City Of Ottawa

Lansdowne Park Event Centre - Ottawa, ON

Stormwater Management Report

January 15, 2025

Confidential

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Revision History

FIRST ISSUE

September 13, 2024	Site Plan Control	
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Fiona Allen, P.Eng.	Iain Smith, P.Eng.	Iain Smith, P.Eng.

REVISION 1

January 15, 2025	Site Plan Control	
Prepared by	Reviewed by	Approved by
Fiona Allen, P.Eng.	Iain Smith, P.Eng.	Iain Smith, P.Eng.

REVISION 2

FINAL

Signatures

Prepared by

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Experienced Engineer, Water Resources

Date

Approved[1] by (must be reviewed for technical accuracy prior to approval)

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Date

[1] Approval of this document is an administrative function indicating readiness for release and does not impart legal liability on to the Approver for any technical content contained herein. Technical accuracy and fit-for-purpose of this content is obtained through the review process. The Approver shall ensure the applicable review process has occurred prior to signing the document.

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Client

	City of Ottawa

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1 INTRODUCTION

1.1 Scope

Following the Zoning By-Law Amendment submission in September 2023, the Lansdowne Park redevelopment project (Lansdowne 2.0) entered the Site Plan Control Application stage. WSP was again retained by the City of Ottawa to provide servicing, grading and stormwater management design services for the phase 1 (Event Centre) development of the project for Site Plan Control Application.

As the existing system stormwater management system for the phase 1 development extends across the overall site, this report analyses the stormwater management for the entire site.

1.2 Site Location

The Lansdowne site is home to many commercial, residential, and leisure facilities. This includes TD place Stadium, Aberdeen Pavilion, Horticultural Building, mixed-use retail/office/residential, and a subsurface parking lot. The overall site is approximately 15.4 ha, and borders Bank Street to the west, Holmwood Ave to the north, and Queen Elizabeth Drive to the south and east.

1.3 Design Criteria

The existing stormwater management system is outlined in the Stormwater Management Design Report for Lansdowne Urban Park, February 2012, by Stantec Consulting Ltd. The design criteria for the proposed development will follow the same criteria outlined in the Stantec 2012 report and listed below.

- A peak flow rate of 616 L/s to O'Connor Street sewer for all events from the 2-year to the 100-year return period
- Stormwater shall be treated to MOE "enhanced" standard (80% TSS removal)
- The "first flush" (i.e. 10mm event) shall be directed to the O'Connor Street storm sewer for the entire site drainage area.
- Outflow to O'Connor Street sewer will be restricted if the downstream system surcharges and will be cut off when the receiving sewer HGL is higher than the onsite HGL.

— The minor system shall be designed for a 5-year level of service with minimal surface ponding.
— The major system shall provide a 100-year level of service while minimizing outflow to the canal.

1.4 Supporting Documents

The existing conditions of the site were determined with information from various reports, drawings, surveys, and models. Listed below are the documents used to develop the existing conditions of the model and the information that was used in the model.

Stormwater Management Design Report for Lansdowne Urban Park, February 2012, by Stantec Consulting Ltd.

The 2012 Stantec report was prepared in support of the development of Lansdowne Park. This report was the main document that was used to develop the model. The report details the multiple storage volumes and their control structures, catchment areas, allowable release rates, and overland flow routes. The surveys show that what was built differs from the system that is outlined in the 2012 Stantec report. Details from the surveys and as built drawing are used over the 2012 Stantec report to development the model where differences occur.

Site Grading Servicing Drawing, 2013, by DSEL David Shaeffer Engineering Ltd.

This CAD drawing includes the locations of catch basins, trench drains and their rim elevations. This drawing was used to determine the number of catch basins in each catchment and their rim elevations. The drawing was also used to evaluate the major drainage from the TD Place field. Additionally, this drawing was used to determine the overland flow path through the site area outside of the phase 1 development.

As built drawing presented in Appendix B-2

The inverts for the existing storm sewers were obtained from this drawing. The inverts differ slightly from the 2012 Stantec report but the most significant difference is the super pipe quantity control structure. The 2012 Stantec report states the structure is located in manhole 105 and manhole 106 but the as built states that the structure is located down stream in manhole 106. In the model outlined below the structure has been placed in manhole 106 to be consistent with conditions on site. The minor system for TD Place field is determined from this drawing. Additionally, the outlet locations for the underground stormwater collection system are outlined in this drawing.

Mechanical Design Brief, 2014, by Smith+Anderson

The brief outlines the stormwater left station design. The brief states that the system will pump the runoff into the storm sewer at the rate which it enters. As a result, the pumps are modeled as inflow=outflow and the underground stormwater collection system is modeled with the runoff being directed to the storm sewer.

2 EXISTING CONDITIONS

2.1 General

The existing conditions on the Lansdowne site are as designed in the Stantec Stormwater Management Design Report – Lansdowne Urban Park (2012) and the DSEL Site Grading and Servicing drawing (2013). The primary site stormwater outlet is to the storm sewer on O'Connor Street, which discharges to a combined sewer at the intersection with Fifth Street.

The existing system provides quantity control via roof top storage, surface ponding, super pipes, and underground storage basins controlled by various orifices and weirs.

When the system was originally built and designed, runoff during large storm events (i.e. greater than the 5-year return period) was directed to the Rideau Canal through an overflow pipe. This connection has since been removed.

Overland flow from O'Connor Street and the surrounding external area is directed to Syliva Holden Park via a sag in the road on O'Connor Street north of the site. The external flow does not enter the site.

2.2 Existing System

The stormwater management system consists of rooftop storage, super pipes, two subsurface storage tanks, surface storage on the Great Lawn, outlet controls, and quantity control structures. Runoff from buildings A-D, G-K, and ROWs Marche Way, Paul Askin Way, Exhibition Way, and Frank Clair Lane discharge to the underground stormwater collection system. Runoff from the stadium is directed to the minor system within the stadium.

Runoff from the buildings A-D and G-K rooftops are controlled before discharging to the underground stormwater collection system.

The two underground storage tanks provide 600 m^3 in Basin 1 and 2200 m^3 in Basin 2, with 700 m^3 provided in pipe storage (total of 3500 m^3 subsurface storage). Basins 1 and 2 are controlled by a 450 mm orifice and an overflow weir which controls runoff before discharging to the system storm sewer system.

Basin 2 overflows to the Great Lawn via a catch basin. The Great Lawn provides a minimum storage volume of 3000 m^3 through surface ponding. Runoff directed to the

Great Lawn is captured by a perforated pipe system and catch basins which direct runoff to manholes FF and GG.

Once the ponding in the Great Lawn exceeds an elevation of 64.5 m, runoff enters the double inlet catch basin which discharges to the Rideau Canal. This outlet is included in the existing model described below but this connection has been abandoned and is no longer functional.

Once the ponding in the Great Lawn exceeds an elevation of 64.9 m runoff will flow overland to the Rideau Canal.

Quantity control for the majority of the site is provided via a 600 mm orifice plate in manhole 106. This orifice provides control for the superpipe and is downstream of the basins.

A backwater valve is provided in manhole 101 prevent flow from the O'Connor Street sewer from entering the site.

A schematic of the existing stormwater management strategy is included in Appendix B.

A PCSWMM model was created to represent the existing conditions on the site based on the documentation provided in the Stantec 2012 report and the As-Built servicing drawings, included in Appendix B.

After review of the as built drawings and discussion with the property manager of TD Place it appears that the location of the existing OGS, outside of Lansdowne 2.0, is unknown or may not have been installed. An additional investigation for the OGS may be required to locate it.

2.3 Modelling Methodology

A PCSWMM model of existing conditions was created as a baseline with which to compare the proposed design. The system was modeled as a dual drainage system to separate the minor flow collected by trench drains and catch basins from the major overland flow.

- **Catchment Areas**: Catchment areas were delineated based on the Stantec catchment area plan (C03) and the documents outlined in Section 1.4. Sub-catchment imperviousness was determined by creating a land use shapefile and using the PCSWMM spatial weighting tool. This was then checked by completing an area take off in Sub-catchment parameters are included in pages 1 to 9 of Appendix B-5 outlines.

- **Storm Sewers**: Storm sewers were modelled as conduits with their size and inverts based on the as-built servicing drawing. A roughness coefficient of 0.013 and average loss coefficient of 0.2 was used.
- **Weirs**: Weirs were used to direct runoff to the major flow route when storm sewer capacity is exceeded. Weirs are also used within the underground storm chamber inlet/outlet structures. Drawing C05 from the 2012 Stantec report was used to determine the inverts of the weirs.
- **Orifices**: An orifice was modelled at the quantity control structure with a discharge coefficient of 0.62. Orifices were also used in the model to represent the 450 mm backflow preventers within the underground storage chamber inlet/outlet structures. Drawing C05 from the 2012 Stantec report was used to determine the inverts of the orifices.
- **Catch basins**: Catch basins are modeled as outlets in the PCSWMM model. The rating curve used to represent the flow through the catch basin was compared to rating curve labeled “CB” provided by the City of Ottawa. To reduce the number of outlets in the model multiple catch basins are modeled together. This is done by multiplying the flow in the rating curve by the number of catch basins.
- **Trench drains**: After discussion with the supplier the trench drains in the ROWs are modeled as a rectangular conduit which outlets to a 200 mm lead. The trench drains which collect from TD Place field are parabolic in shape and the conduits have been modeled as such.
- **Storage**: Underground storage chambers were modelled using storage nodes with storage curves based on their storage area. The Great Lawn was modelled as a storage node with storage defined as the average area available for storage. Roof storage was also modelled based on the documentation in the DSEL FSR report (2012).
- **Ditches**: Ditches shown in the Stantec grading plan were modelled as conduits. Ditches were connected to storm sewers with a catch basin and discharge curve as per MTO design chart 4.19.
- **Rainfall**: The 3-hour Chicago storm using the IDF parameters from the Ottawa Sewer Design Guidelines was used in the analysis. Additionally, a 100-year design storm increased by 20% was included as a sensitivity analysis.
- **Tailwater Conditions**: Tailwater conditions at O’Connor Street were set as a timeseries with a peak at the 5-year peak HGL of 65.2 m. The timeseries was calibrated to produce similar results to those shown in the Stantec report. This tailwater condition will be revised as more information becomes available.

- **Backwater Valve**: A backwater valve is provided in manhole 101 to ensure that flow from the O'Connor Street sewer does enter the site. The backwater valve is represented by a flap gate was added to the conduit between the O'Connor outfall and the junction for manhole 101. Additionally, the 450 mm orifices for Basins 1 and 2 are equipped with backwater valves, a flap gate was added to each orifice in the model to represent this.
- **Underground Stormwater Collection System**: The underground collection system discharges runoff from the ROWs to manhole 109 and the controlled flow from the buildings is discharged to various manholes. This is outlined in Appendix C-1 and the as built outlined in Appendix B-2.

The results of the existing conditions PCSWMM model are not expected to exactly match those of the Stantec 2012 report due to the following:

1. Data regarding tailwater condition – In the Stantec analysis, this data was provided with the City of Ottawa Infoworks model for the Holmwood and O'Connor sewer system and therefore the Stantec Model was able to incorporate a dynamic tailwater condition at the site outlet. The PCSWMM model can be refined as more information becomes available.
2. Infoworks Model – Stantec modelling for the existing site was completed in Infoworks. This model was reviewed and it was determined that the Infoworks model was insufficient and could not be used to develop the PCSWMM model.
3. SWMM Engines – Developments in stormwater management modelling software engines have been made since 2012, which affects the ability to replicate results.
4. The system as it now exists does not match the system described in the Stantec report. These differences are outlined below:
    a. The connection to the Rideau Canal has been disconnected.
    b. Basin 2 was designed to have two CB overflows to the Great Lawn surface storage, only 1 was built.
    c. Runoff from Princess Patrica Way was to be directed to the underground stormwater collection system. Instead, the runoff is collected by a storm sewer system and discharges to manhole 107, which is downstream of the basins and Great Lawn.
    d. Roof runoff is controlled and directed to various manholes, not only manhole 109 as the Stantec report describes. The as built drawing in Appendix B-2 outlines the discharge location of each building.

The focus of this analysis is on the comparison between storage and outflows in the existing conditions PCSWMM model versus the proposed conditions PCSWMM model. PCSWMM modelling output is included in Appendix B.

2.4 Existing Conditions Model Results

The existing conditions PCSWMM model was run for the 2 to 100-year events and a sensitivity analysis.

Storage volumes for Basin 1, Basin 2, and the Great Lawn are shown in Table 2.1, and peak flows at the outfalls in Table 2.2.

Table 2.1: Existing Condition Storage Results

Return Period (Years)	Basin 1			Basin 2			Great Lawn		
	Max Inflow (m^3/s)	Peak Volume (m^3)	Peak HGL (m)	Max Inflow (m^3/s)	Peak Volume (m^3)	Peak HGL (m)	Max Inflow (m^3/s)	Peak Volume (m^3)	Peak HGL (m)
2	0.426	509	63.82	0.267	1596	63.80	0.200	232	64.43
5	0.668	610	64.21	0.593	2164	64.24	0.323	316	64.44
10	0.789	610	64.21	0.887	2165	64.27	0.414	387	64.45
25	0.954	610	64.21	1.205	2164	64.24	0.536	479	64.46
50	1.076	610	64.21	1.626	2165	64.28	0.633	546	64.47
100	1.168	610	64.21	1.804	2216	64.35	0.734	611	64.48
100+20 %	1.419	610	64.21	2.923	2216	64.35	0.959	749	64.49

Table 2.2: Existing Condition Peak Flows

Return Period (Years)	O'Connor Sewer Peak Flow (m^3/s)		Rideau Canal Peak Flow (m^3/s)	
	Max Inflow (m^3/s)	Peak HGL (m)	Max Inflow (m^3/s)	Peak HGL (m)
2	0.372	65.2	0	0
5	0.486	65.2		
10	0.487	65.2		
25	0.488	65.2		
50	0490	65.2		
100	0.492	65.2		
100+20%	0.497	65.2		

Please note that the 2012 Stantec report and Infoworks model resulted in a 100-year release rate of 0.616 m^3/s. The recreated PCSWMM model presented above in Table 2.2 shows a lower flow rate. The lower flow rate in this model is due to the reasons listed below

- The model presented in the 2012 Stantec report did not spilt the minor and major flow and as a result, all flow was directed to the minor system.
- Basin 1 floods and overflows in the 5 to 100-year storms, which was not accounted for in the Stantec model.
- Basin 2 begins to overflow to the Great Lawn in the 2-year event, which was not accounted for in the Stantec model.
- During the 2-year storm manholes STM B and CBMH U begin to flood, which was not accounted for in the Stantec model.
- The underground stormwater collection system discharges to different points then what was described in the Stantec report.

An allowable release rate of 0.616 m^3/s is used for the purpose of this report as it was established as the allowable release rate in the 2012 Stantec Report.

3 POST DEVELOPMENT CONDITIONS

3.1 General

Under proposed conditions the majority of the site land use remains as it is under existing conditions except for the new event centre and Great Lawn. The new event centre requires some rerouting of storm sewers and encroaches on the surface storage previously provided in the Great Lawn. The proposed design involves routing storm sewers south of the new event centre and installing subsurface storage beneath the Great Lawn to account for the additional storage required from the change in land use and elimination of storage on the surface of the Great Lawn.

3.2 Minor System

The subject site will be serviced by a storm sewer system designed in accordance with the amendment to the storm sewer and stormwater management elements of the Ottawa Design Guidelines. The minor system has been designed to convey the 5-year storm without ponding on the surface. Storm sewer design sheets are included in Appendix C-2. A hydraulic analysis report prepared by the trench drain supplier, ACO, which outlines the trench drains sizing, is included in Appendix C.

As discussed above the minor system will be updated to accommodate the new event centre. This includes removing a portion of the super pipe system that conveys flow from TD Place to Basin 2. The proposed storm will be routed south around the event centre and will discharge to the proposed subsurface storage beneath the Great Lawn. Storage within the Great Lawn will be replaced by a subsurface chamber system (Basin 3), wrapped in an impermeable layer to ensure there is no infiltration. Basin 3 then drains by gravity to Basin 2 via a 900 mm pipe.

Runoff from the Great Lawn and the surrounding at-grade area will be directed to the proposed underground chamber system via trench drains. Previously this runoff was directed to the Great Lawn which drained to the superpipe system and Basin 1.

Runoff from the proposed event centre is spilt and will discharge via connections located at manholes 209 and 204. It assumed that there is no quantity control within the event centre and runoff will flow uncontrolled to the proposed storm sewer.

REMOVALS IN THE PROPOSED CONDITION

As discussed above some of the existing minor system will be removed to for the new event centre. Table 3.1 outlines the storm sewer that will be removed in the proposed condition and the new sewers which will be replacing them.

Table 3.1: Storm Sewer Removals

Removed Storm Sewer				Proposed Storm Sewers			
From	**To**	**Diameter (mm)**	**Volume (m^3)**	**From**	**To**	**Diameter (mm)**	**Volume (m^3)**
STM 117	STM 116 (TD Place)	600	1.6	STM 209	STM 208	900	41.8
STM 116 (TD Place)	STM 113	600	17.4	STM 208	STM 207	1050	22.3
STM 113	STM 112	1050	41.4	STM 207	STM 206	1050	22.0
STM116	STM 112	900	54.1	STM 206	STM 205	1050	22.3
STM 111	STM 110	600	11.2	STM 205	STM 204	1050	25.6
				STM 204	STM 203	1050	23.5
				STM 203	STM 202	1050	34.0
				STM 212	STM 211	600	8.5
				STM 211	STM 110	600	3.1

Overall, 126 m^3 of superpipe storage will be removed but will be replaced with 204 m^3 of storage with in the proposed storm sewer outlined in Table 3.1. Appendix C-3 includes a table of the superpipe and the storage it provides. A table outlining the total superpipe storage is included on pages 21 to 22 of Appendix C-3

Further the surface storage provided by the Great Lawn will be removed and replaced with underground chambers. The Great Lawn provided 3000 m^3 of surface storage and 614 m^3 of this storage was utilized during the 100-year event. This will be replaced by an underground chamber system with a volume of 4777 m^3.

A removals plan is available as a part of the civil drawings package.

3.3 Major System

The major system will remain similar to the existing conditions. The site is graded toward to Great Lawn where trench drains around the perimeter will intercept overland runoff and direct it to Basin 3 under the Great Lawn. The overland flow path from TD Place has been altered to flow south to the existing swale which runs north along the walking path. Emergency overland flow is directed toward the Rideau Canal during

extreme events exceeding the 100-year design storm. There is no pipe outlet to the Rideau Canal.

3.4 Quantity Control

Additional storage is required to account for the addition of the new event centre and the removal of surface storage on the Great Lawn. The proposed storm system was modelled in PCSWMM according to the same methodology presented in Section 2.3. Sub-catchment areas and parameters were modified based on the proposed development, a detailed breakdown of each catchment in the proposed condition is available in pages 10 to 20 of Appendix C-3. To size of the new underground storage chamber (Basin 3) this system was modelled iteratively to determine the required area and volume to meet the allowable release rate. Runoff from the new event centre and increased north stands will be directed to Basin 3 before discharging to Basin 2 via a 900 mm pipe. Basin 2 then discharges to the superpipe and Basin 1.

The new underground storage chamber beneath the Great Lawn will have a volume of 4777 m^3. A specification drawing from the supplier is included in Appendix C-5, this includes a stage storage table developed specifically for PCSWMM. Replacing the surface storage with underground storage will improve the useability of the Great Lawn for recreation and events as the ground surface will no longer be used to pond runoff. Overland flow directed to the Great Lawn will be captured by trench drains around the perimeter, and the lawn will be graded to limit ponding. The greatest ponding depth on these trench drains occurs at trench drains 5 and 6 which have ponding depths of 0.03 m and 0.06 m respectively.

In events greater than the 100-year storm flow will be directed overland to the Rideau Canal.

This storage results in reduced flooding in the ROWs and Basin 1 as the HGL in the superpipe system has been reduced. This is due the large increase in storage at a lower elevation provided by Basin 3.

Storage volumes, peak HGL and peak inflows during the 2 to 100-year events for Basin 1, Basin 2, and the new Basin 3 are shown in Table 3.2. Peak flows are shown in Table 3.3.

Table 3.2: Proposed Condition Storage Results

Return Period (Years)	Basin 1			Basin 2			Basin 3		
	Max Inflow (m^3/s)	Peak Volume (m^3)	Peak HGL (m)	Max Inflow (m^3/s)	Peak Volume (m^3)	Peak HGL (m)	Max Inflow (m^3/s)	Peak Volume (m^3)	Peak HGL (m)
2	0.400	504	63.81	0.224	753	63.32	0.502	1313	63.32
5	0.630	523	63.85	0.491	1182	63.56	0.682	2219	63.56
10	0.710	541	63.89	0.633	1492	63.74	0.812	2836	63.74
25	0.842	564	63.93	0.936	1842	63.93	0.987	3475	63.93
50	1.018	609	64.11	1.265	2143	64.10	1.122	3948	64.10
100	1.072	610	64.21	1.566	2164	64.24	1.284	4230	64.24
100+20%	1.255	610	64.21	2.328	2165	64.25	1.923	4277	64.26

Table 3.3: Proposed Condition Peak Flows

Return Period (Years)	O'Connor Sewer Peak Flow (m^3/s)			Rideau Canal Peak Flow (m^3/s)	
	Max Inflow (m^3/s)	Peak HGL (m)	Allowable Release Rate (m^3/s)	Max Inflow (m^3/s)	Peak HGL (m)
2	0.283	65.2	0.616	0	0
5	0.284	65.2			
10	0.336	65.2			
25	0.470	65.2			
50	0.527	65.2			
100	0.544	65.2			
100+20%	0.547	65.2			

The modeling results demonstrate that the peak flows from the proposed system for all events up to and including the 100-year are lower than the allowable release rate established in the 2012 Stantec Report. Further, The proposed system results in lower release rates to the O'Connor Street Sewer in the 2 to 25 – year events and minimal flooding throughout the site. For example, in the purposed condition Basin 1 is full during the 50-year full and floods during the 100-year storm while in the existing condition Basin 1 floods and overflows in the 5 to 100-year storms.

A sensitivity check is also run to evaluate the effect a 100-yr +20% storm would have on the system. Basin 1 will continue to flood as it does in the 100-year storm but Basin 2

and 3 will not flood. Additionally, Trench drain 5 which collects runoff from the major route will not have ponding greater then 0.15 m during a 100-yr +20% storm.

3.5 Quality Control

As noted in Section 1.3, the water quality criteria requires the long-term removal of 80% TSS on an annual loading basis. To achieve the required water quality requirement a treatment train approach is proposed.

Runoff directed to the proposed underground storage will be treated by an OGS and the Isolator® Row Plus provided in the chamber system.

An Isolator® Row Plus shall be proposed at each storm inlet to provide water quality control with easy access for maintenance. The Isolator® Row Plus is the first row of StormTech chambers covered in a non-woven geotextile fabric with a single layer of proprietary woven fabric at the bottom that serves as a filter strip, providing surface area for infiltration and runoff reduction with enhanced suspended solids and pollutant removal.

The Isolator® Row Plus is designed to capture the “first flush” and offers the versatility to be sized on a volume basis or a flow-rate basis. An upstream manhole not only provides access to the Isolator® Row Plus but includes a flow splitter such that stormwater flow rates or volumes that exceed the capacity of the Isolator® Row Plus bypass through a manifold to the other chambers. This creates a differential between the Isolator® Row Plus and the manifold, thus allowing for settlement time in the Isolator® Row Plus. After Stormwater flows through the Isolator® Row Plus and into the rest of the StormTech chamber system, it is passed at a controlled rate through an outlet manifold and outlet control structure.

The Isolator Row® Plus was verified by Environmental Technology Verification (ETV) in July 2020, with an average 82% removal efficiency of Total Suspended Solids (TSS). Refer to Appendix C for ETV verification statement.

An OGS is proposed to treat runoff from the underground system before discharging to Basin 2. This OGS is proposed downstream of the isolator row as there are multiple inlets into the chamber system and each would require its own OGS. By placing the OGS downstream of the Basin 3 only 1 OGS is required.

An FD-8HC OGS is proposed to treat runoff at 29% TSS removal, the OGS has a flow capacity of 1,415 L/s. In the 100-year event the flow from Basin 3 is 328 L/s, therefore the proposed OGS has the capacity to convey the flow from the 100-year event.

The net annual removal efficiency of the proposed OGS and Isolator Row® Plus is provided in Appendix C-5. Overall the proposed system will provided 85.5 % TSS removal and treat 90% is of total annual runoff. The operation and maintenance manual for the isolator flow is also included in Appendix C-5.

3.6 ECA

Currently the site has an ECA number 3380-8UBJJ9. This ECA contains a list of SWM works which are subject to the approval, this includes the great lawn surface storage which will be removed in the proposed condition and along with sections the superpipe outlined in Table 3.1. As a result, an ECA amendment is required to reflect the changes to the approved SWM works.

4 CONCLUSIONS

The Ottawa Sport and Entertainment Group in collaboration with the City of Ottawa are proposed to demolish the existing Civic Arena and North Stands. The proposed Lansdowne 2.0 will include a new 5,500 seat Event Centre, a new 11,200 to 12,000 seat spectator North Stadium Stands and the addition of rental and owned residential units with approx. 1199 units, and associated subsurface parking, as well as the significant landscaping east of the new Event Centre.

Water Quantity

The site will be required by the City to limit the discharge of stormwater to the existing conditions peak flow rate, with stormwater up to the post-development 100yr storm stored on-site. The model results in a maximum site discharge rate of 546 L/s to the O'Connor Street sewer, with additional required storage of 4777 m^3 provided through Basin 3.

Water Quality

A treatment train comprised of an OGS and isolator row are proposed to in order to ensure 80% TSS removal for the site.

APPENDIX

A City NCC Comments

File Number: D01-01-23-0009
D02-02-23-0047

August 3, 2023

Patricia Warren
Fotenn Planning + Design
Via email: warren@fotenn.com

Subject: **Official Plan and Zoning By-law Amendment Application – 945 & 1015 Bank Street – Formal Review Comments**

Please find below the consolidated comments from the formal review of the above noted applications.

1. Planning

Comments:

1.1. Generally, the proposal is in keeping with the Official Plan adopted by Council.

1.2. The Policy team is supportive of the proposed OPA, but requested that a minor change be made.

> "Rather than stating that the Special District policies supersede the Greenspace designation, it would be more appropriate to simply list in the area-specific policy the desired permitted uses on lands designated as Greenspace within the Special District (i.e., an event centre with a green roof etc.).
>
> The preamble in Section 6.6 – Special Districts of the Official Plan states: "[…] They are distinct areas that transcend the role and function of Hubs, Corridors and Neighbourhoods, and warrant unique planning approaches." Notably, Greenspaces are not included in this list as they are intended to maintain their original function within the Special Districts.
>
> It would be more appropriate to expand what is permitted rather than risk setting a precedent that allows for OPAs to effectively eliminate the greenspace function in other Special Districts."

1.3. Please see the draft OPA and ZBA details attached for review and comment.

2. Engineering

Comments:

Functional Servicing & Stormwater Management Study, prepared by WSP, May 25, 2023

2.1. *General*

Section 1.3 of the report states “the minutes for the Pre-Application Consultation Meeting for this Zoning By Law Amendment is provided for reference in Appendix A”. Meeting minutes could not be found in appendix A please revise.

2.2. *Storm*

PCSWMM models are under review by City of Ottawa staff, comments will be provided upon receipt.

The underground storm water storage tank (approx. 4100m3) proposed within the great lawn as part of the study requires technical foundation design based off a geotechnical investigation of the subsurface profile. Please coordinate with the geotechnical engineering consultant Parsons to ensure that the geotechnical study considers this aspect of the design and speak to this in the report.

2.3. *Sanitary*

Provide detailed calculations used to determine the existing sanitary flows, and the anticipated sanitary flows.

2.4. *Water*

Table 2-2 Water Demand and Boundary Conditions Existing Conditions does not match the required fire flow or water demand calculations in Appendix A please clarify and revise.

Provide boundary condition email correspondence with the City of Ottawa in the Appendix of the study.

Please modify section 2.3 (Domestic Supply and pressure) to reference technical bulletin ISD-2010-0

Geotechnical Investigation Proposed Lansdowne Rink and Towers, prepared by Paterson Group, June 28, 2023, Report: PG5792-1

2.5. The project consists of significant underground storm water storage tank (approx. 4100m3) proposed within the great lawn as part of the functional servicing and storm water management study prepared by WSP. Please confirm and coordinate with WSP’s consulting team to ensure that the geotechnical study considers this aspect of the design and speaks to this in the report. The geotechnical investigation should speak to the foundation of the storage tank and determine if additional investigation of the subsurface within the great lawn is required for this proposed structure. For more information, please consult the study prepared by WSP.

Roadway Traffic Noise Feasibility Assessment, prepared by Gradient Wind Engineering Inc., June 16, 2023, Report: 23-053-Traffic noise feasibility.

2.6. During 10. Bank street is divided Arterial not undivided in front of the project, so traffic volume count should be 35,000 instead of 30,000, please clarify. In addition, Queen Elizabeth Drive roadway classification is not listed within the city of Ottawa official plan and Transportation master plan please provide source of Queen Elizabeth Drive roadway classification.

2.7. In section 4.2.3 of the assessment, it is unclear if the listed parameters used for the noise prediction calculations were imputed for the STAMSON model, the Predictor-Lima model, or both. Please clarify in the body of the report.

2.8. The noise feasibility assessment is required to be modeled using the City of Ottawa approved STAMSON modeling program. Additionally, the STAMSON results shown in the report have shown consistently higher results therefore it is possible the STAMSON model is more conservative. Please provide significant justification for the use of the Predictor-Lima software over the approved STAMSON software.

2.9. Have noise impacts from the stadium been factored into the assessment for the predicted noise levels of the outdoor living areas?

2.10. Additional information is required for the analysis of the proposed event center. Quantify the predicted noise levels, and to what extent will the proposed 'room within a room' design mitigate the anticipated noise. Similarly, quantifiable information and assessment of the noise generated from pedestrians congregating at the event center is required to be investigated. What are the potential sound levels generated by the congregating pedestrians, will this impact the residential units as well as the outdoor amenity areas of the proposed towers?

2.11. The STAMSON calculations for receptor 3 and receptor 4 use different barrier heights, please clarify.

2.12. The STAMSON calculations for receptor 3 use a receiver source distance of 80m where receptor 4 uses a receiver source distance of 76m. Based on figure-3 it appears that receptor 3 is closer to the noise source please clarify.

2.13. As per the noise feasibility assessment the following construction is proposed for the event center east of the proposed towers "*the floor could be isolated, jack up slab, the interior walls would be built of double row studs with the first row of studs built on top of the isolation slab. The second row of studs would be on the surrounding structure. A suspended ceiling would be hung using isolation hangers*". Please confirm and coordinate with the geotechnical consultant, Parsons Group, that this type of construction is feasible within the geotechnical constraints of the site. Please speak to this within the assessment.

<u>Phase I & Phase II Environmental Site Assessment</u>

2.14. It has been confirmed with City staff that a Phase I & Phase II environmental site assessment is not required for the Zoning By-law Amendment or The Official Plan Amendment. A phase I and phase II environmental site assessment will be required for the subsequent Site Plan Control application.

<u>Pedestrian Level Wind Study, prepared by Gradient Wind Engineering Inc., June 15, 2023</u>

2.15. It has been confirmed with City staff that the pedestrian level wind study is under review by the urban design.

3. Corporate Real Estate Office

Comments:

3.1. A new Phase One Environmental Site Assessment (ESA) will be required at the time of Site Plan. Should the Phase One identify any Areas of Potential Environmental Concern, a Phase Two ESA will also be required.

3.2. A Record of Site Condition (RSC) will have to be filed with the Ministry of Environment, Conservation and Parks in order to permit the more sensitive residential land use in the area currently occupied by the north side stands and arena structure. This can also be addressed with conditions at the time of Site Plan Approval.

4. Transportation

Comments are forthcoming.

5. Urban Design

Comments:

Clarification questions and additional information requested:

5.1. The zoning schedule permits 38m heights and has a notch close to the Aberdeen Pavilion (Please see the Appendix 1, image 1- area circled in red color). The podium of Tower 3 appears to extend the permitted 38m beyond the zoning line. Does the 'tail' of the proposed building fall within the area with a 6m height max (see Appendix 1, image 2– blue line is estimated as the location of the zoning line). Please provide a drawing that overlays the zoning lines with the proposed building footprint to provide clarity.

5.2. During games or festival times, it is essential to have a well-thought-out plan to handle the crowd effectively, including crowd interface with vehicular circulation and parking. Please clarify:

5.2.1. What are the assumptions regarding pedestrian volumes?

5.2.2. What calculations were used to determine volumes for the commercial areas, when there are events and / or multiple events on site, during different seasons etc.?

5.2.3. Were the edges of the public realm determined by pedestrian volumes or by the limits of easements and building footprints?

5.3. Please clarify:

5.3.1. Which vehicles can drive down to the Exhibition Way as far as the Aberdeen Pavilion.

5.3.2. Is there residential drop-off / delivery all the way to Tower 3?

5.3.3. Are there alternate locations for the servicing / loading function?

5.4. What is the current amount of useable park / great lawn space and what is the size of the park in the proposed concept? Additional dimensioned plans and

section drawings of the berm and grade transition from parkland to Event Centre should be provided.

5.5. The Design Brief TOR noted the need to provide both streetscape cross-sections and a conceptual landscape plan. Neither requirement has been met. These drawings are required to evaluate how the public spaces around Aberdeen, Tower 3, and Event Centre, in particular, will work. The drawings should focus on the proposed public realm and indicate, at minimum:

5.5.1. The locations for pedestrian and vehicular movement.

5.5.2. The size and location of pedestrian gathering points and plazas.

5.5.3. The area available for outdoor staging (current versus proposed).

5.5.4. The room available for tree planting.

5.5.5. the space available for street furniture.

5.6. Streetscape cross-sections and a conceptual landscape plan are required with the second UDRP submission.

5.7. Updated wind and shadow studies are required with the second UDRP submission, based on any proposed revisions.

Building Massing and Public Spaces:

5.8. As noted in previous comments and by the UDRP, tower floorplates shall adhere to the City's High-Rise Building Design Guidelines. Therefore, the floorplates, including balconies, cannot exceed 750m2.

5.9. For towers up to 30-storeys, the minimum separation distance between towers is 23m. For towers over 30-storeys, the minimum separation distance is 25m. Greater tower separations should be provided when tower floorplates exceed 750m².

5.10. The wind and shadow studies provided show negative impacts on the public realm. Specifically, the shadow study shows that Exhibition Way and the Aberdeen Pavilion are in shadow for large amounts of the day. The wind study shows that Exhibition Way and the plaza spaces around the Pavilion were comfortable for sitting, but with new development these comfortable areas will be reduced. The approach to massing and tower placement should re-considered to minimize the impacts of shadowing and wind on the public realm.

5.11. Tower 3 takes away from the experience of the Aberdeen Pavilion; it shifts views and emphasis away from the Pavilion and blocks certain views of the Pavilion. Additionally, it creates significant shadow and wind impacts on the public realm. Urban Design's position is that Tower 3, and the associated podium, should be eliminated (Please see attached Appendix 1, image 3,4 and 5) and the redevelopment of this site should, at maximum, include only two towers.

5.12. Urban Design believes that there should be no building where the Tower 3 podium / base is shown. The space should remain open, at grade, public space in order to: (1) enhance the experience of the Aberdeen Pavilion as seen from the south

side stands, (2) allow for enlarged gathering spaces around the Pavilion and entrance to the Event Center (see Public Space comments below) which will be particularly important when there are events / concurrent events, (3) create more opportunities for tree planting and seating areas, and (4) Provide additional public realm on-site.

5.13. The attached Appendix 1, images 3,4 and 5 shows the positive impacts on the open space and Aberdeen Pavilion with the removal of the tower 3 and its podium. The removal of this podium and tower also creates clear sight lines from north to south, creating a stronger visual connection between the Event Centre and the existing Lansdowne commercial/mixed use development and associated public realm. This space should remain free and clear of any buildings, including if a three- tower solution be pursued,

5.14. Should a three-tower scenario be pursued, the towers are to have a maximum 750m2 floor plate (including balconies) with appropriate separations indicated above, and be located above the north side stands. The attached Appendix 2 illustrates a few conceptual three-tower options.

5.15. In a three-tower scenario towers should be of different heights generally. Taller building / higher density should be positioned closest to Bank Street, while the lower can be placed closer to the Aberdeen Pavilion to better integrate with the historical context of the site (see attached Appendix 2).

5.16. In a two-tower scenario, which is preferred, a twin-tower design may be appropriate. Appendix 3 compares the shadow impacts of the 3-tower scenario and a 2 -tower scenario.

5.17. As currently shown, the Event Centre interrupts the open space and the current slope from the lawn to roof appears to be too steep. Event Centre must be sunk further into the landscape and that the roof must be green and accessible, in order to create a continuous lawn as an extension of the public realm.

5.18. It appears as though there will be significant vehicular circulation on the west end of Exhibition Way. There will also be significant pedestrian circulation. The truck entrance to underground parking in front of the Aberdeen Pavilion will also cross a significant pedestrian space. Alternative solutions should be considered to address the potential conflicts where pedestrians and vehicles cross paths.

Key Recommendations:

5.19. The Urban Design recommends a zoning envelope for this site be produced by way of a schedule for the final proposed podium and tower(s). In the absence of a zoning schedule, the RFO / RFP process to follow should include the following requirements for the redevelopment:

5.19.1. A maximum tower floor plate, including balconies, of 750m2.

5.19.2. A minimum separation distance of 23m between towers up to 30-storeys and 25m between towers above 30-storeys.

5.19.3. No building where Podium / Tower 3 is currently proposed.

5.19.4. Towers to be of different heights (unless in Tower 2 scenario the twin-tower may be appropriate)

5.19.5. Direction regarding podium design and height

5.19.6. An Event Center with a publicly accessible, green roof that functions as a useable extension of the public open space.

5.19.7. The maximum footprint of the Event Centre

6. Urban Design Review Panel

Key Recommendations:

6.1. The Panel recommends designing the site both for event days and the everyday experience of locals.

6.2. The Panel recommends the focus of this next phase of development should be to ensure established qualities are not compromised by the new development.

6.2.1. The Panel recommends year-round success of the pedestrian realm must be achieved and enhanced.

6.2.2. The Panel recommends the pedestrian accessibility of the site needs to be maintained for events such as the Farmer's Market and future large gatherings around the proposed event space.

6.3. The Panel supports opening up Exhibition Way to further pedestrian activity.

6.4. The Panel has concerns with the proposed event centre being too high in the landscape.

6.4.1. The Panel strongly recommends lowering the event centre further into the ground and providing pedestrian access to the rooftop greenspace as a continuation of the park lawn.

6.4.1.1. Consider the overall pedestrian accessibility to the event space, and the potential for large gatherings.

6.5. The Panel strongly recommends the towers follow the City's guidelines of a 750-sq.m. floorplate.

6.5.1. The Panel recommends further investigating a single-tower or two-tower concept to allow for the 750-sq.m floorplates to be achieved.

6.5.2. The Panel suggests doing so will improve the porosity of the site and maintain north-south views across Lansdowne Park, while minimizing wind and shadow impacts on the public realm.

6.6. The Panel has concerns with the orientation and location of Tower 'C' and its tight condition with the Aberdeen Pavilion.

6.6.1. Consider forgoing a three-tower approach.

6.7. The Panel recommends that the future design of the podium consider using masonry to best relate to the Bank Street frontage and neighbourhood character.

Site Design & Public Realm:

6.8. The Panel appreciates and understands all the challenges with funding and the complexity of adding users, servicing, access, and new stands, etc.

6.9. The Panel suggests locating the truck entrance in front of the Aberdeen Pavilion is problematic and would create a lot of challenges.

6.9.1. Consider consolidating servicing to avoid conflicts.

6.9.2. Consider locating the servicing between the podium and the bleachers, preferably with access from west side closer to Bank Street to mitigate trucks driving further into the site.

6.10. The Panel appreciates the existing amenities of Lansdowne and how it has maintained amenities that are multi-generational, with a good balance of commercial uses and public spaces/events. Consider reinforcing this aspect of the site.

6.11. The Panel appreciates that the site could support additional density to help animate Lansdowne Park. However, the Panel has concerns with Lansdowne Park's ability to provide space that is pedestrian friendly and pedestrian focused, which are central to Lansdowne Park's success—and transformative for Ottawa.

6.11.1. The Panel recommends that this unique characteristic of Lansdowne as a pedestrian space and as a city outdoor public amenity must be protected and enhanced. Any diminishment of that would be a concern.

6.12. The Panel has concerns with the lack of porosity north-south.

6.12.1. Consider increasing the porosity between the buildings in the north-south direction.

6.13. The Panel has concerns with the relationship between Tower 'C' and Aberdeen Pavilion.

6.13.1. The Panel has concerns with how Tower 'C' seems to significantly obstruct the Aberdeen Pavilion and the event centre.

6.13.2. The Panel suggests that Tower 'C' obstructs the connectivity and accessibility of the site and negatively affects the north-south access in front of Aberdeen Pavilion.

6.14. The Panel has questions and concerns with the location and orientation of Tower 'C'.

6.14.1. Consider re-orientation to align with the street grid.

6.15. The Panel appreciates that the views from the Rideau Canal have been maintained. However, Tower 'C' shifts the views away from the heritage of Aberdeen Pavilion and is much too prominent in the view planes.

6.15.1. The Panel recommends enhancing the entrance to the event centre and protecting the views of Aberdeen Pavilion by removing Tower 'C'.

6.16. The Panel recommends at a minimum to incorporate a 23-meter separation between Tower 'C' and the Aberdeen Pavilion.

6.17. The Panel has concerns with the proposal's large impact on the pedestrian realm, and outdoor eating and patio spaces.

6.17.1. The Panel recommends a single tower and podium approach that minimizes the wind and shadowing effects of the tower on the pedestrian realm.

6.18. The Panel appreciates that there are various elements of the proposal that are being connected through the site by the promenade behind the stands and the ceremonial stairway, however these may not be the priority to preserve in the grand scheme.

6.19. The Panel recommends any redevelopment of Lansdowne ensures that it remains a great destination in the city for Ottawans and visitors.

Sustainability:

6.20. The Panel strongly recommends and emphasizes that it is an important task to adhere to the sustainability standards and urban design guidelines that the City has implemented or is planning on implementing.

Sustainability:

6.21. The Panel strongly recommends and emphasizes that it is an important task to adhere to the sustainability standards and urban design guidelines that the City has implemented or is planning on implementing.

6.22. The Panel appreciates the aspirations and objectives of the project and the rejuvenation of the stands and site.

6.22.1. The Panel understands the economic model of the project and the neutral cost aspect.

6.23. The Panel strongly recommends adhering to the City's high-rise design guidelines for this City-led project.

6.23.1. The Panel strongly recommends that the guideline's 750-sq.m. floorplate should be followed.

6.23.1.1. Views from the entrance off Queen Elizabeth Driveway (11), from the Bank Street bridge (13), and from Sunnyside/Bristol (7) are all significantly improved with a smaller floorplate design.

6.23.2. The Panel strongly recommends the massing be adjusted with slender towers that meet the 750-sq.m. floorplates and separation distances of the guidelines. Doing so would result in much better views of Lansdowne from afar, and reduce the shadow and wind impacts on the pedestrian realm.

6.24. The Panel recommends that more slender towers and protecting important sky views will greatly improve the proposal.

6.25. The Panel recommends staggering the heights of the towers with the goal of making the high-rise portion seem less like a barrier.

6.26. The Panel recommends designing the project with a brick and stone material palette to help create a cohesive sense of a precinct and to strengthen the character of the area.

6.26.1. The Panel recommends the final product pick up on the prominent use of brick as a character element of Bank Street.

6.26.2. The Panel appreciates the articulation of the podium, however, recommends the materiality should be more tactile and more residential in nature rather than having a glazed commercial appearance.

6.26.3. The Panel recommends the final product should be a residential brick and stone palette, especially on the podium, to enhance the character of Bank.

6.27. The Panel has concerns with the event centre in terms of how it blocks and interrupts the pedestrian experience of the site.

6.27.1. The Panel encourages the applicant to consider alternate sectional studies and provide further analysis to better inform the end result.

6.27.2. The Panel strongly recommends lowering the event centre into the ground and seamlessly connecting the park with its roof to create a park space for public enjoyment, despite additional cost.

6.28. The Panel encourages the applicant to consider alternate sectional studies and provide further analysis to better inform the end result.

6.28.1. Consider other amenities instead to highlight the 'highline' effects. Residential units facing the bleachers should not be an option.

6.29. The Panel appreciates the decision to setback the podium and open up space on the south side of Exhibition Way.

6.30. The Panel recommends further developing the ceremonial stairway. Consideration needs to be given to accessibility standards.

6.31. The Panel recommends pursuing a two-tower approach instead of the three-tower proposal.

7. Heritage

Comments:

7.1. Heritage Context and Background

Existing Context

The Lansdowne Park is the site of the former Central Canada Exhibition Association fairground (1888 – 2009). It is bounded by Bank Street to the west, Holmwood Avenue to the north, and the Queen Elizabeth Driveway (QED) and

the Rideau Canal, National Historic Site of Canada, Canadian Heritage River and UNESCO World Heritage Site to the east and south.

The site contains the Aberdeen Pavilion and Horticulture Building, both of which are designated under Part IV of the Ontario Heritage Act. The Aberdeen Pavilion - a structural steel and pressed metal late-Victorian exhibition hall – was designed by architect Moses C. Edey and constructed in 1898. It is designated a National Historic Site and is also designated by the City of Ottawa under Section 29 of the Ontario Heritage Act (Bylaw No. 22-84). The Prairie-style two-storey brick Horticulture Building opened in 1914 and its design is attributed to architects Francis C. Sullivan (1882-1929) and Allan Keefer (1883-1952).

Permissions, Applications and Review

Part of the site, including the Aberdeen Pavilion and Horticulture Building, are subject to a 2012 Heritage Conservation Easement Agreement between the City of Ottawa and the Ontario Heritage Trust, which includes protected view corridors, and delineated framing and setting lands. Permission will be required from the Ontario Heritage Trust for any construction within the Easement.

The Site is subject to the 1993 Parks Canada and City of Ottawa Cost-Share Agreement and accompanying (1990) Aberdeen Pavilion Conservation Report that identifies the importance of maintaining clear vistas at each of the four entries to the Pavilion.

In accordance with Section 33 (1) of the Ontario Heritage Act, a heritage permit is not required as the proposed alterations will not impact the heritage attributes of the Aberdeen Pavilion and Horticulture building as set out in the designating by-law. This document has been prepared by Heritage Planning staff at the City of Ottawa as the formal comments on the Official Plan and Zoning By-law Amendments for Lansdowne Park.

Section 4.5.2.1 of the City's Official Plan states that when reviewing development applications properties on, or adjacent to a designated property, the City will ensure that the proposal is compatible by respecting and conserving the cultural heritage value and attributes of the heritage property as defined by the associated designation bylaw and having regard for the Standards and Guidelines for the Conservation of Historic Places in Canada. This will be accomplished through the adaptation of the mitigative measures in the HIA and through the consideration and implementation of Heritage Staff's comments.

7.2. Heritage Impact Assessment:

Heritage Staff generally concur with the findings, recommendations, and conclusions in the HIA provided by ERA Architects Inc. dated June 29,2023. Some of the key impacts identified include:

- The visibility of the proposed towers beyond the silhouette of the Aberdeen Pavilion from the east having some visual impact
- Impact to the dynamic views of the site from the Rideau Canal and adjacent landscapes

- The shadow impact on existing built heritage resources
- The proposed new event centre and extended berm will encroach into the framing lands and Great Lawn south of the Aberdeen Pavilion.

The report concludes that:

The proposed development generally conserves the cultural heritage value of the Site, while allowing for its revitalization. New construction is sited to the southwest portion of the Site, where high-density contemporary structures are currently located. The existing built heritage resources will be retained and rehabilitated as part of ongoing City-initiated programs. Other existing land uses and the spatial organization of the Site will remain unchanged. The proposed development has been designed and situated to minimize impact on the protected HCEA and Parks Canada Cost-Share Agreement views, the setting and framing lands, the Aberdeen Pavilion, and the Horticulture Building. Though protecting the silhouette of the Aberdeen Pavilion is not an express objective of the HCEA, the proposed towers will be visible beyond the silhouette of the Aberdeen Pavilion, creating some visual impact

Mitigative Measures

The mitigative measures identified in the HIA should be implemented and used as guiding principles through the next stages of planning and design for the project. These measure include;

- Design the new retail podium to enhance views to and experience of the Aberdeen Pavilion;
- Enhance the public realm surrounding the new retail podium along Exhibition Way and design for year-round usability;
- Consider the form, massing and materiality of the high-rise towers to complement the new backdrop setting of the Aberdeen Pavilion;
- Consider the high-rise tower shape, placement and articulation to minimize shadow impact; and
- Design the new event centre and berm to minimize visual impact on the south elevation of the Aberdeen Pavilion, while enhancing the Great Lawn open space.
- The commemoration and interpretation of Frank Clair Stadium and Ottawa Civic Centre

Conservation Design Parameters

Similarly, the HIA has detailed Conservation Design Parameters, which are intended to establish a set of conservation objectives and design guidelines for the following areas: Exhibition Way, Event Centre and Southeastern Edge and Tower Design. The Conservation Design Parameters (CDPs) should be implemented to help guide the overall design and maintain the cultural heritage value of the site.

Heritage staff recommend the implementation of the Conservation Design Parameters be included as part of the framework for the RFP of the air rights.

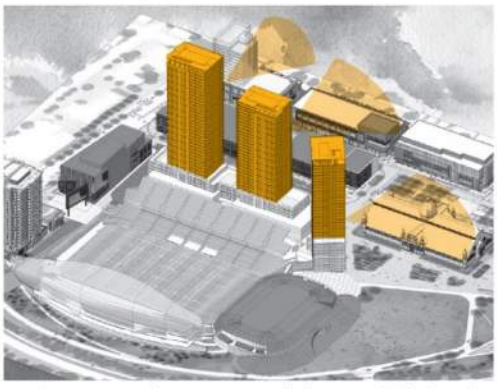
7.3. Additional Heritage Issues /Concerns

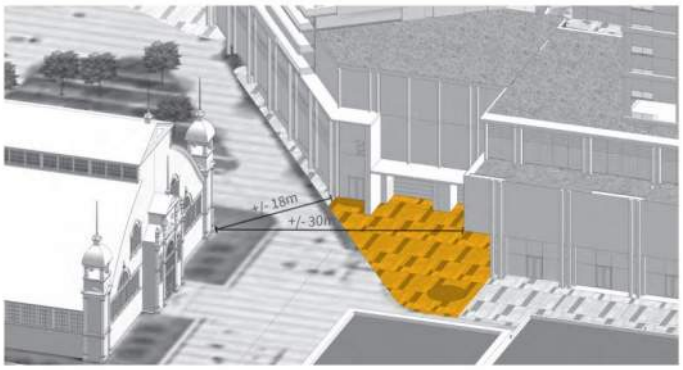
Aberdeen Pavillion and the East Tower

Heritage staff have concerns with the proposed eastern tower on the site and its potential impact on the Aberdeen Pavilion. The revitalization of Lansdowne Park offers an opportunity to further highlight the Aberdeen Pavilion as the heart of Lansdowne, efforts should be made to highlight this landmark building and improve the existing condition between the Aberdeen Pavilion and the new building.

The proposed east tower is adjacent to the Aberdeen Pavilion. The HIA identifies that the proposed development will have an adverse impact on the visual prominence of the Aberdeen Pavilion from certain vantage points within and adjacent to the Site. The 2022 Council-approved (in principle) Lansdowne 2.0 Concept Plan tower heights and massing create a shadow impact on the Aberdeen Pavilion by obscuring heritage features from late morning to early afternoon during the fall and winter months. Character-defining attributes including the central cupola and clerestory windows are cast in new shadow during the September and December test dates. Potential at-grade impacts may include pedestrian and vehicular congestion as well as potential impact during construction. The measures identified in in the HIA will help mitigate these impacts and should be implemented.

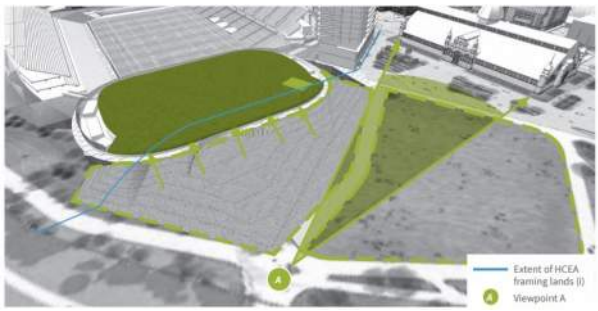
Heritage Staff suggest that alternative option(s) be considered, such as reducing the floor plate and/or height of the eastern tower and/or removing the tower. Further to the appendices provided with comments from the Public Realm and Urban Design Branch, heritage staff encourage the elimination of the third tower or if three towers are to be considered, moving the tower west towards Bank Street so that all three towers are oriented towards Exhibition Way. As shown in these documents, this will mitigate the negative shadow impacts of the current proposal.





Event Centre

The proposed event centre and relocated berm to the east of the TD Place Stadium will encroach in the framing lands as identified within the Ontario Heritage Trust Easement.



Heritage staff support the Conservation Design Parameter in the HIA that states that: The location and design of the event centre should be further refined to minimize visual impact on the south elevation of the Aberdeen Pavilion, while allowing for continued public use of the Great Lawn.

Any alterations to the property within the boundaries of this easement area requires consultation with and approval from the Ontario Heritage Trust.

Public Realm

The open space surrounding the Aberdeen Pavilion contributes to the legibility and prominence of the building. Recommendations to improve the public realm should be explored in coordination with the Council-approved Guiding Principles for the Transformation of Lansdowne and the City of Ottawa's Strategic Investment Plan for the Urban Park and Public Realm.

Heritage Staff encourage the removal of the proposed parking entrance closest to the Aberdeen Pavilion. If required, it should be limited to use as service access.

7.4. Zoning Specific Recommendations– Heritage

Heritage staff recommend that the following be considered through the proposed Zoning By-Law Amendment and Official Plan Amendment.

7.4.1. Reduce potential impacts on the Aberdeen Pavilion

- For the towers, locate the taller height closer to Bank Street and reduce the height and/or building floor plate of the east tower

7.4.2. Protection and enhancement of views of Aberdeen Pavilion

- Establish an increased setback along the southern portion of Exhibition Way to increase the visibility of the Aberdeen pavilion and ensure both spires of the pavilion are visible from Bank Street.

7.4.3. Define and relate the podium height to the Aberdeen Pavilion

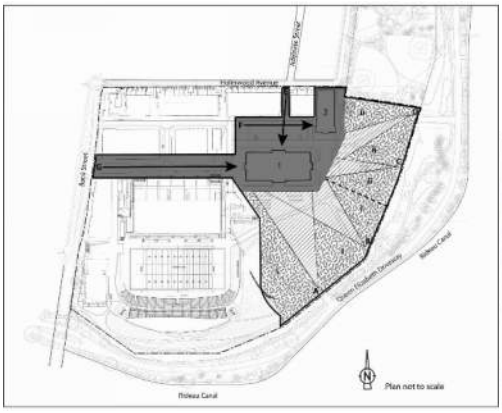
- Limit the height of the podium along Exhibition Way to provide a 3-4 storey streetwall height to ensure compatibility with the Aberdeen Pavilion and the original stadium/grandstand.

7.4.4. Provide a maximum height of the event centre

- Limit the height of the event centre to ensure that the dynamic view of the upper portions of the Aberdeen Pavillion, as defined in the OHT easement, are maintained

7.4.5. Public Realm enhancements to conserve and highlight the Aberdeen Pavilion

- Ensure that the zoning considers the role of open space surrounding the pavilion to maintain its prominence and maintain the established protected views



7.5. Additional Plans and Studies for Site Plan

The following additional plans and studies should be required at site plan:

- HIA Addendum: to look at the more detailed design, including architectural detailing.
- Heritage Interpretation Plan
- Documentation and Salvage Plan for Frank Clair Stadium.
- Heritage Protection Plan for the site which includes:
  - Pre-construction building condition survey and documentation;
  - Vibration and crack monitoring;
  - Implementation of physical protection for the designated buildings;
  - Management of construction dust, debris etc.; and
  - Post-construction building condition survey and documentation.

Heritage Planning Staff can assist in the creation and establishment of the terms of reference for these studies and plans.

8. Ontario Heritage Trust

Comments:

8.1. Building Heights

Towers of the height proposed in the ZBA would impose a negative impact on nearby cultural heritage, by:

- Altering the background of protected views of the Aberdeen Pavilion;
- Placing the Pavilion, Park, and adjacent portions of the Canal in shadow;
- Introducing an abrupt transition of building scale, particularly with respect to proposed Tower 3.

The OHT offers this summary assessment while recognizing that the proposed tower locations are not contained within the boundaries of the provincial easement.

8.2. Event Centre

OHT staff have seen conceptual depictions of the proposed Event Centre pass through several iterations. Previously we have indicated that the heritage impact, though negative, appeared manageable.

The iteration contained in these applications, while understood to be still conceptual, appears to have grown significantly in scale (both the building scale and hardscaping). Its impact would be more considerable than that of previous iterations:

- All iterations of the proposed Event Centre would negatively impact protected views of the Aberdeen Pavilion. The iteration associated with this application appears to have grown in height, and therefore in visual impact;
- All iterations would involve construction within identified zones of archaeological potential;
- This iteration shows hardscape extending further into the Park, and in general, a potentially significant reduction of green space within the easement boundaries;
- The current iteration, unlike previous ones, would appear also to disrupt current community uses of this green space. OHT staff have requested that community uses be integrated.

Recognizing again the conceptual state of progress, the design associated with these applications raises new concerns about impact. The OHT looks forward to continuing discussions with the City.

9. Ottawa Public Health

Comments:

9.1. We note that the provision of 1200 bicycle parking spaces exceeds the current Zoning By-law requirements, however, given that many units will be occupied by more than one person, would recommend increasing this. Unsecure bike parking

would be a significant disincentive to using cycling as a primary mode. This would support OP policies 2.2.4, and 4.1 that seek to incentivize active transportation and make cycling the healthy and easy choice.

9.2. Could there be integration of the High Performance Development Standards (HPDS) in this application, given this is on City lands?

10. Climate Change and Resiliency

Comments:

10.1. While the HPDS has not come into effect, given that this is a City-owned site, it would be appropriate to push this development to apply the HPDS to the fullest extent possible as a showcase example of a City-led project that advances sustainable and resilient design. In my quick review of the Planning Rationale, I see that:

- The project will seek a "high level of sustainable design" as part of the future Site Plan Control application, including:
  - alternative energy and energy-efficient measures, including electric and solar energy sources
  - alternatives to fuel-dependent vehicles
- The proposed concept will aim for LEED Silver certification and will follow the City's Corporate Green Building Policy
- Consideration of a green roof for the event centre.

Here is the link to the Tier 1 and Tier 2 of the HPDS: High Performance Development Standards (HPDS) | City of Ottawa

11. Accessibility Committee

Comments:

11.1. The UDRP package only includes the word accessibility once. Given the scope and application of this work, it should be more explicit in the vision and design objectives.

11.2. Overall, the site should include many accessible rest areas in both active and green spaces.

11.3. Renderings:

11.3.1. Should include people with various disabilities. This shows the disability community that they are considered and included in our work.

11.3.2. Ensure TWSIs are not shown as being obstructed. This is something that should be a strong consideration as the Lansdowne space is reimagined. As constructed, they are not serving their intended purpose.

11.3.3. Ensure a clear pedestrian path of travel (unobstructed by bikes, A-frames, patios, etc.)- the City requires 2 m which won't be demonstrated accurately in a rendering, however, it can demonstrate a clear path

11.3.4. Patios are required to be delineated. This should be shown in renderings.

11.4. How many of the 739 parking spaces will be accessible?

11.5. How many visitor parking spaces will be accessible?

11.6. Are the ceremonial stairs a primary entrance to the buildings or do they serve a strictly decorative purpose?

11.7. Lansdowne has a designated “on-street” accessible parking space above ground - will more of these be included?

12. Rideau Valley Conservation Authority

Comments:

12.1. The RVCA has reviewed the above noted Official Plan and Zoning By-law Amendment application for the Lansdowne 2.0 project to permit building heights up to 40 storeys and facilitate a new stand-alone Event Centre at the east end of TD Place stadium and have no objections.

13. National Capital Commission

Comments are forthcoming.

14. Parks Canada

Comments are forthcoming.

15. Enbridge Gas

Comments:

15.1. Enbridge Gas does not object to the proposed application(s) however, we reserve the right to amend or remove development conditions.

15.2. The applicant will contact Enbridge Gas Customer Service at 1-877-362-7434 prior to any site construction activities to determine if existing piping facilities need to be relocated or abandoned.

16. Telecon

Comments:

16.1. EXTREME CAUTION! TELUS HAS CABLE IN FOREIGN UTILITY'S LEASED DUCTS AND VAULTS, close to the proposed route. Please call for locates.

17. Ottawa Catholic School Board

Comments:

17.1. The Ottawa Catholic School Board has no objection to the proposed zoning amendments and the site plan control proposal for the property located at 945, 1015 Bank Street. However, since new residential developments have an impact on enrolment, transportation routes and attendance boundaries, we would like to

be notified of all decisions pertaining to this application, including notice of public meetings, street name dedications and approval status.

18. Ottawa Catholic School Board

Comments:

18.1. The Planning staff has reviewed the above-noted Official Plan & Zoning By-Law Amendment application. It is understood that the proposed development will have the North stadium stands removed and reconstructed as a standalone structure, which will be the new event centre for Lansdown Park. The proposed development also includes three high-rise residential towers with a maximum height of 40 storeys to be established and will have up to 1,200 residential units.

It is our understanding that the City seeks to amend Area-Specific Policy of the Lansdown Special District designation through an Official Plan Amendment to clarify the City's Official Plan with the following amendments:

- Confirm that the Lansdowne Special District policies supersede the Greenspace and Mainstreet
- Corridor functional designations that are shown on Schedule B2 of the Official Plan.
- Allow for a maximum building height of 40 storeys on the site.
- Allow for a portion of the existing greenspace on the site to be repurposed for a new event centre.

The Zoning By-Law application seeks to rezone a portion of the subject site to permit the new event centre, as well as increase the maximum permitted building height to allow for the proposed 40 storeys and a maximum proposed height of 15.05 meters for the event centre.

Please be advised that our response to your request for comments regarding the proposed development is as follows:

The Ottawa-Carleton District School Board (OCDSB) has no concerns against the proposed Official Plan & Zoning By-Law Amendment. The city is seeking to increase intensification within the urban boundary, and the OCDSB recognizes that new dwellings will generate new students to our local schools.

We would also like to note that the owner be required to inform prospective purchasers that school accommodation pressures exist in the Ottawa-Carleton District School Board schools designated to serve this development which are

19. Councillor and Community issues

Comments:

19.1. Please see summary of community comments (Document 2) attached for review and comment. A public meeting was held on July 13, 2023, with approximately 150 people in attendance.

19.2. At this time, planning staff have not received formal comments from Councillor Menard.

19.3. Staff received approximately 175 public comments during the comment period. Approximately 60 percent of respondent was opposed to the development while 40 percent are either in support or indifferent.

Please review the following comments and provide a response for each theme.

Building height

- Increase of up to 40 storeys from current limit of 20 storeys is selfish and dangerous
- General opposition to Zoning By-law amendment to increase height
- Tall buildings are an eye sore
- The request to increase the maximum height restriction from 38 metres to 127 is excessive and over three times the existing height.
- These heights are out of place for the neighbourhood and the surrounding heritage buildings
- No building should be taller vs. what is there today
- A set of mid-rise residential buildings, with a more fitting aesthetic for the area, would be much more appealing to Glebe residents

Transition to Adjacent Low-rise neighbourhood

- The high-rises are out of place in comparison to the rest of the Glebe
- Completely out of scale with the charm of the surrounding neighbourhood.
- The Glebe has always had an old-world (aka low-rise) feel. This changes the landscape of this beautiful old community,
- This is an iconic Ottawa site, and to propose 40 story towers, which are so shockingly out of proportion with the surrounding cityscape and the site is outrageous.
- The imposing presence of these buildings not only clashes with the surrounding Glebe aesthetic, it also invades the sight lines of Glebe residents, shoppers, and seasonal event goers

Wind impact

- The towers will cause a wind tunnel that will make walking on Marché very unbearable in winter months.
- The wind study as presented, lacks significant information for an assessment to be made as to its validity and appropriateness in the

current context. If anything, it may underestimate the wind climate problems which could occur were this development to be built.

Shadow impact

- The 3 residential towers proposed will be too tall and will provide too much shade on the Aberdeen Pavilion and the existing structures at Lansdowne
- Three high-rise towers will overwhelm the site - especially at 40 stories. They will block the sun and cast long shadows. They will destroy the character of the surrounding area.
- The towers will create large shadows and wind tunnels that will cause the very popular patios on Marché Way to lose most of their sunlight.
- 40 stories will shade so much it will reduce quality of life and enjoyment in the whole area.
- Not only will much of the Lansdowne site be covered by shadow, but also neighboring streets in the Glebe as far as 1st Ave, the canal and streets in Old Ottawa South (across the canal!)
- The angled tower next to the Aberdeen Pavilion is particularly egregious and should be eliminated entirely as it over-shadows the Pavilion
- Eliminating all the sunlight for businesses on exhibition way would be a travesty.

Traffic

- The congestion and confusion in the neighbourhood when events are on now (and even when they aren't) will only be exacerbated by the existence of so many new residential units and the additional events.
- Traffic needs to be addressed to public, and discussions need to be had early on for solving traffic related issues
- Please do whatever is possible to deter more vehicular traffic. It's already a disaster in this regard for anyone living nearby or trying to get to/from that area

Active Transportation (Bicycle and Pedestrian connectivity/safety)

- The active transportation along Bank Street and the Queen Elizabeth Driveway needs to be improved.
- The addition of up to 1200 new units will clog up Bank Street and the nearby neighbourhoods and reduce the ability for pedestrians and cyclists to enjoy the canal and Lansdowne itself.
- Need to widen the Bank Street sidewalks and create properly separated bike lanes

- Increase the transit service to and from the park on Bank Street with a dedicated lane. Get bike lanes on Bank Street and create new and safe bicycling infrastructure to and through the site

Transit

- Insufficient transit options for the site, the busses are insufficient and will only get worse upon development
- How will all of the new residents and visitors get to and from the site.
- Transit for all the events at Lansdowne does not work, building this without implementing better busses or the O-Train will not work

Parking

- 739 parking spaces for 1200 units will be woefully insufficient and 400 cars will try to park in surrounding streets
- unless there is a spot per unit, there will be a spillover to the local neighbourhood
- That a number of dedicated disabled parking spots be implemented in this area would be welcomed.
- Adding 739 vehicles to this space seems designed to create traffic chaos on the site and affected roads.

Density

- Increased density makes sense if there is increased greenspace
- Clearly, the city center is already overcrowded and adding the traffic density expected from thousands of new residents will further degrade the residential environment
- The density of this project will have a negative impact on traffic, transportation, servicing, and greenspace

Loss of Greenspace

- Loss of greenspace will negatively affect the residents on Holmwood Ave
- Replacing the arena and moving it to the green space park is a terrible and costly idea. The lawn is well used and enjoyed by many, and will be needed even more to serve the local population if it increases with the towers
- It is obviously a bad idea to add 1200+ yard-free occupants to the site and eliminate greenspace.
- Lansdowne already has very little green space. None of the green space should be lost, especially to build an arena that is not needed. With this loss of green space, Lansdowne will not have enough green

space to hold music festivals. Also, Lansdowne will be even more of a concrete jungle.

- The plan for 35, 40 and 46 storey towers removes whatever pretext remains for calling Landsdowne a park.
- Make the green roof on the new arena accessible to the public. Doing so would help to offset much of the usable greenspace being lost by relocating the arena.
- The overall design of the project should enhance the site with green space and fit in with some aspect of historical respect for the look of the canal site
- Lansdowne is a park and should be kept as such. Should not be developed on and should be enjoyed by all residents of the city.
- Please save all the green area possible in the inner city lest it become a wasteland.

Housing

- The plan is trying to fit in more residential units than are appropriate for the space
- 40-story condominium buildings at Landsdowne will generate very good property tax revenue for the City but does nothing to address the affordable housing shortage. If you were making affordable or public housing this would be acceptable, but it is not.
- We need more affordable housing, and this project will not be, why aren't we seeing proposals for 5-10 storey buildings lining streets instead?
- If housing is to be added to Lansdowne Park, it should be rent-to-income only. I don't feel like subsidizing rich people's access to pricey condos overlooking the sports fields. I can't afford to buy at Lansdowne. Many people cannot.
- These towers would be better used with 2 and 3 bedroom units - Ottawa already has enough bachelor and one bedroom towers, we need to be thinking of more affordable options for families.

Land Use

- People WANT a park -- not an event space, not an arena, but a PARK. A place for leisure, walking, meeting friends
- The proposed three towers would render this end of the Glebe almost unlivable
- This is not a “partnership” (public, private) but handover of public, precious land to satisfy and expand commercial interests.

- Should not be building 40 storey towers in what is supposed to be a park
- Plant some trees, preserve what little green space is left, build people-friendly sized buildings with affordable housing
- Why aren't we redeveloping the St Laurent shopping centre into high density and putting the stadium there? It's right on the transit way and the freeway

Heritage

- The towers are also in no way in respect to the beauty and heritage of the UNESCO Rideau Canal and the two heritage buildings on site; the Aberdeen Pavillon and the Horticulture Building. Imagine the city of Rome allowing towers such as proposed to be built beside the Colosseum or beside the Pantheon. We need to honor and respect our heritage buildings and not pollute them with 40 story condo buildings.
- This project will fundamentally change the area by overshadowing the historic Aberdeen Pavilion

Sustainability

- There is waste in destroying the recently built podium.
- Force the developers to use only green technologies to lower Lansdowne's carbon footprint. How about increasing rooftop green space use by planting garden beds and vertical gardens?
- Concrete and steel consumption contribute greatly to carbon emissions. It would be irresponsible to dispose of what's already been built, only to replace it with more concrete and steel.
- putting an arena where some of the limited current green space exists seems contrary to all city policies and guidance for greater green space, and inconsistent with fighting climate change.

Noise

- The increased noise, commotion will absolutely kill The Glebe.
- Please revise to lower density and noise

General Inquiries and comments:

- What failed in financial model of 1.0, and how is that being addressed/prevented in 2.0
- The time to complete this large project of this size would be years. Trying to keep the businesses already in place here running during extensive construction will be very difficult

- Saddling the tax payers of Ottawa for years with billions of dollars of debt to finance the proposal and to line the pockets of OSEG members is criminal.
- Where will the kids go to school? Where will they go to the Doctor/Dentist?
- Lack of public consultation

Positive Comments:

- Full support of application in their current state
- This looks great. I was expecting more of the green space to be used so that more people could live in this desirable neighborhood, but there's not much to object with on the modest proposal
- Density and building heights are good, and keeping the arena within Lansdowne is key to the continued success of the area
- I am in full support of densification. This is essential to improving affordability in the city and reducing our environmental impact.
- I think the towers add good density to an attractive site, and bring a critical mass of residents to increase the vibrancy of Lansdowne.
- I LOVE the proposal for Lansdowne 2.0!! We NEED housing. We NEED a football stadium. We NEED a hockey arena for 67s. PLEASE build this as presented. The 3 towers are in the PERFECT PLACE!!! BUILD THIS PLEASE!!! Thank you.
- Review the financials but as for the development as proposed please approve.
- As a homeowner in the Glebe, I'm trilled to hear that the Glebe will be further densified by this development, as it rightly should be. These new towers will provide valuable housing to this supply-constrained market, will provide many people the opportunity to live in one of the best parts of Ottawa, and will bring tons of business to the local businesses.
- I support the project for 945 and 1015 bank St and I think there should be even more apartments.
- I'm a resident of Centretown, frequenting the Glebe/Lansdowne, and I am 100% in favour of this application moving forward. As someone who has lived inner-city in various cities across Canada, I have witnessed first-hand the good that density like this - whether it be market-rate homes for ownership or rental and/or social/affordable homes - does for a community. In my view, intensification makes areas vibrant - it supports businesses, creates walkable areas, helps cut down on our environmental impact, and fosters a sense of community.

- I am in support. This project will make Ottawa a more competitive city for events and will provide more apartments for people to live in.

Should there be any other questions, please do not hesitate to contact me.

Sincerely,

Krishon Walker

cc. Sean Moore, Director, Lansdowne Park Redevelopment Project
Simon Deiaco, Senior Planner
Abdul Mottalib, Infrastructure Project Manager
Mike Giampa, Transportation Project Manager

National Capital Commission Comments

Thank you for circulating the National Capital Commission (NCC) on applications for Official Plan Amendment and Zoning By-law Amendment for 945 and 1015 Bank Street (D01-01-23-0009 / D02-02-23-0047), “Lansdowne 2.0”. The Lansdowne 2.0 initiative presents an opportunity to think boldly about Lansdowne, QED, and broader Capital-building and City-building perspectives. We present the below comments (paired with an attached Appendix in response to the ‘Lessons Learned’ report) in a spirit of openminded discussion and collaboration on this exciting initiative.

Context

- The current process leading to the redevelopment of Lansdowne began in 2007 as the City sought to replace the existing south-side stands and revitalize the site with new development.
- Lansdowne is bounded to the east and south by the NCC-owned Queen Elizabeth Drive (QED) and Capital Urban Greenspace beside the Rideau Canal.
- The Rideau Canal is owned and managed by Parks Canada, and is a UNESCO World Heritage Site.
- The NCC has been a collaborative stakeholder in the redevelopment of Lansdowne, including approving improvements to pedestrian connectivity from the Rideau Canal Capital Pathway, participating in the Lansdowne Transportation Monitoring and Operations Committee (LTMOC), and permitting by agreement the use of QED for park-and-ride shuttles for major events.

Proposed Development

- The proposal comprises:
    - three high-rise residential towers with up to 1,200 new dwelling units and 739 new parking spaces;
    - replacing the current 3,809 square metres of retail space attached to the arena/stadium complex along Exhibition Way with 9,290 square metres of new mixed-use retail space in the podium of the new residential towers;
    - replacing the north-side stadium stands;
    - a new 1,500-person music hall; and
    - a new 5,500 seat multipurpose event centre.

Comments

1. **Queen Elizabeth Drive**

a. The NCC shares the City's goal of re-imagining Queen Elizabeth Driveway to reduce the road's importance as a commuter route in favour of active mobility and the public realm. The QED is a capital parkway designed for its experiential quality, and not intended as a principal commuting transportation route.

b. The NCC's guiding principles for Queen Elizabeth Driveway emphasize sustainable and active modes of mobility over private motor vehicle use of the roadway, consistent with the overall vision for NCC parkways as scenic connections between major national areas of significance while providing opportunities for recreational purposes.

   QED is a federal parkway under the jurisdiction of the NCC. Since 1970 the NCC has hosted bike days, including periodic full closures of Colonel By Drive. Since 2020 the NCC has expanded this program to other parkways so they are periodically reserved for active use and not for use by vehicles and QED is seasonally reserved for active use from May to October on varying days.

   We remain concerned that the TIA analysis does not reflect the reality of regular periods when QED is not available for private vehicle use. We provided feedback on the draft TIA and requested that it evaluate a range of scenarios – different levels of intensity of events at Lansdowne with different formats of QED use. There is a wide range of options and level of impact, wherein QED could be reserved for active use, or opened to shuttles at events of certain sizes. Similarly, the impacts of each option vary by the size of events at Lansdowne: the 1,500-person music venue, the 5,500-seat event venue, events at the Aberdeen Pavilion, and the stadium itself – as each venue is added to a concurrent peak demand, the ways that QED could be used vary.

   The TIA and associated studies did not evaluate these more nuanced options to inform the conversation about QED access, instead relying on "*our assumption is that the QED will, generally, remain as a viable secondary vehicular access point to Lansdowne*". The response provided in the Lessons Learned states that "*If the assumptions are not valid, then the integrity of the Lansdowne 2.0 program (and likely current Lansdowne operations) would be severely compromised from a transportation perspective*." This generalization lacks nuance – there are levels of intensity of activity at Lansdowne wherein QED access is more critical than others.

Lacking a study of those different levels of intensity and QED access as was requested leaves the applications relying on broad assumptions.

Note: The NCC is currently reviewing its Parkway Policy which will provide direction for future use and evolution of QED. We look forward to working with the City to support sustainable mobility while protecting QED's unique capital vocation.

c. The transportation challenges of Lansdowne will not be solved by prioritizing access by personal vehicles. Where access to Lansdowne is needed for major events, Queen Elizabeth Drive has proven successful at efficiently moving large numbers of people through the shuttle program. Improving access to Lansdowne must prioritize increasing capacity and mobility through making transit and other sustainable modes the preferred choice.

These modes will be the preferred choice not only by requiring the attendees of ticketed events to pay for their transit by providing a transit fare with every ticket, but also on a day-to-day basis making access to Lansdowne by transit and other sustainable modes competitively preferable to personal vehicles in cost, time, and convenience. Keeping QED open to personal vehicles at all times undermines this effort.

2. Capital Urban Greenspace

a. The *Strategic Investment Plan for the Urban Park and Public Realm* identifies potential projects on adjacent NCC-owned lands:

   a. Redesigned entrance to Lansdowne at Queen Elizabeth Driveway to better accommodate cyclists and pedestrians with the possibility of a signalized crosswalk.
   b. Forestry and floral plantings along QED
   c. Additional signage of speed limit along QED
   d. A new pedestrian crossing of QED at the site's southeast edge
   e. A two-way accessible link from Colonel By Drive to Bank via Echo Street

Note: We are supportive of improvements to active transportation connectivity and enhancements to animation of the QED corridor, when they are in keeping with its heritage and cultural significance. A Federal

Land Use Design and Transaction Approval (FLUDTA) will be required for any work that is proposed on federal land.

3. Transportation

a. It is essential that the transportation plans associated with Lansdowne 2.0 adequately explore the necessary bold sustainable transportation initiatives, projects and investments and site access improvements to reach the City's and the NCC's objectives. Whether identifying issues through the Transportation Impact Assessment for Lansdowne or proposing new projects for the Transportation Master Plan, these processes must work in tandem to improve mobility and access to this important destination.

b. As noted, the NCC is currently reviewing its Parkway Policy. This initiative, combined with Lansdowne 2.0, presents the opportunity to discuss bold exploratory ideas such as, but not limited to:

   i. Piloting conversion of QED & Colonel By Drive to one-way streets while reducing the number of lanes to provide more space for active use;

   ii. Realigning a portion QED to provide a dedicated access to Lansdowne; and/or

   iii. Exploring limiting access to QED to major event shuttles, emergency vehicles, and active modes on an ongoing basis by design.

c. As discussed in Item 1 above, it needs to be understood how Lansdowne 2.0 and the surrounding transportation network will function under a day-to-day scenario (no medium, major or mega events occurring) with QED closed for active use programming. If it is hypothesized that any long-term, frequent closure of QED will negatively impact the viability of events at Lansdowne, it needs to be understood at what point, in terms of event size programming, does this negative situation occur.

d. To support a viable Lansdowne at all times, TDM activities must strive for a transit mode share that strives beyond the targets set for Lansdowne 1.0; applying the status quo is not a target.

   i. It is important to plan for a transit mode share greater than 10% and an auto mode share lower than 75%, even for events below 10,000 persons in attendance. The smaller events with attendance levels of 5,000 or less occur more frequently at Lansdowne. Of the 161 events

expected in 2024 at Lansdowne, approximately 128 (79%) will be under 5,000.

ii. The Official Plan calls for by 2046, the majority of trips in the city will be made by sustainable transportation. Planning for a 10% transit modal share for 79% of events at Lansdowne will not achieve this objective.

iii. There is inconsistency in the modal share targets. Table 2 indicates a Transit & Shuttle target of 50-55% for Minor Events. Table 4 indicates a target of 10%.

iv. The TIA remains based on forecasted trip generation rates and modal splits. We believe back-casting to identify what actions (built form, TDM, parking supply, transit service, pricing) are needed to reach a desired future scenario is more likely to achieve transportation goals.

v. The growth of automotive mode share should be considered constrained by existing and anticipated conditions on the network including active-use programs on QED.

vi. The TDM report assumes 8,225 person trips as the cap on automotive mode share based on an existing on-street parking supply of 2,175 spaces and on-site of 600 spaces. This appears to presume on-street spaces are available for Lansdowne users despite numerous competing demands for on-street spaces.

vii. Providing capacity to Lansdowne needs to be addressed through high-capacity transportation modes such as shuttles and transit; reliance on the private vehicle will not address the capacity needed.

e. Identifying alternative off-site parking locations is a good approach to intercepting and diverting traffic from Bank. However, consideration should be given to providing shuttle service for locations located further away (i.e. 30-40 minute walk from Lansdowne). For some event goers, the walk may be longer than their drive to the off-site parking location. Park & ride locations that see low usage on evening and weekends present such an opportunity.

f. The inclusion of the concept of a “Fare Free” zone on Bank Street such as is employed in downtown Calgary can support local businesses, including Lansdowne, and reduce the reliance on auto travel while supportive the evolution of Bank Street into a 24/7 transit priority corridor. This is a positive idea that merits serious consideration.

g. To incentivize the use of transit and support a lasting change in commuting behaviour, consideration should be given to providing a preloaded PRESTO card with a 6-month or 1 year transit pass to new residents. A similar type of incentive should be developed for businesses and offered to their employees.

h. In addition to the continuance of bicycle workshops (recommended in the report for the spring), it is recommended that a second workshop be introduced in the fall to provide information on winter cycling. Currently, the multi-use pathways along QED and Colonel By Drive, as well as the cycling facilities on O'Connor St. and Fifth Ave. (QED to O'Connor) are winter maintained routes. Lansdowne 2.0 should take advantage of its proximity to these year-round cycling facilities.

   Although the City is only beginning discussion on a City-wide, City-led bike share program, could a Lansdowne specific bike share program be implemented that would serve the residents of both the new and existing towers? Potentially this program could be managed by the TMA.

i. During the planning process for Lansdowne 1.0, City Staff were directed to retain two qualified transit and transportation planning professionals from outside Ottawa to undertake an independent peer review of the Lansdowne Transportation Impact and Assessment Study and TDM Plan. We suggest a similar peer review be required to provide an independent third-party opinion.

j. The Lansdowne 2.0 proposal includes 739 additional parking spaces for 1,200 new dwelling units, while the zoning by-law requires a minimum rate of 0.5 spaces per dwelling unit. There is no rationale provided for why parking in excess of the minimum is proposed to be provide. Indeed there is no analysis of why a lower rate than the minimum was not considered. Each parking space constructed is a sunk cost into vehicular use that will be paid for by the future residents and users of the site, and by residents surrounding the site through additional traffic generation.

k. The Capital Pathways Strategic Plan is the NCC's principal guiding document for the Capital Pathway network. Based on the thresholds set by the Plan, the Rideau Canal West pathway adjacent to QED exceeds its peak capacity and does not provide the level of high-quality comfortable experience intended for users, nor does the existing pathway width support

ongoing growth of active transportation users. More room for active transportation users is required, especially given ongoing intensification in the inner urban area such as that proposed by Lansdowne 2.0.

4. Civil

a. We understand the existing stormwater management system for Lansdowne includes subsurface storage, surface storage, conveyance sewers, quality control structures and outlet controls. Lansdowne's stormwater management (SWM) discharges to the O'Connor Street combined sewer, and the Rideau Canal sewer functions as a relief sewer, but only once the underground storage system is full and major storm drainage flows enter the Great Lawn (i.e. for events greater than the 5-year event).

SWM runoff to the Rideau Canal is a pressing concern – it not only carries nutrients and sediment that can impact the aquatic ecosystem, but also salt that impacts the ability of the Canal to freeze and be used for skating. Ongoing NCC research in collaboration with Carleton University also identifies warm winter meltwater as exacerbating challenges of establishing and maintaining the Canal's frozen surface for winter skating. It is important that any development brings net improvements to the SWM approach and further avoids directing runoff to the Rideau Canal.

It appears that the proposed Major Event Centre will impact the existing Great Lawn, Berm, and associated SWM storage area. The proposed Major Event Centre is also located on top of the existing Rideau Canal SWM outlet pipe.

We request the City through future detailed design ensure no increase in runoff volume to the Rideau Canal, and evaluate opportunities to reduce or eliminate existing runoff.

Appendix A: Lessons Learned Report Response

In May 2023 the NCC was invited to submit comments on 'Lessons Learned' from experiences of transportation effects of Lansdowne 1.0 (2014-2020). The Lessons Learned document prepared by OSEG (June 2023) contains input from members of the community, the NCC, City Traffic Services, and the Glebe BIA. In preparing the Lessons Learned document, OSEG on behalf of the City, elected to only provide responses to the comments of the NCC. The below comments are further responses.

1. **NCC Comment (May 2023)**: The location of the principal parking garage access at the east end of the site adjacent to the QED forces an unfortunate choice between the impacts to the QED and the vehicular ingress across the quasi- pedestrianized core of Lansdowne.

   OSEG Response: *Based on parking garage data, as well as updated turning movement count data. The QED access functions as an important secondary access point to the site, as intended, and accommodates approximately 35% of vehicular access to Lansdowne. The Bank Street garage ramp functions as the primary access point during regular non-event days. It is noted that the QED access plays a vital role in balancing transportation demands and access arrangements, including during major events when vehicular access from Bank Street is restricted to safely accommodate pedestrian and transit passenger demands from the 450- series shuttle service.*

   NCC Response (July 2023): Vehicular ingress across the quasi-pedestrianized core of Lansdowne is an acknowledged challenge. Despite being designed as a 'shared street', post-development Princess Patricia Way internal to Lansdowne was restricted to pedestrians only, and vehicle traffic was routed through the site via Marché Way. The May 2022 '*Lansdowne Partnership Sustainability Plan and Implementation Report'* contains extensive discussion of the challenges of the design of Aberdeen Square and the internal streets of Lansdowne, and recommends investment to '*improve on-site safety for all users and reduce conflict between transportation modes*.' The location of the parking garage access at the east end of the site adjacent to the QED forces an unfortunate choice between the impacts to the QED and the vehicular ingress across the quasi- pedestrianized core of Lansdowne.

2. **NCC Comment (May 2023)**: Assumptions of unfettered access to the federal parkways from major transportation demand generators, such as was the case for Lansdowne 1.0, led to under-planning for other modes of travel and dissatisfaction when access is not available.

   a) NCC staff flagged this issue in 2011. Quote May 2011 NCC staff comments to the City regarding the then-draft *Transit Service and Shuttle Services and Off-Site Parking Plan Technical Report,* which discussed whether to focus shuttles on QED or Bank, and which heavily favored QED: *"[The report] must be written in neutral language without prejudice, and cannot be seen to be 'prejudging'*

> *outcomes in advance of the findings and conclusions of the pilot project. The outcomes cannot be predicted, and it is unfair to present opinions on one option as the sure success, and the other as a failure. As was mentioned, the City and OSEG have to make the Bank Street shuttle route work, as the QED will not be available for shuttles for all Lansdowne events.* ***So why not make the best effort, devise the best plan, put the best foot forward for the Bank Street option?****" [emphasis added].*

OSEG Response: *One of the key achievements of the TDM program since its implementation in 2014 is the gradual reduction of Park & Shuttle buses operating on QED during major events. As of 2022, the number of Park & Shuttle buses operating on QED has been reduced to an average of 30 - 60 inbound bus trips per major event. This is significantly lower than the original number of bus trips estimated in the 2011 TDM Plan, which is upwards of 100 buses per hour on QED (upwards of +200 bus trips for inbound service). Currently, the majority of Park & Shuttle customers are utilizing the 450-series shuttles with service provided on Bank Street.*

This achievement is consistent with the ideal long-term objective outlined in the ***City of Ottawa – NCC Letter of Intent for Special Event Shuttle Service Pilot Project****, which envisioned a reduction in the number of shuttle buses operating on QED over time.*

It is noted that under a future scenario where no shuttle services are operating on QED, the parkway continues to play a crucial role in supporting a balanced, safe and efficient access program to Lansdowne, particularly during major events.

During major events, vehicular access to Lansdowne is temporarily restricted on Bank Street to safely accommodate the large number of transit passengers, pedestrians and cyclists accessing Lansdowne from Bank Street. During these temporary closures, vehicular access to the underground garage and TNC drop- offs (i.e. Uber and Lyft) is accommodated at the QED access. Under a full QED closure scenario during major events, the expected traffic impacts would be extremely severe and the viability of running events safely with minimal impact to the community would be severely compromised.

NCC Response (July 2023): The reduction in shuttles on QED is an accomplishment in line with the Letter of Intent for the Pilot Project. This does not diminish that the NCC has been consistent in the feedback (as quoted above) that 'the QED will not be available for shuttles for all Lansdowne events' and that development of the site cannot rely on the assumption of unfettered vehicular access.

The NCC provided feedback during the preparation of the TIA, requesting that it model certain scenarios to understand the transportation impacts of different forms of QED access amidst different levels of intensity of Lansdowne programming. No such modeling took place, leaving the analysis of the true impacts of the Lansdowne 2.0 proposal under-informed. The NCC similarly provided detailed comments on the TIA's analysis of MMLOS, transit capacity, and exemptions, among other elements,

but received no response.

The NCC has not determined to close QED during major events but rather has continued to collaborate with the City and OSEG to ensure major events function well. However, we note our 2011 comment that "[The report] must be written in neutral language without prejudice" and that comments such as "the expected traffic impacts would be extremely severe" without the benefit of the requested analysis of such a scenario are premature.

b) **NCC Comment (May 2023):** The NCC reiterated that it ''*will continue (and retains full rights) to close the parkways at its own discretion for its own requirements and third party events''* in a June 2015 letter to OSEG and the City of Ottawa.

OSEG Response: *It is acknowledged that QED is a federal parkway under the jurisdiction of the NCC. It is recognized that the NCC closes QED to vehicular traffic for the staging of Capital events, which historically averages between 15 to 20 days annually. These closures, which occur from time to time as we understand, are successfully coordinated in a collaborative fashion between the NCC, City of Ottawa and OSEG for events such as Winterlude and the Ottawa Race Weekend. OSEG has indicated, for example, that closures that occur in the morning of events, where QED is returned to full operations two hours before events, generally work well.*

NCC Response (July 2023): Major Events (i.e. Ottawa RedBlacks games at the stadium) only constitute 10 to 12 events per year. We continue to coordinate with the City and OSEG to facilitate their successful operation. To suggest that QED should be available to vehicles over the course of the year due to events that occur 10 to 12 times would drastically prioritize vehicular access for a limited number of peak demand events.

c) **NCC Comment (May 2023):** This mirrors our earlier comment that Lansdowne 2.0's studies cannot rely on the assumption that QED will be available upon demand.

OSEG Response: *It is acknowledged that QED is a federal parkway under the jurisdiction of the NCC Irrespective of Lansdowne 2.0, QED is an integral part of the city's transportation network and plays a crucial role in supporting a balanced, safe and efficient access program to Lansdowne, particularly during major events. As previously stated, our assumption is that the QED will, generally, remain as a viable secondary vehicular access point to Lansdowne. If the assumptions is not valid, then the integrity of the Lansdowne 2.0 program (and likely current Lansdowne operations) would be severely compromised from a transportation perspective.*

NCC Response (July 2023): As previously stated, the NCC provided feedback during the preparation of the TIA, requesting that it model certain scenarios to understand the transportation impacts of different forms of QED access amidst different levels of intensity of Lansdowne programming. No such modeling took place. The assumption

of ongoing QED access was refuted by the NCC in 2011 and consistently since then. Such access is not a binary question of no restrictions or complete closures – there are forms of QED access for different modes, and levels of intensity of programming at Lansdowne. To state that 'the integrity of the Lansdowne 2.0 program (and likely current Lansdowne operations) would be severely compromised from a transportation perspective' is over-broad and lacks nuance or qualification.

3. **NCC Comment (May 2023):** Transportation Demand Management has not been consistently supported.

    a) As the Office of the Auditor General: Audit of the Management of the Lansdowne Contract report noted that while OSEG employed a TDM coordinator from 2014 to 2017, despite being required to do so by the site plan agreement "*effective January 1, 2017, OSEG no longer has a dedicated TDM Coordinator, thereby increasing the risk that the effectiveness of the TDM program may be negatively impacted.*"

    b) The 12 November 2020 Lansdowne Annual Report to Finance and Economic Development Committee noted that OSEG did not have a dedicated TDM Coordinator.

    c) The 2021-2022 Lansdowne Annual Report makes no mention of whether this gap has been filled.

    OSEG Response: *Administering the TDM program on-site remains a key component to the success of the TDM program at Lansdowne through the planning and delivery of the various event services and supplementary programming, and support for workplaces and residents at Lansdowne. Currently, the coordination of the TDM program at Lansdowne is administered through a full team that is comprised of individuals within OSEG. This includes the VP, Guest Relations and Operation, and the Director of Safety, Security and Guest Services, who oversee the TDM program and are responsible for the annual TDM reports, in addition to various OSEG staff within Guest Relations and Marketing.*

    NCC Response (July 2023): The 2011 Transportation Demand Management Plan identified the role of a dedicated, on-site TDM Coordinator as key to achieving target modal shares, particularly related to special events. While mode share targets have been met for many events, new TDM initiatives have lagged with the lack of a dedicated TDM coordinator whose responsibilities are not divided with other matters; car sharing is no longer provided, and recommendations related to carpool preferential parking spaces were not implemented. If Lansdowne is to intensify in its residential development and frequency of events, further efforts of TDM will be required.

4. **NCC Comment (May 2023):** In the first months and years following the opening of

Lansdowne's first revitalization, transit was heavily and proactively emphasized as the best way to reach Lansdowne, in marketing material and in direct communications to sports fans. It is our observation that there has been a decline in such promotion in recent years.

OSEG Response: *The inclusion of free transit for all ticketed events at Lansdowne continues to be provided on the TD Place website, as well as through e-mail communications with all event ticketholders. Information is also shared on social media periodically. By example, the inclusion of free transit and enhanced park and shuttle service information is shared on "Know Before You Go" videos that are broadcasted at the start of each season.*

5. **NCC Comment (May 2023):** Lack of clarity on the threshold for enhanced, free, and discounted transit service outside of major event days at the stadium has led to Lansdowne not achieving as high a transit modal share as would be the case if it were commonly known that attending any event at Lansdowne entitled an attendee to ride transit for free.

OSEG Response: *One of the hallmarks of the TDM program for events at Lansdowne is the inclusion of free transit for all ticketed events at Lansdowne with all costs for enhanced public transportation and shuttles paid for by OSEG. This is provided for all events, irrespective of the size of the event. Promotion of free transit service is shared on the TD Place website and shared on social media and promotional materials. The current messaging on the TD Place website for events and concerts states:*

a) The April 2022 "*Lansdowne Partnership Sustainability Plan and Implementation Report***"** dismissed any consideration of free transit to Lansdowne, writing "Before an assessment of free transit can be undertaken, an identified funding mechanism is needed."

b) The report stated that" The concept of free transit, and its implications, was considered by Transportation Committee as a Motion ACS2021-OCC-TRC-0032 on December 1, 2021." The December 2021 response to the motion was regarding free transit being studied through the TMP, not regarding Lansdowne and its redevelopment.

c) The entire premise of Lansdowne 2.0 is funding a major civic project (the replacement of the north stands and the new Event Centre) through the sale of air rights, property tax uplift, and ticket surcharge revenues. The Lansdowne 2.0 analysis should identify the range of costs of providing discount or free transit and the funding mechanisms available to provide this (e.g. further sale of air rights, property tax uplift, and ticket surcharge revenues).

OSEG Response: *As stated earlier, ticketholders to all events at Lansdowne currently have access to free transit and shuttle service for events. The incremental costs of enhancing transit service and providing free transit is paid for by OSEG.*

NCC Response (July 2023): Ticketholders are not provided with free transit, they purchase their transit ride with their ticket cost. The 2012 Site Plan Agreement requires OSEG to include "the cost of enhanced transportation services such as transit, off-site parking and shuttle services and the cost to provide secure temporary on-site bicycle parking corrals **in the ticket price**" [emphasis added].

Despite the continued comment that ticketholders to all events have access to transit, the transit modal share target for Lansdowne 2.0 for minor events (less than 10,000 attendees) is only 10%. This modal share target is low and it appears additional efforts are required to increase transit ridership to minor events and reduce reliance on the private auto (target modal share is 75%).

The analysis of the TIA shows the existing TLOS along Bank at Lansdowne at F. Requiring ticketholders to purchase a transit fare with their ticket may assist with events, but everyday conditions outside of major event days demonstrate the need for improved transit at all times.

6. **NCC Comment (May 2023):** The event size increments for TDM measures is large, which may suggest that implementing more discrete TDM measures commensurate with the size of a wider variety of events should be analyzed

OSEG Response: *The TDM program in place at Lansdowne has been a successful in meetings its goals. Much experience has been gained by City of Ottawa Traffic Services, OC Transpo, and OSEG on a complex program that changes due to factors such as day of the week, time of day, and time of year.*

The management of these factors within the revised attendance levels: less than 5,000, 5,000 to 15,000, 15,000 to 25,000, 25,000 to 40,000, and over 40,000 have proven to be effective. Also, as stated previously, the size of average events at TD Place has proven smaller than initially anticipated. OSEG expects 78% of events held this year to be below 5,000.

NCC Response (July 2023): It is good to see the TDM Report identify updated thresholds of minor and major events, and the growth of public and non-ticketed events that may occur concurrently with other events.

APPENDIX

B

Existing Conditions

B-1 Stantec 2012 Existing Drainage Plan

KEY PLAN
N.T.S.

JOB BENCH MARK #5-
TOP OF SOUTHWEST BOLT OF LAMP STANDARD ELEV=65.51

JOB BENCH MARK #2
MAGNETIC NAIL SET IN TOP OF OLD CONCRETE BASE
ELEVATION=65.380

JOB BENCH MARK #3
MAGNETIC NAIL SET IN TOP OF CONCRETE SLAB ELEV=67.553

JOB BENCH MARK #4
TOP CORNER OF CONCRETE WALL ELEVATION=67.617

JOB BENCH MARK #1
MAGNETIC NAIL SET IN TOP OF CONCRETE CANAL WALL
ELEVATION=64.581

CANAL OUTLET
INV=62.58

OPERATING LEVEL OF CANAL DURING 'NAVIGATION SEASON' 64.03m TO 64.08m

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david schaeffer engineering ltd
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PLANNING • URBAN DESIGN
LANDSCAPE ARCHITECTURE

REVISIONS

No.	Date	Details	By
1	2011-11-21	ISSUED TO CITY FOR REVIEW	JVG
2	2011-12-12	REVISED AS PER CITY COMMENTS	JVG
3	2012-01-11	REVISED AS PER COORDINATION WITH OSEG	JVG
4	2012-01-26	REVISED AS PER CITY COMMENTS	JVG

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PROJECT

Lansdowne
THE TRANSFORMATION OF LANSDOWNE PARK
LA TRANSFORMATION DU PARC LANSDOWNE

DRAWING TITLE

EXISTING CONDITIONS PLAN

DATE
Oct. 13, 2011

SCALE
1:600

REVISION #
4

DRAWING No.
EX01

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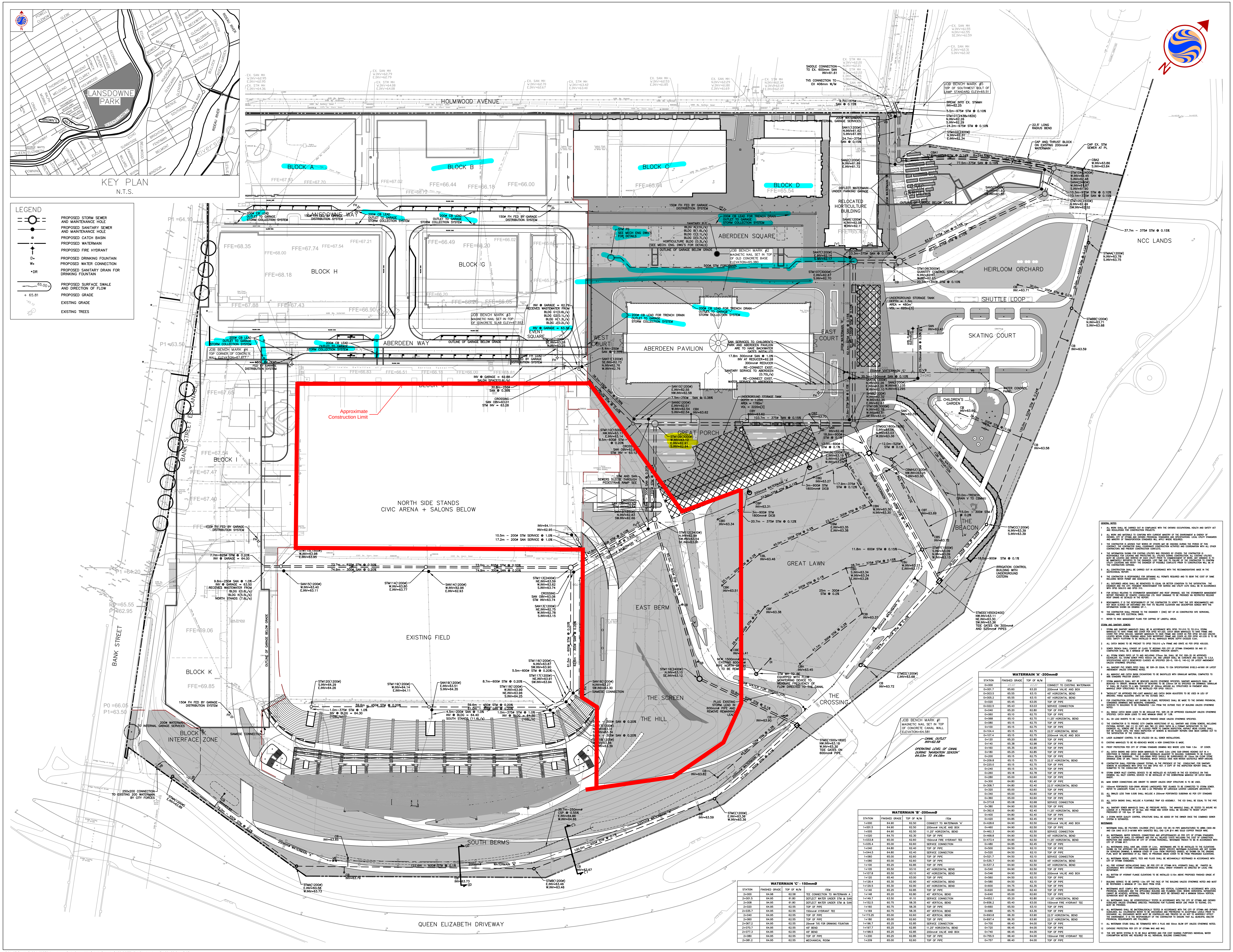

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DSEL david schaeffer engineering ltd

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4	2012–01–26	REVISED AS PER CITY COMMENTS	JVG

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PROJECT

Lansdowne
THE TRANSFORMATION OF LANSDOWNE PARK
LA TRANSFORMATION DU PARC LANSDOWNE

DRAWING TITLE

SITE SERVICING PLAN

DATE Oct. 13, 2011	DRAWING No. C01
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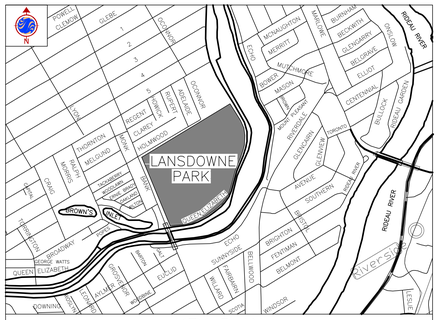
REVISION # 4	



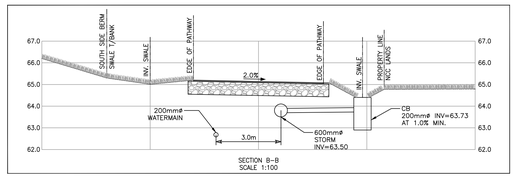
LEGEND

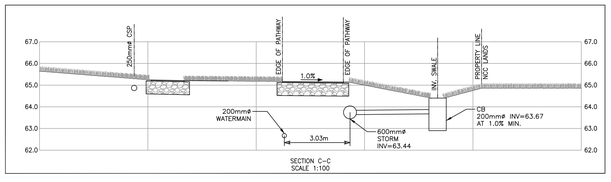
- PROPOSED STORM MAINTENANCE HOLE
- PROPOSED SANITARY MAINTENANCE HOLE
- PROPOSED CATCH BASIN
- 0.5% 65.00 PROPOSED SURFACE SWALE AND DIRECTION OF FLOW
- + 65.81 PROPOSED GRADE
- + 65.81 EX PROPOSED GRADE = EXISTING GRADE
- 65.00 EXISTING GRADE
- EXTENT OF PAH IMPACTED SOIL

HOLMWOOD AVENUE
LANSDOWNE WAY
ABERDEEN AVENUE
BANK STREET
QUEEN ELIZABETH DRIVEWAY
BLOCK A
BLOCK B
BLOCK C
BLOCK D
BLOCK G
BLOCK H
BLOCK J
BLOCK K
BLOCK K INTERFACE ZONE
RELOCATED HORTICULTURE BUILDING
ABERDEEN SQUARE
ABERDEEN PAVILION
WEST COURT
EAST COURT
EVENT SQUARE
HEIRLOOM ORCHARD
SHUTTLE LOOP
SKATING COURT
CHILDREN'S GARDEN
GREAT PORCH
GREAT LAWN
THE BEACON
THE CROSSING
EAST BERM
THE SCREEN
THE HILL
SOUTH BERMS
EXISTING FIELD
NORTH SIDE STANDS
CIVIC ARENA + SALONS BELOW
NCC LANDS
JOB BENCH MARK #1 TOP OF SOUTHWEST BOLT OF LAMP STANDARD ELEV=65.51
JOB BENCH MARK #2 MAGNETIC NAIL SET IN TOP OF OLD CONCRETE BASE ELEVATION=65.380
JOB BENCH MARK #3 MAGNETIC NAIL SET IN TOP OF CONCRETE SLAB ELEV=67.193
JOB BENCH MARK #4 TOP CORNER OF CONCRETE ELEVATION=67.337
JOB BENCH MARK #5 MAGNETIC NAIL SET IN TOP OF CONCRETE CANAL WALL ELEVATION=64.581
95 m
OUTLINE OF GARAGE BELOW GRADE
100 YEAR FLOOD ELEVATION = 64.90m
100 YEAR FLOOD ELEVATION = 64.70m
CANAL OUTLET INV=62.58
OPERATING LEVEL OF CANAL DURING 'NAVIGATION SEASON' 64.03m TO 64.08m

SITE GRADING

1. ALL GRANULAR BASE & SUB BASE COURSE MATERIALS SHALL BE COMPACTED TO 100% STANDARD PROCTOR MAX. DRY DENSITY.
2. ALL DISTURBED GRASSED AREAS SHALL BE RESTORED TO ORIGINAL CONDITION OR BETTER, WITH SOD ON MIN. 100mm TOPSOIL. THE RELOCATION OF TREES AND SHRUBS SHALL BE SUBJECT TO APPROVAL BY THE PROJECT LANDSCAPE ARCHITECT OR ENGINEER.
3. PAVEMENT CONSTRUCTION AS PER DETAILS ON DRAWING No. C07.
4. ALL BARRIER CURBS AND SIDEWALKS TO BE CONSTRUCTED PER CITY OF OTTAWA STANDARD DRAWING SC1 AND SC8 UNLESS OTHERWISE NOTED OR DETAIL PROVIDED.
5. INSPECTIONS: ALL WORK ON THE MUNICIPAL RIGHT OF WAY AND EASEMENTS TO BE INSPECTED BY THE MUNICIPALITY PRIOR TO BACKFILLING. ALL WORK RELATING TO WATERMAINS AND SEWERS TO BE INSPECTED BY THE MUNICIPALITY WHEN REQUIRED.
6. REFER TO ARCHITECTURAL SITE PLAN FOR DIMENSIONS AND SITE DETAILS.
7. CONTRACTOR TO OBTAIN A ROAD OCCUPANCY PERMIT 48 HOURS PRIOR TO COMMENCING ANY WORK WITHIN THE MUNICIPAL ROAD ALLOWANCE IF REQUIRED BY THE MUNICIPALITY.
8. PARKING AREA PONDING DEPTH TO BE 0.30m (MAXIMUM).
9. EMBANKMENTS TO BE SLOPED AT MIN. 3:1, UNLESS OTHERWISE SPECIFIED.
10. ALL PAVEMENT MARKING, LINE PAINTING, DIRECTIONAL LINES/ARROWS ETC. SHALL BE PLACED IN ACCORDANCE WITH THE ARCHITECTURAL SITE PLAN OR THE OWNER'S TRAFFIC ENGINEERING CONSULTANT'S DRAWINGS. LINE PAINTING AND DIRECTIONAL SYMBOLS SHALL BE APPLIED WITH A MINIMUM OF TWO COATS OF ORGANIC SOLVENT BASED PAINT.
11. THE CONTRACTOR SHALL PROVIDE TO THE ENGINEER 1 (ONE) SET OF AS CONSTRUCTED SITE SERVICING, GRADING, AND SITE ELECTRICAL DWGS.
12. SITE SIGNAGE TO BE INSTALLED AS PER ARCHITECTURAL SITE PLAN.
13. ALL NECESSARY CLEARING AND GRUBBING SHALL BE COMPLETED BY THE CONTRACTOR, REVIEW WITH ARCHITECT AND THE CITY OF OTTAWA PRIOR TO TREE CUTTING.
14. SUB-EXCAVATE SOFT AREAS & FILL WITH GRANULAR 'B' COMPACTED IN 0.15m LAYERS.
15. FOR ALL LANDSCAPING FEATURES (ie. TREES, WALKWAYS, PARK DETAILS, NOISE BARRIERS, FENCES etc.) REFER TO LANDSCAPE ARCHITECT PLAN.
16. ROUGH GRADING FOR LANDSCAPED ISLANDS TO BE LEFT 150mm BELOW CURB AND COMPACTED TO 95%.
17. WHERE APPLICABLE THE CONTRACTOR IS TO SUBMIT SHOP DRAWINGS FOR RETAINING WALLS (INCLUDE RAILINGS IF APPLICABLE) TO THE ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION. SHOP DRAWINGS MUST BE SITE SPECIFIC, SIGNED AND SEALED BY A LICENCED STRUCTURAL ENGINEER. THE CONTRACTOR WILL ALSO BE REQUIRED TO SUPPLY STRUCTURAL AND GEOTECHNICAL CERTIFICATION OF THE AS-CONSTRUCTED RETAINING WALL TO THE ENGINEER PRIOR TO FINAL ACCEPTANCE.
18. ALL SWALES LESS THAN 0.50% SHALL INCLUDE A 250mmø PERFORATED SUBDRAIN AS PER CITY STANDARD S29.





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PROJECT

Lansdowne
THE TRANSFORMATION OF LANSDOWNE PARK
LA TRANSFORMATION DU PARC LANSDOWNE

DRAWING TITLE

GRADING PLAN

DATE	DRAWING No.
Oct. 13, 2011	C02
SCALE 1:600	
REVISION # 4	

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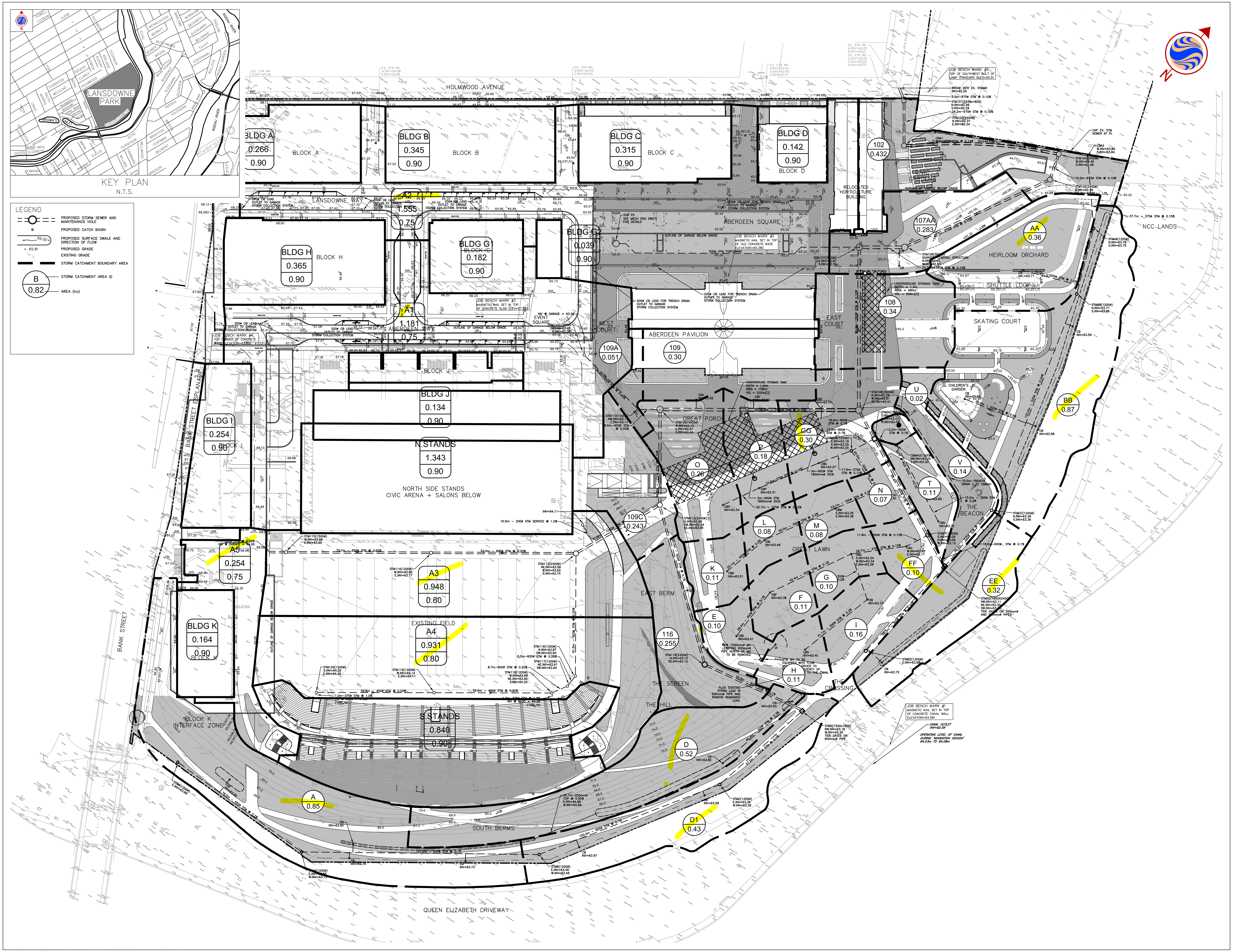

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4	2012-01-26	REVISED AS PER CITY COMMENTS	JVG

1:600

PROJECT

Lansdowne
THE TRANSFORMATION OF LANSDOWNE PARK
LA TRANSFORMATION DU PARC LANSDOWNE

DRAWING TITLE

CATCHMENT AREA PLAN

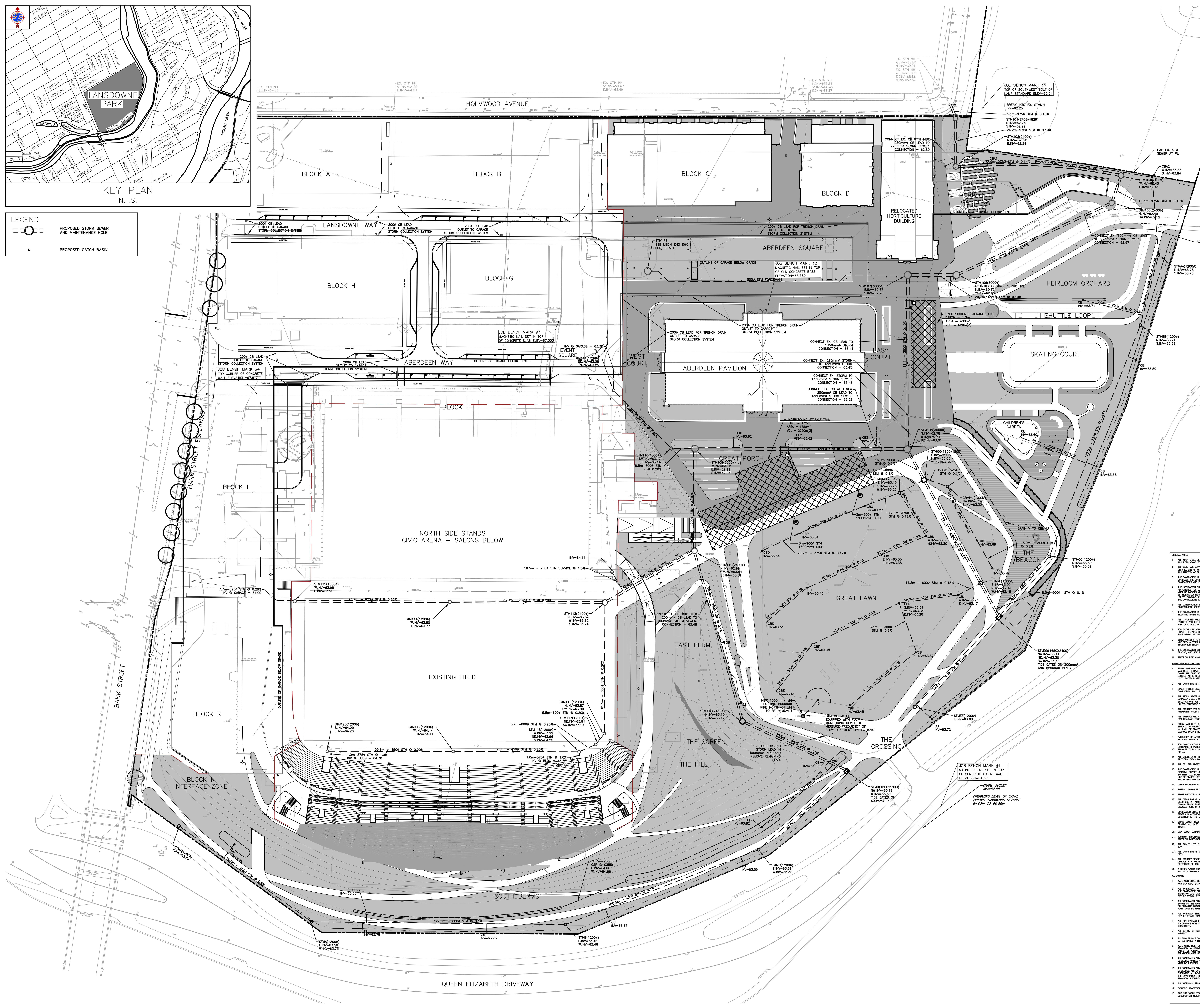
DATE

DRAWING No.

SCALE 1:600

C03

REVISION # 4



GENERAL NOTES

1. ALL WORK SHALL BE CARRIED OUT IN COMPLIANCE WITH THE ONTARIO OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.
2. ALL WORK AND MATERIALS TO CONFORM WITH CURRENT MINISTRY OF THE ENVIRONMENT & ENERGY OF ONTARIO, CITY OF OTTAWA AND ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS. LOCAL UTILITY STANDARDS AND MINISTRY OF TRANSPORTATION STANDARDS WILL APPLY WHERE REQUIRED.
3. THE CONTRACTOR IS ADVISED THAT WORKS BY OTHERS MAY BE ONGOING DURING THE PERIOD OF THIS CONTRACT. THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES AND COORDINATION WITH ALL OTHER CONTRACTORS AND PREVENT CONSTRUCTION CONFLICTS.
4. THE INFORMATION SHOWN FOR EXISTING UTILITIES WAS PROVIDED BY OTHERS. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL UTILITIES DURING CONSTRUCTION. ALL EXISTING UTILITIES MUST BE LOCATED AND VERIFIED BY EACH UTILITY PRIOR TO COMMENCEMENT OF WORK. ANY VARIANCE IS TO BE IMMEDIATELY REPORTED TO THE ENGINEER. LOST TIME DUE TO FAILURE OF THE CONTRACTOR TO CONFIRM UTILITY LOCATIONS AND NOTIFY THE ENGINEER OF POSSIBLE CONFLICTS PRIOR TO CONSTRUCTION WILL BE AT THE CONTRACTORS EXPENSE.
5. ALL CONSTRUCTION SHALL BE CARRIED OUT IN ACCORDANCE WITH THE RECOMMENDATIONS MADE IN THE GEOTECHNICAL REPORT.
6. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED AND TO BEAR THE COST OF SAME INCLUDING WATER PERMIT AND ASSOCIATED COSTS.
7. ALL DISTURBED AREAS SHALL BE REINSTATED TO EQUAL OR BETTER CONDITION TO THE SATISFACTION THE ENGINEER AND THE CITY. PAVEMENT REINSTATEMENT FOR SERVICE AND UTILITY CUTS SHALL BE IN ACCORDANCE WITH OPSD 509.010 AND OPSS 310.
8. FOR DETAILS RELATING TO STORMWATER MANAGEMENT AND ROOF DRAINAGE, SEE THE STORMWATER MANAGEMENT REPORT PREPARED BY STANTEC CONSULTING LTD. ROOF DRAINAGE TO BE PROVIDED VIA RESTRICTED RELEASE ROOF DRAINS AS DETAILED IN THE REPORT.
9. BENCHMARKS: IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT THE SITE BENCHMARK(S) HAS NOT BEEN ALTERED OR DISTURBED AND THAT ITS RELATIVE ELEVATION AND DESCRIPTION AGREES WITH THE INFORMATION SHOWN ON DRAWING GP-1.
10. THE CONTRACTOR SHALL PROVIDE TO THE ENGINEER 1 (ONE) SET OF AS CONSTRUCTED SITE SERVICING, GRADING, AND SITE ELECTRICAL DWGS.
11. REFER TO RISK MANAGEMENT PLANS FOR CAPPING OF LANDFILL AREAS.

STORM AND SANITARY SEWERS

1. STORM AND SANITARY MANHOLES SHALL BE IN ACCORDANCE WITH OPSD 701.010 TO 701.014. STORM MANHOLES TO HAVE FRAME AND COVER PER OPSD 401.020. CATCH BASIN MANHOLES TO HAVE FRAME AND COVER PER OPSD 400.020. SANITARY MANHOLES TO HAVE FRAME AND COVER AS PER OPSD 401.020 UNLESS LOCATED WITHIN STORM PONDING AREAS THEN WATERTIGHT FRAME AND COVER AS PER OPSD 401.030 IS TO BE USED. SAFETY PLATFORM TO BE INSTALLED IN ALL MANHOLES WHERE DEPTH EXCEEDS 5.0m.
2. ALL CATCH BASINS TO BE PRECAST TO OPSD 705.010 c/w FRAME AND GRATE AS PER OPSD 400.020.
3. SEWER TRENCH SHALL CONSIST OF CLASS 'B' BEDDING PER CITY OF OTTAWA STANDARDS S6 AND S7. COMPACTION SHALL BE A MINIMUM OF 98% STANDARD PROCTOR DENSITY.
4. ALL STORM SEWER PIPES UP TO AND INCLUDING 375mm DIA. SHALL BE PVC SDR-35 OR APPROVED EQUIVALENT. ALL STORM SEWER PIPES 450mm DIA. AND LARGER SHALL BE CONCRETE AND EQUAL TO C.S.A. SPECIFICATIONS A257.2 REINFORCED CLASSES AS SPECIFIED (65-D, 100-D, 140-D,) OR LATEST AMENDMENT UNLESS OTHERWISE SPECIFIED.
5. ALL SANITARY PVC SEWER PIPES SHALL BE SDR-35 EQUAL TO CSA SPECIFICATIONS B182.2-M1990 OR LATEST AMENDMENT UNLESS OTHERWISE NOTED.
6. ALL MANHOLE AND CATCH BASIN EXCAVATIONS TO BE BACKFILLED WITH GRANULAR MATERIAL COMPACTED TO 98% STANDARD PROCTOR DENSITY.
7. STORM MANHOLES SHALL NOT BE BENCHED UNLESS OTHERWISE SPECIFIED. SANITARY MANHOLES SHALL BE BENCHED TO OBVERT. MINIMUM WIDTH OF BENCHING TO BE 230mm OR AS SPECIFIED ON DRAWINGS. GRANULAR 'A' SHALL BE PLACED TO A MIN. THICKNESS OF 300mm AROUND ALL STRUCTURES IN PAVEMENT AREA. MANHOLE DROP STRUCTURES TO BE INSTALLED PER OPSD 1003.01.
8. "MODULOC" OR APPROVED PRE-CAST MANHOLE AND CATCH BASIN ADJUSTERS TO BE USED IN LIEU OF BRICKING. PARGE ADJUSTING UNITS ON THE OUTSIDE ONLY.
9. FOR CONSTRUCTION DETAILS NOT SHOWN ON PLANS, REFERENCE SHALL BE MADE TO THE ONTARIO PROVINCIAL STANDARDS DRAWINGS AND MUNICIPAL STANDARDS.
10. SERVICES TO BUILDINGS TO BE TERMINATED 1.0m FROM THE OUTSIDE FACE OF BUILDING UNLESS OTHERWISE NOTED.
11. ALL SINGLE CATCH BASIN LEADS TO BE 200mmØ PVC. SDR-35 OR APPROVED EQUIVALENT UNLESS OTHERWISE SPECIFIED. CATCH BASIN LEADS TO HAVE MINIMUM GRADE OF 1.0%.
12. ALL CB LEAD INVERTS TO BE 1.5m BELOW FINISHED GRADE UNLESS OTHERWISE SPECIFIED.
13. THE CONTRACTOR IS TO PROVIDE CCTV CAMERA INSPECTIONS OF ALL SANITARY AND STORM SEWERS, INCLUDING PICTORIAL REPORT, ONE (1) CD COPY AND TWO (2) VIDEO TAPES IN A FORMAT SATISFACTORY TO THE ENGINEER. ALL SEWERS ARE TO BE FLUSHED PRIOR TO CAMERA INSPECTION. ASPHALT WEAR COURSE SHALL NOT BE PLACED UNTIL THE VIDEO INSPECTION OF SEWERS & NECESSARY REPAIRS HAVE BEEN CARRIED OUT TO THE SATISFACTION OF THE CONSULTANT.
14. LASER ALIGNMENT CONTROL TO BE UTILIZED ON ALL SEWER INSTALLATIONS.
15. EXISTING MANHOLES TO BE RE-BENCHED WHERE A NEW CONNECTION IS MADE.
16. FROST PROTECTION PER CITY OF OTTAWA STANDARD DRAWING W22 WHERE LESS THAN 1.5m OF COVER.
17. ALL CATCH BASINS AND CATCH BASIN MANHOLES TO HAVE 3.0m LONG SUB-DRAINS HEADING OUT IN 4 DIRECTIONS IN PARKING AREAS AND UNDER SIDEWALKS ADJACENT TO BUILDING. SUBDRAINS TO BE PLACED 300mm BELOW SUBGRADE. THE SUB-DRAIN PIPES SHOULD BE SURROUNDED BY 10mm DIA CLEAR STONE DRAINAGE ZONE OF MIN. 150mm THICKNESS, WHICH SHOULD HAVE NON-WOVEN GEOTEXTILE WRAP-AROUND.
18. CONTRACTOR SHALL PERFORM LEAKAGE TESTING, IN THE PRESENCE OF THE CONSULTANT, FOR SANITARY SEWERS IN ACCORDANCE WITH OPSS 410 AND OPSS 407. A COPY OF THE INSPECTION REPORT SHALL BE SUBMITTED TO THE CONSULTANT FOR REVIEW.
19. STORM SEWER INLET CONTROL DEVICES TO BE INSTALLED AS OUTLINED IN THE ICD SCHEDULE ON THIS DRAWING. ALL INLET CONTROL DEVICES TO BE INSTALLED AT THE DOWNSTREAM MANHOLE OR CATCH BASIN INVERT.
20. MAIN SEWER CONNECTIONS ARE OBVERT TO OBVERT UNLESS DROP STRUCTURE IS TO BE USED.
21. 100mmø PERFORATED SUB-DRAIN AROUND LANDSCAPED TREE ISLANDS TO BE CONNECTED TO STORM SEWER. REFER TO LANDSCAPE PLANS L-1A AND L-2A PREPARED BY LAROCQUE LEVSTEK LANDSCAPE ARCHITECTS.
22. ALL SWALES LESS THAN 0.50% SHALL INCLUDE A 250mmø PERFORATED SUBDRAIN AS PER CITY STANDARD S29.
23. ALL CATCH BASINS SHALL INCLUDE A FLOATABLE TRAP ICD ASSEMBLY. THE ICD SHALL BE EQUAL TO THE PIPE SIZE.
24. ALL SANITARY SEWER MANHOLES SHALL BE PRESSURE RATED. THE MANHOLE SHALL BE TESTED TO INSURE NO LEAKAGE AT A PRESSURE OF 20 Kpa. AND FRAME AND COVER SHALL BE SECURED TO RESIST UPLIFT PRESSURES OF 100 Kpa. OF HEAD.
25. A STORM WATER QUALITY CONTROL STRUCTURE SHALL BE ADDED BY THE OWNER ONCE THE COMBINED SEWER SYSTEM IS SEPARATED.

WATERMAINS

1. WATERMAIN SHALL BE POLYVINYL CHLORIDE (PVC) CLASS 150 DR-18 PIPE MANUFACTURED TO AWWA C900-89 AND CSA CAN3 B137.3-M1986 WITH GASKETED BELL END C/W #14 AWG SOLID COPPER TRACER WIRE.
2. ALL WATERMAINS, WATER SERVICES, CONNECTIONS AND APPURTENANCES AS PER CITY OF OTTAWA STANDARDS. THE CONTRACTOR SHALL CO-ORDINATE AND PAY ALL RELATED COSTS INCLUDING THE COST OF CONNECTION, INSPECTION AND DISINFECTION BY CITY OF OTTAWA PERSONELL. WATERMAIN TRENCH TO BE IN ACCORDANCE WITH CITY OF OTTAWA W17.
3. ALL WATERMAINS SHALL HAVE MIN. COVER OF 2.4m. WATERMAINS ARE TO BE INSTALLED TO THE ELEVATIONS SHOWN ON THE APPROVED SITE SERVICING DRAWING. WHERE SPECIFIC WATERMAIN ELEVATIONS ARE NOT SHOWN ON SERVICING DRAWING, A MINIMUM COVER OF 2.4m FROM PROPOSED GRADES, AS SHOWN ON THE GRADING PLAN, MUST BE MAINTAINED AT ALL TIMES. IN PREGRADE AREAS COVER TO BE FROM PREGRADED ELEVATIONS.
4. ALL WATERMAIN BENDS, JOINTS, TEES AND PLUGS SHALL BE MECHANICALLY RESTRAINED IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS.
5. ALL FIRE HYDRANT INSTALLATIONS SHALL BE PER CITY OF OTTAWA W19. HYDRANTS SHALL BE PAINTED IN ACCORDANCE WITH OTTAWA STANDARDS. CONTRACTOR SHALL ORIENT HYDRANTS AS DIRECTED BY LOCAL FIRE DEPARTMENT.
6. ALL BOTTOM OF HYDRANT FLANGE ELEVATIONS TO BE INSTALLED 0.15m ABOVE PROPOSED FINISHED GRADE AT HYDRANT.
7. BUILDING SERVICE TO BE CAPPED 1.0m OFF THE FACE OF THE BUILDING UNLESS OTHERWISE NOTED AND MUST BE RESTRAINED A MINIMUM OF 12m BACK FROM STUB.
8. WATERMAINS MUST COMPLY WITH MINIMUM HORIZONTAL AND VERTICAL CLEARANCES IN ACCORDANCE WITH LOCAL PROVINCIAL GUIDELINES AND THE APPLICABLE BUILDING AND PLUMBING CODE. WHERE HORIZONTAL SEPARATIONS CANNOT BE ACHIEVED, APPROVAL FROM THE ENGINEER MUST BE OBTAINED AND A MINIMUM 500mm VERTICAL SEPARATION MUST BE MAINTAINED.
9. ALL WATERMAINS SHALL BE HYDROSTATICALLY TESTED IN ACCORDANCE WITH THE CITY OF OTTAWA AND ONTARIO GUIDELINES UNLESS OTHERWISE DIRECTED. PROVISIONS FOR FLUSHING WATER LINE PRIOR TO TESTING, ETC. MUST BE PROVIDED.
10. ALL WATERMAINS SHALL BE BACTERIALOGICALLY TESTED IN ACCORDANCE WITH THE CITY OF OTTAWA AND ONTARIO GUIDELINES. ALL CHLORINATED WATER TO BE DISCHARGED AND PRETREATED TO ACCEPTABLE LEVELS PRIOR TO DISCHARGE. ALL DISCHARGED WATER MUST BE CONTROLLED AND TREATED SO AS NOT TO ADVERSELY EFFECT THE ENVIRONMENT. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT ALL MUNICIPAL AND/OR PROVINCIAL REQUIREMENTS ARE FOLLOWED.
11. ALL WATERMAIN STUBS SHALL BE TERMINATED WITH A PLUG AND 50mm BLOW OFF UNLESS OTHERWISE NOTED.
12. CATHODIC PROTECTION PER CITY OF OTTAWA W40 AND W42.
13. THE SITE WATER SYSTEM IS TO BE BULK METERED AND FOR COST SHARING PURPOSES INDIVIDUAL WATER CONSUMPTION METERS ARE REQUIRED ON ALL INDIVIDUAL BUILDING CONNECTIONS.

CLIENT PARTNERSHIP

Ottawa

OSEG

CONSULTANT TEAM

CANNONDESIGN

CORUSH SUNDERLAND WRIGHT

DSEL david schaeffer engineering ltd

GreenbergFarrow

Stantec

PHILLIPS FAREVAAG SMALLENBERG PLANNING + URBAN DESIGN LANDSCAPE ARCHITECTURE

Do not scale drawings. This drawing shall not be used for construction.

REVISIONS

No.	Date	Details	By
1	2011-11-21	ISSUED TO CITY FOR REVIEW	JVG
2	2011-12-12	REVISED AS PER CITY COMMENTS	JVG
3	2012-01-11	REVISED AS PER COORDINATION WITH DSEL.	JVG
4	2012-01-26	REVISED AS PER CITY COMMENTS	JVG

1:600 0 6 18 30m

PROJECT

Lansdowne
THE TRANSFORMATION OF LANSDOWNE PARK
LA TRANSFORMATION DU PARC LANSDOWNE

DRAWING TITLE

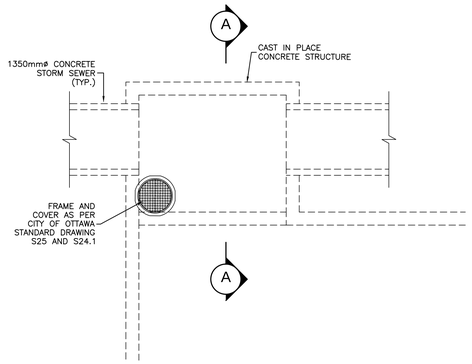
INTERIM STORM SEWER CONNECTION PLAN

DATE Oct. 13, 2011

SCALE 1:600

REVISION # 4

DRAWING No. C04



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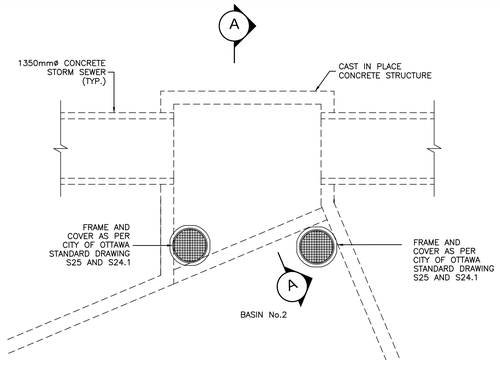

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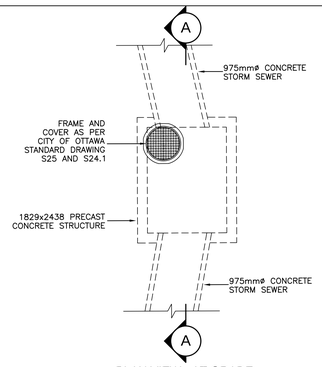

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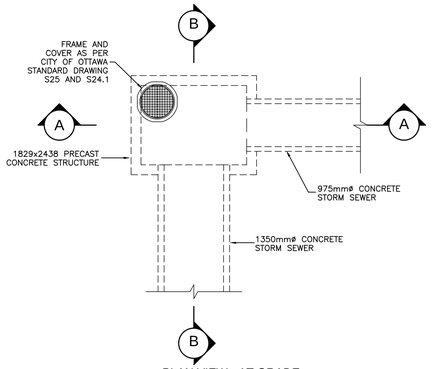

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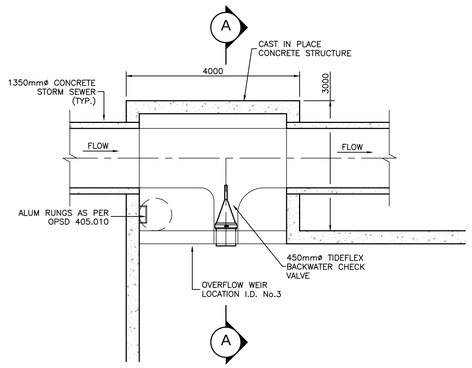

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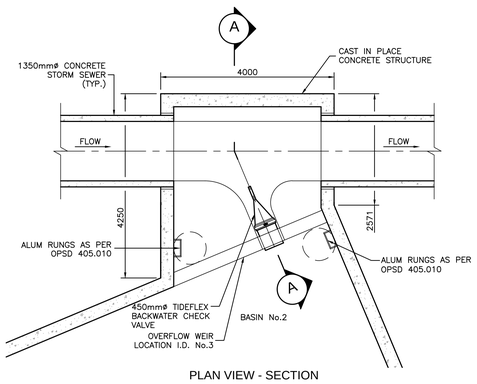

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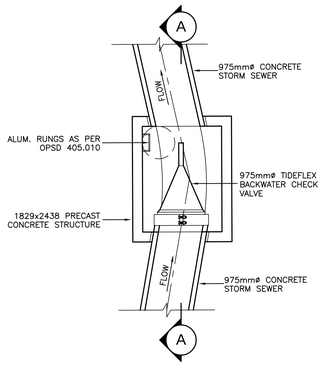

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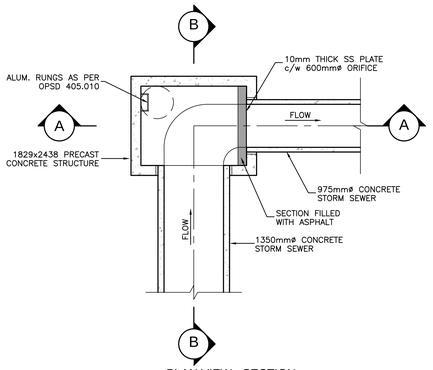

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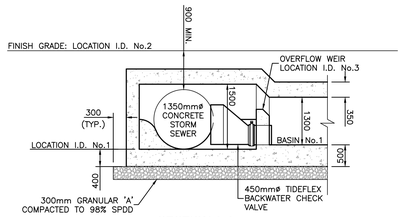
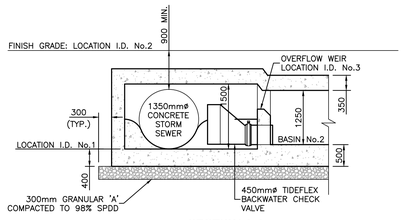


SECTION A-A



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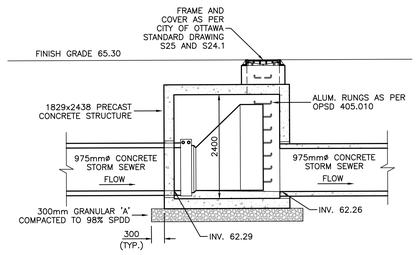
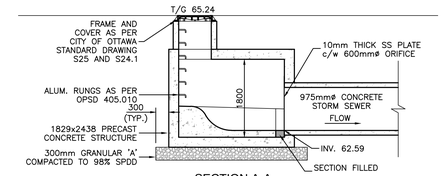


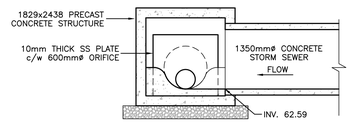
SECTION A-A

FLOW CONTROL MANHOLE No.101
DETAIL

0 500 1500 2500mm



SECTION A-A



SECTION B-B

FLOW CONTROL MANHOLE No.105
DETAIL

0 500 1500 2500mm

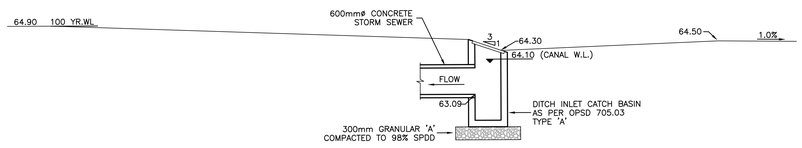
MH 106

ELEVATION TABLE–BASIN No.1	
LOCATION I.D. No.	NORTH MANHOLE 1
1	62.71
2	65.04
3	63.65

FLOW CONTROL MANHOLE TO SWM
BASIN No.1 DETAIL
N.T.S.

ELEVATION TABLE–BASIN No.2	
LOCATION I.D. No.	WEST MANHOLE 1
1	62.85
2	65.14
3	63.75

FLOW CONTROL MANHOLE TO SWM
BASIN No.2 DETAIL
N.T.S.



CANAL FLOW CONTROL MANHOLE

0 500 1500 2500mm

CLIENT PARTNERSHIP

CONSULTANT TEAM

CANNONDESIGN
AN IDEAS BASED PRACTICE

CORUSH SUNDERLAND WRIGHT

DSEL
david schaeffer engineering ltd
SMART SUBDIVISIONS™

GreenbergFarrow

Stantec

PHILLIPS FAREVAAG SMALLENBERG
PLANNING • URBAN DESIGN
LANDSCAPE ARCHITECTURE

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PROJECT

Lansdowne
THE TRANSFORMATION OF LANSDOWNE PARK
LA TRANSFORMATION DU PARC LANSDOWNE

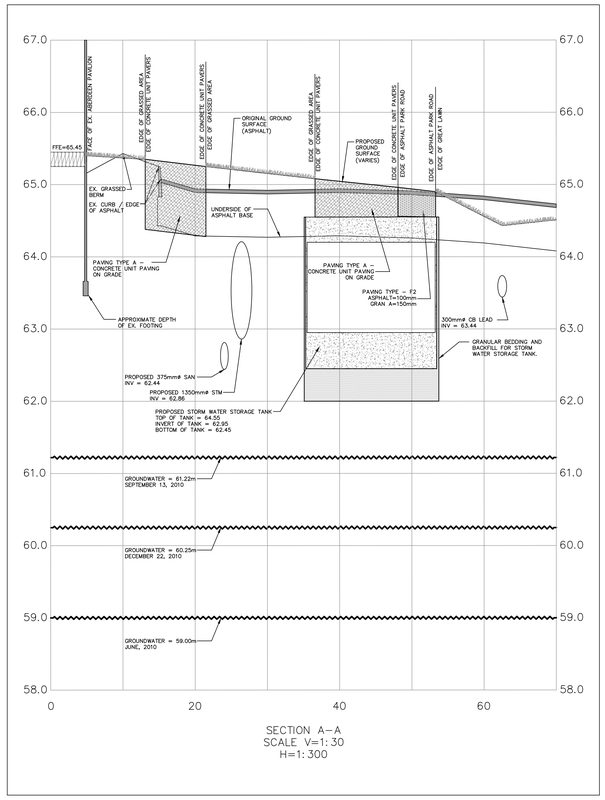
DRAWING TITLE
DETAILS

DATE

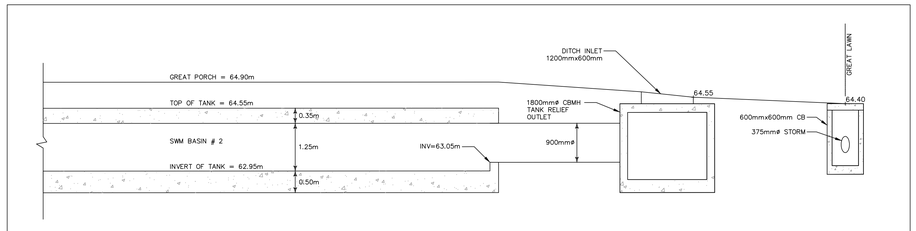
SCALE
AS SHOWN

REVISION #
3

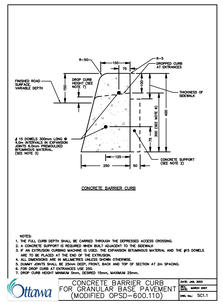
DRAWING No.
C05



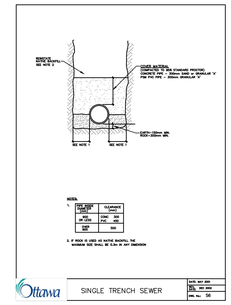
SECTION A–A
SCALE V=1:30
H=1:300

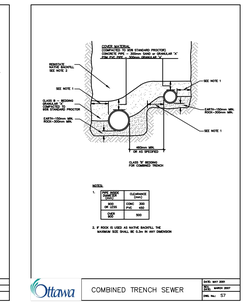


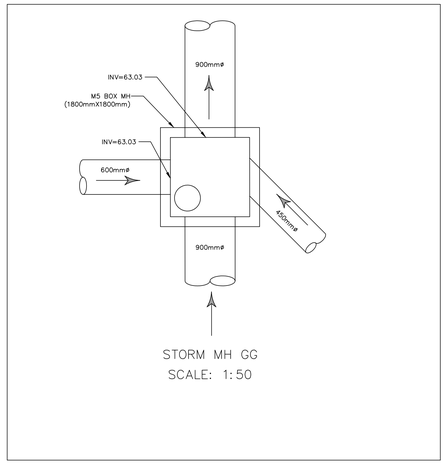
SWM TANK OUTLET RELIEF (TYP.)
N.T.S



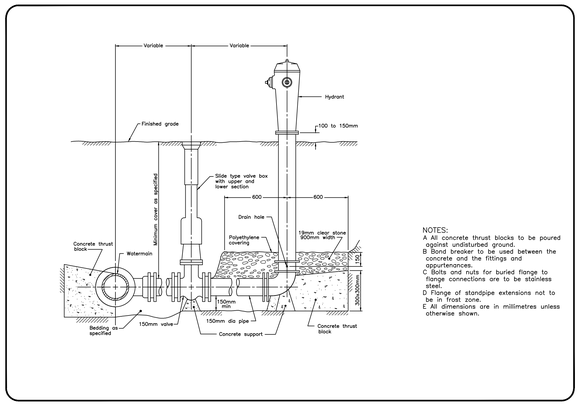
CONCRETE BARRIER CURB FOR GRANULAR BASE PAVEMENT (MODIFIED OPSD-600.110)



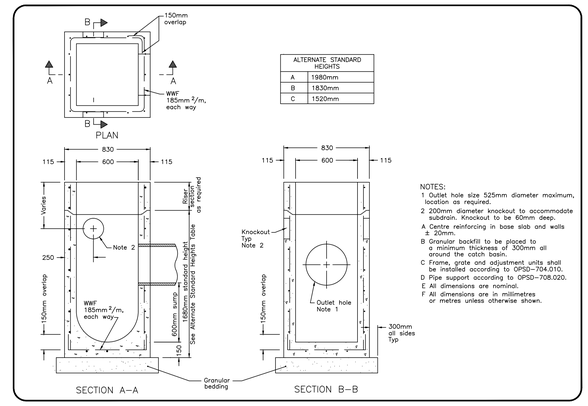




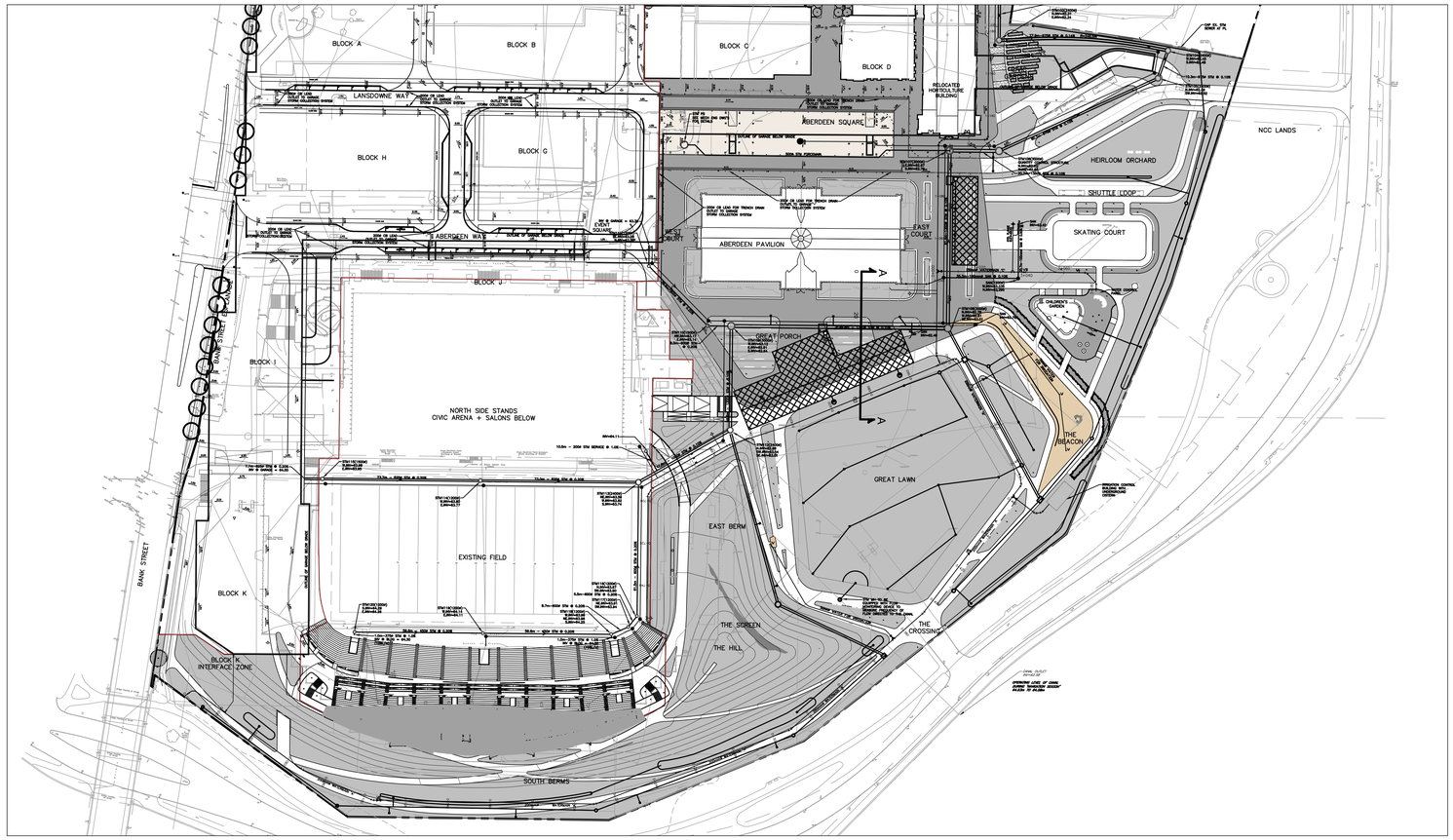
STORM MH GG
SCALE: 1:50



NOTES:
A All concrete thrust blocks to be poured against undisturbed ground.
B Bond breaker to be used between the concrete and the fittings and appurtenances.
C Bolts and nuts for buried flange to flange connections are to be stainless steel.
D Flange of standpipe extensions not to be in frost zone.
E All dimensions are in millimetres unless otherwise shown.



NOTES:
1 Outlet hole size 525mm diameter maximum, location as required.
2 200mm diameter knockout to accommodate subdrain. Knockout to be 60mm deep.
A Centre reinforcing in base slab and walls ± 20mm.
B Granular backfill to be placed to a minimum thickness of 300mm all around the catch basin.
C Frame, grate and adjustment units shall be installed according to OPSD-704.010.
D Pipe support according to OPSD-708.020.
E All dimensions are nominal.
F All dimensions are in millimetres or metres unless otherwise shown.



CLIENT PARTNERSHIP

CONSULTANT TEAM

PHILLIPS FAREVAAG SMALLENBERG
PLANNING • URBAN DESIGN
LANDSCAPE ARCHITECTURE

REVISIONS

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PROJECT

Lansdowne
THE TRANSFORMATION OF LANSDOWNE PARK
LA TRANSFORMATION DU PARC LANSDOWNE

DRAWING TITLE
DETAILS

DATE

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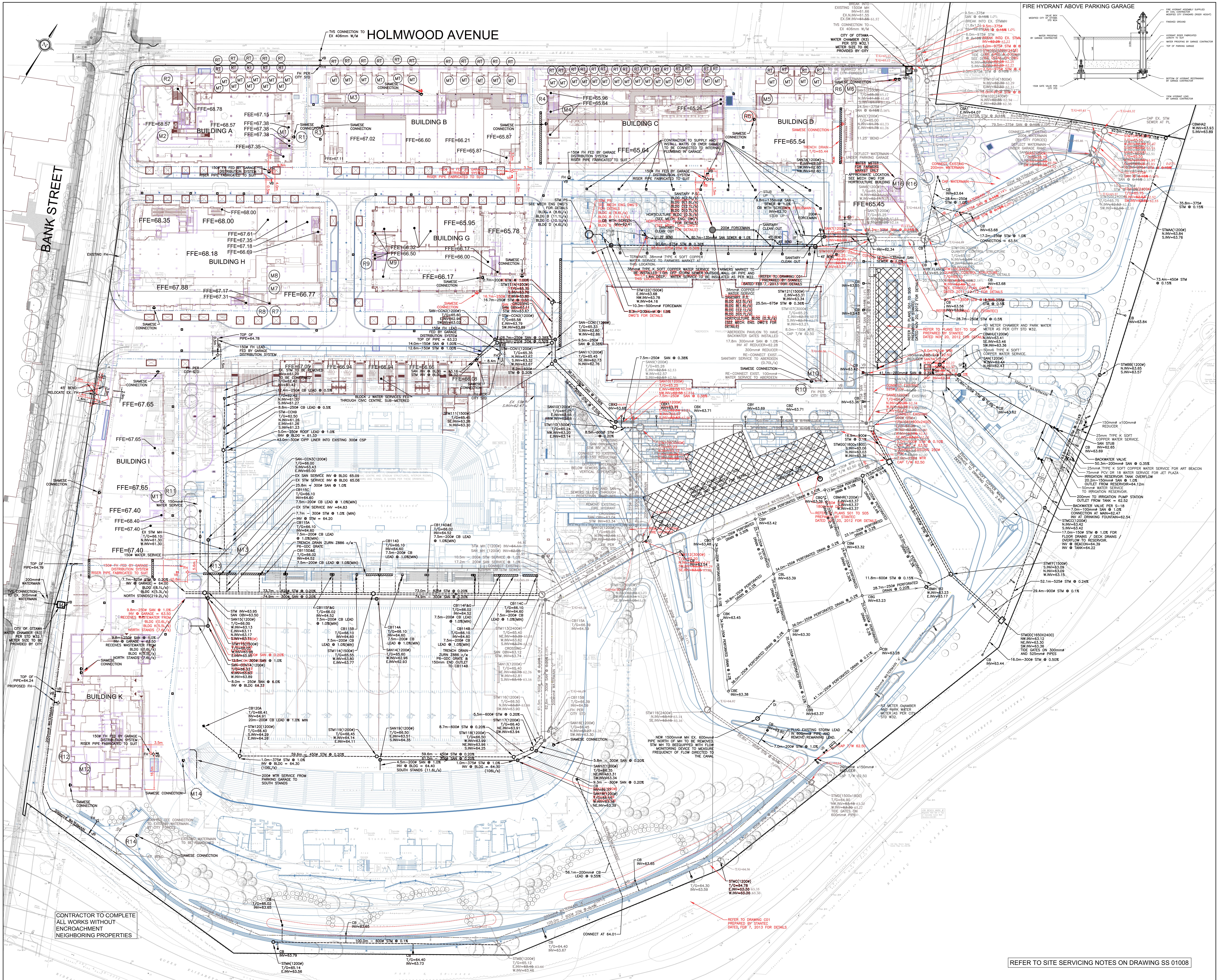
AS SHOWN

REVISION #
3

DRAWING No.
C06

B-2 As Built Drawings



z:\projects\09-378 lansdowne park\design\c detailed design\c.2 drawings\c.2.1 cad drawings\spo_base\spo_378-2015-02-03_servicing-overlay.dwg

REDEVELOPMENT OF LANSDOWNE PARK

Lansdowne
THE TRANSFORMATION OF LANSDOWNE PARK / LA TRANSFORMATION DU PARC LANSDOWNE

Ottawa

OSEG
Ottawa Sports and Entertainment Group

1015 Bank Street
Ottawa, Ontario
K1S 3W7

DSEL
david schaeffer engineering ltd
SMART SUBDIVISIONS™
120 Iber Road Unit 203
Stittsville, Ontario, K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

Stantec
1505 Laperriere Avenue
Ottawa, Ontario, K1Z 7T1
Tel. (613) 722-4420
Fax. (613) 722-2799
www.stantec.com

Drawings are not to be scaled.

Contractor must verify all dimensions on the job and report any discrepancy to architects before proceeding with the work

All drawings and specifications are the property of the architect and must be returned at the completion of the work

This drawing is not to be used for construction until countersigned.

Signature: Date:

Seals:

GENERAL NOTES

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

TOPOGRAPHIC INFORMATION

TOPOGRAPHIC INFORMATION PROVIDED BY FAIRHALL, MOFFATT & WOODLEAND LTD.
PROJ. NO. P19500
DATED 2011-09-27

SITE PLAN INFORMATION

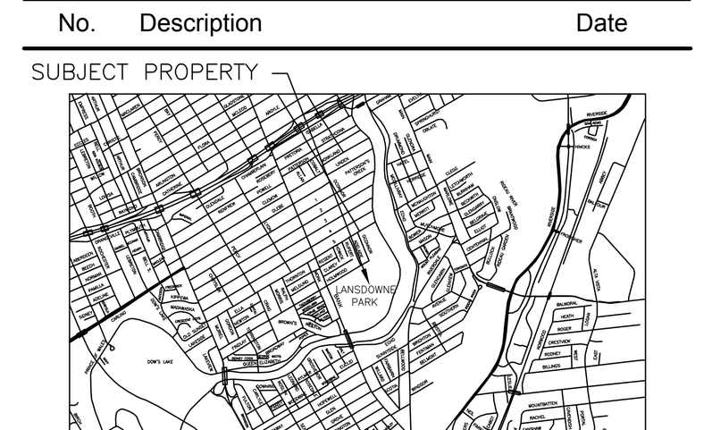
TOPOGRAPHIC INFORMATION PROVIDED BY CORUSH, SUNDERLAND , AND WRIGHT
PROJ. NO. 1766
DATED 2013-06-14

BENCH MARK

MAGNETIC NAIL SET IN TOP OF CONCRETE WALL OF CANAL LOCATED AT SOUTH EAST SITE ACCESS
ELEV=64.581

No.	Description	Date
21	Issued to City	Jan 27/15
20	Issued to City	Sept 04/14
19	Revised Bldg G1 Siamese connection	June 17/14
18	Revised Siamese connections	May 8/14
17	Revised FH Bank Street	Feb 2/14
16	Revised per municipal comments	Dec 10/13
15	Added Meter and Remote Meter locations	Dec 4/13
14	Revised water meter at Bank street, updated per CCN-SS-9r3, CCN-SS-10, CD-SS-3, CD-SS-4	Nov 26/13

SUBJECT PROPERTY



KEY PLAN

Drawing Title:

LANSDOWNE PARK

SITE SERVICING PLAN

Scale.: 1:500 Date Created: MM/DD/YR

Project No.: 09-378 Checked by: CHK

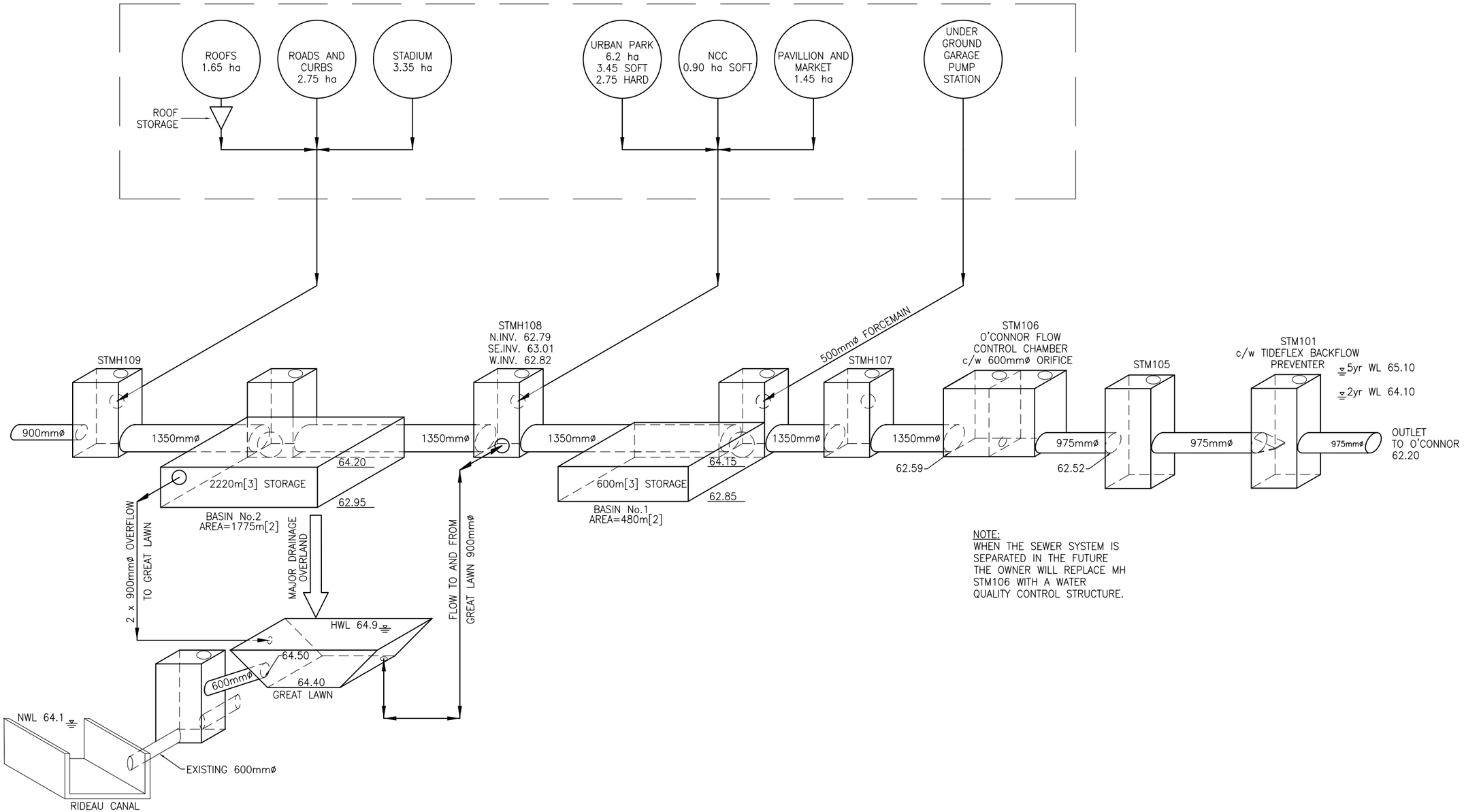
SS 01003

B-3 Stantec 2012 Existing Storm Sewer Design Sheet

														Sewer Data								
Up	Down	BLDG ID	Q_{BLDG}	$Q_{BLDG\ TOT}$	AREA ID	Area	C	Indiv AxC	Acc AxC	T_C	I	Q	Q_{TOT}	DIA	Slope	Length	$A_{hydraulic}$	R	Velocity	Qcap	Time Flow	Q / Q full
			(L/s)	(L/s)		(ha)	(-)			(min)	(mm/hr)	(L/s)	(L/s)	(mm)	(%)	(m)	(m^2)	(m)	(m/s)	(L/s)	(min)	(-)
120	119	S. Stands	106.0	106.0				0.00	0.00	***20.0***	70.3	0.0	106.0	450	0.20	59.6	0.159	0.113	0.80	127.5	1.2	0.83
119	118			106.0				0.00	0.00	21.2	67.6	0.0	106.0	450	0.20	59.6	0.159	0.113	0.80	127.5	1.2	0.83
118	117	S. Stands	106.0	212.0				0.00	0.00	22.5	65.2	0.0	212.0	600	0.20	8.7	0.283	0.150	0.97	274.6	0.1	0.77
117	116			212.0				0.00	0.00	22.6	65.0	0.0	212.0	600	0.20	3.8	0.283	0.150	0.97	274.6	0.1	0.77
116	113			212.0				0.00	0.00	22.7	64.8	0.0	212.0	600	0.20	62.4	0.283	0.150	0.97	274.6	1.1	0.77
										23.8												
115	114	I, K, N.STANDS	232.6	232.6	A3, A4, A5	2.133	0.80	1.71	1.71	***20.0***	70.3	333.0	565.6	825	0.20	73.7	0.535	0.206	1.20	641.9	1.0	0.88
114	113			232.6				0.00	1.71	21.0	68.1	322.7	555.4	825	0.20	73.0	0.535	0.206	1.20	641.9	1.0	0.87
										22.0												
113	112			444.6				0.00	1.71	23.8	62.9	298.4	743.0	1050	0.10	47.8	0.866	0.263	1.00	863.5	0.8	0.86
										24.6												
A	B			0.0		0.870	0.35	0.30	0.30	***15.0***	83.6	70.7	70.7	600	0.10	100.0	0.283	0.150	0.69	194.2	2.4	0.36
B	C			0.0		0.430	0.35	0.15	0.46	17.4	76.5	96.6	96.6	600	0.10	100.0	0.283	0.150	0.69	194.2	2.4	0.50
C	D			0.0				0.00	0.46	19.9	70.6	89.2	89.2	600	0.10	57.0	0.283	0.150	0.69	194.2	1.4	0.46
D	D1			0.0		0.520	0.35	0.18	0.64	21.2	67.6	119.7	119.7	900	0.10	55.8	0.636	0.225	0.90	572.5	1.0	0.21
D1	112			0.0		0.340	0.35	0.12	0.76	22.3	65.6	137.8	137.8	900	0.10	85.0	0.636	0.225	0.90	572.5	1.6	0.24
										23.8												
112	109			444.6				0.00	2.46	24.6	61.6	421.4	866.0	1200	0.10	46.8	1.131	0.300	1.09	1232.9	0.7	0.70
										25.3												
111	110	H, G1, G2, J	23.1	23.1	A1	1.181	0.75	0.89	0.89	***20.0***	70.3	172.8	196.0	600	0.20	39.6	0.283	0.150	0.97	274.6	0.7	0.71
110	109			23.1				0.00	0.89	20.7	68.8	169.3	192.4	600	0.20	8.5	0.283	0.150	0.97	274.6	0.1	0.70
										20.8												
109	108			467.8				0.00	3.35	25.3	60.5	562.3	1030.0	1350	0.10	99.8	1.431	0.338	1.18	1687.8	1.4	0.61
										26.7												
CB1A	AA			0.0		0.430	0.60	0.26	0.26	***15.0***	83.6	59.9	59.9	375	0.15	114.0	0.110	0.094	0.61	67.9	3.1	0.88
AA	BB			0.0		0.360	0.35	0.13	0.38	18.1	74.7	79.7	79.7	450	0.12	35.0	0.159	0.113	0.62	98.8	0.9	0.81
BB	CC			0.0		0.870	0.35	0.30	0.69	19.0	72.5	138.6	138.6	525	0.24	120.0	0.216	0.131	0.97	210.7	2.1	0.66
CC	DD			0.0				0.00	0.69	21.1	68.0	130.0	130.0	525	0.24	38.0	0.216	0.131	0.97	210.7	0.7	0.62
										21.7												
EE	DD			0.0		0.320	0.35	0.11	0.11	***15.0***	83.6	26.0	26.0	300	0.40	59.0	0.071	0.075	0.87	61.2	1.1	0.43
										16.1												
DD	FF			0.0				0.00	0.80	***21.7***	66.7	148.2	148.2	900	0.10	31.0	0.636	0.225	0.90	572.5	0.6	0.26
										22.3												
H	G			0.0		0.270	0.35	0.09	0.09	***15.0***	83.6	21.9	21.9	300	0.20	66.0	0.071	0.075	0.61	43.2	1.8	0.51
G	J			0.0		0.310	0.35	0.11	0.20	16.8	78.2	44.1	44.1	375	0.15	30.0	0.110	0.094	0.61	67.9	0.8	0.65
J	FF			0.0		0.100	0.35	0.04	0.24	17.6	76.0	50.2	50.2	600	0.15	12.0	0.283	0.150	0.84	237.8	0.2	0.21
										17.8												
FF	GG			0.0				0.00	1.04	***22.3***	65.6	189.1	189.1	900	0.10	57.0	0.636	0.225	0.90	572.5	1.1	0.33
										23.4												
K	M			0.0		0.270	0.35	0.09	0.09	***15.0***	83.6	21.9	21.9	300	0.20	65.0	0.071	0.075	0.61	43.2	1.8	0.51
M	R			0.0		0.070	0.35	0.02	0.12	16.8	78.2	25.9	25.9	300	0.20	47.0	0.071	0.075	0.61	43.2	1.3	0.60
										18.1												

														Sewer Data								
Up	Down	BLDG ID	Q_{BLDG}	$Q_{BLDG\ TOT}$	AREA ID	Area	C	Indiv AxC	Acc AxC	T_C	I	Q	Q_{TOT}	DIA	Slope	Length	$A_{hydraulic}$	R	Velocity	Qcap	Time Flow	Q / Q full
			(L/s)	(L/s)		(ha)	(-)			(min)	(mm/hr)	(L/s)	(L/s)	(mm)	(%)	(m)	(m^2)	(m)	(m/s)	(L/s)	(min)	(-)
O	P			0.0		0.280	0.60	0.17	0.17	***15.0***	83.6	39.0	39.0	375	0.12	21.0	0.110	0.094	0.55	60.7	0.6	0.64
P	Q			0.0		0.180	0.60	0.11	0.28	15.6	81.6	62.5	62.5	375	0.10	34.0	0.110	0.094	0.50	55.4	1.1	1.13
Q	R			0.0		0.300	0.60	0.18	0.46	16.8	78.3	99.1	99.1	375	0.12	18.0	0.110	0.094	0.55	60.7	0.5	1.63
R	GG			0.0				0.00	0.58	17.3	76.8	122.6	122.6	600	0.10	13.0	0.283	0.150	0.69	194.2	0.3	0.63
										17.6												
S	U			0.0		0.130	0.60	0.08	0.08	***15.0***	83.6	18.1	18.1	450	0.20	30.0	0.159	0.113	0.80	127.5	0.6	0.14
U	GG			0.0		0.140	0.60	0.08	0.16	15.6	81.6	36.7	36.7	525	0.10	17.0	0.216	0.131	0.63	136.0	0.5	0.27
										16.1												
GG	108			0.0				0.00	1.78	***17.6***	75.9	374.5	374.5	900	0.10	22.0	0.636	0.225	0.90	572.5	0.4	0.65
										18.0												
108	107			0.0		0.340	0.60	0.20	5.33	***26.7***	58.3	863.2	863.2	1350	0.10	81.4	1.431	0.338	1.18	1687.8	1.2	0.51
107	106	A, B, C, D	34.4	502.2	A2	1.555	0.75	1.17	6.49	27.8	56.7	1023.0	1525.1	1350	0.10	20.7	1.431	0.338	1.18	1687.8	0.3	0.90
										28.1												
CONTROLLED FLOW																						
106	105		616.0	616.0				0.00	0.00	27.8	56.7	0.0	616.0	975	0.10	80.2	0.747	0.244	0.95	708.7	1.4	0.87
105	104			616.0				0.00	0.00	29.2	54.9	0.0	616.0	975	0.10	12.1	0.747	0.244	0.95	708.7	0.2	0.87
104	103			616.0				0.00	0.00	29.5	54.6	0.0	616.0	975	0.10	19.2	0.747	0.244	0.95	708.7	0.3	0.87
103	102			616.0				0.00	0.00	29.8	54.2	0.0	616.0	975	0.10	54.2	0.747	0.244	0.95	708.7	1.0	0.87
102	101			616.0				0.00	0.00	30.7	53.0	0.0	616.0	975	0.10	24.2	0.747	0.244	0.95	708.7	0.4	0.87
101	EX			616.0				0.00	0.00	31.2	52.5	0.0	616.0	975	0.10	5.8	0.747	0.244	0.95	708.7	0.1	0.87
										31.3												

B-4 Stantec 2012 Storm Drainage Schematic



NOTE:
WHEN THE SEWER SYSTEM IS SEPARATED IN THE FUTURE THE OWNER WILL REPLACE MH STM106 WITH A WATER QUALITY CONTROL STRUCTURE.

ORIGINAL SHEET – ISO A3

September, 2011
160400832

V:\01-634\active\1604_00832_Lansdowne Park Competition\design\drawing\160400832 Storm Drainage Schematic.dwg
2012/02/06 2:59 PM By: Sharp, Mike

Legend

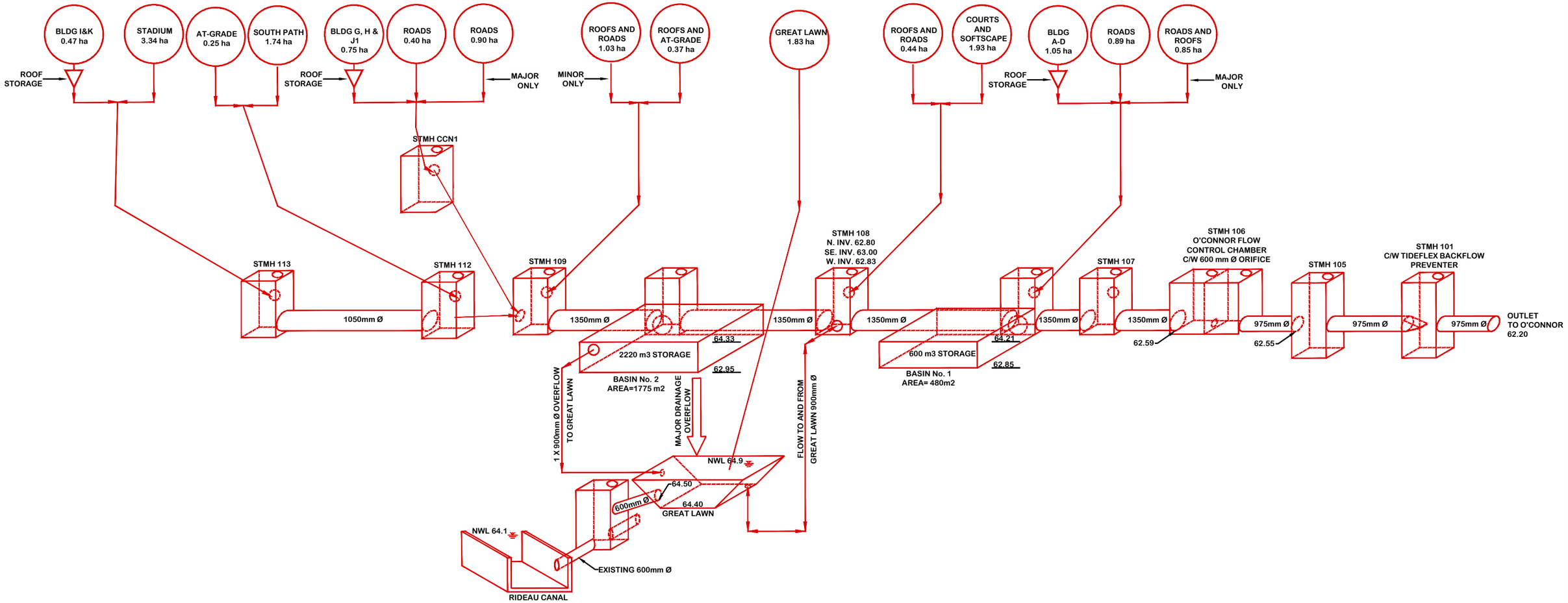
Notes

Stantec
1505 Laperriere Avenue
Ottawa ON Canada
K1Z 7T1
Tel. (613) 722-4420
Fax. (613) 722-2799
www.stantec.com

Client/Project
City of Ottawa
LANSDOWNE PARK
COMPETITION

Figure No.
1.0

Title
PLATE 1
STORM DRAINAGE SCHEMATIC



CLIENT

CITY OF OTTAWA

TITLE

LANDSDOWN PARK COMPETITION
OTTAWA

STORM DRAINAGE SCHEMATIC

wsp
150 Commerce Valley Dr. West, Thornhill, ON Canada L3T 0A1
t: 905.882.1100 f: 905.882.0055 wsp.com

Checked F.A.	Drawn AutoCAD/M.ST.L.	
Date JANUARY 2025	Proj. No. CA0033920.1056	
Scale AS SHOWN	Figure No. 1	Gr.No. -

B-5 Existing Condition Calculations

	Stormwater Management Calculations	Project:	Lansdowne 2.0	No.:	CA0033920.1056
	Area Takeoff and Runoff Coefficient Adjustment Calculations	By:	FA	Date: 2025-01-10	Page: 1
		Checked:	IS		

Post-Development Conditions - T1

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	403	0.0%	0.33%	29	Great Lawn	Great Lawn
At-Grade Impervious	130	100.0%				
Total Area	**532**	**24.4%**				

Post-Development Conditions - V1

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	21	0.0%	0.38%	78	Great Lawn	Great Lawn
At-Grade Impervous	587	100.0%				
Total Area	**608**	**96.5%**				

Post-Development Conditions - T2

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	581	0.0%	0.48%	36	Great Lawn	Great Lawn
At-Grade Impervous	188	100.0%				
Total Area	**769**	**24.5%**				

Post-Development Conditions - V2

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	26	0.0%	0.60%	36	Great Lawn	Great Lawn
At-Grade Impervous	947	100.0%				
Total Area	**973**	**97.3%**				

Post-Development Conditions - GG

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	1068	0.0%	1.78%	54	Underground Via 5 CBs	Great Lawn
At-Grade Impervous	1817	100.0%				
Total Area	**2885**	**63.0%**				

Pre-Development Conditions - P

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	792	0.0%	1.07%	31	Great Lawn	Great Lawn
At-Grade Impervous	935	100.0%				
Total Area	**1727**	**54.1%**				

Pre-Development Conditions - O

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	1094	0.0%	1.68%	36	Great Lawn	Great Lawn
Impervious at Grade	1616	100.0%				
Total Area	**2710**	**59.6%**				

Pre-Development Conditions A3_1

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	1892	0.0%	2.08%	43	Underground Via trenchdrains	Great Lawn
Impervious at Grade	1472	100.0%				
Total Area	**3364**	**43.8%**				

Pre-Development Conditions A3_2

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	3485	0.0%	2.38%	44	Underground Via trenchdrains	Great Lawn
Impervious at Grade	361	100.0%				
Total Area	**3846**	**9.4%**				

Pre-Development Conditions A3_3

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	2871	0.0%	1.96%	40	Underground Via trenchdrains	Great Lawn
Impervious at Grade	304	100.0%				
Total Area	**3175**	**9.6%**				

Pre-Development Conditions A3_4

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
0.00	5061	0.0%	4.66%	40	Underground Via trenchdrains	Great Lawn
0.00	2476	100.0%				
Total Area	**7537**	**32.9%**				

Pre-Development Conditions - A-1_1

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	29	0.0%	3.08%	37	Underground Via 6 CBs	Great Lawn
Impervious at Grade	4951	100.0%				
Total Area	**4979**	**99.4%**				

Pre-Development Conditions - A-1_2 Controlled to existing trench drain

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	121	0.0%	2.47%	51	Existing Trench Drain & STM111	Great Lawn
Impervious at Grade	3874	100.0%				
Total Area	**3995**	**97.0%**				

Pre-Development Conditions - A-1_3 Controlled to existing trench drain

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	0.95%	24	Underground Via 3 CBs	Great Lawn
Impervious at Grade	1537	100.0%				
Total Area	**1537**	**100.0%**				

Post-Development Conditions - A-2_1 Controlled

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	36	0.0%	0.95%	21	Underground Via 5 CBs	Great Lawn
Impervious at Grade	1496	100.0%				
Total Area	**1532**	**97.6%**				

Post-Development Conditions - A-2_2

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	1.35%	21	Underground Via 5 CBs	Great Lawn
Impervious at Grade	2175	100.0%				
Total Area	**2175**	**100.0%**				

Post-Development Conditions - A-2_3

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
0.00	0	0.0%	0.91%	24	Underground Via 3 CBs	Great Lawn
0.00	1470	100.0%				
Total Area	**1470**	**100.0%**				

Post-Development Conditions - A-2_4

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Impervious at Grade	0	0.0%	1.23%	25	Underground Via 6 CBs	Great Lawn
Total Area	1981	100.0%				
Total Area	**1981**	**100.0%**				

Post-Development Conditions - A-2_5

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
0.00	12	0.0%	0.58%	30	Underground Via 1 CBs	Great Lawn
Total Area	926	100.0%				
Total Area	**938**	**98.8%**				

Post-Development Conditions - A-2_6

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	214	0.0%	1.51%	40	Underground Via 5 CBs	Great Lawn
Impervious at Grade	2232	100.0%				
Total Area	**2446**	**91.3%**				

Post-Development Conditions - A-2_7

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	207	0.0%	1.76%	40	Underground Via 5 CBs	Great Lawn
Impervious at Grade	2637	100.0%				
Total Area	**2844**	**92.7%**				

Post-Development Conditions - A-2_8

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	259	0.0%	0.26%	11	Underground Via 2 CBs	Great Lawn
Impervious at Grade	155	100.0%				
Total Area	**414**	**37.4%**				

Post-Development Conditions - A-2_9

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	0.28%	11	Underground Via trench drain	Great Lawn
Impervious at Grade	447	100.0%				
Total Area	**447**	**100.0%**				

Post-Development Conditions - A-2_10

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	24	0.0%	0.34%	14	Underground Via 2 CBs	Great Lawn
Impervious at Grade	530	100.0%				
Total Area	**554**	**95.6%**				

Post-Development Conditions - A-2_11

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	0.48%	18	Underground Via trench drain	Great Lawn
Impervious at Grade	768	100.0%				
Total Area	**768**	**100.0%**				

Post-Development Conditions - A-5

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	170	0.0%	1.53%	18	Underground Via 3 CBs	Great Lawn
Impervious at Grade	2296	100.0%				
Total Area	**2466**	**93.1%**				

Post-Development Conditions - 102

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	1590	0.0%	2.75%	44	Underground Via 2 CBs	Swale and Park
Impervious at Grade	2853	100.0%				
Total Area	**4443**	**64.2%**				

Post-Development Conditions - 107AA_2

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	570	0.0%	1.18%	22	Underground Via 4 CBs	Great Lawn
Impervious at Grade	1331	100.0%				
Total Area	**1901**	**70.0%**				

Post-Development Conditions - 107AA_1

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	25	0.0%	0.49%	24	Underground Via 1 CBs	Great Lawn
Impervious at Grade	775	100.0%				
Total Area	**800**	**96.9%**				

Post-Development Conditions - 108_1

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	522	0.0%	0.46%	26	Underground Via 1 CBs	Great Lawn
Impervious at Grade	216	100.0%				
Total Area	**738**	**29.3%**				

Post-Development Conditions - 108_2

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	697	0.0%	1.67%	41	Underground Via 5 CBs	Great Lawn
Impervious at Grade	2009	100.0%				
Total Area	**2706**	**74.2%**				

Post-Development Conditions - 109

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	400	0.0%	1.99%	89	Underground Via 5 CBs	Great Lawn
Impervious at Grade	2822	100.0%				
Total Area	**3222**	**87.6%**				

Post-Development Conditions - 109A

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	50	0.0%	0.29%	15	Underground Via 1 CBs	Great Lawn
Impervious at Grade	414	100.0%				
Total Area	**464**	**89.1%**				

Post-Development Conditions - 109C

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	974	0.0%	1.55%	22	Underground Via 2 CBs	Great Lawn
Impervious at Grade	1526	100.0%				
Total Area	**2500**	**61.1%**				

Post-Development Conditions - 116

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	2198	0.0%	1.49%	91	Great Lawn	Great Lawn
Impervious at Grade	209	100.0%				
Total Area	**2407**	**8.7%**				

Pre-Development Conditions - AA

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	2057	0.0%	2.29%	52	Great Lawn	Great Lawn
Impervious at Grade	1644	100.0%				
Total Area	**3701**	**44.4%**				

Pre-Development Conditions - BB

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	5799	0.0%	5.51%	51	Underground Via 3 CBs	Grassed Swale along East Boundary
Impervious at Grade	3107	100.0%				
Total Area	**8906**	**34.9%**				

Pre-Development Conditions - EE

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	2055	0.0%	2.02%	39	Underground Via 1 CBs	Great Lawn
Impervious at Grade	1213	100.0%				
Total Area	**3268**	**37.1%**				

Pre-Development Conditions - A

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	4300	0.0%	4.53%	40	Underground Via 4 CBs	Grassed Swale along South Boundary
Impervious at Grade	3026	100.0%				
Total Area	**7326**	**41.3%**				

Pre-Development Conditions - D

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	1116	0.0%	1.17%	39	Underground Via 1 CBs	Grassed Swale along South Boundary
Impervious at Grade	776	100.0%				
Total Area	**1892**	**41.0%**				

Pre-Development Conditions - D1

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	3267	0.0%	2.95%	24	Underground Via 2 CBs	Grassed Swale along South Boundary
Impervious at Grade	1506	100.0%				
Total Area	**4773**	**31.5%**				

Pre-Development Conditions - D2

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	3054	0.0%	2.14%	39	Underground Via 4 CBs	Grassed Swale along South Boundary
Impervious at Grade	399	100.0%				
Total Area	**3453**	**11.5%**				

Pre-Development Conditions - NSTANDS

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	4.64%	136	Directly connected MH115	Directly connected MH115
Impervious at Grade	7506	100.0%				
Total Area	**7506**	**100.0%**				

Pre-Development Conditions - SSTANDS_1

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	2.51%	73	Directly connected MH120	Directly connected MH120
Impervious at Grade	4064	100.0%				
Total Area	**4064**	**100.0%**				

Pre-Development Conditions - SSTANDS_2

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	2.43%	71	Directly connected MH118	Directly connected MH118
Impervious at Grade	3928	100.0%				
Total Area	**3928**	**100.0%**				

Pre-Development Conditions - BLDG-A

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	1.57%	68	Directly connected to MH PS	Directly connected to MH PS
Impervious at Grade	2542	100.0%				
Total Area	**2542**	**100.0%**				

Pre-Development Conditions - BLDG-B

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	2.24%	91	Directly connected to MH PS	Directly connected to MH PS
Impervious at Grade	3626	100.0%				
Total Area	**3626**	**100.0%**				

Pre-Development Conditions - BLDG-C

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	1.85%	78	Directly connected to MH PS	Directly connected to MH PS
Impervious at Grade	2993	100.0%				
Total Area	**2993**	**100.0%**				

Pre-Development Conditions - BLDG-D

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	0.85%	34	Directly connected to MH PS	Directly connected to MH PS
Impervious at Grade	1380	100.0%				
Total Area	**1380**	**100.0%**				

Pre-Development Conditions - BLDG-G

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	1.50%	69	Directly connected to SWMCCN1	Directly connected to SWMCCN1
Impervious at Grade	2429	100.0%				
Total Area	**2429**	**100.0%**				

Pre-Development Conditions - BLDG-H

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	2.29%	83	Directly connected to SWMCCN1	Directly connected to SWMCCN1
Impervious at Grade	3709	100.0%				
Total Area	**3709**	**100.0%**				

Pre-Development Conditions - BLDG-I

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	1.40%	83	Directly connected to STM115	Directly connected to STM115
Impervious at Grade	2256	100.0%				
Total Area	**2256**	**100.0%**				

Pre-Development Conditions - BLDG-J

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	0.83%	89	Directly connected to SWMCCN1	Directly connected to SWMCCN1
Impervious at Grade	1347	100.0%				
Total Area	**1347**	**100.0%**				

Pre-Development Conditions - BLDG-J2

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	2.42%	135	Directly connected to SWMCCN1	Directly connected to SWMCCN1
Impervious at Grade	3910	100.0%				
Total Area	**3910**	**100.0%**				

Pre-Development Conditions - BLDG-K

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	1.53%	73	Directly connected to STM115	Directly connected to STM115
Impervious at Grade	2473	100.0%				
Total Area	**2473**	**100.0%**				

Pre-Development Conditions - GreatLawn

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	8650	0.0%	6.37%	85	Great Lawn	Canal
Impervious at Grade	1649	100.0%				
Total Area	**10299**	**16.0%**				

Worksheet for Overland to Canal

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

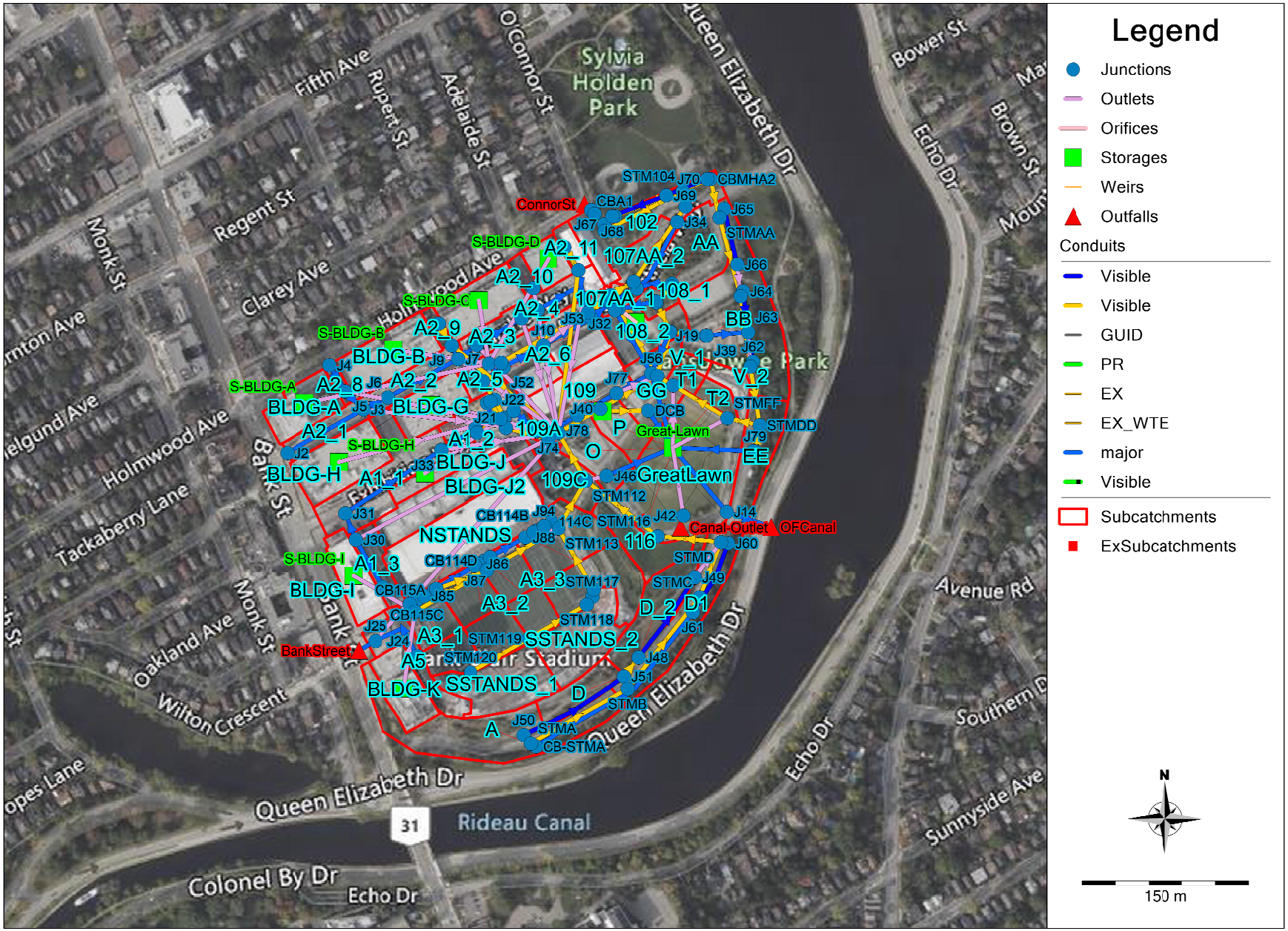
Input Data		
Roughness Coefficient	0.016	
Channel Slope	0.012	m/m
Normal Depth	200.0	mm
Bottom Width	9.40	m

Results		
Discharge	4,360.91	L/s
Flow Area	1.9	m²
Wetted Perimeter	9.8	m
Hydraulic Radius	191.8	mm
Top Width	9.40	m
Critical Depth	280.0	mm
Critical Slope	0.004	m/m
Velocity	2.32	m/s
Velocity Head	0.27	m
Specific Energy	0.47	m
Froude Number	1.656	
Flow Type	Supercritical	

GVF Input Data		
Downstream Depth	0.0	mm
Length	0.0	m
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	mm
Profile Description	N/A	
Profile Headloss	0.00	m
Downstream Velocity	Infinity	m/s
Upstream Velocity	Infinity	m/s
Normal Depth	200.0	mm
Critical Depth	280.0	mm
Channel Slope	0.012	m/m
Critical Slope	0.004	m/m

B-6 PCSWMM Output


Legend
Junctions
Outlets
Orifices
Storages
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Outfalls
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Rupert St
Adelaide St
O'Connor St
Queen Elizabeth Dr
Bower St
Echo Dr
Brown St
Regent St
Monk St
Clarey Ave
Holmwood Ave
Tackaberry Lane
Bank St
Oakland Ave
Wilton Crescent
Avenue Rd
Sunnyside Ave
Southern D
Colonel By Dr
Rideau Canal
31
ConnorSt
BankStreet
Canal-Outlet
OFCanal
Great-Lawn
CBMHA2
STMAA
STMFF
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STMC
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STMA
CB-STMA
CBA1
CB114B
CB114D
CB115A
CB115C
S-BLDG-A
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S-BLDG-I
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BLDG-B
BLDG-G
BLDG-H
BLDG-J
BLDG-J2
BLDG-K
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114C
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STM104
STM112
STM113
STM116
STM117
STM118
STM119
STM120

PCSWMM Catchment Parameters – Existing Conditions

Name	Rain Gage	Outlet	Area (ha)	Imperv. (%)	Peak Runoff (m3/s)	Runoff Coefficient
102	100yr_3hr_Chicago	J67	0.4443	64.2	0.11	0.71
107AA_1	100yr_3hr_Chicago	J54	0.08	96.9	0.04	0.97
107AA_2	100yr_3hr_Chicago	J34	0.1901	70.0	0.07	0.79
108_1	100yr_3hr_Chicago	J38	0.0738	29.3	0.02	0.54
108_2	100yr_3hr_Chicago	J55	0.2706	74.2	0.11	0.83
109	100yr_3hr_Chicago	J74	0.3222	87.6	0.15	0.91
109A	100yr_3hr_Chicago	J74	0.0464	89.1	0.02	0.92
109C	100yr_3hr_Chicago	J46	0.25	61.1	0.08	0.72
116	100yr_3hr_Chicago	Great-Lawn	0.2407	8.7	0.08	0.45
A	100yr_3hr_Chicago	CB-STMA	0.7326	41.3	0.07	0.48
A1_1	100yr_3hr_Chicago	J31	0.4979	99.4	0.24	0.98
A1_2	100yr_3hr_Chicago	J22	0.3995	97.0	0.19	0.97
A1_3	100yr_3hr_Chicago	J29	0.1537	100.0	0.07	0.99
A2_1	100yr_3hr_Chicago	J2	0.1532	97.6	0.07	0.97
A2_10	100yr_3hr_Chicago	J16	0.0554	95.6	0.03	0.96
A2_11	100yr_3hr_Chicago	J17	0.0768	99.0	0.04	0.98
A2_2	100yr_3hr_Chicago	J6	0.2175	100.0	0.10	0.99
A2_3	100yr_3hr_Chicago	J15	0.147	100.0	0.07	0.99
A2_4	100yr_3hr_Chicago	J12	0.1981	100.0	0.10	0.99
A2_5	100yr_3hr_Chicago	J52	0.0938	98.8	0.05	0.98
A2_6	100yr_3hr_Chicago	J52	0.2446	91.3	0.12	0.94
A2_7	100yr_3hr_Chicago	J10	0.2844	92.7	0.14	0.94
A2_8	100yr_3hr_Chicago	J4	0.0414	100.0	0.02	0.99
A2_9	100yr_3hr_Chicago	J8	0.0447	99.0	0.02	0.98
A3_1	100yr_3hr_Chicago	CB115C	0.3362	43.8	0.09	0.61
A3_2	100yr_3hr_Chicago	J87	0.3846	9.4	0.04	0.34
A3_3	100yr_3hr_Chicago	CB114D	0.3175	9.6	0.03	0.35
A3_4	100yr_3hr_Chicago	J88	0.7537	32.9	0.14	0.48
A5	100yr_3hr_Chicago	J24	0.2466	93.1	0.11	0.95
AA	100yr_3hr_Chicago	J36	0.3701	44.4	0.07	0.59
BB	100yr_3hr_Chicago	J39	0.8906	34.9	0.07	0.43
BLDG-A	100yr_3hr_Chicago	S-BLDG-A	0.2542	100	0.13	0.986
BLDG-B	100yr_3hr_Chicago	S-BLDG-B	0.3626	100	0.18	0.986
BLDG-C	100yr_3hr_Chicago	S-BLDG-C	0.2993	100	0.15	0.986
BLDG-D	100yr_3hr_Chicago	S-BLDG-D	0.138	100	0.07	0.986
BLDG-G	100yr_3hr_Chicago	S-BLDG-G	0.2429	100	0.12	0.986
BLDG-H	100yr_3hr_Chicago	S-BLDG-H	0.3709	100	0.18	0.987

BLDG-I	100yr_3hr_Chicago	S-BLDG-I	0.2256	100	0.11	0.985
BLDG-J	100yr_3hr_Chicago	S-BLDG-J1	0.1347	100	0.07	0.983
BLDG-J2	100yr_3hr_Chicago	STMCCN2	0.391	100	0.19	0.986
BLDG-K	100yr_3hr_Chicago	S-BLDG-K	0.2473	99.994	0.12	0.986
D	100yr_3hr_Chicago	J51	0.1892	41	0.04	0.557
D_2	100yr_3hr_Chicago	J48	0.3453	11.5	0.03	0.329
D1	100yr_3hr_Chicago	J61	0.4773	31.5	0.05	0.423
EE	100yr_3hr_Chicago	J81	0.3268	37.1	0.04	0.506
GG	100yr_3hr_Chicago	J56	0.2885	63	0.11	0.753
GreatLawn	100yr_3hr_Chicago	Great-Lawn	1.0299	16.033	0.12	0.366
NSTANDS	100yr_3hr_Chicago	STM115	0.7506	99.984	0.37	0.985
O	100yr_3hr_Chicago	Great-Lawn	0.271	59.6	0.09	0.723
P	100yr_3hr_Chicago	Great-Lawn	0.1727	54.1	0.06	0.691
SSTANDS_1	100yr_3hr_Chicago	STM120	0.4064	99.992	0.2	0.985
SSTANDS_2	100yr_3hr_Chicago	STM118	0.3928	99.992	0.19	0.985
T1	100yr_3hr_Chicago	Great-Lawn	0.0532	24.4	0.04	0.734
T2	100yr_3hr_Chicago	Great-Lawn	0.0769	24.5	0.06	0.744
V_1	100yr_3hr_Chicago	T1	0.0608	96.592	0.03	0.963
V_2	100yr_3hr_Chicago	T2	0.0973	96.592	0.05	0.967

PCSWMM Storage Results – Existing Conditions

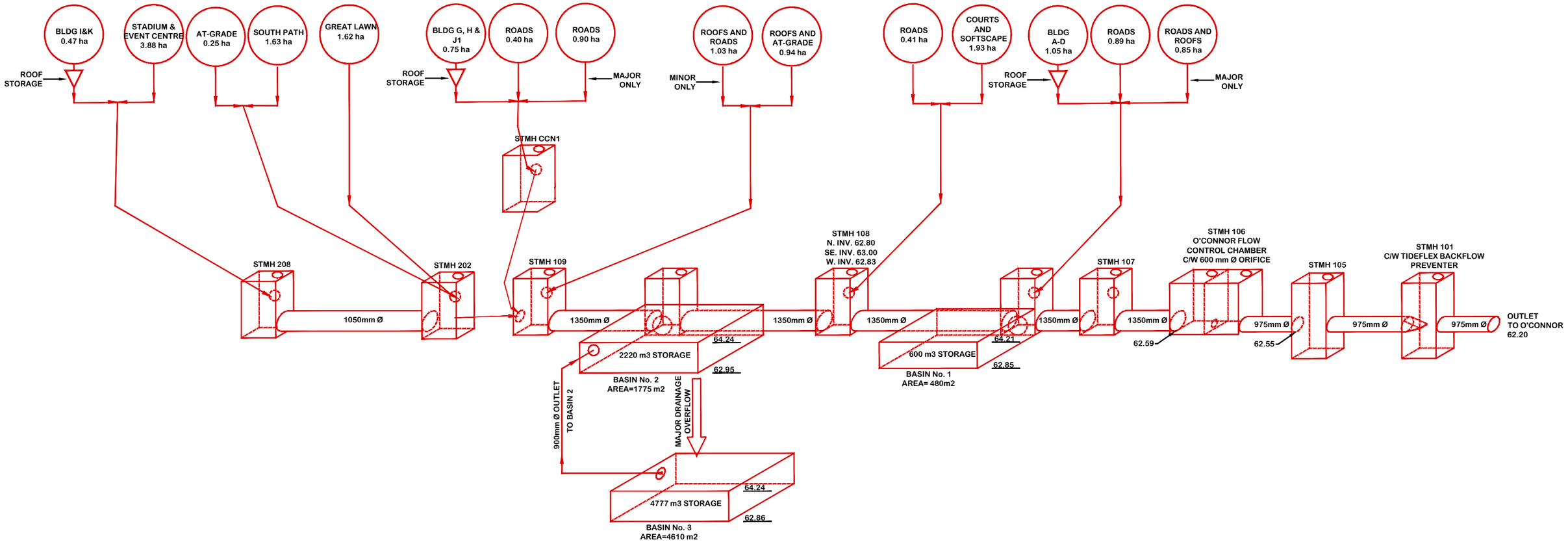
Name	Invert Elev. (m)	Rim Elev. (m)	Depth (m)	Storage Curve	Curve Name	Avg. Depth (m)	Max. Depth (m)	Max. HGL (m)	Max. Volume (1000 m³)	Max. Percent Full (%)	Contributing Area (ha)
BASIN1	62.71	64.21	1.5	TABULAR	BASIN1	0.88	1.5	64.21	0.61	100	15.1
BASIN2	62.85	64.35	1.5	TABULAR	BASIN2	0.76	1.5	64.35	2.166	100	9.9
Great-Lawn	64.4	64.9	0.5	FUNCTIONAL	*	0.02	0.08	64.48	0.612	15	13.8
S-BLDG-A	100	100.15	0.15	TABULAR	BLDGA	0.01	0.07	100.07	0.121	24	0.3
S-BLDG-B	100	100.15	0.15	TABULAR	BLDGB	0.02	0.08	100.08	0.176	27	0.4
S-BLDG-C	100	100.15	0.15	TABULAR	BLDGC	0.01	0.07	100.07	0.142	24	0.3
S-BLDG-D	100	100.15	0.15	TABULAR	BLDGD	0.02	0.08	100.08	0.066	25	0.1
S-BLDG-G	100	100.15	0.15	TABULAR	BLDGG	0.02	0.09	100.09	0.125	38	0.2
S-BLDG-H	100	100.15	0.15	TABULAR	BLDGH	0.02	0.08	100.08	0.178	27	0.4
S-BLDG-I	100	100.15	0.15	TABULAR	BLDGI	0.01	0.07	100.07	0.106	23	0.2
S-BLDG-J1	100	100.15	0.15	TABULAR	BLDGJ	0.02	0.08	100.08	0.065	26	0.1
S-BLDG-K	100	100.15	0.15	TABULAR	BLDGK	0.03	0.1	100.1	0.13	42	0.2

APPENDIX

C

Proposed Conditions

C-1 Proposed Conditions Drawings



CLIENT

CITY OF OTTAWA

TITLE

LANDSDOWN PARK COMPETITION
OTTAWA

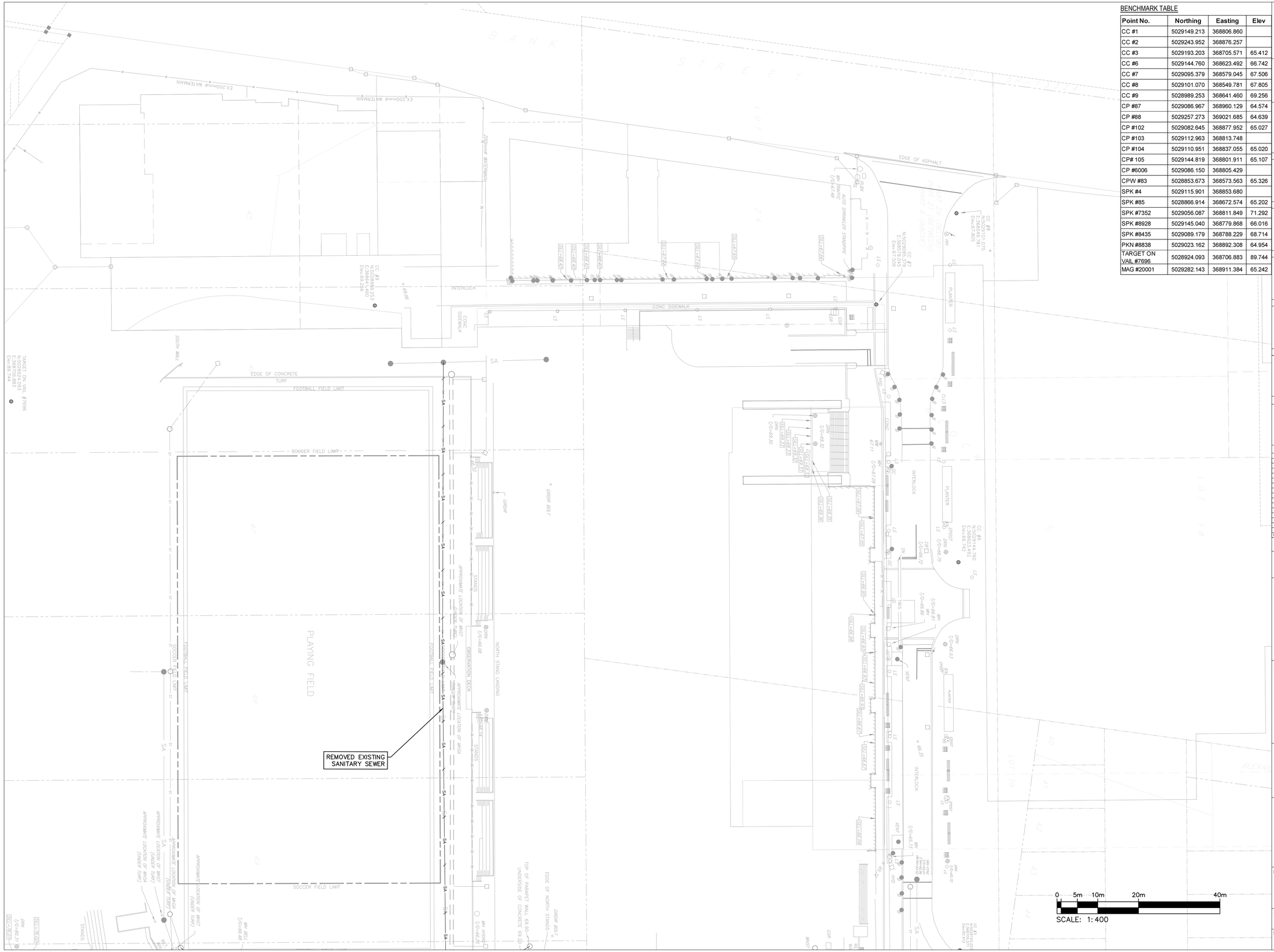
STORM DRAINAGE SCHEMATIC PROPOSED

wsp
150 Commerce Valley Dr. West, Thornhill, ON Canada L3T 0A1
t: 905.882.1100 f: 905.882.0055 wsp.com

Checked F.A.	Drawn AutoCAD/M.ST.L.	
Date JANUARY 2025	Proj. No. CA0033920.1056	
Scale NA	Figure No. 2	Gr.No. -

BENCHMARK TABLE

Point No.	Northing	Easting	Elev
CC #1	5029149.213	368806.860	
CC #2	5029243.952	368876.257	
CC #3	5029193.203	368705.571	65.412
CC #6	5029144.760	368623.492	66.742
CC #7	5029095.379	368579.045	67.506
CC #8	5029101.070	368549.781	67.805
CC #9	5028989.253	368641.460	69.256
CP #87	5029086.967	368960.129	64.574
CP #88	5029257.273	369021.685	64.639
CP #102	5029082.645	368877.952	65.027
CP #103	5029112.963	368813.748	
CP #104	5029110.951	368837.055	65.020
CP# 105	5029144.819	368801.911	65.107
CP #6006	5029086.150	368805.429	
CPW #83	5028853.673	368573.563	65.326
SPK #4	5029115.901	368853.680	
SPK #85	5028866.914	368672.574	65.202
SPK #7352	5029056.087	368811.849	71.292
SPK #8928	5029145.040	368779.868	66.016
SPK #8435	5029089.179	368788.229	68.714
PKN #8838	5029023.162	368892.308	64.954
TARGET ON VAIL #7696	5028924.093	368706.883	89.744
MAG #20001	5029282.143	368911.384	65.242



Ottawa

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Ottawa Sports and Entertainment Group

BRISBIN BROOK BEYNON ARCHITECTS
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(416) 591-8999
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(224) 717-1999
FOOD AND BEVERAGE

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(613) 729-4536
LANDSCAPE ARCHITECT

WSP
2011 QUEENSVIEW DR.
OTTAWA, ONTARIO K2B 8K2
(613) 829-2800
CIVIL ENGINEER

NO	DESCRIPTION	DATE
5	REVISED AS PER CITY COMMENTS	2025-01-15
4	ISSUED FOR COORDINATION	2024-12-20
3	ISSUED FOR 90% DD - CLASS B ESTIMATE	2024-11-15
2	REVISED AS PER CITY COMMENTS	2024-09-13
1	ISSUED FOR SPA	2024-08-07

REVISIONS/ ISSUES

CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND REPORT ANY OMISSIONS OR DISCREPANCIES TO THE ARCHITECT BEFORE PROCEEDING WITH THE WORK.
DO NOT SCALE THE DRAWINGS

SEAL

LICENSED PROFESSIONAL ENGINEER
D. B. YANG
100230568
2025-01-15
PROVINCE OF ONTARIO

HUDON

DRAWN J.T
DATE 2025/01/15
CHECKED W.Y

LANSDOWNE EVENT CENTRE

945 & 1015 BANK STREET

DWG. TITLE

REMOVAL PLAN

SCALE 1:400
DWG. NO. C03A
PROJ. NO. CA0033920.1056

DATE PLOTTED:

#D07-12-24-0082
#19172

MATCHING LINE
SEE DRAWING C03A

REMOVED ALL ITEMS IN LANDSCAPE AREA

REMOVED ASPHALT WALKWAY

REMOVED BRIDGE

REMOVED ALL ITEMS IN LANDSCAPE AREA

REMOVED ALL ITEMS IN LANDSCAPE AREA

REMOVED ALL ITEMS IN LANDSCAPE AREA

CONTRACTOR TO PROVIDE CCTV TO VERIFY THE STATUS OF THE EX.600mm STORM PRIOR TO CONSTRUCTION. REMOVE THE EX.600mm STORM LEAD ALL THE WAY TO THE PROPERTY. PLUG AND FILL THE REMAINING PORTION TO THE CANAL WITH GROUT IF IT WAS YET TO BE ABANDONED

REMOVED ALL ITEMS IN LANDSCAPE AREA

APPROXIMATE LOCATION OF EX.600mm STORM TO CANAL

REMOVED CONCRETE SIDEWALK

REMOVED THE RAMP

REMOVED GRAVEL ROAD

REMOVED THE RETAINING WALL

REMOVED THE INTERLOCK

REMAINED STORM AND SANITARY MANHOLE

REMOVED ALL ITEMS IN LANDSCAPE AREA

REMOVED ALL ITEMS IN LANDSCAPE AREA

REMOVED ALL ITEMS IN LANDSCAPE AREA

35.04m–250mm⌀ PERFORATED DRAIN @ 0.20%

31.87m–250mm⌀ PERFORATED DRAIN @ 0.20%

32.99m–250mm⌀ PERFORATED DRAIN @ 0.20%

19.99m–250mm⌀ PERFORATED DRAIN @ 0.20%

35.60–250mm⌀ PERFORATED DRAIN @ 0.20%

26.54m–250mm⌀ PERFORATED DRAIN @ 0.20%

26.0m–250mm⌀ PERFORATED DRAIN @ 0.20%

34.7m–250mm⌀ PERFORATED DRAIN @ 0.20%

33.84m–250mm⌀ PERFORATED DRAIN @ 0.20%

40.89m–250mm⌀ PERFORATED DRAIN @ 0.20%

25.24m–250mm⌀ PERFORATED DRAIN @ 0.20%

24.9m–250mm⌀ PERFORATED DRAIN @ 0.20%

23.84m–250mm⌀ PERFORATED DRAIN @ 0.20%

29.62m–250mm⌀ PERFORATED DRAIN @ 0.20%

12.47m–250mm⌀ PERFORATED DRAIN @ 0.20%

2.81m–250mm⌀ PERFORATED DRAIN @ 0.20%

REMOVED ALL ITEMS IN LANDSCAPE AREA

REMOVED ALL ITEMS IN LANDSCAPE AREA

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TARGET ON VAIL #7696	5028924.093	368706.883	89.744
MAG #20001	5029282.143	368911.384	65.242

0 5m 10m 20m 40m

SCALE: 1: 400

DATE PLOTTED:

Ottawa

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CIVIL ENGINEER

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REVISIONS/ ISSUES

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SEAL

LICENSED PROFESSIONAL ENGINEER
D. B. YANG
100230568
2025-01-15
PROVINCE OF ONTARIO

HUSON

DRAWN J.T
DATE 2025/01/15
CHECKED W.Y

LANSDOWNE EVENT CENTRE

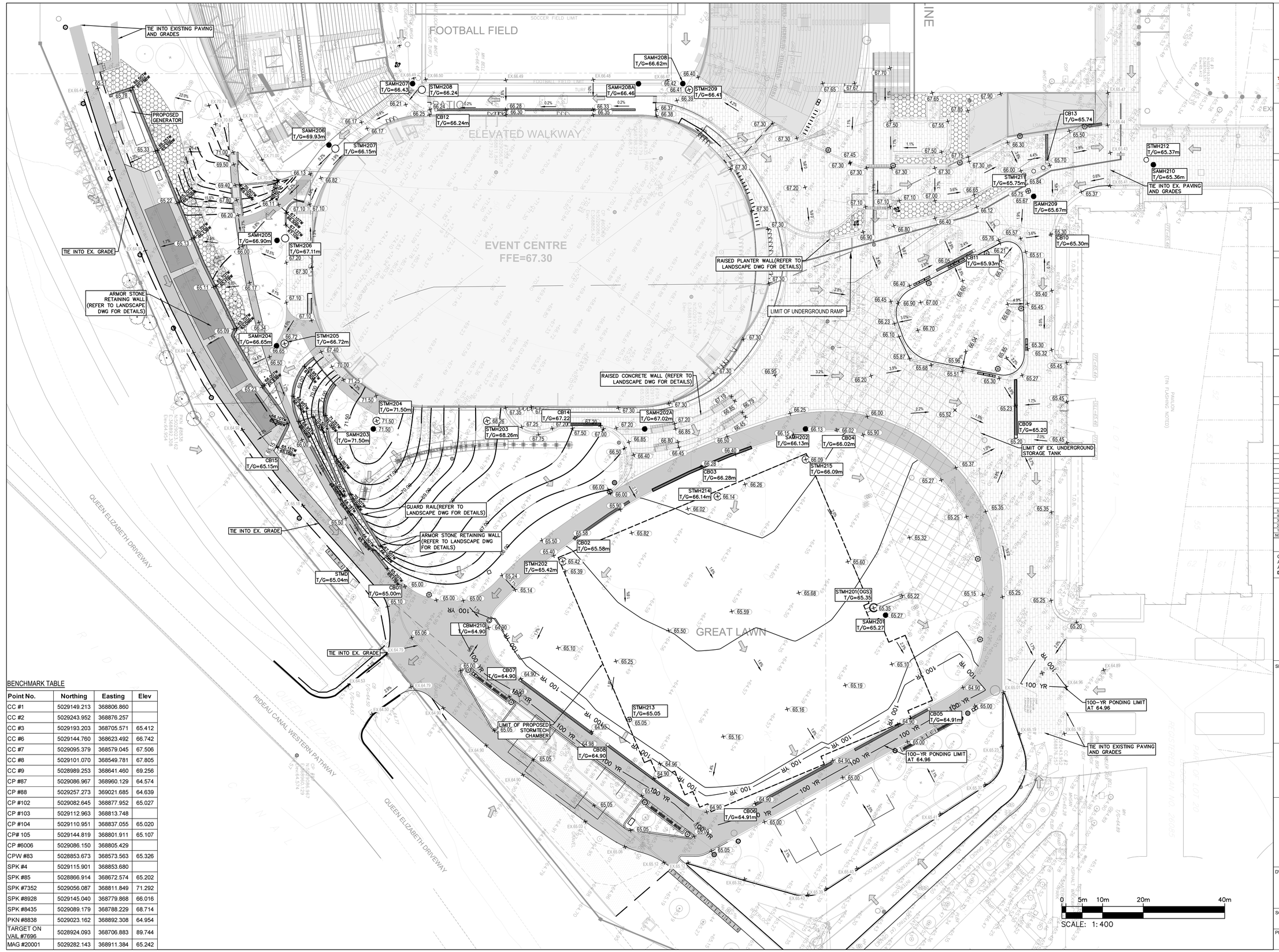
945 & 1015 BANK STREET

DWG. TITLE

REMOVAL PLAN

SCALE 1:400
DWG. NO. C03B
PROJ. NO. CA0033920.1056

#D07-12-24-0082
#19172



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TARGET ON VAIL #7696	5028924.093	368706.883	89.744
MAG #20001	5029282.143	368911.384	65.242

DATE PLOTTED:

Ottawa

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CIVIL ENGINEER

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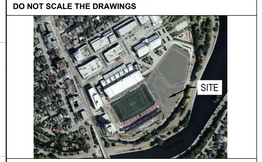

SEAL

LICENSED PROFESSIONAL ENGINEER
D. B. YANG
100230568
2025-01-15
PROVINCE OF ONTARIO

HUXON

DRAWN	J.T
DATE	2025/01/15
CHECKED	W.Y

LANSDOWNE EVENT CENTRE

945 & 1015 BANK STREET

DWG. TITLE

GRADING PLAN

SCALE	DWG. NO.
1:400	C04
PROJ. NO. CA0033920.1056	

#D07-12-24-0082

#19172

BENCHMARK TABLE

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MAG #20001	5029282.143	368911.384	65.242

Ottawa

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LANDSCAPE ARCHITECT

wsp
2011 QUEENSVIEW DR.
OTTAWA, ONTARIO K2B 8K2
(613) 829-2800
CIVIL ENGINEER

NO.	DESCRIPTION	DATE
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REVISIONS/ ISSUES

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SEAL

LICENSED PROFESSIONAL ENGINEER
D. B. YANG
100230568
2025-01-15
PROVINCE OF ONTARIO

DRAWN	J.T
DATE	2025/01/15
CHECKED	W.Y

LANSDOWNE EVENT CENTRE

945 & 1015 BANK STREET

DWG. TITLE

SERVICING PLAN

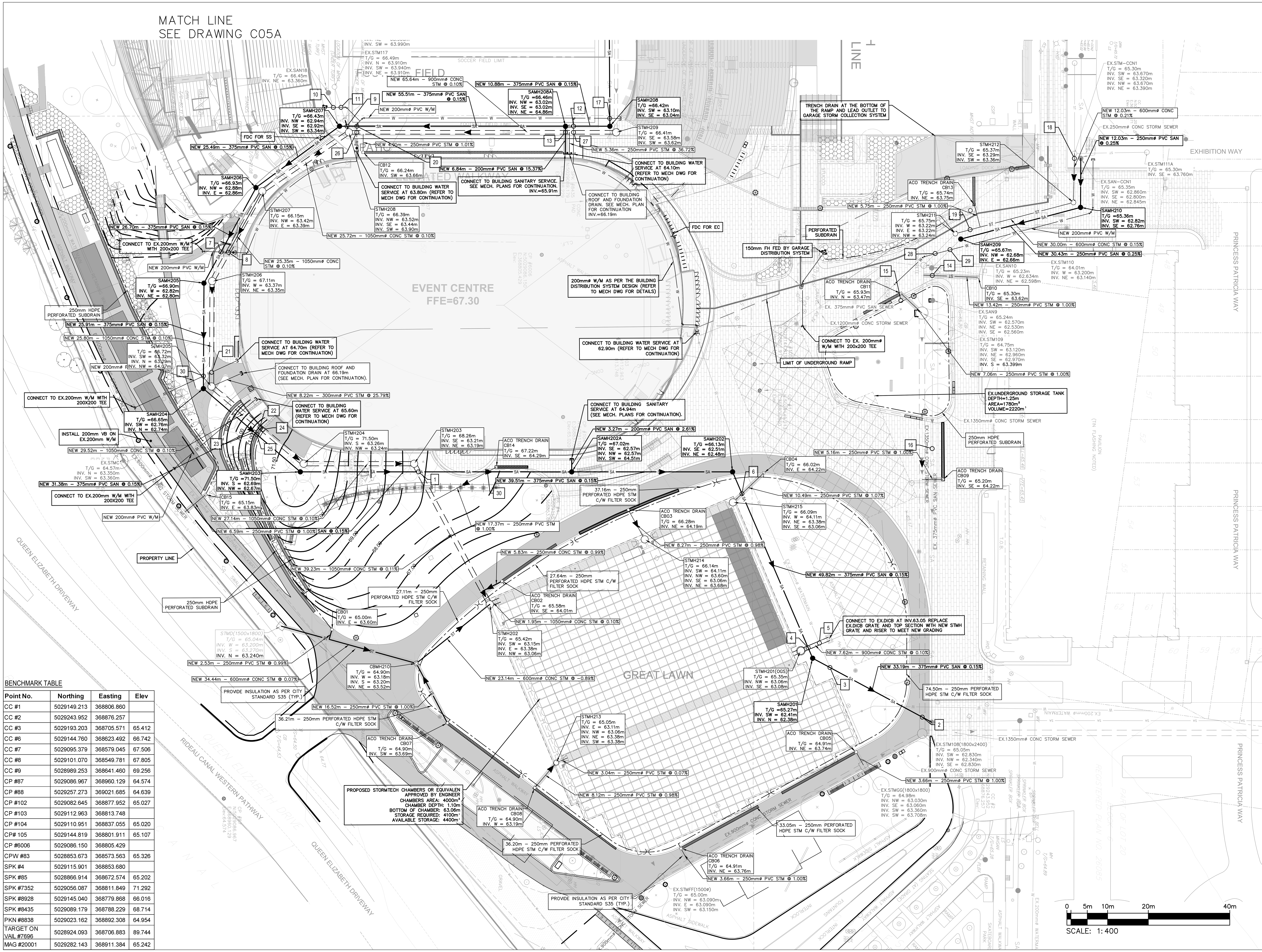
SCALE	DWG. NO.
1:400	C05A
PROJ. NO. CA0033920.1056	

SCALE: 1: 400

DATE PLOTTED:

#19172

#D07-12-24-0082



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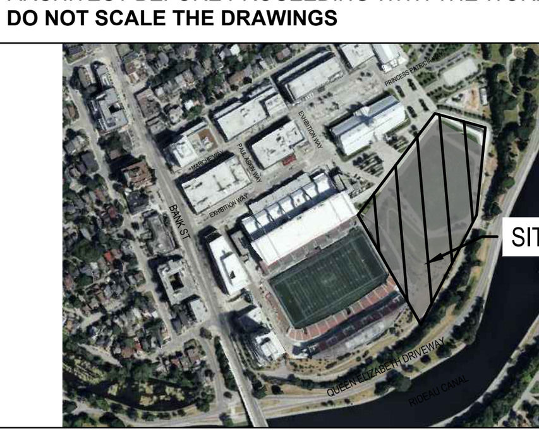

SEAL

LICENSED PROFESSIONAL ENGINEER
D. B. YANG
100230568
2025-01-15
PROVINCE OF ONTARIO

NORTH

DRAWN: J.T
DATE: 2025/01/15
CHECKED: W.Y

LANSDOWNE EVENT CENTRE

945 & 1015 BANK STREET

DWG. TITLE: SERVICING PLAN

SCALE: 1:400
PROJ. NO.: CA0033920.1056
DWG. NO.: C05B

#D07-12-24-0082

#19172

DATE PLOTTED:

Ottawa

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Ottawa Sports and Entertainment Group

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2025-01-15
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DRAWN J.T
DATE 2025/01/15
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LANSDOWNE EVENT CENTRE

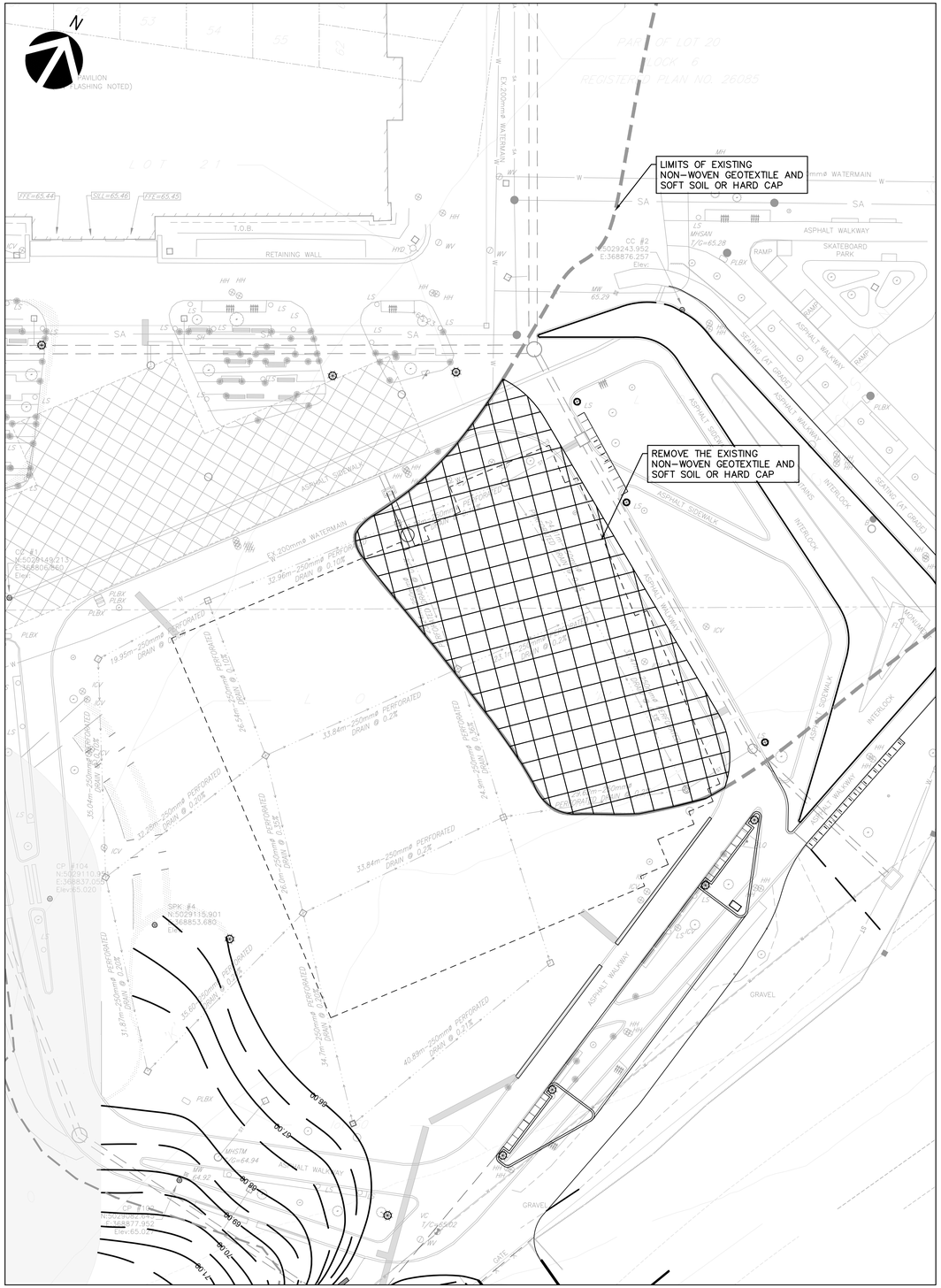
945 & 1015 BANK STREET

DWG. TITLE

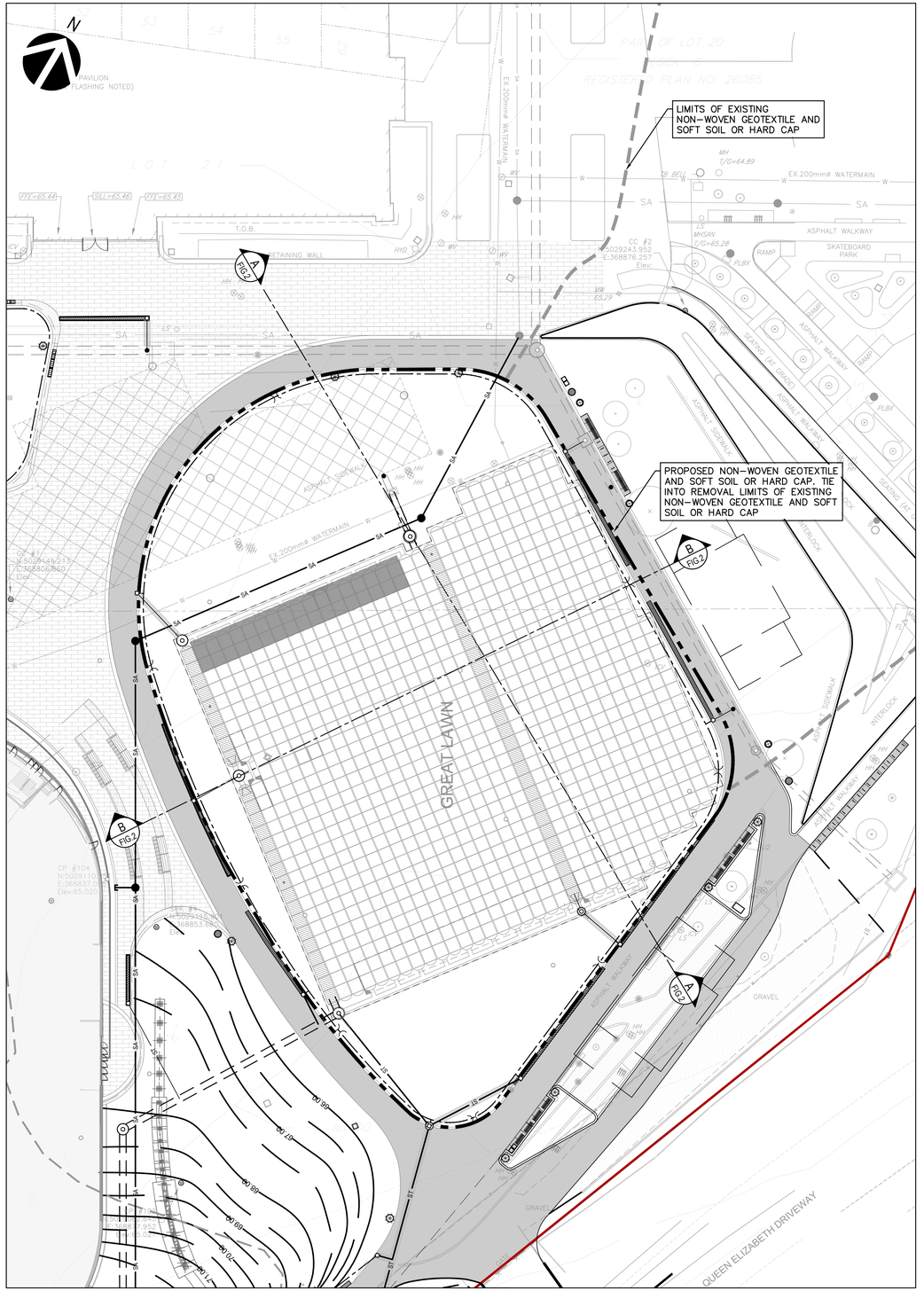
POST-DRAINAGE AREA PLAN

SCALE 1:750
DWG. NO. C08
PROJ. NO. CA0033920.1056

#D07-12-24-0082
#19172



1 FIG.1 EX. NON-WOVEN GEOTEXTILE AND SOFT SOIL OR HARD CAP REMOVAL
SCALE: 1:400



2 FIG.1 PROPOSED NON-WOVEN GEOTEXTILE AND SOFT SOIL OR HARD CAP
SCALE: 1:400

DATE PLOTTED:

Ottawa

OSEG
Ottawa Sports and Entertainment Group

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14 DUNCAN ST 4TH FLOOR
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MECH, PLUMB, FIRE PROTECTION ENGINEER

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90 SHEPPARD AVE EAST, SUITE 500
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FOOD AND BEVERAGE

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(613) 729-4536
LANDSCAPE ARCHITECT

msp
2011 QUEENSVIEW DR.
OTTAWA, ONTARIO K2B 8K2
(613) 829-2800
CIVIL ENGINEER

NO.	DESCRIPTION	DATE
5	REVISED AS PER CITY COMMENTS	2025-01-15
4	ISSUED FOR COORDINATION	2024-12-20
3	ISSUED FOR 90% DD - CLASS B ESTIMATE	2024-11-15
2	REVISED AS PER CITY COMMENTS	2024-09-13
1	ISSUED FOR SPA	2024-08-07

REVISIONS/ ISSUES

CONTRACTOR SHALL CHECK AND VERIFY ALL DIMENSIONS AND REPORT ANY OMISSIONS OR DISCREPANCIES TO THE ARCHITECT BEFORE PROCEEDING WITH THE WORK.
DO NOT SCALE THE DRAWINGS

SEAL

DRAWN	J.T
DATE	2025/01/15
CHECKED	W.Y

LANSDOWNE EVENT CENTRE

945 & 1015 BANK STREET

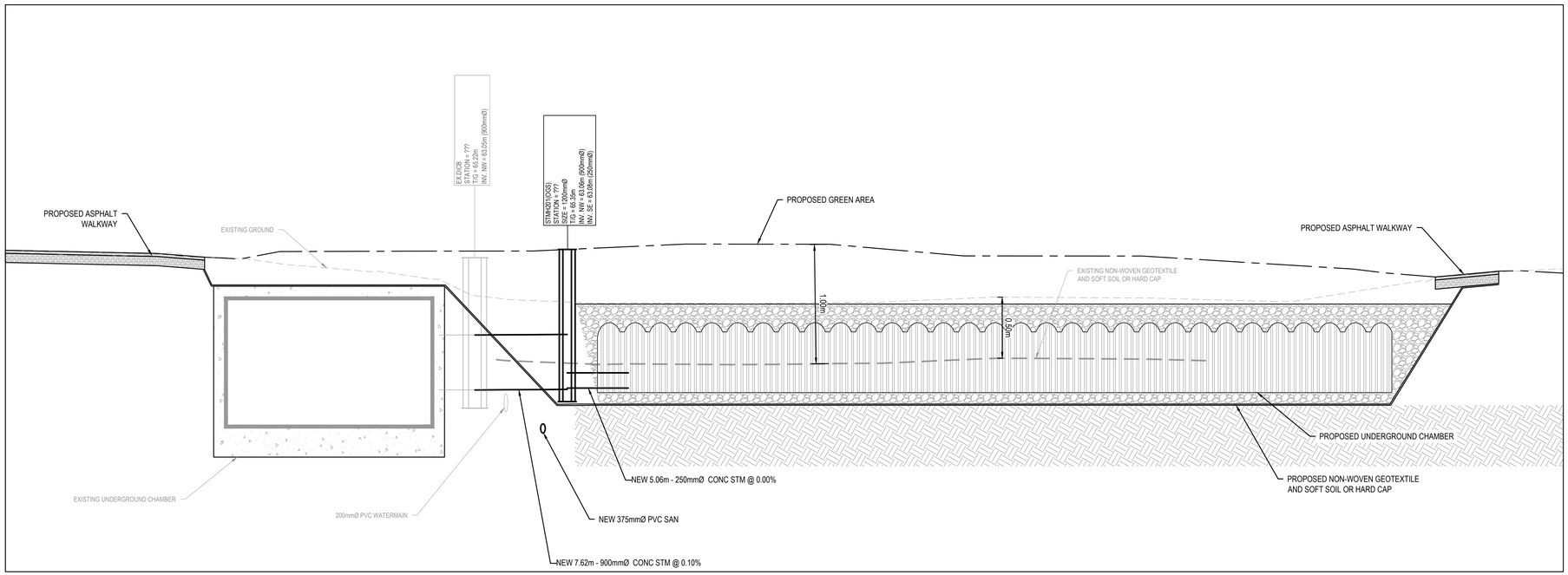
DWG. TITLE

LANSDOWNE 2.0 RISK MANAGEMENT GREAT LAWN AREA PLAN

SCALE	1:400
DWG. NO.	C09
PROJ. NO.	CA0033920.1056

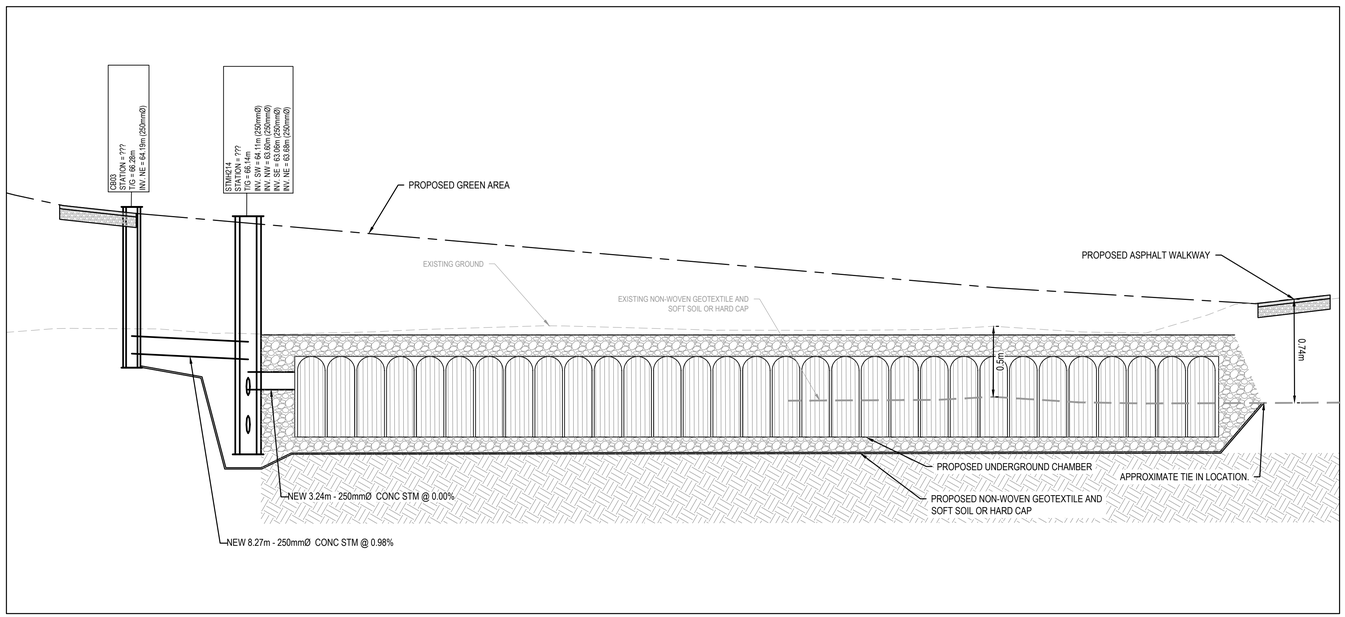
#D07-12-24-0082

#19172



A FIG.2 UNDERGROUND CHAMBER CROSS SECTION A

SCALE: H 1:200, V 1:40



B FIG.2 UNDERGROUNG CHARMBER CROSS SECTION B

SCALE: H 1:200, V 1:40

DATE PLOTTED:

Ottawa

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Ottawa Sports and Entertainment Group

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CIVIL ENGINEER

NO.	DESCRIPTION	DATE
5	REVISED AS PER CITY COMMENTS	2025-01-15
4	ISSUED FOR COORDINATION	2024-12-20
3	ISSUED FOR 90% DD - CLASS B ESTIMATE	2024-11-15
2	REVISED AS PER CITY COMMENTS	2024-09-13
1	ISSUED FOR SPA	2024-06-07

REVISIONS/ ISSUES

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DO NOT SCALE THE DRAWINGS

SEAL

LICENSED PROFESSIONAL ENGINEER
D. B. YANG
100230588
2025-01-15
PROVINCE OF ONTARIO

DRAWN	J.T
DATE	2025/01/15
CHECKED	W.Y

LANSDOWNE EVENT CENTRE

945 & 1015 BANK STREET

DWG. TITLE
UNDERGROUND CHAMBER CROSS SECTION

SCALE	1:200
DWG. NO.	FIG.2
PROJ. NO.	CA0033920.1056

#D07-12-24-0082
#19172

C-2 Storm Sewer Design Sheet

STORM SEWER DESIGN SHEET
LANSDOWNE 2.0
REDEVELOPMENT
CITY OF OTTAWA
Project: CA0033920.1056
Date: January 2025

LOCATION				AREA (Ha)						RATIONAL DESIGN FLOW													PROPSOED SEWER DATA								
BLDG FLOW	AREA ID	FROM	TO	C= 0.20	C= 0.35	C= 0.75	C= 0.80	C= 0.90	C= 1.00	IND 2.78AC	CUM 2.78 AC	INLET (min)	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (100) (mm/hr)	BLDG FLOW (L/s)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	ICD FIXED FLOW (L/s)	DESIGN FLOW (L/s)	MODIFIED DESIGN FLOW (L/s)	MATERIAL PIPE	SIZE (mm)	SLOPE (%)	LENGTH (m)	CAPACITY (l/s)	VELOCITY (m/s)	TIME IN PIPE	AVAIL CAP (2yr) (L/s)	AVAIL CAP (2yr) (%)
Lansdowne 2.0																															
+106 l/s	*S. STANDS*	*Ex. STM 120*	*Ex. STM 119*							0.000	0.000	20.00	21.24	52.03	70.25	119.95			0.00			0.00	106.00	CONC	*450.0*	*0.20*	*59.60*	127.63	0.80	1.24	21.63	16.95%
		Ex. STM 119	*Ex. STM 118*							0.000	0.000	21.24	22.48	50.12	67.64	115.46			0.00			0.00	106.00	CONC	*450.0*	*0.20*	*59.60*	127.63	0.80	1.24	21.63	16.95%
+106 l/s		*Ex. STM 118*	*Ex. STM 117*							0.000	0.000	22.48	22.63	48.36	65.24	111.33			0.00			0.00	212.00	CONC	*600.0*	*0.20*	*8.70*	274.87	0.97	0.15	62.87	22.87%
		Ex. STM 117	STMH 208							0.000	0.000	22.63	22.67	48.16	64.97	110.85			0.00			0.00	212.00	CONC	600.0	0.33	3.00	353.08	1.25	0.04	141.08	39.96%
+232.6 l/s	A3, A4, A5, BLDG I, K, N STANDS	*Ex. STM 115*	*Ex. STM 114*	1.118				0.440		1.722	1.722	20.00	21.02	52.03	70.25	119.95			121.01			121.01	353.61	CONC	*825.0*	*0.20*	*73.70*	642.59	1.20	1.02	288.99	44.97%
		Ex. STM 114	STMH 209							0.000	1.722	21.02	22.06	50.44	68.08	116.22			117.27			117.27	349.87	CONC	*825.0*	*0.20*	*74.50*	642.59	1.20	1.03	292.72	45.55%
	NEC 1, NEC 3	STMH 209	STMH 208	0.000				0.409		1.023	2.746	22.06	23.27	48.94	66.04	112.69			181.33			181.33	413.93	CONC	900.0	0.10	65.64	573.05	0.90	1.22	159.12	27.77%
$Q_{bldg\ Tot}$ = 444.6 l/s		STMH 208	STMH 207							0.000	2.746	23.27	23.70	47.30	63.80	108.84			175.18			175.18	619.78	CONC	1050.0	0.10	25.70	864.40	1.00	0.43	244.62	28.30%
		STMH 207	STMH 206							0.000	2.746	23.70	24.13	46.75	63.05	107.55			173.12			173.12	617.72	CONC	1050.0	0.10	25.40	864.40	1.00	0.42	246.68	28.54%
		STMH 206	STMH 205							0.000	2.746	24.13	24.56	46.22	62.33	106.31			171.14			171.14	615.74	CONC	1050.0	0.10	25.80	864.40	1.00	0.43	248.67	28.77%
	NEC 2	STMH 205	STMH 204	0.000				0.353		0.883	3.629	24.56	25.05	45.69	61.61	105.08			223.59			223.59	668.19	CONC	1050.0	0.10	29.50	864.40	1.00	0.49	196.21	22.70%
		STMH 204	STMH 203							0.000	3.629	25.05	25.50	45.11	60.82	103.71			220.70			220.70	665.30	CONC	1050.0	0.10	27.10	864.40	1.00	0.45	199.10	23.03%
	Great Lawn 5	STMH 203	STMH 202	0.089				0.026		0.115	3.744	25.50	26.16	44.58	60.10	102.48			225.00			225.00	669.60	CONC	1050.0	0.10	39.20	864.40	1.00	0.66	194.80	22.54%
	Great Lawn 6, A, D, D1	*Ex. STMD*	CBMH 210	1.280				0.572		2.143	2.143	20.00	21.00	52.03	70.25	119.95			150.54			150.54		CONC	600.0	0.07	34.40	162.62	0.57	1.00	12.08	7.43%
	Great Lawn 4	CBMH 210	STMH 202	0.160				0.024		0.149	2.292	21.00	21.56	50.48	68.13	116.30			156.15			156.15		CONC	600.0	0.10	23.10	194.36	0.69	0.56	38.21	19.66%
$Q_{bldg\ Tot}$ = 444.6 l/s		CBMH 202	CHAMBER / *Ex. Chamber*							0.000	6.035	26.16	26.16	43.85	59.11	100.77			356.73			356.73	801.33	REFER TO STORMTECH DESIGN								
	OPGG5, Great Lawn 3	CHAMBER / *Ex. Chamber*	*Ex. 1350 PIPE*	0.219				0.120		0.422	6.457	26.16	26.16	43.85	59.11	100.77			381.68			381.68	826.28	REFER TO STORMTECH DESIGN								
+23.1 l/s	A1, BLDGS H, G, J, J1, J2	*Ex. STM-CCN1*	NEW STMH 212	0.019				0.951		2.390	2.390	20.00	20.20	52.03	70.25	119.95			167.90			167.90	191.00	CONC	600.0	0.21	12.00	281.66	1.00	0.20	90.66	32.19%
	N1	NEW STMH 212	NEW STMH 211	0.000				0.034		0.085	2.475	20.20	20.80	51.71	69.81	119.20			172.79			172.79	195.89	CONC	600.0	0.15	30.00	238.05	0.84	0.59	42.16	17.71%
		NEW STMH 211	*Ex. STM 110*							0.000	2.475	20.80	20.98	50.79	68.55	117.02			169.67			169.67	192.77	CONC	600.0	0.20	11.00	274.87	0.97	0.19	82.10	29.87%
	OPGG1, OPGG4	*Ex. STM 110*	*Ex. STM 109*	0.035				0.258		0.665	3.140	20.98	21.19	50.50	68.16	116.35			214.03			214.03	237.13	CONC	*600.0*	*0.20*	*11.70*	274.87	0.97	0.20	37.74	13.73%
$Q_{bldg\ Tot}$ = 467.7 l/s	OPGG2	*Ex. STM 109*	*Ex. STM 108*	0.065				0.224		0.597	10.194	26.16	27.44	43.85	59.11	100.77			602.53			602.53	1070.23	CONC	*1350.0*	*0.13*	*103.30*	1926.37	1.34	1.28	856.14	44.44%
	102, AA, BB, EE	*Ex. STMDD*	*Ex. STMFF*	1.410				0.594		2.270	2.270	21.70	22.27	49.45	66.73	113.88			151.48			151.48		CONC	*900.0*	*0.10*	*31.00*	573.05	0.90	0.57	421.57	73.57%
	Great Lawn 1 & 2, T1, T2, V1, V2	*Ex. STMFF*	*Ex. STMGG*	0.523				0.287		1.009	3.279	22.27	23.33	48.64	65.62	111.98			215.18			215.18		CONC	*900.0*	*0.10*	*57.00*	573.05	0.90	1.06	357.86	62.45%
		Ex. STMGG	*Ex. STM 108*							0.000	3.279	23.33	23.74	47.23	63.70	108.67			208.87			208.87		CONC	*900.0*	*0.10*	*22.00*	573.05	0.90	0.41	364.18	63.55%
$Q_{bldg\ Tot}$ = 467.7 l/s	OPGG3, 108	*Ex. STM 108*	*Ex. STM 107*	0.167				0.316		0.883	14.356	27.44	28.59	42.50	57.26	97.60			822.06			822.06	1289.76	CONC	*1350.0*	*0.10*	*81.40*	1689.54	1.18	1.15	399.78	23.66%
+34.4 l/s, Qbldg Tot = 502.1 l/s	A2, BLDGS A, B, C, D	*Ex. STM 107*	*Ex. STM 106*	0.032				1.555		3.908	18.265	28.59	28.88	41.35	55.71	94.93			1017.49			1017.49	1519.59	CONC	*1350.0*	*0.10*	*20.70*	1689.54	1.18	0.29	169.94	10.06%
		Ex. STM 106	*Ex. STM 105*																			530.00		CONC	*975.0*	*0.10*	*80.20*	709.40	0.95	1.41	179.40	25.29%
		Ex. STM 105	*Ex. STM 104*																			530.00		CONC	*975.0*	*0.10*	*12.10*	709.40	0.95	0.21	179.40	25.29%
	Controlled Flow*	*Ex. STM 104*	*Ex. STM 103*																			530.00		CONC	*975.0*	*0.10*	*19.20*	709.40	0.95	0.34	179.40	25.29%
		Ex. STM 103	*Ex. STM 102*																			530.00		CONC	*975.0*	*0.10*	*54.20*	709.40	0.95	0.95	179.40	25.29%
		Ex. STM 102	*Ex. STM 101*																			530.00		CONC	*975.0*	*0.10*	*24.20*	709.40	0.95	0.42	179.40	25.29%
		Ex. STM 101	*Ex. STM MH (O'Connnor)*																			530.00		CONC	*975.0*	*0.10*	*5.80*	709.40	0.95	0.10	179.40	25.29%

Definition:
Q=2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall Intensity in millimeters per hour (mm/hr)
i = 732.951/(TC+6.199)^0.810 — 2 Year
i = 1174.184/(TC+6.014)^0.816 — 5 Year
i = 1735.688/(TC+6.014)^0.820 — 100 Year

Notes:
1. Mannings coefficient (n) = 0.013

*5-Yr Flow controlled to 530 l/s (refer to SWM report for details)

Time-of-Concentration in the Swale
FAA Equation: t (min) = 3.258 [(1.1 - C) L^0.5 / S^.33]
Where: Longest Watercourse Length, L (m). S (%)
Runoff Coef.C = Impervious

No.	L (m)	S %	Tc (min)
			#DIV/0!

Designed: Z.A.
Checked: D.B.Y.
Dwg. Reference: C05A/C05B

No.	Revision	Date
1.	City Submission No. 1	2023-05-25
2.	City Submission No. 2	2023-09-22
3.	City Submission No. 3	2024-08-07
4.	City Submission No. 4	2025-01-14

File Reference: CA0002045.0622
Date: 2023-09-22
Sheet No: 1 of 1

C-3 SWM Calculations

Post-Development Conditions - T1

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	386	0.0%	0.33%	29	Great Lawn	Great Lawn
At-Grade Impervious	146	100.0%				
Total Area	**532**	**27.5%**				

Post-Development Conditions - V1

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	21	0.0%	0.38%	78	Great Lawn	Great Lawn
At-Grade Impervous	587	100.0%				
Total Area	**608**	**96.5%**				

Post-Development Conditions - T2

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	581	0.0%	0.48%	36	Great Lawn	Great Lawn
At-Grade Impervous	188	100.0%				
Total Area	**769**	**24.5%**				

Post-Development Conditions - V2

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	26	0.0%	0.60%	36	Great Lawn	Great Lawn
At-Grade Impervous	943	100.0%				
Total Area	**969**	**97.3%**				

Post-Development Conditions - OPGG_3

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	194	0.0%	0.86%	65	Underground Via 5 CBs	Great Lawn
At-Grade Impervous	1193	100.0%				
Total Area	**1387**	**86.0%**				

Post-Development Conditions - OPGG_2

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	666	0.0%	1.69%	31	Great Lawn	Great Lawn
At-Grade Impervous	2061	100.0%				
Total Area	**2727**	**75.6%**				

Post-Development Conditions - OPGG_1

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	350	0.0%	0.56%	35	Great Lawn	Great Lawn
Impervious at Grade	546	100.0%				
Total Area	**896**	**60.9%**				

Pre-Development Conditions A3_1

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	1842	0.0%	1.79%	43	Underground Via trenchdrains	Great Lawn
Impervious at Grade	1050	100.0%				
Total Area	**2892**	**36.3%**				

Pre-Development Conditions A3_2

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	3394	0.0%	2.10%	44	Underground Via trenchdrains	Great Lawn
Impervious at Grade	0	100.0%				
Total Area	**3394**	**0.0%**				

Pre-Development Conditions A3_3

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	2857	0.0%	1.77%	40	Underground Via trenchdrains	Great Lawn
Impervious at Grade	0	100.0%				
Total Area	**2857**	**0.0%**				

Pre-Development Conditions A3_4

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
0.00	3013	0.0%	2.08%	40	Underground Via trenchdrains	Great Lawn
0.00	347	100.0%				
Total Area	**3360**	**10.3%**				

Pre-Development Conditions - A-1_1

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	29	0.0%	3.34%	37	Underground Via 6 CBs	Great Lawn
Impervious at Grade	5351	100.0%				
Total Area	**5379**	**99.5%**				

Pre-Development Conditions - A-1_2 Controlled to existing trench drain

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	121	0.0%	1.82%	51	Existing Trench Drain & STM111	Great Lawn
Impervious at Grade	2821	100.0%				
Total Area	**2942**	**95.9%**				

Pre-Development Conditions - A-1_3 Controlled to existing trench drain

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	0.81%	24	Underground Via 3 CBs	Great Lawn
Impervious at Grade	1305	100.0%				
Total Area	**1305**	**100.0%**				

Post-Development Conditions - A-2_1 Controlled

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	36	0.0%	0.95%	21	Underground Via 5 CBs	Great Lawn
Impervious at Grade	1496	100.0%				
Total Area	**1532**	**97.6%**				

Post-Development Conditions - A-2_2

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	1.35%	21	Underground Via 5 CBs	Great Lawn
Impervious at Grade	2175	100.0%				
Total Area	**2175**	**100.0%**				

Post-Development Conditions - A-2_3

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
0.00	0	0.0%	0.91%	24	Underground Via 3 CBs	Great Lawn
0.00	1470	100.0%				
Total Area	**1470**	**100.0%**				

Post-Development Conditions - A-2_4

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Impervious at Grade	0	0.0%	1.23%	25	Underground Via 6 CBs	Great Lawn
Total Area	1981	100.0%				
Total Area	**1981**	**100.0%**				

Post-Development Conditions - A-2_5

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
0.00	12	0.0%	0.58%	30	Underground Via 1 CBs	Great Lawn
Total Area	926	100.0%				
Total Area	**938**	**98.8%**				

Post-Development Conditions - A-2_6

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	214	0.0%	1.52%	40	Underground Via 5 CBs	Great Lawn
Impervious at Grade	2232	100.0%				
Total Area	**2446**	**91.3%**				

Post-Development Conditions - A-2_7

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	207	0.0%	1.76%	40	Underground Via 5 CBs	Great Lawn
Impervious at Grade	2637	100.0%				
Total Area	**2844**	**92.7%**				

Post-Development Conditions - A-2_8

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	0.26%	11	Underground Via 2 CBs	Great Lawn
Impervious at Grade	414	100.0%				
Total Area	**414**	**100.0%**				

Post-Development Conditions - A-2_9

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	0.28%	11	Underground Via trench drain	Great Lawn
Impervious at Grade	447	100.0%				
Total Area	**447**	**100.0%**				

Post-Development Conditions - A-2_10

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	24	0.0%	0.34%	14	Underground Via 2 CBs	Great Lawn
Impervious at Grade	530	100.0%				
Total Area	**554**	**95.6%**				

Post-Development Conditions - A-2_11

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	0.48%	18	Underground Via trench drain	Great Lawn
Impervious at Grade	768	100.0%				
Total Area	**768**	**100.0%**				

Post-Development Conditions - A-5

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	170	0.0%	1.58%	18	Underground Via 3 CBs	Great Lawn
Impervious at Grade	2376	100.0%				
Total Area	**2546**	**93.3%**				

Post-Development Conditions - 102

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	1590	0.0%	2.76%	44	Underground Via 2 CBs	Swale and Park
Impervious at Grade	2853	100.0%				
Total Area	**4443**	**64.2%**				

Post-Development Conditions - 107AA_2

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	570	0.0%	1.18%	22	Underground Via 4 CBs	Great Lawn
Impervious at Grade	1331	100.0%				
Total Area	**1901**	**70.0%**				

Post-Development Conditions - 107AA_1

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	25	0.0%	0.50%	24	Underground Via 1 CBs	Great Lawn
Impervious at Grade	775	100.0%				
Total Area	**800**	**96.9%**				

Post-Development Conditions - 108_1

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	522	0.0%	0.46%	26	Underground Via 1 CBs	Great Lawn
Impervious at Grade	216	100.0%				
Total Area	**738**	**29.3%**				

Post-Development Conditions - 108_2

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	697	0.0%	1.68%	41	Underground Via 5 CBs	Great Lawn
Impervious at Grade	2009	100.0%				
Total Area	**2706**	**74.2%**				

Post-Development Conditions - OPGG_4

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	118	0.0%	0.52%	22	Underground Via 5 CBs	Great Lawn
Impervious at Grade	728	100.0%				
Total Area	**846**	**86.1%**				

Post-Development Conditions - OPGG_5

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	0.68%	42	Underground Via 5 CBs	Great Lawn
Impervious at Grade	1090	100.0%				
Total Area	**1090**	**100.0%**				

Post-Development Conditions - 109

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	1.23%	89	Underground Via 1 CBs	Great Lawn
Impervious at Grade	1978	100.0%				
Total Area	**1978**	**100.0%**				

Pre-Development Conditions - AA

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	2057	0.0%	2.30%	52	Great Lawn	Great Lawn
Impervious at Grade	1644	100.0%				
Total Area	**3701**	**44.4%**				

Pre-Development Conditions - BB

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	5799	0.0%	5.52%	51	Underground Via 3 CBs	Grassed Swale along East Boundary
Impervious at Grade	3107	100.0%				
Total Area	**8906**	**34.9%**				

Pre-Development Conditions - EE

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	2055	0.0%	2.19%	39	Underground Via 1 CBs	Great Lawn
Impervious at Grade	1475	100.0%				
Total Area	**3530**	**41.8%**				

Pre-Development Conditions - A

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	4300	0.0%	4.54%	40	Underground Via 4 CBs	Grassed Swale along South Boundary
Impervious at Grade	3026	100.0%				
Total Area	**7326**	**41.3%**				

Pre-Development Conditions - D

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	1116	0.0%	1.17%	39	Underground Via 1 CBs	Grassed Swale along South Boundary
Impervious at Grade	776	100.0%				
Total Area	**1892**	**41.0%**				

Post-Development Conditions - D1

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	3350	0.0%	3.07%	24	Underground Via 2 CBs	Grassed Swale along South Boundary
Impervious at Grade	1601	100.0%				
Total Area	**4951**	**32.3%**				

Post-Development Conditions - D2

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	1681	0.0%	1.30%	39	Underground Via 4 CBs	Grassed Swale along South Boundary
Impervious at Grade	420	100.0%				
Total Area	**2101**	**20.0%**				

Pre-Development Conditions - NSTANDS

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	3.95%	136	Directly connected MH115	Directly connected MH115
Impervious at Grade	6368	100.0%				
Total Area	**6368**	**100.0%**				

Pre-Development Conditions - SSTANDS_1

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	2.52%	73	Directly connected MH120	Directly connected MH120
Impervious at Grade	4064	100.0%				
Total Area	**4064**	**100.0%**				

Pre-Development Conditions - SSTANDS_2

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	2.51%	71	Directly connected MH118	Directly connected MH118
Impervious at Grade	4041	100.0%				
Total Area	**4041**	**100.0%**				

Pre-Development Conditions - BLDG-A

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	1.58%	68	Directly connected to MH PS	Directly connected to MH PS
Impervious at Grade	2542	100.0%				
Total Area	**2542**	**100.0%**				

Pre-Development Conditions - BLDG-B

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	2.25%	91	Directly connected to MH PS	Directly connected to MH PS
Impervious at Grade	3626	100.0%				
Total Area	**3626**	**100.0%**				

Pre-Development Conditions - BLDG-C

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	1.86%	78	Directly connected to MH PS	Directly connected to MH PS
Impervious at Grade	2993	100.0%				
Total Area	**2993**	**100.0%**				

Pre-Development Conditions - BLDG-D

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	0.86%	34	Directly connected to MH PS	Directly connected to MH PS
Impervious at Grade	1380	100.0%				
Total Area	**1380**	**100.0%**				

Pre-Development Conditions - BLDG-G

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	1.51%	69	Directly connected to SWMCCN1	Directly connected to SWMCCN1
Impervious at Grade	2429	100.0%				
Total Area	**2429**	**100.0%**				

Pre-Development Conditions - BLDG-H

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	2.30%	83	Directly connected to SWMCCN1	Directly connected to SWMCCN1
Impervious at Grade	3709	100.0%				
Total Area	**3709**	**100.0%**				

Pre-Development Conditions - BLDG-I

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	1.40%	83	Directly connected to STM115	Directly connected to STM115
Impervious at Grade	2256	100.0%				
Total Area	**2256**	**100.0%**				

Pre-Development Conditions - BLDG-J

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	3.66%	89	Directly connected to SWMCCN1	Directly connected to SWMCCN1
Impervious at Grade	5903	100.0%				
Total Area	**5903**	**100.0%**				

Pre-Development Conditions - BLDG-J1

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	0.64%	41	Directly connected to SWMCCN1	Directly connected to SWMCCN1
Impervious at Grade	1039	100.0%				
Total Area	**1039**	**100.0%**				

Pre-Development Conditions - BLDG-J2

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	0.55%	37	Directly connected to SWMCCN1	Directly connected to SWMCCN1
Impervious at Grade	892	100.0%				
Total Area	**892**	**100.0%**				

Pre-Development Conditions - BLDG-K

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	1.53%	73	Directly connected to STM115	Directly connected to STM115
Impervious at Grade	2473	100.0%				
Total Area	**2473**	**100.0%**				

Post-Development Conditions - GreatLawn_1

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	3038	0.0%	2.28%	75	Great Lawn	Canal
Impervious at Grade	642	100.0%				
Total Area	**3680**	**17.4%**				

Post-Development Conditions - GreatLawn_2

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	1209	0.0%	0.93%	46	Great Lawn	Canal
Impervious at Grade	291	100.0%				
Total Area	**1500**	**19.4%**				

Post-Development Conditions - GreatLawn_3

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
0.00	2054	0.0%	1.55%	41	Great Lawn	Canal
0.00	449	100.0%				
Total Area	**2503**	**18.0%**				

Post-Development Conditions - GreatLawn_4

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	1408	0.0%	1.14%	50	Great Lawn	Canal
Impervious at Grade	435	100.0%				
Total Area	**1843**	**23.6%**				

Post-Development Conditions - GreatLawn_5

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	792	0.0%	0.71%	45	Great Lawn	Canal
Impervious at Grade	354	100.0%				
Total Area	**1146**	**30.9%**				

Post-Development Conditions - GreatLawn_6

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	1172	0.0%	0.94%	40	Great Lawn	Canal
Impervious at Grade	350	100.0%				
Total Area	**1522**	**23.0%**				

Post-Development Conditions - NEC_1

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	3.01%	107	STM204	STM204
Impervious at Grade	4860	100.0%				
Total Area	**4860**	**100.0%**				

Post-Development Conditions - NEC_2

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	0	0.0%	1.11%	89	STM209	STM209
Impervious at Grade	1785	100.0%				
Total Area	**1785**	**100.0%**				

Post-Development Conditions - NEC_3

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	224	0.0%	1.81%	73	underground via 2 trench drains	Great Lawn
Impervious at Grade	2691	100.0%				
Total Area	**2915**	**92.3%**				

Post-Development Conditions - A6

Land Use	Area (m^2)	IMP(%)	% Coverage	Width (m)	Minor Outlet	Major Outlet
Soft Landscaping	304	0.0%	0.45%	15	underground via trench drain	Great Lawn
Impervious at Grade	428	100.0%				
Total Area	**732**	**58.4%**				

Existing Superpipe Storage

From	To	Diameter (mm)	Length (m)	Volume Provided (m3)	Removed in Proposed Condition
102	101	975	24.2	18.1	N
104	102	975	77.9	58.2	N
105	104	975	10.3	7.7	N
106	105	975	80.2	59.9	N
107	106	1350	20.7	29.6	N
108	107	1350	81.4	116.5	N
109	108	1350	99.8	142.9	N
110	109	600	8.5	2.4	N
111	110	600	39.6	11.2	Y
112	109	1200	46.8	52.9	N
113	112	1050	47.8	41.4	Y
114	113	825	73.0	39.0	N
115	114	825	73.7	39.4	N
116	113	600	61.5	17.4	Y
117	116	600	5.5	1.6	Y
118	117	600	8.7	2.5	N
119	118	450	59.6	9.5	N
120	119	450	59.6	9.5	N
116	112	900	85.0	54.1	Y

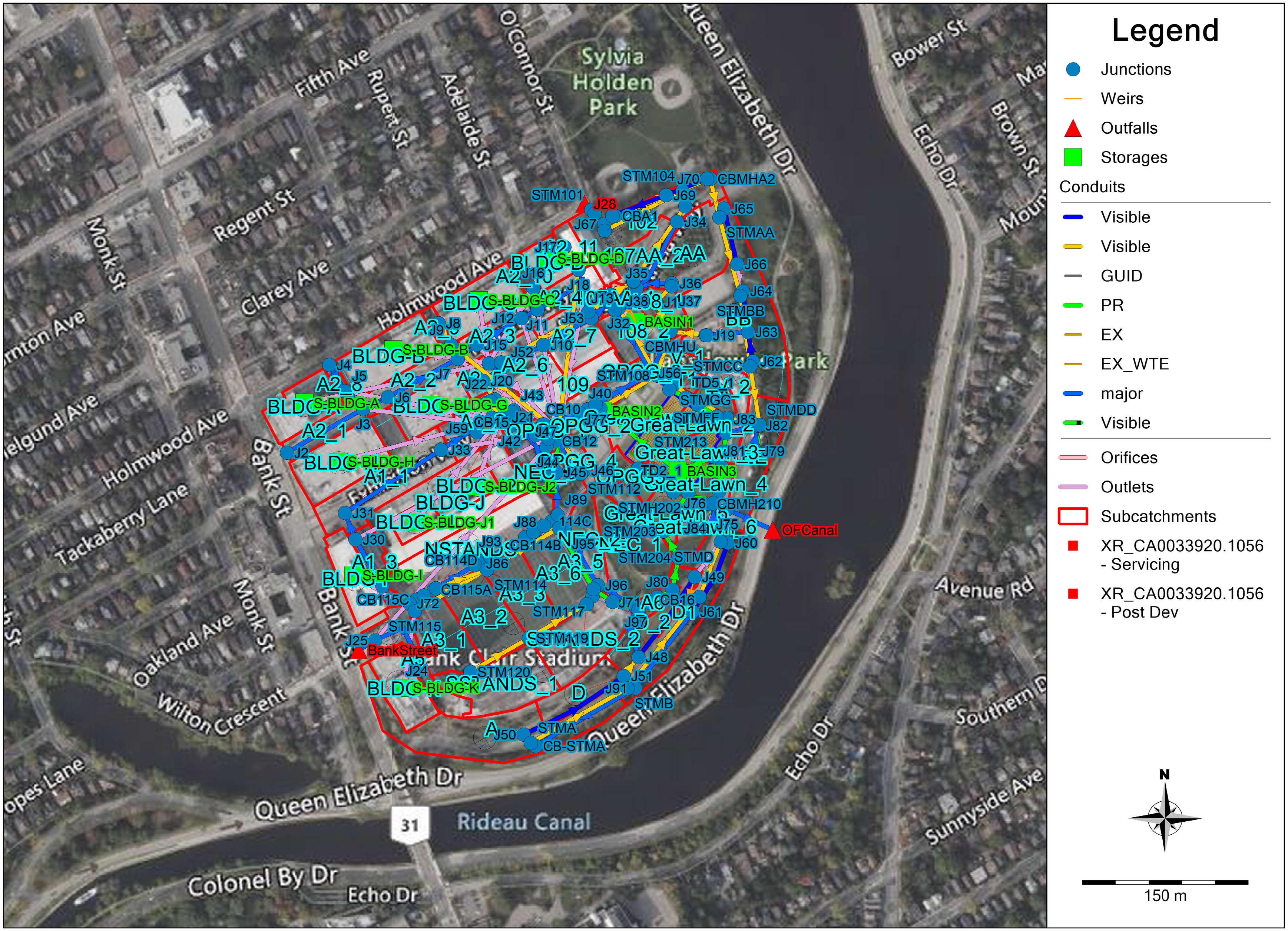
Total Volume Provided:
713.57 m3

Proposed Superpipe Storage

From	To	Diameter (mm)	Length (m)	Volume Provided (m3)	Constructed in Proposed Condition
209	208	900	65.6	41.8	Y
208	207	1050	25.7	22.3	Y
207	206	1050	25.4	22.0	Y
206	205	1050	25.8	22.3	Y
205	204	1050	29.5	25.6	Y
204	203	1050	27.1	23.5	Y
203	202	1050	39.2	34.0	Y
120	119	450	59.6	9.5	N
119	118	450	59.6	9.5	N
118	117	600	8.7	2.5	N
117	208	600	3.0	0.9	Y
115	114	825	73.7	39.4	N
114	209	825	74.5	39.8	N
212	211	600	30.0	8.5	Y
211	110	600	11.0	3.1	Y
112	109	1200	46.8	52.9	N
110	109	600	8.5	2.4	N
109	108	1350	99.8	142.9	N
108	107	1350	81.4	116.5	N
107	106	1350	20.7	29.6	N
106	105	975	80.2	59.9	N
105	104	975	10.3	7.7	N
104	102	975	77.9	58.2	N
102	101	975	24.2	18.1	N

Total Volume Provided:
792.56 m3

C-4 PCSWMM Output


Legend
Junctions
Weirs
Outfalls
Storages
Conduits
Visible
Visible
GUID
PR
EX
EX_WTE
major
Visible
Orifices
Outlets
Subcatchments
XR_CA0033920.1056 - Servicing
XR_CA0033920.1056 - Post Dev
N
150 m
Sylvia Holden Park
Fifth Ave
Regent St
Clarey Ave
Holmwood Ave
Monk St
Bank St
Rupert St
Adelaide St
O'Connor St
Queen Elizabeth Dr
Bower St
Echo Dr
Brown St
Tackaberry Lane
Oakland Ave
Wilton Crescent
Rideau Canal
Colonel By Dr
Avenue Rd
Southern Dr
Sunnyside Ave
OFCanal
BankStreet
BASIN1
BASIN2
BASIN3

PCSWMM Catchment Parameters –Proposed Conditions

Name	Rain Gage	Outlet	Area (ha)	Imperv. (%)	Peak Runoff (m3/s)	Runoff Coefficient
102	100yr_3hr_Chicago	J67	0.4443	64.2	0.11	0.71
107AA_1	100yr_3hr_Chicago	J54	0.08	96.9	0.04	0.97
107AA_2	100yr_3hr_Chicago	J34	0.1901	70.0	0.07	0.79
108_1	100yr_3hr_Chicago	J38	0.0738	29.3	0.02	0.54
108_2	100yr_3hr_Chicago	J55	0.2706	74.2	0.11	0.83
109	100yr_3hr_Chicago	STM109	0.1978	87.5	0.10	0.91
A	100yr_3hr_Chicago	CB-STMA	0.7326	41.3	0.07	0.48
A1_1	100yr_3hr_Chicago	J31	0.537	99.5	0.24	0.98
A1_2	100yr_3hr_Chicago	J22	0.2942	95.9	0.14	0.96
A1_3	100yr_3hr_Chicago	J29	0.1305	100.0	0.06	0.99
A2_1	100yr_3hr_Chicago	J2	0.1532	97.6	0.07	0.97
A2_10	100yr_3hr_Chicago	J16	0.0554	95.6	0.03	0.96
A2_11	100yr_3hr_Chicago	J17	0.0768	100.0	0.04	0.99
A2_2	100yr_3hr_Chicago	J6	0.2175	100.0	0.10	0.99
A2_3	100yr_3hr_Chicago	J15	0.147	100.0	0.07	0.99
A2_4	100yr_3hr_Chicago	J12	0.1981	100.0	0.10	0.99
A2_5	100yr_3hr_Chicago	J52	0.0938	98.8	0.05	0.98
A2_6	100yr_3hr_Chicago	J52	0.2446	91.3	0.12	0.94
A2_7	100yr_3hr_Chicago	J10	0.2844	92.7	0.14	0.94
A2_8	100yr_3hr_Chicago	J4	0.0414	97.9	0.02	0.98
A2_9	100yr_3hr_Chicago	J8	0.0447	100.0	0.02	0.99
A3_1	100yr_3hr_Chicago	CB115C	0.2892	36.3	0.07	0.56
A3_2	100yr_3hr_Chicago	J92	0.3394	0.0	0.02	0.27
A3_3	100yr_3hr_Chicago	J86	0.2857	0.0	0.02	0.28
A3_5	100yr_3hr_Chicago	J95	0.0335	99.0	0.02	0.97
A3_6	100yr_3hr_Chicago	J88	0.3026	10.3	0.03	0.35
A5	100yr_3hr_Chicago	J24	0.2546	93.3	0.11	0.95
A6	100yr_3hr_Chicago	CB16	0.0732	58.4	0.03	0.72
AA	100yr_3hr_Chicago	J36	0.3701	44.4	0.07	0.57
BB	100yr_3hr_Chicago	J39	0.8906	34.9	0.07	0.43
BLDG-A	100yr_3hr_Chicago	S-BLDG-A	0.2542	100.0	0.13	0.99
BLDG-B	100yr_3hr_Chicago	S-BLDG-B	0.3626	100.0	0.18	0.99
BLDG-C	100yr_3hr_Chicago	S-BLDG-C	0.2993	100.0	0.15	0.99
BLDG-D	100yr_3hr_Chicago	S-BLDG-D	0.138	100.0	0.07	0.99
BLDG-G	100yr_3hr_Chicago	S-BLDG-G	0.2429	100.0	0.12	0.99
BLDG-H	100yr_3hr_Chicago	S-BLDG-H	0.3709	100.0	0.18	0.99
BLDG-I	100yr_3hr_Chicago	S-BLDG-I	0.2256	100.0	0.11	0.99
BLDG-J	100yr_3hr_Chicago	SWMCCN1	0.5903	100.0	0.29	0.99
BLDG-J1	100yr_3hr_Chicago	S-BLDG-J1	0.1039	100.0	0.05	0.99
BLDG-J2	100yr_3hr_Chicago	S-BLDG-J2	0.0892	100.0	0.04	0.99

BLDG-K	100yr_3hr_Chicago	S-BLDG-K	0.2473	100.0	0.12	0.99
D	100yr_3hr_Chicago	J51	0.1892	41.0	0.04	0.56
D_2	100yr_3hr_Chicago	J48	0.2101	20.0	0.03	0.42
D1	100yr_3hr_Chicago	J61	0.4951	32.3	0.05	0.43
EE	100yr_3hr_Chicago	J81	0.353	41.8	0.05	0.54
Great-Lawn_1	100yr_3hr_Chicago	TD5_1	0.368	17.4	0.06	0.43
Great-Lawn_2	100yr_3hr_Chicago	TD6_1	0.15	19.4	0.02	0.44
Great-Lawn_3	100yr_3hr_Chicago	TD8_1	0.2503	18.0	0.03	0.40
Great-Lawn_4	100yr_3hr_Chicago	TD7_1	0.1843	23.6	0.03	0.46
Great-Lawn_5	100yr_3hr_Chicago	TD2_1	0.1146	30.9	0.03	0.52
Great-Lawn_6	100yr_3hr_Chicago	J84	0.1522	23.0	0.02	0.45
NEC_1	100yr_3hr_Chicago	STM204	0.486	99.0	0.24	0.98
NEC_2	100yr_3hr_Chicago	STM209	0.1785	99.0	0.09	0.97
NEC_3	100yr_3hr_Chicago	J89	0.2915	92.3	0.14	0.94
NSTANDS	100yr_3hr_Chicago	STM115	0.6368	100.0	0.32	0.99
OPGG_1	100yr_3hr_Chicago	J74	0.0896	61.0	0.03	0.75
OPGG_2	100yr_3hr_Chicago	CB10	0.2722	75.6	0.11	0.83
OPGG_3	100yr_3hr_Chicago	J56	0.1387	86.0	0.07	0.90
OPGG_4	100yr_3hr_Chicago	J46	0.0846	86.1	0.04	0.91
OPGG5	100yr_3hr_Chicago	TD3_1	0.109	99.0	0.05	0.98
SSTANDS_1	100yr_3hr_Chicago	STM120	0.4064	100.0	0.20	0.98
SSTANDS_2	100yr_3hr_Chicago	STM118	0.4041	100.0	0.20	0.98
T1	100yr_3hr_Chicago	TD5_1	0.0532	24.4	0.04	0.73
T2	100yr_3hr_Chicago	TD6_1	0.0769	24.5	0.06	0.74
V_1	100yr_3hr_Chicago	T1	0.0608	96.6	0.03	0.96
V_2	100yr_3hr_Chicago	T2	0.0969	97.3	0.05	0.97

PCSWMM Storage Results – Proposed Conditions

Name	Invert Elev. (m)	Rim Elev. (m)	Depth (m)	Storage Curve	Curve Name	Avg. Depth (m)	Max. Depth (m)	Max. HGL (m)	Max. Volume (1000 m³)	Max. Percent Full (%)	Contributing Area (ha)
BASIN1	62.71	64.21	1.5	TABULAR	BASIN1	0.91	1.5	64.21	0.61	100	15.1
BASIN2	62.85	64.35	1.5	TABULAR	BASIN2	0.78	1.41	64.26	2.165	100	12.3
BASIN3	62.86	64.54	1.68	TABULAR	MC3500	0.77	1.38	64.24	4.23	88	7.5
S-BLDG-A	100	100.15	0.15	TABULAR	BLDGA	0.02	0.07	100.07	0.121	24	0.3
S-BLDG-B	100	100.15	0.15	TABULAR	BLDGB	0.02	0.08	100.08	0.176	27	0.4
S-BLDG-C	100	100.15	0.15	TABULAR	BLDGC	0.02	0.07	100.07	0.142	24	0.3
S-BLDG-D	100	100.15	0.15	TABULAR	BLDGD	0.02	0.08	100.08	0.066	25	0.1
S-BLDG-G	100	100.15	0.15	TABULAR	BLDGG	0.03	0.09	100.09	0.125	38	0.2
S-BLDG-H	100	100.15	0.15	TABULAR	BLDGH	0.02	0.08	100.08	0.178	27	0.4
S-BLDG-I	100	100.15	0.15	TABULAR	BLDGI	0.02	0.07	100.07	0.106	23	0.2
S-BLDG-J1	100	100.15	0.15	TABULAR	BLDGJ1	0.02	0.11	100.11	0.04	52	0.1
S-BLDG-J2	100	100.15	0.15	TABULAR	BLDGJ2	0.02	0.11	100.11	0.035	53	0.1
S-BLDG-K	100	100.15	0.15	TABULAR	BLDGK	0.03	0.1	100.1	0.13	42	0.2

C-5 Supporting Documents+

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

SiteAssist™
FOR STORMTECH
INSTALLATION INSTRUCTIONS
VISIT OUR APP

LANSDOWNE 2.0 ADS

OTTAWA, ON, CANADA

MC-3500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-3500.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 75 mm (3").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
10. MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE. DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
11. ADS DOES NOT DESIGN OR PROVIDE MEMBRANE LINER SYSTEMS. TO MINIMIZE THE LEAKAGE POTENTIAL OF LINER SYSTEMS, THE MEMBRANE LINER SYSTEM SHOULD BE DESIGNED BY A KNOWLEDGEABLE GEOTEXTILE PROFESSIONAL AND INSTALLED BY A QUALIFIED CONTRACTOR.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-3500 CHAMBER SYSTEM

1. STORMTECH MC-3500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 300 mm (12") INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE WELL GRADED BETWEEN ¾" AND 2" (20-50 mm)..
9. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
10. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
11. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-3500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

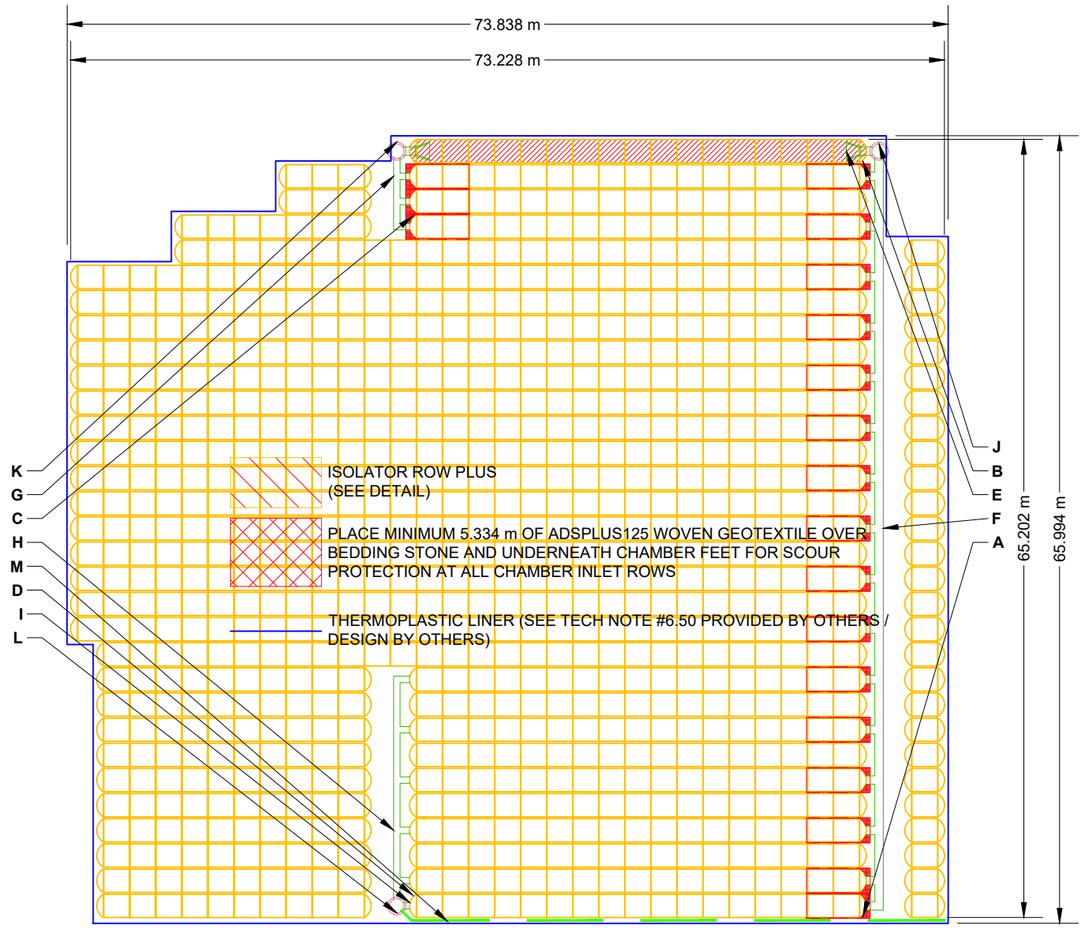
USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-800-821-6710 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT		PROPOSED ELEVATIONS:	
883	STORMTECH MC-3500 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	66.670
142	STORMTECH MC-3500 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	64.841
305	STONE ABOVE (mm)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	64.689
229	STONE BELOW (mm)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	64.689
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	64.689
4777.1	INSTALLED SYSTEM VOLUME (m^3) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	64.537
		TOP OF MC-3500 CHAMBER:	64.232
		450 mm x 450 mm TOP MANIFOLD INVERT:	63.597
		600 mm x 600 mm TOP MANIFOLD INVERT:	63.457
4610.4	SYSTEM AREA (m^2)	600 mm ISOLATOR ROW PLUS INVERT:	63.141
279.7	SYSTEM PERIMETER (m)	600 mm ISOLATOR ROW PLUS INVERT:	63.141
6096	THERMOPLASTIC LINER (m^2) (20% OVERAGE)	450 mm x 450 mm BOTTOM MANIFOLD INVERT:	63.134
		450 mm BOTTOM CONNECTION INVERT:	63.134
		BOTTOM OF MC-3500 CHAMBER:	63.089
		UNDERDRAIN INVERT:	62.860
		BOTTOM OF STONE:	62.860

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	600 mm TOP CORED END CAP, PART#: MC3500IEPP24TC / TYP OF ALL 600 mm TOP CONNECTIONS	368 mm	
PREFABRICATED END CAP	B	600 mm BOTTOM CORED END CAP, PART#: MC3500IEPP24BC / TYP OF ALL 600 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	52 mm	
PREFABRICATED END CAP	C	450 mm TOP CORED END CAP, PART#: MC3500IEPP18TC / TYP OF ALL 450 mm TOP CONNECTIONS	509 mm	
PREFABRICATED END CAP	D	450 mm BOTTOM CORED END CAP, PART#: MC3500IEPP18BC / TYP OF ALL 450 mm BOTTOM CONNECTIONS	45 mm	
FLAMP	E	INSTALL FLAMP ON 600 mm ACCESS PIPE / PART#: MCFLAMP (TYP 2 PLACES)		
MANIFOLD	F	600 mm x 600 mm TOP MANIFOLD, ADS N-12	368 mm	
MANIFOLD	G	450 mm x 450 mm TOP MANIFOLD, ADS N-12	509 mm	
MANIFOLD	H	450 mm x 450 mm BOTTOM MANIFOLD, ADS N-12	45 mm	
PIPE CONNECTION	I	450 mm BOTTOM CONNECTION	45 mm	
CONCRETE STRUCTURE	J	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		
CONCRETE STRUCTURE	K	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		
CONCRETE STRUCTURE	L	OCS (DESIGN BY ENGINEER / PROVIDED BY OTHERS)		227 L/s OUT
UNDERDRAIN	M	150 mm ADS N-12 DUAL WALL PERFORATED HDPE UNDERDRAIN		



NOTES
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- **NOT FOR CONSTRUCTION**: THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

LANSDOWNE 2.0 ADS
OTTAWA, ON, CANADA
DATE: 08/21/2024 | PROJECT #: | DRAWN: HN | CHECKED: N/A

DESCRIPTION	CHK	DRW	DATE

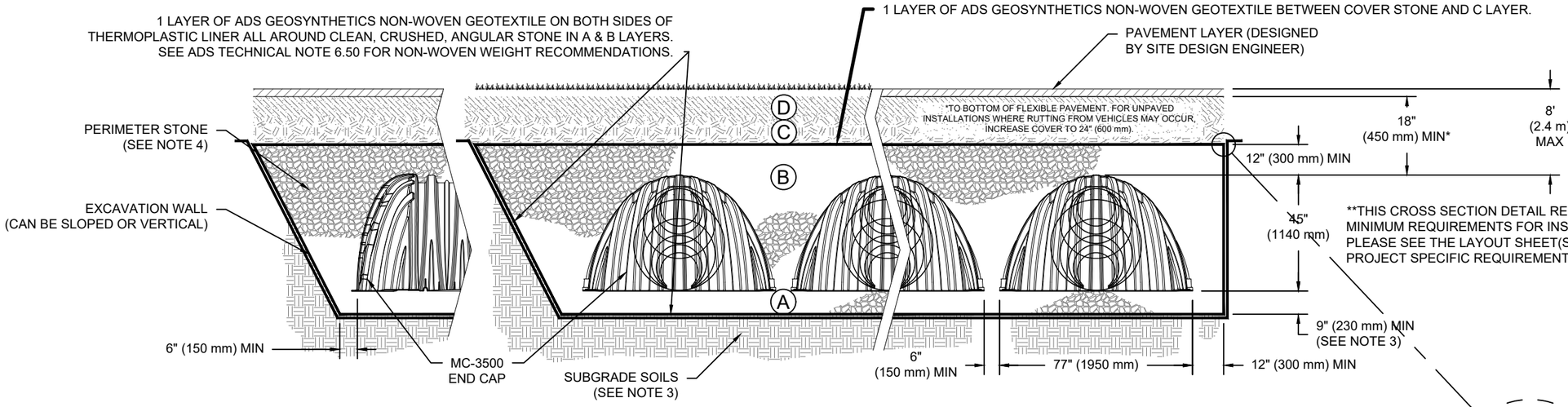
StormTech®
Chamber System
1-800-821-6710 | WWW.STORMTECH.COM
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

SCALE = 1 : 500

ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

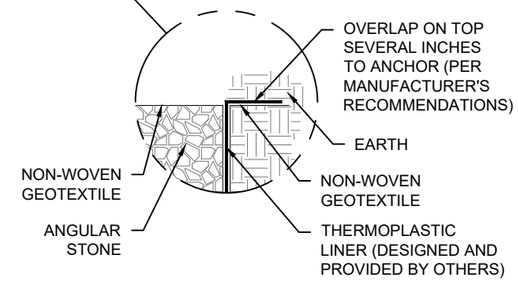
MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE STRUCTURAL BACKFILL".



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
2. MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS. REFERENCE STORMTECH DESIGN MANUAL FOR BEARING CAPACITY GUIDANCE.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.



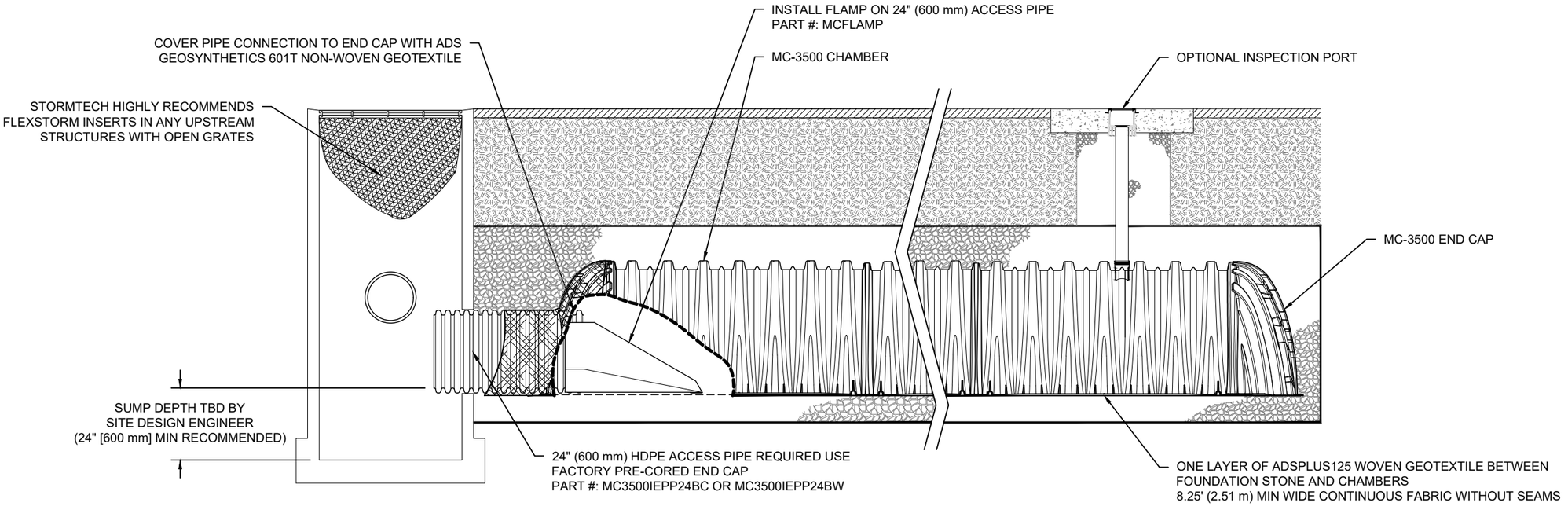
THERMOPLASTIC LINER DETAIL

LANSDOWNE 2.0 ADS
OTTAWA, ON, CANADA
DATE: 08/21/2024 | DRAWN: HN | CHECKED: N/A
PROJECT #:

DATE	DRW	CHK	DESCRIPTION

StormTech® Chamber System
1-800-821-6710 | WWW.STORMTECH.COM

4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473



MC-3500 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

LANSDOWNE 2.0 ADS
OTTAWA, ON, CANADA
DATE: 08/21/2024 | DRAWN: HN | CHECKED: N/A
PROJECT #:

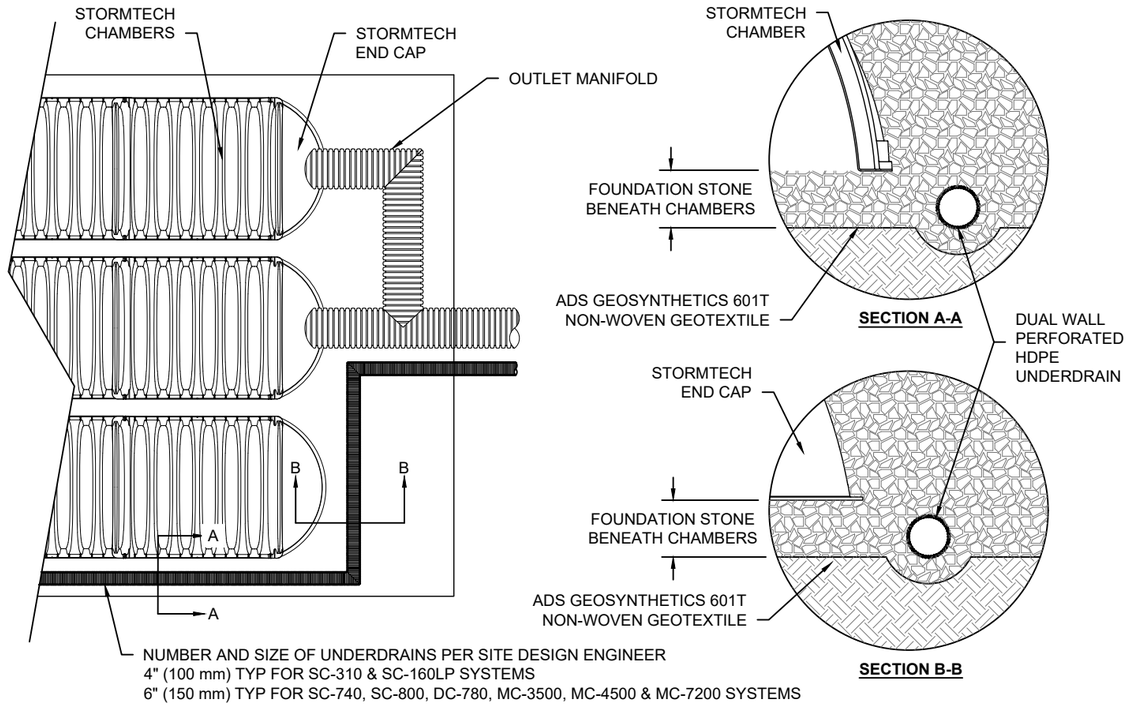
DATE	DRW	CHK	DESCRIPTION

StormTech®
Chamber System
1-800-821-6710 | WWW.STORMTECH.COM

ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

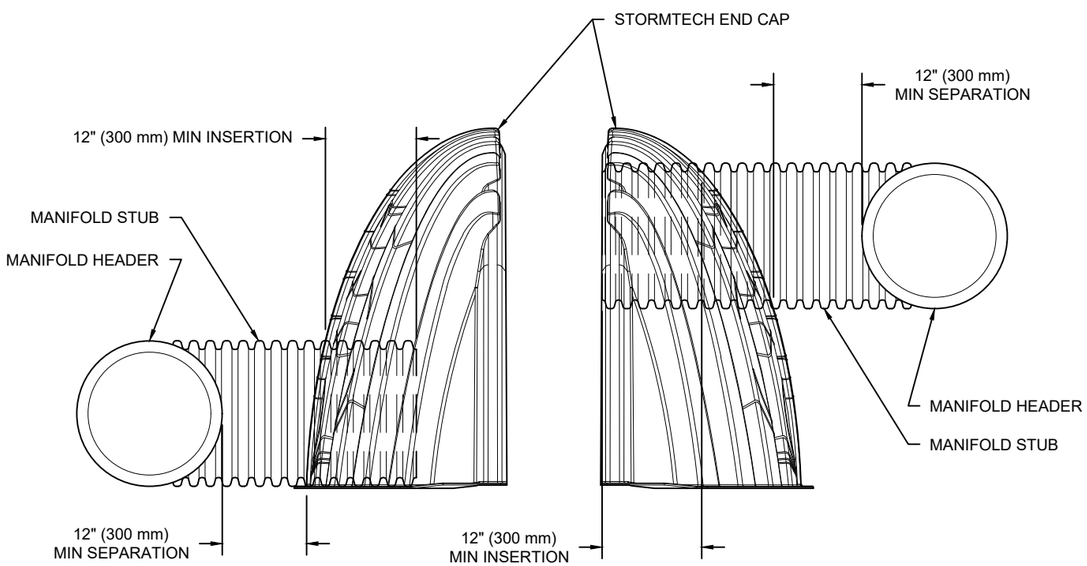
UNDERDRAIN DETAIL

NTS



MC-SERIES END CAP INSERTION DETAIL

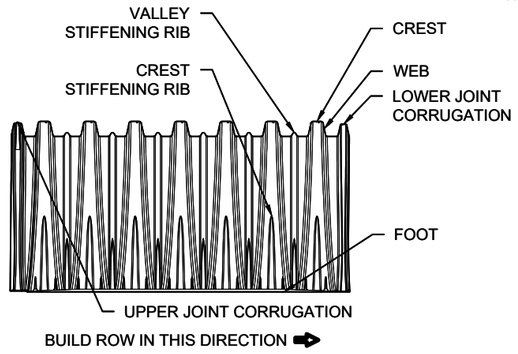
NTS

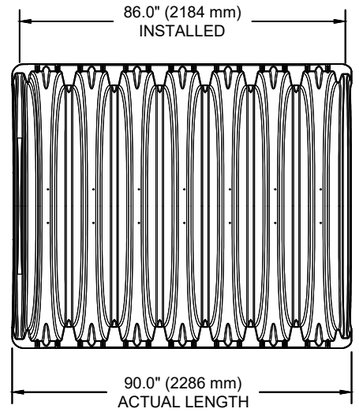


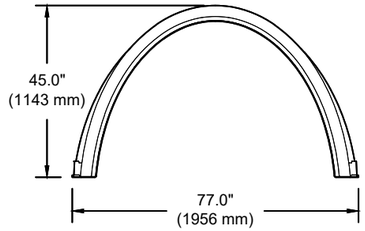
NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

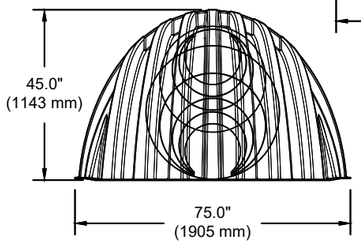
MC-3500 TECHNICAL SPECIFICATION

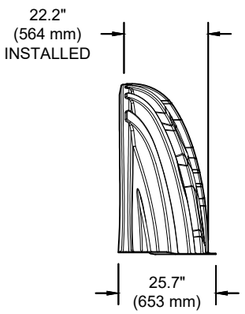
NTS











NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	77.0" X 45.0" X 86.0"	(1956 mm X 1143 mm X 2184 mm)
CHAMBER STORAGE	109.9 CUBIC FEET	(3.11 m³)
MINIMUM INSTALLED STORAGE*	175.0 CUBIC FEET	(4.96 m³)
WEIGHT	134 lbs.	(60.8 kg)

NOMINAL END CAP SPECIFICATIONS

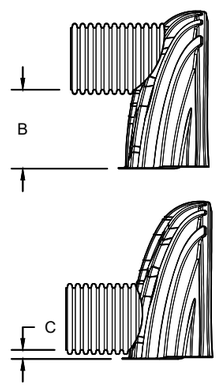
SIZE (W X H X INSTALLED LENGTH)	75.0" X 45.0" X 22.2"	(1905 mm X 1143 mm X 564 mm)
END CAP STORAGE	14.9 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	45.1 CUBIC FEET	(1.28 m³)
WEIGHT	49 lbs.	(22.2 kg)

*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION, 6" SPACING BETWEEN CHAMBERS, 6" (152 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY

STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A WELDED CROWN PLATE END WITH "C"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

PART #	STUB	B	C
MC3500IEPP06T	6" (150 mm)	33.21" (844 mm)	---
MC3500IEPP06B		---	0.66" (17 mm)
MC3500IEPP08T	8" (200 mm)	31.16" (791 mm)	---
MC3500IEPP08B		---	0.81" (21 mm)
MC3500IEPP10T	10" (250 mm)	29.04" (738 mm)	---
MC3500IEPP10B		---	0.93" (24 mm)
MC3500IEPP12T	12" (300 mm)	26.36" (670 mm)	---
MC3500IEPP12B		---	1.35" (34 mm)
MC3500IEPP15T	15" (375 mm)	23.39" (594 mm)	---
MC3500IEPP15B		---	1.50" (38 mm)
MC3500IEPP18TC	18" (450 mm)	20.03" (509 mm)	---
MC3500IEPP18TW			
MC3500IEPP18BC		---	1.77" (45 mm)
MC3500IEPP18BW			
MC3500IEPP24TC	24" (600 mm)	14.48" (368 mm)	---
MC3500IEPP24TW			
MC3500IEPP24BC		---	2.06" (52 mm)
MC3500IEPP24BW			
MC3500IEPP30BC	30" (750 mm)	---	2.75" (70 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL

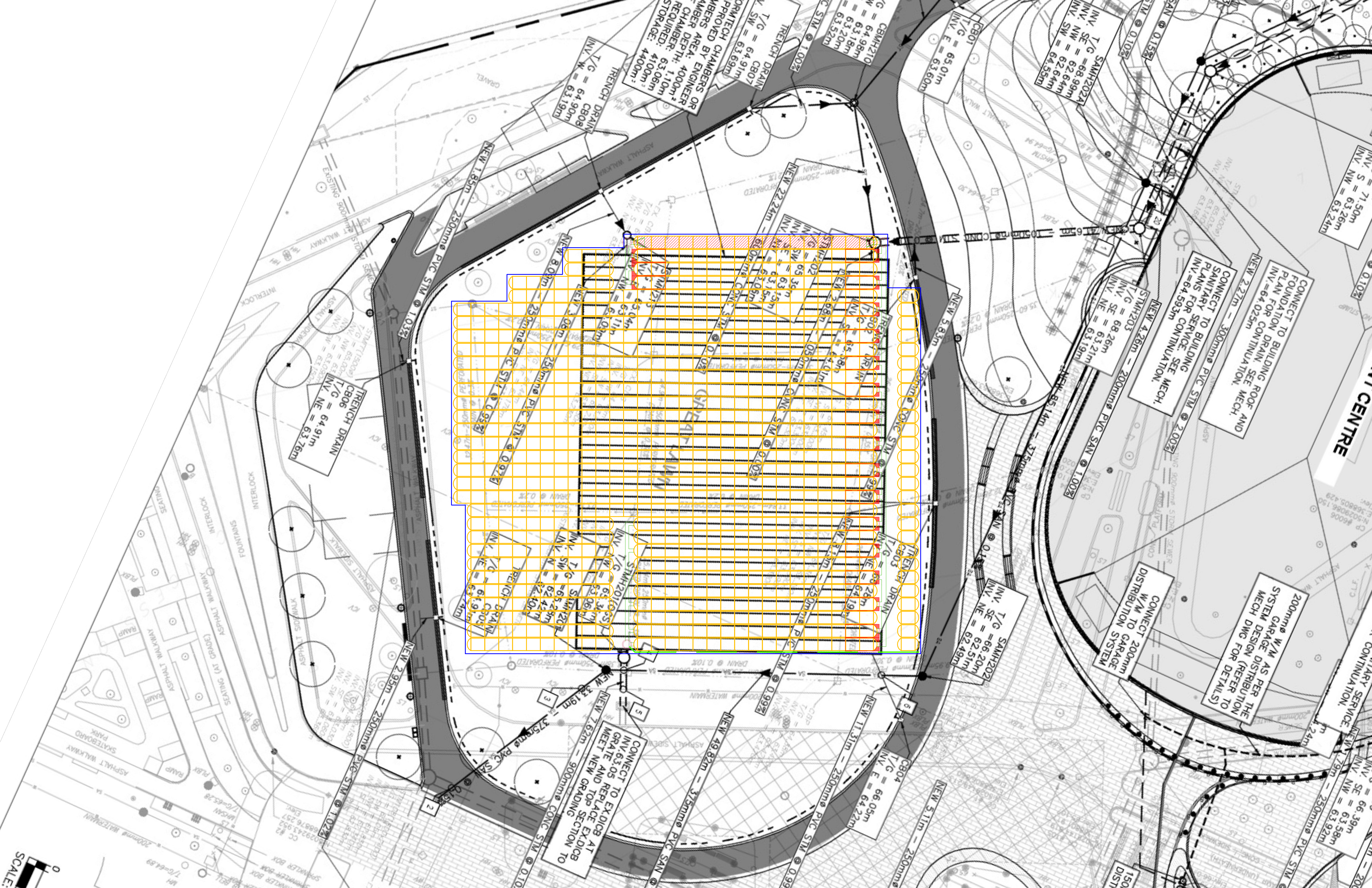


CUSTOM PRECORED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-3500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

LANSDOWNE 2.0 ADS
OTTAWA, ON, CANADA
DATE: 08/21/2024 | PROJECT #: | DRAWN: HN | CHECKED: N/A

DATE	DRW	CHK	DESCRIPTION

StormTech® Chamber System
1-800-821-6710 | WWW.STORMTECH.COM
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473



TRENCH DRAIN CB08 T/G = 64.90m INV. W = 63.19m
CHAMBERS OR APPROVED CHAMBERS BY ENGINEER
CHAMBER AREA: 4000m²
CHAMBER DEPTH: 1.10m
REQUIRED: 63.06m
STORAGE: 4100m³ 4400m³
TRENCH DRAIN CB07 T/G = 64.91m INV. SW = 63.69m
STM @ 1.00%
CBMH210 T/G = 64.98m
63.18m
63.20m
63.52m
CB01 T/G = 65.01m INV. E = 63.60m
SAMH202A T/G =68.99m INV. SE = 62.64m INV. NW = 62.64m INV. SW = 64.55m
STM @ 0.10%
SAN @ 0.15%
INV. S = 71.50m INV. NW = 63.26m 63.24m
1050mmø CONC STM
STMH203 T/G = 68.26m INV. SE = 63.21m INV. NE = 63.19m
NEW 4.26m — 2000mmø PVC SAN @ 1.00%
CONNECT TO BUILDING SANITARY FOR SERVICE. SEE MECH. PLANS FOR CONTINUATION. INV.=64.593m
NEW 2.27m — 3000mmø PVC STM @ 2.00%
CONNECT TO BUILDING ROOF AND FOUNDATION DRAIN. SEE MECH. PLAN FOR CONTINUATION. INV.=64.025m
CENTRE
NEW 5.83m — 250mmø CONC STM
NEW 85.14m — 375mmø PVC SAN
TRENCH DRAIN CB06 T/G = 64.91m INV. NE = 63.76m
NEW 1.85m — 250mmø PVC STM @ 1.03%
NEW 22.24m — 600mmø CONC STM
NEW 8.08m — 250mmø PVC STM @ 0.97%
TRENCH DRAIN CB03
STMH201
NEW 2.95m — 250mmø PVC STM @ 1.02%
SAMH202 T/G =66.20m INV. SE = 62.51m INV. NE = 62.49m
CONNECT 200mm W/M TO GARAGE DISTRIBUTION SYSTEM
200mmø W/M AS PER THE GARAGE DISTRIBUTION SYSTEM DESIGN (REFER TO MECH DWG FOR DETAILS)
CONNECT TO EX.DICB INV.63.05 REPLACE EX.DICB GRATE AND TOP AT MEET NEW GRADING SECTION TO
NEW 7.62m — 900mmø CONC STM @ 0.10%
NEW 33.19m — 375mmø PVC SAN
NEW 49.82m — 375mmø PVC SAN
NEW 11.31m — 250mmø PVC STM @ 0.99%
CB804 T/G = 66.05m INV. E = 64.22m
NEW 5.11m — 250mmø
NEW 1.79m — 250mmø PVC STM
INV. SE = 66.39m INV. NW = 63.58m 63.92m
CONTINUATION.
EXISTING 900mmø STORM SEWER
INTERLOCK
FOUNTAINS
ASPHALT WALKWAY
ASPHALT SIDEWALK
SEATING (AT GRADE)
SKATEBOARD PARK
RAMP
SCALE

Isolator® Row Plus
O&M Manual

ADS StormTech™

The Isolator® Row Plus

Introduction

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row Plus is a technique to inexpensively enhance Total Suspended Solids (TSS), Total Phosphorus (TP), Total Petroluem Hydrocarbons (TPH) and Total Nitrogen (TN) removal with easy access for inspection and maintenance.

The Isolator Row Plus

The Isolator Row Plus is a row of StormTech chambers, either SC-160, SC-310, SC-310-3, SC-740, DC-780, SC-800, MC-3500, MC-4500 or MC-7200 models, are lined with filter fabric and connected to a closely located manhole for easy access. The fabric lined chambers provide for sediment settling and filtration as stormwater rises in the Isolator Row Plus and passes through the filter fabric. The open bottom chambers allow stormwater to flow vertically out of the chambers. Sediments are captured in the Isolator Row Plus protecting the adjacent stone and chambers storage areas from sediment accumulation.

ADS Isolator Row and Plus fabric are placed between the stone and the Isolator Row Plus chambers. The woven geotextile provides a media for stormwater filtration, a durable surface for maintenance, prevents scour of the underlying stone and remains intact during high pressure jetting.

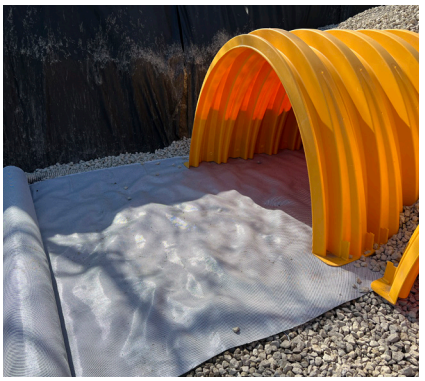
The Isolator Row Plus is designed to capture the “first flush” runoff and offers the versatility to be sized on a volume basis or a flow-rate basis. An upstream manhole provides access to the Isolator Row Plus and includes a high/low concept such that stormwater flow rates or volumes that exceed the capacity of the Isolator Row Plus bypass through a manifold to the other chambers. This is achieved with an elevated bypass manifold or a high-flow weir. This creates a differential between the Isolator Row Plus row of chambers and the manifold to the rest of the system, thus allowing for settlement time in the Isolator Row Plus. After Stormwater flows through the Isolator Row Plus and into the rest of the chamber system it is either exfiltrated into the soils below or passed at a controlled rate through an outlet manifold and outlet control structure.

The Isolator Row Plus Flamp™ is a flared end ramp apparatus attached to the inlet pipe on the inside of the chamber end cap. The FLAMP provides a smooth transition from pipe invert to fabric bottom. It is configured to improve chamber function performance by enhancing outflow of solid debris that would otherwise collect at the chamber's end, or more difficult to remove and require confined space entry into the chamber area. It also serves to improve the fluid and solid flow into the access pipe during maintenance and cleaning and to guide cleaning and inspection equipment back into the inlet pipe when complete.

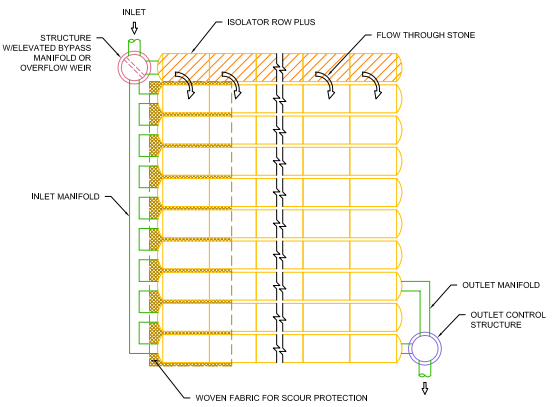
The Isolator Row Plus may be part of a treatment train system. The treatment train design and pretreatment device selection by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, StormTech recommend using the Isolator Row Plus to minimize maintenance requirements and maintenance costs.

Note: *See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row Plus.*

Looking down the Isolator Row Plus from the manhole opening, ADS Plus Fabric is shown between the chamber and stone base.



StormTech Isolator Row Plus with Overflow Structure (not to scale)



Isolator Row Plus Inspection/Maintenance

Inspection

The frequency of inspection and maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row Plus should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

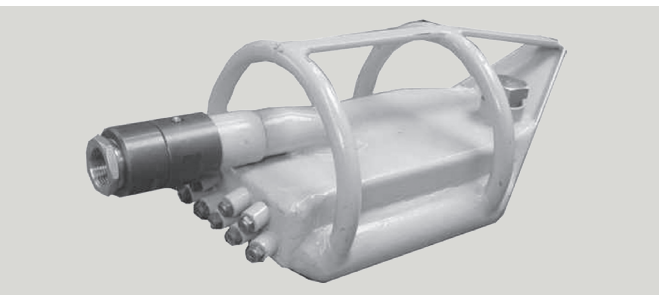
The Isolator Row Plus incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3" (75 mm) throughout the length of the Isolator Row Plus, clean-out should be performed.

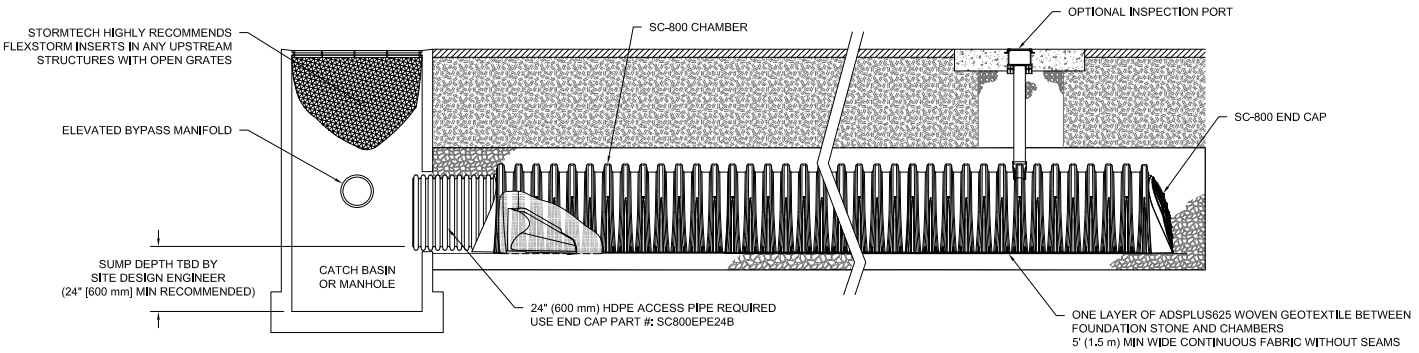
Maintenance

The Isolator Row Plus was designed to reduce the cost of periodic maintenance. By “isolating” sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entry.

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row Plus while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45” are best. StormTech recommends a maximum nozzle pressure of 2000 psi be utilized during cleaning. JetVac reels can vary in length. For ease of maintenance, ADS recommends Isolator Row Plus lengths up to 200' (61 m). **The JetVac process shall only be performed on StormTech Isolator Row Plus that have ADS Plus Fabric (as specified by StormTech) over their angular base stone.**



StormTech Isolator Row Plus (*not to scale*)



Isolator Row Plus Step By Step Maintenance Procedures

Step 1

Inspect Isolator Row Plus for sediment.

A) Inspection ports (if present)
   i. Remove lid from floor box frame
   ii. Remove cap from inspection riser
   iii. Using a flashlight and stadia rod,measure depth of sediment and record results on maintenance log.
   iv. If sediment is at or above 3 inch depth, proceed to Step 2. If not, proceed to Step 3.

B) All Isolator Row Plus
   i. Remove cover from manhole at upstream end of Isolator Row Plus
   ii. Using a flashlight, inspect down Isolator Row Plus through outlet pipe
      1. Mirrors on poles or cameras may be used to avoid a confined space entry
      2. Follow OSHA regulations for confined space entry if entering manhole
   iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches), proceed to Step 2.
   If not, proceed to Step 3.

Step 2

Clean out Isolator Row Plus using the JetVac process.

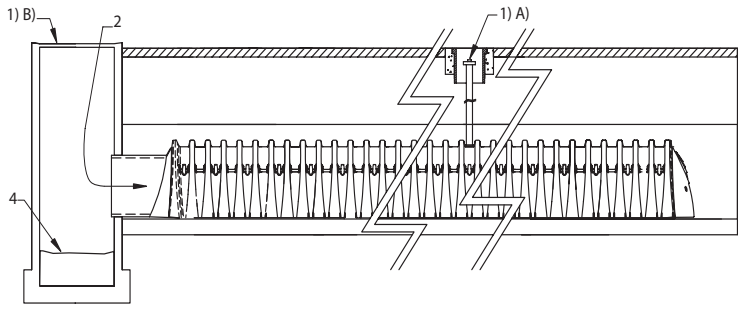
A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
B) Apply multiple passes of JetVac until backflush water is clean
C) Vacuum manhole sump as required

Step 3

Replace all caps, lids and covers, record observations and actions.

Step 4

Inspect & clean catch basins and manholes upstream of the StormTech system.



Sample Maintenance Log

Date	Stadia Rod Readings		Sediment Depth (1)–(2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/11	6.3 ft	none		New installation. Fixed point is CI frame at grade	DJM
9/24/11		6.2	0.1 ft	Some grit felt	SM
6/20/13		5.8	0.5 ft	Mucky feel, debris visible in manhole and in Isolator Row Plus, maintenance due	NV
7/7/13	6.3 ft		0	System jetted and vacuumed	DJM

adspipe.com

800-821-6710

Trench Hydraulic Calculation for ACO Drainage Systems

ACO Technical Services

Project Details

Date: 2024-09-11

Project Name : LANSDOWNE EC
Project Number : 924-279
Street Address, City :
State zip code : Ottawa

Customer

Company :
Contact Name :
Street Address, City :
State zip code :
Phone :
Email :

Input Data

Location : Ottawa

Number	Catchment Description	Area [m²]	C	D [min]	F [a]	I [mm/hr]	Catchment Surface Type	Installation
1	CB02 to TD1	1150.0	0.36	0	0	71		
2	CB03 to TD2	545.0	0.90	0	0	355		
3	CB05 to TD3	2420.0	0.39	0	0	160		
4	CB06 to TD4	3190.0	0.56	0	0	110		
5	CB07 to TD5	1840.0	0.29	0	0	50		
6	CB08 to TD6	2500.0	0.26	0	0	35		

Channel type	Catchment (s)	Catchment Area [m²]	C_m	Total run length [m]	Application
TD1	1	1150.00	0.36	16.00	
TD2	2	545.00	0.90	13.50	
TD3	3	2420.00	0.39	12.50	
TD4	4	3190.00	0.56	21.50	
TD5	5	1840.00	0.29	22.00	
TD6	6	2500.00	0.26	25.00	

Notes

ACO Systems Ltd.
2910 Brighton Rd
L6H 5S3 Oakville

Prepared By : K. Parmar
Phone :
Email : kalpit.parmar@aco.com
Website :

Trench Hydraulic Calculation for ACO Drainage Systems

ACO Technical Services

Project Details

Date: 2024-09-11

Project Name	: LANSDOWNE EC
Project Number	: 924-279
Street Address, City	:
State zip code	: Ottawa

Input

Channel type		: TD1
Trench drain system		: ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout		:
Roughness Coefficient (Strickler) inverse Mannings		: 95
Invert Type		: Neutral Depth
Type of Outlet		: sump unit-DN/OD110
Run Length	[m]	: 16.00
Catchment Area	[m²]	: 1150
Runoff Coefficient	[C_m]	: 0.36
Hydraulic run length	[m]	: 16.00

All run segments combine to give the total run lenth.

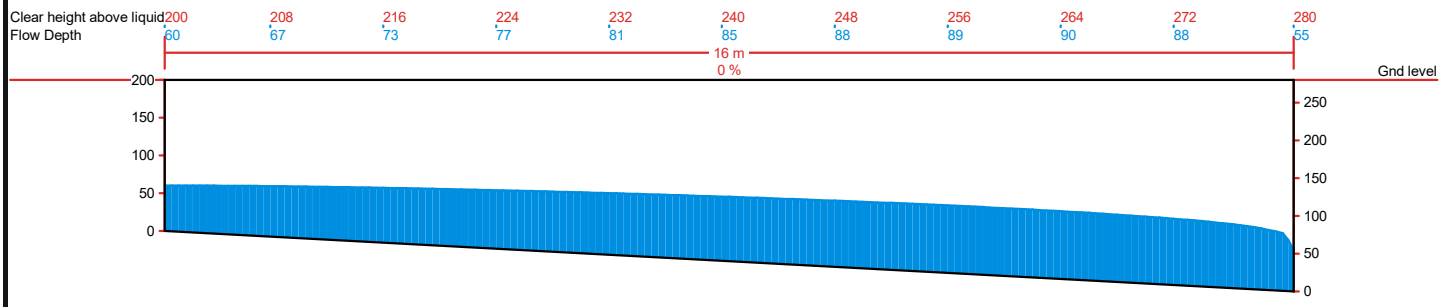
Section		1	2	3	4	5	6	7	8	9	10
Internal Width	[mm]	200									
Upstream Invert	[mm]	200									
Downstream Invert	[mm]	280									
Run Length	[m]	16									
Groundslope	[%]	0.000									

Results

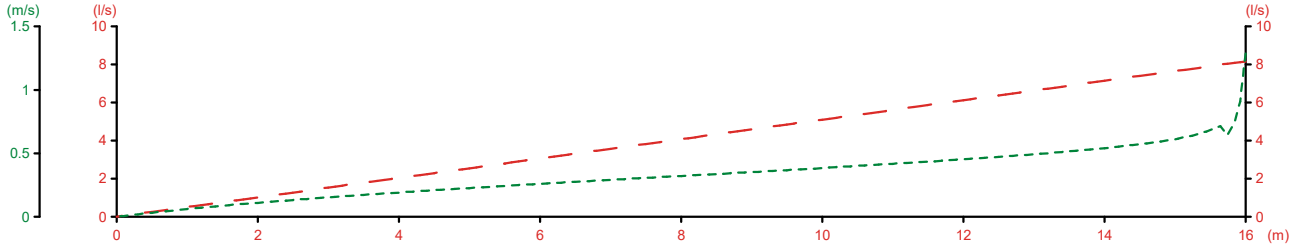
Discharge	[l/s]	: 8.16	
Flow Velocity	[m/s]	: 1.29	
Minimum Freeboard	[mm]	: 139.87, X = 0.00 m	(Freeboard Depth)
Drain Capacity Utilised	[%]	: 25.47	

Level of liquid

All depths are in mm



Flow Velocity and Flow Rate



Flow Velocity (m/s) — — — — Flow Rate (l/s)

Trench Hydraulic Calculation for ACO Drainage Systems

ACO Technical Services

Project Details

Project Name		: LANSDOWNE EC
Project Number		: 924-279
Street Address, City		:
State zip code		: Ottawa

Channel type		: TD1
Trench drain system		: ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout		:
Type of Outlet		: sump unit-DN/OD110
Run Length	[m]	: 16.00
Hydraulic run length	[m]	: 16.00

Notes

Installation

Legend
LC = Load Class according to EN1433 (A15; B125; C250; D400; E600; F900)
SU = Catch Basin
AU = Access Unit
VO = Vertical Outlet
FO = Free Outflow
EO = End Outlet
LO = Lateral Outlet
A = Adapter
P = Plate

Trench Hydraulic Calculation for ACO Drainage Systems

ACO Technical Services

Project Details

Date: 2024-09-11

Project Name	: LANSDOWNE EC
Project Number	: 924-279
Street Address, City	:
State zip code	: Ottawa

Input

Channel type		: TD2
Trench drain system		: ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout		:
Roughness Coefficient (Strickler) inverse Mannings		: 95
Invert Type		: Neutral Depth
Type of Outlet		: sump unit-DN/OD110
Run Length	[m]	: 13.50
Catchment Area	[m²]	: 545
Runoff Coefficient	[C_m]	: 0.90
Hydraulic run length	[m]	: 13.50

All run segments combine to give the total run lenth.

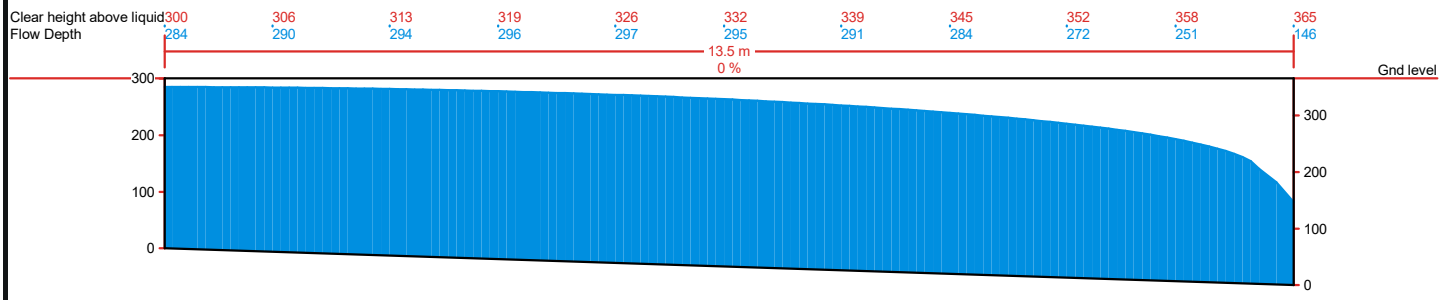
Section		1	2	3	4	5	6	7	8	9	10
Internal Width	[mm]	200									
Upstream Invert	[mm]	300									
Downstream Invert	[mm]	365									
Run Length	[m]	14									
Groundslope	[%]	0.000									

Results

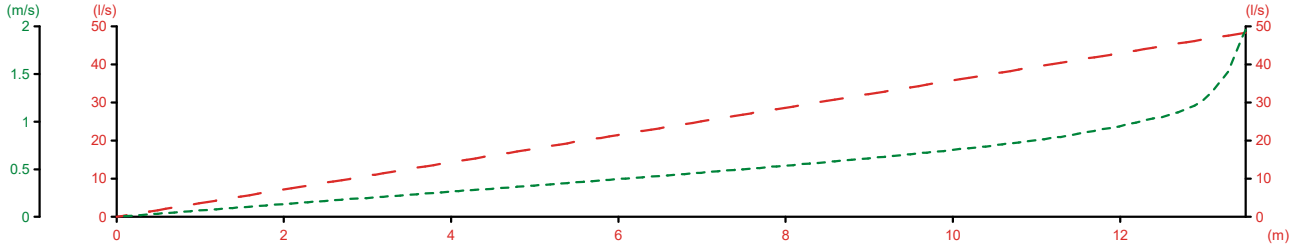
Discharge	[l/s]	: 48.37	
Flow Velocity	[m/s]	: 1.96	
Minimum Freeboard	[mm]	: 15.68, X = 0.00 m	(Freeboard Depth)
Drain Capacity Utilised	[%]	: 94.01	

Level of liquid

All depths are in mm



Flow Velocity and Flow Rate



Trench Hydraulic Calculation for ACO Drainage Systems
ACO Technical Services

Project Details

Project Name		: LANSDOWNE EC
Project Number		: 924-279
Street Address, City		:
State zip code		: Ottawa

Channel type		: TD2
Trench drain system		: ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout		:
Type of Outlet		: sump unit-DN/OD110
Run Length	[m]	: 13.50
Hydraulic run length	[m]	: 13.50

Notes

Installation

Legend
LC = Load Class according to EN1433 (A15; B125; C250; D400; E600; F900)
SU = Catch Basin
AU = Access Unit
VO = Vertical Outlet
FO = Free Outflow
EO = End Outlet
LO = Lateral Outlet
A = Adapter
P = Plate

Trench Hydraulic Calculation for ACO Drainage Systems

ACO Technical Services

Project Details

Date: 2024-09-11

Project Name	: LANSDOWNE EC
Project Number	: 924-279
Street Address, City	:
State zip code	: Ottawa

Input

Channel type		: TD3
Trench drain system		: ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout		:
Roughness Coefficient (Strickler) inverse Mannings		: 95
Invert Type		: Neutral Depth
Type of Outlet		: sump unit-DN/OD110
Run Length	[m]	: 12.50
Catchment Area	[m²]	: 2420
Runoff Coefficient	[C_m]	: 0.39
Hydraulic run length	[m]	: 12.50

All run segments combine to give the total run lenth.

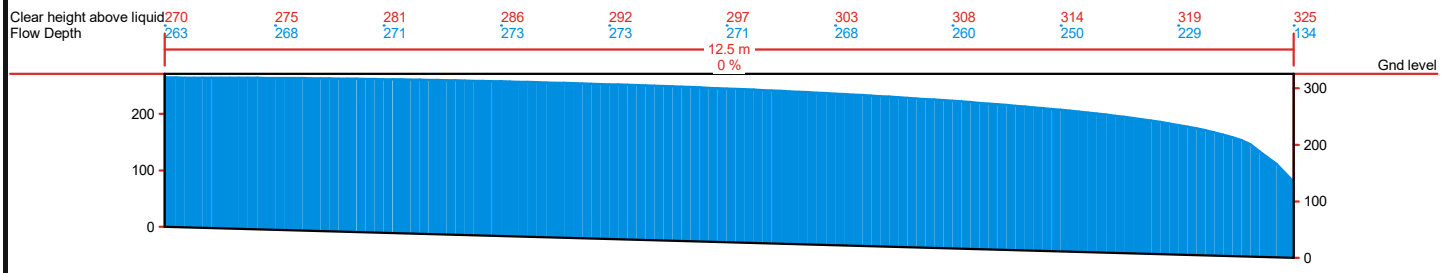
Section		1	2	3	4	5	6	7	8	9	10
Internal Width	[mm]	200									
Upstream Invert	[mm]	270									
Downstream Invert	[mm]	325									
Run Length	[m]	13									
Groundslope	[%]	0.000									

Results

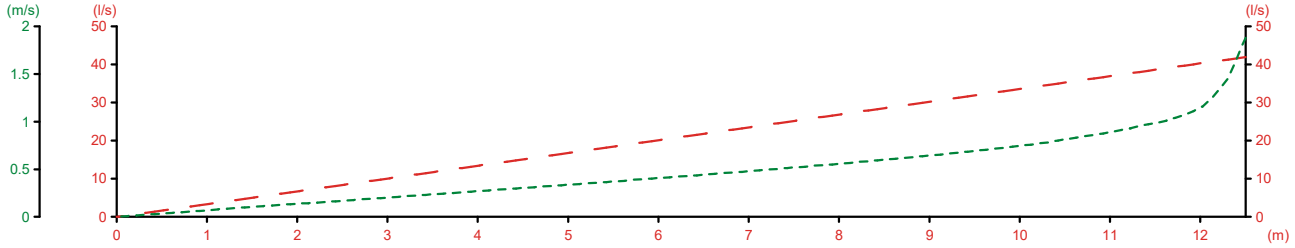
Discharge	[l/s]	: 41.95	
Flow Velocity	[m/s]	: 1.88	
Minimum Freeboard	[mm]	: 6.76, X = 0.00 m	(Freeboard Depth)
Drain Capacity Utilised	[%]	: 97.94	

Level of liquid

All depths are in mm



Flow Velocity and Flow Rate



Trench Hydraulic Calculation for ACO Drainage Systems
ACO Technical Services

Project Details

Project Name		: LANSDOWNE EC
Project Number		: 924-279
Street Address, City		:
State zip code		: Ottawa

Channel type		: TD3
Trench drain system		: ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout		:
Type of Outlet		: sump unit-DN/OD110
Run Length	[m]	: 12.50
Hydraulic run length	[m]	: 12.50

Notes

Installation

Legend
LC = Load Class according to EN1433 (A15; B125; C250; D400; E600; F900)
SU = Catch Basin
AU = Access Unit
VO = Vertical Outlet
FO = Free Outflow
EO = End Outlet
LO = Lateral Outlet
A = Adapter
P = Plate

Trench Hydraulic Calculation for ACO Drainage Systems
ACO Technical Services

Project Details

Date: 2024-09-11

Project Name : LANSDOWNE EC
Project Number : 924-279
Street Address, City :
State zip code : Ottawa

Input

Channel type		: TD4
Trench drain system		: ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout		:
Roughness Coefficient (Strickler) inverse Mannings		: 95
Invert Type		: Neutral Depth
Type of Outlet		: sump unit-DN/OD110
Run Length	[m]	: 21.50
Catchment Area	[m²]	: 3190
Runoff Coefficient	[C_m]	: 0.56
Hydraulic run length	[m]	: 21.50

All run segments combine to give the total run lenth.

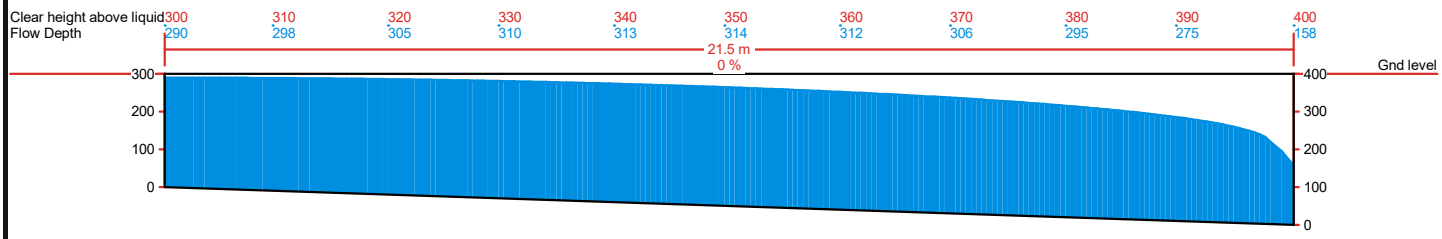
Section		1	2	3	4	5	6	7	8	9	10
Internal Width	[mm]	200									
Upstream Invert	[mm]	300									
Downstream Invert	[mm]	400									
Run Length	[m]	22									
Groundslope	[%]	0.000									

Results

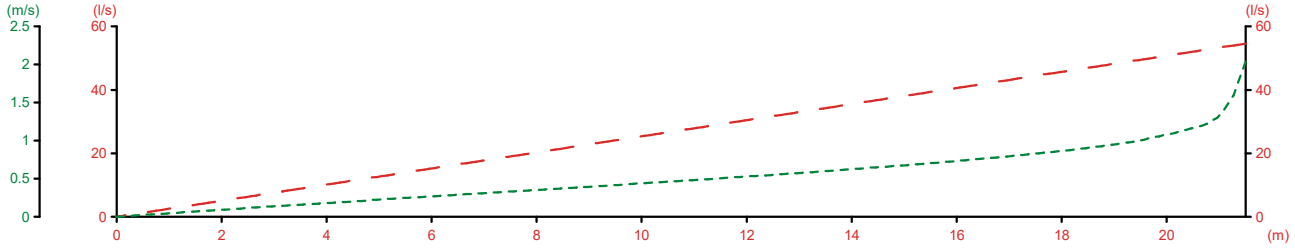
Discharge	[l/s]	: 54.58	
Flow Velocity	[m/s]	: 2.04	
Minimum Freeboard	[mm]	: 10.39, X = 0.00 m	(Freeboard Depth)
Drain Capacity Utilised	[%]	: 96.59	

Level of liquid

All depths are in mm



Flow Velocity and Flow Rate



Trench Hydraulic Calculation for ACO Drainage Systems
ACO Technical Services

Project Details

Project Name		: LANSDOWNE EC
Project Number		: 924-279
Street Address, City		:
State zip code		: Ottawa

Channel type		: TD4
Trench drain system		: ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout		:
Type of Outlet		: sump unit-DN/OD110
Run Length	[m]	: 21.50
Hydraulic run length	[m]	: 21.50

Notes

Installation

Legend
LC = Load Class according to EN1433 (A15; B125; C250; D400; E600; F900)
SU = Catch Basin
AU = Access Unit
VO = Vertical Outlet
FO = Free Outflow
EO = End Outlet
LO = Lateral Outlet
A = Adapter
P = Plate

Trench Hydraulic Calculation for ACO Drainage Systems

ACO Technical Services

Project Details

Date: 2024-09-11

Project Name	: LANSDOWNE EC
Project Number	: 924-279
Street Address, City	:
State zip code	: Ottawa

Input

Channel type		: TD5
Trench drain system		: ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout		:
Roughness Coefficient (Strickler) inverse Mannings		: 95
Invert Type		: Neutral Depth
Type of Outlet		: sump unit-DN/OD110
Run Length	[m]	: 22.00
Catchment Area	[m²]	: 1840
Runoff Coefficient	[C_m]	: 0.29
Hydraulic run length	[m]	: 22.00

All run segments combine to give the total run lenth.

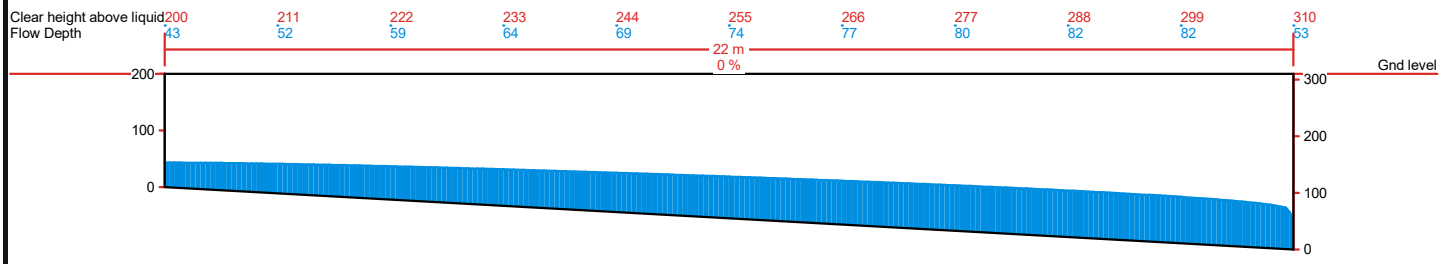
Section		1	2	3	4	5	6	7	8	9	10
Internal Width	[mm]	200									
Upstream Invert	[mm]	200									
Downstream Invert	[mm]	310									
Run Length	[m]	22									
Groundslope	[%]	0.000									

Results

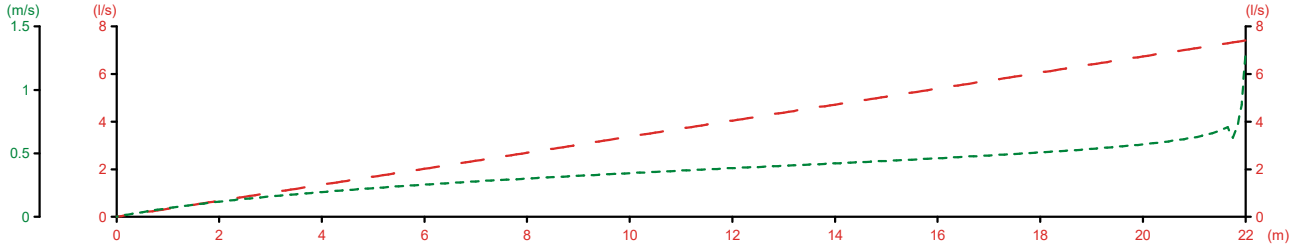
Discharge	[l/s]	: 7.41	
Flow Velocity	[m/s]	: 1.27	
Minimum Freeboard	[mm]	: 156.84, X = 0.00 m	(Freeboard Depth)
Drain Capacity Utilised	[%]	: 20.59	

Level of liquid

All depths are in mm



Flow Velocity and Flow Rate



Trench Hydraulic Calculation for ACO Drainage Systems

ACO Technical Services

Project Details

Project Name	: LANSDOWNE EC
Project Number	: 924-279
Street Address, City	:
State zip code	: Ottawa

Channel type		: TD5
Trench drain system		: ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout		:
Type of Outlet		: sump unit-DN/OD110
Run Length	[m]	: 22.00
Hydraulic run length	[m]	: 22.00

Notes

Installation

Legend
LC = Load Class according to EN1433 (A15; B125; C250; D400; E600; F900)
SU = Catch Basin
AU = Access Unit
VO = Vertical Outlet
FO = Free Outflow
EO = End Outlet
LO = Lateral Outlet
A = Adapter
P = Plate

Trench Hydraulic Calculation for ACO Drainage Systems

ACO Technical Services

Project Details

Date: 2024-09-11

Project Name	: LANSDOWNE EC
Project Number	: 924-279
Street Address, City	:
State zip code	: Ottawa

Input

Channel type		: TD6
Trench drain system		: ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout		:
Roughness Coefficient (Strickler) inverse Mannings		: 95
Invert Type		: Neutral Depth
Type of Outlet		: sump unit-DN/OD110
Run Length	[m]	: 25.00
Catchment Area	[m²]	: 2500
Runoff Coefficient	[C_m]	: 0.26
Hydraulic run length	[m]	: 25.00

All run segments combine to give the total run lenth.

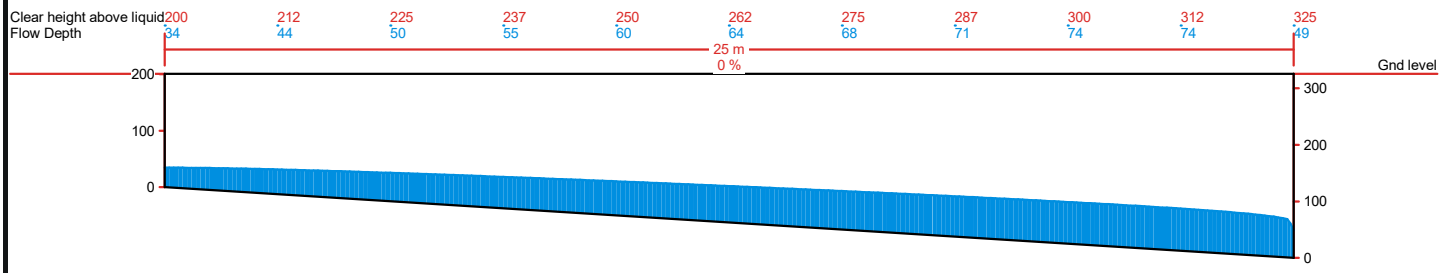
Section		1	2	3	4	5	6	7	8	9	10
Internal Width	[mm]	200									
Upstream Invert	[mm]	200									
Downstream Invert	[mm]	325									
Run Length	[m]	25									
Groundslope	[%]	0.000									

Results

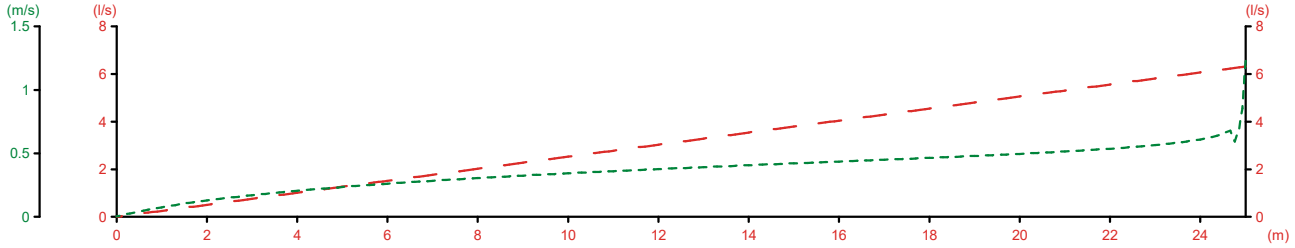
Discharge	[l/s]	: 6.32	
Flow Velocity	[m/s]	: 1.23	
Minimum Freeboard	[mm]	: 165.77, X = 0.00 m	(Freeboard Depth)
Drain Capacity Utilised	[%]	: 16.61	

Level of liquid

All depths are in mm



Flow Velocity and Flow Rate



Trench Hydraulic Calculation for ACO Drainage Systems

ACO Technical Services

Project Details

Project Name		: LANSDOWNE EC
Project Number		: 924-279
Street Address, City		:
State zip code		: Ottawa

Channel type		: TD6
Trench drain system		: ACO DRAIN PowerDrain - S200K
Sloping, Neutral or Combination layout		:
Type of Outlet		: sump unit-DN/OD110
Run Length	[m]	: 25.00
Hydraulic run length	[m]	: 25.00

Notes

Installation

Legend
LC = Load Class according to EN1433 (A15; B125; C250; D400; E600; F900)
SU = Catch Basin
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FO = Free Outflow
EO = End Outlet
LO = Lateral Outlet
A = Adapter
P = Plate