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Site Servicing Report – Canada Post Corporation

50 Leikin Drive, Ottawa ON

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

Value through service and commitment

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1.0 INTRODUCTION

1.1 Background

J.L. Richards & Associates Limited (JLR) was retained by Colliers Project Leaders (Colliers), on behalf of Canada Post Corporation (CPC), to prepare civil drawings as well as a Site Servicing Report in support of a Processing Centre sited at 50 Leikin Drive, in the City of Ottawa.

As per the RFP requirements, email correspondence and a Teams meeting held on Tuesday June 7, 2022, JLR is to deliver the work for Phases 1 through 5 as described in the Collier's statement of requirements for the proposed 228,476 sq.ft. (±21,225 m^2) facility for CPC. Overall, the project includes approx. 226,700 sq.ft. ground floor footprint, 330 sq. ft. of hazardous storage, and 1,446 sq. ft. of admin block projection.

The existing Albert Jackson Processing Centre (AJPC) was referenced in preparing this design.

1.2 Site Description and Background

The subject property is located within the urban limits of the City of Ottawa, specifically in the Davidson Heights neighborhood, at the west side of Leikin Drive at the intersection of Bill Leathem Drive.

As illustrated in Figure 1 (below), the subject site currently consists of an unoccupied parcel at 50 Leikin Drive. The site currently consists of greenfield, which makes the subject site pervious as there are no existing buildings or asphalt.

Figure 1: Site Plan Location

The overall subject parcels amount to ±89,700 m^2. Under the Zoning By-Law (ZBL) layer specified in GeoOttawa, the subject properties are zoned IL9 for light industrial uses.

The Site Plan (Appendix A) provides a breakdown of the type of spaces in the CPC Processing Centre.

1.3 Existing Infrastructure

A review of existing civil drawings was carried out in the vicinity of the site. Available information has been included in Appendix A. Based on the review of the available information, the following infrastructure has been identified to exist within the Bill Leathem Drive and Leikin Drive Right-Of-Way (ROW):

Watermains:

- 305 mm diameter PVC watermain located within Bill Leathem Drive ROW
- 406 mm diameter high pressure concrete located within Leikin Drive ROW

Based on the review of "geoOttawa", the following eight (8) hydrants are located within the prescribed distances noted in ISTB-2018-02, in proximity of the subject property:

- One (1) hydrant is located on the southeast corner of the property at the intersection of Bill Leathem Drive and Leikin Drive intersection.
- Two (2) hydrants are located at the edge of the property along Bill Leathem Drive.
- One (1) hydrant is located across the street from the property along Bill Leathem Drive.
- Four (4) hydrants are located across the street from the property along Leikin Drive.

Sanitary Sewers:

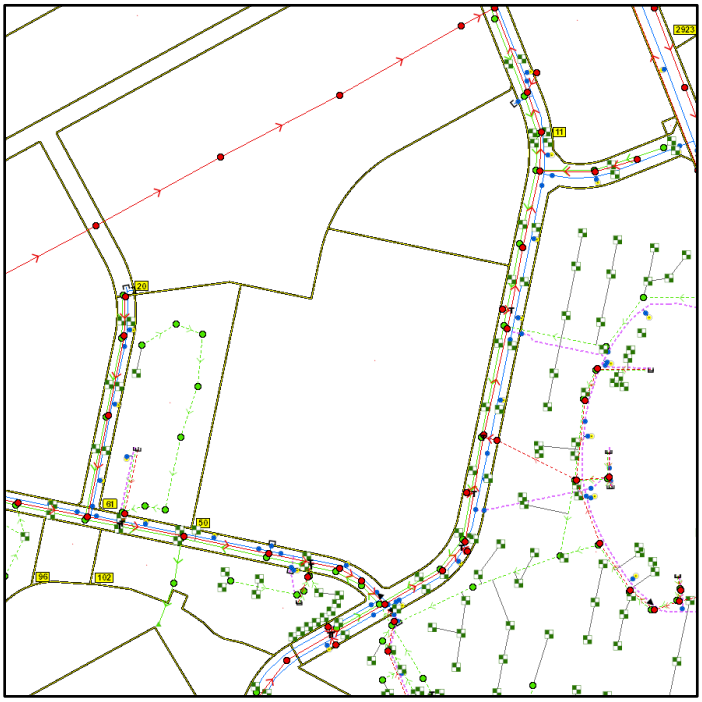
- 375 mm diameter sanitary sewer located within Bill Leathem Drive ROW (flowing east). This sanitary sewer eventually discharges into to the Leikin Drive's 750 mm diameter trunk sanitary sewer, which in turn outlets into the Robert O. Pickard Environmental Centre (ROPEC) via a series of trunk sanitary sewers.
- 750 mm diameter sanitary sewer located within the Leikin Drive ROW. This sanitary sewer also outlets to ROPEC via a series of trunk sanitary sewers.

Storm Sewers:

- There is a single on-site catch basin (CB) at the edge of the property connected to the 1350 mm diameter concrete storm sewer within Bill Leathem Drive ROW.
- There are four (4) on-site catch basins (CBs) at the edge of the property connected to the 1050 mm diameter concrete storm sewer within Leikin Drive ROW.
- 1350 mm diameter concrete storm sewer located within Bill Leathem Drive ROW. This sewer discharges into the stormwater management pond located south of the site.
- 1050 mm diameter concrete storm sewer located within Leikin Drive ROW. This sewer also discharges into the stormwater management pond located south of the site.

Figure 2 below shows the existing infrastructure near the property parcel.

Figure 2: Existing Infrastructure



1.4 Proposed Servicing

The existing servicing and connections to off-site linear infrastructure is summarized in Section 1.3 and 1.4. Based on the above-noted connections with existing infrastructure, the following proposed servicing is envisioned:

Water Servicing: Proposed water service lateral for the building to connect to the existing Leikin Drive 406 mm diameter watermain.

Wastewater: Proposed 200 mm diameter sanitary lateral from the building to the existing Bill Leathem Drive 375 mm diameter sanitary sewer. The 200 mm diameter service lateral will originate from the building's mechanical room.

Storm: Runoff generated from site to be directed towards the existing 1350 mm diameter sewer on Bill Leathem Drive. On-site storage and controls to be implemented to respect the storm discharge design criteria.

1.5 Municipal Design Guidelines

The civil drawings were prepared in accordance with the following:

Ottawa Sewer Design Guidelines (October 2012) complete with the following Technical Bulletins:

- ISTB-2012-01
- ISTDB-2014-01

- ISTDB-2016-01
- ISTDB-2018-01
- ISTDB-2019-01; and
- ISTDB-2019-02

City of Ottawa Water Distribution Guidelines complete with the following Technical Bulletins:

- ISTDB-2010-02
- ISTDB-2014-02
- ISTDB-2018-02; and
- ISTDB-2021-03

Detail Drawings as well as well as Sewer Material Specifications including:

- Sewer Connection (2003-513) and Sewer Use (2003-514) By-Laws
- Watermains/Services Material Specifications as well as Water and Road Standard Detail Drawings
- Water By-Law (2018-167)

1.6 Pre-Consultation, Permits and Approvals

A pre-consultation meeting was held between Colliers and JLR via a Teams Meeting on June 7, 2022 (refer to Appendix B for a copy of the pre-consultation meeting notes).

2.0 WATER SERVICING

2.1 Water Supply and Design Criteria

A Potable Water Assessment (PWA) was carried out to confirm that the existing watermain and proposed 150 mm diameter water service lateral can provide adequate supply while complying with both the Ottawa Design Guidelines for Water Distribution (July 2010) and Technical Bulletins ISDTB-2014-02 and ISTB-2018-02.

Section 4.2.2 of the Water Design Guidelines requires that all new development additions to the public water distribution system be designed such that the minimum and maximum water pressure, as well as the fire flow rates, conform to the following:

- Under maximum hourly demand conditions (peak hour), the pressures shall not be less than 276 kPa
- During periods of maximum day and fire flow demand, the residual pressure at any point in the distribution system shall not be less than 140 kPa (20 psi)
- In accordance with the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi)
- The maximum pressure at any point in the distribution system in unoccupied areas shall not exceed 689 kPa (100 psi); and

- Feedermains, which have been provided primarily for the purpose of redundancy, shall meet, at a minimum, the basic day plus fire flow demand.

Table 2-1 summarizes the design criteria for water servicing, which will also serve as the basis of the detailed design for the site.

Table 2-1: Water Design Criteria

Design Criteria	Design Value
Light industrial average day demand	35,000 L/ha/day
Light industrial maximum demand	1.5 x Avg
Light industrial peak hour	1.8 x Max Day
Fire Flow Requirements	
Municipal ROW	FUS
Pressure/Flow	
Peak hour	>276 kPa (40 psi)
Maximum day plus fire flow	>140 kPa (20 psi)
Minimum hour (maximum HGL)	<552 kPa (80 psi)

2.2 Domestic Water Demands

The water demands were calculated to reflect the area outlined in the latest Site Plan (Appendix A) and the prescribed parameters included in the Ottawa Design Guidelines for Water Distribution which have been synthesized in Table 2-1. The calculations presented in Appendix D are based on the latest Site Plan.

Table 2-2 summarizes the water demands (Appendix D).

Table 2-2: Water Consumption Rates

Demand Scenario	Water Demand (L/s)
Average Day	3.63
Maximum Day	5.45
Peak Hour	9.81

2.3 Proposed Water Servicing

Water servicing will be provided by extending a 200 mm water service connection from the 400 mm diameter watermain on Leikin Drive to an on-site tee, which will then reduce to a 150 mm diameter service lateral into the building's proposed sprinkler room near the southeast corner of the building. This service will provide water supply for both domestic and sprinkler uses. A private on-site hydrant with a 150 mm diameter hydrant lateral is also proposed within 45 m of the building's siamese connection, in accordance with the Ontario Building Code (OBC).

As per City requirements, a redundant water service will be provided as the average day demand exceeds 50 m^3/d. In addition, a 400 mm isolation valve chamber will be added to the watermain on Leikin Drive in between the two service connections.

2.4 Required Fire Flow

The required fire flow (RFF) was calculated based on the latest FUS Guidelines (2020). The FUS calculations reflect a sprinklered building, free-burning occupancy class building, and a non-combustible building classification. Based on these characteristics, the RFF calculated in accordance with the FUS was estimated at 267 L/s (Appendix D).

As shown in the table below, boundary conditions (BCs) were generated by the City for two (2) separate RFFs (refer to Appendix B). The city provided information at the Leikin Drive and Bill Leathem Drive connections. The provided BCs included existing and future conditions on Bill Leathem Drive. The future conditions were provided by the City as the serviced area from Bill Leathem is within an area that is planned to be reconfigured to Pressure Zone SUC in late 2024/2025. Unlike Bill Leathem Drive, Leikin Drive will not be impacted by the future pressure zone reconfiguration, so only existing conditions were provided by the City for the Leikin connection. The Leikin Drive connection is the proposed connection for the CPC Processing Centre.

Table 2-3: Hydraulic Boundary Conditions

Water Demand Scenario	Demand Building (L/s)	Head (m) on Bill Leathem Dr. Connection (Existing Condition)	Head (m) on Bill Leathem Dr. Connection (Future Condition)	Head (m) on Leikin Dr. Connection
Peak Hour	9.81	125.00	144.00	125.00
Maximum HGL	0.00	132.80	146.90	132.70
Max. Day + Fire Flow 1 (FUS)	267	123.80	139.10	124.80
Max. Day + Fire Flow 2 (FUS)	283	123.20	138.40	124.40

2.5 Headloss Calculations

Headloss calculations were carried out using the Hazen-Williams equation to confirm sizing of service lateral. The proposed servicing as presented on the Site Servicing Drawing (S1) was evaluated under the demand scenarios listed in Section 2.2 while the BCs along the ROW reflecting the RFFs calculated based on the FUS. The operating pressures along the proposed water service at the building's entry were calculated using the water demand scenarios listed in Table 2-2. The Headloss Calculation Spreadsheet summarizes the operating pressures at the building under peak hour, maximum pressure, and maximum day plus fire flow scenarios. Detailed calculations for each water demand scenario are included in Appendix B.

2.5.1 Peak Hour

The peak hour demand shown in Table 2-2 for the building was applied along the service lateral. Using the boundary conditions shown in Table 2-3, the anticipated pressure at the building was found to be 332 kPa (48.1 psi), exceeding the minimum pressure criterion of 276 kPa (40 psi).

2.5.2 Maximum Day Plus Fire Flow

Fire flow protection must be verified along the ROW per the FUS and onsite in accordance with the OBC. Along the ROW, the target FUS of 267 L/s is achieved by three (3) existing hydrants on Leikin Drive within the prescribed distances and by one (1) proposed on-site hydrant.

The headloss along the proposed water service lateral was evaluated to fulfill the maximum day demand (5.45 L/s), the sprinkler demand of 34.7 L/s and the hydrant flow of 95 L/s. The proposed water service lateral was assessed in three (3) different segments for the headloss analysis, with the domestic and sprinkler demand being supplied to the building and the 95 L/s hydrant flow being supplied simultaneously to the on-site hydrant.

The residual pressure at the building was calculated to be 236 kPa (34.3 psi) and the residual pressure at the on-site hydrant was calculated to be 178 kPa (25.8 psi), as shown in the headloss calculation sheet (Appendix B). The calculated operating pressure exceeds the minimum pressure requirement of 140 kPa (20 psi).

2.5.3 Maximum HGL

The Water Design Guidelines require that a high-pressure check (maximum hydraulic grade elevation) be performed to ensure that the maximum pressure constraint of 552 kPa (80 psi) is not exceeded. Based on a zero demand (0 L/s) and the maximum HGL boundary condition at Leikin Drive (refer to Table 2-3), the maximum pressure is 409 kPa (59.3 psi). This pressure is below the maximum pressure constraint of 552 kPa (80 psi). Consequently, a pressure reducing valve (PRV) is not warranted for the site.

2.6 Summary and Conclusions

Section 2.0 and the calculations presented in Appendix B demonstrate that the existing municipal water supply is adequate to service the proposed site.

3.0 WASTEWATER SERVICING

3.1 Existing Conditions

Currently, the project Site does not include any hard surface nor an existing building. Therefore, there are no existing service laterals.

3.2 Design Criteria

The sanitary service for the building was designed based on the City of Ottawa Sewer Design Guidelines ((OSDG) - (October 2012)) and associated Technical Bulletins. Key design parameters have been summarized in Table 3-1.

Table 3-1: Wastewater Servicing Design Criteria

Design Criteria	Design Value	Reference
Average Day Light Industrial Flow	35,000 L/ha/day	ISTB-2018-01
Industrial peaking factor	4.3	ISTB-2018-01
Infiltration Allowance 0.05 L/s/ha (dry I/I) 0.28 L/s/ha (wet I/I)	0.33 L/s/ha	ISTB-2018-01
Minimum velocity	0.6 m/s	OSDG Section 6.1.2.2
Maximum velocity	3.0 m/s	OSDG Section 6.1.2.2
Manning Roughness Coefficient (for smooth wall pipes)	0.013	OSDG Section 6.1.8.2
Minimum allowable slopes	Varies	OSDG Table 6.2, Section 6.1.2.2

3.3 Theoretical Sanitary Peak Flow and Proposed Sanitary Servicing

Wastewater flows from the building will be accommodated by a dedicated sanitary service lateral. The building will be serviced via a 200 mm diameter sanitary connection to the existing 375 mm diameter sewer on Bill Leathem Drive. A 200 mm diameter sanitary sewer line is also proposed to service the gatehouse at the northwest corner of the site.

The average day light industrial flow allowance was used to calculate peak wastewater flow as recommended by ISTB-2018-01. The peak wastewater flow was calculated based on the peaking factor of 4.3. The peaking factor was determined by reading the curve of Peaking Factor for Industrial Areas of the ISTB-2018-01. Based on these parameters, the peak wastewater flow was calculated to be 22.7 L/s. This includes a conservative peak flow value of 4.0 L/s for the gatehouse. Appendix C includes the Sanitary Design Sheet**.**

3.4 Summary and Conclusions

Section 3.0 and the calculations presented in Appendix C demonstrate that the site can be serviced using the existing infrastructure within the vicinity of the site.

4.0 STORM SERVICING AND STORMWATER MANAGEMENT

4.1 Storm Criteria

Storm servicing for the subject property has been designed in accordance with the City of Ottawa Sewer Design Guidelines (2012) and Technical Bulletins. The minor system has been designed to capture and convey runoff during frequent storm events up to the 1:5-year recurrence, while the major system has been designed to capture and retain runoff on-site for storm events up to the 1:100-year recurrence.

In addition to the general City of Ottawa design criteria, storm servicing for the proposed development has been designed to comply with the storm servicing requirements outlined in the pre-consultation meeting notes received November 16th, 2022 (Appendix 'A') as summarized below:

- The sites allowable release rate is based on a pre-development C-Factor of 0.24 being controlled to the 1:5-year design storm with a 15-minute time of concentration. For more details, please refer to the South Merivale Business Park Stormwater Management Report prepared by Novatech Engineering Consultants Ltd., dated November 1991 (equivalent of 54.5 L/s/ha).

- A calculated time of concentration for post-development flows with a minimum of 10 minutes.

- Flows to the storm sewer in excess of the allowable release rate must be detained on site for storms up to the 1:100-year return. No surface ponding is permitted for events up to and including the 1:5-year event.

- Ensure no overland flow for all storms up to and including the 1:100-year event.

- The 1:2-year storm or 1:5-year storm event using IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997. Given that regressions for each recurrence is included in the OSDG, rainfall intensities for the 1:5-year and 1:100-year were extracted from the document to carry out sewer sizing and assess the effectiveness of the stormwater management system.

- Quality control requirements provided by Rideau Valley Conservation Authority (RVCA) are for "enhanced" target (80% TSS Removal). Quality control is provided by the existing Longfields/Davidson Stormwater Management Facility that is downstream of the site.

- Best Management Practices (BMPs) are recommended for this site.

4.2 Allowable Release Rate

For the subject property, runoff will be collected by an on-site storm sewer system that outlets to the 1350 mm diameter Bill Leathem storm sewer which then outlets to the Longfields/Davidson Stormwater Management Facility that is downstream of the site. This section of pipe has been

sized in the 1991 Novatech, City of Nepean South Merivale Business Park Stormwater Management Report.

The proposed development encompasses parts of Area 1 and Area 5 as divided in the 1991 Stormwater Management Report. In the 1991 Report, the overall inflow to the storm sewer system is restricted to 54.5 L/s/ha, however part of Area 1 contains the road network which is uncontrolled in up to the 1:10 year event and therefore has a higher capture rate in the 1:5-year event than the sites. The allowable release rate for the part of the site within the Area 1 catchment is restricted to 38.8 L/s/ha to accommodate the increased road drainage.

No road network is proposed within the Area 5 catchment identified in the 1991 Report and access can be achieved to sites via the existing road network in Area 1. Therefore, the allowable release rate from the parts of the development within the Area 5 drainage area is the full 54.5 L/s/ha.

The total release rate from the site is 425 L/s as shown in the calculations included in Appendix E.

4.3 Proposed Storm Servicing

The proposed storm servicing for the site is divided into three (3) different components: the controlled roof drainage, the controlled minor system capture, and the on-site major system storage.

Storm runoff from the ±2.12 ha Processing Centre rooftop will be controlled on the roof via a series of rooftop restrictors (roof drains, e.g., Zurn or Watts). The controlled rooftop flows will then be conveyed by a series of internal piping to the southeast corner of the building before being outlet into the vernal pond, located near the Leikin Drive and Bill Leathem Drive intersection (southeast corner of the site). The vernal pond will have a perched outlet (ditch inlet catch basin) to the proposed storm sewers and will be configured to maintain a 300 mm depth of water for ecological purposes. As the water level in the vernal pond is intended to remain at 300 mm at all times, the restricted roof outflow will be conveyed through the vernal pond and then outlet into the minor system.

Storm runoff generated by the remaining controlled site areas will be collected by a series of surface catch basins (CBs). The captured flows will be controlled by independent inlet control devices (ICDs) and then conveyed via a minor system to the existing 1350 mm trunk storm sewer on Bill Leathem Drive, which eventually discharges into the existing Longfields/Davidson Stormwater Management Facility south of the proposed site (refer to Drawing S1).

Storm servicing for the site was developed into two (2) sewersheds, one system that services the eastern part of the site (referred to as the eastern system) and one system that services the western part of the site (referred to as the western system). The eastern system also includes the vernal pond discussed above and the storm service connection for the building roof. Both systems merge at a maintenance hole (MH19) immediately upstream of the connection to the Bill Leathem Drive 1350 mm diameter storm sewer (MH10A).

There is an uncontrolled site area of 0.59 ha which is designed to sheet flow to the existing road network off site.

The 1:100-year storm event from the controlled areas of the property will be detained on site and the aggregate sum of the controlled flows and uncontrolled flows will be restricted to the total allowable release rate of 425 L/s.

The 1:5 year storm event will be fully captured by the minor system and controlled using ICDs. The 1:5 year flow will be conveyed to one of two (2) underground storage facilities (one for each system – eastern and western) consisting of ADS StormTech chambers. These systems were designed to capture and detain the 1:5-year design storm while releasing the allowable flow to the Bill Leathem Drive 1350 mm diameter storm sewer outlet. An ICD will limit the outflows of each storage facility. The 1:100-year release rate from the storm chambers and the uncontrolled flows will be limited to the total allowable peak flow of 425 L/s (Appendix E). Thus, the proposed servicing solution will meet the constraints described in the South Merivale Business Park Stormwater Management Report.

4.4 Proposed Stormwater Management Solution and Calculations

4.4.1 Water Quantity

The storm and stormwater management solution were developed to limit the 1:100-year post-development flows to 425 L/s. To achieve this criterion, on-site restrictions are being proposed. The stormwater management strategy was developed as follows:

Major System (surface)

The 1:100-year post-development flows will be directed to the on-site catch basins (CBs). Flows exceeding the 1:5 year storm event will be controlled by inlet control devices (ICDs) and detained by parking lot depressions of various depths but limited to 300 mm (refer to Ponding Plan for details). The SWM calculations (Appendix E) show that grading was developed with sufficient storage at each of the CBs to accommodate the 1:100-year post-development flows while releasing the 1:5-year post-development flows. Hence, no surface ponding would occur during the 1:5-year storm. In the case of CB29, a small underground ADS StormTech chamber was designed to capture the 1:100 year storage volume of that catchment area due to the limited surface storage availability. An ICD in CB29 will allow the flow to the 1:100-year storm and another ICD will control the flow from the ADS StormTech chamber to the 1:5-year storm for that catchment area.

To supplement the parking lot storage cells, runoff from the building will be controlled to 60 L/s by means of rooftop restrictors. The SWM calculations (Appendix E) show that there will be sufficient storage provided by the roof, as the calculations assume that only 40% of the roof area would be utilized as storage with a ponding depth of 150 mm.

Minor System (underground)

Given that the 1:5 year post-development flows will be transmitted by the proposed storm sewers, underground storage was incorporated into the site servicing to meet the maximum allowable flow of 335 L/s. When combined with the uncontrolled flow of 90 L/s, flows delivered to the off-site minor and major system will be limited to 425 L/s. As noted in Section 4.3, both underground storage facilities were designed to capture the 1:5-year

post-development peak flows from the minor system while meeting the allowable peak flow of 335 L/s. Based on the Modified Rational Method (MRM) SWM calculations (Appendix E), a storage volume of 326 m^3 and 973 m^3 is required for the eastern and western chambers, respectively, based on a combined outflow of 335 L/s. It should be noted that outflow for the eastern and western chambers was reduced by 50% in the MRM calculations rather than using a dynamic model, to account for the lower release rate under increasing head.

Based on the storm and stormwater management strategy detailed in Appendix E, the storm discharge criteria will be met onsite.

Table 2 below provides a high-level summary given that detailed Modified Rational Method Calculations have been provided in Appendix E. The summary for the eastern and western systems has been totalled based on the serviced area.

Table 4-1: Summary of Controlled and Uncontrolled Areas

Component	Area	$Q_{controlled}$ (L/s)	$Q_{uncontrolled}$ (L/s)	Storage Volume req. (m^3)	Storage Volume provided (m^3)
Roof	2.12	60.0	N/A	985	1270
Western Storage cells (combined)	4.49	1,118 (5-yr)	N/A	526	859
Eastern Storage Cells (combined)	1.46	359 (5-yr)	N/A	287	478
Uncontrolled Areas	0.59	N/A	90.0	N/A	N/A
Western Chamber (minor system)	4.49	167.5	N/A	973	1000
Eastern Chamber (minor system)	1.46	167.5	N/A	326	351

The above Table shows the following (refer to Appendix E):

- Rooftop flows limited to 60 L/s will require 985 m^3. The roof can provide ±1,270 m^3 based on 150 mm ponding over 40% of the roof. Thus, the 1:100-year volume can be contained.
- The individual MRM calculations for the Western storage cells indicate that sufficient storage is provided by the grading. When combined, a storage volume requirement of 526 m^3 is required for the western parking cells while the grading can provide a combined storage of 859 m^3 (refer to Ponding Plan).
- The individual MRM calculations for the Eastern storage cells indicate that sufficient storage is provided by the grading. When combined, a storage volume requirement of 287 m^3 is required for the eastern parking cells while the grading can provide a combined storage of 478 m^3 (refer to Ponding Plan).
- When combined, the uncontrolled areas will sheet flow 90.0 L/s under the 1:100-year storm.

- Based on the MRM calculation for the western chambers, a storage volume of 973 m^3 is required under a release rate of 167.5 L/s. The design of the StormTech chambers will provide 1,000 m^3.
- Based on the MRM calculation for the eastern chambers, a storage volume of 326 m^3 is required under a release rate of 167.5 L/s. The design of the StormTech chambers will provide 351 m^3.

4.4.2 Storage Chambers

To limit the capture flows to the allowable peak flow, two (2) underground storage units will be implemented. One of the storage units will be in the southeast of the site, under the employee parking lot. The second storage unit will be in the southwest of the site, under the 5-ton vehicle parking area. The available storage capacity for the underground storage system was calculated using the ADS StormTech Design Tool (refer to Appendix E) as summarized in Table 2. The chosen design chamber is a 7200-MC chamber.

The proposed underground storage unit located southeast of the site consists of 40 chambers and each chamber has a storage volume of 5 m^3, which combined with the surrounding granular bed provides a total storage volume of 351 m^3. The chambers are proposed to lay in a footprint of three (3) rows of six (6) chambers. The footprint has a length of approximately 31.7 m and a width of 8.9 m. The controlled release rate from the east storage chamber is 167.5 L/s.

The proposed underground storage unit located southwest of the site consists of 121 chambers and each chamber has a storage volume of 5 m^3, which combined with the surrounding granular bed provides a total storage volume of 1,000 m^3. The unit consists of six (6) rows of twelve (12) chambers. The proposed footprint has a length of approximately 45.8 m and a width of 17.2 m. The controlled release rate from the west chamber is 167.5 L/s.

The total storage capacity for both storage units combined is equal to 1434 m^3, which exceeds the required 1,351 m^3. The combined release rate from the two chambers is 335 L/s. Please refer to Appendix ‘E’ for further storage chamber specifications.

Based on the Geotechnical Investigation (December 2022) by WSP E&I Canada Limited, there was no freestanding groundwater measured in the open boreholes on completion of drilling at the locations of the underground storage units.

4.4.3 Water Quality

Storm runoff generated by the proposed site will be collected and conveyed by an on-site storm sewer system into the Bill Leathem Drive storm sewer system that will outlet to the existing Longfields/Davidson Stormwater Management Facility (downstream of the site) to provide quality control, meeting an enhanced level of protection (80% TSS removal).

4.5 Summary and Conclusions

The storm servicing and stormwater management solution presented in this Site Servicing Report has been designed to satisfy the quantity and quality criteria specified by the City of Ottawa. The prescribed release rate of 425 L/s for the 1:100-year peak flow is met with the addition of underground storage while achieving an overall TSS removal in excess of 80%.

5.0 EROSION AND SEDIMENTATION CONTROL

Prior to initiating construction of the proposed development, erosion, and sedimentation control measures, as outlined in the Ontario Ministry of Natural Resources (MNR) Guidelines on Erosion and Sediment Control for Urban Construction Sites, are to be implemented to trap sediment on site.

The following erosion and sedimentation control measures are proposed, as shown on Drawing ESC:

- supply and installation of a silt fence barrier, as per OPSD 219.110;
- supply and installation of filter fabric between the frame and cover of existing catch basins adjacent to the proposed development, including regular inspection and maintenance as required;
- stockpiles of material during construction is to be located along flat areas away from drainage paths and are to be enclosed with additional silt fence;
- proposed catch basins are to be equipped with sumps, inspected frequently, and cleaned as required;
- sandbags are to be placed blocking part of the sewer pipe in the connecting storm maintenance holes to eliminate construction debris from entering the existing storm sewer system. The sandbags are to be removed after the proposed storm sewers have been fully cleaned.

The proposed erosion control measures shall conform to the following documents:

- “Guidelines on Erosion and Sediment Control for Urban Construction Sites” published by Ontario Ministries of Natural Resources, Environment, Municipal Affairs, and Transportation & Communication, Association of Construction Authorities of Ontario and Urban Development Institute, Ontario, May 1987.
- “MTO Drainage Manual”, Chapter F: “Erosion of Materials and Sediment Control”, Ministry of Transportation & Communications, 1985.
- “Erosion and Sediment Control” Training Manual by Ministry of Environment, Spring 1998.
- Applicable Regulations and Guidelines of the Ministry of Natural Resources.

6.0 SITE LIGHTING

Refer to the Photometrics Plan for the light levels measured in lux. Based on this Photometrics Plan, the light levels were determined to be adequate for the requirements of the site and meet the CPC standards.

7.0 OTHER UTILITIES SERVICING

Utilities (Hydro, Comms, Gas) will be consulted to provide their detailed designs to service the site.

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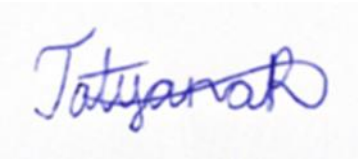
J.L. RICHARDS & ASSOCIATES LIMITED

Prepared by:



Tatyana Roumie, EIT
Civil Engineering Intern

Reviewed by:

Annie Williams, P.Eng.
Civil Engineer

Appendix A

Background Documents

I REQUIRE THIS PLAN TO BE DEPOSITED UNDER THE LAND TITLES ACT.
DATE: Oct 2/19
V. ANDREW SHELP
ONTARIO LAND SURVEYOR

PLAN 4R-32287

RECEIVED AND DEPOSITED
DATE: Oct 2, 2019
D. Bourdeau
REPRESENTATIVE FOR LAND REGISTRAR FOR THE LAND TITLES DIVISION OF OTTAWA-CARLETON NO. 4.

SCHEDULE

PART	BLOCK	PLAN	PIN
1			
2	ALL OF 2	4M - 1354	ALL OF 04733-6646
3			

Part 3: Subject to easement, Inst. OC1093047.
Parts 1, 2 and 3 together constitute all of PIN 04733-6646.

PLAN OF SURVEY OF

BLOCK 2
REGISTERED PLAN 4M-1354
CITY OF OTTAWA
Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 1000
40 30 20 10 0 20 40 Metres

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

Surveyor's Certificate
I CERTIFY THAT :
1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the Land Titles Act and the regulations made under them.
2. The survey was completed on the 18th day of September, 2019.

Sept 18/19
Date
V. Andrew Shelp
Ontario Land Surveyor

Notes & Legend
—□— Denotes Survey Monument Planted
—■— " Survey Monument Found
SIB = Standard Iron Bar
SSIB = Short Standard Iron Bar
IB = Iron Bar
(WIT) = Witness
(AOG) = Annis, O'Sullivan, Vollebekk Ltd.
Meas. = Measured
NT = Non Tangential
(P1) = Plan 4M-1354
(P2) = Plan 4R-9089
(P3) = Plan 4R-24338

Distances shown on this plan are ground distances and can be converted to grid distances by multiplying by the combined scale factor of 0.999933.

Bearings are grid, derived from the westerly limit of Leikin Drive, shown to be N 10°59'50" E on Registered Plan 4M-1354 and are referred to the Central Meridian of MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

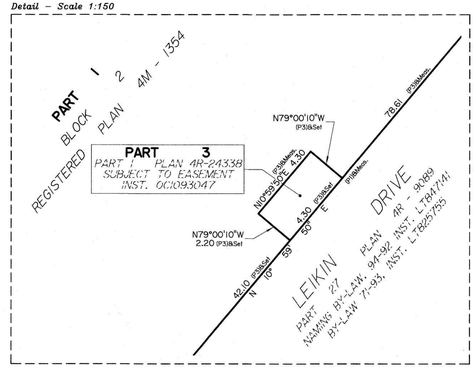
Coordinates are derived from Can-Net 2016 Real Time Network GPS observations referenced to Specified Control Points 01919791338 and 01919871649, MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

Coordinate values are to urban accuracy in accordance with O. Reg. 216/10.

, 01919791338	Northing	5006055.96	Easting	346140.91
, 01919871649	Northing	5007189.87	Easting	372435.05
, Point A	Northing	5017899.36	Easting	367075.65
, Point B	Northing	5017520.64	Easting	366716.97

Caution: Coordinates cannot, in themselves, be used to re-establish corners or boundaries shown on this plan.

Detail – Scale 1:150



ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com
Ontario Land Surveyors
Job No. 180461-19 Mmts Bk2 4M-1354 R F

Y:\2018\180461-19\DWG\180461-19 Mmts Bk2 4M-1354 R F.dwg

TOPOGRAPHICAL PLAN OF SURVEY OF

PART OF BLOCK 2
REGISTERED PLAN 4M-1354
CITY OF OTTAWA

Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 500

20 15 10 5 0 5 10 20 Metres

Metric

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

Surveyor's Certificate

I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the Land Titles Act and the regulations made under them.
2. The survey was completed on the 21st day of January, 2022.

Jan 25/22
Date

Andrew Sheils
Ontario Land Surveyor

Notes & Legend

	-	Survey Monument Planted
	-	Survey Monument Found
SIB	-	Standard Iron Bar
SSIB	-	Short Standard Iron Bar
IB	-	Iron Bar
(WIT)	-	Witness
Meas.	-	Measured
(AOG)	-	Annis, O'Sullivan, Vollebekk Ltd.
(P1)	-	Registered Plan 4M-1354
(P2)	-	Plan 4R-9089
(P3)	-	Plan 4R-32287
(P4)	-	Plan 4R-13400
(P5)	-	Plan 4R-11133
MH--ST	-	Maintenance Hole (Storm Sewer)
MH-S	-	Maintenance Hole (Sanitary)
MH-T	-	Maintenance Hole (Traffic)
MH	-	Maintenance Hole (Unidentified)
VC	-	Valve Chamber (Watermain)
VC	-	Valve Chamber (Watermain)
FH	-	Fire Hydrant
WV	-	Water Valve
LS	-	Light Standard
CB	-	Catch Basin
CBI	-	Catch Basin Inlet
T/G	-	Top of Grate
HH	-	Handhole
TB-B	-	Bell Terminal Box
TB-C	-	Cable Terminal Box
TB-T	-	Traffic Terminal Box
TB	-	Unidentified Terminal Box
TSP	-	Traffic Signal Post
	-	Deciduous Tree
	-	Coniferous Tree
	-	Bollard
S	-	Sign
M-W	-	Monitoring Well
W	-	Well Cap
Ø	-	Diameter
89.00	-	Location of Elevations
89.00	-	Top of Curb/ Wall Elevations
C/L	-	Centreline
	-	Property Line
WRW	-	Wooden Retaining Wall

ELEVATION NOTES

1. Elevations shown are geodetic and are referred to the CGVD28 geodetic datum.
2. It is the responsibility of the user of this information to verify that the job benchmark has not been altered or disturbed and that it's relative elevation and description agrees with the information shown on this drawing.

UTILITY NOTES

1. This drawing cannot be accepted as acknowledging all of the utilities and it will be the responsibility of the user to contact the respective utility authorities for confirmation.
2. Only visible surface utilities were located.
3. A field location of underground plant by the pertinent utility authority is mandatory before any work involving breaking ground, probing, excavating etc.

Bearings are grid, derived from the westerly limit of Leikin Drive shown to be N10°59'50"E on Registered Plan 4M-1354 and are referred to the Central Meridian of MTM Zone 9 (76°30' West Longitude) NAD-83 (original).

Topographic data was collected under Winter Conditions. Snow cover and ice preclude determining location and elevation of some topographical data that is otherwise visible.

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
V-22532

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

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: helpern@aovltd.com
Ontario Land Surveyors

Job No. 22022-22 MTI Blk 2 4M-1354 T F

Frechette, Luc

From: Gervais, Melanie <Melanie.Gervais@ottawa.ca>
Sent: December 1, 2022 9:18 AM
To: MacDonald, Nicole
Subject: Pre-con Follow-up - 50 Leikin Drive

Categories: CPC 821374

Hello Nicole,

Please refer to the below and attached notes regarding the Pre-Application Consultation (pre-con) Meeting held on November 16th 2022 for the property at 50 Leikin Drive for a Site Plan Control application in order to allow the development of parcel processing facility by Canada Post. 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-con meeting:

Planning

- Official Plan:
  - The property is designated Mixed Industrial which permits light industrial uses such as warehousing, distribution and storage.
  - Section 10.2.2 Policy 2 requires a Noise study as this property is located within the airport's 25 Line (Composite of 25NEF/NEP), as shown on Schedule C14.
- Zoning By-law:
  - IL9 – Light Industrial Subzone 9, permits light industrial use. Please ensure the Site Plan includes a zoning chart that identifies all the required & proposed provisions in separate columns. Here's a link to the IL9 zone.
- Landscape requirements
  - The landscape plan must be signed by a landscape architect.
- I confirm that currently the main address for the property is 50 Leikin Drive. If you prefer a Bill Leathem address this request can be done through the Site Plan Control process.
- This will be a Complex Site Plan application with a fee of $49,964.88 plus Engineering Design Review Fees ($ varies) plus Conservation Authority fee ($1065)
- New process: In 2023 the pre-consult process will become a 3-step process. If you submit in 2023 you will have to most likely come back for step 2 of the pre-con process. You can reach out in early 2023 and I should be able to provide you with the specifics at that time. If you submit by December 31st 2022, nothing changes.

Urban Design

- This proposal does not run along or does not meet the threshold in one of the City's Design Priority Areas and need not attend the City's UDRP. Staff will be responsible for evaluating the proposal and providing design direction.
- The concept plan is still very high level with minimal information and we have the following questions/comments about the proposal:
  - Building height: If a mezzanine is pursued we recommend it be incorporated into the proposed height of 30 feet (10 meters);
  - Landscape: We recommend vegetative buffers, street trees and screening be provided all around the site to soften the impact of the heavy use proposed on the surrounding lands;

        - Amenity: If amenity is required for large number of employees we recommend this be located in a aggregated area that is screened from the drive aisles and connected to the office area with a safe and protected circulation path;
        - Light pollution - We recommend the site lighting be visually screened from the residential neighbourhood visible to the south;
        - Pedestrian movement and connectivity - We recommend a pedestrian movement plan be included in the site plan that identifies how pedestrians will access the site, move safely internally on the site with protected sidewalks, painted lanes, landscape buffers and how they can connect to future surrounding parcels;
        - Orientation & primary street frontage: We recommend some consideration for where the primary building facade is located and how it engages the street.
        - Land parcel to the north: How is this land parcel (currently left blank) envisioned and what opportunities does it present for some of the undetermined requirements for the site.
    - A scoped Design Brief is a required submittal for all Site Plan/Re-zoning applications and can be combined with the Planning Rationale. Please see the Design Brief Terms of Reference provided.
        - Note. The Design Brief submittal should have a section which addresses these pre-consultation comments

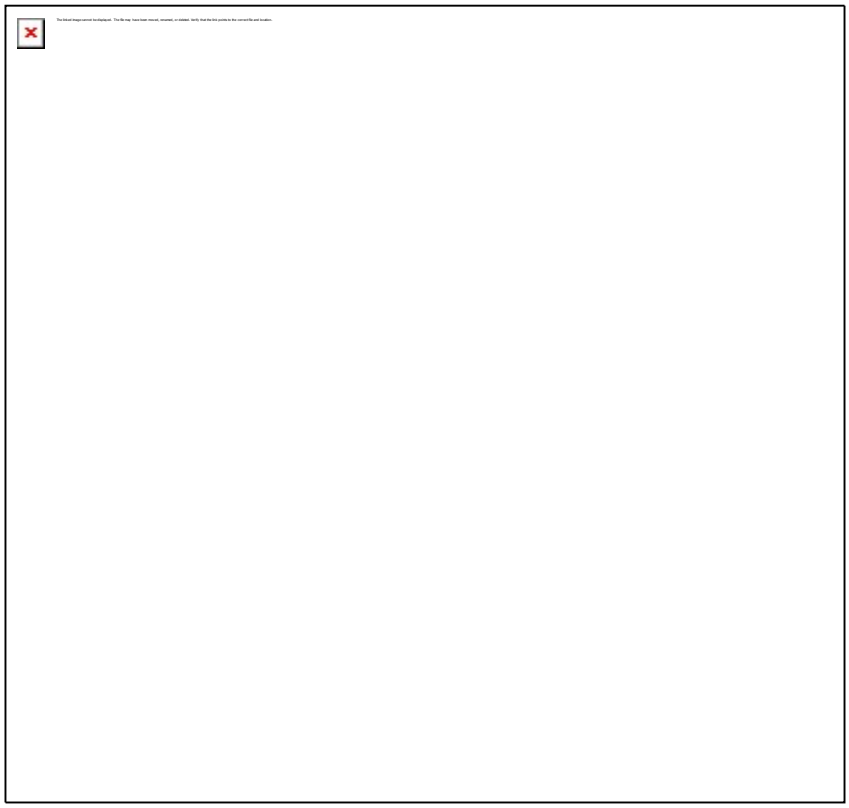
Engineering

Please note the following information regarding the engineering design submissions for the above noted site:

1. The Servicing Study Guidelines for Development Applications are available at the following address: https://ottawa.ca/en/city-hall/planning-and-development/how-develop-property/development-application-review-process-2/guide-preparing-studies-and-plans
2. Servicing and site works shall be in accordance with the following documents:
    - Ottawa Sewer Design Guidelines (October 2012) and all the Technical Bulletins including, Technical Bulletin PIEDTB-2016-01 and ISTB-2018-01
    - Ottawa Design Guidelines – Water Distribution (2010) and Technical Bulletins ISD-2010-2, ISDTB-2014-02 and ISTB-2018-02
    - Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
    - City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
    - City of Ottawa Environmental Noise Control Guidelines (January, 2016)
    - City of Ottawa Park and Pathway Development Manual (2012)
    - City of Ottawa Accessibility Design Standards (2012)
    - Ottawa Standard Tender Documents (latest version)
    - Ontario Provincial Standards for Roads & Public Works (2013)
3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at GeoInformation@ottawa.ca or by phone at (613) 580-2424 x 44455
4. The Stormwater Management Criteria, for the subject site, is to be based on the following (as established in the **South Merivale Business Park Stormwater Management Report** prepared by Novatech Engineering Consultants Ltd., dated November 1991.
    - The sites allowable release rate is based on a pre-development C-Factor of 0.24 being controlled to the 5-year design storm with a 15-minute time of concentration. See the report listed above for more details (equivalent of 54.5 L/s/ha).
    - A calculated time of concentration for post-development flows (Cannot be less than 10 minutes).

- Flows to the storm sewer in excess of the allowable release rate must be detained on site for storms up to the 1:100 year return. No surface ponding is permitted for events up to and including the 5-year event.
- Ensure no overland flow for all storms up to and including the 100-year event.
- The 2-yr storm or 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
- Quality control requirements provided by Rideau Valley Conservation Authority (RVCA) are for "enhanced" target (80% TSS Removal). Quality control is provided by the existing Longfields/Davidson Stormwater Management Facility that is downstream of the site.
- Best Management Practices (BMPs) are recommended for this site.

5. Deep Services:



i. A plan view of the approximate services may be seen above. Services should ideally be grouped in a common trench to minimize the number of road cuts. The sizing of available future services is:

a. Connections:

i. 900 mm dia. STM Conc. Or 1050mm dia. STM Conc. Sewer on Leikin Drive.
ii. Existing Sanitary Maintenance hole MHSA19533 or MHSA19535 on Leikin Drive.
iii. 305 mm dia. WM PVC stub on Bill Leatham Drive.

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

iii. *Provide information on the monitoring manhole requirements – should be located in an accessible location on private property near the property line (ie. Not in a parking area).*

iv. *Provide information on the type of connection permitted*

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

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

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

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

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

e. *No submerged outlet connections.*

6. Civil consultant must request boundary conditions from the City's assigned Project Manager prior to first submission. Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:

- Location of service(s)
- Type of development and the amount of fire flow required (as per FUS, 1999).
- Average daily demand: ___ l/s.
- Maximum daily demand: ___l/s.
- Maximum hourly daily demand: ___ l/s.
- Hydrant location and spacing to meet City's Water Design guidelines.
- Water supply redundancy will be required for more than 50 m3/day water demand.

7. Phase 1 ESAs and Phase 2 ESAs must conform to clause 4.8.4 of the Official Plan that requires that development applications conform to Ontario Regulation 153/04.

8. MECP ECA Requirements (Standard) –
All development applications should be considered for an Environmental Compliance Approval (ECA) by the Ministry of the Environment, Conservation, and Parks (MECP);
- Consultant determines if an approval for sewage works under Section 53 of OWRA is required. Consultant then determines what type of application is required and the City's project manager confirms. (If the consultant is not clear if an ECA is required, they will work with the City to determine what is required. If the consultant it is still unclear or there is a difference of opinion only then will the City PM approach the MECP.
- The project will be either transfer of review (standard), transfer of review (additional), direct submission, or exempt as per O. Reg. 525/98.
- Standard Works ToR Draft ECA's are sent to the local MECP office (moeccottawasewage@ontario.ca) for information only
- Additional ToR draft ECAs require a project summary/design brief and require a response from the local MECP (10 business day window)

- Site plan Approval, or Draft Approval, is required before an application is sent to the MECP

9. General/ additional comments:
    - Only one watermain connection per site. However, looping would be required if proposed demand is 50m3/day or greater.

Feel free to contact the Infrastructure Project Manager, Tyler Cassidy, at Tyler.Cassidy@ottawa.ca, for follow-up questions.

Transportation

- The submitted Transportation Review is not an acceptable Transportation Impact Assessment.
    - The TIA guidelines are available on the City website: https://ottawa.ca/en/transportation-impact-assessment-guidelines
    - The application will not be deemed complete until the submission of the draft step 2-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable). Although a full review of the TIA Strategy report (Step 4) is not required prior to an application, it is strongly recommended.
    - Synchro files are required at Step 4.
- Corner sight triangle requirement is 5m x 5m.
- A Stationary Noise Impact Study is required if there is residential land use within 100m.
- Leikin and Bill Leathem both have a 26m right of way protection.

Feel free to contact the Transportation Project Manager, Mike Giampa, at Mike.Giampa@ottawa.ca, for follow-up questions.

Environmental

- The subject property appears to be a large parcel with undisturbed meadow and grasslands habitat. Given its proximity to the Rideau river and stormponds, and recent findings of nearby studies, I recommend completing a scoped Environmental Impact Study (EIS) that primarily focuses on significant habitat for threatened or endangered species. These surveys will need to be during the appropriate breeding season(s).
- Further details of the scoped EIS can be found in the EIS guidelines. https://documents.ottawa.ca/sites/documents/files/documents/eis_guidelines2015_en.pdf
- I understand that the applicant is obliged to complete an Impact Assessment (or an Environmental Effects Analysis) as part of their submission to the federal planning authority. While it is unclear if the objectives of the Impact Assessment align with and satisfy those of the City's policies, the EIS can be combined with the Impact Assessment (or EEA) to avoid duplications. However, the EIS must demonstrate that the proposed development will have no negative impacts on the natural features for which it was triggered, as outlined in the Provincial Policy Statement and the City's Official Plan.
- I would also encourage the applicant to seek opportunities to add more locally appropriate native trees, shrubs and vegetation to the proposed development. If implemented appropriately, this would not only contribute to the development design, but it would also contribute to the urban tree canopy, local biodiversity, improve the buildings' energy efficiency and reduce the urban heat island effect. Increased vegetation would be especially beneficial with the large parking lot proposed. Having more native trees and shrubs would also require providing sufficient space and soil for the trees and vegetation.
- Feel free to contact the Environmental Planner, Sami Rehman, at sami.rehman@ottawa.ca for follow-up questions.

TCR requirements:

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

a. an approved TCR is a requirement of Site Plan approval.

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

Landscape Plan tree planting requirements:

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

1. Minimum Setbacks
    - Maintain 1.5m from sidewalk or MUP/cycle track or water service laterals.
    - Maintain 2.5m from curb
    - Coniferous species require a minimum 4.5m setback from curb, sidewalk or MUP/cycle track/pathway.
    - Maintain 7.5m between large growing trees, and 4m between small growing trees. Park or open space planting should consider 10m spacing, except where otherwise approved in naturalization / afforestation areas. Adhere to Ottawa Hydro's planting guidelines (species and setbacks) when planting around overhead primary conductors.
2. Tree specifications
    - Minimum stock size: 50mm tree caliper for deciduous, 200cm height for coniferous.
    - Maximize the use of large deciduous species wherever possible to maximize future canopy coverage
    - Tree planting on city property shall be in accordance with the City of Ottawa's Tree Planting Specification; and include watering and warranty as described in the specification (can be provided by Forestry Services).
    - Plant native trees whenever possible
    - No root barriers, dead-man anchor systems, or planters are permitted.
    - No tree stakes unless necessary (and only 1 on the prevailing winds side of the tree)
3. Hard surface planting

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

4. Soil Volume
    - Please document on the LP that adequate soil volumes can be met:

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

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

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

Tree Canopy Cover:

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

Parkland

- Parkland Dedication:
    - The amount of parkland dedication that is required is to be calculated as per the City of Ottawa Parkland Dedication By-law No. 2022-280.
    - Section 11(2)(g) of the by-law states that no conveyance of land or payment of money in-lieu is required for "a municipal or other government use".
    - The proposed development is being undertaken by Canada Post, a Crown corporation owned by the federal government, for the construction of a new Canada Post parcel processing facility.
    - Therefore, this proposal would be considered exempt from a parkland dedication requirement.
    - Please note that the park comments are preliminary and will be finalized, and subject to change, upon receipt of the development application. If the proposed development or land use changes, then the parkland dedication requirement will be re-evaluated accordingly.

City Surveyor

- The determination of property boundaries, minimum setbacks and other regulatory constraints are a critical component of development. An Ontario Land Surveyor (O.L.S.) needs to be consulted at the outset of a project to ensure properties are properly defined and can be used as the geospatial framework for the development.
- Topographic details may also be required for a project and should be either carried out by the O.L.S. that has provided the Legal Survey or done in consultation with the O.L.S. to ensure that the project is integrated to the appropriate control network.

Questions regarding the above requirements can be directed to the City's Surveyor, Bill Harper, at Bill.Harper@ottawa.ca

Conservation Authority

- Please reach out to Eric Lalande at the RVCA eric.lalande@rvca.ca

Other

- Plans are to be standard A1 size (594 mm x 841 mm) or Arch D size (609.6 mm x 914.4 mm) sheets, dimensioned in metric and utilizing an appropriate Metric scale (1:200, 1:250, 1:300, 1:400 or 1:500).
- All PDF submitted documents are to be unlocked and flattened.
- You are encouraged to contact the Ward Councillor, Councillor Wilson Lo, at wilson.lo@ottawa.ca about the proposal.

Please refer to the links to Guide to preparing studies and plans and fees for further 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 geoinformation@ottawa.ca.

It is anticipated that, as a result of the *More Homes for Everyone Act, 2022*, for applications for site plan approval and zoning by-law amendments, new processes in respect of pre-application consultation will be in place as of January 1, 2023. The new processes are anticipated to require a multiple phase pre-application consultation approach before an application will be deemed complete. Applicants who have not filed a complete application by the effective date may be required to undertake further pre-application consultation(s) consistent with the provincial changes. The by-laws to be amended include By-law 2009-320, the Pre-Consultation By-law, By-law 2022-239, the planning fees by-law and By-law 2022-254, the Information and Materials for Planning Application By-law. The revisions are anticipated to be before Council in the period after the new Council takes office and the end of the year.

These pre-con 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,

Mélanie Gervais *MCIP, RPP*
Planner III (A) / Urbaniste III (i)
Development Review - South /
Examen des demandes d'aménagement - sud
Planning, Real Estate and Economic Development Department /
Direction générale de la planification, des biens immobiliers et du développement économique

City of / Ville d'Ottawa
110, avenue Laurier Avenue West / Ouest,
4th Floor / 4ième étage
Ottawa, ON K1P 1J1
Tel. : 613-580-2424 ext. 24025
Cell. : 613-282-0508
E-mail / Courriel : Melanie.Gervais@ottawa.ca
Mail Code: 01-14

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Pre-con Applicant's Study and Plan Identification List 50 Leikin.pdf (195.8KB)
Leikin, 50_Design Brief.pdf (95.5KB)

(2.2MB)
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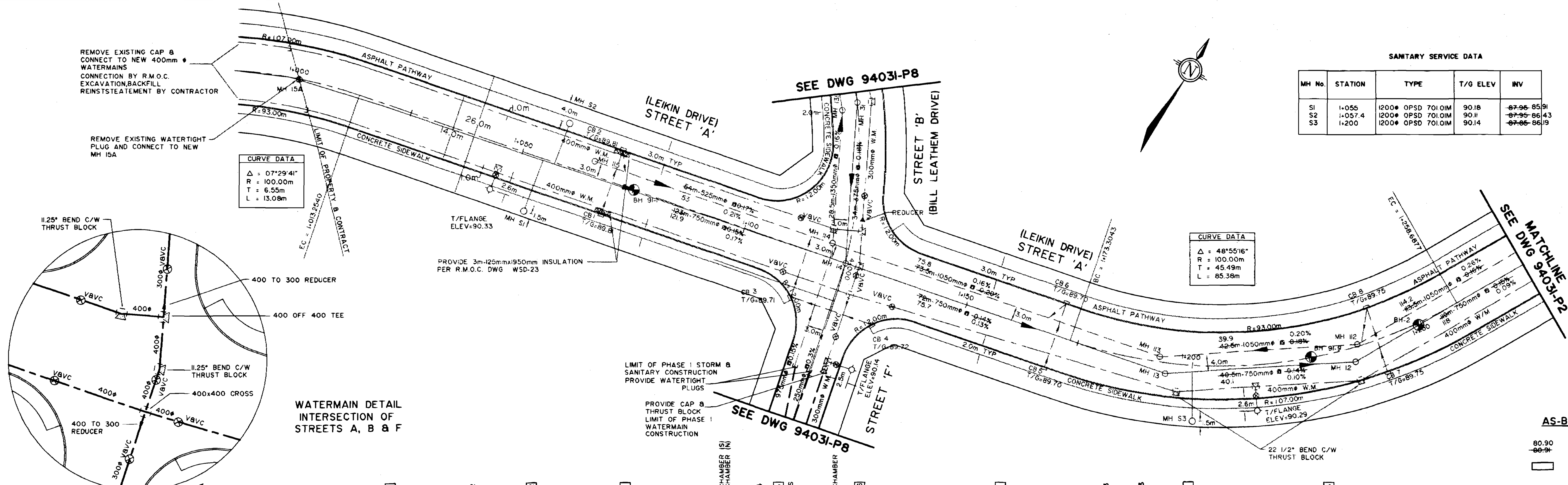


SANITARY SERVICE DATA

MH No.	STATION	TYPE	T/G ELEV	INV
S1	1+055	1200ϕ OPSD 701.01M	90.18	~~87.95~~ 85.91
S2	1+057.4	1200ϕ OPSD 701.01M	90.11	~~87.95~~ 86.43
S3	1+200	1200ϕ OPSD 701.01M	90.14	~~87.65~~ 86.19

STORM MANHOLE DATA

No.	STATION	TYPE	T.G ELEVATION
112	1+235.4	1800ϕ OPSD 701.02M	89.97
113	1+192.7	1800ϕ OPSD 701.02M	89.98
114	1+119.3	1650ϕx2400ϕ M6	89.88
115	1+065.3	1200ϕ OPSD 701.01M	89.95

SANITARY MANHOLE DATA

No.	STATION	TYPE	T.G ELEVATION
12	1+234.2	1500ϕ OPSD 701.04	89.90
13	1+194.5	1500ϕ OPSD 701.04	89.97
14	1+122.7	1200ϕ x 1200ϕ M4	89.96
15A	1+000	1500ϕ OPSD 701.04	89.90
MH 14		DROP OPSD 1003.01M	

CATCHBASIN DATA

No.	STATION	OUTLET INVERT ELEVATION	INLET INVERT ELEVATION	℄ ICD ELEV	℄ ICD TYPE
1	1+070	88.58	-	-	-
2	1+070	88.41	88.44	88.51	B
3	1+114	88.46	88.47	88.56	B
4	1+132	88.57	-	-	-
5	1+170	88.53	-	-	-
6	1+170	88.35	88.38	88.45	B
7	1+240	88.58	-	-	-
8	1+240	88.40	88.43	88.50	B

AS-BUILTS LEGEND

80.90 ~~80.91~~ AS BUILT INFO

ADDITIONAL AS-BUILT INFO

BOREHOLE LEGEND

SILTY CLAY

CLAYEY SILT

GLACIAL TILL

BOREHOLE DATA FROM FONDEX LTD. REPORT NO. Q-A756-A,NOVEMBER,1991

WATERMAIN AS-BUILTS

SOUTH LEG WATERMAIN
1+002.9 EX.& NEW DUCTILE
1+005.3 DUCTILE TO HYPRESCON COUPLER
1+007.6 HYPRESCON

NORTH LEG WATERMAIN
0+994.7 EX. & NEW DUCTILE
0+997.1 DUCTILE TO HYPRESCON COUPLER
0+999.4 HYPRESCON

WATERMAIN NOTES:

1 ALL CONNECTIONS TO EXISTING WATERMAINS ARE TO BE PERFORMED BY R.M.O.C. EXCAVATION, BACKFILL AND REINSTATEMENT BY THE CONTRACTOR.

2 IN THE EVENT OF REVISIONS TO THE STERILIZATION STATIONS, THE VALVE CHAMBERS CAN BE RELOCATED.

3 ALL CONSTRUCTION SHALL CONFORM TO R.M.O.C. STANDARDS.

4 CATHODIC PROTECTION TO BE PROVIDED IN ACCORDANCE WITH R.M.O.C. STANDARD DWGS. WSD-39 & WSD-41.

5 HYDRANTS TO BE INSTALLED PER R.M.O.C. STANDARD DWG. WSD-19

SEEPAGE BARRIERS REQUIRED AT MIN 60m SPACING

NOTE:
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	DATE	BY
10	ISSUED TO THE CITY OF NEPEAN	JAN. 30/96	JFB
9	AS-BUILTS AS PER NEPEAN COMMENTS	MAY 10/93	JFB
8	AS-BUILTS AS PER NEPEAN COMMENTS	MAR.26/93	JFB
7	WATERMAIN OFFSET 4.0m	APR.20/92	UB
6	REVISED AS PER NEPEAN COMMENTS	FEB.14/92	SG
5	REVISED AS PER NEPEAN COMMENTS	FEB.3/92	SG
4	REVISED AS PER R.M.O.C. COMMENTS	JAN.17/92	SG
3	ISSUED FOR TENDER	JAN.15/92	SG
2	REVISED AS PER R.M.O.C. COMMENTS	DEC.9/91	SG
1	REVISED AS PER NEPEAN COMMENTS	NOV.28/91	SG

LICENSED PROFESSIONAL ENGINEER S.M. GORDON PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

NOVATECH ENGINEERING CONSULTANTS LTD. OTTAWA, ONTARIO

DESIGN	SG
CHECKED	UB
DRAWN	JFB
CHECKED	SG
APPROVED	UB

SCALE: 1:500 HORIZONTAL; 1:50 VERTICAL

NEPEAN

SOUTH MERIVALE BUSINESS PARK AS-BUILTS

PLAN AND PROFILE (LEIKIN DRIVE)

STREET A - STATION 1+000 TO 1+275

PROJECT No. 94031

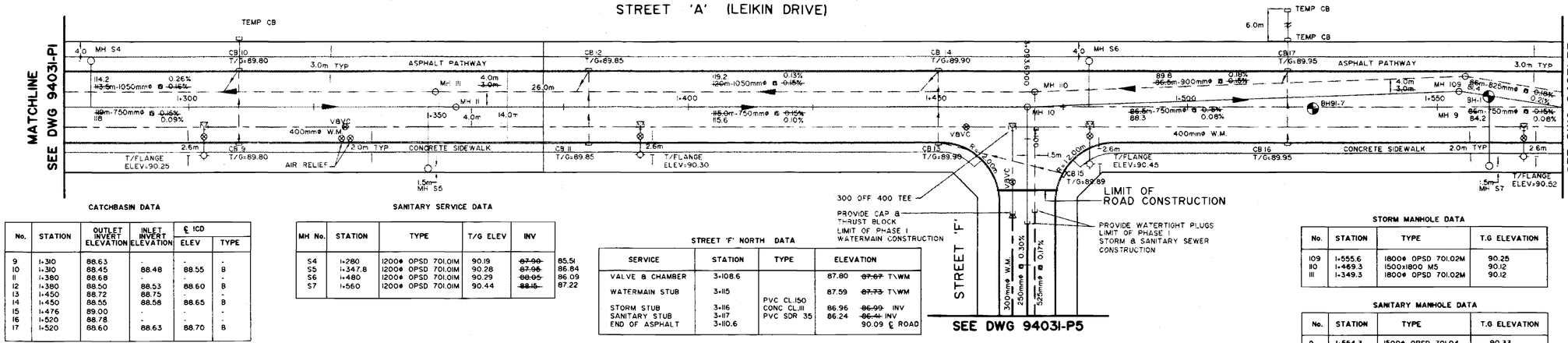
FIELD BOOK

DATE JANUARY 1996

DRAWING No. 94031-P1

Jan 31, 1996 - 11:05:54 DWG Name: D:\NOVA\94031\94031P1.DWG Updated By: JFB

STREET 'A' (LEIKIN DRIVE)



CATCHBASIN DATA

No.	STATION	OUTLET INVERT ELEVATION	INLET INVERT ELEVATION	℄ ICD ELEV	℄ ICD TYPE
9	1+310	88.63	-	-	-
10	1+310	88.45	88.48	88.55	B
11	1+380	88.68	-	-	-
12	1+380	88.50	88.53	88.60	B
13	1+450	88.72	88.75	-	-
14	1+450	88.55	88.58	88.65	B
15	1+476	89.00	-	-	-
16	1+520	88.78	-	-	-
17	1+520	88.60	88.63	88.70	B

SANITARY SERVICE DATA

MH No.	STATION	TYPE	T/G ELEV	INV	
S4	1+280	1200ø OPSD 701.01M	90.19	~~87.90~~	85.51
S5	1+347.8	1200ø OPSD 701.01M	90.28	~~87.98~~	86.84
S6	1+480	1200ø OPSD 701.01M	90.29	~~88.05~~	86.09
S7	1+560	1200ø OPSD 701.01M	90.44	~~88.15~~	87.22

STREET 'F' NORTH DATA

SERVICE	STATION	TYPE	ELEVATION	
VALVE & CHAMBER	3+108.6		87.80	~~87.67~~ T\WM
WATERMAIN STUB	3+115		87.59	~~87.73~~ T\WM
STORM STUB	3+116	PVC CL.150	86.96	~~86.99~~ INV
SANITARY STUB	3+117	CONC CL.III PVC SDR 35	86.24	~~86.41~~ INV
END OF ASPHALT	3+110.6			90.09 ℄ ROAD

STORM MANHOLE DATA

No.	STATION	TYPE	T.G ELEVATION
109	1+555.6	1800ø OPSD 701.02M	90.25
110	1+469.3	1500x1800 M5	90.12
111	1+349.3	1800ø OPSD 701.02M	90.12

SANITARY MANHOLE DATA

No.	STATION	TYPE	T.G ELEVATION
9	1+554.3	1500ø OPSD 701.04	90.33
10	1+467.8	1800ø OPSD 701.05	90.20
11	1+352.8	1500ø OPSD 701.04	90.20
MH 10		DROP OPSD 1003.01M	

AS-BUILTS LEGEND

~~80.90~~ ~~80.91~~ AS BUILT INFO

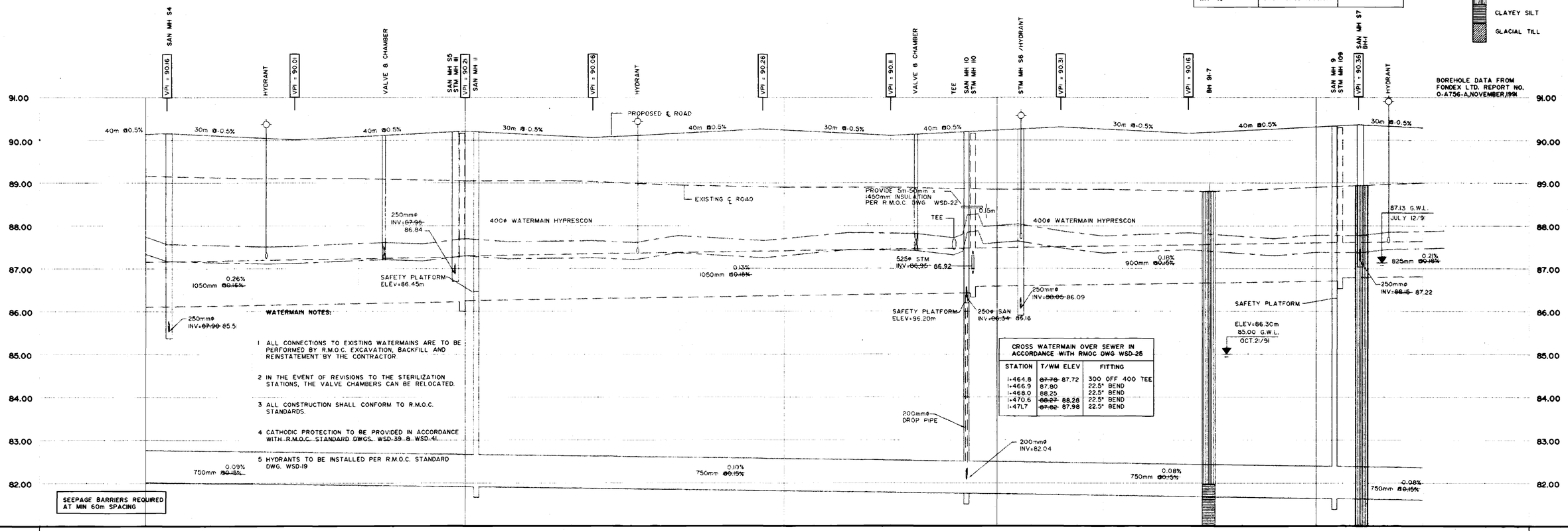
ADDITIONAL AS-BUILT INFO

BOREHOLE LEGEND

SILTY CLAY

CLAYEY SILT

GLACIAL TILL



WATERMAIN NOTES:

1 ALL CONNECTIONS TO EXISTING WATERMAINS ARE TO BE PERFORMED BY R.M.O.C. EXCAVATION, BACKFILL AND REINSTATEMENT BY THE CONTRACTOR

2 IN THE EVENT OF REVISIONS TO THE STERILIZATION STATIONS, THE VALVE CHAMBERS CAN BE RELOCATED.

3 ALL CONSTRUCTION SHALL CONFORM TO R.M.O.C. STANDARDS.

4 CATHODIC PROTECTION TO BE PROVIDED IN ACCORDANCE WITH R.M.O.C. STANDARD DWGS. WSD-39 & WSD-41.

5 HYDRANTS TO BE INSTALLED PER R.M.O.C. STANDARD DWG. WSD-19

CROSS WATERMAIN OVER SEWER IN ACCORDANCE WITH RMOC DWG WSD-25

STATION	T/WM ELEV	FITTING
1+464.8	~~87.78~~ 87.72	300 OFF 400 TEE
1+466.9	87.80	22.5° BEND
1+468.0	88.25	22.5° BEND
1+470.6	~~88.27~~ 88.28	22.5° BEND
1+471.7	~~87.82~~ 87.98	22.5° BEND

℄ ROAD ELEVATION	90.14	90.16	90.06	90.01	90.09	90.21	90.09	90.06	90.16
TOP OF WATERMAIN ELEVATION	~~87.74~~	87.57 ~~87.76~~	87.5 ~~87.66~~ HYD	87.52 ~~87.6~~	~~87.57~~	~~87.69~~	87.61 ~~87.71~~ VBVC	~~87.58~~	87.70 ~~87.8~~
STORM SEWER INVERT		114.2 ~~13.5m-1050ø STM @0.16%~~ 0.26% CONC.CL.III				86.33 ~~86.43~~ 86.25 86.35			119.2 ~~12m-1050ø STM @0.15%~~ 0.13% CONC.CL.III
SANITARY SEWER INVERT		118.0 ~~19m-750ø SAN @0.15%~~ 0.09% CONC.CL.V				88.88 ~~88.93~~ 88.73 88.80			115.6 ~~15m-750ø SAN @0.15%~~ 0.10% CONC.CL.V
EXISTING ℄ R.O.W. ELEVATION	89.15	89.10		89.10		89.05	89.05	88.95	
CHAINAGE	1+275	1+280 VPI/MH	1+300	1+303 VPI	1+310	1+325	1+331	1+340	1+347.8 MH 1+352.8 MH VPI

℄ ROAD ELEVATION	90.18	90.29	90.19	90.28	90.29	90.44	90.20	90.20	90.05	℄ ROAD ELEVATION
TOP OF WATERMAIN ELEVATION	~~87.98~~	~~87.79~~	87.78 ~~87.9~~	87.77 ~~87.90~~	87.85 ~~87.93~~ HYD	~~87.89~~	~~87.69~~			TOP OF WATERMAIN ELEVATION
STORM SEWER INVERT			89.75 ~~86.75~~ 86.75	86.75 ~~86.75~~ 86.75	81.4 ~~86m-825ø STM @0.16%~~ 0.21% CONC.CL.III					STORM SEWER INVERT
SANITARY SEWER INVERT			88.62 ~~88.63~~ 88.53 88.62		84.2 ~~86m-750ø SAN @0.15%~~ 0.08% CONC.CL.V					SANITARY SEWER INVERT
EXISTING ℄ R.O.W. ELEVATION	89.00		88.90		89.00					EXISTING ℄ R.O.W. ELEVATION
CHAINAGE	1+520 VPI	1+525	1+540	1+550	1+554.30 MH 1+564.8 MH	1+560 VPI/MH	1+567	1+575	1+580	CHAINAGE

NOTE:
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No.	REVISION	DATE	BY
10	ISSUED TO THE CITY OF NEPEAN	JAN.30/96	JFB
9	AS-BUILTS AS PER NEPEAN COMMENTS	MAY 04/93	JFB
8	AS-BUILTS AS PER NEPEAN COMMENTS	MAR.26/93	JFB
7	WATERMAIN OFFSET 4.0m	APR.20/92	UB
6	REVISED AS PER NEPEAN COMMENTS	FEB.14/92	SG
5	REVISED AS PER NEPEAN COMMENTS	FEB.3/92	SG
4	REVISED AS PER R.M.O.C. COMMENTS	JAN.17/92	SG
3	ISSUED FOR TENDER	JAN.15/92	SG
2	REVISED AS PER R.M.O.C. COMMENTS	DEC.9/91	SG
1	REVISED AS PER NEPEAN COMMENTS	NOV.28/91	SG

LICENSED PROFESSIONAL ENGINEER S.M. GORDON PROVINCE OF ONTARIO

LICENSED PROFESSIONAL ENGINEER UDO BOEHME PROVINCE OF ONTARIO

NOVATECH
ENGINEERING CONSULTANTS LTD
OTTAWA, ONTARIO

DESIGN	UB/JFB
CHECKED	UB
DRAWN	JFB
CHECKED	UB
APPROVED	JGR

SCALE
1:500 HORIZONTAL (0 5 10 15 20)
1:50 VERTICAL (0 0.5 1.0 1.5 2.0)

NEPEAN

SOUTH MERIVALE BUSINESS PARK
AS-BUILTS

PLAN AND PROFILE (LEIKIN DRIVE)

STREET A - STATION 1+275 TO 1+575

PROJECT No. 94031
FIELD BOOK
DATE JANUARY 1996
DRAWING No. 94031-P2

Jan 31, 1996 - 14:48:5 DWG Name: D:\NOVA\94031\94031P2.DWG Updated By: JFB

NOTE:
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.

EX. STORM MANHOLE DATA

No.	STATION	TYPE	EXISTING T/G ELEVATION	PROPOSED T/G ELEVATION
114	4+003.0	1650x2400 M6	89.88	89.88
131	4+034.1	1650x2400 M6	89.53	89.53
132	4+062.79	1650x2400 M6	89.42	89.35
133	4+142.74	1650x2400 M6	89.35	89.41
134	4+235.69	2400x2400 M8	89.27	88.94

EX. SANITARY MANHOLE DATA

No.	STATION	TYPE	EXISTING T/G ELEVATION	PROPOSED T/G ELEVATION
14	4+000	1200x200 M4	89.96	89.96
31	4+032.25	1200ø OPSD 701.01	89.62	89.62
32	4+061.32	1200ø OPSD 701.01	89.45	89.46
33	4+140.25	1200ø OPSD 701.01	89.45	89.49
34	4+234.19	1200ø OPSD 701.01	89.37	89.04
MH 14		DROP OPSD 1003.01M		

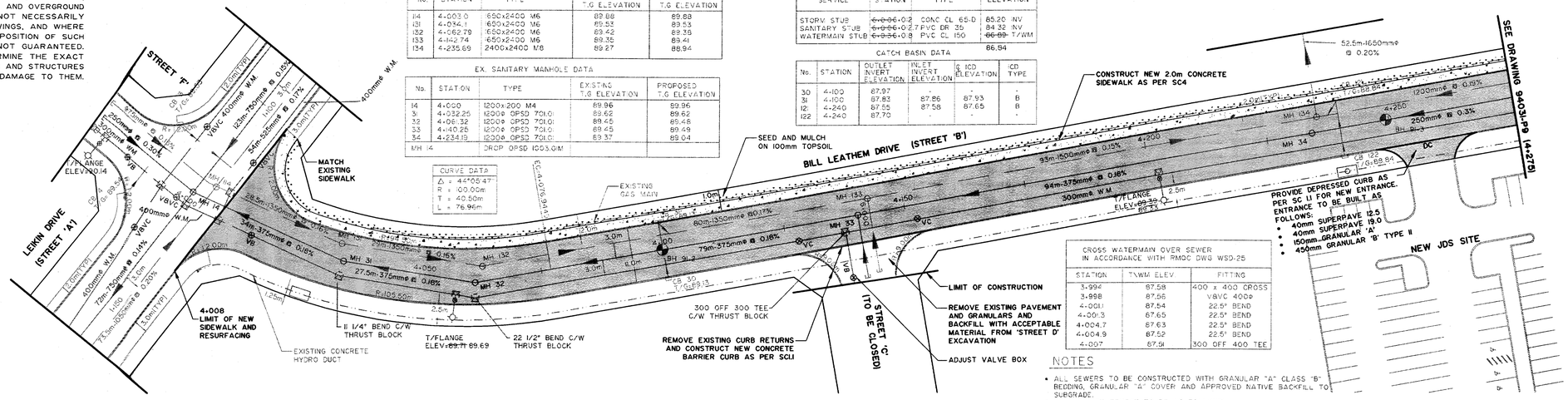
CURVE DATA
Δ = 44°56'47"
R = 40.00m
T = 40.50m
L = 76.96m

STREET 'C' DATA

SERVICE	STATION	TYPE	ELEVATION
STORM STUB	~~4+000.0~~ 4+012	CONC CL 65-D	85.20 INV
SANITARY STUB	~~4+000.0~~ 4+027	PVC DR 35	84.32 INV
WATERMAIN STUB	~~4+036.0~~ 4+018	PVC CL 150	~~86.89~~ T/WM 86.84

CATCH BASIN DATA

No.	STATION	OUTLET INVERT ELEVATION	INLET INVERT ELEVATION	G ICD ELEVATION	ICD TYPE
30	4+100	87.97	-	-	-
31	4+100	87.83	87.86	87.93	B
12	4+240	87.55	87.58	87.65	B
122	4+240	87.70	-	-	-



CROSS WATERMAIN OVER SEWER IN ACCORDANCE WITH RMOC DWG WSD-25

STATION	TWM ELEV.	FITTING
3+996	87.58	400 x 400 CROSS VALVE 4008
3+998	87.56	
4+001	87.54	22.5° BEND
4+003	87.65	22.5° BEND
4+004.7	87.63	22.5° BEND
4+004.9	87.52	22.5° BEND
4+007	87.51	300 OFF 400 TEE

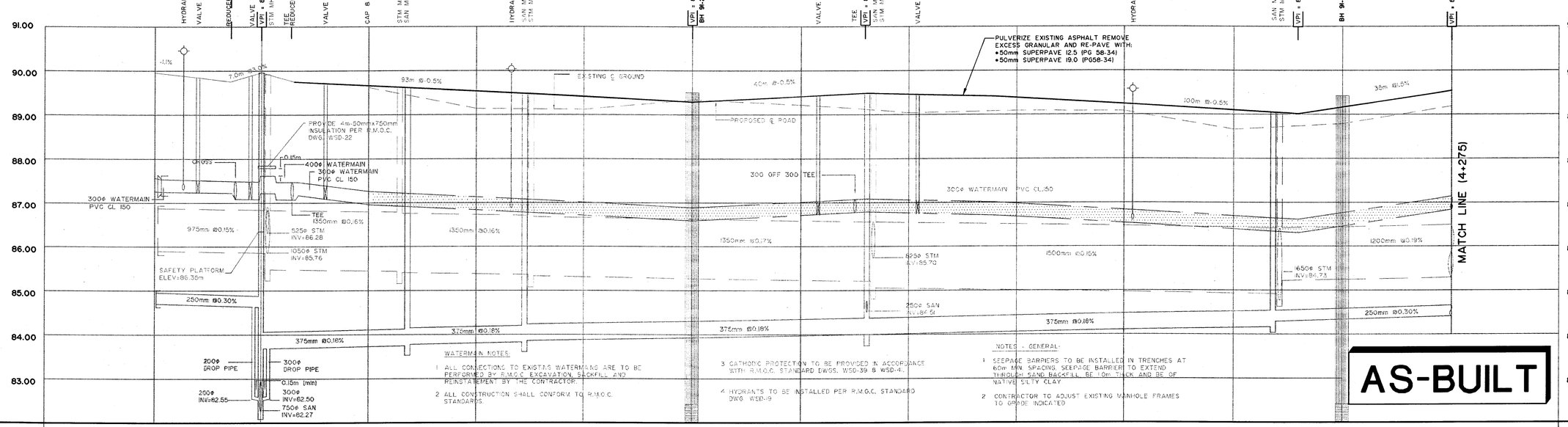
NOTES
- ALL SEWERS TO BE CONSTRUCTED WITH GRANULAR 'A' CLASS 'B' BEDDING, GRANULAR 'A' COVER AND APPROVED NATIVE BACKFILL TO SUBGRADE.
- ROAD REINSTATEMENT TO BE AS FOLLOWS:
  STREET A 40mm HL 4
  45mm HL 8
  150mm GRANULAR 'A'
  600mm GRANULAR 'B'

  STREET B 50mm HL 4
  150mm GRANULAR 'A'
  550mm GRANULAR 'B'

SURFACE TREATMENTS
- ASPHALT
- CONCRETE
- SEED AND MULCH ON 100mm TOPSOIL

BOREHOLE LEGEND
- SILTY CLAY
- CLAYEY SILT
- GLACIAL TILL

BOREHOLE DATA FROM FONDEX LTD. REPORT NO. 0-A756-A, NOVEMBER, 1991



℄ ROAD ELEVATION		89.86	89.75	89.96	89.75	EX.CAP 89.66	89.54	89.41	89.29	89.41	89.49	89.44	89.32	89.19	89.07	89.01	89.16	89.54	℄ ROAD ELEVATION
TOP OF WATERMAIN ELEVATION		87.53 87.50 HYD	87.44 VALVE 87.58 REDUCER CROSS	87.56 VBVC 87.55 BEND	87.58 TEE REDUCER	87.31 VBVC 87.29 ~~87.30~~	87.12	~~87.14~~	87.08 ~~87.09~~ 87.05	87.03 ~~87.04~~ 86.95	86.95	86.97 ~~86.99~~	~~87.01~~ 87.05 86.88 87.04 ~~87.07~~ 87.09	87.05 ~~87.06~~ 87.08 87.09	86.92	~~86.98~~ 86.80	86.89	~~86.79~~ ~~86.82~~ 86.70	86.75	~~86.67~~	86.59 ~~86.61~~	~~89.15~~ 89.86 106.6m-1200ø STM ø0.15% ~~EX.9.0m-1200ø STM ø0.19%~~ CONC.CL.65D	~~87.14~~ 87.17	TOP OF WATERMAIN ELEVATION
STORM SEWER INVERT	85.88	~~23.5m~~ - 975ø STM ~~ø0.15%~~ 0.13% CONC.CL.650	85.85 ~~86.04~~ 86.04 ~~85.45~~ 85.45	28.2m ~~28.5m~~ 1350ø STM ~~ø0.16%~~ 0.21% CONC.CL.650	85.49 ~~85.41~~ 85.41	31.2m ~~29m~~ 1350ø STM ~~ø0.16%~~ 0.26% CONC.CL.650	85.37 ~~85.34~~ 85.34	77.1m ~~80.0~~ 1350ø STM ~~ø0.17%~~ 0.25% CONC.CL.650	85.13 ~~85.17~~ 85.17 ~~85.05~~ 85.05	93.4m ~~93m~~ 1500ø STM ~~ø0.15%~~ 0.35% CONC.CL.650	84.72 ~~84.99~~ 84.99 ~~85.03~~ 85.03	84.54 ~~84.69~~ 84.69	84.05	106.9m-250ø SAN ø0.27% ~~EX.11m-250ø SAN ø0.3%~~ PVC SDR 35	STORM SEWER INVERT
SANITARY SEWER INVERT	84.44 ~~84.74~~	21.4m-250ø SAN ~~ø0.30%~~ 0.37% PVC SDR 35	84.36 ~~84.66~~ 84.69	35.5m ~~34m~~-375ø SAN ~~ø0.18%~~ 0.25% CONC.CL.IV	83.78 ~~83.76~~ 83.80	27.1m ~~27.6m~~-375ø SAN ø0.18% 0.20% CONC.CL.IV	83.84 ~~83.86~~ 83.89	78.1m ~~79m~~-375ø SAN ~~ø0.18%~~ 0.20% CONC.CL.IV	84.05 ~~84.00~~ 84.00 84.06	93m ~~94m~~-375ø SAN ~~ø0.18%~~ 0.17% CONC.CL.IV	84.22 ~~84.17~~ 84.17 84.25	~~84.29~~ 84.29	84.53 ~~84.62~~ 84.62		SANITARY SEWER INVERT
EXISTING ℄ R.O.W. ELEVATION	89.95	89.76	89.96	89.75	89.62	89.14	89.12	89.34	89.22	89.04	89.09	89.08	88.66	88.79	89.19	EXISTING ℄ R.O.W. ELEVATION
CHAINAGE	3+975 3+976 3+978 3+981 3+983 3+985	VPI 3+992 3+994 3+998	4+000 VPI/SAN 4+003 STM	4+007 VPI 4+008	4+017	4+025	4+032.25 SAN/BEND 4+034.11 STM	4+050	4+057 HYD 4+061.32 SAN/BEND 4+062.79 STM	4+075	4+085	4+100 VPI	4+110	4+125	4+127.25 VC	4+137.25 TEE SAN/VPI 4+140.25 4+142.74 STM	4+150 VC 4+152	4+165	4+175	4+180	4+195	4+200 HYD 4+202	4+220	4+225	4+234.19 SAN 4+235.69 STM	4+240 VPI	4+245.2 SAN/STUB 4+248.4 STM/STUB	4+250	4+255	4+275 VPI	CHAINAGE

23	AS-BUILT	FEB 6/08	DHI	No.	REVISION	DATE	BY	8	REVISED AS PER R.M.O.C. COMMENTS	JUNE 01/92	JFB	DESIGN	UB/JFB	SCALE	1:500 0 5 10 15 20 HORIZONTAL 1:50 0 0.5 1.0 1.5 2.0 VERTICAL	NEPEAN	PROJECT No.	94031
22	ISSUED FOR CONSTRUCTION SIDEWALK & NEW PAVEMENT	JUL 20/07	DHI	15	STREET NAMES ADDED	FEB 27/95	AR	7	WATERMAIN OFFSET 4.0m	APR.20/92	UB	CHECKED	UB			SOUTH MERIVALE BUSINESS PARK	FIELD BOOK	
21	ISSUED AS PART OF WATER PERMIT, ST. D	JUL 13/07	DHI	14	CB 30/31 - NOTES - AS BUILT	FEB 13/95	AR	6	REVISED AS PER NEPEAN COMMENTS	FEB.14/92	SG	DRAWN	JFB				DATE	JANUARY 1996
20	ISSUED FOR TENDER	JUN 25/07	RSC	13	REVISIONS AS PER CITY OF NEPEAN	NOV 22/94	AR	5	REVISED AS PER NEPEAN COMMENTS	FEB.3/92	SG	CHECKED	UB			PLAN AND PROFILE (BILL LEATHAM DRIVE)	DRAWING No.	
19	GENERAL REVISIONS/ISSUED TO CITY OF OTTAWA	JUN 12/07	RSC	12	REVISIONS - CONTRACT 1994	AUG 10/94	AR	4	REVISED AS PER R.M.O.C. COMMENTS	JAN.17/92	SG	APPROVED	JGR			STREET B - STATION 3+975 TO 4+275		94031-P8
18	ISSUED TO THE CITY OF NEPEAN	JAN 10/96	JFB	11	ISSUED FOR APPROVAL	JULY 22/94	AR	3	ISSUED FOR TENDER	JAN.15/92	SG							
17	AS-BUILT SEWERS AND WATERMAIN	JAN 10/96	JFB	10	REVISED AS PER R.M.O.C. COMMENTS	NOV 20/92	JFB	2	REVISED AS PER NEPEAN COMMENTS	DEC.9/91	SG							
16	ISSUED FOR TENDER	03.04.95	AR	9	ISSUED FOR M.O.E. APPROVAL	SEPT.17/92	UB	1	REVISED AS PER NEPEAN COMMENTS	NOV.28/91	SG							

LICENCED PROFESSIONAL ENGINEER R.S. CEBRYK PROVINCE OF ONTARIO

NOVATECH ENGINEERING CONSULTANTS LTD.
ENGINEERS & PLANNERS
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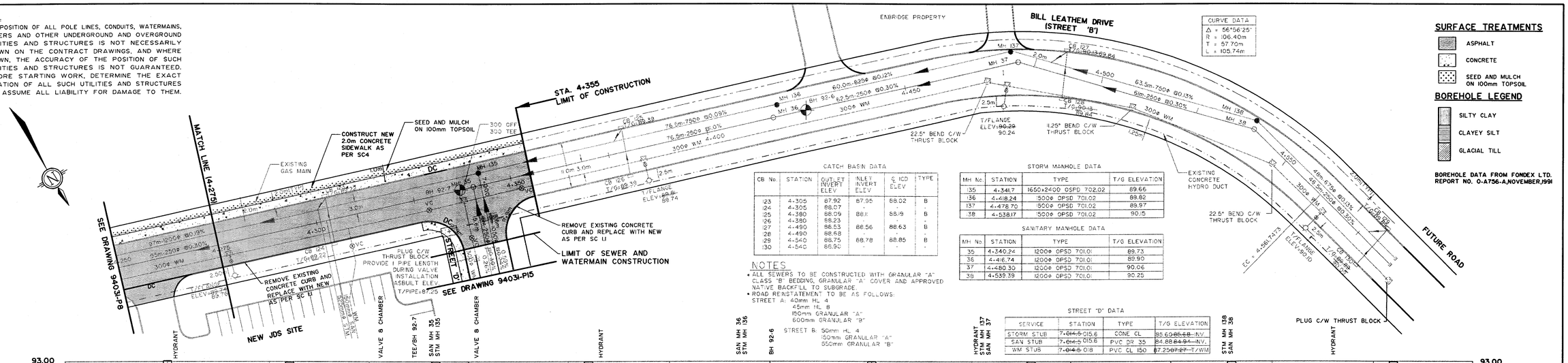
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Email: novainfo@novatech-eng.com

14160

Drawing M:\2007\07045\CAD\design\tabuilt\94031P8.DWG Layout:PLOT SETUP Updated JUN 02, 2008 at 9:45am by corom
2007\07045\CAD\design\tabuilt\94031P8.DWG, PLOT SETUP: 6/2/2008 9:21:20 AM, corom, Xerox EQ myfair.pc3, A1, 1:1

NOTE:
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.



CATCH BASIN DATA

CB No.	STATION	OUTLET INVERT ELEV	INLET INVERT ELEV	G ICD ELEV	TYPE
123	4+305	87.92	87.95	88.02	B
124	4+305	88.07	-	-	-
125	4+380	88.09	88.11	88.19	B
126	4+380	88.23	-	-	-
127	4+490	88.53	88.56	88.63	B
128	4+490	88.68	-	-	-
129	4+540	88.75	88.78	88.85	B
130	4+540	88.90	-	-	-

NOTES
- ALL SEWERS TO BE CONSTRUCTED WITH GRANULAR "A" CLASS "B" BEDDING, GRANULAR "A" COVER AND APPROVED NATIVE BACKFILL TO SUBGRADE.
- ROAD REINSTATEMENT TO BE AS FOLLOWS:
  STREET A: 40mm HL 4
  45mm HL 8
  150mm GRANULAR "A"
  600mm GRANULAR "B"
  STREET B: 50mm HL 4
  150mm GRANULAR "A"
  550mm GRANULAR "B"

STORM MANHOLE DATA

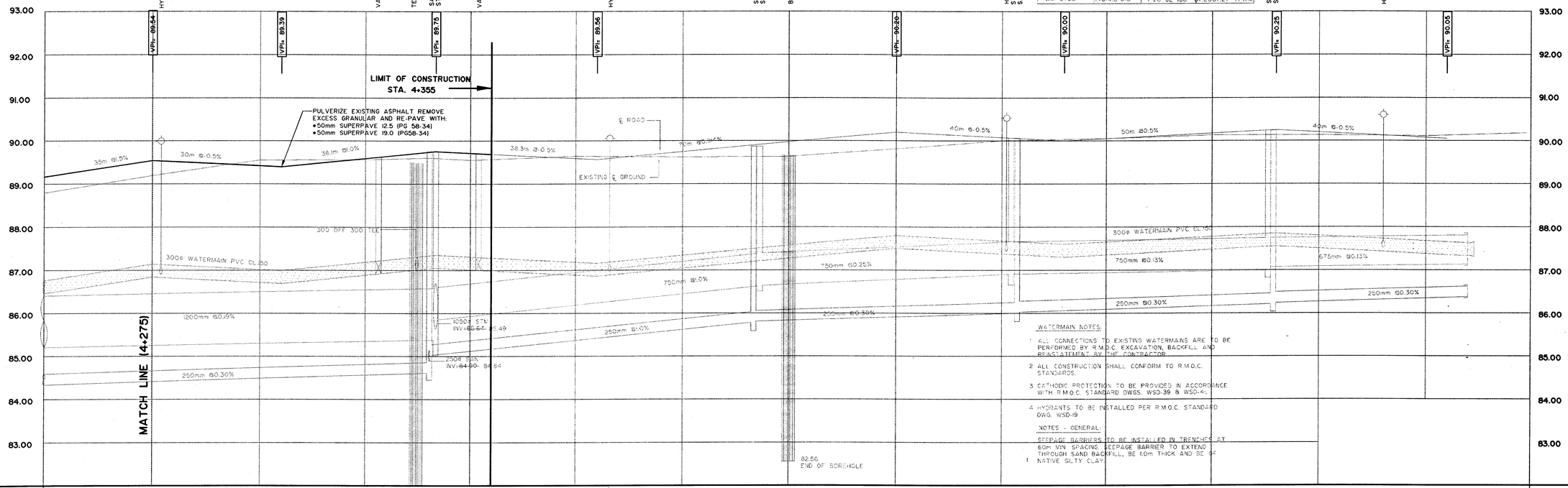
MH No.	STATION	TYPE	T/G ELEVATION
135	4+341.7	1650x2400 OSPD 702.02	89.66
136	4+418.24	1500ø OPSD 701.02	89.82
137	4+478.70	1500ø OPSD 701.02	89.97
138	4+538.17	1500ø OPSD 701.02	90.15

SANITARY MANHOLE DATA

MH No.	STATION	TYPE	T/G ELEVATION
35	4+340.24	1200ø OPSD 701.01	89.73
36	4+416.74	1200ø OPSD 701.01	89.90
37	4+480.30	1200ø OPSD 701.01	90.06
38	4+539.39	1200ø OPSD 701.01	90.25

STREET "D" DATA

SERVICE	STATION	TYPE	T/G ELEVATION
STORM STUB	7+014.5 015.6	CONE CL	85.60 85.68 INV.
SAN STUB	7+014.5 015.6	PVC DR 35	84.88 84.94 INV.
WM STUB	7+014.5 018	PVC CL 150	87.25 87.27 T/WM



℄ ROAD ELEVATION	89.16	89.54	89.42	89.39	89.59	89.75	89.71	89.58	89.56	89.74	89.97	90.20	90.08	90.00	90.05	90.17	90.25	90.20	90.08	90.05	90.08	℄ ROAD ELEVATION
TOP OF WATERMAIN ELEVATION	~~86.76~~	~~87.17~~ ~~87.11~~ 87.19	~~87.02~~	~~86.99~~ 87.00	~~87.19~~ ~~87.24~~ 87.15	~~87.29~~ ~~87.35~~ ~~87.30~~ 87.34	~~87.31~~ ~~87.30~~ 87.29	~~87.21~~	~~87.18~~	~~87.24~~ ~~87.26~~ ~~87.19~~ 87.20	~~87.30~~	~~87.34~~	~~87.41~~	~~87.57~~ 87.56	~~87.69~~ 87.63	~~87.75~~	~~87.73~~ ~~87.70~~ 87.66	~~87.80~~	~~87.65~~	~~87.70~~	~~87.77~~	~~87.80~~ ~~87.85~~	~~87.81~~ ~~87.80~~	~~87.73~~ 87.76	~~87.68~~	~~87.69~~ 86.87 86.14 87.64	TOP OF WATERMAIN ELEVATION
STORM SEWER INVERT		106.6m 97m-1200ø STM @0.19% CONC. CLASS 65 D 0.15%				85.19 85.09 85.71			76.8m 76.6m-750ø STM @1.0% CONC. CLASS 65 D 1.12%				86.57 86.66 86.63		59.5m 60.0m-750ø STM @0.25% CONC. CLASS 65 D 0.24%		86.77 86.91 86.88		63.7m 63.6m-750ø STM @0.13% CONC. CLASS 65 D 0.18%		86.93 87.00 87.00		49.6m 48m-675ø STM @0.13% CONC. CLASS 65 D 0.12%	87.10 87.06	STORM SEWER INVERT
SANITARY SEWER INVERT		106.9m 98m-250ø SAN @0.30% PVC DR 35 0.27%				84.54 84.60 85.00 84.92			76.7m 76.6m-250ø SAN @1.0% PVC DR 35 1.03%				85.71 85.78 85.74		62.8m 62.6m-250ø SAN @0.30% PVC DR 35 0.32%		86.94 87.00 86.98		61.3m 61m-250ø SAN @0.30% PVC DR 35 0.28%		86.15 86.21 86.24 86.22		47.2m 46.5m-250ø SAN @0.30% PVC DR 35 0.30%	86.36 86.37	SANITARY SEWER INVERT
EXISTING ℄ R.O.W. ELEVATION	88.79	89.19	89.55		89.56		89.55	89.64		89.62		88.63	89.81	90.03		90.08		90.13		90.13	90.11		EXISTING ℄ R.O.W. ELEVATION
CHAINAGE		VPI HYD 4+275 4+277		4+300	VPI 4+305	VBVC 4+325 4+330.2	TEE/BH 4+337.2	SAN 4+340.24 STM 4+341.7 VPI/STM	VBVC 4+350 4+352	4+365	VPI 4+375	HYD 4+380 4+383	4+395 4+400 4+410	SAN 4+418.74 STM 4+418.24	BH 4+425	VPI 4+450	4+465	BEND 4+472	LTD 4+475.3 VPI/BEND 4+478.2	VPI 4+490	BEND 11.25° 4+500 4+509	4+525	STM 4+538.17 SAN 4+539.39 VPI/BEND 4+540	4+548 BEND 4+550	HYD 4+565	VPI 4+575	4+580 4+505 4+587.6 STM STUB 4+586.6 SAN STUB 4+588 WM CAP	CHAINAGE

No.	REVISION	DATE		No.	REVISION	DATE	BY	No.	REVISION	DATE	BY
				16	GENERAL REVISIONS/ISSUED TO CITY OF OTTAWA	JUN. 12/07	RSC	7	REVISED AS PER CITY OF NEPEAN COMMENTS	10.08.94	AR
				13	ISSUED TO HYDRO OTTAWA	FEB.27/07	RSC	6	REVISION - CONTRACT 1994	10.08.94	AR
20	AS-BUILT	FEB 6/08	DHI	12	ISSUED TO THE CITY OF NEPEAN	JAN.10 /96	JFB	5	ISSUED FOR APPROVAL	22.07.94	AR
19	ISSUED FOR CONSTRUCTION - SIDEWALK & NEW PAVEMENT	JULY 20/07	DHI	11	ASBUILT SEWER AND WATERMAIN	JAN.10 /96	JFB	4	REVISIONS TO ROAD GRADES WATERMAIN	13.07.94	AR
				10	ISSUED FOR TENDER	03-04-95	AR	3	REVISED AS PER R.M.O.C. COMMENTS	01.11.92	JFB
18	ISSUED AS PART OF WATER PERMIT, ST. D	JULY 13/07	DHI	9	STREET NAMES ADDED	27/02/95	AR	2	ISSUED FOR M.O.E. APPROVAL	17.09.92	UB
17	ISSUED FOR TENDER	JUNE 25/07	RSC	8	REVISION TO STM SEWER & NOTES	13/02/95	AR	1	REVISED AS PER R.M.O.C. COMMENTS	01.06.92	JFB

LICENSED PROFESSIONAL ENGINEER
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Facsimile (613) 254-5867
Email: novainfo@novatech-eng.com

DESIGN	UB/JFB
CHECKED	UB
DRAWN	JFB
CHECKED	UB
APPROVED	JGR

SCALE
1:500 HORIZONTAL
0 5 10 15 20
1:50 VERTICAL
0 0.5 1.0 1.5 2.0

NEPEAN
SOUTH MERIVALE BUSINESS PARK
PLAN AND PROFILE (BILL LEATHAM DRIVE)
STREET B - STATION 4+275 TO 4+600

PROJECT No.	9403I
FIELD BOOK	
DATE	JANUARY 1996
DRAWING No.	9403I-P9

14160

STORM MANHOLE DATA

MH No.	STATION	TYPE	T/G ELEVATION
135	6+997	1650x2400 M6	89.66
158	7+108.52	1800ϕ OPSD 701.012	90.02
159	7+195.37	1800ϕ OPSD 701.012	89.94
160	7+242.52	1800ϕ OPSD 701.012	89.98

SANITARY MANHOLE DATA

MH No.	STATION	TYPE	T/G ELEVATION
35	7+000	1200ϕ OPSD 701.010	89.73
58	7+110	1200ϕ OPSD 701.010	88.97
59	7+196.96	1200ϕ OPSD 701.010	89.98
60	7+241.20	1200ϕ OPSD 701.010	90.02

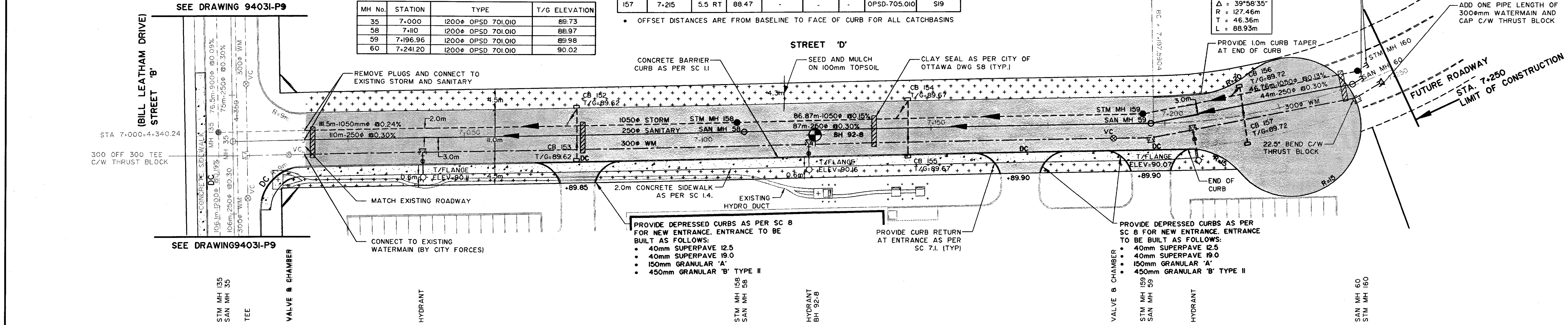
CATCH BASIN DATA

MH No.	STATION	OFFSET (m)	OUTLET INVERT ELEV	INLET INVERT ELEV	℄ ICD ELEV	TYPE	STRUCTURE TYPE	COVER
152	7+075	5.5 LT	88.25	88.35	88.35	B	OPSD-705.010	S22,S23
153	7+075	5.5 RT	88.47	-	-	-	OPSD-705.010	S19
154	7+145	5.5 LT	88.30	88.40	88.40	B	OPSD-705.010	S22,S23
155	7+145	5.5 RT	88.52	-	-	-	OPSD-705.010	S22,S23
156	7+215	5.5 LT	88.25	88.35	88.35	B	OPSD-705.010	S19
157	7+215	5.5 RT	88.47	-	-	-	OPSD-705.010	S19

- OFFSET DISTANCES ARE FROM BASELINE TO FACE OF CURB FOR ALL CATCHBASINS

CURVE DATA

Δ = 39°58'35"
R = 127.46m
T = 46.36m
L = 88.93m



WATERMAIN DATA

STATION	T/WM ELEV.	FITTING
7+019	87.28	COUPLING
7+041	87.51	HYDRANT
7+124	87.57	HYDRANT
7+188	87.56	VALVE & CHAMBER
7+196.96	87.61	11.25° HORIZONTAL BEND
7+206	87.58	HYDRANT
7+242	87.62	22.5° HORIZONTAL BEND
7+247.5	87.57	CAP

WATERMAIN NOTES:

1 ALL CONNECTIONS TO EXISTING WATERMAINS ARE TO BE PERFORMED BY CITY OF OTTAWA FORCES. EXCAVATION, BACKFILL AND REINSTATEMENT BY THE CONTRACTOR.

2 ALL CONSTRUCTION SHALL CONFORM TO CITY OF OTTAWA STANDARDS.

3 CATHODIC PROTECTION TO BE PROVIDED IN ACCORDANCE WITH CITY OF OTTAWA STANDARD DWGS. W40 AND W42.

4 HYDRANTS TO BE INSTALLED PER CITY OF OTTAWA STANDARD DWG. W19.

5 SEEPAGE BARRIERS TO BE INSTALLED IN TRENCHES AT 60m MIN. SPACING. SEEPAGE BARRIER TO EXTEND THROUGH SAND BACKFILL, BE 1.0m THICK AND BE OF NATIVE SILTY CLAY.

SURFACE TREATMENTS

- ASPHALT
- GRANULAR
- SEED AND MULCH ON 100mm TOPSOIL
- CONCRETE

BOREHOLE LEGEND

- SILTY CLAY
- CLAYEY SILT
- GLACIAL TILL

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No.	REVISION	DATE	BY
12	AS-BUILT	FEB 6/08	DHI
11	ISSUED FOR CONSTRUCTION	JULY 20/07	DHI
10	ISSUED FOR WATER PERMIT	JULY 13/07	DHI
9	ISSUED FOR TENDER	JUNE 25/07	RSC
8	GENERAL REVISIONS/ISSUED TO CITY OF OTTAWA	JUNE 12/07	RSC
7	ISSUED TO HYDRO OTTAWA	APR.20/07	RSC
6	ISSUED TO HYDRO OTTAWA	FEB.27/07	RSC
5	ISSUED TO THE CITY OF NEPEAN	JAN.10/96	JFB
4	REVISIONS TO ROAD GRADES	13.7.94	AR
3	REVISED AS PER R.M.O.C. COMMENTS	01.11.92	JFB
2	ISSUED FOR M.O.E. APPROVAL	17.09.92	UB
1	REVISED AS PER R.M.O.C. COMMENTS	01.06.92	JFB

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R.S. CEBRYK
June 2/08
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Email: novainfo@novatech-eng.com

DESIGN	UB/JFB
CHECKED	UB
DRAWN	JFB
CHECKED	UB
APPROVED	JGR

SCALE
HORIZONTAL 1:500 (0 5 10 15 20)
VERTICAL 1:50 (0 0.5 1.0 1.5 2.0)

NEPEAN
SOUTH MERIVALE BUSINESS PARK

PLAN AND PROFILE
STREET D - STATION 7+000 TO 7+250

PROJECT No. 94031
FIELD BOOK
DATE JANUARY 1996
DRAWING No. 94031-P15

14160

Canada Post Corporation - 50 Leikin Drive DEVELOPMENT SERVICING STUDY CHECKLIST	
REFERENCED STUDIES AND REPORTS	**REFERENCE**
Site Servicing Report for Canada Post Corporation, 50 Leikin Drive (J.L. Richards & Associates Limited, Revision 1 dated June 16, 2023)	SSR
Geotechnical Investigation Report, Proposed CPC Processing Centre, 50 Leikin Drive - Ottawa, Ontario Report Number (WSP) - OESA02132, dated December 2, 2022	GEO1
Geotechnical Investigation Factual Report – Revision 3, Proposed CPC Processing Centre, 50 Leikin Drive - Ottawa, Ontario Report Number (WSP) - OESA02132, dated June 13, 2023	GEO2
Stormwater Management Report, South Merivale Business Park – City of Nepean, Novatech Engineering Consultants, dated November 1, 1991 (Revised December 3, 1991)	NOV1
Services Design Report, South Merivale Business Park Phase II and III – City of Nepean, Novatech Engineering Consultants, dated June 23, 1992	NOV2

4.1	GENERAL CONTENT	REFERENCE
☐	Executive Summary (for larger reports only).	N/A
☒	Date and revision number of the report.	SSR (Title Page)
☒	Location map and plan showing municipal address, boundary, and layout of proposed development.	SSR (Figure 1)
☒	Plan showing the site and location of all existing services.	SSR (Figure 2, Appendix A)
☒	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	SSR (Sect. 1.2)
☒	Summary of Pre-consultation Meetings with City and other approval agencies.	SSR (Appendix A)
☒	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	SSR (4.0)
☒	Statement of objectives and servicing criteria.	SSR (Sect. 2.1, 3.1, 3.2, 4.1, 4.2)

☒	Identification of existing and proposed infrastructure available in the immediate area.	SSR (Sect. 1.3, 1.4)
☐	Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	N/A
☒	Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Grading Plan (G1) Ponding Plans (SWM) Drainage Plan (DST)
☐	Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
☐	Proposed phasing of the development, if applicable.	N/A
☒	Reference to geotechnical studies and recommendations concerning servicing.	GEO1, GEO2
☒	All preliminary and formal site plan submissions should have the following information: ▪ Metric scale ▪ North arrow (including construction North) ▪ Key plan ▪ Name and contact information of applicant and property owner ▪ Property limits, including bearings and dimensions ▪ Existing and proposed structures and parking areas ▪ Easements, road widening and rights-of-way ▪ Adjacent street names	All Drawings

4.2	**DEVELOPMENT SERVICING REPORT: WATER**	**REFERENCE**
☒	Confirm consistency with Master Servicing Study, if available.	NOV2
☒	Availability of public infrastructure to service proposed development.	SSR (Sect. 1.4, 2.4) Site Servicing Plan (S1)
☒	Identification of system constraints.	SSR (Sect. 2.0)
☒	Identify boundary conditions.	SSR (Sect. 2.4)
☒	Confirmation of adequate domestic supply and pressure.	SSR (Sect. 2.5, Appendix B)
☒	Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	SSR (Sect. 2.4, 2.5, Appendix B)
☒	Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	SSR (Sect. 2.5)

☐	Definition of phasing constraints. Hydraulic modelling is required to confirm servicing for all defined phases of the project, including the ultimate design.	N/A
☒	Address reliability requirements, such as appropriate location of shutoff valves.	Site Servicing Plan (S1)
☒	Check on the necessity of a pressure zone boundary modification.	SSR (2.4)
☒	Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range.	SSR (Sect. 2.0)
☒	Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants), including special metering provisions.	SSR (Sect. 2.0) Site Servicing Plan (S1)
☐	Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
☒	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	SSR (Sect. 2.2)
☒	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	SSR (Appendix B Hazen-Williams Calculations)

4.3	**DEVELOPMENT SERVICING REPORT: WASTEWATER**	**REFERENCE**
☒	Summary of proposed design criteria (Note: Wet weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	SSR (Sect. 3.2)
☒	Confirm consistency with Master Servicing Study and/or justifications for deviations.	SSR (Sect. 3.0)
☐	Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the Guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A
☒	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	SSR (Sect. 1.4, 3.1, Appendix C)

☒	Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable.)	SSR (Sect. 3.3)
☒	Calculations related to dry weather and wet weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	SSR (Appendix C)
☒	Description of proposed sewer network, including sewers, pumping stations and forcemains.	SSR (Sect. 3.4, Appendix C)
☒	Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	NOV2
☐	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
☐	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
☐	Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
☐	Special considerations, such as contamination, corrosive environment, etc.	N/A

4.4	**DEVELOPMENT SERVICING REPORT: STORMWATER**	**REFERENCE**
☒	Description of drainage outlets and downstream constraints, including legality of outlets (i.e., municipal drain, right-of-way, watercourse, or private property).	SSR (Sect. 4.0)
☒	Analysis of available capacity in existing public infrastructure.	SSR (Sect. 1.3)
☒	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Drainage Plan (DST)
☒	Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected sub watersheds, taking into account long-term cumulative effects.	SSR (Sect. 4.2, 4.3)

☒	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	SSR (Sect. 4.4)
☒	Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	SSR (Sect. 4) S1, DST
☐	Setback from private sewage disposal systems.	N/A
☐	Watercourse and hazard lands setbacks.	N/A
☒	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	MECP Contacted Conservation Authority Not Required
☒	Confirm consistency with subwatershed and Master Servicing Study, if applicable study exists.	NOV1
☒	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:2 year return period) and major events (1:100 year return period).	SSR (Sect. 4, Appendix E)
☐	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A
☒	Calculate pre- and post-development peak flow rates, including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	SSR (Sect. 4, Appendix E)
☐	Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
☒	Proposed minor and major systems, including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Site Servicing Plan (S1) Ponding Plans (SWM) Appendix E
☐	If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A
☒	Identification of potential impacts to receiving watercourses.	SSR (Sect 4.0)
☐	Identification of municipal drains and related approval requirements.	N/A
☒	Description of how the conveyance and storage capacity will be achieved for the development.	SSR (Sect. 4.3)
☒	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	SSR (Sect. 4.3) Site Servicing Plan (S1) Ponding Plans (SWM) Appendix E

☒	Inclusion of hydraulic analysis, including hydraulic grade line elevations.	SSR (Sect. 4.3, Appendix E)
☒	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	SSR (Sect. 5.0) Grading and Erosion & Sediment Control Plan (G1)
☐	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
☒	Identification of fill constraints related to floodplain and geotechnical investigation.	GEO1 and GEO2

4.5	**APPROVAL AND PERMIT REQUIREMENTS**	**REFERENCE**
The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development, as well as the relevant issues affecting such approval. The approval and permitting shall include but not be limited to the following:		
☐	Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams, as defined in the Act.	N/A
☐	Application for Environmental Compliance Approval (ECA) under the Ontario Water Resources Act.	N/A
☐	Changes to Municipal Drains.	N/A
☐	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation, etc.).	N/A

4.6	**CONCLUSION CHECKLIST**	**REFERENCE**
☒	Clearly stated conclusions and recommendations.	SSR (Sect. 3.4, 4.5)
☐	Comments received from review agencies, including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	N/A
☒	All draft and final reports shall be signed and stamped by a Professional Engineer registered in Ontario.	SSR, Drawings

Appendix B

Water

Water Demand Calculations
CPC Ottawa Processing Centre
(JLR 31940-000)

Light Industrial (Site Area)		
Area	8.97	ha
Average Day Consumption Rate	35000	L/ha/d
Average Day Demand	**3.63**	**L/s**
Maximum Day Peaking Factor	1.50	City of Ottawa
Maximum Day Demand	**5.45**	**L/s**
Peak Hour Peaking Factor	1.80	City of Ottawa
Peak Hour Demand	**9.81**	**L/s**

FUS Fire Flow Calculations

CPC Ottawa Processing Centre - Industrial Building

(JLR 31940-000)

Step	Parameter	Value		Note
A	Type of Construction	Non-combustible		
	Coefficient (C)	0.8		
B	Ground Floor Area	23530	m^2	
C	Height in storeys	1	storeys	
	Total Floor Area	23530	m^2	
D	Fire Flow Formula	$F=220C\sqrt{A}$		
	Fire Flow	26998	L/min	
	Rounded Fire Flow	27000	L/min	Flow rounded to nearest 1000 L/min.
E	Occupancy Class	Free Burning		Residential buildings have a limited combustible occupancy.
	Occupancy Charge	15%		
	Occupancy Increase or Decrease	4050		
	Fire Flow	31050	L/min	No rounding applied.
F	Sprinkler Protection	Automatic Fully Supervised		
	Sprinkler Credit	-50%		
	Decrease for Sprinkler	-15525	L/min	
G	*North Side Exposure*			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	0.0	m	
	Height of Exposed Wall:	0	storeys	
	Length-Height Factor	0.0	m-storeys	
	Separation Distance	50	m	
	North Side Exposure Charge	0%		
	East Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	0.0	m	
	Height of Exposed Wall:	0	storeys	
	Length-Height Factor	0.0	m-storeys	
	Separation Distance	50	m	
	East Side Exposure Charge	0%		
	South Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	0.0	m	
	Height of Exposed Wall:	0	storeys	
	Length-Height Factor	0.0	m-storeys	
	Separation Distance	50	m	
	South Side Exposure Charge	0%		
	West Side Exposure			
	Exposing Wall:	Wood Frame		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	0.0	m	
	Height of Exposed Wall:	0	storeys	
	Length-Height Factor	0.0	m-storeys	
	Separation Distance	50	m	
	West Side Exposure Charge	0%		
	Total Exposure Charge	0%		The total exposure charge is below the maximum value of 75%.
	Increase for Exposures	0	L/min	
H	Fire Flow	15525	L/min	
	Rounded Fire Flow	16000	L/min	Flow rounded to nearest 1000 L/min.
City Cap	**Required Fire Flow (RFF)**	**16000**	**L/min**	The City of Ottawa's cap does not apply since there is less than 10 m separation between the back of the unit and the side of the adjacent unit.
		267	**L/s**	

Fire Underwriters Survey (FUS) Fire Flow Calculations

In accordance with City of Ottawa Technical Bulletin ISTB-2018-02 dated March 21, 2018

Boundary Conditions
50 Leikin Drive

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	218	3.63
Maximum Daily Demand	327	5.45
Peak Hour	589	9.81
Fire Flow Demand #1	16,020	267
Fire Flow Demand #2	16,980	283

Location

Results

Existing Condition (Pressure Zone 2W)

Connection 1 – Bill Leathem Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	132.8	61.5
Peak Hour	125.0	50.5
Max Day plus Fire Flow #1	123.8	48.7
Max Day plus Fire Flow #2	123.2	47.9

[1] Ground Elevation = 89.5 m

Connection 2 - Leikin Dr. - Alternative Option for Connection

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	132.7	60.3
Peak Hour	125.0	49.4
Max Day plus Fire Flow #1	124.8	49.1
Max Day plus Fire Flow #2	124.4	48.5

[1] Ground Elevation = 90.2 m

Future Condition (Pressure Zone SUC)

Connection 1 - Bill Leathem Dr.

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	146.9	81.5
Peak Hour	144.0	77.5
Max Day plus Fire Flow #1	139.1	70.4
Max Day plus Fire Flow #2	138.4	69.5

[1] Ground Elevation = 89.5 m

Note Connection 1 on Bill Leathem Dr. will be converted to SUC zone for zone reconfiguration, this does not apply for connection 2.

Notes

1. 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.

J.L. Richards & Associates Limited

HEAD LOSS - HAZEN-WILLIAMS
50 Leikin Dr - Canada Post Processing Center
(JLR 31940-000)

Demand Scenario (Calculated in April 2023)	Building
Average Day	3.63
Maximum Day	5.45
Required Fire Flow 1 (FUS)	267.00
Required Fire Flow 2 (FUS)	283.00
Peak Hour	9.81

Boundary Conditions (Email from City, May 3 2023):

Water Demand Scenario	Demand Building (L/s)	Head (m) on Bill Leathem Dr. Connection (Existing Condition)	Head (m) on Leikin Dr.
Peak Hour (per Apr. 2023 Demand Calculations)	9.81	125.00	125.00
Maximum HGL	0.00	132.80	132.70
Max Day + Fire Flow 1 (FUS) (per Apr. 2023 Demand Calculations)	267.00	123.80	124.80
Max Day + Fire Flow 2 (FUS) (per Apr. 2023 Demand Calculations)	283.00	123.20	124.40

Headloss Calculations (Hazen Williams Equation)

Hazen Williams equation (Mays, 1999; Streeter et al., 1998; Viessman and Hammer, 1993) where k=0.85 for meter and seconds units or 1.318 for feet and seconds units:

$$H = L\left[\frac{V}{kC\left(\frac{4}{D}\right)^{0.63}}\right]^{1/0.54} \qquad V = \frac{Q}{A} \qquad A = \frac{\pi}{4}D^2$$

Where,

HL = Headloss (m)

Q - Flow (m^3/s)
L - Length (m)
C - Hazen Williams "C"
D - Watermain Diameter (m)
V - Velocity (m/s)
A - Watermain Cross-Sectional Area (m^2)

50 Leikin Dr. Headloss Calculations - Connection at Leikin Dr.

Water Demand Condition	Flow (Q) (L/s)	Flow (Q) (m^3/s)	Length (m)	C	D (m)	V (m/s)	A (m2)	Head Loss (m)	HGL (m)	Calculated HGL (m)	Elevation (m) of Building	Pressure @ Node (m)	(kPa)	(psi)	ODG 4.2.2 Requirement	Criteria Achieved?
Peak Hour (400 mm Watermain Section)	9.81	0.010	130.84	100	0.393	0.081	0.121	0.005	125.000	124.995	91.00	33.995	333	48.4	276 kPa	Yes
Peak Hour (200 mm Service Lateral Section)	9.81	0.010	61.89	100	0.204	0.300	0.033	0.057	124.995	124.938	91.00	33.938	333	48.3	276 kPa	Yes
Peak Hour (150 mm Service Lateral Section)	9.81	0.010	35.31	100	0.155	0.520	0.019	0.125	124.938	124.813	91.00	33.813	332	48.1	276 kPa	Yes
Maximum HGL (400 mm Watermain Section)	0.00	0.000	130.84	100	0.393	0.000	0.121	0.000	132.700	132.700	91.00	41.700	409	59.3	552 kPa	Yes
Maximum HGL (200 mm Service Lateral Section)	0.00	0.000	61.89	100	0.204	0.000	0.033	0.000	132.700	132.700	91.00	41.700	409	59.3	552 kPa	Yes
Maximum HGL (150 mm Service Lateral)	0.00	0.000	35.31	100	0.155	0.000	0.019	0.000	132.700	132.700	91.00	41.700	409	59.3	552 kPa	Yes
Max Day + Sprinkler Flow + Hydrant (400 mm Watermain Section)	135.15	0.135	130.84	100	0.393	1.114	0.121	0.640	124.800	124.160	91.00	33.160	325	47.2	140 kPa	Yes
Max Day + Sprinkler Flow + Hydrant (200 mm Service Lateral, watermain to hydrant Tee)	135.15	0.135	61.89	100	0.204	4.135	0.033	7.380	124.160	116.780	91.00	25.780	253	36.7	140 kPa	Yes
Hydrant	95.00	0.095	32.47	100	0.155	5.035	0.019	7.681	116.780	109.099	91.00	18.099	178	25.8	140 kPa	Yes
Building	40.15	0.040	35.31	100	0.155	2.128	0.019	1.695	116.780	115.084	91.00	24.084	236	34.3	140 kPa	Yes

Appendix C

Sanitary

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

ARCADIA STAGE 6
STORM SEWER DESIGN SHEET

DESIGNED BY: MM
CHECKED BY: AW
2023-06-26

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

SANITARY DESIGN SHEET

CANADA POST COROPORATION - OTTAWA PROCESSING CENTRE

JLR NO. 31940-000

Prepared By: TR
Checked By:

Location			INDUSTRIAL			INFILTRATION					Sewer Data									Upstream Geometry				Downstream Geometry				
OUTLET	From MH	To MH	Total Area (ha)	Cum. Total Area (ha)	PEAK FLOW	Total Area (ha)	Cum. Total Area (ha)	PEAK FLOW	Plug Flow (L/s)	Total Peak Flow (L/s)	Type	Nominal Dia. (mm)	Actual Dia. (mm)	Slope	Length (m)	Q Full (L/s)	V Full (m/s)	Residual Capacity (L/s)	% Full	TG From	Obvert	Invert	Cover	TG To	Drop	Obvert	Invert	Cover
BILL LETHEM DRIVE	GATE HOUSE	MH20	3.30	3.30	5.75	3.30	3.30	**1.09**	**4.00**	**10.84**	PVC	200	203.20	1.00%	51.73	34.22	1.06	**23.38**	**32%**	90.33	88.66	88.46	1.67	89.65		88.15	87.94	1.50
BILL LETHEM DRIVE	MH20	MH40	0.52	3.82	6.65	0.52	3.82	**1.26**	**4.00**	**11.91**	PVC	200	203.20	0.32%	60.89	19.36	0.60	**7.44**	**62%**	89.65	88.15	87.94	1.50	89.61		87.95	87.75	1.66
BILL LETHEM DRIVE	MH40	MH21	0.78	4.60	8.01	0.78	4.60	**1.52**	**4.00**	**13.53**	PVC	200	203.20	0.32%	95.21	19.36	0.60	**5.83**	**70%**	89.61	87.95	87.75	1.66	89.70		87.65	87.44	2.06
BILL LETHEM DRIVE	MH21	MH22	0.36	4.96	8.64	0.36	4.96	**1.64**	**4.00**	**14.28**	PVC	200	203.20	0.32%	22.88	19.36	0.60	**5.08**	**74%**	89.70	87.65	87.44	2.06	89.87		87.57	87.37	2.30
BILL LETHEM DRIVE	BLDG	MH22	2.12	2.12	3.69	2.12	2.12	**0.70**		**4.39**	PVC	200	203.20	2.00%	3.21	48.39	1.49	**44.00**	**9%**	89.97	88.14	87.93	1.83	89.87	0.500	88.07	87.87	1.80
BILL LETHEM DRIVE	MH22	EX MHSA19539	1.95	9.03	15.73	1.95	9.03	**2.98**	**4.00**	**22.71**	PVC	200	203.20	1.00%	48.91	34.22	1.06	**11.51**	**66%**	89.87	87.57	87.37	2.30	89.25	2.831	87.08	86.88	2.17

Design Parameters (Per OSDG)		
Manning's Coefficient =	0.013	
Average Light Industrial Flow	35000	L/ha/day
Industrial Peaking Factor	4.3	
Infiltration Rate	0.33	L/s/ha

Appendix D

Storm

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

STORM DESIGN SHEET

CANADA POST COROPORATION - OTTAWA PROCESSING CENTRE

JLR NO. 31940-000

Prepared By: TR
Checked By: MM

Location			Peak Flow Estimation (Rational Method)														Sewer Data									Upstream Geometry				Downstream Geometry				
			C-Factor (1:5 Yr)							1:5 Year Storm																							
	From MH	To MH	0.20	0.90	WEIGHTED AVERAGE C-FACTOR	Total Area (ha)	Cum. Total Area (ha)	Inlet Time (min.)	In Pipe Flow Time (min)	Total Time	2.78AR	Add. 2.78AR	Cum. 2.78AR	1:5 Yr Intensity (mm/hr)	Peak Flow (L/s)	Plug Flow (L/s)	STORAGE TANK OUTFLOW (L/s)	Total Peak Flow (L/s)	Type	Nominal Dia. (mm)	Actual Dia. (mm)	Slope	Length (m)	Q Full (L/s)	V Full (m/s)	Residual Capacity (L/s)	% Full	TG From	Obvert	Invert	Cover	TG To	Drop	Obvert	Invert	Cover
TO WEST STORAGE CHAMBER	CBMH01	MH01	0.300	0.100	0.38	0.40	0.40	**10.00**	1.09	**11.09**	0.42		0.42	104.19	43.45			**43.45**	PVC	375	381.00	0.25%	52.58	91.46	0.80	**48.01**	**48%**	89.772	88.115	87.734	1.66	89.919		87.984	87.603	1.93
TO WEST STORAGE CHAMBER	MH01	MH02	0.380	0.120	0.37	0.50	0.90	**11.09**	2.24	**13.33**	0.51		0.93	98.76	91.70			**91.70**	CONCRETE	450	457.20	0.20%	108.73	133.02	0.81	**41.32**	**69%**	89.919	87.984	87.527	1.93	90.040		87.766	87.309	2.27
TO WEST STORAGE CHAMBER	MH02	MH06		0.130	0.90	0.13	1.03	**13.33**	1.51	**14.84**	0.33		1.25	89.38	112.06			**112.06**	CONCRETE	525	533.40	0.20%	81.61	200.65	0.90	**88.59**	**56%**	90.040	87.766	87.233	2.27	89.738		87.603	87.070	2.13
TO WEST STORAGE CHAMBER	CBMH02	MH03		0.360	0.90	0.36	0.36	**10.00**	0.82	**10.82**	0.90		0.90	104.19	93.85			**93.85**	CONCRETE	450	457.20	0.20%	40.08	133.02	0.81	**39.17**	**71%**	89.590	87.880	87.423	1.71	89.575		87.800	87.342	1.78
TO WEST STORAGE CHAMBER	MH03	MH04		0.330	0.90	0.33	0.69	**10.82**	0.74	**11.57**	0.83		1.73	100.03	172.69			**172.69**	CONCRETE	525	533.40	0.20%	40.06	200.65	0.90	**27.95**	**86%**	89.575	87.800	87.266	1.78	89.541		87.720	87.186	1.82
TO WEST STORAGE CHAMBER	MH04	MH05		0.320	0.90	0.32	1.01	**11.57**	0.73	**12.29**	0.80		2.53	96.58	244.06			**244.06**	CONCRETE	675	685.80	0.15%	40.00	339.63	0.92	**95.57**	**72%**	89.541	87.720	87.034	1.82	89.532		87.660	86.974	1.87
TO WEST STORAGE CHAMBER	MH05	MH06		0.330	0.90	0.33	1.34	**12.29**	0.64	**12.93**	0.83		3.35	93.46	313.35			**313.35**	CONCRETE	750	762.00	0.15%	37.64	449.81	0.99	**136.46**	**70%**	89.532	87.660	86.898	1.87	89.738		87.603	86.841	2.13
TO WEST STORAGE CHAMBER	MH06	MH07				0.00	2.37	**14.84**	0.77	**15.62**	0.00		4.61	84.06	387.24			**387.24**	CONCRETE	825	838.20	0.15%	48.83	579.98	1.05	**192.74**	**67%**	89.738	87.603	86.765	2.13	89.494		87.530	86.692	1.96
TO WEST STORAGE CHAMBER	MH07	MH08	0.030	0.670	0.87	0.70	3.07	**15.62**	0.60	**16.22**	1.69		6.30	81.61	514.11			**514.11**	CONCRETE	900	914.40	0.15%	39.97	731.45	1.11	**217.33**	**70%**	89.494	87.530	86.615	1.96	89.470		87.470	86.555	2.00
TO WEST STORAGE CHAMBER	MH08	MH09	0.010	0.330	0.88	0.34	3.41	**16.22**	0.60	**16.82**	0.83		7.13	79.82	569.19			**569.19**	CONCRETE	900	914.40	0.15%	40.03	731.45	1.11	**162.25**	**78%**	89.470	87.470	86.555	2.00	89.446		87.410	86.495	2.04
TO WEST STORAGE CHAMBER	MH09	MH10	0.010	0.340	0.88	0.35	3.76	**16.82**	0.60	**17.41**	0.86		7.99	78.12	623.92			**623.92**	CONCRETE	900	914.40	0.15%	40.00	731.45	1.11	**107.53**	**85%**	89.446	87.410	86.495	2.04	89.422		87.350	86.435	2.07
TO WEST STORAGE CHAMBER	MH10	MH30	0.020	0.380	0.87	0.40	4.16	**17.41**	0.30	**17.71**	0.96		8.95	76.49	684.51			**684.51**	CONCRETE	900	914.40	0.15%	20.00	731.45	1.11	**46.94**	**94%**	89.422	87.350	86.435	2.07	89.562		87.320	86.405	2.24
TO WEST STORAGE CHAMBER	MH30	MH31		0.190	0.90	0.19	4.35	**17.71**	0.35	**18.07**	0.48		9.42	75.71	713.47			**713.47**	CONCRETE	900	914.40	0.16%	24.47	755.43	1.15	**41.96**	**94%**	89.562	87.320	86.405	2.24	89.727		87.281	86.366	2.45
TO WEST STORAGE CHAMBER	MH31	MH32				0.00	4.35	**18.07**	0.08	**18.15**	0.00		9.42	74.80	704.93			**704.93**	CONCRETE	900	914.40	0.16%	5.57	755.43	1.15	**50.51**	**93%**	89.727	87.281	86.366	2.45	89.694		87.272	86.357	2.42
TO WEST STORAGE CHAMBER	MH34	MH11	0.010	0.300	0.88	0.31	0.31	**10.00**	1.05	**11.05**	0.76		0.76	104.19	78.79			**78.79**	CONCRETE	450	457.20	0.20%	51.05	133.02	0.81	**54.23**	**59%**	89.471	87.473	87.015	2.00	89.500		87.371	86.913	2.13
TO WEST STORAGE CHAMBER	MH11	MH32	0.020	0.070	0.74	0.09	0.40	**11.05**	1.02	**12.07**	0.19		0.94	98.96	93.26			**93.26**	CONCRETE	450	457.20	0.20%	49.38	133.02	0.81	**39.76**	**70%**	89.500	87.371	86.913	2.13	89.694		87.272	86.815	2.42
TO WEST STORAGE CHAMBER	MH32	STORAGE 2.1				0.00	4.75	**18.15**	0.04	**18.19**	0.00		10.37	74.60	773.31			**773.31**	CONCRETE	900	914.40	0.18%	2.85	801.26	1.22	**27.94**	**97%**	89.694	87.272	86.357	2.42	89.750		87.267	86.352	2.48
OUTLET TO BILL LETHEM	STORAGE 2.2	MH33				0.00	0.00	**10.00**	0.83	**10.83**	0.00		0.00	104.19	0.00		167.50	**167.50**	CONCRETE	600	609.60	0.15%	42.20	248.09	0.85	**80.59**	**68%**	89.450	86.962	86.352	2.49	89.650	0.219	86.899	86.289	2.75
OUTLET TO BILL LETHEM	MH33	MH19				0.00	0.00	**10.83**	0.66	**11.49**	0.00		0.00	100.02	0.00			**167.50**	CONCRETE	600	609.60	0.15%	33.77	248.09	0.85	**80.59**	**68%**	89.650	86.680	86.070	2.97	89.500		86.629	86.019	2.87
TO EAST STORAGE CHAMBER	CBMH03	MH12	0.020	0.250	0.85	0.27	0.27	**10.00**	0.69	**10.69**	0.64		0.64	104.19	66.33			**66.33**	PVC	375	381.00	0.25%	32.99	91.46	0.80	**25.12**	**73%**	90.130	88.381	88.000	1.75	90.202		88.298	87.917	1.90
TO EAST STORAGE CHAMBER	MH12	MH13	0.020	0.200	0.84	0.22	0.49	**10.69**	0.82	**11.51**	0.51		1.15	100.71	115.62			**115.62**	CONCRETE	450	457.20	0.20%	40.10	133.02	0.81	**17.39**	**87%**	90.202	88.298	87.841	1.90	90.196		88.218	87.761	1.98
TO EAST STORAGE CHAMBER	MH13	MH14	0.030	0.230	0.82	0.26	0.75	**11.51**	0.76	**12.27**	0.59		1.74	96.84	168.53			**168.53**	CONCRETE	525	533.40	0.20%	41.10	200.65	0.90	**32.12**	**84%**	90.196	88.218	87.685	1.98	90.223		88.136	87.603	2.09
TO EAST STORAGE CHAMBER	MH14	MH15	0.050	0.210	0.77	0.26	1.01	**12.27**	0.77	**13.04**	0.55		2.29	93.54	214.54			**214.54**	CONCRETE	600	609.60	0.15%	39.16	248.09	0.85	**33.54**	**86%**	90.223	88.136	87.527	2.09	90.341		88.077	87.468	2.26
TO EAST STORAGE CHAMBER	MH15	MH35	0.160	0.180	0.57	0.34	1.35	**13.04**	1.27	**14.31**	0.54		2.83	90.47	256.29	60.00		**316.29**	CONCRETE	750	762.00	0.15%	75.23	449.81	0.99	**133.52**	**70%**	90.341	88.077	87.315	2.26	90.385		87.965	87.203	2.42
TO EAST STORAGE CHAMBER	MH18	STORAGE 3.1		0.120	0.90	0.12	0.12	**10.00**	0.18	**10.18**	0.30		0.30	104.19	31.28	69.50		**69.50**	PVC	375	381.00	0.34%	9.86	106.65	0.94	**37.15**	**65%**	89.921	88.042	87.661	1.88	89.896		88.008	87.627	1.89
TO EAST STORAGE CHAMBER	STORAGE 3.2	MH17				0.00	0.00	**10.00**	0.04	**10.04**	0.00		0.00	104.19	0.00	69.50		**69.50**	PVC	375	381.00	0.34%	2.17	106.65	0.94	**37.15**	**65%**	90.047	88.008	87.627	2.04	90.330		88.001	87.620	2.33
TO EAST STORAGE CHAMBER	MH17	MH35		0.140	0.90	0.14	0.14	**10.00**	0.19	**10.19**	0.35		0.35	104.19	36.50		40.55	**77.05**	PVC	375	381.00	0.34%	10.66	106.65	0.94	**29.61**	**72%**	90.330	88.001	87.620	2.33	90.385		87.965	87.584	2.42
TO EAST STORAGE CHAMBER	MH35	STORAGE 1.1				0.00	1.49	**14.31**	0.13	**14.44**	0.00		3.18	85.85	273.26	60.00		**333.26**	CONCRETE	750	762.00	0.15%	7.82	449.81	0.99	**116.55**	**74%**	90.385	87.965	87.203	2.42	90.370		87.953	87.191	2.42
OUTLET TO BILL LETHEM	STORAGE 1.2	MH19				0.00	0.00	**10.00**	0.23	**10.23**	0.00		0.00	104.19	0.00		167.50	**167.50**	CONCRETE	525	533.40	0.20%	12.13	200.65	0.90	**33.15**	**83%**	89.700	87.724	87.191	1.98	89.682	1.071	87.700	87.167	1.98
OUTLET TO BILL LETHEM	MH19	MH10A				0.00	0.00	**11.49**	0.33	**11.82**	0.00		0.00	96.93	0.00			**335.00**	CONCRETE	750	762.00	0.15%	19.28	449.81	0.99	**114.81**	**74%**	89.682	86.629	85.867	3.05	89.250		86.600	85.838	2.65

Design Parameters (Per OSDG)	
Manning's Coefficient =	0.013
1:5 Year Intensity =	998.071 / (Tc + 6.053)^0.814

Note: Tc is the time of concentration in minutes

Appendix E

Stormwater Management

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50 Leikin Drive

Pre-development (Existing) Peak Flow Calculations

Guidance on Approach to Estimate Allowable Peak Flow and SWM Calculations:

1 Allowable peak flow shall be estimated based on a 1:2 year IDF and based on a C-Factor = 0.24.
2 Time of Concentration (Tc) of 15 minutes
3 Rooftop flows and Amenity Area Flows to be controlled and conveyed to the Bill Leathem Drive 1350 mm dia. Sewer
4 1:100 year post development flows to be limited to the allowable peak flow (1:2 year flow) by means of on-site retention measures
5 SWM calculations to be complted using the Modified Rational Method (MRM) for rooftop and at grade storage
6 MRM calculations to estimate cistern storage, to be estimated based on 50% of the peak flow rate per City requirement
7 All storm contributions to be relased to storm sewers to be controlled by means of an inlet control device (ICD) or accounted as uncontrolled.

Total Area of Site: 90,708.88 m^2

Allowable Release Rate Calculation

Area of site includes parts of Area 1 and Area 5
Total site area= 9.07 ha
Site in area 5= 4.57 ha
Site in area 1= 9.07 - 4.57 ha = 4.5 ha

The sites allowable release rate is based on a pre-development C-Factor of 0.24 being controlled to the 5-year design storm with a 15-minute time of concentration. See the report listed above for more details (equivalent of 54.5 L/s/ha).

Phase 1 site stormwater flows are limited to 38.8 L/s/ha

Allowable release rate for area 5= 4.57 ha * (54.8 L/s/ha) = 250 L/s
Allowable release rate for area 1= 4.5 ha * (38.8 L/s/ha) = 175 L/s
Allowable release rate for site = 250 + 175 L/s = 425 L/s

6.0 CONCLUSION

The following summarizes conclusions for the stormwater management for the SMBP.

1. An overall area release rate of 54.8 L/s/ha is permitted to the Longfield/Davidson Stormwater Management Facility.
2. Phase I stormwater flows are to be limited to 1293 L/s.
3. Phase I site stormwater flows are to be limited to 38.8 L/s/ha.
4. The minor stormwater system has been designed to transmit inlet flows equivalent to 54.8 L/s/ha.
5. Release rates in the road right-of-way can be limited to 30 L/s by utilizing a Scepter Type B inlet control device installed to a pair of catchbasins with 1.4 m of head.
6. Saw-tooth road grades have been set to contain the 1:100 year storm event on the road.
7. Sites can be provided with roof top and parking area storage to contain the 1:100 year storm event.

Source: City of Nepean South Merivale Business Park Stormwater Management Report - Novatech (Nepean_SWM Report (2))

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50 Leikin Drive

SWM Calculations Major System East (Bill Leathem Storm Sewer)

CBMH03 - ICD 16 :	Ponding Area 12

	100 YEAR
Area (imp) =	0.25
C-Factor =	1.00
Area (per) =	0.02
C-Factor =	0.25
(AxC)imp + (AxC)per =	0.26
Atotal =	0.27
C-Factor (overall) =	0.94
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	126.58	66.48	60.10	36.06
15	142.89	101.30	66.48	34.82	31.34
20	119.95	85.03	66.48	18.56	22.27
25	103.85	73.62	66.48	7.14	10.71
30	91.87	65.13	66.48	N/A	N/A
35	82.58	58.54	66.48	N/A	N/A
40	75.15	53.27	66.48	N/A	N/A
45	69.05	48.95	66.48	N/A	N/A
50	63.95	45.34	66.48	N/A	N/A
55	59.62	42.27	66.48	N/A	N/A
60	55.89	39.62	66.48	N/A	N/A
65	52.65	37.32	66.48	N/A	N/A
70	49.79	35.30	66.48	N/A	N/A
75	47.26	33.50	66.48	N/A	N/A
80	44.99	31.89	66.48	N/A	N/A

Minimum storage volume requirement = 36.06 m^3
Storage volume provided by design in summary below

*** No spill-over volume is expected for the 1:100 year storm.**

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50 Leikin Drive

SWM Calculations Major System East (Bill Leathem Storm Sewer)

CB24 - ICD 17 :	Ponding Area 12

	100 YEAR
Area (imp) =	0.20
C-Factor =	1.00
Area (per) =	0.02
C-Factor =	0.25
(AxC)imp + (AxC)per =	0.21
Atotal =	0.22
C-Factor (overall) =	0.93
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	101.76	53.53	48.23	28.94
15	142.89	81.44	53.53	27.91	25.12
20	119.95	68.36	53.53	14.83	17.80
25	103.85	59.18	53.53	5.65	8.48
30	91.87	52.36	53.53	N/A	N/A
35	82.58	47.06	53.53	N/A	N/A
40	75.15	42.83	53.53	N/A	N/A
45	69.05	39.35	53.53	N/A	N/A
50	63.95	36.45	53.53	N/A	N/A
55	59.62	33.98	53.53	N/A	N/A
60	55.89	31.85	53.53	N/A	N/A
65	52.65	30.00	53.53	N/A	N/A
70	49.79	28.38	53.53	N/A	N/A
75	47.26	26.93	53.53	N/A	N/A
80	44.99	25.64	53.53	N/A	N/A

Minimum storage volume requirement = 28.94 m^3
Storage volume provided by design in summary below

*** No spill-over volume is expected for the 1:100 year storm.**

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SWM Calculations Major System East (Bill Leathem Storm Sewer)

CB25 - ICD 18 :	Ponding Area 12

	100 YEAR
Area (imp) =	0.23
C-Factor =	1.00
Area (per) =	0.03
C-Factor =	0.25
(AxC)imp + (AxC)per =	0.24
Atotal =	0.26
C-Factor (overall) =	0.91
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	117.89	61.75	56.14	33.68
15	142.89	94.35	61.75	32.59	29.33
20	119.95	79.20	61.75	17.44	20.93
25	103.85	68.57	61.75	6.81	10.22
30	91.87	60.66	61.75	N/A	N/A
35	82.58	54.52	61.75	N/A	N/A
40	75.15	49.61	61.75	N/A	N/A
45	69.05	45.59	61.75	N/A	N/A
50	63.95	42.23	61.75	N/A	N/A
55	59.62	39.37	61.75	N/A	N/A
60	55.89	36.90	61.75	N/A	N/A
65	52.65	34.76	61.75	N/A	N/A
70	49.79	32.87	61.75	N/A	N/A
75	47.26	31.20	61.75	N/A	N/A
80	44.99	29.71	61.75	N/A	N/A

Minimum storage volume requirement = 33.68 m^3
Storage volume provided by design in summary below

*** No spill-over volume is expected for the 1:100 year storm.**

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SWM Calculations Major System East (Bill Leathem Storm Sewer)

CB26 - ICD 19 :	Ponding Area 12

	100 YEAR
Area (imp) =	0.21
C-Factor =	1.00
Area (per) =	0.05
C-Factor =	0.25
(AxC)imp + (AxC)per =	0.22
Atotal =	0.26
C-Factor (overall) =	0.86
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	110.45	57.99	52.46	31.48
15	142.89	88.39	57.99	30.40	27.36
20	119.95	74.20	57.99	16.21	19.45
25	103.85	64.23	57.99	6.25	9.37
30	91.87	56.83	57.99	N/A	N/A
35	82.58	51.08	57.99	N/A	N/A
40	75.15	46.48	57.99	N/A	N/A
45	69.05	42.71	57.99	N/A	N/A
50	63.95	39.56	57.99	N/A	N/A
55	59.62	36.88	57.99	N/A	N/A
60	55.89	34.57	57.99	N/A	N/A
65	52.65	32.56	57.99	N/A	N/A
70	49.79	30.80	57.99	N/A	N/A
75	47.26	29.23	57.99	N/A	N/A
80	44.99	27.83	57.99	N/A	N/A

Minimum storage volume requirement = 31.48 m^3
Storage volume provided by design in summary below

*** No spill-over volume is expected for the 1:100 year storm.**

Summary of Storage volume provided by design
Minimum storage volume requirement = 130.16 m^3
Storage volume provided by design = 382.46 m^3

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SWM Calculations Major System East (Bill Leathem Storm Sewer)

CB27 - ICD 20 :	Ponding Area 13

	100 YEAR
Area (imp) =	0.18
C-Factor =	1.00
Area (per) =	0.00
C-Factor =	0.25
(AxC)imp + (AxC)per =	0.18
Atotal =	0.18
C-Factor (overall) =	1.00
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	89.35	46.92	42.43	25.46
15	142.89	71.50	46.92	24.58	22.12
20	119.95	60.02	46.92	13.10	15.72
25	103.85	51.97	46.92	5.04	7.56
30	91.87	45.97	46.92	N/A	N/A
35	82.58	41.32	46.92	N/A	N/A
40	75.15	37.60	46.92	N/A	N/A
45	69.05	34.55	46.92	N/A	N/A
50	63.95	32.00	46.92	N/A	N/A
55	59.62	29.84	46.92	N/A	N/A
60	55.89	27.97	46.92	N/A	N/A
65	52.65	26.34	46.92	N/A	N/A
70	49.79	24.91	46.92	N/A	N/A
75	47.26	23.65	46.92	N/A	N/A
80	44.99	22.51	46.92	N/A	N/A

Minimum storage volume requirement = 25.46 m^3

Storage volume provided by design = 21.95 m^3 3.51

*** 3.51 m3 is expected to spill-over for the 1:100 year storm**

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SWM Calculations Major System East (Bill Leathem Storm Sewer)

CB28 - ICD 21 :	Ponding Area 14

	100 YEAR
Area (imp) =	0.14
C-Factor =	1.00
Area (per) =	0.00
C-Factor =	0.25
(AxC)imp + (AxC)per =	0.14
Atotal =	0.14
C-Factor (overall) =	1.00
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	69.50	36.50	33.00	19.80
15	142.89	55.61	36.50	19.12	17.21
20	119.95	46.68	36.50	10.19	12.23
25	103.85	40.42	36.50	3.92	5.88
30	91.87	35.76	36.50	N/A	N/A
35	82.58	32.14	36.50	N/A	N/A
40	75.15	29.25	36.50	N/A	N/A
45	69.05	26.87	36.50	N/A	N/A
50	63.95	24.89	36.50	N/A	N/A
55	59.62	23.21	36.50	N/A	N/A
60	55.89	21.75	36.50	N/A	N/A
65	52.65	20.49	36.50	N/A	N/A
70	49.79	19.38	36.50	N/A	N/A
75	47.26	18.39	36.50	N/A	N/A
80	44.99	17.51	36.50	N/A	N/A

Minimum storage volume requirement = 23.30 m^3
Storage volume provided by design = 13.01 m^3 10.29

*** 10.29 m3 is expected to spill-over for the 1:100 year storm**

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SWM Calculations Major System East (Bill Leathem Storm Sewer)

CB29 - ICD 22 :	Ponding Area 15

	100 YEAR
Area (imp) =	0.14
C-Factor =	1.00
Area (per) =	0.00
C-Factor =	0.25
(AxC)imp + (AxC)per =	0.14
Atotal =	0.14
C-Factor (overall) =	1.00
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	69.50	20.28	49.22	29.53
15	142.89	55.61	20.28	35.34	31.80
20	119.95	46.68	20.28	26.41	31.69
25	103.85	40.42	20.28	20.14	30.21
30	91.87	35.76	20.28	15.48	27.86
35	82.58	32.14	20.28	11.86	24.91
40	75.15	29.25	20.28	8.97	21.53
45	69.05	26.87	20.28	6.60	17.82
50	63.95	24.89	20.28	4.61	13.84
55	59.62	23.21	20.28	2.93	9.67
60	55.89	21.75	20.28	1.48	5.32
65	52.65	20.49	20.28	0.21	0.83
70	49.79	19.38	20.28	N/A	N/A
75	47.26	18.39	20.28	N/A	N/A
80	44.99	17.51	20.28	N/A	N/A

Minimum storage volume requirement = 42.10 m^3

Storage volume provided by design = 8.78 m^3 33.32

*** 33.32 m3 will be conveyed to Underground Storage Chamber 3 sized for the 1:100 year storm.**

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50 Leikin Drive

SWM Calculations Major System East (Bill Leathem Storm Sewer)

BUILDING ROOF :

	100 YEAR
Area (imp) =	2.12
C-Factor =	1.00
Area (per) =	0.00
C-Factor =	0.25
(AxC)imp + (AxC)per =	2.12
Atotal =	2.12
C-Factor (overall) =	1.00
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	1052.36	60.00	992.36	595.41
15	142.89	842.16	60.00	782.16	703.94
20	119.95	706.94	60.00	646.94	776.33
25	103.85	612.03	60.00	552.03	828.05
30	91.87	541.43	60.00	481.43	866.58
35	82.58	486.69	60.00	426.69	896.04
40	75.15	442.88	60.00	382.88	918.90
45	69.05	406.96	60.00	346.96	936.78
50	63.95	376.92	60.00	316.92	950.76
55	59.62	351.40	60.00	291.40	961.62
60	55.89	329.42	60.00	269.42	969.91
65	52.65	310.28	60.00	250.28	976.08
70	49.79	293.44	60.00	233.44	980.45
75	47.26	278.51	60.00	218.51	983.27
80	44.99	265.16	60.00	205.16	984.76
81	44.57	262.66	60.00	202.66	984.91
82	44.15	260.21	60.00	200.21	985.02
83	43.74	257.81	60.00	197.81	985.08
84	43.34	255.46	60.00	195.46	985.10
85	42.95	253.15	60.00	193.15	985.08
86	42.57	250.90	60.00	190.90	985.02
87	42.20	248.68	60.00	188.68	984.92
88	41.83	246.51	60.00	186.51	984.77
89	41.47	244.38	60.00	184.38	984.59
90	41.11	242.29	60.00	182.29	984.37
91	40.76	240.24	60.00	180.24	984.12

Minimum storage volume requirement = 985.10 m^3

Storage volume provided by design = 1272.00 m^3 40% of roof assumed

*** No spill-over volume is expected for the 1:100 year storm.**

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50 Leikin Drive

SWM Calculations Major System West (Bill Leathem Storm Sewer)

Allowable Release Rate= 425 L/s

Uncontrolled Areas (4)

Area (ha)	C-Factor	Intensity (mm/hr)	Peak Flow (L/s)
0.39	0.25	178.56	48.40
0.03	0.25	178.56	3.72
0.03	0.25	178.56	3.72
0.05	0.25	178.56	6.20
0.04	0.69	178.56	13.70
0.03	0.29	178.56	4.32
0.02	1.00	178.56	9.93
SUM=			90.00

Controlled Flow= 335.00 L/s

CBMH01 - ICD 1 : **Ponding Area 25**

	100 YEAR
Area (imp) =	0.10
C-Factor =	1.00
Area (per) =	0.30
C-Factor =	0.25
(AxC)imp + (AxC)per =	0.18
Atotal =	0.40
C-Factor (overall) =	0.44
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	86.87	44.03	42.84	25.70
15	142.89	69.52	44.03	25.49	22.94
20	119.95	58.36	44.03	14.33	17.19
25	103.85	50.52	44.03	6.49	9.74
30	91.87	44.69	44.03	0.67	1.20
35	82.58	40.17	44.03	N/A	N/A
40	75.15	36.56	44.03	N/A	N/A
45	69.05	33.59	44.03	N/A	N/A
50	63.95	31.11	44.03	N/A	N/A
55	59.62	29.01	44.03	N/A	N/A
60	55.89	27.19	44.03	N/A	N/A
65	52.65	25.61	44.03	N/A	N/A
70	49.79	24.22	44.03	N/A	N/A
75	47.26	22.99	44.03	N/A	N/A
80	44.99	21.89	44.03	N/A	N/A

Minimum storage volume requirement = 25.70 m^3
Storage volume provided by design = 37.28 m^3

*** No spill-over volume is expected for the 1:100 year storm.**

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50 Leikin Drive

SWM Calculations Major System West (Bill Leathem Storm Sewer)

CB03 - ICD 2 : **Ponding Areas 23 & 24**

	100 YEAR
Area (imp) =	0.12
C-Factor =	1.00
Area (per) =	0.38
C-Factor =	0.25
(AxC)imp + (AxC)per =	0.22
Atotal =	0.50
C-Factor (overall) =	0.43
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	106.72	53.59	53.14	31.88
15	142.89	85.41	53.59	31.82	28.64
20	119.95	71.69	53.59	18.11	21.73
25	103.85	62.07	53.59	8.48	12.72
30	91.87	54.91	53.59	1.32	2.38
35	82.58	49.36	53.59	N/A	N/A
40	75.15	44.91	53.59	N/A	N/A
45	69.05	41.27	53.59	N/A	N/A
50	63.95	38.23	53.59	N/A	N/A
55	59.62	35.64	53.59	N/A	N/A
60	55.89	33.41	53.59	N/A	N/A
65	52.65	31.47	53.59	N/A	N/A
70	49.79	29.76	53.59	N/A	N/A
75	47.26	28.24	53.59	N/A	N/A
80	44.99	26.89	53.59	N/A	N/A

Minimum storage volume requirement = 31.88 m^3

Storage volume provided by design = 16.21 m^3 15.67

*** 15.67 m3 is expected to spill-over for the 1:100 year storm.**

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SWM Calculations Major System West (Bill Leathem Storm Sewer)

CBO5 - ICD 3 : **Ponding Areas 21 & 22**

	100 YEAR
Area (imp) =	0.13
C-Factor =	1.00
Area (per) =	0.00
C-Factor =	0.25
(AxC)imp + (AxC)per =	0.13
Atotal =	0.13
C-Factor (overall) =	1.00
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	64.53	33.89	30.64	18.38
15	142.89	51.64	33.89	17.75	15.98
20	119.95	43.35	33.89	9.46	11.35
25	103.85	37.53	33.89	3.64	5.46
30	91.87	33.20	33.89	N/A	N/A
35	82.58	29.84	33.89	N/A	N/A
40	75.15	27.16	33.89	N/A	N/A
45	69.05	24.95	33.89	N/A	N/A
50	63.95	23.11	33.89	N/A	N/A
55	59.62	21.55	33.89	N/A	N/A
60	55.89	20.20	33.89	N/A	N/A
65	52.65	19.03	33.89	N/A	N/A
70	49.79	17.99	33.89	N/A	N/A
75	47.26	17.08	33.89	N/A	N/A
80	44.99	16.26	33.89	N/A	N/A

Minimum storage volume requirement = 34.06 m^3

Storage volume provided by design = 3.10 m^3 30.96

*** 30.96 m3 is expected to spill-over for the 1:100 year storm.**

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SWM Calculations Major System West (Bill Leathem Storm Sewer)

CBMH02 - ICD 4 :	Ponding Area 11

	100 YEAR
Area (imp) =	0.36
C-Factor =	1.00
Area (per) =	0.00
C-Factor =	0.25
(AxC)imp + (AxC)per =	0.36
Atotal =	0.36
C-Factor (overall) =	1.00
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	178.70	93.85	84.85	50.91
15	142.89	143.01	93.85	49.16	44.24
20	119.95	120.05	93.85	26.20	31.44
25	103.85	103.93	93.85	10.08	15.12
30	91.87	91.94	93.85	N/A	N/A
35	82.58	82.64	93.85	N/A	N/A
40	75.15	75.21	93.85	N/A	N/A
45	69.05	69.11	93.85	N/A	N/A
50	63.95	64.01	93.85	N/A	N/A
55	59.62	59.67	93.85	N/A	N/A
60	55.89	55.94	93.85	N/A	N/A
65	52.65	52.69	93.85	N/A	N/A
70	49.79	49.83	93.85	N/A	N/A
75	47.26	47.29	93.85	N/A	N/A
80	44.99	45.03	93.85	N/A	N/A

Minimum storage volume requirement = 50.91 m^3
Storage volume provided by design = 147.49 m^3

*** No spill-over volume is expected for the 1:100 year storm.**

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SWM Calculations Major System West (Bill Leathem Storm Sewer)

CB06 - ICD 5 :	Ponding Area 10

	100 YEAR
Area (imp) =	0.33
C-Factor =	1.00
Area (per) =	0.00
C-Factor =	0.25
(AxC)imp + (AxC)per =	0.33
Atotal =	0.33
C-Factor (overall) =	1.00
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	163.81	86.03	77.78	46.67
15	142.89	131.09	86.03	45.06	40.56
20	119.95	110.04	86.03	24.01	28.82
25	103.85	95.27	86.03	9.24	13.86
30	91.87	84.28	86.03	N/A	N/A
35	82.58	75.76	86.03	N/A	N/A
40	75.15	68.94	86.03	N/A	N/A
45	69.05	63.35	86.03	N/A	N/A
50	63.95	58.67	86.03	N/A	N/A
55	59.62	54.70	86.03	N/A	N/A
60	55.89	51.28	86.03	N/A	N/A
65	52.65	48.30	86.03	N/A	N/A
70	49.79	45.68	86.03	N/A	N/A
75	47.26	43.35	86.03	N/A	N/A
80	44.99	41.27	86.03	N/A	N/A

Minimum storage volume requirement = 46.67 m^3
Storage volume provided by design = 176.10 m^3

*** No spill-over volume is expected for the 1:100 year storm.**

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SWM Calculations Major System West (Bill Leathem Storm Sewer)

CB07 - ICD 6 :	Ponding Area 9

	100 YEAR
Area (imp) =	0.32
C-Factor =	1.00
Area (per) =	0.00
C-Factor =	0.25
(AxC)imp + (AxC)per =	0.32
Atotal =	0.32
C-Factor (overall) =	1.00
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	158.85	83.42	75.42	45.25
15	142.89	127.12	83.42	43.70	39.33
20	119.95	106.71	83.42	23.29	27.94
25	103.85	92.38	83.42	8.96	13.44
30	91.87	81.73	83.42	N/A	N/A
35	82.58	73.46	83.42	N/A	N/A
40	75.15	66.85	83.42	N/A	N/A
45	69.05	61.43	83.42	N/A	N/A
50	63.95	56.89	83.42	N/A	N/A
55	59.62	53.04	83.42	N/A	N/A
60	55.89	49.72	83.42	N/A	N/A
65	52.65	46.83	83.42	N/A	N/A
70	49.79	44.29	83.42	N/A	N/A
75	47.26	42.04	83.42	N/A	N/A
80	44.99	40.02	83.42	N/A	N/A

Minimum storage volume requirement = 45.25 m^3
Storage volume provided by design = 110.79 m^3

***No spill-over volume is expected for the 1:100 year storm.**

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SWM Calculations Major System West (Bill Leathem Storm Sewer)

CB08 - ICD 7 :	Ponding Area 8

	100 YEAR
Area (imp) =	0.33
C-Factor =	1.00
Area (per) =	0.00
C-Factor =	0.25
(AxC)imp + (AxC)per =	0.33
Atotal =	0.33
C-Factor (overall) =	1.00
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	163.81	86.03	77.78	46.67
15	142.89	131.09	86.03	45.06	40.56
20	119.95	110.04	86.03	24.01	28.82
25	103.85	95.27	86.03	9.24	13.86
30	91.87	84.28	86.03	N/A	N/A
35	82.58	75.76	86.03	N/A	N/A
40	75.15	68.94	86.03	N/A	N/A
45	69.05	63.35	86.03	N/A	N/A
50	63.95	58.67	86.03	N/A	N/A
55	59.62	54.70	86.03	N/A	N/A
60	55.89	51.28	86.03	N/A	N/A
65	52.65	48.30	86.03	N/A	N/A
70	49.79	45.68	86.03	N/A	N/A
75	47.26	43.35	86.03	N/A	N/A
80	44.99	41.27	86.03	N/A	N/A

Minimum storage volume requirement = 77.63 m^3
Storage volume provided by design = 134.65 m^3

*** No spill-over volume is expected for the 1:100 year storm.**

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SWM Calculations Major System West (Bill Leathem Storm Sewer)

CB19 - ICD 8 :	Ponding Area 6

	100 YEAR
Area (imp) =	0.68
C-Factor =	1.00
Area (per) =	0.03
C-Factor =	0.25
(AxC)imp + (AxC)per =	0.69
Atotal =	0.71
C-Factor (overall) =	0.97
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	341.27	178.92	162.35	97.41
15	142.89	273.11	178.92	94.19	84.77
20	119.95	229.26	178.92	50.33	60.40
25	103.85	198.48	178.92	19.56	29.34
30	91.87	175.58	178.92	N/A	N/A
35	82.58	157.83	178.92	N/A	N/A
40	75.15	143.62	178.92	N/A	N/A
45	69.05	131.97	178.92	N/A	N/A
50	63.95	122.23	178.92	N/A	N/A
55	59.62	113.96	178.92	N/A	N/A
60	55.89	106.83	178.92	N/A	N/A
65	52.65	100.62	178.92	N/A	N/A
70	49.79	95.16	178.92	N/A	N/A
75	47.26	90.32	178.92	N/A	N/A
80	44.99	85.99	178.92	N/A	N/A

Minimum storage volume requirement = 97.41 m^3
Storage volume provided by design in summary below

*** No spill-over volume is expected for the 1:100 year storm.**

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SWM Calculations Major System West (Bill Leathem Storm Sewer)

CB20 - ICD 9 :	Ponding Area 6

	100 YEAR
Area (imp) =	0.33
C-Factor =	1.00
Area (per) =	0.01
C-Factor =	0.25
(AxC)imp + (AxC)per =	0.33
Atotal =	0.34
C-Factor (overall) =	0.98
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	165.05	86.67	78.39	47.03
15	142.89	132.08	86.67	45.42	40.88
20	119.95	110.88	86.67	24.21	29.05
25	103.85	95.99	86.67	9.33	13.99
30	91.87	84.92	86.67	N/A	N/A
35	82.58	76.33	86.67	N/A	N/A
40	75.15	69.46	86.67	N/A	N/A
45	69.05	63.83	86.67	N/A	N/A
50	63.95	59.12	86.67	N/A	N/A
55	59.62	55.11	86.67	N/A	N/A
60	55.89	51.67	86.67	N/A	N/A
65	52.65	48.66	86.67	N/A	N/A
70	49.79	46.02	86.67	N/A	N/A
75	47.26	43.68	86.67	N/A	N/A
80	44.99	41.59	86.67	N/A	N/A

Minimum storage volume requirement = 47.03 m^3
Storage volume provided by design in summary below

*** No spill-over volume is expected for the 1:100 year storm.**

Summary of Storage volume provided by design
Minimum storage volume requirement = 144.44 m^3
Storage volume provided by design = 157.85 m^3

***No spill-over volume is expected for the 1:100 year storm.**

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SWM Calculations Major System West (Bill Leathem Storm Sewer)

CB21 - ICD 10 :	Ponding Area 5

	100 YEAR
Area (imp) =	0.33
C-Factor =	1.00
Area (per) =	0.01
C-Factor =	0.25
(AxC)imp + (AxC)per =	0.33
Atotal =	0.34
C-Factor (overall) =	0.98
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	165.05	86.67	78.39	47.03
15	142.89	132.08	86.67	45.42	40.88
20	119.95	110.88	86.67	24.21	29.05
25	103.85	95.99	86.67	9.33	13.99
30	91.87	84.92	86.67	N/A	N/A
35	82.58	76.33	86.67	N/A	N/A
40	75.15	69.46	86.67	N/A	N/A
45	69.05	63.83	86.67	N/A	N/A
50	63.95	59.12	86.67	N/A	N/A
55	59.62	55.11	86.67	N/A	N/A
60	55.89	51.67	86.67	N/A	N/A
65	52.65	48.66	86.67	N/A	N/A
70	49.79	46.02	86.67	N/A	N/A
75	47.26	43.68	86.67	N/A	N/A
80	44.99	41.59	86.67	N/A	N/A

Minimum storage volume requirement = 47.03 m^3
Storage volume provided by design = 87.70 m^3

*** No spill-over volume is expected for the 1:100 year storm.**

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SWM Calculations Major System West (Bill Leathem Storm Sewer)

CB22 - ICD 11 :	Ponding Area 4

	100 YEAR
Area (imp) =	0.38
C-Factor =	1.00
Area (per) =	0.02
C-Factor =	0.25
(AxC)imp + (AxC)per =	0.39
Atotal =	0.40
C-Factor (overall) =	0.96
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	191.11	100.80	90.31	54.19
15	142.89	152.94	100.80	52.14	46.93
20	119.95	128.38	100.80	27.58	33.10
25	103.85	111.15	100.80	10.35	15.52
30	91.87	98.33	100.80	N/A	N/A
35	82.58	88.38	100.80	N/A	N/A
40	75.15	80.43	100.80	N/A	N/A
45	69.05	73.90	100.80	N/A	N/A
50	63.95	68.45	100.80	N/A	N/A
55	59.62	63.82	100.80	N/A	N/A
60	55.89	59.82	100.80	N/A	N/A
65	52.65	56.35	100.80	N/A	N/A
70	49.79	53.29	100.80	N/A	N/A
75	47.26	50.58	100.80	N/A	N/A
80	44.99	48.15	100.80	N/A	N/A

Minimum storage volume requirement = 54.19 m^3
Storage volume provided by design = 82.97 m^3

*** No spill-over volume is expected for the 1:100 year storm.**

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SWM Calculations Major System West (Bill Leathem Storm Sewer)

CB01A - ICD 12 : **Ponding Area 3**

	100 YEAR
Area (imp) =	0.19
C-Factor =	1.00
Area (per) =	0.00
C-Factor =	0.25
(AxC)imp + (AxC)per =	0.19
Atotal =	0.19
C-Factor (overall) =	1.00
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	94.31	49.53	44.78	26.87
15	142.89	75.48	49.53	25.95	23.35
20	119.95	63.36	49.53	13.83	16.59
25	103.85	54.85	49.53	5.32	7.98
30	91.87	48.52	49.53	N/A	N/A
35	82.58	43.62	49.53	N/A	N/A
40	75.15	39.69	49.53	N/A	N/A
45	69.05	36.47	49.53	N/A	N/A
50	63.95	33.78	49.53	N/A	N/A
55	59.62	31.49	49.53	N/A	N/A
60	55.89	29.52	49.53	N/A	N/A
65	52.65	27.81	49.53	N/A	N/A
70	49.79	26.30	49.53	N/A	N/A
75	47.26	24.96	49.53	N/A	N/A
80	44.99	23.76	49.53	N/A	N/A

Minimum storage volume requirement = 26.87 m^3
Storage volume provided by design = 45.84 m^3

*** No spill-over volume is expected for the 1:100 year storm.**

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SWM Calculations Major System West (Bill Leathem Storm Sewer)

CB18 - ICD 13 :	Ponding Area 20

	100 YEAR
Area (imp) =	0.07
C-Factor =	1.00
Area (per) =	0.02
C-Factor =	0.25
(AxC)imp + (AxC)per =	0.08
Atotal =	0.09
C-Factor (overall) =	0.83
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	37.23	19.29	17.94	10.76
15	142.89	29.79	19.29	10.50	9.45
20	119.95	25.01	19.29	5.72	6.86
25	103.85	21.65	19.29	2.36	3.54
30	91.87	19.15	19.29	N/A	N/A
35	82.58	17.22	19.29	N/A	N/A
40	75.15	15.67	19.29	N/A	N/A
45	69.05	14.40	19.29	N/A	N/A
50	63.95	13.33	19.29	N/A	N/A
55	59.62	12.43	19.29	N/A	N/A
60	55.89	11.65	19.29	N/A	N/A
65	52.65	10.98	19.29	N/A	N/A
70	49.79	10.38	19.29	N/A	N/A
75	47.26	9.85	19.29	N/A	N/A
80	44.99	9.38	19.29	N/A	N/A

Minimum storage volume requirement = 10.76 m^3
Storage volume provided by design = 98.00 m^3

*** No spill-over volume is expected for the 1:100 year storm.**

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SWM Calculations Major System West (Bill Leathem Storm Sewer)

CB02A - ICD 14 :	Ponding Area 1

	100 YEAR
Area (imp) =	0.16
C-Factor =	1.00
Area (per) =	0.00
C-Factor =	0.25
(AxC)imp + (AxC)per =	0.16
Atotal =	0.16
C-Factor (overall) =	1.00
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	79.42	41.71	37.71	22.63
15	142.89	63.56	41.71	21.85	19.66
20	119.95	53.35	41.71	11.64	13.97
25	103.85	46.19	41.71	4.48	6.72
30	91.87	40.86	41.71	N/A	N/A
35	82.58	36.73	41.71	N/A	N/A
40	75.15	33.42	41.71	N/A	N/A
45	69.05	30.71	41.71	N/A	N/A
50	63.95	28.45	41.71	N/A	N/A
55	59.62	26.52	41.71	N/A	N/A
60	55.89	24.86	41.71	N/A	N/A
65	52.65	23.42	41.71	N/A	N/A
70	49.79	22.15	41.71	N/A	N/A
75	47.26	21.02	41.71	N/A	N/A
80	44.99	20.01	41.71	N/A	N/A

Minimum storage volume requirement = 22.63 m^3
Storage volume provided by design = 72.81 m^3

*** No spill-over volume is expected for the 1:100 year storm.**

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SWM Calculations Major System West (Bill Leathem Storm Sewer)

CB03A - ICD 15 :	Ponding Area 2

	100 YEAR
Area (imp) =	0.14
C-Factor =	1.00
Area (per) =	0.01
C-Factor =	0.25
(AxC)imp + (AxC)per =	0.14
Atotal =	0.15
C-Factor (overall) =	0.95
Storage Volume (m3)	

Time (min)	Intensity 1:100 Yr (mm/hr)	Qp 1:100 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	178.56	70.74	36.50	34.24	20.54
15	142.89	56.61	36.50	20.11	18.10
20	119.95	47.52	36.50	11.02	13.23
25	103.85	41.14	36.50	4.64	6.96
30	91.87	36.39	36.50	N/A	N/A
35	82.58	32.71	36.50	N/A	N/A
40	75.15	29.77	36.50	N/A	N/A
45	69.05	27.35	36.50	N/A	N/A
50	63.95	25.34	36.50	N/A	N/A
55	59.62	23.62	36.50	N/A	N/A
60	55.89	22.14	36.50	N/A	N/A
65	52.65	20.86	36.50	N/A	N/A
70	49.79	19.72	36.50	N/A	N/A
75	47.26	18.72	36.50	N/A	N/A
80	44.99	17.82	36.50	N/A	N/A

Minimum storage volume requirement = 20.54 m^3
Storage volume provided by design = 33.73 m^3

*** No spill-over volume is expected for the 1:100 year storm.**

EAST STORMTECH (STORAGE 1) :

	100 YEAR
Area (imp) =	
C-Factor =	
Area (per) =	
C-Factor =	
(AxC)imp + (AxC)per =	
Atotal =	1.46
C-Factor (ove	0.85
Storage Volume (m3)	

***Excluding Roof Area**

Time (min)	Intensity 1:5 Yr (mm/hr)	Qp 1:5 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	104.19	359.46	83.75	275.71	165.43
15	83.56	348.27	83.75	264.52	238.07
20	70.25	302.36	83.75	218.61	262.34
25	60.90	270.09	83.75	186.34	279.51
30	53.93	246.05	83.75	162.30	292.14
35	48.52	227.38	83.75	143.63	301.63
40	44.18	212.44	83.75	128.69	308.85
45	40.63	200.17	83.75	116.42	314.33
50	37.65	189.90	83.75	106.15	318.46
55	35.12	181.17	83.75	97.42	321.50
60	32.94	173.65	83.75	89.90	323.66
65	31.04	167.10	83.75	83.35	325.07
70	29.37	161.33	83.75	77.58	325.85
75	27.89	156.21	83.75	72.46	326.09
80	26.56	151.64	83.75	67.89	325.87

Minimum storage volume requiremer 326 m^3

Storage volume provided by design = 351 m^3

WEST STORMTECH (STORAGE 2) :

	100 YEAR
Area (imp) =	
C-Factor =	
Area (per) =	
C-Factor =	
(AxC)imp + (AxC)per =	
Atotal =	4.49
C-Factor (ove	0.86
Storage Volume (m3)	

Time (min)	Intensity 1:5 Yr (mm/hr)	Qp 1:5 Yr (L/s)	Qp ICD (L/s)	Qp stored (L/s)	Max Volume Requirement (m^3)
10	104.19	1118.48	83.75	1034.73	620.84
15	83.56	896.96	83.75	813.21	731.89
20	70.25	754.12	83.75	670.37	804.45
25	60.90	653.70	83.75	569.95	854.93
30	53.93	578.90	83.75	495.15	891.26
35	48.52	520.82	83.75	437.07	917.85
40	44.18	474.31	83.75	390.56	937.34
45	40.63	436.14	83.75	352.39	951.44
50	37.65	404.20	83.75	320.45	961.34
55	35.12	377.04	83.75	293.29	967.85
60	32.94	353.64	83.75	269.89	971.60
65	31.04	333.24	83.75	249.49	973.03
70	29.37	315.30	83.75	231.55	972.50
75	27.89	299.37	83.75	215.62	970.30
80	26.56	285.14	83.75	201.39	966.65

Minimum storage volume requiremer 973 m^3

Storage volume provided by design = 1000 m^3

User Inputs

Chamber Model:	MC-7200
Outlet Control Structure:	Yes
Project Name:	CPC 50 Leikin EAST Storage
Engineer:	N/A
Project Location:	
Measurement Type:	Metric
Required Storage Volume:	975.01 cubic meters.
Stone Porosity:	40%
Stone Foundation Depth:	229 mm.
Stone Above Chambers:	305 mm.
Average Cover Over Chambers:	2401 mm.
Design Constraint Dimensions:	(25.00 m. x 50.00 m.)

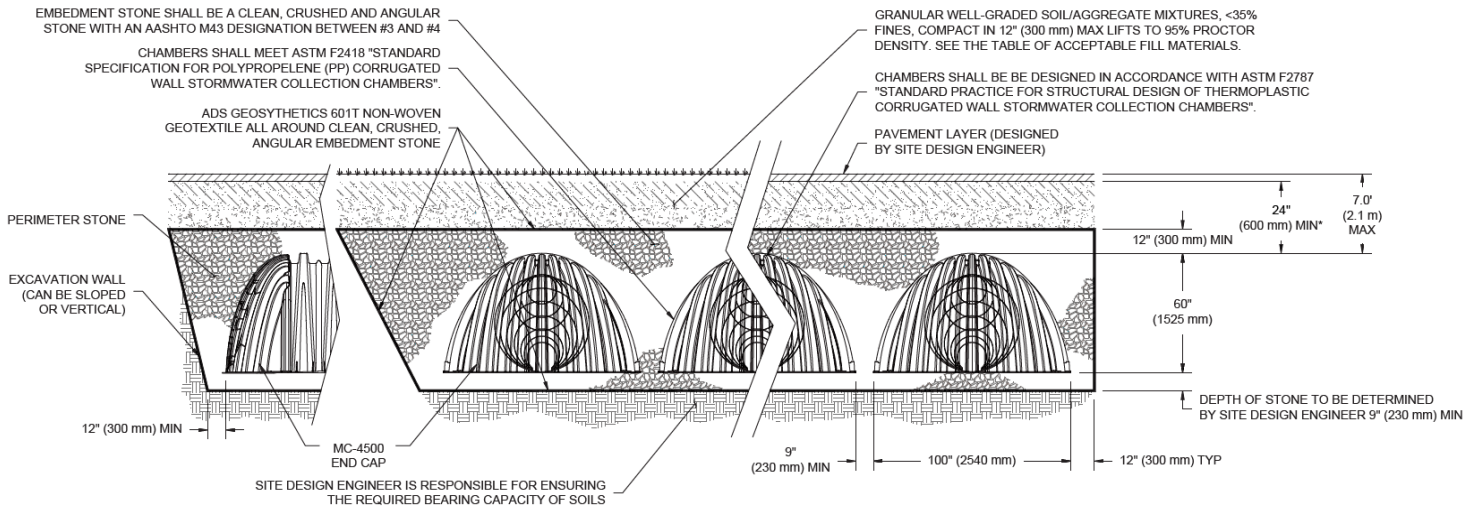
Results

System Volume and Bed Size

Installed Storage Volume:	999.55 cubic meters.
Storage Volume Per Chamber:	4.99 cubic meters.
Number Of Chambers Required:	121
Number Of End Caps Required:	12
Chamber Rows:	6
Maximum Length:	45.84 m.
Maximum Width:	17.18 m.
Approx. Bed Size Required:	765.39 square meters.

System Components

Amount Of Stone Required:	959 cubic meters
Volume Of Excavation (Not Including Fill):	1575 cubic meters
Total Non-woven Geotextile Required:	2155 square meters
Woven Geotextile Required (excluding Isolator Row):	89 square meters
Woven Geotextile Required (Isolator Row):	281 square meters
Total Woven Geotextile Required:	370 square meters
Impervious Liner Required:	0 square meters



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

User Inputs

Chamber Model:	MC-7200
Outlet Control Structure:	Yes
Project Name:	CPC 50 Leikin EAST Storage
Engineer:	N/A
Project Location:	
Measurement Type:	Metric
Required Storage Volume:	328.00 cubic meters.
Stone Porosity:	40%
Stone Foundation Depth:	229 mm.
Stone Above Chambers:	305 mm.
Average Cover Over Chambers:	2401 mm.
Design Constraint Dimensions:	(10.01 m. x 40.00 m.)

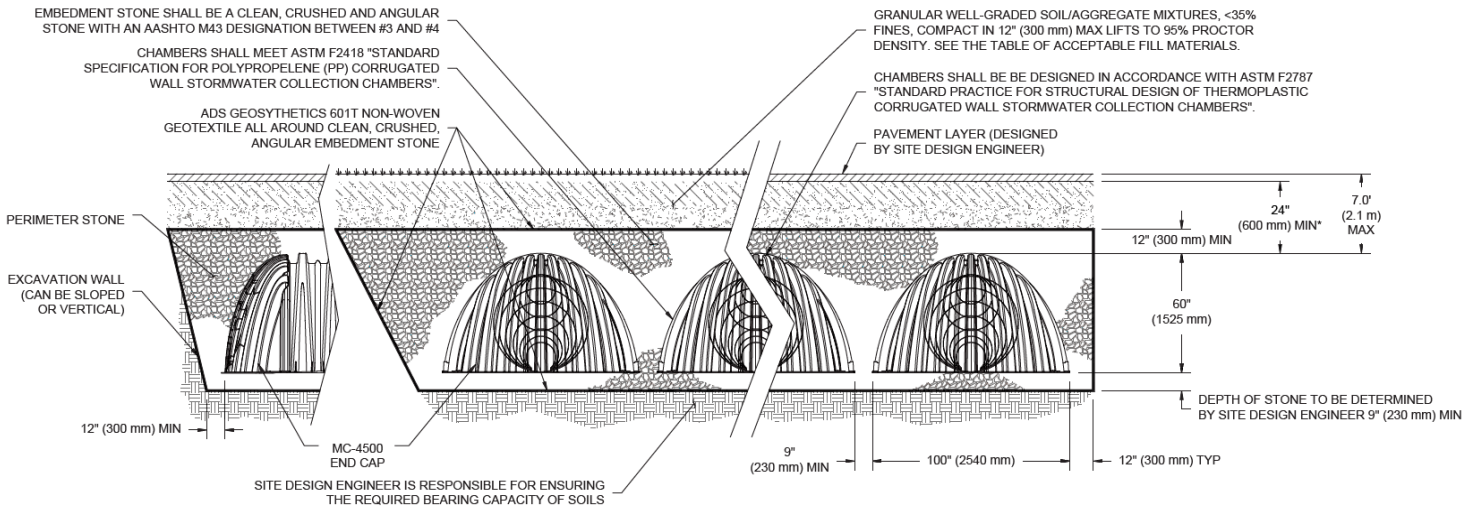
Results

System Volume and Bed Size

Installed Storage Volume:	351.17 cubic meters.
Storage Volume Per Chamber:	4.99 cubic meters.
Number Of Chambers Required:	40
Number Of End Caps Required:	6
Chamber Rows:	3
Maximum Length:	31.67 m.
Maximum Width:	8.87 m.
Approx. Bed Size Required:	276.56 square meters.

System Components

Amount Of Stone Required:	364 cubic meters
Volume Of Excavation (Not Including Fill):	569 cubic meters
Total Non-woven Geotextile Required:	864 square meters
Woven Geotextile Required (excluding Isolator Row):	36 square meters
Woven Geotextile Required (Isolator Row):	191 square meters
Total Woven Geotextile Required:	227 square meters
Impervious Liner Required:	0 square meters



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 30" (750 mm).

User Inputs

Chamber Model:	MC-3500
Outlet Control Structure:	No
Project Name:	CPC 50 Leikin EAST Storage
Engineer:	N/A
Project Location:	
Measurement Type:	Metric
Required Storage Volume:	38.10 cubic meters.
Stone Porosity:	40%
Stone Foundation Depth:	229 mm.
Stone Above Chambers:	305 mm.
Average Cover Over Chambers:	2000 mm.
Design Constraint Dimensions:	(8.01 m. x 25.00 m.)

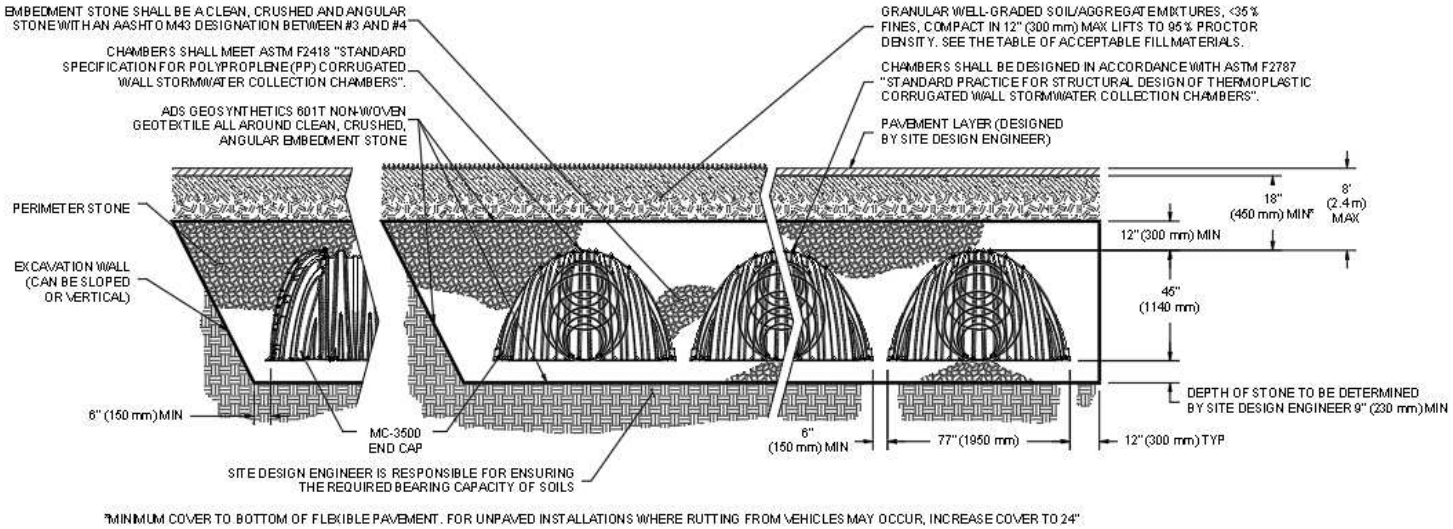
Results

System Volume and Bed Size

Installed Storage Volume:	42.90 cubic meters.
Storage Volume Per Chamber:	3.12 cubic meters.
Number Of Chambers Required:	7
Number Of End Caps Required:	2
Chamber Rows:	1
Maximum Length:	17.05 m.
Maximum Width:	2.57 m.
Approx. Bed Size Required:	43.73 square meters.

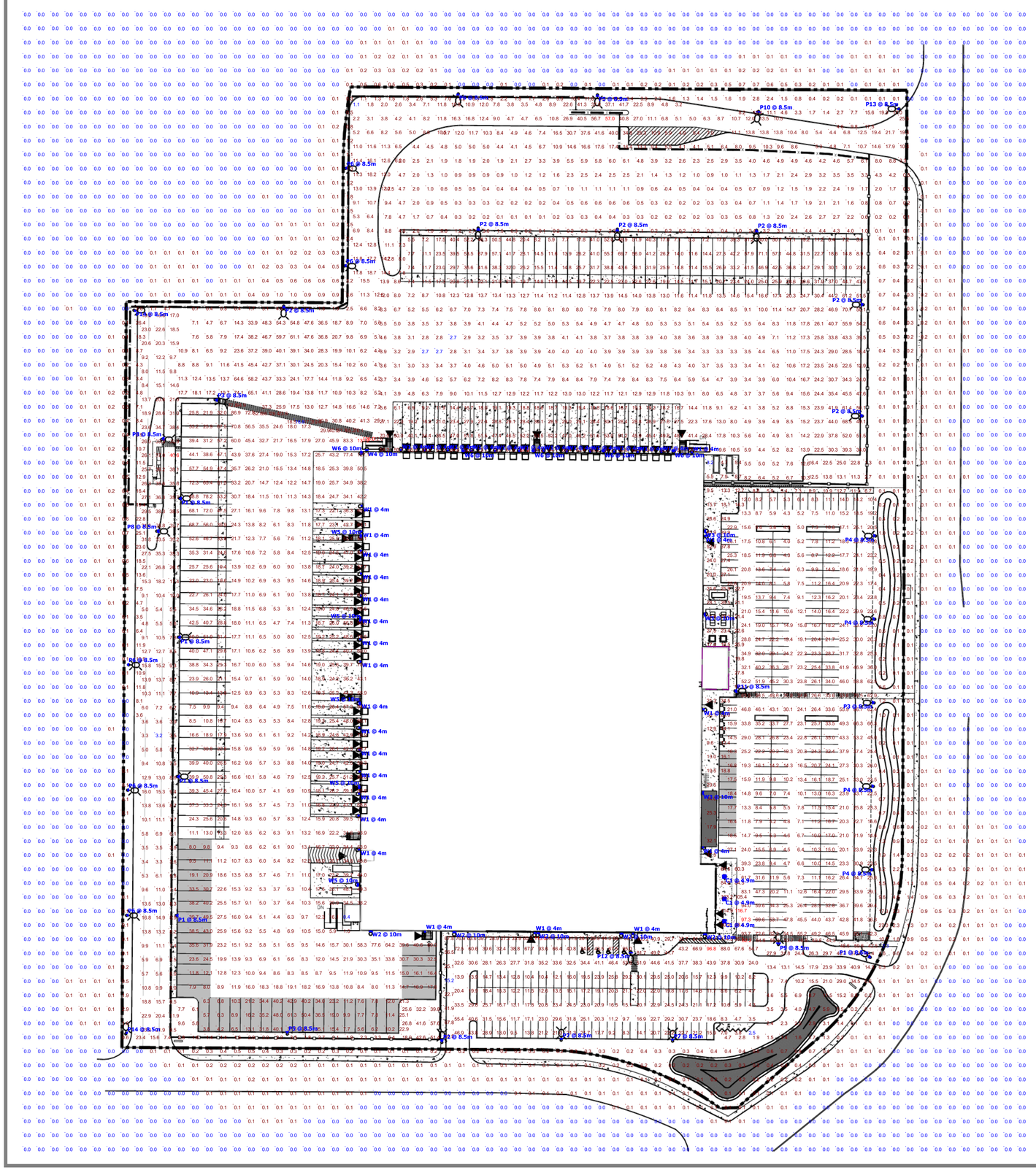
System Components

Amount Of Stone Required:	51 cubic meters
Volume Of Excavation (Not Including Fill):	74 cubic meters
Total Non-woven Geotextile Required:	184 square meters
Woven Geotextile Required (excluding Isolator Row):	0 square meters
Woven Geotextile Required (Isolator Row):	53 square meters
Total Woven Geotextile Required:	53 square meters
Impervious Liner Required:	0 square meters



Appendix F

Photometrics Plan



Plan View
Scale - 1 : 775

Statistics

Description	Symbol	Avg	Min	Max/Min	Avg/Min	Max
Building Perimeter	+	38.1 lux	3.2 lux	36.5:1	11.9:1	116.7 lux
E Pedestrian Crossing		47.4 lux	24.6 lux	3.3:1	1.9:1	81.9 lux
East Parking	+	24.6 lux	4.0 lux	24.3:1	6.2:1	97.3 lux
East Pedestrian Walkway	+	50.3 lux	2.3 lux	35.7:1	21.9:1	82.2 lux
North Parking	+	20.4 lux	2.7 lux	32.6:1	7.6:1	87.9 lux
North Security Gate		30.7 lux	10.6 lux	5.0:1	2.9:1	52.7 lux
NW Pedestrian Crossing	+	51.9 lux	16.8 lux	7.5:1	3.1:1	126.0 lux
South Parking	+	26.6 lux	2.5 lux	38.7:1	10.6:1	96.8 lux
South Pedestrian Walkway	+	50.8 lux	15.2 lux	7.5:1	3.3:1	113.5 lux
West Parking	+	23.9 lux	0.4 lux	328.0:1	59.8:1	131.2 lux
West Security Gate		35.3 lux	29.9 lux	1.4:1	1.2:1	40.8 lux

Schedule

Label	Manufacturer	Catalog Number	Description	Quantity	Lumens Per Lamp	Light Loss Factor	Wattage
C1	Lithonia Lighting	KACM LED 60C 700 40K R5 MVOLT	KACM LED WITH 60-LEDs, @700mA, 4000K, AND TYPE R5 OPTICS	3	16962	1	137
P1	Lithonia Lighting	DSX2 LED P4 40K 70CRI BLC4	D-Series Size 2 Area Luminaire P4 Performance Package 4000K CCT 70 CRI Type 4 Extreme Backlight Control	5	26324	1	272.65
P2	Lithonia Lighting	DSX2 LED P6 40K 70CRI BLC4	D-Series Size 2 Area Luminaire P6 Performance Package 4000K CCT 70 CRI Type 4 Extreme Backlight Control	7	33726	1	341.66
P3	Lithonia Lighting	DSX2 LED P8 40K 70CRI BLC4	D-Series Size 2 Area Luminaire P8 Performance Package 4000K CCT 70 CRI Type 4 Extreme Backlight Control	2	42306	1	462.45
P4	Lithonia Lighting	DSX0 LED P7 40K 70CRI BLC4	D-Series Size 0 Area Luminaire P7 Performance Package 4000K CCT 70 CRI Type 4 Extreme Backlight Control	4	15265	0.9	170.81
P5	Lithonia Lighting	DSX1 LED P9 40K 70CRI BLC3	D-Series Size 1 Area Luminaire P9 Performance Package 4000K CCT 70 CRI Type 3 Extreme Backlight Control	2	24735	1	277.07
P6	Lithonia Lighting	DSX0 LED P4 40K 70CRI BLC3	D-Series Size 0 Area Luminaire P4 Performance Package 4000K CCT 70 CRI Type 3 Extreme Backlight Control	6	8096	0.9	93.04
P7	Lithonia Lighting	DSX0 LED P7 40K 70CRI BLC3	D-Series Size 0 Area Luminaire P7 Performance Package 4000K CCT 70 CRI Type 3 Extreme Backlight Control	2	14780	0.9	170.81
P8	Lithonia Lighting	DSX2 LED P6 40K 70CRI T5M HS	D-Series Size 2 Area Luminaire P6 Performance Package 4000K CCT 70 CRI Type 5 Medium Houseside Shield	2	34071	1	341.6643
P9	Lithonia Lighting	DSX2 LED P5 40K 70CRI T2M HS	D-Series Size 2 Area Luminaire P5 Performance Package 4000K CCT 70 CRI Type 2 Medium Houseside Shield	1	34469	1	326.5841
P10	Lithonia Lighting	DSX0 LED P4 40K 70CRI T2M HS	D-Series Size 0 Area Luminaire P4 Performance Package 4000K CCT 70 CRI Type 2 Medium Houseside Shield	1	9547	1	93.04
P11	Lithonia Lighting	DSX2 LED P6 40K 70CRI T4M	D-Series Size 2 Area Luminaire P6 Performance Package 4000K CCT 70 CRI Type 4 Medium	1	45563	1	341.66
P12	Lithonia Lighting	DSX0 LED P7 40K 70CRI T2M	D-Series Size 0 Area Luminaire P7 Performance Package 4000K CCT 70 CRI Type 2 Medium	1	20086	0.9	170.81
P13	Lithonia Lighting	DSX0 LED P4 40K 70CRI RCCO	D-Series Size 0 Area Luminaire P4 Performance Package 4000K CCT 70 CRI Right Corner Cutoff Extreme Backlight Control	1	8169	0.9	93.04
P14	Lithonia Lighting	DSX0 LED P4 40K 70CRI LCCO	D-Series Size 0 Area Luminaire P4 Performance Package 4000K CCT 70 CRI Left Corner Cutoff Extreme Backlight Control	2	8169	0.9	93.04
W1	Lithonia Lighting	WDGE2 LED P2 40K 80CRI VW	WDGE2 LED WITH P2 - PERFORMANCE PACKAGE, 4000K, 80CRI, VISUAL COMFORT WIDE OPTIC	34	2075	0.9	14.53
W2	Lithonia Lighting	WDGE4 LED P3 70CRI R2 40K	WDGE4 LED WITH P3 - PERFORMANCE PACKAGE, 4000K, 70CRI, TYPE 2 OPTIC	5	18440	1	124.86
W3	Lithonia Lighting	WDGE4 LED P3 70CRI R3 40K	WDGE4 LED WITH P3 - PERFORMANCE PACKAGE, 4000K, 70CRI, TYPE 3 OPTIC	3	18073	1	124.86
W4	Lithonia Lighting	WDGE4 LED P6 70CRI R2 40K	WDGE4 LED WITH P6 - PERFORMANCE PACKAGE, 4000K, 70CRI, TYPE 2 OPTIC	1	25745	1	185.23
W5	Lithonia Lighting	WDGE4 LED P6 70CRI R4 40K	WDGE4 LED WITH P6 - PERFORMANCE PACKAGE, 4000K, 70CRI, TYPE 4 OPTIC	5	25861	1	185.23
W6	Lithonia Lighting	WDGE4 LED P6 70CRI RFT 40K	WDGE4 LED WITH P6 - PERFORMANCE PACKAGE, 4000K, 70CRI, FORWARD THROW OPTIC	5	25586	1	185.23

VISUAL

31940-000 - CPC Ottawa and Vancouver Processing Cent

Designer	IC
Date	06/26/2023
Scale	
Drawing No.	
Summary	

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