public realm. Avoid blank facades, consider utilizing architectural treatments, signage, windows and doors.

15. The Design Brief should include a review of the City's Urban Design Guidelines for Drive-Throughs.

Submission Requirements

16. Urban Design Brief will be required. Please see attached customized Terms of Reference to guide the preparation.

    a. The Urban Design Brief should be structured by generally following the headings highlighted under Section 3 – Contents of these Terms of Reference.

17. Additional drawings and studies are required as shown on the ASPIL. Please follow the terms of references (Planning application submission information and materials | City of Ottawa) the prepare these drawings and studies. These include:

    b. Site Plan

    c. Landscape Plan

    d. Elevations

    e. Design Brief

Engineering

Watermain Design

18. The consultant shall request for Water Boundary Conditions through the Infrastructure Project Manager assigned to this file. The request must include the location of the service (map or plan with connection location(s) indicated) and the expected loads required by the proposed development, including calculations. Please provide the following information:

    a. Location of service

    b. Type of development

    c. The amount of fire flow required (per OBC & FUS).

d. Average daily demand: ___ l/s.

e. Maximum daily demand: ___l/s.

f. Maximum hourly daily demand: ___ l/s.

19. Provide a watermain system analysis demonstrating adequate pressure as per section 4.2.2 of the Water Distribution Guidelines.

20. Two watermains separated by an isolation valve will be required to avoid the creation of a vulnerable service area for proposed demand greater than 50m3/day.

21. Demonstrate adequate hydrant coverage for fire protection. Please review Technical Bulletin ISTB-2018-02, Appendix I table 1 – maximum flow to be considered from a given hydrant.

Stormwater Management

22. The Stormwater Management Criteria, for the subject site, is to be based on the following:

    a. The 5-year storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.

    b. The pre-development runoff coefficient shall be the lower of the existing coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).

    c. A calculated time of concentration (cannot be less than 10 minutes).

    d. Flows to the storm sewer in excess of the 5-year storm release rate, up to and including the 100-year storm event, must be detained on site.

    e. Provide 80% TSS removal for water quality control for the subject site unless otherwise stated by the Rideau Valley Conservative Authority (RVCA). Include correspondence with the RVCA in the servicing report.

23. Ensure all external drainage areas are considered in the proposed design.

24. The proposed design shall confirm no negative impact to the existing major overland flow in the area.

25. Confirm if the site is currently controlled by an ICD downstream.

Sanitary Design

26. Demonstrate there is adequate residual capacity in the receiving downstream sanitary sewer to accommodate the proposed development.

27. Please apply the wastewater design flow parameters in Technical Bulletin PIEDTB-2018-01.

28. Refer to the City of Ottawa Sewer Design Guidelines Appendix 4-A for the daily sewage flow for car wash applications.

Additional Comments:

29. Provide existing servicing information and the recommended location for the proposed connections. Services should ideally be grouped in a common trench to minimize the number of road cuts.

30. Sewer connections to be made above the springline of the sewermain as per:

    i. Std Dwg S11.1 for flexible main sewers – connections made using approved tee or wye fittings.

    ii. Std Dwg S11 (For rigid main sewers) – lateral must be less that 50% the diameter of the sewermain,

    iii. Std Dwg S11.2 (for rigid main sewers using bell end insert method) – for larger diameter laterals where manufactured inserts are not available; lateral must be less that 50% the diameter of the sewermain,

    iv. Connections to manholes permitted when the connection is to rigid main sewers where the lateral exceeds 50% the diameter of the sewermain. – Connect obvert to obvert with the outlet pipe unless pipes are a similar size.

31. After further internal discussions with the Infrastructure and Water Services Department, all sanitary floor drains located outside of the car wash building must be covered to prevent the capture of any stormwater. The Sewer Use By-Law prohibits the capture and discharge of stormwater to a sanitary sewer.

32. An MECP Environmental Compliance Approval may be required for the industrial effluents released from this site. The applicant is advised to refer to the Ontario Regulation 525/98 Approval Exemptions to confirm if an ECA is required. The developer is required to provide a written explanation on why their development should be exempted.

33. The applicant must confirm if an MECP Environmental Compliance Approval exists for the shared private storm sewers they are planning to use. If an ECA exists and this site area is part of it, an amendment to the ECA will be required to reflect the stormwater management and storm sewer works being proposed as part of this application. If an ECA does not exist, the applicant must get their own. Please refer to the Ontario Regulation 525/98 Approval Exemptions.

34. Ensure all easements are shown on the civil drawings. Any work proposed within an easement will require clearance from its owner(s).

35. Please confirm the nature and use of the easement over Part 1 in the 4R-15594 and provide clearance from the owner for the proposed works over it.

36. The applicant must provide confirmation they are part (or have joined) the cost sharing agreement / joint-use maintenance agreement in place for the shared private services they will be connecting to.

37. Typically, the minimum clearance between a water service and a transformer is 3.0m. Currently, only 2.1m is provided to the edge of the proposed transformer. Please contact Hydro to confirm the minimum clearance between the existing water service and proposed transformer or relocate the structure somewhere else.

Feel free to contact Jean-Miguel Roy, Project Manager, for follow-up questions.

Noise

Comments:

38. N/A

Feel free to contact Reed Adams, Transportation Project Manager, for follow-up questions.

Transportation

Comments:

39. Road pattern

40. TIA:

    a. A full scope Transportation Impact Assessment is required. Please submit the Scoping/Forecasting report to reed.adams@ottawa.ca at your earliest convenience. The applicant is responsible to submit the Scoping Report prior to application and must allow for a 14 day circulation period.

    b. The Strategy Report must be submitted with the formal submission to deem complete. The applicant is strongly encouraged to submit the Strategy Report to the TPM prior to formal submission and allow for a 14 day circulation period.

    c. Complete and submit the Transportation Demand Management Measures Checklist and the Transportation Demand Management Supportive

Development Design and Infrastructure Checklist in support of the application.

d. If an RMA is required to support the proposed development, the functional plan and/or RMA plans must be submitted with the formal submission to deem complete. Request base mapping asap if RMA is required, contact Engineering Services

e. The “Urban” area designation is based upon the Transportation Master Plan ‘Inner Urban’ area (i.e. 400m Radius for study area).

41. ROW:

a. Corner site triangle not required, no ROW protection required

42. Site Plan:

a. Clear throat length of 7m must be 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.

b. Corner clearances should follow minimum distances set out within TAC Figure 8.8.2.

c. As the proposed site is commercial and for general public use, AODA legislation applies.

d. 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.

e. Clearly define accessible parking stalls and ensure they meet AODA standards (include an access aisle next to the parking stall and a pedestrian curb ramp at the end of the access aisle, as required).

f. Please consider using the City’s Accessibility Design Standards, which provide a summary of AODA requirements.

g. Ensure site access meets the City’s Private Approach Bylaw.

h. Show all details of the roads abutting the site; include such items as pavement markings, accesses and/or sidewalks.

i. Turning movement diagrams required for all accesses showing the largest vehicle to access/egress the site.

j. Turning movement diagrams required for internal movements (loading areas, garbage).

k. 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).

l. Show dimensions for site elements (i.e. lane/aisle widths, access width and throat length, parking stalls, sidewalks, pedestrian pathways, etc.)

Feel free to contact Reed Adams, Transportation Project Manager, for follow-up questions.

Environment

Comments:

43. No triggers for an Environmental Impact Study.

44. Please review and incorporate bird safe design elements. Some of the risk factors include glass and related design traps such as corner glass and fly-through conditions, ventilation grates and open pipes, landscaping, light pollution. More guidance and solutions are available in the guidelines which can be found here: https://documents.ottawa.ca/sites/documents/files/birdsafedesign_guidelines_en.pdf

45. Urban Heat Island - Please add features that reduce the urban heat island effect (see OP 10.3.3) produced by the parking lot and a building footprint. For example, this impact can be reduced by adding large canopy trees, green roofs or vegetation walls, or constructing the parking lot or building with low heat absorbing materials.

Feel free to contact Matthew Hayley, Environmental Planner, for follow-up questions.

Forestry

Comments:

46. In accordance with the Official Plan §4.8.2, the retention of existing, healthy trees should be prioritized over tree removal and replacement.

    a. A Tree Conservation Report will be required, providing information on the condition of existing trees and detailing tree protection, impact mitigation, and removals required for the development.

47. Where possible, the configuration of the site should be designed to contribute to the permeable soil on & around the site, to enhance landscaping and new tree plantings.

    a. If planting space can be retained on the southern edge of the property, new trees should be planted to provide shade to queuing vehicles.

48. Please maximize tree plantings on site to mitigate the urban heat island effect and contribute to the City's 40% urban canopy cover target (as per Official Plan Sections 2.2.3 and 4.8.2).

    a. Where sufficient soil volumes exist, the planting of large-growing native species should be prioritized.

    b. Where there are conflicts with overhead wires, small trees should be planted.

49. The following Tree Conservation Report (TCR) guidelines have been adapted from the Schedule E of the Tree Protection By-law – for more information on these requirements please contact julian.alvarez-barkham@ottawa.ca

    a. A Tree Conservation Report (TCR) must be supplied for review along with the suite of other plans/reports required by the City

        i. An approved TCR is a requirement of Site Plan approval.

    b. Any removal of privately-owned trees 10cm or larger in diameter within the urban area, 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.

    c. The TCR must contain 2 separate plans:

        i. Plan/Map 1 - show existing conditions with tree cover information.

        ii. Plan/Map 2 - show proposed development with tree cover information.

    d. The TCR must list all trees on site, as well as off-site trees if the CRZ (critical root zone) extends into the developed area, by species, diameter, and health condition.

        i. For ease of review, the Planning Forester suggests that all trees be numbered and referenced in an inventory table.

    e. Please identify trees by ownership – private onsite, private on adjoining site, city owned, co-owned (trees on a property line)

    f. If trees are to be removed, the TCR must clearly show where they are, and document the reason they cannot be retained.

        i. Compensation may be required for the removal of city owned trees.

g. The removal of trees on a property line will require the permission of both property owners.

h. 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 on the Tree Protection Specification or by searching Ottawa.ca.

    i. The location of tree protection fencing must be shown on the plan.

    ii. Show the critical root zone of the retained trees.

i. 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.

50. The following Landscape Plan (LP) guidelines have been adapted from Schedule E of the Tree Protection By-law – for more information on these requirements please contact julian.alvarez-barkham@ottawa.ca

a. Please ensure any retained trees are shown on the LP.

b. Minimum Setbacks

    i. Maintain 1.5m from sidewalk or MUP/cycle track or water service laterals.

    ii. Maintain 2.5m from curb.

    iii. Coniferous species require a minimum 4.5m setback from curb, sidewalk, or MUP/cycle track/pathway.

    iv. 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.

    v. Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.

b. Tree specifications

    i. Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.

    ii. Maximize the use of large deciduous species wherever possible to maximize future canopy coverage.

c. Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and if possible, include watering and warranty as described in the specification.

d. No root barriers, dead-man anchor systems, or planters are permitted.

e. No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)

f. Hard surface planting

   i. If there are hard surface plantings, a planting detail must be provided.

   ii. Curb style planter design is highly recommended.

   iii. No grates are to be used and if guards are required, City of Ottawa standard (which can be provided) shall be used.

c. Trees are to be planted at grade.

d. Soil Volume - Please demonstrate as per the **Landscape Plan Terms of Reference** that the available soil volumes for new plantings will meet or exceed the following:

Tree Type/Size	Single Tree Soil Volume (m^3)	Multiple Tree Soil Volume (m^3/tree)
Ornamental	15	9
Columnar	15	9
Small	20	12
Medium	25	15
Large	30	18
Conifer	25	15

   i. It is strongly suggested that the proposed species list include a column listing the available soil volume.

e. Sensitive Marine Clay - Please follow the City's 2017 Tree Planting in Sensitive Marine Clay guidelines.

f. The City requests that consideration be given to planting native species wherever there is a high probability of survival to maturity.

g. Efforts shall be made to provide as much future canopy cover as possible at a site level, through tree planting and tree retention. The Landscape Plan shall show/document that the proposed tree planting and retention will contribute to the City's overall canopy cover over time. **Please provide a projection of the future canopy cover for the site to 40 years.**

Feel free to contact Julian Alvarez-Barkham, Planning Forester, for follow-up questions.

Parkland

Comments:

51. Cash-in-lieu of parkland will be required for the proposed development.

Feel free to contact Louise Cerveny, Parks Planner, for follow-up questions.

Submission Requirements and Fees

1. Site Plan Control - Standard
    a. Additional information regarding fees related to planning applications can be found here.
2. The attached **Study and Plan Identification List** outlines the information and material that has been identified as either required (R) or advised (A) as part of a future complete application submission.
    a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.
3. All of the above comments or issues should be addressed to ensure the effectiveness of the application submission review.

Should there be any questions, please do not hesitate to contact myself or the contact identified for the above areas / disciplines.

Yours Truly,

Amanda Davidson
Planner, Development Review West

Encl. Study and Plan Identification List
List of Technical Agencies

c.c. Solé Soyak, Planner, Development Review West
Jean-Miguel Roy, Infrastructure Project Manager, Development Review West
Abi Dieme, Infrastructure Project Manager, Development Review West
Reed Adams, Transportation Project Manager
Molly Smith, Planner, Urban Design
Julian Alvarez-Barkham, Planning Forester
Matthew Hayley, Environmental Planner
Amy MacPherson, Planner, Natural Systems
Louise Cerveny, Parks Planner

APPENDIX B

Water Supply Calculations

Water Service Calculations

LRL File No. : 240272
Project : Proposed Development - Halo Car Wash
Location : Lancelot Dr & Hunt Club Dr, Nepean, ON
Date : February 25, 2025
Designed by : M. Basnet

Water Demand

Site area = 0.364 ha

Average day demand =	*35000*	*L / ha·day*	(based on Table 4.2 of Ottawa Design Guidelines-Water Distribution)
=	12740	L / day	
=	**0.15**	**L / s**	
Maximum daily peak factor =	1.5		
Maximum daily demand =	**0.22**	**L / s**	
Maximum hour peak factor =	1.8		
Maximum hour demand =	**0.40**	**L / s**	

Adjustment - Car Wash

Estimated vol. of water/car wash = 170 L

Average day demand =	93151	L / day	(assuming 200000 car wash/year)
	1.08	**L / s**	
Maximum daily demand =	**1.97**	**L / s**	(assuming 1000 car wash/day)
Maximum hour demand =	**6.14**	**L / s**	(assuming 130 car wash/hour)

Total Anticipated Water Demand

Average day demand =	**1.23**	**L/s**
Maximum daily demand =	**2.19**	**L/s**
Maximum hour demand =	**6.54**	**L/s**

Fire Flow Calculations

LRL File No. 240272
Project: Proposed Development-Halo Car Wash
Location: Lancelot Dr & Hunt Club Dr, Nepean, ON
Date: April 2, 2025
Method: Fire Underwriters Survey (FUS)
Prepared by: M. Basnet

Step	Task	Term	Options	Multiplier	Choose:	Value	Unit	Fire Flow
Structural Framing Material								
1	Choose frame used for building	Coefficient C related to the type of construction	Wood Frame	1.5	Non-combustible Construction	**0.8**		
			Ordinary Construction	1.0				
			Non-combustible construction	0.8				
			Fire resistive construction <2 hrs	0.7				
			Fire resistive construction >2 hrs	0.6				
Floor Space Area (A)								
2	Total area					**533**	m^2	
3	Obtain fire flow before reductions	Required fire flow	Fire Flow = 220 x C x $A^{0.5}$				L/min	**4,063**
Reductions or surcharge due to factors affecting burning								
4	Choose combustibility of contents	Occupancy hazard reduction or surcharge	Non-combustible	-25%	Combustible	**0%**	L/min	**4,063**
			Limited combustible	-15%				
			Combustible	0%				
			Free burning	15%				
			Rapid burning	25%				
5	Choose reduction for sprinklers	Sprinkler reduction	Full automatic sprinklers	-30%	False	**0%**	L/min	**4,063**
			Water supply is standard for both the system and fire department hose lines	-10%	False	**0%**		
			Fully supervised system	-10%	False	**0%**		
6	Choose separation	Exposure distance between units	North side	>45m	0%	**15%**	L/min	**4,673**
			East side	30.1 to 45m	5%			
			South side	20.1 to 30m	10%			
			West side	>45m	0%			
Net required fire flow								
7	Obtain fire flow, duration, and volume				Minimum required fire flow rate (rounded to nearest 1000)		L/min	**5,000**
					Minimum required fire flow rate		L/s	**83.3**
					Required duration of fire flow		hr	**1.75**

Mohan Basnet

From: Roy, Jean-Miguel <Jean-Miguel.Roy@ottawa.ca>
Sent: March 19, 2025 8:11 AM
To: Mohan Basnet; Maxime Longtin
Subject: RE: Halo Huntclub - BC Request (LRL#240272)
Attachments: 585 West Hunt Club March 2025.pdf

Follow Up Flag: Follow up
Flag Status: Completed

Hi Mohan,

The following are boundary conditions, HGL, for hydraulic analysis at 585 West Hunt Club (zone 2W2C) assumed to be connected via a private looping to the 305mm watermain on Lancelot Dr (Connection 1) and 406mm on Merivale (Connection 2) (see attached PDF for location). You will need to interpolate the HGLs at your site connections based on the values provided.

Both Connections:
Minimum HGL = 126.0 m
Maximum HGL = 132.3 m
Max Day + Fire Flow (83.3 L/s) = 127.2 m (Connection 1), 127.3 m (Connection 2)

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

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

Please note that the required fire flow in the FUS sheet should be rounded to the nearest 1,000, so 5,000l/min (83.3l/s) would be required here. Please make this adjustment before your official site plan submission.

Regards,
Jean-Miguel

From: Roy, Jean-Miguel
Sent: February 25, 2025 4:03 PM
To: Mohan Basnet <mbasnet@lrl.ca>
Cc: Maxime Longtin <mlongtin@lrl.ca>
Subject: RE: Halo Huntclub - BC Request (LRL#240272)

Hi Mohan,

Thank you for submitting your demands for this site. We will review your calculations first and let you know if we have any questions. If we have no concerns, we will proceed with the boundary conditions in accordance with your demands.

Regards,
JM

From: Mohan Basnet <mbasnet@lrl.ca>
Sent: February 25, 2025 10:27 AM
To: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>; Fawzi, Mohammed <mohammed.fawzi@ottawa.ca>
Cc: Roy, Jean-Miguel <Jean-Miguel.Roy@ottawa.ca>; Maxime Longtin <mlongtin@lrl.ca>
Subject: Halo Huntclub - BC Request (LRL#240272)

Good morning!

We would like to request Boundary Conditions for the proposed Halo Car Wash Development at Lancelot Dr/Hunt Club Dr, Ottawa.

Anticipated water demands are:

- Avg Day = 1.23 L/s
- Max Day = 2.19 L/s
- Peak Hour = 6.54 L/s
- Fire Flow (FUS) = 78.3 L/s

Since the average demand exceeds 50m3/day, we are proposing two (2) connections. For your reference, please find attached the following documents:

- Draft Servicing Plan
- Water Demand Calculations
- FUS Calculations
- Proposed service connections (GeoOttawa)

Thank you.

Mohan Basnet, P.Eng., Ph.D., Civil Engineer

LRL ENGINEERING | INGÉNIERIE

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T +1 613-842-3434 **C** +1 613-229-6819 **E** mbasnet@lrl.ca

Ottawa | Pembroke | Moncton

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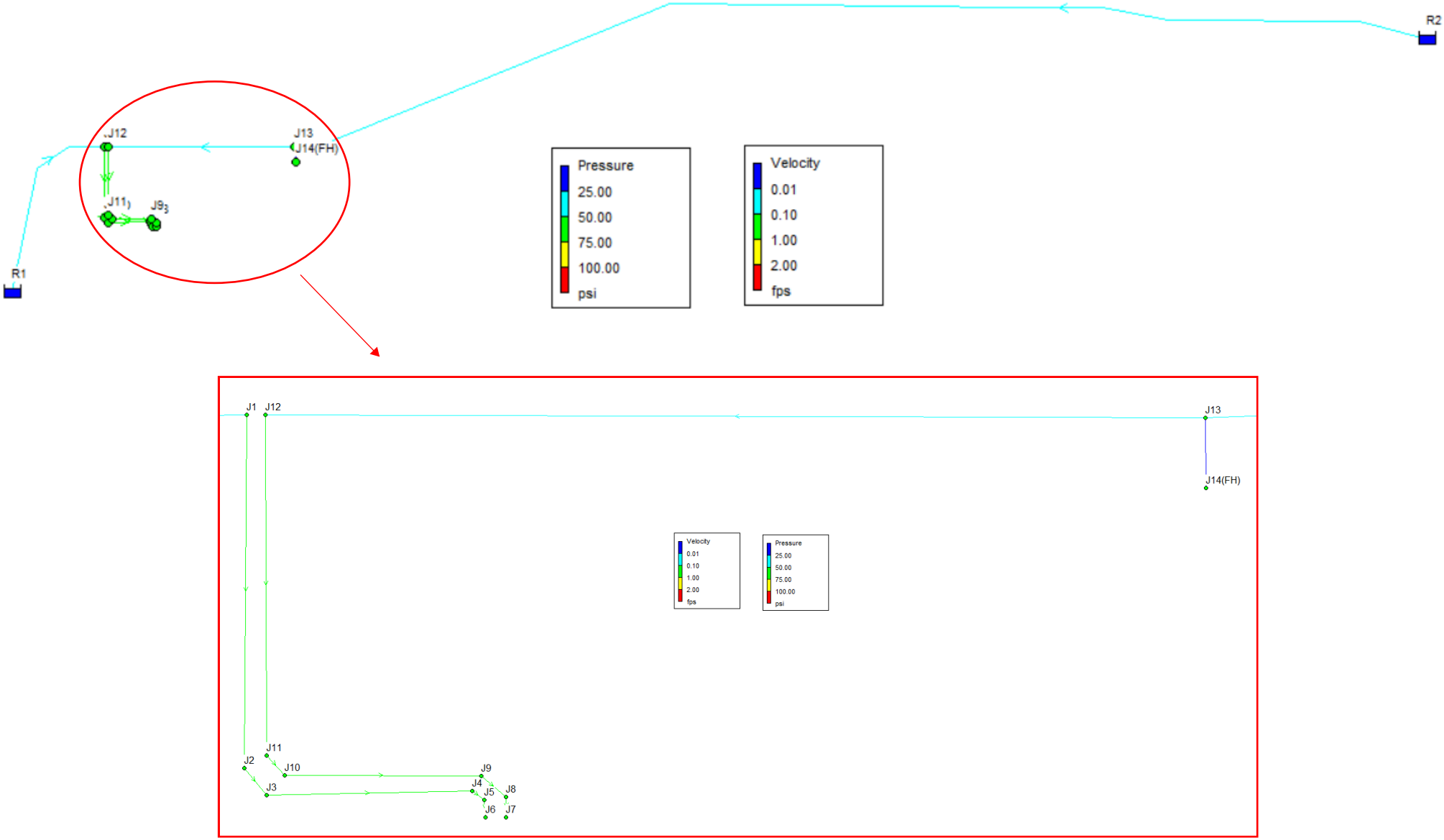
Hydraulic Analysis using EPANET

Scenario 1: Avg Day



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*                            E P A N E T                            *
*                     Hydraulic and Water Quality                   *
*                     Analysis for Pipe Networks                    *
*                           Version 2.2                             *
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Input File: 240272 Average Day_Rev.net

Link - Node Table:

Link ID	Start Node	End Node	Length ft	Diameter in
P2	J1	J2	63.96	4
P3	J2	J3	6.89	4
P4	J3	J4	42.64	4
P5	J4	J5	2.62	4
P6	J5	J6	2.30	4
P7	J8	J7	2.30	4
P8	J9	J8	6.89	4
P9	J10	J9	38.70	4
P10	J11	J10	6.89	4
P13	R2	J13	1194.91	12
P1	R1	J1	204.67	12
P12	J13	J12	184.01	12
P11	J12	J11	60.35	4
P14	J13	J14(FH)	24.6	6

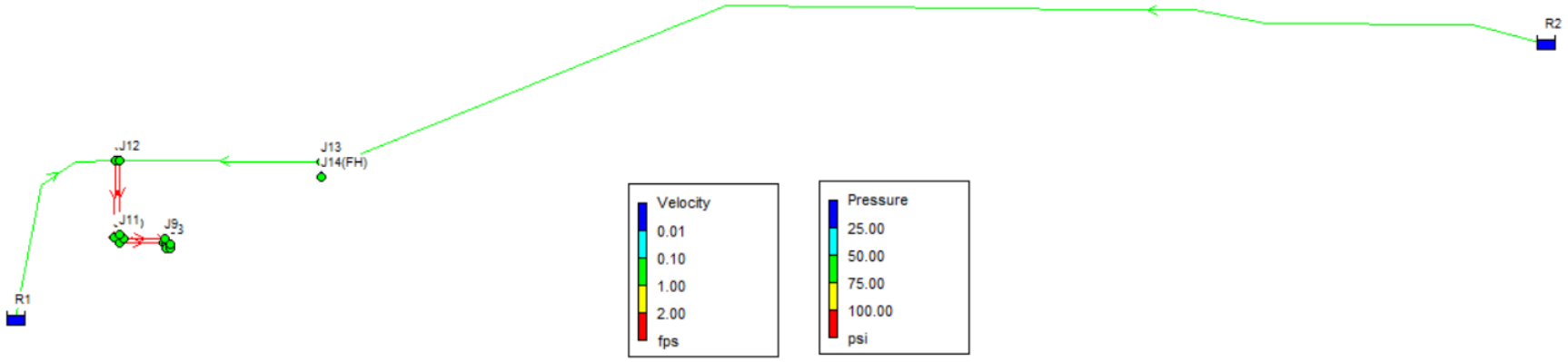
Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality	
J1	0.00	433.94	61.96	0.00	
J2	0.00	433.90	62.44	0.00	
J3	0.00	433.90	62.44	0.00	
J4	0.00	433.87	62.43	0.00	
J5	0.00	433.87	62.43	0.00	
J6	19.50	433.87	62.22	0.00	
J7	19.50	433.87	62.22	0.00	
J8	0.00	433.87	62.43	0.00	
J9	0.00	433.87	62.43	0.00	
J10	0.00	433.90	62.44	0.00	
J11	0.00	433.90	62.44	0.00	
J12	0.00	433.94	61.96	0.00	
J13	0.00	433.94	61.19	0.00	
J14(FH)	0.00	433.94	61.19	0.00	
R1	-19.50	433.94	0.00	0.00	Reservoir
R2	-19.50	433.94	0.00	0.00	Reservoir

Link Results:

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status
P2	19.50	0.50	0.59	Open
P3	19.50	0.50	0.59	Open
P4	19.50	0.50	0.59	Open
P5	19.50	0.50	0.59	Open
P6	19.50	0.50	0.58	Open
P7	19.50	0.50	0.60	Open
P8	19.50	0.50	0.59	Open
P9	19.50	0.50	0.59	Open
P10	19.50	0.50	0.59	Open
P13	19.50	0.06	0.00	Open
P1	19.50	0.06	0.00	Open
P12	19.50	0.06	0.00	Open
P11	19.50	0.50	0.59	Open
P14	0.00	0.00	0.00	Open

Scenario 2: Peak Hour



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*                          E P A N E T                              *
*                    Hydraulic and Water Quality                    *
*                    Analysis for Pipe Networks                     *
*                         Version 2.2                               *
*********************************************************************
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Input File: 240272 Peak Hour_Rev.net

Link - Node Table:

Link ID	Start Node	End Node	Length ft	Diameter in
P2	J1	J2	63.96	4
P3	J2	J3	6.89	4
P4	J3	J4	42.64	4
P5	J4	J5	2.62	4
P6	J5	J6	2.30	4
P7	J8	J7	2.30	4
P8	J9	J8	6.89	4
P9	J10	J9	38.70	4
P10	J11	J10	6.89	4
P13	R2	J13	1194.91	12
P1	R1	J1	204.67	12
P12	J13	J12	184.01	12
P11	J12	J11	60.35	4
P14	J13	J14(FH)	24.6	6

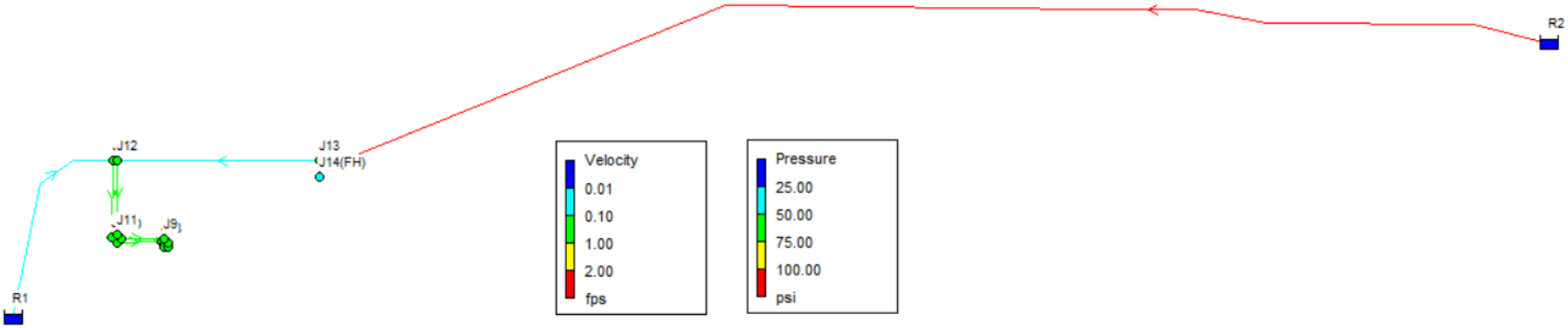
Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality	
J1	0.00	413.27	53.01	0.00	
J2	0.00	412.44	53.14	0.00	
J3	0.00	412.35	53.10	0.00	
J4	0.00	411.79	52.86	0.00	
J5	0.00	411.75	52.85	0.00	
J6	103.66	411.72	52.62	0.00	
J7	103.66	411.72	52.62	0.00	
J8	0.00	411.75	52.84	0.00	
J9	0.00	411.84	52.88	0.00	
J10	0.00	412.34	53.10	0.00	
J11	0.00	412.43	53.14	0.00	
J12	0.00	413.22	52.98	0.00	
J13	0.00	413.23	52.22	0.00	
J14(FH)	0.00	413.23	52.22	0.00	
R1	-103.66	413.28	0.00	0.00	Reservoir
R2	-103.66	413.28	0.00	0.00	Reservoir

Link Results:

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status
P2	103.66	2.65	13.06	Open
P3	103.66	2.65	13.06	Open
P4	103.66	2.65	13.06	Open
P5	103.66	2.65	13.06	Open
P6	103.66	2.65	13.07	Open
P7	103.66	2.65	13.06	Open
P8	103.66	2.65	13.06	Open
P9	103.66	2.65	13.06	Open
P10	103.66	2.65	13.06	Open
P13	103.66	0.29	0.04	Open
P1	103.66	0.29	0.04	Open
P12	103.66	0.29	0.04	Open
P11	103.66	2.65	13.06	Open
P14	0.00	0.00	0.00	Open

Scenario 3: Max Day + Fire Flow



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*********************************************************************
*                          E P A N E T                              *
*                   Hydraulic and Water Quality                     *
*                   Analysis for Pipe Networks                      *
*                         Version 2.2                               *
*********************************************************************
```

Input File: 240272 Max Day + Fire Flow_Rev.net

Link - Node Table:

Link ID	Start Node	End Node	Length ft	Diameter in
P2	J1	J2	63.96	4
P3	J2	J3	6.89	4
P4	J3	J4	42.64	4
P5	J4	J5	2.62	4
P6	J5	J6	2.30	4
P7	J8	J7	2.30	4
P8	J9	J8	6.89	4
P9	J10	J9	38.70	4
P10	J11	J10	6.89	4
P13	R2	J13	1194.91	12
P1	R1	J1	204.67	12
P12	J13	J12	184.01	12
P11	J12	J11	60.35	4
P14	J13	J14(FH)	24.6	6

Node Results:

Node ID	Demand GPM	Head ft	Pressure psi	Quality	
J1	0.00	417.22	54.72	0.00	
J2	0.00	417.11	55.17	0.00	
J3	0.00	417.10	55.16	0.00	
J4	0.00	417.02	55.13	0.00	
J5	0.00	417.02	55.13	0.00	
J6	34.71	417.01	54.91	0.00	
J7	34.71	409.52	51.67	0.00	
J8	0.00	409.53	51.88	0.00	
J9	0.00	409.54	51.89	0.00	
J10	0.00	409.60	51.92	0.00	
J11	0.00	409.62	51.92	0.00	
J12	0.00	409.72	51.47	0.00	
J13	0.00	409.72	50.70	0.00	
J14(FH)	1505.78	403.39	47.96	0.00	
R1	-34.71	417.22	0.00	0.00	Reservoir
R2	-1540.49	417.54	0.00	0.00	Reservoir

Link Results:

Link ID	Flow GPM	Velocity fps	Unit Headloss ft/Kft	Status
P2	34.71	0.89	1.72	Open
P3	34.71	0.89	1.72	Open
P4	34.71	0.89	1.72	Open
P5	34.71	0.89	1.72	Open
P6	34.71	0.89	1.72	Open
P7	34.71	0.89	1.71	Open
P8	34.71	0.89	1.72	Open
P9	34.71	0.89	1.72	Open
P10	34.71	0.89	1.72	Open
P13	1540.49	4.37	6.54	Open
P1	34.71	0.10	0.01	Open
P12	34.71	0.10	0.01	Open
P11	34.71	0.89	1.72	Open
P14	1505.78	17.09	257.31	Open

APPENDIX C

Wastewater Calculations

LRL File No. 240272
Project: Proposed Development-Halo Car Wash
Location: Lancelot Dr & Hunt Club Dr
Designed: M.L./M.B.
Checked: M.B.
Date: August 28, 2025

Sanitary Design Parameters

Average Daily Flow = 280 L/p/day
Commercial & Institutional Flow = 28000 L/ha/day
Light Industrial Flow = 35000 L/ha/day
Heavy Industrial Flow = 55000 L/ha/day
Maximum Residential Peak Factor = 4.0
Commercial & Institutional Peak Factor = 1.5

Industrial Peak Factor = as per Appendix 4-B
Extraneous Flow = 0.33 L/s/gross ha
(as Per Tech Bulletin ISTB-2018-01)

Pipe Design Parameters

Minimum Velocity = 0.60 m/s
Manning's n = 0.013

LOCATION			RESIDENTIAL AREA AND POPULATION						COMMERCIAL		INDUSTRIAL			INSTITUTIONAL		C+I+I	INFILTRATION			TOTAL FLOW (l/s)	PIPE					
STREET/ SITE	FROM MH	TO MH	AREA (Ha)	POP.	CUMMULATIVE AREA (Ha)	CUMMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (Ha)	ACCU. AREA (Ha)	AREA (Ha)	ACCU. AREA (Ha)	PEAK FACT.	AREA (Ha)	ACCU. AREA (Ha)	*PEAK FLOW (l/s)	TOTAL AREA (Ha)	ACCU. AREA (Ha)	INFILT. FLOW (l/s)		LENGTH (m)	DIA. (mm)	SLOPE (%)	MATERIAL	CAP. (FULL) (l/s)	VEL. (FULL) (m/s)
	Car Wash	SAN MH01									0.346					6.139	0.346	0.346	0.114	6.253	1.5	150	1.00%	PVC	15.23	0.86
	SAN MH01	SAN MH02																		6.253	23.6	150	1.00%	PVC	15.23	0.86
	BLDG	SAN MH02														0.003				0.003	9.7	150	2.00%	PVC	21.54	1.22
Lancelot Dr	SAN MH02	Ex. Sewer																		6.256	13.9	150	1.00%	PVC	15.23	0.86

Note:
*Peak flow including anticipated waste water from Halo Car Wash (6.141 L/s), see below

Site Description	Qty	L/Qty	Total L/day	Total L/s
Halo Car Wash				
Anticipated Employees	2	75	150	0.002
Total x Peak Factor (1.5)				**0.003**
Estimated Car Wash/Hour	130	170		**6.139**
Total Anticipated Peak Design Flow (dry weather flow)				**6.141**

Mohan Basnet

From: Maxime Longtin
Sent: August 28, 2025 4:54 PM
To: Mohan Basnet
Subject: FW: Pre-Consultation Follow-up - 585 West Hunt Club - PC2024-0451

Maxime Longtin, Civil Engineering Technologist and Team Manager

LRL ENGINEERING | INGÉNIERIE
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From: Roy, Jean-Miguel <Jean-Miguel.Roy@ottawa.ca>
Sent: 5 décembre 2024 08:09
To: Maxime Longtin <mlongtin@lrl.ca>
Cc: jlupovici@halowash.com; Philippe Paquette <ppaquette@lrl.ca>
Subject: RE: Pre-Consultation Follow-up - 585 West Hunt Club - PC2024-0451

Salut Maxime,

No concerns with the residual capacity of the downstream sanitary sewer based on that release rate. Please consider this comment cleared.

Merci,

Jean-Miguel

From: Maxime Longtin <mlongtin@lrl.ca>
Sent: December 04, 2024 7:50 PM
To: Roy, Jean-Miguel <Jean-Miguel.Roy@ottawa.ca>
Cc: Surprenant, Eric <Eric.Surprenant@ottawa.ca>; jlupovici@halowash.com; Philippe Paquette <ppaquette@lrl.ca>
Subject: RE: Pre-Consultation Follow-up - 585 West Hunt Club - PC2024-0451

Good evening,

The total anticipated sanitary flow is estimated at 6.32 L/s. Please let us know if you need any additional info.

Thanks

Maxime Longtin, Civil Engineering Technologist and Team Manager

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From: Roy, Jean-Miguel <Jean-Miguel.Roy@ottawa.ca>
Sent: 4 décembre 2024 15:32
To: Maxime Longtin <mlongtin@lrl.ca>
Cc: Surprenant, Eric <Eric.Surprenant@ottawa.ca>; jlupovici@halowash.com; Philippe Paquette <ppaquette@lrl.ca>
Subject: RE: Pre-Consultation Follow-up - 585 West Hunt Club - PC2024-0451

Salut Maxime,

Could you provide your expected peak flow rate for your site? I'll have someone look at the downstream capacity of the sanitary.

Merci,

JM

From: Maxime Longtin <mlongtin@lrl.ca>
Sent: November 26, 2024 11:34 AM
To: Roy, Jean-Miguel <Jean-Miguel.Roy@ottawa.ca>
Cc: Surprenant, Eric <Eric.Surprenant@ottawa.ca>; jlupovici@halowash.com; Philippe Paquette <ppaquette@lrl.ca>
Subject: FW: Pre-Consultation Follow-up - 585 West Hunt Club - PC2024-0451

Good morning Jean-Miguel,

I hope everything is well.

We've received the comments from our meeting of a few weeks ago regarding this file and we've noticed a comment about downstream residual capacity for the sanitary sewer. If we are to provide you with a peak flow from our site, could you check internally if this downstream capacity study would be required?

Usually, this type of study takes a lot of back and forth to gather all the information and we would want to avoid this if possible.

I've cc'ed Eric Surprenant who helped us on our other recent Ottawa site in Stittsville.

Thanks,

Maxime Longtin, Civil Engineering Technologist and Team Manager

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From: Davidson, Amanda <amanda.davidson@ottawa.ca>
Sent: November 20, 2024 3:03 PM
To: Jonah Bonn <jbonn@firstbay.ca>
Cc: Soyak, Solé <Sole.Soyak@ottawa.ca>; Roy, Jean-Miguel <Jean-Miguel.Roy@ottawa.ca>; Dieme, Abi <Abibatou.Dieme@ottawa.ca>; Adams, Reed <reed.adams@ottawa.ca>; Alvarez-Barkham, Julian <julian.alvarez-barkham@ottawa.ca>; Smith, Molly <molly.smith@ottawa.ca>; Hayley, Matthew <Matthew.Hayley@ottawa.ca>; Cerveny, Louise <Louise.Cerveny@ottawa.ca>; MacPherson, Amy <Amy.MacPherson@ottawa.ca>
Subject: Pre-Consultation Follow-up - 585 West Hunt Club - PC2024-0451

Good day,

Please refer to the attached Feedback Form in response to the pre-consultation meeting held on November 7, 2024 for the above-noted property and in relation to a proposed application for Site Plan Control in order to permit the development of a car wash.

Attached further to this email are the list of studies and plans, a list of technical agencies you are encouraged to consult with throughout the development of your project concept and a supplementary development information sheet to provide additional information on matters for consideration throughout the application approval and development process.

You are **encouraged** to engage with the Ward Councillor and Community Associations.

These pre-con comments are valid for one year. After this time, you may be requested to meet for another pre-consultation meeting and/or the submission requirements may change.

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

Regards,

Amanda Davidson
Planner I | Urbaniste I
Development Review West | Examen des demandes d'aménagement ouest
Planning, Development and Building Services | Direction générale des services de la planification, de l'aménagement et du bâtiment
110 Laurier Avenue West, 4th Floor, Ottawa, ON K1P 1J1
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613-580-2424, ext./poste 32524

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APPENDIX D

Stormwater Management Calculations

LRL Associates Ltd.
Storm Watershed Summary

LRL File No. 240272
Project: Proposed Development-Halo Car Wash
Location: Lancelot Drive & Hunt Club Drive
Date: December 5, 2025
Designed: M. Longtin
Checked: M. Basnet
Dwg Reference: C701, C702

Pre-Development Catchments

Catchment	C = 0.20	C = 0.80	C = 0.90	Total Area (ha)	Combined C
ECA-01 (uncontrolled)	0.039	0.000	0.306	0.346	0.82
Total	**0.039**	**0.000**	**0.306**	**0.346**	**0.82**

Post-Development Catchments

Catchment	C = 0.20	C = 0.8	C = 0.90	Total Area (ha)	Combined C	Combined C (25% increase)
CA-01 (controlled)	0.000	0.000	0.048	0.048	0.90	1.00
CA-02 (controlled)	0.006	0.000	0.072	0.078	0.85	0.95
CA-03 (controlled)	0.008	0.000	0.000	0.008	0.20	0.25
CA-04 (controlled)	0.004	0.000	0.041	0.045	0.84	0.94
CA-05 (controlled)	0.012	0.000	0.066	0.078	0.79	0.88
CA-06 (controlled)	0.012	0.000	0.060	0.073	0.78	0.87
CA-07 (uncontrolled)	0.000	0.000	0.003	0.003	0.90	1.00
CA-08 (uncontrolled)	0.000	0.000	0.001	0.001	0.90	1.00
CA-09 (uncontrolled)	0.012	0.000	0.000	0.013	0.22	0.27
Total	**0.054**	**0.000**	**0.291**	**0.346**	**0.79**	**0.88**

LRL File No. 240272
Project: Proposed Development-Halo Car Wash
Location: Lancelot Drive & Hunt Club Drive
Date: December 5, 2025
Designed: M. Longtin
Checked: M. Basnet
Drawing Ref.: C701, C702

Stormwater Management Design Sheet

STORM - 100 YEAR

Runoff Equation

Q = 2.78CIA (L/s)
C = Runoff coefficient
I = Rainfall intensity (mm/hr) = $A / (Td + C)^B$
A = Area (ha)
T_c = Time of concentration (min)

Pre-development Release Rate

IDF Curve Equations

I_{100} = **$1735.688 / (Td + 6.014)^{0.820}$** **A = 1735.688** **B = 0.820** **C = 6.014**

C =	0.50	(max. of 0.5 as per City of Ottawa)
I =	178.6	mm/hr
Tc =	10	min
Total Area =	0.346	ha
100-Yr Release Rate =	85.75	L/s
Allowable Release Rate =	**50.04**	**L/s** (5-Yr Pre-development Release Rate)

Post-development Stormwater Management

					$\sum R_{2\&5}$	$\sum R_{100}$
	Total Site Area =	**0.346**	ha	**∑R=**	**0.79**	**0.88**
Controlled	CA-01	0.048	ha	R=	0.90	1.00
	CA-02	0.078	ha	R=	0.85	0.95
	CA-03	0.008	ha	R=	0.20	0.25
	CA-04	0.045	ha	R=	0.84	0.94
	Controlled by ICD#1	***0.179***	*ha*	*R=*	***0.83***	***0.93***
	CA-05	0.078	ha	R=	0.79	0.88
	CA-06	0.073	ha	R=	0.78	0.87
	Controlled by ICD#2	***0.151***	*ha*	*R=*	***0.79***	***0.88***
	Total Contolled =	**0.330**	**ha**	**∑R=**	**0.81**	**0.90**
Uncontrolled	CA-07	0.003	ha	R=	0.90	1.00
	CA-08	0.001	ha	R=	0.90	1.00
	CA-09	0.013	ha	R=	0.22	0.27
	Total Uncontolled =	**0.016**	**ha**	**∑R=**	**0.36**	**0.42**

Post-development Stormwater Management (100-Yr)_Controlled by ICD#1

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	178.56	82.40	35.66	22.97	1.70	24.67
15	142.89	65.94	38.68	22.97	1.36	24.33
20	119.95	55.35	38.86	22.97	1.14	24.11
25	103.85	47.92	37.43	22.97	0.99	23.96
30	91.87	42.40	34.97	22.97	0.87	23.84
35	82.58	38.11	31.79	22.97	0.79	23.76
40	75.15	34.68	28.10	22.97	0.72	23.69
45	69.05	31.87	24.02	22.97	0.66	23.63
50	63.95	29.51	19.63	22.97	0.61	23.58
55	59.62	27.52	15.00	22.97	0.57	23.54
60	55.89	25.79	10.17	22.97	0.53	23.50
70	49.79	22.98	0.03	22.97	0.47	23.44
80	44.99	20.76	0.00	22.97	0.43	23.40
90	41.11	18.97	0.00	22.97	0.39	23.36
100	37.90	17.49	0.00	22.97	0.36	23.33
110	35.20	16.25	0.00	22.97	0.34	23.31
120	32.89	15.18	0.00	22.97	0.31	23.28

On-site stormwater detention

Storage required = 38.86 m^3
Storage provided = 44.20 m^3 (refer to DWG C601)

Structure	Vol (m^3)	Ponding Depth (m)
CBMH04	27.86	0.30
CBMH05	5.86	0.35
CBMH06	10.48	0.20
Total	**44.20**	

LRL File No. 240272
Project: Proposed Development-Halo Car Wash
Location: Lancelot Drive & Hunt Club Drive
Date: December 5, 2025
Designed: M. Longtin
Checked: M. Basnet
Drawing Ref.: C701, C702

Stormwater Management Design Sheet

STORM - 100 YEAR

Post-development Stormwater Management (100-Yr)_Controlled by ICD#2

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	178.56	65.56	25.29	23.41	1.59	25.00
15	142.89	52.47	26.15	23.41	1.27	24.68
20	119.95	44.04	24.76	23.41	1.07	24.48
25	103.85	38.13	22.08	23.41	0.92	24.33
30	91.87	33.73	18.58	23.41	0.82	24.23
35	82.58	30.32	14.51	23.41	0.73	24.14
40	75.15	27.59	10.03	23.41	0.67	24.08
45	69.05	25.35	5.25	23.41	0.61	24.02
50	63.95	23.48	0.22	23.41	0.57	23.98
55	59.62	21.89	0.00	23.41	0.53	23.94
60	55.89	20.52	0.00	23.41	0.50	23.91
70	49.79	18.28	0.00	23.41	0.44	23.85
80	44.99	16.52	0.00	23.41	0.40	23.81
90	41.11	15.09	0.00	23.41	0.37	23.78
100	37.90	13.92	0.00	23.41	0.34	23.75
110	35.20	12.93	0.00	23.41	0.31	23.72
120	32.89	12.08	0.00	23.41	0.29	23.70

On-site stormwater detention

Storage required = 26.15 m^3
Storage provided = 33.04 m^3 (refer to DWG C601)

Structure	Vol (m^3)	Ponding Depth (m)
CBMH02	7.18	0.15
CBMH03	25.86	0.20
Total	**33.04**	

Summary (100-Yr)

Catchments	Area	Release Rate	Storage Req.	Storage Provided
	(ha)	(L/s)	(m^3)	(m^3)
Controlled by ICD#1	0.179	22.97	38.86	44.20
Controlled by ICD#2	0.151	23.41	26.15	33.04
Uncontrolled	0.016	3.29	N/A	N/A
Total	**0.346**	**49.67**	**65.01**	**77.24**

LRL File No. 240272
Project: Proposed Development-Halo Car Wash
Location: Lancelot Drive & Hunt Club Drive
Date: December 5, 2025
Designed: M. Longtin
Checked: M. Basnet
Drawing Ref.: C701, C702

Stormwater Management Design Sheet

STORM - 5 YEAR

Runoff Equation

Q = 2.78CIA (L/s)
C = Runoff coefficient
I = Rainfall intensity (mm/hr) $= A / (Td + C)^B$
A = Area (ha)
T_d = Time of duration (min)

Pre-development Release Rate

IDF Curve Equations

$I_5 = 998.071 / (Td + 6.053)^{0.814}$ **A =** 998.071 **B =** 0.814 **C =** 6.053

C =	0.50	(max. of 0.5 as per City of Ottawa)	
I =	104.2	mm/hr	
Tc =	10	min	
Total Area =	0.346	ha	
Release Rate =	50.04	L/s	(Allowable Release Rate)

Post-development Stormwater Management

					$\sum R_{2\&5}$
	Total Site Area =	**0.346**	ha	**∑R=**	**0.79**
Controlled	CA-01	0.048	ha	R=	0.90
	CA-02	0.078	ha	R=	0.85
	CA-03	0.008	ha	R=	0.20
	CA-04	0.045	ha	R=	0.84
	Controlled by ICD#1	***0.179***	*ha*	*R=*	***0.83***
	CA-05	0.078	ha	R=	0.79
	CA-06	0.073	ha	R=	0.78
	Controlled by ICD#2	***0.151***	*ha*	*R=*	***0.79***
	Total Contolled =	**0.330**	**ha**	**∑R=**	**0.81**
Uncontrolled	CA-07	0.003	ha	R=	0.90
	CA-08	0.001	ha	R=	0.90
	CA-09	0.013	ha	R=	0.22
	Total Uncontolled =	**0.016**	**ha**	**∑R=**	**0.36**

Post-development Stormwater Management (5-Yr)_Controlled by ICD#1

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	104.19	43.15	12.11	22.97	0.81	23.78
15	83.56	34.60	10.47	22.97	0.65	23.62
20	70.25	29.09	7.35	22.97	0.54	23.51
25	60.90	25.22	3.37	22.97	0.47	23.44
30	53.93	22.33	0.00	22.97	0.42	23.39
35	48.52	20.09	0.00	22.97	0.37	23.34
40	44.18	18.30	0.00	22.97	0.34	23.31
45	40.63	16.82	0.00	22.97	0.31	23.28
50	37.65	15.59	0.00	22.97	0.29	23.26
55	35.12	14.54	0.00	22.97	0.27	23.24
60	32.94	13.64	0.00	22.97	0.25	23.22
70	29.37	12.16	0.00	22.97	0.23	23.20
80	26.56	11.00	0.00	22.97	0.21	23.18
90	24.29	10.06	0.00	22.97	0.19	23.16
100	22.41	9.28	0.00	22.97	0.17	23.14
110	20.82	8.62	0.00	22.97	0.16	23.13
120	19.47	8.06	0.00	22.97	0.15	23.12

On-site stormwater detention

Storage required = 12.11 m^3

LRL File No. 240272
Project: Proposed Development-Halo Car Wash
Location: Lancelot Drive & Hunt Club Drive
Date: December 5, 2025
Designed: M. Longtin
Checked: M. Basnet
Drawing Ref.: C701, C702

Stormwater Management Design Sheet

STORM - 5 YEAR

Post-development Stormwater Management (5-Yr)_Controlled by ICD#2

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	104.19	34.25	6.51	23.41	0.83	24.24
15	83.56	27.47	3.65	23.41	0.67	24.08
20	70.25	23.09	0.00	23.41	0.56	23.97
25	60.90	20.02	0.00	23.41	0.49	23.90
30	53.93	17.73	0.00	23.41	0.43	23.84
35	48.52	15.95	0.00	23.41	0.39	23.80
40	44.18	14.52	0.00	23.41	0.35	23.76
45	40.63	13.36	0.00	23.41	0.33	23.74
50	37.65	12.38	0.00	23.41	0.30	23.71
55	35.12	11.55	0.00	23.41	0.28	23.69
60	32.94	10.83	0.00	23.41	0.26	23.67
70	29.37	9.66	0.00	23.41	0.24	23.65
80	26.56	8.73	0.00	23.41	0.21	23.62
90	24.29	7.98	0.00	23.41	0.19	23.60
100	22.41	7.37	0.00	23.41	0.18	23.59
110	20.82	6.85	0.00	23.41	0.17	23.58
120	19.47	6.40	0.00	23.41	0.16	23.57

On-site stormwater detention

Storage required = 6.51 m^3

LRL File No. 240272
Project: Proposed Development-Halo Car Wash
Location: Lancelot Drive & Hunt Club Drive
Date: December 5, 2025
Designed: M. Longtin
Checked: M. Basnet
Drawing Ref.: C701, C702

Stormwater Management Design Sheet

STORM - 2 YEAR

Runoff Equation

Q = 2.78CIA (L/s)
C = Runoff coefficient
I = Rainfall intensity (mm/hr) $= A / (Td + C)^B$
A = Area (ha)
T_c = Time of concentration (min)

Pre-development Stormwater Management (2-Yr)

IDF Curve Equations

$I_2 = 732.951 / (Td + 6.199)^{0.810}$ **A = 732.951** **B = 0.810** **C = 6.199**

C = 0.50 (max. of 0.5 as per City of Ottawa)
I = 76.8 mm/hr
Tc = 10 min
Total Area = 0.346 ha
Release Rate = 36.89 L/s

Post-development Stormwater Management

					$\sum R_{2\&5}$
	Total Site Area =	**0.346**	ha	**∑R=**	**0.79**
Controlled	CA-01	0.048	ha	R=	0.90
	CA-02	0.078	ha	R=	0.85
	CA-03	0.008	ha	R=	0.20
	CA-04	0.045	ha	R=	0.84
	Controlled by ICD#1	***0.179***	*ha*	*R=*	***0.83***
	CA-05	0.078	ha	R=	0.79
	CA-06	0.073	ha	R=	0.78
	Controlled by ICD#2	***0.151***	*ha*	*R=*	***0.79***
	Total Contolled =	**0.330**	**ha**	**∑R=**	**0.81**
Uncontrolled	CA-07	0.003	ha	R=	0.90
	CA-08	0.001	ha	R=	0.90
	CA-09	0.013	ha	R=	0.22
	Total Uncontolled =	**0.016**	**ha**	**∑R=**	**0.36**

Post-development Stormwater Management (2-Yr)_Controlled by ICD#1

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	*Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	76.81	31.81	12.19	11.49	0.59	12.08
15	61.77	25.58	12.68	11.49	0.48	11.96
20	52.03	21.55	12.07	11.49	0.40	11.89
25	45.17	18.70	10.83	11.49	0.35	11.83
30	40.04	16.58	9.18	11.49	0.31	11.79
35	36.06	14.93	7.24	11.49	0.28	11.76
40	32.86	13.61	5.10	11.49	0.25	11.74
45	30.24	12.52	2.80	11.49	0.23	11.72
50	28.04	11.61	0.38	11.49	0.22	11.70
55	26.17	10.84	0.00	11.49	0.20	11.69
60	24.56	10.17	0.00	11.49	0.19	11.67
70	21.91	9.07	0.00	11.49	0.17	11.65
80	19.83	8.21	0.00	11.49	0.15	11.64
90	18.14	7.51	0.00	11.49	0.14	11.63
100	16.75	6.93	0.00	11.49	0.13	11.61
110	15.57	6.45	0.00	11.49	0.12	11.61
120	14.56	6.03	0.00	11.49	0.11	11.60

*Average release rate taken as 50% of the max. allowable controlled release rate for underground storage calculation

On-site stormwater detention

Storage required = **12.68** m^3
Underground storage provided = **14.42** m^3 (pipe storage & CB/CBMH storage)

LRL File No. 240272
Project: Proposed Development-Halo Car Wash
Location: Lancelot Drive & Hunt Club Drive
Date: December 5, 2025
Designed: M. Longtin
Checked: M. Basnet
Drawing Ref.: C701, C702

Stormwater Management Design Sheet

Pipe Storage

Pipe	Length (m)	dia. (m)	Storage (m^3)
CBMH04-CBMH06	27.20	0.525	5.89
CBMH05-CBMH06	7.50	0.300	0.53
		Total	**6.42**

CBMH Storage

CB/CBMH	Depth (m)	dia. (m)	Storage (m^3)
CBMH04	1.85	1.20	2.09
CBMH05	1.92	1.20	2.17
CBMH06	2.11	1.50	3.73
		Total	**8.00**

Post-development Stormwater Management (2-Yr)_Controlled by ICD#2

Time (min)	Intensity (mm/hr)	Controlled Runoff (L/s)	Storage Volume (m^3)	*Controlled Release Rate (L/s)	Uncontrolled Runoff (L/s)	Total Release Rate (L/s)
10	76.81	25.25	8.13	11.71	0.61	12.32
15	61.77	20.31	7.74	11.71	0.49	12.20
20	52.03	17.10	6.48	11.71	0.42	12.12
25	45.17	14.85	4.71	11.71	0.36	12.07
30	40.04	13.16	2.63	11.71	0.32	12.03
35	36.06	11.85	0.31	11.71	0.29	11.99
40	32.86	10.80	0.00	11.71	0.26	11.97
45	30.24	9.94	0.00	11.71	0.24	11.95
50	28.04	9.22	0.00	11.71	0.22	11.93
55	26.17	8.60	0.00	11.71	0.21	11.91
60	24.56	8.07	0.00	11.71	0.20	11.90
70	21.91	7.20	0.00	11.71	0.18	11.88
80	19.83	6.52	0.00	11.71	0.16	11.86
90	18.14	5.96	0.00	11.71	0.15	11.85
100	16.75	5.51	0.00	11.71	0.13	11.84
110	15.57	5.12	0.00	11.71	0.12	11.83
120	14.56	4.79	0.00	11.71	0.12	11.82

*Average release rate taken as 50% of max. allowable controlled release rate for an underground storage calculation

On-site stormwater detention

Storage required = **8.13** m^3

Underground storage provided = **11.32** m^3 (pipe storage & MH/CBMH storage)

Pipe Storage

Length (m)	Length (m)	dia. (m)	Storage (m^3)
Trench Drain-MH01	17.3	0.150	0.31
MH01-CBMH02	9.60	0.250	0.47
CBMH02-CBMH03	30.50	0.250	1.50
		Total	**2.28**

MH/CBMH Storage

CB/CBMH	Depth (m)	dia. (m)	Storage (m^3)
MH01	2.55	1.20	2.89
CBMH02	2.63	1.20	2.98
CBMH03	2.81	1.20	3.18
		Total	**9.04**

LRL Associates Ltd.

Storm Design Sheet

LRL File No.	240272
Project:	Proposed Development-Halo Car Wash
Location:	Lancelot Drive & Hunt Club Drive
Date:	January 0, 1900
Designed:	M. Longtin
Checked:	M. Basnet
Drawing Reference:	C702, C401

Storm Design Parameters

Rational Method	Runoff Coefficient (C)		City of Ottawa IDF curve equation
Q = 2.78CIA	Grass	0.20	(5 year event, intensity in mm/hr)
Q = Peak flow (L/s)	Gravel	0.80	$I_5 = 998.071 / (Td + 6.053)^{0.814}$
A = Drainage area (ha)	Asphalt / rooftop	0.90	Min. velocity = 0.80 m/s
C = Runoff coefficient			Manning's "n" = 0.013
I = Rainfall intensity (mm/hr)			

LOCATION			AREA (ha)			FLOW						STORM SEWER							
WATERSHED / STREET	From MH	To MH	C = 0.20	C = 0.80	C = 0.90	Indiv. 2.78AC	Accum. 2.78AC	Time of Conc. (min.)	Rainfall Intensity (mm/hr)	Peak Flow Q (L/s)	Controlled Flow Q (L/s)	Pipe Diameter (mm)	Type	Slope (%)	Length (m)	Capacity Full (L/s)	Velocity Full (m/s)	Time of Flow (min.)	Ratio (Q/Q_{FULL})
CA-01	BLDG	Sewer	0.000	0.000	0.048	0.121	0.121	10.00	104.19	12.62		150	PVC	2.00%	5.5	21.5	1.22	0.08	0.59
CA-02	CBMH04	CBMH06	0.006	0.000	0.072	0.184	0.305	10.08	103.80	31.69		525	PVC	0.40%	27.2	272.0	1.26	0.36	0.12
CA-03	CBMH05	CBMH06	0.008	0.000	0.000	0.005	0.005	10.00	104.19	0.49		300	PVC	0.50%	7.5	68.4	0.97	0.13	0.01
CA-04	CBMH06	MH07	0.004	0.000	0.041	0.104	0.414	10.44	101.94	42.22	22.97	250	PVC	0.45%	28.2	39.9	0.81	0.58	0.58
Part of CA-05	Trench Drain	MH01	0.000	0.000	0.003	0.008	0.008	10.00	104.19	0.81		150	PVC	2.00%	17.3	21.5	1.22	0.24	0.04
	MH01	CBMH02					0.008	10.24	102.96	0.80		250	PVC	0.50%	9.6	42.0	0.86	0.19	0.02
CA-05	CBMH02	CBMH03	0.012	0.000	0.063	0.164	0.171	10.42	102.01	17.47		250	PVC	0.50%	30.5	42.0	0.86	0.59	0.42
CA-06	CBMH03	MH07	0.012	0.000	0.060	0.157	0.329	11.02	99.11	32.58	23.41	250	PVC	0.50%	9.10	42.0	0.86	0.18	0.77
	MH07	OGS					0.743	11.19	98.28	73.01	46.38	250	PVC	1.00%	2.7	59.5	1.21	0.04	0.78
Lancelot Dr	OGS	Ex.Sewer					0.743	11.23	98.11	72.88	46.38	250	PVC	1.00%	11.9	59.5	1.21	0.16	0.78

LRL File No.	240272
Project:	Proposed Development-Halo Car Wash
Location:	Lancelot Drive & Hunt Club Drive
Date:	December 5, 2025
Designed:	M Basnet
Drawing Ref.:	C401

Orifice Equation

$$Q = C_d\, A \sqrt{2gH}$$

Where:

Q = discharge (m^3/s)
C_d = coefficient of discharge (typical 0.61)
A = area of orifice (m^2)
g = acceleration due to gravity (= 9.81 m/s^2)
H = head above centreline of orifice

	(ICD#1)	(ICD#2)	
Orifice Dia (d) =	**83**	**80**	**mm**
A =	0.0054	0.0050	m^2
C_{d} =	0.61	0.61	
g =	9.81	9.81	m/s^2
H =	2.47	2.97	m
Q =	22.97	23.41	L/s

Maxime Longtin

From: Roy, Jean-Miguel <Jean-Miguel.Roy@ottawa.ca>
Sent: Monday, November 10, 2025 10:49 AM
To: Maxime Longtin
Cc: Mohan Basnet
Subject: RE: Halo Hunt Club (Lancelot Drive) - Exist Storm Capacity

Salut Maxime,

Thank you for providing this excerpt of the old storm sewer design sheet for the area. I was also able to confirm with the Water Resources team that there are no capacity concerns with the City-owned pipe downstream of this one (ID STM16643 on GeoOttawa), therefore we can consider this deficiency cleared.

Please simply document this email in your next submission of the Servicing and SWM Report for records purposes.

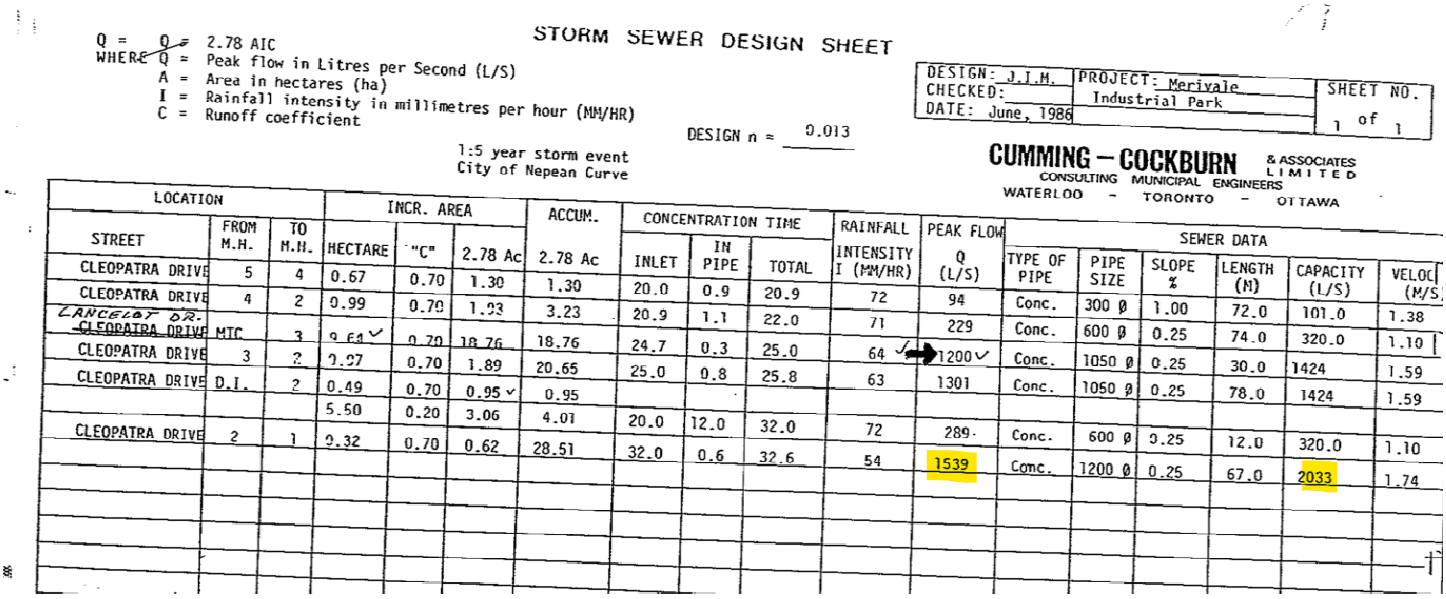
Merci!
Jean-Miguel Roy
Project Manager, Infrastructure Approvals
Planning, Real Estate and Economic Development Department
Services de la planification, Direction générale de la planification, de l'immobilier et du développement économique
110 Laurier Avenue West | 110 avenue Laurier Ouest
City of Ottawa | Ville d'Ottawa
613.580.2424 x 30902

From: Maxime Longtin <mlongtin@lrl.ca>
Sent: September 04, 2025 9:00 AM
To: Roy, Jean-Miguel <Jean-Miguel.Roy@ottawa.ca>
Cc: Mohan Basnet <mbasnet@lrl.ca>
Subject: Halo Hunt Club (Lancelot Drive) - Exist Storm Capacity

Hi Jean-Miguel,

I'm unsure if you received our re-submission for SPC, or it will come to your desk sometime next week.

One of your comments was pertaining to the capacity of the existing storm sewer that we're now connecting into. At the time of addressing the City comments, I didn't have the info but I did receive the info from the developer this evening.



Q = ~~Q~~ = 2.78 AIC
WHERE ~~Q~~ Q = Peak flow in Litres per Second (L/S)
A = Area in hectares (ha)
I = Rainfall intensity in millimetres per hour (MM/HR)
C = Runoff coefficient

STORM SEWER DESIGN SHEET

DESIGN: J.I.M. | PROJECT: Merivale Industrial Park | SHEET NO. 1 of 1
CHECKED:
DATE: June, 1988

DESIGN n = 0.013

1:5 year storm event
City of Nepean Curve

CUMMING – COCKBURN & ASSOCIATES LIMITED
CONSULTING MUNICIPAL ENGINEERS
WATERLOO – TORONTO – OTTAWA

LOCATION			INCR. AREA			ACCUM.	CONCENTRATION TIME			RAINFALL	PEAK FLOW	SEWER DATA					
STREET	FROM M.H.	TO M.H.	HECTARE	"C"	2.78 Ac	2.78 Ac	INLET	IN PIPE	TOTAL	INTENSITY I (MM/HR)	Q (L/S)	TYPE OF PIPE	PIPE SIZE	SLOPE %	LENGTH (M)	CAPACITY (L/S)	VELOC (M/S)
CLEOPATRA DRIVE	5	4	0.67	0.70	1.30	1.30	20.0	0.9	20.9	72	94	Conc.	300 Ø	1.00	72.0	101.0	1.38
CLEOPATRA DRIVE	4	2	0.99	0.70	1.93	3.23	20.9	1.1	22.0	71	229	Conc.	600 Ø	0.25	74.0	320.0	1.10
~~CLEOPATRA DR.~~ CLEOPATRA DRIVE	MTC	3	9.68 ✓	0.70	18.76	18.76	24.7	0.3	25.0	64 ✓	1200 ✓	Conc.	1050 Ø	0.25	30.0	1424	1.59
CLEOPATRA DRIVE	3	2	0.27	0.70	1.89	20.65	25.0	0.8	25.8	63	1301	Conc.	1050 Ø	0.25	78.0	1424	1.59
CLEOPATRA DRIVE	D.I.	2	0.49	0.70	0.95 ✓	0.95											
			5.50	0.20	3.06	4.01	20.0	12.0	32.0	72	289	Conc.	600 Ø	0.25	12.0	320.0	1.10
CLEOPATRA DRIVE	2	1	0.32	0.70	0.62	28.51	32.0	0.6	32.6	54	1539	Conc.	1200 Ø	0.25	67.0	2033	1.74

The pipe that we're connecting to has roughly 494L/s of capacity remaining pre-development.

I trust that this satisfy the concerns about the capacity of this existing sewer.

Thanks 😊
Maxime Longtin, Civil Engineering Technologist and Team Manager

LRL ENGINEERING | INGÉNIERIE
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www.lrl.ca

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Stormceptor®

Rinker MATERIALS® A QUIKRETE® COMPANY

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

03/31/2025

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

Site Name:	Lancelot Drive and Hunt Club Drive

Drainage Area (ha):	0.33
Runoff Coefficient 'c':	0.80

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

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	8.52
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	46.95
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	337
Estimated Average Annual Sediment Volume (L/yr):	274

Project Name:	Halo Car Wash
Project Number:	240272
Designer Name:	Jessica Steffler
Designer Company:	Forterra Pipe & Precast
Designer Email:	jessica.steffler@RinkerPipe.com
Designer Phone:	519-239-6958
EOR Name:	Mohan Basnet
EOR Company:	LRL Engineering
EOR Email:	mbasnet@lrl.ca
EOR Phone:	613-842-3434

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	90
EFO5	94
EFO6	96
EFO8	99
EFO10	100
EFO12	100

Recommended Stormceptor EFO Model:	EFO4
Estimated Net Annual Sediment (TSS) Load Reduction (%):	90
Water Quality Runoff Volume Capture (%):	> 90

imbrium

THIRD-PARTY TESTING AND VERIFICATION

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

PERFORMANCE

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

PARTICLE SIZE DISTRIBUTION (PSD)

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

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

Stormceptor® EF Sizing Report

Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.6	8.6	0.37	22.0	18.0	100	8.6	8.6
1.00	20.3	29.0	0.73	44.0	37.0	100	20.3	29.0
2.00	16.2	45.2	1.47	88.0	73.0	100	16.2	45.2
3.00	12.0	57.2	2.20	132.0	110.0	95	11.4	56.5
4.00	8.4	65.6	2.94	176.0	147.0	91	7.7	64.2
5.00	5.9	71.6	3.67	220.0	183.0	86	5.1	69.3
6.00	4.6	76.2	4.40	264.0	220.0	82	3.8	73.1
7.00	3.1	79.3	5.14	308.0	257.0	81	2.5	75.6
8.00	2.7	82.0	5.87	352.0	294.0	79	2.2	77.7
9.00	3.3	85.3	6.61	396.0	330.0	77	2.6	80.3
10.00	2.3	87.6	7.34	440.0	367.0	76	1.7	82.0
11.00	1.6	89.2	8.07	484.0	404.0	74	1.2	83.2
12.00	1.3	90.5	8.81	528.0	440.0	72	1.0	84.1
13.00	1.7	92.2	9.54	572.0	477.0	71	1.2	85.4
14.00	1.2	93.5	10.27	616.0	514.0	69	0.8	86.2
15.00	1.2	94.6	11.01	661.0	550.0	67	0.8	87.0
16.00	0.7	95.3	11.74	705.0	587.0	66	0.5	87.4
17.00	0.7	96.1	12.48	749.0	624.0	64	0.5	87.9
18.00	0.4	96.5	13.21	793.0	661.0	64	0.3	88.2
19.00	0.4	96.9	13.94	837.0	697.0	64	0.3	88.4
20.00	0.2	97.1	14.68	881.0	734.0	64	0.1	88.6
21.00	0.5	97.5	15.41	925.0	771.0	63	0.3	88.9
22.00	0.2	97.8	16.15	969.0	807.0	63	0.2	89.0
23.00	1.0	98.8	16.88	1013.0	844.0	63	0.6	89.6
24.00	0.3	99.1	17.61	1057.0	881.0	62	0.2	89.8
25.00	0.0	99.1	18.35	1101.0	917.0	62	0.0	89.8
30.00	0.9	100.0	22.02	1321.0	1101.0	59	0.6	90.4
35.00	0.0	100.0	25.69	1541.0	1284.0	55	0.0	90.4
40.00	0.0	100.0	29.36	1761.0	1468.0	50	0.0	90.4
45.00	0.0	100.0	33.03	1982.0	1651.0	44	0.0	90.4
Estimated Net Annual Sediment (TSS) Load Reduction =								90 %

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

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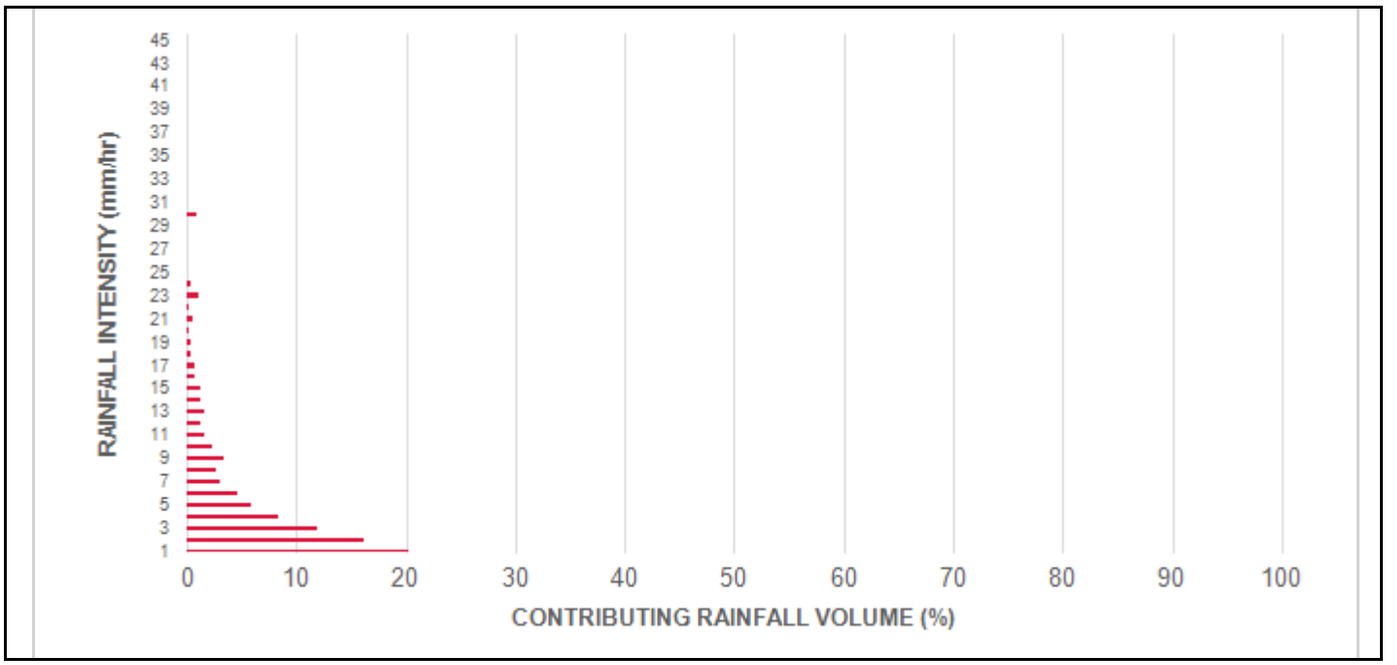
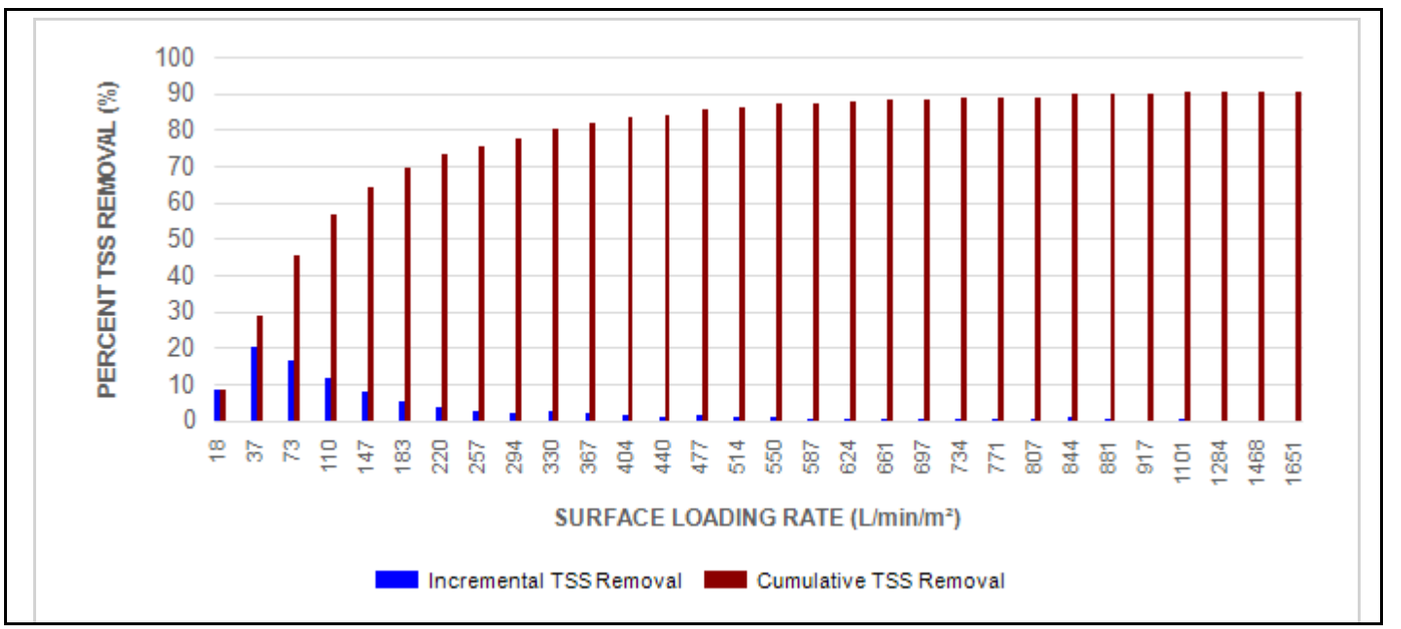
RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL
FOR THE RECOMMENDED STORMCEPTOR® MODEL



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Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF5 / EFO5	1.5	5	90	762	30	762	30	710	25
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

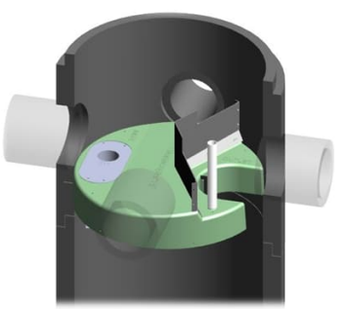
►Stormceptor® EF and EFO feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV Procedure for Laboratory Testing of Oil-Grit Separators, and the exceptional scour test performance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

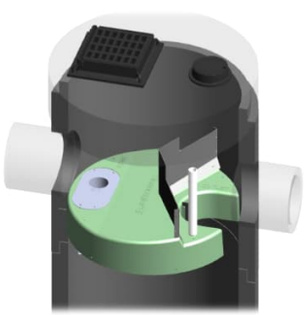
DESIGN FLEXIBILITY

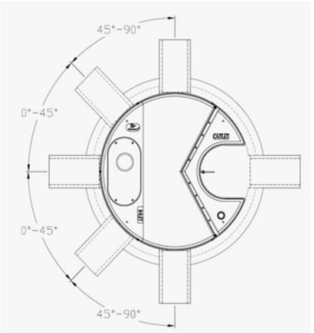
►Stormceptor® EF and EFO offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle,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

OIL CAPTURE AND RETENTION

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







INLET-TO-OUTLET DROP

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

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

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

HEAD LOSS

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

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft³)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

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

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft³)

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

STANDARD STORMCEPTOR EF/EFO DRAWINGS

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

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

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

imbrium®

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

PART 1 – GENERAL

1.1 WORK INCLUDED

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

1.2 REFERENCE STANDARDS & PROCEDURES

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

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

1.3 SUBMITTALS

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

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

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

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

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

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	5 ft (1524 mm) Diameter OGS Units:	1.95 m^3 sediment / 420 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil

10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

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

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

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

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

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

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

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

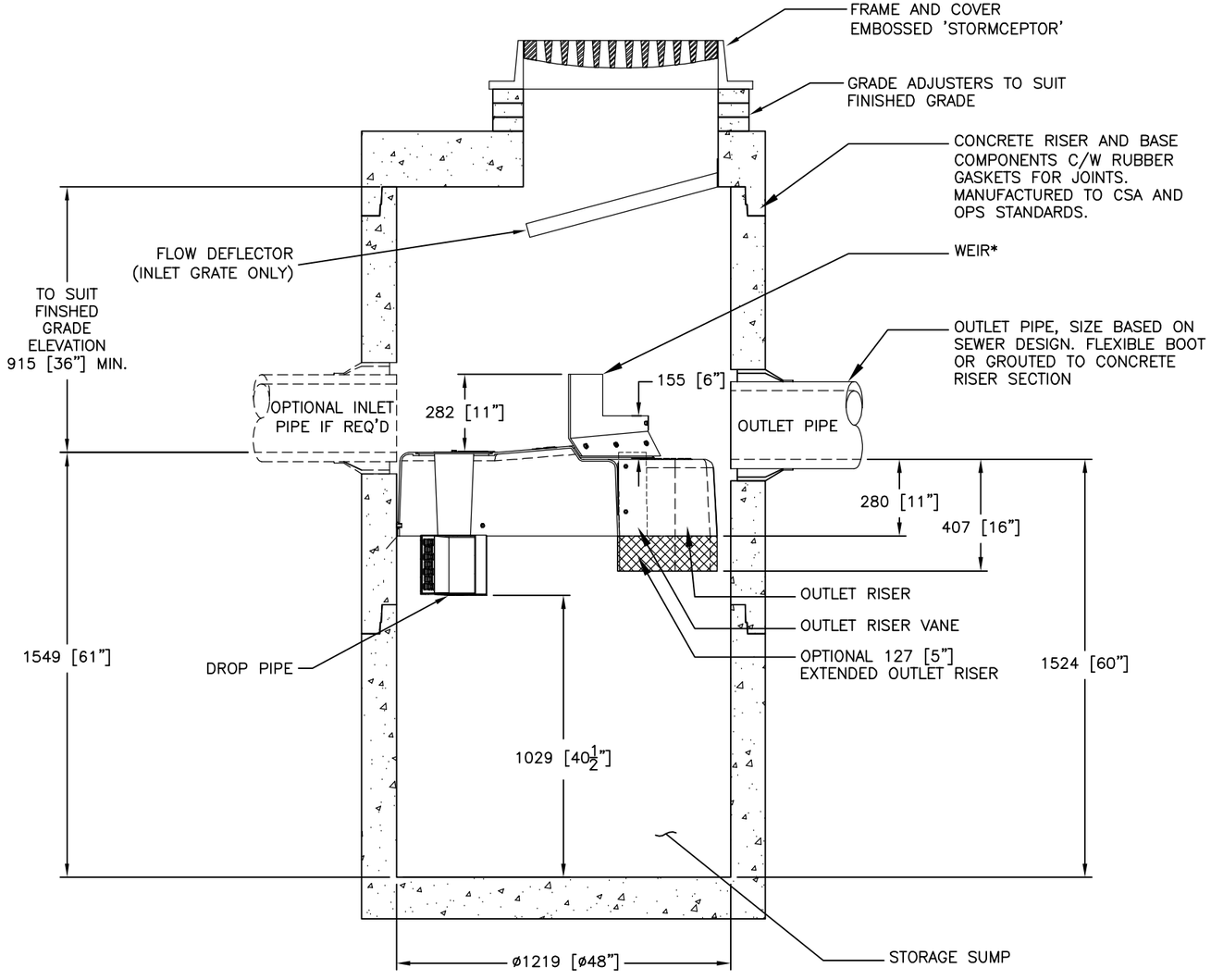
The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

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

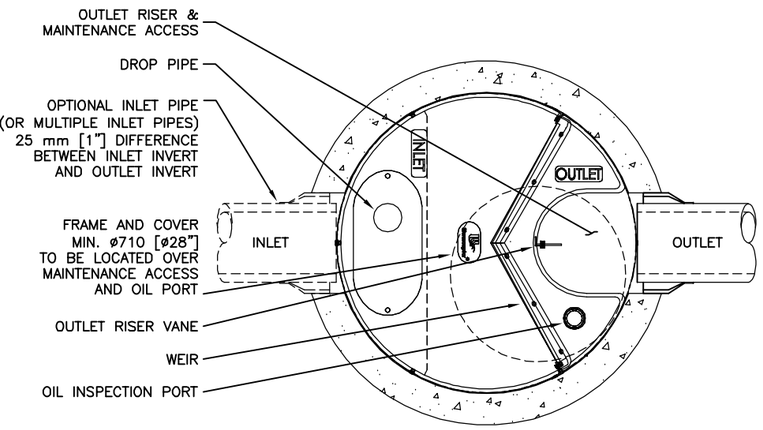
3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

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

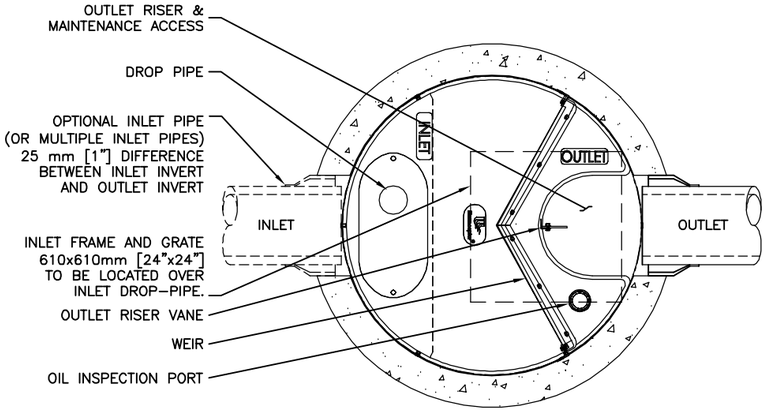
3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five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



SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

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

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF4 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO4 (OIL CAPTURE CONFIGURATION). WEIR HEIGHT IS 150 mm (6 INCH) FOR EF04.

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

INSTALLATION NOTES

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

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EFO4
STRUCTURE ID	*
HYDROCARBON STORAGE REQ'D (L)	*
WATER QUALITY FLOW RATE (L/s)	*
PEAK FLOW RATE (L/s)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
DRAINAGE AREA (HA)	*
DRAINAGE AREA IMPERVIOUSNESS (%)	*

PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

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

Stormceptor® EF

SCALE = NTS

imbrium®
407 FAIRVIEW DRIVE, WHITBY, ON, L1N 9A9
TF 800-565-4501 CA 416-800-9000 INTL +1-416-800-9000

DATE: 10/13/2017

DESIGNED:	DRAWN:
JSK	JSK
CHECKED:	APPROVED:
BSF	SP
PROJECT No.:	SEQUENCE No.:
EFO4	*

SHEET: 1 OF 1

STANDARD SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREAMENT DEVICE WITH THIRD-PARTY VERIFIED LIGHT LIQUID RE-ENTRAINMENT SIMULATION PERFORMANCE TESTING RESULTS

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, designing, maintaining, and constructing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, **specifically an OGS device that has been third-party tested for oil and fuel retention capability using a protocol for light liquid re-entrainment simulation testing, with testing results and a Statement of Verification in accordance with all the provisions of ISO 14034 Environmental Management – Environmental Technology Verification (ETV)**. Work includes supply and installation of concrete bases, precast sections, and the appropriate precast section with OGS internal components correctly installed within the system, watertight sealed to the precast concrete prior to arrival to the project site.

1.2 REFERENCE STANDARDS

1.2.1 For Canadian projects only, the following reference standards apply:

CAN/CSA-A257.4-14: Joints for Circular Concrete Sewer and Culvert Pipe, Manhole Sections, and Fittings Using Rubber Gaskets
CAN/CSA-A257.4-14: Precast Reinforced Circular Concrete Manhole Sections, Catch Basins, and Fittings
CAN/CSA-S6-00: Canadian Highway Bridge Design Code

1.2.2 For ALL projects, the following reference standards apply:

ASTM D-4097: Contact Molded Glass Fiber Reinforced Chemical Resistant Tanks
ASTM C 478: Specification for Precast Reinforced Concrete Manhole Sections
ASTM C 443: Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM C 891: Standard Practice for Installation of Underground Precast Concrete Utility Structures
ASTM D2563: Standard Practice for Classification of Visual Defects in Reinforced Plastics

1.3 SHOP DRAWINGS

1.3.1 Shop drawings shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail the precast concrete components and OGS internal components prior to shipment, including the sequence for installation.

1.3.2 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record. Any and all changes to project cost estimates, bonding amounts, plan check fees for revision of approved documents, or design impacts due to regulatory requirements as a result of a product substitution shall be coordinated by the Contractor with the Engineer of Record.

1.4 HANDLING AND STORAGE

Prevent damage to materials during storage and handling.

1.4.1 OGS internal components supplied by the Manufacturer for attachment to the precast concrete vessel shall be pre-fabricated, bolted to the precast and watertight sealed to the precast vessel surface prior to site delivery to ensure Manufacturer's internal assembly process and quality control processes are fully adhered to, and to prevent materials damage on site.

1.4.2 Follow all instructions including the sequence for installation in the shop drawings during installation.

PART 2 – PRODUCTS

2.1 GENERAL

2.1.1 The OGS vessel shall be cylindrical and constructed from precast concrete riser and slab components.

2.1.2 The precast concrete OGS internal components shall include a fiberglass insert bolted and watertight sealed inside the precast concrete vessel, prior to site delivery. Primary internal components that are to be anchored and watertight sealed to the precast concrete vessel shall be done so only by the Manufacturer prior to arrival at the job site to ensure product quality.

2.1.3 The OGS shall be allowed to be specified and have the ability to function as a 240-degree bend structure in the stormwater drainage system, or as a junction structure.

2.1.4 The OGS to be specified shall have the capability to accept influent flow from an inlet grate and an inlet pipe.

2.2 PRECAST CONCRETE SECTIONS

All precast concrete components shall be designed and manufactured to meet highway loading conditions per State/Provincial or local requirements.

2.3 GASKETS

Only profile neoprene or nitrile rubber gaskets that are oil resistant shall be accepted. For Canadian projects only, gaskets shall be in accordance to CSA A257.4-14. Mastic sealants, butyl tape/rope or Conseal CS-101 alone are not acceptable gasket materials.

2.4 JOINTS

The concrete joints shall be watertight and meet the design criteria according to ASTM C-990. For projects where joints require gaskets, the concrete joints shall be watertight and oil resistant and meet the design criteria according to ASTM C-443. Mastic sealants or butyl tape/rope alone are not an acceptable alternative.

2.5 FRAMES AND COVERS

Frames and covers shall be manufactured in accordance with State/Provincial or local requirements for inspection and maintenance access purposes. A minimum of one cover, at least 22-inch (560 mm) in diameter, shall be clearly embossed with the OGS manufacturer's product name to properly identify this asset's purpose is for stormwater quality treatment.

2.6 PRECAST CONCRETE

All precast concrete components shall conform to the appropriate CSA or ASTM specifications.

2.7 FIBERGLASS

The fiberglass portion of the OGS device shall be constructed in accordance with ASTM D2563, and in accordance with the PS15-69 manufacturing standard, and shall only be installed, bolted and watertight sealed to the precast concrete by the Manufacturer prior to arrival at the project site to ensure product quality.

2.8 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a fiberglass insert for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The total sediment storage capacity shall be a minimum 40 ft^3 (1.1 m^3). The total petroleum hydrocarbon storage capacity shall be a minimum 50 gallons (189 liters). The access opening to the sump of the OGS device for periodic inspection and maintenance purposes shall be a minimum 16 inches (406 mm) in diameter.

2.9 LADDERS

Ladder rungs shall be provided upon request or to comply with State/Provincial or local requirements.

2.10 INSPECTION

All precast concrete sections shall be level and inspected to ensure dimensions, appearance, integrity of internal components, and quality of the product meets State/Provincial or local specifications and associated standards.

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 HYDROLOGY AND RUNOFF VOLUME

The OGS device shall be engineered, designed and sized to treat a minimum of 90 percent of the average annual runoff volume, unless otherwise stated by the Engineer of Record, using historical rainfall data. Rainfall data sets should be comprised of a minimum 15-years of rainfall data or a longer continuous period if available for a given location, but in all cases a minimum 5-year period of rainfall data.

3.3 ANNUAL (TSS) SEDIMIMENT LOAD AND STORAGE CAPACITY

The OGS device shall be capable of removing and have sufficient storage capacity for the calculated annual total suspended solids (TSS) mass load and volume without scouring previously captured pollutants prior to maintenance being required. The annual (TSS) sediment load and volume transported from the drainage area should be calculated and compared to the OGS device's available storage capacity by the specifying Engineer to ensure adequate capacity between maintenance cycles. Sediment loadings shall be determined by land use and defined as a minimum of 450 kg (992 lb) of sediment (TSS) per impervious hectare of drainage area per year, or greater based on land use, as noted in Table 1 below.

Annual sediment volume calculations shall be performed using the projected average annual treated runoff volume, a typical sediment bulk density of 1602 kg/m^3 (100 lbs/ft^3) and an assumed Event Mean Concentration (EMC) of 125 mg/L TSS in the runoff, or as otherwise determined by the Engineer of Record.

Example calculation for a 1.3-hectares parking lot site:

- 1.28 meters of rainfall depth, per year
- 1.3 hectares of 100% impervious drainage area
- EMC of 125 mg/L TSS in runoff
- Treatment of 90% of the average annual runoff volume
- Target average annual TSS removal rate of 60% by OGS

Annual Runoff Volume:

- 1.28 m rain depth x 1.3 ha x 10,000 m^2/ha= 16,640 m^3 of runoff volume
- 16,640 m^3 x 1000 L/m^3 = 16,640,000 L of runoff volume
- 16,640,000 L x 0.90 = 14,976,000 L to be treated by OGS unit

Annual Sediment Mass and Sediment Volume Load Calculation:

- 14,976,000 L x 125 mg/L x kg/1,000,000 mg = 1,872 kg annual sediment mass
- 1,872 kg x m^3/1602 kg = 1.17 m^3 annual sediment volume
- 1.17 m^3 x 60% TSS removal rate by OGS = 0.70 m^3 minimum expected annual storage requirement in OGS

As a guideline, the U.S. EPA has determined typical annual sediment loads per drainage area for various sites by land use (see Table 1). Certain States, Provinces and local jurisdictions have also established such guidelines.

Table 1 – Annual Mass Sediment Loading by Land Use

	Commercial	Parking Lot	Residential			Highways	Industrial	Shopping Center
			High	Med.	Low			
(lbs/acre/yr)	1,000	400	420	250	10	880	500	440
(kg/hectare/yr)	1,124	450	472	281	11	989	562	494

Source: U.S. EPA Stormwater Best Management Practice Design Guide Volume 1, Appendix D, Table D-1, Burton and Pitt 2002

3.4 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in Table 2, Section 3.5, and based on third-party performance testing conducted in accordance with the Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol *Procedure for Laboratory Testing of Oil-Grit Separators*, as follows:

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

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

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

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

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 3.3.

3.4.5 The Peclet Number is not an approved method or model for calculating TSS removal, sizing, or scaling OGS devices.

3.4.6 If an alternate OGS device is proposed, supporting documentation shall be submitted that demonstrates:

- Canadian ETV or ISO 14034 ETV Verification Statement which verifies third-party performance testing conducted in accordance with the **Procedure for Laboratory Testing of Oil-Grit Separators,** including the Light Liquid Re-entrainment Simulation Testing.
- Equal or better sediment (TSS) removal of the PSD specified in Table 2 at equivalent surface loading rates, as compared to the OGS device specified herein.
- Equal or better Light Liquid Re-entrainment Simulation Test results (using low-density polyethylene beads as a surrogate for light liquids such as oil and fuel) at equivalent surface loading rates, as compared to the OGS device specified herein. However, an alternative OGS device shall not be allowed as a substitute if the Light Liquid Re-entrainment Simulation Test was performed with screening components within the OGS device that are effective at retaining the low-density polyethylene beads, but would not be expected to retain light liquids such as oil and fuel.
- Equal or greater sediment storage capacity, as compared to the OGS device specified herein.
- Supporting documentation shall be signed and sealed by a local registered Professional Engineer. All costs associated with preparing and certifying this documentation shall be born solely by the Contractor.

3.5 PARTICLE SIZE DISTRIBUTION (PSD) FOR SIZING

The OGS device shall be sized to achieve the Engineer-specified average annual percent sediment (TSS) removal based solely on the test sediment used in the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** This test sediment is comprised of inorganic ground silica with a specific gravity of 2.65, uniformly mixed, and containing a broad range of particle sizes as specified in Table 2. No alternative PSDs or deviations from Table 2 shall be accepted.

Table 2
Canadian ETV Program Procedure for Laboratory Testing of Oil-Grit Separators
Particle Size Distribution (PSD) of Test Sediment

Particle Diameter (Microns)	% by Mass of All Particles	Specific Gravity
1000	5%	2.65
500	5%	2.65
250	15%	2.65
150	15%	2.65
100	10%	2.65
75	5%	2.65
50	10%	2.65
20	15%	2.65
8	10%	2.65
5	5%	2.65
2	5%	2.65

3.6 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party scour testing conducted and have in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**. This scour testing is conducted with the device pre-loaded with test sediment comprised of the particle size distribution (PSD) illustrated in Table 2.

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

Data generated from laboratory scour testing performed with an OGS device pre-loaded with a coarser PSD than in Table 2 (i.e. the coarser PSD has no particles in the 1-micron to 50-micron size range, or the D_{50} of the test sediment exceeds 75 microns) shall not be acceptable for the determination of the device's suitability for on-line installation.

3.7 DESIGN ACCOUNTING FOR BYPASS

3.7.1 The OGS device shall be specified to achieve the TSS removal performance and water quality objectives without washout of previously captured pollutants. The OGS device shall also have sufficient hydraulic conveyance capacity to convey the peak storm event, in accordance with hydraulic conditions per the Engineer of Record. To ensure this is achieved, there are two design options with associated requirements:

3.7.1.1 The OGS device shall be placed **off-line** with an upstream diversion structure (typically in an upstream manhole) that only allows the water quality volume to be diverted to the OGS device, and excessive flows diverted downstream around the OGS device to prevent high flow washout of pollutants previously captured. This design typically incorporates a triangular layout including an upstream bypass manhole with an appropriately engineered weir wall, the OGS device, and a downstream junction manhole, which is connected to both the OGS device and bypass structure. In this case with an external bypass required, the OGS device manufacturer must provide calculations and designs for all structures, piping and any other required material applicable to the proper functioning of the system, stamped by a Professional Engineer.

3.7.1.2 Alternatively, OGS devices in compliance with Section 3.6 shall be acceptable for an **on-line** design configuration, thereby eliminating the requirement for an upstream bypass manhole and downstream junction manhole.

3.7.2 The OGS device shall also have sufficient hydraulic conveyance capacity to convey the peak storm event, in accordance with hydraulic conditions per the Engineer of Record. If an alternate OGS device is proposed, supporting documentation shall be submitted that demonstrates equal or better hydraulic conveyance capacity as compared to the OGS device specified herein. This documentation shall be signed and sealed by a local registered Professional Engineer. All costs associated with preparing and certifying this documentation shall be born solely by the Contractor.

3.8 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

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

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

3.9 PETROLEUM HYDROCARBONS AND FLOATABLES STORAGE CAPACITY

Petroleum hydrocarbons and floatables storage capacity in the OGS device shall be a minimum 50 gallons (189 Liters), or more as specified.

3.9.1 The OGS device shall have gasketed precast concrete joints that are watertight, and oil resistant and meet the design criteria according to ASTM C-443 to provide safe oil and other hydrocarbon materials storage and ground water protection. Mastic sealants or butyl tape/rope alone are not an acceptable alternative.

3.10 SURFACE LOADING RATE SCALING OF DIFFERENT MODEL SIZES

The reference device for scaling shall be an OGS device that has been third-party tested in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**. Other model sizes of the tested device shall only be scaled such that the claimed TSS removal efficiency of the scaled device shall be no greater than the TSS removal efficiency of the tested device at identical **surface loading rates** (flow rate divided by settling surface area). The depth of other model sizes of the tested device shall be scaled in accordance with the depth scaling provisions within Section 6.0 of the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators**.

3.10.1 The Peclet Number and volumetric scaling are not approved methods for scaling OGS devices.

PART 4 – INSPECTION & MAINTENANCE

The OGS manufacturer shall provide an Owner's Manual upon request.
Maintenance shall be performed by a professional service provider who has experience in cleaning OGS devices and has been trained and certified in applicable health and safety practices, including confined space entry procedures.

4.1 A Quality Assurance Plan that provides inspection for a minimum of 5 years shall be included with the OGS stormwater quality device, and written into the Environmental Compliance Approval (ECA) or the appropriate State/Provincial or local approval document.

4.2 OGS device inspection shall include determination of sediment depth and presence of petroleum hydrocarbons below the insert. Inspection shall be easily conducted from finished grade through a frame and cover of at least 22 inch (560 mm) in diameter.

4.3 Inspection and pollutant removal shall be conducted periodically. For routine maintenance cleaning activities, pollutant removal shall typically utilize a truck equipped with vacuum apparatus, and shall be easily conducted from finished grade through a frame and cover of at least 22-inches (560 mm) in diameter.

4.4 Diameter of the maintenance access opening to the lower chamber and sump shall be scaled consistently across all model sizes, and shall be 1/3 the inside diameter of the OGS structure, or larger.

4.5 No confined space entry shall be required for routine inspection and maintenance cleaning activities.

4.6 For OGS model sizes of diameter 72 inches (1828 mm) and greater, the access opening to the OGS device's lower chamber and sump shall be large enough to allow a maintenance worker to enter the lower chamber to facilitate non-routine maintenance cleaning activities and repairs, as needed.

4.7 The orifice-containing component (i.e. drop pipe, duct, chute, etc.) of the OGS device used to control flow rate into the lower chamber shall be removable from the insert to facilitate cleaning, repair, or replacement of the orifice-containing component, as needed.

PART 5 – EXECUTION

5.1 PRECAST CONCRETE INSTALLATION

The installation of the precast concrete OGS stormwater quality treatment device shall conform to ASTM C 891, ASTM C 478, ASTM C 443, CAN/CSA-A257.4-14, CAN/CSA-A257.4-14, CAN/CSA-S6-00 and all highway, State/Provincial, or local specifications for the construction of manholes. Selected sections of a general specification that are applicable are summarized below. The Contractor shall furnish all labor, equipment and materials necessary to offload, assemble as needed the OGS internal components as specified in the Shop Drawings.

5.2 EXCAVATION

5.2.1 Excavation for the installation of the OGS stormwater quality treatment device shall conform to highway, State/Provincial or local specifications. Topsoil that is removed during the excavation for the OGS stormwater quality treatment device shall be stockpiled in designated areas and not be mixed with subsoil or other materials. Topsoil stockpiles and the general site preparation for the installation of the OGS stormwater quality device shall conform to highway, State/Provincial or local specifications.

5.2.2 The OGS device shall not be installed on frozen ground. Excavation shall extend a minimum of 12 inch (300 mm) from the precast concrete surfaces plus an allowance for shoring and bracing where required. If the bottom of the excavation provides an unsuitable foundation additional excavation may be required.

5.2.3 In areas with a high water table, continuous dewatering shall be provided to ensure that the excavation is stable and free of water.

5.3 BACKFILLING

Backfill material shall conform to highway, State/Provincial or local specifications. Backfill material shall be placed in uniform layers not exceeding 12 inches (300 mm) in depth and compacted to highway, State/Provincial or local specifications.

5.4 OGS WATER QUALITY DEVICE CONSTRUCTION SEQUENCE

5.4.1 The precast concrete OGS stormwater quality treatment device is installed and leveled in sections in the following sequence:

- aggregate base
- base slab, or base
- riser section(s) (if required)
- riser section w/ pre-installed fiberglass insert
- upper riser section(s)
- internal OGS device components
- connect inlet and outlet pipes
- riser section, top slab and/or transition (if required)
- frame and access cover

5.4.2 The precast concrete base shall be placed level at the specified grade. The entire base shall be in contact with the underlying compacted granular material. Subsequent sections, complete with oil resistant, watertight joint seals, shall be installed in accordance with the precast concrete manufacturer's recommendations.

5.4.3 Adjustment of the OGS stormwater quality treatment device can be performed by lifting the upper sections free of the excavated area, re-leveling the base, and re-installing the sections. Damaged sections and gaskets shall be repaired or replaced as necessary. Once the OGS stormwater quality treatment device has been constructed, any lift holes must be plugged with mortar.

5.5 DROP PIPE AND OIL INSPECTION PIPE

Once the upper precast concrete riser has been attached to the lower precast concrete riser section, the OGS device Drop Pipe and Oil Inspection Pipe must be attached, and watertight sealed to the fiberglass insert using Sikaflex 1a. Installation instructions and required materials shall be provided by the OGS manufacturer.

5.6 INLET AND OUTLET PIPES

Inlet and outlet pipes shall be securely set using grout or approved pipe seals (flexible boot connections, where applicable) so that the structure is watertight. Non-secure inlets and outlets will result in improper performance.

5.7 FRAME AND COVER OR FRAME AND GRATE INSTALLATION

Precast concrete adjustment units shall be installed to set the frame and cover/grate at the required elevation. The adjustment units shall be laid in a full bed of mortar with successive units being joined using sealant recommended by the manufacturer. Frames for the cover/grate should be set in a full bed of mortar at the elevation specified.

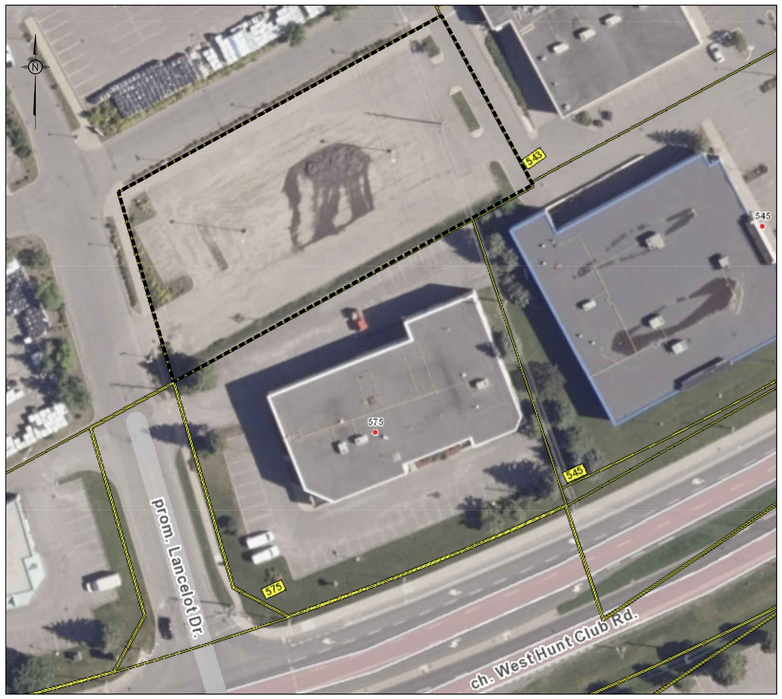
5.7.1 A minimum of one cover, at least 22-inch (560 mm) in diameter, shall be clearly embossed with the OGS device brand or product name to properly identify this asset's purpose is for stormwater quality treatment.

APPENDIX E

Civil Engineering Drawings

PROPOSED HALO DEVELOPMENT
LANCELOT DRIVE AND HUNT CLUB ROAD
NEPEAN, ON

REVISION 03



KEY PLAN (N.T.S.)

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DEMOLITION PLAN	C102
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STORMWATER MANAGEMENT PLAN	C601
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POST-DEVELOPMENT WATERSHED PLAN	C702
CONSTRUCTION DETAIL PLAN	C901

LRL
ENGINEERING | INGÉNIERIE
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PROPOSED HALO DEVELOPMENT
LANCELOT DRIVE AND HUNT CLUB ROAD, NEPEAN, ON
REV.03 - ISSUED FOR APPROVAL - DECEMBER 5th, 2025
LRL PROJECT no: 240272

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2025/12/5
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

GENERAL NOTES

1. ALL WORKS MATERIALS SHALL CONFIRM TO THE LAST REVISION OF THE STANDARDS AND SPECIFICATIONS FOR THE CITY OF OTTAWA, ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS), WHERE APPLICABLE. LOCAL UTILITY STANDARDS AND MINISTRY OF TRANSPORTATION STANDARDS WILL APPLY WHERE REQUIRED.
2. THE CONTRACTORS SHALL CONFIRM THE LOCATION OF ALL EXISTING UTILITIES WITHIN THE SITE AND ADJACENT WORK AREAS. THE CONTRACTORS SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITIES TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OR REPLACEMENT OF ANY SERVICES OR UTILITIES DISTURBED DURING CONSTRUCTION , TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION.
3. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION, ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER. LOST TIME DUE TO FAILURE OF THE CONTRACTORS TO CONFIRM UTILITY LOCATIONS AND NOTIFY ENGINEER OF POSSIBLE CONFLICTS PRIOR TO CONSTRUCTION WILL BE AT CONTRACTORS EXPENSE.
4. ANY AREA BEYOND THE LIMIT OF THE SITE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION AT THE CONTRACTOR'S EXPENSE. RELOCATING OF EXISTING SERVICES AND/OR UTILITIES SHALL BE AS SHOWN ON THE DRAWINGS OR DETECTED BY THE ENGINEER AT THE EXPENSE OF DEVELOPERS.
5. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE 'OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS'. THE GENERAL CONTRACTORS SHALL BE DEEMED TO BE THE 'CONTRACTOR' AS DEFINED IN THE ACT.
6. ALL THE CONSTRUCTION SIGNAGE MUST CONFIRM TO THE MINISTRY OF TRANSPORTATION OF ONTARIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES PER LATEST AMENDMENT.
7. THE CONTRACTOR IS ADVISED THAT WORKS BY OTHERS MAY BE ONGOING DURING THE PERIOD OF THE CONTRACT. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES TO PREVENT CONFLICTS.
8. ALL DIMENSIONS ARE IN METRES UNLESS SPECIFIED OTHERWISE.
9. THERE WILL BE NO SUBSTITUTION OF MATERIALS UNLESS PRIOR WRITTEN APPROVAL IS RECEIVED FROM THE ENGINEER.
10. ALL CONSTRUCTION SHALL BE CARRIED OUT IN ACCORDANCE WITH THE RECOMMENDATIONS MADE IN THE GEOTECHNICAL REPORT.
11. FOR DETAILS RELATING TO STORMWATER MANAGEMENT AND ROOF DRAINAGE REFER TO THE SITE SERVICING AND STORMWATER MANAGEMENT REPORT.
12. ALL SEWERS CONSTRUCTED WITH GRADES LESS THAN 1.0% SHALL BE INSTALLED USING LASER ALIGNMENT AND CHECKED WITH LEVEL INSTRUMENT PRIOR TO BACKFILLING.
13. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED AND TO BEAR THE COST OF THE SAME.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADDITIONAL BEDDING, OR ADDITIONAL STRENGTH PIPE IF THE MAXIMUM TRENCH WIDTH AS SPECIFIED BY OPSD IS EXCEEDED.
15. ALL PIPE/CULVERT SECTION SIZES REFER TO INSIDE DIMENSIONS.
16. SHOULD DEEPLY BURIED ARCHAEOLOGICAL REMAINS BE FOUND ON THE PROPERTY DURING CONSTRUCTION ACTIVITIES, THE HERITAGE OPERATIONS UNIT OF THE ONTARIO MINISTRY OF CULTURE MUST BE NOTIFIED IMMEDIATELY.
17. ALL NECESSARY CLEARING AND GRUBBING SHALL BE COMPLETED BY THE CONTRACTOR. REVIEW WITH CONTRACT ADMINISTRATOR AND THE CITY OF OTTAWA PRIOR TO ANY TREE CUTTING/REMOVAL.
18. DRAWINGS SHALL BE READ ON CONJUNCTION WITH ARCHITECTURAL SITE PLAN.
19. THE CONTRACTOR SHALL PROVIDE THE PROJECT ENGINEER ON SET OF AS CONSTRUCTED SITE SERVICING AND GRADING DRAWINGS.
20. BENCHMARKS: IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT THE SITE BENCHMARK(S) HAS NOT BEEN ALTERED OR DISTURBED AND THAT ITS RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION DEPICTED ON THIS PLAN.

EROSION AND SEDIMENT CONTROL NOTES

GENERAL

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.

THE CONTRACTOR ACKNOWLEDGES THAT SURFACE EROSION AND SEDIMENT RUNOFF RESULTING FROM THEIR CONSTRUCTION OPERATIONS HAS POTENTIAL TO CAUSE A DETRIMENTAL IMPACT TO ANY DOWNSTREAM WATERCOURSE OR SEWER, AND THAT ALL CONSTRUCTION OPERATIONS THAT MAY IMPACT UPON WATER QUALITY SHALL BE CARRIED OUT IN MANNER THAT STRICTLY MEETS THE REQUIREMENT OF ALL APPLICABLE LEGISLATION AND REGULATIONS.

AS SUCH, THE CONTRACTOR SHALL BE RESPONSIBLE FOR CARRYING OUT THEIR OPERATIONS, AND SUPPLYING AND INSTALLING ANY APPROPRIATE CONTROL MEASURES, SO AS TO PREVENT SEDIMENT LADEN RUNOFF ENTERING ANY SEWER OR WATERCOURSE WITHIN OR DOWNSTREAM OF THE WORKING AREA.

THE CONTRACTOR ACKNOWLEDGES THAT NO ONE MEASURE IS LIKELY TO BE 100% EFFECTIVELY FOR EROSION PROTECTION AND CONTROLLING SEDIMENT RUNOFF AND DISCHARGES FROM THE SITE. THEREFORE, WHERE NECESSARY THE CONTRACTOR SHALL IMPLEMENT ADDITIONAL MEASURES ARRANGED IN SUCH MANNER AS TO MITIGATE SEDIMENT RELEASE FROM THE CONSTRUCTION OPERATIONS AND ACHIEVE SPECIFIC MAXIMUM PERMITTED CRITERIA WHERE APPLICABLE. SUGGESTED ON-SITE MEASURES MAY INCLUDE, BUT SHALL NOT BE LIMITED TO, THE FOLLOWING METHODS: SEDIMENT PONDS, FILTER BAGS, PUMP FILTERS, SETTLING TANKS, SILT FENCE, STRAW BALES, FILTER CLOTHS, CATCH BASIN FILTERS, CHECK DAMS AND/OR OTHER RECOGNIZED TECHNOLOGIES AND METHOD AVAILABLE AT THE TIME OF CONSTRUCTION. SPECIFIC MEASURES SHALL BE INSTALLED IN ACCORDANCE WITH REQUIREMENTS OF OPSS 577 WHERE APPROPRIATE, OR IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

WHERE, IN THE OPINION OF THE CONTRACT ADMINISTRATOR OR REGULATORY AGENCY, THE INSTALLED CONTROL MEASURES FAIL TO PERFORM ADEQUATELY, THE CONTRACTOR SHALL SUPPLY AND INSTALL ADDITIONAL OR ALTERNATIVE MEASURES AS DIRECTED BY THE CONTRACT ADMINISTRATOR OR REGULATORY AGENCY, AS SUCH, THE CONTRACTOR SHALL HAVE ADDITIONAL CONTROL MATERIALS ON SITE AT ALL TIME WHICH ARE EASILY ACCESSIBLE AND MAY BE IMPLEMENTED BY HIM AT THE MOMENT'S NOTICE.

PRIOR TO COMMENCING WORK, THE CONTRACTOR SHALL SUBMIT TO THE CONTRACT ADMINISTRATOR SIX COPIES OF A DETAILED EROSION AND SEDIMENT CONTROL PLAN (ESCP). THE ESCP WILL CONSIST OF WRITTEN DESCRIPTION AND DETAILED DRAWINGS INDICATING THE ON-SITE ACTIVITIES AND MEASURES TO BE USED TO CONTROL EROSION AND SEDIMENT MOVEMENT FOR EACH STEP OF THE WORK.

CONTRACTOR'S RESPONSIBILITIES

THE CONTRACTOR SHALL ENSURE THAT ALL WORKERS, INCLUDING SUB-CONTRACTOR, IN THE WORKING ARE ARE AWARE OF THE IMPORTANCE OF THE EROSION AND SEDIMENT CONTROL MEASURES AND INFORMED OF THE CONSEQUENCES OF THE FAILURE TO COMPLY WITH THE REQUIREMENTS OF ALL REGULATORY AGENCIES.

THE CONTRACTOR SHALL PERIODICALLY, AND WHEN REQUESTED BY THE CONTRACT ADMINISTRATOR, CLEAN OUT ACCUMULATED SEDIMENT DEPOSITS AS REQUIRED AT THE SEDIMENT CONTROL DEVICES, INCLUDING THOSE DEPOSITS THAT MAY ORIGINATE FROM OUTSIDE THE CONSTRUCTION AREA. ACCUMULATED SEDIMENT SHALL BE REMOVED IN SUCH A MANNER THAT PREVENTS THE DEPOSITION OF THIS MATERIAL INTO THE SEWER WATERCOURSE AND AVOIDS DAMAGE TO CONTROL MEASURES. THE SEDIMENT SHALL BE REMOVED FROM THE SITE AT THE CONTRACTOR'S EXPENSE AND MANAGED IN COMPLIANCE WITH REQUIREMENTS FRO EXCESS EARTH MATERIAL, AS SPECIFIED ELSEWHERE IN THE CONTRACT.

THE CONTRACTOR SHALL IMMEDIATELY REPORT TO THE CONTRACT ADMINISTRATOR ANY ACCIDENTAL DISCHARGES OF SEDIMENT MATERIAL INTO EITHER THE WATERCOURSE OR THE STORM SEWER SYSTEM. FAILURE TO REPORT WILL BE CONSTITUTE A BRACH OF THIS SPECIFICATION AND THE CONTRACTOR MAY ALSO BE SUBJECT TO THE PENALTIES IMPOSED BY THE APPLICABLE REGULATORY AGENCY. APPROPRIATE RESPONSE MEASURES, INCLUDING ANY REPAIRS TO EXISTING CONTROL MEASURES OR THE IMPLEMENTATION OF ADDITIONAL CONTROL MEASURES, SHALL BE CARRIED OUT BY THE CONTRACTOR WITHOUT DELAY.

THE SEDIMENT CONTROL MEASURES SHALL ONLY BE REMOVED WHEN, IN THE OPINION OF THE CONTRACT ADMINISTRATOR, THE MEASURE OR MEASURES, IS NO LONGER REQUIRED. NO CONTROL MEASURE MAY BE PERMANENTLY REMOVED WITHOUT PRIOR AUTHORIZATION FROM THE CONTRACT ADMINISTRATOR. ALL SEDIMENT AND EROSION CONTROL MEASURES SHALL BE REMOVED IN A MANNER THAT AVOIDS THE ENTRY OF ANY EQUIPMENT, OTHER THAN HAND-HELD EQUIPMENT, INTO ANY WATERCOURSE, AND PREVENTS THE RELEASE OF ANY SEDIMENT OR DEBRIS INTO ANY SEWER OR WATERCOURSE WITHIN OR DOWNSTREAM OF THE WORKING AREA. ALL ACCUMULATED SEDIMENT SHALL BE REMOVED FROM THE WORKING AREA AT THE CONTRACTOR'S EXPENSE AND MANAGED IN COMPLIANCE WITH THE REQUIREMENTS FOR EXCESS EARTH MATERIAL

WHERE, IN THE OPINION OF EITHER THE CONTRACT ADMINISTRATOR OR A REGULATORY AGENCY, ANY OF THE TERMS SPECIFIED HEREIN HAVE NOT BEEN COMPLIED WITH OR PERFORMED IN A SUITABLE MANNER, OR TAT ALL, THE CONTRACTOR ADMINISTRATOR OR A REGULATORY AGENCY HAS THE RIGHT TO IMMEDIATELY WITHDRAW ITS PERMISSION TO CONTINUE THE WORK BUT MAY RENEW ITS PERMISSION UPON BEING SATISFIED THAT THE DEFAULTS OR DEFICIENCIES IN THE PERFORMANCE OF THIS SPECIFICATION BY THE CONTRACTOR HAVE BEEN REMEDIED.

SPILL CONTROL NOTES

1. ALL CONSTRUCTION EQUIPMENT SHALL BE RE-FUELED, MAINTAINED, AND STORED NO LESS THAN 30 METRES FROM WATERCOURSE, STEAMS, CREEKS, WOODLOTS, AND ANY ENVIRONMENTALLY SENSITIVE AREAS, OR AS OTHERWISE SPECIFIED.
2. THE CONTRACTOR MUST IMPLEMENT ALL NECESSARY MEASURES IN ORDER TO PREVENT LEAKS, DISCHARGES OR SPILLS OF POLLUTANTS, DELETERIOUS MATERIALS, OR OTHER SUCH MATERIALS OR SUBSTANCES WHICH WOULD OR COULD CAUSE AN ADVERSE IMPACT TO THE NATURAL ENVIRONMENT.
3. IN THE EVENT OF A LEAK, DISCHARGE OR SPILL OF POLLUTANT, DELETERIOUS MATERIAL OR OTHER SUCH MATERIAL OR SUBSTANCE WHICH WOULD OR COULD CAUSE AN ADVERSE IMPACT TO THE NATURAL ENVIRONMENT, THE CONTRACTOR SHALL:
   - 3.1. IMMEDIATELY NOTIFY APPROPRIATE FEDERAL, PROVINCIAL, AND LOCAL GOVERNMENT MINISTRIES, DEPARTMENTS, AGENCIES, AND AUTHORITIES OF THE INCIDENT IN ACCORDANCE WITH ALL CURRENT LAWS, LEGISLATION, ACTS, BY-LAWS, PERMITS, APPROVALS, ETC.
   - 3.2. TAKE IMMEDIATE MEASURES TO CONTAIN THE MATERIAL OR SUBSTANCE, AND TO TAKE SUCH MEASURES TO MITIGATE AGAINST ADVERSE IMPACTS TO THE NATURAL ENVIRONMENT.
   - 3.3. RESTORE THE AFFECTED AREA TO THE ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE AUTHORITIES HAVING JURISDICTION.

MUD MAT NOTES

1. THE GRANULAR MATERIAL WILL REQUIRE PERIODIC REPLACEMENT AS IT BECOMES CONTAMINATED BY VEHICLE TRAFFIC.
2. SEDIMENT SHALL BE CLEANED FROM PUBLIC ROADS AT THE END OF EACH DAY.
3. SEDIMENT SHALL BE REMOVED FROM PUBLIC ROADS BY SHOVELING OR SWEEPING AND DISPOSED OR PROPERLY IN A CONTROLLED SEDIMENT DISPOSAL AREA.

SITE GRADING NOTES

1. PRIOR TO THE COMMENCEMENT OF THE SITE GRADING WORKS, ALL SILTATION CONTROL DEVICES SHALL BE INSTALLED AND OPERATIONAL PER EROSION CONTROL PLAN.
2. ALL GRANULAR AND PAVEMENT FOR ROADS/PARKING AREAS SHALL BE CONSTRUCTED IN ACCORDANCE WITH GEOTECHNICAL ENGINEER'S RECOMMENDATIONS.
3. ALL TOPSOIL AND ORGANIC MATERIAL SHALL BE STRIPPED WITHIN THE ROAD AND PARKING AREAS ALLOWANCE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
4. CONCRETE CURB SHALL BE IN ACCORDANCE WITH THE CITY OF OTTAWA STD. SC1.1 PROVISION SHALL BE MADE OR CURB DEPRESSIONS AS INDICATED ON ARCHITECTURAL SITE PLAN. CONCRETE SIDEWALK SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD SC1.4. ALL CURBS, CONCRETE ISLANDS, AND SIDEWALKS SHOWN O THIS DRAWING ARE TO BR PRICED IN SITE WORKS PORTION OF THE CONTRACT.
5. PAVEMENT REINSTATEMENT FOR SERVICE AND UTILITY CUTS SHALL BE IN ACCORDANCE WITH THE CITY OF OTTAWA STD. R10 AND OPSD 509.010 AND OPSS 310.
6. GRANULAR 'A' SHALL BE PLACED TO A MINIMUM THICKNESS OF 300MM AROUND ALL STRUCTURES WITHIN THE PAVEMENT AREA.
7. SUB-EXCAVATE SOFT AREAS AND FILL WITH GRANULAR 'B' COMPACTED IN MAXIMUM 300mm LIFTS.
8. ALL WORK ON THE MUNICIPAL RIGHT OF WAY AND EASEMENTS TO BE INSPECTED BY THE MUNICIPALITY PRIOR BACKFILLING.
9. CONTRACTOR TO OBTAIN A ROAD OCCUPANCY PERMIT 48 HOURS PRIOR TO COMMENCING ANY WORK WITHIN THE MUNICIPAL ROAD ALLOWANCE, IF REQUIRED BY THE MUNICIPALITY.
10. ALL PAVEMENT MARKING FEATURES AND SITE SIGNAGE SHALL BE PLACED PER ARCHITECTURAL SITE PLAN. LINE PAINTING AND DIRECTIONAL SYMBOLS SHALL BE APPLIED WITH A MINIMUM OF TWO COATS OF ORGANIC SOLVENT PAINT.
11. REFER TO ARCHITECTURAL SITE PLAN FOR DIMENSIONS AND SITE DETAILS.
12. STEP JOINTS ARE TO BE USED WHERE PROPOSED ASPHALT MEETS EXISTING ASPHALT. ALL JOINTS MUST BE SEALED.
13. SIDEWALKS TO BE 13MM & BEVELED AT 2:1 OR 6MM WITH NO BEVEL REQUIRED BELOW THE FINISHED FLOOR SLAB ELEVATION AT ENTRANCES REQUIRED TO BE BARRIER-FREE, UNLESS OTHERWISE NOTED. ALL IN ACCORDANCE WITH OBC 3.8.1.3 & OTTAWA ACCESSIBILITY DESIGN STANDARDS.
14. WHERE APPLICABLE THE CONTRACTOR IS TO SUBMIT SHOP DRAWINGS TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION. SHOP DRAWINGS MUST BE SITE SPECIFIC, SIGNED AND SEALED BY A LICENSED STRUCTURAL ENGINEER. THE CONTRACTOR WILL ALSO BE REQUIRED TO SUPPLY AND GEOTECHNICAL CERTIFICATION OF THE AS-CONSTRUCTED RETAINING WALL TO THE ENGINEER PRIOR TO FINAL ACCEPTANCE.

ROADWORK SPECIFICATIONS

15. ROADWORK TO BE COMPLETED IN ACCORDANCE WITH GEOTECHNICAL REPORT.
16. AL TOPSOIL AND ORGANIC MATERIAL SHALL BE STRIPPED WITHIN THE ROAD ALLOWANCE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND STOCK PILLED ON SITE AS DIRECTED BY NATIONAL MUNICIPALITY.
17. THE SUBGRADE SHALL BE CROWNED AND SLOPED AT LEAST 2% AND PROOF ROLLED WITH HEAVY ROLLERS.
18. SUB-EXCAVATE SOFT AREAS AND FILL WITH GRANULAR 'A', TYPE II COMPACTED IN MAXIMUM 300MM LIFTS.
19. ALL GRANULAR FOR ROADS SHALL BE COMPACTED TO MINIMUM OF 100% STANDARD PROCTOR DENSITY MAXIMUM DRY DENSITY (SPMDD).
20. CONCRETE RAMP C/W TACTILE WALKING SURFACE INDICATORS COMPONENT AS PER OPSD 310.039. TACTILE WALKING SURFACE INDICATORS TO BE INSTALLED AT ALL RAMPS. MATERIAL TO BE POLYMER COMPOSITE, COLOR GREY

SANITARY, FOUNDATION DRAIN, STORM SEWER AND WATERMAIN NOTES

GENERAL

1. LASER ALIGNMENT CONTROL TO BE UTILIZED ON ALL SEWER INSTALLATIONS.
2. CLAY SEALS TO BE INSTALLED AS PER CITY STANDARD DRAWING S8. THE SEALS SHOULD BE AT LEAST 1.5M LONG (IN THE TRENCH DIRECTION) AND SHOULD EXTEND FROM TRENCH WALL TO TRENCH WALL. THE SEALS SHOULD EXTEND FROM THE FROST LINE AND FULLY PENETRATE THE BEDDING, SUB-BEDDING, AND COVER MATERIAL. THE BARRIERS SHOULD CONSIST OF RELATIVELY DRY AND COMPATIBLE BROWN SILTY CLAY PLACED IN MAXIMUM 225MM LIFTS AND COMPACTED TO A MINIMUM OF 95% SPMDD. THE CLAY SEALS SHOULD BE PLACED AT THE SITE BOUNDARIES AND AT 60M INTERVALS IN THE SERVICE TRENCHES.
3. SERVICES TO BUILDING TO BE TERMINATED 1.0M FROM THE OUTSIDE FACE OF BUILDING UNLESS OTHERWISE NOTED.
4. ALL MAINTENANCE STRUCTURE AND CATCH BASIN EXCAVATIONS TO BE BACKFILLED WITH GRANULAR MATERIAL COMPACTED TO 98% STANDARD PROCTOR DENSITY. A MINIMUM OF 300MM AROUND STRUCTURES.
5. "MODULOC" OR APPROVED PRE-CAST MAINTENANCE STRUCTURE AND CATCH BASIN ADJUSTERS TO BE USED IN LIEU OF BRICKING. PARGE ADJUSTING UNITS ON THE OUTSIDE ONLY.
6. SAFETY PLATFORMS SHALL BE PER OPSD 404.02.
7. DROP STRUCTURES SHALL BE IN ACCORDANCE WITH OPSD 1003.01, IF APPLICABLE.
8. THE CONTRACTOR IS TO PROVIDE CCTV CAMERA INSPECTIONS OF ALL SEWERS, INCLUDING PICTORIAL REPORT, ONE (1) CD COPY AND TWO (2) VIDEO RECORDING IN A FORMAT ACCEPTABLE TO ENGINEER. ALL SEWER ARE TO BE FLUSHED PRIOR TO CAMERA INSPECTION. ASPHALT WEAR COURSE SHALL NOT BE PLACED UNTIL THE VIDEO INSPECTION OF SEWERS AND NECESSARY REPAIRS HAVE BEEN COMPLETED TO THE SATISFACTION OF THE ENGINEER.
9. CONTRACTOR SHALL PERFORM LEAKAGE TESTING, IN THE PRESENCE OF THE CONSULTANT, FOR SANITARY SEWERS IN ACCORDANCE WITH OPSS 407. CONTRACTOR SHALL PERFORM VIDEO INSPECTION OF ALL SEWERS. A COPY OF THE VIDEO AND INSPECTION REPORT SHALL BE SUBMITTED TO THE CONSULTANT FOR REVIEW AND APPROVAL PRIOR TO PLACEMENT OF WEAR COURSE ASPHALT.
10. SHALLOW SEWERS ARE TO BE INSULATED PER CITY OF OTTAWA DETAIL S35.

SANITARY

11. ALL SANITARY SEWER INSTALLATION SHALL CONFORM TO THE LATEST REVISIONS OF THE CITY OF OTTAWA AND THE ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD). AND SPECIFICATIONS (OPSS).
12. ALL SANITARY GRAVITY SEWER SHALL BE PVC SDR 35, IPEX 'RING-TITE' (OR APPROVED EQUIVALENT) PER CSA STANDARD B182.2 OR LATEST AMENDMENT, UNLESS SPECIFIED OTHERWISE.
13. EXISTING MAINTENANCE STRUCTURES TO BE RE-BENCHED WHERE A NEW CONNECTION IS MADE.
14. SANITARY GRAVITY SEWER TRENCH AND BEDDING SHALL BE PER CITY OF OTTAWA STD. S6 AND S7 CLASS 'B' BEDDING, UNLESS SPECIFIED OTHERWISE.
15. SANITARY MAINTENANCE STRUCTURE FRAME AND COVERS SHALL BE PER CITY OF OTTAWA STD. S24 AND S25.
16. SANITARY MAINTENANCE STRUCTURES SHALL BE BENCHED PER OPSD 701.021.
17. 100MM THICK HIGH-DENSITY GRADE 'A' POLYSTYRENE INSULATION TO BE INSTALLED IN ACCORDANCE WITH CITY STD W22 WHERE INDICATED ON DRAWING SSP-1.
18. ALL SANITARY COVERS ARE TO BE WATERTIGHT FRAMES AND COVERS WHERE SURFACE PONDING IS EXPECTED.

STORM

19. ALL REINFORCED CONCRETE STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CSA A257.2, OR LATEST AMENDMENT. ALL NON-REINFORCED CONCRETE STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CSA A257.1, OR LATEST AMENDMENT. PIPE SHALL BE JOINED WITH STD. RUBBER GASKETS AS PER CSA A257.3, OR LATEST AMENDMENT.
20. ALL STORM SEWER TRENCH AND BEDDING SHALL BE IN ACCORDANCE WITH THE CITY OF OTTAWA STD. S6 AND S7 CLASS 'B' UNLESS OTHERWISE SPECIFIED. BEDDING AND COVER MATERIAL SHALL BE SPECIFIED BY PROJECT GEOTECHNICAL ENGINEER.
21. ALL PVC STORM SEWERS ARE TO BE SDR 35 APPROVED PER C.S.A. B182.2 OR LATEST AMENDMENT, UNLESS OTHERWISE SPECIFIED.
22. CATCH BASIN SHALL BE IN ACCORDANCE WITH OPSD 705.010.
23. CATCH BASIN LEADS SHALL BE IN 200MM DIA. AT 1% SLOPE (MIN) UNLESS SPECIFIED OTHERWISE.
24. ALL CATCH BASINS SHALL HAVE 600MM SUMPS, UNLESS SPECIFIED OTHERWISE.
25. ALL CATCH BASIN LEAD INVERTS TO BE 1.5M BELOW FINISHED GRADE UNLESS SPECIFIED OTHERWISE.
26. THE STORM SEWER CLASSES HAVE BEEN DESIGNED BASED ON BEDDING CONDITIONS SPECIFIED ABOVE. WHERE THE SPECIFIED TRENCH WIDTH IS EXCEEDED , THE CONTRACTOR IS REQUIRED TO PROVIDE AND SHALL BE RESPONSIBLE FOR EXTRA TEMPORARY AND/OR PERMANENT REPAIRS MADE NECESSARY BY THE WIDENED TRENCH.
27. ALL ROAD AND PARKING LOT CATCH BASINS TO BE INSTALLED WITH ORTHOGONALLY PLACED SUBDRAINS IN ACCORDANCE WITH DETAIL. PERFORATED SUBDRAIN FOR ROAD AND PARKING LOT CATCH BASIN SHALL BE INSTALLED PER CITY STD R1 UNLESS OTHERWISE NOTED.
28. PERFORATED SUBDRAIN FOR REAR YARD AND LANDSCAPING APPLICATIONS SHALL BE INSTALLED PER CITY STD S29, S30 AND S31, WHERE APPLICABLE.
29. RIP-RAP TREATMENT SEWER AND CULVERT OUTLETS PER OPSD 810.010.
30. ALL STORM SEWER/ CULVERTS TO BE INSTALLED WITH FROST TREATMENT PER OPSD 803.031 WHERE APPLICABLE.
31. ALL STORM MANHOLES WITH PIPE LESS THAN 900MM IN DIAMETER SHALL BE CONSTRUCTED WITH A 300MM SUMP AS PER SDG, CLAUSE 6.2.6.

WATERMAIN

32. ALL WATERMAIN INSTALLATION SHALL CONFORM TO THE LATEST REVISIONS OF THE CITY OF OTTAWA AND THE ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS).
33. ALL PVC WATERMAINS SHALL BE AWWA C-900 CLASS 150, SDR 18 OR APPROVED EQUIVALENT.
34. ALL WATER SERVICES LESS THAN OR EQUAL TO 50MM IN DIAMETER TO BE TYPE 'K' COPPER.
35. WATERMAIN TRENCH AND BEDDING SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARD W17. UNLESS SPECIFIED OTHERWISE. BEDDING AND COVER MATERIAL SHALL BE SPECIFIED BY THE PROJECT GEOTECHNICAL ENGINEER.
36. ALL PVC WATERMAINS, SHALL BE INSTALLED WITH A 10 GAUGE STRANDED COPPER TWU OR RWU TRACER WIRE IN ACCORDANCE WITH CITY OF OTTAWA STD. W.36.
37. CATHODIC PROTECTION IS REQUIRED ON ALL METALLIC FITTINGS PER CITY OF OTTAWA STD.25.5 AND W25.6.
38. VALVE BOXES SHALL BE INSTALLED PER CITY OF OTTAWA STD W24.
39. WATERMAIN IN FILL AREAS TO BE INSTALLED WITH RESTRAINED JOINTS PER CITY OF OTTAWA STD.25.5 AND W25.6.
40. THRUST BLOCKING OF WATERMAINS TO BE INSTALLED PER CITY OF OTTAWA STD. W25.3 AND W25.4.
41. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY CAPS, PLUGS, BLOW-OFFS, AND NOZZLES REQUIRED FOR TESTING AND DISINFECTION OF THE WATERMAIN.
42. WATERMAIN CROSSING OVER AND BELOW SEWERS SHALL BE IN ACCORDANCE WITH THE CITY OF OTTAWA STD. W25,2 AND W25, RESPECTIVELY.
43. WATER SERVICES ARE TO BE INSULATED PER CITY STD. W23 WHERE SEPARATION BETWEEN SERVICES AND MAINTENANCE HOLES ARE LESS THAN 2.4M.
44. THE MINIMUM VERTICAL CLEARANCE BETWEEN WATERMAIN AND SEWER/UTILITY IS 0.5M PER MOE GUIDELINES. FOR CROSSING UNDER SEWERS, ADEQUATE STRUCTURAL SUPPORT FOR THE SEWER IS REQUIRED TO PREVENT EXCESSIVE DEFLECTION OF JOINTS AND SETTLING. THE LENGTH OF WATER PIPE SHALL BE CENTERED AT THE POINT OF CROSSING TO ENSURE THAT THE JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER.
45. ALL WATERMAINS SHALL HAVE A MINIMUM COVER OR 2.4M, OTHERWISE THERMAL INSULATION IS REQUIRED AS PER STD DWG W22.
46. GENERAL WATER PLANT TO UTILITY CLEARANCE AS PER STD DWG R20.
47. FIRE HYDRANT INSTALLATION AS PER STD DWG W19, ALL BOTTOM OF HYDRANT FLANGE ELEVATIONS TO BE INSTALLED 0.10M ABOVE PROPOSED FINISHED GRADE AT HYDRANT; FIRE HYDRANT LOCATION AS PER STD DWG W18.
48. BUILDING SERVICE TO BE CAPPED 1.0M OFF THE FACE OF THE BUILDING UNLESS OTHERWISE NOTED AND MUST BE RESTRAINED A MINIMUM OF 12M BACK FROM STUB.
49. ALL WATERMAINS SHALL BE HYDROSTATICALLY TESTED IN ACCORDANCE WITH THE CITY OF OTTAWA AND ONTARIO GUIDELINES UNLESS OTHERWISE DIRECTED. PROVISIONS FOR FLUSHING WATER LINE PRIOR TO TESTING, ETC. MUST BE PROVIDED.
50. ALL WATERMAINS SHALL BE BACTERIOLOGICALLY TESTED IN ACCORDANCE WITH THE CITY OF OTTAWA AND ONTARIO GUIDELINES. ALL CHLORINATED WATER TO BE DISCHARGED AND PRETREATED TO ACCEPTABLE LEVELS PRIOR TO DISCHARGE. ALL DISCHARGED WATER MUST BE CONTROLLED AND TREATED SO AS NOT TO ADVERSELY EFFECT ENVIRONMENT. IT IS RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT ALL MUNICIPAL AND/OR PROVINCIAL REQUIREMENTS ARE FOLLOWED.
51. ALL WATERMAIN STUBS SHALL BE TERMINATED WITH A PLUG AND 50MM BLOW OFF UNLESS OTHERWISE NOTED.

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01	ISSUED FOR APPROVAL	M.L.	04 APR 2025

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2025/12/5
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
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CLIENT
HALO CAR WASH

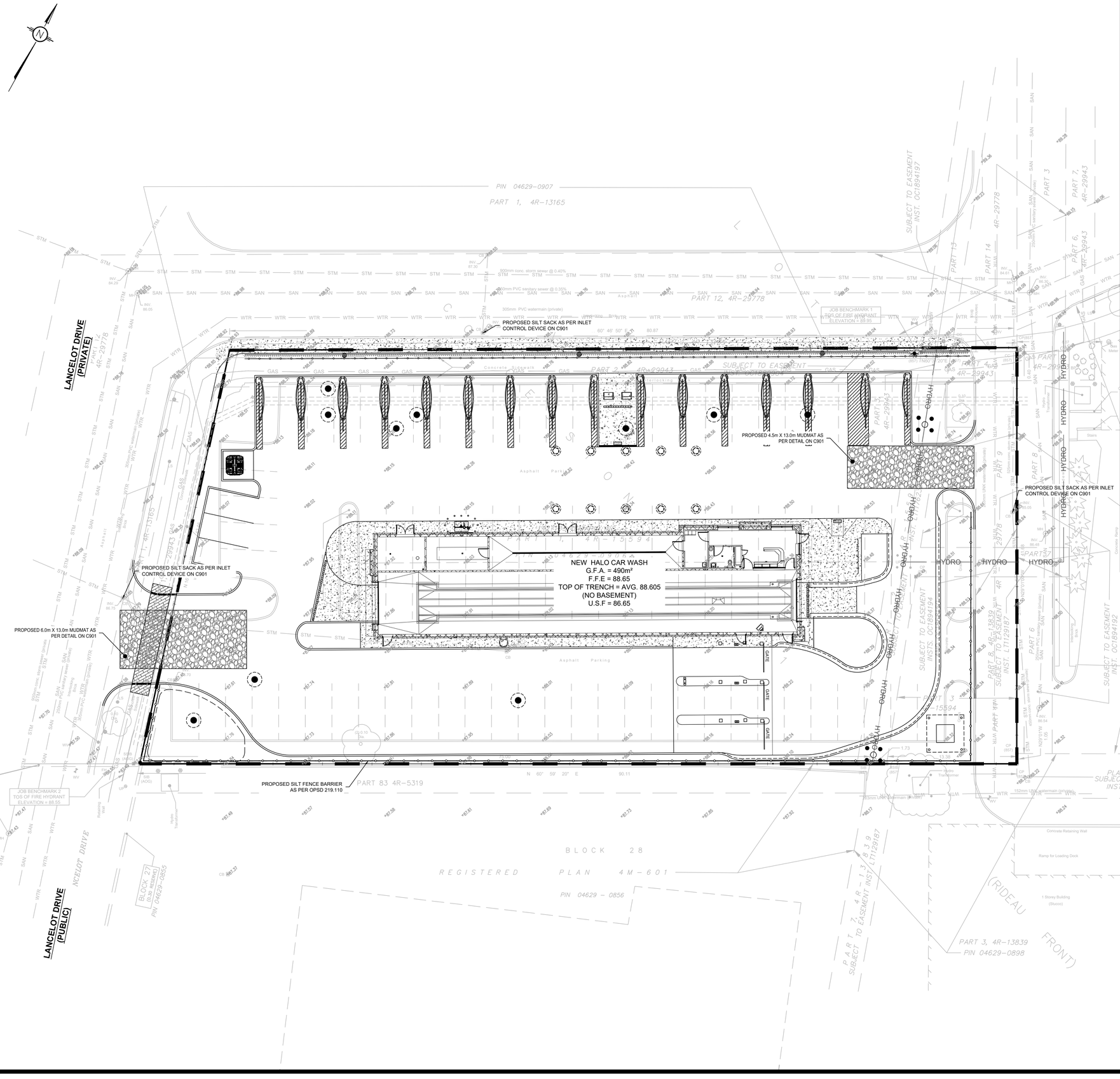
DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.L.	M.L.	M.B.

PROJECT
PROPOSED HALO CAR WASH
LANCELOT DRIVE & HUNT CLUB DRIVE
NEPEAN, ON

DRAWING TITLE
GENERAL NOTES

PROJECT NO.
240272
DATE
MAY 2024

C001



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- PROPOSED CURB STOP
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- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX / CONTROLLER / AREA / RUNOFF — WATERSHED NAME; RUNOFF COEFFICIENT; AREA IN HECTARES
- PROPOSED VACUUM
- PROPOSED SEMI IN-GROUND REFUSE COLLECTION
- PROPOSED MAT WASHER
- PROPOSED TRANSFORMER & PAD

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LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

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CLIENT

HALO CAR WASH

DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.L.	M.L.	M.B.

PROJECT

PROPOSED HALO CAR WASH
LANCELOT DRIVE & HUNT CLUB DRIVE
NEPEAN, ON

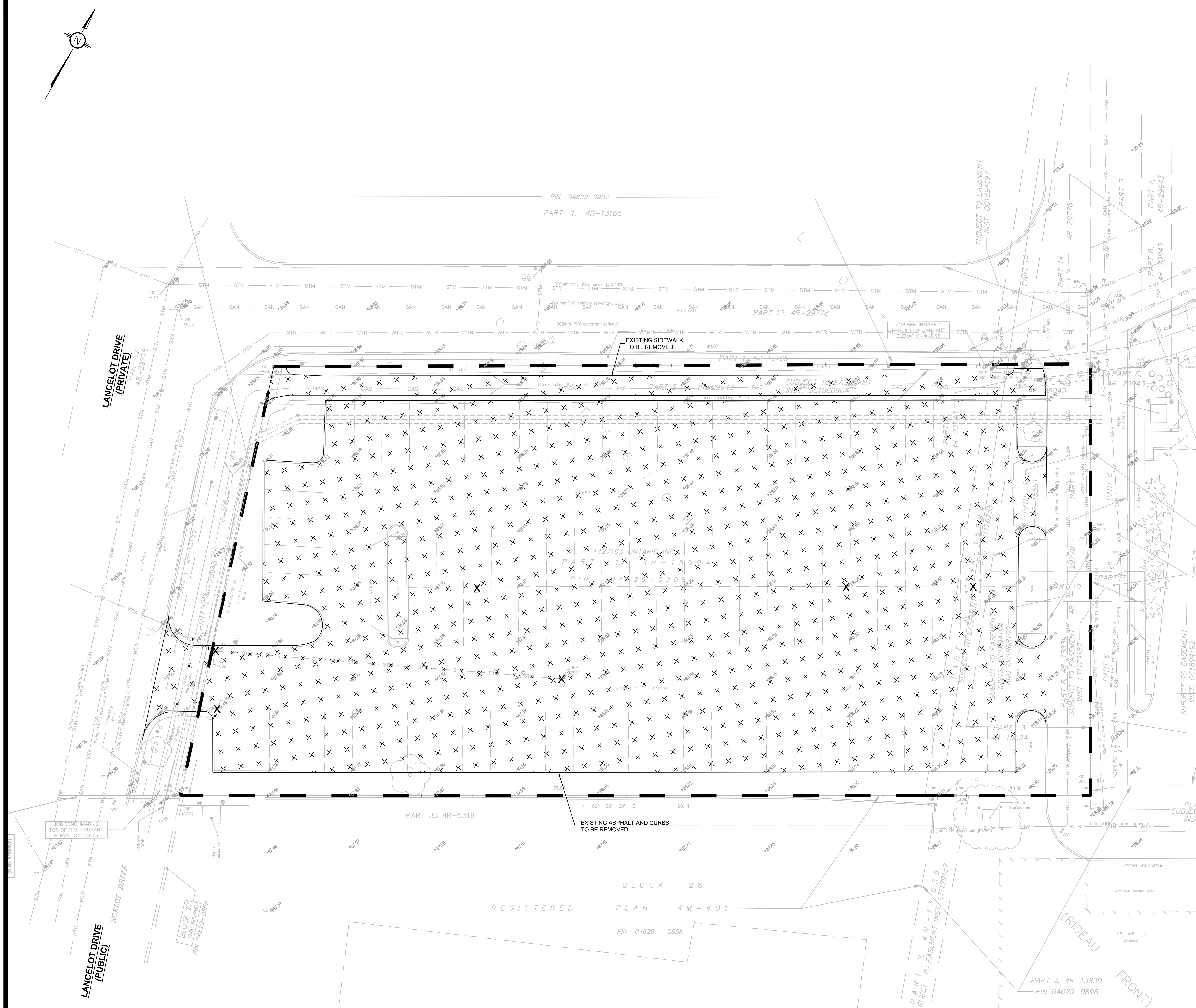
DRAWING TITLE

EROSION AND SEDIMENT CONTROL PLAN

PROJECT NO.
240272

DATE
MAY 2024

C101



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LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2025/12/05
PROVINCE OF ONTARIO

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CLIENT
HALO CAR WASH

DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.L.	M.L.	M.B.

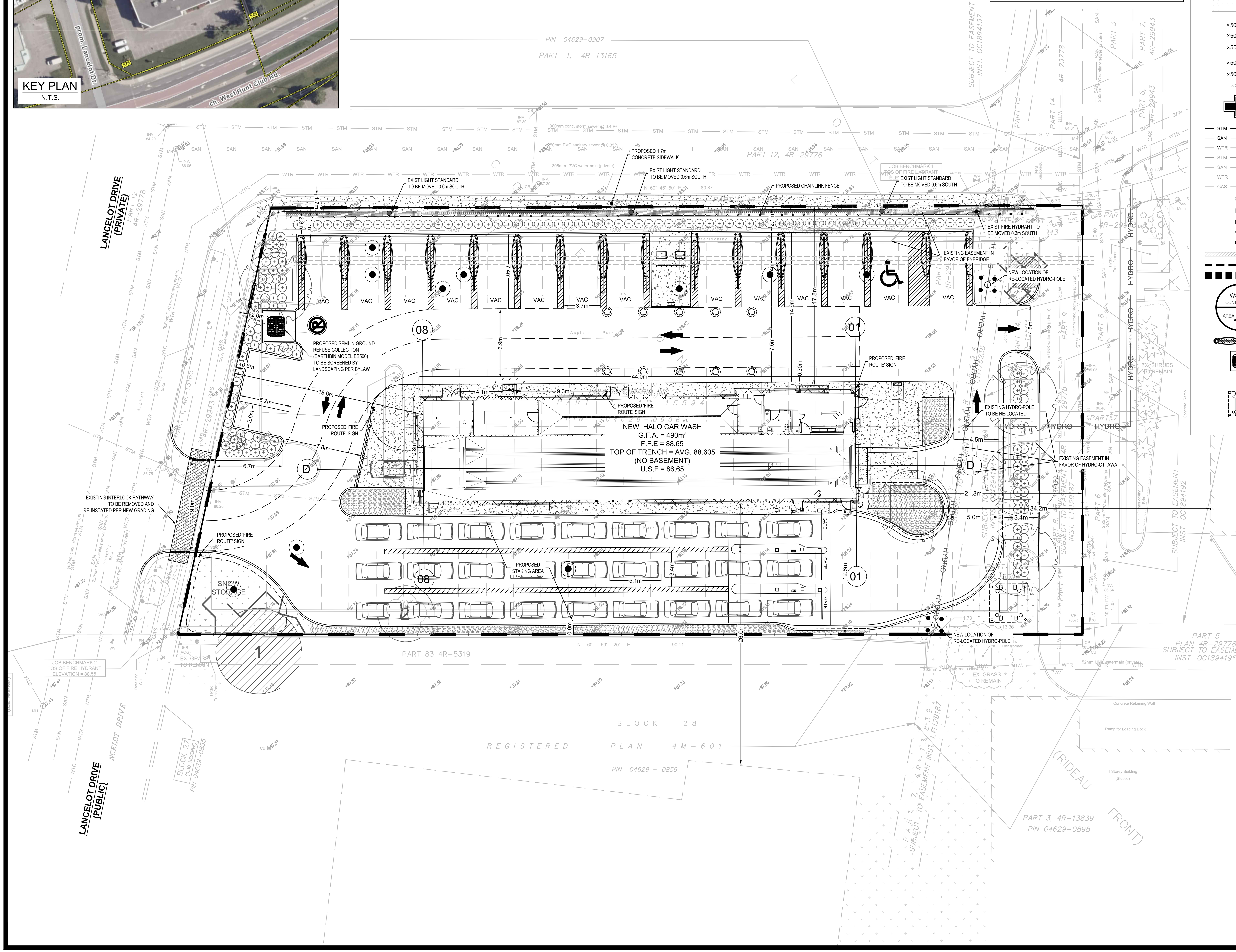
PROJECT
PROPOSED HALO CAR WASH
LANCELOT DRIVE & HUNT CLUB DRIVE
NEPEAN, ON

DRAWING TITLE
DEMOLITION PLAN

PROJECT NO.
240272

DATE
MAY 2024

C102



DETAILS OF DEVELOPMENT			
DATA		REQUIRED	PROVIDED
	ZONING	AM10	
SETBACKS	FY	0.0m	18.6m
	RY	0.0m	21.5m
	INT.SY	0.0m	17.8m
	EXT.SY	0.0m	12.6m
LOT AREA (sqm)		3641 sqm	
BUILDING COVERAGE		N/A	13.2%
BUILDING HEIGHT		11.0m (MAX)	8.0m
GROSS FLOOR AREA		480 sqm	
No. of UNITS		1	
LOADING SPACES		N/A	N/A
PARKING:		N/A	16 + 1 HC
No. OF STOREYS			1
OTHER:			

LEGEND:

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- PROPOSED OVERLAND MAJOR FLOW ROUTE
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- SAN — SAN PROPOSED SANITARY SEWER
- WTR — WTR PROPOSED WATERMAIN
- STM — STM EXISTING STORM SEWER
- SAN — SAN EXISTING SANITARY SEWER
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- EXISTING MANHOLE
- EXISTING CATCHBASIN
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- PROPOSED SEMI IN-GROUND REFUSE COLLECTION
- PROPOSED MAT WASHER
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LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2025/12/5
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

CONSULTANTS

PLANNER

Jonah Bonn
First Bay Properties Inc.
311 Richmond Road, Suite 301, Ottawa

SITE ENGINEERING

Maxime Longtin
LRL Engineering Ltd.
5430 Canotek Rd, Ottawa

ARCHITECT

Ian Wilson
McRobie Architects - Interior Designers
Suite 100, 66 Queen Street, Ottawa

SURVEYOR

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Fairhall Moffatt & Woodland
235 Terence Matthews Crescent, Kanata

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PART OF LOT 28, CONCESSION 1 (RIDEAU FRONT)
DESIGNATED AS PARTS 1, 2, 3 & 4
PLAN 4R-15594 AS IN ALL OF PIN 04629-0906
GEOGRAPHIC TOWNSHIP OF NEPEAN
CITY OF OTTAWA

LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
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CLIENT
HALO CAR WASH

DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.L.	M.L.	M.B.

PROJECT
PROPOSED HALO CAR WASH
LANCELOT DRIVE & HUNT CLUB DRIVE
NEPEAN, ON

DRAWING TITLE
SITE DEVELOPMENT PLAN

PROJECT NO.
240272

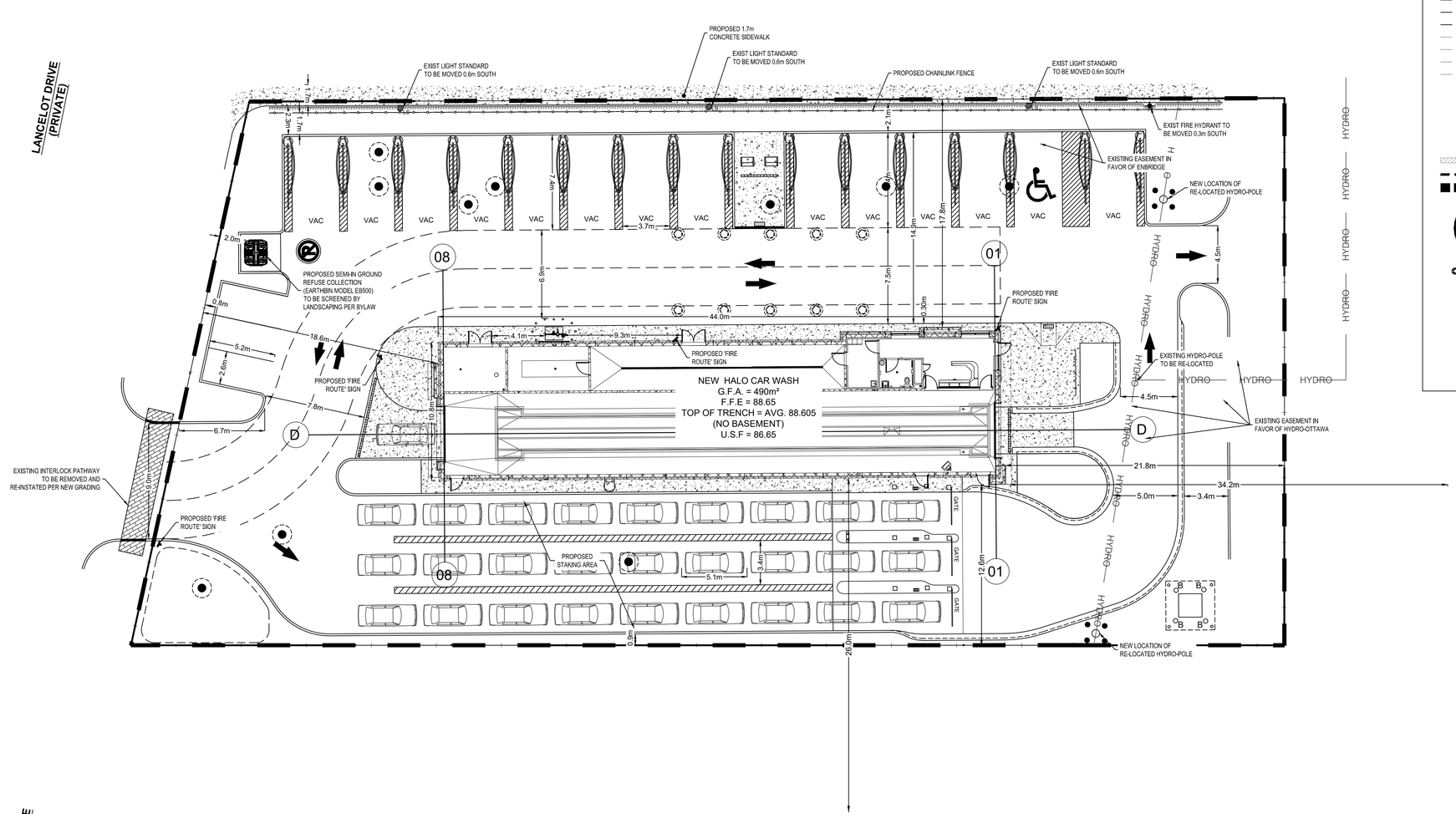
DATE
MAY 2024

C201

KEY PLAN
N.T.S.

DETAILS OF DEVELOPMENT

DATA		REQUIRED	PROVIDED
ZONING		AM10	
SETBACKS	FY	0.0m	18.6m
	RY	0.0m	21.5m
	INT.SY	0.0m	17.8m
	EXT.SY	0.0m	12.6m
LOT AREA (sqm)		3641 sqm	
BUILDING COVERAGE		N/A	13.2%
BUILDING HEIGHT		11.0m (MAX)	8.0m
GROSS FLOOR AREA		480 sqm	
No. of UNITS		1	
LOADING SPACES		N/A	N/A
PARKING:		N/A	16 + 1 HC
No. OF STOREYS			1
OTHER:			



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100501996
PROVINCE OF ONTARIO

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CLIENT
HALO CAR WASH

DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.L.	M.L.	M.B.

PROJECT
PROPOSED HALO CAR WASH
LANCELOT DRIVE & HUNT CLUB DRIVE
NEPEAN, ON

DRAWING TITLE
SITE DEVELOPMENT PLAN
(NO UNDERLAY)

PROJECT NO.
240272

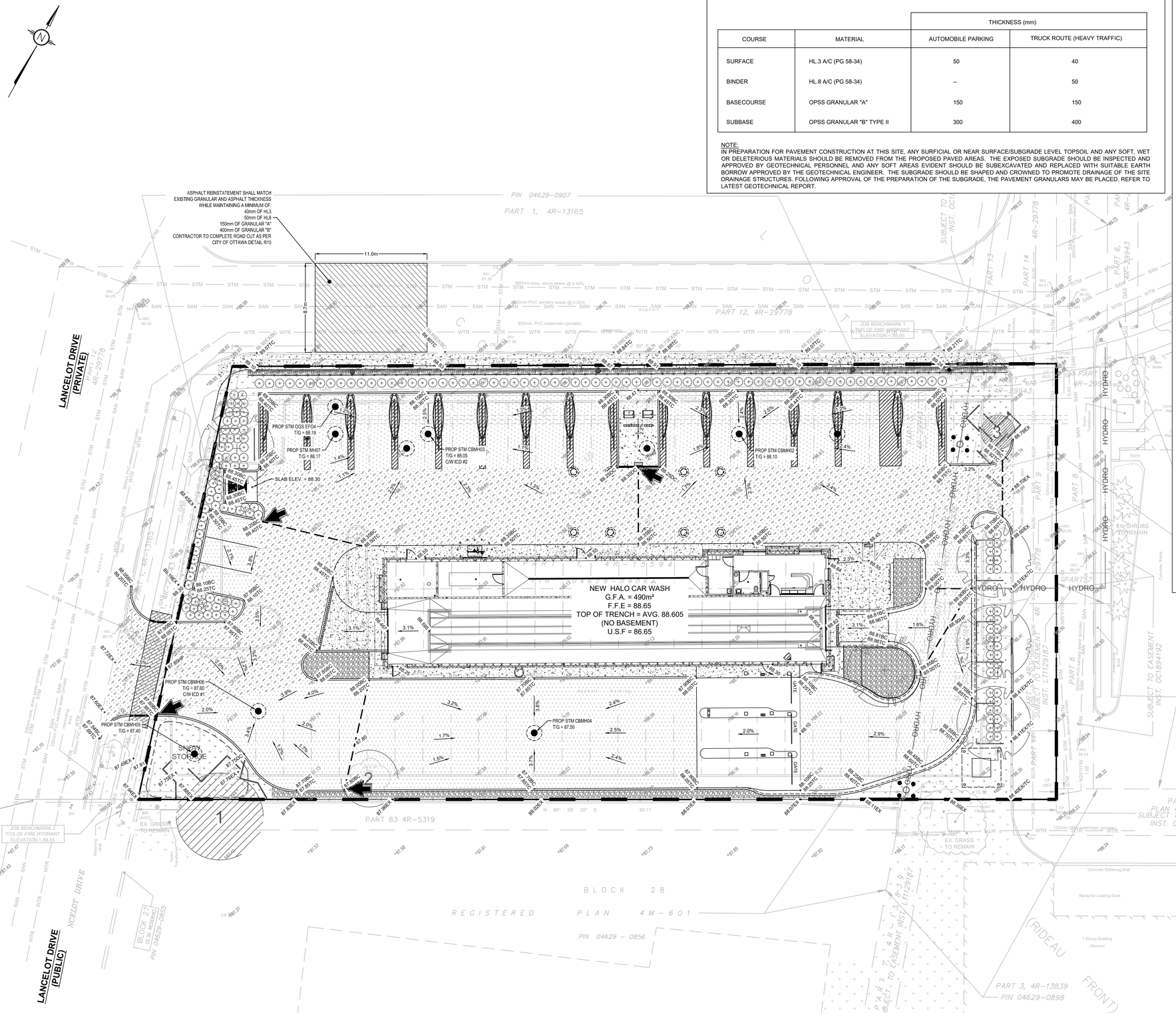
DATE
MAY 2024

C202

PAVEMENT STRUCTURE

COURSE	MATERIAL	THICKNESS (mm) AUTOMOBILE PARKING	THICKNESS (mm) TRUCK ROUTE (HEAVY TRAFFIC)
SURFACE	HL.3 A/C (PG 58-34)	50	40
BINDER	HL.8 A/C (PG 58-34)	--	50
BASECOURSE	OPSS GRANULAR "A"	150	150
SUBBASE	OPSS GRANULAR "B" TYPE II	300	400

NOTE:
IN PREPARATION FOR PAVEMENT CONSTRUCTION AT THIS SITE, ANY SURFICIAL OR NEAR SURFACE/SUBGRADE LEVEL TOPSOIL AND ANY SOFT, WET OR DELETERIOUS MATERIALS SHOULD BE REMOVED FROM THE PROPOSED PAVED AREAS. THE EXPOSED SUBGRADE SHOULD BE INSPECTED AND APPROVED BY GEOTECHNICAL PERSONNEL AND ANY SOFT AREAS EVIDENT SHOULD BE SUBEXCAVATED AND REPLACED WITH SUITABLE EARTH BORROW APPROVED BY THE GEOTECHNICAL ENGINEER. THE SUBGRADE SHOULD BE SHAPED AND CROWNED TO PROMOTE DRAINAGE OF THE SITE DRAINAGE STRUCTURES. FOLLOWING APPROVAL OF THE PREPARATION OF THE SUBGRADE, THE PAVEMENT GRANULARS MAY BE PLACED. REFER TO LATEST GEOTECHNICAL REPORT.



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DRAWING TITLE
GRADING AND DRAINAGE PLAN

PROJECT NO.
240272

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C301

PRELIMINARY CONSTRUCTION MANAGEMENT PLAN

1. WILL CONSTRUCTION REQUIRE THE TEMPORARY DETOUR OF A BUS ROUTE?
NO DETOUR OF A BUS ROUTE WILL BE REQUIRED.

2. WILL THIS WORK BLOCK A BIKE LANE?
NO BIKE LANE WILL BE BLOCKED DURING CONSTRUCTION.

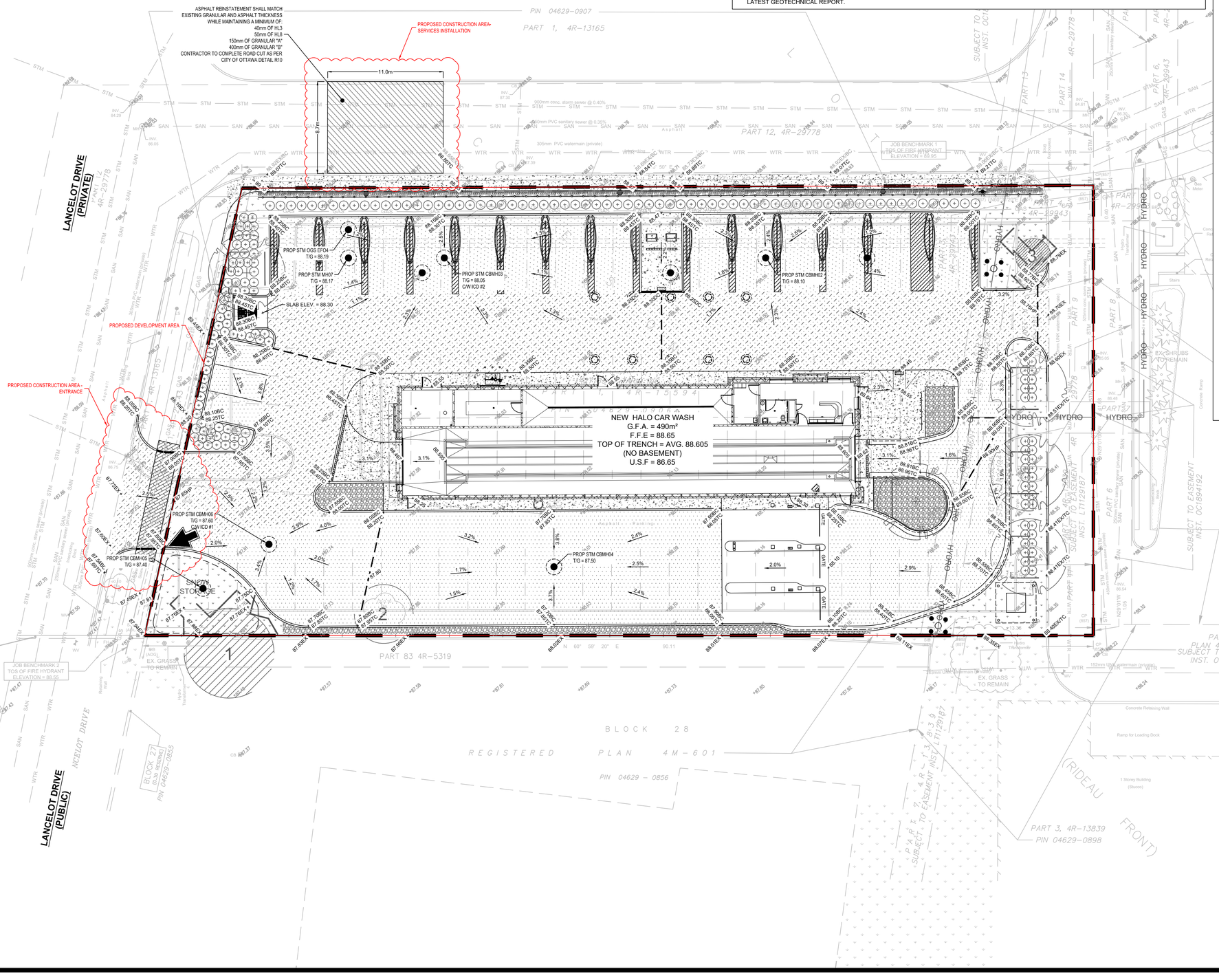
3. WILL THIS WORK BLOCK A SIDEWALK?
A PRIVATE SIDEWALK WILL BE BLOCKED DURING CONSTRUCTION. A PHASING STRATEGY WILL BE PUT IN PLACE TO PROVIDE TEMPORARY ACCESS.

4. WILL THIS WORK REQUIRE A LANE OF TRAFFIC TO BE CLOSED?
A PRIVATE ROAD WILL BE BLOCKED DURING CONSTRUCTION. A PHASING STRATEGY WILL BE PUT IN PLACE TO PROVIDE TEMPORARY ACCESS.

PAVEMENT STRUCTURE

COURSE	MATERIAL	THICKNESS (mm) AUTOMOBILE PARKING	THICKNESS (mm) TRUCK ROUTE (HEAVY TRAFFIC)
SURFACE	HL.3 A/C (PG 58-34)	50	40
BINDER	HL.8 A/C (PG 58-34)	--	50
BASECOURSE	OPSS GRANULAR "A"	150	150
SUBBASE	OPSS GRANULAR "B" TYPE II	300	400

NOTE:
IN PREPARATION FOR PAVEMENT CONSTRUCTION AT THIS SITE, ANY SURFICIAL OR NEAR SURFACE/SUBGRADE LEVEL TOPSOIL AND ANY SOFT, WET OR DELETERIOUS MATERIALS SHOULD BE REMOVED FROM THE PROPOSED PAVED AREAS. THE EXPOSED SUBGRADE SHOULD BE INSPECTED AND APPROVED BY GEOTECHNICAL PERSONNEL AND ANY SOFT AREAS EVIDENT SHOULD BE SUBEXCAVATED AND REPLACED WITH SUITABLE EARTH BORROW APPROVED BY THE GEOTECHNICAL ENGINEER. THE SUBGRADE SHOULD BE SHAPED AND CROWNED TO PROMOTE DRAINAGE OF THE SITE DRAINAGE STRUCTURES. FOLLOWING APPROVAL OF THE PREPARATION OF THE SUBGRADE, THE PAVEMENT GRANULARS MAY BE PLACED. REFER TO LATEST GEOTECHNICAL REPORT.



LEGEND:

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- PROPOSED DEPRESSED CURB
- PROPOSED TERRACING (3:1 MIN.)
- PROPOSED SILT FENCE AS PER OPSD 219.110
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- EXISTING MANHOLE
- EXISTING CATCHBASIN
- PROPOSED CATCHBASIN-MANHOLE/CATCHBASIN
- PROPOSED MANHOLE
- PROPOSED CURB STOP
- PROPOSED PIPE INSULATION
- PROPOSED 100 YEAR HIGH WATER LEVEL
- STORM WATERSHED EXTENT
- WS-XX CONTROLLER / AREA / RUNOFF — WATERSHED NAME, RUNOFF COEFFICIENT, AREA IN HECTARES
- PROPOSED VACUUM
- PROPOSED SEMI IN-GROUND REFUSE COLLECTION
- PROPOSED MAT WASHER
- PROPOSED TRANSFORMER & PAD

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5m 2 0 5m

SCALE: 1:200

No.	REVISIONS	BY	DATE
03	ISSUED FOR APPROVAL	M.L.	05 DEC 2025
02	ISSUED FOR APPROVAL	M.L.	28 AUG 2025
01	ISSUED FOR APPROVAL	M.L.	04 APR 2025

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

CLIENT
HALO CAR WASH

DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.L.	M.L.	M.B.

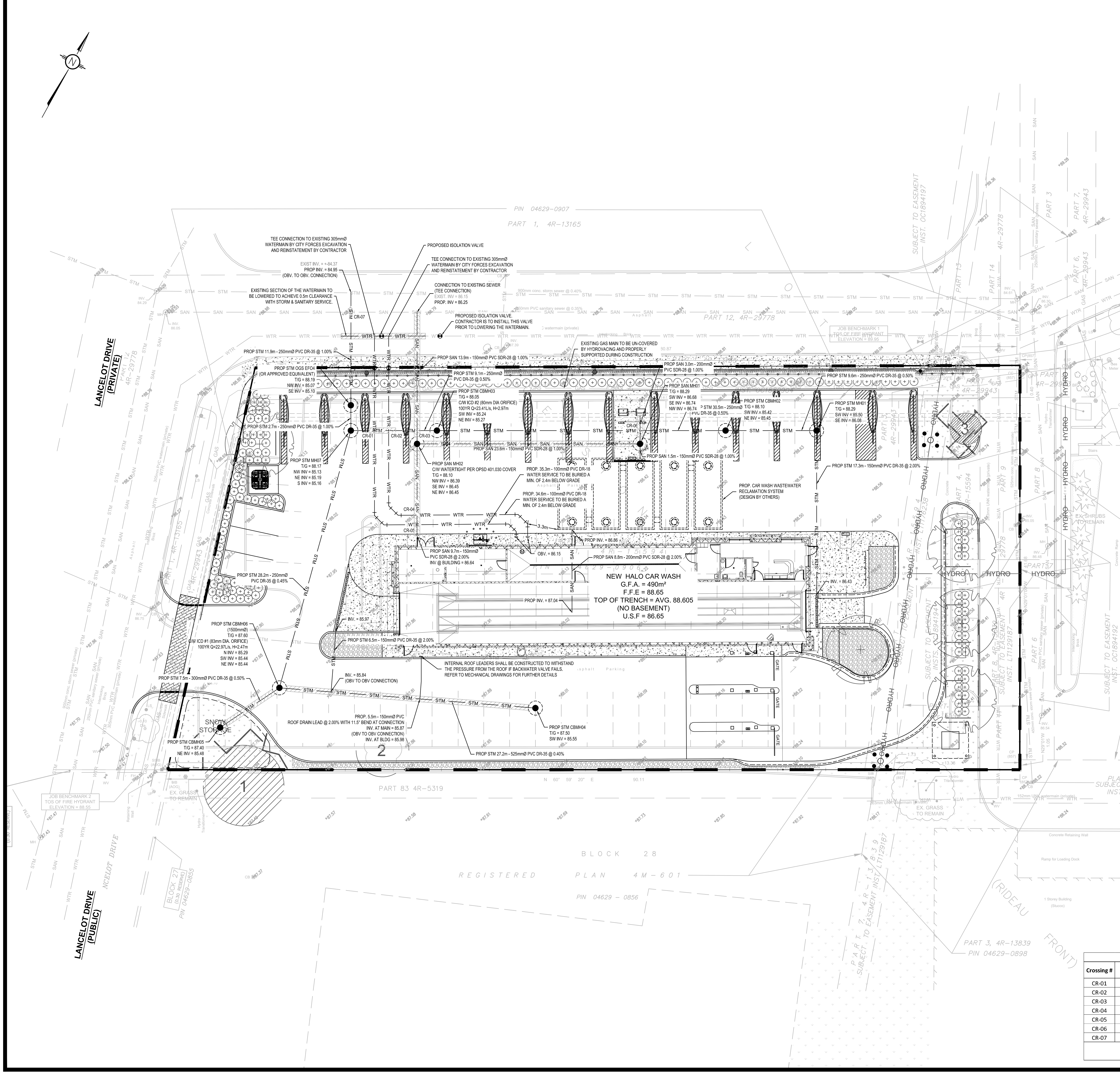
PROJECT
PROPOSED HALO CAR WASH
LANCELOT DRIVE & HUNT CLUB DRIVE
NEPEAN, ON

DRAWING TITLE
PRELIMINARY CONSTRUCTION PLAN

PROJECT NO.
240272

DATE
MAY 2024

C302



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CR-03	N/A		85.53	Obv.	86.38	Inv.	0.85
CR-04	85.95	Obv.	N/A		86.62	Inv.	0.67
CR-05	85.95	Obv.	N/A		86.64	Inv.	0.69
CR-06	N/A		85.63	Obv.	86.75	Inv.	1.12
CR-07	N/A		85.22	Inv.	86.10	Inv.	0.88

WM crossing above sewer per City STD W25.2
WM crossing below sewer per City STD W25

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5m 2 0 5m
SCALE: 1:200

No.	REVISIONS	BY	DATE
03	ISSUED FOR APPROVAL	M.L.	05 DEC 2025
02	ISSUED FOR APPROVAL	M.L.	28 AUG 2025
01	ISSUED FOR APPROVAL	M.L.	04 APR 2025

LICENSED PROFESSIONAL ENGINEER M. BASNET 100501996 2025/12/5 PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road | Ottawa, ON, K1J 9G2
www.lrl.ca | (613) 842-3434

CLIENT
HALO CAR WASH

DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.L.	M.L.	M.B.

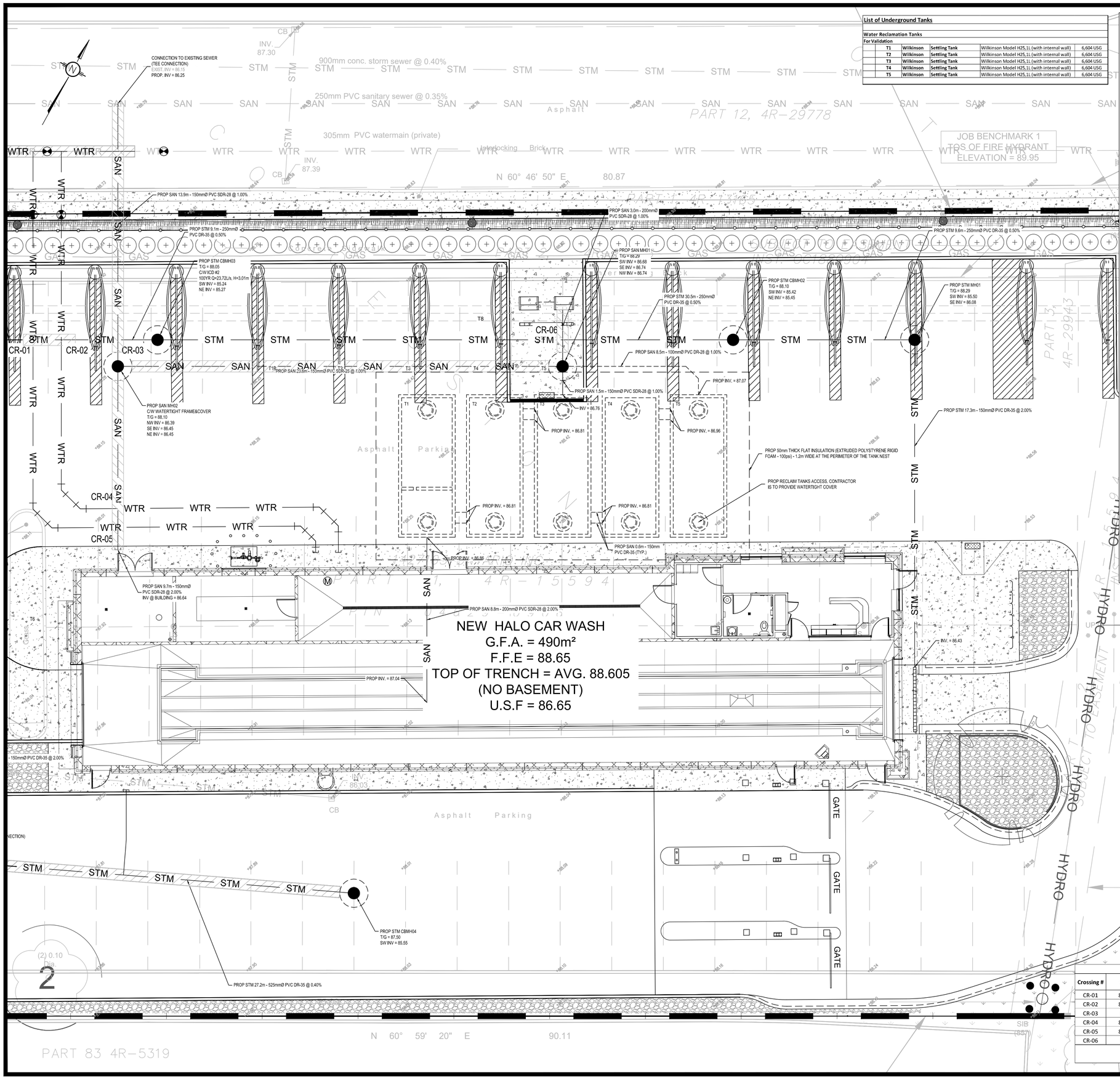
PROJECT
PROPOSED HALO CAR WASH
LANCELOT DRIVE & HUNT CLUB DRIVE
NEPEAN, ON

DRAWING TITLE
SERVICING PLAN

PROJECT NO.
240272

DATE
MAY 2024

C401



List of Underground Tanks

Water Reclamation Tanks
For Validation

T1	Wilkinson	Settling Tank	Wilkinson Model H25,1L (with internal wall)	6,604 USG
T2	Wilkinson	Settling Tank	Wilkinson Model H25,1L (with internal wall)	6,604 USG
T3	Wilkinson	Settling Tank	Wilkinson Model H25,1L (with internal wall)	6,604 USG
T4	Wilkinson	Settling Tank	Wilkinson Model H25,1L (with internal wall)	6,604 USG
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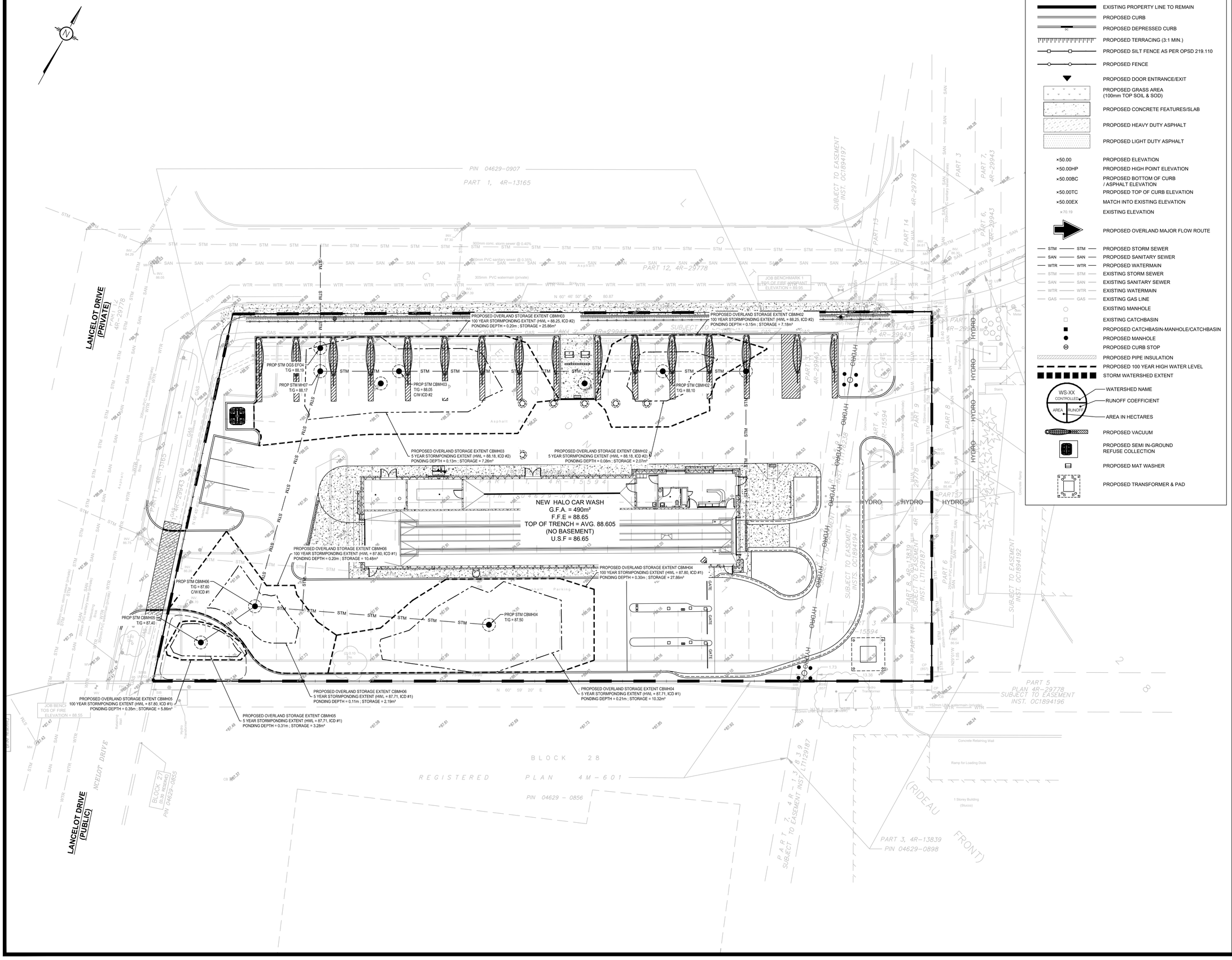
MAY 2024

C402



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  - AREA IN HECTARES
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5m 2 0 5m

SCALE: 1:200

No.	REVISIONS	BY	DATE
03	ISSUED FOR APPROVAL	M.L.	05 DEC 2025
02	ISSUED FOR APPROVAL	M.L.	28 AUG 2025
01	ISSUED FOR APPROVAL	M.L.	04 APR 2025

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2025/12/5
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road | Ottawa, ON. K1J 9G2
www.lrl.ca | (613) 842-3434

CLIENT
HALO CAR WASH

DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.L.	M.L.	M.B.

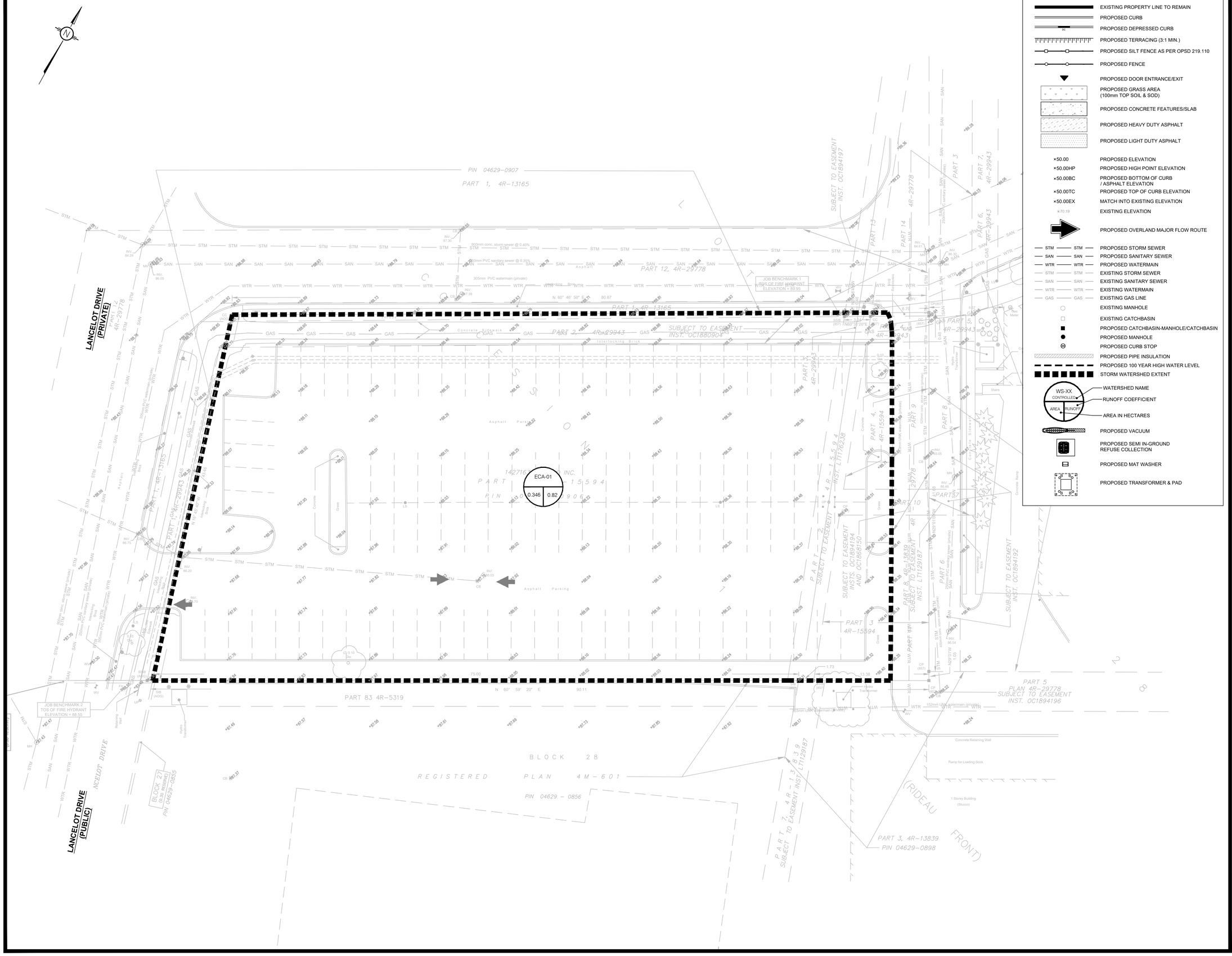
PROJECT
PROPOSED HALO CAR WASH
LANCELOT DRIVE & HUNT CLUB DRIVE
NEPEAN, ON

DRAWING TITLE
STORMWATER MANAGEMENT PLAN

PROJECT NO.
240272

DATE
MAY 2024

C601



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100501996
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DESIGNED BY:	DRAWN BY:	APPROVED BY:
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PROJECT
PROPOSED HALO CAR WASH
LANCELOT DRIVE & HUNT CLUB DRIVE
NEPEAN, ON

DRAWING TITLE
PRE-DEVELOPMENT
WATERSHED PLAN

PROJECT NO.
240272

DATE
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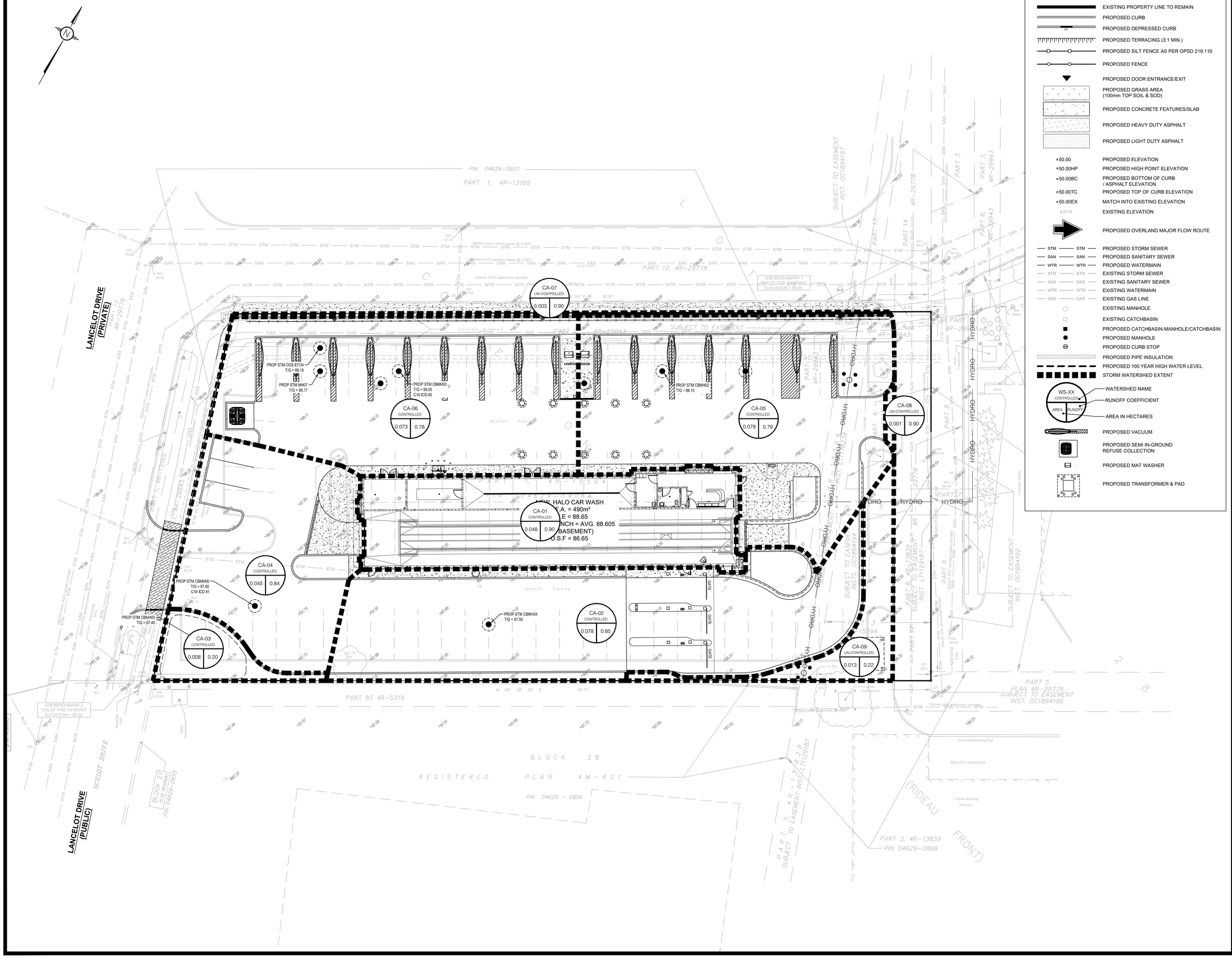
C701



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5m 2 0 5m

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LICENSED PROFESSIONAL ENGINEER
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CLIENT

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PROJECT

PROPOSED HALO CAR WASH
LANCELOT DRIVE & HUNT CLUB DRIVE
NEPEAN, ON

DRAWING TITLE

POST-DEVELOPMENT
WATERSHED PLAN

PROJECT NO.
240272

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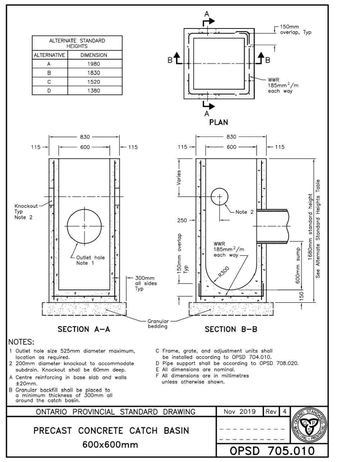
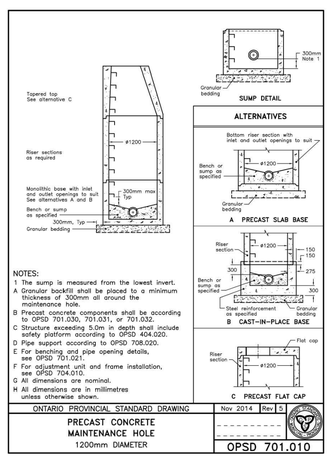
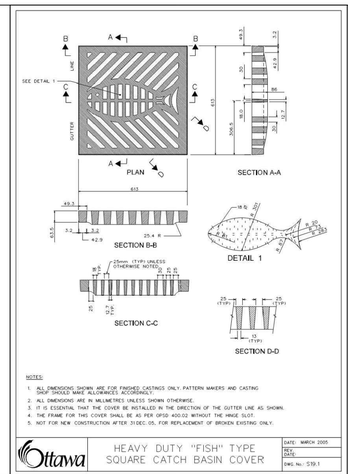
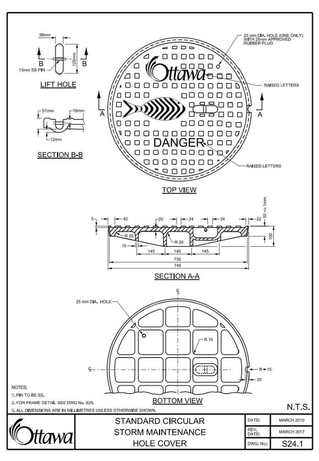
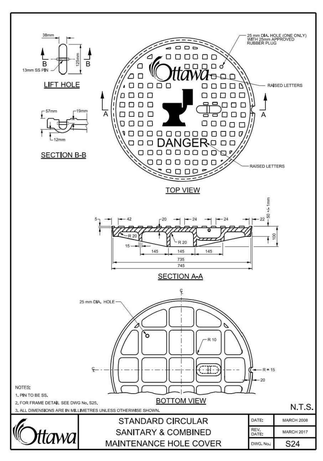
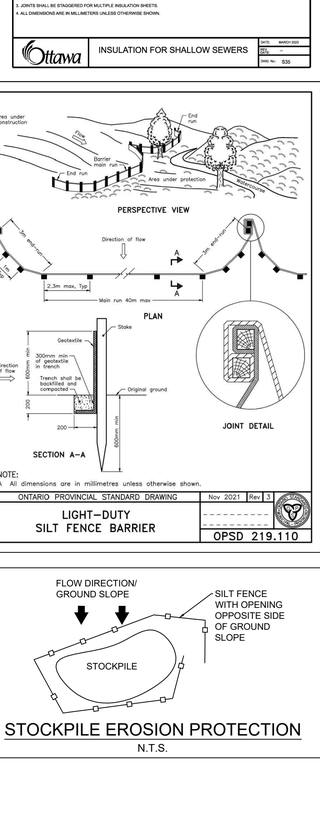


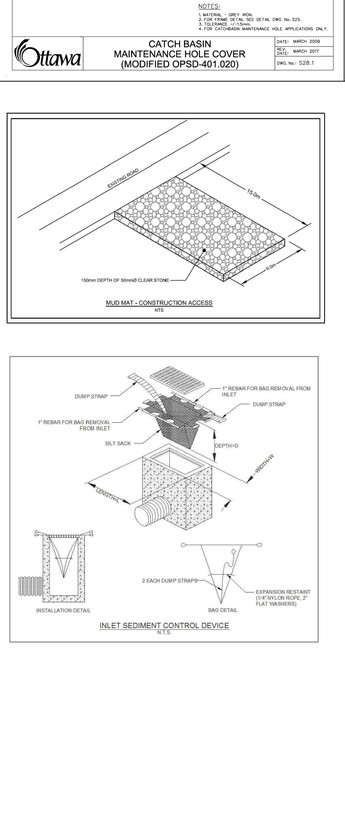


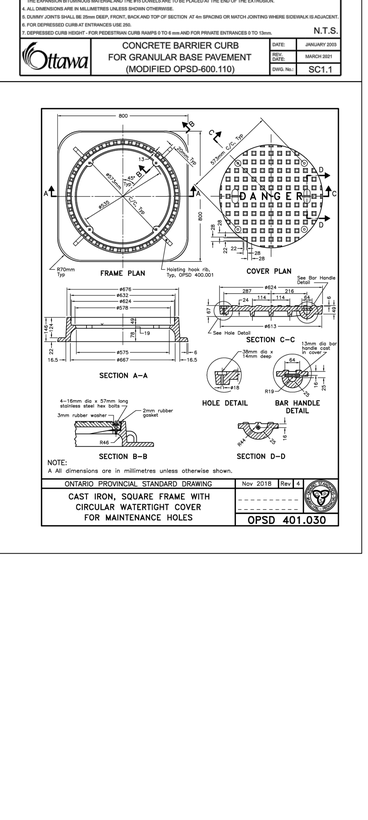












USE AND INTERPRETATION OF DRAWINGS

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION ARE PART OF THE CONTRACT DOCUMENTS AND DESCRIBE USE AND INTENT OF THE DRAWINGS. THE CONTRACT DOCUMENTS INCLUDE NOT ONLY THE DRAWINGS, BUT ALSO THE OWNER-CONTRACTOR AGREEMENTS, CONDITIONS OF THE CONTRACT, THE SPECIFICATIONS, ADDENDA, AND MODIFICATIONS ISSUED AFTER EXECUTION OF THE CONTRACT. THESE CONTRACT DOCUMENTS ARE COMPLEMENTARY, AND WHAT IS REQUIRED BY ANY ONE SHALL BE BINDING AS IF REQUIRED BY ALL. WORK NOT COMPLETELY DELINEATED HEREON SHALL BE CONSTRUCTED OF THE SAME MATERIALS AND DETAILED SIMILARLY AS WORK SHOWN MORE COMPLETELY ELSEWHERE IN THE CONTRACT DOCUMENTS.

BY USE OF THE DRAWINGS FOR CONSTRUCTION OF THE PROJECT, THE OWNER CONFIRMS THAT HE HAS REVIEWED AND APPROVED THE DRAWINGS. THE CONTRACTOR CONFIRMS THAT HE HAS VISITED THE SITE, FAMILIARIZED HIMSELF WITH THE LOCAL CONDITIONS, VERIFIED FIELD DIMENSIONS AND CORRELATED HIS OBSERVATIONS WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

AS INSTRUMENTS OF SERVICE, ALL DRAWINGS, SPECIFICATIONS, CADD FILES OR OTHER ELECTRONIC MEDIA AND COPIED THERE OF FURNISHED BY THE ENGINEER ARE HIS PROPERTY. THEY ARE TO BE USED ONLY FOR THIS PROJECT AND ARE NOT TO BE USED ON ANY OTHER PROJECT, INCLUDING REPEATS OF THE PROJECT. CHANGES TO THE DRAWINGS MAY ONLY BE MADE BY THE ENGINEER.

UNLESS THE REVISION TITLE IS "ISSUED FOR CONSTRUCTION", THESE DRAWINGS SHALL BE CONSIDERED PRELIMINARY AND SHALL NOT BE USED AS A CONSTRUCTION DOCUMENT.

THESE DRAWINGS ILLUSTRATES THE WORK TO BE DONE. THE ENGINEER IS NOT RESPONSIBLE FOR THE MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES USED TO DO THE WORK, OR THE SAFETY ASPECTS OF CONSTRUCTION, AND NOTHING ON THESE DRAWINGS EXPRESSED OR IMPLIED CHANGES THIS CONDITION. CONTRACTOR SHALL DETERMINE ALL CONDITIONS AT THE SITE AND SHALL BE RESPONSIBLE FOR KNOWING HOW THEY AFFECT THE WORK. SUBMITTAL OF A BID TO PERFORM THIS WORK IS ACKNOWLEDGEMENT OF THE RESPONSIBILITIES, AND THAT THEY HAVE BEEN FULLY CONSIDERED IN PLANNING OF THE WORK, AND THE BID PRICE. NO CLAIMS FOR EXTRA CHARGES DUE TO THESE CONDITIONS WILL BE FORTHCOMING.

UNAUTHORIZED CHANGES:

IN THE EVENT THE CLIENT, THE CLIENT'S CONTRACTORS OR SUBCONTRACTORS, OR ANYONE FOR WHOM THE CLIENT IS LEGALLY LIABLE MAKES OR PERMITS TO BE MADE ANY CHANGES TO ANY REPORTS, PLANS, SPECIFICATIONS OR OTHER CONSTRUCTION DOCUMENTS PREPARED BY LRL ASSOCIATES LTD. (LRL) WITHOUT OBTAINING LRL'S PRIOR WRITTEN CONSENT, THE CLIENT SHALL ASSUME FULL RESPONSIBILITY FOR THE RESULTS OF SUCH CHANGES. THEREFORE, THE CLIENT AGREES TO WAIVE ANY CLAIM AGAINST LRL AND TO RELEASE LRL FROM ANY LIABILITY ARISING DIRECTLY OR INDIRECTLY FROM SUCH UNAUTHORIZED CHANGES.

IN ADDITION, THE CLIENT AGREES, TO THE FULLEST EXTENT PERMITTED BY LAW, TO INDEMNIFY AND HOLD HARMLESS LRL FROM ANY DAMAGES, LIABILITIES OR COST, INCLUDING REASONABLE ATTORNEY'S FEES AND COST OF DEFENSE, ARISING FROM SUCH CHANGES.

IN ADDITION, THE CLIENT AGREES TO INCLUDE IN ANY CONTRACTS FOR CONSTRUCTION APPROPRIATE LANGUAGE THAT PROHIBITS THE CONTRACTOR OR ANY SUBCONTRACTORS OF ANY TIER FROM MAKING ANY CHANGES OR MODIFICATIONS TO LRL'S CONSTRUCTION DOCUMENTS WITHOUT THE PRIOR WRITTEN APPROVAL OF LRL AND THAT FURTHER REQUIRES THE CONTRACTOR TO INDEMNIFY BOTH LRL AND THE CLIENT FROM ANY LIABILITY OR COST ARISING FROM SUCH CHANGES MADE WITHOUT SUCH PROPER AUTHORIZATION.

GENERAL NOTES:

EXISTING SERVICES AND UTILITIES SHOWN ON THESE DRAWINGS ARE TAKEN FROM THE BEST AVAILABLE RECORDS, BUT MAY NOT BE COMPLETE OR TO DATE. CONTRACTOR SHALL VERIFY IN FIELD FOR LOCATION AND ELEVATION OF PIPES AND CHECK WITH THE UTILITY COMPANIES BEFORE DIGGING OR PERFORMING WORK.

CONTRACTOR IS ADVISED TO COLLECT INFORMATION ON SOIL CONDITIONS BEFORE START OF CONSTRUCTION.

THE ENGINEER WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS WHICH ARISE FROM FAILURE TO FOLLOW THESE PLANS, SPECIFICATIONS AND THE DESIGN INTENT THEY CONVEY, OR FOR PROBLEMS WHICH ARISE FROM OTHERS' FAILURE TO OBTAIN AND/OR FOLLOW THE ENGINEER'S GUIDANCE WITH RESPECT TO ANY ERRORS, OMISSIONS, INCONSISTENCIES AMBIGUITIES OR CONFLICTS WHICH ARE ALLEGED.

CONTRACTOR TO VERIFY ALL DIMENSIONS AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES BEFORE WORK COMMENCES. DO NOT SCALE DRAWINGS.

No.	REVISIONS	BY	DATE
03	ISSUED FOR APPROVAL	M.L.	05 DEC 2025
02	ISSUED FOR APPROVAL	M.L.	28 AUG 2025
01	ISSUED FOR APPROVAL	M.L.	04 APR 2025

LICENSED PROFESSIONAL ENGINEER
M. BASNET
100501996
2025/12/5
PROVINCE OF ONTARIO

NOT AUTHENTIC UNLESS SIGNED AND DATED

LRL
ENGINEERING | INGÉNIERIE
5430 Canotek Road I Ottawa, ON, K1J 9G2
www.lrl.ca I (613) 842-3434

CLIENT
HALO CAR WASH

DESIGNED BY:	DRAWN BY:	APPROVED BY:
M.L.	M.L.	M.B.

PROJECT
PROPOSED HALO CAR WASH
LANCELOT DRIVE & HUNT CLUB DRIVE
NEPEAN, ON

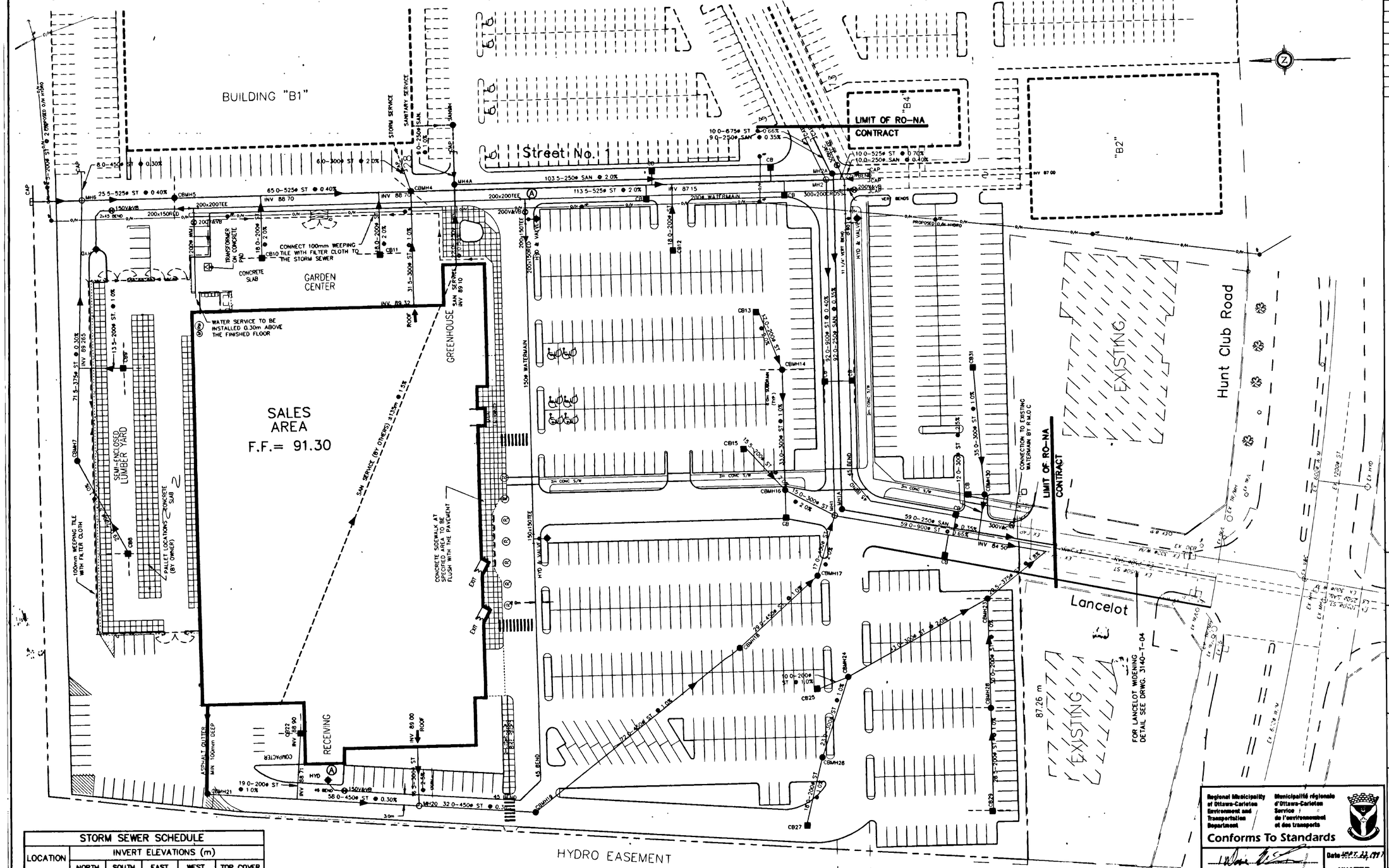
DRAWING TITLE
CONSTRUCTION DETAIL PLAN

PROJECT NO.
240272

DATE
MAY 2024

C901

APPENDIX F
Survey, As-Builts



NO	DATE	BY	REVISION
0	97/06/19	M M	ISSUED FOR APPROVAL
1	97/06/20	M M	REVISED AS PER ARCHITECT
2	97/06/24	M M	ISSUED FOR TENDER
3	97/07/30	D S	GENERAL REVISIONS PER MASTER PLAN
4	97/08/11	M M	REVISED FOR CANADIAN TIRE
5	97/09/18	M M	REVISED AS PER ARCHITECT & RMOC

NOTES :

1. ALL WATERMAINS TO BE CONSTRUCTED IN ACCORDANCE WITH LATEST REVISIONS TO R M O C SPECIFICATIONS AND DRAWINGS.
2. INSULATION TO BE PROVIDED AT CATCHBASINS PER R M O C STANDARD DRAWING WSD-23
3. CATHODIC PROTECTION TO BE PROVIDED TO R M O.C. STANDARDS AND SPECIFICATIONS
4. ALL BENDS, TEES, AND CAPS ARE TO BE RESTRAINED AND/OR THRUST BLOCKS INSTALLED AS PER R M O C STDS.
5. ALL SEWER CONSTRUCTION IN ACCORDANCE WITH THE LATEST REVISIONS TO CITY OF NEPEAN STANDARDS
6. WATERMAIN COVER TO BE 2.4m UNLESS OTHERWISE INDICATED
7. SERVICES SHOWN INSIDE THE BUILDING ENVELOPE ARE FOR INFORMATION ONLY THE CONSTRUCTION OF THESE SERVICES WILL BE ACCORDING TO ARCHITECTS PLAN AND/OR MECHANICAL DRAWINGS
8. CONTRACTOR TO UNCOVER THE EXISTING STORM, WATERMAIN AND SANITARY SEWERS AND PROVIDE ALL CONNECTIONS.
9. ALL STORM AND SANITARY SEWERS TO BE EITHER PVC DR 35 OR CONCRETE CLASS 100-D WITH INSULATION WHERE COVER IS LESS THAN 1.3m
10. ALL WATERMAIN TO BE PVC DR 18 CLASS 150
11. CATCHBASIN LEADS TO BE 200mm∅ @ 1.0% MIN SLOPE UNLESS OTHERWISE INDICATED
12. ALL CATCHBASINS AT LOW POINTS TO HAVE MINIMUM 6.0m LONG, 100mm∅ SUBDRAIN WITH FILTER CLOTH ALL AS PER CITY OF NEPEAN STANDARDS

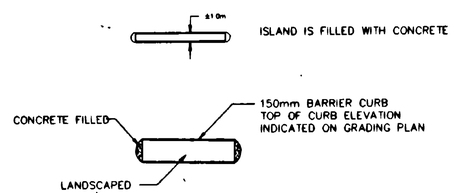
STORM SEWER SCHEDULE

LOCATION	INVERT ELEVATIONS (m) NORTH	SOUTH	EAST	WEST	TOP COVER
CBMH17			89.01	89.11	90.80
CB8				89.40	91.00
CB9	89.40				91.00
STUB	89.10				EX GROUND
CB10			89.08		91.00
CB11			89.08		91.00
CB12			88.20		90.10
CB13			87.85		89.43
CBMH14			87.50	87.40	89.04
CB15		87.81			89.50
CBMH16	87.50	87.00	87.03	87.50	89.30
CBMH17	87.31	87.04			89.20
CBMH18	87.60	87.60			89.82
CBMH19	88.40	88.32			90.80

LOCATION	INVERT ELEVATIONS (m) NORTH	SOUTH	EAST	WEST	TOP COVER
MH20	88.63	88.50	88.60		91.00
CBMH21		88.80			90.55
CB22			88.90		90.00
CBMH23	86.40	85.70		86.20	88.40
CBMH24	87.60	87.26	87.30		89.10
CB25		87.70			89.25
CBMH26			86.62	87.53	88.40
CB27				87.80	89.55
CBMH28			86.51	86.50	88.40
CB29				86.80	88.40
CB30			85.65	85.65	87.55
CB31			86.00		87.96

WATERMAIN SCHEDULE

STATION	DESCRIPTION	FINISHED GRADE(m)	TOP OF WATERMAIN(m)	AS BUILT WATERMAIN(m)
(A) 0+000	HYDRANT	91.15	88.75	
0+000.54	45° BEND	91.10	88.70	
0+003.33	45° BEND	91.00	88.60	
0+006.01	150∅ V&VB	91.00	88.60	
0+054.19	45° BEND	90.85	88.45	
0+062.08	45° BEND	90.90	88.50	
0+128.28	HYDRANT TEE	91.15	88.75	
0+209.62	200x150REDUCER	91.05	88.65	
0+215.86	HYDRANT TEE	91.05	88.65	
0+217.87	200∅ V&VB	91.05	88.65	
0+221.44 (A)	200x200 TEE	91.00	88.60	



DETAIL OF ISLANDS

Regional Municipality of Ottawa-Carleton Environment and Transportation Department
Municipalité régionale d'Ottawa-Carleton Service de l'environnement et des transports
Conforms To Standards
Date SEPT. 22, 1997
WATER WORKS

FOR SITE LAYOUT DIMENSIONS REFER TO ARCHITECTS PLAN

LAYOUT BY ARCHITECTS PLAN ONLY.

CITY OF NEPEAN
PUBLIC WORKS DEPARTMENT

Cumming Cockburn Limited
Consulting Engineers, Planners, and Environmental Scientists

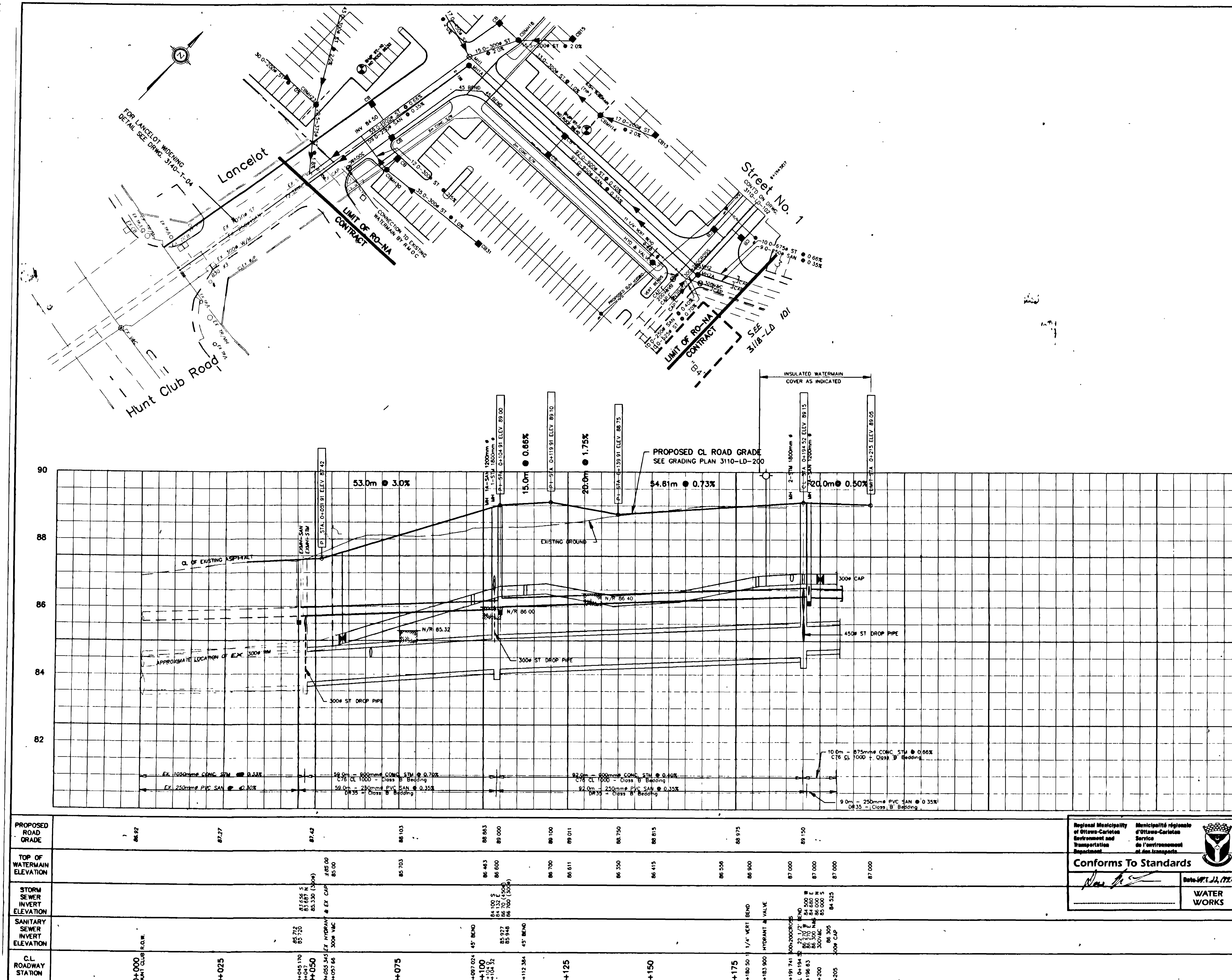
R. W. WINGATE 97/09/19 PROFESSIONAL ENGINEER PROVINCE OF ONTARIO

RO-NA WAREHOUSE

GENERAL PLAN OF SERVICES

SCALE:	1:500		
DRAWN	M M./CAD	DATE:	97/06/13
DESIGN:	K. HOTOVEC	DATE:	97/06/13
CHECKED	R.W.W.	DATE:	97/06/13
PROJECT NO.	3110-LD	DRAWING NO.	100 5065-1

9138



Regional Municipality of Ottawa-Carleton Environment and Transportation Department
Municipalité régionale d'Ottawa-Carleton Service de l'environnement et des transports

Conforms To Standards

Date SEPT. 22, 1997

WATER WORKS

NO	DATE	BY	REVISION
0	97/06/19	M M	ISSUED FOR APPROVAL
1	97/06/24	M M	ISSUED FOR TENDER
2	97/07/28	M M	REVISED AS PER ARCHITECT
3	97/07/30	D S	REVISED PER NEW MASTER PLAN
4	97/08/11	M M	REVISED FOR CANADIAN TIRE
5	97/09/18	M M	REVISED AS PER ARCHITECT & RMOC

FOR SITE LAYOUT DIMENSIONS REFER TO ARCHITECTS PLAN

CITY OF NEPEAN
PUBLIC WORKS DEPARTMENT

Cumming Cockburn Limited
Consulting Engineers, Planners, and Environmental Scientists

REGISTERED PROFESSIONAL ENGINEER — WINGATE — PROVINCE OF ONTARIO

RO–NA WAREHOUSE

EXTENSION OF LANCELOT DRIVE
FROM HUNT CLUB ROAD TO STA. 0+200

SCALE:	1:500 HOR. 1:50 VERT.		
DRAWN	M.M./CAD	DATE	97/06/13
DESIGN:	K HOTOVEC	DATE	97/06/13
CHECKED:	R.W.W.	DATE	97/06/13

PROJECT NO.	DRAWING NO.
3110–LD	101 5065-2

9138

NO.	DATE	BY	REVISION
0.	97/03/26	D.S.	ISSUED FOR APPROVAL
1.	97/06/13	M.M.	REVISED AS PER NEW ARCHITECT PLAN
2.	97/09/09	M.M.	REVISED AS PER S.W.M.
3.	97/09/19	M.M.	REVISED AS PER ARCHITECT & RMOC
4.	97/09/26	M.M.	REVISED PER CANADIAN TIRE CONTRACT
5.	97/10/03	M.M.	REVISED WM AS PER CITY OF NEPEAN
6.	98/04/13	M.M.	REVISED MERIVALE STATION & LAZYBOY

WATERMAIN SCHEDULE

	STATION	DESCRIPTION	FINISHED GRADE(m)	TOP OF WATERMAIN(m)
E	0+000	300x200 CROSS	90.48	88.00
	0+003	200 V&VB	90.33	87.93
	0+008	22 1/2° BEND	90.27	87.87
G	0+011.5	200# CAP	90.25	87.80

NOTE :

ALL PROPOSED TEES, BENDS AND CAPS ON WATERMAIN MUST HAVE THRUST BLOCKS INSTALLED.

FOR SITE LAYOUT DIMENSIONS REFER TO ARCHITECTS PLAN

CITY OF NEPEAN
PUBLIC WORKS DEPARTMENT

Cumming Cockburn Limited
Consulting Engineers, Planners, and Environmental Scientists

REGISTERED PROFESSIONAL ENGINEER
R.W.WINGATE
PROVINCE OF ONTARIO

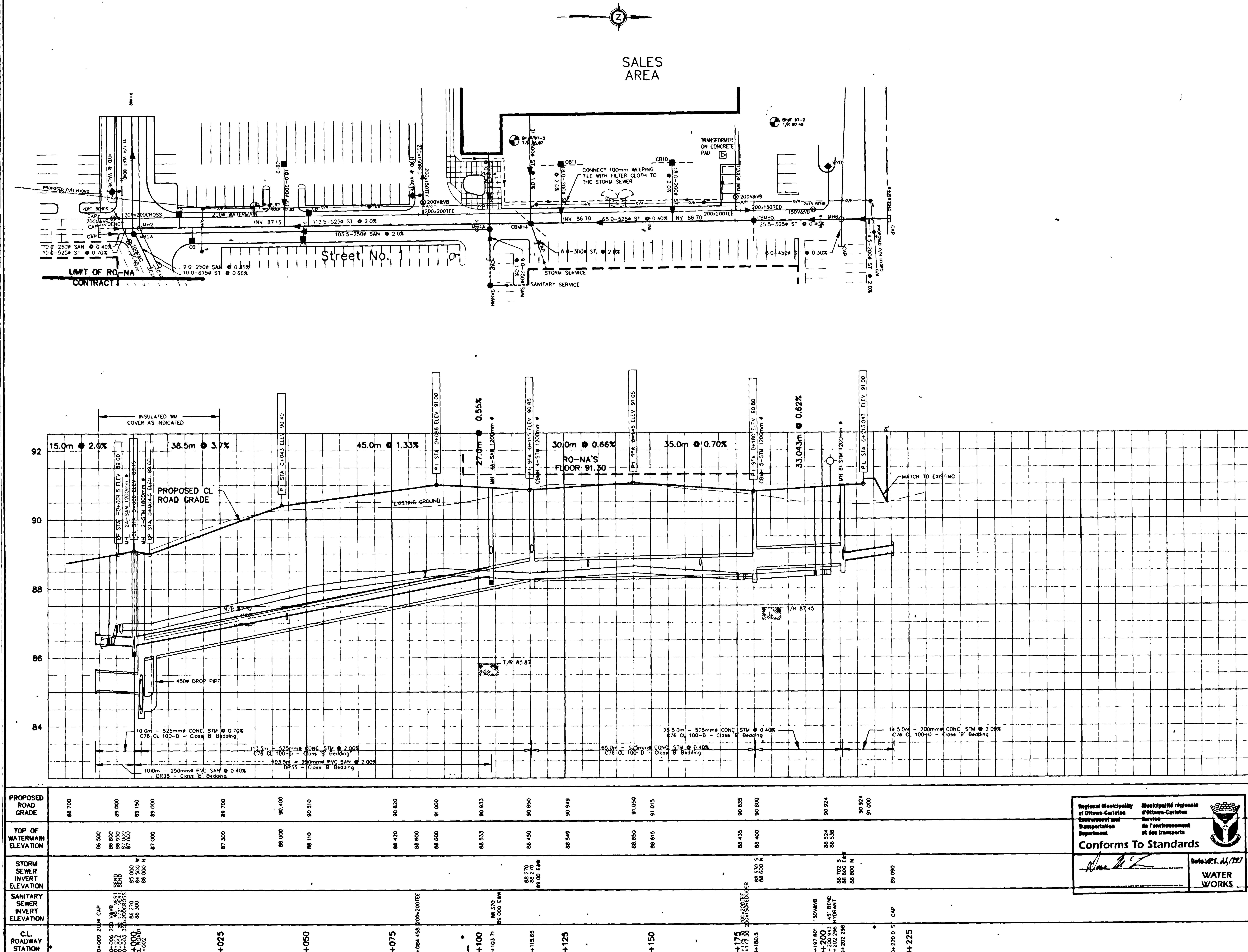
CROSSROADS HOME CENTRE

GENERAL PLAN OF SERVICES

SCALE:	1:750		
DRAWN:	D.S./CAD	DATE:	97/03/26
DESIGN:	K. HOTOVEC	DATE:	97/03/26
CHECKED:	R.W.W.	DATE:	97/03/26

PROJECT NO.	DRAWING NO.
3107-LD	100

NO.	DATE	BY	REVISION
0	97/06/19	M M	ISSUED FOR APPROVAL
1	97/06/24	M M	ISSUED FOR TENDER
2	97/07/30	D S	REVISED PER NEW MASTER PLAN
3	97/08/11	M M	REVISED FOR CANADIAN TIRE
4	97/09/18	M M	REVISED AS PER ARCHITECT & RMOC



FOR SITE LAYOUT DIMENSIONS REFER TO ARCHITECTS PLAN

CITY OF NEPEAN
PUBLIC WORKS DEPARTMENT

Cumming Cockburn Limited
Consulting Engineers, Planners, and Environmental Scientists

RO-NA WAREHOUSE

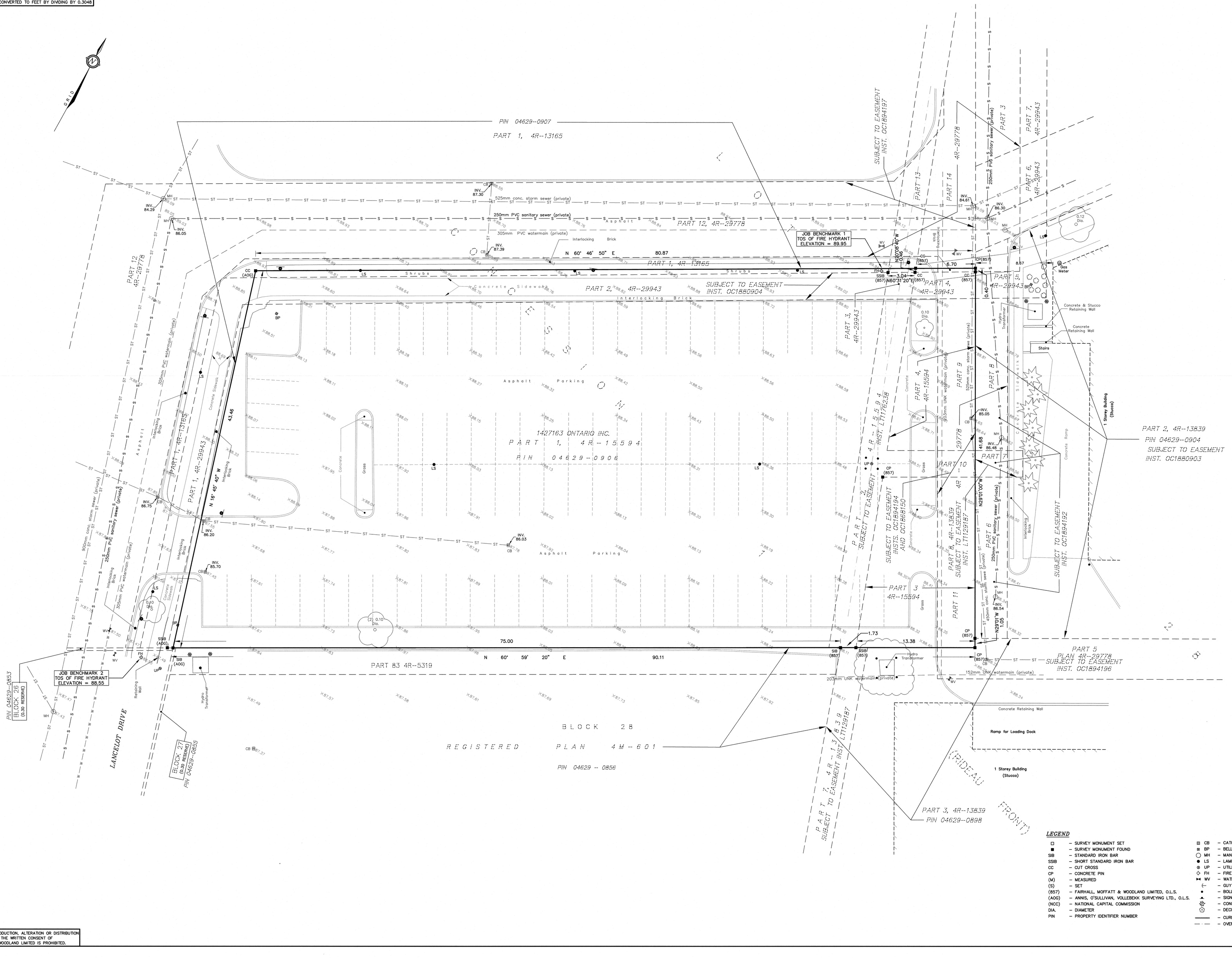
STREET No. 1
CL STA. 0+000 TO STA. 0+225

SCALE	1:500 HOR	1:50 VERT.	
DRAWN	M.M /CAD	DATE	97/06/13
DESIGN	K. HOTOVEC	DATE	97/06/13
CHECKED	R.W.W.	DATE	97/06/13

PROJECT NO.	DRAWING NO.
3110-LD	102

5065-3

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



TOPOGRAPHIC PLAN OF SURVEY OF
PART OF LOT 28
CONCESSION 1 (RIDEAU FRONT)
GEOGRAPHIC TOWNSHIP OF NEPEAN
Now CITY OF OTTAWA

SCALE 1 : 150
0 1 2 5 10 15 metres

FAIRHALL, MOFFATT & WOODLAND LIMITED
ONTARIO LAND SURVEYORS

NOTES

1. BEARINGS HEREON ARE GRID BEARINGS AND ARE DERIVED FROM THE NCC CONTROL MONUMENTS 019710637 (N 5022242.362, E 365393.108) AND 019861625 (N 5021918.356, E 363247.023) AND REFERRED TO THE CENTRAL MERIDIAN 76°30'W LONGITUDE, ZONE 9 OF THE ONTARIO COORDINATE SYSTEM (NAD 27).

ELEVATION NOTES

1. ELEVATIONS SHOWN HEREON ARE REFERRED TO GEODETIC DATUM (CGVD28).
2. ELEVATIONS FOR MANHOLE COVERS AND CATCH BASINS HAVE TO BE INDEPENDENTLY CONFIRMED BEFORE THEY CAN BE ACCEPTED FOR FINAL DESIGN OR CONSTRUCTION PURPOSES.
3. IT IS THE RESPONSIBILITY OF THE USER OF THIS INFORMATION TO VERIFY THAT THE JOB BENCHMARKS HAVE NOT BEEN ALTERED OR DISTURBED AND THAT THEIR RELATIVE ELEVATION AND DESCRIPTION AGREE WITH THE INFORMATION SHOWN ON THIS DRAWING.

UTILITY NOTES

1. THIS DRAWING CANNOT BE ACCEPTED AS ACKNOWLEDGING ALL OF THE UNDERGROUND UTILITIES AND IT WILL BE THE RESPONSIBILITY OF THE USER TO CONTACT THE RESPECTIVE UTILITY AUTHORITIES FOR CONFIRMATION OR LOCATION.
2. UNDERGROUND UTILITIES, AS REPORTED ON THIS DRAWING, ARE NOT BASED ON AN ACTUAL 'FIELD LOCATE' BY THE RESPECTIVE UTILITY AGENCIES BUT HAVE BEEN COMPILED FROM DATA OBTAINED FROM THE FOLLOWING SOURCE:
   a) CITY OF OTTAWA PUBLIC UTILITIES REGISTRY
3. BEFORE ANY WORK INVOLVING PROBING, EXCAVATING, ETC., A FIELD LOCATION OF UNDERGROUND PLANT BY THE PERTINENT UTILITY AUTHORITY IS MANDATORY.
4. INVERT INFORMATION BASED ON UTILITY LOCATE PERFORMED BY USL-1 DEC. 17, 2024.

LEGEND

□	– SURVEY MONUMENT SET	⊞ CB	– CATCH BASIN
■	– SURVEY MONUMENT FOUND	⊞ BP	– BELL PEDESTAL
SIB	– STANDARD IRON BAR	◯ MH	– MANHOLE
SSIB	– SHORT STANDARD IRON BAR	● LS	– LAMP STANDARD
CC	– CUT CROSS	⊕ UP	– UTILITY POLE
CP	– CONCRETE PIN	◇ FH	– FIRE HYDRANT
(M)	– MEASURED	⋈ WV	– WATER VALVE
(S)	– SET	←	– GUY WIRE AND ANCHOR
(857)	– FAIRHALL, MOFFATT & WOODLAND LIMITED, O.L.S.	•	– BOLLARD
(AOG)	– ANNIS, O'SULLIVAN, VOLLEBEKK SURVEYING LTD., O.L.S.	▲	– SIGN
(NCC)	– NATIONAL CAPITAL COMMISSION	⊛	– CONIFEROUS TREE
DIA.	– DIAMETER	⊙	– DECIDUOUS TREE
PIN	– PROPERTY IDENTIFIER NUMBER	———	– CURBING
		— — —	– OVERHEAD UTILITY WIRES

REPORT SUMMARY

DESCRIPTION OF LAND
PART OF LOT 28, CONCESSION 1 (RIDEAU FRONT) DESIGNATED AS PARTS 1, 2, 3 & 4 PLAN 4R–15594 AS IN ALL OF PIN 04629–0906

REGISTERED EASEMENTS
PART SUBJECT TO EASEMENT OVER PARTS 2, 3 AND 4 PLAN 4R–29943 AS IN OC1880904 IN FAVOUR OF ENBRIDGE GAS DISTRIBUTION INC.
SUBJECT TO EASEMENT OVER PART 2 PLAN 4R–15594 AS IN LT1176238 IN FAVOUR OF THE HYDRO–ELECTRIC COMMISSION OF THE CITY OF NEAPEAN.
SUBJECT TO EASEMENT OVER PARTS 9, 10 & 11 PLAN 4R–29778 AS IN OC1868150 IN FAVOUR OF BELL CANADA.
SUBJECT TO EASEMENT OVER PARTS 9, 10 & 11 PLAN 4R–29778 AS IN OC1894194 IN FAVOUR OF CANADIAN TIRE PROPERTIES INC.

ZONING
COMPLIANCE WITH ZONING, LAND USE, ENVIRONMENTAL AND BUILDING REGULATIONS NOT CERTIFIED BY THIS REPORT.

THIS REPORT WAS PREPARED FOR
1427163 ONTARIO INC.
THE UNDERSIGNED ACCEPTS NO RESPONSIBILITY FOR USE BY OTHER PARTIES.

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
V–88247

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR In accordance with Regulation 1026, Section 29 (3).

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:
1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON OCT. 31, 2024.

2025/01/09
DATE

JOHN H. GUTH
ONTARIO LAND SURVEYOR

Fairhall Moffatt & Woodland LIMITED
ONTARIO LAND SURVEYORS — OTTAWA
Surveying and Land Information Services
235 TERENCE MATTHEWS CRESCENT, KANATA, ONTARIO K2M 2B3
TEL: (613) 591–2580 FAX: (613) 591–1460
www.fmw.on.ca

JOB No. AE22300
FILE No.
REFERENCE No. 173 – 1 (RF) NP
S:\JOBS\AE\AE22300\DWG 2025–01–09
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