Robinson
Land Development

4101 Limebank Road, Ottawa, ON
Light Industrial Development
Servicing and Stormwater Management Report

Prepared For:

Groupe Montoni

Prepared By:

Robinson Land Development

Project No. 23074
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LEGAL NOTIFICATION

This report was prepared by Robinson Land Development for the account of **Groupe Montoni**.

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

1.0 INTRODUCTION

Robinson Land Development has been retained by Groupe Montoni to prepare a Site Servicing & Stormwater Management Report in support of a Zoning By-Law Amendment and Site Plan Application for a proposed light industrial (offices and warehousing) development located at 4101 Limebank Road in Ottawa, Ontario.

The Owner proposes to develop two categories of buildings: two buildings with multiple smaller industrial/office units (total approximate footprint 6,000 m^2 and 4,000 m^2); and three buildings each with three large warehousing units (total approximate footprint 16,600 m^2, 17,300 m^2 and 16,400 m^2). The buildings and site will be complete with parking and loading docks, driving aisles, sidewalks, landscaping, and stormwater management pond. Refer to architectural site plan provided in **Appendix A** for reference.

The undeveloped 15.12 ha site is zoned Industrial and Logistics (IL). The property has open agricultural fields to the north and east, urbanized Limebank Road to the west, and stormwater management Pond 3 to the south which currently services the roadway portion of Limebank Road ROW. The future Leitrim Road ROW realignment will include a portion of the subject property between Pond 3 and the development site.

This report will detail the proposed means of servicing the site for potable water and sanitary service and provide details on how to meet the stormwater management requirements within the interior of the site. The validation of the offsite servicing criteria is detailed in a separate report titled **Scoped Master Servicing Study** by Robinson Land Development dated September 2026, upon which this report will reference.

2.0 EXISTING CONDITIONS

The following civil infrastructure exists adjacent to the site:

- 300 mm dia. PVC watermain on Limebank Road from Spratt Road stubbed near north end of the site.
    - An existing valved 300 mm water service located approximately 80 m north of the realigned Leitrim Road will be one of two connections to service the site.
    - Twinning of the 300 mm dia. watermain on Limebank Road from Spratt Road to realigned Leitrim Road is currently under development by Riverside South Development Corp. (RSDC)
- 375 mm dia. concrete sanitary sewer along Limebank Road, flowing south to Spratt Road.
- 450-1200 mm dia. concrete storm sewers along Limebank Road, discharging to the stormwater Pond #3 immediately south of the site.
    - The pond is designed for the roadway of Limebank Road, but is currently under design for expansion by RSDC to service additional lands (not including the subject site)
- Drainage ditches currently exist along the south, middle, and north edge of the site draining from east to west to the Limebank Road ditch.
- The Limebank Road ditches drain southwards along the frontage of the site, discharging to Tributary 3 of Mosquito Creek (bypassing Pond 3).
- There is an 18 m wide easement in favour of Trans Northern Pipelines (TNPI) that runs diagonally through the southwestern corner of the site. There are two gas lines that run through the easement, an active 324 mm dia. pipeline and an abandoned 219 mm dia. pipeline. The servicing and grading design will ensure the minimum offsets from the pipelines are met in accordance with the TNPI Crossing Guidelines. Crossing

approvals will be needed from TNPI, which can only be applied for at the time of construction.

Refer to received survey in **Appendix A** for more details.

3.0 DEVELOPMENT PROPOSAL

The Owner proposes to develop two categories of buildings: two buildings with multiple smaller industrial/office units (total approximate footprint 6,000 m^2 and 4,000 m^2); and three buildings each with three large warehousing units (total approximate footprint 16,600 m^2, 17,300 m^2 and 16,400 m^2). The buildings and site will be complete with parking and loading docks, driving aisles, sidewalks, landscaping, and stormwater management pond.

Access to the site includes one connection from Limebank Road and two locations from the realigned Leitrim Road. The Limebank Road connection is a right in/right out entrance in the northwest corner of the property approximately 220 m north of the realigned Leitrim Road. The first realigned Leitrim Road access location will be located approximately 230 m east of Limebank Road. The realigned Leitrim Road cross section for this section of new road will be constructed as a semi-rural cross-section with a 7 m wide asphalt roadway surface, with curb and sidewalk for pedestrian access and a ditch along the north side, and a gravel shoulder to the existing ditch along the south. This semi-rural cross-section mirrors the current cross-section of realigned Leitrim Road (called Mosquito Drive) in 3700 Twin Falls industrial subdivision located on the west side of Limebank Road from the subject site. The third access location to the site is provided at the southeast corner of the site, however it will only be constructed and opened when warranted by future development of realigned Leitrim Road. Refer to architectural site plan provided in **Appendix A** for reference.

It should be noted that the right in/right out entrance at Limebank Road will be designed under a separate Road Modification Approval application. However, the addition of a turn lane is anticipated to push the Limebank Road ditch eastwards into the property. Therefore, the grading design has anticipated and allowed for this realignment of the ditch.

The proposed development will include a looped water service, sanitary service, and storm infrastructure per City requirements. The proposed civil design drawings are provided in **Appendix B** including:

- Existing Conditions & Removals Plan
- Servicing Plans
- Grading Plans
- Notes & Details Plans
- Erosion & Sediment Control Plan
- Storm Drainage Area Plan
- Sanitary Drainage Area Plan

4.0 WATER SERVICING

4.1 Design Criteria

The watermain system has been designed according to the following standards, guidelines and background documents:

- Ottawa Design Guidelines – Water Distribution (2026) periodically amended as part of Technical Bulletins
- Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection (2020)
- MECP Design Guidelines for Drinking-Water Systems (2008)

- Riverside South Community Infrastructure Servicing Study Update Phase 1, Mosquito Creek Study Area by IBI Group (August 2023)

Accordingly, the following watermain design criteria have been utilized for the subject site:

- Employee Demand: 137 L/cap/d (per ISSU)
- Commercial Peaking Factor: 1.5 Max Day; 1.8 Peak Hour
- Minimum Pressure During Peak Hour 276 kPa (40 psi)
- Minimum Pressure During Maximum Day Plus Fire 140 kPa (20 psi)
- Maximum Pressure in Unoccupied Areas 689 kPa (100 psi)
- Maximum Pressure in Occupied Areas 552 kPa (80 psi)

Refer also to the Scoped Master Servicing Study under separate cover for details related to the offsite servicing requirements.

4.2 Proposed Design

The subject site will receive water supply by connecting to the existing 300 mm dia. service off Limebank Road and a new 250 mm service on the realigned Leitrim Road. A 300 mm dia. watermain will be constructed along realigned Leitrim Road east from Limebank Road approximately 240 m to the site access location, capped for future extension of realigned Leitrim Road. A twin of the 300 mm dia. watermain along Limebank Road is currently under development by RSDC from Spratt Road to the 3700 Twin Falls subdivision and its existence is assumed for this report. The proposed development will include an internally looped 250 mm dia. watermain complete with private hydrants and 150 mm dia. building services. Refer to the servicing plans in **Appendix B** for details.

4.3 Boundary Conditions & Demands

The boundary conditions are taken from the modeling results of the Scoped Master Servicing Study for the twinned watermains along Limebank Road up to the two connection points of the site. The model was run for the current 2C pressure zone configuration and future SUC pressure zone reconfiguration (earliest anticipation for reconfiguration is 2026). Refer to **Appendix C** for proposed domestic and fire demand calculations. The demands and boundary conditions have been summarized in the table below:

Table 1 – Water Demands & Boundary Conditions

Current PZ Demand Scenario	Demand (L/s)	HGL @ Limebank Connection (m)	HGL @ Leitrim Connection (m)
Average Day	1.28 L/s	130.54	130.54
Peak Hour	3.47 L/s	124.24	124.23
Max Day + Fire (12,000 L/min)	201.93 L/s	118.56	117.52
Future SUC Reconfiguration Demand Scenario	**Demand (L/s)**	**HGL @ Limebank Connection (m)**	**HGL @ Leitrim Connection (m)**
Average Day	1.28 L/s	147.04	147.04
Peak Hour	3.47 L/s	144.29	144.28
Max Day + Fire (12,000 L/min)	201.93 L/s	138.31	137.27

It should be noted that the domestic demands used in the Scoped Master Servicing Study were based on gross area which were far greater than the per capita demand estimates, and included the ultimate buildout of the Twin Falls subdivision. Therefore, the boundary conditions used for the internal site water model are considered conservative.

4.3 Fire Protection

The nearest existing hydrant is along the east side of Limebank Road, beside the property, approximately 120 m north of realigned Leitrim Road. Therefore, private hydrants are proposed within the site to provide coverage. Each building will be sprinklered therefore the proposed hydrants will be located within 45m of each buildings' fire department connection. Refer to Hydrant Coverage Plan in **Appendix C** for details.

The required fire flow for the subject site was calculated using the Fire Underwriter's Survey (FUS) long form (refer to **Appendix C**). Based on the anticipated building construction, occupancy and ground floor area, the minimum fire demand is 8,000 L/min (133 L/s) at Building A2 and the maximum fire demand is 12,000 L/min (200 L/s) at Building C3.

4.4 Hydraulic Model Results

The hydraulic model results for Average Day, Peak Hour and Max Day + Fire have been calculated and summarized in **Table 2** below. The fire demand scenario was rendered for the hydrants nearest a sprinklered building and its associated fire demand split between the hydrants (maximum 5,700 L/min assigned to each hydrant per Technical Bulletin ISTB-2018-02). The resultant pressures are measured at ground elevation.

Table 2 – Hydraulic Model Results

Current Pressure Zone Scenario	Max Fire Demand (L/min)	Min. System Pressure	Max. System Pressure	Allowable Pressure Range
Avg Day	-	361 kPa (52.3 psi)	398 kPa (57.7 psi)	276-552 kPa (40 – 80 psi)
Peak Hour	-	299 kPa (43.4 psi)	336 kPa (48.7 psi)	276-552 kPa (40 – 80 psi)
Max Day + Fire (Hyd 2 & 3 - Bldg A1 or B1)	10,000	198 kPa (28.7 psi)	-	>140 kPa (>20 psi)
Max Day + Fire (Hyd 1 & 2 - Bldg A2, B2 or B3)	11,000	191 kPa (27.7 psi)	-	>140 kPa (>20 psi)
Max Day + Fire (Hyd 5 & 6 - Bldg C1 or C2)	10,000	193 kPa (27.9 psi)	-	>140 kPa (>20 psi)
Max Day + Fire (Hyd 4, 5 & 6 - Bldg C3)	12,000	186 kPa (27.0 psi)	-	>140 kPa (>20 psi)
Max Day + Fire (Hyd 4, 5 & 7 - Bldg C3)	12,000	182 kPa (26.3 psi)	-	>140 kPa (>20 psi)
Max Day + Fire (Hyd 7, 8 & 9 – Bldg D1, D2, or D3)	11,000	146 kPa (21.2 psi)	-	>140 kPa (>20 psi)
Future SUC Pressure Zone Scenario	**Max Fire Demand (L/min)**	**Min. System Pressure**	**Max. System Pressure**	**Allowable Pressure Range**
Avg Day	-	523 kPa (75.9 psi)	559 kPa (81.1 psi)	276-552 kPa

				(40 – 80 psi)
Peak Hour	-	496 kPa (71.9 psi)	532 kPa (77.2 psi)	276-552 kPa (40 – 80 psi)
Max Day + Fire (Hyd 2 & 3 - Bldg A1 or B1)	10,000	392 kPa (56.8 psi)	-	>140 kPa (>20 psi)
Max Day + Fire (Hyd 1 & 2 - Bldg A2, B2 or B3)	11,000	385 kPa (55.8 psi)	-	>140 kPa (>20 psi)
Max Day + Fire (Hyd 5 & 6 - Bldg C1 or C2)	10,000	386 kPa (56.0 psi)	-	>140 kPa (>20 psi)
Max Day + Fire (Hyd 4, 5 & 6 - Bldg C3)	12,000	380 kPa (55.1 psi)	-	>140 kPa (>20 psi)
Max Day + Fire (Hyd 4, 5 & 7 - Bldg C3)	12,000	375 kPa (54.4 psi)	-	>140 kPa (>20 psi)
Max Day + Fire (Hyd 7, 8 & 9 – Bldg D1, D2 or D3)	11,000	340 kPa (49.3 psi)	-	>140 kPa (>20 psi)

As indicated in **Table 2** above, the subject site can be adequately serviced for both domestic and fire demands. Under the future pressure zone scenario the average day demand is noted as slightly exceeding the maximum pressure within the private system, however at the building services themselves the pressure is anticipated to be below the maximum pressure. The need for a pressure reducing valve in the buildings will be validated with the Mechanical Engineer during detailed design, however it should not be anticipated. Refer to the hydraulic model outputs provided in **Appendix C** for details.

5.0 SANITARY SERVICING

5.1 Design Criteria

The sanitary sewer system has been designed according to the following standards, guidelines, and background documents:

- Ottawa Sewer Design Guidelines (2025) periodically amended as part of Technical Bulletins
- MECP Design Guidelines for Sewage Works (2008)
- Riverside South Community Infrastructure Servicing Study Update Phase 1, Mosquito Creek Study Area by IBI Group (August 2023)

Accordingly, the following design parameters have been implemented for the subject site:

- Employee Demand: 137 L/cap/d (per ISSU)
- Peaking Factor: 1.0 (for land use >20% area)
- Infiltration Allowance: 0.33 L/s/ha
- Pipe Velocity: 0.60-3.0 m/s

Refer also to the Scoped Master Servicing Study under separate cover for details related to the offsite servicing requirements.

5.2 Proposed Design

Sanitary flows from the site will discharge to the 375 mm dia. sanitary sewer on Limebank Road. A 375 mm dia. sewer will be extended along realigned Leitrim Road to service the site and future upstream flows. A network of 250 mm dia. sewers will collect sanitary discharge from each building, with a final monitoring maintenance hole near the property line at the

southwestern site entrance prior to discharging to the proposed 375 mm dia. sewer on realigned Leitrim Road. All proposed sanitary sewers have been designed to have capacities to convey the peak design flows and meet minimum full flow velocities. Refer to the servicing plans in **Appendix B** and the sanitary sewer design sheet in **Appendix D** for details.

6.0 STORM SERVICING

6.1 Design Criteria

The storm sewer system has been designed according to the following standards, guidelines, and background documents:

- Ottawa Sewer Design Guidelines (2025) periodically amended as part of Technical Bulletins
- MECP Stormwater Management Planning and Design Manual (2003)
- Riverside South Community Master Drainage Plan Update, Mosquito Creek Study Area by IBI Group (April 2021)
- Riverside South Community Infrastructure Servicing Study Update Phase 1, Mosquito Creek Study Area by IBI Group (August 2023)

Further, the Scoped Master Servicing Study for the subject site (under separate cover) proposed and validated site-specific stormwater management criteria in coordination with the City's Engineering Reviewer. Accordingly, the following design parameters have been implemented for the subject site:

- Peak Flow Control: Post- to pre-development from 2yr to 100yr storm
- Quality Control: Enhanced (80% TSS reduction)
- Ponding: No ponding during 2-yr, max. 350mm ponding depth
- Max. Drawdown Time: 48 hrs (per Airport requirements)
- Overflow: Min. 300mm below local building openings
- Pond Overflow: Min. 300mm above 100yr elevation
- Infiltration: N/A
- Pipe Velocity: 0.80-3.0 m/s

Note that the peak flow control of the site was validated in the Scoped Master Servicing Study under separate cover as comparisons of the pre-development to post-development flows were in the context of the larger drainage area of the receiving Tributary 3 of Mosquito Creek.

6.2 Proposed Design

Stormwater runoff from the subject site will be collected to a private stormwater management dry pond in the southwest corner of the site and discharge via a 600 mm dia. storm sewer to the Limebank Road ditch, which shortly downstream discharges to Mosquito Creek Tributary 3. Per the Geotechnical Investigation by EXP dated November 2024, there is a 1.0 m grade raise restriction across the site. Further, there are very explicit and strict crossing requirements for the TNPI gas mains that cross the site. The combination of these two strict requirements, as well as downstream crossings restrictions, meant the stormwater management pond has a specific resultant base elevation. Because of this the proposed pond is lower than the Limebank Road ditch fronting the site, and the pond must discharge to the ditch further downstream where grades permit. With the Pond 3 under expansion, the design may impact the alignment of the Limebank Road ditch and Tributary 3. Therefore, once further information is available on the Pond 3 expansion, the proposed 600 mm dia. storm sewer outlet will be re-evaluated and re-confirmed for exact placement.

The existing ditch along Limebank Road ROW will be maintained, though anticipated to shift with the RMA as described above. Likewise, the existing ditch lines along the north and south side of the property will be maintained and with minor regrading to even out the slopes. A ditch

will be provided along the northside of realigned Leitrim Road tying into the existing Limebank Road ditch.

Refer to the servicing and grading plans in **Appendix B** for details.

6.2 Minor System

The site stormwater is split into two systems defined by their discharge location. The west portion of the site (around Buildings A1 and A2) is collected and drains at the north end of the proposed dry pond. The east portion of the site (around Buildings B, C and D) is collected and drains at the east end of the proposed dry pond. Prior to discharging to the dry pond, oil grit separators will provide initial quality control. The pond is complete with a customized outlet structure maintenance hole outfitted with a 150 mm dia. orifice at the base for minor storms and a stepped weir for major storms. The orifice and weir sizing and elevations have been designed to control peak discharge rates to below pre-development levels. The pond will discharge to a 600 mm dia. storm sewer that discharges to the Limebank Road ditch which shortly downstream discharges to Mosquito Creek Tributary 3.

Each building will be outfitted with controlled roof drains and roof storage. A typical maximum 40 L/s/ha total roof drain discharge rate has been utilized for design purposes. The roof storage is assumed at maximum 150 mm in depth. Accordingly, maximum drawdown time of the roof storage is less than 3 hrs up to the 100yr storm.

The storm sewers have been sized to allow free flow (no ponding) during 2yr storm based on the controlled flow rates from the building roofs. Due to limitations crossing the TNPI gas mains, the culverts to the pond from the east portion of the site cannot freely flow during the 2-yr storm. However, based on an estimated depth of flow in the ditch of <0.70 m during the 2yr storm this constraint in the east inlet culvert/ditch system will not backup the 975 mm dia. storm sewer upstream. Further, in-line check valves are proposed in the storm sewers prior to discharge to the respective inlet ditches of the dry pond to avoid any storage volume from the pond backflowing into the system, most notably impacting the oil grit separators.

Realigned Leitrim Road, proposed as a semi-rural cross-section, will be developed with curb-inlet catch basins to drain the urbanized north side. The catch basin leads are calculated to free flow from the 2yr up to 100yr storm. The northside ditch will be developed with 700 mm dia. culverts crossing the site entrance and the TNPI gas mains. The Limebank Road ditch at the realigned Leitrim Road intersection will be provided with a 1300 mm dia. culvert to maintain pre-development flows.

Refer to the storm sewer design sheets and culvert sizing sheets in **Appendix E** for details of the calculations and the Storm Area Drainage Plan in **Appendix B** for reference.

6.3 Major System

The major system flows of the site involve ponding in the respective drainage areas from sawtooth grading. The individual drainage areas will cascade overland to the dry pond. The individual drainage areas are limited to a maximum 350 mm ponding, and the local overflow elevations are minimum 300 mm below the nearby building entrances. Quantity storage is provided by the building roofs, and ultimately in the dry pond. Emergency spillover is provided in the pond at elevation 92.20, minimum 300 mm above the 100yr ponding elevation, to the proposed ditch on the northside of realigned Leitrim Road which is connected to the existing Limebank Road ditch to Tributary 3. If this ditch along northside of realigned Leitrim Road becomes blocked, there is further emergency spillover route across realigned Leitrim Toad to the existing ditch line along the south property limit that also ties into the Limebank Road ditch and ultimately Tributary 3.

Refer to the servicing and grading plans in **Appendix B** for details.

6.4 Stormwater Model Results

A PCSWMM model was generated for the development and modelled with an array of design storms. The results of the model are summarized in **Table 3** below with further details of the model provided in **Appendix E**.

Table 3 – PCSWMM Model Results

Design Storm		Max. Pond Storage Volume Used (m3)	Max. Pond Depth (m)	Max. Pond Elevation (m)	Peak Pond Outflow (m^3/s)	Max. Drawdown Time (hrs)
4hr-25mm		2014	0.800	89.85	0.038	33.1
2yr	12hr SCS Type II	3031	1.082	90.13	0.1043	41.0
	24hr SCS Type II	2980	1.069	90.12	0.09897	44.0
	3hr Chicago	2658	0.983	90.03	0.06813	37.8
	6hr Chicago	2848	1.034	90.08	0.08558	39.1
5yr	12hr SCS Type II	3589	1.225	90.28	0.2424	42.4
	24hr SCS Type II	3542	1.213	90.26	0.2205	45.5
	3hr Chicago	3338	1.162	90.21	0.1438	40.1
	6hr Chicago	3490	1.200	90.25	0.1974	41.0
10yr	12hr SCS Type II	3701	1.253	90.30	0.2992	42.8
	24hr SCS Type II	3684	1.249	90.30	0.2900	46.1
	3hr Chicago	3540	1.213	90.26	0.2194	40.7
	6hr Chicago	3644	1.239	90.29	0.2698	41.2
25yr	12hr SCS Type II	3853	1.290	90.34	0.3697	44.0
	24hr SCS Type II	3815	1.281	90.33	0.3554	47.3
	3hr Chicago	3658	1.242	90.29	0.2768	41.9
	6hr Chicago	3726	1.259	90.31	0.3120	42.4
50yr	12hr SCS Type II	4005	1.326	90.38	0.4116	44.4
	24hr SCS Type II	3969	1.318	90.37	0.4056	47.9
	3hr Chicago	3758	1.267	90.32	0.3285	42.6
	6hr Chicago	3816	1.281	90.33	0.3558	43.2
100yr	12hr SCS Type II	4219	1.377	90.43	0.4334	44.6
	24hr SCS Type II	4191	1.370	90.42	0.4312	48.0
	3hr Chicago	3867	1.293	90.34	0.3748	43.1
	6hr Chicago	3943	1.312	90.36	0.3985	43.8

The critical storm is noted as the 12hr SCS Type II, which generated the largest required storage volumes for all storm events. Accordingly, the maximum 100yr pond elevation is calculated as 90.43 m, well below the pond overflow elevation of 92.20 m. Pond drawdown time will not exceed the 48 hr requirement to avoid attraction of birds, per Airport requirements.

6.5 Quality Control

Quality control will be provided by oil-grit separators prior to discharge to the respective ponds sized for approximately 60% TSS reduction at ETV particle size distribution. This is the approximate maximum reduction rate a standard OGS unit can achieve using ETV particle

size distribution. In order to achieve the 80% TSS reduction, additional settlement will be provided within the inlet ditches and dry pond. MECP's Stormwater Management Planning and Design Guideline recommends a maximum 0.15 m/s velocity below which settlement will occur within channels and ponds. The pond, based on the maximum pond depth, will provide maximum velocities of approximately 0.002–0.007 m/s from the 2yr to 100yr design storm. The sizing of the oil-grit separators does not include the building roofs as contributors to sediment loading since building roofs are generally considered "clean" (oils and sediments are mostly generated by vehicles/site activities at grade). In-line check valves are proposed immediately downstream of the OGS units, prior to discharging to the ditch inlets of the pond, so the pond storage volume does not impact the OGS units. Refer to OGS sizing cutsheets and pond velocity calculations in **Appendix E** for more details.

6.5 LID Measures

As noted in the Scoped Master Servicing Study under separate cover, the site is ineligible for infiltration-based LID measures to be considered due to the silty clay soils and elevated groundwater levels across the site (per City of Ottawa Technical Bulletin IWSTB-2024-04). Additional LID measures were considered conceptually to reduce the total runoff volume including vegetated roofs, stormwater reuse, and enhanced grass swales. Ultimately, vegetated roofs and stormwater reuse programs would not provide significant volume reduction while increasing capital and maintenance costs as well as site complexity. Given the site requirements for parking and vehicle travel there is insufficient space for significant lengths of enhanced grass swales within the site apart from the inlets to the dry pond.

7.0 EROSION AND SEDIMENT CONTROL

Prior to construction and until vegetation has been re-established in disturbed areas, erosion and sediment control measures must be implemented to mitigate the impact on receiving watercourses and existing infrastructure. Refer to the Erosion and Sediment Control Plan provided in **Appendix B** for more details.

8.0 APPROVALS

The proposed development is subject to the City of Ottawa's Zoning By-Law Amendment and Site Plan Approval process. Notable stakeholders during the process include Rideau Valley Conservation Authority. Since stormwater quantity and quality are being provided for a light industrial use site Environmental Activity and Sector Registry (EASR) from the Ontario Ministry of Environment, Conservation and Parks (MECP) will also be required.

9.0 CONCLUSIONS

This servicing and stormwater management report has been prepared to support the Zoning By-Law Amendment and Site Plan Application for the development of the property located at 4101 Limebank Road. The report has detailed the proposed means of servicing the site for potable water and sanitary sewer and provided details on how to meet the stormwater management requirements in accordance with City of Ottawa standards and requirements, and overarching studies. The proposed servicing and stormwater management designs will be achieved by implementing the following key features:

- Domestic water supply will be provided by the existing 300 mm dia. service stubbed at the property and a 300 mm dia. extension along realigned Leitrim Rd.
- The site will be internally looped with a 250 mm dia. watermain for redundancy.
- Fire protection will be provided by private hydrants within the site and the buildings will all be sprinklered.

- Sanitary flows will be conveyed to the existing 375 mm dia. sanitary sewer on Limebank Rd. via a 375 mm dia. sewer extension on realigned Leitrim Rd. and 250 mm dia. sewers within the site.
- Stormwater runoff (minor system) will be conveyed by the proposed storm sewer system to a dry pond within the site.
- The dry pond will discharge to the Limebank Rd. eastside ditch, which discharges to Mosquito Creek Tributary 3 shortly thereafter.
- Stormwater runoff for all storm events up to and including the 100-year design storm will be controlled on-site to pre-development rates via modified pond outlet structure.
- On-site storage will be provided for all storm events up to and including the 100-year design storm event via roof storage and the dry pond.
- Emergency overland flows will be conveyed to the Limebank Rd. eastside ditch
- Quality control will be provided by oil-grit separators immediately prior to discharging to the respective pond, with further settlement within the pond.
- Erosion and sediment control measures will be implemented prior to construction and maintained until vegetation has been re-established in disturbed areas.

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Senior Water Resources Engineer
For stormwater modelling

Appendix A

CLIENT:

GROUPE MONTONI

PROJECT NAME:

4101 Limebank Road Site Plan Application

PROJECT ADDRESS:

4101 Limebank Road, Ottawa, ON

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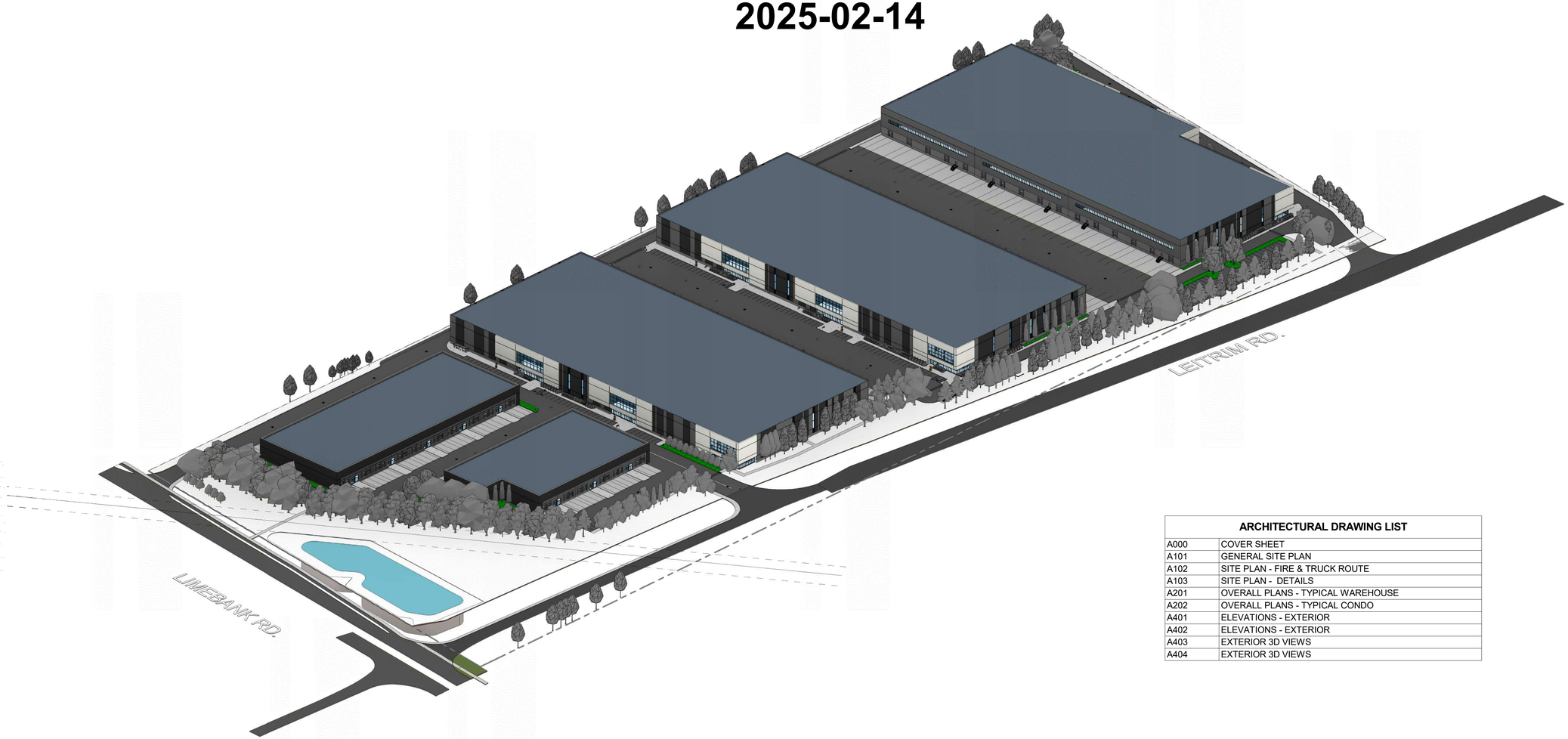
RE-ISSUED FOR SITE PLAN APPROVAL
2025-02-14



3D AXONOMETRIC VIEW
SOUTH-WEST

ARCHITECTURAL DRAWING LIST	
A000	COVER SHEET
A101	GENERAL SITE PLAN
A102	SITE PLAN - FIRE & TRUCK ROUTE
A103	SITE PLAN - DETAILS
A201	OVERALL PLANS - TYPICAL WAREHOUSE
A202	OVERALL PLANS - TYPICAL CONDO
A401	ELEVATIONS - EXTERIOR
A402	ELEVATIONS - EXTERIOR
A403	EXTERIOR 3D VIEWS
A404	EXTERIOR 3D VIEWS

DRAWING NO. **A000**

Planting Schedule

Key	Count	Scientific Name	Common Name	Spacing (mm) (75%)	Size	Native/Non-Native	Comment
Trees - Deciduous							
Ar	4	Acer rubrum	Red Maple	as shown	65mm CAL.	Native	TREES TO BE BALL & BURLAP. SOURCED IN SAME GROWING ZONE. ALL TREES SHOULD HAVE 5 TO 7 MAIN BRANCHES WITH DOMINANT LEADER BRANCH AND WITHOUT DEFECT. MIN ROOT ZONE VOLUME PER TREE: 30 CU. M.
As	19	Acer saccharum 'Columnare'	Columnar Sugar Maple	as shown	50mm CAL.	Native	
Cc	8	Cercis canadensis	Eastern Redbud	as shown	50mm CAL.	Native	
Gb	19	Ginkgo biloba 'Magyar'	Magyar Maidenhair Tree	as shown	50mm CAL.	Non-Native	
Pt	9	Populus tremuloides	Trembling Aspen	as shown	50mm CAL.	Native	
Qc	10	Quercus coccinea	Scarlet Oak	as shown	65mm CAL.	Non-Native	
Gt	24	Shademaster Honeylocust	Gleditsia triacanthos var. inermis 'Shademaster'	as shown	65mm CAL.	Non-Native	
Sr	40	Syringa Reticulata 'Ivory Silk'	Ivory Silk Lilac	as shown	50mm CAL.	Non-Native	
Ua	15	Ulmus americana 'Princeton'	Princeton Elm	as shown	65mm CAL.	Native	
Trees - Coniferous							
Pg	15	Picea glauca	White Spruce	as shown	2000mm HT	Native	TREES TO BE BALL & BURLAP. SOURCED IN SAME GROWING ZONE. ALL TREES SHOULD HAVE DENSE GROWTH AND WITHOUT DEFECT. MIN ROOT ZONE VOLUME PER TREE: 30 CU. M.
Pp	26	Picea pungens	Colorado Blue Spruce	as shown	2000mm HT	Non-Native	
Pr	22	Pinus resinosa	Red Pine	as shown	2000mm HT	Native	
Shrubs - Deciduous							
Di	33	Diervilla lonicera	Bush Honeysuckle	1000	3 gal.	Native	SHRUBS TO BE IN POTS. SOURCED IN SAME GROWING ZONE. ALL SHRUBS SHOULD HAVE DENSE GROWTH, WELL ROOTED AND WITHOUT DEFECT. MIN ROOT ZONE VOLUME PER SHRUB: 5 CU. M.
Hi	15	Hypericum inodorum	St. John's Wort	750	3 gal.	Native	
Iv	35	Ilex verticillata	Winterberry Holly	1500	2 gal.	Native	
Po	60	Physocarpus opulifolium Panther 'NS'	Panther Ninebark	750	2 gal.	Native	
Ra	43	Rhus aromatica	Fragrant Sumac	1800	3 gal.	Native	
Shrubs - Coniferous							
Jh	31	Juniperus horizontalis 'Prince of Wales'	Prince of Wales Juniper	1750	3 gal.	Native	SHRUBS TO BE IN POTS. SOURCED IN SAME GROWING ZONE. ALL SHRUBS SHOULD HAVE DENSE GROWTH, WELL ROOTED AND WITHOUT DEFECT. MIN ROOT ZONE VOLUME PER SHRUB: 5 CU. M.
To	46	Thuja occidentalis 'Golden Globe'	Golden Globe Cedar	1000	3 gal.	Native	
Perennials / Groundcovers / Grasses							
Ca	66	Calamagrostis acutiflora 'Karl Foerster'	Karl Foerster Feather Reed Grass	600	2 gal.	Non-Native	PERENNIALS TO BE IN POTS. SOURCED IN SAME GROWING ZONE. ALL SHRUBS SHOULD HAVE DENSE GROWTH, WELL ROOTED AND WITHOUT DEFECT.

GENERAL NOTES

1. THIS PLAN WAS USING A SURVEYOR PLAN PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD. ON THE 6TH OF DECEMBER 2023.

KEYNOTES

1 FUTURE ROAD CONNECTION.
2 SITE ENTRANCE PER CITY STD. SC7.1 (TYP.)
3 TIE INTO EXISTING SIDEWALK
4 SNOW STORAGE AREA
5 TACTILE WARNING SURFACE INDICATOR

LEGEND

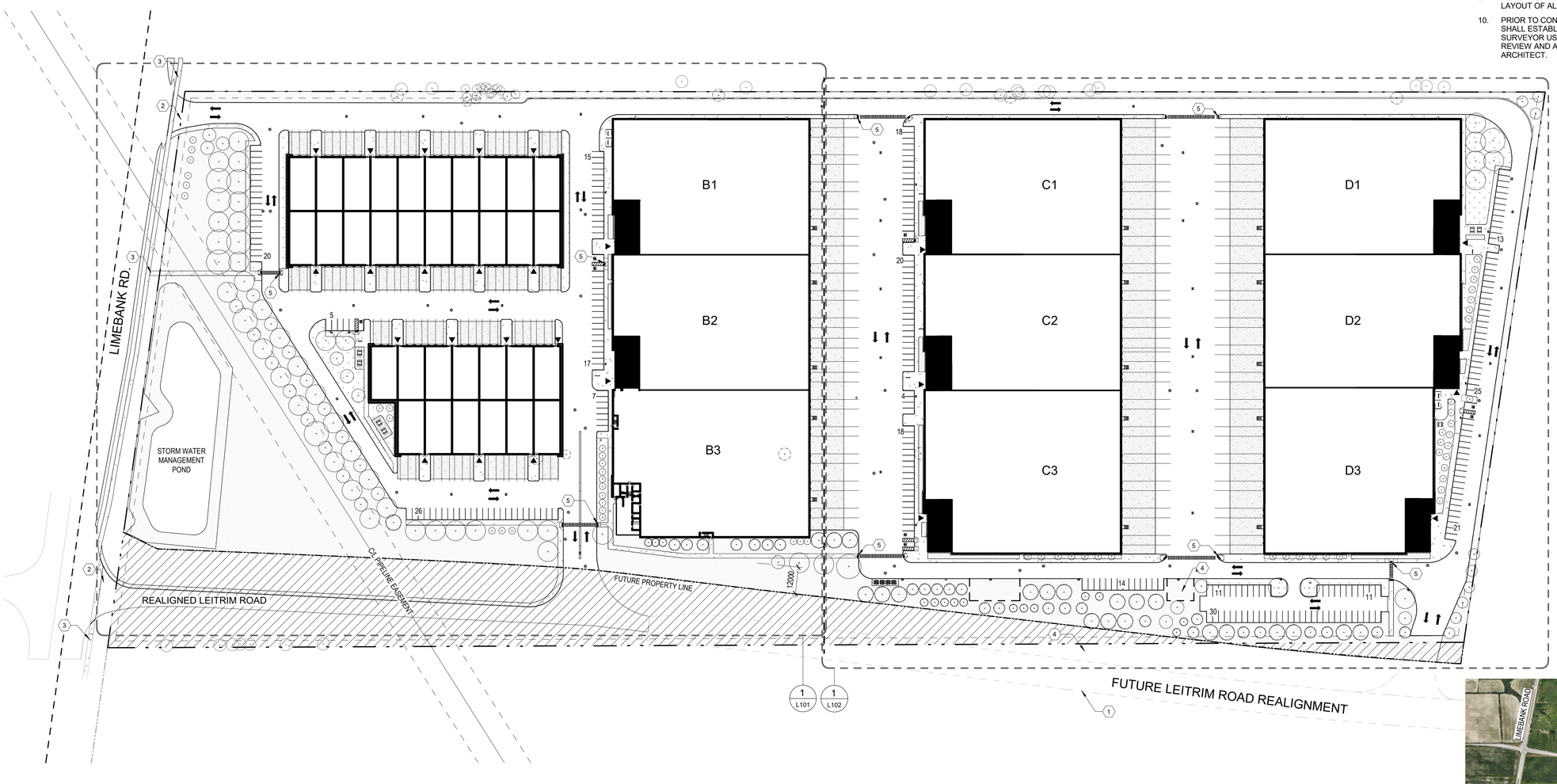
- TOPSOIL AND TALL GRASS SEED MIX
- TOPSOIL AND SOD
- PLANTING BED
- GRANULAR SURFACING
- PEAGRAVEL
- CONCRETE SIDEWALK. REFER TO CIVIL.
- CONCRETE LOADING DOCK RAMP. REFER TO CIVIL.
- EXISTING PROPERTY LINE
- PROPOSED PROPERTY LINE
- MATCH LINE
- FUTURE ROAD WORK
- EXISTING TREE TO BE REMOVED
- EXISTING TREE TO REMAIN
- DECIDUOUS TREE
- CONIFEROUS TREE
- BICYCLE SHELTER
- BICYCLE RACK WITH 7 BIKE CAPACITY
- PICNIC TABLE
- IN GROUND WASTE COLLECTION BIN
- PAINTED LINE PEDESTRIAN CROSSING

PLANTING NOTES

1. LOCATION OF ALL PLANTS MATERIAL TO BE MARKED OUT ON SITE AND APPROVED BY CONTRACT ADMINISTRATOR PRIOR TO PLANTING.
2. TREE SPACING, UNLESS OTHERWISE NOTED:
   ·DECIDUOUS TREES: 6.0m MIN.
   ·CONIFEROUS TREES: 3.0m MIN.
3. SHRUB SPACING, UNLESS OTHERWISE NOTED:
   ·SMALL DECIDUOUS: 600mm O.C.
   ·LARGE DECIDUOUS: 900mm O.C.
   ·CONIFEROUS: 750mm O.C.
   ·GRASSES: 450mm O.C.
4. ALL PLANT MATERIAL TO BE BEST QUALITY, REVIEWED ON SITE BY CONTRACT ADMINISTRATOR PRIOR TO PLANTING. UNACCEPTABLE PLANTS TO BE REPLACED AND NEW PLANTS APPROVED PRIOR TO PLANTING. REPLACEMENTS ARE AT CONTRACTOR'S OWN COST.
5. ALL PLANTING EXCAVATIONS ARE TO BE REVIEWED AND APPROVED BY LANDSCAPE ARCHITECT PRIOR TO PLACEMENT OF DRAINAGE COURSE, FILTER FABRIC AND/OR SOIL.
6. ALL TREES TO BE PLANTED IN A MINIMUM 30 CU M OF TOPSOIL SUITABLE FOR PLANT GROWTH.
7. LANDSCAPE ARCHITECT IN ALL REFERENCES REFERS TO PROJECT LANDSCAPE ARCHITECT (ARCHITECTURE 49).

LAYOUT NOTES

1. CONTRACTOR TO CONFIRM ALL DIMENSIONS AND REPORT ANY DISCREPANCIES TO CONTRACT ADMINISTRATOR PRIOR TO CONSTRUCTION
2. LAYOUT TO BE APPROVED BY CONTRACT ADMINISTRATOR PRIOR TO ANY CONSTRUCTION OR REMOVALS.
3. ALL DIMENSIONS ARE IN METRIC UNLESS OTHERWISE NOTED.
4. CONTRACTOR IS RESPONSIBLE FOR ALL EXCAVATIONS, REMOVALS, DISPOSALS AND ROUGH GRADING AS REQUIRED TO CONSTRUCTION ALL WORKS AS SHOWN ON ALL PLANS, DETAILS AND SPECIFICATIONS.
5. LOCATION OF ALL UTILITIES SHOWN FOR ILLUSTRATION ONLY. CONTRACTOR MUST CONTACT ALL UTILITIES REGARDING RULES FOR WORKING IN THE AREA OF THE UTILITIES PRIOR TO COMMENCEMENT OF ANY WORK. CONTRACTOR MUST CONFIRM LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.
6. ALL EXISTING ROADS, SIDEWALKS, CURBS, FENCING, PAVING, SODDED RIGHT-OF-WAY, AND APPROACHES, ETC. TO REMAIN TO BE PROTECTED DURING CONSTRUCTION TO ONTARIO PROVINCIAL STANDARDS (OPS) AT THE CONTRACTORS OWN COSTS.
7. ALL EXISTING TREES, SHRUB BEDS, MULCH BEDS, AND SOD TO REMAIN TO BE PROTECTED DURING CONSTRUCTION TO CITY OF OTTAWA AREAS DAMAGED DURING CONSTRUCTION TO BE REPAIRED TO ONTARIO PROVINCIAL STANDARDS (OPS) AT THE CONTRACTORS OWN EXPENSE.
8. USE SPECIFIED BACKFILL IN ALL TRENCHES RUNNING BELOW ALL STRUCTURES, PAVING, WALKWAYS, ETC.
9. REFER TO PLANTING ENLARGEMENTS FOR LAYOUT OF ALL SHRUB BEDS.
10. PRIOR TO CONSTRUCTION, CONTRACTOR SHALL ESTABLISH THE SITE LAYOUT BY A SURVEYOR USING A TOTAL STATION FOR REVIEW AND APPROVAL BY THE LANDSCAPE ARCHITECT.



1 LANDSCAPE PLAN
1 : 1000



2 CONTEXT PLAN
NTS

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NORTH ARROW: TRUE NORTH

DIGITAL REFERNECE:

PROJECT NO.: CA0014797.3416 CONTRACT NO.
DRAWN BY: SG/CP CHECKED BY: AH APPROVED BY:

KEYPLAN:

NO.	DATE	ISSUED
6	2025-08-18	ISSUED FOR COORDINATION
5	2025-06-24	ISSUED FOR COORDINATION
4	2025-02-19	RE-ISSUED FOR SITE PLAN CONTROL
3	2024-11-06	ISSUED FOR SITE PLAN CONTROL
2	2024-10-16	ISSUED FOR CLIENT PRICING
1	2024-03-15	ISSUED FOR SITE PLAN PRE-APPLICATION

PROJECT

Limebank Road Site Plan Application

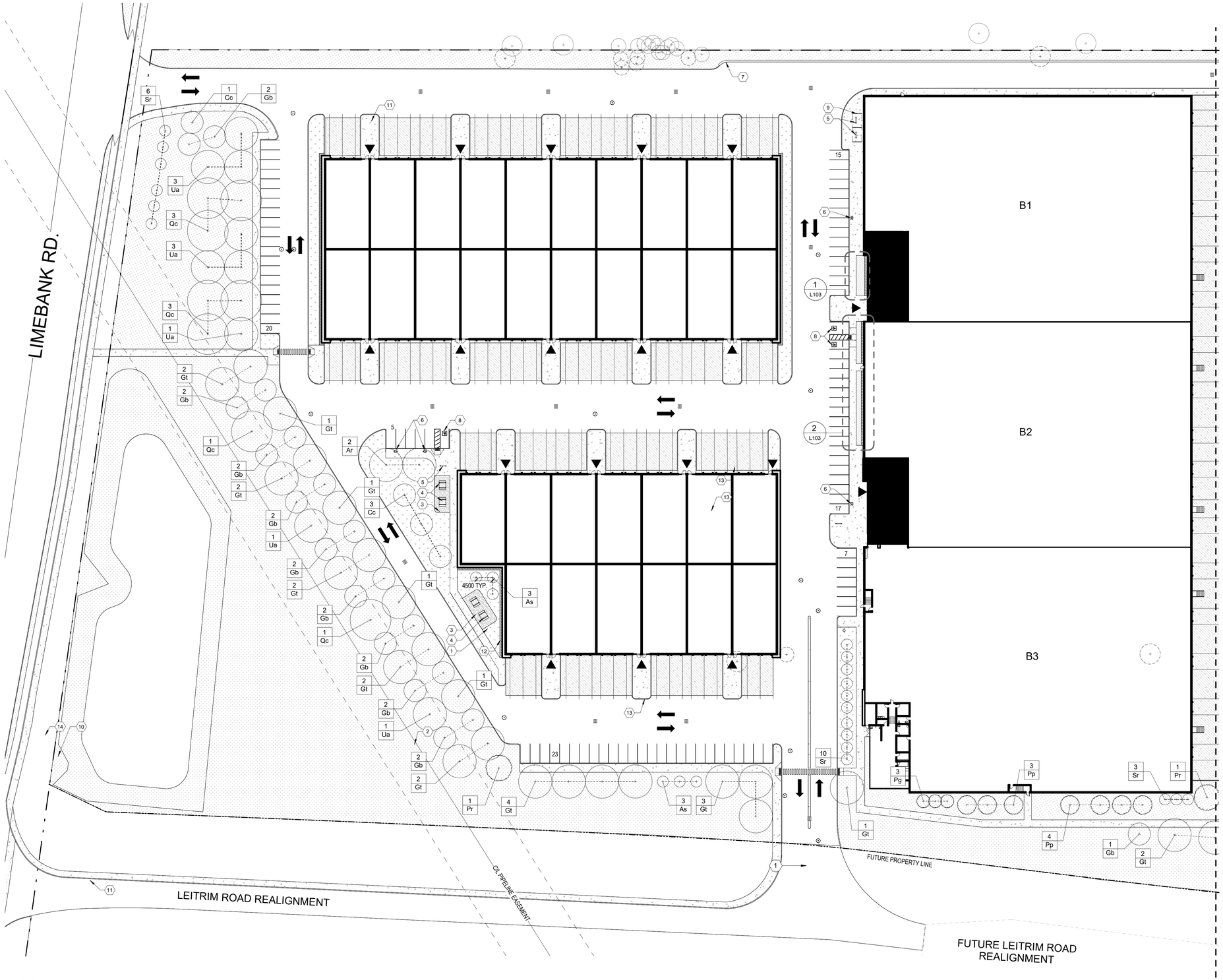
DRAWING TITLE

LANDSCAPE PLAN

DRAWING NO. **L100**

PRINT DATE: 2025-08-18 2:02:05 PM

ARCH D (24" x 36" | 610mm x 914mm)



1 LANDSCAPE PLAN - SECTOR 1
1 : 500

PLANTING NOTES

1. LOCATION OF ALL PLANTS MATERIAL TO BE MARKED OUT ON SITE AND APPROVED BY CONTRACT ADMINISTRATOR PRIOR TO PLANTING.
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7. LANDSCAPE ARCHITECT IN ALL REFERENCES REFERS TO PROJECT LANDSCAPE ARCHITECT (ARCHITECTURE 49).

KEYNOTES

1 TOPSOIL AND SOD.
2 TOPSOIL AND NATIVE GRASS SEED MIX.
3 GRANULAR SURFACING.
4 PICNIC TABLE.
5 SURFACE MOUNTED BICYCLE RACK.
6 EV CHARGING UNIT C/W TWO (2) BOLLARDS.
7 RETAINING WALL. REFER TO CIVIL.
8 BARRIER FREE PARKING.
9 SURFACE MOUNTED BICYCLE SHELTER.
10 LIMIT OF STORMWATER RETENTION BASIN. REFER TO CIVIL.
11 CONCRETE SIDEWALK.
12 600mm GRANULAR MAINTENANCE STRIP.
13 150HT CIP CONCRETE CURB
14 BOTTOM OF SLOPE FOR STORMWATER RETENTION BASIN.

LEGEND

- TOPSOIL AND TALL GRASS SEED MIX
- TOPSOIL AND SOD
- PLANTING BED
- GRANULAR SURFACING
- PEAGRAVEL
- CONCRETE SIDEWALK. REFER TO CIVIL.
- CONCRETE LOADING DOCK RAMP. REFER TO CIVIL.
- EXISTING PROPERTY LINE
- FUTURE PROPERTY LINE
- FUTURE ROAD WORK
- MATCHLINE
- EXISTING TREE TO BE REMOVED
- EXISTING TREE TO REMAIN
- NEW SHRUB
- NEW DECIDUOUS TREE
- NEW CONIFEROUS TREE
- SURFACE MOUNT BICYCLE SHELTER
- BICYCLE RACK WITH 7 BIKE CAPACITY
- PICNIC TABLE
- IN-GROUND WASTE COLLECTION BIN
- NEW MANHOLE.
- NEW FIRE HYDRANT.
- NEW CATCH BASIN.
- NEW TACTILE SURFACE WARNING INFICATOR.
- PAINTED LINE PEDESTRIAN CROSSING

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1	2024-03-15	ISSUED FOR SITE PLAN PRE-APPLICATION

PROJECT

Limebank Road Site Plan Application

DRAWING TITLE

LANDSCAPE PLAN SECTOR 1

DRAWING NO. **L101**

PRINT DATE: 2025-08-18 2:02:07 PM

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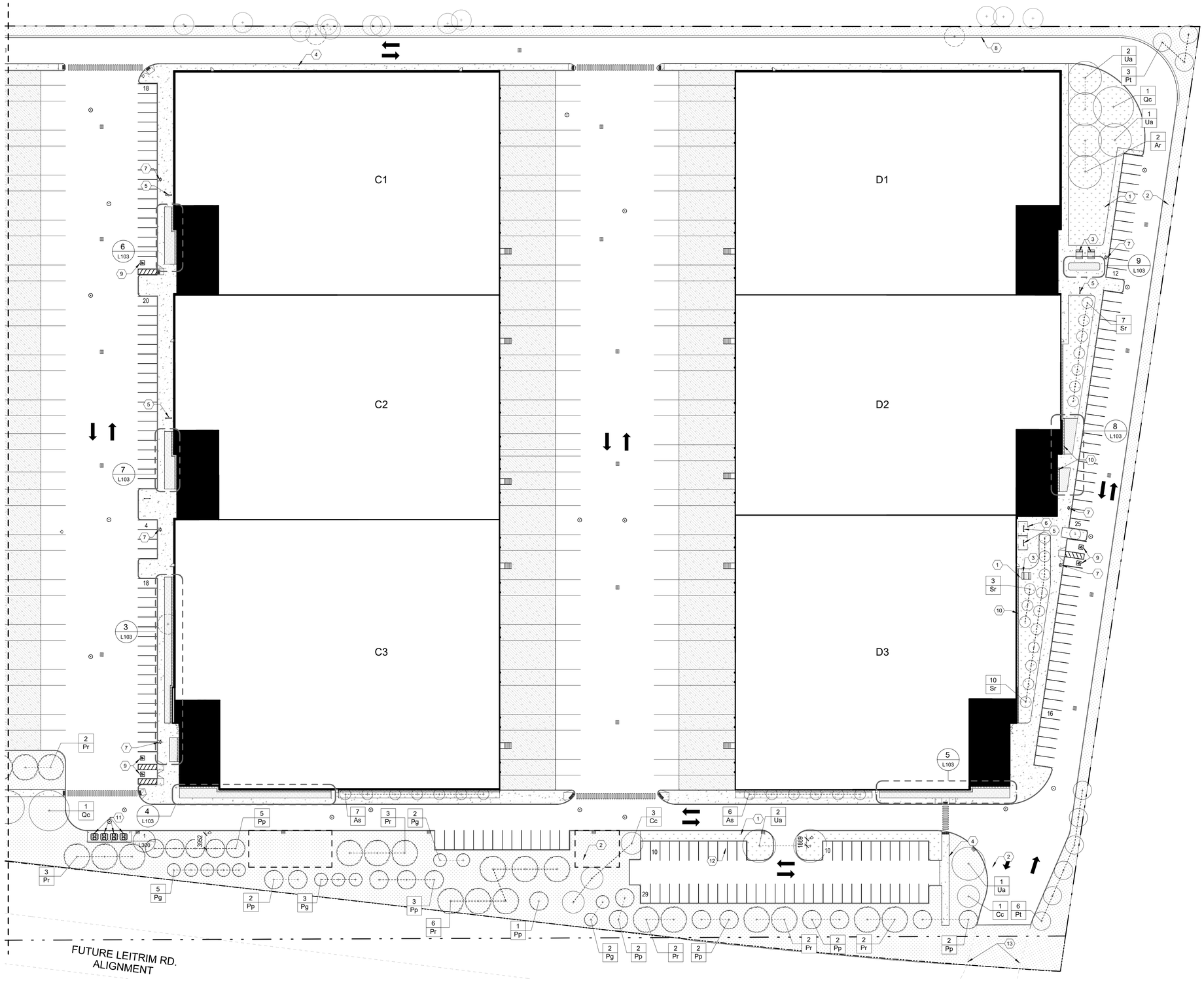

1 LANDSCAPE PLAN - SECTOR 2
1 : 500

PLANTING NOTES

1. LOCATION OF ALL PLANTS MATERIAL TO BE MARKED OUT ON SITE AND APPROVED BY CONTRACT ADMINISTRATOR PRIOR TO PLANTING.
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7. LANDSCAPE ARCHITECT IN ALL REFERENCES REFERS TO PROJECT LANDSCAPE ARCHITECT (ARCHITECTURE 49).

KEYNOTES

1 TOPSOIL AND SOD.
2 TOPSOIL AND NATIVE GRASS SEED MIX.
3 PICNIC TABLE.
4 CONCRETE SIDEWALK.
5 SURFACE MOUNTED BICYCLE RACK.
6 SURFACE MOUNTED BICYCLE SHELTER.
7 EV CHARGING UNIT C/W TWO (2) BOLLARDS.
8 RETAINING WALL. REFER TO CIVIL.
9 BARRIER FREE PARKING.
10 600mm GRANULAR MAINTENANCE STRIP.
11 IN-GROUND WASTE COLLECTION BIN.
12 150HT CIP CONCRETE CURB
13 FUTURE ROAD CONNECTION.

LEGEND

- TOPSOIL AND TALL GRASS SEED MIX
- TOPSOIL AND SOD
- PLANTING BED
- GRANULAR SURFACING
- PEAGRAVEL
- CONCRETE SIDEWALK. REFER TO CIVIL.
- CONCRETE LOADING DOCK RAMP. REFER TO CIVIL.
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3	2024-11-06	ISSUED FOR SITE PLAN CONTROL
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1	2024-03-15	ISSUED FOR SITE PLAN PRE-APPLICATION

PROJECT

Limebank Road Site Plan Application

DRAWING TITLE

LANDSCAPE PLAN SECTOR 2

DRAWING NO. **L102**

PRINT DATE: 2025-08-18 2:02:09 PM

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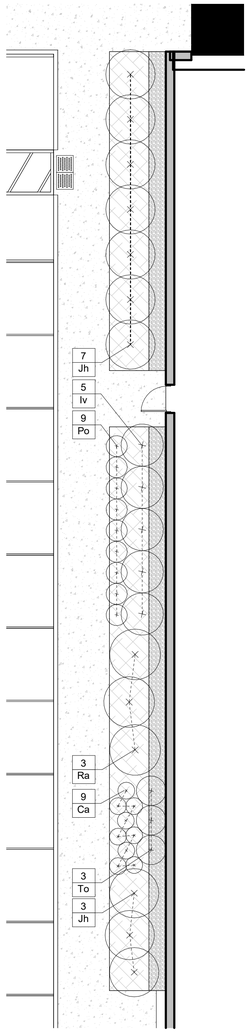
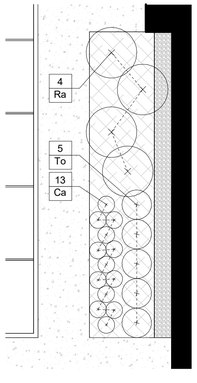
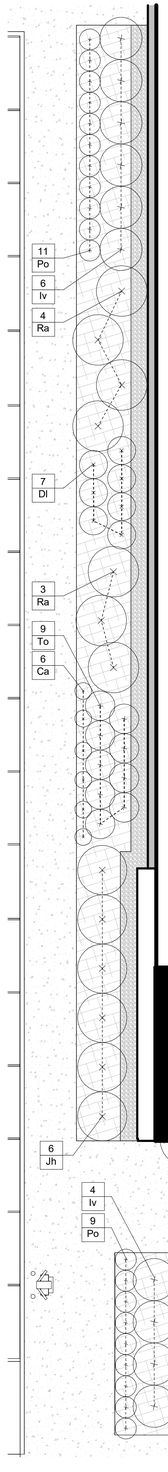


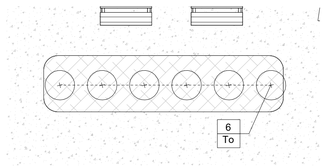
2 WAREHOUSE B2 PLANTING
1 : 100



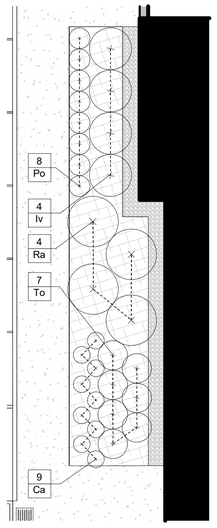
1 WAREHOUSE B1 PLANTING
1 : 100



3 WAREHOUSE C3 PLANTING A
1 : 100



9 WAREHOUSE D1 PLANTING
1 : 100



6 WAREHOUSE C1 PLANTING
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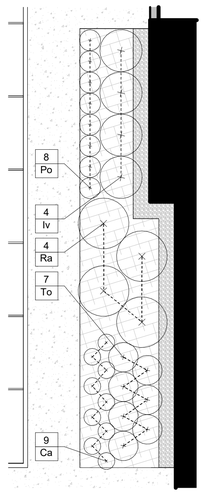
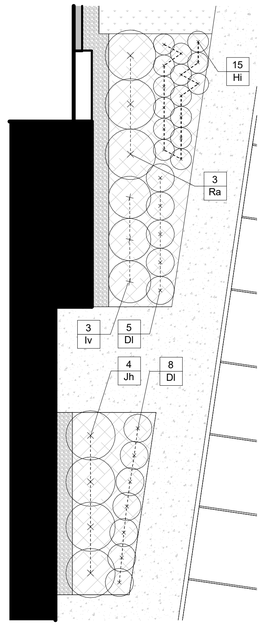


7 WAREHOUSE C2 PLANTING
1 : 100



8 WAREHOUSE D2 PLANTING
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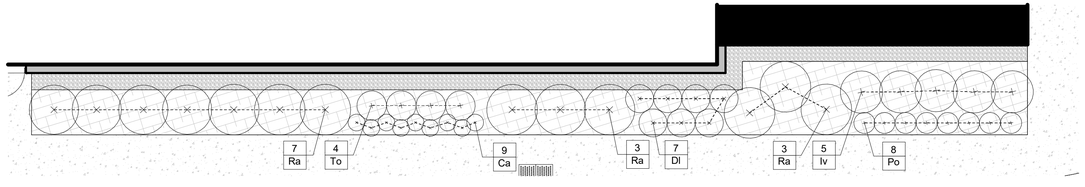

5 WAREHOUSE D3 PLANTING
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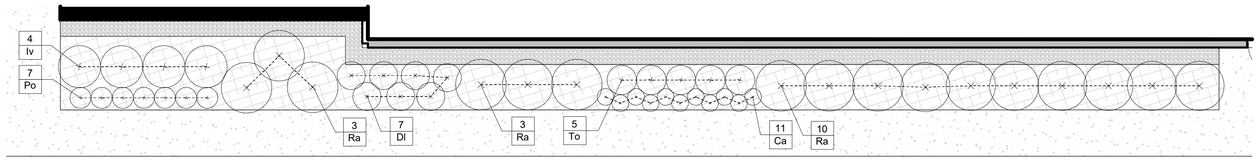

4 WAREHOUSE C3 PLANTING B
1 : 100

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7. LANDSCAPE ARCHITECT IN ALL REFERENCES REFERS TO PROJECT LANDSCAPE ARCHITECT (ARCHITECTURE 49).

LEGEND

- PLANTING BED
- CONCRETE SIDEWALK
- PLANTING CENTRELINE
- NEW SHRUB / PERENNIAL

ARCHITECTURE 49

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DIGITAL REFERNECE:

PROJECT NO.: CA0014797.3416 CONTRACT NO.

DRAWN BY: SG/CP CHECKED BY: AH APPROVED BY:

KEYPLAN:

NO.	DATE	ISSUED
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5	2025-06-24	ISSUED FOR COORDINATION
4	2025-02-19	RE-ISSUED FOR SITE PLAN CONTROL
3	2024-11-06	ISSUED FOR SITE PLAN CONTROL
2	2024-10-16	ISSUED FOR CLIENT PRICING
1	2024-03-15	ISSUED FOR SITE PLAN PRE-APPLICATION

PROJECT

Limebank Road Site Plan Application

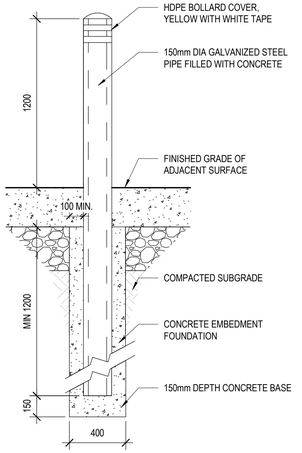
DRAWING TITLE

PLANTING ENLARGEMENT PLANS

DRAWING NO. **L103**

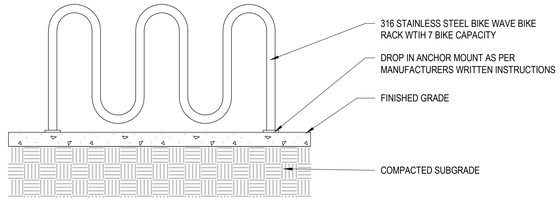
PRINT DATE: 2025-08-18 2:02:10 PM

ARCH D (24" x 36" | 610mm x 914mm)



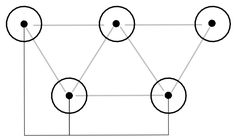
7 L300 — CONCRETE FILLED BOLLARD

1 : 20

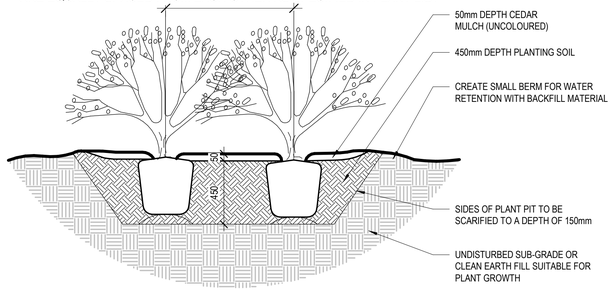


8 L300 — BICYCLE RACK MOUNTING

1 : 20



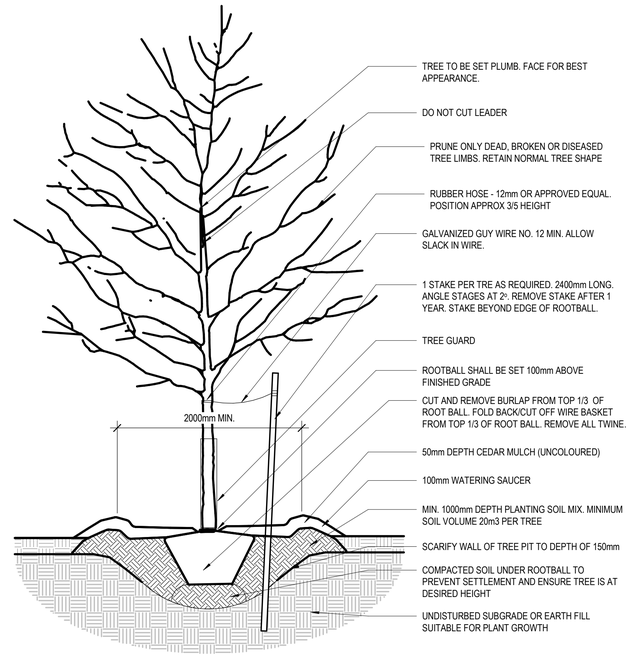
STAGGER PLANTING SUCH THAT ALL PLANTS ARE EQUALLY SPACED FROM EACH OTHER AS SPECIFIED IN PLANT LIST



NOTES:
1. PRUNE ALL BROKEN OR DEAD BRANCHES.
2. FACE PLANTS FOR BEST APPEARANCE.

5 L300 — TYP. SHRUB PLANTING

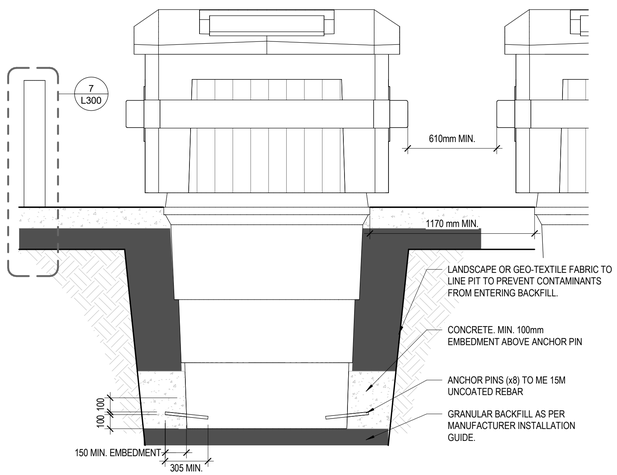
1 : 20



NOTES:
1. IF MINIMUM UTILITY SETBACKS PERMIT, POSITION TREE STAKES INTO DIRECTION OF PREVAILING WINDS
2. ALL TREE STAKES TO MAINTAIN MINIMUM 1.0m CLEARANCE FROM ALL U/G POWER, TELEPHONE AND GAS ALIGNMENTS
3. DIG ALL ROOT HOLES BY HAND WHEN CLOSER THAN 1.0m TO U/G POWER, TELEPHONE AND GAS ALIGNMENT

6 L300 — TYP. TREE PLANTING

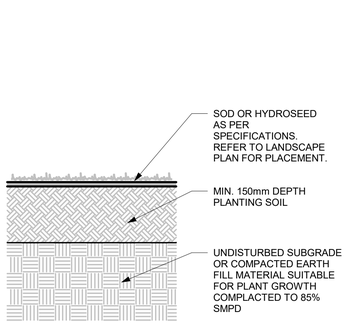
1 : 20



NOTES:
1. REFER TO LAYOUT PLAN FOR BIN LOCATION AND OFFSETS.
2. CONTRACTOR TO ENSURE A MIN EXCAVATION OF ONE HALF OF A (0.5) CUBIC METRE. EXCAVATION DEPTH TO BE CONFIRMED PRIOR TO WORK COMMENCING.
3. DETAIL FOR ILLUSTRATION ONLY. REFER TO MANUFACTURER'S WRITTEN INSTRUCTIONS FOR INSTALLATION RECOMMENDATIONS.

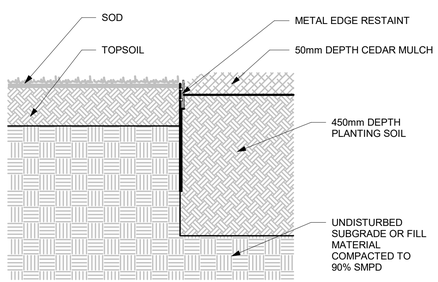
1 L300 — IN GROUND WASTE COLLECTION BIN

1 : 20



2 L300 — TYP. TOPSOIL AND SOD

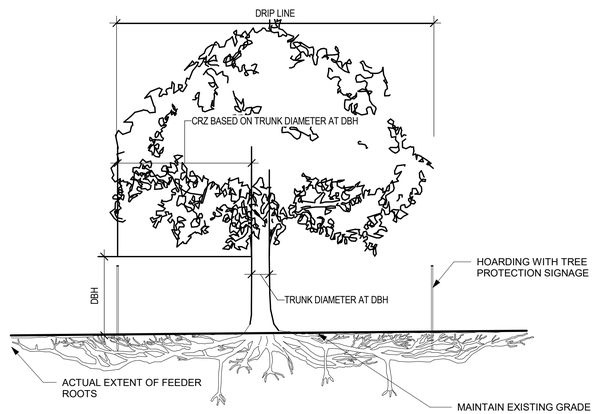
1 : 10



NOTE:
CONNECTION BETWEEN EDGE RESTAINT SECTIONS TO UTILIZE MANUFACTURERS' CONNECTION SYSTEM

3 L300 — METAL EDGING SOD AT PLANTING BED

1 : 10



NOTES:
1. CRITICAL ROOT ZONE (CRZ) OF A TREE IS CALCULATED BY DX10CM, WHERE D IS THE DIAMETER OF THE TRUNK IN CENTIMETRES. D IS MEASURED AT A HEIGHT OF 1.2 METRES FOR TREES OF 15 CENTIMETRES DIAMETER AND GREATER AND AT A HEIGHT OF 0.3 METRES FOR TREES OF LESS THAN 15 CENTIMETRES DIAMETER.
2. NO MATERIAL OR EQUIPMENT SHALL BE PLACED WITHIN THE CRZ OF THE TREE
3. NO SIGNS, NOTICES OR POSTERS SHALL BE ATTACHED TO ANY TREE
4. EXISTING GRADE WITHIN THE CRZ OF A TREE MAY BE ALTERED WITHOUT APPROVAL OF FORESTRY SERVICES
5. NO TUNNEL OR BORING WHEN DIGGING WITHIN THE CRZ OF ANY TREE
6. NO DAMAGE THE ROOT SYSTEM, TRUNK OR BRANCHES OF ANY TREE
7. EXHAUST FUMES FROM ALL EQUIPMENT MAY NOT BE DIRECTED TOWARDS ANY TREE'S CANOPY

4 L300 — TYP. TREE PROTECTION

1 : 50

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PROJECT

Limebank Road Site Plan Application

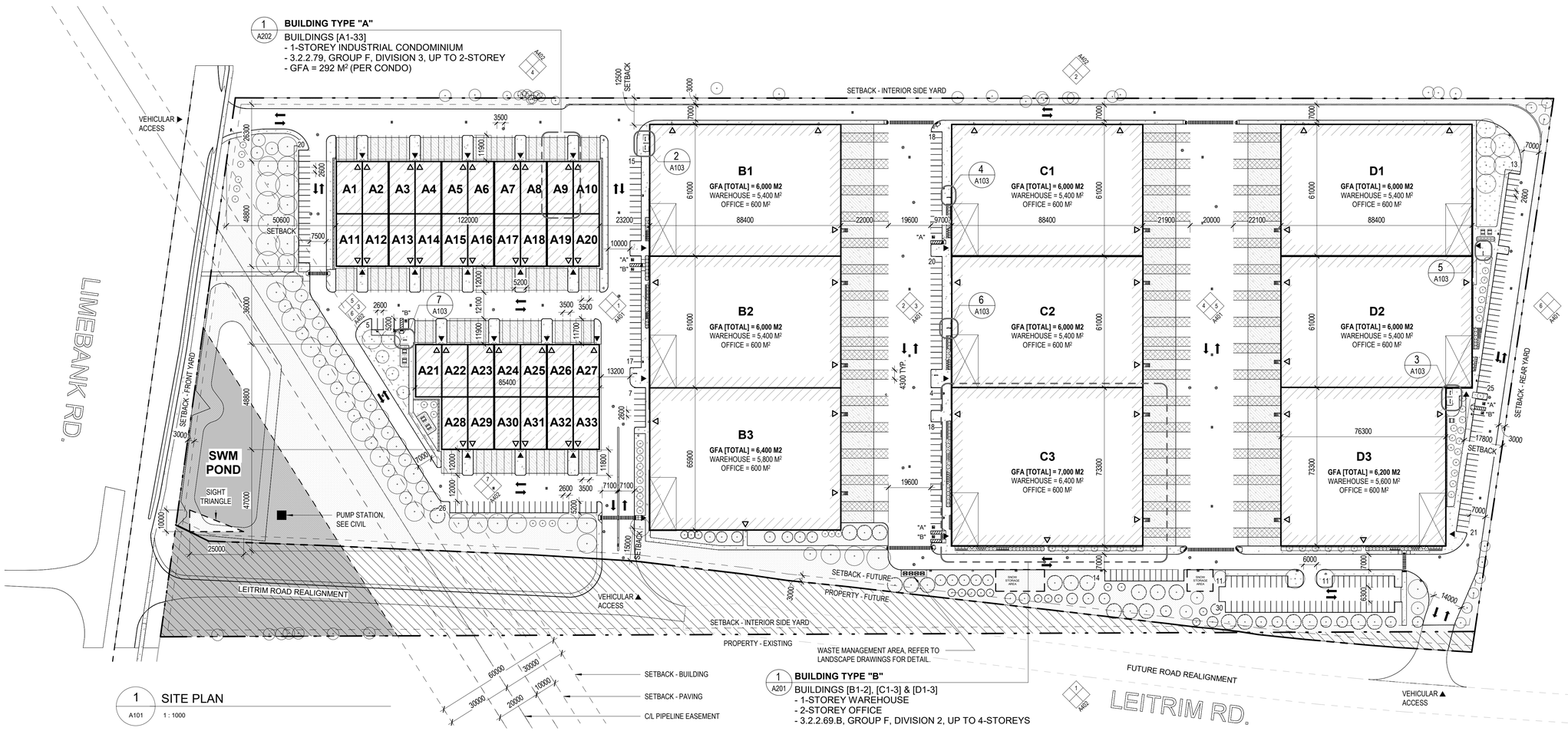
DRAWING TITLE

LANDSCAPE DETAILS

DRAWING NO. **L300**

PRINT DATE: 2025-08-18 2:02:11 PM

ARCH D (24" x 36" | 610mm x 914mm)



SITE PLAN SYMBOLS LEGEND

- = ENTRANCE
- = EXIT
- = MANHOLE, CATCH BASIN, ETC, REFER TO CIVIL
- = LS, LIGHT STANDARD, REFER TO ELECTRICAL AND STRUCTURAL
- = DENOTES SLOPED GRADE, REFER TO CIVIL
- = DENOTES FIRE TRUCK ACCESS ROUTE, REFER TO CIVIL DRAWINGS
- = PROPERTY LINE
- = PEDESTRIAN WALKWAY
- = SWALE. REFER TO CIVIL DRAWINGS
- = SETBACK LINE
- = BOLLARD
- = SURVEY BAR
- = BICYCLE RACK (7 BICYLE CAPACITY)
- = BICYCLE SHELTER
- = IN-GROUND WASTE COLLECTION BIN
- = BUILDING ELEVATION

- = GRASS
- = LANDSCAPING
- = PAINTED LINES
- = RIGHT-OF-WAY WIDENING PROTECTION
- = OFFICE SPACE
- = STORMWATER MANAGEMENT POND
- = SIDEWALK/ LIGHT DUTY CONCRETE SURFACE
- = LOADING DOCK/ HEAVY DUTY CONCRETE SURFACE
- = OVERSIZED LOADING SPACE

GENERAL NOTES

1. CONTRACTOR TO CONFIRM ALL DIMESIONS AND REPORT ANY DISCREPANCIES TO CONTRACTOR ADMINISTRATOR PRIOR TO CONSTRUCTION.
2. LAYOUT TO APPROVED BY CONTRACT ADMINISTRATOR PRIOR TO ANY CONSTRUCTION OR REMOVALS.
3. ALL DIMENSIONS ARE IN METRIC UNLESS OTHERWISE NOTED.
4. CONTRACTOR IS RESPONSIBLE FOR ALL EXCAVATIONS, REMOVALS, DISPOSALS AND ROUGH GRADING AS REQUIRED AS SHOWN ON ALL PLANS, DETAILS AND SPECIFICATIONS.
5. LOCATION OF ALL UTILITITES SHOWN FOR ILLUSTRATION ONLY. CONTRACTOR MUST CONTACT ALL UTILITIES REGARDING RULES FOR WORKING IN THE AREA OF THE UTILITIES PRIOR TO COMMECEMENT OF ANY WORK. CONTRACTOR MUST CONFIRM LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.
6. ALL EXISTING EXISTING ROADS, SIDEWALKS, CURBS, FENCING, PAVING, SODDED AREAS, AND APPROACHES, ETC. TO REMAIN TO BE PROTECTED DURING CONSTRUCTION TO CONTRACT ADMINISTRATOR'S APPROVAL AT THE CONTRACTORS OWN COSTS.
7. FOR LANDSCAPE, REFER TO LANDSCAPE DRAWINGS.
8. FOR UTILITIES, GRADING, ETC. REFER TO CIVIL DRAWINGS.
9. LEGAL SURVEY BOUNDARIES AND TOPOGRAPHICAL INFORMATION TAKEN FROM TOPOGRAPHICAL PLAN OF SURVEY OF PART OF LOTS 16 & 17 CONCESSION 2 (RIDEAU FRONT) GEOGRAPHIC TOWNSHIP OF GLOUCESTER, DATED DECEMBER 6, 2023, FROM THE OFFICE OF ANNIS, O'SULLIVAN, VOLLEBEKK LTD.

Loading Spaces

Requirement

Standard Loading Spaces:
Light Industrial / Warehouse: >25,000m² GFA: 3
65,240 > 25,000 = 3 loading spaces

Oversized Vehicle Loading Spaces:
Light Industrial / Warehouse: 1 space / first 5000m² + all required spaces for GFA > 5000m² = 4 total

	Requirement	Provided
Standard Loading Spaces	3 Spaces	66 Spaces
Oversized Loading Spaces	1 Space	49 Spaces

Site Information

Legal Description:	Part of lots 16 & 17, Concession 2 (Rideau Front), Geographic Township of Gloucester, City of Ottawa
P.I.N:	04331 - 0320
Easements:	Inst. GL54354, Part 16, Plan 4R-8983 Inst. GL50325. Part 2. Plan 5R-9196 Inst. OC2191832, Part 1, Plan 4R-32295
Municipal Address:	4101 Limebank Road, Ottawa, Ontario

Parking (4101 Limebank Road)

Requirement

Light Industrial: 0.8 / 100m² for first 5,000m²;
0.4 / 100m² of remaining gross floor area.

Total GFA = 65,240 m²
First 5,000 m² = 5,000 / [100/0.8] = 40 Spaces
Remaining m² = 60,240 / [100/0.4] = 240.96 Spaces [241 rounded up]

Proposed Buildings	281 Spaces
Accessible Parking	4 - Type A (5200 mm x 3400 mm (MIN.)) 4 - Type B (5200 mm x 2400 mm (MIN.))
Total Site Required	281 Spaces (Including Accessible Parking)

Provided

Total Site Provided	281 Spaces (Including 4 Type-A and 4 Type-B Accessible Parking)

	Requirement	Provided
Bicycle Parking		
Light Industrial: 1 / 1000m² of gross floor area	66 Spaces	70 Spaces

Zoning Statistics

Zoning: General Industrial (IG) - Currently Development Reserve Zone (DR)

Proposed Use:
Building Type "A" [Industrial Condo]: Group F, Division 3 Occupancy, Up to 2-Storeys
Building Type "B" [Warehouse]: Group F, Division 2 Occupancy, Up to 4-Storeys

Standard		Requirement	Provided
Lot Area (min.)		1,000 m²	151,250 m²
Lot Coverage (max.)		65%	43.1%
Gross Floor Area	Condo	N/A	9,640 m²
	Office (Warehouse)	N/A	5,400 m²
	Warehouse	N/A	50,200 m²
	Total	N/A	65,240 m²
Front Yard and Corner Side Yard (min.)			
Front Yard		3.0 m	50.6 m
Corner Side Yard		3.0 m	15.0 m
Side Yard (min.)			
Adjoining Residential or Institutional		15.0 m	N/A
All other cases		3 m	12.5 m [North]
Rear Yard (min.)			
Adjoining Residential or Institutional		15.0 m	N/A
All other cases		3 m	17.8 m
Maximum Floor Space Index		2.0	0.39
Maximum Building Height			
Within 20M of Adjoining Residential Zone		11.0 m	N/A
All other cases - Condo		22.0 m	10.0 m
All other cases - Warehouse		22.0 m	15.0 m
Minimum Width of Landscape Area		3.0 m	3.0 m
Landscaped Area within Parking Lot		N/A	5-10%
Total Vegetation and Landscaped Area		N/A	15%

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4	2024-10-16	ISSUED FOR CLIENT PRICING
3	2024-09-17	ISSUED FOR CLIENT REVIEW
2	2024-09-12	ISSUED FOR COORDINATION - PLANNING
1	2024-03-15	ISSUED FOR SITE PLAN APPLICATION

PROJECT

4101 Limebank Road Site Plan Application

DRAWING TITLE

GENERAL SITE PLAN

DRAWING NO. **A101**

PRINT DATE: 2025-08-18 5:50:49 PM

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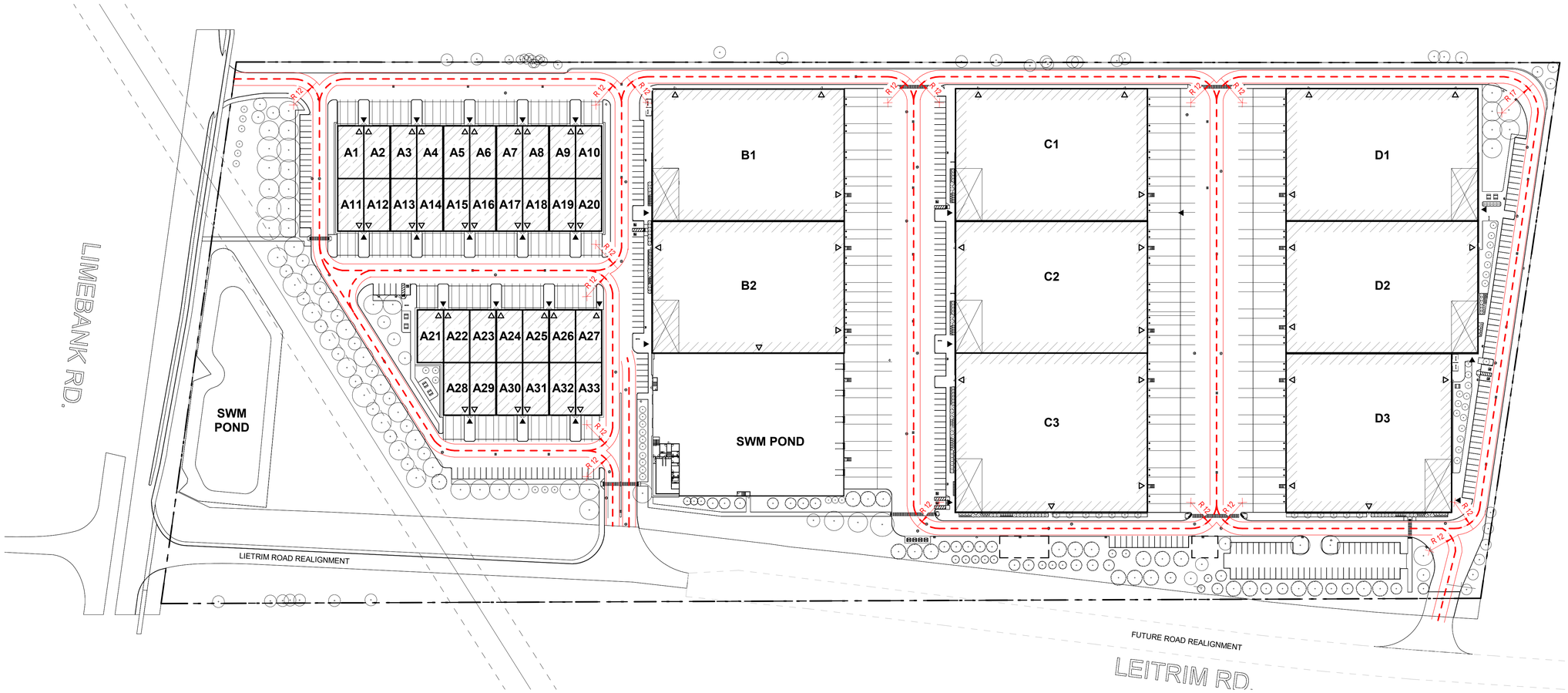

1 A102 SITE PLAN - VEHICULAR TURNING MOVEMENTS

1 : 1000

SITE PLAN LEGEND - FIRE ROUTE

LINE DENOTES FIRE ACCESS ROUTE

GENERAL SITE PLAN NOTES

1. OBC 3.2.5.5.(1) LOCATION OF ACCESS ROUTES

   ACCESS ROUTES REQUIRED BY ARTICLE 3.2.5.4 SHALL BE LOCATED SO THAT THE PRINCIPLE ENTRANCE AND EVERY ACCESS OPENING REQUIRED BY ARTICLE 3.2.5.1 AND 3.2.5.2. ARE LOCATED NOT LESS THAN 3M AND NOT MORE THAN 15M FROM THE CLOSEST PORTION OF THE ACCESS ROUTE REQUIRED FOR FIRE DEPARTMENT USE, MEASURED HORIZONTALLY FROM THE FACE OF THE BUILDING.

2. OBC 3.2.5.6.(1) ACCESS ROUTE DESIGN

   A PORTION OF A ROADWAY OR YARD PROVIDED AS A REQUIRED ACCESS ROUTE FOR FIRE DEPARTMENT USE SHALL,

   (a) HAVE A CLEAR WIDTH OF NOT LESS THAN 6M, UNLESS IT CAN BE SHOWN THAT LESSER WIDTHS ARE SATISFACTORY,
   (b) HAVE A CENTERLINE RADIUS NOT LESS THEN 12M,
   (c) HAVE AN OVERHEAD CLEARANCE OF NOT LESS THAN 5M,
   (d) HAVE A CHANGE OF GRADIENT NOT MORE THAN 1 IN 12.5 OVER A MINIMUM DISTANCE OF 15M,
   (e) BE DESIGNED TO SUPPORT THE EXPECTED LOADS IMPOSED BY FIRE FIGHTING EQUIPMENT AND BE SURFACED WITH CONCRETE ASPHALT OR OTHER MATERIAL DESIGNED TO PERMIT ACCESSIBILITY UNDER ALL CLIMATIC CONDITIONS.

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PROJECT

4101 Limebank Road Site Plan Application

DRAWING TITLE

SITE PLAN - FIRE & TRUCK ROUTE

DRAWING NO. **A102**

PRINT DATE: 2025-08-18 5:50:53 PM

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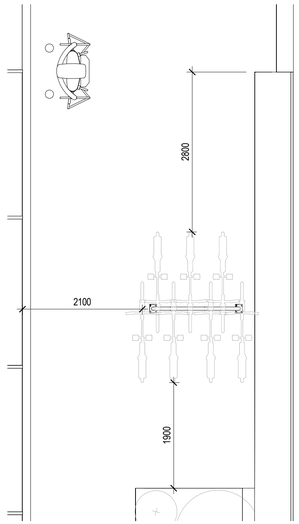
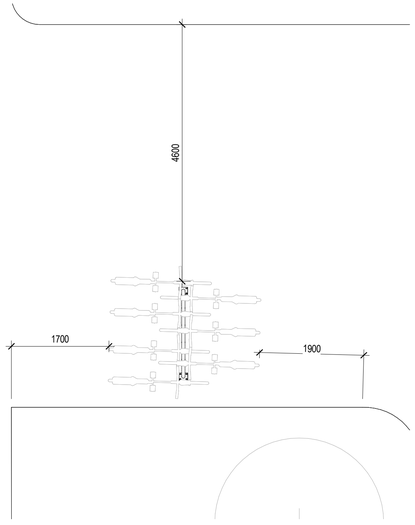
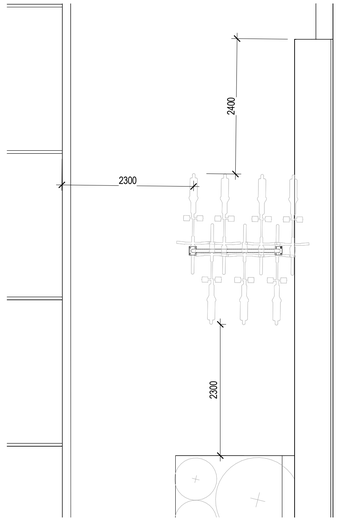


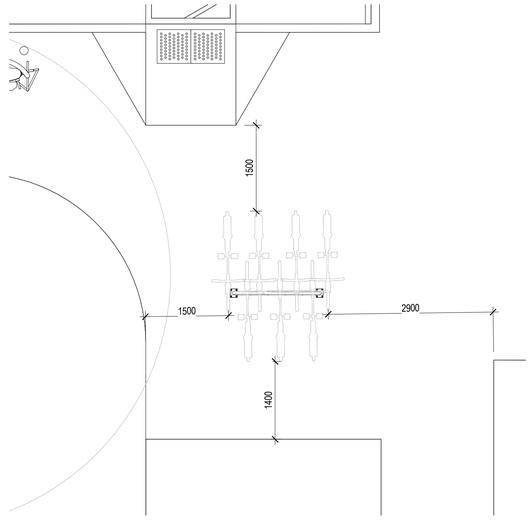
4 WAREHOUSE C1 BICYCLE PARKING
1 : 50



5 WAREHOUSE D1 BICYCLE PARKING
1 : 50

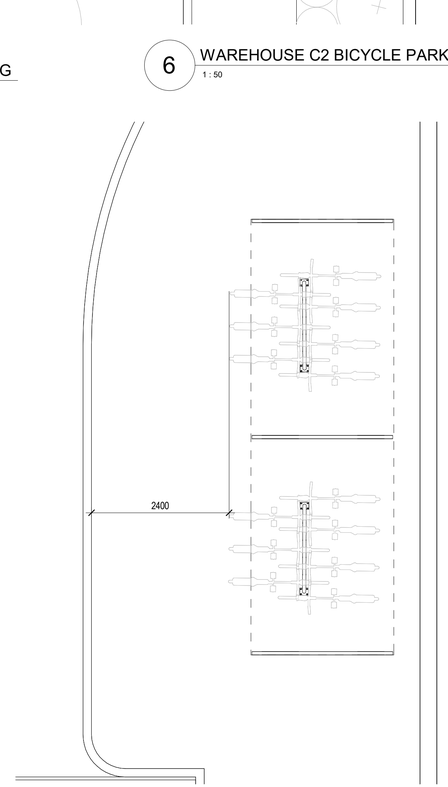


6 WAREHOUSE C2 BICYCLE PARKING
1 : 50

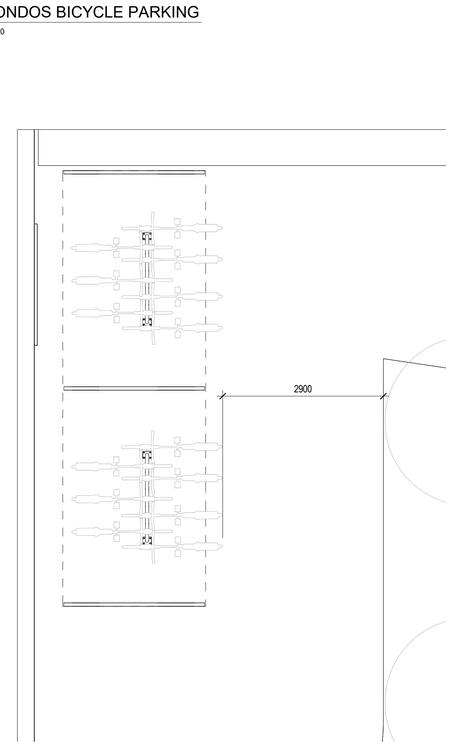


7 CONDOS BICYCLE PARKING
1 : 50

1 A103 TYP. PARKING AND B.F. PARKING DETAILS
1 : 50



2 WAREHOUSE B1 BICYCLE PARKING
1 : 50



3 WAREHOUSE D3 BICYCLE PARKING
1 : 50

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4101 Limebank Road Site Plan Application

DRAWING TITLE

SITE PLAN - DETAILS

DRAWING NO.

A103

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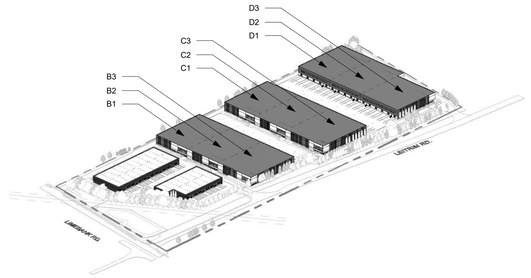
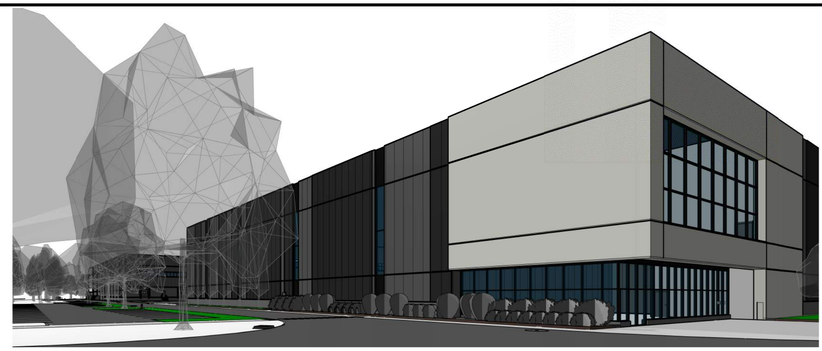
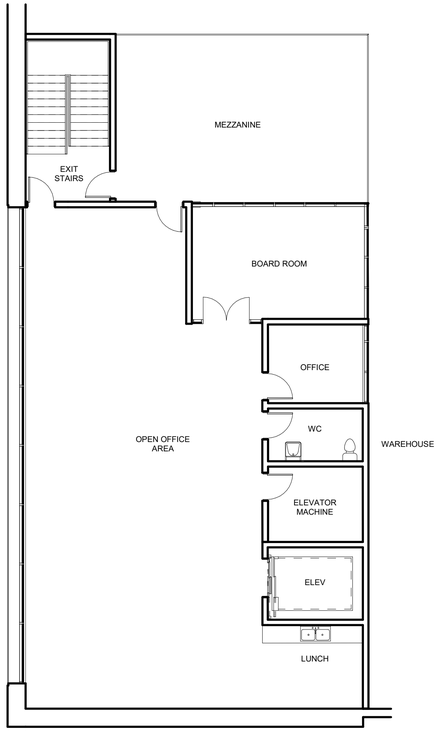


4 A201 — 3D VIEW - WAREHOUSE LOCATIONS

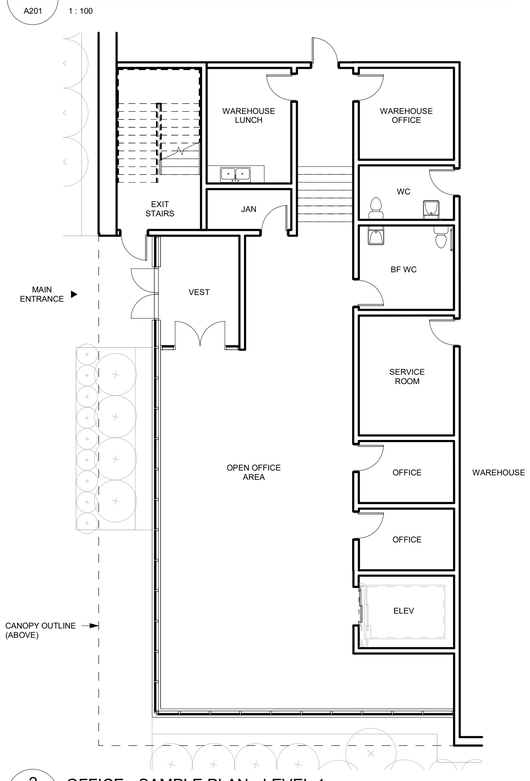


5 — TYPICAL WAREHOUSE



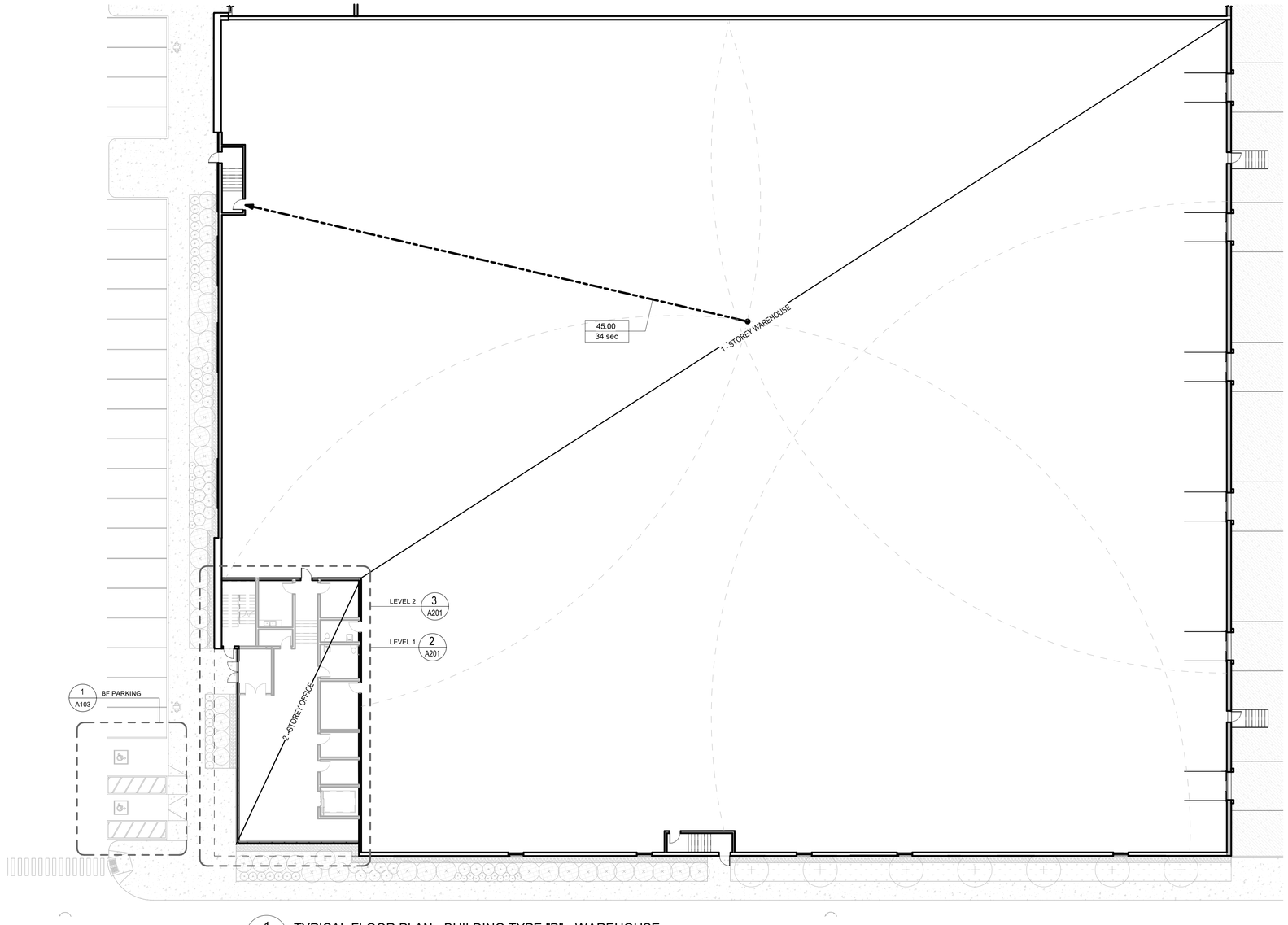
3 A201 — OFFICE - SAMPLE PLAN - LEVEL 2

1 : 100



2 A201 — OFFICE - SAMPLE PLAN - LEVEL 1

1 : 100



1 A201 — TYPICAL FLOOR PLAN - BUILDING TYPE "B" - WAREHOUSE

1 : 200

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1	2024-03-15	ISSUED FOR SITE PLAN APPLICATION

PROJECT

4101 Limebank Road Site Plan Application

DRAWING TITLE

OVERALL PLANS - TYPICAL WAREHOUSE

DRAWING NO. **A201**

PRINT DATE: 2025-08-18 5:51:03 PM

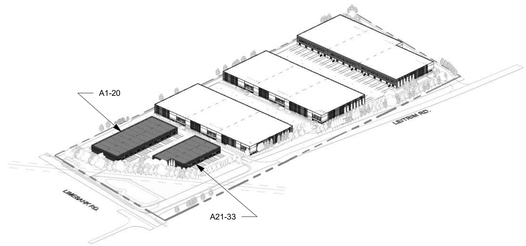
ARCH D (24" x 36" | 610mm x 914mm)



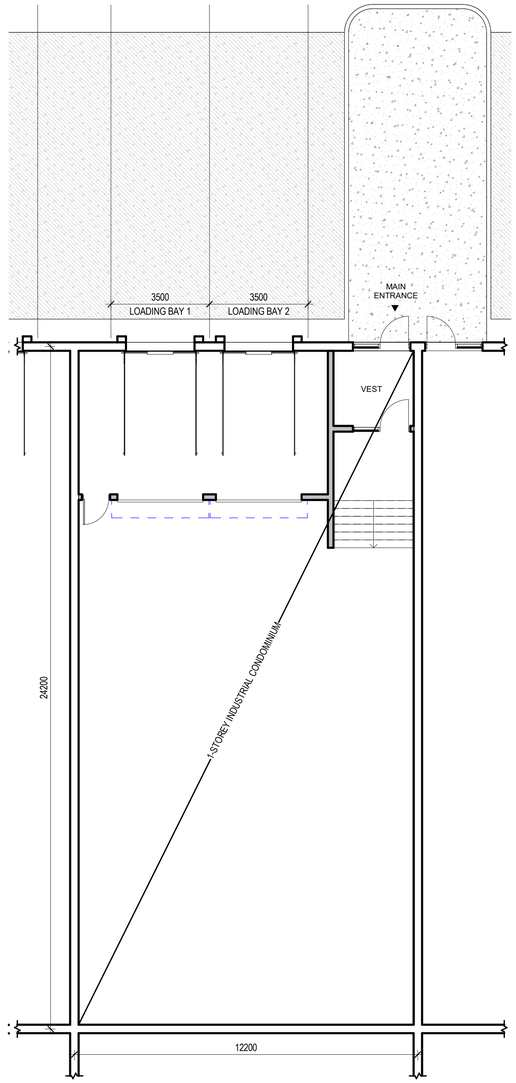
3 A202 3D VIEW - TYPICAL CONDO



2 3D VIEW - CONDO BUILDINGS



4 A202 3D VIEW - CONDO LOCATIONS



1 A202 TYPICAL FLOOR PLAN - BUILDING TYPE "A" - CONDO
1 : 100

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PROJECT

4101 Limebank Road Site Plan Application

DRAWING TITLE

OVERALL PLANS - TYPICAL CONDO

DRAWING NO. **A202**

PRINT DATE: 2025-08-18 5:51:15 PM

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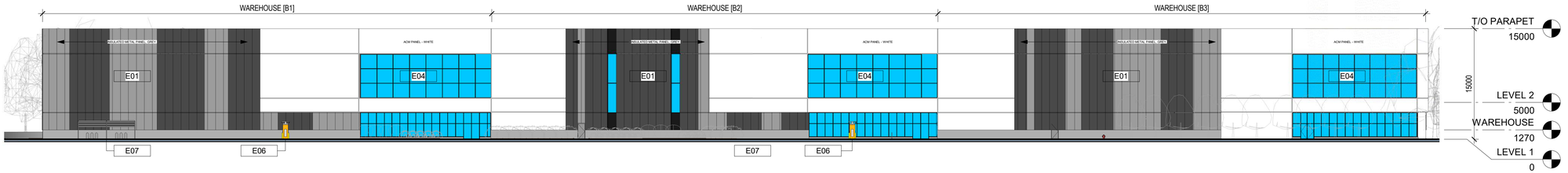
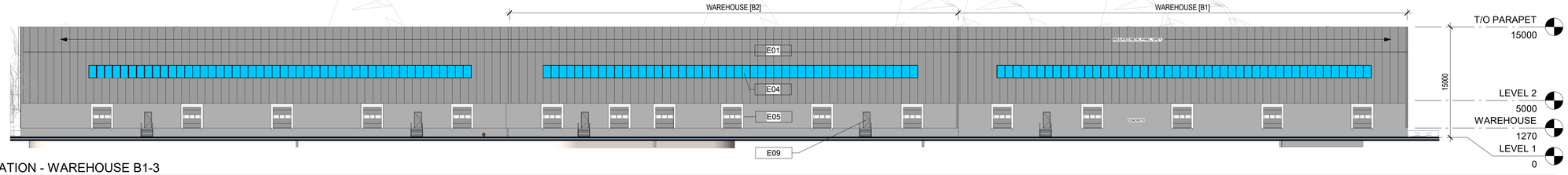


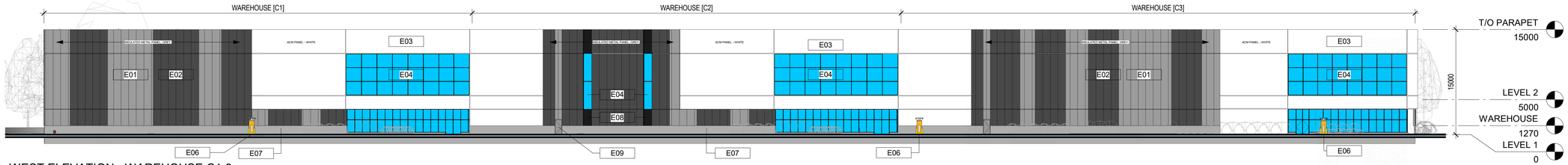
1 WEST ELEVATION - WAREHOUSE B1-3

1 : 300



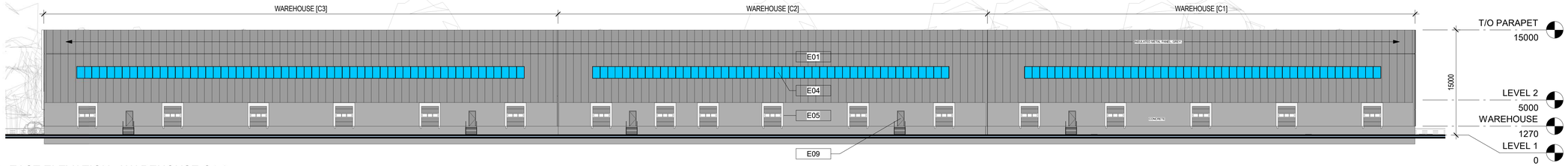
2 EAST ELEVATION - WAREHOUSE B1-3

A401 1 : 300



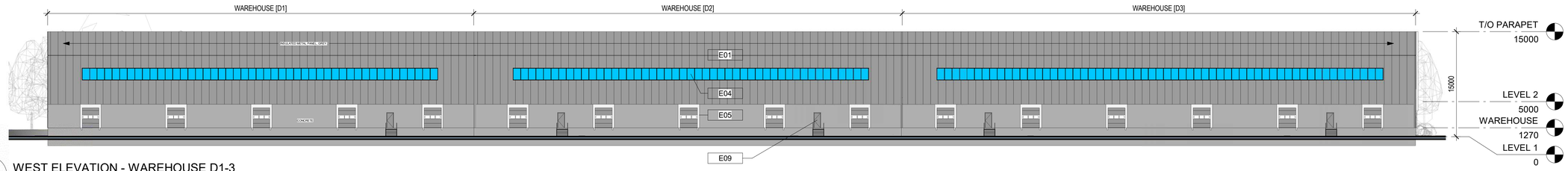
3 WEST ELEVATION - WAREHOUSE C1-3

A401 1 : 300



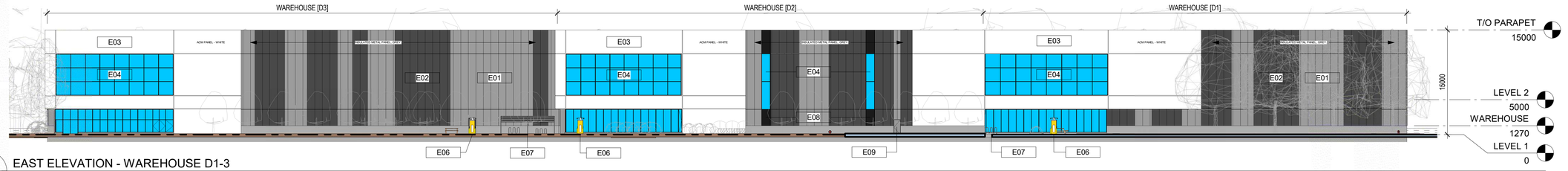
4 EAST ELEVATION - WAREHOUSE C1-3

A401 1 : 300



5 WEST ELEVATION - WAREHOUSE D1-3

A401 1 : 300



6 EAST ELEVATION - WAREHOUSE D1-3

A401 1 : 300

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PROJECT

4101 Limebank Road Site Plan Application

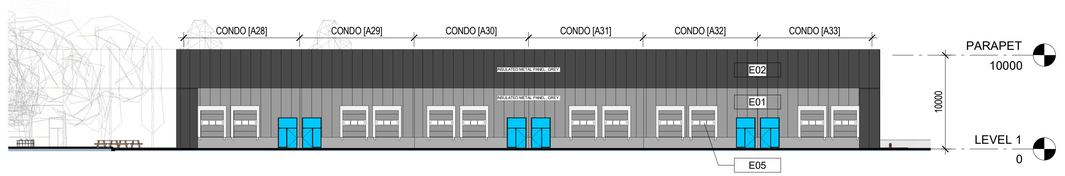
DRAWING TITLE

ELEVATIONS - EXTERIOR

DRAWING NO.

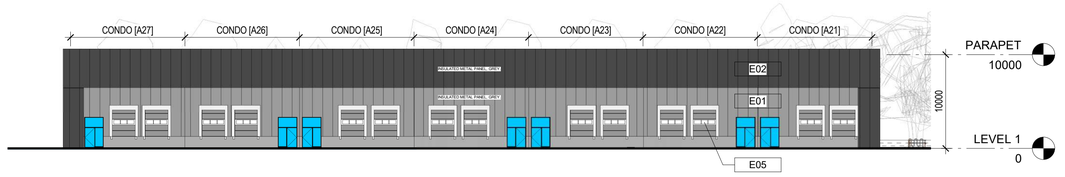
A401

PRINT DATE: 2025-08-18 5:51:23 PM



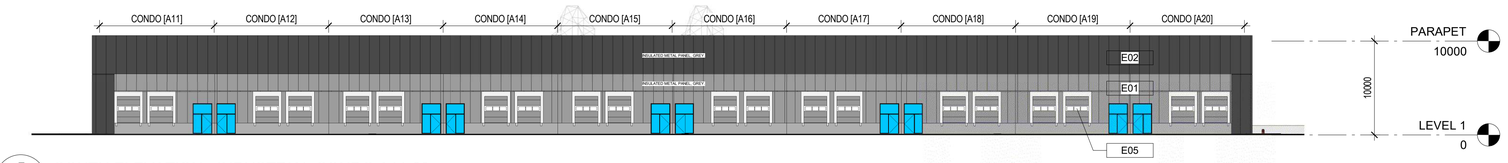
7 A402 SOUTH ELEVATION - INDUSTRIAL CONDO A28-33

1 : 300



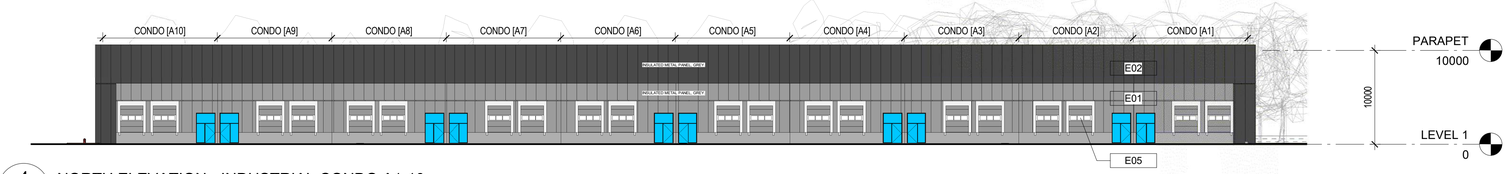
6 A402 NORTH ELEVATION - INDUSTRIAL CONDO A21-27

1 : 300



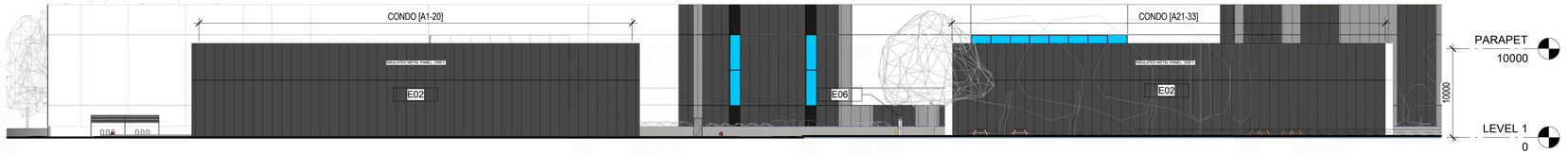
5 A402 SOUTH ELEVATION - INDUSTRIAL CONDO A11-20

1 : 300



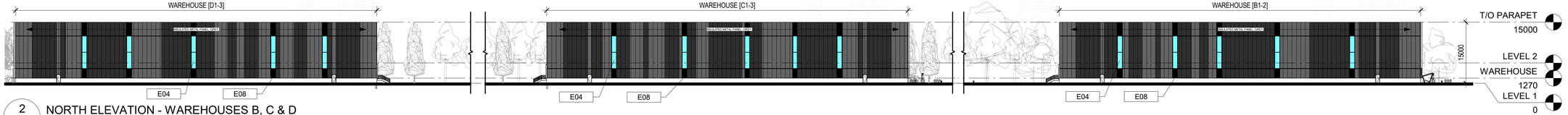
4 A402 NORTH ELEVATION - INDUSTRIAL CONDO A1-10

1 : 300



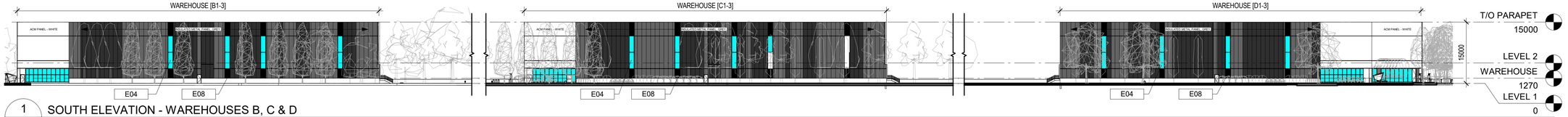
3 A402 WEST ELEVATION - INDUSTRIAL CONDOS

1 : 300



2 A402 NORTH ELEVATION - WAREHOUSES B, C & D

1 : 500



1 A402 SOUTH ELEVATION - WAREHOUSES B, C & D

1 : 500

KEYNOTE LEGEND - ELEVATIONS	
Key Value	Keynote Text
E01	VERTICAL INSULATED METAL PANEL, LIGHT GREY
E02	VERTICAL INSULATED METAL PANEL, DARK GREY
E03	ACM ARCHITECTURAL PANELS, WHITE
E04	BIRD-SAFE GLASS, AS PER CITY OF OTTAWA DESIGN GUIDELINES. REFER TO SPECIFICATIONS
E05	LOADING DOCK DOORS, TYPICAL
E06	ELECTRIC VEHICLE CHARGER, REFER TO LANDSCAPE
E07	BICYCLE PARKING, REFER TO LANDSCAPE
E08	SPANDREL PANEL, BLACK
E09	EXIT DOOR, TYPICAL

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PROJECT

4101 Limebank Road Site Plan Application

DRAWING TITLE

ELEVATIONS - EXTERIOR

DRAWING NO. **A402**

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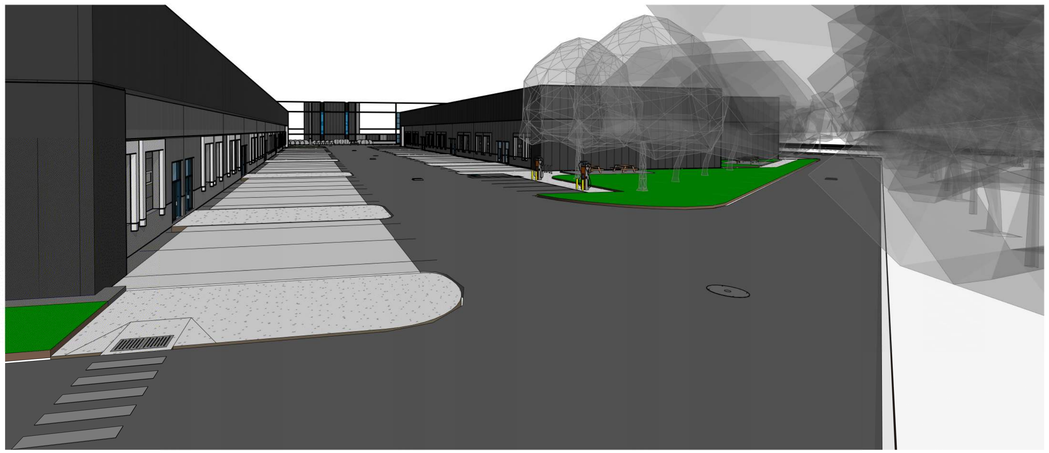
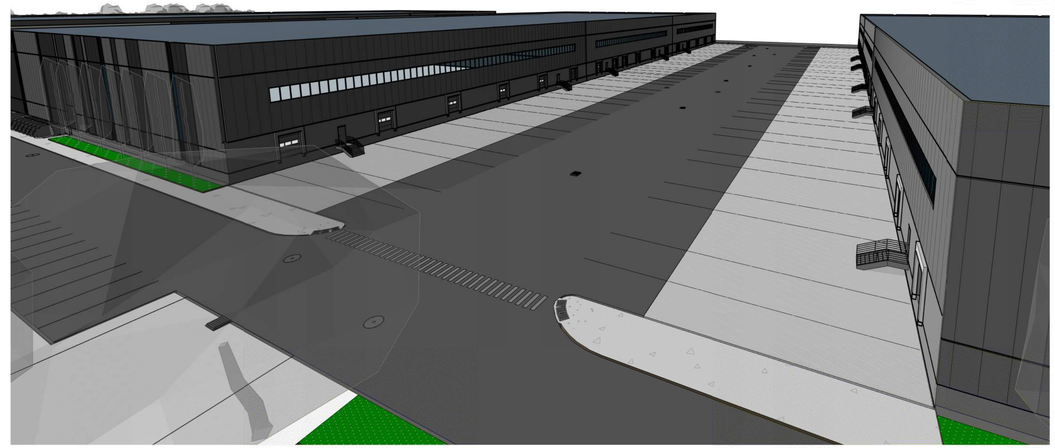
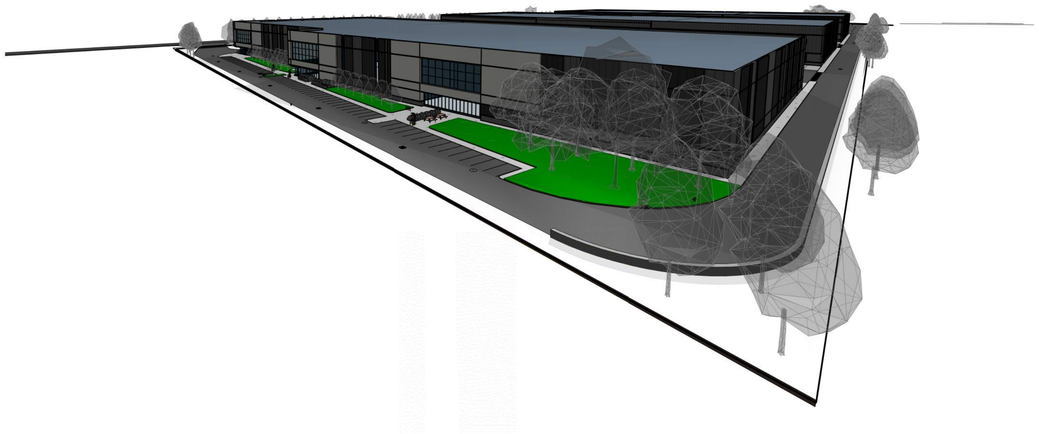
ARCH D (24" x 36" | 610mm x 914mm)



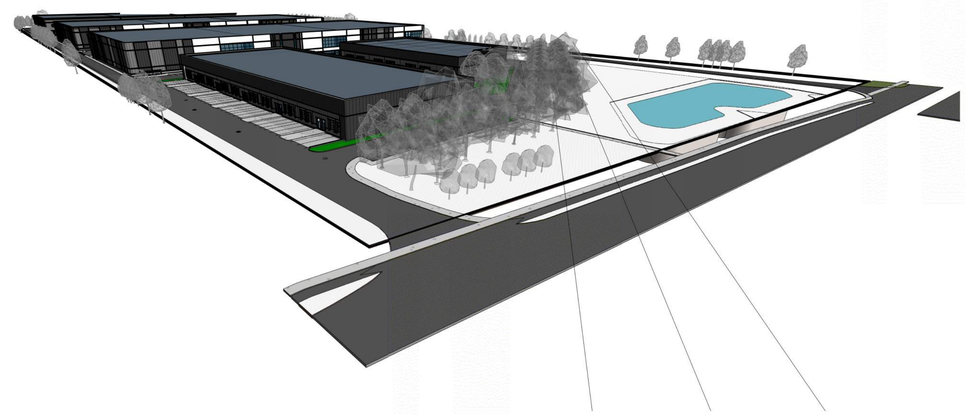
6 A403 3D VIEW - CONDO DRIVE AISLE



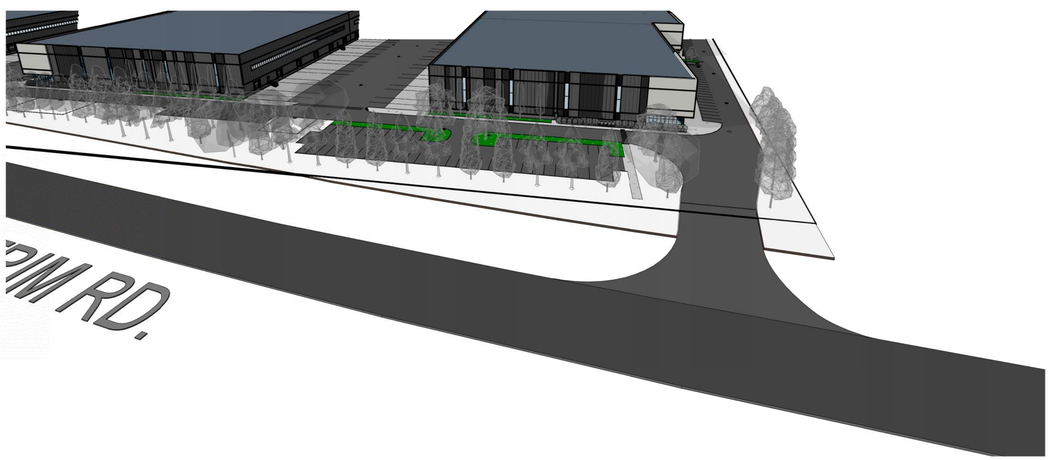
5 A403 3D VIEW - WAREHOUSE DRIVE AISLE SE



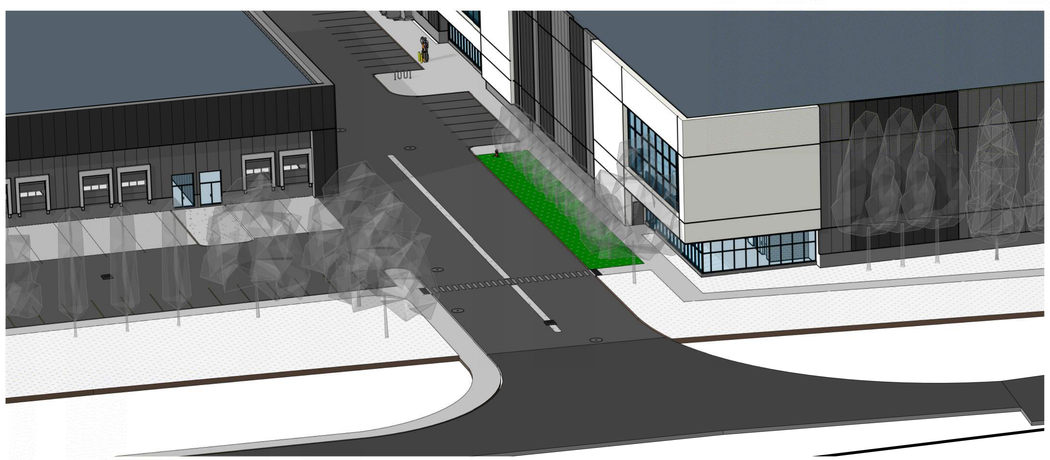
4 A403 3D VIEW - NE SITE



2 3D VIEW - LIMEBANK ENTRANCE



3 A403 3D VIEW - LIETRIM ENTRANCE 2



1 A403 3D VIEW - LIETRIM ENTRANCE 1

ARCH D (24" x 36" | 610mm x 914mm)

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PROJECT

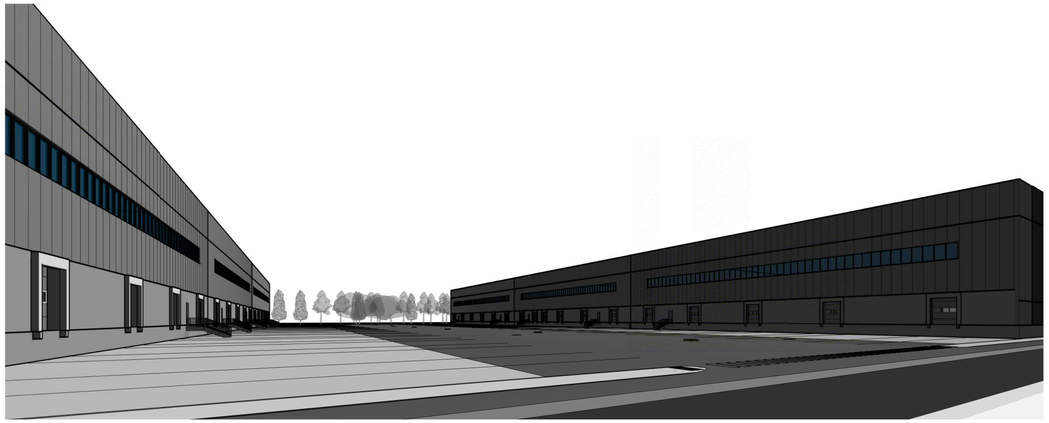
4101 Limebank Road Site Plan Application

DRAWING TITLE

EXTERIOR 3D VIEWS

DRAWING NO. **A403**

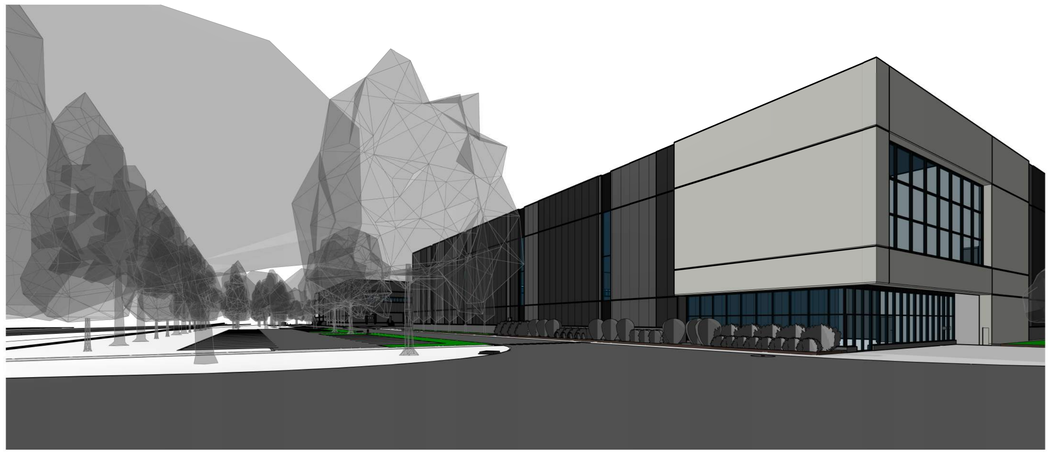
PRINT DATE: 2025-08-18 5:51:52 PM



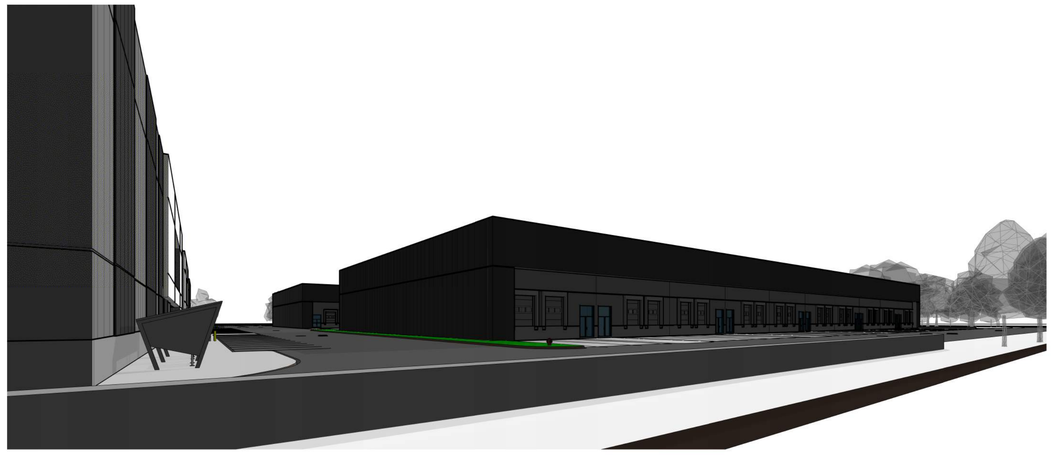
6 A404 3D VIEW - WAREHOUSE NORTH



5 A404 3D VIEW- WAREHOUSE PARKING EAST



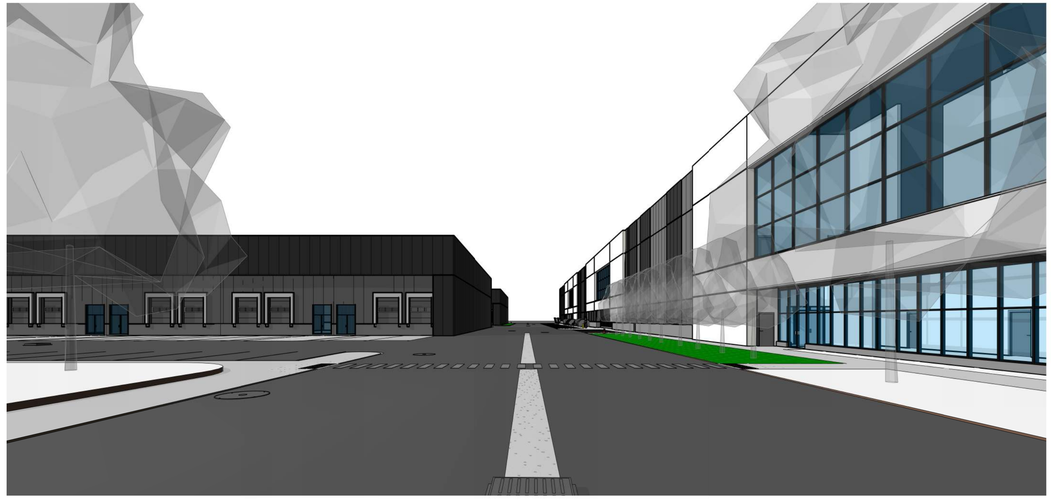
4 A404 3D VIEW- WAREHOUSE PARKING SOUTH



3 A404 3D VIEW- WAREHOUSE/CONDO DRIVE AISLE



2 A404 3D VIEW- CONDO PARKING



1 A404 3D VIEW- LIETRIM ENTRANCE

ARCH D (24" x 36" | 610mm x 914mm)

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4101 Limebank Road Site Plan Application

DRAWING TITLE

EXTERIOR 3D VIEWS

DRAWING NO. **A404**

PRINT DATE: 2025-08-18 5:52:05 PM

TOPOGRAPHICAL PLAN OF SURVEY OF

PART OF LOTS 16 & 17
CONCESSION 2 (RIDEAU FRONT)
GEOGRAPHIC TOWNSHIP OF GLOUCESTER
CITY OF OTTAWA

Surveyed by Annis, O'Sullivan, Vollebekk Ltd.
REVISION NOTE: Elevations on top of exposed Gas Pipe added, January 13, 2025
REVISION NOTE: Topographical features and Elevations east, north and south of subject Land July 17, 2025

Scale 1 : 750

30 22.5 15 7.5 0 15 30 Metres

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

Surveyor's Certificate

I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act and the Surveyors Act and the regulations made under them.
2. The survey was completed on the 5th day of December, 2023.

December 6, 2023
Date

Andrew J. Broxham
Ontario Land Surveyor

LEITRIM ROAD
ROAD ALLOWANCE BETWEEN LOTS 15 & 16 CONCESSION 2 (RIDEAU FRONT)

PART : PLAN 5R-12444

PART : PLAN 5R-1336B

PART : PLAN 5R-9196

PART 3 PLAN 5R-9196

PART 5 PLAN 4R-8983

PART 7 PLAN 4R-8983

PART 1 PLAN 4R-32295 SUBJECT TO EASEMENT INST. OC2093852

PART 5 PLAN 5R - 3340

PIN 04331 - 0309

PIN 04331 - 0308

PIN 04331 - 3887

LOT 16

LOT 17

LOT 18

BLOCK 8 REGISTERED PLAN 4M - 1363

CONCESSIONS 1 & 2 (RIDEAU FRONT)

LIMEBANK ROAD ALLOWANCE BETWEEN CONCESSIONS 1 & 2 (RIDEAU FRONT)

NORTHERN CROSS ROAD

SQUIRT TO LEMONT 30" GAS MAIN 4M-8983

HWY 417 TRANS CANADA

Underground Gas (Marked By Others)

Site Benchmark
Spike in Utility Pole
Elevation=93.03

N 59° 08' 40" E 610.09 Meas (610.05 P3) (610.16 P5)

N 59° 08' 55" E 199.41 (P3) & Meas (N 59° 08' 55" E P3)

N 59° 08' 55" E 207.33 (P3) & Meas

N 59° 08' 55" E 152.40 (P3) & Meas

N 59° 08' 55" E 152.63 (P3) & Meas (152.59 P4)

N 59° 08' 55" E 608.33 (P3) & Meas (608.29 P4)

N 59° 08' 55" E 152.40 (P3) & Meas (N 58° 48' 35" E P1)

N 59° 08' 40" E 11.66 (P2) & Set

N 66°58'20" E 4.25 (P3) & Meas

N 30° 31' 20" W 30.47 (P3 & Meas)

N 10° 31' 20" W 48.69 (P3 & Meas)

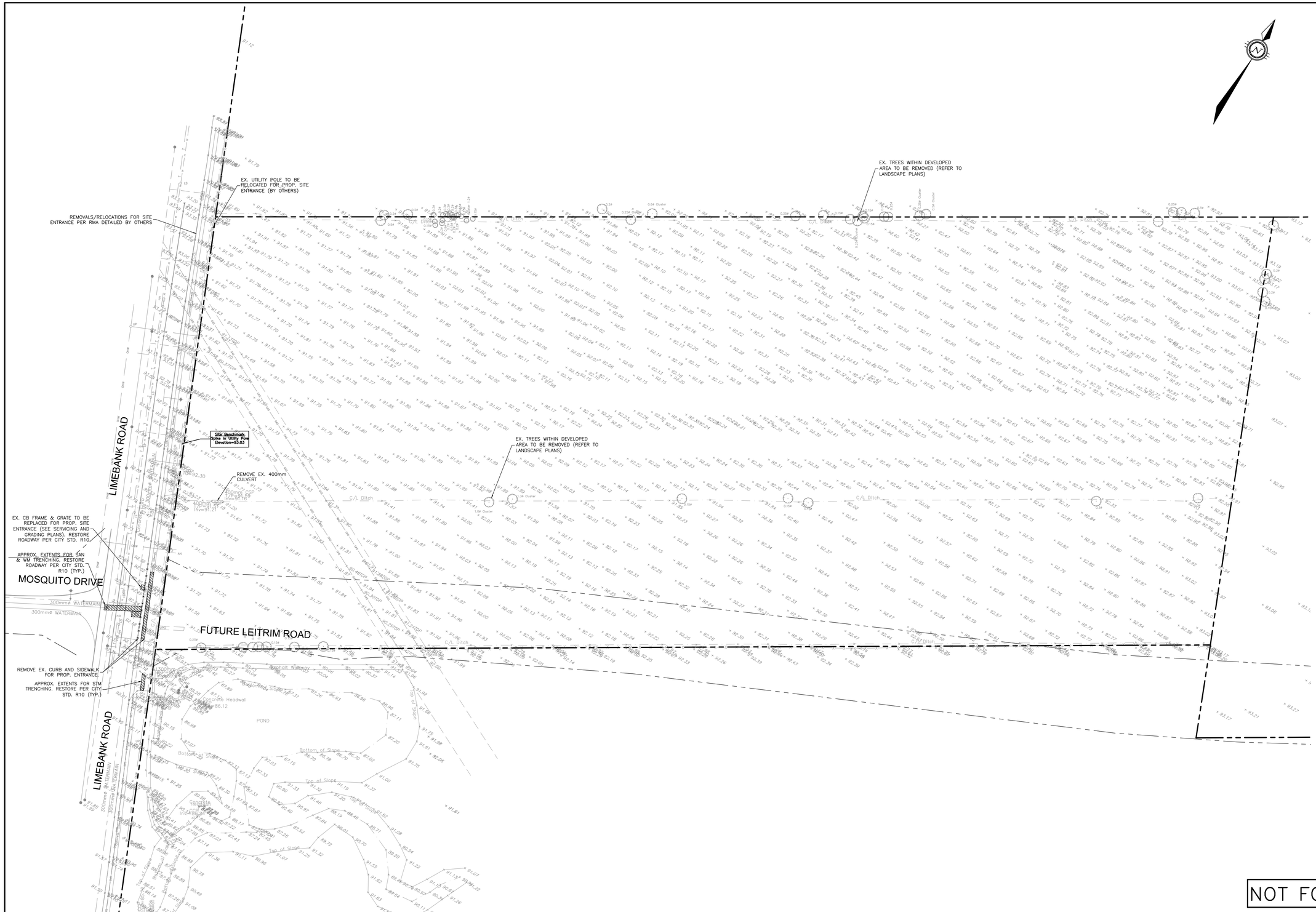
N 10° 31' 20" W 4.46 (P3 & Meas)

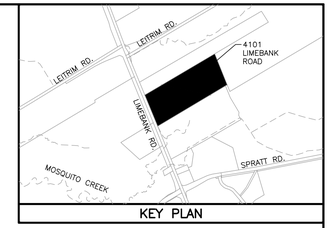
N 24° 32' 00" W 245.27 (P3 & Meas)

N 24° 32' 00" W 245.27 (P3 & Meas)

N 24° 32' 00" W 245.27

Appendix B





KEY PLAN

LEGEND

- PROPERTY BOUNDARY (4101 LIMEBANK RD.)
- FUTURE LEITRIM RD. REALIGNMENT ROW
- EASEMENT
- ×104.00 EXISTING ELEVATION
- EXISTING HYDRANT
- V&VB EXISTING VALVE & VALVE BOX
- EXISTING WATERMAIN
- EXISTING SANITARY SEWER & MAINTENANCE HOLE
- EXISTING STORM SEWER & MAINTENANCE HOLE
- EXISTING CATCH BASIN
- GAS EXISTING GAS LINE
- H EXISTING HYDRO LINE
- T EXISTING TRAFFIC LINE
- OHW EXISTING OVERHEAD LINE
- EXISTING DITCH CENTRELINE
- X EXISTING FENCE

NOT FOR CONSTRUCTION

NOTES

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NO.	REVISION DESCRIPTION	DATE	BY
2	REISSUED FOR SPA	08/09/26	SM
1	ISSUED FOR SPA	16/10/24	SM

SCALE

0 10m 20m 40m

HORIZONTAL 1:1000

LICENCED PROFESSIONAL ENGINEER
SEP 08/26
S.A.G.MCCAUGHEY
100217133
PROVINCE OF ONTARIO

Robinson Land Development
200-2936 Baseline Road
Ottawa, ON K2H 1B3
(613) 592-6060 rcii.com

DESIGN	SM
CHECKED	BM
DRAWN	SM
CHECKED	BM
APPROVED	CC

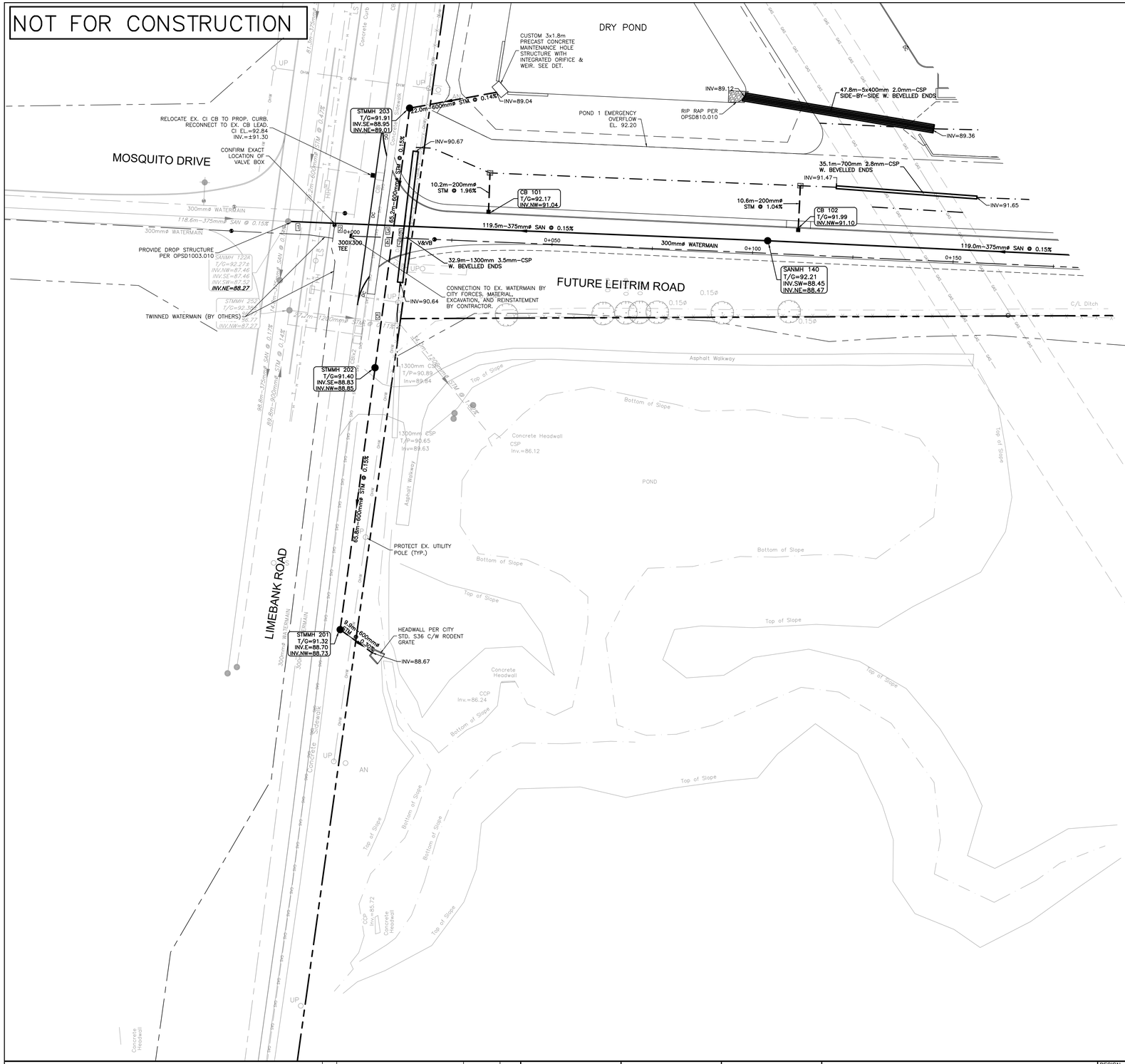
GROUPE MONTONI

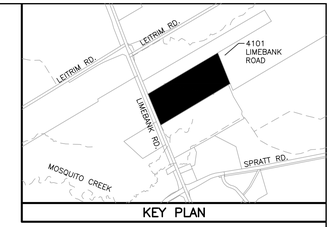
4101 LIMEBANK RD.
CITY OF OTTAWA

EXISTING CONDITIONS AND REMOVALS PLAN

PROJECT No.	23074
SURVEY	AOV
DATED	SEPT 2026
DWG. No:	23074-R1

NOT FOR CONSTRUCTION





LEGEND

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- FIRE DEPARTMENT CONNECTION
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- WATERMAIN
- SANITARY SEWER & MAINTENANCE HOLE
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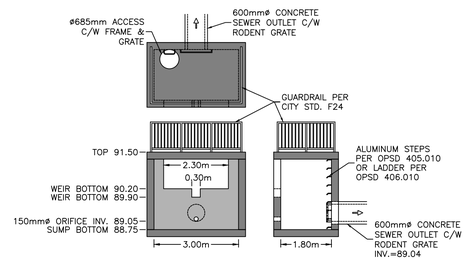
- CATCH BASIN MAINTENANCE HOLE
- CATCH BASIN
- DITCH/SWALE
- DOORWAY
- VEHICLE ENTRANCE
- CROSSING NUMBER (SEE DWG. N3)



POND OUTLET STRUCTURE
N.T.S.

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SCALE
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100217133
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(613) 592-6060 rcii.com

DESIGN	SM
CHECKED	BM
DRAWN	SM
CHECKED	BM
APPROVED	CC

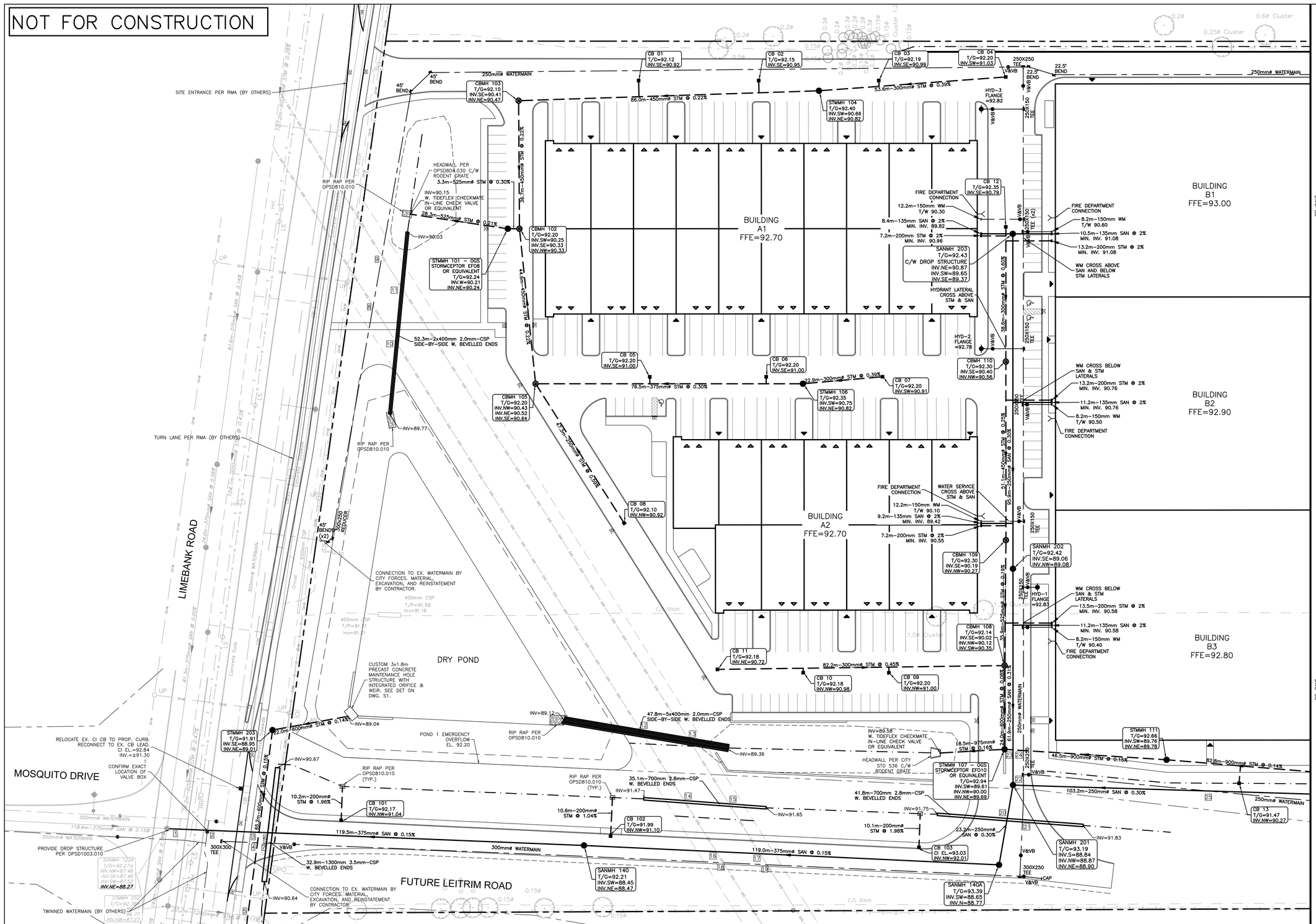
GROUPE MONTONI

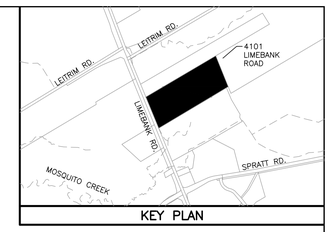
4101 LIMEBANK RD.
CITY OF OTTAWA

SERVICING PLAN

PROJECT No.	23074
SURVEY	AOV
DATED	SEPT 2026
DWG. No:	23074-S1

NOT FOR CONSTRUCTION





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- CATCH BASIN MAINTENANCE HOLE
- CATCH BASIN
- DITCH/SWALE
- DOORWAY
- VEHICLE ENTRANCE
- 1 CROSSING NUMBER (SEE DWG. N3)

NOTES

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SCALE
HORIZONTAL 1:500

LICENSED PROFESSIONAL ENGINEER
SEP. 08/26
S.A.G.MCCAUGHEY
100217133
PROVINCE OF ONTARIO

Robinson Land Development
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(613) 592-6060 rcii.com

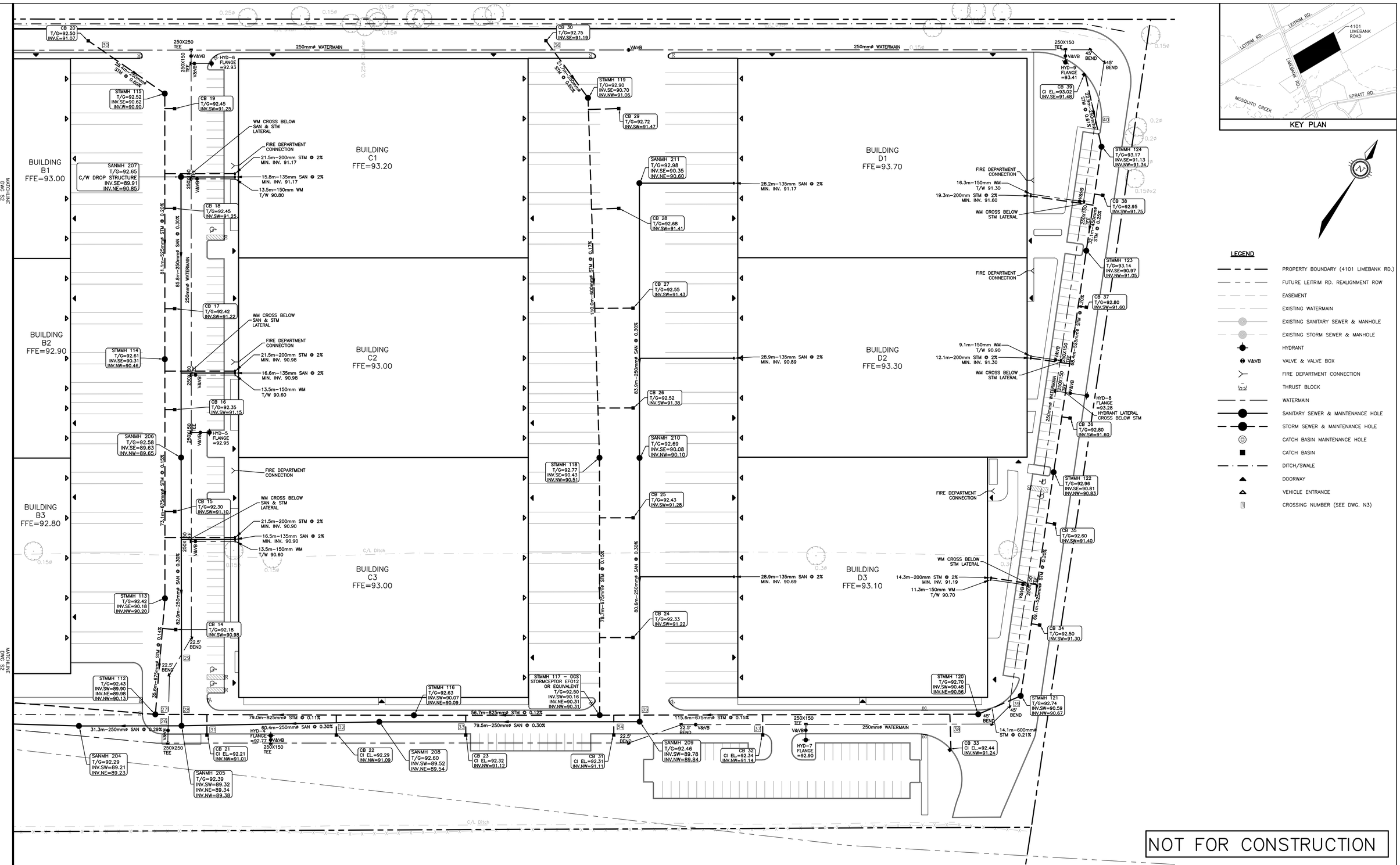
DESIGN	SM
CHECKED	BM
DRAWN	SM
CHECKED	BM
APPROVED	CC

GROUPE MONTONI

4101 LIMEBANK RD.
CITY OF OTTAWA

SERVICING PLAN

PROJECT No.	23074
SURVEY	AOV
DATED	SEPT 2026
DWG. No:	23074-S2



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APPROVED	CC

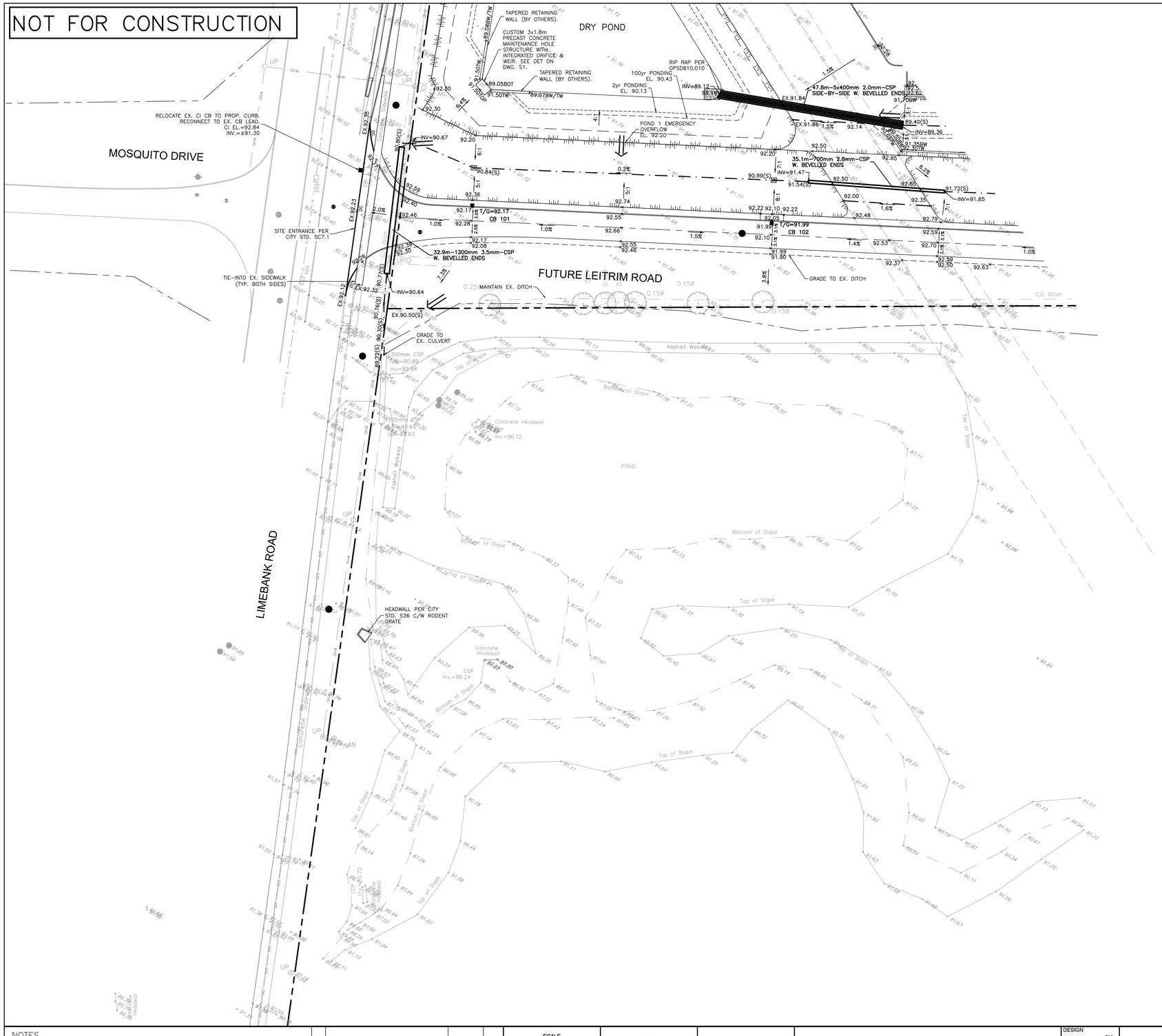
GROUPE MONTONI

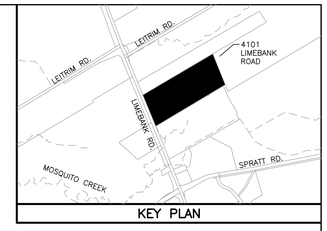
4101 LIMEBANK RD.
CITY OF OTTAWA

SERVICING PLAN

PROJECT No.	23074
SURVEY	AOV
DATED	SEPT 2026
DWG. No:	23074-S3

NOT FOR CONSTRUCTION





KEY PLAN

LEGEND

- PROPERTY BOUNDARY (4101 LIMEBANK RD.)
- FUTURE LEITRIM RD. REALIGNMENT ROW
- EASEMENT
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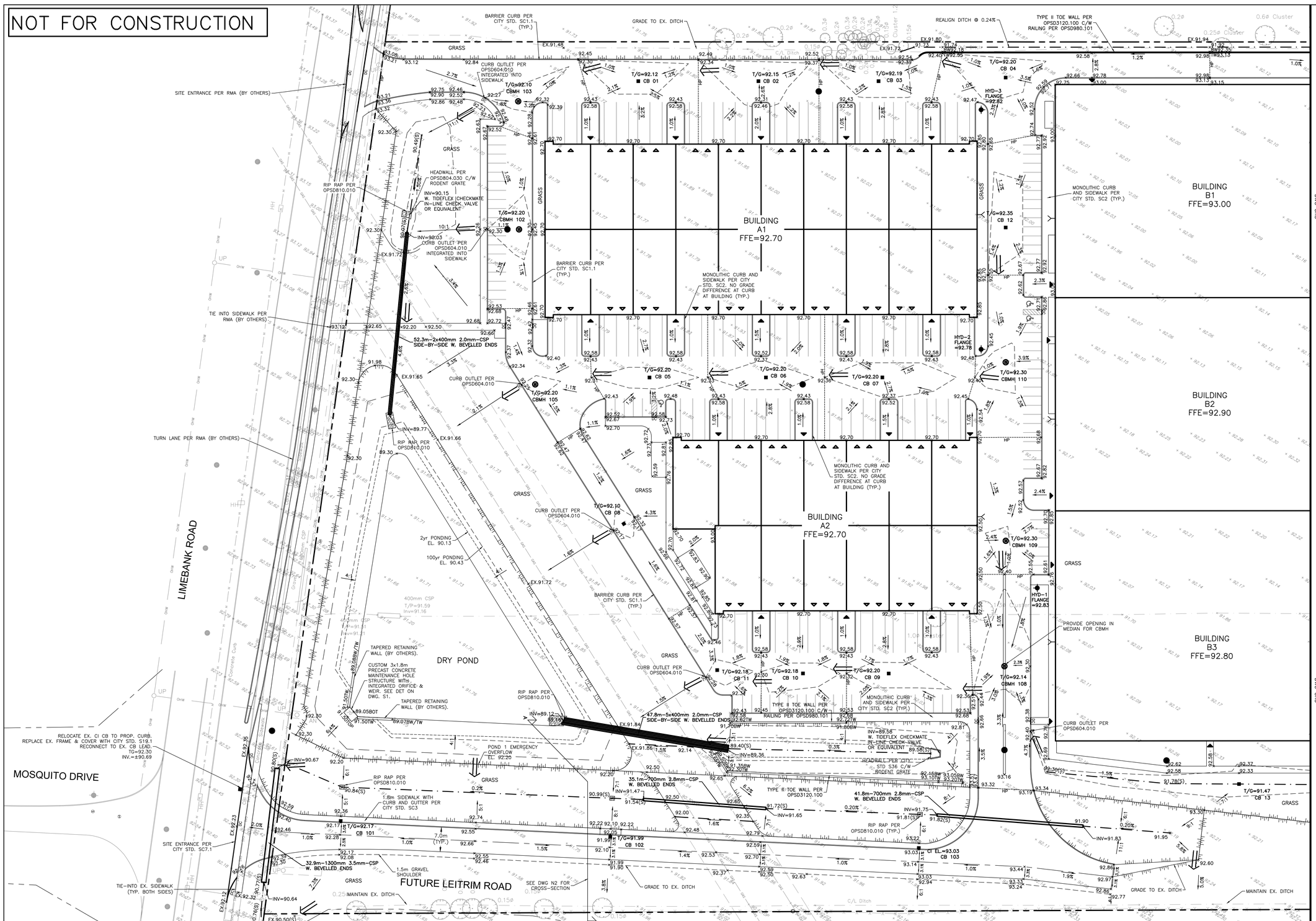
GROUPE MONTONI

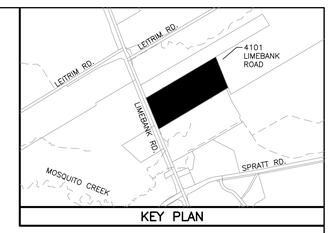
4101 LIMEBANK RD.
CITY OF OTTAWA

GRADING PLAN

PROJECT No.	23074
SURVEY	AOV
DATED	SEPT 2026
DWG. No:	23074-GR1

NOT FOR CONSTRUCTION





KEY PLAN

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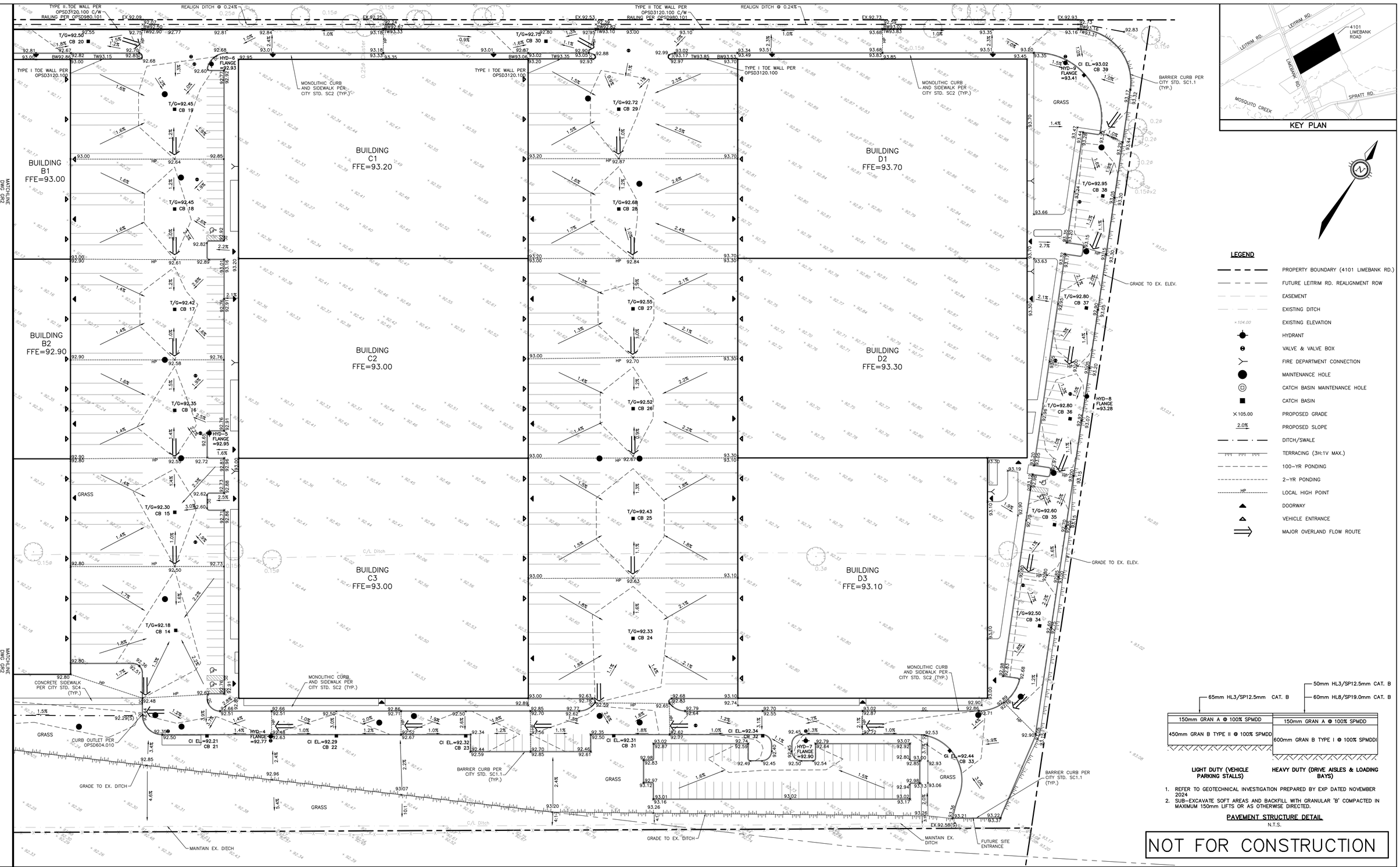
CITY OF OTTAWA

GRADING PLAN

PROJECT No.	23074
SURVEY	AOV
DATED	SEPT 2026
DWG. No:	23074-GR2



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LIGHT DUTY (VEHICLE PARKING STALLS) | **HEAVY DUTY (DRIVE AISLES & LOADING BAYS)**

1. REFER TO GEOTECHNICAL INVESTIGATION PREPARED BY EXP DATED NOVEMBER 2024
2. SUB-EXCAVATE SOFT AREAS AND BACKFILL WITH GRANULAR 'B' COMPACTED IN MAXIMUM 150mm LIFTS OR AS OTHERWISE DIRECTED.

PAVEMENT STRUCTURE DETAIL
N.T.S.

NOT FOR CONSTRUCTION

NOTES

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PROVINCE OF ONTARIO

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DESIGN	SM
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GROUPE MONTONI

4101 LIMEBANK RD.
CITY OF OTTAWA

GRADING PLAN

PROJECT No.	23074
SURVEY	AOV
DATED	SEPT 2026
DWG. No:	23074-G3

GENERAL NOTES:

1. ALL WORKS AND MATERIALS SHALL CONFORM TO THE LATEST REVISIONS OF THE STANDARDS AND SPECIFICATIONS OF THE CITY OF OTTAWA AND ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) AND SPECIFICATIONS (OPSS), AS AMENDED BY THE CITY OF OTTAWA.
2. THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL EXISTING UTILITIES WITHIN THE SITE AND ADJACENT WORK AREAS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITIES TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OR REPLACEMENT OF ANY SERVICES OR UTILITIES DISTURBED DURING CONSTRUCTION, TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION.
3. ALL DIMENSIONS AND ELEVATIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER.
4. DESIGN ELEVATIONS GIVEN ARE TO BE ADHERED TO WITH NO CHANGES WITHOUT PRIOR WRITTEN APPROVAL BY ROBINSON LAND DEVELOPMENT. CONTRACTOR TO PROVIDE AS CONSTRUCTED SURVEY TO VERIFY WORKS ARE COMPLETED IN ACCORDANCE WITH THE DESIGN.
5. ALL GROUND SURFACES SHALL BE EVENLY GRADED WITHOUT PONDING AREAS TO PROPOSED GRADES WHERE NOTED, AND EXISTING GRADES OTHERWISE.
6. CONTRACTOR SHALL ADJUST FINAL GRADE OF EXISTING MAINTENANCE HOLES, VALVE BOXES, ETC. AS REQUIRED TO MATCH PROPOSED GRADES.
7. 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.
8. RELOCATION OF EXISTING SERVICES AND/OR UTILITIES SHALL BE AS SHOWN ON THE DRAWINGS OR AS DIRECTED BY THE ENGINEER AT THE EXPENSE OF THE CONTRACTOR.
9. 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.
10. ALL CONSTRUCTION SIGNAGE MUST CONFORM TO THE M.T.O. MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (LATEST AMENDMENT).
11. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SPECIFIED.
12. THE SUPPORT OF ALL UTILITIES SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
13. THE CONTRACTOR WILL BE RESPONSIBLE FOR ADDITIONAL BEDDING OR ADDITIONAL STRENGTH PIPE IF THE MAXIMUM TRENCH WIDTH, AS SPECIFIED BY OPSD, IS EXCEEDED.
14. ALL NECESSARY CLEARING AND GRUBBING SHALL BE COMPLETED BY THE CONTRACTOR. REFER TO LANDSCAPE PLANS FOR ANY TREE CUTTING.
15. REFER TO GEOTECHNICAL INVESTIGATION PREPARED BY EXP DATED NOVEMBER 2024.
16. THE CONTRACTOR IS RESPONSIBLE FOR AND SHALL PROVIDE FOR DEWATERING, SUPPORT AND PROTECTION OF EXCAVATIONS AND TRENCHING AS WELL AS RELEASE OF ANY PUMPED GROUNDWATER IN A CONTROLLED AND APPROVED MANNER.
17. DO NOT CONSTRUCT USING DRAWINGS THAT ARE NOT MARKED "ISSUED FOR CONSTRUCTION".
18. CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT FOR CONSTRUCTION PURPOSES.
19. THE CONTRACTOR SHALL BE RESPONSIBLE TO MANAGE EXCESS SOIL IN ACCORDANCE WITH ONTARIO REGULATION 406/19.

STORM SEWERS:

1. ALL REINFORCED CONCRETE STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CSA A257.2 (LATEST AMENDMENT). ALL NON-REINFORCED CONCRETE STORM SEWER PIPE SHALL BE IN ACCORDANCE WITH CSA A257.1 (LATEST AMENDMENT). PIPE SHALL BE JOINTED WITH STD. RUBBER GASKETS AS PER CSA A257.3 (LATEST AMENDMENT).
3. ALL PVC STORM SEWERS ARE TO BE SDR 35 APPROVED PER C.S.A. B182.2 (LATEST AMENDMENT), UNLESS OTHERWISE SPECIFIED.
4. ALL STORM SEWER TRENCH AND BEDDING SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. S6 AND S7 CLASS 'B' UNLESS OTHERWISE SPECIFIED. BEDDING AND COVER MATERIAL SHALL BE SPECIFIED BY GEOTECHNICAL REPORT.
5. CLAY SEALS SHALL BE INSTALLED WITHIN SEWER TRENCHES IN ACCORDANCE WITH CITY STANDARD S8.
6. STORM MAINTENANCE HOLESFRAME AND COVERS SHALL BE AS PER CITY OF OTTAWA STD. S24.1 AND S25. CBMH COVER AS PER CITY OF OTTAWA STD. S28.1.
7. CB FRAME PER OPSD 400.020 AND COVER PER CITY OF OTTAWA STD. 19.1. CURB INLET CB FRAME AND COVER PER CITY OF OTTAWA STD. S28. DITCH INLET CB FRAME AND COVER PER OPSD 705.030.
8. STORM SEWER MAINTENANCE HOLESSERVING SEWERS LESS THAN 900mm SHALL BE CONSTRUCTED WITH A 300mm SUMP. FOR STORM SEWERS 900mm AND OVER USE BENCHING IN ACCORDANCE WITH OPSD 701.021.
9. THE STORM SEWER CLASSES HAVE BEEN DESIGNED BASED ON BEDDING CONDITIONS SPECIFIED ABOVE. WHERE THE SPECIFIED TRENCH WIDTH IS EXCEEDED, THE CONTRACTOR SHALL BE REQUIRED TO PROVIDE ADDITIONAL BEDDING, A DIFFERENT TYPE OF BEDDING OR A HIGHER PIPE STRENGTH AT HIS OWN EXPENSE AND SHALL ALSO BE RESPONSIBLE FOR EXTRA TEMPORARY AND/OR PERMANENT REPAIRS MADE NECESSARY BY THE WIDENED TRENCH.
10. ALL STORM MAINTENANCE HOLES SHALL BE 1200mm DIAMETER AS PER OPSD 701.010 UNLESS OTHERWISE NOTED.
11. ALL CATCH BASINS SHALL BE 600mm X 600mm AS PER OPSD 705.010 UNLESS OTHERWISE NOTED.
12. ALL CB LATERALS SHALL BE 200mm PVC AT 2% UNLESS OTHERWISE NOTED.
19. STORM SERVICE CONNECTION REQUIRES APPROVED CONTROLLED SETTLEMENT JOINT IN ACCORDANCE WITH CITY OF OTTAWA STANDARD S11 AND S11.1.
20. FOUNDATION DRAINS TO BE INSTALLED WITH BACKWATER VALVES PER CITY OF OTTAWA STD. S14.
21. SEWERS, SERVICES AND LATERALS WITH LESS THAN 2m COVER SHALL BE INSULATED PER CITY OF OTTAWA STD. S35.
19. CONTRACTOR SHALL PERFORM VIDEO INSPECTION OF ALL STORM SEWERS. A COPY OF THE VIDEO AND INSPECTION REPORT SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.
20. CULVERTS TO BE INSTALLED IN ACCORDANCE WITH CITY OF OTTAWA STD. S26 AND SHALL BE PROVIDED WITH FROST TAPER IN ACCORANCE WITH OPSD 803.030.

SANITARY SEWERS:

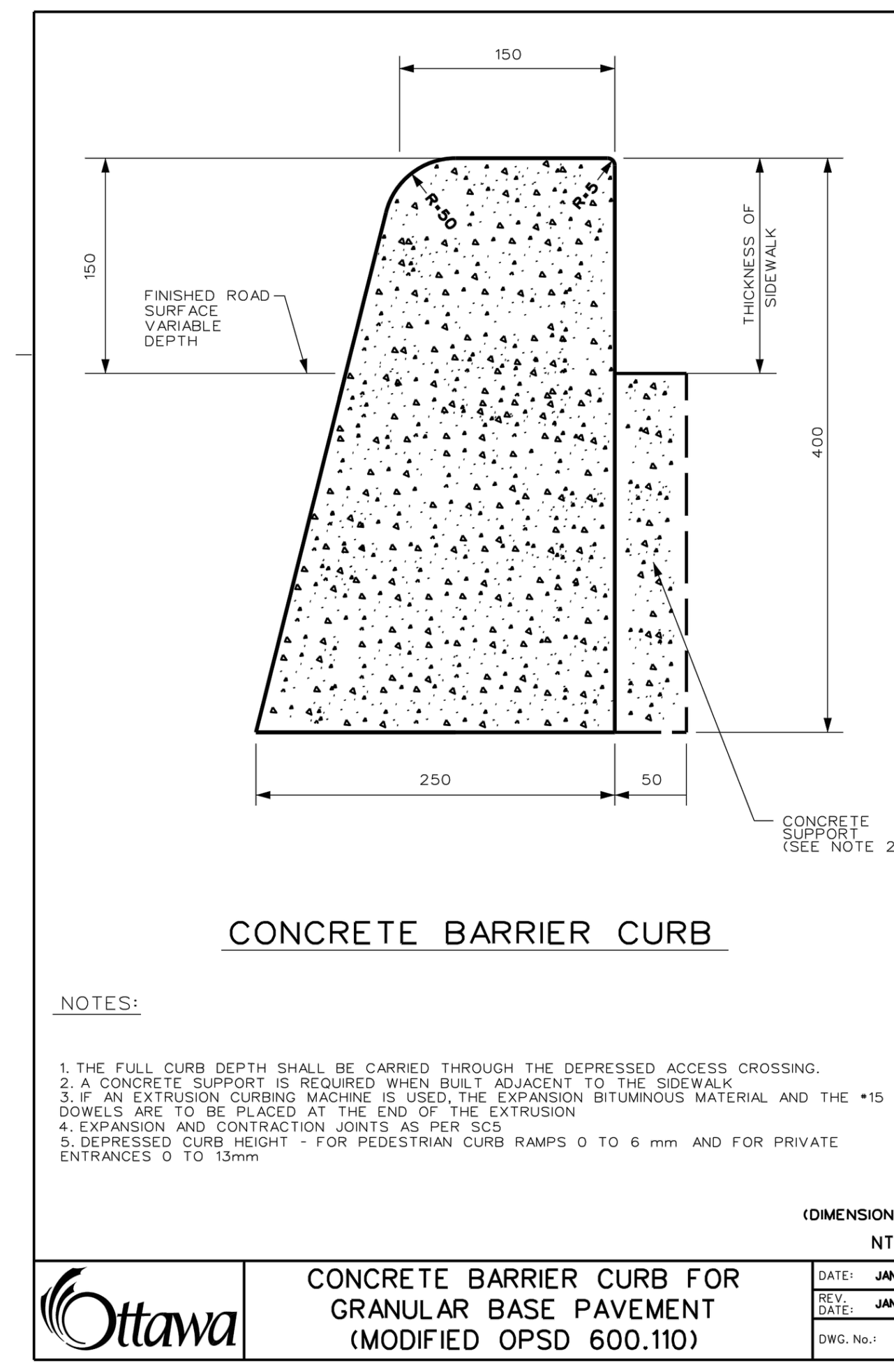
1. ALL SANITARY SEWERS SHALL BE PVC SDR 35 AND SERVICE LATERALS SHALL BE PVC SDR 28, IN ACCORDANCE WITH CITY OF OTTAWA STANDARDS.
2. SANITARY SEWER TRENCH AND BEDDING SHALL BE AS PER CITY OF OTTAWA STD. S6 AND S7, CLASS 'B' BEDDING UNLESS OTHERWISE NOTED. BEDDING AND COVER MATERIAL SHALL BE SPECIFIED BY GEOTECHNICAL REPORT.
3. SANITARY MAINTENANCE HOLE FRAME AND COVERS SHALL BE WATERTIGHT AS PER CITY OF OTTAWA STD. S24 AND S25.
4. SANITARY SEWER MAINTENANCE HOLES SHALL BE 1200mm DIAMETER AS PER OPSD 701.010 AND BENCHED AS PER OPSD 701.021.
5. SANITARY MAINTENANCE HOLES SHALL BE INSTALLED WITH CRETEX JOINT SEALS, OR A SIMILAR PRODUCT TO PREVENT INFILTRATION.
17. CLAY SEALS SHALL BE INSTALLED WITHIN SEWER TRENCHES IN ACCORDANCE WITH CITY STANDARD S8.
18. CONTRACTOR SHALL PERFORM LEAKAGE TESTING, IN THE PRESENCE OF THE CONSULTANT, FOR SANITARY SEWERS IN ACCORDANCE WITH OPSS 410 AND OPSS 407.
19. CONTRACTOR SHALL PERFORM VIDEO INSPECTION OF ALL SANITARY SEWERS. A COPY OF THE VIDEO AND INSPECTION REPORT SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.
20. SANITARY SERVICE CONNECTION REQUIRES APPROVED CONTROLLED SETTLEMENT JOINT IN ACCORDANCE WITH CITY OF OTTAWA STANDARD S11.1,
21. SEWERS AND LATERALS WITH LESS THAN 2m COVER SHALL BE INSULATED PER CITY OF OTTAWA STD. S35.

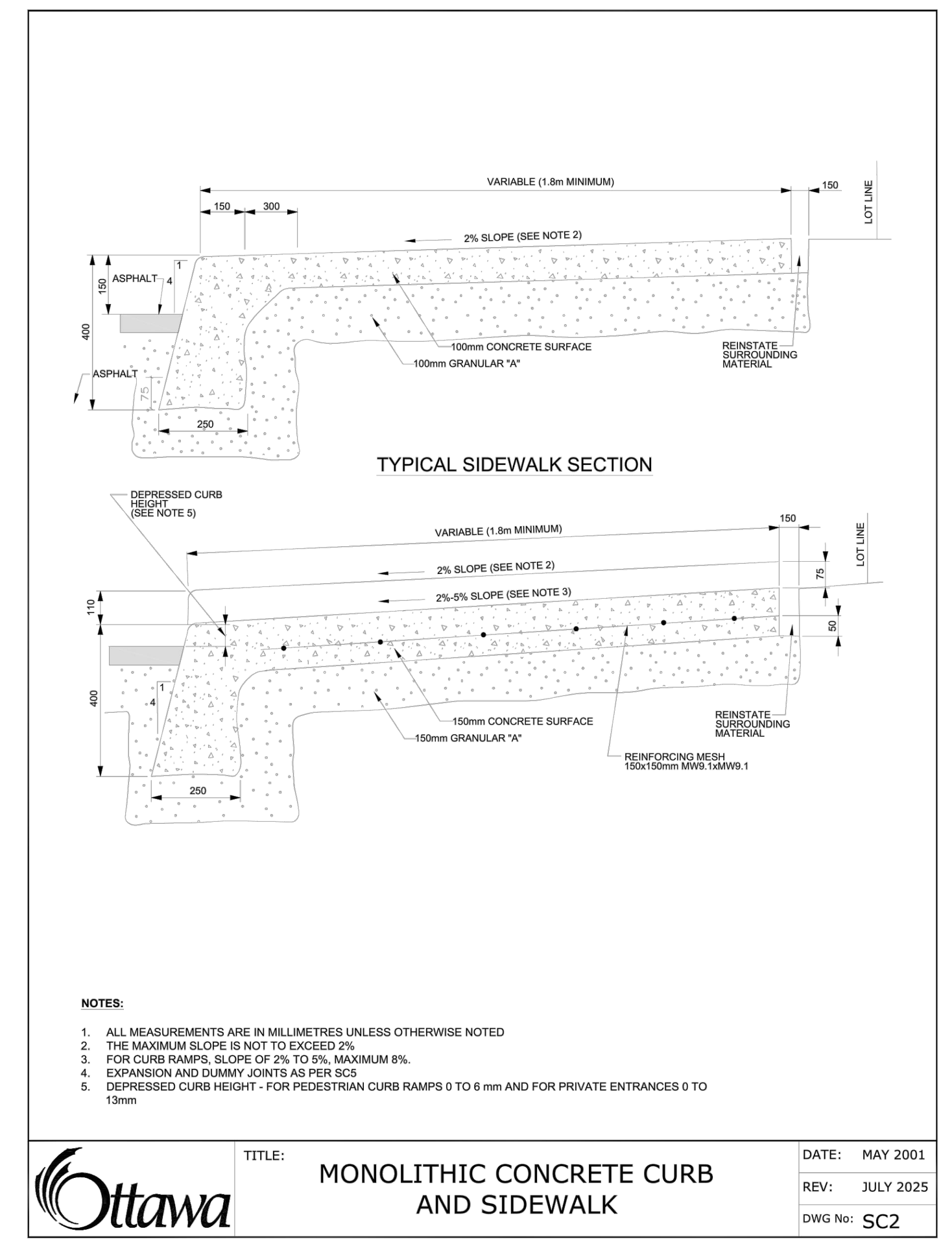
WATER SUPPLY:

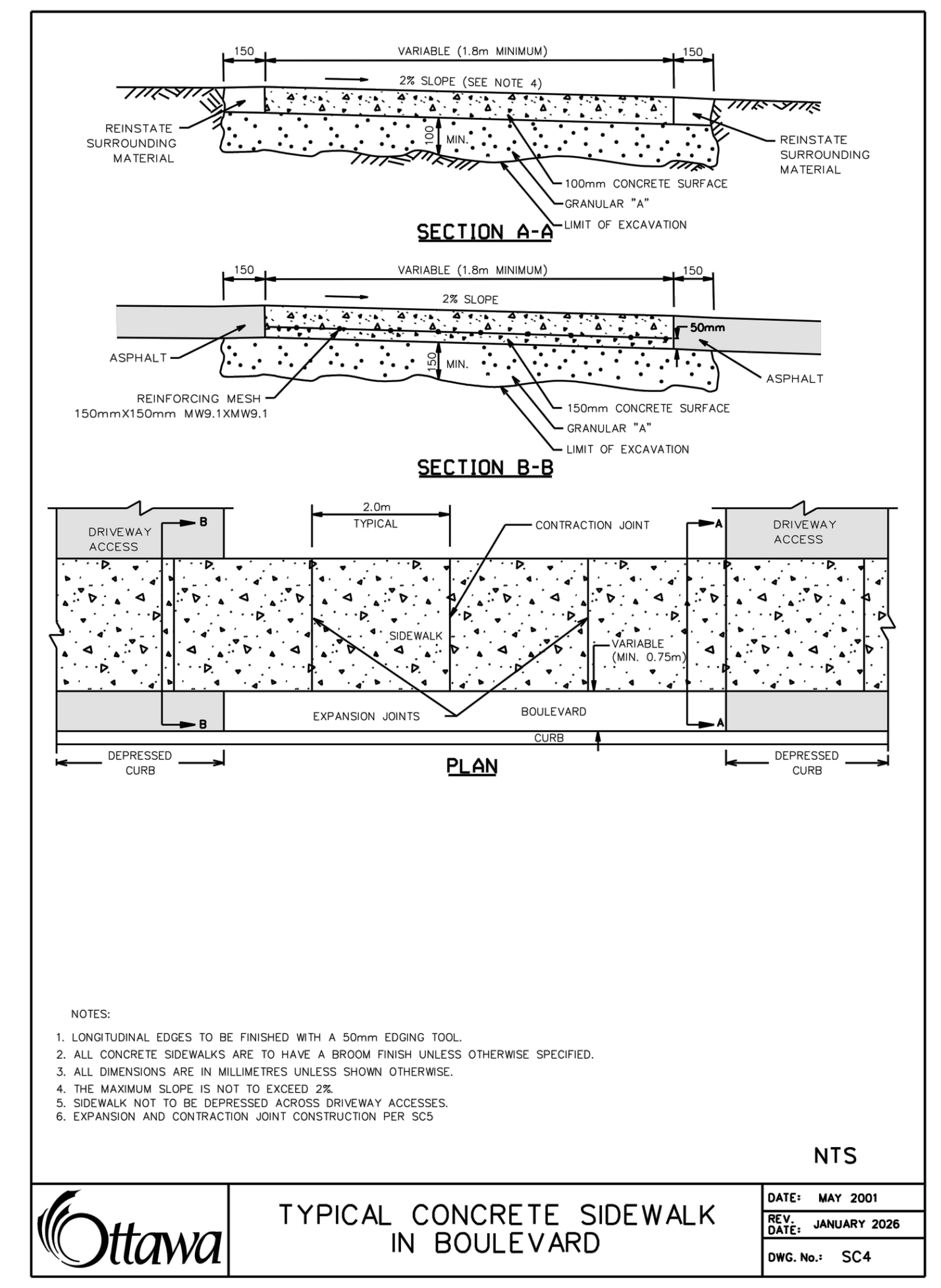
1. ALL PVC WATERMAINS SHALL BE EQUAL TO AWWA C-900 CLASS 150, SDR 18, OR APPROVED EQUAL.
2. WATERMAIN TRENCH AND BEDDING SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STANDARD W17, UNLESS OTHERWISE SPECIFIED. BEDDING AND COVER MATERIAL SHALL BE SPECIFIED BY GEOTECHNICAL REPORT.
3. ALL PVC WATERMAINS SHALL BE INSTALLED WITH A 10 GAUGE STRANDED COPPER TWU OR RWU TRACER WIRE IN ACCORDANCE WITH CITY OF OTTAWA STD. W36.
4. CATHODIC PROTECTION IS REQUIRED ON ALL METALLIC FITTINGS AS PER CITY OF OTTAWA STD. W40 AND W42.
5. CONTRACTOR TO SUPPLY HYDRANT EXTENSION TO ADJUST THE LENGTH OF HYDRANT BARREL IF REQUIRED.
6. FIRE HYDRANTS SHALL BE INSTALLED AS PER CITY OF OTTAWA STD. W19, AND LOCATED AS PER CITY STD. W18.
7. VALVE IN BOXES SHALL BE INSTALLED AS PER CITY OF OTTAWA STD. W24.
8. WATERMAIN IN FILL AREAS TO BE INSTALLED WITH RESTRAINED JOINTS AS PER CITY OF OTTAWA STD. W25.5 AND W25.6.
9. THRUST BLOCKING OF WATERMAIN TO BE INSTALLED AS PER CITY OF OTTAWA STD. W25.3 AND W25.4.
10. INSULATION FOR WATERMAIN CROSSING OVER AND BELOW SEWER SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. W25.2 AND W25, RESPECTIVELY, WHERE WATERMAIN COVER IS LESS THAN 2.4m.
11. INSULATION BETWEEN WATERMAIN AND OPEN STRUCTURES IN ACCORDANCE WITH CITY OF OTTAWA STD. W23 WHERE CLEARANCE IS LESS THAN 2.4m.
12. AS PER CITY GUIDELINE, THE MINIMUM VERTICAL CLEARANCE BETWEEN WATERMAIN AND SEWER / UTILITY IS 0.50m FOR CROSSING UNDER/OVER THE SEWER, AS PER CITY STD. W25 & W25.2. FOR CROSSING UNDER SEWER, ADEQUATE STRUCTURAL SUPPORT FOR THE SEWERS IS REQUIRED TO PREVENT EXCESSIVE DEFLECTION OF JOINTS AND SETTLING. THE LENGTH OF WATER PIPE SHALL BE CENTERED AT THE POINT OF CROSSING SO THAT THE JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER AS PER CITY STD. W25.
13. CONNECTION TO EXISTING WATERMAIN TO BE PERFORMED BY CITY FORCES. CONTRACTOR TO PROVIDE LABOUR, EQUIPMENT AND MATERIAL REQUIRED FOR EXCAVATION, BEDDING AND REINSTATEMENT.
10. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY CAPS, PLUGS AND BLOW-OFFS AND NOZZLES REQUIRED FOR TESTING AND DISINFECTION OF THE WATERMAIN.
11. SWABBING, HYDROSTATIC TESTING, AND DISINFECTION TO BE CONDUCTED AS PER CITY OF OTTAWA STANDARDS IN THE PRESENCE OF A CITY INSPECTOR AND/OR CONSULTANT.

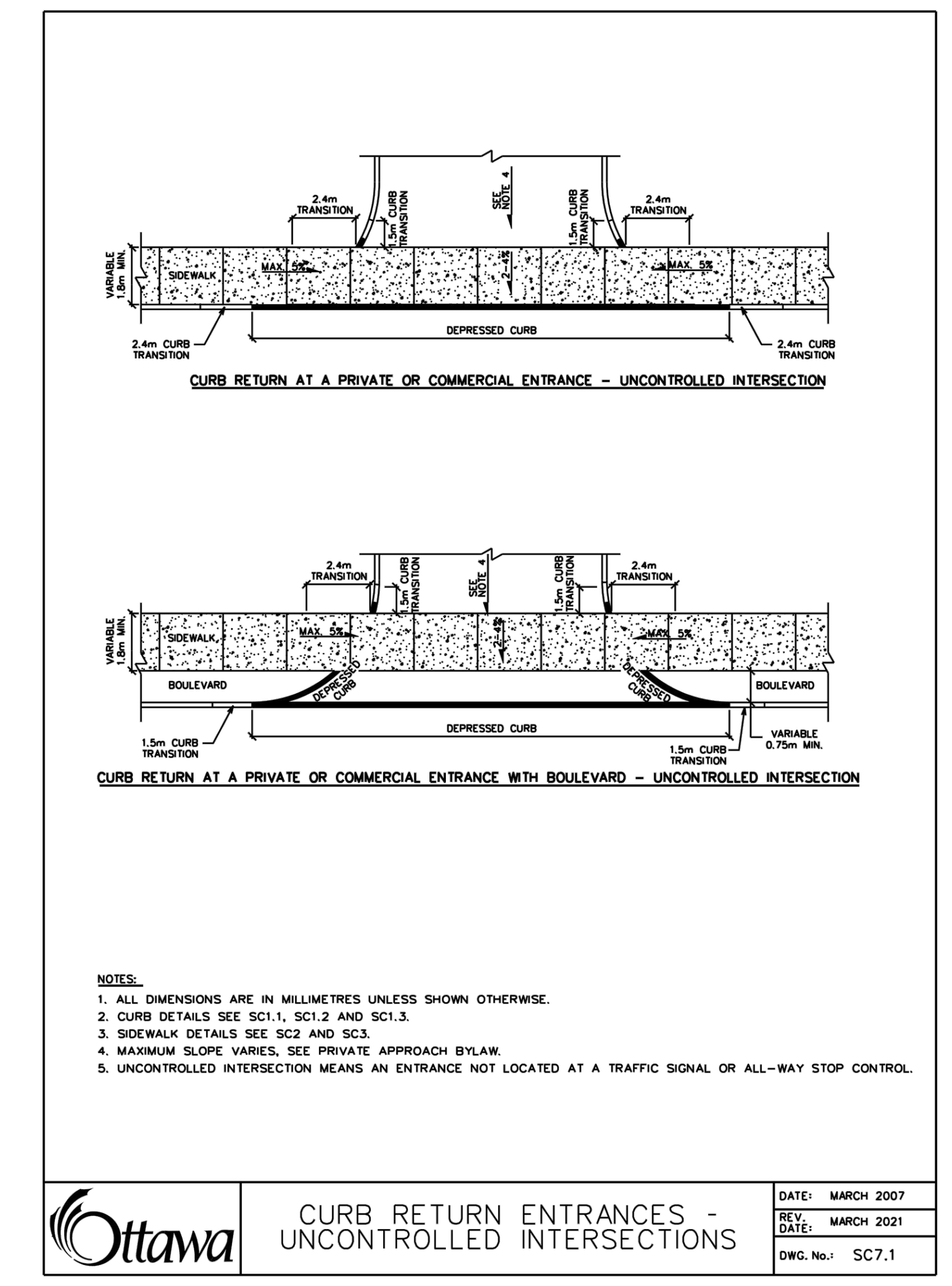
ROADWORK SPECIFICATIONS:

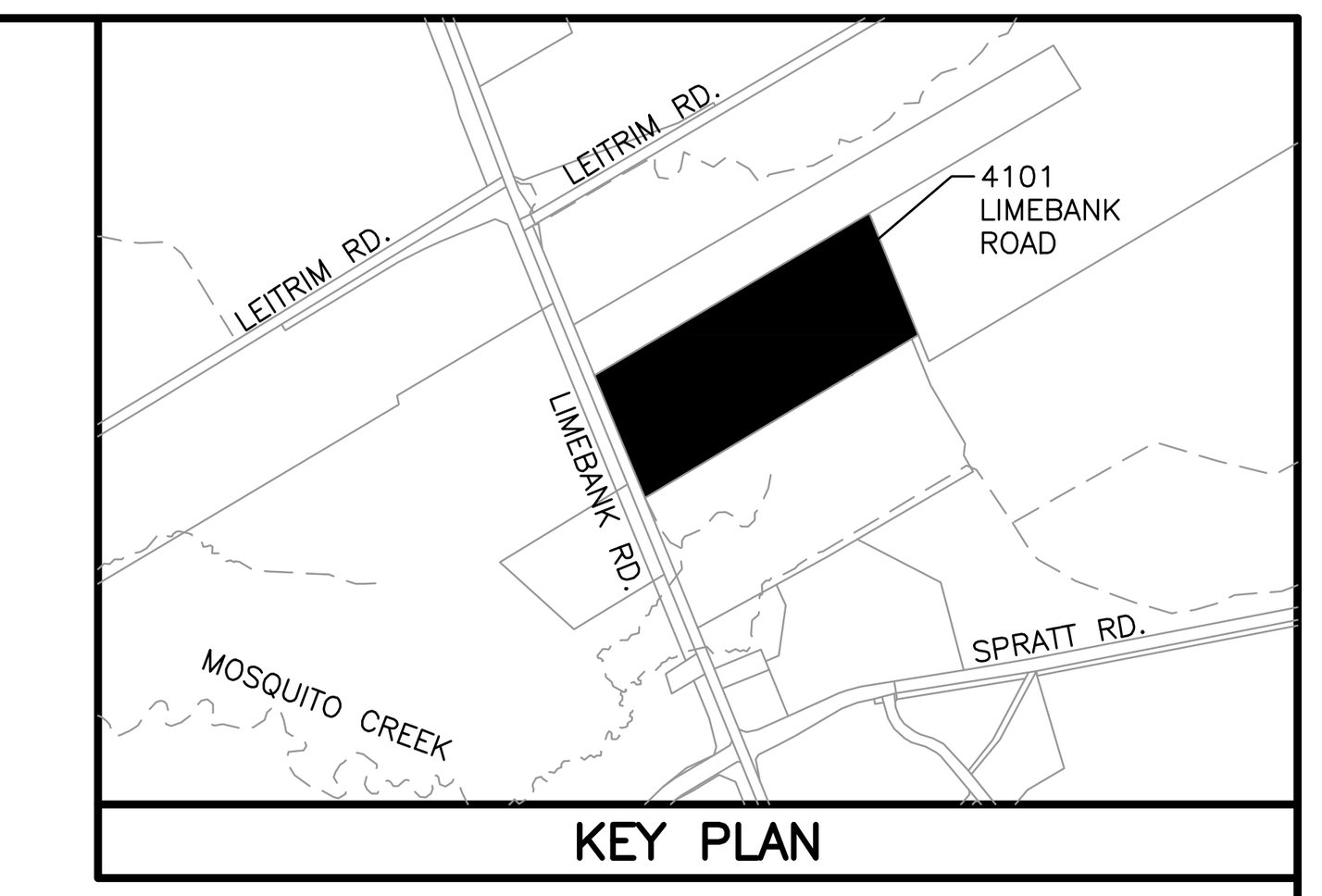
1. CONCRETE CURB SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. SC1.1 (BARRIER CURB). PROVISION SHALL BE MADE FOR CURB DEPRESSIONS AT SIDEWALKS AND DRIVEWAYS.
2. ALL BARRIER CURB TO BE 150mm ABOVE FINISHED ASPHALT GRADE UNLESS OTHERWISE NOTED.
3. MONOLITHIC CURB AND SIDEWALK SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. SC2 WITH CONSTRUCTION JOINTS PER SC5.
4. TACTILE WALKING SURFACE INDICATOR (TWSI) SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. SC7.3. REFER TO ARCHITECTURAL PLANS FOR LOCATIONS.
5. PAVEMENT REINSTATEMENT FOR SERVICE AND UTILITY CUTS SHALL BE IN ACCORDANCE WITH CITY OF OTTAWA STD. R10 AND OPSD 509.010, OPSS 310.
6. GRANULAR "A" SHALL BE PLACED TO A MINIMUM THICKNESS OF 300mm AROUND ALL STRUCTURES WITHIN PAVEMENT AREA.
7. ASPHALT WEAR COURSE SHALL NOT BE PLACED UNTIL THE VIDEO INSPECTION OF SEWERS & NECESSARY REPAIRS HAVE BEEN CARRIED OUT TO THE SATISFACTION OF THE ENGINEER.
8. SUB-EXCAVATE SOFT AREAS AND FILL WITH GRANULAR 'B' COMPACTED IN MAXIMUM 300mm LIFTS.
9. ALL EDGES OF DISTURBED PAVEMENT SHALL BE SAW-CUT TO FORM A NEAT AND STRAIGHT LINE PRIOR TO PLACING NEW ASPHALT.
10. PAVEMENT DESIGN AS PER GEOTECHNICAL RECOMMENDATIONS. SEE REPORT BY EXP DATED NOVEMBER 2024.

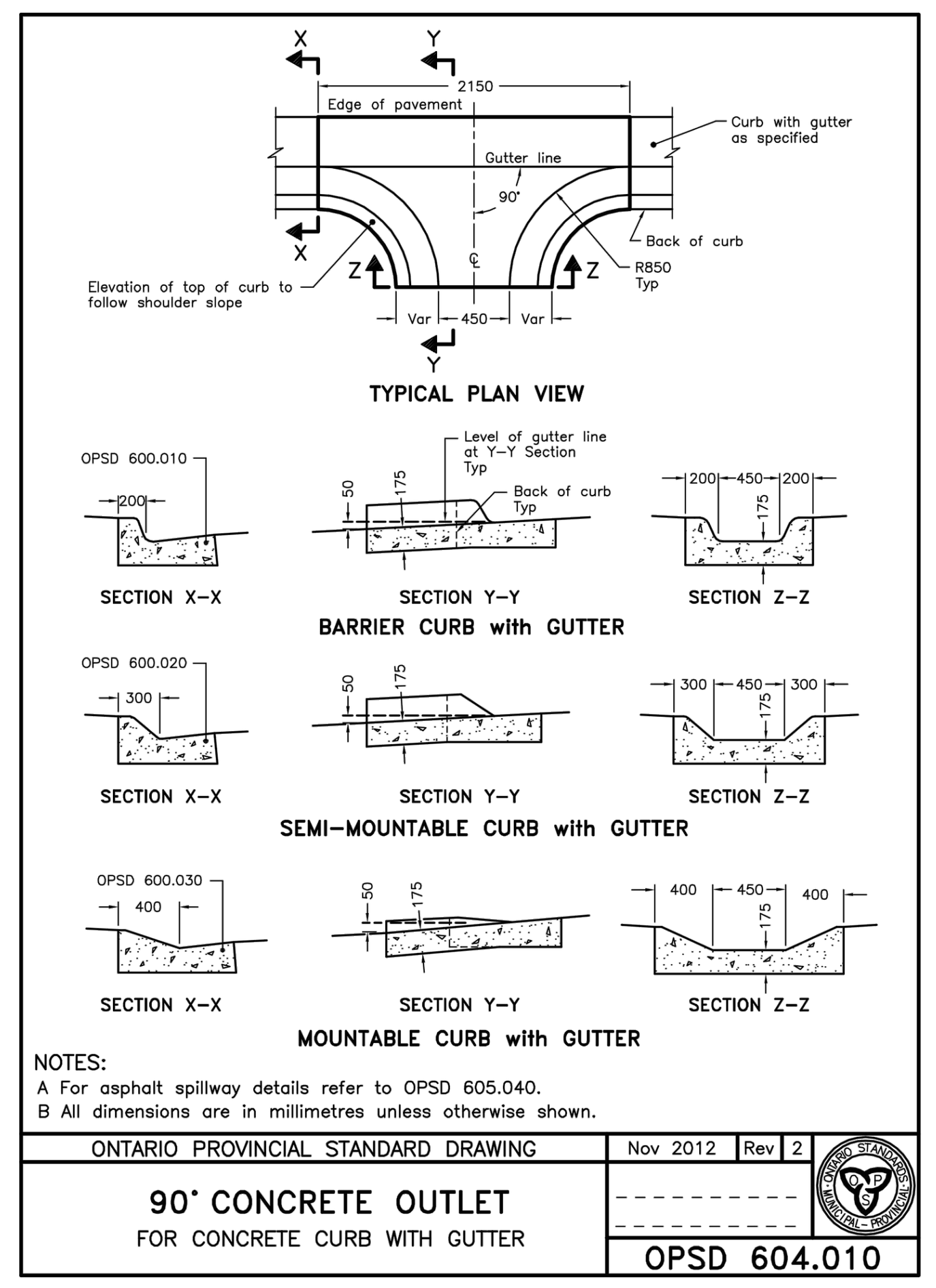


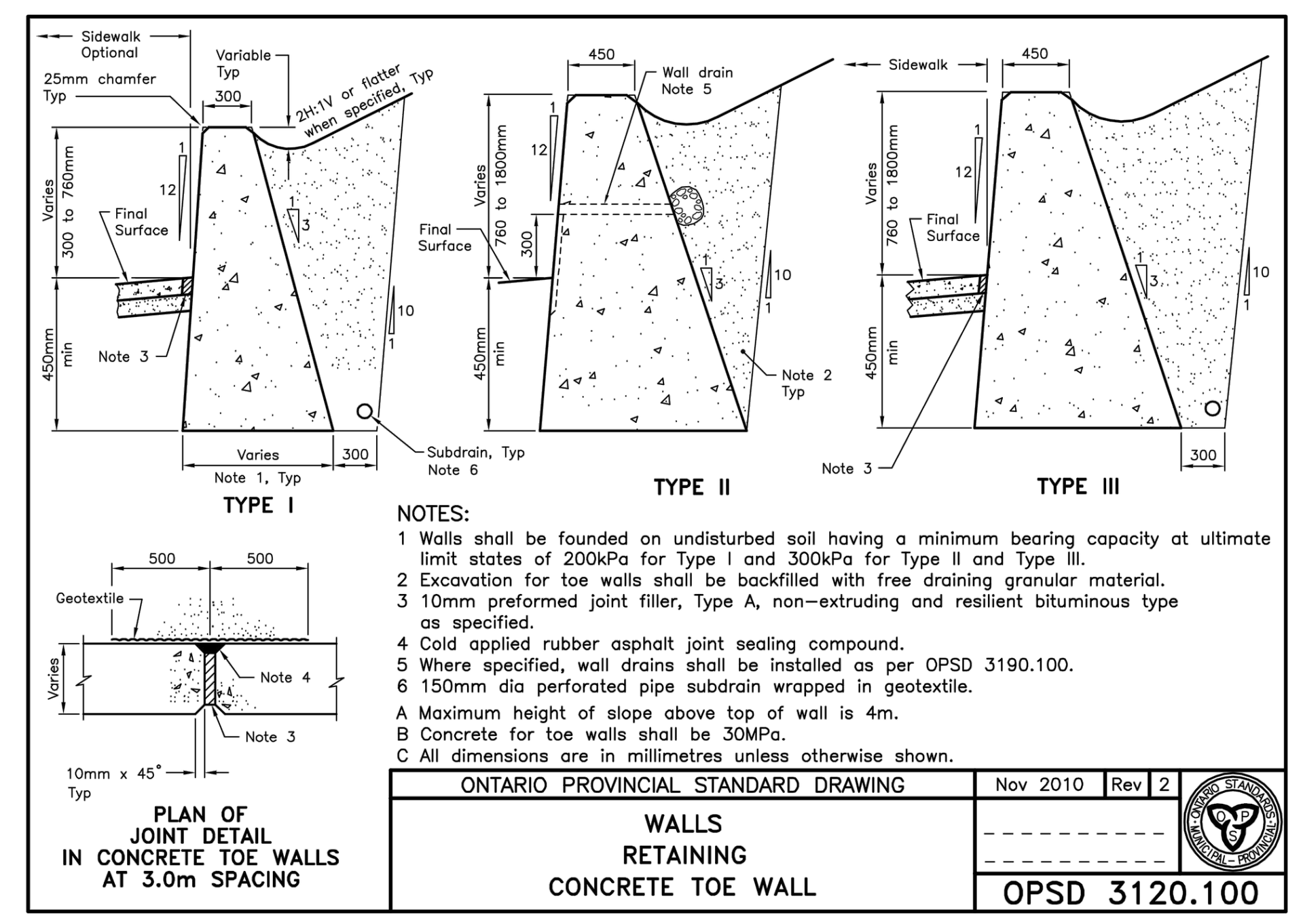


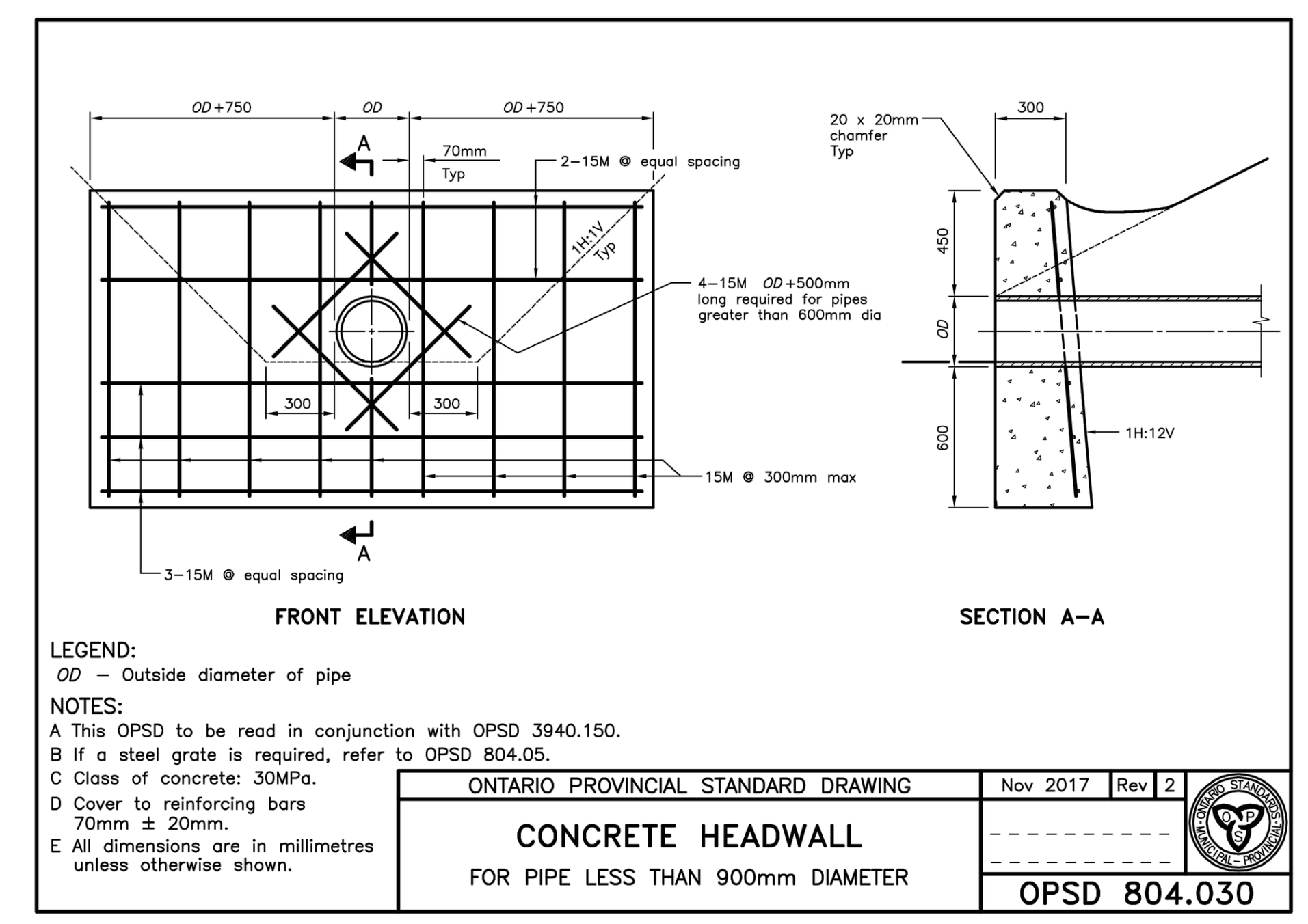


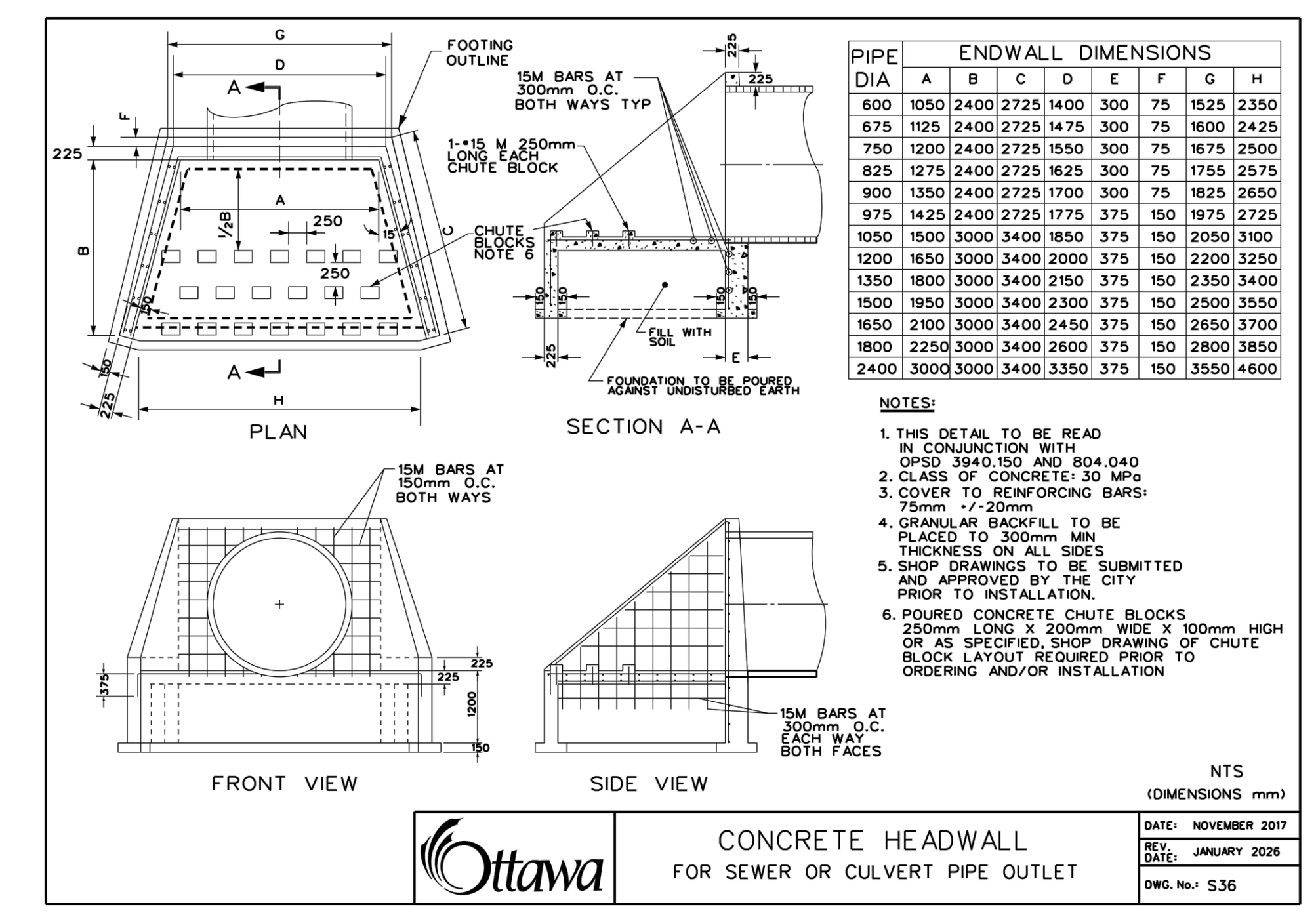




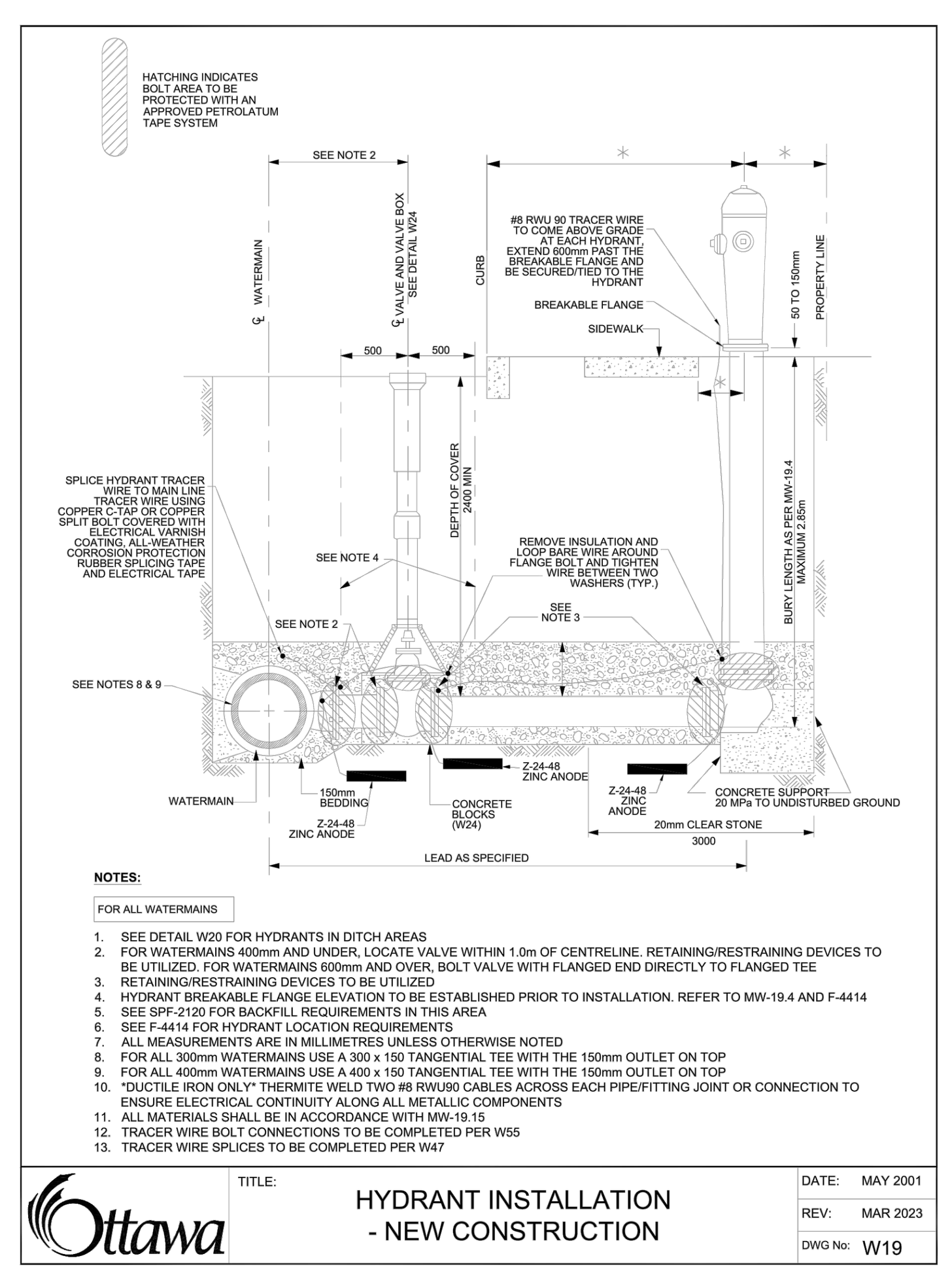


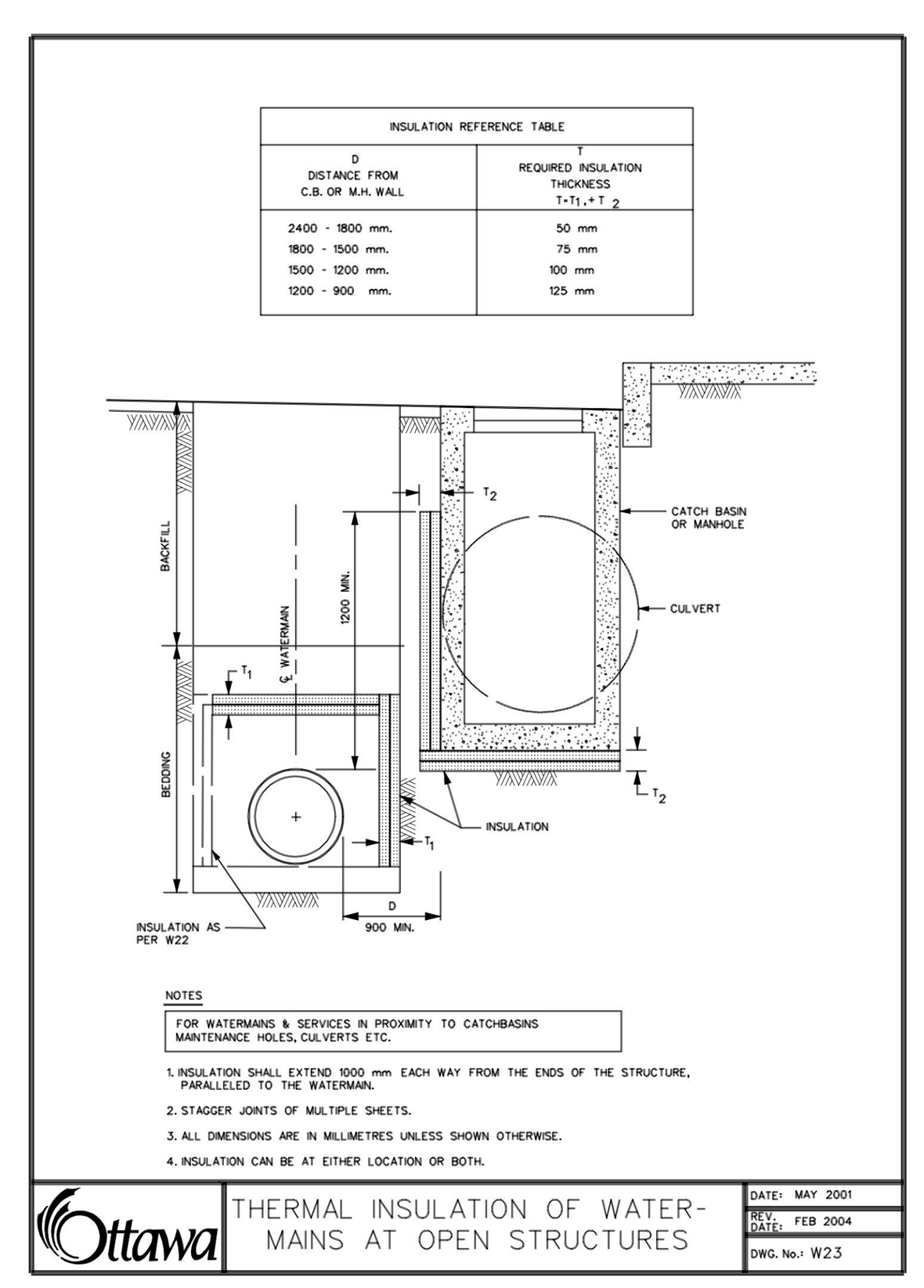




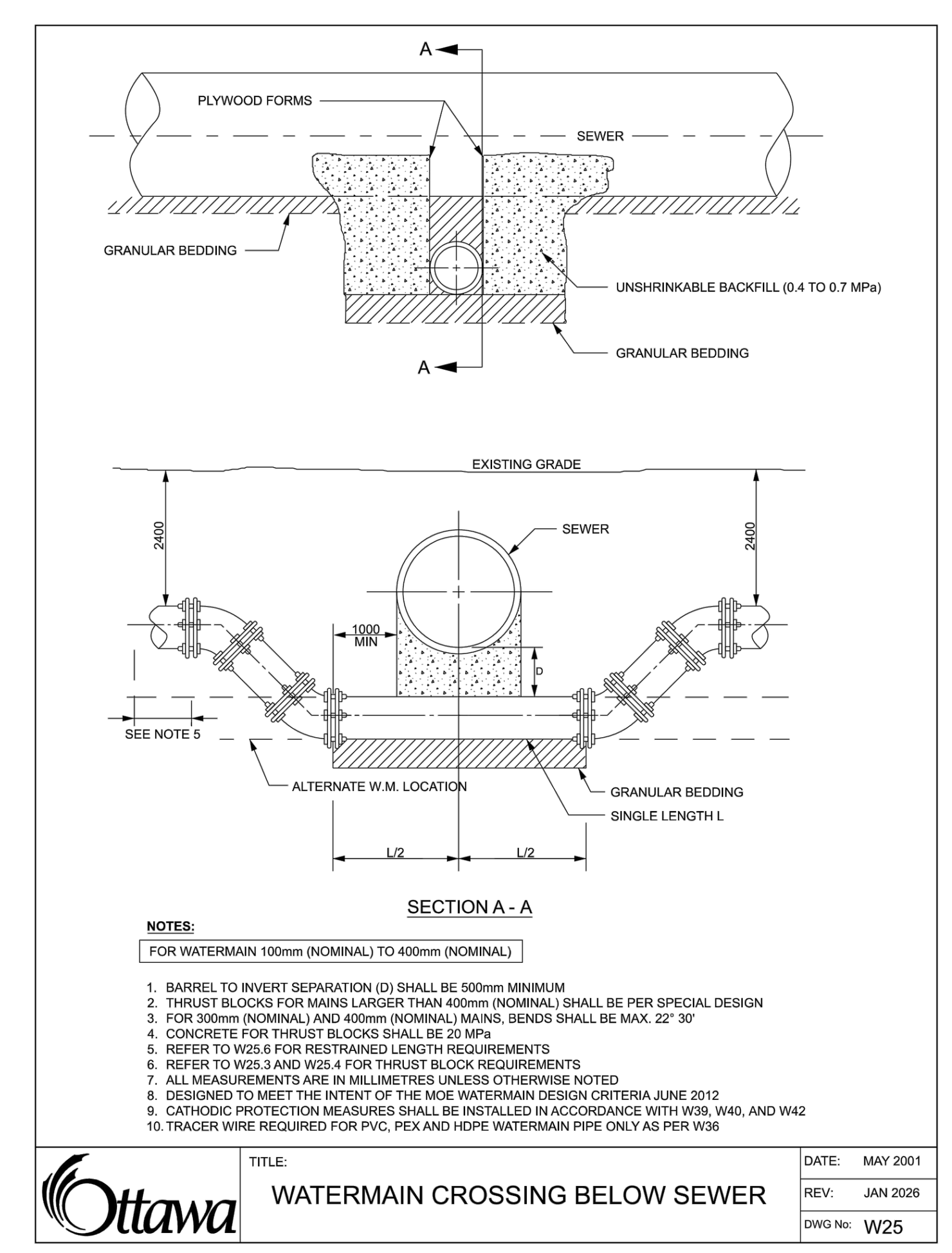


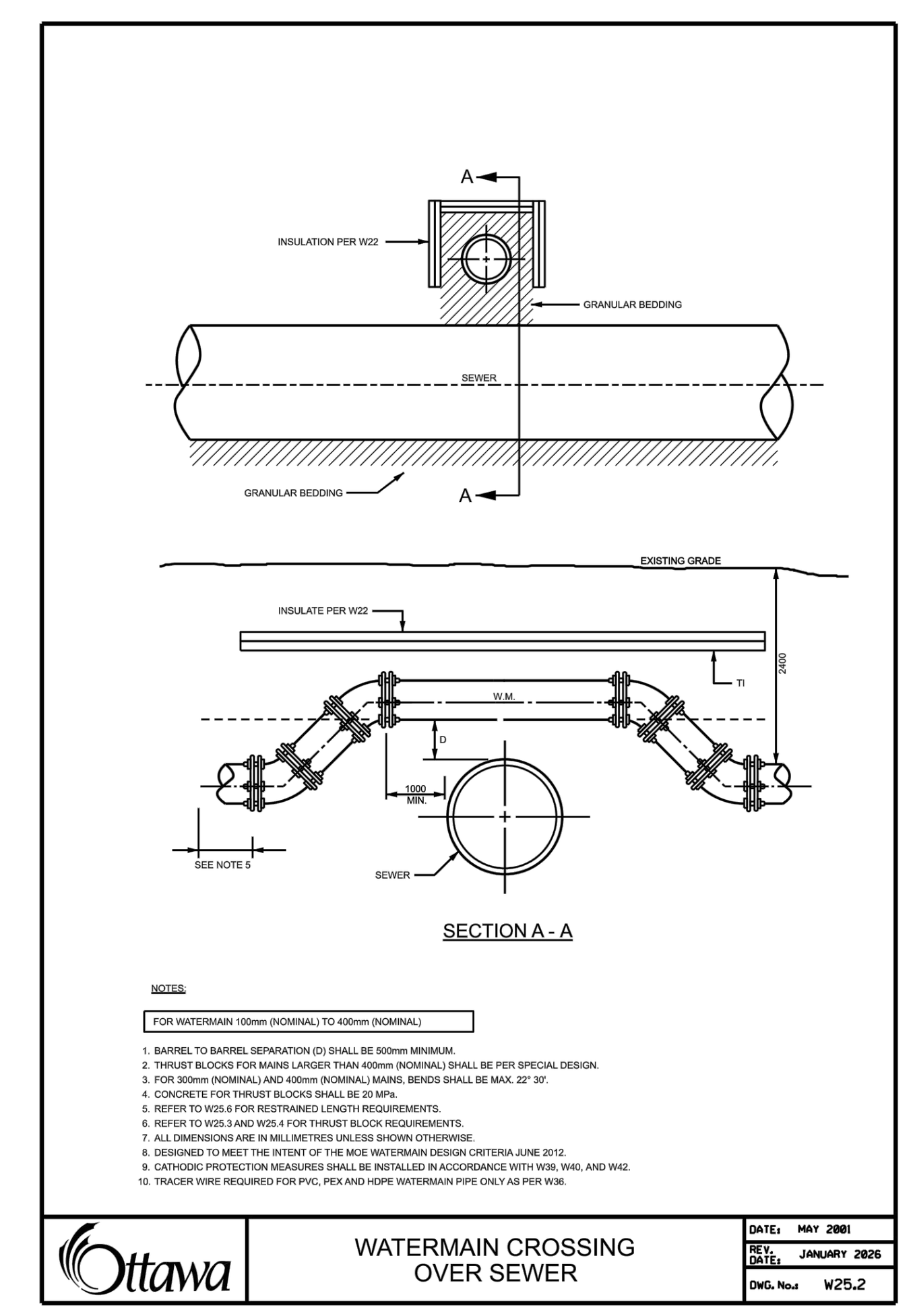
PIPE DIA	A	B	C	D	E	F	G	H
600	1050	2400	2725	1400	300	75	1525	2350
675	1125	2400	2725	1475	300	75	1600	2425
750	1200	2400	2725	1550	300	75	1675	2500
825	1275	2400	2725	1625	300	75	1755	2575
900	1350	2400	2725	1700	300	75	1825	2650
975	1425	2400	2725	1775	375	150	1975	2725
1050	1500	3000	3400	1850	375	150	2050	3100
1200	1650	3000	3400	2000	375	150	2200	3250
1350	1800	3000	3400	2150	375	150	2350	3400
1500	1950	3000	3400	2300	375	150	2500	3550
1650	2100	3000	3400	2450	375	150	2650	3700
1800	2250	3000	3400	2600	375	150	2800	3850
2400	3000	3000	3400	3350	375	150	3550	4600

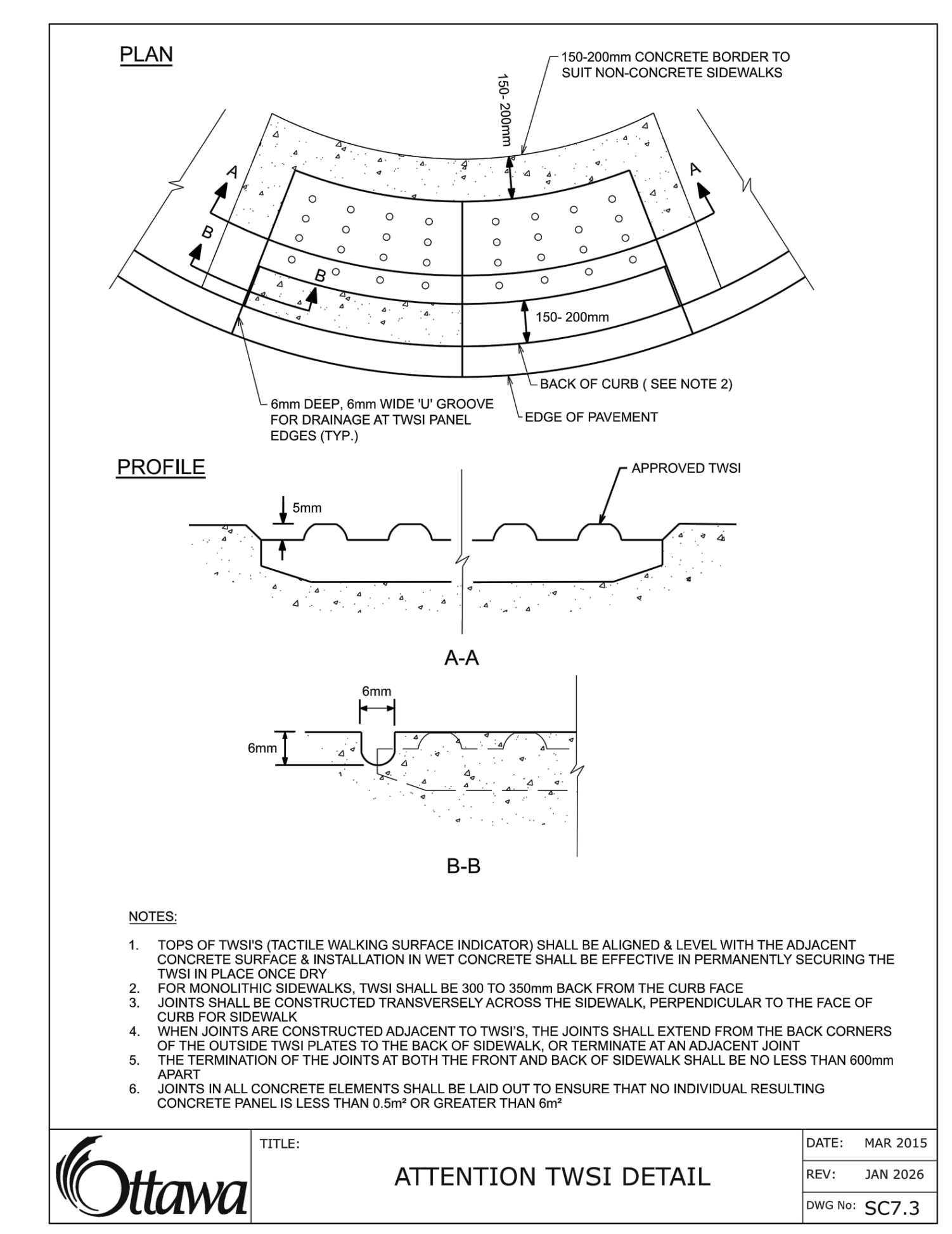




D DISTANCE FROM C.B. OR M.H. WALL	T REQUIRED INSULATION THICKNESS $T = T_1 + T_2$
2400 - 1800 mm.	50 mm
1800 - 1500 mm.	75 mm
1500 - 1200 mm.	100 mm
1200 - 900 mm.	125 mm







NOT FOR CONSTRUCTION

NOTES

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

PROPERTY BOUNDARIES ARE DERIVED FROM TOPOGRAPHICAL PLAN OF SURVEY OF PART OF LOTS 16 & 17 CONCESSION 2 (RIDEAU FRONT), GEOGRAPHIC TOWNSHIP OF GLOUCESTER, CITY OF OTTAWA. PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD. ONTARIO LAND SURVEYORS, REF: 24256-23. ELEVATIONS ARE REFERRED TO GEODETIC DATUM (CGVD28).

NO.	REVISION DESCRIPTION	DATE	BY
2	REISSUED FOR SPA	08/09/26	SM
1	ISSUED FOR SPA	16/10/24	SM

SCALE

LICENSED PROFESSIONAL ENGINEER
SEP 08/26
S.A.G.MCCAUGHEY
100217133
PROVINCE OF ONTARIO

Robinson Land Development
200-2936 Baseline Road
Ottawa, ON K2H 1B3
(613) 592-6060 rcii.com

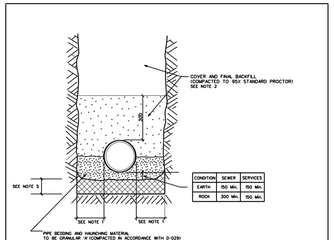
DESIGN	SM
CHECKED	BM
DRAWN	SM
CHECKED	BM
APPROVED	CC

GROUPE MONTONI

4101 LIMEBANK RD.
CITY OF OTTAWA

NOTES AND DETAILS PLAN

PROJECT No.	23074
SURVEY	AOV
DATED	SEPT 2026
DWG. No:	23074-N1



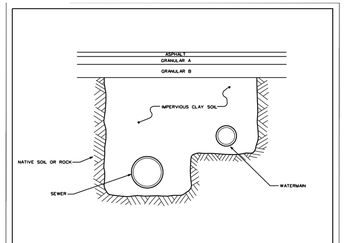
NOTES:

1.

PIPE INSIDE DIAMETER (mm)	CLEARANCE (mm)
900 OR LESS	CONC 450 PVC 450
OVER 900	500

2. FINAL BACKFILL - APPROVED NATIVE MATERIAL OR SELECT SUBGRADE IN ACCORDANCE WITH F-4122 AND F-2120.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.
4. INITIAL BACKFILL MATERIAL
   - SEWER - GRANULAR 'A' OR GRANULAR 'B' OR SELECT SUBGRADE MATERIAL WITH 100% PASSING THE 37.5mm SIEVE
   - PVC PIPE - GRANULAR 'A'
5. WHEN APPROVED BY THE CONTRACT ADMINISTRATOR, POOR SOILS SHALL BE EXCAVATED TO CREATE A FOUNDATION THAT SHALL BE FILLED TO THE BOTTOM OF THE BEDDING WITH GRANULAR 'B'

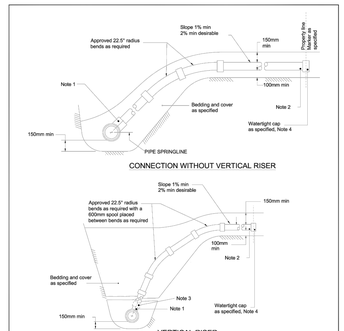
Ottawa	SINGLE TRENCH (SEWER & SEWER SERVICES)	DATE: MAY 2001 REV: DATE: JAN 2026 DWG No.: S6



NOTES:

1. CLAY SEAL TO EXTEND FROM BOTTOM OF TRENCH EXCAVATION TO UNDERSIDE OF ROAD STRUCTURE.
2. CLAY SEAL TO EXTEND FULL TRENCH WIDTH TO EXISTING NATIVE SOILS WITH A MINIMUM THICKNESS OF 1.0m ALONG PIPES.
3. CLAY SEAL TO BE LOCATED SO THAT NO PIPE JOINTS ARE WITHIN THE CLAY SEAL MATERIAL.

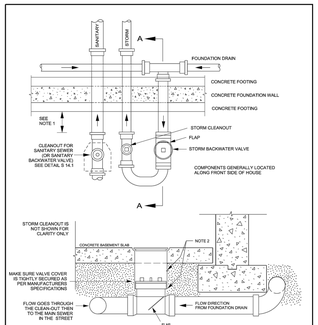
Ottawa	CLAY SEAL FOR PIPE TRENCHES	DATE: MAY 2001 REV: DATE: MARCH 2008 DWG No.: S8



NOTES:

1. THE CONNECTION SHALL BE MADE USING AN APPROVED TEE OR WYE FITTINGS. INVERT OF SERVICE CONNECTION SHALL BE AT THE SAME ELEVATION OR GREATER THAN THE ELEVATION OF THE SPRINGLINE OF THE SEWER MAIN
2. SANITARY SERVICES TO BE 100mm AND STORM SERVICES TO BE 150mm FOR NEW RESIDENCES UNLESS SPECIFIED OTHERWISE. SERVICE PIPE SHALL BE PVC DR 28 OR CSA B182.2 PVC SEWER PIPE WITH GASKETED JOINTS.
3. APPROVED CONTROLLED SETTLEMENT JOINTS OPTIONAL FOR SERVICE CONNECTIONS TO MAIN SEWERS UP TO 6m DEEP. WHERE APPROVED, CONNECTIONS TO SEWERS OVER 6m DEEP REQUIRE APPROVED CONTROLLED SETTLEMENT JOINTS
4. ALL SEWERS TO BE TESTED FOR LEAKAGE BY EXFILTRATION OR HYDROSTATIC TESTING PRESSURE
5. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN
6. RADIUS BENDS GREATER THAN 22.5° ARE NOT ALLOWED

Ottawa	TITLE: SEWER SERVICE CONNECTIONS FOR FLEXIBLE MAIN SEWER PIPE	DATE: MAR 2006 REV: JAN 2026 DWG No: S11.1

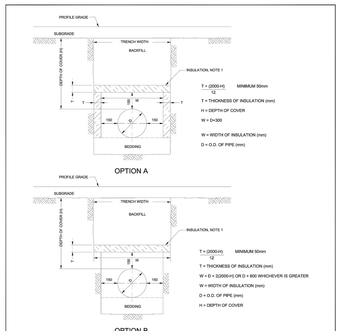


NOTES:

1. BACKWATER VALVE, CLEAN-OUTS AND ANY OTHER FITTINGS MUST BE INSTALLED A MINIMUM OF 300mm INSIDE OF THE BASEMENT FOOTING. THIS IS TO ENSURE THERE IS SUFFICIENT ROOM TO REPLACE THESE COMPONENTS IN THE FUTURE WITHOUT HAVING TO DAMAGE THE FOOTING/WALL DURING THE PROCESS
2. JOINTS BETWEEN THE SLEEVE AND THE BACKWATER VALVE AND THE FLOOR SHALL BE WATERTIGHT.

N.T.S.

Ottawa	FOUNDATION DRAIN BACKWATER VALVE INSTALLATION	DATE: DEC 2002 REV: DATE: MARCH 2011 DWG No.: S14



T = (2000-H) / 13 MINIMUM 50mm

T = THICKNESS OF INSULATION (mm)

H = DEPTH OF COVER

W = D+300

W = WIDTH OF INSULATION (mm)

D = O.D. OF PIPE (mm)

OPTION B

T = (2000-H) / 13 MINIMUM 50mm

T = THICKNESS OF INSULATION (mm)

W = D + 2(2000-H) OR D + 600 WHICHEVER IS GREATER

W = WIDTH OF INSULATION (mm)

D = O.D. OF PIPE (mm)

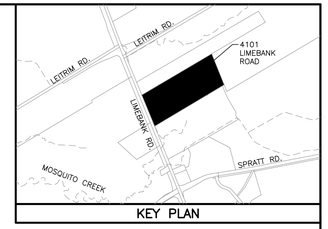
H = DEPTH OF COVER

OPTION B
TYPICAL PIPE INSULATION DETAIL

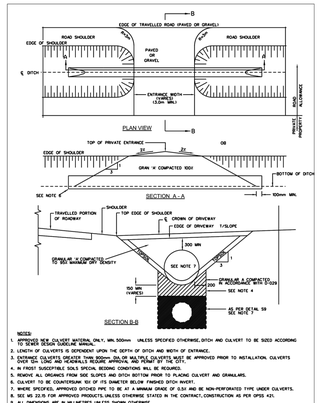
NOTES:

1. THE INSULATION MATERIAL SHALL BE EXTRUDED POLYSTYRENE ACCORDING TO MW-16.15 WITH A MINIMUM COMPRESSIVE STRENGTH OF 275 kPa
2. MINIMUM INSULATION THICKNESS SHALL BE 50mm
3. JOINTS SHALL BE STAGGERED FOR MULTIPLE INSULATION SHEETS
4. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED

Ottawa	TITLE: INSULATION FOR SHALLOW SEWERS	DATE: MAY 2001 REV: JULY 2024 DWG No: S35



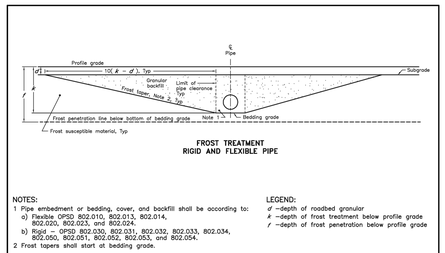
KEY PLAN



NOTES:

1. REMOVING NEW CULVERT MATERIAL ONLY, MIN 500mm UNLESS SPECIFIED OTHERWISE, DITCH AND CULVERT TO BE SIZED ACCORDING TO SEWER DESIGN GUIDELINE MANUAL.
2. LENGTH OF CULVERTS IS DEPENDENT UPON THE DEPTH OF DITCH AND WIDTH OF ENTRANCE.
3. ENTRANCE CULVERTS GREATER THAN 9000mm (SUM OF MULTIPLE CULVERTS) MUST BE APPROVED PRIOR TO INSTALLATION. CULVERTS OVER 12m LONG AND HEADWALLS REQUIRE APPROVAL AND PERMIT BY THE CITY.
4. IN FROST SUSCEPTIBLE SOILS SPECIAL BEDDING CONDITIONS WILL BE REQUIRED.
5. REMOVE ALL ORGANICS FROM SIDE SLOPES AND DITCH BOTTOM PRIOR TO PLACING CULVERT AND GRANULARS.
6. CULVERT TO BE COUNTERSUNK 100 OF ITS DIAMETER BELOW FINISHED DITCH INVERT.
7. WHERE SPECIFIED, APPROVED DITCHED PIPE TO BE AT A MINIMUM GRADE OF 0.5% AND BE NON-PERFORATED TYPE UNDER CULVERTS.
8. SEE MS 22.15 FOR APPROVED PRODUCTS, UNLESS OTHERWISE STATED IN THE CONTRACT, CONSTRUCTION AS PER OPSS 421.
9. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SHOWN OTHERWISE.

Ottawa	PRIVATE ENTRANCE DETAIL - RURAL	DATE: MAY 2001 REV: DATE: MARCH 2016 DWG No.: S26



FROST TREATMENT
RIGID AND FLEXIBLE PIPE

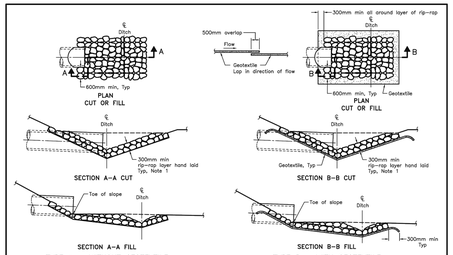
NOTES:

1 Pipe embedment or bedding, cover, and backfill shall be according to:
   a) Flexible OPSD 802.010, 802.013, 802.014, 802.020, 802.023, and 802.024.
   b) Rigid – OPSD 802.030, 802.031, 802.032, 802.033, 802.034, 802.050, 802.051, 802.052, 802.053, and 802.054.
2 Frost tapers shall start at bedding grade.

LEGEND:

d –depth of roadbed granular
x –depth of frost treatment below profile grade
℄ –depth of frost penetration below profile grade

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 3
FROST TREATMENT – PIPE CULVERTS FROST PENETRATION LINE BELOW BEDDING GRADE		OPSD 803.030

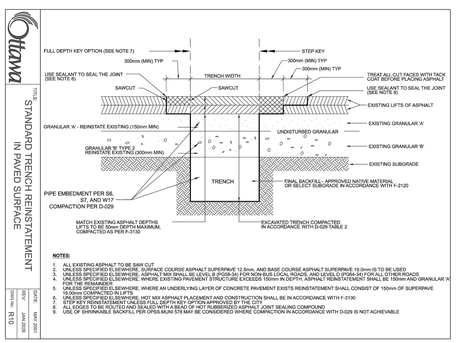


NOTES:

1 The thickness of the rip–rap layer shall be at least 1.5 times the rip–rap mean diameter.

A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2016	Rev 3
GENERAL RIP–RAP LAYOUT FOR SEWER AND CULVERT OUTLETS		OPSD 810.010



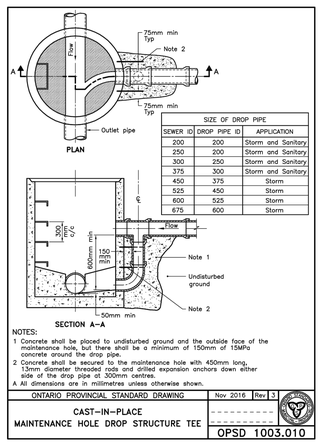
Ottawa

TITLE: STANDARD TRENCH REINSTATEMENT IN PAVED SURFACE

DRAWN: SM | DATE: MAY 2001
CHECKED: BM | REV: JAN 2026
DWG No. R10

NOTES:

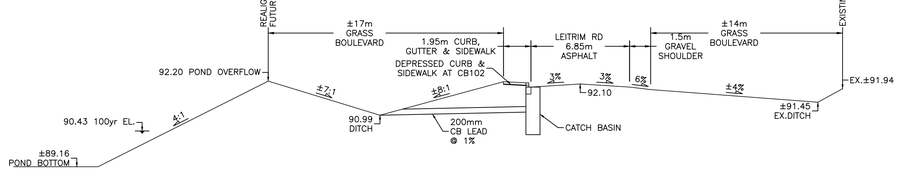
1. ALL EXISTING ASPHALT TO BE SAW CUT.
2. UNLESS SPECIFIED ELSEWHERE, SURFACE COURSE ASPHALT SUPERPAVE 12.5mm, AND BASE COURSE ASPHALT SUPERPAVE 19.0mm IS TO BE USED.
3. UNLESS SPECIFIED ELSEWHERE, ASPHALT MIX SHALL BE LEVEL B (PG58-34) FOR NON-BUS LOCAL ROADS, AND LEVEL E (PG64-34) FOR ALL OTHER ROADS
4. UNLESS SPECIFIED ELSEWHERE, WHERE EXISTING PAVEMENT STRUCTURE EXCEEDS 150mm IN DEPTH, ASPHALT REINSTATEMENT SHALL BE 150mm AND GRANULAR 'A' FOR THE REMAINDER.
5. UNLESS SPECIFIED ELSEWHERE, WHERE AN UNDERLYING LAYER OF CONCRETE PAVEMENT EXISTS REINSTATEMENT SHALL CONSIST OF 150mm OF SUPERPAVE 19.0mm ASPHALT.
6. UNLESS SPECIFIED ELSEWHERE, HOT MIX ASPHALT PLACEMENT AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH F-3130
7. STEP KEY REINSTATEMENT UNLESS FULL DEPTH KEY OPTION APPROVED BY THE CITY.
8. ALL EDGES TO BE ROUTED AND SEALED WITH A BEAD OF HOT RUBBERIZED ASPHALT JOINT SEALING COMPOUND
9. USE OF SHRINKABLE BACKFILL PER OPSS MUNI 515 MAY BE CONSIDERED WHERE COMPACTION IN ACCORDANCE WITH D-029 IS NOT ACHIEVABLE



NOTES:

1 Concrete shall be placed to undisturbed ground and the outside face of the maintenance hole, but there shall be a minimum of 150mm of 15MPa concrete around the drop pipe.
2 Concrete shall be secured to the maintenance hole with 450mm long, 13mm diameter threaded rods and drilled expansion anchors down either side of the drop pipe at 300mm centres.
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2016	Rev 3
CAST–IN–PLACE MAINTENANCE HOLE DROP STRUCTURE TEE		OPSD 1003.010



SECTION A–A REALIGNED LEITRIM RD. ROW
N.T.S.

NOT FOR CONSTRUCTION

NOTES

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

PROPERTY BOUNDARIES ARE DERIVED FROM TOPOGRAPHICAL PLAN OF SURVEY OF PART OF LOTS 16 & 17 CONCESSION 2 (RIDEAU FRONT), GEOGRAPHIC TOWNSHIP OF GLOUCESTER, CITY OF OTTAWA. PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD. ONTARIO LAND SURVEYORS, REF: 24256–23. ELEVATIONS ARE REFERRED TO GEODETIC DATUM (CGVD28).

NO.	REVISION DESCRIPTION	DATE	BY
2	REISSUED FOR SPA	08/09/26	SM
1	ISSUED FOR SPA	16/10/24	SM

SCALE

LICENSED PROFESSIONAL ENGINEER
SEP 08/26
S.A.G.MCCAUGHEY
100217133
PROVINCE OF ONTARIO

Robinson Land Development
200-2936 Baseline Road
Ottawa, ON K2H 1B3
(613) 592-6060 rcii.com

DESIGN	SM
CHECKED	BM
DRAWN	SM
CHECKED	BM
APPROVED	CC

GROUPE MONTONI

4101 LIMEBANK RD.
CITY OF OTTAWA

NOTES AND DETAILS PLAN

PROJECT No.	23074
SURVEY	AOV
DATED	SEPT 2026
DWG. No:	23074-N2

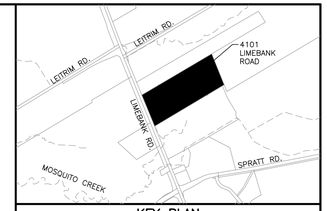
300mmø WATERMAIN GRADE TABLE				
STATION	FINISHED GRADE (m)	TOP OF WATER (m)	COVER DEPTH (m)	COMMENTS
0+000	92.29	89.89	2.40	300x300mm TEE TO EXISTING
0+020.7	92.32	89.92	2.40	300mm VALVE
0+025	92.26	89.86	2.40	TOP OF WATERMAIN
0+050	92.01	89.61	2.40	TOP OF WATERMAIN
0+075	92.52	90.12	2.40	TOP OF WATERMAIN
0+100	92.16	89.76	2.40	TOP OF WATERMAIN
0+125	92.20	89.80	2.40	TOP OF WATERMAIN
0+150	92.53	89.80	2.73	TOP OF WATERMAIN
0+175	92.81	90.41	2.40	TOP OF WATERMAIN
0+200	93.05	90.65	2.40	TOP OF WATERMAIN
0+225	93.30	90.90	2.40	TOP OF WATERMAIN
0+228.7	93.34	90.94	2.40	300x250mm TEE
0+229.8	93.35	90.95	2.40	300mm VALVE
0+235.0	93.19	90.79	2.40	CAP

250mmø WATERMAIN GRADE TABLE				
STATION	FINISHED GRADE (m)	TOP OF WATER (m)	COVER DEPTH (m)	COMMENTS
1+000	93.34	90.94	2.40	300x250mm TEE
1+006.0	93.37	90.97	2.40	250mm VALVE
1+025	93.20	90.80	2.40	TOP OF WATERMAIN
1+029.1	93.05	90.65	2.40	250x250mm TEE
1+050	92.31	89.91	2.40	TOP OF WATERMAIN
1+071.3	92.36	89.96	2.40	250x150mm BUILDING TEE
1+075	92.39	89.99	2.40	TOP OF WATERMAIN
1+082.9	92.46	90.06	2.40	250x150mm HYDRANT TEE
1+100	92.49	90.09	2.40	TOP OF WATERMAIN
1+101.7	92.50	90.10	2.40	250x150mm BUILDING TEE
1+125	92.56	90.16	2.40	TOP OF WATERMAIN
1+135.1	92.49	90.09	2.40	250x150mm BUILDING TEE
1+150	92.50	90.10	2.40	TOP OF WATERMAIN
1+151.1	92.50	90.10	2.40	250x150mm HYDRANT TEE
1+175	92.63	90.23	2.40	TOP OF WATERMAIN
1+184.5	92.56	90.16	2.40	250x150mm BUILDING TEE
1+188.1	92.55	90.15	2.40	150x250mm BUILDING TEE
1+200	92.56	90.16	2.40	TOP OF WATERMAIN
1+219.6	92.52	90.12	2.40	150x250mm HYDRANT TEE
1+250	92.40	90.00	2.40	TOP OF WATERMAIN
1+226.3	92.40	90.00	2.40	250mm VALVE
1+231.7	92.32	89.92	2.40	250x250mm TEE

250mmø WATERMAIN GRADE TABLE				
STATION	FINISHED GRADE (m)	TOP OF WATER (m)	COVER DEPTH (m)	COMMENTS
2+000	93.05	90.65	2.40	250x250mm TEE
2+001.5	93.01	90.61	2.40	250mm VALVE
2+025	92.24	89.84	2.40	TOP OF WATERMAIN
2+050	92.09	90.11	1.98	TOP OF WATERMAIN
2+075	92.72	90.32	2.40	TOP OF WATERMAIN
2+100	92.52	90.12	2.40	TOP OF WATERMAIN
2+125	92.60	90.20	2.40	TOP OF WATERMAIN
2+127.8	92.57	90.17	2.40	250x250mm TEE
2+150	92.68	90.28	2.40	TOP OF WATERMAIN
2+159.3	92.59	90.19	2.40	250X150mm HYDRANT TEE
2+175	92.54	90.14	2.40	TOP OF WATERMAIN
2+200	92.68	90.28	2.40	TOP OF WATERMAIN
2+225	92.55	90.15	2.40	TOP OF WATERMAIN
2+250	92.60	90.20	2.40	TOP OF WATERMAIN
2+268.6	92.70	90.30	2.40	22.5° HORIZONTAL BEND
2+275	92.74	90.34	2.40	TOP OF WATERMAIN
2+285.6	92.61	90.21	2.40	22.5° HORIZONTAL BEND
2+290.0	92.57	90.17	2.40	250mm VALVE
2+300	92.47	90.07	2.40	TOP OF WATERMAIN
2+323.7	92.55	90.15	2.40	250X150mm HYDRANT TEE
2+325	92.57	90.17	2.40	TOP OF WATERMAIN
2+350	92.69	90.29	2.40	TOP OF WATERMAIN
2+375	92.67	90.27	2.40	TOP OF WATERMAIN
2+380.4	92.75	90.35	2.40	45° HORIZONTAL BEND
2+388.0	92.78	90.38	2.40	45° HORIZONTAL BEND
2+400	92.72	90.32	2.40	TOP OF WATERMAIN
2+425	92.71	90.31	2.40	TOP OF WATERMAIN
2+425.4	92.72	90.32	2.40	250X150mm BUILDING TEE
2+450	92.76	90.36	2.40	TOP OF WATERMAIN
2+475	92.92	90.52	2.40	TOP OF WATERMAIN
2+485.4	92.94	90.54	2.40	250X150mm HYDRANT TEE
2+494.8	93.03	90.63	2.40	250X150mm BUILDING TEE
2+500	92.97	90.57	2.40	TOP OF WATERMAIN
2+525	93.14	90.74	2.40	TOP OF WATERMAIN
2+543.8	93.13	90.73	2.40	250X150mm BUILDING TEE
2+550	93.14	90.74	2.40	TOP OF WATERMAIN
2+575	93.27	90.87	2.40	TOP OF WATERMAIN
2+586.9	93.10	90.70	2.40	45° HORIZONTAL BEND
2+592.6	93.11	90.71	2.40	45° HORIZONTAL BEND
2+600	93.11	90.71	2.40	TOP OF WATERMAIN
2+600.2	93.12	90.72	2.40	250X150mm HYDRANT TEE
2+625	93.51	91.11	2.40	TOP OF WATERMAIN
2+650	93.63	91.23	2.40	TOP OF WATERMAIN
2+675	93.58	91.18	2.40	TOP OF WATERMAIN
2+700	93.34	90.94	2.40	TOP OF WATERMAIN
2+725	92.98	90.58	2.40	TOP OF WATERMAIN
2+733.6	92.96	90.56	2.40	250mm VALVE
2+750	92.88	90.48	2.40	TOP OF WATERMAIN
2+775	93.00	90.60	2.40	TOP OF WATERMAIN
2+800	93.14	90.74	2.40	TOP OF WATERMAIN
2+825	93.10	90.70	2.40	TOP OF WATERMAIN
2+850	92.81	90.41	2.40	TOP OF WATERMAIN
2+867.2	92.68	90.28	2.40	250x250mm TEE
2+875	92.69	90.29	2.40	TOP OF WATERMAIN
2+900	92.60	90.20	2.40	TOP OF WATERMAIN
2+925	92.86	90.46	2.40	TOP OF WATERMAIN
2+950	92.97	90.57	2.40	TOP OF WATERMAIN
2+975	92.82	90.42	2.40	TOP OF WATERMAIN
2+992.9	92.59	90.19	2.40	22.5° HORIZONTAL BEND
3+000	92.32	89.92	2.40	TOP OF WATERMAIN
3+000.5	92.32	89.92	2.40	22.5° HORIZONTAL BEND
3+002.0	92.32	89.92	2.40	250x250mm TEE
3+006.3	92.30	89.90	2.40	250mm VALVE
3+025	92.42	90.02	2.40	TOP OF WATERMAIN
3+050	92.29	89.89	2.40	TOP OF WATERMAIN
3+075	92.26	89.86	2.40	TOP OF WATERMAIN
3+100	92.30	89.90	2.40	TOP OF WATERMAIN
3+125	92.29	89.89	2.40	TOP OF WATERMAIN
3+150	92.48	90.08	2.40	TOP OF WATERMAIN
3+171.7	92.83	90.43	2.40	45° HORIZONTAL BEND
3+175	92.87	90.47	2.40	TOP OF WATERMAIN
3+179.5	92.93	90.53	2.40	45° HORIZONTAL BEND
3+200	91.75	89.35	2.40	TOP OF WATERMAIN
3+225	92.11	89.71	2.40	TOP OF WATERMAIN
3+250	92.56	90.16	2.40	TOP OF WATERMAIN
3+275	92.30	89.90	2.40	TOP OF WATERMAIN
3+300	92.30	89.90	2.40	TOP OF WATERMAIN
3+307.0	92.30	89.90	2.40	300x250mm REDUCER
3+309.4	92.30	89.90	2.40	45° HORIZONTAL BEND
3+310.9	92.30	89.90	2.40	45° HORIZONTAL BEND
3+312.9	92.30	89.90	2.40	CONNECT TO EX. 300mm VALVE CHAMBER

NOTE: PROVIDE INSULATION WHEREVER COVER <2.4m PER CITY STD. W22 OR DISTANCE TO CATCH BASIN OR MAINTENANCE HOLE <2.4m PER CITY STD. W23

250mmø WATERMAIN GRADE TABLE				
STATION	FINISHED GRADE (m)	TOP OF WATER (m)	COVER DEPTH (m)	COMMENTS
4+000	92.57	90.17	2.40	250x250mm TEE
4+003.9	92.37	90.33	2.04	250mm VALVE
4+020.8	92.45	90.05	2.40	22.5° HORIZONTAL BEND
4+025	92.39	89.99	2.40	TOP OF WATERMAIN
4+034.0	92.43	90.03	2.40	22.5° HORIZONTAL BEND
4+050	92.58	90.18	2.40	TOP OF WATERMAIN
4+063.5	92.56	90.16	2.40	250x150mm BUILDING TEE
4+075	92.46	90.06	2.40	TOP OF WATERMAIN
4+096.7	92.55	90.15	2.40	250x150mm HYDRANT TEE
4+100	92.51	90.11	2.40	TOP OF WATERMAIN
4+114.3	92.64	90.24	2.40	150mm BUILDING TEE
4+125	92.64	90.24	2.40	TOP OF WATERMAIN
4+150	92.74	90.34	2.40	TOP OF WATERMAIN
4+174.3	92.73	90.33	2.40	250x150mm BUILDING TEE
4+175	92.73	90.33	2.40	TOP OF WATERMAIN
4+200	92.55	90.15	2.40	TOP OF WATERMAIN
4+209.5	92.63	90.23	2.40	250x150mm HYDRANT TEE
4+211.8	92.66	90.26	2.40	250mm VALVE
4+213.6	92.68	90.28	2.40	250x250mm TEE



KEY PLAN

CROSSING TABLE							
CROSSING No.	SERVICE	TOP/BOT OF PIPE	SEPARATION (m)	CROSSING No.	SERVICE	TOP/BOT OF PIPE	SEPARATION (m)
1	SAN	88.26	0.18	26	WM	90.07	0.50
	EX STM	88.08			SAN	89.57	
2	*EX WM*	89.53	0.87	27	STM	89.87	0.50
	SAN	88.66			WM	89.37	
3	STM	88.81	0.13	28	STM	89.87	0.22
	SAN	88.68			SAN	89.65	
4	WM	90.10	0.50	29	WM	90.20	0.50
	STM	89.60			SAN	89.70	
5	STM	88.77	0.68	30	STM	91.03	0.82
	EX STM	88.09			WM	90.21	
6	CULVERT	90.65	1.96	31	STM	90.95	1.33
	SAN	88.69			SAN	89.62	
7	CULVERT	90.65	0.65	32	STM	91.02	1.28
	WM	90.00			SAN	89.74	
8	WM	89.97	0.60	33	STM	91.04	1.16
	EX GAS	89.37			SAN	89.88	
9	*EX GAS*	90.91	1.14	34	STM	91.04	1.02
	WM	89.77			SAN	90.02	
10	CULVERT	89.87	0.50	35	STM	90.23	0.13
	EX GAS	89.37			SAN	90.10	
11	*EX GAS*	90.91	0.56	36	STM	91.16	0.75
	CULVERT	90.35			WM	90.41	
12	*EX GAS*	90.12	0.52	37	STM	91.08	1.06
	CULVERT	89.63			WM	90.02	
13	*EX GAS*	91.06	1.35	38	STM	91.08	0.87
	CULVERT	89.71			WM	90.21	
14	CULVERT	91.53	1.24	39	STM	90.49	0.50
	EX GAS	90.29			WM	89.99	
15	CULVERT	91.59	0.39	40	STM	91.38	0.50
	EX GAS	91.20			WM	90.88	
16	*EX GAS*	89.92	1.02				
	SAN	88.90					
17	*EX GAS*	90.99	2.07				
	SAN	88.92					
18	*EX GAS*	89.96	0.60				
	WM	89.36					
19	*EX GAS*	90.99	0.76				
	WM	90.23					
20	CULVERT	91.79	2.72				
	SAN	89.07					
21	CULVERT	91.80	1.01				
	WM	90.79					
22	WM	90.50	1.33				
	SAN	89.17					
23	STM	89.57	0.41				
	SAN	89.16					
24	STM	89.58	0.50				
	WM	89.08					
25	WM	89.83	0.50				
	SAN	89.33					

NOT FOR CONSTRUCTION

NOTES

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PROPERTY BOUNDARIES ARE DERIVED FROM TOPOGRAPHICAL PLAN OF SURVEY OF PART OF LOTS 16 & 17 CONCESSION 2 (RIDEAU FRONT), GEOGRAPHIC TOWNSHIP OF GLOUCESTER, CITY OF OTTAWA. PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD. ONTARIO LAND SURVEYORS, REF: 24256-23. ELEVATIONS ARE REFERRED TO GEODETIC DATUM (CGVD28).

NO.	REVISION DESCRIPTION	DATE	BY
1	REISSUED FOR SPA	08/09/26	SM

SCALE

LICENSED PROFESSIONAL ENGINEER
SEP 08/26
S.A.G.MCCAUGHEY
100217133
PROVINCE OF ONTARIO

Robinson Land Development
200-2936 Baseline Road
Ottawa, ON K2H 1B3
(613) 592-6060 rcii.com

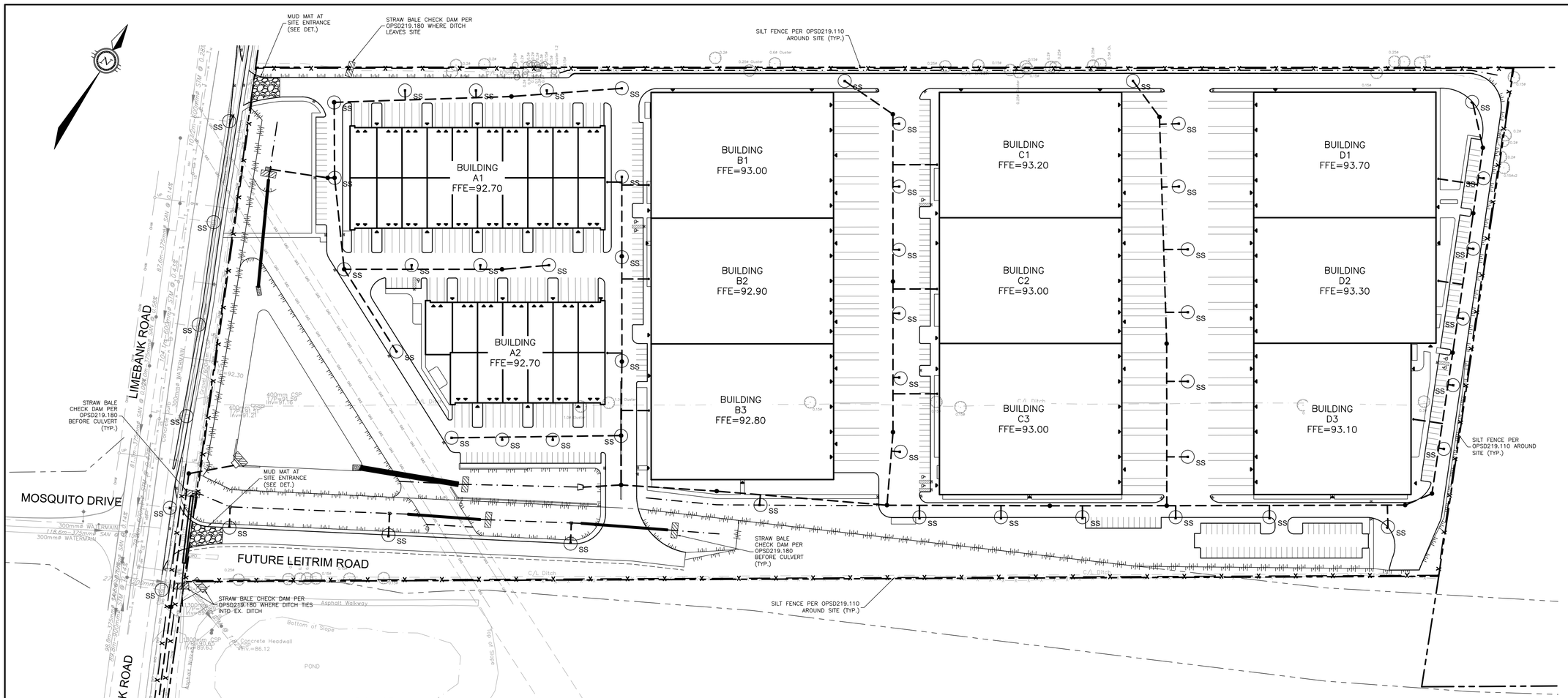
DESIGN	SM
CHECKED	BM
DRAWN	SM
CHECKED	BM
APPROVED	CC

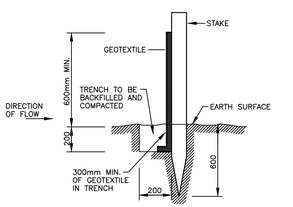
GROUPE MONTONI

4101 LIMEBANK RD.
CITY OF OTTAWA

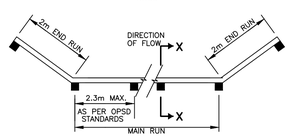
NOTES AND DETAILS PLAN

PROJECT No.	23074
SURVEY	AOV
DATED	SEPT 2026
DWG. No:	23074-N3

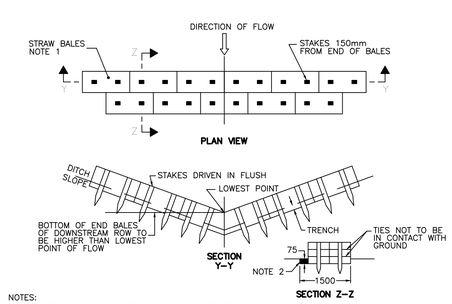




SECTION X–X
N.T.S.

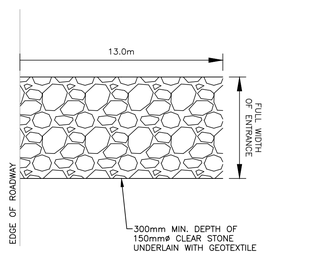


SILT FENCE BARRIER DETAIL
N.T.S.



NOTES:
1. NUMBER OF BALES VARIES AND SHALL SUIT DITCH.
2. STRAW BALES SHALL BE BUTTED TIGHTLY AGAINST ADJOINING BALES AND SHAPED TO CONFORM TO THE SIDES OF THE DITCH TO PREVENT WATER FLOW THROUGH BARRIER
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SHOWN

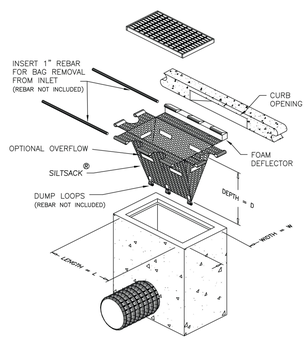
SEDIMENT CONTROL STRAW BALE DETAIL
OPSD 219.180



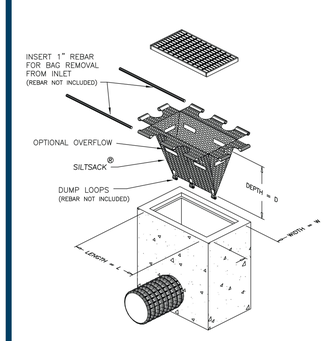
NOTES:
1. MUD MAT TO BE UNDERLAIN WITH A GEOTEXTILE FABRIC.
2. SEDIMENT SHALL BE CLEANED FROM ROADWAYS AS REQUIRED.
3. STORM INLETS IN CLOSE VICINITY TO MUD MAT SHALL BE PROTECTED WITH INLET CONTROL MEASURES.

MUD MAT DETAIL
N.T.S.

Typical Siltsack® Construction - Type A



Typical Siltsack® Construction - Type B



NOTES:
1. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE ULTIMATE RECEIVING WATERCOURSE DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
2. LIMIT THE EXTENT OF EXPOSED SOILS AT ANY GIVEN TIME.
3. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED UNTIL VEGETATION HAS BEEN RE–ESTABLISHED IN ALL DISTURBED AREAS. RE–VEGETATE DISTURBED AREAS AS SOON AS POSSIBLE.
4. STOCKPILE SOIL AWAY (15 METRES OR GREATER) FROM WATERCOURSES, DRAINAGE FEATURES AND TOP OF STEEP SLOPES.
5. SILT SACKS ARE TO BE PLACED UNDERNEATH THE FRAME AND COVER OF ALL PROPOSED AND EXISTING CATCH BASIN AND OPEN COVER STORM MANHOLES UNTIL CONSTRUCTION IS COMPLETED.
6. A SILT FENCE BARRIER SHALL BE INSTALLED AS PER OPSD 219.110 WHERE INDICATED AND MAINTAINED AS REQUIRED.
7. INSTALL MUD MATS AT ALL CONSTRUCTION ENTRANCES.
8. DURING ACTIVE CONSTRUCTION PERIODS, VISUAL INSPECTIONS SHALL BE UNDERTAKEN ON A WEEKLY BASIS AND AFTER MAJOR STORM EVENTS (>25mm RAIN IN 24 HOUR PERIOD) ON SEDIMENT CONTROL BARRIERS AND ANY DAMAGE REPAIRED IMMEDIATELY.
9. EROSION AND SEDIMENT CONTROL BARRIERS SHALL ALSO BE ASSESSED (AND REPAIRED AS REQUIRED) FOLLOWING SIGNIFICANT SNOWMELT EVENTS.
10. VISUAL INSPECTIONS SHALL ALSO BE UNDERTAKEN IN ANTICIPATION OF LARGE STORM EVENTS (OR A SERIES OF RAINFALL AND/OR SNOWMELT DAYS) THAT COULD POTENTIALLY YIELD SIGNIFICANT RUNOFF VOLUMES.
11. CARE SHALL BE TAKEN TO PREVENT DAMAGE TO EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION OPERATIONS.
12. IN SOME CASES, BARRIERS MAY BE REMOVED TEMPORARILY TO ACCOMMODATE THE CONSTRUCTION OPERATIONS. THE AFFECTED BARRIERS SHALL BE REINSTATED IMMEDIATELY AFTER CONSTRUCTION OPERATIONS ARE COMPLETED.
13. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE ADJUSTED AS REQUIRED AS THE SITE BECOMES DEVELOPED.
14. SEDIMENT CONTROL DEVICES SHALL BE CLEANED OF ACCUMULATED SEDIMENTATION AS REQUIRED AND REPLACED AS NECESSARY.
15. DURING THE COURSE OF CONSTRUCTION, IF THE ENGINEER BELIEVES THAT ADDITIONAL PREVENTION METHODS ARE REQUIRED TO CONTROL EROSION AND SEDIMENTATION, THE CONTRACTOR SHALL IMPLEMENT ADDITIONAL MEASURES, AS REQUIRED, TO THE SATISFACTION OF THE ENGINEER.
16. CONSTRUCTION AND MAINTENANCE REQUIREMENTS FOR EROSION AND SEDIMENT CONTROLS ARE TO COMPLY WITH OPSS 805.

NOT FOR CONSTRUCTION

NOTES

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

PROPERTY BOUNDARIES ARE DERIVED FROM TOPOGRAPHICAL PLAN OF SURVEY OF PART OF LOTS 16 & 17 CONCESSION 2 (RIDEAU FRONT), GEOGRAPHIC TOWNSHIP OF GLOUCESTER, CITY OF OTTAWA. PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD. ONTARIO LAND SURVEYORS, REF: 24256–23. ELEVATIONS ARE REFERRED TO GEODETIC DATUM (CGVD28).

NO.	REVISION DESCRIPTION	DATE	BY
2	REISSUED FOR SPA	08/09/26	SM
1	ISSUED FOR SPA	16/10/24	SM

SCALE
HORIZONTAL 1:1000 (0, 10m, 20m, 40m)

LICENSED PROFESSIONAL ENGINEER
SEP. 08/26
S.A.G.MCCAUGHEY
100217133
PROVINCE OF ONTARIO

Robinson Land Development
200-2936 Baseline Road
Ottawa, ON K2H 1B3
(613) 592-6060 rcii.com

DESIGN	SM
CHECKED	BM
DRAWN	SM
CHECKED	BM
APPROVED	CC

GROUPE MONTONI

4101 LIMEBANK RD.
CITY OF OTTAWA

EROSION & SEDIMENT CONTROL PLAN

PROJECT No.	23074
SURVEY	AOV
DATED	SEPT 2026
DWG. No:	23074-ESC1

NOTES

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1	ISSUED FOR SPA	16/10/24	SM

SCALE
HORIZONTAL 1:1000

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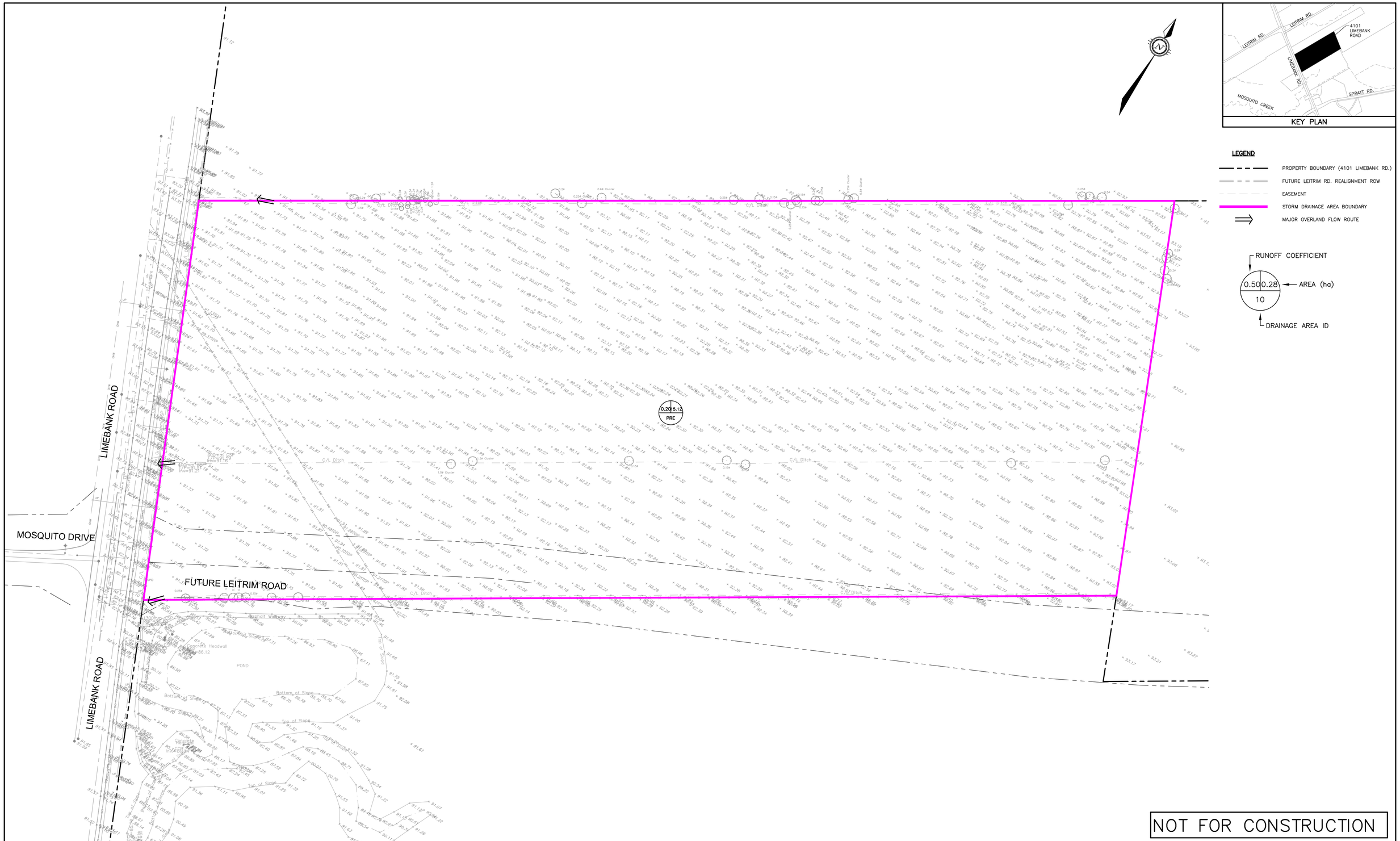
DESIGN	SM
CHECKED	BM
DRAWN	SM
CHECKED	BM
APPROVED	CC

GROUPE MONTONI

4101 LIMEBANK RD.
CITY OF OTTAWA

SANITARY DRAINAGE PLAN

PROJECT No.	23074
SURVEY	AOV
DATED	SEPT 2026
DWG. No:	23074-SAN1



LEGEND

- PROPERTY BOUNDARY (4101 LIMEBANK RD.)
- FUTURE LEITRIM RD. REALIGNMENT ROW
- EASEMENT
- STORM DRAINAGE AREA BOUNDARY
- MAJOR OVERLAND FLOW ROUTE

RUNOFF COEFFICIENT
0.50 | 0.28 ← AREA (ha)
10 ← DRAINAGE AREA ID

NOT FOR CONSTRUCTION

NOTES

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

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SCALE
0 10m 20m 40m
HORIZONTAL 1:1000

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SEP 08/26
S.A.G.MCCAUGHEY
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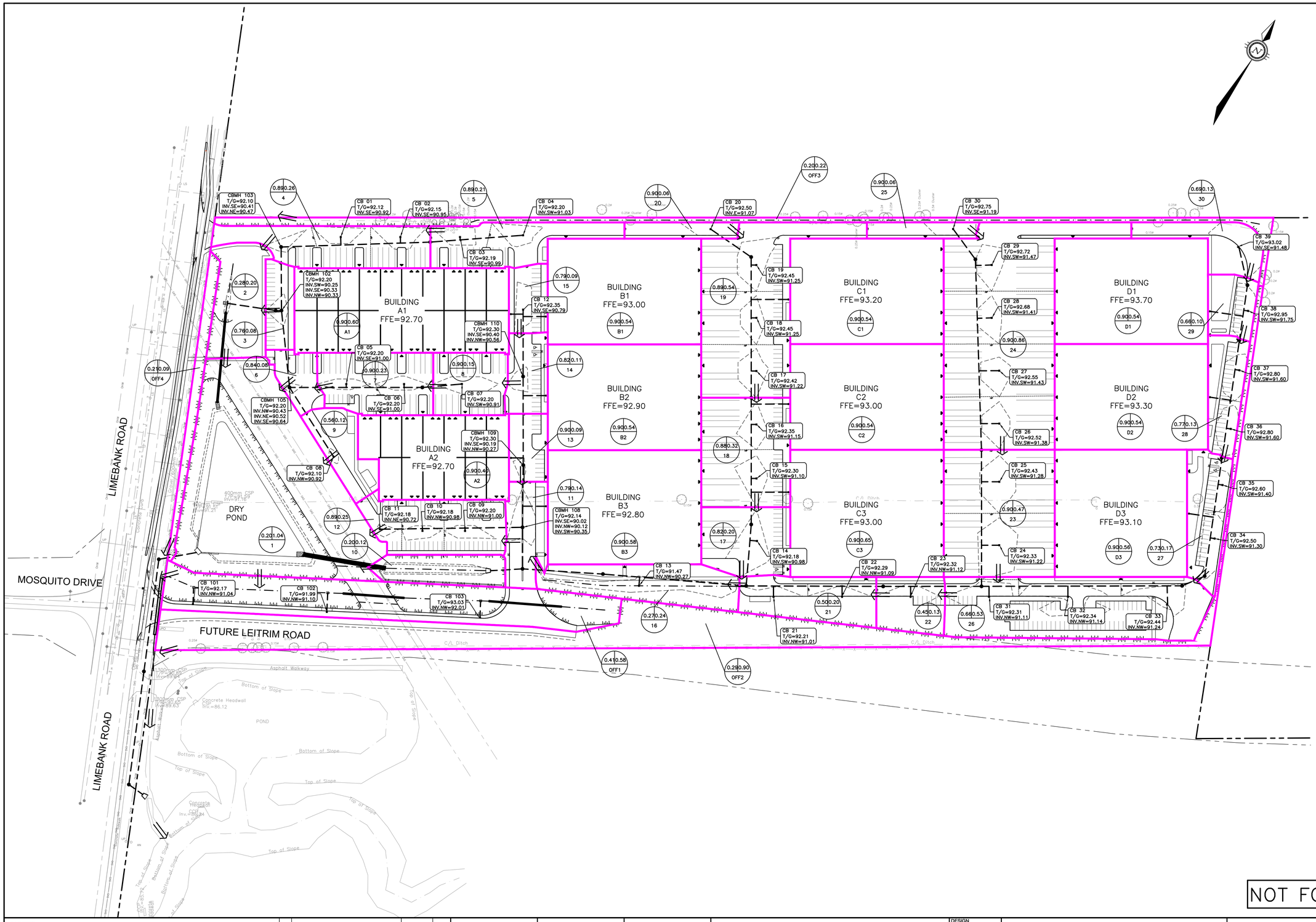
DESIGN	SM
CHECKED	BM
DRAWN	SM
CHECKED	BM
APPROVED	CC

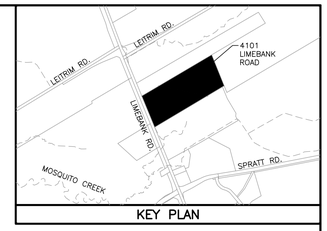
GROUPE MONTONI

4101 LIMEBANK RD.
CITY OF OTTAWA

PRE-DEVELOPMENT
STORM AREA DRAINAGE PLAN

PROJECT No.	23074
SURVEY	AOV
DATED	SEPT 2026
DWG. No:	23074-STM1





KEY PLAN

LEGEND

- PROPERTY BOUNDARY (4101 LIMEBANK RD.)
- FUTURE LEITRIM RD. REALIGNMENT ROW
- EASEMENT
- STORM SEWER & MANHOLE
- CATCH BASIN MAINTENANCE HOLE
- CATCH BASIN
- STORM DRAINAGE AREA BOUNDARY
- MAJOR OVERLAND FLOW ROUTE
- 100-YEAR PONDING LIMIT
- 2-YEAR PONDING LIMIT

RUNOFF COEFFICIENT
0.50 0.28 ← AREA (ha)
10 ← DRAINAGE AREA ID

NOT FOR CONSTRUCTION

NOTES

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1	ISSUED FOR SPA	16/10/24	SM

SCALE
0 10m 20m 40m
HORIZONTAL 1:1000

LICENSED PROFESSIONAL ENGINEER
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APPROVED	CC

GROUPE MONTONI

4101 LIMEBANK RD.
CITY OF OTTAWA

POST-DEVELOPMENT
STORM AREA DRAINAGE PLAN

PROJECT No.	23074
SURVEY	AOV
DATED	SEPT 2026
DWG. No:	23074-STM2

Appendix C

WATERMAIN DESIGN SHEET

4101 Limebank Rd., City of Ottawa

Project No. 23074

Robinson Consultants

	RESIDENTIAL POPULATION				NON-RES				AVG. DAILY					MAX. DAILY					PEAK HOURLY				
	ACTUAL COUNT				IND.	IND.	COMM.	INST.	DEMAND (L/s)					DEMAND (L/s)					DEMAND (L/s)				
	Low Density	Medium Density	High Density	Total Population	(ha)	(pop.)	(ha)	(ha)	RES.	IND.	COMM.	INST.	TOTAL	RES.	IND.	COMM.	INST.	TOTAL	RES.	IND.	COMM.	INST.	TOTAL
Bldg A1						300				0.48			0.48		0.71			0.71		1.28			1.28
Bldg A2						195				0.31			0.31		0.46			0.46		0.83			0.83
Bldg B1						35				0.06			0.06		0.08			0.08		0.15			0.15
Bldg B2						35				0.06			0.06		0.08			0.08		0.15			0.15
Bldg B3						35				0.06			0.06		0.08			0.08		0.15			0.15
Bldg C1						35				0.06			0.06		0.08			0.08		0.15			0.15
Bldg C2						35				0.06			0.06		0.08			0.08		0.15			0.15
Bldg C3						35				0.06			0.06		0.08			0.08		0.15			0.15
Bldg D1						35				0.06			0.06		0.08			0.08		0.15			0.15
Bldg D2						35				0.06			0.06		0.08			0.08		0.15			0.15
Bldg D3						35				0.06			0.06		0.08			0.08		0.15			0.15
													1.28					**1.93**					**3.47**

Residential Densities

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

Avg. Daily Demand:			Max. Daily Demand:		Max. Hourly Demand:	
Residential =	280	L/cap/day	2.5	x Avg. Day	2.2	x Max. Day
Employment*=	**137**	**L/cap/day**	**1.5**	**x Avg. Day**	**1.8**	**x Max. Day**
Industrial (Light) =	35000	L/ha/day	1.5	x Avg. Day	1.8	x Max. Day
Commercial =	28000	L/ha/day	1.5	x Avg. Day	1.8	x Max. Day
Institutional =	28000	L/ha/day	1.5	x Avg. Day	1.8	x Max. Day

*Employee demand based on Riverside South Community Infrastructure Servicing Study Update Phase 1, Mosquito Creek Study Area (ISSU)

Note: Employee count based on average 15 employees per office unit, 35 per warehouse unit

2026-08-24

Project Name:	4101 Limebank Rd.
Project Location:	Ottawa ON
Project No:	23074
Date:	24-Aug-26
Building Type:	Light Industrial
Building Being Considered:	Bldg A1

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Non-Combustible Construction (Type II)	0.8	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				12080.0	m^2
	Total Effective Floor Area				**12,080.0**	**m^2**
C	**Fire Flow**				**19,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Combustible	0	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**0**	**L/min**
	Fire Flow				**19,000**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	Automatic Sprinkler Protection	-0.30	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	Yes	-0.10	
		Full Supervision of the Sprinker System	-0.10	Yes	-0.10	
	Sprinkler Reduction				**-9,500**	**L/min**
	Exposures					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Wall Length				50	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				100	m.storeys
	Construction Type of Exposed Wall	**Options**		Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	100	m
	West Side Exposure Charge				**0.00**	

	North Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			120	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			240	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	100	m
	North Side Exposure Charge			**0.00**	
F	**East Side**				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			50	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			100	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance			23	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			90	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			180	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	36	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0**	**< 0.75**
	Increase for Exposures			**0**	**L/min**
G	**Total Required Fire Flow**			**10,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Building construction type and fire wall dividing blocks assumed based on site plan

3. Floor areas used in Step B equivalent to 2-storey due to high 1-storey building height

4. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

Project Name:	4101 Limebank Rd.
Project Location:	Ottawa ON
Project No:	23074
Date:	24-Aug-26
Building Type:	Light Industrial
Building Being Considered:	Bldg A2

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Non-Combustible Construction (Type II)	0.8	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				7940.0	m^2
	Total Effective Floor Area				**7,940.0**	**m^2**
C	**Fire Flow**				**16,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Combustible	0	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**0**	**L/min**
	Fire Flow				**16,000**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	Automatic Sprinkler Protection	-0.30	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	Yes	-0.10	
		Full Supervision of the Sprinker System	-0.10	Yes	-0.10	
	Sprinkler Reduction				**-8,000**	**L/min**
	Exposures					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Wall Length				50	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				100	m.storeys
	Construction Type of Exposed Wall	**Options**		Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	100	m
	West Side Exposure Charge				**0.00**	

	North Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			120	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			240	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	36	m
	North Side Exposure Charge			**0.00**	
F	**East Side**				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			50	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			100	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance			23	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			120	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			240	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	100	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0**	**< 0.75**
	Increase for Exposures			**0**	**L/min**
G	**Total Required Fire Flow**			**8,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Building construction type and fire wall dividing blocks assumed based on site plan

3. Floor areas used in Step B equivalent to 2-storey due to high 1-storey building height

4. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

Project Name:	4101 Limebank Rd.
Project Location:	Ottawa ON
Project No:	23074
Date:	24-Aug-26
Building Type:	Light Industrial - Warehousing
Building Being Considered:	Bldg B1

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	**Type of Construction**	**Options**	**C**			
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0	Non-Combustible Construction (Type II)	0.8	
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				10800.0	m^2
	Total Effective Floor Area				**10,800.0**	**m^2**
C	**Fire Flow**				**18,000**	**L/min**
D	**Occupancy Class**	**Options**	**Charge**			
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00	Free burning	0.15	
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**2700**	**L/min**
	Fire Flow				**20,700**	**L/min**
E	**Sprinkler Protection**	**Options**	**Charge**			
		Automatic Sprinkler Protection	-0.30	Automatic Sprinkler Protection	-0.30	
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	Yes	-0.10	
		Full Supervision of the Sprinker System	-0.10	Yes	-0.10	
	Sprinkler Reduction				**-10,350**	**L/min**
	Exposures					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Wall Length				45	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				90	m.storeys
	Construction Type of Exposed Wall	**Options**				
		Wood Frame				
		Ordinary with Unprotected Openings		Noncombustible or Fire Resistive with Unprotected Openings		
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance				23	m
	West Side Exposure Charge				**0.00**	

	North Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			90	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			180	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	100	m
	North Side Exposure Charge			**0.00**	
F	**East Side**				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			60	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			120	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	51	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			90	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			180	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**Fire Wall Separation**	0	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0**	**< 0.75**
	Increase for Exposures			**0**	**L/min**
G	**Total Required Fire Flow**			**10,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Building construction type and fire wall dividing blocks assumed based on site plan

3. Floor areas used in Step B equivalent to 2-storey due to high 1-storey building height

4. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

Project Name:	4101 Limebank Rd.
Project Location:	Ottawa ON
Project No:	23074
Date:	24-Aug-26
Building Type:	Light Industrial - Warehousing
Building Being Considered:	Bldg B2

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	**Type of Construction**	**Options**	**C**			
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0	Non-Combustible Construction (Type II)	0.8	
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				10800.0	m^2
	Total Effective Floor Area				**10,800.0**	**m^2**
C	**Fire Flow**				**18,000**	**L/min**
D	**Occupancy Class**	**Options**	**Charge**			
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00	Free burning	0.15	
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**2700**	**L/min**
	Fire Flow				**20,700**	**L/min**
E	**Sprinkler Protection**	**Options**	**Charge**			
		Automatic Sprinkler Protection	-0.30	Automatic Sprinkler Protection	-0.30	
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	Yes	-0.10	
		Full Supervision of the Sprinker System	-0.10	Yes	-0.10	
	Sprinkler Reduction				**-10,350**	**L/min**
	Exposures					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Wall Length				30	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				60	m.storeys
	Construction Type of Exposed Wall	**Options**				
		Wood Frame				
		Ordinary with Unprotected Openings		Noncombustible or Fire Resistive with Unprotected Openings		
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance				23	m
	West Side Exposure Charge				**0.00**	

	North Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			90	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			180	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**Fire Wall Separation**	0	m
	North Side Exposure Charge			**0.00**	
F	**East Side**				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			60	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			120	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	51	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			90	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			180	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**Fire Wall Separation**	0	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0**	**< 0.75**
	Increase for Exposures			**0**	**L/min**
G	**Total Required Fire Flow**			**10,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Building construction type and fire wall dividing blocks assumed based on site plan

3. Floor areas used in Step B equivalent to 2-storey due to high 1-storey building height

4. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

Project Name:	4101 Limebank Rd.
Project Location:	Ottawa ON
Project No:	23074
Date:	24-Aug-26
Building Type:	Light Industrial - Warehousing
Building Being Considered:	Bldg B3

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	**Type of Construction**	**Options**	**C**			
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0	Non-Combustible Construction (Type II)	0.8	
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				11640.0	m^2
	Total Effective Floor Area				**11,640.0**	**m^2**
C	**Fire Flow**				**19,000**	**L/min**
D	**Occupancy Class**	**Options**	**Charge**			
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00	Free burning	0.15	
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**2850**	**L/min**
	Fire Flow				**21,850**	**L/min**
E	**Sprinkler Protection**	**Options**	**Charge**			
		Automatic Sprinkler Protection	-0.30	Automatic Sprinkler Protection	-0.30	
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	Yes	-0.10	
		Full Supervision of the Sprinker System	-0.10	Yes	-0.10	
	Sprinkler Reduction				**-10,925**	**L/min**
	Exposures					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Wall Length				30	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				60	m.storeys
	Construction Type of Exposed Wall	**Options**				
		Wood Frame				
		Ordinary with Unprotected Openings		Noncombustible or Fire Resistive with Unprotected Openings		
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance				23	m
	West Side Exposure Charge				**0.00**	

	North Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			90	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			180	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**Fire Wall Separation**	0	m
	North Side Exposure Charge			**0.00**	
F	**East Side**				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			65	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			130	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	51	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			90	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			180	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	100	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0**	**< 0.75**
	Increase for Exposures			**0**	**L/min**
G	**Total Required Fire Flow**			**11,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Building construction type and fire wall dividing blocks assumed based on site plan

3. Floor areas used in Step B equivalent to 2-storey due to high 1-storey building height

4. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

Project Name:	4101 Limebank Rd.
Project Location:	Ottawa ON
Project No:	23074
Date:	24-Aug-26
Building Type:	Light Industrial - Warehousing
Building Being Considered:	Bldg C1

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Non-Combustible Construction (Type II)	0.8	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				10760.0	m^2
	Total Effective Floor Area				**10,760.0**	**m^2**
C	**Fire Flow**				**18,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Free burning	0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**2700**	**L/min**
	Fire Flow				**20,700**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	Automatic Sprinkler Protection	-0.30	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	Yes	-0.10	
		Full Supervision of the Sprinker System	-0.10	Yes	-0.10	
	Sprinkler Reduction				**-10,350**	**L/min**
	Exposures					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Wall Length				60	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				120	m.storeys
	Construction Type of Exposed Wall	**Options**		Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	51	m
	West Side Exposure Charge				**0.00**	

	North Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			90	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			180	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	100	m
	North Side Exposure Charge			**0.00**	
F	**East Side**				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			60	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			120	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	64	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			90	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			180	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**Fire Wall Separation**	0	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0**	**< 0.75**
	Increase for Exposures			**0**	**L/min**
G	**Total Required Fire Flow**			**10,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Building construction type and fire wall dividing blocks assumed based on site plan

3. Floor areas used in Step B equivalent to 2-storey due to high 1-storey building height

4. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

Project Name:	4101 Limebank Rd.
Project Location:	Ottawa ON
Project No:	23074
Date:	24-Aug-26
Building Type:	Light Industrial - Warehousing
Building Being Considered:	Bldg C2

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Non-Combustible Construction (Type II)	0.8	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				10800.0	m^2
	Total Effective Floor Area				**10,800.0**	**m^2**
C	**Fire Flow**				**18,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Free burning	0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**2700**	**L/min**
	Fire Flow				**20,700**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	Automatic Sprinkler Protection	-0.30	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	Yes	-0.10	
		Full Supervision of the Sprinker System	-0.10	Yes	-0.10	
	Sprinkler Reduction				**-10,350**	**L/min**
	Exposures					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Wall Length				60	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				120	m.storeys
	Construction Type of Exposed Wall	**Options**		Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	51	m
	West Side Exposure Charge				**0.00**	

	North Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			90	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			180	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**Fire Wall Separation**	0	m
	North Side Exposure Charge			**0.00**	
F	**East Side**				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			60	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			120	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	64	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			90	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			180	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**Fire Wall Separation**	0	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0**	**< 0.75**
	Increase for Exposures			**0**	**L/min**
G	**Total Required Fire Flow**			**10,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Building construction type and fire wall dividing blocks assumed based on site plan

3. Floor areas used in Step B equivalent to 2-storey due to high 1-storey building height

4. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

Project Name:	4101 Limebank Rd.
Project Location:	Ottawa ON
Project No:	23074
Date:	24-Aug-26
Building Type:	Light Industrial - Warehousing
Building Being Considered:	Bldg C3

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Non-Combustible Construction (Type II)	0.8	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				12980.0	m^2
	Total Effective Floor Area				**12,980.0**	**m^2**
C	**Fire Flow**				**20,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Free burning	0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**3000**	**L/min**
	Fire Flow				**23,000**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	Automatic Sprinkler Protection	-0.30	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	Yes	-0.10	
		Full Supervision of the Sprinker System	-0.10	Yes	-0.10	
	Sprinkler Reduction				**-11,500**	**L/min**
	Exposures					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Wall Length				65	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				130	m.storeys
	Construction Type of Exposed Wall	**Options**		Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	51	m
	West Side Exposure Charge				**0.00**	

	North Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			90	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			180	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**Fire Wall Separation**	0	m
	North Side Exposure Charge			**0.00**	
F	**East Side**				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			75	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			150	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	64	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			90	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			180	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	100	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0**	**< 0.75**
	Increase for Exposures			**0**	**L/min**
G	**Total Required Fire Flow**			**12,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Building construction type and fire wall dividing blocks assumed based on site plan

3. Floor areas used in Step B equivalent to 2-storey due to high 1-storey building height

4. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

Project Name:	4101 Limebank Rd.
Project Location:	Ottawa ON
Project No:	23074
Date:	24-Aug-26
Building Type:	Light Industrial - Warehousing
Building Being Considered:	Bldg D1

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Non-Combustible Construction (Type II)	0.8	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				10760.0	m^2
	Total Effective Floor Area				**10,760.0**	**m^2**
C	**Fire Flow**				**18,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Free burning	0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**2700**	**L/min**
	Fire Flow				**20,700**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	Automatic Sprinkler Protection	-0.30	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	Yes	-0.10	
		Full Supervision of the Sprinker System	-0.10	Yes	-0.10	
	Sprinkler Reduction				**-10,350**	**L/min**
	Exposures					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Wall Length				60	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				120	m.storeys
	Construction Type of Exposed Wall	**Options**		Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	64	m
	West Side Exposure Charge				**0.00**	

	North Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			90	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			180	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	100	m
	North Side Exposure Charge			**0.00**	
F	**East Side**				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			60	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			120	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	100	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			90	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			180	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**Fire Wall Separation**	0	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0**	**< 0.75**
	Increase for Exposures			**0**	**L/min**
G	**Total Required Fire Flow**			**10,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Building construction type and fire wall dividing blocks assumed based on site plan

3. Floor areas used in Step B equivalent to 2-storey due to high 1-storey building height

4. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

Project Name:	4101 Limebank Rd.
Project Location:	Ottawa ON
Project No:	23074
Date:	24-Aug-26
Building Type:	Light Industrial - Warehousing
Building Being Considered:	Bldg D2

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Non-Combustible Construction (Type II)	0.8	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				10780.0	m^2
	Total Effective Floor Area				**10,780.0**	**m^2**
C	**Fire Flow**				**18,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Free burning	0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**2700**	**L/min**
	Fire Flow				**20,700**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	Automatic Sprinkler Protection	-0.30	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	Yes	-0.10	
		Full Supervision of the Sprinker System	-0.10	Yes	-0.10	
	Sprinkler Reduction				**-10,350**	**L/min**
	Exposures					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Wall Length				60	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				120	m.storeys
	Construction Type of Exposed Wall	**Options**		Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	64	m
	West Side Exposure Charge				**0.00**	

	North Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			90	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			180	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**Fire Wall Separation**	0	m
	North Side Exposure Charge			**0.00**	
F	**East Side**				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			60	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			120	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	100	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			75	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			150	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**Fire Wall Separation**	0	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0**	**< 0.75**
	Increase for Exposures			**0**	**L/min**
G	**Total Required Fire Flow**			**10,000**	**L/min**

Notes:

1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Building construction type and fire wall dividing blocks assumed based on site plan

3. Floor areas used in Step B equivalent to 2-storey due to high 1-storey building height

4. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).

Project Name:	4101 Limebank Rd.
Project Location:	Ottawa ON
Project No:	23074
Date:	24-Aug-26
Building Type:	Light Industrial - Warehousing
Building Being Considered:	Bldg D3

Robinson Land Development

Calculations for Total Required Fire Flow

Step	Parameter				Value	
A	Type of Construction	**Options**	**C**	Non-Combustible Construction (Type II)	0.8	
		Wood Frame (Type V)	1.5			
		Ordinary Construction (Type III)	1.0			
		Non-Combustible Construction (Type II)	0.8			
		Fire Resistive Construction (Type I)	0.6			
B	Ground Floor Area				11200.0	m^2
	Total Effective Floor Area				**11,200.0**	**m^2**
C	**Fire Flow**				**19,000**	**L/min**
D	Occupancy Class	**Options**	**Charge**	Free burning	0.15	
		Non-combustible	-0.25			
		Limited Combustible	-0.15			
		Combustible	0.00			
		Free burning	0.15			
		Rapid Burning	0.25			
	Occupancy Adjustment				**2850**	**L/min**
	Fire Flow				**21,850**	**L/min**
E	Sprinkler Protection	**Options**	**Charge**	Automatic Sprinkler Protection	-0.30	
		Automatic Sprinkler Protection	-0.30			
		None	0.00			
		Water Supply is Standard for System and Hose Lines	-0.10	Yes	-0.10	
		Full Supervision of the Sprinker System	-0.10	Yes	-0.10	
	Sprinkler Reduction				**-10,925**	**L/min**
	Exposures					
	West Side					
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems				Yes	
	Exposed Wall Length				75	m
	Exposed Wall No. of Storeys				2	
	Length-Height Factor of Exposed Wall				150	m.storeys
	Construction Type of Exposed Wall	**Options**		Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame				
		Ordinary with Unprotected Openings				
		Ordinary without Unprotected Openings				
		Noncombustible or Fire Resistive with Unprotected Openings				
		Noncombustible or Fire Resistive without Unprotected Openings				
	Separation Distance			**>30m; No Exposure**	64	m
	West Side Exposure Charge				**0.00**	

	North Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			75	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			150	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**Fire Wall Separation**	0	m
	North Side Exposure Charge			**0.00**	
F	**East Side**				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			75	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			150	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	100	m
	East Side Exposure Charge			**0.00**	
	South Side				
	Subject Building and Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Building Fully Protected with Automatic Sprinker Systems			Yes	
	Exposed Wall Length			75	m
	Exposed Wall No. of Storeys			2	
	Length-Height Factor of Exposed Wall			150	m.storeys
	Construction Type of Exposed Wall	**Options**	Noncombustible or Fire Resistive with Unprotected Openings		
		Wood Frame			
		Ordinary with Unprotected Openings			
		Ordinary without Unprotected Openings			
		Noncombustible or Fire Resistive with Unprotected Openings			
		Noncombustible or Fire Resistive without Unprotected Openings			
	Separation Distance		**>30m; No Exposure**	100	m
	South Side Exposure Charge			**0.00**	
	Total Exposure Charage			**0**	**< 0.75**
	Increase for Exposures			**0**	**L/min**
G	**Total Required Fire Flow**			**11,000**	**L/min**

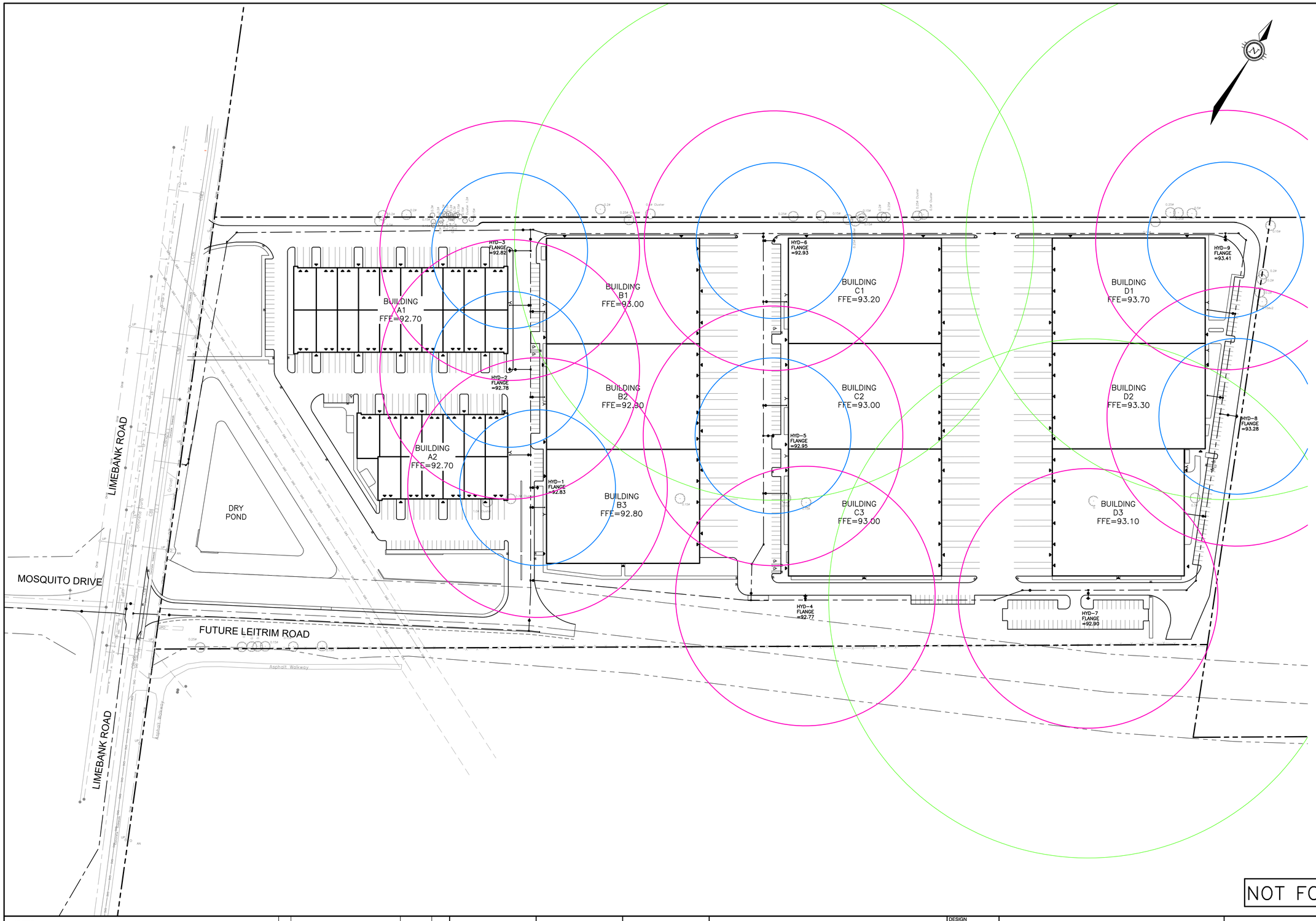
Notes:

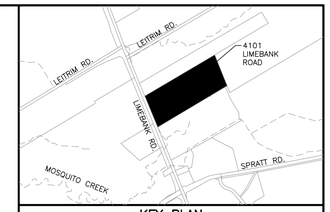
1. Fire flow calculations have been prepared in accordance with Fire Underwriters Survey (v. 2020)

2. Building construction type and fire wall dividing blocks assumed based on site plan

3. Floor areas used in Step B equivalent to 2-storey due to high 1-storey building height

4. Where buildings are at a diagonal to each other, the shortest separtion distance is increased by 3 metres and used as the exposure distance (Ref. FUS v.2020 pg.30).





KEY PLAN

LEGEND

- PROPERTY BOUNDARY (4101 LIMEBANK RD.)
- FUTURE LEITRIM RD. REALIGNMENT ROW
- EASEMENT
- HYDRANT
- FIRE DEPARTMENT CONNECTION
- WATERMAIN
- 45m HYDRANT RADIUS (TO FDC)
- 75m HYDRANT RADIUS
- 150m HYDRANT RADIUS

NOT FOR CONSTRUCTION

NOTES

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

PROPERTY BOUNDARIES ARE DERIVED FROM TOPOGRAPHICAL PLAN OF SURVEY OF PART OF LOTS 16 & 17 CONCESSION 2 (RIDEAU FRONT), GEOGRAPHIC TOWNSHIP OF GLOUCESTER, CITY OF OTTAWA. PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD. ONTARIO LAND SURVEYORS, REF: 24256-23. ELEVATIONS ARE REFERRED TO GEODETIC DATUM (CGVD28).

NO.	REVISION DESCRIPTION	DATE	BY
1	ISSUED FOR SPA	24/08/26	SM

SCALE

0 10m 20m 40m

HORIZONTAL 1:1000

Robinson Land Development
200-2936 Baseline Road
Ottawa, ON K2H 1B3
(613) 592-6060 rcii.com

DESIGN	SM
CHECKED	BM
DRAWN	SM
CHECKED	BM
APPROVED	CC

GROUPE MONTONI

4101 LIMEBANK RD.
CITY OF OTTAWA

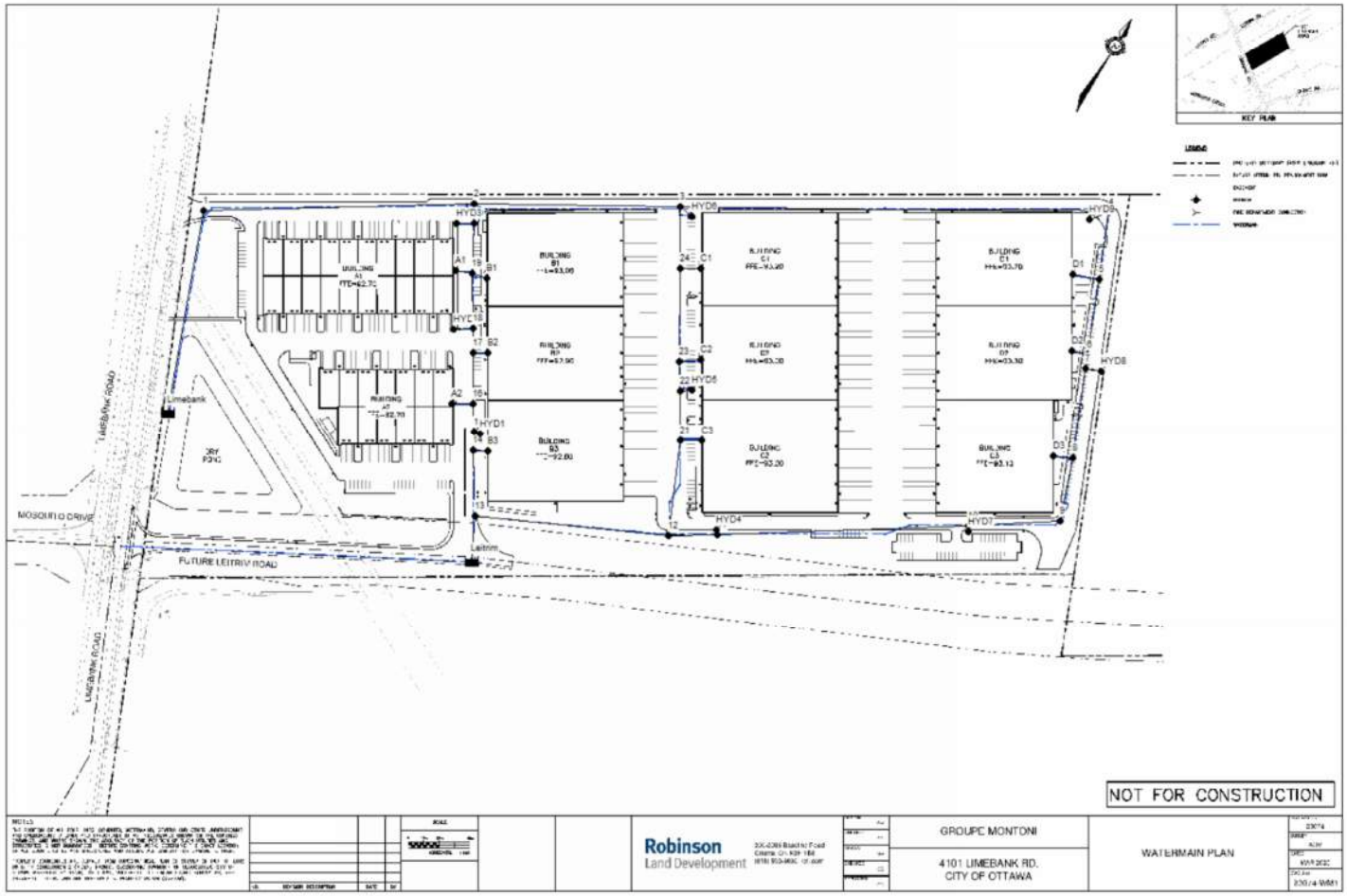
HYDRANT COVERAGE PLAN

PROJECT No.	23074
SURVEY	AOV
DATED	AUG 2026
DWG. No:	23074-HYD1

EPANET 2.2 - 4101 Limebank Rd.net

File Edit View Project Report Window Help

Network Map



Browser

Data Map

Pipes

26
27
30
32
33
35
37

Auto-Length Off LPS 150% X,Y: 4313.489, 8808.823

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

Input File: 4101 Limebank Rd - current avg day.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	Limebank	1	175	250
2	1	2	175	250
3	2	3	130	250
4	3	4	280	250
8	9	10	60	250
9	10	11	165	250
10	11	12	30	250
12	Leitrim	13	30	250
16	20	2	10	250
17	3	HYD6	6	150
18	22	HYD5	6	150
19	12	21	65	250
20	21	22	35	250
23	10	HYD7	4	150
25	HYD4	11	2	150
26	HYD9	4	3	150
27	20	HYD3	11	150
30	20	19	35	250
32	19	B1	8	150
33	19	A1	12	150
35	A2	16	12	150
37	23	C2	14	150
38	24	C1	14	150
39	3	24	40	250
40	24	23	60	250
41	23	22	15	250
46	8	D3	11	150
47	6	D2	9	150
48	6	5	45	250
49	5	4	50	250
50	5	D1	16	150
5	13	12	130	250
6	21	C3	14	150

7	8	9	40	250
11	6	7	10	250
13	7	HYD8	9	150
14	7	8	60	250

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
15	13	14	40	250
21	14	15	10	250
22	16	15	20	250
24	16	17	35	250
28	19	18	35	250
29	17	18	15	250
31	18	HYD2	11	150
34	17	B2	8	150
36	15	HYD1	3	150
42	14	B3	8	150

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
1	0.00	130.54	40.04	0.00
2	0.00	130.54	40.54	0.00
3	0.00	130.54	40.54	0.00
4	0.00	130.54	40.04	0.00
6	0.00	130.54	40.04	0.00
9	0.00	130.54	40.54	0.00
10	0.00	130.54	40.54	0.00
11	0.00	130.54	40.54	0.00
12	0.00	130.54	40.54	0.00
21	0.00	130.54	40.54	0.00
13	0.00	130.54	40.04	0.00
16	0.00	130.54	40.54	0.00
20	0.00	130.54	40.54	0.00
HYD2	0.00	130.54	37.74	0.00
HYD3	0.00	130.54	37.74	0.00
HYD4	0.00	130.54	37.74	0.00
HYD7	0.00	130.54	37.64	0.00
HYD8	0.00	130.54	37.24	0.00
HYD9	0.00	130.54	37.14	0.00
HYD5	0.00	130.54	37.54	0.00
HYD6	0.00	130.54	37.64	0.00
22	0.00	130.54	40.54	0.00

A2	0.31	130.54	37.84	0.00
19	0.00	130.54	40.54	0.00
B1	0.06	130.54	37.54	0.00
A1	0.48	130.54	37.84	0.00
23	0.00	130.54	40.54	0.00
C2	0.06	130.54	37.54	0.00
24	0.00	130.54	40.54	0.00
C1	0.06	130.54	37.34	0.00
8	0.00	130.54	40.04	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality	
D2	0.06	130.54	37.24	0.00	
D3	0.06	130.54	37.44	0.00	
5	0.00	130.54	40.04	0.00	
D1	0.06	130.54	36.84	0.00	
C3	0.06	130.54	37.54	0.00	
7	0.00	130.54	40.04	0.00	
14	0.00	130.54	40.54	0.00	
15	0.00	130.54	40.54	0.00	
17	0.00	130.54	40.54	0.00	
B2	0.06	130.54	37.64	0.00	
B3	0.06	130.54	37.74	0.00	
HYD1	0.00	130.54	37.74	0.00	
18	0.00	130.54	40.54	0.00	
Leitrim	-0.97	130.54	0.00	0.00	Reservoir
Limebank	-0.36	130.54	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	0.36	0.01	0.00	Open
2	0.36	0.01	0.00	Open
3	0.01	0.00	0.00	Open
4	0.05	0.00	0.00	Open
8	-0.13	0.00	0.00	Open
9	-0.13	0.00	0.00	Open
10	-0.13	0.00	0.00	Open
12	0.97	0.02	0.00	Open
16	-0.35	0.01	0.00	Open
17	0.00	0.00	0.00	Open
18	0.00	0.00	0.00	Open
19	0.22	0.00	0.00	Open

20	0.16	0.00	0.00	Open
23	0.00	0.00	0.00	Open
25	0.00	0.00	0.00	Open
26	0.00	0.00	0.00	Open
27	0.00	0.00	0.00	Open
30	0.35	0.01	0.00	Open
32	0.06	0.00	0.00	Open
33	0.48	0.03	0.02	Open
35	-0.31	0.02	0.01	Open
37	0.06	0.00	0.00	Open
38	0.06	0.00	0.00	Open
39	-0.04	0.00	0.00	Open
40	-0.10	0.00	0.00	Open
41	-0.16	0.00	0.00	Open

Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
46	0.06	0.00	0.00	Open
47	0.06	0.00	0.00	Open
48	0.01	0.00	0.00	Open
49	-0.05	0.00	0.00	Open
50	0.06	0.00	0.00	Open
5	0.35	0.01	0.00	Open
6	0.06	0.00	0.00	Open
7	-0.13	0.00	0.00	Open
11	-0.07	0.00	0.00	Open
13	0.00	0.00	0.00	Open
14	-0.07	0.00	0.00	Open
15	0.62	0.01	0.00	Open
21	0.56	0.01	0.00	Open
22	-0.56	0.01	0.00	Open
24	0.25	0.01	0.00	Open
28	-0.19	0.00	0.00	Open
29	0.19	0.00	0.00	Open
31	0.00	0.00	0.00	Open
34	0.06	0.00	0.00	Open
36	0.00	0.00	0.00	Open
42	0.06	0.00	0.00	Open

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******************************************************************
*                            E P A N E T                         *
*                     Hydraulic and Water Quality                *
*                     Analysis for Pipe Networks                 *
*                          Version 2.2                           *
******************************************************************
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Input File: 4101 Limebank Rd - current peak hour.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	Limebank	1	175	250
2	1	2	175	250
3	2	3	130	250
4	3	4	280	250
8	9	10	60	250
9	10	11	165	250
10	11	12	30	250
12	Leitrim	13	30	250
16	20	2	10	250
17	3	HYD6	6	150
18	22	HYD5	6	150
19	12	21	65	250
20	21	22	35	250
23	10	HYD7	4	150
25	HYD4	11	2	150
26	HYD9	4	3	150
27	20	HYD3	11	150
30	20	19	35	250
32	19	B1	8	150
33	19	A1	12	150
35	A2	16	12	150
37	23	C2	14	150
38	24	C1	14	150
39	3	24	40	250
40	24	23	60	250
41	23	22	15	250
46	8	D3	11	150
47	6	D2	9	150
48	6	5	45	250
49	5	4	50	250
50	5	D1	16	150
5	13	12	130	250
6	21	C3	14	150

7	8	9	40	250
11	6	7	10	250
13	7	HYD8	9	150
14	7	8	60	250

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
15	13	14	40	250
21	14	15	10	250
22	16	15	20	250
24	16	17	35	250
28	19	18	35	250
29	17	18	15	250
31	18	HYD2	11	150
34	17	B2	8	150
36	15	HYD1	3	150
42	14	B3	8	150

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
1	0.00	124.24	33.74	0.00
2	0.00	124.23	34.23	0.00
3	0.00	124.23	34.23	0.00
4	0.00	124.23	33.73	0.00
6	0.00	124.23	33.73	0.00
9	0.00	124.23	34.23	0.00
10	0.00	124.23	34.23	0.00
11	0.00	124.23	34.23	0.00
12	0.00	124.23	34.23	0.00
21	0.00	124.23	34.23	0.00
13	0.00	124.23	33.73	0.00
16	0.00	124.23	34.23	0.00
20	0.00	124.23	34.23	0.00
HYD2	0.00	124.23	31.43	0.00
HYD3	0.00	124.23	31.43	0.00
HYD4	0.00	124.23	31.43	0.00
HYD7	0.00	124.23	31.33	0.00
HYD8	0.00	124.23	30.93	0.00
HYD9	0.00	124.23	30.83	0.00
HYD5	0.00	124.23	31.23	0.00
HYD6	0.00	124.23	31.33	0.00
22	0.00	124.23	34.23	0.00

A2	0.83	124.23	31.53	0.00
19	0.00	124.23	34.23	0.00
B1	0.15	124.23	31.23	0.00
A1	1.28	124.23	31.53	0.00
23	0.00	124.23	34.23	0.00
C2	0.15	124.23	31.23	0.00
24	0.00	124.23	34.23	0.00
C1	0.15	124.23	31.03	0.00
8	0.00	124.23	33.73	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality	
D2	0.15	124.23	30.93	0.00	
D3	0.15	124.23	31.13	0.00	
5	0.00	124.23	33.73	0.00	
D1	0.15	124.23	30.53	0.00	
C3	0.15	124.23	31.23	0.00	
7	0.00	124.23	33.73	0.00	
14	0.00	124.23	34.23	0.00	
15	0.00	124.23	34.23	0.00	
17	0.00	124.23	34.23	0.00	
B2	0.15	124.23	31.33	0.00	
B3	0.15	124.23	31.43	0.00	
HYD1	0.00	124.23	31.43	0.00	
18	0.00	124.23	34.23	0.00	
Leitrim	-0.72	124.23	0.00	0.00	Reservoir
Limebank	-2.74	124.24	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	2.74	0.06	0.03	Open
2	2.74	0.06	0.03	Open
3	0.87	0.02	0.00	Open
4	0.31	0.01	0.00	Open
8	-0.14	0.00	0.00	Open
9	-0.14	0.00	0.00	Open
10	-0.14	0.00	0.00	Open
12	0.72	0.01	0.00	Open
16	-1.87	0.04	0.01	Open
17	0.00	0.00	0.00	Open
18	0.00	0.00	0.00	Open
19	-0.11	0.00	0.00	Open

20	-0.26	0.01	0.00	Open
23	0.00	0.00	0.00	Open
25	0.00	0.00	0.00	Open
26	0.00	0.00	0.00	Open
27	0.00	0.00	0.00	Open
30	1.87	0.04	0.01	Open
32	0.15	0.01	0.00	Open
33	1.28	0.07	0.10	Open
35	-0.83	0.05	0.04	Open
37	0.15	0.01	0.00	Open
38	0.15	0.01	0.00	Open
39	0.56	0.01	0.00	Open
40	0.41	0.01	0.00	Open
41	0.26	0.01	0.00	Open

Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
46	0.15	0.01	0.00	Open
47	0.15	0.01	0.00	Open
48	-0.16	0.00	0.00	Open
49	-0.31	0.01	0.00	Open
50	0.15	0.01	0.00	Open
5	0.03	0.00	0.00	Open
6	0.15	0.01	0.00	Open
7	-0.14	0.00	0.00	Open
11	0.01	0.00	0.00	Open
13	0.00	0.00	0.00	Open
14	0.01	0.00	0.00	Open
15	0.69	0.01	0.00	Open
21	0.54	0.01	0.00	Open
22	-0.54	0.01	0.00	Open
24	-0.29	0.01	0.00	Open
28	0.44	0.01	0.00	Open
29	-0.44	0.01	0.00	Open
31	0.00	0.00	0.00	Open
34	0.15	0.01	0.00	Open
36	0.00	0.00	0.00	Open
42	0.15	0.01	0.00	Open

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******************************************************************
*                            E P A N E T                         *
*                     Hydraulic and Water Quality                *
*                     Analysis for Pipe Networks                 *
*                           Version 2.2                          *
******************************************************************
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Input File: 4101 Limebank Rd - current max day + HYD2&3.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	Limebank	1	175	250
2	1	2	175	250
3	2	3	130	250
4	3	4	280	250
8	9	10	60	250
9	10	11	165	250
10	11	12	30	250
12	Leitrim	13	30	250
16	20	2	10	250
17	3	HYD6	6	150
18	22	HYD5	6	150
19	12	21	65	250
20	21	22	35	250
23	10	HYD7	4	150
25	HYD4	11	2	150
26	HYD9	4	3	150
27	20	HYD3	11	150
30	20	19	35	250
32	19	B1	8	150
33	19	A1	12	150
35	A2	16	12	150
37	23	C2	14	150
38	24	C1	14	150
39	3	24	40	250
40	24	23	60	250
41	23	22	15	250
46	8	D3	11	150
47	6	D2	9	150
48	6	5	45	250
49	5	4	50	250
50	5	D1	16	150
5	13	12	130	250
6	21	C3	14	150

7	8	9	40	250
11	6	7	10	250
13	7	HYD8	9	150
14	7	8	60	250

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
15	13	14	40	250
21	14	15	10	250
22	16	15	20	250
24	16	17	35	250
28	19	18	35	250
29	17	18	15	250
31	18	HYD2	11	150
34	17	B2	8	150
36	15	HYD1	3	150
42	14	B3	8	150

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
1	0.00	117.10	26.60	0.00
2	0.00	115.63	25.63	0.00
3	0.00	116.04	26.04	0.00
4	0.00	116.16	25.66	0.00
6	0.00	116.20	25.70	0.00
9	0.00	116.25	26.25	0.00
10	0.00	116.28	26.28	0.00
11	0.00	116.35	26.35	0.00
12	0.00	116.36	26.36	0.00
21	0.00	116.26	26.26	0.00
13	0.00	116.78	26.28	0.00
16	0.00	115.97	25.97	0.00
20	0.00	115.44	25.44	0.00
HYD2	83.30	113.01	20.21	0.00
HYD3	83.30	113.04	20.24	0.00
HYD4	0.00	116.35	23.55	0.00
HYD7	0.00	116.28	23.38	0.00
HYD8	0.00	116.21	22.91	0.00
HYD9	0.00	116.16	22.76	0.00
HYD5	0.00	116.21	23.21	0.00
HYD6	0.00	116.04	23.14	0.00
22	0.00	116.21	26.21	0.00

A2	0.46	115.97	23.27	0.00
19	0.00	115.42	25.42	0.00
B1	0.08	115.42	22.42	0.00
A1	0.71	115.42	22.72	0.00
23	0.00	116.19	26.19	0.00
C2	0.08	116.19	23.19	0.00
24	0.00	116.10	26.10	0.00
C1	0.08	116.10	22.90	0.00
8	0.00	116.23	25.73	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality	
D2	0.08	116.20	22.90	0.00	
D3	0.08	116.23	23.13	0.00	
5	0.00	116.18	25.68	0.00	
D1	0.08	116.18	22.48	0.00	
C3	0.08	116.26	23.26	0.00	
7	0.00	116.21	25.71	0.00	
14	0.00	116.32	26.32	0.00	
15	0.00	116.20	26.20	0.00	
17	0.00	115.57	25.57	0.00	
B2	0.08	115.57	22.67	0.00	
B3	0.08	116.32	23.52	0.00	
HYD1	0.00	116.20	23.40	0.00	
18	0.00	115.40	25.40	0.00	
Leitrim	-108.10	117.52	0.00	0.00	Reservoir
Limebank	-60.39	118.56	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	60.39	1.23	8.36	Open
2	60.39	1.23	8.36	Open
3	-35.68	0.73	3.16	Open
4	-12.07	0.25	0.42	Open
8	-12.31	0.25	0.44	Open
9	-12.31	0.25	0.44	Open
10	-12.31	0.25	0.44	Open
12	108.10	2.20	24.58	Open
16	-96.07	1.96	19.76	Open
17	0.00	0.00	0.00	Open
18	0.00	0.00	0.00	Open
19	23.85	0.49	1.50	Open

20	23.77	0.48	1.49	Open
23	0.00	0.00	0.00	Open
25	0.00	0.00	0.00	Open
26	0.00	0.00	0.00	Open
27	83.30	4.71	217.93	Open
30	12.77	0.26	0.47	Open
32	0.08	0.00	0.00	Open
33	0.71	0.04	0.03	Open
35	-0.46	0.03	0.01	Open
37	0.08	0.00	0.00	Open
38	0.08	0.00	0.00	Open
39	-23.61	0.48	1.47	Open
40	-23.69	0.48	1.48	Open
41	-23.77	0.48	1.49	Open

Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
46	0.08	0.00	0.00	Open
47	0.08	0.00	0.00	Open
48	12.15	0.25	0.43	Open
49	12.07	0.25	0.42	Open
50	0.08	0.00	0.00	Open
5	36.16	0.74	3.23	Open
6	0.08	0.00	0.00	Open
7	-12.31	0.25	0.44	Open
11	-12.23	0.25	0.43	Open
13	0.00	0.00	0.00	Open
14	-12.23	0.25	0.43	Open
15	71.94	1.47	11.56	Open
21	71.86	1.46	11.54	Open
22	-71.86	1.46	11.54	Open
24	71.40	1.45	11.40	Open
28	11.98	0.24	0.42	Open
29	71.32	1.45	11.38	Open
31	83.30	4.71	217.93	Open
34	0.08	0.00	0.00	Open
36	0.00	0.00	0.00	Open
42	0.08	0.00	0.00	Open

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

Input File: 4101 Limebank Rd - current max day + HYD1&2.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	Limebank	1	175	250
2	1	2	175	250
3	2	3	130	250
4	3	4	280	250
8	9	10	60	250
9	10	11	165	250
10	11	12	30	250
12	Leitrim	13	30	250
16	20	2	10	250
17	3	HYD6	6	150
18	22	HYD5	6	150
19	12	21	65	250
20	21	22	35	250
23	10	HYD7	4	150
25	HYD4	11	2	150
26	HYD9	4	3	150
27	20	HYD3	11	150
30	20	19	35	250
32	19	B1	8	150
33	19	A1	12	150
35	A2	16	12	150
37	23	C2	14	150
38	24	C1	14	150
39	3	24	40	250
40	24	23	60	250
41	23	22	15	250
46	8	D3	11	150
47	6	D2	9	150
48	6	5	45	250
49	5	4	50	250
50	5	D1	16	150
5	13	12	130	250
6	21	C3	14	150

7	8	9	40	250
11	6	7	10	250
13	7	HYD8	9	150
14	7	8	60	250

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
15	13	14	40	250
21	14	15	10	250
22	16	15	20	250
24	16	17	35	250
28	19	18	35	250
29	17	18	15	250
31	18	HYD2	11	150
34	17	B2	8	150
36	15	HYD1	3	150
42	14	B3	8	150

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
1	0.00	117.33	26.83	0.00
2	0.00	116.10	26.10	0.00
3	0.00	116.24	26.24	0.00
4	0.00	116.27	25.77	0.00
6	0.00	116.29	25.79	0.00
9	0.00	116.30	26.30	0.00
10	0.00	116.31	26.31	0.00
11	0.00	116.33	26.33	0.00
12	0.00	116.34	26.34	0.00
21	0.00	116.31	26.31	0.00
13	0.00	116.48	25.98	0.00
16	0.00	115.18	25.18	0.00
20	0.00	115.98	25.98	0.00
HYD2	91.70	112.27	19.47	0.00
HYD3	0.00	115.98	23.18	0.00
HYD4	0.00	116.33	23.53	0.00
HYD7	0.00	116.31	23.41	0.00
HYD8	0.00	116.29	22.99	0.00
HYD9	0.00	116.27	22.87	0.00
HYD5	0.00	116.29	23.29	0.00
HYD6	0.00	116.24	23.34	0.00
22	0.00	116.29	26.29	0.00

A2	0.46	115.18	22.48	0.00
19	0.00	115.55	25.55	0.00
B1	0.08	115.55	22.55	0.00
A1	0.71	115.55	22.85	0.00
23	0.00	116.28	26.28	0.00
C2	0.08	116.28	23.28	0.00
24	0.00	116.25	26.25	0.00
C1	0.08	116.25	23.05	0.00
8	0.00	116.30	25.80	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality	
D2	0.08	116.29	22.99	0.00	
D3	0.08	116.30	23.20	0.00	
5	0.00	116.28	25.78	0.00	
D1	0.08	116.28	22.58	0.00	
C3	0.08	116.31	23.31	0.00	
7	0.00	116.29	25.79	0.00	
14	0.00	115.45	25.45	0.00	
15	0.00	115.20	25.20	0.00	
17	0.00	115.14	25.14	0.00	
B2	0.08	115.14	22.24	0.00	
B3	0.08	115.45	22.65	0.00	
HYD1	91.70	114.41	21.61	0.00	
18	0.00	115.13	25.13	0.00	
Leitrim	-130.35	117.52	0.00	0.00	Reservoir
Limebank	-54.94	118.56	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
1	54.94	1.12	7.02	Open
2	54.94	1.12	7.02	Open
3	-19.32	0.39	1.01	Open
4	-6.52	0.13	0.14	Open
8	-6.76	0.14	0.14	Open
9	-6.76	0.14	0.14	Open
10	-6.76	0.14	0.14	Open
12	130.35	2.66	34.77	Open
16	-74.26	1.51	12.26	Open
17	0.00	0.00	0.00	Open
18	0.00	0.00	0.00	Open
19	13.04	0.27	0.49	Open

20	12.96	0.26	0.48	Open
23	0.00	0.00	0.00	Open
25	0.00	0.00	0.00	Open
26	0.00	0.00	0.00	Open
27	0.00	0.00	0.00	Open
30	74.26	1.51	12.26	Open
32	0.08	0.00	0.00	Open
33	0.71	0.04	0.03	Open
35	-0.46	0.03	0.01	Open
37	0.08	0.00	0.00	Open
38	0.08	0.00	0.00	Open
39	-12.80	0.26	0.47	Open
40	-12.88	0.26	0.48	Open
41	-12.96	0.26	0.48	Open

Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
46	0.08	0.00	0.00	Open
47	0.08	0.00	0.00	Open
48	6.60	0.13	0.14	Open
49	6.52	0.13	0.14	Open
50	0.08	0.00	0.00	Open
5	19.80	0.40	1.06	Open
6	0.08	0.00	0.00	Open
7	-6.76	0.14	0.14	Open
11	-6.68	0.14	0.14	Open
13	0.00	0.00	0.00	Open
14	-6.68	0.14	0.14	Open
15	110.55	2.25	25.63	Open
21	110.47	2.25	25.59	Open
22	-18.77	0.38	0.96	Open
24	18.31	0.37	0.92	Open
28	73.47	1.50	12.02	Open
29	18.23	0.37	0.91	Open
31	91.70	5.19	260.37	Open
34	0.08	0.00	0.00	Open
36	91.70	5.19	260.37	Open
42	0.08	0.00	0.00	Open

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

Input File: 4101 Limebank Rd - current max day + HYD5&6.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	Limebank	1	175	250
2	1	2	175	250
3	2	3	130	250
4	3	4	280	250
8	9	10	60	250
9	10	11	165	250
10	11	12	30	250
12	Leitrim	13	30	250
16	20	2	10	250
17	3	HYD6	6	150
18	22	HYD5	6	150
19	12	21	65	250
20	21	22	35	250
23	10	HYD7	4	150
25	HYD4	11	2	150
26	HYD9	4	3	150
27	20	HYD3	11	150
30	20	19	35	250
32	19	B1	8	150
33	19	A1	12	150
35	A2	16	12	150
37	23	C2	14	150
38	24	C1	14	150
39	3	24	40	250
40	24	23	60	250
41	23	22	15	250
46	8	D3	11	150
47	6	D2	9	150
48	6	5	45	250
49	5	4	50	250
50	5	D1	16	150
5	13	12	130	250
6	21	C3	14	150

7	8	9	40	250
11	6	7	10	250
13	7	HYD8	9	150
14	7	8	60	250

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
15	13	14	40	250
21	14	15	10	250
22	16	15	20	250
24	16	17	35	250
28	19	18	35	250
29	17	18	15	250
31	18	HYD2	11	150
34	17	B2	8	150
36	15	HYD1	3	150
42	14	B3	8	150

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
1	0.00	117.36	26.86	0.00
2	0.00	116.17	26.17	0.00
3	0.00	114.08	24.08	0.00
4	0.00	114.36	23.86	0.00
6	0.00	114.45	23.95	0.00
9	0.00	114.56	24.56	0.00
10	0.00	114.62	24.62	0.00
11	0.00	114.79	24.79	0.00
12	0.00	114.82	24.82	0.00
21	0.00	114.25	24.25	0.00
13	0.00	116.70	26.20	0.00
16	0.00	116.51	26.51	0.00
20	0.00	116.19	26.19	0.00
HYD2	0.00	116.38	23.58	0.00
HYD3	0.00	116.19	23.39	0.00
HYD4	0.00	114.79	21.99	0.00
HYD7	0.00	114.62	21.72	0.00
HYD8	0.00	114.46	21.16	0.00
HYD9	0.00	114.36	20.96	0.00
HYD5	83.30	112.63	19.63	0.00
HYD6	83.30	112.78	19.88	0.00
22	0.00	113.94	23.94	0.00

A2	0.46	116.51	23.81	0.00
19	0.00	116.28	26.28	0.00
B1	0.08	116.28	23.28	0.00
A1	0.71	116.28	23.58	0.00
23	0.00	113.96	23.96	0.00
C2	0.08	113.96	20.96	0.00
24	0.00	114.03	24.03	0.00
C1	0.08	114.03	20.83	0.00
8	0.00	114.52	24.02	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality	
D2	0.08	114.45	21.15	0.00	
D3	0.08	114.52	21.42	0.00	
5	0.00	114.41	23.91	0.00	
D1	0.08	114.41	20.71	0.00	
C3	0.08	114.25	21.25	0.00	
7	0.00	114.46	23.96	0.00	
14	0.00	116.59	26.59	0.00	
15	0.00	116.56	26.56	0.00	
17	0.00	116.42	26.42	0.00	
B2	0.08	116.42	23.52	0.00	
B3	0.08	116.59	23.79	0.00	
HYD1	0.00	116.56	23.76	0.00	
18	0.00	116.38	26.38	0.00	
Leitrim	-114.35	117.52	0.00	0.00	Reservoir
Limebank	-54.14	118.56	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	54.14	1.10	6.83	Open
2	54.14	1.10	6.83	Open
3	85.85	1.75	16.04	Open
4	-19.00	0.39	0.98	Open
8	-19.24	0.39	1.01	Open
9	-19.24	0.39	1.01	Open
10	-19.24	0.39	1.01	Open
12	114.35	2.33	27.28	Open
16	31.71	0.65	2.54	Open
17	83.30	4.71	217.93	Open
18	83.30	4.71	217.93	Open
19	61.99	1.26	8.78	Open

20	61.91	1.26	8.76	Open
23	0.00	0.00	0.00	Open
25	0.00	0.00	0.00	Open
26	0.00	0.00	0.00	Open
27	0.00	0.00	0.00	Open
30	-31.71	0.65	2.54	Open
32	0.08	0.00	0.00	Open
33	0.71	0.04	0.03	Open
35	-0.46	0.03	0.01	Open
37	0.08	0.00	0.00	Open
38	0.08	0.00	0.00	Open
39	21.55	0.44	1.24	Open
40	21.47	0.44	1.23	Open
41	21.39	0.44	1.22	Open

Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
46	0.08	0.00	0.00	Open
47	0.08	0.00	0.00	Open
48	19.08	0.39	0.99	Open
49	19.00	0.39	0.98	Open
50	0.08	0.00	0.00	Open
5	81.23	1.65	14.48	Open
6	0.08	0.00	0.00	Open
7	-19.24	0.39	1.01	Open
11	-19.16	0.39	1.00	Open
13	0.00	0.00	0.00	Open
14	-19.16	0.39	1.00	Open
15	33.12	0.67	2.75	Open
21	33.04	0.67	2.74	Open
22	-33.04	0.67	2.74	Open
24	32.58	0.66	2.67	Open
28	-32.50	0.66	2.65	Open
29	32.50	0.66	2.65	Open
31	0.00	0.00	0.00	Open
34	0.08	0.00	0.00	Open
36	0.00	0.00	0.00	Open
42	0.08	0.00	0.00	Open

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

Input File: 4101 Limebank Rd - current max day + HYD4,5&6.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	Limebank	1	175	250
2	1	2	175	250
3	2	3	130	250
4	3	4	280	250
8	9	10	60	250
9	10	11	165	250
10	11	12	30	250
12	Leitrim	13	30	250
16	20	2	10	250
17	3	HYD6	6	150
18	22	HYD5	6	150
19	12	21	65	250
20	21	22	35	250
23	10	HYD7	4	150
25	HYD4	11	2	150
26	HYD9	4	3	150
27	20	HYD3	11	150
30	20	19	35	250
32	19	B1	8	150
33	19	A1	12	150
35	A2	16	12	150
37	23	C2	14	150
38	24	C1	14	150
39	3	24	40	250
40	24	23	60	250
41	23	22	15	250
46	8	D3	11	150
47	6	D2	9	150
48	6	5	45	250
49	5	4	50	250
50	5	D1	16	150
5	13	12	130	250
6	21	C3	14	150

7	8	9	40	250
11	6	7	10	250
13	7	HYD8	9	150
14	7	8	60	250

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
15	13	14	40	250
21	14	15	10	250
22	16	15	20	250
24	16	17	35	250
28	19	18	35	250
29	17	18	15	250
31	18	HYD2	11	150
34	17	B2	8	150
36	15	HYD1	3	150
42	14	B3	8	150

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
1	0.00	117.10	26.60	0.00
2	0.00	115.65	25.65	0.00
3	0.00	113.09	23.09	0.00
4	0.00	113.07	22.57	0.00
6	0.00	113.06	22.56	0.00
9	0.00	113.05	23.05	0.00
10	0.00	113.04	23.04	0.00
11	0.00	113.03	23.03	0.00
12	0.00	113.30	23.30	0.00
21	0.00	113.03	23.03	0.00
13	0.00	116.30	25.80	0.00
16	0.00	116.07	26.07	0.00
20	0.00	115.68	25.68	0.00
HYD2	0.00	115.90	23.10	0.00
HYD3	0.00	115.68	22.88	0.00
HYD4	68.30	112.72	19.92	0.00
HYD7	0.00	113.04	20.14	0.00
HYD8	0.00	113.06	19.76	0.00
HYD9	0.00	113.07	19.67	0.00
HYD5	68.30	111.97	18.97	0.00
HYD6	63.30	112.31	19.41	0.00
22	0.00	112.88	22.88	0.00

A2	0.46	116.07	23.37	0.00
19	0.00	115.79	25.79	0.00
B1	0.08	115.79	22.79	0.00
A1	0.71	115.79	23.09	0.00
23	0.00	112.91	22.91	0.00
C2	0.08	112.91	19.91	0.00
24	0.00	113.02	23.02	0.00
C1	0.08	113.02	19.82	0.00
8	0.00	113.05	22.55	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality	
D2	0.08	113.06	19.76	0.00	
D3	0.08	113.05	19.95	0.00	
5	0.00	113.06	22.56	0.00	
D1	0.08	113.06	19.36	0.00	
C3	0.08	113.03	20.03	0.00	
7	0.00	113.06	22.56	0.00	
14	0.00	116.17	26.17	0.00	
15	0.00	116.14	26.14	0.00	
17	0.00	115.95	25.95	0.00	
B2	0.08	115.95	23.05	0.00	
B3	0.08	116.17	23.37	0.00	
HYD1	0.00	116.14	23.34	0.00	
18	0.00	115.90	25.90	0.00	
Leitrim	-141.58	117.52	0.00	0.00	Reservoir
Limebank	-60.21	118.56	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
1	60.21	1.23	8.32	Open
2	60.21	1.23	8.32	Open
3	95.79	1.95	19.65	Open
4	5.52	0.11	0.10	Open
8	5.28	0.11	0.09	Open
9	5.28	0.11	0.09	Open
10	-63.02	1.28	9.05	Open
12	141.58	2.88	40.52	Open
16	35.58	0.72	3.14	Open
17	63.30	3.58	131.07	Open
18	68.30	3.86	150.88	Open
19	41.58	0.85	4.19	Open

20	41.50	0.85	4.17	Open
23	0.00	0.00	0.00	Open
25	-68.30	3.86	150.88	Open
26	0.00	0.00	0.00	Open
27	0.00	0.00	0.00	Open
30	-35.58	0.72	3.14	Open
32	0.08	0.00	0.00	Open
33	0.71	0.04	0.03	Open
35	-0.46	0.03	0.01	Open
37	0.08	0.00	0.00	Open
38	0.08	0.00	0.00	Open
39	26.96	0.55	1.88	Open
40	26.88	0.55	1.87	Open
41	26.80	0.55	1.86	Open

Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
46	0.08	0.00	0.00	Open
47	0.08	0.00	0.00	Open
48	-5.44	0.11	0.10	Open
49	-5.52	0.11	0.10	Open
50	0.08	0.00	0.00	Open
5	104.59	2.13	23.13	Open
6	0.08	0.00	0.00	Open
7	5.28	0.11	0.09	Open
11	5.36	0.11	0.09	Open
13	0.00	0.00	0.00	Open
14	5.36	0.11	0.09	Open
15	36.99	0.75	3.37	Open
21	36.91	0.75	3.36	Open
22	-36.91	0.75	3.36	Open
24	36.45	0.74	3.28	Open
28	-36.37	0.74	3.27	Open
29	36.37	0.74	3.27	Open
31	0.00	0.00	0.00	Open
34	0.08	0.00	0.00	Open
36	0.00	0.00	0.00	Open
42	0.08	0.00	0.00	Open

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

Input File: 4101 Limebank Rd - current max day + HYD4,5&7.net
```

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	Limebank	1	175	250
2	1	2	175	250
3	2	3	130	250
4	3	4	280	250
8	9	10	60	250
9	10	11	165	250
10	11	12	30	250
12	Leitrim	13	30	250
16	20	2	10	250
17	3	HYD6	6	150
18	22	HYD5	6	150
19	12	21	65	250
20	21	22	35	250
23	10	HYD7	4	150
25	HYD4	11	2	150
26	HYD9	4	3	150
27	20	HYD3	11	150
30	20	19	35	250
32	19	B1	8	150
33	19	A1	12	150
35	A2	16	12	150
37	23	C2	14	150
38	24	C1	14	150
39	3	24	40	250
40	24	23	60	250
41	23	22	15	250
46	8	D3	11	150
47	6	D2	9	150
48	6	5	45	250
49	5	4	50	250
50	5	D1	16	150
5	13	12	130	250
6	21	C3	14	150

7	8	9	40	250
11	6	7	10	250
13	7	HYD8	9	150
14	7	8	60	250

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
15	13	14	40	250
21	14	15	10	250
22	16	15	20	250
24	16	17	35	250
28	19	18	35	250
29	17	18	15	250
31	18	HYD2	11	150
34	17	B2	8	150
36	15	HYD1	3	150
42	14	B3	8	150

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
1	0.00	117.18	26.68	0.00
2	0.00	115.80	25.80	0.00
3	0.00	113.58	23.58	0.00
4	0.00	112.73	22.23	0.00
6	0.00	112.44	21.94	0.00
9	0.00	112.11	22.11	0.00
10	0.00	111.93	21.93	0.00
11	0.00	112.28	22.28	0.00
12	0.00	112.88	22.88	0.00
21	0.00	112.84	22.84	0.00
13	0.00	116.28	25.78	0.00
16	0.00	116.10	26.10	0.00
20	0.00	115.82	25.82	0.00
HYD2	0.00	115.98	23.18	0.00
HYD3	0.00	115.82	23.02	0.00
HYD4	68.30	111.97	19.17	0.00
HYD7	63.30	111.41	18.51	0.00
HYD8	0.00	112.41	19.11	0.00
HYD9	0.00	112.73	19.33	0.00
HYD5	68.30	111.91	18.91	0.00
HYD6	0.00	113.58	20.68	0.00
22	0.00	112.81	22.81	0.00

A2	0.46	116.10	23.40	0.00
19	0.00	115.90	25.90	0.00
B1	0.08	115.90	22.90	0.00
A1	0.71	115.90	23.20	0.00
23	0.00	112.91	22.91	0.00
C2	0.08	112.91	19.91	0.00
24	0.00	113.32	23.32	0.00
C1	0.08	113.32	20.12	0.00
8	0.00	112.23	21.73	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality	
D2	0.08	112.44	19.14	0.00	
D3	0.08	112.23	19.13	0.00	
5	0.00	112.58	22.08	0.00	
D1	0.08	112.58	18.88	0.00	
C3	0.08	112.84	19.84	0.00	
7	0.00	112.41	21.91	0.00	
14	0.00	116.18	26.18	0.00	
15	0.00	116.15	26.15	0.00	
17	0.00	116.02	26.02	0.00	
B2	0.08	116.02	23.12	0.00	
B3	0.08	116.18	23.38	0.00	
HYD1	0.00	116.15	23.35	0.00	
18	0.00	115.98	25.98	0.00	
Leitrim	-143.23	117.52	0.00	0.00	Reservoir
Limebank	-58.56	118.56	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	58.56	1.19	7.90	Open
2	58.56	1.19	7.90	Open
3	88.60	1.80	17.01	Open
4	34.99	0.71	3.04	Open
8	34.75	0.71	3.01	Open
9	-28.55	0.58	2.09	Open
10	-96.85	1.97	20.05	Open
12	143.23	2.92	41.40	Open
16	30.04	0.61	2.29	Open
17	0.00	0.00	0.00	Open
18	68.30	3.86	150.88	Open
19	14.94	0.30	0.63	Open

20	14.86	0.30	0.62	Open
23	63.30	3.58	131.06	Open
25	-68.30	3.86	150.88	Open
26	0.00	0.00	0.00	Open
27	0.00	0.00	0.00	Open
30	-30.04	0.61	2.29	Open
32	0.08	0.00	0.00	Open
33	0.71	0.04	0.03	Open
35	-0.46	0.03	0.01	Open
37	0.08	0.00	0.00	Open
38	0.08	0.00	0.00	Open
39	53.60	1.09	6.71	Open
40	53.52	1.09	6.69	Open
41	53.44	1.09	6.67	Open

Link Results: (continued)

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
46	0.08	0.00	0.00	Open
47	0.08	0.00	0.00	Open
48	-34.91	0.71	3.03	Open
49	-34.99	0.71	3.04	Open
50	0.08	0.00	0.00	Open
5	111.78	2.28	26.16	Open
6	0.08	0.00	0.00	Open
7	34.75	0.71	3.01	Open
11	34.83	0.71	3.02	Open
13	0.00	0.00	0.00	Open
14	34.83	0.71	3.02	Open
15	31.45	0.64	2.50	Open
21	31.37	0.64	2.49	Open
22	-31.37	0.64	2.49	Open
24	30.91	0.63	2.42	Open
28	-30.83	0.63	2.41	Open
29	30.83	0.63	2.41	Open
31	0.00	0.00	0.00	Open
34	0.08	0.00	0.00	Open
36	0.00	0.00	0.00	Open
42	0.08	0.00	0.00	Open

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

Input File: 4101 Limebank Rd - current max day + HYD7,8&9.net
```

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	Limebank	1	175	250
2	1	2	175	250
3	2	3	130	250
4	3	4	280	250
8	9	10	60	250
9	10	11	165	250
10	11	12	30	250
12	Leitrim	13	30	250
16	20	2	10	250
17	3	HYD6	6	150
18	22	HYD5	6	150
19	12	21	65	250
20	21	22	35	250
23	10	HYD7	4	150
25	HYD4	11	2	150
26	HYD9	4	3	150
27	20	HYD3	11	150
30	20	19	35	250
32	19	B1	8	150
33	19	A1	12	150
35	A2	16	12	150
37	23	C2	14	150
38	24	C1	14	150
39	3	24	40	250
40	24	23	60	250
41	23	22	15	250
46	8	D3	11	150
47	6	D2	9	150
48	6	5	45	250
49	5	4	50	250
50	5	D1	16	150
5	13	12	130	250
6	21	C3	14	150

7	8	9	40	250
11	6	7	10	250
13	7	HYD8	9	150
14	7	8	60	250

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
15	13	14	40	250
21	14	15	10	250
22	16	15	20	250
24	16	17	35	250
28	19	18	35	250
29	17	18	15	250
31	18	HYD2	11	150
34	17	B2	8	150
36	15	HYD1	3	150
42	14	B3	8	150

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
1	0.00	117.28	26.78	0.00
2	0.00	116.00	26.00	0.00
3	0.00	113.88	23.88	0.00
4	0.00	109.46	18.96	0.00
6	0.00	109.31	18.81	0.00
9	0.00	109.64	19.64	0.00
10	0.00	109.85	19.85	0.00
11	0.00	113.26	23.26	0.00
12	0.00	113.88	23.88	0.00
21	0.00	113.88	23.88	0.00
13	0.00	116.50	26.00	0.00
16	0.00	116.32	26.32	0.00
20	0.00	116.02	26.02	0.00
HYD2	0.00	116.19	23.39	0.00
HYD3	0.00	116.02	23.22	0.00
HYD4	0.00	113.26	20.46	0.00
HYD7	61.10	109.36	16.46	0.00
HYD8	61.10	108.19	14.89	0.00
HYD9	61.10	109.09	15.69	0.00
HYD5	0.00	113.88	20.88	0.00
HYD6	0.00	113.88	20.98	0.00
22	0.00	113.88	23.88	0.00

A2	0.46	116.32	23.62	0.00
19	0.00	116.11	26.11	0.00
B1	0.08	116.11	23.11	0.00
A1	0.71	116.11	23.41	0.00
23	0.00	113.88	23.88	0.00
C2	0.08	113.88	20.88	0.00
24	0.00	113.88	23.88	0.00
C1	0.08	113.88	20.68	0.00
8	0.00	109.50	19.00	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality	
D2	0.08	109.31	16.01	0.00	
D3	0.08	109.50	16.40	0.00	
5	0.00	109.38	18.88	0.00	
D1	0.08	109.38	15.68	0.00	
C3	0.08	113.88	20.88	0.00	
7	0.00	109.30	18.80	0.00	
14	0.00	116.39	26.39	0.00	
15	0.00	116.37	26.37	0.00	
17	0.00	116.23	26.23	0.00	
B2	0.08	116.23	23.33	0.00	
B3	0.08	116.39	23.59	0.00	
HYD1	0.00	116.37	23.57	0.00	
18	0.00	116.19	26.19	0.00	
Leitrim	-129.02	117.52	0.00	0.00	Reservoir
Limebank	-56.17	118.56	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	56.17	1.14	7.31	Open
2	56.17	1.14	7.31	Open
3	86.67	1.77	16.33	Open
4	85.11	1.73	15.79	Open
8	-37.33	0.76	3.43	Open
9	-98.43	2.01	20.67	Open
10	-98.43	2.01	20.67	Open
12	129.02	2.63	34.11	Open
16	30.50	0.62	2.36	Open
17	0.00	0.00	0.00	Open
18	0.00	0.00	0.00	Open
19	-1.31	0.03	0.01	Open

20	-1.39	0.03	0.01	Open
23	61.10	3.46	122.76	Open
25	0.00	0.00	0.00	Open
26	-61.10	3.46	122.76	Open
27	0.00	0.00	0.00	Open
30	-30.50	0.62	2.36	Open
32	0.08	0.00	0.00	Open
33	0.71	0.04	0.03	Open
35	-0.46	0.03	0.01	Open
37	0.08	0.00	0.00	Open
38	0.08	0.00	0.00	Open
39	1.55	0.03	0.01	Open
40	1.47	0.03	0.01	Open
41	1.39	0.03	0.01	Open

Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
46	0.08	0.00	0.00	Open
47	0.08	0.00	0.00	Open
48	-23.93	0.49	1.51	Open
49	-24.01	0.49	1.52	Open
50	0.08	0.00	0.00	Open
5	97.11	1.98	20.16	Open
6	0.08	0.00	0.00	Open
7	-37.33	0.76	3.43	Open
11	23.85	0.49	1.50	Open
13	61.10	3.46	122.76	Open
14	-37.25	0.76	3.42	Open
15	31.91	0.65	2.57	Open
21	31.83	0.65	2.55	Open
22	-31.83	0.65	2.55	Open
24	31.37	0.64	2.49	Open
28	-31.29	0.64	2.47	Open
29	31.29	0.64	2.47	Open
31	0.00	0.00	0.00	Open
34	0.08	0.00	0.00	Open
36	0.00	0.00	0.00	Open
42	0.08	0.00	0.00	Open

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

Input File: 4101 Limebank Rd - future avg day.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	Limebank	1	175	250
2	1	2	175	250
3	2	3	130	250
4	3	4	280	250
8	9	10	60	250
9	10	11	165	250
10	11	12	30	250
12	Leitrim	13	30	250
16	20	2	10	250
17	3	HYD6	6	150
18	22	HYD5	6	150
19	12	21	65	250
20	21	22	35	250
23	10	HYD7	4	150
25	HYD4	11	2	150
26	HYD9	4	3	150
27	20	HYD3	11	150
30	20	19	35	250
32	19	B1	8	150
33	19	A1	12	150
35	A2	16	12	150
37	23	C2	14	150
38	24	C1	14	150
39	3	24	40	250
40	24	23	60	250
41	23	22	15	250
46	8	D3	11	150
47	6	D2	9	150
48	6	5	45	250
49	5	4	50	250
50	5	D1	16	150
5	13	12	130	250
6	21	C3	14	150

7	8	9	40	250
11	6	7	10	250
13	7	HYD8	9	150
14	7	8	60	250

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
15	13	14	40	250
21	14	15	10	250
22	16	15	20	250
24	16	17	35	250
28	19	18	35	250
29	17	18	15	250
31	18	HYD2	11	150
34	17	B2	8	150
36	15	HYD1	3	150
42	14	B3	8	150

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
1	0.00	147.04	56.54	0.00
2	0.00	147.04	57.04	0.00
3	0.00	147.04	57.04	0.00
4	0.00	147.04	56.54	0.00
6	0.00	147.04	56.54	0.00
9	0.00	147.04	57.04	0.00
10	0.00	147.04	57.04	0.00
11	0.00	147.04	57.04	0.00
12	0.00	147.04	57.04	0.00
21	0.00	147.04	57.04	0.00
13	0.00	147.04	56.54	0.00
16	0.00	147.04	57.04	0.00
20	0.00	147.04	57.04	0.00
HYD2	0.00	147.04	54.24	0.00
HYD3	0.00	147.04	54.24	0.00
HYD4	0.00	147.04	54.24	0.00
HYD7	0.00	147.04	54.14	0.00
HYD8	0.00	147.04	53.74	0.00
HYD9	0.00	147.04	53.64	0.00
HYD5	0.00	147.04	54.04	0.00
HYD6	0.00	147.04	54.14	0.00
22	0.00	147.04	57.04	0.00

A2	0.31	147.04	54.34	0.00
19	0.00	147.04	57.04	0.00
B1	0.06	147.04	54.04	0.00
A1	0.48	147.04	54.34	0.00
23	0.00	147.04	57.04	0.00
C2	0.06	147.04	54.04	0.00
24	0.00	147.04	57.04	0.00
C1	0.06	147.04	53.84	0.00
8	0.00	147.04	56.54	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality	
D2	0.06	147.04	53.74	0.00	
D3	0.06	147.04	53.94	0.00	
5	0.00	147.04	56.54	0.00	
D1	0.06	147.04	53.34	0.00	
C3	0.06	147.04	54.04	0.00	
7	0.00	147.04	56.54	0.00	
14	0.00	147.04	57.04	0.00	
15	0.00	147.04	57.04	0.00	
17	0.00	147.04	57.04	0.00	
B2	0.06	147.04	54.14	0.00	
B3	0.06	147.04	54.24	0.00	
HYD1	0.00	147.04	54.24	0.00	
18	0.00	147.04	57.04	0.00	
Leitrim	-0.97	147.04	0.00	0.00	Reservoir
Limebank	-0.36	147.04	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	0.36	0.01	0.00	Open
2	0.36	0.01	0.00	Open
3	0.01	0.00	0.00	Open
4	0.05	0.00	0.00	Open
8	-0.13	0.00	0.00	Open
9	-0.13	0.00	0.00	Open
10	-0.13	0.00	0.00	Open
12	0.97	0.02	0.00	Open
16	-0.35	0.01	0.00	Open
17	0.00	0.00	0.00	Open
18	0.00	0.00	0.00	Open
19	0.22	0.00	0.00	Open

20	0.16	0.00	0.00	Open
23	0.00	0.00	0.00	Open
25	0.00	0.00	0.00	Open
26	0.00	0.00	0.00	Open
27	0.00	0.00	0.00	Open
30	0.35	0.01	0.00	Open
32	0.06	0.00	0.00	Open
33	0.48	0.03	0.02	Open
35	-0.31	0.02	0.01	Open
37	0.06	0.00	0.00	Open
38	0.06	0.00	0.00	Open
39	-0.04	0.00	0.00	Open
40	-0.10	0.00	0.00	Open
41	-0.16	0.00	0.00	Open

Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
46	0.06	0.00	0.00	Open
47	0.06	0.00	0.00	Open
48	0.01	0.00	0.00	Open
49	-0.05	0.00	0.00	Open
50	0.06	0.00	0.00	Open
5	0.35	0.01	0.00	Open
6	0.06	0.00	0.00	Open
7	-0.13	0.00	0.00	Open
11	-0.07	0.00	0.00	Open
13	0.00	0.00	0.00	Open
14	-0.07	0.00	0.00	Open
15	0.62	0.01	0.00	Open
21	0.56	0.01	0.00	Open
22	-0.56	0.01	0.00	Open
24	0.25	0.01	0.00	Open
28	-0.19	0.00	0.00	Open
29	0.19	0.00	0.00	Open
31	0.00	0.00	0.00	Open
34	0.06	0.00	0.00	Open
36	0.00	0.00	0.00	Open
42	0.06	0.00	0.00	Open

```
******************************************************************
*                            E P A N E T                         *
*                     Hydraulic and Water Quality                *
*                     Analysis for Pipe Networks                 *
*                          Version 2.2                           *
******************************************************************
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Input File: 4101 Limebank Rd - future peak hour.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	Limebank	1	175	250
2	1	2	175	250
3	2	3	130	250
4	3	4	280	250
8	9	10	60	250
9	10	11	165	250
10	11	12	30	250
12	Leitrim	13	30	250
16	20	2	10	250
17	3	HYD6	6	150
18	22	HYD5	6	150
19	12	21	65	250
20	21	22	35	250
23	10	HYD7	4	150
25	HYD4	11	2	150
26	HYD9	4	3	150
27	20	HYD3	11	150
30	20	19	35	250
32	19	B1	8	150
33	19	A1	12	150
35	A2	16	12	150
37	23	C2	14	150
38	24	C1	14	150
39	3	24	40	250
40	24	23	60	250
41	23	22	15	250
46	8	D3	11	150
47	6	D2	9	150
48	6	5	45	250
49	5	4	50	250
50	5	D1	16	150
5	13	12	130	250
6	21	C3	14	150

7	8	9	40	250
11	6	7	10	250
13	7	HYD8	9	150
14	7	8	60	250

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
15	13	14	40	250
21	14	15	10	250
22	16	15	20	250
24	16	17	35	250
28	19	18	35	250
29	17	18	15	250
31	18	HYD2	11	150
34	17	B2	8	150
36	15	HYD1	3	150
42	14	B3	8	150

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
1	0.00	144.29	53.79	0.00
2	0.00	144.28	54.28	0.00
3	0.00	144.28	54.28	0.00
4	0.00	144.28	53.78	0.00
6	0.00	144.28	53.78	0.00
9	0.00	144.28	54.28	0.00
10	0.00	144.28	54.28	0.00
11	0.00	144.28	54.28	0.00
12	0.00	144.28	54.28	0.00
21	0.00	144.28	54.28	0.00
13	0.00	144.28	53.78	0.00
16	0.00	144.28	54.28	0.00
20	0.00	144.28	54.28	0.00
HYD2	0.00	144.28	51.48	0.00
HYD3	0.00	144.28	51.48	0.00
HYD4	0.00	144.28	51.48	0.00
HYD7	0.00	144.28	51.38	0.00
HYD8	0.00	144.28	50.98	0.00
HYD9	0.00	144.28	50.88	0.00
HYD5	0.00	144.28	51.28	0.00
HYD6	0.00	144.28	51.38	0.00
22	0.00	144.28	54.28	0.00

A2	0.83	144.28	51.58	0.00
19	0.00	144.28	54.28	0.00
B1	0.15	144.28	51.28	0.00
A1	1.28	144.28	51.58	0.00
23	0.00	144.28	54.28	0.00
C2	0.15	144.28	51.28	0.00
24	0.00	144.28	54.28	0.00
C1	0.15	144.28	51.08	0.00
8	0.00	144.28	53.78	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality	
D2	0.15	144.28	50.98	0.00	
D3	0.15	144.28	51.18	0.00	
5	0.00	144.28	53.78	0.00	
D1	0.15	144.28	50.58	0.00	
C3	0.15	144.28	51.28	0.00	
7	0.00	144.28	53.78	0.00	
14	0.00	144.28	54.28	0.00	
15	0.00	144.28	54.28	0.00	
17	0.00	144.28	54.28	0.00	
B2	0.15	144.28	51.38	0.00	
B3	0.15	144.28	51.48	0.00	
HYD1	0.00	144.28	51.48	0.00	
18	0.00	144.28	54.28	0.00	
Leitrim	-0.72	144.28	0.00	0.00	Reservoir
Limebank	-2.74	144.29	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	2.74	0.06	0.03	Open
2	2.74	0.06	0.03	Open
3	0.87	0.02	0.00	Open
4	0.31	0.01	0.00	Open
8	-0.14	0.00	0.00	Open
9	-0.14	0.00	0.00	Open
10	-0.14	0.00	0.00	Open
12	0.72	0.01	0.00	Open
16	-1.87	0.04	0.01	Open
17	0.00	0.00	0.00	Open
18	0.00	0.00	0.00	Open
19	-0.11	0.00	0.00	Open

20	-0.26	0.01	0.00	Open
23	0.00	0.00	0.00	Open
25	0.00	0.00	0.00	Open
26	0.00	0.00	0.00	Open
27	0.00	0.00	0.00	Open
30	1.87	0.04	0.01	Open
32	0.15	0.01	0.00	Open
33	1.28	0.07	0.10	Open
35	-0.83	0.05	0.04	Open
37	0.15	0.01	0.00	Open
38	0.15	0.01	0.00	Open
39	0.56	0.01	0.00	Open
40	0.41	0.01	0.00	Open
41	0.26	0.01	0.00	Open

Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
46	0.15	0.01	0.00	Open
47	0.15	0.01	0.00	Open
48	-0.16	0.00	0.00	Open
49	-0.31	0.01	0.00	Open
50	0.15	0.01	0.00	Open
5	0.03	0.00	0.00	Open
6	0.15	0.01	0.00	Open
7	-0.14	0.00	0.00	Open
11	0.01	0.00	0.00	Open
13	0.00	0.00	0.00	Open
14	0.01	0.00	0.00	Open
15	0.69	0.01	0.00	Open
21	0.54	0.01	0.00	Open
22	-0.54	0.01	0.00	Open
24	-0.29	0.01	0.00	Open
28	0.44	0.01	0.00	Open
29	-0.44	0.01	0.00	Open
31	0.00	0.00	0.00	Open
34	0.15	0.01	0.00	Open
36	0.00	0.00	0.00	Open
42	0.15	0.01	0.00	Open

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

Input File: 4101 Limebank Rd - future max day + HYD2&3.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	Limebank	1	175	250
2	1	2	175	250
3	2	3	130	250
4	3	4	280	250
8	9	10	60	250
9	10	11	165	250
10	11	12	30	250
12	Leitrim	13	30	250
16	20	2	10	250
17	3	HYD6	6	150
18	22	HYD5	6	150
19	12	21	65	250
20	21	22	35	250
23	10	HYD7	4	150
25	HYD4	11	2	150
26	HYD9	4	3	150
27	20	HYD3	11	150
30	20	19	35	250
32	19	B1	8	150
33	19	A1	12	150
35	A2	16	12	150
37	23	C2	14	150
38	24	C1	14	150
39	3	24	40	250
40	24	23	60	250
41	23	22	15	250
46	8	D3	11	150
47	6	D2	9	150
48	6	5	45	250
49	5	4	50	250
50	5	D1	16	150
5	13	12	130	250
6	21	C3	14	150

7	8	9	40	250
11	6	7	10	250
13	7	HYD8	9	150
14	7	8	60	250

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
15	13	14	40	250
21	14	15	10	250
22	16	15	20	250
24	16	17	35	250
28	19	18	35	250
29	17	18	15	250
31	18	HYD2	11	150
34	17	B2	8	150
36	15	HYD1	3	150
42	14	B3	8	150

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
1	0.00	136.85	46.35	0.00
2	0.00	135.38	45.38	0.00
3	0.00	135.79	45.79	0.00
4	0.00	135.91	45.41	0.00
6	0.00	135.95	45.45	0.00
9	0.00	136.00	46.00	0.00
10	0.00	136.03	46.03	0.00
11	0.00	136.10	46.10	0.00
12	0.00	136.11	46.11	0.00
21	0.00	136.01	46.01	0.00
13	0.00	136.53	46.03	0.00
16	0.00	135.72	45.72	0.00
20	0.00	135.19	45.19	0.00
HYD2	83.30	132.76	39.96	0.00
HYD3	83.30	132.79	39.99	0.00
HYD4	0.00	136.10	43.30	0.00
HYD7	0.00	136.03	43.13	0.00
HYD8	0.00	135.96	42.66	0.00
HYD9	0.00	135.91	42.51	0.00
HYD5	0.00	135.96	42.96	0.00
HYD6	0.00	135.79	42.89	0.00
22	0.00	135.96	45.96	0.00

A2	0.46	135.72	43.02	0.00
19	0.00	135.17	45.17	0.00
B1	0.08	135.17	42.17	0.00
A1	0.71	135.17	42.47	0.00
23	0.00	135.94	45.94	0.00
C2	0.08	135.94	42.94	0.00
24	0.00	135.85	45.85	0.00
C1	0.08	135.85	42.65	0.00
8	0.00	135.98	45.48	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality	
D2	0.08	135.95	42.65	0.00	
D3	0.08	135.98	42.88	0.00	
5	0.00	135.93	45.43	0.00	
D1	0.08	135.93	42.23	0.00	
C3	0.08	136.01	43.01	0.00	
7	0.00	135.96	45.46	0.00	
14	0.00	136.07	46.07	0.00	
15	0.00	135.95	45.95	0.00	
17	0.00	135.32	45.32	0.00	
B2	0.08	135.32	42.42	0.00	
B3	0.08	136.07	43.27	0.00	
HYD1	0.00	135.95	43.15	0.00	
18	0.00	135.15	45.15	0.00	
Leitrim	-108.10	137.27	0.00	0.00	Reservoir
Limebank	-60.39	138.31	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	60.39	1.23	8.36	Open
2	60.39	1.23	8.36	Open
3	-35.68	0.73	3.16	Open
4	-12.07	0.25	0.42	Open
8	-12.31	0.25	0.44	Open
9	-12.31	0.25	0.44	Open
10	-12.31	0.25	0.44	Open
12	108.10	2.20	24.58	Open
16	-96.07	1.96	19.76	Open
17	0.00	0.00	0.00	Open
18	0.00	0.00	0.00	Open
19	23.85	0.49	1.50	Open

20	23.77	0.48	1.49	Open
23	0.00	0.00	0.00	Open
25	0.00	0.00	0.00	Open
26	0.00	0.00	0.00	Open
27	83.30	4.71	217.93	Open
30	12.77	0.26	0.47	Open
32	0.08	0.00	0.00	Open
33	0.71	0.04	0.03	Open
35	-0.46	0.03	0.01	Open
37	0.08	0.00	0.00	Open
38	0.08	0.00	0.00	Open
39	-23.61	0.48	1.47	Open
40	-23.69	0.48	1.48	Open
41	-23.77	0.48	1.49	Open

Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
46	0.08	0.00	0.00	Open
47	0.08	0.00	0.00	Open
48	12.15	0.25	0.43	Open
49	12.07	0.25	0.42	Open
50	0.08	0.00	0.00	Open
5	36.16	0.74	3.23	Open
6	0.08	0.00	0.00	Open
7	-12.31	0.25	0.44	Open
11	-12.23	0.25	0.43	Open
13	0.00	0.00	0.00	Open
14	-12.23	0.25	0.43	Open
15	71.94	1.47	11.56	Open
21	71.86	1.46	11.54	Open
22	-71.86	1.46	11.54	Open
24	71.40	1.45	11.40	Open
28	11.98	0.24	0.42	Open
29	71.32	1.45	11.38	Open
31	83.30	4.71	217.93	Open
34	0.08	0.00	0.00	Open
36	0.00	0.00	0.00	Open
42	0.08	0.00	0.00	Open

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

Input File: 4101 Limebank Rd - future max day + HYD1&2.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	Limebank	1	175	250
2	1	2	175	250
3	2	3	130	250
4	3	4	280	250
8	9	10	60	250
9	10	11	165	250
10	11	12	30	250
12	Leitrim	13	30	250
16	20	2	10	250
17	3	HYD6	6	150
18	22	HYD5	6	150
19	12	21	65	250
20	21	22	35	250
23	10	HYD7	4	150
25	HYD4	11	2	150
26	HYD9	4	3	150
27	20	HYD3	11	150
30	20	19	35	250
32	19	B1	8	150
33	19	A1	12	150
35	A2	16	12	150
37	23	C2	14	150
38	24	C1	14	150
39	3	24	40	250
40	24	23	60	250
41	23	22	15	250
46	8	D3	11	150
47	6	D2	9	150
48	6	5	45	250
49	5	4	50	250
50	5	D1	16	150
5	13	12	130	250
6	21	C3	14	150

7	8	9	40	250
11	6	7	10	250
13	7	HYD8	9	150
14	7	8	60	250

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
15	13	14	40	250
21	14	15	10	250
22	16	15	20	250
24	16	17	35	250
28	19	18	35	250
29	17	18	15	250
31	18	HYD2	11	150
34	17	B2	8	150
36	15	HYD1	3	150
42	14	B3	8	150

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
1	0.00	137.08	46.58	0.00
2	0.00	135.85	45.85	0.00
3	0.00	135.99	45.99	0.00
4	0.00	136.02	45.52	0.00
6	0.00	136.04	45.54	0.00
9	0.00	136.05	46.05	0.00
10	0.00	136.06	46.06	0.00
11	0.00	136.08	46.08	0.00
12	0.00	136.09	46.09	0.00
21	0.00	136.06	46.06	0.00
13	0.00	136.23	45.73	0.00
16	0.00	134.93	44.93	0.00
20	0.00	135.73	45.73	0.00
HYD2	91.70	132.02	39.22	0.00
HYD3	0.00	135.73	42.93	0.00
HYD4	0.00	136.08	43.28	0.00
HYD7	0.00	136.06	43.16	0.00
HYD8	0.00	136.04	42.74	0.00
HYD9	0.00	136.02	42.62	0.00
HYD5	0.00	136.04	43.04	0.00
HYD6	0.00	135.99	43.09	0.00
22	0.00	136.04	46.04	0.00

A2	0.46	134.93	42.23	0.00
19	0.00	135.30	45.30	0.00
B1	0.08	135.30	42.30	0.00
A1	0.71	135.30	42.60	0.00
23	0.00	136.03	46.03	0.00
C2	0.08	136.03	43.03	0.00
24	0.00	136.00	46.00	0.00
C1	0.08	136.00	42.80	0.00
8	0.00	136.05	45.55	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality	
D2	0.08	136.04	42.74	0.00	
D3	0.08	136.05	42.95	0.00	
5	0.00	136.03	45.53	0.00	
D1	0.08	136.03	42.33	0.00	
C3	0.08	136.06	43.06	0.00	
7	0.00	136.04	45.54	0.00	
14	0.00	135.20	45.20	0.00	
15	0.00	134.95	44.95	0.00	
17	0.00	134.89	44.89	0.00	
B2	0.08	134.89	41.99	0.00	
B3	0.08	135.20	42.40	0.00	
HYD1	91.70	134.16	41.36	0.00	
18	0.00	134.88	44.88	0.00	
Leitrim	-130.35	137.27	0.00	0.00	Reservoir
Limebank	-54.94	138.31	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	54.94	1.12	7.02	Open
2	54.94	1.12	7.02	Open
3	-19.32	0.39	1.01	Open
4	-6.52	0.13	0.14	Open
8	-6.76	0.14	0.14	Open
9	-6.76	0.14	0.14	Open
10	-6.76	0.14	0.14	Open
12	130.35	2.66	34.77	Open
16	-74.26	1.51	12.26	Open
17	0.00	0.00	0.00	Open
18	0.00	0.00	0.00	Open
19	13.04	0.27	0.49	Open

20	12.96	0.26	0.48	Open
23	0.00	0.00	0.00	Open
25	0.00	0.00	0.00	Open
26	0.00	0.00	0.00	Open
27	0.00	0.00	0.00	Open
30	74.26	1.51	12.26	Open
32	0.08	0.00	0.00	Open
33	0.71	0.04	0.03	Open
35	-0.46	0.03	0.01	Open
37	0.08	0.00	0.00	Open
38	0.08	0.00	0.00	Open
39	-12.80	0.26	0.47	Open
40	-12.88	0.26	0.48	Open
41	-12.96	0.26	0.48	Open

Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
46	0.08	0.00	0.00	Open
47	0.08	0.00	0.00	Open
48	6.60	0.13	0.14	Open
49	6.52	0.13	0.14	Open
50	0.08	0.00	0.00	Open
5	19.80	0.40	1.06	Open
6	0.08	0.00	0.00	Open
7	-6.76	0.14	0.14	Open
11	-6.68	0.14	0.14	Open
13	0.00	0.00	0.00	Open
14	-6.68	0.14	0.14	Open
15	110.55	2.25	25.63	Open
21	110.47	2.25	25.59	Open
22	-18.77	0.38	0.96	Open
24	18.31	0.37	0.92	Open
28	73.47	1.50	12.02	Open
29	18.23	0.37	0.91	Open
31	91.70	5.19	260.37	Open
34	0.08	0.00	0.00	Open
36	91.70	5.19	260.37	Open
42	0.08	0.00	0.00	Open

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

Input File: 4101 Limebank Rd - future max day + HYD5&6.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	Limebank	1	175	250
2	1	2	175	250
3	2	3	130	250
4	3	4	280	250
8	9	10	60	250
9	10	11	165	250
10	11	12	30	250
12	Leitrim	13	30	250
16	20	2	10	250
17	3	HYD6	6	150
18	22	HYD5	6	150
19	12	21	65	250
20	21	22	35	250
23	10	HYD7	4	150
25	HYD4	11	2	150
26	HYD9	4	3	150
27	20	HYD3	11	150
30	20	19	35	250
32	19	B1	8	150
33	19	A1	12	150
35	A2	16	12	150
37	23	C2	14	150
38	24	C1	14	150
39	3	24	40	250
40	24	23	60	250
41	23	22	15	250
46	8	D3	11	150
47	6	D2	9	150
48	6	5	45	250
49	5	4	50	250
50	5	D1	16	150
5	13	12	130	250
6	21	C3	14	150

7	8	9	40	250
11	6	7	10	250
13	7	HYD8	9	150
14	7	8	60	250

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
15	13	14	40	250
21	14	15	10	250
22	16	15	20	250
24	16	17	35	250
28	19	18	35	250
29	17	18	15	250
31	18	HYD2	11	150
34	17	B2	8	150
36	15	HYD1	3	150
42	14	B3	8	150

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
1	0.00	137.11	46.61	0.00
2	0.00	135.92	45.92	0.00
3	0.00	133.83	43.83	0.00
4	0.00	134.11	43.61	0.00
6	0.00	134.20	43.70	0.00
9	0.00	134.31	44.31	0.00
10	0.00	134.37	44.37	0.00
11	0.00	134.54	44.54	0.00
12	0.00	134.57	44.57	0.00
21	0.00	134.00	44.00	0.00
13	0.00	136.45	45.95	0.00
16	0.00	136.26	46.26	0.00
20	0.00	135.94	45.94	0.00
HYD2	0.00	136.13	43.33	0.00
HYD3	0.00	135.94	43.14	0.00
HYD4	0.00	134.54	41.74	0.00
HYD7	0.00	134.37	41.47	0.00
HYD8	0.00	134.21	40.91	0.00
HYD9	0.00	134.11	40.71	0.00
HYD5	83.30	132.38	39.38	0.00
HYD6	83.30	132.53	39.63	0.00
22	0.00	133.69	43.69	0.00

A2	0.46	136.26	43.56	0.00
19	0.00	136.03	46.03	0.00
B1	0.08	136.03	43.03	0.00
A1	0.71	136.03	43.33	0.00
23	0.00	133.71	43.71	0.00
C2	0.08	133.71	40.71	0.00
24	0.00	133.78	43.78	0.00
C1	0.08	133.78	40.58	0.00
8	0.00	134.27	43.77	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality	
D2	0.08	134.20	40.90	0.00	
D3	0.08	134.27	41.17	0.00	
5	0.00	134.16	43.66	0.00	
D1	0.08	134.16	40.46	0.00	
C3	0.08	134.00	41.00	0.00	
7	0.00	134.21	43.71	0.00	
14	0.00	136.34	46.34	0.00	
15	0.00	136.31	46.31	0.00	
17	0.00	136.17	46.17	0.00	
B2	0.08	136.17	43.27	0.00	
B3	0.08	136.34	43.54	0.00	
HYD1	0.00	136.31	43.51	0.00	
18	0.00	136.13	46.13	0.00	
Leitrim	-114.35	137.27	0.00	0.00	Reservoir
Limebank	-54.14	138.31	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	54.14	1.10	6.83	Open
2	54.14	1.10	6.83	Open
3	85.85	1.75	16.04	Open
4	-19.00	0.39	0.98	Open
8	-19.24	0.39	1.01	Open
9	-19.24	0.39	1.01	Open
10	-19.24	0.39	1.01	Open
12	114.35	2.33	27.28	Open
16	31.71	0.65	2.54	Open
17	83.30	4.71	217.93	Open
18	83.30	4.71	217.93	Open
19	61.99	1.26	8.78	Open

20	61.91	1.26	8.76	Open
23	0.00	0.00	0.00	Open
25	0.00	0.00	0.00	Open
26	0.00	0.00	0.00	Open
27	0.00	0.00	0.00	Open
30	-31.71	0.65	2.54	Open
32	0.08	0.00	0.00	Open
33	0.71	0.04	0.03	Open
35	-0.46	0.03	0.01	Open
37	0.08	0.00	0.00	Open
38	0.08	0.00	0.00	Open
39	21.55	0.44	1.24	Open
40	21.47	0.44	1.23	Open
41	21.39	0.44	1.22	Open

Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
46	0.08	0.00	0.00	Open
47	0.08	0.00	0.00	Open
48	19.08	0.39	0.99	Open
49	19.00	0.39	0.98	Open
50	0.08	0.00	0.00	Open
5	81.23	1.65	14.48	Open
6	0.08	0.00	0.00	Open
7	-19.24	0.39	1.01	Open
11	-19.16	0.39	1.00	Open
13	0.00	0.00	0.00	Open
14	-19.16	0.39	1.00	Open
15	33.12	0.67	2.75	Open
21	33.04	0.67	2.74	Open
22	-33.04	0.67	2.74	Open
24	32.58	0.66	2.67	Open
28	-32.50	0.66	2.65	Open
29	32.50	0.66	2.65	Open
31	0.00	0.00	0.00	Open
34	0.08	0.00	0.00	Open
36	0.00	0.00	0.00	Open
42	0.08	0.00	0.00	Open

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

Input File: 4101 Limebank Rd - future max day + HYD4,5&6.net
```

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	Limebank	1	175	250
2	1	2	175	250
3	2	3	130	250
4	3	4	280	250
8	9	10	60	250
9	10	11	165	250
10	11	12	30	250
12	Leitrim	13	30	250
16	20	2	10	250
17	3	HYD6	6	150
18	22	HYD5	6	150
19	12	21	65	250
20	21	22	35	250
23	10	HYD7	4	150
25	HYD4	11	2	150
26	HYD9	4	3	150
27	20	HYD3	11	150
30	20	19	35	250
32	19	B1	8	150
33	19	A1	12	150
35	A2	16	12	150
37	23	C2	14	150
38	24	C1	14	150
39	3	24	40	250
40	24	23	60	250
41	23	22	15	250
46	8	D3	11	150
47	6	D2	9	150
48	6	5	45	250
49	5	4	50	250
50	5	D1	16	150
5	13	12	130	250
6	21	C3	14	150

7	8	9	40	250
11	6	7	10	250
13	7	HYD8	9	150
14	7	8	60	250

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
15	13	14	40	250
21	14	15	10	250
22	16	15	20	250
24	16	17	35	250
28	19	18	35	250
29	17	18	15	250
31	18	HYD2	11	150
34	17	B2	8	150
36	15	HYD1	3	150
42	14	B3	8	150

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
1	0.00	136.85	46.35	0.00
2	0.00	135.40	45.40	0.00
3	0.00	132.84	42.84	0.00
4	0.00	132.82	42.32	0.00
6	0.00	132.81	42.31	0.00
9	0.00	132.80	42.80	0.00
10	0.00	132.79	42.79	0.00
11	0.00	132.78	42.78	0.00
12	0.00	133.05	43.05	0.00
21	0.00	132.78	42.78	0.00
13	0.00	136.05	45.55	0.00
16	0.00	135.82	45.82	0.00
20	0.00	135.43	45.43	0.00
HYD2	0.00	135.65	42.85	0.00
HYD3	0.00	135.43	42.63	0.00
HYD4	68.30	132.47	39.67	0.00
HYD7	0.00	132.79	39.89	0.00
HYD8	0.00	132.81	39.51	0.00
HYD9	0.00	132.82	39.42	0.00
HYD5	68.30	131.72	38.72	0.00
HYD6	63.30	132.06	39.16	0.00
22	0.00	132.63	42.63	0.00

A2	0.46	135.82	43.12	0.00
19	0.00	135.54	45.54	0.00
B1	0.08	135.54	42.54	0.00
A1	0.71	135.54	42.84	0.00
23	0.00	132.66	42.66	0.00
C2	0.08	132.66	39.66	0.00
24	0.00	132.77	42.77	0.00
C1	0.08	132.77	39.57	0.00
8	0.00	132.80	42.30	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality	
D2	0.08	132.81	39.51	0.00	
D3	0.08	132.80	39.70	0.00	
5	0.00	132.81	42.31	0.00	
D1	0.08	132.81	39.11	0.00	
C3	0.08	132.78	39.78	0.00	
7	0.00	132.81	42.31	0.00	
14	0.00	135.92	45.92	0.00	
15	0.00	135.89	45.89	0.00	
17	0.00	135.70	45.70	0.00	
B2	0.08	135.70	42.80	0.00	
B3	0.08	135.92	43.12	0.00	
HYD1	0.00	135.89	43.09	0.00	
18	0.00	135.65	45.65	0.00	
Leitrim	-141.58	137.27	0.00	0.00	Reservoir
Limebank	-60.21	138.31	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	60.21	1.23	8.32	Open
2	60.21	1.23	8.32	Open
3	95.79	1.95	19.65	Open
4	5.52	0.11	0.10	Open
8	5.28	0.11	0.09	Open
9	5.28	0.11	0.09	Open
10	-63.02	1.28	9.05	Open
12	141.58	2.88	40.52	Open
16	35.58	0.72	3.14	Open
17	63.30	3.58	131.07	Open
18	68.30	3.86	150.88	Open
19	41.58	0.85	4.19	Open

20	41.50	0.85	4.17	Open
23	0.00	0.00	0.00	Open
25	-68.30	3.86	150.88	Open
26	0.00	0.00	0.00	Open
27	0.00	0.00	0.00	Open
30	-35.58	0.72	3.14	Open
32	0.08	0.00	0.00	Open
33	0.71	0.04	0.03	Open
35	-0.46	0.03	0.01	Open
37	0.08	0.00	0.00	Open
38	0.08	0.00	0.00	Open
39	26.96	0.55	1.88	Open
40	26.88	0.55	1.87	Open
41	26.80	0.55	1.86	Open

Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
46	0.08	0.00	0.00	Open
47	0.08	0.00	0.00	Open
48	-5.44	0.11	0.10	Open
49	-5.52	0.11	0.10	Open
50	0.08	0.00	0.00	Open
5	104.59	2.13	23.13	Open
6	0.08	0.00	0.00	Open
7	5.28	0.11	0.09	Open
11	5.36	0.11	0.09	Open
13	0.00	0.00	0.00	Open
14	5.36	0.11	0.09	Open
15	36.99	0.75	3.37	Open
21	36.91	0.75	3.36	Open
22	-36.91	0.75	3.36	Open
24	36.45	0.74	3.28	Open
28	-36.37	0.74	3.27	Open
29	36.37	0.74	3.27	Open
31	0.00	0.00	0.00	Open
34	0.08	0.00	0.00	Open
36	0.00	0.00	0.00	Open
42	0.08	0.00	0.00	Open

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

Input File: 4101 Limebank Rd - future max day + HYD4,5&7.net
```

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	Limebank	1	175	250
2	1	2	175	250
3	2	3	130	250
4	3	4	280	250
8	9	10	60	250
9	10	11	165	250
10	11	12	30	250
12	Leitrim	13	30	250
16	20	2	10	250
17	3	HYD6	6	150
18	22	HYD5	6	150
19	12	21	65	250
20	21	22	35	250
23	10	HYD7	4	150
25	HYD4	11	2	150
26	HYD9	4	3	150
27	20	HYD3	11	150
30	20	19	35	250
32	19	B1	8	150
33	19	A1	12	150
35	A2	16	12	150
37	23	C2	14	150
38	24	C1	14	150
39	3	24	40	250
40	24	23	60	250
41	23	22	15	250
46	8	D3	11	150
47	6	D2	9	150
48	6	5	45	250
49	5	4	50	250
50	5	D1	16	150
5	13	12	130	250
6	21	C3	14	150

7	8	9	40	250
11	6	7	10	250
13	7	HYD8	9	150
14	7	8	60	250

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
15	13	14	40	250
21	14	15	10	250
22	16	15	20	250
24	16	17	35	250
28	19	18	35	250
29	17	18	15	250
31	18	HYD2	11	150
34	17	B2	8	150
36	15	HYD1	3	150
42	14	B3	8	150

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
1	0.00	136.93	46.43	0.00
2	0.00	135.55	45.55	0.00
3	0.00	133.33	43.33	0.00
4	0.00	132.48	41.98	0.00
6	0.00	132.19	41.69	0.00
9	0.00	131.86	41.86	0.00
10	0.00	131.68	41.68	0.00
11	0.00	132.03	42.03	0.00
12	0.00	132.63	42.63	0.00
21	0.00	132.59	42.59	0.00
13	0.00	136.03	45.53	0.00
16	0.00	135.85	45.85	0.00
20	0.00	135.57	45.57	0.00
HYD2	0.00	135.73	42.93	0.00
HYD3	0.00	135.57	42.77	0.00
HYD4	68.30	131.72	38.92	0.00
HYD7	63.30	131.16	38.26	0.00
HYD8	0.00	132.16	38.86	0.00
HYD9	0.00	132.48	39.08	0.00
HYD5	68.30	131.66	38.66	0.00
HYD6	0.00	133.33	40.43	0.00
22	0.00	132.56	42.56	0.00

A2	0.46	135.85	43.15	0.00
19	0.00	135.65	45.65	0.00
B1	0.08	135.65	42.65	0.00
A1	0.71	135.65	42.95	0.00
23	0.00	132.66	42.66	0.00
C2	0.08	132.66	39.66	0.00
24	0.00	133.07	43.07	0.00
C1	0.08	133.07	39.87	0.00
8	0.00	131.98	41.48	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality	
D2	0.08	132.19	38.89	0.00	
D3	0.08	131.98	38.88	0.00	
5	0.00	132.33	41.83	0.00	
D1	0.08	132.33	38.63	0.00	
C3	0.08	132.59	39.59	0.00	
7	0.00	132.16	41.66	0.00	
14	0.00	135.93	45.93	0.00	
15	0.00	135.90	45.90	0.00	
17	0.00	135.77	45.77	0.00	
B2	0.08	135.77	42.87	0.00	
B3	0.08	135.93	43.13	0.00	
HYD1	0.00	135.90	43.10	0.00	
18	0.00	135.73	45.73	0.00	
Leitrim	-143.23	137.27	0.00	0.00	Reservoir
Limebank	-58.56	138.31	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	58.56	1.19	7.90	Open
2	58.56	1.19	7.90	Open
3	88.60	1.80	17.01	Open
4	34.99	0.71	3.04	Open
8	34.75	0.71	3.01	Open
9	-28.55	0.58	2.09	Open
10	-96.85	1.97	20.06	Open
12	143.23	2.92	41.40	Open
16	30.04	0.61	2.29	Open
17	0.00	0.00	0.00	Open
18	68.30	3.86	150.88	Open
19	14.94	0.30	0.63	Open

20	14.86	0.30	0.62	Open
23	63.30	3.58	131.07	Open
25	-68.30	3.86	150.88	Open
26	0.00	0.00	0.00	Open
27	0.00	0.00	0.00	Open
30	-30.04	0.61	2.29	Open
32	0.08	0.00	0.00	Open
33	0.71	0.04	0.03	Open
35	-0.46	0.03	0.01	Open
37	0.08	0.00	0.00	Open
38	0.08	0.00	0.00	Open
39	53.60	1.09	6.71	Open
40	53.52	1.09	6.69	Open
41	53.44	1.09	6.67	Open

Link Results: (continued)

Link ID	Flow LPS	VelocityUnit m/s	Headloss m/km	Status
46	0.08	0.00	0.00	Open
47	0.08	0.00	0.00	Open
48	-34.91	0.71	3.03	Open
49	-34.99	0.71	3.04	Open
50	0.08	0.00	0.00	Open
5	111.78	2.28	26.16	Open
6	0.08	0.00	0.00	Open
7	34.75	0.71	3.01	Open
11	34.83	0.71	3.02	Open
13	0.00	0.00	0.00	Open
14	34.83	0.71	3.02	Open
15	31.45	0.64	2.50	Open
21	31.37	0.64	2.49	Open
22	-31.37	0.64	2.49	Open
24	30.91	0.63	2.42	Open
28	-30.83	0.63	2.41	Open
29	30.83	0.63	2.41	Open
31	0.00	0.00	0.00	Open
34	0.08	0.00	0.00	Open
36	0.00	0.00	0.00	Open
42	0.08	0.00	0.00	Open

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

Input File: 4101 Limebank Rd - future max day + HYD7,8&9.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	Limebank	1	175	250
2	1	2	175	250
3	2	3	130	250
4	3	4	280	250
8	9	10	60	250
9	10	11	165	250
10	11	12	30	250
12	Leitrim	13	30	250
16	20	2	10	250
17	3	HYD6	6	150
18	22	HYD5	6	150
19	12	21	65	250
20	21	22	35	250
23	10	HYD7	4	150
25	HYD4	11	2	150
26	HYD9	4	3	150
27	20	HYD3	11	150
30	20	19	35	250
32	19	B1	8	150
33	19	A1	12	150
35	A2	16	12	150
37	23	C2	14	150
38	24	C1	14	150
39	3	24	40	250
40	24	23	60	250
41	23	22	15	250
46	8	D3	11	150
47	6	D2	9	150
48	6	5	45	250
49	5	4	50	250
50	5	D1	16	150
5	13	12	130	250
6	21	C3	14	150

7	8	9	40	250
11	6	7	10	250
13	7	HYD8	9	150
14	7	8	60	250

Link - Node Table: (continued)

Link ID	Start Node	End Node	Length m	Diameter mm
15	13	14	40	250
21	14	15	10	250
22	16	15	20	250
24	16	17	35	250
28	19	18	35	250
29	17	18	15	250
31	18	HYD2	11	150
34	17	B2	8	150
36	15	HYD1	3	150
42	14	B3	8	150

Node Results:

Node ID	Demand LPS	Head m	Pressure m	Quality
1	0.00	137.03	46.53	0.00
2	0.00	135.75	45.75	0.00
3	0.00	133.63	43.63	0.00
4	0.00	129.21	38.71	0.00
6	0.00	129.06	38.56	0.00
9	0.00	129.39	39.39	0.00
10	0.00	129.60	39.60	0.00
11	0.00	133.01	43.01	0.00
12	0.00	133.63	43.63	0.00
21	0.00	133.63	43.63	0.00
13	0.00	136.25	45.75	0.00
16	0.00	136.07	46.07	0.00
20	0.00	135.77	45.77	0.00
HYD2	0.00	135.94	43.14	0.00
HYD3	0.00	135.77	42.97	0.00
HYD4	0.00	133.01	40.21	0.00
HYD7	61.10	129.11	36.21	0.00
HYD8	61.10	127.94	34.64	0.00
HYD9	61.10	128.84	35.44	0.00
HYD5	0.00	133.63	40.63	0.00
HYD6	0.00	133.63	40.73	0.00
22	0.00	133.63	43.63	0.00

A2	0.46	136.07	43.37	0.00
19	0.00	135.86	45.86	0.00
B1	0.08	135.86	42.86	0.00
A1	0.71	135.86	43.16	0.00
23	0.00	133.63	43.63	0.00
C2	0.08	133.63	40.63	0.00
24	0.00	133.63	43.63	0.00
C1	0.08	133.63	40.43	0.00
8	0.00	129.25	38.75	0.00

Node Results: (continued)

Node ID	Demand LPS	Head m	Pressure m	Quality	
D2	0.08	129.06	35.76	0.00	
D3	0.08	129.25	36.15	0.00	
5	0.00	129.13	38.63	0.00	
D1	0.08	129.13	35.43	0.00	
C3	0.08	133.63	40.63	0.00	
7	0.00	129.05	38.55	0.00	
14	0.00	136.14	46.14	0.00	
15	0.00	136.12	46.12	0.00	
17	0.00	135.98	45.98	0.00	
B2	0.08	135.98	43.08	0.00	
B3	0.08	136.14	43.34	0.00	
HYD1	0.00	136.12	43.32	0.00	
18	0.00	135.94	45.94	0.00	
Leitrim	-129.02	137.27	0.00	0.00	Reservoir
Limebank	-56.17	138.31	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
1	56.17	1.14	7.31	Open
2	56.17	1.14	7.31	Open
3	86.67	1.77	16.33	Open
4	85.11	1.73	15.79	Open
8	-37.33	0.76	3.43	Open
9	-98.43	2.01	20.67	Open
10	-98.43	2.01	20.67	Open
12	129.02	2.63	34.11	Open
16	30.50	0.62	2.36	Open
17	0.00	0.00	0.00	Open
18	0.00	0.00	0.00	Open
19	-1.31	0.03	0.01	Open

20	-1.39	0.03	0.01	Open
23	61.10	3.46	122.76	Open
25	0.00	0.00	0.00	Open
26	-61.10	3.46	122.76	Open
27	0.00	0.00	0.00	Open
30	-30.50	0.62	2.36	Open
32	0.08	0.00	0.00	Open
33	0.71	0.04	0.03	Open
35	-0.46	0.03	0.01	Open
37	0.08	0.00	0.00	Open
38	0.08	0.00	0.00	Open
39	1.55	0.03	0.01	Open
40	1.47	0.03	0.01	Open
41	1.39	0.03	0.01	Open

Link Results: (continued)

Link ID	Flow LPS	Velocity m/s	Unit Headloss m/km	Status
46	0.08	0.00	0.00	Open
47	0.08	0.00	0.00	Open
48	-23.93	0.49	1.51	Open
49	-24.01	0.49	1.52	Open
50	0.08	0.00	0.00	Open
5	97.11	1.98	20.16	Open
6	0.08	0.00	0.00	Open
7	-37.33	0.76	3.43	Open
11	23.85	0.49	1.50	Open
13	61.10	3.46	122.75	Open
14	-37.25	0.76	3.42	Open
15	31.91	0.65	2.57	Open
21	31.83	0.65	2.55	Open
22	-31.83	0.65	2.55	Open
24	31.37	0.64	2.49	Open
28	-31.29	0.64	2.47	Open
29	31.29	0.64	2.47	Open
31	0.00	0.00	0.00	Open
34	0.08	0.00	0.00	Open
36	0.00	0.00	0.00	Open
42	0.08	0.00	0.00	Open

Appendix D

SANITARY SEWER DESIGN SHEET
for
4101 LIMEBANK RD., CITY OF OTTAWA

Robinson
Land Development

LOCATION							COMMERCIAL / INSTITUTIONAL FLOW				CUM. EXTRAN. FLOW (L/s)	CUM. PEAK DESIGN FLOW (L/s)	PIPE									
	FROM MH	TO MH	DRAINAGE AREA (ha)	CUM. DRAINAGE AREA (ha)	INFILTRATION AREA (ha)	CUM. INFILTRATION AREA (ha)	POPULATION	CUM. POPULATION	AVG FLOW (L/s)	PEAK FLOW (L/s)			LENGTH (m)	DIAMETER (mm)	UPSTREAM MH INV. (m)	DNSTREAM MH INV. (m)	SLOPE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	ACTUAL VELOCITY (m/s)	EXCESS CAPACITY (L/s)	PERCENT FULL
UPSTREAM SITES	142	141	21.00	21.00	44.61	44.61			8.51	8.51	14.72	**23.23**	680	299	92.47	90.09	0.35%	56.76	0.81	0.77	33.53	41%
UPSTREAM SITES	141	140A		21.00		44.61			8.51	8.51	14.72	**23.23**	390	299	90.09	88.72	0.35%	56.76	0.81	0.77	33.53	41%
D1, D2	SANMH 211	SANMH 210	2.42	2.42	2.42	2.42	70	70	0.11	0.11	0.80	**0.91**	83.9	251	90.35	90.10	0.30%	32.95	0.67	0.29	32.04	3%
D3	SANMH 210	SANMH 209	1.23	3.65	1.23	3.65	35	105	0.17	0.17	1.20	**1.37**	80.6	251	90.08	89.84	0.30%	32.95	0.67	0.33	31.58	4%
SITE	SANMH 209	SANMH 208	0.78	4.43	0.78	4.43	0	105	0.17	0.17	1.46	**1.63**	79.5	251	89.78	89.54	0.30%	32.95	0.67	0.34	31.32	5%
SITE	SANMH 208	SANMH 205	0.24	4.67	0.24	4.67	0	105	0.17	0.17	1.54	**1.71**	60.4	251	89.52	89.34	0.30%	32.95	0.67	0.35	31.25	5%
C1, C2	SANMH 208	SANMH 206	1.87	1.87	1.87	1.87	70	70	0.11	0.11	0.62	**0.73**	85.8	251	89.91	89.65	0.30%	32.95	0.67	0.27	32.22	2%
C3	SANMH 206	SANMH 205	1.03	2.91	1.03	2.91	35	105	0.17	0.17	0.96	**1.13**	82.0	251	89.63	89.38	0.30%	32.95	0.67	0.31	31.83	3%
SITE	SANMH 205	SANMH 204	0.13	7.70	0.13	7.70	0	210	0.33	0.33	2.54	**2.87**	31.3	251	89.32	89.23	0.30%	32.95	0.67	0.41	30.08	9%
SITE	SANMH 204	SANMH 201	0.43	8.13	0.43	8.13	0	210	0.33	0.33	2.68	**3.02**	103.2	251	89.21	88.90	0.30%	32.95	0.67	0.41	29.94	9%
A1, A2, B1, B2	SANMH 203	SANMH 202	4.37	4.37	4.37	4.37	565	565	0.90	0.90	1.44	**2.34**	95.9	251	89.37	89.08	0.30%	32.95	0.67	0.38	30.61	7%
B3	SANMH 202	SANMH 201	1.70	6.07	1.70	6.07	35	600	0.95	0.95	2.00	**2.96**	61.9	251	89.06	88.87	0.30%	32.95	0.67	0.41	30.00	9%
SITE	SANMH 201	SANMH 140A	0.10	14.30	0.10	14.30	0	810	1.28	1.28	4.72	**6.00**	23.2	251	88.84	88.77	0.30%	32.95	0.67	0.51	26.95	18%
LEITRIM	SANMH 140A	SANMH 140	0.43	35.73	0.43	59.34		810	9.79	9.79	19.58	**29.37**	119.0	366	88.65	88.47	0.15%	63.71	0.61	0.59	34.34	46%
LEITRIM	SANMH 140	SANMH 122A	0.47	36.20	0.47	59.81		810	9.79	9.79	19.74	**29.53**	119.5	366	88.45	88.27	0.15%	63.71	0.61	0.59	34.18	46%

DESIGN PARAMETERS

Employment Flow =	137	L/cap/day	per ISSU for water
Employment Flow =	35000	L/ha/day	per ISSU
Maximum Residential Peak Factor =	4.0		
Employment Peak Factor =	1.0	if >20% area	per ISSU
Employment Peak Factor =	1.5	if <20% area	per ISSU
Extraneous Flow =	0.33	L/s/ha	
Minimum Full Flow Velocity =	0.6	m/s	
Maximum Full Flow Velocity =	3.0	m/s	

Note: Employee count based on average 15 employees per office unit, 35 per warehouse unit
Note: See Scoped Master Servicing Report for details on upstream flows

2026-08-24

Appendix E

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	Impervious	Pervious	Gravel
C	0.9	0.2	0.8

Runoff Coefficient Calculations - On-Site

Drainage Area ID	Impervious Area (ha)	Pervious Area (ha)	Gravel Area (ha)	Total Area (ha)	C	C (100 YR)	Percent Impervious (%)
A1	0.604			0.60	0.90	1.00	100.0
A2	0.397			0.40	0.90	1.00	100.0
B1	0.540			0.54	0.90	1.00	100.0
B2	0.540			0.54	0.90	1.00	100.0
B3	0.582			0.58	0.90	1.00	100.0
C1	0.538			0.54	0.90	1.00	100.0
C2	0.540			0.54	0.90	1.00	100.0
C3	0.649			0.65	0.90	1.00	100.0
D1	0.538			0.54	0.90	1.00	100.0
D2	0.539			0.54	0.90	1.00	100.0
D3	0.560			0.56	0.90	1.00	100.0
1	0.005	1.030		1.04	0.20	0.25	0.5
2	0.022	0.179		0.20	0.28	0.35	10.9
3	0.067	0.017		0.08	0.76	0.95	79.8
4	0.251	0.004		0.26	0.89	1.00	98.4
5	0.206	0.004		0.21	0.89	1.00	98.1
6	0.073	0.007		0.08	0.84	1.00	91.3
7	0.228			0.23	0.90	1.00	100.0
8	0.152			0.15	0.90	1.00	100.0
9	0.064	0.060		0.12	0.56	0.70	51.6
10		0.124		0.12	0.20	0.25	0.0
11	0.118	0.021		0.14	0.79	0.99	84.8
12	0.245	0.003		0.25	0.89	1.00	98.8
13	0.088			0.09	0.90	1.00	100.0
14	0.096	0.013		0.11	0.82	1.00	88.1
15	0.074	0.013		0.09	0.80	0.99	85.1
16	0.024	0.212		0.24	0.27	0.34	10.2
17	0.175	0.022		0.20	0.82	1.00	88.8
18	0.316	0.008		0.32	0.88	1.00	97.5
19	0.536	0.004		0.54	0.89	1.00	99.3
20	0.062			0.06	0.90	1.00	100.0
21	0.084	0.115		0.20	0.50	0.62	42.2
22	0.045	0.080		0.13	0.45	0.57	36.0
23	0.470			0.47	0.90	1.00	100.0
24	0.862			0.86	0.90	1.00	100.0
25	0.060			0.06	0.90	1.00	100.0
26	0.350	0.181		0.53	0.66	0.83	65.9
27	0.130	0.041		0.17	0.73	0.92	76.0
28	0.109	0.025		0.13	0.77	0.96	81.3
29	0.063	0.032		0.10	0.66	0.83	66.3
30	0.094	0.039		0.13	0.69	0.87	70.7
TOTAL	**11.10**	**2.23**	**0.00**	**13.33**	**0.78**	**0.98**	**83.2**

Runoff Coefficient Calculations - Off-Site

Drainage Area ID	Impervious Area (ha)	Pervious Area (ha)	Gravel Area (ha)	Total Area (ha)	C	C (100 YR)	Percent Impervious (%)
OFF1	0.170	0.406		0.58	0.41	0.51	29.5
OFF2	0.088	0.777	0.04	0.90	0.29	0.37	13.8
OFF3		0.220		0.22	0.20	0.25	0.0
OFF4	0.001	0.092		0.09	0.21	0.26	1.1
TOTAL	**0.26**	**1.50**	**0.04**	**1.79**	**0.31**	**0.39**	**16.5**

Time of Concentration - Uplands Method

OFF2

L =	820	m
Upstream Elev. =	93.19	m
Dnstream Elev. =	90.34	m
Slope =	0.0035	m/m
V/sqrt(S) =	2.3	short grass pasture
V =	0.14	m/s
Tc =	**101**	**min**

OFF3

L =	660	m
Upstream Elev. =	93.17	m
Dnstream Elev. =	90.31	m
Slope =	0.0043	m/m
V/sqrt(S) =	2.3	short grass pasture
V =	0.15	m/s
Tc =	**73**	**min**

Table 3.9 $V/S^{0.5}$ relationship for various land covers

Land Cover	$V/S^{0.5}$ (m/s)
Forest with heavy ground litter, hay meadow (overland flow)	0.6
Trash fallow or minimum tillage cultivation, contour, strip cropped woodland (overland flow)	1.5
Short grass pasture (overland flow)	2.3
Cultivated, straight row (overland flow)	2.7
Nearly bare and untilled (overland flow) or alluvial fans in Western mountain regions	3.0
Grassed waterway	4.6
Paved areas (sheet flow); small upland gullies	6.1

Source: Handbook of Steel Drainage & Highway Construction Products (Canadian Edition)

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Off-Site Runoff

OFF1

Given:

Area (ha) = 0.58
C = 0.41
C (50 YR) = 0.49
C (100 YR) = 0.51

Return Period	Time of Concentration (min)	Intensity*1, i (mm/hr)	Flow*2, Q (L/s)
2 Year	10	76.8	50.0
5 Year	10	104.2	67.8
50 Year	10	161.5	126.2
100 Year	10	178.6	145.3

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Flow calculated using the Rational Method (Q = 2.78CiA).

OFF2

Given:

Area (ha) = 0.90
C = 0.29
C (50 YR) = 0.35
C (100 YR) = 0.37

Return Period	Time of Concentration (min)	Intensity*1, i (mm/hr)	Flow*2, Q (L/s)
2 Year	101	16.6	12.2
5 Year	101	22.3	16.3
50 Year	101	34.1	29.9
100 Year	101	37.7	34.5

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Flow calculated using the Rational Method (Q = 2.78CiA).
3. Tc calculated with Uplands Method

OFF3

Given:

Area (ha) = 0.22
C = 0.20
C (50 YR) = 0.24
C (100 YR) = 0.25

Return Period	Time of Concentration (min)	Intensity*1, i (mm/hr)	Flow*2, Q (L/s)
2 Year	73	21.3	2.6
5 Year	73	28.6	3.5
50 Year	73	43.8	6.4
100 Year	73	48.4	7.4

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Flow calculated using the Rational Method (Q = 2.78CiA).
3. Tc calculated with Uplands Method

OFF4

Given:

Area (ha) = 0.09
C = 0.21
C (50 YR) = 0.25
C (100 YR) = 0.26

Return Period	Time of Concentration (min)	Intensity*1, i (mm/hr)	Flow*2, Q (L/s)
2 Year	10	76.8	4.1
5 Year	10	104.2	5.6
50 Year	10	161.5	10.4
100 Year	10	178.6	12.0

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Flow calculated using the Rational Method (Q = 2.78CiA).

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OFF1 - Hardscape to CB 101

Given:

Area (ha) = 0.03
C = 0.90
C (50 YR) = 1.00
C (100 YR) = 1.00

Return Period	Time of Concentration (min)	Intensity[*1], i (mm/hr)	Flow[*2], Q (L/s)
2 Year	10	76.8	6.0
5 Year	10	104.2	8.1
50 Year	10	161.5	13.9
100 Year	10	178.6	15.4

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Flow calculated using the Rational Method (Q = 2.78CiA).
3. 200mm CB lead @ 2% has a free flow capacity of 47.1 L/s

OFF1 - Hardscape to CB 102

Given:

Area (ha) = 0.07
C = 0.90
C (50 YR) = 1.00
C (100 YR) = 1.00

Return Period	Time of Concentration (min)	Intensity[*1], i (mm/hr)	Flow[*2], Q (L/s)
2 Year	10	76.8	12.9
5 Year	10	104.2	17.5
50 Year	10	161.5	30.1
100 Year	10	178.6	33.3

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Flow calculated using the Rational Method (Q = 2.78CiA).
3. 200mm CB lead @ 1.0% has a free flow capacity of 33.3 L/s

OFF1 - Hardscape to CB 103

Given:

Area (ha) = 0.03
C = 0.90
C (50 YR) = 1.00
C (100 YR) = 1.00

Return Period	Time of Concentration (min)	Intensity[*1], i (mm/hr)	Flow[*2], Q (L/s)
2 Year	10	76.8	6.1
5 Year	10	104.2	8.3
50 Year	10	161.5	12.9
100 Year	10	178.6	15.9

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Flow calculated using the Rational Method (Q = 2.78CiA).
3. 200mm CB lead @ 2% has a free flow capacity of 47.1 L/s

STORM SEWER DESIGN SHEET
for
4101 LIMEBANK ROAD, OTTAWA

Robinson Consultants

LOCATION			2 YEAR				FLOW				PROPOSED SEWER								
DRAINAGE AREA	FROM MH	TO MH	AREA (ha)	C	INDIV. 2.78AC	ACCUM. 2.78AC	TIME OF CONC. (min)	2 YEAR RAINFALL INTENSITY (mm/hr)	2 YEAR PEAK FLOW (L/s)	CUMULATIVE CONTROLLED PEAK FLOW (L/s)	LENGTH (m)	PIPE DIA. (mm)	UPSTREAM INV.	DNSTREAM INV.	GRADE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min)	PERCENT FULL
9	CB11	CBMH105	0.12	0.56	0.19	0.19	10.00	76.81	14.9	14.9	47.3	251	90.92	90.64	0.59	46.2	0.93	0.84	32%
8	CB07	MH106	0.15	0.90	0.38	0.38	10.00	76.81	29.2	29.2	22.9	299	90.91	90.82	0.39	59.9	0.85	0.45	49%
7	MH106	CBMH105	0.23	0.90	0.57	0.95	10.45	75.13	71.4	71.4	76.5	366	90.75	90.52	0.30	90.1	0.86	1.49	79%
6	CBMH105	CBMH102	0.08	0.84	0.19	1.33	11.94	70.09	93.3	93.3	44.6	457	90.43	90.33	0.22	139.5	0.85	0.87	67%
5	CB04	MH104	0.21	0.89	0.52	0.52	10.00	76.81	39.8	39.8	53.6	299	91.03	90.82	0.39	59.9	0.85	1.05	66%
4	MH104	CBMH103	0.26	0.89	0.63	1.15	11.05	73.01	83.8	83.8	86.0	457	90.66	90.47	0.22	139.5	0.85	1.69	60%
	CBMH103	CBMH102	0.00	0.00	0.00	1.15	12.73	67.69	77.7	77.7	36.7	457	90.41	90.33	0.22	139.5	0.85	0.72	56%
3	CBMH102	MH101	0.08	0.76	0.18	2.66	13.45	65.68	174.4	174.4	3.3	533	90.25	90.24	0.30	245.5	1.10	0.05	71%
	MH101	DITCH	0.00	0.00	0.00	2.66	13.50	65.55	174.1	174.1	28.3	533	90.21	90.15	0.21	205.4	0.92	0.51	85%
2	DITCH	POND	0.20	0.28	0.15	2.81	14.01	64.20	180.4	180.4	52.3	400	90.03	89.77	0.50	190	1.51	0.58	95%

STORM SEWER DESIGN SHEET
for
4101 LIMEBANK ROAD, OTTAWA

Robinson Consultants

LOCATION			2 YEAR				FLOW				PROPOSED SEWER								
DRAINAGE AREA	FROM MH	TO MH	AREA (ha)	C	INDIV. 2.78AC	ACCUM. 2.78AC	TIME OF CONC. (min)	2 YEAR RAINFALL INTENSITY (mm/hr)	2 YEAR PEAK FLOW (L/s)	CUMULATIVE CONTROLLED PEAK FLOW (L/s)	LENGTH (m)	PIPE DIA. (mm)	UPSTREAM INV.	DNSTREAM INV.	GRADE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min)	PERCENT FULL
30	CB39	MH124	0.13	0.69	0.26	0.26	10.00	76.81	19.7	19.7	22.9	251	91.48	91.34	0.61	47.0	0.95	0.40	42%
D1	BLDG	PIPE	0.54	0.90	1.35	1.35	10.00	76.81	103.4	*21.5*	19.3	201	91.60	91.21	2.00	47.1	1.48	0.22	46%
29	MH124	MH123	0.10	0.66	0.18	1.78	10.40	75.30	133.9	*54.1*	32.1	457	91.13	91.05	0.25	148.7	0.91	0.59	36%
D2	BLDG	PIPE	0.54	0.90	1.35	1.35	10.00	76.81	103.6	*21.6*	12.1	201	91.30	91.06	2.00	47.1	1.48	0.14	46%
28	MH123	MH122	0.13	0.77	0.29	3.41	10.99	73.19	249.9	*95.7*	68.4	533	90.97	90.83	0.20	200.4	0.90	1.27	48%
D3	BLDG	PIPE	0.56	0.90	1.40	1.40	10.00	76.81	107.6	*22.4*	14.3	201	91.19	90.90	2.00	47.1	1.48	0.16	48%
27	MH122	MH121	0.17	0.73	0.35	5.16	12.26	69.09	356.7	*139.2*	69.1	533	90.81	90.67	0.20	200.4	0.90	1.28	69%
	MH121	MH120	0.00	0.00	0.00	5.16	13.54	65.43	337.8	*135.3*	14.1	610	90.59	90.56	0.21	294.4	1.01	0.23	46%
26	MH120	MH117	0.53	0.66	0.98	6.14	13.78	64.81	397.9	*197.9*	115.6	686	90.48	90.31	0.15	340.2	0.92	2.09	58%
25	CB30	MH119	0.06	0.90	0.15	0.15	10.00	76.81	11.5	11.5	21.7	251	91.19	91.06	0.60	46.6	0.94	0.38	25%
24	MH119	MH118	0.86	0.90	2.16	2.31	10.38	75.36	173.8	173.8	110.0	610	90.70	90.51	0.17	264.8	0.91	2.02	66%
23	MH118	MH117	0.47	0.90	1.18	3.48	12.41	68.65	239.1	239.1	78.7	686	90.43	90.31	0.15	340.2	0.92	1.42	70%
22	MH117	MH116	0.13	0.45	0.16	9.78	15.87	59.79	584.7	*405.3*	56.7	838	90.16	90.09	0.12	518.9	0.94	1.00	78%
21	MH116	MH112	0.20	0.50	0.27	10.05	16.87	57.67	579.8	*409.0*	79.0	838	90.07	89.98	0.11	496.8	0.90	1.46	82%
20	CB 19	MH115	0.06	0.90	0.16	0.16	10.00	76.81	11.9	11.9	28.4	251	91.07	90.90	0.60	46.6	0.94	0.50	26%
C1	BLDG	PIPE	0.54	0.90	1.35	1.35	10.00	76.81	103.4	*21.5*	21.5	201	91.17	90.74	2.00	47.1	1.48	0.24	46%
19	MH115	MH114	0.54	0.89	1.34	2.84	10.50	74.93	213.1	*133.8*	81.1	533	90.62	90.46	0.20	200.4	0.90	1.50	67%
C2	BLDG	PIPE	0.54	0.90	1.35	1.35	10.00	76.81	103.8	*21.6*	21.5	201	90.98	90.55	2.00	47.1	1.48	0.24	46%
C3	BLDG	PIPE	0.65	0.90	1.62	1.62	10.00	76.81	124.7	*26.0*	21.5	201	90.90	90.47	2.00	47.1	1.48	0.24	55%
18	MH114	MH113	0.32	0.88	0.80	6.61	12.01	69.87	462.2	*229.3*	73.1	686	90.31	90.20	0.15	340.2	0.92	1.32	67%
17	MH113	MH112	0.20	0.82	0.45	7.06	13.33	66.01	466.3	*250.2*	35.6	686	90.18	90.13	0.14	328.7	0.89	0.67	76%
16	MH112	MH111	0.24	0.27	0.18	17.30	18.34	54.87	949.1	*621.8*	82.8	914	89.90	89.78	0.14	706.5	1.08	1.28	88%
	MH111	MH107	0.00	0.00	0.00	17.30	19.62	52.66	910.7	*602.1*	46.5	914	89.76	89.69	0.15	731.3	1.11	0.70	82%
A1	BLDG	PIPE	0.60	0.90	1.51	1.51	10.00	76.81	116.1	*24.2*	7.2	201	90.96	90.82	2.00	47.1	1.48	0.08	51%
B1	BLDG	PIPE	0.54	0.90	1.35	1.35	10.00	76.81	103.8	*21.6*	13.2	201	91.08	90.81	2.00	47.1	1.48	0.15	46%
15	CB12	CBMH110	0.09	0.80	0.19	3.05	10.15	76.24	232.9	*60.4*	38.6	299	90.79	90.56	0.60	74.3	1.06	0.61	81%
B2	BLDG	PIPE	0.54	0.90	1.35	1.35	10.00	76.81	103.8	*21.6*	13.2	201	90.76	90.50	2.00	47.1	1.48	0.15	46%
A2	BLDG	PIPE	0.40	0.90	0.99	0.99	10.00	76.81	76.3	*15.9*	7.2	201	90.55	90.41	2.00	47.1	1.48	0.08	34%
14	CBMH110	CBMH109	0.11	0.82	0.25	5.65	10.76	74.02	417.9	*115.8*	51.1	457	90.40	90.27	0.25	148.7	0.91	0.94	78%
B3	BLDG	PIPE	0.58	0.90	1.46	1.46	10.00	76.81	111.8	*23.3*	13.5	201	90.58	90.31	2.00	47.1	1.48	0.15	49%
13	CBMH109	CBMH108	0.09	0.90	0.22	7.32	11.70	70.85	518.9	*153.3*	35.9	533	90.19	90.12	0.19	195.4	0.88	0.68	78%
12	CB11	CBMH108	0.25	0.89	0.61	0.61	10.00	76.81	47.2	47.2	82.2	299	90.72	90.35	0.45	64.4	0.92	1.49	73%
11	CBMH108	MH107	0.14	0.79	0.31	8.24	12.38	68.74	566.6	*215.2*	24.0	600	90.05	90.00	0.21	281.7	1.00	0.40	76%
	MH107	DITCH	0.00	0.00	0.00	25.54	20.31	51.53	1316.1	*780.1*	18.5	991	89.61	89.58	0.16	937.1	1.21	0.25	83%
10	DITCH	POND	0.12	0.20	0.07	25.61	20.57	51.14	1309.5	*779.5*	47.8	400	89.36	89.12	0.50	500	3.98	0.20	156%

STORM SEWER DESIGN SHEET
for
4101 LIMEBANK ROAD, OTTAWA

Robinson Consultants

LOCATION			2 YEAR				FLOW				PROPOSED SEWER								
DRAINAGE AREA	FROM MH	TO MH	AREA (ha)	C	INDIV. 2.78AC	ACCUM. 2.78AC	TIME OF CONC. (min)	2 YEAR RAINFALL INTENSITY (mm/hr)	2 YEAR PEAK FLOW (L/s)	CUMULATIVE CONTROLLED PEAK FLOW (L/s)	LENGTH (m)	PIPE DIA. (mm)	UPSTREAM INV.	DNSTREAM INV.	GRADE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min)	PERCENT FULL
1	POND	MH203	1.04	0.20	0.59	28.78	20.77	50.83	1462.9	*104.3*	22.0	610	89.04	89.01	0.14	240.3	0.82	0.74	43%
	MH203	MH202	0.00	0.00	0.00	28.78	21.50	49.73	1431.3	*104.3*	65.2	610	88.95	88.85	0.15	248.8	0.85	1.56	42%
	MH202	MH201	0.00	0.00	0.00	28.78	23.06	47.58	1369.3	*104.3*	65.8	610	88.83	88.73	0.15	248.8	0.85	1.57	42%
	MH201	DITCH	0.00	0.00	0.00	28.78	24.63	45.61	1312.6	*104.3*	9.9	610	88.70	88.67	0.30	351.8	1.20	0.34	30%
			13.33																

Design Parameters

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Peak flows calculated using the Rational Method.
3. Manning's roughness coefficient = 0.013
4. Full flow velocity: MIN 0.8 m/s; MAX 3.0 m/s (City of Ottawa Sewer Design Guidelines, v.2012)
5. Building roofs are controlled, assumed at a typical 40 L/s/ha
6. Italicized "Cumulative Controlled Peak Flow " indicates the equivalent peak flow from the contributing roofs are assumed at the controlled flow rate
7. Italicized "Cumulative Controlled Peak Flow " downstream of POND based on max pond controlled flow per PCSWMM model.
8. Pipe Capacity of culverts (From "DITCH" to "POND") based on separate culvert sizing sheets
9. "Percent Full" based on "Cumulative Controlled Peak Flow"

STORM SEWER DESIGN SHEET
for
4101 LIMEBANK ROAD, OTTAWA

Robinson Consultants

LOCATION			100 YEAR				FLOW				PROPOSED SEWER								
DRAINAGE AREA	FROM MH	TO MH	AREA (ha)	C	INDIV. 2.78AC	ACCUM. 2.78AC	TIME OF CONC. (min)	100 YEAR RAINFALL INTENSITY (mm/hr)	100 YEAR PEAK FLOW (L/s)	CUMULATIVE CONTROLLED PEAK FLOW (L/s)	LENGTH (m)	PIPE DIA. (mm)	UPSTREAM INV.	DNSTREAM INV.	GRADE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min)	PERCENT FULL
9	CB11	CBMH105	0.12	0.70	0.24	0.24	10.00	178.56	43.2	43.2	47.3	251	90.92	90.64	0.59	46.2	0.93	0.84	93%
8	CB07	MH106	0.15	1.00	0.42	0.42	10.00	178.56	75.5	75.5	22.9	299	90.91	90.82	0.39	59.9	0.85	0.45	126%
7	MH106	CBMH105	0.23	1.00	0.63	1.06	10.45	174.57	184.4	184.4	76.5	366	90.75	90.52	0.30	90.1	0.86	1.49	205%
6	CBMH105	CBMH102	0.08	1.00	0.22	1.52	11.94	162.61	247.3	247.3	44.6	457	90.43	90.33	0.22	139.5	0.85	0.87	177%
5	CB04	MH104	0.21	1.00	0.58	0.58	10.00	178.56	104.2	104.2	53.6	299	91.03	90.82	0.39	59.9	0.85	1.05	174%
4	MH104	CBMH103	0.26	1.00	0.71	1.29	11.05	169.52	219.1	219.1	86.0	457	90.66	90.47	0.22	139.5	0.85	1.69	157%
	CBMH103	CBMH102	0.00	0.00	0.00	1.29	12.73	156.92	202.9	202.9	36.7	457	90.41	90.33	0.22	139.5	0.85	0.72	145%
3	CBMH102	MH101	0.08	0.95	0.22	3.03	13.45	152.15	461.7	461.7	3.3	533	90.25	90.24	0.30	245.5	1.10	0.05	188%
	MH101	DITCH	0.00	0.00	0.00	3.03	13.50	151.83	460.8	460.8	28.3	533	90.21	90.15	0.21	205.4	0.92	0.51	224%
2	DITCH	POND	0.20	0.35	0.19	3.23	14.01	148.64	479.8	479.8	52.3	400	90.03	89.77	0.50	190	1.51	0.58	253%

STORM SEWER DESIGN SHEET
for
4101 LIMEBANK ROAD, OTTAWA

Robinson Consultants

LOCATION			100 YEAR				FLOW				PROPOSED SEWER								
DRAINAGE AREA	FROM MH	TO MH	AREA (ha)	C	INDIV. 2.78AC	ACCUM. 2.78AC	TIME OF CONC. (min)	100 YEAR RAINFALL INTENSITY (mm/hr)	100 YEAR PEAK FLOW (L/s)	CUMULATIVE CONTROLLED PEAK FLOW (L/s)	LENGTH (m)	PIPE DIA. (mm)	UPSTREAM INV.	DNSTREAM INV.	GRADE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min)	PERCENT FULL
30	CB39	MH124	0.13	0.87	0.32	0.32	10.00	178.56	57.3	57.3	22.9	251	91.48	91.34	0.61	47.0	0.95	0.40	122%
D1	BLDG	PIPE	0.54	1.00	1.50	1.50	10.00	178.56	267.1	*21.5*	19.3	201	91.60	91.21	2.00	47.1	1.48	0.22	46%
29	MH124	MH123	0.10	0.83	0.22	2.04	10.40	174.97	356.2	*116.1*	32.1	457	91.13	91.05	0.25	148.7	0.91	0.59	78%
D2	BLDG	PIPE	0.54	1.00	1.50	1.50	10.00	178.56	267.6	*21.6*	12.1	201	91.30	91.06	2.00	47.1	1.48	0.14	46%
28	MH123	MH122	0.13	0.96	0.36	3.89	10.99	169.97	661.6	*195.8*	68.4	533	90.97	90.83	0.20	200.4	0.90	1.27	98%
D3	BLDG	PIPE	0.56	1.00	1.56	1.56	10.00	178.56	278.0	*22.4*	14.3	201	91.19	90.90	2.00	47.1	1.48	0.16	48%
27	MH122	MH121	0.17	0.92	0.44	5.88	12.26	160.23	942.9	*279.2*	69.1	533	90.81	90.67	0.20	200.4	0.90	1.28	139%
	MH121	MH120	0.00	0.00	0.00	5.88	13.54	151.57	891.9	*267.6*	14.1	610	90.59	90.56	0.21	294.4	1.01	0.23	91%
26	MH120	MH117	0.53	0.83	1.22	7.10	13.78	150.10	1066.5	*448.9*	115.6	686	90.48	90.31	0.15	340.2	0.92	2.09	132%
25	CB30	MH119	0.06	1.00	0.17	0.17	10.00	178.56	29.8	29.8	21.7	251	91.19	91.06	0.60	46.6	0.94	0.38	64%
24	MH119	MH118	0.86	1.00	2.40	2.56	10.38	175.12	448.9	448.9	110.0	610	90.70	90.51	0.17	264.8	0.91	2.02	169%
23	MH118	MH117	0.47	1.00	1.31	3.87	12.41	159.19	616.0	616.0	78.7	686	90.43	90.31	0.15	340.2	0.92	1.42	181%
22	MH117	MH116	0.13	0.57	0.20	11.17	15.87	138.22	1544.1	*980.5*	56.7	838	90.16	90.09	0.12	518.9	0.94	1.00	189%
21	MH116	MH112	0.20	0.62	0.34	11.51	16.87	133.23	1534.0	*993.1*	79.0	838	90.07	89.98	0.11	496.8	0.90	1.46	200%
20	CB 19	MH115	0.06	1.00	0.17	0.17	10.00	178.56	30.8	30.8	28.4	251	91.07	90.90	0.60	46.6	0.94	0.50	66%
C1	BLDG	PIPE	0.54	1.00	1.50	1.50	10.00	178.56	267.1	*21.5*	21.5	201	91.17	90.74	2.00	47.1	1.48	0.24	46%
19	MH115	MH114	0.54	1.00	1.50	3.17	10.50	174.09	551.7	*312.9*	81.1	533	90.62	90.46	0.20	200.4	0.90	1.50	156%
C2	BLDG	PIPE	0.54	1.00	1.50	1.50	10.00	178.56	268.1	*21.6*	21.5	201	90.98	90.55	2.00	47.1	1.48	0.24	46%
C3	BLDG	PIPE	0.65	1.00	1.80	1.80	10.00	178.56	322.2	*26.0*	21.5	201	90.90	90.47	2.00	47.1	1.48	0.24	55%
18	MH114	MH113	0.32	1.00	0.90	7.38	12.01	162.08	1195.4	*486.3*	73.1	686	90.31	90.20	0.15	340.2	0.92	1.32	143%
17	MH113	MH112	0.20	1.00	0.55	7.92	13.33	152.93	1211.7	*546.5*	35.6	686	90.18	90.13	0.14	328.7	0.89	0.67	166%
16	MH112	MH111	0.24	0.27	0.18	19.61	18.34	126.64	2483.9	*1434.2*	82.8	914	89.90	89.78	0.14	706.5	1.08	1.28	203%
	MH111	MH107	0.00	0.00	0.00	19.61	19.62	121.42	2381.6	*1380.7*	46.5	914	89.76	89.69	0.15	731.3	1.11	0.70	189%
A1	BLDG	PIPE	0.60	0.90	1.51	1.51	10.00	178.56	269.8	*24.2*	7.2	201	90.96	90.82	2.00	47.1	1.48	0.08	51%
B1	BLDG	PIPE	0.54	0.90	1.35	1.35	10.00	178.56	241.2	*21.6*	13.2	201	91.08	90.81	2.00	47.1	1.48	0.15	46%
15	CB12	CBMH110	0.09	0.80	0.19	3.05	10.15	177.21	541.3	*79.9*	38.6	299	90.79	90.56	0.60	74.3	1.06	0.61	107%
B2	BLDG	PIPE	0.54	0.90	1.35	1.35	10.00	178.56	241.2	*21.6*	13.2	201	90.76	90.50	2.00	47.1	1.48	0.15	46%
A2	BLDG	PIPE	0.40	0.90	0.99	0.99	10.00	178.56	177.4	*15.9*	7.2	201	90.55	90.41	2.00	47.1	1.48	0.08	34%
14	CBMH110	CBMH109	0.11	0.82	0.25	5.65	10.76	171.93	970.8	*158.9*	51.1	457	90.40	90.27	0.25	148.7	0.91	0.94	107%
B3	BLDG	PIPE	0.58	0.90	1.46	1.46	10.00	178.56	260.0	*23.3*	13.5	201	90.58	90.31	2.00	47.1	1.48	0.15	49%
13	CBMH109	CBMH108	0.09	0.90	0.22	7.32	11.70	164.41	1204.0	*215.0*	35.9	533	90.19	90.12	0.19	195.4	0.88	0.68	110%
12	CB11	CBMH108	0.25	0.89	0.61	0.61	10.00	178.56	109.8	109.8	82.2	299	90.72	90.35	0.45	64.4	0.92	1.49	171%
11	CBMH108	MH107	0.14	0.79	0.31	8.24	12.38	159.39	1313.9	*358.4*	24.0	600	90.05	90.00	0.21	281.7	1.00	0.40	127%
	MH107	DITCH	0.00	0.00	0.00	27.86	20.31	118.78	3309.1	*1647.9*	18.5	991	89.61	89.58	0.16	937.1	1.21	0.25	176%
10	DITCH	POND	0.12	0.20	0.07	27.93	20.57	117.85	3291.3	*1645.0*	47.8	400	89.36	89.12	0.50	500	3.98	0.20	329%

STORM SEWER DESIGN SHEET
for
4101 LIMEBANK ROAD, OTTAWA

Robinson Consultants

LOCATION			100 YEAR				FLOW				PROPOSED SEWER								
DRAINAGE AREA	FROM MH	TO MH	AREA (ha)	C	INDIV. 2.78AC	ACCUM. 2.78AC	TIME OF CONC. (min)	100 YEAR RAINFALL INTENSITY (mm/hr)	100 YEAR PEAK FLOW (L/s)	CUMULATIVE CONTROLLED PEAK FLOW (L/s)	LENGTH (m)	PIPE DIA. (mm)	UPSTREAM INV.	DNSTREAM INV.	GRADE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	TIME OF FLOW (min)	PERCENT FULL
1	POND	MH203	1.04	0.20	0.59	31.48	20.77	117.13	3687.0	*433.4*	22.0	610	89.04	89.01	0.14	240.3	0.82	0.74	180%
	MH203	MH202	0.00	0.00	0.00	31.48	21.50	114.56	3606.0	*433.4*	65.2	610	88.95	88.85	0.15	248.8	0.85	1.56	174%
	MH202	MH201	0.00	0.00	0.00	31.48	23.06	109.50	3446.9	*433.4*	65.8	610	88.83	88.73	0.15	248.8	0.85	1.57	174%
	MH201	DITCH	0.00	0.00	0.00	31.48	24.63	104.88	3301.5	*433.4*	9.9	610	88.70	88.67	0.30	351.8	1.20	0.34	123%
			13.33																

Design Parameters

Notes:
1. Rainfall intensity calculated using City of Ottawa IDF curve equations.
2. Peak flows calculated using the Rational Method.
3. C(100yr) = C*1.25 (max 1.0)
4. Manning's roughness coefficient = 0.013
5. Full flow velocity: MIN 0.8 m/s; MAX 3.0 m/s (City of Ottawa Sewer Design Guidelines, v.2012)
6. Building roofs are controlled, assumed at a typical 40 L/s/ha
7. Italicized "Cumulative Controlled Peak Flow " indicates the equivalent peak flow from the contributing roofs are assumed at the controlled flow rate
8. Italicized "Cumulative Controlled Peak Flow " downstream of POND based on max pond controlled flow per PCSWMM model.
9. Pipe Capacity of culverts (From "DITCH" to "POND") based on separate culvert sizing sheets
10. "Percent Full" based on "Cumulative Controlled Peak Flow"

Robinson Consultants

Roof Storage Volume Calculations

Drainage Area = **Bldg A1 (2yr)**
2.78* AC = 1.51
Max Depth = 0.15
Ponding Area (m2) = 6040
Max Available Storage (m3) = 302.0

Return Period	Time of Concentration (min)	Intensity, i (mm/hr)	Flow In, Q (L/s)	Controlled Flow (L/s)*	Net Runoff to be Stored (L/s)	Storage Required (m^3)	Drawdown Time (hr)
2 Year	15	61.8	93.3	24.2	69.2	62.3	0.7
	20	52.0	78.6	24.2	54.5	65.4	0.8
	25	**45.2**	**68.3**	**24.2**	**44.1**	**66.1**	**0.8**
	30	40.0	60.5	24.2	36.4	65.4	0.8
	35	36.1	54.5	24.2	30.3	63.7	0.7
	40	32.9	49.7	24.2	25.5	61.2	0.7

*Controlled flow assumed based on 40 L/s/ha; @ 0.60ha = 24.2 L/s

Drainage Area = **Bldg A2 (2yr)**
2.78* AC = 0.99
Max Depth = 0.15
Ponding Area (m2) = 3970
Max Available Storage (m3) = 198.5

Return Period	Time of Concentration (min)	Intensity, i (mm/hr)	Flow In, Q (L/s)	Controlled Flow (L/s)*	Net Runoff to be Stored (L/s)	Storage Required (m^3)	Drawdown Time (hr)
2 Year	15	61.8	61.4	15.9	45.5	40.9	0.7
	20	52.0	51.7	15.9	35.8	43.0	0.8
	25	**45.2**	**44.9**	**15.9**	**29.0**	**43.5**	**0.8**
	30	40.0	39.8	15.9	23.9	43.0	0.8
	35	36.1	35.8	15.9	19.9	41.9	0.7
	40	32.9	32.6	15.9	16.8	40.2	0.7

*Controlled flow assumed based on 40 L/s/ha; @ 0.40ha = 15.9 L/s

Drainage Area = **Bldg A1 (100yr)**
2.78* AC = 1.68
Max Depth = 0.15
Ponding Area (m2) = 6040
Max Available Storage (m3) = 302.0

Return Period	Time of Concentration (min)	Intensity, i (mm/hr)	Flow In, Q (L/s)	Controlled Flow (L/s)*	Net Runoff to be Stored (L/s)	Storage Required (m^3)	Drawdown Time (hr)
100 Year	50	64.0	107.4	24.2	83.2	249.7	2.9
	55	59.6	100.1	24.2	76.0	250.7	2.9
	60	**55.9**	**93.9**	**24.2**	**69.7**	**250.9**	**2.9**
	65	52.6	88.4	24.2	64.2	250.5	2.9
	70	49.8	83.6	24.2	59.4	249.7	2.9
	75	47.3	79.3	24.2	55.2	248.3	2.9

*Controlled flow assumed based on 40 L/s/ha; @ 0.60ha = 24.2 L/s

Drainage Area = **Bldg A2 (100yr)**
2.78* AC = 1.10
Max Depth = 0.15
Ponding Area (m2) = 3970
Max Available Storage (m3) = 198.5

Return Period	Time of Concentration (min)	Intensity, i (mm/hr)	Flow In, Q (L/s)	Controlled Flow (L/s)*	Net Runoff to be Stored (L/s)	Storage Required (m^3)	Drawdown Time (hr)
100 Year	50	64.0	70.6	15.9	54.7	164.1	2.9
	55	59.6	65.8	15.9	49.9	164.8	2.9
	60	**55.9**	**61.7**	**15.9**	**45.8**	**164.9**	**2.9**
	65	52.6	58.1	15.9	42.2	164.7	2.9
	70	49.8	55.0	15.9	39.1	164.1	2.9
	75	47.3	52.2	15.9	36.3	163.2	2.9

*Controlled flow assumed based on 40 L/s/ha; @ 0.40ha = 15.9 L/s

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Drainage Area = **Bldg B1 (2yr)** Ponding Area (m2) = 5400

2.78* AC = 1.35 Max Depth = 0.15 Max Available Storage (m3) = 270.0

Return Period	Time of Concentration (min)	Intensity, i (mm/hr)	Flow In, Q (L/s)	Controlled Flow (L/s)*	Net Runoff to be Stored (L/s)	Storage Required (m^3)	Drawdown Time (hr)
2 Year	15	61.8	83.5	21.6	61.9	55.7	0.7
	20	52.0	70.3	21.6	48.7	58.4	0.8
	25	**45.2**	**61.0**	**21.6**	**39.4**	**59.1**	**0.8**
	30	40.0	54.1	21.6	32.5	58.5	0.8
	35	36.1	48.7	21.6	27.1	56.9	0.7
	40	32.9	44.4	21.6	22.8	54.7	0.7

*Controlled flow assumed based on 40 L/s/ha; @ 0.54ha = 21.6 L/s

Drainage Area = **Bldg B2 (2yr)** Ponding Area (m2) = 5400

2.78* AC = 1.35 Max Depth = 0.15 Max Available Storage (m3) = 270.0

Return Period	Time of Concentration (min)	Intensity, i (mm/hr)	Flow In, Q (L/s)	Controlled Flow (L/s)*	Net Runoff to be Stored (L/s)	Storage Required (m^3)	Drawdown Time (hr)
2 Year	15	61.8	83.5	21.6	61.9	55.7	0.7
	20	52.0	70.3	21.6	48.7	58.4	0.8
	25	**45.2**	**61.0**	**21.6**	**39.4**	**59.1**	**0.8**
	30	40.0	54.1	21.6	32.5	58.5	0.8
	35	36.1	48.7	21.6	27.1	56.9	0.7
	40	32.9	44.4	21.6	22.8	54.7	0.7

*Controlled flow assumed based on 40 L/s/ha; @ 0.54ha = 21.6 L/s

Drainage Area = **Bldg B3 (2yr)** Ponding Area (m2) = 5820

2.78* AC = 1.46 Max Depth = 0.15 Max Available Storage (m3) = 291.0

Return Period	Time of Concentration (min)	Intensity, i (mm/hr)	Flow In, Q (L/s)	Controlled Flow (L/s)*	Net Runoff to be Stored (L/s)	Storage Required (m^3)	Drawdown Time (hr)
2 Year	15	61.8	89.9	23.3	66.7	60.0	0.7
	20	52.0	75.8	23.3	52.5	63.0	0.8
	25	**45.2**	**65.8**	**23.3**	**42.5**	**63.7**	**0.8**
	30	40.0	58.3	23.3	35.0	63.1	0.8
	35	36.1	52.5	23.3	29.2	61.4	0.7
	40	32.9	47.9	23.3	24.6	59.0	0.7

*Controlled flow assumed based on 40 L/s/ha; @ 0.54ha = 21.6 L/s

Drainage Area = **Bldg B1 (100yr)** Ponding Area (m2) = 5400

2.78* AC = 1.50 Max Depth = 0.15 Max Available Storage (m3) = 270.0

Return Period	Time of Concentration (min)	Intensity, i (mm/hr)	Flow In, Q (L/s)	Controlled Flow (L/s)*	Net Runoff to be Stored (L/s)	Storage Required (m^3)	Drawdown Time (hr)
100 Year	50	64.0	96.0	21.6	74.4	223.2	2.9
	55	59.6	89.5	21.6	67.9	224.1	2.9
	60	**55.9**	**83.9**	**21.6**	**62.3**	**224.3**	**2.9**
	65	52.6	79.0	21.6	57.4	224.0	2.9
	70	49.8	74.7	21.6	53.1	223.2	2.9
	75	47.3	70.9	21.6	49.3	222.0	2.9

*Controlled flow assumed based on 40 L/s/ha; @ 0.54ha = 21.6 L/s

Drainage Area = **Bldg B2 (100yr)** Ponding Area (m2) = 5400

2.78* AC = 1.50 Max Depth = 0.15 Max Available Storage (m3) = 270.0

Return Period	Time of Concentration (min)	Intensity, i (mm/hr)	Flow In, Q (L/s)	Controlled Flow (L/s)*	Net Runoff to be Stored (L/s)	Storage Required (m^3)	Drawdown Time (hr)
2 Year	45	69.1	93.3	21.6	71.7	193.6	2.5
	50	64.0	86.4	21.6	64.8	194.4	2.5
	55	**59.6**	**80.6**	**21.6**	**59.0**	**194.6**	**2.5**
	60	55.9	75.5	21.6	53.9	194.1	2.5
	65	52.6	71.1	21.6	49.5	193.2	2.5
	70	49.8	67.3	21.6	45.7	191.8	2.5

*Controlled flow assumed based on 40 L/s/ha; @ 0.54ha = 21.6 L/s

Drainage Area = **Bldg B3 (100yr)** Ponding Area (m2) = 5820

2.78* AC = 1.62 Max Depth = 0.15 Max Available Storage (m3) = 291.0

Return Period	Time of Concentration (min)	Intensity, i (mm/hr)	Flow In, Q (L/s)	Controlled Flow (L/s)*	Net Runoff to be Stored (L/s)	Storage Required (m^3)	Drawdown Time (hr)
2 Year	50	64.0	93.1	23.3	69.8	209.5	2.5
	55	59.6	86.8	23.3	63.5	209.7	2.5
	60	**55.9**	**81.4**	**23.3**	**58.1**	**209.2**	**2.5**
	65	52.6	76.7	23.3	53.4	208.2	2.5
	70	49.8	72.5	23.3	49.2	206.7	2.5
	75	47.3	68.8	23.3	45.5	204.9	2.4

*Controlled flow assumed based on 40 L/s/ha; @ 0.54ha = 21.6 L/s

Drainage Area = **Bldg C1 (2yr)** Ponding Area (m2) = 5380

2.78* AC = 1.35 Max Depth = 0.15 Max Available Storage (m3) = 269.0

Return Period	Time of Concentration (min)	Intensity, i (mm/hr)	Flow In, Q (L/s)	Controlled Flow (L/s)*	Net Runoff to be Stored (L/s)	Storage Required (m^3)	Drawdown Time (hr)
2 Year	15	61.8	83.1	21.5	61.6	55.5	0.7
	20	52.0	70.0	21.5	48.5	58.2	0.8
	25	**45.2**	**60.8**	**21.5**	**39.3**	**58.9**	**0.8**
	30	40.0	53.9	21.5	32.4	58.3	0.8
	35	36.1	48.5	21.5	27.0	56.7	0.7
	40	32.9	44.2	21.5	22.7	54.5	0.7

*Controlled flow assumed based on 40 L/s/ha; @ 0.54ha = 21.5 L/s

Drainage Area = **Bldg C2 (2yr)** Ponding Area (m2) = 5400

2.78* AC = 1.35 Max Depth = 0.15 Max Available Storage (m3) = 270.0

Return Period	Time of Concentration (min)	Intensity, i (mm/hr)	Flow In, Q (L/s)	Controlled Flow (L/s)*	Net Runoff to be Stored (L/s)	Storage Required (m^3)	Drawdown Time (hr)
2 Year	15	61.8	83.5	21.6	61.9	55.7	0.7
	20	52.0	70.3	21.6	48.7	58.4	0.8
	25	**45.2**	**61.0**	**21.6**	**39.4**	**59.1**	**0.8**
	30	40.0	54.1	21.6	32.5	58.5	0.8
	35	36.1	48.7	21.6	27.1	56.9	0.7
	40	32.9	44.4	21.6	22.8	54.7	0.7

*Controlled flow assumed based on 40 L/s/ha; @ 0.54ha = 21.6 L/s

Drainage Area = **Bldg C3 (2yr)** Ponding Area (m2) = 6490

2.78* AC = 1.62 Max Depth = 0.15 Max Available Storage (m3) = 324.5

Return Period	Time of Concentration (min)	Intensity, i (mm/hr)	Flow In, Q (L/s)	Controlled Flow (L/s)*	Net Runoff to be Stored (L/s)	Storage Required (m^3)	Drawdown Time (hr)
2 Year	15	61.8	100.3	26.0	74.3	66.9	0.7
	20	52.0	84.5	26.0	58.5	70.2	0.8
	25	**45.2**	**73.3**	**26.0**	**47.4**	**71.1**	**0.8**
	30	40.0	65.0	26.0	39.1	70.3	0.8
	35	36.1	58.6	26.0	32.6	68.4	0.7
	40	32.9	53.4	26.0	27.4	65.8	0.7

*Controlled flow assumed based on 40 L/s/ha; @ 0.65ha = 26.0 L/s

Drainage Area = **Bldg C1 (100yr)** Ponding Area (m2) = 5380

2.78* AC = 1.50 Max Depth = 0.15 Max Available Storage (m3) = 269.0

Return Period	Time of Concentration (min)	Intensity, i (mm/hr)	Flow In, Q (L/s)	Controlled Flow (L/s)*	Net Runoff to be Stored (L/s)	Storage Required (m^3)	Drawdown Time (hr)
100 Year	50	64.0	95.7	21.5	74.1	222.4	2.9
	55	59.6	89.2	21.5	67.7	223.3	2.9
	60	**55.9**	**83.6**	**21.5**	**62.1**	**223.5**	**2.9**
	65	52.6	78.7	21.5	57.2	223.2	2.9
	70	49.8	74.5	21.5	52.9	222.4	2.9
	75	47.3	70.7	21.5	49.2	221.2	2.9

*Controlled flow assumed based on 40 L/s/ha; @ 0.54ha = 21.5 L/s

Drainage Area = **Bldg C2 (100yr)** Ponding Area (m2) = 5400

2.78* AC = 1.50 Max Depth = 0.15 Max Available Storage (m3) = 270.0

Return Period	Time of Concentration (min)	Intensity, i (mm/hr)	Flow In, Q (L/s)	Controlled Flow (L/s)*	Net Runoff to be Stored (L/s)	Storage Required (m^3)	Drawdown Time (hr)
100 Year	50	64.0	96.0	21.6	74.4	223.2	2.9
	55	59.6	89.5	21.6	67.9	224.1	2.9
	60	**55.9**	**83.9**	**21.6**	**62.3**	**224.3**	**2.9**
	65	52.6	79.0	21.6	57.4	224.0	2.9
	70	49.8	74.7	21.6	53.1	223.2	2.9
	75	47.3	70.9	21.6	49.3	222.0	2.9

*Controlled flow assumed based on 40 L/s/ha; @ 0.54ha = 21.6 L/s

Drainage Area = **Bldg C3 (100yr)** Ponding Area (m2) = 6490

2.78* AC = 1.80 Max Depth = 0.15 Max Available Storage (m3) = 324.5

Return Period	Time of Concentration (min)	Intensity, i (mm/hr)	Flow In, Q (L/s)	Controlled Flow (L/s)*	Net Runoff to be Stored (L/s)	Storage Required (m^3)	Drawdown Time (hr)
100 Year	50	64.0	115.4	26.0	89.4	268.3	2.9
	55	59.6	107.6	26.0	81.6	269.3	2.9
	60	**55.9**	**100.8**	**26.0**	**74.9**	**269.6**	**2.9**
	65	52.6	95.0	26.0	69.0	269.2	2.9
	70	49.8	89.8	26.0	63.9	268.3	2.9
	75	47.3	85.3	26.0	59.3	266.8	2.9

*Controlled flow assumed based on 40 L/s/ha; @ 0.65ha = 26.0 L/s

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Drainage Area = **Bldg D1 (2yr)** Ponding Area (m2) = 5380

2.78* AC = 1.35 Max Depth = 0.15 Max Available Storage (m3) = 269.0

Return Period	Time of Concentration (min)	Intensity, i (mm/hr)	Flow In, Q (L/s)	Controlled Flow (L/s)*	Net Runoff to be Stored (L/s)	Storage Required (m^3)	Drawdown Time (hr)
2 Year	15	61.8	83.1	21.5	61.6	55.5	0.7
	20	52.0	70.0	21.5	48.5	58.2	0.8
	25	**45.2**	**60.8**	**21.5**	**39.3**	**58.9**	**0.8**
	30	40.0	53.9	21.5	32.4	58.3	0.8
	35	36.1	48.5	21.5	27.0	56.7	0.7
	40	32.9	44.2	21.5	22.7	54.5	0.7

*Controlled flow assumed based on 40 L/s/ha; @ 0.54ha = 21.5 L/s

Drainage Area = **Bldg D1 (100yr)** Ponding Area (m2) = 5380

2.78* AC = 1.50 Max Depth = 0.15 Max Available Storage (m3) = 269.0

Return Period	Time of Concentration (min)	Intensity, i (mm/hr)	Flow In, Q (L/s)	Controlled Flow (L/s)*	Net Runoff to be Stored (L/s)	Storage Required (m^3)	Drawdown Time (hr)
100 Year	50	64.0	95.7	21.5	74.1	222.4	2.9
	55	59.6	89.2	21.5	67.7	223.3	2.9
	60	**55.9**	**83.6**	**21.5**	**62.1**	**223.5**	**2.9**
	65	52.6	78.7	21.5	57.2	223.2	2.9
	70	49.8	74.5	21.5	52.9	222.4	2.9
	75	47.3	70.7	21.5	49.2	221.2	2.9

*Controlled flow assumed based on 40 L/s/ha; @ 0.54ha = 21.5 L/s

Drainage Area = **Bldg D2 (2yr)** Ponding Area (m2) = 5390

2.78* AC = 1.35 Max Depth = 0.15 Max Available Storage (m3) = 269.5

Return Period	Time of Concentration (min)	Intensity, i (mm/hr)	Flow In, Q (L/s)	Controlled Flow (L/s)*	Net Runoff to be Stored (L/s)	Storage Required (m^3)	Drawdown Time (hr)
2 Year	15	61.8	83.3	21.6	61.7	55.6	0.7
	20	52.0	70.2	21.6	48.6	58.3	0.8
	25	**45.2**	**60.9**	**21.6**	**39.4**	**59.0**	**0.8**
	30	40.0	54.0	21.6	32.4	58.4	0.8
	35	36.1	48.6	21.6	27.1	56.8	0.7
	40	32.9	44.3	21.6	22.8	54.6	0.7

*Controlled flow assumed based on 40 L/s/ha; @ 0.54ha = 21.6 L/s

Drainage Area = **Bldg D2 (100yr)** Ponding Area (m2) = 5390

2.78* AC = 1.50 Max Depth = 0.15 Max Available Storage (m3) = 269.5

Return Period	Time of Concentration (min)	Intensity, i (mm/hr)	Flow In, Q (L/s)	Controlled Flow (L/s)*	Net Runoff to be Stored (L/s)	Storage Required (m^3)	Drawdown Time (hr)
100 Year	50	64.0	95.8	21.6	74.3	222.8	2.9
	55	59.6	89.3	21.6	67.8	223.7	2.9
	60	**55.9**	**83.8**	**21.6**	**62.2**	**223.9**	**2.9**
	65	52.6	78.9	21.6	57.3	223.6	2.9
	70	49.8	74.6	21.6	53.0	222.8	2.9
	75	47.3	70.8	21.6	49.2	221.6	2.9

*Controlled flow assumed based on 40 L/s/ha; @ 0.54ha = 21.6 L/s

Drainage Area = **Bldg D3 (2yr)** Ponding Area (m2) = 5600

2.78* AC = 1.40 Max Depth = 0.15 Max Available Storage (m3) = 280.0

Return Period	Time of Concentration (min)	Intensity, i (mm/hr)	Flow In, Q (L/s)	Controlled Flow (L/s)*	Net Runoff to be Stored (L/s)	Storage Required (m^3)	Drawdown Time (hr)
2 Year	15	61.8	86.5	22.4	64.1	57.7	0.7
	20	52.0	72.9	22.4	50.5	60.6	0.8
	25	**45.2**	**63.3**	**22.4**	**40.9**	**61.3**	**0.8**
	30	40.0	56.1	22.4	33.7	60.7	0.8
	35	36.1	50.5	22.4	28.1	59.1	0.7
	40	32.9	46.0	22.4	23.6	56.8	0.7

*Controlled flow assumed based on 40 L/s/ha; @ 0.56ha = 22.4 L/s

Drainage Area = **Bldg D3 (100yr)** Ponding Area (m2) = 5600

2.78* AC = 1.56 Max Depth = 0.15 Max Available Storage (m3) = 280.0

Return Period	Time of Concentration (min)	Intensity, i (mm/hr)	Flow In, Q (L/s)	Controlled Flow (L/s)*	Net Runoff to be Stored (L/s)	Storage Required (m^3)	Drawdown Time (hr)
100 Year	50	64.0	99.6	22.4	77.2	231.5	2.9
	55	59.6	92.8	22.4	70.4	232.4	2.9
	60	**55.9**	**87.0**	**22.4**	**64.6**	**232.6**	**2.9**
	65	52.6	82.0	22.4	59.6	232.3	2.9
	70	49.8	77.5	22.4	55.1	231.5	2.9
	75	47.3	73.6	22.4	51.2	230.3	2.9

*Controlled flow assumed based on 40 L/s/ha; @ 0.56ha = 22.4 L/s

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Pond Velocity

Return Period	Peak Outflow (m3/s)	Peak Volume (m3)	Peak Velocity (m/s)
2 Year	0.1043	3031	0.0024
5 Year	0.2424	3589	0.0047
10 Year	0.2992	3701	0.0057
25 Year	0.3697	3853	0.0067
50 Year	0.4116	4005	0.0072
100 Year	0.4334	4219	0.0072

Notes:
1. Storage volume and average outflow per PCSWMM model
2. Average length of travel from inlet culverts to outlet approximately 70 m

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Ditch Capacity

Ditch to Pond (from Drainage Areas 2-9)

Slope (m/m)	0.015	
Side slope (run for 1m rise)	3	minimum
Bottom width (m)	0	
Manning's n	0.03	based on OSDG App. 6-C.1

Depth of flow (m)	Flow Capacity (L/s)	Velocity (m/s)
0.10	5.8	0.19
0.20	46.5	0.39
0.30	**156.9**	**0.58**
0.35	**249.1**	**0.68**
0.40	**371.8**	**0.77**
0.45	**529.4**	**0.87**
0.50	726.2	0.97
0.60	1254.8	1.16
0.70	1992.6	1.36
0.80	2974.5	1.55
0.90	4235.1	1.74
1.00	5809.5	1.94

Notes:
1. Ditch capacity calculated using Manning's Equation for open channel flow
2. 2yr Flow = 180.4 L/s
3. 100yr Flow = 479.8 L/s

Ditch to Pond (from Drainage Areas 10-30)

Slope (m/m)	0.003	
Side slope (run for 1m rise)	3	minimum
Bottom width (m)	0	
Manning's n	0.03	based on OSDG App. 6-C.1

Depth of flow (m)	Flow Capacity (L/s)	Velocity (m/s)
0.10	2.6	0.09
0.20	20.8	0.17
0.30	70.1	0.26
0.40	166.3	0.35
0.50	324.8	0.43
0.60	561.2	0.52
0.65	**713.5**	**0.56**
0.70	**891.1**	**0.61**
0.75	**1096.1**	**0.65**
0.80	1330.2	0.69
0.90	1894.0	0.78
1.00	2598.1	0.87

Notes:
1. Ditch capacity calculated using Manning's Equation for open channel flow
2. 2yr Flow = 779.5 L/s
3. 100yr Flow = 937.1 L/s (max. flow from upstream 975mm storm sewer) + 12.5 L/s (100yr flow from Drainage Area 10) = 949.6 L/s

Realigned Leitrim ROW North Ditch (from Drainage Area OFF1)

Slope (m/m)	0.002	
Side slope (run for 1m rise)	5	minimum
Bottom width (m)	0	
Manning's n	0.03	based on OSDG App. 6-C.1

Depth of flow (m)	Flow Capacity (L/s)	Velocity (m/s)
0.10	3.7	0.07
0.20	29.2	0.15
0.30	98.7	0.22
0.40	233.9	0.29
0.45	**333.0**	**0.33**
0.50	**456.8**	**0.37**
0.60	789.4	0.44
0.70	1253.5	0.51
0.80	1871.1	0.58
0.90	2664.1	0.66
1.00	3654.4	0.73

Notes:
1. Ditch capacity calculated using Manning's Equation for open channel flow
2. 100yr Flow = 145.32 L/s

Limebank Rd Ditch at MH201 Outfall

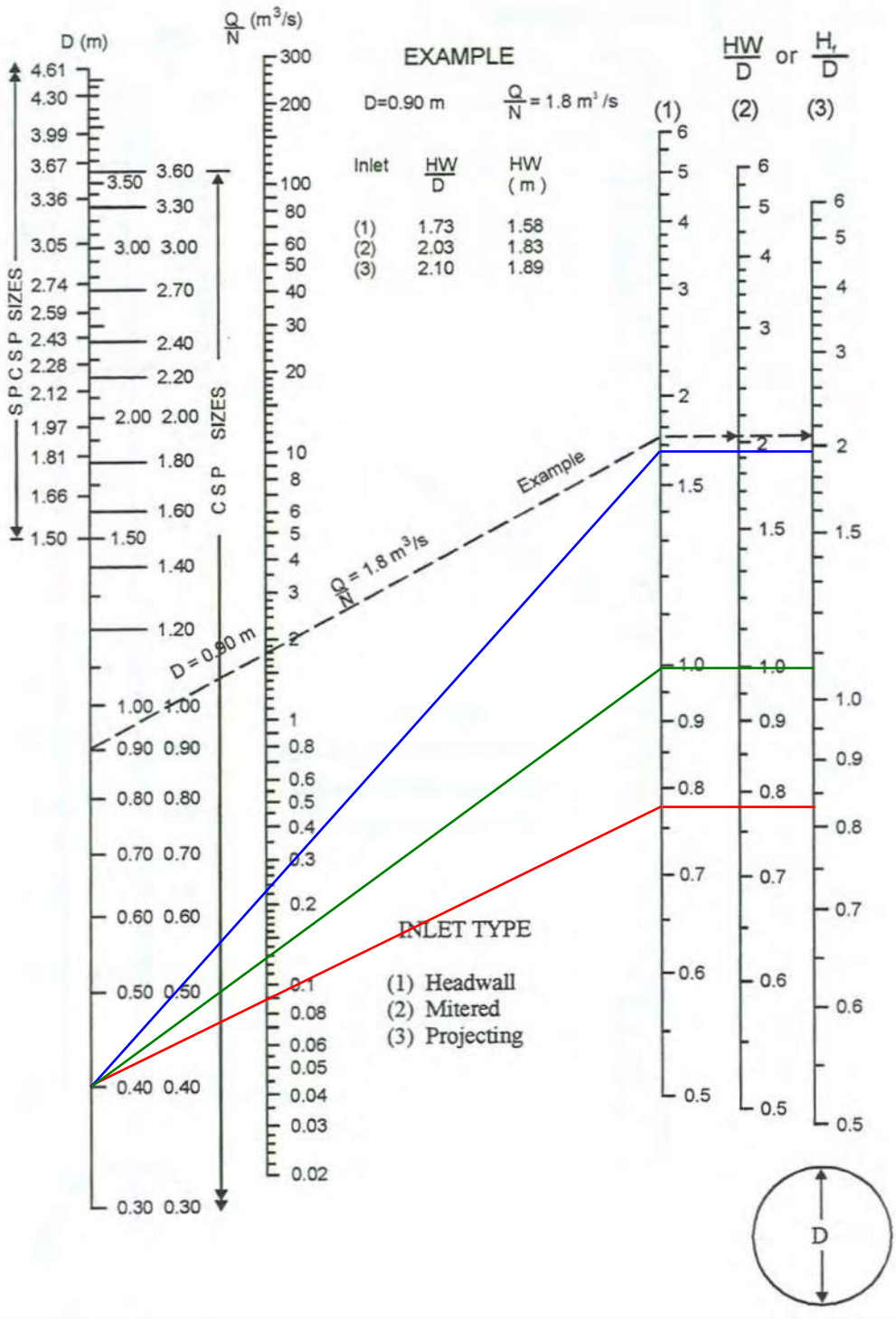
Slope (m/m)	0.06	
Side slope (run for 1m rise)	1	avg
Bottom width (m)	2	avg
Manning's n	0.03	based on OSDG App. 6-C.1

Depth of flow (m)	Flow Capacity (L/s)	Velocity (m/s)
0.10	157.7	3.15
0.15	**350.3**	**3.11**
0.20	**616.1**	**3.08**
0.30	1364.7	3.03
0.35	**1847.4**	**3.02**
0.40	**2403.0**	**3.00**
0.50	3736.7	2.99
0.60	5374.6	2.99
0.70	7328.3	2.99
0.80	9610.8	3.00
0.90	12236.2	3.02
1.00	15219.2	3.04

Notes:
1. Ditch capacity calculated using Manning's Equation for open channel flow
2. 2yr Flow = 535 L/s (per PCSWMM 12hrSCS-II)
3. 100yr Flow = 2138 L/s (per PCSWMM 12hrSCS-II)

Pond North Inlet - 2x400mm Dia.

Design Chart 2.32: Inlet Control: Circular CSP and SPCSP Culverts

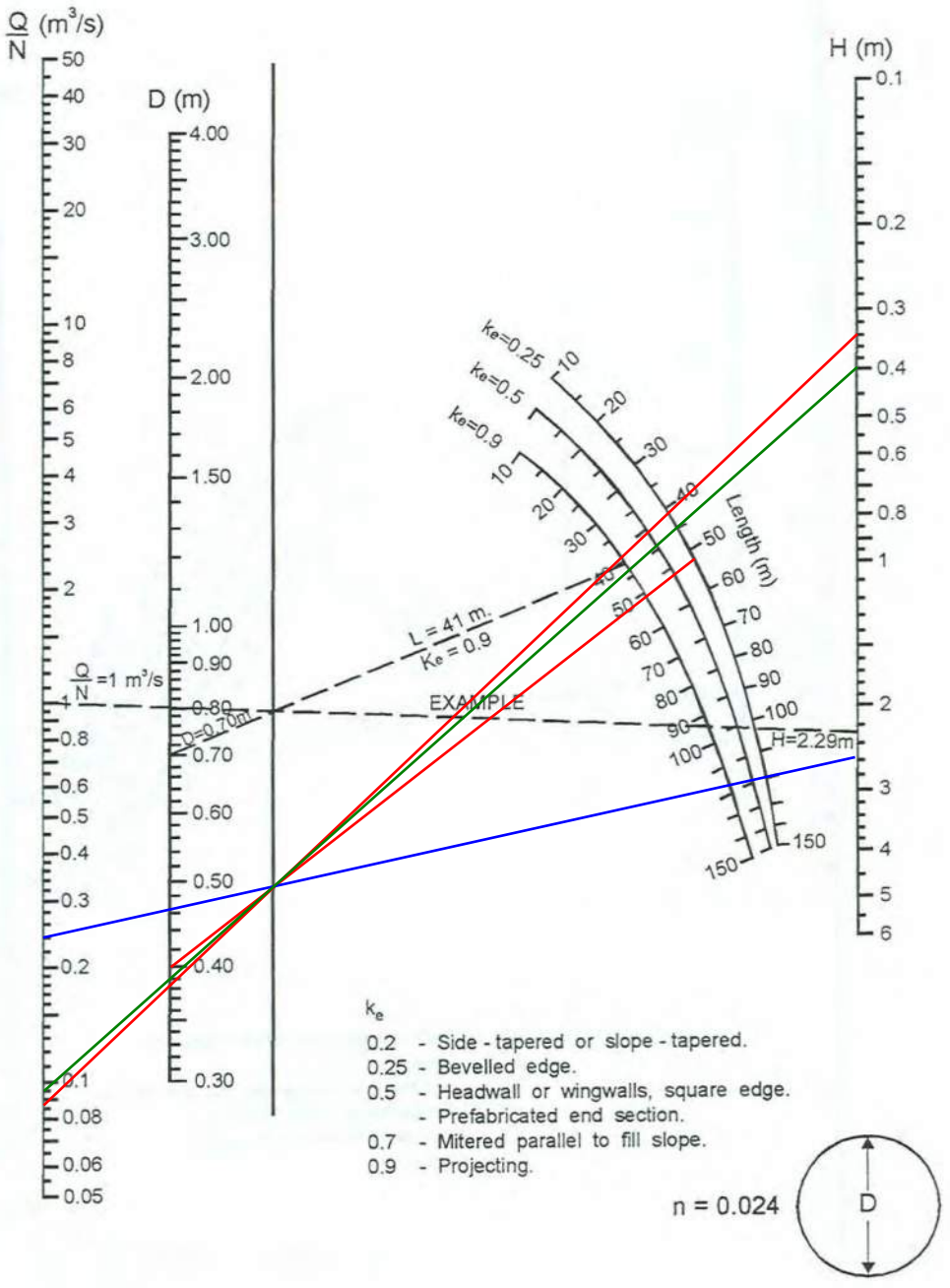


Source: Herr (1977)

Q(2yr) = 180 L/s (Drainage Area 2-9)
Q(100yr) = 480 L/s (Drainage Area 2-9)
Q(full) ≈250 L/s

Pond North Inlet - 2x400mm Dia.

Design Chart 2.35: Outlet Control: CSP Culvert - Flowing Full

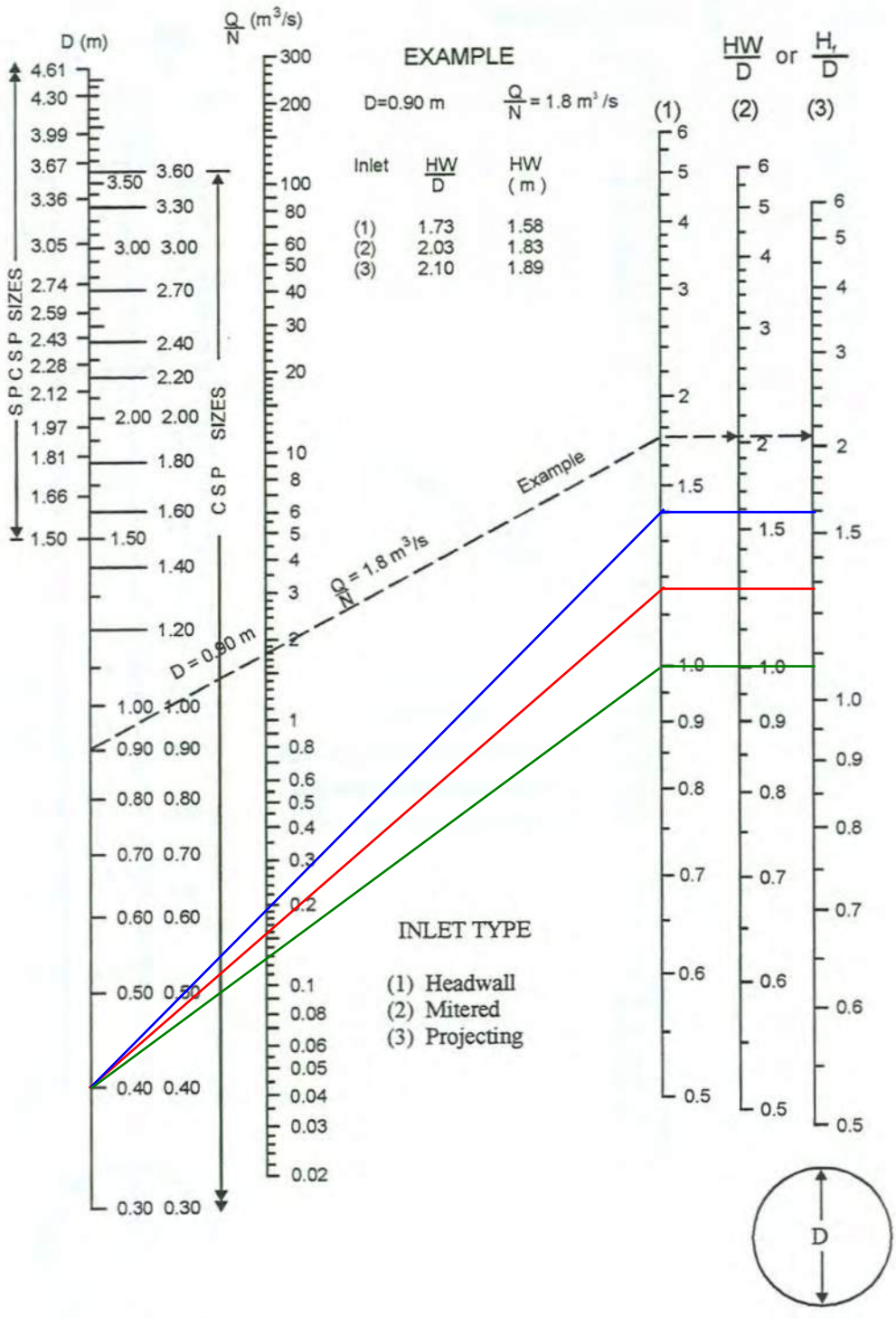


Source: Herr (1977)

Q(2yr) = 180 L/s (Drainage Area 2-9)
Q(100yr) = 480 L/s (Drainage Area 2-9)
Q(full) ≈190 L/s

Pond North Inlet - 5x400mm Dia.

Design Chart 2.32: Inlet Control: Circular CSP and SPCSP Culverts

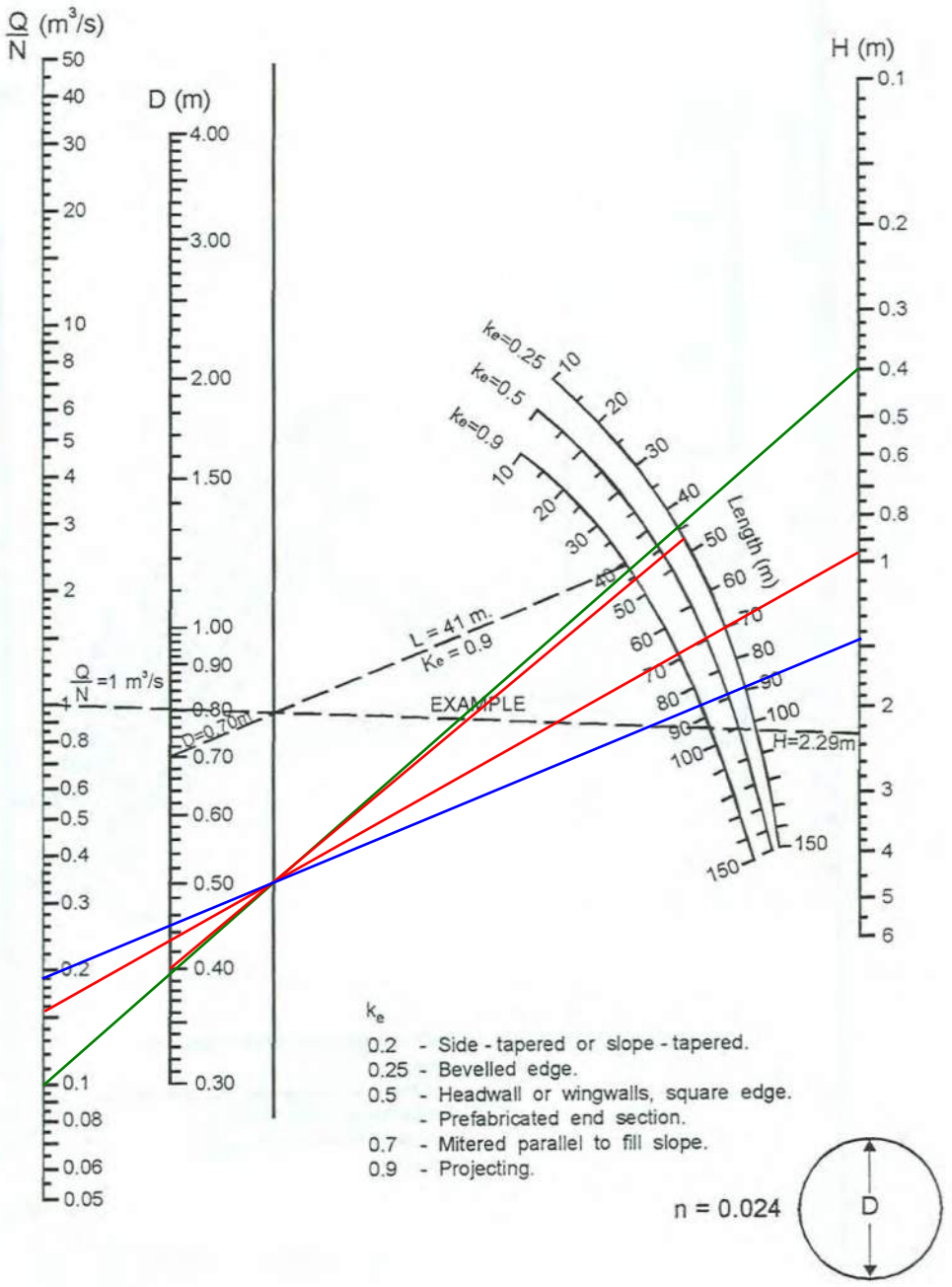


Source: Herr (1977)

Q(2yr) = 780 L/s (Drainage Area 10-30)
Q(100yr) = 950 L/s (Max flow from upstream 975mm sewer + Drainage Area 10)
Q(full) ≈650 L/s

Pond North Inlet - 5x400mm Dia.

Design Chart 2.35: Outlet Control: CSP Culvert - Flowing Full

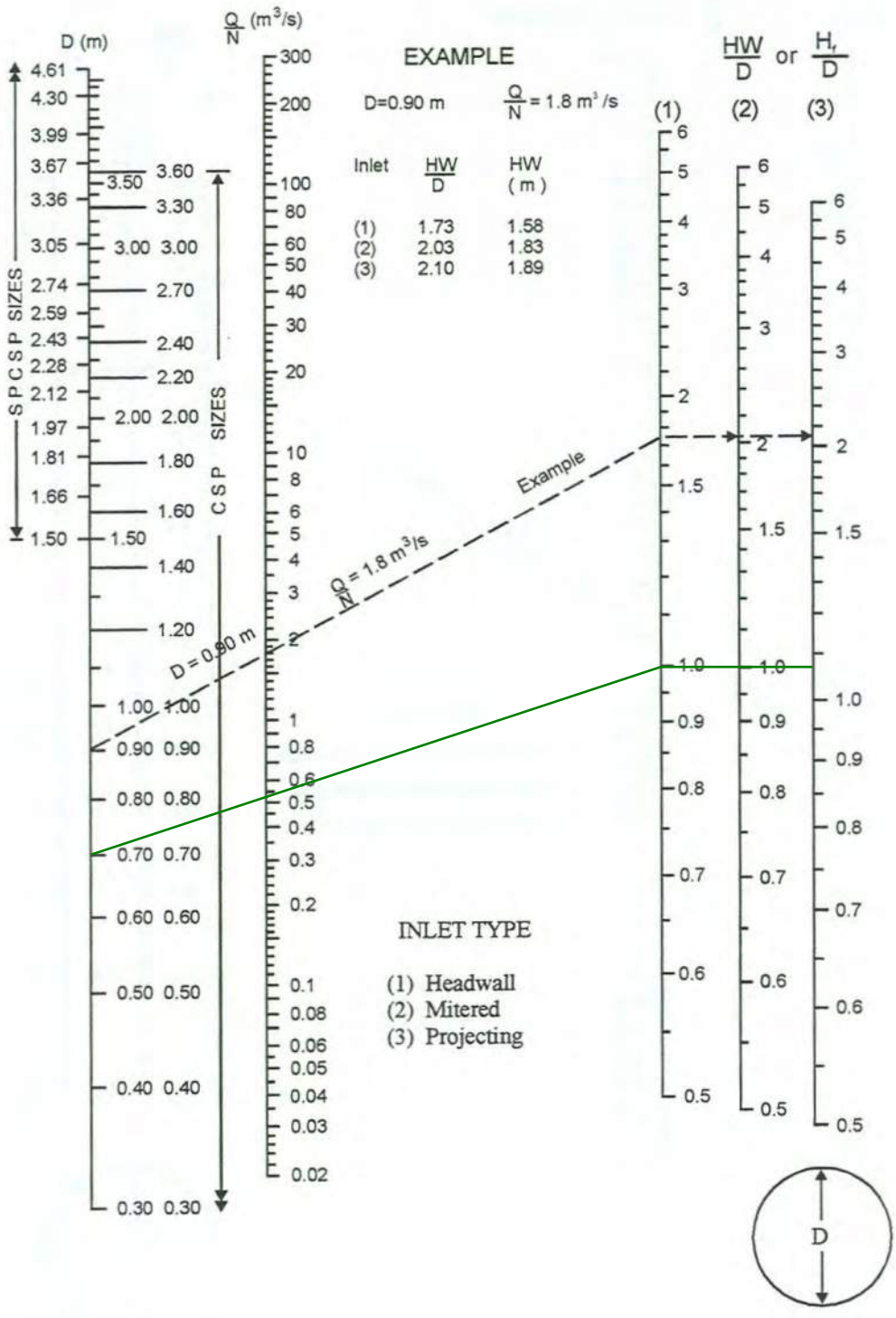


Source: Herr (1977)

Q(2yr) = 780 L/s (Drainage Area 10-30)
Q(100yr) = 950 L/s (Max flow from upstream 975mm sewer + Drainage Area 10)
Q(full) ≈500 L/s

Realigned Leitrim North Ditch - 700mm Dia.

Design Chart 2.32: Inlet Control: Circular CSP and SPCSP Culverts

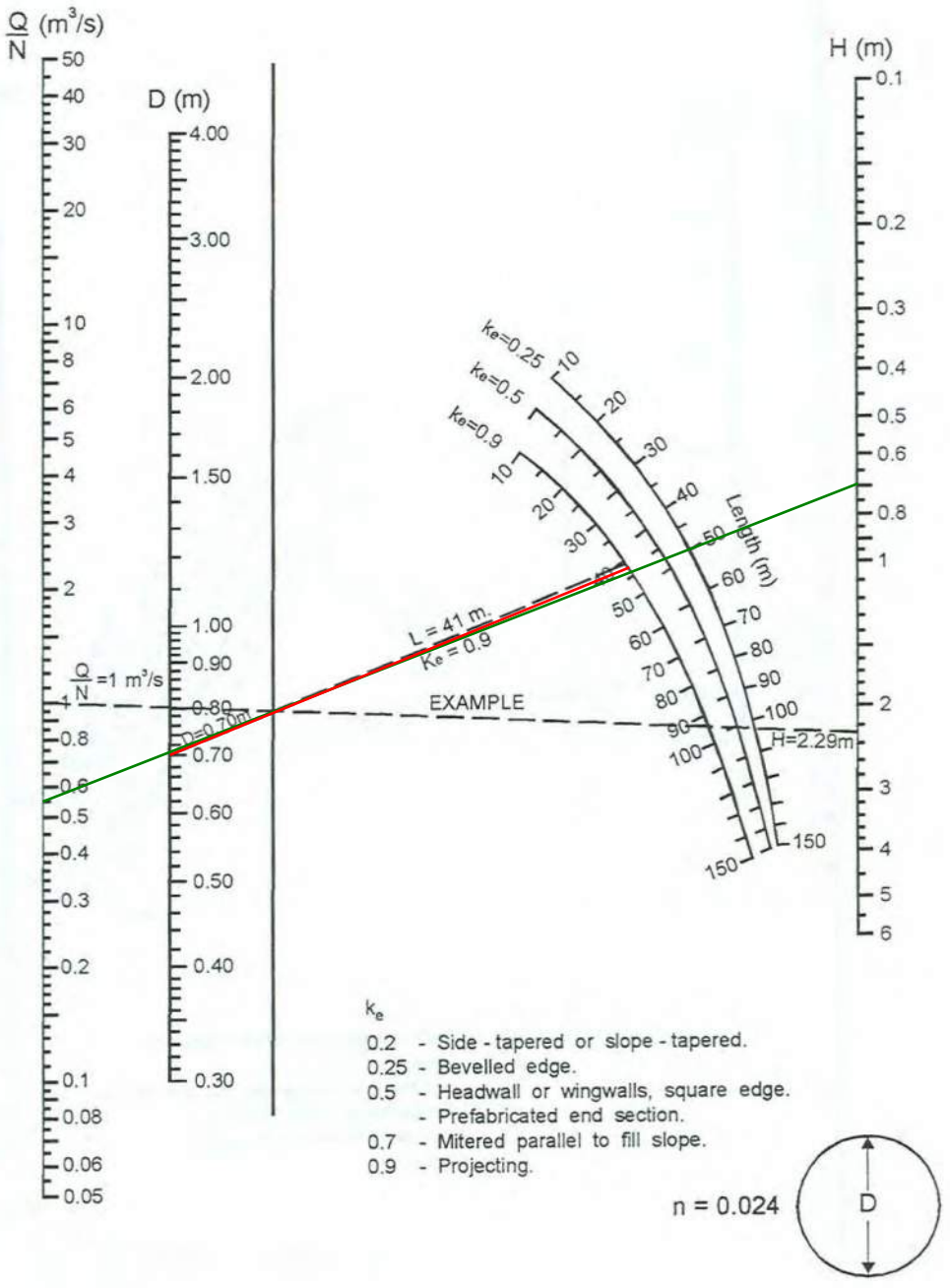


Source: Herr (1977)

Q(full) ≈525 L/s

Realigned Leitrim North Ditch - 700mm Dia.

Design Chart 2.35: Outlet Control: CSP Culvert - Flowing Full

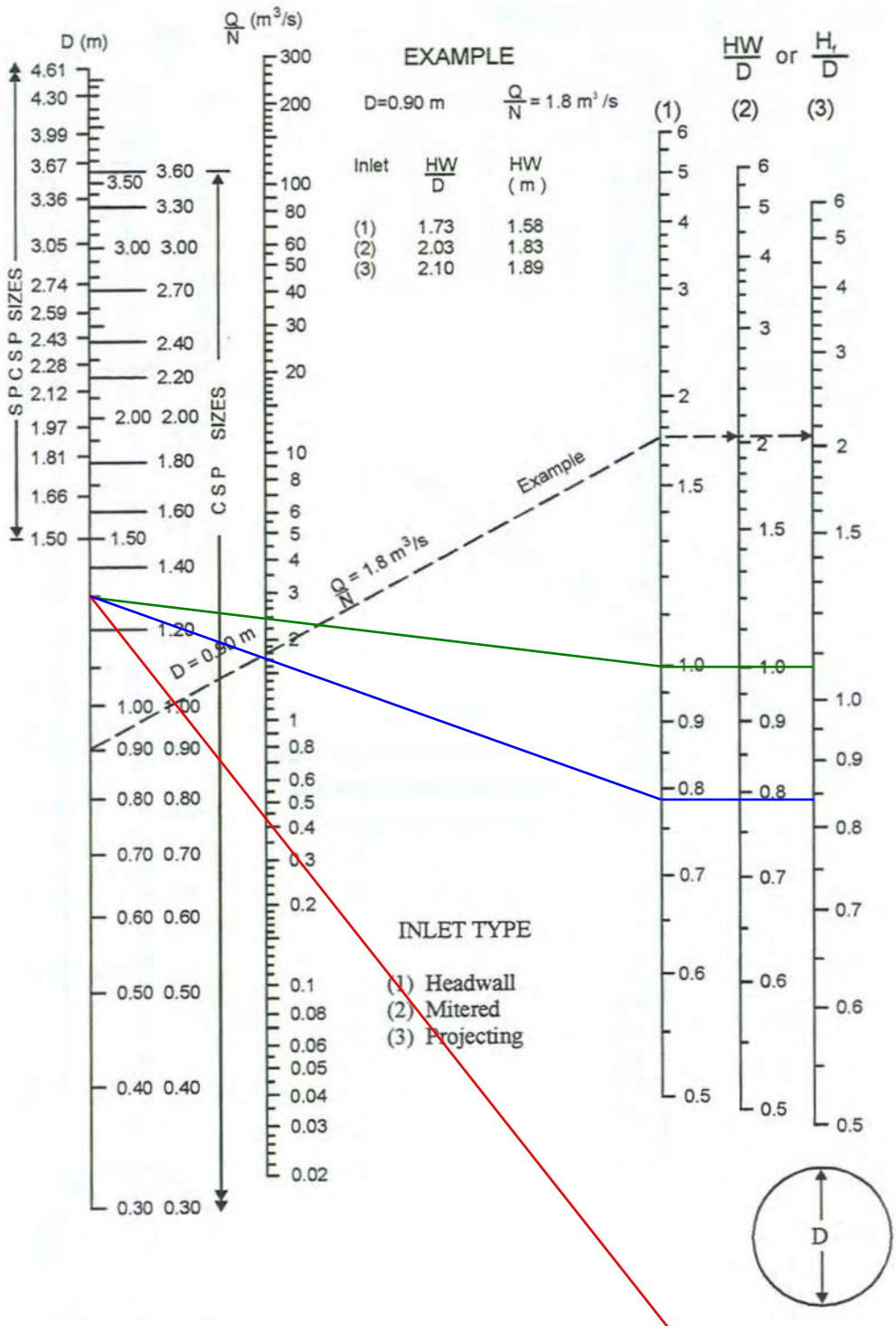


Source: Herr (1977)

Q(full) ≈550 L/s

Limebank Crossing Realigned Leitrim - 1300mm Dia.

Design Chart 2.32: Inlet Control: Circular CSP and SPCSP Culverts

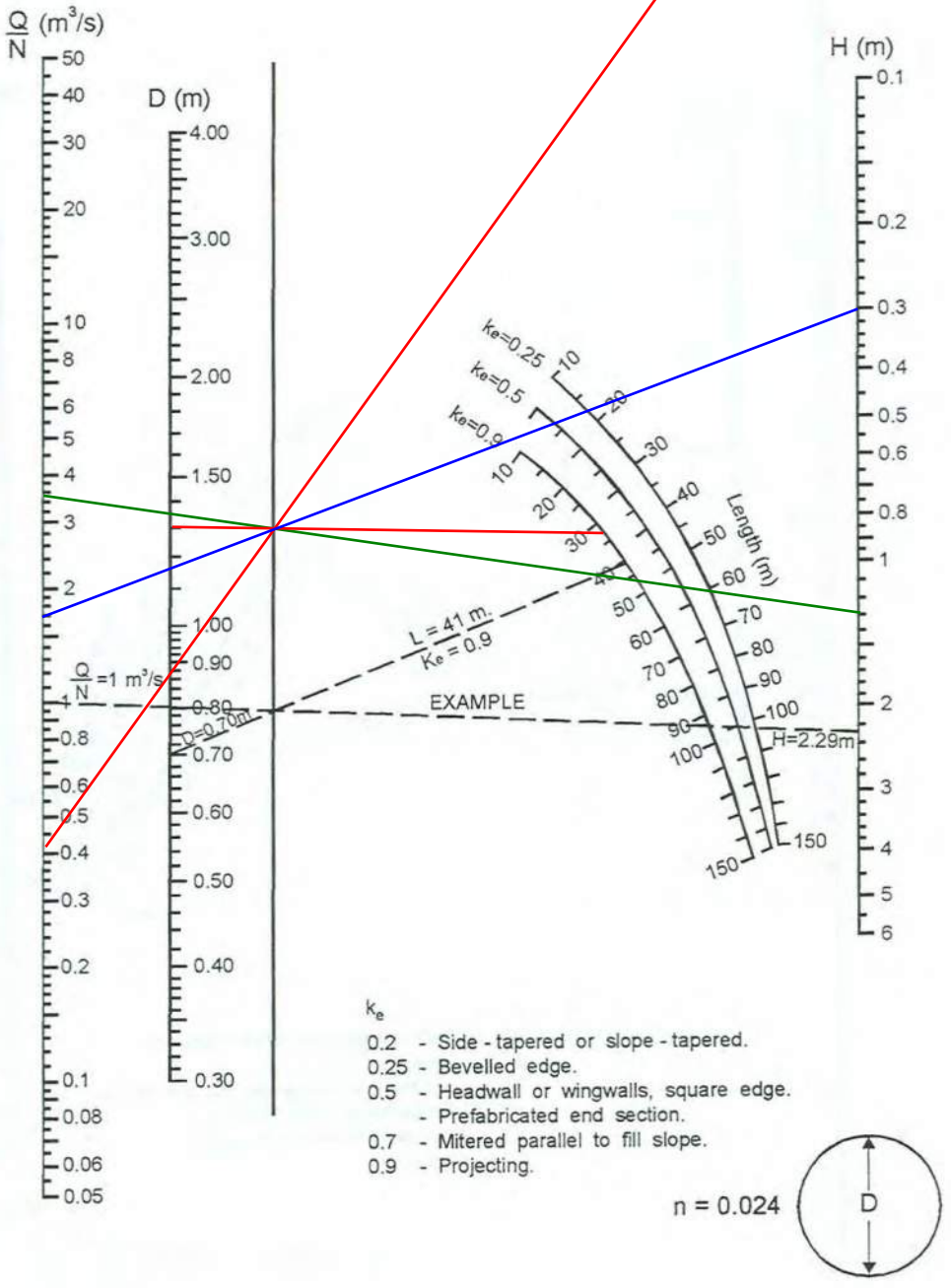


Source: Herr (1977)

Q(2yr) = 425 L/s (per PCSWMM 12hrSCS-II)
Q(100yr) = 1680 L/s (per PCSWMM 12hrSCS-II)
Q(full) ≈2400 L/s

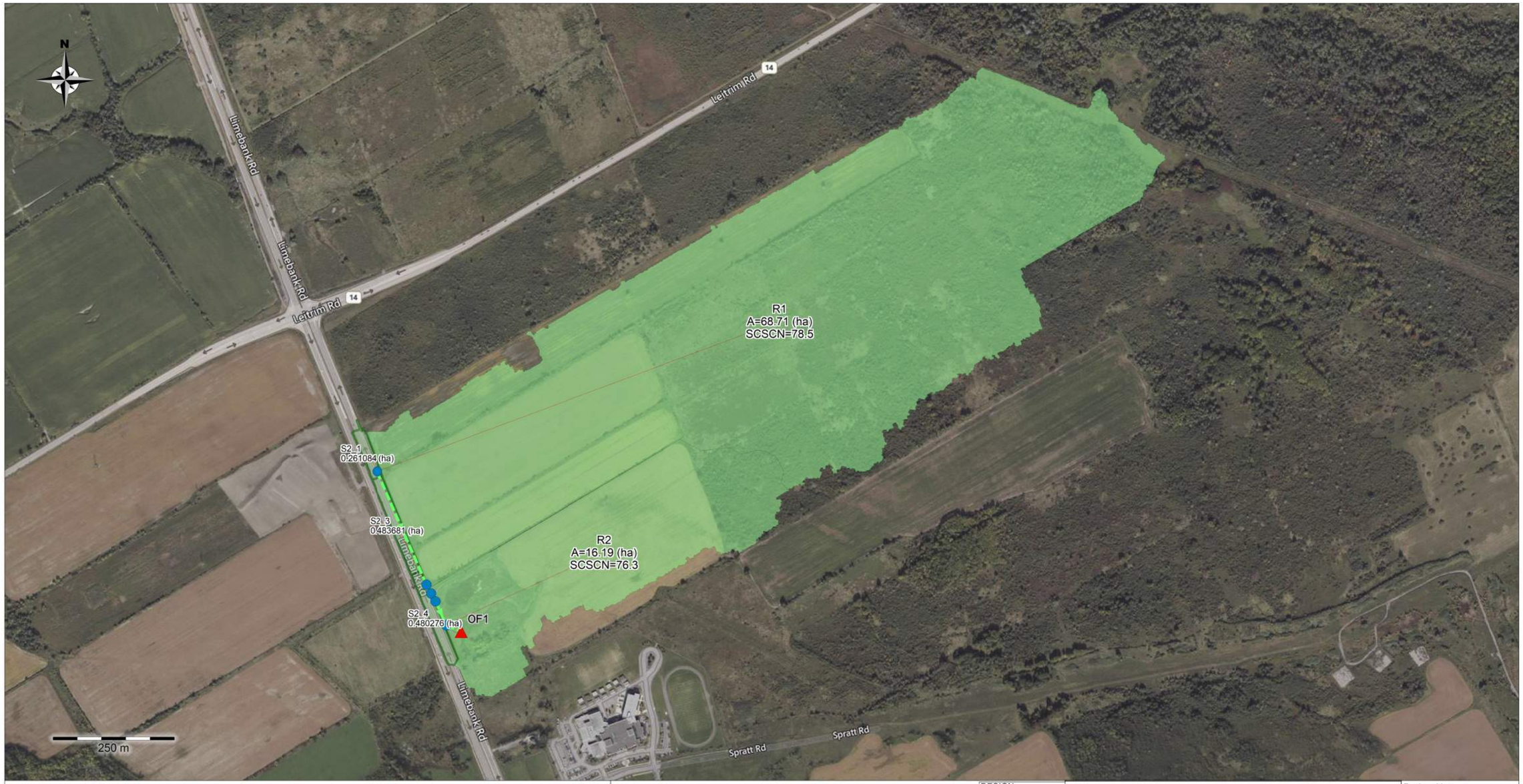
Limebank Crossing Realigned Leitrim - 1300mm Dia.

Design Chart 2.35: Outlet Control: CSP Culvert - Flowing Full



Source: Herr (1977)

Q(2yr) = 425 L/s (per PCSWMM 12hrSCS-II)
Q(100yr) = 1680 L/s (per PCSWMM 12hrSCS-II)
Q(full) ≈3500 L/s



Legend

- Junctions
- Outfalls
- Conduits
  - Coneyance ditch
  - Storm Sewer
  - Culvert
- ARM Subcatchments
- Subcatchments

Robinson Land Development
2936 Baseline Road,
Suite 200,
Ottawa, ON K2H 1B3
rcii.com

DESIGN:	JB
DRAWN:	JB
CHECKED:	ID
APPROVED	SM

GROUPE MONTONI

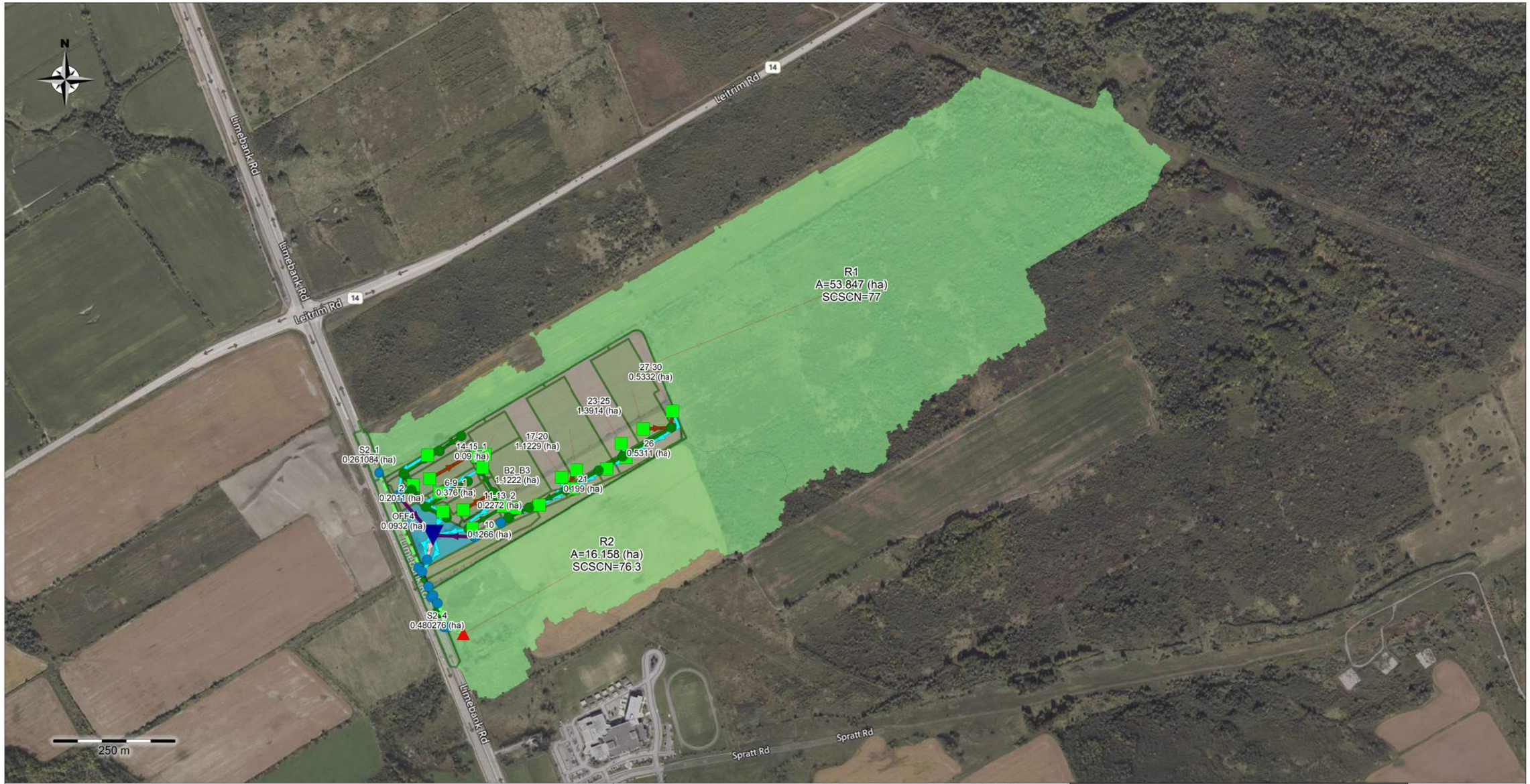
4101 LIMEBANK ROAD, OTTAWA, ON
LIGHT INDUSTRIAL DEVELOPMENT
SCOPE MASTER SERVICING STUDY

MODEL SCHEMATIC
PRE-DEVELOPMENT DRAINAGE CONDITIONS

Project No.: 23074

Date: AUGUST 2026

Drawing No.: FIGURE D1



Legend

- Outfalls
- Storages
  - CB Area
  - Storm Sewer Manhole
  - SWM Dry Pond
- Conduits
  - Coneyance ditch
  - Storm Sewer
  - Culvert
  - Orifices
- Weirs
- Subcatchments
  - Subcatchments
  - SWM Block
  - Impervious

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DESIGN:	JB
DRAWN:	JB
CHECKED:	ID
APPROVED	SM

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MODEL SCHEMATIC
POST-DEVELOPMENT DRAINAGE CONDITIONS

Project No.: 23074

Date: AUGUST 2026

Drawing No.: FIGURE D2

PCSWMM Input and Output Files
Pre- and Post-Development Conditions

1:100-year 12-hour SCS PCSWMM Input File Pre-Development Conditions

```
[TITLE]
;;Project Title/Notes

[OPTIONS]
;;Option             Value
FLOW_UNITS           CMS
INFILTRATION         HORTON
FLOW_ROUTING         DYNWAVE
LINK_OFFSETS         ELEVATION
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           01/01/2000
START_TIME           00:00:00
REPORT_START_DATE    01/01/2000
REPORT_START_TIME    00:00:00
END_DATE             01/04/2000
END_TIME             00:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:01:00
WET_STEP             00:05:00
DRY_STEP             00:05:00
ROUTING_STEP         1
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
MAX_TRIALS           8
HEAD_TOLERANCE       0.0015
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              16

[FILES]
;;Interfacing Files
USE INFLOWS "C:\Users\jboyes\OneDrive - Robinson
Consultants\Documents\PCSWMM Projects\23074 -
Limebank\Modelling\PRE 12SCS100.arm.txt"

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
CONSTANT         0.0
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- -------- -------- ----------
Rainfall         INTENSITY 0:15     1.0      TIMESERIES
12SCS100

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area
%Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- --------
-------- -------- -------- -------- ----------------
S2_1             Rainfall         J1               0.261084
60       130.542  3        0
S2_3             Rainfall         STMMH_467_(STM)  0.483681
60       241.841  3        0
S2_4             Rainfall         STMMH_468_(STM)  0.480276
60       240.138  3        0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv
PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ----------
---------- ---------- ----------
S2_1             0.013      0.25       1.57       4.67
0          OUTLET
S2_3             0.013      0.25       1.57       4.67
0          OUTLET
S2_4             0.013      0.25       1.57       4.67
0          OUTLET

[INFILTRATION]
;;Subcatchment   Param1     Param2     Param3     Param4
Param5
;;-------------- ---------- ---------- ---------- ----------
----------
S2_1             82.75      0          7          0
0          CURVE_NUMBER
S2_3             82.75      0          7          0
0          CURVE_NUMBER
S2_4             82.75      0          7          0
0          CURVE_NUMBER

[JUNCTIONS]
;;Name           Elevation  MaxDepth   InitDepth  SurDepth
Aponded
;;-------------- ---------- ---------- ---------- ----------
----------
J1               91.35      1.75       0          0
0
;Concentric Cylindrical Structure SI
STMMH_467_(STM)  90.4       1.65       0          0
0
;Concentric Cylindrical Structure SI
STMMH_468_(STM)  88.37      1.525      0          0
0
;Concentric Cylindrical Structure SI
STMMH_474_(STM)  89.84      3          0          0
0
;Concentric Cylindrical Structure SI
STMMH_475_(STM)  89.33      3          0          0
0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data
Gated    Route To
;;-------------- ---------- ---------- ---------------- ----
---- ----------------
OF1              87.12      FREE                        NO

[CONDUITS]
;;Name           From Node        To Node          Length
Roughness  InOffset   OutOffset  InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------
- ---------- ---------- ---------- ---------- ----------
;Concrete Pipe SI
244_(STM)        STMMH_474_(STM)  STMMH_475_(STM)  17.841
0.024      89.84      89.63      0          0
C1               STMMH_475_(STM)  STMMH_468_(STM)  53.881
0.04       89.33      88.37      0          0
C2               STMMH_467_(STM)  STMMH_474_(STM)  20.914
0.04       90.4       89.84      0          0
C3               STMMH_468_(STM)  OF1              30.258
0.01       88.37      87.12      0          0
C6               J1               STMMH_467_(STM)  258
0.01       91.35      90.4       0          0

[XSECTIONS]
;;Link           Shape        Geom1            Geom2
Geom3      Geom4      Barrels    Culvert
;;-------------- ------------ ---------------- ---------- --
-------- ---------- ---------- ----------
244_(STM)        CIRCULAR     1.3              0          0
0          1          6
C1               IRREGULAR    Channe_475-468
C2               IRREGULAR    Chann1_467-474
C3               IRREGULAR    Outfall_Ditch
C6               IRREGULAR    LimebankDitch

[TRANSECTS]
;;Transect Data in HEC-2 format
;
;Averaged transect, created from transects:
;4, 5
NC 0.045    0.045    0.035
```

```
X1 Channe_475-468    17       6.5      10.5     0.0      0.0
0.0      0.0      0.0
GR 90.216   1.5      90.094   2.5      90.016   3.5
89.953   4.5      89.925   5.5
GR 89.836   6.5      89.534   7.5      89.579   9.5
89.888   10.5     90.158   11.5
GR 90.326   12.5     90.496   13.5     90.682   14.5
90.917   15.5     91.125   16.5
GR 91.276   17.5     91.489   18.5
;
;Ditch created from measure tool across ditch
NC 0.045    0.045    0.035
X1 Channl_467-474    21       9        18       0.0      0.0
0.0      0.0      0.0
GR 92.045   0        92.053   1        92       2
91.883   3        91.753   4
GR 91.617   5        91.485   6        91.253   7
91.043   8        90.789   9
GR 90.494   10       90.304   11       90.256   12
90.242   13       90.249   14
GR 90.276   15       90.411   16       90.568   17
90.691   18       90.767   19
GR 90.8     19.497
;
;Ditch created from measure tool, conveying flows from
expanded DA down Limebank
NC 0.045    0.045    0.035
X1 LimebankDitch     15       4        11       0.0      0.0
0.0      0.0      0.0
GR 92.635   0        92.669   1        92.668   2
92.553   3        92.302   4
GR 91.813   5        91.5     6        91.158   7
91.19    8        91.362   9
GR 91.464   10       92.3     11       92.3     12
92.3     13       92.3     14
;
NC 0.045    0.045    0.045
X1 NW_Storage_Ditch  21       7        17       0.0      0.0
0.0      0.0      0.0
GR 92.56    0        92.454   1        92.346   2
92.13    3        91.831   4
GR 91.626   5        91.313   6        91.004   7
90.688   8        90.402   9
GR 90.243   10       90.401   11       90.509   12
90.6     13       90.694   14
GR 90.816   15       90.873   16       90.964   17
91.054   18       91.154   19
GR 91.265   20
;
;Ditch created from measure tool across ditch
NC 0.045    0.045    0.035
X1 Outfall_Ditch     16       5        10       0.0      0.0
0.0      0.0      0.0
GR 89.433   0        89.423   1        89.42    2
89.395   3        89.362   4
GR 89.251   5        88.665   6        88.05    7
88.136   8        89.023   9
GR 89.681   10       89.874   11       90.118   12
90.276   13       90.352   14
GR 90.378   14.848

[LOSSES]
;;Link           Kentry     Kexit      Kavg       Flap Gate
Seepage
;;-------------- ---------- ---------- ---------- ----------
----------
244_(STM)        0.9        0.5        0          NO
0

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
;Rainfall (mm/hr)
12SCS10          01/01/2000 00:00:00   1.344
12SCS10          01/01/2000 00:15:00   1.613
12SCS10          01/01/2000 00:30:00   1.613
12SCS10          01/01/2000 00:45:00   1.613
12SCS10          01/01/2000 01:00:00   1.613
12SCS10          01/01/2000 01:15:00   1.613
12SCS10          01/01/2000 01:30:00   1.613
12SCS10          01/01/2000 01:45:00   1.882
12SCS10          01/01/2000 02:00:00   2.15
12SCS10          01/01/2000 02:15:00   2.15
12SCS10          01/01/2000 02:30:00   2.15
12SCS10          01/01/2000 02:45:00   2.15
12SCS10          01/01/2000 03:00:00   2.688
12SCS10          01/01/2000 03:15:00   2.688
12SCS10          01/01/2000 03:30:00   2.688
12SCS10          01/01/2000 03:45:00   2.688
12SCS10          01/01/2000 04:00:00   3.494
12SCS10          01/01/2000 04:15:00   3.763
12SCS10          01/01/2000 04:30:00   4.301
12SCS10          01/01/2000 04:45:00   4.838
12SCS10          01/01/2000 05:00:00   5.914
12SCS10          01/01/2000 05:15:00   8.87
12SCS10          01/01/2000 05:30:00   12.634
12SCS10          01/01/2000 05:45:00   102.144
12SCS10          01/01/2000 06:00:00   19.354
12SCS10          01/01/2000 06:15:00   11.021
12SCS10          01/01/2000 06:30:00   7.526
12SCS10          01/01/2000 06:45:00   5.645
12SCS10          01/01/2000 07:00:00   4.57
12SCS10          01/01/2000 07:15:00   3.763
12SCS10          01/01/2000 07:30:00   3.494
12SCS10          01/01/2000 07:45:00   3.226
12SCS10          01/01/2000 08:00:00   3.226
12SCS10          01/01/2000 08:15:00   2.688
12SCS10          01/01/2000 08:30:00   2.688
12SCS10          01/01/2000 08:45:00   2.419
12SCS10          01/01/2000 09:00:00   2.15
12SCS10          01/01/2000 09:15:00   2.15
12SCS10          01/01/2000 09:30:00   2.15
12SCS10          01/01/2000 09:45:00   1.882
12SCS10          01/01/2000 10:00:00   1.613
12SCS10          01/01/2000 10:15:00   1.613
12SCS10          01/01/2000 10:30:00   1.613
12SCS10          01/01/2000 10:45:00   1.613
12SCS10          01/01/2000 11:00:00   1.613
12SCS10          01/01/2000 11:15:00   1.613
12SCS10          01/01/2000 11:30:00   1.613
12SCS10          01/01/2000 11:45:00   1.344

;Rainfall (mm/hr)
12SCS100         01/01/2000 00:00:00   1.92
12SCS100         01/01/2000 00:15:00   2.304
12SCS100         01/01/2000 00:30:00   2.304
12SCS100         01/01/2000 00:45:00   2.304
12SCS100         01/01/2000 01:00:00   2.304
12SCS100         01/01/2000 01:15:00   2.304
12SCS100         01/01/2000 01:30:00   2.304
12SCS100         01/01/2000 01:45:00   2.688
12SCS100         01/01/2000 02:00:00   3.072
12SCS100         01/01/2000 02:15:00   3.072
12SCS100         01/01/2000 02:30:00   3.072
12SCS100         01/01/2000 02:45:00   3.072
12SCS100         01/01/2000 03:00:00   3.84
12SCS100         01/01/2000 03:15:00   3.84
12SCS100         01/01/2000 03:30:00   3.84
12SCS100         01/01/2000 03:45:00   3.84
12SCS100         01/01/2000 04:00:00   4.992
12SCS100         01/01/2000 04:15:00   5.376
12SCS100         01/01/2000 04:30:00   6.144
12SCS100         01/01/2000 04:45:00   6.912
12SCS100         01/01/2000 05:00:00   8.448
12SCS100         01/01/2000 05:15:00   12.672
12SCS100         01/01/2000 05:30:00   18.048
12SCS100         01/01/2000 05:45:00   145.92
12SCS100         01/01/2000 06:00:00   27.648
12SCS100         01/01/2000 06:15:00   15.744
12SCS100         01/01/2000 06:30:00   10.752
12SCS100         01/01/2000 06:45:00   8.064
12SCS100         01/01/2000 07:00:00   6.528
12SCS100         01/01/2000 07:15:00   5.376
12SCS100         01/01/2000 07:30:00   4.992
12SCS100         01/01/2000 07:45:00   4.608
12SCS100         01/01/2000 08:00:00   4.608
12SCS100         01/01/2000 08:15:00   3.84
12SCS100         01/01/2000 08:30:00   3.84
12SCS100         01/01/2000 08:45:00   3.456
12SCS100         01/01/2000 09:00:00   3.072
12SCS100         01/01/2000 09:15:00   3.072
12SCS100         01/01/2000 09:30:00   3.072
```

```
12SCS100          01/01/2000 09:45:00   2.688
12SCS100          01/01/2000 10:00:00   2.304
12SCS100          01/01/2000 10:15:00   2.304
12SCS100          01/01/2000 10:30:00   2.304
12SCS100          01/01/2000 10:45:00   2.304
12SCS100          01/01/2000 11:00:00   2.304
12SCS100          01/01/2000 11:15:00   2.304
12SCS100          01/01/2000 11:30:00   2.304
12SCS100          01/01/2000 11:45:00   1.92

;Rainfall (mm/hr)
12SCS2            01/01/2000 00:00:00   0.864
12SCS2            01/01/2000 00:15:00   1.037
12SCS2            01/01/2000 00:30:00   1.037
12SCS2            01/01/2000 00:45:00   1.037
12SCS2            01/01/2000 01:00:00   1.037
12SCS2            01/01/2000 01:15:00   1.037
12SCS2            01/01/2000 01:30:00   1.037
12SCS2            01/01/2000 01:45:00   1.21
12SCS2            01/01/2000 02:00:00   1.382
12SCS2            01/01/2000 02:15:00   1.382
12SCS2            01/01/2000 02:30:00   1.382
12SCS2            01/01/2000 02:45:00   1.382
12SCS2            01/01/2000 03:00:00   1.728
12SCS2            01/01/2000 03:15:00   1.728
12SCS2            01/01/2000 03:30:00   1.728
12SCS2            01/01/2000 03:45:00   1.728
12SCS2            01/01/2000 04:00:00   2.246
12SCS2            01/01/2000 04:15:00   2.419
12SCS2            01/01/2000 04:30:00   2.765
12SCS2            01/01/2000 04:45:00   3.11
12SCS2            01/01/2000 05:00:00   3.802
12SCS2            01/01/2000 05:15:00   5.702
12SCS2            01/01/2000 05:30:00   8.122
12SCS2            01/01/2000 05:45:00   65.664
12SCS2            01/01/2000 06:00:00   12.442
12SCS2            01/01/2000 06:15:00   7.085
12SCS2            01/01/2000 06:30:00   4.838
12SCS2            01/01/2000 06:45:00   3.629
12SCS2            01/01/2000 07:00:00   2.938
12SCS2            01/01/2000 07:15:00   2.419
12SCS2            01/01/2000 07:30:00   2.246
12SCS2            01/01/2000 07:45:00   2.074
12SCS2            01/01/2000 08:00:00   2.074
12SCS2            01/01/2000 08:15:00   1.728
12SCS2            01/01/2000 08:30:00   1.728
12SCS2            01/01/2000 08:45:00   1.555
12SCS2            01/01/2000 09:00:00   1.382
12SCS2            01/01/2000 09:15:00   1.382
12SCS2            01/01/2000 09:30:00   1.382
12SCS2            01/01/2000 09:45:00   1.21
12SCS2            01/01/2000 10:00:00   1.037
12SCS2            01/01/2000 10:15:00   1.037
12SCS2            01/01/2000 10:30:00   1.037
12SCS2            01/01/2000 10:45:00   1.037
12SCS2            01/01/2000 11:00:00   1.037
12SCS2            01/01/2000 11:15:00   1.037
12SCS2            01/01/2000 11:30:00   1.037
12SCS2            01/01/2000 11:45:00   0.864

;Rainfall (mm/hr)
12SCS25           01/01/2000 00:00:00   1.584
12SCS25           01/01/2000 00:15:00   1.901
12SCS25           01/01/2000 00:30:00   1.901
12SCS25           01/01/2000 00:45:00   1.901
12SCS25           01/01/2000 01:00:00   1.901
12SCS25           01/01/2000 01:15:00   1.901
12SCS25           01/01/2000 01:30:00   1.901
12SCS25           01/01/2000 01:45:00   2.218
12SCS25           01/01/2000 02:00:00   2.534
12SCS25           01/01/2000 02:15:00   2.534
12SCS25           01/01/2000 02:30:00   2.534
12SCS25           01/01/2000 02:45:00   2.534
12SCS25           01/01/2000 03:00:00   3.168
12SCS25           01/01/2000 03:15:00   3.168
12SCS25           01/01/2000 03:30:00   3.168
12SCS25           01/01/2000 03:45:00   3.168
12SCS25           01/01/2000 04:00:00   4.118
12SCS25           01/01/2000 04:15:00   4.435
12SCS25           01/01/2000 04:30:00   5.069
12SCS25           01/01/2000 04:45:00   5.702
12SCS25           01/01/2000 05:00:00   6.97
12SCS25           01/01/2000 05:15:00   10.454
12SCS25           01/01/2000 05:30:00   14.89
12SCS25           01/01/2000 05:45:00   120.384
12SCS25           01/01/2000 06:00:00   22.81
12SCS25           01/01/2000 06:15:00   12.989
12SCS25           01/01/2000 06:30:00   8.87
12SCS25           01/01/2000 06:45:00   6.653
12SCS25           01/01/2000 07:00:00   5.386
12SCS25           01/01/2000 07:15:00   4.435
12SCS25           01/01/2000 07:30:00   4.118
12SCS25           01/01/2000 07:45:00   3.802
12SCS25           01/01/2000 08:00:00   3.802
12SCS25           01/01/2000 08:15:00   3.168
12SCS25           01/01/2000 08:30:00   3.168
12SCS25           01/01/2000 08:45:00   2.851
12SCS25           01/01/2000 09:00:00   2.534
12SCS25           01/01/2000 09:15:00   2.534
12SCS25           01/01/2000 09:30:00   2.534
12SCS25           01/01/2000 09:45:00   2.218
12SCS25           01/01/2000 10:00:00   1.901
12SCS25           01/01/2000 10:15:00   1.901
12SCS25           01/01/2000 10:30:00   1.901
12SCS25           01/01/2000 10:45:00   1.901
12SCS25           01/01/2000 11:00:00   1.901
12SCS25           01/01/2000 11:15:00   1.901
12SCS25           01/01/2000 11:30:00   1.901
12SCS25           01/01/2000 11:45:00   1.584

;Rainfall (mm/hr)
12SCS5            01/01/2000 00:00:00   1.152
12SCS5            01/01/2000 00:15:00   1.382
12SCS5            01/01/2000 00:30:00   1.382
12SCS5            01/01/2000 00:45:00   1.382
12SCS5            01/01/2000 01:00:00   1.382
12SCS5            01/01/2000 01:15:00   1.382
12SCS5            01/01/2000 01:30:00   1.382
12SCS5            01/01/2000 01:45:00   1.613
12SCS5            01/01/2000 02:00:00   1.843
12SCS5            01/01/2000 02:15:00   1.843
12SCS5            01/01/2000 02:30:00   1.843
12SCS5            01/01/2000 02:45:00   1.843
12SCS5            01/01/2000 03:00:00   2.304
12SCS5            01/01/2000 03:15:00   2.304
12SCS5            01/01/2000 03:30:00   2.304
12SCS5            01/01/2000 03:45:00   2.304
12SCS5            01/01/2000 04:00:00   2.995
12SCS5            01/01/2000 04:15:00   3.226
12SCS5            01/01/2000 04:30:00   3.686
12SCS5            01/01/2000 04:45:00   4.147
12SCS5            01/01/2000 05:00:00   5.069
12SCS5            01/01/2000 05:15:00   7.603
12SCS5            01/01/2000 05:30:00   10.829
12SCS5            01/01/2000 05:45:00   87.552
12SCS5            01/01/2000 06:00:00   16.589
12SCS5            01/01/2000 06:15:00   9.446
12SCS5            01/01/2000 06:30:00   6.451
12SCS5            01/01/2000 06:45:00   4.838
12SCS5            01/01/2000 07:00:00   3.917
12SCS5            01/01/2000 07:15:00   3.226
12SCS5            01/01/2000 07:30:00   2.995
12SCS5            01/01/2000 07:45:00   2.765
12SCS5            01/01/2000 08:00:00   2.765
12SCS5            01/01/2000 08:15:00   2.304
12SCS5            01/01/2000 08:30:00   2.304
12SCS5            01/01/2000 08:45:00   2.074
12SCS5            01/01/2000 09:00:00   1.843
12SCS5            01/01/2000 09:15:00   1.843
12SCS5            01/01/2000 09:30:00   1.843
12SCS5            01/01/2000 09:45:00   1.613
12SCS5            01/01/2000 10:00:00   1.382
12SCS5            01/01/2000 10:15:00   1.382
12SCS5            01/01/2000 10:30:00   1.382
12SCS5            01/01/2000 10:45:00   1.382
12SCS5            01/01/2000 11:00:00   1.382
12SCS5            01/01/2000 11:15:00   1.382
12SCS5            01/01/2000 11:30:00   1.382
12SCS5            01/01/2000 11:45:00   1.152

;Rainfall (mm/hr)
12SCS50           01/01/2000 00:00:00   1.752
```

```
12SCS50          01/01/2000 00:15:00   2.102
12SCS50          01/01/2000 00:30:00   2.102
12SCS50          01/01/2000 00:45:00   2.102
12SCS50          01/01/2000 01:00:00   2.102
12SCS50          01/01/2000 01:15:00   2.102
12SCS50          01/01/2000 01:30:00   2.102
12SCS50          01/01/2000 01:45:00   2.453
12SCS50          01/01/2000 02:00:00   2.803
12SCS50          01/01/2000 02:15:00   2.803
12SCS50          01/01/2000 02:30:00   2.803
12SCS50          01/01/2000 02:45:00   2.803
12SCS50          01/01/2000 03:00:00   3.504
12SCS50          01/01/2000 03:15:00   3.504
12SCS50          01/01/2000 03:30:00   3.504
12SCS50          01/01/2000 03:45:00   3.504
12SCS50          01/01/2000 04:00:00   4.555
12SCS50          01/01/2000 04:15:00   4.906
12SCS50          01/01/2000 04:30:00   5.606
12SCS50          01/01/2000 04:45:00   6.307
12SCS50          01/01/2000 05:00:00   7.709
12SCS50          01/01/2000 05:15:00   11.563
12SCS50          01/01/2000 05:30:00   16.469
12SCS50          01/01/2000 05:45:00   133.152
12SCS50          01/01/2000 06:00:00   25.229
12SCS50          01/01/2000 06:15:00   14.366
12SCS50          01/01/2000 06:30:00   9.811
12SCS50          01/01/2000 06:45:00   7.358
12SCS50          01/01/2000 07:00:00   5.957
12SCS50          01/01/2000 07:15:00   4.906
12SCS50          01/01/2000 07:30:00   4.555
12SCS50          01/01/2000 07:45:00   4.205
12SCS50          01/01/2000 08:00:00   4.205
12SCS50          01/01/2000 08:15:00   3.504
12SCS50          01/01/2000 08:30:00   3.504
12SCS50          01/01/2000 08:45:00   3.154
12SCS50          01/01/2000 09:00:00   2.803
12SCS50          01/01/2000 09:15:00   2.803
12SCS50          01/01/2000 09:30:00   2.803
12SCS50          01/01/2000 09:45:00   2.453
12SCS50          01/01/2000 10:00:00   2.102
12SCS50          01/01/2000 10:15:00   2.102
12SCS50          01/01/2000 10:30:00   2.102
12SCS50          01/01/2000 10:45:00   2.102
12SCS50          01/01/2000 11:00:00   2.102
12SCS50          01/01/2000 11:15:00   2.102
12SCS50          01/01/2000 11:30:00   2.102
12SCS50          01/01/2000 11:45:00   1.752

;Rainfall (mm/hr)
24SCS10          01/01/2000 00:00:00   0.792
24SCS10          01/01/2000 00:15:00   0.792
24SCS10          01/01/2000 00:30:00   0.792
24SCS10          01/01/2000 00:45:00   0.792
24SCS10          01/01/2000 01:00:00   0.792
24SCS10          01/01/2000 01:15:00   0.792
24SCS10          01/01/2000 01:30:00   0.792
24SCS10          01/01/2000 01:45:00   0.792
24SCS10          01/01/2000 02:00:00   0.936
24SCS10          01/01/2000 02:15:00   0.936
24SCS10          01/01/2000 02:30:00   0.936
24SCS10          01/01/2000 02:45:00   0.936
24SCS10          01/01/2000 03:00:00   0.936
24SCS10          01/01/2000 03:15:00   0.936
24SCS10          01/01/2000 03:30:00   0.936
24SCS10          01/01/2000 03:45:00   0.936
24SCS10          01/01/2000 04:00:00   1.152
24SCS10          01/01/2000 04:15:00   1.152
24SCS10          01/01/2000 04:30:00   1.152
24SCS10          01/01/2000 04:45:00   1.152
24SCS10          01/01/2000 05:00:00   1.152
24SCS10          01/01/2000 05:15:00   1.152
24SCS10          01/01/2000 05:30:00   1.152
24SCS10          01/01/2000 05:45:00   1.152
24SCS10          01/01/2000 06:00:00   1.296
24SCS10          01/01/2000 06:15:00   1.296
24SCS10          01/01/2000 06:30:00   1.296
24SCS10          01/01/2000 06:45:00   1.296
24SCS10          01/01/2000 07:00:00   1.584
24SCS10          01/01/2000 07:15:00   1.584
24SCS10          01/01/2000 07:30:00   1.584
24SCS10          01/01/2000 07:45:00   1.584
24SCS10          01/01/2000 08:00:00   1.872
24SCS10          01/01/2000 08:15:00   1.872
24SCS10          01/01/2000 08:30:00   2.016
24SCS10          01/01/2000 08:45:00   2.016
24SCS10          01/01/2000 09:00:00   2.304
24SCS10          01/01/2000 09:15:00   2.304
24SCS10          01/01/2000 09:30:00   2.592
24SCS10          01/01/2000 09:45:00   2.592
24SCS10          01/01/2000 10:00:00   3.312
24SCS10          01/01/2000 10:15:00   3.312
24SCS10          01/01/2000 10:30:00   4.464
24SCS10          01/01/2000 10:45:00   4.464
24SCS10          01/01/2000 11:00:00   6.912
24SCS10          01/01/2000 11:15:00   6.912
24SCS10          01/01/2000 11:30:00   21.312
24SCS10          01/01/2000 11:45:00   88.128
24SCS10          01/01/2000 12:00:00   10.368
24SCS10          01/01/2000 12:15:00   10.368
24SCS10          01/01/2000 12:30:00   5.328
24SCS10          01/01/2000 12:45:00   5.328
24SCS10          01/01/2000 13:00:00   3.888
24SCS10          01/01/2000 13:15:00   3.888
24SCS10          01/01/2000 13:30:00   3.024
24SCS10          01/01/2000 13:45:00   3.024
24SCS10          01/01/2000 14:00:00   2.16
24SCS10          01/01/2000 14:15:00   2.16
24SCS10          01/01/2000 14:30:00   2.16
24SCS10          01/01/2000 14:45:00   2.16
24SCS10          01/01/2000 15:00:00   2.16
24SCS10          01/01/2000 15:15:00   2.16
24SCS10          01/01/2000 15:30:00   2.16
24SCS10          01/01/2000 15:45:00   2.16
24SCS10          01/01/2000 16:00:00   1.296
24SCS10          01/01/2000 16:15:00   1.296
24SCS10          01/01/2000 16:30:00   1.296
24SCS10          01/01/2000 16:45:00   1.296
24SCS10          01/01/2000 17:00:00   1.296
24SCS10          01/01/2000 17:15:00   1.296
24SCS10          01/01/2000 17:30:00   1.296
24SCS10          01/01/2000 17:45:00   1.296
24SCS10          01/01/2000 18:00:00   1.296
24SCS10          01/01/2000 18:15:00   1.296
24SCS10          01/01/2000 18:30:00   1.296
24SCS10          01/01/2000 18:45:00   1.296
24SCS10          01/01/2000 19:00:00   1.296
24SCS10          01/01/2000 19:15:00   1.296
24SCS10          01/01/2000 19:30:00   1.296
24SCS10          01/01/2000 19:45:00   1.296
24SCS10          01/01/2000 20:00:00   0.864
24SCS10          01/01/2000 20:15:00   0.864
24SCS10          01/01/2000 20:30:00   0.864
24SCS10          01/01/2000 20:45:00   0.864
24SCS10          01/01/2000 21:00:00   0.864
24SCS10          01/01/2000 21:15:00   0.864
24SCS10          01/01/2000 21:30:00   0.864
24SCS10          01/01/2000 21:45:00   0.864
24SCS10          01/01/2000 22:00:00   0.864
24SCS10          01/01/2000 22:15:00   0.864
24SCS10          01/01/2000 22:30:00   0.864
24SCS10          01/01/2000 22:45:00   0.864
24SCS10          01/01/2000 23:00:00   0.864
24SCS10          01/01/2000 23:15:00   0.864
24SCS10          01/01/2000 23:30:00   0.864
24SCS10          01/01/2000 23:45:00   0.864

;Rainfall (mm/hr)
24SCS100         01/01/2000 00:00:00   1.135
24SCS100         01/01/2000 00:15:00   1.135
24SCS100         01/01/2000 00:30:00   1.135
24SCS100         01/01/2000 00:45:00   1.135
24SCS100         01/01/2000 01:00:00   1.135
24SCS100         01/01/2000 01:15:00   1.135
24SCS100         01/01/2000 01:30:00   1.135
24SCS100         01/01/2000 01:45:00   1.135
24SCS100         01/01/2000 02:00:00   1.342
24SCS100         01/01/2000 02:15:00   1.342
24SCS100         01/01/2000 02:30:00   1.342
24SCS100         01/01/2000 02:45:00   1.342
24SCS100         01/01/2000 03:00:00   1.342
24SCS100         01/01/2000 03:15:00   1.342
24SCS100         01/01/2000 03:30:00   1.342
```

```
24SCS100        01/01/2000 03:45:00   1.342
24SCS100        01/01/2000 04:00:00   1.651
24SCS100        01/01/2000 04:15:00   1.651
24SCS100        01/01/2000 04:30:00   1.651
24SCS100        01/01/2000 04:45:00   1.651
24SCS100        01/01/2000 05:00:00   1.651
24SCS100        01/01/2000 05:15:00   1.651
24SCS100        01/01/2000 05:30:00   1.651
24SCS100        01/01/2000 05:45:00   1.651
24SCS100        01/01/2000 06:00:00   1.858
24SCS100        01/01/2000 06:15:00   1.858
24SCS100        01/01/2000 06:30:00   1.858
24SCS100        01/01/2000 06:45:00   1.858
24SCS100        01/01/2000 07:00:00   2.27
24SCS100        01/01/2000 07:15:00   2.27
24SCS100        01/01/2000 07:30:00   2.27
24SCS100        01/01/2000 07:45:00   2.27
24SCS100        01/01/2000 08:00:00   2.683
24SCS100        01/01/2000 08:15:00   2.683
24SCS100        01/01/2000 08:30:00   2.89
24SCS100        01/01/2000 08:45:00   2.89
24SCS100        01/01/2000 09:00:00   3.302
24SCS100        01/01/2000 09:15:00   3.302
24SCS100        01/01/2000 09:30:00   3.715
24SCS100        01/01/2000 09:45:00   3.715
24SCS100        01/01/2000 10:00:00   4.747
24SCS100        01/01/2000 10:15:00   4.747
24SCS100        01/01/2000 10:30:00   6.398
24SCS100        01/01/2000 10:45:00   6.398
24SCS100        01/01/2000 11:00:00   9.907
24SCS100        01/01/2000 11:15:00   9.907
24SCS100        01/01/2000 11:30:00   30.547
24SCS100        01/01/2000 11:45:00   126.317
24SCS100        01/01/2000 12:00:00   14.861
24SCS100        01/01/2000 12:15:00   14.861
24SCS100        01/01/2000 12:30:00   7.637
24SCS100        01/01/2000 12:45:00   7.637
24SCS100        01/01/2000 13:00:00   5.573
24SCS100        01/01/2000 13:15:00   5.573
24SCS100        01/01/2000 13:30:00   4.334
24SCS100        01/01/2000 13:45:00   4.334
24SCS100        01/01/2000 14:00:00   3.096
24SCS100        01/01/2000 14:15:00   3.096
24SCS100        01/01/2000 14:30:00   3.096
24SCS100        01/01/2000 14:45:00   3.096
24SCS100        01/01/2000 15:00:00   3.096
24SCS100        01/01/2000 15:15:00   3.096
24SCS100        01/01/2000 15:30:00   3.096
24SCS100        01/01/2000 15:45:00   3.096
24SCS100        01/01/2000 16:00:00   1.858
24SCS100        01/01/2000 16:15:00   1.858
24SCS100        01/01/2000 16:30:00   1.858
24SCS100        01/01/2000 16:45:00   1.858
24SCS100        01/01/2000 17:00:00   1.858
24SCS100        01/01/2000 17:15:00   1.858
24SCS100        01/01/2000 17:30:00   1.858
24SCS100        01/01/2000 17:45:00   1.858
24SCS100        01/01/2000 18:00:00   1.858
24SCS100        01/01/2000 18:15:00   1.858
24SCS100        01/01/2000 18:30:00   1.858
24SCS100        01/01/2000 18:45:00   1.858
24SCS100        01/01/2000 19:00:00   1.858
24SCS100        01/01/2000 19:15:00   1.858
24SCS100        01/01/2000 19:30:00   1.858
24SCS100        01/01/2000 19:45:00   1.858
24SCS100        01/01/2000 20:00:00   1.238
24SCS100        01/01/2000 20:15:00   1.238
24SCS100        01/01/2000 20:30:00   1.238
24SCS100        01/01/2000 20:45:00   1.238
24SCS100        01/01/2000 21:00:00   1.238
24SCS100        01/01/2000 21:15:00   1.238
24SCS100        01/01/2000 21:30:00   1.238
24SCS100        01/01/2000 21:45:00   1.238
24SCS100        01/01/2000 22:00:00   1.238
24SCS100        01/01/2000 22:15:00   1.238
24SCS100        01/01/2000 22:30:00   1.238
24SCS100        01/01/2000 22:45:00   1.238
24SCS100        01/01/2000 23:00:00   1.238
24SCS100        01/01/2000 23:15:00   1.238
24SCS100        01/01/2000 23:30:00   1.238
24SCS100        01/01/2000 23:45:00   1.238

;Rainfall (mm/hr)
24SCS2          01/01/2000 00:00:00   0.528
24SCS2          01/01/2000 00:15:00   0.528
24SCS2          01/01/2000 00:30:00   0.528
24SCS2          01/01/2000 00:45:00   0.528
24SCS2          01/01/2000 01:00:00   0.528
24SCS2          01/01/2000 01:15:00   0.528
24SCS2          01/01/2000 01:30:00   0.528
24SCS2          01/01/2000 01:45:00   0.528
24SCS2          01/01/2000 02:00:00   0.624
24SCS2          01/01/2000 02:15:00   0.624
24SCS2          01/01/2000 02:30:00   0.624
24SCS2          01/01/2000 02:45:00   0.624
24SCS2          01/01/2000 03:00:00   0.624
24SCS2          01/01/2000 03:15:00   0.624
24SCS2          01/01/2000 03:30:00   0.624
24SCS2          01/01/2000 03:45:00   0.624
24SCS2          01/01/2000 04:00:00   0.768
24SCS2          01/01/2000 04:15:00   0.768
24SCS2          01/01/2000 04:30:00   0.768
24SCS2          01/01/2000 04:45:00   0.768
24SCS2          01/01/2000 05:00:00   0.768
24SCS2          01/01/2000 05:15:00   0.768
24SCS2          01/01/2000 05:30:00   0.768
24SCS2          01/01/2000 05:45:00   0.768
24SCS2          01/01/2000 06:00:00   0.864
24SCS2          01/01/2000 06:15:00   0.864
24SCS2          01/01/2000 06:30:00   0.864
24SCS2          01/01/2000 06:45:00   0.864
24SCS2          01/01/2000 07:00:00   1.056
24SCS2          01/01/2000 07:15:00   1.056
24SCS2          01/01/2000 07:30:00   1.056
24SCS2          01/01/2000 07:45:00   1.056
24SCS2          01/01/2000 08:00:00   1.248
24SCS2          01/01/2000 08:15:00   1.248
24SCS2          01/01/2000 08:30:00   1.344
24SCS2          01/01/2000 08:45:00   1.344
24SCS2          01/01/2000 09:00:00   1.536
24SCS2          01/01/2000 09:15:00   1.536
24SCS2          01/01/2000 09:30:00   1.728
24SCS2          01/01/2000 09:45:00   1.728
24SCS2          01/01/2000 10:00:00   2.208
24SCS2          01/01/2000 10:15:00   2.208
24SCS2          01/01/2000 10:30:00   2.976
24SCS2          01/01/2000 10:45:00   2.976
24SCS2          01/01/2000 11:00:00   4.608
24SCS2          01/01/2000 11:15:00   4.608
24SCS2          01/01/2000 11:30:00   14.208
24SCS2          01/01/2000 11:45:00   58.752
24SCS2          01/01/2000 12:00:00   6.912
24SCS2          01/01/2000 12:15:00   6.912
24SCS2          01/01/2000 12:30:00   3.552
24SCS2          01/01/2000 12:45:00   3.552
24SCS2          01/01/2000 13:00:00   2.592
24SCS2          01/01/2000 13:15:00   2.592
24SCS2          01/01/2000 13:30:00   2.016
24SCS2          01/01/2000 13:45:00   2.016
24SCS2          01/01/2000 14:00:00   1.44
24SCS2          01/01/2000 14:15:00   1.44
24SCS2          01/01/2000 14:30:00   1.44
24SCS2          01/01/2000 14:45:00   1.44
24SCS2          01/01/2000 15:00:00   1.44
24SCS2          01/01/2000 15:15:00   1.44
24SCS2          01/01/2000 15:30:00   1.44
24SCS2          01/01/2000 15:45:00   1.44
24SCS2          01/01/2000 16:00:00   0.864
24SCS2          01/01/2000 16:15:00   0.864
24SCS2          01/01/2000 16:30:00   0.864
24SCS2          01/01/2000 16:45:00   0.864
24SCS2          01/01/2000 17:00:00   0.864
24SCS2          01/01/2000 17:15:00   0.864
24SCS2          01/01/2000 17:30:00   0.864
24SCS2          01/01/2000 17:45:00   0.864
24SCS2          01/01/2000 18:00:00   0.864
24SCS2          01/01/2000 18:15:00   0.864
24SCS2          01/01/2000 18:30:00   0.864
24SCS2          01/01/2000 18:45:00   0.864
24SCS2          01/01/2000 19:00:00   0.864
24SCS2          01/01/2000 19:15:00   0.864
24SCS2          01/01/2000 19:30:00   0.864
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24SCS2           01/01/2000 19:45:00   0.864
24SCS2           01/01/2000 20:00:00   0.576
24SCS2           01/01/2000 20:15:00   0.576
24SCS2           01/01/2000 20:30:00   0.576
24SCS2           01/01/2000 20:45:00   0.576
24SCS2           01/01/2000 21:00:00   0.576
24SCS2           01/01/2000 21:15:00   0.576
24SCS2           01/01/2000 21:30:00   0.576
24SCS2           01/01/2000 21:45:00   0.576
24SCS2           01/01/2000 22:00:00   0.576
24SCS2           01/01/2000 22:15:00   0.576
24SCS2           01/01/2000 22:30:00   0.576
24SCS2           01/01/2000 22:45:00   0.576
24SCS2           01/01/2000 23:00:00   0.576
24SCS2           01/01/2000 23:15:00   0.576
24SCS2           01/01/2000 23:30:00   0.576
24SCS2           01/01/2000 23:45:00   0.576

;Rainfall (mm/hr)
24SCS25          01/01/2000 00:00:00   0.924
24SCS25          01/01/2000 00:15:00   0.924
24SCS25          01/01/2000 00:30:00   0.924
24SCS25          01/01/2000 00:45:00   0.924
24SCS25          01/01/2000 01:00:00   0.924
24SCS25          01/01/2000 01:15:00   0.924
24SCS25          01/01/2000 01:30:00   0.924
24SCS25          01/01/2000 01:45:00   0.924
24SCS25          01/01/2000 02:00:00   1.092
24SCS25          01/01/2000 02:15:00   1.092
24SCS25          01/01/2000 02:30:00   1.092
24SCS25          01/01/2000 02:45:00   1.092
24SCS25          01/01/2000 03:00:00   1.092
24SCS25          01/01/2000 03:15:00   1.092
24SCS25          01/01/2000 03:30:00   1.092
24SCS25          01/01/2000 03:45:00   1.092
24SCS25          01/01/2000 04:00:00   1.344
24SCS25          01/01/2000 04:15:00   1.344
24SCS25          01/01/2000 04:30:00   1.344
24SCS25          01/01/2000 04:45:00   1.344
24SCS25          01/01/2000 05:00:00   1.344
24SCS25          01/01/2000 05:15:00   1.344
24SCS25          01/01/2000 05:30:00   1.344
24SCS25          01/01/2000 05:45:00   1.344
24SCS25          01/01/2000 06:00:00   1.512
24SCS25          01/01/2000 06:15:00   1.512
24SCS25          01/01/2000 06:30:00   1.512
24SCS25          01/01/2000 06:45:00   1.512
24SCS25          01/01/2000 07:00:00   1.848
24SCS25          01/01/2000 07:15:00   1.848
24SCS25          01/01/2000 07:30:00   1.848
24SCS25          01/01/2000 07:45:00   1.848
24SCS25          01/01/2000 08:00:00   2.184
24SCS25          01/01/2000 08:15:00   2.184
24SCS25          01/01/2000 08:30:00   2.352
24SCS25          01/01/2000 08:45:00   2.352
24SCS25          01/01/2000 09:00:00   2.688
24SCS25          01/01/2000 09:15:00   2.688
24SCS25          01/01/2000 09:30:00   3.024
24SCS25          01/01/2000 09:45:00   3.024
24SCS25          01/01/2000 10:00:00   3.864
24SCS25          01/01/2000 10:15:00   3.864
24SCS25          01/01/2000 10:30:00   5.208
24SCS25          01/01/2000 10:45:00   5.208
24SCS25          01/01/2000 11:00:00   8.064
24SCS25          01/01/2000 11:15:00   8.064
24SCS25          01/01/2000 11:30:00   24.864
24SCS25          01/01/2000 11:45:00   102.816
24SCS25          01/01/2000 12:00:00   12.096
24SCS25          01/01/2000 12:15:00   12.096
24SCS25          01/01/2000 12:30:00   6.216
24SCS25          01/01/2000 12:45:00   6.216
24SCS25          01/01/2000 13:00:00   4.536
24SCS25          01/01/2000 13:15:00   4.536
24SCS25          01/01/2000 13:30:00   3.528
24SCS25          01/01/2000 13:45:00   3.528
24SCS25          01/01/2000 14:00:00   2.52
24SCS25          01/01/2000 14:15:00   2.52
24SCS25          01/01/2000 14:30:00   2.52
24SCS25          01/01/2000 14:45:00   2.52
24SCS25          01/01/2000 15:00:00   2.52
24SCS25          01/01/2000 15:15:00   2.52
24SCS25          01/01/2000 15:30:00   2.52
24SCS25          01/01/2000 15:45:00   2.52
24SCS25          01/01/2000 16:00:00   1.512
24SCS25          01/01/2000 16:15:00   1.512
24SCS25          01/01/2000 16:30:00   1.512
24SCS25          01/01/2000 16:45:00   1.512
24SCS25          01/01/2000 17:00:00   1.512
24SCS25          01/01/2000 17:15:00   1.512
24SCS25          01/01/2000 17:30:00   1.512
24SCS25          01/01/2000 17:45:00   1.512
24SCS25          01/01/2000 18:00:00   1.512
24SCS25          01/01/2000 18:15:00   1.512
24SCS25          01/01/2000 18:30:00   1.512
24SCS25          01/01/2000 18:45:00   1.512
24SCS25          01/01/2000 19:00:00   1.512
24SCS25          01/01/2000 19:15:00   1.512
24SCS25          01/01/2000 19:30:00   1.512
24SCS25          01/01/2000 19:45:00   1.512
24SCS25          01/01/2000 20:00:00   1.008
24SCS25          01/01/2000 20:15:00   1.008
24SCS25          01/01/2000 20:30:00   1.008
24SCS25          01/01/2000 20:45:00   1.008
24SCS25          01/01/2000 21:00:00   1.008
24SCS25          01/01/2000 21:15:00   1.008
24SCS25          01/01/2000 21:30:00   1.008
24SCS25          01/01/2000 21:45:00   1.008
24SCS25          01/01/2000 22:00:00   1.008
24SCS25          01/01/2000 22:15:00   1.008
24SCS25          01/01/2000 22:30:00   1.008
24SCS25          01/01/2000 22:45:00   1.008
24SCS25          01/01/2000 23:00:00   1.008
24SCS25          01/01/2000 23:15:00   1.008
24SCS25          01/01/2000 23:30:00   1.008
24SCS25          01/01/2000 23:45:00   1.008

;Rainfall (mm/hr)
24SCS5           01/01/2000 00:00:00   0.686
24SCS5           01/01/2000 00:15:00   0.686
24SCS5           01/01/2000 00:30:00   0.686
24SCS5           01/01/2000 00:45:00   0.686
24SCS5           01/01/2000 01:00:00   0.686
24SCS5           01/01/2000 01:15:00   0.686
24SCS5           01/01/2000 01:30:00   0.686
24SCS5           01/01/2000 01:45:00   0.686
24SCS5           01/01/2000 02:00:00   0.811
24SCS5           01/01/2000 02:15:00   0.811
24SCS5           01/01/2000 02:30:00   0.811
24SCS5           01/01/2000 02:45:00   0.811
24SCS5           01/01/2000 03:00:00   0.811
24SCS5           01/01/2000 03:15:00   0.811
24SCS5           01/01/2000 03:30:00   0.811
24SCS5           01/01/2000 03:45:00   0.811
24SCS5           01/01/2000 04:00:00   0.998
24SCS5           01/01/2000 04:15:00   0.998
24SCS5           01/01/2000 04:30:00   0.998
24SCS5           01/01/2000 04:45:00   0.998
24SCS5           01/01/2000 05:00:00   0.998
24SCS5           01/01/2000 05:15:00   0.998
24SCS5           01/01/2000 05:30:00   0.998
24SCS5           01/01/2000 05:45:00   0.998
24SCS5           01/01/2000 06:00:00   1.123
24SCS5           01/01/2000 06:15:00   1.123
24SCS5           01/01/2000 06:30:00   1.123
24SCS5           01/01/2000 06:45:00   1.123
24SCS5           01/01/2000 07:00:00   1.373
24SCS5           01/01/2000 07:15:00   1.373
24SCS5           01/01/2000 07:30:00   1.373
24SCS5           01/01/2000 07:45:00   1.373
24SCS5           01/01/2000 08:00:00   1.622
24SCS5           01/01/2000 08:15:00   1.622
24SCS5           01/01/2000 08:30:00   1.747
24SCS5           01/01/2000 08:45:00   1.747
24SCS5           01/01/2000 09:00:00   1.997
24SCS5           01/01/2000 09:15:00   1.997
24SCS5           01/01/2000 09:30:00   2.246
24SCS5           01/01/2000 09:45:00   2.246
24SCS5           01/01/2000 10:00:00   2.87
24SCS5           01/01/2000 10:15:00   2.87
24SCS5           01/01/2000 10:30:00   3.869
24SCS5           01/01/2000 10:45:00   3.869
24SCS5           01/01/2000 11:00:00   5.99
```

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24SCS5          01/01/2000 11:15:00   5.99
24SCS5          01/01/2000 11:30:00   18.47
24SCS5          01/01/2000 11:45:00   76.378
24SCS5          01/01/2000 12:00:00   8.986
24SCS5          01/01/2000 12:15:00   8.986
24SCS5          01/01/2000 12:30:00   4.618
24SCS5          01/01/2000 12:45:00   4.618
24SCS5          01/01/2000 13:00:00   3.37
24SCS5          01/01/2000 13:15:00   3.37
24SCS5          01/01/2000 13:30:00   2.621
24SCS5          01/01/2000 13:45:00   2.621
24SCS5          01/01/2000 14:00:00   1.872
24SCS5          01/01/2000 14:15:00   1.872
24SCS5          01/01/2000 14:30:00   1.872
24SCS5          01/01/2000 14:45:00   1.872
24SCS5          01/01/2000 15:00:00   1.872
24SCS5          01/01/2000 15:15:00   1.872
24SCS5          01/01/2000 15:30:00   1.872
24SCS5          01/01/2000 15:45:00   1.872
24SCS5          01/01/2000 16:00:00   1.123
24SCS5          01/01/2000 16:15:00   1.123
24SCS5          01/01/2000 16:30:00   1.123
24SCS5          01/01/2000 16:45:00   1.123
24SCS5          01/01/2000 17:00:00   1.123
24SCS5          01/01/2000 17:15:00   1.123
24SCS5          01/01/2000 17:30:00   1.123
24SCS5          01/01/2000 17:45:00   1.123
24SCS5          01/01/2000 18:00:00   1.123
24SCS5          01/01/2000 18:15:00   1.123
24SCS5          01/01/2000 18:30:00   1.123
24SCS5          01/01/2000 18:45:00   1.123
24SCS5          01/01/2000 19:00:00   1.123
24SCS5          01/01/2000 19:15:00   1.123
24SCS5          01/01/2000 19:30:00   1.123
24SCS5          01/01/2000 19:45:00   1.123
24SCS5          01/01/2000 20:00:00   0.749
24SCS5          01/01/2000 20:15:00   0.749
24SCS5          01/01/2000 20:30:00   0.749
24SCS5          01/01/2000 20:45:00   0.749
24SCS5          01/01/2000 21:00:00   0.749
24SCS5          01/01/2000 21:15:00   0.749
24SCS5          01/01/2000 21:30:00   0.749
24SCS5          01/01/2000 21:45:00   0.749
24SCS5          01/01/2000 22:00:00   0.749
24SCS5          01/01/2000 22:15:00   0.749
24SCS5          01/01/2000 22:30:00   0.749
24SCS5          01/01/2000 22:45:00   0.749
24SCS5          01/01/2000 23:00:00   0.749
24SCS5          01/01/2000 23:15:00   0.749
24SCS5          01/01/2000 23:30:00   0.749
24SCS5          01/01/2000 23:45:00   0.749

;Rainfall (mm/hr)
24SCS50         01/01/2000 00:00:00   1.03
24SCS50         01/01/2000 00:15:00   1.03
24SCS50         01/01/2000 00:30:00   1.03
24SCS50         01/01/2000 00:45:00   1.03
24SCS50         01/01/2000 01:00:00   1.03
24SCS50         01/01/2000 01:15:00   1.03
24SCS50         01/01/2000 01:30:00   1.03
24SCS50         01/01/2000 01:45:00   1.03
24SCS50         01/01/2000 02:00:00   1.217
24SCS50         01/01/2000 02:15:00   1.217
24SCS50         01/01/2000 02:30:00   1.217
24SCS50         01/01/2000 02:45:00   1.217
24SCS50         01/01/2000 03:00:00   1.217
24SCS50         01/01/2000 03:15:00   1.217
24SCS50         01/01/2000 03:30:00   1.217
24SCS50         01/01/2000 03:45:00   1.217
24SCS50         01/01/2000 04:00:00   1.498
24SCS50         01/01/2000 04:15:00   1.498
24SCS50         01/01/2000 04:30:00   1.498
24SCS50         01/01/2000 04:45:00   1.498
24SCS50         01/01/2000 05:00:00   1.498
24SCS50         01/01/2000 05:15:00   1.498
24SCS50         01/01/2000 05:30:00   1.498
24SCS50         01/01/2000 05:45:00   1.498
24SCS50         01/01/2000 06:00:00   1.685
24SCS50         01/01/2000 06:15:00   1.685
24SCS50         01/01/2000 06:30:00   1.685
24SCS50         01/01/2000 06:45:00   1.685
24SCS50         01/01/2000 07:00:00   2.059
24SCS50         01/01/2000 07:15:00   2.059
24SCS50         01/01/2000 07:30:00   2.059
24SCS50         01/01/2000 07:45:00   2.059
24SCS50         01/01/2000 08:00:00   2.434
24SCS50         01/01/2000 08:15:00   2.434
24SCS50         01/01/2000 08:30:00   2.621
24SCS50         01/01/2000 08:45:00   2.621
24SCS50         01/01/2000 09:00:00   2.995
24SCS50         01/01/2000 09:15:00   2.995
24SCS50         01/01/2000 09:30:00   3.37
24SCS50         01/01/2000 09:45:00   3.37
24SCS50         01/01/2000 10:00:00   4.306
24SCS50         01/01/2000 10:15:00   4.306
24SCS50         01/01/2000 10:30:00   5.803
24SCS50         01/01/2000 10:45:00   5.803
24SCS50         01/01/2000 11:00:00   8.986
24SCS50         01/01/2000 11:15:00   8.986
24SCS50         01/01/2000 11:30:00   27.706
24SCS50         01/01/2000 11:45:00   114.566
24SCS50         01/01/2000 12:00:00   13.478
24SCS50         01/01/2000 12:15:00   13.478
24SCS50         01/01/2000 12:30:00   6.926
24SCS50         01/01/2000 12:45:00   6.926
24SCS50         01/01/2000 13:00:00   5.054
24SCS50         01/01/2000 13:15:00   5.054
24SCS50         01/01/2000 13:30:00   3.931
24SCS50         01/01/2000 13:45:00   3.931
24SCS50         01/01/2000 14:00:00   2.808
24SCS50         01/01/2000 14:15:00   2.808
24SCS50         01/01/2000 14:30:00   2.808
24SCS50         01/01/2000 14:45:00   2.808
24SCS50         01/01/2000 15:00:00   2.808
24SCS50         01/01/2000 15:15:00   2.808
24SCS50         01/01/2000 15:30:00   2.808
24SCS50         01/01/2000 15:45:00   2.808
24SCS50         01/01/2000 16:00:00   1.685
24SCS50         01/01/2000 16:15:00   1.685
24SCS50         01/01/2000 16:30:00   1.685
24SCS50         01/01/2000 16:45:00   1.685
24SCS50         01/01/2000 17:00:00   1.685
24SCS50         01/01/2000 17:15:00   1.685
24SCS50         01/01/2000 17:30:00   1.685
24SCS50         01/01/2000 17:45:00   1.685
24SCS50         01/01/2000 18:00:00   1.685
24SCS50         01/01/2000 18:15:00   1.685
24SCS50         01/01/2000 18:30:00   1.685
24SCS50         01/01/2000 18:45:00   1.685
24SCS50         01/01/2000 19:00:00   1.685
24SCS50         01/01/2000 19:15:00   1.685
24SCS50         01/01/2000 19:30:00   1.685
24SCS50         01/01/2000 19:45:00   1.685
24SCS50         01/01/2000 20:00:00   1.123
24SCS50         01/01/2000 20:15:00   1.123
24SCS50         01/01/2000 20:30:00   1.123
24SCS50         01/01/2000 20:45:00   1.123
24SCS50         01/01/2000 21:00:00   1.123
24SCS50         01/01/2000 21:15:00   1.123
24SCS50         01/01/2000 21:30:00   1.123
24SCS50         01/01/2000 21:45:00   1.123
24SCS50         01/01/2000 22:00:00   1.123
24SCS50         01/01/2000 22:15:00   1.123
24SCS50         01/01/2000 22:30:00   1.123
24SCS50         01/01/2000 22:45:00   1.123
24SCS50         01/01/2000 23:00:00   1.123
24SCS50         01/01/2000 23:15:00   1.123
24SCS50         01/01/2000 23:30:00   1.123
24SCS50         01/01/2000 23:45:00   1.123

;Rainfall (mm/hr)
AUG4-88         01/01/2000 00:00:00   0
AUG4-88         01/01/2000 00:05:00   0.1
AUG4-88         01/01/2000 00:10:00   0.1
AUG4-88         01/01/2000 00:15:00   0
AUG4-88         01/01/2000 00:20:00   3.7
AUG4-88         01/01/2000 00:25:00   6.2
AUG4-88         01/01/2000 00:30:00   101.5
AUG4-88         01/01/2000 00:35:00   15.5
AUG4-88         01/01/2000 00:40:00   29.3
AUG4-88         01/01/2000 00:45:00   19.8
AUG4-88         01/01/2000 00:50:00   1.5
```

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AUG4-88          01/01/2000 00:55:00   1.7
AUG4-88          01/01/2000 01:00:00   5.4
AUG4-88          01/01/2000 01:05:00   24.6
AUG4-88          01/01/2000 01:10:00   26.5
AUG4-88          01/01/2000 01:15:00   34.9
AUG4-88          01/01/2000 01:20:00   10.2
AUG4-88          01/01/2000 01:25:00   27.1
AUG4-88          01/01/2000 01:30:00   104.4
AUG4-88          01/01/2000 01:35:00   27.5
AUG4-88          01/01/2000 01:40:00   62.5
AUG4-88          01/01/2000 01:45:00   31.8
AUG4-88          01/01/2000 01:50:00   79.8
AUG4-88          01/01/2000 01:55:00   67.5
AUG4-88          01/01/2000 02:00:00   156.2
AUG4-88          01/01/2000 02:05:00   5.1
AUG4-88          01/01/2000 02:10:00   0.2
AUG4-88          01/01/2000 02:15:00   0.2
AUG4-88          01/01/2000 02:20:00   0.2
AUG4-88          01/01/2000 02:25:00   0.2
AUG4-88          01/01/2000 02:30:00   0.2
AUG4-88          01/01/2000 02:35:00   0.2
AUG4-88          01/01/2000 02:40:00   0.2
AUG4-88          01/01/2000 02:45:00   0.2
AUG4-88          01/01/2000 02:50:00   0.2
AUG4-88          01/01/2000 02:55:00   0.2
AUG4-88          01/01/2000 03:00:00   12.8
AUG4-88          01/01/2000 03:05:00   14
AUG4-88          01/01/2000 03:10:00   22.2
AUG4-88          01/01/2000 03:15:00   21.8
AUG4-88          01/01/2000 03:20:00   1.4
AUG4-88          01/01/2000 03:25:00   0.2
AUG4-88          01/01/2000 03:30:00   0.2
AUG4-88          01/01/2000 03:35:00   0.2
AUG4-88          01/01/2000 03:40:00   0.2
AUG4-88          01/01/2000 03:45:00   0.2
AUG4-88          01/01/2000 03:50:00   0.2
AUG4-88          01/01/2000 03:55:00   0.2
AUG4-88          01/01/2000 04:00:00   0.2
AUG4-88          01/01/2000 04:05:00   0.2
AUG4-88          01/01/2000 04:10:00   0.2
AUG4-88          01/01/2000 04:15:00   0.2
AUG4-88          01/01/2000 04:20:00   0.2
AUG4-88          01/01/2000 04:25:00   0.2
AUG4-88          01/01/2000 04:30:00   0.2
AUG4-88          01/01/2000 04:35:00   0.2
AUG4-88          01/01/2000 04:40:00   0.2
AUG4-88          01/01/2000 04:45:00   0.2
AUG4-88          01/01/2000 04:50:00   0.2
AUG4-88          01/01/2000 04:55:00   0.2
AUG4-88          01/01/2000 05:00:00   2.9
AUG4-88          01/01/2000 05:05:00   7.8
AUG4-88          01/01/2000 05:10:00   10
AUG4-88          01/01/2000 05:15:00   6.3
AUG4-88          01/01/2000 05:20:00   5.1
AUG4-88          01/01/2000 05:25:00   9.8
AUG4-88          01/01/2000 05:30:00   2.6
AUG4-88          01/01/2000 05:35:00   1.7
AUG4-88          01/01/2000 05:40:00   0
AUG4-88          01/01/2000 05:45:00   0

;Rainfall (mm/hr)
AUG8-96          01/01/2000 00:00:00   4
AUG8-96          01/01/2000 00:05:00   11.9
AUG8-96          01/01/2000 00:10:00   26.5
AUG8-96          01/01/2000 00:15:00   13.3
AUG8-96          01/01/2000 00:20:00   0
AUG8-96          01/01/2000 00:25:00   2.7
AUG8-96          01/01/2000 00:30:00   0
AUG8-96          01/01/2000 00:35:00   8
AUG8-96          01/01/2000 00:40:00   18.6
AUG8-96          01/01/2000 00:45:00   10.6
AUG8-96          01/01/2000 00:50:00   21.2
AUG8-96          01/01/2000 00:55:00   2.7
AUG8-96          01/01/2000 01:00:00   2.7
AUG8-96          01/01/2000 01:05:00   15.9
AUG8-96          01/01/2000 01:10:00   66.3
AUG8-96          01/01/2000 01:15:00   55.7
AUG8-96          01/01/2000 01:20:00   122
AUG8-96          01/01/2000 01:25:00   88.9
AUG8-96          01/01/2000 01:30:00   9.3
AUG8-96          01/01/2000 01:35:00   8
AUG8-96          01/01/2000 01:40:00   4
AUG8-96          01/01/2000 01:45:00   0
AUG8-96          01/01/2000 01:50:00   2.7
AUG8-96          01/01/2000 01:55:00   0
AUG8-96          01/01/2000 02:00:00   0
AUG8-96          01/01/2000 02:05:00   0
AUG8-96          01/01/2000 02:10:00   5.3
AUG8-96          01/01/2000 02:15:00   0
AUG8-96          01/01/2000 02:20:00   0
AUG8-96          01/01/2000 02:25:00   0
AUG8-96          01/01/2000 02:30:00   0
AUG8-96          01/01/2000 02:35:00   0
AUG8-96          01/01/2000 02:40:00   0
AUG8-96          01/01/2000 02:45:00   4
AUG8-96          01/01/2000 02:50:00   53.1
AUG8-96          01/01/2000 02:55:00   69
AUG8-96          01/01/2000 03:00:00   63.7
AUG8-96          01/01/2000 03:05:00   58.4
AUG8-96          01/01/2000 03:10:00   47.8
AUG8-96          01/01/2000 03:15:00   15.9
AUG8-96          01/01/2000 03:20:00   13.3
AUG8-96          01/01/2000 03:25:00   8
AUG8-96          01/01/2000 03:30:00   5.3
AUG8-96          01/01/2000 03:35:00   6.6
AUG8-96          01/01/2000 03:40:00   2.7
AUG8-96          01/01/2000 03:45:00   4
AUG8-96          01/01/2000 03:50:00   2.7
AUG8-96          01/01/2000 03:55:00   4
AUG8-96          01/01/2000 04:00:00   2.7
AUG8-96          01/01/2000 04:05:00   5.3
AUG8-96          01/01/2000 04:10:00   4
AUG8-96          01/01/2000 04:15:00   2.7
AUG8-96          01/01/2000 04:20:00   4
AUG8-96          01/01/2000 04:25:00   2.7
AUG8-96          01/01/2000 04:30:00   1.3
AUG8-96          01/01/2000 04:35:00   1.3
AUG8-96          01/01/2000 04:40:00   0
AUG8-96          01/01/2000 04:45:00   0
AUG8-96          01/01/2000 04:50:00   0
AUG8-96          01/01/2000 04:55:00   0
AUG8-96          01/01/2000 05:00:00   2.7
AUG8-96          01/01/2000 05:05:00   0
AUG8-96          01/01/2000 05:10:00   0
AUG8-96          01/01/2000 05:15:00   0
AUG8-96          01/01/2000 05:20:00   0
AUG8-96          01/01/2000 05:25:00   0
AUG8-96          01/01/2000 05:30:00   0
AUG8-96          01/01/2000 05:35:00   0
AUG8-96          01/01/2000 05:40:00   1.3
AUG8-96          01/01/2000 05:45:00   0

;Rainfall (mm/hr)
CHI_3hr_10       01/01/2000 00:00:00   3.755
CHI_3hr_10       01/01/2000 00:10:00   4.478
CHI_3hr_10       01/01/2000 00:20:00   5.593
CHI_3hr_10       01/01/2000 00:30:00   7.551
CHI_3hr_10       01/01/2000 00:40:00   11.936
CHI_3hr_10       01/01/2000 00:50:00   30.856
CHI_3hr_10       01/01/2000 01:00:00   122.142
CHI_3hr_10       01/01/2000 01:10:00   35.237
CHI_3hr_10       01/01/2000 01:20:00   18.159
CHI_3hr_10       01/01/2000 01:30:00   12.238
CHI_3hr_10       01/01/2000 01:40:00   9.269
CHI_3hr_10       01/01/2000 01:50:00   7.492
CHI_3hr_10       01/01/2000 02:00:00   6.309
CHI_3hr_10       01/01/2000 02:10:00   5.465
CHI_3hr_10       01/01/2000 02:20:00   4.831
CHI_3hr_10       01/01/2000 02:30:00   4.338
CHI_3hr_10       01/01/2000 02:40:00   3.942
CHI_3hr_10       01/01/2000 02:50:00   3.617
CHI_3hr_10       01/01/2000 03:00:00   0

;Rainfall (mm/hr)
CHI_3hr_100      01/01/2000 00:00:00   5.339
CHI_3hr_100      01/01/2000 00:10:00   6.376
CHI_3hr_100      01/01/2000 00:20:00   7.977
CHI_3hr_100      01/01/2000 00:30:00   10.797
CHI_3hr_100      01/01/2000 00:40:00   17.136
CHI_3hr_100      01/01/2000 00:50:00   45.128
CHI_3hr_100      01/01/2000 01:00:00   178.107
CHI_3hr_100      01/01/2000 01:10:00   51.056
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CHI_3hr_100      01/01/2000 01:20:00   26.163
CHI_3hr_100      01/01/2000 01:30:00   17.571
CHI_3hr_100      01/01/2000 01:40:00   13.277
CHI_3hr_100      01/01/2000 01:50:00   10.712
CHI_3hr_100      01/01/2000 02:00:00   9.008
CHI_3hr_100      01/01/2000 02:10:00   7.793
CHI_3hr_100      01/01/2000 02:20:00   6.883
CHI_3hr_100      01/01/2000 02:30:00   6.174
CHI_3hr_100      01/01/2000 02:40:00   5.607
CHI_3hr_100      01/01/2000 02:50:00   5.142
CHI_3hr_100      01/01/2000 03:00:00   0

;Rainfall (mm/hr)
CHI_3hr_2        01/01/2000 00:00:00   2.491
CHI_3hr_2        01/01/2000 00:10:00   2.966
CHI_3hr_2        01/01/2000 00:20:00   3.696
CHI_3hr_2        01/01/2000 00:30:00   4.976
CHI_3hr_2        01/01/2000 00:40:00   7.828
CHI_3hr_2        01/01/2000 00:50:00   19.966
CHI_3hr_2        01/01/2000 01:00:00   76.805
CHI_3hr_2        01/01/2000 01:10:00   22.777
CHI_3hr_2        01/01/2000 01:20:00   11.852
CHI_3hr_2        01/01/2000 01:30:00   8.025
CHI_3hr_2        01/01/2000 01:40:00   6.096
CHI_3hr_2        01/01/2000 01:50:00   4.938
CHI_3hr_2        01/01/2000 02:00:00   4.165
CHI_3hr_2        01/01/2000 02:10:00   3.613
CHI_3hr_2        01/01/2000 02:20:00   3.197
CHI_3hr_2        01/01/2000 02:30:00   2.873
CHI_3hr_2        01/01/2000 02:40:00   2.613
CHI_3hr_2        01/01/2000 02:50:00   2.4
CHI_3hr_2        01/01/2000 03:00:00   0

;Rainfall (mm/hr)
CHI_3hr_25       01/01/2000 00:00:00   4.358
CHI_3hr_25       01/01/2000 00:10:00   5.202
CHI_3hr_25       01/01/2000 00:20:00   6.506
CHI_3hr_25       01/01/2000 00:30:00   8.801
CHI_3hr_25       01/01/2000 00:40:00   13.954
CHI_3hr_25       01/01/2000 00:50:00   36.302
CHI_3hr_25       01/01/2000 01:00:00   144.693
CHI_3hr_25       01/01/2000 01:10:00   41.479
CHI_3hr_25       01/01/2000 01:20:00   21.286
CHI_3hr_25       01/01/2000 01:30:00   14.308
CHI_3hr_25       01/01/2000 01:40:00   10.818
CHI_3hr_25       01/01/2000 01:50:00   8.732
CHI_3hr_25       01/01/2000 02:00:00   7.345
CHI_3hr_25       01/01/2000 02:10:00   6.356
CHI_3hr_25       01/01/2000 02:20:00   5.615
CHI_3hr_25       01/01/2000 02:30:00   5.038
CHI_3hr_25       01/01/2000 02:40:00   4.576
CHI_3hr_25       01/01/2000 02:50:00   4.197
CHI_3hr_25       01/01/2000 03:00:00   0

;Rainfall (mm/hr)
CHI_3hr_5        01/01/2000 00:00:00   3.256
CHI_3hr_5        01/01/2000 00:10:00   3.881
CHI_3hr_5        01/01/2000 00:20:00   4.844
CHI_3hr_5        01/01/2000 00:30:00   6.532
CHI_3hr_5        01/01/2000 00:40:00   10.308
CHI_3hr_5        01/01/2000 00:50:00   26.792
CHI_3hr_5        01/01/2000 01:00:00   103.93
CHI_3hr_5        01/01/2000 01:10:00   30.286
CHI_3hr_5        01/01/2000 01:20:00   15.655
CHI_3hr_5        01/01/2000 01:30:00   10.568
CHI_3hr_5        01/01/2000 01:40:00   8.013
CHI_3hr_5        01/01/2000 01:50:00   6.482
CHI_3hr_5        01/01/2000 02:00:00   5.462
CHI_3hr_5        01/01/2000 02:10:00   4.733
CHI_3hr_5        01/01/2000 02:20:00   4.186
CHI_3hr_5        01/01/2000 02:30:00   3.76
CHI_3hr_5        01/01/2000 02:40:00   3.418
CHI_3hr_5        01/01/2000 02:50:00   3.137
CHI_3hr_5        01/01/2000 03:00:00   0

;Rainfall (mm/hr)
CHI_3hr_50       01/01/2000 00:00:00   4.828
CHI_3hr_50       01/01/2000 00:10:00   5.766
CHI_3hr_50       01/01/2000 00:20:00   7.214
CHI_3hr_50       01/01/2000 00:30:00   9.763
CHI_3hr_50       01/01/2000 00:40:00   15.496
CHI_3hr_50       01/01/2000 00:50:00   40.401
CHI_3hr_50       01/01/2000 01:00:00   161.471
CHI_3hr_50       01/01/2000 01:10:00   46.17
CHI_3hr_50       01/01/2000 01:20:00   23.66
CHI_3hr_50       01/01/2000 01:30:00   15.89
CHI_3hr_50       01/01/2000 01:40:00   12.006
CHI_3hr_50       01/01/2000 01:50:00   9.687
CHI_3hr_50       01/01/2000 02:00:00   8.146
CHI_3hr_50       01/01/2000 02:10:00   7.047
CHI_3hr_50       01/01/2000 02:20:00   6.224
CHI_3hr_50       01/01/2000 02:30:00   5.583
CHI_3hr_50       01/01/2000 02:40:00   5.07
CHI_3hr_50       01/01/2000 02:50:00   4.649
CHI_3hr_50       01/01/2000 03:00:00   0

;Rainfall (mm/hr)
CHI_6hr_10       01/01/2000 00:00:00   1.944
CHI_6hr_10       01/01/2000 00:10:00   2.097
CHI_6hr_10       01/01/2000 00:20:00   2.278
CHI_6hr_10       01/01/2000 00:30:00   2.499
CHI_6hr_10       01/01/2000 00:40:00   2.772
CHI_6hr_10       01/01/2000 00:50:00   3.122
CHI_6hr_10       01/01/2000 01:00:00   3.585
CHI_6hr_10       01/01/2000 01:10:00   4.231
CHI_6hr_10       01/01/2000 01:20:00   5.199
CHI_6hr_10       01/01/2000 01:30:00   6.823
CHI_6hr_10       01/01/2000 01:40:00   10.137
CHI_6hr_10       01/01/2000 01:50:00   20.829
CHI_6hr_10       01/01/2000 02:00:00   122.142
CHI_6hr_10       01/01/2000 02:10:00   41.92
CHI_6hr_10       01/01/2000 02:20:00   21.263
CHI_6hr_10       01/01/2000 02:30:00   13.557
CHI_6hr_10       01/01/2000 02:40:00   9.991
CHI_6hr_10       01/01/2000 02:50:00   7.945
CHI_6hr_10       01/01/2000 03:00:00   6.62
CHI_6hr_10       01/01/2000 03:10:00   5.692
CHI_6hr_10       01/01/2000 03:20:00   5.004
CHI_6hr_10       01/01/2000 03:30:00   4.474
CHI_6hr_10       01/01/2000 03:40:00   4.052
CHI_6hr_10       01/01/2000 03:50:00   3.708
CHI_6hr_10       01/01/2000 04:00:00   3.422
CHI_6hr_10       01/01/2000 04:10:00   3.181
CHI_6hr_10       01/01/2000 04:20:00   2.973
CHI_6hr_10       01/01/2000 04:30:00   2.794
CHI_6hr_10       01/01/2000 04:40:00   2.636
CHI_6hr_10       01/01/2000 04:50:00   2.497
CHI_6hr_10       01/01/2000 05:00:00   2.373
CHI_6hr_10       01/01/2000 05:10:00   2.262
CHI_6hr_10       01/01/2000 05:20:00   2.162
CHI_6hr_10       01/01/2000 05:30:00   2.071
CHI_6hr_10       01/01/2000 05:40:00   1.988
CHI_6hr_10       01/01/2000 05:50:00   1.912
CHI_6hr_10       01/01/2000 06:00:00   0

;Rainfall (mm/hr)
CHI_6hr_100      01/01/2000 00:00:00   2.752
CHI_6hr_100      01/01/2000 00:10:00   2.969
CHI_6hr_100      01/01/2000 00:20:00   3.228
CHI_6hr_100      01/01/2000 00:30:00   3.542
CHI_6hr_100      01/01/2000 00:40:00   3.933
CHI_6hr_100      01/01/2000 00:50:00   4.432
CHI_6hr_100      01/01/2000 01:00:00   5.095
CHI_6hr_100      01/01/2000 01:10:00   6.021
CHI_6hr_100      01/01/2000 01:20:00   7.412
CHI_6hr_100      01/01/2000 01:30:00   9.748
CHI_6hr_100      01/01/2000 01:40:00   14.532
CHI_6hr_100      01/01/2000 01:50:00   30.054
CHI_6hr_100      01/01/2000 02:00:00   178.559
CHI_6hr_100      01/01/2000 02:10:00   60.818
CHI_6hr_100      01/01/2000 02:20:00   30.678
CHI_6hr_100      01/01/2000 02:30:00   19.483
CHI_6hr_100      01/01/2000 02:40:00   14.32
CHI_6hr_100      01/01/2000 02:50:00   11.366
CHI_6hr_100      01/01/2000 03:00:00   9.456
CHI_6hr_100      01/01/2000 03:10:00   8.119
CHI_6hr_100      01/01/2000 03:20:00   7.131
CHI_6hr_100      01/01/2000 03:30:00   6.37
CHI_6hr_100      01/01/2000 03:40:00   5.765
CHI_6hr_100      01/01/2000 03:50:00   5.272
CHI_6hr_100      01/01/2000 04:00:00   4.863
CHI_6hr_100      01/01/2000 04:10:00   4.517
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CHI_6hr_100      01/01/2000 04:20:00   4.22
CHI_6hr_100      01/01/2000 04:30:00   3.964
CHI_6hr_100      01/01/2000 04:40:00   3.739
CHI_6hr_100      01/01/2000 04:50:00   3.54
CHI_6hr_100      01/01/2000 05:00:00   3.363
CHI_6hr_100      01/01/2000 05:10:00   3.205
CHI_6hr_100      01/01/2000 05:20:00   3.062
CHI_6hr_100      01/01/2000 05:30:00   2.932
CHI_6hr_100      01/01/2000 05:40:00   2.814
CHI_6hr_100      01/01/2000 05:50:00   2.706
CHI_6hr_100      01/01/2000 06:00:00   0

;Rainfall (mm/hr)
CHI_6hr_2        01/01/2000 00:00:00   1.297
CHI_6hr_2        01/01/2000 00:10:00   1.398
CHI_6hr_2        01/01/2000 00:20:00   1.518
CHI_6hr_2        01/01/2000 00:30:00   1.663
CHI_6hr_2        01/01/2000 00:40:00   1.843
CHI_6hr_2        01/01/2000 00:50:00   2.074
CHI_6hr_2        01/01/2000 01:00:00   2.379
CHI_6hr_2        01/01/2000 01:10:00   2.803
CHI_6hr_2        01/01/2000 01:20:00   3.439
CHI_6hr_2        01/01/2000 01:30:00   4.501
CHI_6hr_2        01/01/2000 01:40:00   6.66
CHI_6hr_2        01/01/2000 01:50:00   13.563
CHI_6hr_2        01/01/2000 02:00:00   76.805
CHI_6hr_2        01/01/2000 02:10:00   27.028
CHI_6hr_2        01/01/2000 02:20:00   13.849
CHI_6hr_2        01/01/2000 02:30:00   8.88
CHI_6hr_2        01/01/2000 02:40:00   6.566
CHI_6hr_2        01/01/2000 02:50:00   5.234
CHI_6hr_2        01/01/2000 03:00:00   4.369
CHI_6hr_2        01/01/2000 03:10:00   3.761
CHI_6hr_2        01/01/2000 03:20:00   3.311
CHI_6hr_2        01/01/2000 03:30:00   2.963
CHI_6hr_2        01/01/2000 03:40:00   2.686
CHI_6hr_2        01/01/2000 03:50:00   2.46
CHI_6hr_2        01/01/2000 04:00:00   2.272
CHI_6hr_2        01/01/2000 04:10:00   2.113
CHI_6hr_2        01/01/2000 04:20:00   1.976
CHI_6hr_2        01/01/2000 04:30:00   1.858
CHI_6hr_2        01/01/2000 04:40:00   1.754
CHI_6hr_2        01/01/2000 04:50:00   1.662
CHI_6hr_2        01/01/2000 05:00:00   1.58
CHI_6hr_2        01/01/2000 05:10:00   1.507
CHI_6hr_2        01/01/2000 05:20:00   1.441
CHI_6hr_2        01/01/2000 05:30:00   1.38
CHI_6hr_2        01/01/2000 05:40:00   1.326
CHI_6hr_2        01/01/2000 05:50:00   1.275
CHI_6hr_2        01/01/2000 06:00:00   0

;Rainfall (mm/hr)
CHI_6hr_25       01/01/2000 00:00:00   2.249
CHI_6hr_25       01/01/2000 00:10:00   2.426
CHI_6hr_25       01/01/2000 00:20:00   2.637
CHI_6hr_25       01/01/2000 00:30:00   2.893
CHI_6hr_25       01/01/2000 00:40:00   3.212
CHI_6hr_25       01/01/2000 00:50:00   3.619
CHI_6hr_25       01/01/2000 01:00:00   4.159
CHI_6hr_25       01/01/2000 01:10:00   4.914
CHI_6hr_25       01/01/2000 01:20:00   6.046
CHI_6hr_25       01/01/2000 01:30:00   7.947
CHI_6hr_25       01/01/2000 01:40:00   11.837
CHI_6hr_25       01/01/2000 01:50:00   24.442
CHI_6hr_25       01/01/2000 02:00:00   144.693
CHI_6hr_25       01/01/2000 02:10:00   49.392
CHI_6hr_25       01/01/2000 02:20:00   24.95
CHI_6hr_25       01/01/2000 02:30:00   15.861
CHI_6hr_25       01/01/2000 02:40:00   11.666
CHI_6hr_25       01/01/2000 02:50:00   9.263
CHI_6hr_25       01/01/2000 03:00:00   7.71
CHI_6hr_25       01/01/2000 03:10:00   6.622
CHI_6hr_25       01/01/2000 03:20:00   5.817
CHI_6hr_25       01/01/2000 03:30:00   5.197
CHI_6hr_25       01/01/2000 03:40:00   4.705
CHI_6hr_25       01/01/2000 03:50:00   4.303
CHI_6hr_25       01/01/2000 04:00:00   3.97
CHI_6hr_25       01/01/2000 04:10:00   3.688
CHI_6hr_25       01/01/2000 04:20:00   3.446
CHI_6hr_25       01/01/2000 04:30:00   3.237
CHI_6hr_25       01/01/2000 04:40:00   3.054
CHI_6hr_25       01/01/2000 04:50:00   2.892
CHI_6hr_25       01/01/2000 05:00:00   2.747
CHI_6hr_25       01/01/2000 05:10:00   2.618
CHI_6hr_25       01/01/2000 05:20:00   2.501
CHI_6hr_25       01/01/2000 05:30:00   2.396
CHI_6hr_25       01/01/2000 05:40:00   2.299
CHI_6hr_25       01/01/2000 05:50:00   2.211
CHI_6hr_25       01/01/2000 06:00:00   0

;Rainfall (mm/hr)
CHI_6hr_5        01/01/2000 00:00:00   1.69
CHI_6hr_5        01/01/2000 00:10:00   1.822
CHI_6hr_5        01/01/2000 00:20:00   1.979
CHI_6hr_5        01/01/2000 00:30:00   2.169
CHI_6hr_5        01/01/2000 00:40:00   2.406
CHI_6hr_5        01/01/2000 00:50:00   2.708
CHI_6hr_5        01/01/2000 01:00:00   3.109
CHI_6hr_5        01/01/2000 01:10:00   3.667
CHI_6hr_5        01/01/2000 01:20:00   4.504
CHI_6hr_5        01/01/2000 01:30:00   5.905
CHI_6hr_5        01/01/2000 01:40:00   8.759
CHI_6hr_5        01/01/2000 01:50:00   17.944
CHI_6hr_5        01/01/2000 02:00:00   104.193
CHI_6hr_5        01/01/2000 02:10:00   36.002
CHI_6hr_5        01/01/2000 02:20:00   18.319
CHI_6hr_5        01/01/2000 02:30:00   11.702
CHI_6hr_5        01/01/2000 02:40:00   8.634
CHI_6hr_5        01/01/2000 02:50:00   6.872
CHI_6hr_5        01/01/2000 03:00:00   5.73
CHI_6hr_5        01/01/2000 03:10:00   4.929
CHI_6hr_5        01/01/2000 03:20:00   4.335
CHI_6hr_5        01/01/2000 03:30:00   3.877
CHI_6hr_5        01/01/2000 03:40:00   3.513
CHI_6hr_5        01/01/2000 03:50:00   3.216
CHI_6hr_5        01/01/2000 04:00:00   2.969
CHI_6hr_5        01/01/2000 04:10:00   2.76
CHI_6hr_5        01/01/2000 04:20:00   2.58
CHI_6hr_5        01/01/2000 04:30:00   2.425
CHI_6hr_5        01/01/2000 04:40:00   2.289
CHI_6hr_5        01/01/2000 04:50:00   2.168
CHI_6hr_5        01/01/2000 05:00:00   2.061
CHI_6hr_5        01/01/2000 05:10:00   1.965
CHI_6hr_5        01/01/2000 05:20:00   1.878
CHI_6hr_5        01/01/2000 05:30:00   1.799
CHI_6hr_5        01/01/2000 05:40:00   1.727
CHI_6hr_5        01/01/2000 05:50:00   1.661
CHI_6hr_5        01/01/2000 06:00:00   0

;Rainfall (mm/hr)
CHI_6hr_50       01/01/2000 00:00:00   2.489
CHI_6hr_50       01/01/2000 00:10:00   2.685
CHI_6hr_50       01/01/2000 00:20:00   2.919
CHI_6hr_50       01/01/2000 00:30:00   3.203
CHI_6hr_50       01/01/2000 00:40:00   3.556
CHI_6hr_50       01/01/2000 00:50:00   4.008
CHI_6hr_50       01/01/2000 01:00:00   4.608
CHI_6hr_50       01/01/2000 01:10:00   5.445
CHI_6hr_50       01/01/2000 01:20:00   6.702
CHI_6hr_50       01/01/2000 01:30:00   8.815
CHI_6hr_50       01/01/2000 01:40:00   13.141
CHI_6hr_50       01/01/2000 01:50:00   27.177
CHI_6hr_50       01/01/2000 02:00:00   161.471
CHI_6hr_50       01/01/2000 02:10:00   54.997
CHI_6hr_50       01/01/2000 02:20:00   27.742
CHI_6hr_50       01/01/2000 02:30:00   17.619
CHI_6hr_50       01/01/2000 02:40:00   12.949
CHI_6hr_50       01/01/2000 02:50:00   10.278
CHI_6hr_50       01/01/2000 03:00:00   8.551
CHI_6hr_50       01/01/2000 03:10:00   7.342
CHI_6hr_50       01/01/2000 03:20:00   6.448
CHI_6hr_50       01/01/2000 03:30:00   5.76
CHI_6hr_50       01/01/2000 03:40:00   5.213
CHI_6hr_50       01/01/2000 03:50:00   4.768
CHI_6hr_50       01/01/2000 04:00:00   4.397
CHI_6hr_50       01/01/2000 04:10:00   4.084
CHI_6hr_50       01/01/2000 04:20:00   3.817
CHI_6hr_50       01/01/2000 04:30:00   3.584
CHI_6hr_50       01/01/2000 04:40:00   3.381
CHI_6hr_50       01/01/2000 04:50:00   3.201
CHI_6hr_50       01/01/2000 05:00:00   3.041
CHI_6hr_50       01/01/2000 05:10:00   2.898
```

```
CHI_6hr_50       01/01/2000 05:20:00   2.769
CHI_6hr_50       01/01/2000 05:30:00   2.651
CHI_6hr_50       01/01/2000 05:40:00   2.545
CHI_6hr_50       01/01/2000 05:50:00   2.447
CHI_6hr_50       01/01/2000 06:00:00   0

;Rainfall (mm/hr)
JUL1-79          01/01/2000 00:00:00   2.3
JUL1-79          01/01/2000 00:05:00   2.3
JUL1-79          01/01/2000 00:10:00   8.89
JUL1-79          01/01/2000 00:15:00   8.89
JUL1-79          01/01/2000 00:20:00   8.89
JUL1-79          01/01/2000 00:25:00   8.89
JUL1-79          01/01/2000 00:30:00   38.1
JUL1-79          01/01/2000 00:35:00   38.1
JUL1-79          01/01/2000 00:40:00   38.1
JUL1-79          01/01/2000 00:45:00   38.1
JUL1-79          01/01/2000 00:50:00   38.1
JUL1-79          01/01/2000 00:55:00   38.1
JUL1-79          01/01/2000 01:00:00   38.1
JUL1-79          01/01/2000 01:05:00   50.8
JUL1-79          01/01/2000 01:10:00   50.8
JUL1-79          01/01/2000 01:15:00   76.2
JUL1-79          01/01/2000 01:20:00   106.7
JUL1-79          01/01/2000 01:25:00   106.7
JUL1-79          01/01/2000 01:30:00   71.1
JUL1-79          01/01/2000 01:35:00   71.1
JUL1-79          01/01/2000 01:40:00   30.5
JUL1-79          01/01/2000 01:45:00   30.5
JUL1-79          01/01/2000 01:50:00   30.5
JUL1-79          01/01/2000 01:55:00   30.5
JUL1-79          01/01/2000 02:00:00   3.8
JUL1-79          01/01/2000 02:05:00   3.8
JUL1-79          01/01/2000 02:10:00   3.8
JUL1-79          01/01/2000 02:15:00   3.8
JUL1-79          01/01/2000 02:20:00   3.8
JUL1-79          01/01/2000 02:25:00   3.8
JUL1-79          01/01/2000 02:30:00   3.8
JUL1-79          01/01/2000 02:35:00   3.8
JUL1-79          01/01/2000 02:40:00   3.8
JUL1-79          01/01/2000 02:45:00   3.8
JUL1-79          01/01/2000 02:50:00   3.8
JUL1-79          01/01/2000 02:55:00   3.8

[REPORT]
;;Reporting Options
INPUT      YES
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]
Link       244_(STM)        Culvert
Link       C1               Ditch
Link       C2               Ditch
Link       C3               Ditch
Link       C6               Ditch

[MAP]
DIMENSIONS       369414.0948      5017174.41005
369675.9432      5017722.93495
UNITS            Meters

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[POLYGONS]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------


[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[PROFILES]
;;Name           Links
;;-------------- ----------
```

1:100-year 12-hour SCS PCSWMM Output File Pre-Development Conditions

```
  ALTERNATIVE RUNOFF METHOD (ARM) - PCSWMM VERSION 7.7.3920
  ---------------------------------------------------------

  This is a new version of ARM - your feedback and
suggestions are solicited.
  Create a ticket, post on the PCSWMM feature request forum,
or email us directly!

  Simulation start time:                  01/01/2000
00:00:00
  Simulation end time:                    01/04/2000
00:00:00
  Runoff wet weather time steps:          300 seconds
  Report time steps:                      60 seconds
  Number of data points:                  4321


  ******************************
  Unit Hydrographs Runoff Method
  ******************************

  ------------------------------------------------------------
------------------------------------------------------------
----------------------------------------

Area    Time of Concentration  Time to Peak    Time after
Peak    Peak UH Flow    UH Depth
  Subcatchment          Runoff Method             Raingage
(ha)    (min)                 (min)            (min)
(m³/s/mm)       (mm)
  ------------------------------------------------------------
------------------------------------------------------------
----------------------------------------
  R2                    Nash IUH                  Rainfall
16.19  121.3                 80.87           464.13
0.01806         1
  R1                    Nash IUH                  Rainfall
68.71  146.5                 97.67           632.33
0.06347         1


  ******************
  ARM Runoff Summary
  ******************

  ------------------------------------------------------------
---------------------------------
                        Total       Total       Total
Total       Peak        Runoff
                        Precip      Losses      Runoff
Runoff      Runoff      Coeff
  Subcatchment          (mm)        (mm)        (mm)
10^6 ltr    CMS         (fraction)
  ------------------------------------------------------------
---------------------------------
  R2                    96          47          48.993
7.932       0.601       0.51
  R1                    96          44.158      51.841
35.62       2.335       0.54



  EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build
5.2.4)
  ------------------------------------------------------------
--

  WARNING 02: maximum depth increased for Node
STMMH_467_(STM)
  WARNING 02: maximum depth increased for Node
STMMH_468_(STM)

  *************

  Element Count
  *************
  Number of rain gages ...... 1
  Number of subcatchments ... 3
  Number of nodes ........... 6
  Number of links ........... 5
  Number of pollutants ...... 0
  Number of land uses ....... 0


  ****************
  Raingage Summary
  ****************
                                                        Data
Recording
  Name                  Data Source                     Type
Interval
  ------------------------------------------------------------
--------------
  Rainfall              12SCS100
INTENSITY   15 min.


  ********************
  Subcatchment Summary
  ********************
  Name                         Area     Width   %Imperv
%Slope Rain Gage            Outlet
  ------------------------------------------------------------
-------------------------------------------------
  S2_1                          0.26    130.54     60.00
3.0000 Rainfall             J1
  S2_3                          0.48    241.84     60.00
3.0000 Rainfall             STMMH_467_(STM)
  S2_4                          0.48    240.14     60.00
3.0000 Rainfall             STMMH_468_(STM)


  *************
  Node Summary
  *************
                                          Invert      Max.
Ponded    External
  Name                  Type                Elev.     Depth
Area    Inflow
  ------------------------------------------------------------
----------------------
  J1                    JUNCTION              91.35      1.75
0.0
  STMMH_467_(STM)       JUNCTION              90.40      1.81
0.0
  STMMH_468_(STM)       JUNCTION              88.37      2.33
0.0
  STMMH_474_(STM)       JUNCTION              89.84      3.00
0.0
  STMMH_475_(STM)       JUNCTION              89.33      3.00
0.0
  OF1                   OUTFALL               87.12      2.33
0.0


  *************
  Link Summary
  *************
  Name              From Node         To Node           Type
Length    %Slope Roughness
  ------------------------------------------------------------
-----------------------------------
  244_(STM)         STMMH_474_(STM)   STMMH_475_(STM)   CONDUIT
17.8    1.1771    0.0240
  C1                STMMH_475_(STM)   STMMH_468_(STM)   CONDUIT
53.9    1.7820    0.0350
  C2                STMMH_467_(STM)   STMMH_474_(STM)   CONDUIT
20.9    2.6786    0.0350
  C3                STMMH_468_(STM)   OF1               CONDUIT
30.3    4.1347    0.0350
  C6                J1                STMMH_467_(STM)   CONDUIT
258.0    0.3682    0.0350


  *********************
```

```
  Cross Section Summary
  *********************
                                        Full     Full
Hyd.     Max.   No. of     Full
  Conduit          Shape                Depth     Area
Rad.    Width  Barrels     Flow
  ------------------------------------------------------------
----------------------------
  244_(STM)        CIRCULAR             1.30     1.33
0.33     1.30        1     2.84
  C1               Channe_475-468       1.96    21.10
1.03    17.00        1    82.04
  C2               Channl_467-474       1.81    20.86
1.26    19.50        1   113.75
  C3               Outfall_Ditch        2.33    14.74
1.00    14.85        1    85.61
  C6               LimebankDitch        1.51     9.32
0.89    14.00        1    14.92



  ****************
  Transect Summary
  ****************

  Transect Channe_475-468
  Area:
              0.0017     0.0058     0.0105     0.0156
0.0211
              0.0272     0.0337     0.0407     0.0486
0.0576
              0.0685     0.0812     0.0952     0.1105
0.1269
              0.1441     0.1623     0.1815     0.2011
0.2211
              0.2416     0.2625     0.2839     0.3057
0.3278
              0.3504     0.3734     0.3968     0.4205
0.4447
              0.4691     0.4939     0.5189     0.5443
0.5700
              0.5959     0.6223     0.6490     0.6760
0.7034
              0.7311     0.7593     0.7880     0.8171
0.8467
              0.8767     0.9070     0.9377     0.9687
1.0000
  Hrad:
              0.0189     0.0501     0.0806     0.1089
0.1354
              0.1607     0.1849     0.2100     0.2357
0.2639
              0.2833     0.2994     0.3144     0.3292
0.3446
              0.3608     0.3765     0.3941     0.4138
0.4339
              0.4544     0.4749     0.4955     0.5160
0.5364
              0.5568     0.5771     0.5973     0.6172
0.6373
              0.6575     0.6776     0.6975     0.7173
0.7369
              0.7562     0.7751     0.7938     0.8123
0.8307
              0.8485     0.8651     0.8814     0.8976
0.9143
              0.9317     0.9490     0.9661     0.9831
1.0000
  Width:
              0.1098     0.1392     0.1543     0.1693
0.1844
              0.1994     0.2145     0.2346     0.2679
0.3022
              0.3799     0.4249     0.4652     0.5032
0.5340
              0.5616     0.5941     0.6162     0.6299
0.6436
              0.6571     0.6707     0.6842     0.6977
0.7108
              0.7231     0.7355     0.7479     0.7602
0.7710
              0.7808     0.7905     0.8003     0.8101
0.8199
              0.8305     0.8415     0.8526     0.8637
0.8747
              0.8871     0.9023     0.9175     0.9328
0.9460
              0.9568     0.9676     0.9784     0.9892
1.0000

  Transect Channl_467-474
  Area:
              0.0040     0.0109     0.0188     0.0275
0.0370
              0.0473     0.0583     0.0700     0.0822
0.0952
              0.1089     0.1233     0.1384     0.1546
0.1719
              0.1901     0.2087     0.2275     0.2466
0.2659
              0.2855     0.3053     0.3253     0.3457
0.3664
              0.3873     0.4086     0.4302     0.4520
0.4742
              0.4966     0.5192     0.5422     0.5654
0.5889
              0.6129     0.6374     0.6623     0.6877
0.7136
              0.7399     0.7667     0.7940     0.8218
0.8500
              0.8788     0.9081     0.9379     0.9683
1.0000
  Hrad:
              0.0188     0.0413     0.0645     0.0861
0.1068
              0.1269     0.1463     0.1665     0.1860
0.2034
              0.2205     0.2373     0.2585     0.2808
0.3014
              0.3246     0.3484     0.3723     0.3962
0.4200
              0.4437     0.4673     0.4906     0.5137
0.5365
              0.5592     0.5816     0.6037     0.6258
0.6476
              0.6693     0.6908     0.7121     0.7333
0.7536
              0.7732     0.7925     0.8115     0.8302
0.8486
              0.8666     0.8844     0.9018     0.9190
0.9359
              0.9523     0.9683     0.9841     0.9978
1.0000
  Width:
              0.1785     0.2226     0.2461     0.2697
0.2926
              0.3142     0.3356     0.3538     0.3719
0.3933
              0.4147     0.4361     0.4631     0.4939
0.5264
              0.5450     0.5523     0.5596     0.5669
0.5742
              0.5815     0.5888     0.5975     0.6064
0.6152
              0.6240     0.6329     0.6417     0.6497
0.6577
              0.6657     0.6737     0.6817     0.6897
0.7019
              0.7159     0.7300     0.7441     0.7577
0.7714
              0.7850     0.7989     0.8132     0.8275
0.8418
              0.8571     0.8730     0.8889     0.9137
1.0000

  Transect LimebankDitch
  Area:
              0.0017     0.0056     0.0104     0.0160
0.0225
              0.0299     0.0381     0.0474     0.0580
0.0699
```

```
            0.0826    0.0958    0.1095    0.1235
0.1380
            0.1529    0.1682    0.1840    0.2002
0.2168
            0.2339    0.2514    0.2692    0.2874
0.3058
            0.3246    0.3437    0.3631    0.3829
0.4029
            0.4233    0.4440    0.4650    0.4863
0.5079
            0.5299    0.5522    0.5768    0.6095
0.6426
            0.6760    0.7099    0.7441    0.7787
0.8138
            0.8492    0.8851    0.9219    0.9596
1.0000
  Hrad:
            0.0169    0.0432    0.0667    0.0882
0.1085
            0.1279    0.1452    0.1583    0.1722
0.1866
            0.2115    0.2368    0.2613    0.2852
0.3085
            0.3313    0.3537    0.3757    0.3973
0.4185
            0.4394    0.4609    0.4837    0.5063
0.5285
            0.5504    0.5720    0.5934    0.6145
0.6354
            0.6561    0.6765    0.6968    0.7168
0.7367
            0.7564    0.7759    0.7933    0.8070
0.8224
            0.8390    0.8565    0.8747    0.8933
0.9124
            0.9319    0.9510    0.9697    0.9881
1.0000
  Width:
            0.0738    0.0959    0.1147    0.1336
0.1524
            0.1713    0.1923    0.2198    0.2473
0.2747
            0.2860    0.2953    0.3047    0.3142
0.3237
            0.3332    0.3427    0.3521    0.3616
0.3711
            0.3806    0.3892    0.3962    0.4032
0.4102
            0.4172    0.4242    0.4312    0.4382
0.4452
            0.4522    0.4592    0.4662    0.4732
0.4802
            0.4872    0.4942    0.7155    0.7241
0.7327
            0.7413    0.7499    0.7585    0.7671
0.7757
            0.7843    0.8015    0.8202    0.8469
1.0000

  Transect NW_Storage_Ditch
  Area:
            0.0005    0.0019    0.0043    0.0077
0.0120
            0.0174    0.0237    0.0312    0.0398
0.0494
            0.0600    0.0714    0.0839    0.0978
0.1129
            0.1290    0.1463    0.1646    0.1840
0.2044
            0.2257    0.2479    0.2708    0.2939
0.3173
            0.3409    0.3647    0.3888    0.4132
0.4377
            0.4626    0.4879    0.5136    0.5396
0.5659
            0.5926    0.6194    0.6466    0.6739
0.7016
            0.7295    0.7577    0.7863    0.8152
0.8445
            0.8742    0.9046    0.9357    0.9675
1.0000
  Hrad:
            0.0165    0.0330    0.0496    0.0659
0.0823
            0.0982    0.1130    0.1284    0.1442
0.1612
            0.1801    0.1987    0.2100    0.2218
0.2384
            0.2549    0.2712    0.2882    0.3057
0.3235
            0.3419    0.3601    0.3884    0.4170
0.4453
            0.4734    0.5012    0.5287    0.5561
0.5827
            0.6067    0.6305    0.6540    0.6774
0.7027
            0.7285    0.7542    0.7797    0.8050
0.8301
            0.8543    0.8763    0.8981    0.9198
0.9414
            0.9562    0.9670    0.9779    0.9888
1.0000
  Width:
            0.0292    0.0585    0.0877    0.1173
0.1468
            0.1774    0.2110    0.2443    0.2771
0.3080
            0.3343    0.3606    0.4007    0.4425
0.4753
            0.5083    0.5414    0.5734    0.6041
0.6339
            0.6623    0.6907    0.6993    0.7067
0.7141
            0.7215    0.7289    0.7363    0.7437
0.7518
            0.7631    0.7744    0.7857    0.7970
0.8057
            0.8134    0.8212    0.8289    0.8367
0.8444
            0.8530    0.8637    0.8744    0.8852
0.8959
            0.9133    0.9347    0.9563    0.9781
1.0000

  Transect Outfall_Ditch
  Area:
            0.0010    0.0039    0.0077    0.0120
0.0167
            0.0218    0.0273    0.0332    0.0394
0.0461
            0.0533    0.0608    0.0687    0.0770
0.0857
            0.0949    0.1045    0.1145    0.1249
0.1357
            0.1470    0.1586    0.1708    0.1835
0.1966
            0.2102    0.2250    0.2414    0.2604
0.2869
            0.3175    0.3483    0.3793    0.4106
0.4420
            0.4740    0.5067    0.5402    0.5744
0.6094
            0.6449    0.6811    0.7178    0.7552
0.7932
            0.8321    0.8720    0.9128    0.9552
1.0000
  Hrad:
            0.0226    0.0478    0.0842    0.1168
0.1468
            0.1749    0.2014    0.2268    0.2512
0.2749
            0.2980    0.3206    0.3428    0.3643
0.3855
            0.4065    0.4273    0.4479    0.4684
0.4888
            0.5088    0.5273    0.5459    0.5646
0.5834
            0.6043    0.6301    0.6515    0.6649
0.6574
            0.6509    0.6523    0.6590    0.6694
0.6826
```

```
             0.7056     0.7287     0.7516     0.7744
0.7971
             0.8197     0.8423     0.8648     0.8872
0.9090
             0.9301     0.9507     0.9703     0.9874
1.0000
  Width:
             0.0416     0.0781     0.0867     0.0954
0.1040
             0.1126     0.1213     0.1299     0.1385
0.1472
             0.1558     0.1644     0.1731     0.1819
0.1908
             0.1997     0.2086     0.2174     0.2263
0.2352
             0.2442     0.2543     0.2645     0.2746
0.2847
             0.2995     0.3325     0.3655     0.4568
0.6495
             0.6543     0.6591     0.6638     0.6686
0.6733
             0.6893     0.7055     0.7217     0.7380
0.7514
             0.7643     0.7771     0.7900     0.8028
0.8198
             0.8396     0.8595     0.8834     0.9247
1.0000


  ****************
  Analysis Options
  ****************
  Flow Units ............... CMS
  Process Models:
    Rainfall/Runoff ........ YES
    RDII ................... NO
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... YES
    Ponding Allowed ........ NO
    Water Quality .......... NO
  Infiltration Method ...... HORTON
  Flow Routing Method ...... DYNWAVE
  Surcharge Method ......... EXTRAN
  Starting Date ............ 01/01/2000 00:00:00
  Ending Date .............. 01/04/2000 00:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 00:01:00
  Wet Time Step ............ 00:05:00
  Dry Time Step ............ 00:05:00
  Routing Time Step ........ 1.00 sec
  Variable Time Step ....... YES
  Maximum Trials ........... 8
  Number of Threads ........ 1
  Head Tolerance ........... 0.001500 m


  **************************        Volume         Depth
  Runoff Quantity Continuity     hectare-m            mm
  **************************     ---------      -------
  Total Precipitation ......         0.118        96.000
  Evaporation Loss .........         0.000         0.000
  Infiltration Loss ........         0.019        15.132
  Surface Runoff ...........         0.098        79.657
  Final Storage ............         0.002         1.443
  Continuity Error (%) .....        -0.243


  **************************        Volume        Volume
  Flow Routing Continuity        hectare-m      10^6 ltr
  **************************     ---------     ---------
  Dry Weather Inflow .......         0.000         0.000
  Wet Weather Inflow .......         0.098         0.976
  Groundwater Inflow .......         0.000         0.000
  RDII Inflow ..............         0.000         0.000
  External Inflow ..........         4.355        43.546
  External Outflow .........         4.450        44.501
  Flooding Loss ............         0.000         0.000
  Evaporation Loss .........         0.000         0.000
  Exfiltration Loss ........         0.000         0.000
  Initial Stored Volume ....         0.000         0.000
  Final Stored Volume ......         0.000         0.000
  Continuity Error (%) .....         0.048


  ***************************
  Time-Step Critical Elements
  ***************************
  None


  *******************************
  Highest Flow Instability Indexes
  *******************************
  All links are stable.


  *******************************
  Most Frequent Nonconverging Nodes
  *******************************
  Convergence obtained at all time steps.


  ************************
  Routing Time Step Summary
  ************************
  Minimum Time Step           :     0.50 sec
  Average Time Step           :     1.00 sec
  Maximum Time Step           :     1.00 sec
  % of Time in Steady State   :     0.00
  Average Iterations per Step :     2.00
  % of Steps Not Converging   :     0.00
  Time Step Frequencies       :
      1.000 -  0.871 sec      :   100.00 %
      0.871 -  0.758 sec      :     0.00 %
      0.758 -  0.660 sec      :     0.00 %
      0.660 -  0.574 sec      :     0.00 %
      0.574 -  0.500 sec      :     0.00 %


  ***************************
  Subcatchment Runoff Summary
  ***************************

  ------------------------------------------------------------
------------------------------------------------------------
--------
                                Total      Total      Total
Total     Imperv       Perv      Total      Total     Peak
Runoff
                              Precip      Runon       Evap
Infil     Runoff     Runoff     Runoff     Runoff    Runoff
Coeff
  Subcatchment                 mm         mm         mm
mm         mm         mm         mm    10^6 ltr      CMS
  ------------------------------------------------------------
------------------------------------------------------------
--------
  S2_1                       96.00       0.00       0.00
15.13      56.70      22.95      79.66       0.21      0.10
0.830
  S2_3                       96.00       0.00       0.00
15.13      56.70      22.95      79.66       0.39      0.18
0.830
  S2_4                       96.00       0.00       0.00
15.13      56.70      22.95      79.66       0.38      0.18
0.830


  ******************
  Node Depth Summary
  ******************

  ------------------------------------------------------------
-----------------------
                                  Average  Maximum  Maximum
Time of Max    Reported
                                    Depth    Depth      HGL
Occurrence   Max Depth
  Node                 Type       Meters   Meters   Meters
days hr:min      Meters
```

```
  ---------------------------------------------------------
----------------------
  J1                    JUNCTION     0.09     0.69    92.04
0  06:42        0.69
  STMMH_467_(STM)       JUNCTION     0.05     0.85    91.25
0  07:57        0.85
  STMMH_468_(STM)       JUNCTION     0.06     0.61    88.98
0  07:52        0.61
  STMMH_474_(STM)       JUNCTION     0.12     1.66    91.50
0  07:56        1.65
  STMMH_475_(STM)       JUNCTION     0.04     0.44    89.77
0  07:56        0.44
  OF1                   OUTFALL      0.06     0.61    87.73
0  07:52        0.61


  *******************
  Node Inflow Summary
  *******************

  ---------------------------------------------------------
----------------------------------------
                                  Maximum  Maximum
Lateral       Total        Flow
                                  Lateral    Total  Time of
Max      Inflow      Inflow     Balance
                                   Inflow   Inflow
Occurrence      Volume      Volume       Error
  Node                 Type            CMS      CMS  days
hr:min    10^6 ltr    10^6 ltr     Percent
  ---------------------------------------------------------
----------------------------------------
  J1                    JUNCTION     2.339    2.339     0
07:45        35.8        35.8       0.005
  STMMH_467_(STM)       JUNCTION     0.176    7.575     0
07:52       0.385        48.5      -0.482
  STMMH_468_(STM)       JUNCTION     0.608    3.109     0
07:52        8.31        44.5       0.035
  STMMH_474_(STM)       JUNCTION     0.000    9.939     0
07:56           0        48.8       0.528
  STMMH_475_(STM)       JUNCTION     0.000    2.921     0
07:58           0        36.2      -0.048
  OF1                   OUTFALL      0.000    2.945     0
07:52           0        44.5       0.000


  **********************
  Node Surcharge Summary
  **********************

  No nodes were surcharged.


  *********************
  Node Flooding Summary
  *********************

  No nodes were flooded.


  ***********************
  Outfall Loading Summary
  ***********************

  ---------------------------------------------------------
-
                        Flow       Avg       Max
Total
                        Freq      Flow      Flow
Volume
  Outfall Node           Pcnt       CMS       CMS    10^6
ltr
  ---------------------------------------------------------
-
  OF1                  45.84     0.375     2.945
44.501
  ---------------------------------------------------------
-
  System               45.84     0.375     2.945
44.501


  *******************
  Link Flow Summary
  *******************

  ---------------------------------------------------------
-------------------
                                  Maximum  Time of Max
Maximum    Max/    Max/
                                   |Flow|   Occurrence
|Veloc|    Full    Full
  Link                 Type          CMS  days hr:min
m/sec    Flow   Depth
  ---------------------------------------------------------
-------------------
  244_(STM)            CONDUIT     2.921     0  07:58
2.42    1.03    0.86
  C1                   CHANNEL     2.536     0  07:58
1.22    0.03    0.27
  C2                   CHANNEL     9.939     0  07:56
1.09    0.09    0.67
  C3                   CHANNEL     2.945     0  07:52
2.86    0.03    0.26
  C6                   CHANNEL     2.342     0  07:47
0.94    0.16    0.51


  **************************
  Flow Classification Summary
  **************************

  ---------------------------------------------------------
---------------------------
                       Adjusted    ---------- Fraction of
Time in Flow Class ----------
                        /Actual          Up    Down  Sub   Sup
Up    Down  Norm  Inlet
  Conduit               Length    Dry  Dry   Dry   Crit
Crit  Crit  Crit  Ltd   Ctrl
  ---------------------------------------------------------
---------------------------
  244_(STM)               1.00   0.01  0.00  0.00  0.00
0.00  0.00  0.99  0.00  0.21
  C1                      1.00   0.01  0.00  0.00  0.99
0.00  0.00  0.00  0.99  0.00
  C2                      1.00   0.01  0.00  0.00  0.99
0.00  0.00  0.00  0.93  0.00
  C3                      1.00   0.01  0.00  0.00  0.02
0.97  0.00  0.00  0.04  0.00
  C6                      1.00   0.01  0.00  0.00  0.99
0.00  0.00  0.00  0.02  0.00


  *************************
  Conduit Surcharge Summary
  *************************

  ---------------------------------------------------------
------------------

Hours        Hours
                          --------- Hours Full --------
Above Full   Capacity
  Conduit               Both Ends  Upstream  Dnstream
Normal Flow   Limited
  ---------------------------------------------------------
------------------
  244_(STM)                   0.01      1.12      0.01
0.10         0.01


  Analysis begun on:  Fri Jul 10 18:15:43 2026
  Analysis ended on:  Fri Jul 10 18:15:48 2026
  Total elapsed time: 00:00:05
```

Post-Development Conditions

1:100-year 12-hour SCS PCSWMM Input File Post-Development Conditions

```
[TITLE]
;;Project Title/Notes

[OPTIONS]
;;Option             Value
FLOW_UNITS           CMS
INFILTRATION         HORTON
FLOW_ROUTING         DYNWAVE
LINK_OFFSETS         ELEVATION
MIN_SLOPE            0
ALLOW_PONDING        NO
SKIP_STEADY_STATE    NO

START_DATE           01/01/2000
START_TIME           00:00:00
REPORT_START_DATE    01/01/2000
REPORT_START_TIME    00:00:00
END_DATE             01/04/2000
END_TIME             00:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:01:00
WET_STEP             00:05:00
DRY_STEP             00:05:00
ROUTING_STEP         1
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
MAX_TRIALS           8
HEAD_TOLERANCE       0.0015
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              16

[FILES]
;;Interfacing Files
USE INFLOWS "C:\Users\jboyes\OneDrive - Robinson
Consultants\Documents\PCSWMM Projects\23074 -
Limebank\Modelling\POST 12SCS100.arm.txt"

[EVAPORATION]
;;Data Source    Parameters
;;-------------- ----------------
CONSTANT         0.0
DRY_ONLY         NO

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- -------- -------- ----------
Rainfall         INTENSITY 0:15     1.0      TIMESERIES
12SCS100

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area
%Imperv  Width    %Slope   CurbLen  SnowPack
;;-------------- ---------------- ---------------- --------
-------- -------- -------- -------- ----------------
10               Rainfall         STMMH_451_(STM)  0.1266
7.143    148.941  0.5      0
11-13_1          Rainfall         St_CB11          0.2473
94.286   140.018  1        0
11-13_2          Rainfall         St_CBMH108       0.2272
94.286   201.974  2        0
;14-15 split
14-15_1          Rainfall         St_CB12          0.09
87.143   45.014   1.5      0
;14-15 split
14-15_2          Rainfall         St_CBMH110       0.106
87.143   45.032   1.4      0
16               Rainfall         St_CB13          0.2358
10       226.7    1.5      0
17-20            Rainfall         St_CB14          1.1229
97.143   410      2        0
2                Rainfall         STMMH_477_(STM)  0.2011
11.429   80.44    7.5      0
21               Rainfall         St_CB21          0.199
42.857   161.526  3        0
22               Rainfall         St_CB23          0.1248
35.714   80       0.5      0
23-25            Rainfall         St_CB24          1.3914
100      410      1.8      0
26               Rainfall         St_CB31          0.5311
65.714   302.3    1.5      0
27-30            Rainfall         St_CB34          0.5332
74.286   418.02   1.8      0
3-5_1            Rainfall         St_CBMH102       0.1474
95.714   60.016   1        0
;x1 channel flow width
3-5_2            Rainfall         St_CB01          0.4014
95.714   159.984  2.75     0
6-9_1            Rainfall         St_CB05          0.376
88.571   202.009  2        0
6-9_2            Rainfall         St_CBMH105       0.2078
88.571   83.12    0.5      0
A1               Rainfall         St_A1            0.6042
100      135.945  1        0
A2               Rainfall         St_A2            0.3973
100      89.392   1        0
B1               Rainfall         St_B1            0.5396
100      121.41   1        0
B2_B3            Rainfall         St_B2_B3         1.1222
100      252.495  1        0
C1_C2_C3         Rainfall         St_C1_C2_C3      1.7265
100      388.462  1        0
D1_D2_D3         Rainfall         St_D1_D2_D3      1.6365
100      368.213  1        0
OFF1             Rainfall         STMMH_466_(STM)  0.5761
30       523.727  0.2      0
OFF2             Rainfall         STMMH_467_(STM)  0.8556
12.857   213.9    0.235    0
OFF4             Rainfall         STMMH_466_(STM)  0.0932
1.429    175      4.978    0
Pond-1           Rainfall         Pond             1.0347
28.571   344.9    2        0
S2_1             Rainfall         J1               0.261084
60       130.542  3        0
S2_3             Rainfall         STMMH_466_(STM)  0.483681
60       241.841  3        0
S2_4             Rainfall         STMMH_468_(STM)  0.480276
60       240.138  3        0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv
PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ----------
---------- ---------- ----------
10               0.013      0.25       1.57       4.67
0          OUTLET
11-13_1          0.013      0.25       1.57       4.67
0          OUTLET
11-13_2          0.013      0.25       1.57       4.67
0          OUTLET
14-15_1          0.013      0.25       1.57       4.67
0          OUTLET
14-15_2          0.013      0.25       1.57       4.67
0          OUTLET
16               0.013      0.25       1.57       4.67
0          OUTLET
17-20            0.013      0.25       1.57       4.67
0          OUTLET
2                0.013      0.25       1.57       4.67
0          OUTLET
21               0.013      0.25       1.57       4.67
0          OUTLET
22               0.013      0.25       1.57       4.67
0          OUTLET
23-25            0.013      0.25       1.57       4.67
0          OUTLET
26               0.013      0.25       1.57       4.67
0          OUTLET
```

```
27-30           0.013      0.25       1.57       4.67
0          OUTLET
3-5_1           0.013      0.25       1.57       4.67
0          OUTLET
3-5_2           0.013      0.25       1.57       4.67
0          OUTLET
6-9_1           0.013      0.25       1.57       4.67
0          OUTLET
6-9_2           0.013      0.25       1.57       4.67
0          OUTLET
A1              0.013      0.25       1.57       4.67
0          OUTLET
A2              0.013      0.25       1.57       4.67
0          OUTLET
B1              0.013      0.25       1.57       4.67
0          OUTLET
B2_B3           0.013      0.25       1.57       4.67
0          OUTLET
C1_C2_C3        0.013      0.25       1.57       4.67
0          OUTLET
D1_D2_D3        0.013      0.25       1.57       4.67
0          OUTLET
OFF1            0.013      0.25       1.57       4.67
0          OUTLET
OFF2            0.013      0.25       1.57       4.67
0          OUTLET
OFF4            0.013      0.25       1.57       4.67
0          OUTLET
Pond-1          0.013      0.25       1.57       4.67
0          OUTLET
S2_1            0.013      0.25       1.57       4.67
0          OUTLET
S2_3            0.013      0.25       1.57       4.67
0          OUTLET
S2_4            0.013      0.25       1.57       4.67
0          OUTLET

[INFILTRATION]
;;Subcatchment   Param1     Param2     Param3     Param4
Param5
;;-------------- ---------- ---------- ---------- ----------
----------
10              80         0.5        7          0
0          CURVE_NUMBER
11-13_1         80         0.5        7          0
0          CURVE_NUMBER
11-13_2         80         0.5        7          0
0          CURVE_NUMBER
14-15_1         80         0.5        7          0
0          CURVE_NUMBER
14-15_2         80         0.5        7          0
0          CURVE_NUMBER
16              80         0.5        7          0
0          CURVE_NUMBER
17-20           80         0.5        7          0
0          CURVE_NUMBER
2               80         0.5        7          0
0          CURVE_NUMBER
21              80         0.5        7          0
0          CURVE_NUMBER
22              80         0.5        7          0
0          CURVE_NUMBER
23-25           80         0.5        7          0
0          CURVE_NUMBER
26              80         0.5        7          0
0          CURVE_NUMBER
27-30           80         0.5        7          0
0          CURVE_NUMBER
3-5_1           80         0.5        7          0
0          CURVE_NUMBER
3-5_2           80         0.5        7          0
0          CURVE_NUMBER
6-9_1           80         0.5        7          0
0          CURVE_NUMBER
6-9_2           80         0.5        7          0
0          CURVE_NUMBER
A1              80         0.5        7          0
0          CURVE_NUMBER
A2              80         0.5        7          0
0          CURVE_NUMBER
B1              80         0.5        7          0
0          CURVE_NUMBER
B2_B3           80         0.5        7          0
0          CURVE_NUMBER
C1_C2_C3        80         0.5        7          0
0          CURVE_NUMBER
D1_D2_D3        80         0.5        7          0
0          CURVE_NUMBER
OFF1            80         0.5        7          0
0          CURVE_NUMBER
OFF2            80         0.5        7          0
0          CURVE_NUMBER
OFF4            80         0.5        7          0
0          CURVE_NUMBER
Pond-1          80         0.5        7          0
0          CURVE_NUMBER
S2_1            82.75      0          7          0
0          CURVE_NUMBER
S2_3            82.75      0          7          0
0          CURVE_NUMBER
S2_4            82.75      0          7          0
0          CURVE_NUMBER

[JUNCTIONS]
;;Name           Elevation  MaxDepth   InitDepth  SurDepth
Aponded
;;-------------- ---------- ---------- ---------- ----------
----------
J1              91.35      1.75       0          0
0
;Concentric Cylindrical Structure SI
STMMH_201_(STM)  88.4       2.916      0          0
0
;Concentric Cylindrical Structure SI
STMMH_202_(STM)  88.53      2.873      0          0
0
;Concentric Cylindrical Structure SI
STMMH_203_(STM)  88.65      3.257      0          0
0
;Concentric Cylindrical Structure SI
STMMH_451_(STM)  89.28      1.975      0          0
0
;Concentric Cylindrical Structure SI
STMMH_459_(STM)  88.82      1.4        0          0
0
;Concentric Cylindrical Structure SI
STMMH_465_(STM)  88.75      2.75       0          0
0
;Concentric Cylindrical Structure SI
STMMH_466_(STM)  90.73      1.65       0          0
0
;Concentric Cylindrical Structure SI
STMMH_467_(STM)  90.4       1.65       0          0
0
;Concentric Cylindrical Structure SI
STMMH_468_(STM)  88.37      1.525      0          0
0
;Concentric Cylindrical Structure SI
STMMH_473_(STM)  89.731     1.24       0          0
0
;Concentric Cylindrical Structure SI
STMMH_474_(STM)  89.84      3          0          0
0
;Concentric Cylindrical Structure SI
STMMH_475_(STM)  89.33      3          0          0
0
;Concentric Cylindrical Structure SI
STMMH_477_(STM)  89.85      1.326      0          0
0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data
Gated    Route To
;;-------------- ---------- ---------- ---------------- ----
---- ----------------
OF1             87.12      FREE                        NO

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape
Curve Name/Params            SurDepth Fevap    Psi      Ksat
IMD
```

```
;;-------------- -------- ---------- ---------- ----------
---------------------------- -------- -------- -------- ----
---- --------
;Concentric Cylindrical Structure SI
CB_04_(STM)      90.73    1.875      0          FUNCTIONAL
0         0         1.13     0        0
;Concentric Cylindrical Structure SI
CB_07_(STM)      90.61    2.59       0          FUNCTIONAL
0         0         1.13     0        0
;Concentric Cylindrical Structure SI
CB_08_(STM)      90.62    2.481      0          FUNCTIONAL
0         0         1.13     0        0
;Concentric Cylindrical Structure SI
CB_11_(STM)      90.42    1.875      0          FUNCTIONAL
0         0         1.13     0        0
;Concentric Cylindrical Structure SI
CB_12_(STM)      90.49    1.86       0          FUNCTIONAL
0         0         1.13     0        0
;Concentric Cylindrical Structure SI
CBMH_102_(STM)   89.95    2.25       0          FUNCTIONAL
0         0         1.13     0        0
;Concentric Cylindrical Structure SI
CBMH_103_(STM)   90.11    2.11       0          FUNCTIONAL
0         0         1.13     0        0
;Concentric Cylindrical Structure SI
CBMH_105_(STM)   90.13    2.07       0          FUNCTIONAL
0         0         1.13     0        0
;Concentric Cylindrical Structure SI
CBMH_108_(STM)   89.72    2.42       0          FUNCTIONAL
0         0         1.13     0        0
;Concentric Cylindrical Structure SI
CBMH_109_(STM)   89.89    2.41       0          FUNCTIONAL
0         0         1.13     0        0
;Concentric Cylindrical Structure SI
CBMH_110_(STM)   90.1     2.2        0          FUNCTIONAL
0         0         1.13     0        0
Pond             89.05    3.25       0          TABULAR
SWM_Facility_1                0        0
St_A1            102.7    0.05       0          FUNCTIONAL
0         0         6042     0        0
St_A2            102.7    0.05       0          FUNCTIONAL
0         0         3973     0        0
St_B1            108      0.05       0          FUNCTIONAL
0         0         5396     0        0
St_B2_B3         107.8    0.05       0          FUNCTIONAL
0         0         11222    0        0
St_C1_C2_C3      108      0.05       0          FUNCTIONAL
0         0         17265    0        0
St_CB01          92.12    0.3        0          TABULAR
CB01                          0        0
St_CB05          92.2     0.33       0          TABULAR
CB5                           0        0
St_CB11          92.18    0.54       0          TABULAR
CB11_revised                  0        0
St_CB12          92.35    0.35       0          TABULAR
CB12_revised                  0        0
St_CB13          91.47    0.91       0          TABULAR
CB13                          0        0
St_CB14          92.18    0.45       0          TABULAR
CB14                          0        0
St_CB21          92.21    0.38       0          TABULAR
CB21                          0        0
St_CB23          92.32    0.35       0          TABULAR
CB23                          0        0
St_CB24          92.33    0.41       0          TABULAR
CB24                          0        0
St_CB31          92.31    0.4        0          TABULAR
CB31                          0        0
St_CB34          92.5     0.41       0          TABULAR
CB34                          0        0
St_CBMH102       92.2     0.25       0          TABULAR
CBMH103                       0        0
St_CBMH105       92.1     0.44       0          TABULAR
CBMH105                       0        0
St_CBMH108       92.14    0.37       0          TABULAR
CBMH108                       0        0
St_CBMH110       92.3     0.25       0          TABULAR
CBMH110_revised               0        0
St_D1_D2_D3      103.1    0.05       0          FUNCTIONAL
0         0         16365    0        0
;Concentric Cylindrical Structure SI
STMMH_101_(STM)  89.91    2.327      0          FUNCTIONAL
0         0         1.13     0        0
;Concentric Cylindrical Structure SI
STMMH_104_(STM)  90.36    2.045      0          FUNCTIONAL
0         0         1.13     0        0
;Concentric Cylindrical Structure SI
STMMH_106_(STM)  90.45    1.897      0          FUNCTIONAL
0         0         1.13     0        0
;Concentric Cylindrical Structure SI
STMMH_107_(STM)  89.31    3.627      0          FUNCTIONAL
0         0         1.13     0        0
;Concentric Cylindrical Structure SI
STMMH_111_(STM)  89.46    3.203      0          FUNCTIONAL
0         0         1.13     0        0
;Concentric Cylindrical Structure SI
STMMH_112_(STM)  89.6     2.826      0          FUNCTIONAL
0         0         1.13     0        0
;Concentric Cylindrical Structure SI
STMMH_116_(STM)  89.77    2.858      0          FUNCTIONAL
0         0         1.13     0        0
;Concentric Cylindrical Structure SI
STMMH_117_(STM)  90.16    2.335      0          FUNCTIONAL
0         0         1.13     0        0
;Null Structure
STMMH_120_(STM)  90.18    2.52       0          FUNCTIONAL
0         0         1.13     0        0

[CONDUITS]
;;Name           From Node        To Node          Length
Roughness  InOffset   OutOffset  InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------
- ---------- ---------- ---------- ---------- ----------
;Concrete Pipe SI
154_(1)_(STM)    STMMH_120_(STM)  STMMH_117_(STM)  115.603
0.013      90.48      90.31      0          0
;Concrete Pipe SI
156_(STM)        CB_04_(STM)      STMMH_104_(STM)  53.637
0.013      91.03      90.82      0          0
;Concrete Pipe SI
157_(1)_(STM)    CBMH_109_(STM)   CBMH_108_(STM)   35.916
0.013      90.19      90.12      0          0
;Concrete Pipe SI
158_(1)_(STM)    STMMH_107_(STM)  STMMH_451_(STM)  18.539
0.013      89.61      89.58      0          0
;Concrete Pipe SI
158_(STM)        CBMH_108_(STM)   STMMH_107_(STM)  23.966
0.013      90.02      90         0          0
;Concrete Pipe SI
160_(STM)        STMMH_104_(STM)  CBMH_103_(STM)   86.041
0.013      90.66      90.47      0          0
;Concrete Pipe SI
161_(STM)        CBMH_103_(STM)   CBMH_102_(STM)   36.659
0.013      90.41      90.33      0          0
;PVC Pipe SI
166_(STM)        CBMH_105_(STM)   CBMH_102_(STM)   44.613
0.013      90.43      90.33      0          0
;Concrete Pipe SI
167_(3)_(STM)    STMMH_117_(STM)  STMMH_116_(STM)  56.717
0.013      90.16      90.09      0          0
;Corrugated Metal Pipe SI
170_(STM)        STMMH_112_(STM)  STMMH_111_(STM)  82.822
0.013      89.9       89.78      0          0
;Concrete Pipe SI
171_(1)_(STM)    STMMH_106_(STM)  CBMH_105_(STM)   76.541
0.013      90.75      90.52      0          0
;Concrete Pipe SI
172_(STM)        CB_07_(STM)      STMMH_106_(STM)  22.878
0.013      90.91      90.82      0          0
;Concrete Pipe SI
175_(STM)        CBMH_102_(STM)   STMMH_101_(STM)  3.327
0.013      90.25      90.24      0          0
;Concrete Pipe SI
176_(1)_(1)_(STM) CB_11_(STM)     CBMH_108_(STM)   82.217
0.013      90.72      90.35      0          0
;Concrete Pipe SI
179_(STM)        CB_08_(STM)      CBMH_105_(STM)   47.258
0.013      90.92      90.64      0          0
;Corrugated Metal Pipe SI
184_(STM)        CBMH_110_(STM)   CBMH_109_(STM)   51.082
0.013      90.4       90.27      0          0
;Corrugated Metal Pipe SI
```

```
186_(STM)        CB_12_(STM)      CBMH_110_(STM)   38.593
0.013      90.79      90.56      0          0
;Corrugated Metal Pipe SI
200_(STM)        STMMH_101_(STM)  STMMH_477_(STM)  28.286
0.013      90.21      90.15      0          0
;Corrugated HDPE Pipe SI
226_(1)_(1)_(2)_(STM) STMMH_459_(STM) Pond         47.775
0.024      89.359     89.12      0          0
;Corrugated HDPE Pipe SI
226_(1)_(STM)    STMMH_473_(STM)  Pond             52.297
0.024      90.031     89.77      0          0
;Concrete Pipe SI
230_(STM)        STMMH_466_(STM)  STMMH_467_(STM)  32.852
0.024      90.73      90.7       0          0
;Corrugated Metal Pipe SI
237_(STM)        STMMH_111_(STM)  STMMH_107_(STM)  46.477
0.013      89.76      89.69      0          0
;Concrete Pipe SI
238_(STM)        STMMH_465_(STM)  STMMH_203_(STM)  23.523
0.013      89.05      89.01      0          0
;Concrete Pipe SI
239_(1)_(STM)    STMMH_202_(STM)  STMMH_201_(STM)  65.809
0.013      88.83      88.73      0          0
;Concrete Pipe SI
239_(STM)        STMMH_203_(STM)  STMMH_202_(STM)  65.232
0.013      88.95      88.85      0          0
;Concrete Pipe SI
240_(STM)        STMMH_201_(STM)  STMMH_468_(STM)  9.92
0.013      88.7       88.67      0          0
;Concrete Pipe SI
242_(STM)        STMMH_116_(STM)  STMMH_112_(STM)  78.969
0.013      90.07      89.98      0          0
;Concrete Pipe SI
244_(STM)        STMMH_474_(STM)  STMMH_475_(STM)  17.841
0.024      89.84      89.63      0          0
C1               STMMH_475_(STM)  STMMH_468_(STM)  53.881
0.04       89.33      88.37      0          0
C2               STMMH_467_(STM)  STMMH_474_(STM)  20.914
0.04       90.4       89.84      0          0
C3               STMMH_468_(STM)  OF1              30.258
0.01       88.37      87.12      0          0
C4               STMMH_477_(STM)  STMMH_473_(STM)  28
0.04       90.15      90.031     0          0
C5               STMMH_451_(STM)  STMMH_459_(STM)  57.9
0.04       89.58      89.359     0          0
C6               J1               STMMH_466_(STM)  225
0.01       91.35      90.73      0          0

[ORIFICES]
;;Name           From Node        To Node          Type
Offset     Qcoeff     Gated    CloseTime
;;-------------- ---------------- ---------------- ---------
---------- ---------- ---------- -------- ----------
OR3              Pond             STMMH_465_(STM)  SIDE
89.05      0.61       NO       0

[WEIRS]
;;Name           From Node        To Node          Type
CrestHt    Qcoeff     Gated    EndCon   EndCoeff   Surcharge
RoadWidth  RoadSurf   Coeff. Curve
;;-------------- ---------------- ---------------- ----------
---------- ---------- ---------- -------- -------- ---------- -----
----- ---------- ---------- ----------------
;Dwg notes emergency spill EL as 92.2. Confirm.
W_Pond           Pond             STMMH_466_(STM)
TRAPEZOIDAL  92.2       1.84       NO       0        0
NO
W_St_CB05        St_CB05          St_CBMH105       V-NOTCH
92.31      0.62       NO       0          0        NO
W_St_CB11        St_CB11          Pond             V-NOTCH
92.28      0.62       NO       0          0        NO
;Effective weir combining curb depression and curb inlet
W_St_CB13        St_CB13          St_CBMH108       V-NOTCH
92.3       0.62       NO       0          0        NO
W_St_CB14        St_CB14          St_CB13
TRANSVERSE   92.48      1.84       NO       0        0
NO
W_St_CB21        St_CB21          St_CB13
TRANSVERSE   92.44      1.84       NO       0        0
NO
W_St_CB23        St_CB23          St_CB21
TRANSVERSE   92.52      1.84       NO       0        0
NO
W_St_CB24        St_CB24          St_CB31
TRANSVERSE   92.59      1.84       NO       0        0
NO
W_St_CB31        St_CB31          St_CB23
TRANSVERSE   92.56      1.84       NO       0        0
NO
W_St_CB34        St_CB34          St_CB31
TRANSVERSE   92.76      1.84       NO       0        0
NO
W_St_CBMH102     St_CBMH102       STMMH_477_(STM)  V-NOTCH
92.3       0.62       NO       0          0        NO
W_St_CBMH108     St_CBMH108       St_CB11
TRANSVERSE   92.36      1.84       NO       0        0
NO
W_St_CBMH110     St_CBMH110       St_CB05          V-NOTCH
92.4       0.62       NO       0          0        NO
W1               St_CB01          STMMH_477_(STM)
TRANSVERSE   92.27      1.84       NO       0        0
NO
W1_St_CB12       St_CB12          St_CBMH110
TRANSVERSE   92.55      1.84       NO       0        0
NO
W2               St_CBMH105       Pond             V-NOTCH
92.17      0.62       NO       0          0        NO
W3               Pond             STMMH_465_(STM)
TRANSVERSE   89.9       1.84       NO       0        0
YES
W4               Pond             STMMH_465_(STM)
TRANSVERSE   90.2       1.84       NO       0        0
YES

[OUTLETS]
;;Name           From Node        To Node          Offset
Type             QTable/Qcoeff    Qexpon     Gated
;;-------------- ---------------- ---------------- ---------
- ---------------- ---------------- ---------- --------
OUT_St_A1        St_A1            CB_12_(STM)      102.7
TABULAR/HEAD     Roof_A1                     YES
OUT_St_A2        St_A2            CBMH_109_(STM)   102.7
TABULAR/HEAD     Roof_A2                     YES
OUT_St_B1        St_B1            CB_12_(STM)      108
TABULAR/HEAD     Roof_B1                     YES
OUT_St_B2_B3     St_B2_B3         CBMH_108_(STM)   107.8
TABULAR/HEAD     Roof_B2_B3                  YES
OUT_St_C1_C2_C3  St_C1_C2_C3      STMMH_112_(STM)  108
TABULAR/HEAD     Roof_C1_C2_C3               YES
OUT_St_CB01      St_CB01          STMMH_104_(STM)  92.12
TABULAR/HEAD     CBx4                        NO
OUT_St_CB05      St_CB05          STMMH_106_(STM)  92.2
TABULAR/HEAD     CBx3                        NO
OUT_St_CB11      St_CB11          CB_11_(STM)      92.18
TABULAR/HEAD     CBx3                        NO
OUT_St_CB12      St_CB12          CB_12_(STM)      92.35
TABULAR/HEAD     CBx1                        NO
OUT_St_CB13      St_CB13          STMMH_111_(STM)  91.47
TABULAR/HEAD     CBx1                        NO
OUT_St_CB14      St_CB14          STMMH_112_(STM)  92.18
TABULAR/HEAD     CBx6                        NO
OUT_St_CB21      St_CB21          STMMH_112_(STM)  92.21
TABULAR/HEAD     CBx2                        NO
OUT_St_CB23      St_CB23          STMMH_116_(STM)  92.32
TABULAR/HEAD     CBx1                        NO
OUT_St_CB24      St_CB24          STMMH_117_(STM)  92.33
TABULAR/HEAD     CBx7                        NO
OUT_St_CB31      St_CB31          STMMH_117_(STM)  92.31
TABULAR/HEAD     CBx3                        NO
OUT_St_CB34      St_CB34          STMMH_120_(STM)  92.5
TABULAR/HEAD     CBx6                        NO
OUT_St_CBMH102   St_CBMH102       CBMH_102_(STM)   92.2
TABULAR/HEAD     CBMHx2                      NO
OUT_St_CBMH105   St_CBMH105       CB_08_(STM)      92.1
TABULAR/HEAD     CBx2                        NO
OUT_St_CBMH108   St_CBMH108       CBMH_108_(STM)   92.14
TABULAR/HEAD     CBMHx2                      NO
OUT_St_CBMH110   St_CBMH110       CBMH_110_(STM)   92.3
TABULAR/HEAD     CBMHx1                      NO
OUT_St_D1_D2_D3  St_D1_D2_D3      STMMH_120_(STM)  103.1
TABULAR/HEAD     Roof_D1_D2_D3               YES
```

```
OVF_CB_07        CB_07_(STM)      St_CB05          92.2
TABULAR/HEAD     Manhole_Rating_Curve            YES
OVF_CB_08        CB_08_(STM)      St_CBMH105       92.101
TABULAR/HEAD     Manhole_Rating_Curve            YES

[XSECTIONS]
;;Link           Shape        Geom1            Geom2
Geom3      Geom4      Barrels    Culvert
;;-------------- ------------ ---------------- ---------- --
-------- ---------- ---------- ----------
154_(1)_(STM)    CIRCULAR     0.675            0          0
0          1
156_(STM)        CIRCULAR     0.3              0          0
0          1
157_(1)_(STM)    CIRCULAR     0.525            0          0
0          1
158_(1)_(STM)    CIRCULAR     0.975            0          0
0          1
158_(STM)        CIRCULAR     0.6              0          0
0          1
160_(STM)        CIRCULAR     0.45             0          0
0          1
161_(STM)        CIRCULAR     0.45             0          0
0          1
166_(STM)        CIRCULAR     0.45             0          0
0          1
167_(3)_(STM)    CIRCULAR     0.825            0          0
0          1
170_(STM)        CIRCULAR     0.9              0          0
0          1
171_(1)_(STM)    CIRCULAR     0.375            0          0
0          1
172_(STM)        CIRCULAR     0.3              0          0
0          1
175_(STM)        CIRCULAR     0.525            0          0
0          1
176_(1)_(1)_(STM) CIRCULAR    0.3              0          0
0          1
179_(STM)        CIRCULAR     0.25             0          0
0          1
184_(STM)        CIRCULAR     0.45             0          0
0          1
186_(STM)        CIRCULAR     0.3              0          0
0          1
200_(STM)        CIRCULAR     0.525            0          0
0          1
226_(1)_(1)_(2)_(STM) CIRCULAR 0.4            0          0
0          4          6
226_(1)_(STM)    CIRCULAR     0.4              0          0
0          2          6
230_(STM)        CIRCULAR     1.3              0          0
0          1          6
237_(STM)        CIRCULAR     0.9              0          0
0          1
238_(STM)        CIRCULAR     0.6              0          0
0          1
239_(1)_(STM)    CIRCULAR     0.6              0          0
0          1
239_(STM)        CIRCULAR     0.6              0          0
0          1
240_(STM)        CIRCULAR     0.6              0          0
0          1
242_(STM)        CIRCULAR     0.825            0          0
0          1
244_(STM)        CIRCULAR     1.3              0          0
0          1          6
C1               IRREGULAR    Channe_475-468
C2               IRREGULAR    Channl_467-474
C3               IRREGULAR    Outfall_Ditch
C4               IRREGULAR    NW_Storage_Ditch
C5               TRAPEZOIDAL  2                6
3.5        3.5        1
C6               IRREGULAR    LimebankDitch
OR3              CIRCULAR     0.15             0          0
0
W_Pond           TRAPEZOIDAL  0.1              77.4       15
15
W_St_CB05        TRIANGULAR   0.22             20         0
0
W_St_CB11        TRIANGULAR   0.44             24.1       0
0
W_St_CB13        TRIANGULAR   0.08             30         0
0
W_St_CB14        RECT_OPEN    0.15             19.46      0
0
W_St_CB21        RECT_OPEN    0.15             5.34       1
1
W_St_CB23        RECT_OPEN    0.15             7.41       0
0
W_St_CB24        RECT_OPEN    0.15             22.6       0
0
W_St_CB31        RECT_OPEN    0.15             12.35      0
0
W_St_CB34        RECT_OPEN    0.15             13.6       0
0
W_St_CBMH102     TRIANGULAR   0.15             52         0
0
W_St_CBMH108     RECT_OPEN    0.15             23.16      0
0
W_St_CBMH110     TRIANGULAR   0.23             12.53      0
0
W1               RECT_OPEN    0.15             12.85      0
0
W1_St_CB12       RECT_OPEN    0.15             10.11      0
0
W2               TRIANGULAR   0.37             37.79      0
0
W3               RECT_OPEN    2.49             0.3        0
0
W4               RECT_OPEN    2.05             2          0
0

[TRANSECTS]
;;Transect Data in HEC-2 format
;
;Averaged transect, created from transects:
;4, 5
NC 0.045    0.045    0.035
X1 Channe_475-468    17       6.5      10.5     0.0      0.0
0.0      0.0      0.0
GR 90.216   1.5      90.094   2.5      90.016   3.5
89.953   4.5      89.925   5.5
GR 89.836   6.5      89.534   7.5      89.579   9.5
89.888   10.5     90.158   11.5
GR 90.326   12.5     90.496   13.5     90.682   14.5
90.917   15.5     91.125   16.5
GR 91.276   17.5     91.489   18.5
;
;Ditch created from measure tool across ditch
NC 0.045    0.045    0.035
X1 Channl_467-474    21       9        18       0.0      0.0
0.0      0.0      0.0
GR 92.045   0        92.053   1        92       2
91.883   3        91.753   4
GR 91.617   5        91.485   6        91.253   7
91.043   8        90.789   9
GR 90.494   10       90.304   11       90.256   12
90.242   13       90.249   14
GR 90.276   15       90.411   16       90.568   17
90.691   18       90.767   19
GR 90.8     19.497
;
;Ditch created from measure tool, conveying flows from
expanded DA down Limebank
NC 0.045    0.045    0.035
X1 LimebankDitch     15       4        11       0.0      0.0
0.0      0.0      0.0
GR 92.635   0        92.669   1        92.668   2
92.553   3        92.302   4
GR 91.813   5        91.5     6        91.158   7
91.19    8        91.362   9
GR 91.464   10       92.3     11       92.3     12
92.3     13       92.3     14
;
NC 0.045    0.045    0.045
X1 NW_Storage_Ditch  21       7        17       0.0      0.0
0.0      0.0      0.0
GR 92.56    0        92.454   1        92.346   2
92.13    3        91.831   4
GR 91.626   5        91.313   6        91.004   7
90.688   8        90.402   9
```

```
GR 90.243   10       90.401   11       90.509   12
90.6     13       90.694   14
GR 90.816   15       90.873   16       90.964   17
91.054   18       91.154   19
GR 91.265   20
;
;Ditch created from measure tool across ditch
NC 0.045    0.045    0.035
X1 Outfall_Ditch     16       5        10       0.0      0.0
0.0      0.0      0.0
GR 89.433   0        89.423   1        89.42    2
89.395   3        89.362   4
GR 89.251   5        88.665   6        88.05    7
88.136   8        89.023   9
GR 89.681   10       89.874   11       90.118   12
90.276   13       90.352   14
GR 90.378   14.848

[LOSSES]
;;Link           Kentry     Kexit      Kavg       Flap Gate
Seepage
;;-------------- ---------- ---------- ---------- ----------
----------
154_(1)_(STM)    0          0.032      0          NO
0
156_(STM)        0          0.032      0          NO
0
157_(1)_(STM)    0          0.032      0          NO
0
158_(1)_(STM)    0          0.5        0          NO
0
158_(STM)        0          1.319      0          NO
0
160_(STM)        0          1.319      0          NO
0
161_(STM)        0          1.319      0          NO
0
166_(STM)        0          1.195      0          NO
0
167_(3)_(STM)    0          0.032      0          NO
0
170_(STM)        0          0.032      0          NO
0
171_(1)_(STM)    0          1.195      0          NO
0
172_(STM)        0          0.051      0          NO
0
175_(STM)        0          0.051      0          NO
0
176_(1)_(1)_(STM) 0         1.319      0          NO
0
179_(STM)        0          0.21       0          NO
0
184_(STM)        0          0.032      0          NO
0
186_(STM)        0          1.319      0          NO
0
200_(STM)        0          1.319      0          NO
0
226_(1)_(1)_(2)_(STM) 0.9   0.5        0          NO
0
226_(1)_(STM)    0.9        0.5        0          NO
0
230_(STM)        0.9        0.5        0          NO
0
237_(STM)        0          0.051      0          NO
0
238_(STM)        0          0.843      0          NO
0
239_(1)_(STM)    0          0.726      0          NO
0
239_(STM)        0          1.319      0          NO
0
240_(STM)        0          0.116      0          NO
0
242_(STM)        0          0.032      0          NO
0
244_(STM)        0.9        0.5        0          NO
0

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
;City of Ottawa Continuous Fishbone CB Inlet Curve
CB_Fishbone      Rating     0          0
CB_Fishbone                 0.01       0.001
CB_Fishbone                 0.015      0.003
CB_Fishbone                 0.021      0.007
CB_Fishbone                 0.03       0.014
CB_Fishbone                 0.04       0.024
CB_Fishbone                 0.05       0.036
CB_Fishbone                 0.054      0.036
CB_Fishbone                 0.06       0.047
CB_Fishbone                 0.07       0.05
CB_Fishbone                 1          0.05

;CBMH Inlet Capture Curve based on the OSDG Appendix 7-A
CBMHx1           Rating     0          0
CBMHx1                      0.122      0.06
CBMHx1                      0.183      0.073
CBMHx1                      0.2        0.076
CBMHx1                      0.243      0.084
CBMHx1                      0.305      0.094

;x2 concurrent CBMH discharge
CBMHx2           Rating     0          0
CBMHx2                      0.122      0.12
CBMHx2                      0.183      0.146
CBMHx2                      0.2        0.152
CBMHx2                      0.243      0.168
CBMHx2                      0.305      0.188

;x3 concurrent CBMH discharge
CBMHx3           Rating     0          0
CBMHx3                      0.122      0.18
CBMHx3                      0.183      0.219
CBMHx3                      0.2        0.228
CBMHx3                      0.243      0.252
CBMHx3                      0.305      0.282

;City of Ottawa Standard CB Inlet Curve at low point
CBx1             Rating     0          0
CBx1                        0.01       0.002
CBx1                        0.015      0.002
CBx1                        0.021      0.003
CBx1                        0.03       0.005
CBx1                        0.04       0.006
CBx1                        0.05       0.008
CBx1                        0.054      0.01
CBx1                        0.06       0.013
CBx1                        0.08       0.022
CBx1                        0.09       0.034
CBx1                        0.1        0.048
CBx1                        0.104      0.052
CBx1                        0.11       0.06
CBx1                        0.14       0.08
CBx1                        0.15       0.085
CBx1                        0.16       0.09
CBx1                        0.17       0.095
CBx1                        0.2        0.097
CBx1                        0.3        0.1
CBx1                        1          0.1

;2 concurrent CBs
CBx2             Rating     0          0
CBx2                        0.01       0.004
CBx2                        0.015      0.004
CBx2                        0.021      0.006
CBx2                        0.03       0.01
CBx2                        0.04       0.012
CBx2                        0.05       0.016
CBx2                        0.054      0.02
CBx2                        0.06       0.026
CBx2                        0.08       0.044
CBx2                        0.09       0.068
CBx2                        0.1        0.096
CBx2                        0.104      0.104
CBx2                        0.11       0.12
CBx2                        0.14       0.16
CBx2                        0.15       0.17
CBx2                        0.16       0.18
CBx2                        0.17       0.19
```

```
CBx2                    0.2       0.194
CBx2                    0.3       0.2
CBx2                    1         0.2

;3 concurrent CB discharge
CBx3            Rating  0         0
CBx3                    0.01      0.006
CBx3                    0.015     0.006
CBx3                    0.021     0.009
CBx3                    0.03      0.015
CBx3                    0.04      0.018
CBx3                    0.05      0.024
CBx3                    0.054     0.03
CBx3                    0.06      0.039
CBx3                    0.08      0.066
CBx3                    0.09      0.102
CBx3                    0.1       0.144
CBx3                    0.104     0.156
CBx3                    0.11      0.18
CBx3                    0.14      0.24
CBx3                    0.15      0.255
CBx3                    0.16      0.27
CBx3                    0.17      0.285
CBx3                    0.2       0.291
CBx3                    0.3       0.3
CBx3                    1         0.3

;4 concurrent CB discharge
CBx4            Rating  0         0
CBx4                    0.01      0.008
CBx4                    0.015     0.008
CBx4                    0.021     0.012
CBx4                    0.03      0.02
CBx4                    0.04      0.024
CBx4                    0.05      0.032
CBx4                    0.054     0.04
CBx4                    0.06      0.052
CBx4                    0.08      0.088
CBx4                    0.09      0.136
CBx4                    0.1       0.192
CBx4                    0.104     0.208
CBx4                    0.11      0.24
CBx4                    0.14      0.32
CBx4                    0.15      0.34
CBx4                    0.16      0.36
CBx4                    0.17      0.38
CBx4                    0.2       0.388
CBx4                    0.3       0.4
CBx4                    1         0.4

;5 concurrent CB discharge
CBx5            Rating  0         0
CBx5                    0.01      0.01
CBx5                    0.015     0.01
CBx5                    0.021     0.015
CBx5                    0.03      0.025
CBx5                    0.04      0.03
CBx5                    0.05      0.04
CBx5                    0.054     0.05
CBx5                    0.06      0.065
CBx5                    0.08      0.11
CBx5                    0.09      0.17
CBx5                    0.1       0.24
CBx5                    0.104     0.26
CBx5                    0.11      0.3
CBx5                    0.14      0.4
CBx5                    0.15      0.425
CBx5                    0.16      0.45
CBx5                    0.17      0.475
CBx5                    0.2       0.485
CBx5                    0.3       0.5
CBx5                    1         0.5

;6 CB concurrent discharge
CBx6            Rating  0         0
CBx6                    0.01      0.012
CBx6                    0.015     0.012
CBx6                    0.021     0.018
CBx6                    0.03      0.03
CBx6                    0.04      0.036
CBx6                    0.05      0.048
CBx6                    0.054     0.06
CBx6                    0.06      0.078
CBx6                    0.08      0.132
CBx6                    0.09      0.204
CBx6                    0.1       0.288
CBx6                    0.104     0.312
CBx6                    0.11      0.36
CBx6                    0.14      0.48
CBx6                    0.15      0.51
CBx6                    0.16      0.54
CBx6                    0.17      0.57
CBx6                    0.2       0.582
CBx6                    0.3       0.6
CBx6                    1         0.6

;7 concurrent CB discharge
CBx7            Rating  0         0
CBx7                    0.01      0.014
CBx7                    0.015     0.014
CBx7                    0.021     0.021
CBx7                    0.03      0.035
CBx7                    0.04      0.042
CBx7                    0.05      0.056
CBx7                    0.054     0.07
CBx7                    0.06      0.091
CBx7                    0.08      0.154
CBx7                    0.09      0.238
CBx7                    0.1       0.336
CBx7                    0.104     0.364
CBx7                    0.11      0.42
CBx7                    0.14      0.56
CBx7                    0.15      0.595
CBx7                    0.16      0.63
CBx7                    0.17      0.665
CBx7                    0.2       0.679
CBx7                    0.3       0.7
CBx7                    1         0.7

Manhole_Rating_Curve Rating     0.11      0
Manhole_Rating_Curve            0.2       0.3
Manhole_Rating_Curve            0.3       0.63
Manhole_Rating_Curve            0.4       0.96
Manhole_Rating_Curve            0.5       1.3
Manhole_Rating_Curve            0.6       1.63
Manhole_Rating_Curve            0.7       1.96
Manhole_Rating_Curve            0.8       2.29
Manhole_Rating_Curve            0.9       2.63
Manhole_Rating_Curve            1         2.96

;The outflow from the roof is calculated based on the
release rate of 24 l/s/ha
Roof_A1         Rating  0         0
Roof_A1                 0.01      0.023
Roof_A1                 0.5       0.024

;The outflow from the roof is calculated based on the
release rate of 16 l/s/ha
Roof_A2         Rating  0         0
Roof_A2                 0.01      0.015
Roof_A2                 0.15      0.016

;The outflow from the roof is calculated based on the
release rate of 22 l/s/ha
Roof_B1         Rating  0         0
Roof_B1                 0.01      0.021
Roof_B1                 0.5       0.022

;Roof B2-B3 cum. release rate.
Roof_B2_B3      Rating  0         0
Roof_B2_B3              0.01      0.044
Roof_B2_B3              0.5       0.045

;Roof C1-C3 cum. release rate.
Roof_C1_C2_C3   Rating  0         0
Roof_C1_C2_C3           0.01      0.068
Roof_C1_C2_C3           0.5       0.069

;Roof D1-D3 cum. release rate.
Roof_D1_D2_D3   Rating  0         0
Roof_D1_D2_D3           0.01      0.065
Roof_D1_D2_D3           0.5       0.066
```

```
;Takes into account available storage areas at the upstream
CBs: 1-4. 300mm above 92.3 spill EL
CB01            Storage    0          0
CB01                       0.05       18.13375705
CB01                       0.1        103.2470128
CB01                       0.15       305.908016
CB01                       0.2        633.7163064
CB01                       0.25       1086.671884
CB01                       0.3        1664.774749
CB01                       0.35       2368.024901
CB01                       0.4        3196.42234
CB01                       0.45       4149.967067
CB01                       0.5        5228.659081

;Takes into account available storage areas at the upstream
CBs: 9, 10, 11. 300mm above 92.28 spill EL
CB11_revised    Storage    0          0
CB11_revised               0.05       45.52875
CB11_revised               0.1        210.2744444
CB11_revised               0.15       498.2598611
CB11_revised               0.2        909.485
CB11_revised               0.25       1443.949861
CB11_revised               0.3        2101.654444
CB11_revised               0.35       2882.59875
CB11_revised               0.4        3786.782778

;Takes into account available storage areas at CB12 only.
Extrapolated 300mm above ponding depth
CB12_revised    Storage    0          0
CB12_revised               0.05       13.95
CB12_revised               0.1        55.8
CB12_revised               0.15       125.55
CB12_revised               0.2        223.2
CB12_revised               0.25       348.75
CB12_revised               0.3        502.2
CB12_revised               0.35       683.55
CB12_revised               0.4        892.8
CB12_revised               0.45       1129.95
CB12_revised               0.5        1395

;Storage at CB13
CB13            Storage    0          0
CB13                       0.1        7.504798243
CB13                       0.2        30.01919297
CB13                       0.3        67.54318418
CB13                       0.4        120.0767719
CB13                       0.5        187.6199561
CB13                       0.6        270.1727367
CB13                       0.7        367.7351139
CB13                       0.8        480.3070875
CB13                       0.9        607.8886576
CB13                       1          750.4798243
CB13                       1.1        908.0805874

;Takes into account available storage areas at the upstream
CB 14-19
CB14            Storage    0          0
CB14                       0.05       13.11138889
CB14                       0.1        52.44555556
CB14                       0.15       124.593875
CB14                       0.2        262.4031972
CB14                       0.25       493.601955
CB14                       0.3        878.3107544
CB14                       0.35       1513.864935
CB14                       0.4        2408.773385
CB14                       0.45       3563.036104

;Takes into account available storage areas at the upstream
CB 21-22
CB21            Storage    0          0
CB21                       0.05       6.307655955
CB21                       0.1        26.49765983
CB21                       0.15       72.29009473
CB21                       0.2        146.5357917
CB21                       0.25       249.2347507
CB21                       0.3        380.3869717
CB21                       0.35       539.9924548

;Takes into account available storage areas at the upstream
CB 23
CB23            Storage    0          0
CB23                       0.1        48.3475
CB23                       0.2        193.39
CB23                       0.3        435.1275
CB23                       0.4        773.56

;Takes into account available storage areas at the upstream
CB 24-30
CB24            Storage    0          0
CB24                       0.05       23.06065089
CB24                       0.1        92.24260355
CB24                       0.15       236.907108
CB24                       0.2        487.6779475
CB24                       0.25       896.9239222
CB24                       0.3        1528.855832
CB24                       0.35       2388.231543
CB24                       0.4        3501.319611
CB24                       0.45       4938.836013
CB24                       0.5        6746.625356
CB24                       0.55       8927.594829
CB24                       0.6        11481.74443

;Takes into account available storage areas at the upstream
CB 33-31
CB31            Storage    0          0
CB31                       0.05       14.28454694
CB31                       0.1        80.6288
CB31                       0.15       207.0304122
CB31                       0.2        408.2072663
CB31                       0.25       687.7393878
CB31                       0.3        1045.626777
CB31                       0.35       1481.869433
CB31                       0.4        1996.467356

;Takes into account availabl storage areas at the upstream
CBs: CB39, CB38,CB37,CB36,CB35 and CB34
CB34            Storage    0          0
CB34                       0.05       13.28846154
CB34                       0.1        53.15384615
CB34                       0.15       136.5836538
CB34                       0.2        280.5653846
CB34                       0.25       485.0990385
CB34                       0.3        750.1846154
CB34                       0.35       1117.580461
CB34                       0.4        1629.044921
CB34                       0.45       2284.577995
CB34                       0.5        3104.364683
CB34                       0.55       4117.806661
CB34                       0.6        5362.794703
CB34                       0.65       6843.425109
CB34                       0.7        8559.697879

;Takes into account available storage areas at the upstream
CB 5-7. Note these CBs all have the same T/G elevation so
shape is triangular
CB5             Storage    0          0
CB5                        0.05       70.93669994
CB5                        0.1        283.7467998
CB5                        0.15       638.4302995
CB5                        0.2        1134.987199
CB5                        0.25       1773.417499
CB5                        0.3        2553.721198
CB5                        0.35       3475.898297
CB5                        0.4        4539.948796
CB5                        0.45       5745.872695

;Takes into account available storage areas at the
upstreamMH CBs: 103,102
CBMH103         Storage    0          0
CBMH103                    0.05       8.728373702
CBMH103                    0.1        34.91349481
CBMH103                    0.15       109.2928633
CBMH103                    0.2        262.6039792
CBMH103                    0.25       494.8468426
CBMH103                    0.3        806.0214533
CBMH103                    0.35       1196.127811
CBMH103                    0.4        1665.165917
CBMH103                    0.45       2213.13577
CBMH103                    0.5        2840.03737
CBMH103                    0.55       3545.870718
```

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;Takes into account available storage areas at the
upstreamMH CBs: 105, 8
CBMH105          Storage    0          0
CBMH105                     0.05       18.94387755
CBMH105                     0.1        75.7755102
CBMH105                     0.15       205.394898
CBMH105                     0.2        442.7020408
CBMH105                     0.25       787.6969388
CBMH105                     0.3        1240.379592
CBMH105                     0.35       1800.75
CBMH105                     0.4        2468.808163
CBMH105                     0.45       3244.554082

;Takes into account available storage areas at the upstream
MHCBs:108, 109. 300mm above 92.36 spill EL
CBMH108          Storage    0          0
CBMH108                     0.05       16.55165289
CBMH108                     0.1        66.20661157
CBMH108                     0.15       148.964876
CBMH108                     0.2        273.8312463
CBMH108                     0.25       459.3781223
CBMH108                     0.3        706.1683041
CBMH108                     0.35       1014.201792
CBMH108                     0.4        1383.478585
CBMH108                     0.45       1813.998684
CBMH108                     0.5        2305.762089

CBMH110          Storage    0          0
CBMH110                     0.05       27.59
CBMH110                     0.1        124.31
CBMH110                     0.15       304.11
CBMH110                     0.2        566.99
CBMH110                     0.25       912.95
CBMH110                     0.3        1341.99
CBMH110                     0.35       1854.11

;Takes into account available storage areas at CBMH110 only.
Extrapolated 300mm above ponding depth
CBMH110_revised  Storage    0          0
CBMH110_revised             0.05       27.59
CBMH110_revised             0.1        110.36
CBMH110_revised             0.15       248.31
CBMH110_revised             0.2        441.44
CBMH110_revised             0.25       689.75
CBMH110_revised             0.3        993.24
CBMH110_revised             0.35       1351.91
CBMH110_revised             0.4        1765.76

;From stage-storage curve provided up to 91.22. Interpolated
last interval to emergency spill depth of 92.2
SWM_Facility_1   Storage    0          0
SWM_Facility_1              0.05       306.3
SWM_Facility_1              0.15       1888.71
SWM_Facility_1              0.25       2712.57
SWM_Facility_1              0.35       2809.39
SWM_Facility_1              0.45       2918.17
SWM_Facility_1              0.55       3049.52
SWM_Facility_1              0.65       3189.01
SWM_Facility_1              0.75       3329.2
SWM_Facility_1              0.85       3470.09
SWM_Facility_1              0.95       3611.68
SWM_Facility_1              1.05       3754.34
SWM_Facility_1              1.15       3903.79
SWM_Facility_1              1.25       4061.99
SWM_Facility_1              1.35       4229.89
SWM_Facility_1              1.45       4422.7
SWM_Facility_1              1.55       4624.54
SWM_Facility_1              1.65       4831.05
SWM_Facility_1              1.75       5042.15
SWM_Facility_1              1.85       5257.81
SWM_Facility_1              1.95       5478.04
SWM_Facility_1              2.05       5702.84
SWM_Facility_1              2.15       5932.2
SWM_Facility_1              2.17       5978.86
SWM_Facility_1              3.15       8265

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
;Rainfall (mm/hr)
12SCS10          01/01/2000 00:00:00   1.344
12SCS10          01/01/2000 00:15:00   1.613
12SCS10          01/01/2000 00:30:00   1.613
12SCS10          01/01/2000 00:45:00   1.613
12SCS10          01/01/2000 01:00:00   1.613
12SCS10          01/01/2000 01:15:00   1.613
12SCS10          01/01/2000 01:30:00   1.613
12SCS10          01/01/2000 01:45:00   1.882
12SCS10          01/01/2000 02:00:00   2.15
12SCS10          01/01/2000 02:15:00   2.15
12SCS10          01/01/2000 02:30:00   2.15
12SCS10          01/01/2000 02:45:00   2.15
12SCS10          01/01/2000 03:00:00   2.688
12SCS10          01/01/2000 03:15:00   2.688
12SCS10          01/01/2000 03:30:00   2.688
12SCS10          01/01/2000 03:45:00   2.688
12SCS10          01/01/2000 04:00:00   3.494
12SCS10          01/01/2000 04:15:00   3.763
12SCS10          01/01/2000 04:30:00   4.301
12SCS10          01/01/2000 04:45:00   4.838
12SCS10          01/01/2000 05:00:00   5.914
12SCS10          01/01/2000 05:15:00   8.87
12SCS10          01/01/2000 05:30:00   12.634
12SCS10          01/01/2000 05:45:00   102.144
12SCS10          01/01/2000 06:00:00   19.354
12SCS10          01/01/2000 06:15:00   11.021
12SCS10          01/01/2000 06:30:00   7.526
12SCS10          01/01/2000 06:45:00   5.645
12SCS10          01/01/2000 07:00:00   4.57
12SCS10          01/01/2000 07:15:00   3.763
12SCS10          01/01/2000 07:30:00   3.494
12SCS10          01/01/2000 07:45:00   3.226
12SCS10          01/01/2000 08:00:00   3.226
12SCS10          01/01/2000 08:15:00   2.688
12SCS10          01/01/2000 08:30:00   2.688
12SCS10          01/01/2000 08:45:00   2.419
12SCS10          01/01/2000 09:00:00   2.15
12SCS10          01/01/2000 09:15:00   2.15
12SCS10          01/01/2000 09:30:00   2.15
12SCS10          01/01/2000 09:45:00   1.882
12SCS10          01/01/2000 10:00:00   1.613
12SCS10          01/01/2000 10:15:00   1.613
12SCS10          01/01/2000 10:30:00   1.613
12SCS10          01/01/2000 10:45:00   1.613
12SCS10          01/01/2000 11:00:00   1.613
12SCS10          01/01/2000 11:15:00   1.613
12SCS10          01/01/2000 11:30:00   1.613
12SCS10          01/01/2000 11:45:00   1.344

;Rainfall (mm/hr)
12SCS100         01/01/2000 00:00:00   1.92
12SCS100         01/01/2000 00:15:00   2.304
12SCS100         01/01/2000 00:30:00   2.304
12SCS100         01/01/2000 00:45:00   2.304
12SCS100         01/01/2000 01:00:00   2.304
12SCS100         01/01/2000 01:15:00   2.304
12SCS100         01/01/2000 01:30:00   2.304
12SCS100         01/01/2000 01:45:00   2.688
12SCS100         01/01/2000 02:00:00   3.072
12SCS100         01/01/2000 02:15:00   3.072
12SCS100         01/01/2000 02:30:00   3.072
12SCS100         01/01/2000 02:45:00   3.072
12SCS100         01/01/2000 03:00:00   3.84
12SCS100         01/01/2000 03:15:00   3.84
12SCS100         01/01/2000 03:30:00   3.84
12SCS100         01/01/2000 03:45:00   3.84
12SCS100         01/01/2000 04:00:00   4.992
12SCS100         01/01/2000 04:15:00   5.376
12SCS100         01/01/2000 04:30:00   6.144
12SCS100         01/01/2000 04:45:00   6.912
12SCS100         01/01/2000 05:00:00   8.448
12SCS100         01/01/2000 05:15:00   12.672
12SCS100         01/01/2000 05:30:00   18.048
12SCS100         01/01/2000 05:45:00   145.92
12SCS100         01/01/2000 06:00:00   27.648
12SCS100         01/01/2000 06:15:00   15.744
12SCS100         01/01/2000 06:30:00   10.752
12SCS100         01/01/2000 06:45:00   8.064
12SCS100         01/01/2000 07:00:00   6.528
12SCS100         01/01/2000 07:15:00   5.376
12SCS100         01/01/2000 07:30:00   4.992
12SCS100         01/01/2000 07:45:00   4.608
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12SCS100          01/01/2000 08:00:00   4.608
12SCS100          01/01/2000 08:15:00   3.84
12SCS100          01/01/2000 08:30:00   3.84
12SCS100          01/01/2000 08:45:00   3.456
12SCS100          01/01/2000 09:00:00   3.072
12SCS100          01/01/2000 09:15:00   3.072
12SCS100          01/01/2000 09:30:00   3.072
12SCS100          01/01/2000 09:45:00   2.688
12SCS100          01/01/2000 10:00:00   2.304
12SCS100          01/01/2000 10:15:00   2.304
12SCS100          01/01/2000 10:30:00   2.304
12SCS100          01/01/2000 10:45:00   2.304
12SCS100          01/01/2000 11:00:00   2.304
12SCS100          01/01/2000 11:15:00   2.304
12SCS100          01/01/2000 11:30:00   2.304
12SCS100          01/01/2000 11:45:00   1.92

;Rainfall (mm/hr)
12SCS2            01/01/2000 00:00:00   0.864
12SCS2            01/01/2000 00:15:00   1.037
12SCS2            01/01/2000 00:30:00   1.037
12SCS2            01/01/2000 00:45:00   1.037
12SCS2            01/01/2000 01:00:00   1.037
12SCS2            01/01/2000 01:15:00   1.037
12SCS2            01/01/2000 01:30:00   1.037
12SCS2            01/01/2000 01:45:00   1.21
12SCS2            01/01/2000 02:00:00   1.382
12SCS2            01/01/2000 02:15:00   1.382
12SCS2            01/01/2000 02:30:00   1.382
12SCS2            01/01/2000 02:45:00   1.382
12SCS2            01/01/2000 03:00:00   1.728
12SCS2            01/01/2000 03:15:00   1.728
12SCS2            01/01/2000 03:30:00   1.728
12SCS2            01/01/2000 03:45:00   1.728
12SCS2            01/01/2000 04:00:00   2.246
12SCS2            01/01/2000 04:15:00   2.419
12SCS2            01/01/2000 04:30:00   2.765
12SCS2            01/01/2000 04:45:00   3.11
12SCS2            01/01/2000 05:00:00   3.802
12SCS2            01/01/2000 05:15:00   5.702
12SCS2            01/01/2000 05:30:00   8.122
12SCS2            01/01/2000 05:45:00   65.664
12SCS2            01/01/2000 06:00:00   12.442
12SCS2            01/01/2000 06:15:00   7.085
12SCS2            01/01/2000 06:30:00   4.838
12SCS2            01/01/2000 06:45:00   3.629
12SCS2            01/01/2000 07:00:00   2.938
12SCS2            01/01/2000 07:15:00   2.419
12SCS2            01/01/2000 07:30:00   2.246
12SCS2            01/01/2000 07:45:00   2.074
12SCS2            01/01/2000 08:00:00   2.074
12SCS2            01/01/2000 08:15:00   1.728
12SCS2            01/01/2000 08:30:00   1.728
12SCS2            01/01/2000 08:45:00   1.555
12SCS2            01/01/2000 09:00:00   1.382
12SCS2            01/01/2000 09:15:00   1.382
12SCS2            01/01/2000 09:30:00   1.382
12SCS2            01/01/2000 09:45:00   1.21
12SCS2            01/01/2000 10:00:00   1.037
12SCS2            01/01/2000 10:15:00   1.037
12SCS2            01/01/2000 10:30:00   1.037
12SCS2            01/01/2000 10:45:00   1.037
12SCS2            01/01/2000 11:00:00   1.037
12SCS2            01/01/2000 11:15:00   1.037
12SCS2            01/01/2000 11:30:00   1.037
12SCS2            01/01/2000 11:45:00   0.864

;Rainfall (mm/hr)
12SCS25           01/01/2000 00:00:00   1.584
12SCS25           01/01/2000 00:15:00   1.901
12SCS25           01/01/2000 00:30:00   1.901
12SCS25           01/01/2000 00:45:00   1.901
12SCS25           01/01/2000 01:00:00   1.901
12SCS25           01/01/2000 01:15:00   1.901
12SCS25           01/01/2000 01:30:00   1.901
12SCS25           01/01/2000 01:45:00   2.218
12SCS25           01/01/2000 02:00:00   2.534
12SCS25           01/01/2000 02:15:00   2.534
12SCS25           01/01/2000 02:30:00   2.534
12SCS25           01/01/2000 02:45:00   2.534
12SCS25           01/01/2000 03:00:00   3.168
12SCS25           01/01/2000 03:15:00   3.168
12SCS25           01/01/2000 03:30:00   3.168
12SCS25           01/01/2000 03:45:00   3.168
12SCS25           01/01/2000 04:00:00   4.118
12SCS25           01/01/2000 04:15:00   4.435
12SCS25           01/01/2000 04:30:00   5.069
12SCS25           01/01/2000 04:45:00   5.702
12SCS25           01/01/2000 05:00:00   6.97
12SCS25           01/01/2000 05:15:00   10.454
12SCS25           01/01/2000 05:30:00   14.89
12SCS25           01/01/2000 05:45:00   120.384
12SCS25           01/01/2000 06:00:00   22.81
12SCS25           01/01/2000 06:15:00   12.989
12SCS25           01/01/2000 06:30:00   8.87
12SCS25           01/01/2000 06:45:00   6.653
12SCS25           01/01/2000 07:00:00   5.386
12SCS25           01/01/2000 07:15:00   4.435
12SCS25           01/01/2000 07:30:00   4.118
12SCS25           01/01/2000 07:45:00   3.802
12SCS25           01/01/2000 08:00:00   3.802
12SCS25           01/01/2000 08:15:00   3.168
12SCS25           01/01/2000 08:30:00   3.168
12SCS25           01/01/2000 08:45:00   2.851
12SCS25           01/01/2000 09:00:00   2.534
12SCS25           01/01/2000 09:15:00   2.534
12SCS25           01/01/2000 09:30:00   2.534
12SCS25           01/01/2000 09:45:00   2.218
12SCS25           01/01/2000 10:00:00   1.901
12SCS25           01/01/2000 10:15:00   1.901
12SCS25           01/01/2000 10:30:00   1.901
12SCS25           01/01/2000 10:45:00   1.901
12SCS25           01/01/2000 11:00:00   1.901
12SCS25           01/01/2000 11:15:00   1.901
12SCS25           01/01/2000 11:30:00   1.901
12SCS25           01/01/2000 11:45:00   1.584

;Rainfall (mm/hr)
12SCS5            01/01/2000 00:00:00   1.152
12SCS5            01/01/2000 00:15:00   1.382
12SCS5            01/01/2000 00:30:00   1.382
12SCS5            01/01/2000 00:45:00   1.382
12SCS5            01/01/2000 01:00:00   1.382
12SCS5            01/01/2000 01:15:00   1.382
12SCS5            01/01/2000 01:30:00   1.382
12SCS5            01/01/2000 01:45:00   1.613
12SCS5            01/01/2000 02:00:00   1.843
12SCS5            01/01/2000 02:15:00   1.843
12SCS5            01/01/2000 02:30:00   1.843
12SCS5            01/01/2000 02:45:00   1.843
12SCS5            01/01/2000 03:00:00   2.304
12SCS5            01/01/2000 03:15:00   2.304
12SCS5            01/01/2000 03:30:00   2.304
12SCS5            01/01/2000 03:45:00   2.304
12SCS5            01/01/2000 04:00:00   2.995
12SCS5            01/01/2000 04:15:00   3.226
12SCS5            01/01/2000 04:30:00   3.686
12SCS5            01/01/2000 04:45:00   4.147
12SCS5            01/01/2000 05:00:00   5.069
12SCS5            01/01/2000 05:15:00   7.603
12SCS5            01/01/2000 05:30:00   10.829
12SCS5            01/01/2000 05:45:00   87.552
12SCS5            01/01/2000 06:00:00   16.589
12SCS5            01/01/2000 06:15:00   9.446
12SCS5            01/01/2000 06:30:00   6.451
12SCS5            01/01/2000 06:45:00   4.838
12SCS5            01/01/2000 07:00:00   3.917
12SCS5            01/01/2000 07:15:00   3.226
12SCS5            01/01/2000 07:30:00   2.995
12SCS5            01/01/2000 07:45:00   2.765
12SCS5            01/01/2000 08:00:00   2.765
12SCS5            01/01/2000 08:15:00   2.304
12SCS5            01/01/2000 08:30:00   2.304
12SCS5            01/01/2000 08:45:00   2.074
12SCS5            01/01/2000 09:00:00   1.843
12SCS5            01/01/2000 09:15:00   1.843
12SCS5            01/01/2000 09:30:00   1.843
12SCS5            01/01/2000 09:45:00   1.613
12SCS5            01/01/2000 10:00:00   1.382
12SCS5            01/01/2000 10:15:00   1.382
12SCS5            01/01/2000 10:30:00   1.382
12SCS5            01/01/2000 10:45:00   1.382
```

```
12SCS5          01/01/2000 11:00:00   1.382
12SCS5          01/01/2000 11:15:00   1.382
12SCS5          01/01/2000 11:30:00   1.382
12SCS5          01/01/2000 11:45:00   1.152

;Rainfall (mm/hr)
12SCS50         01/01/2000 00:00:00   1.752
12SCS50         01/01/2000 00:15:00   2.102
12SCS50         01/01/2000 00:30:00   2.102
12SCS50         01/01/2000 00:45:00   2.102
12SCS50         01/01/2000 01:00:00   2.102
12SCS50         01/01/2000 01:15:00   2.102
12SCS50         01/01/2000 01:30:00   2.102
12SCS50         01/01/2000 01:45:00   2.453
12SCS50         01/01/2000 02:00:00   2.803
12SCS50         01/01/2000 02:15:00   2.803
12SCS50         01/01/2000 02:30:00   2.803
12SCS50         01/01/2000 02:45:00   2.803
12SCS50         01/01/2000 03:00:00   3.504
12SCS50         01/01/2000 03:15:00   3.504
12SCS50         01/01/2000 03:30:00   3.504
12SCS50         01/01/2000 03:45:00   3.504
12SCS50         01/01/2000 04:00:00   4.555
12SCS50         01/01/2000 04:15:00   4.906
12SCS50         01/01/2000 04:30:00   5.606
12SCS50         01/01/2000 04:45:00   6.307
12SCS50         01/01/2000 05:00:00   7.709
12SCS50         01/01/2000 05:15:00   11.563
12SCS50         01/01/2000 05:30:00   16.469
12SCS50         01/01/2000 05:45:00   133.152
12SCS50         01/01/2000 06:00:00   25.229
12SCS50         01/01/2000 06:15:00   14.366
12SCS50         01/01/2000 06:30:00   9.811
12SCS50         01/01/2000 06:45:00   7.358
12SCS50         01/01/2000 07:00:00   5.957
12SCS50         01/01/2000 07:15:00   4.906
12SCS50         01/01/2000 07:30:00   4.555
12SCS50         01/01/2000 07:45:00   4.205
12SCS50         01/01/2000 08:00:00   4.205
12SCS50         01/01/2000 08:15:00   3.504
12SCS50         01/01/2000 08:30:00   3.504
12SCS50         01/01/2000 08:45:00   3.154
12SCS50         01/01/2000 09:00:00   2.803
12SCS50         01/01/2000 09:15:00   2.803
12SCS50         01/01/2000 09:30:00   2.803
12SCS50         01/01/2000 09:45:00   2.453
12SCS50         01/01/2000 10:00:00   2.102
12SCS50         01/01/2000 10:15:00   2.102
12SCS50         01/01/2000 10:30:00   2.102
12SCS50         01/01/2000 10:45:00   2.102
12SCS50         01/01/2000 11:00:00   2.102
12SCS50         01/01/2000 11:15:00   2.102
12SCS50         01/01/2000 11:30:00   2.102
12SCS50         01/01/2000 11:45:00   1.752

;Rainfall (mm/hr)
24SCS10         01/01/2000 00:00:00   0.792
24SCS10         01/01/2000 00:15:00   0.792
24SCS10         01/01/2000 00:30:00   0.792
24SCS10         01/01/2000 00:45:00   0.792
24SCS10         01/01/2000 01:00:00   0.792
24SCS10         01/01/2000 01:15:00   0.792
24SCS10         01/01/2000 01:30:00   0.792
24SCS10         01/01/2000 01:45:00   0.792
24SCS10         01/01/2000 02:00:00   0.936
24SCS10         01/01/2000 02:15:00   0.936
24SCS10         01/01/2000 02:30:00   0.936
24SCS10         01/01/2000 02:45:00   0.936
24SCS10         01/01/2000 03:00:00   0.936
24SCS10         01/01/2000 03:15:00   0.936
24SCS10         01/01/2000 03:30:00   0.936
24SCS10         01/01/2000 03:45:00   0.936
24SCS10         01/01/2000 04:00:00   1.152
24SCS10         01/01/2000 04:15:00   1.152
24SCS10         01/01/2000 04:30:00   1.152
24SCS10         01/01/2000 04:45:00   1.152
24SCS10         01/01/2000 05:00:00   1.152
24SCS10         01/01/2000 05:15:00   1.152
24SCS10         01/01/2000 05:30:00   1.152
24SCS10         01/01/2000 05:45:00   1.152
24SCS10         01/01/2000 06:00:00   1.296
24SCS10         01/01/2000 06:15:00   1.296
24SCS10         01/01/2000 06:30:00   1.296
24SCS10         01/01/2000 06:45:00   1.296
24SCS10         01/01/2000 07:00:00   1.584
24SCS10         01/01/2000 07:15:00   1.584
24SCS10         01/01/2000 07:30:00   1.584
24SCS10         01/01/2000 07:45:00   1.584
24SCS10         01/01/2000 08:00:00   1.872
24SCS10         01/01/2000 08:15:00   1.872
24SCS10         01/01/2000 08:30:00   2.016
24SCS10         01/01/2000 08:45:00   2.016
24SCS10         01/01/2000 09:00:00   2.304
24SCS10         01/01/2000 09:15:00   2.304
24SCS10         01/01/2000 09:30:00   2.592
24SCS10         01/01/2000 09:45:00   2.592
24SCS10         01/01/2000 10:00:00   3.312
24SCS10         01/01/2000 10:15:00   3.312
24SCS10         01/01/2000 10:30:00   4.464
24SCS10         01/01/2000 10:45:00   4.464
24SCS10         01/01/2000 11:00:00   6.912
24SCS10         01/01/2000 11:15:00   6.912
24SCS10         01/01/2000 11:30:00   21.312
24SCS10         01/01/2000 11:45:00   88.128
24SCS10         01/01/2000 12:00:00   10.368
24SCS10         01/01/2000 12:15:00   10.368
24SCS10         01/01/2000 12:30:00   5.328
24SCS10         01/01/2000 12:45:00   5.328
24SCS10         01/01/2000 13:00:00   3.888
24SCS10         01/01/2000 13:15:00   3.888
24SCS10         01/01/2000 13:30:00   3.024
24SCS10         01/01/2000 13:45:00   3.024
24SCS10         01/01/2000 14:00:00   2.16
24SCS10         01/01/2000 14:15:00   2.16
24SCS10         01/01/2000 14:30:00   2.16
24SCS10         01/01/2000 14:45:00   2.16
24SCS10         01/01/2000 15:00:00   2.16
24SCS10         01/01/2000 15:15:00   2.16
24SCS10         01/01/2000 15:30:00   2.16
24SCS10         01/01/2000 15:45:00   2.16
24SCS10         01/01/2000 16:00:00   1.296
24SCS10         01/01/2000 16:15:00   1.296
24SCS10         01/01/2000 16:30:00   1.296
24SCS10         01/01/2000 16:45:00   1.296
24SCS10         01/01/2000 17:00:00   1.296
24SCS10         01/01/2000 17:15:00   1.296
24SCS10         01/01/2000 17:30:00   1.296
24SCS10         01/01/2000 17:45:00   1.296
24SCS10         01/01/2000 18:00:00   1.296
24SCS10         01/01/2000 18:15:00   1.296
24SCS10         01/01/2000 18:30:00   1.296
24SCS10         01/01/2000 18:45:00   1.296
24SCS10         01/01/2000 19:00:00   1.296
24SCS10         01/01/2000 19:15:00   1.296
24SCS10         01/01/2000 19:30:00   1.296
24SCS10         01/01/2000 19:45:00   1.296
24SCS10         01/01/2000 20:00:00   0.864
24SCS10         01/01/2000 20:15:00   0.864
24SCS10         01/01/2000 20:30:00   0.864
24SCS10         01/01/2000 20:45:00   0.864
24SCS10         01/01/2000 21:00:00   0.864
24SCS10         01/01/2000 21:15:00   0.864
24SCS10         01/01/2000 21:30:00   0.864
24SCS10         01/01/2000 21:45:00   0.864
24SCS10         01/01/2000 22:00:00   0.864
24SCS10         01/01/2000 22:15:00   0.864
24SCS10         01/01/2000 22:30:00   0.864
24SCS10         01/01/2000 22:45:00   0.864
24SCS10         01/01/2000 23:00:00   0.864
24SCS10         01/01/2000 23:15:00   0.864
24SCS10         01/01/2000 23:30:00   0.864
24SCS10         01/01/2000 23:45:00   0.864

;Rainfall (mm/hr)
24SCS100        01/01/2000 00:00:00   1.135
24SCS100        01/01/2000 00:15:00   1.135
24SCS100        01/01/2000 00:30:00   1.135
24SCS100        01/01/2000 00:45:00   1.135
24SCS100        01/01/2000 01:00:00   1.135
24SCS100        01/01/2000 01:15:00   1.135
24SCS100        01/01/2000 01:30:00   1.135
24SCS100        01/01/2000 01:45:00   1.135
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24SCS100        01/01/2000 02:00:00   1.342
24SCS100        01/01/2000 02:15:00   1.342
24SCS100        01/01/2000 02:30:00   1.342
24SCS100        01/01/2000 02:45:00   1.342
24SCS100        01/01/2000 03:00:00   1.342
24SCS100        01/01/2000 03:15:00   1.342
24SCS100        01/01/2000 03:30:00   1.342
24SCS100        01/01/2000 03:45:00   1.342
24SCS100        01/01/2000 04:00:00   1.651
24SCS100        01/01/2000 04:15:00   1.651
24SCS100        01/01/2000 04:30:00   1.651
24SCS100        01/01/2000 04:45:00   1.651
24SCS100        01/01/2000 05:00:00   1.651
24SCS100        01/01/2000 05:15:00   1.651
24SCS100        01/01/2000 05:30:00   1.651
24SCS100        01/01/2000 05:45:00   1.651
24SCS100        01/01/2000 06:00:00   1.858
24SCS100        01/01/2000 06:15:00   1.858
24SCS100        01/01/2000 06:30:00   1.858
24SCS100        01/01/2000 06:45:00   1.858
24SCS100        01/01/2000 07:00:00   2.27
24SCS100        01/01/2000 07:15:00   2.27
24SCS100        01/01/2000 07:30:00   2.27
24SCS100        01/01/2000 07:45:00   2.27
24SCS100        01/01/2000 08:00:00   2.683
24SCS100        01/01/2000 08:15:00   2.683
24SCS100        01/01/2000 08:30:00   2.89
24SCS100        01/01/2000 08:45:00   2.89
24SCS100        01/01/2000 09:00:00   3.302
24SCS100        01/01/2000 09:15:00   3.302
24SCS100        01/01/2000 09:30:00   3.715
24SCS100        01/01/2000 09:45:00   3.715
24SCS100        01/01/2000 10:00:00   4.747
24SCS100        01/01/2000 10:15:00   4.747
24SCS100        01/01/2000 10:30:00   6.398
24SCS100        01/01/2000 10:45:00   6.398
24SCS100        01/01/2000 11:00:00   9.907
24SCS100        01/01/2000 11:15:00   9.907
24SCS100        01/01/2000 11:30:00   30.547
24SCS100        01/01/2000 11:45:00   126.317
24SCS100        01/01/2000 12:00:00   14.861
24SCS100        01/01/2000 12:15:00   14.861
24SCS100        01/01/2000 12:30:00   7.637
24SCS100        01/01/2000 12:45:00   7.637
24SCS100        01/01/2000 13:00:00   5.573
24SCS100        01/01/2000 13:15:00   5.573
24SCS100        01/01/2000 13:30:00   4.334
24SCS100        01/01/2000 13:45:00   4.334
24SCS100        01/01/2000 14:00:00   3.096
24SCS100        01/01/2000 14:15:00   3.096
24SCS100        01/01/2000 14:30:00   3.096
24SCS100        01/01/2000 14:45:00   3.096
24SCS100        01/01/2000 15:00:00   3.096
24SCS100        01/01/2000 15:15:00   3.096
24SCS100        01/01/2000 15:30:00   3.096
24SCS100        01/01/2000 15:45:00   3.096
24SCS100        01/01/2000 16:00:00   1.858
24SCS100        01/01/2000 16:15:00   1.858
24SCS100        01/01/2000 16:30:00   1.858
24SCS100        01/01/2000 16:45:00   1.858
24SCS100        01/01/2000 17:00:00   1.858
24SCS100        01/01/2000 17:15:00   1.858
24SCS100        01/01/2000 17:30:00   1.858
24SCS100        01/01/2000 17:45:00   1.858
24SCS100        01/01/2000 18:00:00   1.858
24SCS100        01/01/2000 18:15:00   1.858
24SCS100        01/01/2000 18:30:00   1.858
24SCS100        01/01/2000 18:45:00   1.858
24SCS100        01/01/2000 19:00:00   1.858
24SCS100        01/01/2000 19:15:00   1.858
24SCS100        01/01/2000 19:30:00   1.858
24SCS100        01/01/2000 19:45:00   1.858
24SCS100        01/01/2000 20:00:00   1.238
24SCS100        01/01/2000 20:15:00   1.238
24SCS100        01/01/2000 20:30:00   1.238
24SCS100        01/01/2000 20:45:00   1.238
24SCS100        01/01/2000 21:00:00   1.238
24SCS100        01/01/2000 21:15:00   1.238
24SCS100        01/01/2000 21:30:00   1.238
24SCS100        01/01/2000 21:45:00   1.238
24SCS100        01/01/2000 22:00:00   1.238
24SCS100        01/01/2000 22:15:00   1.238
24SCS100        01/01/2000 22:30:00   1.238
24SCS100        01/01/2000 22:45:00   1.238
24SCS100        01/01/2000 23:00:00   1.238
24SCS100        01/01/2000 23:15:00   1.238
24SCS100        01/01/2000 23:30:00   1.238
24SCS100        01/01/2000 23:45:00   1.238

;Rainfall (mm/hr)
24SCS2          01/01/2000 00:00:00   0.528
24SCS2          01/01/2000 00:15:00   0.528
24SCS2          01/01/2000 00:30:00   0.528
24SCS2          01/01/2000 00:45:00   0.528
24SCS2          01/01/2000 01:00:00   0.528
24SCS2          01/01/2000 01:15:00   0.528
24SCS2          01/01/2000 01:30:00   0.528
24SCS2          01/01/2000 01:45:00   0.528
24SCS2          01/01/2000 02:00:00   0.624
24SCS2          01/01/2000 02:15:00   0.624
24SCS2          01/01/2000 02:30:00   0.624
24SCS2          01/01/2000 02:45:00   0.624
24SCS2          01/01/2000 03:00:00   0.624
24SCS2          01/01/2000 03:15:00   0.624
24SCS2          01/01/2000 03:30:00   0.624
24SCS2          01/01/2000 03:45:00   0.624
24SCS2          01/01/2000 04:00:00   0.768
24SCS2          01/01/2000 04:15:00   0.768
24SCS2          01/01/2000 04:30:00   0.768
24SCS2          01/01/2000 04:45:00   0.768
24SCS2          01/01/2000 05:00:00   0.768
24SCS2          01/01/2000 05:15:00   0.768
24SCS2          01/01/2000 05:30:00   0.768
24SCS2          01/01/2000 05:45:00   0.768
24SCS2          01/01/2000 06:00:00   0.864
24SCS2          01/01/2000 06:15:00   0.864
24SCS2          01/01/2000 06:30:00   0.864
24SCS2          01/01/2000 06:45:00   0.864
24SCS2          01/01/2000 07:00:00   1.056
24SCS2          01/01/2000 07:15:00   1.056
24SCS2          01/01/2000 07:30:00   1.056
24SCS2          01/01/2000 07:45:00   1.056
24SCS2          01/01/2000 08:00:00   1.248
24SCS2          01/01/2000 08:15:00   1.248
24SCS2          01/01/2000 08:30:00   1.344
24SCS2          01/01/2000 08:45:00   1.344
24SCS2          01/01/2000 09:00:00   1.536
24SCS2          01/01/2000 09:15:00   1.536
24SCS2          01/01/2000 09:30:00   1.728
24SCS2          01/01/2000 09:45:00   1.728
24SCS2          01/01/2000 10:00:00   2.208
24SCS2          01/01/2000 10:15:00   2.208
24SCS2          01/01/2000 10:30:00   2.976
24SCS2          01/01/2000 10:45:00   2.976
24SCS2          01/01/2000 11:00:00   4.608
24SCS2          01/01/2000 11:15:00   4.608
24SCS2          01/01/2000 11:30:00   14.208
24SCS2          01/01/2000 11:45:00   58.752
24SCS2          01/01/2000 12:00:00   6.912
24SCS2          01/01/2000 12:15:00   6.912
24SCS2          01/01/2000 12:30:00   3.552
24SCS2          01/01/2000 12:45:00   3.552
24SCS2          01/01/2000 13:00:00   2.592
24SCS2          01/01/2000 13:15:00   2.592
24SCS2          01/01/2000 13:30:00   2.016
24SCS2          01/01/2000 13:45:00   2.016
24SCS2          01/01/2000 14:00:00   1.44
24SCS2          01/01/2000 14:15:00   1.44
24SCS2          01/01/2000 14:30:00   1.44
24SCS2          01/01/2000 14:45:00   1.44
24SCS2          01/01/2000 15:00:00   1.44
24SCS2          01/01/2000 15:15:00   1.44
24SCS2          01/01/2000 15:30:00   1.44
24SCS2          01/01/2000 15:45:00   1.44
24SCS2          01/01/2000 16:00:00   0.864
24SCS2          01/01/2000 16:15:00   0.864
24SCS2          01/01/2000 16:30:00   0.864
24SCS2          01/01/2000 16:45:00   0.864
24SCS2          01/01/2000 17:00:00   0.864
24SCS2          01/01/2000 17:15:00   0.864
24SCS2          01/01/2000 17:30:00   0.864
24SCS2          01/01/2000 17:45:00   0.864
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24SCS2           01/01/2000 18:00:00   0.864
24SCS2           01/01/2000 18:15:00   0.864
24SCS2           01/01/2000 18:30:00   0.864
24SCS2           01/01/2000 18:45:00   0.864
24SCS2           01/01/2000 19:00:00   0.864
24SCS2           01/01/2000 19:15:00   0.864
24SCS2           01/01/2000 19:30:00   0.864
24SCS2           01/01/2000 19:45:00   0.864
24SCS2           01/01/2000 20:00:00   0.576
24SCS2           01/01/2000 20:15:00   0.576
24SCS2           01/01/2000 20:30:00   0.576
24SCS2           01/01/2000 20:45:00   0.576
24SCS2           01/01/2000 21:00:00   0.576
24SCS2           01/01/2000 21:15:00   0.576
24SCS2           01/01/2000 21:30:00   0.576
24SCS2           01/01/2000 21:45:00   0.576
24SCS2           01/01/2000 22:00:00   0.576
24SCS2           01/01/2000 22:15:00   0.576
24SCS2           01/01/2000 22:30:00   0.576
24SCS2           01/01/2000 22:45:00   0.576
24SCS2           01/01/2000 23:00:00   0.576
24SCS2           01/01/2000 23:15:00   0.576
24SCS2           01/01/2000 23:30:00   0.576
24SCS2           01/01/2000 23:45:00   0.576

;Rainfall (mm/hr)
24SCS25          01/01/2000 00:00:00   0.924
24SCS25          01/01/2000 00:15:00   0.924
24SCS25          01/01/2000 00:30:00   0.924
24SCS25          01/01/2000 00:45:00   0.924
24SCS25          01/01/2000 01:00:00   0.924
24SCS25          01/01/2000 01:15:00   0.924
24SCS25          01/01/2000 01:30:00   0.924
24SCS25          01/01/2000 01:45:00   0.924
24SCS25          01/01/2000 02:00:00   1.092
24SCS25          01/01/2000 02:15:00   1.092
24SCS25          01/01/2000 02:30:00   1.092
24SCS25          01/01/2000 02:45:00   1.092
24SCS25          01/01/2000 03:00:00   1.092
24SCS25          01/01/2000 03:15:00   1.092
24SCS25          01/01/2000 03:30:00   1.092
24SCS25          01/01/2000 03:45:00   1.092
24SCS25          01/01/2000 04:00:00   1.344
24SCS25          01/01/2000 04:15:00   1.344
24SCS25          01/01/2000 04:30:00   1.344
24SCS25          01/01/2000 04:45:00   1.344
24SCS25          01/01/2000 05:00:00   1.344
24SCS25          01/01/2000 05:15:00   1.344
24SCS25          01/01/2000 05:30:00   1.344
24SCS25          01/01/2000 05:45:00   1.344
24SCS25          01/01/2000 06:00:00   1.512
24SCS25          01/01/2000 06:15:00   1.512
24SCS25          01/01/2000 06:30:00   1.512
24SCS25          01/01/2000 06:45:00   1.512
24SCS25          01/01/2000 07:00:00   1.848
24SCS25          01/01/2000 07:15:00   1.848
24SCS25          01/01/2000 07:30:00   1.848
24SCS25          01/01/2000 07:45:00   1.848
24SCS25          01/01/2000 08:00:00   2.184
24SCS25          01/01/2000 08:15:00   2.184
24SCS25          01/01/2000 08:30:00   2.352
24SCS25          01/01/2000 08:45:00   2.352
24SCS25          01/01/2000 09:00:00   2.688
24SCS25          01/01/2000 09:15:00   2.688
24SCS25          01/01/2000 09:30:00   3.024
24SCS25          01/01/2000 09:45:00   3.024
24SCS25          01/01/2000 10:00:00   3.864
24SCS25          01/01/2000 10:15:00   3.864
24SCS25          01/01/2000 10:30:00   5.208
24SCS25          01/01/2000 10:45:00   5.208
24SCS25          01/01/2000 11:00:00   8.064
24SCS25          01/01/2000 11:15:00   8.064
24SCS25          01/01/2000 11:30:00   24.864
24SCS25          01/01/2000 11:45:00   102.816
24SCS25          01/01/2000 12:00:00   12.096
24SCS25          01/01/2000 12:15:00   12.096
24SCS25          01/01/2000 12:30:00   6.216
24SCS25          01/01/2000 12:45:00   6.216
24SCS25          01/01/2000 13:00:00   4.536
24SCS25          01/01/2000 13:15:00   4.536
24SCS25          01/01/2000 13:30:00   3.528
24SCS25          01/01/2000 13:45:00   3.528
24SCS25          01/01/2000 14:00:00   2.52
24SCS25          01/01/2000 14:15:00   2.52
24SCS25          01/01/2000 14:30:00   2.52
24SCS25          01/01/2000 14:45:00   2.52
24SCS25          01/01/2000 15:00:00   2.52
24SCS25          01/01/2000 15:15:00   2.52
24SCS25          01/01/2000 15:30:00   2.52
24SCS25          01/01/2000 15:45:00   2.52
24SCS25          01/01/2000 16:00:00   1.512
24SCS25          01/01/2000 16:15:00   1.512
24SCS25          01/01/2000 16:30:00   1.512
24SCS25          01/01/2000 16:45:00   1.512
24SCS25          01/01/2000 17:00:00   1.512
24SCS25          01/01/2000 17:15:00   1.512
24SCS25          01/01/2000 17:30:00   1.512
24SCS25          01/01/2000 17:45:00   1.512
24SCS25          01/01/2000 18:00:00   1.512
24SCS25          01/01/2000 18:15:00   1.512
24SCS25          01/01/2000 18:30:00   1.512
24SCS25          01/01/2000 18:45:00   1.512
24SCS25          01/01/2000 19:00:00   1.512
24SCS25          01/01/2000 19:15:00   1.512
24SCS25          01/01/2000 19:30:00   1.512
24SCS25          01/01/2000 19:45:00   1.512
24SCS25          01/01/2000 20:00:00   1.008
24SCS25          01/01/2000 20:15:00   1.008
24SCS25          01/01/2000 20:30:00   1.008
24SCS25          01/01/2000 20:45:00   1.008
24SCS25          01/01/2000 21:00:00   1.008
24SCS25          01/01/2000 21:15:00   1.008
24SCS25          01/01/2000 21:30:00   1.008
24SCS25          01/01/2000 21:45:00   1.008
24SCS25          01/01/2000 22:00:00   1.008
24SCS25          01/01/2000 22:15:00   1.008
24SCS25          01/01/2000 22:30:00   1.008
24SCS25          01/01/2000 22:45:00   1.008
24SCS25          01/01/2000 23:00:00   1.008
24SCS25          01/01/2000 23:15:00   1.008
24SCS25          01/01/2000 23:30:00   1.008
24SCS25          01/01/2000 23:45:00   1.008

;Rainfall (mm/hr)
24SCS5           01/01/2000 00:00:00   0.686
24SCS5           01/01/2000 00:15:00   0.686
24SCS5           01/01/2000 00:30:00   0.686
24SCS5           01/01/2000 00:45:00   0.686
24SCS5           01/01/2000 01:00:00   0.686
24SCS5           01/01/2000 01:15:00   0.686
24SCS5           01/01/2000 01:30:00   0.686
24SCS5           01/01/2000 01:45:00   0.686
24SCS5           01/01/2000 02:00:00   0.811
24SCS5           01/01/2000 02:15:00   0.811
24SCS5           01/01/2000 02:30:00   0.811
24SCS5           01/01/2000 02:45:00   0.811
24SCS5           01/01/2000 03:00:00   0.811
24SCS5           01/01/2000 03:15:00   0.811
24SCS5           01/01/2000 03:30:00   0.811
24SCS5           01/01/2000 03:45:00   0.811
24SCS5           01/01/2000 04:00:00   0.998
24SCS5           01/01/2000 04:15:00   0.998
24SCS5           01/01/2000 04:30:00   0.998
24SCS5           01/01/2000 04:45:00   0.998
24SCS5           01/01/2000 05:00:00   0.998
24SCS5           01/01/2000 05:15:00   0.998
24SCS5           01/01/2000 05:30:00   0.998
24SCS5           01/01/2000 05:45:00   0.998
24SCS5           01/01/2000 06:00:00   1.123
24SCS5           01/01/2000 06:15:00   1.123
24SCS5           01/01/2000 06:30:00   1.123
24SCS5           01/01/2000 06:45:00   1.123
24SCS5           01/01/2000 07:00:00   1.373
24SCS5           01/01/2000 07:15:00   1.373
24SCS5           01/01/2000 07:30:00   1.373
24SCS5           01/01/2000 07:45:00   1.373
24SCS5           01/01/2000 08:00:00   1.622
24SCS5           01/01/2000 08:15:00   1.622
24SCS5           01/01/2000 08:30:00   1.747
24SCS5           01/01/2000 08:45:00   1.747
24SCS5           01/01/2000 09:00:00   1.997
24SCS5           01/01/2000 09:15:00   1.997
```

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24SCS5          01/01/2000 09:30:00   2.246
24SCS5          01/01/2000 09:45:00   2.246
24SCS5          01/01/2000 10:00:00   2.87
24SCS5          01/01/2000 10:15:00   2.87
24SCS5          01/01/2000 10:30:00   3.869
24SCS5          01/01/2000 10:45:00   3.869
24SCS5          01/01/2000 11:00:00   5.99
24SCS5          01/01/2000 11:15:00   5.99
24SCS5          01/01/2000 11:30:00   18.47
24SCS5          01/01/2000 11:45:00   76.378
24SCS5          01/01/2000 12:00:00   8.986
24SCS5          01/01/2000 12:15:00   8.986
24SCS5          01/01/2000 12:30:00   4.618
24SCS5          01/01/2000 12:45:00   4.618
24SCS5          01/01/2000 13:00:00   3.37
24SCS5          01/01/2000 13:15:00   3.37
24SCS5          01/01/2000 13:30:00   2.621
24SCS5          01/01/2000 13:45:00   2.621
24SCS5          01/01/2000 14:00:00   1.872
24SCS5          01/01/2000 14:15:00   1.872
24SCS5          01/01/2000 14:30:00   1.872
24SCS5          01/01/2000 14:45:00   1.872
24SCS5          01/01/2000 15:00:00   1.872
24SCS5          01/01/2000 15:15:00   1.872
24SCS5          01/01/2000 15:30:00   1.872
24SCS5          01/01/2000 15:45:00   1.872
24SCS5          01/01/2000 16:00:00   1.123
24SCS5          01/01/2000 16:15:00   1.123
24SCS5          01/01/2000 16:30:00   1.123
24SCS5          01/01/2000 16:45:00   1.123
24SCS5          01/01/2000 17:00:00   1.123
24SCS5          01/01/2000 17:15:00   1.123
24SCS5          01/01/2000 17:30:00   1.123
24SCS5          01/01/2000 17:45:00   1.123
24SCS5          01/01/2000 18:00:00   1.123
24SCS5          01/01/2000 18:15:00   1.123
24SCS5          01/01/2000 18:30:00   1.123
24SCS5          01/01/2000 18:45:00   1.123
24SCS5          01/01/2000 19:00:00   1.123
24SCS5          01/01/2000 19:15:00   1.123
24SCS5          01/01/2000 19:30:00   1.123
24SCS5          01/01/2000 19:45:00   1.123
24SCS5          01/01/2000 20:00:00   0.749
24SCS5          01/01/2000 20:15:00   0.749
24SCS5          01/01/2000 20:30:00   0.749
24SCS5          01/01/2000 20:45:00   0.749
24SCS5          01/01/2000 21:00:00   0.749
24SCS5          01/01/2000 21:15:00   0.749
24SCS5          01/01/2000 21:30:00   0.749
24SCS5          01/01/2000 21:45:00   0.749
24SCS5          01/01/2000 22:00:00   0.749
24SCS5          01/01/2000 22:15:00   0.749
24SCS5          01/01/2000 22:30:00   0.749
24SCS5          01/01/2000 22:45:00   0.749
24SCS5          01/01/2000 23:00:00   0.749
24SCS5          01/01/2000 23:15:00   0.749
24SCS5          01/01/2000 23:30:00   0.749
24SCS5          01/01/2000 23:45:00   0.749

;Rainfall (mm/hr)
24SCS50         01/01/2000 00:00:00   1.03
24SCS50         01/01/2000 00:15:00   1.03
24SCS50         01/01/2000 00:30:00   1.03
24SCS50         01/01/2000 00:45:00   1.03
24SCS50         01/01/2000 01:00:00   1.03
24SCS50         01/01/2000 01:15:00   1.03
24SCS50         01/01/2000 01:30:00   1.03
24SCS50         01/01/2000 01:45:00   1.03
24SCS50         01/01/2000 02:00:00   1.217
24SCS50         01/01/2000 02:15:00   1.217
24SCS50         01/01/2000 02:30:00   1.217
24SCS50         01/01/2000 02:45:00   1.217
24SCS50         01/01/2000 03:00:00   1.217
24SCS50         01/01/2000 03:15:00   1.217
24SCS50         01/01/2000 03:30:00   1.217
24SCS50         01/01/2000 03:45:00   1.217
24SCS50         01/01/2000 04:00:00   1.498
24SCS50         01/01/2000 04:15:00   1.498
24SCS50         01/01/2000 04:30:00   1.498
24SCS50         01/01/2000 04:45:00   1.498
24SCS50         01/01/2000 05:00:00   1.498
24SCS50         01/01/2000 05:15:00   1.498
24SCS50         01/01/2000 05:30:00   1.498
24SCS50         01/01/2000 05:45:00   1.498
24SCS50         01/01/2000 06:00:00   1.685
24SCS50         01/01/2000 06:15:00   1.685
24SCS50         01/01/2000 06:30:00   1.685
24SCS50         01/01/2000 06:45:00   1.685
24SCS50         01/01/2000 07:00:00   2.059
24SCS50         01/01/2000 07:15:00   2.059
24SCS50         01/01/2000 07:30:00   2.059
24SCS50         01/01/2000 07:45:00   2.059
24SCS50         01/01/2000 08:00:00   2.434
24SCS50         01/01/2000 08:15:00   2.434
24SCS50         01/01/2000 08:30:00   2.621
24SCS50         01/01/2000 08:45:00   2.621
24SCS50         01/01/2000 09:00:00   2.995
24SCS50         01/01/2000 09:15:00   2.995
24SCS50         01/01/2000 09:30:00   3.37
24SCS50         01/01/2000 09:45:00   3.37
24SCS50         01/01/2000 10:00:00   4.306
24SCS50         01/01/2000 10:15:00   4.306
24SCS50         01/01/2000 10:30:00   5.803
24SCS50         01/01/2000 10:45:00   5.803
24SCS50         01/01/2000 11:00:00   8.986
24SCS50         01/01/2000 11:15:00   8.986
24SCS50         01/01/2000 11:30:00   27.706
24SCS50         01/01/2000 11:45:00   114.566
24SCS50         01/01/2000 12:00:00   13.478
24SCS50         01/01/2000 12:15:00   13.478
24SCS50         01/01/2000 12:30:00   6.926
24SCS50         01/01/2000 12:45:00   6.926
24SCS50         01/01/2000 13:00:00   5.054
24SCS50         01/01/2000 13:15:00   5.054
24SCS50         01/01/2000 13:30:00   3.931
24SCS50         01/01/2000 13:45:00   3.931
24SCS50         01/01/2000 14:00:00   2.808
24SCS50         01/01/2000 14:15:00   2.808
24SCS50         01/01/2000 14:30:00   2.808
24SCS50         01/01/2000 14:45:00   2.808
24SCS50         01/01/2000 15:00:00   2.808
24SCS50         01/01/2000 15:15:00   2.808
24SCS50         01/01/2000 15:30:00   2.808
24SCS50         01/01/2000 15:45:00   2.808
24SCS50         01/01/2000 16:00:00   1.685
24SCS50         01/01/2000 16:15:00   1.685
24SCS50         01/01/2000 16:30:00   1.685
24SCS50         01/01/2000 16:45:00   1.685
24SCS50         01/01/2000 17:00:00   1.685
24SCS50         01/01/2000 17:15:00   1.685
24SCS50         01/01/2000 17:30:00   1.685
24SCS50         01/01/2000 17:45:00   1.685
24SCS50         01/01/2000 18:00:00   1.685
24SCS50         01/01/2000 18:15:00   1.685
24SCS50         01/01/2000 18:30:00   1.685
24SCS50         01/01/2000 18:45:00   1.685
24SCS50         01/01/2000 19:00:00   1.685
24SCS50         01/01/2000 19:15:00   1.685
24SCS50         01/01/2000 19:30:00   1.685
24SCS50         01/01/2000 19:45:00   1.685
24SCS50         01/01/2000 20:00:00   1.123
24SCS50         01/01/2000 20:15:00   1.123
24SCS50         01/01/2000 20:30:00   1.123
24SCS50         01/01/2000 20:45:00   1.123
24SCS50         01/01/2000 21:00:00   1.123
24SCS50         01/01/2000 21:15:00   1.123
24SCS50         01/01/2000 21:30:00   1.123
24SCS50         01/01/2000 21:45:00   1.123
24SCS50         01/01/2000 22:00:00   1.123
24SCS50         01/01/2000 22:15:00   1.123
24SCS50         01/01/2000 22:30:00   1.123
24SCS50         01/01/2000 22:45:00   1.123
24SCS50         01/01/2000 23:00:00   1.123
24SCS50         01/01/2000 23:15:00   1.123
24SCS50         01/01/2000 23:30:00   1.123
24SCS50         01/01/2000 23:45:00   1.123

;Rainfall (mm/hr)
4hr-25mm        01/01/2000 00:00:00   1.777
4hr-25mm        01/01/2000 00:15:00   2.357
4hr-25mm        01/01/2000 00:30:00   3.618
4hr-25mm        01/01/2000 00:45:00   8.975
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4hr-25mm          01/01/2000 01:00:00   45.631
4hr-25mm          01/01/2000 01:15:00   11.911
4hr-25mm          01/01/2000 01:30:00   6.051
4hr-25mm          01/01/2000 01:45:00   4.108
4hr-25mm          01/01/2000 02:00:00   3.138
4hr-25mm          01/01/2000 02:15:00   2.555
4hr-25mm          01/01/2000 02:30:00   2.165
4hr-25mm          01/01/2000 02:45:00   1.885
4hr-25mm          01/01/2000 03:00:00   1.675
4hr-25mm          01/01/2000 03:15:00   1.509
4hr-25mm          01/01/2000 03:30:00   1.376
4hr-25mm          01/01/2000 03:45:00   1.266

;Rainfall (mm/hr)
AUG4-88           01/01/2000 00:00:00   0
AUG4-88           01/01/2000 00:05:00   0.1
AUG4-88           01/01/2000 00:10:00   0.1
AUG4-88           01/01/2000 00:15:00   0
AUG4-88           01/01/2000 00:20:00   3.7
AUG4-88           01/01/2000 00:25:00   6.2
AUG4-88           01/01/2000 00:30:00   101.5
AUG4-88           01/01/2000 00:35:00   15.5
AUG4-88           01/01/2000 00:40:00   29.3
AUG4-88           01/01/2000 00:45:00   19.8
AUG4-88           01/01/2000 00:50:00   1.5
AUG4-88           01/01/2000 00:55:00   1.7
AUG4-88           01/01/2000 01:00:00   5.4
AUG4-88           01/01/2000 01:05:00   24.6
AUG4-88           01/01/2000 01:10:00   26.5
AUG4-88           01/01/2000 01:15:00   34.9
AUG4-88           01/01/2000 01:20:00   10.2
AUG4-88           01/01/2000 01:25:00   27.1
AUG4-88           01/01/2000 01:30:00   104.4
AUG4-88           01/01/2000 01:35:00   27.5
AUG4-88           01/01/2000 01:40:00   62.5
AUG4-88           01/01/2000 01:45:00   31.8
AUG4-88           01/01/2000 01:50:00   79.8
AUG4-88           01/01/2000 01:55:00   67.5
AUG4-88           01/01/2000 02:00:00   156.2
AUG4-88           01/01/2000 02:05:00   5.1
AUG4-88           01/01/2000 02:10:00   0.2
AUG4-88           01/01/2000 02:15:00   0.2
AUG4-88           01/01/2000 02:20:00   0.2
AUG4-88           01/01/2000 02:25:00   0.2
AUG4-88           01/01/2000 02:30:00   0.2
AUG4-88           01/01/2000 02:35:00   0.2
AUG4-88           01/01/2000 02:40:00   0.2
AUG4-88           01/01/2000 02:45:00   0.2
AUG4-88           01/01/2000 02:50:00   0.2
AUG4-88           01/01/2000 02:55:00   0.2
AUG4-88           01/01/2000 03:00:00   12.8
AUG4-88           01/01/2000 03:05:00   14
AUG4-88           01/01/2000 03:10:00   22.2
AUG4-88           01/01/2000 03:15:00   21.8
AUG4-88           01/01/2000 03:20:00   1.4
AUG4-88           01/01/2000 03:25:00   0.2
AUG4-88           01/01/2000 03:30:00   0.2
AUG4-88           01/01/2000 03:35:00   0.2
AUG4-88           01/01/2000 03:40:00   0.2
AUG4-88           01/01/2000 03:45:00   0.2
AUG4-88           01/01/2000 03:50:00   0.2
AUG4-88           01/01/2000 03:55:00   0.2
AUG4-88           01/01/2000 04:00:00   0.2
AUG4-88           01/01/2000 04:05:00   0.2
AUG4-88           01/01/2000 04:10:00   0.2
AUG4-88           01/01/2000 04:15:00   0.2
AUG4-88           01/01/2000 04:20:00   0.2
AUG4-88           01/01/2000 04:25:00   0.2
AUG4-88           01/01/2000 04:30:00   0.2
AUG4-88           01/01/2000 04:35:00   0.2
AUG4-88           01/01/2000 04:40:00   0.2
AUG4-88           01/01/2000 04:45:00   0.2
AUG4-88           01/01/2000 04:50:00   0.2
AUG4-88           01/01/2000 04:55:00   0.2
AUG4-88           01/01/2000 05:00:00   2.9
AUG4-88           01/01/2000 05:05:00   7.8
AUG4-88           01/01/2000 05:10:00   10
AUG4-88           01/01/2000 05:15:00   6.3
AUG4-88           01/01/2000 05:20:00   5.1
AUG4-88           01/01/2000 05:25:00   9.8
AUG4-88           01/01/2000 05:30:00   2.6
AUG4-88           01/01/2000 05:35:00   1.7
AUG4-88           01/01/2000 05:40:00   0
AUG4-88           01/01/2000 05:45:00   0

;Rainfall (mm/hr)
AUG8-96           01/01/2000 00:00:00   4
AUG8-96           01/01/2000 00:05:00   11.9
AUG8-96           01/01/2000 00:10:00   26.5
AUG8-96           01/01/2000 00:15:00   13.3
AUG8-96           01/01/2000 00:20:00   0
AUG8-96           01/01/2000 00:25:00   2.7
AUG8-96           01/01/2000 00:30:00   0
AUG8-96           01/01/2000 00:35:00   8
AUG8-96           01/01/2000 00:40:00   18.6
AUG8-96           01/01/2000 00:45:00   10.6
AUG8-96           01/01/2000 00:50:00   21.2
AUG8-96           01/01/2000 00:55:00   2.7
AUG8-96           01/01/2000 01:00:00   2.7
AUG8-96           01/01/2000 01:05:00   15.9
AUG8-96           01/01/2000 01:10:00   66.3
AUG8-96           01/01/2000 01:15:00   55.7
AUG8-96           01/01/2000 01:20:00   122
AUG8-96           01/01/2000 01:25:00   88.9
AUG8-96           01/01/2000 01:30:00   9.3
AUG8-96           01/01/2000 01:35:00   8
AUG8-96           01/01/2000 01:40:00   4
AUG8-96           01/01/2000 01:45:00   0
AUG8-96           01/01/2000 01:50:00   2.7
AUG8-96           01/01/2000 01:55:00   0
AUG8-96           01/01/2000 02:00:00   0
AUG8-96           01/01/2000 02:05:00   0
AUG8-96           01/01/2000 02:10:00   5.3
AUG8-96           01/01/2000 02:15:00   0
AUG8-96           01/01/2000 02:20:00   0
AUG8-96           01/01/2000 02:25:00   0
AUG8-96           01/01/2000 02:30:00   0
AUG8-96           01/01/2000 02:35:00   0
AUG8-96           01/01/2000 02:40:00   0
AUG8-96           01/01/2000 02:45:00   4
AUG8-96           01/01/2000 02:50:00   53.1
AUG8-96           01/01/2000 02:55:00   69
AUG8-96           01/01/2000 03:00:00   63.7
AUG8-96           01/01/2000 03:05:00   58.4
AUG8-96           01/01/2000 03:10:00   47.8
AUG8-96           01/01/2000 03:15:00   15.9
AUG8-96           01/01/2000 03:20:00   13.3
AUG8-96           01/01/2000 03:25:00   8
AUG8-96           01/01/2000 03:30:00   5.3
AUG8-96           01/01/2000 03:35:00   6.6
AUG8-96           01/01/2000 03:40:00   2.7
AUG8-96           01/01/2000 03:45:00   4
AUG8-96           01/01/2000 03:50:00   2.7
AUG8-96           01/01/2000 03:55:00   4
AUG8-96           01/01/2000 04:00:00   2.7
AUG8-96           01/01/2000 04:05:00   5.3
AUG8-96           01/01/2000 04:10:00   4
AUG8-96           01/01/2000 04:15:00   2.7
AUG8-96           01/01/2000 04:20:00   4
AUG8-96           01/01/2000 04:25:00   2.7
AUG8-96           01/01/2000 04:30:00   1.3
AUG8-96           01/01/2000 04:35:00   1.3
AUG8-96           01/01/2000 04:40:00   0
AUG8-96           01/01/2000 04:45:00   0
AUG8-96           01/01/2000 04:50:00   0
AUG8-96           01/01/2000 04:55:00   0
AUG8-96           01/01/2000 05:00:00   2.7
AUG8-96           01/01/2000 05:05:00   0
AUG8-96           01/01/2000 05:10:00   0
AUG8-96           01/01/2000 05:15:00   0
AUG8-96           01/01/2000 05:20:00   0
AUG8-96           01/01/2000 05:25:00   0
AUG8-96           01/01/2000 05:30:00   0
AUG8-96           01/01/2000 05:35:00   0
AUG8-96           01/01/2000 05:40:00   1.3
AUG8-96           01/01/2000 05:45:00   0

;Rainfall (mm/hr)
CHI_3hr_10        01/01/2000 00:00:00   3.755
CHI_3hr_10        01/01/2000 00:10:00   4.478
CHI_3hr_10        01/01/2000 00:20:00   5.593
CHI_3hr_10        01/01/2000 00:30:00   7.551
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CHI_3hr_10       01/01/2000 00:40:00   11.936
CHI_3hr_10       01/01/2000 00:50:00   30.856
CHI_3hr_10       01/01/2000 01:00:00   122.142
CHI_3hr_10       01/01/2000 01:10:00   35.237
CHI_3hr_10       01/01/2000 01:20:00   18.159
CHI_3hr_10       01/01/2000 01:30:00   12.238
CHI_3hr_10       01/01/2000 01:40:00   9.269
CHI_3hr_10       01/01/2000 01:50:00   7.492
CHI_3hr_10       01/01/2000 02:00:00   6.309
CHI_3hr_10       01/01/2000 02:10:00   5.465
CHI_3hr_10       01/01/2000 02:20:00   4.831
CHI_3hr_10       01/01/2000 02:30:00   4.338
CHI_3hr_10       01/01/2000 02:40:00   3.942
CHI_3hr_10       01/01/2000 02:50:00   3.617
CHI_3hr_10       01/01/2000 03:00:00   0

;Rainfall (mm/hr)
CHI_3hr_100      01/01/2000 00:00:00   5.339
CHI_3hr_100      01/01/2000 00:10:00   6.376
CHI_3hr_100      01/01/2000 00:20:00   7.977
CHI_3hr_100      01/01/2000 00:30:00   10.797
CHI_3hr_100      01/01/2000 00:40:00   17.136
CHI_3hr_100      01/01/2000 00:50:00   45.128
CHI_3hr_100      01/01/2000 01:00:00   178.107
CHI_3hr_100      01/01/2000 01:10:00   51.056
CHI_3hr_100      01/01/2000 01:20:00   26.163
CHI_3hr_100      01/01/2000 01:30:00   17.571
CHI_3hr_100      01/01/2000 01:40:00   13.277
CHI_3hr_100      01/01/2000 01:50:00   10.712
CHI_3hr_100      01/01/2000 02:00:00   9.008
CHI_3hr_100      01/01/2000 02:10:00   7.793
CHI_3hr_100      01/01/2000 02:20:00   6.883
CHI_3hr_100      01/01/2000 02:30:00   6.174
CHI_3hr_100      01/01/2000 02:40:00   5.607
CHI_3hr_100      01/01/2000 02:50:00   5.142
CHI_3hr_100      01/01/2000 03:00:00   0

;Rainfall (mm/hr)
CHI_3hr_2        01/01/2000 00:00:00   2.491
CHI_3hr_2        01/01/2000 00:10:00   2.966
CHI_3hr_2        01/01/2000 00:20:00   3.696
CHI_3hr_2        01/01/2000 00:30:00   4.976
CHI_3hr_2        01/01/2000 00:40:00   7.828
CHI_3hr_2        01/01/2000 00:50:00   19.966
CHI_3hr_2        01/01/2000 01:00:00   76.805
CHI_3hr_2        01/01/2000 01:10:00   22.777
CHI_3hr_2        01/01/2000 01:20:00   11.852
CHI_3hr_2        01/01/2000 01:30:00   8.025
CHI_3hr_2        01/01/2000 01:40:00   6.096
CHI_3hr_2        01/01/2000 01:50:00   4.938
CHI_3hr_2        01/01/2000 02:00:00   4.165
CHI_3hr_2        01/01/2000 02:10:00   3.613
CHI_3hr_2        01/01/2000 02:20:00   3.197
CHI_3hr_2        01/01/2000 02:30:00   2.873
CHI_3hr_2        01/01/2000 02:40:00   2.613
CHI_3hr_2        01/01/2000 02:50:00   2.4
CHI_3hr_2        01/01/2000 03:00:00   0

;Rainfall (mm/hr)
CHI_3hr_25       01/01/2000 00:00:00   4.358
CHI_3hr_25       01/01/2000 00:10:00   5.202
CHI_3hr_25       01/01/2000 00:20:00   6.506
CHI_3hr_25       01/01/2000 00:30:00   8.801
CHI_3hr_25       01/01/2000 00:40:00   13.954
CHI_3hr_25       01/01/2000 00:50:00   36.302
CHI_3hr_25       01/01/2000 01:00:00   144.693
CHI_3hr_25       01/01/2000 01:10:00   41.479
CHI_3hr_25       01/01/2000 01:20:00   21.286
CHI_3hr_25       01/01/2000 01:30:00   14.308
CHI_3hr_25       01/01/2000 01:40:00   10.818
CHI_3hr_25       01/01/2000 01:50:00   8.732
CHI_3hr_25       01/01/2000 02:00:00   7.345
CHI_3hr_25       01/01/2000 02:10:00   6.356
CHI_3hr_25       01/01/2000 02:20:00   5.615
CHI_3hr_25       01/01/2000 02:30:00   5.038
CHI_3hr_25       01/01/2000 02:40:00   4.576
CHI_3hr_25       01/01/2000 02:50:00   4.197
CHI_3hr_25       01/01/2000 03:00:00   0

;Rainfall (mm/hr)
CHI_3hr_5        01/01/2000 00:00:00   3.256
CHI_3hr_5        01/01/2000 00:10:00   3.881
CHI_3hr_5        01/01/2000 00:20:00   4.844
CHI_3hr_5        01/01/2000 00:30:00   6.532
CHI_3hr_5        01/01/2000 00:40:00   10.308
CHI_3hr_5        01/01/2000 00:50:00   26.792
CHI_3hr_5        01/01/2000 01:00:00   103.93
CHI_3hr_5        01/01/2000 01:10:00   30.286
CHI_3hr_5        01/01/2000 01:20:00   15.655
CHI_3hr_5        01/01/2000 01:30:00   10.568
CHI_3hr_5        01/01/2000 01:40:00   8.013
CHI_3hr_5        01/01/2000 01:50:00   6.482
CHI_3hr_5        01/01/2000 02:00:00   5.462
CHI_3hr_5        01/01/2000 02:10:00   4.733
CHI_3hr_5        01/01/2000 02:20:00   4.186
CHI_3hr_5        01/01/2000 02:30:00   3.76
CHI_3hr_5        01/01/2000 02:40:00   3.418
CHI_3hr_5        01/01/2000 02:50:00   3.137
CHI_3hr_5        01/01/2000 03:00:00   0

;Rainfall (mm/hr)
CHI_3hr_50       01/01/2000 00:00:00   4.828
CHI_3hr_50       01/01/2000 00:10:00   5.766
CHI_3hr_50       01/01/2000 00:20:00   7.214
CHI_3hr_50       01/01/2000 00:30:00   9.763
CHI_3hr_50       01/01/2000 00:40:00   15.496
CHI_3hr_50       01/01/2000 00:50:00   40.401
CHI_3hr_50       01/01/2000 01:00:00   161.471
CHI_3hr_50       01/01/2000 01:10:00   46.17
CHI_3hr_50       01/01/2000 01:20:00   23.66
CHI_3hr_50       01/01/2000 01:30:00   15.89
CHI_3hr_50       01/01/2000 01:40:00   12.006
CHI_3hr_50       01/01/2000 01:50:00   9.687
CHI_3hr_50       01/01/2000 02:00:00   8.146
CHI_3hr_50       01/01/2000 02:10:00   7.047
CHI_3hr_50       01/01/2000 02:20:00   6.224
CHI_3hr_50       01/01/2000 02:30:00   5.583
CHI_3hr_50       01/01/2000 02:40:00   5.07
CHI_3hr_50       01/01/2000 02:50:00   4.649
CHI_3hr_50       01/01/2000 03:00:00   0

;Rainfall (mm/hr)
CHI_6hr_10       01/01/2000 00:00:00   1.944
CHI_6hr_10       01/01/2000 00:10:00   2.097
CHI_6hr_10       01/01/2000 00:20:00   2.278
CHI_6hr_10       01/01/2000 00:30:00   2.499
CHI_6hr_10       01/01/2000 00:40:00   2.772
CHI_6hr_10       01/01/2000 00:50:00   3.122
CHI_6hr_10       01/01/2000 01:00:00   3.585
CHI_6hr_10       01/01/2000 01:10:00   4.231
CHI_6hr_10       01/01/2000 01:20:00   5.199
CHI_6hr_10       01/01/2000 01:30:00   6.823
CHI_6hr_10       01/01/2000 01:40:00   10.137
CHI_6hr_10       01/01/2000 01:50:00   20.829
CHI_6hr_10       01/01/2000 02:00:00   122.142
CHI_6hr_10       01/01/2000 02:10:00   41.92
CHI_6hr_10       01/01/2000 02:20:00   21.263
CHI_6hr_10       01/01/2000 02:30:00   13.557
CHI_6hr_10       01/01/2000 02:40:00   9.991
CHI_6hr_10       01/01/2000 02:50:00   7.945
CHI_6hr_10       01/01/2000 03:00:00   6.62
CHI_6hr_10       01/01/2000 03:10:00   5.692
CHI_6hr_10       01/01/2000 03:20:00   5.004
CHI_6hr_10       01/01/2000 03:30:00   4.474
CHI_6hr_10       01/01/2000 03:40:00   4.052
CHI_6hr_10       01/01/2000 03:50:00   3.708
CHI_6hr_10       01/01/2000 04:00:00   3.422
CHI_6hr_10       01/01/2000 04:10:00   3.181
CHI_6hr_10       01/01/2000 04:20:00   2.973
CHI_6hr_10       01/01/2000 04:30:00   2.794
CHI_6hr_10       01/01/2000 04:40:00   2.636
CHI_6hr_10       01/01/2000 04:50:00   2.497
CHI_6hr_10       01/01/2000 05:00:00   2.373
CHI_6hr_10       01/01/2000 05:10:00   2.262
CHI_6hr_10       01/01/2000 05:20:00   2.162
CHI_6hr_10       01/01/2000 05:30:00   2.071
CHI_6hr_10       01/01/2000 05:40:00   1.988
CHI_6hr_10       01/01/2000 05:50:00   1.912
CHI_6hr_10       01/01/2000 06:00:00   0

;Rainfall (mm/hr)
CHI_6hr_100      01/01/2000 00:00:00   2.752
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CHI_6hr_100      01/01/2000 00:10:00   2.969
CHI_6hr_100      01/01/2000 00:20:00   3.228
CHI_6hr_100      01/01/2000 00:30:00   3.542
CHI_6hr_100      01/01/2000 00:40:00   3.933
CHI_6hr_100      01/01/2000 00:50:00   4.432
CHI_6hr_100      01/01/2000 01:00:00   5.095
CHI_6hr_100      01/01/2000 01:10:00   6.021
CHI_6hr_100      01/01/2000 01:20:00   7.412
CHI_6hr_100      01/01/2000 01:30:00   9.748
CHI_6hr_100      01/01/2000 01:40:00   14.532
CHI_6hr_100      01/01/2000 01:50:00   30.054
CHI_6hr_100      01/01/2000 02:00:00   178.559
CHI_6hr_100      01/01/2000 02:10:00   60.818
CHI_6hr_100      01/01/2000 02:20:00   30.678
CHI_6hr_100      01/01/2000 02:30:00   19.483
CHI_6hr_100      01/01/2000 02:40:00   14.32
CHI_6hr_100      01/01/2000 02:50:00   11.366
CHI_6hr_100      01/01/2000 03:00:00   9.456
CHI_6hr_100      01/01/2000 03:10:00   8.119
CHI_6hr_100      01/01/2000 03:20:00   7.131
CHI_6hr_100      01/01/2000 03:30:00   6.37
CHI_6hr_100      01/01/2000 03:40:00   5.765
CHI_6hr_100      01/01/2000 03:50:00   5.272
CHI_6hr_100      01/01/2000 04:00:00   4.863
CHI_6hr_100      01/01/2000 04:10:00   4.517
CHI_6hr_100      01/01/2000 04:20:00   4.22
CHI_6hr_100      01/01/2000 04:30:00   3.964
CHI_6hr_100      01/01/2000 04:40:00   3.739
CHI_6hr_100      01/01/2000 04:50:00   3.54
CHI_6hr_100      01/01/2000 05:00:00   3.363
CHI_6hr_100      01/01/2000 05:10:00   3.205
CHI_6hr_100      01/01/2000 05:20:00   3.062
CHI_6hr_100      01/01/2000 05:30:00   2.932
CHI_6hr_100      01/01/2000 05:40:00   2.814
CHI_6hr_100      01/01/2000 05:50:00   2.706
CHI_6hr_100      01/01/2000 06:00:00   0

;Rainfall (mm/hr)
CHI_6hr_2        01/01/2000 00:00:00   1.297
CHI_6hr_2        01/01/2000 00:10:00   1.398
CHI_6hr_2        01/01/2000 00:20:00   1.518
CHI_6hr_2        01/01/2000 00:30:00   1.663
CHI_6hr_2        01/01/2000 00:40:00   1.843
CHI_6hr_2        01/01/2000 00:50:00   2.074
CHI_6hr_2        01/01/2000 01:00:00   2.379
CHI_6hr_2        01/01/2000 01:10:00   2.803
CHI_6hr_2        01/01/2000 01:20:00   3.439
CHI_6hr_2        01/01/2000 01:30:00   4.501
CHI_6hr_2        01/01/2000 01:40:00   6.66
CHI_6hr_2        01/01/2000 01:50:00   13.563
CHI_6hr_2        01/01/2000 02:00:00   76.805
CHI_6hr_2        01/01/2000 02:10:00   27.028
CHI_6hr_2        01/01/2000 02:20:00   13.849
CHI_6hr_2        01/01/2000 02:30:00   8.88
CHI_6hr_2        01/01/2000 02:40:00   6.566
CHI_6hr_2        01/01/2000 02:50:00   5.234
CHI_6hr_2        01/01/2000 03:00:00   4.369
CHI_6hr_2        01/01/2000 03:10:00   3.761
CHI_6hr_2        01/01/2000 03:20:00   3.311
CHI_6hr_2        01/01/2000 03:30:00   2.963
CHI_6hr_2        01/01/2000 03:40:00   2.686
CHI_6hr_2        01/01/2000 03:50:00   2.46
CHI_6hr_2        01/01/2000 04:00:00   2.272
CHI_6hr_2        01/01/2000 04:10:00   2.113
CHI_6hr_2        01/01/2000 04:20:00   1.976
CHI_6hr_2        01/01/2000 04:30:00   1.858
CHI_6hr_2        01/01/2000 04:40:00   1.754
CHI_6hr_2        01/01/2000 04:50:00   1.662
CHI_6hr_2        01/01/2000 05:00:00   1.58
CHI_6hr_2        01/01/2000 05:10:00   1.507
CHI_6hr_2        01/01/2000 05:20:00   1.441
CHI_6hr_2        01/01/2000 05:30:00   1.38
CHI_6hr_2        01/01/2000 05:40:00   1.326
CHI_6hr_2        01/01/2000 05:50:00   1.275
CHI_6hr_2        01/01/2000 06:00:00   0

;Rainfall (mm/hr)
CHI_6hr_25       01/01/2000 00:00:00   2.249
CHI_6hr_25       01/01/2000 00:10:00   2.426
CHI_6hr_25       01/01/2000 00:20:00   2.637
CHI_6hr_25       01/01/2000 00:30:00   2.893
CHI_6hr_25       01/01/2000 00:40:00   3.212
CHI_6hr_25       01/01/2000 00:50:00   3.619
CHI_6hr_25       01/01/2000 01:00:00   4.159
CHI_6hr_25       01/01/2000 01:10:00   4.914
CHI_6hr_25       01/01/2000 01:20:00   6.046
CHI_6hr_25       01/01/2000 01:30:00   7.947
CHI_6hr_25       01/01/2000 01:40:00   11.837
CHI_6hr_25       01/01/2000 01:50:00   24.442
CHI_6hr_25       01/01/2000 02:00:00   144.693
CHI_6hr_25       01/01/2000 02:10:00   49.392
CHI_6hr_25       01/01/2000 02:20:00   24.95
CHI_6hr_25       01/01/2000 02:30:00   15.861
CHI_6hr_25       01/01/2000 02:40:00   11.666
CHI_6hr_25       01/01/2000 02:50:00   9.263
CHI_6hr_25       01/01/2000 03:00:00   7.71
CHI_6hr_25       01/01/2000 03:10:00   6.622
CHI_6hr_25       01/01/2000 03:20:00   5.817
CHI_6hr_25       01/01/2000 03:30:00   5.197
CHI_6hr_25       01/01/2000 03:40:00   4.705
CHI_6hr_25       01/01/2000 03:50:00   4.303
CHI_6hr_25       01/01/2000 04:00:00   3.97
CHI_6hr_25       01/01/2000 04:10:00   3.688
CHI_6hr_25       01/01/2000 04:20:00   3.446
CHI_6hr_25       01/01/2000 04:30:00   3.237
CHI_6hr_25       01/01/2000 04:40:00   3.054
CHI_6hr_25       01/01/2000 04:50:00   2.892
CHI_6hr_25       01/01/2000 05:00:00   2.747
CHI_6hr_25       01/01/2000 05:10:00   2.618
CHI_6hr_25       01/01/2000 05:20:00   2.501
CHI_6hr_25       01/01/2000 05:30:00   2.396
CHI_6hr_25       01/01/2000 05:40:00   2.299
CHI_6hr_25       01/01/2000 05:50:00   2.211
CHI_6hr_25       01/01/2000 06:00:00   0

;Rainfall (mm/hr)
CHI_6hr_5        01/01/2000 00:00:00   1.69
CHI_6hr_5        01/01/2000 00:10:00   1.822
CHI_6hr_5        01/01/2000 00:20:00   1.979
CHI_6hr_5        01/01/2000 00:30:00   2.169
CHI_6hr_5        01/01/2000 00:40:00   2.406
CHI_6hr_5        01/01/2000 00:50:00   2.708
CHI_6hr_5        01/01/2000 01:00:00   3.109
CHI_6hr_5        01/01/2000 01:10:00   3.667
CHI_6hr_5        01/01/2000 01:20:00   4.504
CHI_6hr_5        01/01/2000 01:30:00   5.905
CHI_6hr_5        01/01/2000 01:40:00   8.759
CHI_6hr_5        01/01/2000 01:50:00   17.944
CHI_6hr_5        01/01/2000 02:00:00   104.193
CHI_6hr_5        01/01/2000 02:10:00   36.002
CHI_6hr_5        01/01/2000 02:20:00   18.319
CHI_6hr_5        01/01/2000 02:30:00   11.702
CHI_6hr_5        01/01/2000 02:40:00   8.634
CHI_6hr_5        01/01/2000 02:50:00   6.872
CHI_6hr_5        01/01/2000 03:00:00   5.73
CHI_6hr_5        01/01/2000 03:10:00   4.929
CHI_6hr_5        01/01/2000 03:20:00   4.335
CHI_6hr_5        01/01/2000 03:30:00   3.877
CHI_6hr_5        01/01/2000 03:40:00   3.513
CHI_6hr_5        01/01/2000 03:50:00   3.216
CHI_6hr_5        01/01/2000 04:00:00   2.969
CHI_6hr_5        01/01/2000 04:10:00   2.76
CHI_6hr_5        01/01/2000 04:20:00   2.58
CHI_6hr_5        01/01/2000 04:30:00   2.425
CHI_6hr_5        01/01/2000 04:40:00   2.289
CHI_6hr_5        01/01/2000 04:50:00   2.168
CHI_6hr_5        01/01/2000 05:00:00   2.061
CHI_6hr_5        01/01/2000 05:10:00   1.965
CHI_6hr_5        01/01/2000 05:20:00   1.878
CHI_6hr_5        01/01/2000 05:30:00   1.799
CHI_6hr_5        01/01/2000 05:40:00   1.727
CHI_6hr_5        01/01/2000 05:50:00   1.661
CHI_6hr_5        01/01/2000 06:00:00   0

;Rainfall (mm/hr)
CHI_6hr_50       01/01/2000 00:00:00   2.489
CHI_6hr_50       01/01/2000 00:10:00   2.685
CHI_6hr_50       01/01/2000 00:20:00   2.919
CHI_6hr_50       01/01/2000 00:30:00   3.203
CHI_6hr_50       01/01/2000 00:40:00   3.556
CHI_6hr_50       01/01/2000 00:50:00   4.008
CHI_6hr_50       01/01/2000 01:00:00   4.608
```

```
CHI_6hr_50       01/01/2000 01:10:00   5.445
CHI_6hr_50       01/01/2000 01:20:00   6.702
CHI_6hr_50       01/01/2000 01:30:00   8.815
CHI_6hr_50       01/01/2000 01:40:00   13.141
CHI_6hr_50       01/01/2000 01:50:00   27.177
CHI_6hr_50       01/01/2000 02:00:00   161.471
CHI_6hr_50       01/01/2000 02:10:00   54.997
CHI_6hr_50       01/01/2000 02:20:00   27.742
CHI_6hr_50       01/01/2000 02:30:00   17.619
CHI_6hr_50       01/01/2000 02:40:00   12.949
CHI_6hr_50       01/01/2000 02:50:00   10.278
CHI_6hr_50       01/01/2000 03:00:00   8.551
CHI_6hr_50       01/01/2000 03:10:00   7.342
CHI_6hr_50       01/01/2000 03:20:00   6.448
CHI_6hr_50       01/01/2000 03:30:00   5.76
CHI_6hr_50       01/01/2000 03:40:00   5.213
CHI_6hr_50       01/01/2000 03:50:00   4.768
CHI_6hr_50       01/01/2000 04:00:00   4.397
CHI_6hr_50       01/01/2000 04:10:00   4.084
CHI_6hr_50       01/01/2000 04:20:00   3.817
CHI_6hr_50       01/01/2000 04:30:00   3.584
CHI_6hr_50       01/01/2000 04:40:00   3.381
CHI_6hr_50       01/01/2000 04:50:00   3.201
CHI_6hr_50       01/01/2000 05:00:00   3.041
CHI_6hr_50       01/01/2000 05:10:00   2.898
CHI_6hr_50       01/01/2000 05:20:00   2.769
CHI_6hr_50       01/01/2000 05:30:00   2.651
CHI_6hr_50       01/01/2000 05:40:00   2.545
CHI_6hr_50       01/01/2000 05:50:00   2.447
CHI_6hr_50       01/01/2000 06:00:00   0

;Rainfall (mm/hr)
JUL1-79          01/01/2000 00:00:00   2.3
JUL1-79          01/01/2000 00:05:00   2.3
JUL1-79          01/01/2000 00:10:00   8.89
JUL1-79          01/01/2000 00:15:00   8.89
JUL1-79          01/01/2000 00:20:00   8.89
JUL1-79          01/01/2000 00:25:00   8.89
JUL1-79          01/01/2000 00:30:00   38.1
JUL1-79          01/01/2000 00:35:00   38.1
JUL1-79          01/01/2000 00:40:00   38.1
JUL1-79          01/01/2000 00:45:00   38.1
JUL1-79          01/01/2000 00:50:00   38.1
JUL1-79          01/01/2000 00:55:00   38.1
JUL1-79          01/01/2000 01:00:00   38.1
JUL1-79          01/01/2000 01:05:00   50.8
JUL1-79          01/01/2000 01:10:00   50.8
JUL1-79          01/01/2000 01:15:00   76.2
JUL1-79          01/01/2000 01:20:00   106.7
JUL1-79          01/01/2000 01:25:00   106.7
JUL1-79          01/01/2000 01:30:00   71.1
JUL1-79          01/01/2000 01:35:00   71.1
JUL1-79          01/01/2000 01:40:00   30.5
JUL1-79          01/01/2000 01:45:00   30.5
JUL1-79          01/01/2000 01:50:00   30.5
JUL1-79          01/01/2000 01:55:00   30.5
JUL1-79          01/01/2000 02:00:00   3.8
JUL1-79          01/01/2000 02:05:00   3.8
JUL1-79          01/01/2000 02:10:00   3.8
JUL1-79          01/01/2000 02:15:00   3.8
JUL1-79          01/01/2000 02:20:00   3.8
JUL1-79          01/01/2000 02:25:00   3.8
JUL1-79          01/01/2000 02:30:00   3.8
JUL1-79          01/01/2000 02:35:00   3.8
JUL1-79          01/01/2000 02:40:00   3.8
JUL1-79          01/01/2000 02:45:00   3.8
JUL1-79          01/01/2000 02:50:00   3.8
JUL1-79          01/01/2000 02:55:00   3.8

[REPORT]
;;Reporting Options
INPUT      YES
CONTROLS   NO
SUBCATCHMENTS ALL
NODES ALL
LINKS ALL

[TAGS]
Subcatch   10               Overland_Flow_Area
Subcatch   11-13_1          Parking
Subcatch   11-13_2          Parking
Subcatch   14-15_1          Parking
Subcatch   14-15_2          Parking
Subcatch   16               Parking
Subcatch   17-20            Parking
Subcatch   2                Overland_Flow_Area
Subcatch   21               Parking
Subcatch   22               Parking
Subcatch   23-25            Parking
Subcatch   26               Parking
Subcatch   27-30            Parking
Subcatch   3-5_1            Parking
Subcatch   3-5_2            Parking
Subcatch   6-9_1            Parking
Subcatch   6-9_2            Parking
Subcatch   A1               Roof
Subcatch   A2               Roof
Subcatch   B1               Roof
Subcatch   B2_B3            Roof
Subcatch   C1_C2_C3         Roof
Subcatch   D1_D2_D3         Roof
Subcatch   OFF1             Off-site
Subcatch   OFF2             Off-site
Subcatch   OFF4             Off-site
Subcatch   Pond-1           SWM_Block
Node       CB_04_(STM)      Manhole
Node       CB_07_(STM)      Manhole
Node       CB_08_(STM)      Manhole
Node       CB_11_(STM)      Manhole
Node       CB_12_(STM)      Manhole
Node       CBMH_102_(STM)   Manhole
Node       CBMH_103_(STM)   Manhole
Node       CBMH_105_(STM)   Manhole
Node       CBMH_108_(STM)   Manhole
Node       CBMH_109_(STM)   Manhole
Node       CBMH_110_(STM)   Manhole
Node       Pond             Pond
Node       St_C1_C2_C3      On_Site_Storage
Node       St_CB34          Low_Point
Node       St_D1_D2_D3      On-Site_Storage
Node       STMMH_101_(STM)  Manhole
Node       STMMH_104_(STM)  Manhole
Node       STMMH_106_(STM)  Manhole
Node       STMMH_107_(STM)  Manhole
Node       STMMH_111_(STM)  Manhole
Node       STMMH_112_(STM)  Manhole
Node       STMMH_116_(STM)  Manhole
Node       STMMH_117_(STM)  Manhole
Node       STMMH_120_(STM)  Manhole
Link       154_(1)_(STM)    Storm_Sewer
Link       156_(STM)        Storm_Sewer
Link       157_(1)_(STM)    Storm_Sewer
Link       158_(1)_(STM)    Storm_Sewer
Link       158_(STM)        Storm_Sewer
Link       160_(STM)        Storm_Sewer
Link       161_(STM)        Storm_Sewer
Link       166_(STM)        Storm_Sewer
Link       167_(3)_(STM)    Storm_Sewer
Link       170_(STM)        Storm_Sewer
Link       171_(1)_(STM)    Storm_Sewer
Link       172_(STM)        Storm_Sewer
Link       175_(STM)        Storm_Sewer
Link       176_(1)_(1)_(STM) Storm_Sewer
Link       179_(STM)        Storm_Sewer
Link       184_(STM)        Storm_Sewer
Link       186_(STM)        Storm_Sewer
Link       200_(STM)        Storm_Sewer
Link       226_(1)_(1)_(2)_(STM) Culvert
Link       226_(1)_(STM)    Culvert
Link       230_(STM)        Culvert
Link       237_(STM)        Storm_Sewer
Link       238_(STM)        Storm_Sewer
Link       239_(1)_(STM)    Storm_Sewer
Link       239_(STM)        Storm_Sewer
Link       240_(STM)        Storm_Sewer
Link       242_(STM)        Storm_Sewer
Link       244_(STM)        Culvert
Link       C1               Ditch
Link       C2               Ditch
Link       C3               Ditch
Link       C4               Ditch
Link       C5               Ditch
```

```
Link       C6               Ditch
Link       OUT_St_A1        Roof_Outflow
Link       OUT_St_A2        Roof_Outflow
Link       OUT_St_B1        Roof_Outflow
Link       OUT_St_B2_B3     Roof_Outflow
Link       OUT_St_C1_C2_C3  Roof_Outflow
Link       OUT_St_CB01      Storm_Inlet
Link       OUT_St_CB05      Storm_Inlet
Link       OUT_St_CB11      Storm_Inlet
Link       OUT_St_CB12      Storm_Inlet
Link       OUT_St_CB13      Storm_Inlet
Link       OUT_St_CB14      Storm_Inlet
Link       OUT_St_CB21      Storm_Inlet
Link       OUT_St_CB23      Storm_Inlet
Link       OUT_St_CB24      Storm_Inlet
Link       OUT_St_CB31      Storm_Inlet
Link       OUT_St_CB34      Storm_Inlet
Link       OUT_St_CBMH102   Storm_Inlet
Link       OUT_St_CBMH105   Storm_Inlet
Link       OUT_St_CBMH108   Storm_Inlet
Link       OUT_St_CBMH110   Storm_Inlet
Link       OUT_St_D1_D2_D3  Roof_Outflow
Link       OVF_CB_07        Surcharge
Link       OVF_CB_08        Surcharge

[MAP]
DIMENSIONS       369391.9254      5017164.8251
370141.5006      5017924.2189
UNITS            Meters

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[POLYGONS]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
2                369529.235         5017584.131

;;Storage Node   X-Coord            Y-Coord
;;-------------- ------------------ ------------------

[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
```

1:100-year 12-hour SCS PCSWMM Output File Post-Development Conditions

```
  ALTERNATIVE RUNOFF METHOD (ARM) - PCSWMM VERSION 7.7.3920
  ---------------------------------------------------------

  This is a new version of ARM - your feedback and
suggestions are solicited.
  Create a ticket, post on the PCSWMM feature request forum,
or email us directly!

  Simulation start time:                  01/01/2000
00:00:00
  Simulation end time:                    01/04/2000
00:00:00
  Runoff wet weather time steps:          300 seconds
  Report time steps:                      60 seconds
  Number of data points:                  4321


  ******************************
  Unit Hydrographs Runoff Method
  ******************************

  ------------------------------------------------------------
------------------------------------------------------------
----------------------------------------

Area    Time of Concentration  Time to Peak    Time after
Peak     Peak UH Flow    UH Depth
  Subcatchment          Runoff Method             Raingage
(ha)    (min)                 (min)           (min)
(m³/s/mm)       (mm)
  ------------------------------------------------------------
------------------------------------------------------------
----------------------------------------
  R1                    Nash IUH                  Rainfall
53.847 156.1                  104.07          650.93
0.04668         1
  R2                    Nash IUH                  Rainfall
16.158 118.9                  79.27           455.73
0.01839         1


  ******************
  ARM Runoff Summary
  ******************

  ------------------------------------------------------------
---------------------------------
                        Total       Total       Total
Total       Peak        Runoff
                        Precip      Losses      Runoff
Runoff      Runoff      Coeff
  Subcatchment          (mm)        (mm)        (mm)
10^6 ltr    CMS          (fraction)
  ------------------------------------------------------------
---------------------------------
  R1                    96          46.113      49.882
26.86       1.67         0.52
  R2                    96          46.572      49.418
7.985       0.614        0.515



  EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build
5.2.4)
  ------------------------------------------------------------
--

  WARNING 02: maximum depth increased for Node
STMMH_451_(STM)
  WARNING 02: maximum depth increased for Node
STMMH_459_(STM)
  WARNING 02: maximum depth increased for Node
STMMH_467_(STM)
  WARNING 02: maximum depth increased for Node
STMMH_468_(STM)
  WARNING 02: maximum depth increased for Node
STMMH_473_(STM)
  WARNING 02: maximum depth increased for Node
STMMH_477_(STM)

  *************
  Element Count
  *************
  Number of rain gages ...... 1
  Number of subcatchments ... 30
  Number of nodes ........... 57
  Number of links ........... 76
  Number of pollutants ...... 0
  Number of land uses ....... 0


  ****************
  Raingage Summary
  ****************
                                                          Data
Recording
  Name                Data Source                       Type
Interval
  ------------------------------------------------------------
--------------
  Rainfall            12SCS100
INTENSITY   15 min.


  ********************
  Subcatchment Summary
  ********************
  Name                        Area     Width   %Imperv
%Slope Rain Gage            Outlet
  ------------------------------------------------------------
-------------------------------------------------
  10                         0.13    148.94      7.14
0.5000 Rainfall             STMMH_451_(STM)
  11-13_1                    0.25    140.02     94.29
1.0000 Rainfall             St_CB11
  11-13_2                    0.23    201.97     94.29
2.0000 Rainfall             St_CBMH108
  14-15_1                    0.09     45.01     87.14
1.5000 Rainfall             St_CB12
  14-15_2                    0.11     45.03     87.14
1.4000 Rainfall             St_CBMH110
  16                         0.24    226.70     10.00
1.5000 Rainfall             St_CB13
  17-20                      1.12    410.00     97.14
2.0000 Rainfall             St_CB14
  2                          0.20     80.44     11.43
7.5000 Rainfall             STMMH_477_(STM)
  21                         0.20    161.53     42.86
3.0000 Rainfall             St_CB21
  22                         0.12     80.00     35.71
0.5000 Rainfall             St_CB23
  23-25                      1.39    410.00    100.00
1.8000 Rainfall             St_CB24
  26                         0.53    302.30     65.71
1.5000 Rainfall             St_CB31
  27-30                      0.53    418.02     74.29
1.8000 Rainfall             St_CB34
  3-5_1                      0.15     60.02     95.71
1.0000 Rainfall             St_CBMH102
  3-5_2                      0.40    159.98     95.71
2.7500 Rainfall             St_CB01
  6-9_1                      0.38    202.01     88.57
2.0000 Rainfall             St_CB05
  6-9_2                      0.21     83.12     88.57
0.5000 Rainfall             St_CBMH105
  A1                         0.60    135.94    100.00
1.0000 Rainfall             St_A1
  A2                         0.40     89.39    100.00
1.0000 Rainfall             St_A2
  B1                         0.54    121.41    100.00
1.0000 Rainfall             St_B1
  B2_B3                      1.12    252.50    100.00
1.0000 Rainfall             St_B2_B3
  C1_C2_C3                   1.73    388.46    100.00
1.0000 Rainfall             St_C1_C2_C3
```

```
  D1_D2_D3                  1.64    368.21    100.00
1.0000 Rainfall             St_D1_D2_D3
  OFF1                      0.58    523.73     30.00
0.2000 Rainfall             STMMH_466_(STM)
  OFF2                      0.86    213.90     12.86
0.2350 Rainfall             STMMH_467_(STM)
  OFF4                      0.09    175.00      1.43
4.9780 Rainfall             STMMH_466_(STM)
  Pond-1                    1.03    344.90     28.57
2.0000 Rainfall             Pond
  S2_1                      0.26    130.54     60.00
3.0000 Rainfall             J1
  S2_3                      0.48    241.84     60.00
3.0000 Rainfall             STMMH_466_(STM)
  S2_4                      0.48    240.14     60.00
3.0000 Rainfall             STMMH_468_(STM)


  ************
  Node Summary
  ************
                                      Invert      Max.
Ponded    External
  Name                  Type           Elev.     Depth
Area    Inflow
  ------------------------------------------------------------
---------------------
  J1                    JUNCTION         91.35      1.75
0.0
  STMMH_201_(STM)       JUNCTION         88.40      2.92
0.0
  STMMH_202_(STM)       JUNCTION         88.53      2.87
0.0
  STMMH_203_(STM)       JUNCTION         88.65      3.26
0.0
  STMMH_451_(STM)       JUNCTION         89.28      2.30
0.0
  STMMH_459_(STM)       JUNCTION         88.82      2.54
0.0
  STMMH_465_(STM)       JUNCTION         88.75      2.75
0.0
  STMMH_466_(STM)       JUNCTION         90.73      1.65
0.0
  STMMH_467_(STM)       JUNCTION         90.40      1.81
0.0
  STMMH_468_(STM)       JUNCTION         88.37      2.33
0.0
  STMMH_473_(STM)       JUNCTION         89.73      2.62
0.0
  STMMH_474_(STM)       JUNCTION         89.84      3.00
0.0
  STMMH_475_(STM)       JUNCTION         89.33      3.00
0.0
  STMMH_477_(STM)       JUNCTION         89.85      2.62
0.0
  OF1                   OUTFALL          87.12      2.33
0.0
  CB_04_(STM)           STORAGE          90.73      1.87
0.0
  CB_07_(STM)           STORAGE          90.61      2.59
0.0
  CB_08_(STM)           STORAGE          90.62      2.48
0.0
  CB_11_(STM)           STORAGE          90.42      1.87
0.0
  CB_12_(STM)           STORAGE          90.49      1.86
0.0
  CBMH_102_(STM)        STORAGE          89.95      2.25
0.0
  CBMH_103_(STM)        STORAGE          90.11      2.11
0.0
  CBMH_105_(STM)        STORAGE          90.13      2.07
0.0
  CBMH_108_(STM)        STORAGE          89.72      2.42
0.0
  CBMH_109_(STM)        STORAGE          89.89      2.41
0.0
  CBMH_110_(STM)        STORAGE          90.10      2.20
0.0
  Pond                  STORAGE          89.05      3.25
0.0
  St_A1                 STORAGE         102.70      0.05
0.0
  St_A2                 STORAGE         102.70      0.05
0.0
  St_B1                 STORAGE         108.00      0.05
0.0
  St_B2_B3              STORAGE         107.80      0.05
0.0
  St_C1_C2_C3           STORAGE         108.00      0.05
0.0
  St_CB01               STORAGE          92.12      0.30
0.0
  St_CB05               STORAGE          92.20      0.33
0.0
  St_CB11               STORAGE          92.18      0.54
0.0
  St_CB12               STORAGE          92.35      0.35
0.0
  St_CB13               STORAGE          91.47      0.91
0.0
  St_CB14               STORAGE          92.18      0.45
0.0
  St_CB21               STORAGE          92.21      0.38
0.0
  St_CB23               STORAGE          92.32      0.35
0.0
  St_CB24               STORAGE          92.33      0.41
0.0
  St_CB31               STORAGE          92.31      0.40
0.0
  St_CB34               STORAGE          92.50      0.41
0.0
  St_CBMH102            STORAGE          92.20      0.25
0.0
  St_CBMH105            STORAGE          92.10      0.44
0.0
  St_CBMH108            STORAGE          92.14      0.37
0.0
  St_CBMH110            STORAGE          92.30      0.25
0.0
  St_D1_D2_D3           STORAGE         103.10      0.05
0.0
  STMMH_101_(STM)       STORAGE          89.91      2.33
0.0
  STMMH_104_(STM)       STORAGE          90.36      2.04
0.0
  STMMH_106_(STM)       STORAGE          90.45      1.90
0.0
  STMMH_107_(STM)       STORAGE          89.31      3.63
0.0
  STMMH_111_(STM)       STORAGE          89.46      3.20
0.0
  STMMH_112_(STM)       STORAGE          89.60      2.83
0.0
  STMMH_116_(STM)       STORAGE          89.77      2.86
0.0
  STMMH_117_(STM)       STORAGE          90.16      2.33
0.0
  STMMH_120_(STM)       STORAGE          90.18      2.52
0.0


  ************
  Link Summary
  ************
  Name              From Node        To Node          Type
Length    %Slope Roughness
  ------------------------------------------------------------
-----------------------------------
  154_(1)_(STM)     STMMH_120_(STM)  STMMH_117_(STM)  CONDUIT
115.6     0.1471    0.0130
  156_(STM)         CB_04_(STM)      STMMH_104_(STM)  CONDUIT
53.6      0.3915    0.0130
  157_(1)_(STM)     CBMH_109_(STM)   CBMH_108_(STM)   CONDUIT
35.9      0.1949    0.0130
  158_(1)_(STM)     STMMH_107_(STM)  STMMH_451_(STM)  CONDUIT
18.5      0.1618    0.0130
  158_(STM)         CBMH_108_(STM)   STMMH_107_(STM)  CONDUIT
24.0      0.0835    0.0130
  160_(STM)         STMMH_104_(STM)  CBMH_103_(STM)   CONDUIT
86.0      0.2208    0.0130
```

```
  161_(STM)        CBMH_103_(STM)   CBMH_102_(STM)   CONDUIT
36.7    0.2182    0.0130
  166_(STM)        CBMH_105_(STM)   CBMH_102_(STM)   CONDUIT
44.6    0.2242    0.0130
  167_(3)_(STM)    STMMH_117_(STM)  STMMH_116_(STM)  CONDUIT
56.7    0.1234    0.0130
  170_(STM)        STMMH_112_(STM)  STMMH_111_(STM)  CONDUIT
82.8    0.1449    0.0130
  171_(1)_(STM)    STMMH_106_(STM)  CBMH_105_(STM)   CONDUIT
76.5    0.3005    0.0130
  172_(STM)        CB_07_(STM)      STMMH_106_(STM)  CONDUIT
22.9    0.3934    0.0130
  175_(STM)        CBMH_102_(STM)   STMMH_101_(STM)  CONDUIT
3.3    0.3006    0.0130
  176_(1)_(1)_(STM) CB_11_(STM)      CBMH_108_(STM)
CONDUIT          82.2    0.4500    0.0130
  179_(STM)        CB_08_(STM)      CBMH_105_(STM)   CONDUIT
47.3    0.5925    0.0130
  184_(STM)        CBMH_110_(STM)   CBMH_109_(STM)   CONDUIT
51.1    0.2545    0.0130
  186_(STM)        CB_12_(STM)      CBMH_110_(STM)   CONDUIT
38.6    0.5960    0.0130
  200_(STM)        STMMH_101_(STM)  STMMH_477_(STM)  CONDUIT
28.3    0.2121    0.0130
  226_(1)_(1)_(2)_(STM) STMMH_459_(STM)  Pond
CONDUIT          47.8    0.5003    0.0240
  226_(1)_(STM)    STMMH_473_(STM)  Pond             CONDUIT
52.3    0.4991    0.0240
  230_(STM)        STMMH_466_(STM)  STMMH_467_(STM)  CONDUIT
32.9    0.0913    0.0240
  237_(STM)        STMMH_111_(STM)  STMMH_107_(STM)  CONDUIT
46.5    0.1506    0.0130
  238_(STM)        STMMH_465_(STM)  STMMH_203_(STM)  CONDUIT
23.5    0.1700    0.0130
  239_(1)_(STM)    STMMH_202_(STM)  STMMH_201_(STM)  CONDUIT
65.8    0.1520    0.0130
  239_(STM)        STMMH_203_(STM)  STMMH_202_(STM)  CONDUIT
65.2    0.1533    0.0130
  240_(STM)        STMMH_201_(STM)  STMMH_468_(STM)  CONDUIT
9.9    0.3024    0.0130
  242_(STM)        STMMH_116_(STM)  STMMH_112_(STM)  CONDUIT
79.0    0.1140    0.0130
  244_(STM)        STMMH_474_(STM)  STMMH_475_(STM)  CONDUIT
17.8    1.1771    0.0240
  C1               STMMH_475_(STM)  STMMH_468_(STM)  CONDUIT
53.9    1.7820    0.0350
  C2               STMMH_467_(STM)  STMMH_474_(STM)  CONDUIT
20.9    2.6786    0.0350
  C3               STMMH_468_(STM)  OF1              CONDUIT
30.3    4.1347    0.0350
  C4               STMMH_477_(STM)  STMMH_473_(STM)  CONDUIT
28.0    0.4250    0.0450
  C5               STMMH_451_(STM)  STMMH_459_(STM)  CONDUIT
57.9    0.3817    0.0400
  C6               J1               STMMH_466_(STM)  CONDUIT
225.0    0.2756    0.0350
  OR3              Pond             STMMH_465_(STM)  ORIFICE
  W_Pond           Pond             STMMH_466_(STM)  WEIR
  W_St_CB05        St_CB05          St_CBMH105       WEIR
  W_St_CB11        St_CB11          Pond             WEIR
  W_St_CB13        St_CB13          St_CBMH108       WEIR
  W_St_CB14        St_CB14          St_CB13          WEIR
  W_St_CB21        St_CB21          St_CB13          WEIR
  W_St_CB23        St_CB23          St_CB21          WEIR
  W_St_CB24        St_CB24          St_CB31          WEIR
  W_St_CB31        St_CB31          St_CB23          WEIR
  W_St_CB34        St_CB34          St_CB31          WEIR
  W_St_CBMH102     St_CBMH102       STMMH_477_(STM)  WEIR
  W_St_CBMH108     St_CBMH108       St_CB11          WEIR
  W_St_CBMH110     St_CBMH110       St_CB05          WEIR
  W1               St_CB01          STMMH_477_(STM)  WEIR
  W1_St_CB12       St_CB12          St_CBMH110       WEIR
  W2               St_CBMH105       Pond             WEIR
  W3               Pond             STMMH_465_(STM)  WEIR
  W4               Pond             STMMH_465_(STM)  WEIR
  OUT_St_A1        St_A1            CB_12_(STM)      OUTLET
  OUT_St_A2        St_A2            CBMH_109_(STM)   OUTLET
  OUT_St_B1        St_B1            CB_12_(STM)      OUTLET
  OUT_St_B2_B3     St_B2_B3         CBMH_108_(STM)   OUTLET
  OUT_St_C1_C2_C3  St_C1_C2_C3      STMMH_112_(STM)  OUTLET
  OUT_St_CB01      St_CB01          STMMH_104_(STM)  OUTLET
  OUT_St_CB05      St_CB05          STMMH_106_(STM)  OUTLET
  OUT_St_CB11      St_CB11          CB_11_(STM)      OUTLET
  OUT_St_CB12      St_CB12          CB_12_(STM)      OUTLET
  OUT_St_CB13      St_CB13          STMMH_111_(STM)  OUTLET
  OUT_St_CB14      St_CB14          STMMH_112_(STM)  OUTLET
  OUT_St_CB21      St_CB21          STMMH_112_(STM)  OUTLET
  OUT_St_CB23      St_CB23          STMMH_116_(STM)  OUTLET
  OUT_St_CB24      St_CB24          STMMH_117_(STM)  OUTLET
  OUT_St_CB31      St_CB31          STMMH_117_(STM)  OUTLET
  OUT_St_CB34      St_CB34          STMMH_120_(STM)  OUTLET
  OUT_St_CBMH102   St_CBMH102       CBMH_102_(STM)   OUTLET
  OUT_St_CBMH105   St_CBMH105       CB_08_(STM)      OUTLET
  OUT_St_CBMH108   St_CBMH108       CBMH_108_(STM)   OUTLET
  OUT_St_CBMH110   St_CBMH110       CBMH_110_(STM)   OUTLET
  OUT_St_D1_D2_D3  St_D1_D2_D3      STMMH_120_(STM)  OUTLET
  OVF_CB_07        CB_07_(STM)      St_CB05          OUTLET
  OVF_CB_08        CB_08_(STM)      St_CBMH105       OUTLET


  **********
  Cross Section Summary
  **********
                                                    Full     Full
Hyd.     Max.   No. of     Full
  Conduit          Shape                Depth     Area
Rad.    Width  Barrels     Flow
  ------------------------------------------------------------
----------------------------
  154_(1)_(STM)    CIRCULAR             0.68     0.36
0.17     0.68        1     0.32
  156_(STM)        CIRCULAR             0.30     0.07
0.07     0.30        1     0.06
  157_(1)_(STM)    CIRCULAR             0.53     0.22
0.13     0.53        1     0.19
  158_(1)_(STM)    CIRCULAR             0.97     0.75
0.24     0.97        1     0.90
  158_(STM)        CIRCULAR             0.60     0.28
0.15     0.60        1     0.18
  160_(STM)        CIRCULAR             0.45     0.16
0.11     0.45        1     0.13
  161_(STM)        CIRCULAR             0.45     0.16
0.11     0.45        1     0.13
  166_(STM)        CIRCULAR             0.45     0.16
0.11     0.45        1     0.14
  167_(3)_(STM)    CIRCULAR             0.82     0.53
0.21     0.82        1     0.50
  170_(STM)        CIRCULAR             0.90     0.64
0.23     0.90        1     0.69
  171_(1)_(STM)    CIRCULAR             0.38     0.11
0.09     0.38        1     0.10
  172_(STM)        CIRCULAR             0.30     0.07
0.07     0.30        1     0.06
  175_(STM)        CIRCULAR             0.53     0.22
0.13     0.53        1     0.24
  176_(1)_(1)_(STM) CIRCULAR              0.30     0.07
0.07     0.30        1     0.06
  179_(STM)        CIRCULAR             0.25     0.05
0.06     0.25        1     0.05
  184_(STM)        CIRCULAR             0.45     0.16
0.11     0.45        1     0.14
  186_(STM)        CIRCULAR             0.30     0.07
0.07     0.30        1     0.07
  200_(STM)        CIRCULAR             0.53     0.22
0.13     0.53        1     0.20
  226_(1)_(1)_(2)_(STM) CIRCULAR             0.40     0.13
0.10     0.40        4     0.08
  226_(1)_(STM)    CIRCULAR             0.40     0.13
0.10     0.40        2     0.08
  230_(STM)        CIRCULAR             1.30     1.33
0.33     1.30        1     0.79
  237_(STM)        CIRCULAR             0.90     0.64
0.23     0.90        1     0.70
  238_(STM)        CIRCULAR             0.60     0.28
0.15     0.60        1     0.25
  239_(1)_(STM)    CIRCULAR             0.60     0.28
0.15     0.60        1     0.24
  239_(STM)        CIRCULAR             0.60     0.28
0.15     0.60        1     0.24
  240_(STM)        CIRCULAR             0.60     0.28
0.15     0.60        1     0.34
```

```
  242_(STM)        CIRCULAR             0.82     0.53
0.21     0.82        1     0.48
  244_(STM)        CIRCULAR             1.30     1.33
0.33     1.30        1     2.84
  C1               Channe_475-468       1.96    21.10
1.03    17.00        1    82.04
  C2               Channl_467-474       1.81    20.86
1.26    19.50        1   113.75
  C3               Outfall_Ditch        2.33    14.74
1.00    14.85        1    85.61
  C4               NW_Storage_Ditch     2.32    28.19
1.38    20.00        1    50.61
  C5               TRAPEZOIDAL          2.00    26.00
1.26    20.00        1    46.97
  C6               LimebankDitch        1.51     9.32
0.89    14.00        1    12.91


  ****************
  Transect Summary
  ****************

  Transect Channe_475-468
  Area:
              0.0017     0.0058     0.0105     0.0156
0.0211
              0.0272     0.0337     0.0407     0.0486
0.0576
              0.0685     0.0812     0.0952     0.1105
0.1269
              0.1441     0.1623     0.1815     0.2011
0.2211
              0.2416     0.2625     0.2839     0.3057
0.3278
              0.3504     0.3734     0.3968     0.4205
0.4447
              0.4691     0.4939     0.5189     0.5443
0.5700
              0.5959     0.6223     0.6490     0.6760
0.7034
              0.7311     0.7593     0.7880     0.8171
0.8467
              0.8767     0.9070     0.9377     0.9687
1.0000
  Hrad:
              0.0189     0.0501     0.0806     0.1089
0.1354
              0.1607     0.1849     0.2100     0.2357
0.2639
              0.2833     0.2994     0.3144     0.3292
0.3446
              0.3608     0.3765     0.3941     0.4138
0.4339
              0.4544     0.4749     0.4955     0.5160
0.5364
              0.5568     0.5771     0.5973     0.6172
0.6373
              0.6575     0.6776     0.6975     0.7173
0.7369
              0.7562     0.7751     0.7938     0.8123
0.8307
              0.8485     0.8651     0.8814     0.8976
0.9143
              0.9317     0.9490     0.9661     0.9831
1.0000
  Width:
              0.1098     0.1392     0.1543     0.1693
0.1844
              0.1994     0.2145     0.2346     0.2679
0.3022
              0.3799     0.4249     0.4652     0.5032
0.5340
              0.5616     0.5941     0.6162     0.6299
0.6436
              0.6571     0.6707     0.6842     0.6977
0.7108
              0.7231     0.7355     0.7479     0.7602
0.7710
              0.7808     0.7905     0.8003     0.8101
0.8199
              0.8305     0.8415     0.8526     0.8637
0.8747
              0.8871     0.9023     0.9175     0.9328
0.9460
              0.9568     0.9676     0.9784     0.9892
1.0000

  Transect Channl_467-474
  Area:
              0.0040     0.0109     0.0188     0.0275
0.0370
              0.0473     0.0583     0.0700     0.0822
0.0952
              0.1089     0.1233     0.1384     0.1546
0.1719
              0.1901     0.2087     0.2275     0.2466
0.2659
              0.2855     0.3053     0.3253     0.3457
0.3664
              0.3873     0.4086     0.4302     0.4520
0.4742
              0.4966     0.5192     0.5422     0.5654
0.5889
              0.6129     0.6374     0.6623     0.6877
0.7136
              0.7399     0.7667     0.7940     0.8218
0.8500
              0.8788     0.9081     0.9379     0.9683
1.0000
  Hrad:
              0.0188     0.0413     0.0645     0.0861
0.1068
              0.1269     0.1463     0.1665     0.1860
0.2034
              0.2205     0.2373     0.2585     0.2808
0.3014
              0.3246     0.3484     0.3723     0.3962
0.4200
              0.4437     0.4673     0.4906     0.5137
0.5365
              0.5592     0.5816     0.6037     0.6258
0.6476
              0.6693     0.6908     0.7121     0.7333
0.7536
              0.7732     0.7925     0.8115     0.8302
0.8486
              0.8666     0.8844     0.9018     0.9190
0.9359
              0.9523     0.9683     0.9841     0.9978
1.0000
  Width:
              0.1785     0.2226     0.2461     0.2697
0.2926
              0.3142     0.3356     0.3538     0.3719
0.3933
              0.4147     0.4361     0.4631     0.4939
0.5264
              0.5450     0.5523     0.5596     0.5669
0.5742
              0.5815     0.5888     0.5975     0.6064
0.6152
              0.6240     0.6329     0.6417     0.6497
0.6577
              0.6657     0.6737     0.6817     0.6897
0.7019
              0.7159     0.7300     0.7441     0.7577
0.7714
              0.7850     0.7989     0.8132     0.8275
0.8418
              0.8571     0.8730     0.8889     0.9137
1.0000

  Transect LimebankDitch
  Area:
              0.0017     0.0056     0.0104     0.0160
0.0225
              0.0299     0.0381     0.0474     0.0580
0.0699
              0.0826     0.0958     0.1095     0.1235
0.1380
```

```
            0.1529     0.1682     0.1840     0.2002
0.2168
            0.2339     0.2514     0.2692     0.2874
0.3058
            0.3246     0.3437     0.3631     0.3829
0.4029
            0.4233     0.4440     0.4650     0.4863
0.5079
            0.5299     0.5522     0.5768     0.6095
0.6426
            0.6760     0.7099     0.7441     0.7787
0.8138
            0.8492     0.8851     0.9219     0.9596
1.0000
  Hrad:
            0.0169     0.0432     0.0667     0.0882
0.1085
            0.1279     0.1452     0.1583     0.1722
0.1866
            0.2115     0.2368     0.2613     0.2852
0.3085
            0.3313     0.3537     0.3757     0.3973
0.4185
            0.4394     0.4609     0.4837     0.5063
0.5285
            0.5504     0.5720     0.5934     0.6145
0.6354
            0.6561     0.6765     0.6968     0.7168
0.7367
            0.7564     0.7759     0.7933     0.8070
0.8224
            0.8390     0.8565     0.8747     0.8933
0.9124
            0.9319     0.9510     0.9697     0.9881
1.0000
  Width:
            0.0738     0.0959     0.1147     0.1336
0.1524
            0.1713     0.1923     0.2198     0.2473
0.2747
            0.2860     0.2953     0.3047     0.3142
0.3237
            0.3332     0.3427     0.3521     0.3616
0.3711
            0.3806     0.3892     0.3962     0.4032
0.4102
            0.4172     0.4242     0.4312     0.4382
0.4452
            0.4522     0.4592     0.4662     0.4732
0.4802
            0.4872     0.4942     0.7155     0.7241
0.7327
            0.7413     0.7499     0.7585     0.7671
0.7757
            0.7843     0.8015     0.8202     0.8469
1.0000

  Transect NW_Storage_Ditch
  Area:
            0.0005     0.0019     0.0043     0.0077
0.0120
            0.0174     0.0237     0.0312     0.0398
0.0494
            0.0600     0.0714     0.0839     0.0978
0.1129
            0.1290     0.1463     0.1646     0.1840
0.2044
            0.2257     0.2479     0.2708     0.2939
0.3173
            0.3409     0.3647     0.3888     0.4132
0.4377
            0.4626     0.4879     0.5136     0.5396
0.5659
            0.5926     0.6194     0.6466     0.6739
0.7016
            0.7295     0.7577     0.7863     0.8152
0.8445
            0.8742     0.9046     0.9357     0.9675
1.0000
  Hrad:
            0.0165     0.0330     0.0496     0.0659
0.0823
            0.0982     0.1130     0.1284     0.1442
0.1612
            0.1801     0.1987     0.2100     0.2218
0.2384
            0.2549     0.2712     0.2882     0.3057
0.3235
            0.3419     0.3601     0.3884     0.4170
0.4453
            0.4734     0.5012     0.5287     0.5561
0.5827
            0.6067     0.6305     0.6540     0.6774
0.7027
            0.7285     0.7542     0.7797     0.8050
0.8301
            0.8543     0.8763     0.8981     0.9198
0.9414
            0.9562     0.9670     0.9779     0.9888
1.0000
  Width:
            0.0292     0.0585     0.0877     0.1173
0.1468
            0.1774     0.2110     0.2443     0.2771
0.3080
            0.3343     0.3606     0.4007     0.4425
0.4753
            0.5083     0.5414     0.5734     0.6041
0.6339
            0.6623     0.6907     0.6993     0.7067
0.7141
            0.7215     0.7289     0.7363     0.7437
0.7518
            0.7631     0.7744     0.7857     0.7970
0.8057
            0.8134     0.8212     0.8289     0.8367
0.8444
            0.8530     0.8637     0.8744     0.8852
0.8959
            0.9133     0.9347     0.9563     0.9781
1.0000

  Transect Outfall_Ditch
  Area:
            0.0010     0.0039     0.0077     0.0120
0.0167
            0.0218     0.0273     0.0332     0.0394
0.0461
            0.0533     0.0608     0.0687     0.0770
0.0857
            0.0949     0.1045     0.1145     0.1249
0.1357
            0.1470     0.1586     0.1708     0.1835
0.1966
            0.2102     0.2250     0.2414     0.2604
0.2869
            0.3175     0.3483     0.3793     0.4106
0.4420
            0.4740     0.5067     0.5402     0.5744
0.6094
            0.6449     0.6811     0.7178     0.7552
0.7932
            0.8321     0.8720     0.9128     0.9552
1.0000
  Hrad:
            0.0226     0.0478     0.0842     0.1168
0.1468
            0.1749     0.2014     0.2268     0.2512
0.2749
            0.2980     0.3206     0.3428     0.3643
0.3855
            0.4065     0.4273     0.4479     0.4684
0.4888
            0.5088     0.5273     0.5459     0.5646
0.5834
            0.6043     0.6301     0.6515     0.6649
0.6574
            0.6509     0.6523     0.6590     0.6694
0.6826
            0.7056     0.7287     0.7516     0.7744
0.7971
```

```
             0.8197     0.8423     0.8648     0.8872
0.9090
             0.9301     0.9507     0.9703     0.9874
1.0000
  Width:
             0.0416     0.0781     0.0867     0.0954
0.1040
             0.1126     0.1213     0.1299     0.1385
0.1472
             0.1558     0.1644     0.1731     0.1819
0.1908
             0.1997     0.2086     0.2174     0.2263
0.2352
             0.2442     0.2543     0.2645     0.2746
0.2847
             0.2995     0.3325     0.3655     0.4568
0.6495
             0.6543     0.6591     0.6638     0.6686
0.6733
             0.6893     0.7055     0.7217     0.7380
0.7514
             0.7643     0.7771     0.7900     0.8028
0.8198
             0.8396     0.8595     0.8834     0.9247
1.0000


  ***************
  Analysis Options
  ***************
  Flow Units ............... CMS
  Process Models:
    Rainfall/Runoff ........ YES
    RDII ................... NO
    Snowmelt ............... NO
    Groundwater ............ NO
    Flow Routing ........... YES
    Ponding Allowed ........ NO
    Water Quality .......... NO
  Infiltration Method ...... HORTON
  Flow Routing Method ...... DYNWAVE
  Surcharge Method ......... EXTRAN
  Starting Date ............ 01/01/2000 00:00:00
  Ending Date .............. 01/04/2000 00:00:00
  Antecedent Dry Days ...... 0.0
  Report Time Step ......... 00:01:00
  Wet Time Step ............ 00:05:00
  Dry Time Step ............ 00:05:00
  Routing Time Step ........ 1.00 sec
  Variable Time Step ....... YES
  Maximum Trials ........... 8
  Number of Threads ........ 12
  Head Tolerance ........... 0.001500 m


  *************************        Volume         Depth
  Runoff Quantity Continuity     hectare-m            mm
  *************************     ---------       -------
  Total Precipitation ......         1.544        96.000
  Evaporation Loss .........         0.000         0.000
  Infiltration Loss ........         0.153         9.528
  Surface Runoff ...........         1.373        85.383
  Final Storage ............         0.024         1.498
  Continuity Error (%) .....        -0.426


  *************************        Volume        Volume
  Flow Routing Continuity        hectare-m      10^6 ltr
  *************************     ---------      ---------
  Dry Weather Inflow .......         0.000         0.000
  Wet Weather Inflow .......         1.373        13.730
  Groundwater Inflow .......         0.000         0.000
  RDII Inflow ..............         0.000         0.000
  External Inflow ..........         3.484        34.843
  External Outflow .........         4.858        48.580
  Flooding Loss ............         0.000         0.000
  Evaporation Loss .........         0.000         0.000
  Exfiltration Loss ........         0.000         0.000
  Initial Stored Volume ....         0.000         0.000
  Final Stored Volume ......         0.001         0.008
  Continuity Error (%) .....        -0.033


  ************************
  Highest Continuity Errors
  ************************
  Node STMMH_473_(STM) (1.40%)
  Node STMMH_104_(STM) (1.07%)


  ***************************
  Time-Step Critical Elements
  ***************************
  None


  *********************************
  Highest Flow Instability Indexes
  *********************************
  Link 244_(STM) (5)
  Link C1 (3)
  Link OUT_St_D1_D2_D3 (2)
  Link OUT_St_B2_B3 (2)
  Link OUT_St_C1_C2_C3 (2)


  *********************************
  Most Frequent Nonconverging Nodes
  *********************************
  Convergence obtained at all time steps.


  ************************
  Routing Time Step Summary
  ************************
  Minimum Time Step           :     0.50 sec
  Average Time Step           :     1.00 sec
  Maximum Time Step           :     1.00 sec
  % of Time in Steady State   :     0.00
  Average Iterations per Step :     2.00
  % of Steps Not Converging   :     0.00
  Time Step Frequencies       :
      1.000 -  0.871 sec      :    99.73 %
      0.871 -  0.758 sec      :     0.09 %
      0.758 -  0.660 sec      :     0.06 %
      0.660 -  0.574 sec      :     0.04 %
      0.574 -  0.500 sec      :     0.08 %


  ***************************
  Subcatchment Runoff Summary
  ***************************

  ---------------------------------------------------------
-----------------------------------------------------------------
--------
                             Total      Total      Total      Total
Imperv       Perv      Total       Total     Peak  Runoff
                           Precip      Runon      Evap      Infil
Runoff     Runoff     Runoff      Runoff   Runoff   Coeff
  Subcatchment                mm         mm         mm         mm
mm         mm         mm    10^6 ltr      CMS
  ---------------------------------------------------------------------
-----------------------------------------------------------
  10                        96.00       0.00       0.00      39.17
6.75      49.12      55.87        0.07     0.03   0.582
  11-13_1                   96.00       0.00       0.00       2.39
89.31       3.05      92.36        0.23     0.10   0.962
  11-13_2                   96.00       0.00       0.00       2.38
89.12       3.04      92.16        0.21     0.09   0.960
  14-15_1                   96.00       0.00       0.00       5.38
82.50       6.86      89.36        0.08     0.04   0.931
  14-15_2                   96.00       0.00       0.00       5.38
82.56       6.86      89.42        0.09     0.04   0.931
  16                        96.00       0.00       0.00      37.85
9.45      47.76      57.21        0.13     0.07   0.596
  17-20                     96.00       0.00       0.00       1.19
92.07       1.52      93.59        1.05     0.45   0.975
  2                         96.00       0.00       0.00      37.27
10.80      46.98      57.78        0.12     0.06   0.602
  21                        96.00       0.00       0.00      23.96
40.49      30.44      70.93        0.14     0.07   0.739
  22                        96.00       0.00       0.00      27.16
33.78      33.93      67.71        0.08     0.04   0.705
  23-25                     96.00       0.00       0.00       0.00
94.89       0.00      94.89        1.32     0.56   0.988
```

```
  26                      96.00       0.00       0.00      14.38
62.13      18.25      80.38        0.43      0.19    0.837
  27-30                   96.00       0.00       0.00      10.76
70.21      13.72      83.93        0.45      0.20    0.874
  3-5_1                   96.00       0.00       0.00       1.79
90.79       2.29      93.08        0.14      0.06    0.970
  3-5_2                   96.00       0.00       0.00       1.79
90.62       2.28      92.90        0.37      0.16    0.968
  6-9_1                   96.00       0.00       0.00       4.78
83.79       6.10      89.89        0.34      0.15    0.936
  6-9_2                   96.00       0.00       0.00       4.79
84.11       6.09      90.20        0.19      0.08    0.940
  A1                      96.00       0.00       0.00       0.00
95.06       0.00      95.06        0.57      0.24    0.990
  A2                      96.00       0.00       0.00       0.00
95.06       0.00      95.06        0.38      0.16    0.990
  B1                      96.00       0.00       0.00       0.00
95.06       0.00      95.06        0.51      0.22    0.990
  B2_B3                   96.00       0.00       0.00       0.00
95.06       0.00      95.06        1.07      0.45    0.990
  C1_C2_C3                96.00       0.00       0.00       0.00
95.06       0.00      95.06        1.64      0.70    0.990
  D1_D2_D3                96.00       0.00       0.00       0.00
95.06       0.00      95.06        1.56      0.66    0.990
  OFF1                    96.00       0.00       0.00      29.63
28.36      36.87      65.23        0.38      0.16    0.679
  OFF2                    96.00       0.00       0.00      37.75
12.16      44.90      57.06        0.49      0.12    0.594
  OFF4                    96.00       0.00       0.00      41.25
1.35       52.61      53.96        0.05      0.03    0.562
  Pond-1                  96.00       0.00       0.00      30.20
27.00      37.68      64.68        0.67      0.29    0.674
  S2_1                    96.00       0.00       0.00      15.13
56.70      22.95      79.66        0.21      0.10    0.830
  S2_3                    96.00       0.00       0.00      15.13
56.70      22.95      79.66        0.39      0.18    0.830
  S2_4                    96.00       0.00       0.00      15.13
56.70      22.95      79.66        0.38      0.18    0.830


  ******************
  Node Depth Summary
  ******************


  ------------------------------------------------------------
-----------------------
                                    Average  Maximum  Maximum
Time of Max    Reported
                                      Depth    Depth      HGL
Occurrence   Max Depth
  Node                 Type        Meters   Meters   Meters
days hr:min      Meters
  ------------------------------------------------------------
-----------------------
  J1                   JUNCTION      0.07     0.64    91.99
0  08:03         0.64
  STMMH_201_(STM)      JUNCTION      0.39     0.79    89.19
0  07:28         0.79
  STMMH_202_(STM)      JUNCTION      0.44     1.11    89.64
0  07:27         1.11
  STMMH_203_(STM)      JUNCTION      0.45     1.48    90.13
0  07:27         1.48
  STMMH_451_(STM)      JUNCTION      0.46     2.05    91.33
0  06:09         2.05
  STMMH_459_(STM)      JUNCTION      0.78     2.51    91.33
0  06:09         2.51
  STMMH_465_(STM)      JUNCTION      0.46     1.60    90.35
0  07:27         1.60
  STMMH_466_(STM)      JUNCTION      0.12     1.16    91.89
0  08:05         1.16
  STMMH_467_(STM)      JUNCTION      0.03     0.67    91.07
0  08:03         0.67
  STMMH_468_(STM)      JUNCTION      0.09     0.53    88.90
0  08:04         0.52
  STMMH_473_(STM)      JUNCTION      0.34     1.24    90.97
0  06:06         1.24
  STMMH_474_(STM)      JUNCTION      0.10     1.22    91.06
0  08:09         1.21
  STMMH_475_(STM)      JUNCTION      0.04     0.38    89.71
0  08:06         0.38
  STMMH_477_(STM)      JUNCTION      0.33     1.12    90.97
0  06:06         1.12
  OF1                  OUTFALL       0.09     0.52    87.64
0  08:04         0.52
  CB_04_(STM)          STORAGE       0.28     1.04    91.77
0  06:00         1.04
  CB_07_(STM)          STORAGE       0.28     1.60    92.21
0  06:00         1.59
  CB_08_(STM)          STORAGE       0.31     1.51    92.13
0  06:00         1.51
  CB_11_(STM)          STORAGE       0.32     1.77    92.19
0  06:00         1.77
  CB_12_(STM)          STORAGE       0.33     1.36    91.85
0  06:01         1.36
  CBMH_102_(STM)       STORAGE       0.32     1.40    91.35
0  06:01         1.40
  CBMH_103_(STM)       STORAGE       0.31     1.38    91.49
0  06:01         1.38
  CBMH_105_(STM)       STORAGE       0.31     1.52    91.65
0  06:01         1.52
  CBMH_108_(STM)       STORAGE       0.38     1.76    91.48
0  06:03         1.76
  CBMH_109_(STM)       STORAGE       0.35     1.62    91.51
0  06:03         1.62
  CBMH_110_(STM)       STORAGE       0.34     1.47    91.57
0  06:02         1.47
  Pond                 STORAGE       0.39     1.38    90.43
0  07:27         1.38
  St_A1                STORAGE       0.00     0.05   102.75
0  06:33         0.05
  St_A2                STORAGE       0.00     0.05   102.75
0  06:32         0.05
  St_B1                STORAGE       0.00     0.05   108.05
0  06:32         0.05
  St_B2_B3             STORAGE       0.00     0.04   107.84
0  06:32         0.04
  St_C1_C2_C3          STORAGE       0.00     0.04   108.04
0  06:32         0.04
  St_CB01              STORAGE       0.00     0.09    92.21
0  06:00         0.09
  St_CB05              STORAGE       0.00     0.10    92.30
0  06:00         0.10
  St_CB11              STORAGE       0.00     0.09    92.27
0  06:00         0.09
  St_CB12              STORAGE       0.00     0.09    92.44
0  06:00         0.09
  St_CB13              STORAGE       0.00     0.21    91.68
0  06:03         0.21
  St_CB14              STORAGE       0.00     0.13    92.31
0  06:00         0.13
  St_CB21              STORAGE       0.00     0.09    92.30
0  06:00         0.09
  St_CB23              STORAGE       0.00     0.09    92.41
0  06:00         0.09
  St_CB24              STORAGE       0.00     0.21    92.54
0  06:01         0.21
  St_CB31              STORAGE       0.00     0.21    92.52
0  06:02         0.21
  St_CB34              STORAGE       0.00     0.11    92.61
0  06:00         0.11
  St_CBMH102           STORAGE       0.00     0.06    92.26
0  06:00         0.06
  St_CBMH105           STORAGE       0.00     0.11    92.21
0  06:00         0.11
  St_CBMH108           STORAGE       0.00     0.09    92.23
0  06:00         0.09
  St_CBMH110           STORAGE       0.00     0.08    92.38
0  06:00         0.08
  St_D1_D2_D3          STORAGE       0.00     0.04   103.14
0  06:32         0.04
  STMMH_101_(STM)      STORAGE       0.32     1.41    91.32
0  06:02         1.41
  STMMH_104_(STM)      STORAGE       0.31     1.40    91.76
0  06:00         1.40
  STMMH_106_(STM)      STORAGE       0.31     1.75    92.20
0  06:00         1.75
  STMMH_107_(STM)      STORAGE       0.46     2.10    91.41
0  06:06         2.10
  STMMH_111_(STM)      STORAGE       0.42     2.12    91.58
0  06:03         2.12
  STMMH_112_(STM)      STORAGE       0.40     2.41    92.01
0  06:00         2.41
  STMMH_116_(STM)      STORAGE       0.37     2.49    92.26
0  06:00         2.49
  STMMH_117_(STM)      STORAGE       0.07     2.27    92.43
0  06:01         2.27
```

```
  STMMH_120_(STM)      STORAGE      0.34     2.34    92.52
0  06:00        2.34


  ********************
  Node Inflow Summary
  ********************

  ------------------------------------------------------------
--------------------------------------
                                 Maximum  Maximum
Lateral       Total        Flow
                               Lateral    Total  Time of
Max      Inflow      Inflow     Balance
                                Inflow   Inflow
Occurrence      Volume      Volume       Error
  Node                Type           CMS      CMS  days
hr:min    10^6 ltr    10^6 ltr     Percent
  ------------------------------------------------------------
--------------------------------------
  J1                  JUNCTION     1.674    1.674     0
07:55        27.1        27.1     0.002
  STMMH_201_(STM)     JUNCTION     0.000    0.433     0
07:28           0        11.9     0.002
  STMMH_202_(STM)     JUNCTION     0.000    0.433     0
07:28           0        11.9     0.012
  STMMH_203_(STM)     JUNCTION     0.000    0.433     0
07:28           0        11.9     0.001
  STMMH_451_(STM)     JUNCTION     0.034    1.789     0
05:57      0.0707          10    -0.038
  STMMH_459_(STM)     JUNCTION     0.000    1.223     0
05:59           0          10     0.010
  STMMH_465_(STM)     JUNCTION     0.000    0.433     0
07:27           0        11.9     0.004
  STMMH_466_(STM)     JUNCTION     0.365    1.682     0
07:57       0.811        27.9    -0.001
  STMMH_467_(STM)     JUNCTION     0.121    3.840     0
07:48       0.488        31.3     0.052
  STMMH_468_(STM)     JUNCTION     0.175    2.211     0
08:04       0.383        40.6     0.007
  STMMH_473_(STM)     JUNCTION     0.000    0.358     0
06:00           0        1.14     1.417
  STMMH_474_(STM)     JUNCTION     0.000    5.399     0
07:57           0        31.3    -0.025
  STMMH_475_(STM)     JUNCTION     0.000    1.986     0
08:03           0        28.4    -0.028
  STMMH_477_(STM)     JUNCTION     0.057    0.439     0
06:00       0.116        1.14    -0.220
  OF1                 OUTFALL      0.614    2.699     0
07:51        7.98        48.6     0.000
  CB_04_(STM)          STORAGE     0.000    0.019     0
05:52           0     0.00392    -11.782
  CB_07_(STM)          STORAGE     0.000    0.016     0
05:51           0     0.00378     -4.469
  CB_08_(STM)          STORAGE     0.000    0.078     0
05:55           0       0.183     0.806
  CB_11_(STM)          STORAGE     0.000    0.099     0
05:59           0       0.228     0.961
  CB_12_(STM)          STORAGE     0.000    0.079     0
06:00           0        1.17     0.075
  CBMH_102_(STM)       STORAGE     0.000    0.390     0
06:00           0        1.03    -0.105
  CBMH_103_(STM)       STORAGE     0.000    0.148     0
06:00           0       0.369    -0.965
  CBMH_105_(STM)       STORAGE     0.000    0.203     0
05:55           0       0.517    -0.460
  CBMH_108_(STM)       STORAGE     0.000    0.336     0
06:00           0        3.14    -0.022
  CBMH_109_(STM)       STORAGE     0.000    0.124     0
06:01           0        1.64    -0.041
  CBMH_110_(STM)       STORAGE     0.000    0.116     0
05:52           0        1.26     0.030
  Pond                 STORAGE     0.294    1.190     0
06:00       0.669        11.8    -0.075
  St_A1                STORAGE     0.245    0.245     0
06:00       0.574       0.574    -0.005
  St_A2                STORAGE     0.161    0.161     0
06:00       0.378       0.378    -0.005
  St_B1                STORAGE     0.219    0.219     0
06:00       0.513       0.513    -0.005
  St_B2_B3             STORAGE     0.455    0.455     0
06:00        1.07        1.07    -0.005
  St_C1_C2_C3          STORAGE     0.700    0.700     0
06:00        1.64        1.64    -0.005
  St_CB01              STORAGE     0.161    0.161     0
06:00       0.373       0.373    -0.002
  St_CB05              STORAGE     0.148    0.148     0
06:00       0.338       0.338    -0.001
  St_CB11              STORAGE     0.099    0.099     0
06:00       0.228       0.228    -0.002
  St_CB12              STORAGE     0.035    0.035     0
06:00      0.0804      0.0804    -0.002
  St_CB13              STORAGE     0.067    0.067     0
06:00       0.135       0.135     0.000
  St_CB14              STORAGE     0.452    0.452     0
06:00        1.05        1.05    -0.002
  St_CB21              STORAGE     0.067    0.067     0
06:00       0.141       0.141    -0.000
  St_CB23              STORAGE     0.037    0.037     0
06:00      0.0845      0.0845    -0.000
  St_CB24              STORAGE     0.564    0.564     0
06:00        1.32        1.32    -0.002
  St_CB31              STORAGE     0.193    0.193     0
06:00       0.427       0.427    -0.001
  St_CB34              STORAGE     0.200    0.200     0
06:00       0.448       0.448    -0.001
  St_CBMH102           STORAGE     0.059    0.059     0
06:00       0.137       0.137    -0.006
  St_CBMH105           STORAGE     0.081    0.081     0
06:00       0.187       0.187    -0.003
  St_CBMH108           STORAGE     0.091    0.091     0
06:00       0.209       0.209    -0.002
  St_CBMH110           STORAGE     0.041    0.041     0
06:00      0.0948      0.0948    -0.004
  St_D1_D2_D3          STORAGE     0.663    0.663     0
06:00        1.56        1.56    -0.005
  STMMH_101_(STM)      STORAGE     0.000    0.384     0
06:00           0        1.03     0.214
  STMMH_104_(STM)      STORAGE     0.000    0.161     0
06:00           0       0.377     1.082
  STMMH_106_(STM)      STORAGE     0.000    0.147     0
06:00           0       0.342     0.447
  STMMH_107_(STM)      STORAGE     0.000    1.780     0
05:56           0        9.96    -0.032
  STMMH_111_(STM)      STORAGE     0.000    1.507     0
05:56           0        6.81    -0.166
  STMMH_112_(STM)      STORAGE     0.000    1.495     0
05:56           0        6.67    -0.082
  STMMH_116_(STM)      STORAGE     0.000    0.957     0
05:55           0        3.83    -0.191
  STMMH_117_(STM)      STORAGE     0.000    0.976     0
05:55           0        3.75    -0.019
  STMMH_120_(STM)      STORAGE     0.000    0.264     0
05:58           0            2     0.075


  **********************
  Node Surcharge Summary
  **********************

  Surcharging occurs when water rises above the top of the
highest conduit.
  ------------------------------------------------------------
-----------
                                                    Max. Height
Min. Depth
                                     Hours       Above Crown
Below Rim
  Node                Type      Surcharged          Meters
Meters
  ------------------------------------------------------------
-----------
  STMMH_202_(STM)     JUNCTION         3.58           0.195
1.758
  STMMH_203_(STM)     JUNCTION         4.31           0.518
1.779


  *********************
  Node Flooding Summary
  *********************
```

```
  No nodes were flooded.


  **********************
  Storage Volume Summary
  **********************

  ------------------------------------------------------------
-------------------------------------
                           Average    Avg   Evap  Exfil
Maximum    Max    Time of Max    Maximum
                            Volume   Pcnt   Pcnt   Pcnt
Volume   Pcnt     Occurrence    Outflow
  Storage Unit           1000 m³   Full   Loss   Loss
1000 m³   Full    days hr:min        CMS
  ------------------------------------------------------------
-------------------------------------
  CB_04_(STM)              0.000   14.8    0.0    0.0
0.001   55.5       0  06:00      0.012
  CB_07_(STM)              0.000   10.8    0.0    0.0
0.002   61.6       0  06:00      0.009
  CB_08_(STM)              0.000   12.4    0.0    0.0
0.002   60.8       0  06:00      0.073
  CB_11_(STM)              0.000   16.8    0.0    0.0
0.002   94.2       0  06:00      0.090
  CB_12_(STM)              0.000   17.6    0.0    0.0
0.002   73.2       0  06:01      0.079
  CBMH_102_(STM)           0.000   14.1    0.0    0.0
0.002   62.3       0  06:01      0.384
  CBMH_103_(STM)           0.000   14.8    0.0    0.0
0.002   65.4       0  06:01      0.142
  CBMH_105_(STM)           0.000   15.1    0.0    0.0
0.002   73.3       0  06:01      0.193
  CBMH_108_(STM)           0.000   15.5    0.0    0.0
0.002   72.8       0  06:03      0.323
  CBMH_109_(STM)           0.000   14.6    0.0    0.0
0.002   67.1       0  06:03      0.119
  CBMH_110_(STM)           0.000   15.3    0.0    0.0
0.002   66.9       0  06:02      0.109
  Pond                     0.941    5.8    0.0    0.0
4.219   26.2       0  07:27      0.433
  St_A1                    0.014    4.8    0.0    0.0
0.274   90.8       0  06:33      0.023
  St_A2                    0.010    4.8    0.0    0.0
0.180   90.8       0  06:32      0.015
  St_B1                    0.013    4.6    0.0    0.0
0.243   90.1       0  06:32      0.021
  St_B2_B3                 0.026    4.6    0.0    0.0
0.505   89.9       0  06:32      0.044
  St_C1_C2_C3              0.039    4.6    0.0    0.0
0.775   89.8       0  06:32      0.068
  St_CB01                  0.000    0.0    0.0    0.0
0.003    2.0       0  06:00      0.161
  St_CB05                  0.000    0.0    0.0    0.0
0.011    3.2       0  06:00      0.147
  St_CB11                  0.000    0.0    0.0    0.0
0.006    0.5       0  06:00      0.099
  St_CB12                  0.000    0.0    0.0    0.0
0.002    2.0       0  06:00      0.035
  St_CB13                  0.000    0.0    0.0    0.0
0.003    1.3       0  06:03      0.065
  St_CB14                  0.000    0.0    0.0    0.0
0.004    1.2       0  06:00      0.451
  St_CB21                  0.000    0.0    0.0    0.0
0.001    1.0       0  06:00      0.067
  St_CB23                  0.000    0.0    0.0    0.0
0.002    2.8       0  06:00      0.037
  St_CB24                  0.000    0.0    0.0    0.0
0.036    8.8       0  06:01      0.563
  St_CB31                  0.000    0.0    0.0    0.0
0.031   12.5       0  06:02      0.277
  St_CB34                  0.000    0.0    0.0    0.0
0.002    1.2       0  06:00      0.199
  St_CBMH102               0.000    0.0    0.0    0.0
0.000    1.0       0  06:00      0.059
  St_CBMH105               0.000    0.0    0.0    0.0
0.004    1.1       0  06:00      0.080
  St_CBMH108               0.000    0.0    0.0    0.0
0.002    1.5       0  06:00      0.091
  St_CBMH110               0.000    0.0    0.0    0.0
0.003    4.3       0  06:00      0.041
  St_D1_D2_D3              0.037    4.5    0.0    0.0
0.733   89.5       0  06:32      0.065
  STMMH_101_(STM)          0.000   13.8    0.0    0.0
0.002   60.5       0  06:02      0.382
  STMMH_104_(STM)          0.000   15.2    0.0    0.0
0.002   68.5       0  06:00      0.151
  STMMH_106_(STM)          0.000   16.4    0.0    0.0
0.002   92.3       0  06:00      0.141
  STMMH_107_(STM)          0.001   12.7    0.0    0.0
0.002   57.8       0  06:06      1.759
  STMMH_111_(STM)          0.000   13.2    0.0    0.0
0.002   66.3       0  06:03      1.473
  STMMH_112_(STM)          0.000   14.0    0.0    0.0
0.003   85.3       0  06:00      1.448
  STMMH_116_(STM)          0.000   13.0    0.0    0.0
0.003   87.2       0  06:00      0.913
  STMMH_117_(STM)          0.000    2.9    0.0    0.0
0.003   97.2       0  06:01      0.924
  STMMH_120_(STM)          0.000   13.6    0.0    0.0
0.003   92.8       0  06:00      0.265


  ***********************
  Outfall Loading Summary
  ***********************

  ------------------------------------------------------------
-
                           Flow       Avg       Max
Total
                           Freq      Flow      Flow
Volume
  Outfall Node             Pcnt       CMS       CMS    10^6
ltr
  ------------------------------------------------------------
-
  OF1                     79.65     0.237     2.699
48.580
  ------------------------------------------------------------
-
  System                  79.65     0.237     2.699
48.580


  ********************
  Link Flow Summary
  ********************

  ------------------------------------------------------------
------------------
                                    Maximum  Time of Max
Maximum    Max/    Max/
                                     |Flow|   Occurrence
|Veloc|    Full    Full
  Link                Type           CMS  days hr:min
m/sec    Flow   Depth
  ------------------------------------------------------------
------------------
  154_(1)_(STM)        CONDUIT     0.265     0  05:57
0.81    0.82    1.00
  156_(STM)            CONDUIT     0.019     0  05:52
0.33    0.32    1.00
  157_(1)_(STM)        CONDUIT     0.119     0  06:02
0.64    0.63    1.00
  158_(1)_(STM)        CONDUIT     1.759     0  05:57
2.36    1.95    1.00
  158_(STM)            CONDUIT     0.323     0  06:00
1.14    1.82    1.00
  160_(STM)            CONDUIT     0.148     0  06:00
0.96    1.10    1.00
  161_(STM)            CONDUIT     0.142     0  06:01
0.89    1.06    1.00
  166_(STM)            CONDUIT     0.193     0  06:01
1.22    1.43    1.00
  167_(3)_(STM)        CONDUIT     0.924     0  05:55
1.73    1.83    1.00
  170_(STM)            CONDUIT     1.448     0  05:56
2.28    2.10    1.00
```

```
  171_(1)_(STM)         CONDUIT     0.139     0  06:00
1.26    1.45    1.00
  172_(STM)             CONDUIT     0.016     0  05:51
0.34    0.27    1.00
  175_(STM)             CONDUIT     0.384     0  06:00
1.78    1.63    1.00
  176_(1)_(1)_(STM)     CONDUIT     0.090     0  05:59
1.28    1.39    1.00
  179_(STM)             CONDUIT     0.073     0  05:55
1.48    1.59    1.00
  184_(STM)             CONDUIT     0.109     0  06:01
0.97    0.76    1.00
  186_(STM)             CONDUIT     0.079     0  05:52
1.17    1.06    1.00
  200_(STM)             CONDUIT     0.382     0  06:00
1.76    1.93    1.00
  226_(1)_(1)_(2)_(STM) CONDUIT     0.690     0  06:07
1.37    2.16    1.00
  226_(1)_(STM)         CONDUIT     0.283     0  06:08
1.23    1.78    1.00
  230_(STM)             CONDUIT     1.678     0  08:05
1.66    2.12    0.71
  237_(STM)             CONDUIT     1.473     0  05:56
2.32    2.10    1.00
  238_(STM)             CONDUIT     0.433     0  07:28
1.53    1.71    1.00
  239_(1)_(STM)         CONDUIT     0.433     0  07:28
1.64    1.81    0.88
  239_(STM)             CONDUIT     0.433     0  07:28
1.53    1.80    1.00
  240_(STM)             CONDUIT     0.433     0  07:28
1.87    1.28    0.76
  242_(STM)             CONDUIT     0.913     0  05:56
1.71    1.88    1.00
  244_(STM)             CONDUIT     1.986     0  08:03
1.84    0.70    0.76
  C1                    CHANNEL     1.778     0  08:06
1.13    0.02    0.23
  C2                    CHANNEL     5.399     0  07:57
0.84    0.05    0.46
  C3                    CHANNEL     2.138     0  08:04
2.63    0.02    0.23
  C4                    CHANNEL     0.358     0  06:00
0.36    0.01    0.38
  C5                    CONDUIT     1.223     0  05:59
0.16    0.03    0.93
  C6                    CHANNEL     1.668     0  08:00
0.46    0.13    0.59
  OR3                   ORIFICE     0.043     0  06:16
1.00
  W_Pond                WEIR        0.000     0  00:00
0.00
  W_St_CB05             WEIR        0.000     0  00:00
0.00
  W_St_CB11             WEIR        0.000     0  00:00
0.00
  W_St_CB13             WEIR        0.000     0  00:00
0.00
  W_St_CB14             WEIR        0.000     0  00:00
0.00
  W_St_CB21             WEIR        0.000     0  00:00
0.00
  W_St_CB23             WEIR        0.000     0  00:00
0.00
  W_St_CB24             WEIR        0.000     0  00:00
0.00
  W_St_CB31             WEIR        0.000     0  00:00
0.00
  W_St_CB34             WEIR        0.000     0  00:00
0.00
  W_St_CBMH102          WEIR        0.000     0  00:00
0.00
  W_St_CBMH108          WEIR        0.000     0  00:00
0.00
  W_St_CBMH110          WEIR        0.000     0  00:00
0.00
  W1                    WEIR        0.000     0  00:00
0.00
  W1_St_CB12            WEIR        0.000     0  00:00
0.00
  W2                    WEIR        0.013     0  06:00
0.12
  W3                    WEIR        0.153     0  06:30
0.21
  W4                    WEIR        0.301     0  07:27
0.11
  OUT_St_A1             DUMMY       0.023     0  06:33
  OUT_St_A2             DUMMY       0.015     0  06:33
  OUT_St_B1             DUMMY       0.021     0  06:32
  OUT_St_B2_B3          DUMMY       0.044     0  06:32
  OUT_St_C1_C2_C3       DUMMY       0.068     0  06:32
  OUT_St_CB01           DUMMY       0.161     0  06:00
  OUT_St_CB05           DUMMY       0.147     0  06:00
  OUT_St_CB11           DUMMY       0.099     0  05:59
  OUT_St_CB12           DUMMY       0.035     0  06:00
  OUT_St_CB13           DUMMY       0.065     0  05:59
  OUT_St_CB14           DUMMY       0.451     0  06:00
  OUT_St_CB21           DUMMY       0.067     0  06:00
  OUT_St_CB23           DUMMY       0.037     0  06:00
  OUT_St_CB24           DUMMY       0.563     0  05:56
  OUT_St_CB31           DUMMY       0.277     0  06:05
  OUT_St_CB34           DUMMY       0.199     0  05:58
  OUT_St_CBMH102        DUMMY       0.059     0  06:00
  OUT_St_CBMH105        DUMMY       0.078     0  05:55
  OUT_St_CBMH108        DUMMY       0.091     0  06:00
  OUT_St_CBMH110        DUMMY       0.041     0  06:00
  OUT_St_D1_D2_D3       DUMMY       0.065     0  06:32
  OVF_CB_07             DUMMY       0.000     0  00:00
  OVF_CB_08             DUMMY       0.000     0  00:00


  ***************************
  Flow Classification Summary
  ***************************

  -------------------------------------------------------------
----------------------------
                         Adjusted    ---------- Fraction of
Time in Flow Class ----------
                          /Actual          Up    Down  Sub   Sup
Up    Down  Norm  Inlet
  Conduit               Length    Dry  Dry   Dry   Crit
Crit  Crit  Crit  Ltd   Ctrl
  -------------------------------------------------------------
----------------------------
  154_(1)_(STM)            1.00   0.01  0.00  0.00  0.08
0.00  0.00  0.91  0.02  0.00
  156_(STM)                1.00   0.08  0.00  0.00  0.01
0.00  0.00  0.91  0.00  0.00
  157_(1)_(STM)            1.00   0.01  0.00  0.00  0.13
0.00  0.00  0.86  0.01  0.00
  158_(1)_(STM)            1.00   0.01  0.00  0.00  0.85
0.00  0.00  0.14  0.03  0.00
  158_(STM)                1.00   0.01  0.00  0.00  0.14
0.00  0.00  0.85  0.00  0.00
  160_(STM)                1.00   0.01  0.00  0.00  0.01
0.00  0.00  0.98  0.00  0.00
  161_(STM)                1.00   0.01  0.00  0.00  0.05
0.00  0.00  0.94  0.02  0.00
  166_(STM)                1.00   0.01  0.00  0.00  0.04
0.00  0.00  0.95  0.02  0.00
  167_(3)_(STM)            1.00   0.01  0.00  0.00  0.18
0.00  0.00  0.81  0.02  0.00
  170_(STM)                1.00   0.01  0.00  0.00  0.29
0.00  0.00  0.70  0.05  0.00
  171_(1)_(STM)            1.00   0.01  0.00  0.00  0.01
0.00  0.00  0.98  0.00  0.00
  172_(STM)                1.00   0.07  0.01  0.00  0.02
0.00  0.00  0.90  0.91  0.00
  175_(STM)                1.00   0.01  0.00  0.00  0.09
0.00  0.00  0.90  0.00  0.00
  176_(1)_(1)_(STM)        1.00   0.01  0.00  0.00  0.07
0.00  0.00  0.91  0.04  0.00
  179_(STM)                1.00   0.01  0.00  0.00  0.01
0.00  0.00  0.98  0.00  0.00
  184_(STM)                1.00   0.01  0.00  0.00  0.08
0.00  0.00  0.91  0.01  0.00
  186_(STM)                1.00   0.01  0.00  0.00  0.04
0.00  0.00  0.95  0.00  0.00
  200_(STM)                1.00   0.01  0.42  0.00  0.57
0.00  0.00  0.00  0.86  0.00
```

```
  226_(1)_(1)_(2)_(STM)    1.00   0.02  0.00  0.00  0.63
0.00  0.00  0.36  0.00  0.18
  226_(1)_(STM)            1.00   0.02  0.00  0.00  0.22
0.00  0.00  0.76  0.00  0.10
  230_(STM)                1.00   0.01  0.00  0.00  0.00
0.00  0.00  0.99  0.00  0.07
  237_(STM)                1.00   0.01  0.00  0.00  0.28
0.00  0.00  0.71  0.03  0.00
  238_(STM)                1.00   0.01  0.00  0.00  0.15
0.00  0.00  0.83  0.00  0.00
  239_(1)_(STM)            1.00   0.02  0.00  0.00  0.07
0.00  0.00  0.91  0.00  0.00
  239_(STM)                1.00   0.02  0.00  0.00  0.68
0.00  0.00  0.30  0.00  0.00
  240_(STM)                1.00   0.02  0.00  0.00  0.00
0.00  0.00  0.98  0.00  0.00
  242_(STM)                1.00   0.01  0.00  0.00  0.18
0.00  0.00  0.81  0.03  0.00
  244_(STM)                1.00   0.01  0.00  0.00  0.00
0.00  0.00  0.99  0.00  0.21
  C1                       1.00   0.01  0.00  0.00  0.99
0.00  0.00  0.00  0.99  0.00
  C2                       1.00   0.01  0.00  0.00  0.99
0.00  0.00  0.00  0.94  0.00
  C3                       1.00   0.01  0.00  0.00  0.04
0.95  0.00  0.00  0.03  0.00
  C4                       1.00   0.01  0.00  0.00  0.69
0.20  0.00  0.09  0.04  0.00
  C5                       1.00   0.01  0.07  0.00  0.91
0.00  0.00  0.01  0.66  0.00
  C6                       1.00   0.01  0.00  0.00  0.99
0.00  0.00  0.00  0.97  0.00


  *************************
  Conduit Surcharge Summary
  *************************

  ---------------------------------------------------------
------------------

Hours        Hours
                        --------- Hours Full --------
Above Full   Capacity
  Conduit                Both Ends  Upstream  Dnstream
Normal Flow   Limited
  ---------------------------------------------------------
------------------
  154_(1)_(STM)               0.96      0.96      1.32
0.01         0.01
  156_(STM)                   0.20      0.20      0.28
0.01         0.01
  157_(1)_(STM)               2.51      2.51      3.10
0.01         0.01
  158_(1)_(STM)               3.49      3.54      3.85
0.31         0.32
  158_(STM)                   3.34      3.36      3.36
0.31         1.71
  160_(STM)                   0.28      0.28      0.36
0.15         0.19
  161_(STM)                   0.41      0.41      0.45
0.09         0.23
  166_(STM)                   0.40      0.40      0.45
0.25         0.27
  167_(3)_(STM)               1.32      1.32      1.50
0.30         0.28
  170_(STM)                   1.90      1.92      2.64
0.32         0.28
  171_(1)_(STM)               0.30      0.30      0.39
0.23         0.24
  172_(STM)                   0.28      0.28      0.30
0.01         0.01
  175_(STM)                   0.46      0.46      0.46
0.27         0.27
  176_(1)_(1)_(STM)           1.20      1.21      3.05
0.24         0.23
  179_(STM)                   0.29      0.31      0.40
0.27         0.24
  184_(STM)                   1.76      1.76      2.47
0.01         0.01
  186_(STM)                   1.34      1.38      1.72
0.05         0.19
  200_(STM)                   0.40      0.48      0.42
0.29         0.23
  226_(1)_(1)_(2)_(STM)      16.93     16.93     25.11
2.86         3.56
  226_(1)_(STM)               0.51      0.89      6.76
0.56         0.20
  230_(STM)                   0.01      0.01      0.01
4.10         0.01
  237_(STM)                   2.80      2.82      3.48
0.32         0.26
  238_(STM)                   4.31      4.56      4.31
4.82         4.31
  239_(1)_(STM)               0.01      3.84      0.01
4.96         0.01
  239_(STM)                   3.58      4.61      3.58
4.95         3.58
  240_(STM)                   0.01      0.01      0.01
3.49         0.01
  242_(STM)                   1.57      1.57      1.90
0.31         0.29


  Analysis begun on:  Fri Jul 10 18:28:11 2026
  Analysis ended on:  Fri Jul 10 18:28:56 2026
  Total elapsed time: 00:00:45
```

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

08/25/2026

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

Project Name:	4101 Limebank
Project Number:	65650
Designer Name:	Stephen McCaughey
Designer Company:	Robinson Consultants
Designer Email:	smccaughey@rcii.com
Designer Phone:	613-592-6060
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Site Name:	STMMH 101
Drainage Area (ha):	1.13
Runoff Coefficient 'c':	0.85
Particle Size Distribution:	CA ETV
Target TSS Removal (%):	60.0
Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	31.00
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	150
Estimated Average Annual Sediment Load (kg/yr):	645
Estimated Average Annual Sediment Volume (L/yr):	524

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	48
EFO5	52
EFO6	56
EFO8	61
EFO10	64
EFO12	66

Recommended Stormceptor EFO Model: EFO8

Estimated Net Annual Sediment (TSS) Load Reduction (%): 61

Water Quality Runoff Volume Capture (%): > 90

THIRD-PARTY TESTING AND VERIFICATION

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

PERFORMANCE

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

PARTICLE SIZE DISTRIBUTION (PSD)

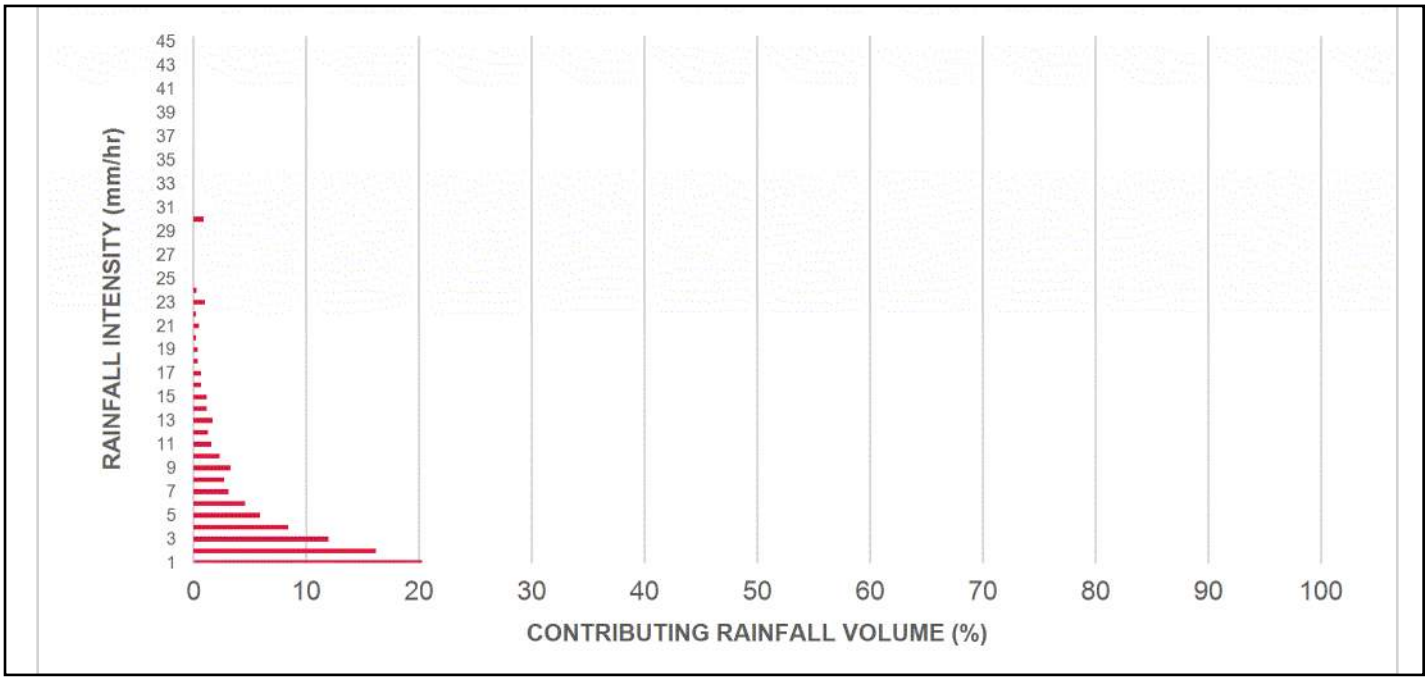
►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a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

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

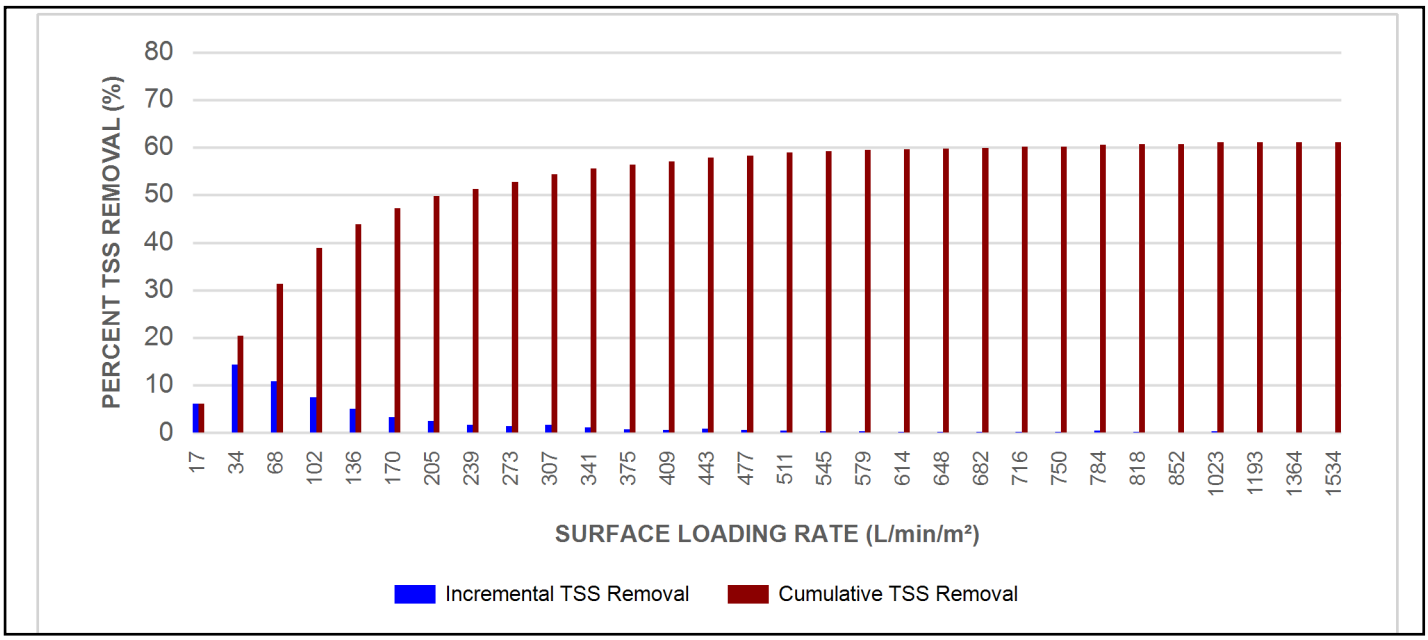
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.6	8.6	1.34	80.0	17.0	70	6.1	6.1
1.00	20.3	29.0	2.67	160.0	34.0	70	14.3	20.4
2.00	16.2	45.2	5.34	320.0	68.0	67	10.9	31.3
3.00	12.0	57.2	8.01	481.0	102.0	62	7.5	38.8
4.00	8.4	65.6	10.68	641.0	136.0	60	5.1	43.8
5.00	5.9	71.6	13.35	801.0	170.0	57	3.4	47.2
6.00	4.6	76.2	16.02	961.0	205.0	54	2.5	49.7
7.00	3.1	79.3	18.69	1121.0	239.0	53	1.6	51.3
8.00	2.7	82.0	21.36	1282.0	273.0	52	1.4	52.7
9.00	3.3	85.3	24.03	1442.0	307.0	51	1.7	54.4
10.00	2.3	87.6	26.70	1602.0	341.0	50	1.1	55.6
11.00	1.6	89.2	29.37	1762.0	375.0	49	0.8	56.3
12.00	1.3	90.5	32.04	1923.0	409.0	48	0.6	57.0
13.00	1.7	92.2	34.71	2083.0	443.0	47	0.8	57.8
14.00	1.2	93.5	37.38	2243.0	477.0	46	0.6	58.3
15.00	1.2	94.6	40.05	2403.0	511.0	45	0.5	58.9
16.00	0.7	95.3	42.72	2563.0	545.0	44	0.3	59.2
17.00	0.7	96.1	45.39	2724.0	579.0	43	0.3	59.5
18.00	0.4	96.5	48.06	2884.0	614.0	42	0.2	59.6
19.00	0.4	96.9	50.73	3044.0	648.0	42	0.2	59.8
20.00	0.2	97.1	53.40	3204.0	682.0	42	0.1	59.9
21.00	0.5	97.5	56.07	3364.0	716.0	41	0.2	60.1
22.00	0.2	97.8	58.74	3525.0	750.0	41	0.1	60.2
23.00	1.0	98.8	61.41	3685.0	784.0	41	0.4	60.6
24.00	0.3	99.1	64.08	3845.0	818.0	41	0.1	60.7
25.00	0.0	99.1	66.75	4005.0	852.0	41	0.0	60.7
30.00	0.9	100.0	80.11	4806.0	1023.0	40	0.4	61.1
35.00	0.0	100.0	93.46	5607.0	1193.0	37	0.0	61.1
40.00	0.0	100.0	106.81	6408.0	1364.0	35	0.0	61.1
45.00	0.0	100.0	120.16	7210.0	1534.0	31	0.0	61.1
Estimated Net Annual Sediment (TSS) Load Reduction =								**61 %**

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

RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

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

SCOUR PREVENTION AND ONLINE CONFIGURATION

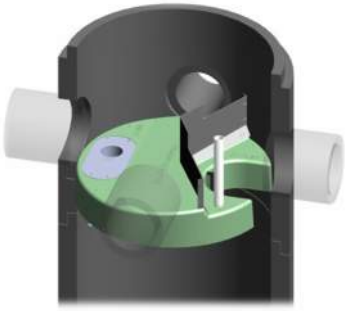
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test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

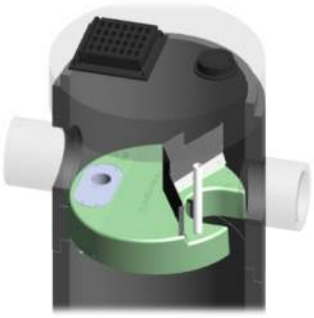
DESIGN FLEXIBILITY

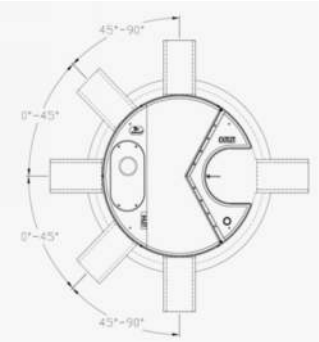
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend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

OIL CAPTURE AND RETENTION

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







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.
0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.
45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

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

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity
** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

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

STANDARD STORMCEPTOR EF/EFO DRAWINGS

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

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

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

Table of TSS Removal vs Surface Loading Rate Based on Third-Party Test Results
Stormceptor® EFO

SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL
1	70	660	42	1320	35	1980	24
30	70	690	42	1350	35	2010	24
60	67	720	41	1380	34	2040	23
90	63	750	41	1410	34	2070	23
120	61	780	41	1440	33	2100	23
150	58	810	41	1470	32	2130	22
180	56	840	41	1500	32	2160	22
210	54	870	41	1530	31	2190	22
240	53	900	41	1560	31	2220	21
270	52	930	40	1590	30	2250	21
300	51	960	40	1620	29	2280	21
330	50	990	40	1650	29	2310	21
360	49	1020	40	1680	28	2340	20
390	48	1050	39	1710	28	2370	20
420	47	1080	39	1740	27	2400	20
450	47	1110	38	1770	27	2430	20
480	46	1140	38	1800	26	2460	19
510	45	1170	37	1830	26	2490	19
540	44	1200	37	1860	26	2520	19
570	43	1230	37	1890	25	2550	19
600	42	1260	36	1920	25	2580	18
630	42	1290	36	1950	24	2600	26

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

PART 1 – GENERAL

1.1 WORK INCLUDED

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

1.2 REFERENCE STANDARDS & PROCEDURES

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

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

1.3 SUBMITTALS

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

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

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

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

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

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	5 ft (1524 mm) Diameter OGS Units:	1.95 m^3 sediment / 420 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

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

3.2 SIZING METHODOLOGY

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

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

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

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

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

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

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

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

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

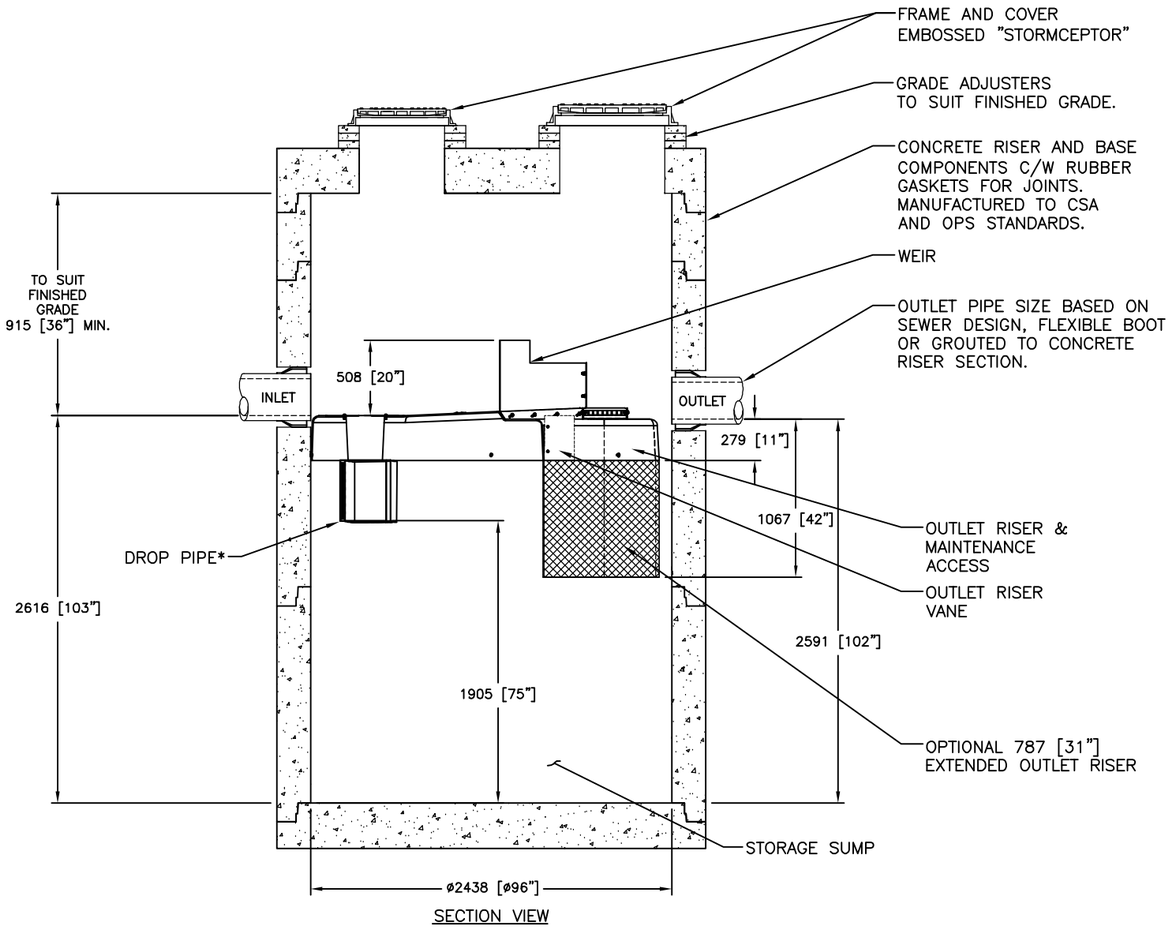
3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-

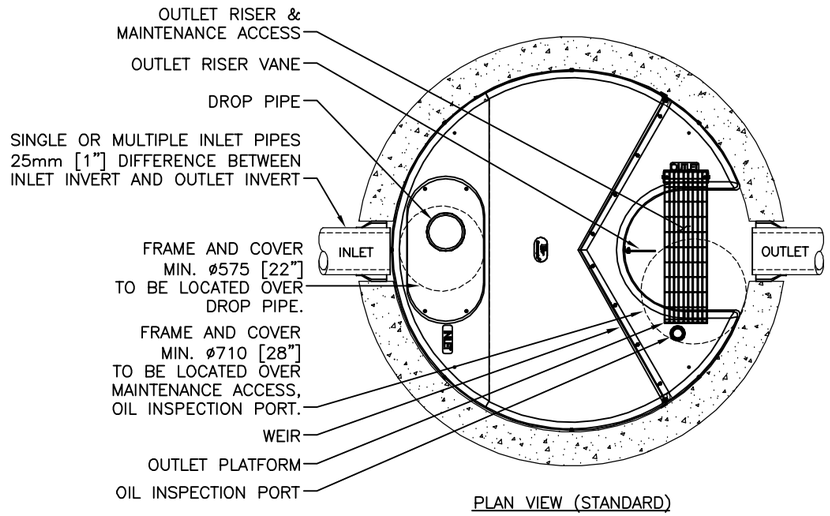
entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

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

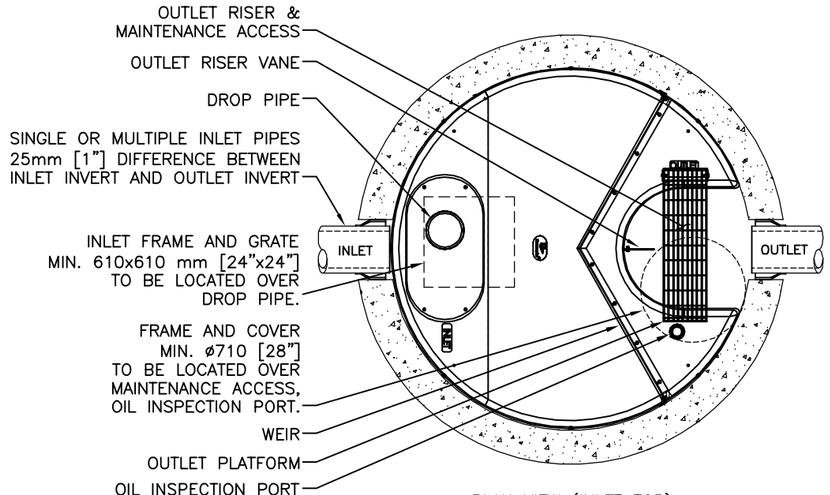
DRAWING NOT TO BE USED FOR CONSTRUCTION



SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF8 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO8 (OIL CAPTURE CONFIGURATION).

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

INSTALLATION NOTES

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

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

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EFO8				
STRUCTURE ID					*
HYDROCARBON STORAGE REQ'D (L)					*
WATER QUALITY FLOW RATE (L/s)					*
PEAK FLOW RATE (L/s)					*
RETURN PERIOD OF PEAK FLOW (yrs)					*
DRAINAGE AREA (HA)					*
DRAINAGE AREA IMPERVIOUSNESS (%)					*
PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

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

Stormceptor® EF

SCALE = NTS

imbrium®
407 FAIRVIEW DRIVE, WHITBY, ON L1N 9A9
TF 800-565-6801 CA 416-665-8600 INTL +1-416-665-8600

DATE: 10/13/2017

DESIGNED:	DRAWN:
JSK	JSK
CHECKED:	APPROVED:
BSF	*
PROJECT No.:	SEQUENCE No.:
EFO8	*

SHEET: 1 OF 1

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

08/25/2026

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

Site Name:	STMMH 107

Drainage Area (ha):	2.35
Runoff Coefficient 'c':	0.76

Particle Size Distribution:	CA ETV
Target TSS Removal (%):	60.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	57.64
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	150
Estimated Average Annual Sediment Load (kg/yr):	1103
Estimated Average Annual Sediment Volume (L/yr):	897

Project Name:	4101 Limebank
Project Number:	65650
Designer Name:	Stephen McCaughey
Designer Company:	Robinson Consultants
Designer Email:	smccaughey@rcii.com
Designer Phone:	613-592-6060
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	40
EFO5	45
EFO6	49
EFO8	56
EFO10	60
EFO12	62

Recommended Stormceptor EFO Model: EFO10

Estimated Net Annual Sediment (TSS) Load Reduction (%): 60

Water Quality Runoff Volume Capture (%): > 90

THIRD-PARTY TESTING AND VERIFICATION

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

PERFORMANCE

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

PARTICLE SIZE DISTRIBUTION (PSD)

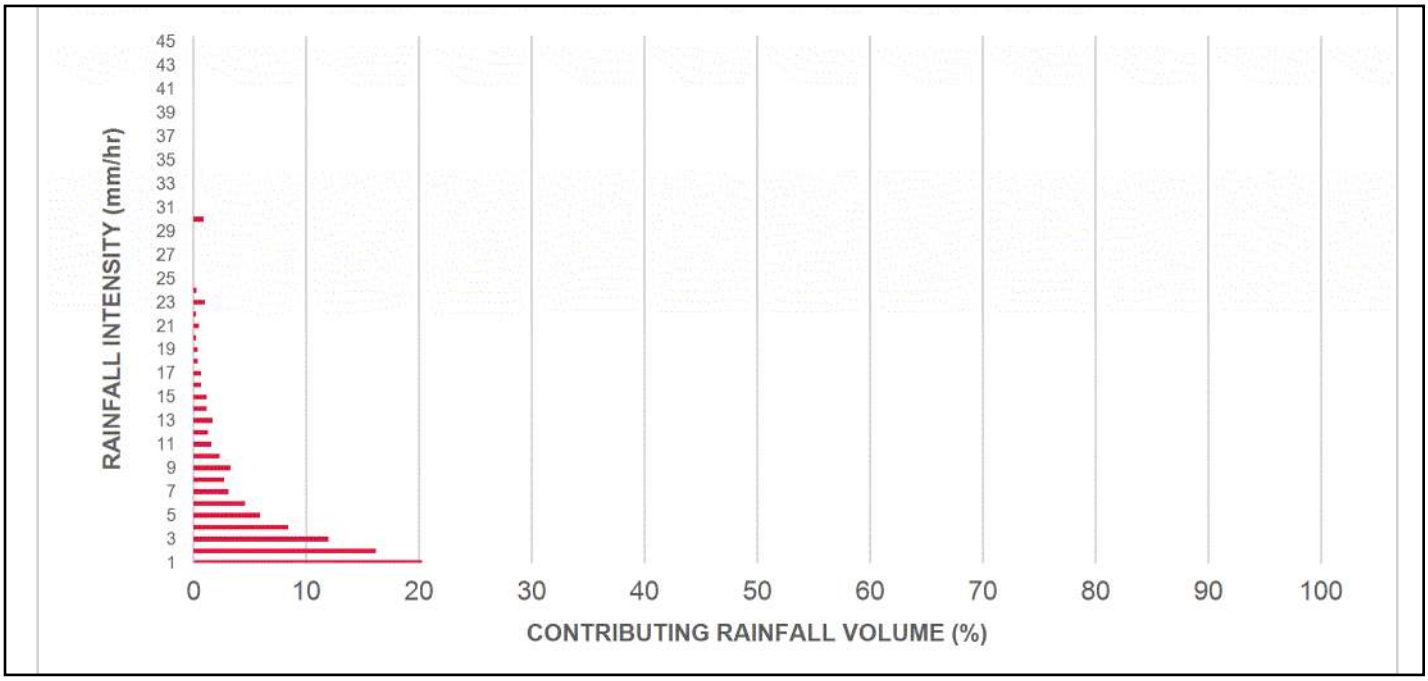
►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a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

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

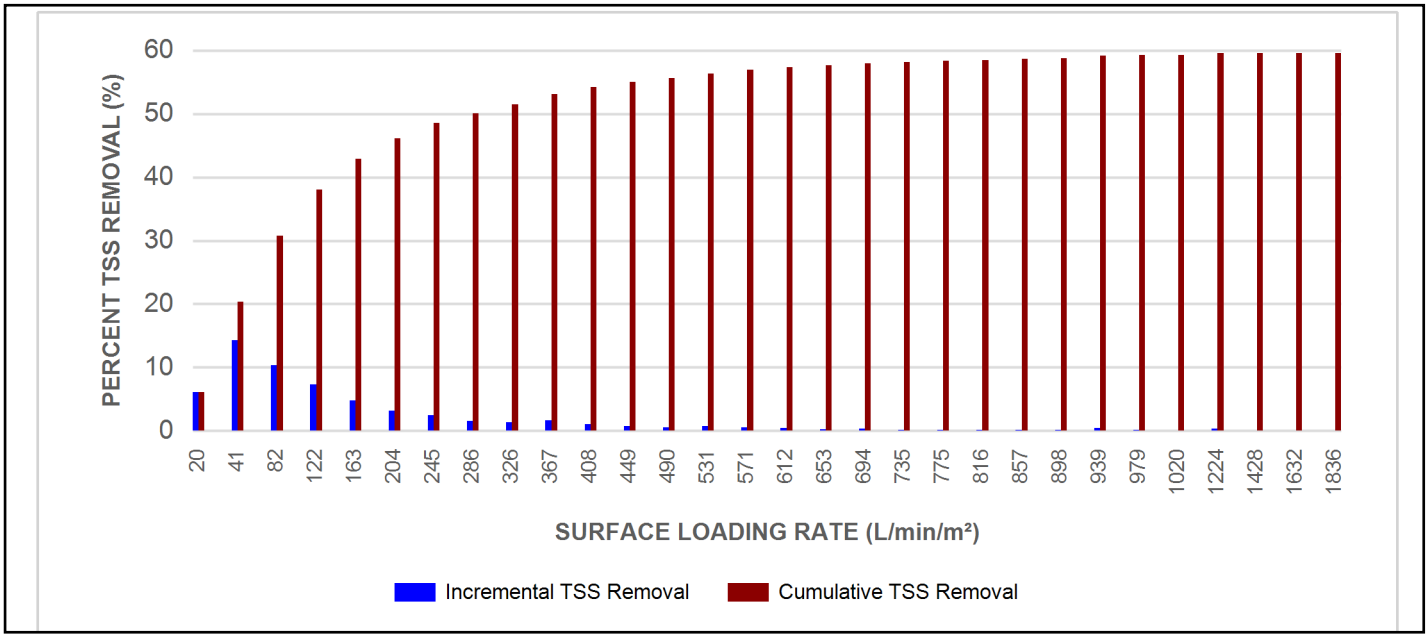
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.6	8.6	2.48	149.0	20.0	70	6.1	6.1
1.00	20.3	29.0	4.97	298.0	41.0	70	14.3	20.4
2.00	16.2	45.2	9.93	596.0	82.0	64	10.4	30.8
3.00	12.0	57.2	14.90	894.0	122.0	61	7.3	38.0
4.00	8.4	65.6	19.86	1192.0	163.0	57	4.8	42.9
5.00	5.9	71.6	24.83	1490.0	204.0	54	3.2	46.1
6.00	4.6	76.2	29.79	1787.0	245.0	53	2.4	48.5
7.00	3.1	79.3	34.76	2085.0	286.0	52	1.6	50.1
8.00	2.7	82.0	39.72	2383.0	326.0	50	1.4	51.5
9.00	3.3	85.3	44.69	2681.0	367.0	49	1.6	53.1
10.00	2.3	87.6	49.65	2979.0	408.0	48	1.1	54.2
11.00	1.6	89.2	54.62	3277.0	449.0	47	0.7	55.0
12.00	1.3	90.5	59.58	3575.0	490.0	45	0.6	55.6
13.00	1.7	92.2	64.55	3873.0	531.0	44	0.8	56.3
14.00	1.2	93.5	69.51	4171.0	571.0	43	0.5	56.9
15.00	1.2	94.6	74.48	4469.0	612.0	42	0.5	57.3
16.00	0.7	95.3	79.44	4766.0	653.0	42	0.3	57.6
17.00	0.7	96.1	84.41	5064.0	694.0	42	0.3	57.9
18.00	0.4	96.5	89.37	5362.0	735.0	41	0.2	58.1
19.00	0.4	96.9	94.34	5660.0	775.0	41	0.2	58.3
20.00	0.2	97.1	99.30	5958.0	816.0	41	0.1	58.4
21.00	0.5	97.5	104.27	6256.0	857.0	41	0.2	58.6
22.00	0.2	97.8	109.23	6554.0	898.0	41	0.1	58.7
23.00	1.0	98.8	114.20	6852.0	939.0	40	0.4	59.1
24.00	0.3	99.1	119.16	7150.0	979.0	40	0.1	59.2
25.00	0.0	99.1	124.13	7448.0	1020.0	40	0.0	59.2
30.00	0.9	100.0	148.95	8937.0	1224.0	37	0.3	59.5
35.00	0.0	100.0	173.78	10427.0	1428.0	34	0.0	59.5
40.00	0.0	100.0	198.60	11916.0	1632.0	29	0.0	59.5
45.00	0.0	100.0	223.43	13406.0	1836.0	26	0.0	59.5
Estimated Net Annual Sediment (TSS) Load Reduction =								**60 %**

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

RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

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

SCOUR PREVENTION AND ONLINE CONFIGURATION

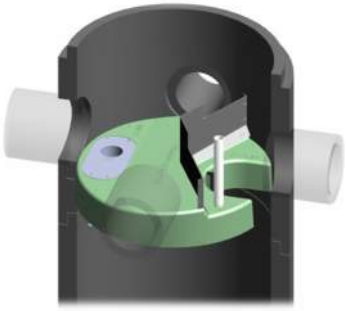
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test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

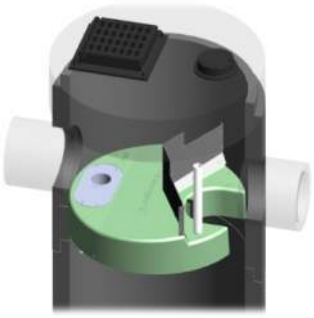
DESIGN FLEXIBILITY

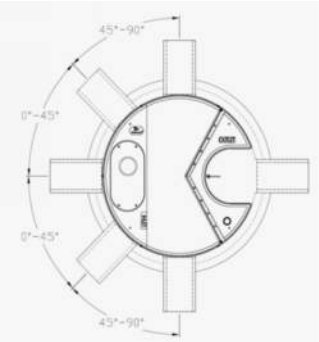
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend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

OIL CAPTURE AND RETENTION

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







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.
0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.
45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

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

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity
** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

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

STANDARD STORMCEPTOR EF/EFO DRAWINGS

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

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

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

Table of TSS Removal vs Surface Loading Rate Based on Third-Party Test Results
Stormceptor® EFO

SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL
1	70	660	42	1320	35	1980	24
30	70	690	42	1350	35	2010	24
60	67	720	41	1380	34	2040	23
90	63	750	41	1410	34	2070	23
120	61	780	41	1440	33	2100	23
150	58	810	41	1470	32	2130	22
180	56	840	41	1500	32	2160	22
210	54	870	41	1530	31	2190	22
240	53	900	41	1560	31	2220	21
270	52	930	40	1590	30	2250	21
300	51	960	40	1620	29	2280	21
330	50	990	40	1650	29	2310	21
360	49	1020	40	1680	28	2340	20
390	48	1050	39	1710	28	2370	20
420	47	1080	39	1740	27	2400	20
450	47	1110	38	1770	27	2430	20
480	46	1140	38	1800	26	2460	19
510	45	1170	37	1830	26	2490	19
540	44	1200	37	1860	26	2520	19
570	43	1230	37	1890	25	2550	19
600	42	1260	36	1920	25	2580	18
630	42	1290	36	1950	24	2600	26

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

PART 1 – GENERAL

1.1 WORK INCLUDED

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

1.2 REFERENCE STANDARDS & PROCEDURES

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

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

1.3 SUBMITTALS

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

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

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

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

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

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	5 ft (1524 mm) Diameter OGS Units:	1.95 m^3 sediment / 420 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

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

3.2 SIZING METHODOLOGY

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

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

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

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

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

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

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

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

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

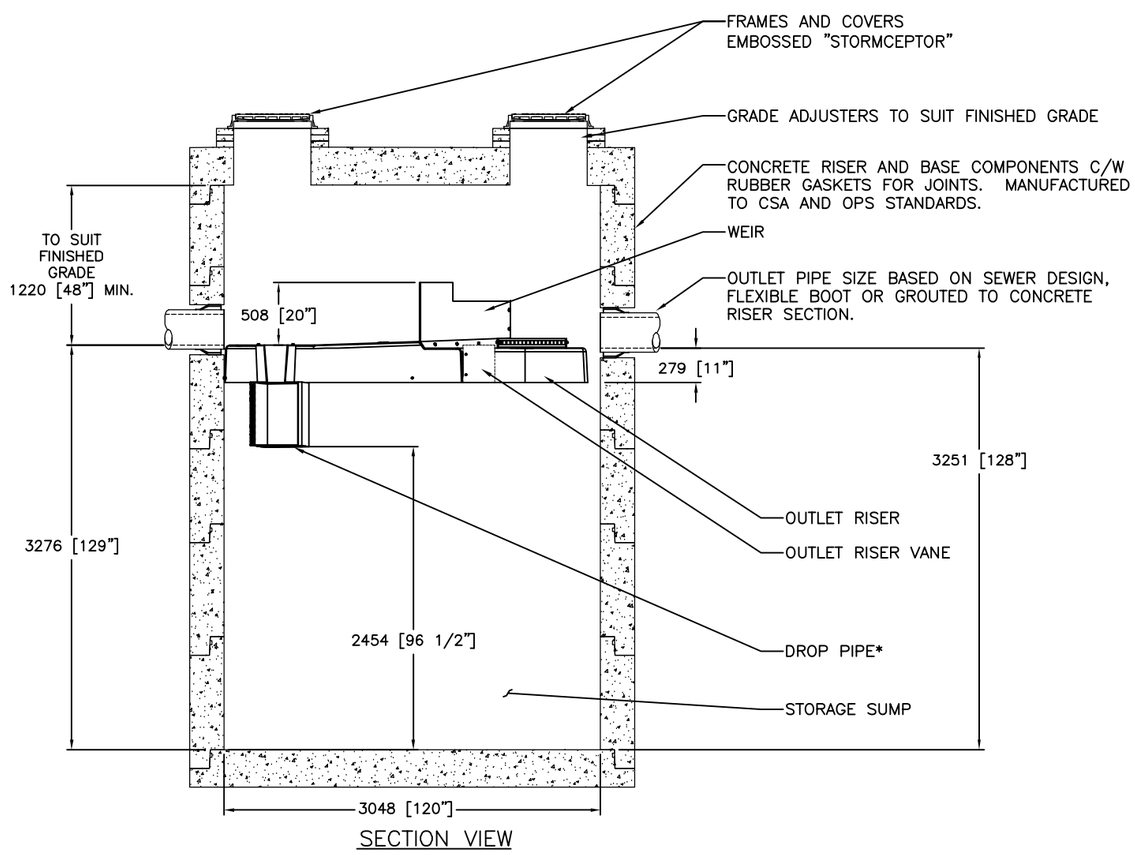
3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-

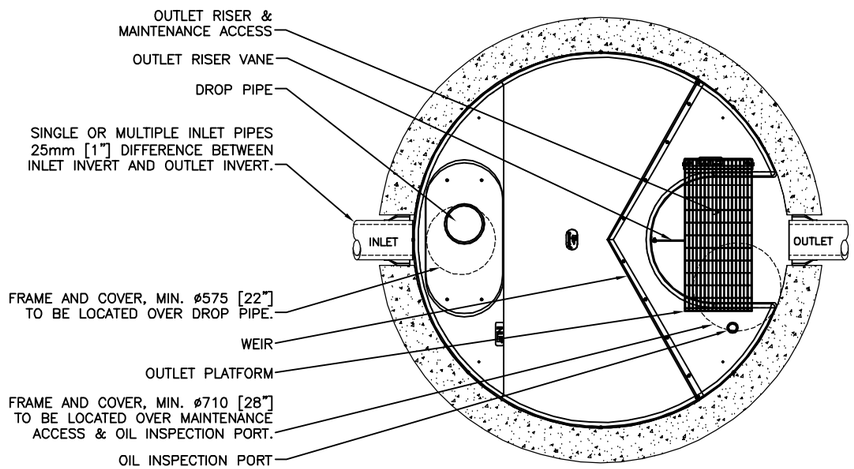
entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

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

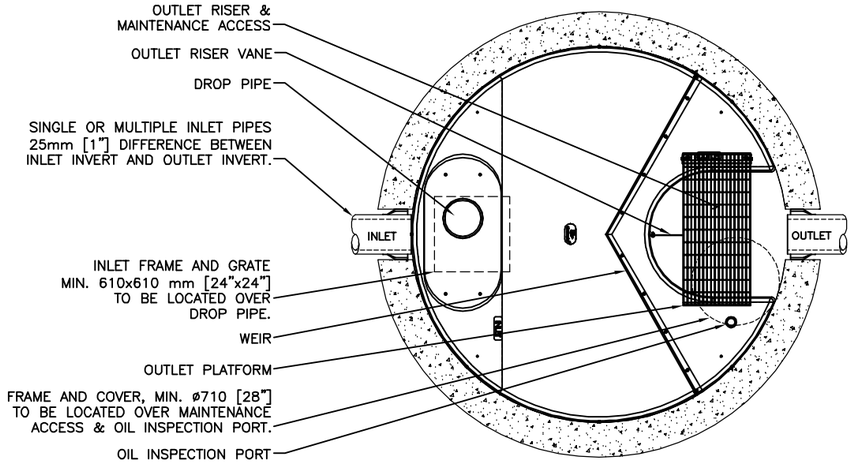
DRAWING NOT TO BE USED FOR CONSTRUCTION



SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF10 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO10 (OIL CAPTURE CONFIGURATION).

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

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

INSTALLATION NOTES

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

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EFO10				
STRUCTURE ID					*
HYDROCARBON STORAGE REQ'D (L)					*
WATER QUALITY FLOW RATE (L/s)					
PEAK FLOW RATE (L/s)					*
RETURN PERIOD OF PEAK FLOW (yrs)					*
DRAINAGE AREA (HA)					*
DRAINAGE AREA IMPERVIOUSNESS (%)					*
PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

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

Stormceptor® EF

SCALE = NTS

imbrium®
407 FAIRVIEW DRIVE, WHITBY, ON L1N 9A9
TF 800-565-4967 CA +1 416-960-9900 INTL +1 416-960-9600

DATE: 10/24/2017

DESIGNED:	DRAWN:
JSK	JSK
CHECKED:	APPROVED:
BSF	SP
PROJECT No.:	SEQUENCE No.:
EFO10	*

SHEET: 1 OF 1

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

08/25/2026

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

Site Name:	STMMH 117

Drainage Area (ha):	2.46
Runoff Coefficient 'c':	0.81

Particle Size Distribution:	CA ETV
Target TSS Removal (%):	60.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	64.31
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	150
Estimated Average Annual Sediment Load (kg/yr):	1323
Estimated Average Annual Sediment Volume (L/yr):	1076

Project Name:	4101 Limebank
Project Number:	65650
Designer Name:	Stephen McCaughey
Designer Company:	Robinson Consultants
Designer Email:	smccaughey@rcii.com
Designer Phone:	613-592-6060
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	38
EFO5	43
EFO6	48
EFO8	54
EFO10	59
EFO12	62

Recommended Stormceptor EFO Model: EFO12

Estimated Net Annual Sediment (TSS) Load Reduction (%): 62

Water Quality Runoff Volume Capture (%): > 90

THIRD-PARTY TESTING AND VERIFICATION

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

PERFORMANCE

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

PARTICLE SIZE DISTRIBUTION (PSD)

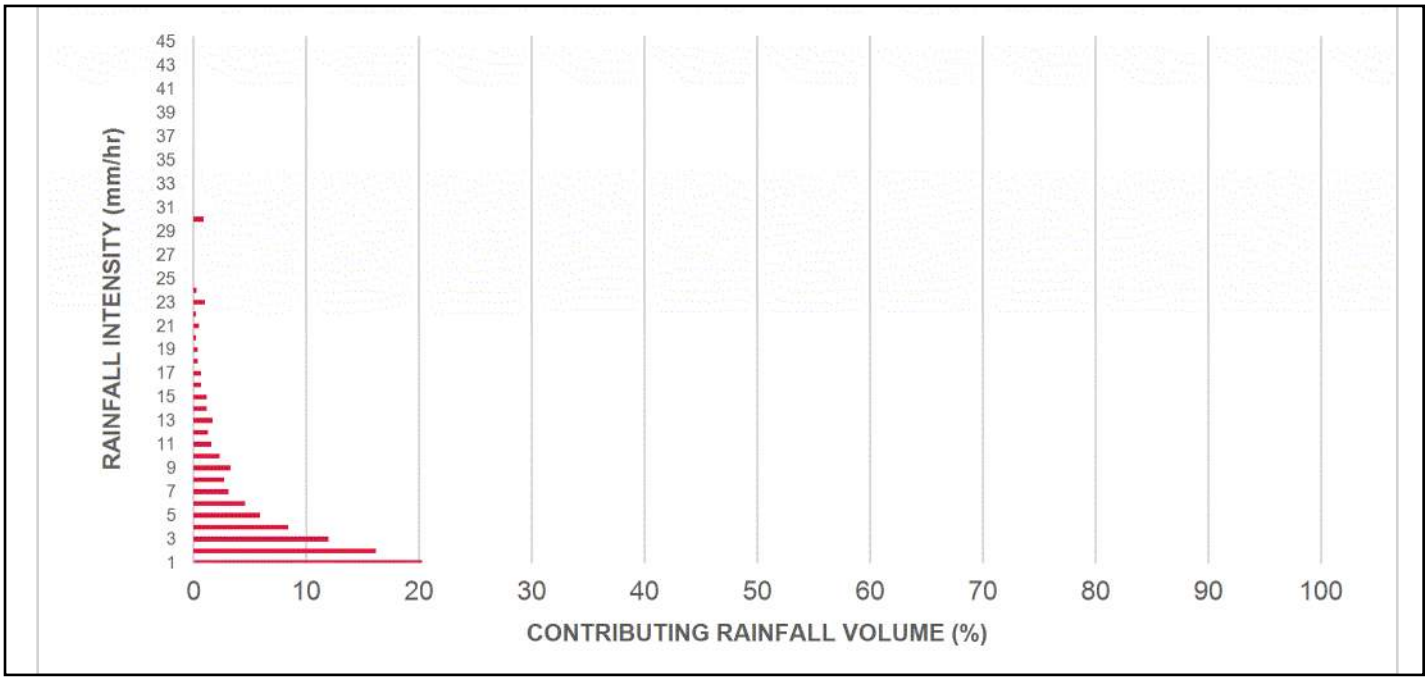
►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a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

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

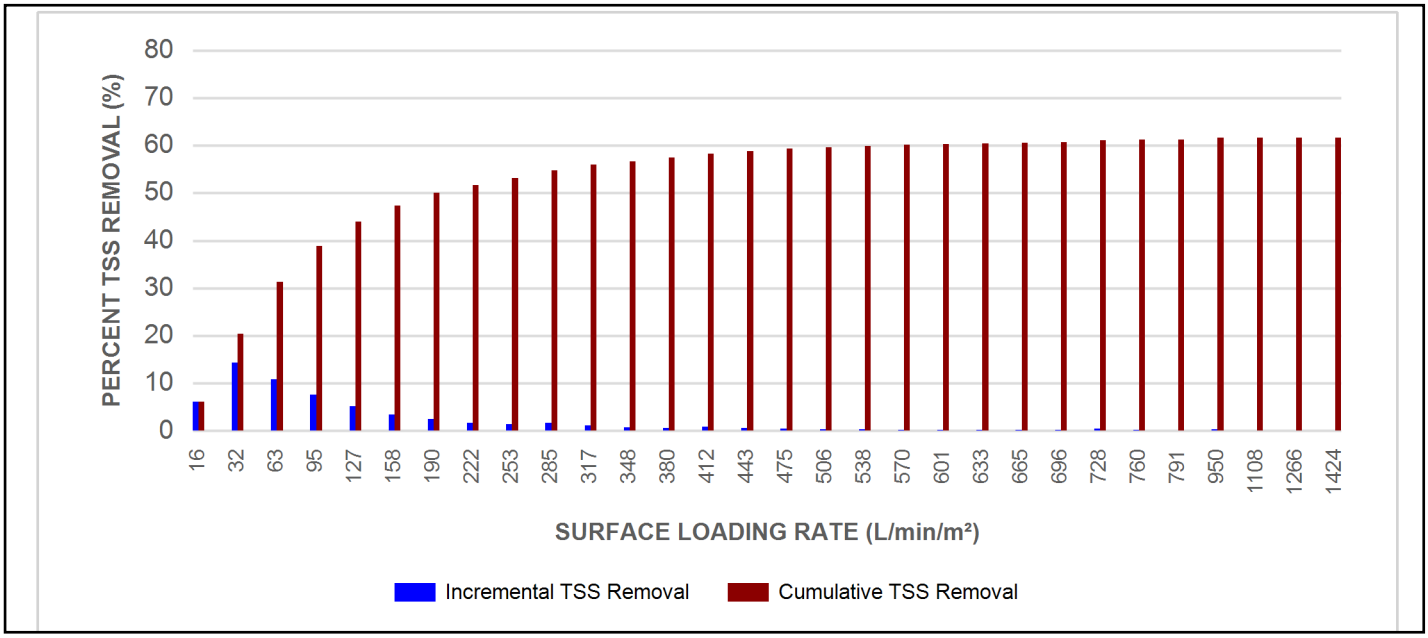
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.6	8.6	2.77	166.0	16.0	70	6.1	6.1
1.00	20.3	29.0	5.54	332.0	32.0	70	14.3	20.4
2.00	16.2	45.2	11.08	665.0	63.0	67	10.9	31.3
3.00	12.0	57.2	16.62	997.0	95.0	63	7.6	38.9
4.00	8.4	65.6	22.16	1329.0	127.0	61	5.1	44.0
5.00	5.9	71.6	27.70	1662.0	158.0	58	3.5	47.4
6.00	4.6	76.2	33.24	1994.0	190.0	55	2.5	50.0
7.00	3.1	79.3	38.78	2327.0	222.0	53	1.6	51.6
8.00	2.7	82.0	44.32	2659.0	253.0	53	1.4	53.1
9.00	3.3	85.3	49.85	2991.0	285.0	52	1.7	54.8
10.00	2.3	87.6	55.39	3324.0	317.0	51	1.2	55.9
11.00	1.6	89.2	60.93	3656.0	348.0	50	0.8	56.7
12.00	1.3	90.5	66.47	3988.0	380.0	49	0.6	57.4
13.00	1.7	92.2	72.01	4321.0	412.0	48	0.8	58.2
14.00	1.2	93.5	77.55	4653.0	443.0	47	0.6	58.8
15.00	1.2	94.6	83.09	4985.0	475.0	46	0.5	59.3
16.00	0.7	95.3	88.63	5318.0	506.0	45	0.3	59.6
17.00	0.7	96.1	94.17	5650.0	538.0	44	0.3	59.9
18.00	0.4	96.5	99.71	5983.0	570.0	43	0.2	60.1
19.00	0.4	96.9	105.25	6315.0	601.0	42	0.2	60.3
20.00	0.2	97.1	110.79	6647.0	633.0	42	0.1	60.4
21.00	0.5	97.5	116.33	6980.0	665.0	42	0.2	60.6
22.00	0.2	97.8	121.87	7312.0	696.0	42	0.1	60.7
23.00	1.0	98.8	127.41	7644.0	728.0	41	0.4	61.1
24.00	0.3	99.1	132.95	7977.0	760.0	41	0.1	61.2
25.00	0.0	99.1	138.49	8309.0	791.0	41	0.0	61.2
30.00	0.9	100.0	166.18	9971.0	950.0	40	0.4	61.6
35.00	0.0	100.0	193.88	11633.0	1108.0	39	0.0	61.6
40.00	0.0	100.0	221.58	13295.0	1266.0	36	0.0	61.6
45.00	0.0	100.0	249.27	14956.0	1424.0	34	0.0	61.6
Estimated Net Annual Sediment (TSS) Load Reduction =								**62 %**

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

RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

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

SCOUR PREVENTION AND ONLINE CONFIGURATION

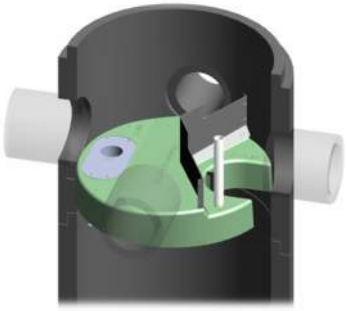
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test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

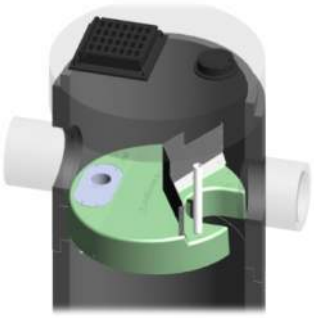
DESIGN FLEXIBILITY

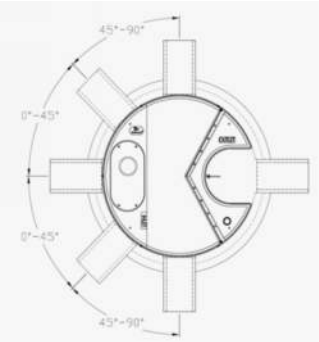
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend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

OIL CAPTURE AND RETENTION

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







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.
0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.
45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

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

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity
** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

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

STANDARD STORMCEPTOR EF/EFO DRAWINGS

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

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

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

Table of TSS Removal vs Surface Loading Rate Based on Third-Party Test Results
Stormceptor® EFO

SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL
1	70	660	42	1320	35	1980	24
30	70	690	42	1350	35	2010	24
60	67	720	41	1380	34	2040	23
90	63	750	41	1410	34	2070	23
120	61	780	41	1440	33	2100	23
150	58	810	41	1470	32	2130	22
180	56	840	41	1500	32	2160	22
210	54	870	41	1530	31	2190	22
240	53	900	41	1560	31	2220	21
270	52	930	40	1590	30	2250	21
300	51	960	40	1620	29	2280	21
330	50	990	40	1650	29	2310	21
360	49	1020	40	1680	28	2340	20
390	48	1050	39	1710	28	2370	20
420	47	1080	39	1740	27	2400	20
450	47	1110	38	1770	27	2430	20
480	46	1140	38	1800	26	2460	19
510	45	1170	37	1830	26	2490	19
540	44	1200	37	1860	26	2520	19
570	43	1230	37	1890	25	2550	19
600	42	1260	36	1920	25	2580	18
630	42	1290	36	1950	24	2600	26

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

PART 1 – GENERAL

1.1 WORK INCLUDED

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

1.2 REFERENCE STANDARDS & PROCEDURES

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

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

1.3 SUBMITTALS

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

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

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

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

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

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	5 ft (1524 mm) Diameter OGS Units:	1.95 m^3 sediment / 420 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

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

3.2 SIZING METHODOLOGY

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

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

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

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

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

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

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

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

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

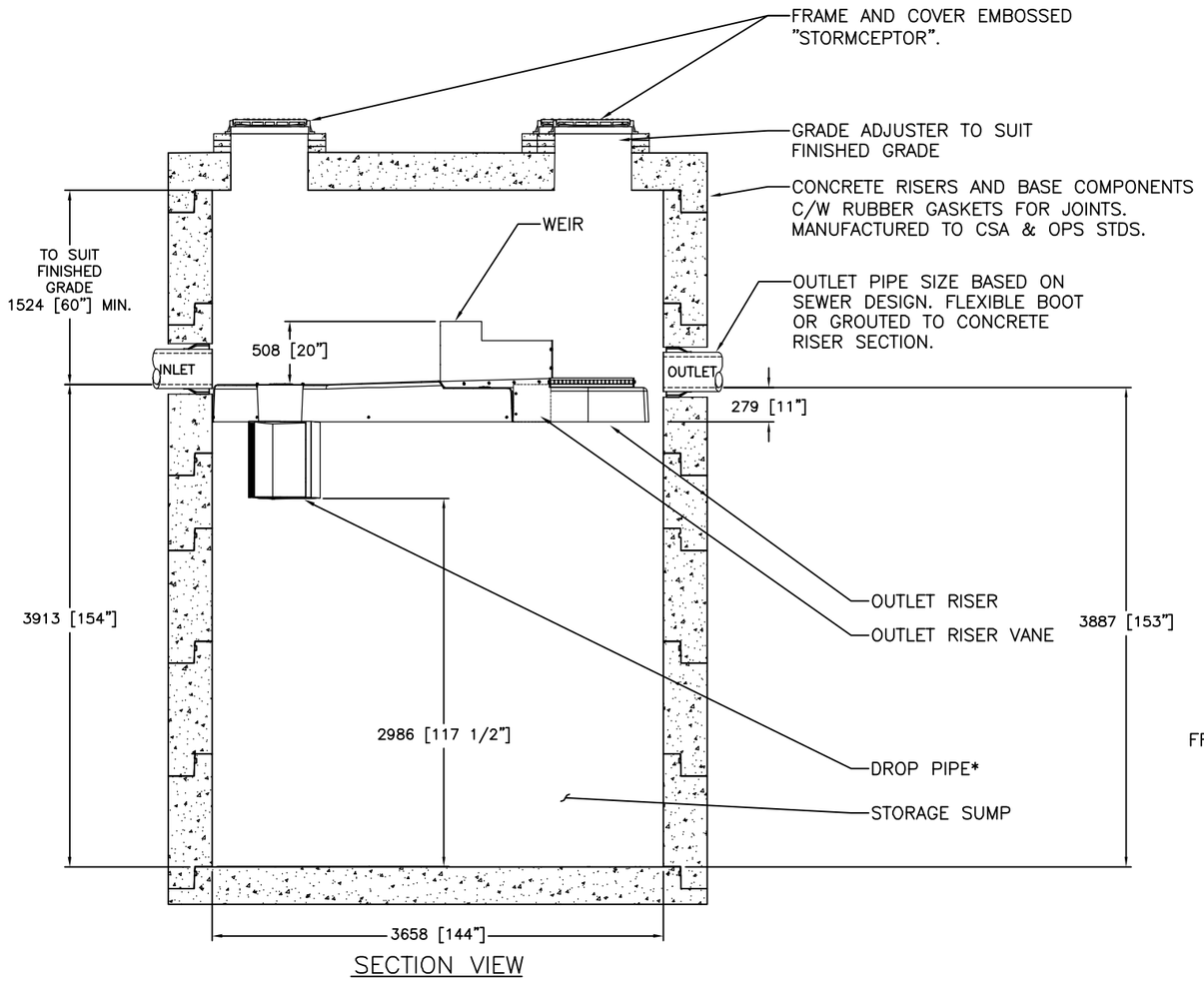
3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-

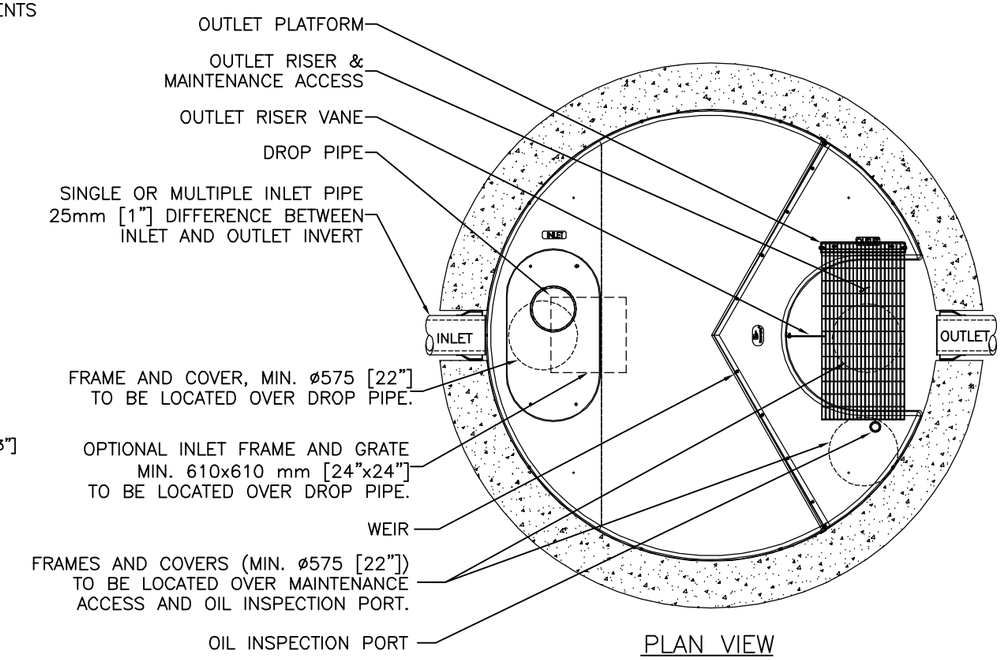
entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

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

DRAWING NOT TO BE USED FOR CONSTRUCTION



SECTION VIEW



PLAN VIEW

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF12 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO12 (OIL CAPTURE CONFIGURATION).

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

INSTALLATION NOTES

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

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

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EFO12				
STRUCTURE ID					*
HYDROCARBON STORAGE REQ'D (L)					*
WATER QUALITY FLOW RATE (L/s)					*
PEAK FLOW RATE (L/s)					*
RETURN PERIOD OF PEAK FLOW (yrs)					*
DRAINAGE AREA (HA)					*
DRAINAGE AREA IMPERVIOUSNESS (%)					*
PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

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

Stormceptor® EF

SCALE = NTS

imbrium®
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TF 800-565-4801 CA 416-665-8600 INTL +1-416-665-8600

DATE:	10/24/2017
DESIGNED:	JSK
DRAWN:	JSK
CHECKED:	BSF
APPROVED:	SP
PROJECT No.:	EFO12
SEQUENCE No.:	*
SHEET:	1 OF 1

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