Robinson Land Development

May 28th, 2021

Attention: **Jill Sparling**
McRobie Architects & Interior Designers

Reference: **Application for Site Plan Control – D07-12-20-0189**
Maritime-Ontario
8800 Campeau Drive, KWBP
1st Submission Review Comments
Our Project No. 20027

Dear Ms. Sparling,

Please find below, our responses to the servicing, grading and stormwater management related review comments received for the proposed Maritime-Ontario development.

<u>Mississippi Valley Conservation Authority (MVCA) Comments, dated February 16, 2021:</u>

1. As noted in Table 5 of the report, 100-year provided storage volume are determined using Civil3D by Autodesk. In Section 7.4, flows from drainage areas within the central parking lot (from STM9 to STM14) and within the landscape areas (from STM 15 to STM 17) have been optimized to remove surface ponding. However, as per Storage Volume Calculations tables in Appendix F, the tables indicate available storage volumes for those drainage areas. Please clarify whether available storage volumes are within the storage of the storm sewer system.

Response: The available storage volume values previously provided in the storage volume tables correspond to the maximum **surface** storage volume available at each structure location before "overtopping" will occur. For the drainage areas optimized to eliminate surface ponding, the available storage volume would not be utilized unless a blockage in the system or an event(s) exceeding the 100 year design event were to occur. Additional notes have been provided on the storage volume tables for clarification.

2. Please include the ponding depth, volume, and extent for 2-year and 100-year events on the grading plan for surface storage areas.

Response: Ponding details for the 2, 5 and 100-year design events have been provided on the grading plans as requested.

3. Please provide inlet control device design details on the site servicing plan.

Response: An ICD design table, which included the structure name, 100-year outflow, 100-year head and orifice diameter for each ICD was previously provided on the Servicing Plans. Please identify what additional ICD information is required to be provided.

4. Silt fencing is placed across the entrance(s). Please update the drawing to reflect curled end sections around the entrance(s).

Response: The silt fence was previously shown to extend through the proposed entrance as sediment and erosion control measures are to be installed prior to construction and shall be adjusted as the site becomes developed. However, limits of silt fence have been revised at site entrances as requested.

5. In Section 8.0 of the report, it is noted that a mud mat will be implemented. However, it is not shown on the Erosion and Sediment Control Plan (20027-ESC1). Please include a mud mat on the plan as noted in Section 8.0.

Response: A mud mat has been added to the Erosion and Sediment Control Plan. Note that mud mats will only be required at construction entrances.

City of Ottawa Comments, dated March 19, 2021:

Infrastructure Comments

General comments

1. Further comments about SWM might Follow, if any.

Response: Noted.

2. Please include the file no. D07-12-20-0189 and Plan no. 18376 at the bottom left corner of the drawings as per city standards.

Response: File and plan numbers have been added to the drawings as requested.

3. Please provide an Existing Conditions/Removals Plan as part of the engineering drawing set. Any existing services are to be removed or abandoned in accordance with City standards.

Response: An Existing Conditions and Removals Plan (DWG. 20027-R1) has been provided as requested.

4. All underground and above ground building footprints and permanent walls need to be shown on the plans to confirm that any permanent structure does not encroach within the right-of-way.

Response: Noted. Building footprints and permanent structures have been provided on the drawings.

Grading Plan, DWG# 20027-GR1 to 3 Rev#1

5. Please include elevations for each ponding area.

Response: Ponding elevations have been added to the grading plans as requested.

6. Drawing shows east and west side of property draining to the neighboring property, please avoid sending any drainage to neighboring property, any storm water needs to be sent to City ROW.

Response: A retaining wall has been added along the eastern boundary in order to better tie into the proposed grading design for the adjacent Block 6 development. As a result, drainage between the edge of pavement and property line will be directed to the on-site storm sewer system and will no longer free flow to the neighbouring property to the east.

Under pre-development conditions, drainage from the adjacent property to the west is captured by the existing on-site drainage ditch which has no proper outlet. As a result of filling the subject property (necessary to facilitate the servicing and SWM designs), this drainage will be now be conveyed along the shared property line towards the south (ultimately to the Pond 6 West Facility). Only 0.12 hectares of grassed area from the subject site will contribute to the free flow along the shared property line. In order to fully contain all on-site drainage from the western boundary as noted in the comment, a retaining wall would need to be constructed since the existing elevations along the property are lower than that of the City ROW.

7. Please provide a structural detail for retaining walls stamped by a structural engineer.

Response: Sealed structural details will be provided for all retaining walls greater than 1.0 metre in height once the grading design has been generally accepted and no further major changes are anticipated.

8. Please confirm the different paving types areas, show areas with light duty asphalt, heavy duty asphalt and Concrete Surfaces.

Response: Heavy duty asphalt limits were previously hatched on the grading plans. Areas designated for roller compacted concrete were previously identified with notes. Due to the amount of information required to be provided on the grading plans, additional hatching will only clutter the drawings. Additional notes have been provided for better clarification of surface material limits. Surface materials have been identified on the Site Plan.

Erosion and Sedimentation control Plan, Drawing # 20027-ESC1, Rev.#1,

9. Please show location of proposed straw bale flow dam & Rock flow check dam.

Response: No straw bale or rock flow check dams are proposed for the subject site. The existing ditches identified on the plans have no proper outlet and are to be filled as part of the development work.

10. With respect to all proposed infiltration/retention practices proposed, please update the ESC plan to address the following from the MECP SWM Planning & Design Manual (March 2003), Section 4.6.6 “Infiltration basins will only operate as designed if they are constructed properly. There are three main rules that must be followed during construction:

Response: Notes added to the drawing as requested.

11. Basins should be constructed at the end of the development construction;

Response: Notes added to the drawing as requested.

12. Smearing of the native material at the interface with the basin floor must be avoided and/or corrected by raking or roto-tilling; and

Response: Notes added to the drawing as requested.

13. Compaction of the basin during construction must be minimized."

Response: Notes added to the drawing as requested.

Servicing Plan, DWG# 20027-S1, Rev#1

14. Please provide manhole information adjacent to each Manhole, including MH no., T/G, Inverts IN & OUT and if there is an ICD.

Response: Structure ID labels were provided adjacent to each structure in plan view. The corresponding structure information (i.e. structure size, T/G elevation, INV. Elevations) were provided in table form on the Servicing Plans. The drawings would be cluttered and illegible if all information was provided in plan view as requested due to the scale of the drawing.

15. Please show all features on site to make sure there are no conflicts with proposed services including trees, light fixtures and fences.

Response: Typically, trees are not provided on the Servicing Plans. On-site infrastructure is shown on the Landscape Plan for ease of review. However, all fixtures including trees have been shown on the plan as requested.

16. Please show information for Rooftop storage as per item 8.3.11.3 in City's guidelines.

Response: Please refer to the Flow Control Roof Drainage Declaration (provided in Appendix F) which indicates that a conventional drained roof with no flow controls will be implemented for the subject site.

17. According to item 5.7.2 roof drains should discharge to the surface as far away as is practical from the foundation wall.

Response: Section 5.7.2 of the Sewer Design Guidelines does not apply in this case. In accordance with the approved overarching reports for the KWBP, roof drainage is to be conveyed to on-site infiltration galleries for groundwater recharge and therefore shall govern over the recommendations noted in Section 5.7.2 of Sewer Design Guidelines. The roof drainage will be conveyed to an underground storm sewer system and directed to the proposed infiltration gallery located in the parking lot.

18. Please show on the plan structure with ICDs.

Response: An ICD table, which indicates all structures requiring an ICD, was previously provided on the Servicing Plans.

19. Please include inverts and Finish grades on Infiltration Gallery Sections.

Response: Relevant elevations have been provided on the infiltration gallery sections as requested.

20. Can you please confirm there is at least 0.3m horizontal separation between MH101 & MH208, and MH201 & 200mm SAN pipe.

Response: Note that service locations have been revised based on internal building mechanical room conditions. Minimum separation distances have been provided at all locations.

21. Please show area for road cut permit to connect to existing services along Campeau Drive.

Response: Approximate road cut areas have been provided on the drawing as requested.

22. Manholes in ponding areas need to have solid grate, please highlight that on the drawing and mention the city detail.

Response: As per current City standards, all manhole grates have solid watertight covers. Grate details have been added to the structure tables on the Servicing Plans.

23. Please explain how the infiltration gallery will drain in-case of overflow.

Response: As previously discussed under Section 6.0, "In the event that infiltration is not being fully achieved, a proposed overflow pipe will convey drainage from the infiltration gallery to proposed STMMH 200". The pipes within the infiltration gallery, although perforated, will still function to convey stormwater runoff to a proper outlet downstream (i.e. to STMMH 200) in the event that the infiltration gallery does not have available storage capacity. Additional verbiage has been added to the report under Section 7.5 for clarification.

24. If Overflow will happen through the subdrain pipes, please explain what will happen in-case of failure for these pipes.

Response: As noted in response #23 above, any overflow will be conveyed by the pipes within the infiltration gallery to a proper outlet downstream. However, by using proper installation methods, the pipes within the infiltration gallery are not anticipated to experience a failure any more likely than any other pipes installed on the subject site.

Maritime-Ontario, 8800 Campeau Drive, KWBP, Servicing and Stormwater Management Report, Dated December 2020

25. Please include pre consultation notes as part of this report.

Response: Pre-consultation notes have been provided in Appendix A as requested.

26. Please provide hydrant coverage plan

Response: To be provided by McRobie Architects.

27. Please explain that the bottom of infiltration trench is a min 1m away from the groundwater as per MOE requirements.

Response: Additional verbiage has been provided under Section 7.5 of the report and refer to the memorandum, Geotechnical Response to City Comments, prepared by Paterson, dated May 11, 2021 and revised Geotechnical Investigation.

28. Please provide more information discussing how the infiltration gallery functions with the proposed SWM system.

Response: Additional verbiage regarding the infiltration gallery has been added to Section 7.5 of the report.

29. Because rooftop storage is proposed as part of the SWM strategy, the following information is required to be provided on the engineering plan(s) and discussion and documented in the report as per Ottawa Sewer Design Guidelines (SDG) SD002, October 2012, City of Ottawa, Clause 8.3.11.3. The below information is to be provided if rooftop storage is proposed as part of the SWM solution. Please provide a design table that includes the following information for the 2-year, 5-year and 100-year events on the engineering drawings once complete (it is suggested to present in a table format on the drawing)

    a. Total number of control devices proposed for the building;
    b. Type of control device proposed (product name and manufacturer);
    c. Rooftop storage volume for each roof drain catchment area;
    d. Depth of Flow depth
    e. Location of roof drains (show/define roof drain catchment areas);
    f. Scupper locations;▪ Spill points (onto scuppers);
    g. Proposed flow per roof drain;
    h. Total flow from the roof.

Response: Please refer to the Flow Control Roof Drainage Declaration (provided in Appendix F) which indicates that a conventional drained roof with no flow controls will be implemented for the subject site.

30. For roof top storage, please provide a Flow Control Roof Drainage Declaration (attached). It needs to be completed by the mechanical and structural engineer responsible for the design.

Response: Please refer to the Flow Control Roof Drainage Declaration (provided in Appendix F) which indicates that a conventional drained roof with no flow controls will be implemented for the subject site.

31. According to City guidelines, No ponding for 2-yrs is permitted, please show that ICD flows exceeds the 2 years flows and that no ponding will happen.

Response: The City guideline referenced in the comment applies to the design of municipal roadways and not to private development sites such as this. The depth of ponding in the 2-year event is at the discretion of the property owner. Further, the allowable release rate for the site, for all events up to an including the 100-year design event (as per the IBI Report), is approximately the same flow rate as the 2-year event under post-development conditions. Therefore, some on-site drainage areas must be controlled to less than the 2-year flow rate in order to compensate for areas which must be overcontrolled (due to grading) and free flow areas.

32. Please make sure the orifice diameter for ICD matches the sewer specification item no. 13.1.19.3.

Response: Please provide direction to sewer specification item no. 13.1.19.3 noted in the comment. Please note that details regarding orifice diameters with the Sewer Design Guidelines apply to City owned ICD's located within the City ROW and not to privately owned sites. Proposed orifice diameters are at the discretion of the Owner as per City M.S. 18.4.1.3.

33. The finished floor of the basement appears to be below what was contemplated in the IBI Group Report "Design Brief for Kanata West Business Park – Phase 5". The required finished floor elevation (FFE) for the site is 106.6m (Table 4.10 below) and slab on grade construction was assumed. The plan shows that there is a basement slab of 104.5m in the office building.

Response: A HGL analysis was completed for the on-site storm sewer system (previously provided in Appendix F). The analysis determined that elevation of the storm service at the building is above the HGL. Further, the building storm service will be equipped with a backflow preventor in accordance with City standards.

34. Per the Geotechnical Report: "The percolation rate was interpreted from the hydraulic conductivity which was estimated based on previous investigations within the area and on experience".

Response: Noted.

35. Per the Draft December 2019 LID Guidance Document (which has been circulated publicly for comment): "Infiltration Rate - The rate at which stormwater moves from the surface into the soil, typically measured in inches per hour, millimeters, centimeters or meters per second. It is critical to note that infiltration rate and hydraulic conductivity are two different concepts and that conversion from one parameter to another cannot be done through unit conversion (see hydraulic conductivity and saturated hydraulic conductivity). Typically, saturated hydraulic conductivity is used to calculate the infiltration rate to be used as a design input based on approximate relationships and often include an infiltration reduction factor (or safety factor)".

Response: The infiltration rate previously used in the design calculations was calculated as the inverse of the percolation time in accordance with industry standards. An updated percolation time has been provided by Paterson Group based on their recent on-site testing. This value and a safety factor have been used to calculate a design infiltration rate used for the design calculations. Refer to Section 7.5 of the Robinson report and to the memorandum, Geotechnical Response to City Comments, prepared by Paterson, dated May 11, 2021.

36. Please request confirmation of the site specific infiltration rate from the Geotechnical Engineer re the definition above.

Response: Refer to the memorandum, Geotechnical Response to City Comments, prepared by Paterson, dated May 11, 2021 and revised Geotechnical Investigation.

37. Per Section 7.5 of the Servicing and SWM report, the infiltration gallery has a depth of 1 m however, based on the Site Servicing Plan, the invert of the header pipes are proposed at less than 1 m from the base of the gallery (retention volume would be below the subdrains). Please revise the submission to ensure consistency in the drawings vs the calculations to demonstrate infiltration targets are met.

Response: The provided storage volume within the infiltration gallery has been revised to only consider volume below the header invert elevations as requested.

38. Per the drawing set, the invert of the base of the infiltration practice is not specified. Please update the package to include this detail.

Response: The base of the infiltration gallery elevation has been provided on the Servicing Plan (DWG. 20027-S1) as requested.

39. Per Appendix 1 of the Geotech report, BH19 (the borehole closest to the proposed infiltration practice), water level is reported at elevation of 103.08 m (dated January 15, 2014).

Response: Please note that the Geotechnical Investigation has been revised based on recent on-site testing.

40. Please provide confirmation of the seasonal high groundwater elevation (seasonal high water table is typically during the spring freshet).

Response: Additional verbiage has been provided under Section 7.5 of the Robinson report and refer to the memorandum, Geotechnical Response to City Comments, prepared by Paterson, dated May 11, 2021 and revised Geotechnical Investigation.

41. Please demonstrate in the next design submission how the base of the infiltration practice storage media, is a minimum 1 m from the seasonally high groundwater table, as per Ministry requirements.

Response: Additional verbiage has been provided under Section 7.5 of the Robinson report and refer to the memorandum, Geotechnical Response to City Comments, prepared by Paterson, dated May 11, 2021.

42. Update the Design Brief to reference the seasonal high water table with respect to the design of the infiltration gallery.

Response: Additional verbiage has been provided under Section 7.5 of the Robinson report and refer to the memorandum, Geotechnical Response to City Comments, prepared by Paterson, dated May 11, 2021.

43. Please revise the design accordingly. If applicable, explore whether the invert of the gallery can be raised and whether the footprint of the gallery needs to be increased to meet the KWMSS infiltration targets while also complying with MECP guidelines. If the site requires an MECP ECA, then please demonstrate the 1 m clearance.

Response: The design of the infiltration gallery has been revised based on City comments and the updated geotechnical investigation as required given the site constraints.

NOTE: a groundwater mounding analysis is required where the seasonally high tater table (or bedrock) is less than 1 m from the bottom of the facility. Please reference the Draft December 2019 LID Guidance Document (which has been circulated publicly for comment). If mounding is identified and there is no flexibility to change the design then how would this impact meeting the infiltration target for the site.

Response: The function of an infiltration gallery may be limited during seasonally high groundwater conditions, however, infiltration is still feasible during the remainder of the year when groundwater levels are lower. The groundwater level on the property is expected to become lower over time once the site is developed as the sewer service trenches are lower than the infiltration gallery and the foundation drainage system includes two duplex sump pump systems that have been designed to maintain the groundwater level below the basement slab.

44. The depth from the bottom of the infiltration practice to the bedrock should be greater than or equal to 1 metre, per Ministry requirements. Please provide confirmation that this will be achieved.

Response: Additional verbiage has been provided under Section 7.5 of the Robinson report and refer to the memorandum, Geotechnical Response to City Comments, prepared by Paterson, dated May 11, 2021.

If you have any questions, please do not hesitate to contact the undersigned.

Yours truly,

ROBINSON LAND DEVELOPMENT

Sean Czaharynski, P.Eng.
Manager – Land Development

Robinson
Land Development

Maritime-Ontario 8800 Campeau Drive Kanata West Business Park Servicing and Stormwater Management Report

Prepared For:

Maritime-Ontario Freight Lines Limited

Prepared By:

Robinson Land Development

Project No. 20027
December 2020
Revised May 2021

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LEGAL NOTIFICATION

This report was prepared by Robinson Land Development for the account of **Maritime-Ontario Freight Lines Limited**.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. **Robinson Land Development** accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this project

1.0 INTRODUCTION

Robinson Land Development have been retained by Maritime-Ontario Freight Lines Limited to prepare a servicing and stormwater management design for a proposed development located at 8800 Campeau Drive within the Kanata West Business Park (KWBP). The subject site is proposed to be developed into a distribution warehouse and associated parking lot. The property is located north of Campeau Drive and west of Upper Canada Street (refer to **Figure 1 – Key Plan** following page 1).

The subject site is located within the Phase 5 limits of the KWBP. Servicing and stormwater management requirements for Phase 5 have been updated and outlined in the report titled *Design Brief, Kanata West Business Park – Phase 5, 425 Huntmar Drive*, prepared by IBI Group, dated October 2019 (herein referred to as the *IBI Report*). This report will detail the proposed means of servicing the site and provide details on how to meet the stormwater management requirements outlined in the *IBI Report*.

Pre-consultation notes from the City of Ottawa have been provided in **Appendix A** for reference.

2.0 EXISTING CONDITIONS

The 7.04 hectare subject site is zoned Business Park Industrial Zone (IP13[2166]-h) and is currently undeveloped. The site is bounded by Mineral Extraction Zone (ME) land to the west (existing quarry), Agricultural Zone (AG) land to the north, an undeveloped industrial parcel and Upper Canada Street to the east and Campeau Drive to the south.

The subject site is contained within Block 37, 38 and 39 of the KWBP Master Plan. The KWBP – Phase 5 area includes the construction of Upper Canada Street (from Campeau Drive to Palladium Drive) and the registration of the blocks adjacent to the proposed roadway (i.e. the subject site). As part of the Phase 5 registration, previous Blocks 37, 38 and 39 have been complied into a single parcel, currently referred to as Block 7 (refer to *Figure 6 – Draft Plan*, prepared by IBI Group, in **Appendix A**).

Municipal infrastructure has been installed within the Campeau Drive right-of-way, adjacent to the subject site, as follows:

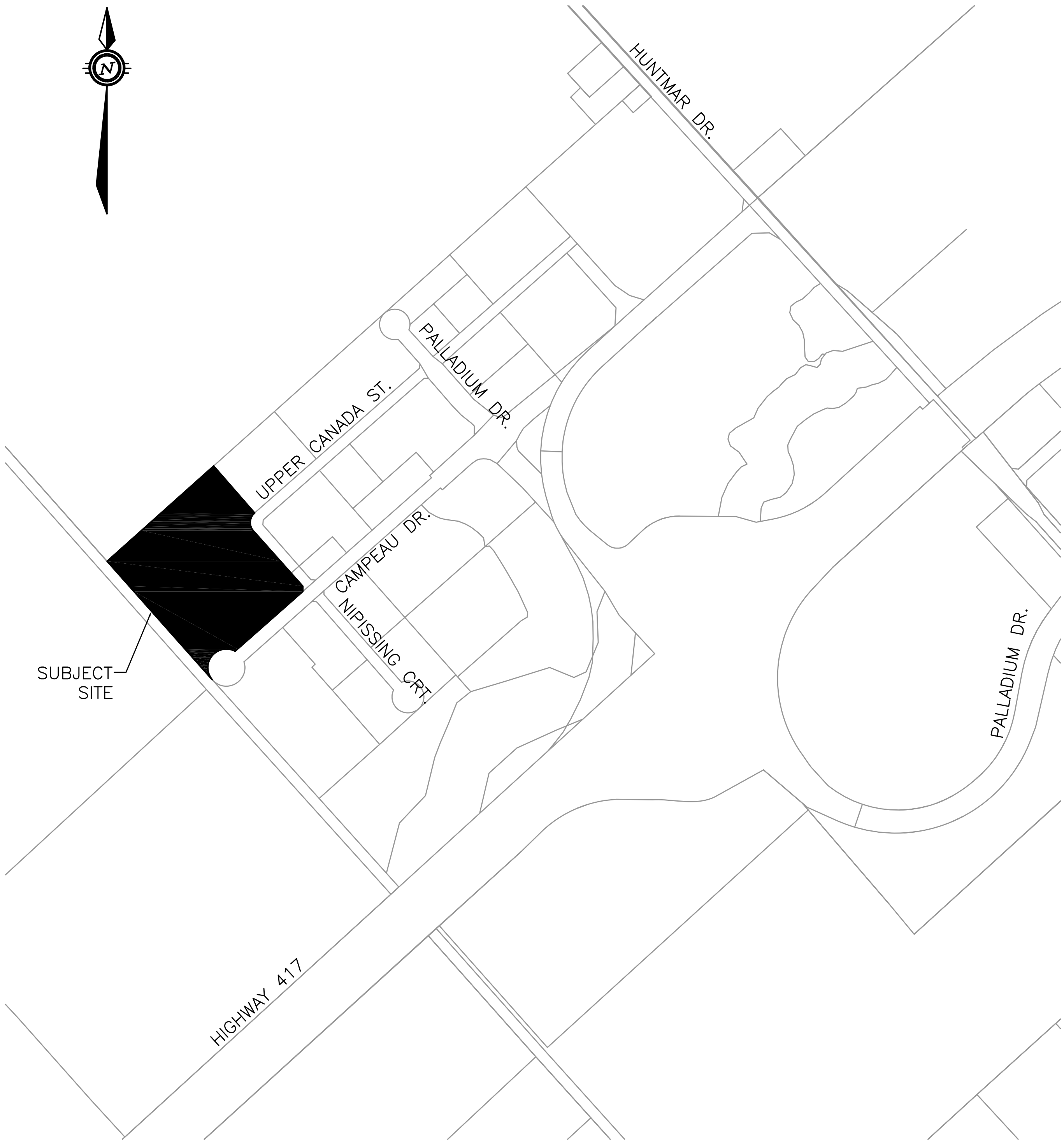
- 250 mm diameter watermain
- 250 mm diameter sanitary sewer
- 1050 mm diameter to 1200 mm diameter storm sewers

Municipal infrastructure has been installed within the Upper Canada Street right-of-way, adjacent to the subject site, as follows:

- 250 mm diameter watermain
- 250 mm diameter sanitary sewer
- 1500 mm diameter to 1650 mm diameter storm sewers

Refer to following KWBP – Phase 5 design drawings, prepared by IBI Group, in **Appendix A** for more details:

- *General Plan of Services, Drawing No. 100*
- *Campeau Drive from STA 19+780 to STA 20+110, Drawing No. 101*
- *Upper Canada Street from Campeau Drive to STA 0+410, Drawing No. 109*



Robinson
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scale N.T.S.	8800 CAMPEAU DRIVE, KWBP	project no. 20027
date 01/11/20		
drawn by BLM	KEY PLAN	FIG 1.0

3.0 DEVELOPMENT PROPOSAL

The Owner is proposing to develop the subject site into a distribution warehouse and associated parking lot. The proposed building will include approximately 60,000 square feet of warehouse space and an additional 18,720 square feet of office space. The proposed parking lot will include an area for 134 office staff parking spaces, accessed via an entrance connection to Campeau Drive. A secondary entrance connection will provide access to the portion of the parking lot designated for 59 'day cab' tractor parking spaces. A third four lane entrance connection will provide access to the warehouse building. Refer to the Site Plan, prepared by McRobie Architects, in **Appendix B** for more details.

The proposed development will be provided with new water and sanitary services and also include a new storm sewer system to control the site's stormwater to the requirements outlined in the *IBI Report* (refer to **Figure 2 – General Plan of Services** following page 2).

4.0 WATER SERVICING

The subject site will receive water supply via a 200 mm diameter watermain connection to the existing 250 mm diameter watermain on Campeau Drive. An existing 250 mm diameter watermain is also available along Upper Canada Street. Refer to *Figure 4 – Proposed Water Distribution Plan*, prepared by IBI Group for Phase 5 of the KWBP in **Appendix C**. In accordance with the *IBI Report* and City of Ottawa design guidelines, the following watermain design criteria have been utilized for the subject site:

- Minimum Pressure During Peak Hour 276 kPa (40 psi)
- Minimum Pressure During Maximum Day Plus Fire 140 kPa (20 psi)
- Fire Flow Rate 13,000 L/min (216.7 L/s)
- Maximum Pressure in Unoccupied Areas 689 kPa (100 psi)
- Maximum Pressure in Occupied Areas 552 kPa (80 psi)

4.1 Boundary Conditions

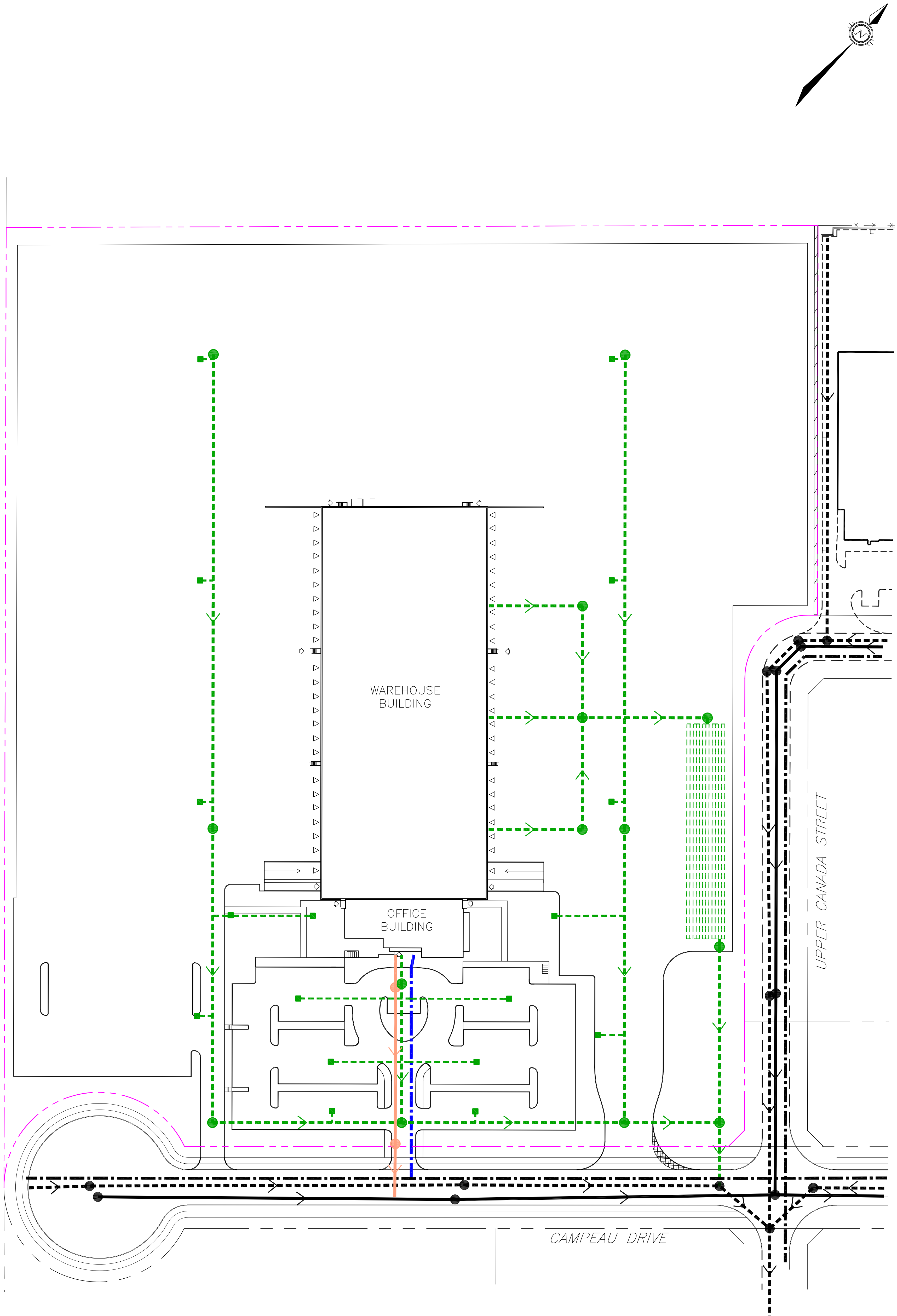
The City of Ottawa provided boundary conditions for the subject site at the proposed connection to the existing 250 mm diameter watermain on Campeau Drive (refer to **Appendix C**). The boundary conditions have been summarized in **Table 1** below:

Table 1 – Boundary Conditions

Demand Scenario	Head (m)	Pressure (psi)
Maximum HGL	161.4	80.2
Peak Hour	156.3	72.9
Max Day Plus Fire	122.6	25.1

4.2 Fire Protection

Two existing hydrants are available on the north-west side of Campeau Drive across the frontage of the subject site. The existing hydrant located approximately 50 metres south-west of Upper Canada Street will be required to be relocated as part of the proposed development works as the hydrant is in conflict with the proposed entrance connection to Campeau Drive. Two existing hydrants are also available on the north-east side of Upper Canada Street, adjacent to the eastern property boundary of the site.



LEGEND

	PROPERTY BOUNDARY
	PROPOSED STORM SYSTEM
	PROPOSED SANITARY SYSTEM
	PROPOSED WATER SYSTEM
	EXISTING STORM SYSTEM
	EXISTING SANITARY SYSTEM
	EXISTING WATER SYSTEM

Robinson Land Development

scale N.T.S.	MARITIME–ONTARIO, KWBP	project no. 20027
date 27/05/21	GENERAL PLAN OF SERVICES	FIG 2
drawn by BLM		

Fire protection for the subject site will be provided by a proposed on-site hydrant which will receive water supply via the proposed 200 mm diameter watermain connection to the existing 250 mm diameter watermain on Campeau Drive. The proposed hydrant will be located within a landscaped island to the front of the main entrance, within 45 metres of the proposed siamese connection for the building.

The required fire flow for the subject site was calculated using the Fire Underwriter's Survey (FUS) long form (refer to **Appendix C**). Based on the building construction and occupancy, the required fire flow is 7,000 Lpm (117 L/s).

4.3 Hydraulic Model Results

The hydraulic model results for Maximum HGL, Peak Hour and Maximum Day + FF have been calculated and summarized in **Table 2** below.

Table 2 – Hydraulic Model Results

Criteria	Boundary Conditions – Head (m)	Modelling Results (psi or Lpm)	Allowable Pressure Range
Peak Hour	156.3	68.5	40 – 80 psi
Max Pressure	161.4	75.8	< 80 psi
Max Day + Fire	122.6	11,556	@ 20 psi

As indicated in **Table 2** above, it has been demonstrated that the subject site can be adequately serviced for both domestic and fire flow demands. Refer to the hydraulic model outputs provided in **Appendix C**.

As noted in *Section 2.4* of the *IBI Report*, pressure reducing valves will be required for all buildings located in Phase 5 of the KWBP since the calculated pressures were expected to be greater than 80 psi (552 kPa). However, as indicated in **Table 2** above, the modelled maximum pressure condition for the subject site has been calculated to be 75.8 psi and therefore a pressure reducing valve (PRV) will not be required.

5.0 SANITARY SERVICING

5.1 Design Criteria

Sanitary flows from the KWBP are conveyed east via the Campeau Drive sanitary sewer system before ultimately being conveyed to the Signature Ridge Pump Station (SRPS) north of Highway 417. Refer to *Figure 5 – Wastewater Plan*, prepared by IBI Group, in **Appendix D**. The municipal sanitary sewer system for Phase 5 of the KWBP has been designed (by IBI Group) based on recommendations from the following reports:

- Kanata West Master Servicing Study (KWMSS), 2006
- City of Ottawa Sewer Design Guidelines, 2012
- Ministry of the Environment Design Guidelines for Sewage Works, 2008
- City of Ottawa Technical Bulletin ISTB-2018-01

The subject site (i.e. Block 7) has been identified as light industrial land use on the *Sanitary Drainage Area Plan,* prepared by IBI Group for the KWBP, provided in **Appendix D**. In keeping with the sanitary sewer design criteria outlined in *Section 3.3* of the *IBI Report*, the following design parameters have been implemented for the subject site:

- Light Industrial Flow: 28,000 L/ha/d
- Peaking Factor: 4.5 (MOE Chart – City of Ottawa Appendix 4-B.1)
- Infiltration Allowance: 0.33 L/s/ha
- Minimum Velocity: 0.60 m/s
- Maximum Velocity: 3.0 m/s

As noted in the *IBI Report*, the Phase 5 lands have been designed to outlet to the existing 300 mm diameter sanitary sewer on Campeau Drive, west of the Palladium Drive roundabout. The sanitary flows to be generated from Block 7 (formerly Block 37, 38, 39) have been allocated within pipe run MH151A to MH150A on Upper Canada Street as noted on the *Sanitary Sewer Design Sheet*, prepared by IBI Group, provided in **Appendix D**.

5.2 Proposed Design

The *IBI Report* has allocated sanitary flows from the subject site within the 250 mm diameter sanitary sewer on Upper Canada Street, however, it is proposed to outlet sanitary flows to the existing 250 mm diameter sanitary sewer on Campeau Drive for the following reasons:

- The orientation of the proposed building and site layout (i.e. main building entrance facing Campeau Drive and entrance connections via Campeau Drive) facilitate a straight-line connection from the building mechanical room to the existing sewer on Campeau Drive.
- In order to maintain a common sewer trench (water, sanitary and storm) and single road cut (for water and sanitary connections), the proposed sanitary sewer outlet must also be to Campeau Drive.

Sanitary flows generated from the subject site will be conveyed by a proposed 200 mm diameter sanitary sewer system to the existing 250 mm diameter sanitary sewer on Campeau Drive (between EXMH99A and EXMH100A). Using the parameters noted above, the peak sanitary design flow for the site has been calculated to be 12.59 L/s. The existing pipe runs on Campeau Drive, EX99A to EX100A and EX100A to EX101A, will have 31.82 L/s and 42.38 L/s of excess capacity respectively after the addition of 12.59 L/s of sanitary flow from the subject site. Therefore, the existing 250 mm diameter sanitary sewer on Campeau Drive (upstream of Upper Canada Street) will have adequate capacity to convey the peak sanitary design flows from the subject site. The proposed sanitary sewers have been designed in accordance with current City of Ottawa standards and in keeping with the design criteria outlined in the *IBI Report*. Refer to the sanitary sewer design sheet in **Appendix D** for more details.

6.0 STORM SERVICING

Storm drainage from the subject site (i.e. Block 37, 38, 39) has been allocated within the existing 1200 mm diameter storm sewer on Campeau Drive, downstream of EXMH101, as indicated on the *storm sewer design sheet*, prepared by IBI Group, provided in **Appendix E.** The existing 1200 mm diameter storm sewer on Campeau Drive conveys stormwater south on Nipissing Court, before being conveyed to the Pond 6 West Facility and ultimately discharging into Feedmill Creek. Refer to *Figure 8 – Proposed Storm Sewer Plan*, prepared by IBI Group, in **Appendix E**. Stormwater runoff from the subject site will be captured by surface inlet grates and conveyed via the proposed on-site storm sewer system to EXMH101 on Campeau Drive. The on-site storm sewers range from 250 mm to 900 mm in diameter and have been designed to convey the full 5 year peak flow and be within the acceptable full flow velocity range of 0.80 m/s to 3.0 m/s in accordance with City of Ottawa standards and the *IBI Report*. Refer to the storm sewer design sheet and Storm Drainage Area Plan (DWG. 20027-STM1) in **Appendix F** for more details.

A secondary storm sewer system is proposed to convey drainage from the roof area to a proposed infiltration gallery (refer to **Section 7.5 - Infiltration**) located within the parking lot. The secondary storm sewer system has been designed to have capacity to convey the roof flows provided by the Mechanical Engineer (refer to roof flow correspondence in **Appendix F**). In the event that infiltration into the surrounding soil is not being achieved (i.e. fine sediment accumulation or abnormally high groundwater table), stormwater would bypass through the infiltration gallery via the proposed storm pipes and outlet to the storm sewer system at downstream STMMH 200 without impacting any on-site infrastructure. The proposed 900 mm diameter storm sewer downstream of STMMH 200 has been designed to have capacity to convey the full 5 year peak storm from the roof area, however, full to partial infiltration is expected to occur. Refer to **Figure 3 – Roof Drainage Area Plan** and the infiltration gallery storm sewer design sheet in **Appendix F** for more details.

7.0 STORMWATER MANAGEMENT DESIGN

7.1 Design Criteria

A dual drainage design, minor and major system, has been utilized for the KWBP. The *IBI Report* provides updated stormwater management design criteria for the Phase 5 portion of the development. The design criteria were prepared in accordance with current City of Ottawa Design Guidelines and with the following overarching reports prepared for the KWBP:

- Kanata West Master Servicing Study (KWMSS), prepared by Stantec and CCI/IBI Group, dated 2006.
- Kanata West Business Park Stormwater Management Report and Pond 6 West Design Brief, prepared by IBI Group, dated November 2015.
- Addendum Report: Kanata West Business Park Stormwater Management Report and Pond 6 East Design Brief, prepared by IBI Group, dated November 2015.

7.2 Minor System

Stormwater runoff from the subject site, which is captured by the proposed on-site storm sewer system, will be conveyed to EXMH101 on Campeau Drive. The minor system design of the KWBP conveys the drainage south via the existing storm sewer system on Nipissing Court, to the Pond 6 West Facility and ultimately to Feedmill Creek. The minor system capture for the proposed blocks tributary to the Pond 6 West Facility is based on the 5 year, 3 hour Chicago simulated flow in accordance with the overarching reports for the KWBP. The subject site (denoted as Area 101A on the *Storm Drainage Area Plan*, prepared by IBI Group, provided in **Appendix E**) has been allocated the following minor system design parameters:

Table 3 – Drainage Area Design Parameters

Area ID	Area (ha)	Minor System Capture (L/s)	Required Storage Volume (m^3)
101A	7.03	1230	780

Notes:

1. Subject site is denoted as Area 101A on the *Storm Drainage Area Plan*, prepared by IBI Group, in **Appendix E**.
2. Parameters as per *Table 4.2* of the *IBI Report*, provided in **Appendix E**.

In accordance with the design criteria outlined in the *IBI Report*, the minor system from the subject site must be restricted to a rate of 1230 L/s for all events up to an including the 100 design storm. In order to control the site's runoff to less than the allowable release rate of 1230 L/s, inlet control devices (ICDs) are proposed to be installed within the outlets of the on-site catch basins. Refer to **Section 7.3 – Release Rates** for more details.

7.3 Release Rates

As noted above, runoff from the subject site must be controlled to a rate of 1230 L/s for all storm events up to and including the 100 year design storm in accordance with the *IBI Report*. In order to control the site's runoff, inlet control devices (ICDs) are proposed to be installed within the outlets of the on-site catch basins. The ICDs have been sized based on the 100 year head (measured from the 100 year ponding elevation to the centreline of orifice elevation) and an allowable outflow. Refer to the ICD calculations in **Appendix F** for more details.

Drainage from the roof areas will be collected by multiple roof drains and conveyed by the internal building plumbing to the secondary storm sewer system (refer to **Section 6.0 – Storm Servicing**) to the proposed infiltration gallery (refer to **Section 7.5 – Infiltration**) located in the parking lot area. The mechanical design has utilized a conventional drained roof with no flow controls, therefore, the building roofs have been analyzed as free flow areas. Refer to the Flow Control Roof Drainage Declaration in **Appendix F**.

Areas of the subject site which cannot be captured by the on-site storm sewer system will flow "uncontrolled" off-site during storm events. Drainage will be conveyed "uncontrolled" to Campeau Drive, Upper Canada Street, to the north and to the west. These free flow areas must be accounted for in the overall release rate for the site. A summary of the on-site release rates for the 100 year design event has been provided in **Table 4** below:

Table 4 – Summary of Release Rates

Drainage Area	100 Year Release Rate (L/s)
STM1	120.0
STM2	60.0
STM3	80.0
STM4	60.0
STM5	120.0
STM6	60.0
STM7	30.0
STM8	25.0
STM9	55.0
STM10	30.0
STM11	25.0
STM12	40.0
STM13	30.0
STM14	25.0
STM15 + STM16	20.0
STM17	20.0
STM18 (ROOF 1)	28.2[*1]
STM19 (ROOF 2)	325.3[*1]
FF1 (CAMPEAU)	23.2
FF2 (UPPER CANADA)	16.4
FF3 (NORTH)	17.7
FF4 (WEST)	14.7
Total =	1225.5
Allowable[*2] =	1230.0
Δ =	4.5

Notes:
1. Roof areas are assumed to be free flow.
2. Allowable release rate as per *IBI Report*.

As noted in **Table 4** above, the 100 year outflow from the subject site of 1225.5 L/s is less than the allowable rate of 1230 L/s and therefore has been designed in keeping with the *IBI Report*.

7.4 Major System/ Quantity Control

Overland flow from the majority of the KWBP is conveyed from west to east, ultimately to Huntmar Drive (refer to the *SWMHYMO Schematic*, prepared by IBI Group, in **Appendix E**). For the subject site (drainage area 101A), overland flow from the individual on-site ponding areas will cascade south-east, via the parking lot and entrance connections, to Campeau Drive and ultimately to Huntmar Drive. The on-site major system has been designed to pond stormwater to a maximum depth of 0.30 metres before “overtopping” in accordance with City of Ottawa design standards. A minimum freeboard of 0.30 metres has been provided between the spillover elevations and the adjacent building finished floor elevation.

In accordance with the *IBI Report*, individual blocks within the KWBP are to provide on-site quantity storage control for up to and including the 100 year design storm event (in excess of the allowable release rate of 1230 L/s for the subject site). The *IBI Report* has allocated a required storage volume of 780 m^3 for the subject site (refer to **Table 3** above). Required storage volumes have been calculated for each individual drainage area based on the allowable release rates noted in **Table 4** above. A summary of the required and provided 100 year storage volumes for the on-site drainage areas have been provided in **Table 5** below.

Table 5 – Summary of 100 Year Storage Volumes

Drainage Area	100 Year Required Storage Volume (m^3)	100 Year Provided Storage Volume (m^3)
STM1	216.2	232.6
STM2	182.7	200.8
STM3	172.5	184.7
STM4	104.8	109.4
STM5	241.9	243.6
STM6	180.0	180.2
STM7	198.3	200.5
STM8	79.6	86.7
STM9	2.8	3.7
STM10	15.7	16.6
STM11	15.1	15.7
STM12	4.3	4.6
STM13	15.7	16.6
STM14	13.4	15.7
STM15 + STM16	0.0[*4]	0.0[*4]
STM17	0.0[*4]	0.0[*4]
STM17 (ROOF 1)	0.0	0.0
STM18 (ROOF 2)	0.0	0.0
FF1 (CAMPEAU)	0.0	0.0
FF2 (UPPER CANADA)	0.0	0.0
FF3 (EAST)	0.0	0.0
FF4 (NORTH)	0.0	0.0
FF5 (WEST)	0.0	0.0
Total =	**780.0[*1]**	**1511.4**

Notes:

1. Required storage volume of 780 m^3 as per *IBI Report*.
2. Provide storage volumes calculated using Civil3D by Autodesk.
3. Provided storage volumes include surface storage only (i.e. no pipe storage).
4. Areas experience no surface ponding during the 100 year event, therefore, no provided surface storage has been considered although surface storage is available.

As noted in **Table 5** above, adequate on-site quantity control has been provided for all storm events up to and including the 100 year design storm in keeping with the *IBI Report*. Refer to the storage volume tables provided in **Appendix F** for more details. The outflows from the drainage areas within the landscape areas (STM15, STM16, STM17) have been optimized to eliminate surface ponding for all storm events up to and including the 100 year design storm. Although surface storage will not be required for these drainage areas (for events up to and including the 100 year design storm), quantity storage volume is available as noted on the storage volume tables provided in **Appendix F**.

7.5 Infiltration

The Carp River Watershed/Subwatershed Study (CRWS) provided water balance calculations and outlined infiltration targets within the subwatershed area from the stormwater management perspective, based on soil characteristics. Following the CRWS, infiltration targets for the Kanata West development were established within the KWMSS. That study indicated that a range of 70 to 100 mm/year of runoff be infiltrated from the western portion of the KWBP site. The KWMSS also indicated that post development infiltration rates are to be increased by 25% above these pre-development rates to compensate for areas (i.e. roadway corridors) that cannot provide infiltration. In keeping with the *IBI Report* and overarching reports for the KWBP, each block will be required to provide engineered infiltration measures (such as infiltration galleries fed by roof drains) to achieve the required infiltration rates as outlined within the KWMSS. For the subject site, a target infiltration range of 87.5 mm/year to 125 mm/year is required (i.e. 70 to 100 mm/year + 25%).

Drainage from the roof areas will be captured by multiple roof drains (designed by Mechanical Engineer with no flow controls, refer to Flow Control Roof Drainage Declaration in **Appendix E**) and conveyed via the secondary storm sewer system to a proposed infiltration gallery located within the parking lot. The proposed infiltration gallery has been designed using guidelines from the *Low Impact Development Stormwater Management Planning and Design Guide (*herein referred to as the *LID Manual)*. The proposed infiltration gallery has also been sized to have capacity to detain roof drainage for the 95^{th} percentile storm event for the Ottawa area. Rainfall data has been referenced from the report titled *Runoff Volume Control Targets for Ontario Final Report,* prepared by Aquafor Beech Ltd. and Earthfx Inc. for the Ministry of the Environment & Climate Change (currently known as the Ministry of the Environment, Conservation and Parks), dated October 2016 (herein referred to as the *Aquafor Beech Report*).

<u>Required Storage Volume:</u>

95^{th} Percentile Daily Volume = 0.0279 m (*Aquafor Beech Report Table 3.16,* ***Appendix E***)

Roof Area = 7,126.82 m^2

Required Storage Volume = (0.0279 m) x (7,126.82 m^2) = **198.84 m^3**

<u>Provided Storage Volume:</u>

Infiltration Gallery Bottom Area = 897.0 m^2 (69.0 m length x 13.0 m width)

Infiltration Gallery Depth = 0.6 m (measured from header invert to gallery bottom)

Infiltration Gallery Storage Media Porosity = 0.4 (50 mm diameter clear stone)

Provided Storage Volume = (897.0 m^2) x (0.6 m) x (0.4) = **215.3 m^3**

As calculated above, the proposed infiltration gallery has been designed to provide 215.3 m^3 of storage volume which is greater than the 95th percentile daily rainfall volume for the Ottawa area.

<u>Infiltration Target:</u>

Target Infiltration Rate = 87.5 mm/yr to 125 mm/yr
Average Annual Precipitation = 0.925 to 0.950 m (*Aquafor Beech Report Figure 3.41,* ***Appendix E***)
Roof Area = 7,126.82 m^2
Site Area = 70,353.28 m^2

Maximum Average Annual Precipitation = (0.95 m) x (7,126.82 m^2) = 6,770.48 m^3

Maximum Average Site Infiltration Rate = (6,770.48 m^3) / (70,353.28 m^2) x 1000 = 96.2 mm/yr

Maximum Effective Site Infiltration Rate = (96.2 mm/yr) x (0.95) = **91.39 mm/yr**

Minimum Average Annual Precipitation = (0.925 m) x (7,126.82 m^2) = 6,592.31 m^3

Minimum Average Site Infiltration Rate = (6,592.31 m^3) / (70,353.28 m^2) x 1000 = 93.70 mm/yr

Minimum Effective Site Infiltration Rate = (93.70 mm/yr) x (0.95) = **89.02 mm/yr**

Based on precipitation data from the *Aquafor Beech Report* and site parameters (i.e. total site and roof areas), the minimum effective site infiltration rate has been calculated to be 89.02 mm/year which is within the acceptable range outlined in the *IBI Report* and overarching studies for the area. It should be noted that the infiltration rate calculations for the subject site only consider roof drainage (in keeping with the *IBI Report*) and do not account for the approximately 0.85 hectares of pervious area where natural infiltration of runoff at source will occur.

Section 4.4 of the *LID Manual* states that the maximum allowable depth of a stone reservoir can be calculated using the following equation:

$d_{max} = i * t / V_r$

where:

d_{max} = maximum stone reservoir depth (mm)
i = infiltration rate for native soils (mm/hr)
V_r = void ratio (0.4 for clear stone)
t = time to drain (48 hrs recommended)

Based on the findings of the Geotechnical Investigation prepared by Paterson Group (Table 6 – Estimated Percolation Rates), the native soil percolation time (T) for the subject site has been field verified to be 6 to 10 mins/cm. Refer to relevant percolation rate and borehole information provided in **Appendix E**. The infiltration rate can then be calculated as the inverse of the percolation time (i.e. infiltration rate = 1/T).

6 mins/cm x (1/ 60 mins/hr) x (1/ 10 mm/cm) = 0.01 hr/mm
10 mins/cm x (1/ 60 mins/hr) x (1/ 10 mm/cm) = 0.017 hr/mm
Infiltration $Rate_{max}$ = 1 / 0.01 = 100 mm/hr
Infiltration $Rate_{min}$ = 1 / 0.017 = 60 mm/hr
Infiltration $Rate_{avg}$ = 80 mm/hr

To account for potential reductions in soil permeability a safety correction factor must be incorporated to determine the design infiltration rate to be used in calculations. Since the soil profile is continuous at the location of the proposed infiltration gallery, a safety correction factor of 2.5 is applicable (source: wiki.sustainabletechnologies.ca/infiltration).

Design Infiltration Rate = 80 / 2.5 = **32 mm/hr**

d_{max} = (32 mm/hr) x (48 hrs) / 0.4 = 3840 mm = **3.84 m**

The proposed infiltration gallery depth of 0.6 m is less than the maximum allowable depth of 3.84 m calculated using the equation from the *LID Manual*. For applications with an underdrain, the maximum depth is measured below the invert of the underdrain pipe.

Section 4.4 of the *LID Manual* also states that the required footprint surface area of a stone reservoir can be calculated using the following equation:

$A_f = WQV / (d * V_r)$

where:

A_f = footprint surface area (m^2)
WQV = water quality volume (m^3)
d = stone reservoir depth (m)
V_r = void ratio (0.4 for clear stone)

A = (198.84 m^3) / (0.6 m x 0.4) = **828.5 m^2**

The proposed infiltration gallery footprint area of 897.0 m^2 is more than the required footprint area of 828.5 m^2 calculated using the equation from the *LID Manual*. To be conservative, infiltration through the gallery bottom has only been considered, however, lateral infiltration through the sides is expected to occur. Based on the calculations above, it can be concluded that the infiltration gallery has been designed in accordance with the *LID Manual* for depth and footprint area.

<u>Groundwater:</u>

For optimal performance of infiltration practices, a minimum separation of 1.0 metre between the bottom of the infiltration facility and the seasonal high groundwater table is desired. As detailed in the Geotechnical Investigation and Geotechnical Response to City Comments Memorandum (prepared by Paterson Group and provided in **Appendix E**), the groundwater levels were measured periodically throughout spring months at the on-site monitoring well constructed at BH 1-21 as well as within the piezometers installed in the other on-site boreholes. The seasonally high groundwater was generally encountered at elevations ranging from 105.2 to 106.0 m. It is anticipated that the elevated groundwater levels observed within the boreholes have been influence by surface water collected within the adjacent drainage ditch which runs along the western limit of the subject site. Based on the observed colour and consistency of the recovered soil samples, the long-term groundwater table is anticipated to be located at an approximate elevation of 104.0 to 104.5 m. The bottom of the proposed infiltration facility is set at an elevation of 103.61 m, however, it is anticipated that the localized long-term groundwater level will be lowered further due to development of the site and adjacent roadway which will provide sufficient separation between the storage media and the groundwater table (refer to Geotechnical Response to City Comments Memorandum in **Appendix E**). It should be noted that the function of an infiltration gallery may be limited during seasonal high groundwater conditions, however, the infiltration practice is still feasible during the remainder of the year when groundwater levels are lower.

Overflow/ Bypass

In the event that infiltration into the surrounding soil is not being achieved (i.e. fine sediment accumulation or abnormally high groundwater table), stormwater would bypass through the infiltration gallery via the proposed storm pipes and outlet to the storm sewer system at downstream STMMH 200 without impacting any on-site infrastructure. As previously noted in **Section 6.0**, the storm sewer downstream of STMMH 200 has been designed to have capacity to convey the full 5 year peak flow from the roof area in the event that an overflow does occur.

Bedrock

Based on the available geological mapping, bedrock is expected at a depth of 5 m to 15 m below the existing ground surface. In addition, practical refusal to dynamic cone penetration testing was encountered in boreholes BH 2-21 and BH 1 (2014) at geodetic elevations of 98.46 and 97.38 m, respectively. Given that the bottom of the proposed infiltration facility is set at an elevation of 103.61 m, over 1.0 metre separation to bedrock will be provided in accordance with design standards. Refer to Geotechnical Response to City Comments Memorandum in **Appendix E**.

The overall design of the infiltration gallery as it relates to the design infiltration rate, factor of safety and site constraints should be reviewed by the Geotechnical Consultant prior to construction.

7.6 Hydraulic Grade Line (HGL) Analysis

As noted in *Section 4.6* of the *IBI Report*, the hydraulic grade line (HGL) within the storm sewers of the KWBP is dictated by water levels in Feedmill Creek and water levels in the Pond 6 West and Pond 6 East facilities. A summary of the 100 year HGL analysis for the KWBP – Phase 5 has been provided in *Table 4.10* of the *IBI Report* (refer to **Appendix E**). Due to the permanent water level within the Pond 6 West and Pond 6 East Facilities, some of the storm sewers within the KWBP will be partially submerged, which includes the outlet for the subject site (i.e. existing storm sewer on Campeau Drive downstream of EXMH101). To account for this, the *IBI Report* has analysed the submerged sewers within the KWBP system with a 25% sediment accumulation. Refer to *Section 4.6.3* of the *IBI Report* for more details.

An HGL analysis has been prepared for the proposed on-site storm sewer system based on a connection to EXMH101 on Campeau Drive at a 100 year HGL elevation of 103.57 m (modelled by IBI Group using 100 year 12 hour SCS storm event). The HGL analysis determined that the HGL would remain below the top of grate/cover elevations of the on-site storm manholes and catch basins. The HGL will be contained within the storm sewer between STMMH 208 to STMMH 201 and therefore is not of concern for the proposed building service connection. The overflow outlet from the infiltration gallery, downstream of STMMH 304, will connect to STMMH 200 above the HGL elevation and therefore is not expected to impact the performance of the infiltration practices. Refer to the HGL computation sheet in **Appendix F** for more details.

In the event that the on-site storm sewers are surcharged, stormwater runoff will be conveyed to a proper outlet (i.e. Campeau Drive right-of-way) via the major overland flow route (refer to **Section 7.4**) without impacting the on-site building or neighbouring properties.

7.7 Quality Control

The Pond 6 West Facility is located at the western edge of the KWBP, north of Feedmill Creek. The facility provides water quality (and quantity) control for the development west of Palladium Drive (refer to *Figure 2 – Post-Development SWM Drainage Boundaries Overall Site*, prepared by IBI Group, in **Appendix E**). The facility discharges to Feedmill Creek in accordance with the *Kanata West Business Park Stormwater Management Report and Pond 6 West Design Brief*, prepared by IBI Group. Additional on-site quality control is not required for the subject site as the minor storm system is tributary to the Pond 6 West Facility.

8.0 EROSION AND SEDIMENT CONTROL

Prior to construction and until vegetation has been re-established in disturbed areas, erosion and sediment control measures must be implemented to mitigate the impact on receiving watercourses and existing infrastructure. The following erosion and sediment control (ESC) measures have been proposed for the subject site:

- Limiting the extent of exposed soils at any given time.
- Erosion and sediment control measures shall be maintained until vegetation has been re-established in all disturbed areas. Re-vegetate disturbed areas in accordance with approved Landscape Plan as soon as possible.
- Stockpile soil away (15 metres or greater) from watercourses, drainage features and top of steep slopes.
- Installation of silt sacks between frame and cover on all proposed and existing catch basins and open cover storm manholes until construction is completed.
- Silt fence to be installed and maintained along the property boundaries.
- Install mud mats at all construction entrances.
- During active construction periods, visual inspections shall be undertaken on a weekly basis and after major storm events (>25mm of rain in 24 hour period) on ESC and any damage repaired immediately.
- ESC shall also be assessed (and repaired as required) following significant snowmelt events.
- Visual inspections shall also be undertaken in anticipation of large storm events (or a series of rainfall and/or snowmelt days) that could potentially yield significant runoff volumes.
- Care shall be taken to prevent damage to ESC during construction operations.
- In some cases, barriers may be removed temporarily to accommodate construction operations. The affected barriers shall be reinstated immediately after construction operations are completed.
- ESC should be adjusted during construction to adapt to site features as the site becomes developed.
- ESC shall be cleaned of accumulated sedimentation as required and replaced as necessary.
- During the course of construction, if the Engineer believes that additional prevention methods are required to control erosion and sedimentation, the Contractor shall implement additional measures, as required, to the satisfaction of the Engineer.
- Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification (OPSS) 805.

Refer to the Erosion and Sediment Control Plan (DWG. 20027-ESC1) provided in **Appendix B** for more details.

9.0 CONCLUSIONS

This servicing and stormwater management report has been prepared to support the Site Plan Application for the development of the property located at 8800 Campeau Drive, within the KWBP. The report has detailed the proposed means of servicing the site and provided details on how to meet the stormwater management requirements in accordance with City of Ottawa standards and the overarching IBI Reports prepared for the KWBP. The proposed servicing and stormwater management designs will be achieved by implementing the following key features:

- Domestic water supply will be provided by a 200 mm diameter watermain connection to the existing 250 mm diameter watermain on Campeau Drive.
- Water supply for fire protection will be provided by a proposed on-site hydrant.
- Sanitary flows will be conveyed to the existing 250 mm diameter sanitary sewer on Campeau Drive via a proposed 200 mm diameter sanitary sewer.
- Stormwater runoff (minor system) will be conveyed by the proposed storm sewer system to EXMH101 on Campeau Drive.
- Stormwater outflows for all storm events up to and including the 100 year design storm will be controlled in accordance with the *IBI Report*.
- On-site storage will be provided for all storm events up to and including the 100 year design storm event.
- Major overland flows will be conveyed to Campeau Drive.
- A proposed infiltration gallery, fed by roof drains, will be utilized to meet the infiltration targets for the site.
- Quality control will be provided by the existing Pond 6 West Facility.
- Erosion and sediment control measures will be implemented prior to construction and maintained until vegetation has been re-established in disturbed areas.

Report Prepared By:

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Report Reviewed By:

Sean Czaharynski, P.Eng.
Manager – Land Development

Watermain Analysis Prepared By:

Pat Leblanc, P.Eng.
Project Manager

Appendix A

Pre-Consultation Notes

KWBP Figure 6 – Draft Plan (prepared by IBI Group)

KWBP General Plan of Services (prepared by IBI Group)

KWBP Campeau Drive from STA 19+780 to STA 20+410 (prepared by IBI Group)

KWBP Upper Canada Street from Campeau Drive to STA 0+410 (prepared by IBI Group)

Jill Sparling

From: David McRobie
Sent: September-28-20 10:44 AM
To: Jill Sparling
Subject: FW: Pre-Consultation Follow-Up: Maritime Ontario (Kanata West Business Park)
Attachments: Pre-con Applicant's Study and Plan Identification List.pdf

Her name is Laurel McCreight.

David McRobie FRAIC OAA OAQ AAA
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From: Derek Howe <derek.howe@taggart.ca>
Sent: September-25-20 10:39 AM
To: David McRobie <McRobie@mcrobie.com>
Subject: FW: Pre-Consultation Follow-Up: Maritime Ontario (Kanata West Business Park)

This is who you should request – she is really good.
Derek

From: McCreight, Laurel <Laurel.McCreight@ottawa.ca>
Sent: October 23, 2019 10:51 AM
To: dplumb@realinc-scs.com; dplumb.can@gmail.com
Cc: Derek Howe <derek.howe@taggart.ca>; Emily McGirr <emily.mcgirr@taggart.ca>
Subject: Pre-Consultation Follow-Up: Maritime Ontario (Kanata West Business Park)

Hi David,

Please refer to the below regarding the Pre-Application Consultation Meeting held on Thursday October 17, 2019 for the property at the far west end of the Kanata West Business Park north of Campeau Drive for a Site Plan Control Application for Maritime Ontario (warehouse and office). I have also attached the required Plans & Study List for application submission.

Below are staff's preliminary comments based on the information available at the time of pre-consultation meeting:

<u>Planning / Urban Design</u>

- Phase 5 of the Kanata West Business Park must be registered prior to receiving site plan approval.
    - An address will be assigned as part of the subdivision registration.
- Emphasis on landscaping along the street edge to provide a green buffer to the parking lot will be important.
- Pedestrian circulation on site from parking areas to the buildings should be clearly defined.

- Please include sidewalks along the frontage of the site.
- Examples of similar developments (Moncton and Brampton) as discussed in the meeting are welcome examples of the level of detail and attention to landscaping, site layout and building design.

Engineering

- The Stormwater Management Criteria for the subject site is to be in accordance with Kanata West Business Park Phase 5 Design Brief, prepared by IBI Group (latest revision). The Phase 5 registration documents are currently under review by the City of Ottawa. Flows to the storm sewer in excess of the allocated storm release rate, up to and including the 100-year storm event, must be detained on site.
- The sanitary sewer release rate for the subject site is to be in accordance with Kanata West Business Park Phase 5 Design Brief, prepared by IBI Group (latest revision).
- Proposed connection locations for sanitary and storm services are to be in accordance with Kanata West Business Park Phase 5 Design Brief, prepared by IBI Group (latest revision
- Provide the following information for water main boundary conditions:
    1. Location map with water service connection location
    2. Average daily demand (l/s)
    3. Maximum daily demand (l/s)
    4. Maximum hourly demand (l/s)
    5. Fire flow demand (provide fire detailed flow calculations based on the fire underwriters survey method)
    6. If you are proposing any exterior light fixtures, all must be included and approved as part of the site plan approval. Therefore, the lights must be clearly identified by make, model and part number. All external light fixtures must meet the criteria for full cut-off classification as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and must result in minimal light spillage onto adjacent properties (as a guideline, 0.5 fc is normally the maximum allowable spillage). In order to satisfy these criteria, the applicant must provide certification from an acceptable professional engineer. The location of all exterior fixtures, a table showing the fixture types (including make, model, part number), and the mounting heights must be included on a plan.
- An MECP Environmental Compliance Approval (Industrial Sewage Works) will be required for the proposed development assuming “storage of goods or materials” will occur at the proposed warehouse.

Please contact Infrastructure Project Manager, Julie Candow for follow-up questions.

Transportation

- Follow Traffic Impact Assessment Guidelines
    - Screening form to start, full Traffic Impact Assessment if any of the triggers on the screening form are satisfied.
    - Start this process asap. The application will not be deemed complete until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).
- It would be beneficial if the TIA forecasting includes reference to existing Bantree site in terms of site generated traffic.
- Corner triangles as per OP Annex 1 - Road Classification and Rights-of-Way at the following locations on the final plan will be required (measure on the property line/ROW protected line; no structure above or below this triangle):
    - Local Road to Local Road: 3 m x 3 m
- Sight triangle as per Zoning by-law is 6 m x 6 m (measure on the curb line).
- Based upon TAC (Figure 8.8.2), the minimum corner clearance for a local road is 15m.
- Review the Private Approach By-law to define:
    - The number of accesses (based upon frontage size);
    - The allowable width of private approach (desired max. 9m, exception can be granted for “transport loading areas”);

    - The required distance between private approaches (min. 9 m).
- Consider separating heavy vehicles and passenger vehicles on site and at accesses.
- On site plan:
    - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
    - Turning templates will be required for all accesses showing the largest vehicle to access the site; required for internal movements and at all access (entering and exiting and going in both directions).
    - Show all curb radii measurements; ensure that all curb radii are reduced as much as possible
    - Show lane/aisle widths.
    - Provide dedicated pedestrian paths.
    - Sidewalk is to be provided along the site frontages and continuous across accesses as per City Specification 7.1.
    - Grey out any area that will not be impacted by this application.

Please contact Transportation Project Manager, Josiane Gervais for follow-up questions.

Other

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

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

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

Regards,
Laurel

Laurel McCreight MCIP, RPP
Planner
Development Review West
Urbaniste
Examen des demandes d'aménagement ouest

City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 16587
ottawa.ca/planning / ottawa.ca/urbanisme

'

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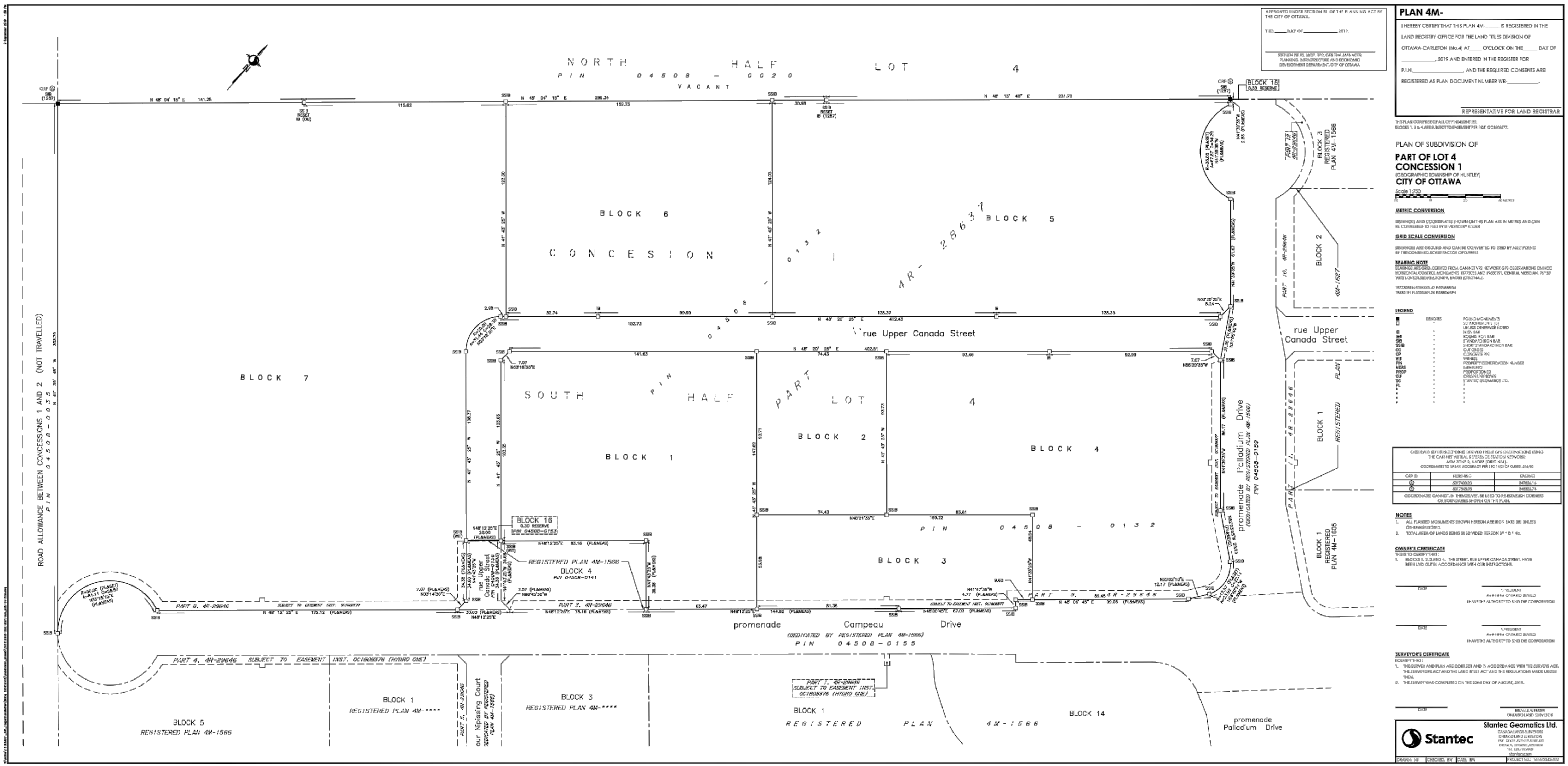
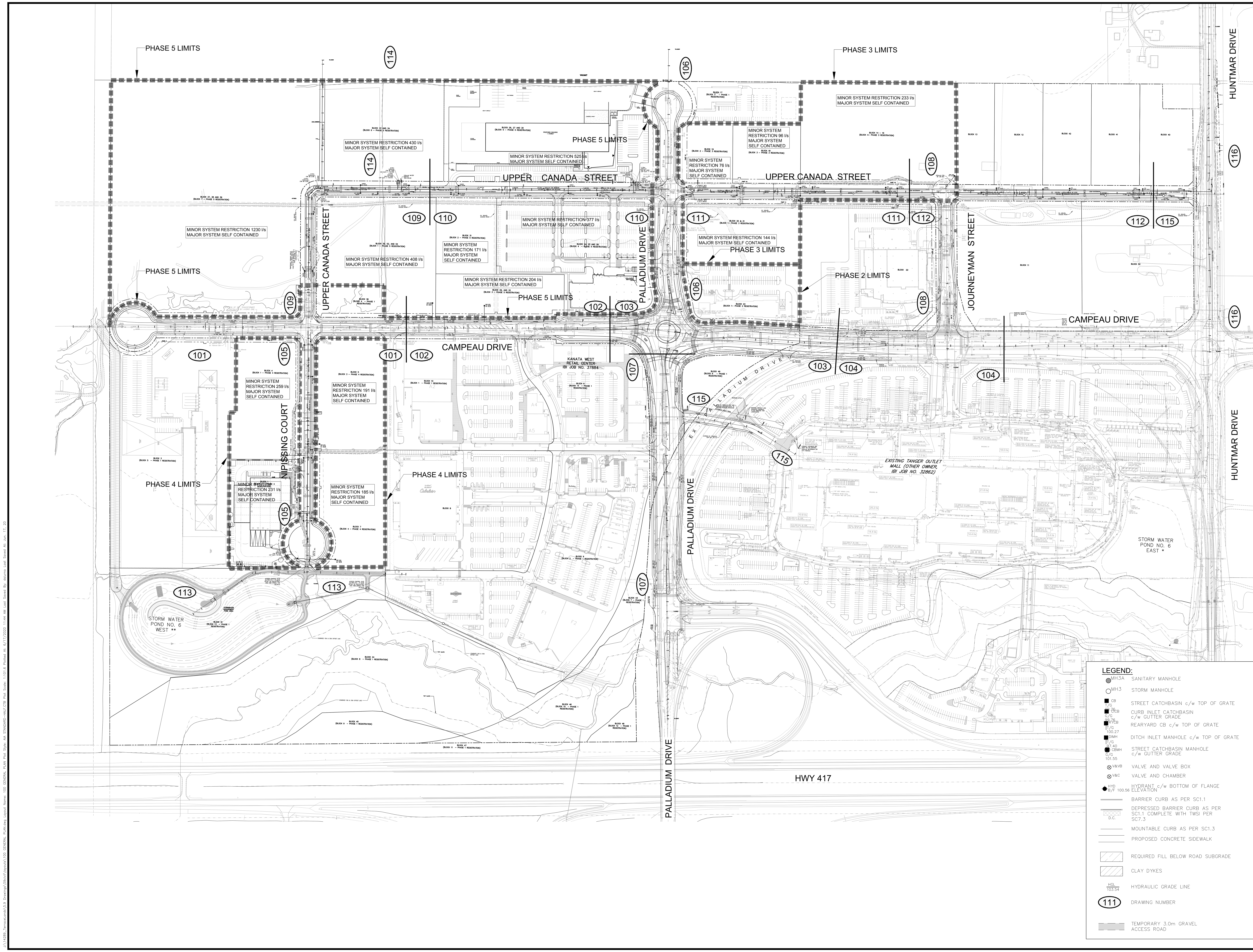
J:\14289_TerraceLands\5.9 Drawings\59civil\current\Phase 5 Figures\14289-Figures-2019-09-11.dwg Sheet Set: ###



Plot Style: AIA STANDARD COLOR-HALF.CTB Plot Scale: 0.042:1 Plotted At: Sep. 11, 19 8:28 AM Printed By: DON SIURNA Last Saved By: DSIURNA Last Saved At: Sep. 11, 19

Scale	Project Title	Drawing Title	Sheet No.
N.T.S.	KANATA WEST BUSINESS PARK	DRAFT PLAN	FIGURE 6

IBI



NOTES:
* REFER TO KANATA WEST BUSINESS PARK STORMWATER MANAGEMENT REPORT AND POND 6 EAST DESIGN REPORT. 337 HUNTMAR DRIVE TANGER OUTLET CENTERS REPORT 32862.5.2.3 REVISION 4 NOVEMBER 2014.

** REFER TO KANATA WEST BUSINESS PARK STORMWATER MANAGEMENT REPORT AND POND 6 WEST DESIGN BRIEF REPORT 14289.5.2.3 SEPTEMBER 2015.

SITE BENCHMARK TO BE OBTAINED FROM LEGAL SURVEYOR STANTEC GEOMATICS

FOR EXTENT OF EXISTING CONSTRUCTION REFER TO DRAWING 14289-100A

No.	REVISIONS	By	Date
31	ADD SERVICE CONNECTIONS FOR BLOCKS 5 AND 6	LME	20:06:17
30	ISSUED FOR CONSTRUCTION PHASE 4 AND 5	LME	20:05:27
29	ISSUED FOR TENDER PHASE 4 AND 5	LME	20:02:12
28	REVISED AS PER PHASE 5 COMMENTS	LME	19:10:25
27	ISSUED FOR PHASE 5 REGISTRATION	LME	19:09:10
26	ISSUED FOR PHASE 3 CONSTRUCTION	LME	19:08:15
25	REVISED AS PER PHASE 4 COMMENTS	LME	19:07:25
24	REVISED AS PER PHASE 4 COMMENTS	LME	19:07:22
23	REVISED AS PER PHASE 4 COMMENTS	LME	19:06:24
22	ISSUED FOR PHASE 4 REGISTRATION	LME	19:04:25
21	REVISED AS PER PHASE 3 COMMENTS	LME	19:03:08
20	REVISED AS PER PHASE 3 COMMENTS	LME	19:02:11
19	ISSUED FOR PHASE 3 TENDER	LME	19:01:11
18	REVISED AS PER PHASE 3 COMMENTS	LME	18:12:14
17	REVISED FOR PHASE 3 REGISTRATION	LME	18:09:14
16	ADDED CITY FILE NUMBER	LME	18:05:30
15	REVISED FOR PHASE 2 REGISTRATION	LME	18:04:20
14	REVISED DMA CHAMBER IN BLK 10 & RELOCATE HYD. BLK 35/36	LME	16:05:05
13	ISSUED AS PER REVISED CARPENTERS UNION	LME	16:04:25
12	REVISE HYDRANT ON UPPER CANADA ST. AT BLOCK 36 P/L	LME	16:04:20
11	REVISE ENTRANCE TO TANGER MALL FROM PALLADIUM DRIVE	LME	16:03:02
10	RE-ISSUED FOR CONSTRUCTION	LME	16:02:03
9	ISSUED FOR CONSTRUCTION	LME	16:01:19
8	ISSUED FOR MYLARS	LME	16:01:12
7	ISSUED TO TAGGART	LME	15:12:14
6	ISSUED TO TAGGART	LME	15:10:16
5	REVISED AS PER CITY COMMENTS	LME	15:10:15
4	REVISE WM, STM, AND SAN ON CAMPEAU AND UPPER CANADA	LME	15:08:19
3	REVISED AS PER NEW SITE PLAN AND CITY COMMENTS	LME	15:06:19
2	REVISED AS PER CITY COMMENTS	LME	15:04:08
1	ISSUED TO CITY FOR APPROVAL	LME	14:11:27

TAGGART REALTY MANAGEMENT

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

Project Title
KANATA WEST BUSINESS PARK PHASE 5

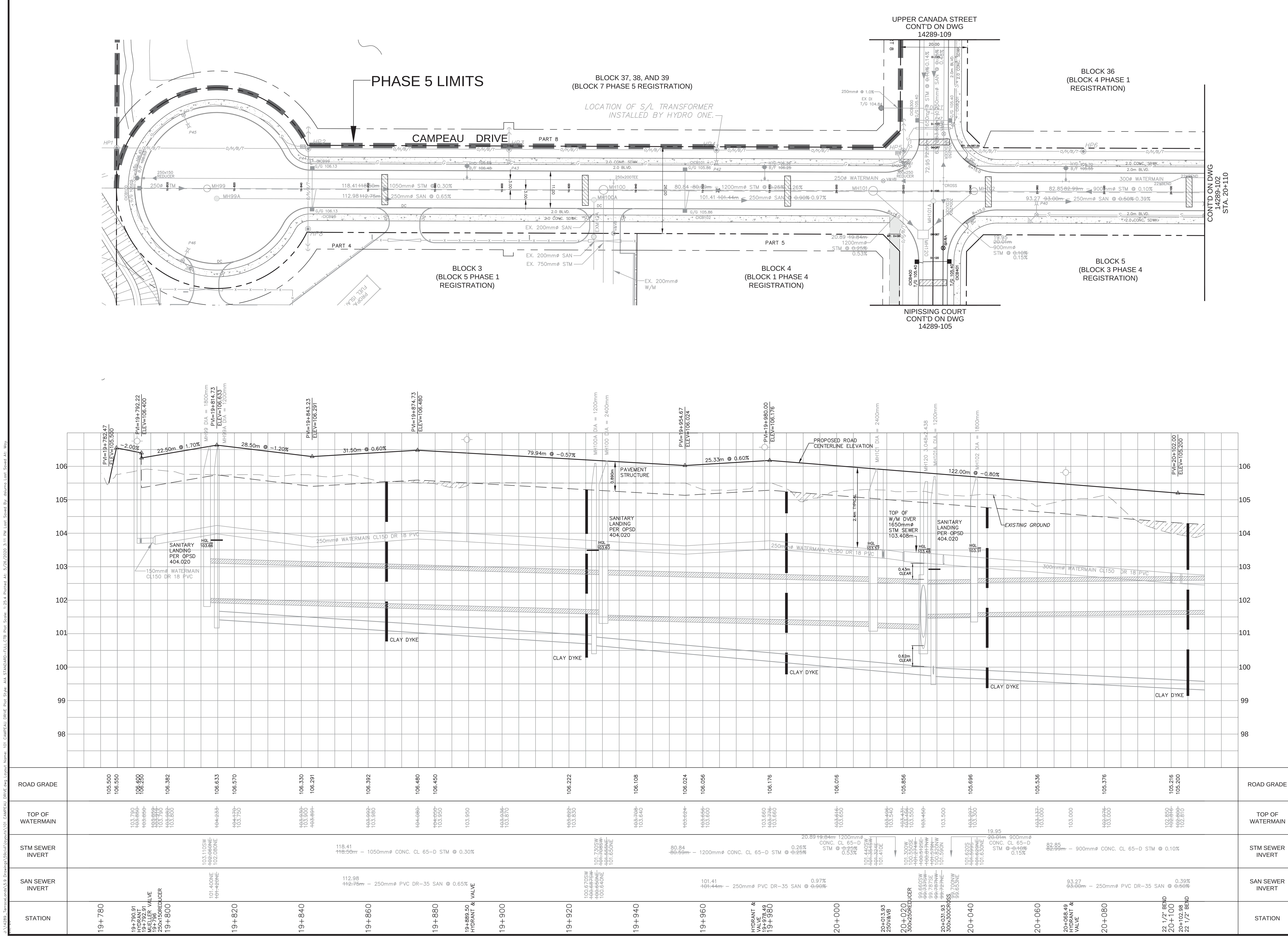
LICENSED PROFESSIONAL ENGINEER
L. M. ERION
13379508
2020/06/17
PROVINCE OF ONTARIO

Drawing Title
GENERAL PLAN OF SERVICES

Scale 1:2000	
Design LME	Date NOV. 2014
Drawn DPS	Checked TRB
Project No. 14289	Drawing No. 100

D07-16-14-0003_P5

#17661



FOR EXTENT OF EXISTING CONSTRUCTION REFER TO DRAWING 14289-100A

LEGEND:

- MH3A — SANITARY MANHOLE
- MH3 — STORM MANHOLE
- CB T/G 99.76 — STREET CATCHBASIN c/w TOP OF GRATE
- CICB G/G 99.76 — CURB INLET CATCHBASIN c/w GUTTER GRADE
- RYCB T/G 100.27 — REARYARD CB c/w TOP OF GRATE
- DIMH T/G 97.40 — DITCH INLET MANHOLE c/w TOP OF GRATE
- CBMH G/G 101.55 — STREET CATCHBASIN MANHOLE c/w GUTTER GRADE
- V&VB — VALVE AND VALVE BOX
- V&C — VALVE AND CHAMBER
- HYD B/F 100.56 — HYDRANT c/w BOTTOM OF FLANGE ELEVATION
- BARRIER CURB AS PER SC1.1
- D.C. — DEPRESSED BARRIER CURB AS PER SC1.1 COMPLETE WITH TWSI PER SC7.3
- MOUNTABLE CURB AS PER SC1.3
- PROPOSED CONCRETE SIDEWALK
- REQUIRED FILL BELOW ROAD SUBGRADE
- CLAY DYKES
- HGL 103.54 — HYDRAULIC GRADE LINE
- TEMPORARY 3.0m GRAVEL ACCESS ROAD

No.	REVISIONS	By	Date
14	ISSUED FOR CONSTRUCTION PHASE 4 AND 5	LME	20:05:27
13	ISSUED FOR TENDER PHASE 4 AND 5	LME	20:02:12
12	ISSUED FOR PHASE 5 REGISTRATION	LME	19:09:10
11	REVISED FOR PHASE 3 REGISTRATION	LME	18:09:14
10	ADDED CITY FILE NUMBER	LME	18:05:30
9	REVISED FOR PHASE 2 REGISTRATION	LME	18:04:20
8	ISSUED FOR CONSTRUCTION	LME	16:01:19
7	ISSUED FOR MYLARS	LME	16:01:12
6	ISSUED TO TAGGART	LME	15:12:14
5	REVISED AS PER CITY COMMENTS	LME	15:10:15
4	REMOVE V&C AT STA 20+102.60	LME	15:08:19
3	REVISED AS PER NEW SITE PLAN AND CITY COMMENTS	LME	15:06:19
2	REVISED AS PER CITY COMMENTS	LME	15:04:08
1	ISSUED TO CITY FOR APPROVAL	LME	14:11:27

TAGGART REALTY MANAGEMENT

IBI GROUP
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Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

Project Title

KANATA WEST BUSINESS PARK PHASE 5

LICENSED PROFESSIONAL ENGINEER L. M. ERION 13379508 2020/05/27 PROVINCE OF ONTARIO

Drawing Title

CAMPEAU DRIVE

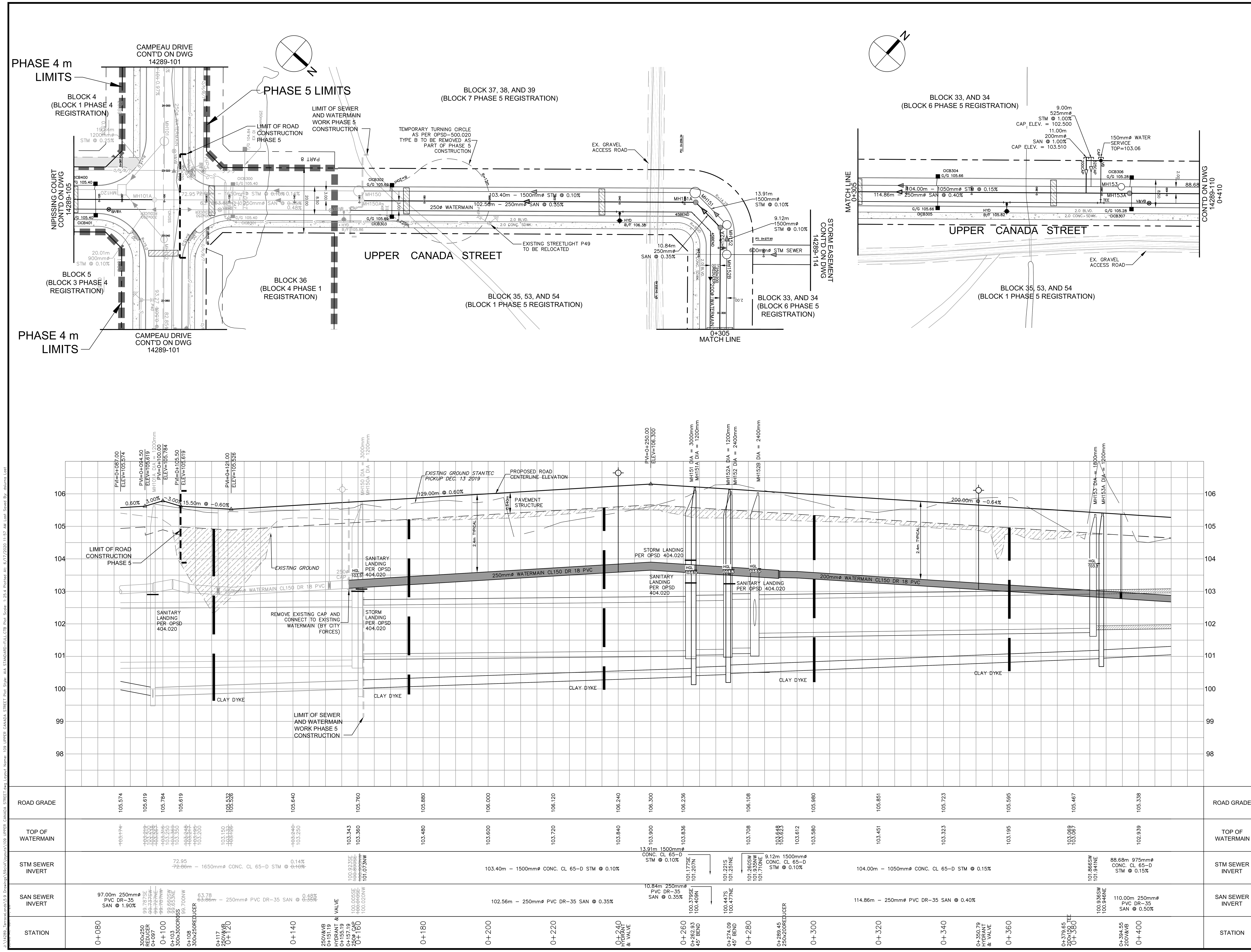
FROM STA 19+780 TO STA 20+110

Scale
HORIZ. SCALE 1:500
VERT. SCALE 1:50

Design	Date
LME	NOV. 2014
Drawn	**Checked**
DPS	TRB
Project No.	**Drawing No.**
14289	101

D07-16-14-0003_P5

#17661



LEGEND:

- MH3A SANITARY MANHOLE
- MH3 STORM MANHOLE
- CB T/G 99.76 STREET CATCHBASIN c/w TOP OF GRATE
- CICB G/G 99.76 CURB INLET CATCHBASIN c/w GUTTER GRADE
- RYCB T/G 100.27 REARYARD CB c/w TOP OF GRATE
- DIMH T/G 97.40 DITCH INLET MANHOLE c/w TOP OF GRATE
- CBMH G/G 101.55 STREET CATCHBASIN MANHOLE c/w GUTTER GRADE
- V&VB VALVE AND VALVE BOX
- V&C VALVE AND CHAMBER
- HYD B/F 100.56 HYDRANT c/w BOTTOM OF FLANGE ELEVATION
- BARRIER CURB AS PER SC1.1
- D.C. DEPRESSED BARRIER CURB AS PER SC1.1 COMPLETE WITH TWSI PER SC7.3
- MOUNTABLE CURB AS PER SC1.3
- PROPOSED CONCRETE SIDEWALK
- REQUIRED FILL BELOW ROAD SUBGRADE
- CLAY DYKES
- HGL 103.54 HYDRAULIC GRADE LINE
- TEMPORARY 3.0m GRAVEL ACCESS ROAD

FOR EXTENT OF EXISTING CONSTRUCTION REFER TO DRAWING 14289-100A

No.	REVISIONS	By	Date
19			
18	ADD SERVICE CONNECTIONS FOR BLOCKS 5 AND 6	LME	20:06:17
17	ISSUED FOR CONSTRUCTION PHASE 4 AND 5	LME	20:05:27
16	ISSUED FOR TENDER PHASE 4 AND 5	LME	20:02:12
15	REVISED AS PER PHASE 5 COMMENTS	LME	19:10:25
14	ISSUED FOR PHASE 5 REGISTRATION	LME	19:09:10
13	REVISED FOR PHASE 3 REGISTRATION	LME	18:09:14
12	ADDED CITY FILE NUMBER	LME	18:05:30
11	REVISED FOR PHASE 2 REGISTRATION	LME	18:04:20
10	RELOCATE V&VB, HYDRANT AND CAP. AT BLOCK 35/36	LME	16:05:05
9	REVISED LIMIT BLK 36, RELOCATE V&VB, HYDRANT AND CAP.	LME	16:04:20
8	ISSUED FOR CONSTRUCTION	LME	16:01:19
7	ISSUED FOR MYLARS	LME	16:01:12
6	ISSUED TO TAGGART	LME	15:12:14
5	REVISED AS PER CITY COMMENTS	LME	15:10:15
4	REVISE PHASE 1 LIMITS	LME	15:08:19
3	REVISED AS PER NEW SITE PLAN AND CITY COMMENTS	LME	15:06:19
2	REVISED AS PER CITY COMMENTS	LME	15:04:08
1	ISSUED TO CITY FOR APPROVAL	LME	14:11:27

TAGGART REALTY MANAGEMENT

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Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

Project Title

KANATA WEST BUSINESS PARK PHASE 5

LICENSED PROFESSIONAL ENGINEER
L. M. ERION
13379508
2020/06/17
PROVINCE OF ONTARIO

Drawing Title

UPPER CANADA STREET

FROM CAMPEAU DRIVE to STA. 0+410

Scale
HORIZ. SCALE 1:500
VERT. SCALE 1:50

Design	Date
LME	NOV. 2014
Drawn: DPS	Checked: TRB
Project No.: 14289	Drawing No.: 109

D07-16-14-0003_P5

#17661

Appendix B

Site Plan
(prepared by McRobie Architects)

Servicing Plans
(DWG. 20027-S1, S2)

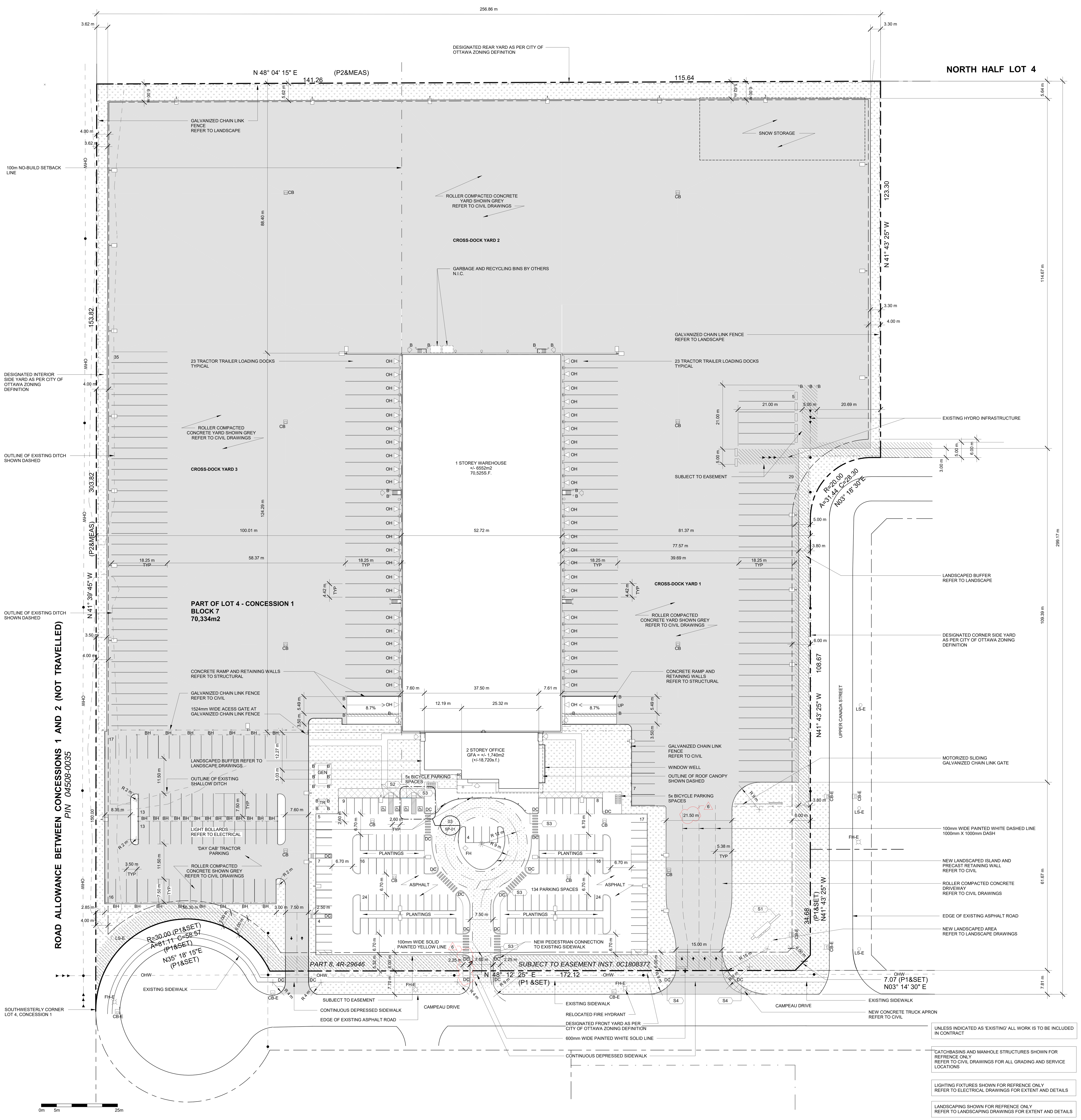
Grading Plans
(DWG. 20027-GR1, GR2, GR3)

Erosion and Sediment Control Plan
(DWG. 20027-ESC1)

Notes & Details
(DWG. 20027-N1)

Existing Conditions and Removals Plan
(DWG. 20027-R1)

MCROBIE
ARCHITECTS + INTERIOR DESIGNERS
OTTAWA, ONTARIO



UNLESS INDICATED AS 'EXISTING' ALL WORK IS TO BE INCLUDED IN CONTRACT

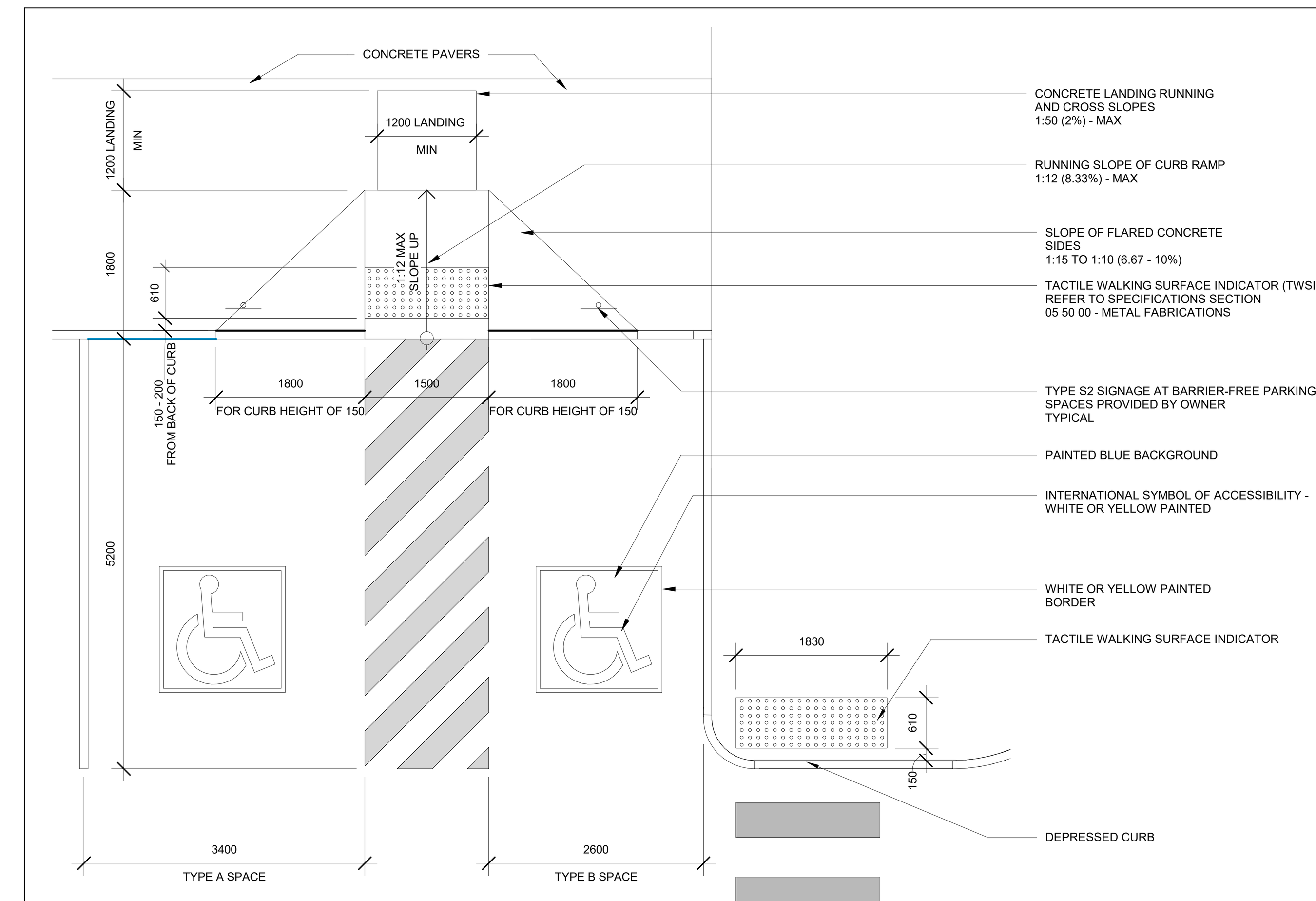
CATCHBASINS AND MANHOLE STRUCTURES SHOWN FOR REFRENCE ONLY
REFER TO CIVIL DRAWINGS FOR ALL GRADING AND SERVICE LOCATIONS

LIGHTING FIXTURES SHOWN FOR REFRENCE ONLY
REFER TO ELECTRICAL DRAWINGS FOR EXTENT AND DETAILS

LANDSCAPING SHOWN FOR REFRENCE ONLY
REFER TO LANDSCAPING DRAWINGS FOR EXTENT AND DETAILS

05 SP-01 SITE PLAN
Scale: 1 : 500

04 SP-01 RESERVED
Scale: N/A



03 SP-01 TYPICAL DETAIL - DEPRESSED CURB AND TWSI AT BARRIER-FREE PARKING STALL
Scale: 1 : 50

	REQUIRED	PROVIDED
MINIMUM LOT AREA	750m2	70,334m2
MINIMUM LOT WIDTH	NO MINIMUM	297.6m
MINIMUM LOT COVERAGE	55%	10.3%
SETBACKS	FRONT YARD: 6m	FRONT YARD: 59.83m
	INTERIOR SIDE YARD: 4m	INTERIOR SIDE YARD: 100m
	CORNER SIDE YARD: 6m	CORNER SIDE YARD: 81.37m
	REAR YARD: 6m	REAR YARD: 88.4m
MAXIMUM FLOOR SPACE INDEX	2.0	0.103
MAXIMUM BUILDING HEIGHT	22m	12.38m
MINIMUM WIDTH OF LANDSCAPE	ABUTTING A STREET: 3m ALL OTHER CASES: NO MINIMUM	ABUTTING A STREET: 3m (CAMPEAU), 5.32m (UPPER CANADA) ALL OTHER CASES: 1.52m
ACCESSORY SALES AND DISPLAY AREA	MAXIMUM 25% OF THE GROSS FLOOR AREA OF THE PROPOSED BUILDING	N/A
MINIMUM PARKING WAREHOUSE: 0.8/100m2 OF GFA	WAREHOUSE: 58 SPACES	134 SPACES
BARRIER FREE PARKING TYPE A: MINIMUM 3.4m WIDE TYPE B: MINIMUM 2.6m WIDE MINIMUM ACCESS AISLE: 1.5m	4 SPACES (2 TYPE A + 2 TYPE B)	4 SPACES (2 TYPE A + 2 TYPE B)
MINIMUM BICYCLE PARKING WAREHOUSE: 1/1000m2 OF GFA	7 SPACES	10 SPACES
LOADING SPACES	2 SPACES	48 SPACES

02 SP-01 ZONING TABLE
Scale: N/A

SITE PLAN INFORMATION

UNDERLYING TOPOGRAPHICAL INFORMATION IS AS PER A PLAN PREPARED BY STANTEC GEOMATICS LTD, ONTARIO LAND SURVEYORS DATED DECEMBER 20TH, 2019 OF PART OF LOT 4 CONCESSION 1, GEOGRAPHIC TOWNSHIP OF HUNTLEY.

ABBREVIATIONS

AODA : ACCESSIBILITY FOR ONTARIANS WITH DISABILITIES
TWSI : TACTILE WALKING SURFACE INDICATOR
N.I.C. : NOT IN CONTRACT

SIGNAGE

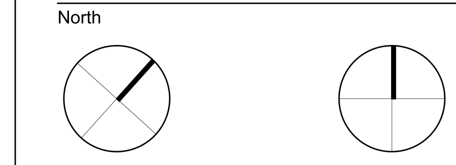
S1 NEW ILLUMINATED MONUMENT SIGN
S2 AODA COMPLIANT VERTICAL PARKING SIGN TYPICAL AT EACH AODA PARKING SPACE
S3 FIRE ROUTE SIGNAGE
S4 'AUTHORIZED USE ONLY' OVERHEAD SIGN

LINE OF SETBACK AS PER ZONING BY-LAW
PROPERTY LINE
SUBJECT TO EASEMENT
OHW OVERHEAD WIRES
EXISTING UTILITY POLE
NEW WALL MOUNTED LIGHT FIXTURE REFER TO ELECTRICAL
NEW EXTERIOR LIGHT STANDARD REFER TO ELECTRICAL
GEN GENERATOR
TR TRANSFORMER
BH POST-MOUNTED BLOCK HEATER OUTLETS - DUAL RECEPTACLE
LS-E EXISTING LIGHT STANDARD
NEW SITE LIGHTING FIXTURE REFER TO ELECTRICAL
PRECAST CONCRETE PAVERS
FIRE ROUTE
SOD, REFER TO LANDSCAPE PLAN
NEW SHRUBS, REFER TO LANDSCAPE PLAN
NEW TREE, REFER TO LANDSCAPE PLAN

2.4M HIGH GALVANIZED CHAIN LINK FENCE WITH 3 ROWS OF BARB WIRE
GALVANIZED TRAFFIC BARRIER GUARDRAIL ON STEEL POSTS
BUILDING ENTRANCE
B 203mm DIAMETER CONCRETE-FILLED BOLLARD
OH OVERHEAD DOOR
SC SIAMESE FIRE DEPARTMENT CONNECTION
FH NEW FIRE HYDRANT
FH-E EXISTING FIRE HYDRANT
CB NEW CATCH BASIN
CB-E EXISTING CATCH BASIN
BARRIER FREE PARKING STALL
NEW HORIZONTAL BICYCLE PARKING
CROSSWALK PAINT MARKINGS
610mm DEEP TACTILE WALKING SURFACE INDICATOR (TWSI)
-PROFILE TO MATCH EXTENT OF DEPRESSED CURB
-TYPICAL ALL DEPRESSED CURBS UNLESS OTHERWISE INDICATED
6
DC DEPRESSED CURB

01 SP-01 SITE PLAN NOTES, LEGEND, AND ABBREVIATIONS
Scale: N/A

North



Revisions

Revision Number	Description	Date
1	ISSUED FOR SITE PLAN APPLICATION	2020-12-16
2	ISSUED FOR COORDINATION	2021-03-08
3	ISSUED FOR COORDINATION	2021-03-19
4	ISSUED FOR COORDINATION	2021-03-23
5	ISSUED FOR PERMIT	2021-04-07
6	ISSUED IN RESPONSE TO CITY COMMENTS	2021-

Project

MARITIME-ONTARIO OTTAWA FACILITY

8800 CAMPEAU DRIVE.
OTTAWA, ON

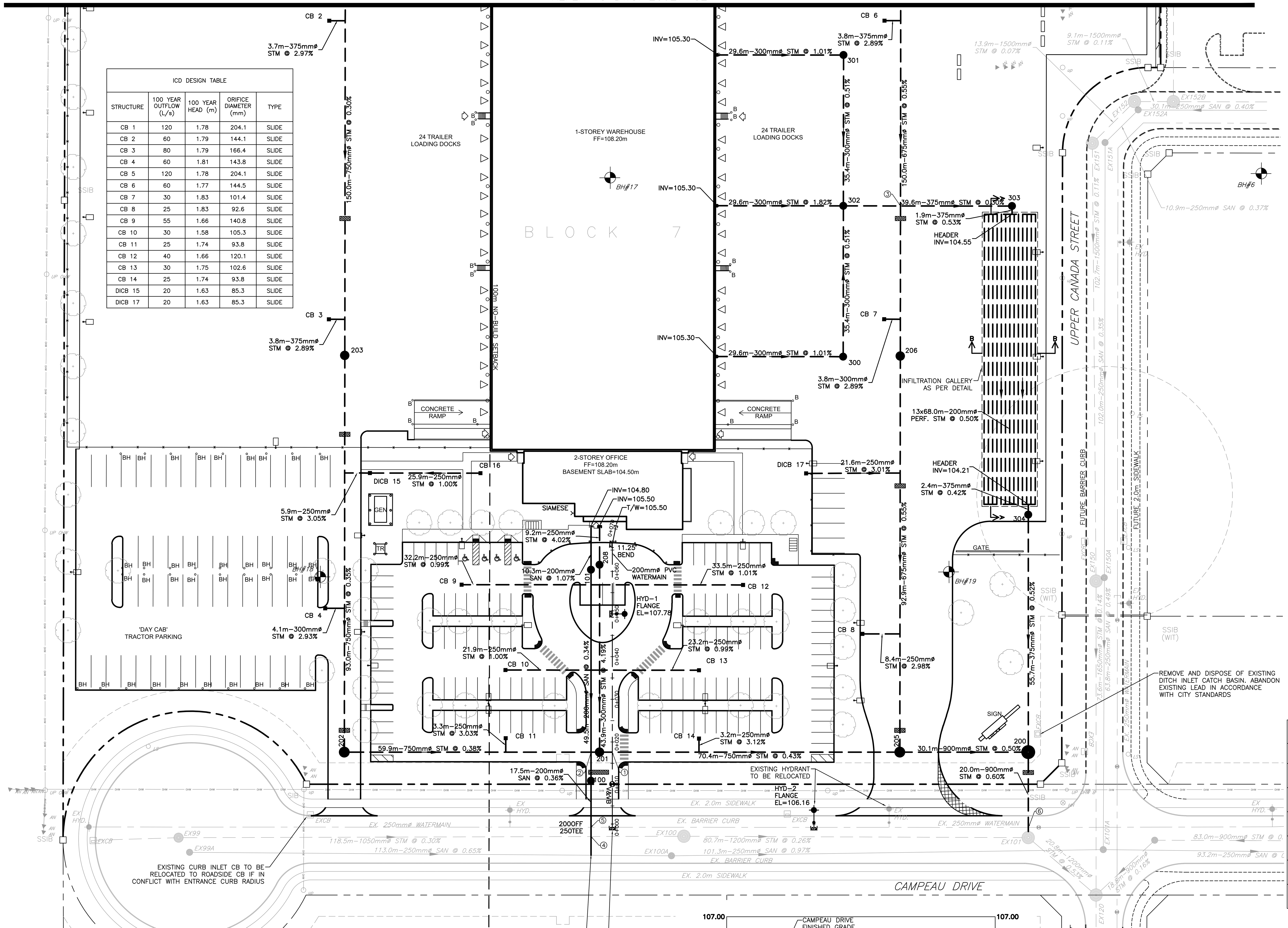
Drawing

SITE PLAN

Scale: As indicated
Stamp
Drawn: RH
Checked: DM
Project No. 19-247
Date: 2020/07/21
Drawing No. SP-01

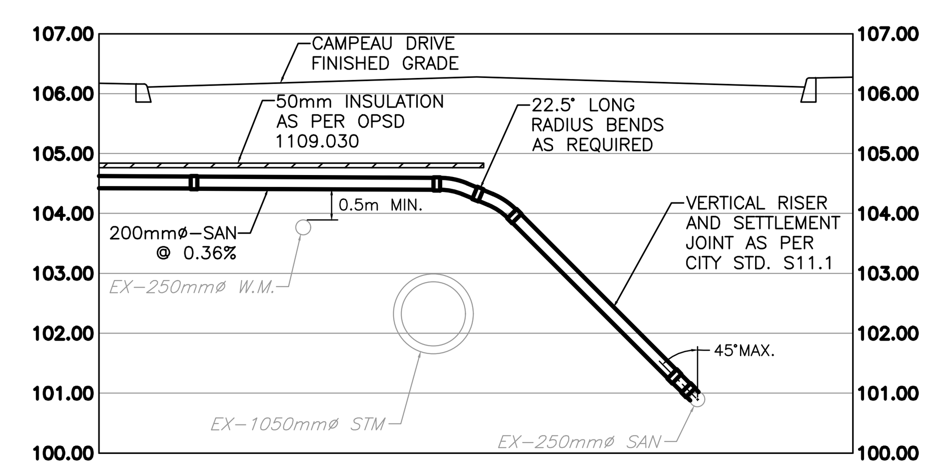
2021-05-25 5:22:00 PM

MATCHLINE
REFER TO DWG. 20027-S2



ICD DESIGN TABLE				
STRUCTURE	100 YEAR OUTFLOW (L/s)	100 YEAR HEAD (m)	ORIFICE DIAMETER (mm)	TYPE
CB 1	120	1.78	204.1	SLIDE
CB 2	60	1.79	144.1	SLIDE
CB 3	80	1.79	166.4	SLIDE
CB 4	60	1.81	143.8	SLIDE
CB 5	120	1.78	204.1	SLIDE
CB 6	60	1.77	144.5	SLIDE
CB 7	30	1.83	101.4	SLIDE
CB 8	25	1.83	92.6	SLIDE
CB 9	55	1.66	140.8	SLIDE
CB 10	30	1.58	105.3	SLIDE
CB 11	25	1.74	93.8	SLIDE
CB 12	40	1.66	120.1	SLIDE
CB 13	30	1.75	102.6	SLIDE
CB 14	25	1.74	93.8	SLIDE
DICB 15	20	1.63	85.3	SLIDE
DICB 17	20	1.63	85.3	SLIDE

WATERMAIN GRADE TABLE (200mmø)			
STATION	FINISHED GRADE (m)	TOP OF WATER (m)	DESCRIPTION
0+000	106.17	103.86	200mm OFF 250mm TEE
0+010.1	106.25	103.85	VALVE & VALVE BOX
0+020	106.36	103.96	TOP OF WATERMAIN
0+030	106.63	104.23	TOP OF WATERMAIN
0+040	107.08	104.68	TOP OF WATERMAIN
0+050	107.77	105.37	152mm OFF 250mm HYDRANT TEE
0+060	107.78	105.38	TOP OF WATERMAIN
0+066.3	107.89	105.49	11.25° BEND
0+070.8	108.08	105.50	CAP



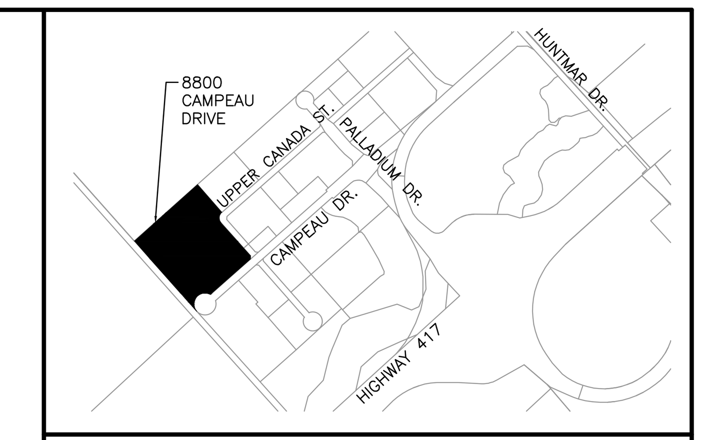
SANITARY CONNECTION DETAIL (TYP.)
N.T.S.

STORM MANHOLE TABLE				
STRUCTURE	STRUCTURE SIZE	T/G ELEV	INVERT	GRATE
EX101	2400mmø	105.88	SW=101.44 E=101.41 NW=101.86	S24.1
200	2400mmø	105.88	NW=103.82 SW=102.04 SE=101.98	S24.1
201	1500mmø	106.37	SW=102.67 NW=103.24 NE=102.64	S24.1
202	1800mmø	106.43	NW=102.96 NE=102.90	S24.1
203	1500mmø	106.35	NW=103.32 SE=103.29	S24.1
204	1500mmø	106.46	SE=103.76	S24.1
205	1800mmø	106.23	NW=102.42 SW=102.34 NE=102.19	S24.1
206	1500mmø	106.33	NW=102.96 SE=102.93	S24.1
207	1500mmø	106.46	SE=103.78	S24.1
208	1200mmø	106.66	NW=105.13 SE=105.08	S24.1
300	1200mmø	106.44	NW=104.94 SW=105.00	S24.1
301	1200mmø	106.47	SE=104.94 SW=105.00	S24.1
302	1200mmø	106.55	SE=104.76 NE=104.68 NW=104.76 SW=104.76	S24.1
303	1200mmø	106.64	SW=104.56 SE=104.50	S24.1
304	1200mmø	106.48	NW=104.14 SE=104.11	S24.1

SANITARY MANHOLE TABLE				
STRUCTURE	STRUCTURE SIZE	T/G ELEV	INVERT	GRATE
100	1200mmø	106.28	NW=104.49 SE=104.46	S24
101	1200mmø	108.28	SE=104.66 NW=104.69	S24

CATCH BASIN TABLE				
STRUCTURE	STRUCTURE SIZE	T/G ELEV	INVERT	GRATE
CB 1	600x600mm	106.42	NE=104.74	S19
CB 2	600x600mm	106.32	NE=104.64	S19
CB 3	600x600mm	106.22	NE=104.54	S19
CB 4	600x600mm	106.15	NE=104.47	S19
CB 5	600x600mm	106.42	NE=104.74	S19
CB 6	600x600mm	106.32	NE=104.64	S19
CB 7	600x600mm	106.22	NE=104.54	S19
CB 8	600x600mm	105.95	NE=104.27	S19
CB 9	600x600mm	107.10	NE=105.42	S19
CB 10	600x600mm	106.64	NE=105.13	S19
CB 11	600x600mm	106.06	SE=104.38	S19
CB 12	600x600mm	107.10	SW=105.42	S19
CB 13	600x600mm	106.64	SW=104.96	S19
CB 14	600x600mm	106.06	SE=104.38	S19
CB 16	600x600mm	106.61	SW=105.41	S19
DICB 15	600x600mm	106.42	SW=104.67 NE=105.15	403.010
DICB 17	600x600mm	106.50	NE=104.75	403.010

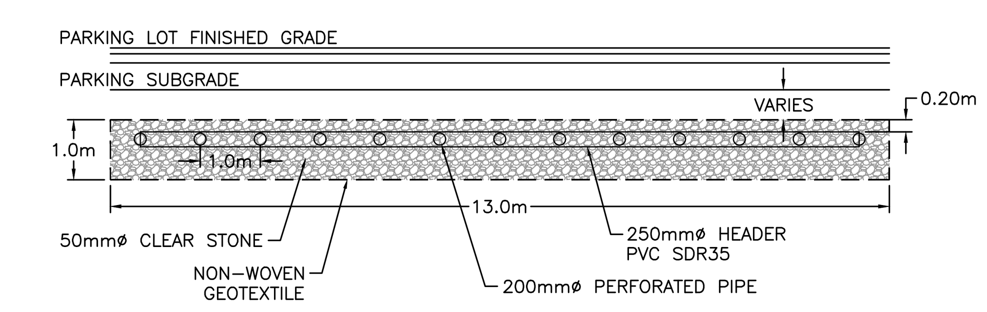
SEWER CROSSING TABLE		
CROSSING No.	INVERTS (m)	SEPARATION (m)
1	WATER INV.=103.77 STM OBV.=103.50	0.27
2	SAN INV.=104.51 STM OBV.=103.55	0.96
3	STM INV.=104.64 STM OBV.=103.94	0.70
4	SAN INV.=104.41 EX STM OBV.=103.00	1.41
5	SAN INV.=104.42 EX WATER OBV.=103.88	0.54
6	EX WATER INV.=103.28 STM OBV.=102.90	0.38



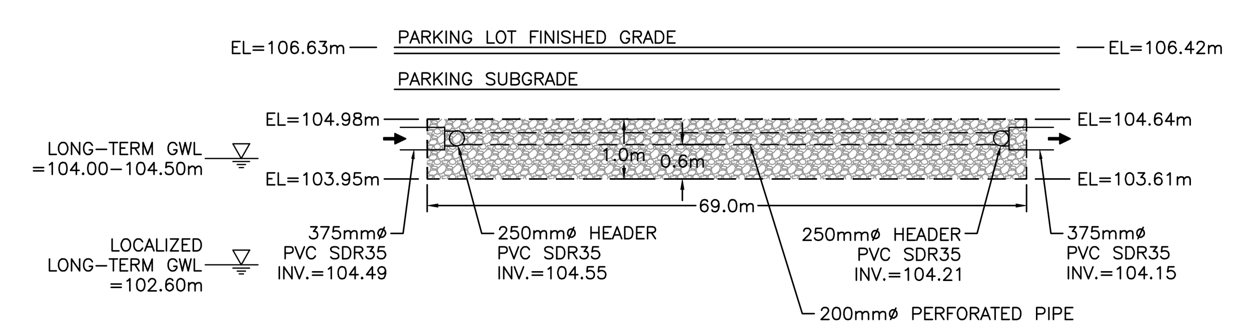
KEY PLAN

LEGEND

- PROPERTY BOUNDARY
- CATCH BASIN
- STORM SEWER & MANHOLE
- SANITARY SEWER & MANHOLE
- WATERMAIN
- HYDRANT
- VALVE & VALVE BOX
- SIAMESE CONNECTION
- EXISTING CATCH BASIN
- EXISTING STORM SEWER & MANHOLE
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING WATERMAIN
- EXISTING HYDRANT
- EXISTING VALVE & VALVE BOX
- 100m NO-BUILD SETBACK
- CLAY SEAL
- BOREHOLE
- CROSSING NUMBER
- BUILDING ENTRANCE (REFER TO SITE PLAN)
- BOLLARD (REFER TO SITE PLAN)
- BLOCK HEATER POST (REFER TO SITE PLAN)
- LIGHT STANDARD (REFER TO SITE PLAN)
- JERSEY BARRIER (REFER TO SITE PLAN)
- TWSI (REFER TO SITE PLAN)
- PROPOSED TREE (REFER TO LANDSCAPE PLAN)



INFILTRATION GALLERY SECTION B–B
N.T.S.



INFILTRATION GALLERY SECTION A–A
N.T.S.

NOT FOR CONSTRUCTION

NOTES

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NO.	REVISION DESCRIPTION	DATE	BY
3	REVISED PER COMMENTS	28/05/21	SMC
2	ISSUED FOR PROGRESS REVIEW	22/03/21	SMC
1	ISSUED FOR SITE PLAN APPLICATION	02/12/20	SMC

SCALE
0 5m 10m 20m
HORIZONTAL 1:500

LICENSED PROFESSIONAL ENGINEER
S. M. CZARABYNSKI
PROVINCE OF ONTARIO
May 28 2021

Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SMC
DRAWN	BLM
CHECKED	SMC
APPROVED	SMC

MARITIME-ONTARIO FREIGHT LINES LIMITED

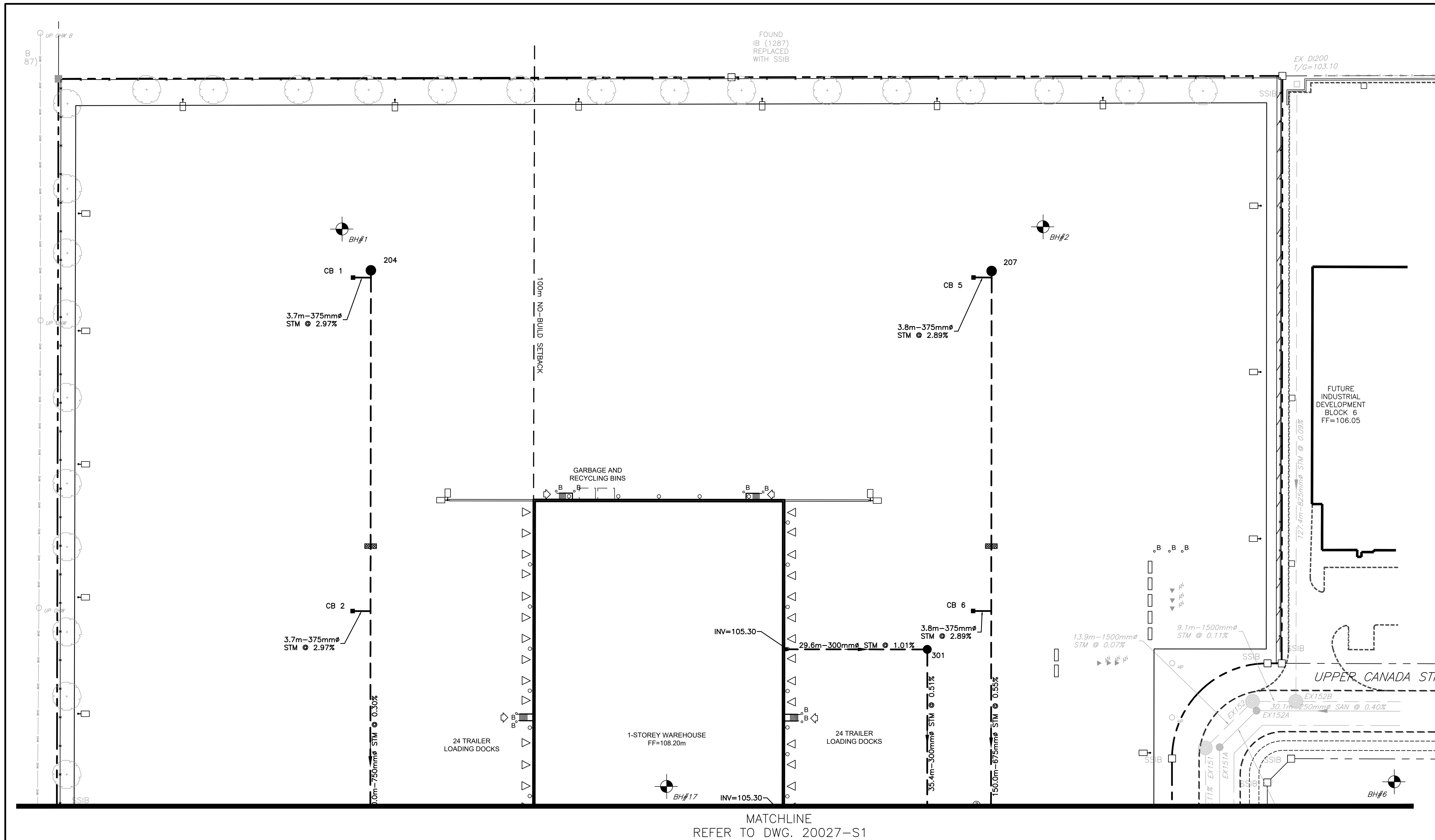
KANATA WEST BUSINESS PARK
8800 CAMPEAU DRIVE, OTTAWA, ON

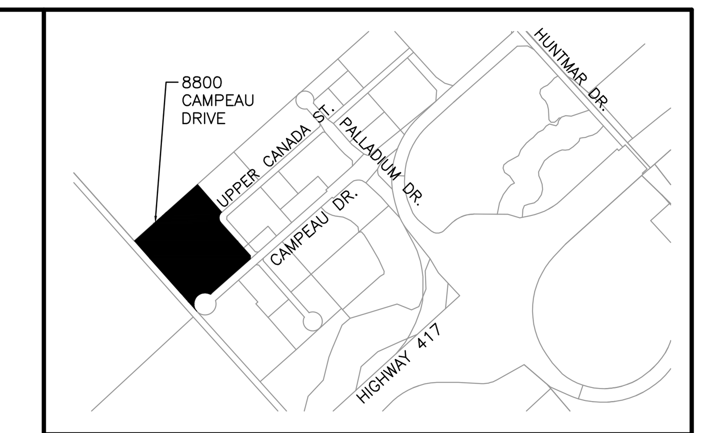
SERVICING PLAN

PROJECT No.	20027
SURVEY	STANTEC
DATED	MAY 2021
DWG. No.	20027-S1

D07-12-20-0189

#18376





KEY PLAN

STORM MANHOLE TABLE				
STRUCTURE	STRUCTURE SIZE	T/G ELEV	INVERT	GRATE
EX101	2400mmø	105.88	SW=101.44 E=101.41 NW=101.86	S24.1
200	2400mmø	105.88	NW=103.82 SW=102.04 SE=101.98	S24.1
201	1500mmø	106.37	SW=102.67 NW=103.24 NE=102.64	S24.1
202	1800mmø	106.43	NW=102.96 NE=102.90	S24.1
203	1500mmø	106.35	NW=103.32 SE=103.29	S24.1
204	1500mmø	106.46	SE=103.76	S24.1
205	1800mmø	106.23	NW=102.42 SW=102.34 NE=102.19	S24.1
206	1500mmø	106.33	NW=102.96 SE=102.93	S24.1
207	1500mmø	106.46	SE=103.78	S24.1
208	1200mmø	106.66	NW=105.13 SE=105.08	S24.1
300	1200mmø	106.44	NW=104.94 SW=105.00	S24.1
301	1200mmø	106.47	SE=104.94 SW=105.00	S24.1
302	1200mmø	106.55	SE=104.76 NE=104.68 NW=104.76 SW=104.76	S24.1
303	1200mmø	106.64	SW=104.56 SE=104.50	S24.1
304	1200mmø	106.48	NW=104.14 SE=104.11	S24.1

SANITARY MANHOLE TABLE				
STRUCTURE	STRUCTURE SIZE	T/G ELEV	INVERT	GRATE
100	1200mmø	106.28	NW=104.49 SE=104.46	S24
101	1200mmø	108.28	SE=104.66 NW=104.69	S24

CATCH BASIN TABLE				
STRUCTURE	STRUCTURE SIZE	T/G ELEV	INVERT	GRATE
CB 1	600x600mm	106.42	NE=104.74	S19
CB 2	600x600mm	106.32	NE=104.64	S19
CB 3	600x600mm	106.22	NE=104.54	S19
CB 4	600x600mm	106.15	NE=104.47	S19
CB 5	600x600mm	106.42	NE=104.74	S19
CB 6	600x600mm	106.32	NE=104.64	S19
CB 7	600x600mm	106.22	NE=104.54	S19
CB 8	600x600mm	105.95	NE=104.27	S19
CB 9	600x600mm	107.10	NE=105.42	S19
CB 10	600x600mm	106.64	NE=105.13	S19
CB 11	600x600mm	106.06	SE=104.38	S19
CB 12	600x600mm	107.10	SW=105.42	S19
CB 13	600x600mm	106.64	SW=104.96	S19
CB 14	600x600mm	106.06	SE=104.38	S19
CB 16	600x600mm	106.61	SW=105.41	S19
DICB 15	600x600mm	106.42	SW=104.67 NE=105.15	403.010
DICB 17	600x600mm	106.50	NE=104.75	403.010

ICD DESIGN TABLE				
STRUCTURE	100 YEAR OUTFLOW (L/s)	100 YEAR HEAD (m)	ORIFICE DIAMETER (mm)	TYPE
CB 1	120	1.78	204.1	SLIDE
CB 2	60	1.79	144.1	SLIDE
CB 3	80	1.79	166.4	SLIDE
CB 4	60	1.81	143.8	SLIDE
CB 5	120	1.78	204.1	SLIDE
CB 6	60	1.77	144.5	SLIDE
CB 7	30	1.83	101.4	SLIDE
CB 8	25	1.83	92.6	SLIDE
CB 9	55	1.66	140.8	SLIDE
CB 10	30	1.58	105.3	SLIDE
CB 11	25	1.74	93.8	SLIDE
CB 12	40	1.66	120.1	SLIDE
CB 13	30	1.75	102.6	SLIDE
CB 14	25	1.74	93.8	SLIDE
DICB 15	20	1.63	85.3	SLIDE
DICB 17	20	1.63	85.3	SLIDE

LEGEND

PROPERTY BOUNDARY
CATCH BASIN
STORM SEWER & MANHOLE
SANITARY SEWER & MANHOLE
WATERMAIN
HYDRANT
VALVE & VALVE BOX
SIAMESE CONNECTION
EXISTING CATCH BASIN
EXISTING STORM SEWER & MANHOLE
EXISTING SANITARY SEWER & MANHOLE
EXISTING WATERMAIN
EXISTING HYDRANT
EXISTING VALVE & VALVE BOX
100m NO-BUILD SETBACK
CLAY SEAL
BOREHOLE
CROSSING NUMBER
BUILDING ENTRANCE (REFER TO SITE PLAN)
BOLLARD (REFER TO SITE PLAN)
BLOCK HEATER POST (REFER TO SITE PLAN)
LIGHT STANDARD (REFER TO SITE PLAN)
JERSEY BARRIER (REFER TO SITE PLAN)
TWSI (REFER TO SITE PLAN)
PROPOSED TREE (REFER TO LANDSCAPE PLAN)

NOT FOR CONSTRUCTION

NOTES

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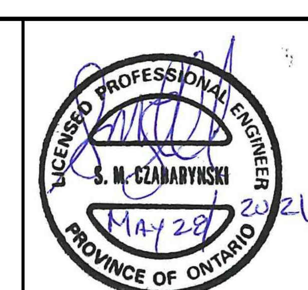
SCALE

0 5m 10m 20m

HORIZONTAL 1:500



Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN BLM
CHECKED SMC
DRAWN BLM
CHECKED SMC
APPROVED SMC

MARITIME-ONTARIO FREIGHT LINES LIMITED

KANATA WEST BUSINESS PARK
8800 CAMPEAU DRIVE, OTTAWA, ON

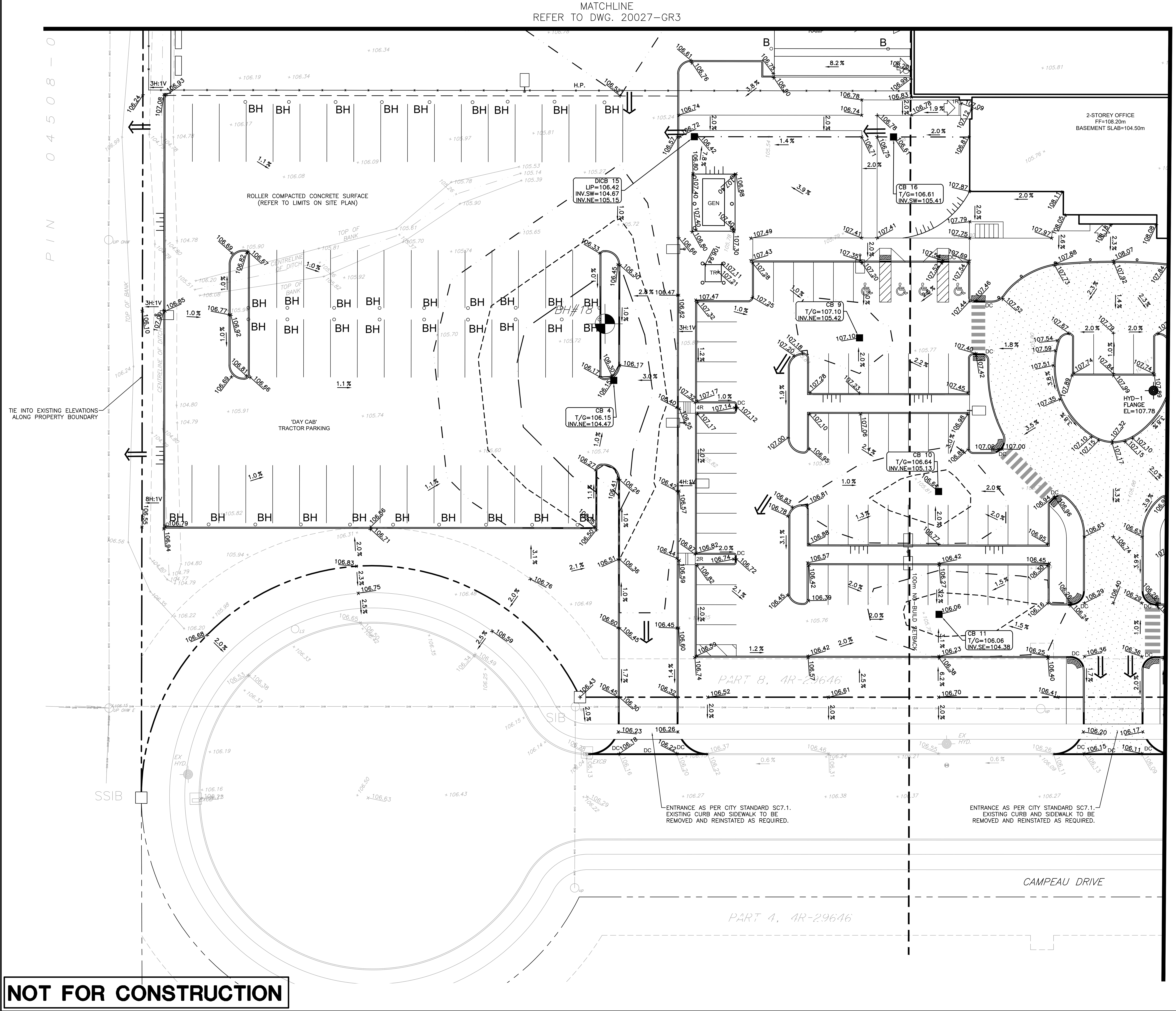
SERVICING PLAN

PROJECT No. 20027
SURVEY STANTEC
DATED MAY 2021
DWG. No: 20027-S2

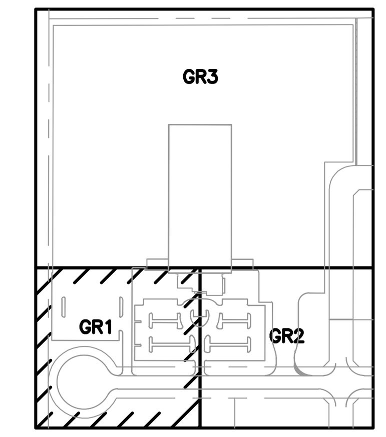
D07-12-20-0189

#18376

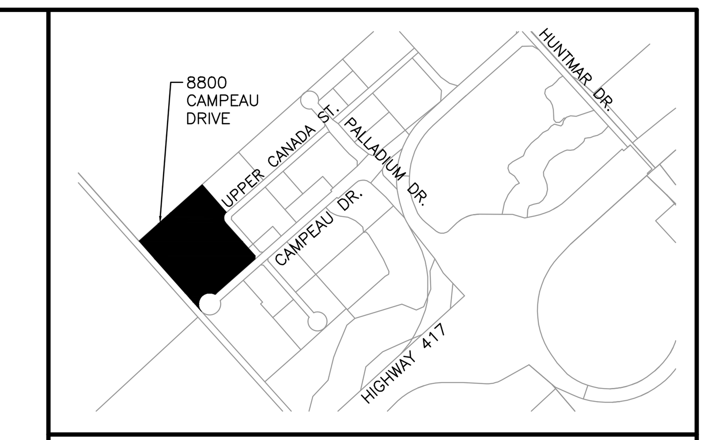
MATCHLINE
REFER TO DWG. 20027-GR3



MATCHLINE
REFER TO DWG. 20027-GR2



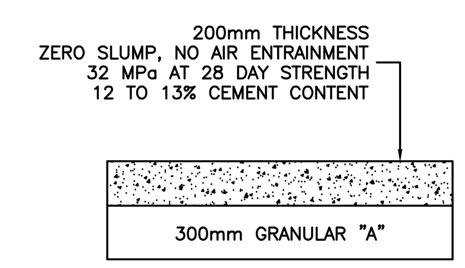
DRAWING KEY PLAN



KEY PLAN

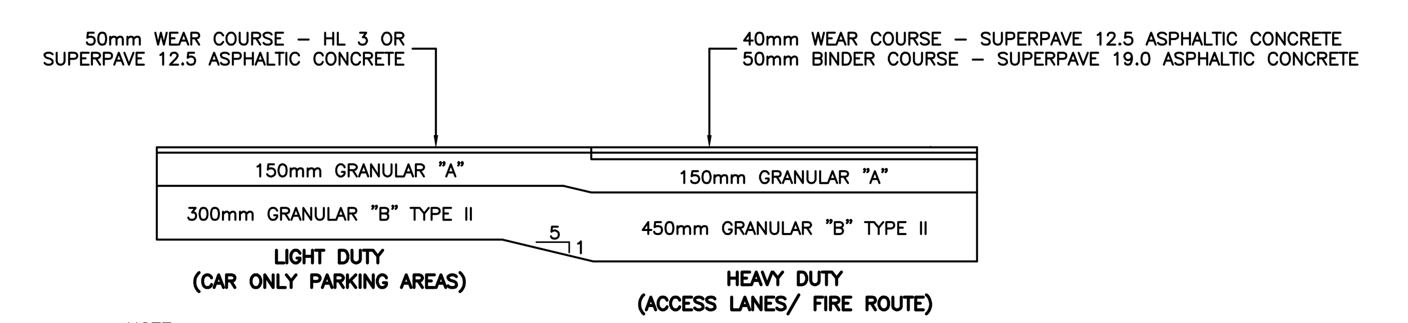
LEGEND

- 106.00 — EXISTING ELEVATION
- 107.00 — PROPOSED GRADE
- 2.0% — PROPOSED DRAINAGE SLOPE AND DIRECTION
- 107.00 — IBI GROUP DESIGN GRADE
- PROPERTY BOUNDARY
- CATCH BASIN
- EXISTING CATCH BASIN
- EXISTING HYDRANT
- SWALE
- H.P. — HIGH POINT
- DC — DEPRESSED CURB
- TERRACING (3H:1V MAX.)
- 100m NO-BUILD SETBACK
- 2 YEAR PONDING LIMIT
- 5 YEAR PONDING LIMIT
- 100 YEAR PONDING LIMIT
- BOREHOLE
- BUILDING ENTRANCE (REFER TO SITE PLAN)
- B — BOLLARD (REFER TO SITE PLAN)
- BH — BLOCK HEATER POST (REFER TO SITE PLAN)
- LIGHT STANDARD (REFER TO SITE PLAN)
- TWSI (REFER TO SITE PLAN)
- MAJOR OVERLAND FLOW ROUTE
- HEAVY DUTY ASPHALT LIMITS



NOTE:
1. REFER TO GEOTECHNICAL INVESTIGATION PREPARED BY PATERSON GROUP, REPORT PG5618-1, DATED APRIL 9, 2021.
2. REFER TO LIMITS OF INSTALLATION ON SITE PLAN.

ROLLER COMPACTED CONCRETE PAVEMENT STRUCTURE DETAIL
N.T.S.



NOTE:
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2. REFER TO LIMITS OF INSTALLATION ON SITE PLAN.

ASPHALT PAVEMENT STRUCTURE DETAIL
N.T.S.

SURFACE STORAGE AREAS									
LOCATION	2 YEAR			5 YEAR			100 YEAR		
	STORAGE VOLUME (m^3)	PONDING DEPTH (m)	PONDING ELEVATION (m)	STORAGE VOLUME (m^3)	PONDING DEPTH (m)	PONDING ELEVATION (m)	STORAGE VOLUME (m^3)	PONDING DEPTH (m)	PONDING ELEVATION (m)
CB 4	15.5	0.15	106.30	30.3	30.3	0.19	109.4	0.28	106.43
CB 9	N/A	N/A	N/A	N/A	N/A	N/A	3.7	0.10	107.20
CB 10	N/A	N/A	N/A	1.8	0.09	106.73	16.6	0.19	106.83
DICB 15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CB 16	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

NOT FOR CONSTRUCTION

NOTES
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SCALE
HORIZONTAL 1:250

LICENSED PROFESSIONAL ENGINEER
S. M. CZARABYNSKI
PROVINCE OF ONTARIO
May 28 2021

Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SMC
DRAWN	BLM
CHECKED	SMC
APPROVED	SMC

MARITIME-ONTARIO FREIGHT LINES LIMITED

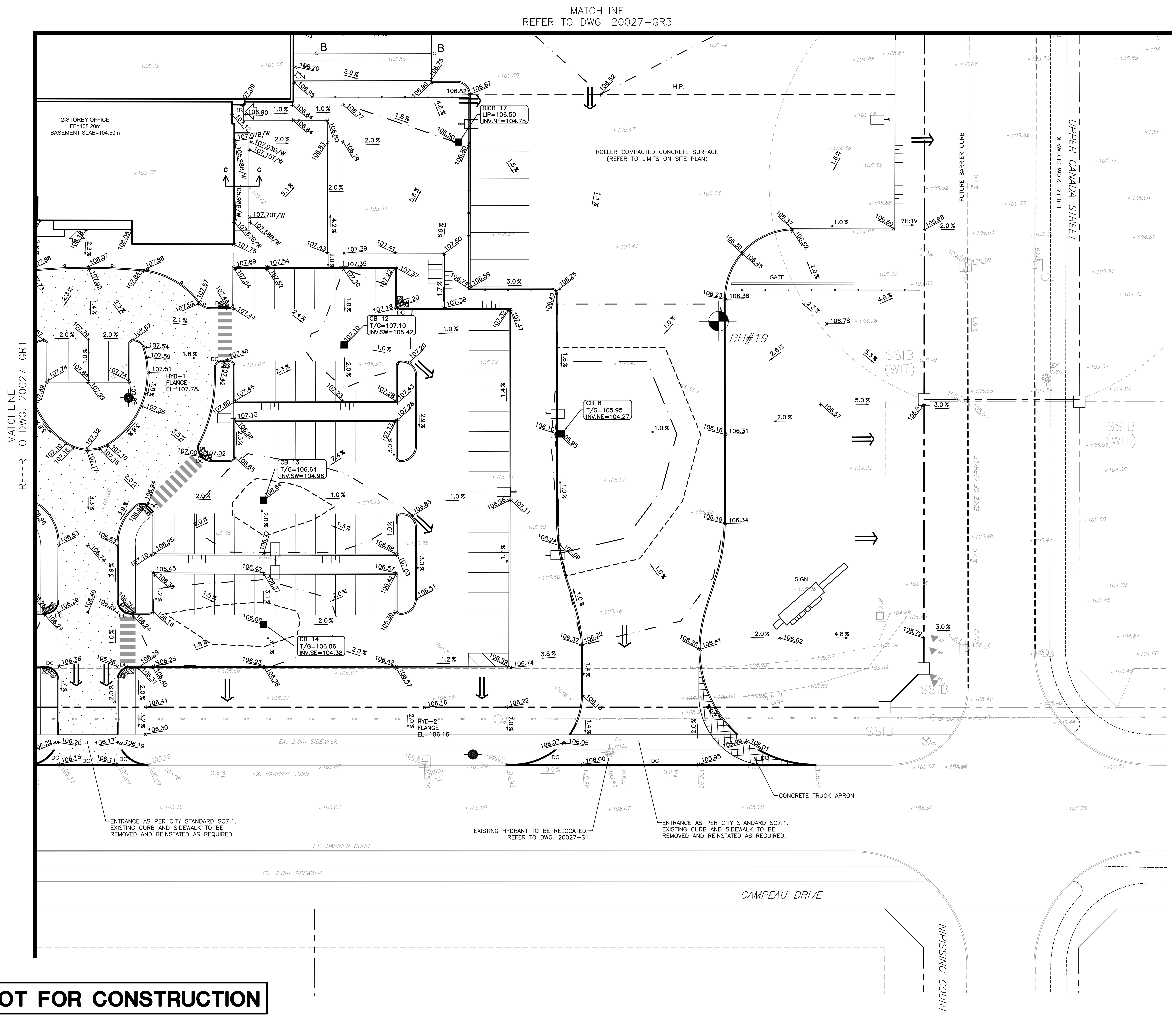
KANATA WEST BUSINESS PARK
8800 CAMPEAU DRIVE, OTTAWA, ON

GRADING PLAN

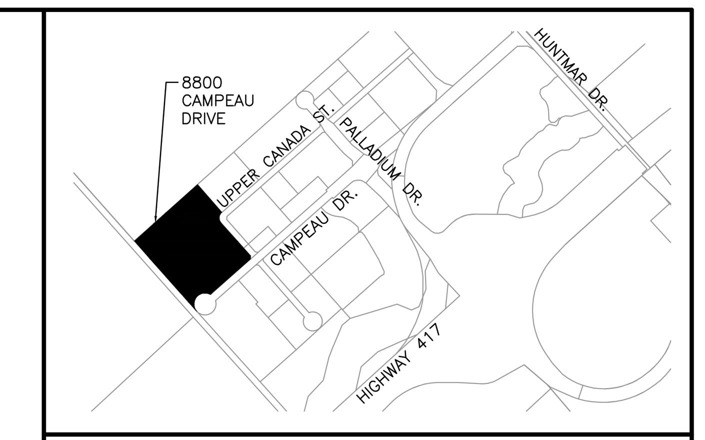
PROJECT No.	20027
SURVEY	STANTEC
DATED	MAY 2021
DWG. No:	20027-GR1

D07-12-20-0189

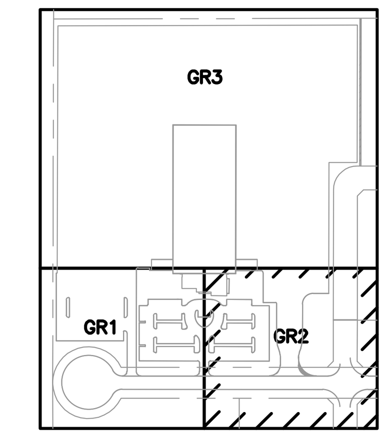
#18376



NOT FOR CONSTRUCTION



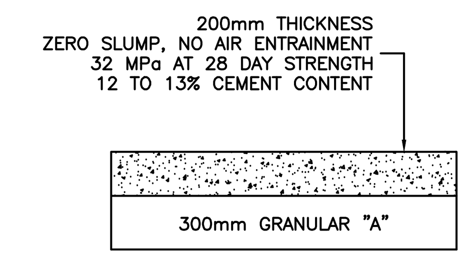
KEY PLAN



DRAWING KEY PLAN

LEGEND

106.00	EXISTING ELEVATION
107.00	PROPOSED GRADE
2.0%	PROPOSED DRAINAGE SLOPE AND DIRECTION
107.00	IBI GROUP DESIGN GRADE
	PROPERTY BOUNDARY
	CATCH BASIN
	EXISTING CATCH BASIN
	EXISTING HYDRANT
	SWALE
H.P.	HIGH POINT
DC	DEPRESSED CURB
	TERRACING (3H:1V MAX.)
	100m NO-BUILD SETBACK
	2 YEAR PONDING LIMIT
	5 YEAR PONDING LIMIT
	100 YEAR PONDING LIMIT
	BOREHOLE
	BUILDING ENTRANCE (REFER TO SITE PLAN)
B	BOLLARD (REFER TO SITE PLAN)
BH	BLOCK HEATER POST (REFER TO SITE PLAN)
	LIGHT STANDARD (REFER TO SITE PLAN)
	TWSI (REFER TO SITE PLAN)
	MAJOR OVERLAND FLOW ROUTE
	HEAVY DUTY ASPHALT LIMITS



NOTE:
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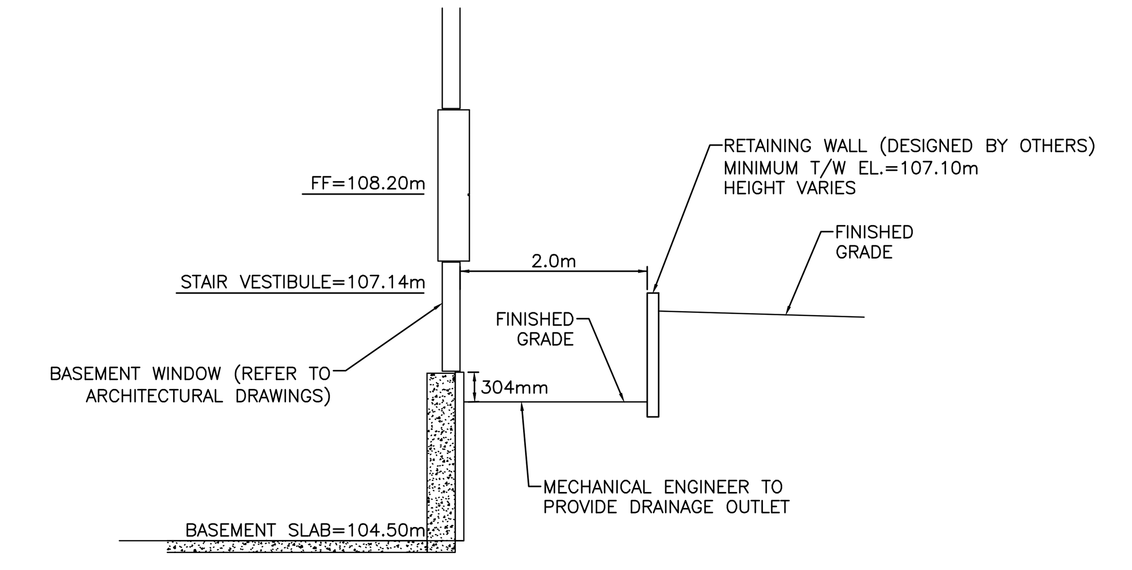
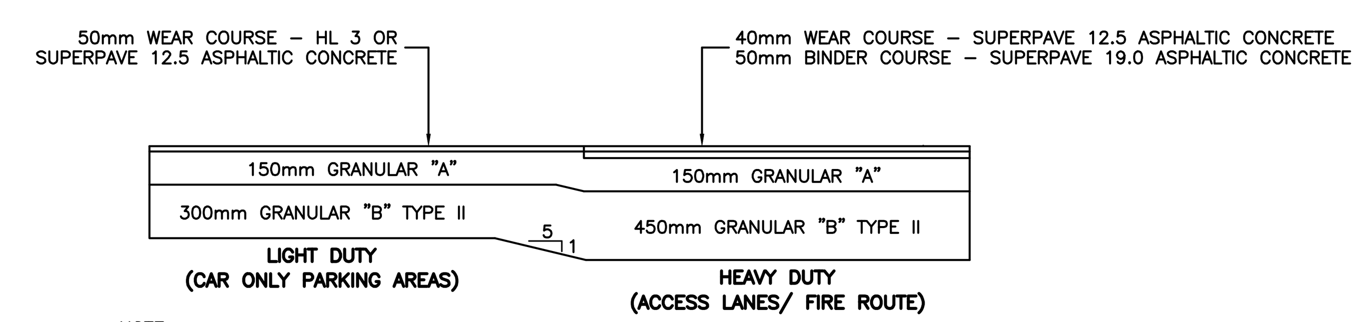
2. REFER TO LIMITS OF INSTALLATION ON SITE PLAN.

ROLLER COMPACTED CONCRETE PAVEMENT STRUCTURE DETAIL
N.T.S.



WINDOW WELL SECTION C-C
N.T.S.



NOTE:
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2. REFER TO LIMITS OF INSTALLATION ON SITE PLAN.

ASPHALT PAVEMENT STRUCTURE DETAIL
N.T.S.

SURFACE STORAGE AREAS

LOCATION	2 YEAR			5 YEAR			100 YEAR		
	STORAGE VOLUME (m^3)	PONDING DEPTH (m)	PONDING ELEVATION (m)	STORAGE VOLUME (m^3)	PONDING DEPTH (m)	PONDING ELEVATION (m)	STORAGE VOLUME (m^3)	PONDING DEPTH (m)	PONDING ELEVATION (m)
CB 8	15.3	0.15	106.10	26.5	0.18	106.13	86.7	0.27	106.22
CB 12	N/A	N/A	N/A	N/A	N/A	N/A	4.6	0.10	107.20
CB 13	N/A	N/A	N/A	1.8	0.09	106.73	16.6	0.19	106.83
CB 17	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

NOTES
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SCALE
HORIZONTAL 1:250

LICENSED PROFESSIONAL ENGINEER
S. M. CZARABYNSKI
PROVINCE OF ONTARIO
May 28 2021

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350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SMC
DRAWN	BLM
CHECKED	SMC
APPROVED	SMC

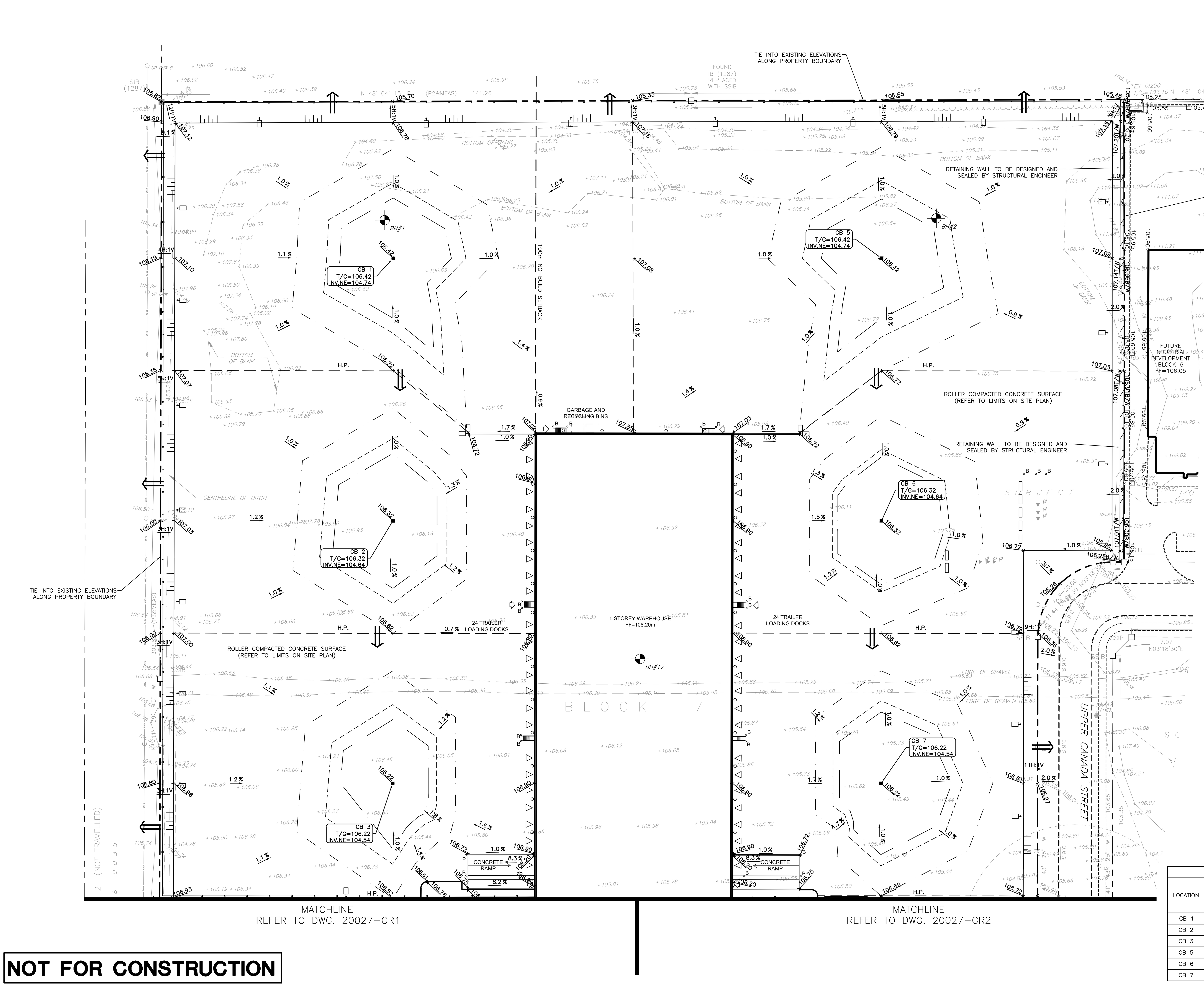
MARITIME-ONTARIO
FREIGHT LINES LIMITED

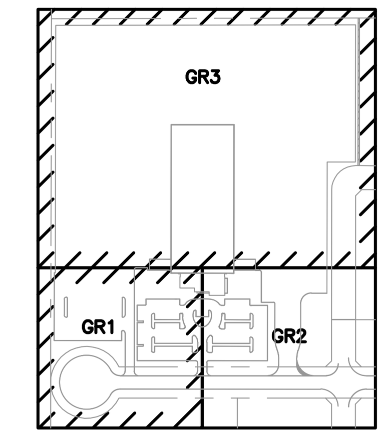
KANATA WEST BUSINESS PARK
8800 CAMPEAU DRIVE, OTTAWA, ON

GRADING PLAN

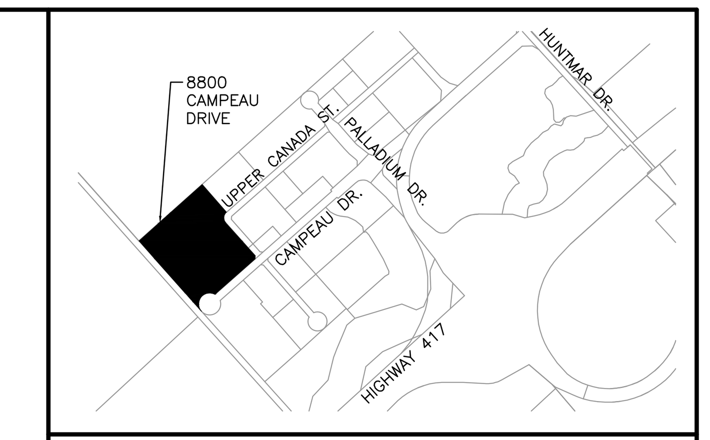
PROJECT No.	20027
SURVEY	STANTEC
DATED	MAY 2021
DWG. No:	20027-GR2

D07-12-20-0189
#18376

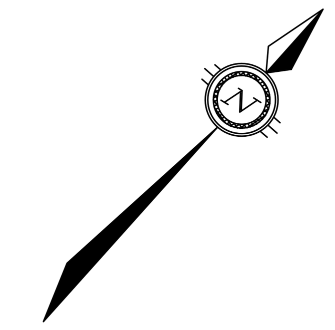




DRAWING KEY PLAN

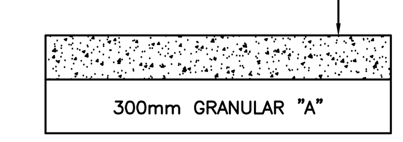


KEY PLAN



LEGEND

+ 106.00	EXISTING ELEVATION
×107.00	PROPOSED GRADE
2.0%	PROPOSED DRAINAGE SLOPE AND DIRECTION
×107.00	IBI GROUP DESIGN GRADE
	PROPERTY BOUNDARY
	CATCH BASIN
	EXISTING CATCH BASIN
	EXISTING HYDRANT
	SWALE
H.P.	HIGH POINT
DC	DEPRESSED CURB
	TERRACING (3H:1V MAX.)
	RETAINING WALL
	100m NO-BUILD SETBACK
	2 YEAR PONDING LIMIT
	5 YEAR PONDING LIMIT
	100 YEAR PONDING LIMIT
	BOREHOLE
	BUILDING ENTRANCE (REFER TO SITE PLAN)
B	BOLLARD (REFER TO SITE PLAN)
BH	BLOCK HEATER POST (REFER TO SITE PLAN)
	LIGHT STANDARD (REFER TO SITE PLAN)
	JERSEY BARRIER (REFER TO SITE PLAN)
	MAJOR OVERLAND FLOW ROUTE
	HEAVY DUTY ASPHALT LIMITS



NOTE:
1. REFER TO GEOTECHNICAL INVESTIGATION PREPARED BY PATERSON GROUP, REPORT PG5618–1, DATED APRIL 9, 2021.
2. REFER TO LIMITS OF INSTALLATION ON SITE PLAN.

ROLLER COMPACTED CONCRETE PAVEMENT STRUCTURE DETAIL
N.T.S.

SURFACE STORAGE AREAS									
LOCATION	2 YEAR			5 YEAR			100 YEAR		
	STORAGE VOLUME (m^3)	PONDING DEPTH (m)	PONDING ELEVATION (m)	STORAGE VOLUME (m^3)	PONDING DEPTH (m)	PONDING ELEVATION (m)	STORAGE VOLUME (m^3)	PONDING DEPTH (m)	PONDING ELEVATION (m)
CB 1	39.1	0.16	106.58	78.6	0.20	106.62	232.6	0.29	106.71
CB 2	43.4	0.18	106.50	79.2	0.22	106.54	200.8	0.30	106.62
CB 3	29.9	0.17	106.39	63.4	0.21	106.43	184.7	0.30	106.52
CB 5	40.9	0.16	106.58	79.9	0.20	106.62	243.6	0.29	106.71
CB 6	40.3	0.17	106.49	65.2	0.19	106.51	180.2	0.28	106.60
CB 7	50.9	0.19	106.41	83.8	0.22	106.44	200.5	0.30	106.52

NOT FOR CONSTRUCTION

NOTES

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NO.	REVISION DESCRIPTION	DATE	BY
3	REVISED PER COMMENTS	28/05/21	SMC
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SCALE
HORIZONTAL 1:500

LICENSED PROFESSIONAL ENGINEER
S. M. CZARABYNSKI
PROVINCE OF ONTARIO
May 28 2021

Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SMC
DRAWN	BLM
CHECKED	SMC
APPROVED	SMC

MARITIME-ONTARIO FREIGHT LINES LIMITED

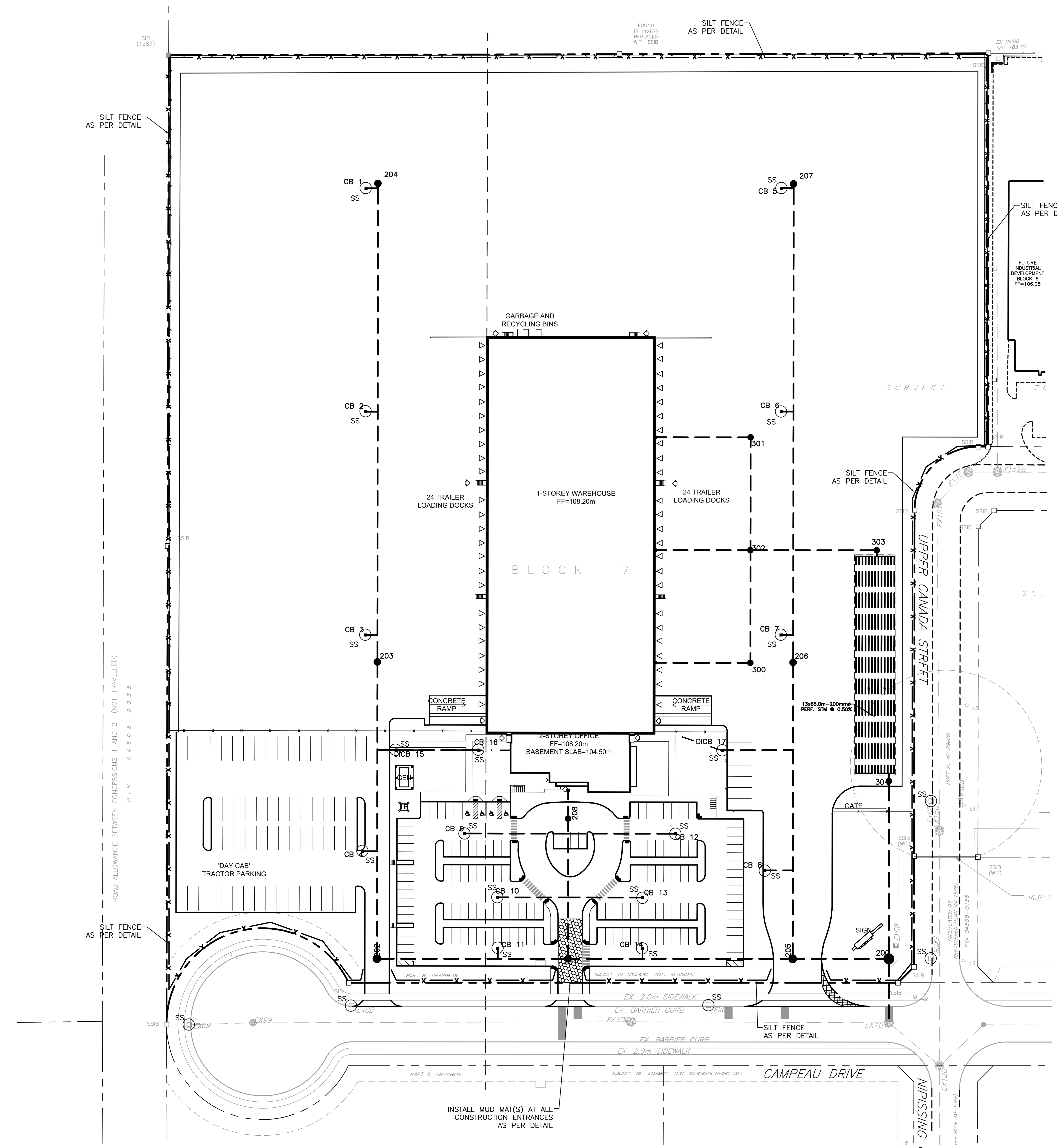
KANATA WEST BUSINESS PARK
8800 CAMPEAU DRIVE, OTTAWA, ON

GRADING PLAN

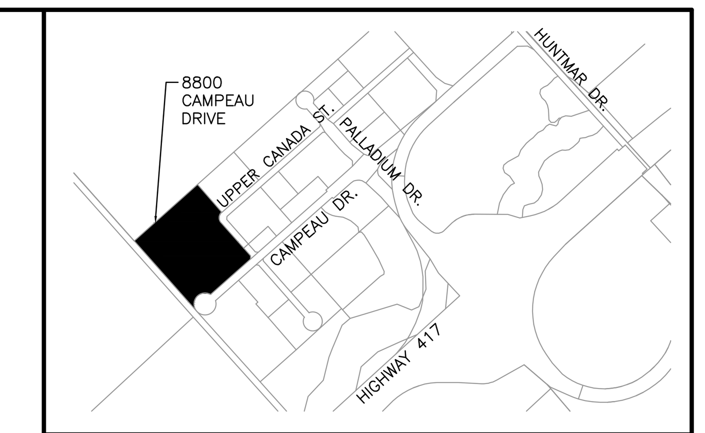
PROJECT No.	20027
SURVEY	STANTEC
DATED	MAY 2021
DWG. No:	20027-GR3

D07-12-20-0189

#18376

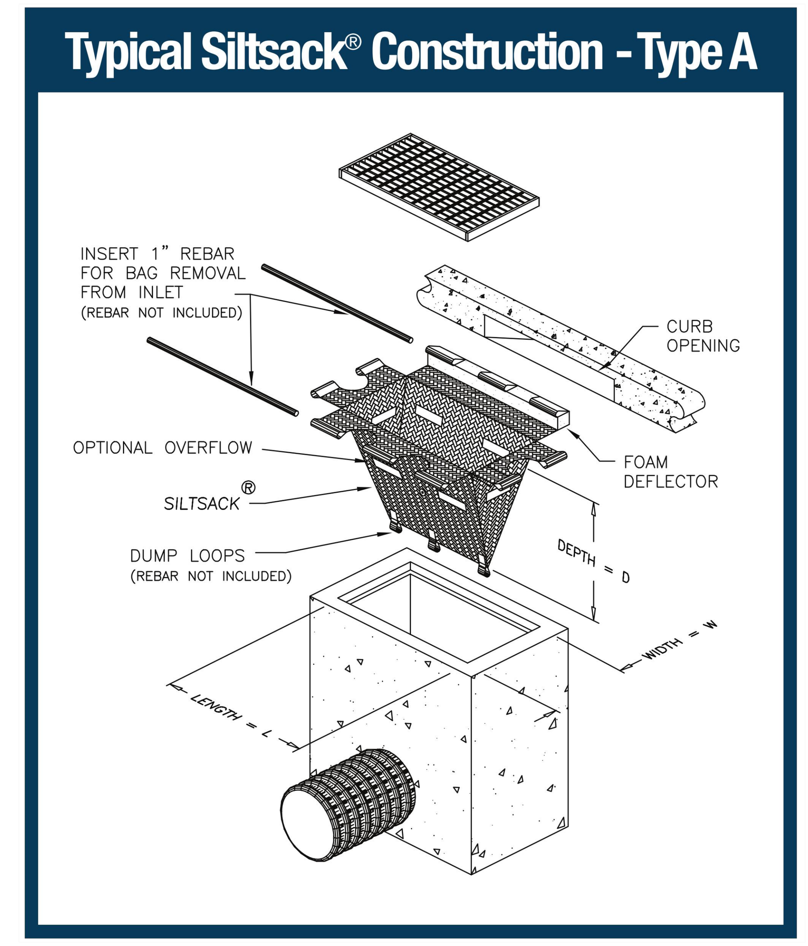


NOT FOR CONSTRUCTION

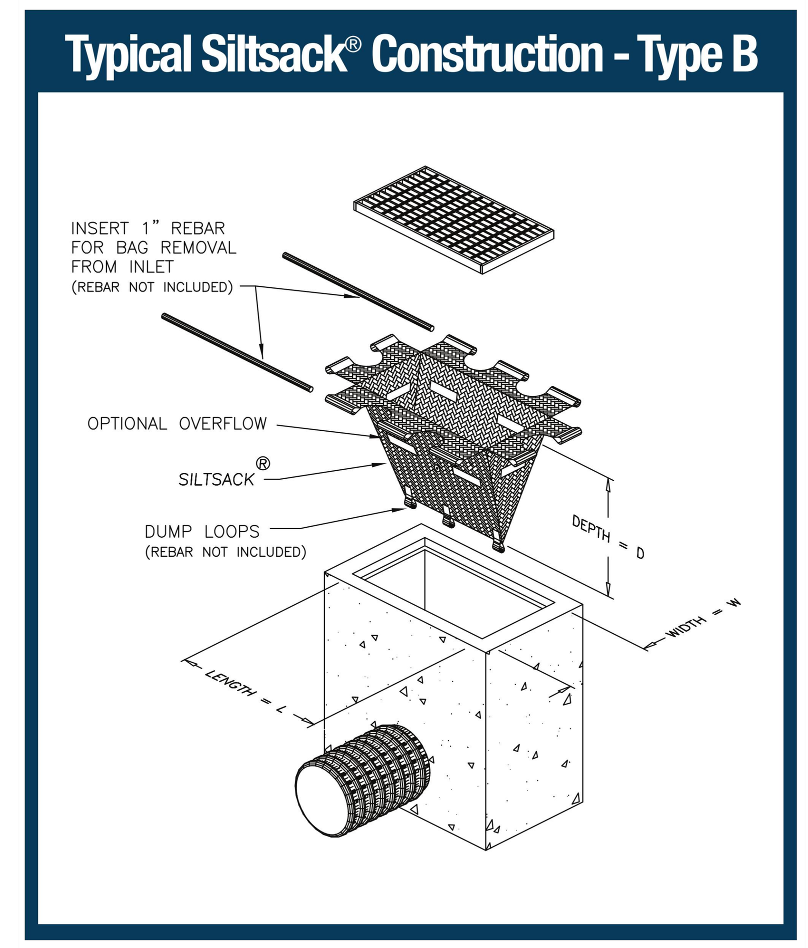


KEY PLAN

Typical Siltsack® Construction - Type A

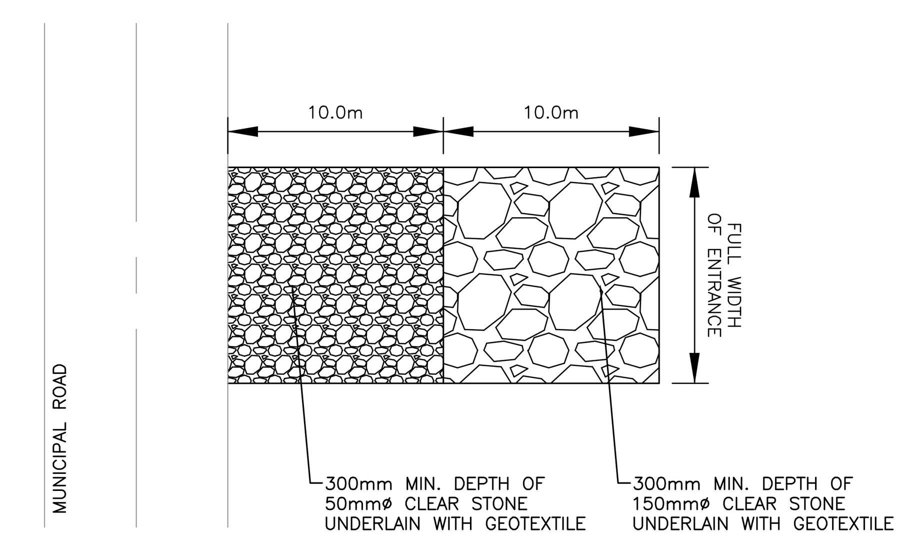


Typical Siltsack® Construction - Type B



LEGEND

- PROPERTY BOUNDARY
- CATCH BASIN
- EXISTING CATCH BASIN
- STORM SEWER & MANHOLE
- EXISTING STORM SEWER & MANHOLE
- 100m NO-BUILD SETBACK
- SILT FENCE
- SILT SACK UNDER FRAME AND COVER

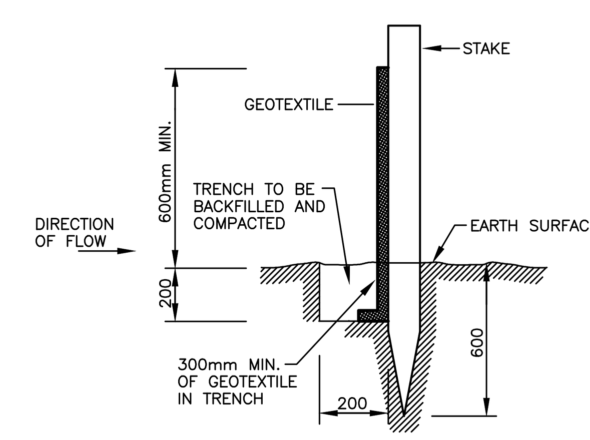


NOTES:
1. MUD MAT TO BE UNDERLAIN WITH A GEOTEXTILE FABRIC.
2. SEDIMENT SHALL BE CLEANED FROM MUNICIPAL RIGHT-OF-WAYS AS REQUIRED.
3. STORM INLETS IN CLOSE VICINITY TO MUD MAT SHALL BE PROTECTED WITH INLET CONTROL MEASURES.

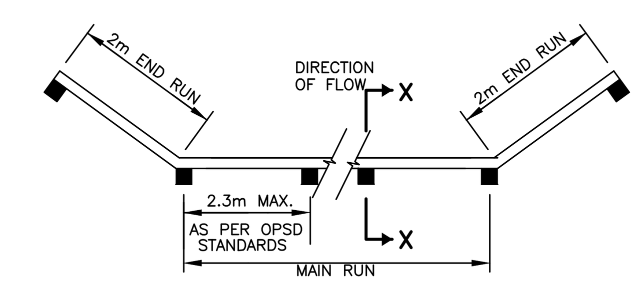
MUD MAT DETAIL
N.T.S.

INFILTRATION GALLERY NOTES:

1. INFILTRATION GALLERY SHALL BE CONSTRUCTED TOWARDS THE END OF THE DEVELOPMENT CONSTRUCTION PERIOD IN ORDER TO NOT CONTAMINATE THE PRACTICE.
2. SMEARING OF THE NATIVE MATERIAL AT THE INTERFACE WITH THE GALLERY FLOOR MUST BE AVOIDED AND/OR CORRECTED BY RAKING OR ROTO-TILLING.
3. COMPACTION OF THE GALLERY BOTTOM MUST BE MINIMIZED.



SECTION X-X
N.T.S.



SILT FENCE BARRIER DETAIL
N.T.S.

NOTES:

1. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE ULTIMATE 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.
2. LIMIT THE EXTENT OF EXPOSED SOILS AT ANY GIVEN TIME.
3. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED UNTIL VEGETATION HAS BEEN RE-ESTABLISHED IN ALL DISTURBED AREAS. RE-VEGETATE DISTURBED AREAS IN ACCORDANCE WITH APPROVED LANDSCAPE PLAN AS SOON AS POSSIBLE.
4. STOCKPILE SOIL AWAY (15 METRES OR GREATER) FROM WATERCOURSES, DRAINAGE FEATURES AND TOP OF STEEP SLOPES.
5. SILT SACKS ARE TO BE PLACED UNDERNEATH THE FRAME AND COVER OF ALL PROPOSED AND EXISTING CATCH BASINS AND OPEN COVER STORM MANHOLES UNTIL CONSTRUCTION IS COMPLETED.
6. A SILT FENCE BARRIER SHALL BE INSTALLED AS PER OPSD 219.1100 WHERE INDICATED AND MAINTAINED AS REQUIRED.
7. DURING ACTIVE CONSTRUCTION PERIODS, VISUAL INSPECTIONS SHALL BE UNDERTAKEN ON A WEEKLY BASIS AND AFTER MAJOR STORM EVENTS (>25mm RAIN IN 24 HOUR PERIOD) ON SEDIMENT CONTROL BARRIERS AND ANY DAMAGE REPAIRED IMMEDIATELY.
8. EROSION AND SEDIMENT CONTROL BARRIERS SHALL ALSO BE ASSESSED (AND REPAIRED AS REQUIRED) FOLLOWING SIGNIFICANT SNOWMELT EVENTS.
9. VISUAL INSPECTIONS SHALL ALSO BE UNDERTAKEN IN ANTICIPATION OF LARGE STORM EVENTS (OR A SERIES OF RAINFALL AND/OR SNOWMELT DAYS) THAT COULD POTENTIALLY YIELD SIGNIFICANT RUNOFF VOLUMES.
10. CARE SHALL BE TAKEN TO PREVENT DAMAGE TO EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION OPERATIONS.
11. IN SOME CASES, BARRIERS MAY BE REMOVED TEMPORARILY TO ACCOMMODATE THE CONSTRUCTION OPERATIONS. THE AFFECTED BARRIERS SHALL BE REINSTATED IMMEDIATELY AFTER CONSTRUCTION OPERATIONS ARE COMPLETED.
12. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE ADJUSTED AS REQUIRED AS THE SITE BECOMES DEVELOPED.
13. SEDIMENT CONTROL DEVICES SHALL BE CLEANED OF ACCUMULATED SEDIMENTATION AS REQUIRED AND REPLACED AS NECESSARY.
14. DURING THE COURSE OF CONSTRUCTION, IF THE ENGINEER BELIEVES THAT ADDITIONAL PREVENTION METHODS ARE REQUIRED TO CONTROL EROSION AND SEDIMENTATION, THE CONTRACTOR SHALL IMPLEMENT ADDITIONAL MEASURES, AS REQUIRED, TO THE SATISFACTION OF THE ENGINEER.
15. CONSTRUCTION AND MAINTENANCE REQUIREMENTS FOR EROSION AND SEDIMENT CONTROLS ARE TO COMPLY WITH OPSS 805.
16. MUD MATS SHALL BE INSTALLED AT ALL CONSTRUCTION ENTRANCES.

NOTES

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SCALE
0 5m 10m 30m
HORIZONTAL 1:750

LICENSED PROFESSIONAL ENGINEER S. M. CZARABYNSKI PROVINCE OF ONTARIO
May 28 2021

Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SMC
DRAWN	BLM
CHECKED	SMC
APPROVED	SMC

MARITIME-ONTARIO FREIGHT LINES LIMITED

KANATA WEST BUSINESS PARK
8800 CAMPEAU DRIVE, OTTAWA, ON

EROSION AND SEDIMENT CONTROL PLAN

PROJECT No.	20027
SURVEY	STANTEC
DATED	MAY 2021
DWG. No:	20027-ESC1

D07-12-20-0189

#18376

GENERAL NOTES:

1. ALL WORKS AND MATERIALS SHALL CONFORM TO THE LATEST REVISIONS OF THE STANDARDS AND SPECIFICATIONS OF THE CITY OF OTTAWA AND ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS), AS AMENDED BY THE CITY OF OTTAWA.
2. THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL EXISTING UTILITIES WITHIN THE SITE AND ADJACENT WORK AREAS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITIES TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OR REPLACEMENT OF ANY SERVICES OR UTILITIES DISTURBED DURING CONSTRUCTION, TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION.
3. ALL DIMENSIONS AND ELEVATIONS 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.
4. DESIGN ELEVATIONS GIVEN ARE TO BE ADHERED TO WITH NO CHANGES WITHOUT PRIOR WRITTEN APPROVAL BY ROBINSON LAND DEVELOPMENT.
5. ANY AREAS 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.
6. RELOCATION OF EXISTING SERVICES AND/OR UTILITIES SHALL BE AS SHOWN ON THE DRAWINGS OR AS DIRECTED BY THE ENGINEER AT THE EXPENSE OF THE CONTRACTOR.
7. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE "OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS". THE GENERAL CONTRACTOR SHALL BE DEEMED TO BE THE CONSTRUCTOR AS DEFINED IN THE ACT.
8. ALL CONSTRUCTION SIGNAGE MUST CONFORM TO THE M.T.O. MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (LATEST AMENDMENT).
9. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
10. THE SUPPORT OF ALL UTILITIES SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
11. THE CONTRACTOR WILL BE RESPONSIBLE FOR ADDITIONAL BEDDING OR ADDITIONAL STRENGTH PIPE IF THE MAXIMUM TRENCH WIDTH, AS SPECIFIED BY OPSD, IS EXCEEDED.
12. ALL NECESSARY CLEARING AND GRUBBING SHALL BE COMPLETED BY THE CONTRACTOR. REVIEW WITH CONTRACT ADMINISTRATOR AND THE CITY OF OTTAWA PRIOR TO AND TREE CUTTING.
13. REFER TO GEOTECHNICAL INVESTIGATION PREPARED BY PATERSON GROUP, REPORT NO. PG5618–1, DATED APRIL 9, 2021.
14. THE CONTRACTOR IS RESPONSIBLE FOR AND SHALL PROVIDE FOR DEWATERING, SUPPORT AND PROTECTION OF EXCAVATIONS AND TRENCHING AS WELL AS RELEASE OF ANY PUMPED GROUNDWATER IN A CONTROLLED AND APPROVED MANNER.
15. DO NOT CONSTRUCT USING DRAWINGS THAT ARE NOT MARKED "ISSUED FOR CONSTRUCTION".
16. CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT FOR CONSTRUCTION PURPOSES.
17. CLAY SEALS SHALL BE INSTALLED WITHIN SEWER TRENCHES IN ACCORDANCE WITH CITY STANDARD S8.

STORM SEWERS:

1. ALL REINFORCED CONCRETE STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CSA A257.2 (LATEST AMENDMENT). ALL NON–REINFORCED CONCRETE STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CSA A257.1 (LATEST AMENDMENT). PIPE SHALL BE JOINTED WITH STD. RUBBER GASKETS AS PER CSA A257.3 (LATEST AMENDMENT).
2. ALL STORM SEWER TRENCH AND BEDDING SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. S6 AND S7 CLASS 'B' UNLESS OTHERWISE SPECIFIED. BEDDING AND COVER MATERIAL SHALL BE SPECIFIED BY PROJECT GEOTECHNICAL ENGINEER.
3. ALL PVC STORM SEWERS ARE TO BE SDR 35 APPROVED PER C.S.A. B182.2 OR LATEST AMENDMENT, UNLESS OTHERWISE SPECIFIED.
4. STORM MANHOLE FRAME AND COVERS SHALL BE AS PER CITY OF OTTAWA STD. S24.1.
5. STORM SEWER MANHOLES SERVING SEWERS LESS THAN 900mm SHALL BE CONSTRUCTED WITH A 300mm SUMP. FOR STORM SEWERS 900mm AND OVER USE BENCHING IN ACCORDANCE WITH OPSD 701.021.
6. THE STORM SEWER CLASSES HAVE BEEN DESIGNED BASED ON BEDDING CONDITIONS SPECIFIED ABOVE. WHERE THE SPECIFIED TRENCH WIDTH IS EXCEEDED, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE ADDITIONAL BEDDING, A DIFFERENT TYPE OF BEDDING OR A HIGHER PIPE STRENGTH AT HIS OWN EXPENSE AND SHALL ALSO BE RESPONSIBLE FOR EXTRA TEMPORARY AND/OR PERMANENT REPAIRS MADE NECESSARY BY THE WIDENED TRENCH.

SANITARY SEWERS:

1. ALL SANITARY SEWERS SHALL BE PVC SDR 35, IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS.
2. SANITARY SEWER TRENCH AND BEDDING SHALL BE AS PER CITY OF OTTAWA STD. S6 AND S7, CLASS 'B' BEDDING UNLESS OTHERWISE NOTED.
3. ALL SANITARY SERVICES ARE TO BE EQUIPPED WITH APPROVED BACKWATER VALVES.
4. SANITARY MANHOLE FRAME AND COVERS SHALL BE AS PER CITY OF OTTAWA STD. S24.
5. SANITARY SEWER MANHOLES SHALL BE BENCHED AS PER OPSD 701.021.
6. SANITARY PRE–CAST MANHOLE SHALL BE CONSTRUCTED WITH A HIGHER PERCENTAGE OF SILICA FUME IN THE CONCRETE TO MAKE IT MORE DENSE AND LESS SUSCEPTIBLE TO CORROSION OR PINHOLE LEAKS.
7. FOR SANITARY MANHOLES, DEPENDING ON THE ELEVATION OF THE GROUNDWATER TABLE, AND BASED ON THE RECOMMENDATION OF THE PROJECT GEOTECHNICAL CONSULTANT, CRETEX SEALS, OR A SIMILAR PRODUCT, SHALL BE INSTALLED IN THE PRE–CAST MANHOLE SECTION TO JUST BELOW THE MANHOLE FRAME TO PREVENT INFILTRATION.
8. CONTRACTOR SHALL PERFORM LEAKAGE TESTING, IN THE PRESENCE OF THE CONSULTANT, FOR SANITARY SEWERS IN ACCORDANCE WITH OPSS 410 AND OPSS 407. CONTRACTOR SHALL PERFORM VIDEO INSPECTION OF ALL STORM AND SANITARY SEWERS. A COPY OF THE VIDEO AND INSPECTION REPORT SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.
9. IN ACCORDANCE WITH CITY OF OTTAWA STANDARD S11, SANITARY SERVICE CONNECTION REQUIRES APPROVED CONTROLLED SETTLEMENT JOINT.

WATER SUPPLY:

1. ALL PVC WATERMAINS SHALL BE EQUAL TO AWWA C–900 CLASS 150, SDR 18, OR APPROVED EQUAL.
2. WATERMAIN TRENCH AND BEDDING SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARD W17, UNLESS OTHERWISE SPECIFIED. BEDDING AND COVER MATERIAL SHALL BE SPECIFIED BY PROJECT GEOTECHNICAL ENGINEER.
3. ALL PVC WATERMAINS SHALL BE INSTALLED WITH A 10 GAUGE STRANDED COPPER TWU OR RWU TRACER WIRE IN ACCORDANCE WITH CITY OF OTTAWA STD. W36.
4. CATHODIC PROTECTION IS REQUIRED ON ALL METALLIC FITTINGS AS PER CITY OF OTTAWA STD. W40 AND W42.
5. CONTRACTOR TO SUPPLY HYDRANT EXTENSION TO ADJUST THE LENGTH OF HYDRANT BARREL IF REQUIRED.
6. FIRE HYDRANTS SHALL BE INSTALLED AS PER CITY OF OTTAWA STD. W19, AND LOCATED AS PER CITY STD. W18.
7. VALVE IN BOXES SHALL BE INSTALLED AS PER CITY OF OTTAWA STD. W24.
8. WATERMAIN IN FILL AREAS TO BE INSTALLED WITH RESTRAINED JOINTS AS PER CITY OF OTTAWA STD. W25.5 AND W25.6.
9. THRUST BLOCKING OF WATERMAIN TO BE INSTALLED AS PER CITY OF OTTAWA STD. W25.3 AND W25.4.
10. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY CAPS, PLUGS AND BLOW–OFFS AND NOZZLES REQUIRED FOR TESTING AND DISINFECTION OF THE WATERMAIN.
11. INSULATION FOR WATERMAIN CROSSING OVER AND BELOW SEWER SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. W25.2 AND W25, RESPECTIVELY, WHERE WATERMAIN COVER IS LESS THAN 2.4m.
12. AS PER CITY GUIDELINE, THE MINIMUM VERTICAL CLEARANCE BETWEEN WATERMAIN AND SEWER / UTILITY IS 0.25m FOR CROSSING OVER THE SEWER, AS PER CITY STD. W25.2. FOR CROSSING UNDER SEWER, ADEQUATE STRUCTURAL SUPPORT FOR THE SEWERS IS REQUIRED TO PREVENT EXCESSIVE DEFLECTION OF JOINTS AND SETTLING. THE LENGTH OF WATER PIPE SHALL BE CENTERED AT THE POINT OF CROSSING SO THAT THE JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER AS PER CITY STD. W25.
13. CONNECTION TO EXISTING WATERMAIN TO BE PERFORMED BY CITY FORCES. CONTRACTOR TO PROVIDE LABOUR, EQUIPMENT AND MATERIAL REQUIRED FOR EXCAVATION, BEDDING AND REINSTATEMENT.
14. SWABBING, DISINFECTION, AND HYDROSTATIC TESTING TO BE CONDUCTED AS PER CITY OF OTTAWA STANDARDS IN THE PRESENCE OF A CITY INSPECTOR AND/OR CONSULTANT.

ROADWORK SPECIFICATIONS:

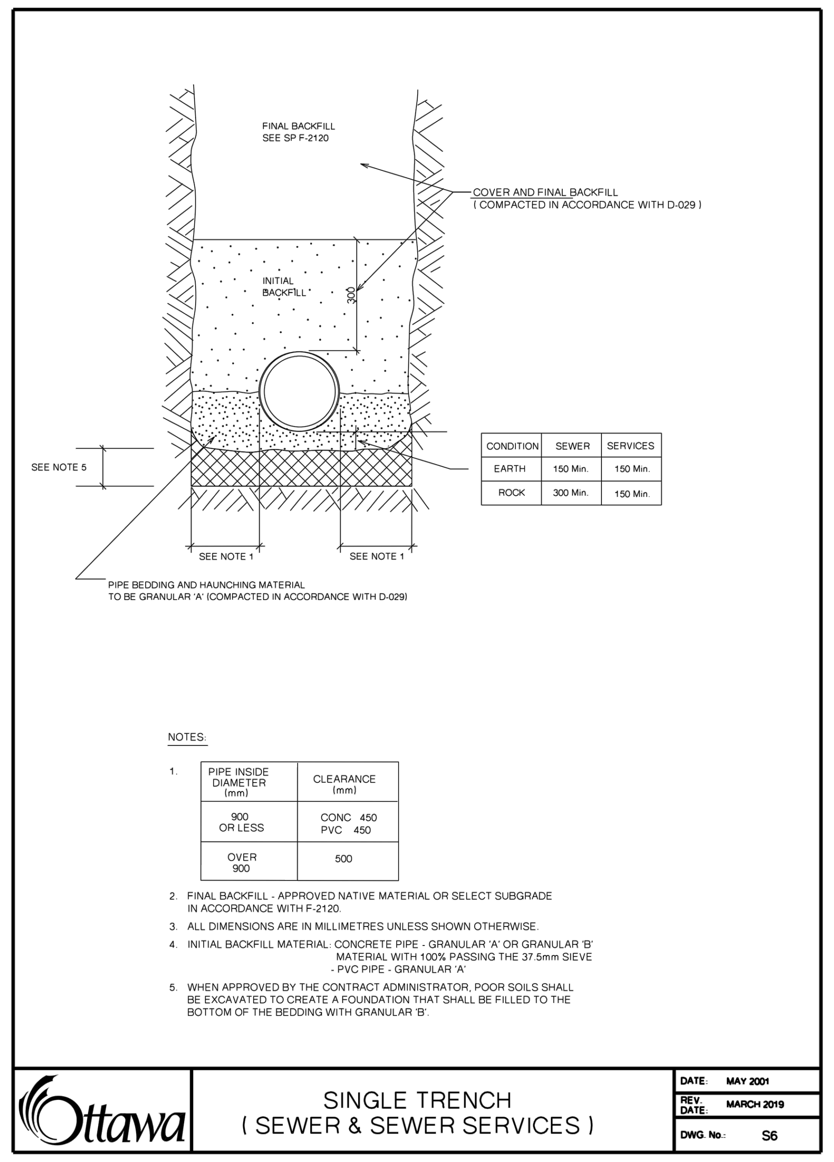
1. CONCRETE CURB SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. SC1.1 (BARRIER CURB). PROVISION SHALL BE MADE FOR CURB DEPRESSIONS AT SIDEWALKS AND DRIVEWAYS.
2. ALL BARRIER CURB TO BE 150mm ABOVE FINISHED ASPHALT GRADE UNLESS OTHERWISE NOTED.
3. CONCRETE SIDEWALK SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. SC3 AND SC1.4.
4. TWSIs SHALL BE INSTALLED IN ACCORDANCE WITH CITY OF OTTAWA STD. SC7.3.
5. PAVEMENT REINSTATEMENT FOR SERVICE AND UTILITY CUTS SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. R10 AND OPSD 509.010, OPSS 310.
6. GRANULAR "A" SHALL BE PLACED TO A MINIMUM THICKNESS OF 300mm AROUND ALL STRUCTURES WITHIN PAVEMENT AREA.
7. ALL GRANULAR FOR ROADS SHALL BE COMPACTED TO A MINIMUM OF 98% STANDARD PROCTOR DENSITY.
8. ASPHALT WEAR COURSE SHALL NOT BE PLACED UNTIL THE VIDEO INSPECTION OF SEWERS & NECESSARY REPAIRS HAVE BEEN CARRIED OUT TO THE SATISFACTION OF THE ENGINEER.
9. SUB–EXCAVATE SOFT AREAS AND FILL WITH GRANULAR 'B' COMPACTED IN MAXIMUM 300mm LIFTS.
10. PEDESTRIAN CURB RAMP WITH BOULEVARD SHALL BE ACCORDANCE WITH CITY OF OTTAWA STD. SC7.
11. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW–CUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW ASPHALT.
12. PAVEMENT DESIGN AS PER GEOTECHNICAL RECOMMENDATIONS:

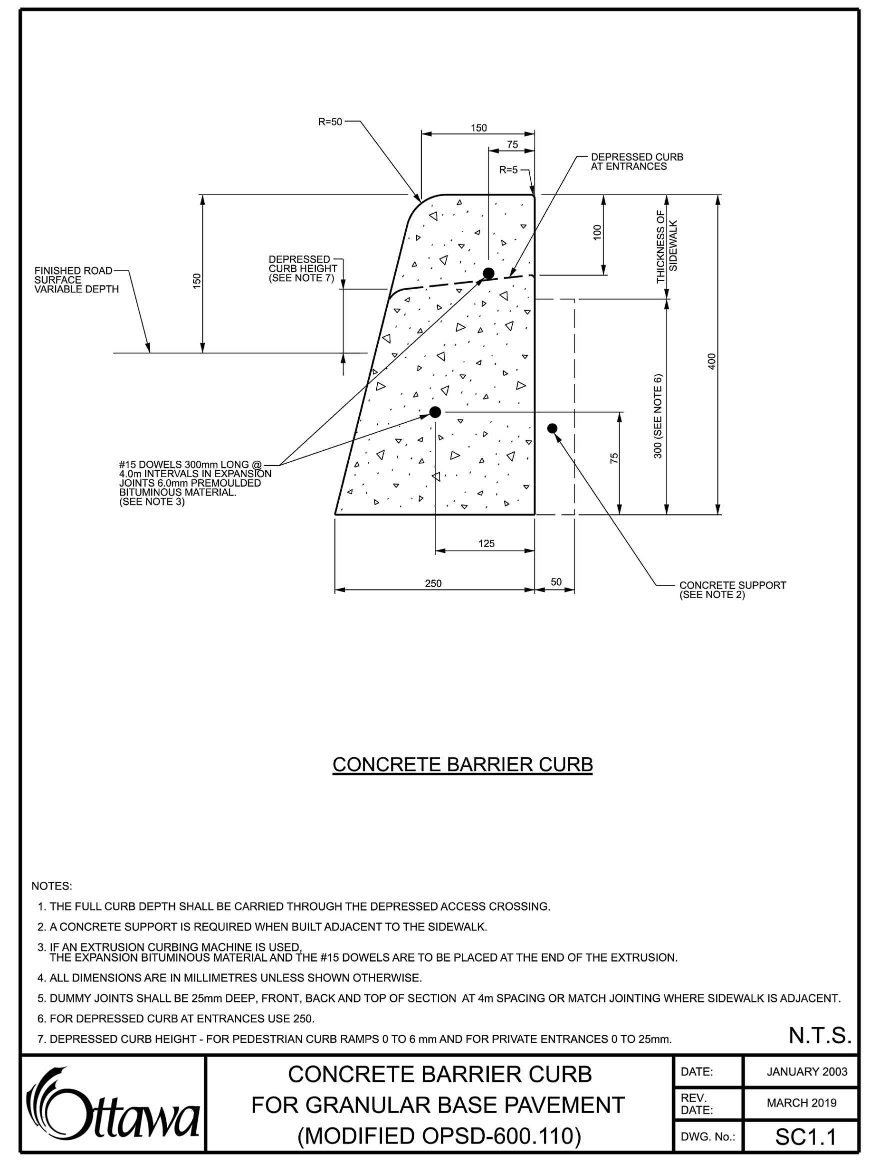
LIGHT DUTY (CAR ONLY PARKING AREAS)
- 50mm WEAR COURSE – HL–3 OR SUPERPAVE 12.5 ASPHALTIC CONCRETE
- 150mm BASE – OPSS GRANULAR "A" CRUSHED STONE
- 300mm SUBBASE – OPSS GRANULAR "B" TYPE II
- SUBGRADE – EITHER FILL, IN SITU SOIL OR OPSS GRANULAR "B" TYPE I OR II MATERIAL PLACED OVER IN SITU SOIL OR FILL

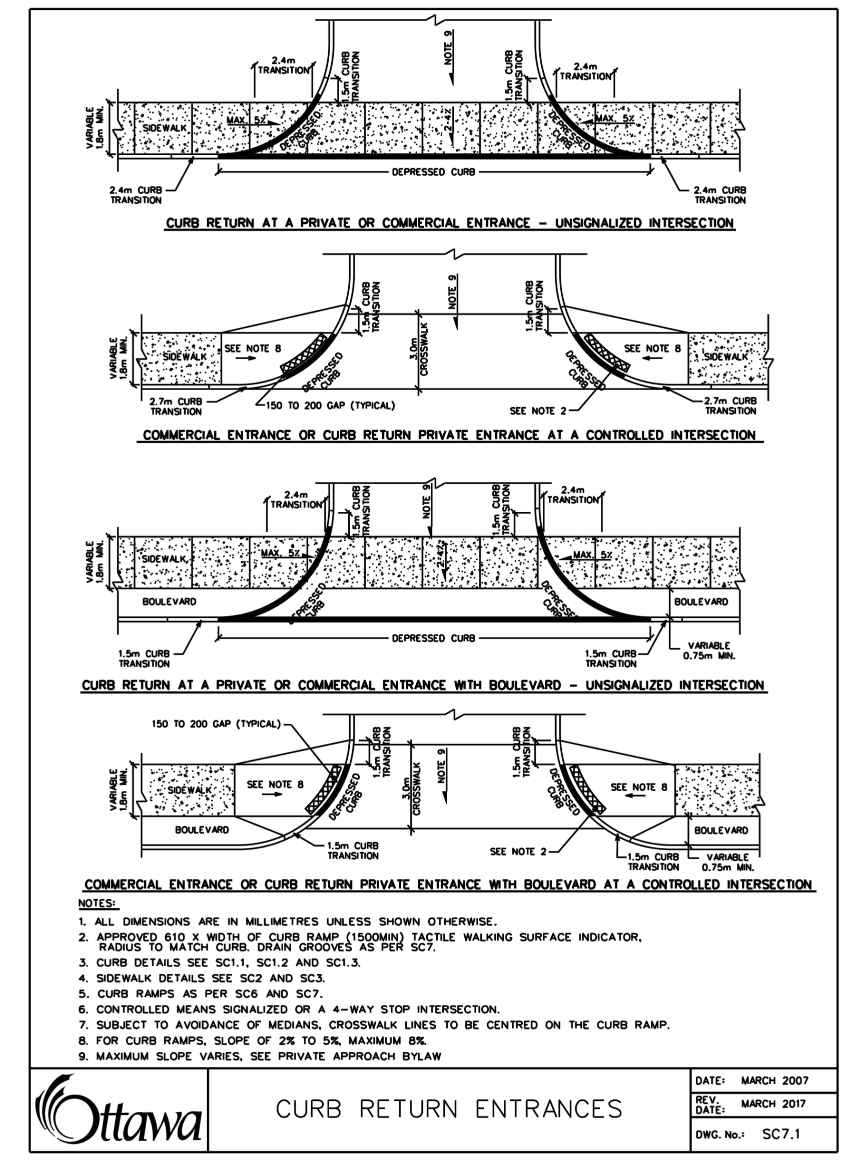
HEAVY DUTY (ACCESS LANES AND HEAVY TRUCK PARKING AREAS)
- 40mm WEAR COURSE – SUPERPAVE 12.5 ASPHALTIC CONCRETE
- 50mm BINDER COURSE – SUPERPAVE 19.0 ASPHALTIC CONCRETE
- 150mm BASE – OPSS GRANULAR "A" CRUSHED STONE
- 450mm SUBBASE – OPSS GRANULAR "B" TYPE II
- SUBGRADE – EITHER FILL, IN SITU SOIL OR OPSS GRANULAR "B" TYPE I OR II MATERIAL PLACED OVER IN SITU SOIL OR FILL

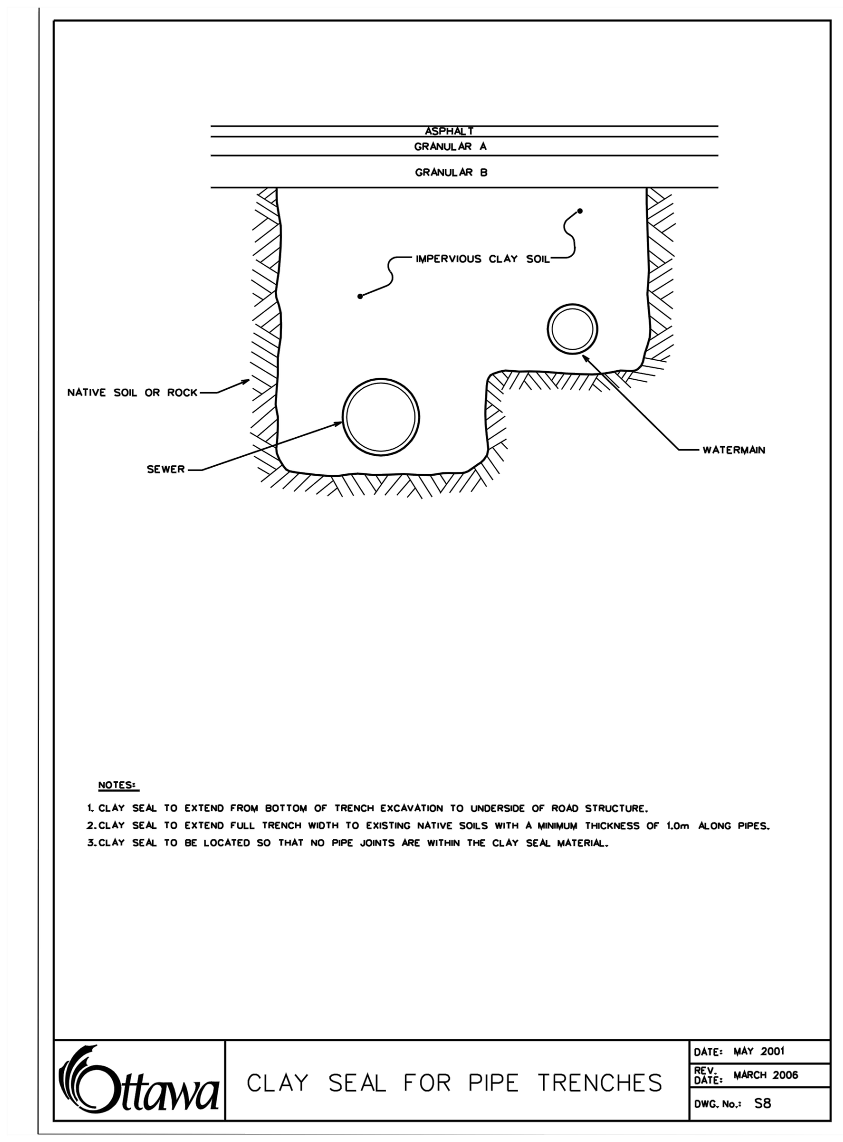
ROLLER COMPACTED CONCRETE (AS PER SITE PLAN)
- 200mm THICKNESS, ZERO SLUMP, NO AIR ENTRAINMENT, 32 MPa AT 28 DAY STRENGTH, 12 TO 13% CEMENT CONTENT
- 300mm BASE – OPSS GRANULAR "A" CRUSHED STONE

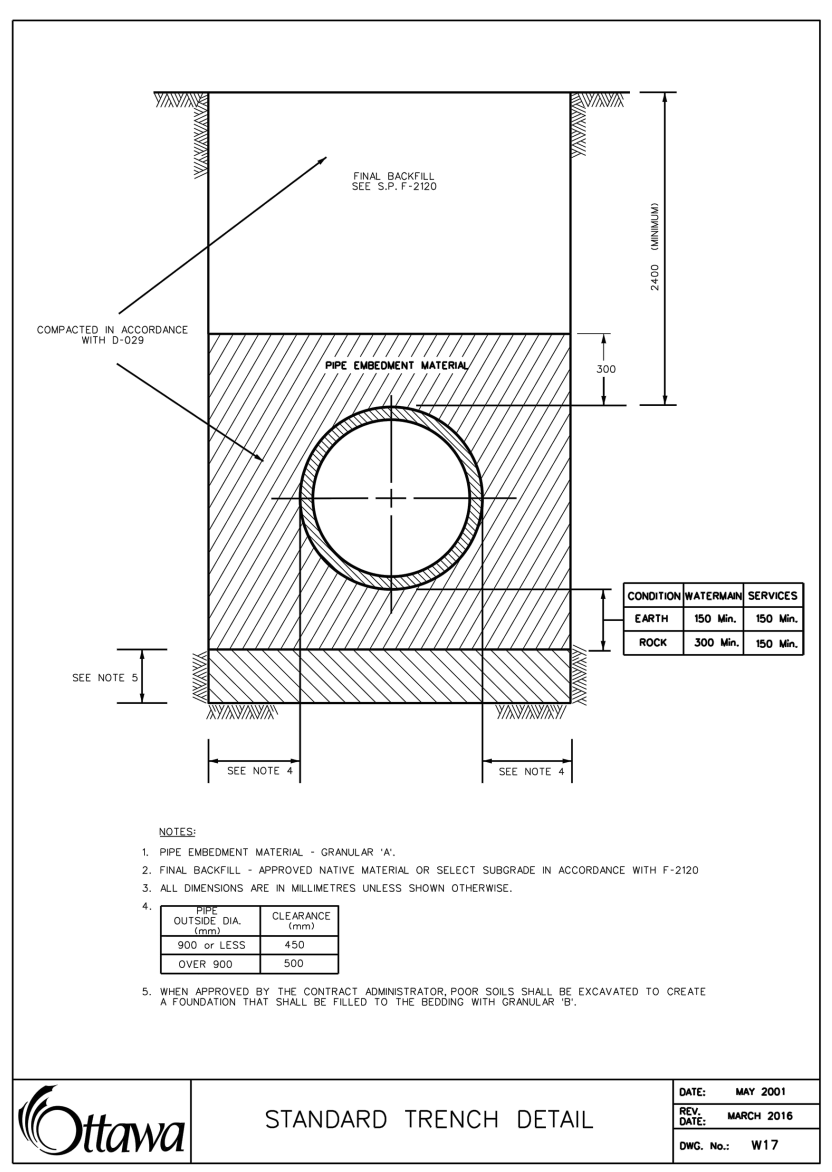
NOT FOR CONSTRUCTION

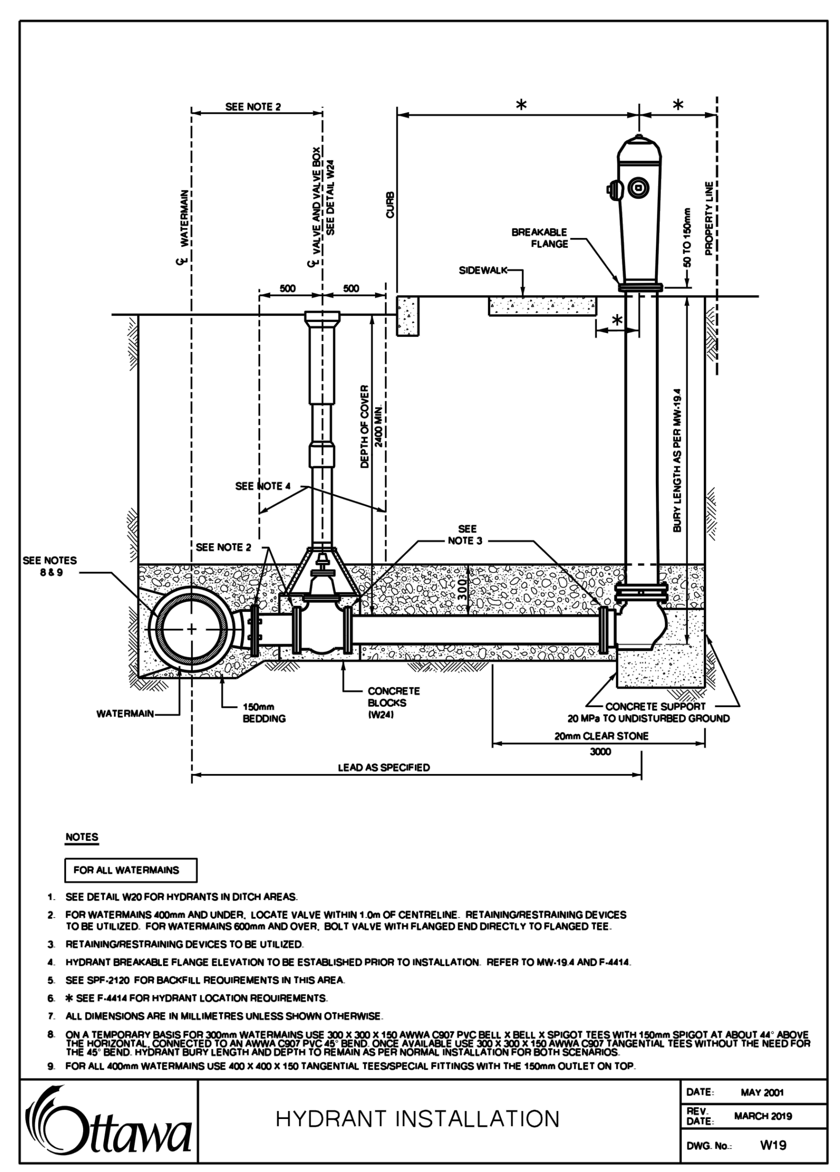


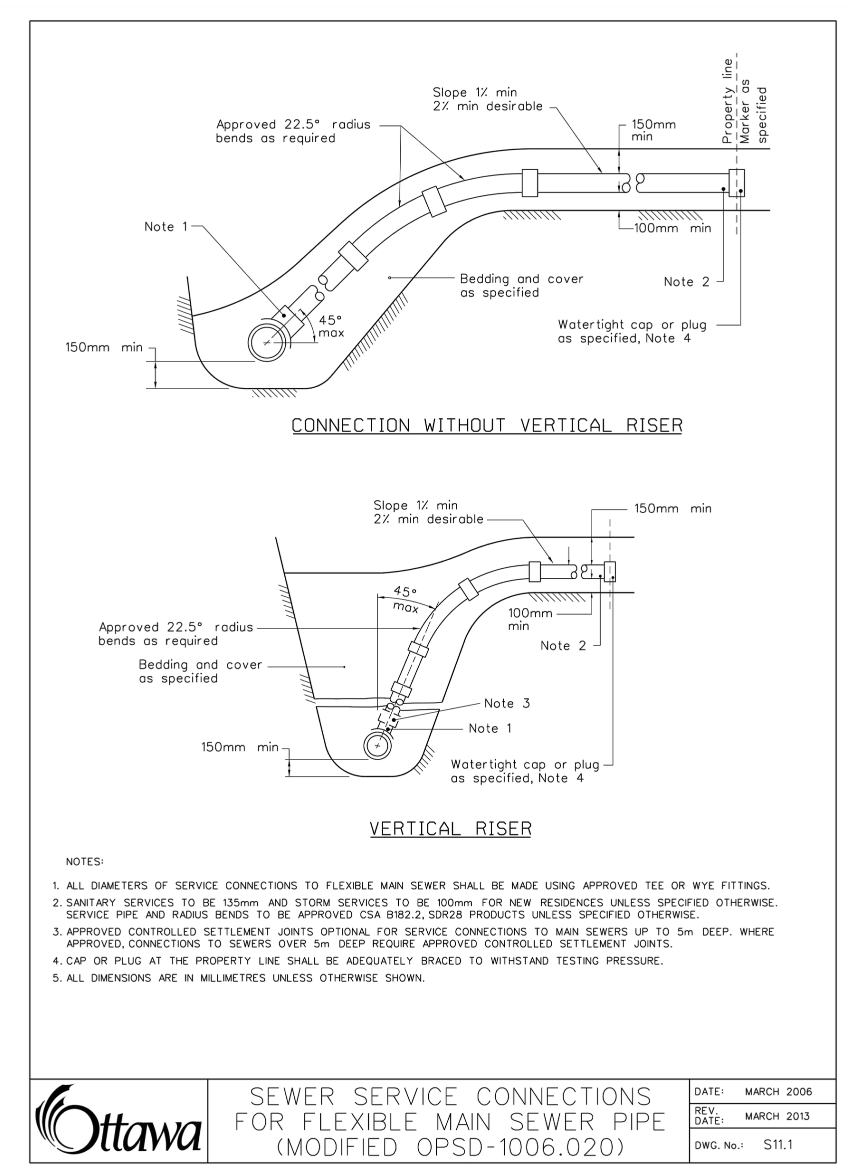


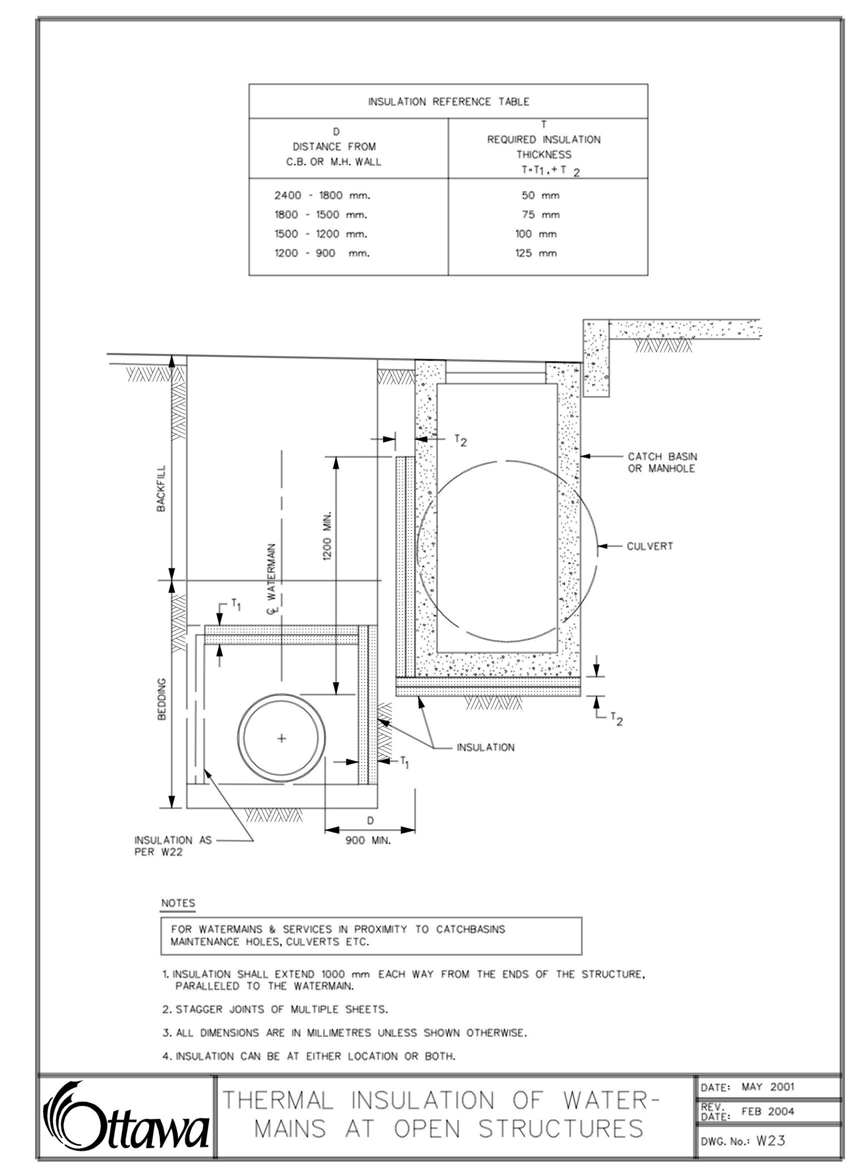












NOTES

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

NO.	REVISION DESCRIPTION	DATE	BY
3	REVISED PER COMMENTS	28/05/21	SMC
2	ISSUED FOR PROGRESS REVIEW	22/03/21	SMC
1	ISSUED FOR SITE PLAN APPLICATION	02/12/20	SMC

SCALE

LICENSED PROFESSIONAL ENGINEER
S. M. CZARADYNSKI
PROVINCE OF ONTARIO
May 28 2021

Robinson
Land Development

350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SMC
DRAWN	BLM
CHECKED	SMC
APPROVED	SMC

MARITIME-ONTARIO
FREIGHT LINES LIMITED

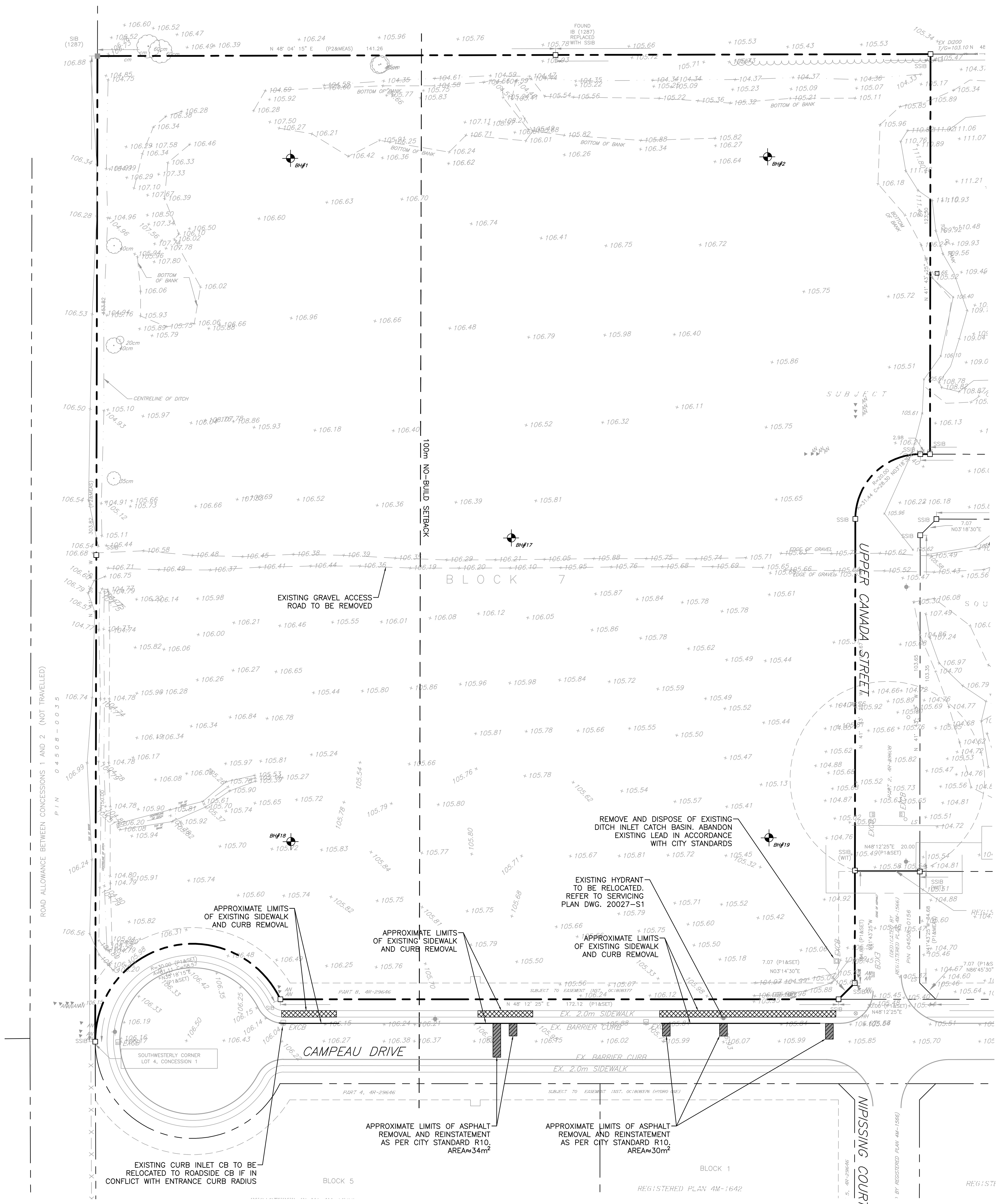
KANATA WEST BUSINESS PARK
8800 CAMPEAU DRIVE, OTTAWA, ON

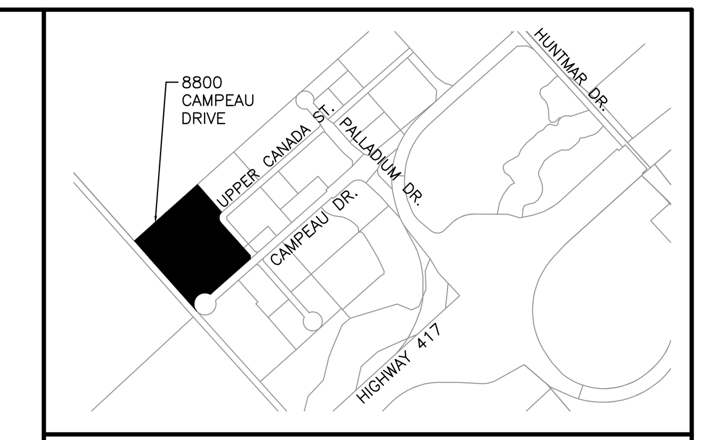
NOTES & DETAILS

PROJECT No.	20027
SURVEY	STANTEC
DATED	MAY 2021
DWG. No:	20027-N1

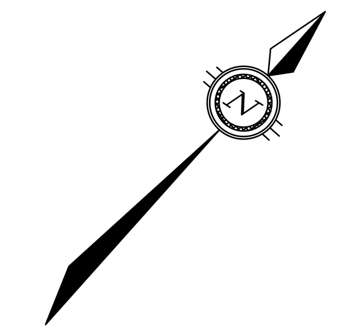
D07-12-20-0189

#18376





KEY PLAN



LEGEND

- PROPERTY BOUNDARY
- EXISTING ELEVATION
- EXISTING DITCH
- EXISTING CATCH BASIN
- EXISTING STORM SEWER & MANHOLE
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING WATERMAIN
- EXISTING HYDRANT
- EXISTING VALVE & VALVE BOX
- 100m NO-BUILD SETBACK
- BOREHOLE
- EXISTING CURB REMOVAL
- EXISTING ASPHALT REMOVAL
- EXISTING SIDEWALK REMOVAL

NOTES:

1. THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL EXISTING UTILITIES WITHIN THE SITE AND ADJACENT WORK AREAS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITIES TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OR REPLACEMENT OF ANY SERVICES OR UTILITIES DISTURBED DURING CONSTRUCTION, TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION.
2. ANY AREAS 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.
3. RELOCATION OF EXISTING SERVICES AND/OR UTILITIES SHALL BE AS SHOWN ON THE DRAWINGS OR AS DIRECTED BY THE ENGINEER AT THE EXPENSE OF THE CONTRACTOR.
4. THE SUPPORT OF ALL UTILITIES SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
5. ALL NECESSARY CLEARING AND GRUBBING SHALL BE COMPLETED BY THE CONTRACTOR. REVIEW WITH CONTRACT ADMINISTRATOR AND THE CITY OF OTTAWA PRIOR TO AND TREE CUTTING.
6. REFER TO GEOTECHNICAL INVESTIGATION PREPARED BY PATERSON GROUP, REPORT NO. PG5618-1, DATED NOVEMBER 24, 2020.
7. ALL EXISTING ASPHALT TO BE SAW-CUT.
8. REINSTATE ROAD CUTS IN ACCORDANCE WITH CITY STANDARD R10.

NOT FOR CONSTRUCTION

NOTES

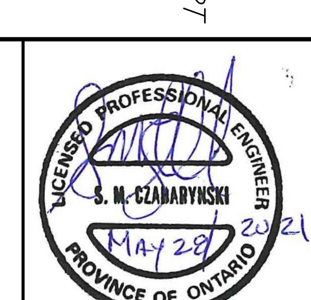
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE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

NO.	REVISION DESCRIPTION	DATE	BY
1	REVISED PER COMMENTS	28/05/21	SMC

SCALE

0 5m 10m 30m

HORIZONTAL 1:750



Robinson Land Development

350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SMC
DRAWN	BLM
CHECKED	SMC
APPROVED	SMC

MARITIME-ONTARIO FREIGHT LINES LIMITED

KANATA WEST BUSINESS PARK
8800 CAMPEAU DRIVE, OTTAWA, ON

EXISTING CONDITIONS AND REMOVALS PLAN

PROJECT No.	20027
SURVEY	STANTEC
DATED	MAY 2021
DWG. No:	20027-R1

D07-12-20-0189

#18376

Appendix C

KWBP Figure 4 – Water Distribution Plan (prepared by IBI Group)

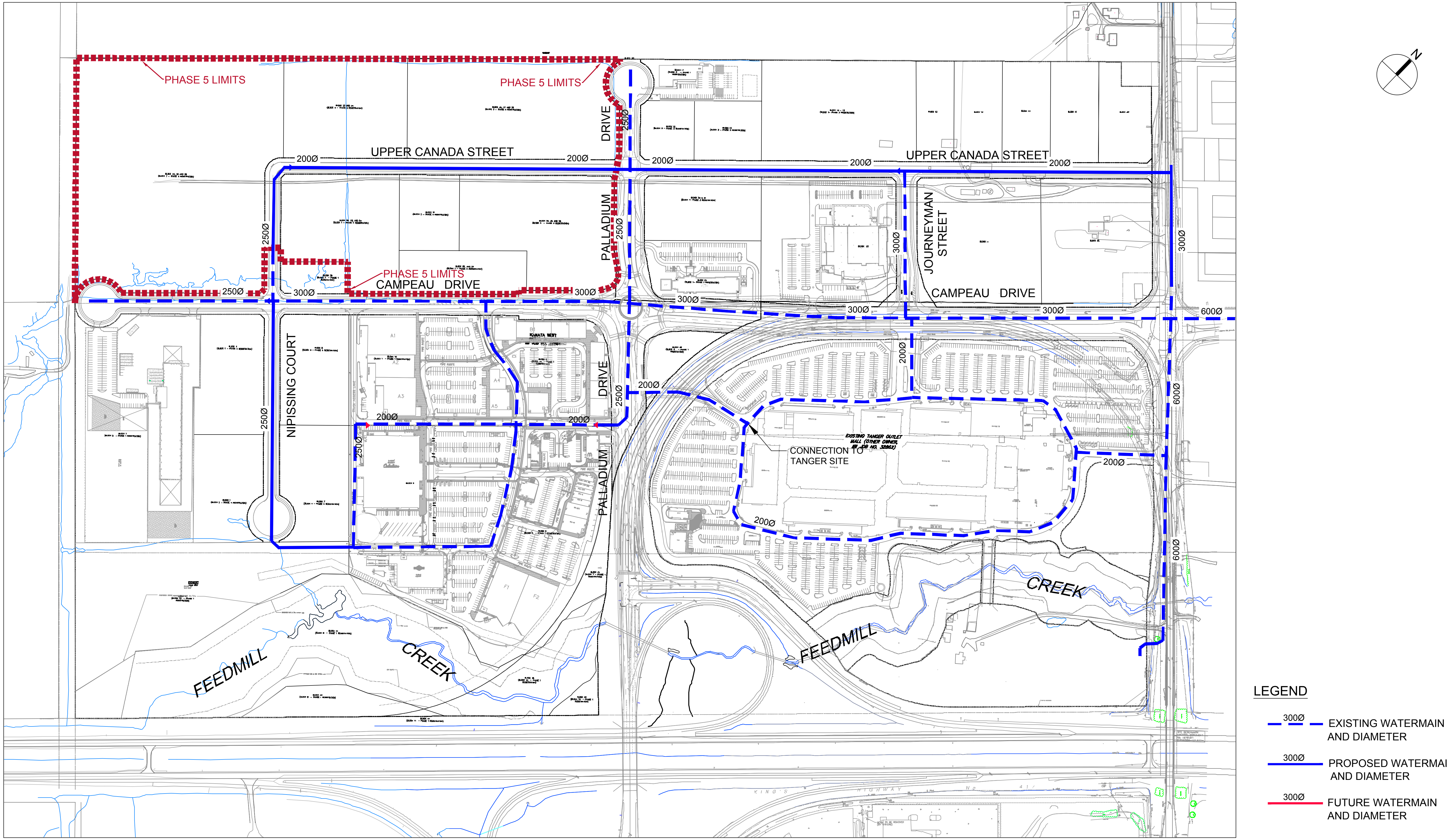
Boundary Conditions

Boundary Condition Model

FUS Long Form

Water Model Outputs

Watermain Design Sheet



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IBI

Scale

N.T.S.

Project Title

KANATA WEST BUSINESS PARK

Drawing Title

PROPOSED WATER DISTRIBUTION PLAN

Sheet No.

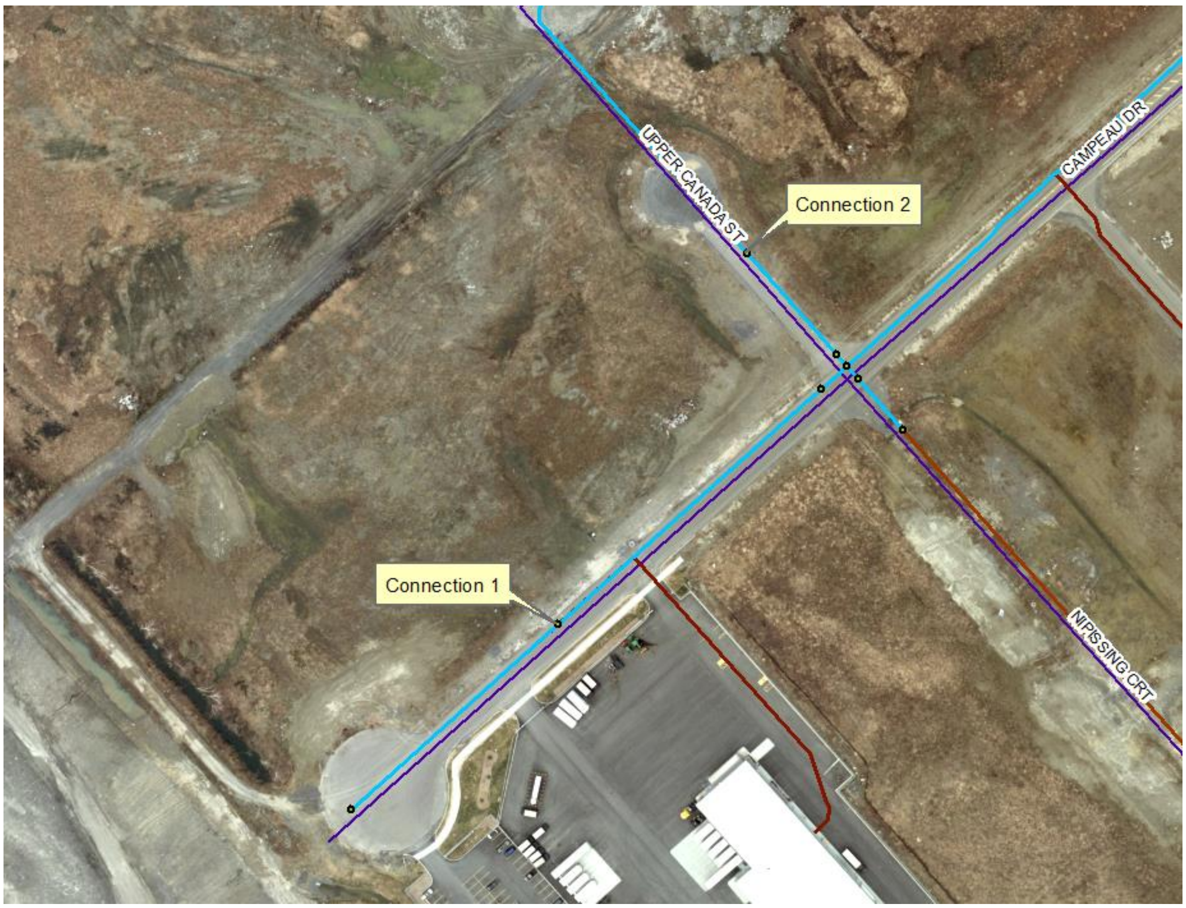
FIGURE 4

Boundary Conditions
8800 Campeau Drive

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	161	2.69
Maximum Daily Demand	242	4.03
Peak Hour	436	7.26
Fire Flow Demand #1	9,000	150.00

Location



Results

Connection 1 – Campeau Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	161.4	80.2
Peak Hour	156.3	72.9
Max Day plus Fire 1	122.6	25.1

[1] Ground Elevation = 104.98 m

Connection 2 – Upper Canada St.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	161.4	80.2
Peak Hour	156.3	72.9
Max Day plus Fire 1	136.0	44.1

[1] Ground Elevation = 104.99 m

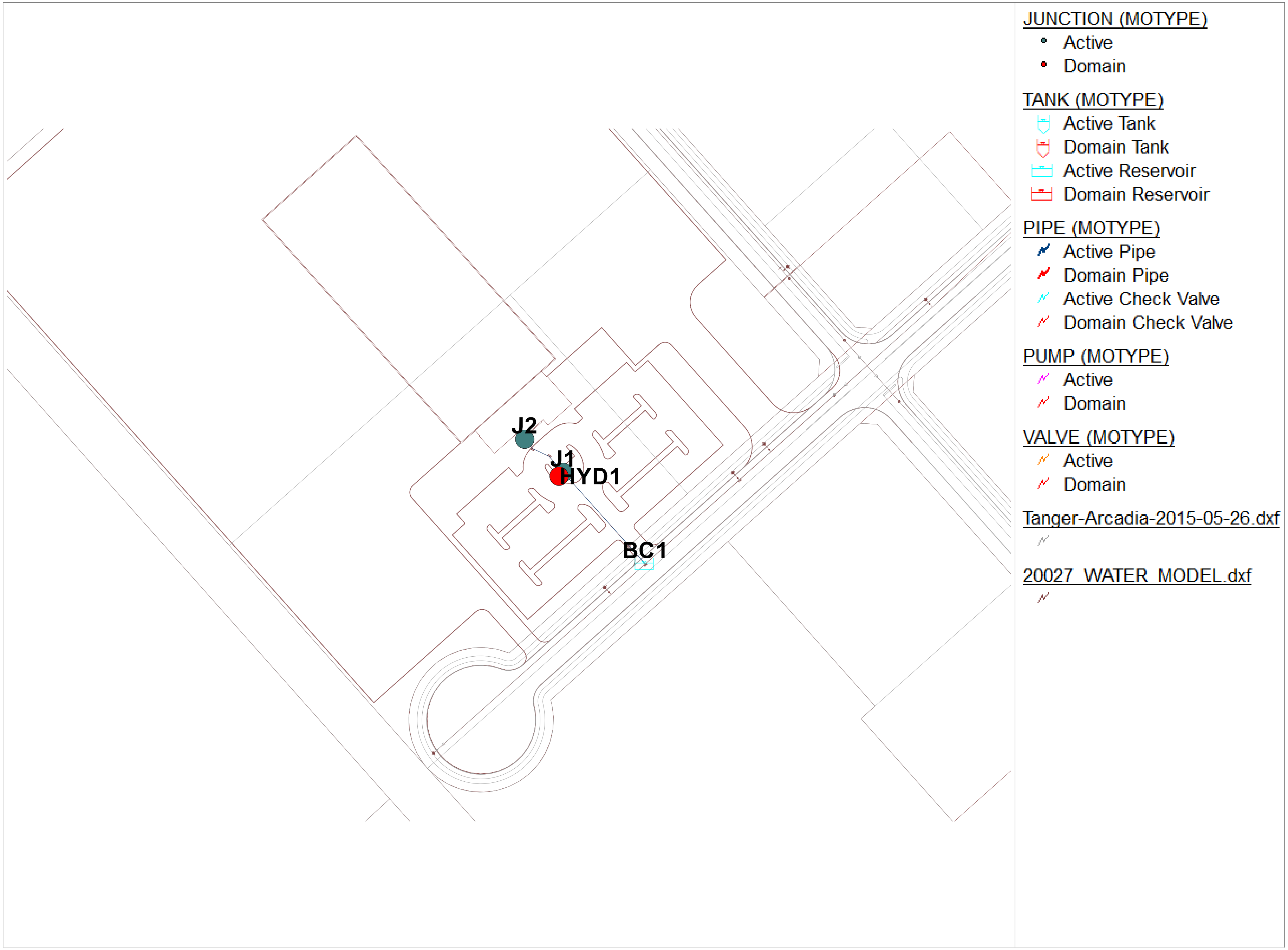
Notes

1. A second connection to the watermain is required since the basic day demand is above $50m^3/d$.
2. As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:
   a. If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
   b. Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.

Disclaimer

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

MARATIME



Prepared By:

Date: 26/11/2020 10:01:10 AM

FUS Fire Flow Calculations

Robinson Consultants

Project #: 20027
Project Name: Maritime Ontario - Kanata West
Date: 27-Oct-20
Building Type/Description/Name: Commercial Warehouse

Calculations Based on 1999 Publication "Water Supply for Public Fire Protection" by Fire Underwriters' Survey (FUS)

Table A: Fire Underwriters Survey Determination of Required Fire Flow - Long Method

Step	Task	Term	Options	Multiplier Associated with Option	Choose:	Value Used	Unit	Total Fire Flow (L/min)
		Framing Material						
1	Choose Frame Used for Construction of Unit	Coefficient related to type of construction (C)	Wood Frame	1.5	Fire resistive construction (> 2 hrs)	0.6	m	
			Ordinary Construction	1				
			Non-combustible construction	0.8				
			Fire resistive construction (< 2 hrs)	0.7				
			Fire resistive construction (> 2 hrs)	0.6				
		Floor Space Area						
2	Choose Type of Housing (if TH, Enter Number of Units per TH Block)	Type of Housing	Single Family	1	Other (comm, ind, etc.)	1	Units	
			Townhouse - indicate # of units	1				
			Other (comm, ind, etc.)	1				
2.2	# of Storeys	Number of Floors/Storeys in the Unit (do not include basement):			2	2	Storeys	
2.3	Length-height factor	Length	North Side	52.7	Length-Height factor	105.4	m.Storeys	
			East Side	124.0	Length-Height factor	248	m.Storeys	
			South Side	52.7	Length-Height factor	105.4	m.Storeys	
			West Side	124.0	Length-Height factor	248	m.Storeys	
3	Enter Ground Floor Area of One Unit	Enter Ground Floor Area (A) of One Unit Only:			6132	6132	Area in Square Metres (m^2)	
		Measurement Units	Square Feet (ft^2)	0.09290304	Square Metres (m2)			
			Square Metres (m^2)	1				
			Hectares (ha)	10,000				
4	Obtain Required Fire Flow Without Reductions	Required Fire Flow (without reductions or increases per FUS) (F=220*C*√A), round to nearest 1000 L/min						10000
5	Apply Factors Affecting Burning	**Reductions/Increases Due to Factors Affecting Burning**						
5.1	Choose Combustibility of Building Contents	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Combustible	0	N/A	10000
			Limited Combustible	-0.15				
			Combustible	0				
			Free burning	0.15				
			Rapid Burning	0.25				
5.2	Choose Reduction Due to Presence of Sprinklers	Sprinkler reduction	Complete Automatic Sprinkler Protection	-0.5	Complete Automatic Sprinkler Protection	-0.5	N/A	-5000
			None	0				
5.3	Choose Separation Distance Between Units	Exposure Distance Between Units	North Side	50	5%	0.2	N/A	2000
			East Side	50	5%			
			South Side	50	5%			
			West Side	50	5%			
6	Obtain Required Fire Flow, Duration & Volume	***Total Required Fire Flow, rounded to nearest 1000 L/min:***						7000
		Total Required Fire Flow (above) in L/s:						116.666667
		Required Duration of Fire Flow (hrs)						2
		Required Volume of Fire Flow (m^3)						840

Note: The most current FUS document should be referenced before design to ensure that the above figures are consistent with the intent of the Guidelines

Legend	
(green)	Drop down menu - choose option, or enter value
(grey)	No information, No input required

		ID	Demand (Lpm)	Elevation (m)	Head (m)	Pressure (psi)
1		HYD1	0.00	107.78	161.40	76.22
2		J1	0.00	107.20	161.40	77.04
3		J2	161.40	108.10	161.39	75.76

		ID	Demand (Lpm)	Elevation (m)	Head (m)	Pressure (psi)
1		HYD1	0.00	107.78	156.28	68.94
2		J1	0.00	107.20	156.28	69.77
3		J2	435.60	108.10	156.27	68.47

Maratime-Ontario - Fireflow Report

		ID	Total Demand (Lpm)	Critical Fire Node ID	Adjusted Fire-Flow (Lpm)	Available Flow at Hydrant (Lpm)
1		HYD1	6,959.95	HYD1	11,556.07	11,556.43

		ID	Design Flow (Lpm)
1		HYD1	11,556.07

Maratime-Ontario - Pipe Report

		ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness
1		P1	BC1	J1	51.01	203.00	110.00
2		P2	J1	HYD1	2.39	152.00	100.00
3		P3	J1	J2	21.49	203.00	110.00

WATERMAIN DESIGN SHEET

Maritime Ontario - Kanata West

Project No. 20027

TABLE

Junction Node Number	RESIDENTIAL POPULATION ACTUAL COUNT				NON-RES		AVG. DAILY DEMAND (l/s)				MAX. DAILY DEMAND (l/s)				MAX. HOURLY DEMAND (l/s)			
	Low Density	Medium Density	High Density	Total Population	COMM. (HA)	INST. (HA)	RES.	IND.	INST.	TOTAL	RES.	IND.	INST.	TOTAL	RES.	IND.	INST.	TOTAL
J1					6.64			2.69		2.69		4.03		4.03		7.26		7.26
Total					6.64			2.69		2.69		4.03		4.03		7.26		7.26

Residential Densities

Low Density (SFH's) =	3.4	cap/unit
Medium Density (Townhouses) =	2.7	cap/unit
High Density (Apartments) =	1.8	cap/unit

Avg. Daily Demand:			Max. Daily Demand:		Max. Hourly Demand:	
Residential =	350	L/cap/day	2.5	x Avg. Day	2.2	x Max. Day
Commercial =	60000	L/ha/day	1.5	x Avg. Day	1.8	x Max. Day
Institutional =	15000	L/ha/day	1.5	x Avg. Day	1.8	x Max. Day
Industrial Light =	35000	L/ha/day	1.5	x Avg. Day	1.8	x Max. Day

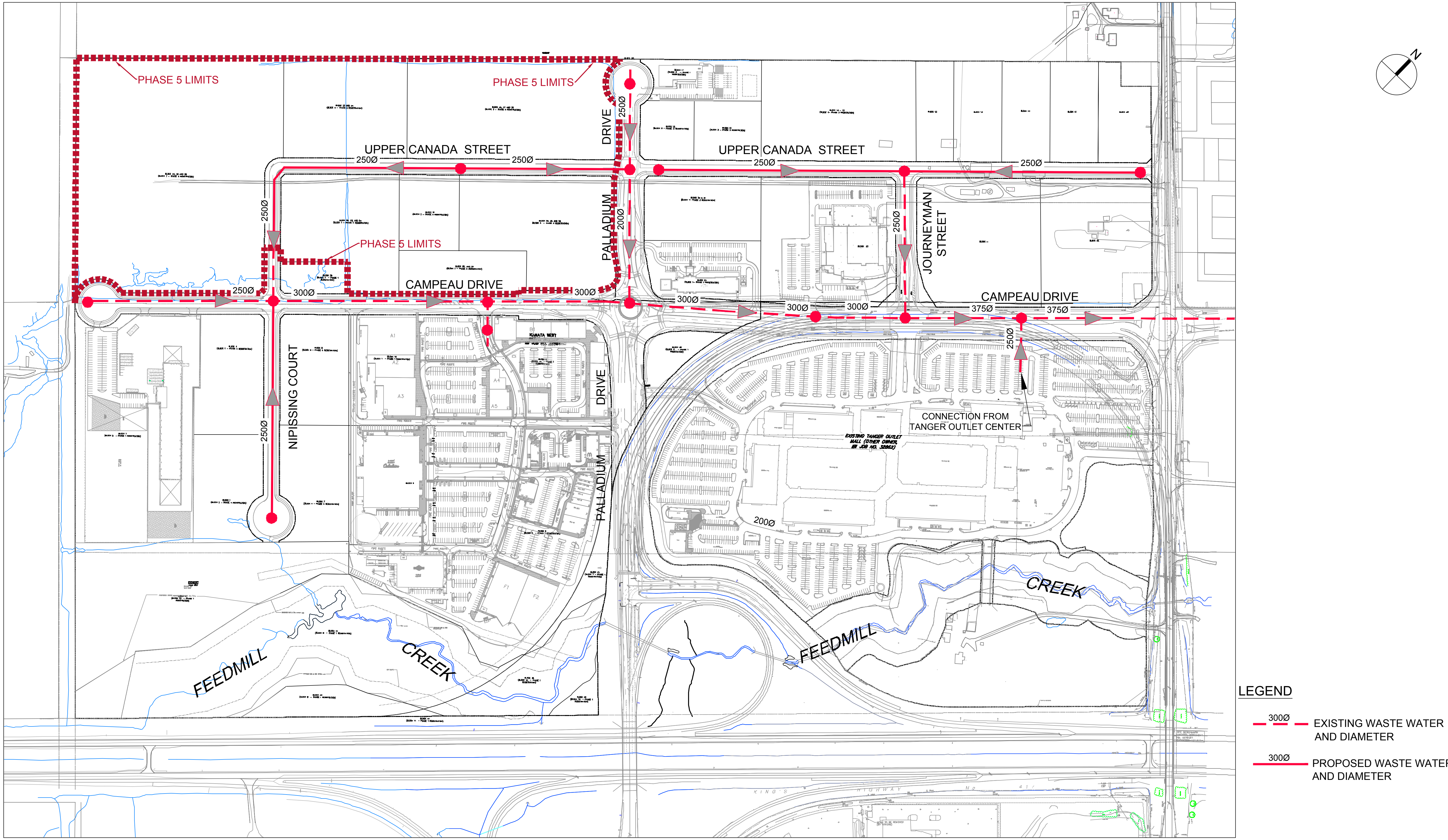
Appendix D

KWBP Figure 5 – Wastewater Plan
(prepared by IBI Group)

KWBP Sanitary Drainage Area Plan
(prepared by IBI Group)

KWBP Sanitary Sewer Design Sheet
(prepared by IBI Group)

Sanitary Sewer Design Sheet



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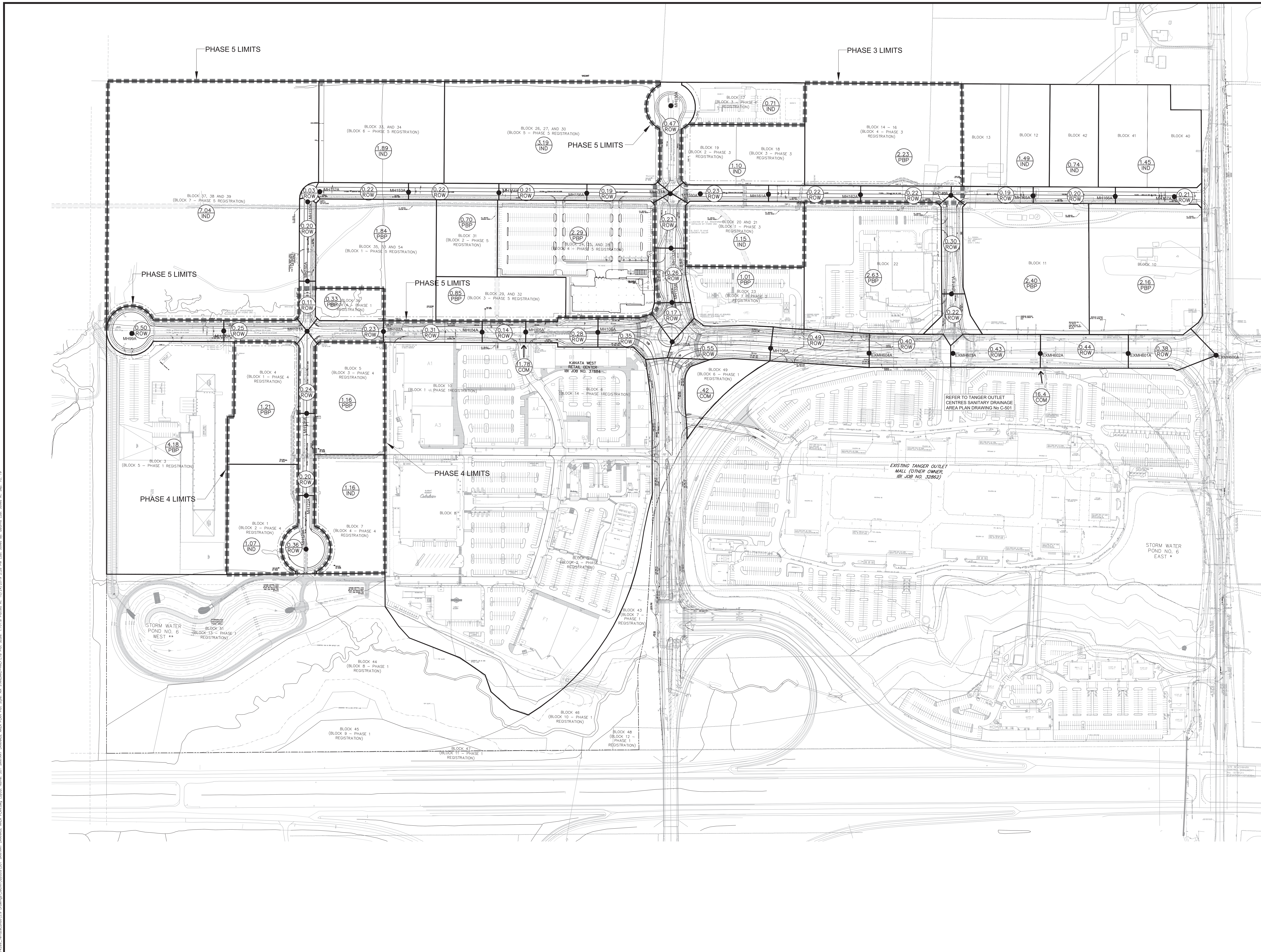
Scale	Project Title	Drawing Title	Sheet No.
N.T.S.	KANATA WEST BUSINESS PARK	PROPOSED WASTEWATER PLAN	FIGURE 5



LEGEND:

5.14 / P.B.P. — AREA IN HECTARES / LAND USE TYPE

- PBP PRESTIGE BUSINESS PARK - 35 000 l/s/ha
- IND LIGHT INDUSTRIAL - 35 000 l/s/ha
- COM COMMERCIAL - 50 000 l/S/ha
- ROW RIGHT OF WAY (INFILTRATION FLOW ONLY)

DRAINAGE AREA LIMITS

MH601A SANITARY MANHOLE & NUMBER

SANITARY SEWER & FLOW DIRECTION

No.	REVISIONS	By	Date
20			
19			
18			
17			
16			
15	ISSUED FOR PHASE 5 REGISTRATION	LME	19:09:10
14	REVISED AS PER PHASE 4 COMMENTS	LME	19:07:25
13	REVISED AS PER PHASE 4 COMMENTS	LME	19:07:22
12	REVISED AS PER PHASE 4 COMMENTS	LME	19:06:24
11	ISSUED FOR PHASE 4 REGISTRATION	LME	19:04:25
10	REVISED AS PER PHASE 3 COMMENTS	LME	19:03:08
9	ISSUED FOR PHASE 3 TENDER	LME	19:01:11
8	REVISED AS PER PHASE 3 COMMENTS	LME	18:12:14
7	REVISED FOR PHASE 3 REGISTRATION	LME	18:09:14
6	REVISED FOR PHASE 2 REGISTRATION	LME	18:04:20
5	REVISED AS PER CITY COMMENTS	LME	15:11:05
4	REVISED AS PER CITY COMMENTS	LME	15:10:15
3	REVISED AS PER NEW SITE PLAN AND CITY COMMENTS	LME	15:06:19
2	REVISED AS PER CITY COMMENTS	LME	15:04:08
1	ISSUED TO CITY FOR APPROVAL	LME	14:11:27

TAGGART
REALTY MANAGEMENT

IBI GROUP
400 – 333 Preston Street
Ottawa ON K1S 5N4 Canada
tel 613 225 1311 fax 613 225 9868
ibigroup.com

Project Title

KANATA WEST BUSINESS PARK PHASE 5

LICENSED PROFESSIONAL ENGINEER
L. M. ERION
13379508
2019/09/10
PROVINCE OF ONTARIO

N

Drawing Title

SANITARY DRAINAGE AREA PLAN

Scale	
1:2000	
Design: LME	Date: NOV. 2014
Drawn: DPS	Checked: TRB
Project No.: 14289	Drawing No.: 501

D07-16-14-0003_P5

#17661

IBI GROUP
IBI Group
400-333 Preston Street
Ottawa, Ontario
K1S 5N4

SANITARY SEWER DESIGN SHEET

PROJECT: KANATA WEST BUSINESS PARK
LOCATION: 333 HUNTMAR DRIVE
CLIENT: TAGGART

LOCATION				RESIDENTIAL									ICI AREAS								INFILTRATION ALLOWANCE			FIXED	TOTAL	PROPOSED SEWER DESIGN							
				UNIT TYPES				AREA	POPULATION		PEAK	PEAK	AREA (Ha)							PEAK	AREA (Ha)		FLOW	FLOW	FLOW	CAPACITY	LENGTH	DIA	SLOPE	VELOCITY	VELOCITY	AVAILABLE CAPACITY	
											FACTOR	FLOW	PRESTIGE BUISNESS PK		COMMERCIAL		INDUSTRIAL			FLOW										(full)	(actual)		
STREET	AREA ID	FROM MH	TO MH	SF	SD	TH	APT	(Ha)	IND	CUM		(L/s)	IND	CUM	IND	CUM	IND	CUM	PF	(L/s)	IND	CUM	(L/s)	(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(m/s)	(m/s)	L/s	(%)
KANATA WEST BUSINESS PARK - Block number based on overall concept plan of subdivision																																	
Upper Canada Street	Blocks 31	MH154A	MH153A										0.70	0.70				0.00	1.50	0.34	0.92	0.92	0.30	0.00	0.64	43.87	110.00	250	0.50	0.866	0.301	43.22	98.53
	Blocks 35, 53, 54												1.84	2.54				0.00	1.50	1.23	2.06	2.98		0.00	1.23								
	Blocks 33, 34	MH153A	MH152A														1.89	1.89	5.90	4.52	1.89	4.87	1.61	0.00	7.36	39.24	114.86	250	0.40	0.774	0.543	31.88	81.24
		MH152A	MH151A											2.54				1.89	5.90	5.75	0.03	4.90	1.62	0.00	7.37	36.70	10.84	250	0.35	0.724	0.562	29.33	79.92
	Blocks 37, 38, 39	MH151A	MH150A											2.54			7.04	8.93	4.50	17.51	7.24	12.14	4.01	0.00	21.52	36.70	102.56	250	0.35	0.724	0.753	15.18	41.37
		MH150A	MH101A											2.54				8.93	4.50	17.51	0.11	12.25	4.04	0.00	21.56	36.70	63.86	250	0.35	0.724	0.753	15.15	41.27
Campeau Drive	Blocks 3	MH99A	MH100A										4.18	4.18						2.03	4.68	4.68	1.54	0.00	3.58	50.02	112.75	250	0.65	0.987	0.570	46.44	92.85
		MH100A	MH101A											4.18						2.03	0.25	4.93	1.63	0.00	3.66	51.91	101.44	250	0.70	1.024	0.571	48.25	92.95
Nipissing Court	Blocks 1, 7	MH123A	MH122A														2.23	2.23	6.25	5.65	2.59	2.59	0.85	0.00	6.50	50.02	65.18	250	0.65	0.987	0.607	43.52	87.00
		MH122A	MH121A															2.23	6.25	5.65	0.20	2.79	0.92	0.00	6.57	50.02	100.00	250	0.65	0.987	0.607	43.45	86.87
	Blocks 4, 5	MH121A	MH101A										2.37	2.37				2.23	6.25	6.80	2.61	5.40	1.78	0.00	8.58	85.51	97.00	250	1.90	1.688	1.038	76.93	89.97
Campeau Drive	Block 36	MH101A	MH103A										0.33	9.42				11.16	4.75	26.05	0.56	23.14	7.64	0.00	33.69	43.87	93.00	250	0.50	0.866	0.952	10.18	23.20
	Block 32, 54	MH103A	MH104A										1.00	10.42				11.16	4.75	26.54	1.31	24.45	8.07	0.00	34.61	43.87	120.00	250	0.50	0.866	0.952	9.26	21.11
Campeau Drive	Block 29, 32	MH104A	MH105A										0.85	11.27				11.16	4.75	26.95	0.99	25.44	8.40	0.00	35.35	43.87	53.11	250	0.50	0.866	0.952	8.52	19.42
KWRC	Blocks 6, 8, 9, 10		MH 105A												11.78	11.78				5.73	11.78	11.78	3.89	0.00	9.61	39.24	12.01	250	0.40	0.774	0.601	29.62	75.50
Campeau Drive		MH105A	MH106A											11.27		11.78		11.16	4.75	32.68	0.28	37.50	12.38	0.00	45.05	59.68	87.77	300	0.35	0.818	0.877	14.63	24.51
	Block 24	MH106A	MH107A										0.75	12.02		11.78		11.16	4.75	33.04	1.10	38.60	12.74	0.00	45.78	59.68	90.92	300	0.35	0.818	0.900	13.90	23.29
Upper Canada Street	Blocks 26, 27, 30	MH154A	MH156A														3.19	3.19	5.50	7.11	3.40	3.40	1.12	0.00	8.23	50.02	107.00	250	0.65	0.987	0.692	41.79	83.55
		MH156A	MH131A															3.19	5.50	7.11	0.19	3.59	1.18	0.00	8.29	50.02	101.71	250	0.65	0.987	0.692	41.73	83.42
Palladium Drive	Blocks 17	MH130A	MH131A											0.00			0.71	0.71	5.50	1.58	1.18	1.18	0.39	0.00	1.97	50.02	106.00	250	0.65	0.987	0.467	48.05	96.06
Palladium Drive		MH131A	MH132A											0.00				3.90	5.25	8.29	0.23	5.00	1.65	0.00	9.94	43.87	67.35	250	0.50	0.866	0.672	33.92	77.33
	Block 23, 24, 25, 28	MH132A	MH133A										3.30	3.30				3.90	5.25	9.90	3.56	8.56	2.82	0.00	12.72	43.87	71.26	250	0.50	0.866	0.730	31.14	71.00
		MH133A	MH107A											3.30				3.90	5.25	9.90	0.17	8.73	2.88	0.00	12.78	107.45	42.79	250	3.00	2.121	1.304	94.67	88.11
Campeau Drive	Block 49	MH107A	MH108A											15.32	0.42	12.20		15.06	4.40	40.22	0.97	48.30	15.94	0.00	56.16	59.68	120.00	300	0.35	0.818	0.900	3.52	5.90
		MH108A	EX604A											15.32		12.20		15.06	4.40	40.22	0.49	48.79	16.10	0.00	56.32	59.68	120.00	300	0.35	0.818	0.900	3.36	5.63
	Block 22	MH 604A	MH 603A										2.63	17.95		12.20		15.06	4.40	41.50	3.03	51.82	17.10	0.00	58.60	62.51	102.12	300	0.38	0.857	0.942	3.91	6.26
Upper Canada Street	Blocks 18, 19, 20, 21	MH160A	MH161A											0.00			2.25	2.25	5.75	5.24	2.48	2.48	0.82	0.00	6.06	58.86	83.00	250	0.90	1.162	0.714	52.80	89.70
	Block 14- 16	MH161A	MH162A										2.23	2.23				2.25	5.75	6.32	2.45	4.93	1.63	0.00	7.95	50.02	112.00	250	0.65	0.987	0.692	42.07	84.10
		MH162A	MH140A											2.23				2.25	5.75	6.32	0.22	5.15	1.70	0.00	8.02	63.57	110.98	250	1.05	1.255	0.772	55.55	87.38
Upper Canada Street	Blocks 40, 41	MH167A	MH166A											0.00			1.45	1.45	6.25	3.67	1.66	1.66	0.55	0.00	4.22	51.91	72.00	250	0.70	1.024	0.611	47.69	91.87
	Block 42	MH166A	MH165A											0.00			0.74	2.19	5.70	5.06	0.94	2.60	0.86	0.00	5.91	50.02	100.00	250	0.65	0.987	0.607	44.10	88.17
	Blocks 12, 13	MH165A	MH140A											0.00			1.49	3.68	5.30	7.90	1.68	4.28	1.41	0.00	9.31	39.24	99.02	250	0.40	0.774	0.601	29.92	76.26
Journeyman Street		MH140A	MH141A											2.23				5.93	5.00	13.10	0.30	9.73	3.21	0.00	16.31	31.02	120.00	250	0.25	0.612	0.612	14.71	47.43
		MH141A	MH (84)											2.23				5.93	5.00	13.10	0.22	9.95	3.28	0.00	16.38	31.02	40.30	250	0.25	0.612	0.612	14.64	47.20
		Stub	MH 603A											2.23				5.93	5.00	13.10	0.00	9.95	3.28	0.00	16.38	31.63	32.98	250	0.26	0.624	0.624	15.26	48.22
Campeau Drive	Block 11	MH 603A	MH 602A										2.40	22.58		12.20		20.99	3.80	49.22	2.83	64.60	21.32	0.00	70.54	103.47	105.24	375	0.32	0.908	0.973	32.93	31.83
	Tanger Outlet Centres	MH 602A	MH 601A											22.58	16.40	28.60		20.99	3.80	57.19	16.84	81.44	26.88	0.00	84.07	109.75	107.73	375	0.36	0.963	1.059	25.68	23.40
	Block 52	MH 601A	MH 600A										2.16	24.74		28.60		20.99	3.80	58.24	2.54	83.98	27.71	0.00	85.95	109.75	106.95	375	0.36	0.963	1.059	23.79	21.68

Campeau Drive	Block XX	MH XXX	MH XXX	Light Grey = Constructed Sewer

Design Parameters:

Residential			ICI Areas			Peak Factor (PF)
SF	3.4	p/p/u	P.B.P.	28,000	L/Ha/day	1.5
TH/SD	2.7	p/p/u	COM	28,000	L/Ha/day	1.5
APT	1.8	p/p/u	IND	35,000	L/Ha/day	MOE Chart
Other	60	p/p/Ha				

Notes:

1. Manning's coefficient (n) = 0.013
2. Demand (per capita): 280 L/day 300 L/day
3. Infiltration allowance: 0.33 L/s/Ha 0.4 L/s/Ha
4. Residential Peaking Factor:
   Harmon Formula = 1+(14/(4+P^0.5)) K=0.8
   where P = population in thousands

Designed: LME

Checked:

Dwg. Reference: 14289-501

No.	Revision	Date
1.	City submission No. 1	2014-11-25
2.	City submission No. 2	2015-04-08
3.	City submission No. 3	2015-06-18
4.	City submission No. 4	2015-10-15
5.	Revised for Phase 2 Registration	2018-04-19
6.	Revised for Phase 3 Registration	2018-09-14
7.	Revised per City Comments (Phase 3)	2018-12-14
8.	Revised for Phase 4 Registration	2019-04-26
9.	Revised for Phase 4 Registration Comments	2019-06-24
10.	Revised for Phase 5 Registration	2019-09-11
11.	Revised per City comments for Phase 5 Registration	2019-10-25

File Reference:	Date:	Sheet No:
14289.5.7.1	2018-04-19	1 of 1

SANITARY SEWER DESIGN SHEET
for
MARITIME-ONTARIO
8800 CAMPEAU DRIVE, KWBP

LOCATION			AREA (ha)		INDUSTRIAL FLOW				PIPE						
STREET	FROM MH	TO MH	INDIVIDUAL	CUMM.	PEAK FACTOR	PEAK IND. FLOW (L/s)	EXTRAN. FLOW (L/s)	PEAK DESIGN FLOW (L/s)	LENGTH (m)	DIAMETER (mm)	SLOPE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	EXCESS CAPACITY (L/s)	PERCENT FULL
TO CAMPEAU DRIVE SANITARY SEWER															
PARKING LOT	BLDG	101	7.04	7.04	4.50	10.27	2.32	12.59	10.3	201.16	1.07	34.49	1.09	21.90	36.50
PARKING LOT	101	100	0.00	7.04	4.50	10.27	2.32	12.59	49.5	201.16	0.34	19.44	0.61	6.85	64.76
PARKING LOT	100	MAIN	0.00	7.04	4.50	10.27	2.32	12.59	17.5	201.16	0.36	20.01	0.63	7.42	62.93
CAMPEAU DRIVE	*EX99A*	*EX100A*	*4.18*	*11.22*		*12.30*	*3.86*	*16.17*	*113.0*	*250.00*	*0.65*	*47.99*	*0.98*	*31.82*	*33.69*
CAMPEAU DRIVE	*EX100A*	*EX101A*	*0.00*	*11.22*		*12.30*	*3.95*	*16.25*	*101.3*	*250.00*	*0.97*	*58.63*	*1.19*	*42.38*	*27.72*

DESIGN PARAMETERS

Average Daily Flow =		L/person/day
Comm./Inst. Flow =		L/s/ha
Light Industrial Flow =	28000	L/ha/d
Maximum Residential Peak Factor =	4.0	
Harmon - Correction Factor (K) =	0.8	
Peaking Factor =	4.5	(MOE Chart - City of Ottawa Appendix 4-B.1)
Extraneous Flow =	0.33	L/s/ha
Minimum Full Flow Velocity =	0.60	m/s
Maximum Full Flow Velocity =	3.0	m/s
Manning's Coefficient (n) =	0.013	

Notes:
1. Sanitary sewer design parameters in accordance IBI Report for KWBP - Phase 5
2. Refer to drawing Campeau Drive from STA 19+780 to STA 20+110, Drawing No. 101, prepared by IBI Group.
3. Refer to KWBP sanitary sewer design sheet, prepared by IBI Group.

Appendix E

KWBP Storm Sewer Design Sheet (prepared by IBI Group)

KWBP Figure 8 – Proposed Storm Sewer Plan (prepared by IBI Group)

KWBP Storm Drainage Area Plan (prepared by IBI Group)

KWBP Table 4.2 – Drainage Area Parameters (prepared by IBI Group)

KWBP SWMHYMO Schematic (prepared by IBI Group)

KWBP Table 4.10 – Summary of Hydraulic Grade Line (prepared by IBI Group)

Aquafor Beech Report Excerpts

Geotechnical Correspondence

KWBP Figure 2 – Post-Development SWM Drainage Boundaries Overall Site (prepared by IBI Group)

IBI GROUP

IBI Group
400-333 Preston Street
Ottawa, Ontario
K1S 5N4

STORM SEWER DESIGN SHEET

PROJECT: KANATA WEST BUSINESS PARK
LOCATION: 333 HUNTMAR DRIVE
CLIENT: TAGGART

LOCATION				AREA (Ha)											RATIONAL DESIGN FLOW													SEWER DATA								
STREET	AREA ID	FROM MH	TO MH	C= 0.20	C= 0.57	C= 0.57	C= 0.61	C= 0.68	C= 0.68	C= 0.70	C= 0.85	C= 0.85	C= 0.90	C= 0.90	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW (L/s)	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	W	H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (5yr) (L/s)	(%)
KANATA WEST BUSINESS PARK - Block numbers based on overall concept plan of subdivision																																				
Journeyman St.		MH140	MH141												0.00	19.28	16.32			79.51	93.10	135.92	1,533.17													
						0.13				0.32					0.83	2.96	16.32	0.95	17.27	79.51	93.10	135.92			402.03		1,935.2	2,784.1	107.00	1350			0.25	1.884	848.9	30.5%
		MH141	MH141B												0.00	19.28	17.27			76.88	90.00	131.37	1,482.33													
										0.13					0.25	3.21	17.27	0.54	17.81	76.88	90.00	131.37			421.81		1,904.1	2,156.5	47.35	1350			0.15	1.460	252.4	11.7%
Journeyman St.		Stub	MH 603												0.00	19.28	17.81			75.46	88.33	128.92	1,454.94													
															0.00	3.21	17.81	0.33	18.14	75.46	88.33	128.92			413.95		1,868.9	1,363.9	18.02	1350			0.06	0.923	-505.0	-37.0%
Campeau Drive		603	602												0.00	47.54	19.70			70.93	83.00	121.11	3,372.06													
												0.26			0.61	15.30	19.70	0.71	20.41	70.93	83.00	121.11			1,853.06		5,225.1	3,971.3	92.77	1500			0.29	2.177	-1253.8	-31.6%
		602	601												0.00	47.54	20.41			69.37	81.18	118.44	3,298.20													
												0.32			0.76	16.06	20.41	0.53	20.94	69.37	81.18	118.44			1,901.67		5,199.9	4,362.8	76.05	1500			0.35	2.392	-837.0	-19.2%
Tanger	Blocks 10, 11	601	9								4.56				10.78	58.32	20.94			68.26	79.87	116.52	3,980.92													
												0.78			1.84	17.90	20.94	0.87	21.80	68.26	79.87	116.52			2,085.72		6,066.6	5,730.3	96.86	1950			0.15	1.859	-336.4	-5.9%
Tanger		9	12										3.24		8.11	66.43	21.80			66.52	77.83	113.53	4,418.87													
															0.00	17.90	21.80	0.81	22.62	66.52	77.83	113.53			2,032.17	18.00	6,469.0	5,749.5	90.76	1950			0.15	1.865	-719.6	-12.5%
Tanger		12	13										1.81		4.53	70.95	22.62			64.99	76.03	110.89	4,611.14													
															0.00	17.90	22.62	0.22	22.83	64.99	76.03	110.89			1,984.84	18.00	6,614.0	5,749.5	24.54	1950			0.15	1.865	-864.5	-15.0%
Tanger		13	Pond 6E										4.11		10.28	81.24	22.83			64.59	75.56	110.20	5,246.78													
														0.84	2.10	20.00	22.83	0.08	22.92	64.59	75.56	110.20			2,204.06	153.00	7,603.8	7,005.7	9.99	2100			0.15	1.959	-598.1	-8.5%
KANATA WEST BUSINESS PARK																																				
Upper Canada St.	Block31,33,34	**MH154**	**MH153**								**2.59**				**6.12**	**6.12**	**12.70**			**91.81**	**107.56**	**157.14**	**561.88**													
						0.32									**0.51**	**0.51**	**12.70**	**1.70**	**14.40**	**91.81**	**107.56**	**157.14**			**79.68**		**641.6**	**905.5**	**120.00**	**975**			**0.15**	**1.175**	**263.92**	**29.15%**
Upper Canada St.	**Blocks 35, 53, 54**	**MH153**	**MH152B**								**1.82**				**4.30**	**10.42**	**14.40**			**85.54**	**100.18**	**146.32**	**891.39**													
						0.16									**0.25**	**0.76**	**14.40**	**1.10**	**15.51**	**85.54**	**100.18**	**146.32**			**111.29**		**1002.7**	**1,103.3**	**81.80**	**1050**			**0.15**	**1.234**	**100.65**	**9.12%**
	External Drainage	**DI200**	**MH152B**	14.53											**8.08**	**8.08**	**30.00**	**2.48**	**32.48**	**53.93**	**63.05**	**91.87**	**435.66**				**435.7**	**473.6**	**127.45**	**825**			**0.10**	**0.858**	**37.89**	**8.00%**
Upper Canada St.		**MH152B**	**MH152**												**0.00**	**18.50**	**14.40**			**85.54**	**100.18**	**146.32**	**1,582.43**													
															0.00	**0.76**	**14.40**	**1.07**	**15.47**	**85.54**	**100.18**	**146.32**			**111.29**		**1693.7**	**2,332.0**	**81.80**	**1500**			**0.10**	**1.278**	**638.30**	**27.37%**
	Blocks 39	**MH152**	**MH151**												**0.00**	**18.50**	**15.47**			**82.07**	**96.11**	**140.33**	**1,518.31**													
															0.00	**0.76**	**15.47**	**0.18**	**15.65**	**82.07**	**96.11**	**140.33**			**106.74**		**1625.0**	**2,332.0**	**13.91**	**1500**			**0.10**	**1.278**	**706.98**	**30.32%**
		MH151	**MH150**												**0.00**	**18.50**	**15.65**			**81.51**	**95.45**	**139.37**	**1,507.97**													
						0.17									**0.27**	**1.03**	**15.65**	**1.35**	**17.00**	**81.51**	**95.45**	**139.37**			**143.55**		**1651.5**	**2,332.0**	**103.40**	**1500**			**0.10**	**1.278**	**680.50**	**29.18%**
		MH150	**MH120**												**0.00**	**18.50**	**17.00**			**77.61**	**90.86**	**132.64**	**1,435.79**													
						0.20									**0.32**	**1.35**	**17.00**	**0.89**	**17.89**	**77.61**	**90.86**	**132.64**			**178.65**		**1614.4**	**3,006.9**	**72.86**	**1650**			**0.10**	**1.362**	**1392.42**	**46.31%**
Campeau Drive	Block 3	MH99	MH100								4.18				9.88	9.88	11.70			96.00	112.49	164.38	948.19													
									0.36						0.68	0.68	11.70	1.13	12.83	96.00	112.49	164.38			111.87		1060.1	1,560.3	118.50	1050			0.30	1.746	500.29	32.06%
		MH100	MH101												0.00	9.88	12.83			91.29	106.95	156.24	901.68													
							0.27								0.46	1.14	12.83	0.76	13.59	91.29	106.95	156.24			177.87		1079.6	2,073.9	80.84	1200			0.26	1.776	994.37	47.95%
	Block 37, 38, 39	MH101	MH120								7.03				16.61	26.49	15.50			81.98	95.99	140.17	2,171.48													
															0.00	1.14	15.50	0.14	15.64	81.98	95.99	140.17			159.57		2331.0	2,961.0	20.89	1200			0.53	2.536	630.00	21.28%
Campeau Drive	Block 32, 29	MH104	MH103								0.85				2.01	2.01	11.25			98.02	114.88	167.89	196.89													
							0.66								1.12	1.12	11.25	2.33	13.58	98.02	114.88	167.89			187.90		384.8	473.6	120.00	825			0.10	0.858	88.76	18.74%
	Block 36	MH103	MH102								0.33				0.78	2.79	13.58			88.44	103.60	151.33	246.61													
															0.00	1.12	13.58	1.52	15.10	88.44	103.60	151.33			169.37		416.0	597.2	82.99	900			0.10	0.909	181.24	30.35%
		MH102	MH120												0.00	2.79	15.10			83.23	97.47	142.33	232.08													
															0.00	1.12	15.10	0.37	15.47	83.23	97.47	142.33			159.30		391.4	597.2	20.01	900			0.10	0.909	205.85	34.47%
Nipissing Court	Blocks 4, 5	MH120	MH121								2.37				5.60	53.38	17.89			75.25	88.09	128.57	4,016.75													
						0.26									0.41	4.02	17.89	0.74	18.63	75.25	88.09	128.57			516.40		4533.2	6,120.8	88.44	1950			0.17	1.985	1587.62	25.94%
		MH121	MH122		0.21										0.33	53.71	18.63			73.40	85.92	125.38	3,942.57													
															0.00	4.02	18.63	0.73	19.36	73.40	85.92	125.38			503.61		4446.2	7,119.4	100.84	1950			0.23	2.309	2673.27	37.55%
	Blocks 1, 7	MH122	MH123					0.35			2.23				5.93	59.64	19.36			71.69	83.90	122.43	4,275.61													
															0.00	4.02	19.36	0.77	20.13	71.69	83.90	122.43			491.73		4767.3	6,638.9	99.19	1950			0.20	2.154	1871.57	28.19%
Future	Blocks 8, 9	MH (215)	MH123								11.78				27.84	27.84	20.70	0.24	20.94	68.75	80.45	117.37	1,913.77				1,913.8	3,006.9	20.00	1650			0.10	1.362	1093.09	36.35%
West Pond Outlet		MH123	Outlet												0.00	87.48	20.13			69.97	81.88	119.47	6,121.06													
															0.00	4.02	20.13	0.87	21.00	69.97	81.88	119.47			479.86		6600.9	10,648.2	119.64	2400			0.17	2.280	4047.31	38.01%
Future	Blocks X,X	MH XX	MHXX	Grey = Constructed																																

Definitions:
Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:
1. Mannings coefficient (n) = 0.013

2. The Storm Sewer Design Sheet is for the rational method storm sewer design only, release rates for the individual blocks are included in Table 4.1 of the Design Brief, Kanata West Business Park, 333 Huntmar Drive, by IBI Group November 2015

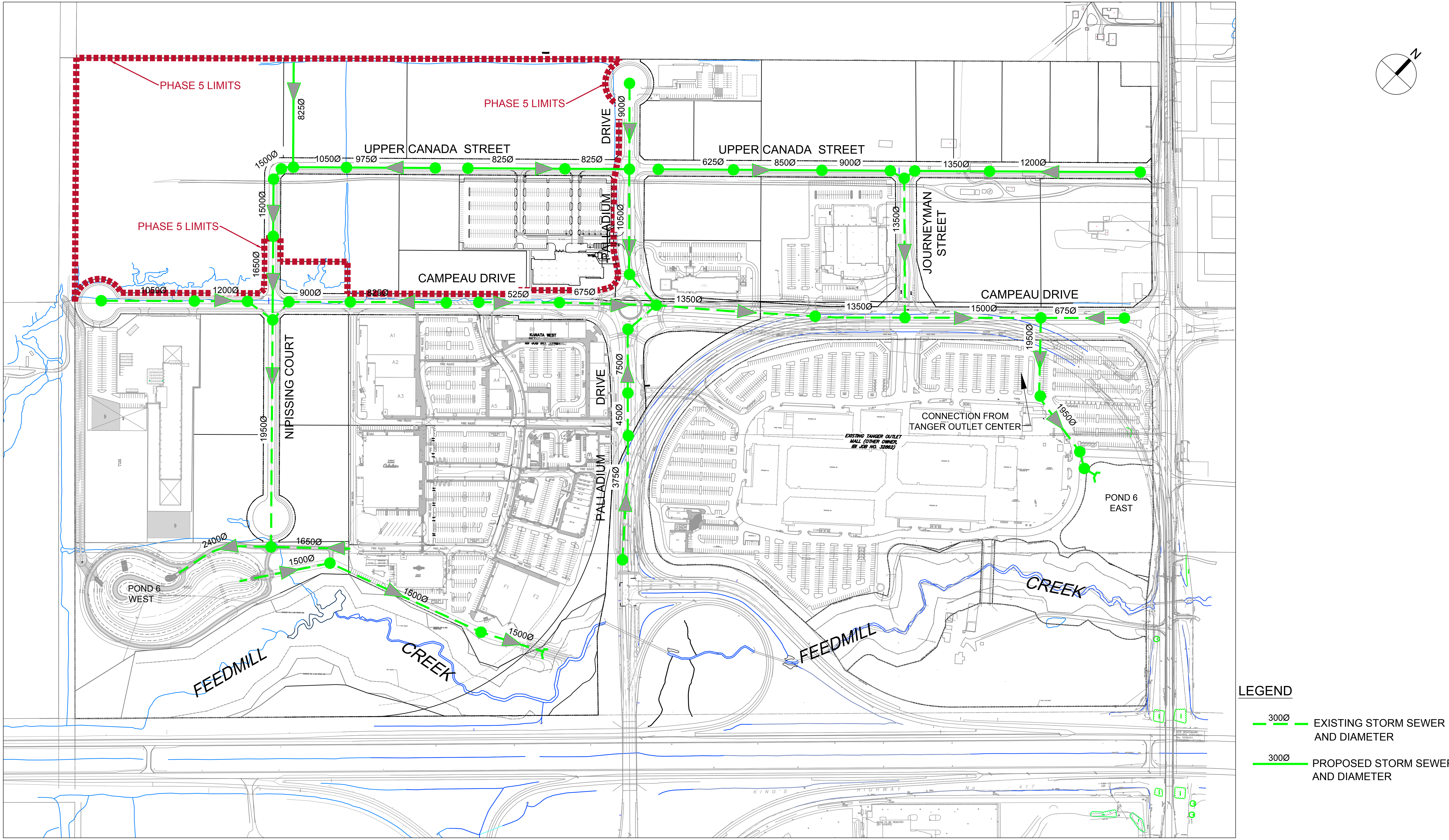
Designed: LME

Checked:

Dwg. Reference: 14289-500

No.	Revision	Date
1.	City submission No. 1	2014-11-25
2.	City submission No. 2	2015-04-08
3.	City submission No. 3	2015-06-18
4.	City submission No. 4	2015-10-15
5.	City submission No. 5	2015-11-04
6.	Revised for Phase 2 Registration	2018-04-19
7.	Revised for Phase 3 Registration	2018-09-14
8.	Revised per City comments	2018-12-14
9.	Revised per City comments	2019-03-08
10.	Revised for Phase 4 Registration	2019-04-25
11.	Revised per comments for Phase 4 Registration	2019-06-24
12.	Revised for Phase 5 Registration	2019-09-10
13.	Revised per City comments for Phase 5 Registration	2019-10-24
14.	Revised per City comments for Phase 5 Registration	2019-11-06

File Reference:	Date:	Sheet No:
14289.5.7.1	2019-11-06	2 of 2



Plot Style: AIA STANDARD COLOR-HALF.CTB Plot Scale: 0.042:1 Plotted At: Oct. 17, 19 1:41 PM Printed By: DON SIURNA Last Saved By: DSIURNA Last Saved At: Oct. 17, 19

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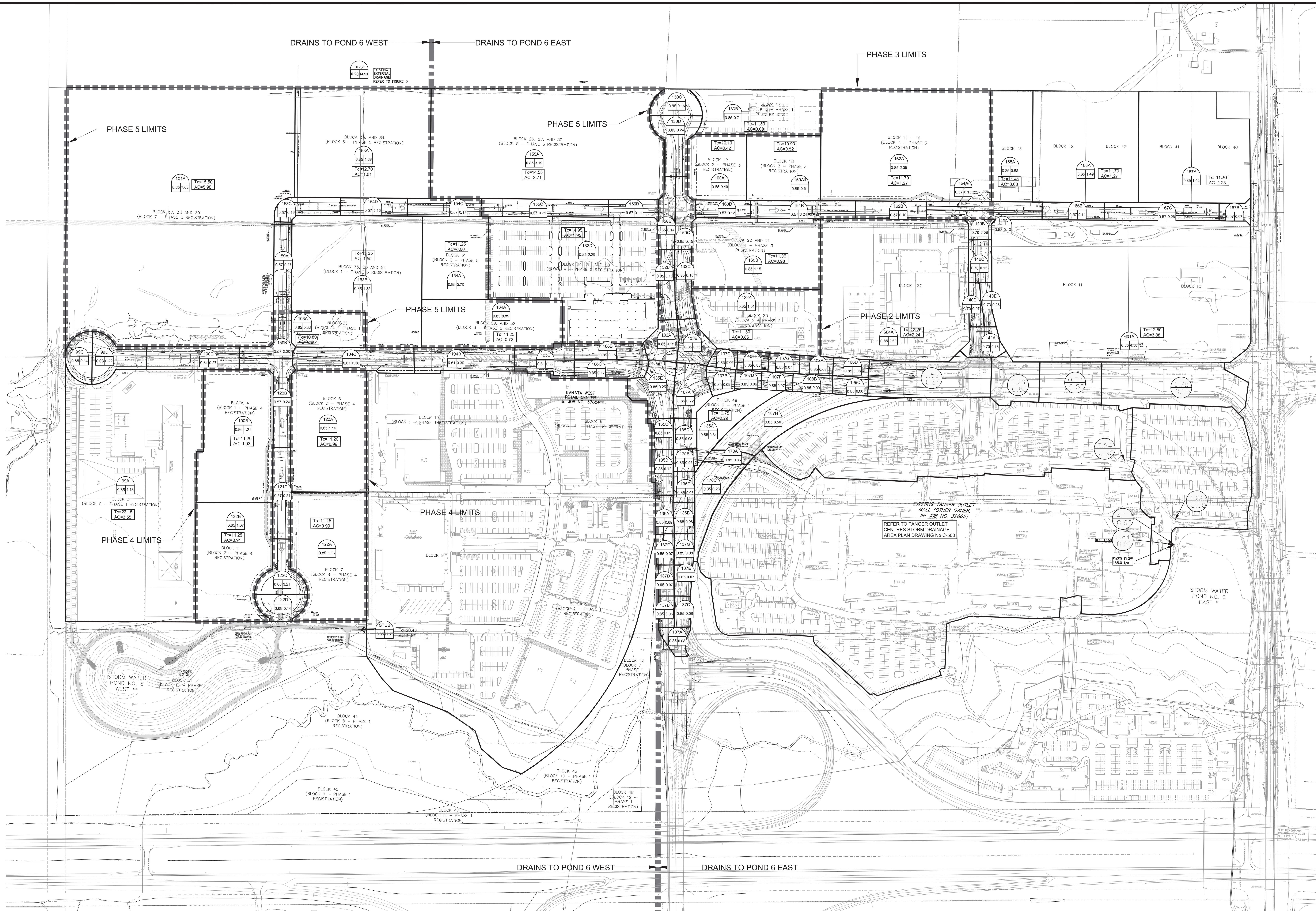
Scale: N.T.S.

Project Title: KANATA WEST BUSINESS PARK

Drawing Title: PROPOSED STORM SEWER PLAN

Sheet No.: FIGURE 8



LEGEND:

- DRAINAGE AREA LIMITS
- MH601 — STORM MANHOLE & NUMBER
- STORM SEWER & FLOW DIRECTION
- 604A — AREA ID
- 0.85 | 2.63 — AREA IN HECTARES; RUNOFF COEFFICIENT
- EMERGENCY OVERLAND FLOW ROUTE
- Tc=11.70 — ESTIMATED TIME OF CONCENTRATION IN MINUTES
- AC=1.23 — PRODUCT OF AREA AND RUNOFF COEFFICIENT

EXISTING TANGER OUTLET CENTRE

- 0.56 — AREA IN HECTARES
- 0.85 — RUNOFF COEFFICIENT

No.	REVISIONS	By	Date
20			
19			
18			
17			
16			
15	ISSUED FOR PHASE 5 REGISTRATION	LME	19:09:10
14	REVISED AS PER PHASE 4 COMMENTS	LME	19:07:25
13	REVISED AS PER PHASE 4 COMMENTS	LME	19:07:22
12	REVISED AS PER PHASE 4 COMMENTS	LME	19:06:24
11	ISSUED FOR PHASE 4 REGISTRATION	LME	19:04:25
10	REVISED AS PER PHASE 3 COMMENTS	LME	19:03:08
9	ISSUED FOR PHASE 3 TENDER	LME	19:01:11
8	REVISED AS PER PHASE 3 COMMENTS	LME	18:12:14
7	REVISED FOR PHASE 3 REGISTRATION	LME	18:09:14
6	REVISED FOR PHASE 2 REGISTRATION	LME	18:04:20
5	REVISED AS PER CITY COMMENTS	LME	15:11:05
4	REVISED AS PER CITY COMMENTS	LME	15:10:15
3	REVISED AS PER NEW SITE PLAN AND CITY COMMENTS	LME	15:06:19
2	REVISED AS PER CITY COMMENTS	LME	15:04:08
1	ISSUED TO CITY FOR APPOVAL	LME	14:11:27

TAGGART REALTY MANAGEMENT

IBI GROUP
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Ottawa ON K1S 5N4 Canada
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Project Title

KANATA WEST BUSINESS PARK PHASE 5

LICENSED PROFESSIONAL ENGINEER
L. M. ERION
13379508
2019/09/10
PROVINCE OF ONTARIO

Drawing Title

STORM DRAINAGE AREA PLAN

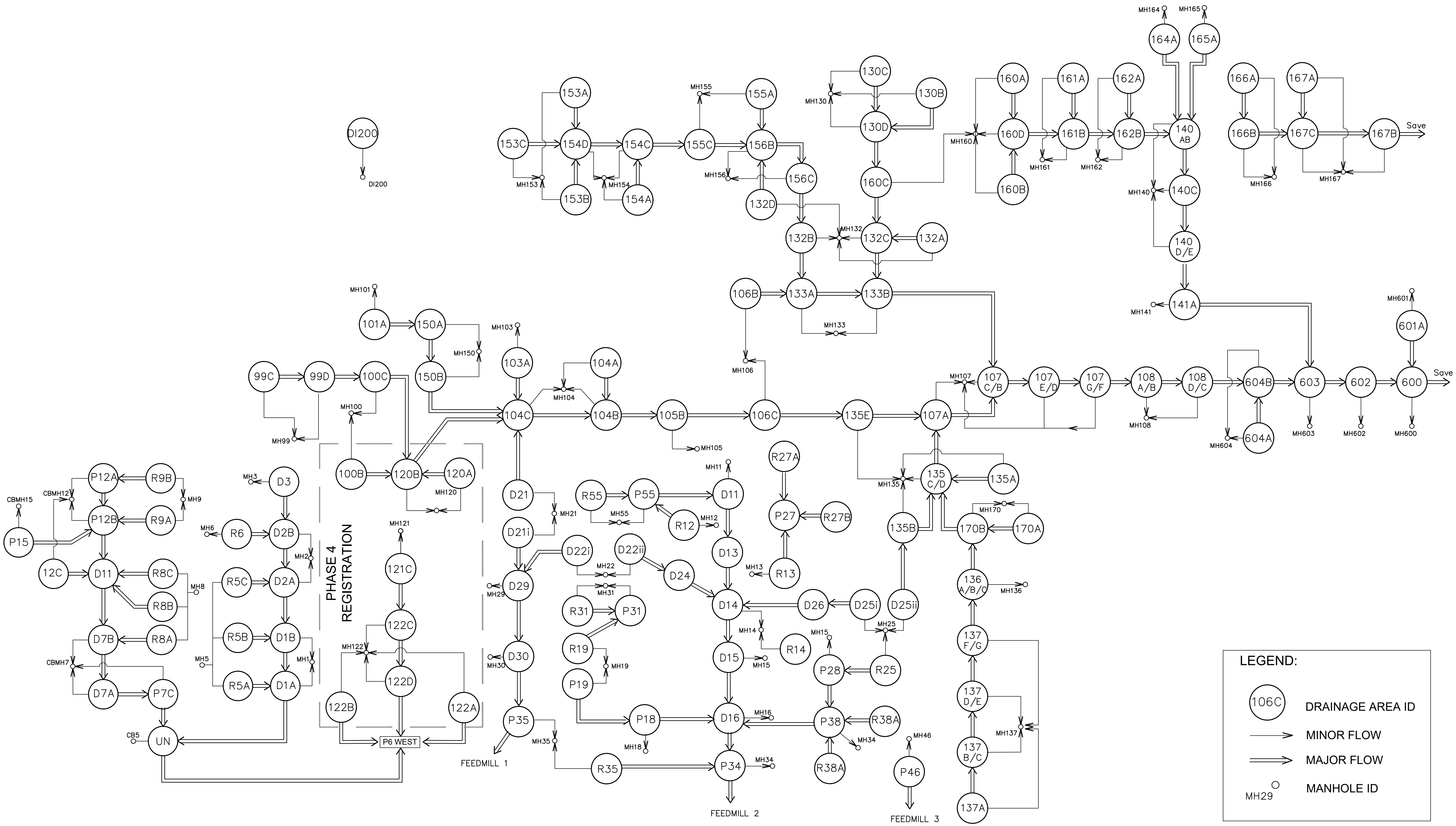
Scale 1:2000

Design	Date
LME	NOV. 2014
Drawn	**Checked**
DPS	TRB
Project No.	**Drawing No.**
14289	500

D07-16-14-0003_P5

#17661

Area ID	Area (ha)	IMP (%)		LGI (m)	AVAILABLE/REQUIRED STORAGE (cu-m)	MINOR SYSTEM CAPTURE (l/s)
		TIMP	XIMP			
101A	**7.03**	**0.93**	**0.93**	**327**	**780**	**1230**
150A	**0.17**	**0.53**	**0.53**	**83**	**n/a**	**31**
150B	**0.2**	**0.53**	**0.53**	**75**	**7**	**37**
UPS Site modelled as per approved report "Design Brief UPS Canada Inc. 8825 Campeau Drive (IBI Group, January 2017)						
99C	0.14	0.69	0.69	30	44	33
99D	0.22	0.69	0.69	60	21	45
100C	0.27	0.59	0.59	103	13	49
100B	1.21	0.93	0.93	155	117	259
120A	1.16	0.93	0.93	214	75	191
120B	0.26	0.53	0.53	100	7	45
103A	0.33	0.93	0.93	56	20	104
104C	0.36	0.59	0.59	135	17	62
Kanata West Retail Centre modelled as per approved report "Design Brief Kanata West Retail Centre 3015, 3075 and 3095 Palladium Drive" (IBI Group, July 2017)						
121C	0.21	0.53	0.53	101	49	37
122B	1.07	0.93	0.93	149	103	231
122A	1.16	0.93	0.93	216	73	185
122C	0.21	0.69	0.69	60	21	46
122D	0.14	0.69	0.69	30	24	31
153A	**1.89**	**0.93**	**0.93**	**119**	**190**	**430**
153B	**1.82**	**0.93**	**0.93**	**129**	**180**	**408**
153C	**0.16**	**0.53**	**0.53**	**79**	**n/a**	**29**
154D	**0.15**	**0.53**	**0.53**	**76**	**n/a**	**29**
154A	**0.70**	**0.93**	**0.93**	**81**	**70**	**171**
154C	**0.17**	**0.57**	**0.57**	**82**	**48**	**33**
155C	**0.29**	**0.57**	**0.57**	**141**	**60**	**50**
155A	**3.19**	**0.93**	**0.93**	**160**	**480**	**525**
132D	**2.29**	**0.93**	**0.93**	**157**	**360**	**377**
156B	**0.11**	**0.57**	**0.57**	**56**	**5**	**22**
156C	0.14	0.93	0.93	82	7	40
132B	0.15	0.93	0.93	80	9	43
130C	0.15	0.93	0.93	30	15	41
130B	0.71	0.93	0.93	101	120	111
130D	0.24	0.93	0.93	67	15	62
160C	0.15	0.93	0.93	81	n/a	43
132A	1.01	0.93	0.93	117	132	187
132C	0.15	0.93	0.93	77	4	43
104A	**0.85**	**0.93**	**0.93**	**95**	**90**	**204**
104B	0.3	0.71	0.71	111	65	75
105B	0.22	0.93	0.93	65	n/a	57
106C	0.17	0.93	0.93	82	1	110
135E	0.25	0.93	0.93	50	11	80
106B	0.15	0.93	0.93	82	1	58
133A	0.15	0.93	0.93	57	19	48
133B	0.16	0.93	0.93	57	n/a	74
137A	0.08	0.93	0.93	33	n/a	38
137B/C	0.12	0.93	0.93	36	n/a	57



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Scale

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Project Title

KANATA WEST BUISINESS PARK
PHASE 5 REGISTRATION

Drawing Title

OVERALL
SWMHYMO SCHEMATIC

Sheet No.

Table 4.10 Summary of Hydraulic Grade Line during the 100 year 12 hour SCS Storm and 100 year 3 hour Chicago Storm

LOCATION		MH	FINISHED FLOOR ELEVATION (M)	100 YEAR 12 HOUR SCS		100 YEAR 3 HOUR CHICAGO		100 YEAR 12 HOUR SCS +20%		100 YEAR 3 HOUR CHICAGO +20%	
				HGL (M)	FB (M)	HGL (M)	FB (M)	HGL (M)	FB (M)	HGL (M)	FB (M)
POND 6 WEST	**NIPISSING COURT**	P6WEST	**N/A**	103.26	N/A	102.93	N/A	103.71	N/A	103.28	N/A
		123	**105.37 (T/G)**	103.28	2.09	102.94	2.43	103.73	1.64	103.30	2.07
		122	**106.20**	103.34	2.86	102.97	3.23	103.76	2.44	103.32	2.88
		121	**106.20**	103.40	2.90	103.03	3.27	103.78	2.52	103.34	2.96
		120	**106.30**	103.48	2.83	103.07	3.23	103.83	2.47	103.41	2.89
	UPPER CANADA ST	150	**106.00**	103.51	2.49	103.09	2.91	103.86	2.14	103.45	2.55
		151	**106.00**	103.60	2.40	103.14	2.86	103.91	2.09	103.54	2.46
		152	**105.90**	103.63	2.27	103.17	2.73	103.92	1.98	103.58	2.32
		152B	**105.85**	103.65	2.20	103.19	2.66	103.93	1.92	103.60	2.25
		153	**105.85**	103.81	2.04	103.34	2.51	104.03	1.82	103.74	2.11
		154	**105.80**	103.82	1.98	103.35	2.45	104.05	1.75	103.76	2.04
	CAMPEAU DR.	99	**106.70**	103.66	3.04	103.16	3.54	103.91	2.79	103.56	3.14
		100	**106.75**	103.60	3.15	103.16	3.60	103.87	2.88	103.54	3.21
		101	**106.60**	103.57	3.03	103.13	3.47	103.88	2.72	103.51	3.09
		102	**106.00**	103.51	2.49	103.08	2.92	103.85	2.15	103.44	2.57
		103	**105.85**	103.63	2.22	103.25	2.60	103.95	1.90	103.54	2.31
		104	**105.45**	103.71	1.74	103.33	2.12	104.01	1.44	103.62	1.83
POND 6 EAST	**CAMPEAU DR.**	P6EAST	**N/A**	98.40	N/A	98.37	N/A	98.55	N/A	98.48	N/A
		13	**100.42 (T/G)**	98.50	1.92	98.44	1.98	98.71	1.71	98.56	1.86
		12	**101.30 (T/G)**	98.71	2.59	98.56	2.74	98.96	2.34	98.77	2.53
		9	**101.38 (T/G)**	98.96	2.42	98.77	2.61	99.30	2.08	99.07	2.31
		600	**102.60**	99.51	3.09	99.22	3.38	100.02	2.58	99.78	2.82
		601	**102.60**	99.43	3.17	99.21	3.39	99.93	2.67	99.69	2.91
		602	**102.70**	100.00	2.70	99.72	2.98	100.70	2.00	100.39	2.31
		603	**103.30**	100.47	2.83	100.16	3.14	101.32	1.98	100.94	2.36
		604	**103.30**	100.84	2.47	100.52	2.78	101.87	1.43	101.42	1.88
		108	**104.00**	101.06	2.94	100.76	3.24	102.24	1.76	101.73	2.27
		107	**104.00**	101.30	2.70	101.02	2.98	102.64	1.36	102.07	1.93
		106	**105.10**	101.34	3.76	101.09	4.01	102.78	2.32	102.14	2.96
		105	**105.45**	101.42	4.03	101.41	4.04	102.93	2.52	102.16	3.29
	JOURNEYMAN ST	141	**102.70**	100.58	2.12	100.26	2.44	101.44	1.26	101.05	1.65
		140	**102.70**	100.70	2.00	100.37	2.33	101.57	1.13	101.17	1.53
	UPPER CANADA ST	164	**102.90**	100.70	2.20	100.38	2.52	101.57	1.33	101.17	1.73
		165	**102.90**	100.72	2.18	100.39	2.51	101.59	1.31	101.19	1.71
		166	**102.55**	100.75	1.80	100.56	1.99	101.62	0.93	101.21	1.34
		167	**102.20**	100.79	1.41	100.55	1.65	101.63	0.57	101.22	0.98
		163	**102.90**	100.75	2.15	100.43	2.47	101.62	1.28	101.22	1.68
		162	**103.25**	100.99	2.26	100.65	2.60	101.87	1.38	101.45	1.80
		161	**103.90**	101.09	2.81	100.74	3.16	101.97	1.93	101.54	2.36
		160	**104.25**	101.29	2.96	100.89	3.36	102.17	2.08	101.72	2.53
	PALLADIUM DR	134	**104.60**	101.45	3.15	101.14	3.46	102.86	1.74	102.18	2.42
		135	**104.60**	101.77	2.83	101.42	3.18	103.24	1.36	102.38	2.22
		136	**105.42 (T/G)**	102.51	2.91	102.56	2.86	103.86	1.57	102.59	2.84
		137	**107.79 (T/G)**	104.57	3.22	104.65	3.14	105.13	2.66	104.65	3.14
		133	**104.00**	101.48	2.52	101.21	2.79	102.86	1.14	102.29	1.71
		132	**104.00**	101.71	2.29	101.45	2.55	103.11	0.89	102.55	1.45
		131	**105.10**	101.80	3.30	101.54	3.56	103.23	1.87	102.66	2.44
		130	**104.95**	101.81	3.14	101.56	3.39	103.30	1.65	102.68	2.27
	UPPER CANADA ST	156	**104.36 (T/G)**	102.03	2.33	101.83	2.53	103.50	0.86	102.93	1.43
		155	**104.93 (T/G)**	102.19	2.74	102.13	2.80	103.65	1.28	103.08	1.85

(Model Files: 14289-100YRSCS-2019-08-27.out, 32862-100YRSCS-2019-08-27.out, 14289-100YRCHI-2019-08-27.out, 32862-100YRCHI-2019-08-27.out, 14289-100YRSCS20%-2019-08-27.out, 32862-100YRSCS20%-2019-08-27.out, 14289-100YRCHI20%-2019-08-27.out, 32862-100YRCHI20%-2019-08-27.out)

The hydraulic grade line will be at least 1.41m below the T/G or finished floor elevation within the proposed Phase 5 of the KWBP. A summary of all results of the computer simulations are presented within **Appendix C**. It should be noted that the Kanata West Business Park will be comprised of typical commercial type buildings constructed using slab on grade foundation type (ie no basement).

Table 3.16 - 90th and 95th Percentile event daily rainfall volumes from daily climate data collected proximal to the City of Ottawa.

Station Name	Annual Average		Number of Years in Analysis	90th Percentile Daily Volume (mm)				95th Percentile Daily Volume (mm)			
	Precipitation* (mm)	Oct. to Apr. Rainfall) (mm)		ALL RAINFALL EVENTS		APR. 1ST - OCT. 31ST		ALL RAINFALL EVENTS		APR. 1ST - OCT. 31ST	
				2 mm Cut-off	5 mm Cut-off	2 mm Cut-off	5 mm Cut-off	2 mm Cut-off	5 mm Cut-off	2 mm Cut-off	5 mm Cut-off
OTTAWA CDA	910	583	36	21.2	25.8	21.8	25.8	27.2	31.4	27.4	31.8
OTTAWA MACDONALD-CARTIER INT'L A	935	580	36	22.0	26.6	22.6	26.8	28.6	34.4	29.0	35.0
Average	922	581	36	21.6	26.2	22.2	26.3	27.9	32.9	28.2	33.4

3.7.3.3 Windsor

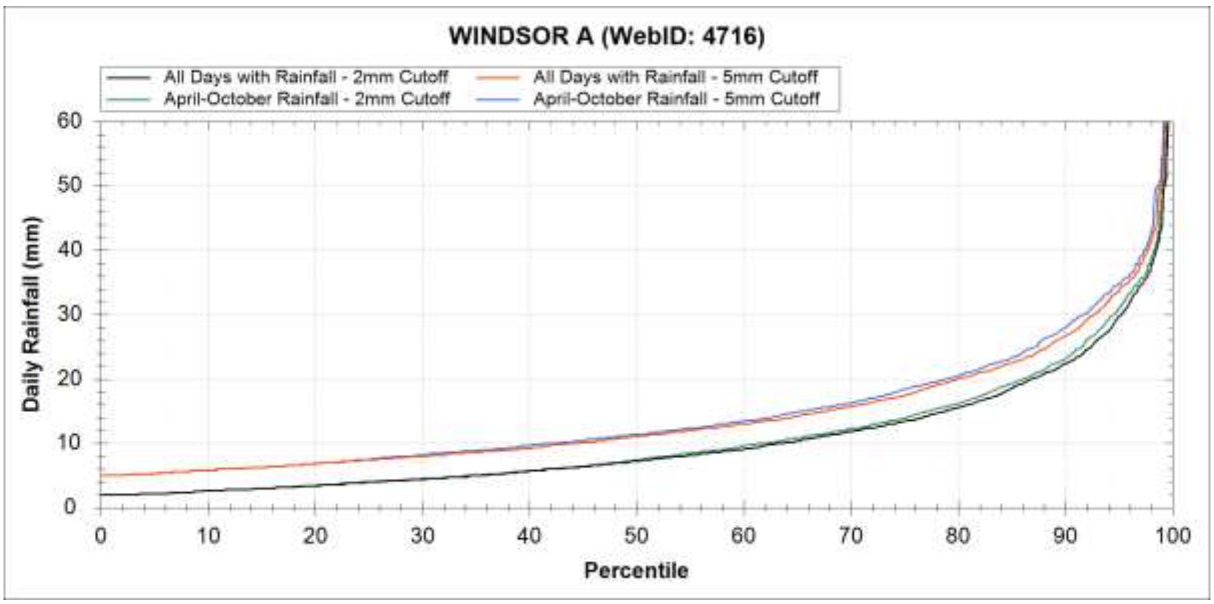


Figure 3.59 - Daily rainfall frequency curves derived from daily rainfall data at ECCC climate station WINDSOR A.

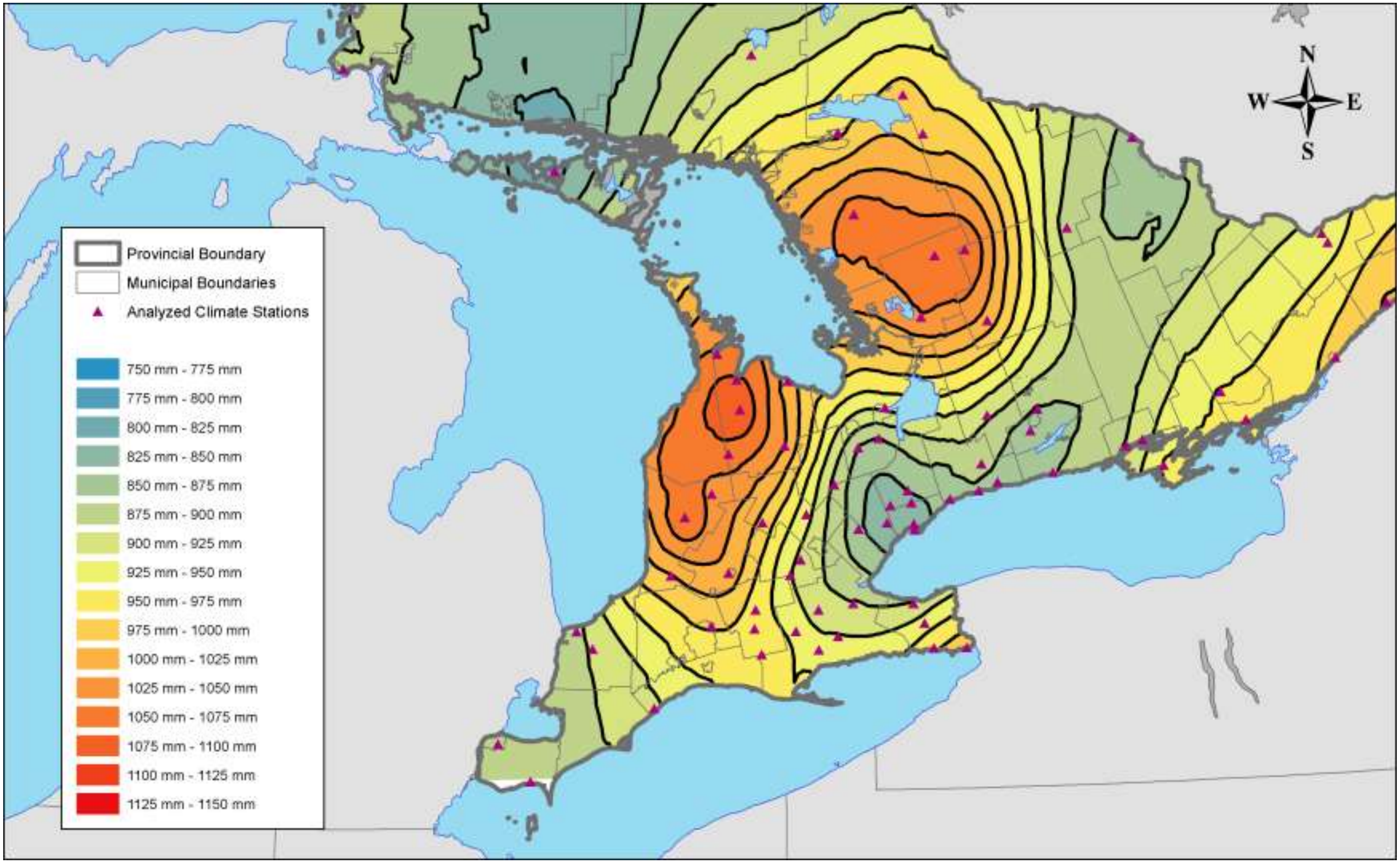


Figure 3.41 - Average annual precipitation in southern Ontario (1970-2005).

Grain Size Distribution Sieve Analysis

Grain size distribution (sieve analysis) was also completed on two (2) selected soil samples. The results of the grain size analysis are summarized in Table 2 and presented on the Grain-Size Distribution Testing Results sheets in Appendix 1.

Table 1 - Summary of Grain Size Distribution Analysis

Test Hole	Sample	Gravel (%)	Sand (%)	Silt and Clay (%)
BH 1-21	SS5	0.0	12.4	87.6
BH 3-21	SS6	1.0	38.4	60.6

4.3 Groundwater

Groundwater level readings were recorded on March 31, April 12 and May 7, 2021. The groundwater level readings are presented in the Soil Profile and Test Data sheets in Appendix 1 and summarized in Table 2. It should be noted that groundwater levels are subject to seasonal fluctuations, therefore, the groundwater levels could vary at the time of construction.

Based on available design plans, the proposed finished floor elevation in the office is 108.2 m and the underground level underside of footing elevation is 3.7 m below the finished floor elevation, corresponding to a geodetic elevation of 104.5 m.

Table 2 - Summary of Groundwater Levels

Borehole Number	Ground Elev. (m)	Groundwater Levels (m)		Recording Date
		Depth	Elevation	
BH 1-21	105.80	0.30	**105.50**	Mar. 31, 2021
		0.65	**105.15**	April 12, 2021
		0.57	**105.23**	May 7, 2021
BH 2-21	106.18	0.68	**105.50**	Mar. 31, 2021
		0.73	**105.45**	April 12, 2021
		0.68	**105.50**	May 7, 2021

Table 2 - Summary of Groundwater Levels cont.

BH 3-21	106.59	0.62	**105.97**	Mar. 31, 2021
		0.93	**105.66**	April 12, 2021
		0.86	**105.73**	May 7, 2021
BH 1	105.99	1.5	104.49	Jan. 15, 2014
BH 2	104.99	1.8	103.19	Jan. 15, 2014
BH 17	105.68	2.0	103.68	Jan. 15, 2014
BH 18	105.53	1.5	104.03	Jan. 15, 2014
BH 19	105.08	2.0	103.08	Jan. 15, 2014

Table 4 - Recommended Flexible Pavement Structure - Car Only Parking Areas

Thickness (mm)	Material Description
50	**Wear Course** - HL 3 or Superpave 12.5 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
300	**SUBBASE** - OPSS Granular B Type II
SUBGRADE - Either fill, in situ soil or OPSS Granular B Type I or II material placed over in situ soil or fill	

Table 5 - Recommended Flexible Pavement Structure - Access Lanes and Heavy Truck Parking/loading Areas

Thickness (mm)	Material Description
40	**Wear Course -** Superpave 12.5 Asphaltic Concrete
50	**Binder Course -** Superpave 19.0 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
450	**SUBBASE** - OPSS Granular B Type II
SUBGRADE - Either fill, in situ soil or OPSS Granular B Type I or II material placed over in situ soil or fill	

If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type II material. The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 100% of the material's SPMDD using suitable vibratory equipment.

5.8 Hydraulic Conductivity Testing

Hydraulic conductivity testing was completed at borehole BH 1-21 which was outfitted with a monitoring well and screened within the silty sand to sandy silt and glacial till layers. Rising head and falling head testing ("slug testing") was completed within the soil strata in accordance with ASTM Standard Test Method D4404 - Field Procedure for Instantaneous Change in Head (Slug) Tests for Determining Hydraulic Properties of Aquifers.

Following the completion of the slug testing, the test data was analyzed as per the method set out by Hvorslev (1951). Assumptions inherent in the Hvorslev method include a homogeneous and isotropic aquifer of infinite extent with zero-storage assumption, and a screen length significantly greater than the monitoring well diameter. The assumption regarding aquifer storage is considered to be appropriate for groundwater flow through the overburden aquifer. The assumption regarding screen length and well diameter is considered to be met based on the screen length of 3 m and the well diameter of 0.051 m at borehole BH 1-21.

While the idealized assumptions regarding aquifer extent, homogeneity, and isotropy are not strictly met in this case (or in any real-world situation), it has been our experience that the Hvorslev method produces effective point estimates of hydraulic conductivity in conditions similar to those encountered at the subject site.

The Hvorslev analysis is based on the line of best fit through the field data (hydraulic head recovery vs. time), plotted on a semi-logarithmic scale. In cases where the initial hydraulic head displacement is known with relative certainty, such as in this case where a physical slug has been introduced/removed, the line of best fit is considered to pass through the origin.

Based on the above test methods, the monitoring wells screened in the overburden soils displayed a hydraulic conductivity value ranging from **4.6 x 10^{-6} to 1.34 x 10^{-5} m/sec**. The values measured within the monitoring well are generally consistent with similar material Paterson has encountered on other sites and typical published values for silty sand and sandy silt. These values typically range from 1 x 10^{-4} to 1 x 10^{-6} m/sec. The results from the hydraulic conductivity testing are attached to the current report.

5.9 Percolation Rates

Infiltration galleries are anticipated to be located beneath the roller compacted concrete pavement structure within the subject site. Paterson completed hydraulic conductivity testing at borehole BH 1-21 in order to establish hydraulic conductivity and percolation time of in-situ materials.

It is anticipated that a silty sand to sandy silt will be encountered at the base of the infiltration galleries during the installation and will affect the rate of stormwater infiltration into the underlying material. The results of the hydraulic conductivity testing were used to determine the estimated percolation rates of the in-situ soils using the approximate relationship between infiltration rate and hydraulic conductivity, as described in the Draft LID Guidance Document, dated December 2019. Based on this relationship, the estimated percolation rate (T-Time) was estimated to be within the ranges in Table 5.

Table 6 - Estimated Percolation Rates

Material	Hydraulic Conductivity - k (m/sec)	Percolation (T-time) - (mins/cm)
Silty Fine Sand to Sandy Silt	**1.3×10^{-5} to 4.6×10^{-6}**	**6 to 10**

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Commercial Development
8800 Campeau Drive - Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger

DATE 2021 March 15

FILE NO. PG5618

HOLE NO. BH 1-21

SOIL DESCRIPTION	Depth to base (m)	TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	105.80
TOPSOIL	0.08	AU	1				
FILL: Brown silty clay trace sand and gravel	0.46						
Compact brown **SILTY SAND** to **SANDY SILT**	1.83	SS	2	58	23	1	104.80
		SS	3	33	13		
Compact to loose grey **SILTY SAND** to **SANDY SILT**	4.52					2	103.80
		SS	4	50	17		
						3	102.80
		SS	5	42	9		
						4	101.80
		SS	6	33	5		
GLACIAL TILL: Grey silty sand to sandy silt some gravel, trace clay, cobbles and boulders	5.94	SS	7	50	1	5	100.80
		SS	8	50	33		

End of Borehole

(GWL @ 0.30 m depth - March 31, 2021)

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %

20 40 60 80

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

Monitoring Well Construction

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Commercial Development
8800 Campeau Drive - Ottawa, Ontario

DATUM Geodetic

REMARKS

BORINGS BY CME 55 Power Auger

DATE 2021 March 15

FILE NO. PG5618

HOLE NO. BH 2-21

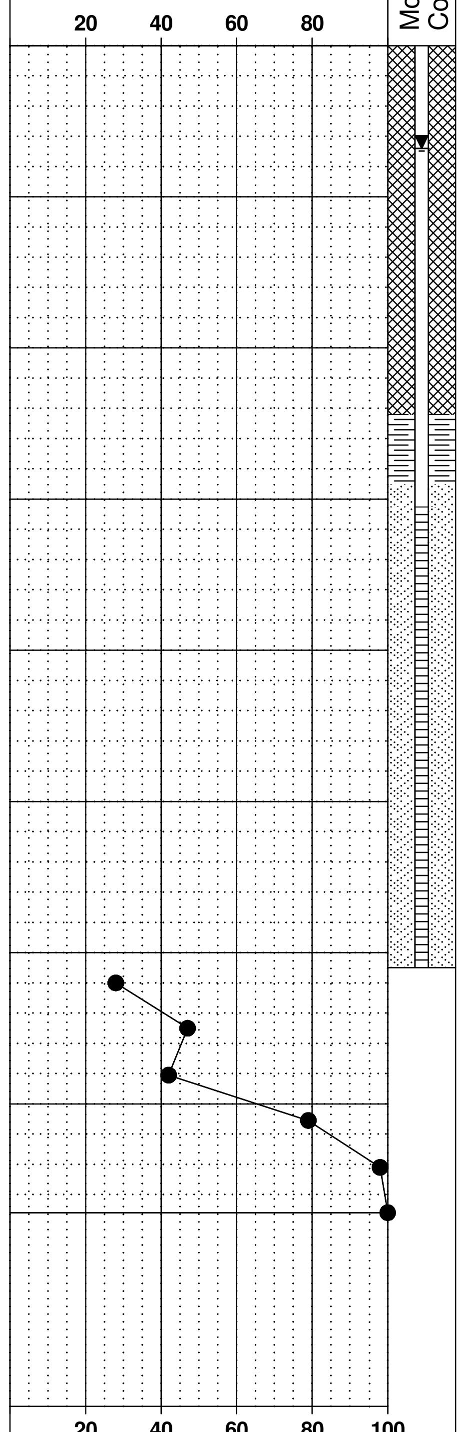
SOIL DESCRIPTION	Depth to base (m)	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	106.18
TOPSOIL	0.10	AU	1				
FILL: Brown silty clay with sand and gravel	0.36						
Loose to compact brown **SILTY SAND** to **SANDY SILT**	2.13	SS	2	25	6	1	105.18
		SS	3	42	18	2	104.18
Loose to firm grey **SILTY SAND** to **SANDY SILT**	5.64	SS	4	42	9	3	103.18
		SS	5	50	9	4	102.18
		SS	6	50	6	5	101.18
		SS	7	42	11		
GLACIAL TILL: Compact grey silty sand to sandy silt some gravel, trace clay, cobbles and boulders	6.10	SS	8	58	20	6	100.18
Dynamic Cone Penetration Test commenced at 6.10 m depth.	7.72					7	99.18
End of Borehole							

Practical refusal to DCPT at 7.72 m depth

(GWL @ 0.68 m depth - March 31, 2021)

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %



Shear Strength (kPa)
▲ Undisturbed △ Remoulded

Monitoring Well Construction

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Commercial Development
8800 Campeau Drive - Ottawa, Ontario

DATUM Geodetic

REMARKS

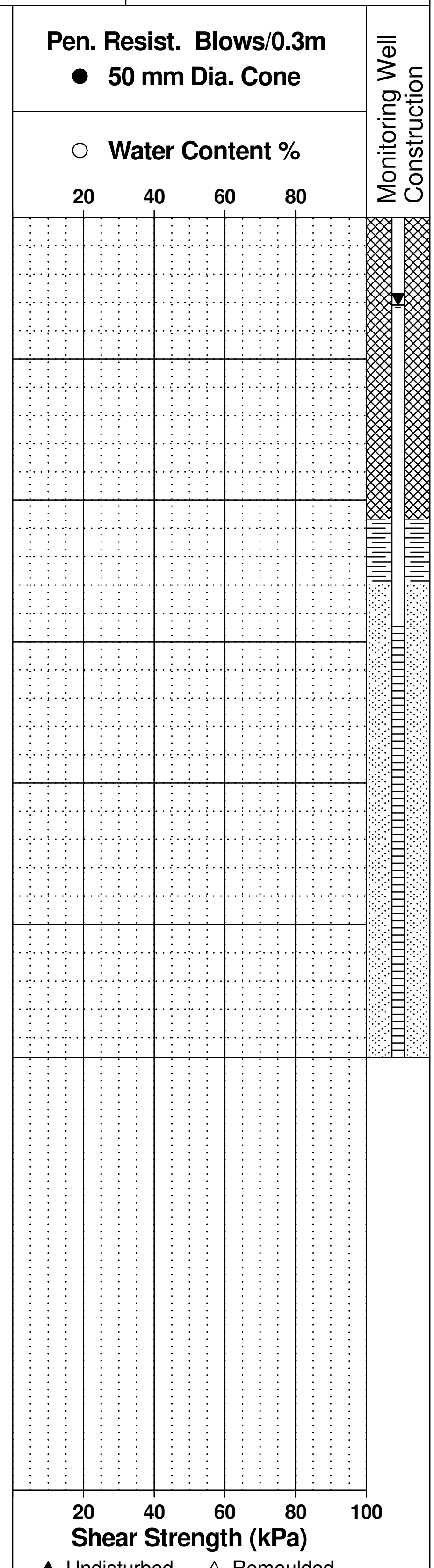
BORINGS BY CME 55 Power Auger

DATE 2021 March 15

FILE NO. PG5618

HOLE NO. BH 3-21

SOIL DESCRIPTION	Depth of change (m)	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	106.59
TOPSOIL	0.08	AU	1				
FILL: Brown silty clay with sand, trace gravel and topsoil	0.30						
Compact brown **SILTY SAND** to **SANDY SILT**		SS	2	25	3	1	105.59
- Dense by 1.7 m depth	2.13	SS	3	67	20	2	104.59
Compact to loose grey **SILTY SAND** to **SANDY SILT**		SS	4	50	12	3	103.59
		SS	5	50	11	4	102.59
		SS	6	50	5	5	101.59
		SS	7	33	8		
	5.94	SS	8	67	W		
End of Borehole							
(GWL @ 0.62 m depth - March 31, 2021)							



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Commercial Development - Huntmar Road
Ottawa, Ontario

DATUM Ground surface elevations provided by Stantec Geomatics Ltd.

FILE NO. PG3115

REMARKS

HOLE NO. BH 1

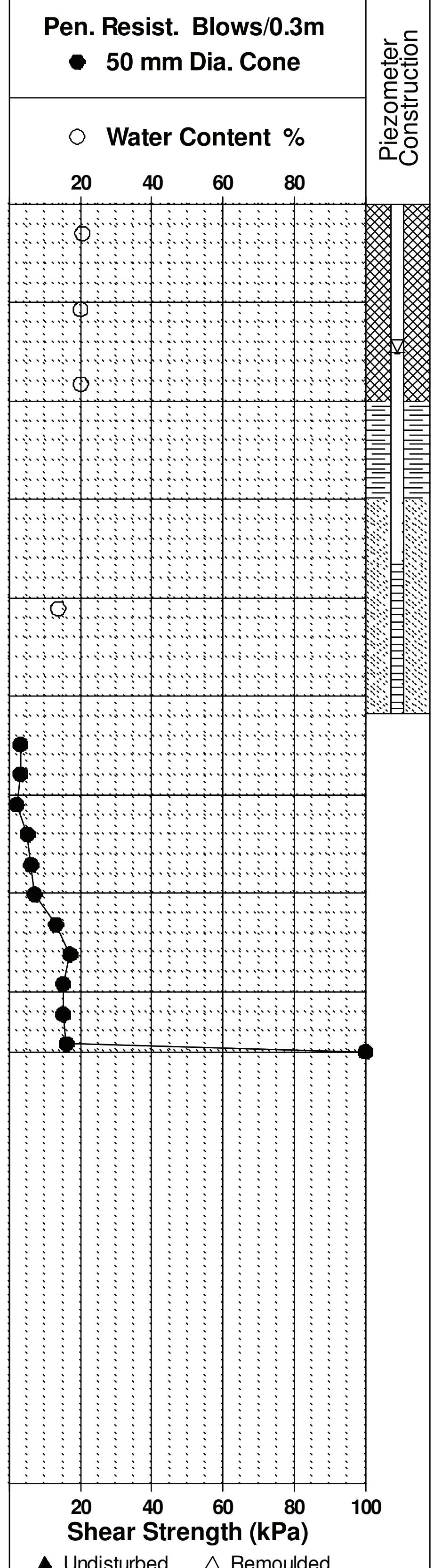
BORINGS BY CME 55 Power Auger **DATE** January 15, 2014

SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE					0	105.99
TOPSOIL 0.28	AU	1				
Compact, brown **SILTY FINE SAND**	SS	2	71	11	1	104.99
- grey by 1.5m depth	SS	3	54	11	2	103.99
2.97	SS	4	25	13		
GLACIAL TILL: Grey silty sand with gravel, cobbles and boulders	SS	5	58	3	3	102.99
	SS	6	67	17	4	101.99
5.18	SS	7	50	3	5	100.99
Dynamic Cone Penetration Test commenced at 5.18m depth.					6	99.99
Inferred **GLACIAL TILL**					7	98.99
8.61					8	97.99

End of Borehole

Practical DCPT refusal at 8.61m depth

(GWL @ 1.5m depth based on field observations)



patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Commercial Development - Huntmar Road
Ottawa, Ontario

DATUM Ground surface elevations provided by Stantec Geomatics Ltd.

REMARKS

BORINGS BY CME 55 Power Auger

DATE January 15, 2014

FILE NO. PG3115

HOLE NO. BH 2

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	104.99
TOPSOIL 0.36		AU	1				
Brown **SILTY CLAY,** trace sand 0.69		AU	2				
Compact, brown **SILTY FINE SAND**		SS	3	100	14	1	103.99
		SS	4	83	12	2	102.99
		SS	5	71	8		
- grey by 3.0m depth		SS	6	58	9	3	101.99
		SS	7	54	6	4	100.99
		SS	8	58	10	5	99.99
6.02		SS	9	58	12	6	98.99
GLACIAL TILL: Grey silty sand with gravel, cobbles and boulders, trace clay 6.70		SS	10	67	24		
End of Borehole							
(GWL @ 1.8m depth based on field observations)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %

20 40 60 80

Piezometer Construction

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Commercial Development - Huntmar Road
Ottawa, Ontario

DATUM Ground surface elevations provided by Stantec Geomatics Ltd.

REMARKS

BORINGS BY CME 55 Power Auger

DATE January 15, 2014

FILE NO. PG3115

HOLE NO. BH17

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone / ○ Water Content %	Piezometer Construction
GROUND SURFACE						0	105.68		
TOPSOIL (0.30)									
		SS	1	83	10	1	104.68		
		SS	2	54	8	2	103.68		
Loose, grey **SILTY FINE SAND**		SS	3	67	2	3	102.68		
		SS	4	62	3				
		SS	5	67	8	4	101.68		
		SS	6	67	5	5	100.68		
(6.00)		SS	7	54	2	6	99.68		
GLACIAL TILL: Grey silty sand with clay, gravel, cobbles and boulders (6.70)		SS	8	50	3				
End of Borehole									
(GWL @ 2.0m depth based on field observations)									

Pen. Resist. / Water Content % scale: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Commercial Development - Huntmar Road
Ottawa, Ontario

DATUM Ground surface elevations provided by Stantec Geomatics Ltd.

FILE NO. PG3115

REMARKS

HOLE NO. BH18

BORINGS BY CME 55 Power Auger

DATE January 15, 2014

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	105.53
TOPSOIL 0.20		AU	1				
Compact to loose, brown **SILTY FINE SAND** - grey by 3.0m depth		SS	2	83	11	1	104.53
		SS	3	62	13	2	103.53
		SS	4	67	9	3	102.53
		SS	5	58	7		
		SS	6	58	10	4	101.53
		SS	7	71	7	5	100.53
		SS	8	67	6	6	99.53
6.70		SS	9	50	3		
End of Borehole (GWL @ 1.5m depth based on field observations)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone

○ Water Content %

20 40 60 80

Piezometer Construction

20 40 60 80 100
Shear Strength (kPa)
▲ Undisturbed △ Remoulded

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Geotechnical Investigation
Proposed Commercial Development - Huntmar Road
Ottawa, Ontario

DATUM Ground surface elevations provided by Stantec Geomatics Ltd.

REMARKS

BORINGS BY CME 55 Power Auger

DATE January 15, 2014

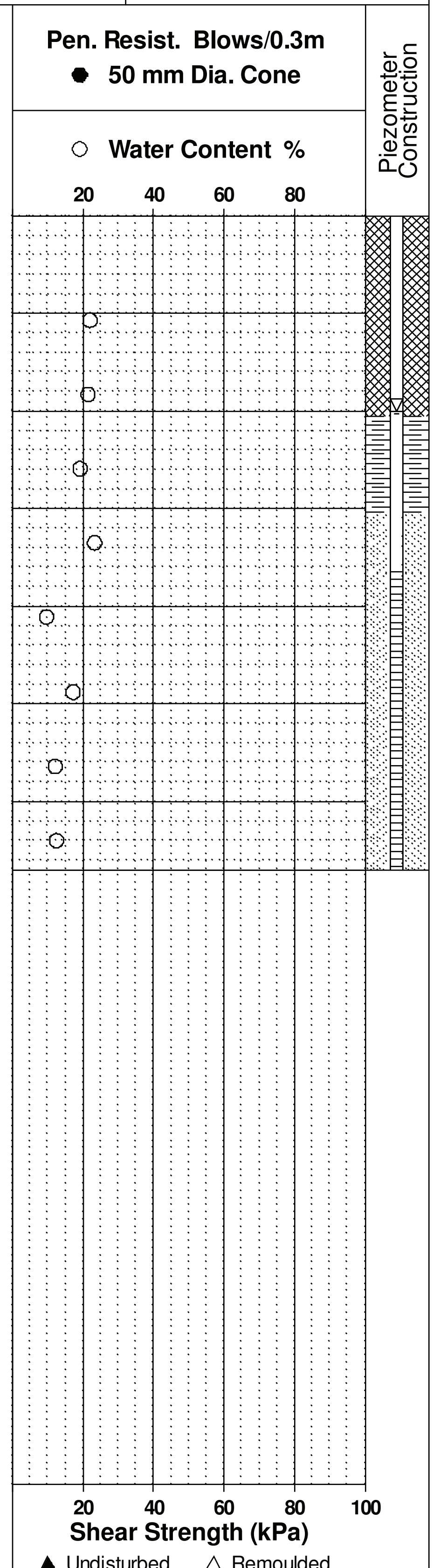
FILE NO. PG3115

HOLE NO. BH19

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	% RECOVERY	N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	105.08
TOPSOIL 0.23							
Compact o very loose, brown **SILTY FINE SAND**		SS	1	62	12	1	104.08
		SS	2	71	1	2	103.08
- grey-brown by 2.2m depth		SS	3	62	1	3	102.08
- trace gravel below 3.0m depth		SS	4	67	8		
- grey by 3.7m depth		SS	5	83	1	4	101.08
5.26		SS	6	25	3	5	100.08
GLACIAL TILL: Grey silty sand with gravel, cobbles and boulders		SS	7	100	14	6	99.08
6.70		SS	8	100	32		

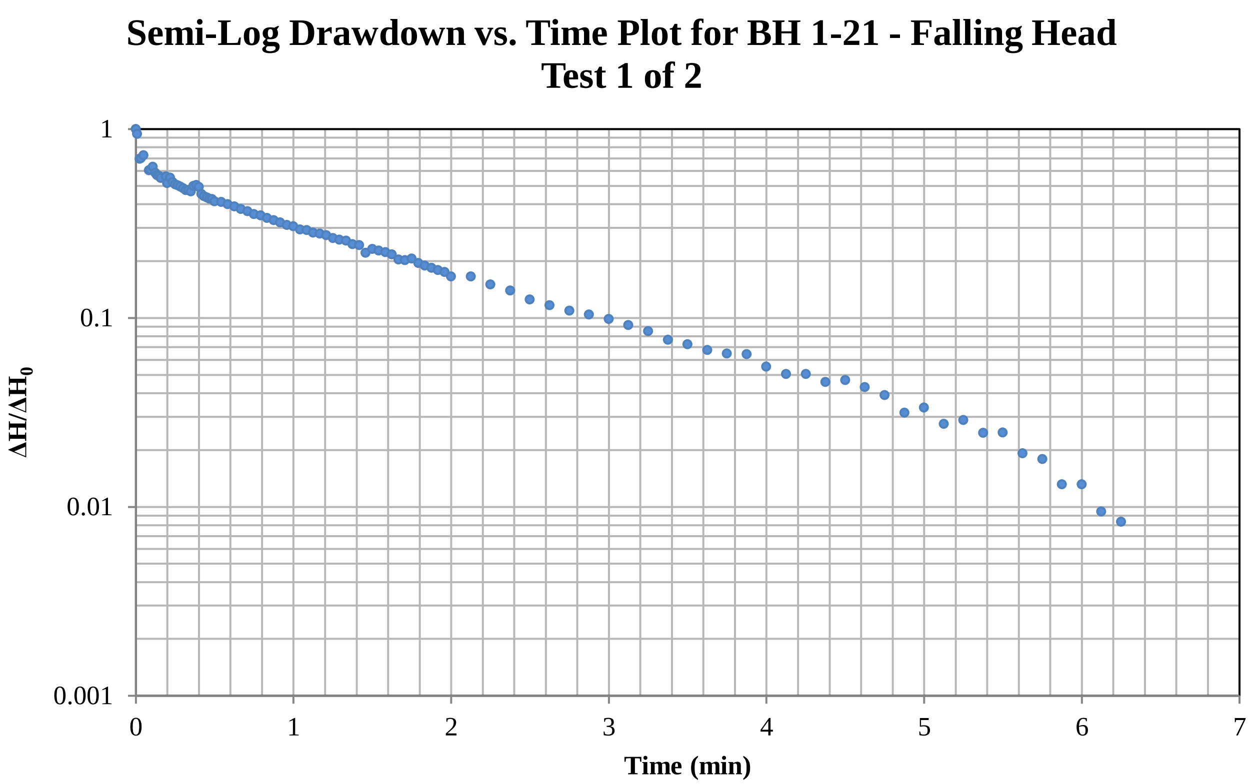
End of Borehole

(GWL @ 2.0m depth based on field observations)



Hvorslev Hydraulic Conductivity Analysis

Project: Maritime Ontario c/o Realinc-SCS - 8800 Campeau Drive
Test Location: BH 1-21
Test: 1 of 2 Falling Head
Date: May 7, 2021



Hvorslev Horizontal Hydraulic Conductivity

$$K = \frac{\pi r_c^2}{F}\frac{1}{t^*}\ln\left(\frac{\Delta H^*}{\Delta H_0}\right)$$

Hvorslev Shape Factor

$$F = \frac{2\pi L}{\ln\left(\frac{2L}{D}\right)}$$

Valid for L>>D

Hvorslev Shape Factor F: 4.00025

Well Parameters:

L	3.048	m	Saturated length of screen or open hole
D	0.0508	m	Diameter of well
r_c	0.0254	m	Radius of well

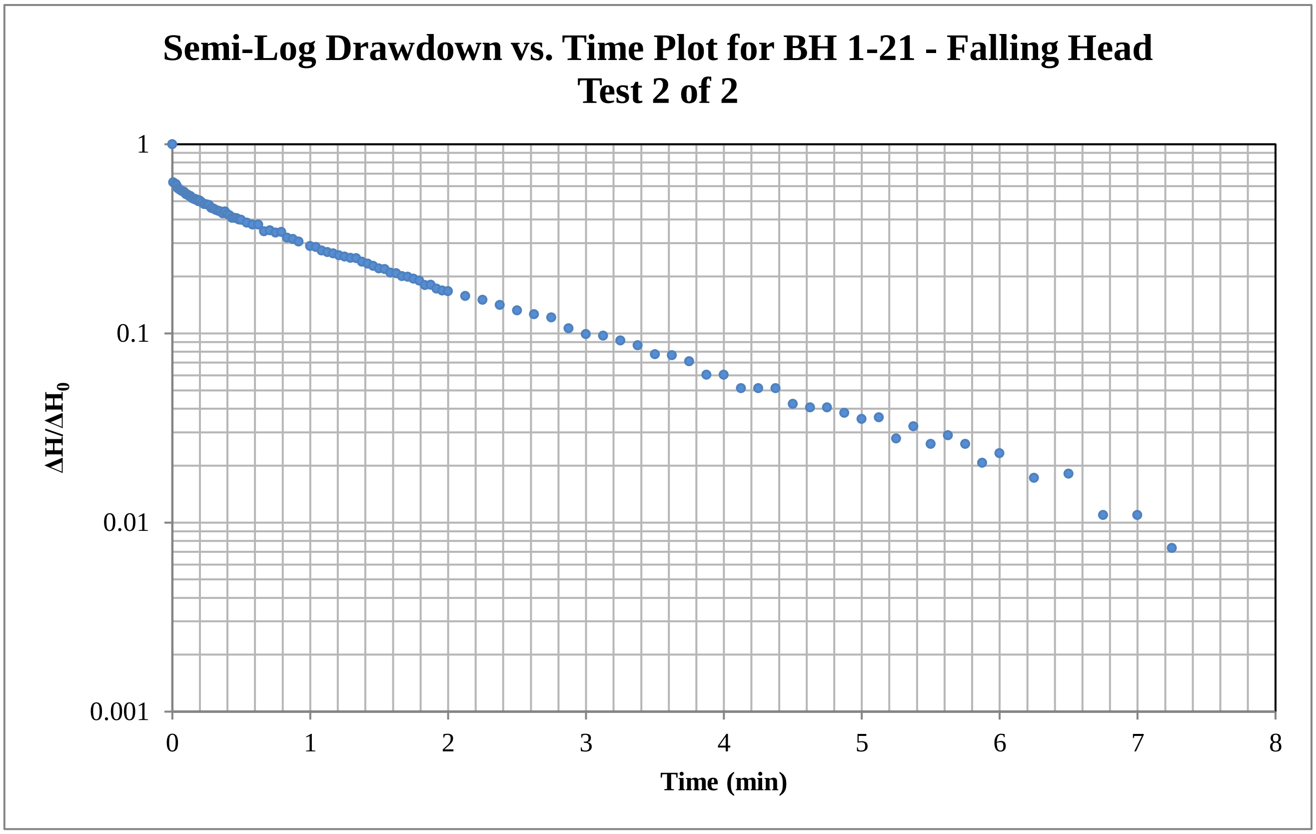
Data Points (from plot):

t^*: 0.679 minutes $\Delta H^*/\Delta H_0$: 0.37

Horizontal Hydraulic Conductivity
K = 1.24E-05 m/sec

Hvorslev Hydraulic Conductivity Analysis

Project: Maritime Ontario c/o Realinc-SCS - 8800 Campeau Drive
Test Location: BH 1-21
Test: 2 of 2 Falling Head
Date: May 7, 2021



Hvorslev Horizontal Hydraulic Conductivity

$$K = \frac{\pi r_c^2}{F} \frac{1}{t*} \ln\left(\frac{\Delta H *}{\Delta H_0}\right)$$

Hvorslev Shape Factor

$$F = \frac{2\pi L}{\ln\left(\frac{2L}{D}\right)}$$

Valid for L>>D

Hvorslev Shape Factor F: 4.00025

Well Parameters:

L	3.048	m	Saturated length of screen or open hole
D	0.0508	m	Diameter of well
r_c	0.0254	m	Radius of well

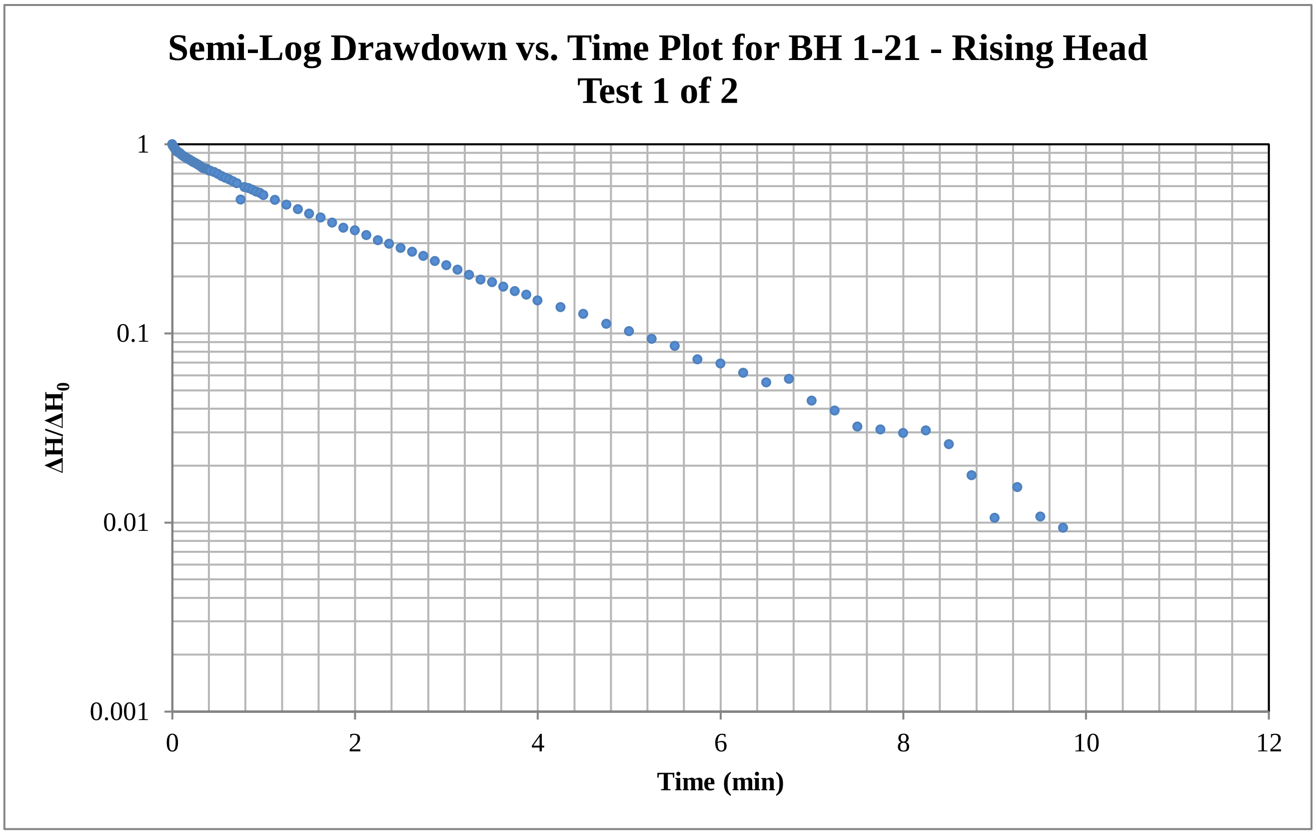
Data Points (from plot):

t*: 0.628 minutes $\Delta H^*/\Delta H_0$: 0.37

Horizontal Hydraulic Conductivity
K = 1.34E-05 m/sec

Hvorslev Hydraulic Conductivity Analysis

Project: Maritime Ontario c/o Realinc-SCS - 8800 Campeau Drive
Test Location: BH 2-21
Test: 1 of 2 Rising Head
Date: May 7, 2021



Hvorslev Horizontal Hydraulic Conductivity

$$K = \frac{\pi r_c^2}{F} \frac{1}{t^*} \ln\left(\frac{\Delta H^*}{\Delta H_0}\right)$$

Hvorslev Shape Factor

$$F = \frac{2\pi L}{\ln\left(\frac{2L}{D}\right)}$$

Valid for L>>D

Hvorslev Shape Factor F: 4.00025

Well Parameters:

L	3.048	m	Saturated length of screen or open hole
D	0.0508	m	Diameter of well
r_c	0.0254	m	Radius of well

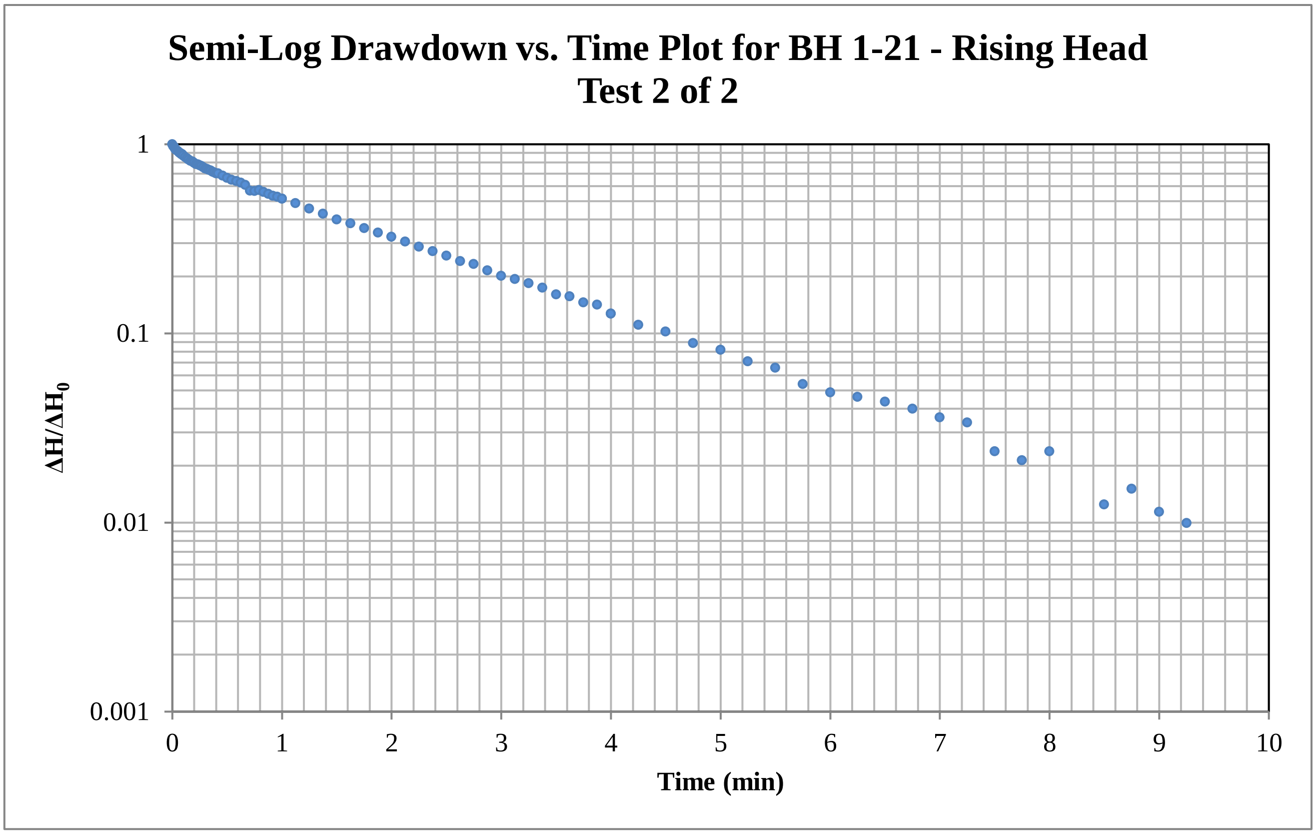
Data Points (from plot):

t^*: 1.841 minutes $\Delta H^*/\Delta H_0$: 0.37

Horizontal Hydraulic Conductivity
K = 4.56E-06 m/sec

Hvorslev Hydraulic Conductivity Analysis

Project: Maritime Ontario c/o Realinc-SCS - 8800 Campeau Drive
Test Location: BH 2-21
Test: 2 of 2 Rising Head
Date: May 7, 2021



Hvorslev Horizontal Hydraulic Conductivity

$$K = \frac{\pi r_c^2}{F}\frac{1}{t^*}\ln\left(\frac{\Delta H^*}{\Delta H_0}\right)$$

Hvorslev Shape Factor

$$F = \frac{2\pi L}{\ln\left(\frac{2L}{D}\right)}$$

Valid for L>>D

Hvorslev Shape Factor F: 4.00025

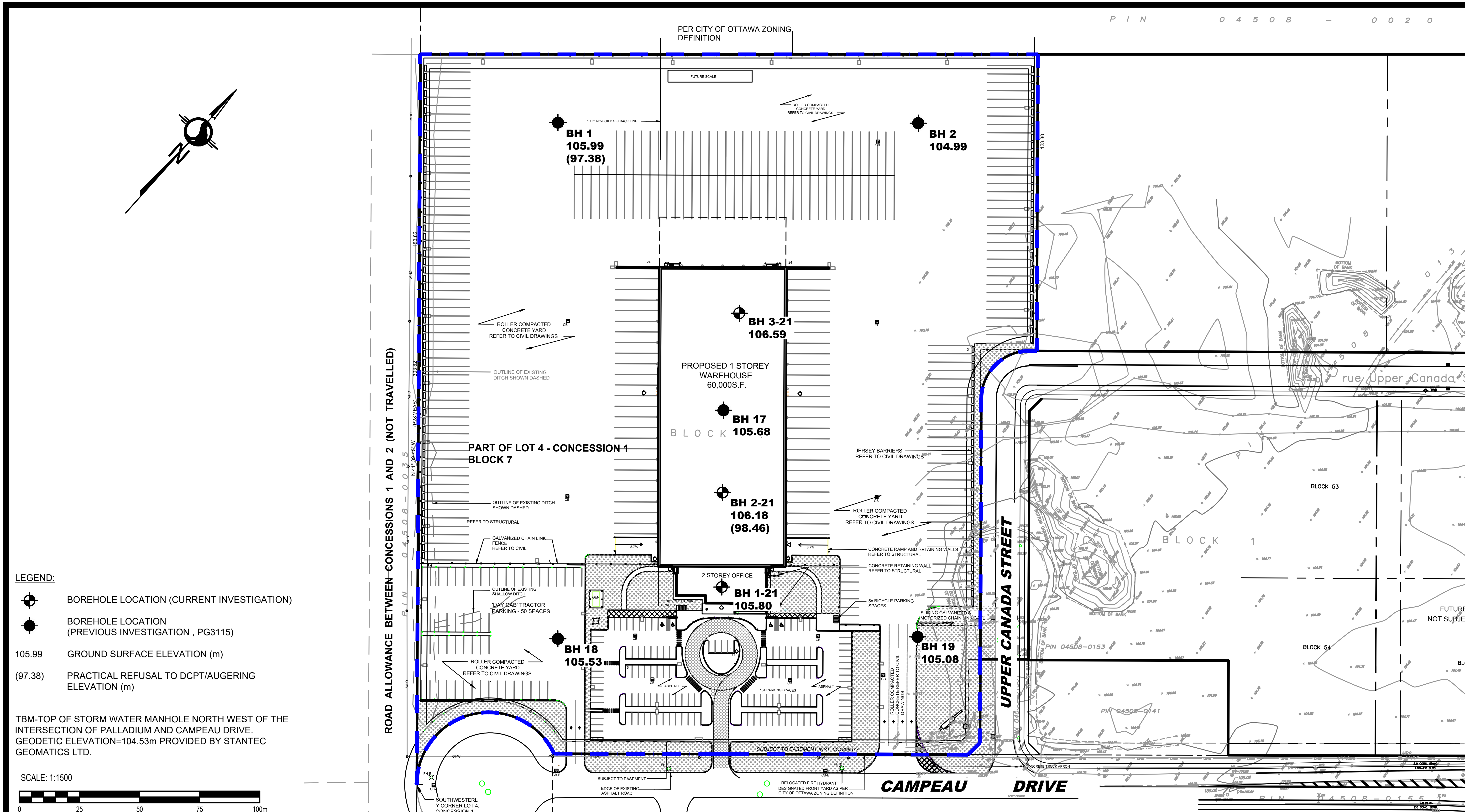
Well Parameters:

L	3.048	m	Saturated length of screen or open hole
D	0.0508	m	Diameter of well
r_c	0.0254	m	Radius of well

Data Points (from plot):

t^*: 1.705 minutes $\Delta H^*/\Delta H_0$: 0.37

Horizontal Hydraulic Conductivity
K = 4.93E-06 m/sec



LEGEND:

- BOREHOLE LOCATION (CURRENT INVESTIGATION)
- BOREHOLE LOCATION (PREVIOUS INVESTIGATION , PG3115)
- 105.99 GROUND SURFACE ELEVATION (m)
- (97.38) PRACTICAL REFUSAL TO DCPT/AUGERING ELEVATION (m)

TBM-TOP OF STORM WATER MANHOLE NORTH WEST OF THE INTERSECTION OF PALLADIUM AND CAMPEAU DRIVE. GEODETIC ELEVATION=104.53m PROVIDED BY STANTEC GEOMATICS LTD.

SCALE: 1:1500

0 25 50 75 100m

patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL
1	BH 1-21 TO 3-21 ADDED	18/03/2021	NP

MARITIME ONTARIO

GEOTECHNICAL INVESTIGATION

PROPOSED WAREHOUSE AND OFFICE BUILDINGS - KANATA WEST BUSINESS PARK - BLOCK 4 - CAMPEAU DR.

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:1500	Date: 11/2020
Drawn by: NFRV	Report No.: PG5618-1 REV.1
Checked by: NP	Dwg. No.: PG5618-1
Approved by: DJG	Revision No.: 1

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re: **Geotechnical Response to City Comments**
Proposed Commercial Development
8800 Campeau Drive - Ottawa

to: Maritime Ontario c/o Realinc-SCS - **Mr. David Plumb** - dplumb@realinc-scs.com

date: May 11, 2021

file: PG5618-MEMO.01 Revision 1

Further to your request and authorization, Paterson Group (Paterson) prepared the following memorandum to provide geotechnical responses to city comments regarding the proposed commercial development at the aforementioned site. This memorandum should be read in conjunction with Paterson Geotechnical Report PG5618-1 Revision 3 dated May 11, 2021.

Servicing and Stormwater Management Report Comments

Comment 34: *Per the Geotechnical Report: "The percolation rate was interpreted from the hydraulic conductivity which was estimated based on previous investigations within the area and on experience".*

Comment 35: *Per the Draft December 2019 LID Guidance Document (which has been circulated publicly for comment): "Infiltration Rate – The rate at which stormwater moves from the surface into the soil, typically measured in inches per hour, millimeters, centimeters or meters per second. It is critical to note that that* ***infiltration rate and hydraulic conductivity are two different concepts and that conversion from one parameter to another cannot be done through unit conversion (see hydraulic conductivity and saturated hydraulic conductivity).*** *Typically, saturated hydraulic conductivity is used to calculate the infiltration rate to be used as a design input based on the approximate relationships and often include an infiltration reduction factor (or safety factor)"*

Comment 36: Please request confirmation of the site specific infiltration rate from the Geotechnical Engineer re the definition above.

Response to Comments 34, 35 & 36: Please refer to sections 5.8 Hydraulic Conductivity Testing and 5.9 Percolation Rates of Paterson Group Report PG5618 Revision 3, dated May 11, 2021. Hydraulic conductivity testing was carried out at borehole BH 1-21 on May 7, 2021. The hydraulic conductivity of the in-situ soils was determined based on the results of the rising head and falling head testing ("slug testing") carried out at borehole BH 1-21. The hydraulic conductivity values were then used to determine the infiltration rates of the in-situ soils using Figure C1: Approximate relationship between infiltration rate and hydraulic conductivity, as described in the Draft December 2019 LID Guidance Document.

Geotechnical Investigation, Prepared by Paterson Group, Report PG5618-1, dated November 24, 2020 Report Comments

Comment 45: *Please provide a memo that grading plans have been reviewed and meets grade raise restrictions.*

Response: Please refer to Paterson Group memorandum PG5618-MEMO.02, dated May 6, 2021. A silty clay deposit was not encountered during the geotechnical investigation and therefore no permissible grade raises restrictions have been provided for the subject site. Based on a review of the most recent grading plans and the soils present at the subject site, the grading is considered acceptable from a geotechnical perspective.

Comment 46: *Please Provide confirmation of the seasonal high groundwater elevation.*

Response: Please refer to section 4.3 Groundwater of Paterson Group Report PG5618 Revision 3, dated May 11, 2021. Groundwater levels were measured periodically throughout the spring months at the monitoring well constructed at borehole BH 1-21 as well as within the flexible piezometers installed in the remaining boreholes, seasonal high groundwater was generally encountered at geodetic elevations ranging from 105.2 to 106.0 m.

However, it is anticipated that the elevated groundwater levels observed within boreholes BH 1-21 through BH 3-21 have been influence by surface water collected within the adjacent drainage ditch which runs along the western limit of the subject site. Therefore, groundwater levels are expected to be lowered within the immediate area of the drainage ditch if a culvert is installed to allow flow to continue toward the adjacent ditch along the access road.

Comment 47: *Please demonstrate in the next design submission how the base of the storage media is a minimum 1 m from the seasonally high groundwater table, as per Ministry requirements.*

Response: Upon review of the civil drawings, the base of the proposed infiltration gallery will be located at a geodetic elevation of 103.6 m. Based on the measured groundwater levels within boreholes BH 1-21 through BH 3-21 the seasonally high groundwater is anticipated to be located at an approximate geodetic elevation of 105 to 106 m. However, as previously discussed, it is anticipated that the elevated groundwater levels have been influenced by the neighbouring quarry.

Based on the observed colour and consistency of the recovered soil samples, the long-term groundwater table is anticipated to be located at an approximated geodetic elevation of 104 to 104.5 m. Further, it is anticipated that the localized long-term groundwater level will be lowered due to development of the site and adjacent roadway, which will provide sufficient separation between the storage media and the groundwater table.

Comment 48: *The depth from the bottom of the infiltration practice to the bedrock should be greater than or equal to 1 meter, per Ministry requirements. Please provide confirmation that this will be achieved.*

Response: Based on the available geological mapping, bedrock is expected at a depth of 5 to 15 m below the existing ground surface. In addition, practical refusal to dynamic cone penetration testing was encountered in boreholes BH 2-21 and BH 1 (2014) at geodetic elevations of 98.46 and 97.38 m, respectively. Upon review of the civil drawings, the bottom of the infiltration system will be located at geodetic elevation 103.6 m. Therefore, the depth from the bottom of the infiltration system to the bedrock will be greater than 1 m, as per Ministry requirements.

Comment 49: *Please provide a note about construction the infiltration gallery under the compacted Concrete Surface, and recommendations for constructions.*

Response: It is anticipated that the infiltration system will be designed to support the temporary loading during construction of the roller compacted concrete structure as well as the heavy truck traffic loads.

Where the infiltration system subgrade consists of a silty sand which is observed to be in a loose state of compactness, the material should be proof compacted using suitable vibratory equipment making several passes under dry conditions and above freezing temperatures and which is approved by Paterson at the time of construction. If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type II material.

Comment 50: *Please confirm the design for Roller Compacted Concrete Surface.*

Response: Please refer to Section 5.7 Pavement Structure, Table 3 - Recommended Roller Compacted Concrete Pavement Structure - Heavy Truck Access Lanes, Parking and Loading Areas. The roller compacter concrete pavement structure will consist of an approximate 200 mm thickness of zero slump, 32 MPa at 28 day strength concrete which is underlain by an approximate 300 mm thickness OPSS Granular A crushed stone base.

We trust that the current submission meets your immediate requirements.

Best Regards,

Paterson Group Inc.

LICENSED PROFESSIONAL ENGINEER
May 11, 2021
D. J. GILBERT
100116130
PROVINCE OF ONTARIO

Kevin A. Pickard, EIT

David J. Gilbert, P.Eng.

Paterson Group Inc.

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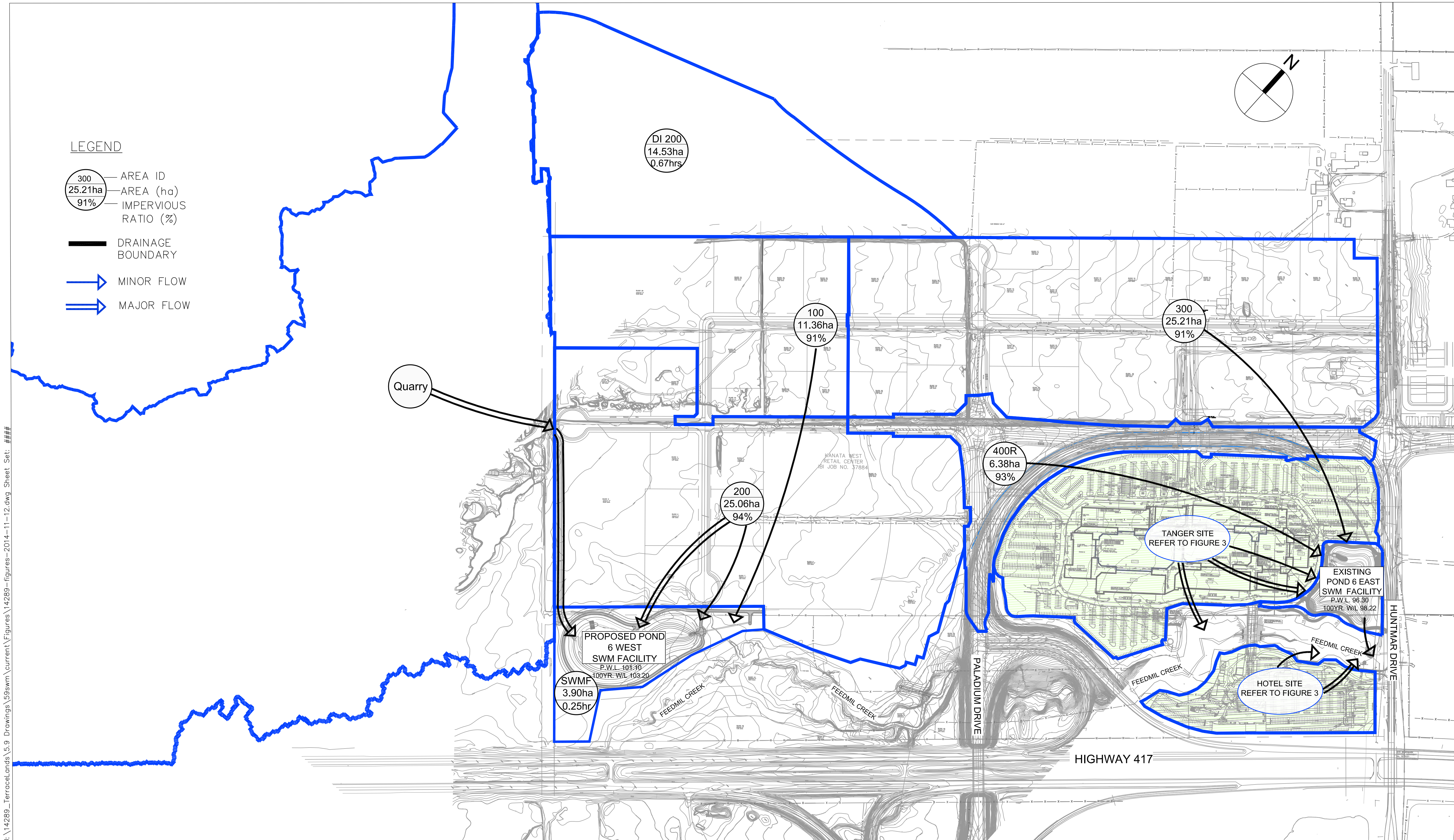
63 Gibson Street
North bay – Ontario – P1B 8Z4
Tel: (705) 472-5331 Fax: (705) 472-2334



J:\14289_TerraceLands\5.9 Drawings\59swm\current\Figures\14289-figures-2014-11-12.dwg Sheet Set: ###

Plot Style: ---- Plot Scale: 1:1 Plotted At: Sep. 28, 15 10:17 AM Printed By: SLAVICA VUKIC Last Saved By: SVUKIC Last Saved At: Sep. 28, 15

IBI GROUP

Scale

N.T.S.

Project Title

TANGER OUTLETS CENTRE
STORMWATER MANAGEMENT
FACILITY

Drawing Title

POST-DEVELOPMENT SWM
DRAINAGE BOUNDARIES
OVERALL SITE

Sheet No.

FIGURE 2

Appendix F

Storm Sewer Design Sheet

Storm Drainage Area Plan
(DWG. 20027-STM1)

Flow Control Roof Drainage
Declaration

Roof Flow Correspondence

Figure 3 – Roof Drainage Area Plan

Infiltration Gallery Storm Sewer Design
Sheet

Runoff Coefficient Calculations

Free Flow Calculations

ICD Calculations

Storage Volume Tables

HGL Computation Sheet

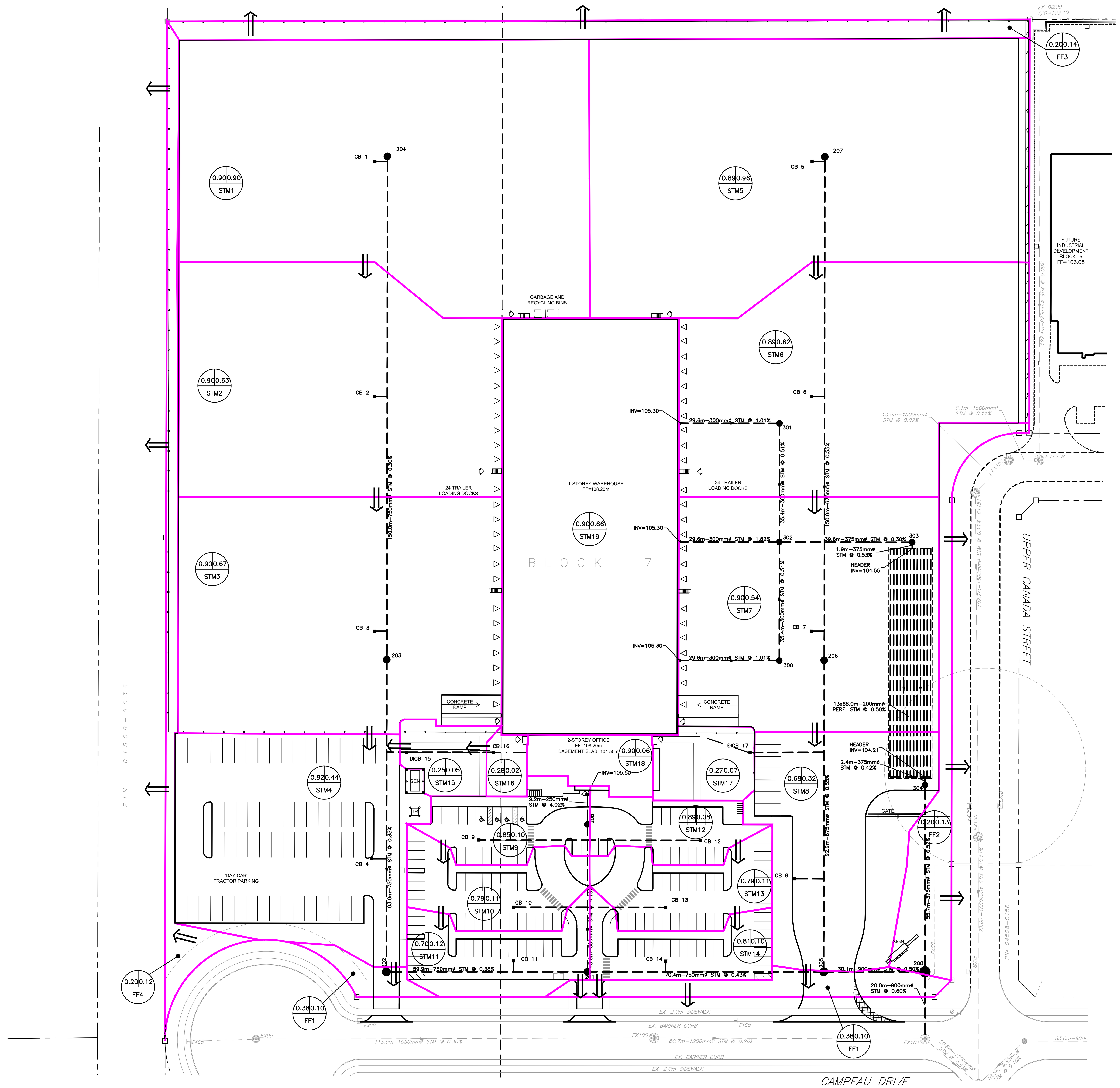
STORM SEWER DESIGN SHEET
for
MARITIME-ONTARIO, CAMPEAU DRIVE, KWBP

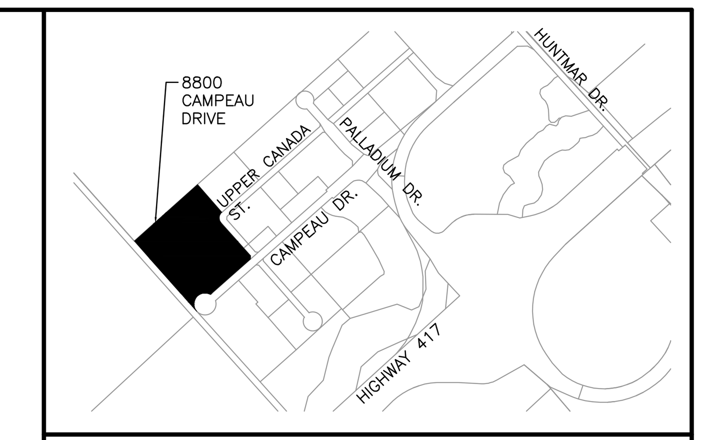
LOCATION				AREA (ha)		INDIV. 2.78AR	ACCUM. 2.78AR	TIME OF CONC. (min)	5 YR RAINFALL INTENSITY (mm/hr)	5 YR PEAK FLOW (L/s)	PROPOSED SEWER						
DRAINAGE AREA	STREET NAME	FROM MH	TO MH	TOTAL AREA	C						PIPE DIA. (mm)	GRADE (%)	LENGTH (m)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min)	PERCENT FULL
STM1	PARKING LOT	CB 1	MAIN	0.90	0.90	2.25	2.25	10.00	104.19	234.64	366.4	2.97	3.7	284.36	2.70	0.02	83%
STM2	PARKING LOT	CB 2	MAIN	0.63	0.90	1.58	1.58	10.00	104.19	164.15	366.4	2.97	3.7	284.36	2.70	0.02	58%
STM3	PARKING LOT	CB 3	MAIN	0.67	0.90	1.68	1.68	10.00	104.19	174.93	366.4	2.89	3.8	280.50	2.66	0.02	62%
	PARKING LOT	204	203	0.00	0.00	0.00	5.51	10.02	104.07	573.06	762.0	0.30	150.0	636.77	1.40	1.79	90%
STM4	PARKING LOT	CB 4	MAIN	0.44	0.82	1.01	1.01	10.00	104.19	105.44	299.4	2.93	4.1	164.75	2.34	0.03	64%
STM16	LANDSCAPE	CB 16	DICB 15	0.02	0.28	0.02	0.02	10.00	104.19	1.78	251.5	1.00	25.9	60.46	1.22	0.35	3%
STM15	LANDSCAPE	DICB 15	MAIN	0.05	0.25	0.04	0.05	10.35	102.36	5.38	251.5	3.05	5.9	105.59	2.13	0.05	5%
	PARKING LOT	203	202	0.00	0.00	0.00	6.57	11.81	95.50	627.53	762.0	0.35	93.0	687.79	1.51	1.03	91%
STM11	PARKING LOT	CB 11	MAIN	0.12	0.70	0.23	0.23	10.00	104.19	23.44	251.5	3.03	3.3	105.24	2.12	0.03	22%
	PARKING LOT	202	201	0.00	0.00	0.00	6.80	12.84	91.25	620.13	762.0	0.38	59.9	716.67	1.57	0.64	87%
STM5	PARKING LOT	CB 5	MAIN	0.96	0.89	2.38	2.38	10.00	104.19	248.50	366.4	2.89	3.8	280.50	2.66	0.02	89%
STM6	PARKING LOT	CB 6	MAIN	0.62	0.89	1.54	1.54	10.00	104.19	160.49	366.4	2.89	3.8	280.50	2.66	0.02	57%
STM7	PARKING LOT	CB 7	MAIN	0.54	0.90	1.35	1.35	10.00	104.19	140.47	299.4	2.89	3.8	163.62	2.32	0.03	86%
	PARKING LOT	207	206	0.00	0.00	0.00	5.27	10.03	104.05	548.70	686.0	0.55	150.0	651.51	1.76	1.42	84%
STM17	LANDSCAPE	DICB 17	MAIN	0.07	0.27	0.05	0.05	10.00	104.19	5.06	251.5	3.01	21.6	104.89	2.11	0.17	5%
STM8	PARKING LOT	CB 8	MAIN	0.32	0.68	0.60	0.60	10.00	104.19	62.65	251.5	2.98	8.4	104.37	2.10	0.07	60%
	PARKING LOT	206	205	0.00	0.00	0.00	5.92	11.45	97.13	575.34	686.0	0.55	92.9	651.51	1.76	0.88	88%
STM18	PARKING LOT	BLDG	208	0.06	0.90	0.14	0.14	10.00	104.19	14.83	251.5	4.02	9.2	121.27	2.44	0.06	12%
STM9	PARKING LOT	CB 9	MAIN	0.10	0.85	0.22	0.22	10.00	104.19	23.40	251.5	0.99	32.2	60.16	1.21	0.44	39%
STM12	PARKING LOT	CB 12	MAIN	0.08	0.89	0.20	0.20	10.00	104.19	20.91	251.5	1.01	33.5	60.76	1.22	0.46	34%
STM13	PARKING LOT	CB 13	MAIN	0.11	0.79	0.25	0.25	10.00	104.19	26.19	251.5	0.99	23.2	60.16	1.21	0.32	44%
STM10	PARKING LOT	CB 10	MAIN	0.11	0.79	0.25	0.25	10.00	104.19	26.24	251.5	1.00	21.9	60.46	1.22	0.30	43%
STM10	PARKING LOT	208	201	0.00	0.00	0.00	1.07	10.44	101.91	109.14	299.4	4.19	43.9	197.02	2.80	0.26	55%

STORM SEWER DESIGN SHEET
for
MARITIME-ONTARIO, CAMPEAU DRIVE, KWBP

LOCATION				AREA (ha)		INDIV. 2.78AR	ACCUM. 2.78AR	TIME OF CONC. (min)	5 YR RAINFALL INTENSITY (mm/hr)	5 YR PEAK FLOW (L/s)	PROPOSED SEWER						
DRAINAGE AREA	STREET NAME	FROM MH	TO MH	TOTAL AREA	C						PIPE DIA. (mm)	GRADE (%)	LENGTH (m)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min)	PERCENT FULL
STM14	PARKING LOT	CB 14	MAIN	0.10	0.81	0.21	0.21	10.00	104.19	22.34	251.5	3.12	3.2	106.79	2.15	0.02	21%
	PARKING LOT	201	205	0.00	0.00	0.00	8.08	13.48	88.83	717.83	762.0	0.43	70.4	762.36	1.67	0.70	94%
	PARKING LOT	205	200	0.00	0.00	0.00	14.00	14.18	86.31	1208.73	914.0	0.50	30.1	1335.22	2.04	0.25	91%
STM19	PARKING LOT	304	200	0.66	0.90	1.64	1.64	10.00	104.19	170.85	251.5	0.51	57.2	43.18	0.87	1.10	
	PARKING LOT	200	*EX101*	0.00	0.00	0.00	15.64	14.42	85.46	1337.01	914.0	0.60	20.0	1462.66	2.23	0.15	91%

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations. $I = 998.071 / (T + 6.053)^{0.814}$ (T= time in minutes)
2. Peak Flow = Accummulated 2.78AR x Rainfall Intensity





KEY PLAN

LEGEND

— - — -	PROPERTY BOUNDARY
■	CATCH BASIN
□	EXISTING CATCH BASIN
- -●- -	STORM SEWER & MANHOLE
- -●- -	EXISTING STORM SEWER & MANHOLE
— — —	100m NO-BUILD SETBACK
— · —	SWALE
——	STORM DRAINAGE AREA BOUNDARY
⟹	MAJOR OVERLAND FLOW ROUTE

RUNOFF COEFFICIENT
0.50 0.28 — AREA (ha)
STM1
DRAINAGE AREA

NOT FOR CONSTRUCTION

NOTES

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

NO.	REVISION DESCRIPTION	DATE	BY
2	REVISED PER COMMENTS	28/05/21	SMC
1	ISSUED FOR SITE PLAN APPLICATION	02/12/20	SMC

SCALE
0 5m 10m 30m
HORIZONTAL 1:750

LICENSED PROFESSIONAL ENGINEER
S. M. CZABARYNSKI
PROVINCE OF ONTARIO
May 28 2021

Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SMC
DRAWN	BLM
CHECKED	SMC
APPROVED	SMC

MARITIME-ONTARIO FREIGHT LINES LIMITED

KANATA WEST BUSINESS PARK
8800 CAMPEAU DRIVE, OTTAWA, ON

STORM DRAINAGE AREA PLAN

PROJECT No.	20027
SURVEY	STANTEC
DATED	MAY 2021
DWG. No:	20027-STM1

D07-12-20-0189
#18376

FLOW CONTROL ROOF DRAINAGE DECLARATION

THIS FORM TO BE COMPLETED BY THE MECHANICAL AND STRUCTURAL ENGINEERS RESPONSIBLE FOR DESIGN

Permit Application No. D07-12-20-0189

Project Name: Maritime Ontario

Building Location: 8800 Campeau Drive

Municipality: Ottawa

The roof drainage system has been designed in accordance with the following criteria: (please check one of the following).

M1. ✓ Conventionally drained roof (no flow control roof drains used).

M2. 0 Flow control roof drains meeting the following conditions have been incorporated in this design:

(a) the maximum drain down time does not exceed 24h,
(b) one or more scuppers are installed so that the maximum depth of water on the roof cannot exceed 150mm,
(c) drains are located not more than 15m from the edge of roof and not more than 30m from adjacent drains, and
(d) there is at least one drain for each 900 sq.m.

M3. 0 A flow control drainage system that does not meet the minimum drainage criteria described in M2 has been incorporated in this design.

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: Andrew Lawton

Firm: McKee Engineering

Phone#: 613-723-9585

City: Ottawa Province: Ontario

LICENSED PROFESSIONAL ENGINEER
A. H. LAWTON
Mar. 23/21
PROVINCE OF ONTARIO

Mechanical Engineer's Seal

S1. 0 The design parameters incorporated into the overall structural design are consistent with the information provided by the Mechanical Engineer in M2. Loads due to rain are not considered to act simultaneously with loads due to snow as per Sentence 4.1.7.3 (3) OBC.

S2. 0 The structure has been designed incorporating the additional structural loading due to rain acting simultaneously with the snow load. The design parameters are consistent with the control flow drainage system designed by the mechanical engineer.

S3 ✓ The structure has not been designed for flow control roof drains, consistent with the information provided in M1 above.

PROFESSIONAL SEAL APPLIED BY:

Practitioner's Name: Colin Davies, P.Eng.

Firm: Cleland Jardine Engineering Ltd.

Phone#: 613-591-1533

City: Ottawa Province: Ontario

LICENSED PROFESSIONAL ENGINEER
C.L. DAVIES
Mar 23, 2021
PROVINCE OF ONTARIO

Structural Engineer's Seal

Brandon Mackechnie

Subject: FW: 19-247 - M-O - Kanata North Business Park - Weeping Tile Pumps(MK 20071)

From: Andrew Lawton <andrew.lawton@mckeeottawa.ca>
Sent: May 19, 2021 8:46 AM
To: Sean Czaharynski <sczaharynski@rcii.com>
Cc: Jill Sparling <Sparling@mcrobie.com>
Subject: RE: 19-247 - M-O - Kanata North Business Park - Weeping Tile Pumps(MK 20071)

"CAUTION: External Sender"
Hi Sean,

For the Cross Dock: 37.6 l/s
For the Office: 19.5 l/s

Andrew Lawton, P.Eng.
President

Andrew.Lawton@mckeeottawa.ca
1785 Woodward Drive
Ottawa, ON K2C 0P9
Tel: (613) 723-9585 Ext 105
Fax: (613) 723-9584

www.mckeeottawa.ca

McKEE ENGINEERING

From: Sean Czaharynski <sczaharynski@rcii.com>
Sent: May 19, 2021 7:45 AM
To: Andrew Lawton <andrew.lawton@mckeeottawa.ca>
Cc: Jill Sparling <Sparling@mcrobie.com>
Subject: RE: 19-247 - M-O - Kanata North Business Park - Weeping Tile Pumps(MK 20071)

Morning Andrew

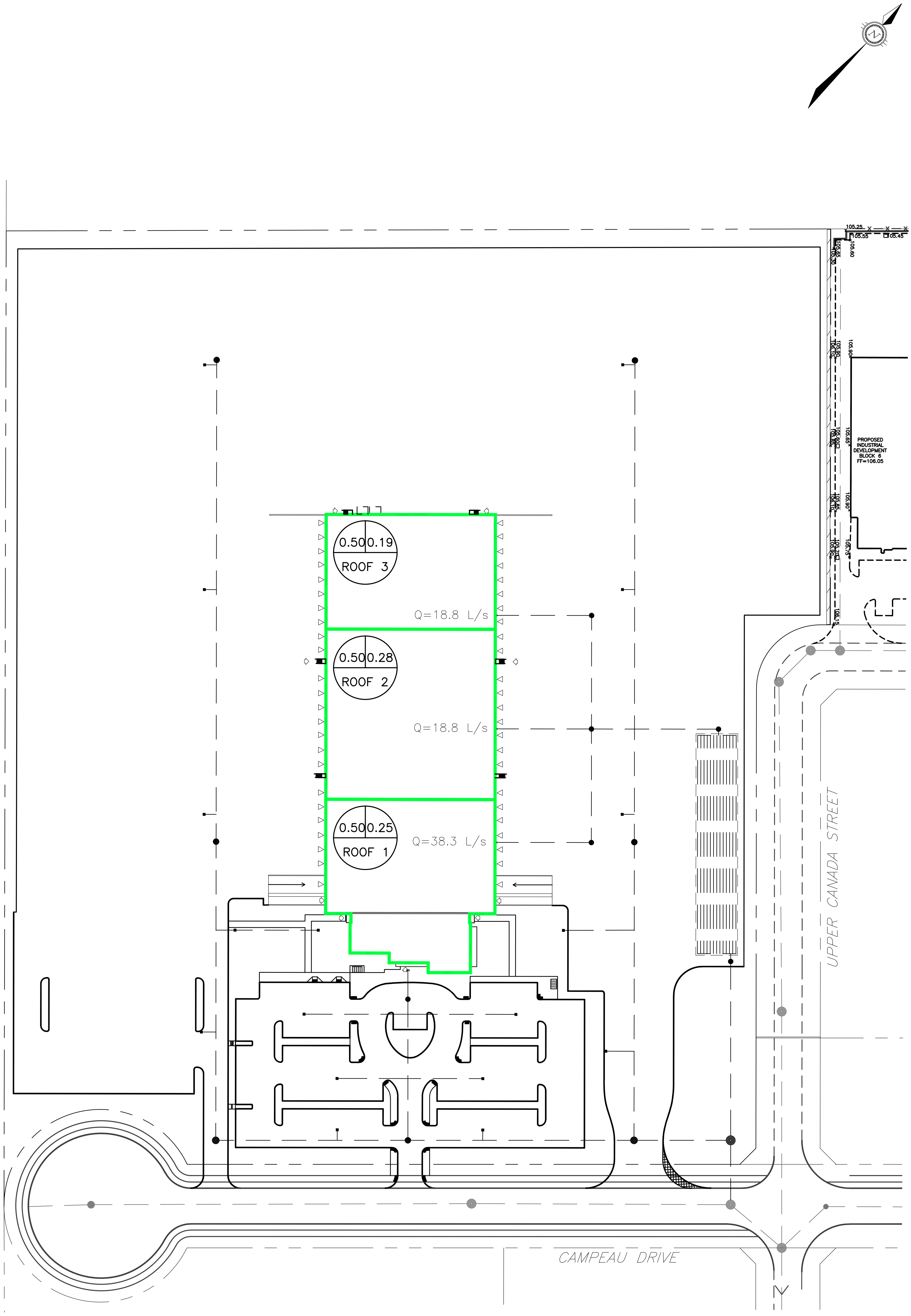
Can you tell me what your design flowrate from the uncontrolled roof drains are?

I want to include that in our storm drainage section of our design report.

Thanks,

Sean Czaharynski, P.Eng. | Manager - Land Development

Robinson Land Development 350 Palladium Drive, Suite 210, Ottawa ON, K2V 1A8
T.(613) 592-6060 ext. 152 | rcii.com



LEGEND

PROPERTY BOUNDARY

ROOF DRAINAGE AREA BOUNDARY

RUNOFF COEFFICIENT

0.9 | 0.30 — AREA (ha)

ROOF 1

DRAINAGE AREA

Robinson
Land Development

scale		project no.
N.T.S.	MARITIME–ONTARIO, KWBP	20027
date 27/05/21		
drawn by BLM	ROOF DRAINAGE AREA PLAN	FIG 3

STORM SEWER DESIGN SHEET - INFILTRATION GALLERY
for
MARITIME-ONTARIO, CAMPEAU DRIVE, KWBP

LOCATION				AREA (ha)		INDIV. 2.78AR	ACCUM. 2.78AR	TIME OF CONC. (min)	5 YR RAINFALL INTENSITY*1 (mm/hr)	5 YR PEAK FLOW*2 (L/s)	FIXED FLOW*4 (L/s)	PROPOSED SEWER						
DRAINAGE AREA	STREET NAME	FROM MH	TO MH	TOTAL AREA	C							PIPE DIA. (mm)	GRADE (%)	LENGTH (m)	CAPACITY (L/s)	FULL FLOW VELOCITY*3 (m/s)	TIME OF FLOW (min)	PERCENT FULL
ROOF1	PARKING LOT	RD1	300	0.25	0.90	0.63	0.63	10.00	104.19	65.17	38.30	299.4	1.01	29.6	96.73	1.37	0.36	40%
	PARKING LOT	300	302	0.00	0.00	0.00	0.63	10.36	102.33	64.01	38.30	299.4	0.51	35.4	68.74	0.98	0.60	56%
ROOF2	PARKING LOT	RD2	302	0.28	0.90	0.70	0.70	10.00	104.19	72.99	18.80	299.4	1.82	29.6	129.85	1.84	0.27	14%
ROOF3	PARKING LOT	RD3	301	0.19	0.90	0.48	0.48	10.00	104.19	49.53	18.80	299.4	1.01	29.6	96.73	1.37	0.36	19%
	PARKING LOT	301	302	0.00	0.00	0.00	0.48	10.36	102.33	48.65	18.80	299.4	0.51	35.4	68.74	0.98	0.60	27%
	PARKING LOT	302	303	0.00	0.00	0.00	1.80	10.96	99.37	179.00	75.90	366.4	0.30	39.6	90.38	0.86	0.77	84%
	PARKING LOT	303	HEADER	0.00	0.00	0.00	1.80	11.73	95.85	172.67	75.90	366.4	0.53	1.9	120.12	1.14	0.03	63%
	PARKING LOT	HEADER	304	0.00	0.00	0.00	1.80	11.76	95.73	172.45	75.90	366.4	0.42	2.4	106.93	1.01	0.04	71%
	PARKING LOT	304	200	0.00	0.00	0.00	1.80	11.80	95.56	172.14	75.90	366.4	0.52	55.7	118.98	1.13	0.82	64%

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations. $I = 998.071 / (T + 6.053)^{0.814}$ (T= time in minutes)
2. Peak Flow = Accummulated 2.78AR x Rainfall Intensity
3. Full Flow Velocity: MIN. = 0.80 m/s; MAX. = 3.0 m/s (City of Ottawa Sewer Design Guidelines, v.2012)
4. Fixed flow corresponds to roof flows provided by Mechancial Engineer. Refer to Appendix F.

Runoff Coefficient Calculations

Development Condition	Impervious Area (ha)	Pervious Area (ha)	Gravel Area (ha)	Total Area (ha)	C	C (100 YR)	Percent Impervious (%)
PRE	0.00	6.96	0.08	7.04	0.21	0.26	1.2
POST	6.19	0.85	0.00	7.04	0.82	1.00	87.9

Sub-Drainage Area Runoff Coefficient Calculations

Drainage Area ID	Impervious Area (ha)	Pervious Area (ha)	Gravel Area (ha)	Total Area (ha)	C	C (100 YR)	Percent Impervious (%)
STM1	0.90	0.00	0.00	0.90	0.90	1.00	100.0
STM2	0.63	0.00	0.00	0.63	0.90	1.00	100.0
STM3	0.67	0.00	0.00	0.67	0.90	1.00	100.0
STM4	0.39	0.05	0.00	0.44	0.82	1.00	89.1
STM5	0.95	0.01	0.00	0.96	0.89	1.00	98.5
STM6	0.61	0.01	0.00	0.62	0.89	1.00	98.4
STM7	0.54	0.00	0.00	0.54	0.90	1.00	100.0
STM8	0.22	0.10	0.00	0.32	0.68	0.85	69.1
STM9	0.09	0.01	0.00	0.10	0.85	1.00	92.6
STM10	0.10	0.02	0.00	0.11	0.79	0.99	85.0
STM11	0.08	0.03	0.00	0.12	0.70	0.88	71.5
STM12	0.08	0.00	0.00	0.08	0.89	1.00	99.1
STM13	0.10	0.02	0.00	0.11	0.79	0.99	84.8
STM14	0.08	0.01	0.00	0.10	0.81	1.00	87.0
STM15	0.00	0.05	0.00	0.05	0.25	0.31	7.3
STM16	0.00	0.02	0.00	0.02	0.28	0.34	10.8
STM17	0.01	0.06	0.00	0.07	0.27	0.34	9.8
STM18 (ROOF 1)	0.06	0.00	0.00	0.06	0.90	1.00	100.0
STM19 (ROOF 2)	0.66	0.00	0.00	0.66	0.90	1.00	100.0
FF1 (CAMPEAU)	0.03	0.07	0.00	0.10	0.38	0.47	25.7
FF2 (UPPER CANADA)	0.00	0.13	0.00	0.13	0.20	0.25	0.0
FF3 (NORTH)	0.00	0.14	0.00	0.14	0.20	0.25	0.0
FF4 (WEST)	0.00	0.12	0.00	0.12	0.20	0.25	0.0

Runoff Coefficients:
C impervious = 0.90
C pervious = 0.20
C gravel = 0.80
C_{100} = C * 1.25 (Max. 1.0)

Free Flow Calculations - FF1 (CAMPEAU)

Given:
Area (ha) = 0.10
C = 0.38
C (100 YR) = 0.47

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
5 Year	5	141.2	14.7
	10	**104.2**	**10.8**
	15	83.6	8.7
	20	70.3	7.3
	25	60.9	6.3
	30	53.9	5.6
100 Year	5	242.7	31.5
	10	**178.6**	**23.2**
	15	142.9	18.6
	20	120.0	15.6
	25	103.8	13.5
	30	91.9	11.9

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Flow calculated using the Rational Method. Q=2.78CiA
3. C (100 YR) = C + 25% (Max. 1.0)

Free Flow Calculations - FF2 (UPPER CANADA)

Given:
Area (ha) = 0.13
C = 0.20
C (100 YR) = 0.25

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
5 Year	5	141.2	10.3
	10	**104.2**	**7.6**
	15	83.6	6.1
	20	70.3	5.1
	25	60.9	4.5
	30	53.9	4.0
100 Year	5	242.7	22.2
	10	**178.6**	**16.4**
	15	142.9	13.1
	20	120.0	11.0
	25	103.8	9.5
	30	91.9	8.4

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Flow calculated using the Rational Method. Q=2.78CiA
3. C (100 YR) = C + 25% (Max. 1.0)

Free Flow Calculations - FF4 (WEST)

Given:
Area (ha) = 0.12
C = 0.20
C (100 YR) = 0.25

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
5 Year	5	141.2	9.3
	10	**104.2**	**6.8**
	15	83.6	5.5
	20	70.3	4.6
	25	60.9	4.0
	30	53.9	3.5
100 Year	5	242.7	19.9
	10	**178.6**	**14.7**
	15	142.9	11.7
	20	120.0	9.9
	25	103.8	9.5
	30	91.9	7.5

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Flow calculated using the Rational Method. Q=2.78CiA
3. C (100 YR) = C + 25% (Max. 1.0)

Free Flow Calculations - FF3 (NORTH)

Given:
Area (ha) = 0.14
C = 0.20
C (100 YR) = 0.25

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
5 Year	5	141.2	11.2
	10	**104.2**	**8.3**
	15	83.6	6.6
	20	70.3	5.6
	25	60.9	4.8
	30	53.9	4.3
100 Year	5	242.7	24.1
	10	**178.6**	**17.7**
	15	142.9	14.2
	20	120.0	11.9
	25	103.8	9.5
	30	91.9	9.1

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Flow calculated using the Rational Method. Q=2.78CiA
3. C (100 YR) = C + 25% (Max. 1.0)

Free Flow Calculations - STM18 (ROOF 1)

Given:
Area (ha) = 0.06
C = 0.90
C (100 YR) = 1.00

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
5 Year	5	141.2	20.1
	10	**104.2**	**14.8**
	15	83.6	11.9
	20	70.3	10.0
	25	60.9	8.7
	30	53.9	7.7
100 Year	5	242.7	38.4
	10	**178.6**	**28.2**
	15	142.9	22.6
	20	120.0	19.0
	25	103.8	16.4
	30	91.9	14.5

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Flow calculated using the Rational Method. Q=2.78CiA
3. C (100 YR) = C + 25% (Max. 1.0)

Free Flow Calculations - STM19 (ROOF 2)

Given:
Area (ha) = 0.66
C = 0.90
C (100 YR) = 1.00

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)
5 Year	5	141.2	231.5
	10	**104.2**	**170.8**
	15	83.6	137.0
	20	70.3	115.2
	25	60.9	99.9
	30	53.9	88.4
100 Year	5	242.7	442.2
	10	**178.6**	**325.3**
	15	142.9	260.3
	20	120.0	218.5
	25	103.8	189.2
	30	91.9	167.4

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Flow calculated using the Rational Method. Q=2.78CiA
3. C (100 YR) = C + 25% (Max. 1.0)

Inlet Control Device Calculations

Structure	Drainage Area	Outlet Pipe Inv. Elev. (m)	Outlet Pipe Diam. (m)	C/L Orifice Elev. (m)	T/G Elev. (m)	Max. Ponding Depth (m)	Max. Ponding Elev. (m)	Max. Head (m)	100 Yr. Ponding Depth (m)	100 Yr. Ponding Elev. (m)	100 Yr. Head (m)	100 Yr. Outflow (L/s)	Orifice Area (m^2)	Orifice Diameter (mm)	Orifice Type
CB 1	STM1	104.74	0.375	104.93	106.42	0.30	106.72	1.79	0.29	106.71	1.78	120.0	0.033	204.1	Circular, slide
CB 2	STM2	104.64	0.375	104.83	106.32	0.30	106.62	1.79	"100 Year El. = Maximum El."			60.0	0.016	144.1	Circular, slide
CB 3	STM3	104.54	0.375	104.73	106.22	0.30	106.52	1.79	"100 Year El. = Maximum El."			80.0	0.022	166.4	Circular, slide
CB 4	STM4	104.47	0.300	104.62	106.15	0.30	106.45	1.83	0.28	106.43	1.81	60.0	0.016	143.8	Circular, slide
CB 5	STM5	104.74	0.375	104.93	106.42	0.30	106.72	1.79	0.29	106.71	1.78	120.0	0.033	204.1	Circular, slide
CB 6	STM6	104.64	0.375	104.83	106.32	0.30	106.62	1.79	0.28	106.60	1.77	60.0	0.016	144.5	Circular, slide
CB 7	STM7	104.54	0.300	104.69	106.22	0.30	106.52	1.83	"100 Year El. = Maximum El."			30.0	0.008	101.4	Circular, slide
CB 8	STM8	104.27	0.250	104.40	105.95	0.27	106.22	1.83	"100 Year El. = Maximum El."			25.0	0.007	92.6	Circular, slide
CB 9	STM9	105.42	0.250	105.55	107.10	0.10	107.20	1.66	"100 Year El. = Maximum El."			55.0	0.016	140.8	Circular, slide
CB 10	STM10	105.13	0.250	105.26	106.64	0.19	106.83	1.58	"100 Year El. = Maximum El."			30.0	0.009	105.3	Circular, slide
CB 11	STM11	104.38	0.250	104.51	106.06	0.30	106.36	1.86	0.18	106.24	1.74	25.0	0.007	93.8	Circular, slide
CB 12	STM12	105.42	0.250	105.55	107.10	0.10	107.20	1.66	"100 Year El. = Maximum El."			40.0	0.011	120.1	Circular, slide
CB 13	STM13	104.96	0.250	105.09	106.64	0.19	106.83	1.75	"100 Year El. = Maximum El."			30.0	0.008	102.6	Circular, slide
CB 14	STM14	104.38	0.250	104.51	106.06	0.30	106.36	1.86	0.18	106.24	1.74	25.0	0.007	93.8	Circular, slide
DICB 15	STM15	104.67	0.250	104.80	106.42	0.30	106.72	1.93	0.00	106.42	1.63	20.0	0.006	85.3	Circular, slide
DICB 17	STM16	104.75	0.250	104.88	106.50	0.30	106.80	1.93	0.00	106.50	1.63	20.0	0.006	85.3	Circular, slide
									Total =			800.0			

Notes:
1. Maximum ponding depth is measured from the maximum ponding elevation to the T/G elevation; 100 year ponding depth is measured from the 100 year ponding elevation to the T/G elevation.
2. Maximum head is measured from the maximum ponding elevation to the centreline of orifice elevation; 100 year head is measured from the 100 year ponding elevation to the centreline of orifice elevation.
3. Orifice Area = (Q/1000) / 0.62(2*9.81*H_{100})^0.5
4. Orifice area calculated using 100 year head values.

Storage Volume Calculations - STM1 (CB 1)

Given:

Area (ha) = 0.90

C = 0.90

C (100 YR) = 1.00

Release Rate (L/s) = 120.0

Available Storage Volume (m^3) = 265.3

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	**5**	**103.6**	**233.2**	**120.0**	**113.2**	**34.0**
	10	76.8	173.0	120.0	53.0	31.8
	15	61.8	139.1	120.0	19.1	17.2
	20	52.0	117.2	120.0	-2.8	-3.4
	25	45.2	101.7	120.0	-18.3	-27.4
	30	40.0	90.2	120.0	-29.8	-53.7
5 Year	5	141.2	317.9	120.0	197.9	59.4
	10	**104.2**	**234.6**	**120.0**	**114.6**	**68.8**
	15	83.6	188.2	120.0	68.2	61.4
	20	70.3	158.2	120.0	38.2	45.8
	25	60.9	137.1	120.0	17.1	25.7
	30	53.9	121.4	120.0	1.4	2.6
100 Year	5	242.7	607.3	120.0	487.3	146.2
	10	178.6	446.8	120.0	326.8	196.1
	15	142.9	357.5	120.0	237.5	213.8
	20	**120.0**	**300.1**	**120.0**	**180.1**	**216.2**
	25	103.8	259.8	120.0	139.8	209.8
	30	91.9	229.9	120.0	109.9	197.8

Notes:

1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided and available storage volume values have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)
5. Available storage volume corresponds to the maximum surface storage volume available before 'overtopping'.

Storage Volume Calculations - STM2 (CB 2)

Given:

Area (ha) = 0.63

C = 0.90

C (100 YR) = 1.00

Release Rate (L/s) = 60.0

Available Storage Volume (m^3) = 200.8

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	5	103.6	163.2	60.0	103.2	31.0
	10	**76.8**	**121.0**	**60.0**	**61.0**	**36.6**
	15	61.8	97.3	60.0	37.3	33.6
	20	52.0	82.0	60.0	22.0	26.4
	25	45.2	71.2	60.0	11.2	16.7
	30	40.0	63.1	60.0	3.1	5.6
5 Year	5	141.2	222.4	60.0	162.4	48.7
	10	104.2	164.2	60.0	104.2	62.5
	15	**83.6**	**131.6**	**60.0**	**71.6**	**64.5**
	20	70.3	110.7	60.0	50.7	60.8
	25	60.9	95.9	60.0	35.9	53.9
	30	53.9	85.0	60.0	25.0	44.9
100 Year	15	142.9	250.1	60.0	190.1	171.1
	20	120.0	210.0	60.0	150.0	180.0
	25	**103.8**	**181.8**	**60.0**	**121.8**	**182.7**
	30	91.9	160.8	60.0	100.8	181.5
	35	82.6	144.6	60.0	84.6	177.6
	40	75.1	131.5	60.0	71.5	171.7

Notes:

1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided and available storage volume values have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)
5. Available storage volume corresponds to the maximum surface storage volume available before 'overtopping'.

Storage Volume Calculations - STM3 (CB 3)

Given:

Area (ha) = 0.67
C = 0.90
C (100 YR) = 1.00

Release Rate (L/s) = 80.0

Available Storage Volume (m^3) = 184.7

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	5	103.6	173.9	80.0	93.9	28.2
	10	**76.8**	**128.9**	**80.0**	**48.9**	**29.4**
	15	61.8	103.7	80.0	23.7	21.3
	20	52.0	87.4	80.0	7.4	8.8
	25	45.2	75.8	80.0	-4.2	-6.3
	30	40.0	67.2	80.0	-12.8	-23.0
5 Year	5	141.2	237.0	80.0	157.0	47.1
	10	**104.2**	**174.9**	**80.0**	**94.9**	**57.0**
	15	83.6	140.3	80.0	60.3	54.3
	20	70.3	117.9	80.0	37.9	45.5
	25	60.9	102.2	80.0	22.2	33.4
	30	53.9	90.5	80.0	10.5	19.0
100 Year	10	178.6	333.1	80.0	253.1	151.9
	15	142.9	266.6	80.0	186.6	167.9
	20	**120.0**	**223.8**	**80.0**	**143.8**	**172.5**
	25	103.8	193.7	80.0	113.7	170.6
	30	91.9	171.4	80.0	91.4	164.5
	35	82.6	154.0	80.0	74.0	155.5

Notes:

1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided and available storage volume values have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)
5. Available storage volume corresponds to the maximum surface storage volume available before 'overtopping'.

Storage Volume Calculations - STM4 (CB 4)

Given:

Area (ha) = 0.44
C = 0.82
C (100 YR) = 1.00

Release Rate (L/s) = 60.0

Available Storage Volume (m^3) = 135.7

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	**5**	**103.6**	**104.8**	**60.0**	**44.8**	**13.4**
	10	76.8	77.7	60.0	17.7	10.6
	15	61.8	62.5	60.0	2.5	2.3
	20	52.0	52.7	60.0	-7.3	-8.8
	25	45.2	45.7	60.0	-14.3	-21.4
	30	40.0	40.5	60.0	-19.5	-35.1
5 Year	5	141.2	142.9	60.0	82.9	24.9
	10	**104.2**	**105.4**	**60.0**	**45.4**	**27.3**
	15	83.6	84.6	60.0	24.6	22.1
	20	70.3	71.1	60.0	11.1	13.3
	25	60.9	61.6	60.0	1.6	2.4
	30	53.9	54.6	60.0	-5.4	-9.8
100 Year	10	178.6	219.3	60.0	159.3	95.6
	15	142.9	175.5	60.0	115.5	104.0
	20	**120.0**	**147.3**	**60.0**	**87.3**	**104.8**
	25	103.8	127.6	60.0	67.6	101.4
	30	91.9	112.9	60.0	52.9	95.1
	35	82.6	101.4	60.0	41.4	87.0

Notes:

1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided and available storage volume values have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)
5. Available storage volume corresponds to the maximum surface storage volume available before 'overtopping'.

Storage Volume Calculations - STM5 (CB 5)

Given:

Area (ha) =	0.96	Release Rate (L/s) =	120.0
C =	0.89		
C (100 YR) =	1.00	Available Storage Volume (m^3) =	269.7

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	**5**	**103.6**	**247.0**	**120.0**	**127.0**	**38.1**
	10	76.8	183.2	120.0	63.2	37.9
	15	61.8	147.3	120.0	27.3	24.6
	20	52.0	124.1	120.0	4.1	4.9
	25	45.2	107.7	120.0	-12.3	-18.4
	30	40.0	95.5	120.0	-24.5	-44.1
5 Year	5	141.2	336.7	120.0	216.7	65.0
	10	**104.2**	**248.5**	**120.0**	**128.5**	**77.1**
	15	83.6	199.3	120.0	79.3	71.4
	20	70.3	167.5	120.0	47.5	57.1
	25	60.9	145.2	120.0	25.2	37.9
	30	53.9	128.6	120.0	8.6	15.5
100 Year	10	178.6	478.7	120.0	358.7	215.2
	15	142.9	383.1	120.0	263.1	236.8
	20	**120.0**	**321.6**	**120.0**	**201.6**	**241.9**
	25	103.8	278.4	120.0	158.4	237.6
	30	91.9	246.3	120.0	126.3	227.3
	35	82.6	221.4	120.0	101.4	212.9

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided and available storage volume values have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)
5. Available storage volume corresponds to the maximum surface storage volume available before 'overtopping'.

Storage Volume Calculations - STM6 (CB 6)

Given:

Area (ha) =	0.62	Release Rate (L/s) =	60.0
C =	0.89		
C (100 YR) =	1.00	Available Storage Volume (m^3) =	221.7

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	5	103.6	159.5	60.0	99.5	29.9
	10	**76.8**	**118.3**	**60.0**	**58.3**	**35.0**
	15	61.8	95.1	60.0	35.1	31.6
	20	52.0	80.1	60.0	20.1	24.2
	25	45.2	69.6	60.0	9.6	14.4
	30	40.0	61.7	60.0	1.7	3.0
5 Year	5	141.2	217.5	60.0	157.5	47.2
	10	104.2	160.5	60.0	100.5	60.3
	15	**83.6**	**128.7**	**60.0**	**68.7**	**61.8**
	20	70.3	108.2	60.0	48.2	57.8
	25	60.9	93.8	60.0	33.8	50.7
	30	53.9	83.1	60.0	23.1	41.5
100 Year	15	142.9	247.7	60.0	187.7	168.9
	20	120.0	207.9	60.0	147.9	177.5
	25	**103.8**	**180.0**	**60.0**	**120.0**	**180.0**
	30	91.9	159.2	60.0	99.2	178.6
	35	82.6	143.1	60.0	83.1	174.6
	40	75.1	130.2	60.0	70.2	168.6

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided and available storage volume values have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)
5. Available storage volume corresponds to the maximum surface storage volume available before 'overtopping'.

Storage Volume Calculations - STM7 (CB 7)

Given:

Area (ha) = 0.54
C = 0.90
C (100 YR) = 1.00

Release Rate (L/s) = 30.0
Available Storage Volume (m^3) = 200.5

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	10	76.8	103.5	30.0	73.5	44.1
	15	61.8	83.3	30.0	53.3	47.9
	20	**52.0**	**70.1**	**30.0**	**40.1**	**48.2**
	25	45.2	60.9	30.0	30.9	46.3
	30	40.0	54.0	30.0	24.0	43.2
	35	36.1	48.6	30.0	18.6	39.1
5 Year	15	83.6	112.6	30.0	82.6	74.4
	20	70.3	94.7	30.0	64.7	77.6
	25	**60.9**	**82.1**	**30.0**	**52.1**	**78.1**
	30	53.9	72.7	30.0	42.7	76.9
	35	48.5	65.4	30.0	35.4	74.4
	40	44.2	59.6	30.0	29.6	71.0
100 Year	35	82.6	123.7	30.0	93.7	196.8
	40	75.1	112.6	30.0	82.6	198.1
	45	**69.1**	**103.4**	**30.0**	**73.4**	**198.3**
	50	64.0	95.8	30.0	65.8	197.4
	55	59.6	89.3	30.0	59.3	195.7
	60	55.9	83.7	30.0	53.7	193.4

Notes:

1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided and available storage volume values have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)
5. Available storage volume corresponds to the maximum surface storage volume available before 'overtopping'.

Storage Volume Calculations - STM8 (CB 8)

Given:

Area (ha) = 0.32
C = 0.68
C (100 YR) = 0.85

Release Rate (L/s) = 25.0
Available Storage Volume (m^3) = 86.7

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	5	103.6	62.3	25.0	37.3	11.2
	10	**76.8**	**46.2**	**25.0**	**21.2**	**12.7**
	15	61.8	37.1	25.0	12.1	10.9
	20	52.0	31.3	25.0	6.3	7.5
	25	45.2	27.2	25.0	2.2	3.2
	30	40.0	24.1	25.0	-0.9	-1.7
5 Year	5	141.2	84.9	25.0	59.9	18.0
	10	104.2	62.6	25.0	37.6	22.6
	15	**83.6**	**50.2**	**25.0**	**25.2**	**22.7**
	20	70.3	42.2	25.0	17.2	20.7
	25	60.9	36.6	25.0	11.6	17.4
	30	53.9	32.4	25.0	7.4	13.4
100 Year	15	142.9	107.4	25.0	82.4	74.2
	20	120.0	90.2	25.0	65.2	78.2
	25	**103.8**	**78.1**	**25.0**	**53.1**	**79.6**
	30	91.9	69.0	25.0	44.0	79.3
	35	82.6	62.1	25.0	37.1	77.8
	40	75.1	56.5	25.0	31.5	75.5

Notes:

1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided and available storage volume values have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)
5. Available storage volume corresponds to the maximum surface storage volume available before 'overtopping'.

Storage Volume Calculations - STM9 (CB 9)

Given:

Area (ha) = 0.10
C = 0.85
C (100 YR) = 1.00

Release Rate (L/s) = 55.0
Available Storage Volume (m^3) = 3.7

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	5	103.6	23.3	55.0	-31.7	-9.5
	10	76.8	17.3	55.0	-37.7	-22.6
	15	61.8	13.9	55.0	-41.1	-37.0
	20	52.0	11.7	55.0	-43.3	-52.0
	25	45.2	10.1	55.0	-44.9	-67.3
	30	40.0	9.0	55.0	-46.0	-82.8
5 Year	5	141.2	31.7	55.0	-23.3	-7.0
	10	104.2	23.4	55.0	-31.6	-19.0
	15	83.6	18.8	55.0	-36.2	-32.6
	20	70.3	15.8	55.0	-39.2	-47.1
	25	60.9	13.7	55.0	-41.3	-62.0
	30	53.9	12.1	55.0	-42.9	-77.2
100 Year	**5**	**242.7**	**64.3**	**55.0**	**9.3**	**2.8**
	10	178.6	47.3	55.0	-7.7	-4.6
	15	142.9	37.8	55.0	-17.2	-15.4
	20	120.0	31.8	55.0	-23.2	-27.9
	25	103.8	27.5	55.0	-27.5	-41.3
	30	91.9	24.3	55.0	-30.7	-55.2

Notes:

1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided and available storage volume values have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)
5. Available storage volume corresponds to the maximum surface storage volume available before 'overtopping'.

Storage Volume Calculations - STM10 (CB 10)

Given:

Area (ha) = 0.11
C = 0.79
C (100 YR) = 0.99

Release Rate (L/s) = 30.0
Available Storage Volume (m^3) = 16.6

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	5	103.6	26.1	30.0	-3.9	-1.2
	10	76.8	19.3	30.0	-10.7	-6.4
	15	61.8	15.6	30.0	-14.4	-13.0
	20	52.0	13.1	30.0	-16.9	-20.3
	25	45.2	11.4	30.0	-18.6	-27.9
	30	40.0	10.1	30.0	-19.9	-35.8
5 Year	**5**	**141.2**	**35.6**	**30.0**	**5.6**	**1.7**
	10	104.2	26.2	30.0	-3.8	-2.3
	15	83.6	21.0	30.0	-9.0	-8.1
	20	70.3	17.7	30.0	-12.3	-14.8
	25	60.9	15.3	30.0	-14.7	-22.0
	30	53.9	13.6	30.0	-16.4	-29.6
100 Year	5	242.7	76.4	30.0	46.4	13.9
	10	**178.6**	**56.2**	**30.0**	**26.2**	**15.7**
	15	142.9	45.0	30.0	15.0	13.5
	20	120.0	37.8	30.0	7.8	9.3
	25	103.8	32.7	30.0	2.7	4.0
	30	91.9	28.9	30.0	-1.1	-1.9

Notes:

1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided and available storage volume values have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)
5. Available storage volume corresponds to the maximum surface storage volume available before 'overtopping'.

Storage Volume Calculations - STM11 (CB 11)

Given:

Area (ha) = 0.12
C = 0.70
C (100 YR) = 0.88

Release Rate (L/s) = 25.0
Available Storage Volume (m^3) = 53.6

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	5	103.6	23.3	25.0	-1.7	-0.5
	10	76.8	17.3	25.0	-7.7	-4.6
	15	61.8	13.9	25.0	-11.1	-10.0
	20	52.0	11.7	25.0	-13.3	-16.0
	25	45.2	10.2	25.0	-14.8	-22.3
	30	40.0	9.0	25.0	-16.0	-28.8
5 Year	**5**	**141.2**	**31.8**	**25.0**	**6.8**	**2.0**
	10	104.2	23.4	25.0	-1.6	-0.9
	15	83.6	18.8	25.0	-6.2	-5.6
	20	70.3	15.8	25.0	-9.2	-11.0
	25	60.9	13.7	25.0	-11.3	-16.9
	30	53.9	12.1	25.0	-12.9	-23.2
100 Year	5	242.7	68.3	25.0	43.3	13.0
	10	**178.6**	**50.2**	**25.0**	**25.2**	**15.1**
	15	142.9	40.2	25.0	15.2	13.7
	20	120.0	33.7	25.0	8.7	10.5
	25	103.8	29.2	25.0	4.2	6.3
	30	91.9	25.8	25.0	0.8	1.5

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided and available storage volume values have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)
5. Available storage volume corresponds to the maximum surface storage volume available before 'overtopping'.

Storage Volume Calculations - STM12 (CB 12)

Given:

Area (ha) = 0.08
C = 0.89
C (100 YR) = 1.00

Release Rate (L/s) = 40.0
Available Storage Volume (m^3) = 4.6

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	5	103.6	20.8	40.0	-19.2	-5.8
	10	76.8	15.4	40.0	-24.6	-14.8
	15	61.8	12.4	40.0	-27.6	-24.8
	20	52.0	10.4	40.0	-29.6	-35.5
	25	45.2	9.1	40.0	-30.9	-46.4
	30	40.0	8.0	40.0	-32.0	-57.5
5 Year	5	141.2	28.3	40.0	-11.7	-3.5
	10	104.2	20.9	40.0	-19.1	-11.5
	15	83.6	16.8	40.0	-23.2	-20.9
	20	70.3	14.1	40.0	-25.9	-31.1
	25	60.9	12.2	40.0	-27.8	-41.7
	30	53.9	10.8	40.0	-29.2	-52.5
100 Year	**5**	**242.7**	**54.5**	**40.0**	**14.5**	**4.3**
	10	178.6	40.1	40.0	0.1	0.1
	15	142.9	32.1	40.0	-7.9	-7.1
	20	120.0	26.9	40.0	-13.1	-15.7
	25	103.8	23.3	40.0	-16.7	-25.0
	30	91.9	20.6	40.0	-19.4	-34.9

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided and available storage volume values have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)
5. Available storage volume corresponds to the maximum surface storage volume available before 'overtopping'.

Storage Volume Calculations - STM13 (CB 13)

Given:

Area (ha) = 0.11

C = 0.79

C (100 YR) = 0.99

Release Rate (L/s) = 30.0

Available Storage Volume (m^3) = 16.6

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	5	103.6	26.0	30.0	-4.0	-1.2
	10	76.8	19.3	30.0	-10.7	-6.4
	15	61.8	15.5	30.0	-14.5	-13.0
	20	52.0	13.1	30.0	-16.9	-20.3
	25	45.2	11.4	30.0	-18.6	-28.0
	30	40.0	10.1	30.0	-19.9	-35.9
5 Year	**5**	**141.2**	**35.5**	**30.0**	**5.5**	**1.6**
	10	104.2	26.2	30.0	-3.8	-2.3
	15	83.6	21.0	30.0	-9.0	-8.1
	20	70.3	17.7	30.0	-12.3	-14.8
	25	60.9	15.3	30.0	-14.7	-22.0
	30	53.9	13.6	30.0	-16.4	-29.6
100 Year	5	242.7	76.3	30.0	46.3	13.9
	10	**178.6**	**56.1**	**30.0**	**26.1**	**15.7**
	15	142.9	44.9	30.0	14.9	13.4
	20	120.0	37.7	30.0	7.7	9.2
	25	103.8	32.6	30.0	2.6	3.9
	30	91.9	28.9	30.0	-1.1	-2.0

Notes:

1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided and available storage volume values have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)
5. Available storage volume corresponds to the maximum surface storage volume available before 'overtopping'.

Storage Volume Calculations - STM14 (CB 14)

Given:

Area (ha) = 0.10

C = 0.81

C (100 YR) = 1.00

Release Rate (L/s) = 25.0

Available Storage Volume (m^3) = 54.5

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	5	103.6	22.2	25.0	-2.8	-0.8
	10	76.8	16.5	25.0	-8.5	-5.1
	15	61.8	13.2	25.0	-11.8	-10.6
	20	52.0	11.2	25.0	-13.8	-16.6
	25	45.2	9.7	25.0	-15.3	-23.0
	30	40.0	8.6	25.0	-16.4	-29.5
5 Year	**5**	**141.2**	**30.3**	**25.0**	**5.3**	**1.6**
	10	104.2	22.3	25.0	-2.7	-1.6
	15	83.6	17.9	25.0	-7.1	-6.4
	20	70.3	15.1	25.0	-9.9	-11.9
	25	60.9	13.1	25.0	-11.9	-17.9
	30	53.9	11.6	25.0	-13.4	-24.2
100 Year	5	242.7	64.3	25.0	39.3	11.8
	10	**178.6**	**47.3**	**25.0**	**22.3**	**13.4**
	15	142.9	37.9	25.0	12.9	11.6
	20	120.0	31.8	25.0	6.8	8.1
	25	103.8	27.5	25.0	2.5	3.8
	30	91.9	24.3	25.0	-0.7	-1.2

Notes:

1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided and available storage volume values have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)
5. Available storage volume corresponds to the maximum surface storage volume available before 'overtopping'.

Storage Volume Calculations - STM15 + STM16 (DICB 15)

Given:

Area (ha) = 0.07

C = 0.26

C (100 YR) = 0.32

Release Rate (L/s) = 20.0

Available Storage Volume (m^3) = 18.3

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	5	103.6	5.4	20.0	-14.6	-4.4
	10	76.8	4.0	20.0	-16.0	-9.6
	15	61.8	3.2	20.0	-16.8	-15.1
	20	52.0	2.7	20.0	-17.3	-20.7
	25	45.2	2.4	20.0	-17.6	-26.4
	30	40.0	2.1	20.0	-17.9	-32.2
5 Year	5	141.2	7.4	20.0	-12.6	-3.8
	10	104.2	5.5	20.0	-14.5	-8.7
	15	83.6	4.4	20.0	-15.6	-14.0
	20	70.3	3.7	20.0	-16.3	-19.6
	25	60.9	3.2	20.0	-16.8	-25.2
	30	53.9	2.8	20.0	-17.2	-30.9
100 Year	5	242.7	15.9	20.0	-4.1	-1.2
	10	178.6	11.7	20.0	-8.3	-5.0
	15	142.9	9.4	20.0	-10.6	-9.5
	20	120.0	7.9	20.0	-12.1	-14.5
	25	103.8	6.8	20.0	-13.2	-19.8
	30	91.9	6.0	20.0	-14.0	-25.1

Notes:

1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided and available storage volume values have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)
5. Available storage volume corresponds to the maximum surface storage volume available before 'overtopping'.

Storage Volume Calculations - STM17 (DICB 17)

Given:

Area (ha) = 0.07

C = 0.27

C (100 YR) = 0.34

Release Rate (L/s) = 20.0

Available Storage Volume (m^3) = 16.0

Design Event	Time (min)	Rainfall Intensity (mm/hr)	Flow (L/s)	Release Rate (L/s)	Net Runoff to be Stored (L/s)	Storage Required (m^3)
2 Year	5	103.6	5.0	20.0	-15.0	-4.5
	10	76.8	3.7	20.0	-16.3	-9.8
	15	61.8	3.0	20.0	-17.0	-15.3
	20	52.0	2.5	20.0	-17.5	-21.0
	25	45.2	2.2	20.0	-17.8	-26.7
	30	40.0	1.9	20.0	-18.1	-32.5
5 Year	5	141.2	6.9	20.0	-13.1	-3.9
	10	104.2	5.1	20.0	-14.9	-9.0
	15	83.6	4.1	20.0	-15.9	-14.3
	20	70.3	3.4	20.0	-16.6	-19.9
	25	60.9	3.0	20.0	-17.0	-25.6
	30	53.9	2.6	20.0	-17.4	-31.3
100 Year	5	242.7	14.7	20.0	-5.3	-1.6
	10	178.6	10.8	20.0	-9.2	-5.5
	15	142.9	8.7	20.0	-11.3	-10.2
	20	120.0	7.3	20.0	-12.7	-15.3
	25	103.8	6.3	20.0	-13.7	-20.5
	30	91.9	5.6	20.0	-14.4	-26.0

Notes:

1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Provided and available storage volume values have been calculated using Civil3D by Autodesk.
3. Flow calculated using the Rational Method. Q=2.78CiA
4. C (100 YR) = C + 25% (Max. 1.0)
5. Available storage volume corresponds to the maximum surface storage volume available before 'overtopping'.

HYDRAULIC GRADE LINE COMPUTATION FORM

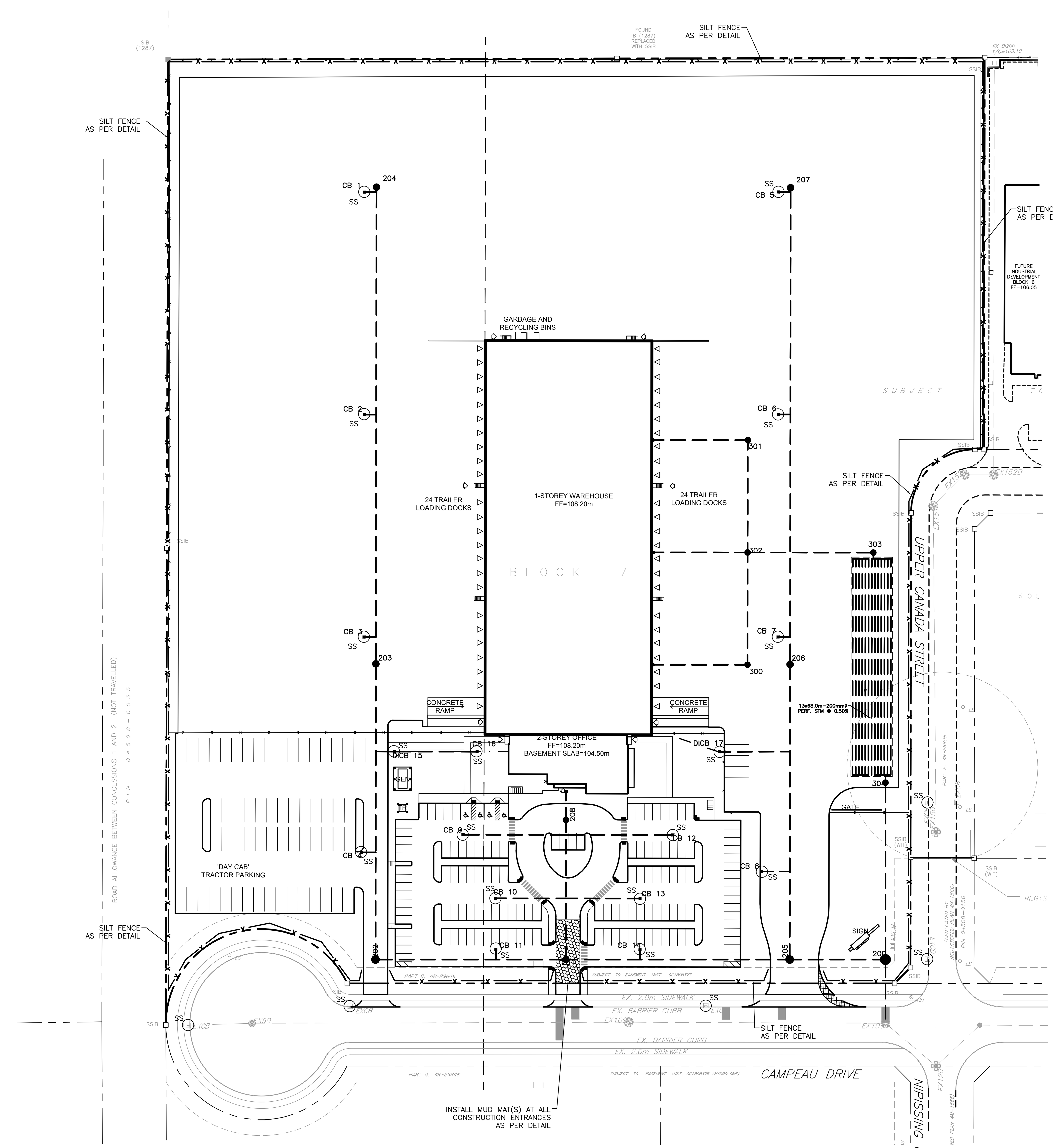
From Manhole	To Manhole	U/S Invert	D/S Invert	U/S Obvert	D/S Obvert	Slope	TW	Diameter D_o	Area	Hydraulic Radius	5 Year Peak Flow Q_o	Length L_o	Velocity V_o	Velocity Head $V_o^2/2g$	Friction Slope Sf_o	Friction Loss H_f	Angle of Deflection at U/S MH	Hydraulic Loss at MH*[1]	EGL_o	EGL_i	HGL_o	HGL_i	Ground Elev.	Surcharge Depth	Free Board
		m	m	m	m	m/m	m	m	m^2	m	m^3/s	m	m/s	m	m/m	m	degrees	m	m	m	m	m	m	m	m
EX101	200	101.98	101.86	102.89	102.77	0.0060	103.57	0.914	0.66	0.23	1.3370	20.0	2.04	0.21	0.0050	0.100	50	0.0974	103.78	103.98	103.57	103.77	105.93	0.87	2.16
200	205	102.19	102.04	103.10	102.95	0.0050	103.77	0.914	0.66	0.23	1.2087	30.1	1.84	0.17	0.0041	0.124	90	0.2284	103.94	104.29	103.77	104.12	106.10	1.02	1.98
205	201	102.64	102.34	103.40	103.10	0.0043	104.12	0.762	0.46	0.19	0.7178	70.4	1.57	0.13	0.0038	0.269	0	0.0025	104.25	104.52	104.12	104.39	106.21	0.99	1.82
201	202	102.90	102.67	103.66	103.43	0.0038	104.39	0.762	0.46	0.19	0.6201	59.9	1.36	0.09	0.0029	0.171	0	0.0019	104.49	104.66	104.39	104.56	106.37	0.90	1.81
202	203	103.29	102.96	104.05	103.72	0.0035	104.56	0.762	0.46	0.19	0.6275	93.0	1.38	0.10	0.0029	0.272	90	0.1274	104.66	105.06	104.56	104.96	106.43	0.91	1.47
203	204	103.76	103.32	104.52	104.08	0.0029	104.96	0.762	0.46	0.19	0.5731	150.0	1.26	0.08	0.0024	0.365	0	0.0016	105.04	105.41	104.96	105.33	106.34	0.81	1.01
EX101	200	101.98	101.86	102.89	102.77	0.0060	103.57	0.914	0.66	0.23	1.344	20.0	2.05	0.21	0.0051	0.101	50	0.0984	103.78	103.98	103.57	103.77	105.93	0.88	2.16
200	205	102.19	102.04	103.10	102.95	0.0050	103.77	0.914	0.66	0.23	1.216	30.1	1.85	0.18	0.0042	0.125	90	0.2310	103.94	104.30	103.77	104.13	106.10	1.02	1.97
205	201	102.64	102.34	103.40	103.10	0.0045	104.13	0.762	0.46	0.19	0.720	70.8	1.58	0.13	0.0038	0.272	0	0.0025	104.25	104.53	104.13	104.40	106.21	0.98	1.81
201	208	104.98	103.24	105.28	103.54	4.1900	104.40	0.299	0.07	0.07	0.109	43.9	1.55	0.12	0.0129	0.566	90	0.1618	104.52	105.25	104.40	105.13	106.37	-0.15	1.24
208	BLDG	105.50	105.04	105.75	105.29	4.0200	105.13	0.252	0.05	0.06	0.015	9.2	0.30	0.00	0.0006	0.006	30	0.0010	105.13	105.14	105.13	105.13	107.85	-0.62	2.72
EX101	200	101.98	101.86	102.89	102.77	0.0060	103.57	0.914	0.66	0.23	1.344	20.0	2.05	0.21	0.0051	0.101	50	0.0984	103.78	103.98	103.57	103.77	105.93	0.88	2.16
200	205	102.19	102.04	103.10	102.95	0.0050	103.77	0.914	0.66	0.23	1.216	30.1	1.85	0.18	0.0042	0.125	90	0.2310	103.94	104.30	103.77	104.13	106.10	1.02	1.97
205	206	102.93	102.42	103.62	103.11	0.0055	104.13	0.686	0.37	0.17	0.575	92.9	1.56	0.12	0.0043	0.399	90	0.1631	104.25	104.81	104.13	104.69	106.21	1.07	1.52
206	207	103.78	102.96	104.47	103.65	0.0055	104.69	0.686	0.37	0.17	0.549	150.0	1.48	0.11	0.0039	0.586	0	0.0022	104.80	105.39	104.69	105.28	106.33	0.81	1.05
EX101	200	101.98	101.86	102.89	102.77	0.0060	103.57	0.914	0.66	0.23	1.347	20.0	2.05	0.21	0.0051	0.102	50	0.0989	103.78	103.99	103.57	103.77	105.93	0.88	2.16
200	304	HGL is contained within storm sewer																							

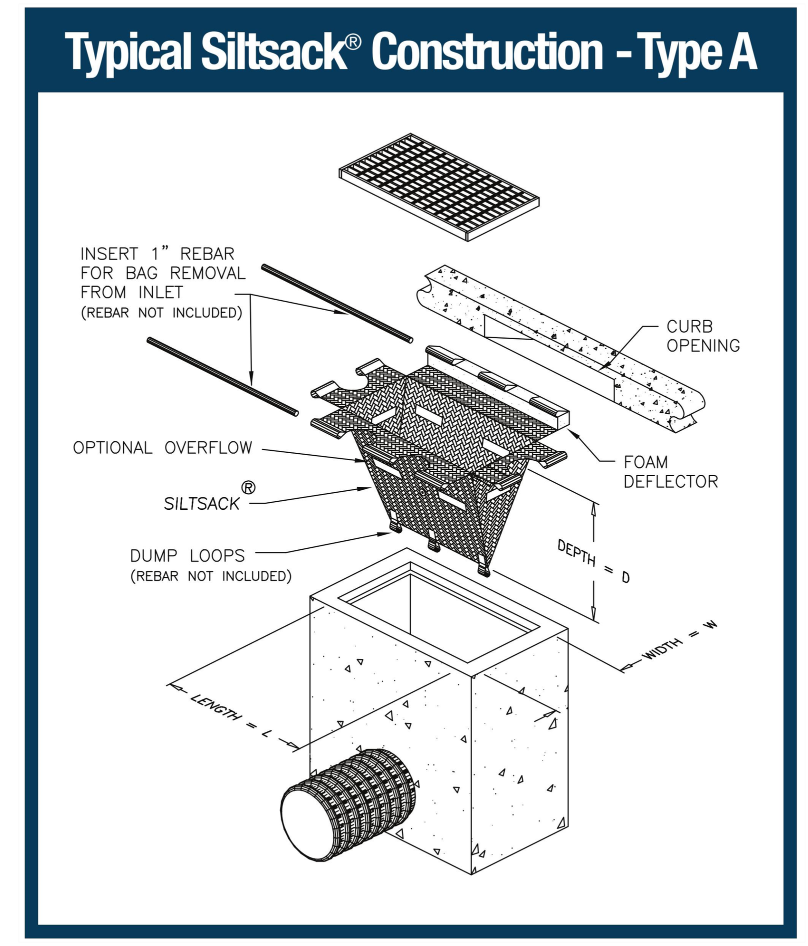
Notes:
1. From "Sewer Bend Loss Coefficient Design Chart", Appendix 6-B, City of Ottawa Sewer Design Guidelines, 2004

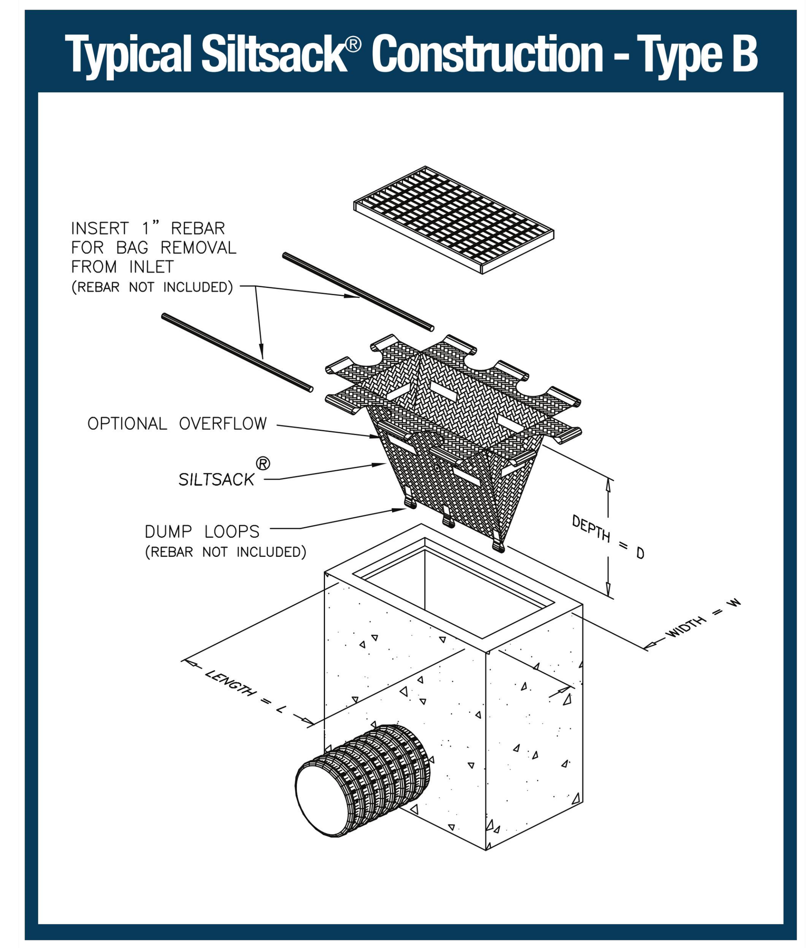
Designed: BLM
Checked:
Dwg. Reference:
Project: Maritime-Ontario Distribution Warehouse
Location: 8800 Campeau Drive, KWBP, Ottawa, ON
Project No.: 20027
Date: 27-May-21
Page 1 of 1

From "Sewer Bend Loss Coefficient Design Chart", Appendix 6-B, City of Ottawa Sewer Design Guidelines, 2004

Deflection Angle	Bend Loss Coefficient
0	0.02
30	0.22
50	0.46
90	1.32

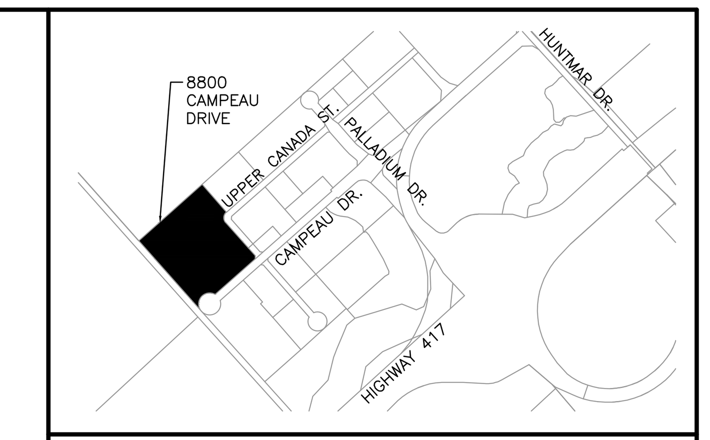




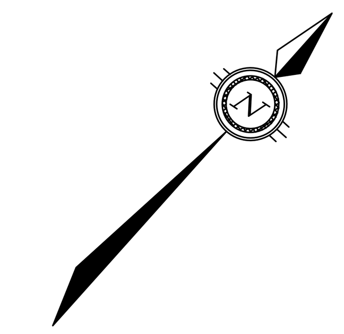


INFILTRATION GALLERY NOTES:

1. INFILTRATION GALLERY SHALL BE CONSTRUCTED TOWARDS THE END OF THE DEVELOPMENT CONSTRUCTION PERIOD IN ORDER TO NOT CONTAMINATE THE PRACTICE.
2. SMEARING OF THE NATIVE MATERIAL AT THE INTERFACE WITH THE GALLERY FLOOR MUST BE AVOIDED AND/OR CORRECTED BY RAKING OR ROTO-TILLING.
3. COMPACTION OF THE GALLERY BOTTOM MUST BE MINIMIZED.

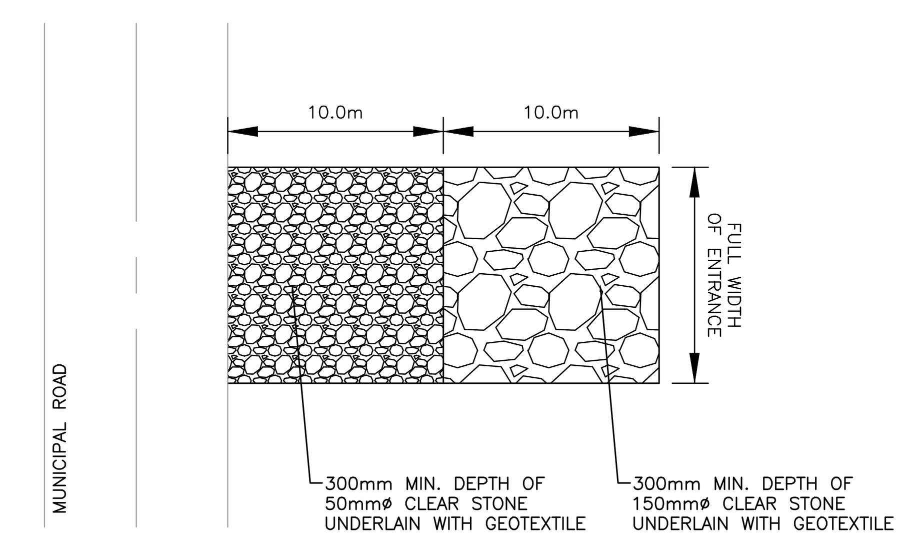


KEY PLAN



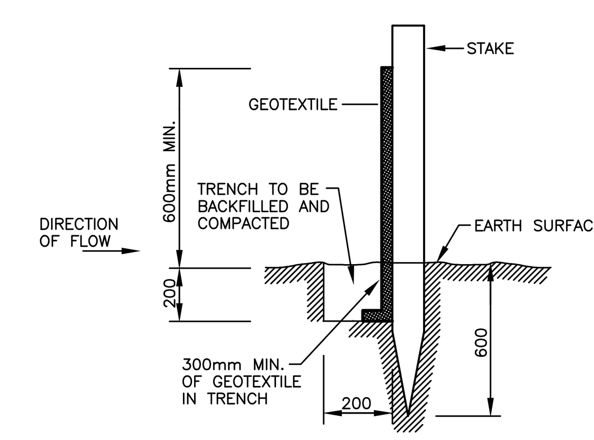
LEGEND

	PROPERTY BOUNDARY
	CATCH BASIN
	EXISTING CATCH BASIN
	STORM SEWER & MANHOLE
	EXISTING STORM SEWER & MANHOLE
	100m NO-BUILD SETBACK
	SILT FENCE
SS	SILT SACK UNDER FRAME AND COVER

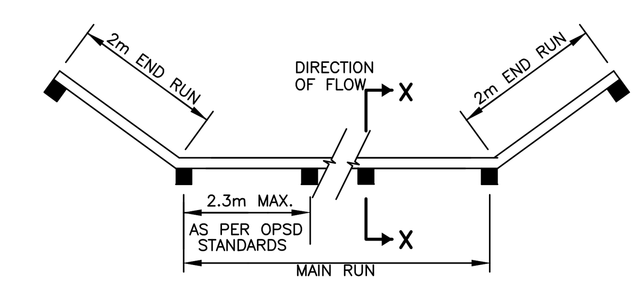


NOTES:
1. MUD MAT TO BE UNDERLAIN WITH A GEOTEXTILE FABRIC.
2. SEDIMENT SHALL BE CLEANED FROM MUNICIPAL RIGHT-OF-WAYS AS REQUIRED.
3. STORM INLETS IN CLOSE VICINITY TO MUD MAT SHALL BE PROTECTED WITH INLET CONTROL MEASURES.

MUD MAT DETAIL
N.T.S.



SECTION X–X
N.T.S.



SILT FENCE BARRIER DETAIL
N.T.S.

NOTES:

1. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE ULTIMATE 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.
2. LIMIT THE EXTENT OF EXPOSED SOILS AT ANY GIVEN TIME.
3. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED UNTIL VEGETATION HAS BEEN RE-ESTABLISHED IN ALL DISTURBED AREAS. RE-VEGETATE DISTURBED AREAS IN ACCORDANCE WITH APPROVED LANDSCAPE PLAN AS SOON AS POSSIBLE.
4. STOCKPILE SOIL AWAY (15 METRES OR GREATER) FROM WATERCOURSES, DRAINAGE FEATURES AND TOP OF STEEP SLOPES.
5. SILT SACKS ARE TO BE PLACED UNDERNEATH THE FRAME AND COVER OF ALL PROPOSED AND EXISTING CATCH BASINS AND OPEN COVER STORM MANHOLES UNTIL CONSTRUCTION IS COMPLETED.
6. A SILT FENCE BARRIER SHALL BE INSTALLED AS PER OPSD 219.1100 WHERE INDICATED AND MAINTAINED AS REQUIRED.
7. DURING ACTIVE CONSTRUCTION PERIODS, VISUAL INSPECTIONS SHALL BE UNDERTAKEN ON A WEEKLY BASIS AND AFTER MAJOR STORM EVENTS (>25mm RAIN IN 24 HOUR PERIOD) ON SEDIMENT CONTROL BARRIERS AND ANY DAMAGE REPAIRED IMMEDIATELY.
8. EROSION AND SEDIMENT CONTROL BARRIERS SHALL ALSO BE ASSESSED (AND REPAIRED AS REQUIRED) FOLLOWING SIGNIFICANT SNOWMELT EVENTS.
9. VISUAL INSPECTIONS SHALL ALSO BE UNDERTAKEN IN ANTICIPATION OF LARGE STORM EVENTS (OR A SERIES OF RAINFALL AND/OR SNOWMELT DAYS) THAT COULD POTENTIALLY YIELD SIGNIFICANT RUNOFF VOLUMES.
10. CARE SHALL BE TAKEN TO PREVENT DAMAGE TO EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION OPERATIONS.
11. IN SOME CASES, BARRIERS MAY BE REMOVED TEMPORARILY TO ACCOMMODATE THE CONSTRUCTION OPERATIONS. THE AFFECTED BARRIERS SHALL BE REINSTATED IMMEDIATELY AFTER CONSTRUCTION OPERATIONS ARE COMPLETED.
12. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE ADJUSTED AS REQUIRED AS THE SITE BECOMES DEVELOPED.
13. SEDIMENT CONTROL DEVICES SHALL BE CLEANED OF ACCUMULATED SEDIMENTATION AS REQUIRED AND REPLACED AS NECESSARY.
14. DURING THE COURSE OF CONSTRUCTION, IF THE ENGINEER BELIEVES THAT ADDITIONAL PREVENTION METHODS ARE REQUIRED TO CONTROL EROSION AND SEDIMENTATION, THE CONTRACTOR SHALL IMPLEMENT ADDITIONAL MEASURES, AS REQUIRED, TO THE SATISFACTION OF THE ENGINEER.
15. CONSTRUCTION AND MAINTENANCE REQUIREMENTS FOR EROSION AND SEDIMENT CONTROLS ARE TO COMPLY WITH OPSS 805.
16. MUD MATS SHALL BE INSTALLED AT ALL CONSTRUCTION ENTRANCES.

NOT FOR CONSTRUCTION

NOTES
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

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SCALE
0 5m 10m 30m
HORIZONTAL 1:750

LICENSED PROFESSIONAL ENGINEER
S. M. CZARABYNSKI
May 28 2021
PROVINCE OF ONTARIO

Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SMC
DRAWN	BLM
CHECKED	SMC
APPROVED	SMC

MARITIME-ONTARIO FREIGHT LINES LIMITED

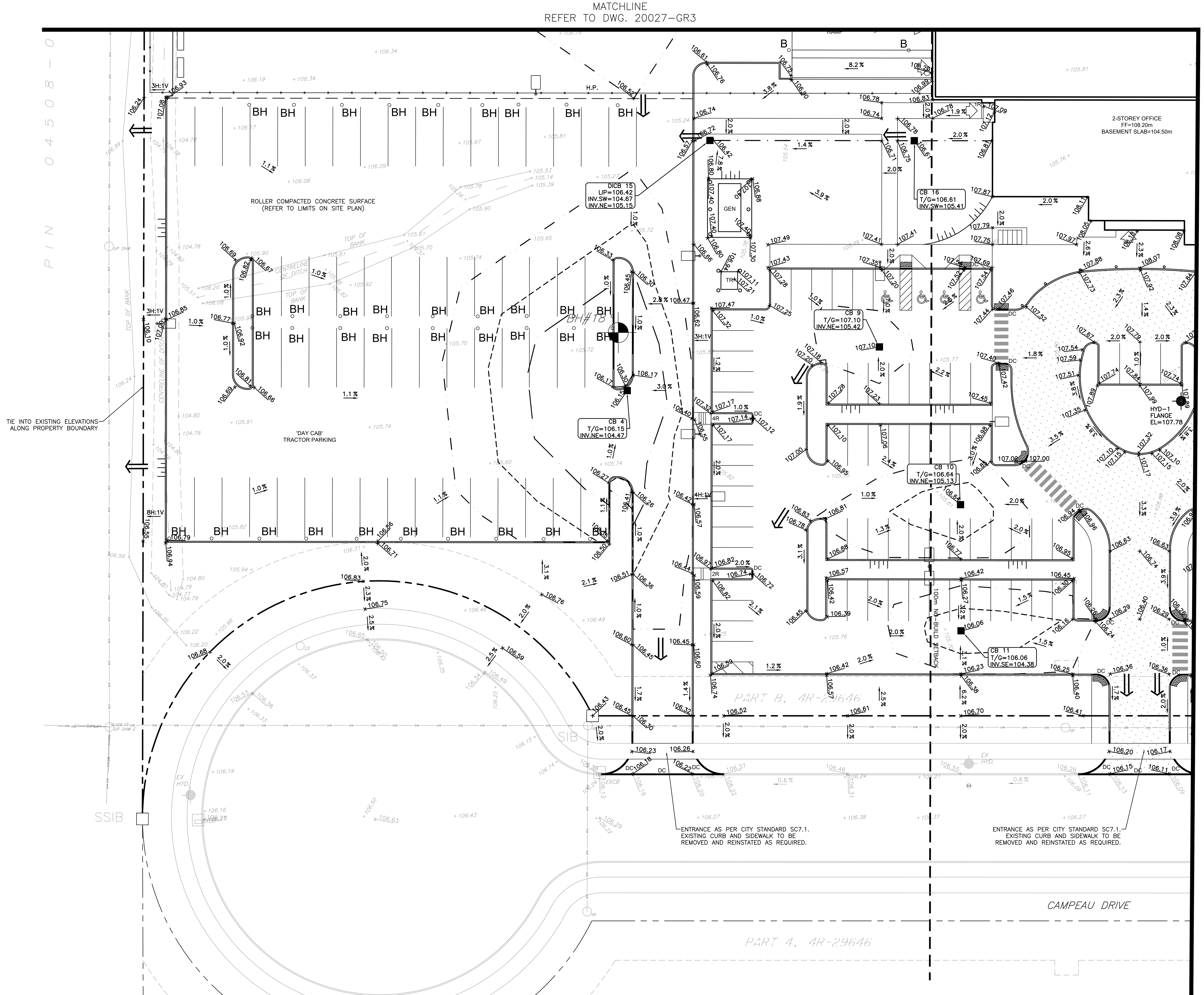
KANATA WEST BUSINESS PARK
8800 CAMPEAU DRIVE, OTTAWA, ON

EROSION AND SEDIMENT CONTROL PLAN

PROJECT No.	20027
SURVEY	STANTEC
DATED	MAY 2021
DWG. No:	20027-ESC1

D07-12-20-0189

#18376



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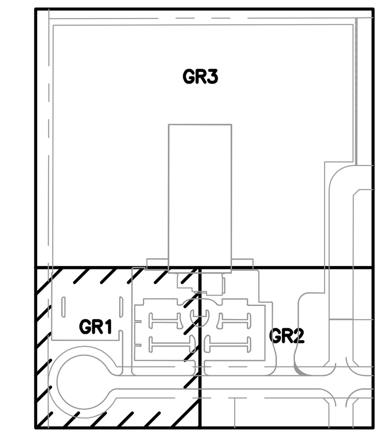
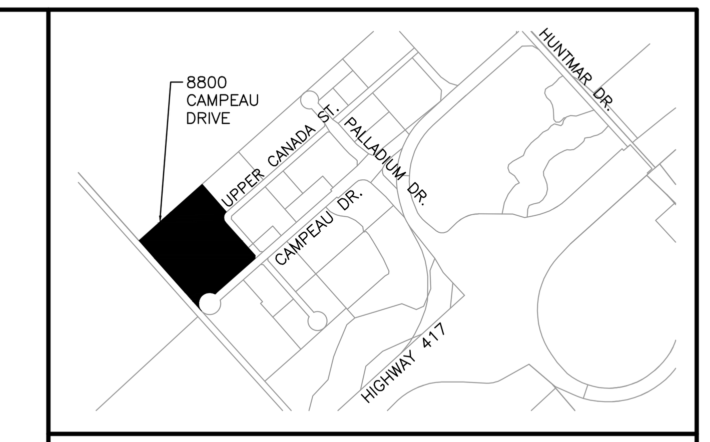


DRAWING KEY PLAN



KEY PLAN

LEGEND

+ 106.00	EXISTING ELEVATION
x 107.00	PROPOSED GRADE
2.0%	PROPOSED DRAINAGE SLOPE AND DIRECTION
107.00	IBI GROUP DESIGN GRADE
	PROPERTY BOUNDARY
	CATCH BASIN
	EXISTING CATCH BASIN
	EXISTING HYDRANT
	SWALE
H.P.	HIGH POINT
DC	DEPRESSED CURB
	TERRACING (3H:1V MAX.)
	100m NO-BUILD SETBACK
	2 YEAR PONDING LIMIT
	5 YEAR PONDING LIMIT
	100 YEAR PONDING LIMIT
	BOREHOLE
	BUILDING ENTRANCE (REFER TO SITE PLAN)
•B	BOLLARD (REFER TO SITE PLAN)
•BH	BLOCK HEATER POST (REFER TO SITE PLAN)
	LIGHT STANDARD (REFER TO SITE PLAN)
	TWSI (REFER TO SITE PLAN)
	MAJOR OVERLAND FLOW ROUTE
	HEAVY DUTY ASPHALT LIMITS

200mm THICKNESS
ZERO SLUMP, NO AIR ENTRAINMENT
32 MPa AT 28 DAY STRENGTH
12 TO 13% CEMENT CONTENT

300mm GRANULAR "A"

NOTE:
1. REFER TO GEOTECHNICAL INVESTIGATION PREPARED BY PATERSON GROUP, REPORT PG5618-1, DATED APRIL 9, 2021.
2. REFER TO LIMITS OF INSTALLATION ON SITE PLAN.

ROLLER COMPACTED CONCRETE PAVEMENT STRUCTURE DETAIL
N.T.S.

50mm WEAR COURSE – HL 3 OR SUPERPAVE 12.5 ASPHALTIC CONCRETE

40mm WEAR COURSE – SUPERPAVE 12.5 ASPHALTIC CONCRETE
50mm BINDER COURSE – SUPERPAVE 19.0 ASPHALTIC CONCRETE

150mm GRANULAR "A"
300mm GRANULAR "B" TYPE II
LIGHT DUTY
(CAR ONLY PARKING AREAS)

150mm GRANULAR "A"
450mm GRANULAR "B" TYPE II
HEAVY DUTY
(ACCESS LANES/ FIRE ROUTE)

NOTE:
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2. REFER TO LIMITS OF INSTALLATION ON SITE PLAN.

ASPHALT PAVEMENT STRUCTURE DETAIL
N.T.S.

SURFACE STORAGE AREAS

LOCATION	2 YEAR			5 YEAR			100 YEAR		
	STORAGE VOLUME (m^3)	PONDING DEPTH (m)	PONDING ELEVATION (m)	STORAGE VOLUME (m^3)	PONDING DEPTH (m)	PONDING ELEVATION (m)	STORAGE VOLUME (m^3)	PONDING DEPTH (m)	PONDING ELEVATION (m)
CB 4	15.5	0.15	106.30	30.3	30.3	0.19	109.4	0.28	106.43
CB 9	N/A	N/A	N/A	N/A	N/A	N/A	3.7	0.10	107.20
CB 10	N/A	N/A	N/A	1.8	0.09	106.73	16.6	0.19	106.83
DICB 15	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CB 16	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

NOTES

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0 2m 4m 10m
HORIZONTAL 1:250

LICENSED PROFESSIONAL ENGINEER
S. M. CZARABYNSKI
PROVINCE OF ONTARIO
May 28 2021

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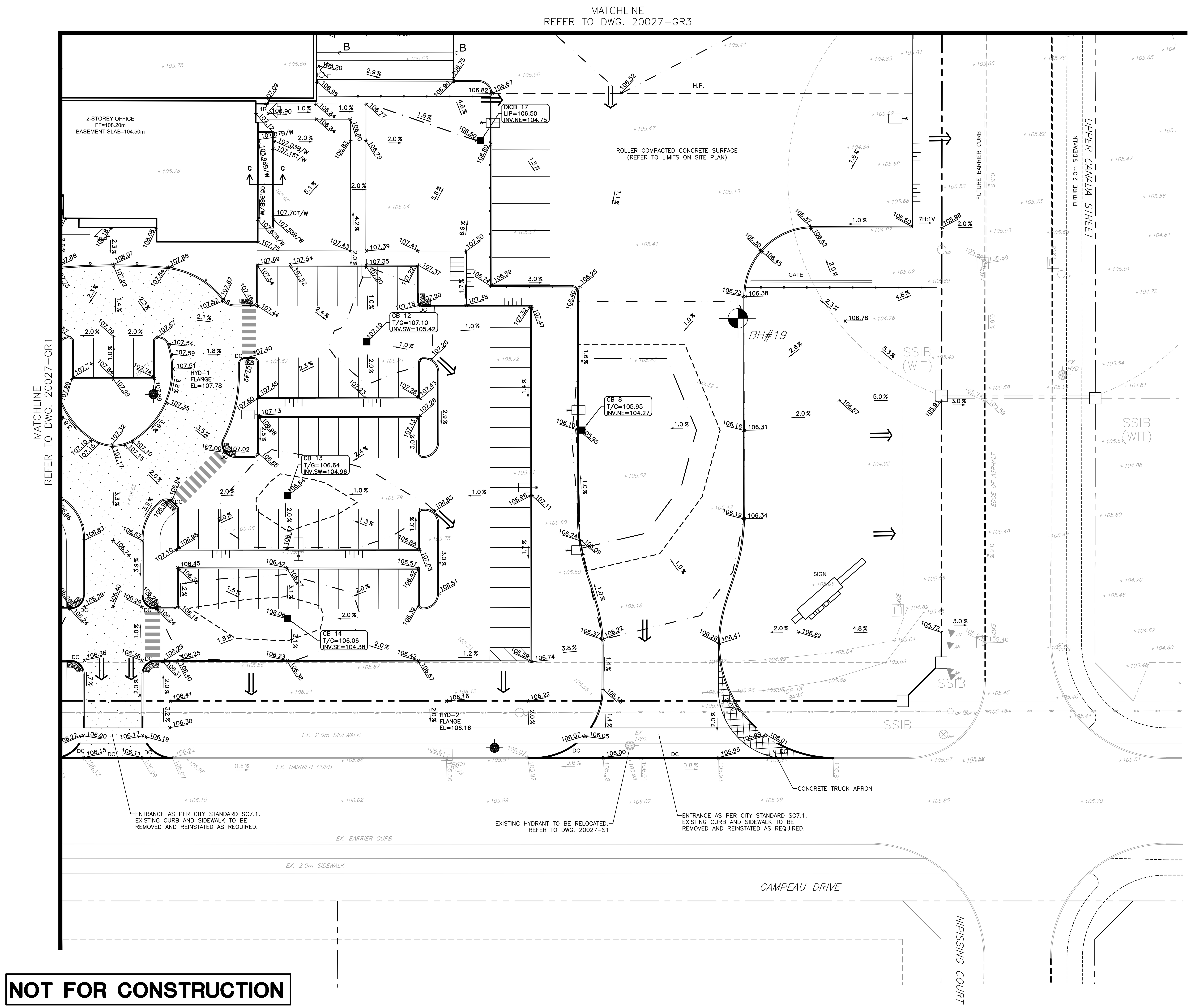
MARITIME-ONTARIO FREIGHT LINES LIMITED

KANATA WEST BUSINESS PARK
8800 CAMPEAU DRIVE, OTTAWA, ON

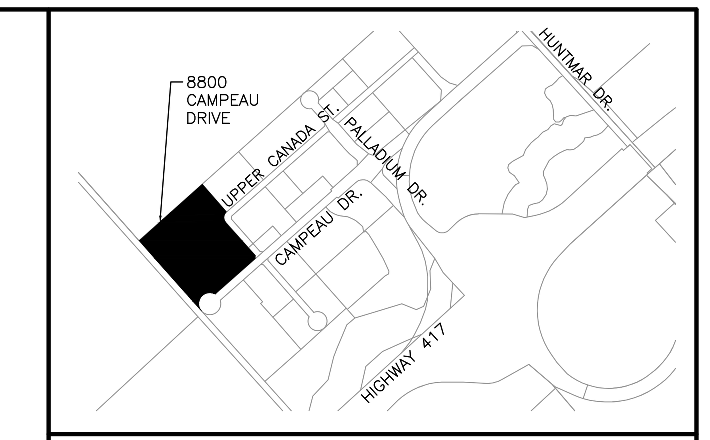
GRADING PLAN

PROJECT No.	20027
SURVEY	STANTEC
DATED	MAY 2021
DWG. No:	20027-GR1

D07-12-20-0189
#18376



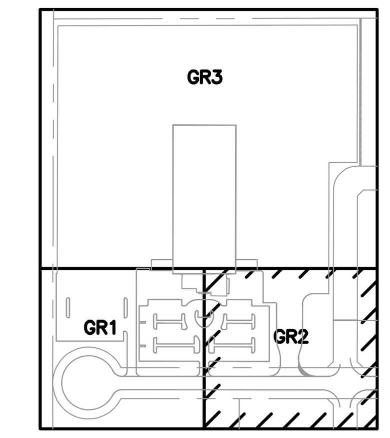
NOT FOR CONSTRUCTION



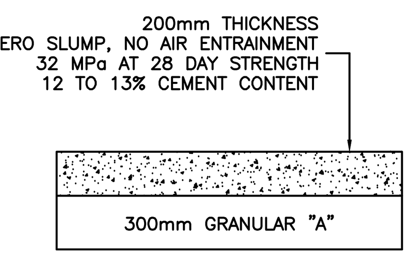
KEY PLAN

LEGEND

106.00	EXISTING ELEVATION
107.00	PROPOSED GRADE
2.0%	PROPOSED DRAINAGE SLOPE AND DIRECTION
107.00	IBI GROUP DESIGN GRADE
	PROPERTY BOUNDARY
	CATCH BASIN
	EXISTING CATCH BASIN
	EXISTING HYDRANT
	SWALE
H.P.	HIGH POINT
DC	DEPRESSED CURB
	TERRACING (3H:1V MAX.)
	100m NO-BUILD SETBACK
	2 YEAR PONDING LIMIT
	5 YEAR PONDING LIMIT
	100 YEAR PONDING LIMIT
	BOREHOLE
	BUILDING ENTRANCE (REFER TO SITE PLAN)
B	BOLLARD (REFER TO SITE PLAN)
BH	BLOCK HEATER POST (REFER TO SITE PLAN)
	LIGHT STANDARD (REFER TO SITE PLAN)
	TWSI (REFER TO SITE PLAN)
	MAJOR OVERLAND FLOW ROUTE
	HEAVY DUTY ASPHALT LIMITS



DRAWING KEY PLAN



NOTE:
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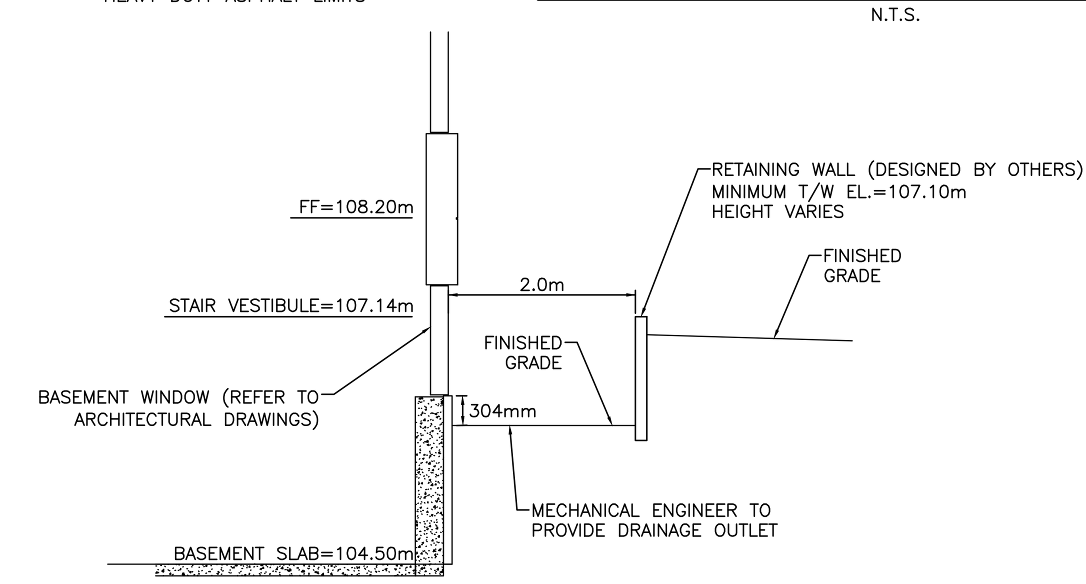
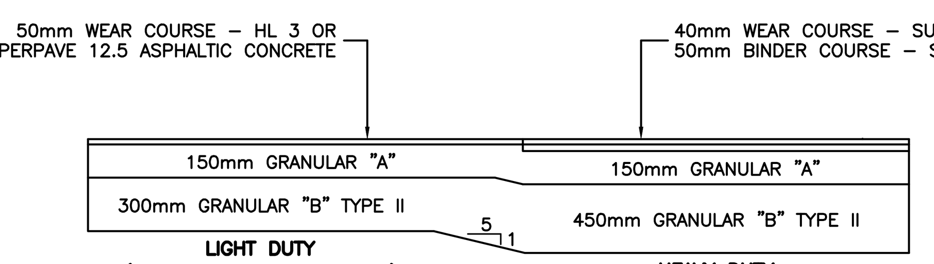
2. REFER TO LIMITS OF INSTALLATION ON SITE PLAN.

ROLLER COMPACTED CONCRETE PAVEMENT STRUCTURE DETAIL
N.T.S.



WINDOW WELL SECTION C-C
N.T.S.



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ASPHALT PAVEMENT STRUCTURE DETAIL
N.T.S.

SURFACE STORAGE AREAS

LOCATION	2 YEAR STORAGE VOLUME (m^3)	2 YEAR PONDING DEPTH (m)	2 YEAR PONDING ELEVATION (m)	5 YEAR STORAGE VOLUME (m^3)	5 YEAR PONDING DEPTH (m)	5 YEAR PONDING ELEVATION (m)	100 YEAR STORAGE VOLUME (m^3)	100 YEAR PONDING DEPTH (m)	100 YEAR PONDING ELEVATION (m)
CB 8	15.3	0.15	106.10	26.5	0.18	106.13	86.7	0.27	106.22
CB 12	N/A	N/A	N/A	N/A	N/A	N/A	4.6	0.10	107.20
CB 13	N/A	N/A	N/A	1.8	0.09	106.73	16.6	0.19	106.83
CB 17	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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SCALE
0 2m 4m 10m
HORIZONTAL 1:250

LICENSED PROFESSIONAL ENGINEER
S. M. CZARABYNSKI
May 28 2021
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MARITIME-ONTARIO FREIGHT LINES LIMITED

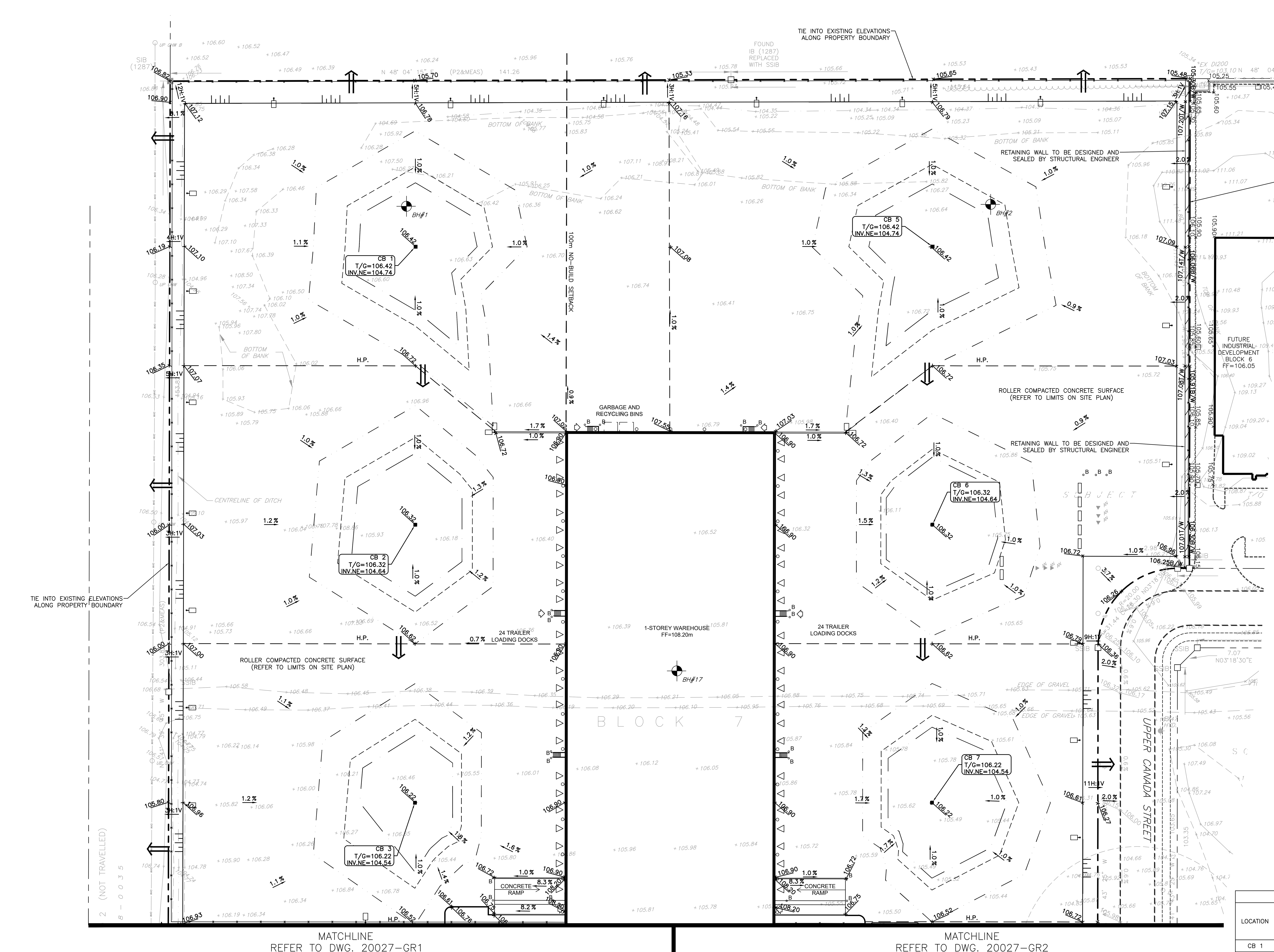
KANATA WEST BUSINESS PARK
8800 CAMPEAU DRIVE, OTTAWA, ON

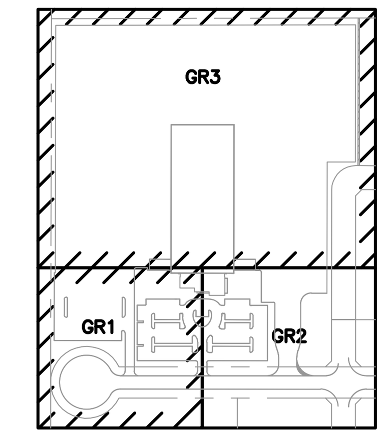
GRADING PLAN

PROJECT No.	20027
SURVEY	STANTEC
DATED	MAY 2021
DWG. No:	20027-GR2

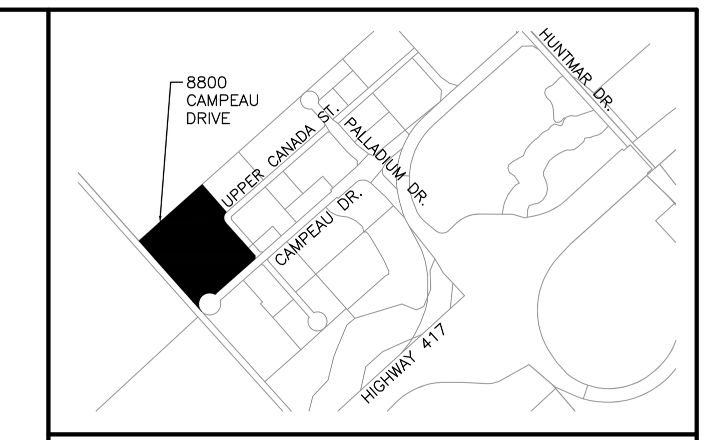
D07-12-20-0189

#18376

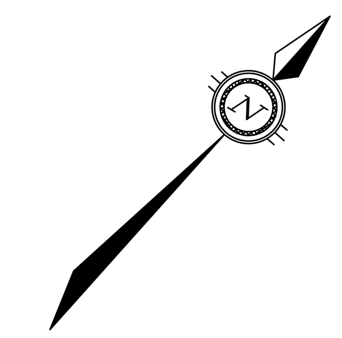




DRAWING KEY PLAN

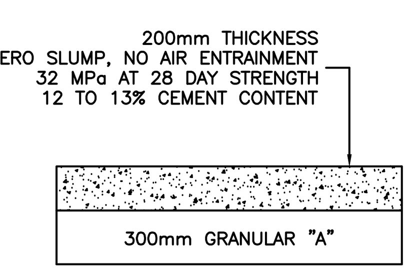


KEY PLAN



LEGEND

- EXISTING ELEVATION
- PROPOSED GRADE
- PROPOSED DRAINAGE SLOPE AND DIRECTION
- IBI GROUP DESIGN GRADE
- PROPERTY BOUNDARY
- CATCH BASIN
- EXISTING CATCH BASIN
- EXISTING HYDRANT
- SWALE
- HIGH POINT
- DEPRESSED CURB
- TERRACING (3H:1V MAX.)
- RETAINING WALL
- 100m NO-BUILD SETBACK
- 2 YEAR PONDING LIMIT
- 5 YEAR PONDING LIMIT
- 100 YEAR PONDING LIMIT
- BOREHOLE
- BUILDING ENTRANCE (REFER TO SITE PLAN)
- BOLLARD (REFER TO SITE PLAN)
- BLOCK HEATER POST (REFER TO SITE PLAN)
- LIGHT STANDARD (REFER TO SITE PLAN)
- JERSEY BARRIER (REFER TO SITE PLAN)
- MAJOR OVERLAND FLOW ROUTE
- HEAVY DUTY ASPHALT LIMITS



NOTE:
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2. REFER TO LIMITS OF INSTALLATION ON SITE PLAN.

ROLLER COMPACTED CONCRETE PAVEMENT STRUCTURE DETAIL
N.T.S.

SURFACE STORAGE AREAS

LOCATION	2 YEAR			5 YEAR			100 YEAR		
	STORAGE VOLUME (m^3)	PONDING DEPTH (m)	PONDING ELEVATION (m)	STORAGE VOLUME (m^3)	PONDING DEPTH (m)	PONDING ELEVATION (m)	STORAGE VOLUME (m^3)	PONDING DEPTH (m)	PONDING ELEVATION (m)
CB 1	39.1	0.16	106.58	78.6	0.20	106.62	232.6	0.29	106.71
CB 2	43.4	0.18	106.50	79.2	0.22	106.54	200.8	0.30	106.62
CB 3	29.9	0.17	106.39	63.4	0.21	106.43	184.7	0.30	106.52
CB 5	40.9	0.16	106.58	79.9	0.20	106.62	243.6	0.29	106.71
CB 6	40.3	0.17	106.49	65.2	0.19	106.51	180.2	0.28	106.60
CB 7	50.9	0.19	106.41	83.8	0.22	106.44	200.5	0.30	106.52

NOT FOR CONSTRUCTION

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HORIZONTAL 1:500

LICENSED PROFESSIONAL ENGINEER
S. M. CZARABYNSKI
PROVINCE OF ONTARIO
May 28 2021

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DRAWN	BLM
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APPROVED	SMC

MARITIME-ONTARIO FREIGHT LINES LIMITED

KANATA WEST BUSINESS PARK
8800 CAMPEAU DRIVE, OTTAWA, ON

GRADING PLAN

PROJECT No. 20027
SURVEY STANTEC
DATED MAY 2021
DWG. No: 20027-GR3

D07-12-20-0189

#18376

GENERAL NOTES:

1. ALL WORKS AND MATERIALS SHALL CONFORM TO THE LATEST REVISIONS OF THE STANDARDS AND SPECIFICATIONS OF THE CITY OF OTTAWA AND ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS), AS AMENDED BY THE CITY OF OTTAWA.
2. THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL EXISTING UTILITIES WITHIN THE SITE AND ADJACENT WORK AREAS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITIES TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OR REPLACEMENT OF ANY SERVICES OR UTILITIES DISTURBED DURING CONSTRUCTION, TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION.
3. ALL DIMENSIONS AND ELEVATIONS 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.
4. DESIGN ELEVATIONS GIVEN ARE TO BE ADHERED TO WITH NO CHANGES WITHOUT PRIOR WRITTEN APPROVAL BY ROBINSON LAND DEVELOPMENT.
5. ANY AREAS 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.
6. RELOCATION OF EXISTING SERVICES AND/OR UTILITIES SHALL BE AS SHOWN ON THE DRAWINGS OR AS DIRECTED BY THE ENGINEER AT THE EXPENSE OF THE CONTRACTOR.
7. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE "OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS". THE GENERAL CONTRACTOR SHALL BE DEEMED TO BE THE CONSTRUCTOR AS DEFINED IN THE ACT.
8. ALL CONSTRUCTION SIGNAGE MUST CONFORM TO THE M.T.O. MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (LATEST AMENDMENT).
9. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
10. THE SUPPORT OF ALL UTILITIES SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
11. THE CONTRACTOR WILL BE RESPONSIBLE FOR ADDITIONAL BEDDING OR ADDITIONAL STRENGTH PIPE IF THE MAXIMUM TRENCH WIDTH, AS SPECIFIED BY OPSD, IS EXCEEDED.
12. ALL NECESSARY CLEARING AND GRUBBING SHALL BE COMPLETED BY THE CONTRACTOR. REVIEW WITH CONTRACT ADMINISTRATOR AND THE CITY OF OTTAWA PRIOR TO AND TREE CUTTING.
13. REFER TO GEOTECHNICAL INVESTIGATION PREPARED BY PATERSON GROUP, REPORT NO. PG5618–1, DATED APRIL 9, 2021.
14. THE CONTRACTOR IS RESPONSIBLE FOR AND SHALL PROVIDE FOR DEWATERING, SUPPORT AND PROTECTION OF EXCAVATIONS AND TRENCHING AS WELL AS RELEASE OF ANY PUMPED GROUNDWATER IN A CONTROLLED AND APPROVED MANNER.
15. DO NOT CONSTRUCT USING DRAWINGS THAT ARE NOT MARKED "ISSUED FOR CONSTRUCTION".
16. CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT FOR CONSTRUCTION PURPOSES.
17. CLAY SEALS SHALL BE INSTALLED WITHIN SEWER TRENCHES IN ACCORDANCE WITH CITY STANDARD S8.

STORM SEWERS:

1. ALL REINFORCED CONCRETE STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CSA A257.2 (LATEST AMENDMENT). ALL NON–REINFORCED CONCRETE STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CSA A257.1 (LATEST AMENDMENT). PIPE SHALL BE JOINTED WITH STD. RUBBER GASKETS AS PER CSA A257.3 (LATEST AMENDMENT).
2. ALL STORM SEWER TRENCH AND BEDDING SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. S6 AND S7 CLASS 'B' UNLESS OTHERWISE SPECIFIED. BEDDING AND COVER MATERIAL SHALL BE SPECIFIED BY PROJECT GEOTECHNICAL ENGINEER.
3. ALL PVC STORM SEWERS ARE TO BE SDR 35 APPROVED PER C.S.A. B182.2 OR LATEST AMENDMENT, UNLESS OTHERWISE SPECIFIED.
4. STORM MANHOLE FRAME AND COVERS SHALL BE AS PER CITY OF OTTAWA STD. S24.1.
5. STORM SEWER MANHOLES SERVING SEWERS LESS THAN 900mm SHALL BE CONSTRUCTED WITH A 300mm SUMP. FOR STORM SEWERS 900mm AND OVER USE BENCHING IN ACCORDANCE WITH OPSD 701.021.
6. THE STORM SEWER CLASSES HAVE BEEN DESIGNED BASED ON BEDDING CONDITIONS SPECIFIED ABOVE. WHERE THE SPECIFIED TRENCH WIDTH IS EXCEEDED, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE ADDITIONAL BEDDING, A DIFFERENT TYPE OF BEDDING OR A HIGHER PIPE STRENGTH AT HIS OWN EXPENSE AND SHALL ALSO BE RESPONSIBLE FOR EXTRA TEMPORARY AND/OR PERMANENT REPAIRS MADE NECESSARY BY THE WIDENED TRENCH.

SANITARY SEWERS:

1. ALL SANITARY SEWERS SHALL BE PVC SDR 35, IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS.
2. SANITARY SEWER TRENCH AND BEDDING SHALL BE AS PER CITY OF OTTAWA STD. S6 AND S7, CLASS 'B' BEDDING UNLESS OTHERWISE NOTED.
3. ALL SANITARY SERVICES ARE TO BE EQUIPPED WITH APPROVED BACKWATER VALVES.
4. SANITARY MANHOLE FRAME AND COVERS SHALL BE AS PER CITY OF OTTAWA STD. S24.
5. SANITARY SEWER MANHOLES SHALL BE BENCHED AS PER OPSD 701.021.
6. SANITARY PRE–CAST MANHOLE SHALL BE CONSTRUCTED WITH A HIGHER PERCENTAGE OF SILICA FUME IN THE CONCRETE TO MAKE IT MORE DENSE AND LESS SUSCEPTIBLE TO CORROSION OR PINHOLE LEAKS.
7. FOR SANITARY MANHOLES, DEPENDING ON THE ELEVATION OF THE GROUNDWATER TABLE, AND BASED ON THE RECOMMENDATION OF THE PROJECT GEOTECHNICAL CONSULTANT, CRETEX SEALS, OR A SIMILAR PRODUCT, SHALL BE INSTALLED IN THE PRE–CAST MANHOLE SECTION TO JUST BELOW THE MANHOLE FRAME TO PREVENT INFILTRATION.
8. CONTRACTOR SHALL PERFORM LEAKAGE TESTING, IN THE PRESENCE OF THE CONSULTANT, FOR SANITARY SEWERS IN ACCORDANCE WITH OPSS 410 AND OPSS 407. CONTRACTOR SHALL PERFORM VIDEO INSPECTION OF ALL STORM AND SANITARY SEWERS. A COPY OF THE VIDEO AND INSPECTION REPORT SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.
9. IN ACCORDANCE WITH CITY OF OTTAWA STANDARD S11, SANITARY SERVICE CONNECTION REQUIRES APPROVED CONTROLLED SETTLEMENT JOINT.

WATER SUPPLY:

1. ALL PVC WATERMAINS SHALL BE EQUAL TO AWWA C–900 CLASS 150, SDR 18, OR APPROVED EQUAL.
2. WATERMAIN TRENCH AND BEDDING SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARD W17, UNLESS OTHERWISE SPECIFIED. BEDDING AND COVER MATERIAL SHALL BE SPECIFIED BY PROJECT GEOTECHNICAL ENGINEER.
3. ALL PVC WATERMAINS SHALL BE INSTALLED WITH A 10 GAUGE STRANDED COPPER TWU OR RWU TRACER WIRE IN ACCORDANCE WITH CITY OF OTTAWA STD. W36.
4. CATHODIC PROTECTION IS REQUIRED ON ALL METALLIC FITTINGS AS PER CITY OF OTTAWA STD. W40 AND W42.
5. CONTRACTOR TO SUPPLY HYDRANT EXTENSION TO ADJUST THE LENGTH OF HYDRANT BARREL IF REQUIRED.
6. FIRE HYDRANTS SHALL BE INSTALLED AS PER CITY OF OTTAWA STD. W19, AND LOCATED AS PER CITY STD. W18.
7. VALVE IN BOXES SHALL BE INSTALLED AS PER CITY OF OTTAWA STD. W24.
8. WATERMAIN IN FILL AREAS TO BE INSTALLED WITH RESTRAINED JOINTS AS PER CITY OF OTTAWA STD. W25.5 AND W25.6.
9. THRUST BLOCKING OF WATERMAIN TO BE INSTALLED AS PER CITY OF OTTAWA STD. W25.3 AND W25.4.
10. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY CAPS, PLUGS AND BLOW–OFFS AND NOZZLES REQUIRED FOR TESTING AND DISINFECTION OF THE WATERMAIN.
11. INSULATION FOR WATERMAIN CROSSING OVER AND BELOW SEWER SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. W25.2 AND W25, RESPECTIVELY, WHERE WATERMAIN COVER IS LESS THAN 2.4m.
12. AS PER CITY GUIDELINE, THE MINIMUM VERTICAL CLEARANCE BETWEEN WATERMAIN AND SEWER / UTILITY IS 0.25m FOR CROSSING OVER THE SEWER, AS PER CITY STD. W25.2. FOR CROSSING UNDER SEWER, ADEQUATE STRUCTURAL SUPPORT FOR THE SEWERS IS REQUIRED TO PREVENT EXCESSIVE DEFLECTION OF JOINTS AND SETTLING. THE LENGTH OF WATER PIPE SHALL BE CENTERED AT THE POINT OF CROSSING SO THAT THE JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER AS PER CITY STD. W25.
13. CONNECTION TO EXISTING WATERMAIN TO BE PERFORMED BY CITY FORCES. CONTRACTOR TO PROVIDE LABOUR, EQUIPMENT AND MATERIAL REQUIRED FOR EXCAVATION, BEDDING AND REINSTATEMENT.
14. SWABBING, DISINFECTION, AND HYDROSTATIC TESTING TO BE CONDUCTED AS PER CITY OF OTTAWA STANDARDS IN THE PRESENCE OF A CITY INSPECTOR AND/OR CONSULTANT.

ROADWORK SPECIFICATIONS:

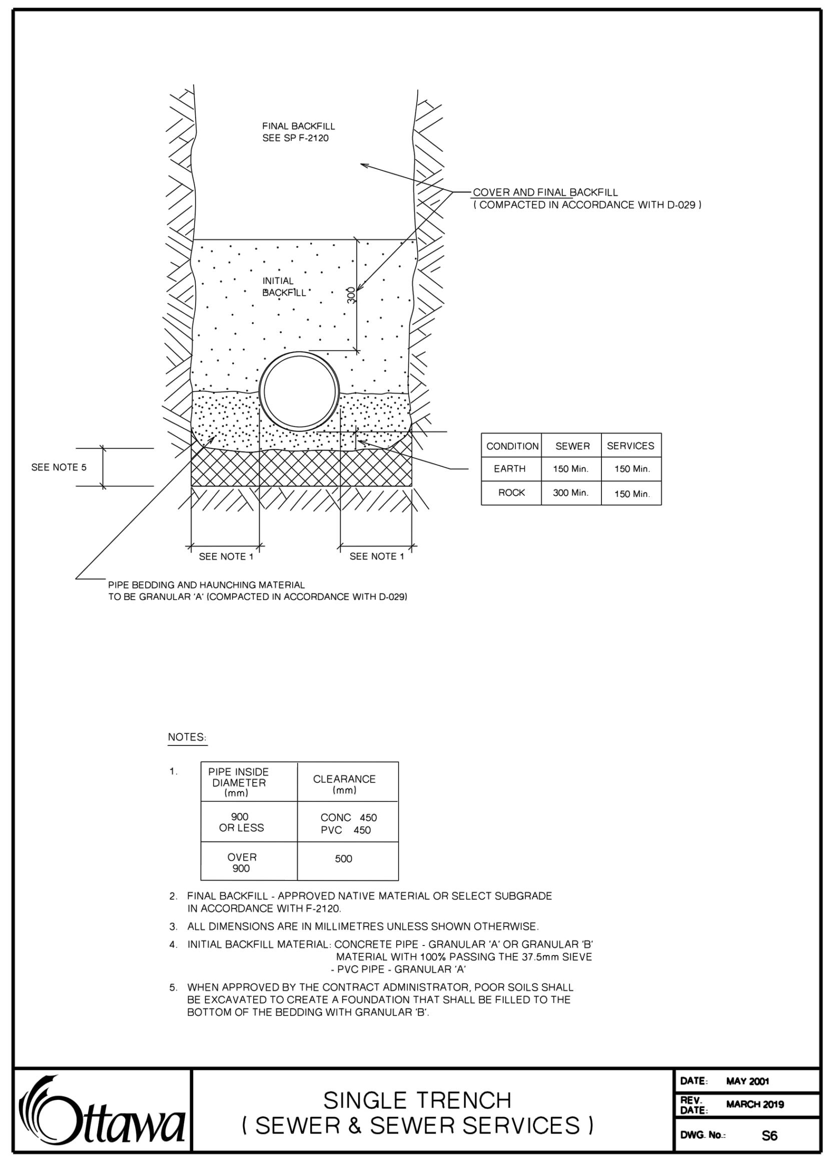
1. CONCRETE CURB SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. SC1.1 (BARRIER CURB). PROVISION SHALL BE MADE FOR CURB DEPRESSIONS AT SIDEWALKS AND DRIVEWAYS.
2. ALL BARRIER CURB TO BE 150mm ABOVE FINISHED ASPHALT GRADE UNLESS OTHERWISE NOTED.
3. CONCRETE SIDEWALK SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. SC3 AND SC1.4.
4. TWSIs SHALL BE INSTALLED IN ACCORDANCE WITH CITY OF OTTAWA STD. SC7.3.
5. PAVEMENT REINSTATEMENT FOR SERVICE AND UTILITY CUTS SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. R10 AND OPSD 509.010, OPSS 310.
6. GRANULAR "A" SHALL BE PLACED TO A MINIMUM THICKNESS OF 300mm AROUND ALL STRUCTURES WITHIN PAVEMENT AREA.
7. ALL GRANULAR FOR ROADS SHALL BE COMPACTED TO A MINIMUM OF 98% STANDARD PROCTOR DENSITY.
8. ASPHALT WEAR COURSE SHALL NOT BE PLACED UNTIL THE VIDEO INSPECTION OF SEWERS & NECESSARY REPAIRS HAVE BEEN CARRIED OUT TO THE SATISFACTION OF THE ENGINEER.
9. SUB–EXCAVATE SOFT AREAS AND FILL WITH GRANULAR 'B' COMPACTED IN MAXIMUM 300mm LIFTS.
10. PEDESTRIAN CURB RAMP WITH BOULEVARD SHALL BE ACCORDANCE WITH CITY OF OTTAWA STD. SC7.
11. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW–CUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW ASPHALT.
12. PAVEMENT DESIGN AS PER GEOTECHNICAL RECOMMENDATIONS:

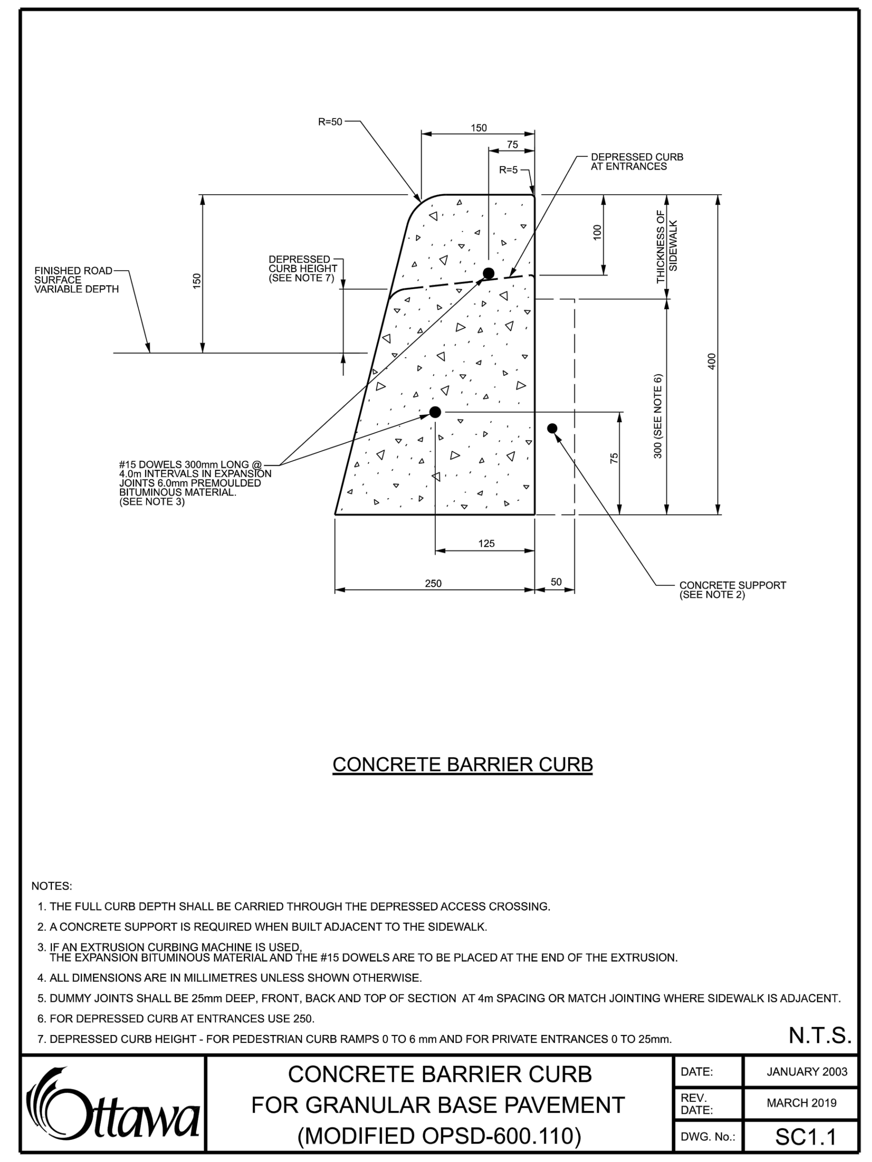
<u>LIGHT DUTY</u> (CAR ONLY PARKING AREAS)
- 50mm WEAR COURSE – HL–3 OR SUPERPAVE 12.5 ASPHALTIC CONCRETE
- 150mm BASE – OPSS GRANULAR "A" CRUSHED STONE
- 300mm SUBBASE – OPSS GRANULAR "B" TYPE II
- SUBGRADE – EITHER FILL, IN SITU SOIL OR OPSS GRANULAR "B" TYPE I OR II MATERIAL PLACED OVER IN SITU SOIL OR FILL

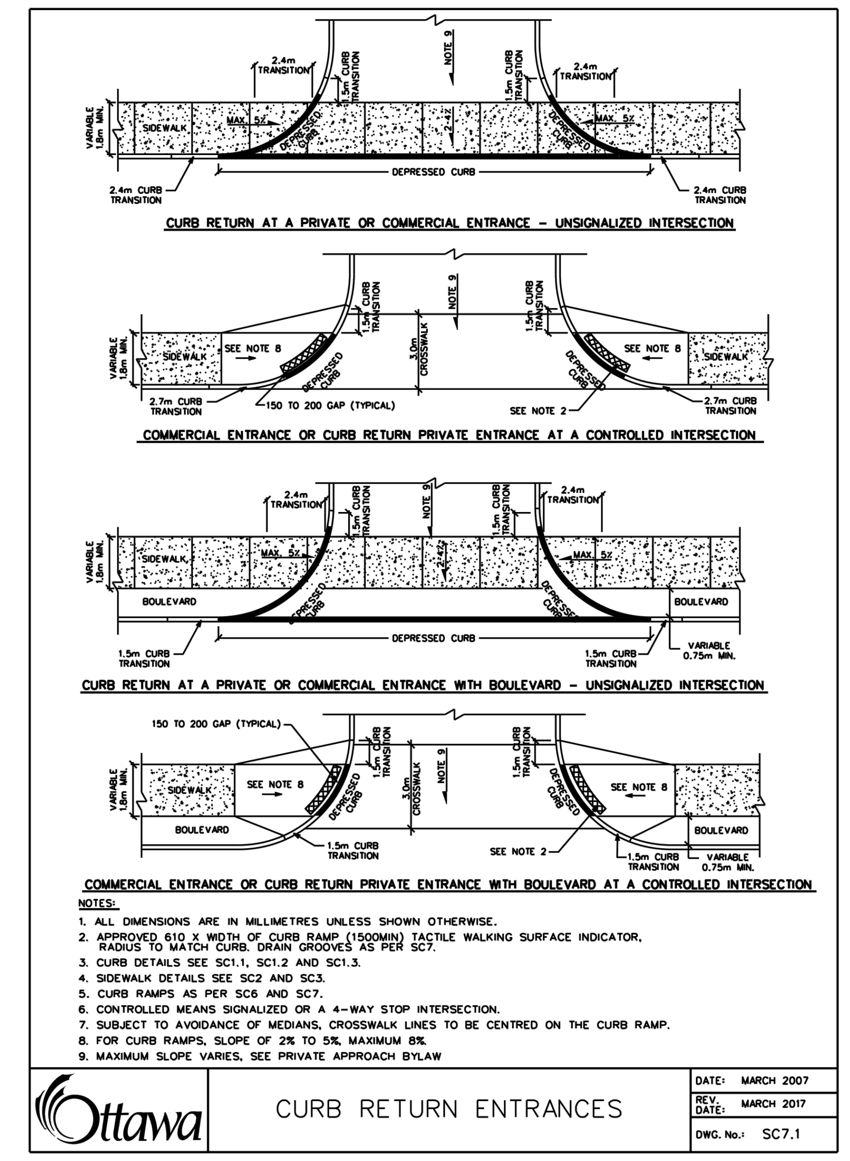
<u>HEAVY DUTY</u> (ACCESS LANES AND HEAVY TRUCK PARKING AREAS)
- 40mm WEAR COURSE – SUPERPAVE 12.5 ASPHALTIC CONCRETE
- 50mm BINDER COURSE – SUPERPAVE 19.0 ASPHALTIC CONCRETE
- 150mm BASE – OPSS GRANULAR "A" CRUSHED STONE
- 450mm SUBBASE – OPSS GRANULAR "B" TYPE II
- SUBGRADE – EITHER FILL, IN SITU SOIL OR OPSS GRANULAR "B" TYPE I OR II MATERIAL PLACED OVER IN SITU SOIL OR FILL

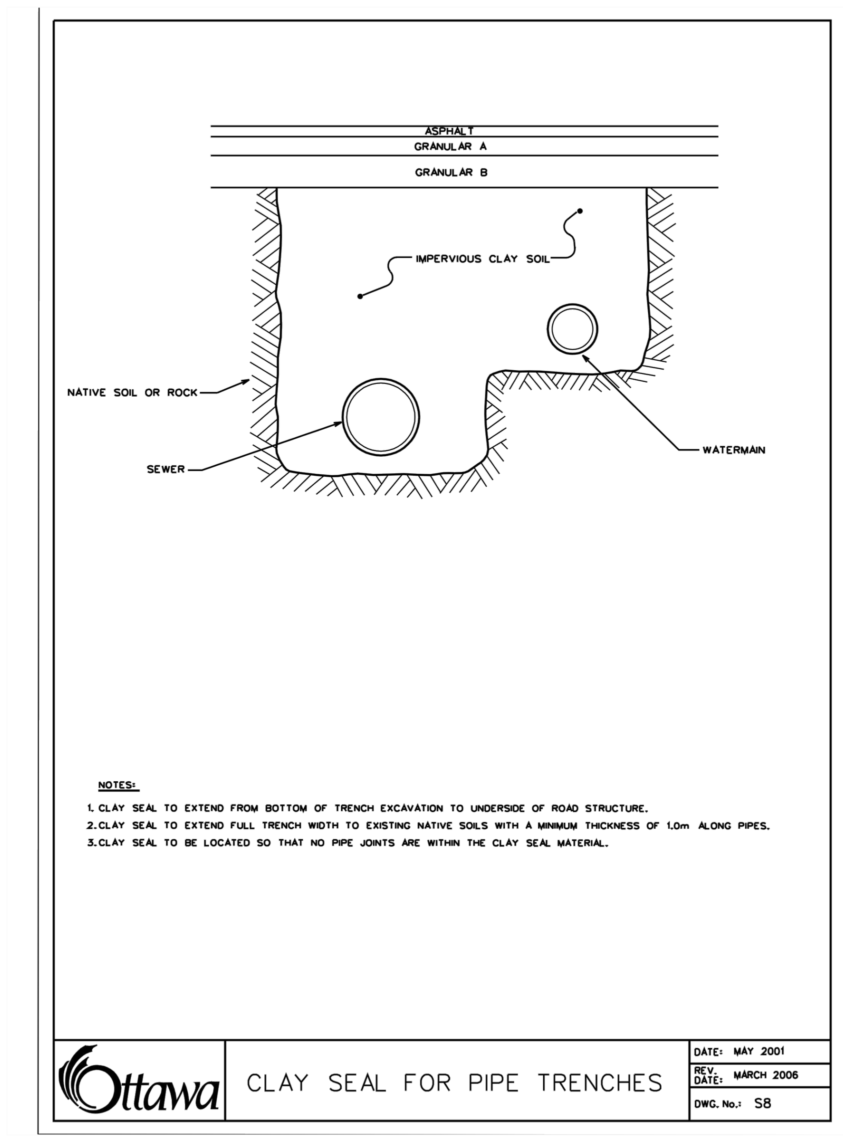
<u>ROLLER COMPACTED CONCRETE</u> (AS PER SITE PLAN)
- 200mm THICKNESS, ZERO SLUMP, NO AIR ENTRAINMENT, 32 MPa AT 28 DAY STRENGTH, 12 TO 13% CEMENT CONTENT
- 300mm BASE – OPSS GRANULAR "A" CRUSHED STONE

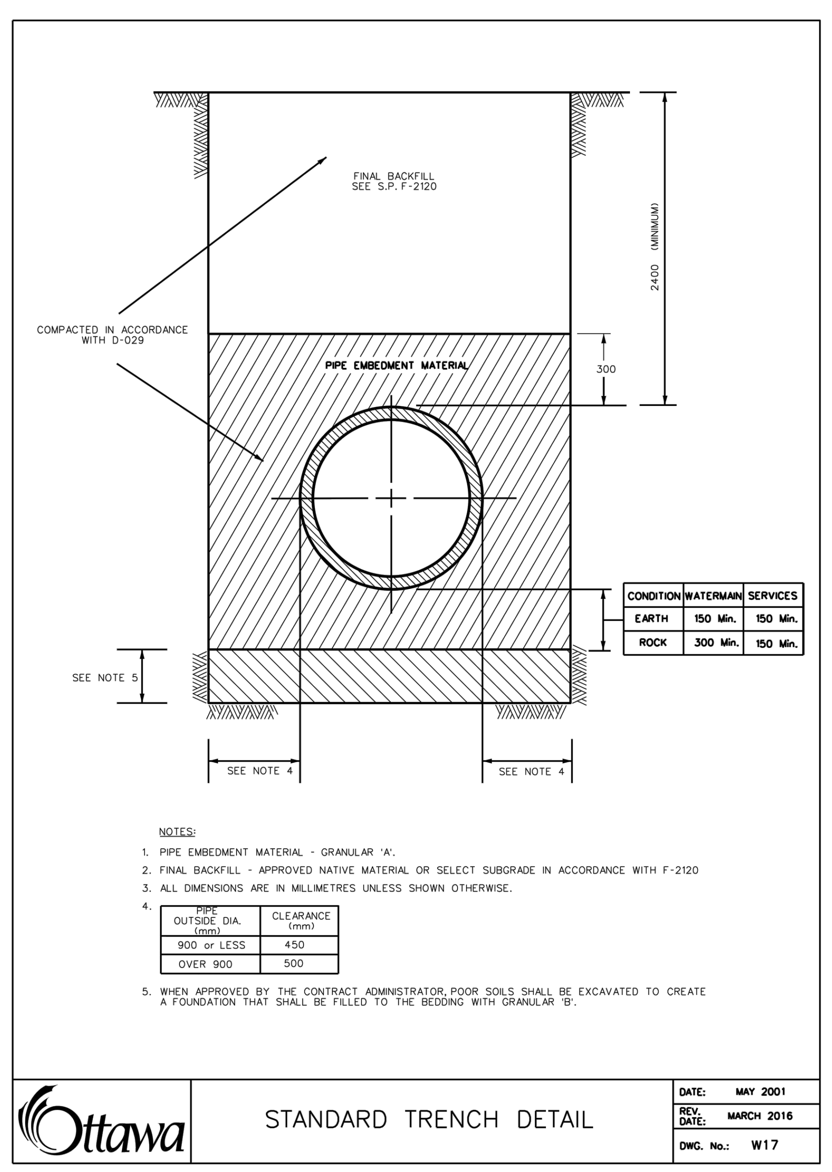
NOT FOR CONSTRUCTION

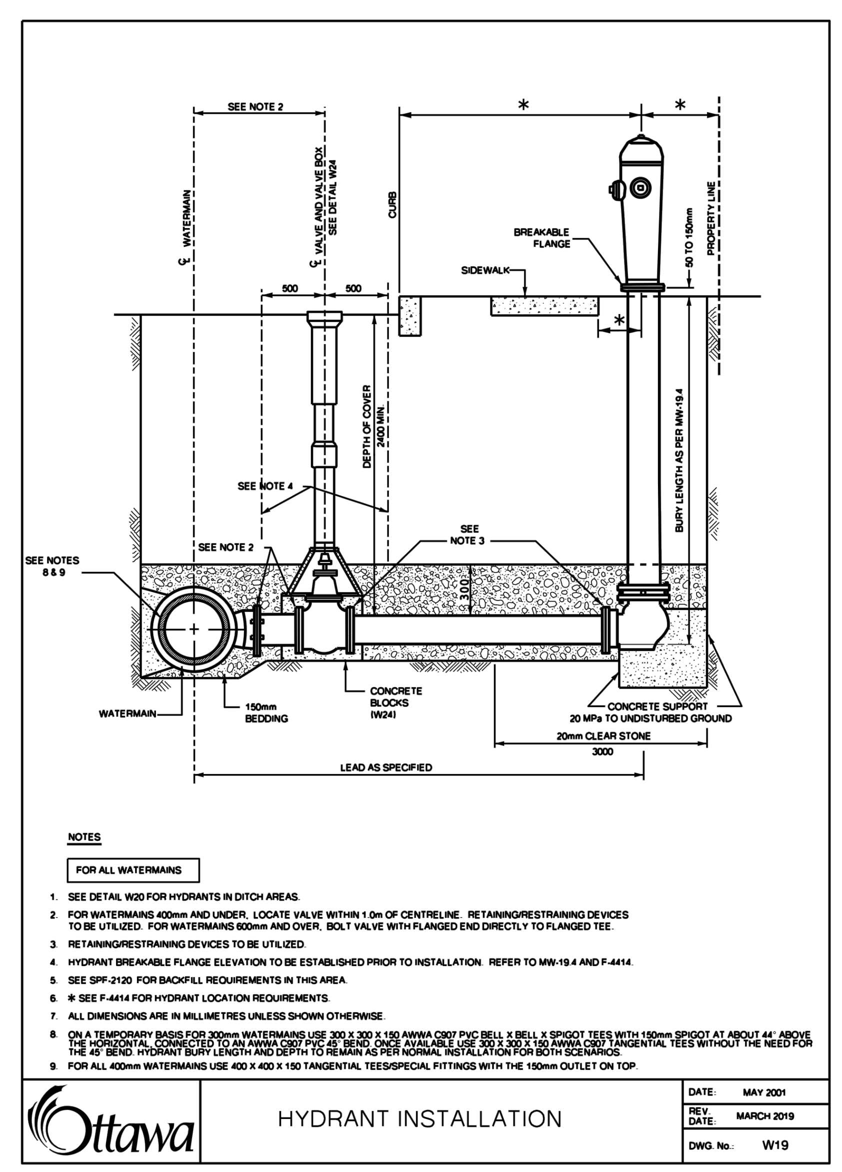


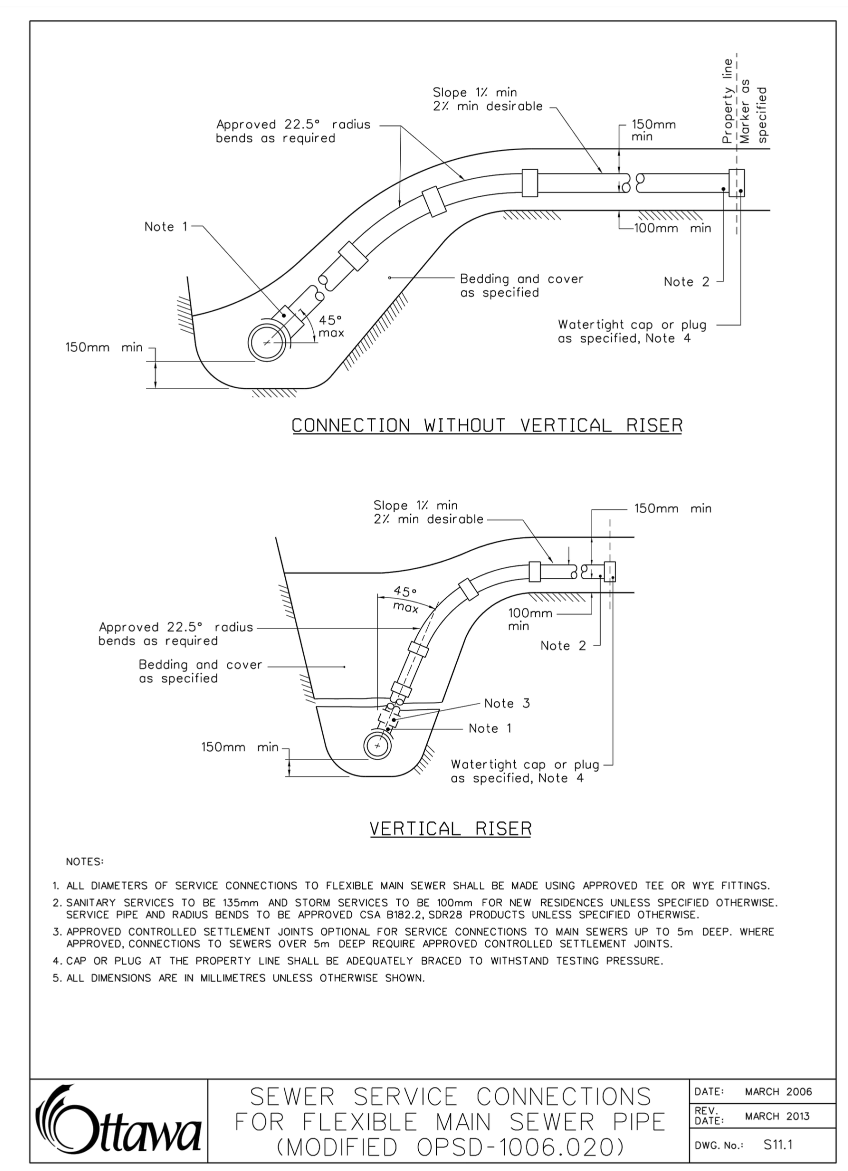


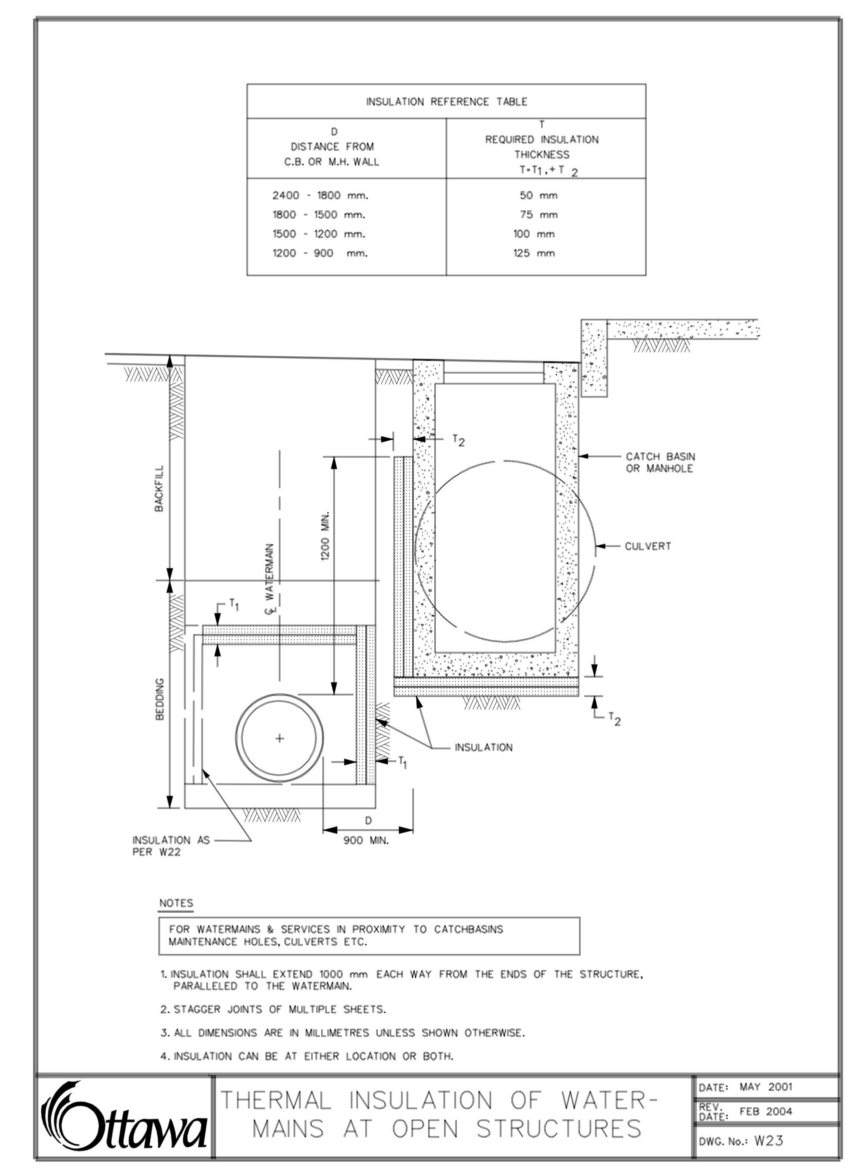












NOTES

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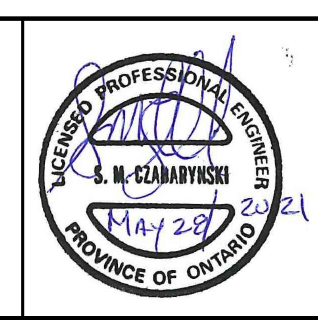
NO.	REVISION DESCRIPTION	DATE	BY
3	REVISED PER COMMENTS	28/05/21	SMC
2	ISSUED FOR PROGRESS REVIEW	22/03/21	SMC
1	ISSUED FOR SITE PLAN APPLICATION	02/12/20	SMC

SCALE



Robinson
Land Development

350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SMC
DRAWN	BLM
CHECKED	SMC
APPROVED	SMC

MARITIME-ONTARIO
FREIGHT LINES LIMITED

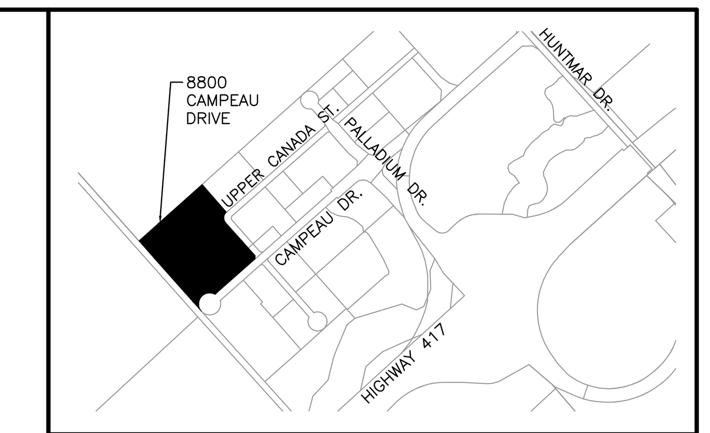
KANATA WEST BUSINESS PARK
8800 CAMPEAU DRIVE, OTTAWA, ON

NOTES & DETAILS

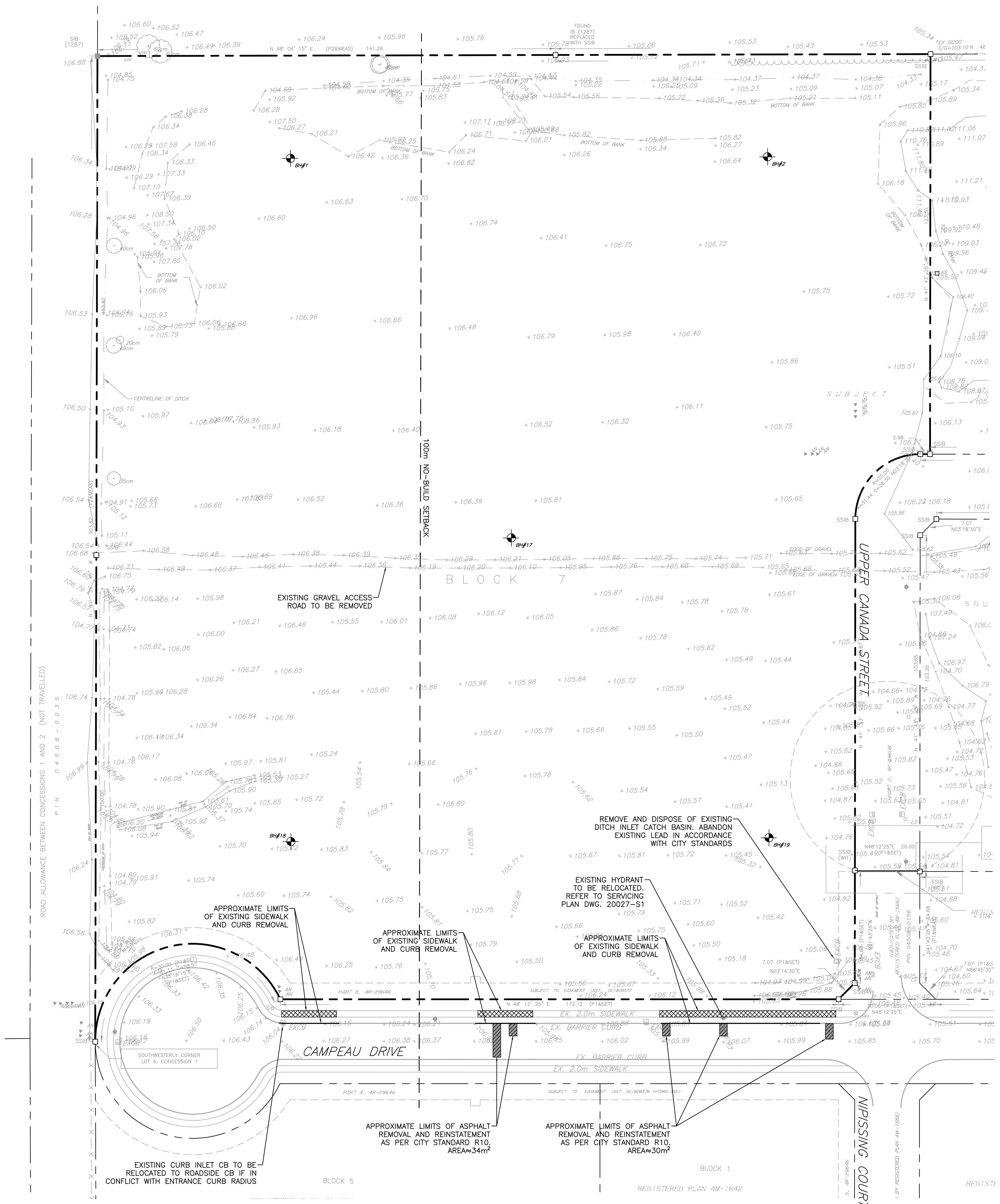
PROJECT No.	20027
SURVEY	STANTEC
DATED	MAY 2021
DWG. No:	20027-N1

D07-12-20-0189

#18376



KEY PLAN



LEGEND

- PROPERTY BOUNDARY
- EXISTING ELEVATION
- EXISTING DITCH
- EXISTING CATCH BASIN
- EXISTING STORM SEWER & MANHOLE
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING WATERMAIN
- EXISTING HYDRANT
- EXISTING VALVE & VALVE BOX
- 100m NO-BUILD SETBACK
- BOREHOLE
- EXISTING CURB REMOVAL
- EXISTING ASPHALT REMOVAL
- EXISTING SIDEWALK REMOVAL

NOTES:

1. THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL EXISTING UTILITIES WITHIN THE SITE AND ADJACENT WORK AREAS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITIES TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OR REPLACEMENT OF ANY SERVICES OR UTILITIES DISTURBED DURING CONSTRUCTION, TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION.
2. ANY AREAS 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.
3. RELOCATION OF EXISTING SERVICES AND/OR UTILITIES SHALL BE AS SHOWN ON THE DRAWINGS OR AS DIRECTED BY THE ENGINEER AT THE EXPENSE OF THE CONTRACTOR.
4. THE SUPPORT OF ALL UTILITIES SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
5. ALL NECESSARY CLEARING AND GRUBBING SHALL BE COMPLETED BY THE CONTRACTOR. REVIEW WITH CONTRACT ADMINISTRATOR AND THE CITY OF OTTAWA PRIOR TO AND TREE CUTTING.
6. REFER TO GEOTECHNICAL INVESTIGATION PREPARED BY PATERSON GROUP, REPORT NO. PG5618-1, DATED NOVEMBER 24, 2020.
7. ALL EXISTING ASPHALT TO BE SAW-CUT.
8. REINSTATE ROAD CUTS IN ACCORDANCE WITH CITY STANDARD R10.

NOT FOR CONSTRUCTION

NOTES

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NO.	REVISION DESCRIPTION	DATE	BY
1	REVISED PER COMMENTS	28/05/21	SMC

SCALE
0 5m 10m 30m
HORIZONTAL 1:750

LICENSED PROFESSIONAL ENGINEER
S. M. CZABARYNSKI
PROVINCE OF ONTARIO
May 28 2021

Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SMC
DRAWN	BLM
CHECKED	SMC
APPROVED	SMC

MARITIME-ONTARIO FREIGHT LINES LIMITED

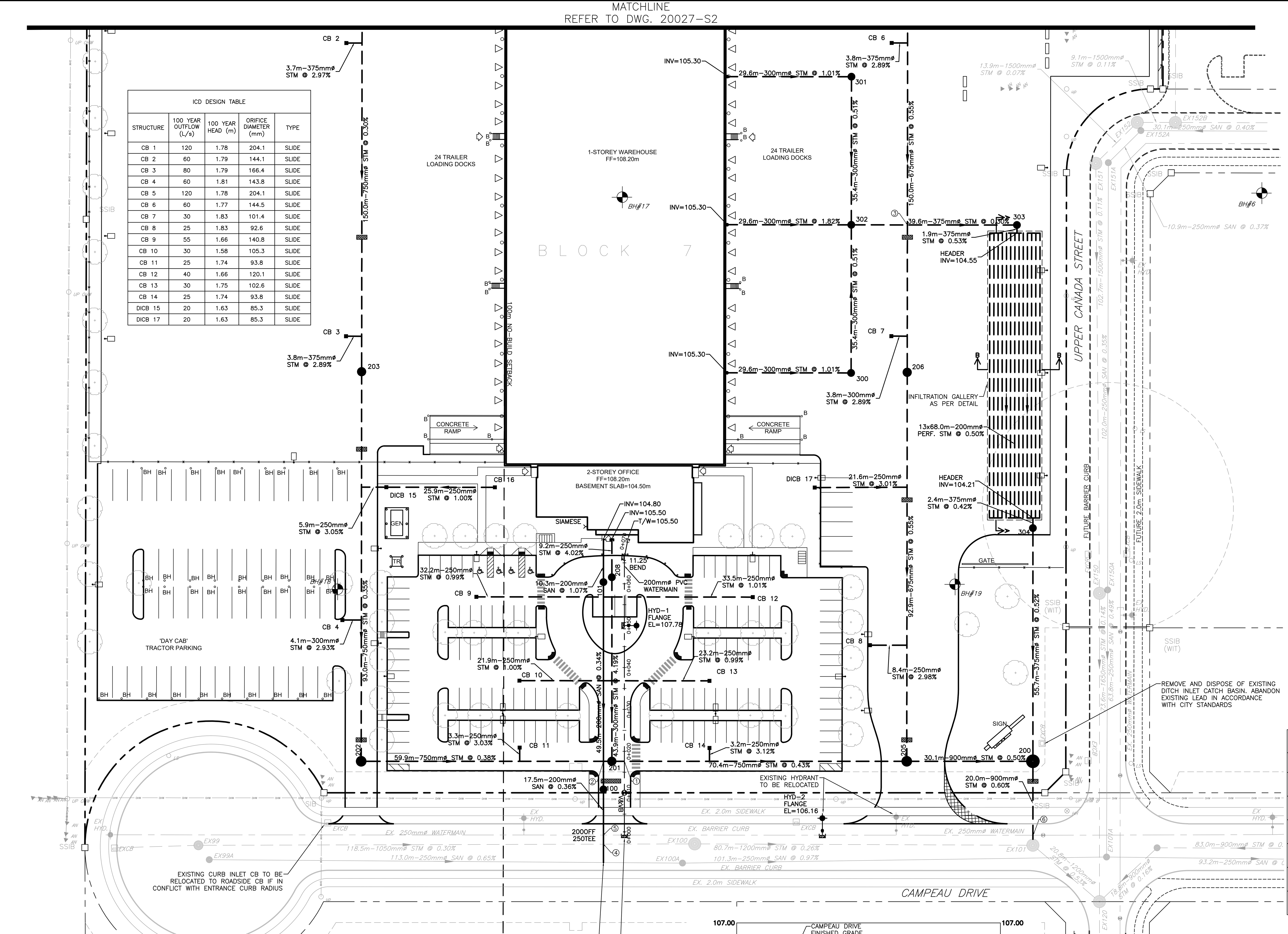
KANATA WEST BUSINESS PARK
8800 CAMPEAU DRIVE, OTTAWA, ON

EXISTING CONDITIONS AND REMOVALS PLAN

PROJECT No.	20027
SURVEY	STANTEC
DATED	MAY 2021
DWG. No:	20027-R1

D07-12-20-0189

#18376



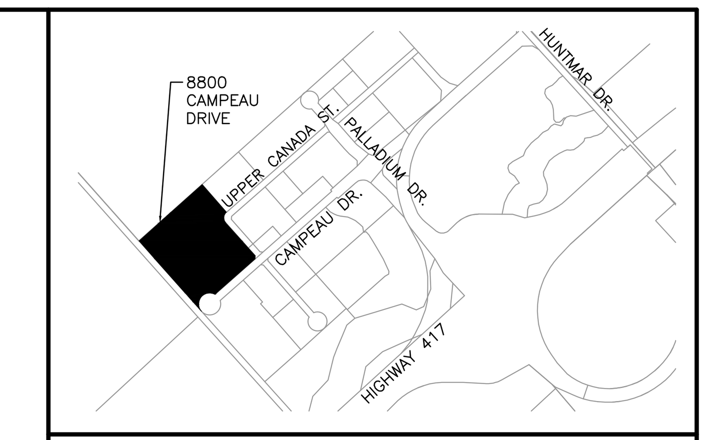
ICD DESIGN TABLE				
STRUCTURE	100 YEAR OUTFLOW (L/s)	100 YEAR HEAD (m)	ORIFICE DIAMETER (mm)	TYPE
CB 1	120	1.78	204.1	SLIDE
CB 2	60	1.79	144.1	SLIDE
CB 3	80	1.79	166.4	SLIDE
CB 4	60	1.81	143.8	SLIDE
CB 5	120	1.78	204.1	SLIDE
CB 6	60	1.77	144.5	SLIDE
CB 7	30	1.83	101.4	SLIDE
CB 8	25	1.83	92.6	SLIDE
CB 9	55	1.66	140.8	SLIDE
CB 10	30	1.58	105.3	SLIDE
CB 11	25	1.74	93.8	SLIDE
CB 12	40	1.66	120.1	SLIDE
CB 13	30	1.75	102.6	SLIDE
CB 14	25	1.74	93.8	SLIDE
DICB 15	20	1.63	85.3	SLIDE
DICB 17	20	1.63	85.3	SLIDE

STORM MANHOLE TABLE				
STRUCTURE	STRUCTURE SIZE	T/G ELEV	INVERT	GRATE
EX101	2400mmø	105.88	SW=101.44 E=101.41 NW=101.86	S24.1
200	2400mmø	105.88	NW=103.82 SW=102.04 SE=101.98	S24.1
201	1500mmø	106.37	SW=102.67 NW=103.24 NE=102.64	S24.1
202	1800mmø	106.43	NW=102.96 NE=102.90	S24.1
203	1500mmø	106.35	NW=103.32 SE=103.29	S24.1
204	1500mmø	106.46	SE=103.76	S24.1
205	1800mmø	106.23	NW=102.42 SW=102.34 NE=102.19	S24.1
206	1500mmø	106.33	NW=102.96 SE=102.93	S24.1
207	1500mmø	106.46	SE=103.78	S24.1
208	1200mmø	106.66	NW=105.13 SE=105.08	S24.1
300	1200mmø	106.44	NW=104.94 SW=105.00	S24.1
301	1200mmø	106.47	SE=104.94 SW=105.00	S24.1
302	1200mmø	106.55	SE=104.76 NE=104.68 NW=104.76 SW=104.76	S24.1
303	1200mmø	106.64	SW=104.56 SE=104.50	S24.1
304	1200mmø	106.48	NW=104.14 SE=104.11	S24.1

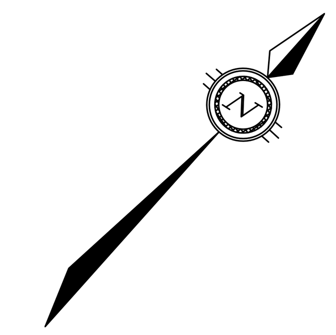
SANITARY MANHOLE TABLE				
STRUCTURE	STRUCTURE SIZE	T/G ELEV	INVERT	GRATE
100	1200mmø	106.28	NW=104.49 SE=104.46	S24
101	1200mmø	108.28	SE=104.66 NW=104.69	S24

CATCH BASIN TABLE				
STRUCTURE	STRUCTURE SIZE	T/G ELEV	INVERT	GRATE
CB 1	600x600mm	106.42	NE=104.74	S19
CB 2	600x600mm	106.32	NE=104.64	S19
CB 3	600x600mm	106.22	NE=104.54	S19
CB 4	600x600mm	106.15	NE=104.47	S19
CB 5	600x600mm	106.42	NE=104.74	S19
CB 6	600x600mm	106.32	NE=104.64	S19
CB 7	600x600mm	106.22	NE=104.54	S19
CB 8	600x600mm	105.95	NE=104.27	S19
CB 9	600x600mm	107.10	NE=105.42	S19
CB 10	600x600mm	106.64	NE=105.13	S19
CB 11	600x600mm	106.06	SE=104.38	S19
CB 12	600x600mm	107.10	SW=105.42	S19
CB 13	600x600mm	106.64	SW=104.96	S19
CB 14	600x600mm	106.06	SE=104.38	S19
CB 16	600x600mm	106.61	SW=105.41	S19
DICB 15	600x600mm	106.42	SW=104.67 NE=105.15	403.010
DICB 17	600x600mm	106.50	NE=104.75	403.010

SEWER CROSSING TABLE		
CROSSING No.	INVERTS (m)	SEPARATION (m)
1	WATER INV.=103.77	0.27
	STM OBV.=103.50	
2	SAN INV.=104.51	0.96
	STM OBV.=103.55	
3	STM INV.=104.64	0.70
	STM OBV.=103.94	
4	SAN INV.=104.41	1.41
	EX STM OBV.=103.00	
5	SAN INV.=104.42	0.54
	EX WATER OBV.=103.88	
6	EX WATER INV.=103.28	0.38
	STM OBV.=102.90	

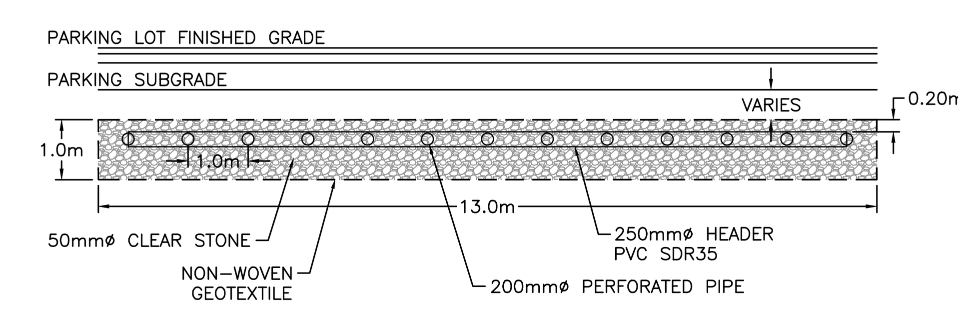


KEY PLAN

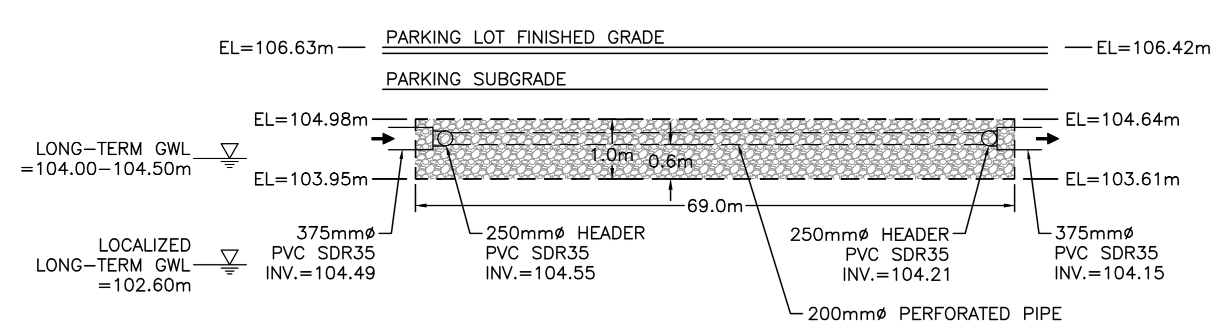


LEGEND

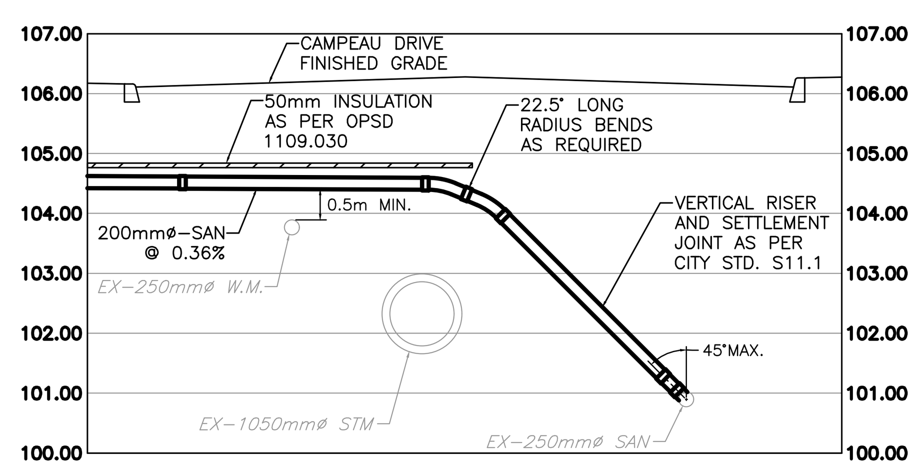
	PROPERTY BOUNDARY
	CATCH BASIN
	STORM SEWER & MANHOLE
	SANITARY SEWER & MANHOLE
	WATERMAIN
	HYDRANT
	VALVE & VALVE BOX
	SIAMESE CONNECTION
	EXISTING CATCH BASIN
	EXISTING STORM SEWER & MANHOLE
	EXISTING SANITARY SEWER & MANHOLE
	EXISTING WATERMAIN
	EXISTING HYDRANT
	EXISTING VALVE & VALVE BOX
	100m NO-BUILD SETBACK
	CLAY SEAL
	BOREHOLE
①	CROSSING NUMBER
	BUILDING ENTRANCE (REFER TO SITE PLAN)
∘B	BOLLARD (REFER TO SITE PLAN)
∘BH	BLOCK HEATER POST (REFER TO SITE PLAN)
	LIGHT STANDARD (REFER TO SITE PLAN)
	JERSEY BARRIER (REFER TO SITE PLAN)
	TWSI (REFER TO SITE PLAN)
	PROPOSED TREE (REFER TO LANDSCAPE PLAN)



INFILTRATION GALLERY SECTION B-B
N.T.S.



INFILTRATION GALLERY SECTION A-A
N.T.S.



SANITARY CONNECTION DETAIL (TYP.)
N.T.S.

WATERMAIN GRADE TABLE (200mmø)			
STATION	FINISHED GRADE (m)	TOP OF WATER (m)	DESCRIPTION
0+000	106.17	103.86	200mm OFF 250mm TEE
0+010.1	106.25	103.85	VALVE & VALVE BOX
0+020	106.36	103.96	TOP OF WATERMAIN
0+030	106.63	104.23	TOP OF WATERMAIN
0+040	107.08	104.68	TOP OF WATERMAIN
0+050	107.77	105.37	152mm OFF 250mm HYDRANT TEE
0+060	107.78	105.38	TOP OF WATERMAIN
0+066.3	107.89	105.49	11.25° BEND
0+070.8	108.08	105.50	CAP

NOT FOR CONSTRUCTION

NOTES

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2	ISSUED FOR PROGRESS REVIEW	22/03/21	SMC
1	ISSUED FOR SITE PLAN APPLICATION	02/12/20	SMC

SCALE
0 5m 10m 20m
HORIZONTAL 1:500

LICENSED PROFESSIONAL ENGINEER
S. M. CZARABYNSKI
May 28 2021
PROVINCE OF ONTARIO

Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SMC
DRAWN	BLM
CHECKED	SMC
APPROVED	SMC

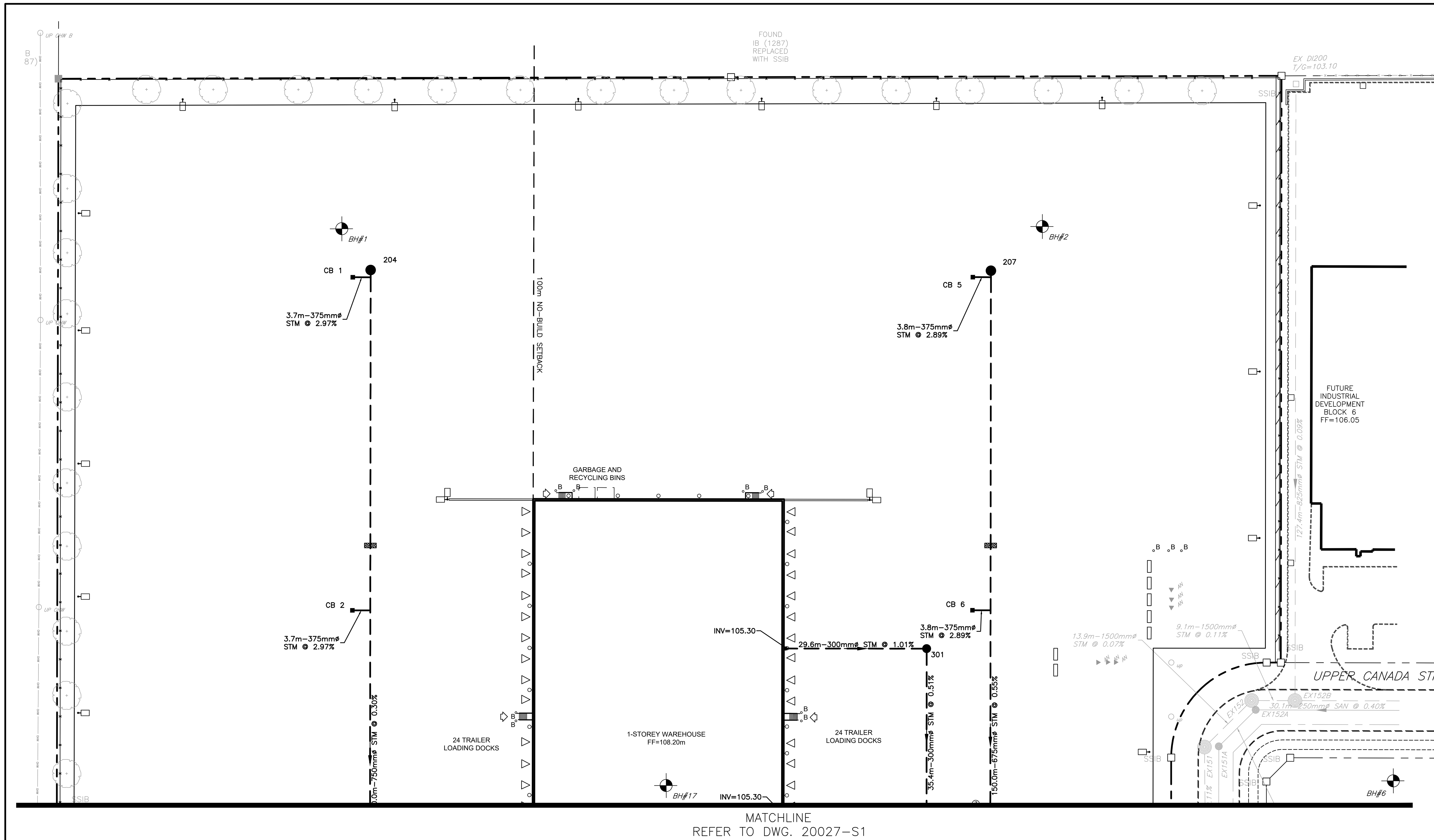
MARITIME-ONTARIO FREIGHT LINES LIMITED

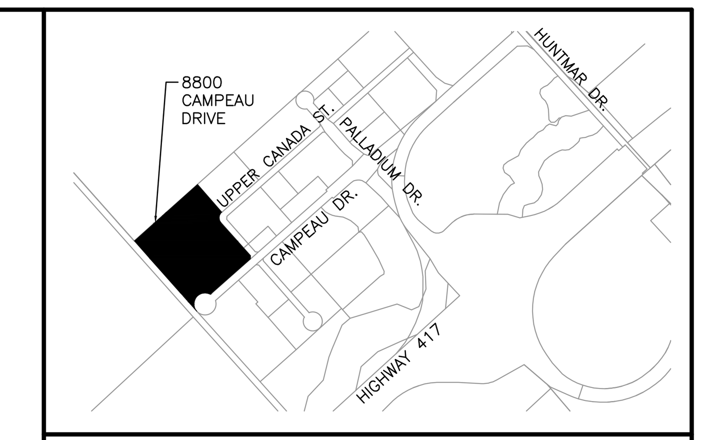
KANATA WEST BUSINESS PARK
8800 CAMPEAU DRIVE, OTTAWA, ON

SERVICING PLAN

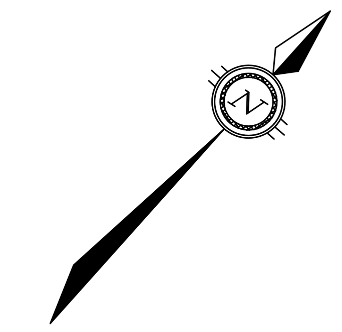
PROJECT No.	20027
SURVEY	STANTEC
DATED	MAY 2021
DWG. No.	20027-S1

D07-12-20-0189
#18376





KEY PLAN



STORM MANHOLE TABLE				
STRUCTURE	STRUCTURE SIZE	T/G ELEV	INVERT	GRATE
EX101	2400mmø	105.88	SW=101.44 E=101.41 NW=101.86	S24.1
200	2400mmø	105.88	NW=103.82 SW=102.04 SE=101.98	S24.1
201	1500mmø	106.37	SW=102.67 NW=103.24 NE=102.64	S24.1
202	1800mmø	106.43	NW=102.96 NE=102.90	S24.1
203	1500mmø	106.35	NW=103.32 SE=103.29	S24.1
204	1500mmø	106.46	SE=103.76	S24.1
205	1800mmø	106.23	NW=102.42 SW=102.34 NE=102.19	S24.1
206	1500mmø	106.33	NW=102.96 SE=102.93	S24.1
207	1500mmø	106.46	SE=103.78	S24.1
208	1200mmø	106.66	NW=105.13 SE=105.08	S24.1
300	1200mmø	106.44	NW=104.94 SW=105.00	S24.1
301	1200mmø	106.47	SE=104.94 SW=105.00	S24.1
302	1200mmø	106.55	SE=104.76 NE=104.68 NW=104.76 SW=104.76	S24.1
303	1200mmø	106.64	SW=104.56 SE=104.50	S24.1
304	1200mmø	106.48	NW=104.14 SE=104.11	S24.1

SANITARY MANHOLE TABLE				
STRUCTURE	STRUCTURE SIZE	T/G ELEV	INVERT	GRATE
100	1200mmø	106.28	NW=104.49 SE=104.46	S24
101	1200mmø	108.28	SE=104.66 NW=104.69	S24

CATCH BASIN TABLE				
STRUCTURE	STRUCTURE SIZE	T/G ELEV	INVERT	GRATE
CB 1	600x600mm	106.42	NE=104.74	S19
CB 2	600x600mm	106.32	NE=104.64	S19
CB 3	600x600mm	106.22	NE=104.54	S19
CB 4	600x600mm	106.15	NE=104.47	S19
CB 5	600x600mm	106.42	NE=104.74	S19
CB 6	600x600mm	106.32	NE=104.64	S19
CB 7	600x600mm	106.22	NE=104.54	S19
CB 8	600x600mm	105.95	NE=104.27	S19
CB 9	600x600mm	107.10	NE=105.42	S19
CB 10	600x600mm	106.64	NE=105.13	S19
CB 11	600x600mm	106.06	SE=104.38	S19
CB 12	600x600mm	107.10	SW=105.42	S19
CB 13	600x600mm	106.64	SW=104.96	S19
CB 14	600x600mm	106.06	SE=104.38	S19
CB 16	600x600mm	106.61	SW=105.41	S19
DICB 15	600x600mm	106.42	SW=104.67 NE=105.15	403.010
DICB 17	600x600mm	106.50	NE=104.75	403.010

ICD DESIGN TABLE				
STRUCTURE	100 YEAR OUTFLOW (L/s)	100 YEAR HEAD (m)	ORIFICE DIAMETER (mm)	TYPE
CB 1	120	1.78	204.1	SLIDE
CB 2	60	1.79	144.1	SLIDE
CB 3	80	1.79	166.4	SLIDE
CB 4	60	1.81	143.8	SLIDE
CB 5	120	1.78	204.1	SLIDE
CB 6	60	1.77	144.5	SLIDE
CB 7	30	1.83	101.4	SLIDE
CB 8	25	1.83	92.6	SLIDE
CB 9	55	1.66	140.8	SLIDE
CB 10	30	1.58	105.3	SLIDE
CB 11	25	1.74	93.8	SLIDE
CB 12	40	1.66	120.1	SLIDE
CB 13	30	1.75	102.6	SLIDE
CB 14	25	1.74	93.8	SLIDE
DICB 15	20	1.63	85.3	SLIDE
DICB 17	20	1.63	85.3	SLIDE

LEGEND

- PROPERTY BOUNDARY
- CATCH BASIN
- STORM SEWER & MANHOLE
- SANITARY SEWER & MANHOLE
- WATERMAIN
- HYDRANT
- VALVE & VALVE BOX
- SIAMESE CONNECTION
- EXISTING CATCH BASIN
- EXISTING STORM SEWER & MANHOLE
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING WATERMAIN
- EXISTING HYDRANT
- EXISTING VALVE & VALVE BOX
- 100m NO–BUILD SETBACK
- CLAY SEAL
- BOREHOLE
- CROSSING NUMBER
- BUILDING ENTRANCE (REFER TO SITE PLAN)
- B BOLLARD (REFER TO SITE PLAN)
- BH BLOCK HEATER POST (REFER TO SITE PLAN)
- LIGHT STANDARD (REFER TO SITE PLAN)
- JERSEY BARRIER (REFER TO SITE PLAN)
- TWSI (REFER TO SITE PLAN)
- PROPOSED TREE (REFER TO LANDSCAPE PLAN)

NOT FOR CONSTRUCTION

NOTES

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

NO.	REVISION DESCRIPTION	DATE	BY
3	REVISED PER COMMENTS	28/05/21	SMC
2	ISSUED FOR PROGRESS REVIEW	22/03/21	SMC
1	ISSUED FOR SITE PLAN APPLICATION	02/12/20	SMC

SCALE

0 5m 10m 20m
HORIZONTAL 1:500

LICENSED PROFESSIONAL ENGINEER
S. M. CZARABYNSKI
May 28 2021
PROVINCE OF ONTARIO

Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SMC
DRAWN	BLM
CHECKED	SMC
APPROVED	SMC

MARITIME-ONTARIO FREIGHT LINES LIMITED

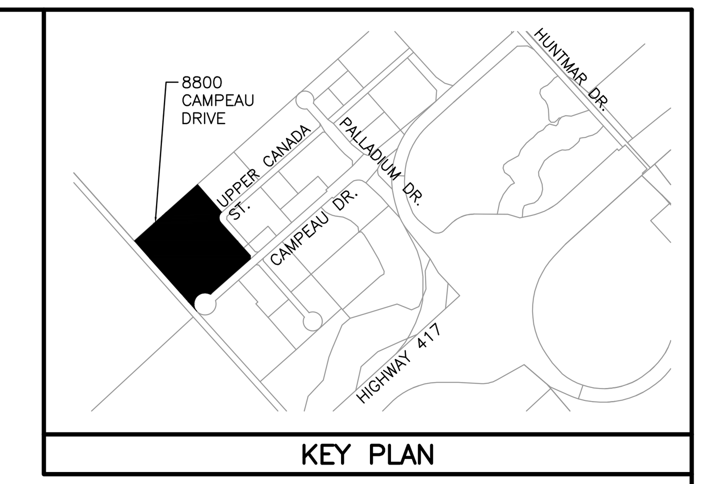
KANATA WEST BUSINESS PARK
8800 CAMPEAU DRIVE, OTTAWA, ON

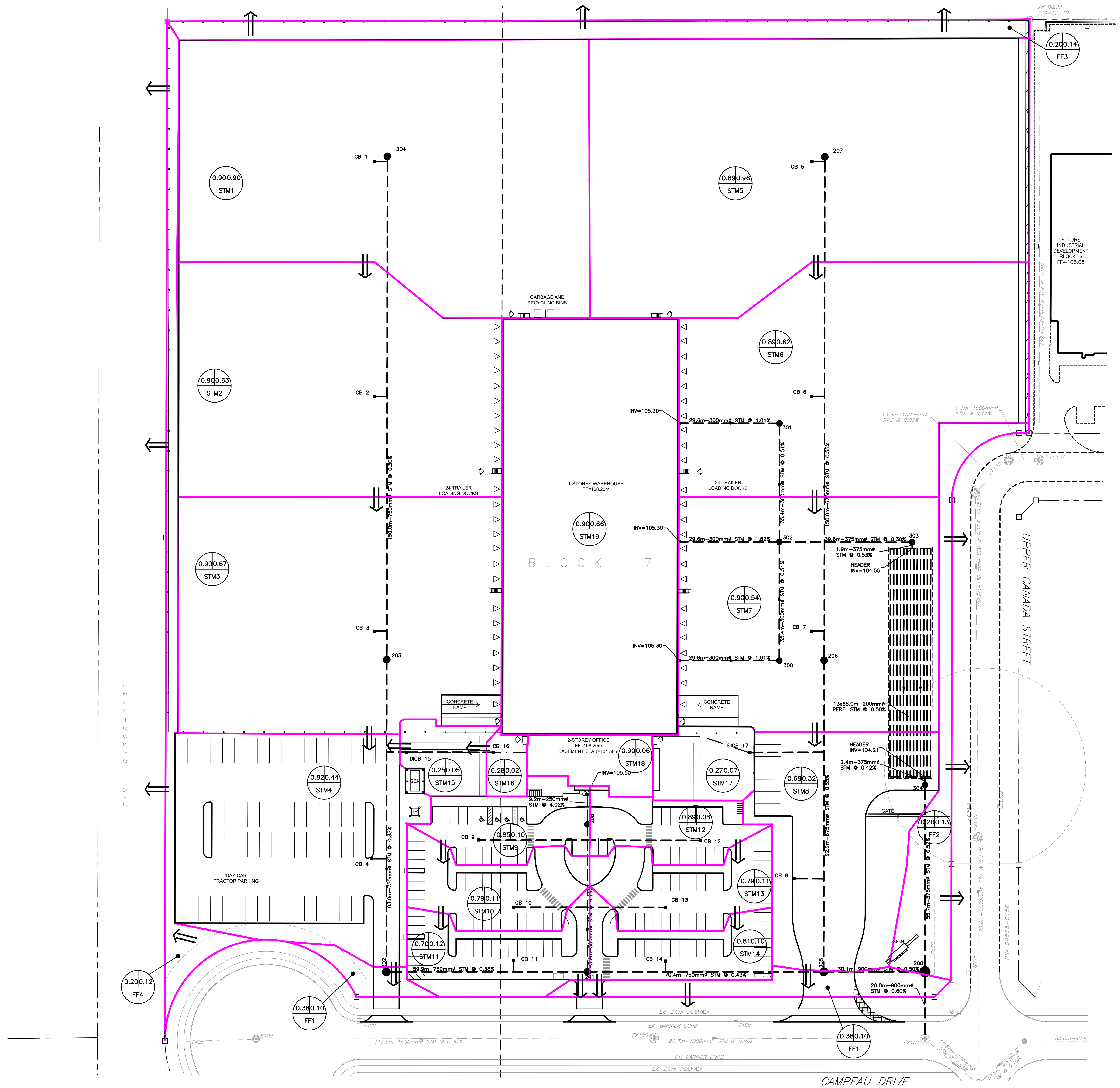
SERVICING PLAN

PROJECT No.	20027
SURVEY	STANTEC
DATED	MAY 2021
DWG. No.	20027-S2

D07-12-20-0189

#18376





LEGEND

- PROPERTY BOUNDARY
- CATCH BASIN
- EXISTING CATCH BASIN
- STORM SEWER & MANHOLE
- EXISTING STORM SEWER & MANHOLE
- 100m NO-BUILD SETBACK
- SWALE
- STORM DRAINAGE AREA BOUNDARY
- MAJOR OVERLAND FLOW ROUTE

RUNOFF COEFFICIENT — 0.50 — 0.28 — AREA (ha) — STM1 — DRAINAGE AREA

NOT FOR CONSTRUCTION

NOTES

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NO.	REVISION DESCRIPTION	DATE	BY
2	REVISED PER COMMENTS	28/05/21	SMC
1	ISSUED FOR SITE PLAN APPLICATION	02/12/20	SMC

SCALE
0 5m 10m 30m
HORIZONTAL 1:750

LICENSED PROFESSIONAL ENGINEER
S. M. CZARABYNSKI
May 28 2021
PROVINCE OF ONTARIO

Robinson Land Development
350 Palladium Drive
Ottawa, ON K2V 1A8
(613) 592-6060 rcii.com

DESIGN	BLM
CHECKED	SMC
DRAWN	BLM
CHECKED	SMC
APPROVED	SMC

MARITIME-ONTARIO FREIGHT LINES LIMITED

KANATA WEST BUSINESS PARK
8800 CAMPEAU DRIVE, OTTAWA, ON

STORM DRAINAGE AREA PLAN

PROJECT No.	20027
SURVEY	STANTEC
DATED	MAY 2021
DWG. No:	20027-STM1

#18376

D07-12-20-0189