THE COMMONS (3610 INNES ROAD) – PHASE 1

SITE SERVICING AND STORMWATER MANAGEMENT REPORT

Prepared for:

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June 30, 2021

Novatech File: 118224
Ref: R-2021-099

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June 30, 2021

City of Ottawa
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Development Review (Urban Services - East) Branch
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Project Manager

Reference: **The Commons (3610 Innes Road) – Phase 1**
Site Servicing and Stormwater Management Report
Novatech File No.: 118224

Enclosed is the Site Servicing and Stormwater Management Report for The Commons (3610 Innes Road) development.

This report addresses the approach to site servicing and stormwater management for Phase 1 of the Subject Site and is submitted in support of the detailed design of the subdivision approval and registration for this phase. This report also provides an update to the conceptual servicing for Phase 2, 3, and 4. The servicing and stormwater management design has been developed based on the requirements of the City of Ottawa and Rideau Valley Conservation Authority.

Should you have any questions, or require additional information, please contact me.

Yours truly,

NOVATECH



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Senior Project Manager | Land Development

cc: Eric Lalande, Rideau Valley Conservation Authority
Jillian Normand, Glenview Homes (Innes) Ltd.

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1.0 INTRODUCTION

1.1 Background

This report addresses the approach to site servicing for The Commons development (Subject Site), formerly known as BMR Lands, which is being proposed by Glenview Homes (Innes) Ltd. (Developer).

The Subject Site is located within the north-west quadrant of the East Urban Community (EUC) Phase 3 Area Community Design Plan. More specifically, the site is south of Innes Road, 240m east of its intersection with Lamarche Avenue, as shown on **Figure 1.1** – Key Plan. The site is bound to the south and east by future development lands owned by Richcraft Homes, to the west by the recently constructed residential subdivision known as Orleans Village by Caivan Communities, and to the north by Innes Road, and remnant mixed use parcels.

Historically, the existing land usage was for a commercial plaza that comprised of the BMR sales center/ warehouse and parking lot along Innes Road as shown on **Figure 1.2** – Existing Conditions Plan. Two parts of the existing parcel have since been severed and will be developed under separate planning applications. The existing buildings within the limits of the Subject Site were demolished in 2017. The northern side of the subject side is relatively flat and at grade with Innes Road. The south side is undeveloped and slopes gradually downward to the southern property line.

The existing residential subdivisions to the west, Orleans Village, is currently serviced with public services (i.e. sanitary and storm sewers, and watermain), and drainage is directed towards EUC Pond 1.

1.2 Development Intent

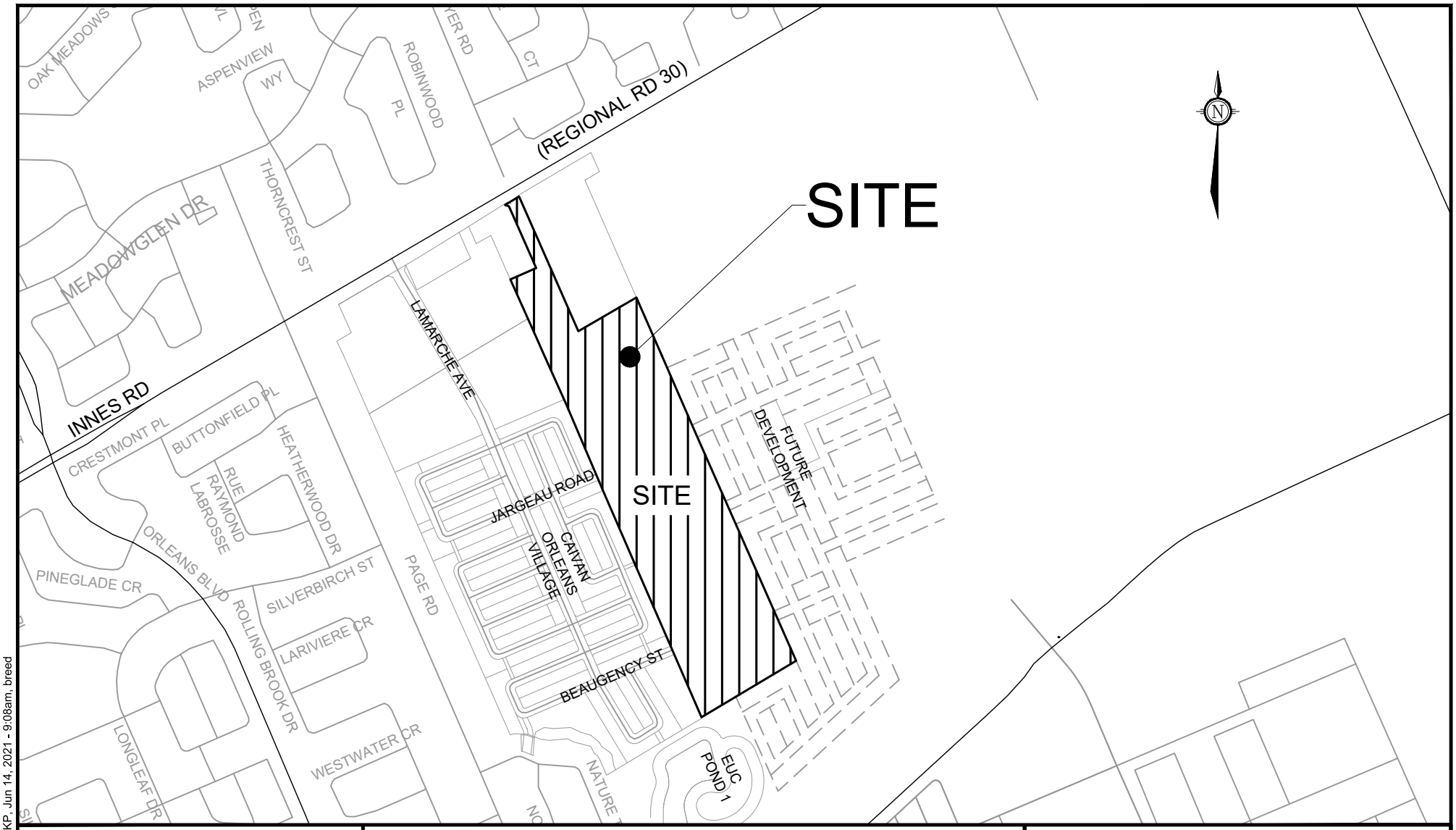
The Subject Site has an area of 15.71 ha, and the proposed subdivision will comprise of residential housing, public right-of-ways/pathways, and parkland, as shown in **Table 1.1**. The development will contain City of Ottawa municipal road allowances of 18.0, 20.0, and 24.0 metres wide. The proposed site development plan is shown on **Figure 1.3** – Site Plan.

Table 1.1: Land Use, Development Potential, and Yield

Unit Type	Number of Units	Area
Singles	151	4.93 ha
Townhouses	151	3.34 ha
Medium Density (2-BR Apartments)	168	2.04 ha
Local Roads / Pathways	-	4.39 ha
Parkland	-	1.01 ha
TOTAL	**470**	**15.71 ha**

In order to facilitate the above, servicing of the Subject Site will be phased. Refer to the Phasing Plan (Drawing 118224-PH) for reference to the limits of the proposed phasing.

As part of Phase 1, the following section describes the rationale and significance of the phase to the overall development:



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THE COMMONS (3610 INNES ROAD)

KEY PLAN

SCALE		
NOT TO SCALE		
DATE	JOB	FIGURE
JUNE 2021	118224	1.1

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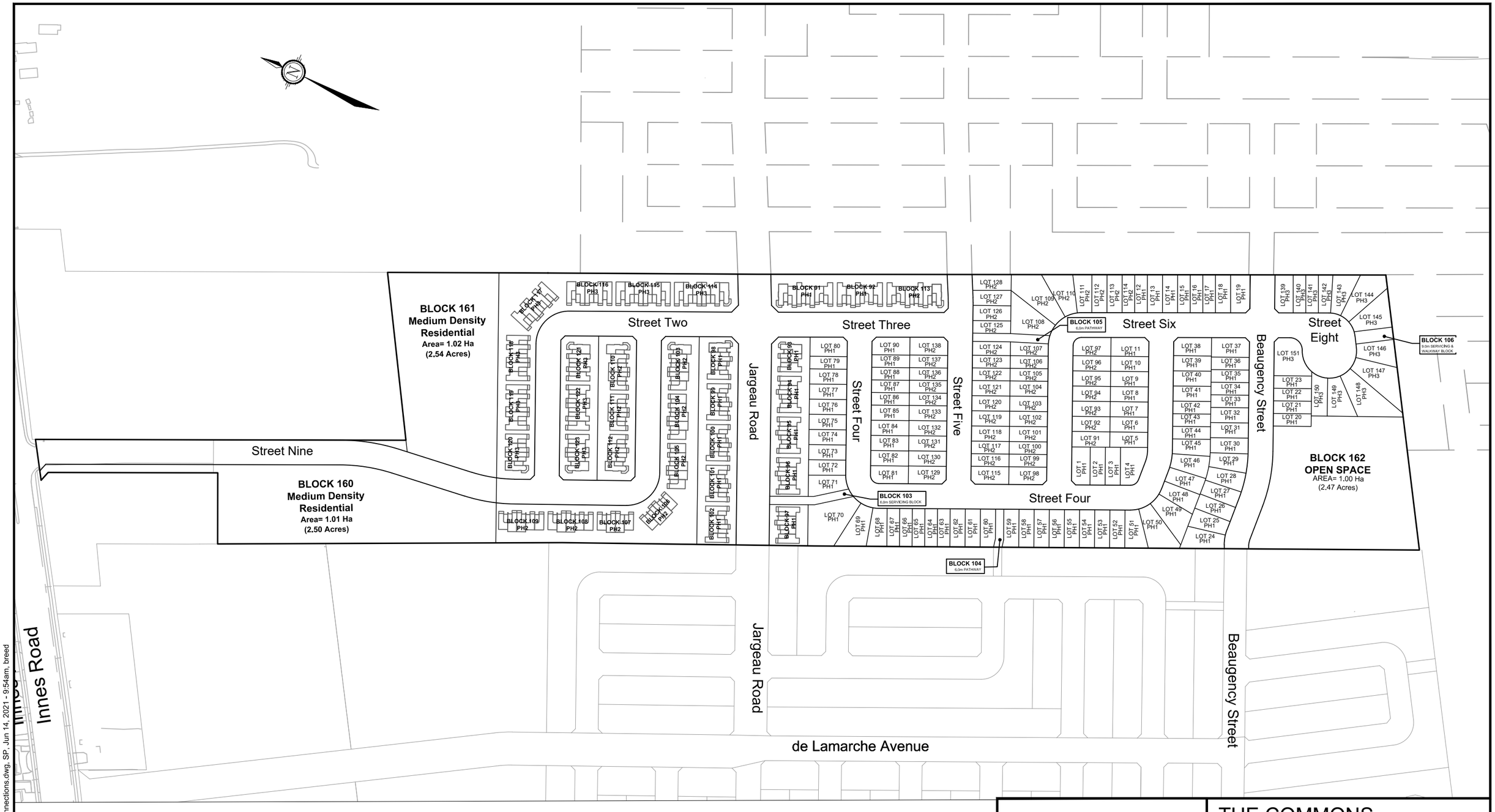
THE COMMONS (3610 INNES ROAD)

EXISTING CONDITIONS

SCALE	DATE	JOB	FIGURE
NOT TO SCALE	JUNE 2021	118224	1.2

SHT8X11.DWG - 216mmx279mm

C:\temp\AcPublish_13004\Fig 1.2- Existing Conditions.dwg, EX, Apr 05, 2020 - 1:25pm, bsweet



C:\temp\AcPublish_13004\Fig 3.1 - Service Connections.dwg, SP, Jun 14, 2021 - 9:54am, breed

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THE COMMONS (3610 INNES ROAD)

SITE PLAN

SCALE	JOB	FIGURE
NOT TO SCALE		
DATE: JUNE 2021	JOB: 118224	FIGURE: 1.3

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- **Storm Sewers:** The proposed sewers for Phase 1 will be constructed to the existing EUC Pond 1, to serve as the storm outlet for the Subject Site.
- **Stormwater Management**: The existing EUC Pond 1 has sufficient capacity to serve Phase 1 of the Subject Site. No modifications are required as part of Phase 1 construction.
- **Sanitary Sewers**: The proposed sewers for Phase 1 will be constructed, including the extension of the existing trunk sanitary sewer within the Subject Site, to service the future development to the east and serve as the sanitary outlet for the Subject Site.
- **Watermain**: As part of Phase 1, the watermains will be built within Phase 1 and connections will be made to an existing 200 mm watermain within Beaugency Street and to an existing 300mm watermain within Jargeau Road.

As part of Phase 2, the following section describes the rationale and significance of the phase to the overall development:

- **Storm and Sanitary Sewers:** The proposed sewers for Phase 2 will be constructed to extend the systems to the future phases.
- **Stormwater Management**: In Phase 2, the EUC Pond 1 Expansion will need to be implemented.
- **Watermain:** As part of Phase 2, a final watermain connection will be made at the intersection of Street 9 and Innes Road.

In Phase 3, the remainder of the servicing will be implemented as per the ultimate servicing plan.

Phase 4 will allow the development of the high-density blocks when future site plan applications are submitted and approved.

1.3 Report Objective

This report provides detailed servicing and stormwater management details for Phase 1, in support of final approval and registration for this particular phase, in accordance to the Draft Conditions for Draft Approval. The Draft Conditions have been provided in **Appendix G**.

It is important to note that although this report provides an update to the conceptual servicing for Phase 2, 3, and 4, the intention is to demonstrate the functional design of the overall development of the Subject Site. A report addressing the detailed approach to site servicing and stormwater management for Phase 2, 3, and 4 will be provided as part of a separate cover, as the development advances.

Due to the location of the multi-residential blocks, preliminary details for the servicing of the blocks are also provided within this report. The development of these blocks will be subject to a Site Plan Application and detailed site servicing and stormwater management reports will be warranted.

This report will also be provided to various agencies for their approval and in support of obtaining any applicable permits.

The City of Ottawa Applicant Study and Plan Identification List along with proof of a pre-consultation meeting is provided in **Appendix A**. The City of Ottawa Servicing Study Guidelines for Development Applications checklist has been completed and is provided in **Appendix B**.

2.0 REFERENCES AND SUPPORTING DOCUMENTS

2.1 Guidelines and Supporting Studies

The following guidelines and supporting documents were utilized in the preparation of this report:

- **City of Ottawa Official Plan** (OP)
  City of Ottawa, adopted by Council May 2003 (comprehensive review in 2013 and 2016).
- **City of Ottawa Infrastructure Master Plan** (IMP)
  City of Ottawa, November 2013.
- **City of Ottawa Water Distribution Guidelines** (OWDG)
  City of Ottawa, July 2010.
- **Revisions to OWDG** (ISTB-2010-01, ISTB-2014-02, ISTB-2018-02, ISTB-2018-04)
  City of Ottawa, December 2010, May 2014, March 2018, and June 2018.
- **City of Ottawa Sewer Design Guidelines** (OSDG)
  City of Ottawa, October 2012.
- **Revisions to OSDG** (ISTB-2016-01, ISTB-2018-01, ISTB-2018-03)
  City of Ottawa, September 2016 and March 2018.
- **Design Guidelines for Sewage Works and Drinking Water System** (MECP Guidelines)
  Ontario's Ministry of the Environment, 2008.
- **Stormwater Management Planning and Design Manual** (MECP SWM Guidelines)
  Ontario's Ministry of the Environment, 2003.
- **Master Serving Study for East Urban Community Phase 3 Area Community Design Plan** (MSS EUC-Phase 3)
  David Schaeffer Engineering, Dec 2020.
- **Mud Creek Cumulative Impact Study** (Mud Creek CIS)
  Stantec and JTB Environmental Systems, May 2020.

2.2 Geotechnical Investigation

Paterson Group Inc. (Paterson) conducted a geotechnical investigation and subsequent geotechnical review of the lightweight fill requirements in support of the proposed residential development:

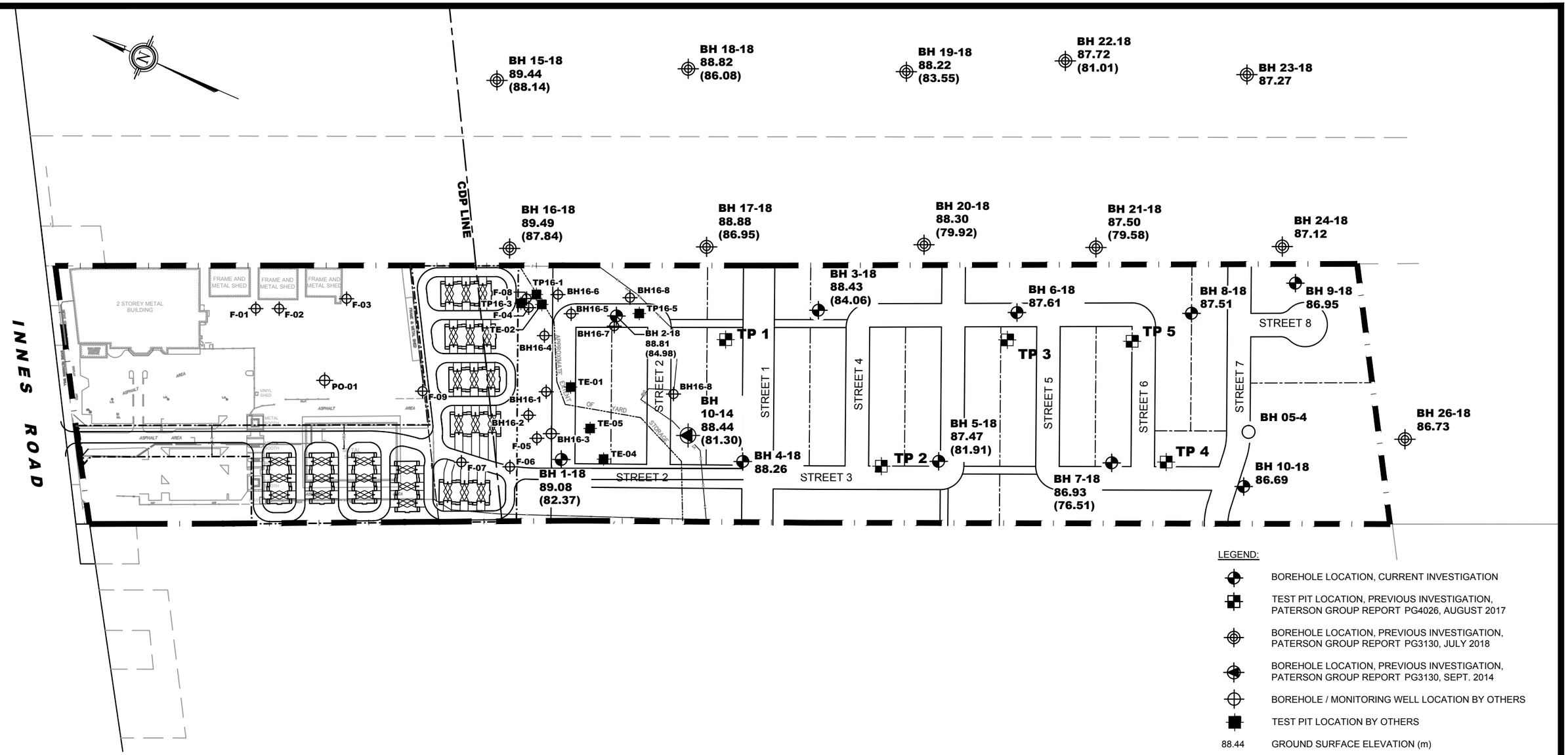
- **Geotechnical Investigation – Proposed Residential Development 3604-3646 Innes Road***, Ottawa, Ontario; Report No. PG4026-2 (revision 2), Paterson Group Inc., April 2, 2020.*
- **Geotechnical Review – Lightweight Fill Requirements, Proposed Residential Development 3604-3646 Innes Road***, Ottawa, Ontario; Report No. PG4026-MEMO.02, Paterson Group Inc., February 18, 2021.*

A digital copy of the foregoing geotechnical information has been provided in **Appendix F.** Based on the geotechnical investigation and subsequent geotechnical review, it is not anticipated that there will be any significant geotechnical concerns with respect to servicing and developing the Subject Site.

The test hole locations have been provided in **Figure 2.1** – Geotechnical Investigation – Test Hole Locations, and a summary of the geotechnical investigation findings has been provided in **Table 2.1** below.

Table 2.1: Summary of Geotechnical Servicing and Grading Considerations

Parameter	Summary
Sub-Soil Conditions	Silty Clay / Glacier Till / Bedrock
Grade Raise Restriction	2.5m to 2.0m
OHSA Soil Type	Type 2 and 3
Groundwater Considerations	Low to Moderate groundwater flow
Pipe Bedding / Backfill	Pipe Bedding 150 mm to 300mm Granular A Pipe Cover 300 mm Granular A Backfill Native Material
Pavement Structure (Driveways)	50mm Wear Course (SuperPave 12.5) 150mm Base (Granular A) 300mm Subbase (Granular B Type II)
Pavement Structure (Local Roadways)	40mm Wear Course (SuperPave 12.5) 50mm Binder Course (SuperPave 19.0) 150mm Base (Granular A) 400mm Subbase (Granular B Type II)
Pavement Structure (Collector Roads)	40mm Wear Course (SuperPave 12.5) 50mm Upper Binder Course (SuperPave 19.0) 50mm Lower Binder Course (SuperPave 19.0) 150mm Base (Granular A) 550mm Subbase (Granular B Type II)
Landscape Consideration	Large Trees (Minimum setback of the full mature height of the tree) Small to Medium tree species (7.5 m set back)



LEGEND:

- BOREHOLE LOCATION, CURRENT INVESTIGATION
- TEST PIT LOCATION, PREVIOUS INVESTIGATION, PATERSON GROUP REPORT PG4026, AUGUST 2017
- BOREHOLE LOCATION, PREVIOUS INVESTIGATION, PATERSON GROUP REPORT PG3130, JULY 2018
- BOREHOLE LOCATION, PREVIOUS INVESTIGATION, PATERSON GROUP REPORT PG3130, SEPT. 2014
- BOREHOLE / MONITORING WELL LOCATION BY OTHERS
- TEST PIT LOCATION BY OTHERS
- 88.44 GROUND SURFACE ELEVATION (m)
- (81.30) PRACTICAL REFUSAL TO DCPT / AUGERING ELEV. (m)

BASEPLAN PROVIDED BY KORSIAK URBAN PLANNING.

TEST HOLE LOCATIONS AND ELEVATIONS AT TEST HOLES PROVIDED BY J.D. BARNES LIMITED.

SCALE: 1:3000

0 10 20 30 40 50 100 150 200m

FIGURE 2.1- GEOTECHNICAL INVESTIGATION- TEST HOLE LOCATIONS

patersongroup
consulting engineers

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

NO.	REVISIONS	DATE	INITIAL
3	UPDATED CONCEPTUAL PLAN	09/08/2019	RG
2	EXISTING BOREHOLES BY OTHERS ADDED	01/2019	RG
1	NEW BOREHOLES ADDED	11/2018	RG

GLENVIEW HOMES (INNES) LTD.

SUPPLEMENTAL GEOTECHNICAL INVESTIGATION
3604-3646 INNES ROAD

OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:3000	Date: 08/2017
Drawn by: RCG	Report No.: PG4026-1
Checked by: NZ	Dwg. No.: PG4026-1
Approved by: DJG	Revision No.: 3

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3.0 SERVICING AND GRADING

3.1 Contemplated MSS EUC-Phase 3 Servicing Connections

Storm servicing for the proposed site will outlet into the existing EUC Pond 1. Sanitary servicing for the proposed site will connect to the existing trunk sanitary sewer located within Beaugency Street of the Subject Site. Water service for the proposed site will connect to the existing watermains on Jargeau Road, Beaugency Street and also a connection to the north along Innes Road.

Refer to the East Urban Community Phase 3 Area Community Design Plan – Key Plan Mark-up included in the enclosed drawing set.

3.2 General Servicing

The Subject Site will be serviced using local storm and sanitary sewers, and watermain. The storm / stormwater management, sanitary and water servicing strategy is discussed in further detail in the following sections.

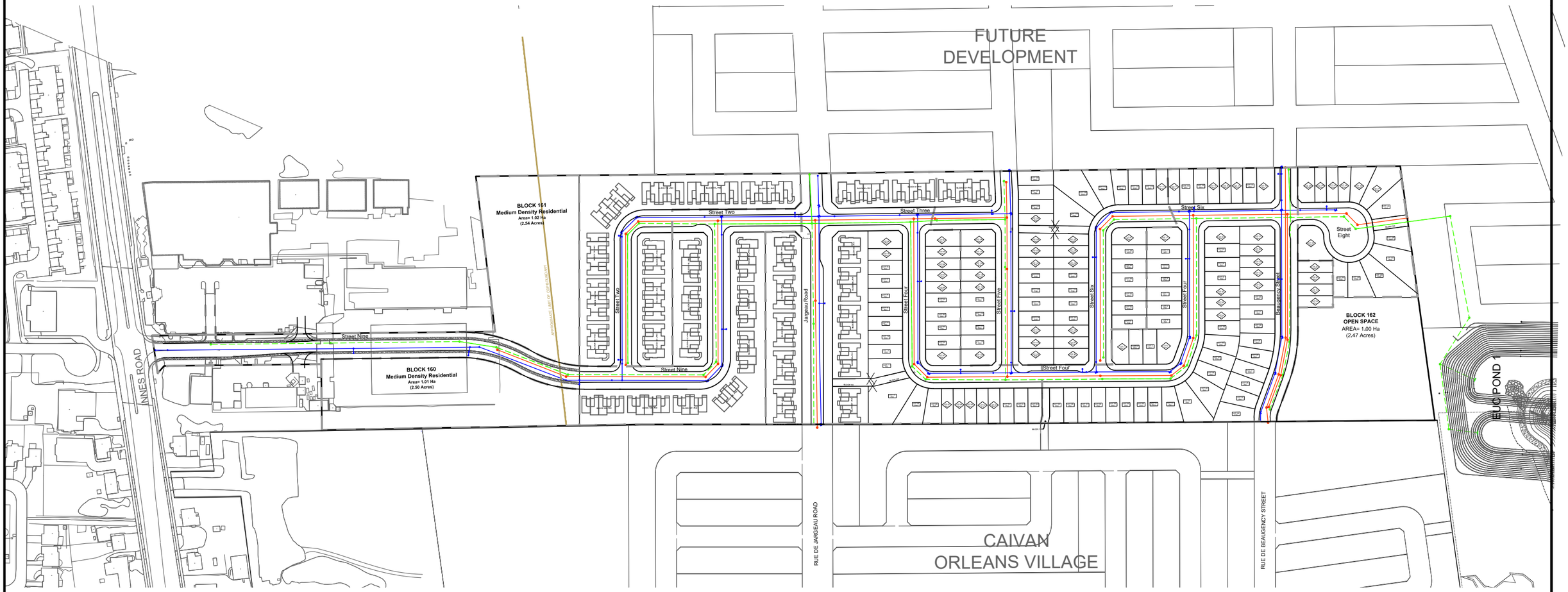
Refer to **Figure 3.1** – Proposed Servicing Layout Plan and the General Plan of Services (Drawings 118224-GP1, 118224-GP2 and 118224-GP3) included in the enclosed drawing set.

3.3 General Grading

The local roadway within the Subject Site will be graded in a saw-toothed pattern to promote surface storage of stormwater. The grading will direct emergency overland flows from the local roads to the existing EUC Pond 1.

The lots will be graded from front to back to direct surface drainage to the rearyard areas.

Refer to the Grading Plan (Drawings 118224-GR1, 118224-GR2 and 118224-GR3) included in the enclosed drawing set.



LEGEND

MH 101 — PROPOSED SANITARY MH & SEWER

MH 100 — PROPOSED STORM MH & SEWER

PROPOSED WATERMAIN AND DIAMETER

PROPOSED ROW LIMIT

PROPERTY BOUNDARY

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THE COMMONS (3610 INNES ROAD)

PROPOSED SERVICING LAYOUT PLAN

SCALE 1:3000

DATE JUNE 2021 | JOB 118224 | FIGURE 3.1

SHT11X17 DWG - 279mmX432mm

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4.0 STORM SEWER SYSTEM AND STORMWATER MANAGEMENT

The post-development storm sewer and stormwater management system will adhere to the criteria outlined as a part of the MSS EUC-Phase 3. Storm runoff from the site will outlet to the existing EUC Pond 1 stormwater management facility at the south end of the site.

The following sections outline the preliminary stormwater management design and analysis. J.F. Sabourin and Associates Inc. (JFSA) was retained to prepare a Stormwater Management (SWM) Plan for the Subject Site. The findings and recommendations can be found in the JFSA Report in **Appendix C.** The JFSA Report should be read in conjunction with this report.

4.1 Stormwater Management Criteria

The Subject Site is located within the Ottawa River East Subwatershed, and are tributary to the Ottawa River, which falls under the jurisdiction of the Rideau Valley Conservation Authority (RVCA). The following stormwater management criteria have been developed based on the criteria in the MSS EUC-Phase 3, and requirements of the RVCA and the OSDG.

Minor System (Storm Sewers)

- Storm sewers are to be designed using the Rational Method as follows:
    - 1:2-year return period for local streets;
    - 1:5-year return period for collector roads;
- Ensure that the 100-year hydraulic grade line in the storm sewer is at least 0.3 m below the underside of footing (USF) elevations and ensure that the 100-year + 20% (stress test) hydraulic grade line in the storm sewer is below the USF for the proposed development;
- Inlet control devices (ICDs) are to be installed in road and rearyard catchbasins to control inflows to the storm sewers;

Major System (Overland Flow)

- Overland flows are to be confined within the right-of-ways and/ or defined drainage easements for all storms up to and including the 1:100-year event;
- Storm runoff that exceeds the capacity of the minor system will be stored within road sags;
    - Runoff that exceeds the capacity of the road sags will be conveyed overland along defined major system flow routes towards the proposed major system outlet to the existing EUC Pond 1;
- Major system storage in backyards is not to be included/ accounted for in design computations;
- Maximum depth of flow (static + dynamic) on local and collector streets shall not exceed 0.35 m and shall be confined to the road right-of-way, as well as not touch any part of the building envelope and must remain below the lowest building opening during the stress test event;
- For front yards, there must be 0.15 m of vertical clearance between the spill elevation on the street and the ground elevation at the nearest building envelope that is in the proximity of the flow route or ponding area;
- For rear yards, there must be 0.30 m of vertical clearance between the rear yard spill elevation and the ground elevation at the adjacent building envelope;

- The product of the 100-year flow depth (m) on street and flow velocity (m/s) shall not exceed 0.60.

Water Quality & Quantity Control – Interim as part of Phase 1

- A *Normal* (70% TSS removal) level of quality control will be provided by the existing EUC Pond 1 SWM Facility in the interim, which outlets to Mud Creek, and ultimately outlets to Green's Creek and then the Ottawa River.

Water Quality & Quantity Control – Ultimate as part of Phase 2, 3, and 4

- An *enhanced* (80% TSS removal) level of quality control will be provided by the existing EUC Pond 1 SWM Facility in the ultimate as part of the pond expansion (under separate cover), which outlets to Mud Creek, and ultimately outlets to Green's Creek and then the Ottawa River.

4.2 Proposed Storm Drainage System

Storm servicing for the Subject Site will be provided using a dual drainage system: Runoff from frequent events will be conveyed by storm sewers (minor system), while runoff from larger storm events which exceed the capacity of the minor system will be conveyed overland along defined overland flow routes (major system). The EUC Pond 1 SWM facility is the outlet for both the major and minor systems.

Excerpts of the storm sewer design sheets from the MSS EUC-Phase 3, demonstrating that the Subject Site was accounted for in the EUC Pond 1 SWM facility revisions/pond expansion, can be found in **Appendix C**. Refer to the MSS EUC-Phase 3 for additional details on the revisions/pond expansion. The East Urban Community Phase 3 Area Community Design Plan – Conceptual Storm Servicing is included in the enclosed drawing set. For reference to the Subject Site's location, refer to the East Urban Community Phase 3 Area Community Design Plan – Key Plan Mark-up.

4.2.1 *Storm Sewer Design (Minor System)*

The minor system has been conceptually designed using the Rational Method. The conceptual storm sewer design sheets are provided in **Appendix C**. Refer to the Storm Drainage Area Plan (Drawing 118224-STM) for details. The criteria used to size the storm sewers are summarized in **Table 4.1** below.

Table 4.1: Storm Sewer Design Parameters

Parameter	Design Criteria
Local Roads	2-year Return Period
Collector Roads	5-year Return Period
Storm Sewer Design	Rational Method/Modeling
IDF Rainfall Data	OSDG
Initial Time of Concentration (T_c)	10 minutes
Minimum Velocity [(1)]	0.8 m/s
Maximum Velocity	3.0 m/s
Minimum Diameter	250 mm

[1]A minimum gradient of 0.65% is required for any initial sewer run with less than 10 residential connections.

For both the interim and ultimate conditions, inlet control devices (ICDs) are to be installed in all catchbasins to limit inflows to the minor system during larger storm events. ICDs will be sized during the detailed design stage.

4.2.2 *Overland Flow Path (Major System)*

The Subject Site has been graded to provide an engineered overland flow route (major system) for large, infrequent storms or in the event that the storm sewer system becomes obstructed. Flows will be directed to EUC Pond 1. The major system is to be designed to conform to the design standards outlined in Section 5.5 of the OSDG.

4.2.3 *Best Management Practices and Low Impact Development*

As outlined within the MSS EUC-Phase 3, the results from site-specific testing found that the vertical movement of water is restricted by the low permeability of the clay soils and the perched water table. As such, implementation of stormwater best management practices (BMPs) and low impact development (LID) techniques to mitigate the reduction in groundwater infiltration / recharge resulting from the proposed development is not being proposed.

4.2.1 *SWM Facility – EUC Pond 1*

Water quantity control and water quality treatment will be provided by an end-of pipe stormwater management pond, 'EUC Pond 1'.

Interim B Conditions

EUC Pond 1 was modified in 2014 to support the development of the Trails Edge subdivision south of the hydro easement, and the extension of Brian Coburn Boulevard. These modifications were detailed as part of the Design Brief for the Reconstruction of the East Urban Community Stormwater Management Pond 1 for the Trails Edge Subdivision (March 2014) and were referred to as the Interim B conditions.

Upon further review in 2018, it was proposed that the interim drainage area could be expanded to allow for development of the Orleans Village Subdivision, which was initially considered as undeveloped area. This was reviewed as part of the Stormwater Management Report for the Orleans Village Subdivision (July 2018).

Building on the model that was reviewed as part of the July 2018 study, it is proposed that the development of Phase 1 of the Subject Site be permitted under Interim B conditions, similar to Orleans Village, in exchange for Orleans Village mixed-use block 148 and future residential block 147 remaining undeveloped until the ultimate conditions expansion of the north main cell and north forebay in EUC Pond 1 is complete. Refer to Section 5 of the JFSA Report provided in **Appendix C** for additional details.

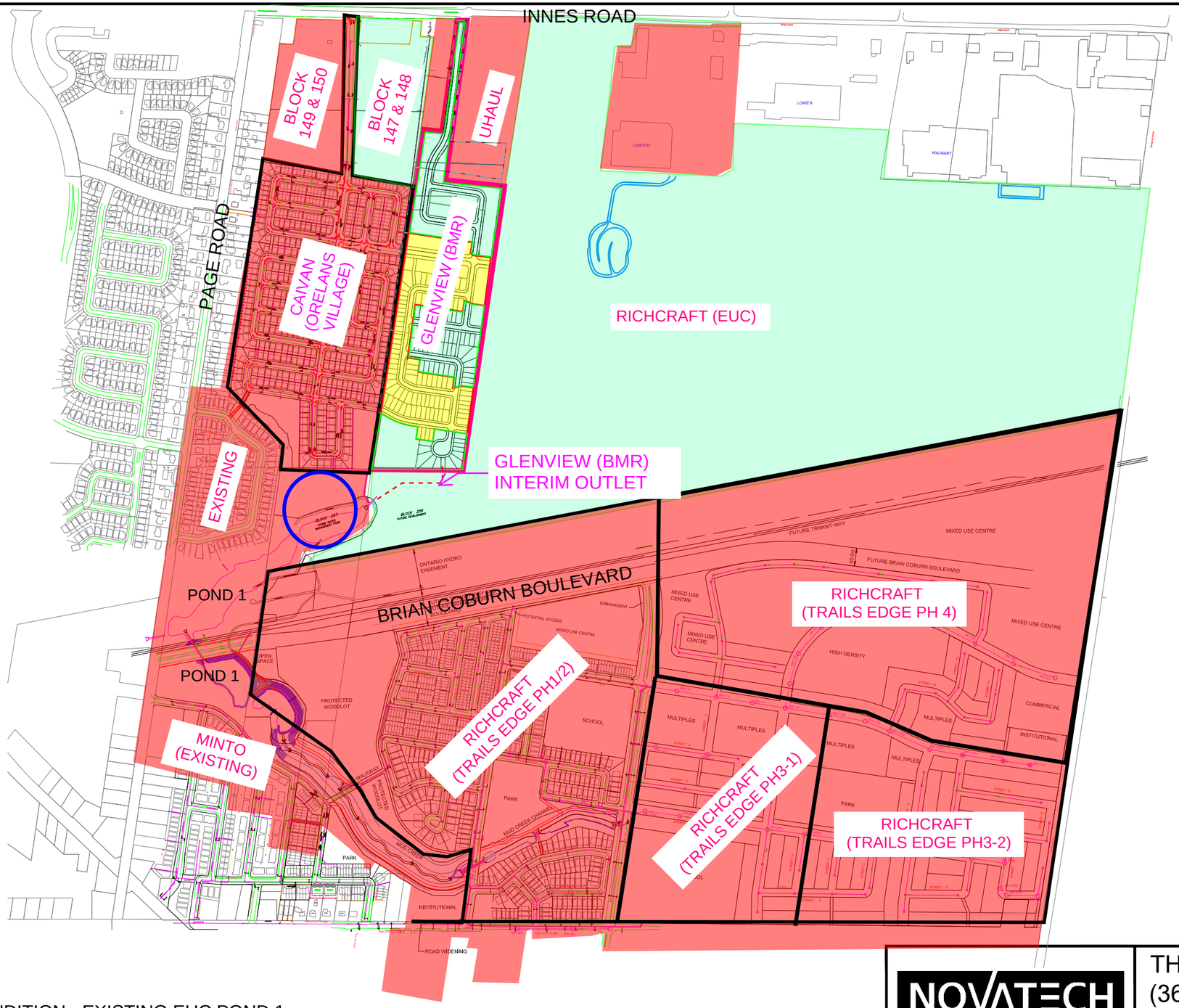
Refer to **Figure 4.1** EUC Pond 1 – Interim B Conditions which demonstrates the limits of the areas tributary to the EUC Pond 1 and the limits of the proposed development under Interim B conditions.

Ultimate Conditions

Development of Phase 2, 3, and 4 of the Subject Site, as well as lands within the EUC, will require the EUC Pond 1 expansion. Detailed design for the expansion is currently being completed by David Schaeffer Engineering (DSEL).

4.3 Hydrologic & Hydraulic Modeling

The OSDG requires hydrologic modeling for all dual drainage systems. The performance of the proposed storm drainage system for the Subject Site was evaluated using the PCSWMM hydrologic/hydraulic model. As mentioned above, JFSA was retained to prepare a SWM Plan for the Subject Site. As such, refer to the JFSA Report found in **Appendix C** for the findings and recommendations from the hydrologic and hydraulic modeling.



LEGEND

- INTERIM B CONDITION - EXISTING EUC POND 1
- ULTIMATE - FUTURE EUC POND 1 EXPANSION
- GLENVIEW (BMR) PHASE 1

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone (613) 254-9643
Facsimile (613) 254-5867
Website www.novatech-eng.com

THE COMMONS (3610 INNES ROAD)

EUC POND 1 - INTERIM B CONDITIONS

SCALE		
NOT TO SCALE		
DATE	JOB	FIGURE
JUNE 2021	118224	4.1

C:\temp\AcPublish_14868\Fig 1.3 - Site Plan.dwg, SP, Jul 05, 2021 - 10:09am, breed

5.0 SANITARY SEWER SYSTEM

5.1 Existing Sanitary Infrastructure

The sanitary outlet for the site will consist of an existing 525 mm trunk sanitary sewer (gravity) located within Beaugency Street and an existing 200mm sanitary sewer within Jargeau Road. Refer to the General Plan of Services and the Sanitary Drainage Area Plan (Drawings 118224-GP1, 118224-GP2, 118224-GP3 and 118224-SAN) for an illustration of the proposed sanitary connection and layout details.

Excerpts of the sanitary sewer design sheets from the MSS EUC-Phase 3, demonstrating that the Subject Site was accounted for in the downstream sewers, can be found in **Appendix D**. The East Urban Community Phase 3 Area Community Design Plan – Conceptual Sanitary Servicing is included in the enclosed drawing set. For reference to the Subject Site's location, refer to the East Urban Community Phase 3 Area Community Design Plan – Key Plan Mark-up.

5.2 Proposed Sanitary Infrastructure

On-site works

The proposed on-site works will require approximately 1,965 m of on-site sanitary sewer (gravity) to collect wastewater flows and to direct flows to the sanitary outlet. The existing trunk sanitary sewer will be extended within Beaugency Street of the Subject Site to service the future development to the east. The proposed service laterals on Beaugency Street of the Subject Site will connect to a separate collector sanitary sewer running parallel to the trunk sanitary sewer extension and will outlet into the trunk downstream of Beaugency Street.

5.3 Sanitary Demand and Design Parameters

The peak design flow parameters in **Table 5.1** have been used in the sewer capacity analysis. Unit and population densities and all other design parameters are specified in the OSDG.

Table 5.1: Sanitary Sewer Design Parameters

Design Component	Design Parameter
Unit Population: Single Detached Home Semis-Detached /Townhomes 2-BR Apartments	 3.4 people/unit 2.7 people/unit 2.1 people/unit
Residential Flow Rate, Average Daily	280 L/cap/day
Residential Peaking Factor	Harmon Equation (min=2.0, max=4.0) Harmon Correction Factor = 0.8
Extraneous Flow Rate	0.33 L/s/ha
Minimum Pipe Size	200mm (Res)
Minimum Velocity[1]	0.6 m/s
Maximum Velocity	3.0 m/s
Minimum Pipe Cover	2.5 m (Unless frost protection provided)

[1]A minimum gradient of 0.65% is required for any initial sewer run with less than 10 residential connections.

The sanitary sewer design sheet, located in **Appendix D**, confirms the combined peaked sanitary flows from the Subject Site to the existing 200mm sewer on Jargeau Road and the receiving sanitary trunk on Beaugency Street will be 0.96 L/s and 116.46 L/s, respectively.

Hydraulic Grade Line

In order to comply with the OSDG, the sanitary sewer must have adequate freeboard between the USF elevation and the 100-year HGL, with 1.0m being desirable and 0.3m being the absolute minimum.

Based on review of the Orleans Village Subdivision / Forest Valley Sanitary Trunk Sewer – Hydraulic Gradeline Analysis Test, prepared by JFSA, and included in the MSS EUC-Phase 3, it is anticipated that the HGL within the existing trunk sanitary sewer within Beaugency Street will be greater than 1.0m below the proposed USF elevations within the Subject Site owing to the downstream connection to the existing trunk sanitary sewer at Nature Trail Crescent (ID fv07700) having a ground elevation of 87.80m and an HGL of 83.41m. The existing trunk sanitary sewer connection for the Subject Site has a ground elevation of 87.95m and the lowest proposed USF elevation within the Subject Site is 85.90m. For comparison the lowest proposed USF within the Orleans Village Subdivision, fronting the existing trunk sanitary sewer is 85.58m. Excerpts of the Orleans Village Subdivision / Forest Valley Sanitary Trunk Sewer – Hydraulic Gradeline Analysis Test can be found in **Appendix D**.

6.0 WATER SUPPLY SYSTEM

6.1 Existing Water Infrastructure

The watermain connection points for the proposed site are an existing 300 mm watermain within Jargeau Road (Connection 1); an existing 200 mm watermain within Beaugency Street (Connection 2); and an existing 400 mm watermain located at the Innes Road and Street Nine intersection (Connection 3).

As per the MSS EUC-Phase 3, it is proposed that the 300 mm watermain within Jargeau Road be extended to the future development to the east. Excerpts from the MSS EUC-Phase 3 showing the proposed EUC Phase 3 site layout, connection points, and water supply system is included in **Appendix E**. Refer to the East Urban Community Phase 3 Area Community Design Plan – Key Plan Mark-up, included in the enclosed drawing set, for reference to the Subject Site's location.

6.2 Proposed Water Infrastructure

The Subject Site will be serviced with approximately 2,155 m of on-site watermain 200 mm in diameter, and 200 m of a watermain trunk 300 mm in diameter within Jargeau Road. For fire fighting purposes nineteen onsite hydrants are being proposed. Refer to the General Plan of Services (Drawings 118224-GP1, 118224-GP2 and 118224-GP3) for an illustration of the proposed water supply system.

6.3 Watermain Design Parameters

Boundary conditions were provided by the City of Ottawa, based on the OWDG water demand criteria for the proposed development comprising of approximately 180 single family dwellings, 109 townhouses and 168 medium density units. The boundary conditions are included in **Appendix E**.

The domestic demand design parameters, fire fighting demand design scenarios and system pressure criteria design parameters are outlined in **Table 6.1** below. The system pressure design criteria used to determine the size of the watermains, required within the Subject Site, and are based on a conservative approach that considers three possible scenarios.

Table 6.1: Watermain Design Parameters and Criteria

Domestic Demand Design Parameters	**Design Parameters**
Unit Population: Single Detached Home Semis-Detached /Townhomes 2-BR Apartments	 3.4 people/unit 2.7 people/unit 2.1 people/unit
Basic Day Residential Demand (BSDY)	350 L/c/d
Maximum Day Demand (MXDY)	2.5 x Basic Day
Peak Hour Demand (PKHR)	2.2 x Maximum Day
Fire Demand (FF) Design	**Design Flows**
Conventional single/town units, unless otherwise noted. Medium density residential blocks Hydrant spacing and coding	10,000L/min per FUS / OWDG TB-2014 15,000L/min per FUS 90 to 120m spacing per OWDG
System Pressure Criteria Design Parameters	**Criteria**
Maximum Pressure (BSDY) Condition	< 80 psi occupied areas < 100 psi unoccupied areas
Minimum Pressure (PKHR) Condition	> 40 psi
Minimum Pressure (MXDY+FF) Condition	> 20 psi

The firefighting water demands for the Subject Site have been estimated per OWDG which refers to the Fire Underwriters Survey (CGI, 1999) document, abbreviated as FUS.

In accordance with the FUS and based on the proposed zoning, there is potential for less than 3m of separation between the single family, semi-detached, and row townhome wood-framed buildings, which would require the fire area in the FUS estimate for multiple buildings to be treated as a contiguous block area. This results in a high fire flow demand which is difficult to attain from the existing system; moreover, it would trigger larger diameter watermain size within the Subject Site, creating system vulnerabilities such as water age issues. As per the ISTB-2014-02, fire flows may be capped at 167 L/s (10,000 L/min) for single family, semi-detached, and row townhome, provided certain site criteria are met. The criteria are:

- For singles: a min separation of 10m between the backs of adjacent units.
- Traditional side-by-side semi-detached or row townhomes:
    a. firewalls with a min two-hour rating to separate the block into fire areas of no more than the lesser of 7 dwelling units, or 600 m^2 of building area; and
    b. Min separation of 10 m between the backs of adjacent units.

In general, the proposed layout of the Subject Site in conjunction with the established zoning setbacks ensures that the minimum separation of 10 meters between the backs of adjacent units is achieved and the capped fire flow of 167 L/s can be used for the majority of the residential units being proposed.

Notwithstanding the above, three areas have been identified where a minimum separation of 10 meters between the backs of adjacent units is not achieved. Refer to Figures E-4 and E-5 found in **Appendix E** for the locations of the areas of concern. These areas have been reviewed to

ensure that there is available fire flow in the neighbouring hydrants for fire fighting purposes per the ISTB-2014-02. As such, firewalls with a minimum two-hour rating will not need to be implemented.

Detailed FUS calculations can be found attached in **Appendix E**.

6.4 System Pressure Modeling and Results

System pressures for the Subject Site were estimated using the EPANET engine within PCSWMM.

The PCSWMM model layout is demonstrated in **Figure 6.1** – Proposed Watermain Sizing, Layout and Junction IDs and **Figure 6.2** – Ground Elevations (m).

Domestic Demand

The water demand summary for the complete build out of the Subject Site for the basic daily and peak hour demands has been provided in Error! Reference source not found. **6.2** below. For detailed results refer to the tables provided in **Appendix E.** The detailed results are also demonstrated in **Figure 6.3** – Maximum Pressures During BSDY Condition and **Figure 6.4** – Minimum Pressures During PKHR Condition.

Table 6.2: System Pressure (EPANET)

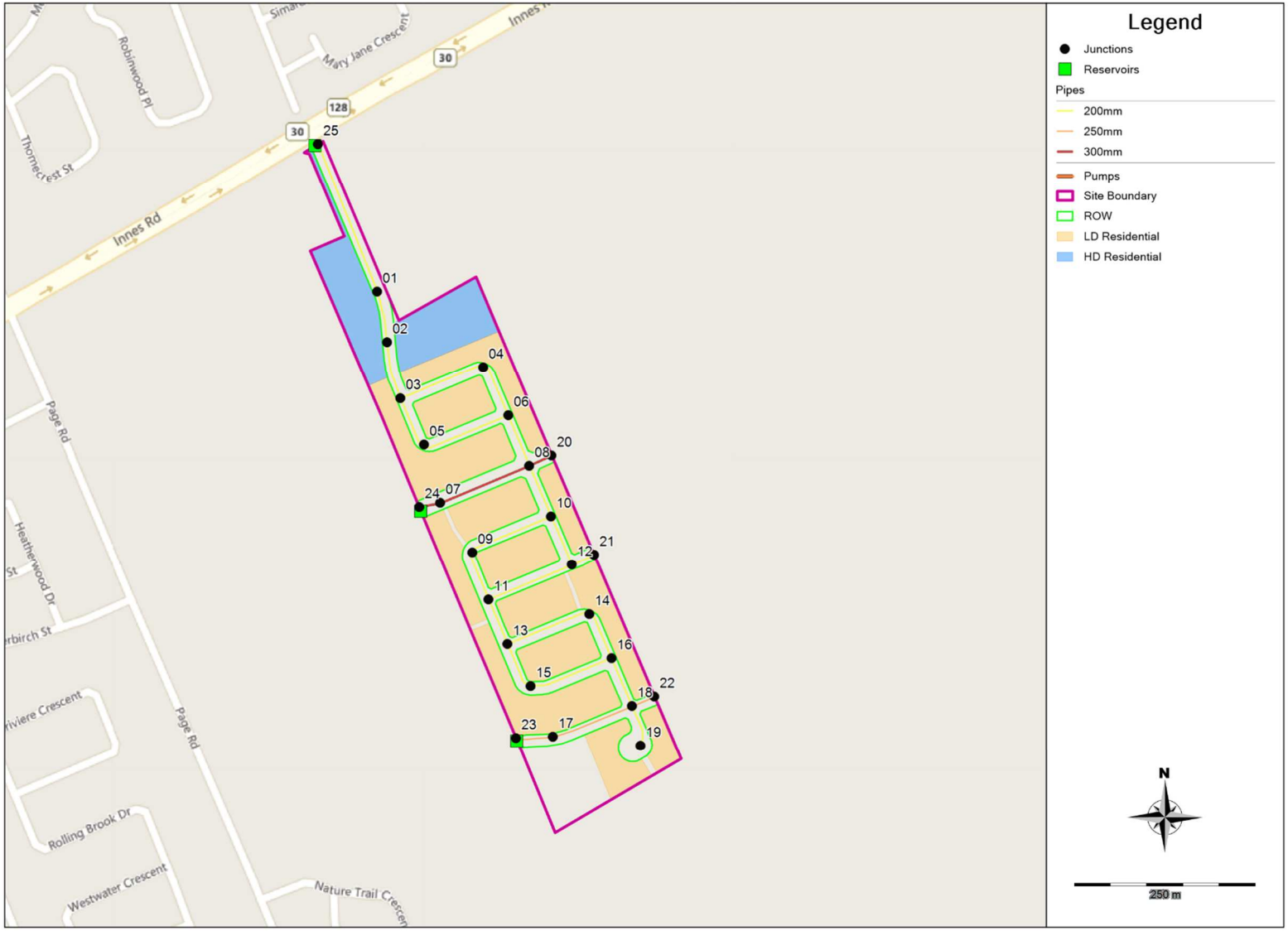
Condition	Demand (L/s)	Allowable Pressure (psi)	Max/Min Pressure (psi)
Basic Daily Demand	5.11	80 (Max)	62
Peak Hour Demand	28.13	40 (Min)	51

Fire Demand

Furthermore, an analysis was carried out to determine the available fire flow under maximum day demand while maintaining a residual pressure of 20psi. This was completed using the EPANET fire flow analysis feature within PCSWMM. For detailed results refer to the tables provided in **Appendix E.** The detailed results are also demonstrated in **Figure 6.5** – Available Flow at 20psi During MXDY+FF Condition.

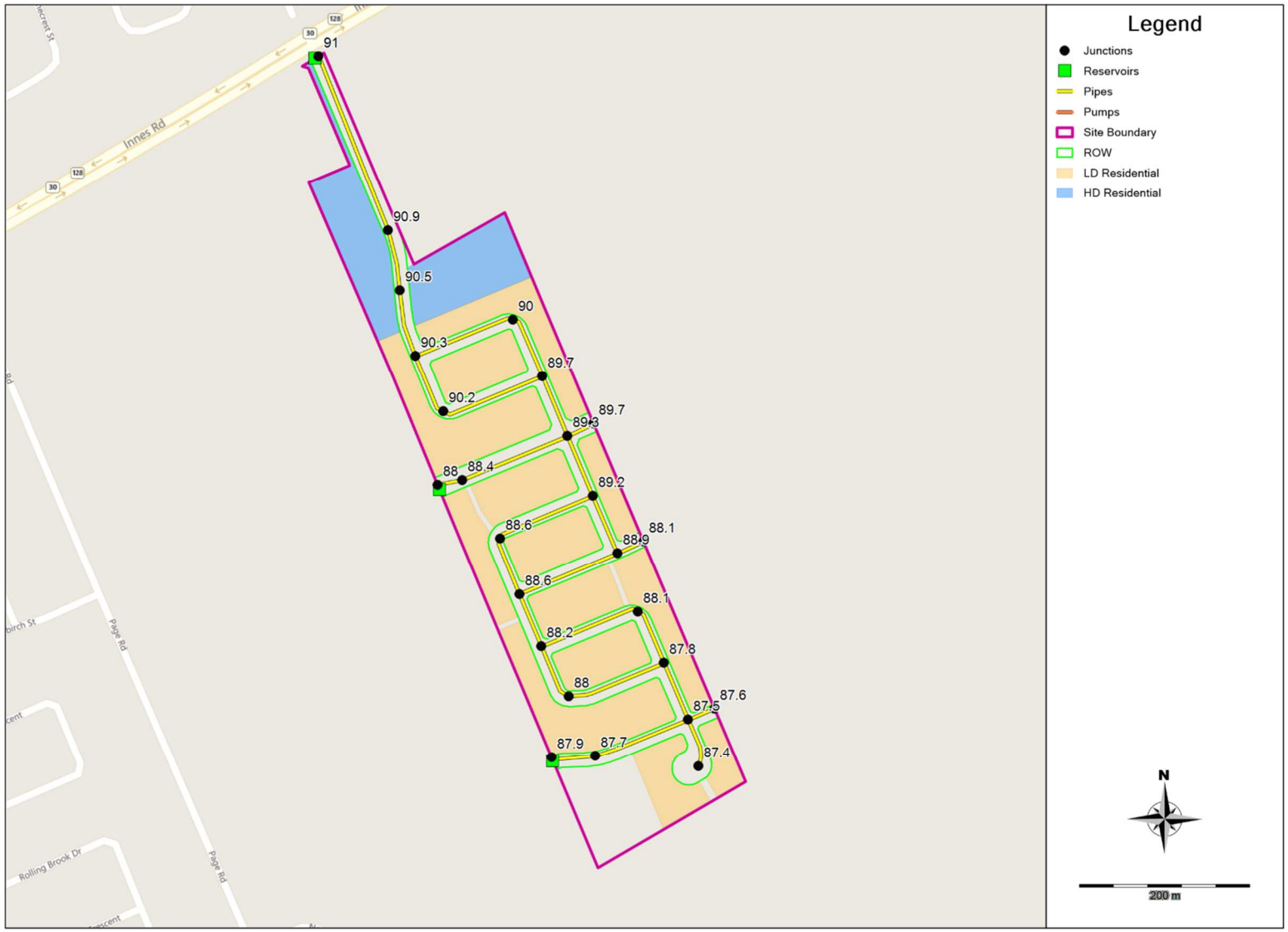
The hydraulic analysis demonstrates that the proposed watermain sizing meets the design criteria.

3610 Innes Road (Former BMR Lands)
Job No. 118224
PCSWMM Model Schematic
Figure 6.1 – Proposed Watermain Sizing, Layout and Junction IDs



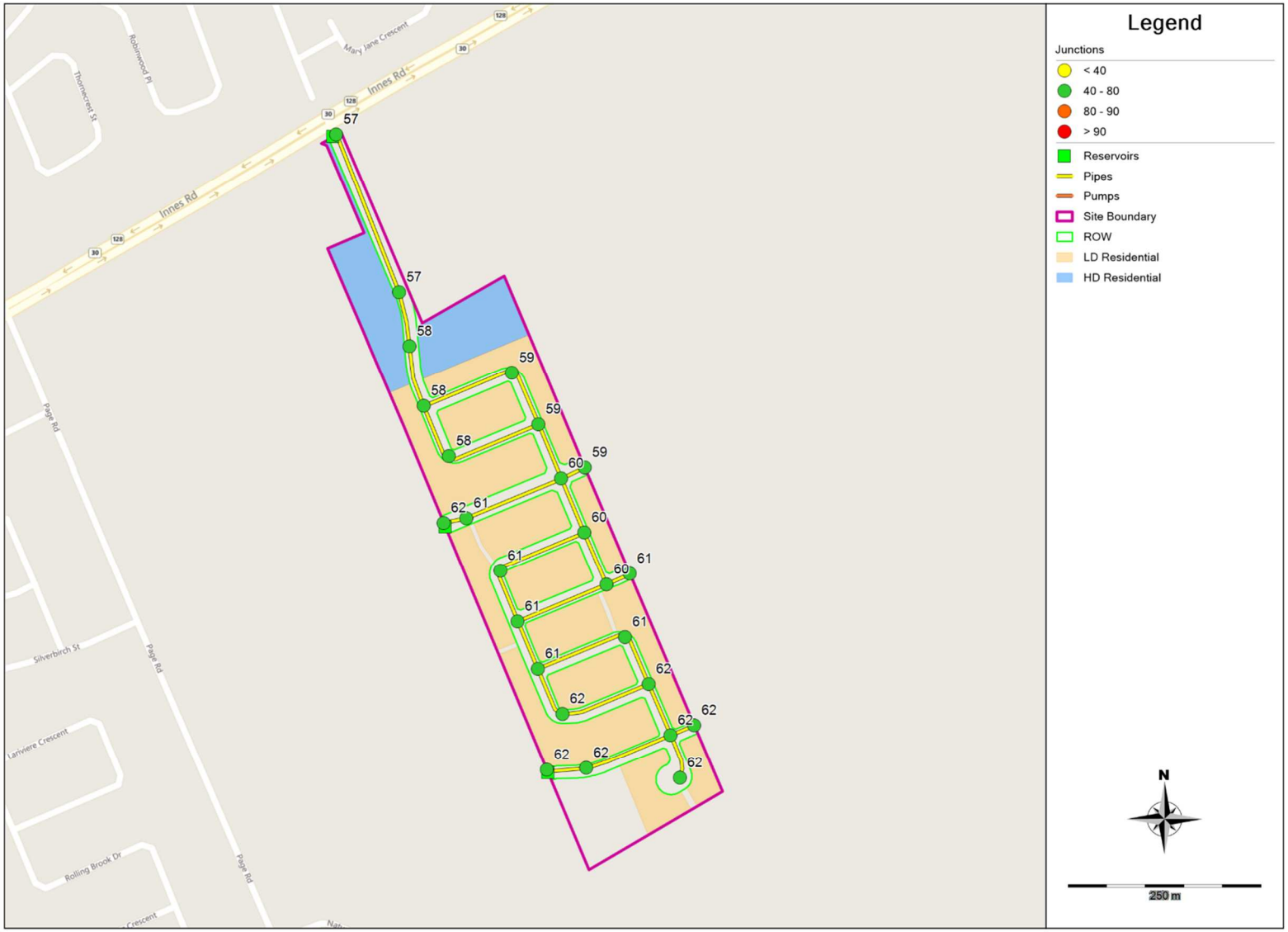
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3610 Innes Road (Former BMR Lands)
Job No. 118224
PCSWMM Model Schematic
Figure 6.2 – Ground Elevations (m)



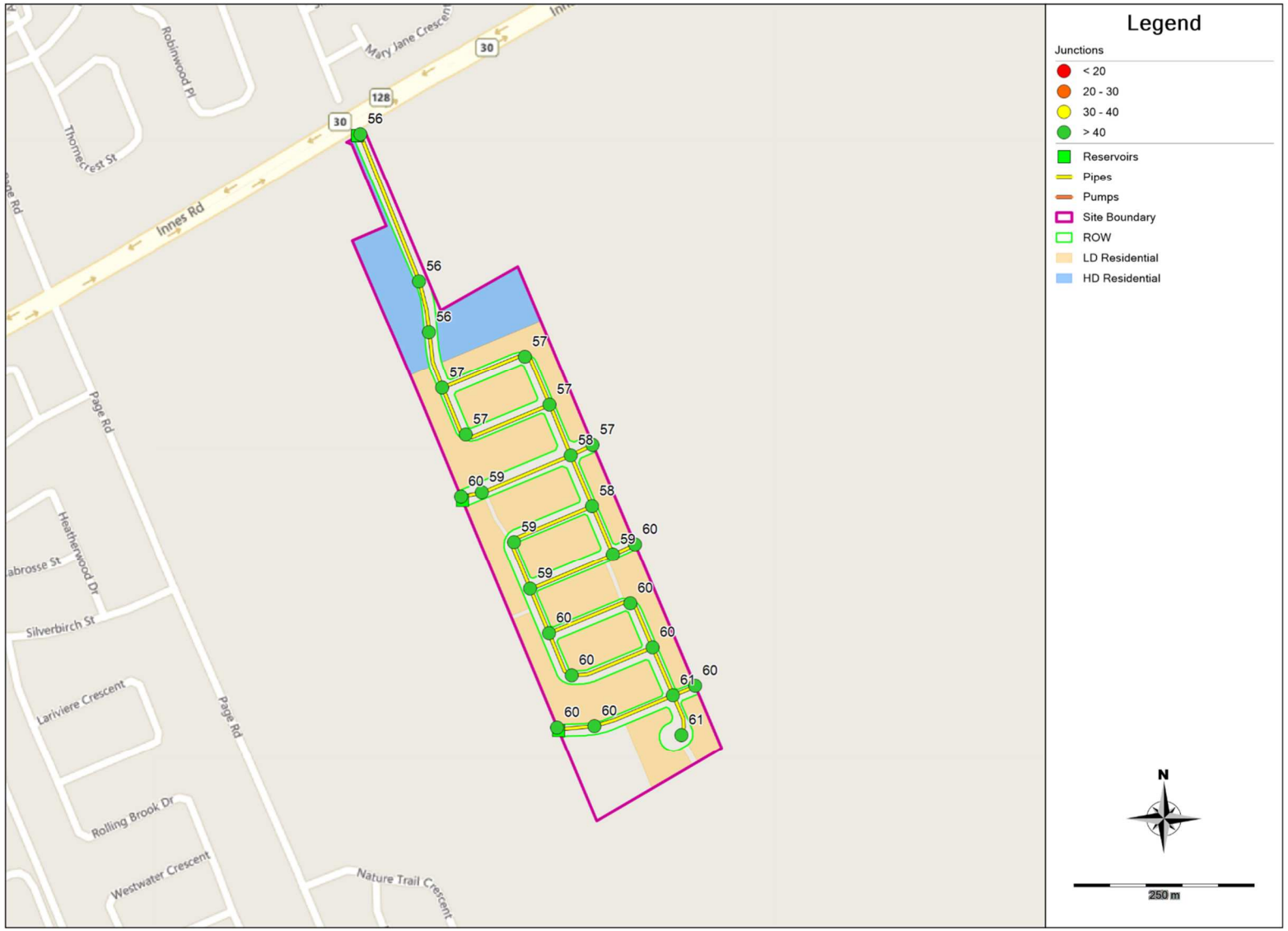
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3610 Innes Road (Former BMR Lands)
Job No. 118224
PCSWMM Model Schematic
Figure 6.3 – Maximum Pressures During BSDY Conditions



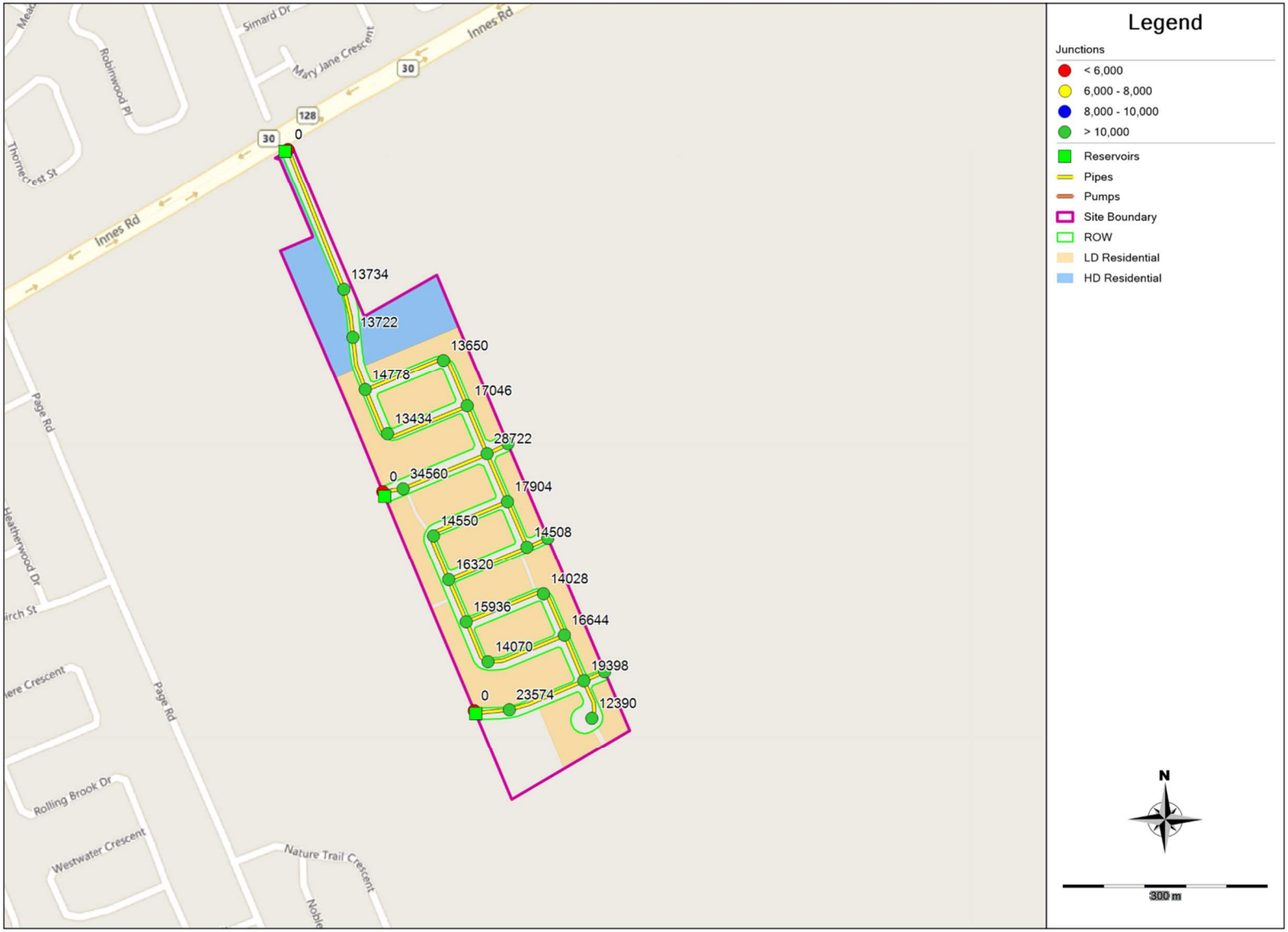
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3610 Innes Road (Former BMR Lands)
Job No. 118224
PCSWMM Model Schematic
Figure 6.4 – Minimum Pressures During PKHR Conditions



Date: 2020/04/03
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3610 Innes Road (Former BMR Lands)
Job No. 118224
PCSWMM Model Schematic
Figure 6.5 – Available Flow at 20psi During MXDY+FF Conditions



Date: 2020/04/03
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7.0 UTILITIES

The development will be serviced by Hydro Ottawa, Bell Canada, Rogers Communications, and Enbridge Gas Distribution Inc. Furthermore, streetlighting will be provided within the proposed road allowances, and will be designed in accordance with the City's lighting policy (2016). The utility companies have been contacted and their preliminary designs to service Phase 1 of the development have been received and compiled into the Composite Utility Plan, however, further coordination is still required.

Refer to the preliminary Composite Utility Plan (Drawings 118224-CUP1, 118224-CUP2 and 118224-CUP3) for information.

For the preliminary right-of-way cross sections refer to the Cross Sections Typical ROW (Drawings 118224-XS1 and 118224-XS2), included in the enclosed drawing set.

8.0 EROSION AND SEDIMENT CONTROL AND DEWATERING MEASURES

Temporary erosion and sediment control measures will be implemented during construction in accordance with the "Guidelines on Erosion and Sediment Control for Urban Construction Sites" (Government of Ontario, May 1987). Details will be provided on an Erosion and Sediment Control Plan, prepared as part of detailed design. Erosion and sediment control measures may include:

- Placement of filter fabric under all catch basin and maintenance hatches;
- Tree protection fence around the trees to be maintained
- Silt fence around the area under construction placed as per OPSS 577 / OPSD 219.110
- Light duty straw bale check dam per OPSD 219.180

The erosion and sediment control measures will need to be installed to the satisfaction of the engineer, the City, the Ontario Ministry of Environment, Conservation, and Parks (MECP), and the RVCA, prior to construction and will remain in place during construction until vegetation is established. The erosion and sediment control measure will also be subject to regular inspection to ensure that measures are operational.

Refer to the Erosion and Sediment Control Plan (Drawing 118224-ESC) included in the enclosed drawing set.

9.0 NEXT STEPS, COORDINATION, AND APPROVALS

The proposed municipal infrastructure may be subject, but not limited to the following approvals:

- MECP PTTW. Submitted to: MECP. Proponent: Glenview Homes (Innes) Ltd.
- MECP Environmental Certificate of Approval (ECA) for the storm / sanitary sewers through the "Transfer of Review" program. Submitted to: City of Ottawa/ MECP and approved by MECP. Proponent: Glenview Homes (Innes) Ltd.
- MECP Pre-authorized watermain alteration and extension program granted as part of City of Ottawa's Drinking Water Works Permit (F-1 Form). Submitted to: City of Ottawa. Proponent: Glenview Homes (Innes) Ltd.
- Road Cut Permit. Submitted to City of Ottawa. Proponent: Glenview Homes (Innes) Ltd., or its contractor/agent.
- Tree Cutting Permit. Submitted to City of Ottawa. Proponent: Glenview Homes (Innes) Ltd., or its contractor/agent.
- Separate from this report, the Developer may enter into a Cost Sharing Agreement to provide cost sharing principles and recovery mechanisms for development components that benefit external parties.

10.0 SUMMARY AND CONCLUSIONS

This report demonstrates that the proposed development can be adequately serviced with storm and sanitary sewers and watermain. The report is summarized below:

Stormwater Management:

- The Subject Site will be serviced with approximately 2,260 m of on-site storm sewers ranging from 250 mm to 1500 mm in diameter. The on-site storm sewers will outlet to the existing EUC Pond 1 SWM facility to the south of the Subject Site.
- Storm servicing for the Subject Site will be provided using a dual drainage system: Runoff from frequent events will be conveyed by storm sewers (minor system), while runoff from larger storm events which exceed the capacity of the minor system will be conveyed overland along defined overland flow routes (major system). The EUC Pond 1 SWM facility is the outlet for both the major and minor systems.
- Inlet control devices (ICDs) are to be installed in all catchbasins to limit inflows to the minor system during larger storm events. ICDs will be sized during the detailed design stage.
- Road Right-of-Ways will be used for surface storage (i.e. road sags – saw-toothed grading).
- It is proposed that the development of Phase 1 of the Subject Site be permitted under Interim B conditions, similar to Orleans Village, in exchange for Orleans Village mixed-use block 148 and future residential block 147 remaining undeveloped until the ultimate conditions expansion of the north main cell and north forebay in EUC Pond 1 are complete.
- Development of Phase 2, 3, and 4 of the Subject Site, as well as lands within the EUC, will require the EUC Pond 1 expansion. Detailed design for the expansion is currently being completed by David Schaeffer Engineering (DSEL).

Sanitary and Wastewater Collection System:

- The Subject Site will be serviced with approximately 1,965 m of on-site sanitary sewers ranging from 200 mm to 250 mm in diameter, which will direct flows to an existing 525 mm trunk sanitary sewer (gravity) located within Beaugency Street of the Subject Site. The existing trunk sanitary sewer will be extended within Beaugency Street of the Subject Site to service the future development to the east. The proposed service laterals on Beaugency Street will connect to a separate collector sanitary sewer running parallel to the trunk sanitary sewer extension and will outlet into the trunk downstream of Beaugency Street.
- The downstream existing sanitary sewer system has been designed for the flows of the Subject Site and have adequate capacity.

Water Supply System

- The Subject Site will be serviced with approximately 2,155 m of on-site watermain 200 mm in diameter, and 200 m of a watermain trunk 300 mm in diameter within Jardeau Road. The watermain connection points for the proposed site are an existing 300 mm watermain within Jargeau Road (Connection 1); an existing 200 mm watermain within Beaugency Street (Connection 2); and the existing 400 mm watermain located at the Innes Road and Street Nine intersection.

- The proposed watermains have adequate capacity to service the domestic and firefighting demand of the Subject Site.
- Firewalls with a minimum two-hour rating will not need be required within the Subject Site.

Erosion and Sediment Control

- Temporary erosion and sediment control measures will be implemented both prior to commencement and during construction in accordance with the "Guidelines on Erosion and Sediment Control for Urban Construction Sites" (Government of Ontario, May 1987).

Next Steps, Coordination, and Approvals

- MECP PTTW.
- MECP Environmental Certificate of Approval (ECA) for the storm / sanitary sewers through the "Transfer of Review" program.
- MECP Pre-authorized watermain alteration and extension program granted as part of City of Ottawa's Drinking Water Works Permit (F-1 Form).
- Road Cut Permit.
- Tree Cutting Permit.
- Separate from this report, the developer may enter into a Cost Sharing Agreement to provide cost sharing principles and recovery mechanisms for development components that provide direct benefits to more than one party.

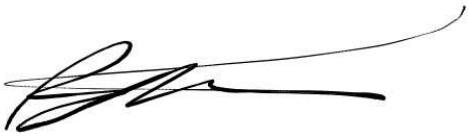
11.0 CLOSURE

This report is respectfully submitted for review and subsequent approval. Please contact the undersigned should you have questions or require additional information.

NOVATECH

Prepared by:





Ben Sweet, P.Eng.
Project Coordinator I Land Development

Bradley Reed,
E.I.T. | Land Development

Reviewed by:



Bassam Bahia, M.Eng., P.Eng.
Senior Project Manager | Land Development

Appendix A
Correspondence

MINUTES
Pre-Consultation Meeting

ADDRESS: 3604-3636 Innes Road
DATE: October 5, 2017
TIME: 3:00pm to 4:00pm
LOCATION: 110 Laurier Ave West, Room 4102E
CONTACT: Michael Boughton

City of Ottawa Staff Present:
Michael Boughton (Planner), Nick Stow (Environmental Planner), Diane Emmerson (Parks Planner), Isaac Wong (Engineer), Ellen Potts (Student Planner)

Invitees Present:
Michael Michaud (Glenview Homes)

1.0 Introductions

2.0 Overview of Proposal

- To develop the rear portion of the site for a residential subdivision consisting of single-detached and townhouse dwellings according to the on-going EUC MUC CDP.

3.0 Summary of Preliminary Comments from City Staff Represented Disciplines

- **Michael Boughton and Ellen Potts provided transportation comments (on behalf of Asad Yousfani) and planning comments**
    - A noise study is required and should take into account the area within 100 metres of the right-of-way of arterial and collector roads, both existing and proposed.
    - A transportation study is required.
        - The new TIA guidelines can be accessed at http://documents.ottawa.ca/sites/documents.ottawa.ca/files/tia_guidelines_en.pdf
        - The study will focus on identifying the road modifications required to safely accommodate the site generated traffic.

- **Isaac Wong provided engineering comments**
    - Please see the attached memo.

- **Nick Stow provided environmental comments**
    - No EIS is required, but a tree conservation report is required.

- **Diane Emmerson provided parks comments**
    - Confirmed that the proposed park is a neighbourhood park
    - Explained the new developer-built park process
        - Reviewed the various amenities needed in this park
        - Developer is to provide a Facility-Fit plan prior to Draft Plan approval
    - Main concerns:
        - Park is lacking street frontage; proposed park is only at 25% street frontage (including Caivan's section), but closer to 50% frontage is preferred.

- Michael Michaud pointed out that Caivan has not provided 50% street frontage for their portion of the park and Richcraft is not supplying any.
- Diane Emmerson suggested that Glenview enter into a cost-sharing agreement with Caivan to compensate the lost profit from the removal of housing units for parkland.
    - It is not common practise in cost sharing agreements to compensate a developer for lost revenue from homes that could have been built. Ellen Potts will look into options for compensation.
- Suggested that residential lots bordering the park on Street 7 and Street 8 be eliminated, but of particular concern is the little "divot" on Street 7
- The general location of the park is fine.
- There may be a potential to shift some of the parkland dedication to the north.
- The park budget is $504,865 per hectare.

4.0 Next Steps

- Meet with City staff to have a discussion regarding subdivision layout/design and coordination the CDP.

5.0 List of Required Plans and Studies

Engineering

- Site Servicing Plan (3 copies)
- Site Servicing Study (3 copies)
- Stormwater Management Report (3 copies)
- Geotechnical Study (3 copies)
- Noise Study (3 copies)
- Transportation Impact Study (3 copies)

Planning / Design / Survey

- Draft Plan of Subdivision (15 copies)
- Land-use table (include on Draft Plan of Subdivision)
- Concept Plan showing proposed street configuration, blocks, lots, and dwelling types (colour coordinated, simple) (3 copies)
- Survey Plan (6 copies)
- Planning Rationale (include explanation of how proposal complies with draft EUC MUC CDP) (3 copies)
- Archaeological Resource Assessment (3 copies)

Environmental

- Tree Conservation Report (3 copies)

****Please submit all plans, studies and reports as separate pdf. files on a USB stick or CD (the Draft Plan of Subdivision should also be submitted as a dwg. file)**

ATTACHMENTS

MEMO

Date: October 6, 2017

To / Destinataire	Ellen Potts, Student Planner	
From / Expéditeur	Isaac Wong, Project Manager, Infrastructure Approvals	
Subject / Objet	**Pre-Application Consultation** **3604 Innes Road Ward No. 2** *Develop the rear vacant portion of the site for a residential subdivision consisting of single-detached and townhouse dwellings.*	File No. PC2017-0262

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

1. The Servicing Study Guidelines for Development Applications are available at the following address: http://ottawa.ca/en/development-application-review-process-0/servicing-study-guidelines-development-applications

2. The following Engineering plans and reports are requested for submission:

   a. Site Servicing Plan

   b. Site Servicing Study

   c. Geotechnical Study

   d. Stormwater Management Report

3. Servicing and site works shall be in accordance with the following documents:

   ⇨ Ottawa Sewer Design Guidelines (October 2012)

   ⇨ Ottawa Design Guidelines – Water Distribution (2010)

- ⇨ Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
- ⇨ City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
- ⇨ City of Ottawa Environmental Noise Control Guidelines (January, 2016)
- ⇨ City of Ottawa Park and Pathway Development Manual (2012)
- ⇨ City of Ottawa Accessibility Design Standards (2012)
- ⇨ Ottawa Standard Tender Documents (latest version)
- ⇨ Ontario Provincial Standards for Roads & Public Works (2013)

4. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x.44455).

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

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

   ii. For separated sewer system built pre-1970 the design of the storm sewers are based on a 2 year storm.

   iii. The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).

   iv. A calculated time of concentration (Cannot be less than 10 minutes).

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

   vi. For a combined sewer system the maximum C= 0.4 or the pre-development C value, whichever is less. In the absence of other information the allowable release rate shall be based on a 2 year storm event.

   Note: There may be area specific SWM Criteria that may apply. Check for any related SWM &/or Sub-watershed studies that may have been completed.

6. Deep Services (Storm, Sanitary & Water Supply)

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

   ii. *Connections to trunk sewers and easement sewers are typically not permitted.*

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

   iv. *Review provision of a high-level sewer.*

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

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

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

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

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

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

      e. *No submerged outlet connections.*

7. Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:

   i. Location of service

ii. Type of development and the amount of fire flow required (as per FUS, 1999).

iii. Average daily demand: ___ l/s.

iv. Maximum daily demand: ___l/s.

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

8. MOECC ECA Requirements – The applicant shall consult with the local office of the MOECC to determine which ECA, if any, are required. **NOTE: Site Plan Approval, or Draft Approval, is required before any Ministry of the Environment and Climate Change application is sent to the MOECC.**

For residential applications: Charlie Primeau

(613) 521-3450, ext. 251

Charlie.Primeau@ontario.ca

For I/C/I applications: Emily Diamond

(613) 521-3450, ext. 238

Emily.Diamond@ontario.ca

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

Should you have any questions or require additional information, please contact me directly at (613) 580-2424, x 24169 or by email at Isaac.Wong@ottawa.ca.

APPLICANT'S STUDY AND PLAN IDENTIFICATION LIST

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S	1	44. Land use table	45.		

Meeting Date: June 28, 2019 — Application Type: *Plan of Subdivision*

File Lead (Assigned Planner): Steve Belan — Infrastructure Approvals Project Manager: Sara Mashaie

Site Address (Municipal Address):3604 Innes Road — *Preliminary Assessment: 1☐ 2☐ 3☐ 4☒ 5☐

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

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Date de réunion : Type de demande :

Urbaniste responsable du dossier : Gestionnaire de projet, Approbation des demandes d'infrastructure :

Adresse du site (adresse municipale) : *Évaluation préliminaire : 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐

*Le chiffre un (1) indique que des révisions importantes sont nécessaires avant qu'une demande d'aménagement puisse être présentée, et le chiffre cinq (5) suppose que la demande semble conforme aux politiques et aux directives d'utilisation du sol de la Ville. Cette évaluation est purement consultative. Elle ne tient pas compte des aspects techniques de la demande et ne garantit d'aucune manière l'approbation d'une demande.

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Meeting Date: June 28, 2019

Application Type: *Zoning By-Law Amendment*

File Lead (Assigned Planner): Steve Belan

Infrastructure Approvals Project Manager: Sara Mashaie

Site Address (Municipal Address):3604 Innes Road

*Preliminary Assessment: 1☐ 2☐ 3☐ 4☐ 5☒

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Ben Sweet

Subject: RE: Pre-con Follow-up - 3604 Innes Rd, BMR lands

From: Belan, Steve <Steve.Belan@ottawa.ca>
Sent: Tuesday, July 16, 2019 3:34 PM
To: Michael Michaud <MMichaud@glenview.ca>
Subject: Pre-con Follow-up - 3604 Innes Rd, BMR lands

In attendance: Mike Giampa, Robin van de Lande, Sara Mashaie, Mike Thivierge, Sami Rehman, Steve Belan, Michael Michaud, Jake Shabinsky, Jenifer Wong, James Ireland

Hello,

Please refer to the below regarding the Pre-Application Consultation (pre-con) Meeting held on June 28 for the property at 3604 Innes Road for a rezoning and plan of subdivision application in order to allow the development of a plan of subdivision by Glenview Homes. I have also attached the required Plans & Study List for application submission.

As Heard

- Pre-Application Consultation held in 2017, Plan of Subdivision delayed to delays of the CDP
- Brownfield Clean-up in southern portion of site to be completed, 90% complete, RSC awaiting completion
- Early servicing to begin in 2020, home building 2021
- Park concern addressed with Ingrid (see park comments)
- McEwen and U-Haul have purchased lands up on Innes Road, remainder of the lands outside of the CDP to be incorporated into this subdivision
- The City has asked U-Haul and Gib Patterson for an access (private or public) road (or a protected ROW), running parallel to Innes to allow connectivity between lots/developments
- The lands on the edge of the CDP are medium density (62 unit/ha) and will continue that density over the abutting lands to the north
- Adjacent to Significant woodlands, EIS requirements? (see Sami's comments)
- Engineering, MMS is still underway along with the CDP. LIDs in the MSS: the MSS will not have 10mm accommodation cushion. Glenview will be required to implement the use of LIDs either as soft or other, this is all related to Mud Creek flows.

Below are staff's preliminary comments based on the information available since of pre-con meeting:

Planning

- Draft CDP to be posted
- Road pattern looks acceptable
- Planning wants a ROW (public or private running parallel with Innes Road. To be roughly along the rear of the U-haul property. In a pre-consultation, U-haul was considering providing 40 feet at the rear of their property.
- Maybe both Glenview and U-haul could contribute some land for this ROW and provide landscaping to buffer residential uses from the warehouse space
- We have no issue with including lands outside of the CDP to this application
- A Zoning amendment application will need to be submitted to address the permitted uses and accommodate any provision requests.

Urban Design

- This application will not subject to the Urban Design Review Panel
- Mid to higher density development should be orientated (door should face) to the street.
- There should be accommodations made to provide street trees in front of every house and each corner side yards.

Engineering

- Please consult the Pre-con servicing memo Dated October 6, 2017 From Isaac Wong
- Servicing will be in conformity with the MSS
- Storm water quantity and quality will be controlled
- LIDs either as soft or other need to be implemented and the MSS will not have a 10mm accommodation cushion.

Feel free to contact Infrastructure Project Manager, Sara Mashaie, at sara.mashaie@ottawa.ca or 613.580.2424 ext./poste 27885, for follow-up questions

Transportation

- TIA submission / Road modification agreement requirements

Feel free to contact Transportation Project Manager, Mike Giampa, at mike.giampa@ottawa.ca or 613.580.2424 ext./poste 23657, for follow-up questions

Environmental

- The scoped EIS was reviewed and it was found that it does not sufficiently cover the requirements for an EIS in support of the subdivision. The EIS is required since the site is adjacent to a significant woodlot and Species at Risk have been identified in the vicinity by the CDP study, The EIS should cover potential impacts on these two items and demonstrate how the proposed development will have no negative impacts. Further details of EIS requirements can be found in the OP section 4.7.8 and the EIS guidelines:
  https://documents.ottawa.ca/sites/default/files/documents/eis_guidelines2015_en.pdf
- A RSC will be required for sensitive land uses where Brownfields development occurs.

Feel free to contact Sami Rehman, Environmental Planner, at Sami.Rehman@ottawa.ca or 613.580.2424 ext./poste 13364, for follow-up questions.

Parkland

- The park size proposed is 0.96ha. The CDP and Area Parks Plan requires a 1.82ha park block shown as Park 1 in the APP. Caivan has provided 0.654ha of the required 1.82ha. The remaining parkland is to be conveyed by Glenview. Please have Glenview revise Block 186 to reflect the required 1.166ha park block.
- Once a formal application is submitted, Parks and Facility Planning will review and provide draft conditions as required.

Feel free to contact Mary Ellen Wood, Parks Planner, at MaryEllen.Wood@ottawa.ca or 613.580.2424 ext./poste 16482, for follow-up questions.

Conservation Authority

- Comments related to the Conservation Authority
  - Stormwater runoff quality criteria
  - Area specific stormwater runoff criteria
-

Other

- You are encouraged to contact the Ward Councillor, Councillor Laura Dudas, at Laura.Dudas@ottawa.ca about the proposal.

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

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

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

Regards,

Steve Belan, MCIP, RPP

Planner Planning Services, Development Review Services
Planning, Infrastructure and Economic Development
City of Ottawa / Ville d'Ottawa
110 Laurier Avenue West, 4th Floor / 110, avenue Laurier Ouest, 4e étage
Ottawa, ON K1P 1J1
Telephone / tél.: 613-580-2424 ext./poste 27591
E-mail / courriel: Steve.Belan@ottawa.ca

City of Ottawa 2017 TIA Guidelines Screening Form

1. Description of Proposed Development

Municipal Address	
Description of Location	
Land Use Classification	
Development Size (units)	
Development Size (m^2)	
Number of Accesses and Locations	
Phase of Development	
Buildout Year	

If available, please attach a sketch of the development or site plan to this form.

2. Trip Generation Trigger

Considering the Development's Land Use type and Size (as filled out in the previous section), please refer to the Trip Generation Trigger checks below.

Land Use Type	Minimum Development Size
Single-family homes	40 units
Townhomes or apartments	90 units
Office	3,500 m^2
Industrial	5,000 m^2
Fast-food restaurant or coffee shop	100 m^2
Destination retail	1,000 m^2
Gas station or convenience market	75 m^2

** If the development has a land use type other than what is presented in the table above, estimates of person-trip generation may be made based on average trip generation characteristics represented in the current edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual.*

If the proposed development size is greater than the sizes identified above, the Trip Generation Trigger is satisfied.

3. Location Triggers

	Yes	No
Does the development propose a new driveway to a boundary street that is designated as part of the City's Transit Priority, Rapid Transit or Spine Bicycle Networks?		
Is the development in a Design Priority Area (DPA) or Transit-oriented Development (TOD) zone?*		

**DPA and TOD are identified in the City of Ottawa Official Plan (DPA in Section 2.5.1 and Schedules A and B; TOD in Annex 6). See Chapter 4 for a list of City of Ottawa Planning and Engineering documents that support the completion of TIA).*

If any of the above questions were answered with 'Yes,' the Location Trigger is satisfied.

4. Safety Triggers

	Yes	No
Are posted speed limits on a boundary street are 80 km/hr or greater?		
Are there any horizontal/vertical curvatures on a boundary street limits sight lines at a proposed driveway?		
Is the proposed driveway within the area of influence of an adjacent traffic signal or roundabout (i.e. within 300 m of intersection in rural conditions, or within 150 m of intersection in urban/ suburban conditions)?		
Is the proposed driveway within auxiliary lanes of an intersection?		
Does the proposed driveway make use of an existing median break that serves an existing site?		
Is there is a documented history of traffic operations or safety concerns on the boundary streets within 500 m of the development?		
Does the development include a drive-thru facility?		

If any of the above questions were answered with 'Yes,' the Safety Trigger is satisfied.

5. Summary

	Yes	No
Does the development satisfy the Trip Generation Trigger?		
Does the development satisfy the Location Trigger?		
Does the development satisfy the Safety Trigger?		

If none of the triggers are satisfied, the TIA Study is complete. If one or more of the triggers is satisfied, the TIA Study must continue into the next stage (Screening and Scoping).

Ben Sweet

Subject: RE: IPU Review Comments - Oct 2018 EUCMUC MSS

On Jun 20, 2019, at 12:48 PM, Michael Michaud <MMichaud@glenview.ca> wrote:

Hi Sam. Please see attached from Laura. Maybe the anticipated meeting is not required?

Mike

From: Laura Maxwell <LMaxwell@dsel.ca>
Sent: June 20, 2019 12:40 PM
To: van de Lande, Robin <Robin.vandeLande@ottawa.ca>; Ted.Cooper@ottawa.ca; Baird, Natasha <Natasha.Baird@ottawa.ca>
Cc: 'Fairouz Wahab - Richcraft (FWahab@richcraft.com)' <FWahab@richcraft.com>; Steve Pichette <SPichette@dsel.ca>; Matt Wingate <MWingate@dsel.ca>; Michael Michaud <MMichaud@glenview.ca>
Subject: RE: IPU Review Comments - Oct 2018 EUCMUC MSS

Hi Robin, Ted, Natasha,

Please find attached draft updated storm servicing & pond concepts for the northwest quadrant, for review and discussion.

I've provided preliminary notes below [in red], based on a phone conversation with Ted last month about the City comments we received April 29, 2019 [in black].

Attachments are available for download at this link:

* https://spaces.hightail.com/receive/e0VcWngSbx
* Expires Friday June 28th

Can we please meet to discuss and set out next steps for the MSS?

We would like to suggest Monday, June 24th starting anytime between 11:00am and 12:30pm – are you available?

Thanks,

Laura Maxwell, B.Sc.(Civil Eng), M.Pl.
Client Project Manager

DSEL
david schaeffer engineering ltd.

phone: (613) 836-0856 ext. 527
cell: (613) 293-8750
email: lmaxwell@DSEL.ca<mailto:lmaxwell@DSEL.ca>

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sender by reply email and destroy all copies of the original.

Following are IPU's comments following our review of the subject MSS:

General

The MSS has been prepared with the intention of fulfilling documentation requirements of the MEA Class EA process. It is normal practice for the City to require documentation and evaluation of alternatives in the MSS prior to recommending the approval by Council of the preferred water, wastewater and stormwater servicing plans (I have attached excerpts from the Area 10 MSS that provides an example of the typical type of servicing alternatives considered / evaluated in an MSS).

[Noted.]

[The public consultation report (that will be published as a MCEA document alongside the existing conditions report, the MSS, the MTS, and the CDP) will describe the evaluation of alternative development scenarios and associated servicing options. I've re-attached a summary of the evaluation that was presented at TAC #4 (Attachment A) and the associated responses to City comments (Attachment B), for reference.]

[The MSS will be updated to further document the consideration of alternative designs.]

It is acknowledged that previous servicing plans have been approved in recent years in the Southeast and Southwest quadrants that need not be re-opened (unless affected by changes in development / servicing elsewhere in the EUCMUC). However, the Northwest quadrant is largely a greenfield area where servicing alternatives are not constrained. (For the Northeast quadrant, given the passage of time and change in environmental setting, should this area remain part of the EUCMUC study area, existing preferred servicing approaches would need to be re-confirmed or revised as appropriate).

[Noted. While servicing alternatives may not be considered constrained within the quadrants, the MSS builds on the existing trunk infrastructure surrounding each quadrant that has been built with allowances for development of the subject lands.]

We are not requesting an exhaustive development and evaluation of alternatives. We explain what would be helpful in our comments on water, wastewater and stormwater below.

[Noted.]

The SWM approach and hydraulic modelling documentation included in the MSS was reviewed and found to be consistent with the City's master servicing and design guideline requirements.

[Noted.]

Water

As per the Area 10 examples, it would be helpful to present alternative watermain networks and a discussion, for example, of how the various alternatives improve looping, simplify phasing/implementation, etc.

[Consideration of alternative designs will be further described in the MSS. See snapshot below for alternative trunk watermain locations that were considered, based on available connection points to the City's existing watermain

network. The network identified in the MSS represents the minimum amount of trunk infrastructure required to meet service pressures and to provide a redundant network. The watermain network in the northeast quadrant will be defined as the internal road network is finalized for each development parcel.]

[cid:image001.jpg@01D52766.41F65DB0]

Wastewater

Again, as per the Area 10 examples, alternative routing of trunk sewers should be presented. As noted in the EUCMUC MSS Alternatives attachment, there appears to be an opportunity to locate the deeper trunk sanitary sewer (Trunk 1) to the hydro corridor alignment (Trunk 2), which would avoid the need to construct the deeper trunk sewer on a local street within a narrow ROW.

[Consideration of the alternative designs will be further described in the MSS. Given the grade raise restrictions for the soils, the overall grading strategy is to keep the road grades as low as possible in the northwest quadrant. The sanitary sewer elevation drives the grading plan for the northwest quadrant. To keep sanitary sewers as flat as possible, the overall concept is to collect as much flow as possible into a main trunk sewer and have the alignment be as direct as possible to the existing outlet within the Orleans Village development. The sanitary sewer is expected to have a max cover of about 3.75m at the downstream end of the system.]

Stormwater (Sewers)

The EUC MUC MSS Alternatives attachment presents a storm sewer alternative similar to the alternative wastewater solution referred to above, whereby the deeper trunk storm sewer (Trunk 1) is relocated to the hydro corridor (Trunk 2), which would avoid the need to construct a deep trunk storm sewer on a local street within a narrow ROW. The terminus of the Snow Storage Facility FM could be relocated to outlet to this storm trunk.

[Consideration of the alternative designs will be further described in the MSS.The attached updated servicing design relocates the trunk storm sewer towards the Hydro One corridor as suggested, to minimize the extent of large storm sewers within local roads, which will contribute to ease of maintenance. The updated servicing design restricts capture and requires storage up to the 100-year design event on development blocks other than low density residential areas. Note that there is a proposed 2.7m dia. storm trunk sewer within the local ROWs surrounding the pond. The attached memo from Paterson (Attachment C) confirms that the construction of a storm sewer up to 3m dia. is acceptable in this area, including where the storm trunk sewer runs parallel to the sanitary trunk sewer. Per the City's direction at TAC #5, the snow disposal facility is assumed to remain in place (e.g. no future development) with its forcemain directly connected to EUC Pond 1, like in existing conditions.]

SWM Pond Expansion

The MSS identified the need to expand the existing EUC Pond 1. The MSS did not present / evaluate alternatives that were considered as to how / where the SWMP was to be expanded. The only approach presented included expansion of the SWMP into the woodlot surrounding the existing pond, part of which is subject to the City's Significant Woodland Guidelines. Application of the Significant Woodland Guidelines must follow the mitigation hierarchy outlined below, which lends itself well to the normal evaluation process requirements of MSSs / Class EAs previously approved by Council. As is outlined in the Guidelines, environmental reports must explicitly address how the mitigation hierarchy has been applied in the proposed development or site alteration.

The mitigation hierarchy is a widely accepted approach in conservation and land use planning for guiding decisions on protection of the natural environment. It categorizes and prioritizes protective measures according to their general type and effectiveness:
Priority 1 - Avoidance: redirection of the proposed action away from the natural feature.
Priority 2 - Minimization: reduction of the magnitude of the proposed action, either in space, time, or both.

Priority 3 - Mitigation: protection of the feature from the proposed action, through measures such as changes in design, physical barriers, and modified operating procedures.
Priority 4 - Compensation: off-setting of the impacts through replacement of the feature and its ecological functions elsewhere, typically at a ratio greater than 1:1 to reflect the greater risks.

The current draft of the MSS has focused entirely on Priority 4 – proposing compensation of only 0.5 ha of tree planting for every 1 ha of loss of woodland around EUC Pond 1. There will be a need to demonstrate why Priorities 1-3 cannot apply if there is a need to expand the SWM Pond into the Significant Woodlands at the perimeter of EUC Pond 1.

[Noted. The attached memo from Kilgour (Attachment D) clarifies the extent of the significant woodland. Based on the new woodland definition and the updated predicted storm inflows (including exclusion of future development of the snow dump), a revised draft pond footprint is proposed for City comment. Please note that overall this pond does not meet the RVCA's request for 80% TSS removal (which is beyond the 70% TSS removal approved for the existing EUC Pond 1), but is expected to achieve around 78% TSS removal for the lands draining to the proposed expanded north forebays.]

Four alternative SWM pond expansion concepts have been presented in the EUCMUC MSS Alternatives attachment. The alternatives present incremental pond expansion approaches:

1) Construct new sediment forebay at east end of existing SWMP, and modify existing outlet structure to more closely discharge pre-development flows so as to minimize peak quantity control storage requirements;

[Per discussions with City staff regarding the Mud Creek CIS study, the project team has previously been directed to keep the existing EUC Pond 1 outflows that were approved under the existing ECA for EUC Pond 1.]

2) If additional quantity control is required beyond Alternative 1, expand existing SWMP into hydro corridor to the south;

[Per the approved EUC Pond 1 design drawings, the Hydro One corridor is the location of the sediment management area for EUC Pond 1.]

3) If additional quantity control is required beyond Alternative 2, expand SWMP to the east of the existing SWMP;

[Noted.]

4) If additional quantity control is required beyond Alternative 3, expand existing SWMP into area south of existing SWMP.

[Noted.]

If there is no means to satisfy quantity and quality control requirements with Alternative 4, then the SWMP could be expanded to the north into the Significant Woodland providing acceptable compensation is agreed to.

[Noted.]

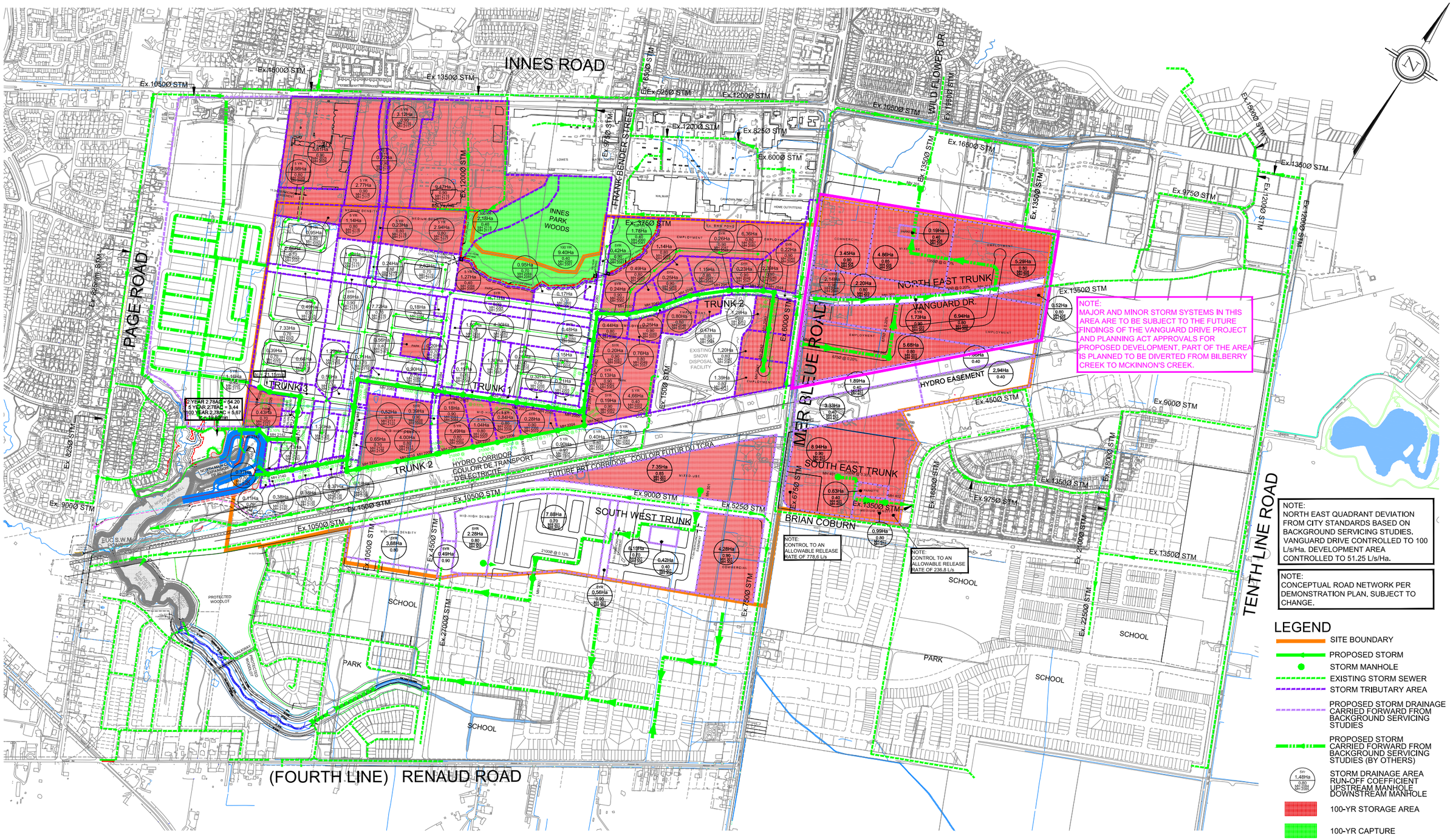
[I've attached an updated slope stability report for the area surrounding the pond (Attachment E), prepared in response

to the geotechnical peer review comments dated April 5, 2019 (Attachment F) and RVCA comments dated February 11, 2019 and March 7, 2019 (Attachment G). The slope stability report shows that the pond slopes could be constructed close to the existing headwater features provided the limit of hazard line is respected, although additional clearance is proposed under the latest pond concept.]
'

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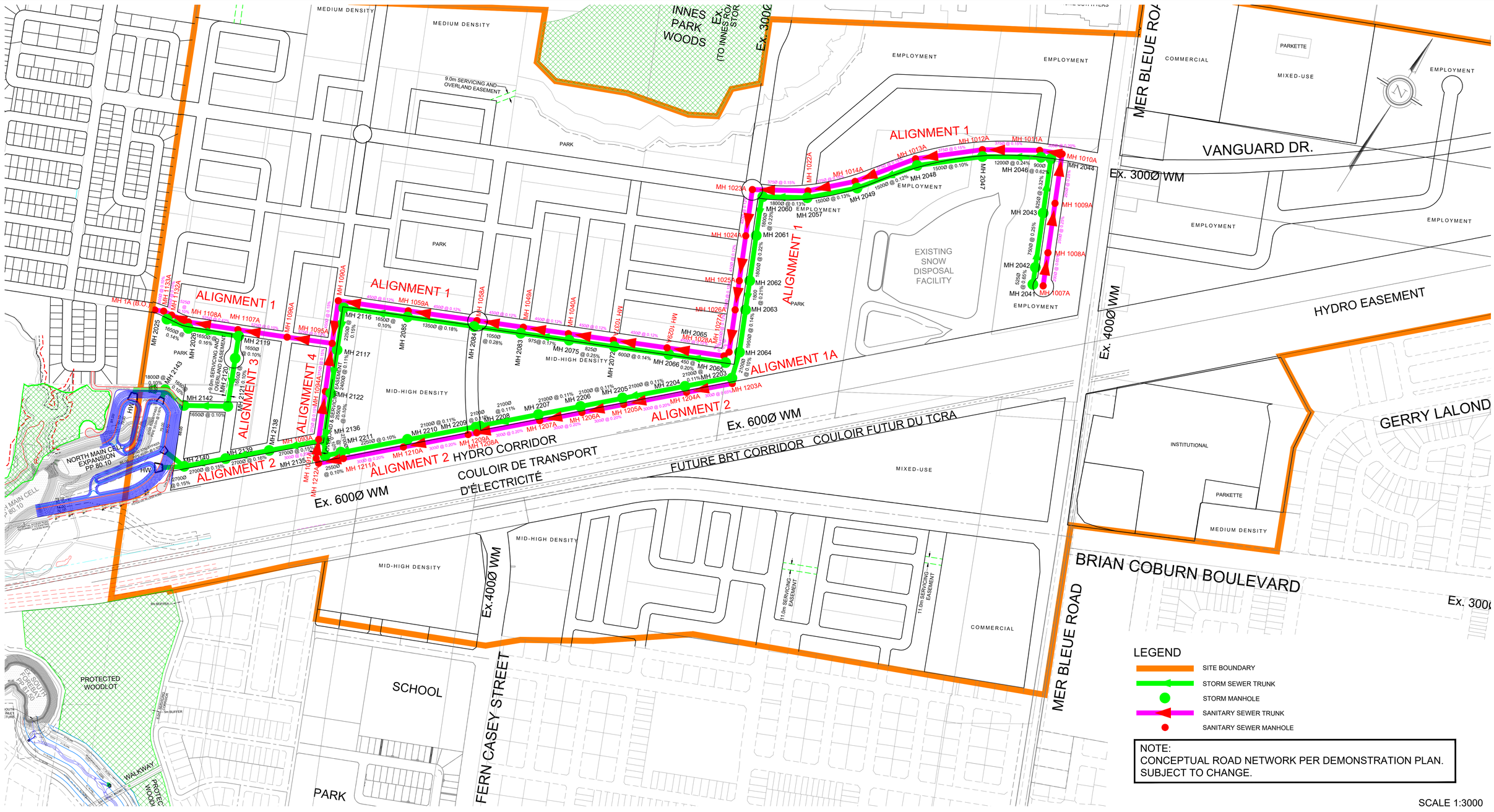


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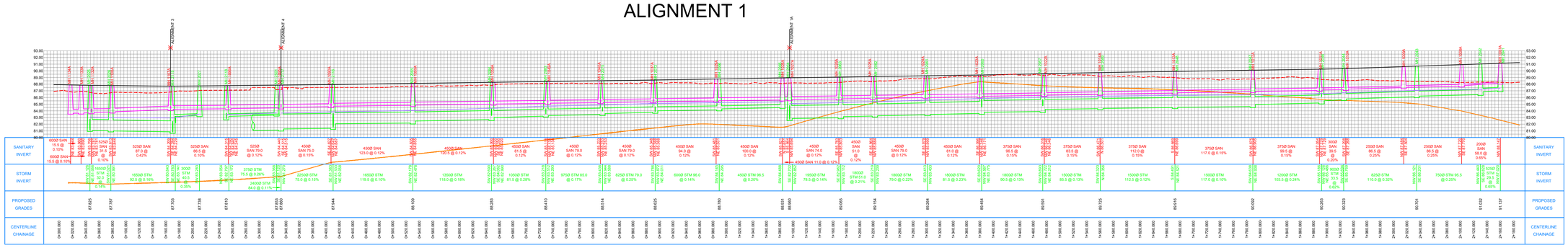
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EAST URBAN COMMUNITY PHASE 3 AREA COMMUNITY DESIGN PLAN
CONCEPTUAL STORM SERVICING

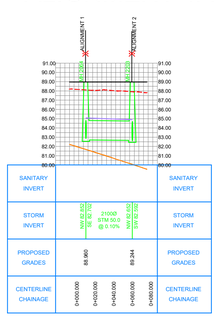
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DATE:	OCTOBER 2019
DRAWING No.	4



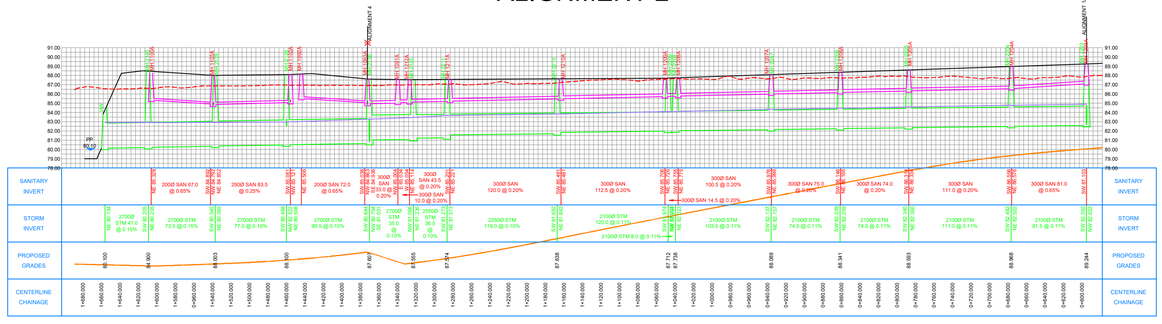
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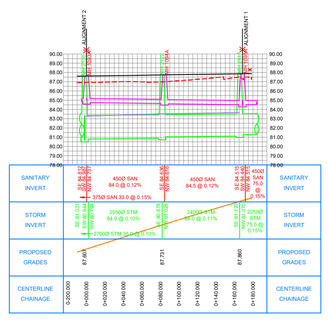
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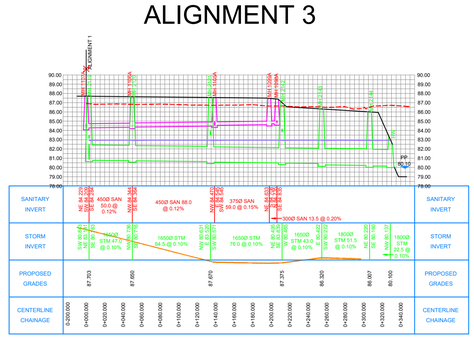
ALIGNMENT 2



ALIGNMENT 4



ALIGNMENT 3



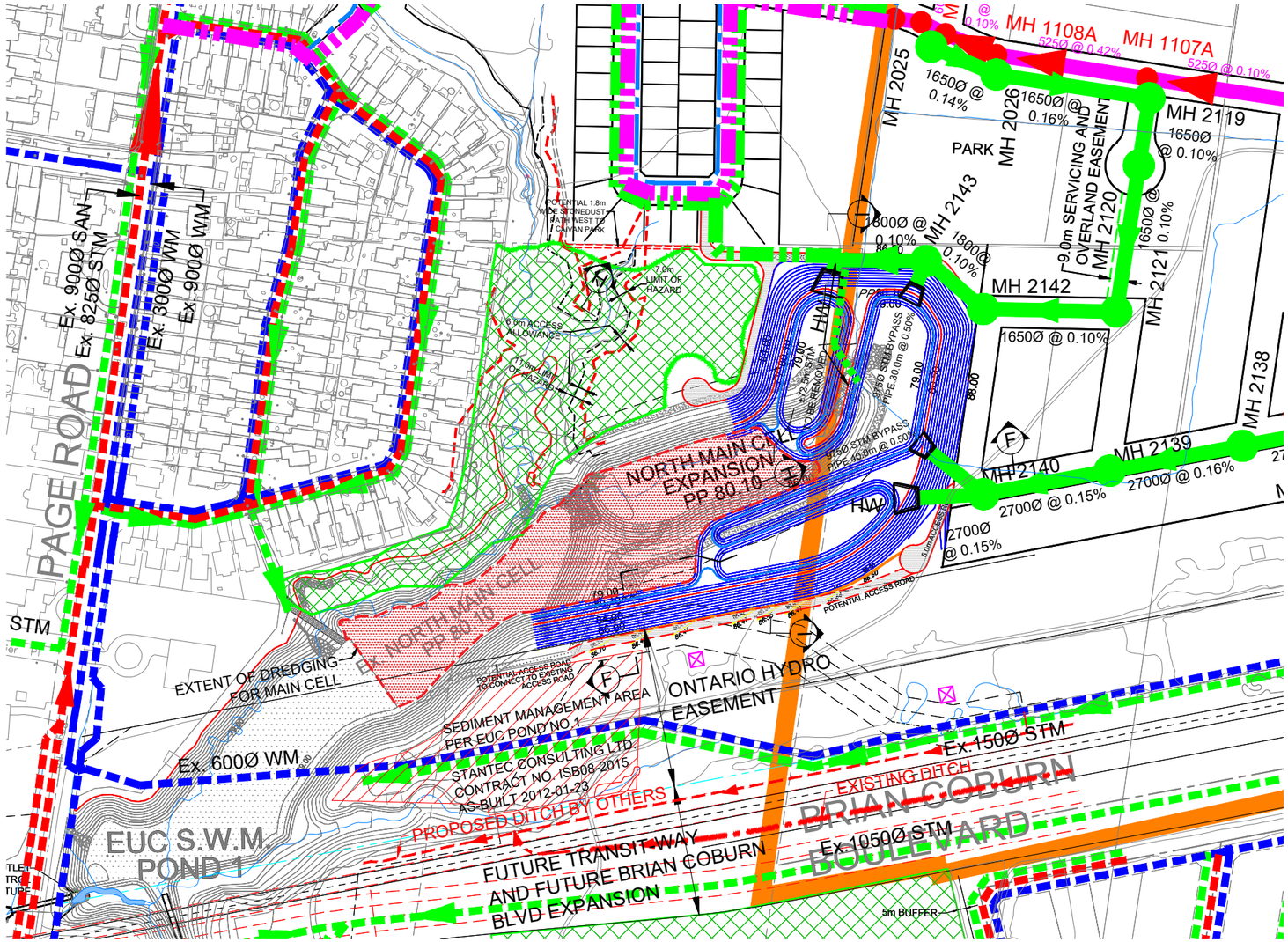
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VER. 1:300

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EAST URBAN COMMUNITY PHASE 3 AREA COMMUNITY DESIGN PLAN
STORM AND SANITARY TRUNK PROFILES
OPTION 1 - ONE POND

PROJECT No. :	14-733
SCALE:	NOT APPLICABLE
DATE:	OCTOBER 2019
DRAWING No.	3

EUC POND No. 1 PAGE ROAD SWM FACILITY
REFER TO
STANTEC CONSULTING LTD.
CONTRACT No. ISB08-2015
AS-BUILT 2012-01-23



LEGEND

- EXISTING STORM SEWER
- PROPOSED STORM TRUNK
- PROPOSED STORM SEWER
- STORM SEWER BY OTHERS
- EXISTING SANITARY SEWER
- PROPOSED SAN SEWER
- SAN SEWER BY OTHERS
- EXISTING WATERMAIN
- PROPOSED WATERMAIN
- WATERMAIN BY OTHERS
- EXISTING HYDRO TOWER
- SEDIMENT MANAGEMENT AREA

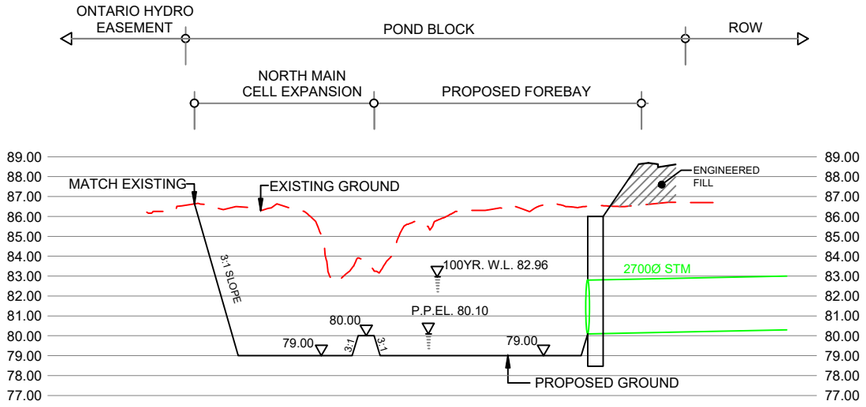
NOTE:
FOR CROSS-SECTIONS F,H, AND I,
REFER TO FIGURE 3A

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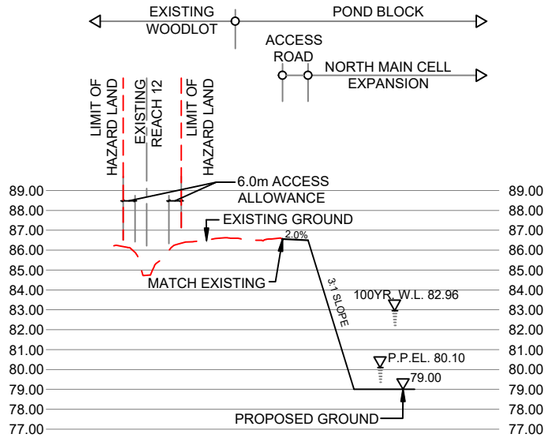
EAST URBAN COMMUNITY PHASE 3 AREA COMMUNITY DESIGN PLAN

PROPOSED SWM POND EXPANSION
CITY OF OTTAWA

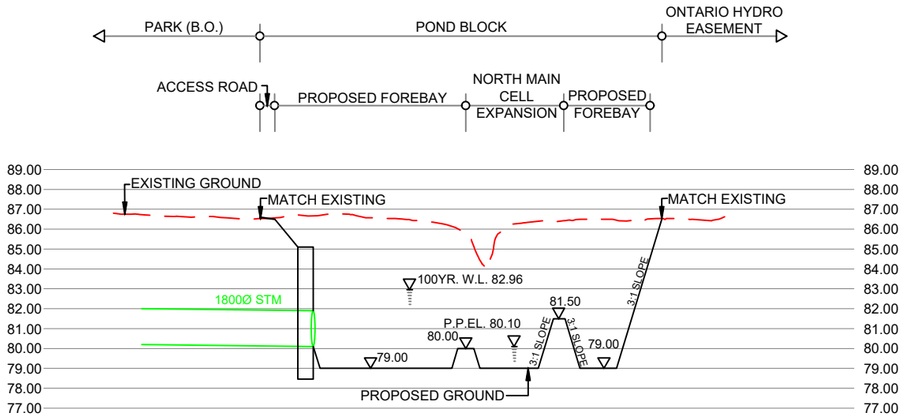
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PROJECT No.:	14-733
FIGURE	3



SECTION F-F
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VER. 1:300



SECTION H-H
SCALE HOR. 1:3000
VER. 1:300



SECTION I-I
SCALE HOR. 1:3000
VER. 1:300

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EAST URBAN COMMUNITY PHASE 3 AREA COMMUNITY DESIGN PLAN

PROPOSED SWM POND EXPANSION
CITY OF OTTAWA

DATE:	OCTOBER 2019
SCALE:	NOT APPLICABLE
PROJECT No.:	14-733
FIGURE	3A

Appendix B
Servicing Report Checklist

NOVATECH
Engineers, Planners & Landscape Architects

Development Servicing Study Checklist

Project Name: The Commons (3610 Innes Road)
Project Number:118224
Date: June 30, 2021

4.1 General Content	**Addressed (Y/N/NA)**	**Section**	**Comments**
Executive Summary (for larger reports only).	NA		
Date and revision number of the report.	Y	Cover	
Location map and plan showing municipal address, boundary, and layout of proposed development.	Y	Fig 1.1, 1.2, 1.3	
Plan showing the site and location of all existing services.	Y	GP	
Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	NA	1	
Summary of Pre-consultation Meetings with City and other approval agencies.	Y	1	
Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	Y	2.1	
Statement of objectives and servicing criteria.	Y	1	
Identification of existing and proposed infrastructure available in the immediate area.	Y	4,5,6	
Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	NA		
Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighboring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Y	GR	

4.1 General Content	Addressed (Y/N/NA)	Section	Comments
Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	NA		
Proposed phasing of the development, if applicable.	NA		
Reference to geotechnical studies and recommendations concerning servicing.	Y	2.2	
All preliminary and formal site plan submissions should have the following information:			
Metric scale	NA		
North arrow (including construction North)	NA		
Key plan	NA		
Name and contact information of applicant and property owner	NA		
Property limits including bearings and dimensions	NA		
Existing and proposed structures and parking areas	NA		
Easements, road widening and rights-of-way	NA		
Adjacent street names	NA		

4.2 Water	Addressed (Y/N/NA)	Section	Comments
Confirm consistency with Master Servicing Study, if available.	Y	6	
Availability of public infrastructure to service proposed development.	Y	6	
Identification of system constraints.	Y	6	
Identify boundary conditions.	Y	6	
Confirmation of adequate domestic supply and pressure.	Y	6	
Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Y	6	
Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	Y	6	
Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design.	N	1, 6, GP	
Address reliability requirements such as appropriate location of shut-off valves.	N	GP	
Check on the necessity of a pressure zone boundary modification.	NA		
Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range.	Y	6	
Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	Y	6, GP	
Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	NA		
Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Y	6	
Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	Y	App E	

4.3 Wastewater	Addressed (Y/N/NA)	Section	Comments
Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Y	5	
Confirm consistency with Master Servicing Study and/or justifications for deviations.	Y	5	
Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	NA		
Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Y	5	
Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Y	5	
Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	NA		
Description of proposed sewer network including sewers, pumping stations, and forcemains.	Y	5	
Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	NA		
Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	NA		
Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	NA		
Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	NA		
Special considerations such as contamination, corrosive environment etc.	NA		

4.4 Stormwater	Addressed (Y/N/NA)	Section	Comments
Description of drainage outlets and downstream constraints including legality of outlet (i.e. municipal drain, right-of-way, watercourse, or private property).	Y	4	
Analysis of the available capacity in existing public infrastructure.	NA		
A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns and proposed drainage patterns.	Y	AppC, STM	
Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Y	4	
Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Y	4	
Description of stormwater management concept with facility locations and descriptions with references and supporting information.	Y	4	
Set-back from private sewage disposal systems.	NA		
Watercourse and hazard lands setbacks.	NA		
Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	NA		
Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	Y	4	
Storage requirements (complete with calcs) and conveyance capacity for 5 yr and 100 yr events.	Y	4	
Identification of watercourse within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	Y	4	
Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Y	4	
Any proposed diversion of drainage catchment areas from one outlet to another.	NA		
Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and SWM facilities.	Y	4	
If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	NA		

4.4 Stormwater	Addressed (Y/N/NA)	Section	Comments
Identification of municipal drains and related approval requirements.	NA		
Description of how the conveyance and storage capacity will be achieved for the development.	Y	4	
100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Y	4	
Inclusion of hydraulic analysis including HGL elevations.	Y	4	
Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Y	8	
Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	Y	4	
Identification of fill constrains related to floodplain and geotechnical investigation.	NA		

4.5 Approval and Permit Requirements	Addressed (Y/N/NA)	Section	Comments
Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	Y	9	
Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	Y	9	
Changes to Municipal Drains.	NA		
Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	Y	9	

4.6 Conclusion	Addressed (Y/N/NA)	Section	Comments
Clearly stated conclusions and recommendations.	Y	10	
Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	NA		
All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario.	Y	11	

Appendix C
Storm Sewer Design Sheets and
Stormwater Management Report, prepared by J. F. Sabourin and Associates Inc.

STORM SEWER DESIGN SHEET (PRELIMINARY)

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 118224
Project Name: 3610 Innes Road (Former BMR Lands)
Date Prepared: 10/4/2019
Date Revised: 6/2/2021
Input By: Bradley Reed
Reviewed By: Sam Bahia/ Ben Sweet
Drawing Reference: Sam Bahia

Legend:
- PROJECT SPECIFIC INFO
- USER DESIGN INPUT
- CUMILATIVE CELL
- CALCULATED DESIGN CELL OUTPUT
- USER AS-BUILT INPUT

LOCATION			DEMAND																	CAPACITY							
			AREA									FLOW								PROPOSED SEWER PIPE SIZING / DESIGN							
															RAIN INTENSITY (mm/hr)					PIPE PROPERTIES							
STREET	FROM MH	TO MH	AREA ID	COMMERCIAL	HIGH DENSITY	ROAD 1	REAR YARD 1 (TOWN)	REAR YARD 2 (SINGLE/SEMI)	PARK	TOTAL AREA	WEIGHTED RUNOFF COEFFICIENT	INDIVI 2.78 AR	ACCUM 2.78 AR	TIME OF CONC	2yr	5yr	100yr	PEAK FLOW	TOTAL UNCONTROLLED PEAK FLOW (QDesign)	TOTAL RESTRICTED PEAK FLOW (Q)	LENGTH	SIZE / MATERIAL	ID ACTUAL	ROUGHNESS	DESIGN GRADE	CAPACITY	FULL FLOW VELOCITY	TIME OF FLOW	QPEAK DESIGN / QFULL
				0.90	0.80	0.70	0.50	0.45	0.25	(ha)				(min.)				(L/s)	(L/s)		(m)	(mm / type)	(m)		(%)	(L/s)	(m/s)	(min.)	(%)
Street 9	170	168	A1			0.33				0.33	0.70	0.64	0.64	10.00	76.81			49.32	49.3		93.9	375 PVC	0.381	0.013	0.35	108.2	0.95	1.65	45.6%
										0.00		0.00	0.00	10.00				0.00											
										0.00		0.00	0.00	10.00				0.00											
	168	166	B1		1.01					0.00		0.00	0.64	11.65	71.01			45.60	261.7		93.9	600 CONC	0.6096	0.013	0.35	379.0	1.30	1.21	69.1%
										1.01	0.80	2.25	2.25	11.65		96.22		216.14										
										0.00		0.00	0.00	11.65				0.00											
	166	164								0.00		0.00	0.64	12.85	67.34			43.25	248.1		32.0	600 CONC	0.6096	0.013	0.35	379.0	1.30	0.41	65.5%
										0.00	0.90	0.00	2.25	12.85		91.20		204.85										
										0.00		0.00	0.00	12.85				0.00											
	164	162	A2, B2, B3	3.43	1.02	0.24				0.24	0.70	0.47	1.11	13.26	66.19			73.42	1247.1		70.0	1050 CONC	1.0668	0.013	0.35	1685.4	1.89	0.62	74.0%
										4.45	0.88	10.85	13.10	13.26		89.62		1173.67										
										0.00		0.00	0.00	13.26				0.00											
	162	160	A3, A4, A5			0.32	0.39			0.71	0.59	1.16	2.27	13.88	64.53			146.75	1290.7		99.8	1050 CONC	1.0668	0.013	0.35	1685.4	1.89	0.88	76.6%
										0.00		0.00	13.10	13.88		87.35		1143.94										
										0.00		0.00	0.00	13.88				0.00											
	160	158	-							0.00		0.00	2.27	14.77	62.33			141.73	1246.1		14.3	1050 CONC	1.0668	0.013	0.50	2014.4	2.25	0.11	61.9%
										0.00		0.00	13.10	14.77		84.32		1104.32										
										0.00		0.00	0.00	14.77				0.00											
	158	150	A6			0.42				0.42	0.70	0.82	3.09	14.87	62.07			191.89	1291.7		108.0	1050 CONC	1.0668	0.013	0.35	1685.4	1.89	0.95	76.6%
										0.00		0.00	13.10	14.87		83.97		1099.78										
										0.00		0.00	0.00	14.87				0.00											
Street 2	156	154	A7			0.37				0.37	0.70	0.72	0.72	10.00	76.81			55.30	55.3		100.7	450 PVC	0.4572	0.013	0.35	176.0	1.07	1.57	31.4%
										0.00		0.00	0.00	10.00				0.00											
										0.00		0.00	0.00	10.00				0.00											
	154	152	-							0.00		0.00	0.72	11.57	71.27			51.32	51.3		12.6	450 PVC	0.4572	0.013	0.50	210.3	1.28	0.16	24.4%
										0.00		0.00	0.00	11.57				0.00											
										0.00		0.00	0.00	11.57				0.00											
	152	150	A8, A9, A10			0.21	0.63			0.84	0.55	1.28	2.00	11.73	70.75			141.80	141.8		59.4	525 CONC	0.5334	0.013	0.35	265.4	1.19	0.83	53.4%
										0.00		0.00	0.00	11.73				0.00											
										0.00		0.00	0.00	11.73				0.00											
Street 2	150	144	A11, A12			0.26	0.29			0.55	0.59	0.91	6.00	15.83	59.88			359.59	1420.1		76.3	1200 CONC	1.2192	0.013	0.35	2406.2	2.06	0.62	59.0%
										0.00		0.00	13.10	15.83		80.98		1060.56										
										0.00		0.00	0.00	15.83				0.00											
Street 1	148	146	A13, A14			0.42	0.39			0.00		0.00	0.00	10.00				0.00	141.6		78.5	450 PVC	0.4572	0.013	0.35	176.0	1.07	1.22	80.5%
										0.81	0.60	1.36	1.36	10.00		104.19		141.64										
										0.00		0.00	0.00	10.00				0.00											
	146	144	A15			0.10				0.00		0.00	0.00	11.22				0.00	152.5		78.7	600 CONC	0.6096	0.013	0.35	379.0	1.30	1.01	40.3%
										0.10	0.70	0.19	1.55	11.22		98.16		152.54										
										0.00		0.00	0.00	11.22				0.00											
Street 3	144	140	A16, A17			0.24	0.12			0.36	0.63	0.63	6.64	10.00	76.81			509.88	2036.4		77.3	1200 CONC	1.2192	0.013	0.35	2406.2	2.06	0.63	84.6%
										0.00		0.00	14.65	10.00		104.19		1526.49										
										0.00		0.00	0.00	10.00				0.00											
Street 3	142	140	A18, A19			0.04	0.26			0.30	0.53	0.44	0.44	10.00	76.81			33.74	33.7		20.7	250 PVC	0.254	0.013	0.65	50.0	0.99	0.35	67.4%
										0.00		0.00	0.00	10.00				0.00											
										0.00		0.00	0.00	10.00				0.00											
Street 4	140	138	A20			0.25				0.25	0.70	0.49	7.56	10.63	74.49			563.44	2043.2		113.1	1350 CONC	1.3716	0.013	0.25	2784.1	1.88	1.00	73.4%
										0.00		0.00	14.65	10.63		101.00		1479.76										
										0.00		0.00	0.00	10.63				0.00											
	138	136	A21, A22, A23				0.71		0.03	0.74	0.49	1.01	8.57	11.63	71.08			609.31	2020.5		13.7	1350 CONC	1.3716	0.013	0.50	3937.3	2.66	0.09	51.3%
										0.00		0.00	14.65	11.63		96.33		1411.23										
										0.00		0.00	0.00	11.63				0.00											
	136	128	A24, A25			0.24		0.46		0.70	0.54	1.04	9.61	11.71	70.81			680.77	2086.5		63.4	1350 CONC	1.3716	0.013	0.20	2490.2	1.69	0.63	83.8%
										0.00		0.00	14.65	11.71		95.95		1405.70										
										0.00		0.00	0.00	11.71				0.00											
Street 3	140	132	A26			0.15				0.15	0.70	0.29	0.29	10.00	76.81			22.42	22.4		53.4	300 PVC	0.3048	0.013	0.65	81.3	1.11	0.80	27.6%
										0.00		0.00	0.00	10.00				0.00											
										0.00		0.00	0.00	10.00				0.00											
Street 5	134	132	-							0.00		0.00	0.00	10.00				0.00	0.0		30.0	250 PVC	0.254	0.013	0.65	50.0	0.99	0.51	0.0%
										0.00		0.00	0.00	10.00				0.00											
										0.00		0.00	0.00	10.00				0.00											
	132	130	A27			0.17				0.17	0.70	0.33	0.62	10.51	74.91			46.65	46.6		37.4	600 CONC	0.6096	0.013	0.35	379.0	1.30	0.48	12.3%
										0.00		0.00	0.00	10.51				0.00											
										0.00		0.00	0.00	10.51				0.00											
	130	128	A28			0.18				0.18	0.70	0.35	0.97	10.99	73.21			71.24	71.2		87.4	600 CONC	0.6096	0.013	0.35	379.0	1.30	1.12	18.8%
										0.00		0.00	0.00	10.99				0.00											

STORM SEWER DESIGN SHEET (PRELIMINARY)

NOVATECH
Engineers, Planners & Landscape Architects

LOCATION			DEMAND																	CAPACITY							
			AREA									FLOW								PROPOSED SEWER PIPE SIZING / DESIGN							
															RAIN INTENSITY (mm/hr)					PIPE PROPERTIES							
STREET	FROM MH	TO MH	AREA ID	COMMERCIAL	HIGH DENSITY	ROAD 1	REAR YARD 1 (TOWN)	REAR YARD 2 (SINGLE/SEMI)	PARK	TOTAL AREA	WEIGHTED RUNOFF COEFFICIENT	INDIVI 2.78 AR	ACCUM 2.78 AR	TIME OF CONC	2yr	5yr	100yr	PEAK FLOW	TOTAL UNCONTROLLED PEAK FLOW (QDesign)	TOTAL RESTRICTED PEAK FLOW (Q)	LENGTH	SIZE / MATERIAL	ID ACTUAL	ROUGHNESS	DESIGN GRADE	CAPACITY	FULL FLOW VELOCITY	TIME OF FLOW	QPEAK DESIGN / QFULL
				0.90	0.80	0.70	0.50	0.45	0.25	(ha)				(min.)				(L/s)	(L/s)	(L/s)	(m)	(mm / type)	(m)		(%)	(L/s)	(m/s)	(min.)	(%)
Street 4	128	126	A29, A30, A31, A32			0.18		0.47	0.01	0.66	0.52	0.95	11.53	12.34	68.86			794.15										
										0.00		0.00	14.65	12.34		93.28		1366.57	2160.7		76.0	1350 CONC	1.3716	0.013	0.20	2490.2	1.69	0.75	86.8%
										0.00		0.00	0.00	12.34				0.00										
	126	124	A33			0.15				0.15	0.70	0.29	11.82	13.09	66.68			788.45										
										0.00		0.00	14.65	13.09		90.29		1322.73	2111.2		53.4	1350 CONC	1.3716	0.013	0.20	2490.2	1.69	0.53	84.8%
										0.00		0.00	0.00	13.09				0.00										
	124	122	-							0.00		0.00	11.82	13.62	65.24			771.39										
										0.00		0.00	14.65	13.62		88.31		1293.75	2065.1		16.9	1350 CONC	1.3716	0.013	0.50	3937.3	2.66	0.11	52.5%
										0.00		0.00	0.00	13.62				0.00										
	122	120	A34			0.09				0.09	0.70	0.18	12.00	13.72	64.95			779.45										
										0.00		0.00	14.65	13.72		87.92		1288.12	2067.6		24.5	1350 CONC	1.3716	0.013	0.20	2490.2	1.69	0.24	83.0%
										0.00		0.00	0.00	13.72				0.00										
	120	112	A35			0.23				0.23	0.70	0.45	12.45	13.97	64.32			800.64										
										0.00		0.00	14.65	13.97		87.06		1275.42	2076.1		91.6	1350 CONC	1.3716	0.013	0.20	2490.2	1.69	0.91	83.4%
										0.00		0.00	0.00	13.97				0.00										
Street 6	118	116	A36			0.33				0.33	0.70	0.64	0.64	10.00	76.81			49.32										
										0.00		0.00	0.00	10.00				0.00	49.3		99.6	450 PVC	0.4572	0.013	0.35	176.0	1.07	1.55	28.0%
										0.00		0.00	0.00	10.00				0.00										
	116	114	A37, A38, A39					0.74	0.03	0.77	0.44	0.95	1.59	11.55	71.33			113.33										
										0.00		0.00	0.00	11.55				0.00	113.3		11.9	450 PVC	0.4572	0.013	0.50	210.3	1.28	0.15	53.9%
										0.00		0.00	0.00	11.55				0.00										
	114	112	A40, A41			0.24		0.46		0.70	0.54	1.04	2.63	11.70	70.83			186.37										
										0.00		0.00	0.00	11.70				0.00	186.4		64.1	525 CONC	0.5334	0.013	0.35	265.4	1.19	0.90	70.2%
										0.00		0.00	0.00	11.70				0.00										
Street 6	112	104	A42, A43			0.24		0.35		0.59	0.55	0.90	15.98	14.87	62.07			992.15										
										0.00		0.00	14.65	14.87		83.98		1230.29	2222.4		69.3	1350 CONC	1.3716	0.013	0.20	2490.2	1.69	0.69	89.2%
										0.00		0.00	0.00	14.87				0.00										
Street 7	110	108	A44					0.29		0.29	0.45	0.36	0.36	10.00	76.81			27.86										
										0.00		0.00	0.00	10.00				0.00	27.9		27.7	250 PVC	0.254	0.013	0.65	50.0	0.99	0.47	55.7%
										0.00		0.00	0.00	10.00				0.00										
	108	106	A45			0.20				0.20	0.70	0.39	0.75	10.47	75.05			56.44										
										0.00		0.00	0.00	10.47				0.00	56.4		27.7	450 PVC	0.4572	0.013	0.25	148.7	0.91	0.51	38.0%
										0.00		0.00	0.00	10.47				0.00										
	106	104	A46, B4			0.22			1.00	1.22	0.33	1.12	1.88	10.98	73.25			137.34										
										0.00		0.00	0.00	10.98				0.00	137.3		98.6	525 CONC	0.5334	0.013	0.20	200.6	0.90	1.83	68.5%
										0.00		0.00	0.00	10.98				0.00										
Street 8	104	102	A47, A48, A49, A50			0.22		0.38		0.60	0.54	0.90	18.76	15.56	60.48			1134.82										
										0.00		0.00	14.65	15.56		81.80		1198.43	2333.2		41.9	1650 CONC	1.6764	0.013	0.10	3006.9	1.36	0.51	77.6%
										0.00		0.00	0.00	15.56				0.00										
	102	100	-							0.00		0.00	18.76	16.07	59.35			1113.61										
										0.00		0.00	14.65	16.07		80.25		1175.78	2289.4		13.3	1650 CONC	1.6764	0.013	0.10	3006.9	1.36	0.16	76.1%
										0.00		0.00	0.00	16.07				0.00										
	100	2121	A51, A52, A53, A54			0.10		0.48	0.02	0.60	0.49	0.81	19.57	16.23	59.00			1154.79										
										0.00		0.00	14.65	16.23		79.78		1168.78	2323.6		74.8	1650 CONC	1.6764	0.013	0.10	3006.9	1.36	0.92	77.3%
										0.00		0.00	0.00	16.23				0.00										
TO TRUNK STORM SEWER																											

DEMAND EQUATION

Q = 2.78 AIR Where : Q = Peak flow in litres per second (L/s)
A = Area in hectares (ha)
R = Weighted runoff coefficient (increased by 25% for 100-year)
I = Rainfall intensity in millimeters per hour (mm/hr)
Rainfall Intensity (I) is based on City of Ottawa IDF data presented in the City of Ottawa Sewer Design Guidelines (Oct. 2012)

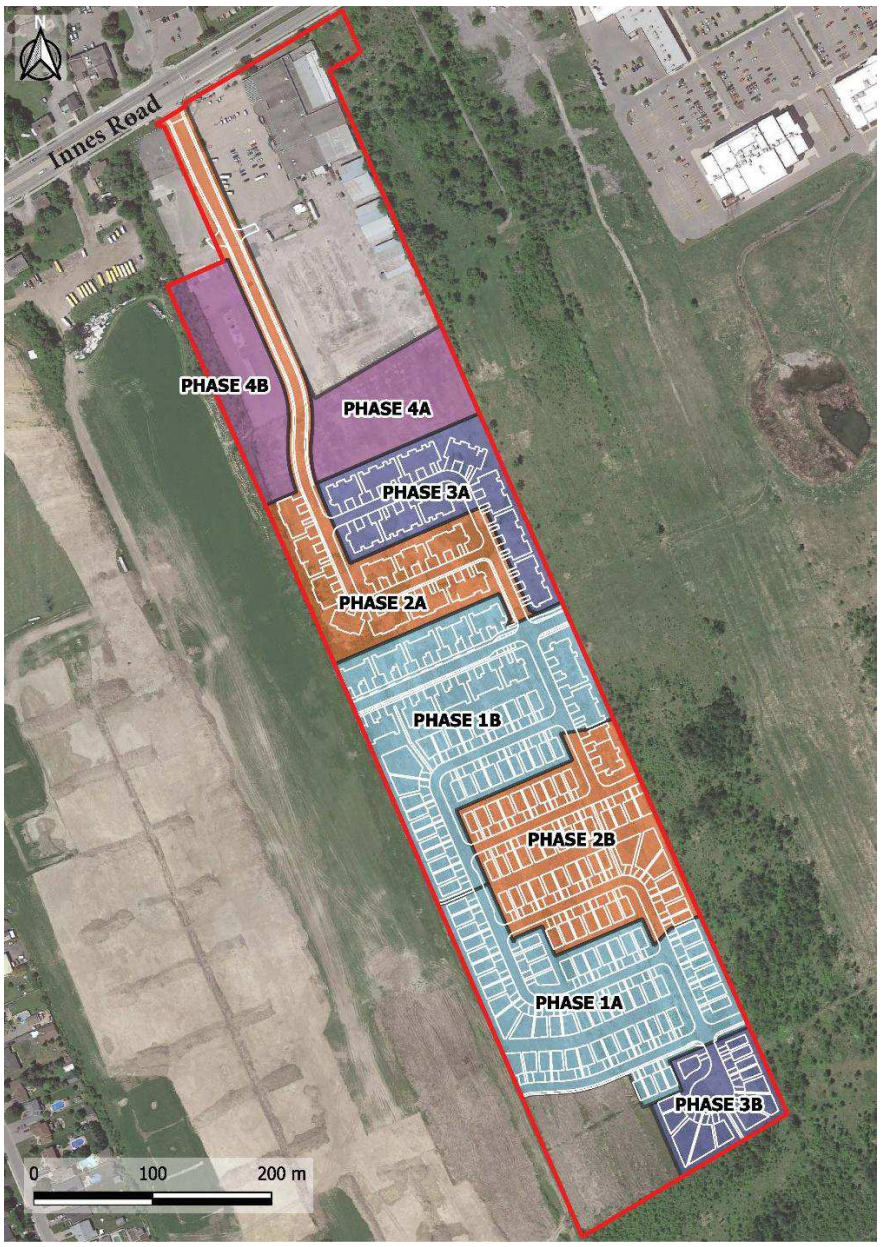
CAPACITY EQUATION

Q full= (1/n) A R^(2/3)So^(1/2) Where : Q full = Capacity (L/s)
n = Manning coefficient of roughness (0.013)
A = Flow area (m^2)
R = Wetter perimenter (m)
So = Pipe Slope/gradient

Stormwater Management Report
BMR The Commons

Novatech Engineering Consultants

June 2021



Prepared for: Novatech Engineering Consultants

Prepared by: JFSA Water Resources and Environmental Consultants

JFSA Ref. No.: 2102-21

J.F. Sabourin and Associates Inc.
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Stormwater Management Report
BMR – The Commons Subdivision

in the City of Ottawa

June 2021

Prepared for :

Novatech Engineering Consultants

Prepared by :

Tamarra Lewis, B.Eng., EIT.



Reviewed by :

Jonathon Burnett, B.Eng., P.Eng.

JFSA Ref. No.: 2102-21

Stormwater Management Report
BMR The Commons
in the City of Ottawa

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Stormwater Management Report
BMR The Commons
in the City of Ottawa
June 2021

1 INTRODUCTION AND OBJECTIVES

J.F. Sabourin and Associates Inc. (JFSA) were retained by Novatech Engineering Consultants (Novatech) to prepare a Stormwater Management (SWM) Plan for the BMR – The Commons Subdivision, located in Orleans, within the City of Ottawa. As shown by the image provided on the cover page, the future development is located at 3610 Innes Road and split into four phases. The Interim SWM scenario includes the development of Phase 1A and 1B only, and the Ultimate SWM scenario includes Phases 1 – 4. The proposed development will be serviced by the existing East Urban Community Stormwater Pond #1 (EUC SWM Pond 1) that is located southwest of the site. EUC SWM Pond 1 will discharge under Page Road and into Mud Creek.

The BMR – The Commons development has a total drainage area of 19.15 ha, including a 1.0 ha of park block, 12.75 ha of residential development, 2.0 ha of medium density development and a 3.4 ha existing U-Haul site. The proposed development will be treated by a wet pond, the EUC Pond 1. Figure 1 provides an overview of the location of these respective blocks within the subdivision.

The purpose of this report is to evaluate the major and minor system flows of the proposed BMR – The Commons residential development with respect to the City's stormwater management guidelines and to check the adequacy of the proposed pipe sizes to convey the 2-year (5-year on collector) and the 100-year storm flows from within the development and from external areas. Background documents that were reviewed in preparing this report include the following:

- *Stormwater Management Planning and Design Manual,* Ministry of the Environment, March 2003.
- *Erosion and Sediment Control Guidelines for Urban Construction,* Conservation Halton et al., December 2006.
- *City of Ottawa Sewer Design Guidelines,* City of Ottawa, October 2012.
- *Technical Bulletin ISDTB-2014-01, Revisions to Ottawa Design Guidelines – Sewer,* City of Ottawa, February 2014.
- *City of Ottawa Technical Bulletin PIEDTB-2016-01*, City of Ottawa, September 2016.
- *City of Ottawa Technical Bulletin ISTB-2018-04*, City of Ottawa, June 2018.
- *EUC SWM Pond 1 – Original ECA and Amended ECA,* David Schaeffer Engineering Limited, April 2018
- *East Urban Community / Preliminary Hydraulic Gradeline Analysis and Pond Design Addendum,* J.F. Sabourin & Associates, August 2020

- *Design Brief 3636 Innes Road C/O Amerco Real Estate Company City of Ottawa.* IBI Group, February 2020
- *Master Servicing Study for East Urban Community Phase 3 Area Community Design Plan Richcraft Homes,* David Schaeffer Engineering Limited, June 2020
- *Novatech Conceptual Site Servicing and Stormwater Management Report for 3610 Innes Road (Former BMR Lands),* Novatech Engineering Consultants, November 2020

As per the approach formalized in the September 2016 *City of Ottawa Technical Bulletin PIEDTB-2016-01*, the proposed subdivision has been designed with a 2-year minor system level of service on local roads and a 5-year level of service on collector roads (Rue De Jargeau Road). Where possible with grading and minor system capture limitations, road ponding areas up to 35 cm deep were used to contain the 100-year major system flows.

The PCSWMM computer program was used to model the major and minor systems, to ensure that all stormwater management requirements are satisfied. The general SWM design criteria and guidelines that are to be met are described in Section 2.

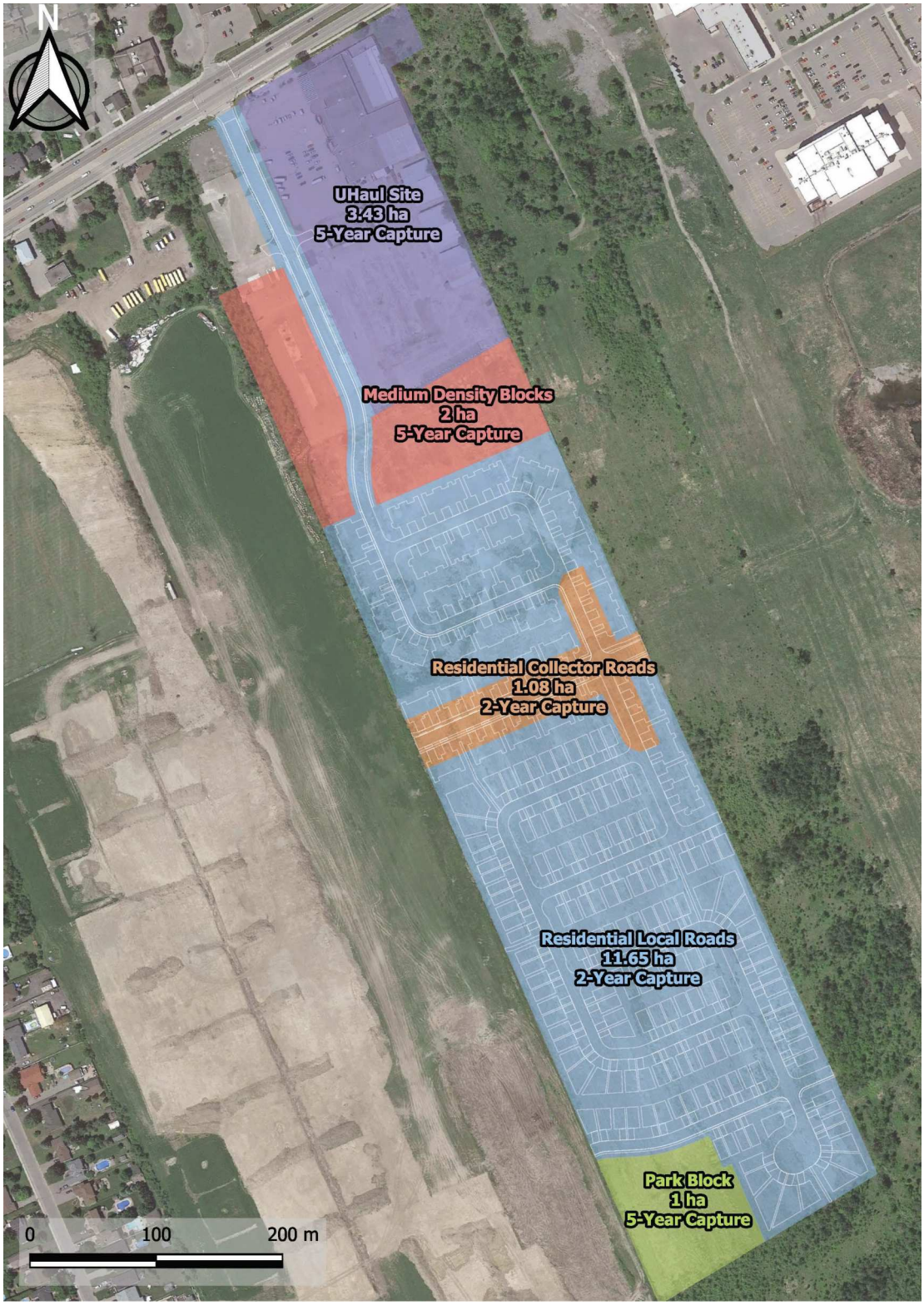


Figure 1: General Site Plan

2 DESIGN CRITERIA AND GUIDELINES

The design criteria and guidelines used for the stormwater management of the subject subdivision are those that were developed in the background documents, as well as those provided in the October 2012 *City of Ottawa Sewer Design Guidelines* and subsequent technical memorandums, and generally accepted stormwater management design guidelines.

The detailed design of the proposed BMR – The Commons development has a total drainage area of 19.15 ha with an average imperviousness of 67%. A detailed analysis of the proposed dual drainage system was required to confirm that the following general design criteria and guidelines for the minor and major systems would be met.

2.1 Minor System

a) Storm sewers are to be designed to provide a minimum 2-year level of service, plus 5-year inflows on collector roads (Rue De Jargeau Road), as seen in Figure 1 above.

b) The 100-year hydraulic grade line (HGL) within the development minor systems must be maintained at least 0.3 m below the underside of footing elevation where gravity house connections are installed.

c) For less frequent storms (i.e. larger than 1:2 year or 1:5 year on collector), the minor system shall, if required, be limited with the use of inlet control devices to prevent excessive hydraulic surcharges and to maximize the use of surface storage on the road where desired.

d) Catchbasins on the road are to be equipped with City standard type S19 (fish) grates or City standard type S22 side inlets, and grates for catchbasins in rear yards, park and open spaces with pedestrian traffic are to be City standard type S19, S30 and S31.

e) Single catchbasins are to be equipped with 200 mm minimum lead pipes, and double catchbasins are to be equipped with 250 mm minimum lead pipes.

f) Rearyard catchbasins are to be equipped with 250 mm minimum lead pipes. Catchbasins installed on the street, where rearyard catchbasins connect to the main storm sewer through the catchbasin, are to be equipped with 250 mm minimum lead pipes for both single and double catchbasins.

g) Under full flow conditions, the allowable velocity in storm sewers is to be no less than 0.80 m/s and no greater than 3.0 m/s. Where velocities over 3.0 m/s are proposed, provisions shall be made to protect against displacement of sewers by sudden jarring or movement. Velocities greater than 6.0 m/s are not permitted.

2.2 Major System

a) The major system shall be designed with enough road surface storage to allow the excess runoff of a 100-year storm to be retained within road ponding areas where desired.

b) Inlet control devices should be sized such that they do not create surface ponding on the road during the 2-year design storm on local roads (5-year design storm on collector and 10-year design storm on arterial roads); it should be noted that surface ponding over grates is present during rainfall under any design, as an appropriate depth of water is required for runoff to enter the grate (refer to Tables D-6 of Appendix D).

c) Roof leaders shall be installed to direct the runoff to splash pads and onto grassed areas.

d) For the 100-year storm, the maximum total depth of water (static + dynamic) on all roads shall not exceed 35 cm at the gutter.

e) During the 100-year + 20% stress test, the maximum extent of surface water on streets, rearyards, public space and parking areas shall not touch the building envelope.

f) When catchbasins are installed in rear yards, safe overland flow routes are to be provided to allow the release of excess flows from such areas.

g) The product of the maximum flow depths on streets and maximum flow velocity must be less than 0.60 m^2/s on all roads.

h) For the majority of the developments, the excess major system flows up to the 100-year return period are to be retained on-site in development blocks such as parks, schools, commercial, unless specified otherwise.

i) There must be at least 15 cm of vertical clearance between the spill elevation on the street and the ground elevation at the nearest building envelope that is in the proximity of the flow route or ponding area.

j) There must be at least 30 cm of vertical clearance between the rearyard spill elevation and the ground elevation at the adjacent building envelope.

3 ASSUMPTIONS AND SOURCE OF DATA USED IN THIS STUDY

Sources of information and assumptions made in this study are listed below:

- Stormwater management model: *PCSWMM (version 7.4)*
- Minor system design: *1:2 year, plus 1:5-year inflows on collector roads. See the Rational Method Calculations in Appendix A.*
- Major system design: *1:100 year*
- Max. 100-yr water depth on roads: *35 cm above the gutter*
- Extent of the major system: *Shall not touch the building envelope during the 100-year + 20% stress test*
- PCSWMM model parameters: *Fo = 76.2 mm/hr, Fc = 13.2 mm/hr, DCAY = 4.14/hr, D.Stor.Imp. = 1.57 mm, D.Stor.Per. = 4.67 mm (as per 2012 City of Ottawa Sewer Design Guidelines)*
  Detailed Area Imperviousness: based on development layout.
- Design storms: *25mm 4-hour Chicago, 2-, 5-, and 100-year 3-hour Chicago and the 100-year 24-hour SCS Type II storms as per 2012 City of Ottawa Sewer Design Guidelines; peak averaged over 10 minutes.*
- Historical Events: *July 1st, 1979; August 4th, 1988; and August 8th, 1996 events as per 2012 City of Ottawa Sewer Design Guidelines.*
- Stress Test: *20% increase in the 100-year 3-hour Chicago storm.*
- Street catchbasin covers: *City Standard Type S19 (fish) or City Standard Type S22 (side inlet). Type S19 approach flow-capture curves as per MTO design charts (equivalent to OPSD 400.010). Type S22 approach flow-capture curves as per the 2004 City of Ottawa Guidelines.*
- Rearyard catchbasin covers: *City Standard Type S19, S30 and S31*
- Curb and gutter: *City Standard SC1.3 (mountable) and SC1.1 (barrier). In the absence of flow capture curves for these curbs and gutters, OPSD 600.010 curb and gutters are assumed.*
- Manning's' roughness coeff.: *0.013 for concrete and 0.024 for PVC pipes (free flow).*
- Minor system losses: *Refer to Appendix C for maintenance hole loss coefficients.*
- Underside of footing elevations: *As provided by Novatech.*
- Freeboard in HGL analysis: *0.3 m between the underside of footing elevation and 100-year hydraulic gradeline.*
- Inlet Control Devices: *Refer to Appendix B for Plas-Tech ICD details.*
- Depth of backyard swales: *As per Novatech's Grading Plan*
- Street and pipe dimensions: *As per Novatech's Plan and Profiles*
- Right-of-way characteristics: *As per Novatech's Details of Roads*
- Downstream HGL: *Boundary condition set at STM-2121 as per JFSA East Urban Community/Preliminary HGL analysis and Pond Design Addendum, August 2020.*

4 ULTIMATE CONDITIONS PROPOSED MINOR AND MAJOR SYSTEM DRAINAGE

The proposed minor and major system drainage routes are shown in plan view in Figures 2 and 3. The residential areas where enough detail was available were modelled in PCSWMM.

As per City standards, the minor system has been designed to accommodate a minimum of the 2-year post-development flows from within the site and local roads, plus 5-year inflows on collector roads, the medium density areas and the U-Haul area. A Rational Method design was conducted by Novatech (refer to Appendix A) to estimate minor system flows based on the City of Ottawa IDF relationship and selected runoff coefficients. The rational method 5-year inflows were used to determine the release rates for the medium density and U-Haul lands.

The minor system release rates from the 1.0 ha parklands area were assumed to be 5-year capture to the minor system with on-site storage up to the 100-year event with any excess flows to Rue De Beaugency street to the North of the park. The U-Haul land on the Northeast corner of the site was limited to the 5-year capture and 100-year storage on-site. The on-site storage volumes were determined by the IBI Group in the Pond Design Brief (Feb, 2020) and were then used in JFSA's PCSWMM model. The medium density blocks were limited to the 5-year capture, with onsite storage provided up to the 100-year event as determined in the MSS (June, 2020) and Novatech Conceptual Design (Nov, 2020). The collector road (Rue De Jargeau Road) was limited to the 5-year rational method as per the MSS (June, 2020) and Novatech Conceptual Design (Nov, 2020).

As noted earlier in this report, where possible with grading limitations, road ponding areas up to 35 cm deep were used to contain the 100-year major system flows in the development. Note that rearyard catchbasins were connected to catchbasins on the road where possible, to allow rearyard runoff access to the storage in road ponding areas at regular intervals. In a design of this type where lots are serviced by gravity house connections, inlet control devices (ICDs) can be used to limit minor system capture at each catchbasin to the appropriate level of service.

Within the development, circular orifice plate type Inlet Control Devices (ICDs) of City standard diameters 83 mm, 94 mm, 102 mm, 108 mm, 127 mm, 152 mm and 178 mm will be used to limit minor system capture to a minimum of the 2-year flow (refer to Appendix B for Plas-Tech ICD details), allowing for sub-surface storage of 0.5 m^3 in single catchbasins, 1.0 m^3 in double catch basins, and 1.9 m^3 in catchbasin manholes. Note that this subsurface catchbasin storage has not been included in the modelling to be conservative.

The street segments within the proposed development have been designed using a 'saw tooth' or 'sagged' road profile. The runoff from within these segments will be conveyed to catchbasins located at the lowest point within the street segment. Flows more than the catchbasin capture rate will be temporarily stored within the 'sagged' street segments and released slowly to the storm sewers, up to the 100-year design storm. When the storage on a specific street segment is surpassed due to blockage or an event greater than the 100-year storm, the excess water will flow towards the next downstream street sag, and eventually to the pond. It should be noted that the

major system would outlet during the 100-year + 20% stress test without flooding any of the properties within the subdivision.

If the drainage system's capacity to capture surface flows is exceeded, Figures 5A-5C via Novatech present the maximum extent of static surface ponding and volume on the streets based on grading. Additionally, surface storage volumes that may exist in the rear yards have not been considered in this model, and the runoff from these areas have been directed straight to the catchbasins that the rear yard swales will discharge to. This has been completed to ensure that the peak flows and ponding volumes calculated in the model are conservative.

The PCSWMM analyses, discussed in Sections 4.1 and 4.2, have demonstrated that the proposed drainage system for the subdivision will have sufficient capacity to control the excess flow during a 100-year storm and safely capture and convey the 2-year (plus 5-year on collector roads) flow to the pond.

4.1 Ultimate Conditions Major System and SWM Analysis

The PCSWMM computer program was used to model the major and minor system flows within the proposed development.

The PCSWMM model was developed based on the information provided in Figures 2, 3, and 4. Eight (8) simulations were conducted, one for each of the following rainfall events:

i) the 2-year, 3-hour Chicago storm;
ii) the 5-year, 3-hour Chicago storm;
iii) the 100-year, 3-hour Chicago storm;
iv) the 100-year, 24-hour SCS Type II storm
v) the July 1st, 1979 historical event;
vi) the August 4th, 1988 historical event;
vii) the August 8th, 1996 historical event; and
viii) the 100-year, 3-hour Chicago storm + 20%.

Note that the purpose of simulating the 100-year, 3-hour Chicago storm with a 20% increase is to stress test the drainage system for potential flooding, as per the October 2012 City of Ottawa Sewer Design Guidelines. The depression storage and infiltration parameters in the PCSWMM model are as per the October 2012 City of Ottawa Sewer Design Guidelines. The percent imperviousness of the detailed drainage areas was measured based on the proposed development layout. The proposed development layouts have been established based on zoning requirements and represent the largest allowable footprint on each lot. JFSA measured the impervious area in each catchment discreetly, and as such, the percent impervious values can be considered to be based on zoning. The percent imperviousness of undetailed (lumped/external) drainage areas were calculated based on the runoff coefficient (C), where C = 0.7 x imperviousness ratio + 0.2. Figure 2 provides an overview of the subcatchments, and Table D-3 provides a full summary of all subcatchment parameters modelled in PCSWMM, respectively.

Within the model, all CB grates have been explicitly represented using orifice connections, with the opening dimensions and configuration (side/bottom inlet) reflective of each specific grate. The grate allows flows into the CB based on the individual hydraulic properties of each specific grate configuration.

Where required, inflows are limited by circular orifice plate type Inlet Control Devices (ICDs) of City standard diameters 83 mm, 94 mm, 102 mm, 108 mm, 127 mm, 152 mm and 178 mm. Each of these ICDs has been explicitly represented in the model through the use of circular orifices reflective of the standard ICD dimensions. Note that 200 mm diameter lead pipes were assumed and are required between single catchbasins and the storm sewers, and 250 mm diameter lead pipes were assumed and are required between rearyard catchbasins or single catchbasin maintenance holes and the storm sewers. No temporary CBs are required within the development, note that the proposed ICDs are the controlling feature into the minor system, not the lead pipe, as such only the ICD has been represented in the model. Refer to Table B-1 for ICD's control rates, D-4A & D-4B for grate capacity, and D-5C to lead pipe flows.

Within the proposed subdivision, the dynamic flow depth on the road (at the gutter) will be minimal during the 100-year storms, as the 100-year flows are mostly retained within the road ponding areas and do not accumulate as in a typical subdivision design. Furthermore, it was determined that for the 100-year storm at all major system segments, the product of the depth of water (m) at the gutter multiplied by the velocity of flow (m/s) will not exceed the maximum allowable 0.6 m^2/s (refer to Table D-8 of Appendix D, where the calculated maximum was determined to be 0.056 m^2/s). Table D-9 of Appendix D presents the stress test results for dynamic flow depth on the road based on a 20% increase in the 100-year storm, as per the October 2012 *City of Ottawa Sewer Design Guidelines*. As shown in Table D-9, the maximum dynamic flow depth under these conditions is calculated as 0.28 cm, and the product of the depth of water at the gutter multiplied by the velocity of flow is 0.07 m^2/s. Table 1 below presents a summary of the major system results within the development simulated in PCSWMM during the 100-year Chicago storm.

Details of the 100-year street maximum water depth and water surface elevations are provided in Table D-7 of Appendix D. Based on Novatech's grading the major system has approximately 920 m^3 of storage at these localized low points throughout the development (see Figures 6A-6C). Depths calculated by the PCSWMM model demonstrate that the total 100-year depth of water (static and dynamic) on the street at these ponding areas will not exceed the maximum depth of 35 cm.

Table D-7 of Appendix D also presents the street storage stress test results based on a 20% increase in the 100-year storm, as per the October 2012 *City of Ottawa Sewer Design Guidelines*. As shown in Table D-7, the maximum depth of water (static + dynamic overflow) at any ponding area under these conditions is calculated as 30 cm. The maximum extent of surface water during the 100-year + 20% stress test will not touch the building envelopes, refer to Novatech drawings for the flood extent of these ponding depths provided in Figures 6A-6C.

Table 1: Summary of Major System Results for the 100-Year 3-Hour Chicago Storm

Catch Basin ID	Flow Depth (m)	Approach Flow (m^3/s)	Captured Flow (m^3/s)
10_(CB)	0.16	0.040	0.028
11_(CB)	0.16	0.040	0.040
12_(CB)	0.10	0.034	0.020
13_(CB)	0.10	0.034	0.020
14_(CB)	0.04	0.018	0.017
15_(CB)	0.04	0.018	0.017
16_(CB)	0.09	0.028	0.020
17_(CB)	0.09	0.028	0.020
18_(CB)	0.09	0.030	0.020
19_(CB)	0.09	0.030	0.020
2_(CB)	0.08	0.029	0.020
20_(CB)	0.26	0.053	0.036
21_(CB)	0.26	0.053	0.032
22_(CB)	0.12	0.042	0.021
23_(CB)	0.12	0.042	0.020
25_(CB)	0.20	0.057	0.021
26_(CB)	0.20	0.057	0.021
27_(CB)	0.04	0.022	0.009
28_(CB)	0.04	0.022	0.009
29_(CB)	0.13	0.092	0.050
3_(CB)	0.08	0.029	0.020
30_CB-C	0.13	0.092	0.051
32_(CB)	0.05	0.045	0.032
33_(CB)	0.05	0.045	0.017
35_(CB)	0.18	0.036	0.048
36_(CB)	0.13	0.070	0.034
37_(CB)	0.13	0.070	0.034
38_(CB)	0.16	0.051	0.019
39_(CB)	0.16	0.051	0.021
4_(CB)	0.10	0.034	0.019
40_(CB)	0.13	0.037	0.020
41_(CB)	0.13	0.037	0.021
42_(CB)	0.14	0.050	0.026
43_(CB)	0.14	0.050	0.020
44_(CB)	0.04	0.021	0.020
45_(CB)	0.04	0.021	0.020
46_(CB)	0.10	0.029	0.021
47_(CB)	0.10	0.029	0.020
48_(CB)	0.11	0.032	0.020
49_(CB)	0.11	0.032	0.019
5_(CB)	0.10	0.034	0.019
50_(CB)	0.13	0.053	0.028
51_(CB)	0.13	0.053	0.027
53_(CB)	0.16	0.060	0.026
54_(CB)	0.16	0.060	0.027
55_(CB)	0.11	0.033	0.020
56_(CB)	0.11	0.033	0.020
57_CB	0.17	0.058	0.020
8_(CB)	0.11	0.036	0.020
9_(CB)	0.11	0.036	0.043

4.2 Ultimate Conditions Minor System and Hydraulic Gradeline Analysis

The minor system analysis was completed using the PCSWMM program based on the peak flows captured during the rainfall events. Note that the storm sewer design is as provided by Novatech, and a Manning's roughness coefficient of 0.013 was used for concrete and PVC storm sewer pipes. Refer to Appendix C for maintenance hole loss coefficients used in the PCSWMM model.

The minor system performance was analyzed using a dynamic water surface elevation time-series at STM-2121 unique for each design storm based on the HGL determined in JFSA's *"East Urban Community/Preliminary HGL analysis and Pond Design Addendum, August 2020"*. Table 2 presents the peak minor system outflows obtained with the above-mentioned simulations.

Table 2: Comparison of Ultimate Minor System Flows (3-Hour Chicago Storm) to the Pond from The Commons Development

Location	Novatech Rational Method Flow (m^3/s)	2-Year PCSWMM Flow (m^3/s)	5-Year PCSWMM Flow (m^3/s)	100-Year PCSWMM Flow (m^3/s)
STM-2121 to Pond	2.32	1.73	2.41	3.34

Table 2 shows that the total 2-year flows simulated by the PCSWMM models are between the 2-year and 5-year PCSWMM flows. This is to be expected as the majority of the site is serviced by the 2-year storms with some locations within the development serviced by the 5-year storm.

The PCSWMM simulations have determined that for the selected 2-, 5- and 100-year 3-Hour Chicago storms, the total minor system flows from the BMR – The Commons development would be 1.73 m^3/s, 2.41 m^3/s and 3.34 m^3/s, respectively. Although the 100-year flow will surcharge some of the minor system, with the majority being in the rear yard swales, a freeboard of 0.3 m between the 100-year hydraulic grade line and the underside of footings has been provided throughout the proposed development.

Tables C-1A and C-1E of Appendix C summarizes the pipe data and hydraulic simulation results for the 100-year 3-hour Chicago storm, 100-year 24-hour SCS Type II storm and the three historical events. Note that a minimum freeboard of 0.3 m between the hydraulic grade line and the underside of footings has been provided throughout the proposed developments for the 100-year storms, and a minimum freeboard of 0 m has been provided throughout the proposed development for the historical events. Additionally, note that the majority of the flowing full pipe velocities are no less than 0.80 m/s and no greater than 3.0 m/s. If velocities are over 3.0m/s, provisions shall be made to protect against displacement of sewers by sudden jarring or movement. Velocities greater than 6.0 m/s are not permitted.

Table C-1F of Appendix C presents the climate change stress test results for the hydraulic grade line analysis based on a 20% increase in the 100-year storm, as per the October 2012 *City of Ottawa Sewer Design Guidelines*. Under these conditions, no locations within the proposed developments have a USF freeboard less than 0 m.

Table 3 presents the Ultimate composite hydraulic grade line results for the 100-year 3-hour Chicago and 100-year 24-hour SCS Type II design storms. Note to simplify this analysis, the highest HGL and the lowest USF on a single pipe length are compared, if it is found that the freeboard between these two locations is either less than 0.3m or less than 0.0m this location is flagged yellow or red, respectively. This flag then initiates a detailed analysis for this segment, where the HGL is interpolated along the full length of the pipe and then compared with the individual USF along with the distance, to confirm whether there is an HGL issue along that segment.

Table 3: Composite Hydraulic Gradeline Results for 100-Year Design Storms

U/S MH	D/S MH	Max. U/S HGL (m)	Max. D/S HGL (m)	Lot Number	USF (m)	Freeboard [2] (m)	Interpolated HGL		
							Length HGL (m)	Dist. From D/S MH (m)	HGL (m)
102_(STM)	100_(STM)	82.861	82.925	145	85.65	2.789			
104_(STM)	102_(STM)	82.833	82.861	139	85.7	2.867			
106_(STM)	104_(STM)	84.060	82.833	20	85.9	1.840			
108_(STM)	106_(STM)	84.079	84.060	28	86.1	2.021			
110_(STM)	108_(STM)	84.426	84.105	26	86.1	1.674			
112_(STM)	104_(STM)	83.220	82.833	18	85.95	2.730			
114_(STM)	112_(STM)	84.076	83.220	113	86.05	1.974			
116_(STM)	114_(STM)	84.111	84.076	108	86.5	2.389			
118_(STM)	116_(STM)	84.360	84.111	93	86.4	2.040			
120_(STM)	112_(STM)	83.958	83.220	9	86.1	2.142			
122_(STM)	120_(STM)	84.037	83.958	47	86.25	2.213			
124_(STM)	122_(STM)	84.071	84.037	49	86.5	2.429			
126_(STM)	124_(STM)	84.248	84.071	3	86.5	2.252			
128_(STM)	126_(STM)	84.460	84.248	56	86.7	2.240			
130_(STM)	128_(STM)	84.608	84.460	115	86.85	2.242			
132_(STM)	130_(STM)	84.699	84.608	122	87.3	2.601			
134_(STM)	132_(STM)	85.104	84.859	125	87.4	2.296			
136_(STM)	128_(STM)	84.595	84.460	63	86.8	2.205			
138_(STM)	136_(STM)	84.609	84.595	70	87.05	2.441			
140_(STM)	138_(STM)	84.885	84.609	76	87.1	2.215			
142_(STM)	132_(STM)	85.244	84.859	113	87.35	2.106			
142_(STM)	140_(STM)	85.244	84.885	92	87.45	2.206			
144_(STM)	140_(STM)	85.247	84.885	91	87.45	2.203			
146_(STM)	144_(STM)	85.549	85.247	94	87.7	2.151			
148_(STM)	146_(STM)	85.995	85.549	97	87	1.005			
150_(STM)	144_(STM)	85.519	85.247	114	87.7	2.181			
152_(STM)	150_(STM)	85.842	85.519	115	87.9	2.058			
154_(STM)	152_(STM)	85.843	85.842	117	88.3	2.457			
156_(STM)	154_(STM)	86.198	85.843	118	88.2	2.002			
158_(STM)	150_(STM)	86.077	85.519	103	88	1.923			
160_(STM)	158_(STM)	86.119	86.077	106	88.4	2.281			
162_(STM)	160_(STM)	86.538	86.119	107	88.4	1.862			

[2] Conservative estimate of freeboard based on U/S HGL and lowest USF connected to pipe. Actual HGL / freeboard at all connecting lots interpolated where conservative estimate does not meet freeboard requirements.

[3] Future USF elevations estimated as 1.8 m below the upstream top of manhole elevations.

Interpolated HGL elevation

Freebaord Less than 0.3m

Freebaord Less than 0.0m

5 PERFORMANCE OF INTERIM B EUC POND 1

As detailed in the March 2014 *Design Brief for the Reconstruction of the East Urban Community Stormwater Management Pond 1 for the Trails Edge Subdivision*, East Urban Community (EUC) Pond 1 has been modified for Interim B conditions to support the development of the Trails Edge subdivision south of the hydro easement, and the extension of Brian Coburn Boulevard. Undeveloped area and existing commercial areas north of the hydro easement also drain to Pond 1 under Interim B conditions.

The Orleans Village and BMR - The Commons sites north of the hydro corridor were treated as undeveloped under Interim B conditions in the March 2014 *Design Brief* and lumped in with the development of the East Urban Community lands to the north of the hydro corridor, which will trigger an "Ultimate Conditions" expansion of the north main cell and north forebay in EUC Pond 1. However, it was proposed in the July 2018 *Stormwater Management Report for the Orleans Village Subdivision* that the development of Orleans Village be allowed under Interim B conditions, with the understanding that the 100-year water level in EUC Pond 1 would increase temporarily under these conditions. A maximum 100-year pond level of 83.05 m was reported for these conditions in the July 2018 *Stormwater Management Report for the Orleans Village Subdivision*; 5 cm above the target 100-year pond level of 83.00 m. All other quality, erosion and quantity control requirements identified in the March 2014 *Design Brief* are satisfied under these conditions. The Interim B drainage area to EUC Pond 1 as proposed in the July 2018 *Stormwater Management Report for the Orleans Village Subdivision* is presented in Figure E-1 of Appendix E of the current report. Refer to the July 2018 *Stormwater Management Report for the Orleans Village Subdivision* for further details.

It is proposed as part of the current study that the development of Phase 1 of BMR - The Commons be permitted under Interim B conditions, similar to Orleans Village, in exchange for Orleans Village mixed-use block 148 and future residential block 147 remaining undeveloped until the ultimate conditions expansion of the north main cell and north forebay in EUC Pond 1. Orleans Village mixed-use block 148 is identified as area B013DV2 in Figure E-1 of Appendix E (2.535 ha at 93% imperviousness), and Orleans Village future residential block 147 is identified as area B015RE2 in Figure E-1 of Appendix E (2.165 ha at 79% imperviousness). For comparison, Phase 1 of BMR - The Commons is 5.817 ha at 59% imperviousness.

To evaluate the performance of EUC Pond 1 under these proposed conditions, the PCSWMM model of BMR - The Commons was modified to represent interim conditions wherein only Phase 1 is developed, with 100-year capture to the minor system of undeveloped future phases and the existing commercial area to the north (refer to Figure 5). Similarly, the DDSWMM / SWMHYMO / XPSWMM model of drainage to EUC Pond 1 under Interim B conditions from the July 2018 *Stormwater Management Report for the Orleans Village Subdivision* was modified to remove the area occupied by the BMR - The Commons development (to avoid double-counting this area), and to represent Orleans Village areas B013DV2 and B015RE2 as undeveloped. The simulated outflow from the interim conditions model of BMR - The Commons Phase 1 was then input to the modified XPSWMM model of the EUC Pond 1 system under Interim B conditions.

The operation of Interim B EUC Pond 1 under these proposed conditions – Interim B + Orleans Village development (areas B013DV2 and B015RE2 undeveloped) + BMR – The Commons Phase 1 development – are summarized in Table 4 below.

Table 4: Summary of SWM Pond 1 Operating Characteristics
Under Interim B Conditions (+ BMR - The Commons Phase 1)

Pond Component	Water Level (m)				Volume Used [2] (m^3)	Allowable Outflow [3] (m^3/s)	Provided Outflow (m^3/s)
	North Forebay	North Main Cell	South Forebay	South Main Cell			
Permanent Pool [4]	81.600	80.100	81.500	80.100	36400	N/A	N/A
Quality Control	N/A	80.684	N/A	80.684	14892	N/A	0.204
Extended Detention	81.650	81.650	81.650	81.650	43988	N/A	0.383
2-Year, 24-Hour SCS	81.955	81.826	81.946	81.826	53634	1.000	0.536
5-Year, 24-Hour SCS	82.210	82.210	82.210	82.210	69580	2.300	1.125
10-Year, 24-Hour SCS	82.431	82.431	82.431	82.431	80155	3.800	1.641
25-Year, 24-Hour SCS	82.667	82.667	82.668	82.668	91936	5.600	3.281
50-Year, 24-Hour SCS	82.833	82.833	82.836	82.835	100446	6.700	4.883
100-Year, 24-Hour SCS [5]	83.009	83.009	83.016	83.016	109770	8.000	6.847
July 1st, 1979 Event	83.117	83.117	83.123	83.123	115111	N/A	8.154
August 4, 1988 Event	82.915	82.914	82.918	82.917	104748	N/A	5.758
August 8, 1996 Event	82.825	82.825	82.827	82.827	100013	N/A	4.799

[2] Volumes are active storage only for all SWM facility components except the permanent pool.
[3] Refer to the March 2014 Design Brief for target release rates and volumes.
[4] Bottom elevations are 79.00 m in the north main cell, 79.10 m in the south main cell, 79.50 m in the north forebay and 80.00 m in the south forebay.
[5] Maximum allowable 100-year pond level = 83.0 m in the main cell (per the April 2008 "East Urban Community Pond No. 1 Design Brief" by Stantec).

The above results show that the actual provided release rates do not exceed the allowable release rates for SWM Pond 1. Note that the maximum 100-year pond level is 83.02 m; 2 cm above the target 100-year water level of 83.0 m.

Interim B EUC Pond 1 has been equipped with two sediment forebays. Calculations for the minimum dispersion length, settling length and the average velocity in the north and south forebays under these Interim B conditions are presented in Calculation Sheets E-2 and E-3 of Attachment E. Note that the south forebay is not negatively affected by the Orleans Village and BMR - The Commons Phase 1 developments, as the proposed developments discharge to the north main cell and forebay of EUC Pond 1. Dispersion, setting and average velocity criteria are satisfied by the existing north forebay under these proposed conditions.

EUC SWM Pond 1 has a permanent pool volume of 36,400 m^3, which is more than the minimum permanent pool volume the SWMP Design Manual requires for normal protection for a wet pond for the 372.298 ha drainage area at 42% imperviousness, as calculated below.

$$(97.00 - 40)\ m^3/ha \times 372.298\ ha = 21{,}221\ m^3$$

The required quality control volume of 14,892 m^3 (40 m^3/ha) for the 372.298 ha drainage area is contained within the extended detention volume at an elevation of 80.684 m. The provided extended detention volume of 43,988 m^3 exceeds the required volume of 33,922 m^3 calculated based on detention of the 25 mm storm runoff.

It may therefore be concluded that the operation of EUC SWM Pond 1 under Interim B conditions, with the Orleans Village (with areas B013DV2 and B015RE2 undeveloped) and BMR The Commons Phase 1 developments in place, is in conformance with the requirements presented in the March 2014 *Design Brief for the Reconstruction of the East Urban Community Stormwater Management Pond 1 for the Trails Edge West Subdivision*, except for the 100-year pond level, which exceeds the maximum allowable elevation by 2 cm.

EROSION AND SEDIMENT CONTROL DURING AND AFTER CONSTRUCTION

Silt and erosion control strategies shall be implemented during construction activities to minimize the transfer of silt off-site. The following measures should be implemented:

i) Silt control fences shall be installed as required to prevent the movement of silt off-site during rainfall events.

ii) Construction of a mud mat shall be installed at the site entrance to promote self-cleaning of truck tires when leaving the site.

iii) All catch basins shall be equipped with a crushed stone filter to prevent the capture of silt in the storm sewer system.

iv) Regular cleaning of the adjacent roads shall be undertaken during the construction activities.

v) Regular inspection and maintenance of the silt control measures shall be undertaken until the site has been stabilized.

vi) The erosion and sediment control devices shall be removed after the site has been stabilized.

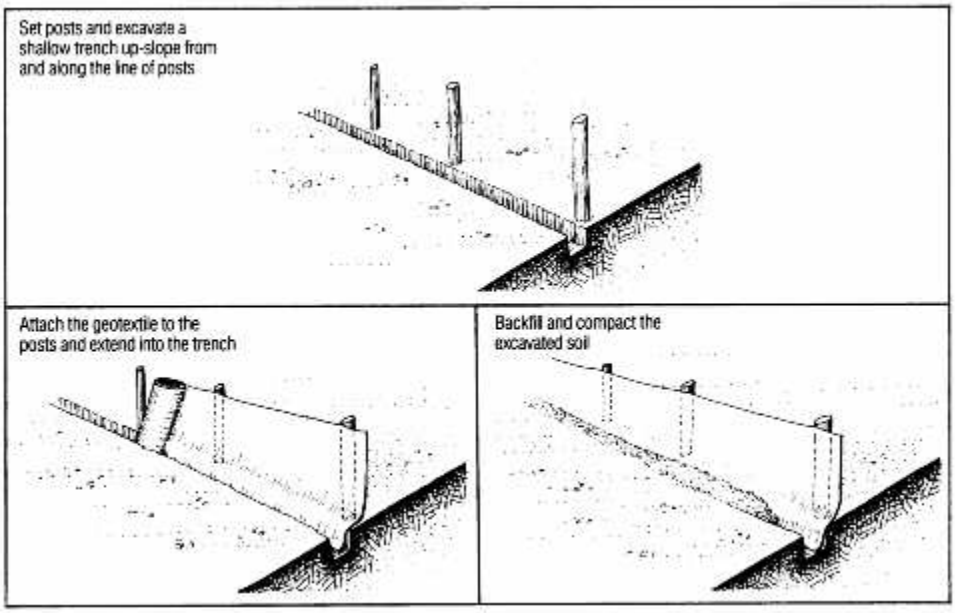


Figure 7: Typical installation of silt fences

6 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The BMR – The Commons development is in the City of Ottawa, on Innes Road and east of Page Road. The development has a drainage area of 19.15 ha, which will be treated by a wet SWM pond for quantity and quality control, which services a total drainage area of 372.298 ha.

Per the City of Ottawa design guidelines, the minor system has been designed to accommodate a minimum of the 2-year post-development flows from within the site and from external areas (plus 5-year flows on collector). The PCSWMM model analyses have determined that the minor system will surcharge in some parts of the system. However, with the use of Inlet Control Devices, a minimum freeboard of 0.3 m is provided between the 100-year hydraulic grade line and the underside of footings throughout the subdivision.

The PCSWMM simulations have determined that for the selected 2-, 5- and 100-year 3-Hour Chicago storms, the total minor system flows from the Kanata North development and associated external areas would be 1.73 m^3/s, 2.41 m^3/s and 3.34 m^3/s, respectively.

Within the subdivision, the peak water depths do not exceed the maximum allowable 35 cm depth at the gutter for the simulated 100-year storm (Table D-7 of Appendix D). Furthermore, it was determined that for the 100-year event, the product of the velocity and depth of flow does not exceed the maximum allowable 0.60 m^2/s. Also as required, the maximum extent of surface water during the 100-year + 20% stress test will not touch the building envelopes.

Table C-1A- C1F of Appendix C summarizes the hydraulic grade line analysis for the various storm. Note that the full pipe velocities are generally no less than 0.80 m/s and no greater than 3.0 m/s for the proposed pipes. Where velocities over 3.0 m/s are proposed, provisions shall be made to protect against displacement of sewers by sudden jarring or movement.

Stress test results for the major and minor drainage systems based on a 20% increase in the 100-year storm, as per the October 2012 *City of Ottawa Sewer Design Guidelines*, are summarized in Section 4.

The operation of EUC SWM Pond 1 under Interim B conditions, with the Orleans Village (with areas B013DV2 and B015RE2 undeveloped) and BMR The Commons Phase 1 developments in place, is in conformance with the requirements presented in the March 2014 *Design Brief for the Reconstruction of the East Urban Community Stormwater Management Pond 1 for the Trails Edge West Subdivision*, except for the 100-year pond level, which exceeds the maximum allowable elevation by 2 cm.

Recommendations for silt and erosion control strategies to be implemented during construction are presented in Section 6.

In conclusion, the proposed design satisfies all selected design guidelines and requirements.



N

Legend

- Site Plan
- Catch Basin
- Manhole
- Minor System
- Rear Yard

ICD Type

- 0.083m Circular Orifice Plate
- 0.094m Circular Orifice Plate
- 0.102m Circular Orifice Plate
- 0.108m Circular Orifice Plate
- 0.127m Circular Orifice Plate
- 0.152m Circular Orifice Plate
- 0.178m Circular Orifice Plate

SCALE: 1:3500

0 100 200 m

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Stormwater Management Report for
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Figure 2: Minor System Overview

PROJECT	2102-21
DRAWN	MP
DATE	06-22-2021

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N

Legend

- Site Plan
- Subcatchments

SCALE: 1:4000

0 100 200 m

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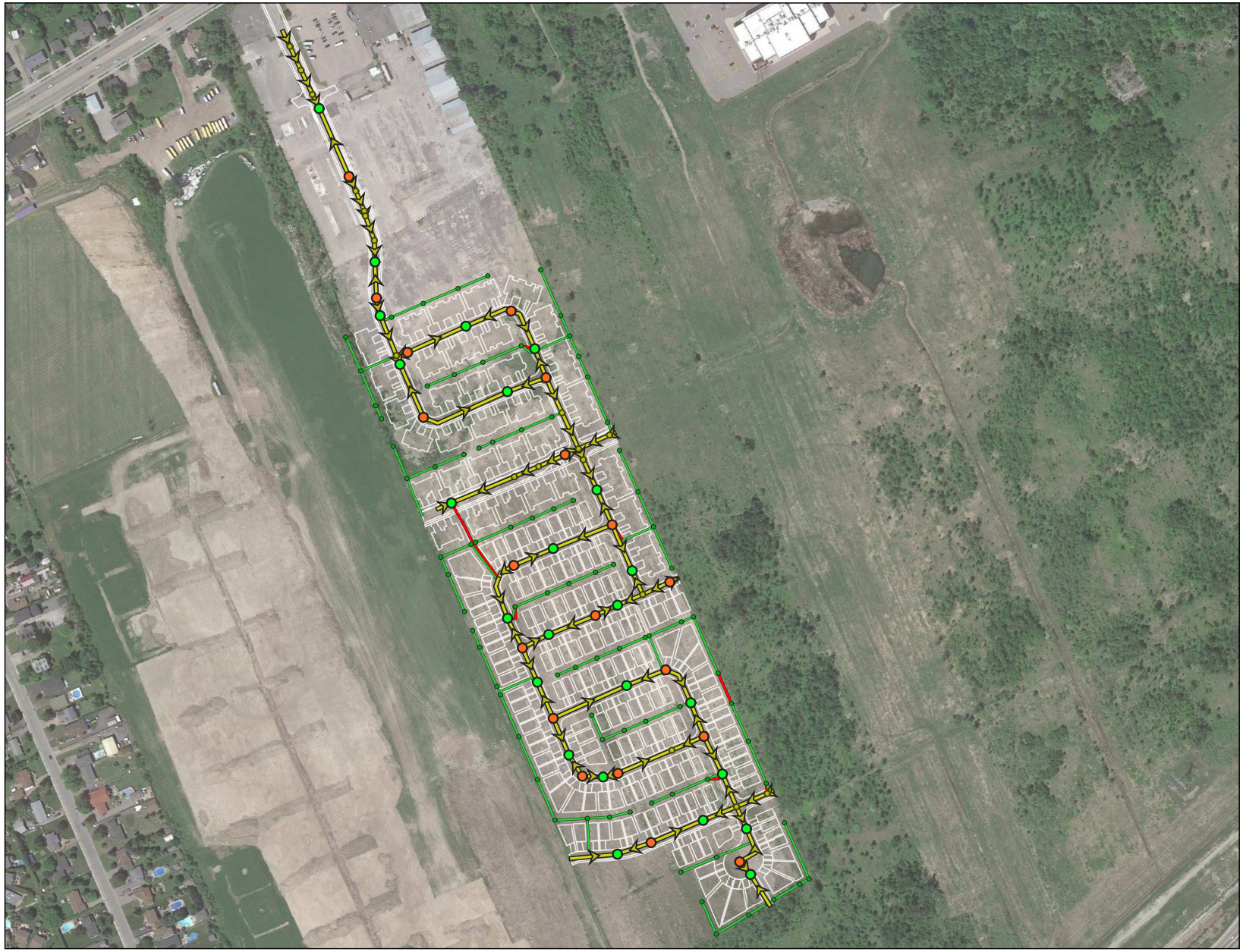
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Stormwater Management Report for
BMR - The Commons

Figure 3: Subcatchment Overview

PROJECT	2102-21
DRAWN	MP
DATE	06-23-2021

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N

Legend

- Site Plan
- High Point
- Low Point
- Major System
- Rear Yard
- Major System Spill Points

SCALE: 1:3500

0 100 200 m

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BMR - The Commons

Figure 4: Proposed Major System

PROJECT	2102-21
DRAWN	MP
DATE	06-23-2021

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N

Legend

- Site Plan
- Site Area
- Developed Areas
- Undeveloped Areas

SCALE: 1:4100

0 100 200 m

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Stormwater Management Report for
BMR - The Commons

Figure 5: Interim Condition

PROJECT	2102-21
DRAWN	MP
DATE	06-24-2021

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LEGEND

- PROPOSED ELEVATION / EXISTING ELEVATION (120.46 / 119.58)
- PROPOSED SWALE ELEVATION (120.46(S))
- PROPOSED TOP OF GRATE ELEVATION (120.46T/G)
- PROPOSED VERTICAL POINT OF INTERSECTION ELEVATION (120.46(VPI))
- PROPOSED TOP OF NOISE WALL ELEVATION / PROPOSED BOTTOM OF NOISE WALL ELEVATION (87.78TW / 85.98BW)
- PROPOSED ELEVATION BY OTHERS (CAIVAN ORLEANS VILLAGE) (120.46)
- GRADE AND DIRECTION (3.2%)
- PROPOSED TERRACE ELEVATION (127.55)
- SPILL ELEVATION (120.46)
- FF= FINISHED FLOOR ELEVATION
- TF= TOP OF FOUNDATION ELEVATION
- USF= UNDERSIDE OF FOOTING ELEVATION
- C/LO/WO UNIT BASEMENT STYLE (CONVENTIONAL / LOOKOUT / WALKOUT)
- PRV PRESSURE REDUCING VALVE
- EMERGENCY OVERLAND FLOW
- PROPOSED TERRACING
- PROPOSED SWALE
- MH 100 PROPOSED STORM MH
- PROPOSED LANDSCAPE TEE CATCH BASIN
- PROPOSED LANDSCAPE ELBOW CATCH BASIN
- PROPOSED REAR YARD CATCH BASIN MANHOLE
- PROPOSED REAR YARD CATCH BASIN
- PROPOSED ROAD CATCHBASIN
- EXISTING TREE TO REMAIN IF POSSIBLE
- 97.84 STATIC PONDING LIMITS

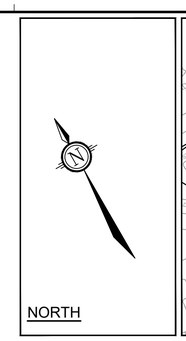
ROADWAY CATCHBASIN TABLE (PHASE 2A)

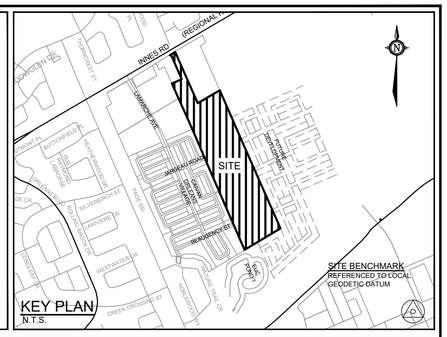
CB No.	STATION	T/G ELEVATION	INVERT	ICD DIA.	SIZE
31a	2+172.35	89.47	87.65	127mm	600 x 600 CB
32	2+235.53	89.07	87.57	94mm	600 x 600 CB
33**	2+235.52	89.15	87.97	127mm	600 x 600 CB
35	2+172.35	89.47	87.97	127mm	600 x 600 CB
36	9+535.97	89.51	88.01	108mm	600 x 600 CB
37	9+535.97	89.51	88.01	108mm	600 x 600 CB
38	9+396.24	89.79	88.29	83mm	600 x 600 CB
39	9+395.97	89.79	88.60	83mm	600 x 600 CB
40	9+294.96	90.23	88.77	83mm	600 x 600 CB
41	9+294.96	90.13	88.63	83mm	600 x 600 CB
42	9+139.87	90.30	88.73	94mm	600 x 600 CB
43	9+140	90.29	88.79	94mm	600 x 600 CB
52*	9+351.61	90.27	88.80	83mm	600 x 600 CB

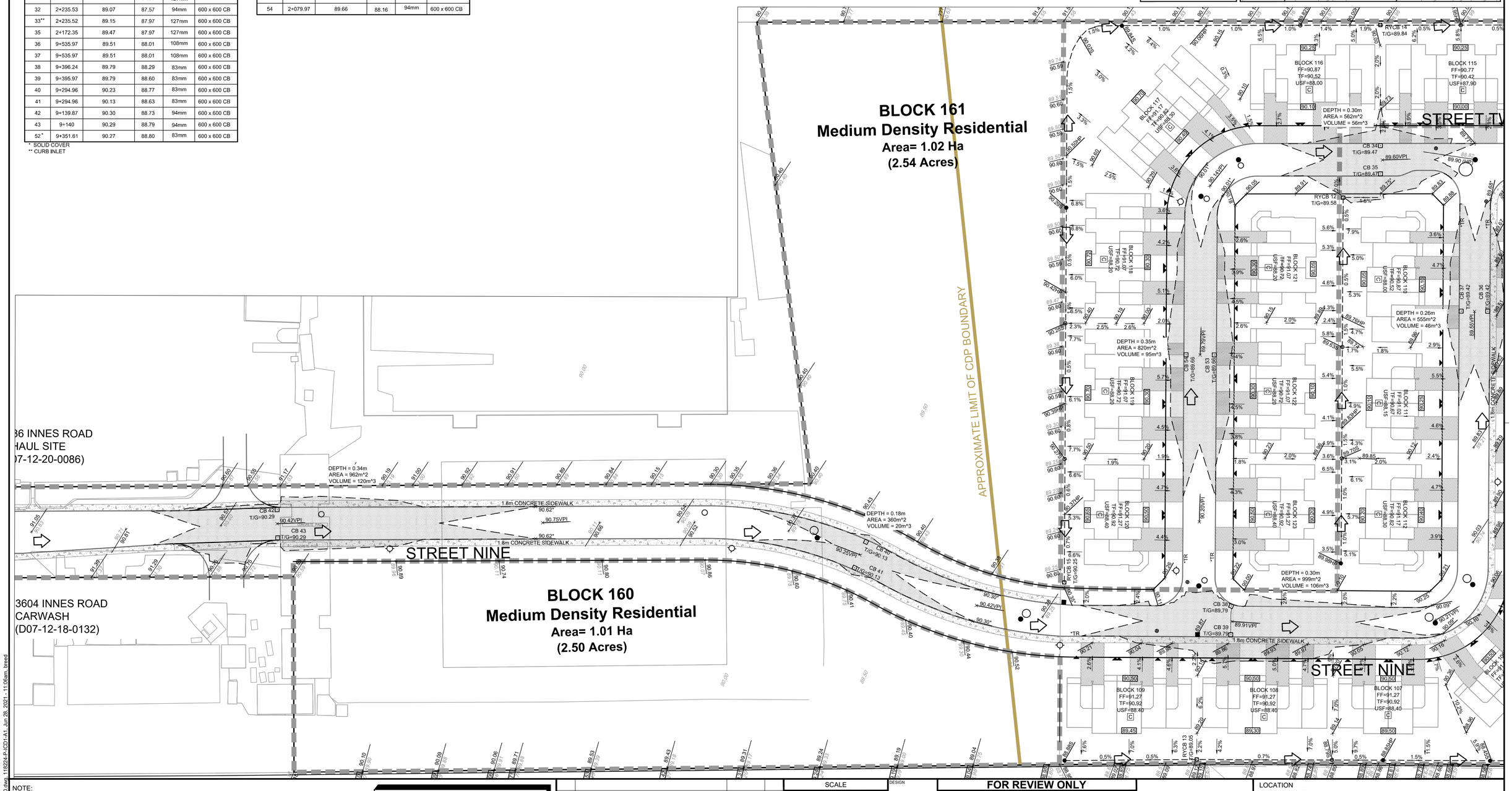
* SOLID COVER
** CURB INLET

ROADWAY CATCHBASIN TABLE (PHASE 3A)

CB No.	STATION	T/G ELEVATION	INVERT	ICD DIA.	SIZE
53	2+079.97	89.71	88.21	94mm	600 x 600 CB
54	2+079.97	89.66	88.16	94mm	600 x 600 CB







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

PRELIMINARY

No.	REVISION	DATE	BY
1.	ISSUED FOR REVIEW	JUNE 18/21	BHB

SCALE 1:500 (1:500, 0 5 10 15 20)

DESIGN DJC
CHECKED BCS
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CHECKED BCS
APPROVED BHB

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LOCATION
CITY OF OTTAWA
THE COMMONS

DRAWING NAME
PONDING AND ICD PLAN

PROJECT No. 118224-00
REV REV # 1
DRAWING No. 118224-P-ICD1

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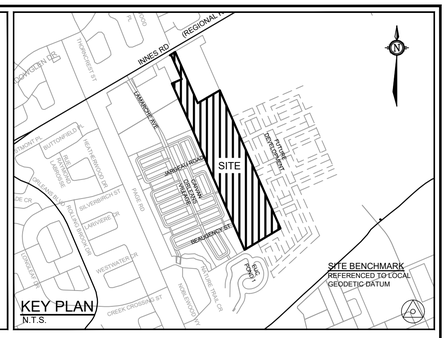
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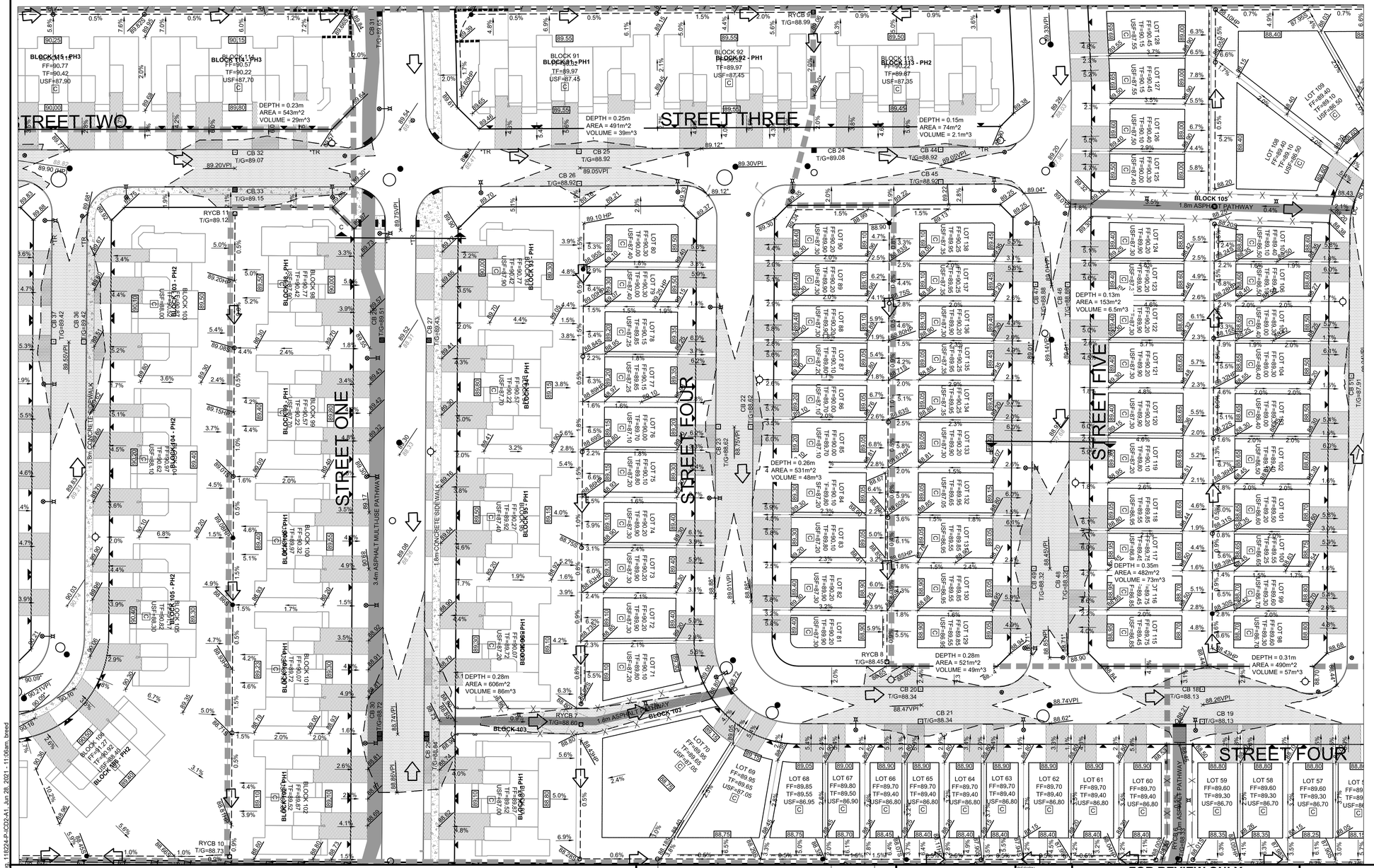
LEGEND

- 120.46 / 119.56 — PROPOSED ELEVATION / EXISTING ELEVATION
- 120.46(S) — PROPOSED SWALE ELEVATION
- 120.46TG — PROPOSED TOP OF GRATE ELEVATION
- 120.46(VPI) — PROPOSED VERTICAL POINT OF INTERSECTION ELEVATION
- 87.78TW / 86.98BW — PROPOSED TOP OF NOISE WALL ELEVATION / PROPOSED BOTTOM OF NOISE WALL ELEVATION
- 120.46 — PROPOSED ELEVATION BY OTHERS (CAIVAN ORLEANS VILLAGE)
- 3.2% — GRADE AND DIRECTION
- 127.55 — PROPOSED TERRACE ELEVATION
- 120.46 — SPILL ELEVATION
- FF= — FINISHED FLOOR ELEVATION
- TF= — TOP OF FOUNDATION ELEVATION
- USF= — UNDERSIDE OF FOOTING ELEVATION
- C/LO/WO — UNIT BASEMENT STYLE (CONVENTIONAL / LOOKOUT / WALKOUT)
- PRV — PRESSURE REDUCING VALVE
- EMERGENCY OVERLAND FLOW
- PROPOSED TERRACING
- PROPOSED SWALE
- MH 100 — PROPOSED STORM MH
- PROPOSED LANDSCAPE TEE CATCH BASIN
- PROPOSED LANDSCAPE ELBOW CATCH BASIN
- PROPOSED REAR YARD CATCH BASIN MANHOLE
- PROPOSED REAR YARD CATCH BASIN
- PROPOSED ROAD CATCHBASIN
- EXISTING TREE TO REMAIN IF POSSIBLE
- 97.84 — STATIC PONDING LIMITS

NORTH

KEY PLAN
N.T.S.





ROADWAY CATCHBASIN TABLE (PHASE 1B)

CB No.	STATION	T/G ELEVATION	INVERT	ICD DIA.	SIZE
20	4+170	88.34	86.84	102mm	600 x 600 CB
21	4+170	88.34	86.92	102mm	600 x 600 CB
22	4+069	88.62	87.27	83mm	600 x 600 CB
23	4+069	88.77	87.12	83mm	600 x 600 CB
25	3+052	88.92	87.42	83mm	600 x 600 CB
26	3+052	88.92	87.42	83mm	600 x 600 CB
27**	1+126.45	89.43	87.93	83mm	600 x 600 CB
28**	1+126.45	89.50	88.00	83mm	600 x 600 CB
29***	1+035.61	88.64	87.14	127mm	600 x 600 CB
30***	1+035.62	88.72	87.22	127mm	600 x 600 CB
31*	1+201.83	89.65	88.15	127mm	1,200 mm dia CBMH

* SOLID COVER
** CURB INLET
*** CURB INLET DUAL CATCHBASIN

ROADWAY CATCHBASIN TABLE (PHASE 2B)

CB No.	STATION	T/G ELEVATION	INVERT	ICD DIA.	SIZE
10	6+165.12	87.57	86.07	102mm	600 x 600 CB
11	6+165.12	87.56	86.56	178mm	600 x 600 CB
24*	3+106.23	89.08	86.41	127mm	600 x 600 CB
44	3+135.44	88.92	86.06	83mm	600 x 600 CB
45	3+135.44	88.92	87.58	83mm	600 x 600 CB
46	5+063.76	88.88	87.42	83mm	600 x 600 CB
47	5+063.76	89.03	87.42	83mm	600 x 600 CB
48	5+129.30	88.32	87.53	83mm	600 x 600 CB
49	5+129.30	88.47	87.38	83mm	600 x 600 CB
50	6+085	87.91	87.04	94mm	600 x 600 CB
51	6+085	88.06	86.89	94mm	600 x 600 CB

* SOLID COVER

NOTE:
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PRELIMINARY

No.	REVISION	DATE	BY
1.	ISSUED FOR REVIEW	JUNE 18/21	BHB

SCALE 1:500

1:500
0 5 10 15 20

DESIGN BR
CHECKED BCS
DRAWN BR
CHECKED BCS
APPROVED BHB

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LOCATION
CITY OF OTTAWA
THE COMMONS

DRAWING NAME
PONDING AND ICD PLAN

PROJECT No. 118224-00
REV REV # 1
DRAWING No. 118224-P-ICD2

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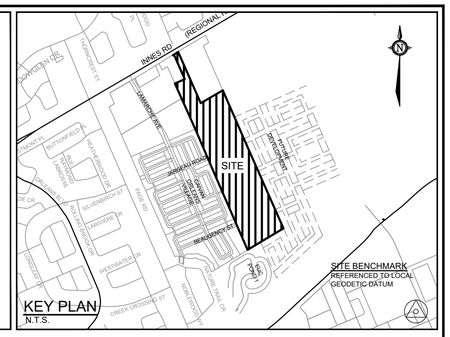
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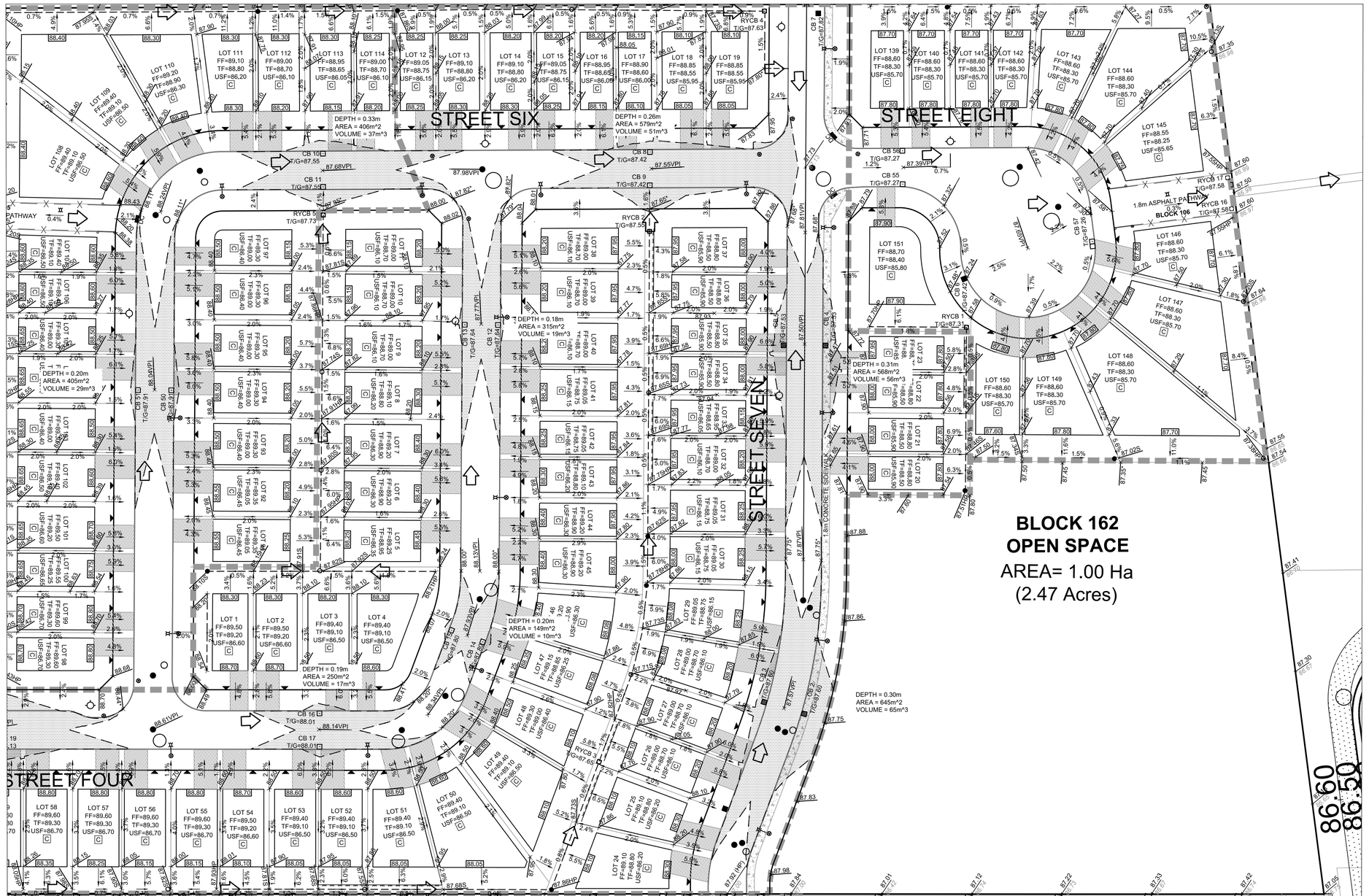
LEGEND

120.46 / 119.50	PROPOSED ELEVATION / EXISTING ELEVATION	3.2%	GRADE AND DIRECTION		EMERGENCY OVERLAND FLOW		PROPOSED LANDSCAPE TEE CATCH BASIN
120.46(S)	PROPOSED SWALE ELEVATION	127.55	PROPOSED TERRACE ELEVATION				PROPOSED LANDSCAPE ELBOW CATCH BASIN
120.46T/G	PROPOSED TOP OF GRATE ELEVATION	120.46	SPILL ELEVATION		PROPOSED TERRACING		PROPOSED REAR YARD CATCH BASIN MANHOLE
120.46(VPI)	PROPOSED VERTICAL POINT OF INTERSECTION ELEVATION	FF=	FINISHED FLOOR ELEVATION		PROPOSED SWALE		PROPOSED REAR YARD CATCH BASIN
87.78TW / 85.98BW	PROPOSED TOP OF NOISE WALL ELEVATION / PROPOSED BOTTOM OF NOISE WALL ELEVATION	TF=	TOP OF FOUNDATION ELEVATION		PROPOSED STORM MH		PROPOSED ROAD CATCHBASIN
120.46	PROPOSED ELEVATION BY OTHERS (CAIVAN ORLEANS VILLAGE)	USF=	UNDERSIDE OF FOOTING ELEVATION	MH 100			
		C/LO/WO	UNIT BASEMENT STYLE (CONVENTIONAL / LOOKOUT / WALKOUT)			97.84	STATIC PONDING LIMITS
		PRV	PRESSURE REDUCING VALVE				EXISTING TREE TO REMAIN IF POSSIBLE

NORTH

KEY PLAN
N.T.S.





ROADWAY CATCHBASIN TABLE (PHASE 1A)

CB No.	STATION	T/G ELEVATION	INVERT	ICD DIA.	SIZE
1*	7+021	87.81	86.33	127mm	1,200 mm dia CBMH
2**	7+046.78	87.60	86.31	83mm	600 x 600 CB
3**	7+046.78	87.60	86.10	83mm	600 x 600 CB
4**	7+128.30	87.53	86.10	83mm	600 x 600 CB
5**	7+128.30	87.53	86.10	83mm	600 x 600 CB
7*	7+203.11	87.83	86.10	127mm	1,200 mm dia CBMH
8	6+238.28	87.44	85.93	83mm	600 x 600 CB
9	6+238.19	87.43	85.94	152mm	600 x 600 CB
12	4+425	87.64	86.14	83mm	600 x 600 CB
13	4+425	87.79	86.29	83mm	600 x 600 CB
14	4+355	87.80	86.30	83mm	600 x 600 CB
15	4+355	87.80	86.45	83mm	600 x 600 CB
16	4+310	88.01	86.52	83mm	600 x 600 CB
17	4+310	88.02	86.51	83mm	600 x 600 CB
18	4+235	88.13	86.64	83mm	600 x 600 CB
19	4+235	88.14	86.63	83mm	600 x 600 CB

* SOLID COVER
** CURB INLET

ROADWAY CATCHBASIN TABLE (PHASE 1A)

CB No.	STATION	T/G ELEVATION	INVERT	ICD DIA.	SIZE
1*	7+021	87.81	86.33	127mm	1,200 mm dia CBMH
2**	7+046.78	87.60	86.31	83mm	600 x 600 CB
3**	7+046.78	87.60	86.10	83mm	600 x 600 CB
4**	7+128.30	87.53	86.10	83mm	600 x 600 CB
5**	7+128.30	87.53	86.10	83mm	600 x 600 CB
7*	7+203.11	87.83	86.10	127mm	1,200 mm dia CBMH
8	6+238.28	87.44	85.93	83mm	600 x 600 CB
9	6+238.19	87.43	85.94	152mm	600 x 600 CB
12	4+425	87.64	86.14	83mm	600 x 600 CB
13	4+425	87.79	86.29	83mm	600 x 600 CB
14	4+355	87.80	86.30	83mm	600 x 600 CB
15	4+355	87.80	86.45	83mm	600 x 600 CB
16	4+310	88.01	86.52	83mm	600 x 600 CB
17	4+310	88.02	86.51	83mm	600 x 600 CB
18	4+235	88.13	86.64	83mm	600 x 600 CB
19	4+235	88.14	86.63	83mm	600 x 600 CB

* SOLID COVER
** CURB INLET

ROADWAY CATCHBASIN TABLE (PHASE 3B)

CB No.	STATION	T/G ELEVATION	INVERT	ICD DIA.	SIZE
6*	8+077.65	87.39	86.89	127mm	600 x 600 CB
55	8+030	87.27	86.77	83mm	600 x 600 CB
56	8+030	87.27	86.77	83mm	600 x 600 CB
57****	8+069.57	87.26	86.76	83mm	600 x 600 CB

* SOLID COVER
**** DUAL CATCHBASIN

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

PRELIMINARY

No.	REVISION	DATE	BY
1.	ISSUED FOR REVIEW	JUNE 18/21	BHB

SCALE 1:500
1:500 0 5 10 15 20

DESIGN DJC
CHECKED BCS
DRAWN MFD
CHECKED BCS
APPROVED BHB

FOR REVIEW ONLY

NOVATECH
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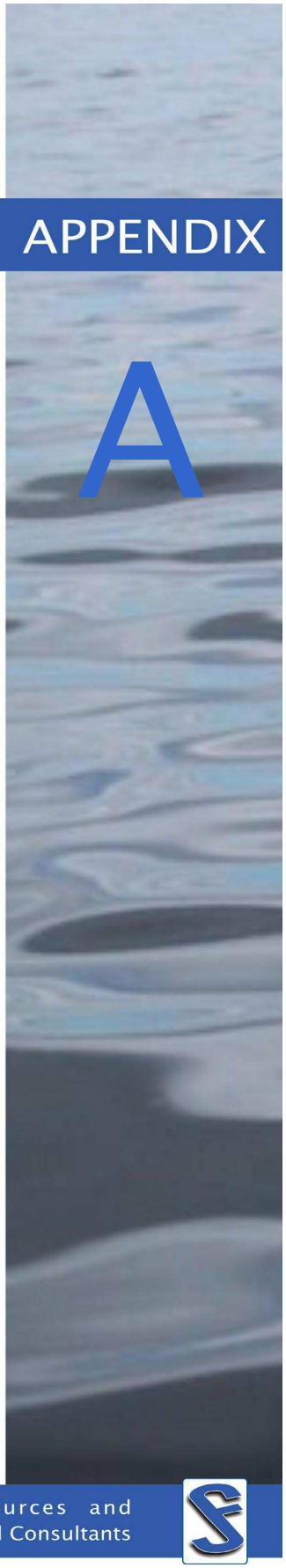
LOCATION
CITY OF OTTAWA
THE COMMONS

DRAWING NAME
PONDING AND ICD PLAN

PROJECT No. 118224-00
REV REV # 1
DRAWING No. 118224-P-ICD3

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PLANARTDWG - 84 forms3d.mnl



APPENDIX

A

Rational Method Design Sheets (as per Novatech)

JFSA Water Resources and Environmental Consultants

STORM SEWER DESIGN SHEET (PRELIMINARY)

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 118224
Project Name: 3610 Innes Road (Former BMR Lands)
Date Prepared: 10/4/2019
Date Revised: 6/2/2021
Input By: Bradley Reed
Reviewed By: Sam Bahia/ Ben Sweet
Drawing Reference: Sam Bahia

Legend:
- PROJECT SPECIFIC INFO
- USER DESIGN INPUT
- CUMILATIVE CELL
- CALCULATED DESIGN CELL OUTPUT
- USER AS-BUILT INPUT

LOCATION			DEMAND																	CAPACITY							
			AREA									FLOW								PROPOSED SEWER PIPE SIZING / DESIGN							
															RAIN INTENSITY (mm/hr)					PIPE PROPERTIES							
STREET	FROM MH	TO MH	AREA ID	COMMERCIAL	HIGH DENSITY	ROAD 1	REAR YARD 1 (TOWN)	REAR YARD 2 (SINGLE/SEMI)	PARK	TOTAL AREA	WEIGHTED RUNOFF COEFFICIENT	INDIVI 2.78 AR	ACCUM 2.78 AR	TIME OF CONC	2yr	5yr	100yr	PEAK FLOW	TOTAL UNCONTROLLED PEAK FLOW (QDesign)	TOTAL RESTRICTED PEAK FLOW (Q)	LENGTH	SIZE / MATERIAL	ID ACTUAL	ROUGHNESS	DESIGN GRADE	CAPACITY	FULL FLOW VELOCITY	TIME OF FLOW	QPEAK DESIGN / QFULL
				0.90	0.80	0.70	0.50	0.45	0.25	(ha)				(min.)				(L/s)	(L/s)	(L/s)	(m)	(mm / type)	(m)		(%)	(L/s)	(m/s)	(min.)	(%)
	170	168	A1			0.33				0.33	0.70	0.64	0.64	10.00	76.81			49.32										
										0.00		0.00	0.00	10.00				0.00	49.3		93.9	375 PVC	0.381	0.013	0.35	108.2	0.95	1.65	45.6%
										0.00		0.00	0.00	10.00				0.00										
	168	166	B1		1.01					0.00		0.00	0.64	11.65	71.01			45.60										
										1.01	0.80	2.25	2.25	11.65		96.22		216.14	261.7		93.9	600 CONC	0.6096	0.013	0.35	379.0	1.30	1.21	69.1%
										0.00		0.00	0.00	11.65				0.00										
	166	164								0.00		0.00	0.64	12.85	67.34			43.25										
										0.00	0.90	0.00	2.25	12.85		91.20		204.85	248.1		32.0	600 CONC	0.6096	0.013	0.35	379.0	1.30	0.41	65.5%
										0.00		0.00	0.00	12.85				0.00										
Street 9	164	162	A2, B2, B3	3.43	1.02	0.24				0.24	0.70	0.47	1.11	13.26	66.19			73.42										
										4.45	0.88	10.85	13.10	13.26		89.62		1173.67	1247.1		70.0	1050 CONC	1.0668	0.013	0.35	1685.4	1.89	0.62	74.0%
										0.00		0.00	0.00	13.26				0.00										
	162	160	A3, A4, A5			0.32	0.39			0.71	0.59	1.16	2.27	13.88	64.53			146.75										
										0.00		0.00	13.10	13.88		87.35		1143.94	1290.7		99.8	1050 CONC	1.0668	0.013	0.35	1685.4	1.89	0.88	76.6%
										0.00		0.00	0.00	13.88				0.00										
	160	158	-							0.00		0.00	2.27	14.77	62.33			141.73										
										0.00		0.00	13.10	14.77		84.32		1104.32	1246.1		14.3	1050 CONC	1.0668	0.013	0.50	2014.4	2.25	0.11	61.9%
										0.00		0.00	0.00	14.77				0.00										
	158	150	A6			0.42				0.42	0.70	0.82	3.09	14.87	62.07			191.89										
										0.00		0.00	13.10	14.87		83.97		1099.78	1291.7		108.0	1050 CONC	1.0668	0.013	0.35	1685.4	1.89	0.95	76.6%
										0.00		0.00	0.00	14.87				0.00										
	156	154	A7			0.37				0.37	0.70	0.72	0.72	10.00	76.81			55.30										
										0.00		0.00	0.00	10.00				0.00	55.3		100.7	450 PVC	0.4572	0.013	0.35	176.0	1.07	1.57	31.4%
										0.00		0.00	0.00	10.00				0.00										
Street 2	154	152	-							0.00		0.00	0.72	11.57	71.27			51.32										
										0.00		0.00	0.00	11.57				0.00	51.3		12.6	450 PVC	0.4572	0.013	0.50	210.3	1.28	0.16	24.4%
										0.00		0.00	0.00	11.57				0.00										
	152	150	A8, A9, A10			0.21	0.63			0.84	0.55	1.28	2.00	11.73	70.75			141.80										
										0.00		0.00	0.00	11.73				0.00	141.8		59.4	525 CONC	0.5334	0.013	0.35	265.4	1.19	0.83	53.4%
										0.00		0.00	0.00	11.73				0.00										
Street 2	150	144	A11, A12			0.26	0.29			0.55	0.59	0.91	6.00	15.83	59.88			359.59										
										0.00		0.00	13.10	15.83		80.98		1060.56	1420.1		76.3	1200 CONC	1.2192	0.013	0.35	2406.2	2.06	0.62	59.0%
										0.00		0.00	0.00	15.83				0.00										
	148	146	A13, A14							0.00		0.00	0.00	10.00				0.00										
Street 1						0.42	0.39			0.81	0.60	1.36	1.36	10.00		104.19		141.64	141.6		78.5	450 PVC	0.4572	0.013	0.35	176.0	1.07	1.22	80.5%
										0.00		0.00	0.00	10.00				0.00										
	146	144	A15							0.00		0.00	0.00	11.22				0.00										
						0.10				0.10	0.70	0.19	1.55	11.22		98.16		152.54	152.5		78.7	600 CONC	0.6096	0.013	0.35	379.0	1.30	1.01	40.3%
										0.00		0.00	0.00	11.22				0.00										
Street 3	144	140	A16, A17			0.24	0.12			0.36	0.63	0.63	6.64	10.00	76.81			509.88										
										0.00		0.00	14.65	10.00		104.19		1526.49	2036.4		77.3	1200 CONC	1.2192	0.013	0.35	2406.2	2.06	0.63	84.6%
										0.00		0.00	0.00	10.00				0.00										
	142	140	A18, A19			0.04	0.26			0.30	0.53	0.44	0.44	10.00	76.81			33.74										
Street 3										0.00		0.00	0.00	10.00				0.00	33.7		20.7	250 PVC	0.254	0.013	0.65	50.0	0.99	0.35	67.4%
										0.00		0.00	0.00	10.00				0.00										
	140	138	A20			0.25				0.25	0.70	0.49	7.56	10.63	74.49			563.44										
										0.00		0.00	14.65	10.63		101.00		1479.76	2043.2		113.1	1350 CONC	1.3716	0.013	0.25	2784.1	1.88	1.00	73.4%
										0.00		0.00	0.00	10.63				0.00										
Street 4	138	136	A21, A22, A23				0.71		0.03	0.74	0.49	1.01	8.57	11.63	71.08			609.31										
										0.00		0.00	14.65	11.63		96.33		1411.23	2020.5		13.7	1350 CONC	1.3716	0.013	0.50	3937.3	2.66	0.09	51.3%
										0.00		0.00	0.00	11.63				0.00										
	136	128	A24, A25			0.24		0.46		0.70	0.54	1.04	9.61	11.71	70.81			680.77										
										0.00		0.00	14.65	11.71		95.95		1405.70	2086.5		63.4	1350 CONC	1.3716	0.013	0.20	2490.2	1.69	0.63	83.8%
										0.00		0.00	0.00	11.71				0.00										
Street 3	140	132	A26			0.15				0.15	0.70	0.29	0.29	10.00	76.81			22.42										
										0.00		0.00	0.00	10.00				0.00	22.4		53.4	300 PVC	0.3048	0.013	0.65	81.3	1.11	0.80	27.6%
										0.00		0.00	0.00	10.00				0.00										
	134	132	-							0.00		0.00	0.00	10.00				0.00										
										0.00		0.00	0.00	10.00				0.00	0.0		30.0	250 PVC	0.254	0.013	0.65	50.0	0.99	0.51	0.0%
										0.00		0.00	0.00	10.00				0.00										
Street 5	132	130	A27			0.17				0.17	0.70	0.33	0.62	10.51	74.91			46.65										
										0.00		0.00	0.00	10.51				0.00	46.6		37.4	600 CONC	0.6096	0.013	0.35	379.0	1.30	0.48	12.3%
										0.00		0.00	0.00	10.51				0.00										
	130	128	A28			0.18				0.18	0.70	0.35	0.97	10.99	73.21			71.24										
										0.00		0.00	0.00	10.99				0.00	71.2		87.4	600 CONC	0.6096	0.013	0.35	379.0	1.30	1.12	18.8%
										0.00		0.00	0.00	10.99				0.00										

STORM SEWER DESIGN SHEET (PRELIMINARY)

NOVATECH
Engineers, Planners & Landscape Architects

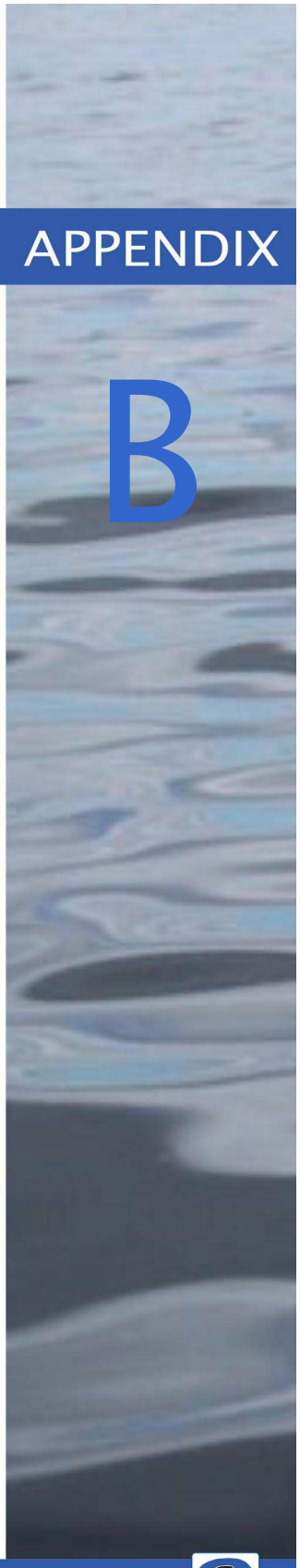
LOCATION			DEMAND																	CAPACITY							
			AREA									FLOW								PROPOSED SEWER PIPE SIZING / DESIGN							
															RAIN INTENSITY (mm/hr)					PIPE PROPERTIES							
STREET	FROM MH	TO MH	AREA ID	COMMERCIAL	HIGH DENSITY	ROAD 1	REAR YARD 1 (TOWN)	REAR YARD 2 (SINGLE/SEMI)	PARK	TOTAL AREA	WEIGHTED RUNOFF COEFFICIENT	INDIVI 2.78 AR	ACCUM 2.78 AR	TIME OF CONC	2yr	5yr	100yr	PEAK FLOW	TOTAL UNCONTROLLED PEAK FLOW (QDesign)	TOTAL RESTRICTED PEAK FLOW (Q)	LENGTH	SIZE / MATERIAL	ID ACTUAL	ROUGHNESS	DESIGN GRADE	CAPACITY	FULL FLOW VELOCITY	TIME OF FLOW	QPEAK DESIGN / QFULL
				0.90	0.80	0.70	0.50	0.45	0.25	(ha)				(min.)				(L/s)	(L/s)	(L/s)	(m)	(mm / type)	(m)		(%)	(L/s)	(m/s)	(min.)	(%)
Street 4	128	126	A29, A30, A31, A32			0.18		0.47	0.01	0.66	0.52	0.95	11.53	12.34	68.86			794.15											
										0.00		0.00	14.65	12.34		93.28		1366.57	2160.7		76.0	1350 CONC	1.3716	0.013	0.20	2490.2	1.69	0.75	86.8%
										0.00		0.00	0.00	12.34				0.00											
	126	124	A33			0.15				0.15	0.70	0.29	11.82	13.09	66.68			788.45											
										0.00		0.00	14.65	13.09		90.29		1322.73	2111.2		53.4	1350 CONC	1.3716	0.013	0.20	2490.2	1.69	0.53	84.8%
										0.00		0.00	0.00	13.09				0.00											
	124	122	-							0.00		0.00	11.82	13.62	65.24			771.39											
										0.00		0.00	14.65	13.62		88.31		1293.75	2065.1		16.9	1350 CONC	1.3716	0.013	0.50	3937.3	2.66	0.11	52.5%
										0.00		0.00	0.00	13.62				0.00											
	122	120	A34			0.09				0.09	0.70	0.18	12.00	13.72	64.95			779.45											
										0.00		0.00	14.65	13.72		87.92		1288.12	2067.6		24.5	1350 CONC	1.3716	0.013	0.20	2490.2	1.69	0.24	83.0%
										0.00		0.00	0.00	13.72				0.00											
	120	112	A35			0.23				0.23	0.70	0.45	12.45	13.97	64.32			800.64											
										0.00		0.00	14.65	13.97		87.06		1275.42	2076.1		91.6	1350 CONC	1.3716	0.013	0.20	2490.2	1.69	0.91	83.4%
										0.00		0.00	0.00	13.97				0.00											
Street 6	118	116	A36			0.33				0.33	0.70	0.64	0.64	10.00	76.81			49.32											
										0.00		0.00	0.00	10.00				0.00	49.3		99.6	450 PVC	0.4572	0.013	0.35	176.0	1.07	1.55	28.0%
										0.00		0.00	0.00	10.00				0.00											
	116	114	A37, A38, A39					0.74	0.03	0.77	0.44	0.95	1.59	11.55	71.33			113.33											
										0.00		0.00	0.00	11.55				0.00	113.3		11.9	450 PVC	0.4572	0.013	0.50	210.3	1.28	0.15	53.9%
										0.00		0.00	0.00	11.55				0.00											
	114	112	A40, A41			0.24		0.46		0.70	0.54	1.04	2.63	11.70	70.83			186.37											
										0.00		0.00	0.00	11.70				0.00	186.4		64.1	525 CONC	0.5334	0.013	0.35	265.4	1.19	0.90	70.2%
										0.00		0.00	0.00	11.70				0.00											
Street 6	112	104	A42, A43			0.24		0.35		0.59	0.55	0.90	15.98	14.87	62.07			992.15											
										0.00		0.00	14.65	14.87		83.98		1230.29	2222.4		69.3	1350 CONC	1.3716	0.013	0.20	2490.2	1.69	0.69	89.2%
										0.00		0.00	0.00	14.87				0.00											
Street 7	110	108	A44					0.29		0.29	0.45	0.36	0.36	10.00	76.81			27.86											
										0.00		0.00	0.00	10.00				0.00	27.9		27.7	250 PVC	0.254	0.013	0.65	50.0	0.99	0.47	55.7%
										0.00		0.00	0.00	10.00				0.00											
	108	106	A45			0.20				0.20	0.70	0.39	0.75	10.47	75.05			56.44											
										0.00		0.00	0.00	10.47				0.00	56.4		27.7	450 PVC	0.4572	0.013	0.25	148.7	0.91	0.51	38.0%
										0.00		0.00	0.00	10.47				0.00											
	106	104	A46, B4			0.22			1.00	1.22	0.33	1.12	1.88	10.98	73.25			137.34											
										0.00		0.00	0.00	10.98				0.00	137.3		98.6	525 CONC	0.5334	0.013	0.20	200.6	0.90	1.83	68.5%
										0.00		0.00	0.00	10.98				0.00											
Street 8	104	102	A47, A48, A49, A50			0.22		0.38		0.60	0.54	0.90	18.76	15.56	60.48			1134.82											
										0.00		0.00	14.65	15.56		81.80		1198.43	2333.2		41.9	1650 CONC	1.6764	0.013	0.10	3006.9	1.36	0.51	77.6%
										0.00		0.00	0.00	15.56				0.00											
	102	100	-							0.00		0.00	18.76	16.07	59.35			1113.61											
										0.00		0.00	14.65	16.07		80.25		1175.78	2289.4		13.3	1650 CONC	1.6764	0.013	0.10	3006.9	1.36	0.16	76.1%
										0.00		0.00	0.00	16.07				0.00											
	100	2121	A51, A52, A53, A54			0.10		0.48	0.02	0.60	0.49	0.81	19.57	16.23	59.00			1154.79											
										0.00		0.00	14.65	16.23		79.78		1168.78	2323.6		74.8	1650 CONC	1.6764	0.013	0.10	3006.9	1.36	0.92	77.3%
										0.00		0.00	0.00	16.23				0.00											
TO TRUNK STORM SEWER																													

DEMAND EQUATION

Q = 2.78 AIR Where : Q = Peak flow in litres per second (L/s)
A = Area in hectares (ha)
R = Weighted runoff coefficient (increased by 25% for 100-year)
I = Rainfall intensity in millimeters per hour (mm/hr)
Rainfall Intensity (I) is based on City of Ottawa IDF data presented in the City of Ottawa Sewer Design Guidelines (Oct. 2012)

CAPACITY EQUATION

Q full= (1/n) A R^(2/3)So^(1/2) Where : Q full = Capacity (L/s)
n = Manning coefficient of roughness (0.013)
A = Flow area (m^)
R = Wetter perimenter (m)
So = Pipe Slope/gradient



APPENDIX

B

Inlet Control Devices PCSWMM

Input Files for Interim Condition Model

and Ultimate Condition Model

JFSA Water Resources and Environmental Consultants

Products – StormTech Orifice Plate

Our StormTech Orifice Plate uses a calibrated orifice to control the outflow at a specific rate at a specific head in the catch basin. This is our simplest and most economical Inlet Control Device (ICD), and can be sometimes used by municipalities as a starting point for storm water management until more information is gathered. As with all our products, it can be swapped out with another StormTech ICD once more is known about the system.

Orifice Plate units can have any shape or size of orifice customized to meet your needs. Standard designs include Round, Diamond, Keyhole and Diamond Keyhole shaped orifices. Keyholes help create a torsional flow pattern through the orifice that can help unblock some debris.

Orifice plate ICD's do not form water traps to prevent odours and are also prone to blockage by floatables like leaves, twigs, bottles and cans, especially during higher rainfall periods. Monitoring of these types of installs is recommended and sometimes leads to recommendations to upgrade to water trap devices, such as Odour Traps and Sumps, to prevent blockage and odours. But in locations where they work properly they are an economical alternative solution.

Primary Function(s): Flow Control for Medium to High Flow Rates (15 to 100 l/s | 237 to 1585 GPM).

Other Functions(s): None.

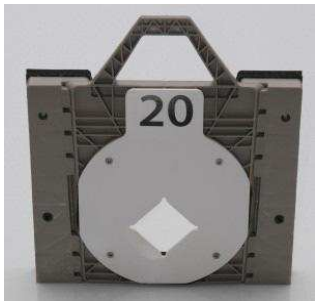
Outflow Pipe Diameter: 150 mm to 300 mm | 6 inch to 12 inch. Special orders can be made for larger sizes.

Catch Basin Types: All – with or without sumps.
Rectangular or Round Catch Basins (Round requires built-in adapter that can be provided).
Standard Round is 600 mm, but larger sizes available (900 mm, 1200 mm, 1600 mm …etc.).
Fits through even small Catch Basin openings (300 mm x 450 mm).

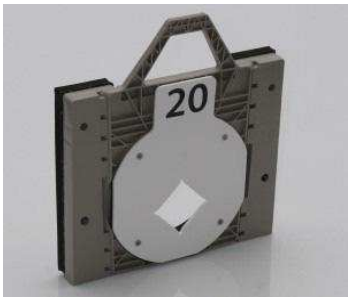
Specifications:
Orifice Plate: HDPE Thermoplastic with UV resistant additives.
Handle Plate (common): HDPE Thermoplastic.
Handle Plate (common): HDPE Thermoplastic.
Mounting Plate (common): HDPE Thermoplastic.
Hardware (common): Stainless Steel Wedge Bolts with Nut and Washer (4).
Welds: None.
Inner Ring Seal: Rubber Bulb Seal EPDM. Held in place and reusable. No need to replace.
Wall Seal: 3/8 or 5/8 inch Neoprene closed cell sponge gasket attached to Mounting Plate.
Identifier: 50 mm high numeric's on top of unit. Peel and stick. Note: Not visible from street surface.
Special Tools: None required.
Weight: Removable Unit: 0.5 kg / 1 lb. Maximum Total Assembly: 2.3 kg / 5 lb.

Products – StormTech Orifice Plate (continued)

Orifice Plate – Square Adapter (with Diamond Orifice pictured)



Front

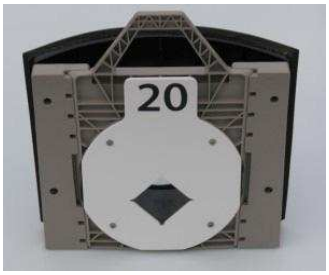


Left Angle

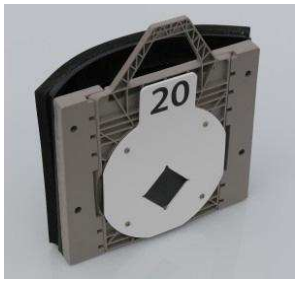


Back – View from Wall

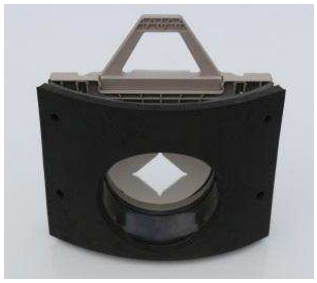
Orifice Plate – Round Adapter



Front



Left Angle



Back – View from Wall

Installation:

1. If necessary, cut protruding out-flowing pipe back flush to Catch Basin wall.
2. Use Mounting Plate as template to mark four hole pattern on Catch Basin wall.
3. Install four Stainless Steel Wedge Bolts (provided) perpendicular to Mounting Plate.
4. Install Mounting Plate and hand secure with four washers and nuts (provided).
5. Torque nuts to 40 N-•m or 30 lbf•ft. Do not over-tighten.
6. Snap unit into place by pushing Handle Plate into dove-tail slot of Mounting Plate.
7. Record Unit Identifier along with Catch Basin Location according to municipal requirements.
8. Note – Unit Identifier with this model is NOT easily seen from street level.

Table B-1: Plas-Tech StormTech Orifice Plate Inlet Control Device (ICD) Capacities [1]

ICD Diameter (mm)	Capture (L/s)							
	CB (1.38 m lead pipe invert depth)				CBMH (1.74 m lead pipe invert depth)			
Water Depth: Head:	*0 cm 1.28 m*	*Average 1.4 m*	*30 cm 1.58 m*	*35 cm 1.63 m*	*0 cm 1.64 m*	*Average 1.76 m*	*30 cm 1.94 m*	*35 cm 1.99 m*
83	17.6	18.4	19.6	19.9	19.9	20.7	21.7	22.0
94	22.6	23.6	25.1	25.5	25.6	26.5	27.8	28.2
102	26.6	27.8	29.6	30.0	30.1	31.2	32.8	33.2
108	29.8	31.2	33.2	33.7	33.8	35.0	36.7	37.2
127	41.3	43.2	45.8	46.6	46.7	48.4	50.8	51.5
152	59.1	61.8	65.7	66.7	66.9	69.3	72.8	73.7
178	81.1	84.8	90.1	91.5	91.8	95.0	99.8	101.1

[1] For circular orifices plate type with diameters as specified by City of Ottawa standards.

[Interim Conditions – BMR The Commons]

;;Project Title/Notes

Base_Model_v1.5 from the Model Build (GIS) folder.

[OPTIONS]

;;Option Value

FLOW_UNITS CMS

INFILTRATION HORTON

FLOW_ROUTING DYNWAVE

LINK_OFFSETS ELEVATION

MIN_SLOPE 0

ALLOW_PONDING YES

SKIP_STEADY_STATE NO

START_DATE 01/01/2019

START_TIME 00:00:00

REPORT_START_DATE 01/01/2019

REPORT_START_TIME 00:00:00

END_DATE 01/02/2019

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 0.5

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 1.167

MAX_TRIALS 21

HEAD_TOLERANCE 0.0001

SYS_FLOW_TOL 5

LAT_FLOW_TOL 5

MINIMUM_STEP 0.5

THREADS 6

[EVAPORATION]

;;Data Source Parameters

;;---------- ----------

CONSTANT 0.0

DRY_ONLY NO

[RAINGAGES]

;;Name Format Interval SCF Source

;;---------- --------- -------- -------- ----------

002yrChicago3hr INTENSITY 0:10 1.0 TIMESERIES 002yrChicago3hr

002YrSCS24 INTENSITY 0:10 1.0 TIMESERIES 002YrSCS24

005yrChicago3hr INTENSITY 0:10 1.0 TIMESERIES 005yrChicago3hr

005YrSCS24 INTENSITY 0:10 1.0 TIMESERIES 005YrSCS24

010yrChicago3hr INTENSITY 0:10 1.0 TIMESERIES 010yrChicago3hr

010YrSCS24 INTENSITY 0:10 1.0 TIMESERIES 010YrSCS24

025yrChicago3hr INTENSITY 0:10 1.0 TIMESERIES 025yrChicago3hr

025YrSCS24 INTENSITY 0:10 1.0 TIMESERIES 025YrSCS24

050yrChicago3hr INTENSITY 0:10 1.0 TIMESERIES 050yrChicago3hr

050YrSCS24 INTENSITY 0:10 1.0 TIMESERIES 050YrSCS24

100yrChicago3hr INTENSITY 0:10 1.0 TIMESERIES 100yrChicago3hr

100yrChicago3hr+20% INTENSITY 0:10 1.0 TIMESERIES 100yrChicago3hr+20%

100YrSCS12hr INTENSITY 0:15 1.0 TIMESERIES 100YrSCS12hr

100YrSCS24 INTENSITY 0:10 1.0 TIMESERIES 100YrSCS24

100YrSCS24+20% INTENSITY 0:10 1.0 TIMESERIES 100YrSCS24+20%

1979July01 INTENSITY 0:05 1.0 TIMESERIES 1979July01

1988Aug04 INTENSITY 0:05 1.0 TIMESERIES 1988Aug04

1996Aug08 INTENSITY 0:05 1.0 TIMESERIES 1996Aug08

25mmChicago4Hr INTENSITY 0:10 1.0 TIMESERIES 25mmChicago4Hr

2YrSCS12hr INTENSITY 0:15 1.0 TIMESERIES 2YrSCS12hr

5YrSCS12hr INTENSITY 0:15 1.0 TIMESERIES 5YrSCS12hr

No_Rain INTENSITY 0:01 1.0 TIMESERIES No_Rain

[SUBCATCHMENTS]

;;Name	Rain Gage	Outlet	Area	%Imperv	Width	%Slope	CurbLen	SnowPack
A11	100YrSCS24	Maj-15_2	0.0625	69.915	5.901	0.231	0	
A12	100YrSCS24	Structure_-_(41)_(RYCB)	0.1545	50.168	20.118	0.144	0	
A13	100YrSCS24	RYCB_10	0.1476	41.86	20.099	0.883	0	
A14	100YrSCS24	Maj-21	0.4228	70.28	41.049	0.686	0	
A15	100YrSCS24	Maj-19	0.096	70.28	40.921	0.686	0	
A17	100YrSCS24	Maj-24	0.2419	61.404	22.641	0.346	0	
A18	100YrSCS24	Structure_-_(29)_(RYCB)	0.1664	52.344	12.996	0.51	0	
A19	100YrSCS24	24_(RYCB)	0.0352	69.048	19.472	0.555	0	
A20	100YrSCS24	Maj-26	0.2502	62.8	25.022	0.298	0	
A21	100YrSCS24	Structure_-_(7)_(RYCB)	0.4795	55.324	41.326	0.419	0	

A22 100YrSCS24 Structure_-_(7)_(RYCB) 0.0284 28.571 6.174 4.719 0

A23 100YrSCS24 Structure_-_(7)_(RYCB) 0.2269 60.987 29.719 0.577 0

A24 100YrSCS24 Maj-28 0.2227 61.111 24.481 0.284 0

A25 100YrSCS24 Structure_-_(115)_(RYCB) 0.2389 56.478 22.451 0.521 0

A29 100YrSCS24 Structure_-_(27)_(RYCB) 0.1843 60.326 23.741 0.348 0

A30 100YrSCS24 Structure_-_(26)_(RYCB) 0.0141 50 5.974 1.2 0

A31 100YrSCS24 Structure_-_(25)_(RYCB) 0.2889 61.938 22.424 0.292 0

A32 100YrSCS24 Maj-35 0.1617 61.875 22.1 0.18 0

A33 100YrSCS24 Maj-37 0.1587 62.581 25.695 0.465 0

A34 100YrSCS24 Maj-39 0.0904 59.756 26.348 0.662 0

A35 100YrSCS24 Maj-41 0.2254 63.556 24.772 0.078 0

A41 100YrSCS24 TEE_5_(RYCB) 0.2972 57.229 28.854 0.788 0

A42 100YrSCS24 Maj-46 0.2381 58.242 23.285 0.197 0

A43 100YrSCS24 TEE_6_(RYCB) 0.3468 58.205 41.479 0.114 0

A44 100YrSCS24 TEE_3_(RYCB) 0.288 61.716 42.223 0.009 0

A45 100YrSCS24 Maj-50 0.195 60.112 25.306 0.059 0

A46 100YrSCS24 Maj-52 0.2085 63.587 28.559 0.054 0

A47 100YrSCS24 TEE_4_(RYCB) 0.1447 56.757 22.739 0.58 0

A54 100YrSCS24 STM-Split3 0.8163 7 70.909 0.2 0

A9 100YrSCS24 150_(STM) 3.0378 7 135.013 1 0

;5-year capture and 100-year on-site storage

B1 100YrSCS24 150_(STM) 1.6805 7 224.067 1 0

B2 100YrSCS24 150_(STM) 3.4322 100 279.041 1 0

B3 100YrSCS24 150_(STM) 1.0071 86 116.226 1 0

B4 100YrSCS24 110_(STM) 1.002 7 67.253 0.51 0

C2 100YrSCS24 Maj-22 0.0688 67.606 40.636 1.801 0

S6 100YrSCS24 Maj-45 0.0439 25 4.39 0.5 0

S7 100YrSCS24 104_(STM) 0.0486 25 4.86 0.5 0

S8 100YrSCS24 TEE_1_(1)_(1)_(RYCB) 0.0832 25 8.32 0.5 0

S9 100YrSCS24 114_(STM) 2.3186 7 120.135 0.5 0

[SUBAREAS]

;;Subcatchment N-Imperv N-Perv S-Imperv S-Perv PctZero RouteTo PctRouted

;;---------- ---------- ---------- ---------- ---------- ---------- ---------- ----------

A11	0.013	0.25	1.57	4.67	25	OUTLET	
A12	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A13	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A14	0.013	0.25	1.57	4.67	25	OUTLET	
A15	0.013	0.25	1.57	4.67	25	OUTLET	
A17	0.013	0.25	1.57	4.67	25	OUTLET	
A18	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A19	0.013	0.25	1.57	4.67	25	OUTLET	
A20	0.013	0.25	1.57	4.67	25	OUTLET	
A21	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A22	0.013	0.25	1.57	4.67	25	OUTLET	
A23	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A24	0.013	0.25	1.57	4.67	25	OUTLET	
A25	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A29	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A30	0.013	0.25	1.57	4.67	25	OUTLET	
A31	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A32	0.013	0.25	1.57	4.67	25	OUTLET	
A33	0.013	0.25	1.57	4.67	25	OUTLET	
A34	0.013	0.25	1.57	4.67	25	OUTLET	
A35	0.013	0.25	1.57	4.67	25	OUTLET	
A41	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A42	0.013	0.25	1.57	4.67	25	OUTLET	
A43	0.013	0.25	1.57	4.67	25	PERVIOUS	100

A44	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A45	0.013	0.25	1.57	4.67	25	OUTLET	
A46	0.013	0.25	1.57	4.67	25	OUTLET	
A47	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A54	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A9	0.013	0.25	1.57	4.67	25	PERVIOUS	100
B1	0.013	0.25	1.57	4.67	25	PERVIOUS	100
B2	0.013	0.25	1.57	4.67	25	OUTLET	
B3	0.013	0.25	1.57	4.67	25	OUTLET	
B4	0.013	0.25	1.57	4.67	25	PERVIOUS	100
C2	0.013	0.25	1.57	4.67	25	OUTLET	
S6	0.013	0.25	1.57	4.67	25	OUTLET	
S7	0.013	0.25	1.57	4.67	25	OUTLET	
S8	0.013	0.25	1.57	4.67	25	OUTLET	
S9	0.013	0.25	1.57	4.67	25	PERVIOUS	100

[INFILTRATION]

;;Subcatchment	Param1	Param2	Param3	Param4	Param5
;;---	---	---	---	---	---
A11	76.2	13.2	4.14	7	0
A12	76.2	13.2	4.14	7	0
A13	76.2	13.2	4.14	7	0
A14	76.2	13.2	4.14	7	0
A15	76.2	13.2	4.14	7	0
A17	76.2	13.2	4.14	7	0
A18	76.2	13.2	4.14	7	0
A19	76.2	13.2	4.14	7	0
A20	76.2	13.2	4.14	7	0
A21	76.2	13.2	4.14	7	0

A22	76.2	13.2	4.14	7	0
A23	76.2	13.2	4.14	7	0
A24	76.2	13.2	4.14	7	0
A25	76.2	13.2	4.14	7	0
A29	76.2	13.2	4.14	7	0
A30	76.2	13.2	4.14	7	0
A31	76.2	13.2	4.14	7	0
A32	76.2	13.2	4.14	7	0
A33	76.2	13.2	4.14	7	0
A34	76.2	13.2	4.14	7	0
A35	76.2	13.2	4.14	7	0
A41	76.2	13.2	4.14	7	0
A42	76.2	13.2	4.14	7	0
A43	76.2	13.2	4.14	7	0
A44	76.2	13.2	4.14	7	0
A45	76.2	13.2	4.14	7	0
A46	76.2	13.2	4.14	7	0
A47	76.2	13.2	4.14	7	0
A54	76.2	13.2	4.14	7	0
A9	76.2	13.2	4.14	7	0
B1	76.2	13.2	4.14	7	0
B2	76.2	13.2	4.14	7	0
B3	76.2	13.2	4.14	7	0
B4	76.2	13.2	4.14	7	0
C2	76.2	13.2	4.14	7	0
S6	76	12.7	4	7	0
S7	76	12.7	4	7	0
S8	76	12.7	4	7	0
S9	76	12.7	4	7	0

[JUNCTIONS]

;;Name Elevation MaxDepth InitDepth SurDepth Aponded

;;---------- ---------- ---------- ---------- ---------- ----------

;Mcon-CB

(28)_(CB) 86.7 3.29 0 0 0

;Mcon-CBMH

1_(1)_(RYCB) 86.327 1.486 0 0 1

;Mcon-CB

10_(CB) 86.17 1.98 0 0 0

;Mcon MH - Concentric

104_(STM) 81.683 5.941 0 0 0

;Mcon MH - Concentric

106_(STM) 83.52 4.143 0 0 0

;Mcon MH - Concentric

108_(STM) 83.839 3.664 0 0 0

;Mcon-CB

11_(2)_(RYCB) 86.321 1.829 0 0 0

;Mcon MH - Concentric

110_(STM) 84.236 3.513 0 0 0

;Mcon MH - Concentric

112_(STM) 82.13 5.796 0 0 0

;Mcon MH - Concentric

114_(STM) 83.666 4.334 0 0 0

;Mcon-CB

12_(CB) 85.943 2.297 0 0 0

;Mcon MH - Concentric

120_(STM) 82.918 5.078 0 0 0

;Mcon MH - Concentric

122_(STM) 82.977 5.136 0 0 0

;Mcon MH - Concentric

124_(STM) 83.071 5.124 0 0 0

;Mcon MH - Concentric

126_(STM) 83.188 5.336 0 0 0

;Mcon MH - Concentric

128_(STM) 83.35 5.304 0 0 0

;Mcon-CB

13_(CB) 86.093 2.147 0 0 0

;Mcon MH - Concentric

136_(STM) 83.485 5.195 0 0 0

;Mcon MH - Concentric

138_(STM) 83.569 5.227 0 0 0

;Mcon-CB

14_(CB) 86.101 2.299 0 0 0

;Mcon MH - Concentric

140_(STM) 83.915 5.293 0 0 0

;Mcon MH - Concentric

142_(STM) 85.034 4.126 0 0 0

;Mcon MH - Concentric

144_(STM) 84.367 5.102 0 0 0

;Mcon MH - Concentric

146_(STM) 85.209 3.915 0 0 0

;Mcon MH - Concentric

148_(STM) 85.555 2.924 0 0 0

;Mcon-CB

15_(CB) 86.251 2.149 0 0 0

;Mcon MH - Concentric

150_(STM) 84.679 5.116 0 0 0

;Mcon-CB

16_(CB) 86.312 2.298 0 0 0

;Mcon-CB

17_(CB) 86.316 2.294 0 0 0

;Mcon-CB

18_(CB) 86.433 2.297 0 0 0

;Mcon-CB

19_(CB) 86.436 2.294 0 0 0

;Mcon-CB

2_(CB) 85.9 2.14 0 0 0

;Mcon-CB

20_(CB) 86.721 2.219 0 0 0

;Mcon-CB

21_(CB) 86.642 2.298 0 0 0

;Mcon-CB

22_(CB) 86.923 2.297 0 0 0

;Mcon-CB

23_(CB) 87.073 2.147 0 0 0

;Mcon-CB

24_(RYCB) 87.683 2.307 0 0 1

;Mcon-CB

25_(CB) 87.223 2.297 0 0 0

;Mcon-CB

26_(CB) 87.223 2.297 0 0 0

;Mcon-CB

27_(CB) 87.729 2.261 0 0 0

;Mcon-CB

29_(CB) 86.775 2.435 0 0 0

;Mcon-CB

3_(CB) 85.9 2.14 0 0 0

;Mcon-CB

30_CB-C 86.72 2.49 0 0 0

;Mcon-CBMH

31_(RYCB) 88.539 1.901 0 0 1

;Mcon-CB

32_(CB) 86.93 3.234 0 0 0

;Mcon-CB

33_(RYCB) 87.65 2.514 0 0 0

;Mcon-CB

4_(CB) 85.899 2.071 0 0 0

;Mcon-CB

5_(CB) 85.899 2.071 0 0 0

;Mcon-CB

8_(CB) 85.736 2.284 0 0 0

;Mcon-CB

9_(1)_(RYCB) 86.261 1.759 0 0 1

;Closed CB

CBMH_6_(RYCB) 86.19 1.201 0 0 1

;Mcon-CBMH

CBMH_7_(RYCB) 86.36 1.467 0 0 1

Maj-15_2 89.414 0.6 0 0 0

Maj-18_2 89.533 0.617 0 0 0

Maj-19 89.39 0.6 0 0 0

Maj-19_2 89.62 0.6 0 0 0

Maj-20 89.17 0.6 0 0 0

;lp

Maj-21 88.61 0.6 0 0 0

Maj-23 89.22 0.6 0 0 0

Maj-24 88.92 0.6 0 0 0

Maj-25 89.17 0.6 0 0 0

Maj-26 88.62 0.6 0 0 0

Maj-27 88.88 0.6 0 0 0

Maj-28 88.34 0.6 0 0 0

Maj-29 88.61 0.6 0 0 0

Maj-35 88.13 0.6 0 0 0

Maj-36 88.48 0.6 0 0 0

Maj-37 88.01 0.6 0 0 0

Maj-38 88.21 0.6 0 0 0

Maj-39 87.8 0.6 0 0 0

Maj-40 88 0.6 0 0 0

Maj-41 87.64 0.6 0 0 0

Maj-44 87.55 0.6 0 0 0

Maj-45 87.9 0.6 0 0 0

Maj-46 87.42 0.6 0 0 0

Maj-48_2 87.755 0.625 0 0 0

Maj-50 87.44 0.6 0 0 0

Maj-51 87.74 0.6 0 0 0

Maj-52 87.37 0.6 0 0 0

Maj-53 87.6 0.6 0 0 0

;Overland Major Spill Point

Maj-56 88.5 0.6 0 0 0

;Spill Point

Maj-60 88.697 0.6 0 0 0

;Mcon-CBMH

RYCB_10 87.33 1.399 0 0 1

;Mcon-CBMH

RYCB_3_(RYCB) 86.3 1.01 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(14)_(RYCB) 86.85 1.613 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(15)_(RYCB) 86.65 1.225 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(16)_(1)_(RYCB) 87.072 1.008 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(16)_(2)_(RYCB) 87.35 0.998 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(16)_(RYCB) 86.89 1.011 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(17)_(RYCB) 87.15 1.037 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(19)_(RYCB) 87.9 1.002 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(2)_(1)_(RYCB) 86.78 1.005 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(2)_(2)_(RYCB) 86.65 1.06 0 0 1

;CBMH

RYCB_6_(1)_(2)_(RYCB) 86.62 1.008 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(21)_(RYCB) 88.3 1.003 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(22)_(RYCB) 88.08 1.01 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(23)_(1)_(RYCB) 87.57 1.184 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(23)_(2)_(RYCB) 87.84 1.002 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(23)_(RYCB) 87.69 1.014 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(24)_(RYCB) 87.95 1.011 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(25)_(RYCB) 87.86 1.001 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(26)_(RYCB) 88.08 1 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(27)_(1)_(RYCB) 87.83 1.246 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(27)_(RYCB) 87.99 1.02 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(3)_(RYCB) 86.83 1.03 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(4)_(RYCB) 86.55 1.009 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(5)_(RYCB) 86.32 1.506 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(6)_(RYCB) 87.1 1.009 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(7)_(1)_(RYCB) 86.64 1.1 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(7)_(RYCB) 86.76 1.081 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(8)_(RYCB) 86.52 1.198 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(RYCB) 86.51 1.138 0 0 1

Slope1 89.564 0.6 0 0 0

;Null Structure

STM-247_(STM) 86.3 1.527 0 0 0

;Null Structure

STM-251_(STM) 85.609 4.04 0 0 0

;88.747

STM-Split 83.538 6.262 0 0 0

;Dummy

STM-Split3 80.665 6.767 0 0 0

;Mcon-CBMH

Structure_-_(115)_(1)_(RYCB) 87.47 1.135 0 0 1

;Mcon-CBMH

Structure_-_(115)_(2)_(RYCB) 87.59 1.031 0 0 1

;Mcon-CBMH

Structure_-_(115)_(3)_(RYCB) 87.74 1.017 0 0 1

;Mcon-CBMH

Structure_-_(115)_(RYCB) 87.27 1.93 0 0 1

;CB-LANDSCAPE

Structure_-_(20)_(RYCB) 87 1.29 0 0 1

;CB-LANDSCAPE

Structure_-_(22)_(RYCB) 87.38 1.247 0 0 1

;CB-LANDSCAPE

Structure_-_(25)_(RYCB) 86.09 1.934 0 0 1

;Mcon-CBMH

Structure_-_(26)_(RYCB) 86.075 2.254 0 0 1

;CB-LANDSCAPE

Structure_-_(27)_(RYCB) 86.68 1.367 0 0 1

;Mcon-CBMH

Structure_-_(29)_(RYCB) 87.84 1.152 0 0 1

;Mcon-CBMH

Structure_-_(31)_(RYCB) 87.7 1.013 0 0 1

;Mcon-CBMH

Structure_-_(41)_(RYCB) 87.675 1.448 0 0 1

;Mcon-CBMH

Structure_-_(7)_(RYCB) 86.795 1.805 0 0 1

;CB-LANDSCAPE

TEE_1_(1)_(1)_(RYCB) 86.51 0.992 0 0 1

;Mcon-CBMH

TEE_3_(RYCB) 86.48 1.172 0 0 1

;Mcon-CBMH

TEE_4_(RYCB) 86.42 1.98 0 0 1

;Mcon-CBMH

TEE_5_(RYCB) 86.344 1.313 0 0 1

;TEE

TEE_6_(RYCB) 86.31 1.94 0 0 1

[OUTFALLS]

;;Name Elevation Type Stage Data Gated Route To

;;---------- ---------- ---------- ---------- -------- ----------

;Mcon MH - Concentric

2121_(STM) 80.276 FREE NO

;HP

Maj-18 89.55 FREE NO

Maj-22 88.7 FREE NO

;HP

Maj-48 87.78 FREE NO

;HP

Maj-49 87.79 FREE NO

Maj-59 87.59 FREE NO

[CONDUITS]

;;Name From Node To Node Length Roughness InOffset OutOffset InitFlow MaxFlow

;;---------- ---------- ---------- ---------- ---------- ---------- ---------- ----------

;Mcon Circular Conc. Pipe

10_(STM) 124_(STM) 122_(STM) 16.861 0.013 83.071 82.987 0 0

;Mcon Circular Conc. Pipe

11_(STM) 122_(STM) 120_(STM) 24.63 0.013 82.977 82.928 0 0

;Mcon Circular Conc. Pipe

12_(STM) 120_(STM) 112_(STM) 91.577 0.013 82.918 82.735 0 0

;Mcon Circular Conc. Pipe

13_(STM) 112_(STM) 104_(STM) 73.806 0.013 82.13 81.983 0 0

;Mcon Circular Conc. Pipe

15_(10)_(STM)_1 138_(STM) STM-Split 6.264 0.013 83.569 83.538 0 0

;Mcon Circular Conc. Pipe

15_(10)_(STM)_2 STM-Split 136_(STM) 8.522 0.013 83.538 83.495 0 0

;Mcon Circular Conc. Pipe

15_(11)_(STM) 136_(STM) 128_(STM) 62.502 0.013 83.485 83.36 0 0

;Mcon Circular Conc. Pipe

15_(12)_(STM) 148_(STM) 146_(STM) 78.544 0.013 85.555 85.359 0 0

;Mcon Circular Conc. Pipe

15_(13)_(STM) 146_(STM) 144_(STM) 78.667 0.013 85.209 85.012 0 0

;Mcon Circular Conc. Pipe

15_(5)_(STM) 114_(STM) 112_(STM) 64.643 0.013 83.666 83.44 0 0

;Mcon Circular Conc. Pipe

15_(9)_(STM) 140_(STM) 138_(STM) 113.122 0.013 83.915 83.63 0 0

;Mcon Circular Conc. Pipe

4_(STM) 150_(STM) 144_(STM) 76.296 0.013 84.679 84.412 0 0

;Mcon Circular Conc. Pipe

5_(STM) 144_(STM) 140_(STM) 77.329 0.013 84.367 84.1 0 0

;Mcon Circular Conc. Pipe

8_(STM) 128_(STM) 126_(STM) 75.982 0.013 83.35 83.198 0 0

;Mcon Circular Conc. Pipe

9_(STM) 126_(STM) 124_(STM) 53.404 0.013 83.188 83.081 0 0

C1 104_(STM) STM-Split3 91.263 0.013 81.683 80.665 0 0

;Maj RY Spill Point

C18 31_(RYCB) Maj-18_2 4.776 0.035 89.84 89.55 0 0

C18_4 Slope1 Maj-15_2 37.347 0.01 89.564 89.414 0 0

C18_5 Maj-19_2 Maj-15_2 13.813 0.01 89.62 89.414 0 0

C18_6 Maj-19_2 Maj-19 27.25 0.01 89.62 89.39 0 0

C18_8 Maj-18 Maj-18_2 5 0.01 89.55 89.533 0 0

C18_9 Maj-18_2 Maj-15_2 31.942 0.01 89.533 89.414 0 0

C19 Maj-15_2 Maj-23 11.274 0.01 89.414 89.22 0 0

C2 Maj-53 Maj-59 98.833 0.035 87.6 87.59 0 0

C20 Maj-19 Maj-20 24.9 0.01 89.39 89.17 0 0

C21 Maj-20 Maj-21 64.337 0.01 89.17 88.61 0 0

C22 Maj-22 Maj-21 13.47 0.01 88.7 88.61 0 0

C23 Maj-23 Maj-24 31.267 0.01 89.22 88.92 0 0

C24 Maj-25 Maj-24 35.922 0.01 89.17 88.92 0 0

C25 Maj-25 Maj-26 59.92 0.01 89.17 88.62 0 0

C26 Maj-27 Maj-26 40.459 0.01 88.88 88.62 0 0

;Maj RY Spill Point

C27 24_(RYCB) Maj-25 17.828 0.035 89.3 89.17 0 0

C27_1 Maj-27 Maj-60 20.292 0.01 88.88 88.697 0 0

C27_2 Maj-60 Maj-28 39.649 0.01 88.697 88.34 0 0

C28 Maj-29 Maj-28 31.279 0.01 88.61 88.34 0 0

;Maj RY Spill Point

C31 Structure_-_(115)_(RYCB) Maj-28 19.142 0.035 88.6 88.34 0 0

C36 Maj-29 Maj-35 35.198 0.01 88.61 88.13 0 0

C37 Maj-36 Maj-35 37.341 0.01 88.48 88.13 0 0

C41 Maj-45 Maj-44 34.02 0.01 87.9 87.55 0 0

C42 Maj-45 Maj-41 33.014 0.01 87.9 87.64 0 0

C43 Maj-40 Maj-41 55.256 0.01 88 87.64 0 0

C44 Maj-40 Maj-39 14.403 0.01 88 87.8 0 0

C45 Maj-38 Maj-39 19.588 0.01 88.21 87.8 0 0

C46 Maj-36 Maj-37 37.582 0.01 88.48 88.01 0 0

C47 Maj-38 Maj-37 23.672 0.01 88.21 88.01 0 0

C48 Maj-45 Maj-46 39.529 0.01 87.9 87.42 0 0

C49 Maj-53 Maj-46 33.614 0.01 87.6 87.42 0 0

;RY Maj Spill Point

C5 STM-Split Maj-60 2.964 0.035 88.8 88.697 0 0

C50_1 Maj-48 Maj-48_2 5 0.01 87.78 87.755 0 0

C50_2 Maj-48_2 Maj-53 31.434 0.01 87.755 87.6 0 0

C51 Maj-53 Maj-52 33.988 0.01 87.6 87.37 0 0

C52 Maj-51 Maj-52 53.407 0.01 87.74 87.37 0 0

C53 Maj-51 Maj-50 33.561 0.01 87.74 87.44 0 0

C54 Maj-49 Maj-50 43.76 0.01 87.79 87.44 0 0

C56 Maj-21 Maj-56 22.042 0.035 88.61 88.5 0 0

;Maj RY Spill Point

C58 TEE_6_(RYCB) Maj-46 16.507 0.035 87.65 87.42 0 0

;Maj RY Spill Point

C59 TEE_4_(RYCB) Maj-48_2 9.706 0.035 87.8 87.755 0 0

;Major System Overland Spillway

C60 Maj-56 Maj-60 62.349 0.035 88.5 88.697 0 0

;HDPE Pipe SI

Pipe_-_(100)_(RYCB) RYCB_6_(1)_(15)_(RYCB) TEE_4_(RYCB) 43.107 0.013 86.65 86.434 0 0

;HDPE Pipe SI

Pipe_-_(110)_(RYCB) RYCB_6_(1)_(21)_(RYCB) RYCB_6_(1)_(22)_(RYCB) 42.797 0.013 88.3 88.086 0
0

;HDPE Pipe SI

Pipe_-_(111)_(RYCB) RYCB_6_(1)_(22)_(RYCB) Structure_-_(29)_(RYCB) 36.137 0.013 88.08 87.899 0
0

;HDPE Pipe SI

Pipe_-_(114)_(RYCB) RYCB_6_(1)_(24)_(RYCB) RYCB_6_(1)_(23)_(2)_(RYCB) 20.158 0.013 87.95 87.849 0
0

;HDPE Pipe SI

Pipe_-_(117)_(RYCB) RYCB_6_(1)_(26)_(RYCB) RYCB_6_(1)_(27)_(RYCB) 14.18 0.013 88.08 88.009 0
0

;HDPE Pipe SI

Pipe_-_(118)_(RYCB) RYCB_6_(1)_(27)_(RYCB) RYCB_6_(1)_(27)_(1)_(RYCB) 29.667 0.013 87.99 87.842 0
0

;HDPE Pipe SI

Pipe_-_(119)_(RYCB) RYCB_6_(1)_(25)_(RYCB) Structure_-_(31)_(RYCB) 29.541 0.013 87.86 87.712 0
0

;HDPE Pipe SI

Pipe_-_(134)_(RYCB) RYCB_6_(1)_(16)_(RYCB) Structure_-_(27)_(RYCB) 40.37 0.013 86.89 86.688 0
0

;HDPE Pipe SI

Pipe_-_(137)_(RYCB) RYCB_6_(1)_(7)_(RYCB) RYCB_6_(1)_(7)_(1)_(RYCB) 22.479 0.013 86.76 86.648 0
0

;HDPE Pipe SI

Pipe_-_(138)_(RYCB) RYCB_6_(1)_(7)_(1)_(RYCB) RYCB_6_(1)_(8)_(RYCB) 21.988 0.013 86.64 86.53 0
0

;HDPE Pipe SI

Pipe_-_(139)_(RYCB) RYCB_6_(1)_(2)_(1)_(RYCB) RYCB_6_(1)_(2)_(2)_(RYCB) 19.884 0.013 86.78 86.681
0 0

;HDPE Pipe SI

Pipe_-_(14)_(RYCB) Structure_-_(22)_(RYCB) Structure_-_(7)_(RYCB) 4.758 0.013 87.38 87.356 0
0

;HDPE Pipe SI

Pipe_-_(140)_(RYCB) RYCB_6_(1)_(2)_(2)_(RYCB) TEE_3_(RYCB) 21.13 0.013 86.65 86.544 0 0

;HDPE Pipe SI

Pipe_-_(141)_(RYCB) RYCB_6_(1)_(19)_(RYCB) Structure_-_(115)_(3)_(RYCB) 18.513 0.013 87.9 87.752 0 0

;HDPE Pipe SI

Pipe_-_(142)_(RYCB) Structure_-_(115)_(3)_(RYCB) Structure_-_(115)_(2)_(RYCB) 27.381 0.013 87.74 87.603 0 0

;HDPE Pipe SI

Pipe_-_(143)_(RYCB) Structure_-_(115)_(2)_(RYCB) Structure_-_(115)_(1)_(RYCB) 22.082 0.013 87.59 87.48 0 0

;HDPE Pipe SI

Pipe_-_(144)_(RYCB) Structure_-_(115)_(1)_(RYCB) Structure_-_(115)_(RYCB) 33.251 0.013 87.47 87.304 0 0

;HDPE Pipe SI

Pipe_-_(15)_(RYCB) Structure_-_(7)_(RYCB) STM-Split 39.005 0.013 86.795 86.475 0 0

;HDPE Pipe SI

Pipe_-_(150)_(RYCB) RYCB_6_(1)_(23)_(2)_(RYCB) RYCB_6_(1)_(23)_(RYCB) 21.983 0.013 87.84 87.73 0 0

;HDPE Pipe SI

Pipe_-_(151)_(RYCB) RYCB_6_(1)_(23)_(RYCB) RYCB_6_(1)_(23)_(1)_(RYCB) 22.117 0.013 87.69 87.579 0 0

;HDPE Pipe SI

Pipe_-_(152)_(RYCB) RYCB_6_(1)_(23)_(1)_(RYCB) Structure_-_(22)_(RYCB) 36.028 0.013 87.57 87.39 0 0

;HDPE Pipe SI

Pipe_-_(153)_(RYCB) RYCB_6_(1)_(16)_(1)_(RYCB) RYCB_6_(1)_(16)_(RYCB) 17.188 0.013 87.072 86.9 0 0

;HDPE Pipe SI

Pipe_-_(154)_(RYCB) RYCB_6_(1)_(16)_(2)_(RYCB) RYCB_6_(1)_(17)_(RYCB) 38.097 0.013 87.35 87.16 0 0

;HDPE Pipe SI

Pipe_-_(155)_(RYCB) RYCB_6_(1)_(17)_(RYCB) Structure_-_(20)_(RYCB) 17.928 0.013 87.15 87.06 0
0

;HDPE Pipe SI

Pipe_-_(156)_(RYCB) Structure_-_(20)_(RYCB) Structure_-_(7)_(RYCB) 31.031 0.013 87 86.845 0
0

;HDPE Pipe SI

Pipe_-_(16)_(RYCB) Structure_-_(25)_(RYCB) Structure_-_(26)_(RYCB) 3.089 0.013 86.09 86.075 0
0

;HDPE Pipe SI

Pipe_-_(161)_(RYCB) TEE_1_(1)_(1)_(RYCB) RYCB_3_(RYCB) 36.543 0.013 86.51 86.327 0 0

;HDPE Pipe SI

Pipe_-_(164)_(RYCB) Structure_-_(31)_(RYCB) RYCB_10 28.561 0.013 87.7 87.557 0 0

;HDPE Pipe SI

Pipe_-_(165)_(RYCB) RYCB_6_(1)_(27)_(1)_(RYCB) Structure_-_(41)_(RYCB) 30.956 0.013 87.83 87.675 0
0

;HDPE Pipe SI

Pipe_-_(17)_(RYCB) Structure_-_(27)_(RYCB) Structure_-_(26)_(RYCB) 5.409 0.013 86.68 86.653 0
0

;HDPE Pipe SI

Pipe_-_(19)_(RYCB) Structure_-_(29)_(RYCB) 24_(RYCB) 31.338 0.013 87.84 87.683 0 0

;HDPE Pipe SI

Pipe_-_(25)_(RYCB) Structure_-_(41)_(RYCB) 33_(RYCB) 6.05 0.013 87.68 87.65 0 0

;HDPE Pipe SI

Pipe_-_(27)_(RYCB) TEE_3_(RYCB) 1_(1)_(RYCB) 30.601 0.013 86.48 86.327 0 0

;HDPE Pipe SI

Pipe_-_(5)_(RYCB) RYCB_3_(RYCB) CBMH_6_(RYCB) 11.006 0.013 86.3 86.19 0 0

;HDPE Pipe SI

Pipe_-_(6)_(RYCB) TEE_4_(RYCB) CBMH_7_(RYCB) 12.045 0.013 86.42 86.36 0 0

;HDPE Pipe SI

Pipe_-_(7)_(RYCB) TEE_6_(RYCB) 9_(1)_(RYCB) 9.779 0.013 86.31 86.261 0 0

;HDPE Pipe SI

Pipe_-_(73)_(RYCB) Structure_-_(115)_(RYCB) 20_(CB) 9.658 0.013 87.27 87.222 0 0

;HDPE Pipe SI

Pipe_-_(87)_(RYCB) RYCB_6_(1)_(2)_(RYCB) RYCB_6_(1)_(RYCB) 21.137 0.013 86.62 86.515 0 0

;HDPE Pipe SI

Pipe_-_(88)_(RYCB) RYCB_6_(1)_(RYCB) TEE_6_(RYCB) 36.066 0.013 86.51 86.33 0 0

;HDPE Pipe SI

Pipe_-_(89)_(RYCB) RYCB_6_(1)_(3)_(RYCB) TEE_3_(RYCB) 30.529 0.013 86.83 86.677 0 0

;HDPE Pipe SI

Pipe_-_(9)_(RYCB) TEE_5_(RYCB) 11_(2)_(RYCB) 5.75 0.013 86.35 86.321 0 0

;HDPE Pipe SI

Pipe_-_(93)_(RYCB) RYCB_6_(1)_(3)_(RYCB) RYCB_6_(1)_(4)_(RYCB) 41.813 0.013 86.83 86.621 0 0

;HDPE Pipe SI

Pipe_-_(94)_(RYCB) RYCB_6_(1)_(4)_(RYCB) RYCB_6_(1)_(5)_(RYCB) 43.994 0.013 86.55 86.33 0 0

;HDPE Pipe SI

Pipe_-_(95)_(RYCB) RYCB_6_(1)_(5)_(RYCB) Structure_-_(25)_(RYCB) 43.249 0.013 86.32 86.104 0 0

;HDPE Pipe SI

Pipe_-_(96)_(RYCB) RYCB_6_(1)_(6)_(RYCB) RYCB_6_(1)_(7)_(RYCB) 25.115 0.013 87.1 86.82 0 0

;HDPE Pipe SI

Pipe_-_(98)_(RYCB) RYCB_6_(1)_(8)_(RYCB) TEE_5_(RYCB) 35.119 0.013 86.52 86.344 0 0

;HDPE Pipe SI

Pipe_-_(99)_(RYCB) RYCB_6_(1)_(14)_(RYCB) RYCB_6_(1)_(15)_(RYCB) 38.97 0.013 86.85 86.655 0 0

;Mcon Circular Conc. Pipe

STM-23_(STM) 106_(STM) 104_(STM) 97.603 0.013 83.764 83.52 0 0

;Mcon Circular Conc. Pipe

STM-24_(STM) 108_(STM) 106_(STM) 26.242 0.013 83.905 83.839 0 0

;Ipex PVC DR 35

STM-28_(STM) 110_(STM) 108_(STM) 29.107 0.013 84.236 84.105 0 0

;Mcon Circular Conc. Pipe

STM-34_(1)_(STM)_2 STM-Split3 2121_(STM) 34.317 0.013 80.665 80.631 0 0

;HDPE Pipe SI

STM-81_(STM) 142_(STM) 140_(STM) 20.687 0.013 85.034 84.9 0 0

STM-82_(STM) STM-247_(STM) 104_(STM) 37.514 0.013 86.3 86.112 0 0

;HDPE Pipe SI

STM-83_(STM) 144_(STM) STM-251_(STM) 38.404 0.013 85.225 85.609 0 0

[ORIFICES]

;;Name From Node To Node Type Offset Qcoeff Gated CloseTime

;;---------- ---------- ---------- ---------- ---------- ---------- -------- ----------

CB-10 10_(CB) 114_(STM) SIDE 86.17 0.65 NO 0

CB-12-C 12_(CB) 120_(STM) SIDE 85.943 0.65 NO 0

CB-13-C 13_(CB) 120_(STM) SIDE 86.093 0.65 NO 0

CB-14 14_(CB) 122_(STM) SIDE 86.101 0.65 NO 0

CB-15 15_(CB) 122_(STM) SIDE 86.251 0.65 NO 0

CB-16 16_(CB) 126_(STM) SIDE 86.312 0.65 NO 0

CB-17 17_(CB) 126_(STM) SIDE 86.316 0.65 NO 0

CB-18 18_(CB) 128_(STM) SIDE 86.433 0.65 NO 0

CB-19 19_(CB) 128_(STM) SIDE 86.436 0.65 NO 0

CB-2 2_(CB) 106_(STM) SIDE 85.9 0.65 NO 0

CB-20 20_(CB) 136_(STM) SIDE 86.721 0.65 NO 0

CB-21 21_(CB) 136_(STM) SIDE 86.642 0.65 NO 0

CB-22 22_(CB) 140_(STM) SIDE 86.923 0.65 NO 0

CB-23 23_(CB) 140_(STM) SIDE 87.073 0.65 NO 0

CB-25 25_(CB) 144_(STM) SIDE 87.223 0.65 NO 0

CB-26 26_(CB) 144_(STM) SIDE 87.223 0.65 NO 0

CB-27(1) 27_(CB) 146_(STM) SIDE 87.729 0.65 NO 0

CB-28 (28)_(CB) 146_(STM) SIDE 86.7 0.65 NO 0

CB-29 29_(CB) 148_(STM) SIDE 86.775 0.65 NO 0

CB-3 3_(CB) 106_(STM) SIDE 85.9 0.65 NO 0

CB-30 30_CB-C 148_(STM) SIDE 86.72 0.65 NO 0

CB-32 32_(CB) 150_(STM) SIDE 86.93 0.65 NO 0

CB-33 33_(RYCB) 150_(STM) SIDE 87.65 0.65 NO 0

CB-4 4_(CB) 104_(STM) SIDE 85.899 0.65 NO 0

CB-5 5_(CB) 104_(STM) SIDE 85.899 0.65 NO 0

;Closed CB

CB-6 CBMH_6_(RYCB) 104_(STM) SIDE 86.19 0.62 NO 0

CB-8 8_(CB) 112_(STM) SIDE 85.736 0.65 NO 0

CB-9 9_(1)_(RYCB) 112_(STM) SIDE 86.261 0.65 NO 0

OR11 Slope1 32_(CB) BOTTOM 89.564 0.62 NO 0

OR12 Maj-19 27_(CB) SIDE 89.39 0.65 NO 0

OR13 Maj-19 (28)_(CB) SIDE 89.39 0.65 NO 0

OR14 Maj-24 25_(CB) BOTTOM 88.92 0.62 NO 0

OR15 Maj-24 26_(CB) BOTTOM 88.92 0.62 NO 0

OR16 Maj-26 23_(CB) BOTTOM 88.62 0.62 NO 0

OR17 Maj-26 22_(CB) BOTTOM 88.62 0.62 NO 0

OR18 Maj-28 20_(CB) BOTTOM 88.34 0.62 NO 0

OR19 Maj-28 21_(CB) BOTTOM 88.34 0.62 NO 0

OR26 Maj-35 18_(CB) BOTTOM 88.13 0.62 NO 0

OR27 Maj-35 19_(CB) BOTTOM 88.13 0.62 NO 0

OR30 Maj-44 10_(CB) BOTTOM 87.55 0.62 NO 0

OR31 Maj-44 11_(2)_(RYCB) BOTTOM 87.55 0.62 NO 0

OR32 Maj-41 13_(CB) BOTTOM 87.64 0.62 NO 0

OR33 Maj-41 12_(CB) BOTTOM 87.64 0.62 NO 0

OR34 Maj-39 15_(CB) BOTTOM 87.8 0.62 NO 0

OR35 Maj-39 14_(CB) BOTTOM 87.8 0.62 NO 0

OR36 Maj-37 16_(CB) BOTTOM 88.01 0.62 NO 0

OR37 Maj-37 17_(CB) BOTTOM 88.01 0.62 NO 0

OR38 Maj-46 8_(CB) BOTTOM 87.42 0.62 NO 0

OR39 Maj-46 9_(1)_(RYCB) BOTTOM 87.42 0.62 NO 0

OR40 Maj-52 5_(CB) SIDE 87.37 0.65 NO 0

OR41 Maj-52 4_(CB) SIDE 87.37 0.65 NO 0

OR42 Maj-50 3_(CB) SIDE 87.44 0.65 NO 0

OR43 Maj-50 2_(CB) SIDE 87.44 0.65 NO 0

;Double CB Grate

OR46 Maj-21 30_CB-C SIDE 88.61 0.65 NO 0

;Double CB Grate

OR47 Maj-21 29_(CB) SIDE 88.61 0.65 NO 0

OR48 Slope1 33_(RYCB) SIDE 89.564 0.65 NO 0

RYCB-1 1_(1)_(RYCB) 110_(STM) SIDE 86.327 0.62 NO 0

RYCB-10 RYCB_10 148_(STM) SIDE 87.33 0.62 NO 0

RYCB-11 11_(2)_(RYCB) 114_(STM) SIDE 86.321 0.65 NO 0

;Closed CB

RYCB-24 24_(RYCB) 142_(STM) SIDE 87.683 0.65 NO 0

RYCB-26 Structure_-_(26)_(RYCB) 128_(STM) SIDE 86.075 0.62 NO 0

;Closed CB

RYCB-31 31_(RYCB) STM-251_(STM) SIDE 88.539 0.62 NO 0

RYCB-7 CBMH_7_(RYCB) STM-247_(STM) SIDE 86.36 0.62 NO 0

[XSECTIONS]

;;Link Shape Geom1 Geom2 Geom3 Geom4 Barrels Culvert

;;---------- ---------- ---------- ---------- ---------- ---------- ---------- ----------

10_(STM) CIRCULAR 1.35 0 0 0 1

11_(STM)	CIRCULAR	1.35	0	0	0	1
12_(STM)	CIRCULAR	1.35	0	0	0	1
13_(STM)	CIRCULAR	1.35	0	0	0	1
15_(10)_(STM)_1	CIRCULAR	1.35	0	0	0	1
15_(10)_(STM)_2	CIRCULAR	1.35	0	0	0	1
15_(11)_(STM)	CIRCULAR	1.35	0	0	0	1
15_(12)_(STM)	CIRCULAR	0.45	0	0	0	1
15_(13)_(STM)	CIRCULAR	0.6	0	0	0	1
15_(5)_(STM)	CIRCULAR	0.525	0	0	0	1
15_(9)_(STM)	CIRCULAR	1.35	0	0	0	1
4_(STM)	CIRCULAR	1.2	0	0	0	1
5_(STM)	CIRCULAR	1.2	0	0	0	1
8_(STM)	CIRCULAR	1.35	0	0	0	1
9_(STM)	CIRCULAR	1.35	0	0	0	1
C1	CIRCULAR	1.65	0	0	0	1
C18	TRIANGULAR	0.6	3.6	0	0	1
C18_4	IRREGULAR	18mROWwSidewalk	0	0	0	1
C18_5	IRREGULAR	24mROW-Dbl-Sidewalk	0	0	0	1
C18_6	IRREGULAR	24mROW-Dbl-Sidewalk	0	0	0	1
C18_8	IRREGULAR	24mROW-Dbl-Sidewalk	0	0	0	1
C18_9	IRREGULAR	24mROW-Dbl-Sidewalk	0	0	0	1
C19	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C2	TRIANGULAR	0.6	3.6	0	0	1
C20	IRREGULAR	24mROW-Dbl-Sidewalk	0	0	0	1
C21	IRREGULAR	24mROW-Dbl-Sidewalk	0	0	0	1
C22	IRREGULAR	24mROW-Dbl-Sidewalk	0	0	0	1
C23	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C24	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C25	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1

C26	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C27	TRIANGULAR	0.6	3.6	0	0	1
C27_1	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C27_2	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C28	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C31	TRIANGULAR	0.6	3.6	0	0	1
C36	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C37	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C41	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C42	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C43	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C44	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C45	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C46	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C47	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C48	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C49	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C5	TRIANGULAR	0.6	3.6	0	0	1
C50_1	IRREGULAR	18mROWwSidewalk	0	0	0	1
C50_2	IRREGULAR	18mROWwSidewalk	0	0	0	1
C51	IRREGULAR	18mROWwSidewalk	0	0	0	1
C52	IRREGULAR	18mROWwSidewalk	0	0	0	1
C53	IRREGULAR	18mROWwSidewalk	0	0	0	1
C54	IRREGULAR	18mROWwSidewalk	0	0	0	1
C56	TRIANGULAR	0.6	3.6	0	0	1
C58	TRIANGULAR	0.6	3.6	0	0	1
C59	TRIANGULAR	0.6	3.6	0	0	1
C60	TRIANGULAR	0.6	3.6	0	0	1
Pipe_-_(100)_(RYCB)	CIRCULAR	0.25	0	0	0	1

Pipe_-_(110)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(111)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(114)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(117)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(118)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(119)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(134)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(137)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(138)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(139)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(14)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(140)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(141)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(142)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(143)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(144)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(15)_(RYCB) CIRCULAR 0.3 0 0 0 1

Pipe_-_(150)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(151)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(152)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(153)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(154)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(155)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(156)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(16)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(161)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(164)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(165)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(17)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(19)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(25)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(27)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(5)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(6)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(7)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(73)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(87)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(88)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(89)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(9)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(93)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(94)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(95)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(96)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(98)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(99)_(RYCB) CIRCULAR 0.25 0 0 0 1

STM-23_(STM) CIRCULAR 0.525 0 0 0 1

STM-24_(STM) CIRCULAR 0.45 0 0 0 1

STM-28_(STM) CIRCULAR 0.25 0 0 0 1

STM-34_(1)_(STM)_2 CIRCULAR 1.65 0 0 0 1

STM-81_(STM) CIRCULAR 0.3 0 0 0 1

STM-82_(STM) CIRCULAR 0.25 0 0 0 1

STM-83_(STM) CIRCULAR 0.25 0 0 0 1

CB-10 CIRCULAR 0.102 0 0 0

CB-12-C CIRCULAR 0.083 0 0 0

CB-13-C CIRCULAR 0.083 0 0 0

CB-14 CIRCULAR 0.083 0 0 0

CB-15 CIRCULAR 0.083 0 0 0

CB-16	CIRCULAR	0.083	0	0	0
CB-17	CIRCULAR	0.083	0	0	0
CB-18	CIRCULAR	0.083	0	0	0
CB-19	CIRCULAR	0.083	0	0	0
CB-2	CIRCULAR	0.083	0	0	0
CB-20	CIRCULAR	0.102	0	0	0
CB-21	CIRCULAR	0.102	0	0	0
CB-22	CIRCULAR	0.083	0	0	0
CB-23	CIRCULAR	0.083	0	0	0
CB-25	CIRCULAR	0.083	0	0	0
CB-26	CIRCULAR	0.083	0	0	0
CB-27(1)	CIRCULAR	0.083	0	0	0
CB-28	CIRCULAR	0.083	0	0	0
CB-29	CIRCULAR	0.127	0	0	0
CB-3	CIRCULAR	0.083	0	0	0
CB-30	CIRCULAR	0.127	0	0	0
CB-32	CIRCULAR	0.094	0	0	0
CB-33	CIRCULAR	0.127	0	0	0
CB-4	CIRCULAR	0.083	0	0	0
CB-5	CIRCULAR	0.083	0	0	0
CB-6	CIRCULAR	0.127	0	0	0
CB-8	CIRCULAR	0.083	0	0	0
CB-9	CIRCULAR	0.152	0	0	0
OR11	RECT_CLOSED	0.35	0.35	0	0
OR12	RECT_CLOSED	0.13	0.65	0	0
OR13	RECT_CLOSED	0.13	0.65	0	0
OR14	RECT_CLOSED	0.35	0.35	0	0
OR15	RECT_CLOSED	0.35	0.35	0	0
OR16	RECT_CLOSED	0.35	0.35	0	0

OR17	RECT_CLOSED	0.35	0.35	0	0
OR18	RECT_CLOSED	0.35	0.35	0	0
OR19	RECT_CLOSED	0.35	0.35	0	0
OR26	RECT_CLOSED	0.35	0.35	0	0
OR27	RECT_CLOSED	0.35	0.35	0	0
OR30	RECT_CLOSED	0.35	0.35	0	0
OR31	RECT_CLOSED	0.35	0.35	0	0
OR32	RECT_CLOSED	0.35	0.35	0	0
OR33	RECT_CLOSED	0.35	0.35	0	0
OR34	RECT_CLOSED	0.35	0.35	0	0
OR35	RECT_CLOSED	0.35	0.35	0	0
OR36	RECT_CLOSED	0.35	0.35	0	0
OR37	RECT_CLOSED	0.35	0.35	0	0
OR38	RECT_CLOSED	0.35	0.35	0	0
OR39	RECT_CLOSED	0.35	0.35	0	0
OR40	RECT_CLOSED	0.13	0.65	0	0
OR41	RECT_CLOSED	0.13	0.65	0	0
OR42	RECT_CLOSED	0.13	0.65	0	0
OR43	RECT_CLOSED	0.13	0.65	0	0
OR46	RECT_CLOSED	0.26	1.3	0	0
OR47	RECT_CLOSED	0.26	1.3	0	0
OR48	RECT_CLOSED	0.13	0.65	0	0
RYCB-1	CIRCULAR	0.127	0	0	0
RYCB-10	CIRCULAR	0.178	0	0	0
RYCB-11	CIRCULAR	0.178	0	0	0
RYCB-24	CIRCULAR	0.127	0	0	0
RYCB-26	CIRCULAR	0.152	0	0	0
RYCB-31	CIRCULAR	0.127	0	0	0
RYCB-7	CIRCULAR	0.127	0	0	0

[TRANSECTS]

;;Transect Data in HEC-2 format

;

NC 0.035 0.035 0.013

X1 16.5mROW-Dbl-Sidewalk 9 2 14.5 0.0 0.0 0.0 0.0 0.0

GR 0.6 -10.9 0.15 2 0.15 4 0 4.01 0.13 8.25

GR 0 12.49 0.15 12.5 0.15 14.5 0.6 25.6

;

NC 0.035 0.035 0.013

X1 16.5mROW-No-Sidewalk 9 3.8 12.7 0.0 0.0 0.0 0.0 0.0

GR 0.6 -9.1 0.15 3.8 0.15 4 0 4.01 0.13 8.25

GR 0 12.49 0.15 12.5 0.15 12.7 0.6 25.6

;

NC 0.035 0.035 0.013

X1 16.5mROWwSidewalk 9 2 12.7 0.0 0.0 0.0 0.0 0.0

GR 0.6 -10.9 0.15 2 0.15 4 0 4.01 0.13 8.25

GR 0 12.49 0.15 12.5 0.15 12.7 0.6 25.6

;

NC 0.035 0.035 0.013

X1 18mROW-Dbl-Sidewalk 9 5.5 18 0.0 0.0 0.0 0.0 0.0

GR 0.6 -10 0.09 5.5 0.08 7.5 0 7.5 0.13 11.75

GR 0 16 0.08 16 0.09 18 0.6 29.25

;

NC 0.035 0.035 0.013

X1 18mROW-No-Sidewalk 7 7.5 16 0.0 0.0 0.0 0.0 0.0

GR 0.6 -10 0.08 7.5 0 7.5 0.13 11.75 0 16

GR 0.08 16 0.6 29.25

;

```
NC 0.035    0.035    0.013
X1 18mROWwSidewalk   8       2.75     16      0.0     0.0     0.0     0.0     0.0
GR 0.6      -10      0.09     2.75     0.08     7.5     0       7.5     0.13     11.75
GR 0        16       0.08     16       0.6      29.25
;
NC 0.035    0.035    0.013
X1 18mROWwSidewalk-Half  5       2.75     16      0.0     0.0     0.0     0.0     0.0
GR 0.6      -10      0.09     2.75     0.08     7.5     0       7.5     0.13     11.75
;
NC 0.035    0.035    0.013
X1 24mROW-Dbl-Sidewalk  9       3.6      20.4     0.0     0.0     0.0     0.0     0.0
GR 0.6      -9.3     0.15     3.6      0.15     7.5     0       7.51     0.13     12
GR 0        16.49    0.15     16.5     0.15     20.4     0.6     33.3

[LOSSES]
;;Link          Kentry     Kexit      Kavg       Flap Gate  Seepage
;;--------------- ---------- ---------- ---------- ---------- ----------

[CURVES]
;;Name          Type       X-Value    Y-Value
;;--------------- ---------- ---------- ----------
;100% capture of flow to this CB
100%_Capture     Rating     0          0
100%_Capture               0.01       0.001
100%_Capture               0.1        1
100%_Capture               0.3        5

;Plas-Tech StormTech Orifice Plate Inlet Control Device (ICD).
;Depth from top of CB
```

102mm-ICD Rating 0 0

102mm-ICD 0.01 0.0266

102mm-ICD 0.15 0.0278

102mm-ICD 0.3 0.0296

102mm-ICD 0.35 0.03

102mm-ICD-RLCB Rating 0 0

102mm-ICD-RLCB 0.01 0.0301

102mm-ICD-RLCB 0.15 0.0312

102mm-ICD-RLCB 0.3 0.0328

102mm-ICD-RLCB 0.35 0.0332

;Plas-Tech StormTech Orifice Plate Inlet Control Device (ICD).

;Depth from top of CB

108mm-ICD Rating 0 0

108mm-ICD 0.01 0.0298

108mm-ICD 0.15 0.0312

108mm-ICD 0.3 0.0332

108mm-ICD 0.35 0.0337

108mm-ICD-RLCB Rating 0 0

108mm-ICD-RLCB 0.01 0.0338

108mm-ICD-RLCB 0.15 0.035

108mm-ICD-RLCB 0.3 0.0367

108mm-ICD-RLCB 0.35 0.0372

;Plas-Tech StormTech Orifice Plate Inlet Control Device (ICD).

;Depth from top of CB

127mm-ICD Rating 0 0

127mm-ICD 0.01 0.0413

127mm-ICD 0.15 0.0432

127mm-ICD 0.3 0.0458

127mm-ICD 0.35 0.0466

127mm-ICD-RLCB Rating 0 0

127mm-ICD-RLCB 0.01 0.047

127mm-ICD-RLCB 0.15 0.048

127mm-ICD-RLCB 0.3 0.051

127mm-ICD-RLCB 0.35 0.052

;Plas-Tech StormTech Orifice Plate Inlet Control Device (ICD).

;Depth from top of CB

152mm-ICD Rating 0 0

152mm-ICD 0.01 0.0591

152mm-ICD 0.15 0.0618

152mm-ICD 0.3 0.0657

152mm-ICD 0.35 0.0667

152mm-ICD-RLCB Rating 0 0

152mm-ICD-RLCB 0.01 0.067

152mm-ICD-RLCB 0.15 0.069

152mm-ICD-RLCB 0.3 0.073

152mm-ICD-RLCB 0.35 0.074

;Sx0.03

16ROW_1CB_So0.005 Rating 0 0

16ROW_1CB_So0.005 0.01 0.0003

16ROW_1CB_So0.005 0.02 0.0011

16ROW_1CB_So0.005	0.03	0.0037
16ROW_1CB_So0.005	0.04	0.0072
16ROW_1CB_So0.005	0.05	0.0132
16ROW_1CB_So0.005	0.06	0.0168
16ROW_1CB_So0.005	0.07	0.0214
16ROW_1CB_So0.005	0.08	0.0253
16ROW_1CB_So0.005	0.09	0.0286
16ROW_1CB_So0.005	0.1	0.0331
16ROW_1CB_So0.005	0.11	0.0367
16ROW_1CB_So0.005	0.12	0.0409
16ROW_1CB_So0.005	0.13	0.0446
16ROW_1CB_So0.005	0.14	0.048
16ROW_1CB_So0.005	0.15	0.049
16ROW_1CB_So0.005	0.16	0.049
16ROW_1CB_So0.005	0.17	0.049
16ROW_1CB_So0.005	0.18	0.049
16ROW_1CB_So0.005	0.19	0.049
16ROW_1CB_So0.005	0.2	0.049
16ROW_1CB_So0.005	0.21	0.049
16ROW_1CB_So0.005	0.22	0.049
16ROW_1CB_So0.005	0.23	0.049
16ROW_1CB_So0.005	0.24	0.049
16ROW_1CB_So0.005	0.25	0.049
16ROW_1CB_So0.005	0.26	0.049
16ROW_1CB_So0.005	0.27	0.049
16ROW_1CB_So0.005	0.28	0.049
16ROW_1CB_So0.005	0.29	0.049
16ROW_1CB_So0.005	0.3	0.049
16ROW_1CB_So0.005	0.31	0.049

16ROW_1CB_So0.005 0.32 0.049

16ROW_1CB_So0.005 0.33 0.049

16ROW_1CB_So0.005 0.34 0.049

16ROW_1CB_So0.005 0.35 0.049

16ROW_1CB_So0.005 0.36 0.049

16ROW_1CB_So0.005 0.37 0.049

16ROW_1CB_So0.005 0.38 0.049

16ROW_1CB_So0.005 0.39 0.049

16ROW_1CB_So0.005 0.4 0.049

;Sx0.03

16ROW_1CB_So0.01 Rating 0 0

16ROW_1CB_So0.01 0.01 0.0005

16ROW_1CB_So0.01 0.02 0.0016

16ROW_1CB_So0.01 0.03 0.0052

16ROW_1CB_So0.01 0.04 0.0101

16ROW_1CB_So0.01 0.05 0.0158

16ROW_1CB_So0.01 0.06 0.0206

16ROW_1CB_So0.01 0.07 0.0254

16ROW_1CB_So0.01 0.08 0.029

16ROW_1CB_So0.01 0.09 0.0343

16ROW_1CB_So0.01 0.1 0.0382

16ROW_1CB_So0.01 0.11 0.043

16ROW_1CB_So0.01 0.12 0.0463

16ROW_1CB_So0.01 0.13 0.049

16ROW_1CB_So0.01 0.14 0.049

16ROW_1CB_So0.01 0.15 0.049

16ROW_1CB_So0.01 0.16 0.049

16ROW_1CB_So0.01 0.17 0.049

16ROW_1CB_So0.01 0.18 0.049

16ROW_1CB_So0.01 0.19 0.049

16ROW_1CB_So0.01 0.2 0.049

16ROW_1CB_So0.01 0.21 0.049

16ROW_1CB_So0.01 0.22 0.049

16ROW_1CB_So0.01 0.23 0.049

16ROW_1CB_So0.01 0.24 0.049

16ROW_1CB_So0.01 0.25 0.049

16ROW_1CB_So0.01 0.26 0.049

16ROW_1CB_So0.01 0.27 0.049

16ROW_1CB_So0.01 0.28 0.049

16ROW_1CB_So0.01 0.29 0.049

16ROW_1CB_So0.01 0.3 0.049

16ROW_1CB_So0.01 0.31 0.049

16ROW_1CB_So0.01 0.32 0.049

16ROW_1CB_So0.01 0.33 0.049

16ROW_1CB_So0.01 0.34 0.049

16ROW_1CB_So0.01 0.35 0.049

16ROW_1CB_So0.01 0.36 0.049

16ROW_1CB_So0.01 0.37 0.049

;Sx0.03

16ROW_1CB_So0.02 Rating 0 0

16ROW_1CB_So0.02 0.01 0.0006

16ROW_1CB_So0.02 0.02 0.0019

16ROW_1CB_So0.02 0.03 0.0062

16ROW_1CB_So0.02 0.04 0.012

16ROW_1CB_So0.02 0.05 0.0154

16ROW_1CB_So0.02 0.06 0.0192

16ROW_1CB_So0.02 0.07 0.0236

16ROW_1CB_So0.02 0.08 0.0275

16ROW_1CB_So0.02 0.09 0.0316

16ROW_1CB_So0.02 0.1 0.0363

16ROW_1CB_So0.02 0.11 0.041

16ROW_1CB_So0.02 0.12 0.045

16ROW_1CB_So0.02 0.13 0.045

16ROW_1CB_So0.02 0.14 0.045

16ROW_1CB_So0.02 0.15 0.045

16ROW_1CB_So0.02 0.16 0.045

16ROW_1CB_So0.02 0.17 0.045

16ROW_1CB_So0.02 0.18 0.045

16ROW_1CB_So0.02 0.19 0.045

16ROW_1CB_So0.02 0.2 0.045

16ROW_1CB_So0.02 0.21 0.045

16ROW_1CB_So0.02 0.22 0.045

16ROW_1CB_So0.02 0.23 0.045

16ROW_1CB_So0.02 0.24 0.045

16ROW_1CB_So0.02 0.25 0.045

16ROW_1CB_So0.02 0.26 0.045

16ROW_1CB_So0.02 0.27 0.045

16ROW_1CB_So0.02 0.28 0.045

16ROW_1CB_So0.02 0.29 0.045

16ROW_1CB_So0.02 0.3 0.045

16ROW_1CB_So0.02 0.31 0.045

16ROW_1CB_So0.02 0.32 0.045

;Sx0.03

16ROW_1CB_So0.03 Rating 0 0

16ROW_1CB_So0.03	0.01	0.0005
16ROW_1CB_So0.03	0.02	0.0017
16ROW_1CB_So0.03	0.03	0.0057
16ROW_1CB_So0.03	0.04	0.011
16ROW_1CB_So0.03	0.05	0.0146
16ROW_1CB_So0.03	0.06	0.0179
16ROW_1CB_So0.03	0.07	0.0216
16ROW_1CB_So0.03	0.08	0.0256
16ROW_1CB_So0.03	0.09	0.0298
16ROW_1CB_So0.03	0.1	0.0335
16ROW_1CB_So0.03	0.11	0.038
16ROW_1CB_So0.03	0.12	0.039
16ROW_1CB_So0.03	0.13	0.039
16ROW_1CB_So0.03	0.14	0.039
16ROW_1CB_So0.03	0.15	0.039
16ROW_1CB_So0.03	0.16	0.039
16ROW_1CB_So0.03	0.17	0.039
16ROW_1CB_So0.03	0.18	0.039
16ROW_1CB_So0.03	0.19	0.039
16ROW_1CB_So0.03	0.2	0.039
16ROW_1CB_So0.03	0.21	0.039
16ROW_1CB_So0.03	0.22	0.039
16ROW_1CB_So0.03	0.23	0.039
16ROW_1CB_So0.03	0.24	0.039
16ROW_1CB_So0.03	0.25	0.039
16ROW_1CB_So0.03	0.26	0.039
16ROW_1CB_So0.03	0.27	0.039
16ROW_1CB_So0.03	0.28	0.039
16ROW_1CB_So0.03	0.29	0.039

16ROW_1CB_So0.03 0.3 0.039

;Plas-Tech StormTech Orifice Plate Inlet Control Device (ICD).

;Depth from top of CB

178mm-ICD Rating 0 0

178mm-ICD 0.01 0.0811

178mm-ICD 0.15 0.0848

178mm-ICD 0.3 0.0901

178mm-ICD 0.35 0.0915

178mm-ICD-RLCB Rating 0 0

178mm-ICD-RLCB 0.01 0.092

178mm-ICD-RLCB 0.15 0.095

178mm-ICD-RLCB 0.3 0.1

178mm-ICD-RLCB 0.35 0.101

;1 Single CB on single lead pipe. Single CB is limited by 250mm Lead pipe at 1.2m head. Q=195.3 L/s

1-CB Rating 0 0

1-CB 0.05 0.1953

1-CB 1 0.1954

;1 DCB on single lead pipe. DCB is limited by 300mm Lead pipe at 1.2m head. Q=281.2 L/s

1-DCB Rating 0 0

1-DCB 0.05 0.2812

1-DCB 1 0.2813

;Sx0.03

24ROW_1CB_So0.005 Rating 0 0

24ROW_1CB_So0.005 0.01 0.0004

24ROW_1CB_So0.005	0.02	0.0012
24ROW_1CB_So0.005	0.03	0.0039
24ROW_1CB_So0.005	0.04	0.0076
24ROW_1CB_So0.005	0.05	0.0136
24ROW_1CB_So0.005	0.06	0.0174
24ROW_1CB_So0.005	0.07	0.022
24ROW_1CB_So0.005	0.08	0.0258
24ROW_1CB_So0.005	0.09	0.0296
24ROW_1CB_So0.005	0.1	0.034
24ROW_1CB_So0.005	0.11	0.0378
24ROW_1CB_So0.005	0.12	0.0418
24ROW_1CB_So0.005	0.13	0.0453
24ROW_1CB_So0.005	0.14	0.0486
24ROW_1CB_So0.005	0.15	0.049
24ROW_1CB_So0.005	0.16	0.049
24ROW_1CB_So0.005	0.17	0.049
24ROW_1CB_So0.005	0.18	0.049
24ROW_1CB_So0.005	0.19	0.049
24ROW_1CB_So0.005	0.2	0.049
24ROW_1CB_So0.005	0.21	0.049
24ROW_1CB_So0.005	0.22	0.049
24ROW_1CB_So0.005	0.23	0.049
24ROW_1CB_So0.005	0.24	0.049
24ROW_1CB_So0.005	0.25	0.049
24ROW_1CB_So0.005	0.26	0.049
24ROW_1CB_So0.005	0.27	0.049
24ROW_1CB_So0.005	0.28	0.049
24ROW_1CB_So0.005	0.29	0.049
24ROW_1CB_So0.005	0.3	0.049

24ROW_1CB_So0.005 0.31 0.049

24ROW_1CB_So0.005 0.32 0.049

24ROW_1CB_So0.005 0.33 0.049

24ROW_1CB_So0.005 0.34 0.049

24ROW_1CB_So0.005 0.35 0.049

24ROW_1CB_So0.005 0.36 0.049

24ROW_1CB_So0.005 0.37 0.049

24ROW_1CB_So0.005 0.38 0.049

24ROW_1CB_So0.005 0.39 0.049

24ROW_1CB_So0.005 0.4 0.049

;Sx0.03

24ROW_1CB_So0.01 Rating 0 0

24ROW_1CB_So0.01 0.01 0.0005

24ROW_1CB_So0.01 0.02 0.0017

24ROW_1CB_So0.01 0.03 0.0055

24ROW_1CB_So0.01 0.04 0.0107

24ROW_1CB_So0.01 0.05 0.0164

24ROW_1CB_So0.01 0.06 0.0212

24ROW_1CB_So0.01 0.07 0.0259

24ROW_1CB_So0.01 0.08 0.03

24ROW_1CB_So0.01 0.09 0.0351

24ROW_1CB_So0.01 0.1 0.0396

24ROW_1CB_So0.01 0.11 0.044

24ROW_1CB_So0.01 0.12 0.0473

24ROW_1CB_So0.01 0.13 0.049

24ROW_1CB_So0.01 0.14 0.049

24ROW_1CB_So0.01 0.15 0.049

24ROW_1CB_So0.01 0.16 0.049

24ROW_1CB_So0.01 0.17 0.049

24ROW_1CB_So0.01 0.18 0.049

24ROW_1CB_So0.01 0.19 0.049

24ROW_1CB_So0.01 0.2 0.049

24ROW_1CB_So0.01 0.21 0.049

24ROW_1CB_So0.01 0.22 0.049

24ROW_1CB_So0.01 0.23 0.049

24ROW_1CB_So0.01 0.24 0.049

24ROW_1CB_So0.01 0.25 0.049

24ROW_1CB_So0.01 0.26 0.049

24ROW_1CB_So0.01 0.27 0.049

24ROW_1CB_So0.01 0.28 0.049

24ROW_1CB_So0.01 0.29 0.049

24ROW_1CB_So0.01 0.3 0.049

24ROW_1CB_So0.01 0.31 0.049

24ROW_1CB_So0.01 0.32 0.049

24ROW_1CB_So0.01 0.33 0.049

24ROW_1CB_So0.01 0.34 0.049

24ROW_1CB_So0.01 0.35 0.049

24ROW_1CB_So0.01 0.36 0.049

24ROW_1CB_So0.01 0.37 0.049

;Sx0.03

24ROW_1CB_So0.02 Rating 0 0

24ROW_1CB_So0.02 0.01 0.0006

24ROW_1CB_So0.02 0.02 0.002

24ROW_1CB_So0.02 0.03 0.0066

24ROW_1CB_So0.02 0.04 0.0123

24ROW_1CB_So0.02 0.05 0.0158

24ROW_1CB_So0.02	0.06	0.0198
24ROW_1CB_So0.02	0.07	0.0243
24ROW_1CB_So0.02	0.08	0.0281
24ROW_1CB_So0.02	0.09	0.0325
24ROW_1CB_So0.02	0.1	0.0373
24ROW_1CB_So0.02	0.11	0.0418
24ROW_1CB_So0.02	0.12	0.045
24ROW_1CB_So0.02	0.13	0.045
24ROW_1CB_So0.02	0.14	0.045
24ROW_1CB_So0.02	0.15	0.045
24ROW_1CB_So0.02	0.16	0.045
24ROW_1CB_So0.02	0.17	0.045
24ROW_1CB_So0.02	0.18	0.045
24ROW_1CB_So0.02	0.19	0.045
24ROW_1CB_So0.02	0.2	0.045
24ROW_1CB_So0.02	0.21	0.045
24ROW_1CB_So0.02	0.22	0.045
24ROW_1CB_So0.02	0.23	0.045
24ROW_1CB_So0.02	0.24	0.045
24ROW_1CB_So0.02	0.25	0.045
24ROW_1CB_So0.02	0.26	0.045
24ROW_1CB_So0.02	0.27	0.045
24ROW_1CB_So0.02	0.28	0.045
24ROW_1CB_So0.02	0.29	0.045
24ROW_1CB_So0.02	0.3	0.045
24ROW_1CB_So0.02	0.31	0.045
24ROW_1CB_So0.02	0.32	0.045

;Sx0.03

24ROW_1CB_So0.03	Rating	0	0
24ROW_1CB_So0.03		0.01	0.0006
24ROW_1CB_So0.03		0.02	0.0018
24ROW_1CB_So0.03		0.03	0.006
24ROW_1CB_So0.03		0.04	0.0113
24ROW_1CB_So0.03		0.05	0.015
24ROW_1CB_So0.03		0.06	0.0183
24ROW_1CB_So0.03		0.07	0.0225
24ROW_1CB_So0.03		0.08	0.0264
24ROW_1CB_So0.03		0.09	0.0306
24ROW_1CB_So0.03		0.1	0.0343
24ROW_1CB_So0.03		0.11	0.0388
24ROW_1CB_So0.03		0.12	0.039
24ROW_1CB_So0.03		0.13	0.039
24ROW_1CB_So0.03		0.14	0.039
24ROW_1CB_So0.03		0.15	0.039
24ROW_1CB_So0.03		0.16	0.039
24ROW_1CB_So0.03		0.17	0.039
24ROW_1CB_So0.03		0.18	0.039
24ROW_1CB_So0.03		0.19	0.039
24ROW_1CB_So0.03		0.2	0.039
24ROW_1CB_So0.03		0.21	0.039
24ROW_1CB_So0.03		0.22	0.039
24ROW_1CB_So0.03		0.23	0.039
24ROW_1CB_So0.03		0.24	0.039
24ROW_1CB_So0.03		0.25	0.039
24ROW_1CB_So0.03		0.26	0.039
24ROW_1CB_So0.03		0.27	0.039
24ROW_1CB_So0.03		0.28	0.039

24ROW_1CB_So0.03 0.29 0.039

24ROW_1CB_So0.03 0.3 0.039

;Plas-Tech StormTech Orifice Plate Inlet Control Device (ICD).

;Depth from top of CB

;Assumes 2 CB's with individual ICD's

2x102mm-ICD Rating 0 0

2x102mm-ICD 0.005 0.0532

2x102mm-ICD 0.15 0.0556

2x102mm-ICD 0.3 0.0592

2x102mm-ICD 0.35 0.06

;Plas-Tech StormTech Orifice Plate Inlet Control Device (ICD).

;Depth from top of CB

;Assumes 2 CB's with individual ICD's

2x152mm-ICD Rating 0 0

2x152mm-ICD 0.005 0.1182

2x152mm-ICD 0.15 0.1236

2x152mm-ICD 0.3 0.1314

2x152mm-ICD 0.35 0.1334

;Plas-Tech StormTech Orifice Plate Inlet Control Device (ICD).

;Depth from top of CB

83mm-ICD Rating 0 0

83mm-ICD 0.01 0.0176

83mm-ICD 0.15 0.0184

83mm-ICD 0.3 0.0196

83mm-ICD 0.35 0.0199

83mm-ICD-RLCB Rating 0 0

83mm-ICD-RLCB 0.01 0.0199

83mm-ICD-RLCB 0.15 0.0207

83mm-ICD-RLCB 0.3 0.0217

83mm-ICD-RLCB 0.35 0.022

;Plas-Tech StormTech Orifice Plate Inlet Control Device (ICD).

;Depth from top of CB

94mm-ICD Rating 0 0

94mm-ICD 0.01 0.0226

94mm-ICD 0.15 0.0236

94mm-ICD 0.3 0.0251

94mm-ICD 0.35 0.0255

94mm-ICD-RLCB Rating 0 0

94mm-ICD-RLCB 0.01 0.0256

94mm-ICD-RLCB 0.15 0.0265

94mm-ICD-RLCB 0.3 0.0278

94mm-ICD-RLCB 0.35 0.0282

;Block 160 - Medium Density Residential

;1.01 ha R=0.80 tc= 10 min

;5 Year Rational = 234 L/s

B1-Out Rating 0 0

B1-Out 0.01 0.234

B1-Out 0.3 0.266

;Existing UHAUL site

;3.43 ha R=0.90 tc= 12 min

;5 Year Rational (via Novatech)= 786.6 L/s

B2-Out Rating 0 0

B2-Out 0.01 0.787

B2-Out 0.3 0.897

;Block 161 - Medium Density Residential

;1.02 ha R=0.80 tc= 10 min

;5 Year Rational (via Novatech) = 1173.67 L/s

B3-Out Rating 0 0

B3-Out 0.01 1.173

B3-Out 0.3 1.337

;Park Lands

;1.00 ha R=0.25 tc= 10 min

;5 Year Rational (via Novatech) = 129 L/s

B4-Out Rating 0 0

B4-Out 0.01 0.1297

B4-Out 0.3 0.1479

;540 m³ of storage assumed for site based on MArch 2020 UHAUL site Design Breif

UHAL_Onsite Storage 0 1800

UHAL_Onsite 0.3 1800

UHAL_Onsite 0.31 1

UHAL_Onsite 2 1

[TIMESERIES]

;;Name Date Time Value

;;---------- ---------- ---------- ----------

;Rainfall (mm/hr)

002yrChicago3hr 01-01-2019 00:00:00 0

002yrChicago3hr 01-01-2019 00:10:00 2.81459

002yrChicago3hr 01-01-2019 00:20:00 3.49824

002yrChicago3hr 01-01-2019 00:30:00 4.68718

002yrChicago3hr 01-01-2019 00:40:00 7.30485

002yrChicago3hr 01-01-2019 00:50:00 18.20881

002yrChicago3hr 01-01-2019 01:00:00 76.805

002yrChicago3hr 01-01-2019 01:10:00 24.07906

002yrChicago3hr 01-01-2019 01:20:00 12.36376

002yrChicago3hr 01-01-2019 01:30:00 8.32403

002yrChicago3hr 01-01-2019 01:40:00 6.30341

002yrChicago3hr 01-01-2019 01:50:00 5.09498

002yrChicago3hr 01-01-2019 02:00:00 4.29133

002yrChicago3hr 01-01-2019 02:10:00 3.71786

002yrChicago3hr 01-01-2019 02:20:00 3.28762

002yrChicago3hr 01-01-2019 02:30:00 2.95254

002yrChicago3hr 01-01-2019 02:40:00 2.68388

002yrChicago3hr 01-01-2019 02:50:00 2.46348

002yrChicago3hr 01-01-2019 03:00:00 2.27921

;Rainfall (mm/hr)

002YrSCS24 01-01-2019 00:00:00 0.53

002YrSCS24 01-01-2019 00:10:00 0.53

002YrSCS24 01-01-2019 00:20:00 0.53

002YrSCS24 01-01-2019 00:30:00 0.53

002YrSCS24 01-01-2019 00:40:00 0.53

002YrSCS24 01-01-2019 00:50:00 0.53

002YrSCS24 01-01-2019 01:00:00 0.53

002YrSCS24 01-01-2019 01:10:00 0.53

002YrSCS24	01-01-2019 01:20:00	0.53
002YrSCS24	01-01-2019 01:30:00	0.53
002YrSCS24	01-01-2019 01:40:00	0.53
002YrSCS24	01-01-2019 01:50:00	0.53
002YrSCS24	01-01-2019 02:00:00	0.63
002YrSCS24	01-01-2019 02:10:00	0.63
002YrSCS24	01-01-2019 02:20:00	0.63
002YrSCS24	01-01-2019 02:30:00	0.63
002YrSCS24	01-01-2019 02:40:00	0.63
002YrSCS24	01-01-2019 02:50:00	0.63
002YrSCS24	01-01-2019 03:00:00	0.63
002YrSCS24	01-01-2019 03:10:00	0.63
002YrSCS24	01-01-2019 03:20:00	0.63
002YrSCS24	01-01-2019 03:30:00	0.63
002YrSCS24	01-01-2019 03:40:00	0.63
002YrSCS24	01-01-2019 03:50:00	0.63
002YrSCS24	01-01-2019 04:00:00	0.78
002YrSCS24	01-01-2019 04:10:00	0.78
002YrSCS24	01-01-2019 04:20:00	0.78
002YrSCS24	01-01-2019 04:30:00	0.78
002YrSCS24	01-01-2019 04:40:00	0.78
002YrSCS24	01-01-2019 04:50:00	0.78
002YrSCS24	01-01-2019 05:00:00	0.78
002YrSCS24	01-01-2019 05:10:00	0.78
002YrSCS24	01-01-2019 05:20:00	0.78
002YrSCS24	01-01-2019 05:30:00	0.78
002YrSCS24	01-01-2019 05:40:00	0.78
002YrSCS24	01-01-2019 05:50:00	0.78
002YrSCS24	01-01-2019 06:00:00	0.87

002YrSCS24	01-01-2019 06:10:00	0.87
002YrSCS24	01-01-2019 06:20:00	0.87
002YrSCS24	01-01-2019 06:30:00	0.87
002YrSCS24	01-01-2019 06:40:00	0.87
002YrSCS24	01-01-2019 06:50:00	0.87
002YrSCS24	01-01-2019 07:00:00	1.07
002YrSCS24	01-01-2019 07:10:00	1.07
002YrSCS24	01-01-2019 07:20:00	1.07
002YrSCS24	01-01-2019 07:30:00	1.07
002YrSCS24	01-01-2019 07:40:00	1.07
002YrSCS24	01-01-2019 07:50:00	1.07
002YrSCS24	01-01-2019 08:00:00	1.26
002YrSCS24	01-01-2019 08:10:00	1.26
002YrSCS24	01-01-2019 08:20:00	1.26
002YrSCS24	01-01-2019 08:30:00	1.36
002YrSCS24	01-01-2019 08:40:00	1.36
002YrSCS24	01-01-2019 08:50:00	1.36
002YrSCS24	01-01-2019 09:00:00	1.55
002YrSCS24	01-01-2019 09:10:00	1.55
002YrSCS24	01-01-2019 09:20:00	1.55
002YrSCS24	01-01-2019 09:30:00	1.74
002YrSCS24	01-01-2019 09:40:00	1.74
002YrSCS24	01-01-2019 09:50:00	1.74
002YrSCS24	01-01-2019 10:00:00	2.23
002YrSCS24	01-01-2019 10:10:00	2.23
002YrSCS24	01-01-2019 10:20:00	2.23
002YrSCS24	01-01-2019 10:30:00	3.01
002YrSCS24	01-01-2019 10:40:00	3.01
002YrSCS24	01-01-2019 10:50:00	3.01

002YrSCS24	01-01-2019 11:00:00	4.65
002YrSCS24	01-01-2019 11:10:00	4.65
002YrSCS24	01-01-2019 11:20:00	4.65
002YrSCS24	01-01-2019 11:30:00	14.35
002YrSCS24	01-01-2019 11:40:00	36.84
002YrSCS24	01-01-2019 11:50:00	59.33
002YrSCS24	01-01-2019 12:00:00	6.98
002YrSCS24	01-01-2019 12:10:00	6.98
002YrSCS24	01-01-2019 12:20:00	6.98
002YrSCS24	01-01-2019 12:30:00	3.59
002YrSCS24	01-01-2019 12:40:00	3.59
002YrSCS24	01-01-2019 12:50:00	3.59
002YrSCS24	01-01-2019 13:00:00	2.62
002YrSCS24	01-01-2019 13:10:00	2.62
002YrSCS24	01-01-2019 13:20:00	2.62
002YrSCS24	01-01-2019 13:30:00	2.04
002YrSCS24	01-01-2019 13:40:00	2.04
002YrSCS24	01-01-2019 13:50:00	2.04
002YrSCS24	01-01-2019 14:00:00	1.45
002YrSCS24	01-01-2019 14:10:00	1.45
002YrSCS24	01-01-2019 14:20:00	1.45
002YrSCS24	01-01-2019 14:30:00	1.45
002YrSCS24	01-01-2019 14:40:00	1.45
002YrSCS24	01-01-2019 14:50:00	1.45
002YrSCS24	01-01-2019 15:00:00	1.45
002YrSCS24	01-01-2019 15:10:00	1.45
002YrSCS24	01-01-2019 15:20:00	1.45
002YrSCS24	01-01-2019 15:30:00	1.45
002YrSCS24	01-01-2019 15:40:00	1.45

002YrSCS24	01-01-2019 15:50:00	1.45
002YrSCS24	01-01-2019 16:00:00	0.87
002YrSCS24	01-01-2019 16:10:00	0.87
002YrSCS24	01-01-2019 16:20:00	0.87
002YrSCS24	01-01-2019 16:30:00	0.87
002YrSCS24	01-01-2019 16:40:00	0.87
002YrSCS24	01-01-2019 16:50:00	0.87
002YrSCS24	01-01-2019 17:00:00	0.87
002YrSCS24	01-01-2019 17:10:00	0.87
002YrSCS24	01-01-2019 17:20:00	0.87
002YrSCS24	01-01-2019 17:30:00	0.87
002YrSCS24	01-01-2019 17:40:00	0.87
002YrSCS24	01-01-2019 17:50:00	0.87
002YrSCS24	01-01-2019 18:00:00	0.87
002YrSCS24	01-01-2019 18:10:00	0.87
002YrSCS24	01-01-2019 18:20:00	0.87
002YrSCS24	01-01-2019 18:30:00	0.87
002YrSCS24	01-01-2019 18:40:00	0.87
002YrSCS24	01-01-2019 18:50:00	0.87
002YrSCS24	01-01-2019 19:00:00	0.87
002YrSCS24	01-01-2019 19:10:00	0.87
002YrSCS24	01-01-2019 19:20:00	0.87
002YrSCS24	01-01-2019 19:30:00	0.87
002YrSCS24	01-01-2019 19:40:00	0.87
002YrSCS24	01-01-2019 19:50:00	0.87
002YrSCS24	01-01-2019 20:00:00	0.58
002YrSCS24	01-01-2019 20:10:00	0.58
002YrSCS24	01-01-2019 20:20:00	0.58
002YrSCS24	01-01-2019 20:30:00	0.58

002YrSCS24 01-01-2019 20:40:00 0.58

002YrSCS24 01-01-2019 20:50:00 0.58

002YrSCS24 01-01-2019 21:00:00 0.58

002YrSCS24 01-01-2019 21:10:00 0.58

002YrSCS24 01-01-2019 21:20:00 0.58

002YrSCS24 01-01-2019 21:30:00 0.58

002YrSCS24 01-01-2019 21:40:00 0.58

002YrSCS24 01-01-2019 21:50:00 0.58

002YrSCS24 01-01-2019 22:00:00 0.58

002YrSCS24 01-01-2019 22:10:00 0.58

002YrSCS24 01-01-2019 22:20:00 0.58

002YrSCS24 01-01-2019 22:30:00 0.58

002YrSCS24 01-01-2019 22:40:00 0.58

002YrSCS24 01-01-2019 22:50:00 0.58

002YrSCS24 01-01-2019 23:00:00 0.58

002YrSCS24 01-01-2019 23:10:00 0.58

002YrSCS24 01-01-2019 23:20:00 0.58

002YrSCS24 01-01-2019 23:30:00 0.58

002YrSCS24 01-01-2019 23:40:00 0.58

002YrSCS24 01-01-2019 23:50:00 0.58

;Rainfall (mm/hr)

005yrChicago3hr 01-01-2019 00:00:00 0

005yrChicago3hr 01-01-2019 00:10:00 3.68223

005yrChicago3hr 01-01-2019 00:20:00 4.58232

005yrChicago3hr 01-01-2019 00:30:00 6.15055

005yrChicago3hr 01-01-2019 00:40:00 9.6141

005yrChicago3hr 01-01-2019 00:50:00 24.17035

005yrChicago3hr 01-01-2019 01:00:00 104.193

005yrChicago3hr 01-01-2019 01:10:00 32.03692

005yrChicago3hr 01-01-2019 01:20:00 16.3375

005yrChicago3hr 01-01-2019 01:30:00 10.96479

005yrChicago3hr 01-01-2019 01:40:00 8.28693

005yrChicago3hr 01-01-2019 01:50:00 6.68897

005yrChicago3hr 01-01-2019 02:00:00 5.6279

005yrChicago3hr 01-01-2019 02:10:00 4.87167

005yrChicago3hr 01-01-2019 02:20:00 4.30483

005yrChicago3hr 01-01-2019 02:30:00 3.8637

005yrChicago3hr 01-01-2019 02:40:00 3.51028

005yrChicago3hr 01-01-2019 02:50:00 3.22046

005yrChicago3hr 01-01-2019 03:00:00 2.97831

;Rainfall (mm/hr)

005YrSCS24 01-01-2019 00:00:00 0.71

005YrSCS24 01-01-2019 00:10:00 0.71

005YrSCS24 01-01-2019 00:20:00 0.71

005YrSCS24 01-01-2019 00:30:00 0.71

005YrSCS24 01-01-2019 00:40:00 0.71

005YrSCS24 01-01-2019 00:50:00 0.71

005YrSCS24 01-01-2019 01:00:00 0.71

005YrSCS24 01-01-2019 01:10:00 0.71

005YrSCS24 01-01-2019 01:20:00 0.71

005YrSCS24 01-01-2019 01:30:00 0.71

005YrSCS24 01-01-2019 01:40:00 0.71

005YrSCS24 01-01-2019 01:50:00 0.71

005YrSCS24 01-01-2019 02:00:00 0.83

005YrSCS24 01-01-2019 02:10:00 0.83

005YrSCS24 01-01-2019 02:20:00 0.83

005YrSCS24	01-01-2019 02:30:00	0.83
005YrSCS24	01-01-2019 02:40:00	0.83
005YrSCS24	01-01-2019 02:50:00	0.83
005YrSCS24	01-01-2019 03:00:00	0.83
005YrSCS24	01-01-2019 03:10:00	0.83
005YrSCS24	01-01-2019 03:20:00	0.83
005YrSCS24	01-01-2019 03:30:00	0.83
005YrSCS24	01-01-2019 03:40:00	0.83
005YrSCS24	01-01-2019 03:50:00	0.83
005YrSCS24	01-01-2019 04:00:00	1.03
005YrSCS24	01-01-2019 04:10:00	1.03
005YrSCS24	01-01-2019 04:20:00	1.03
005YrSCS24	01-01-2019 04:30:00	1.03
005YrSCS24	01-01-2019 04:40:00	1.03
005YrSCS24	01-01-2019 04:50:00	1.03
005YrSCS24	01-01-2019 05:00:00	1.03
005YrSCS24	01-01-2019 05:10:00	1.03
005YrSCS24	01-01-2019 05:20:00	1.03
005YrSCS24	01-01-2019 05:30:00	1.03
005YrSCS24	01-01-2019 05:40:00	1.03
005YrSCS24	01-01-2019 05:50:00	1.03
005YrSCS24	01-01-2019 06:00:00	1.15
005YrSCS24	01-01-2019 06:10:00	1.15
005YrSCS24	01-01-2019 06:20:00	1.15
005YrSCS24	01-01-2019 06:30:00	1.15
005YrSCS24	01-01-2019 06:40:00	1.15
005YrSCS24	01-01-2019 06:50:00	1.15
005YrSCS24	01-01-2019 07:00:00	1.41
005YrSCS24	01-01-2019 07:10:00	1.41

005YrSCS24	01-01-2019 07:20:00	1.41
005YrSCS24	01-01-2019 07:30:00	1.41
005YrSCS24	01-01-2019 07:40:00	1.41
005YrSCS24	01-01-2019 07:50:00	1.41
005YrSCS24	01-01-2019 08:00:00	1.67
005YrSCS24	01-01-2019 08:10:00	1.67
005YrSCS24	01-01-2019 08:20:00	1.67
005YrSCS24	01-01-2019 08:30:00	1.8
005YrSCS24	01-01-2019 08:40:00	1.8
005YrSCS24	01-01-2019 08:50:00	1.8
005YrSCS24	01-01-2019 09:00:00	2.05
005YrSCS24	01-01-2019 09:10:00	2.05
005YrSCS24	01-01-2019 09:20:00	2.05
005YrSCS24	01-01-2019 09:30:00	2.31
005YrSCS24	01-01-2019 09:40:00	2.31
005YrSCS24	01-01-2019 09:50:00	2.31
005YrSCS24	01-01-2019 10:00:00	2.95
005YrSCS24	01-01-2019 10:10:00	2.95
005YrSCS24	01-01-2019 10:20:00	2.95
005YrSCS24	01-01-2019 10:30:00	3.98
005YrSCS24	01-01-2019 10:40:00	3.98
005YrSCS24	01-01-2019 10:50:00	3.98
005YrSCS24	01-01-2019 11:00:00	6.16
005YrSCS24	01-01-2019 11:10:00	6.16
005YrSCS24	01-01-2019 11:20:00	6.16
005YrSCS24	01-01-2019 11:30:00	18.98
005YrSCS24	01-01-2019 11:40:00	48.73
005YrSCS24	01-01-2019 11:50:00	78.48
005YrSCS24	01-01-2019 12:00:00	9.23

005YrSCS24	01-01-2019 12:10:00	9.23
005YrSCS24	01-01-2019 12:20:00	9.23
005YrSCS24	01-01-2019 12:30:00	4.74
005YrSCS24	01-01-2019 12:40:00	4.74
005YrSCS24	01-01-2019 12:50:00	4.74
005YrSCS24	01-01-2019 13:00:00	3.46
005YrSCS24	01-01-2019 13:10:00	3.46
005YrSCS24	01-01-2019 13:20:00	3.46
005YrSCS24	01-01-2019 13:30:00	2.69
005YrSCS24	01-01-2019 13:40:00	2.69
005YrSCS24	01-01-2019 13:50:00	2.69
005YrSCS24	01-01-2019 14:00:00	1.92
005YrSCS24	01-01-2019 14:10:00	1.92
005YrSCS24	01-01-2019 14:20:00	1.92
005YrSCS24	01-01-2019 14:30:00	1.92
005YrSCS24	01-01-2019 14:40:00	1.92
005YrSCS24	01-01-2019 14:50:00	1.92
005YrSCS24	01-01-2019 15:00:00	1.92
005YrSCS24	01-01-2019 15:10:00	1.92
005YrSCS24	01-01-2019 15:20:00	1.92
005YrSCS24	01-01-2019 15:30:00	1.92
005YrSCS24	01-01-2019 15:40:00	1.92
005YrSCS24	01-01-2019 15:50:00	1.92
005YrSCS24	01-01-2019 16:00:00	1.15
005YrSCS24	01-01-2019 16:10:00	1.15
005YrSCS24	01-01-2019 16:20:00	1.15
005YrSCS24	01-01-2019 16:30:00	1.15
005YrSCS24	01-01-2019 16:40:00	1.15
005YrSCS24	01-01-2019 16:50:00	1.15

005YrSCS24	01-01-2019 17:00:00	1.15
005YrSCS24	01-01-2019 17:10:00	1.15
005YrSCS24	01-01-2019 17:20:00	1.15
005YrSCS24	01-01-2019 17:30:00	1.15
005YrSCS24	01-01-2019 17:40:00	1.15
005YrSCS24	01-01-2019 17:50:00	1.15
005YrSCS24	01-01-2019 18:00:00	1.15
005YrSCS24	01-01-2019 18:10:00	1.15
005YrSCS24	01-01-2019 18:20:00	1.15
005YrSCS24	01-01-2019 18:30:00	1.15
005YrSCS24	01-01-2019 18:40:00	1.15
005YrSCS24	01-01-2019 18:50:00	1.15
005YrSCS24	01-01-2019 19:00:00	1.15
005YrSCS24	01-01-2019 19:10:00	1.15
005YrSCS24	01-01-2019 19:20:00	1.15
005YrSCS24	01-01-2019 19:30:00	1.15
005YrSCS24	01-01-2019 19:40:00	1.15
005YrSCS24	01-01-2019 19:50:00	1.15
005YrSCS24	01-01-2019 20:00:00	0.77
005YrSCS24	01-01-2019 20:10:00	0.77
005YrSCS24	01-01-2019 20:20:00	0.77
005YrSCS24	01-01-2019 20:30:00	0.77
005YrSCS24	01-01-2019 20:40:00	0.77
005YrSCS24	01-01-2019 20:50:00	0.77
005YrSCS24	01-01-2019 21:00:00	0.77
005YrSCS24	01-01-2019 21:10:00	0.77
005YrSCS24	01-01-2019 21:20:00	0.77
005YrSCS24	01-01-2019 21:30:00	0.77
005YrSCS24	01-01-2019 21:40:00	0.77

005YrSCS24 01-01-2019 21:50:00 0.77

005YrSCS24 01-01-2019 22:00:00 0.77

005YrSCS24 01-01-2019 22:10:00 0.77

005YrSCS24 01-01-2019 22:20:00 0.77

005YrSCS24 01-01-2019 22:30:00 0.77

005YrSCS24 01-01-2019 22:40:00 0.77

005YrSCS24 01-01-2019 22:50:00 0.77

005YrSCS24 01-01-2019 23:00:00 0.77

005YrSCS24 01-01-2019 23:10:00 0.77

005YrSCS24 01-01-2019 23:20:00 0.77

005YrSCS24 01-01-2019 23:30:00 0.77

005YrSCS24 01-01-2019 23:40:00 0.77

005YrSCS24 01-01-2019 23:50:00 0.77

;Rainfall (mm/hr)

010yrChicago3hr 01-01-2019 00:00:00 0

010yrChicago3hr 01-01-2019 00:10:00 4.24804

010yrChicago3hr 01-01-2019 00:20:00 5.29032

010yrChicago3hr 01-01-2019 00:30:00 7.10821

010yrChicago3hr 01-01-2019 00:40:00 11.12994

010yrChicago3hr 01-01-2019 00:50:00 28.09961

010yrChicago3hr 01-01-2019 01:00:00 122.1418

010yrChicago3hr 01-01-2019 01:10:00 37.28489

010yrChicago3hr 01-01-2019 01:20:00 18.95368

010yrChicago3hr 01-01-2019 01:30:00 12.69959

010yrChicago3hr 01-01-2019 01:40:00 9.58762

010yrChicago3hr 01-01-2019 01:50:00 7.7327

010yrChicago3hr 01-01-2019 02:00:00 6.50203

010yrChicago3hr 01-01-2019 02:10:00 5.6255

010yrChicago3hr 01-01-2019 02:20:00 4.96886

010yrChicago3hr 01-01-2019 02:30:00 4.45808

010yrChicago3hr 01-01-2019 02:40:00 4.04902

010yrChicago3hr 01-01-2019 02:50:00 3.71371

010yrChicago3hr 01-01-2019 03:00:00 3.4336

;Rainfall (mm/hr)

010YrSCS24 01-01-2019 00:00:00 0.82

010YrSCS24 01-01-2019 00:10:00 0.82

010YrSCS24 01-01-2019 00:20:00 0.82

010YrSCS24 01-01-2019 00:30:00 0.82

010YrSCS24 01-01-2019 00:40:00 0.82

010YrSCS24 01-01-2019 00:50:00 0.82

010YrSCS24 01-01-2019 01:00:00 0.82

010YrSCS24 01-01-2019 01:10:00 0.82

010YrSCS24 01-01-2019 01:20:00 0.82

010YrSCS24 01-01-2019 01:30:00 0.82

010YrSCS24 01-01-2019 01:40:00 0.82

010YrSCS24 01-01-2019 01:50:00 0.82

010YrSCS24 01-01-2019 02:00:00 0.97

010YrSCS24 01-01-2019 02:10:00 0.97

010YrSCS24 01-01-2019 02:20:00 0.97

010YrSCS24 01-01-2019 02:30:00 0.97

010YrSCS24 01-01-2019 02:40:00 0.97

010YrSCS24 01-01-2019 02:50:00 0.97

010YrSCS24 01-01-2019 03:00:00 0.97

010YrSCS24 01-01-2019 03:10:00 0.97

010YrSCS24 01-01-2019 03:20:00 0.97

010YrSCS24 01-01-2019 03:30:00 0.97

010YrSCS24	01-01-2019 03:40:00	0.97
010YrSCS24	01-01-2019 03:50:00	0.97
010YrSCS24	01-01-2019 04:00:00	1.19
010YrSCS24	01-01-2019 04:10:00	1.19
010YrSCS24	01-01-2019 04:20:00	1.19
010YrSCS24	01-01-2019 04:30:00	1.19
010YrSCS24	01-01-2019 04:40:00	1.19
010YrSCS24	01-01-2019 04:50:00	1.19
010YrSCS24	01-01-2019 05:00:00	1.19
010YrSCS24	01-01-2019 05:10:00	1.19
010YrSCS24	01-01-2019 05:20:00	1.19
010YrSCS24	01-01-2019 05:30:00	1.19
010YrSCS24	01-01-2019 05:40:00	1.19
010YrSCS24	01-01-2019 05:50:00	1.19
010YrSCS24	01-01-2019 06:00:00	1.34
010YrSCS24	01-01-2019 06:10:00	1.34
010YrSCS24	01-01-2019 06:20:00	1.34
010YrSCS24	01-01-2019 06:30:00	1.34
010YrSCS24	01-01-2019 06:40:00	1.34
010YrSCS24	01-01-2019 06:50:00	1.34
010YrSCS24	01-01-2019 07:00:00	1.64
010YrSCS24	01-01-2019 07:10:00	1.64
010YrSCS24	01-01-2019 07:20:00	1.64
010YrSCS24	01-01-2019 07:30:00	1.64
010YrSCS24	01-01-2019 07:40:00	1.64
010YrSCS24	01-01-2019 07:50:00	1.64
010YrSCS24	01-01-2019 08:00:00	1.93
010YrSCS24	01-01-2019 08:10:00	1.93
010YrSCS24	01-01-2019 08:20:00	1.93

010YrSCS24	01-01-2019 08:30:00	2.08
010YrSCS24	01-01-2019 08:40:00	2.08
010YrSCS24	01-01-2019 08:50:00	2.08
010YrSCS24	01-01-2019 09:00:00	2.38
010YrSCS24	01-01-2019 09:10:00	2.38
010YrSCS24	01-01-2019 09:20:00	2.38
010YrSCS24	01-01-2019 09:30:00	2.68
010YrSCS24	01-01-2019 09:40:00	2.68
010YrSCS24	01-01-2019 09:50:00	2.68
010YrSCS24	01-01-2019 10:00:00	3.42
010YrSCS24	01-01-2019 10:10:00	3.42
010YrSCS24	01-01-2019 10:20:00	3.42
010YrSCS24	01-01-2019 10:30:00	4.61
010YrSCS24	01-01-2019 10:40:00	4.61
010YrSCS24	01-01-2019 10:50:00	4.61
010YrSCS24	01-01-2019 11:00:00	7.14
010YrSCS24	01-01-2019 11:10:00	7.14
010YrSCS24	01-01-2019 11:20:00	7.14
010YrSCS24	01-01-2019 11:30:00	22
010YrSCS24	01-01-2019 11:40:00	56.5
010YrSCS24	01-01-2019 11:50:00	90.99
010YrSCS24	01-01-2019 12:00:00	10.7
010YrSCS24	01-01-2019 12:10:00	10.7
010YrSCS24	01-01-2019 12:20:00	10.7
010YrSCS24	01-01-2019 12:30:00	5.5
010YrSCS24	01-01-2019 12:40:00	5.5
010YrSCS24	01-01-2019 12:50:00	5.5
010YrSCS24	01-01-2019 13:00:00	4.01
010YrSCS24	01-01-2019 13:10:00	4.01

010YrSCS24	01-01-2019 13:20:00	4.01
010YrSCS24	01-01-2019 13:30:00	3.12
010YrSCS24	01-01-2019 13:40:00	3.12
010YrSCS24	01-01-2019 13:50:00	3.12
010YrSCS24	01-01-2019 14:00:00	2.23
010YrSCS24	01-01-2019 14:10:00	2.23
010YrSCS24	01-01-2019 14:20:00	2.23
010YrSCS24	01-01-2019 14:30:00	2.23
010YrSCS24	01-01-2019 14:40:00	2.23
010YrSCS24	01-01-2019 14:50:00	2.23
010YrSCS24	01-01-2019 15:00:00	2.23
010YrSCS24	01-01-2019 15:10:00	2.23
010YrSCS24	01-01-2019 15:20:00	2.23
010YrSCS24	01-01-2019 15:30:00	2.23
010YrSCS24	01-01-2019 15:40:00	2.23
010YrSCS24	01-01-2019 15:50:00	2.23
010YrSCS24	01-01-2019 16:00:00	1.34
010YrSCS24	01-01-2019 16:10:00	1.34
010YrSCS24	01-01-2019 16:20:00	1.34
010YrSCS24	01-01-2019 16:30:00	1.34
010YrSCS24	01-01-2019 16:40:00	1.34
010YrSCS24	01-01-2019 16:50:00	1.34
010YrSCS24	01-01-2019 17:00:00	1.34
010YrSCS24	01-01-2019 17:10:00	1.34
010YrSCS24	01-01-2019 17:20:00	1.34
010YrSCS24	01-01-2019 17:30:00	1.34
010YrSCS24	01-01-2019 17:40:00	1.34
010YrSCS24	01-01-2019 17:50:00	1.34
010YrSCS24	01-01-2019 18:00:00	1.34

010YrSCS24	01-01-2019 18:10:00	1.34
010YrSCS24	01-01-2019 18:20:00	1.34
010YrSCS24	01-01-2019 18:30:00	1.34
010YrSCS24	01-01-2019 18:40:00	1.34
010YrSCS24	01-01-2019 18:50:00	1.34
010YrSCS24	01-01-2019 19:00:00	1.34
010YrSCS24	01-01-2019 19:10:00	1.34
010YrSCS24	01-01-2019 19:20:00	1.34
010YrSCS24	01-01-2019 19:30:00	1.34
010YrSCS24	01-01-2019 19:40:00	1.34
010YrSCS24	01-01-2019 19:50:00	1.34
010YrSCS24	01-01-2019 20:00:00	0.89
010YrSCS24	01-01-2019 20:10:00	0.89
010YrSCS24	01-01-2019 20:20:00	0.89
010YrSCS24	01-01-2019 20:30:00	0.89
010YrSCS24	01-01-2019 20:40:00	0.89
010YrSCS24	01-01-2019 20:50:00	0.89
010YrSCS24	01-01-2019 21:00:00	0.89
010YrSCS24	01-01-2019 21:10:00	0.89
010YrSCS24	01-01-2019 21:20:00	0.89
010YrSCS24	01-01-2019 21:30:00	0.89
010YrSCS24	01-01-2019 21:40:00	0.89
010YrSCS24	01-01-2019 21:50:00	0.89
010YrSCS24	01-01-2019 22:00:00	0.89
010YrSCS24	01-01-2019 22:10:00	0.89
010YrSCS24	01-01-2019 22:20:00	0.89
010YrSCS24	01-01-2019 22:30:00	0.89
010YrSCS24	01-01-2019 22:40:00	0.89
010YrSCS24	01-01-2019 22:50:00	0.89

010YrSCS24 01-01-2019 23:00:00 0.89

010YrSCS24 01-01-2019 23:10:00 0.89

010YrSCS24 01-01-2019 23:20:00 0.89

010YrSCS24 01-01-2019 23:30:00 0.89

010YrSCS24 01-01-2019 23:40:00 0.89

010YrSCS24 01-01-2019 23:50:00 0.89

;Rainfall (mm/hr)

025yrChicago3hr 01-01-2019 00:00:00 0

025yrChicago3hr 01-01-2019 00:10:00 4.9336

025yrChicago3hr 01-01-2019 00:20:00 6.15217

025yrChicago3hr 01-01-2019 00:30:00 8.28157

025yrChicago3hr 01-01-2019 00:40:00 13.00553

025yrChicago3hr 01-01-2019 00:50:00 33.04079

025yrChicago3hr 01-01-2019 01:00:00 144.693

025yrChicago3hr 01-01-2019 01:10:00 43.90416

025yrChicago3hr 01-01-2019 01:20:00 22.22391

025yrChicago3hr 01-01-2019 01:30:00 14.85162

025yrChicago3hr 01-01-2019 01:40:00 11.19158

025yrChicago3hr 01-01-2019 01:50:00 9.01374

025yrChicago3hr 01-01-2019 02:00:00 7.57085

025yrChicago3hr 01-01-2019 02:10:00 6.54433

025yrChicago3hr 01-01-2019 02:20:00 5.77608

025yrChicago3hr 01-01-2019 02:30:00 5.17898

025yrChicago3hr 01-01-2019 02:40:00 4.7011

025yrChicago3hr 01-01-2019 02:50:00 4.30965

025yrChicago3hr 01-01-2019 03:00:00 3.98283

;Rainfall (mm/hr)

025YrSCS24	01-01-2019 00:00:00	0.96
025YrSCS24	01-01-2019 00:10:00	0.96
025YrSCS24	01-01-2019 00:20:00	0.96
025YrSCS24	01-01-2019 00:30:00	0.96
025YrSCS24	01-01-2019 00:40:00	0.96
025YrSCS24	01-01-2019 00:50:00	0.96
025YrSCS24	01-01-2019 01:00:00	0.96
025YrSCS24	01-01-2019 01:10:00	0.96
025YrSCS24	01-01-2019 01:20:00	0.96
025YrSCS24	01-01-2019 01:30:00	0.96
025YrSCS24	01-01-2019 01:40:00	0.96
025YrSCS24	01-01-2019 01:50:00	0.96
025YrSCS24	01-01-2019 02:00:00	1.13
025YrSCS24	01-01-2019 02:10:00	1.13
025YrSCS24	01-01-2019 02:20:00	1.13
025YrSCS24	01-01-2019 02:30:00	1.13
025YrSCS24	01-01-2019 02:40:00	1.13
025YrSCS24	01-01-2019 02:50:00	1.13
025YrSCS24	01-01-2019 03:00:00	1.13
025YrSCS24	01-01-2019 03:10:00	1.13
025YrSCS24	01-01-2019 03:20:00	1.13
025YrSCS24	01-01-2019 03:30:00	1.13
025YrSCS24	01-01-2019 03:40:00	1.13
025YrSCS24	01-01-2019 03:50:00	1.13
025YrSCS24	01-01-2019 04:00:00	1.39
025YrSCS24	01-01-2019 04:10:00	1.39
025YrSCS24	01-01-2019 04:20:00	1.39
025YrSCS24	01-01-2019 04:30:00	1.39
025YrSCS24	01-01-2019 04:40:00	1.39

025YrSCS24	01-01-2019 04:50:00	1.39
025YrSCS24	01-01-2019 05:00:00	1.39
025YrSCS24	01-01-2019 05:10:00	1.39
025YrSCS24	01-01-2019 05:20:00	1.39
025YrSCS24	01-01-2019 05:30:00	1.39
025YrSCS24	01-01-2019 05:40:00	1.39
025YrSCS24	01-01-2019 05:50:00	1.39
025YrSCS24	01-01-2019 06:00:00	1.56
025YrSCS24	01-01-2019 06:10:00	1.56
025YrSCS24	01-01-2019 06:20:00	1.56
025YrSCS24	01-01-2019 06:30:00	1.56
025YrSCS24	01-01-2019 06:40:00	1.56
025YrSCS24	01-01-2019 06:50:00	1.56
025YrSCS24	01-01-2019 07:00:00	1.91
025YrSCS24	01-01-2019 07:10:00	1.91
025YrSCS24	01-01-2019 07:20:00	1.91
025YrSCS24	01-01-2019 07:30:00	1.91
025YrSCS24	01-01-2019 07:40:00	1.91
025YrSCS24	01-01-2019 07:50:00	1.91
025YrSCS24	01-01-2019 08:00:00	2.26
025YrSCS24	01-01-2019 08:10:00	2.26
025YrSCS24	01-01-2019 08:20:00	2.26
025YrSCS24	01-01-2019 08:30:00	2.43
025YrSCS24	01-01-2019 08:40:00	2.43
025YrSCS24	01-01-2019 08:50:00	2.43
025YrSCS24	01-01-2019 09:00:00	2.78
025YrSCS24	01-01-2019 09:10:00	2.78
025YrSCS24	01-01-2019 09:20:00	2.78
025YrSCS24	01-01-2019 09:30:00	3.13

025YrSCS24	01-01-2019	09:40:00	3.13
025YrSCS24	01-01-2019	09:50:00	3.13
025YrSCS24	01-01-2019	10:00:00	4
025YrSCS24	01-01-2019	10:10:00	4
025YrSCS24	01-01-2019	10:20:00	4
025YrSCS24	01-01-2019	10:30:00	5.39
025YrSCS24	01-01-2019	10:40:00	5.39
025YrSCS24	01-01-2019	10:50:00	5.39
025YrSCS24	01-01-2019	11:00:00	8.34
025YrSCS24	01-01-2019	11:10:00	8.34
025YrSCS24	01-01-2019	11:20:00	8.34
025YrSCS24	01-01-2019	11:30:00	25.73
025YrSCS24	01-01-2019	11:40:00	66.05
025YrSCS24	01-01-2019	11:50:00	106.38
025YrSCS24	01-01-2019	12:00:00	12.52
025YrSCS24	01-01-2019	12:10:00	12.52
025YrSCS24	01-01-2019	12:20:00	12.52
025YrSCS24	01-01-2019	12:30:00	6.43
025YrSCS24	01-01-2019	12:40:00	6.43
025YrSCS24	01-01-2019	12:50:00	6.43
025YrSCS24	01-01-2019	13:00:00	4.69
025YrSCS24	01-01-2019	13:10:00	4.69
025YrSCS24	01-01-2019	13:20:00	4.69
025YrSCS24	01-01-2019	13:30:00	3.65
025YrSCS24	01-01-2019	13:40:00	3.65
025YrSCS24	01-01-2019	13:50:00	3.65
025YrSCS24	01-01-2019	14:00:00	2.61
025YrSCS24	01-01-2019	14:10:00	2.61
025YrSCS24	01-01-2019	14:20:00	2.61

025YrSCS24	01-01-2019 14:30:00	2.61
025YrSCS24	01-01-2019 14:40:00	2.61
025YrSCS24	01-01-2019 14:50:00	2.61
025YrSCS24	01-01-2019 15:00:00	2.61
025YrSCS24	01-01-2019 15:10:00	2.61
025YrSCS24	01-01-2019 15:20:00	2.61
025YrSCS24	01-01-2019 15:30:00	2.61
025YrSCS24	01-01-2019 15:40:00	2.61
025YrSCS24	01-01-2019 15:50:00	2.61
025YrSCS24	01-01-2019 16:00:00	1.56
025YrSCS24	01-01-2019 16:10:00	1.56
025YrSCS24	01-01-2019 16:20:00	1.56
025YrSCS24	01-01-2019 16:30:00	1.56
025YrSCS24	01-01-2019 16:40:00	1.56
025YrSCS24	01-01-2019 16:50:00	1.56
025YrSCS24	01-01-2019 17:00:00	1.56
025YrSCS24	01-01-2019 17:10:00	1.56
025YrSCS24	01-01-2019 17:20:00	1.56
025YrSCS24	01-01-2019 17:30:00	1.56
025YrSCS24	01-01-2019 17:40:00	1.56
025YrSCS24	01-01-2019 17:50:00	1.56
025YrSCS24	01-01-2019 18:00:00	1.56
025YrSCS24	01-01-2019 18:10:00	1.56
025YrSCS24	01-01-2019 18:20:00	1.56
025YrSCS24	01-01-2019 18:30:00	1.56
025YrSCS24	01-01-2019 18:40:00	1.56
025YrSCS24	01-01-2019 18:50:00	1.56
025YrSCS24	01-01-2019 19:00:00	1.56
025YrSCS24	01-01-2019 19:10:00	1.56

025YrSCS24	01-01-2019 19:20:00	1.56
025YrSCS24	01-01-2019 19:30:00	1.56
025YrSCS24	01-01-2019 19:40:00	1.56
025YrSCS24	01-01-2019 19:50:00	1.56
025YrSCS24	01-01-2019 20:00:00	1.04
025YrSCS24	01-01-2019 20:10:00	1.04
025YrSCS24	01-01-2019 20:20:00	1.04
025YrSCS24	01-01-2019 20:30:00	1.04
025YrSCS24	01-01-2019 20:40:00	1.04
025YrSCS24	01-01-2019 20:50:00	1.04
025YrSCS24	01-01-2019 21:00:00	1.04
025YrSCS24	01-01-2019 21:10:00	1.04
025YrSCS24	01-01-2019 21:20:00	1.04
025YrSCS24	01-01-2019 21:30:00	1.04
025YrSCS24	01-01-2019 21:40:00	1.04
025YrSCS24	01-01-2019 21:50:00	1.04
025YrSCS24	01-01-2019 22:00:00	1.04
025YrSCS24	01-01-2019 22:10:00	1.04
025YrSCS24	01-01-2019 22:20:00	1.04
025YrSCS24	01-01-2019 22:30:00	1.04
025YrSCS24	01-01-2019 22:40:00	1.04
025YrSCS24	01-01-2019 22:50:00	1.04
025YrSCS24	01-01-2019 23:00:00	1.04
025YrSCS24	01-01-2019 23:10:00	1.04
025YrSCS24	01-01-2019 23:20:00	1.04
025YrSCS24	01-01-2019 23:30:00	1.04
025YrSCS24	01-01-2019 23:40:00	1.04
025YrSCS24	01-01-2019 23:50:00	1.04

;Rainfall (mm/hr)

050yrChicago3hr 01-01-2019 00:00:00 0

050yrChicago3hr 01-01-2019 00:10:00 5.46715

050yrChicago3hr 01-01-2019 00:20:00 6.8204

050yrChicago3hr 01-01-2019 00:30:00 9.18659

050yrChicago3hr 01-01-2019 00:40:00 14.44064

050yrChicago3hr 01-01-2019 00:50:00 36.76423

050yrChicago3hr 01-01-2019 01:00:00 161.4707

050yrChicago3hr 01-01-2019 01:10:00 48.876

050yrChicago3hr 01-01-2019 01:20:00 24.70426

050yrChicago3hr 01-01-2019 01:30:00 16.49475

050yrChicago3hr 01-01-2019 01:40:00 12.42227

050yrChicago3hr 01-01-2019 01:50:00 10.00043

050yrChicago3hr 01-01-2019 02:00:00 8.39661

050yrChicago3hr 01-01-2019 02:10:00 7.256

050yrChicago3hr 01-01-2019 02:20:00 6.40264

050yrChicago3hr 01-01-2019 02:30:00 5.73956

050yrChicago3hr 01-01-2019 02:40:00 5.20902

050yrChicago3hr 01-01-2019 02:50:00 4.77451

050yrChicago3hr 01-01-2019 03:00:00 4.41182

;Rainfall (mm/hr)

050YrSCS24 01-01-2019 00:00:00 1.06

050YrSCS24 01-01-2019 00:10:00 1.06

050YrSCS24 01-01-2019 00:20:00 1.06

050YrSCS24 01-01-2019 00:30:00 1.06

050YrSCS24 01-01-2019 00:40:00 1.06

050YrSCS24 01-01-2019 00:50:00 1.06

050YrSCS24 01-01-2019 01:00:00 1.06

050YrSCS24	01-01-2019 01:10:00	1.06
050YrSCS24	01-01-2019 01:20:00	1.06
050YrSCS24	01-01-2019 01:30:00	1.06
050YrSCS24	01-01-2019 01:40:00	1.06
050YrSCS24	01-01-2019 01:50:00	1.06
050YrSCS24	01-01-2019 02:00:00	1.25
050YrSCS24	01-01-2019 02:10:00	1.25
050YrSCS24	01-01-2019 02:20:00	1.25
050YrSCS24	01-01-2019 02:30:00	1.25
050YrSCS24	01-01-2019 02:40:00	1.25
050YrSCS24	01-01-2019 02:50:00	1.25
050YrSCS24	01-01-2019 03:00:00	1.25
050YrSCS24	01-01-2019 03:10:00	1.25
050YrSCS24	01-01-2019 03:20:00	1.25
050YrSCS24	01-01-2019 03:30:00	1.25
050YrSCS24	01-01-2019 03:40:00	1.25
050YrSCS24	01-01-2019 03:50:00	1.25
050YrSCS24	01-01-2019 04:00:00	1.54
050YrSCS24	01-01-2019 04:10:00	1.54
050YrSCS24	01-01-2019 04:20:00	1.54
050YrSCS24	01-01-2019 04:30:00	1.54
050YrSCS24	01-01-2019 04:40:00	1.54
050YrSCS24	01-01-2019 04:50:00	1.54
050YrSCS24	01-01-2019 05:00:00	1.54
050YrSCS24	01-01-2019 05:10:00	1.54
050YrSCS24	01-01-2019 05:20:00	1.54
050YrSCS24	01-01-2019 05:30:00	1.54
050YrSCS24	01-01-2019 05:40:00	1.54
050YrSCS24	01-01-2019 05:50:00	1.54

050YrSCS24	01-01-2019 06:00:00	1.74
050YrSCS24	01-01-2019 06:10:00	1.74
050YrSCS24	01-01-2019 06:20:00	1.74
050YrSCS24	01-01-2019 06:30:00	1.74
050YrSCS24	01-01-2019 06:40:00	1.74
050YrSCS24	01-01-2019 06:50:00	1.74
050YrSCS24	01-01-2019 07:00:00	2.12
050YrSCS24	01-01-2019 07:10:00	2.12
050YrSCS24	01-01-2019 07:20:00	2.12
050YrSCS24	01-01-2019 07:30:00	2.12
050YrSCS24	01-01-2019 07:40:00	2.12
050YrSCS24	01-01-2019 07:50:00	2.12
050YrSCS24	01-01-2019 08:00:00	2.51
050YrSCS24	01-01-2019 08:10:00	2.51
050YrSCS24	01-01-2019 08:20:00	2.51
050YrSCS24	01-01-2019 08:30:00	2.7
050YrSCS24	01-01-2019 08:40:00	2.7
050YrSCS24	01-01-2019 08:50:00	2.7
050YrSCS24	01-01-2019 09:00:00	3.09
050YrSCS24	01-01-2019 09:10:00	3.09
050YrSCS24	01-01-2019 09:20:00	3.09
050YrSCS24	01-01-2019 09:30:00	3.48
050YrSCS24	01-01-2019 09:40:00	3.48
050YrSCS24	01-01-2019 09:50:00	3.48
050YrSCS24	01-01-2019 10:00:00	4.44
050YrSCS24	01-01-2019 10:10:00	4.44
050YrSCS24	01-01-2019 10:20:00	4.44
050YrSCS24	01-01-2019 10:30:00	5.98
050YrSCS24	01-01-2019 10:40:00	5.98

050YrSCS24	01-01-2019 10:50:00	5.98
050YrSCS24	01-01-2019 11:00:00	9.27
050YrSCS24	01-01-2019 11:10:00	9.27
050YrSCS24	01-01-2019 11:20:00	9.27
050YrSCS24	01-01-2019 11:30:00	28.57
050YrSCS24	01-01-2019 11:40:00	73.36
050YrSCS24	01-01-2019 11:50:00	118.15
050YrSCS24	01-01-2019 12:00:00	13.9
050YrSCS24	01-01-2019 12:10:00	13.9
050YrSCS24	01-01-2019 12:20:00	13.9
050YrSCS24	01-01-2019 12:30:00	7.14
050YrSCS24	01-01-2019 12:40:00	7.14
050YrSCS24	01-01-2019 12:50:00	7.14
050YrSCS24	01-01-2019 13:00:00	5.21
050YrSCS24	01-01-2019 13:10:00	5.21
050YrSCS24	01-01-2019 13:20:00	5.21
050YrSCS24	01-01-2019 13:30:00	4.05
050YrSCS24	01-01-2019 13:40:00	4.05
050YrSCS24	01-01-2019 13:50:00	4.05
050YrSCS24	01-01-2019 14:00:00	2.9
050YrSCS24	01-01-2019 14:10:00	2.9
050YrSCS24	01-01-2019 14:20:00	2.9
050YrSCS24	01-01-2019 14:30:00	2.9
050YrSCS24	01-01-2019 14:40:00	2.9
050YrSCS24	01-01-2019 14:50:00	2.9
050YrSCS24	01-01-2019 15:00:00	2.9
050YrSCS24	01-01-2019 15:10:00	2.9
050YrSCS24	01-01-2019 15:20:00	2.9
050YrSCS24	01-01-2019 15:30:00	2.9

050YrSCS24	01-01-2019 15:40:00	2.9
050YrSCS24	01-01-2019 15:50:00	2.9
050YrSCS24	01-01-2019 16:00:00	1.74
050YrSCS24	01-01-2019 16:10:00	1.74
050YrSCS24	01-01-2019 16:20:00	1.74
050YrSCS24	01-01-2019 16:30:00	1.74
050YrSCS24	01-01-2019 16:40:00	1.74
050YrSCS24	01-01-2019 16:50:00	1.74
050YrSCS24	01-01-2019 17:00:00	1.74
050YrSCS24	01-01-2019 17:10:00	1.74
050YrSCS24	01-01-2019 17:20:00	1.74
050YrSCS24	01-01-2019 17:30:00	1.74
050YrSCS24	01-01-2019 17:40:00	1.74
050YrSCS24	01-01-2019 17:50:00	1.74
050YrSCS24	01-01-2019 18:00:00	1.74
050YrSCS24	01-01-2019 18:10:00	1.74
050YrSCS24	01-01-2019 18:20:00	1.74
050YrSCS24	01-01-2019 18:30:00	1.74
050YrSCS24	01-01-2019 18:40:00	1.74
050YrSCS24	01-01-2019 18:50:00	1.74
050YrSCS24	01-01-2019 19:00:00	1.74
050YrSCS24	01-01-2019 19:10:00	1.74
050YrSCS24	01-01-2019 19:20:00	1.74
050YrSCS24	01-01-2019 19:30:00	1.74
050YrSCS24	01-01-2019 19:40:00	1.74
050YrSCS24	01-01-2019 19:50:00	1.74
050YrSCS24	01-01-2019 20:00:00	1.16
050YrSCS24	01-01-2019 20:10:00	1.16
050YrSCS24	01-01-2019 20:20:00	1.16

050YrSCS24 01-01-2019 20:30:00 1.16

050YrSCS24 01-01-2019 20:40:00 1.16

050YrSCS24 01-01-2019 20:50:00 1.16

050YrSCS24 01-01-2019 21:00:00 1.16

050YrSCS24 01-01-2019 21:10:00 1.16

050YrSCS24 01-01-2019 21:20:00 1.16

050YrSCS24 01-01-2019 21:30:00 1.16

050YrSCS24 01-01-2019 21:40:00 1.16

050YrSCS24 01-01-2019 21:50:00 1.16

050YrSCS24 01-01-2019 22:00:00 1.16

050YrSCS24 01-01-2019 22:10:00 1.16

050YrSCS24 01-01-2019 22:20:00 1.16

050YrSCS24 01-01-2019 22:30:00 1.16

050YrSCS24 01-01-2019 22:40:00 1.16

050YrSCS24 01-01-2019 22:50:00 1.16

050YrSCS24 01-01-2019 23:00:00 1.16

050YrSCS24 01-01-2019 23:10:00 1.16

050YrSCS24 01-01-2019 23:20:00 1.16

050YrSCS24 01-01-2019 23:30:00 1.16

050YrSCS24 01-01-2019 23:40:00 1.16

050YrSCS24 01-01-2019 23:50:00 1.16

;Rainfall (mm/hr)

100yrChicago3hr 01-01-2019 00:00:00 0

100yrChicago3hr 01-01-2019 00:10:00 6.04573

100yrChicago3hr 01-01-2019 00:20:00 7.54219

100yrChicago3hr 01-01-2019 00:30:00 10.1588

100yrChicago3hr 01-01-2019 00:40:00 15.96889

100yrChicago3hr 01-01-2019 00:50:00 40.65497

100yrChicago3hr 01-01-2019 01:00:00 178.559

100yrChicago3hr 01-01-2019 01:10:00 54.04853

100yrChicago3hr 01-01-2019 01:20:00 27.3187

100yrChicago3hr 01-01-2019 01:30:00 18.24039

100yrChicago3hr 01-01-2019 01:40:00 13.73692

100yrChicago3hr 01-01-2019 01:50:00 11.05876

100yrChicago3hr 01-01-2019 02:00:00 9.28521

100yrChicago3hr 01-01-2019 02:10:00 8.02389

100yrChicago3hr 01-01-2019 02:20:00 7.08022

100yrChicago3hr 01-01-2019 02:30:00 6.34698

100yrChicago3hr 01-01-2019 02:40:00 5.76029

100yrChicago3hr 01-01-2019 02:50:00 5.27978

100yrChicago3hr 01-01-2019 03:00:00 4.87871

;Rainfall (mm/hr)

100yrChicago3hr+20% 01-01-2019 00:00:00 0

100yrChicago3hr+20% 01-01-2019 00:10:00 7.25488

100yrChicago3hr+20% 01-01-2019 00:20:00 9.05063

100yrChicago3hr+20% 01-01-2019 00:30:00 12.19056

100yrChicago3hr+20% 01-01-2019 00:40:00 19.16267

100yrChicago3hr+20% 01-01-2019 00:50:00 48.78596

100yrChicago3hr+20% 01-01-2019 01:00:00 214.2708

100yrChicago3hr+20% 01-01-2019 01:10:00 64.85824

100yrChicago3hr+20% 01-01-2019 01:20:00 32.78244

100yrChicago3hr+20% 01-01-2019 01:30:00 21.88847

100yrChicago3hr+20% 01-01-2019 01:40:00 16.4843

100yrChicago3hr+20% 01-01-2019 01:50:00 13.27051

100yrChicago3hr+20% 01-01-2019 02:00:00 11.14225

100yrChicago3hr+20% 01-01-2019 02:10:00 9.62867

100yrChicago3hr+20% 01-01-2019 02:20:00 8.49626

100yrChicago3hr+20% 01-01-2019 02:30:00 7.61638

100yrChicago3hr+20% 01-01-2019 02:40:00 6.91235

100yrChicago3hr+20% 01-01-2019 02:50:00 6.33574

100yrChicago3hr+20% 01-01-2019 03:00:00 5.85445

;Rainfall (mm/hr)

100YrSCS12hr 01-01-2019 0:00:00 2.4

100YrSCS12hr 01-01-2019 0:15:00 2.4

100YrSCS12hr 01-01-2019 0:30:00 2.4

100YrSCS12hr 01-01-2019 0:45:00 2.4

100YrSCS12hr 01-01-2019 1:00:00 2.4

100YrSCS12hr 01-01-2019 1:15:00 2.4

100YrSCS12hr 01-01-2019 1:30:00 2.4

100YrSCS12hr 01-01-2019 1:45:00 2.4

100YrSCS12hr 01-01-2019 2:00:00 2.88

100YrSCS12hr 01-01-2019 2:15:00 2.88

100YrSCS12hr 01-01-2019 2:30:00 2.88

100YrSCS12hr 01-01-2019 2:45:00 2.88

100YrSCS12hr 01-01-2019 3:00:00 3.84

100YrSCS12hr 01-01-2019 3:15:00 3.84

100YrSCS12hr 01-01-2019 3:30:00 3.84

100YrSCS12hr 01-01-2019 3:45:00 3.84

100YrSCS12hr 01-01-2019 4:00:00 5.76

100YrSCS12hr 01-01-2019 4:15:00 5.76

100YrSCS12hr 01-01-2019 4:30:00 7.68

100YrSCS12hr 01-01-2019 4:45:00 7.68

100YrSCS12hr 01-01-2019 5:00:00 11.52

100YrSCS12hr 01-01-2019 5:15:00 11.52

100YrSCS12hr 01-01-2019 5:30:00 46.08

100YrSCS12hr 01-01-2019 5:45:00 126.72

100YrSCS12hr 01-01-2019 6:00:00 17.28

100YrSCS12hr 01-01-2019 6:15:00 17.28

100YrSCS12hr 01-01-2019 6:30:00 7.68

100YrSCS12hr 01-01-2019 6:45:00 7.68

100YrSCS12hr 01-01-2019 7:00:00 5.76

100YrSCS12hr 01-01-2019 7:15:00 5.76

100YrSCS12hr 01-01-2019 7:30:00 5.76

100YrSCS12hr 01-01-2019 7:45:00 5.76

100YrSCS12hr 01-01-2019 8:00:00 3.36

100YrSCS12hr 01-01-2019 8:15:00 3.36

100YrSCS12hr 01-01-2019 8:30:00 3.36

100YrSCS12hr 01-01-2019 8:45:00 3.36

100YrSCS12hr 01-01-2019 9:00:00 3.36

100YrSCS12hr 01-01-2019 9:15:00 3.36

100YrSCS12hr 01-01-2019 9:30:00 3.36

100YrSCS12hr 01-01-2019 9:45:00 3.36

100YrSCS12hr 01-01-2019 10:00:00 1.92

100YrSCS12hr 01-01-2019 10:15:00 1.92

100YrSCS12hr 01-01-2019 10:30:00 1.92

100YrSCS12hr 01-01-2019 10:45:00 1.92

100YrSCS12hr 01-01-2019 11:00:00 1.92

100YrSCS12hr 01-01-2019 11:15:00 1.92

100YrSCS12hr 01-01-2019 11:30:00 1.92

100YrSCS12hr 01-01-2019 11:45:00 1.92

100YrSCS12hr 01-01-2019 12:00:00 0

;Rainfall (mm/hr)

100YrSCS24	01/01/2019 00:00:00	1.17
100YrSCS24	01/01/2019 00:10:00	1.17
100YrSCS24	01/01/2019 00:20:00	1.17
100YrSCS24	01/01/2019 00:30:00	1.17
100YrSCS24	01/01/2019 00:40:00	1.17
100YrSCS24	01/01/2019 00:50:00	1.17
100YrSCS24	01/01/2019 01:00:00	1.17
100YrSCS24	01/01/2019 01:10:00	1.17
100YrSCS24	01/01/2019 01:20:00	1.17
100YrSCS24	01/01/2019 01:30:00	1.17
100YrSCS24	01/01/2019 01:40:00	1.17
100YrSCS24	01/01/2019 01:50:00	1.17
100YrSCS24	01/01/2019 02:00:00	1.39
100YrSCS24	01/01/2019 02:10:00	1.39
100YrSCS24	01/01/2019 02:20:00	1.39
100YrSCS24	01/01/2019 02:30:00	1.39
100YrSCS24	01/01/2019 02:40:00	1.39
100YrSCS24	01/01/2019 02:50:00	1.39
100YrSCS24	01/01/2019 03:00:00	1.39
100YrSCS24	01/01/2019 03:10:00	1.39
100YrSCS24	01/01/2019 03:20:00	1.39
100YrSCS24	01/01/2019 03:30:00	1.39
100YrSCS24	01/01/2019 03:40:00	1.39
100YrSCS24	01/01/2019 03:50:00	1.39
100YrSCS24	01/01/2019 04:00:00	1.71
100YrSCS24	01/01/2019 04:10:00	1.71
100YrSCS24	01/01/2019 04:20:00	1.71
100YrSCS24	01/01/2019 04:30:00	1.71
100YrSCS24	01/01/2019 04:40:00	1.71

100YrSCS24	01/01/2019 04:50:00	1.71
100YrSCS24	01/01/2019 05:00:00	1.71
100YrSCS24	01/01/2019 05:10:00	1.71
100YrSCS24	01/01/2019 05:20:00	1.71
100YrSCS24	01/01/2019 05:30:00	1.71
100YrSCS24	01/01/2019 05:40:00	1.71
100YrSCS24	01/01/2019 05:50:00	1.71
100YrSCS24	01/01/2019 06:00:00	1.92
100YrSCS24	01/01/2019 06:10:00	1.92
100YrSCS24	01/01/2019 06:20:00	1.92
100YrSCS24	01/01/2019 06:30:00	1.92
100YrSCS24	01/01/2019 06:40:00	1.92
100YrSCS24	01/01/2019 06:50:00	1.92
100YrSCS24	01/01/2019 07:00:00	2.35
100YrSCS24	01/01/2019 07:10:00	2.35
100YrSCS24	01/01/2019 07:20:00	2.35
100YrSCS24	01/01/2019 07:30:00	2.35
100YrSCS24	01/01/2019 07:40:00	2.35
100YrSCS24	01/01/2019 07:50:00	2.35
100YrSCS24	01/01/2019 08:00:00	2.78
100YrSCS24	01/01/2019 08:10:00	2.78
100YrSCS24	01/01/2019 08:20:00	2.78
100YrSCS24	01/01/2019 08:30:00	2.99
100YrSCS24	01/01/2019 08:40:00	2.99
100YrSCS24	01/01/2019 08:50:00	2.99
100YrSCS24	01/01/2019 09:00:00	3.42
100YrSCS24	01/01/2019 09:10:00	3.42
100YrSCS24	01/01/2019 09:20:00	3.42
100YrSCS24	01/01/2019 09:30:00	3.84

100YrSCS24	01/01/2019 09:40:00	3.84
100YrSCS24	01/01/2019 09:50:00	3.84
100YrSCS24	01/01/2019 10:00:00	4.91
100YrSCS24	01/01/2019 10:10:00	4.91
100YrSCS24	01/01/2019 10:20:00	4.91
100YrSCS24	01/01/2019 10:30:00	6.62
100YrSCS24	01/01/2019 10:40:00	6.62
100YrSCS24	01/01/2019 10:50:00	6.62
100YrSCS24	01/01/2019 11:00:00	10.25
100YrSCS24	01/01/2019 11:10:00	10.25
100YrSCS24	01/01/2019 11:20:00	10.25
100YrSCS24	01/01/2019 11:30:00	31.6
100YrSCS24	01/01/2019 11:40:00	81.12
100YrSCS24	01/01/2019 11:50:00	130.65
100YrSCS24	01/01/2019 12:00:00	15.37
100YrSCS24	01/01/2019 12:10:00	15.37
100YrSCS24	01/01/2019 12:20:00	15.37
100YrSCS24	01/01/2019 12:30:00	7.9
100YrSCS24	01/01/2019 12:40:00	7.9
100YrSCS24	01/01/2019 12:50:00	7.9
100YrSCS24	01/01/2019 13:00:00	5.76
100YrSCS24	01/01/2019 13:10:00	5.76
100YrSCS24	01/01/2019 13:20:00	5.76
100YrSCS24	01/01/2019 13:30:00	4.48
100YrSCS24	01/01/2019 13:40:00	4.48
100YrSCS24	01/01/2019 13:50:00	4.48
100YrSCS24	01/01/2019 14:00:00	3.2
100YrSCS24	01/01/2019 14:10:00	3.2
100YrSCS24	01/01/2019 14:20:00	3.2

100YrSCS24	01/01/2019 14:30:00	3.2
100YrSCS24	01/01/2019 14:40:00	3.2
100YrSCS24	01/01/2019 14:50:00	3.2
100YrSCS24	01/01/2019 15:00:00	3.2
100YrSCS24	01/01/2019 15:10:00	3.2
100YrSCS24	01/01/2019 15:20:00	3.2
100YrSCS24	01/01/2019 15:30:00	3.2
100YrSCS24	01/01/2019 15:40:00	3.2
100YrSCS24	01/01/2019 15:50:00	3.2
100YrSCS24	01/01/2019 16:00:00	1.92
100YrSCS24	01/01/2019 16:10:00	1.92
100YrSCS24	01/01/2019 16:20:00	1.92
100YrSCS24	01/01/2019 16:30:00	1.92
100YrSCS24	01/01/2019 16:40:00	1.92
100YrSCS24	01/01/2019 16:50:00	1.92
100YrSCS24	01/01/2019 17:00:00	1.92
100YrSCS24	01/01/2019 17:10:00	1.92
100YrSCS24	01/01/2019 17:20:00	1.92
100YrSCS24	01/01/2019 17:30:00	1.92
100YrSCS24	01/01/2019 17:40:00	1.92
100YrSCS24	01/01/2019 17:50:00	1.92
100YrSCS24	01/01/2019 18:00:00	1.92
100YrSCS24	01/01/2019 18:10:00	1.92
100YrSCS24	01/01/2019 18:20:00	1.92
100YrSCS24	01/01/2019 18:30:00	1.92
100YrSCS24	01/01/2019 18:40:00	1.92
100YrSCS24	01/01/2019 18:50:00	1.92
100YrSCS24	01/01/2019 19:00:00	1.92
100YrSCS24	01/01/2019 19:10:00	1.92

100YrSCS24	01/01/2019 19:20:00	1.92
100YrSCS24	01/01/2019 19:30:00	1.92
100YrSCS24	01/01/2019 19:40:00	1.92
100YrSCS24	01/01/2019 19:50:00	1.92
100YrSCS24	01/01/2019 20:00:00	1.28
100YrSCS24	01/01/2019 20:10:00	1.28
100YrSCS24	01/01/2019 20:20:00	1.28
100YrSCS24	01/01/2019 20:30:00	1.28
100YrSCS24	01/01/2019 20:40:00	1.28
100YrSCS24	01/01/2019 20:50:00	1.28
100YrSCS24	01/01/2019 21:00:00	1.28
100YrSCS24	01/01/2019 21:10:00	1.28
100YrSCS24	01/01/2019 21:20:00	1.28
100YrSCS24	01/01/2019 21:30:00	1.28
100YrSCS24	01/01/2019 21:40:00	1.28
100YrSCS24	01/01/2019 21:50:00	1.28
100YrSCS24	01/01/2019 22:00:00	1.28
100YrSCS24	01/01/2019 22:10:00	1.28
100YrSCS24	01/01/2019 22:20:00	1.28
100YrSCS24	01/01/2019 22:30:00	1.28
100YrSCS24	01/01/2019 22:40:00	1.28
100YrSCS24	01/01/2019 22:50:00	1.28
100YrSCS24	01/01/2019 23:00:00	1.28
100YrSCS24	01/01/2019 23:10:00	1.28
100YrSCS24	01/01/2019 23:20:00	1.28
100YrSCS24	01/01/2019 23:30:00	1.28
100YrSCS24	01/01/2019 23:40:00	1.28
100YrSCS24	01/01/2019 23:50:00	1.28

;Rainfall (mm/hr)

100YrSCS24+20%	01-01-2019 00:00:00	1.404
100YrSCS24+20%	01-01-2019 00:10:00	1.404
100YrSCS24+20%	01-01-2019 00:20:00	1.404
100YrSCS24+20%	01-01-2019 00:30:00	1.404
100YrSCS24+20%	01-01-2019 00:40:00	1.404
100YrSCS24+20%	01-01-2019 00:50:00	1.404
100YrSCS24+20%	01-01-2019 01:00:00	1.404
100YrSCS24+20%	01-01-2019 01:10:00	1.404
100YrSCS24+20%	01-01-2019 01:20:00	1.404
100YrSCS24+20%	01-01-2019 01:30:00	1.404
100YrSCS24+20%	01-01-2019 01:40:00	1.404
100YrSCS24+20%	01-01-2019 01:50:00	1.404
100YrSCS24+20%	01-01-2019 02:00:00	1.668
100YrSCS24+20%	01-01-2019 02:10:00	1.668
100YrSCS24+20%	01-01-2019 02:20:00	1.668
100YrSCS24+20%	01-01-2019 02:30:00	1.668
100YrSCS24+20%	01-01-2019 02:40:00	1.668
100YrSCS24+20%	01-01-2019 02:50:00	1.668
100YrSCS24+20%	01-01-2019 03:00:00	1.668
100YrSCS24+20%	01-01-2019 03:10:00	1.668
100YrSCS24+20%	01-01-2019 03:20:00	1.668
100YrSCS24+20%	01-01-2019 03:30:00	1.668
100YrSCS24+20%	01-01-2019 03:40:00	1.668
100YrSCS24+20%	01-01-2019 03:50:00	1.668
100YrSCS24+20%	01-01-2019 04:00:00	2.052
100YrSCS24+20%	01-01-2019 04:10:00	2.052
100YrSCS24+20%	01-01-2019 04:20:00	2.052
100YrSCS24+20%	01-01-2019 04:30:00	2.052

100YrSCS24+20%	01-01-2019 04:40:00	2.052
100YrSCS24+20%	01-01-2019 04:50:00	2.052
100YrSCS24+20%	01-01-2019 05:00:00	2.052
100YrSCS24+20%	01-01-2019 05:10:00	2.052
100YrSCS24+20%	01-01-2019 05:20:00	2.052
100YrSCS24+20%	01-01-2019 05:30:00	2.052
100YrSCS24+20%	01-01-2019 05:40:00	2.052
100YrSCS24+20%	01-01-2019 05:50:00	2.052
100YrSCS24+20%	01-01-2019 06:00:00	2.304
100YrSCS24+20%	01-01-2019 06:10:00	2.304
100YrSCS24+20%	01-01-2019 06:20:00	2.304
100YrSCS24+20%	01-01-2019 06:30:00	2.304
100YrSCS24+20%	01-01-2019 06:40:00	2.304
100YrSCS24+20%	01-01-2019 06:50:00	2.304
100YrSCS24+20%	01-01-2019 07:00:00	2.82
100YrSCS24+20%	01-01-2019 07:10:00	2.82
100YrSCS24+20%	01-01-2019 07:20:00	2.82
100YrSCS24+20%	01-01-2019 07:30:00	2.82
100YrSCS24+20%	01-01-2019 07:40:00	2.82
100YrSCS24+20%	01-01-2019 07:50:00	2.82
100YrSCS24+20%	01-01-2019 08:00:00	3.336
100YrSCS24+20%	01-01-2019 08:10:00	3.336
100YrSCS24+20%	01-01-2019 08:20:00	3.336
100YrSCS24+20%	01-01-2019 08:30:00	3.588
100YrSCS24+20%	01-01-2019 08:40:00	3.588
100YrSCS24+20%	01-01-2019 08:50:00	3.588
100YrSCS24+20%	01-01-2019 09:00:00	4.104
100YrSCS24+20%	01-01-2019 09:10:00	4.104
100YrSCS24+20%	01-01-2019 09:20:00	4.104

100YrSCS24+20%	01-01-2019 09:30:00	4.608
100YrSCS24+20%	01-01-2019 09:40:00	4.608
100YrSCS24+20%	01-01-2019 09:50:00	4.608
100YrSCS24+20%	01-01-2019 10:00:00	5.892
100YrSCS24+20%	01-01-2019 10:10:00	5.892
100YrSCS24+20%	01-01-2019 10:20:00	5.892
100YrSCS24+20%	01-01-2019 10:30:00	7.944
100YrSCS24+20%	01-01-2019 10:40:00	7.944
100YrSCS24+20%	01-01-2019 10:50:00	7.944
100YrSCS24+20%	01-01-2019 11:00:00	12.3
100YrSCS24+20%	01-01-2019 11:10:00	12.3
100YrSCS24+20%	01-01-2019 11:20:00	12.3
100YrSCS24+20%	01-01-2019 11:30:00	37.92
100YrSCS24+20%	01-01-2019 11:40:00	97.344
100YrSCS24+20%	01-01-2019 11:50:00	156.78
100YrSCS24+20%	01-01-2019 12:00:00	18.444
100YrSCS24+20%	01-01-2019 12:10:00	18.444
100YrSCS24+20%	01-01-2019 12:20:00	18.444
100YrSCS24+20%	01-01-2019 12:30:00	9.48
100YrSCS24+20%	01-01-2019 12:40:00	9.48
100YrSCS24+20%	01-01-2019 12:50:00	9.48
100YrSCS24+20%	01-01-2019 13:00:00	6.912
100YrSCS24+20%	01-01-2019 13:10:00	6.912
100YrSCS24+20%	01-01-2019 13:20:00	6.912
100YrSCS24+20%	01-01-2019 13:30:00	5.376
100YrSCS24+20%	01-01-2019 13:40:00	5.376
100YrSCS24+20%	01-01-2019 13:50:00	5.376
100YrSCS24+20%	01-01-2019 14:00:00	3.84
100YrSCS24+20%	01-01-2019 14:10:00	3.84

100YrSCS24+20%	01-01-2019 14:20:00	3.84
100YrSCS24+20%	01-01-2019 14:30:00	3.84
100YrSCS24+20%	01-01-2019 14:40:00	3.84
100YrSCS24+20%	01-01-2019 14:50:00	3.84
100YrSCS24+20%	01-01-2019 15:00:00	3.84
100YrSCS24+20%	01-01-2019 15:10:00	3.84
100YrSCS24+20%	01-01-2019 15:20:00	3.84
100YrSCS24+20%	01-01-2019 15:30:00	3.84
100YrSCS24+20%	01-01-2019 15:40:00	3.84
100YrSCS24+20%	01-01-2019 15:50:00	3.84
100YrSCS24+20%	01-01-2019 16:00:00	2.304
100YrSCS24+20%	01-01-2019 16:10:00	2.304
100YrSCS24+20%	01-01-2019 16:20:00	2.304
100YrSCS24+20%	01-01-2019 16:30:00	2.304
100YrSCS24+20%	01-01-2019 16:40:00	2.304
100YrSCS24+20%	01-01-2019 16:50:00	2.304
100YrSCS24+20%	01-01-2019 17:00:00	2.304
100YrSCS24+20%	01-01-2019 17:10:00	2.304
100YrSCS24+20%	01-01-2019 17:20:00	2.304
100YrSCS24+20%	01-01-2019 17:30:00	2.304
100YrSCS24+20%	01-01-2019 17:40:00	2.304
100YrSCS24+20%	01-01-2019 17:50:00	2.304
100YrSCS24+20%	01-01-2019 18:00:00	2.304
100YrSCS24+20%	01-01-2019 18:10:00	2.304
100YrSCS24+20%	01-01-2019 18:20:00	2.304
100YrSCS24+20%	01-01-2019 18:30:00	2.304
100YrSCS24+20%	01-01-2019 18:40:00	2.304
100YrSCS24+20%	01-01-2019 18:50:00	2.304
100YrSCS24+20%	01-01-2019 19:00:00	2.304

100YrSCS24+20%	01-01-2019 19:10:00	2.304
100YrSCS24+20%	01-01-2019 19:20:00	2.304
100YrSCS24+20%	01-01-2019 19:30:00	2.304
100YrSCS24+20%	01-01-2019 19:40:00	2.304
100YrSCS24+20%	01-01-2019 19:50:00	2.304
100YrSCS24+20%	01-01-2019 20:00:00	1.536
100YrSCS24+20%	01-01-2019 20:10:00	1.536
100YrSCS24+20%	01-01-2019 20:20:00	1.536
100YrSCS24+20%	01-01-2019 20:30:00	1.536
100YrSCS24+20%	01-01-2019 20:40:00	1.536
100YrSCS24+20%	01-01-2019 20:50:00	1.536
100YrSCS24+20%	01-01-2019 21:00:00	1.536
100YrSCS24+20%	01-01-2019 21:10:00	1.536
100YrSCS24+20%	01-01-2019 21:20:00	1.536
100YrSCS24+20%	01-01-2019 21:30:00	1.536
100YrSCS24+20%	01-01-2019 21:40:00	1.536
100YrSCS24+20%	01-01-2019 21:50:00	1.536
100YrSCS24+20%	01-01-2019 22:00:00	1.536
100YrSCS24+20%	01-01-2019 22:10:00	1.536
100YrSCS24+20%	01-01-2019 22:20:00	1.536
100YrSCS24+20%	01-01-2019 22:30:00	1.536
100YrSCS24+20%	01-01-2019 22:40:00	1.536
100YrSCS24+20%	01-01-2019 22:50:00	1.536
100YrSCS24+20%	01-01-2019 23:00:00	1.536
100YrSCS24+20%	01-01-2019 23:10:00	1.536
100YrSCS24+20%	01-01-2019 23:20:00	1.536
100YrSCS24+20%	01-01-2019 23:30:00	1.536
100YrSCS24+20%	01-01-2019 23:40:00	1.536
100YrSCS24+20%	01-01-2019 23:50:00	1.536

;Rainfall (mm/hr)

1979July01	1/1/2019	0:00:00	2.3
1979July01	1/1/2019	0:05:00	2.3
1979July01	1/1/2019	0:10:00	8.89
1979July01	1/1/2019	0:15:00	8.89
1979July01	1/1/2019	0:20:00	8.89
1979July01	1/1/2019	0:25:00	8.89
1979July01	1/1/2019	0:30:00	38.1
1979July01	1/1/2019	0:35:00	38.1
1979July01	1/1/2019	0:40:00	38.1
1979July01	1/1/2019	0:45:00	38.1
1979July01	1/1/2019	0:50:00	38.1
1979July01	1/1/2019	0:55:00	38.1
1979July01	1/1/2019	1:00:00	38.1
1979July01	1/1/2019	1:05:00	50.8
1979July01	1/1/2019	1:10:00	50.8
1979July01	1/1/2019	1:15:00	76.2
1979July01	1/1/2019	1:20:00	106.7
1979July01	1/1/2019	1:25:00	106.7
1979July01	1/1/2019	1:30:00	71.1
1979July01	1/1/2019	1:35:00	71.1
1979July01	1/1/2019	1:40:00	30.5
1979July01	1/1/2019	1:45:00	30.5
1979July01	1/1/2019	1:50:00	30.5
1979July01	1/1/2019	1:55:00	30.5
1979July01	1/1/2019	2:00:00	3.8
1979July01	1/1/2019	2:05:00	3.8
1979July01	1/1/2019	2:10:00	3.8

1979July01	1/1/2019	2:15:00	3.8
1979July01	1/1/2019	2:20:00	3.8
1979July01	1/1/2019	2:25:00	3.8
1979July01	1/1/2019	2:30:00	3.8
1979July01	1/1/2019	2:35:00	3.8
1979July01	1/1/2019	2:40:00	3.8
1979July01	1/1/2019	2:45:00	3.8
1979July01	1/1/2019	2:50:00	3.8
1979July01	1/1/2019	2:55:00	3.8
1979July01	1/1/2019	3:00:00	0
1979July01	1/1/2019	3:05:00	0
1979July01	1/1/2019	3:10:00	0
1979July01	1/1/2019	3:15:00	0
1979July01	1/1/2019	3:20:00	0
1979July01	1/1/2019	3:25:00	0
1979July01	1/1/2019	3:30:00	0
1979July01	1/1/2019	3:35:00	0
1979July01	1/1/2019	3:40:00	0
1979July01	1/1/2019	3:45:00	0
1979July01	1/1/2019	3:50:00	0
1979July01	1/1/2019	3:55:00	0
1979July01	1/1/2019	4:00:00	0
1979July01	1/1/2019	4:05:00	0
1979July01	1/1/2019	4:10:00	0
1979July01	1/1/2019	4:15:00	0
1979July01	1/1/2019	4:20:00	0
1979July01	1/1/2019	4:25:00	0
1979July01	1/1/2019	4:30:00	0
1979July01	1/1/2019	4:35:00	0

1979July01	1/1/2019	4:40:00	0
1979July01	1/1/2019	4:45:00	0
1979July01	1/1/2019	4:50:00	0
1979July01	1/1/2019	4:55:00	0
1979July01	1/1/2019	5:00:00	0
1979July01	1/1/2019	5:05:00	0
1979July01	1/1/2019	5:10:00	0
1979July01	1/1/2019	5:15:00	0
1979July01	1/1/2019	5:20:00	0
1979July01	1/1/2019	5:25:00	0
1979July01	1/1/2019	5:30:00	0
1979July01	1/1/2019	5:35:00	0
1979July01	1/1/2019	5:40:00	0
1979July01	1/1/2019	5:45:00	0
1979July01	1/1/2019	5:50:00	0
1979July01	1/1/2019	5:55:00	0
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1979July01	1/1/2019	6:10:00	0
1979July01	1/1/2019	6:15:00	0
1979July01	1/1/2019	6:20:00	0
1979July01	1/1/2019	6:25:00	0
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1979July01	1/1/2019	6:35:00	0
1979July01	1/1/2019	6:40:00	0
1979July01	1/1/2019	6:45:00	0
1979July01	1/1/2019	6:50:00	0
1979July01	1/1/2019	6:55:00	0
1979July01	1/1/2019	7:00:00	0

1979July01	1/1/2019	7:05:00	0
1979July01	1/1/2019	7:10:00	0
1979July01	1/1/2019	7:15:00	0
1979July01	1/1/2019	7:20:00	0
1979July01	1/1/2019	7:25:00	0
1979July01	1/1/2019	7:30:00	0
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1979July01	1/1/2019	8:00:00	0
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1979July01	1/1/2019	8:10:00	0
1979July01	1/1/2019	8:15:00	0
1979July01	1/1/2019	8:20:00	0
1979July01	1/1/2019	8:25:00	0
1979July01	1/1/2019	8:30:00	0
1979July01	1/1/2019	8:35:00	0
1979July01	1/1/2019	8:40:00	0
1979July01	1/1/2019	8:45:00	0
1979July01	1/1/2019	8:50:00	0
1979July01	1/1/2019	8:55:00	0
1979July01	1/1/2019	9:00:00	0
1979July01	1/1/2019	9:05:00	0
1979July01	1/1/2019	9:10:00	0
1979July01	1/1/2019	9:15:00	0
1979July01	1/1/2019	9:20:00	0
1979July01	1/1/2019	9:25:00	0

1979July01	1/1/2019	9:30:00	0
1979July01	1/1/2019	9:35:00	0
1979July01	1/1/2019	9:40:00	0
1979July01	1/1/2019	9:45:00	0
1979July01	1/1/2019	9:50:00	0
1979July01	1/1/2019	9:55:00	0
1979July01	1/1/2019	10:00:00	0
1979July01	1/1/2019	10:05:00	0
1979July01	1/1/2019	10:10:00	0
1979July01	1/1/2019	10:15:00	0
1979July01	1/1/2019	10:20:00	0
1979July01	1/1/2019	10:25:00	0
1979July01	1/1/2019	10:30:00	0
1979July01	1/1/2019	10:35:00	0
1979July01	1/1/2019	10:40:00	0
1979July01	1/1/2019	10:45:00	0
1979July01	1/1/2019	10:50:00	0
1979July01	1/1/2019	10:55:00	0
1979July01	1/1/2019	11:00:00	0
1979July01	1/1/2019	11:05:00	0
1979July01	1/1/2019	11:10:00	0
1979July01	1/1/2019	11:15:00	0
1979July01	1/1/2019	11:20:00	0
1979July01	1/1/2019	11:25:00	0
1979July01	1/1/2019	11:30:00	0
1979July01	1/1/2019	11:35:00	0
1979July01	1/1/2019	11:40:00	0
1979July01	1/1/2019	11:45:00	0
1979July01	1/1/2019	11:50:00	0

1979July01	1/1/2019	11:55:00	0
1979July01	1/1/2019	12:00:00	0
1979July01	1/1/2019	12:05:00	0
1979July01	1/1/2019	12:10:00	0
1979July01	1/1/2019	12:15:00	0
1979July01	1/1/2019	12:20:00	0
1979July01	1/1/2019	12:25:00	0
1979July01	1/1/2019	12:30:00	0
1979July01	1/1/2019	12:35:00	0
1979July01	1/1/2019	12:40:00	0
1979July01	1/1/2019	12:45:00	0
1979July01	1/1/2019	12:50:00	0
1979July01	1/1/2019	12:55:00	0
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1979July01	1/1/2019	13:05:00	0
1979July01	1/1/2019	13:10:00	0
1979July01	1/1/2019	13:15:00	0
1979July01	1/1/2019	13:20:00	0
1979July01	1/1/2019	13:25:00	0
1979July01	1/1/2019	13:30:00	0
1979July01	1/1/2019	13:35:00	0
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1979July01	1/1/2019	13:50:00	0
1979July01	1/1/2019	13:55:00	0
1979July01	1/1/2019	14:00:00	0
1979July01	1/1/2019	14:05:00	0
1979July01	1/1/2019	14:10:00	0
1979July01	1/1/2019	14:15:00	0

1979July01	1/1/2019	14:20:00	0
1979July01	1/1/2019	14:25:00	0
1979July01	1/1/2019	14:30:00	0
1979July01	1/1/2019	14:35:00	0
1979July01	1/1/2019	14:40:00	0
1979July01	1/1/2019	14:45:00	0
1979July01	1/1/2019	14:50:00	0
1979July01	1/1/2019	14:55:00	0
1979July01	1/1/2019	15:00:00	0
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1979July01	1/1/2019	15:15:00	0
1979July01	1/1/2019	15:20:00	0
1979July01	1/1/2019	15:25:00	0
1979July01	1/1/2019	15:30:00	0
1979July01	1/1/2019	15:35:00	0
1979July01	1/1/2019	15:40:00	0
1979July01	1/1/2019	15:45:00	0
1979July01	1/1/2019	15:50:00	0
1979July01	1/1/2019	15:55:00	0
1979July01	1/1/2019	16:00:00	0
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1979July01	1/1/2019	16:15:00	0
1979July01	1/1/2019	16:20:00	0
1979July01	1/1/2019	16:25:00	0
1979July01	1/1/2019	16:30:00	0
1979July01	1/1/2019	16:35:00	0
1979July01	1/1/2019	16:40:00	0

1979July01	1/1/2019	16:45:00	0
1979July01	1/1/2019	16:50:00	0
1979July01	1/1/2019	16:55:00	0
1979July01	1/1/2019	17:00:00	0
1979July01	1/1/2019	17:05:00	0
1979July01	1/1/2019	17:10:00	0
1979July01	1/1/2019	17:15:00	0
1979July01	1/1/2019	17:20:00	0
1979July01	1/1/2019	17:25:00	0
1979July01	1/1/2019	17:30:00	0
1979July01	1/1/2019	17:35:00	0
1979July01	1/1/2019	17:40:00	0
1979July01	1/1/2019	17:45:00	0
1979July01	1/1/2019	17:50:00	0
1979July01	1/1/2019	17:55:00	0
1979July01	1/1/2019	18:00:00	0
1979July01	1/1/2019	18:05:00	0
1979July01	1/1/2019	18:10:00	0
1979July01	1/1/2019	18:15:00	0
1979July01	1/1/2019	18:20:00	0
1979July01	1/1/2019	18:25:00	0
1979July01	1/1/2019	18:30:00	0
1979July01	1/1/2019	18:35:00	0
1979July01	1/1/2019	18:40:00	0
1979July01	1/1/2019	18:45:00	0
1979July01	1/1/2019	18:50:00	0
1979July01	1/1/2019	18:55:00	0
1979July01	1/1/2019	19:00:00	0
1979July01	1/1/2019	19:05:00	0

1979July01	1/1/2019	19:10:00	0
1979July01	1/1/2019	19:15:00	0
1979July01	1/1/2019	19:20:00	0
1979July01	1/1/2019	19:25:00	0
1979July01	1/1/2019	19:30:00	0
1979July01	1/1/2019	19:35:00	0
1979July01	1/1/2019	19:40:00	0
1979July01	1/1/2019	19:45:00	0
1979July01	1/1/2019	19:50:00	0
1979July01	1/1/2019	19:55:00	0
1979July01	1/1/2019	20:00:00	0
1979July01	1/1/2019	20:05:00	0
1979July01	1/1/2019	20:10:00	0
1979July01	1/1/2019	20:15:00	0
1979July01	1/1/2019	20:20:00	0
1979July01	1/1/2019	20:25:00	0
1979July01	1/1/2019	20:30:00	0
1979July01	1/1/2019	20:35:00	0
1979July01	1/1/2019	20:40:00	0
1979July01	1/1/2019	20:45:00	0
1979July01	1/1/2019	20:50:00	0
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1979July01	1/1/2019	21:00:00	0
1979July01	1/1/2019	21:05:00	0
1979July01	1/1/2019	21:10:00	0
1979July01	1/1/2019	21:15:00	0
1979July01	1/1/2019	21:20:00	0
1979July01	1/1/2019	21:25:00	0
1979July01	1/1/2019	21:30:00	0

1979July01	1/1/2019	21:35:00	0
1979July01	1/1/2019	21:40:00	0
1979July01	1/1/2019	21:45:00	0
1979July01	1/1/2019	21:50:00	0
1979July01	1/1/2019	21:55:00	0
1979July01	1/1/2019	22:00:00	0
1979July01	1/1/2019	22:05:00	0
1979July01	1/1/2019	22:10:00	0
1979July01	1/1/2019	22:15:00	0
1979July01	1/1/2019	22:20:00	0
1979July01	1/1/2019	22:25:00	0
1979July01	1/1/2019	22:30:00	0
1979July01	1/1/2019	22:35:00	0
1979July01	1/1/2019	22:40:00	0
1979July01	1/1/2019	22:45:00	0
1979July01	1/1/2019	22:50:00	0
1979July01	1/1/2019	22:55:00	0
1979July01	1/1/2019	23:00:00	0
1979July01	1/1/2019	23:05:00	0
1979July01	1/1/2019	23:10:00	0
1979July01	1/1/2019	23:15:00	0
1979July01	1/1/2019	23:20:00	0
1979July01	1/1/2019	23:25:00	0
1979July01	1/1/2019	23:30:00	0
1979July01	1/1/2019	23:35:00	0
1979July01	1/1/2019	23:40:00	0
1979July01	1/1/2019	23:45:00	0
1979July01	1/1/2019	23:50:00	0
1979July01	1/1/2019	23:55:00	0

;Rainfall (mm/hr)

1988Aug04	01-01-2019 00:00:00	0.1
1988Aug04	01-01-2019 00:05:00	0.1
1988Aug04	01-01-2019 00:10:00	0
1988Aug04	01-01-2019 00:15:00	3.7
1988Aug04	01-01-2019 00:20:00	6.2
1988Aug04	01-01-2019 00:25:00	101.5
1988Aug04	01-01-2019 00:30:00	15.5
1988Aug04	01-01-2019 00:35:00	29.3
1988Aug04	01-01-2019 00:40:00	19.8
1988Aug04	01-01-2019 00:45:00	1.5
1988Aug04	01-01-2019 00:50:00	1.7
1988Aug04	01-01-2019 00:55:00	5.4
1988Aug04	01-01-2019 01:00:00	24.6
1988Aug04	01-01-2019 01:05:00	26.5
1988Aug04	01-01-2019 01:10:00	34.9
1988Aug04	01-01-2019 01:15:00	10.2
1988Aug04	01-01-2019 01:20:00	27.1
1988Aug04	01-01-2019 01:25:00	104.4
1988Aug04	01-01-2019 01:30:00	27.5
1988Aug04	01-01-2019 01:35:00	62.5
1988Aug04	01-01-2019 01:40:00	31.8
1988Aug04	01-01-2019 01:45:00	79.8
1988Aug04	01-01-2019 01:50:00	67.5
1988Aug04	01-01-2019 01:55:00	156.2
1988Aug04	01-01-2019 02:00:00	5.1
1988Aug04	01-01-2019 02:05:00	0.2
1988Aug04	01-01-2019 02:10:00	0.2

1988Aug04	01-01-2019 02:15:00	0.2
1988Aug04	01-01-2019 02:20:00	0.2
1988Aug04	01-01-2019 02:25:00	0.2
1988Aug04	01-01-2019 02:30:00	0.2
1988Aug04	01-01-2019 02:35:00	0.2
1988Aug04	01-01-2019 02:40:00	0.2
1988Aug04	01-01-2019 02:45:00	0.2
1988Aug04	01-01-2019 02:50:00	0.2
1988Aug04	01-01-2019 02:55:00	12.8
1988Aug04	01-01-2019 03:00:00	14
1988Aug04	01-01-2019 03:05:00	22.2
1988Aug04	01-01-2019 03:10:00	21.8
1988Aug04	01-01-2019 03:15:00	1.4
1988Aug04	01-01-2019 03:20:00	0.2
1988Aug04	01-01-2019 03:25:00	0.2
1988Aug04	01-01-2019 03:30:00	0.2
1988Aug04	01-01-2019 03:35:00	0.2
1988Aug04	01-01-2019 03:40:00	0.2
1988Aug04	01-01-2019 03:45:00	0.2
1988Aug04	01-01-2019 03:50:00	0.2
1988Aug04	01-01-2019 03:55:00	0.2
1988Aug04	01-01-2019 04:00:00	0.2
1988Aug04	01-01-2019 04:05:00	0.2
1988Aug04	01-01-2019 04:10:00	0.2
1988Aug04	01-01-2019 04:15:00	0.2
1988Aug04	01-01-2019 04:20:00	0.2
1988Aug04	01-01-2019 04:25:00	0.2
1988Aug04	01-01-2019 04:30:00	0.2
1988Aug04	01-01-2019 04:35:00	0.2

1988Aug04 01-01-2019 04:40:00 0.2

1988Aug04 01-01-2019 04:45:00 0.2

1988Aug04 01-01-2019 04:50:00 0.2

1988Aug04 01-01-2019 04:55:00 2.9

1988Aug04 01-01-2019 05:00:00 7.8

1988Aug04 01-01-2019 05:05:00 10

1988Aug04 01-01-2019 05:10:00 6.3

1988Aug04 01-01-2019 05:15:00 5.1

1988Aug04 01-01-2019 05:20:00 9.8

1988Aug04 01-01-2019 05:25:00 2.6

1988Aug04 01-01-2019 05:30:00 1.7

;Rainfall (mm/hr)

1996Aug08 01-01-2019 00:00:00 4

1996Aug08 01-01-2019 00:05:00 11.9

1996Aug08 01-01-2019 00:10:00 26.5

1996Aug08 01-01-2019 00:15:00 13.3

1996Aug08 01-01-2019 00:20:00 0

1996Aug08 01-01-2019 00:25:00 2.7

1996Aug08 01-01-2019 00:30:00 0

1996Aug08 01-01-2019 00:35:00 8

1996Aug08 01-01-2019 00:40:00 18.6

1996Aug08 01-01-2019 00:45:00 10.6

1996Aug08 01-01-2019 00:50:00 21.2

1996Aug08 01-01-2019 00:55:00 2.7

1996Aug08 01-01-2019 01:00:00 2.7

1996Aug08 01-01-2019 01:05:00 15.9

1996Aug08 01-01-2019 01:10:00 66.3

1996Aug08 01-01-2019 01:15:00 55.7

1996Aug08	01-01-2019 01:20:00	122
1996Aug08	01-01-2019 01:25:00	88.9
1996Aug08	01-01-2019 01:30:00	9.3
1996Aug08	01-01-2019 01:35:00	8
1996Aug08	01-01-2019 01:40:00	4
1996Aug08	01-01-2019 01:45:00	0
1996Aug08	01-01-2019 01:50:00	2.7
1996Aug08	01-01-2019 01:55:00	0
1996Aug08	01-01-2019 02:00:00	0
1996Aug08	01-01-2019 02:05:00	0
1996Aug08	01-01-2019 02:10:00	5.3
1996Aug08	01-01-2019 02:15:00	0
1996Aug08	01-01-2019 02:20:00	0
1996Aug08	01-01-2019 02:25:00	0
1996Aug08	01-01-2019 02:30:00	0
1996Aug08	01-01-2019 02:35:00	0
1996Aug08	01-01-2019 02:40:00	0
1996Aug08	01-01-2019 02:45:00	4
1996Aug08	01-01-2019 02:50:00	53.1
1996Aug08	01-01-2019 02:55:00	69
1996Aug08	01-01-2019 03:00:00	63.7
1996Aug08	01-01-2019 03:05:00	58.4
1996Aug08	01-01-2019 03:10:00	47.8
1996Aug08	01-01-2019 03:15:00	15.9
1996Aug08	01-01-2019 03:20:00	13.3
1996Aug08	01-01-2019 03:25:00	8
1996Aug08	01-01-2019 03:30:00	5.3
1996Aug08	01-01-2019 03:35:00	6.6
1996Aug08	01-01-2019 03:40:00	2.7

1996Aug08 01-01-2019 03:45:00 4

1996Aug08 01-01-2019 03:50:00 2.7

1996Aug08 01-01-2019 03:55:00 4

1996Aug08 01-01-2019 04:00:00 2.7

1996Aug08 01-01-2019 04:05:00 5.3

1996Aug08 01-01-2019 04:10:00 4

1996Aug08 01-01-2019 04:15:00 2.7

1996Aug08 01-01-2019 04:20:00 4

1996Aug08 01-01-2019 04:25:00 2.7

1996Aug08 01-01-2019 04:30:00 1.3

1996Aug08 01-01-2019 04:35:00 1.3

1996Aug08 01-01-2019 04:40:00 0

1996Aug08 01-01-2019 04:45:00 0

1996Aug08 01-01-2019 04:50:00 0

1996Aug08 01-01-2019 04:55:00 0

1996Aug08 01-01-2019 05:00:00 2.7

1996Aug08 01-01-2019 05:05:00 0

1996Aug08 01-01-2019 05:10:00 0

1996Aug08 01-01-2019 05:15:00 0

1996Aug08 01-01-2019 05:20:00 0

1996Aug08 01-01-2019 05:25:00 0

1996Aug08 01-01-2019 05:30:00 0

1996Aug08 01-01-2019 05:35:00 0

1996Aug08 01-01-2019 05:40:00 1.3

;Rainfall (mm/hr)

25mmChicago4Hr 01-01-2019 00:00:00 0

25mmChicago4Hr 01-01-2019 00:10:00 1.5122

25mmChicago4Hr 01-01-2019 00:20:00 1.7483

25mmChicago4Hr 01-01-2019 00:30:00 2.0803

25mmChicago4Hr 01-01-2019 00:40:00 2.5819

25mmChicago4Hr 01-01-2019 00:50:00 3.4597

25mmChicago4Hr 01-01-2019 01:00:00 5.3924

25mmChicago4Hr 01-01-2019 01:10:00 13.4405

25mmChicago4Hr 01-01-2019 01:20:00 56.6613

25mmChicago4Hr 01-01-2019 01:30:00 17.7634

25mmChicago4Hr 01-01-2019 01:40:00 9.1177

25mmChicago4Hr 01-01-2019 01:50:00 6.1375

25mmChicago4Hr 01-01-2019 02:00:00 4.6474

25mmChicago4Hr 01-01-2019 02:10:00 3.7548

25mmChicago4Hr 01-01-2019 02:20:00 3.1647

25mmChicago4Hr 01-01-2019 02:30:00 2.7442

25mmChicago4Hr 01-01-2019 02:40:00 2.427

25mmChicago4Hr 01-01-2019 02:50:00 2.1762

25mmChicago4Hr 01-01-2019 03:00:00 1.977

25mmChicago4Hr 01-01-2019 03:10:00 1.8147

25mmChicago4Hr 01-01-2019 03:20:00 1.6819

25mmChicago4Hr 01-01-2019 03:30:00 1.5639

25mmChicago4Hr 01-01-2019 03:40:00 1.468

25mmChicago4Hr 01-01-2019 03:50:00 1.3795

25mmChicago4Hr 01-01-2019 04:00:00 1.3057

;Rainfall (mm/hr)

2YrSCS12hr 01-01-2019 0:00:00 1.08

2YrSCS12hr 01-01-2019 0:15:00 1.08

2YrSCS12hr 01-01-2019 0:30:00 1.08

2YrSCS12hr 01-01-2019 0:45:00 1.08

2YrSCS12hr 01-01-2019 1:00:00 1.08

2YrSCS12hr	01-01-2019 1:15:00	1.08
2YrSCS12hr	01-01-2019 1:30:00	1.08
2YrSCS12hr	01-01-2019 1:45:00	1.08
2YrSCS12hr	01-01-2019 2:00:00	1.296
2YrSCS12hr	01-01-2019 2:15:00	1.296
2YrSCS12hr	01-01-2019 2:30:00	1.296
2YrSCS12hr	01-01-2019 2:45:00	1.296
2YrSCS12hr	01-01-2019 3:00:00	1.728
2YrSCS12hr	01-01-2019 3:15:00	1.728
2YrSCS12hr	01-01-2019 3:30:00	1.728
2YrSCS12hr	01-01-2019 3:45:00	1.728
2YrSCS12hr	01-01-2019 4:00:00	2.592
2YrSCS12hr	01-01-2019 4:15:00	2.592
2YrSCS12hr	01-01-2019 4:30:00	3.456
2YrSCS12hr	01-01-2019 4:45:00	3.456
2YrSCS12hr	01-01-2019 5:00:00	5.184
2YrSCS12hr	01-01-2019 5:15:00	5.184
2YrSCS12hr	01-01-2019 5:30:00	20.736
2YrSCS12hr	01-01-2019 5:45:00	57.024
2YrSCS12hr	01-01-2019 6:00:00	7.776
2YrSCS12hr	01-01-2019 6:15:00	7.776
2YrSCS12hr	01-01-2019 6:30:00	3.456
2YrSCS12hr	01-01-2019 6:45:00	3.456
2YrSCS12hr	01-01-2019 7:00:00	2.592
2YrSCS12hr	01-01-2019 7:15:00	2.592
2YrSCS12hr	01-01-2019 7:30:00	2.592
2YrSCS12hr	01-01-2019 7:45:00	2.592
2YrSCS12hr	01-01-2019 8:00:00	1.512
2YrSCS12hr	01-01-2019 8:15:00	1.512

2YrSCS12hr 01-01-2019 8:30:00 1.512

2YrSCS12hr 01-01-2019 8:45:00 1.512

2YrSCS12hr 01-01-2019 9:00:00 1.512

2YrSCS12hr 01-01-2019 9:15:00 1.512

2YrSCS12hr 01-01-2019 9:30:00 1.512

2YrSCS12hr 01-01-2019 9:45:00 1.512

2YrSCS12hr 01-01-2019 10:00:00 0.864

2YrSCS12hr 01-01-2019 10:15:00 0.864

2YrSCS12hr 01-01-2019 10:30:00 0.864

2YrSCS12hr 01-01-2019 10:45:00 0.864

2YrSCS12hr 01-01-2019 11:00:00 0.864

2YrSCS12hr 01-01-2019 11:15:00 0.864

2YrSCS12hr 01-01-2019 11:30:00 0.864

2YrSCS12hr 01-01-2019 12:00:00 0

;Rainfall (mm/hr)

5YrSCS12hr 01-01-2019 0:00:00 1.44

5YrSCS12hr 01-01-2019 0:15:00 1.44

5YrSCS12hr 01-01-2019 0:30:00 1.44

5YrSCS12hr 01-01-2019 0:45:00 1.44

5YrSCS12hr 01-01-2019 1:00:00 1.44

5YrSCS12hr 01-01-2019 1:15:00 1.44

5YrSCS12hr 01-01-2019 1:30:00 1.44

5YrSCS12hr 01-01-2019 1:45:00 1.44

5YrSCS12hr 01-01-2019 2:00:00 1.728

5YrSCS12hr 01-01-2019 2:15:00 1.728

5YrSCS12hr 01-01-2019 2:30:00 1.728

5YrSCS12hr 01-01-2019 2:45:00 1.728

5YrSCS12hr 01-01-2019 3:00:00 2.304

5YrSCS12hr	01-01-2019 3:15:00	2.304
5YrSCS12hr	01-01-2019 3:30:00	2.304
5YrSCS12hr	01-01-2019 3:45:00	2.304
5YrSCS12hr	01-01-2019 4:00:00	3.456
5YrSCS12hr	01-01-2019 4:15:00	3.456
5YrSCS12hr	01-01-2019 4:30:00	4.608
5YrSCS12hr	01-01-2019 4:45:00	4.608
5YrSCS12hr	01-01-2019 5:00:00	6.912
5YrSCS12hr	01-01-2019 5:15:00	6.912
5YrSCS12hr	01-01-2019 5:30:00	27.648
5YrSCS12hr	01-01-2019 5:45:00	76.032
5YrSCS12hr	01-01-2019 6:00:00	10.368
5YrSCS12hr	01-01-2019 6:15:00	10.368
5YrSCS12hr	01-01-2019 6:30:00	4.608
5YrSCS12hr	01-01-2019 6:45:00	4.608
5YrSCS12hr	01-01-2019 7:00:00	3.456
5YrSCS12hr	01-01-2019 7:15:00	3.456
5YrSCS12hr	01-01-2019 7:30:00	3.456
5YrSCS12hr	01-01-2019 7:45:00	3.456
5YrSCS12hr	01-01-2019 8:00:00	2.016
5YrSCS12hr	01-01-2019 8:15:00	2.016
5YrSCS12hr	01-01-2019 8:30:00	2.016
5YrSCS12hr	01-01-2019 8:45:00	2.016
5YrSCS12hr	01-01-2019 9:00:00	2.016
5YrSCS12hr	01-01-2019 9:15:00	2.016
5YrSCS12hr	01-01-2019 9:30:00	2.016
5YrSCS12hr	01-01-2019 9:45:00	2.016
5YrSCS12hr	01-01-2019 10:00:00	1.152
5YrSCS12hr	01-01-2019 10:15:00	1.152

5YrSCS12hr 01-01-2019 10:30:00 1.152

5YrSCS12hr 01-01-2019 10:45:00 1.152

5YrSCS12hr 01-01-2019 11:00:00 1.152

5YrSCS12hr 01-01-2019 11:15:00 1.152

5YrSCS12hr 01-01-2019 11:30:00 1.152

5YrSCS12hr 01-01-2019 11:45:00 1.152

5YrSCS12hr 01-01-2019 12:00:00 0

;Depth (m)

MH-2121-100YrCHI3Hr 01/01/2019 00:00:00 80.571

MH-2121-100YrCHI3Hr 01/01/2019 00:05:00 80.571

MH-2121-100YrCHI3Hr 01/01/2019 00:10:00 80.572

MH-2121-100YrCHI3Hr 01/01/2019 00:15:00 80.573

MH-2121-100YrCHI3Hr 01/01/2019 00:20:00 80.598

MH-2121-100YrCHI3Hr 01/01/2019 00:25:00 80.659

MH-2121-100YrCHI3Hr 01/01/2019 00:30:00 80.721

MH-2121-100YrCHI3Hr 01/01/2019 00:35:00 80.794

MH-2121-100YrCHI3Hr 01/01/2019 00:40:00 80.872

MH-2121-100YrCHI3Hr 01/01/2019 00:45:00 80.963

MH-2121-100YrCHI3Hr 01/01/2019 00:50:00 81.068

MH-2121-100YrCHI3Hr 01/01/2019 00:55:00 81.22

MH-2121-100YrCHI3Hr 01/01/2019 01:00:00 81.386

MH-2121-100YrCHI3Hr 01/01/2019 01:05:00 81.505

MH-2121-100YrCHI3Hr 01/01/2019 01:10:00 81.555

MH-2121-100YrCHI3Hr 01/01/2019 01:15:00 81.604

MH-2121-100YrCHI3Hr 01/01/2019 01:20:00 81.721

MH-2121-100YrCHI3Hr 01/01/2019 01:25:00 81.907

MH-2121-100YrCHI3Hr 01/01/2019 01:30:00 82.122

MH-2121-100YrCHI3Hr 01/01/2019 01:35:00 82.313

MH-2121-100YrCHI3Hr 01/01/2019 01:40:00 82.438

MH-2121-100YrCHI3Hr 01/01/2019 01:45:00 82.497

MH-2121-100YrCHI3Hr 01/01/2019 01:50:00 82.568

MH-2121-100YrCHI3Hr 01/01/2019 01:55:00 82.632

MH-2121-100YrCHI3Hr 01/01/2019 02:00:00 82.69

MH-2121-100YrCHI3Hr 01/01/2019 02:05:00 82.713

MH-2121-100YrCHI3Hr 01/01/2019 02:10:00 82.737

MH-2121-100YrCHI3Hr 01/01/2019 02:15:00 82.761

MH-2121-100YrCHI3Hr 01/01/2019 02:20:00 82.781

MH-2121-100YrCHI3Hr 01/01/2019 02:25:00 82.787

MH-2121-100YrCHI3Hr 01/01/2019 02:30:00 82.797

MH-2121-100YrCHI3Hr 01/01/2019 02:35:00 82.804

MH-2121-100YrCHI3Hr 01/01/2019 02:40:00 82.811

MH-2121-100YrCHI3Hr 01/01/2019 02:45:00 82.811

MH-2121-100YrCHI3Hr 01/01/2019 02:50:00 82.812

MH-2121-100YrCHI3Hr 01/01/2019 02:55:00 82.814

MH-2121-100YrCHI3Hr 01/01/2019 03:00:00 82.815

MH-2121-100YrCHI3Hr 01/01/2019 03:05:00 82.813

MH-2121-100YrCHI3Hr 01/01/2019 03:10:00 82.809

MH-2121-100YrCHI3Hr 01/01/2019 03:15:00 82.808

MH-2121-100YrCHI3Hr 01/01/2019 03:20:00 82.805

MH-2121-100YrCHI3Hr 01/01/2019 03:25:00 82.799

MH-2121-100YrCHI3Hr 01/01/2019 03:30:00 82.789

MH-2121-100YrCHI3Hr 01/01/2019 03:35:00 82.785

MH-2121-100YrCHI3Hr 01/01/2019 03:40:00 82.78

MH-2121-100YrCHI3Hr 01/01/2019 03:45:00 82.772

MH-2121-100YrCHI3Hr 01/01/2019 03:50:00 82.761

MH-2121-100YrCHI3Hr 01/01/2019 03:55:00 82.755

MH-2121-100YrCHI3Hr 01/01/2019 04:00:00 82.75

MH-2121-100YrCHI3Hr 01/01/2019 04:05:00 82.741

MH-2121-100YrCHI3Hr 01/01/2019 04:10:00 82.732

MH-2121-100YrCHI3Hr 01/01/2019 04:15:00 82.725

MH-2121-100YrCHI3Hr 01/01/2019 04:20:00 82.72

MH-2121-100YrCHI3Hr 01/01/2019 04:25:00 82.713

MH-2121-100YrCHI3Hr 01/01/2019 04:30:00 82.704

MH-2121-100YrCHI3Hr 01/01/2019 04:35:00 82.697

MH-2121-100YrCHI3Hr 01/01/2019 04:40:00 82.692

MH-2121-100YrCHI3Hr 01/01/2019 04:45:00 82.686

MH-2121-100YrCHI3Hr 01/01/2019 04:50:00 82.678

MH-2121-100YrCHI3Hr 01/01/2019 04:55:00 82.671

MH-2121-100YrCHI3Hr 01/01/2019 05:00:00 82.665

MH-2121-100YrCHI3Hr 01/01/2019 05:05:00 82.661

MH-2121-100YrCHI3Hr 01/01/2019 05:10:00 82.653

MH-2121-100YrCHI3Hr 01/01/2019 05:15:00 82.647

MH-2121-100YrCHI3Hr 01/01/2019 05:20:00 82.642

MH-2121-100YrCHI3Hr 01/01/2019 05:25:00 82.637

MH-2121-100YrCHI3Hr 01/01/2019 05:30:00 82.631

MH-2121-100YrCHI3Hr 01/01/2019 05:35:00 82.624

MH-2121-100YrCHI3Hr 01/01/2019 05:40:00 82.619

MH-2121-100YrCHI3Hr 01/01/2019 05:45:00 82.616

MH-2121-100YrCHI3Hr 01/01/2019 05:50:00 82.61

MH-2121-100YrCHI3Hr 01/01/2019 05:55:00 82.604

MH-2121-100YrCHI3Hr 01/01/2019 06:00:00 82.599

MH-2121-100YrCHI3Hr 01/01/2019 06:05:00 82.596

MH-2121-100YrCHI3Hr 01/01/2019 06:10:00 82.591

MH-2121-100YrCHI3Hr 01/01/2019 06:15:00 82.585

MH-2121-100YrCHI3Hr 01/01/2019 06:20:00 82.581

MH-2121-100YrCHI3Hr 01/01/2019 06:25:00 82.577

MH-2121-100YrCHI3Hr 01/01/2019 06:30:00 82.573

MH-2121-100YrCHI3Hr 01/01/2019 06:35:00 82.568

MH-2121-100YrCHI3Hr 01/01/2019 06:40:00 82.563

MH-2121-100YrCHI3Hr 01/01/2019 06:45:00 82.56

MH-2121-100YrCHI3Hr 01/01/2019 06:50:00 82.556

MH-2121-100YrCHI3Hr 01/01/2019 06:55:00 82.552

MH-2121-100YrCHI3Hr 01/01/2019 07:00:00 82.547

MH-2121-100YrCHI3Hr 01/01/2019 07:05:00 82.544

MH-2121-100YrCHI3Hr 01/01/2019 07:10:00 82.542

MH-2121-100YrCHI3Hr 01/01/2019 07:15:00 82.538

MH-2121-100YrCHI3Hr 01/01/2019 07:20:00 82.533

MH-2121-100YrCHI3Hr 01/01/2019 07:25:00 82.529

MH-2121-100YrCHI3Hr 01/01/2019 07:30:00 82.526

MH-2121-100YrCHI3Hr 01/01/2019 07:35:00 82.523

MH-2121-100YrCHI3Hr 01/01/2019 07:40:00 82.519

MH-2121-100YrCHI3Hr 01/01/2019 07:45:00 82.516

MH-2121-100YrCHI3Hr 01/01/2019 07:50:00 82.513

MH-2121-100YrCHI3Hr 01/01/2019 07:55:00 82.51

MH-2121-100YrCHI3Hr 01/01/2019 08:00:00 82.507

MH-2121-100YrCHI3Hr 01/01/2019 08:05:00 82.503

MH-2121-100YrCHI3Hr 01/01/2019 08:10:00 82.5

MH-2121-100YrCHI3Hr 01/01/2019 08:15:00 82.497

MH-2121-100YrCHI3Hr 01/01/2019 08:20:00 82.495

MH-2121-100YrCHI3Hr 01/01/2019 08:25:00 82.491

MH-2121-100YrCHI3Hr 01/01/2019 08:30:00 82.488

MH-2121-100YrCHI3Hr 01/01/2019 08:35:00 82.485

MH-2121-100YrCHI3Hr 01/01/2019 08:40:00 82.483

MH-2121-100YrCHI3Hr 01/01/2019 08:45:00 82.48

MH-2121-100YrCHI3Hr 01/01/2019 08:50:00 82.477

MH-2121-100YrCHI3Hr 01/01/2019 08:55:00 82.474

MH-2121-100YrCHI3Hr 01/01/2019 09:00:00 82.472

MH-2121-100YrCHI3Hr 01/01/2019 09:05:00 82.469

MH-2121-100YrCHI3Hr 01/01/2019 09:10:00 82.467

MH-2121-100YrCHI3Hr 01/01/2019 09:15:00 82.463

MH-2121-100YrCHI3Hr 01/01/2019 09:20:00 82.462

MH-2121-100YrCHI3Hr 01/01/2019 09:25:00 82.459

MH-2121-100YrCHI3Hr 01/01/2019 09:30:00 82.457

MH-2121-100YrCHI3Hr 01/01/2019 09:35:00 82.453

MH-2121-100YrCHI3Hr 01/01/2019 09:40:00 82.452

MH-2121-100YrCHI3Hr 01/01/2019 09:45:00 82.449

MH-2121-100YrCHI3Hr 01/01/2019 09:50:00 82.448

MH-2121-100YrCHI3Hr 01/01/2019 09:55:00 82.444

MH-2121-100YrCHI3Hr 01/01/2019 10:00:00 82.443

MH-2121-100YrCHI3Hr 01/01/2019 10:05:00 82.44

MH-2121-100YrCHI3Hr 01/01/2019 10:10:00 82.439

MH-2121-100YrCHI3Hr 01/01/2019 10:15:00 82.435

MH-2121-100YrCHI3Hr 01/01/2019 10:20:00 82.434

MH-2121-100YrCHI3Hr 01/01/2019 10:25:00 82.431

MH-2121-100YrCHI3Hr 01/01/2019 10:30:00 82.43

MH-2121-100YrCHI3Hr 01/01/2019 10:35:00 82.426

MH-2121-100YrCHI3Hr 01/01/2019 10:40:00 82.425

MH-2121-100YrCHI3Hr 01/01/2019 10:45:00 82.422

MH-2121-100YrCHI3Hr 01/01/2019 10:50:00 82.422

MH-2121-100YrCHI3Hr 01/01/2019 10:55:00 82.418

MH-2121-100YrCHI3Hr 01/01/2019 11:00:00 82.417

MH-2121-100YrCHI3Hr 01/01/2019 11:05:00 82.414

MH-2121-100YrCHI3Hr 01/01/2019 11:10:00 82.413

MH-2121-100YrCHI3Hr 01/01/2019 11:15:00 82.411

MH-2121-100YrCHI3Hr 01/01/2019 11:20:00 82.409

MH-2121-100YrCHI3Hr 01/01/2019 11:25:00 82.407

MH-2121-100YrCHI3Hr 01/01/2019 11:30:00 82.405

MH-2121-100YrCHI3Hr 01/01/2019 11:35:00 82.404

MH-2121-100YrCHI3Hr 01/01/2019 11:40:00 82.401

MH-2121-100YrCHI3Hr 01/01/2019 11:45:00 82.4

MH-2121-100YrCHI3Hr 01/01/2019 11:50:00 82.397

MH-2121-100YrCHI3Hr 01/01/2019 11:55:00 82.396

MH-2121-100YrCHI3Hr 01/01/2019 12:00:00 82.394

MH-2121-100YrCHI3Hr 01/01/2019 12:05:00 82.392

MH-2121-100YrCHI3Hr 01/01/2019 12:10:00 82.39

MH-2121-100YrCHI3Hr 01/01/2019 12:15:00 82.388

MH-2121-100YrCHI3Hr 01/01/2019 12:20:00 82.387

MH-2121-100YrCHI3Hr 01/01/2019 12:25:00 82.385

MH-2121-100YrCHI3Hr 01/01/2019 12:30:00 82.383

MH-2121-100YrCHI3Hr 01/01/2019 12:35:00 82.381

MH-2121-100YrCHI3Hr 01/01/2019 12:40:00 82.38

MH-2121-100YrCHI3Hr 01/01/2019 12:45:00 82.378

MH-2121-100YrCHI3Hr 01/01/2019 12:50:00 82.376

MH-2121-100YrCHI3Hr 01/01/2019 12:55:00 82.374

MH-2121-100YrCHI3Hr 01/01/2019 13:00:00 82.373

MH-2121-100YrCHI3Hr 01/01/2019 13:05:00 82.371

MH-2121-100YrCHI3Hr 01/01/2019 13:10:00 82.369

MH-2121-100YrCHI3Hr 01/01/2019 13:15:00 82.367

MH-2121-100YrCHI3Hr 01/01/2019 13:20:00 82.366

MH-2121-100YrCHI3Hr 01/01/2019 13:25:00 82.364

MH-2121-100YrCHI3Hr 01/01/2019 13:30:00 82.362

MH-2121-100YrCHI3Hr 01/01/2019 13:35:00 82.36

MH-2121-100YrCHI3Hr 01/01/2019 13:40:00 82.359

MH-2121-100YrCHI3Hr 01/01/2019 13:45:00 82.357

MH-2121-100YrCHI3Hr 01/01/2019 13:50:00 82.356

MH-2121-100YrCHI3Hr 01/01/2019 13:55:00 82.354

MH-2121-100YrCHI3Hr 01/01/2019 14:00:00 82.352

MH-2121-100YrCHI3Hr 01/01/2019 14:05:00 82.35

MH-2121-100YrCHI3Hr 01/01/2019 14:10:00 82.349

MH-2121-100YrCHI3Hr 01/01/2019 14:15:00 82.347

MH-2121-100YrCHI3Hr 01/01/2019 14:20:00 82.346

MH-2121-100YrCHI3Hr 01/01/2019 14:25:00 82.344

MH-2121-100YrCHI3Hr 01/01/2019 14:30:00 82.342

MH-2121-100YrCHI3Hr 01/01/2019 14:35:00 82.34

MH-2121-100YrCHI3Hr 01/01/2019 14:40:00 82.339

MH-2121-100YrCHI3Hr 01/01/2019 14:45:00 82.337

MH-2121-100YrCHI3Hr 01/01/2019 14:50:00 82.336

MH-2121-100YrCHI3Hr 01/01/2019 14:55:00 82.334

MH-2121-100YrCHI3Hr 01/01/2019 15:00:00 82.333

MH-2121-100YrCHI3Hr 01/01/2019 15:05:00 82.331

MH-2121-100YrCHI3Hr 01/01/2019 15:10:00 82.329

MH-2121-100YrCHI3Hr 01/01/2019 15:15:00 82.328

MH-2121-100YrCHI3Hr 01/01/2019 15:20:00 82.326

MH-2121-100YrCHI3Hr 01/01/2019 15:25:00 82.324

MH-2121-100YrCHI3Hr 01/01/2019 15:30:00 82.323

MH-2121-100YrCHI3Hr 01/01/2019 15:35:00 82.321

MH-2121-100YrCHI3Hr 01/01/2019 15:40:00 82.32

MH-2121-100YrCHI3Hr 01/01/2019 15:45:00 82.318

MH-2121-100YrCHI3Hr 01/01/2019 15:50:00 82.316

MH-2121-100YrCHI3Hr 01/01/2019 15:55:00 82.314

MH-2121-100YrCHI3Hr 01/01/2019 16:00:00 82.313

MH-2121-100YrCHI3Hr 01/01/2019 16:05:00 82.312

MH-2121-100YrCHI3Hr 01/01/2019 16:10:00 82.31

MH-2121-100YrCHI3Hr 01/01/2019 16:15:00 82.308

MH-2121-100YrCHI3Hr 01/01/2019 16:20:00 82.307

MH-2121-100YrCHI3Hr 01/01/2019 16:25:00 82.305

MH-2121-100YrCHI3Hr 01/01/2019 16:30:00 82.304

MH-2121-100YrCHI3Hr 01/01/2019 16:35:00 82.302

MH-2121-100YrCHI3Hr 01/01/2019 16:40:00 82.301

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MH-2121-100YrCHI3Hr 01/01/2019 23:20:00 82.188

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MH-2121-100YrCHI3Hr 01/01/2019 23:40:00 82.183

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MH-2121-100YrCHI3Hr 01/02/2019 00:00:00 82.178

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MH-2121-100YrCHI3Hr+20% 01/01/2019 00:05:00 80.571

MH-2121-100YrCHI3Hr+20% 01/01/2019 00:10:00 80.572

MH-2121-100YrCHI3Hr+20% 01/01/2019 00:15:00 80.584

MH-2121-100YrCHI3Hr+20% 01/01/2019 00:20:00 80.633

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MH-2121-100YrCHI3Hr+20% 01/01/2019 00:30:00 80.783

MH-2121-100YrCHI3Hr+20% 01/01/2019 00:35:00 80.942

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MH-2121-100YrCHI3Hr+20% 01/01/2019 00:50:00 81.292

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MH-2121-100YrCHI3Hr+20% 01/01/2019 02:10:00 83.147

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MH-2121-100YrCHI3Hr+20% 01/01/2019 03:15:00 83.091

MH-2121-100YrCHI3Hr+20% 01/01/2019 03:20:00 83.085

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MH-2121-100YrCHI3Hr+20% 01/01/2019 06:25:00 82.702

MH-2121-100YrCHI3Hr+20% 01/01/2019 06:30:00 82.694

MH-2121-100YrCHI3Hr+20% 01/01/2019 06:35:00 82.687

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MH-2121-100YrCHI3Hr+20% 01/01/2019 06:45:00 82.677

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MH-2121-100YrCHI3Hr+20% 01/01/2019 07:15:00 82.643

MH-2121-100YrCHI3Hr+20% 01/01/2019 07:20:00 82.637

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MH-2121-100YrCHI3Hr+20% 01/01/2019 07:40:00 82.618

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MH-2121-100YrCHI3Hr+20% 01/01/2019 09:05:00 82.552

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MH-2121-100YrCHI3Hr+20% 01/01/2019 09:15:00 82.546

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MH-2121-100YrCHI3Hr+20% 01/01/2019 09:40:00 82.53

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MH-2121-100YrCHI3Hr+20% 01/01/2019 09:55:00 82.522

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MH-2121-100YrCHI3Hr+20% 01/01/2019 10:05:00 82.516

MH-2121-100YrCHI3Hr+20% 01/01/2019 10:10:00 82.513

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MH-2121-100YrCHI3Hr+20% 01/01/2019 10:30:00 82.503

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MH-2121-100YrCHI3Hr+20% 01/01/2019 10:55:00 82.491

MH-2121-100YrCHI3Hr+20% 01/01/2019 11:00:00 82.489

MH-2121-100YrCHI3Hr+20% 01/01/2019 11:05:00 82.486

MH-2121-100YrCHI3Hr+20% 01/01/2019 11:10:00 82.484

MH-2121-100YrCHI3Hr+20%	01/01/2019 11:15:00	82.481
MH-2121-100YrCHI3Hr+20%	01/01/2019 11:20:00	82.48
MH-2121-100YrCHI3Hr+20%	01/01/2019 11:25:00	82.477
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MH-2121-100YrCHI3Hr+20%	01/01/2019 11:40:00	82.472
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MH-2121-100YrCHI3Hr+20%	01/01/2019 12:00:00	82.464
MH-2121-100YrCHI3Hr+20%	01/01/2019 12:05:00	82.46
MH-2121-100YrCHI3Hr+20%	01/01/2019 12:10:00	82.46
MH-2121-100YrCHI3Hr+20%	01/01/2019 12:15:00	82.456
MH-2121-100YrCHI3Hr+20%	01/01/2019 12:20:00	82.456
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MH-2121-100YrCHI3Hr+20%	01/01/2019 12:30:00	82.453
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MH-2121-100YrCHI3Hr+20%	01/01/2019 13:20:00	82.436
MH-2121-100YrCHI3Hr+20%	01/01/2019 13:25:00	82.432
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MH-2121-100YrCHI3Hr+20%	01/01/2019 13:35:00	82.428

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MH-2121-100YrCHI3Hr+20% 01/01/2019 13:55:00 82.422

MH-2121-100YrCHI3Hr+20% 01/01/2019 14:00:00 82.423

MH-2121-100YrCHI3Hr+20% 01/01/2019 14:05:00 82.419

MH-2121-100YrCHI3Hr+20% 01/01/2019 14:10:00 82.419

MH-2121-100YrCHI3Hr+20% 01/01/2019 14:15:00 82.415

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MH-2121-100YrCHI3Hr+20% 01/01/2019 14:35:00 82.41

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MH-2121-100YrCHI3Hr+20% 01/01/2019 14:45:00 82.406

MH-2121-100YrCHI3Hr+20% 01/01/2019 14:50:00 82.408

MH-2121-100YrCHI3Hr+20% 01/01/2019 14:55:00 82.403

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:00:00 82.405

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:05:00 82.4

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:10:00 82.402

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:15:00 82.398

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:20:00 82.399

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:25:00 82.396

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:30:00 82.396

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:35:00 82.394

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:40:00 82.394

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:45:00 82.393

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:50:00 82.392

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:55:00 82.391

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:00:00 82.389

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:05:00 82.387

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:10:00 82.385

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:15:00 82.384

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:20:00 82.383

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:25:00 82.382

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:30:00 82.38

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:35:00 82.377

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:40:00 82.377

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:45:00 82.376

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:50:00 82.376

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:55:00 82.374

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:00:00 82.373

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:05:00 82.372

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:10:00 82.371

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:15:00 82.368

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:20:00 82.367

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:25:00 82.366

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:30:00 82.365

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:35:00 82.363

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:40:00 82.363

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:45:00 82.361

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:50:00 82.36

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MH-2121-100YrCHI3Hr+20% 01/01/2019 18:05:00 82.356

MH-2121-100YrCHI3Hr+20% 01/01/2019 18:10:00 82.356

MH-2121-100YrCHI3Hr+20% 01/01/2019 18:15:00 82.354

MH-2121-100YrCHI3Hr+20% 01/01/2019 18:20:00 82.353

MH-2121-100YrCHI3Hr+20% 01/01/2019 18:25:00 82.351

MH-2121-100YrCHI3Hr+20% 01/01/2019 18:30:00 82.351

MH-2121-100YrCHI3Hr+20% 01/01/2019 18:35:00 82.348

MH-2121-100YrCHI3Hr+20% 01/01/2019 18:40:00 82.348

MH-2121-100YrCHI3Hr+20% 01/01/2019 18:45:00 82.347

MH-2121-100YrCHI3Hr+20% 01/01/2019 18:50:00 82.347

MH-2121-100YrCHI3Hr+20% 01/01/2019 18:55:00 82.344

MH-2121-100YrCHI3Hr+20% 01/01/2019 19:00:00 82.344

MH-2121-100YrCHI3Hr+20% 01/01/2019 19:05:00 82.341

MH-2121-100YrCHI3Hr+20% 01/01/2019 19:10:00 82.341

MH-2121-100YrCHI3Hr+20% 01/01/2019 19:15:00 82.339

MH-2121-100YrCHI3Hr+20% 01/01/2019 19:20:00 82.34

MH-2121-100YrCHI3Hr+20% 01/01/2019 19:25:00 82.336

MH-2121-100YrCHI3Hr+20% 01/01/2019 19:30:00 82.337

MH-2121-100YrCHI3Hr+20% 01/01/2019 19:35:00 82.334

MH-2121-100YrCHI3Hr+20% 01/01/2019 19:40:00 82.334

MH-2121-100YrCHI3Hr+20% 01/01/2019 19:45:00 82.332

MH-2121-100YrCHI3Hr+20% 01/01/2019 19:50:00 82.332

MH-2121-100YrCHI3Hr+20% 01/01/2019 19:55:00 82.329

MH-2121-100YrCHI3Hr+20% 01/01/2019 20:00:00 82.33

MH-2121-100YrCHI3Hr+20% 01/01/2019 20:05:00 82.326

MH-2121-100YrCHI3Hr+20% 01/01/2019 20:10:00 82.327

MH-2121-100YrCHI3Hr+20% 01/01/2019 20:15:00 82.325

MH-2121-100YrCHI3Hr+20% 01/01/2019 20:20:00 82.324

MH-2121-100YrCHI3Hr+20% 01/01/2019 20:25:00 82.323

MH-2121-100YrCHI3Hr+20% 01/01/2019 20:30:00 82.321

MH-2121-100YrCHI3Hr+20% 01/01/2019 20:35:00 82.32

MH-2121-100YrCHI3Hr+20% 01/01/2019 20:40:00 82.319

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MH-2121-100YrCHI3Hr+20% 01/01/2019 20:50:00 82.317

MH-2121-100YrCHI3Hr+20%	01/01/2019 20:55:00	82.316
MH-2121-100YrCHI3Hr+20%	01/01/2019 21:00:00	82.314
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MH-2121-100YrCHI3Hr+20%	01/01/2019 21:10:00	82.313
MH-2121-100YrCHI3Hr+20%	01/01/2019 21:15:00	82.311
MH-2121-100YrCHI3Hr+20%	01/01/2019 21:20:00	82.31
MH-2121-100YrCHI3Hr+20%	01/01/2019 21:25:00	82.309
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MH-2121-100YrCHI3Hr+20%	01/01/2019 21:35:00	82.307
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MH-2121-100YrCHI3Hr+20%	01/01/2019 21:55:00	82.302
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MH-2121-100YrCHI3Hr+20%	01/01/2019 22:15:00	82.297
MH-2121-100YrCHI3Hr+20%	01/01/2019 22:20:00	82.296
MH-2121-100YrCHI3Hr+20%	01/01/2019 22:25:00	82.295
MH-2121-100YrCHI3Hr+20%	01/01/2019 22:30:00	82.294
MH-2121-100YrCHI3Hr+20%	01/01/2019 22:35:00	82.293
MH-2121-100YrCHI3Hr+20%	01/01/2019 22:40:00	82.291
MH-2121-100YrCHI3Hr+20%	01/01/2019 22:45:00	82.29
MH-2121-100YrCHI3Hr+20%	01/01/2019 22:50:00	82.289
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MH-2121-100YrCHI3Hr+20%	01/01/2019 23:10:00	82.284
MH-2121-100YrCHI3Hr+20%	01/01/2019 23:15:00	82.283

MH-2121-100YrCHI3Hr+20% 01/01/2019 23:20:00 82.283

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MH-2121-100YrCHI3Hr+20% 01/01/2019 23:35:00 82.279

MH-2121-100YrCHI3Hr+20% 01/01/2019 23:40:00 82.278

MH-2121-100YrCHI3Hr+20% 01/01/2019 23:45:00 82.276

MH-2121-100YrCHI3Hr+20% 01/01/2019 23:50:00 82.275

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MH-2121-100YrCHI3Hr+20% 01/02/2019 00:00:00 82.273

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MH-2121-July_1_1979 01/01/2019 20:50:00 82.12

MH-2121-July_1_1979 01/01/2019 20:55:00 82.118

MH-2121-July_1_1979 01/01/2019 21:00:00 82.116

MH-2121-July_1_1979 01/01/2019 21:05:00 82.114

MH-2121-July_1_1979 01/01/2019 21:10:00 82.112

MH-2121-July_1_1979 01/01/2019 21:15:00 82.11

MH-2121-July_1_1979 01/01/2019 21:20:00 82.108

MH-2121-July_1_1979 01/01/2019 21:25:00 82.106

MH-2121-July_1_1979 01/01/2019 21:30:00 82.105

MH-2121-July_1_1979 01/01/2019 21:35:00 82.103

MH-2121-July_1_1979 01/01/2019 21:40:00 82.101

MH-2121-July_1_1979 01/01/2019 21:45:00 82.099

MH-2121-July_1_1979 01/01/2019 21:50:00 82.097

MH-2121-July_1_1979 01/01/2019 21:55:00 82.095

MH-2121-July_1_1979 01/01/2019 22:00:00 82.094

MH-2121-July_1_1979 01/01/2019 22:05:00 82.092

MH-2121-July_1_1979 01/01/2019 22:10:00 82.09

MH-2121-July_1_1979 01/01/2019 22:15:00 82.088

MH-2121-July_1_1979 01/01/2019 22:20:00 82.087

MH-2121-July_1_1979 01/01/2019 22:25:00 82.084

MH-2121-July_1_1979 01/01/2019 22:30:00 82.083

MH-2121-July_1_1979 01/01/2019 22:35:00 82.081

MH-2121-July_1_1979 01/01/2019 22:40:00 82.08

MH-2121-July_1_1979 01/01/2019 22:45:00 82.077

MH-2121-July_1_1979 01/01/2019 22:50:00 82.076

MH-2121-July_1_1979 01/01/2019 22:55:00 82.074

MH-2121-July_1_1979 01/01/2019 23:00:00 82.072

MH-2121-July_1_1979 01/01/2019 23:05:00 82.07

MH-2121-July_1_1979 01/01/2019 23:10:00 82.069

MH-2121-July_1_1979 01/01/2019 23:15:00 82.067

MH-2121-July_1_1979 01/01/2019 23:20:00 82.066

MH-2121-July_1_1979 01/01/2019 23:25:00 82.064

MH-2121-July_1_1979 01/01/2019 23:30:00 82.062

MH-2121-July_1_1979 01/01/2019 23:35:00 82.06

MH-2121-July_1_1979 01/01/2019 23:40:00 82.059

MH-2121-July_1_1979 01/01/2019 23:45:00 82.057

MH-2121-July_1_1979 01/01/2019 23:50:00 82.055

MH-2121-July_1_1979 01/01/2019 23:55:00 82.053

MH-2121-July_1_1979 01/02/2019 00:00:00 82.052

No_Rain 01/01/2019 00:00 0

No_Rain 12/31/2019 0:00 0

[REPORT]

;;Reporting Options

INPUT YES

CONTROLS NO

SUBCATCHMENTS ALL

NODES ALL

LINKS ALL

[TAGS]

Node (28)_(CB) CB

Node 1_(1)_(RYCB) CB

Node 10_(CB) CB

Node 104_(STM) STM

Node 106_(STM) STM

Node 108_(STM) STM

Node 11_(2)_(RYCB) CB

Node 110_(STM) STM

Node 112_(STM) STM

Node 114_(STM) STM

Node 12_(CB) CB

Node 120_(STM) STM

Node 122_(STM) STM

Node 124_(STM) STM

Node 126_(STM) STM

Node 128_(STM) STM

Node 13_(CB) CB

Node 136_(STM) STM

Node 138_(STM) STM

Node 14_(CB) CB

Node 140_(STM) STM

Node 142_(STM) STM

Node 144_(STM) STM

Node 146_(STM) STM

Node 148_(STM) STM

Node 15_(CB) CB

Node 150_(STM) STM

Node 16_(CB) CB

Node 17_(CB) CB

Node	18_(CB)	CB
Node	19_(CB)	CB
Node	2_(CB)	CB
Node	20_(CB)	CB
Node	21_(CB)	CB
Node	22_(CB)	CB
Node	23_(CB)	CB
Node	24_(RYCB)	CB
Node	25_(CB)	CB
Node	26_(CB)	CB
Node	27_(CB)	CB
Node	29_(CB)	CB
Node	3_(CB)	CB
Node	30_CB-C	CB
Node	31_(RYCB)	CB
Node	32_(CB)	CB
Node	33_(RYCB)	CB
Node	4_(CB)	CB
Node	5_(CB)	CB
Node	8_(CB)	CB
Node	9_(1)_(RYCB)	CB
Node	CBMH_6_(RYCB)	CB
Node	CBMH_7_(RYCB)	CB
Node	Maj-15_2	Maj
Node	Maj-18_2	Maj
Node	Maj-19	Maj
Node	Maj-19_2	Maj
Node	Maj-20	Maj
Node	Maj-21	Maj

Node Maj-23 Maj

Node Maj-24 Maj

Node Maj-25 Maj

Node Maj-26 Maj

Node Maj-27 Maj

Node Maj-28 Maj

Node Maj-29 Maj

Node Maj-35 Maj

Node Maj-36 Maj

Node Maj-37 Maj

Node Maj-38 Maj

Node Maj-39 Maj

Node Maj-40 Maj

Node Maj-41 Maj

Node Maj-44 Maj

Node Maj-45 Maj

Node Maj-46 Maj

Node Maj-48_2 Maj

Node Maj-50 Maj

Node Maj-51 Maj

Node Maj-52 Maj

Node Maj-53 Maj

Node Maj-56 Maj

Node RYCB_10 RY

Node RYCB_3_(RYCB) RY

Node RYCB_6_(1)_(14)_(RYCB) RY

Node RYCB_6_(1)_(15)_(RYCB) RY

Node RYCB_6_(1)_(16)_(1)_(RYCB) RY

Node RYCB_6_(1)_(16)_(2)_(RYCB) RY

Node RYCB_6_(1)_(16)_(RYCB) RY

Node RYCB_6_(1)_(17)_(RYCB) RY

Node RYCB_6_(1)_(19)_(RYCB) RY

Node RYCB_6_(1)_(2)_(1)_(RYCB) RY

Node RYCB_6_(1)_(2)_(2)_(RYCB) RY

Node RYCB_6_(1)_(2)_(RYCB) RY

Node RYCB_6_(1)_(21)_(RYCB) RY

Node RYCB_6_(1)_(22)_(RYCB) RY

Node RYCB_6_(1)_(23)_(1)_(RYCB) RY

Node RYCB_6_(1)_(23)_(2)_(RYCB) RY

Node RYCB_6_(1)_(23)_(RYCB) RY

Node RYCB_6_(1)_(24)_(RYCB) RY

Node RYCB_6_(1)_(25)_(RYCB) RY

Node RYCB_6_(1)_(26)_(RYCB) RY

Node RYCB_6_(1)_(27)_(1)_(RYCB) RY

Node RYCB_6_(1)_(27)_(RYCB) RY

Node RYCB_6_(1)_(3)_(RYCB) RY

Node RYCB_6_(1)_(4)_(RYCB) RY

Node RYCB_6_(1)_(5)_(RYCB) RY

Node RYCB_6_(1)_(6)_(RYCB) RY

Node RYCB_6_(1)_(7)_(1)_(RYCB) RY

Node RYCB_6_(1)_(7)_(RYCB) RY

Node RYCB_6_(1)_(8)_(RYCB) RY

Node RYCB_6_(1)_(RYCB) RY

Node Slope1 Maj

Node STM-247_(STM) STM

Node STM-251_(STM) STM

Node STM-Split STM

Node STM-Split3 STM

Node Structure_-_(115)_(1)_(RYCB) RY

Node Structure_-_(115)_(2)_(RYCB) RY

Node Structure_-_(115)_(3)_(RYCB) RY

Node Structure_-_(115)_(RYCB) RY

Node Structure_-_(20)_(RYCB) RY

Node Structure_-_(22)_(RYCB) RY

Node Structure_-_(25)_(RYCB) RY

Node Structure_-_(26)_(RYCB) CB

Node Structure_-_(27)_(RYCB) RY

Node Structure_-_(29)_(RYCB) RY

Node Structure_-_(31)_(RYCB) RY

Node Structure_-_(41)_(RYCB) RY

Node Structure_-_(7)_(RYCB) RY

Node TEE_1_(1)_(1)_(RYCB) RY

Node TEE_3_(RYCB) RY

Node TEE_4_(RYCB) RY

Node TEE_5_(RYCB) RY

Node TEE_6_(RYCB) RY

Node 2121_(STM) STM

Node Maj-18 Maj

Node Maj-22 Maj

Node Maj-48 Maj

Node Maj-49 Maj

Node Maj-59 Maj

Link 10_(STM) STM

Link 11_(STM) STM

Link 12_(STM) STM

Link 13_(STM) STM

Link 15_(10)_(STM)_1 STM

Link 15_(10)_(STM)_2 STM

Link 15_(11)_(STM) STM

Link 15_(12)_(STM) STM

Link 15_(13)_(STM) STM

Link 15_(5)_(STM) STM

Link 15_(9)_(STM) STM

Link 4_(STM) STM

Link 5_(STM) STM

Link 8_(STM) STM

Link 9_(STM) STM

Link C1 STM

Link C18 Spill

Link C18_4 Maj

Link C18_5 Maj

Link C18_6 Maj

Link C18_8 Maj

Link C18_9 Maj

Link C19 Maj

Link C2 Maj

Link C20 Maj

Link C21 Maj

Link C22 Maj

Link C23 Maj

Link C24 Maj

Link C25 Maj

Link C26 Maj

Link C27 Spill

Link C27_1 Maj

Link C27_2 Maj

Link	C28	Maj
Link	C31	Spill
Link	C36	Maj
Link	C37	Maj
Link	C41	Maj
Link	C42	Maj
Link	C43	Maj
Link	C44	Maj
Link	C45	Maj
Link	C46	Maj
Link	C47	Maj
Link	C48	Maj
Link	C49	Maj
Link	C5	Spill
Link	C50_1	Maj
Link	C50_2	Maj
Link	C51	Maj
Link	C52	Maj
Link	C53	Maj
Link	C54	Maj
Link	C56	Spill
Link	C58	Spill
Link	C59	Spill
Link	C60	Spill
Link	Pipe_-_(100)_(RYCB)	RY
Link	Pipe_-_(110)_(RYCB)	RY
Link	Pipe_-_(111)_(RYCB)	RY
Link	Pipe_-_(114)_(RYCB)	RY
Link	Pipe_-_(117)_(RYCB)	RY

Link Pipe_-_(118)_(RYCB) RY

Link Pipe_-_(119)_(RYCB) RY

Link Pipe_-_(134)_(RYCB) RY

Link Pipe_-_(137)_(RYCB) RY

Link Pipe_-_(138)_(RYCB) RY

Link Pipe_-_(139)_(RYCB) RY

Link Pipe_-_(14)_(RYCB) RY

Link Pipe_-_(140)_(RYCB) RY

Link Pipe_-_(141)_(RYCB) RY

Link Pipe_-_(142)_(RYCB) RY

Link Pipe_-_(143)_(RYCB) RY

Link Pipe_-_(144)_(RYCB) RY

Link Pipe_-_(15)_(RYCB) RY

Link Pipe_-_(150)_(RYCB) RY

Link Pipe_-_(151)_(RYCB) RY

Link Pipe_-_(152)_(RYCB) RY

Link Pipe_-_(153)_(RYCB) RY

Link Pipe_-_(154)_(RYCB) RY

Link Pipe_-_(155)_(RYCB) RY

Link Pipe_-_(156)_(RYCB) RY

Link Pipe_-_(16)_(RYCB) RY

Link Pipe_-_(161)_(RYCB) RY

Link Pipe_-_(164)_(RYCB) RY

Link Pipe_-_(165)_(RYCB) RY

Link Pipe_-_(17)_(RYCB) RY

Link Pipe_-_(19)_(RYCB) RY

Link Pipe_-_(25)_(RYCB) RY

Link Pipe_-_(27)_(RYCB) RY

Link Pipe_-_(5)_(RYCB) RY

Link Pipe_-_(6)_(RYCB) RY

Link Pipe_-_(7)_(RYCB) RY

Link Pipe_-_(73)_(RYCB) RY

Link Pipe_-_(87)_(RYCB) RY

Link Pipe_-_(88)_(RYCB) RY

Link Pipe_-_(89)_(RYCB) RY

Link Pipe_-_(9)_(RYCB) RY

Link Pipe_-_(93)_(RYCB) RY

Link Pipe_-_(94)_(RYCB) RY

Link Pipe_-_(95)_(RYCB) RY

Link Pipe_-_(96)_(RYCB) RY

Link Pipe_-_(98)_(RYCB) RY

Link Pipe_-_(99)_(RYCB) RY

Link STM-23_(STM) STM

Link STM-24_(STM) STM

Link STM-28_(STM) STM

Link STM-34_(1)_(STM)_2 STM

Link STM-81_(STM) STM

Link STM-82_(STM) STM

Link STM-83_(STM) STM

Link CB-10 ICD

Link CB-12-C ICD

Link CB-13-C ICD

Link CB-14 ICD

Link CB-15 ICD

Link CB-16 ICD

Link CB-17 ICD

Link CB-18 ICD

Link CB-19 ICD

Link	CB-2	ICD
Link	CB-20	ICD
Link	CB-21	ICD
Link	CB-22	ICD
Link	CB-23	ICD
Link	CB-25	ICD
Link	CB-26	ICD
Link	CB-27(1)	ICD
Link	CB-28	ICD
Link	CB-29	ICD
Link	CB-3	ICD
Link	CB-30	ICD
Link	CB-32	ICD
Link	CB-33	ICD
Link	CB-4	ICD
Link	CB-5	ICD
Link	CB-6	ICD
Link	CB-8	ICD
Link	CB-9	ICD
Link	OR11	Grate
Link	OR12	Grate
Link	OR13	Grate
Link	OR14	Grate
Link	OR15	Grate
Link	OR16	Grate
Link	OR17	Grate
Link	OR18	Grate
Link	OR19	Grate
Link	OR26	Grate

Link OR27 Grate

Link OR30 Grate

Link OR31 Grate

Link OR32 Grate

Link OR33 Grate

Link OR34 Grate

Link OR35 Grate

Link OR36 Grate

Link OR37 Grate

Link OR38 Grate

Link OR39 Grate

Link OR40 Grate

Link OR41 Grate

Link OR42 Grate

Link OR43 Grate

Link OR46 Grate

Link OR47 Grate

Link OR48 Grate

Link RYCB-1 ICD

Link RYCB-10 ICD

Link RYCB-11 ICD

Link RYCB-24 ICD

Link RYCB-26 ICD

Link RYCB-31 ICD

Link RYCB-7 ICD

[MAP]

DIMENSIONS 381265.33875 5033765.6351 381848.91625 5034900.2169

UNITS Meters

[COORDINATES]

;;Node X-Coord Y-Coord

;;---------- ---------- ----------

(28)_(CB) 381566.42 5034311.904

1_(1)_(RYCB) 381613.893 5033947.165

10_(CB) 381712.816 5034088.875

104_(STM) 381751.832 5033983.755

106_(STM) 381661.746 5033946.201

108_(STM) 381636.072 5033940.78

11_(2)_(RYCB) 381705.04 5034085.441

110_(STM) 381606.992 5033939.535

112_(STM) 381722.061 5034051.287

114_(STM) 381695.933 5034110.412

12_(CB) 381693.043 5034036.978

120_(STM) 381637.884 5034015.234

122_(STM) 381613.388 5034012.674

124_(STM) 381598.561 5034020.702

126_(STM) 381577.374 5034069.721

128_(STM) 381546.966 5034139.351

13_(CB) 381689.694 5034044.79

136_(STM) 381522.723 5034196.958

138_(STM) 381527.988 5034210.775

14_(CB) 381626.497 5034011.771

140_(STM) 381631.534 5034256.315

142_(STM) 381640.84 5034237.84

144_(STM) 381600.199 5034327.009

146_(STM) 381528.36 5034294.959

148_(STM) 381456.173 5034264.012

15_(CB) 381626.048 5034020.259

150_(STM) 381569.837 5034397.001

16_(CB) 381597.707 5034039.587

17_(CB) 381589.912 5034036.197

18_(CB) 381567.802 5034108.366

19_(CB) 381560.007 5034104.977

2_(CB) 381640.363 5033940.449

20_(CB) 381541.884 5034167.976

21_(CB) 381534.089 5034164.586

22_(CB) 381581.406 5034227.395

23_(CB) 381578.057 5034235.207

24_(RYCB) 381646.054 5034240.141

25_(CB) 381624.155 5034289.758

26_(CB) 381616.38 5034286.326

27_(CB) 381569.662 5034304.343

29_(CB) 381486.175 5034268.55

3_(CB) 381639.319 5033948.683

30_CB-C 381482.314 5034277.558

31_(RYCB) 381634.571 5034343.916

32_(CB) 381592.282 5034362.433

33_(RYCB) 381584.351 5034358.98

4_(CB) 381722.756 5033971.115

5_(CB) 381719.48 5033978.741

8_(CB) 381742.356 5034021.942

9_(1)_(RYCB) 381734.544 5034018.593

CBMH_6_(RYCB) 381744.277 5033945.622

CBMH_7_(RYCB) 381785.825 5033999.81

Maj-15_2 381603.958 5034326.416

Maj-18_2 381633.162 5034339.352

Maj-19	381566.414	5034309.787
Maj-19_2	381591.329	5034320.821
Maj-20	381543.507	5034300.028
Maj-21	381484.13	5034275.264
Maj-23	381608.541	5034316.116
Maj-24	381621.369	5034287.602
Maj-25	381635.742	5034254.683
Maj-26	381580.14	5034232.354
Maj-27	381542.959	5034216.403
Maj-28	381537.056	5034166.519
Maj-29	381551.053	5034138.548
Maj-35	381565.153	5034106.298
Maj-36	381580.163	5034072.108
Maj-37	381594.925	5034037.548
Maj-38	381607.643	5034017.583
Maj-39	381627.215	5034016.832
Maj-40	381641.204	5034020.257
Maj-41	381691.979	5034042.051
Maj-44	381709.885	5034086.78
Maj-45	381722.3	5034055.107
Maj-46	381739.691	5034019.611
Maj-48_2	381781.911	5034001.184
Maj-50	381640.747	5033943.955
Maj-51	381672.455	5033954.949
Maj-52	381721.553	5033975.962
Maj-53	381753.038	5033988.761
Maj-56	381494.997	5034256.087
Maj-60	381528.438	5034203.658
RYCB_10	381442.319	5034298.46

RYCB_3_(RYCB) 381734.202 5033941.191

RYCB_6_(1)_(14)_(RYCB) 381748.325 5034086.133

RYCB_6_(1)_(15)_(RYCB) 381764.108 5034050.504

RYCB_6_(1)_(16)_(1)_(RYCB) 381504.046 5034155.002

RYCB_6_(1)_(16)_(2)_(RYCB) 381496.419 5034172.819

RYCB_6_(1)_(16)_(RYCB) 381510.902 5034139.24

RYCB_6_(1)_(17)_(RYCB) 381481.223 5034207.753

RYCB_6_(1)_(19)_(RYCB) 381637.075 5034217.32

RYCB_6_(1)_(2)_(1)_(RYCB) 381652.666 5033983.757

RYCB_6_(1)_(2)_(2)_(RYCB) 381633.371 5033978.954

RYCB_6_(1)_(2)_(RYCB) 381672.996 5033992.169

RYCB_6_(1)_(21)_(RYCB) 381642.665 5034324.923

RYCB_6_(1)_(22)_(RYCB) 381660.032 5034285.809

RYCB_6_(1)_(23)_(1)_(RYCB) 381540.082 5034252.461

RYCB_6_(1)_(23)_(2)_(RYCB) 381580.624 5034269.812

RYCB_6_(1)_(23)_(RYCB) 381560.408 5034261.179

RYCB_6_(1)_(24)_(RYCB) 381599.13 5034277.804

RYCB_6_(1)_(25)_(RYCB) 381495.849 5034321.044

RYCB_6_(1)_(26)_(RYCB) 381510.037 5034327.133

RYCB_6_(1)_(27)_(1)_(RYCB) 381550.359 5034344.355

RYCB_6_(1)_(27)_(RYCB) 381523.065 5034332.731

RYCB_6_(1)_(3)_(RYCB) 381581.795 5033976.053

RYCB_6_(1)_(4)_(RYCB) 381565.175 5034014.419

RYCB_6_(1)_(5)_(RYCB) 381547.662 5034054.776

RYCB_6_(1)_(6)_(RYCB) 381616.382 5034075.058

RYCB_6_(1)_(7)_(1)_(RYCB) 381647.239 5034060.747

RYCB_6_(1)_(7)_(RYCB) 381626.502 5034052.072

RYCB_6_(1)_(8)_(RYCB) 381667.469 5034069.361

RYCB_6_(1)_(RYCB) 381692.419 5034000.507

Slope1 381588.486 5034360.406

STM-247_(STM) 381785.753 5033999.773

STM-251_(STM) 381634.726 5034343.823

STM-Split 381525.758 5034204.922

STM-Split3 381784.268 5033898.453

Structure_-_(115)_(1)_(RYCB) 381574.635 5034190.459

Structure_-_(115)_(2)_(RYCB) 381594.914 5034199.197

Structure_-_(115)_(3)_(RYCB) 381620.112 5034209.907

Structure_-_(115)_(RYCB) 381544.063 5034177.384

Structure_-_(20)_(RYCB) 381474.067 5034224.19

Structure_-_(22)_(RYCB) 381506.998 5034238.2

Structure_-_(25)_(RYCB) 381530.407 5034094.432

Structure_-_(26)_(RYCB) 381529.161 5034097.261

Structure_-_(27)_(RYCB) 381526.967 5034102.206

Structure_-_(29)_(RYCB) 381674.723 5034252.795

Structure_-_(31)_(RYCB) 381468.715 5034309.368

Structure_-_(41)_(RYCB) 381578.806 5034356.559

Structure_-_(7)_(RYCB) 381502.626 5034236.326

TEE_1_(1)_(1)_(RYCB) 381700.573 5033926.894

TEE_3_(RYCB) 381612.277 5033977.722

TEE_4_(RYCB) 381781.005 5034010.848

TEE_5_(RYCB) 381699.781 5034083.118

TEE_6_(RYCB) 381725.556 5034014.74

2121_(STM) 381801.852 5033868.985

Maj-18 381637.356 5034341.21

Maj-22 381471.715 5034270.038

Maj-48 381786.497 5034003.157

Maj-49 381597.176 5033939.913

Maj-59 381784.088 5033896.145

[VERTICES]

;;Link X-Coord Y-Coord

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8_(STM) 381559.624 5034110.365

C2 381783.179 5033918.541

C27_1 381530.457 5034209.122

C27_2 381525.808 5034196.539

C31 381544.884 5034166.111

C58 381736.37 5034014.991

C60 381504.843 5034236.863

C60 381519.73 5034216.349

C60 381524.654 5034209.668

CB-10 381704.903 5034089.995

CB-12-C 381685.802 5034035.756

CB-13-C 381686.52 5034036.115

CB-14 381622.185 5034013.641

CB-15 381622.185 5034013.569

CB-16 381590.378 5034039.565

CB-17 381590.378 5034039.655

CB-18 381561.015 5034107.37

CB-19 381560.913 5034107.573

CB-2 381646.478 5033942.903

CB-20 381534.761 5034168.258

CB-21 381534.767 5034168.197

CB-22 381584.515 5034235.721

CB-23 381584.88 5034235.843

CB-25 381616.036 5034291.456

CB-26 381616.138 5034291.354

CB-27(1) 381560.371 5034309.161

CB-28 381562.638 5034314.574

CB-28 381560.176 5034309.091

CB-29 381481.036 5034274.715

CB-3 381646.22 5033942.852

CB-30 381481.141 5034274.662

CB-32 381584.728 5034362.597

CB-33 381584.676 5034362.636

CB-4 381726.802 5033973.355

CB-5 381728.108 5033973.863

CB-6 381764.779 5033954.239

CB-8 381735.291 5034021.224

CB-9 381735.323 5034021.364

RYCB-1 381614.266 5033939.735

RYCB-11 381704.989 5034090.043

RYCB-26 381559.658 5034110.697

RYCB-31 381635.327 5034344.004

RYCB-7 381786.26 5033999.955

[POLYGONS]

;;Subcatchment X-Coord Y-Coord

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A11 381626.891 5034348.37

A11 381632.397 5034350.995

A11 381637.626 5034339.378

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A12	381582.529	5034337.465
A12	381578.833	5034335.863
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A14	381472.789	5034268.144
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A15	381570.752	5034304.811
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A17	381621.236	5034263.558
A17	381617.344	5034261.848
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A17	381611.967	5034284.56
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A17	381590.391	5034319.127
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A17	381639.562	5034285.829
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A19	381657.393	5034245.146
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A19	381650.236	5034261.642
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A20	381539.469	5034223.832
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A21	381617.364	5034261.857

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A22	381507.271	5034235.073
A22	381520.172	5034217.548
A22	381516.384	5034212.572
A22	381502.03	5034232.078
A22	381492.228	5034254.985
A22	381497.521	5034257.481
A23	381517.339	5034181.269
A23	381495.8	5034171.958

A23	381472.748	5034224.605
A23	381464.973	5034243.267
A23	381480.449	5034249.957
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A23	381502.03	5034232.078
A23	381516.384	5034212.572
A23	381515.626	5034211.577
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A23	381514.784	5034209.884
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A25	381545.108	5034183.382
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C2	381448.951	5034280.33
C2	381448.951	5034280.33
C2	381464.597	5034287.094
C2	381480.443	5034249.954
C2	381464.797	5034243.19
C2	381448.951	5034280.33
S6	381710.636	5034062.278
S6	381723.666	5034076.008
S6	381733.168	5034080.19
S6	381736.862	5034071.819
S6	381741.019	5034062.402
S6	381723.329	5034054.567
S6	381714.18	5034058.229
S6	381710.636	5034062.278
S7	381743.781	5033974.131
S7	381739.978	5033983.001
S7	381786.165	5034002.801
S7	381790.062	5033993.97
S7	381743.781	5033974.131
S8	381691.086	5033946.31
S8	381724.733	5033960.767
S8	381733.678	5033939.879
S8	381699.904	5033925.456
S8	381691.086	5033946.31
S9	381658.03	5034243.911
S9	381676.037	5034252.206

S9 381694.117 5034211.846

S9 381748.988 5034087.15

S9 381733.168 5034080.19

S9 381723.666 5034076.008

S9 381710.636 5034062.278

S9 381709.474 5034063.632

S9 381699.763 5034084.175

S9 381626.97 5034053.08

S9 381615.884 5034078.292

S9 381594.866 5034069.14

S9 381590.23 5034068.687

S9 381544.327 5034176.339

S9 381641.338 5034218.013

S9 381631.832 5034240.483

S9 381658.03 5034243.911

[SYMBOLS]

;;Gage X-Coord Y-Coord

;;---------- ---------- ----------

[PROFILES]

;;Name Links

;;---------- ----------

"Profile 001. Junction RYCB_6_(1)_(19)_(RYCB) to Junction 108_(STM)" Pipe_-_(141)_(RYCB) Pipe_-_(142)_(RYCB) Pipe_-_(143)_(RYCB) Pipe_-_(144)_(RYCB) C31

"Profile 001. Junction RYCB_6_(1)_(19)_(RYCB) to Junction 108_(STM)" OR19 CB-21 15_(11)_(STM) 8_(STM) 9_(STM)

"Profile 001. Junction RYCB_6_(1)_(19)_(RYCB) to Junction 108_(STM)" 10_(STM) 11_(STM) 12_(STM) 13_(STM) STM-23_(STM)

"Profile 001. Junction RYCB_6_(1)_(19)_(RYCB) to Junction 108_(STM)" STM-24_(STM)

"Profile 002. Outfall Maj-01 to Junction STM-251_(STM)" C1_1 C1_2 C2_1 C2_2 OR1

"Profile 002. Outfall Maj-01 to Junction STM-251_(STM)" CB-43 15_(19)_(STM) 15_(20)_(STM) 15_(21)_(STM) 15_(22)_(STM)

"Profile 002. Outfall Maj-01 to Junction STM-251_(STM)" 15_(14)_(STM) 15_(15)_(STM) 15_(16)_(STM) 4_(STM) STM-83_(STM)

"Profile 003. Junction RYCB_6_(1)_(9)_(RYCB) to Junction 112_(STM)" Pipe_-_(145)_(RYCB) Pipe_-_(146)_(RYCB) Pipe_-_(147)_(RYCB) Pipe_-_(148)_(RYCB) Pipe_-_(10)_(RYCB)

"Profile 003. Junction RYCB_6_(1)_(9)_(RYCB) to Junction 112_(STM)" Pipe_-_(11)_(RYCB) OL1 15_(4)_(STM) 15_(5)_(STM)

"Profile 004. Junction RYCB_6_(1)_(13)_(RYCB) to Junction 104_(STM)" C50 Pipe_-_(99)_(RYCB) Pipe_-_(100)_(RYCB) C59 C50_2

"Profile 004. Junction RYCB_6_(1)_(13)_(RYCB) to Junction 104_(STM)" C55 OR44 CB-56

"Profile 005. Junction RYCB_6_(1)_(21)_(RYCB) to Junction 144_(STM)" Pipe_-_(110)_(RYCB) Pipe_-_(111)_(RYCB) Pipe_-_(19)_(RYCB) C27 C24

"Profile 005. Junction RYCB_6_(1)_(21)_(RYCB) to Junction 144_(STM)" OR15 CB-26

"Profile 006. Junction Maj-04 to Junction 164_(STM)" C4_1 C4_2 C5_1 C5_2 C6_2

"Profile 006. Junction Maj-04 to Junction 164_(STM)" OR4 CB-41

"Profile 007. Junction RYCB_6_(1)_(24)_(RYCB) to Junction 136_(STM)" Pipe_-_(114)_(RYCB) Pipe_-_(150)_(RYCB) Pipe_-_(151)_(RYCB) Pipe_-_(152)_(RYCB) Pipe_-_(14)_(RYCB)

"Profile 007. Junction RYCB_6_(1)_(24)_(RYCB) to Junction 136_(STM)" Pipe_-_(15)_(RYCB) 15_(10)_(STM)_2

"Profile 008. Junction RYCB_6_(1)_(31)_(RYCB) to Junction 150_(STM)" Pipe_-_(123)_(RYCB) Pipe_-_(124)_(RYCB) Pipe_-_(125)_(RYCB) Pipe_-_(23)_(RYCB) CB-35

"Profile 008. Junction RYCB_6_(1)_(31)_(RYCB) to Junction 150_(STM)" 3_(STM)

"Profile 009. Junction RYCB_6_(1)_(6)_(RYCB) to Junction 114_(STM)" Pipe_-_(96)_(RYCB) Pipe_-_(137)_(RYCB) Pipe_-_(138)_(RYCB) Pipe_-_(98)_(RYCB) Pipe_-_(9)_(RYCB)

"Profile 009. Junction RYCB_6_(1)_(6)_(RYCB) to Junction 114_(STM)" RYCB-11

"Profile 010. Junction Maj-34_2 to Junction 128_(STM)" C18_7 C32 OR23 CB-47 7_(STM)

"Profile 010. Junction Maj-34_2 to Junction 128_(STM)" 7_(1)_(STM)

"Profile 011. Junction Maj-19 to Junction 144_(STM)" C20 C21 OR46 CB-30 15_(12)_(STM)

"Profile 011. Junction Maj-19 to Junction 144_(STM)" 15_(13)_(STM)

"Profile 012. Junction RYCB_6_(1)_(26)_(RYCB) to Junction 150_(STM)" Pipe_-_(117)_(RYCB) Pipe_-_(118)_(RYCB) Pipe_-_(165)_(RYCB) Pipe_-_(25)_(RYCB) CB-33

"Profile 013. Junction Maj-11 to Junction 152_(STM)" C13 OR8 CB-54 1_(STM) 2_(STM)

"Profile 014. Junction RYCB_6_(1)_(36)_(RYCB) to Junction 162_(STM)" Pipe_-_(126)_(RYCB) Pipe_-_(127)_(RYCB) Pipe_-_(128)_(RYCB) Pipe_-_(74)_(RYCB) RYCB-52

"Profile 015. Junction Maj-07 to Junction 162_(STM)" C7 C8 C9 OR5 CB-39

"Profile 016. Junction RYCB_6_(1)_(2)_(1)_(RYCB) to Junction 108_(STM)" Pipe_-_(139)_(RYCB) Pipe_-_(140)_(RYCB) Pipe_-_(27)_(RYCB) RYCB-1 STM-28_(STM)

"Profile 017. Junction TEE_2_(2)_(RYCB) to Outfall 2121_(STM)" Pipe_-_(159)_(RYCB) Pipe_-_(160)_(RYCB) Pipe_-_(1)_(RYCB) Pipe_-_(4)_(RYCB) STM-34_(1)_(STM)_2

"Profile 018. Junction RYCB_6_(1)_(3)_(RYCB) to Junction 128_(STM)" Pipe_-_(93)_(RYCB) Pipe_-_(94)_(RYCB) Pipe_-_(95)_(RYCB) Pipe_-_(16)_(RYCB) RYCB-26

"Profile 019. Junction Maj-25 to Junction STM-Split" C25 OR16 CB-23 15_(9)_(STM) 15_(10)_(STM)_1

"Profile 020. Junction Maj-15 to Junction Maj-24" C18_3 C18_4 C19 C23

"Profile 021. Junction RYCB_6_(1)_(37)_(RYCB) to Junction 152_(STM)" Pipe_-_(129)_(RYCB) Pipe_-_(130)_(RYCB) Pipe_-_(22)_(RYCB) CB-31a

"Profile 022. Junction RYCB_6_(1)_(28)_(RYCB) to Junction 162_(STM)" Pipe_-_(120)_(RYCB) Pipe_-_(121)_(RYCB) Pipe_-_(77)_(RYCB) RYCB-34

"Profile 023. Junction RYCB_6_(1)_(2)_(RYCB) to Junction 112_(STM)" Pipe_-_(87)_(RYCB) Pipe_-_(88)_(RYCB) Pipe_-_(7)_(RYCB) CB-9

"Profile 024. Junction Maj-36 to Junction 116_(STM)" C38 OR28 CB-51 15_(3)_(STM)

"Profile 025. Junction TEE_1_(1)_(RYCB) to Junction STM-Split3" Pipe_-_(157)_(RYCB) Pipe_-_(158)_(RYCB) Pipe_-_(2)_(RYCB) Pipe_-_(3)_(RYCB)

"Profile 026. Junction RYCB_6_(1)_(40)_(RYCB) to Junction STM-251_(STM)" Pipe_-_(132)_(RYCB) Pipe_-_(133)_(RYCB) Pipe_-_(24)_(RYCB) RYCB-31

"Profile 027. Junction Maj-25 to Junction 132_(STM)" C29 OR25 CB-45 6_(STM)

"Profile 028. Junction Maj-55 to Junction STM-Split3" C1 OR51 CB-57 STM-34_(1)_(STM)_1

"Profile 029. Junction Maj-17 to Junction 158_(STM)" C11 OR10 CB-37

"Profile 030. Junction RYCB_6_(1)_(25)_(RYCB) to Junction 148_(STM)" Pipe_-_(119)_(RYCB) Pipe_-_(164)_(RYCB) RYCB-10

"Profile 031. Junction Maj-51 to Junction 106_(STM)" C53 OR42 CB-3

"Profile 032. Junction TEE_1_(1)_(1)_(RYCB) to Junction 104_(STM)" Pipe_-_(161)_(RYCB) Pipe_-_(5)_(RYCB) CB-6

"Profile 033. Junction Maj-40 to Junction 120_(STM)" C43 OR32 CB-13-C

"Profile 034. Junction Maj-38 to Junction 122_(STM)" C45 OR34 CB-15

"Profile 035. Junction RYCB_6_(1)_(16)_(1)_(RYCB) to Junction Structure_-_(26)_(RYCB)" Pipe_-_(153)_(RYCB) Pipe_-_(134)_(RYCB) Pipe_-_(17)_(RYCB)

"Profile 036. Junction Maj-29 to Junction 128_(STM)" C36 OR27 CB-19

"Profile 037. Junction Maj-31 to Junction 130_(STM)" C34 OR21 CB-49

"Profile 038. Junction RYCB_6_(1)_(16)_(2)_(RYCB) to Junction Structure_-_(7)_(RYCB)" Pipe_-_(154)_(RYCB) Pipe_-_(155)_(RYCB) Pipe_-_(156)_(RYCB)

"Profile 039. Junction Maj-19_2 to Junction 146_(STM)" C18_6 OR13 CB-28

"Profile 040. Junction Maj-53 to Junction 104_(STM)" C51 OR40 CB-5

"Profile 041. Junction TEE_4_(RYCB) to Junction 104_(STM)" Pipe_-_(6)_(RYCB) RYCB-7 STM-82_(STM)

"Profile 042. Junction RYCB_6_(1)_(13)_(RYCB) to Junction Structure_-_(17)_(RYCB)" Pipe_-_(101)_(RYCB) Pipe_-_(149)_(RYCB) Pipe_-_(103)_(RYCB)

"Profile 043. Junction Maj-36 to Junction 126_(STM)" C46 OR37 CB-17

"Profile 044. Junction Maj-21 to Junction Maj-28" C56 C60 C27_2

"Profile 045. Junction Maj-13 to Junction 35_(CB)" C16 OR50

"Profile 046. Junction Maj-45 to Junction 9_(1)_(RYCB)" C48 OR39

"Profile 047. Junction Maj-43 to Junction 11_(2)_(RYCB)" C40 OR31

"Profile 048. Outfall Maj-18 to Junction Maj-15_2" C18_8 C18_9

"Profile 049. Junction Maj-24 to Junction 144_(STM)" OR14 CB-25

"Profile 050. Junction Slope1 to Junction 150_(STM)" OR11 CB-32

"Profile 051. Junction Maj-12 to Junction 156_(STM)" OR7 CB-53

"Profile 052. Junction Maj-16 to Junction 158_(STM)" OR9 CB-36

"Profile 053. Junction Maj-10 to Junction 162_(STM)" OR6 CB-38

"Profile 054. Junction Maj-06_2 to Junction 164_(STM)" OR3 CB-40

"Profile 055. Junction Maj-03 to Junction 170_(STM)" OR2 CB-42

"Profile 056. Junction Maj-19 to Junction 146_(STM)" OR12 CB-27(1)

"Profile 057. Junction Maj-21 to Junction 148_(STM)" OR47 CB-29

"Profile 058. Junction Maj-50 to Junction 106_(STM)" OR43 CB-2

"Profile 059. Junction Maj-54 to Junction 104_(STM)" OR45 CB-55

"Profile 060. Junction Maj-52 to Junction 104_(STM)" OR41 CB-4

"Profile 061. Junction Maj-46 to Junction 112_(STM)" OR38 CB-8

"Profile 062. Junction Maj-44 to Junction 114_(STM)" OR30 CB-10

"Profile 063. Junction Maj-42 to Junction 118_(STM)" OR29 CB-50

"Profile 064. Junction Maj-41 to Junction 120_(STM)" OR33 CB-12-C

"Profile 065. Junction Maj-39 to Junction 122_(STM)" OR35 CB-14

"Profile 066. Junction Maj-37 to Junction 126_(STM)" OR36 CB-16

"Profile 067. Junction Maj-35 to Junction 128_(STM)" OR26 CB-18

"Profile 068. Junction Maj-30 to Junction 130_(STM)" OR20 CB-48

"Profile 069. Junction Maj-32 to Junction 132_(STM)" OR22 CB-46

"Profile 070. Junction Maj-33 to Junction 142_(STM)" OR24 CB-44

"Profile 071. Junction Maj-28 to Junction 136_(STM)" OR18 CB-20

"Profile 072. Junction Maj-26 to Junction 140_(STM)" OR17 CB-22

"Profile 073. Junction 104_(STM) to Junction 100_(STM)" 14_(STM) STM-34_(STM)

"Profile 074. Junction RYCB_6_(1)_(20)_(RYCB) to Junction Structure_-_(29)_(RYCB)" Pipe_-_(109)_(RYCB)

"Profile 075. Junction Maj-19_2 to Junction Maj-15_2" C18_5

"Profile 076. Junction RYCB_6_(1)_(40)_(RYCB) to Junction Structure_-_(35)_(RYCB)" Pipe_-_(131)_(RYCB)

"Profile 077. Junction RYCB_6_(1)_(30)_(RYCB) to Junction Structure_-_(132)_(RYCB)" Pipe_-_(122)_(RYCB)

"Profile 078. Storage B3_Stor to Junction 164_(STM)" B3-Out

"Profile 079. Storage B2_Stor to Junction 164_(STM)" B2-Out

"Profile 080. Storage B1_Stor to Junction 164_(STM)" B1-Out

"Profile 081. Junction RYCB_6_(1)_(25)_(2)_(RYCB) to Junction RYCB_10" Pipe_-_(162)_(RYCB)

"Profile 082. Junction RYCB_6_(1)_(3)_(RYCB) to Junction TEE_3_(RYCB)" Pipe_-_(89)_(RYCB)

"Profile 083. Storage B4_Stor to Junction 106_(STM)" B4-Out

"Profile 084. Junction Maj-55 to Junction Maj-54" C57

"Profile 085. Junction 134_(STM) to Junction 132_(STM)" STM-27_(STM)

"Profile 086. Junction Maj-27 to Junction Maj-60" C27_1

"Profile 087. Junction 31_(RYCB) to Junction Maj-18_2" C18

"Profile 088. Junction Slope1 to Junction 33_(RYCB)" OR48

"Profile 089. Junction Maj-15 to Junction Maj-14" C17

"Profile 090. Junction Structure_-_(12)_(RYCB) to Junction Maj-14" C4

"Profile 091. Junction Maj-14 to Junction 31a_(RYCB)" OR49

"Profile 092. Junction Maj-13 to Junction Maj-12" C14

"Profile 093. Junction Maj-15 to Junction Maj-16" C15

"Profile 094. Junction Maj-17 to Junction Maj-10" C10

"Profile 095. Junction Maj-11 to Junction Maj-09" C12

"Profile 096. Junction 52_(RYCB) to Junction Maj-08" C6

"Profile 097. Junction Maj-07 to Junction Maj-06_2" C6_1

"Profile 098. Storage B2_Stor to Junction Maj-06" B2-Outflow

"Profile 099. Junction Maj-04 to Junction Maj-03" C3

"Profile 100. Outfall Maj-22 to Junction Maj-21" C22

"Profile 101. Outfall Maj-49 to Junction Maj-50" C54

"Profile 102. Outfall Maj-48 to Junction Maj-48_2" C50_1

"Profile 103. Junction Maj-51 to Junction Maj-52" C52

"Profile 104. Junction Maj-53 to Junction Maj-46" C49

"Profile 105. Junction TEE_6_(RYCB) to Junction Maj-46" C58

"Profile 106. Junction Maj-45 to Junction Maj-44" C41

"Profile 107. Junction Maj-43 to Junction Maj-42" C39

"Profile 108. Junction Maj-45 to Junction Maj-41" C42

"Profile 109. Junction Maj-40 to Junction Maj-39" C44

"Profile 110. Junction Maj-38 to Junction Maj-37" C47

"Profile 111. Junction Maj-36 to Junction Maj-35" C37

"Profile 112. Junction Maj-29 to Junction Maj-30" C35

"Profile 113. Junction Maj-31 to Junction Maj-32" C33

"Profile 114. Junction 24_(RYCB) to Junction 142_(STM)" RYCB-24

"Profile 115. Junction Maj-34 to Junction Maj-33" C30

"Profile 116. Junction Maj-29 to Junction Maj-28" C28

"Profile 117. Junction STM-Split to Junction Maj-60" C5

"Profile 118. Junction Structure_-_(115)_(RYCB) to Junction 20_(CB)" Pipe_-_(73)_(RYCB)

"Profile 119. Junction 144_(STM) to Junction 140_(STM)" 5_(STM)

"Profile 120. Junction 142_(STM) to Junction 140_(STM)" STM-81_(STM)

"Profile 121. Junction Maj-27 to Junction Maj-26" C26

"Profile 122. Junction Maj-34_2 to Outfall Maj-57" C18_2

"Profile 123. Outfall Maj-59 to Junction Maj-58" C2

[Ultimate Conditions – BMR The Commons Input File]

;;Project Title/Notes

Base_Model_v1.5 from the Model Build (GIS) folder.

[OPTIONS]

;;Option Value

FLOW_UNITS CMS

INFILTRATION HORTON

FLOW_ROUTING DYNWAVE

LINK_OFFSETS ELEVATION

MIN_SLOPE 0

ALLOW_PONDING YES

SKIP_STEADY_STATE NO

START_DATE 01/01/2019

START_TIME 00:00:00

REPORT_START_DATE 01/01/2019

REPORT_START_TIME 00:00:00

END_DATE 01/02/2019

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 0.5

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 1.167

MAX_TRIALS 21

HEAD_TOLERANCE 0.0001

SYS_FLOW_TOL 5

LAT_FLOW_TOL 5

MINIMUM_STEP 0.5

THREADS 6

[EVAPORATION]

;;Data Source Parameters

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CONSTANT 0.0

DRY_ONLY NO

[RAINGAGES]

;;Name Format Interval SCF Source

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002yrChicago3hr INTENSITY 0:10 1.0 TIMESERIES 002yrChicago3hr

002YrSCS24 INTENSITY 0:10 1.0 TIMESERIES 002YrSCS24

005yrChicago3hr INTENSITY 0:10 1.0 TIMESERIES 005yrChicago3hr

005YrSCS24 INTENSITY 0:10 1.0 TIMESERIES 005YrSCS24

010yrChicago3hr INTENSITY 0:10 1.0 TIMESERIES 010yrChicago3hr

010YrSCS24 INTENSITY 0:10 1.0 TIMESERIES 010YrSCS24

025yrChicago3hr INTENSITY 0:10 1.0 TIMESERIES 025yrChicago3hr

025YrSCS24 INTENSITY 0:10 1.0 TIMESERIES 025YrSCS24

050yrChicago3hr INTENSITY 0:10 1.0 TIMESERIES 050yrChicago3hr

050YrSCS24 INTENSITY 0:10 1.0 TIMESERIES 050YrSCS24

100yrChicago3hr INTENSITY 0:10 1.0 TIMESERIES 100yrChicago3hr

100yrChicago3hr+20% INTENSITY 0:10 1.0 TIMESERIES 100yrChicago3hr+20%

100YrSCS12hr INTENSITY 0:15 1.0 TIMESERIES 100YrSCS12hr

100YrSCS24 INTENSITY 0:10 1.0 TIMESERIES 100YrSCS24

100YrSCS24+20% INTENSITY 0:10 1.0 TIMESERIES 100YrSCS24+20%

1979July01 INTENSITY 0:05 1.0 TIMESERIES 1979July01

1988Aug04 INTENSITY 0:05 1.0 TIMESERIES 1988Aug04

1996Aug08 INTENSITY 0:05 1.0 TIMESERIES 1996Aug08

25mmChicago4Hr INTENSITY 0:10 1.0 TIMESERIES 25mmChicago4Hr

2YrSCS12hr INTENSITY 0:15 1.0 TIMESERIES 2YrSCS12hr

5YrSCS12hr INTENSITY 0:15 1.0 TIMESERIES 5YrSCS12hr

No_Rain INTENSITY 0:01 1.0 TIMESERIES No_Rain

[SUBCATCHMENTS]

;;Name Rain Gage Outlet Area %Imperv Width %Slope CurbLen SnowPack

;;---------- ---------- ---------- -------- -------- -------- -------- -------- ----------

A1 100yrChicago3hr Maj-03 0.3314 60.725 22.244 0.307 0

A10 100yrChicago3hr Structure_-_(12)_(RYCB) 0.3679 50 35.133 0.386 0

A11 100yrChicago3hr Slope1 0.2575 69.915 24.312 0.231 0

A12 100yrChicago3hr Structure_-_(41)_(RYCB) 0.2851 50.168 37.125 0.144 0

A13 100yrChicago3hr RYCB_10 0.3898 41.86 53.081 0.883 0

A14 100yrChicago3hr Maj-21 0.4228 70.28 41.049 0.686 0

A15 100yrChicago3hr Maj-19 0.096 70.28 40.921 0.686 0

A16 100yrChicago3hr Structure_-_(39)_(RYCB) 0.1244 54.198 18.14 1.096 0

A17 100yrChicago3hr Maj-24 0.2419 61.404 22.641 0.346 0

A18 100yrChicago3hr Structure_-_(29)_(RYCB) 0.2563 52.344 20.018 0.51 0

A19	100yrChicago3hr	24_(RYCB)	0.042	69.048	23.234	0.555	0
A2	100yrChicago3hr	Maj-06_2	0.2419	59.917	20.203	0.265	0
A20	100yrChicago3hr	Maj-26	0.2502	62.8	25.022	0.298	0
A21	100yrChicago3hr	Structure_-_(7)_(RYCB)	0.4795	55.324	41.326	0.419	0
A22	100yrChicago3hr	Structure_-_(7)_(RYCB)	0.0284	28.571	6.174	4.719	0
A23	100yrChicago3hr	Structure_-_(7)_(RYCB)	0.2269	60.987	29.719	0.577	0
A24	100yrChicago3hr	Maj-28	0.2358	61.111	25.921	0.284	0
A25	100yrChicago3hr	Structure_-_(115)_(RYCB)	0.4572	56.478	42.966	0.521	0
A26	100yrChicago3hr	Maj-33	0.1489	60.417	20.112	0.03	0
A27	100yrChicago3hr	Maj-32	0.165	64.151	21.53	0.248	0
A28	100yrChicago3hr	Maj-30	0.18	61.714	27.611	0.523	0
A29	100yrChicago3hr	Structure_-_(27)_(RYCB)	0.1843	60.326	23.741	0.348	0
A3	100yrChicago3hr	RYCB_6_(1)_(36)_(RYCB)	0.2114	51.659	19.122	0.12	0
A30	100yrChicago3hr	26_(RYCB)	0.0141	50	5.974	1.2	0
A31	100yrChicago3hr	Structure_-_(25)_(RYCB)	0.2889	61.938	22.424	0.292	0
A32	100yrChicago3hr	Maj-35	0.1808	61.875	24.71	0.18	0
A33	100yrChicago3hr	Maj-37	0.155	62.581	25.096	0.465	0
A34	100yrChicago3hr	Maj-39	0.0904	59.756	26.348	0.662	0
A35	100yrChicago3hr	Maj-41	0.2254	63.556	24.772	0.078	0
A36	100yrChicago3hr	Maj-42	0.3259	61.922	28.065	0.348	0
A37	100yrChicago3hr	TEE_9_(RYCB)	0.4162	58.542	40.498	0.733	0
A38	100yrChicago3hr	Structure_-_(17)_(RYCB)	0.0287	31.034	6.239	0.492	0
A39	100yrChicago3hr	RYCB_6_(1)_(12)_(RYCB)	0.3191	61.939	21.147	0.003	0
A4	100yrChicago3hr	Maj-10	0.323	64.706	26.482	0.179	0
A40	100yrChicago3hr	Maj-44	0.2386	62.13	31.172	0.237	0
A41	100yrChicago3hr	TEE_5_(RYCB)	0.4644	57.229	45.087	0.788	0
A42	100yrChicago3hr	Maj-46	0.2381	58.242	23.285	0.197	0
A43	100yrChicago3hr	TEE_6_(RYCB)	0.3468	58.205	41.479	0.114	0
A44	100yrChicago3hr	TEE_3_(RYCB)	0.288	61.716	42.223	0.009	0

A45 100yrChicago3hr Maj-50 0.195 60.112 25.306 0.059 0

A46 100yrChicago3hr Maj-52 0.2199 63.587 30.12 0.054 0

A47 100yrChicago3hr TEE_4_(RYCB) 0.1603 56.757 25.19 0.58 0

A48 100yrChicago3hr Maj-54 0.1665 67.47 17.147 0.26 0

A49 100yrChicago3hr RYCB_3_(RYCB) 0.1137 56 30.961 1.501 0

A5 100yrChicago3hr Structure_-_(132)_(RYCB) 0.1763 49.099 15.697 0.202 0

A50 100yrChicago3hr Maj-55 0.0531 54.717 20.245 0.957 0

A51 100yrChicago3hr Maj-58 0.0995 72 41.965 0.685 0

A52 100yrChicago3hr CBMH_17_(RYCB) 0.0212 19.048 9.02 0.937 0

A53 100yrChicago3hr TEE_1_(RYCB) 0.2444 63.115 20.139 0.041 0

A54 100yrChicago3hr TEE_2_(RYCB) 0.238 58.403 20.674 0.504 0

A6 100yrChicago3hr Maj-16 0.423 66.667 33.886 0.242 0

A7 100yrChicago3hr Maj-12 0.372 66.398 35.522 0.141 0

A8 100yrChicago3hr Maj-14 0.2059 62.051 28.418 0.323 0

A9 100yrChicago3hr Structure_-_(35)_(RYCB) 0.2608 42.146 24.881 2.355 0

;5-year capture and 100-year on-site storage

B1 100yrChicago3hr B1_Stor 0.9923 86 169.879 1.955 0

;5-year capture and 100-year on-site storage

B2 100yrChicago3hr B2_Stor 3.4322 100 279.041 1 0

;5-year capture and 100-year on-site storage

B3 100yrChicago3hr B3_Stor 1.0071 86 116.226 1.356 0

B4 100yrChicago3hr B4_Stor 1.002 7 67.253 0.51 0

C1 100yrChicago3hr Maj-01 0.1144 53.509 20.92 0.779 0

C2 100yrChicago3hr Maj-22 0.0688 67.606 40.636 1.801 0

C3 100yrChicago3hr Maj-34_2 0.0197 50 21.992 7.699 0

[SUBAREAS]

;;Subcatchment N-Imperv N-Perv S-Imperv S-Perv PctZero RouteTo PctRouted

;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------

A1	0.013	0.25	1.57	4.67	25	OUTLET	
A10	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A11	0.013	0.25	1.57	4.67	25	OUTLET	
A12	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A13	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A14	0.013	0.25	1.57	4.67	25	OUTLET	
A15	0.013	0.25	1.57	4.67	25	OUTLET	
A16	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A17	0.013	0.25	1.57	4.67	25	OUTLET	
A18	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A19	0.013	0.25	1.57	4.67	25	OUTLET	
A2	0.013	0.25	1.57	4.67	25	OUTLET	
A20	0.013	0.25	1.57	4.67	25	OUTLET	
A21	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A22	0.013	0.25	1.57	4.67	25	OUTLET	
A23	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A24	0.013	0.25	1.57	4.67	25	OUTLET	
A25	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A26	0.013	0.25	1.57	4.67	25	OUTLET	
A27	0.013	0.25	1.57	4.67	25	OUTLET	
A28	0.013	0.25	1.57	4.67	25	OUTLET	
A29	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A3	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A30	0.013	0.25	1.57	4.67	25	OUTLET	
A31	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A32	0.013	0.25	1.57	4.67	25	OUTLET	
A33	0.013	0.25	1.57	4.67	25	OUTLET	
A34	0.013	0.25	1.57	4.67	25	OUTLET	
A35	0.013	0.25	1.57	4.67	25	OUTLET	

A36	0.013	0.25	1.57	4.67	25	OUTLET	
A37	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A38	0.013	0.25	1.57	4.67	25	OUTLET	
A39	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A4	0.013	0.25	1.57	4.67	25	OUTLET	
A40	0.013	0.25	1.57	4.67	25	OUTLET	
A41	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A42	0.013	0.25	1.57	4.67	25	OUTLET	
A43	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A44	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A45	0.013	0.25	1.57	4.67	25	OUTLET	
A46	0.013	0.25	1.57	4.67	25	OUTLET	
A47	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A48	0.013	0.25	1.57	4.67	25	OUTLET	
A49	0.013	0.25	1.57	4.67	25	OUTLET	
A5	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A50	0.013	0.25	1.57	4.67	25	OUTLET	
A51	0.013	0.25	1.57	4.67	25	OUTLET	
A52	0.013	0.25	1.57	4.67	25	OUTLET	
A53	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A54	0.013	0.25	1.57	4.67	25	PERVIOUS	100
A6	0.013	0.25	1.57	4.67	25	OUTLET	
A7	0.013	0.25	1.57	4.67	25	OUTLET	
A8	0.013	0.25	1.57	4.67	25	OUTLET	
A9	0.013	0.25	1.57	4.67	25	PERVIOUS	100
B1	0.013	0.25	1.57	4.67	25	OUTLET	
B2	0.013	0.25	1.57	4.67	25	OUTLET	
B3	0.013	0.25	1.57	4.67	25	OUTLET	
B4	0.013	0.25	1.57	4.67	25	PERVIOUS	100

C1 0.013 0.25 1.57 4.67 25 OUTLET

C2 0.013 0.25 1.57 4.67 25 OUTLET

C3 0.013 0.25 1.57 4.67 25 OUTLET

[INFILTRATION]

;;Subcatchment Param1 Param2 Param3 Param4 Param5

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A1 76.2 13.2 4.14 7 0

A10 76.2 13.2 4.14 7 0

A11 76.2 13.2 4.14 7 0

A12 76.2 13.2 4.14 7 0

A13 76.2 13.2 4.14 7 0

A14 76.2 13.2 4.14 7 0

A15 76.2 13.2 4.14 7 0

A16 76.2 13.2 4.14 7 0

A17 76.2 13.2 4.14 7 0

A18 76.2 13.2 4.14 7 0

A19 76.2 13.2 4.14 7 0

A2 76.2 13.2 4.14 7 0

A20 76.2 13.2 4.14 7 0

A21 76.2 13.2 4.14 7 0

A22 76.2 13.2 4.14 7 0

A23 76.2 13.2 4.14 7 0

A24 76.2 13.2 4.14 7 0

A25 76.2 13.2 4.14 7 0

A26 76.2 13.2 4.14 7 0

A27 76.2 13.2 4.14 7 0

A28 76.2 13.2 4.14 7 0

A29 76.2 13.2 4.14 7 0

A3	76.2	13.2	4.14	7	0
A30	76.2	13.2	4.14	7	0
A31	76.2	13.2	4.14	7	0
A32	76.2	13.2	4.14	7	0
A33	76.2	13.2	4.14	7	0
A34	76.2	13.2	4.14	7	0
A35	76.2	13.2	4.14	7	0
A36	76.2	13.2	4.14	7	0
A37	76.2	13.2	4.14	7	0
A38	76.2	13.2	4.14	7	0
A39	76.2	13.2	4.14	7	0
A4	76.2	13.2	4.14	7	0
A40	76.2	13.2	4.14	7	0
A41	76.2	13.2	4.14	7	0
A42	76.2	13.2	4.14	7	0
A43	76.2	13.2	4.14	7	0
A44	76.2	13.2	4.14	7	0
A45	76.2	13.2	4.14	7	0
A46	76.2	13.2	4.14	7	0
A47	76.2	13.2	4.14	7	0
A48	76.2	13.2	4.14	7	0
A49	76.2	13.2	4.14	7	0
A5	76.2	13.2	4.14	7	0
A50	76.2	13.2	4.14	7	0
A51	76.2	13.2	4.14	7	0
A52	76.2	13.2	4.14	7	0
A53	76.2	13.2	4.14	7	0
A54	76.2	13.2	4.14	7	0
A6	76.2	13.2	4.14	7	0

A7 76.2 13.2 4.14 7 0

A8 76.2 13.2 4.14 7 0

A9 76.2 13.2 4.14 7 0

B1 76.2 13.2 4.14 7 0

B2 76.2 13.2 4.14 7 0

B3 76.2 13.2 4.14 7 0

B4 76.2 13.2 4.14 7 0

C1 76.2 13.2 4.14 7 0

C2 76.2 13.2 4.14 7 0

C3 76.2 13.2 4.14 7 0

[JUNCTIONS]

;;Name Elevation MaxDepth InitDepth SurDepth Aponded

;;---------- ---------- ---------- ---------- ---------- ----------

;Mcon-CBMH

1_(RYCB) 86.327 1.486 0 0 1

;Mcon-CB

10_(CB) 86.17 1.98 0 0 0

;Mcon MH - Concentric

100_(STM) 80.705 6.797 0 0 0

;Mcon MH - Concentric

102_(STM) 81.641 5.902 0 0 0

;Mcon MH - Concentric

104_(STM) 81.683 5.941 0 0 0

;Mcon MH - Concentric

106_(STM) 83.52 4.143 0 0 0

;Mcon MH - Concentric

108_(STM) 83.839 3.664 0 0 0

;Mcon-CB

11_(CB) 86.321 1.829 0 0 0

;Mcon MH - Concentric

110_(STM) 84.236 3.513 0 0 0

;Mcon MH - Concentric

112_(STM) 82.13 5.796 0 0 0

;Mcon MH - Concentric

114_(STM) 83.666 4.334 0 0 0

;Mcon MH - Concentric

116_(STM) 83.801 4.374 0 0 0

;Mcon MH - Concentric

118_(STM) 84.18 4.247 0 0 0

;Mcon-CB

12_(CB) 85.943 2.297 0 0 0

;Mcon MH - Concentric

120_(STM) 82.918 5.078 0 0 0

;Mcon MH - Concentric

122_(STM) 82.977 5.136 0 0 0

;Mcon MH - Concentric

124_(STM) 83.071 5.124 0 0 0

;Mcon MH - Concentric

126_(STM) 83.188 5.336 0 0 0

;Mcon MH - Concentric

128_(STM) 83.35 5.304 0 0 0

;Mcon-CB

13_(CB) 86.093 2.147 0 0 0

;Mcon MH - Concentric

130_(STM) 84.418 4.627 0 0 0

;Mcon MH - Concentric

132_(STM) 84.559 4.586 0 0 0

;Mcon MH - Concentric

134_(STM) 85.104 4.157 0 0 0

;Mcon MH - Concentric

136_(STM) 83.485 5.195 0 0 0

;Mcon MH - Concentric

138_(STM) 83.569 5.227 0 0 0

;Mcon-CB

14_(CB) 86.101 2.299 0 0 0

;Mcon MH - Concentric

140_(STM) 83.915 5.293 0 0 0

;Mcon MH - Concentric

142_(STM) 85.034 4.126 0 0 0

;Mcon MH - Concentric

144_(STM) 84.367 5.102 0 0 0

;Mcon MH - Concentric

146_(STM) 85.209 3.915 0 0 0

;Mcon MH - Concentric

148_(STM) 85.555 2.924 0 0 0

;Mcon-CB

15_(CB) 86.251 2.149 0 0 0

;Mcon MH - Concentric

150_(STM) 84.679 5.116 0 0 0

;Mcon MH - Concentric

152_(STM) 85.562 4.438 0 0 0

;Mcon MH - Concentric

154_(STM) 85.653 4.438 0 0 0

;Mcon MH - Concentric

156_(STM) 86.028 4.25 0 0 0

;Mcon MH - Concentric

158_(STM) 85.207 4.859 0 0 0

;Mcon-CB

16_(CB) 86.312 2.298 0 0 0

;Mcon MH - Concentric

160_(STM) 85.289 4.873 0 0 0

;Mcon MH - Concentric

162_(STM) 85.648 4.655 0 0 0

;Mcon MH - Concentric

164_(STM) 85.903 6.097 0 0 0

;Mcon MH - Concentric

166_(STM) 86.465 3.959 0 0 0

;Mcon MH - Concentric

168_(STM) 86.804 3.586 0 0 0

;Mcon-CB

17_(CB) 86.316 2.294 0 0 0

;Mcon MH - Concentric

170_(STM) 87.358 3.697 0 0 0

;Mcon-CB

18_(CB) 86.433 2.297 0 0 0

;Mcon-CB

19_(CB) 86.436 2.294 0 0 0

;Mcon-CB

2_(CB) 85.9 2.14 0 0 0

;Mcon-CB

20_(CB) 86.721 2.219 0 0 0

;Mcon-CB

21_(CB) 86.642 2.298 0 0 0

;Mcon-CB

22_(CB) 86.923 2.297 0 0 0

;Mcon-CB

23_(CB) 87.073 2.147 0 0 0

;Mcon-CB

24_(RYCB) 87.683 2.307 0 0 1

;Mcon-CB

25_(CB) 87.223 2.297 0 0 0

;Mcon-CB

26_(CB) 87.223 2.297 0 0 0

;Mcon-CBMH

26_(RYCB) 86.075 2.254 0 0 1

;Mcon-CB

27_(CB) 87.729 2.261 0 0 0

;Mcon-CB

28_(CB) 86.7 3.29 0 0 0

;Mcon-CB

29_(CB) 86.775 2.435 0 0 0

;Mcon-CB

3_(CB) 85.9 2.14 0 0 0

;Mcon-CB

30_CB-C 86.72 2.49 0 0 0

;Mcon-CBMH

31_(RYCB) 88.539 1.901 0 0 1

;Mcon-CB

31a_(RYCB) 88.283 1.787 0 0 1

;Mcon-CB

32_(CB) 86.93 3.234 0 0 0

;Mcon-CB

33_(CB) 87.65 2.514 0 0 0

;Mcon-CB

34_(RYCB) 87.378 2.481 0 0 1

;Mcon-CB

35_(CB) 87.773 2.297 0 0 0

;Mcon-CB

36_(CB) 87.807 2.213 0 0 0

;Mcon-CB

37_(CB) 87.807 2.213 0 0 0

;Mcon-CB

38_(CB) 88.405 1.975 0 0 0

;Mcon-CB

39_(CB) 88.092 2.288 0 0 0

;Mcon-CB

4_(CB) 85.899 2.071 0 0 0

;Mcon-CB

40_(CB) 88.526 2.194 0 0 0

;Mcon-CB

41_(CB) 88.425 2.295 0 0 0

;Mcon-CB

42_(CB) 88.599 2.291 0 0 0

;Mcon-CB

43_(CB) 89.355 1.535 0 0 0

;Mcon-CB

44_(CB) 87.221 2.279 0 0 0

;Mcon-CB

45_(CB) 87.221 2.279 0 0 0

;Mcon-CB

46_(CB) 87.184 2.306 0 0 0

;Mcon-CB

47_(CB) 87.334 2.156 0 0 0

;Mcon-CB

48_(CB) 86.685 2.235 0 0 0

;Mcon-CB

49_(CB) 86.835 2.085 0 0 0

;Mcon-CB

5_(CB) 85.899 2.071 0 0 0

;Mcon-CB

50_(CB) 86.03 2.47 0 0 0

;Mcon-CB

51_(CB) 86.06 2.44 0 0 0

;Closed

52_(RYCB) 88.671 2.279 0 0 1

;Mcon-CB

53_(CB) 88.008 2.252 0 0 0

;Mcon-CB

54_(CB) 87.962 2.298 0 0 0

;Mcon-CB

55_(CB) 85.571 2.289 0 0 0

;Mcon-CB

56_(CB) 85.57 2.29 0 0 0

57_CB 85.56 2.21 0 0 0

;Closed CB

6_(RYCB) 86.19 1.201 0 0 1

;Mcon-CBMH

7_(RYCB) 86.36 1.467 0 0 1

;Mcon-CB

8_(CB) 85.736 2.284 0 0 0

;Mcon-CB

9_(CB) 86.261 1.759 0 0 1

;Mcon-CBMH

CBMH_16_(RYCB) 85.505 2.08 0 0 1

;Mcon-CBMH

CBMH_17_(RYCB) 85.778 1.807 0 0 1

Maj-01_2 90.921 0.6 0 0 0

Maj-02 90.68 0.6 0 0 0

Maj-02_2 90.44 0.6 0 0 0

;LP

Maj-03 90.29 0.6 0 0 0

;HP

Maj-04 90.62 0.6 0 0 0

Maj-04_2 90.53 0.6 0 0 0

Maj-05 90.41 0.6 0 0 0

Maj-05_2 90.39 0.6 0 0 0

Maj-06 90.24 0.6 0 0 0

;LP

Maj-06_2 90.12 0.6 0 0 0

;HP

Maj-07 90.29 0.6 0 0 0

;LP

Maj-08 90.15 0.6 0 0 0

Maj-09 89.846 0.6 0 0 0

;LP

Maj-10 89.78 0.6 0 0 0

;HP

Maj-11 90.12 0.6 0 0 0

;LP

Maj-12 89.66 0.6 0 0 0

;HP

Maj-13 90.01 0.6 0 0 0

;LP

Maj-14 89.47 0.6 0 0 0

;HP

Maj-15 89.77 0.6 0 0 0

Maj-15_2 89.414 0.6 0 0 0

;LP

Maj-16 89.42 0.6 0 0 0

;HP

Maj-17 90.08 0.6 0 0 0

Maj-18_2 89.533 0.617 0 0 0

Maj-19 89.39 0.6 0 0 0

;HP

Maj-19_2 89.62 0.6 0 0 0

Maj-20 89.17 0.6 0 0 0

;LP

Maj-21 88.61 0.6 0 0 0

Maj-23 89.22 0.6 0 0 0

;LP

Maj-24 88.92 0.6 0 0 0

;HP

Maj-25 89.17 0.6 0 0 0

;LP

Maj-26 88.62 0.6 0 0 0

;HP

Maj-27 88.88 0.6 0 0 0

;LP

Maj-28 88.34 0.6 0 0 0

;HP

Maj-29 88.61 0.6 0 0 0

;LP

Maj-30 88.32 0.6 0 0 0

;HP

Maj-31 89.03 0.6 0 0 0

;LP

Maj-32 88.89 0.6 0 0 0

;LP

Maj-33 88.9 0.6 0 0 0

Maj-34 89.05 0.6 0 0 0

;HP

Maj-34_2 89.2 0.6 0 0 0

;LP

Maj-35 88.13 0.6 0 0 0

;HP

Maj-36 88.48 0.6 0 0 0

;LP

Maj-37 88.01 0.6 0 0 0

;HP

Maj-38 88.21 0.6 0 0 0

;LP

Maj-39 87.8 0.6 0 0 0

;HP

Maj-40 88 0.6 0 0 0

Maj-41 87.64 0.6 0 0 0

;LP

Maj-42 87.9 0.6 0 0 0

;HP

Maj-43 88.11 0.6 0 0 0

;LP

Maj-44 87.55 0.6 0 0 0

;HP

Maj-45 87.9 0.6 0 0 0

;LP

Maj-46 87.42 0.6 0 0 0

Maj-48_2 87.755 0.625 0 0 0

;LP

Maj-50 87.44 0.6 0 0 0

;HP

Maj-51 87.74 0.6 0 0 0

;LP

Maj-52 87.37 0.6 0 0 0

Maj-53 87.6 0.6 0 0 0

;LP

Maj-54 87.26 0.6 0 0 0

;HP

Maj-55 87.52 0.6 0 0 0

;Overland Major Spill Point

Maj-56 88.5 0.6 0 0 0

;LP

Maj-58 87.17 0.6 0 0 0

;Spill Point

Maj-60 88.697 0.6 0 0 0

;Mcon-CBMH

RYCB_10 87.33 1.399 0 0 1

;Mcon-CBMH

RYCB_3_(RYCB) 86.3 1.01 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(10)_(1)_(RYCB) 87.05 1.177 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(10)_(RYCB) 87.17 1.142 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(11)_(RYCB) 86.92 1.231 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(12)_(1)_(RYCB) 86.344 1.801 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(12)_(RYCB) 86.28 1.777 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(13)_(RYCB) 86.684 1.611 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(14)_(RYCB) 86.85 1.613 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(15)_(RYCB) 86.65 1.225 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(16)_(1)_(RYCB) 87.072 1.008 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(16)_(2)_(RYCB) 87.35 0.998 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(16)_(RYCB) 86.89 1.011 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(17)_(RYCB) 87.15 1.037 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(19)_(RYCB) 87.9 1.002 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(2)_(1)_(RYCB) 86.78 1.005 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(2)_(2)_(RYCB) 86.65 1.06 0 0 1

;CBMH

RYCB_6_(1)_(2)_(RYCB) 86.62 1.008 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(20)_(RYCB) 88.36 1.003 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(21)_(RYCB) 88.3 1.003 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(22)_(RYCB) 88.08 1.01 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(23)_(1)_(RYCB) 87.57 1.184 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(23)_(2)_(RYCB) 87.84 1.002 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(23)_(RYCB) 87.69 1.014 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(24)_(RYCB) 87.95 1.011 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(25)_(2)_(RYCB) 87.5 0.956 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(25)_(RYCB) 87.86 1.001 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(26)_(RYCB) 88.08 1 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(27)_(1)_(RYCB) 87.83 1.246 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(27)_(RYCB) 87.99 1.02 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(28)_(RYCB) 87.85 1.005 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(29)_(RYCB) 87.77 1.018 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(3)_(RYCB) 86.83 1.03 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(30)_(RYCB) 87.88 1.001 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(31)_(RYCB) 88.98 1.004 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(32)_(RYCB) 88.69 1.019 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(33)_(RYCB) 88.53 1.099 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(34)_(RYCB) 88.94 1.365 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(35)_(RYCB) 89.13 1.186 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(36)_(RYCB) 89.29 1.009 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(37)_(RYCB) 88.84 1.002 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(38)_(RYCB) 88.6 1.219 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(39)_(RYCB) 88.82 1.002 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(4)_(RYCB) 86.55 1.009 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(40)_(RYCB) 88.95 1.001 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(5)_(RYCB) 86.32 1.506 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(6)_(RYCB) 87.1 1.009 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(7)_(1)_(RYCB) 86.64 1.1 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(7)_(RYCB) 86.76 1.081 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(8)_(RYCB) 86.52 1.198 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(9)_(RYCB) 87.27 1.032 0 0 1

;Mcon-CBMH

RYCB_6_(1)_(RYCB) 86.51 1.138 0 0 1

Slope1 89.564 0.6 0 0 0

;Null Structure

STM-247_(STM) 86.3 1.527 0 0 0

;Null Structure

STM-251_(STM) 85.609 4.04 0 0 0

;88.747

STM-Split 83.538 6.262 0 0 0

;Dummy

STM-Split3 80.665 6.767 0 0 0

Structure-(18) 85.879 1.984 0 0 1

;Mcon-CBMH

Structure_-_(115)_(1)_(RYCB) 87.47 1.135 0 0 1

;Mcon-CBMH

Structure_-_(115)_(2)_(RYCB) 87.59 1.031 0 0 1

;Mcon-CBMH

Structure_-_(115)_(3)_(RYCB) 87.74 1.017 0 0 1

;Mcon-CBMH

Structure_-_(115)_(RYCB) 87.27 1.93 0 0 1

;Mcon-CBMH

Structure_-_(12)_(RYCB) 88.3 2.05 0 0 1

;CB-LANDSCAPE

Structure_-_(132)_(RYCB) 87.54 1.508 0 0 1

;CB-LANDSCAPE

Structure_-_(15)_(RYCB) 88.7 1.554 0 0 1

;Mcon-CBMH

Structure_-_(17)_(RYCB) 86.064 2.039 0 0 1

;CB-LANDSCAPE

Structure_-_(20)_(RYCB) 87 1.29 0 0 1

;CB-LANDSCAPE

Structure_-_(22)_(RYCB) 87.38 1.247 0 0 1

;CB-LANDSCAPE

Structure_-_(25)_(RYCB) 86.09 1.934 0 0 1

;CB-LANDSCAPE

Structure_-_(27)_(RYCB) 86.68 1.367 0 0 1

;Mcon-CBMH

Structure_-_(29)_(RYCB) 87.84 1.152 0 0 1

;Mcon-CBMH

Structure_-_(31)_(RYCB) 87.7 1.013 0 0 1

;Mcon-CBMH

Structure_-_(35)_(RYCB) 88.44 1.414 0 0 1

;Mcon-CBMH

Structure_-_(39)_(RYCB) 88.58 1.084 0 0 1

;Mcon-CBMH

Structure_-_(41)_(RYCB) 87.675 1.448 0 0 1

;Mcon-CBMH

Structure_-_(7)_(RYCB) 86.795 1.805 0 0 1

;CB-LANDSCAPE

TEE_1_(1)_(1)_(RYCB) 86.51 0.992 0 0 1

;CB-LANDSCAPE

TEE_1_(1)_(RYCB) 86.02 1.018 0 0 1

;CB-LANDSCAPE

TEE_1_(2)_(RYCB) 85.8 1.586 0 0 1

;CB-LANDSCAPE

TEE_1_(RYCB) 85.61 1.591 0 0 1

;CB-LANDSCAPE

TEE_2_(1)_(RYCB) 85.98 1.194 0 0 1

;CB-LANDSCAPE

TEE_2_(2)_(RYCB) 86.28 1.017 0 0 1

;CB-LANDSCAPE

TEE_2_(RYCB) 85.92 1.237 0 0 1

;Mcon-CBMH

TEE_3_(RYCB) 86.48 1.172 0 0 1

;Mcon-CBMH

TEE_4_(RYCB) 86.42 1.98 0 0 1

;Mcon-CBMH

TEE_5_(RYCB) 86.344 1.313 0 0 1

;TEE

TEE_6_(RYCB) 86.31 1.94 0 0 1

;CB-LANDSCAPE

TEE_9_(RYCB) 86.78 1.449 0 0 1

[OUTFALLS]

;;Name Elevation Type Stage Data Gated Route To

;;---------- ---------- ---------- ---------- -------- ----------

;Mcon MH - Concentric

2121_(STM) 80.276 TIMESERIES MH-2121-100YrCHI3Hr NO

Maj-01 91.07 FREE NO

;HP

Maj-18 89.55 FREE NO

Maj-22 88.7 FREE NO

;HP

Maj-48 87.78 FREE NO

;HP

Maj-49 87.79 FREE NO

Maj-57 89.07 FREE NO

Maj-59 87.6 FREE NO

[STORAGE]

;;Name Elev. MaxDepth InitDepth Shape Curve Name/Params N/A Fevap Psi Ksat IMD

;;---------- -------- ---------- ---------- ---------- ---------- -------- -------- -------- --------

B1_Stor 90.5 1.5 0 FUNCTIONAL 383 0 0 0 0

B2_Stor 90.5 1.5 0 TABULAR UHAL_Onsite 0 0

B3_Stor 90.5 1.5 0 FUNCTIONAL 368 0 0 0 0

B4_Stor 90.5 1.5 0 FUNCTIONAL 55 0 0 0 0

[CONDUITS]

;;Name From Node To Node Length Roughness InOffset OutOffset InitFlow MaxFlow

;;---------- ---------- ---------- ---------- ---------- ---------- ---------- ---------- ----------

;Mcon Circular Conc. Pipe

1_(STM) 156_(STM) 154_(STM) 100.711 0.013 86.028 85.68 0 0

;Mcon Circular Conc. Pipe

10_(STM) 124_(STM) 122_(STM) 16.861 0.013 83.071 82.987 0 0

;Mcon Circular Conc. Pipe

11_(STM) 122_(STM) 120_(STM) 24.63 0.013 82.977 82.928 0 0

;Mcon Circular Conc. Pipe

12_(STM) 120_(STM) 112_(STM) 91.577 0.013 82.918 82.735 0 0

;Mcon Circular Conc. Pipe

13_(STM) 112_(STM) 104_(STM) 73.806 0.013 82.13 81.983 0 0

;Mcon Circular Conc. Pipe

14_(STM) 104_(STM) 102_(STM) 41.857 0.013 81.683 81.641 0 0

;Mcon Circular Conc. Pipe

15_(10)_(STM)_1 138_(STM) STM-Split 6.264 0.013 83.569 83.538 0 0

;Mcon Circular Conc. Pipe

15_(10)_(STM)_2 STM-Split 136_(STM) 8.522 0.013 83.538 83.495 0 0

;Mcon Circular Conc. Pipe

15_(11)_(STM) 136_(STM) 128_(STM) 62.502 0.013 83.485 83.36 0 0

;Mcon Circular Conc. Pipe

15_(12)_(STM) 148_(STM) 146_(STM) 78.544 0.013 85.555 85.359 0 0

;Mcon Circular Conc. Pipe

15_(13)_(STM) 146_(STM) 144_(STM) 78.667 0.013 85.209 85.012 0 0

;Mcon Circular Conc. Pipe

15_(14)_(STM) 162_(STM) 160_(STM) 106.281 0.013 85.648 85.299 0 0

;Mcon Circular Conc. Pipe

15_(15)_(STM) 160_(STM) 158_(STM) 14.297 0.013 85.289 85.217 0 0

;Mcon Circular Conc. Pipe

15_(16)_(STM) 158_(STM) 150_(STM) 108.026 0.013 85.207 84.829 0 0

;Mcon Circular Conc. Pipe

15_(19)_(STM) 170_(STM) 168_(STM) 93.894 0.013 87.358 87.029 0 0

;Mcon Circular Conc. Pipe

15_(20)_(STM) 168_(STM) 166_(STM) 101.151 0.013 86.804 86.475 0 0

;Mcon Circular Conc. Pipe

15_(21)_(STM) 166_(STM) 164_(STM) 29.241 0.013 86.465 86.353 0 0

;Mcon Circular Conc. Pipe

15_(22)_(STM) 164_(STM) 162_(STM) 60.141 0.013 85.903 85.658 0 0

;Ipex PVC DR 35

15_(3)_(STM) 118_(STM) 116_(STM) 99.633 0.013 84.18 83.831 0 0

;Mcon Circular Conc. Pipe

15_(4)_(STM) 116_(STM) 114_(STM) 11.938 0.013 83.801 83.741 0 0

;Mcon Circular Conc. Pipe

15_(5)_(STM) 114_(STM) 112_(STM) 64.643 0.013 83.666 83.44 0 0

;Mcon Circular Conc. Pipe

15_(9)_(STM) 140_(STM) 138_(STM) 113.122 0.013 83.915 83.63 0 0

;Mcon Circular Conc. Pipe

2_(STM) 154_(STM) 152_(STM) 12.573 0.013 85.653 85.59 0 0

;Mcon Circular Conc. Pipe

3_(STM) 152_(STM) 150_(STM) 59.353 0.013 85.562 85.354 0 0

;Mcon Circular Conc. Pipe

4_(STM) 150_(STM) 144_(STM) 76.296 0.013 84.679 84.412 0 0

;Mcon Circular Conc. Pipe

5_(STM) 144_(STM) 140_(STM) 77.329 0.013 84.367 84.1 0 0

;Ipex PVC DR 35

6_(STM) 142_(STM) 132_(STM) 53.44 0.013 85.207 84.859 0 0

;Mcon Circular Conc. Pipe

7_(1)_(STM) 130_(STM) 128_(STM) 88.34 0.013 84.418 84.109 0 0

;Mcon Circular Conc. Pipe

7_(STM) 132_(STM) 130_(STM) 37.407 0.013 84.559 84.428 0 0

;Mcon Circular Conc. Pipe

8_(STM) 128_(STM) 126_(STM) 75.982 0.013 83.35 83.198 0 0

;Mcon Circular Conc. Pipe

9_(STM) 126_(STM) 124_(STM) 53.404 0.013 83.188 83.081 0 0

B2-Outflow B2_Stor Maj-06 19.504 0.035 90.8 90.24 0 0

C1 Maj-55 Maj-58 15.736 0.01 87.52 87.17 0 0

C1_1 Maj-01 Maj-01_2 15.296 0.01 91.07 90.921 0 0

C1_2 Maj-01_2 Maj-02 24.816 0.01 90.921 90.68 0 0

C10 Maj-17 Maj-10 54.682 0.01 90.08 89.78 0 0

C11 Maj-17 Maj-16 86.734 0.01 90.08 89.42 0 0

C12 Maj-11 Maj-09 10.987 0.01 90.12 89.846 0 0

C13 Maj-11 Maj-12 60.306 0.01 90.12 89.66 0 0

C14 Maj-13 Maj-12 46.489 0.01 90.01 89.66 0 0

C15 Maj-15 Maj-16 38.838 0.01 89.77 89.42 0 0

C16 Maj-13 Maj-14 44.234 0.01 90.01 89.47 0 0

C17 Maj-15 Maj-14 29.277 0.01 89.77 89.47 0 0

;Maj RY Spill Point

C18 31_(RYCB) Maj-18_2 4.776 0.035 89.84 89.55 0 0

C18_2 Maj-34_2 Maj-57 7.803 0.01 89.2 89.07 0 0

C18_3 Maj-15 Slope1 36.415 0.01 89.77 89.564 0 0

C18_4 Slope1 Maj-15_2 37.347 0.01 89.564 89.414 0 0

C18_5 Maj-19_2 Maj-15_2 13.813 0.01 89.62 89.414 0 0

C18_6 Maj-19_2 Maj-19 27.25 0.01 89.62 89.39 0 0

C18_7 Maj-34_2 Maj-34 28.133 0.01 89.2 89.05 0 0

C18_8 Maj-18 Maj-18_2 5 0.01 89.55 89.533 0 0

C18_9 Maj-18_2 Maj-15_2 31.942 0.01 89.533 89.414 0 0

C19 Maj-15_2 Maj-23 11.274 0.01 89.414 89.22 0 0

C2 Maj-59 Maj-58 33.787 0.01 87.6 87.17 0 0

C2_1 Maj-02 Maj-02_2 25.364 0.01 90.68 90.44 0 0

C2_2 Maj-02_2 Maj-03 14.602 0.01 90.44 90.29 0 0

C20 Maj-19 Maj-20 24.9 0.01 89.39 89.17 0 0

C21 Maj-20 Maj-21 64.337 0.01 89.17 88.61 0 0

C22 Maj-22 Maj-21 13.47 0.01 88.7 88.61 0 0

C23 Maj-23 Maj-24 31.267 0.01 89.22 88.92 0 0

C24	Maj-25	Maj-24	35.922	0.01	89.17	88.92	0	0
C25	Maj-25	Maj-26	59.92	0.01	89.17	88.62	0	0
C26	Maj-27	Maj-26	40.459	0.01	88.88	88.62	0	0
;Maj RY Spill Point								
C27	24_(RYCB)	Maj-25	17.828	0.035	89.3	89.17	0	0
C27_1	Maj-27	Maj-60	20.292	0.01	88.88	88.697	0	0
C27_2	Maj-60	Maj-28	39.649	0.01	88.697	88.34	0	0
C28	Maj-29	Maj-28	31.279	0.01	88.61	88.34	0	0
C29	Maj-25	Maj-33	47.188	0.01	89.17	88.9	0	0
C3	Maj-04	Maj-03	70.051	0.01	90.62	90.29	0	0
C30	Maj-34	Maj-33	24.584	0.01	89.05	88.9	0	0
;Maj RY Spill Point								
C31	Structure_-_(115)_(RYCB)	Maj-28	19.142	0.035	88.6	88.34	0	0
C32	Maj-34	Maj-32	25.871	0.01	89.05	88.89	0	0
C33	Maj-31	Maj-32	22.994	0.01	89.03	88.89	0	0
C34	Maj-31	Maj-30	47.52	0.01	89.03	88.32	0	0
C35	Maj-29	Maj-30	27.889	0.01	88.61	88.32	0	0
C36	Maj-29	Maj-35	35.198	0.01	88.61	88.13	0	0
C37	Maj-36	Maj-35	37.341	0.01	88.48	88.13	0	0
C38	Maj-36	Maj-42	75.802	0.01	88.48	87.9	0	0
C39	Maj-43	Maj-42	39.792	0.01	88.11	87.9	0	0
;Maj RY Spill Point								
C4	Structure_-_(12)_(RYCB)	Maj-14	13.065	0.035	89.7	89.47	0	0
C4_1	Maj-04	Maj-04_2	15.06	0.01	90.62	90.53	0	0
C4_2	Maj-04_2	Maj-05	20.639	0.01	90.53	90.41	0	0
C40	Maj-43	Maj-44	41.644	0.01	88.11	87.55	0	0
C41	Maj-45	Maj-44	34.02	0.01	87.9	87.55	0	0
C42	Maj-45	Maj-41	33.014	0.01	87.9	87.64	0	0
C43	Maj-40	Maj-41	55.256	0.01	88	87.64	0	0

C44 Maj-40 Maj-39 14.403 0.01 88 87.8 0 0

C45 Maj-38 Maj-39 19.588 0.01 88.21 87.8 0 0

C46 Maj-36 Maj-37 37.582 0.01 88.48 88.01 0 0

C47 Maj-38 Maj-37 23.672 0.01 88.21 88.01 0 0

C48 Maj-45 Maj-46 39.529 0.01 87.9 87.42 0 0

C49 Maj-53 Maj-46 33.614 0.01 87.6 87.42 0 0

;RY Maj Spill Point

C5 STM-Split Maj-60 2.964 0.035 88.8 88.697 0 0

C5_1 Maj-05 Maj-05_2 4.665 0.01 90.41 90.39 0 0

C5_2 Maj-05_2 Maj-06 24.629 0.01 90.39 90.24 0 0

;RY Maj System Spill Point

C50 RYCB_6_(1)_(13)_(RYCB) RYCB_6_(1)_(14)_(RYCB) 31.256 0.01 87.694 87.862 0 0

C50_1 Maj-48 Maj-48_2 5 0.01 87.78 87.755 0 0

C50_2 Maj-48_2 Maj-53 31.434 0.01 87.755 87.6 0 0

C51 Maj-53 Maj-52 33.988 0.01 87.6 87.37 0 0

C52 Maj-51 Maj-52 53.407 0.01 87.74 87.37 0 0

C53 Maj-51 Maj-50 33.561 0.01 87.74 87.44 0 0

C54 Maj-49 Maj-50 43.76 0.01 87.79 87.44 0 0

C55 Maj-53 Maj-54 22.82 0.01 87.6 87.26 0 0

C56 Maj-21 Maj-56 22.042 0.035 88.61 88.5 0 0

C57 Maj-55 Maj-54 42.124 0.01 87.52 87.26 0 0

;Maj RY Spill Point

C58 TEE_6_(RYCB) Maj-46 16.507 0.035 87.65 87.42 0 0

;Maj RY Spill Point

C59 TEE_4_(RYCB) Maj-48_2 9.706 0.035 87.8 87.755 0 0

;Maj RY Spill Point

C6 52_(RYCB) Maj-08 6.432 0.035 90.35 90.15 0 0

C6_1 Maj-07 Maj-06_2 34.136 0.01 90.29 90.12 0 0

C6_2 Maj-06 Maj-06_2 20.238 0.01 90.24 90.12 0 0

;Major System Overland Spillway

C60 Maj-56 Maj-60 62.349 0.035 88.5 88.697 0 0

C7 Maj-07 Maj-08 17.171 0.01 90.29 90.15 0 0

C8 Maj-08 Maj-09 40.633 0.01 90.15 89.846 0 0

C9 Maj-09 Maj-10 8.974 0.01 89.846 89.78 0 0

;HDPE Pipe SI

Pipe_-_(1)_(RYCB) TEE_2_(RYCB) CBMH_17_(RYCB) 28.44 0.013 85.92 85.778 0 0

;HDPE Pipe SI

Pipe_-_(10)_(RYCB) TEE_9_(RYCB) Structure_-_(17)_(RYCB) 4.029 0.013 86.78 86.76 0 0

;HDPE Pipe SI

Pipe_-_(100)_(RYCB) RYCB_6_(1)_(15)_(RYCB) TEE_4_(RYCB) 43.107 0.013 86.65 86.434 0 0

;HDPE Pipe SI

Pipe_-_(101)_(RYCB) RYCB_6_(1)_(13)_(RYCB) RYCB_6_(1)_(12)_(1)_(RYCB) 58.135 0.013 86.684 86.393 0 0

;HDPE Pipe SI

Pipe_-_(103)_(RYCB) RYCB_6_(1)_(12)_(RYCB) Structure_-_(17)_(RYCB) 33.287 0.013 86.28 86.114 0 0

;HDPE Pipe SI

Pipe_-_(109)_(RYCB) RYCB_6_(1)_(20)_(RYCB) Structure_-_(29)_(RYCB) 42.608 0.013 88.36 88.147 0 0

;HDPE Pipe SI

Pipe_-_(11)_(RYCB) Structure_-_(17)_(RYCB) Structure-(18) 37.715 0.013 86.064 85.879 0 0

;HDPE Pipe SI

Pipe_-_(110)_(RYCB) RYCB_6_(1)_(21)_(RYCB) RYCB_6_(1)_(22)_(RYCB) 42.797 0.013 88.3 88.086 0 0

;HDPE Pipe SI

Pipe_-_(111)_(RYCB) RYCB_6_(1)_(22)_(RYCB) Structure_-_(29)_(RYCB) 36.137 0.013 88.08 87.899 0 0

;HDPE Pipe SI

Pipe_-_(114)_(RYCB) RYCB_6_(1)_(24)_(RYCB) RYCB_6_(1)_(23)_(2)_(RYCB) 20.158 0.013 87.95 87.849 0 0

;HDPE Pipe SI

Pipe_-_(117)_(RYCB) RYCB_6_(1)_(26)_(RYCB) RYCB_6_(1)_(27)_(RYCB) 14.18 0.013 88.08 88.009 0 0

;HDPE Pipe SI

Pipe_-_(118)_(RYCB) RYCB_6_(1)_(27)_(RYCB) RYCB_6_(1)_(27)_(1)_(RYCB) 29.667 0.013 87.99 87.842 0 0

;HDPE Pipe SI

Pipe_-_(119)_(RYCB) RYCB_6_(1)_(25)_(RYCB) Structure_-_(31)_(RYCB) 29.541 0.013 87.86 87.712 0 0

;HDPE Pipe SI

Pipe_-_(120)_(RYCB) RYCB_6_(1)_(28)_(RYCB) RYCB_6_(1)_(29)_(RYCB) 13.487 0.013 87.85 87.783 0 0

;HDPE Pipe SI

Pipe_-_(121)_(RYCB) RYCB_6_(1)_(29)_(RYCB) Structure_-_(132)_(RYCB) 35.693 0.013 87.77 87.592 0 0

;HDPE Pipe SI

Pipe_-_(122)_(RYCB) RYCB_6_(1)_(30)_(RYCB) Structure_-_(132)_(RYCB) 34.874 0.013 87.88 87.706 0 0

;HDPE Pipe SI

Pipe_-_(123)_(RYCB) RYCB_6_(1)_(31)_(RYCB) RYCB_6_(1)_(32)_(RYCB) 27.685 0.013 88.98 88.703 0 0

;HDPE Pipe SI

Pipe_-_(124)_(RYCB) RYCB_6_(1)_(32)_(RYCB) RYCB_6_(1)_(33)_(RYCB) 29.407 0.013 88.69 88.543 0 0

;HDPE Pipe SI

Pipe_-_(125)_(RYCB) RYCB_6_(1)_(33)_(RYCB) Structure_-_(12)_(RYCB) 39.401 0.013 88.53 88.333 0 0

;HDPE Pipe SI

Pipe_-_(126)_(RYCB) RYCB_6_(1)_(36)_(RYCB) RYCB_6_(1)_(35)_(RYCB) 30.532 0.013 89.29 89.137 0 0

;HDPE Pipe SI

Pipe_-_(127)_(RYCB) RYCB_6_(1)_(35)_(RYCB) RYCB_6_(1)_(34)_(RYCB) 35.766 0.013 89.13 88.951 0 0

;HDPE Pipe SI

Pipe_-_(128)_(RYCB) RYCB_6_(1)_(34)_(RYCB) Structure_-_(15)_(RYCB) 32.604 0.013 88.94 88.777 0 0

;HDPE Pipe SI

Pipe_-_(129)_(RYCB) RYCB_6_(1)_(37)_(RYCB) RYCB_6_(1)_(38)_(RYCB) 47.077 0.013 88.84 88.605 0 0

;HDPE Pipe SI

Pipe_-_(130)_(RYCB) RYCB_6_(1)_(38)_(RYCB) Structure_-_(35)_(RYCB) 21.116 0.013 88.6 88.494 0 0

;HDPE Pipe SI

Pipe_-_(131)_(RYCB) RYCB_6_(1)_(40)_(RYCB) Structure_-_(35)_(RYCB) 21.232 0.013 88.95 88.844 0 0

;HDPE Pipe SI

Pipe_-_(132)_(RYCB) RYCB_6_(1)_(40)_(RYCB) RYCB_6_(1)_(39)_(RYCB) 21.03 0.013 88.95 88.845 0 0

;HDPE Pipe SI

Pipe_-_(133)_(RYCB) RYCB_6_(1)_(39)_(RYCB) Structure_-_(39)_(RYCB) 46.601 0.013 88.82 88.587 0 0

;HDPE Pipe SI

Pipe_-_(134)_(RYCB) RYCB_6_(1)_(16)_(RYCB) Structure_-_(27)_(RYCB) 40.37 0.013 86.89 86.688 0 0

;HDPE Pipe SI

Pipe_-_(137)_(RYCB) RYCB_6_(1)_(7)_(RYCB) RYCB_6_(1)_(7)_(1)_(RYCB) 22.479 0.013 86.76 86.648 0 0

;HDPE Pipe SI

Pipe_-_(138)_(RYCB) RYCB_6_(1)_(7)_(1)_(RYCB) RYCB_6_(1)_(8)_(RYCB) 21.988 0.013 86.64 86.53 0 0

;HDPE Pipe SI

Pipe_-_(139)_(RYCB) RYCB_6_(1)_(2)_(1)_(RYCB) RYCB_6_(1)_(2)_(2)_(RYCB) 19.884 0.013 86.78 86.681 0 0

;HDPE Pipe SI

Pipe_-_(14)_(RYCB) Structure_-_(22)_(RYCB) Structure_-_(7)_(RYCB) 4.758 0.013 87.38 87.356 0 0

;HDPE Pipe SI

Pipe_-_(140)_(RYCB) RYCB_6_(1)_(2)_(2)_(RYCB) TEE_3_(RYCB) 21.13 0.013 86.65 86.544 0 0

;HDPE Pipe SI

Pipe_-_(141)_(RYCB) RYCB_6_(1)_(19)_(RYCB) Structure_-_(115)_(3)_(RYCB) 18.513 0.013 87.9 87.752 0 0

;HDPE Pipe SI

Pipe_-_(142)_(RYCB) Structure_-_(115)_(3)_(RYCB) Structure_-_(115)_(2)_(RYCB) 27.381 0.013 87.74 87.603 0 0

;HDPE Pipe SI

Pipe_-_(143)_(RYCB) Structure_-_(115)_(2)_(RYCB) Structure_-_(115)_(1)_(RYCB) 22.082 0.013 87.59 87.48 0 0

;HDPE Pipe SI

Pipe_-_(144)_(RYCB) Structure_-_(115)_(1)_(RYCB) Structure_-_(115)_(RYCB) 33.251 0.013 87.47 87.304 0 0

;HDPE Pipe SI

Pipe_-_(145)_(RYCB) RYCB_6_(1)_(9)_(RYCB) RYCB_6_(1)_(10)_(RYCB) 18.496 0.013 87.27 87.178 0 0

;HDPE Pipe SI

Pipe_-_(146)_(RYCB) RYCB_6_(1)_(10)_(RYCB) RYCB_6_(1)_(10)_(1)_(RYCB) 21.927 0.013 87.17 87.06 0 0

;HDPE Pipe SI

Pipe_-_(147)_(RYCB) RYCB_6_(1)_(10)_(1)_(RYCB) RYCB_6_(1)_(11)_(RYCB) 23.151 0.013 87.05 86.934 0 0

;HDPE Pipe SI

Pipe_-_(148)_(RYCB) RYCB_6_(1)_(11)_(RYCB) TEE_9_(RYCB) 26.342 0.013 86.92 86.788 0 0

;HDPE Pipe SI

Pipe_-_(149)_(RYCB) RYCB_6_(1)_(12)_(1)_(RYCB) RYCB_6_(1)_(12)_(RYCB) 12.115 0.013 86.344 86.284 0 0

;HDPE Pipe SI

Pipe_-_(15)_(RYCB) Structure_-_(7)_(RYCB) STM-Split 39.005 0.013 86.795 86.475 0 0

;HDPE Pipe SI

Pipe_-_(150)_(RYCB) RYCB_6_(1)_(23)_(2)_(RYCB) RYCB_6_(1)_(23)_(RYCB) 21.983 0.013 87.84 87.73 0 0

;HDPE Pipe SI

Pipe_-_(151)_(RYCB) RYCB_6_(1)_(23)_(RYCB) RYCB_6_(1)_(23)_(1)_(RYCB) 22.117 0.013 87.69 87.579 0 0

;HDPE Pipe SI

Pipe_-_(152)_(RYCB) RYCB_6_(1)_(23)_(1)_(RYCB) Structure_-_(22)_(RYCB) 36.028 0.013 87.57 87.39 0 0

;HDPE Pipe SI

Pipe_-_(153)_(RYCB) RYCB_6_(1)_(16)_(1)_(RYCB) RYCB_6_(1)_(16)_(RYCB) 17.188 0.013 87.072 86.9 0 0

;HDPE Pipe SI

Pipe_-_(154)_(RYCB) RYCB_6_(1)_(16)_(2)_(RYCB) RYCB_6_(1)_(17)_(RYCB) 38.097 0.013 87.35 87.16 0 0

;HDPE Pipe SI

Pipe_-_(155)_(RYCB) RYCB_6_(1)_(17)_(RYCB) Structure_-_(20)_(RYCB) 17.928 0.013 87.15 87.06 0 0

;HDPE Pipe SI

Pipe_-_(156)_(RYCB) Structure_-_(20)_(RYCB) Structure_-_(7)_(RYCB) 31.031 0.013 87 86.845 0 0

;HDPE Pipe SI

Pipe_-_(157)_(RYCB) TEE_1_(1)_(RYCB) TEE_1_(2)_(RYCB) 33.301 0.013 86.02 85.853 0 0

;HDPE Pipe SI

Pipe_-_(158)_(RYCB) TEE_1_(2)_(RYCB) TEE_1_(RYCB) 35.309 0.013 85.8 85.623 0 0

;HDPE Pipe SI

Pipe_-_(159)_(RYCB) TEE_2_(2)_(RYCB) TEE_2_(1)_(RYCB) 57.985 0.013 86.28 85.99 0 0

;HDPE Pipe SI

Pipe_-_(16)_(RYCB) Structure_-_(25)_(RYCB) 26_(RYCB) 3.089 0.013 86.09 86.075 0 0

;HDPE Pipe SI

Pipe_-_(160)_(RYCB) TEE_2_(1)_(RYCB) TEE_2_(RYCB) 10.146 0.013 85.98 85.929 0 0

;HDPE Pipe SI

Pipe_-_(161)_(RYCB) TEE_1_(1)_(1)_(RYCB) RYCB_3_(RYCB) 36.543 0.013 86.51 86.327 0 0

;HDPE Pipe SI

Pipe_-_(162)_(RYCB) RYCB_6_(1)_(25)_(2)_(RYCB) RYCB_10 33.015 0.013 87.5 87.33 0 0

;HDPE Pipe SI

Pipe_-_(164)_(RYCB) Structure_-_(31)_(RYCB) RYCB_10 28.561 0.013 87.7 87.557 0 0

;HDPE Pipe SI

Pipe_-_(165)_(RYCB) RYCB_6_(1)_(27)_(1)_(RYCB) Structure_-_(41)_(RYCB) 30.956 0.013 87.83 87.675 0 0

;HDPE Pipe SI

Pipe_-_(17)_(RYCB) Structure_-_(27)_(RYCB) 26_(RYCB) 5.409 0.013 86.68 86.653 0 0

;HDPE Pipe SI

Pipe_-_(19)_(RYCB) Structure_-_(29)_(RYCB) 24_(RYCB) 31.338 0.013 87.84 87.683 0 0

;HDPE Pipe SI

Pipe_-_(2)_(RYCB) TEE_1_(RYCB) CBMH_16_(RYCB) 20.915 0.013 85.61 85.505 0 0

;HDPE Pipe SI

Pipe_-_(22)_(RYCB) Structure_-_(35)_(RYCB) 31a_(RYCB) 31.317 0.013 88.44 88.283 0 0

;HDPE Pipe SI

Pipe_-_(23)_(RYCB) Structure_-_(12)_(RYCB) 35_(CB) 11.395 0.013 88.3 88.243 0 0

;HDPE Pipe SI

Pipe_-_(24)_(RYCB) Structure_-_(39)_(RYCB) 31_(RYCB) 8.187 0.013 88.58 88.539 0 0

;HDPE Pipe SI

Pipe_-_(25)_(RYCB) Structure_-_(41)_(RYCB) 33_(CB) 6.05 0.013 87.68 87.65 0 0

;HDPE Pipe SI

Pipe_-_(27)_(RYCB) TEE_3_(RYCB) 1_(RYCB) 30.601 0.013 86.48 86.327 0 0

;HDPE Pipe SI

Pipe_-_(3)_(RYCB) CBMH_16_(RYCB) STM-Split3 2.343 0.013 85.505 85.493 0 0

;HDPE Pipe SI

Pipe_-_(4)_(RYCB) CBMH_17_(RYCB) STM-Split3 4.656 0.013 85.83 85.78 0 0

;HDPE Pipe SI

Pipe_-_(5)_(RYCB) RYCB_3_(RYCB) 6_(RYCB) 11.006 0.013 86.3 86.19 0 0

;HDPE Pipe SI

Pipe_-_(6)_(RYCB) TEE_4_(RYCB) 7_(RYCB) 12.045 0.013 86.42 86.36 0 0

;HDPE Pipe SI

Pipe_-_(7)_(RYCB) TEE_6_(RYCB) 9_(CB) 9.779 0.013 86.31 86.261 0 0

;HDPE Pipe SI

Pipe_-_(73)_(RYCB) Structure_-_(115)_(RYCB) 20_(CB) 9.658 0.013 87.27 87.222 0 0

;HDPE Pipe SI

Pipe_-_(74)_(RYCB) Structure_-_(15)_(RYCB) 52_(RYCB) 5.744 0.013 88.7 88.671 0 0

;HDPE Pipe SI

Pipe_-_(77)_(RYCB) Structure_-_(132)_(RYCB) 34_(RYCB) 32.434 0.013 87.54 87.378 0 0

;HDPE Pipe SI

Pipe_-_(87)_(RYCB) RYCB_6_(1)_(2)_(RYCB) RYCB_6_(1)_(RYCB) 21.137 0.013 86.62 86.515 0 0

;HDPE Pipe SI

Pipe_-_(88)_(RYCB) RYCB_6_(1)_(RYCB) TEE_6_(RYCB) 36.066 0.013 86.51 86.33 0 0

;HDPE Pipe SI

Pipe_-_(89)_(RYCB) RYCB_6_(1)_(3)_(RYCB) TEE_3_(RYCB) 30.529 0.013 86.83 86.677 0 0

;HDPE Pipe SI

Pipe_-_(9)_(RYCB) TEE_5_(RYCB) 11_(CB) 5.75 0.013 86.35 86.321 0 0

;HDPE Pipe SI

Pipe_-_(93)_(RYCB) RYCB_6_(1)_(3)_(RYCB) RYCB_6_(1)_(4)_(RYCB) 41.813 0.013 86.83 86.621 0 0

;HDPE Pipe SI

Pipe_-_(94)_(RYCB) RYCB_6_(1)_(4)_(RYCB) RYCB_6_(1)_(5)_(RYCB) 43.994 0.013 86.55 86.33 0 0

;HDPE Pipe SI

Pipe_-_(95)_(RYCB) RYCB_6_(1)_(5)_(RYCB) Structure_-_(25)_(RYCB) 43.249 0.013 86.32 86.104 0 0

;HDPE Pipe SI

Pipe_-_(96)_(RYCB) RYCB_6_(1)_(6)_(RYCB) RYCB_6_(1)_(7)_(RYCB) 25.115 0.013 87.1 86.82 0 0

;HDPE Pipe SI

Pipe_-_(98)_(RYCB) RYCB_6_(1)_(8)_(RYCB) TEE_5_(RYCB) 35.119 0.013 86.52 86.344 0 0

;HDPE Pipe SI

Pipe_-_(99)_(RYCB) RYCB_6_(1)_(14)_(RYCB) RYCB_6_(1)_(15)_(RYCB) 38.97 0.013 86.85 86.655 0 0

;Mcon Circular Conc. Pipe

STM-23_(STM) 106_(STM) 104_(STM) 97.603 0.013 83.764 83.52 0 0

;Mcon Circular Conc. Pipe

STM-24_(STM) 108_(STM) 106_(STM) 26.242 0.013 83.905 83.839 0 0

;Ipex PVC DR 35

STM-27_(STM) 134_(STM) 132_(STM) 30 0.013 85.104 84.909 0 0

;Ipex PVC DR 35

STM-28_(STM) 110_(STM) 108_(STM) 29.107 0.013 84.236 84.105 0 0

;Mcon Circular Conc. Pipe

STM-34_(1)_(STM)_1 100_(STM) STM-Split3 40.459 0.013 80.705 80.665 0 0

;Mcon Circular Conc. Pipe

STM-34_(1)_(STM)_2 STM-Split3 2121_(STM) 34.317 0.013 80.665 80.631 0 0

;Mcon Circular Conc. Pipe

STM-34_(STM) 102_(STM) 100_(STM) 13.322 0.013 81.641 81.627 0 0

;HDPE Pipe SI

STM-81_(STM) 142_(STM) 140_(STM) 20.687 0.013 85.034 84.9 0 0

STM-82_(STM) STM-247_(STM) 104_(STM) 37.514 0.013 86.3 86.112 0 0

;HDPE Pipe SI

STM-83_(STM) 144_(STM) STM-251_(STM) 38.404 0.013 85.225 85.609 0 0

[ORIFICES]

;;Name From Node To Node Type Offset Qcoeff Gated CloseTime

;;--------------- ---------------- ---------------- ------------ ---------- ---------- -------- ----------

CB-10 10_(CB) 114_(STM) SIDE 86.17 0.65 NO 0

CB-11 11_(CB) 114_(STM) SIDE 86.321 0.65 NO 0

CB-12-C 12_(CB) 120_(STM) SIDE 85.943 0.65 NO 0

CB-13-C 13_(CB) 120_(STM) SIDE 86.093 0.65 NO 0

CB-14 14_(CB) 122_(STM) SIDE 86.101 0.65 NO 0

CB-15 15_(CB) 122_(STM) SIDE 86.251 0.65 NO 0

CB-16 16_(CB) 126_(STM) SIDE 86.312 0.65 NO 0

CB-17 17_(CB) 126_(STM) SIDE 86.316 0.65 NO 0

CB-18 18_(CB) 128_(STM) SIDE 86.433 0.65 NO 0

CB-19 19_(CB) 128_(STM) SIDE 86.436 0.65 NO 0

CB-2 2_(CB) 106_(STM) SIDE 85.9 0.65 NO 0

CB-20 20_(CB) 136_(STM) SIDE 86.721 0.65 NO 0

CB-21 21_(CB) 136_(STM) SIDE 86.642 0.65 NO 0

CB-22 22_(CB) 140_(STM) SIDE 86.923 0.65 NO 0

CB-23 23_(CB) 140_(STM) SIDE 87.073 0.65 NO 0

CB-25 25_(CB) 144_(STM) SIDE 87.223 0.65 NO 0

CB-26 26_(CB) 144_(STM) SIDE 87.223 0.65 NO 0

CB-27(1) 27_(CB) 146_(STM) SIDE 87.729 0.65 NO 0

CB-28 28_(CB) 146_(STM) SIDE 86.7 0.65 NO 0

CB-29 29_(CB) 148_(STM) SIDE 86.775 0.65 NO 0

CB-3 3_(CB) 106_(STM) SIDE 85.9 0.65 NO 0

CB-30 30_CB-C 148_(STM) SIDE 86.72 0.65 NO 0

CB-31a 31a_(RYCB) 152_(STM) SIDE 88.283 0.65 NO 0

CB-32 32_(CB) 150_(STM) SIDE 86.93 0.65 NO 0

CB-33 33_(CB) 150_(STM) SIDE 87.65 0.65 NO 0

CB-35 35_(CB) 152_(STM) SIDE 87.773 0.65 NO 0

CB-36 36_(CB) 158_(STM) SIDE 87.807 0.65 NO 0

CB-37 37_(CB) 158_(STM) SIDE 87.807 0.65 NO 0

CB-38	38_(CB)	162_(STM)	SIDE	88.405	0.65	NO	0
CB-39	39_(CB)	162_(STM)	SIDE	88.092	0.65	NO	0
CB-4	4_(CB)	104_(STM)	SIDE	85.899	0.65	NO	0
CB-40	40_(CB)	164_(STM)	SIDE	88.526	0.65	NO	0
CB-41	41_(CB)	164_(STM)	SIDE	88.425	0.65	NO	0
CB-42	42_(CB)	170_(STM)	SIDE	88.599	0.65	NO	0
CB-43	43_(CB)	170_(STM)	SIDE	89.355	0.65	NO	0
CB-44	44_(CB)	142_(STM)	SIDE	87.221	0.65	NO	0
CB-45	45_(CB)	142_(STM)	SIDE	87.221	0.65	NO	0
CB-46	46_(CB)	132_(STM)	SIDE	87.184	0.65	NO	0
CB-47	47_(CB)	132_(STM)	SIDE	87.334	0.65	NO	0
CB-48	48_(CB)	130_(STM)	SIDE	86.685	0.65	NO	0
CB-49	49_(CB)	130_(STM)	SIDE	86.835	0.65	NO	0
CB-5	5_(CB)	104_(STM)	SIDE	85.899	0.65	NO	0
CB-50	50_(CB)	118_(STM)	SIDE	86.03	0.65	NO	0
CB-51	51_(CB)	118_(STM)	SIDE	86.06	0.65	NO	0
CB-53	53_(CB)	156_(STM)	SIDE	88.008	0.65	NO	0
CB-54	54_(CB)	156_(STM)	SIDE	87.962	0.65	NO	0
CB-55	55_(CB)	104_(STM)	SIDE	85.571	0.65	NO	0
CB-56	56_(CB)	104_(STM)	SIDE	85.57	0.65	NO	0
CB-57	57_CB	100_(STM)	SIDE	85.56	0.65	NO	0
;Closed CB							
CB-6	6_(RYCB)	104_(STM)	SIDE	86.19	0.62	NO	0
CB-8	8_(CB)	112_(STM)	SIDE	85.736	0.65	NO	0
CB-9	9_(CB)	112_(STM)	SIDE	86.261	0.65	NO	0
OR1	Maj-03	43_(CB)	BOTTOM	90.29	0.62	NO	0
OR10	Maj-16	37_(CB)	BOTTOM	89.42	0.62	NO	0
OR11	Slope1	32_(CB)	BOTTOM	89.564	0.62	NO	0
OR12	Maj-19	27_(CB)	SIDE	89.39	0.65	NO	0

OR13	Maj-19	28_(CB)	SIDE	89.39	0.65	NO	0
OR14	Maj-24	25_(CB)	BOTTOM	88.92	0.62	NO	0
OR15	Maj-24	26_(CB)	BOTTOM	88.92	0.62	NO	0
OR16	Maj-26	23_(CB)	BOTTOM	88.62	0.62	NO	0
OR17	Maj-26	22_(CB)	BOTTOM	88.62	0.62	NO	0
OR18	Maj-28	20_(CB)	BOTTOM	88.34	0.62	NO	0
OR19	Maj-28	21_(CB)	BOTTOM	88.34	0.62	NO	0
OR2	Maj-03	42_(CB)	BOTTOM	90.29	0.62	NO	0
OR20	Maj-30	48_(CB)	BOTTOM	88.32	0.62	NO	0
OR21	Maj-30	49_(CB)	BOTTOM	88.32	0.62	NO	0
OR22	Maj-32	46_(CB)	BOTTOM	88.89	0.62	NO	0
OR23	Maj-32	47_(CB)	BOTTOM	88.89	0.62	NO	0
OR24	Maj-33	44_(CB)	BOTTOM	88.9	0.62	NO	0
OR25	Maj-33	45_(CB)	BOTTOM	88.9	0.62	NO	0
OR26	Maj-35	18_(CB)	BOTTOM	88.13	0.62	NO	0
OR27	Maj-35	19_(CB)	BOTTOM	88.13	0.62	NO	0
OR28	Maj-42	51_(CB)	BOTTOM	87.9	0.62	NO	0
OR29	Maj-42	50_(CB)	BOTTOM	87.9	0.62	NO	0
OR3	Maj-06_2	40_(CB)	BOTTOM	90.12	0.62	NO	0
OR30	Maj-44	10_(CB)	BOTTOM	87.55	0.62	NO	0
OR31	Maj-44	11_(CB)	BOTTOM	87.55	0.62	NO	0
OR32	Maj-41	13_(CB)	BOTTOM	87.64	0.62	NO	0
OR33	Maj-41	12_(CB)	BOTTOM	87.64	0.62	NO	0
OR34	Maj-39	15_(CB)	BOTTOM	87.8	0.62	NO	0
OR35	Maj-39	14_(CB)	BOTTOM	87.8	0.62	NO	0
OR36	Maj-37	16_(CB)	BOTTOM	88.01	0.62	NO	0
OR37	Maj-37	17_(CB)	BOTTOM	88.01	0.62	NO	0
OR38	Maj-46	8_(CB)	BOTTOM	87.42	0.62	NO	0
OR39	Maj-46	9_(CB)	BOTTOM	87.42	0.62	NO	0

OR4 Maj-06_2 41_(CB) BOTTOM 90.12 0.62 NO 0

OR40 Maj-52 5_(CB) SIDE 87.37 0.65 NO 0

OR41 Maj-52 4_(CB) SIDE 87.37 0.65 NO 0

OR42 Maj-50 3_(CB) SIDE 87.44 0.65 NO 0

OR43 Maj-50 2_(CB) SIDE 87.44 0.65 NO 0

OR44 Maj-54 56_(CB) BOTTOM 87.26 0.62 NO 0

OR45 Maj-54 55_(CB) BOTTOM 87.26 0.62 NO 0

;Double CB Grate

OR46 Maj-21 30_CB-C SIDE 88.61 0.65 NO 0

;Double CB Grate

OR47 Maj-21 29_(CB) SIDE 88.61 0.65 NO 0

OR48 Slope1 33_(CB) SIDE 89.564 0.65 NO 0

OR49 Maj-14 31a_(RYCB) BOTTOM 89.47 0.62 NO 0

OR5 Maj-10 39_(CB) BOTTOM 89.78 0.62 NO 0

OR50 Maj-14 35_(CB) BOTTOM 89.47 0.62 NO 0

;Double CB Grate

OR51 Maj-58 57_CB BOTTOM 87.17 0.62 NO 0

OR6 Maj-10 38_(CB) BOTTOM 89.78 0.62 NO 0

OR7 Maj-12 53_(CB) BOTTOM 89.66 0.62 NO 0

OR8 Maj-12 54_(CB) BOTTOM 89.66 0.62 NO 0

OR9 Maj-16 36_(CB) BOTTOM 89.42 0.62 NO 0

RYCB-1 1_(RYCB) 110_(STM) SIDE 86.327 0.62 NO 0

RYCB-10 RYCB_10 148_(STM) SIDE 87.33 0.62 NO 0

RYCB-17 Structure-(18) 116_(STM) SIDE 85.879 0.62 NO 0

;Closed CB

RYCB-24 24_(RYCB) 142_(STM) SIDE 87.683 0.65 NO 0

RYCB-26 26_(RYCB) 128_(STM) SIDE 86.075 0.62 NO 0

;Closed CB

RYCB-31 31_(RYCB) STM-251_(STM) SIDE 88.539 0.62 NO 0

;Closed CB

RYCB-34 34_(RYCB) 162_(STM) SIDE 87.378 0.62 NO 0

;Closed CB

RYCB-52 52_(RYCB) 162_(STM) SIDE 88.671 0.62 NO 0

RYCB-7 7_(RYCB) STM-247_(STM) SIDE 86.36 0.62 NO 0

[OUTLETS]

;;Name From Node To Node Offset Type QTable/Qcoeff Qexpon Gated

;;---------- ---------- ---------- ---------- ---------- ---------- ---------- --------

B1-Out B1_Stor 164_(STM) 90.5 TABULAR/HEAD B1-Out NO

B2-Out B2_Stor 164_(STM) 90.5 TABULAR/HEAD B2-Out NO

B3-Out B3_Stor 164_(STM) 90.5 TABULAR/HEAD B3-Out NO

B4-Out B4_Stor 106_(STM) 90.5 TABULAR/HEAD B4-Out NO

[XSECTIONS]

;;Link Shape Geom1 Geom2 Geom3 Geom4 Barrels Culvert

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1_(STM) CIRCULAR 0.45 0 0 0 1

10_(STM) CIRCULAR 1.35 0 0 0 1

11_(STM) CIRCULAR 1.35 0 0 0 1

12_(STM) CIRCULAR 1.35 0 0 0 1

13_(STM) CIRCULAR 1.35 0 0 0 1

14_(STM) CIRCULAR 1.65 0 0 0 1

15_(10)_(STM)_1 CIRCULAR 1.35 0 0 0 1

15_(10)_(STM)_2 CIRCULAR 1.35 0 0 0 1

15_(11)_(STM) CIRCULAR 1.35 0 0 0 1

15_(12)_(STM) CIRCULAR 0.45 0 0 0 1

15_(13)_(STM) CIRCULAR 0.6 0 0 0 1

15_(14)_(STM) CIRCULAR 1.05 0 0 0 1

15_(15)_(STM)	CIRCULAR	1.05	0	0	0	1
15_(16)_(STM)	CIRCULAR	1.05	0	0	0	1
15_(19)_(STM)	CIRCULAR	0.375	0	0	0	1
15_(20)_(STM)	CIRCULAR	0.6	0	0	0	1
15_(21)_(STM)	CIRCULAR	0.6	0	0	0	1
15_(22)_(STM)	CIRCULAR	1.05	0	0	0	1
15_(3)_(STM)	CIRCULAR	0.45	0	0	0	1
15_(4)_(STM)	CIRCULAR	0.45	0	0	0	1
15_(5)_(STM)	CIRCULAR	0.525	0	0	0	1
15_(9)_(STM)	CIRCULAR	1.35	0	0	0	1
2_(STM)	CIRCULAR	0.45	0	0	0	1
3_(STM)	CIRCULAR	0.525	0	0	0	1
4_(STM)	CIRCULAR	1.2	0	0	0	1
5_(STM)	CIRCULAR	1.2	0	0	0	1
6_(STM)	CIRCULAR	0.3	0	0	0	1
7_(1)_(STM)	CIRCULAR	0.6	0	0	0	1
7_(STM)	CIRCULAR	0.6	0	0	0	1
8_(STM)	CIRCULAR	1.35	0	0	0	1
9_(STM)	CIRCULAR	1.35	0	0	0	1
B2-Outflow	TRIANGULAR	0.5	3	0	0	1
C1	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C1_1	IRREGULAR	18mROW-Dbl-Sidewalk	0	0	0	1
C1_2	IRREGULAR	18mROW-Dbl-Sidewalk	0	0	0	1
C10	IRREGULAR	18mROWwSidewalk	0	0	0	1
C11	IRREGULAR	18mROWwSidewalk	0	0	0	1
C12	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C13	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C14	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C15	IRREGULAR	18mROWwSidewalk	0	0	0	1

C16	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C17	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C18	TRIANGULAR	0.6	3.6	0	0	1
C18_2	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C18_3	IRREGULAR	18mROWwSidewalk	0	0	0	1
C18_4	IRREGULAR	18mROWwSidewalk	0	0	0	1
C18_5	IRREGULAR	24mROW-Dbl-Sidewalk	0	0	0	1
C18_6	IRREGULAR	24mROW-Dbl-Sidewalk	0	0	0	1
C18_7	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C18_8	IRREGULAR	24mROW-Dbl-Sidewalk	0	0	0	1
C18_9	IRREGULAR	24mROW-Dbl-Sidewalk	0	0	0	1
C19	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C2	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C2_1	IRREGULAR	18mROW-Dbl-Sidewalk	0	0	0	1
C2_2	IRREGULAR	18mROW-Dbl-Sidewalk	0	0	0	1
C20	IRREGULAR	24mROW-Dbl-Sidewalk	0	0	0	1
C21	IRREGULAR	24mROW-Dbl-Sidewalk	0	0	0	1
C22	IRREGULAR	24mROW-Dbl-Sidewalk	0	0	0	1
C23	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C24	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C25	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C26	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C27	TRIANGULAR	0.6	3.6	0	0	1
C27_1	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C27_2	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C28	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C29	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C3	IRREGULAR	18mROW-Dbl-Sidewalk	0	0	0	1
C30	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1

C31	TRIANGULAR	0.6	3.6	0	0	1
C32	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C33	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C34	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C35	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C36	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C37	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C38	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C39	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C4	TRIANGULAR	0.6	3.6	0	0	1
C4_1	IRREGULAR	18mROW-Dbl-Sidewalk	0	0	0	1
C4_2	IRREGULAR	18mROW-Dbl-Sidewalk	0	0	0	1
C40	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C41	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C42	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C43	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C44	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C45	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C46	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C47	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C48	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C49	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C5	TRIANGULAR	0.6	3.6	0	0	1
C5_1	IRREGULAR	18mROW-Dbl-Sidewalk	0	0	0	1
C5_2	IRREGULAR	18mROW-Dbl-Sidewalk	0	0	0	1
C50	TRIANGULAR	0.6	3.6	0	0	1
C50_1	IRREGULAR	18mROWwSidewalk	0	0	0	1
C50_2	IRREGULAR	18mROWwSidewalk	0	0	0	1
C51	IRREGULAR	18mROWwSidewalk	0	0	0	1

C52	IRREGULAR	18mROWwSidewalk	0	0	0	1
C53	IRREGULAR	18mROWwSidewalk	0	0	0	1
C54	IRREGULAR	18mROWwSidewalk	0	0	0	1
C55	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C56	TRIANGULAR	0.6	3.6	0	0	1
C57	IRREGULAR	18mROW-No-Sidewalk	0	0	0	1
C58	TRIANGULAR	0.6	3.6	0	0	1
C59	TRIANGULAR	0.6	3.6	0	0	1
C6	TRIANGULAR	0.6	3.6	0	0	1
C6_1	IRREGULAR	18mROW-Dbl-Sidewalk	0	0	0	1
C6_2	IRREGULAR	18mROW-Dbl-Sidewalk	0	0	0	1
C60	TRIANGULAR	0.6	3.6	0	0	1
C7	IRREGULAR	18mROW-Dbl-Sidewalk	0	0	0	1
C8	IRREGULAR	18mROW-Dbl-Sidewalk	0	0	0	1
C9	IRREGULAR	18mROWwSidewalk	0	0	0	1
Pipe_-_(1)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(10)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(100)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(101)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(103)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(109)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(11)_(RYCB)	CIRCULAR	0.3	0	0	0	1
Pipe_-_(110)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(111)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(114)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(117)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(118)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(119)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(120)_(RYCB)	CIRCULAR	0.25	0	0	0	1

Pipe_-_(121)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(122)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(123)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(124)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(125)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(126)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(127)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(128)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(129)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(130)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(131)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(132)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(133)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(134)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(137)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(138)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(139)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(14)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(140)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(141)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(142)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(143)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(144)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(145)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(146)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(147)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(148)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(149)_(RYCB) CIRCULAR 0.25 0 0 0 1

Pipe_-_(15)_(RYCB) CIRCULAR 0.3 0 0 0 1

Pipe_-_(150)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(151)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(152)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(153)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(154)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(155)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(156)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(157)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(158)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(159)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(16)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(160)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(161)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(162)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(164)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(165)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(17)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(19)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(2)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(22)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(23)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(24)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(25)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(27)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(3)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(4)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(5)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(6)_(RYCB) CIRCULAR	0.25	0	0	0	1
Pipe_-_(7)_(RYCB) CIRCULAR	0.25	0	0	0	1

Pipe_-_(73)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(74)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(77)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(87)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(88)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(89)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(9)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(93)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(94)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(95)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(96)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(98)_(RYCB)	CIRCULAR	0.25	0	0	0	1
Pipe_-_(99)_(RYCB)	CIRCULAR	0.25	0	0	0	1
STM-23_(STM)	CIRCULAR	0.525	0	0	0	1
STM-24_(STM)	CIRCULAR	0.45	0	0	0	1
STM-27_(STM)	CIRCULAR	0.25	0	0	0	1
STM-28_(STM)	CIRCULAR	0.25	0	0	0	1
STM-34_(1)_(STM)_1	CIRCULAR	1.65	0	0	0	1
STM-34_(1)_(STM)_2	CIRCULAR	1.65	0	0	0	1
STM-34_(STM)	CIRCULAR	1.65	0	0	0	1
STM-81_(STM)	CIRCULAR	0.3	0	0	0	1
STM-82_(STM)	CIRCULAR	0.25	0	0	0	1
STM-83_(STM)	CIRCULAR	0.25	0	0	0	1
CB-10	CIRCULAR	0.102	0	0	0	
CB-11	CIRCULAR	0.178	0	0	0	
CB-12-C	CIRCULAR	0.083	0	0	0	
CB-13-C	CIRCULAR	0.083	0	0	0	
CB-14	CIRCULAR	0.083	0	0	0	
CB-15	CIRCULAR	0.083	0	0	0	

CB-16	CIRCULAR	0.083	0	0	0
CB-17	CIRCULAR	0.083	0	0	0
CB-18	CIRCULAR	0.083	0	0	0
CB-19	CIRCULAR	0.083	0	0	0
CB-2	CIRCULAR	0.083	0	0	0
CB-20	CIRCULAR	0.102	0	0	0
CB-21	CIRCULAR	0.102	0	0	0
CB-22	CIRCULAR	0.083	0	0	0
CB-23	CIRCULAR	0.083	0	0	0
CB-25	CIRCULAR	0.083	0	0	0
CB-26	CIRCULAR	0.083	0	0	0
CB-27(1)	CIRCULAR	0.083	0	0	0
CB-28	CIRCULAR	0.083	0	0	0
CB-29	CIRCULAR	0.127	0	0	0
CB-3	CIRCULAR	0.083	0	0	0
CB-30	CIRCULAR	0.127	0	0	0
CB-31a	CIRCULAR	0.127	0	0	0
CB-32	CIRCULAR	0.094	0	0	0
CB-33	CIRCULAR	0.127	0	0	0
CB-35	CIRCULAR	0.127	0	0	0
CB-36	CIRCULAR	0.108	0	0	0
CB-37	CIRCULAR	0.108	0	0	0
CB-38	CIRCULAR	0.083	0	0	0
CB-39	CIRCULAR	0.083	0	0	0
CB-4	CIRCULAR	0.083	0	0	0
CB-40	CIRCULAR	0.083	0	0	0
CB-41	CIRCULAR	0.083	0	0	0
CB-42	CIRCULAR	0.094	0	0	0
CB-43	CIRCULAR	0.094	0	0	0

CB-44	CIRCULAR	0.083	0	0	0
CB-45	CIRCULAR	0.083	0	0	0
CB-46	CIRCULAR	0.083	0	0	0
CB-47	CIRCULAR	0.083	0	0	0
CB-48	CIRCULAR	0.083	0	0	0
CB-49	CIRCULAR	0.083	0	0	0
CB-5	CIRCULAR	0.083	0	0	0
CB-50	CIRCULAR	0.094	0	0	0
CB-51	CIRCULAR	0.094	0	0	0
CB-53	CIRCULAR	0.094	0	0	0
CB-54	CIRCULAR	0.094	0	0	0
CB-55	CIRCULAR	0.083	0	0	0
CB-56	CIRCULAR	0.083	0	0	0
CB-57	CIRCULAR	0.083	0	0	0
CB-6	CIRCULAR	0.127	0	0	0
CB-8	CIRCULAR	0.083	0	0	0
CB-9	CIRCULAR	0.152	0	0	0
OR1	RECT_CLOSED	0.35	0.35	0	0
OR10	RECT_CLOSED	0.35	0.35	0	0
OR11	RECT_CLOSED	0.35	0.35	0	0
OR12	RECT_CLOSED	0.13	0.65	0	0
OR13	RECT_CLOSED	0.13	0.65	0	0
OR14	RECT_CLOSED	0.35	0.35	0	0
OR15	RECT_CLOSED	0.35	0.35	0	0
OR16	RECT_CLOSED	0.35	0.35	0	0
OR17	RECT_CLOSED	0.35	0.35	0	0
OR18	RECT_CLOSED	0.35	0.35	0	0
OR19	RECT_CLOSED	0.35	0.35	0	0
OR2	RECT_CLOSED	0.35	0.35	0	0

OR20	RECT_CLOSED	0.35	0.35	0	0
OR21	RECT_CLOSED	0.35	0.35	0	0
OR22	RECT_CLOSED	0.35	0.35	0	0
OR23	RECT_CLOSED	0.35	0.35	0	0
OR24	RECT_CLOSED	0.35	0.35	0	0
OR25	RECT_CLOSED	0.35	0.35	0	0
OR26	RECT_CLOSED	0.35	0.35	0	0
OR27	RECT_CLOSED	0.35	0.35	0	0
OR28	RECT_CLOSED	0.35	0.35	0	0
OR29	RECT_CLOSED	0.35	0.35	0	0
OR3	RECT_CLOSED	0.35	0.35	0	0
OR30	RECT_CLOSED	0.35	0.35	0	0
OR31	RECT_CLOSED	0.35	0.35	0	0
OR32	RECT_CLOSED	0.35	0.35	0	0
OR33	RECT_CLOSED	0.35	0.35	0	0
OR34	RECT_CLOSED	0.35	0.35	0	0
OR35	RECT_CLOSED	0.35	0.35	0	0
OR36	RECT_CLOSED	0.35	0.35	0	0
OR37	RECT_CLOSED	0.35	0.35	0	0
OR38	RECT_CLOSED	0.35	0.35	0	0
OR39	RECT_CLOSED	0.35	0.35	0	0
OR4	RECT_CLOSED	0.35	0.35	0	0
OR40	RECT_CLOSED	0.13	0.65	0	0
OR41	RECT_CLOSED	0.13	0.65	0	0
OR42	RECT_CLOSED	0.13	0.65	0	0
OR43	RECT_CLOSED	0.13	0.65	0	0
OR44	RECT_CLOSED	0.35	0.35	0	0
OR45	RECT_CLOSED	0.35	0.35	0	0
OR46	RECT_CLOSED	0.26	1.3	0	0

OR47 RECT_CLOSED 0.26 1.3 0 0

OR48 RECT_CLOSED 0.13 0.65 0 0

OR49 RECT_CLOSED 0.35 0.35 0 0

OR5 RECT_CLOSED 0.35 0.35 0 0

OR50 RECT_CLOSED 0.35 0.35 0 0

OR51 RECT_CLOSED 0.7 0.7 0 0

OR6 RECT_CLOSED 0.35 0.35 0 0

OR7 RECT_CLOSED 0.35 0.35 0 0

OR8 RECT_CLOSED 0.35 0.35 0 0

OR9 RECT_CLOSED 0.35 0.35 0 0

RYCB-1 CIRCULAR 0.127 0 0 0

RYCB-10 CIRCULAR 0.178 0 0 0

RYCB-17 CIRCULAR 0.178 0 0 0

RYCB-24 CIRCULAR 0.127 0 0 0

RYCB-26 CIRCULAR 0.152 0 0 0

RYCB-31 CIRCULAR 0.127 0 0 0

RYCB-34 CIRCULAR 0.083 0 0 0

RYCB-52 CIRCULAR 0.083 0 0 0

RYCB-7 CIRCULAR 0.127 0 0 0

[TRANSECTS]

;;Transect Data in HEC-2 format

;

NC 0.035 0.035 0.013

X1 16.5mROW-Dbl-Sidewalk 9 2 14.5 0.0 0.0 0.0 0.0 0.0

GR 0.6 -10.9 0.15 2 0.15 4 0 4.01 0.13 8.25

GR 0 12.49 0.15 12.5 0.15 14.5 0.6 25.6

;

NC 0.035 0.035 0.013

X1 16.5mROW-No-Sidewalk 9 3.8 12.7 0.0 0.0 0.0 0.0 0.0

GR 0.6 -9.1 0.15 3.8 0.15 4 0 4.01 0.13 8.25

GR 0 12.49 0.15 12.5 0.15 12.7 0.6 25.6

;

NC 0.035 0.035 0.013

X1 16.5mROWwSidewalk 9 2 12.7 0.0 0.0 0.0 0.0 0.0

GR 0.6 -10.9 0.15 2 0.15 4 0 4.01 0.13 8.25

GR 0 12.49 0.15 12.5 0.15 12.7 0.6 25.6

;

NC 0.035 0.035 0.013

X1 18mROW-Dbl-Sidewalk 9 5.5 18 0.0 0.0 0.0 0.0 0.0

GR 0.6 -10 0.09 5.5 0.08 7.5 0 7.5 0.13 11.75

GR 0 16 0.08 16 0.09 18 0.6 29.25

;

NC 0.035 0.035 0.013

X1 18mROW-No-Sidewalk 7 7.5 16 0.0 0.0 0.0 0.0 0.0

GR 0.6 -10 0.08 7.5 0 7.5 0.13 11.75 0 16

GR 0.08 16 0.6 29.25

;

NC 0.035 0.035 0.013

X1 18mROWwSidewalk 8 2.75 16 0.0 0.0 0.0 0.0 0.0

GR 0.6 -10 0.09 2.75 0.08 7.5 0 7.5 0.13 11.75

GR 0 16 0.08 16 0.6 29.25

;

NC 0.035 0.035 0.013

X1 18mROWwSidewalk-Half 5 2.75 16 0.0 0.0 0.0 0.0 0.0

GR 0.6 -10 0.09 2.75 0.08 7.5 0 7.5 0.13 11.75

;

NC 0.035 0.035 0.013

```
X1 24mROW-Dbl-Sidewalk  9       3.6     20.4     0.0     0.0     0.0     0.0     0.0
GR 0.6     -9.3     0.15     3.6     0.15     7.5     0       7.51     0.13     12
GR 0       16.49    0.15     16.5     0.15     20.4     0.6     33.3

[LOSSES]
;;Link          Kentry     Kexit      Kavg       Flap Gate  Seepage
;;-------------- ---------- ---------- ---------- ---------- ----------

[CURVES]
;;Name          Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
;100% capture of flow to this CB
100%_Capture     Rating     0        0
100%_Capture               0.01      0.001
100%_Capture               0.1       1
100%_Capture               0.3       5

;Plas-Tech StormTech Orifice Plate Inlet Control Device (ICD).
;Depth from top of CB
102mm-ICD        Rating     0        0
102mm-ICD                  0.01      0.0266
102mm-ICD                  0.15      0.0278
102mm-ICD                  0.3       0.0296
102mm-ICD                  0.35      0.03

102mm-ICD-RLCB   Rating     0        0
102mm-ICD-RLCB             0.01      0.0301
102mm-ICD-RLCB             0.15      0.0312
102mm-ICD-RLCB             0.3       0.0328
```

102mm-ICD-RLCB 0.35 0.0332

;Plas-Tech StormTech Orifice Plate Inlet Control Device (ICD).

;Depth from top of CB

108mm-ICD Rating 0 0

108mm-ICD 0.01 0.0298

108mm-ICD 0.15 0.0312

108mm-ICD 0.3 0.0332

108mm-ICD 0.35 0.0337

108mm-ICD-RLCB Rating 0 0

108mm-ICD-RLCB 0.01 0.0338

108mm-ICD-RLCB 0.15 0.035

108mm-ICD-RLCB 0.3 0.0367

108mm-ICD-RLCB 0.35 0.0372

;Plas-Tech StormTech Orifice Plate Inlet Control Device (ICD).

;Depth from top of CB

127mm-ICD Rating 0 0

127mm-ICD 0.01 0.0413

127mm-ICD 0.15 0.0432

127mm-ICD 0.3 0.0458

127mm-ICD 0.35 0.0466

127mm-ICD-RLCB Rating 0 0

127mm-ICD-RLCB 0.01 0.047

127mm-ICD-RLCB 0.15 0.048

127mm-ICD-RLCB 0.3 0.051

127mm-ICD-RLCB 0.35 0.052

;Plas-Tech StormTech Orifice Plate Inlet Control Device (ICD).

;Depth from top of CB

152mm-ICD Rating 0 0

152mm-ICD 0.01 0.0591

152mm-ICD 0.15 0.0618

152mm-ICD 0.3 0.0657

152mm-ICD 0.35 0.0667

152mm-ICD-RLCB Rating 0 0

152mm-ICD-RLCB 0.01 0.067

152mm-ICD-RLCB 0.15 0.069

152mm-ICD-RLCB 0.3 0.073

152mm-ICD-RLCB 0.35 0.074

;Sx0.03

16ROW_1CB_So0.005 Rating 0 0

16ROW_1CB_So0.005 0.01 0.0003

16ROW_1CB_So0.005 0.02 0.0011

16ROW_1CB_So0.005 0.03 0.0037

16ROW_1CB_So0.005 0.04 0.0072

16ROW_1CB_So0.005 0.05 0.0132

16ROW_1CB_So0.005 0.06 0.0168

16ROW_1CB_So0.005 0.07 0.0214

16ROW_1CB_So0.005 0.08 0.0253

16ROW_1CB_So0.005 0.09 0.0286

16ROW_1CB_So0.005 0.1 0.0331

16ROW_1CB_So0.005 0.11 0.0367

16ROW_1CB_So0.005 0.12 0.0409

16ROW_1CB_So0.005	0.13	0.0446
16ROW_1CB_So0.005	0.14	0.048
16ROW_1CB_So0.005	0.15	0.049
16ROW_1CB_So0.005	0.16	0.049
16ROW_1CB_So0.005	0.17	0.049
16ROW_1CB_So0.005	0.18	0.049
16ROW_1CB_So0.005	0.19	0.049
16ROW_1CB_So0.005	0.2	0.049
16ROW_1CB_So0.005	0.21	0.049
16ROW_1CB_So0.005	0.22	0.049
16ROW_1CB_So0.005	0.23	0.049
16ROW_1CB_So0.005	0.24	0.049
16ROW_1CB_So0.005	0.25	0.049
16ROW_1CB_So0.005	0.26	0.049
16ROW_1CB_So0.005	0.27	0.049
16ROW_1CB_So0.005	0.28	0.049
16ROW_1CB_So0.005	0.29	0.049
16ROW_1CB_So0.005	0.3	0.049
16ROW_1CB_So0.005	0.31	0.049
16ROW_1CB_So0.005	0.32	0.049
16ROW_1CB_So0.005	0.33	0.049
16ROW_1CB_So0.005	0.34	0.049
16ROW_1CB_So0.005	0.35	0.049
16ROW_1CB_So0.005	0.36	0.049
16ROW_1CB_So0.005	0.37	0.049
16ROW_1CB_So0.005	0.38	0.049
16ROW_1CB_So0.005	0.39	0.049
16ROW_1CB_So0.005	0.4	0.049

;Sx0.03

16ROW_1CB_So0.01	Rating	0	0
16ROW_1CB_So0.01		0.01	0.0005
16ROW_1CB_So0.01		0.02	0.0016
16ROW_1CB_So0.01		0.03	0.0052
16ROW_1CB_So0.01		0.04	0.0101
16ROW_1CB_So0.01		0.05	0.0158
16ROW_1CB_So0.01		0.06	0.0206
16ROW_1CB_So0.01		0.07	0.0254
16ROW_1CB_So0.01		0.08	0.029
16ROW_1CB_So0.01		0.09	0.0343
16ROW_1CB_So0.01		0.1	0.0382
16ROW_1CB_So0.01		0.11	0.043
16ROW_1CB_So0.01		0.12	0.0463
16ROW_1CB_So0.01		0.13	0.049
16ROW_1CB_So0.01		0.14	0.049
16ROW_1CB_So0.01		0.15	0.049
16ROW_1CB_So0.01		0.16	0.049
16ROW_1CB_So0.01		0.17	0.049
16ROW_1CB_So0.01		0.18	0.049
16ROW_1CB_So0.01		0.19	0.049
16ROW_1CB_So0.01		0.2	0.049
16ROW_1CB_So0.01		0.21	0.049
16ROW_1CB_So0.01		0.22	0.049
16ROW_1CB_So0.01		0.23	0.049
16ROW_1CB_So0.01		0.24	0.049
16ROW_1CB_So0.01		0.25	0.049
16ROW_1CB_So0.01		0.26	0.049
16ROW_1CB_So0.01		0.27	0.049

16ROW_1CB_So0.01 0.28 0.049

16ROW_1CB_So0.01 0.29 0.049

16ROW_1CB_So0.01 0.3 0.049

16ROW_1CB_So0.01 0.31 0.049

16ROW_1CB_So0.01 0.32 0.049

16ROW_1CB_So0.01 0.33 0.049

16ROW_1CB_So0.01 0.34 0.049

16ROW_1CB_So0.01 0.35 0.049

16ROW_1CB_So0.01 0.36 0.049

16ROW_1CB_So0.01 0.37 0.049

;Sx0.03

16ROW_1CB_So0.02 Rating 0 0

16ROW_1CB_So0.02 0.01 0.0006

16ROW_1CB_So0.02 0.02 0.0019

16ROW_1CB_So0.02 0.03 0.0062

16ROW_1CB_So0.02 0.04 0.012

16ROW_1CB_So0.02 0.05 0.0154

16ROW_1CB_So0.02 0.06 0.0192

16ROW_1CB_So0.02 0.07 0.0236

16ROW_1CB_So0.02 0.08 0.0275

16ROW_1CB_So0.02 0.09 0.0316

16ROW_1CB_So0.02 0.1 0.0363

16ROW_1CB_So0.02 0.11 0.041

16ROW_1CB_So0.02 0.12 0.045

16ROW_1CB_So0.02 0.13 0.045

16ROW_1CB_So0.02 0.14 0.045

16ROW_1CB_So0.02 0.15 0.045

16ROW_1CB_So0.02 0.16 0.045

16ROW_1CB_So0.02 0.17 0.045

16ROW_1CB_So0.02 0.18 0.045

16ROW_1CB_So0.02 0.19 0.045

16ROW_1CB_So0.02 0.2 0.045

16ROW_1CB_So0.02 0.21 0.045

16ROW_1CB_So0.02 0.22 0.045

16ROW_1CB_So0.02 0.23 0.045

16ROW_1CB_So0.02 0.24 0.045

16ROW_1CB_So0.02 0.25 0.045

16ROW_1CB_So0.02 0.26 0.045

16ROW_1CB_So0.02 0.27 0.045

16ROW_1CB_So0.02 0.28 0.045

16ROW_1CB_So0.02 0.29 0.045

16ROW_1CB_So0.02 0.3 0.045

16ROW_1CB_So0.02 0.31 0.045

16ROW_1CB_So0.02 0.32 0.045

;Sx0.03

16ROW_1CB_So0.03 Rating 0 0

16ROW_1CB_So0.03 0.01 0.0005

16ROW_1CB_So0.03 0.02 0.0017

16ROW_1CB_So0.03 0.03 0.0057

16ROW_1CB_So0.03 0.04 0.011

16ROW_1CB_So0.03 0.05 0.0146

16ROW_1CB_So0.03 0.06 0.0179

16ROW_1CB_So0.03 0.07 0.0216

16ROW_1CB_So0.03 0.08 0.0256

16ROW_1CB_So0.03 0.09 0.0298

16ROW_1CB_So0.03 0.1 0.0335

16ROW_1CB_So0.03 0.11 0.038

16ROW_1CB_So0.03 0.12 0.039

16ROW_1CB_So0.03 0.13 0.039

16ROW_1CB_So0.03 0.14 0.039

16ROW_1CB_So0.03 0.15 0.039

16ROW_1CB_So0.03 0.16 0.039

16ROW_1CB_So0.03 0.17 0.039

16ROW_1CB_So0.03 0.18 0.039

16ROW_1CB_So0.03 0.19 0.039

16ROW_1CB_So0.03 0.2 0.039

16ROW_1CB_So0.03 0.21 0.039

16ROW_1CB_So0.03 0.22 0.039

16ROW_1CB_So0.03 0.23 0.039

16ROW_1CB_So0.03 0.24 0.039

16ROW_1CB_So0.03 0.25 0.039

16ROW_1CB_So0.03 0.26 0.039

16ROW_1CB_So0.03 0.27 0.039

16ROW_1CB_So0.03 0.28 0.039

16ROW_1CB_So0.03 0.29 0.039

16ROW_1CB_So0.03 0.3 0.039

;Plas-Tech StormTech Orifice Plate Inlet Control Device (ICD).

;Depth from top of CB

178mm-ICD Rating 0 0

178mm-ICD 0.01 0.0811

178mm-ICD 0.15 0.0848

178mm-ICD 0.3 0.0901

178mm-ICD 0.35 0.0915

178mm-ICD-RLCB Rating 0 0

178mm-ICD-RLCB 0.01 0.092

178mm-ICD-RLCB 0.15 0.095

178mm-ICD-RLCB 0.3 0.1

178mm-ICD-RLCB 0.35 0.101

;1 Single CB on single lead pipe. Single CB is limited by 250mm Lead pipe at 1.2m head. Q=195.3 L/s

1-CB Rating 0 0

1-CB 0.05 0.1953

1-CB 1 0.1954

;1 DCB on single lead pipe. DCB is limited by 300mm Lead pipe at 1.2m head. Q=281.2 L/s

1-DCB Rating 0 0

1-DCB 0.05 0.2812

1-DCB 1 0.2813

;Sx0.03

24ROW_1CB_So0.005 Rating 0 0

24ROW_1CB_So0.005 0.01 0.0004

24ROW_1CB_So0.005 0.02 0.0012

24ROW_1CB_So0.005 0.03 0.0039

24ROW_1CB_So0.005 0.04 0.0076

24ROW_1CB_So0.005 0.05 0.0136

24ROW_1CB_So0.005 0.06 0.0174

24ROW_1CB_So0.005 0.07 0.022

24ROW_1CB_So0.005 0.08 0.0258

24ROW_1CB_So0.005 0.09 0.0296

24ROW_1CB_So0.005 0.1 0.034

24ROW_1CB_So0.005 0.11 0.0378

24ROW_1CB_So0.005	0.12	0.0418
24ROW_1CB_So0.005	0.13	0.0453
24ROW_1CB_So0.005	0.14	0.0486
24ROW_1CB_So0.005	0.15	0.049
24ROW_1CB_So0.005	0.16	0.049
24ROW_1CB_So0.005	0.17	0.049
24ROW_1CB_So0.005	0.18	0.049
24ROW_1CB_So0.005	0.19	0.049
24ROW_1CB_So0.005	0.2	0.049
24ROW_1CB_So0.005	0.21	0.049
24ROW_1CB_So0.005	0.22	0.049
24ROW_1CB_So0.005	0.23	0.049
24ROW_1CB_So0.005	0.24	0.049
24ROW_1CB_So0.005	0.25	0.049
24ROW_1CB_So0.005	0.26	0.049
24ROW_1CB_So0.005	0.27	0.049
24ROW_1CB_So0.005	0.28	0.049
24ROW_1CB_So0.005	0.29	0.049
24ROW_1CB_So0.005	0.3	0.049
24ROW_1CB_So0.005	0.31	0.049
24ROW_1CB_So0.005	0.32	0.049
24ROW_1CB_So0.005	0.33	0.049
24ROW_1CB_So0.005	0.34	0.049
24ROW_1CB_So0.005	0.35	0.049
24ROW_1CB_So0.005	0.36	0.049
24ROW_1CB_So0.005	0.37	0.049
24ROW_1CB_So0.005	0.38	0.049
24ROW_1CB_So0.005	0.39	0.049
24ROW_1CB_So0.005	0.4	0.049

;Sx0.03

24ROW_1CB_So0.01	Rating	0	0
24ROW_1CB_So0.01		0.01	0.0005
24ROW_1CB_So0.01		0.02	0.0017
24ROW_1CB_So0.01		0.03	0.0055
24ROW_1CB_So0.01		0.04	0.0107
24ROW_1CB_So0.01		0.05	0.0164
24ROW_1CB_So0.01		0.06	0.0212
24ROW_1CB_So0.01		0.07	0.0259
24ROW_1CB_So0.01		0.08	0.03
24ROW_1CB_So0.01		0.09	0.0351
24ROW_1CB_So0.01		0.1	0.0396
24ROW_1CB_So0.01		0.11	0.044
24ROW_1CB_So0.01		0.12	0.0473
24ROW_1CB_So0.01		0.13	0.049
24ROW_1CB_So0.01		0.14	0.049
24ROW_1CB_So0.01		0.15	0.049
24ROW_1CB_So0.01		0.16	0.049
24ROW_1CB_So0.01		0.17	0.049
24ROW_1CB_So0.01		0.18	0.049
24ROW_1CB_So0.01		0.19	0.049
24ROW_1CB_So0.01		0.2	0.049
24ROW_1CB_So0.01		0.21	0.049
24ROW_1CB_So0.01		0.22	0.049
24ROW_1CB_So0.01		0.23	0.049
24ROW_1CB_So0.01		0.24	0.049
24ROW_1CB_So0.01		0.25	0.049
24ROW_1CB_So0.01		0.26	0.049

24ROW_1CB_So0.01 0.27 0.049

24ROW_1CB_So0.01 0.28 0.049

24ROW_1CB_So0.01 0.29 0.049

24ROW_1CB_So0.01 0.3 0.049

24ROW_1CB_So0.01 0.31 0.049

24ROW_1CB_So0.01 0.32 0.049

24ROW_1CB_So0.01 0.33 0.049

24ROW_1CB_So0.01 0.34 0.049

24ROW_1CB_So0.01 0.35 0.049

24ROW_1CB_So0.01 0.36 0.049

24ROW_1CB_So0.01 0.37 0.049

;Sx0.03

24ROW_1CB_So0.02 Rating 0 0

24ROW_1CB_So0.02 0.01 0.0006

24ROW_1CB_So0.02 0.02 0.002

24ROW_1CB_So0.02 0.03 0.0066

24ROW_1CB_So0.02 0.04 0.0123

24ROW_1CB_So0.02 0.05 0.0158

24ROW_1CB_So0.02 0.06 0.0198

24ROW_1CB_So0.02 0.07 0.0243

24ROW_1CB_So0.02 0.08 0.0281

24ROW_1CB_So0.02 0.09 0.0325

24ROW_1CB_So0.02 0.1 0.0373

24ROW_1CB_So0.02 0.11 0.0418

24ROW_1CB_So0.02 0.12 0.045

24ROW_1CB_So0.02 0.13 0.045

24ROW_1CB_So0.02 0.14 0.045

24ROW_1CB_So0.02 0.15 0.045

24ROW_1CB_So0.02 0.16 0.045

24ROW_1CB_So0.02 0.17 0.045

24ROW_1CB_So0.02 0.18 0.045

24ROW_1CB_So0.02 0.19 0.045

24ROW_1CB_So0.02 0.2 0.045

24ROW_1CB_So0.02 0.21 0.045

24ROW_1CB_So0.02 0.22 0.045

24ROW_1CB_So0.02 0.23 0.045

24ROW_1CB_So0.02 0.24 0.045

24ROW_1CB_So0.02 0.25 0.045

24ROW_1CB_So0.02 0.26 0.045

24ROW_1CB_So0.02 0.27 0.045

24ROW_1CB_So0.02 0.28 0.045

24ROW_1CB_So0.02 0.29 0.045

24ROW_1CB_So0.02 0.3 0.045

24ROW_1CB_So0.02 0.31 0.045

24ROW_1CB_So0.02 0.32 0.045

;Sx0.03

24ROW_1CB_So0.03 Rating 0 0

24ROW_1CB_So0.03 0.01 0.0006

24ROW_1CB_So0.03 0.02 0.0018

24ROW_1CB_So0.03 0.03 0.006

24ROW_1CB_So0.03 0.04 0.0113

24ROW_1CB_So0.03 0.05 0.015

24ROW_1CB_So0.03 0.06 0.0183

24ROW_1CB_So0.03 0.07 0.0225

24ROW_1CB_So0.03 0.08 0.0264

24ROW_1CB_So0.03 0.09 0.0306

24ROW_1CB_So0.03 0.1 0.0343

24ROW_1CB_So0.03 0.11 0.0388

24ROW_1CB_So0.03 0.12 0.039

24ROW_1CB_So0.03 0.13 0.039

24ROW_1CB_So0.03 0.14 0.039

24ROW_1CB_So0.03 0.15 0.039

24ROW_1CB_So0.03 0.16 0.039

24ROW_1CB_So0.03 0.17 0.039

24ROW_1CB_So0.03 0.18 0.039

24ROW_1CB_So0.03 0.19 0.039

24ROW_1CB_So0.03 0.2 0.039

24ROW_1CB_So0.03 0.21 0.039

24ROW_1CB_So0.03 0.22 0.039

24ROW_1CB_So0.03 0.23 0.039

24ROW_1CB_So0.03 0.24 0.039

24ROW_1CB_So0.03 0.25 0.039

24ROW_1CB_So0.03 0.26 0.039

24ROW_1CB_So0.03 0.27 0.039

24ROW_1CB_So0.03 0.28 0.039

24ROW_1CB_So0.03 0.29 0.039

24ROW_1CB_So0.03 0.3 0.039

;Plas-Tech StormTech Orifice Plate Inlet Control Device (ICD).

;Depth from top of CB

;Assumes 2 CB's with individual ICD's

2x102mm-ICD Rating 0 0

2x102mm-ICD 0.005 0.0532

2x102mm-ICD 0.15 0.0556

2x102mm-ICD 0.3 0.0592

2x102mm-ICD 0.35 0.06

;Plas-Tech StormTech Orifice Plate Inlet Control Device (ICD).

;Depth from top of CB

;Assumes 2 CB's with individual ICD's

2x152mm-ICD Rating 0 0

2x152mm-ICD 0.005 0.1182

2x152mm-ICD 0.15 0.1236

2x152mm-ICD 0.3 0.1314

2x152mm-ICD 0.35 0.1334

;Plas-Tech StormTech Orifice Plate Inlet Control Device (ICD).

;Depth from top of CB

83mm-ICD Rating 0 0

83mm-ICD 0.01 0.0176

83mm-ICD 0.15 0.0184

83mm-ICD 0.3 0.0196

83mm-ICD 0.35 0.0199

83mm-ICD-RLCB Rating 0 0

83mm-ICD-RLCB 0.01 0.0199

83mm-ICD-RLCB 0.15 0.0207

83mm-ICD-RLCB 0.3 0.0217

83mm-ICD-RLCB 0.35 0.022

;Plas-Tech StormTech Orifice Plate Inlet Control Device (ICD).

;Depth from top of CB

94mm-ICD Rating 0 0

94mm-ICD 0.01 0.0226

94mm-ICD 0.15 0.0236

94mm-ICD 0.3 0.0251

94mm-ICD 0.35 0.0255

94mm-ICD-RLCB Rating 0 0

94mm-ICD-RLCB 0.01 0.0256

94mm-ICD-RLCB 0.15 0.0265

94mm-ICD-RLCB 0.3 0.0278

94mm-ICD-RLCB 0.35 0.0282

;Block 160 - Medium Density Residential

;1.01 ha R=0.80 tc= 10 min

;5 Year Rational = 234 L/s

B1-Out Rating 0 0

B1-Out 0.01 0.234

B1-Out 0.3 0.266

;Existing UHAUL site

;3.43 ha R=0.90 tc= 12 min

;5 Year Rational (via Novatech)= 786.6 L/s

B2-Out Rating 0 0

B2-Out 0.01 0.787

B2-Out 0.3 0.897

;Block 161 - Medium Density Residential

;1.02 ha R=0.80 tc= 10 min

;5 Year Rational (via Novatech) = 1173.67 L/s

B3-Out Rating 0 0

B3-Out 0.01 1.173

B3-Out 0.3 1.337

;Park Lands

;1.00 ha R=0.25 tc= 10 min

;5 Year Rational (via Novatech) = 129 L/s

B4-Out Rating 0 0

B4-Out 0.01 0.1297

B4-Out 0.3 0.1479

;540 m³ of storage assumed for site based on MArch 2020 UHAUL site Design Breif

UHAL_Onsite Storage 0 1800

UHAL_Onsite 0.3 1800

UHAL_Onsite 0.31 1

UHAL_Onsite 2 1

[TIMESERIES]

;;Name Date Time Value

;;-------------- ---------- ---------- ----------

;Rainfall (mm/hr)

002yrChicago3hr 01-01-2019 00:00:00 0

002yrChicago3hr 01-01-2019 00:10:00 2.81459

002yrChicago3hr 01-01-2019 00:20:00 3.49824

002yrChicago3hr 01-01-2019 00:30:00 4.68718

002yrChicago3hr 01-01-2019 00:40:00 7.30485

002yrChicago3hr 01-01-2019 00:50:00 18.20881

002yrChicago3hr 01-01-2019 01:00:00 76.805

002yrChicago3hr 01-01-2019 01:10:00 24.07906

002yrChicago3hr 01-01-2019 01:20:00 12.36376

002yrChicago3hr 01-01-2019 01:30:00 8.32403

002yrChicago3hr 01-01-2019 01:40:00 6.30341

002yrChicago3hr 01-01-2019 01:50:00 5.09498

002yrChicago3hr 01-01-2019 02:00:00 4.29133

002yrChicago3hr 01-01-2019 02:10:00 3.71786

002yrChicago3hr 01-01-2019 02:20:00 3.28762

002yrChicago3hr 01-01-2019 02:30:00 2.95254

002yrChicago3hr 01-01-2019 02:40:00 2.68388

002yrChicago3hr 01-01-2019 02:50:00 2.46348

002yrChicago3hr 01-01-2019 03:00:00 2.27921

;Rainfall (mm/hr)

002YrSCS24 01-01-2019 00:00:00 0.53

002YrSCS24 01-01-2019 00:10:00 0.53

002YrSCS24 01-01-2019 00:20:00 0.53

002YrSCS24 01-01-2019 00:30:00 0.53

002YrSCS24 01-01-2019 00:40:00 0.53

002YrSCS24 01-01-2019 00:50:00 0.53

002YrSCS24 01-01-2019 01:00:00 0.53

002YrSCS24 01-01-2019 01:10:00 0.53

002YrSCS24 01-01-2019 01:20:00 0.53

002YrSCS24 01-01-2019 01:30:00 0.53

002YrSCS24 01-01-2019 01:40:00 0.53

002YrSCS24 01-01-2019 01:50:00 0.53

002YrSCS24 01-01-2019 02:00:00 0.63

002YrSCS24 01-01-2019 02:10:00 0.63

002YrSCS24 01-01-2019 02:20:00 0.63

002YrSCS24 01-01-2019 02:30:00 0.63

002YrSCS24 01-01-2019 02:40:00 0.63

002YrSCS24 01-01-2019 02:50:00 0.63

002YrSCS24	01-01-2019 03:00:00	0.63
002YrSCS24	01-01-2019 03:10:00	0.63
002YrSCS24	01-01-2019 03:20:00	0.63
002YrSCS24	01-01-2019 03:30:00	0.63
002YrSCS24	01-01-2019 03:40:00	0.63
002YrSCS24	01-01-2019 03:50:00	0.63
002YrSCS24	01-01-2019 04:00:00	0.78
002YrSCS24	01-01-2019 04:10:00	0.78
002YrSCS24	01-01-2019 04:20:00	0.78
002YrSCS24	01-01-2019 04:30:00	0.78
002YrSCS24	01-01-2019 04:40:00	0.78
002YrSCS24	01-01-2019 04:50:00	0.78
002YrSCS24	01-01-2019 05:00:00	0.78
002YrSCS24	01-01-2019 05:10:00	0.78
002YrSCS24	01-01-2019 05:20:00	0.78
002YrSCS24	01-01-2019 05:30:00	0.78
002YrSCS24	01-01-2019 05:40:00	0.78
002YrSCS24	01-01-2019 05:50:00	0.78
002YrSCS24	01-01-2019 06:00:00	0.87
002YrSCS24	01-01-2019 06:10:00	0.87
002YrSCS24	01-01-2019 06:20:00	0.87
002YrSCS24	01-01-2019 06:30:00	0.87
002YrSCS24	01-01-2019 06:40:00	0.87
002YrSCS24	01-01-2019 06:50:00	0.87
002YrSCS24	01-01-2019 07:00:00	1.07
002YrSCS24	01-01-2019 07:10:00	1.07
002YrSCS24	01-01-2019 07:20:00	1.07
002YrSCS24	01-01-2019 07:30:00	1.07
002YrSCS24	01-01-2019 07:40:00	1.07

002YrSCS24	01-01-2019 07:50:00	1.07
002YrSCS24	01-01-2019 08:00:00	1.26
002YrSCS24	01-01-2019 08:10:00	1.26
002YrSCS24	01-01-2019 08:20:00	1.26
002YrSCS24	01-01-2019 08:30:00	1.36
002YrSCS24	01-01-2019 08:40:00	1.36
002YrSCS24	01-01-2019 08:50:00	1.36
002YrSCS24	01-01-2019 09:00:00	1.55
002YrSCS24	01-01-2019 09:10:00	1.55
002YrSCS24	01-01-2019 09:20:00	1.55
002YrSCS24	01-01-2019 09:30:00	1.74
002YrSCS24	01-01-2019 09:40:00	1.74
002YrSCS24	01-01-2019 09:50:00	1.74
002YrSCS24	01-01-2019 10:00:00	2.23
002YrSCS24	01-01-2019 10:10:00	2.23
002YrSCS24	01-01-2019 10:20:00	2.23
002YrSCS24	01-01-2019 10:30:00	3.01
002YrSCS24	01-01-2019 10:40:00	3.01
002YrSCS24	01-01-2019 10:50:00	3.01
002YrSCS24	01-01-2019 11:00:00	4.65
002YrSCS24	01-01-2019 11:10:00	4.65
002YrSCS24	01-01-2019 11:20:00	4.65
002YrSCS24	01-01-2019 11:30:00	14.35
002YrSCS24	01-01-2019 11:40:00	36.84
002YrSCS24	01-01-2019 11:50:00	59.33
002YrSCS24	01-01-2019 12:00:00	6.98
002YrSCS24	01-01-2019 12:10:00	6.98
002YrSCS24	01-01-2019 12:20:00	6.98
002YrSCS24	01-01-2019 12:30:00	3.59

002YrSCS24	01-01-2019 12:40:00	3.59
002YrSCS24	01-01-2019 12:50:00	3.59
002YrSCS24	01-01-2019 13:00:00	2.62
002YrSCS24	01-01-2019 13:10:00	2.62
002YrSCS24	01-01-2019 13:20:00	2.62
002YrSCS24	01-01-2019 13:30:00	2.04
002YrSCS24	01-01-2019 13:40:00	2.04
002YrSCS24	01-01-2019 13:50:00	2.04
002YrSCS24	01-01-2019 14:00:00	1.45
002YrSCS24	01-01-2019 14:10:00	1.45
002YrSCS24	01-01-2019 14:20:00	1.45
002YrSCS24	01-01-2019 14:30:00	1.45
002YrSCS24	01-01-2019 14:40:00	1.45
002YrSCS24	01-01-2019 14:50:00	1.45
002YrSCS24	01-01-2019 15:00:00	1.45
002YrSCS24	01-01-2019 15:10:00	1.45
002YrSCS24	01-01-2019 15:20:00	1.45
002YrSCS24	01-01-2019 15:30:00	1.45
002YrSCS24	01-01-2019 15:40:00	1.45
002YrSCS24	01-01-2019 15:50:00	1.45
002YrSCS24	01-01-2019 16:00:00	0.87
002YrSCS24	01-01-2019 16:10:00	0.87
002YrSCS24	01-01-2019 16:20:00	0.87
002YrSCS24	01-01-2019 16:30:00	0.87
002YrSCS24	01-01-2019 16:40:00	0.87
002YrSCS24	01-01-2019 16:50:00	0.87
002YrSCS24	01-01-2019 17:00:00	0.87
002YrSCS24	01-01-2019 17:10:00	0.87
002YrSCS24	01-01-2019 17:20:00	0.87

002YrSCS24	01-01-2019 17:30:00	0.87
002YrSCS24	01-01-2019 17:40:00	0.87
002YrSCS24	01-01-2019 17:50:00	0.87
002YrSCS24	01-01-2019 18:00:00	0.87
002YrSCS24	01-01-2019 18:10:00	0.87
002YrSCS24	01-01-2019 18:20:00	0.87
002YrSCS24	01-01-2019 18:30:00	0.87
002YrSCS24	01-01-2019 18:40:00	0.87
002YrSCS24	01-01-2019 18:50:00	0.87
002YrSCS24	01-01-2019 19:00:00	0.87
002YrSCS24	01-01-2019 19:10:00	0.87
002YrSCS24	01-01-2019 19:20:00	0.87
002YrSCS24	01-01-2019 19:30:00	0.87
002YrSCS24	01-01-2019 19:40:00	0.87
002YrSCS24	01-01-2019 19:50:00	0.87
002YrSCS24	01-01-2019 20:00:00	0.58
002YrSCS24	01-01-2019 20:10:00	0.58
002YrSCS24	01-01-2019 20:20:00	0.58
002YrSCS24	01-01-2019 20:30:00	0.58
002YrSCS24	01-01-2019 20:40:00	0.58
002YrSCS24	01-01-2019 20:50:00	0.58
002YrSCS24	01-01-2019 21:00:00	0.58
002YrSCS24	01-01-2019 21:10:00	0.58
002YrSCS24	01-01-2019 21:20:00	0.58
002YrSCS24	01-01-2019 21:30:00	0.58
002YrSCS24	01-01-2019 21:40:00	0.58
002YrSCS24	01-01-2019 21:50:00	0.58
002YrSCS24	01-01-2019 22:00:00	0.58
002YrSCS24	01-01-2019 22:10:00	0.58

002YrSCS24 01-01-2019 22:20:00 0.58

002YrSCS24 01-01-2019 22:30:00 0.58

002YrSCS24 01-01-2019 22:40:00 0.58

002YrSCS24 01-01-2019 22:50:00 0.58

002YrSCS24 01-01-2019 23:00:00 0.58

002YrSCS24 01-01-2019 23:10:00 0.58

002YrSCS24 01-01-2019 23:20:00 0.58

002YrSCS24 01-01-2019 23:30:00 0.58

002YrSCS24 01-01-2019 23:40:00 0.58

002YrSCS24 01-01-2019 23:50:00 0.58

;Rainfall (mm/hr)

005yrChicago3hr 01-01-2019 00:00:00 0

005yrChicago3hr 01-01-2019 00:10:00 3.68223

005yrChicago3hr 01-01-2019 00:20:00 4.58232

005yrChicago3hr 01-01-2019 00:30:00 6.15055

005yrChicago3hr 01-01-2019 00:40:00 9.6141

005yrChicago3hr 01-01-2019 00:50:00 24.17035

005yrChicago3hr 01-01-2019 01:00:00 104.193

005yrChicago3hr 01-01-2019 01:10:00 32.03692

005yrChicago3hr 01-01-2019 01:20:00 16.3375

005yrChicago3hr 01-01-2019 01:30:00 10.96479

005yrChicago3hr 01-01-2019 01:40:00 8.28693

005yrChicago3hr 01-01-2019 01:50:00 6.68897

005yrChicago3hr 01-01-2019 02:00:00 5.6279

005yrChicago3hr 01-01-2019 02:10:00 4.87167

005yrChicago3hr 01-01-2019 02:20:00 4.30483

005yrChicago3hr 01-01-2019 02:30:00 3.8637

005yrChicago3hr 01-01-2019 02:40:00 3.51028

005yrChicago3hr 01-01-2019 02:50:00 3.22046

005yrChicago3hr 01-01-2019 03:00:00 2.97831

;Rainfall (mm/hr)

005YrSCS24 01-01-2019 00:00:00 0.71

005YrSCS24 01-01-2019 00:10:00 0.71

005YrSCS24 01-01-2019 00:20:00 0.71

005YrSCS24 01-01-2019 00:30:00 0.71

005YrSCS24 01-01-2019 00:40:00 0.71

005YrSCS24 01-01-2019 00:50:00 0.71

005YrSCS24 01-01-2019 01:00:00 0.71

005YrSCS24 01-01-2019 01:10:00 0.71

005YrSCS24 01-01-2019 01:20:00 0.71

005YrSCS24 01-01-2019 01:30:00 0.71

005YrSCS24 01-01-2019 01:40:00 0.71

005YrSCS24 01-01-2019 01:50:00 0.71

005YrSCS24 01-01-2019 02:00:00 0.83

005YrSCS24 01-01-2019 02:10:00 0.83

005YrSCS24 01-01-2019 02:20:00 0.83

005YrSCS24 01-01-2019 02:30:00 0.83

005YrSCS24 01-01-2019 02:40:00 0.83

005YrSCS24 01-01-2019 02:50:00 0.83

005YrSCS24 01-01-2019 03:00:00 0.83

005YrSCS24 01-01-2019 03:10:00 0.83

005YrSCS24 01-01-2019 03:20:00 0.83

005YrSCS24 01-01-2019 03:30:00 0.83

005YrSCS24 01-01-2019 03:40:00 0.83

005YrSCS24 01-01-2019 03:50:00 0.83

005YrSCS24 01-01-2019 04:00:00 1.03

005YrSCS24	01-01-2019 04:10:00	1.03
005YrSCS24	01-01-2019 04:20:00	1.03
005YrSCS24	01-01-2019 04:30:00	1.03
005YrSCS24	01-01-2019 04:40:00	1.03
005YrSCS24	01-01-2019 04:50:00	1.03
005YrSCS24	01-01-2019 05:00:00	1.03
005YrSCS24	01-01-2019 05:10:00	1.03
005YrSCS24	01-01-2019 05:20:00	1.03
005YrSCS24	01-01-2019 05:30:00	1.03
005YrSCS24	01-01-2019 05:40:00	1.03
005YrSCS24	01-01-2019 05:50:00	1.03
005YrSCS24	01-01-2019 06:00:00	1.15
005YrSCS24	01-01-2019 06:10:00	1.15
005YrSCS24	01-01-2019 06:20:00	1.15
005YrSCS24	01-01-2019 06:30:00	1.15
005YrSCS24	01-01-2019 06:40:00	1.15
005YrSCS24	01-01-2019 06:50:00	1.15
005YrSCS24	01-01-2019 07:00:00	1.41
005YrSCS24	01-01-2019 07:10:00	1.41
005YrSCS24	01-01-2019 07:20:00	1.41
005YrSCS24	01-01-2019 07:30:00	1.41
005YrSCS24	01-01-2019 07:40:00	1.41
005YrSCS24	01-01-2019 07:50:00	1.41
005YrSCS24	01-01-2019 08:00:00	1.67
005YrSCS24	01-01-2019 08:10:00	1.67
005YrSCS24	01-01-2019 08:20:00	1.67
005YrSCS24	01-01-2019 08:30:00	1.8
005YrSCS24	01-01-2019 08:40:00	1.8
005YrSCS24	01-01-2019 08:50:00	1.8

005YrSCS24	01-01-2019 09:00:00	2.05
005YrSCS24	01-01-2019 09:10:00	2.05
005YrSCS24	01-01-2019 09:20:00	2.05
005YrSCS24	01-01-2019 09:30:00	2.31
005YrSCS24	01-01-2019 09:40:00	2.31
005YrSCS24	01-01-2019 09:50:00	2.31
005YrSCS24	01-01-2019 10:00:00	2.95
005YrSCS24	01-01-2019 10:10:00	2.95
005YrSCS24	01-01-2019 10:20:00	2.95
005YrSCS24	01-01-2019 10:30:00	3.98
005YrSCS24	01-01-2019 10:40:00	3.98
005YrSCS24	01-01-2019 10:50:00	3.98
005YrSCS24	01-01-2019 11:00:00	6.16
005YrSCS24	01-01-2019 11:10:00	6.16
005YrSCS24	01-01-2019 11:20:00	6.16
005YrSCS24	01-01-2019 11:30:00	18.98
005YrSCS24	01-01-2019 11:40:00	48.73
005YrSCS24	01-01-2019 11:50:00	78.48
005YrSCS24	01-01-2019 12:00:00	9.23
005YrSCS24	01-01-2019 12:10:00	9.23
005YrSCS24	01-01-2019 12:20:00	9.23
005YrSCS24	01-01-2019 12:30:00	4.74
005YrSCS24	01-01-2019 12:40:00	4.74
005YrSCS24	01-01-2019 12:50:00	4.74
005YrSCS24	01-01-2019 13:00:00	3.46
005YrSCS24	01-01-2019 13:10:00	3.46
005YrSCS24	01-01-2019 13:20:00	3.46
005YrSCS24	01-01-2019 13:30:00	2.69
005YrSCS24	01-01-2019 13:40:00	2.69

005YrSCS24	01-01-2019 13:50:00	2.69
005YrSCS24	01-01-2019 14:00:00	1.92
005YrSCS24	01-01-2019 14:10:00	1.92
005YrSCS24	01-01-2019 14:20:00	1.92
005YrSCS24	01-01-2019 14:30:00	1.92
005YrSCS24	01-01-2019 14:40:00	1.92
005YrSCS24	01-01-2019 14:50:00	1.92
005YrSCS24	01-01-2019 15:00:00	1.92
005YrSCS24	01-01-2019 15:10:00	1.92
005YrSCS24	01-01-2019 15:20:00	1.92
005YrSCS24	01-01-2019 15:30:00	1.92
005YrSCS24	01-01-2019 15:40:00	1.92
005YrSCS24	01-01-2019 15:50:00	1.92
005YrSCS24	01-01-2019 16:00:00	1.15
005YrSCS24	01-01-2019 16:10:00	1.15
005YrSCS24	01-01-2019 16:20:00	1.15
005YrSCS24	01-01-2019 16:30:00	1.15
005YrSCS24	01-01-2019 16:40:00	1.15
005YrSCS24	01-01-2019 16:50:00	1.15
005YrSCS24	01-01-2019 17:00:00	1.15
005YrSCS24	01-01-2019 17:10:00	1.15
005YrSCS24	01-01-2019 17:20:00	1.15
005YrSCS24	01-01-2019 17:30:00	1.15
005YrSCS24	01-01-2019 17:40:00	1.15
005YrSCS24	01-01-2019 17:50:00	1.15
005YrSCS24	01-01-2019 18:00:00	1.15
005YrSCS24	01-01-2019 18:10:00	1.15
005YrSCS24	01-01-2019 18:20:00	1.15
005YrSCS24	01-01-2019 18:30:00	1.15

005YrSCS24	01-01-2019 18:40:00	1.15
005YrSCS24	01-01-2019 18:50:00	1.15
005YrSCS24	01-01-2019 19:00:00	1.15
005YrSCS24	01-01-2019 19:10:00	1.15
005YrSCS24	01-01-2019 19:20:00	1.15
005YrSCS24	01-01-2019 19:30:00	1.15
005YrSCS24	01-01-2019 19:40:00	1.15
005YrSCS24	01-01-2019 19:50:00	1.15
005YrSCS24	01-01-2019 20:00:00	0.77
005YrSCS24	01-01-2019 20:10:00	0.77
005YrSCS24	01-01-2019 20:20:00	0.77
005YrSCS24	01-01-2019 20:30:00	0.77
005YrSCS24	01-01-2019 20:40:00	0.77
005YrSCS24	01-01-2019 20:50:00	0.77
005YrSCS24	01-01-2019 21:00:00	0.77
005YrSCS24	01-01-2019 21:10:00	0.77
005YrSCS24	01-01-2019 21:20:00	0.77
005YrSCS24	01-01-2019 21:30:00	0.77
005YrSCS24	01-01-2019 21:40:00	0.77
005YrSCS24	01-01-2019 21:50:00	0.77
005YrSCS24	01-01-2019 22:00:00	0.77
005YrSCS24	01-01-2019 22:10:00	0.77
005YrSCS24	01-01-2019 22:20:00	0.77
005YrSCS24	01-01-2019 22:30:00	0.77
005YrSCS24	01-01-2019 22:40:00	0.77
005YrSCS24	01-01-2019 22:50:00	0.77
005YrSCS24	01-01-2019 23:00:00	0.77
005YrSCS24	01-01-2019 23:10:00	0.77
005YrSCS24	01-01-2019 23:20:00	0.77

005YrSCS24 01-01-2019 23:30:00 0.77

005YrSCS24 01-01-2019 23:40:00 0.77

005YrSCS24 01-01-2019 23:50:00 0.77

;Rainfall (mm/hr)

010yrChicago3hr 01-01-2019 00:00:00 0

010yrChicago3hr 01-01-2019 00:10:00 4.24804

010yrChicago3hr 01-01-2019 00:20:00 5.29032

010yrChicago3hr 01-01-2019 00:30:00 7.10821

010yrChicago3hr 01-01-2019 00:40:00 11.12994

010yrChicago3hr 01-01-2019 00:50:00 28.09961

010yrChicago3hr 01-01-2019 01:00:00 122.1418

010yrChicago3hr 01-01-2019 01:10:00 37.28489

010yrChicago3hr 01-01-2019 01:20:00 18.95368

010yrChicago3hr 01-01-2019 01:30:00 12.69959

010yrChicago3hr 01-01-2019 01:40:00 9.58762

010yrChicago3hr 01-01-2019 01:50:00 7.7327

010yrChicago3hr 01-01-2019 02:00:00 6.50203

010yrChicago3hr 01-01-2019 02:10:00 5.6255

010yrChicago3hr 01-01-2019 02:20:00 4.96886

010yrChicago3hr 01-01-2019 02:30:00 4.45808

010yrChicago3hr 01-01-2019 02:40:00 4.04902

010yrChicago3hr 01-01-2019 02:50:00 3.71371

010yrChicago3hr 01-01-2019 03:00:00 3.4336

;Rainfall (mm/hr)

010YrSCS24 01-01-2019 00:00:00 0.82

010YrSCS24 01-01-2019 00:10:00 0.82

010YrSCS24 01-01-2019 00:20:00 0.82

010YrSCS24	01-01-2019 00:30:00	0.82
010YrSCS24	01-01-2019 00:40:00	0.82
010YrSCS24	01-01-2019 00:50:00	0.82
010YrSCS24	01-01-2019 01:00:00	0.82
010YrSCS24	01-01-2019 01:10:00	0.82
010YrSCS24	01-01-2019 01:20:00	0.82
010YrSCS24	01-01-2019 01:30:00	0.82
010YrSCS24	01-01-2019 01:40:00	0.82
010YrSCS24	01-01-2019 01:50:00	0.82
010YrSCS24	01-01-2019 02:00:00	0.97
010YrSCS24	01-01-2019 02:10:00	0.97
010YrSCS24	01-01-2019 02:20:00	0.97
010YrSCS24	01-01-2019 02:30:00	0.97
010YrSCS24	01-01-2019 02:40:00	0.97
010YrSCS24	01-01-2019 02:50:00	0.97
010YrSCS24	01-01-2019 03:00:00	0.97
010YrSCS24	01-01-2019 03:10:00	0.97
010YrSCS24	01-01-2019 03:20:00	0.97
010YrSCS24	01-01-2019 03:30:00	0.97
010YrSCS24	01-01-2019 03:40:00	0.97
010YrSCS24	01-01-2019 03:50:00	0.97
010YrSCS24	01-01-2019 04:00:00	1.19
010YrSCS24	01-01-2019 04:10:00	1.19
010YrSCS24	01-01-2019 04:20:00	1.19
010YrSCS24	01-01-2019 04:30:00	1.19
010YrSCS24	01-01-2019 04:40:00	1.19
010YrSCS24	01-01-2019 04:50:00	1.19
010YrSCS24	01-01-2019 05:00:00	1.19
010YrSCS24	01-01-2019 05:10:00	1.19

010YrSCS24	01-01-2019 05:20:00	1.19
010YrSCS24	01-01-2019 05:30:00	1.19
010YrSCS24	01-01-2019 05:40:00	1.19
010YrSCS24	01-01-2019 05:50:00	1.19
010YrSCS24	01-01-2019 06:00:00	1.34
010YrSCS24	01-01-2019 06:10:00	1.34
010YrSCS24	01-01-2019 06:20:00	1.34
010YrSCS24	01-01-2019 06:30:00	1.34
010YrSCS24	01-01-2019 06:40:00	1.34
010YrSCS24	01-01-2019 06:50:00	1.34
010YrSCS24	01-01-2019 07:00:00	1.64
010YrSCS24	01-01-2019 07:10:00	1.64
010YrSCS24	01-01-2019 07:20:00	1.64
010YrSCS24	01-01-2019 07:30:00	1.64
010YrSCS24	01-01-2019 07:40:00	1.64
010YrSCS24	01-01-2019 07:50:00	1.64
010YrSCS24	01-01-2019 08:00:00	1.93
010YrSCS24	01-01-2019 08:10:00	1.93
010YrSCS24	01-01-2019 08:20:00	1.93
010YrSCS24	01-01-2019 08:30:00	2.08
010YrSCS24	01-01-2019 08:40:00	2.08
010YrSCS24	01-01-2019 08:50:00	2.08
010YrSCS24	01-01-2019 09:00:00	2.38
010YrSCS24	01-01-2019 09:10:00	2.38
010YrSCS24	01-01-2019 09:20:00	2.38
010YrSCS24	01-01-2019 09:30:00	2.68
010YrSCS24	01-01-2019 09:40:00	2.68
010YrSCS24	01-01-2019 09:50:00	2.68
010YrSCS24	01-01-2019 10:00:00	3.42

010YrSCS24	01-01-2019 10:10:00	3.42
010YrSCS24	01-01-2019 10:20:00	3.42
010YrSCS24	01-01-2019 10:30:00	4.61
010YrSCS24	01-01-2019 10:40:00	4.61
010YrSCS24	01-01-2019 10:50:00	4.61
010YrSCS24	01-01-2019 11:00:00	7.14
010YrSCS24	01-01-2019 11:10:00	7.14
010YrSCS24	01-01-2019 11:20:00	7.14
010YrSCS24	01-01-2019 11:30:00	22
010YrSCS24	01-01-2019 11:40:00	56.5
010YrSCS24	01-01-2019 11:50:00	90.99
010YrSCS24	01-01-2019 12:00:00	10.7
010YrSCS24	01-01-2019 12:10:00	10.7
010YrSCS24	01-01-2019 12:20:00	10.7
010YrSCS24	01-01-2019 12:30:00	5.5
010YrSCS24	01-01-2019 12:40:00	5.5
010YrSCS24	01-01-2019 12:50:00	5.5
010YrSCS24	01-01-2019 13:00:00	4.01
010YrSCS24	01-01-2019 13:10:00	4.01
010YrSCS24	01-01-2019 13:20:00	4.01
010YrSCS24	01-01-2019 13:30:00	3.12
010YrSCS24	01-01-2019 13:40:00	3.12
010YrSCS24	01-01-2019 13:50:00	3.12
010YrSCS24	01-01-2019 14:00:00	2.23
010YrSCS24	01-01-2019 14:10:00	2.23
010YrSCS24	01-01-2019 14:20:00	2.23
010YrSCS24	01-01-2019 14:30:00	2.23
010YrSCS24	01-01-2019 14:40:00	2.23
010YrSCS24	01-01-2019 14:50:00	2.23

010YrSCS24	01-01-2019 15:00:00	2.23
010YrSCS24	01-01-2019 15:10:00	2.23
010YrSCS24	01-01-2019 15:20:00	2.23
010YrSCS24	01-01-2019 15:30:00	2.23
010YrSCS24	01-01-2019 15:40:00	2.23
010YrSCS24	01-01-2019 15:50:00	2.23
010YrSCS24	01-01-2019 16:00:00	1.34
010YrSCS24	01-01-2019 16:10:00	1.34
010YrSCS24	01-01-2019 16:20:00	1.34
010YrSCS24	01-01-2019 16:30:00	1.34
010YrSCS24	01-01-2019 16:40:00	1.34
010YrSCS24	01-01-2019 16:50:00	1.34
010YrSCS24	01-01-2019 17:00:00	1.34
010YrSCS24	01-01-2019 17:10:00	1.34
010YrSCS24	01-01-2019 17:20:00	1.34
010YrSCS24	01-01-2019 17:30:00	1.34
010YrSCS24	01-01-2019 17:40:00	1.34
010YrSCS24	01-01-2019 17:50:00	1.34
010YrSCS24	01-01-2019 18:00:00	1.34
010YrSCS24	01-01-2019 18:10:00	1.34
010YrSCS24	01-01-2019 18:20:00	1.34
010YrSCS24	01-01-2019 18:30:00	1.34
010YrSCS24	01-01-2019 18:40:00	1.34
010YrSCS24	01-01-2019 18:50:00	1.34
010YrSCS24	01-01-2019 19:00:00	1.34
010YrSCS24	01-01-2019 19:10:00	1.34
010YrSCS24	01-01-2019 19:20:00	1.34
010YrSCS24	01-01-2019 19:30:00	1.34
010YrSCS24	01-01-2019 19:40:00	1.34

010YrSCS24 01-01-2019 19:50:00 1.34

010YrSCS24 01-01-2019 20:00:00 0.89

010YrSCS24 01-01-2019 20:10:00 0.89

010YrSCS24 01-01-2019 20:20:00 0.89

010YrSCS24 01-01-2019 20:30:00 0.89

010YrSCS24 01-01-2019 20:40:00 0.89

010YrSCS24 01-01-2019 20:50:00 0.89

010YrSCS24 01-01-2019 21:00:00 0.89

010YrSCS24 01-01-2019 21:10:00 0.89

010YrSCS24 01-01-2019 21:20:00 0.89

010YrSCS24 01-01-2019 21:30:00 0.89

010YrSCS24 01-01-2019 21:40:00 0.89

010YrSCS24 01-01-2019 21:50:00 0.89

010YrSCS24 01-01-2019 22:00:00 0.89

010YrSCS24 01-01-2019 22:10:00 0.89

010YrSCS24 01-01-2019 22:20:00 0.89

010YrSCS24 01-01-2019 22:30:00 0.89

010YrSCS24 01-01-2019 22:40:00 0.89

010YrSCS24 01-01-2019 22:50:00 0.89

010YrSCS24 01-01-2019 23:00:00 0.89

010YrSCS24 01-01-2019 23:10:00 0.89

010YrSCS24 01-01-2019 23:20:00 0.89

010YrSCS24 01-01-2019 23:30:00 0.89

010YrSCS24 01-01-2019 23:40:00 0.89

010YrSCS24 01-01-2019 23:50:00 0.89

;Rainfall (mm/hr)

025yrChicago3hr 01-01-2019 00:00:00 0

025yrChicago3hr 01-01-2019 00:10:00 4.9336

025yrChicago3hr 01-01-2019 00:20:00 6.15217

025yrChicago3hr 01-01-2019 00:30:00 8.28157

025yrChicago3hr 01-01-2019 00:40:00 13.00553

025yrChicago3hr 01-01-2019 00:50:00 33.04079

025yrChicago3hr 01-01-2019 01:00:00 144.693

025yrChicago3hr 01-01-2019 01:10:00 43.90416

025yrChicago3hr 01-01-2019 01:20:00 22.22391

025yrChicago3hr 01-01-2019 01:30:00 14.85162

025yrChicago3hr 01-01-2019 01:40:00 11.19158

025yrChicago3hr 01-01-2019 01:50:00 9.01374

025yrChicago3hr 01-01-2019 02:00:00 7.57085

025yrChicago3hr 01-01-2019 02:10:00 6.54433

025yrChicago3hr 01-01-2019 02:20:00 5.77608

025yrChicago3hr 01-01-2019 02:30:00 5.17898

025yrChicago3hr 01-01-2019 02:40:00 4.7011

025yrChicago3hr 01-01-2019 02:50:00 4.30965

025yrChicago3hr 01-01-2019 03:00:00 3.98283

;Rainfall (mm/hr)

025YrSCS24 01-01-2019 00:00:00 0.96

025YrSCS24 01-01-2019 00:10:00 0.96

025YrSCS24 01-01-2019 00:20:00 0.96

025YrSCS24 01-01-2019 00:30:00 0.96

025YrSCS24 01-01-2019 00:40:00 0.96

025YrSCS24 01-01-2019 00:50:00 0.96

025YrSCS24 01-01-2019 01:00:00 0.96

025YrSCS24 01-01-2019 01:10:00 0.96

025YrSCS24 01-01-2019 01:20:00 0.96

025YrSCS24 01-01-2019 01:30:00 0.96

025YrSCS24	01-01-2019 01:40:00	0.96
025YrSCS24	01-01-2019 01:50:00	0.96
025YrSCS24	01-01-2019 02:00:00	1.13
025YrSCS24	01-01-2019 02:10:00	1.13
025YrSCS24	01-01-2019 02:20:00	1.13
025YrSCS24	01-01-2019 02:30:00	1.13
025YrSCS24	01-01-2019 02:40:00	1.13
025YrSCS24	01-01-2019 02:50:00	1.13
025YrSCS24	01-01-2019 03:00:00	1.13
025YrSCS24	01-01-2019 03:10:00	1.13
025YrSCS24	01-01-2019 03:20:00	1.13
025YrSCS24	01-01-2019 03:30:00	1.13
025YrSCS24	01-01-2019 03:40:00	1.13
025YrSCS24	01-01-2019 03:50:00	1.13
025YrSCS24	01-01-2019 04:00:00	1.39
025YrSCS24	01-01-2019 04:10:00	1.39
025YrSCS24	01-01-2019 04:20:00	1.39
025YrSCS24	01-01-2019 04:30:00	1.39
025YrSCS24	01-01-2019 04:40:00	1.39
025YrSCS24	01-01-2019 04:50:00	1.39
025YrSCS24	01-01-2019 05:00:00	1.39
025YrSCS24	01-01-2019 05:10:00	1.39
025YrSCS24	01-01-2019 05:20:00	1.39
025YrSCS24	01-01-2019 05:30:00	1.39
025YrSCS24	01-01-2019 05:40:00	1.39
025YrSCS24	01-01-2019 05:50:00	1.39
025YrSCS24	01-01-2019 06:00:00	1.56
025YrSCS24	01-01-2019 06:10:00	1.56
025YrSCS24	01-01-2019 06:20:00	1.56

025YrSCS24	01-01-2019 06:30:00	1.56
025YrSCS24	01-01-2019 06:40:00	1.56
025YrSCS24	01-01-2019 06:50:00	1.56
025YrSCS24	01-01-2019 07:00:00	1.91
025YrSCS24	01-01-2019 07:10:00	1.91
025YrSCS24	01-01-2019 07:20:00	1.91
025YrSCS24	01-01-2019 07:30:00	1.91
025YrSCS24	01-01-2019 07:40:00	1.91
025YrSCS24	01-01-2019 07:50:00	1.91
025YrSCS24	01-01-2019 08:00:00	2.26
025YrSCS24	01-01-2019 08:10:00	2.26
025YrSCS24	01-01-2019 08:20:00	2.26
025YrSCS24	01-01-2019 08:30:00	2.43
025YrSCS24	01-01-2019 08:40:00	2.43
025YrSCS24	01-01-2019 08:50:00	2.43
025YrSCS24	01-01-2019 09:00:00	2.78
025YrSCS24	01-01-2019 09:10:00	2.78
025YrSCS24	01-01-2019 09:20:00	2.78
025YrSCS24	01-01-2019 09:30:00	3.13
025YrSCS24	01-01-2019 09:40:00	3.13
025YrSCS24	01-01-2019 09:50:00	3.13
025YrSCS24	01-01-2019 10:00:00	4
025YrSCS24	01-01-2019 10:10:00	4
025YrSCS24	01-01-2019 10:20:00	4
025YrSCS24	01-01-2019 10:30:00	5.39
025YrSCS24	01-01-2019 10:40:00	5.39
025YrSCS24	01-01-2019 10:50:00	5.39
025YrSCS24	01-01-2019 11:00:00	8.34
025YrSCS24	01-01-2019 11:10:00	8.34

025YrSCS24	01-01-2019 11:20:00	8.34
025YrSCS24	01-01-2019 11:30:00	25.73
025YrSCS24	01-01-2019 11:40:00	66.05
025YrSCS24	01-01-2019 11:50:00	106.38
025YrSCS24	01-01-2019 12:00:00	12.52
025YrSCS24	01-01-2019 12:10:00	12.52
025YrSCS24	01-01-2019 12:20:00	12.52
025YrSCS24	01-01-2019 12:30:00	6.43
025YrSCS24	01-01-2019 12:40:00	6.43
025YrSCS24	01-01-2019 12:50:00	6.43
025YrSCS24	01-01-2019 13:00:00	4.69
025YrSCS24	01-01-2019 13:10:00	4.69
025YrSCS24	01-01-2019 13:20:00	4.69
025YrSCS24	01-01-2019 13:30:00	3.65
025YrSCS24	01-01-2019 13:40:00	3.65
025YrSCS24	01-01-2019 13:50:00	3.65
025YrSCS24	01-01-2019 14:00:00	2.61
025YrSCS24	01-01-2019 14:10:00	2.61
025YrSCS24	01-01-2019 14:20:00	2.61
025YrSCS24	01-01-2019 14:30:00	2.61
025YrSCS24	01-01-2019 14:40:00	2.61
025YrSCS24	01-01-2019 14:50:00	2.61
025YrSCS24	01-01-2019 15:00:00	2.61
025YrSCS24	01-01-2019 15:10:00	2.61
025YrSCS24	01-01-2019 15:20:00	2.61
025YrSCS24	01-01-2019 15:30:00	2.61
025YrSCS24	01-01-2019 15:40:00	2.61
025YrSCS24	01-01-2019 15:50:00	2.61
025YrSCS24	01-01-2019 16:00:00	1.56

025YrSCS24	01-01-2019 16:10:00	1.56
025YrSCS24	01-01-2019 16:20:00	1.56
025YrSCS24	01-01-2019 16:30:00	1.56
025YrSCS24	01-01-2019 16:40:00	1.56
025YrSCS24	01-01-2019 16:50:00	1.56
025YrSCS24	01-01-2019 17:00:00	1.56
025YrSCS24	01-01-2019 17:10:00	1.56
025YrSCS24	01-01-2019 17:20:00	1.56
025YrSCS24	01-01-2019 17:30:00	1.56
025YrSCS24	01-01-2019 17:40:00	1.56
025YrSCS24	01-01-2019 17:50:00	1.56
025YrSCS24	01-01-2019 18:00:00	1.56
025YrSCS24	01-01-2019 18:10:00	1.56
025YrSCS24	01-01-2019 18:20:00	1.56
025YrSCS24	01-01-2019 18:30:00	1.56
025YrSCS24	01-01-2019 18:40:00	1.56
025YrSCS24	01-01-2019 18:50:00	1.56
025YrSCS24	01-01-2019 19:00:00	1.56
025YrSCS24	01-01-2019 19:10:00	1.56
025YrSCS24	01-01-2019 19:20:00	1.56
025YrSCS24	01-01-2019 19:30:00	1.56
025YrSCS24	01-01-2019 19:40:00	1.56
025YrSCS24	01-01-2019 19:50:00	1.56
025YrSCS24	01-01-2019 20:00:00	1.04
025YrSCS24	01-01-2019 20:10:00	1.04
025YrSCS24	01-01-2019 20:20:00	1.04
025YrSCS24	01-01-2019 20:30:00	1.04
025YrSCS24	01-01-2019 20:40:00	1.04
025YrSCS24	01-01-2019 20:50:00	1.04

025YrSCS24 01-01-2019 21:00:00 1.04

025YrSCS24 01-01-2019 21:10:00 1.04

025YrSCS24 01-01-2019 21:20:00 1.04

025YrSCS24 01-01-2019 21:30:00 1.04

025YrSCS24 01-01-2019 21:40:00 1.04

025YrSCS24 01-01-2019 21:50:00 1.04

025YrSCS24 01-01-2019 22:00:00 1.04

025YrSCS24 01-01-2019 22:10:00 1.04

025YrSCS24 01-01-2019 22:20:00 1.04

025YrSCS24 01-01-2019 22:30:00 1.04

025YrSCS24 01-01-2019 22:40:00 1.04

025YrSCS24 01-01-2019 22:50:00 1.04

025YrSCS24 01-01-2019 23:00:00 1.04

025YrSCS24 01-01-2019 23:10:00 1.04

025YrSCS24 01-01-2019 23:20:00 1.04

025YrSCS24 01-01-2019 23:30:00 1.04

025YrSCS24 01-01-2019 23:40:00 1.04

025YrSCS24 01-01-2019 23:50:00 1.04

;Rainfall (mm/hr)

050yrChicago3hr 01-01-2019 00:00:00 0

050yrChicago3hr 01-01-2019 00:10:00 5.46715

050yrChicago3hr 01-01-2019 00:20:00 6.8204

050yrChicago3hr 01-01-2019 00:30:00 9.18659

050yrChicago3hr 01-01-2019 00:40:00 14.44064

050yrChicago3hr 01-01-2019 00:50:00 36.76423

050yrChicago3hr 01-01-2019 01:00:00 161.4707

050yrChicago3hr 01-01-2019 01:10:00 48.876

050yrChicago3hr 01-01-2019 01:20:00 24.70426

050yrChicago3hr 01-01-2019 01:30:00 16.49475

050yrChicago3hr 01-01-2019 01:40:00 12.42227

050yrChicago3hr 01-01-2019 01:50:00 10.00043

050yrChicago3hr 01-01-2019 02:00:00 8.39661

050yrChicago3hr 01-01-2019 02:10:00 7.256

050yrChicago3hr 01-01-2019 02:20:00 6.40264

050yrChicago3hr 01-01-2019 02:30:00 5.73956

050yrChicago3hr 01-01-2019 02:40:00 5.20902

050yrChicago3hr 01-01-2019 02:50:00 4.77451

050yrChicago3hr 01-01-2019 03:00:00 4.41182

;Rainfall (mm/hr)

050YrSCS24 01-01-2019 00:00:00 1.06

050YrSCS24 01-01-2019 00:10:00 1.06

050YrSCS24 01-01-2019 00:20:00 1.06

050YrSCS24 01-01-2019 00:30:00 1.06

050YrSCS24 01-01-2019 00:40:00 1.06

050YrSCS24 01-01-2019 00:50:00 1.06

050YrSCS24 01-01-2019 01:00:00 1.06

050YrSCS24 01-01-2019 01:10:00 1.06

050YrSCS24 01-01-2019 01:20:00 1.06

050YrSCS24 01-01-2019 01:30:00 1.06

050YrSCS24 01-01-2019 01:40:00 1.06

050YrSCS24 01-01-2019 01:50:00 1.06

050YrSCS24 01-01-2019 02:00:00 1.25

050YrSCS24 01-01-2019 02:10:00 1.25

050YrSCS24 01-01-2019 02:20:00 1.25

050YrSCS24 01-01-2019 02:30:00 1.25

050YrSCS24 01-01-2019 02:40:00 1.25

050YrSCS24	01-01-2019 02:50:00	1.25
050YrSCS24	01-01-2019 03:00:00	1.25
050YrSCS24	01-01-2019 03:10:00	1.25
050YrSCS24	01-01-2019 03:20:00	1.25
050YrSCS24	01-01-2019 03:30:00	1.25
050YrSCS24	01-01-2019 03:40:00	1.25
050YrSCS24	01-01-2019 03:50:00	1.25
050YrSCS24	01-01-2019 04:00:00	1.54
050YrSCS24	01-01-2019 04:10:00	1.54
050YrSCS24	01-01-2019 04:20:00	1.54
050YrSCS24	01-01-2019 04:30:00	1.54
050YrSCS24	01-01-2019 04:40:00	1.54
050YrSCS24	01-01-2019 04:50:00	1.54
050YrSCS24	01-01-2019 05:00:00	1.54
050YrSCS24	01-01-2019 05:10:00	1.54
050YrSCS24	01-01-2019 05:20:00	1.54
050YrSCS24	01-01-2019 05:30:00	1.54
050YrSCS24	01-01-2019 05:40:00	1.54
050YrSCS24	01-01-2019 05:50:00	1.54
050YrSCS24	01-01-2019 06:00:00	1.74
050YrSCS24	01-01-2019 06:10:00	1.74
050YrSCS24	01-01-2019 06:20:00	1.74
050YrSCS24	01-01-2019 06:30:00	1.74
050YrSCS24	01-01-2019 06:40:00	1.74
050YrSCS24	01-01-2019 06:50:00	1.74
050YrSCS24	01-01-2019 07:00:00	2.12
050YrSCS24	01-01-2019 07:10:00	2.12
050YrSCS24	01-01-2019 07:20:00	2.12
050YrSCS24	01-01-2019 07:30:00	2.12

050YrSCS24	01-01-2019 07:40:00	2.12
050YrSCS24	01-01-2019 07:50:00	2.12
050YrSCS24	01-01-2019 08:00:00	2.51
050YrSCS24	01-01-2019 08:10:00	2.51
050YrSCS24	01-01-2019 08:20:00	2.51
050YrSCS24	01-01-2019 08:30:00	2.7
050YrSCS24	01-01-2019 08:40:00	2.7
050YrSCS24	01-01-2019 08:50:00	2.7
050YrSCS24	01-01-2019 09:00:00	3.09
050YrSCS24	01-01-2019 09:10:00	3.09
050YrSCS24	01-01-2019 09:20:00	3.09
050YrSCS24	01-01-2019 09:30:00	3.48
050YrSCS24	01-01-2019 09:40:00	3.48
050YrSCS24	01-01-2019 09:50:00	3.48
050YrSCS24	01-01-2019 10:00:00	4.44
050YrSCS24	01-01-2019 10:10:00	4.44
050YrSCS24	01-01-2019 10:20:00	4.44
050YrSCS24	01-01-2019 10:30:00	5.98
050YrSCS24	01-01-2019 10:40:00	5.98
050YrSCS24	01-01-2019 10:50:00	5.98
050YrSCS24	01-01-2019 11:00:00	9.27
050YrSCS24	01-01-2019 11:10:00	9.27
050YrSCS24	01-01-2019 11:20:00	9.27
050YrSCS24	01-01-2019 11:30:00	28.57
050YrSCS24	01-01-2019 11:40:00	73.36
050YrSCS24	01-01-2019 11:50:00	118.15
050YrSCS24	01-01-2019 12:00:00	13.9
050YrSCS24	01-01-2019 12:10:00	13.9
050YrSCS24	01-01-2019 12:20:00	13.9

050YrSCS24	01-01-2019 12:30:00	7.14
050YrSCS24	01-01-2019 12:40:00	7.14
050YrSCS24	01-01-2019 12:50:00	7.14
050YrSCS24	01-01-2019 13:00:00	5.21
050YrSCS24	01-01-2019 13:10:00	5.21
050YrSCS24	01-01-2019 13:20:00	5.21
050YrSCS24	01-01-2019 13:30:00	4.05
050YrSCS24	01-01-2019 13:40:00	4.05
050YrSCS24	01-01-2019 13:50:00	4.05
050YrSCS24	01-01-2019 14:00:00	2.9
050YrSCS24	01-01-2019 14:10:00	2.9
050YrSCS24	01-01-2019 14:20:00	2.9
050YrSCS24	01-01-2019 14:30:00	2.9
050YrSCS24	01-01-2019 14:40:00	2.9
050YrSCS24	01-01-2019 14:50:00	2.9
050YrSCS24	01-01-2019 15:00:00	2.9
050YrSCS24	01-01-2019 15:10:00	2.9
050YrSCS24	01-01-2019 15:20:00	2.9
050YrSCS24	01-01-2019 15:30:00	2.9
050YrSCS24	01-01-2019 15:40:00	2.9
050YrSCS24	01-01-2019 15:50:00	2.9
050YrSCS24	01-01-2019 16:00:00	1.74
050YrSCS24	01-01-2019 16:10:00	1.74
050YrSCS24	01-01-2019 16:20:00	1.74
050YrSCS24	01-01-2019 16:30:00	1.74
050YrSCS24	01-01-2019 16:40:00	1.74
050YrSCS24	01-01-2019 16:50:00	1.74
050YrSCS24	01-01-2019 17:00:00	1.74
050YrSCS24	01-01-2019 17:10:00	1.74

050YrSCS24	01-01-2019 17:20:00	1.74
050YrSCS24	01-01-2019 17:30:00	1.74
050YrSCS24	01-01-2019 17:40:00	1.74
050YrSCS24	01-01-2019 17:50:00	1.74
050YrSCS24	01-01-2019 18:00:00	1.74
050YrSCS24	01-01-2019 18:10:00	1.74
050YrSCS24	01-01-2019 18:20:00	1.74
050YrSCS24	01-01-2019 18:30:00	1.74
050YrSCS24	01-01-2019 18:40:00	1.74
050YrSCS24	01-01-2019 18:50:00	1.74
050YrSCS24	01-01-2019 19:00:00	1.74
050YrSCS24	01-01-2019 19:10:00	1.74
050YrSCS24	01-01-2019 19:20:00	1.74
050YrSCS24	01-01-2019 19:30:00	1.74
050YrSCS24	01-01-2019 19:40:00	1.74
050YrSCS24	01-01-2019 19:50:00	1.74
050YrSCS24	01-01-2019 20:00:00	1.16
050YrSCS24	01-01-2019 20:10:00	1.16
050YrSCS24	01-01-2019 20:20:00	1.16
050YrSCS24	01-01-2019 20:30:00	1.16
050YrSCS24	01-01-2019 20:40:00	1.16
050YrSCS24	01-01-2019 20:50:00	1.16
050YrSCS24	01-01-2019 21:00:00	1.16
050YrSCS24	01-01-2019 21:10:00	1.16
050YrSCS24	01-01-2019 21:20:00	1.16
050YrSCS24	01-01-2019 21:30:00	1.16
050YrSCS24	01-01-2019 21:40:00	1.16
050YrSCS24	01-01-2019 21:50:00	1.16
050YrSCS24	01-01-2019 22:00:00	1.16

050YrSCS24 01-01-2019 22:10:00 1.16

050YrSCS24 01-01-2019 22:20:00 1.16

050YrSCS24 01-01-2019 22:30:00 1.16

050YrSCS24 01-01-2019 22:40:00 1.16

050YrSCS24 01-01-2019 22:50:00 1.16

050YrSCS24 01-01-2019 23:00:00 1.16

050YrSCS24 01-01-2019 23:10:00 1.16

050YrSCS24 01-01-2019 23:20:00 1.16

050YrSCS24 01-01-2019 23:30:00 1.16

050YrSCS24 01-01-2019 23:40:00 1.16

050YrSCS24 01-01-2019 23:50:00 1.16

;Rainfall (mm/hr)

100yrChicago3hr 01-01-2019 00:00:00 0

100yrChicago3hr 01-01-2019 00:10:00 6.04573

100yrChicago3hr 01-01-2019 00:20:00 7.54219

100yrChicago3hr 01-01-2019 00:30:00 10.1588

100yrChicago3hr 01-01-2019 00:40:00 15.96889

100yrChicago3hr 01-01-2019 00:50:00 40.65497

100yrChicago3hr 01-01-2019 01:00:00 178.559

100yrChicago3hr 01-01-2019 01:10:00 54.04853

100yrChicago3hr 01-01-2019 01:20:00 27.3187

100yrChicago3hr 01-01-2019 01:30:00 18.24039

100yrChicago3hr 01-01-2019 01:40:00 13.73692

100yrChicago3hr 01-01-2019 01:50:00 11.05876

100yrChicago3hr 01-01-2019 02:00:00 9.28521

100yrChicago3hr 01-01-2019 02:10:00 8.02389

100yrChicago3hr 01-01-2019 02:20:00 7.08022

100yrChicago3hr 01-01-2019 02:30:00 6.34698

100yrChicago3hr 01-01-2019 02:40:00 5.76029

100yrChicago3hr 01-01-2019 02:50:00 5.27978

100yrChicago3hr 01-01-2019 03:00:00 4.87871

;Rainfall (mm/hr)

100yrChicago3hr+20% 01-01-2019 00:00:00 0

100yrChicago3hr+20% 01-01-2019 00:10:00 7.25488

100yrChicago3hr+20% 01-01-2019 00:20:00 9.05063

100yrChicago3hr+20% 01-01-2019 00:30:00 12.19056

100yrChicago3hr+20% 01-01-2019 00:40:00 19.16267

100yrChicago3hr+20% 01-01-2019 00:50:00 48.78596

100yrChicago3hr+20% 01-01-2019 01:00:00 214.2708

100yrChicago3hr+20% 01-01-2019 01:10:00 64.85824

100yrChicago3hr+20% 01-01-2019 01:20:00 32.78244

100yrChicago3hr+20% 01-01-2019 01:30:00 21.88847

100yrChicago3hr+20% 01-01-2019 01:40:00 16.4843

100yrChicago3hr+20% 01-01-2019 01:50:00 13.27051

100yrChicago3hr+20% 01-01-2019 02:00:00 11.14225

100yrChicago3hr+20% 01-01-2019 02:10:00 9.62867

100yrChicago3hr+20% 01-01-2019 02:20:00 8.49626

100yrChicago3hr+20% 01-01-2019 02:30:00 7.61638

100yrChicago3hr+20% 01-01-2019 02:40:00 6.91235

100yrChicago3hr+20% 01-01-2019 02:50:00 6.33574

100yrChicago3hr+20% 01-01-2019 03:00:00 5.85445

;Rainfall (mm/hr)

100YrSCS12hr 01-01-2019 0:00:00 2.4

100YrSCS12hr 01-01-2019 0:15:00 2.4

100YrSCS12hr 01-01-2019 0:30:00 2.4

100YrSCS12hr	01-01-2019 0:45:00	2.4
100YrSCS12hr	01-01-2019 1:00:00	2.4
100YrSCS12hr	01-01-2019 1:15:00	2.4
100YrSCS12hr	01-01-2019 1:30:00	2.4
100YrSCS12hr	01-01-2019 1:45:00	2.4
100YrSCS12hr	01-01-2019 2:00:00	2.88
100YrSCS12hr	01-01-2019 2:15:00	2.88
100YrSCS12hr	01-01-2019 2:30:00	2.88
100YrSCS12hr	01-01-2019 2:45:00	2.88
100YrSCS12hr	01-01-2019 3:00:00	3.84
100YrSCS12hr	01-01-2019 3:15:00	3.84
100YrSCS12hr	01-01-2019 3:30:00	3.84
100YrSCS12hr	01-01-2019 3:45:00	3.84
100YrSCS12hr	01-01-2019 4:00:00	5.76
100YrSCS12hr	01-01-2019 4:15:00	5.76
100YrSCS12hr	01-01-2019 4:30:00	7.68
100YrSCS12hr	01-01-2019 4:45:00	7.68
100YrSCS12hr	01-01-2019 5:00:00	11.52
100YrSCS12hr	01-01-2019 5:15:00	11.52
100YrSCS12hr	01-01-2019 5:30:00	46.08
100YrSCS12hr	01-01-2019 5:45:00	126.72
100YrSCS12hr	01-01-2019 6:00:00	17.28
100YrSCS12hr	01-01-2019 6:15:00	17.28
100YrSCS12hr	01-01-2019 6:30:00	7.68
100YrSCS12hr	01-01-2019 6:45:00	7.68
100YrSCS12hr	01-01-2019 7:00:00	5.76
100YrSCS12hr	01-01-2019 7:15:00	5.76
100YrSCS12hr	01-01-2019 7:30:00	5.76
100YrSCS12hr	01-01-2019 7:45:00	5.76

100YrSCS12hr 01-01-2019 8:00:00 3.36

100YrSCS12hr 01-01-2019 8:15:00 3.36

100YrSCS12hr 01-01-2019 8:30:00 3.36

100YrSCS12hr 01-01-2019 8:45:00 3.36

100YrSCS12hr 01-01-2019 9:00:00 3.36

100YrSCS12hr 01-01-2019 9:15:00 3.36

100YrSCS12hr 01-01-2019 9:30:00 3.36

100YrSCS12hr 01-01-2019 9:45:00 3.36

100YrSCS12hr 01-01-2019 10:00:00 1.92

100YrSCS12hr 01-01-2019 10:15:00 1.92

100YrSCS12hr 01-01-2019 10:30:00 1.92

100YrSCS12hr 01-01-2019 10:45:00 1.92

100YrSCS12hr 01-01-2019 11:00:00 1.92

100YrSCS12hr 01-01-2019 11:15:00 1.92

100YrSCS12hr 01-01-2019 11:30:00 1.92

100YrSCS12hr 01-01-2019 11:45:00 1.92

100YrSCS12hr 01-01-2019 12:00:00 0

;Rainfall (mm/hr)

100YrSCS24 01/01/2019 00:00:00 1.17

100YrSCS24 01/01/2019 00:10:00 1.17

100YrSCS24 01/01/2019 00:20:00 1.17

100YrSCS24 01/01/2019 00:30:00 1.17

100YrSCS24 01/01/2019 00:40:00 1.17

100YrSCS24 01/01/2019 00:50:00 1.17

100YrSCS24 01/01/2019 01:00:00 1.17

100YrSCS24 01/01/2019 01:10:00 1.17

100YrSCS24 01/01/2019 01:20:00 1.17

100YrSCS24 01/01/2019 01:30:00 1.17

100YrSCS24	01/01/2019 01:40:00	1.17
100YrSCS24	01/01/2019 01:50:00	1.17
100YrSCS24	01/01/2019 02:00:00	1.39
100YrSCS24	01/01/2019 02:10:00	1.39
100YrSCS24	01/01/2019 02:20:00	1.39
100YrSCS24	01/01/2019 02:30:00	1.39
100YrSCS24	01/01/2019 02:40:00	1.39
100YrSCS24	01/01/2019 02:50:00	1.39
100YrSCS24	01/01/2019 03:00:00	1.39
100YrSCS24	01/01/2019 03:10:00	1.39
100YrSCS24	01/01/2019 03:20:00	1.39
100YrSCS24	01/01/2019 03:30:00	1.39
100YrSCS24	01/01/2019 03:40:00	1.39
100YrSCS24	01/01/2019 03:50:00	1.39
100YrSCS24	01/01/2019 04:00:00	1.71
100YrSCS24	01/01/2019 04:10:00	1.71
100YrSCS24	01/01/2019 04:20:00	1.71
100YrSCS24	01/01/2019 04:30:00	1.71
100YrSCS24	01/01/2019 04:40:00	1.71
100YrSCS24	01/01/2019 04:50:00	1.71
100YrSCS24	01/01/2019 05:00:00	1.71
100YrSCS24	01/01/2019 05:10:00	1.71
100YrSCS24	01/01/2019 05:20:00	1.71
100YrSCS24	01/01/2019 05:30:00	1.71
100YrSCS24	01/01/2019 05:40:00	1.71
100YrSCS24	01/01/2019 05:50:00	1.71
100YrSCS24	01/01/2019 06:00:00	1.92
100YrSCS24	01/01/2019 06:10:00	1.92
100YrSCS24	01/01/2019 06:20:00	1.92

100YrSCS24	01/01/2019 06:30:00	1.92
100YrSCS24	01/01/2019 06:40:00	1.92
100YrSCS24	01/01/2019 06:50:00	1.92
100YrSCS24	01/01/2019 07:00:00	2.35
100YrSCS24	01/01/2019 07:10:00	2.35
100YrSCS24	01/01/2019 07:20:00	2.35
100YrSCS24	01/01/2019 07:30:00	2.35
100YrSCS24	01/01/2019 07:40:00	2.35
100YrSCS24	01/01/2019 07:50:00	2.35
100YrSCS24	01/01/2019 08:00:00	2.78
100YrSCS24	01/01/2019 08:10:00	2.78
100YrSCS24	01/01/2019 08:20:00	2.78
100YrSCS24	01/01/2019 08:30:00	2.99
100YrSCS24	01/01/2019 08:40:00	2.99
100YrSCS24	01/01/2019 08:50:00	2.99
100YrSCS24	01/01/2019 09:00:00	3.42
100YrSCS24	01/01/2019 09:10:00	3.42
100YrSCS24	01/01/2019 09:20:00	3.42
100YrSCS24	01/01/2019 09:30:00	3.84
100YrSCS24	01/01/2019 09:40:00	3.84
100YrSCS24	01/01/2019 09:50:00	3.84
100YrSCS24	01/01/2019 10:00:00	4.91
100YrSCS24	01/01/2019 10:10:00	4.91
100YrSCS24	01/01/2019 10:20:00	4.91
100YrSCS24	01/01/2019 10:30:00	6.62
100YrSCS24	01/01/2019 10:40:00	6.62
100YrSCS24	01/01/2019 10:50:00	6.62
100YrSCS24	01/01/2019 11:00:00	10.25
100YrSCS24	01/01/2019 11:10:00	10.25

100YrSCS24	01/01/2019 11:20:00	10.25
100YrSCS24	01/01/2019 11:30:00	31.6
100YrSCS24	01/01/2019 11:40:00	81.12
100YrSCS24	01/01/2019 11:50:00	130.65
100YrSCS24	01/01/2019 12:00:00	15.37
100YrSCS24	01/01/2019 12:10:00	15.37
100YrSCS24	01/01/2019 12:20:00	15.37
100YrSCS24	01/01/2019 12:30:00	7.9
100YrSCS24	01/01/2019 12:40:00	7.9
100YrSCS24	01/01/2019 12:50:00	7.9
100YrSCS24	01/01/2019 13:00:00	5.76
100YrSCS24	01/01/2019 13:10:00	5.76
100YrSCS24	01/01/2019 13:20:00	5.76
100YrSCS24	01/01/2019 13:30:00	4.48
100YrSCS24	01/01/2019 13:40:00	4.48
100YrSCS24	01/01/2019 13:50:00	4.48
100YrSCS24	01/01/2019 14:00:00	3.2
100YrSCS24	01/01/2019 14:10:00	3.2
100YrSCS24	01/01/2019 14:20:00	3.2
100YrSCS24	01/01/2019 14:30:00	3.2
100YrSCS24	01/01/2019 14:40:00	3.2
100YrSCS24	01/01/2019 14:50:00	3.2
100YrSCS24	01/01/2019 15:00:00	3.2
100YrSCS24	01/01/2019 15:10:00	3.2
100YrSCS24	01/01/2019 15:20:00	3.2
100YrSCS24	01/01/2019 15:30:00	3.2
100YrSCS24	01/01/2019 15:40:00	3.2
100YrSCS24	01/01/2019 15:50:00	3.2
100YrSCS24	01/01/2019 16:00:00	1.92

100YrSCS24	01/01/2019 16:10:00	1.92
100YrSCS24	01/01/2019 16:20:00	1.92
100YrSCS24	01/01/2019 16:30:00	1.92
100YrSCS24	01/01/2019 16:40:00	1.92
100YrSCS24	01/01/2019 16:50:00	1.92
100YrSCS24	01/01/2019 17:00:00	1.92
100YrSCS24	01/01/2019 17:10:00	1.92
100YrSCS24	01/01/2019 17:20:00	1.92
100YrSCS24	01/01/2019 17:30:00	1.92
100YrSCS24	01/01/2019 17:40:00	1.92
100YrSCS24	01/01/2019 17:50:00	1.92
100YrSCS24	01/01/2019 18:00:00	1.92
100YrSCS24	01/01/2019 18:10:00	1.92
100YrSCS24	01/01/2019 18:20:00	1.92
100YrSCS24	01/01/2019 18:30:00	1.92
100YrSCS24	01/01/2019 18:40:00	1.92
100YrSCS24	01/01/2019 18:50:00	1.92
100YrSCS24	01/01/2019 19:00:00	1.92
100YrSCS24	01/01/2019 19:10:00	1.92
100YrSCS24	01/01/2019 19:20:00	1.92
100YrSCS24	01/01/2019 19:30:00	1.92
100YrSCS24	01/01/2019 19:40:00	1.92
100YrSCS24	01/01/2019 19:50:00	1.92
100YrSCS24	01/01/2019 20:00:00	1.28
100YrSCS24	01/01/2019 20:10:00	1.28
100YrSCS24	01/01/2019 20:20:00	1.28
100YrSCS24	01/01/2019 20:30:00	1.28
100YrSCS24	01/01/2019 20:40:00	1.28
100YrSCS24	01/01/2019 20:50:00	1.28

100YrSCS24 01/01/2019 21:00:00 1.28

100YrSCS24 01/01/2019 21:10:00 1.28

100YrSCS24 01/01/2019 21:20:00 1.28

100YrSCS24 01/01/2019 21:30:00 1.28

100YrSCS24 01/01/2019 21:40:00 1.28

100YrSCS24 01/01/2019 21:50:00 1.28

100YrSCS24 01/01/2019 22:00:00 1.28

100YrSCS24 01/01/2019 22:10:00 1.28

100YrSCS24 01/01/2019 22:20:00 1.28

100YrSCS24 01/01/2019 22:30:00 1.28

100YrSCS24 01/01/2019 22:40:00 1.28

100YrSCS24 01/01/2019 22:50:00 1.28

100YrSCS24 01/01/2019 23:00:00 1.28

100YrSCS24 01/01/2019 23:10:00 1.28

100YrSCS24 01/01/2019 23:20:00 1.28

100YrSCS24 01/01/2019 23:30:00 1.28

100YrSCS24 01/01/2019 23:40:00 1.28

100YrSCS24 01/01/2019 23:50:00 1.28

;Rainfall (mm/hr)

100YrSCS24+20% 01-01-2019 00:00:00 1.404

100YrSCS24+20% 01-01-2019 00:10:00 1.404

100YrSCS24+20% 01-01-2019 00:20:00 1.404

100YrSCS24+20% 01-01-2019 00:30:00 1.404

100YrSCS24+20% 01-01-2019 00:40:00 1.404

100YrSCS24+20% 01-01-2019 00:50:00 1.404

100YrSCS24+20% 01-01-2019 01:00:00 1.404

100YrSCS24+20% 01-01-2019 01:10:00 1.404

100YrSCS24+20% 01-01-2019 01:20:00 1.404

100YrSCS24+20%	01-01-2019 01:30:00	1.404
100YrSCS24+20%	01-01-2019 01:40:00	1.404
100YrSCS24+20%	01-01-2019 01:50:00	1.404
100YrSCS24+20%	01-01-2019 02:00:00	1.668
100YrSCS24+20%	01-01-2019 02:10:00	1.668
100YrSCS24+20%	01-01-2019 02:20:00	1.668
100YrSCS24+20%	01-01-2019 02:30:00	1.668
100YrSCS24+20%	01-01-2019 02:40:00	1.668
100YrSCS24+20%	01-01-2019 02:50:00	1.668
100YrSCS24+20%	01-01-2019 03:00:00	1.668
100YrSCS24+20%	01-01-2019 03:10:00	1.668
100YrSCS24+20%	01-01-2019 03:20:00	1.668
100YrSCS24+20%	01-01-2019 03:30:00	1.668
100YrSCS24+20%	01-01-2019 03:40:00	1.668
100YrSCS24+20%	01-01-2019 03:50:00	1.668
100YrSCS24+20%	01-01-2019 04:00:00	2.052
100YrSCS24+20%	01-01-2019 04:10:00	2.052
100YrSCS24+20%	01-01-2019 04:20:00	2.052
100YrSCS24+20%	01-01-2019 04:30:00	2.052
100YrSCS24+20%	01-01-2019 04:40:00	2.052
100YrSCS24+20%	01-01-2019 04:50:00	2.052
100YrSCS24+20%	01-01-2019 05:00:00	2.052
100YrSCS24+20%	01-01-2019 05:10:00	2.052
100YrSCS24+20%	01-01-2019 05:20:00	2.052
100YrSCS24+20%	01-01-2019 05:30:00	2.052
100YrSCS24+20%	01-01-2019 05:40:00	2.052
100YrSCS24+20%	01-01-2019 05:50:00	2.052
100YrSCS24+20%	01-01-2019 06:00:00	2.304
100YrSCS24+20%	01-01-2019 06:10:00	2.304

100YrSCS24+20%	01-01-2019 06:20:00	2.304
100YrSCS24+20%	01-01-2019 06:30:00	2.304
100YrSCS24+20%	01-01-2019 06:40:00	2.304
100YrSCS24+20%	01-01-2019 06:50:00	2.304
100YrSCS24+20%	01-01-2019 07:00:00	2.82
100YrSCS24+20%	01-01-2019 07:10:00	2.82
100YrSCS24+20%	01-01-2019 07:20:00	2.82
100YrSCS24+20%	01-01-2019 07:30:00	2.82
100YrSCS24+20%	01-01-2019 07:40:00	2.82
100YrSCS24+20%	01-01-2019 07:50:00	2.82
100YrSCS24+20%	01-01-2019 08:00:00	3.336
100YrSCS24+20%	01-01-2019 08:10:00	3.336
100YrSCS24+20%	01-01-2019 08:20:00	3.336
100YrSCS24+20%	01-01-2019 08:30:00	3.588
100YrSCS24+20%	01-01-2019 08:40:00	3.588
100YrSCS24+20%	01-01-2019 08:50:00	3.588
100YrSCS24+20%	01-01-2019 09:00:00	4.104
100YrSCS24+20%	01-01-2019 09:10:00	4.104
100YrSCS24+20%	01-01-2019 09:20:00	4.104
100YrSCS24+20%	01-01-2019 09:30:00	4.608
100YrSCS24+20%	01-01-2019 09:40:00	4.608
100YrSCS24+20%	01-01-2019 09:50:00	4.608
100YrSCS24+20%	01-01-2019 10:00:00	5.892
100YrSCS24+20%	01-01-2019 10:10:00	5.892
100YrSCS24+20%	01-01-2019 10:20:00	5.892
100YrSCS24+20%	01-01-2019 10:30:00	7.944
100YrSCS24+20%	01-01-2019 10:40:00	7.944
100YrSCS24+20%	01-01-2019 10:50:00	7.944
100YrSCS24+20%	01-01-2019 11:00:00	12.3

100YrSCS24+20%	01-01-2019 11:10:00	12.3
100YrSCS24+20%	01-01-2019 11:20:00	12.3
100YrSCS24+20%	01-01-2019 11:30:00	37.92
100YrSCS24+20%	01-01-2019 11:40:00	97.344
100YrSCS24+20%	01-01-2019 11:50:00	156.78
100YrSCS24+20%	01-01-2019 12:00:00	18.444
100YrSCS24+20%	01-01-2019 12:10:00	18.444
100YrSCS24+20%	01-01-2019 12:20:00	18.444
100YrSCS24+20%	01-01-2019 12:30:00	9.48
100YrSCS24+20%	01-01-2019 12:40:00	9.48
100YrSCS24+20%	01-01-2019 12:50:00	9.48
100YrSCS24+20%	01-01-2019 13:00:00	6.912
100YrSCS24+20%	01-01-2019 13:10:00	6.912
100YrSCS24+20%	01-01-2019 13:20:00	6.912
100YrSCS24+20%	01-01-2019 13:30:00	5.376
100YrSCS24+20%	01-01-2019 13:40:00	5.376
100YrSCS24+20%	01-01-2019 13:50:00	5.376
100YrSCS24+20%	01-01-2019 14:00:00	3.84
100YrSCS24+20%	01-01-2019 14:10:00	3.84
100YrSCS24+20%	01-01-2019 14:20:00	3.84
100YrSCS24+20%	01-01-2019 14:30:00	3.84
100YrSCS24+20%	01-01-2019 14:40:00	3.84
100YrSCS24+20%	01-01-2019 14:50:00	3.84
100YrSCS24+20%	01-01-2019 15:00:00	3.84
100YrSCS24+20%	01-01-2019 15:10:00	3.84
100YrSCS24+20%	01-01-2019 15:20:00	3.84
100YrSCS24+20%	01-01-2019 15:30:00	3.84
100YrSCS24+20%	01-01-2019 15:40:00	3.84
100YrSCS24+20%	01-01-2019 15:50:00	3.84

100YrSCS24+20%	01-01-2019 16:00:00	2.304
100YrSCS24+20%	01-01-2019 16:10:00	2.304
100YrSCS24+20%	01-01-2019 16:20:00	2.304
100YrSCS24+20%	01-01-2019 16:30:00	2.304
100YrSCS24+20%	01-01-2019 16:40:00	2.304
100YrSCS24+20%	01-01-2019 16:50:00	2.304
100YrSCS24+20%	01-01-2019 17:00:00	2.304
100YrSCS24+20%	01-01-2019 17:10:00	2.304
100YrSCS24+20%	01-01-2019 17:20:00	2.304
100YrSCS24+20%	01-01-2019 17:30:00	2.304
100YrSCS24+20%	01-01-2019 17:40:00	2.304
100YrSCS24+20%	01-01-2019 17:50:00	2.304
100YrSCS24+20%	01-01-2019 18:00:00	2.304
100YrSCS24+20%	01-01-2019 18:10:00	2.304
100YrSCS24+20%	01-01-2019 18:20:00	2.304
100YrSCS24+20%	01-01-2019 18:30:00	2.304
100YrSCS24+20%	01-01-2019 18:40:00	2.304
100YrSCS24+20%	01-01-2019 18:50:00	2.304
100YrSCS24+20%	01-01-2019 19:00:00	2.304
100YrSCS24+20%	01-01-2019 19:10:00	2.304
100YrSCS24+20%	01-01-2019 19:20:00	2.304
100YrSCS24+20%	01-01-2019 19:30:00	2.304
100YrSCS24+20%	01-01-2019 19:40:00	2.304
100YrSCS24+20%	01-01-2019 19:50:00	2.304
100YrSCS24+20%	01-01-2019 20:00:00	1.536
100YrSCS24+20%	01-01-2019 20:10:00	1.536
100YrSCS24+20%	01-01-2019 20:20:00	1.536
100YrSCS24+20%	01-01-2019 20:30:00	1.536
100YrSCS24+20%	01-01-2019 20:40:00	1.536

100YrSCS24+20% 01-01-2019 20:50:00 1.536

100YrSCS24+20% 01-01-2019 21:00:00 1.536

100YrSCS24+20% 01-01-2019 21:10:00 1.536

100YrSCS24+20% 01-01-2019 21:20:00 1.536

100YrSCS24+20% 01-01-2019 21:30:00 1.536

100YrSCS24+20% 01-01-2019 21:40:00 1.536

100YrSCS24+20% 01-01-2019 21:50:00 1.536

100YrSCS24+20% 01-01-2019 22:00:00 1.536

100YrSCS24+20% 01-01-2019 22:10:00 1.536

100YrSCS24+20% 01-01-2019 22:20:00 1.536

100YrSCS24+20% 01-01-2019 22:30:00 1.536

100YrSCS24+20% 01-01-2019 22:40:00 1.536

100YrSCS24+20% 01-01-2019 22:50:00 1.536

100YrSCS24+20% 01-01-2019 23:00:00 1.536

100YrSCS24+20% 01-01-2019 23:10:00 1.536

100YrSCS24+20% 01-01-2019 23:20:00 1.536

100YrSCS24+20% 01-01-2019 23:30:00 1.536

100YrSCS24+20% 01-01-2019 23:40:00 1.536

100YrSCS24+20% 01-01-2019 23:50:00 1.536

;Rainfall (mm/hr)

1979July01 01-01-2019 00:00:00 2.3

1979July01 01-01-2019 00:05:00 2.3

1979July01 01-01-2019 00:10:00 8.89

1979July01 01-01-2019 00:15:00 8.89

1979July01 01-01-2019 00:20:00 8.89

1979July01 01-01-2019 00:25:00 8.89

1979July01 01-01-2019 00:30:00 38.1

1979July01 01-01-2019 00:35:00 38.1

1979July01	01-01-2019 00:40:00	38.1
1979July01	01-01-2019 00:45:00	38.1
1979July01	01-01-2019 00:50:00	38.1
1979July01	01-01-2019 00:55:00	38.1
1979July01	01-01-2019 01:00:00	38.1
1979July01	01-01-2019 01:05:00	50.8
1979July01	01-01-2019 01:10:00	50.8
1979July01	01-01-2019 01:15:00	76.2
1979July01	01-01-2019 01:20:00	106.7
1979July01	01-01-2019 01:25:00	106.7
1979July01	01-01-2019 01:30:00	71.1
1979July01	01-01-2019 01:35:00	71.1
1979July01	01-01-2019 01:40:00	30.5
1979July01	01-01-2019 01:45:00	30.5
1979July01	01-01-2019 01:50:00	30.5
1979July01	01-01-2019 01:55:00	30.5
1979July01	01-01-2019 02:00:00	3.8
1979July01	01-01-2019 02:05:00	3.8
1979July01	01-01-2019 02:10:00	3.8
1979July01	01-01-2019 02:15:00	3.8
1979July01	01-01-2019 02:20:00	3.8
1979July01	01-01-2019 02:25:00	3.8
1979July01	01-01-2019 02:30:00	3.8
1979July01	01-01-2019 02:35:00	3.8
1979July01	01-01-2019 02:40:00	3.8
1979July01	01-01-2019 02:45:00	3.8
1979July01	01-01-2019 02:50:00	3.8
1979July01	01-01-2019 02:55:00	3.8

;Rainfall (mm/hr)

1988Aug04	01-01-2019 00:00:00	0.1
1988Aug04	01-01-2019 00:05:00	0.1
1988Aug04	01-01-2019 00:10:00	0
1988Aug04	01-01-2019 00:15:00	3.7
1988Aug04	01-01-2019 00:20:00	6.2
1988Aug04	01-01-2019 00:25:00	101.5
1988Aug04	01-01-2019 00:30:00	15.5
1988Aug04	01-01-2019 00:35:00	29.3
1988Aug04	01-01-2019 00:40:00	19.8
1988Aug04	01-01-2019 00:45:00	1.5
1988Aug04	01-01-2019 00:50:00	1.7
1988Aug04	01-01-2019 00:55:00	5.4
1988Aug04	01-01-2019 01:00:00	24.6
1988Aug04	01-01-2019 01:05:00	26.5
1988Aug04	01-01-2019 01:10:00	34.9
1988Aug04	01-01-2019 01:15:00	10.2
1988Aug04	01-01-2019 01:20:00	27.1
1988Aug04	01-01-2019 01:25:00	104.4
1988Aug04	01-01-2019 01:30:00	27.5
1988Aug04	01-01-2019 01:35:00	62.5
1988Aug04	01-01-2019 01:40:00	31.8
1988Aug04	01-01-2019 01:45:00	79.8
1988Aug04	01-01-2019 01:50:00	67.5
1988Aug04	01-01-2019 01:55:00	156.2
1988Aug04	01-01-2019 02:00:00	5.1
1988Aug04	01-01-2019 02:05:00	0.2
1988Aug04	01-01-2019 02:10:00	0.2
1988Aug04	01-01-2019 02:15:00	0.2

1988Aug04	01-01-2019 02:20:00	0.2
1988Aug04	01-01-2019 02:25:00	0.2
1988Aug04	01-01-2019 02:30:00	0.2
1988Aug04	01-01-2019 02:35:00	0.2
1988Aug04	01-01-2019 02:40:00	0.2
1988Aug04	01-01-2019 02:45:00	0.2
1988Aug04	01-01-2019 02:50:00	0.2
1988Aug04	01-01-2019 02:55:00	12.8
1988Aug04	01-01-2019 03:00:00	14
1988Aug04	01-01-2019 03:05:00	22.2
1988Aug04	01-01-2019 03:10:00	21.8
1988Aug04	01-01-2019 03:15:00	1.4
1988Aug04	01-01-2019 03:20:00	0.2
1988Aug04	01-01-2019 03:25:00	0.2
1988Aug04	01-01-2019 03:30:00	0.2
1988Aug04	01-01-2019 03:35:00	0.2
1988Aug04	01-01-2019 03:40:00	0.2
1988Aug04	01-01-2019 03:45:00	0.2
1988Aug04	01-01-2019 03:50:00	0.2
1988Aug04	01-01-2019 03:55:00	0.2
1988Aug04	01-01-2019 04:00:00	0.2
1988Aug04	01-01-2019 04:05:00	0.2
1988Aug04	01-01-2019 04:10:00	0.2
1988Aug04	01-01-2019 04:15:00	0.2
1988Aug04	01-01-2019 04:20:00	0.2
1988Aug04	01-01-2019 04:25:00	0.2
1988Aug04	01-01-2019 04:30:00	0.2
1988Aug04	01-01-2019 04:35:00	0.2
1988Aug04	01-01-2019 04:40:00	0.2

1988Aug04 01-01-2019 04:45:00 0.2

1988Aug04 01-01-2019 04:50:00 0.2

1988Aug04 01-01-2019 04:55:00 2.9

1988Aug04 01-01-2019 05:00:00 7.8

1988Aug04 01-01-2019 05:05:00 10

1988Aug04 01-01-2019 05:10:00 6.3

1988Aug04 01-01-2019 05:15:00 5.1

1988Aug04 01-01-2019 05:20:00 9.8

1988Aug04 01-01-2019 05:25:00 2.6

1988Aug04 01-01-2019 05:30:00 1.7

;Rainfall (mm/hr)

1996Aug08 01-01-2019 00:00:00 4

1996Aug08 01-01-2019 00:05:00 11.9

1996Aug08 01-01-2019 00:10:00 26.5

1996Aug08 01-01-2019 00:15:00 13.3

1996Aug08 01-01-2019 00:20:00 0

1996Aug08 01-01-2019 00:25:00 2.7

1996Aug08 01-01-2019 00:30:00 0

1996Aug08 01-01-2019 00:35:00 8

1996Aug08 01-01-2019 00:40:00 18.6

1996Aug08 01-01-2019 00:45:00 10.6

1996Aug08 01-01-2019 00:50:00 21.2

1996Aug08 01-01-2019 00:55:00 2.7

1996Aug08 01-01-2019 01:00:00 2.7

1996Aug08 01-01-2019 01:05:00 15.9

1996Aug08 01-01-2019 01:10:00 66.3

1996Aug08 01-01-2019 01:15:00 55.7

1996Aug08 01-01-2019 01:20:00 122

1996Aug08	01-01-2019 01:25:00	88.9
1996Aug08	01-01-2019 01:30:00	9.3
1996Aug08	01-01-2019 01:35:00	8
1996Aug08	01-01-2019 01:40:00	4
1996Aug08	01-01-2019 01:45:00	0
1996Aug08	01-01-2019 01:50:00	2.7
1996Aug08	01-01-2019 01:55:00	0
1996Aug08	01-01-2019 02:00:00	0
1996Aug08	01-01-2019 02:05:00	0
1996Aug08	01-01-2019 02:10:00	5.3
1996Aug08	01-01-2019 02:15:00	0
1996Aug08	01-01-2019 02:20:00	0
1996Aug08	01-01-2019 02:25:00	0
1996Aug08	01-01-2019 02:30:00	0
1996Aug08	01-01-2019 02:35:00	0
1996Aug08	01-01-2019 02:40:00	0
1996Aug08	01-01-2019 02:45:00	4
1996Aug08	01-01-2019 02:50:00	53.1
1996Aug08	01-01-2019 02:55:00	69
1996Aug08	01-01-2019 03:00:00	63.7
1996Aug08	01-01-2019 03:05:00	58.4
1996Aug08	01-01-2019 03:10:00	47.8
1996Aug08	01-01-2019 03:15:00	15.9
1996Aug08	01-01-2019 03:20:00	13.3
1996Aug08	01-01-2019 03:25:00	8
1996Aug08	01-01-2019 03:30:00	5.3
1996Aug08	01-01-2019 03:35:00	6.6
1996Aug08	01-01-2019 03:40:00	2.7
1996Aug08	01-01-2019 03:45:00	4

1996Aug08 01-01-2019 03:50:00 2.7

1996Aug08 01-01-2019 03:55:00 4

1996Aug08 01-01-2019 04:00:00 2.7

1996Aug08 01-01-2019 04:05:00 5.3

1996Aug08 01-01-2019 04:10:00 4

1996Aug08 01-01-2019 04:15:00 2.7

1996Aug08 01-01-2019 04:20:00 4

1996Aug08 01-01-2019 04:25:00 2.7

1996Aug08 01-01-2019 04:30:00 1.3

1996Aug08 01-01-2019 04:35:00 1.3

1996Aug08 01-01-2019 04:40:00 0

1996Aug08 01-01-2019 04:45:00 0

1996Aug08 01-01-2019 04:50:00 0

1996Aug08 01-01-2019 04:55:00 0

1996Aug08 01-01-2019 05:00:00 2.7

1996Aug08 01-01-2019 05:05:00 0

1996Aug08 01-01-2019 05:10:00 0

1996Aug08 01-01-2019 05:15:00 0

1996Aug08 01-01-2019 05:20:00 0

1996Aug08 01-01-2019 05:25:00 0

1996Aug08 01-01-2019 05:30:00 0

1996Aug08 01-01-2019 05:35:00 0

1996Aug08 01-01-2019 05:40:00 1.3

;Rainfall (mm/hr)

25mmChicago4Hr 01-01-2019 00:00:00 0

25mmChicago4Hr 01-01-2019 00:10:00 1.5122

25mmChicago4Hr 01-01-2019 00:20:00 1.7483

25mmChicago4Hr 01-01-2019 00:30:00 2.0803

25mmChicago4Hr 01-01-2019 00:40:00 2.5819

25mmChicago4Hr 01-01-2019 00:50:00 3.4597

25mmChicago4Hr 01-01-2019 01:00:00 5.3924

25mmChicago4Hr 01-01-2019 01:10:00 13.4405

25mmChicago4Hr 01-01-2019 01:20:00 56.6613

25mmChicago4Hr 01-01-2019 01:30:00 17.7634

25mmChicago4Hr 01-01-2019 01:40:00 9.1177

25mmChicago4Hr 01-01-2019 01:50:00 6.1375

25mmChicago4Hr 01-01-2019 02:00:00 4.6474

25mmChicago4Hr 01-01-2019 02:10:00 3.7548

25mmChicago4Hr 01-01-2019 02:20:00 3.1647

25mmChicago4Hr 01-01-2019 02:30:00 2.7442

25mmChicago4Hr 01-01-2019 02:40:00 2.427

25mmChicago4Hr 01-01-2019 02:50:00 2.1762

25mmChicago4Hr 01-01-2019 03:00:00 1.977

25mmChicago4Hr 01-01-2019 03:10:00 1.8147

25mmChicago4Hr 01-01-2019 03:20:00 1.6819

25mmChicago4Hr 01-01-2019 03:30:00 1.5639

25mmChicago4Hr 01-01-2019 03:40:00 1.468

25mmChicago4Hr 01-01-2019 03:50:00 1.3795

25mmChicago4Hr 01-01-2019 04:00:00 1.3057

;Rainfall (mm/hr)

2YrSCS12hr 01-01-2019 0:00:00 1.08

2YrSCS12hr 01-01-2019 0:15:00 1.08

2YrSCS12hr 01-01-2019 0:30:00 1.08

2YrSCS12hr 01-01-2019 0:45:00 1.08

2YrSCS12hr 01-01-2019 1:00:00 1.08

2YrSCS12hr 01-01-2019 1:15:00 1.08

2YrSCS12hr	01-01-2019 1:30:00	1.08
2YrSCS12hr	01-01-2019 1:45:00	1.08
2YrSCS12hr	01-01-2019 2:00:00	1.296
2YrSCS12hr	01-01-2019 2:15:00	1.296
2YrSCS12hr	01-01-2019 2:30:00	1.296
2YrSCS12hr	01-01-2019 2:45:00	1.296
2YrSCS12hr	01-01-2019 3:00:00	1.728
2YrSCS12hr	01-01-2019 3:15:00	1.728
2YrSCS12hr	01-01-2019 3:30:00	1.728
2YrSCS12hr	01-01-2019 3:45:00	1.728
2YrSCS12hr	01-01-2019 4:00:00	2.592
2YrSCS12hr	01-01-2019 4:15:00	2.592
2YrSCS12hr	01-01-2019 4:30:00	3.456
2YrSCS12hr	01-01-2019 4:45:00	3.456
2YrSCS12hr	01-01-2019 5:00:00	5.184
2YrSCS12hr	01-01-2019 5:15:00	5.184
2YrSCS12hr	01-01-2019 5:30:00	20.736
2YrSCS12hr	01-01-2019 5:45:00	57.024
2YrSCS12hr	01-01-2019 6:00:00	7.776
2YrSCS12hr	01-01-2019 6:15:00	7.776
2YrSCS12hr	01-01-2019 6:30:00	3.456
2YrSCS12hr	01-01-2019 6:45:00	3.456
2YrSCS12hr	01-01-2019 7:00:00	2.592
2YrSCS12hr	01-01-2019 7:15:00	2.592
2YrSCS12hr	01-01-2019 7:30:00	2.592
2YrSCS12hr	01-01-2019 7:45:00	2.592
2YrSCS12hr	01-01-2019 8:00:00	1.512
2YrSCS12hr	01-01-2019 8:15:00	1.512
2YrSCS12hr	01-01-2019 8:30:00	1.512

2YrSCS12hr 01-01-2019 8:45:00 1.512

2YrSCS12hr 01-01-2019 9:00:00 1.512

2YrSCS12hr 01-01-2019 9:15:00 1.512

2YrSCS12hr 01-01-2019 9:30:00 1.512

2YrSCS12hr 01-01-2019 9:45:00 1.512

2YrSCS12hr 01-01-2019 10:00:00 0.864

2YrSCS12hr 01-01-2019 10:15:00 0.864

2YrSCS12hr 01-01-2019 10:30:00 0.864

2YrSCS12hr 01-01-2019 10:45:00 0.864

2YrSCS12hr 01-01-2019 11:00:00 0.864

2YrSCS12hr 01-01-2019 11:15:00 0.864

2YrSCS12hr 01-01-2019 11:30:00 0.864

2YrSCS12hr 01-01-2019 12:00:00 0

;Rainfall (mm/hr)

5YrSCS12hr 01-01-2019 0:00:00 1.44

5YrSCS12hr 01-01-2019 0:15:00 1.44

5YrSCS12hr 01-01-2019 0:30:00 1.44

5YrSCS12hr 01-01-2019 0:45:00 1.44

5YrSCS12hr 01-01-2019 1:00:00 1.44

5YrSCS12hr 01-01-2019 1:15:00 1.44

5YrSCS12hr 01-01-2019 1:30:00 1.44

5YrSCS12hr 01-01-2019 1:45:00 1.44

5YrSCS12hr 01-01-2019 2:00:00 1.728

5YrSCS12hr 01-01-2019 2:15:00 1.728

5YrSCS12hr 01-01-2019 2:30:00 1.728

5YrSCS12hr 01-01-2019 2:45:00 1.728

5YrSCS12hr 01-01-2019 3:00:00 2.304

5YrSCS12hr 01-01-2019 3:15:00 2.304

5YrSCS12hr	01-01-2019 3:30:00	2.304
5YrSCS12hr	01-01-2019 3:45:00	2.304
5YrSCS12hr	01-01-2019 4:00:00	3.456
5YrSCS12hr	01-01-2019 4:15:00	3.456
5YrSCS12hr	01-01-2019 4:30:00	4.608
5YrSCS12hr	01-01-2019 4:45:00	4.608
5YrSCS12hr	01-01-2019 5:00:00	6.912
5YrSCS12hr	01-01-2019 5:15:00	6.912
5YrSCS12hr	01-01-2019 5:30:00	27.648
5YrSCS12hr	01-01-2019 5:45:00	76.032
5YrSCS12hr	01-01-2019 6:00:00	10.368
5YrSCS12hr	01-01-2019 6:15:00	10.368
5YrSCS12hr	01-01-2019 6:30:00	4.608
5YrSCS12hr	01-01-2019 6:45:00	4.608
5YrSCS12hr	01-01-2019 7:00:00	3.456
5YrSCS12hr	01-01-2019 7:15:00	3.456
5YrSCS12hr	01-01-2019 7:30:00	3.456
5YrSCS12hr	01-01-2019 7:45:00	3.456
5YrSCS12hr	01-01-2019 8:00:00	2.016
5YrSCS12hr	01-01-2019 8:15:00	2.016
5YrSCS12hr	01-01-2019 8:30:00	2.016
5YrSCS12hr	01-01-2019 8:45:00	2.016
5YrSCS12hr	01-01-2019 9:00:00	2.016
5YrSCS12hr	01-01-2019 9:15:00	2.016
5YrSCS12hr	01-01-2019 9:30:00	2.016
5YrSCS12hr	01-01-2019 9:45:00	2.016
5YrSCS12hr	01-01-2019 10:00:00	1.152
5YrSCS12hr	01-01-2019 10:15:00	1.152
5YrSCS12hr	01-01-2019 10:30:00	1.152

5YrSCS12hr 01-01-2019 10:45:00 1.152

5YrSCS12hr 01-01-2019 11:00:00 1.152

5YrSCS12hr 01-01-2019 11:15:00 1.152

5YrSCS12hr 01-01-2019 11:30:00 1.152

5YrSCS12hr 01-01-2019 11:45:00 1.152

5YrSCS12hr 01-01-2019 12:00:00 0

;Depth (m)

MH-2121-100YrCHI3Hr 01/01/2019 00:00:00 80.571

MH-2121-100YrCHI3Hr 01/01/2019 00:05:00 80.571

MH-2121-100YrCHI3Hr 01/01/2019 00:10:00 80.572

MH-2121-100YrCHI3Hr 01/01/2019 00:15:00 80.573

MH-2121-100YrCHI3Hr 01/01/2019 00:20:00 80.598

MH-2121-100YrCHI3Hr 01/01/2019 00:25:00 80.659

MH-2121-100YrCHI3Hr 01/01/2019 00:30:00 80.721

MH-2121-100YrCHI3Hr 01/01/2019 00:35:00 80.794

MH-2121-100YrCHI3Hr 01/01/2019 00:40:00 80.872

MH-2121-100YrCHI3Hr 01/01/2019 00:45:00 80.963

MH-2121-100YrCHI3Hr 01/01/2019 00:50:00 81.068

MH-2121-100YrCHI3Hr 01/01/2019 00:55:00 81.22

MH-2121-100YrCHI3Hr 01/01/2019 01:00:00 81.386

MH-2121-100YrCHI3Hr 01/01/2019 01:05:00 81.505

MH-2121-100YrCHI3Hr 01/01/2019 01:10:00 81.555

MH-2121-100YrCHI3Hr 01/01/2019 01:15:00 81.604

MH-2121-100YrCHI3Hr 01/01/2019 01:20:00 81.721

MH-2121-100YrCHI3Hr 01/01/2019 01:25:00 81.907

MH-2121-100YrCHI3Hr 01/01/2019 01:30:00 82.122

MH-2121-100YrCHI3Hr 01/01/2019 01:35:00 82.313

MH-2121-100YrCHI3Hr 01/01/2019 01:40:00 82.438

MH-2121-100YrCHI3Hr 01/01/2019 01:45:00 82.497

MH-2121-100YrCHI3Hr 01/01/2019 01:50:00 82.568

MH-2121-100YrCHI3Hr 01/01/2019 01:55:00 82.632

MH-2121-100YrCHI3Hr 01/01/2019 02:00:00 82.69

MH-2121-100YrCHI3Hr 01/01/2019 02:05:00 82.713

MH-2121-100YrCHI3Hr 01/01/2019 02:10:00 82.737

MH-2121-100YrCHI3Hr 01/01/2019 02:15:00 82.761

MH-2121-100YrCHI3Hr 01/01/2019 02:20:00 82.781

MH-2121-100YrCHI3Hr 01/01/2019 02:25:00 82.787

MH-2121-100YrCHI3Hr 01/01/2019 02:30:00 82.797

MH-2121-100YrCHI3Hr 01/01/2019 02:35:00 82.804

MH-2121-100YrCHI3Hr 01/01/2019 02:40:00 82.811

MH-2121-100YrCHI3Hr 01/01/2019 02:45:00 82.811

MH-2121-100YrCHI3Hr 01/01/2019 02:50:00 82.812

MH-2121-100YrCHI3Hr 01/01/2019 02:55:00 82.814

MH-2121-100YrCHI3Hr 01/01/2019 03:00:00 82.815

MH-2121-100YrCHI3Hr 01/01/2019 03:05:00 82.813

MH-2121-100YrCHI3Hr 01/01/2019 03:10:00 82.809

MH-2121-100YrCHI3Hr 01/01/2019 03:15:00 82.808

MH-2121-100YrCHI3Hr 01/01/2019 03:20:00 82.805

MH-2121-100YrCHI3Hr 01/01/2019 03:25:00 82.799

MH-2121-100YrCHI3Hr 01/01/2019 03:30:00 82.789

MH-2121-100YrCHI3Hr 01/01/2019 03:35:00 82.785

MH-2121-100YrCHI3Hr 01/01/2019 03:40:00 82.78

MH-2121-100YrCHI3Hr 01/01/2019 03:45:00 82.772

MH-2121-100YrCHI3Hr 01/01/2019 03:50:00 82.761

MH-2121-100YrCHI3Hr 01/01/2019 03:55:00 82.755

MH-2121-100YrCHI3Hr 01/01/2019 04:00:00 82.75

MH-2121-100YrCHI3Hr 01/01/2019 04:05:00 82.741

MH-2121-100YrCHI3Hr 01/01/2019 04:10:00 82.732

MH-2121-100YrCHI3Hr 01/01/2019 04:15:00 82.725

MH-2121-100YrCHI3Hr 01/01/2019 04:20:00 82.72

MH-2121-100YrCHI3Hr 01/01/2019 04:25:00 82.713

MH-2121-100YrCHI3Hr 01/01/2019 04:30:00 82.704

MH-2121-100YrCHI3Hr 01/01/2019 04:35:00 82.697

MH-2121-100YrCHI3Hr 01/01/2019 04:40:00 82.692

MH-2121-100YrCHI3Hr 01/01/2019 04:45:00 82.686

MH-2121-100YrCHI3Hr 01/01/2019 04:50:00 82.678

MH-2121-100YrCHI3Hr 01/01/2019 04:55:00 82.671

MH-2121-100YrCHI3Hr 01/01/2019 05:00:00 82.665

MH-2121-100YrCHI3Hr 01/01/2019 05:05:00 82.661

MH-2121-100YrCHI3Hr 01/01/2019 05:10:00 82.653

MH-2121-100YrCHI3Hr 01/01/2019 05:15:00 82.647

MH-2121-100YrCHI3Hr 01/01/2019 05:20:00 82.642

MH-2121-100YrCHI3Hr 01/01/2019 05:25:00 82.637

MH-2121-100YrCHI3Hr 01/01/2019 05:30:00 82.631

MH-2121-100YrCHI3Hr 01/01/2019 05:35:00 82.624

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MH-2121-100YrCHI3Hr+20% 01/01/2019 05:00:00 82.836

MH-2121-100YrCHI3Hr+20% 01/01/2019 05:05:00 82.827

MH-2121-100YrCHI3Hr+20% 01/01/2019 05:10:00 82.815

MH-2121-100YrCHI3Hr+20% 01/01/2019 05:15:00 82.806

MH-2121-100YrCHI3Hr+20% 01/01/2019 05:20:00 82.799

MH-2121-100YrCHI3Hr+20% 01/01/2019 05:25:00 82.791

MH-2121-100YrCHI3Hr+20% 01/01/2019 05:30:00 82.78

MH-2121-100YrCHI3Hr+20% 01/01/2019 05:35:00 82.772

MH-2121-100YrCHI3Hr+20% 01/01/2019 05:40:00 82.765

MH-2121-100YrCHI3Hr+20% 01/01/2019 05:45:00 82.758

MH-2121-100YrCHI3Hr+20% 01/01/2019 05:50:00 82.748

MH-2121-100YrCHI3Hr+20% 01/01/2019 05:55:00 82.741

MH-2121-100YrCHI3Hr+20% 01/01/2019 06:00:00 82.735

MH-2121-100YrCHI3Hr+20% 01/01/2019 06:05:00 82.729

MH-2121-100YrCHI3Hr+20% 01/01/2019 06:10:00 82.72

MH-2121-100YrCHI3Hr+20% 01/01/2019 06:15:00 82.713

MH-2121-100YrCHI3Hr+20% 01/01/2019 06:20:00 82.707

MH-2121-100YrCHI3Hr+20% 01/01/2019 06:25:00 82.702

MH-2121-100YrCHI3Hr+20%	01/01/2019 06:30:00	82.694
MH-2121-100YrCHI3Hr+20%	01/01/2019 06:35:00	82.687
MH-2121-100YrCHI3Hr+20%	01/01/2019 06:40:00	82.681
MH-2121-100YrCHI3Hr+20%	01/01/2019 06:45:00	82.677
MH-2121-100YrCHI3Hr+20%	01/01/2019 06:50:00	82.67
MH-2121-100YrCHI3Hr+20%	01/01/2019 06:55:00	82.664
MH-2121-100YrCHI3Hr+20%	01/01/2019 07:00:00	82.658
MH-2121-100YrCHI3Hr+20%	01/01/2019 07:05:00	82.654
MH-2121-100YrCHI3Hr+20%	01/01/2019 07:10:00	82.648
MH-2121-100YrCHI3Hr+20%	01/01/2019 07:15:00	82.643
MH-2121-100YrCHI3Hr+20%	01/01/2019 07:20:00	82.637
MH-2121-100YrCHI3Hr+20%	01/01/2019 07:25:00	82.634
MH-2121-100YrCHI3Hr+20%	01/01/2019 07:30:00	82.628
MH-2121-100YrCHI3Hr+20%	01/01/2019 07:35:00	82.624
MH-2121-100YrCHI3Hr+20%	01/01/2019 07:40:00	82.618
MH-2121-100YrCHI3Hr+20%	01/01/2019 07:45:00	82.615
MH-2121-100YrCHI3Hr+20%	01/01/2019 07:50:00	82.61
MH-2121-100YrCHI3Hr+20%	01/01/2019 07:55:00	82.606
MH-2121-100YrCHI3Hr+20%	01/01/2019 08:00:00	82.601
MH-2121-100YrCHI3Hr+20%	01/01/2019 08:05:00	82.597
MH-2121-100YrCHI3Hr+20%	01/01/2019 08:10:00	82.593
MH-2121-100YrCHI3Hr+20%	01/01/2019 08:15:00	82.589
MH-2121-100YrCHI3Hr+20%	01/01/2019 08:20:00	82.584
MH-2121-100YrCHI3Hr+20%	01/01/2019 08:25:00	82.581
MH-2121-100YrCHI3Hr+20%	01/01/2019 08:30:00	82.577
MH-2121-100YrCHI3Hr+20%	01/01/2019 08:35:00	82.574
MH-2121-100YrCHI3Hr+20%	01/01/2019 08:40:00	82.569
MH-2121-100YrCHI3Hr+20%	01/01/2019 08:45:00	82.566
MH-2121-100YrCHI3Hr+20%	01/01/2019 08:50:00	82.563

MH-2121-100YrCHI3Hr+20% 01/01/2019 08:55:00 82.56

MH-2121-100YrCHI3Hr+20% 01/01/2019 09:00:00 82.555

MH-2121-100YrCHI3Hr+20% 01/01/2019 09:05:00 82.552

MH-2121-100YrCHI3Hr+20% 01/01/2019 09:10:00 82.549

MH-2121-100YrCHI3Hr+20% 01/01/2019 09:15:00 82.546

MH-2121-100YrCHI3Hr+20% 01/01/2019 09:20:00 82.543

MH-2121-100YrCHI3Hr+20% 01/01/2019 09:25:00 82.539

MH-2121-100YrCHI3Hr+20% 01/01/2019 09:30:00 82.536

MH-2121-100YrCHI3Hr+20% 01/01/2019 09:35:00 82.534

MH-2121-100YrCHI3Hr+20% 01/01/2019 09:40:00 82.53

MH-2121-100YrCHI3Hr+20% 01/01/2019 09:45:00 82.527

MH-2121-100YrCHI3Hr+20% 01/01/2019 09:50:00 82.524

MH-2121-100YrCHI3Hr+20% 01/01/2019 09:55:00 82.522

MH-2121-100YrCHI3Hr+20% 01/01/2019 10:00:00 82.519

MH-2121-100YrCHI3Hr+20% 01/01/2019 10:05:00 82.516

MH-2121-100YrCHI3Hr+20% 01/01/2019 10:10:00 82.513

MH-2121-100YrCHI3Hr+20% 01/01/2019 10:15:00 82.511

MH-2121-100YrCHI3Hr+20% 01/01/2019 10:20:00 82.508

MH-2121-100YrCHI3Hr+20% 01/01/2019 10:25:00 82.506

MH-2121-100YrCHI3Hr+20% 01/01/2019 10:30:00 82.503

MH-2121-100YrCHI3Hr+20% 01/01/2019 10:35:00 82.5

MH-2121-100YrCHI3Hr+20% 01/01/2019 10:40:00 82.499

MH-2121-100YrCHI3Hr+20% 01/01/2019 10:45:00 82.496

MH-2121-100YrCHI3Hr+20% 01/01/2019 10:50:00 82.493

MH-2121-100YrCHI3Hr+20% 01/01/2019 10:55:00 82.491

MH-2121-100YrCHI3Hr+20% 01/01/2019 11:00:00 82.489

MH-2121-100YrCHI3Hr+20% 01/01/2019 11:05:00 82.486

MH-2121-100YrCHI3Hr+20% 01/01/2019 11:10:00 82.484

MH-2121-100YrCHI3Hr+20% 01/01/2019 11:15:00 82.481

MH-2121-100YrCHI3Hr+20% 01/01/2019 11:20:00 82.48

MH-2121-100YrCHI3Hr+20% 01/01/2019 11:25:00 82.477

MH-2121-100YrCHI3Hr+20% 01/01/2019 11:30:00 82.476

MH-2121-100YrCHI3Hr+20% 01/01/2019 11:35:00 82.473

MH-2121-100YrCHI3Hr+20% 01/01/2019 11:40:00 82.472

MH-2121-100YrCHI3Hr+20% 01/01/2019 11:45:00 82.469

MH-2121-100YrCHI3Hr+20% 01/01/2019 11:50:00 82.468

MH-2121-100YrCHI3Hr+20% 01/01/2019 11:55:00 82.464

MH-2121-100YrCHI3Hr+20% 01/01/2019 12:00:00 82.464

MH-2121-100YrCHI3Hr+20% 01/01/2019 12:05:00 82.46

MH-2121-100YrCHI3Hr+20% 01/01/2019 12:10:00 82.46

MH-2121-100YrCHI3Hr+20% 01/01/2019 12:15:00 82.456

MH-2121-100YrCHI3Hr+20% 01/01/2019 12:20:00 82.456

MH-2121-100YrCHI3Hr+20% 01/01/2019 12:25:00 82.452

MH-2121-100YrCHI3Hr+20% 01/01/2019 12:30:00 82.453

MH-2121-100YrCHI3Hr+20% 01/01/2019 12:35:00 82.449

MH-2121-100YrCHI3Hr+20% 01/01/2019 12:40:00 82.45

MH-2121-100YrCHI3Hr+20% 01/01/2019 12:45:00 82.445

MH-2121-100YrCHI3Hr+20% 01/01/2019 12:50:00 82.447

MH-2121-100YrCHI3Hr+20% 01/01/2019 12:55:00 82.442

MH-2121-100YrCHI3Hr+20% 01/01/2019 13:00:00 82.443

MH-2121-100YrCHI3Hr+20% 01/01/2019 13:05:00 82.438

MH-2121-100YrCHI3Hr+20% 01/01/2019 13:10:00 82.44

MH-2121-100YrCHI3Hr+20% 01/01/2019 13:15:00 82.435

MH-2121-100YrCHI3Hr+20% 01/01/2019 13:20:00 82.436

MH-2121-100YrCHI3Hr+20% 01/01/2019 13:25:00 82.432

MH-2121-100YrCHI3Hr+20% 01/01/2019 13:30:00 82.433

MH-2121-100YrCHI3Hr+20% 01/01/2019 13:35:00 82.428

MH-2121-100YrCHI3Hr+20% 01/01/2019 13:40:00 82.43

MH-2121-100YrCHI3Hr+20% 01/01/2019 13:45:00 82.425

MH-2121-100YrCHI3Hr+20% 01/01/2019 13:50:00 82.426

MH-2121-100YrCHI3Hr+20% 01/01/2019 13:55:00 82.422

MH-2121-100YrCHI3Hr+20% 01/01/2019 14:00:00 82.423

MH-2121-100YrCHI3Hr+20% 01/01/2019 14:05:00 82.419

MH-2121-100YrCHI3Hr+20% 01/01/2019 14:10:00 82.419

MH-2121-100YrCHI3Hr+20% 01/01/2019 14:15:00 82.415

MH-2121-100YrCHI3Hr+20% 01/01/2019 14:20:00 82.416

MH-2121-100YrCHI3Hr+20% 01/01/2019 14:25:00 82.412

MH-2121-100YrCHI3Hr+20% 01/01/2019 14:30:00 82.414

MH-2121-100YrCHI3Hr+20% 01/01/2019 14:35:00 82.41

MH-2121-100YrCHI3Hr+20% 01/01/2019 14:40:00 82.411

MH-2121-100YrCHI3Hr+20% 01/01/2019 14:45:00 82.406

MH-2121-100YrCHI3Hr+20% 01/01/2019 14:50:00 82.408

MH-2121-100YrCHI3Hr+20% 01/01/2019 14:55:00 82.403

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:00:00 82.405

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:05:00 82.4

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:10:00 82.402

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:15:00 82.398

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:20:00 82.399

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:25:00 82.396

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:30:00 82.396

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:35:00 82.394

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:40:00 82.394

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:45:00 82.393

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:50:00 82.392

MH-2121-100YrCHI3Hr+20% 01/01/2019 15:55:00 82.391

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:00:00 82.389

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:05:00 82.387

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:10:00 82.385

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:15:00 82.384

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:20:00 82.383

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:25:00 82.382

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:30:00 82.38

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:35:00 82.377

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:40:00 82.377

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:45:00 82.376

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:50:00 82.376

MH-2121-100YrCHI3Hr+20% 01/01/2019 16:55:00 82.374

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:00:00 82.373

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:05:00 82.372

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:10:00 82.371

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:15:00 82.368

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:20:00 82.367

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:25:00 82.366

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:30:00 82.365

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:35:00 82.363

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:40:00 82.363

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:45:00 82.361

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:50:00 82.36

MH-2121-100YrCHI3Hr+20% 01/01/2019 17:55:00 82.358

MH-2121-100YrCHI3Hr+20% 01/01/2019 18:00:00 82.358

MH-2121-100YrCHI3Hr+20% 01/01/2019 18:05:00 82.356

MH-2121-100YrCHI3Hr+20% 01/01/2019 18:10:00 82.356

MH-2121-100YrCHI3Hr+20% 01/01/2019 18:15:00 82.354

MH-2121-100YrCHI3Hr+20% 01/01/2019 18:20:00 82.353

MH-2121-100YrCHI3Hr+20% 01/01/2019 18:25:00 82.351

MH-2121-100YrCHI3Hr+20% 01/01/2019 18:30:00 82.351

MH-2121-100YrCHI3Hr+20%	01/01/2019 18:35:00	82.348
MH-2121-100YrCHI3Hr+20%	01/01/2019 18:40:00	82.348
MH-2121-100YrCHI3Hr+20%	01/01/2019 18:45:00	82.347
MH-2121-100YrCHI3Hr+20%	01/01/2019 18:50:00	82.347
MH-2121-100YrCHI3Hr+20%	01/01/2019 18:55:00	82.344
MH-2121-100YrCHI3Hr+20%	01/01/2019 19:00:00	82.344
MH-2121-100YrCHI3Hr+20%	01/01/2019 19:05:00	82.341
MH-2121-100YrCHI3Hr+20%	01/01/2019 19:10:00	82.341
MH-2121-100YrCHI3Hr+20%	01/01/2019 19:15:00	82.339
MH-2121-100YrCHI3Hr+20%	01/01/2019 19:20:00	82.34
MH-2121-100YrCHI3Hr+20%	01/01/2019 19:25:00	82.336
MH-2121-100YrCHI3Hr+20%	01/01/2019 19:30:00	82.337
MH-2121-100YrCHI3Hr+20%	01/01/2019 19:35:00	82.334
MH-2121-100YrCHI3Hr+20%	01/01/2019 19:40:00	82.334
MH-2121-100YrCHI3Hr+20%	01/01/2019 19:45:00	82.332
MH-2121-100YrCHI3Hr+20%	01/01/2019 19:50:00	82.332
MH-2121-100YrCHI3Hr+20%	01/01/2019 19:55:00	82.329
MH-2121-100YrCHI3Hr+20%	01/01/2019 20:00:00	82.33
MH-2121-100YrCHI3Hr+20%	01/01/2019 20:05:00	82.326
MH-2121-100YrCHI3Hr+20%	01/01/2019 20:10:00	82.327
MH-2121-100YrCHI3Hr+20%	01/01/2019 20:15:00	82.325
MH-2121-100YrCHI3Hr+20%	01/01/2019 20:20:00	82.324
MH-2121-100YrCHI3Hr+20%	01/01/2019 20:25:00	82.323
MH-2121-100YrCHI3Hr+20%	01/01/2019 20:30:00	82.321
MH-2121-100YrCHI3Hr+20%	01/01/2019 20:35:00	82.32
MH-2121-100YrCHI3Hr+20%	01/01/2019 20:40:00	82.319
MH-2121-100YrCHI3Hr+20%	01/01/2019 20:45:00	82.318
MH-2121-100YrCHI3Hr+20%	01/01/2019 20:50:00	82.317
MH-2121-100YrCHI3Hr+20%	01/01/2019 20:55:00	82.316

MH-2121-100YrCHI3Hr+20% 01/01/2019 21:00:00 82.314

MH-2121-100YrCHI3Hr+20% 01/01/2019 21:05:00 82.313

MH-2121-100YrCHI3Hr+20% 01/01/2019 21:10:00 82.313

MH-2121-100YrCHI3Hr+20% 01/01/2019 21:15:00 82.311

MH-2121-100YrCHI3Hr+20% 01/01/2019 21:20:00 82.31

MH-2121-100YrCHI3Hr+20% 01/01/2019 21:25:00 82.309

MH-2121-100YrCHI3Hr+20% 01/01/2019 21:30:00 82.308

MH-2121-100YrCHI3Hr+20% 01/01/2019 21:35:00 82.307

MH-2121-100YrCHI3Hr+20% 01/01/2019 21:40:00 82.305

MH-2121-100YrCHI3Hr+20% 01/01/2019 21:45:00 82.304

MH-2121-100YrCHI3Hr+20% 01/01/2019 21:50:00 82.303

MH-2121-100YrCHI3Hr+20% 01/01/2019 21:55:00 82.302

MH-2121-100YrCHI3Hr+20% 01/01/2019 22:00:00 82.301

MH-2121-100YrCHI3Hr+20% 01/01/2019 22:05:00 82.299

MH-2121-100YrCHI3Hr+20% 01/01/2019 22:10:00 82.298

MH-2121-100YrCHI3Hr+20% 01/01/2019 22:15:00 82.297

MH-2121-100YrCHI3Hr+20% 01/01/2019 22:20:00 82.296

MH-2121-100YrCHI3Hr+20% 01/01/2019 22:25:00 82.295

MH-2121-100YrCHI3Hr+20% 01/01/2019 22:30:00 82.294

MH-2121-100YrCHI3Hr+20% 01/01/2019 22:35:00 82.293

MH-2121-100YrCHI3Hr+20% 01/01/2019 22:40:00 82.291

MH-2121-100YrCHI3Hr+20% 01/01/2019 22:45:00 82.29

MH-2121-100YrCHI3Hr+20% 01/01/2019 22:50:00 82.289

MH-2121-100YrCHI3Hr+20% 01/01/2019 22:55:00 82.288

MH-2121-100YrCHI3Hr+20% 01/01/2019 23:00:00 82.287

MH-2121-100YrCHI3Hr+20% 01/01/2019 23:05:00 82.285

MH-2121-100YrCHI3Hr+20% 01/01/2019 23:10:00 82.284

MH-2121-100YrCHI3Hr+20% 01/01/2019 23:15:00 82.283

MH-2121-100YrCHI3Hr+20% 01/01/2019 23:20:00 82.283

MH-2121-100YrCHI3Hr+20% 01/01/2019 23:25:00 82.281

MH-2121-100YrCHI3Hr+20% 01/01/2019 23:30:00 82.28

MH-2121-100YrCHI3Hr+20% 01/01/2019 23:35:00 82.279

MH-2121-100YrCHI3Hr+20% 01/01/2019 23:40:00 82.278

MH-2121-100YrCHI3Hr+20% 01/01/2019 23:45:00 82.276

MH-2121-100YrCHI3Hr+20% 01/01/2019 23:50:00 82.275

MH-2121-100YrCHI3Hr+20% 01/01/2019 23:55:00 82.274

MH-2121-100YrCHI3Hr+20% 01/02/2019 00:00:00 82.273

;Depth (m)

MH-2121-100YrSCS24Hr 01/01/2019 00:00:00 80.571

MH-2121-100YrSCS24Hr 01/01/2019 00:05:00 80.571

MH-2121-100YrSCS24Hr 01/01/2019 00:10:00 80.572

MH-2121-100YrSCS24Hr 01/01/2019 00:15:00 80.572

MH-2121-100YrSCS24Hr 01/01/2019 00:20:00 80.572

MH-2121-100YrSCS24Hr 01/01/2019 00:25:00 80.572

MH-2121-100YrSCS24Hr 01/01/2019 00:30:00 80.572

MH-2121-100YrSCS24Hr 01/01/2019 00:35:00 80.572

MH-2121-100YrSCS24Hr 01/01/2019 00:40:00 80.572

MH-2121-100YrSCS24Hr 01/01/2019 00:45:00 80.572

MH-2121-100YrSCS24Hr 01/01/2019 00:50:00 80.572

MH-2121-100YrSCS24Hr 01/01/2019 00:55:00 80.572

MH-2121-100YrSCS24Hr 01/01/2019 01:00:00 80.572

MH-2121-100YrSCS24Hr 01/01/2019 01:05:00 80.572

MH-2121-100YrSCS24Hr 01/01/2019 01:10:00 80.572

MH-2121-100YrSCS24Hr 01/01/2019 01:15:00 80.572

MH-2121-100YrSCS24Hr 01/01/2019 01:20:00 80.572

MH-2121-100YrSCS24Hr 01/01/2019 01:25:00 80.574

MH-2121-100YrSCS24Hr 01/01/2019 01:30:00 80.581

MH-2121-100YrSCS24Hr 01/01/2019 01:35:00 80.591

MH-2121-100YrSCS24Hr 01/01/2019 01:40:00 80.6

MH-2121-100YrSCS24Hr 01/01/2019 01:45:00 80.607

MH-2121-100YrSCS24Hr 01/01/2019 01:50:00 80.615

MH-2121-100YrSCS24Hr 01/01/2019 01:55:00 80.625

MH-2121-100YrSCS24Hr 01/01/2019 02:00:00 80.641

MH-2121-100YrSCS24Hr 01/01/2019 02:05:00 80.671

MH-2121-100YrSCS24Hr 01/01/2019 02:10:00 80.709

MH-2121-100YrSCS24Hr 01/01/2019 02:15:00 80.723

MH-2121-100YrSCS24Hr 01/01/2019 02:20:00 80.728

MH-2121-100YrSCS24Hr 01/01/2019 02:25:00 80.731

MH-2121-100YrSCS24Hr 01/01/2019 02:30:00 80.734

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MH-2121-July_1_1979 01/01/2019 08:25:00 82.506

MH-2121-July_1_1979 01/01/2019 08:30:00 82.499

MH-2121-July_1_1979 01/01/2019 08:35:00 82.497

MH-2121-July_1_1979 01/01/2019 08:40:00 82.491

MH-2121-July_1_1979 01/01/2019 08:45:00 82.489

MH-2121-July_1_1979 01/01/2019 08:50:00 82.482

MH-2121-July_1_1979 01/01/2019 08:55:00 82.481

MH-2121-July_1_1979 01/01/2019 09:00:00 82.475

MH-2121-July_1_1979 01/01/2019 09:05:00 82.473

MH-2121-July_1_1979 01/01/2019 09:10:00 82.467

MH-2121-July_1_1979 01/01/2019 09:15:00 82.466

MH-2121-July_1_1979 01/01/2019 09:20:00 82.459

MH-2121-July_1_1979 01/01/2019 09:25:00 82.458

MH-2121-July_1_1979 01/01/2019 09:30:00 82.452

MH-2121-July_1_1979 01/01/2019 09:35:00 82.451

MH-2121-July_1_1979 01/01/2019 09:40:00 82.445

MH-2121-July_1_1979 01/01/2019 09:45:00 82.444

MH-2121-July_1_1979 01/01/2019 09:50:00 82.438

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MH-2121-July_1_1979 01/01/2019 10:00:00 82.431

MH-2121-July_1_1979 01/01/2019 10:05:00 82.43

MH-2121-July_1_1979 01/01/2019 10:10:00 82.425

MH-2121-July_1_1979 01/01/2019 10:15:00 82.424

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MH-2121-July_1_1979 01/01/2019 10:25:00 82.417

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MH-2121-July_1_1979 01/01/2019 10:35:00 82.411

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MH-2121-July_1_1979 01/01/2019 11:25:00 82.381

MH-2121-July_1_1979 01/01/2019 11:30:00 82.378

MH-2121-July_1_1979 01/01/2019 11:35:00 82.375

MH-2121-July_1_1979 01/01/2019 11:40:00 82.372

MH-2121-July_1_1979 01/01/2019 11:45:00 82.369

MH-2121-July_1_1979 01/01/2019 11:50:00 82.366

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MH-2121-July_1_1979 01/01/2019 12:00:00 82.361

MH-2121-July_1_1979 01/01/2019 12:05:00 82.359

MH-2121-July_1_1979 01/01/2019 12:10:00 82.355

MH-2121-July_1_1979 01/01/2019 12:15:00 82.353

MH-2121-July_1_1979 01/01/2019 12:20:00 82.35

MH-2121-July_1_1979 01/01/2019 12:25:00 82.348

MH-2121-July_1_1979 01/01/2019 12:30:00 82.345

MH-2121-July_1_1979 01/01/2019 12:35:00 82.343

MH-2121-July_1_1979 01/01/2019 12:40:00 82.339

MH-2121-July_1_1979 01/01/2019 12:45:00 82.337

MH-2121-July_1_1979 01/01/2019 12:50:00 82.334

MH-2121-July_1_1979 01/01/2019 12:55:00 82.332

MH-2121-July_1_1979 01/01/2019 13:00:00 82.329

MH-2121-July_1_1979 01/01/2019 13:05:00 82.327

MH-2121-July_1_1979 01/01/2019 13:10:00 82.324

MH-2121-July_1_1979 01/01/2019 13:15:00 82.321

MH-2121-July_1_1979 01/01/2019 13:20:00 82.319

MH-2121-July_1_1979 01/01/2019 13:25:00 82.316

MH-2121-July_1_1979 01/01/2019 13:30:00 82.314

MH-2121-July_1_1979 01/01/2019 13:35:00 82.311

MH-2121-July_1_1979 01/01/2019 13:40:00 82.308

MH-2121-July_1_1979 01/01/2019 13:45:00 82.306

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MH-2121-July_1_1979 01/01/2019 14:00:00 82.298

MH-2121-July_1_1979 01/01/2019 14:05:00 82.296

MH-2121-July_1_1979 01/01/2019 14:10:00 82.293

MH-2121-July_1_1979 01/01/2019 14:15:00 82.291

MH-2121-July_1_1979 01/01/2019 14:20:00 82.288

MH-2121-July_1_1979 01/01/2019 14:25:00 82.286

MH-2121-July_1_1979 01/01/2019 14:30:00 82.283

MH-2121-July_1_1979 01/01/2019 14:35:00 82.281

MH-2121-July_1_1979 01/01/2019 14:40:00 82.278

MH-2121-July_1_1979 01/01/2019 14:45:00 82.276

MH-2121-July_1_1979 01/01/2019 14:50:00 82.273

MH-2121-July_1_1979 01/01/2019 14:55:00 82.271

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MH-2121-July_1_1979 01/01/2019 15:05:00 82.266

MH-2121-July_1_1979 01/01/2019 15:10:00 82.264

MH-2121-July_1_1979 01/01/2019 15:15:00 82.261

MH-2121-July_1_1979 01/01/2019 15:20:00 82.259

MH-2121-July_1_1979 01/01/2019 15:25:00 82.257

MH-2121-July_1_1979 01/01/2019 15:30:00 82.254

MH-2121-July_1_1979 01/01/2019 15:35:00 82.252

MH-2121-July_1_1979 01/01/2019 15:40:00 82.25

MH-2121-July_1_1979 01/01/2019 15:45:00 82.247

MH-2121-July_1_1979 01/01/2019 15:50:00 82.245

MH-2121-July_1_1979 01/01/2019 15:55:00 82.243

MH-2121-July_1_1979 01/01/2019 16:00:00 82.24

MH-2121-July_1_1979 01/01/2019 16:05:00 82.238

MH-2121-July_1_1979 01/01/2019 16:10:00 82.236

MH-2121-July_1_1979 01/01/2019 16:15:00 82.233

MH-2121-July_1_1979 01/01/2019 16:20:00 82.231

MH-2121-July_1_1979 01/01/2019 16:25:00 82.229

MH-2121-July_1_1979 01/01/2019 16:30:00 82.227

MH-2121-July_1_1979 01/01/2019 16:35:00 82.224

MH-2121-July_1_1979 01/01/2019 16:40:00 82.222

MH-2121-July_1_1979 01/01/2019 16:45:00 82.22

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MH-2121-July_1_1979 01/01/2019 16:55:00 82.215

MH-2121-July_1_1979 01/01/2019 17:00:00 82.213

MH-2121-July_1_1979 01/01/2019 17:05:00 82.211

MH-2121-July_1_1979 01/01/2019 17:10:00 82.209

MH-2121-July_1_1979 01/01/2019 17:15:00 82.207

MH-2121-July_1_1979 01/01/2019 17:20:00 82.205

MH-2121-July_1_1979 01/01/2019 17:25:00 82.202

MH-2121-July_1_1979 01/01/2019 17:30:00 82.2

MH-2121-July_1_1979 01/01/2019 17:35:00 82.198

MH-2121-July_1_1979 01/01/2019 17:40:00 82.196

MH-2121-July_1_1979 01/01/2019 17:45:00 82.194

MH-2121-July_1_1979 01/01/2019 17:50:00 82.192

MH-2121-July_1_1979 01/01/2019 17:55:00 82.189

MH-2121-July_1_1979 01/01/2019 18:00:00 82.187

MH-2121-July_1_1979 01/01/2019 18:05:00 82.185

MH-2121-July_1_1979 01/01/2019 18:10:00 82.183

MH-2121-July_1_1979 01/01/2019 18:15:00 82.181

MH-2121-July_1_1979 01/01/2019 18:20:00 82.179

MH-2121-July_1_1979 01/01/2019 18:25:00 82.177

MH-2121-July_1_1979 01/01/2019 18:30:00 82.175

MH-2121-July_1_1979 01/01/2019 18:35:00 82.173

MH-2121-July_1_1979 01/01/2019 18:40:00 82.171

MH-2121-July_1_1979 01/01/2019 18:45:00 82.169

MH-2121-July_1_1979 01/01/2019 18:50:00 82.167

MH-2121-July_1_1979 01/01/2019 18:55:00 82.164

MH-2121-July_1_1979 01/01/2019 19:00:00 82.163

MH-2121-July_1_1979 01/01/2019 19:05:00 82.16

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MH-2121-July_1_1979 01/01/2019 19:15:00 82.156

MH-2121-July_1_1979 01/01/2019 19:20:00 82.154

MH-2121-July_1_1979 01/01/2019 19:25:00 82.152

MH-2121-July_1_1979 01/01/2019 19:30:00 82.151

MH-2121-July_1_1979 01/01/2019 19:35:00 82.148

MH-2121-July_1_1979 01/01/2019 19:40:00 82.147

MH-2121-July_1_1979 01/01/2019 19:45:00 82.144

MH-2121-July_1_1979 01/01/2019 19:50:00 82.143

MH-2121-July_1_1979 01/01/2019 19:55:00 82.141

MH-2121-July_1_1979 01/01/2019 20:00:00 82.139

MH-2121-July_1_1979 01/01/2019 20:05:00 82.137

MH-2121-July_1_1979 01/01/2019 20:10:00 82.135

MH-2121-July_1_1979 01/01/2019 20:15:00 82.133

MH-2121-July_1_1979 01/01/2019 20:20:00 82.131

MH-2121-July_1_1979 01/01/2019 20:25:00 82.129

MH-2121-July_1_1979 01/01/2019 20:30:00 82.127

MH-2121-July_1_1979 01/01/2019 20:35:00 82.125

MH-2121-July_1_1979 01/01/2019 20:40:00 82.123

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MH-2121-July_1_1979 01/01/2019 20:50:00 82.12

MH-2121-July_1_1979 01/01/2019 20:55:00 82.118

MH-2121-July_1_1979 01/01/2019 21:00:00 82.116

MH-2121-July_1_1979 01/01/2019 21:05:00 82.114

MH-2121-July_1_1979 01/01/2019 21:10:00 82.112

MH-2121-July_1_1979 01/01/2019 21:15:00 82.11

MH-2121-July_1_1979 01/01/2019 21:20:00 82.108

MH-2121-July_1_1979 01/01/2019 21:25:00 82.106

MH-2121-July_1_1979 01/01/2019 21:30:00 82.105

MH-2121-July_1_1979 01/01/2019 21:35:00 82.103

MH-2121-July_1_1979 01/01/2019 21:40:00 82.101

MH-2121-July_1_1979 01/01/2019 21:45:00 82.099

MH-2121-July_1_1979 01/01/2019 21:50:00 82.097

MH-2121-July_1_1979 01/01/2019 21:55:00 82.095

MH-2121-July_1_1979 01/01/2019 22:00:00 82.094

MH-2121-July_1_1979 01/01/2019 22:05:00 82.092

MH-2121-July_1_1979 01/01/2019 22:10:00 82.09

MH-2121-July_1_1979 01/01/2019 22:15:00 82.088

MH-2121-July_1_1979 01/01/2019 22:20:00 82.087

MH-2121-July_1_1979 01/01/2019 22:25:00 82.084

MH-2121-July_1_1979 01/01/2019 22:30:00 82.083

MH-2121-July_1_1979 01/01/2019 22:35:00 82.081

MH-2121-July_1_1979 01/01/2019 22:40:00 82.08

MH-2121-July_1_1979 01/01/2019 22:45:00 82.077

MH-2121-July_1_1979 01/01/2019 22:50:00 82.076

MH-2121-July_1_1979 01/01/2019 22:55:00 82.074

MH-2121-July_1_1979 01/01/2019 23:00:00 82.072

MH-2121-July_1_1979 01/01/2019 23:05:00 82.07

MH-2121-July_1_1979 01/01/2019 23:10:00 82.069

MH-2121-July_1_1979 01/01/2019 23:15:00 82.067

MH-2121-July_1_1979 01/01/2019 23:20:00 82.066

MH-2121-July_1_1979 01/01/2019 23:25:00 82.064

MH-2121-July_1_1979 01/01/2019 23:30:00 82.062

MH-2121-July_1_1979 01/01/2019 23:35:00 82.06

MH-2121-July_1_1979 01/01/2019 23:40:00 82.059

MH-2121-July_1_1979 01/01/2019 23:45:00 82.057

MH-2121-July_1_1979 01/01/2019 23:50:00 82.055

MH-2121-July_1_1979 01/01/2019 23:55:00 82.053

MH-2121-July_1_1979 01/02/2019 00:00:00 82.052

No_Rain 01/01/2019 00:00 0

No_Rain 12/31/2019 0:00 0

[REPORT]

;;Reporting Options

INPUT YES

CONTROLS NO

SUBCATCHMENTS ALL

NODES ALL

LINKS ALL

[TAGS]

Node 1_(RYCB) CB

Node	10_(CB)	CB
Node	100_(STM)	STM
Node	102_(STM)	STM
Node	104_(STM)	STM
Node	106_(STM)	STM
Node	108_(STM)	STM
Node	11_(CB)	CB
Node	110_(STM)	STM
Node	112_(STM)	STM
Node	114_(STM)	STM
Node	116_(STM)	STM
Node	118_(STM)	STM
Node	12_(CB)	CB
Node	120_(STM)	STM
Node	122_(STM)	STM
Node	124_(STM)	STM
Node	126_(STM)	STM
Node	128_(STM)	STM
Node	13_(CB)	CB
Node	130_(STM)	STM
Node	132_(STM)	STM
Node	134_(STM)	STM
Node	136_(STM)	STM
Node	138_(STM)	STM
Node	14_(CB)	CB
Node	140_(STM)	STM
Node	142_(STM)	STM
Node	144_(STM)	STM
Node	146_(STM)	STM

Node 148_(STM) STM

Node 15_(CB) CB

Node 150_(STM) STM

Node 152_(STM) STM

Node 154_(STM) STM

Node 156_(STM) STM

Node 158_(STM) STM

Node 16_(CB) CB

Node 160_(STM) STM

Node 162_(STM) STM

Node 164_(STM) STM

Node 166_(STM) STM

Node 168_(STM) STM

Node 17_(CB) CB

Node 170_(STM) STM

Node 18_(CB) CB

Node 19_(CB) CB

Node 2_(CB) CB

Node 20_(CB) CB

Node 21_(CB) CB

Node 22_(CB) CB

Node 23_(CB) CB

Node 24_(RYCB) CB

Node 25_(CB) CB

Node 26_(CB) CB

Node 26_(RYCB) CB

Node 27_(CB) CB

Node 28_(CB) CB

Node 29_(CB) CB

Node 3_(CB) CB

Node 30_CB-C CB

Node 31_(RYCB) CB

Node 31a_(RYCB) CB

Node 32_(CB) CB

Node 33_(CB) CB

Node 34_(RYCB) CB

Node 35_(CB) CB

Node 36_(CB) CB

Node 37_(CB) CB

Node 38_(CB) CB

Node 39_(CB) CB

Node 4_(CB) CB

Node 40_(CB) CB

Node 41_(CB) CB

Node 42_(CB) CB

Node 43_(CB) CB

Node 44_(CB) CB

Node 45_(CB) CB

Node 46_(CB) CB

Node 47_(CB) CB

Node 48_(CB) CB

Node 49_(CB) CB

Node 5_(CB) CB

Node 50_(CB) CB

Node 51_(CB) CB

Node 52_(RYCB) CB

Node 53_(CB) CB

Node 54_(CB) CB

Node 55_(CB) CB

Node 56_(CB) CB

Node 57_CB CB

Node 6_(RYCB) CB

Node 7_(RYCB) CB

Node 8_(CB) CB

Node 9_(CB) CB

Node CBMH_16_(RYCB) RY

Node CBMH_17_(RYCB) RY

Node Maj-01_2 Maj

Node Maj-02 Maj

Node Maj-02_2 Maj

Node Maj-03 Maj

Node Maj-04 Maj

Node Maj-04_2 Maj

Node Maj-05 Maj

Node Maj-05_2 Maj

Node Maj-06 Maj

Node Maj-06_2 Maj

Node Maj-07 Maj

Node Maj-08 Maj

Node Maj-09 Maj

Node Maj-10 Maj

Node Maj-11 Maj

Node Maj-12 Maj

Node Maj-13 Maj

Node Maj-14 Maj

Node Maj-15 Maj

Node Maj-15_2 Maj

Node Maj-16 Maj

Node Maj-17 Maj

Node Maj-18_2 Maj

Node Maj-19 Maj

Node Maj-19_2 Maj

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Node Maj-29 Maj

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Node Maj-32 Maj

Node Maj-33 Maj

Node Maj-34 Maj

Node Maj-34_2 Maj

Node Maj-35 Maj

Node Maj-36 Maj

Node Maj-37 Maj

Node Maj-38 Maj

Node Maj-39 Maj

Node Maj-40 Maj

Node Maj-41 Maj

Node Maj-42 Maj

Node Maj-43 Maj

Node Maj-44 Maj

Node Maj-45 Maj

Node Maj-46 Maj

Node Maj-48_2 Maj

Node Maj-50 Maj

Node Maj-51 Maj

Node Maj-52 Maj

Node Maj-53 Maj

Node Maj-54 Maj

Node Maj-55 Maj

Node Maj-56 Maj

Node Maj-58 Maj

Node RYCB_10 RY

Node RYCB_3_(RYCB) RY

Node RYCB_6_(1)_(10)_(1)_(RYCB) RY

Node RYCB_6_(1)_(10)_(RYCB) RY

Node RYCB_6_(1)_(11)_(RYCB) RY

Node RYCB_6_(1)_(12)_(1)_(RYCB) RY

Node RYCB_6_(1)_(12)_(RYCB) RY

Node RYCB_6_(1)_(13)_(RYCB) RY

Node RYCB_6_(1)_(14)_(RYCB) RY

Node RYCB_6_(1)_(15)_(RYCB) RY

Node RYCB_6_(1)_(16)_(1)_(RYCB) RY

Node RYCB_6_(1)_(16)_(2)_(RYCB) RY

Node RYCB_6_(1)_(16)_(RYCB) RY

Node RYCB_6_(1)_(17)_(RYCB) RY

Node RYCB_6_(1)_(19)_(RYCB) RY

Node RYCB_6_(1)_(2)_(1)_(RYCB) RY

Node RYCB_6_(1)_(2)_(2)_(RYCB) RY

Node RYCB_6_(1)_(2)_(RYCB) RY

Node RYCB_6_(1)_(20)_(RYCB) RY

Node RYCB_6_(1)_(21)_(RYCB) RY

Node RYCB_6_(1)_(22)_(RYCB) RY

Node RYCB_6_(1)_(23)_(1)_(RYCB) RY

Node RYCB_6_(1)_(23)_(2)_(RYCB) RY

Node RYCB_6_(1)_(23)_(RYCB) RY

Node RYCB_6_(1)_(24)_(RYCB) RY

Node RYCB_6_(1)_(25)_(2)_(RYCB) RY

Node RYCB_6_(1)_(25)_(RYCB) RY

Node RYCB_6_(1)_(26)_(RYCB) RY

Node RYCB_6_(1)_(27)_(1)_(RYCB) RY

Node RYCB_6_(1)_(27)_(RYCB) RY

Node RYCB_6_(1)_(28)_(RYCB) RY

Node RYCB_6_(1)_(29)_(RYCB) RY

Node RYCB_6_(1)_(3)_(RYCB) RY

Node RYCB_6_(1)_(30)_(RYCB) RY

Node RYCB_6_(1)_(31)_(RYCB) RY

Node RYCB_6_(1)_(32)_(RYCB) RY

Node RYCB_6_(1)_(33)_(RYCB) RY

Node RYCB_6_(1)_(34)_(RYCB) RY

Node RYCB_6_(1)_(35)_(RYCB) RY

Node RYCB_6_(1)_(36)_(RYCB) RY

Node RYCB_6_(1)_(37)_(RYCB) RY

Node RYCB_6_(1)_(38)_(RYCB) RY

Node RYCB_6_(1)_(39)_(RYCB) RY

Node RYCB_6_(1)_(4)_(RYCB) RY

Node RYCB_6_(1)_(40)_(RYCB) RY

Node RYCB_6_(1)_(5)_(RYCB) RY

Node RYCB_6_(1)_(6)_(RYCB) RY

Node RYCB_6_(1)_(7)_(1)_(RYCB) RY

Node RYCB_6_(1)_(7)_(RYCB) RY

Node RYCB_6_(1)_(8)_(RYCB) RY

Node RYCB_6_(1)_(9)_(RYCB) RY

Node RYCB_6_(1)_(RYCB) RY

Node Slope1 Maj

Node STM-247_(STM) STM

Node STM-251_(STM) STM

Node STM-Split STM

Node STM-Split3 STM

Node Structure-(18) RY

Node Structure_-_(115)_(1)_(RYCB) RY

Node Structure_-_(115)_(2)_(RYCB) RY

Node Structure_-_(115)_(3)_(RYCB) RY

Node Structure_-_(115)_(RYCB) RY

Node Structure_-_(12)_(RYCB) RY

Node Structure_-_(132)_(RYCB) RY

Node Structure_-_(15)_(RYCB) RY

Node Structure_-_(17)_(RYCB) RY

Node Structure_-_(20)_(RYCB) RY

Node Structure_-_(22)_(RYCB) RY

Node Structure_-_(25)_(RYCB) RY

Node Structure_-_(27)_(RYCB) RY

Node Structure_-_(29)_(RYCB) RY

Node Structure_-_(31)_(RYCB) RY

Node Structure_-_(35)_(RYCB) RY

Node Structure_-_(39)_(RYCB) RY

Node Structure_-_(41)_(RYCB) RY

Node Structure_-_(7)_(RYCB) RY

Node TEE_1_(1)_(1)_(RYCB) RY

Node TEE_1_(1)_(RYCB) RY

Node TEE_1_(2)_(RYCB) RY

Node TEE_1_(RYCB) RY

Node TEE_2_(1)_(RYCB) RY

Node TEE_2_(2)_(RYCB) RY

Node TEE_2_(RYCB) RY

Node TEE_3_(RYCB) RY

Node TEE_4_(RYCB) RY

Node TEE_5_(RYCB) RY

Node TEE_6_(RYCB) RY

Node TEE_9_(RYCB) RY

Node 2121_(STM) STM

Node Maj-01 Maj

Node Maj-18 Maj

Node Maj-22 Maj

Node Maj-48 Maj

Node Maj-49 Maj

Node Maj-57 Maj

Node Maj-59 Maj

Link 1_(STM) STM

Link 10_(STM) STM

Link 11_(STM) STM

Link 12_(STM) STM

Link 13_(STM) STM

Link 14_(STM) STM

Link 15_(10)_(STM)_1 STM

Link 15_(10)_(STM)_2 STM

Link 15_(11)_(STM) STM

Link 15_(12)_(STM) STM

Link 15_(13)_(STM) STM

Link 15_(14)_(STM) STM

Link 15_(15)_(STM) STM

Link 15_(16)_(STM) STM

Link 15_(19)_(STM) STM

Link 15_(20)_(STM) STM

Link 15_(21)_(STM) STM

Link 15_(22)_(STM) STM

Link 15_(3)_(STM) STM

Link 15_(4)_(STM) STM

Link 15_(5)_(STM) STM

Link 15_(9)_(STM) STM

Link 2_(STM) STM

Link 3_(STM) STM

Link 4_(STM) STM

Link 5_(STM) STM

Link 6_(STM) STM

Link 7_(1)_(STM) STM

Link 7_(STM) STM

Link 8_(STM) STM

Link 9_(STM) STM

Link B2-Outflow Ditch

Link C1 Maj

Link C1_1 Maj

Link C1_2 Maj

Link C10 Maj

Link C11 Maj

Link	C12	Maj
Link	C13	Maj
Link	C14	Maj
Link	C15	Maj
Link	C16	Maj
Link	C17	Maj
Link	C18	Spill
Link	C18_2	Maj
Link	C18_3	Maj
Link	C18_4	Maj
Link	C18_5	Maj
Link	C18_6	Maj
Link	C18_7	Maj
Link	C18_8	Maj
Link	C18_9	Maj
Link	C19	Maj
Link	C2	Maj
Link	C2_1	Maj
Link	C2_2	Maj
Link	C20	Maj
Link	C21	Maj
Link	C22	Maj
Link	C23	Maj
Link	C24	Maj
Link	C25	Maj
Link	C26	Maj
Link	C27	Spill
Link	C27_1	Maj
Link	C27_2	Maj

Link	C28	Maj
Link	C29	Maj
Link	C3	Maj
Link	C30	Maj
Link	C31	Spill
Link	C32	Maj
Link	C33	Maj
Link	C34	Maj
Link	C35	Maj
Link	C36	Maj
Link	C37	Maj
Link	C38	Maj
Link	C39	Maj
Link	C4	Spill
Link	C4_1	Maj
Link	C4_2	Maj
Link	C40	Maj
Link	C41	Maj
Link	C42	Maj
Link	C43	Maj
Link	C44	Maj
Link	C45	Maj
Link	C46	Maj
Link	C47	Maj
Link	C48	Maj
Link	C49	Maj
Link	C5	Spill
Link	C5_1	Maj
Link	C5_2	Maj

Link	C50	Spill
Link	C50_1	Maj
Link	C50_2	Maj
Link	C51	Maj
Link	C52	Maj
Link	C53	Maj
Link	C54	Maj
Link	C55	Maj
Link	C56	Spill
Link	C57	Maj
Link	C58	Spill
Link	C59	Spill
Link	C6	Spill
Link	C6_1	Maj
Link	C6_2	Maj
Link	C60	Spill
Link	C7	Maj
Link	C8	Maj
Link	C9	Maj
Link	Pipe_-_(1)_(RYCB) RY	
Link	Pipe_-_(10)_(RYCB) RY	
Link	Pipe_-_(100)_(RYCB) RY	
Link	Pipe_-_(101)_(RYCB) RY	
Link	Pipe_-_(103)_(RYCB) RY	
Link	Pipe_-_(109)_(RYCB) RY	
Link	Pipe_-_(11)_(RYCB) RY	
Link	Pipe_-_(110)_(RYCB) RY	
Link	Pipe_-_(111)_(RYCB) RY	
Link	Pipe_-_(114)_(RYCB) RY	

Link Pipe_-_(117)_(RYCB) RY

Link Pipe_-_(118)_(RYCB) RY

Link Pipe_-_(119)_(RYCB) RY

Link Pipe_-_(120)_(RYCB) RY

Link Pipe_-_(121)_(RYCB) RY

Link Pipe_-_(122)_(RYCB) RY

Link Pipe_-_(123)_(RYCB) RY

Link Pipe_-_(124)_(RYCB) RY

Link Pipe_-_(125)_(RYCB) RY

Link Pipe_-_(126)_(RYCB) RY

Link Pipe_-_(127)_(RYCB) RY

Link Pipe_-_(128)_(RYCB) RY

Link Pipe_-_(129)_(RYCB) RY

Link Pipe_-_(130)_(RYCB) RY

Link Pipe_-_(131)_(RYCB) RY

Link Pipe_-_(132)_(RYCB) RY

Link Pipe_-_(133)_(RYCB) RY

Link Pipe_-_(134)_(RYCB) RY

Link Pipe_-_(137)_(RYCB) RY

Link Pipe_-_(138)_(RYCB) RY

Link Pipe_-_(139)_(RYCB) RY

Link Pipe_-_(14)_(RYCB) RY

Link Pipe_-_(140)_(RYCB) RY

Link Pipe_-_(141)_(RYCB) RY

Link Pipe_-_(142)_(RYCB) RY

Link Pipe_-_(143)_(RYCB) RY

Link Pipe_-_(144)_(RYCB) RY

Link Pipe_-_(145)_(RYCB) RY

Link Pipe_-_(146)_(RYCB) RY

Link Pipe_-_(147)_(RYCB) RY

Link Pipe_-_(148)_(RYCB) RY

Link Pipe_-_(149)_(RYCB) RY

Link Pipe_-_(15)_(RYCB) RY

Link Pipe_-_(150)_(RYCB) RY

Link Pipe_-_(151)_(RYCB) RY

Link Pipe_-_(152)_(RYCB) RY

Link Pipe_-_(153)_(RYCB) RY

Link Pipe_-_(154)_(RYCB) RY

Link Pipe_-_(155)_(RYCB) RY

Link Pipe_-_(156)_(RYCB) RY

Link Pipe_-_(157)_(RYCB) RY

Link Pipe_-_(158)_(RYCB) RY

Link Pipe_-_(159)_(RYCB) RY

Link Pipe_-_(16)_(RYCB) RY

Link Pipe_-_(160)_(RYCB) RY

Link Pipe_-_(161)_(RYCB) RY

Link Pipe_-_(162)_(RYCB) RY

Link Pipe_-_(164)_(RYCB) RY

Link Pipe_-_(165)_(RYCB) RY

Link Pipe_-_(17)_(RYCB) RY

Link Pipe_-_(19)_(RYCB) RY

Link Pipe_-_(2)_(RYCB) RY

Link Pipe_-_(22)_(RYCB) RY

Link Pipe_-_(23)_(RYCB) RY

Link Pipe_-_(24)_(RYCB) RY

Link Pipe_-_(25)_(RYCB) RY

Link Pipe_-_(27)_(RYCB) RY

Link Pipe_-_(3)_(RYCB) RY

Link Pipe_-_(4)_(RYCB) RY

Link Pipe_-_(5)_(RYCB) RY

Link Pipe_-_(6)_(RYCB) RY

Link Pipe_-_(7)_(RYCB) RY

Link Pipe_-_(73)_(RYCB) RY

Link Pipe_-_(74)_(RYCB) RY

Link Pipe_-_(77)_(RYCB) RY

Link Pipe_-_(87)_(RYCB) RY

Link Pipe_-_(88)_(RYCB) RY

Link Pipe_-_(89)_(RYCB) RY

Link Pipe_-_(9)_(RYCB) RY

Link Pipe_-_(93)_(RYCB) RY

Link Pipe_-_(94)_(RYCB) RY

Link Pipe_-_(95)_(RYCB) RY

Link Pipe_-_(96)_(RYCB) RY

Link Pipe_-_(98)_(RYCB) RY

Link Pipe_-_(99)_(RYCB) RY

Link STM-23_(STM) STM

Link STM-24_(STM) STM

Link STM-27_(STM) STM

Link STM-28_(STM) STM

Link STM-34_(1)_(STM)_1 STM

Link STM-34_(1)_(STM)_2 STM

Link STM-34_(STM) STM

Link STM-81_(STM) STM

Link STM-82_(STM) STM

Link STM-83_(STM) STM

Link CB-10 ICD

Link CB-11 ICD

Link	CB-12-C	ICD
Link	CB-13-C	ICD
Link	CB-14	ICD
Link	CB-15	ICD
Link	CB-16	ICD
Link	CB-17	ICD
Link	CB-18	ICD
Link	CB-19	ICD
Link	CB-2	ICD
Link	CB-20	ICD
Link	CB-21	ICD
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Link	CB-27(1)	ICD
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Link	CB-3	ICD
Link	CB-30	ICD
Link	CB-31a	ICD
Link	CB-32	ICD
Link	CB-33	ICD
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Link	CB-37	ICD
Link	CB-38	ICD
Link	CB-39	ICD
Link	CB-4	ICD

Link	CB-40	ICD
Link	CB-41	ICD
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Link	CB-56	ICD
Link	CB-57	ICD
Link	CB-6	ICD
Link	CB-8	ICD
Link	CB-9	ICD
Link	OR1	Grate
Link	OR10	Grate
Link	OR11	Grate
Link	OR12	Grate
Link	OR13	Grate
Link	OR14	Grate
Link	OR15	Grate
Link	OR16	Grate

Link	OR17	Grate
Link	OR18	Grate
Link	OR19	Grate
Link	OR2	Grate
Link	OR20	Grate
Link	OR21	Grate
Link	OR22	Grate
Link	OR23	Grate
Link	OR24	Grate
Link	OR25	Grate
Link	OR26	Grate
Link	OR27	Grate
Link	OR28	Grate
Link	OR29	Grate
Link	OR3	Grate
Link	OR30	Grate
Link	OR31	Grate
Link	OR32	Grate
Link	OR33	Grate
Link	OR34	Grate
Link	OR35	Grate
Link	OR36	Grate
Link	OR37	Grate
Link	OR38	Grate
Link	OR39	Grate
Link	OR4	Grate
Link	OR40	Grate
Link	OR41	Grate
Link	OR42	Grate

Link OR43 Grate

Link OR44 Grate

Link OR45 Grate

Link OR46 Grate

Link OR47 Grate

Link OR48 Grate

Link OR49 Grate

Link OR5 Grate

Link OR50 Grate

Link OR51 Grate

Link OR6 Grate

Link OR7 Grate

Link OR8 Grate

Link OR9 Grate

Link RYCB-1 ICD

Link RYCB-10 ICD

Link RYCB-17 ICD

Link RYCB-24 ICD

Link RYCB-26 ICD

Link RYCB-31 ICD

Link RYCB-34 ICD

Link RYCB-52 ICD

Link RYCB-7 ICD

[MAP]

DIMENSIONS 381264.26565 5033765.6351 381848.96735 5034900.2169

UNITS Meters

[COORDINATES]

;;Node	X-Coord	Y-Coord
1_(RYCB)	381613.893	5033947.165
10_(CB)	381712.816	5034088.875
100_(STM)	381763.537	5033933.196
102_(STM)	381768.733	5033945.462
104_(STM)	381751.832	5033983.755
106_(STM)	381661.746	5033946.201
108_(STM)	381636.072	5033940.78
11_(CB)	381705.04	5034085.441
110_(STM)	381606.992	5033939.535
112_(STM)	381722.061	5034051.287
114_(STM)	381695.933	5034110.412
116_(STM)	381684.826	5034114.785
118_(STM)	381593.257	5034075.528
12_(CB)	381693.043	5034036.978
120_(STM)	381637.884	5034015.234
122_(STM)	381613.388	5034012.674
124_(STM)	381598.561	5034020.702
126_(STM)	381577.374	5034069.721
128_(STM)	381546.966	5034139.351
13_(CB)	381689.694	5034044.79
130_(STM)	381628.129	5034174.222
132_(STM)	381662.497	5034188.987
134_(STM)	381689.728	5034201.574
136_(STM)	381522.723	5034196.958
138_(STM)	381527.988	5034210.775
14_(CB)	381626.497	5034011.771
140_(STM)	381631.534	5034256.315

142_(STM)	381640.84	5034237.84
144_(STM)	381600.199	5034327.009
146_(STM)	381528.36	5034294.959
148_(STM)	381456.173	5034264.012
15_(CB)	381626.048	5034020.259
150_(STM)	381569.837	5034397.001
152_(STM)	381547.042	5034451.801
154_(STM)	381535.402	5034456.553
156_(STM)	381442.843	5034416.871
158_(STM)	381470.942	5034353.543
16_(CB)	381597.707	5034039.587
160_(STM)	381457.588	5034358.648
162_(STM)	381416.076	5034456.483
164_(STM)	381413.768	5034516.578
166_(STM)	381406.574	5034544.92
168_(STM)	381365.805	5034637.487
17_(CB)	381589.912	5034036.197
170_(STM)	381327.98	5034723.422
18_(CB)	381567.802	5034108.366
19_(CB)	381560.007	5034104.977
2_(CB)	381640.363	5033940.449
20_(CB)	381541.884	5034167.976
21_(CB)	381534.089	5034164.586
22_(CB)	381581.406	5034227.395
23_(CB)	381578.057	5034235.207
24_(RYCB)	381646.054	5034240.141
25_(CB)	381624.155	5034289.758
26_(CB)	381616.38	5034286.326
26_(RYCB)	381529.161	5034097.261

27_(CB)	381569.662	5034304.343
28_(CB)	381566.42	5034311.904
29_(CB)	381486.175	5034268.55
3_(CB)	381639.319	5033948.683
30_CB-C	381482.314	5034277.558
31_(RYCB)	381634.571	5034343.916
31a_(RYCB)	381567.034	5034420.338
32_(CB)	381592.282	5034362.433
33_(CB)	381584.351	5034358.98
34_(RYCB)	381428.516	5034412.648
35_(CB)	381559.242	5034416.94
36_(CB)	381537.986	5034376.241
37_(CB)	381534.823	5034383.637
38_(CB)	381439.974	5034407.723
39_(CB)	381431.96	5034404.589
4_(CB)	381722.756	5033971.115
40_(CB)	381417.006	5034502.802
41_(CB)	381408.506	5034502.869
42_(CB)	381362.704	5034648.887
43_(CB)	381354.995	5034645.351
44_(CB)	381657.847	5034213.423
45_(CB)	381650.071	5034209.99
46_(CB)	381640.714	5034173.395
47_(CB)	381637.365	5034181.208
48_(CB)	381577.25	5034146.187
49_(CB)	381573.901	5034154
5_(CB)	381719.48	5033978.741
50_(CB)	381650.459	5034098.147
51_(CB)	381647.109	5034105.959

52_(RYCB) 381422.234 5034448.442

53_(CB) 381498.626 5034437.794

54_(CB) 381495.276 5034445.607

55_(CB) 381757.359 5033966.847

56_(CB) 381765.154 5033970.288

57_CB 381764.633 5033923.144

6_(RYCB) 381744.277 5033945.622

7_(RYCB) 381785.825 5033999.81

8_(CB) 381742.356 5034021.942

9_(CB) 381734.544 5034018.593

CBMH_16_(RYCB) 381782.18 5033897.386

CBMH_17_(RYCB) 381788.188 5033900.966

Maj-01_2 381331.798 5034706.09

Maj-02 381342.288 5034683.601

Maj-02_2 381353.136 5034660.675

Maj-03 381359.381 5034647.476

Maj-04 381387.564 5034583.347

Maj-04_2 381393.958 5034569.712

Maj-05 381401.951 5034550.685

Maj-05_2 381402.995 5034546.139

Maj-06 381411.465 5034523.013

Maj-06_2 381411.962 5034502.782

Maj-07 381413.465 5034468.681

Maj-08 381416.91 5034452.053

Maj-09 381432.186 5034414.401

Maj-10 381435.592 5034406.1

Maj-11 381442.75 5034417.422

Maj-12 381497.775 5034442.096

Maj-13 381540.5 5034456.439

Maj-14	381562.795	5034420.835
Maj-15	381573.401	5034393.548
Maj-15_2	381603.958	5034326.416
Maj-16	381536.878	5034380.344
Maj-17	381457.696	5034356.086
Maj-18_2	381633.162	5034339.352
Maj-19	381566.414	5034309.787
Maj-19_2	381591.329	5034320.821
Maj-20	381543.507	5034300.028
Maj-21	381484.13	5034275.264
Maj-23	381608.541	5034316.116
Maj-24	381621.369	5034287.602
Maj-25	381635.742	5034254.683
Maj-26	381580.14	5034232.354
Maj-27	381542.959	5034216.403
Maj-28	381537.056	5034166.519
Maj-29	381551.053	5034138.548
Maj-30	381575.916	5034151.181
Maj-31	381619.905	5034169.153
Maj-32	381640.736	5034178.887
Maj-33	381654.551	5034211.407
Maj-34	381664.566	5034188.956
Maj-34_2	381690.114	5034200.734
Maj-35	381565.153	5034106.298
Maj-36	381580.163	5034072.108
Maj-37	381594.925	5034037.548
Maj-38	381607.643	5034017.583
Maj-39	381627.215	5034016.832
Maj-40	381641.204	5034020.257

Maj-41	381691.979	5034042.051
Maj-42	381649.35	5034103.073
Maj-43	381686.268	5034117.916
Maj-44	381709.885	5034086.78
Maj-45	381722.3	5034055.107
Maj-46	381739.691	5034019.611
Maj-48_2	381781.911	5034001.184
Maj-50	381640.747	5033943.955
Maj-51	381672.455	5033954.949
Maj-52	381721.553	5033975.962
Maj-53	381753.038	5033988.761
Maj-54	381762.396	5033967.949
Maj-55	381756.035	5033936.806
Maj-56	381494.997	5034256.087
Maj-58	381766.255	5033924.841
Maj-60	381528.438	5034203.658
RYCB_10	381442.319	5034298.46
RYCB_3_(RYCB)	381734.202	5033941.191
RYCB_6_(1)_(10)_(1)_(RYCB)	381621.361	5034128.918
RYCB_6_(1)_(10)_(RYCB)	381601.179	5034120.349
RYCB_6_(1)_(11)_(RYCB)	381642.632	5034138.054
RYCB_6_(1)_(12)_(1)_(RYCB)	381712.266	5034167.926
RYCB_6_(1)_(12)_(RYCB)	381701.138	5034163.137
RYCB_6_(1)_(13)_(RYCB)	381735.662	5034114.708
RYCB_6_(1)_(14)_(RYCB)	381748.325	5034086.133
RYCB_6_(1)_(15)_(RYCB)	381764.108	5034050.504
RYCB_6_(1)_(16)_(1)_(RYCB)	381504.046	5034155.002
RYCB_6_(1)_(16)_(2)_(RYCB)	381496.419	5034172.819
RYCB_6_(1)_(16)_(RYCB)	381510.902	5034139.24

RYCB_6_(1)_(17)_(RYCB) 381481.223 5034207.753

RYCB_6_(1)_(19)_(RYCB) 381637.075 5034217.32

RYCB_6_(1)_(2)_(1)_(RYCB) 381652.666 5033983.757

RYCB_6_(1)_(2)_(2)_(RYCB) 381633.371 5033978.954

RYCB_6_(1)_(2)_(RYCB) 381672.996 5033992.169

RYCB_6_(1)_(20)_(RYCB) 381691.942 5034213.823

RYCB_6_(1)_(21)_(RYCB) 381642.665 5034324.923

RYCB_6_(1)_(22)_(RYCB) 381660.032 5034285.809

RYCB_6_(1)_(23)_(1)_(RYCB) 381540.082 5034252.461

RYCB_6_(1)_(23)_(2)_(RYCB) 381580.624 5034269.812

RYCB_6_(1)_(23)_(RYCB) 381560.408 5034261.179

RYCB_6_(1)_(24)_(RYCB) 381599.13 5034277.804

RYCB_6_(1)_(25)_(2)_(RYCB) 381429.255 5034328.779

RYCB_6_(1)_(25)_(RYCB) 381495.849 5034321.044

RYCB_6_(1)_(26)_(RYCB) 381510.037 5034327.133

RYCB_6_(1)_(27)_(1)_(RYCB) 381550.359 5034344.355

RYCB_6_(1)_(27)_(RYCB) 381523.065 5034332.731

RYCB_6_(1)_(28)_(RYCB) 381418.154 5034354.74

RYCB_6_(1)_(29)_(RYCB) 381412.802 5034367.12

RYCB_6_(1)_(3)_(RYCB) 381581.795 5033976.053

RYCB_6_(1)_(30)_(RYCB) 381384.507 5034431.762

RYCB_6_(1)_(31)_(RYCB) 381461.331 5034385.698

RYCB_6_(1)_(32)_(RYCB) 381486.817 5034396.509

RYCB_6_(1)_(33)_(RYCB) 381513.832 5034408.124

RYCB_6_(1)_(34)_(RYCB) 381457.485 5034463.531

RYCB_6_(1)_(35)_(RYCB) 381490.353 5034477.632

RYCB_6_(1)_(36)_(RYCB) 381518.443 5034489.592

RYCB_6_(1)_(37)_(RYCB) 381568.311 5034495.286

RYCB_6_(1)_(38)_(RYCB) 381587.21 5034452.17

RYCB_6_(1)_(39)_(RYCB) 381612.601 5034394.104

RYCB_6_(1)_(4)_(RYCB) 381565.175 5034014.419

RYCB_6_(1)_(40)_(RYCB) 381604.181 5034413.374

RYCB_6_(1)_(5)_(RYCB) 381547.662 5034054.776

RYCB_6_(1)_(6)_(RYCB) 381616.382 5034075.058

RYCB_6_(1)_(7)_(1)_(RYCB) 381647.239 5034060.747

RYCB_6_(1)_(7)_(RYCB) 381626.502 5034052.072

RYCB_6_(1)_(8)_(RYCB) 381667.469 5034069.361

RYCB_6_(1)_(9)_(RYCB) 381584.211 5034112.987

RYCB_6_(1)_(RYCB) 381692.419 5034000.507

Slope1 381588.486 5034360.406

STM-247_(STM) 381785.753 5033999.773

STM-251_(STM) 381634.726 5034343.823

STM-Split 381525.758 5034204.922

STM-Split3 381784.268 5033898.453

Structure-(18) 381684.561 5034114.995

Structure_-_(115)_(1)_(RYCB) 381574.635 5034190.459

Structure_-_(115)_(2)_(RYCB) 381594.914 5034199.197

Structure_-_(115)_(3)_(RYCB) 381620.112 5034209.907

Structure_-_(115)_(RYCB) 381544.063 5034177.384

Structure_-_(12)_(RYCB) 381550.039 5034423.66

Structure_-_(132)_(RYCB) 381398.692 5034399.905

Structure_-_(15)_(RYCB) 381427.566 5034450.578

Structure_-_(17)_(RYCB) 381670.55 5034150.009

Structure_-_(20)_(RYCB) 381474.067 5034224.19

Structure_-_(22)_(RYCB) 381506.998 5034238.2

Structure_-_(25)_(RYCB) 381530.407 5034094.432

Structure_-_(27)_(RYCB) 381526.967 5034102.206

Structure_-_(29)_(RYCB) 381674.723 5034252.795

Structure_-_(31)_(RYCB) 381468.715 5034309.368

Structure_-_(35)_(RYCB) 381595.739 5034432.854

Structure_-_(39)_(RYCB) 381631.287 5034351.415

Structure_-_(41)_(RYCB) 381578.806 5034356.559

Structure_-_(7)_(RYCB) 381502.626 5034236.326

TEE_1_(1)_(1)_(RYCB) 381700.573 5033926.894

TEE_1_(1)_(RYCB) 381720.467 5033899.08

TEE_1_(2)_(RYCB) 381733.885 5033868.603

TEE_1_(RYCB) 381764.223 5033886.665

TEE_2_(1)_(RYCB) 381821.397 5033920.61

TEE_2_(2)_(RYCB) 381798.126 5033973.718

TEE_2_(RYCB) 381812.604 5033915.548

TEE_3_(RYCB) 381612.277 5033977.722

TEE_4_(RYCB) 381781.005 5034010.848

TEE_5_(RYCB) 381699.781 5034083.118

TEE_6_(RYCB) 381725.556 5034014.74

TEE_9_(RYCB) 381666.847 5034148.422

2121_(STM) 381801.852 5033868.985

Maj-01 381325.332 5034719.952

Maj-18 381637.356 5034341.21

Maj-22 381471.715 5034270.038

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B2_Stor 381428.703 5034532.135

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[VERTICES]

;;Link X-Coord Y-Coord

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[POLYGONS]

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A8	381550.593	5034424.985
A8	381543.767	5034428.677
A8	381538.648	5034440.658
A8	381542.828	5034442.483
A8	381538.374	5034452.891
A8	381539.119	5034456.989
A8	381539.895	5034461.254
A8	381543.496	5034471.849
A8	381560.114	5034466.201
A8	381564.943	5034464.56
A8	381565.509	5034457.066
A8	381576.576	5034431.663
A8	381589.032	5034403.097
A8	381585.165	5034401.272
A9	381531.483	5034474.785
A9	381531.128	5034496.065
A9	381563.233	5034509.828
A9	381605.188	5034413.771
A9	381587.702	5034406.147
A9	381565.509	5034457.066
A9	381564.944	5034464.565
A9	381533.878	5034475.124
A9	381531.483	5034474.785
A9	381531.483	5034474.785
B1	381382.967	5034432.546
B1	381300.46	5034616.899
B1	381347.727	5034637.71
B1	381351.366	5034639.318
B1	381395.133	5034539.884

B1	381397.385	5034534.249
B1	381399.255	5034528.475
B1	381400.734	5034522.59
B1	381401.816	5034516.618
B1	381402.496	5034510.588
B1	381402.771	5034504.526
B1	381402.639	5034498.459
B1	381402.102	5034492.414
B1	381402.102	5034492.414
B1	381401.745	5034485.342
B1	381401.845	5034478.261
B1	381402.403	5034471.202
B1	381403.416	5034464.193
B1	381404.88	5034457.265
B1	381406.789	5034450.446
B1	381409.135	5034443.764
B1	381409.135	5034443.764
B1	381382.967	5034432.546
B2	381530.741	5034583.97
B2	381424.704	5034522.345
B2	381316.325	5034768.575
B2	381315.387	5034770.706
B2	381447.869	5034848.645
B2	381463.21	5034813.692
B2	381436.808	5034798.087
B2	381530.741	5034583.97
B3	381425.905	5034450.967
B3	381424.386	5034456.035
B3	381423.166	5034461.183

B3	381422.249	5034466.393
B3	381421.638	5034471.648
B3	381421.335	5034476.93
B3	381421.341	5034482.22
B3	381422.371	5034491.754
B3	381422.735	5034501.337
B3	381422.432	5034510.921
B3	381421.463	5034520.462
B3	381421.463	5034520.462
B3	381530.743	5034583.965
B3	381563.223	5034509.824
B3	381425.905	5034450.967
B4	381689.214	5033950.737
B4	381699.904	5033925.456
B4	381707.071	5033928.472
B4	381733.358	5033867.072
B4	381726.731	5033863.109
B4	381649.853	5033817.207
B4	381600.42	5033930.899
B4	381602.883	5033931.972
B4	381607.711	5033932.914
B4	381632.558	5033934.227
B4	381639.597	5033934.814
B4	381646.587	5033935.826
B4	381646.587	5033935.826
B4	381652.844	5033937.104
B4	381662.718	5033939.868
B4	381676.204	5033945.159
B4	381689.214	5033950.737

C1 381295.775 5034755.869

C1 381316.325 5034768.575

C1 381335.973 5034723.936

C1 381314.105 5034714.308

C1 381298.068 5034750.515

C1 381290.843 5034752.826

C1 381295.775 5034755.869

C1 381295.775 5034755.869

C2 381448.951 5034280.33

C2 381448.951 5034280.33

C2 381464.597 5034287.094

C2 381480.443 5034249.954

C2 381464.797 5034243.19

C2 381448.951 5034280.33

C3 381694.117 5034211.846

C3 381703.079 5034191.055

C3 381695.51 5034187.728

C3 381689.685 5034199.604

C3 381685.879 5034207.763

C3 381694.117 5034211.846

[SYMBOLS]

;;Gage X-Coord Y-Coord

;;---------- ---------- ----------

[PROFILES]

;;Name Links

;;---------- ----------

"Profile 001. Junction RYCB_6_(1)_(19)_(RYCB) to Junction 108_(STM)" Pipe_-_(141)_(RYCB) Pipe_-_(142)_(RYCB) Pipe_-_(143)_(RYCB) Pipe_-_(144)_(RYCB) C31

"Profile 001. Junction RYCB_6_(1)_(19)_(RYCB) to Junction 108_(STM)" OR19 CB-21 15_(11)_(STM) 8_(STM) 9_(STM)

"Profile 001. Junction RYCB_6_(1)_(19)_(RYCB) to Junction 108_(STM)" 10_(STM) 11_(STM) 12_(STM) 13_(STM) STM-23_(STM)

"Profile 001. Junction RYCB_6_(1)_(19)_(RYCB) to Junction 108_(STM)" STM-24_(STM)

"Profile 002. Outfall Maj-01 to Junction STM-251_(STM)" C1_1 C1_2 C2_1 C2_2 OR1

"Profile 002. Outfall Maj-01 to Junction STM-251_(STM)" CB-43 15_(19)_(STM) 15_(20)_(STM) 15_(21)_(STM) 15_(22)_(STM)

"Profile 002. Outfall Maj-01 to Junction STM-251_(STM)" 15_(14)_(STM) 15_(15)_(STM) 15_(16)_(STM) 4_(STM) STM-83_(STM)

"Profile 003. Junction RYCB_6_(1)_(9)_(RYCB) to Junction 112_(STM)" Pipe_-_(145)_(RYCB) Pipe_-_(146)_(RYCB) Pipe_-_(147)_(RYCB) Pipe_-_(148)_(RYCB) Pipe_-_(10)_(RYCB)

"Profile 003. Junction RYCB_6_(1)_(9)_(RYCB) to Junction 112_(STM)" Pipe_-_(11)_(RYCB) RYCB-17 15_(4)_(STM) 15_(5)_(STM)

"Profile 004. Junction RYCB_6_(1)_(13)_(RYCB) to Junction 104_(STM)" C50 Pipe_-_(99)_(RYCB) Pipe_-_(100)_(RYCB) C59 C50_2

"Profile 004. Junction RYCB_6_(1)_(13)_(RYCB) to Junction 104_(STM)" C55 OR44 CB-56

"Profile 005. Junction RYCB_6_(1)_(21)_(RYCB) to Junction 144_(STM)" Pipe_-_(110)_(RYCB) Pipe_-_(111)_(RYCB) Pipe_-_(19)_(RYCB) C27 C24

"Profile 005. Junction RYCB_6_(1)_(21)_(RYCB) to Junction 144_(STM)" OR15 CB-26

"Profile 006. Junction Maj-04 to Junction 164_(STM)" C4_1 C4_2 C5_1 C5_2 C6_2

"Profile 006. Junction Maj-04 to Junction 164_(STM)" OR4 CB-41

"Profile 007. Junction RYCB_6_(1)_(24)_(RYCB) to Junction 136_(STM)" Pipe_-_(114)_(RYCB) Pipe_-_(150)_(RYCB) Pipe_-_(151)_(RYCB) Pipe_-_(152)_(RYCB) Pipe_-_(14)_(RYCB)

"Profile 007. Junction RYCB_6_(1)_(24)_(RYCB) to Junction 136_(STM)" Pipe_-_(15)_(RYCB) 15_(10)_(STM)_2

"Profile 008. Junction RYCB_6_(1)_(31)_(RYCB) to Junction 150_(STM)" Pipe_-_(123)_(RYCB) Pipe_-_(124)_(RYCB) Pipe_-_(125)_(RYCB) Pipe_-_(23)_(RYCB) CB-35

"Profile 008. Junction RYCB_6_(1)_(31)_(RYCB) to Junction 150_(STM)" 3_(STM)

"Profile 009. Junction RYCB_6_(1)_(6)_(RYCB) to Junction 114_(STM)" Pipe_-_(96)_(RYCB) Pipe_-_(137)_(RYCB) Pipe_-_(138)_(RYCB) Pipe_-_(98)_(RYCB) Pipe_-_(9)_(RYCB)

"Profile 009. Junction RYCB_6_(1)_(6)_(RYCB) to Junction 114_(STM)" CB-11

"Profile 010. Junction Maj-34_2 to Junction 128_(STM)" C18_7 C32 OR23 CB-47 7_(STM)

"Profile 010. Junction Maj-34_2 to Junction 128_(STM)" 7_(1)_(STM)

"Profile 011. Junction Maj-19 to Junction 144_(STM)" C20 C21 OR46 CB-30 15_(12)_(STM)

"Profile 011. Junction Maj-19 to Junction 144_(STM)" 15_(13)_(STM)

"Profile 012. Junction RYCB_6_(1)_(26)_(RYCB) to Junction 150_(STM)" Pipe_-_(117)_(RYCB) Pipe_-_(118)_(RYCB) Pipe_-_(165)_(RYCB) Pipe_-_(25)_(RYCB) CB-33

"Profile 013. Junction Maj-11 to Junction 152_(STM)" C13 OR8 CB-54 1_(STM) 2_(STM)

"Profile 014. Junction RYCB_6_(1)_(36)_(RYCB) to Junction 162_(STM)" Pipe_-_(126)_(RYCB) Pipe_-_(127)_(RYCB) Pipe_-_(128)_(RYCB) Pipe_-_(74)_(RYCB) RYCB-52

"Profile 015. Junction Maj-07 to Junction 162_(STM)" C7 C8 C9 OR5 CB-39

"Profile 016. Junction RYCB_6_(1)_(2)_(1)_(RYCB) to Junction 108_(STM)" Pipe_-_(139)_(RYCB) Pipe_-_(140)_(RYCB) Pipe_-_(27)_(RYCB) RYCB-1 STM-28_(STM)

"Profile 017. Junction TEE_2_(2)_(RYCB) to Outfall 2121_(STM)" Pipe_-_(159)_(RYCB) Pipe_-_(160)_(RYCB) Pipe_-_(1)_(RYCB) Pipe_-_(4)_(RYCB) STM-34_(1)_(STM)_2

"Profile 018. Junction RYCB_6_(1)_(3)_(RYCB) to Junction 128_(STM)" Pipe_-_(93)_(RYCB) Pipe_-_(94)_(RYCB) Pipe_-_(95)_(RYCB) Pipe_-_(16)_(RYCB) RYCB-26

"Profile 019. Junction Maj-25 to Junction STM-Split" C25 OR16 CB-23 15_(9)_(STM) 15_(10)_(STM)_1

"Profile 020. Junction Maj-15 to Junction Maj-24" C18_3 C18_4 C19 C23

"Profile 021. Junction RYCB_6_(1)_(37)_(RYCB) to Junction 152_(STM)" Pipe_-_(129)_(RYCB) Pipe_-_(130)_(RYCB) Pipe_-_(22)_(RYCB) CB-31a

"Profile 022. Junction RYCB_6_(1)_(28)_(RYCB) to Junction 162_(STM)" Pipe_-_(120)_(RYCB) Pipe_-_(121)_(RYCB) Pipe_-_(77)_(RYCB) RYCB-34

"Profile 023. Junction RYCB_6_(1)_(2)_(RYCB) to Junction 112_(STM)" Pipe_-_(87)_(RYCB) Pipe_-_(88)_(RYCB) Pipe_-_(7)_(RYCB) CB-9

"Profile 024. Junction Maj-36 to Junction 116_(STM)" C38 OR28 CB-51 15_(3)_(STM)

"Profile 025. Junction TEE_1_(1)_(RYCB) to Junction STM-Split3" Pipe_-_(157)_(RYCB) Pipe_-_(158)_(RYCB) Pipe_-_(2)_(RYCB) Pipe_-_(3)_(RYCB)

"Profile 026. Junction RYCB_6_(1)_(40)_(RYCB) to Junction STM-251_(STM)" Pipe_-_(132)_(RYCB) Pipe_-_(133)_(RYCB) Pipe_-_(24)_(RYCB) RYCB-31

"Profile 027. Junction Maj-25 to Junction 132_(STM)" C29 OR25 CB-45 6_(STM)

"Profile 028. Junction Maj-55 to Junction STM-Split3" C1 OR51 CB-57 STM-34_(1)_(STM)_1

"Profile 029. Junction Maj-17 to Junction 158_(STM)" C11 OR10 CB-37

"Profile 030. Junction RYCB_6_(1)_(25)_(RYCB) to Junction 148_(STM)" Pipe_-_(119)_(RYCB) Pipe_-_(164)_(RYCB) RYCB-10

"Profile 031. Junction Maj-51 to Junction 106_(STM)" C53 OR42 CB-3

"Profile 032. Junction TEE_1_(1)_(1)_(RYCB) to Junction 104_(STM)" Pipe_-_(161)_(RYCB) Pipe_-_(5)_(RYCB) CB-6

"Profile 033. Junction Maj-40 to Junction 120_(STM)" C43 OR32 CB-13-C

"Profile 034. Junction Maj-38 to Junction 122_(STM)" C45 OR34 CB-15

"Profile 035. Junction RYCB_6_(1)_(16)_(1)_(RYCB) to Junction Structure_-_(26)_(RYCB)" Pipe_-_(153)_(RYCB) Pipe_-_(134)_(RYCB) Pipe_-_(17)_(RYCB)

"Profile 036. Junction Maj-29 to Junction 128_(STM)" C36 OR27 CB-19

"Profile 037. Junction Maj-31 to Junction 130_(STM)" C34 OR21 CB-49

"Profile 038. Junction RYCB_6_(1)_(16)_(2)_(RYCB) to Junction Structure_-_(7)_(RYCB)" Pipe_-_(154)_(RYCB) Pipe_-_(155)_(RYCB) Pipe_-_(156)_(RYCB)

"Profile 039. Junction Maj-19_2 to Junction 146_(STM)" C18_6 OR13 CB-28

"Profile 040. Junction Maj-53 to Junction 104_(STM)" C51 OR40 CB-5

"Profile 041. Junction TEE_4_(RYCB) to Junction 104_(STM)" Pipe_-_(6)_(RYCB) RYCB-7 STM-82_(STM)

"Profile 042. Junction RYCB_6_(1)_(13)_(RYCB) to Junction Structure_-_(17)_(RYCB)" Pipe_-_(101)_(RYCB) Pipe_-_(149)_(RYCB) Pipe_-_(103)_(RYCB)

"Profile 043. Junction Maj-36 to Junction 126_(STM)" C46 OR37 CB-17

"Profile 044. Junction Maj-21 to Junction Maj-28" C56 C60 C27_2

"Profile 045. Junction Maj-13 to Junction 35_(CB)" C16 OR50

"Profile 046. Junction Maj-45 to Junction 9_(1)_(RYCB)" C48 OR39

"Profile 047. Junction Maj-43 to Junction 11_(2)_(RYCB)" C40 OR31

"Profile 048. Outfall Maj-18 to Junction Maj-15_2" C18_8 C18_9

"Profile 049. Junction Maj-24 to Junction 144_(STM)" OR14 CB-25

"Profile 050. Junction Slope1 to Junction 150_(STM)" OR11 CB-32

"Profile 051. Junction Maj-12 to Junction 156_(STM)" OR7 CB-53

"Profile 052. Junction Maj-16 to Junction 158_(STM)" OR9 CB-36

"Profile 053. Junction Maj-10 to Junction 162_(STM)" OR6 CB-38

"Profile 054. Junction Maj-06_2 to Junction 164_(STM)" OR3 CB-40

"Profile 055. Junction Maj-03 to Junction 170_(STM)" OR2 CB-42

"Profile 056. Junction Maj-19 to Junction 146_(STM)" OR12 CB-27(1)

"Profile 057. Junction Maj-21 to Junction 148_(STM)" OR47 CB-29

"Profile 058. Junction Maj-50 to Junction 106_(STM)" OR43 CB-2

"Profile 059. Junction Maj-54 to Junction 104_(STM)" OR45 CB-55

"Profile 060. Junction Maj-52 to Junction 104_(STM)" OR41 CB-4

"Profile 061. Junction Maj-46 to Junction 112_(STM)" OR38 CB-8

"Profile 062. Junction Maj-44 to Junction 114_(STM)" OR30 CB-10

"Profile 063. Junction Maj-42 to Junction 118_(STM)" OR29 CB-50

"Profile 064. Junction Maj-41 to Junction 120_(STM)" OR33 CB-12-C

"Profile 065. Junction Maj-39 to Junction 122_(STM)" OR35 CB-14

"Profile 066. Junction Maj-37 to Junction 126_(STM)" OR36 CB-16

"Profile 067. Junction Maj-35 to Junction 128_(STM)" OR26 CB-18

"Profile 068. Junction Maj-30 to Junction 130_(STM)" OR20 CB-48

"Profile 069. Junction Maj-32 to Junction 132_(STM)" OR22 CB-46

"Profile 070. Junction Maj-33 to Junction 142_(STM)" OR24 CB-44

"Profile 071. Junction Maj-28 to Junction 136_(STM)" OR18 CB-20

"Profile 072. Junction Maj-26 to Junction 140_(STM)" OR17 CB-22

"Profile 073. Junction 104_(STM) to Junction 100_(STM)" 14_(STM) STM-34_(STM)

"Profile 074. Junction RYCB_6_(1)_(20)_(RYCB) to Junction Structure_-_(29)_(RYCB)" Pipe_-_(109)_(RYCB)

"Profile 075. Junction Maj-19_2 to Junction Maj-15_2" C18_5

"Profile 076. Junction RYCB_6_(1)_(40)_(RYCB) to Junction Structure_-_(35)_(RYCB)" Pipe_-_(131)_(RYCB)

"Profile 077. Junction RYCB_6_(1)_(30)_(RYCB) to Junction Structure_-_(132)_(RYCB)" Pipe_-_(122)_(RYCB)

"Profile 078. Storage B3_Stor to Junction 164_(STM)" B3-Out

"Profile 079. Storage B2_Stor to Junction 164_(STM)" B2-Out

"Profile 080. Storage B1_Stor to Junction 164_(STM)" B1-Out

"Profile 081. Junction RYCB_6_(1)_(25)_(2)_(RYCB) to Junction RYCB_10" Pipe_-_(162)_(RYCB)

"Profile 082. Junction RYCB_6_(1)_(3)_(RYCB) to Junction TEE_3_(RYCB)" Pipe_-_(89)_(RYCB)

"Profile 083. Storage B4_Stor to Junction 106_(STM)" B4-Out

"Profile 084. Junction Maj-55 to Junction Maj-54" C57

"Profile 085. Junction 134_(STM) to Junction 132_(STM)" STM-27_(STM)

"Profile 086. Junction Maj-27 to Junction Maj-60" C27_1

"Profile 087. Junction 31_(RYCB) to Junction Maj-18_2" C18

"Profile 088. Junction Slope1 to Junction 33_(RYCB)" OR48

"Profile 089. Junction Maj-15 to Junction Maj-14" C17

"Profile 090. Junction Structure_-_(12)_(RYCB) to Junction Maj-14" C4

"Profile 091. Junction Maj-14 to Junction 31a_(RYCB)" OR49

"Profile 092. Junction Maj-13 to Junction Maj-12" C14

"Profile 093. Junction Maj-15 to Junction Maj-16" C15

"Profile 094. Junction Maj-17 to Junction Maj-10" C10

"Profile 095. Junction Maj-11 to Junction Maj-09" C12

"Profile 096. Junction 52_(RYCB) to Junction Maj-08" C6

"Profile 097. Junction Maj-07 to Junction Maj-06_2" C6_1

"Profile 098. Storage B2_Stor to Junction Maj-06" B2-Outflow

"Profile 099. Junction Maj-04 to Junction Maj-03" C3

"Profile 100. Outfall Maj-22 to Junction Maj-21" C22

"Profile 101. Outfall Maj-49 to Junction Maj-50" C54

"Profile 102. Outfall Maj-48 to Junction Maj-48_2" C50_1

"Profile 103. Junction Maj-51 to Junction Maj-52" C52

"Profile 104. Junction Maj-53 to Junction Maj-46" C49

"Profile 105. Junction TEE_6_(RYCB) to Junction Maj-46" C58

"Profile 106. Junction Maj-45 to Junction Maj-44" C41

"Profile 107. Junction Maj-43 to Junction Maj-42" C39

"Profile 108. Junction Maj-45 to Junction Maj-41" C42

"Profile 109. Junction Maj-40 to Junction Maj-39" C44

"Profile 110. Junction Maj-38 to Junction Maj-37" C47

"Profile 111. Junction Maj-36 to Junction Maj-35" C37

"Profile 112. Junction Maj-29 to Junction Maj-30" C35

"Profile 113. Junction Maj-31 to Junction Maj-32" C33

"Profile 114. Junction 24_(RYCB) to Junction 142_(STM)" RYCB-24

"Profile 115. Junction Maj-34 to Junction Maj-33" C30

"Profile 116. Junction Maj-29 to Junction Maj-28" C28

"Profile 117. Junction STM-Split to Junction Maj-60" C5

"Profile 118. Junction Structure_-_(115)_(RYCB) to Junction 20_(CB)" Pipe_-_(73)_(RYCB)

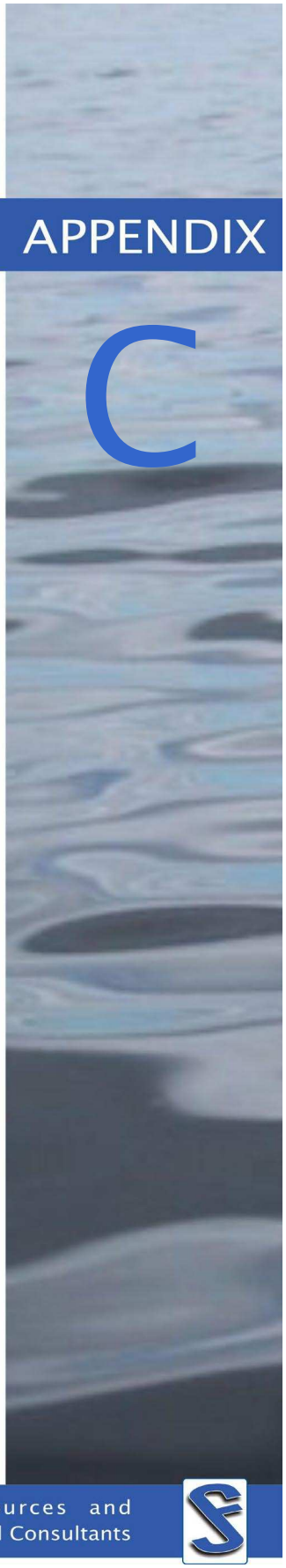
"Profile 119. Junction 144_(STM) to Junction 140_(STM)" 5_(STM)

"Profile 120. Junction 142_(STM) to Junction 140_(STM)" STM-81_(STM)

"Profile 121. Junction Maj-27 to Junction Maj-26" C26

"Profile 122. Junction Maj-34_2 to Outfall Maj-57" C18_2

"Profile 123. Outfall Maj-59 to Junction Maj-58" C2



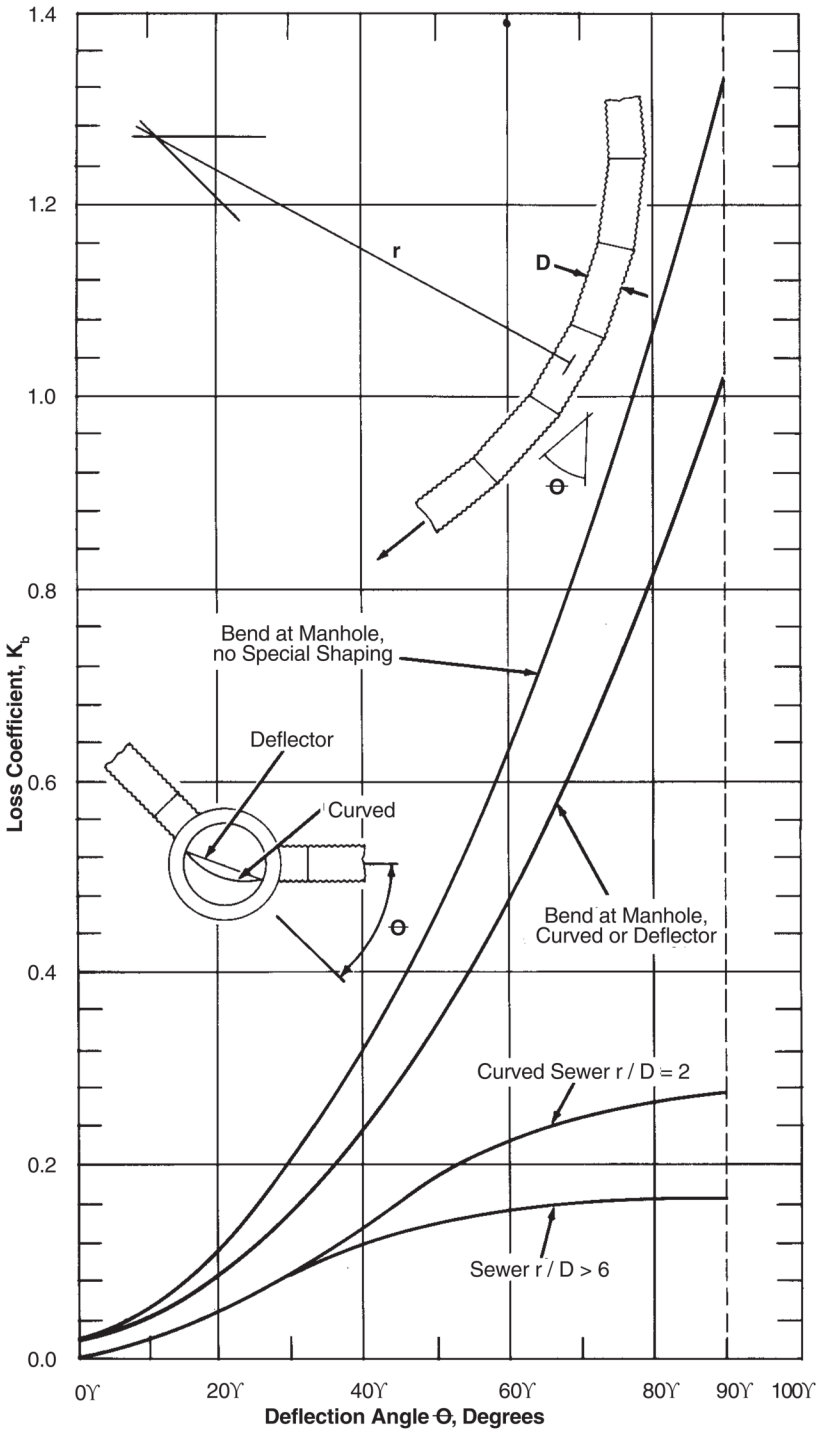
APPENDIX C

Manhole Loss Coefficient Nomograph and Table

Pipe Data and Hydraulic Simulation Results

JFSA Water Resources and Environmental Consultants

MANHOLE LOSS COEFFICIENT NOMOGRAPH AND TABLE



Angle	Exit Loss
0	0.02
5	0.035
10	0.055
15	0.08
20	0.11
25	0.16
30	0.21
35	0.26
40	0.32
45	0.39
50	0.47
55	0.54
60	0.635
65	0.73
70	0.84
75	0.95
80	1.07
85	1.19
90	1.33

Figure 4.13 Sewer bend loss coefficient[16]

Table C-1A: Pipe Data and Hydraulic Simulation Results for the 100-Year, 3-Hour Chicago Storm

U/S MH	D/S MH	U/S Invert (m)	D/S Invert (m)	Pipe Dia. / Height (mm)	Pipe Length (m)	Pipe Slope (%)	n	U/S MH Cover Elev. (m)	D/S MH Cover Elev. (m)	Design Vel. (m/s)	Design Flow (m^3/s)	Peak Pipe Flow (m^3/s)	Peak / Design Flow	Surcharge U/S [1] (m)	Time to Peak (hh:mm)	Max. U/S HGL (m)	Max. D/S HGL (m)	Lot Number	USF (m)	Freeboard [2] (m)	Interpolated HGL		
																					Length HGL (m)	Dist. From D/S MH (m)	HGL (m)
102_(STM)	100_(STM)	81.641	81.627	1650	13.3	0.1	0.013	87.543	67.400	1.381	2.95	3.28	1.1	-0.430	01:16	82.86	82.93	145	85.65	2.789			
104_(STM)	102_(STM)	81.683	81.641	1650	41.9	0.1	0.013	87.624	67.400	1.348	2.88	3.28	1.1	-0.510	01:16	82.82	82.86	139	85.7	2.877			
106_(STM)	104_(STM)	83.764	81.983	525	97.6	0.3	0.013	87.663	87.624	0.993	0.22	0.12	0.6	-0.239	01:21	84.05	82.82	20	85.9	1.850			
108_(STM)	106_(STM)	83.905	83.839	450	26.2	0.3	0.013	87.503	87.663	0.900	0.14	0.04	0.3	-0.286	01:23	84.07	84.05	28	86.1	2.031			
110_(STM)	108_(STM)	84.236	84.105	250	29.1	0.5	0.013	87.749	87.503	0.813	0.04	0.04	0.9	-0.060	01:22	84.43	84.11	26	86.1	1.674			
112_(STM)	104_(STM)	82.130	81.983	1350	73.8	0.2	0.013	87.926	87.624	1.663	2.38	3.06	1.3	-0.260	01:16	83.22	82.82	18	85.95	2.730			
114_(STM)	112_(STM)	83.666	82.735	525	64.6	0.4	0.013	88.000	87.926	1.175	0.25	0.25	1.0	-0.115	01:21	84.08	83.22	113	86.05	1.974			
116_(STM)	114_(STM)	83.801	83.741	450	11.9	0.5	0.013	88.175	88.000	1.271	0.20	0.14	0.7	-0.140	01:20	84.11	84.08	108	86.5	2.389			
118_(STM)	116_(STM)	84.180	83.831	450	99.6	0.4	0.013	88.427	88.175	1.061	0.17	0.06	0.3	-0.270	01:07	84.36	84.11	93	86.4	2.040			
120_(STM)	112_(STM)	82.918	82.735	1350	91.6	0.2	0.013	87.996	87.926	1.668	2.39	2.74	1.1	-0.310	01:15	83.96	83.22	9	86.1	2.142			
122_(STM)	120_(STM)	82.977	82.928	1350	24.6	0.2	0.013	88.113	87.996	1.663	2.38	2.70	1.1	-0.290	01:15	84.04	83.96	47	86.25	2.213			
124_(STM)	122_(STM)	83.071	82.987	1350	16.9	0.5	0.013	88.195	88.113	2.631	3.77	2.68	0.7	-0.350	01:14	84.07	84.04	49	86.5	2.429			
126_(STM)	124_(STM)	83.188	83.081	1350	53.4	0.2	0.013	88.524	88.195	1.668	2.39	2.68	1.1	-0.290	01:14	84.25	84.07	3	86.5	2.252			
128_(STM)	126_(STM)	83.350	83.198	1350	76.0	0.2	0.013	88.654	88.524	1.668	2.39	2.64	1.1	-0.240	01:14	84.46	84.25	56	86.7	2.240			
130_(STM)	128_(STM)	84.418	83.360	600	88.3	0.4	0.013	89.045	88.654	1.285	0.36	0.08	0.2	-0.410	01:12	84.61	84.46	115	86.85	2.242			
132_(STM)	130_(STM)	84.559	84.428	600	37.4	0.4	0.013	89.145	89.045	1.285	0.36	0.04	0.1	-0.460	01:12	84.70	84.61	122	87.3	2.601			
134_(STM)	132_(STM)	85.104	84.859	250	30.0	0.7	0.013	89.261	89.145	0.977	0.05	0.00	0.0	-0.250	00:00	85.10	84.86	125	87.4	2.296			
136_(STM)	128_(STM)	83.485	83.360	1350	62.5	0.2	0.013	88.680	88.654	1.668	2.39	2.47	1.0	-0.240	01:14	84.60	84.46	63	86.8	2.205			
138_(STM)	136_(STM)	83.569	83.495	1350	6.3	0.5	0.013	88.796	88.680	2.623	3.76	2.30	0.6	-0.310	01:13	84.61	84.60	70	87.05	2.441			
140_(STM)	138_(STM)	83.915	83.630	1350	113.1	0.3	0.013	89.208	88.796	1.872	2.68	2.30	0.9	-0.380	01:13	84.89	84.61	76	87.1	2.215			
142_(STM)	132_(STM)	85.207	84.859	300	53.4	0.7	0.013	89.160	89.145	1.104	0.08	0.00	0.0	-0.263	01:11	85.24	84.86	113	87.35	2.106			
142_(STM)	140_(STM)	85.207	84.100	300	53.4	0.7	0.013	89.160	89.208	1.104	0.08	0.00	0.0	-0.263	01:11	85.24	84.89	92	87.45	2.206			
144_(STM)	140_(STM)	84.367	84.100	1200	77.3	0.3	0.013	89.469	89.208	2.025	2.29	2.20	1.0	-0.320	01:12	85.25	84.89	91	87.45	2.203			
146_(STM)	144_(STM)	85.209	85.012	600	78.7	0.3	0.013	89.124	89.469	1.086	0.31	0.18	0.6	-0.270	01:17	85.54	85.25	94	87.7	2.161			
148_(STM)	146_(STM)	85.555	85.359	450	78.5	0.3	0.013	88.479	89.124	0.896	0.14	0.18	1.2	-0.010	01:17	86.00	85.54	97	87	1.005			
150_(STM)	144_(STM)	84.679	85.012	1200	76.3	0.4	0.013	89.795	89.469	2.039	2.31	1.95	0.8	-0.360	01:12	85.52	85.25	114	87.7	2.181			
152_(STM)	150_(STM)	85.562	84.829	525	59.4	0.4	0.013	90.000	89.795	1.175	0.25	0.14	0.6	-0.245	01:19	85.84	85.52	115	87.9	2.058			
154_(STM)	152_(STM)	85.653	85.590	450	12.6	0.5	0.013	90.091	90.000	1.269	0.20	0.05	0.3	-0.260	01:43	85.84	85.84	117	88.3	2.457			
156_(STM)	154_(STM)	86.028	85.680	450	100.7	0.3	0.013	90.278	90.091	1.054	0.17	0.05	0.3	-0.280	01:19	86.20	85.84	118	88.2	2.002			
158_(STM)	150_(STM)	85.207	84.829	1050	108.0	0.4	0.013	90.066	89.795	1.866	1.62	1.74	1.1	-0.180	01:11	86.08	85.52	103	88	1.923			
160_(STM)	158_(STM)	85.289	85.217	1050	14.3	0.5	0.013	90.162	90.066	2.239	1.94	1.68	0.9	-0.220	01:10	86.12	86.08	106	88.4	2.281			
162_(STM)	160_(STM)	85.648	85.299	1050	106.3	0.3	0.013	90.303	90.162	1.806	1.56	1.68	1.1	-0.160	01:10	86.54	86.12	107	88.4	1.862			

[2] Conservative estimate of freeboard based on U/S HGL and lowest USF connected to pipe. Actual HGL / freeboard at all connecting lots interpolated where conservative estimate does not meet freeboard requirements.

[3] Future USF elevations estimated as 1.8 m below the upstream top of manhole elevations.

Interpolated HGL elevation

Freebaord Less than 0.3m

Freebaord Less than 0.0m

Table C-1B: Pipe Data and Hydraulic Simulation Results for the 100-Year, 24-Hour SCS Storm

U/S MH	D/S MH	U/S Invert (m)	D/S Invert (m)	Pipe Dia. / Height (mm)	Pipe Length (m)	Pipe Slope (%)	n	U/S MH Cover Elev. (m)	D/S MH Cover Elev. (m)	Design Vel. (m/s)	Design Flow (m^3/s)	Peak Pipe Flow (m^3/s)	Peak / Design Flow	Surcharge U/S [1] (m)	Time to Peak (hh:mm)	Max. U/S HGL (m)	Max. D/S HGL (m)	Lot Number	USF (m)	Freeboard [2] (m)	Interpolated HGL		
																					Length HGL (m)	Dist. From D/S MH (m)	HGL (m)
102_(STM)	100_(STM)	81.641	81.627	1650	13.3	0.1	0.013	87.543	67.400	1.381	2.95	3.25	1.1	-0.470	12:05	82.82	82.83	145	85.65	2.829			
104_(STM)	102_(STM)	81.683	81.641	1650	41.9	0.1	0.013	87.624	67.400	1.348	2.88	3.25	1.1	-0.500	12:05	82.83	82.82	139	85.7	2.867			
106_(STM)	104_(STM)	83.764	81.983	525	97.6	0.3	0.013	87.663	87.624	0.993	0.22	0.13	0.6	-0.229	12:05	84.06	82.83	20	85.9	1.840			
108_(STM)	106_(STM)	83.905	83.839	450	26.2	0.3	0.013	87.503	87.663	0.900	0.14	0.04	0.3	-0.276	12:08	84.08	84.06	28	86.1	2.021			
110_(STM)	108_(STM)	84.236	84.105	250	29.1	0.5	0.013	87.749	87.503	0.813	0.04	0.04	1.0	-0.060	12:08	84.43	84.11	26	86.1	1.674			
112_(STM)	104_(STM)	82.130	81.983	1350	73.8	0.2	0.013	87.926	87.624	1.663	2.38	2.99	1.3	-0.270	12:05	83.21	82.83	18	85.95	2.740			
114_(STM)	112_(STM)	83.666	82.735	525	64.6	0.4	0.013	88.000	87.926	1.175	0.25	0.25	1.0	-0.115	12:07	84.08	83.21	113	86.05	1.974			
116_(STM)	114_(STM)	83.801	83.741	450	11.9	0.5	0.013	88.175	88.000	1.271	0.20	0.14	0.7	-0.140	12:06	84.11	84.08	108	86.5	2.389			
118_(STM)	116_(STM)	84.180	83.831	450	99.6	0.4	0.013	88.427	88.175	1.061	0.17	0.05	0.3	-0.270	12:03	84.36	84.11	93	86.4	2.040			
120_(STM)	112_(STM)	82.918	82.735	1350	91.6	0.2	0.013	87.996	87.926	1.668	2.39	2.66	1.1	-0.330	12:04	83.94	83.21	9	86.1	2.162			
122_(STM)	120_(STM)	82.977	82.928	1350	24.6	0.2	0.013	88.113	87.996	1.663	2.38	2.62	1.1	-0.310	12:04	84.02	83.94	47	86.25	2.233			
124_(STM)	122_(STM)	83.071	82.987	1350	16.9	0.5	0.013	88.195	88.113	2.631	3.77	2.61	0.7	-0.370	12:03	84.05	84.02	49	86.5	2.449			
126_(STM)	124_(STM)	83.188	83.081	1350	53.4	0.2	0.013	88.524	88.195	1.668	2.39	2.61	1.1	-0.320	12:03	84.22	84.05	3	86.5	2.282			
128_(STM)	126_(STM)	83.350	83.198	1350	76.0	0.2	0.013	88.654	88.524	1.668	2.39	2.57	1.1	-0.270	12:03	84.43	84.22	56	86.7	2.270			
130_(STM)	128_(STM)	84.418	83.360	600	88.3	0.4	0.013	89.045	88.654	1.285	0.36	0.08	0.2	-0.410	12:03	84.61	84.43	115	86.85	2.242			
132_(STM)	130_(STM)	84.559	84.428	600	37.4	0.4	0.013	89.145	89.045	1.285	0.36	0.04	0.1	-0.460	12:02	84.70	84.61	122	87.3	2.601			
134_(STM)	132_(STM)	85.104	84.859	250	30.0	0.7	0.013	89.261	89.145	0.977	0.05	0.00	0.0	-0.250	00:00	85.10	84.86	125	87.4	2.296			
136_(STM)	128_(STM)	83.485	83.360	1350	62.5	0.2	0.013	88.680	88.654	1.668	2.39	2.39	1.0	-0.270	12:03	84.57	84.43	63	86.8	2.235			
138_(STM)	136_(STM)	83.569	83.495	1350	6.3	0.5	0.013	88.796	88.680	2.623	3.76	2.19	0.6	-0.340	12:03	84.58	84.57	70	87.05	2.471			
140_(STM)	138_(STM)	83.915	83.630	1350	113.1	0.3	0.013	89.208	88.796	1.872	2.68	2.20	0.8	-0.420	12:02	84.85	84.58	76	87.1	2.255			
142_(STM)	132_(STM)	85.207	84.859	300	53.4	0.7	0.013	89.160	89.145	1.104	0.08	0.00	0.0	-0.263	12:02	85.24	84.86	113	87.35	2.106			
142_(STM)	140_(STM)	85.207	84.100	300	53.4	0.7	0.013	89.160	89.208	1.104	0.08	0.00	0.0	-0.263	12:02	85.24	84.85	92	87.45	2.206			
144_(STM)	140_(STM)	84.367	84.100	1200	77.3	0.3	0.013	89.469	89.208	2.025	2.29	2.10	0.9	-0.340	12:02	85.23	84.85	91	87.45	2.223			
146_(STM)	144_(STM)	85.209	85.012	600	78.7	0.3	0.013	89.124	89.469	1.086	0.31	0.19	0.6	-0.260	12:02	85.55	85.23	94	87.7	2.151			
148_(STM)	146_(STM)	85.555	85.359	450	78.5	0.3	0.013	88.479	89.124	0.896	0.14	0.18	1.2	-0.010	12:03	86.00	85.55	97	87	1.005			
150_(STM)	144_(STM)	84.679	85.012	1200	76.3	0.4	0.013	89.795	89.469	2.039	2.31	1.83	0.8	-0.390	12:01	85.49	85.23	114	87.7	2.211			
152_(STM)	150_(STM)	85.562	84.829	525	59.4	0.4	0.013	90.000	89.795	1.175	0.25	0.14	0.6	-0.245	12:05	85.84	85.49	115	87.9	2.058			
154_(STM)	152_(STM)	85.653	85.590	450	12.6	0.5	0.013	90.091	90.000	1.269	0.20	0.05	0.3	-0.260	12:06	85.84	85.84	117	88.3	2.457			
156_(STM)	154_(STM)	86.028	85.680	450	100.7	0.3	0.013	90.278	90.091	1.054	0.17	0.05	0.3	-0.280	12:04	86.20	85.84	118	88.2	2.002			
158_(STM)	150_(STM)	85.207	84.829	1050	108.0	0.4	0.013	90.066	89.795	1.866	1.62	1.62	1.0	-0.230	12:01	86.03	85.49	103	88	1.973			
160_(STM)	158_(STM)	85.289	85.217	1050	14.3	0.5	0.013	90.162	90.066	2.239	1.94	1.55	0.8	-0.270	12:00	86.07	86.03	106	88.4	2.331			
162_(STM)	160_(STM)	85.648	85.299	1050	106.3	0.3	0.013	90.303	90.162	1.806	1.56	1.56	1.0	-0.220	12:00	86.48	86.07	107	88.4	1.922			

[2] Conservative estimate of freeboard based on U/S HGL and lowest USF connected to pipe. Actual HGL / freeboard at all connecting lots interpolated where conservative estimate does not meet freeboard requirements.

[3] Future USF elevations estimated as 1.8 m below the upstream top of manhole elevations.

Interpolated HGL elevation

Freebaord Less than 0.3m

Freebaord Less than 0.0m

Table C-1C: Pipe Data and Hydraulic Simulation Results for the Historical July 1, 1979 Storm

U/S MH	D/S MH	U/S Invert (m)	D/S Invert (m)	Pipe Dia. / Height (mm)	Pipe Length (m)	Pipe Slope (%)	n	U/S MH Cover Elev. (m)	D/S MH Cover Elev. (m)	Design Vel. (m/s)	Design Flow (m^3/s)	Peak Pipe Flow (m^3/s)	Peak / Design Flow	Surcharge U/S [1] (m)	Time to Peak (hh:mm)	Max. U/S HGL (m)	Max. D/S HGL (m)	Lot Number	USF (m)	Freeboard [2] (m)	Interpolated HGL		
																					Length HGL (m)	Dist. From D/S MH (m)	HGL (m)
102_(STM)	100_(STM)	81.641	81.627	1650	13.3	0.1	0.013	87.543	67.400	1.381	2.95	3.14	1.1	-0.130	01:36	83.16	83.19	145	85.65	2.489			
104_(STM)	102_(STM)	81.683	81.641	1650	41.9	0.1	0.013	87.624	67.400	1.348	2.88	3.14	1.1	-0.210	01:36	83.12	83.16	139	85.7	2.577			
106_(STM)	104_(STM)	83.764	81.983	525	97.6	0.3	0.013	87.663	87.624	0.993	0.22	0.14	0.6	-0.219	01:42	84.07	83.12	20	85.9	1.830			
108_(STM)	106_(STM)	83.905	83.839	450	26.2	0.3	0.013	87.503	87.663	0.900	0.14	0.04	0.3	-0.266	01:48	84.09	84.07	28	86.1	2.011			
110_(STM)	108_(STM)	84.236	84.105	250	29.1	0.5	0.013	87.749	87.503	0.813	0.04	0.04	1.1	-0.040	01:48	84.45	84.11	26	86.1	1.654			
112_(STM)	104_(STM)	82.130	81.983	1350	73.8	0.2	0.013	87.926	87.624	1.663	2.38	2.88	1.2	-0.300	01:36	83.18	83.12	18	85.95	2.770			
114_(STM)	112_(STM)	83.666	82.735	525	64.6	0.4	0.013	88.000	87.926	1.175	0.25	0.25	1.0	-0.115	01:40	84.08	83.18	113	86.05	1.974			
116_(STM)	114_(STM)	83.801	83.741	450	11.9	0.5	0.013	88.175	88.000	1.271	0.20	0.14	0.7	-0.140	01:39	84.11	84.08	108	86.5	2.389			
118_(STM)	116_(STM)	84.180	83.831	450	99.6	0.4	0.013	88.427	88.175	1.061	0.17	0.05	0.3	-0.270	01:40	84.36	84.11	93	86.4	2.040			
120_(STM)	112_(STM)	82.918	82.735	1350	91.6	0.2	0.013	87.996	87.926	1.668	2.39	2.56	1.1	-0.360	01:35	83.91	83.18	9	86.1	2.192			
122_(STM)	120_(STM)	82.977	82.928	1350	24.6	0.2	0.013	88.113	87.996	1.663	2.38	2.52	1.1	-0.340	01:35	83.99	83.91	47	86.25	2.263			
124_(STM)	122_(STM)	83.071	82.987	1350	16.9	0.5	0.013	88.195	88.113	2.631	3.77	2.50	0.7	-0.400	01:35	84.02	83.99	49	86.5	2.479			
126_(STM)	124_(STM)	83.188	83.081	1350	53.4	0.2	0.013	88.524	88.195	1.668	2.39	2.50	1.0	-0.350	01:34	84.19	84.02	3	86.5	2.312			
128_(STM)	126_(STM)	83.350	83.198	1350	76.0	0.2	0.013	88.654	88.524	1.668	2.39	2.47	1.0	-0.300	01:34	84.40	84.19	56	86.7	2.300			
130_(STM)	128_(STM)	84.418	83.360	600	88.3	0.4	0.013	89.045	88.654	1.285	0.36	0.08	0.2	-0.410	01:31	84.61	84.40	115	86.85	2.242			
132_(STM)	130_(STM)	84.559	84.428	600	37.4	0.4	0.013	89.145	89.045	1.285	0.36	0.04	0.1	-0.470	01:31	84.69	84.61	122	87.3	2.611			
134_(STM)	132_(STM)	85.104	84.859	250	30.0	0.7	0.013	89.261	89.145	0.977	0.05	0.00	0.0	-0.250	00:00	85.10	84.86	125	87.4	2.296			
136_(STM)	128_(STM)	83.485	83.360	1350	62.5	0.2	0.013	88.680	88.654	1.668	2.39	2.29	1.0	-0.310	01:34	84.53	84.40	63	86.8	2.275			
138_(STM)	136_(STM)	83.569	83.495	1350	6.3	0.5	0.013	88.796	88.680	2.623	3.76	2.10	0.6	-0.380	01:33	84.54	84.53	70	87.05	2.511			
140_(STM)	138_(STM)	83.915	83.630	1350	113.1	0.3	0.013	89.208	88.796	1.872	2.68	2.10	0.8	-0.450	01:33	84.82	84.54	76	87.1	2.285			
142_(STM)	132_(STM)	85.207	84.859	300	53.4	0.7	0.013	89.160	89.145	1.104	0.08	0.00	0.0	-0.263	01:40	85.24	84.86	113	87.35	2.106			
142_(STM)	140_(STM)	85.207	84.100	300	53.4	0.7	0.013	89.160	89.208	1.104	0.08	0.00	0.0	-0.263	01:40	85.24	84.82	92	87.45	2.206			
144_(STM)	140_(STM)	84.367	84.100	1200	77.3	0.3	0.013	89.469	89.208	2.025	2.29	2.00	0.9	-0.370	01:32	85.20	84.82	91	87.45	2.253			
146_(STM)	144_(STM)	85.209	85.012	600	78.7	0.3	0.013	89.124	89.469	1.086	0.31	0.19	0.6	-0.270	01:38	85.54	85.20	94	87.7	2.161			
148_(STM)	146_(STM)	85.555	85.359	450	78.5	0.3	0.013	88.479	89.124	0.896	0.14	0.17	1.2	-0.020	01:37	85.99	85.54	97	87	1.015			
150_(STM)	144_(STM)	84.679	85.012	1200	76.3	0.4	0.013	89.795	89.469	2.039	2.31	1.74	0.8	-0.420	01:31	85.46	85.20	114	87.7	2.241			
152_(STM)	150_(STM)	85.562	84.829	525	59.4	0.4	0.013	90.000	89.795	1.175	0.25	0.14	0.6	-0.245	01:44	85.84	85.46	115	87.9	2.058			
154_(STM)	152_(STM)	85.653	85.590	450	12.6	0.5	0.013	90.091	90.000	1.269	0.20	0.05	0.3	-0.260	01:44	85.84	85.84	117	88.3	2.457			
156_(STM)	154_(STM)	86.028	85.680	450	100.7	0.3	0.013	90.278	90.091	1.054	0.17	0.05	0.3	-0.280	01:43	86.20	85.84	118	88.2	2.002			
158_(STM)	150_(STM)	85.207	84.829	1050	108.0	0.4	0.013	90.066	89.795	1.866	1.62	1.53	0.9	-0.270	01:31	85.99	85.46	103	88	2.013			
160_(STM)	158_(STM)	85.289	85.217	1050	14.3	0.5	0.013	90.162	90.066	2.239	1.94	1.47	0.8	-0.300	01:30	86.04	85.99	106	88.4	2.361			
162_(STM)	160_(STM)	85.648	85.299	1050	106.3	0.3	0.013	90.303	90.162	2.347	7.39	1.47	0.2	-0.260	01:30	86.44	86.04	107	88.4	1.962			

[2] Conservative estimate of freeboard based on U/S HGL and lowest USF connected to pipe. Actual HGL / freeboard at all connecting lots interpolated where conservative estimate does not meet freeboard requirements.

[3] Future USF elevations estimated as 1.8 m below the upstream top of manhole elevations.

Interpolated HGL elevation

Freebaord Less than 0.3m

Freebaord Less than 0.0m

Table C-1D: Pipe Data and Hydraulic Simulation Results for the Historical August 4, 1988 Storm

U/S MH	D/S MH	U/S Invert (m)	D/S Invert (m)	Pipe Dia. / Height (mm)	Pipe Length (m)	Pipe Slope (%)	n	U/S MH Cover Elev. (m)	D/S MH Cover Elev. (m)	Design Vel. (m/s)	Design Flow (m^3/s)	Peak Pipe Flow (m^3/s)	Peak / Design Flow	Surcharge U/S [1] (m)	Time to Peak (hh:mm)	Max. U/S HGL (m)	Max. D/S HGL (m)	Lot Number	USF (m)	Freeboard [2] (m)	Interpolated HGL		
																					Length HGL (m)	Dist. From D/S MH (m)	HGL (m)
102_(STM)	100_(STM)	81.641	81.627	1650	13.3	0.1	0.013	87.543	67.400	1.381	2.95	3.21	1.1	-0.320	02:06	82.97	83.02	145	85.65	2.679			
104_(STM)	102_(STM)	81.683	81.641	1650	41.9	0.1	0.013	87.624	67.400	1.348	2.88	3.23	1.1	-0.400	02:05	82.93	82.97	139	85.7	2.767			
106_(STM)	104_(STM)	83.764	81.983	525	97.6	0.3	0.013	87.663	87.624	0.993	0.22	0.14	0.6	-0.219	02:03	84.07	82.93	20	85.9	1.830			
108_(STM)	106_(STM)	83.905	83.839	450	26.2	0.3	0.013	87.503	87.663	0.900	0.14	0.04	0.3	-0.266	02:08	84.09	84.07	28	86.1	2.011			
110_(STM)	108_(STM)	84.236	84.105	250	29.1	0.5	0.013	87.749	87.503	0.813	0.04	0.04	1.0	-0.050	02:08	84.44	84.11	26	86.1	1.664			
112_(STM)	104_(STM)	82.130	81.983	1350	73.8	0.2	0.013	87.926	87.624	1.663	2.38	2.99	1.3	-0.270	02:05	83.21	82.93	18	85.95	2.740			
114_(STM)	112_(STM)	83.666	82.735	525	64.6	0.4	0.013	88.000	87.926	1.175	0.25	0.25	1.0	-0.115	02:07	84.08	83.21	113	86.05	1.974			
116_(STM)	114_(STM)	83.801	83.741	450	11.9	0.5	0.013	88.175	88.000	1.271	0.20	0.14	0.7	-0.150	02:07	84.10	84.08	108	86.5	2.399			
118_(STM)	116_(STM)	84.180	83.831	450	99.6	0.4	0.013	88.427	88.175	1.061	0.17	0.05	0.3	-0.270	02:03	84.36	84.10	93	86.4	2.040			
120_(STM)	112_(STM)	82.918	82.735	1350	91.6	0.2	0.013	87.996	87.926	1.668	2.39	2.66	1.1	-0.330	02:04	83.94	83.21	9	86.1	2.162			
122_(STM)	120_(STM)	82.977	82.928	1350	24.6	0.2	0.013	88.113	87.996	1.663	2.38	2.62	1.1	-0.310	02:04	84.02	83.94	47	86.25	2.233			
124_(STM)	122_(STM)	83.071	82.987	1350	16.9	0.5	0.013	88.195	88.113	2.631	3.77	2.61	0.7	-0.370	02:04	84.05	84.02	49	86.5	2.449			
126_(STM)	124_(STM)	83.188	83.081	1350	53.4	0.2	0.013	88.524	88.195	1.668	2.39	2.61	1.1	-0.310	02:04	84.23	84.05	3	86.5	2.272			
128_(STM)	126_(STM)	83.350	83.198	1350	76.0	0.2	0.013	88.654	88.524	1.668	2.39	2.58	1.1	-0.270	02:04	84.43	84.23	56	86.7	2.270			
130_(STM)	128_(STM)	84.418	83.360	600	88.3	0.4	0.013	89.045	88.654	1.285	0.36	0.08	0.2	-0.410	02:02	84.61	84.43	115	86.85	2.242			
132_(STM)	130_(STM)	84.559	84.428	600	37.4	0.4	0.013	89.145	89.045	1.285	0.36	0.04	0.1	-0.460	02:01	84.70	84.61	122	87.3	2.601			
134_(STM)	132_(STM)	85.104	84.859	250	30.0	0.7	0.013	89.261	89.145	0.977	0.05	0.00	0.0	-0.250	00:00	85.10	84.86	125	87.4	2.296			
136_(STM)	128_(STM)	83.485	83.360	1350	62.5	0.2	0.013	88.680	88.654	1.668	2.39	2.39	1.0	-0.270	02:03	84.57	84.43	63	86.8	2.235			
138_(STM)	136_(STM)	83.569	83.495	1350	6.3	0.5	0.013	88.796	88.680	2.623	3.76	2.20	0.6	-0.340	02:03	84.58	84.57	70	87.05	2.471			
140_(STM)	138_(STM)	83.915	83.630	1350	113.1	0.3	0.013	89.208	88.796	1.872	2.68	2.21	0.8	-0.410	02:03	84.86	84.58	76	87.1	2.245			
142_(STM)	132_(STM)	85.207	84.859	300	53.4	0.7	0.013	89.160	89.145	1.104	0.08	0.00	0.1	-0.253	02:01	85.25	84.86	113	87.35	2.096			
142_(STM)	140_(STM)	85.207	84.100	300	53.4	0.7	0.013	89.160	89.208	1.104	0.08	0.00	0.1	-0.253	02:01	85.25	84.86	92	87.45	2.196			
144_(STM)	140_(STM)	84.367	84.100	1200	77.3	0.3	0.013	89.469	89.208	2.025	2.29	2.10	0.9	-0.340	02:02	85.23	84.86	91	87.45	2.223			
146_(STM)	144_(STM)	85.209	85.012	600	78.7	0.3	0.013	89.124	89.469	1.086	0.31	0.19	0.6	-0.270	02:02	85.54	85.23	94	87.7	2.161			
148_(STM)	146_(STM)	85.555	85.359	450	78.5	0.3	0.013	88.479	89.124	0.896	0.14	0.17	1.2	-0.020	02:03	85.99	85.54	97	87	1.015			
150_(STM)	144_(STM)	84.679	85.012	1200	76.3	0.4	0.013	89.795	89.469	2.039	2.31	1.84	0.8	-0.390	02:02	85.49	85.23	114	87.7	2.211			
152_(STM)	150_(STM)	85.562	84.829	525	59.4	0.4	0.013	90.000	89.795	1.175	0.25	0.14	0.6	-0.245	02:06	85.84	85.49	115	87.9	2.058			
154_(STM)	152_(STM)	85.653	85.590	450	12.6	0.5	0.013	90.091	90.000	1.269	0.20	0.05	0.3	-0.260	02:06	85.84	85.84	117	88.3	2.457			
156_(STM)	154_(STM)	86.028	85.680	450	100.7	0.3	0.013	90.278	90.091	1.054	0.17	0.05	0.3	-0.280	02:04	86.20	85.84	118	88.2	2.002			
158_(STM)	150_(STM)	85.207	84.829	1050	108.0	0.4	0.013	90.066	89.795	1.866	1.62	1.62	1.0	-0.230	02:01	86.03	85.49	103	88	1.973			
160_(STM)	158_(STM)	85.289	85.217	1050	14.3	0.5	0.013	90.162	90.066	2.239	1.94	1.56	0.8	-0.270	02:01	86.07	86.03	106	88.4	2.331			
162_(STM)	160_(STM)	85.648	85.299	1050	106.3	0.3	0.013	90.303	90.162	2.347	7.39	1.57	0.2	-0.220	02:00	86.48	86.07	107	88.4	1.922			

[2] Conservative estimate of freeboard based on U/S HGL and lowest USF connected to pipe. Actual HGL / freeboard at all connecting lots interpolated where conservative estimate does not meet freeboard requirements.

[3] Future USF elevations estimated as 1.8 m below the upstream top of manhole elevations.

Interpolated HGL elevation

Freebaord Less than 0.3m

Freebaord Less than 0.0m

Table C-1E: Pipe Data and Hydraulic Simulation Results for the Historical August 8, 1996 Storm

U/S MH	D/S MH	U/S Invert (m)	D/S Invert (m)	Pipe Dia. / Height (mm)	Pipe Length (m)	Pipe Slope (%)	n	U/S MH Cover Elev. (m)	D/S MH Cover Elev. (m)	Design Vel. (m/s)	Design Flow (m^3/s)	Peak Pipe Flow (m^3/s)	Peak / Design Flow	Surcharge U/S [1] (m)	Time to Peak (hh:mm)	Max. U/S HGL (m)	Max. D/S HGL (m)	Lot Number	USF (m)	Freeboard [2] (m)	Interpolated HGL		
																					Length HGL (m)	Dist. From D/S MH (m)	HGL (m)
102_(STM)	100_(STM)	81.641	81.627	1650	13.3	0.1	0.013	87.543	67.400	1.381	2.95	2.67	0.9	-0.430	01:32	82.86	82.94	145	85.65	2.789			
104_(STM)	102_(STM)	81.683	81.641	1650	41.9	0.1	0.013	87.624	67.400	1.348	2.88	2.67	0.9	-0.520	01:32	82.81	82.86	139	85.7	2.887			
106_(STM)	104_(STM)	83.764	81.983	525	97.6	0.3	0.013	87.663	87.624	0.993	0.22	0.05	0.2	-0.349	01:32	83.94	82.81	20	85.9	1.960			
108_(STM)	106_(STM)	83.905	83.839	450	26.2	0.3	0.013	87.503	87.663	0.900	0.14	0.01	0.1	-0.356	01:40	84.00	83.94	28	86.1	2.101			
110_(STM)	108_(STM)	84.236	84.105	250	29.1	0.5	0.013	87.749	87.503	0.813	0.04	0.01	0.4	-0.150	01:40	84.34	84.11	26	86.1	1.764			
112_(STM)	104_(STM)	82.130	81.983	1350	73.8	0.2	0.013	87.926	87.624	1.663	2.38	2.52	1.1	-0.380	01:32	83.10	82.81	18	85.95	2.850			
114_(STM)	112_(STM)	83.666	82.735	525	64.6	0.4	0.013	88.000	87.926	1.175	0.25	0.19	0.8	-0.185	01:32	84.01	83.10	113	86.05	2.044			
116_(STM)	114_(STM)	83.801	83.741	450	11.9	0.5	0.013	88.175	88.000	1.271	0.20	0.10	0.5	-0.210	01:33	84.04	84.01	108	86.5	2.459			
118_(STM)	116_(STM)	84.180	83.831	450	99.6	0.4	0.013	88.427	88.175	1.061	0.17	0.06	0.3	-0.270	01:26	84.36	84.04	93	86.4	2.040			
120_(STM)	112_(STM)	82.918	82.735	1350	91.6	0.2	0.013	87.996	87.926	1.668	2.39	2.27	1.0	-0.430	01:32	83.84	83.10	9	86.1	2.262			
122_(STM)	120_(STM)	82.977	82.928	1350	24.6	0.2	0.013	88.113	87.996	1.663	2.38	2.23	0.9	-0.420	01:31	83.91	83.84	47	86.25	2.343			
124_(STM)	122_(STM)	83.071	82.987	1350	16.9	0.5	0.013	88.195	88.113	2.631	3.77	2.22	0.6	-0.470	01:31	83.95	83.91	49	86.5	2.549			
126_(STM)	124_(STM)	83.188	83.081	1350	53.4	0.2	0.013	88.524	88.195	1.668	2.39	2.22	0.9	-0.430	01:31	84.11	83.95	3	86.5	2.392			
128_(STM)	126_(STM)	83.350	83.198	1350	76.0	0.2	0.013	88.654	88.524	1.668	2.39	2.19	0.9	-0.390	01:32	84.31	84.11	56	86.7	2.390			
130_(STM)	128_(STM)	84.418	83.360	600	88.3	0.4	0.013	89.045	88.654	1.285	0.36	0.07	0.2	-0.420	01:28	84.60	84.31	115	86.85	2.252			
132_(STM)	130_(STM)	84.559	84.428	600	37.4	0.4	0.013	89.145	89.045	1.285	0.36	0.03	0.1	-0.480	01:26	84.68	84.60	122	87.3	2.621			
134_(STM)	132_(STM)	85.104	84.859	250	30.0	0.7	0.013	89.261	89.145	0.977	0.05	0.00	0.0	-0.250	00:00	85.10	84.86	125	87.4	2.296			
136_(STM)	128_(STM)	83.485	83.360	1350	62.5	0.2	0.013	88.680	88.654	1.668	2.39	2.07	0.9	-0.390	01:32	84.45	84.31	63	86.8	2.355			
138_(STM)	136_(STM)	83.569	83.495	1350	6.3	0.5	0.013	88.796	88.680	2.623	3.76	1.93	0.5	-0.460	01:32	84.46	84.45	70	87.05	2.591			
140_(STM)	138_(STM)	83.915	83.630	1350	113.1	0.3	0.013	89.208	88.796	1.872	2.68	1.93	0.7	-0.510	01:32	84.76	84.46	76	87.1	2.345			
142_(STM)	132_(STM)	85.207	84.859	300	53.4	0.7	0.013	89.160	89.145	1.104	0.08	0.00	0.0	-0.300	00:00	85.21	84.86	113	87.35	2.143			
142_(STM)	140_(STM)	85.207	84.100	300	53.4	0.7	0.013	89.160	89.208	1.104	0.08	0.00	0.0	-0.300	00:00	85.21	84.76	92	87.45	2.243			
144_(STM)	140_(STM)	84.367	84.100	1200	77.3	0.3	0.013	89.469	89.208	2.025	2.29	1.84	0.8	-0.410	01:31	85.16	84.76	91	87.45	2.293			
146_(STM)	144_(STM)	85.209	85.012	600	78.7	0.3	0.013	89.124	89.469	1.086	0.31	0.14	0.5	-0.320	01:31	85.49	85.16	94	87.7	2.211			
148_(STM)	146_(STM)	85.555	85.359	450	78.5	0.3	0.013	88.479	89.124	0.896	0.14	0.13	0.9	-0.120	01:31	85.89	85.49	97	87	1.115			
150_(STM)	144_(STM)	84.679	85.012	1200	76.3	0.4	0.013	89.795	89.469	2.039	2.31	1.65	0.7	-0.450	01:28	85.43	85.16	114	87.7	2.271			
152_(STM)	150_(STM)	85.562	84.829	525	59.4	0.4	0.013	90.000	89.795	1.175	0.25	0.12	0.5	-0.275	01:34	85.81	85.43	115	87.9	2.088			
154_(STM)	152_(STM)	85.653	85.590	450	12.6	0.5	0.013	90.091	90.000	1.269	0.20	0.05	0.3	-0.280	01:34	85.82	85.81	117	88.3	2.477			
156_(STM)	154_(STM)	86.028	85.680	450	100.7	0.3	0.013	90.278	90.091	1.054	0.17	0.05	0.3	-0.280	01:33	86.20	85.82	118	88.2	2.002			
158_(STM)	150_(STM)	85.207	84.829	1050	108.0	0.4	0.013	90.066	89.795	1.866	1.62	1.50	0.9	-0.280	01:28	85.98	85.43	103	88	2.023			
160_(STM)	158_(STM)	85.289	85.217	1050	14.3	0.5	0.013	90.162	90.066	2.239	1.94	1.43	0.7	-0.310	01:27	86.03	85.98	106	88.4	2.371			
162_(STM)	160_(STM)	85.648	85.299	1050	106.3	0.3	0.013	90.303	90.162	2.347	7.39	1.43	0.2	-0.280	01:27	86.42	86.03	107	88.4	1.982			

[2] Conservative estimate of freeboard based on U/S HGL and lowest USF connected to pipe. Actual HGL / freeboard at all connecting lots interpolated where conservative estimate does not meet freeboard requirements.

[3] Future USF elevations estimated as 1.8 m below the upstream top of manhole elevations.

Interpolated HGL elevation

Freebaord Less than 0.3m

Freebaord Less than 0.0m

Table C-1F: Pipe Data and Hydraulic Simulation Results for the 100-Year, 3-Hour Chicago Storm + 20%

U/S MH	D/S MH	U/S Invert (m)	D/S Invert (m)	Pipe Dia. / Height (mm)	Pipe Length (m)	Pipe Slope (%)	n	U/S MH Cover Elev. (m)	D/S MH Cover Elev. (m)	Design Vel. (m/s)	Design Flow (m^3/s)	Peak Pipe Flow (m^3/s)	Peak / Design Flow	Surcharge U/S [1] (m)	Time to Peak (hh:mm)	Max. U/S HGL (m)	Max. D/S HGL (m)	Lot Number	USF (m)	Freeboard [2] (m)	Interpolated HGL		
																					Length HGL (m)	Dist. From D/S MH (m)	HGL (m)
102_(STM)	100_(STM)	81.641	81.627	1650	13.3	0.1	0.013	87.543	67.400	1.381	2.95	3.62	1.2	-0.080	01:16	83.21	83.23	145	85.65	2.439			
104_(STM)	102_(STM)	81.683	81.641	1650	41.9	0.1	0.013	87.624	67.400	1.348	2.88	3.62	1.3	-0.150	01:16	83.18	83.21	139	85.7	2.517			
106_(STM)	104_(STM)	83.764	81.983	525	97.6	0.3	0.013	87.663	87.624	0.993	0.22	0.15	0.7	-0.199	01:26	84.09	83.18	20	85.9	1.810			
108_(STM)	106_(STM)	83.905	83.839	450	26.2	0.3	0.013	87.503	87.663	0.900	0.14	0.05	0.3	-0.246	01:32	84.11	84.09	28	86.1	1.991			
110_(STM)	108_(STM)	84.236	84.105	250	29.1	0.5	0.013	87.749	87.503	0.813	0.04	0.05	1.1	-0.030	01:30	84.46	84.11	26	86.1	1.644			
112_(STM)	104_(STM)	82.130	81.983	1350	73.8	0.2	0.013	87.926	87.624	1.663	2.38	3.32	1.4	-0.190	01:15	83.29	83.18	18	85.95	2.660			
114_(STM)	112_(STM)	83.666	82.735	525	64.6	0.4	0.013	88.000	87.926	1.175	0.25	0.27	1.0	-0.095	01:20	84.10	83.29	113	86.05	1.954			
116_(STM)	114_(STM)	83.801	83.741	450	11.9	0.5	0.013	88.175	88.000	1.271	0.20	0.15	0.7	-0.130	01:19	84.12	84.10	108	86.5	2.379			
118_(STM)	116_(STM)	84.180	83.831	450	99.6	0.4	0.013	88.427	88.175	1.061	0.17	0.06	0.3	-0.270	01:20	84.36	84.12	93	86.4	2.040			
120_(STM)	112_(STM)	82.918	82.735	1350	91.6	0.2	0.013	87.996	87.926	1.668	2.39	2.98	1.2	-0.250	01:15	84.02	83.29	9	86.1	2.082			
122_(STM)	120_(STM)	82.977	82.928	1350	24.6	0.2	0.013	88.113	87.996	1.663	2.38	2.94	1.2	-0.220	01:15	84.11	84.02	47	86.25	2.143			
124_(STM)	122_(STM)	83.071	82.987	1350	16.9	0.5	0.013	88.195	88.113	2.631	3.77	2.92	0.8	-0.280	01:15	84.14	84.11	49	86.5	2.359			
126_(STM)	124_(STM)	83.188	83.081	1350	53.4	0.2	0.013	88.524	88.195	1.668	2.39	2.92	1.2	-0.210	01:15	84.33	84.14	3	86.5	2.172			
128_(STM)	126_(STM)	83.350	83.198	1350	76.0	0.2	0.013	88.654	88.524	1.668	2.39	2.88	1.2	-0.150	01:14	84.55	84.33	56	86.7	2.150			
130_(STM)	128_(STM)	84.418	83.360	600	88.3	0.4	0.013	89.045	88.654	1.285	0.36	0.09	0.2	-0.400	01:18	84.62	84.55	115	86.85	2.232			
132_(STM)	130_(STM)	84.559	84.428	600	37.4	0.4	0.013	89.145	89.045	1.285	0.36	0.05	0.1	-0.450	01:18	84.71	84.62	122	87.3	2.591			
134_(STM)	132_(STM)	85.104	84.859	250	30.0	0.7	0.013	89.261	89.145	0.977	0.05	0.00	0.0	-0.250	00:00	85.10	84.86	125	87.4	2.296			
136_(STM)	128_(STM)	83.485	83.360	1350	62.5	0.2	0.013	88.680	88.654	1.668	2.39	2.68	1.1	-0.140	01:14	84.70	84.55	63	86.8	2.105			
138_(STM)	136_(STM)	83.569	83.495	1350	6.3	0.5	0.013	88.796	88.680	2.623	3.76	2.47	0.7	-0.210	01:13	84.71	84.70	70	87.05	2.341			
140_(STM)	138_(STM)	83.915	83.630	1350	113.1	0.3	0.013	89.208	88.796	1.872	2.68	2.48	0.9	-0.310	01:12	84.96	84.71	76	87.1	2.145			
142_(STM)	132_(STM)	85.207	84.859	300	53.4	0.7	0.013	89.160	89.145	1.104	0.08	0.01	0.1	-0.233	01:18	85.27	84.86	113	87.35	2.076			
142_(STM)	140_(STM)	85.207	84.100	300	53.4	0.7	0.013	89.160	89.208	1.104	0.08	0.01	0.1	-0.233	01:18	85.27	84.96	92	87.45	2.176			
144_(STM)	140_(STM)	84.367	84.100	1200	77.3	0.3	0.013	89.469	89.208	2.025	2.29	2.38	1.0	-0.270	01:12	85.30	84.96	91	87.45	2.153			
146_(STM)	144_(STM)	85.209	85.012	600	78.7	0.3	0.013	89.124	89.469	1.086	0.31	0.20	0.7	-0.250	01:13	85.56	85.30	94	87.7	2.141			
148_(STM)	146_(STM)	85.555	85.359	450	78.5	0.3	0.013	88.479	89.124	0.896	0.14	0.19	1.4	0.060	01:18	86.07	85.56	97	87	0.935			
150_(STM)	144_(STM)	84.679	85.012	1200	76.3	0.4	0.013	89.795	89.469	2.039	2.31	2.10	0.9	-0.310	01:12	85.57	85.30	114	87.7	2.131			
152_(STM)	150_(STM)	85.562	84.829	525	59.4	0.4	0.013	90.000	89.795	1.175	0.25	0.15	0.6	-0.245	01:22	85.84	85.57	115	87.9	2.058			
154_(STM)	152_(STM)	85.653	85.590	450	12.6	0.5	0.013	90.091	90.000	1.269	0.20	0.05	0.3	-0.260	01:25	85.84	85.84	117	88.3	2.457			
156_(STM)	154_(STM)	86.028	85.680	450	100.7	0.3	0.013	90.278	90.091	1.054	0.17	0.05	0.3	-0.270	01:23	86.21	85.84	118	88.2	1.992			
158_(STM)	150_(STM)	85.207	84.829	1050	108.0	0.4	0.013	90.066	89.795	1.866	1.62	1.88	1.2	-0.120	01:11	86.14	85.57	103	88	1.863			
160_(STM)	158_(STM)	85.289	85.217	1050	14.3	0.5	0.013	90.162	90.066	2.239	1.94	1.81	0.9	-0.150	01:10	86.19	86.14	106	88.4	2.211			
162_(STM)	160_(STM)	85.648	85.299	1050	106.3	0.3	0.013	90.303	90.162	2.347	7.39	1.82	0.2	-0.070	01:10	86.63	86.19	107	88.4	1.772			

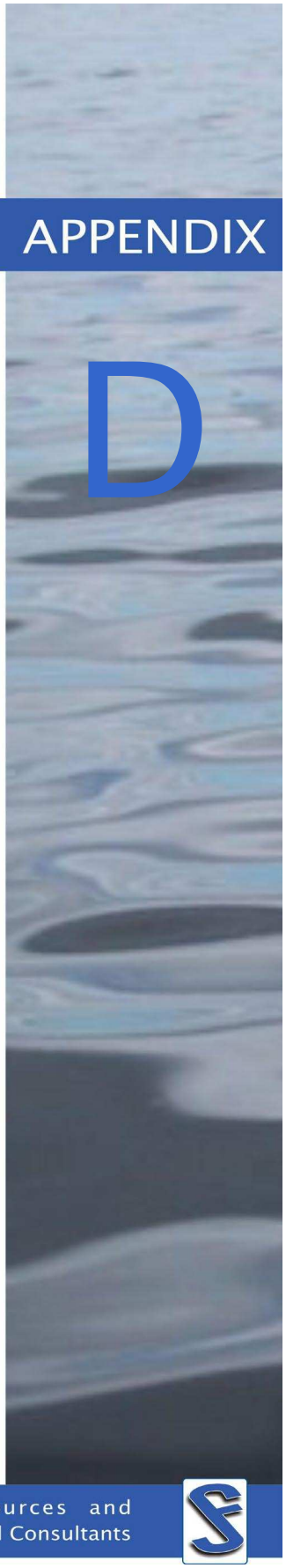
[2] Conservative estimate of freeboard based on U/S HGL and lowest USF connected to pipe. Actual HGL / freeboard at all connecting lots interpolated where conservative estimate does not meet freeboard requirements.

[3] Future USF elevations estimated as 1.8 m below the upstream top of manhole elevations.

Interpolated HGL elevation

Freebaord Less than 0.3m

Freebaord Less than 0.0m



APPENDIX

D

Tables and Calculation Sheets

JFSA Water Resources and Environmental Consultants

Table D-1: Approach Flows and Captured Flows for the 100-Year Chicago Storm

Catch Basin ID	Approach Flow (m^3/s)	Captured Flow (m^3/s)
10_(CB)	0.040	0.028
11_(CB)	0.040	0.040
12_(CB)	0.034	0.020
13_(CB)	0.034	0.020
14_(CB)	0.018	0.017
15_(CB)	0.018	0.017
16_(CB)	0.028	0.020
17_(CB)	0.028	0.020
18_(CB)	0.030	0.020
19_(CB)	0.030	0.020
2_(CB)	0.029	0.020
20_(CB)	0.053	0.036
21_(CB)	0.053	0.032
22_(CB)	0.042	0.021
23_(CB)	0.042	0.020
25_(CB)	0.057	0.021
26_(CB)	0.057	0.021
27_(CB)	0.022	0.009
28_(CB)	0.022	0.009
29_(CB)	0.092	0.050
3_(CB)	0.029	0.020
30_CB-C	0.092	0.051
32_(CB)	0.045	0.032
33_(CB)	0.045	0.017
35_(CB)	0.036	0.048
36_(CB)	0.070	0.034
37_(CB)	0.070	0.034
38_(CB)	0.051	0.019
39_(CB)	0.051	0.021
4_(CB)	0.034	0.019
40_(CB)	0.037	0.020
41_(CB)	0.037	0.021
42_(CB)	0.050	0.026
43_(CB)	0.050	0.020
44_(CB)	0.021	0.020
45_(CB)	0.021	0.020
46_(CB)	0.029	0.021
47_(CB)	0.029	0.020
48_(CB)	0.032	0.020
49_(CB)	0.032	0.019
5_(CB)	0.034	0.019
50_(CB)	0.053	0.028
51_(CB)	0.053	0.027
53_(CB)	0.060	0.026
54_(CB)	0.060	0.027
55_(CB)	0.033	0.020
56_(CB)	0.033	0.020
57_CB	0.058	0.020
8_(CB)	0.036	0.020
9_(CB)	0.036	0.043

Table D-2: Major System Flow Depths for the 100-Year Chicago Storm

Catch Basin ID	Depth (m)
10_(CB)	0.16
11_(CB)	0.16
12_(CB)	0.10
13_(CB)	0.10
14_(CB)	0.04
15_(CB)	0.04
16_(CB)	0.09
17_(CB)	0.09
18_(CB)	0.09
19_(CB)	0.09
2_(CB)	0.08
20_(CB)	0.26
21_(CB)	0.26
22_(CB)	0.12
23_(CB)	0.12
25_(CB)	0.20
26_(CB)	0.20
27_(CB)	0.04
28_(CB)	0.04
29_(CB)	0.13
3_(CB)	0.08
30_CB-C	0.13
32_(CB)	0.05
33_(CB)	0.05
35_(CB)	0.18
36_(CB)	0.13
37_(CB)	0.13
38_(CB)	0.16
39_(CB)	0.16
4_(CB)	0.10
40_(CB)	0.13
41_(CB)	0.13
42_(CB)	0.14
43_(CB)	0.14
44_(CB)	0.04
45_(CB)	0.04
46_(CB)	0.10
47_(CB)	0.10
48_(CB)	0.11
49_(CB)	0.11
5_(CB)	0.10
50_(CB)	0.13
51_(CB)	0.13
53_(CB)	0.16
54_(CB)	0.16
55_(CB)	0.11
56_(CB)	0.11
57_CB	0.17
8_(CB)	0.11
9_(CB)	0.11

Note: Depth calculated as per PCSWMM model

Table D-3A: PCSWMM Subcatchment Parameters

Name	Area (ha)	Width (m)	Slope (%)	Imperv. (%)	N Imperv	N Perv	Dstore Imperv (mm)	Dstore Perv (mm)	Subarea Routing	Percent Routed (%)	Max. Infil. Rate (mm/hr)	Min. Infil. Rate (mm/hr)	Decay Constant (1/hr)	Drying Time (days)
A1	0.331	22	0.3	60.7	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A10	0.368	35	0.4	50.0	0.013	0.25	1.57	4.67	PERVIOUS	100	HORTON	76.2	13.2	4.14
A11	0.258	24	0.2	69.9	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A12	0.285	37	0.1	50.2	0.013	0.25	1.57	4.67	PERVIOUS	100	HORTON	76.2	13.2	4.14
A13	0.390	53	0.9	41.9	0.013	0.25	1.57	4.67	PERVIOUS	100	HORTON	76.2	13.2	4.14
A14	0.423	41	0.7	70.3	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A15	0.096	41	0.7	70.3	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A16	0.124	18	1.1	54.2	0.013	0.25	1.57	4.67	PERVIOUS	100	HORTON	76.2	13.2	4.14
A17	0.242	23	0.3	61.4	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A18	0.256	20	0.5	52.3	0.013	0.25	1.57	4.67	PERVIOUS	100	HORTON	76.2	13.2	4.14
A19	0.042	23	0.6	69.0	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A2	0.242	20	0.3	59.9	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A20	0.250	25	0.3	62.8	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A21	0.480	41	0.4	55.3	0.013	0.25	1.57	4.67	PERVIOUS	100	HORTON	76.2	13.2	4.14
A22	0.028	6	4.7	28.6	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A23	0.227	30	0.6	61.0	0.013	0.25	1.57	4.67	PERVIOUS	100	HORTON	76.2	13.2	4.14
A24	0.236	26	0.3	61.1	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A25	0.457	43	0.5	56.5	0.013	0.25	1.57	4.67	PERVIOUS	100	HORTON	76.2	13.2	4.14
A26	0.149	20	0.0	60.4	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A27	0.165	22	0.2	64.2	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A28	0.180	28	0.5	61.7	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A29	0.184	24	0.3	60.3	0.013	0.25	1.57	4.67	PERVIOUS	100	HORTON	76.2	13.2	4.14
A3	0.211	19	0.1	51.7	0.013	0.25	1.57	4.67	PERVIOUS	100	HORTON	76.2	13.2	4.14
A30	0.014	6	1.2	50.0	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A31	0.289	22	0.3	61.9	0.013	0.25	1.57	4.67	PERVIOUS	100	HORTON	76.2	13.2	4.14
A32	0.181	25	0.2	61.9	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A33	0.155	25	0.5	62.6	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A34	0.090	26	0.7	59.8	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A35	0.225	25	0.1	63.6	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A36	0.326	28	0.3	61.9	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A37	0.416	40	0.7	58.5	0.013	0.25	1.57	4.67	PERVIOUS	100	HORTON	76.2	13.2	4.14
A38	0.029	6	0.5	31.0	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A39	0.319	21	0.0	61.9	0.013	0.25	1.57	4.67	PERVIOUS	100	HORTON	76.2	13.2	4.14
A4	0.323	26	0.2	64.7	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A40	0.239	31	0.2	62.1	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A41	0.464	45	0.8	57.2	0.013	0.25	1.57	4.67	PERVIOUS	100	HORTON	76.2	13.2	4.14
A42	0.238	23	0.2	58.2	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A43	0.347	41	0.1	58.2	0.013	0.25	1.57	4.67	PERVIOUS	100	HORTON	76.2	13.2	4.14
A44	0.288	42	0.0	61.7	0.013	0.25	1.57	4.67	PERVIOUS	100	HORTON	76.2	13.2	4.14
A45	0.195	25	0.1	60.1	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A46	0.220	30	0.1	63.6	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A47	0.160	25	0.6	56.8	0.013	0.25	1.57	4.67	PERVIOUS	100	HORTON	76.2	13.2	4.14
A48	0.167	17	0.3	67.5	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A49	0.114	31	1.5	56.0	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A5	0.176	16	0.2	49.1	0.013	0.25	1.57	4.67	PERVIOUS	100	HORTON	76.2	13.2	4.14
A50	0.053	20	1.0	54.7	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A51	0.100	42	0.7	72.0	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A52	0.021	9	0.9	19.0	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A53	0.244	20	0.0	63.1	0.013	0.25	1.57	4.67	PERVIOUS	100	HORTON	76.2	13.2	4.14
A54	0.238	21	0.5	58.4	0.013	0.25	1.57	4.67	PERVIOUS	100	HORTON	76.2	13.2	4.14
A6	0.423	34	0.2	66.7	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A7	0.372	36	0.1	66.4	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A8	0.206	28	0.3	62.1	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
A9	0.261	25	2.4	42.1	0.013	0.25	1.57	4.67	PERVIOUS	100	HORTON	76.2	13.2	4.14
B1	0.992	170	2.0	86.0	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
B2	3.432	279	1.0	100.0	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
B3	1.007	116	1.4	86.0	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
B4	1.002	67	0.5	7.0	0.013	0.25	1.57	4.67	PERVIOUS	100	HORTON	76.2	13.2	4.14
C1	0.114	21	0.8	53.5	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
C2	0.069	41	1.8	67.6	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14
C3	0.020	22	7.7	50.0	0.013	0.25	1.57	4.67	OUTLET	100	HORTON	76.2	13.2	4.14

Table D-4A: Capacity of Grates

Water Depth H (m)	$Q_{captured}$ (L/s) OPSD 400.01 SINGLE * (L/s)	TWIN * (L/s)
0.00	0	0
0.01	1	1
0.02	2	3
0.03	4	5
0.04	7	9
0.05	11	16
0.06	16	27
0.07	20	36
0.08	36	54
0.09	48	71
0.10	61	91
0.11	73	109
0.12	86	127
0.13	99	140
0.14	109	155
0.15	120	169
0.16	129	183
0.17	136	196
0.18	145	211
0.19	150	228
0.20	156	243
0.21	161	259
0.22	167	275
0.23	172	291
0.24	176	307
0.25	181	322
0.26	186	337
0.27	189	354
0.28	194	371
0.29	199	387
0.30	202	403

* From MTO Drainage Management Manual (1997), Design Chart 4.19

Table D-4B: Capacity of Side Inlet [(1)]

Water Depth (m)	SINGLE Capacity (L/s)	TWIN Capacity (L/s)
0.00	0	0
0.01	1	2
0.02	3	6
0.03	6	12
0.04	9	18
0.05	13	26
0.06	17	34
0.07	22	44
0.08	26	52
0.09	32	64
0.10	37	74
0.11	43	86
0.12	49	98
0.13	62	124
0.14	67	134
0.15	71	142
0.16	75	150
0.17	79	158
0.18	83	166
0.19	86	172
0.20	89	178
0.21	93	186
0.22	96	192
0.23	99	198
0.24	102	204
0.25	105	210
0.26	107	214
0.27	110	220
0.28	113	226
0.29	115	230
0.30	118	236

[(1)] As per $Q_{weir} = CLH^{3/2}$ where C = 1.8, and $Q_{orifice} = CA\times(2gh)^{0.5}$ where C = 0.65 for a 13 cm high x 65 cm wide side inlet.

Table D-5: Capacity of Lead Pipes

	Release Rate (L/s) by Pipe Diameter (mm)						
Head (m)	100	150	200	250	300	375	450
0.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.050	6.4	14.4	25.5	39.9	57.4	89.7	129.2
0.100	9.0	20.3	36.1	56.4	81.2	126.9	182.7
0.150	11.0	24.9	44.2	69.1	99.4	155.4	223.7
0.200	12.8	28.7	51.0	79.7	114.8	179.4	258.3
0.250	14.3	32.1	57.1	89.1	128.4	200.6	288.8
0.300	15.6	35.2	62.5	97.7	140.6	219.7	316.4
0.350	16.9	38.0	67.5	105.5	151.9	237.3	341.8
0.400	18.0	40.6	72.2	112.8	162.4	253.7	365.3
0.450	19.1	43.1	76.5	119.6	172.2	269.1	387.5
0.500	20.2	45.4	80.7	126.1	181.5	283.7	408.5
0.550	21.2	47.6	84.6	132.2	190.4	297.5	428.4
0.600	22.1	49.7	88.4	138.1	198.9	310.7	447.5
0.650	23.0	51.7	92.0	143.7	207.0	323.4	465.7
0.700	23.9	53.7	95.5	149.2	214.8	335.6	483.3
0.750	24.7	55.6	98.8	154.4	222.3	347.4	500.3
0.800	25.5	57.4	102.1	159.5	229.6	358.8	516.7
0.850	26.3	59.2	105.2	164.4	236.7	369.8	532.6
0.900	27.1	60.9	108.3	169.1	243.6	380.6	548.0
0.950	27.8	62.6	111.2	173.8	250.2	391.0	563.0
1.000	28.5	64.2	114.1	178.3	256.7	401.2	577.7
1.050	29.2	65.8	116.9	182.7	263.1	411.1	591.9
1.100	29.9	67.3	119.7	187.0	269.3	420.7	605.9
1.150	30.6	68.8	122.4	191.2	275.3	430.2	619.5
1.200	31.2	70.3	125.0	195.3	281.2	439.4	632.8
1.250	31.9	71.8	127.6	199.3	287.0	448.5	645.9
1.300	32.5	73.2	130.1	203.3	292.7	457.4	658.6
1.350	33.1	74.6	132.6	207.2	298.3	466.1	671.2
1.400	33.8	75.9	135.0	211.0	303.8	474.7	683.5
1.450	34.4	77.3	137.4	214.7	309.2	483.1	695.6
1.500	34.9	78.6	139.8	218.4	314.4	491.3	707.5
1.550	35.5	79.9	142.1	222.0	319.6	499.4	719.2
1.600	36.1	81.2	144.3	225.5	324.8	507.4	730.7

Short tube orifice coefficient = 0.82

Short tube release rate = $C\pi(Dia/1000)^2/4\times(2\times9.81\times H)^{0.5}\times1000$

Table D-6: ICD Type and Inlet Capture Results for the 2-Year Chicago Storm [1]

Catch Basin ID	Peak Flow (m^3/s)	Actual Capture (m^3/s)	Max Depth (cm)	Flow Spread (m)	% of Total Travel Lane [1]	ICD Type	Comment
10_(CB)	0.015	0.014	3.0	0.98	12%	102 mm	Low Point CB
11_(CB)	0.015	0.014	3.0	0.98	12%	178 mm	Low Point CB
12_(CB)	0.012	0.012	3.0	0.98	12%	83 mm	Low Point CB
13_(CB)	0.012	0.012	3.0	0.98	12%	83 mm	Low Point CB
14_(CB)	0.006	0.006	2.0	0.65	8%	83 mm	Low Point CB
15_(CB)	0.006	0.006	2.0	0.65	8%	83 mm	Low Point CB
16_(CB)	0.010	0.010	2.0	0.65	8%	83 mm	Low Point CB
17_(CB)	0.010	0.010	2.0	0.65	8%	83 mm	Low Point CB
18_(CB)	0.011	0.011	3.0	0.98	12%	83 mm	Low Point CB
19_(CB)	0.011	0.011	3.0	0.98	12%	83 mm	Low Point CB
2_(CB)	0.010	0.009	4.0	1.31	15%	83 mm	Low Point CICB
20_(CB)	0.014	0.014	3.0	0.98	12%	102 mm	Low Point CB
21_(CB)	0.014	0.014	3.0	0.98	12%	102 mm	Low Point CB
22_(CB)	0.015	0.015	3.0	0.98	12%	83 mm	Low Point CB
23_(CB)	0.015	0.015	3.0	0.98	12%	83 mm	Low Point CB
25_(CB)	0.018	0.018	4.0	1.31	15%	83 mm	Low Point CB
26_(CB)	0.018	0.018	4.0	1.31	15%	83 mm	Low Point CB
27_(CB)	0.007	0.004	2.0	0.65	8%	83 mm	CICB on Slope
28_(CB)	0.007	0.004	2.0	0.65	8%	83 mm	CICB on Slope
29_(CB)	0.033	0.030	5.0	1.63	19%	127 mm	Low Point Double CICB
3_(CB)	0.010	0.009	4.0	1.31	15%	83 mm	Low Point CICB
30_CB-C	0.033	0.030	5.0	1.63	19%	127 mm	Low Point Double CICB
32_(CB)	0.017	0.015	3.0	0.98	12%	94 mm	CB on Slope
33_(CB)	0.017	0.008	3.0	0.98	12%	127 mm	CB on Slope
35_(CB)	0.013	0.013	3.0	0.98	12%	127 mm	Low Point CB
36_(CB)	0.025	0.024	4.0	1.31	15%	108 mm	Low Point CB
37_(CB)	0.025	0.024	4.0	1.31	15%	108 mm	Low Point CB
38_(CB)	0.018	0.018	4.0	1.31	15%	83 mm	Low Point CB
39_(CB)	0.018	0.018	4.0	1.31	15%	83 mm	Low Point CB
4_(CB)	0.012	0.010	4.0	1.31	15%	83 mm	Low Point CICB
40_(CB)	0.014	0.013	3.0	0.98	12%	83 mm	Low Point CB
41_(CB)	0.014	0.013	3.0	0.98	12%	83 mm	Low Point CB
42_(CB)	0.018	0.017	4.0	1.31	15%	94 mm	Low Point CB
43_(CB)	0.018	0.017	4.0	1.31	15%	94 mm	Low Point CB
44_(CB)	0.007	0.007	2.0	0.65	8%	83 mm	Low Point CB
45_(CB)	0.007	0.007	2.0	0.65	8%	83 mm	Low Point CB
46_(CB)	0.011	0.010	3.0	0.98	12%	83 mm	Low Point CB
47_(CB)	0.011	0.010	3.0	0.98	12%	83 mm	Low Point CB
48_(CB)	0.012	0.011	3.0	0.98	12%	83 mm	Low Point CB
49_(CB)	0.012	0.011	3.0	0.98	12%	83 mm	Low Point CB
5_(CB)	0.012	0.010	4.0	1.31	15%	83 mm	Low Point CICB
50_(CB)	0.020	0.018	4.0	1.31	15%	94 mm	Low Point CB
51_(CB)	0.020	0.018	4.0	1.31	15%	94 mm	Low Point CB
53_(CB)	0.022	0.020	4.0	1.31	15%	94 mm	Low Point CB
54_(CB)	0.022	0.020	4.0	1.31	15%	94 mm	Low Point CB
55_(CB)	0.012	0.011	3.0	0.98	12%	83 mm	Low Point CB
56_(CB)	0.012	0.011	3.0	0.98	12%	83 mm	Low Point CB
57_CB	0.019	0.019	2.0	0.65	8%	83 mm	Low Point CB
8_(CB)	0.013	0.013	3.0	0.98	12%	83 mm	Low Point CB
9_(CB)	0.013	0.013	3.0	0.98	12%	152 mm	Low Point CB

[1] Total travel lane width assumed to be 8.5 m (minimum road width in subdivision)

Table D-7: Ponding at Major Low Points for the 100-Year Chicago Storm & 100-Year Chicago Storm +20% [1]

Catch Basin ID	Total Depth [1]		Water Surface Elevation [1]	
	100 Year 3 Hr Chi (m)	100 Year 3 Hr Chi+20% (m)	100 Year 3 Hr Chi (m)	100 Year 3 Hr Chi+20% (m)
10_(CB)	0.16	0.25	87.71	87.80
11_(CB)	0.16	0.25	87.71	87.80
12_(CB)	0.10	0.14	87.74	87.78
13_(CB)	0.10	0.14	87.74	87.78
14_(CB)	0.04	0.06	87.84	87.86
15_(CB)	0.04	0.06	87.84	87.86
16_(CB)	0.09	0.13	88.10	88.14
17_(CB)	0.09	0.13	88.10	88.14
18_(CB)	0.09	0.12	88.22	88.25
19_(CB)	0.09	0.12	88.22	88.25
2_(CB)	0.08	0.11	87.52	87.55
20_(CB)	0.26	0.30	88.60	88.64
21_(CB)	0.26	0.30	88.60	88.64
22_(CB)	0.12	0.16	88.74	88.78
23_(CB)	0.12	0.16	88.74	88.78
25_(CB)	0.20	0.27	89.12	89.19
26_(CB)	0.20	0.27	89.12	89.19
27_(CB)	0.04	0.04	89.43	89.43
28_(CB)	0.04	0.04	89.43	89.43
29_(CB)	0.13	0.16	88.74	88.77
3_(CB)	0.08	0.11	87.52	87.55
30_CB-C	0.13	0.16	88.74	88.77
32_(CB)	0.05	0.06	89.62	89.63
33_(CB)	0.05	0.06	89.62	89.63
35_(CB)	0.18	0.28	89.65	89.75
36_(CB)	0.13	0.17	89.55	89.59
37_(CB)	0.13	0.17	89.55	89.59
38_(CB)	0.16	0.20	89.94	89.98
39_(CB)	0.16	0.20	89.94	89.98
4_(CB)	0.10	0.12	87.47	87.49
40_(CB)	0.13	0.21	90.25	90.33
41_(CB)	0.13	0.21	90.25	90.33
42_(CB)	0.14	0.18	90.43	90.47
43_(CB)	0.14	0.18	90.43	90.47
44_(CB)	0.04	0.07	88.94	88.97
45_(CB)	0.04	0.07	88.94	88.97
46_(CB)	0.10	0.14	88.99	89.03
47_(CB)	0.10	0.14	88.99	89.03
48_(CB)	0.11	0.14	88.43	88.46
49_(CB)	0.11	0.14	88.43	88.46
5_(CB)	0.10	0.12	87.47	87.49
50_(CB)	0.13	0.16	88.03	88.06
51_(CB)	0.13	0.16	88.03	88.06
53_(CB)	0.16	0.20	89.82	89.86
54_(CB)	0.16	0.20	89.82	89.86
55_(CB)	0.11	0.14	87.37	87.40
56_(CB)	0.11	0.14	87.37	87.40
57_CB	0.17	0.21	87.34	87.38
8_(CB)	0.11	0.20	87.53	87.62
9_(CB)	0.11	0.20	87.53	87.62

[1] As per PCSWMM models for the 100-year, 3-hour Chicago storm and the 100-year, 3-hour Chicago storm + 20%.

Table D-8: Major System Flow Depths 100-Year 3-Hour Chicago Peak Flow

Link Name	Transect	Max Velocity (m/s)	Max Depth (m)	Depth x Velocity (m^2/s)
C1	18mROW-No-Sidewalk	0.350	0.16	0.06
C1_1	18mROW-Dbl-Sidewalk	0.000	0.00	0.00
C1_2	18mROW-Dbl-Sidewalk	0.000	0.00	0.00
C10	18mROWwSidewalk	0.000	0.13	0.00
C11	18mROWwSidewalk	0.000	0.11	0.00
C12	18mROW-No-Sidewalk	0.000	0.08	0.00
C13	18mROW-No-Sidewalk	0.000	0.13	0.00
C14	18mROW-No-Sidewalk	0.000	0.13	0.00
C15	18mROWwSidewalk	0.000	0.11	0.00
C16	18mROW-No-Sidewalk	0.000	0.15	0.00
C17	18mROW-No-Sidewalk	0.000	0.15	0.00
C18_2	18mROW-No-Sidewalk	0.460	0.03	0.01
C18_3	18mROWwSidewalk	0.000	0.05	0.00
C18_4	18mROWwSidewalk	0.530	0.08	0.04
C18_5	24mROW-Dbl-Sidewalk	0.000	0.03	0.00
C18_6	24mROW-Dbl-Sidewalk	0.000	0.03	0.00
C18_7	18mROW-No-Sidewalk	0.320	0.03	0.01
C18_8	24mROW-Dbl-Sidewalk	0.000	0.00	0.00
C18_9	24mROW-Dbl-Sidewalk	0.000	0.03	0.00
C19	18mROW-No-Sidewalk	0.650	0.07	0.05
C2	18mROW-No-Sidewalk	0.000	0.14	0.00
C2_1	18mROW-Dbl-Sidewalk	0.000	0.00	0.00
C2_2	18mROW-Dbl-Sidewalk	0.000	0.12	0.00
C20	24mROW-Dbl-Sidewalk	0.510	0.06	0.03
C21	24mROW-Dbl-Sidewalk	0.120	0.14	0.02
C22	24mROW-Dbl-Sidewalk	0.110	0.14	0.02
C23	18mROW-No-Sidewalk	0.220	0.19	0.04
C24	18mROW-No-Sidewalk	0.000	0.17	0.00
C25	18mROW-No-Sidewalk	0.000	0.10	0.00
C26	18mROW-No-Sidewalk	0.000	0.10	0.00
C27_1	18mROW-No-Sidewalk	0.000	0.01	0.00
C27_2	18mROW-No-Sidewalk	0.030	0.22	0.01
C28	18mROW-No-Sidewalk	0.000	0.22	0.00
C29	18mROW-No-Sidewalk	0.000	0.03	0.00
C3	18mROW-Dbl-Sidewalk	0.000	0.12	0.00
C30	18mROW-No-Sidewalk	0.060	0.04	0.00
C32	18mROW-No-Sidewalk	0.070	0.10	0.01
C33	18mROW-No-Sidewalk	0.000	0.09	0.00
C34	18mROW-No-Sidewalk	0.000	0.09	0.00
C35	18mROW-No-Sidewalk	0.000	0.09	0.00
C36	18mROW-No-Sidewalk	0.000	0.07	0.00
C37	18mROW-No-Sidewalk	0.000	0.07	0.00
C38	18mROW-No-Sidewalk	0.000	0.10	0.00
C39	18mROW-No-Sidewalk	0.000	0.10	0.00
C4_1	18mROW-Dbl-Sidewalk	0.000	0.00	0.00
C4_2	18mROW-Dbl-Sidewalk	0.000	0.00	0.00
C40	18mROW-No-Sidewalk	0.000	0.14	0.00
C41	18mROW-No-Sidewalk	0.000	0.14	0.00
C42	18mROW-No-Sidewalk	0.000	0.09	0.00
C43	18mROW-No-Sidewalk	0.000	0.09	0.00
C44	18mROW-No-Sidewalk	0.000	0.03	0.00
C45	18mROW-No-Sidewalk	0.000	0.03	0.00
C46	18mROW-No-Sidewalk	0.000	0.07	0.00
C47	18mROW-No-Sidewalk	0.000	0.07	0.00
C48	18mROW-No-Sidewalk	0.000	0.09	0.00
C49	18mROW-No-Sidewalk	0.000	0.09	0.00

Table D-8: Major System Flow Depths 100-Year 3-Hour Chicago Peak Flow

Link Name	Transect	Max Velocity (m/s)	Max Depth (m)	Depth x Velocity (m^2/s)
C5_1	18mROW-Dbl-Sidewalk	0.000	0.00	0.00
C5_2	18mROW-Dbl-Sidewalk	0.000	0.01	0.00
C50_1	18mROWwSidewalk	0.000	0.00	0.00
C50_2	18mROWwSidewalk	0.000	0.00	0.00
C51	18mROWwSidewalk	0.000	0.08	0.00
C52	18mROWwSidewalk	0.000	0.08	0.00
C53	18mROWwSidewalk	0.000	0.07	0.00
C54	18mROWwSidewalk	0.000	0.07	0.00
C55	18mROW-No-Sidewalk	0.000	0.09	0.00
C57	18mROW-No-Sidewalk	0.190	0.11	0.02
C6_1	18mROW-Dbl-Sidewalk	0.000	0.11	0.00
C6_2	18mROW-Dbl-Sidewalk	0.030	0.12	0.00
C7	18mROW-Dbl-Sidewalk	0.000	0.00	0.00
C8	18mROW-Dbl-Sidewalk	0.000	0.08	0.00
C9	18mROWwSidewalk	0.110	0.21	0.02
	Max	**0.65**	**0.22**	**0.056**

Note: Depth and velocity calculated by PCSWMM model.

Table D-9: Major System Flow Depths 100-Year 3 Hour Chicago + 20% Peak Flow

Link Name	Transect	Max Velocity (m/s)	Max Depth (m)	Depth x Velocity (m^2/s)
C1	18mROW-No-Sidewalk	0.340	0.19	0.06
C1_1	18mROW-Dbl-Sidewalk	0.000	0.00	0.00
C1_2	18mROW-Dbl-Sidewalk	0.000	0.00	0.00
C10	18mROWwSidewalk	0.000	0.17	0.00
C11	18mROWwSidewalk	0.000	0.14	0.00
C12	18mROW-No-Sidewalk	0.000	0.11	0.00
C13	18mROW-No-Sidewalk	0.000	0.17	0.00
C14	18mROW-No-Sidewalk	0.000	0.17	0.00
C15	18mROWwSidewalk	0.000	0.14	0.00
C16	18mROW-No-Sidewalk	0.000	0.24	0.00
C17	18mROW-No-Sidewalk	0.000	0.24	0.00
C18_2	18mROW-No-Sidewalk	0.490	0.04	0.02
C18_3	18mROWwSidewalk	0.000	0.05	0.00
C18_4	18mROWwSidewalk	0.580	0.09	0.05
C18_5	24mROW-Dbl-Sidewalk	0.000	0.04	0.00
C18_6	24mROW-Dbl-Sidewalk	0.000	0.03	0.00
C18_7	18mROW-No-Sidewalk	0.340	0.03	0.01
C18_8	24mROW-Dbl-Sidewalk	0.090	0.04	0.00
C18_9	24mROW-Dbl-Sidewalk	0.270	0.06	0.02
C19	18mROW-No-Sidewalk	0.730	0.08	0.06
C2	18mROW-No-Sidewalk	0.000	0.17	0.00
C2_1	18mROW-Dbl-Sidewalk	0.000	0.02	0.00
C2_2	18mROW-Dbl-Sidewalk	0.030	0.17	0.01
C20	24mROW-Dbl-Sidewalk	0.560	0.07	0.04
C21	24mROW-Dbl-Sidewalk	0.120	0.16	0.02
C22	24mROW-Dbl-Sidewalk	0.160	0.18	0.03
C23	18mROW-No-Sidewalk	0.230	0.26	0.06
C24	18mROW-No-Sidewalk	0.030	0.24	0.01
C25	18mROW-No-Sidewalk	0.030	0.15	0.00
C26	18mROW-No-Sidewalk	0.000	0.13	0.00
C27_1	18mROW-No-Sidewalk	0.000	0.02	0.00
C27_2	18mROW-No-Sidewalk	0.030	0.27	0.01
C28	18mROW-No-Sidewalk	0.050	0.28	0.01
C29	18mROW-No-Sidewalk	0.200	0.06	0.01
C3	18mROW-Dbl-Sidewalk	0.000	0.15	0.00
C30	18mROW-No-Sidewalk	0.060	0.07	0.00
C32	18mROW-No-Sidewalk	0.070	0.13	0.01
C33	18mROW-No-Sidewalk	0.030	0.12	0.00
C34	18mROW-No-Sidewalk	0.010	0.12	0.00
C35	18mROW-No-Sidewalk	0.220	0.14	0.03
C36	18mROW-No-Sidewalk	0.310	0.12	0.04
C37	18mROW-No-Sidewalk	0.000	0.10	0.00
C38	18mROW-No-Sidewalk	0.000	0.13	0.00
C39	18mROW-No-Sidewalk	0.000	0.13	0.00
C4_1	18mROW-Dbl-Sidewalk	0.000	0.00	0.00
C4_2	18mROW-Dbl-Sidewalk	0.000	0.00	0.00
C40	18mROW-No-Sidewalk	0.000	0.21	0.00
C41	18mROW-No-Sidewalk	0.000	0.21	0.00
C42	18mROW-No-Sidewalk	0.000	0.11	0.00
C43	18mROW-No-Sidewalk	0.000	0.11	0.00
C44	18mROW-No-Sidewalk	0.000	0.05	0.00
C45	18mROW-No-Sidewalk	0.000	0.05	0.00
C46	18mROW-No-Sidewalk	0.000	0.10	0.00
C47	18mROW-No-Sidewalk	0.000	0.10	0.00
C48	18mROW-No-Sidewalk	0.000	0.17	0.00
C49	18mROW-No-Sidewalk	0.020	0.18	0.00

Table D-9: Major System Flow Depths 100-Year 3 Hour Chicago + 20% Peak Flow

Link Name	Transect	Max Velocity (m/s)	Max Depth (m)	Depth x Velocity (m^2/s)
C5_1	18mROW-Dbl-Sidewalk	0.000	0.00	0.00
C5_2	18mROW-Dbl-Sidewalk	0.000	0.08	0.00
C50_1	18mROWwSidewalk	0.090	0.05	0.00
C50_2	18mROWwSidewalk	0.850	0.05	0.04
C51	18mROWwSidewalk	0.030	0.12	0.00
C52	18mROWwSidewalk	0.000	0.10	0.00
C53	18mROWwSidewalk	0.000	0.09	0.00
C54	18mROWwSidewalk	0.000	0.09	0.00
C55	18mROW-No-Sidewalk	0.090	0.13	0.01
C57	18mROW-No-Sidewalk	0.190	0.14	0.03
C6_1	18mROW-Dbl-Sidewalk	0.140	0.21	0.03
C6_2	18mROW-Dbl-Sidewalk	0.280	0.25	0.07
C7	18mROW-Dbl-Sidewalk	0.920	0.05	0.05
C8	18mROW-Dbl-Sidewalk	0.070	0.14	0.01
C9	18mROWwSidewalk	0.120	0.28	0.03
	Max	**0.92**	**0.28**	**0.07**

Note: Depth and velocity calculated by PCSWMM model.

APPENDIX

E

Interim Condition and EUC Pond 1 Analysis

JFSA Water Resources and Environmental Consultants

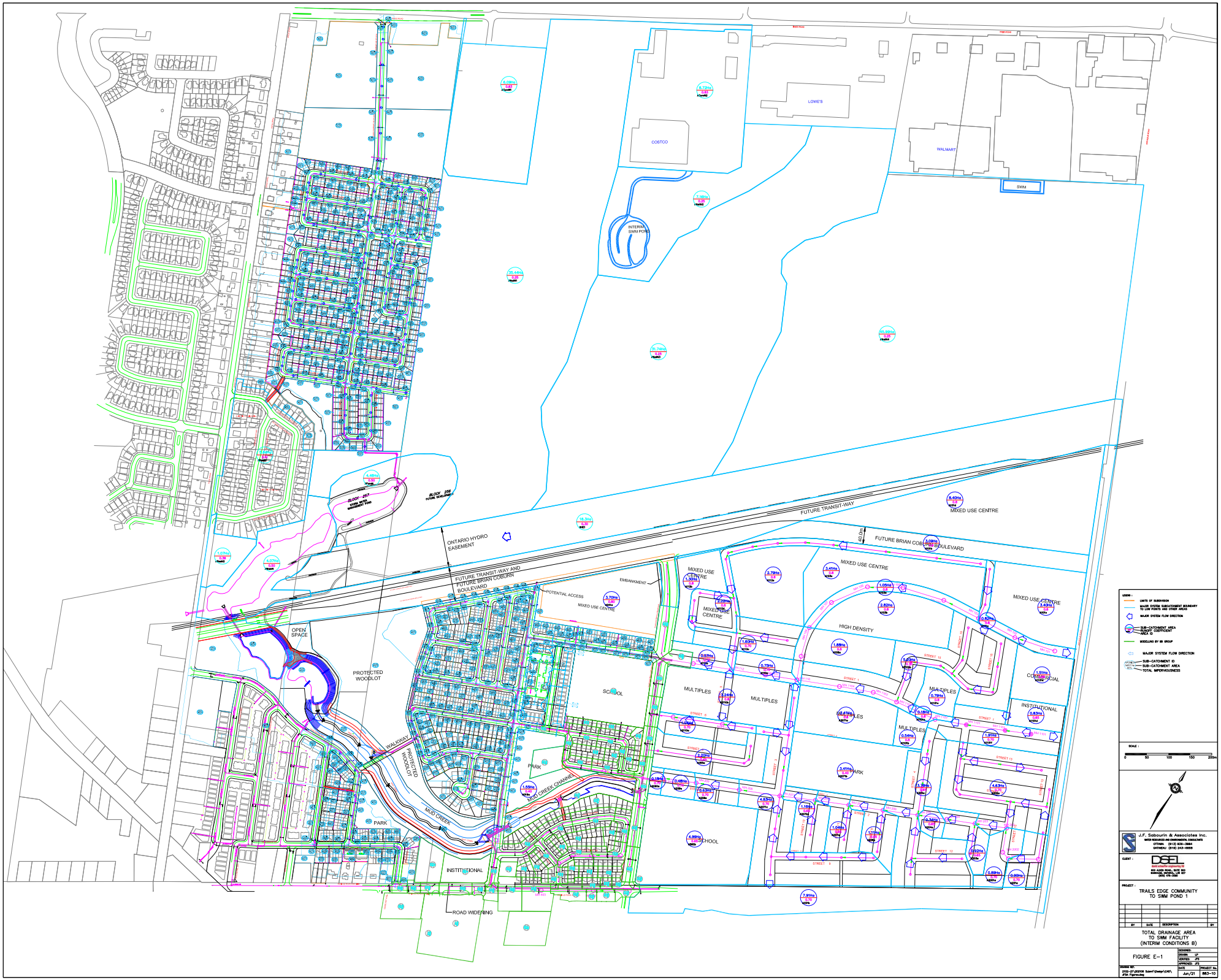

COSTCO
LOWE'S
WALMART
SWM
INTERIM SWM POND
FUTURE TRANSIT-WAY
FUTURE BRIAN COBURN BOULEVARD
ONTARIO HYDRO EASEMENT
FUTURE TRANSIT-WAY AND FUTURE BRIAN COBURN BOULEVARD
EMBANKMENT
POTENTIAL ACCESS
MIXED USE CENTRE
HIGH DENSITY
MULTIPLES
SCHOOL
PARK
OPEN SPACE
PROTECTED WOODLOT
WALKWAY
MUD CREEK
MUD CREEK CHANNEL
INSTITUTIONAL
COMMERCIAL
ROAD WIDENING
BLOCK 257
BLOCK 258
FUTURE DEVELOPMENT
LEGEND :
LIMITS OF SUBDIVISION
MAJOR SYSTEM SUBCATCHMENT BOUNDARY
TO LOW POINTS AND OTHER AREAS
MAJOR SYSTEM FLOW DIRECTION
SUB-CATCHMENT AREA
RUNOFF COEFFICIENT
AREA ID
MODELLING BY SB GROUP
MAJOR SYSTEM FLOW DIRECTION
SUB-CATCHMENT ID
SUB-CATCHMENT AREA
TOTAL IMPERVIOUSNESS
SCALE :
0 50 100 150 200m
J.F. Sabourin & Associates Inc.
CLIENT :
PROJECT :
TRAILS EDGE COMMUNITY
TO SWM POND 1
BY DATE DESCRIPTION BY
TOTAL DRAINAGE AREA
TO SWM FACILITY
(INTERIM CONDITIONS B)
FIGURE E-1
DESIGNED :
DRAWN : LP
CHECKED : JFS
APPROVED : JFS
DRAWING REF:
2122-21\2021\08 Submit\Design\CAD\
JFSA Figures.dwg
DATE
Jun/21
PROJECT No.
SNS-10

Table E-1: Criteria for Required Storage Volumes Under Interim B Conditions

Pond	Area (ha)	Imperviousness (%)	Storage Volume for Impervious Level [1] (m^3/ha)
N/A	N/A	35	90
SWM Pond 1	372.298	42	97.00
N/A	N/A	55	110

[1] Protection Level for Wet Pond: Normal 70% long-term S.S. removal.
SWM Planning & Design Manual, Table 3.2, p.3-10 (March 2003).

Table E-2: Required Storage Volumes for SWM Facility Under Interim B Conditions

Pond Component	Required Volume (m^3)	Provided Volume [4] (m^3)	Volume Ratio	Provided Area [5] (m^2)	Provided Elevation (m)
Permanent Pool (PP) [1]	21221	36400	1.72	35421	Variable [7]
Quality Control [2]	14892	14892	1.00	N/A	80.684
Extended Detention [3]	33922	43988	1.30	N/A	81.650
Forebay (20% PP)	N/A	N/A	N/A	11212.4	Variable [7]
PP - Forebay	N/A	N/A	N/A	24208	Variable [7]
			Area Ratio (%) [6] =	32	

[1] Required PP volume based on Table E-1 (97.00 - 40 = 57.00 m^3/ha).
[2] Required quality control volume based on 40 m^3/ha.
[3] Required extended detention volume based on the detention of the 25 mm storm for a 24 to 48 hour drawdown time.
[4] Provided volume based on stage-storage curve and extended detention (refer to Tables E-3 and E-4).
[5] Based on grading plan provided by DSEL (refer to Figure 2).
[6] As per MOE, Maximum Forebay Area: 33% of Total Permanent Pool.
[7] Permanent pool elevations are 80.10 m in the main cell, 81.60 m in the north forebay and 81.50 m in the south forebay.

Table E-3: Extended Detention Parameters for SWM Facility Under Interim B Conditions

			Quality Orifice Parameters		
Area (C3)	24208.20	m^2	Diameter	0.400	m
Volume	36400.40	m^3			
PP Elev	80.100	m	Area	0.126	m^2
QC Elev	80.684	m	Invert	80.100	m
h (m)	0.584	m	C_o	0.62	

Notes:
- C3 is the intercept from the area-depth linear regression.
- PP Elev indicates the elevation of the permanent pool.
- QC Elev indicates the elevation of the storage volume required by MOE for quality control.
- h is the maximum water elevation above the orifice (m).

Table E-4: Extended Detention Drawdown Time for SWM Facility Under Interim B Conditions (Existing Controls)

Elev.	Active Storage			C2	Drawdown Time	Drawdown Time	Flow	Demarkation
(m)	V (m^3)	A (m^2)	depth (m)	(m^2/m)	(h)	(days)	(m^3/s)	Point
80.100	**0.0**	**24208.2**	**0.00**				**0.000**	**PP Elev (Main)**
80.150	1219.2	24453.2	0.05	4900	8.73	0.36	0.019	
80.200	2448.4	24672.4	0.10	4642	12.38	0.52	0.038	
80.250	3687.2	24882.3	0.15	4494	15.21	0.63	0.057	
80.300	4931.9	25091.0	0.20	4414	17.61	0.73	0.075	
80.350	6196.0	25302.1	0.25	4376	19.75	0.82	0.094	
80.400	7507.8	25553.4	0.30	4484	21.71	0.90	0.112	
80.450	8742.2	25921.8	0.35	4896	23.56	0.98	0.130	
80.500	10038.4	25925.1	0.40	4292	25.19	1.05	0.147	
80.550	11335.4	25939.8	0.45	3848	26.72	1.11	0.165	
80.600	12653.7	26378.5	0.50	4341	28.33	1.18	0.181	
80.650	13983.1	26657.4	0.55	4453	29.83	1.24	0.195	
80.684	**14892.0**	**26831.1**	**0.58**	**4492**	**30.80**	**1.28**	**0.204**	**QC Elev**
80.700	15323.5	26913.6	0.60	4509	31.26	1.30	0.209	
80.750	16675.6	27152.6	0.65	4530	32.64	1.36	0.221	
80.800	18031.5	27386.6	0.70	4541	33.97	1.42	0.233	
80.850	19415.8	27631.9	0.75	4565	35.28	1.47	0.245	
80.900	20845.4	27913.0	0.80	4631	36.57	1.52	0.255	
80.950	22194.0	28324.5	0.85	4843	37.89	1.58	0.266	
81.000	23610.8	28336.7	0.90	4587	39.00	1.62	0.276	
81.050	25028.8	28361.2	0.95	4372	40.08	1.67	0.286	
81.100	26464.1	28707.0	1.00	4499	41.30	1.72	0.295	
81.150	27908.4	28942.1	1.05	4508	42.45	1.77	0.304	
81.200	29360.8	29142.3	1.10	4486	43.56	1.82	0.313	
81.250	30815.5	29338.0	1.15	4461	44.65	1.86	0.321	
81.300	32295.1	29535.6	1.20	4439	45.73	1.91	0.330	
81.350	33777.2	29736.9	1.25	4423	46.79	1.95	0.338	
81.400	35307.4	29972.4	1.30	4434	47.86	1.99	0.346	
81.450	36764.7	30324.9	1.35	4531	48.99	2.04	0.354	
81.500	**38275.7**	**35486.6**	**1.40**	**8056**	**53.13**	**2.21**	**0.361**	**PP Elev (SFore)**
81.550	40062.1	35627.9	1.45	7876	54.16	2.26	0.369	
81.600	**41866.2**	**42142.6**	**1.50**	**11956**	**59.32**	**2.47**	**0.376**	**PP Elev (NFore)**
81.650	**43987.5**	**42516.9**	**1.55**	**11812**	**60.54**	**2.52**	**0.383**	**Ext. Det.**
81.700	46121.5	42829.6	1.60	11638	61.72	2.57	0.390	
81.750	48270.9	43143.8	1.65	11476	62.89	2.62	0.397	

Table E-4: Extended Detention Drawdown Time for SWM Facility Under Interim B Conditions (Existing Controls)

Elev.	Active Storage			C2	Drawdown Time	Drawdown Time	Flow	Demarkation
(m)	V (m^3)	A (m^2)	depth (m)	(m^2/m)	(h)	(days)	(m^3/s)	Point
81.800	50436.7	43457.5	1.70	11323	64.06	2.67	0.404	
81.850	52614.8	43779.8	1.75	11184	65.22	2.72	0.411	
81.900	54874.0	44141.0	1.80	11074	66.40	2.77	0.417	
81.950	57016.8	44692.9	1.85	11073	67.72	2.82	0.424	
82.000	59250.7	44700.3	1.90	10785	68.63	2.86	0.430	
82.050	61533.8	45651.1	1.95	10996	70.23	2.93	0.436	
82.100	63847.2	46277.0	2.00	11034	71.60	2.98	0.442	

Notes:
- C2 is the slope coefficient from the area-depth linear regression.
- PP Elev indicates the elevation of the permanent pool.
- QC Elev indicates the elevation of the storage volume required by MOE for quality control.
- Ext. Det. indicates the elevation of extended detention provided based on the detention of the 25 mm storm for a 24 to 48 hour drawdown time.

Table E-5: Stage-Storage-Outflow Curve for SWM Facility Under Interim B Conditions (Existing Controls)

			Quality Control 1		Quantity Control 1		Quantity Control 2		Quantity Control 3		Quantity Control 4			
			Vertical Orifice		Rectangular Weir		Rectangular Weir		Rectangular Weir		Rectangular Weir			
			Dia (m)	0.400	L (m)	1.000	L (m)	3.000	L (m)	1.500	L (m)	1.500		
			Area (m^2)	0.126										
			Invert (m)	80.10	C_w	1.800	C_w	1.800	C_w	1.800	C_w	1.800		
			C_o	0.62	Invert (m)	81.65	Invert (m)	82.35	Invert (m)	82.35	Invert (m)	82.35		
			Q @ D	0.154	n contr.	2	n contr.	2	n contr.	2	n contr.	2		
Elevation (m)	Active Sto. (m^3)	Demarkation Points	Head (m)	Outflow (m^3/s)	Head (m)	Outflow (m^3/s)	Head (m)	Outflow (m^3/s)	Head (m)	Outflow (m^3/s)	Head (m)	Outflow (m^3/s)	Outflow (m^3/s)	Storage (ha·m)
80.100	**0**	**PP Elev (Main)**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**
80.150	1219		0.050	0.019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.019	0.122
80.200	2448		0.100	0.038	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.038	0.245
80.250	3687		0.150	0.057	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.057	0.369
80.300	4932		0.200	0.075	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.075	0.493
80.350	6196		0.250	0.094	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.094	0.620
80.400	7508		0.300	0.112	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.112	0.751
80.450	8742		0.350	0.130	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.130	0.874
80.500	10038		0.400	0.147	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.147	1.004
80.550	11335		0.450	0.165	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.165	1.134
80.600	12654		0.500	0.181	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.181	1.265
80.650	13983		0.550	0.195	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.195	1.398
80.684	**14892**	**QC Elev**	**0.584**	**0.204**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.204**	**1.489**
80.700	15324		0.600	0.209	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.209	1.532
80.750	16676		0.650	0.221	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.221	1.668
80.800	18032		0.700	0.233	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.233	1.803
80.850	19416		0.750	0.245	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.245	1.942
80.900	20845		0.800	0.255	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.255	2.085
80.950	22194		0.850	0.266	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.266	2.219
81.000	23611		0.900	0.276	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.276	2.361
81.050	25029		0.950	0.286	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.286	2.503
81.100	26464		1.000	0.295	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.295	2.646
81.150	27908		1.050	0.304	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.304	2.791
81.200	29361		1.100	0.313	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.313	2.936
81.250	30816		1.150	0.321	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.321	3.082
81.300	32295		1.200	0.330	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.330	3.230
81.350	33777		1.250	0.338	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.338	3.378
81.400	35307		1.300	0.346	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.346	3.531
81.450	36765		1.350	0.354	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.354	3.676
81.500	**38276**	**PP Elev (South)**	**1.400**	**0.361**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.361**	**3.828**
81.550	40062		1.450	0.369	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.369	4.006
81.600	**41866**	**PP Elev (North)**	**1.500**	**0.376**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.376**	**4.187**
81.650	**43988**	**Ext. Det.**	**1.550**	**0.383**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.383**	**4.399**

Table E-5: Stage-Storage-Outflow Curve for SWM Facility Under Interim B Conditions (Existing Controls)

			Quality Control 1		Quantity Control 1		Quantity Control 2		Quantity Control 3		Quantity Control 4			
			Vertical Orifice		Rectangular Weir		Rectangular Weir		Rectangular Weir		Rectangular Weir			
			Dia (m)	0.400	L (m)	1.000	L (m)	3.000	L (m)	1.500	L (m)	1.500		
			Area (m^2)	0.126										
			Invert (m)	80.10	C_w	1.800	C_w	1.800	C_w	1.800	C_w	1.800		
			C_o	0.62	Invert (m)	81.65	Invert (m)	82.35	Invert (m)	82.35	Invert (m)	82.35		
			Q @ D	0.154	n contr.	2	n contr.	2	n contr.	2	n contr.	2		
Elevation (m)	Active Sto. (m^3)	Demarkation Points	Head (m)	Outflow (m^3/s)	Head (m)	Outflow (m^3/s)	Head (m)	Outflow (m^3/s)	Head (m)	Outflow (m^3/s)	Head (m)	Outflow (m^3/s)	Outflow (m^3/s)	Storage (ha·m)
81.700	46122		1.600	0.390	0.050	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.410	4.612
81.750	48271		1.650	0.397	0.100	0.056	0.000	0.000	0.000	0.000	0.000	0.000	0.453	4.827
81.800	50437		1.700	0.404	0.150	0.101	0.000	0.000	0.000	0.000	0.000	0.000	0.505	5.044
81.850	52615		1.750	0.411	0.200	0.155	0.000	0.000	0.000	0.000	0.000	0.000	0.565	5.261
81.900	54874		1.800	0.417	0.250	0.214	0.000	0.000	0.000	0.000	0.000	0.000	0.631	5.487
81.950	57017		1.850	0.424	0.300	0.278	0.000	0.000	0.000	0.000	0.000	0.000	0.702	5.702
82.000	59251		1.900	0.430	0.350	0.347	0.000	0.000	0.000	0.000	0.000	0.000	0.777	5.925
82.050	61534		1.950	0.436	0.400	0.419	0.000	0.000	0.000	0.000	0.000	0.000	0.855	6.153
82.100	63847		2.000	0.442	0.450	0.494	0.000	0.000	0.000	0.000	0.000	0.000	0.937	6.385
82.150	66177		2.050	0.449	0.500	0.573	0.000	0.000	0.000	0.000	0.000	0.000	1.021	6.618
82.200	68518		2.100	0.455	0.550	0.653	0.000	0.000	0.000	0.000	0.000	0.000	1.108	6.852
82.250	70885		2.150	0.460	0.600	0.736	0.000	0.000	0.000	0.000	0.000	0.000	1.197	7.089
82.300	73266		2.200	0.466	0.650	0.821	0.000	0.000	0.000	0.000	0.000	0.000	1.287	7.327
82.350	**75666**		**2.250**	**0.472**	**0.700**	**0.907**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**1.379**	**7.567**
82.400	78151		2.300	0.478	0.750	*0.907*	0.050	0.060	0.050	0.030	0.050	0.030	1.505	7.815
82.450	80507		2.350	0.484	0.800	*0.907*	0.100	0.170	0.100	0.084	0.100	0.084	1.728	8.051
82.500	82968		2.400	0.489	0.850	*0.907*	0.150	0.311	0.150	0.154	0.150	0.154	2.014	8.297
82.550	85443		2.450	0.495	0.900	*0.907*	0.200	0.477	0.200	0.235	0.200	0.235	2.348	8.544
82.600	87947		2.500	0.500	0.950	*0.907*	0.250	0.664	0.250	0.326	0.250	0.326	2.723	8.795
82.650	90467		2.550	0.506	1.000	*0.907*	0.300	0.870	0.300	0.426	0.300	0.426	3.133	9.047
82.700	92991		2.600	0.511	1.050	*0.907*	0.350	1.092	0.350	0.533	0.350	0.533	3.575	9.299
82.750	95541		2.650	0.516	1.100	*0.907*	0.400	1.330	0.400	0.647	0.400	0.647	4.046	9.554
82.800	98121		2.700	0.521	1.150	*0.907*	0.450	1.581	0.450	0.766	0.450	0.766	4.541	9.812
82.850	100710		2.750	0.527	1.200	*0.907*	0.500	1.846	0.500	0.891	0.500	0.891	5.061	10.071
82.900	103374		2.800	0.532	1.250	*0.907*	0.550	2.122	0.550	1.021	0.550	1.021	5.601	10.337
82.950	105922		2.850	0.537	1.300	*0.907*	0.600	2.409	0.600	1.154	0.600	1.154	6.162	10.592
83.000	**108567**	**100-Year**	**2.900**	**0.542**	**1.350**	***0.907***	**0.650**	**2.707**	**0.650**	**1.292**	**0.650**	**1.292**	**6.740**	**10.857**
83.050	111257		2.950	0.547	1.400	*0.907*	0.700	3.015	0.700	1.434	0.700	1.434	7.336	11.126
83.100	113981		3.000	0.552	1.450	*0.907*	0.750	3.332	0.750	1.578	0.750	1.578	7.947	11.398
83.150	115245		3.050	0.557	1.500	*0.907*	0.800	3.658	0.800	1.726	0.800	1.726	8.573	11.525
83.200	116522		3.100	0.562	1.550	*0.907*	0.850	3.992	0.850	1.876	0.850	1.876	9.212	11.652
83.250	117806		3.150	0.566	1.600	*0.907*	0.900	4.334	0.900	2.029	0.900	2.029	9.864	11.781
83.300	119098		3.200	0.571	1.650	*0.907*	0.950	4.683	0.950	2.183	0.950	2.183	10.528	11.910

Table E-5: Stage-Storage-Outflow Curve for SWM Facility Under Interim B Conditions (Existing Controls)

			Quality Control 1		Quantity Control 1		Quantity Control 2		Quantity Control 3		Quantity Control 4			
			Vertical Orifice		Rectangular Weir		Rectangular Weir		Rectangular Weir		Rectangular Weir			
			Dia (m)	0.400	L (m)	1.000	L (m)	3.000	L (m)	1.500	L (m)	1.500		
			Area (m^2)	0.126										
			Invert (m)	80.10	C_w	1.800	C_w	1.800	C_w	1.800	C_w	1.800		
			C_o	0.62	Invert (m)	81.65	Invert (m)	82.35	Invert (m)	82.35	Invert (m)	82.35		
			Q @ D	0.154	n contr.	2	n contr.	2	n contr.	2	n contr.	2		
Elevation (m)	Active Sto. (m^3)	Demarkation Points	Head (m)	Outflow (m^3/s)	Head (m)	Outflow (m^3/s)	Head (m)	Outflow (m^3/s)	Head (m)	Outflow (m^3/s)	Head (m)	Outflow (m^3/s)	Outflow (m^3/s)	Storage (ha·m)
83.350	120419		3.250	0.576	1.700	*0.907*	1.000	5.040	1.000	2.340	1.000	2.340	11.202	12.042
83.400	130762		3.300	0.581	1.750	*0.907*	1.050	5.403	1.050	2.498	1.050	2.498	11.887	13.076
83.450	133548		3.350	0.585	1.800	*0.907*	1.100	5.773	1.100	2.658	1.100	2.658	12.581	13.355
83.500	**136424**	**Top of Berm**	**3.400**	**0.590**	**1.850**	***0.907***	**1.150**	**6.149**	**1.150**	**2.819**	**1.150**	**2.819**	**13.284**	**13.642**

Notes :

- PP Elev indicates the elevation of the permanent pool.
- QC Elev indicates the elevation of the storage volume required by MOE for quality control.
- Ext. Det. indicates the elevation of extended detention provided based on the detention of the 25 mm storm for a 24 to 48 hour drawdown time.
- 100-Year indicates the elevation of the maximum allowable 100-year water level in the main pond cell.
- Top of Berm indicates the elevation at the top of the berm.
- Head losses for reverse grade pipe included in quality control outflow calculations.

Table E-6: Drainage Area to SWM Facility (Interim B Conditions)

Segment ID [1]	Area (ha)	Imperviousness (%)	Area x Imp.
To SWM Facility 1			
A101a	0.820	86	70.520
A101b	3.090	86	265.740
A101c	3.400	86	292.400
A103a	1.050	86	90.300
A103b	2.820	86	242.520
A103c	3.410	86	293.260
A108a	1.880	86	161.680
A110a	0.750	71	53.250
A112a	0.570	71	40.470
A112b	1.300	86	111.800
A112c	1.600	71	113.600
A112d	2.220	86	190.920
A112e	2.790	86	239.940
A201a	0.900	71	63.900
A202a	4.630	71	328.730
A203a	0.920	64	58.880
A204a	0.340	64	21.760
A205a	3.780	64	241.920
A206a	1.110	64	71.040
A207a	1.040	64	66.560
A208a	0.630	71	44.730
A209a	0.480	71	34.080
A1101a	0.180	86	15.480
A1101b	0.540	86	46.440
A1101c	0.790	86	67.940
A1101d	0.830	64	53.120
A1101e	1.510	64	96.640
A1101f	1.910	71	135.610
A1102a	5.200	71	369.200
A2001a	0.890	71	63.190
A2070a	1.160	64	74.240
A2071a	2.410	86	207.260
A2071b	3.410	29	98.890
A2071c	4.830	71	342.930
A2090a	0.180	71	12.780
ABLK246	2.890	64	184.960
AR114	0.110	49	5.390
AR113	0.130	49	6.370
AR112A	0.170	49	8.330
AS112A	0.140	73	10.220
AS113	0.340	73	24.820
AS112B	0.060	73	4.380
AS101	0.200	73	14.600
AS102	0.180	73	13.140
AP104	0.420	0	0.000
AS106	0.150	73	10.950
AS114	0.290	73	21.170
AS104	0.100	73	7.300
AR112B	0.090	49	4.410
AR104	0.220	49	10.780
AS3901E	0.270	86	23.220
AS3900B	0.220	86	18.920
AS54E	0.170	86	14.620
AS55AE	0.120	86	10.320

Table E-6: Drainage Area to SWM Facility (Interim B Conditions)

Segment ID [1]	Area (ha)	Imperviousness (%)	Area x Imp.
AS55BE	0.110	86	9.460
AS55C	0.080	86	6.880
AS56E	0.170	86	14.620
AS3901W	0.190	86	16.340
AS54W	0.110	86	9.460
AS55AW	0.096	86	8.256
AS55BW	0.096	86	8.256
AS56W	0.097	86	8.342
AEXT2A	1.516	100	151.600
AEXT2B	0.720	49	35.280
AS500C	0.310	86	26.660
AS500	0.260	86	22.360
AS307	0.250	73	18.250
AS311	0.430	73	31.390
AS312	0.350	73	25.550
AS306	0.390	73	28.470
AR301B	0.160	49	7.840
AS301	0.360	73	26.280
AS303	0.310	73	22.630
AS304	0.280	73	20.440
AR312A	0.330	49	16.170
AR312B	0.110	49	5.390
AR301A	0.150	49	7.350
AR301C	0.120	49	5.880
AR301D	0.100	49	4.900
AS314	0.170	73	12.410
AR305	0.170	49	8.330
AR402B	0.130	49	6.370
AR402A	0.130	49	6.370
AS400e	0.030	71	2.130
AS400A	0.100	71	7.100
AS400B	0.100	71	7.100
AS400C	0.120	71	8.520
AS400D	0.070	71	4.970
AS401A	0.060	71	4.260
AS401B	0.110	71	7.810
AS401C	0.290	71	20.590
AS401E	0.020	71	1.420
AS402A	0.510	71	36.210
AS402C	0.340	71	24.140
AS402G	0.110	71	7.810
AS404	0.160	70	11.200
A21	0.630	86	54.180
AS410A	0.210	86	18.060
AS410B	0.090	86	7.740
AR410A	1.830	42	76.860
AR410B	0.480	42	20.160
A402I	0.760	63	47.880
A055a	2.200	64	140.800
A101d	8.400	86	722.400
A401b	7.910	71	561.610
A560b	4.990	64	319.360
A2110a	1.040	71	73.840
A2110b	3.240	86	278.640
A039NE	0.017	75	1.275

Table E-6: Drainage Area to SWM Facility (Interim B Conditions)

Segment ID [1]	Area (ha)	Imperviousness (%)	Area x Imp.
A039NW	0.046	74	3.404
A039SE	0.021	84	1.764
A039SW	0.023	57	1.311
A019a	1.550	29	44.950
A001N1	0.038	47	1.786
A001N2	0.047	36	1.692
A001NE	0.029	48	1.392
A001NW	0.017	47	0.799
A001R1	0.034	18	0.612
A001S1	0.057	54	3.078
A001S2	0.011	55	0.605
A001SE	0.047	62	2.914
A001SW	0.039	64	2.496
A003R1	0.040	20	0.800
A003R2	0.176	15	2.640
A004NE	0.098	66	6.468
A004NW	0.054	46	2.484
A004SW	0.024	42	1.008
A005NE	0.030	47	1.410
A005NW	0.018	50	0.900
A005SE	0.186	71	13.206
A005SW	0.130	80	10.400
A005W1	0.039	41	1.599
A006NE	0.105	71	7.455
A006NW	0.031	77	2.387
A006SE	0.142	76	10.792
A006SW	0.127	81	10.287
A007E1	0.117	74	8.658
A007E2	0.131	76	9.956
A007N1	0.063	84	5.292
A007NE	0.023	48	1.104
A007NW	0.045	62	2.790
A007R1	0.183	17	3.111
A007R2	0.036	19	0.684
A007S1	0.020	90	1.800
A007SE	0.021	52	1.092
A007SW	0.064	55	3.520
A008NE	0.039	33	1.287
A008NW	0.045	42	1.890
A008R1	0.027	19	0.513
A008R2	0.178	19	3.382
A008R3	0.153	18	2.754
A008SE	0.021	33	0.693
A008SW	0.026	42	1.092
A009E1	0.090	70	6.300
A009E2	0.039	72	2.808
A009N1	0.018	50	0.900
A009N2	0.027	48	1.296
A009N3	0.028	29	0.812
A009NE	0.054	70	3.780
A009NW	0.027	63	1.701
A009SE	0.049	84	4.116
A009SW	0.044	70	3.080
A009W1	0.086	74	6.364
A009W2	0.037	70	2.590

Table E-6: Drainage Area to SWM Facility (Interim B Conditions)

Segment ID [1]	Area (ha)	Imperviousness (%)	Area x Imp.
A010NE	0.080	66	5.280
A010NW	0.080	71	5.680
A010S1	0.151	75	11.325
A010S2	0.151	75	11.325
A010SE	0.052	83	4.316
A010SW	0.052	75	3.900
A010W1	0.035	69	2.415
A011NE	0.076	82	6.232
A011NW	0.036	69	2.484
A011SW	0.189	77	14.553
A012NE	0.033	58	1.914
A012NW	0.055	65	3.575
A012SE	0.089	74	6.586
A012SW	0.040	80	3.200
A013N1	0.031	39	1.209
A013N2	0.029	86	2.494
A013NE	0.073	78	5.694
A013NW	0.037	78	2.886
A013S1	0.058	38	2.204
A013S2	0.062	79	4.898
A013SE	0.068	72	4.896
A013SW	0.042	74	3.108
A015N1	0.019	47	0.893
A015N2	0.010	40	0.400
A015NE	0.063	51	3.213
A015NW	0.057	70	3.990
A015S1	0.029	31	0.899
A015S2	0.007	43	0.301
A015SE	0.028	68	1.904
A015SW	0.081	74	5.994
A017NE	0.021	76	1.596
A017NW	0.168	76	12.768
A017SE	0.021	71	1.491
A017SW	0.048	73	3.504
A018DV1	0.621	74	45.954
A018NE	0.040	70	2.800
A018NW	0.045	56	2.520
A018R1	0.153	20	3.060
A018R2	0.114	21	2.394
A018R3	0.082	21	1.722
A018SE	0.021	71	1.491
A018SW	0.026	50	1.300
A019b	0.073	73	5.329
A019DV1	0.084	59	4.956
A019E1	0.040	70	2.800
A019E2	0.022	73	1.606
A019N1	0.035	69	2.415
A019N2	0.064	77	4.928
A019N3	0.027	63	1.701
A019N4	0.082	76	6.232
A019NE	0.040	85	3.400
A019NW	0.023	61	1.403
A019R1	0.198	22	4.356
A019R2	0.080	16	1.280
A019S1	0.035	77	2.695

Table E-6: Drainage Area to SWM Facility (Interim B Conditions)

Segment ID [1]	Area (ha)	Imperviousness (%)	Area x Imp.
A019S2	0.066	70	4.620
A019S3	0.029	72	2.088
A019S4	0.083	72	5.976
A019SE	0.020	70	1.400
A019SW	0.026	50	1.300
A019W1	0.071	83	5.893
A019W2	0.065	72	4.680
A020E1	0.042	71	2.982
A020N1	0.066	52	3.432
A020N2	0.040	70	2.800
A020N3	0.049	57	2.793
A020NE	0.059	68	4.012
A020NW	0.064	67	4.288
A020S1	0.046	72	3.312
A020S2	0.022	68	1.496
A020SE	0.068	82	5.576
A020SW	0.068	75	5.100
A020W1	0.086	74	6.364
A020W2	0.047	66	3.102
A021NE	0.076	71	5.396
A021NW	0.122	67	8.174
A021SE	0.054	75	4.050
A021SW	0.073	63	4.599
A023N1	0.024	83	1.992
A023N2	0.059	73	4.307
A023NE	0.060	73	4.380
A023NW	0.032	84	2.688
A023R1	0.048	17	0.816
A023R2	0.130	18	2.340
A023R3	0.147	17	2.499
A023R4	0.116	20	2.320
A023S1	0.022	41	0.902
A023S2	0.048	46	2.208
A023SE	0.066	67	4.422
A023SW	0.026	81	2.106
A025NE	0.042	55	2.310
A025NW	0.094	55	5.170
A025SE	0.030	83	2.490
A025SW	0.020	45	0.900
A028R1	0.478	8	3.824
A029NE	0.050	66	3.300
A029NW	0.015	53	0.795
A029R1	0.129	11	1.419
A029R2	0.156	18	2.808
A029R3	0.028	23	0.644
A029R4	0.110	21	2.310
A029R5	0.211	20	4.220
A029R6	0.048	10	0.480
A029S1	0.074	42	3.108
A029S2	0.108	60	6.480
A029SE	0.155	72	11.160
A029SW	0.186	71	13.206
A031NE	0.071	62	4.402
A031NW	0.034	74	2.516
A031SE	0.061	80	4.880

Table E-6: Drainage Area to SWM Facility (Interim B Conditions)

Segment ID [1]	Area (ha)	Imperviousness (%)	Area x Imp.
A031SW	0.027	37	0.999
A032NE	0.059	59	3.481
A032NW	0.024	29	0.696
A032R1	0.061	20	1.220
A032SE	0.054	78	4.212
A032SW	0.036	67	2.412
A034NE	0.024	71	1.704
A034NW	0.016	44	0.704
A034SE	0.021	48	1.008
A034SW	0.110	55	6.050
A039N1	0.042	88	3.696
A039N2	0.069	87	6.003
A039S1	0.021	57	1.197
A039S2	0.034	59	2.006
A040N1	0.032	81	2.592
A040N2	0.068	75	5.100
A040NE	0.082	84	6.888
A040NW	0.029	83	2.407
A040R1	0.050	19	0.950
A040R2	0.056	17	0.952
A040R3	0.076	20	1.520
A040R4	0.062	22	1.364
A040R5	0.040	13	0.520
A040S1	0.021	57	1.197
A040S2	0.035	60	2.100
A040SE	0.035	60	2.100
A040SW	0.021	57	1.197
A041a	3.700	86	318.200
A041DV1	0.631	66	41.646
A041DV2	0.018	49	0.882
A041DV3	0.048	40	1.920
A041DV4	0.144	46	6.624
A041DV5	0.129	46	5.934
A041DV6	0.070	36	2.520
A041N1	0.139	77	10.703
A041N2	0.030	73	2.190
A041NE	0.053	81	4.293
A041NW	0.044	77	3.388
A041S1	0.067	61	4.087
A041SE	0.035	60	2.100
A041SW	0.021	57	1.197
A047E1	0.015	73	1.095
A047E2	0.027	74	1.998
A047PK1	0.375	7	2.625
A047W1	0.036	22	0.792
A047W2	0.074	62	4.588
A049NE	0.039	69	2.691
A049NW	0.018	72	1.296
A049R1	0.082	16	1.312
A049R2	0.052	16	0.832
A049R3	0.116	16	1.856
A049R4	0.023	20	0.460
A049R5	0.039	22	0.858
A049SE	0.072	69	4.968
A049SW	0.045	76	3.420

Table E-6: Drainage Area to SWM Facility (Interim B Conditions)

Segment ID [1]	Area (ha)	Imperviousness (%)	Area x Imp.
A100NE	3.234	65	210.210
A101E1	0.017	82	1.394
A101E2	0.150	57	8.550
A101E3	0.054	48	2.592
A101N1	0.151	64	9.664
A101N2	0.142	76	10.792
A101W1	0.033	64	2.112
A101W2	0.153	64	9.792
A107NW	0.087	72	6.264
A107SW	0.125	64	8.000
A140R1	0.054	22	1.188
A140R2	0.150	20	3.000
A140R3	0.125	20	2.500
A140R4	0.133	20	2.660
A140WK1	0.084	24	2.016
A170DV1	0.130	41	5.330
A170NE	0.040	70	2.800
A170NW	0.090	81	7.290
A170S1	0.038	71	2.698
A170S2	0.022	68	1.496
A170SE	0.020	70	1.400
A170SW	0.046	72	3.312
A200NE	0.035	34	1.190
A200NW	0.034	35	1.190
A200R1	0.026	13	0.338
A200R2	0.041	18	0.738
A200R3	0.049	18	0.882
A200R4	0.030	18	0.540
A250NE	0.051	67	3.417
A250NW	0.033	42	1.386
A250SE	0.071	73	5.183
A250SW	0.044	50	2.200
AChan2	2.658	100	265.800
AChan3	1.162	100	116.200
AForeS	1.859	37	68.783
ARes2	1.385	33	45.705
AWood1	0.847	7	5.929
AWood2	5.699	7	39.893
A21	0.630	86	54.180
A410F	0.520	64	33.280
AForeN	4.460	43	191.780
AMainN	4.070	43	175.010
AMainS	1.902	43	81.786
ARes1	1.212	24	29.088
AResN1	5.840	44	256.960
AResN2	1.070	26	27.820
AHE1b	18.300	14	256.200
ATW1b	3.100	7	21.700
ATW2b	6.100	7	42.700
ATW3b	5.100	86	438.600
B001N1	0.096	78	7.488
B001N2	0.090	78	7.020
B002NE	0.092	73	6.716
B002NW	0.101	77	7.777
B002R1	0.042	22	0.924

Table E-6: Drainage Area to SWM Facility (Interim B Conditions)

Segment ID [1]	Area (ha)	Imperviousness (%)	Area x Imp.
B002R2	0.056	22	1.232
B002R3	0.092	15	1.380
B002R4	0.033	9	0.297
B002R5	0.037	22	0.814
B002SE	0.048	44	2.112
B002SW	0.128	75	9.600
B002WK1	0.019	32	0.608
B004NE	0.067	72	4.824
B004NW	0.083	70	5.810
B004PK1	0.654	29	18.966
B004R1	0.067	13	0.871
B004R2	0.062	16	0.992
B004SE	0.032	72	2.304
B004SW	0.044	68	2.992
B004WK1	0.025	50	1.250
B005N1	0.080	73	5.840
B005N2	0.043	81	3.483
B005N3	0.030	63	1.890
B005NE	0.058	71	4.118
B005NW	0.156	70	10.920
B005R1	0.059	14	0.826
B005R2	0.119	22	2.618
B005R3	0.063	20	1.260
B005R4	0.121	22	2.662
B005S1	0.080	71	5.680
B005S2	0.043	77	3.311
B005SE	0.063	71	4.473
B005SW	0.075	68	5.100
B008NE	0.049	71	3.479
B008NW	0.076	63	4.788
B008R1	0.132	22	2.904
B008SE	0.024	75	1.800
B008SW	0.106	74	7.844
B009NE	0.043	79	3.397
B009NW	0.090	73	6.570
B009PK1	0.711	29	20.619
B009R1	0.057	23	1.311
B009R2	0.128	21	2.688
B009SE	0.029	62	1.798
B009SW	0.043	74	3.182
B010N1	0.041	78	3.198
B010N2	0.048	79	3.792
B010NE	0.055	69	3.795
B010NW	0.050	68	3.400
B010R1	0.116	22	2.552
B010S1	0.052	79	4.108
B010S2	0.049	76	3.724
B010SE	0.058	71	4.118
B010SW	0.048	75	3.600
B010W1	0.021	48	1.008
B010W2	0.025	48	1.200
B011NE	0.031	55	1.705
B011NW	0.097	72	6.984
B011R1	0.074	21	1.554
B011R2	0.113	22	2.486

Table E-6: Drainage Area to SWM Facility (Interim B Conditions)

Segment ID [1]	Area (ha)	Imperviousness (%)	Area x Imp.
B011S1	0.034	87	2.958
B011SE	0.030	53	1.590
B011SW	0.097	72	6.984
B012EX1	0.054	29	1.566
B012EX2	0.522	39	20.358
B012NE	0.082	63	5.166
B012NW	0.100	63	6.300
B012SE	0.074	63	4.662
B012SW	0.091	63	5.733
B013DV1	2.860	93	265.980
B013DV2	2.535	7	17.745
B013EX1	0.084	29	2.436
B013EX2	0.074	51	3.774
B013NE	0.080	62	4.960
B013NW	0.099	62	6.138
B015NE	0.085	63	5.355
B015NW	0.102	63	6.426
B015RE1	2.173	79	171.667
B015RE2	2.165	7	15.155
B015SE	0.049	63	3.087
B015SW	0.059	63	3.717
B016NE	0.135	68	9.180
B016NW	0.073	64	4.672
B016R1	0.065	24	1.560
B016R2	0.031	23	0.713
B016R3	0.056	11	0.616
B016R4	0.015	23	0.345
B016S1	0.061	68	4.148
B016S2	0.062	68	4.216
B016S3	0.029	61	1.769
B016SE	0.048	73	3.504
B016SW	0.052	76	3.952
B018NE	0.110	67	7.370
B018NW	0.049	72	3.528
B018R1	0.060	23	1.380
B018R2	0.044	23	1.012
B018R3	0.051	15	0.765
B018SE	0.023	48	1.104
B018SW	0.047	55	2.585
B019N1	0.070	64	4.480
B019N2	0.051	73	3.723
B019NE	0.067	70	4.690
B019NW	0.141	72	10.152
B019R1	0.045	12	0.540
B019R2	0.045	23	1.035
B019R3	0.032	22	0.704
B019R4	0.025	22	0.550
B019R5	0.052	23	1.196
B019S1	0.070	70	4.900
B019S2	0.064	73	4.672
B019SE	0.066	65	4.290
B019SW	0.074	61	4.514
B021R1	0.056	21	1.176
B021R2	0.128	23	2.944
B022N1	0.072	68	4.896

Table E-6: Drainage Area to SWM Facility (Interim B Conditions)

Segment ID [1]	Area (ha)	Imperviousness (%)	Area x Imp.
B022N2	0.050	72	3.600
B022N3	0.056	58	3.248
B022NE	0.055	69	3.795
B022NW	0.056	66	3.696
B022S1	0.073	68	4.964
B022S2	0.050	72	3.600
B022SE	0.055	68	3.740
B022SW	0.063	67	4.221
B022W1	0.045	71	3.195
B022W2	0.023	83	1.909
B022W3	0.024	46	1.104
B024NE	0.127	70	8.890
B024NW	0.021	62	1.302
B024R1	0.109	23	2.507
B024R2	0.051	22	1.122
B024R3	0.034	24	0.816
B024SE	0.057	72	4.104
B024SW	0.049	61	2.989
B026R1	0.120	23	2.760
B028N1	0.084	68	5.712
B028N2	0.048	83	3.984
B028NE	0.062	73	4.526
B028NW	0.092	58	5.336
B028R1	0.108	22	2.376
B028R2	0.056	21	1.176
B028R3	0.139	22	3.058
B028S1	0.085	72	6.120
B028S2	0.056	67	3.752
B028SE	0.062	65	4.030
B028SW	0.184	62	11.408
B031N1	0.062	71	4.402
B031N2	0.025	56	1.400
B031N3	0.070	82	5.740
B031NE	0.077	74	5.698
B031NW	0.171	73	12.483
B031R1	0.052	13	0.676
B031R2	0.135	21	2.835
B031R3	0.062	23	1.426
B031R4	0.094	21	1.974
B031R5	0.015	23	0.345
B031S1	0.063	70	4.410
B031S2	0.032	53	1.696
B031SE	0.077	74	5.698
B031SW	0.092	58	5.336
B033NE	0.131	71	9.301
B033NW	0.034	76	2.584
B033R1	0.041	22	0.902
B033R2	0.063	21	1.323
B033R3	0.142	21	2.982
B033SE	0.105	70	7.350
B033SW	0.045	84	3.780
B036NE	0.061	70	4.270
B036NW	0.047	77	3.619
B036R1	0.126	21	2.646
B036SE	0.059	71	4.189

Table E-6: Drainage Area to SWM Facility (Interim B Conditions)

Segment ID [1]	Area (ha)	Imperviousness (%)	Area x Imp.
B036SW	0.048	75	3.600
B036W1	0.025	48	1.200
B036W2	0.025	52	1.300
B037N1	0.045	78	3.510
B037NE	0.025	56	1.400
B037NW	0.094	73	6.862
B037R1	0.060	22	1.320
B037R2	0.113	21	2.373
B037R3	0.014	23	0.322
B037R4	0.012	25	0.300
B037SE	0.025	52	1.300
B037SW	0.095	73	6.935
B038NE	0.104	70	7.280
B038NW	0.032	78	2.496
B038SE	0.047	77	3.619
B038SW	0.047	81	3.807
B040NE	0.034	59	2.006
B040NW	0.028	58	1.624
B040R1	0.031	23	0.713
B040SE	0.129	70	9.030
B040SW	0.051	81	4.131
B041NE	0.034	59	2.006
B041NW	0.030	59	1.770
B041R1	0.031	23	0.713
B041SE	0.036	61	2.196
B041SW	0.043	74	3.182
B042N1	0.112	70	7.840
B042N2	0.044	73	3.212
B042N3	0.027	48	1.296
B042NE	0.116	72	8.352
B042NW	0.044	73	3.212
B042R1	0.090	21	1.890
B042R2	0.142	20	2.840
B042R3	0.077	16	1.232
B042S1	0.094	72	6.768
B042S2	0.094	71	6.674
B042SE	0.053	66	3.498
B042SW	0.027	48	1.296
B044NE	0.081	70	5.670
B044NW	0.082	71	5.822
B044R1	0.043	20	0.860
B044R2	0.088	22	1.936
B044SE	0.121	71	8.591
B044SW	0.053	70	3.710
B046NE	0.023	48	1.104
B046NW	0.055	63	3.465
B046R2	0.052	20	1.040
B046R3	0.080	27	2.160
B046S1	0.022	50	1.100
B046SE	0.038	79	3.002
B046SW	0.119	73	8.687
B047NE	0.112	71	7.952
B047NW	0.026	50	1.300
B047R1	0.125	22	2.750
B047R2	0.060	21	1.260

Table E-6: Drainage Area to SWM Facility (Interim B Conditions)

Segment ID [1]	Area (ha)	Imperviousness (%)	Area x Imp.
B047R3	0.053	23	1.219
B047R4	0.014	18	0.252
B047R5	0.048	21	1.008
B047R6	0.065	20	1.300
B047SE	0.111	73	8.103
B047SW	0.055	69	3.795
B048N1	0.027	48	1.296
B048NE	0.075	75	5.625
B048NW	0.064	70	4.480
B048R1	0.062	21	1.302
B048R2	0.082	20	1.640
B048R3	0.138	16	2.208
B048SE	0.076	79	6.004
B048SW	0.065	68	4.420
B048W1	0.032	47	1.504
B048W2	0.036	83	2.988
B048W3	0.024	50	1.200
B050N1	0.088	72	6.336
B050N2	0.033	52	1.716
B050NE	0.065	75	4.875
B050NW	0.070	64	4.480
B050R1	0.128	21	2.688
B050R2	0.068	22	1.496
B050R3	0.103	22	2.266
B050S1	0.087	72	6.264
B050S2	0.039	85	3.315
B050S3	0.023	61	1.403
B050SE	0.057	68	3.876
B050SW	0.153	72	11.016
B055N1	0.030	47	1.410
B055NE	0.096	69	6.624
B055NW	0.046	72	3.312
B055R1	0.118	21	2.478
B055SE	0.093	72	6.696
B055SW	0.048	71	3.408
B056NE	0.029	48	1.392
B056NW	0.028	61	1.708
B056SE	0.025	48	1.200
B056SW	0.025	64	1.600
B058NE	0.039	72	2.808
B058NW	0.046	72	3.312
B058R1	0.117	21	2.457
B058R2	0.102	22	2.244
B058SE	0.021	62	1.302
B058SW	0.031	61	1.891
B180N1	0.060	68	4.080
B180N2	0.060	68	4.080
B180N3	0.038	46	1.748
B180NE	0.065	71	4.615
B180NW	0.067	70	4.690
B180R1	0.117	23	2.691
B180R2	0.075	23	1.725
B180SE	0.050	72	3.600
B180SW	0.047	73	3.431
B410NE	0.025	56	1.400

Table E-6: Drainage Area to SWM Facility (Interim B Conditions)

Segment ID [1]	Area (ha)	Imperviousness (%)	Area x Imp.
B410NW	0.037	78	2.886
B590NE	0.103	74	7.622
B590NW	0.105	76	7.980
B590R1	0.067	22	1.474
B590R2	0.172	22	3.784
B590R3	0.120	21	2.520
B590R4	0.080	10	0.800
B590SE	0.108	69	7.452
B590SW	0.071	73	5.183
C001R1	0.084	9	0.756
C001R2	0.705	9	6.345
C002R1	0.200	11	2.200
C003R1	0.155	5	0.775
C004R1	0.381	6	2.286
C005R1	0.297	9	2.673
C006R1	0.319	9	2.871
C007R1	0.342	6	2.052
C008R1	0.385	7	2.695
C009R1	0.460	9	4.140
C010R1	0.334	10	3.340
C011R1	0.130	13	1.690
C012R1	0.092	13	1.196
C012WK1	0.028	66	1.848
C013PK1	0.428	29	12.412
C013R1	0.295	39	11.505
C013R2	0.151	40	6.040
NCOM2	8.720	90	784.800
NNAT1	21.420	7	149.940
NNAT2	7.160	7	50.120
NNAT3	31.740	7	222.180
NNAT4	45.990	7	321.930
To SWM Facility 1 (BMR Phase 1 Interim)			
A11	0.063	69.915	4.370
A12	0.155	50.168	7.751
A13	0.148	41.86	6.179
A14	0.423	70.28	29.714
A15	0.096	70.28	6.747
A17	0.242	61.404	14.854
A18	0.166	52.344	8.710
A19	0.035	69.048	2.430
A20	0.250	62.8	15.713
A21	0.480	55.324	26.528
A22	0.028	28.571	0.811
A23	0.227	60.987	13.838
A24	0.223	61.111	13.609
A25	0.239	56.478	13.493
A29	0.184	60.326	11.118
A30	0.014	50	0.705
A31	0.289	61.938	17.894
A32	0.162	61.875	10.005
A33	0.159	62.581	9.932
A34	0.090	59.756	5.402
A35	0.225	63.556	14.326
A41	0.297	57.229	17.008
A42	0.238	58.242	13.867

Table E-6: Drainage Area to SWM Facility (Interim B Conditions)

Segment ID [1]	Area (ha)	Imperviousness (%)	Area x Imp.
A43	0.347	58.205	20.185
A44	0.288	61.716	17.774
A45	0.195	60.112	11.722
A46	0.209	63.587	13.258
A47	0.145	56.757	8.213
A54	0.816	7	5.714
A9	3.038	7	21.265
B1	1.681	7	11.764
B2	3.432	100	343.220
B3	1.007	86	86.611
B4	1.002	7	7.014
C2	0.069	67.606	4.651
S6	0.044	25	1.098
S7	0.049	25	1.215
S8	0.083	25	2.080
S9	2.319	7	16.230
To SWM Facility 3			
A043R1	0.226	8	1.808
A043R2	0.017	18	0.306
A043R3	0.076	32	2.432
A043R4	0.078	32	2.496
A043SE	0.064	64	4.096
A043SW	0.048	64	3.072
A044R1	0.173	12	2.076
A045N1	0.049	71	3.479
A045N2	0.081	77	6.237
A045NE	0.251	69	17.319
A045NW	0.043	84	3.612
A045S1	0.048	73	3.504
A045S2	0.081	78	6.318
A045SE	0.118	61	7.198
A045SW	0.043	86	3.698
A046NE	0.058	69	4.002
A046R1	0.170	21	3.570
A046R2	0.145	12	1.740
A046R3	0.280	14	3.920
A046SE	0.095	76	7.220
A046SW	0.039	77	3.003
A047NE	0.009	78	0.702
A047NW	0.025	76	1.900
A047R1	0.144	17	2.448
A047R2	0.098	16	1.568
A047SE	0.040	73	2.920
A047SW	0.115	66	7.590
A101NE	0.073	73	5.329
A101NW	0.046	64	2.944
A101S1	0.107	64	6.848
A101S2	0.113	63	7.119
A101SE	0.084	70	5.880
A101SW	0.076	64	4.864
A102R1	0.087	32	2.784
A410F	0.520	64	33.280
A460NE	0.059	61	3.599
A460NW	0.090	57	5.130
A460PK1	0.355	7	2.485

Table E-6: Drainage Area to SWM Facility (Interim B Conditions)

Segment ID [1]	Area (ha)	Imperviousness (%)	Area x Imp.
A460R1	0.071	20	1.420
A460R2	0.057	19	1.083
A460R3	0.030	23	0.690
A460SE	0.041	85	3.485
AR410C	0.550	64	35.200
AS410C	0.110	86	9.460
AS410D	0.080	86	6.880
AS410E	0.100	86	8.600
Total	**377.561**	**42**	**15965.636**

[1] Refer to Figure 2

Weighted Average Imperviousness = S(Area x Imp) / Total Area = 15965.636 / 377.561 = 42 %

Table E-7: Summary of Total Drainage Area (Interim B Conditions)

Land Use [1]	Area (ha)	Imperviousness (%)	Area x Imp.
To SWM Facility 1	372.298	42	15710.322
To SWM Facility 3	5.263	49	255.314
Total	377.561	42	15965.636

[1] Refer to Figure 2

Weighted Average Imperviousness = S(Area x Imp) / Total Area = 15965.636 / 377.561 = 42 %

Table E-8: Target Release Rates for SWM Facility [1]

Event	Pre-Development Release Rate ($m^3/s/ha$)	Target Release Rate (m^3/s)
2-Year, 24-Hour SCS	1.600	1.000
5-Year, 24-Hour SCS	2.900	2.300
10-Year, 24-Hour SCS	3.900	3.800
25-Year, 24-Hour SCS	5.500	5.600
50-Year, 24-Hour SCS	6.600	6.700
100-Year, 24-Hour SCS	7.800	8.000

[1] As per the April 2008 "*East Urban Community Pond No. 1 Design Brief*" by Stantec.

CALCULATION SHEET E-1: EXISTING CONTROLS (INTERIM B CONDITIONS)

Quality Control 1			Quantity Control 1			Quantity Control 2			Quantity Control 3			Quantity Control 4		
Vertical Circular Orifice			Rectangular Weir			Rectangular Weir			Rectangular Weir			Rectangular Weir		
Diameter	(m)	0.400	L	(m)	1.000	L	(m)	3.000	L	(m)	1.500	L	(m)	1.500
A_o	(m^2)	0.126												
invert	(m)	80.10	C_w		1.80	C_w		1.80	C_w		1.80	C_w		1.80
C_o		0.62	Crest Elev.	(m)	81.65	Crest Elev.	(m)	82.35	Crest Elev.	(m)	82.35	Crest Elev.	(m)	82.35
			n		2	n		2	n		2	n		2
Max Water Level	(m)	83.009	Max Water Level	(m)	83.009	Max Water Level	(m)	83.009	Max Water Level	(m)	83.009	Max Water Level	(m)	83.009
Head of Water	(m)	2.909	Head of Water	(m)	1.359	Head of Water	(m)	0.659	Head of Water	(m)	0.659	Head of Water	(m)	0.659
Q_0	(m^3/s)	0.568	Q_w	(m^3/s)	2.077	Q_w	(m^3/s)	2.762	Q_w	(m^3/s)	1.317	Q_w	(m^3/s)	1.317
Orifice Equation:			Weir Equation:			Weir Equation:			Weir Equation:			Weir Equation:		
$Q_o = C_o A_o (2gh)^{0.5}$			$Qw = C_w (L-0.1nh)h^{1.5}$			$Qw = C_w (L-0.1nh)h^{1.5}$			$Qw = C_w (L-0.1nh)h^{1.5}$			$Qw = C_w (L-0.1nh)h^{1.5}$		
Not including outlet pipe losses														
Q_o *is the orifice flow*			*Qw is the weir flow*			*Qw is the weir flow*			*Qw is the weir flow*			*Qw is the weir flow*		
C_o *is the orifice coefficient*			*Cw is the weir coefficient*			*Cw is the weir coefficient*			*Cw is the weir coefficient*			*Cw is the weir coefficient*		
A_o *is the orifice flow area*			*L is the weir length*			*L is the weir length*			*L is the weir length*			*L is the weir length*		
g is the gravitational constant			*h is the weir height*			*h is the weir height*			*h is the weir height*			*h is the weir height*		
h is the head of water			*n is the # of side contractions*			*n is the # of side contractions*			*n is the # of side contractions*			*n is the # of side contractions*		

CALCULATION SHEET E-2: FOREBAY SIZING FOR SWM FACILITY

Trails Edge Subdivision
SWM Facility 1 - Interim B Conditions
City of Ottawa
Calculation of North Forebay Size

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Settling Criteria

From the SWMP Manual, the required length for settling is as follows:

$$L_{min} = \left(\frac{r\,Q_p}{V_s}\right)^{0.5}$$

where:
- r = length to width ratio, at the invert of the inlet pipe.
- Q_p = peak outflow during design quality storm
- V_s = settling velocity

Input:

r =	3.47		149 m / 43 m
Q_p =	0.383	m^3/s	(at elevation 81.65 m)
V_s =	0.0003	m/s	

L_{min} = 66.52 m

The peak flow rate from the pond during the quality storm is taken as the flow that would occur just below the quantity controls (Refer to Table B-5 of Appendix B)

Dispersion Criteria

From the SWMP Manual, the required length for dispersion is as follows:

$$L_{min} = \frac{8\,Q}{d\,V_f}$$

where:
- Q = Inlet flowrate (10-Year, 24-Hour SCS Type II Storm)
- d = depth of pond during peak 10-year inflow (12h:00min)
- V_f = desired final velocity

Input:

Q =	5.579	m^3/s
d =	2.51	m
Vf =	0.5	m/s

L_{min} = 35.55 m

The minimum forebay length is determined by the larger of the settling or dispersion criteria.

Minimum Length of Forebay Required	66.52 m	
Length of Forebay Provided	**149.00 m**	(at elevation 81.6 m)

Average Forebay Velocity

From the SWMP Manual, the maximum allowable average velocity is 0.15 m/s:

$$V_{avg} = \frac{Q}{d\,W_{avg}}$$

where:
- Q = Inlet flowrate (10-Year, 24-Hour SCS Type II Storm)
- d = depth of pond during peak 10-year inflow (12h:05min)
- W_{avg} = average width of forebay

Input:

Q =	5.579	m^3/s	
d =	2.51	m	
W_{avg} =	40	m	(36 m bottom, 43 m permanent pool)

V = 0.06 m/s < 0.15 m/s

CALCULATION SHEET E-3: FOREBAY SIZING FOR SWM FACILITY

Trails Edge Subdivision
SWM Facility 1 - Interim B Conditions
City of Ottawa
Calculation of South Forebay Size

© DSEL

Settling Criteria

From the SWMP Manual, the required length for settling is as follows:

$$L_{min} = \left(\frac{r\,Q_p}{V_s}\right)^{0.5}$$

where:
- r = length to width ratio, at the invert of the inlet pipe.
- Q_p = peak outflow during design quality storm
- V_s = settling velocity

Input:

r =	3.18		143 m / 45 m
Q_p =	0.383	m^3/s	(at elevation 81.65 m)
V_s =	0.0003	m/s	

L_{min} = 63.71 m

The peak flow rate from the pond during the quality storm is taken as the flow that would occur just below the quantity controls (Refer to Table B-5 of Appendix B)

Dispersion Criteria

From the SWMP Manual, the required length for dispersion is as follows:

$$L_{min} = \frac{8\,Q}{d\,V_f}$$

where:
- Q = Inlet flowrate (10-Year, 24-Hour SCS Type II Storm)
- d = depth of pond during peak 10-year inflow (12h:10min)
- V_f = desired final velocity

Input:

Q =	15.601	m^3/s
d =	2.08	m
Vf =	0.5	m/s

L_{min} = 120.30 m

The minimum forebay length is determined by the larger of the settling or dispersion criteria.

Minimum Length of Forebay Required	120.30 m	
Length of Forebay Provided	**143.00 m**	(at elevation 81.5 m)

Average Forebay Velocity

From the SWMP Manual, the maximum allowable average velocity is 0.15 m/s:

$$V_{avg} = \frac{Q}{d\,W_{avg}}$$

where:
- Q = Inlet flowrate (10-Year, 24-Hour SCS Type II Storm)
- d = depth of pond during peak 10-year inflow (12h:10min)
- W_{avg} = average width of forebay

Input:

Q =	15.601	m^3/s	
d =	2.08	m	
W_{avg} =	38	m	(31 m bottom, 45 m permanent pool)

V = 0.20 m/s > 0.15 m/s

Appendix D
Sanitary Sewer Design Sheets and Sanitary Calculations

SANITARY SEWER CALCULATION SHEET

Manning's n=0.013

LOCATION			RESIDENTIAL AREA AND POPULATION						COMM		INSTIT		PARK		C+I+I	INFILTRATION				PIPE					
STREET	FROM M.H.	TO M.H.	AREA (ha)	POP.	CUMULATIVE AREA (ha)	CUMULATIVE POP.	PEAK FACT.	PEAK FLOW (l/s)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	AREA (ha)	ACCU. AREA (ha)	PEAK FLOW (l/s)	TOTAL AREA (ha)	ACCU. AREA (ha)	INFILT. FLOW (l/s)	TOTAL FLOW (l/s)	DIST (m)	DIA (mm)	SLOPE (%)	CAP. (FULL) (l/s)	RATIO Q act/Q cap	VEL (FULL) (m/s)	VEL (ACT.) (m/s)
North West Sanitary Trunk																									
Trunk 1	1007A	1008A			0.00	0			2.58	2.58					1.57	2.58	2.58	0.85	2.42	58.00	200.00	0.65	26.44	0.09	0.84	0.52
COMMERCIAL	1008A	1009A			0.00	0				2.58					1.57	0.00	2.58	0.85	2.42	86.50	250.00	0.25	29.73	0.08	0.61	0.37
COMMERCIAL	1009A	1010A			0.00	0			1.29	3.87					2.35	1.29	3.87	1.28	3.63	86.50	250.00	0.25	29.73	0.12	0.61	0.41
COMMERCIAL					0.00	0			0.22	4.09						0.22	4.09								
COMMERCIAL	1010A	1011A			0.00	0			1.63	5.72					3.48	1.63	5.72	1.89	5.37	39.50	300.00	0.20	43.25	0.12	0.61	0.00
COMMERCIAL	1011A	1012A			0.00	0			0.99	6.71					4.08	0.99	6.71	2.21	6.29	99.50	375.00	0.15	67.91	0.09	0.61	0.38
COMMERCIAL	1012A	1013A			0.00	0			1.41	8.12					4.93	1.41	8.12	2.68	7.61	117.00	375.00	0.15	67.91	0.11	0.61	0.40
COMMERCIAL	1013A	1014A			0.00	0			1.41	9.53					5.79	1.41	9.53	3.14	8.93	112.00	375.00	0.15	67.91	0.13	0.61	0.41
COMMERCIAL	1014A	1022A			0.00	0			1.54	11.07					6.73	1.54	11.07	3.65	10.38	83.50	375.00	0.15	67.91	0.15	0.61	0.44
COMMERCIAL	1022A	1023A			0.00	0			7.02	18.09					10.99	7.02	18.09	5.97	16.96	96.50	375.00	0.15	67.91	0.25	0.61	0.51
	1023A	1024A	0.65	66	0.65	66	3.63	0.78		18.09					10.99	0.65	18.74	6.18	17.95	81.00	450.00	0.12	98.76	0.18	0.62	0.47
	1024A	1025A	0.20	21	0.85	87	3.61	1.02		18.09					10.99	0.20	18.94	6.25	18.26	79.00	450.00	0.12	98.76	0.18	0.62	0.47
	1025A	1026A	0.13	14	0.98	101	3.59	1.18		18.09					10.99	0.13	19.07	6.29	18.46	51.00	450.00	0.12	98.76	0.19	0.62	0.48
	1026A	1027A	0.20	21	1.18	122	3.58	1.42		18.09					10.99	0.20	19.27	6.36	18.77	74.00	450.00	0.12	98.76	0.19	0.62	0.48
	1027A	1028A			1.18	122				18.09					10.99	0.00	19.27	6.36	17.35	11.00	450.00	0.12	98.76	0.18	0.62	0.47
	1028A	1029A	0.40	41	1.58	163	3.54	1.87		18.09					10.99	0.40	19.67	6.49	19.35	100.00	450.00	0.12	98.76	0.20	0.62	0.48
	1029A	1037A	0.60	61	2.18	224	3.50	2.54		18.09					10.99	0.60	20.27	6.69	20.22	94.00	450.00	0.12	98.76	0.20	0.62	0.48
	1037A	1040A	3.30	334	5.48	558	3.36	6.08		18.09					10.99	3.30	23.57	7.78	24.85	79.00	450.00	0.12	98.76	0.25	0.62	0.51
	1040A	1049A	1.45	147	6.93	705	3.31	7.56		18.09					10.99	1.45	25.02	8.26	26.81	79.00	450.00	0.12	98.76	0.27	0.62	0.52
	1049A	1058A	4.50	455	11.43	1160	3.21	12.07		18.09					10.99	4.50	29.52	9.74	32.80	81.50	450.00	0.12	98.76	0.33	0.62	0.56
PARK	1058A	1059A	5.80	586	17.23	1746	3.10	17.54		18.09			1.27	1.27	11.20	7.07	36.59	12.07	40.81	120.50	450.00	0.12	98.76	0.41	0.62	0.59
	1059A	1090A	0.70	71	17.93	1817	3.09	18.20		18.09				1.27	11.20	0.70	37.29	12.31	41.71	123.00	450.00	0.12	98.76	0.42	0.62	0.59
PARK, EXT FUT			4.30	620	22.23	2437			5.27	23.36			0.56	1.83		10.13	47.42									
	1090A	1095A	12.65	1278	34.88	3715	2.89	34.79		23.36				1.83	14.49	12.65	60.07	19.82	69.10	75.00	450.00	0.15	110.42	0.63	0.69	0.73
Contribution from Trunk 2, MH 1094A-1095A					10.74	1478				0.00				4.64			15.38									
	1095A	1096A	0.50	51	46.12	5244	2.78	47.24		23.36				6.47	15.24	0.50	75.95	25.06	87.54	79.00	525.00	0.12	148.98	0.59	0.69	0.72
	1096A	1107A	2.26	229	48.38	5473	2.77	49.13		23.36				6.47	15.24	2.26	78.21	25.81	90.18	86.50	525.00	0.10	136.00	0.66	0.63	0.67
	1107A	1108A	4.24	429	52.62	5902	2.74	52.41		23.36				6.47	15.24	4.24	82.45	27.21	94.86	87.00	525.00	0.42	278.71	0.34	1.29	1.16
PARK	1108A	1132A	0.06	8	52.68	5910	2.74	52.48		23.36			1.16	7.63	15.43	1.22	83.67	27.61	95.52	31.50	525.00	0.10	136.00	0.70	0.63	0.68
CONTRIBUTION FROM EXTERNAL			0.96	144	53.64	6054	2.73	53.56	4.42	27.78				7.63		5.38	89.05									
			0.95	137	54.59	6191				27.78				7.63		0.95	90.00									
	1132A	1133A	9.80	990	64.39	7181	2.68	62.37		27.78				7.63	18.11	9.80	99.80	32.93	113.41	15.50	600.00	0.10	194.17	0.58	0.69	0.72
	1133A	1A (B.O.)			64.39	7181	2.68	62.37		27.78				7.63	18.11	0.00	99.80	32.93	113.41	15.50	600.00	0.10	194.17	0.58	0.69	0.72
To MH 1A By Others																										
Trunk 2																										
PARK	1203A	1204A	0.40	58	0.40	58				0.00			4.64	4.64	0.75	5.04	5.04	1.66	2.41	81.00	300.00	0.65	77.96	0.03	1.10	0.48
	1204A	1205A	0.89	129	1.29	187	3.53	2.14		0.00				4.64	0.75	0.89	5.93	1.96	4.85	111.00	300.00	0.20	43.25	0.11	0.61	0.40
	1205A	1206A	0.83	120	2.12	307	3.46	3.44		0.00				4.64	0.75	0.83	6.76	2.23	6.42	74.00	300.00	0.20	43.25	0.15	0.61	0.44
	1206A	1207A	1.03	149	3.15	456	3.40	5.02		0.00				4.64	0.75	1.03	7.79	2.57	8.34	75.00	300.00	0.20	43.25	0.19	0.61	0.47
	1207A	1208A			3.15	456				0.00				4.64	0.75	0.00	7.79	2.57	3.32	100.50	300.00	0.20	43.25	0.08	0.61	0.37

LICENSED PROFESSIONAL ENGINEER
K. MITIC
100122349
OCT. 18, 2019
PROVINCE OF ONTARIO

DESIGN PARAMETERS

Park Flow =	9300	L/ha/da	0.108	Harmon Correction Factor =	0.800		
Average Daily Flow =	280	l/p/day		Industrial Peak Factor = as per MOE Graph			
Comm/Inst Flow =	35000	L/ha/da	0.405	Extraneous Flow =	0.330	L/s/ha	
Industrial Flow =	35000	L/ha/da	0.405	Minimum Velocity =	0.600	m/s	
Max Res. Peak Factor =	4.00			Manning's n = (Conc)	0.013	(Pvc)	0.013
Commercial/Inst./Park Peak Factor =	1.50	if ICI >20%	1.00	if ICI <20%			
Mixed Use	35000.00	L/ha/da					
Institutional =	0.405	l/s/Ha					

Designed: R.B	PROJECT: Orleans EUC MUC		
Checked: K.M	LOCATION: City of Ottawa		
Dwg. Reference:	File Ref: 14-733	Date: October, 2019	Sheet No. 1 of 2

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D1

SANITARY SEWER DESIGN SHEET (PRELIMINARY)

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 118224
Project Name: BMR
Date Prepared: 10/4/2019
Date Revised: 6/8/2021
Input By: Dan Coffey
Reviewed By: Sam Bahia
Drawing Reference: 118224-GP AND 118224-SAN

Legend:
- PROJECT SPECIFIC INFO
- USER DESIGN INPUT
- CUMILATIVE CELL
- CALCULATED DESIGN CELL OUTPUT
- CALCULATED ANNUAL CELL OUTPUT
- CALCULATED RARE CELL OUTPUT
- USER AS-BUILT INPUT

LOCATION				DEMAND																		DESIGN CAPACITY							
				RESIDENTIAL FLOW											INDUSTRIAL / COMMERICAL / INSTITUIONAL FLOW						EXTRANOUS FLOW AREA METHOD		TOTAL DESIGN FLOW	PROPOSED SEWER PIPE SIZING / DESIGN							
STREET	AREA	FROM MH	TO MH	SINGLES	SEMIS/ TOWNS	APARTS	PARK AREA (ha)	POPULATION (in 1000's)	CUMULATIVE POPULATION (in 1000's)	PEAK FACTOR M	AVG POPULATION FLOW Q(q) (L/s)	PEAKED DESIGN POP FLOW Q(p) (L/s)	PEAKED ANNUAL/RARE POP FLOW Q(AR - Res) (L/s)	RESIDENTIAL DRAINAGE AREA (ha.)	CUMULATIVE RES DRAINAGE AREA (ha.)	COMMERICAL / INSTITUIONAL AREA (ha.)	CUMULATIVE COMMERICAL / INSTITUIONAL AREA (ha.)	AVG DESIGN COMMERICAL / INSTITUIONAL FLOW Q (ci) (L/s)	COMMERICAL / INSTITUIONAL PEAK FACTOR	CUMULATIVE ICI DRAINAGE AREA (ha.)	PEAKED DESIGN ICI FLOW Q (CI) (L/s)	CUMULATIVE EXTRANOUS DRAINAGE AREA (ha.)	DESIGN EXTRAN. FLOW Q(e) (L/s)	TOTAL DESIGN FLOW Q(D) (L/s)	LENGTH (m)	PIPE SIZE (mm) AND MATERIAL	PIPE ID ACTUAL (m)	ROUGH. (n)	DESIGN GRADE (%)	CAPACITY (L/s)	FULL FLOW VELOCITY (m/s)	Qpeak Design / Qcap
Street 9	A1	169	165					0.000	0.000	4.00	0.00	0.00	0.00	1.570	1.570	0.000	0.000	0.00	1.00	0.000	0.00	1.570	0.52	0.52	123.7	250 PVC	0.254	0.013	0.25	31.0	0.61	1.7%
	A2, A3	165	163			168		0.353	0.353	4.00	1.14	3.66	1.96	1.160	2.730	0.000	0.000	0.00	1.00	0.000	0.00	2.730	0.90	4.56	72.5	250 PVC	0.254	0.013	0.25	31.0	0.61	14.7%
	A4	163	161		14			0.038	0.391	4.00	1.27	4.05	2.17	0.470	3.200	0.000	0.000	0.00	1.00	0.000	0.00	3.200	1.06	5.11	102.9	250 PVC	0.254	0.013	0.25	31.0	0.61	16.5%
	A5	161	159		4			0.011	0.401	4.00	1.30	4.16	2.23	0.150	3.350	0.000	0.000	0.00	1.00	0.000	0.00	3.350	1.11	5.27	14.1	250 PVC	0.254	0.013	0.50	43.9	0.87	12.0%
	A6	159	151		28			0.076	0.477	3.98	1.55	4.93	2.64	0.150	3.500	0.000	0.000	0.00	1.00	0.000	0.00	3.500	1.16	6.08	112.1	250 PVC	0.254	0.013	0.25	31.0	0.61	19.6%
Street 2	A7	157	155		27			0.073	0.073	4.00	0.24	0.76	0.41	0.760	0.760	0.000	0.000	0.00	1.00	0.000	0.00	0.760	0.25	1.01	102.8	200 PVC	0.203	0.013	0.35	20.2	0.62	5.0%
	A8	155	153		4			0.011	0.084	4.00	0.27	0.87	0.47	0.170	0.930	0.000	0.000	0.00	1.00	0.000	0.00	0.930	0.31	1.17	13.8	200 PVC	0.203	0.013	0.50	24.2	0.75	4.9%
	A9	153	151		10			0.027	0.111	4.00	0.36	1.15	0.62	0.340	1.270	0.000	0.000	0.00	1.00	0.000	0.00	1.270	0.42	1.57	62.5	200 PVC	0.203	0.013	0.35	20.2	0.62	7.7%
Street 2	A10	151	145		8			0.022	0.609	3.93	1.97	6.21	3.32	0.330	5.100	0.000	0.000	0.00	1.00	0.000	0.00	5.100	1.68	7.89	76.3	250 PVC	0.254	0.013	0.25	31.0	0.61	25.4%
Street 1	A12	147	145		14			0.038	0.038	4.00	0.12	0.39	0.21	0.450	0.450	0.000	0.000	0.00	1.00	0.000	0.00	0.450	0.15	0.54	98.1	250 PVC	0.254	0.013	0.25	31.0	0.61	1.7%
	A11	147	EX		25			0.068	0.068	4.00	0.22	0.70	0.38	0.780	0.780	0.000	0.000	0.00	1.00	0.000	0.00	0.780	0.26	0.96	64.5	200 PVC	0.203	0.013	0.65	27.6	0.85	3.5%
Street 3	A13	145	141		9			0.024	0.671	3.90	2.18	6.80	3.64	0.330	5.880	0.000	0.000	0.00	1.00	0.000	0.00	5.880	1.94	8.74	77.3	300 PVC	0.305	0.013	0.20	45.1	0.62	19.4%
	A14	143	141		2			0.005	0.005	4.00	0.02	0.06	0.03	0.080	0.080	0.000	0.000	0.00	1.00	0.000	0.00	0.080	0.03	0.08	16.6	200 PVC	0.203	0.013	1.20	37.5	1.16	0.2%
Street 4	A15	141	139	20				0.068	0.745	3.88	2.41	7.49	4.01	0.800	6.760	0.000	0.000	0.00	1.00	0.000	0.00	6.760	2.23	9.72	113.9	300 PVC	0.305	0.013	0.20	45.1	0.62	21.5%
	A16	139	137	2				0.007	0.752	3.88	2.44	7.55	4.05	0.180	6.940	0.000	0.000	0.00	1.00	0.000	0.00	6.940	2.29	9.84	14.6	300 PVC	0.305	0.013	0.50	71.3	0.98	13.8%
	A18	137	129	6				0.020	0.772	3.87	2.50	7.75	4.15	0.270	7.210	0.000	0.000	0.00	1.00	0.000	0.00	7.210	2.38	10.12	62.8	300 PVC	0.305	0.013	0.20	45.1	0.62	22.4%
Street 3	A18	143	133		6			0.016	0.016	4.00	0.05	0.17	0.09	0.290	0.290	0.000	0.000	0.00	1.00	0.000	0.00	0.290	0.10	0.26	56..5	200 PVC	0.203	0.013	0.65	27.6	0.85	1.0%
Street 5	A19	135	133	3				0.010	0.010	4.00	0.03	0.11	0.06	0.150	0.150	0.000	0.000	0.00	1.00	0.000	0.00	0.150	0.05	0.16	27.7	200 PVC	0.203	0.013	0.65	27.6	0.85	0.6%
Street 5	A20	133	131	7				0.024	0.050	4.00	0.16	0.52	0.28	0.280	0.720	0.000	0.000	0.00	1.00	0.000	0.00	0.720	0.24	0.76	40.4	200 PVC	0.203	0.013	0.35	20.2	0.62	3.7%
	A21	131	129	14				0.048	0.098	4.00	0.32	1.01	0.54	0.560	0.560	0.000	0.000	0.00	1.00	0.000	0.00	0.560	0.18	1.20	84.3	200 PVC	0.203	0.013	0.35	20.2	0.62	5.9%
Street 4	A22	129	127	6				0.020	0.890	3.83	2.88	8.84	4.74	0.330	8.100	0.000	0.000	0.00	1.00	0.000	0.00	8.100	2.67	11.52	73.0	300 PVC	0.305	0.013	0.20	45.1	0.62	25.5%
	A23	127	125	10				0.034	0.924	3.82	3.00	9.16	4.91	0.440	8.540	0.000	0.000	0.00	1.00	0.000	0.00	8.540	2.82	11.98	56.6	300 PVC	0.305	0.013	0.20	45.1	0.62	26.5%
	A24	125	123	2				0.007	0.931	3.82	3.02	9.22	4.94	0.120	8.660	0.000	0.000	0.00	1.00	0.000	0.00	8.660	2.86	12.08	11.2	300 PVC	0.305	0.013	0.50	71.3	0.98	16.9%
	A25	123	121	3				0.010	0.941	3.82	3.05	9.31	4.99	0.150	8.810	0.000	0.000	0.00	1.00	0.000	0.00	8.810	2.91	12.22	23.6	300 PVC	0.305	0.013	0.20	45.1	0.62	27.1%
	A26	121	113	15				0.051	0.992	3.80	3.22	9.78	5.24	0.620	9.430	0.000	0.000	0.00	1.00	0.000	0.00	9.430	3.11	12.89	96.7	300 PVC	0.305	0.013	0.20	45.1	0.62	28.6%
Street 6	A27	119	117	17				0.058	0.058	4.00	0.19	0.60	0.32	0.710	0.710	0.000	0.000	0.00	1.00	0.000	0.00	0.710	0.23	0.83	103.0	200 PVC	0.203	0.013	0.35	20.2	0.62	4.1%
	A28	117	115	2				0.007	0.065	4.00	0.21	0.67	0.36	0.160	0.870	0.000	0.000	0.00	1.00	0.000	0.00	0.870	0.29	0.96	14.0	200 PVC	0.203	0.013	0.50	24.2	0.75	4.0%
	A29	115	113	7				0.024	0.088	4.00	0.29	0.92	0.49	0.330	1.200	0.000	0.000	0.00	1.00	0.000	0.00	1.200	0.40	1.31	63.2	200 PVC	0.203	0.013	0.35	20.2	0.62	6.5%
Street 6	A30	113	105	6				0.020	1.101	3.77	3.57	10.77	5.77	0.290	10.920	0.000	0.000	0.00	1.00	0.000	0.00	10.920	3.60	14.37	72.3	300 PVC	0.305	0.013	0.20	45.1	0.62	31.9%
TO TRUNK SANITARY SEWER																															
Street 8	FUTURE	CAP2	101	113				0.384	0.384	4.00	1.25	3.98	2.13	3.470	3.470	0.000	0.000	0.00	1.00	0.000	0.00	3.470	1.15	5.13	40.4	200 PVC	0.203	0.013	0.35	20.2	0.62	25.3%
	A31	101	103	8				0.027	0.411	4.00	1.33	4.27	2.29	0.500	3.970	0.000	0.000	0.00	1.00	0.000	0.00	3.970	1.31	5.58	12.5	200 PVC	0.203	0.013	0.50	24.2	0.75	23.0%
	A32	103	105	5				0.017	0.428	4.00	1.39	4.44	2.38	0.270	4.240	0.000	0.000	0.00	1.00	0.000	0.00	4.240	1.40	5.84	46.9	200 PVC	0.203	0.013	0.35	20.2	0.62	28.9%
TO TRUNK SANITARY SEWER																															
Street 7	A34	105	107	12				0.041	1.570	3.67	5.09	14.92	7.99	0.500	0.500		0.000	0.00	1.00	0.000	0.00	0.500	0.17	15.09	98.4	300 PVC	0.305	0.013	0.20	45.1	0.62	33.4%
	A35	107	109	2				0.007	1.577	3.66	5.11	14.98	8.02	0.120	0.620	0.000	0.000	0.00	1.00	0.000	0.00	0.620	0.20	15.18	28.3	300 PVC	0.305	0.013	0.20	45.1	0.62	33.7%
	A36, A37	109	111	4			1.000	0.017	1.594	3.66	5.17	15.13	8.10	0.210	0.830	0.000	0.000	0.00	1.00	0.000	0.00	0.830	0.27	15.40	26.6	300 PVC	0.305	0.013	0.20	45.1	0.62	34.1%
	-	111	205	0				0.000	1.594	3.66	5.17	15.13	8.10	0.000	0.830	0.000	0.000	0.00	1.00	0.000	0.00	0.830	0.27	15.40	1.8	300 PVC	0.305	0.013	0.50	71.3	0.98	21.6%
TRUNK SANITARY SEWER																															
Street 7	FUTURE, A33	CAP1	201				6.470	5.473	5.473	2.77	17.74	39.30	21.06	48.380	48.380	40.860	40.860	13.24	1.50	40.860	19.86	89.240	29.45	88.62	36.6	525 CONC	0.533	0.013	0.35	265.4	1.19	33.4%
	-	201	203					0.000	7.002	3.11	22.69	56.40	30.21	0.500	48.880	0.000	40.860	13.24	1.50	40.860	19.86	89.740	29.61	105.87	96.7	525 CONC	0.533	0.013	0.10	141.9	0.63	74.6%
	-	203	205					0.000	8.596	3.02	27.86	67.30	36.05	0.120	49.000	0.000	40.860	13.24	1.50	40.860	19.86	89.860	29.65	116.81	29.2	525 CONC	0.533	0.013	0.10	141.9	0.63	82.3%
	-	205	1A					0.000	8.596	3.02	27.86	67.30	36.05	1.000	50.830	0.000	40.860	13.24	1.50	40.860	19.86	91.690	30.26	117.42	27.7	525 CONC	0.533	0.013	0.10	141.9	0.63	82.8%
TOTALS				264	151	168	7.470		8.604																						

DEMAND EQUATION

Design Parameters:

1. Q(D), Q(A), Q(R) = Q(p) + Q(fd) + Q(ici) + Q(e)
2. Q(p) = (P x q x M x K / 86,400)
3. q Avg capita flow 280 L/per/day (design)
   (L/per/day)= 200 L/per/day (annual and rare)
4. M = Harmon Formula (maximum of 4.0)
5. K = 0.8 (design)
   0.6 (annual and rare)
6. Park flow is considered equivalent to a single unit / ha
   Park Demand = 1 Single Unit Equivalent / Park ha
7. Foundation Drains 0.45 L/s/unit
8. Q(ici) = ICI Area x ICI Flow x ICI Peak
9. Q(e) = 0.33 L/sec/ha (design)
   0.30 L/sec/ha (annual)
   0.55 L/sec/ha (rare)

Definitions:

Q(D) = Peak Design Flow (L/sec) Q(A) = Peak Annual Flow (L/sec) Q(R) = Peak Rare Flow (L/sec)
Q(e) = Extraneous Flow (L/sec)
Q(p) = Population Flow (L/sec)

K = Harmon Correction Factor	Singles	Semis/Towns	Apts (2-BR)
P = Residential Population	3.4	2.7	2.1
Typ Service Diameter (mm)		135	
Typ Service Length (m)	15	15	
I/I Pipe Rate (L/mm dia/m/hr) =	0.007		

Q(fd) = Foundation Flow (L/sec)
Q(ici) = Industrial / Commercial / Institutional Flow (L/sec)

Institutional / Commercial / Industrial		Industrial	Commercial / Institutional	
	Design =	35000	28000	L/gHa/d
	Annual / Rare =	10000	17000	L/gHa/d
ICI Peak *	Design = Std ICI -->	1.0	1.5	* ICI Peak = 1.0 Default, 1.5 if ICI in contributing area is >20% (design only)
	Annual / Rare =	1.0		

NOTES

External Flows to be determined as part of detailed design process. Futher coordination with DSEL required.

CAPACITY EQUATION

Q full= (1/n) A R^(2/3)So^(1/2)

Where : Q full = Capacity (L/s)
n = Manning coefficient of roughness (0.013)
A = Flow area (m^2)
R = Wetter perimenter (m)
So = Pipe Slope/gradient

FOREST VALLEY TRUNK AND ORLEANS CUMBERLAND COLLECTOR CAPACITY ANALYSIS

634-00465

Prepared by:

Stantec Consulting Ltd.
400-1505 Laperriere Avenue
Ottawa ON K1Z 7T1

Prepared for:

City of Ottawa
111 Lisgar Street
4th Floor
Ottawa, ON K1P 1J1

October 2003

Stantec

Distribution:
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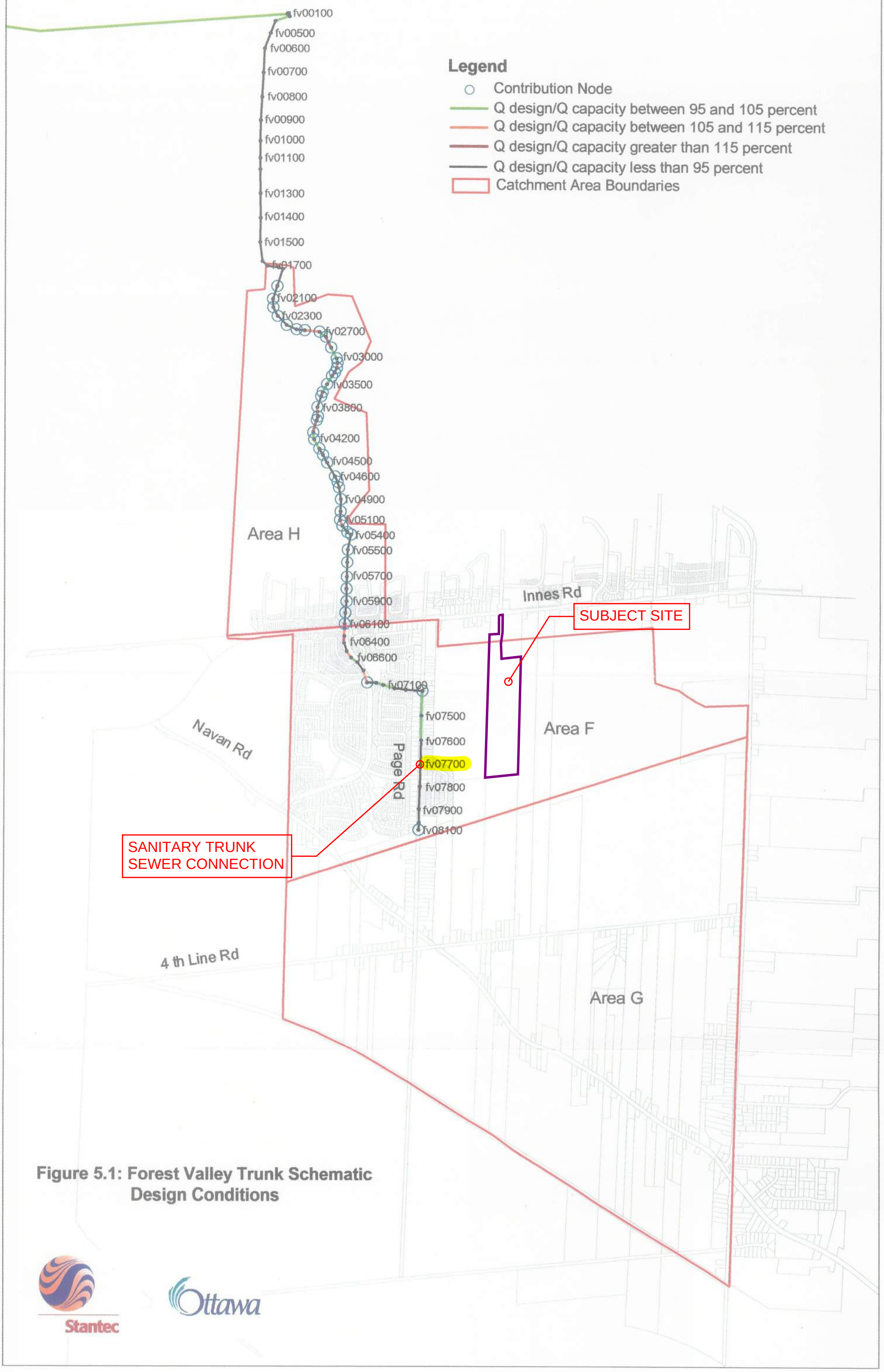


Figure 5.1: Forest Valley Trunk Schematic Design Conditions

Stantec

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DESIGN BRIEF

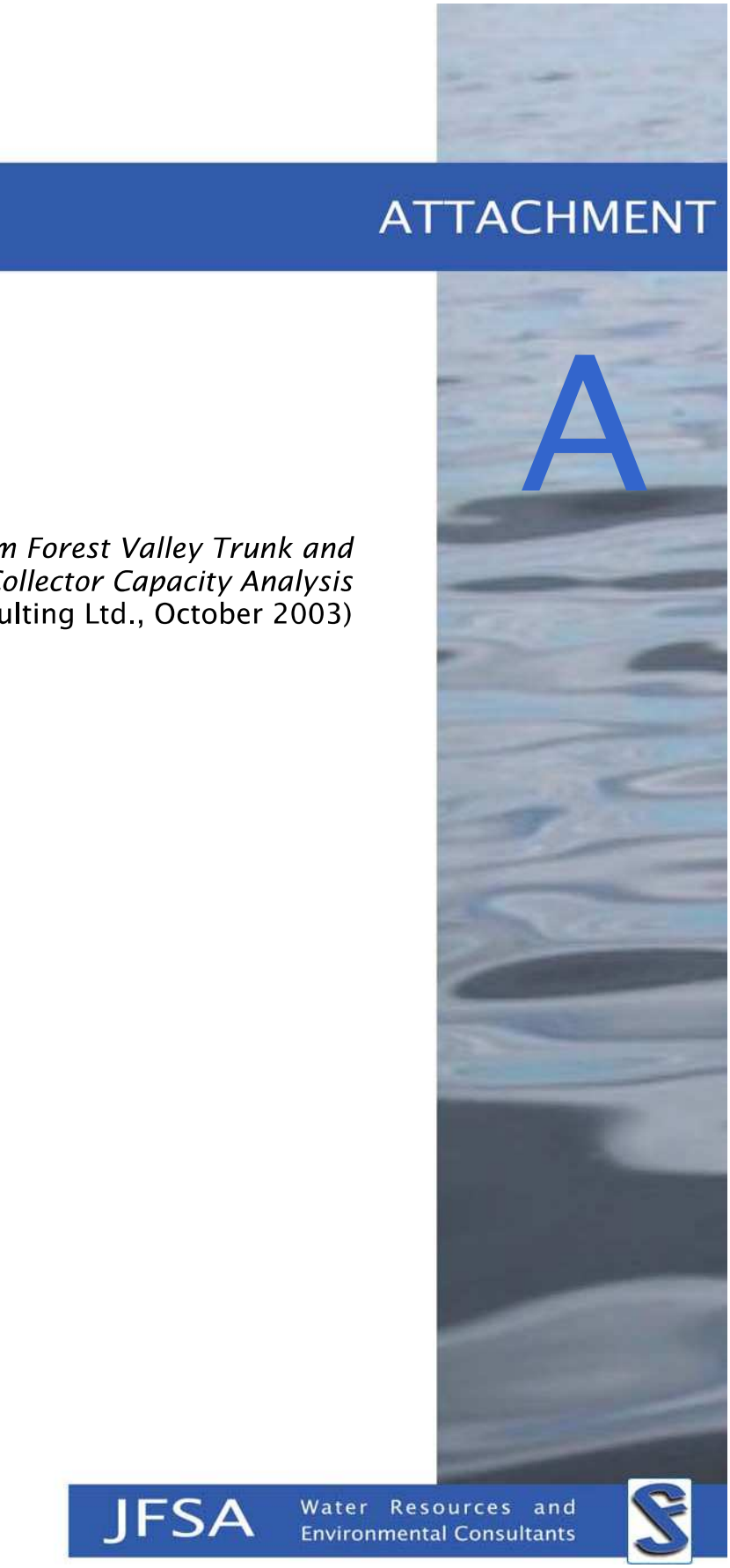
FOR

CAIVAN (ORLEANS VILLAGE) LIMITED
3490 INNES ROAD

CITY OF OTTAWA

PROJECT NO.: 15-881

MAY 2018 – VER 2
© DSEL



ATTACHMENT

A

Excerpts from Forest Valley Trunk and Orleans Cumberland Collector Capacity Analysis
(Stantec Consulting Ltd., October 2003)

JFSA Water Resources and Environmental Consultants

TABLE 5-1
Summary of FVT Wasterwater Flows and HGL

LEGEND
- Catchment Node
- Q/Qcap between 95% and105%
- Q/Qcap between 105% and115%
- Q/Qcap greater than 115%
- Q/Qcap greater than 95% and HGL is above basement elevation (OG-3.3m)

USMH	DSMH	LENGTH	USINV	USOBV	GROUND	USF Elev. (3.3m below OG)	Qcap Manning's (L/s)	Design				Monitored (300Lpcd, 0.50L/s/ha, K=0.60)				Monitored & Design			
								HGL (m)	Surcharge (m)	Q (L/s)	Q/Qc (%)	HGL (m)	Surcharge (m)	Q (L/s)	Q/Qc (%)	HGL (m)	Surcharge (m)	Q (L/s)	Q/Qc (%)
fv05100	fv05000	3,608	78.8	79.7	84.0	80.7	924	79.7	0.00	793	86%	79.7	0.00	661	71%	79.7	0.00	820	89%
fv05200	fv05100	3,646	78.9	79.8	84.3	81.0	731	79.8	0.01	793	109%	79.8	0.00	660	90%	79.8	0.02	819	112%
fv05300	fv05200	3,698	79.1	80.0	84.7	81.4	924	80.0	0.00	793	86%	80.0	0.00	660	71%	80.0	0.00	819	89%
fv05400	fv05300	3,724	79.1	80.0	85.5	82.2	822	80.0	0.00	792	96%	80.0	0.00	659	80%	80.0	0.00	819	100%
fv05500	fv05400	3,821	79.4	80.3	86.9	83.6	924	80.3	0.00	783	85%	80.3	0.00	649	70%	80.3	0.00	807	87%
fv05600	fv05500	3,898	79.6	80.5	87.9	84.6	844	80.5	0.00	783	93%	80.5	0.00	648	77%	80.5	0.00	807	96%
fv05700	fv05600	3,989	79.8	80.7	89.1	85.8	962	80.7	0.00	783	81%	80.7	0.00	648	67%	80.7	0.00	806	84%
fv05800	fv05700	4,063	80.0	80.9	89.0	85.7	864	80.9	0.00	773	89%	80.9	0.00	636	74%	80.9	0.00	794	92%
fv05900	fv05800	4,140	80.2	81.1	88.6	85.3	885	81.1	0.00	773	87%	81.1	0.00	636	72%	81.1	0.00	794	90%
fv06000	fv05900	4,210	80.3	81.2	88.6	85.3	885	81.2	0.00	773	87%	81.2	0.00	636	72%	81.2	0.00	793	90%
fv06100	fv06000	4,280	80.5	81.4	88.9	85.6	822	81.4	0.00	772	94%	81.4	0.00	636	77%	81.4	0.00	793	96%
fv06200	fv06100	4,306	80.5	81.4	88.8	85.5	864	81.4	0.00	772	89%	81.4	0.00	635	74%	81.4	0.00	793	92%
fv06300	fv06200	4,354	80.6	81.5	88.6	85.3	731	81.5	0.01	772	106%	81.5	0.00	635	87%	81.5	0.01	793	109%
fv06400	fv06300	4,397	80.6	81.5	88.5	85.2	653	81.6	0.02	772	118%	81.5	0.00	635	97%	81.6	0.02	793	121%
fv06500	fv06400	4,448	80.8	81.7	88.2	84.9	1016	81.7	0.00	772	76%	81.7	0.00	635	63%	81.7	0.00	793	78%
fv06600	fv06500	4,495	80.8	81.8	88.1	84.8	731	81.8	0.01	772	106%	81.8	0.00	635	87%	81.8	0.01	793	109%
fv06700	fv06600	4,544	80.9	81.8	87.8	84.5	778	81.8	0.00	772	99%	81.8	0.00	635	82%	81.9	0.02	793	102%
fv06800	fv06700	4,609	81.1	82.0	87.7	84.4	885	82.0	0.00	772	87%	82.0	0.00	635	72%	82.0	0.00	793	90%
fv06900	fv06800	4,688	81.2	82.1	87.0	83.7	706	82.1	0.02	772	109%	82.1	0.00	635	90%	82.2	0.03	793	112%
fv07000	fv06900	4,744	81.3	82.3	87.3	84.0	800	82.3	0.00	714	89%	82.3	0.00	561	70%	82.3	0.00	714	89%
fv07100	fv07000	4,791	81.4	82.4	87.6	84.3	680	82.4	0.01	714	105%	82.4	0.00	561	83%	82.4	0.01	714	105%
fv07200	fv07100	4,863	81.6	82.5	87.5	84.2	731	82.5	0.00	714	98%	82.5	0.00	561	77%	82.5	0.00	714	98%
fv07300	fv07200	4,934	81.8	82.7	87.8	84.5	1016	82.7	0.00	714	70%	82.7	0.00	561	55%	82.7	0.00	714	70%
fv07400	fv07300	5,037	81.9	82.9	88.0	84.7	1790	82.9	0.00	714	40%	82.9	0.00	561	31%	82.9	0.00	714	40%
fv07500	fv07400	5,189	82.224	83.138	87.8	84.5	706	83.1	0.00	533	76%	83.1	0.00	458	65%	83.1	0.00	533	76%
fv07600	fv07500	5,342	82.450	83.364	87.7	84.4	731	83.4	0.00	533	73%	83.4	0.00	458	63%	83.4	0.00	533	73%
fv07700	fv07600	5,495	82.608	83.522	87.8	84.5	597	83.5	0.00	533	89%	83.5	0.00	458	77%	83.5	0.00	533	89%
fv07800	fv07700	5,627	82.751	83.665	87.6	84.3	626	83.7	0.00	533	85%	83.7	0.00	458	73%	83.7	0.00	533	85%
fv07900	fv07800	5,766	82.877	83.791	87.1	83.8	1790	83.8	0.00	533	30%	83.8	0.00	458	26%	83.8	0.00	533	30%
fv08000	fv07900	5,852	82.965	83.879	86.4	83.1	1790	83.9	0.00	533	30%	83.9	0.00	458	26%	83.9	0.00	533	30%
fv08100	fv08000	5,897	83.011	83.925	86.0	82.7	597	83.9	0.00	533	89%	83.9	0.00	458	77%	83.9	0.00	533	89%

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B

XPSWMM Model Schematic

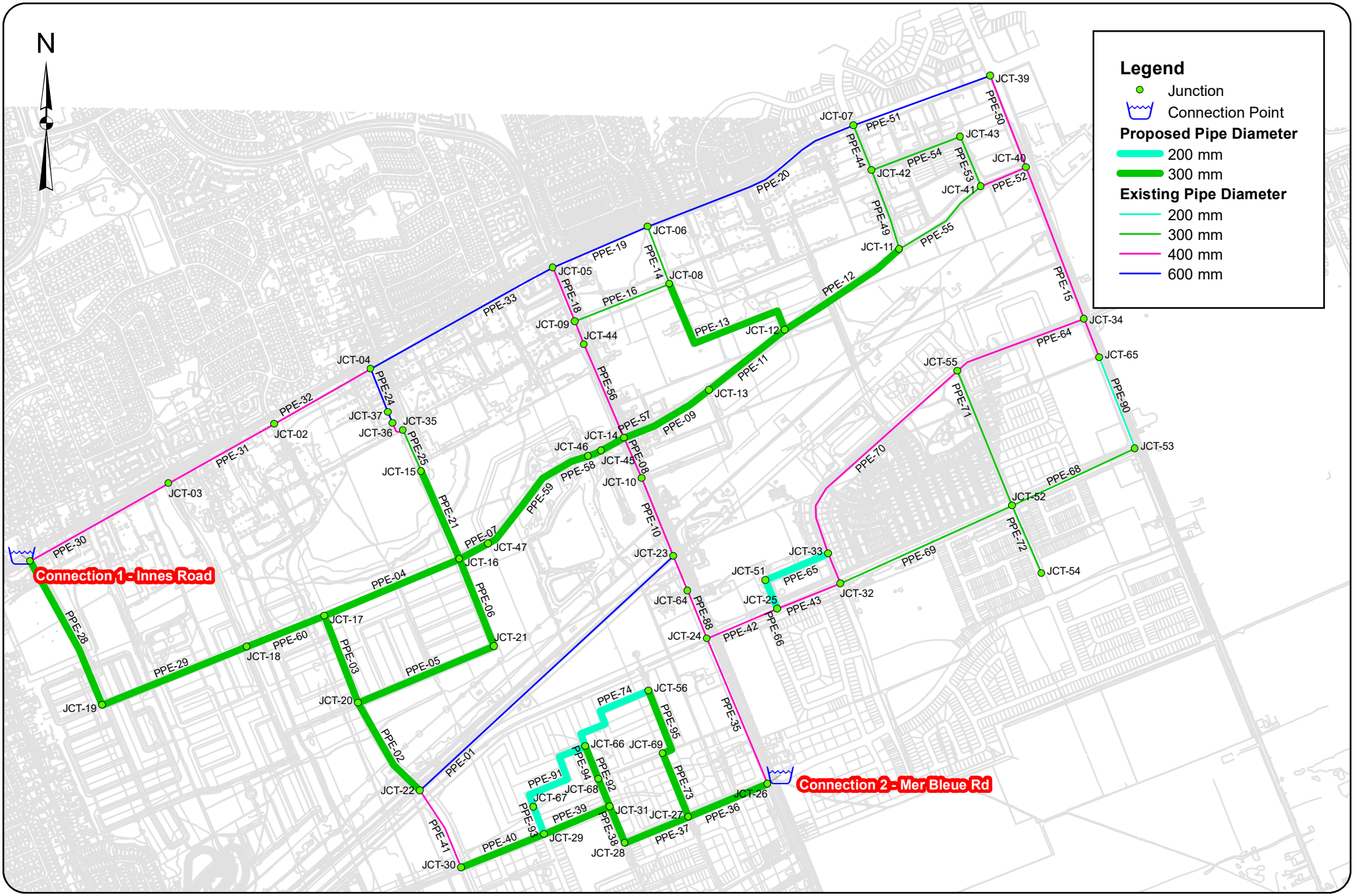
Pipe Data and Hydraulic Simulation Results

JFSA Water Resources and Environmental Consultants

Table B-2: Pipe Data and Hydraulic Simulation Results for the Sanitary Trunk Sewer (Monitored & Design Scenario, 165.2 L/s Redirected from fv07400 to fv07700)

U/S MH	D/S MH	U/S Invert (m)	D/S Invert (m)	Pipe Dia. / Height (mm)	Pipe Length (m)	Pipe Slope (%)	n	U/S MH Cover Elev. (m)	D/S MH Cover Elev. (m)	Design Vel. (m/s)	Design Flow (m^3/s)	Peak Pipe Flow (m^3/s)	Peak / Design Flow	Surcharge U/S [1] (m)	Max. U/S HGL (m)	Max. D/S HGL (m)	Freeboard U/S HGL and MH Cover [2] (m)	Compare to 2003 HGL Results (m)	
																		U/S HGL [3] (m)	Difference (m)
fv08100	fv08000	83.011	82.965	900	45.0	0.1	0.013	86.000	86.400	0.900	0.572	0.533	0.9	-0.166	83.745	83.705	2.255	83.9	-0.155
fv08000	fv07900	82.965	82.877	900	86.0	0.1	0.013	86.400	87.100	0.900	0.572	0.533	0.9	-0.160	83.705	83.631	2.695	83.9	-0.195
fv07900	fv07800	82.877	82.751	900	139.0	0.1	0.013	87.100	87.600	0.854	0.543	0.533	1.0	-0.146	83.631	83.515	3.469	83.8	-0.169
fv07800	fv07700	82.751	82.608	900	132.0	0.1	0.013	87.600	87.800	0.944	0.600	0.533	0.9	-0.136	83.515	83.410	4.085	83.7	-0.185
fv07700	fv07600	82.608	82.450	900	153.0	0.1	0.013	87.800	87.700	0.900	0.572	0.698	1.2	-0.098	83.410	83.194	4.390	83.5	-0.090
fv07600	fv07500	82.450	82.224	900	153.0	0.2	0.013	87.700	87.800	1.102	0.701	0.698	1.0	-0.156	83.194	82.968	4.506	83.4	-0.206
fv07500	fv07400	82.224	81.900	900	152.0	0.2	0.013	87.800	88.000	1.304	0.830	0.698	0.8	-0.156	82.968	82.637	4.832	83.1	-0.132
fv07400	fv07300	81.900	81.800	900	103.0	0.1	0.013	88.000	87.800	0.900	0.572	0.714	1.2	-0.163	82.637	82.442	5.363	82.9	-0.263
fv07300	fv07200	81.800	81.600	900	71.0	0.3	0.013	87.800	87.500	1.506	0.958	0.714	0.7	-0.258	82.442	82.306	5.358	82.7	-0.258
fv07200	fv07100	81.600	81.400	900	72.0	0.3	0.013	87.500	87.600	1.506	0.958	0.714	0.7	-0.194	82.306	82.201	5.194	82.5	-0.194
fv07100	fv07000	81.400	81.300	900	47.0	0.2	0.013	87.600	87.300	1.304	0.830	0.714	0.9	-0.099	82.201	82.133	5.399	82.4	-0.199
fv07000	fv06900	81.300	81.200	900	56.0	0.2	0.013	87.300	87.000	1.207	0.768	0.714	0.9	-0.067	82.133	81.994	5.167	82.3	-0.167
fv06900	fv06800	81.200	81.100	900	79.0	0.1	0.013	87.000	87.700	0.986	0.627	0.793	1.3	-0.106	81.994	81.834	5.006	82.2	-0.206
fv06800	fv06700	81.100	80.900	900	65.0	0.3	0.013	87.700	87.800	1.584	1.008	0.793	0.8	-0.166	81.834	81.713	5.866	82.0	-0.166
fv06700	fv06600	80.900	80.800	900	49.0	0.2	0.013	87.800	88.100	1.273	0.810	0.793	1.0	-0.087	81.713	81.621	6.087	81.9	-0.187
fv06600	fv06500	80.800	80.800	900	47.0	0.0	0.013	88.100	88.200	0.090	0.060	0.793	13.2	-0.079	81.621	81.515	6.479	81.8	-0.179
fv06500	fv06400	80.800	80.600	900	51.0	0.4	0.013	88.200	88.500	1.777	1.131	0.793	0.7	-0.185	81.515	81.422	6.685	81.7	-0.185
fv06400	fv06300	80.600	80.600	900	43.0	0.0	0.013	88.500	88.600	0.090	0.060	0.793	13.2	-0.078	81.422	81.335	7.078	81.6	-0.178
fv06300	fv06200	80.600	80.500	900	48.0	0.2	0.013	88.600	88.800	1.304	0.830	0.793	1.0	-0.165	81.335	81.241	7.265	81.5	-0.165
fv06200	fv06100	80.500	80.500	900	26.0	0.0	0.013	88.800	88.900	0.090	0.060	0.793	13.2	-0.159	81.241	81.174	7.559	81.4	-0.159
fv06100	fv06000	80.500	80.300	900	70.0	0.3	0.013	88.900	88.600	1.520	0.970	0.793	0.8	-0.226	81.174	81.023	7.726	81.4	-0.226
fv06000	fv05900	80.300	80.200	900	70.0	0.1	0.013	88.600	88.600	1.080	0.680	0.793	1.2	-0.177	81.023	80.858	7.577	81.2	-0.177
fv05900	fv05800	80.200	80.000	900	77.0	0.3	0.013	88.600	89.000	1.450	0.920	0.794	0.9	-0.242	80.858	80.669	7.742	81.1	-0.242
fv05800	fv05700	80.000	79.800	900	74.0	0.3	0.013	89.000	89.100	1.480	0.940	0.794	0.8	-0.231	80.669	80.500	8.331	80.9	-0.231
fv05700	fv05600	79.800	79.600	900	91.0	0.2	0.013	89.100	87.900	1.330	0.850	0.806	0.9	-0.200	80.500	80.296	8.600	80.7	-0.200
fv05600	fv05500	79.600	79.400	900	77.0	0.3	0.013	87.900	86.900	1.450	0.920	0.807	0.9	-0.204	80.296	80.126	7.604	80.5	-0.204
fv05500	fv05400	79.400	79.100	900	97.0	0.3	0.013	86.900	85.500	1.580	1.010	0.807	0.8	-0.174	80.126	79.840	6.774	80.3	-0.174
fv05400	fv05300	79.100	79.100	900	26.0	0.0	0.013	85.500	84.700	0.090	0.060	0.819	13.7	-0.160	79.840	79.744	5.660	80.0	-0.160
fv05300	fv05200	79.100	78.900	900	52.0	0.4	0.013	84.700	84.300	1.760	1.120	0.819	0.7	-0.256	79.744	79.615	4.956	80.0	-0.256
fv05200	fv05100	78.900	78.800	900	38.0	0.3	0.013	84.300	84.000	1.460	0.930	0.819	0.9	-0.185	79.615	79.513	4.685	79.8	-0.185
fv05100	fv05000	78.800	78.700	900	53.0	0.2	0.013	84.000	84.400	1.240	0.790	0.820	1.0	-0.187	79.513	79.383	4.487	79.7	-0.187
fv05000	fv04900	78.700	78.500	900	76.0	0.3	0.013	84.400	84.800	1.460	0.930	0.820	0.9	-0.217	79.383	79.198	5.017	79.6	-0.217
fv04900	fv04800	78.500	78.300	900	74.0	0.3	0.013	84.800	84.300	1.480	0.940	0.822	0.9	-0.202	79.198	79.033	5.602	79.4	-0.202
fv04800	fv04700	78.300	78.200	900	36.0	0.3	0.013	84.300	84.300	1.500	0.950	0.822	0.9	-0.167	79.033	78.956	5.267	79.2	-0.167
fv04700	fv04600	78.200	78.100	900	38.0	0.3	0.013	84.300	84.400	1.460	0.930	0.822	0.9	-0.144	78.956	78.882	5.344	79.1	-0.144
fv04600	fv04500	78.100	77.900	900	81.0	0.3	0.013	84.400	84.800	1.410	0.900	0.823	0.9	-0.118	78.882	78.735	5.518	79.0	-0.118
fv04500	fv04400	77.900	77.800	900	48.0	0.2	0.013	84.800	84.400	1.300	0.830	0.823	1.0	-0.065	78.735	78.648	6.065	78.8	-0.065
fv04400	fv04300	77.800	77.700	900	41.0	0.2	0.013	84.400	84.000	1.410	0.890	0.828	0.9	-0.052	78.648	78.572	5.752	78.7	-0.052
fv04300	fv04200	77.700	77.500	900	55.0	0.4	0.013	84.000	84.500	1.720	1.090	0.883	0.8	-0.028	78.572	78.443	5.428	78.6	-0.028
fv04200	fv04100	77.500	77.400	900	43.0	0.2	0.013	84.500	84.600	1.370	0.870	0.883	1.0	0.043	78.443	78.329	6.057	78.4	0.043
fv04100	fv04000	77.400	77.300	900	79.0	0.1	0.013	84.600	84.100	1.010	0.640	0.884	1.4	0.029	78.329	78.140	6.271	78.4	-0.071
fv04000	fv03900	77.300	77.200	900	21.0	0.5	0.013	84.100	83.900	1.960	1.250	0.889	0.7	-0.060	78.140	78.088	5.960	78.2	-0.060
fv03900	fv03800	77.200	77.100	900	61.0	0.2	0.013	83.900	83.600	1.150	0.730	0.889	1.2	-0.012	78.088	77.934	5.812	78.2	-0.112
fv03800	fv03700	77.100	76.900	900	71.0	0.3	0.013	83.600	83.600	1.510	0.960	0.891	0.9	-0.066	77.934	77.781	5.666	78.0	-0.066
fv03700	fv03600	76.900	76.900	900	27.0	0.0	0.013	83.600	83.700	0.090	0.060	0.892	14.9	-0.019	77.781	77.709	5.819	77.9	-0.119
fv03600	fv03500	76.900	76.800	900	55.0	0.2	0.013	83.700	84.000	1.210	0.770	0.893	1.2	-0.091	77.709	77.583	5.991	77.9	-0.191
fv03500	fv03400	76.800	76.600	900	59.0	0.3	0.013	84.000	83.800	1.660	1.050	0.895	0.9	-0.117	77.583	77.458	6.417	77.7	-0.117

Appendix E
Water Demand Calculations and Hydraulic Modeling



GeoAdvice Engineering Inc.

Project: **Hydraulic Capacity and Modeling Analysis East Urban Community Mixed-Use Centre Development**
Client: **David Schaeffer Engineering Ltd.**
Date: **July 2018**
Created by: **AM**
Reviewed by: **WdS**

DISCLAIMER: GeoAdvice does not warrant in any way the accuracy and completeness of the information shown on this map. Field verification of the accuracy and completeness of the information shown on this map is the sole responsibility of the user.

0 400 800
Meters

Site Layout and Connection Points

Figure 1.1
B5

Boundary Conditions for BMR Lands

Date Provided September-19

Scenario	Demand	
	L/min	L/s
Average Daily Demand	306.06	5.101
Maximum Daily Demand	765.06	12.751
Peak Hour	1683.18	28.053
Fire Flow Demand #1	10020	167
Fire Flow Demand #2	13020	217
Fire Flow Demand #3	15000	250

of connections 2

Location:



Results:

Connection 1 - Jargeau Road

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.9	61.0
Peak Hour	127.0	55.4
Max Day plus Fire 1	122.5	49.1
Max Day plus Fire 3	116.5	40.5

[1] Ground Elevation = 88.0 m

Max Day Plus Fire 2 = 118.9, 43.9

Connection 2 - Beaugency Street

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.9	61.0
Peak Hour	127.0	55.4
Max Day plus Fire 1	120.9	46.8
Max Day plus Fire 3	113.2	35.9

[1] Ground Elevation = 88.0 m

Max Day Plus Fire 2 = 116.3, 40.2

Connection 3 - Innes Rd (Optional)

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.9	56.4
Peak Hour	127.0	50.9
Max Day plus Fire 1	127.1	51.0
Max Day plus Fire 3	126.0	49.5

[1] Ground Elevation = 91.2 m

Max Day Plus Fire 2 = 126.4, 50.1

Notes:

1. Please interpolate to estimate HGL elevations at fire flow demand 2.

Disclaimer

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

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 118224
Project Name: The Commons (3610 Innes Road)
Date: 6/24/2021
Input By: BCS
Reviewed By: BHB

Legend

Building Description: Lots 24 to 59 - Single Family
Wood frame

Step			Input		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Modified Fire resistive construction (2 hrs)		0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	3297			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**6,594**	
	F	**Base fire flow without reductions**				**27,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**22,950**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	No	-30%		**0**
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	3.1 - 10 m		20%	**13,770**
		East Side	20.1 - 30 m		10%	
		South Side	10.1 - 20 m		15%	
		West Side	10.1 - 20 m		15%	
				Cumulative Total	**60%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**37,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**617**
				or	USGPM	9,775
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	8.5
		Required Volume of Fire Flow (m^3)			m^3	18870

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 118224
Project Name: The Commons (3610 Innes Road)
Date: 6/24/2021
Input By: BCS
Reviewed By: BHB

Legend

Building Description: Block 114 to 120
Wood frame

Step			Input		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Modified Fire resistive construction (2 hrs)		0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	4500			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**9,000**	
	F	**Base fire flow without reductions**				**31,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**26,350**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	No	-30%		**0**
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	3.1 - 10 m		20%	**14,493**
		East Side	10.1 - 20 m		15%	
		South Side	20.1 - 30 m		10%	
		West Side	20.1 - 30 m		10%	
				Cumulative Total	**55%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**41,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**683**
				or	USGPM	10,832
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	9.5
		Required Volume of Fire Flow (m^3)			m^3	23370

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 118224
Project Name: The Commons (3610 Innes Road)
Date: 6/24/2021
Input By: BCS
Reviewed By: BHB

Legend

Building Description: Lots 20 to 23, 146 to 151 - Single Family (contiguous block basis)
Wood frame

Step			Input		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Modified Fire resistive construction (2 hrs)		0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	1570			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**3,140**	
	F	**Base fire flow without reductions**				**18,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**15,300**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	No	-30%		**0**
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	10.1 - 20 m		15%	**6,120**
		East Side	10.1 - 20 m		15%	
		South Side	> 45.1m		0%	
		West Side	20.1 - 30 m		10%	
				Cumulative Total	**40%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**21,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**350**
				or	USGPM	5,548
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	4.5
		Required Volume of Fire Flow (m^3)			m^3	5670

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 118224
Project Name: The Commons (3610 Innes Road)
Date: 6/24/2021
Input By: BCS
Reviewed By: BHB

Legend

Building Description: Lots 1 to 11, 91 to 97 - Single Family (contiguous block basis)
Wood frame

Step			Input		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Modified Fire resistive construction (2 hrs)		0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	2826			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**5,652**	
	F	**Base fire flow without reductions**				**25,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**21,250**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	No	-30%		**0**
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	20.1 - 30 m		10%	**8,500**
		East Side	20.1 - 30 m		10%	
		South Side	20.1 - 30 m		10%	
		West Side	20.1 - 30 m		10%	
				Cumulative Total	**40%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**30,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**500**
				or	USGPM	7,926
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	7
		Required Volume of Fire Flow (m^3)			m^3	12600

FUS - Fire Flow Calculations

As per 1999 Fire Underwriter's Survey Guidelines

NOVATECH
Engineers, Planners & Landscape Architects

Novatech Project #: 118224
Project Name: The Commons (3610 Innes Road)
Date: 6/24/2021
Input By: BCS
Reviewed By: BHB

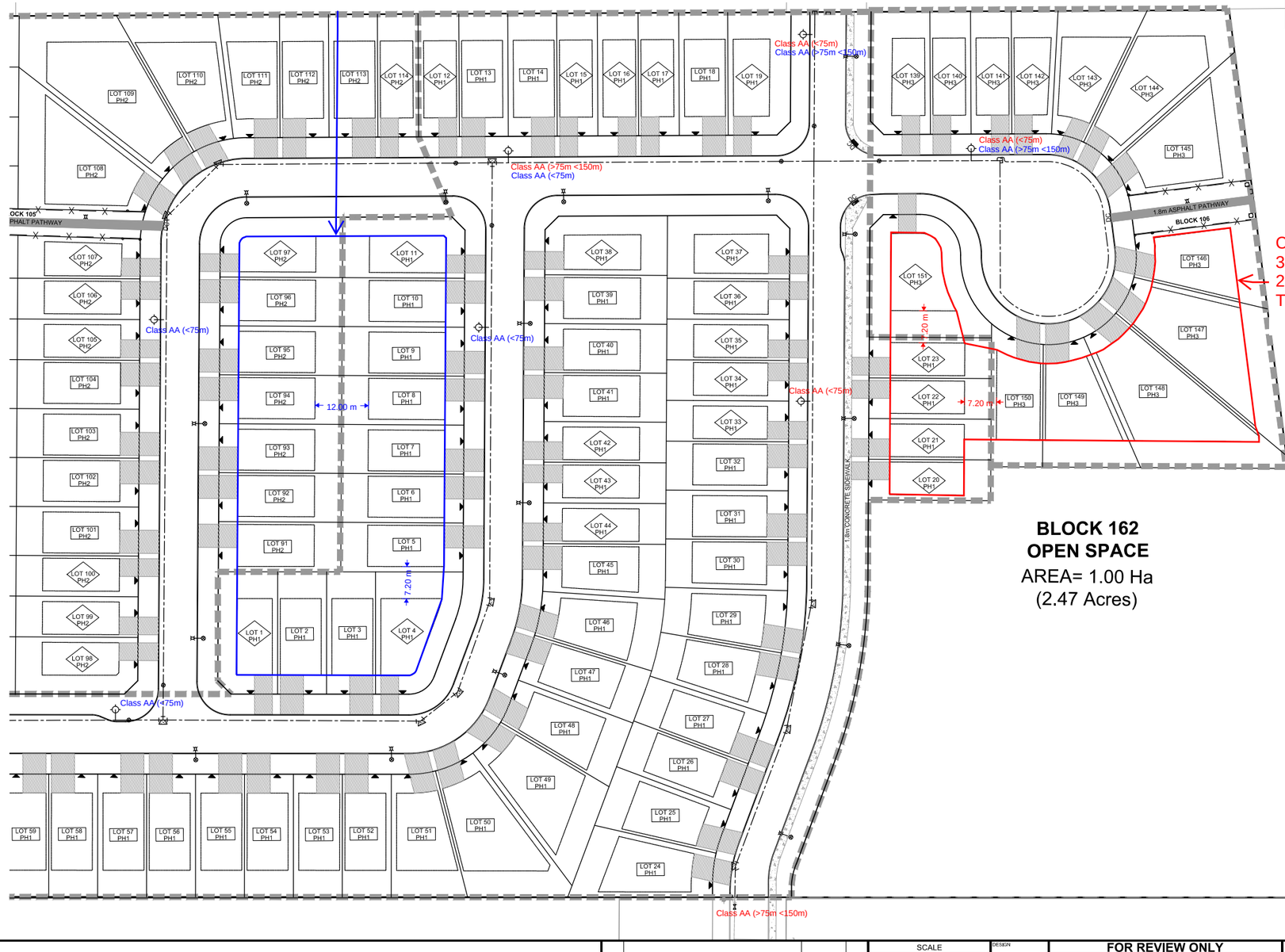
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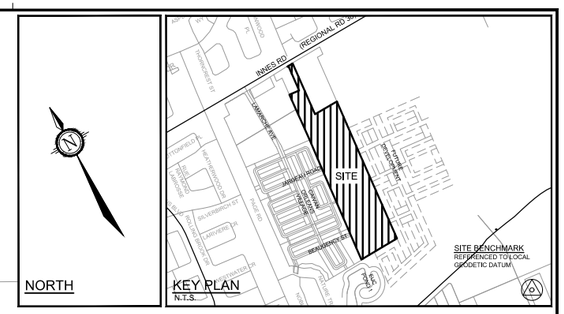
Building Description: Block 102 - Townhouse Block (contiguous block basis)
Wood frame

Step			Input		Value Used	Total Fire Flow (L/min)
Base Fire Flow						
1	**Construction Material**			**Multiplier**		
	Coefficient related to type of construction **C**	Wood frame	Yes	1.5	1.5	
		Ordinary construction		1		
		Non-combustible construction		0.8		
		Modified Fire resistive construction (2 hrs)		0.6		
		Fire resistive construction (> 3 hrs)		0.6		
2	**Floor Area**					
	A	Building Footprint (m^2)	875			
		Number of Floors/Storeys	2			
		Area of structure considered (m^2)			**1,750**	
	F	**Base fire flow without reductions**				**14,000**
		F = 220 **C** (**A**)$^{0.5}$				
Reductions or Surcharges						
3	**Occupancy hazard reduction or surcharge**			**Reduction/Surcharge**		
	(1)	Non-combustible		-25%	-15%	**11,900**
		Limited combustible	Yes	-15%		
		Combustible		0%		
		Free burning		15%		
		Rapid burning		25%		
4	**Sprinkler Reduction**			**Reduction**		
	(2)	Adequately Designed System (NFPA 13)	No	-30%		**0**
		Standard Water Supply	No	-10%		
		Fully Supervised System	No	-10%		
				Cumulative Total	**0%**	
5	**Exposure Surcharge (cumulative %)**				**Surcharge**	
	(3)	North Side	0 - 3 m		25%	**7,735**
		East Side	30.1- 45 m		5%	
		South Side	20.1 - 30 m		10%	
		West Side	0 - 3 m		25%	
				Cumulative Total	**65%**	
Results						
6	**(1) + (2) + (3)**	**Total Required Fire Flow, rounded to nearest 1000L/min**			**L/min**	**20,000**
		(2,000 L/min < Fire Flow < 45,000 L/min)		or	L/s	**333**
				or	USGPM	5,284
7	**Storage Volume**	Required Duration of Fire Flow (hours)			Hours	4.5
		Required Volume of Fire Flow (m^3)			m^3	5400

FIGURE E4

Contiguous Block 2 - Required Fire Flow = 30000 L/min
4 Class AA - (<75m) Hydrants = 22800 L/min
2 Class AA - (>75m <150m) Hydrants = 7600 L/min
Total Contribution to Required Fire Flow = 30400 L/min





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

No.	REVISION	DATE	BY

SCALE 1:500

1:500
0 5 10 15 20

DESIGN BR
CHECKED BCS
DRAWN BR
CHECKED BCS
APPROVED BHB

FOR REVIEW ONLY

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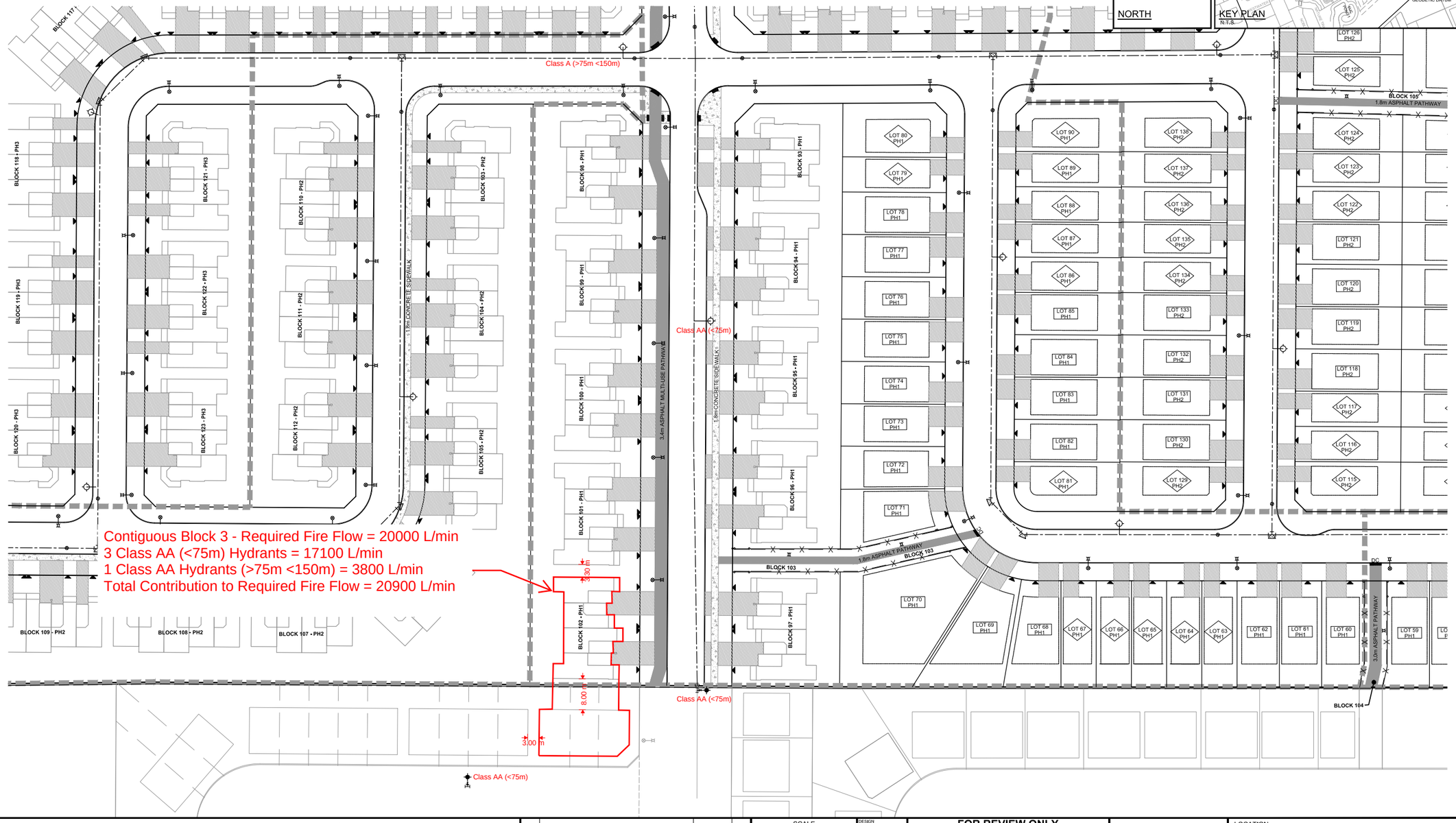
LOCATION
CITY OF OTTAWA
THE COMMONS

DRAWING NAME

PROJECT No. 118224-00
REV REV # 1
DRAWING No.

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FIGURE E5



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

PRELIMINARY

No.	REVISION	DATE	BY

SCALE 1:500

1:500
0 5 10 15 20

DESIGN BR
CHECKED BCS
DRAWN BR
CHECKED BCS
APPROVED BHB

FOR REVIEW ONLY

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Website www.novatech-eng.com

LOCATION
CITY OF OTTAWA
THE COMMONS

DRAWING NAME

PROJECT No. 118224-00
REV REV # 1
DRAWING No.

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1. Background

On behalf of the City of Ottawa, the National Research Council of Canada (NRC) evaluated the City's hydrant spacing guidelines in relation to Required Fire Flow (RFF) as calculated using the Fire Underwriters Survey (FUS) methodology. This work lead to the development of a procedure to be used to establish the appropriate sizing of, and hydrant spacing on, dead-end watermains. This procedure may also be used as an optional watermain network design method to optimize watermain sizing based on RFF and standard hydrant spacing.

The procedure is partially based on the NFPA 1: Fire Code (NFPA1) and the City of Ottawa existing hydrant classification practice (refer to **Attachment A** at the end of this appendix for relevant excerpts of the Fire Code).

2. Rationale for Guideline

Given a Required Fire Flow (RFF) for a certain asset/structure/building, proper planning must ensure that there is a sufficient number of hydrants at sufficient proximities to actually provide the RFF. Both the capacity of the hydrants and their proximity to the asset/structure/building must be considered. Pressure losses (due to friction) in firehoses are proportional to the firehose length. Therefore, the actual fire flow delivered by the nozzle at the end of a very long firehose will be less compared to a short firehose connected to the same hydrant. Table 1 provides conservative values for hydrant fire flow capacity adjusted for firehose length.

3. Hydrant Capacity Requirement

For the purposes of this guidelines, the aggregate fire flow capacity of all contributing fire hydrants within 150 m of a building/asset/structure[1], measured in accordance with Table 1, shall be not less than the RFF.

4. Standard Practice

For the vast majority of developments, hydrant spacing as indicated in Section 4.5, Table 4.9, Ottawa Design Guidelines – Water Distribution, are sufficient to meet the RFF. This has been verified by evaluating approved development plans representing a

[1] Although NFPA 1 considers hydrant contribution at distances of up to 1000ft (305 m), Ottawa Fire Services (OFS) would need two pumpers to deliver flow from such a distance (one pumper midway – acting as a booster). Moreover, OFS cautioned that some redundancy is advisable to account for accessibility limitations in emergency situations, wind effects, etc. Therefore 150 m was considered as the maximum contributing distance

range of land uses and configurations. However, in some instances involving dead-end watermains, standard spacing requirements may not be sufficient to meet RFF.

Standard design practice involves systematic checking of design fire flows at every node in hydraulic models of proposed water distribution systems. Normally the entire design fire flow is applied to each node in succession. Nodes are typically at water main junctions rather than actual hydrant locations. This significantly simplifies the design process and the current software packages that are normally used for this purpose have been developed based on this practice. The "point load assumption" produces a conservative design.

Table 1. Maximum flow to be considered from a given hydrant

Hydrant Class	Distance to asset/structure/building (m)[a]	Contribution to required fire flow (L/min)[b]
AA	≤ 75	5,700
	> 75 and ≤ 150	3,800
A	≤ 75	3,800
	> 75 and ≤ 150	2,850
B	≤ 75	1,900
	> 75 and ≤ 150	1,500
C	≤ 75	800
	> 75 and ≤ 150	800

[a] Distance of contributing hydrant from the structure, measured in accordance with NFPA 1 (Appendix A).

[b] Maximum flow contribution to be considered for a given asset/structure/building, at a residual pressure of 20 psi, measured at the location of the main, at ground level.

4. Intended Application of Guideline

The intent of this procedure is to:

- Determine the appropriate sizing of dead end watermains and associated hydrant requirements.
- Provide an optional approach to local watermain network sizing that will assist the designer in determining the minimum pipe sizing needed to meet RFF.

The procedure permits the designer to: (a) reconcile available hydrant flow with computed RFFs, and (b) allow the distribution of RFFs along multiple hydrants, rather

than consider RFF to be a point flow. The application of this protocol may result in reduced watermain diameters compared to those determined based on a traditional design approach. Caution is required in the application of the procedure to ensure that the transmission function of any watermains identified in a Master Servicing Study is not compromised. Normally, watermains 300mm in diameter and larger that are identified in such studies would not be considered for resizing.

5. Application Procedure

5.1 Rated hydrants

The procedure described here would apply to an existing watermain network with existing hydrants (i.e., re-development or infill in existing neighborhoods):

- Identify critical zones within the (re)development area, e.g., high RFF, dead ends, small diameter watermains, low C factor, and/or high geographic elevation zones.
- For the critical zones use Table 1 to examine if there are sufficient hydrants to deliver the RFF (following procedure described in 5.3).
- If hydrant capacity is insufficient, then consider either:
    - adding hydrants as appropriate;
    - determine if the existing hydrants can be upgraded to higher rating; or
    - upgrade existing watermains.

5.2 Un-rated hydrants

There are currently about 24,800 hydrants in the City of Ottawa, of which about 78% are rated. Of the rated hydrants, 96% are AA (Blue), 3% are A (Green). Many of the un-rated hydrants are located in old parts of the City, often installed on water mains with minimum diameter of 6" (150 mm), and would be likely to have a low rating.

Based on a review of hydrants that have been installed as part of recent urban development, approximately 99% of those which were rated are rated AA, and only 1% are rated A.

5.2.1 Un-rated Existing Hydrants

In cases where fire flow is to be evaluated in areas with an established water distribution network and with existing fire hydrants (i.e., re-development or infill in existing neighborhoods), all un-rated hydrants should be tested and rated in accordance with NFPA standard 291. The procedure described in Section 5.1 can then be followed to complete the design.

5.2.2 Planned hydrants

Planned hydrants cannot be tested for rating because they have not been installed yet. Moreover, the rating of a hydrant is an intrinsic property of the hydrant and can therefore not be directly evaluated by simulation. Based on the statistics cited previously, it can be assumed for design purposes that all planned hydrants are AA. However, there could be a situation where the proposed network might not have sufficient capacity to supply 5,700 L/min to a AA-rated hydrant in a specific area. Hydraulic analysis is required to confirm that the distribution network is capable of providing the hydrants with the fire flows in Table 1.

5.3 Hydrant Placement and Watermain Size Optimization

Ottawa design guidelines for watermain sizing and hydrant placement (Section 4) stipulate that the RFF be added to the average hourly rate of a peak day demand. This fire flow is added to hydraulic nodes in the vicinity of the planned development, while ensuring that the residual pressure is at least 140 kPa (measured at the location of the main, at ground level).[2] The following procedure is used to optimize watermain sizing and hydrant placement based on the RFF.

- Place hydrants throughout the development area according to the current Ottawa design guidelines.
- Size water mains and locate hydrants according to standard design procedures. Assume all hydrants are AA-rated.
- Identify the most critical zones in the development area, e.g. highest required fire flows, dead ends, longest distances between junctions, and/or highest elevation. Within these critical zones identify critical structures, i.e. those with highest RFF or greatest distance from proposed hydrant locations. Identify the closest hydrants to these buildings.
- For each critical structure, distribute the RFF according to Table 1 (i.e., assign a flow of 5,700 L/min to all hydrants with a distance of less or equal to 75 m from the test property and 3,800 L/min to all hydrants with a distance of more than 75 m but less or equal to 150 m from the test property) These hydrants are to be represented as hydrant-nodes in the network model, where the hydrant lateral would connect to the proposed water main.

---

[2] At the time when this protocol was proposed, the City of Ottawa had in effect Technical Bulletin ISDTB 2014-02, whereby RFF may be capped at 10,000 L/min for single detached dwellings (with a minimum 10 m separation between the backs of adjacent units and for side-by-side town and row houses that comply with the OBC Div. B, subsection 3.1.10 requirement (compartments of no more than 600 m^2 area).

- For each critical structure, run a single fire flow simulation ensuring that the RFF is provided by hydrants within 150 m distance from the test property, with a minimum residual pressure of 140 kPa.
- If the required residual pressure cannot be achieved, consider either re-sizing of pipes, and/or re-spacing of hydrants.

The above procedure is optional except for dead-end watermains servicing cul-de-sacs because (a) based on standard spacing requirements, there would often be insufficient fire flow provided and (b) the watermain would otherwise could be sized larger than necessary and lead to excessive water age and on-going flushing requirements.

Irrespective of the above, if the RFF is equal to or less than 10,000 L/min, then:

- where the distance between two adjacent hydraulic nodes is greater than the inter-hydrant spacing allowed in the guideline, a hydraulic node should be added halfway between the two nodes, and proceed with fire flow simulations to verify watermain sizing, ensuring that the simulation considers RFF at the new hydraulic node.

Attachment A—Excerpts from NFPA 1 Fire Code (2015 Edition)

18.5 Fire Hydrants.

18.5.1 Fire Hydrant Locations and Distribution. Fire hydrants shall be provided in accordance with Section 18.5 for all new buildings, or buildings relocated into the jurisdiction unless otherwise permitted by 18.5.1.1 or 18.5.1.2.

18.5.1.4* The distances specified in Section 18.5 shall be measured along fire department access roads in accordance with 18.2.3.

18.5.1.5 Where fire department access roads are provided with median dividers incapable of being crossed by fire apparatus, or where fire department access roads have traffic counts of more than 30,000 vehicles per day, hydrants shall be placed on both sides of the fire department access road on an alternating basis, and the distances specified by Section 18.5 shall be measured independently of the hydrants on the opposite side of the fire department access road.

18.5.1.6 Fire hydrants shall be located not more than 12 ft (3.7 m) from the fire department access road.

18.5.2 Detached One- and Two-Family Dwellings. Fire hydrants shall be provided for detached one- and two-family dwellings in accordance with both of the following:

(1) The maximum distance to a fire hydrant from the closest point on the building shall not exceed 600 ft (183 m).

(2) The maximum distance between fire hydrants shall not exceed 800 ft (244 m).

18.5.3 Buildings Other than Detached One- and Two-Family Dwellings. Fire hydrants shall be provided for buildings other than detached one- and two-family dwellings in accordance with both of the following:

(1) The maximum distance to a fire hydrant from the closest point on the building shall not exceed 400 ft (122 m).

(2) The maximum distance between fire hydrants shall not exceed 500 ft (152 m).

18.5.4 Minimum Number of Fire Hydrants for Fire Flow.

18.5.4.1 The minimum number of fire hydrants needed to deliver the required fire flow for new buildings in accordance with Section 18.4 shall be determined in accordance with Section 18.5.4.

18.5.4.2 The aggregate fire flow capacity of all fire hydrants within 1000 ft (305 m) of the building, measured in accordance with 18.5.1.4 and 18.5.1.5, shall be not less than the required fire flow determined in accordance with Section 18.4.

18.5.4.3* The maximum fire flow capacity for which a fire hydrant shall be credited shall be as specified by Table 18.5.4.3. Capacities exceeding the values specified in Table 18.5.4.3 shall be permitted when local fire department operations have the ability to accommodate such values as determined by the fire department.

Table 18.5.4.3 Maximum fire flow hydrant capacity

Distance to buildings[a]		Maximum capacity[b]	
(ft)	(m)	(gpm)	(L/min)
≤ 250	≤ 76	1500	5678
> 250 and ≤ 500	> 76 and ≤ 152	1000	3785
> 500 and ≤ 1000	> 152 and ≤ 305	750	2839

[a] Measured in accordance with 18.5.1.4 and 18.5.1.5.

[b] Minimum 20 psi (139.9 kPa) residual pressure.

18.5.4.4 Fire hydrants required by **18.5.2** and **18.5.3** shall be included in the minimum number of fire hydrants for fire flow required by **18.5.4**.

The City of Ottawa design guidelines on hydrant classification conform to the NFPA Standard #291, which recommends the following:

5.1 Classification of Hydrants. Hydrants should be classified in accordance with their rated capacities [at 20 psi (1.4 bar) residual pressure or other designated value as follows:

(1) Class AA — Rated capacity of 1500 gpm (5700L/min) or greater

(2) Class A — Rated capacity of 1000–1499 gpm (3800– 5699 L/min)

(3) Class B — Rated capacity of 500–999 gpm (1900–3799 L/min)

(4) Class C — Rated capacity of less than 500 gpm (1900 L/min)

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OVERALL WATER DEMAND

RESIDENTIAL					BASIC DAY DEMAND	MAX. DAY DEMAND	PEAK HOUR DEMAND
NUMBER OF UNITS				POP'N			
SINGLE DWELLING	ROW TOWNHOME	MULTI-RESIDENTIAL	PARK	(pers)	(L/s) RES.	(L/s) RES.	(L/s) RES.
179	109	168	1	1259	5.10	12.75	28.05

ASSUMPTIONS:

RESIDENTIAL POPULATION	- Single Dwelling	3.4	people/unit
	- Semi-Detached	2.7	people/unit
	- Row Townhome	2.7	people/unit
	- Multi-Residential	2.1	people/unit
	- Park demands, equivalent to Single Dwelling		
BASIC DAY DEMAND:	- Residential	350	L / c / d
MAXIMUM DAY DEMAND:	- Residential	2.50	* basic day
PEAK HOUR DEMAND:	- Residential	2.20	* maximum day

FIRE FLOW DEMAND:	- Low Density Residential	10,000	L/min. =	167	L/s
	- Typ. Row Town Blocks	13,000	L/min. =	217	L/s
	- Stacked Row Town Blocks	15,000	L/min. =	250	L/s

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JUNCTION DEMAND

JUNCTION ID	RESIDENTIAL					BASIC DAY DEMAND	MAX. DAY DEMAND	PEAK HOUR DEMAND	FIRE FLOW DEMAND
	NUMBER OF UNITS				POP'N				
	SINGLE DWELLING	ROW TOWNHOME	MULTI-RESIDENTIAL	PARK	(pers)	(L/s)	(L/s)	(L/s)	(L/s)
1			84		176	0.71	1.79	3.93	167
2			84		176	0.71	1.79	3.93	167
3	8	12			60	0.24	0.60	1.33	167
4	6	14			58	0.24	0.59	1.30	167
5	6	13			56	0.22	0.56	1.24	167
6	8	14			65	0.26	0.66	1.45	167
7		25			68	0.27	0.68	1.50	167
8	3	17			56	0.23	0.57	1.25	167
9	13				44	0.18	0.45	0.98	167
10	10	10			61	0.25	0.62	1.36	167
11	15				51	0.21	0.52	1.14	167
12	15	4			62	0.25	0.63	1.38	167
13	14				48	0.19	0.48	1.06	167
14	15				51	0.21	0.52	1.14	167
15	14				48	0.19	0.48	1.06	167
16	17				58	0.23	0.59	1.29	167
17	10			1	37	0.15	0.38	0.83	167
18	13				44	0.18	0.45	0.98	167
19	12				41	0.17	0.41	0.91	167
20					0	0.00	0.00	0.00	167
21					0	0.00	0.00	0.00	167
22					0	0.00	0.00	0.00	167
23					0	0.00	0.00	0.00	167
24					0	0.00	0.00	0.00	167
25					0	0.00	0.00	0.00	167
TOTAL	**179**	**109**	**168**	**1**	**1,259**	**5.10**	**12.75**	**28.05**	

ASSUMPTIONS:

RESIDENTIAL POPULATION DENSITY:
- Single Dwelling — 3.4 people/unit
- Semi-Detached — 2.7 people/unit
- Row Townhome — 2.7 people/unit
- Multi-Residential — 2.1 people/unit
- Park demands, equivalent to Single Dwelling

BASIC DAY DEMAND:
- Residential — 350 L / c / d

MAXIMUM DAY DEMAND:
- Residential — 2.50 * basic day

PEAK HOUR DEMAND:
- Residential — 2.20 * maximum day

FIRE FLOW DEMAND:
- Low Density Residential — 10,000 L/min. = 167 L/s
- Typ. Row Town Blocks — 13,000 L/min. = 217 L/s
- Stacked Row Town Blocks — 15,000 L/min. = 250 L/s

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MAX PRESSURES DURING BSDY CONDITIONS

JUNCTION ID	ELEVATION (m)	STATIC DEMAND (L/s)	STATIC HEAD (m)	STATIC PRESSURE (m)	STATIC PRESSURE (psi)
1	90.90	0.71	131.30	40.40	57
2	90.50	0.71	131.30	40.79	58
3	90.30	0.24	131.30	40.99	58
4	90.00	0.24	131.30	41.29	59
5	90.20	0.22	131.30	41.09	58
6	89.70	0.26	131.30	41.59	59
7	88.40	0.27	131.30	42.90	61
8	89.30	0.23	131.30	42.00	60
9	88.60	0.18	131.30	42.69	61
10	89.20	0.25	131.30	42.09	60
11	88.60	0.21	131.30	42.69	61
12	88.90	0.25	131.30	42.39	60
13	88.20	0.19	131.30	43.10	61
14	88.10	0.21	131.30	43.20	61
15	88.00	0.19	131.30	43.30	62
16	87.80	0.23	131.30	43.50	62
17	87.70	0.15	131.30	43.60	62
18	87.50	0.18	131.30	43.80	62
19	87.40	0.17	131.30	43.90	62
20	89.70	0.00	131.30	41.60	59
21	88.10	0.00	131.30	43.19	61
22	87.60	0.00	131.30	43.70	62
23	87.90	0.00	131.30	43.40	62
24	88.00	0.00	131.30	43.30	62
25	91.00	0.00	131.30	40.30	57

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MIN PRESSURES DURING PKHR CONDITIONS

JUNCTION ID	ELEVATION (m)	STATIC DEMAND (L/s)	STATIC HEAD (m)	STATIC PRESSURE (m)	STATIC PRESSURE (psi)
1	90.90	3.91	130.08	39.18	56
2	90.50	3.91	130.06	39.56	56
3	90.30	1.32	130.06	39.76	57
4	90.00	1.32	130.06	40.06	57
5	90.20	1.21	130.06	39.86	57
6	89.70	1.43	130.06	40.36	57
7	88.40	1.49	130.08	41.68	59
8	89.30	1.27	130.07	40.77	58
9	88.60	0.99	130.06	41.46	59
10	89.20	1.38	130.06	40.86	58
11	88.60	1.16	130.06	41.46	59
12	88.90	1.38	130.06	41.16	59
13	88.20	1.05	130.07	41.87	60
14	88.10	1.16	130.07	41.97	60
15	88.00	1.05	130.07	42.07	60
16	87.80	1.27	130.08	42.28	60
17	87.70	0.83	130.18	42.48	60
18	87.50	0.98	130.10	42.60	61
19	87.40	0.94	130.10	42.70	61
20	89.70	0.00	130.07	40.37	57
21	88.10	0.00	130.06	41.96	60
22	87.60	0.00	130.10	42.50	60
23	87.90	0.00	130.22	42.32	60
24	88.00	0.00	130.09	42.09	60
25	91.00	0.00	130.24	39.24	56

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AVAILABLE FLOW AT 20psi DURING MXDY+FF CONDITIONS

JUNCTION ID	ELEVATION (m)	STATIC DEMAND (L/s)	STATIC HEAD (m)	STATIC PRESSURE (m)	STATIC PRESSURE (psi)	FIRE FLOW DEMAND (L/s)	FIRE FLOW DEMAND (L/min)	AVAILABLE FLOW (L/min)
1	90.90	1.78	130.98	40.08	57	167	10,000	13,734
2	90.50	1.78	130.97	40.48	58	167	10,000	13,722
3	90.30	0.60	130.97	40.68	58	167	10,000	14,778
4	90.00	0.60	130.97	40.98	58	167	10,000	13,650
5	90.20	0.55	130.97	40.78	58	167	10,000	13,434
6	89.70	0.65	130.97	41.28	59	167	10,000	17,046
7	88.40	0.68	130.98	42.58	61	167	10,000	34,560
8	89.30	0.58	130.98	41.68	59	167	10,000	28,722
9	88.60	0.45	130.97	42.38	60	167	10,000	14,550
10	89.20	0.63	130.97	41.78	59	167	10,000	17,904
11	88.60	0.53	130.97	42.38	60	167	10,000	16,320
12	88.90	0.63	130.97	42.08	60	167	10,000	14,508
13	88.20	0.48	130.97	42.78	61	167	10,000	15,936
14	88.10	0.53	130.97	42.88	61	167	10,000	14,028
15	88.00	0.48	130.97	42.98	61	167	10,000	14,070
16	87.80	0.58	130.98	43.18	61	167	10,000	16,644
17	87.70	0.38	131.00	43.30	62	167	10,000	23,574
18	87.50	0.45	130.98	43.49	62	167	10,000	19,398
19	87.40	0.43	130.98	43.59	62	167	10,000	12,390
20	89.70	0.00	130.98	41.28	59	167	10,000	25,728
21	88.10	0.00	130.97	42.88	61	167	10,000	12,012
22	87.60	0.00	130.98	43.39	62	167	10,000	17,238

Appendix F
Geotechnical Investigation (soft copy)

Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

Archaeological Services

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Geotechnical Investigation

Proposed Residential Development
3604-3646 Innes Road
Ottawa, Ontario

Prepared For

Glenview Homes (Innes) Ltd.

April 2, 2020

Report: PG4026-2 Revision 2

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Appendix 1 Soil Profile and Test Data Sheets
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Symbols and Terms
Atterberg Limits Testing Results
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Appendix 2 Figure 1 - Key Plan
Drawing PG4026-1 - Test Hole Location Plan
Drawing PG4026-2 - Permissible Grade Raise Plan

1.0 Introduction

Paterson Group (Paterson) was commissioned by Glenview Homes (Innes) Ltd. to conduct a geotechnical investigation for the proposed residential development to be located at 3604, 3636 and 3646 Innes Road, in the City of Ottawa, Ontario (Refer to Figure 1 - Key Plan in Appendix 2).

The objectives of the current geotechnical review were:

- ❑ to determine the subsurface soil and groundwater conditions based on the soils information.
- ❑ to provide geotechnical recommendations pertaining to design of the proposed development including construction considerations which may affect the design.

The following report has been prepared specifically and solely for the aforementioned project which is described herein. The report contains the geotechnical findings and recommendations pertaining to the design and construction of the subject development as understood at the time of writing this report.

2.0 Proposed Development

Specific details of the proposed development were not available at the time of writing this report. However it is understood that the proposed development will consist of townhouse units and residential single unit dwellings. It is also anticipated that the development will include associated car parking areas, residential driveways, access lanes and landscaped areas. It is further understood that the site will be municipally serviced.

3.0 Method of Investigation

3.1 Field Investigation

The field program for the current investigation was conducted between December 5 and December 7, 2018. At that time, a total of 10 (ten) boreholes (BH) were advanced to a maximum depth of 6.7 m. Previous field investigations were completed by Paterson between September 2014 and August 2017. During that time, a total of 6 test holes, consisting of boreholes and test pits were extended to a maximum depth of 7.1 m.

Previous geotechnical investigations were also completed by others within the area of the subject site. The results of the previous investigations by others are discussed in the current report. The locations of the test holes are shown on Drawing PG4026-1 - Test Hole Location Plan included in Appendix 2.

The boreholes were completed using a track mounted auger drill rig operated by a two person crew. The test pits were completed using a hydraulic shovel. All fieldwork was conducted under the full-time supervision of Paterson personnel from our geotechnical division under the direction of a senior engineer. The testing procedure consisted of augering to the required depths and at the selected locations sampling the overburden.

Two (2) investigations were completed by others for environmental purposes for the subject site. The field work was conducted in 2013 and 2016. A total of 34 test holes were completed during the course of the investigations by others. The test holes were advanced to a maximum depth of 7.0 m below existing ground surface.

Sampling and In Situ Testing

Soil samples were collected from the boreholes using a 50 mm diameter split spoon sampler. Soil samples were also recovered along the sidewalls of the test pits by hand during excavation.

All soil samples were visually inspected and initially classified on site. The split spoon samples were placed in sealed plastic bags. All samples were transported to our laboratory for examination and classification. The depths at which the split spoon, auger and grab samples were recovered from the test holes are shown as SS, AU and G, respectively, on the Soil Profile and Test Data sheets presented in Appendix 1.

The Standard Penetration Test (SPT) was conducted in conjunction with the recovery of the split-spoon samples. The SPT results are recorded as "N" values on the Soil Profile and Test Data sheets. The "N" value is the number of blows required to drive the split-spoon sampler 300 mm into the soil after a 150 mm initial penetration using a 63.5 kg hammer falling from a height of 760 mm.

Undrained shear strength testing was carried out at regular depth intervals in cohesive soils using a field vane apparatus.

Overburden thickness was evaluated during the course of the site investigations by dynamic cone penetration testing (DCPT) at several borehole locations. The DCPT consists of driving a steel drill rod, equipped with a 50 mm diameter cone at the tip, using a 63.5 kg hammer falling from a height of 760 mm. The number of blows required to drive the cone into the soil is recorded for each 300 mm increment.

The subsurface conditions observed at the borehole and test pit locations were recorded in detail in the field. The soil profiles are presented on the Soil Profile and Test Data sheets and Borehole Logs by Others in Appendix 1.

Groundwater

Flexible standpipes were installed in all boreholes to monitor the groundwater levels subsequent to the completion of the sampling program. Groundwater infiltration levels were noted at the time of excavation at the test pit locations.

3.2 Field Survey

The borehole locations were determined by Paterson personnel taking into consideration the presence of underground and aboveground services. The location and ground surface elevation at each borehole location were provided by J.D. Barnes Limited. It is understood that the elevations are referenced to a geodetic datum. The test hole locations and ground surface elevations at the test hole locations are presented on Drawing PG4026-1 - Test Hole Location Plan in Appendix 2.

3.3 Laboratory Testing

The soil samples recovered from the subject site were visually examined in our laboratory to review the results of the field logging. A total of two (2) Atterberg limit tests were completed on selected silty clay samples. Grain size distribution (hydrometer) testing was also completed on two (2) soil samples and one (1) soil sample was submitted for shrinkage testing. The results are presented in Subsection 4.2 of our current report and in Appendix 1.

3.4 Analytical Testing

One (1) soil sample was submitted to assess the corrosion potential for exposed ferrous metals and the potential of sulphate attacks against subsurface concrete structures. The sample was analyzed to determine the concentration of sulphate and chloride, the resistivity and the pH of the sample. The results are discussed in Subsection 6.7 and shown in Appendix 1.

4.0 Observations

4.1 Surface Conditions

The north portion of the subject site is currently occupied by commercial buildings with associated paved/gravel surfaced areas used for parking and storage units. The gravel surfacing extends approximately 400 m south of Innes Road, and is relatively flat and at grade with Innes Road. The ground surface along the north portion of the site is relatively flat and at grade with Innes Road. The ground surface south of the gravel surfaced area consists of grass covered, undeveloped land with occasional trees, and slopes gradually down toward the south. The site is bordered to the north by Innes Road and to the east, south and west by undeveloped land. Additional commercial properties border the subject site to the east and west along Innes Road.

4.2 Subsurface Profile

Overburden

Generally, the subsurface profile at the borehole locations consisted of a layer of topsoil, followed by a very stiff to stiff brown silty clay crust. A stiff to firm grey silty clay deposit was encountered below the aforementioned layers. A glacial till deposit was encountered below the grey silty clay at some borehole locations. The fine matrix of the glacial till was observed to consist of grey silty clay with sand and gravel, with occasional cobbles and boulders. Practical refusal to augering was encountered at BH 2-18, BH 3-18 and BH 5-18 at depths of 3.8 to 5.6 m. Practical refusal to DCPT was encountered at a depth of 10.4 m at BH 7. Reference should be made to the Soil Profile and Test Data sheets in Appendix 1 for specific details of the soil profiles encountered at each test hole location.

Atterberg Limits Results

The results of the Atterberg Limit tests conducted within the silty clay are presented below in Table 1 - Summary of Atterberg Limits Results and are presented in Appendix 1.

Table 1 - Summary of Atterberg Limits Results				
Sample	**Liquid Limit %**	**Plastic Limit %**	**Plasticity Index %**	**Classification**
BH1-18 SS2	67	29	38	CH
BH10-18 SS3	72	29	43	CH
TP 1 G2	66	21	45	CH
TP 1 G3	71	24	47	CH
TP 2 G2	78	25	53	CH
TP 3 G2	69	25	44	CH
TP 4 G2	77	25	52	CH
TP 5 G3	70	24	46	CH

The results of the shrinkage testing of BH5 SS3 resulted in a shrinkage limit of 19% with a shrinkage ratio of 1.71.

Hydrometer Testing

Two (2) soil samples were submitted for hydrometer testing. The results are summarized in Table 2 and presented on the Grain Size Distribution sheets in Appendix 1.

Table 2 - Summary of Hydrometer Tests				
Sample	**Gravel %**	**Sand %**	**Fines Content**	
			Silt %	**Clay %**
BH4-18 SS3	0	0.6	29.9	69.5
BH6-18 SS3	0	0.5	23	76.5

Bedrock

Based on available geological mapping, the local bedrock consists of limestone and shale of the Bobcaygeon and Lindsay formations with an anticipated overburden thickness of 0 to 25 m.

4.3 Groundwater

The groundwater levels were measured in the borehole locations on December 14, 2018, and are presented in the Soil Profile and Test Data sheets in Appendix 1.

Table 3 - Summary of Groundwater Level Readings

Test Hole Number	Ground Elevation (m)	Groundwater Levels (m)		Recording Date
		Depth	Elevation	
BH1-18	89.02	1.84	87.18	December 14, 2018
BH2-18	88.81	1.19	87.62	December 14, 2018
BH3-18	88.43	0.95	87.48	December 14, 2018
BH4-18	88.26	1.07	87.19	December 14, 2018
BH5-18	87.47	1.29	86.18	December 14, 2018
BH6-18	87.61	Damaged	n/a	December 14, 2018
BH7-18	86.93	1.02	85.91	December 14, 2018
BH8-18	87.51	Damaged	n/a	December 14, 2018
BH9-18	86.95	0.65	86.3	December 14, 2018
BH10-18	86.69	Frozen	n/a	December 14, 2018

Note: The ground surface elevations at the borehole locations were provided by JD Barnes Limited.

It is important to note that groundwater level readings could be influenced by surface water infiltrating the backfilled borehole, which can lead to higher than typical groundwater levels. The long-term groundwater level can also be estimated based on moisture levels and colouring of the recovered soil samples. Based on these observations at the borehole locations, the long-term groundwater level is expected at a 3 to 4 m depth.

It should be noted that groundwater levels are subject to seasonal fluctuations, therefore groundwater levels could differ at the time of construction.

5.0 Discussion

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is considered adequate for the proposed development. It is expected that buildings can be founded by conventional style shallow foundations placed on undisturbed, stiff to firm silty clay, glacial till or a clean, surface sounded bedrock bearing surface.

Due to the presence of the silty clay deposit, the subject site will be subject to permissible grade raise recommendations.

The above and other consideration are discussed in the following paragraphs.

5.2 Site Grading and Preparation

Stripping Depth

Topsoil and deleterious fill, such as those containing organic materials, should be stripped from under any buildings, paved areas, pipe bedding, and other settlement sensitive structures.

Due to the presence of shallow bedrock, some bedrock removal may be required to construct footings and municipal services.

Bedrock Removal

Based on the bedrock encountered in the area, line drilling in conjunction with hoe-ramming or controlled blasting may be required to remove the bedrock. In areas of weathered bedrock and where only a small quantity of bedrock is to be removed, bedrock removal may be possible by hoe-ramming alone.

Prior to considering blasting operations, the blasting effects on the existing services, buildings and other structures should be addressed. A pre-blast or pre-construction survey of the existing structures located in proximity to the blasting operations should be completed prior to commencing site activities. The extent of the survey should be determined by the blasting consultant and should be sufficient to respond to any inquiries/claims related to the blasting operations.

As a general guideline, peak particle velocities (measured at the structures) should not exceed 25 mm/s during the blasting program to reduce the risks of damage to the existing structures.

The blasting operations should be planned and conducted under the supervision of a licensed professional engineer who is also an experienced blasting consultant.

Excavation side slopes in sound bedrock can be excavated almost vertical side walls. A minimum 1 m horizontal ledge, should remain between the overburden excavation and the bedrock surface. The ledge will provide an area to allow for potential sloughing or a stable base for the overburden shoring system.

Vibration Considerations

Construction operations are the cause of vibrations, and possibly sources of nuisance to the community. Therefore, means to reduce the vibration levels as much as possible should be incorporated in the construction operations to maintain, as much as possible, a cooperative environment with the residents.

The following construction equipments could be the source of vibrations: hoe ram, compactor, dozer, crane, truck traffic, etc. Vibrations, whether caused by blasting operations or by construction operations, could be the source of detrimental vibrations on the nearby buildings and structures. Therefore, all vibrations are recommended to be limited.

Two parameters are used to determine the permissible vibrations, namely, the maximum peak particle velocity and the frequency. For low frequency vibrations, the maximum allowable peak particle velocity is less than that for high frequency vibrations. As a guideline, the peak particle velocity should be less than 15 mm/s between frequencies of 4 to 12 Hz, and 50 mm/s above a frequency of 40 Hz (interpolate between 12 and 40 Hz). The guidelines are for current construction standards. Considering that these guidelines are above perceptible human level and, in some cases, could be very disturbing to some people, a pre-construction survey is recommended be completed to minimize the risks of claims during or following the construction of the proposed building.

Fill Placement

Fill used for grading beneath the building areas should consist, unless otherwise specified, of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II material. This material should be tested and approved prior to delivery to the site. The fill should be placed in lifts no greater than 300 mm thick and compacted using suitable compaction equipment for the lift thickness. Fill placed beneath the buildings should be compacted to at least 98% of its standard Proctor maximum dry density (SPMDD).

Non-specified existing fill along with site-excavated soil can be used as general landscaping fill where settlement of the ground surface is of minor concern. These materials should be spread in thin lifts and at least compacted by the tracks of the spreading equipment to minimize voids. If excavated stiff brown silty clay, free of organics and deleterious materials, is to be used to build up the subgrade level for areas to be paved, the silty clay, under dry conditions, should be compacted in thin lifts to a minimum density of 95% of their respective SPMDD. Non-specified existing fill and site-excavated soils are not suitable for use as backfill against foundation walls unless a composite drainage blanket connected to a perimeter drainage system is provided.

Decommissioning of Standpipe Piezometers

Upon the completion of groundwater level monitoring program, the flexible standpipe piezometers shall be properly decommissioned by licensed and experienced contractor as per Ontario Regulation 903 to protect the water quality of existing and future standpipes and the shared groundwater resources.

As per Ontario Regulation 903, abandonment barrier (sealant) material must be placed continuously from the bottom of the standpipe piezometer upward to approximately 2 m below the ground surface. The abandonment barrier material must be compatible with the quality of the water found in the standpipe piezometer, stable in the presence of any contaminants, and should not contain any materials that may impair the integrity of the abandonment barrier, including soil or drill cuttings. The abandonment barrier should be placed in a manner that does not prevent the placement of clean, washed sand or gravel adjacent to water producing zones or bedrock fractures to minimize the loss of abandonment barrier material. However, the abandonment barrier must be placed in a manner that prevents any movement of water, natural gas, contaminants or other material between subsurface formations (which include aquifers) or between a subsurface formation and the top of abandonment barrier material. After or during the placement of the abandonment barrier, the casing or screen must be removed, if reasonably possible.

During the removal of the screen, the bottom of the screen must be immersed in the rising accumulation of the abandonment barrier until the required level is reached.

To prevent inadvertent or unauthorized access, the standpipe piezometer and the standpipe piezometer opening must be sealed up to the ground surface by placing 50 mm or 150 mm bentonite chips, pellets, granules or powder in accordance with the manufacturer's specifications, and cover the bentonite with soil cover or other material that is keeping with the immediately adjacent material.

5.3 Foundation Design

Bearing Resistance Values

Strip footings, up to 2 m wide, and pad footings, up to 4 m wide, founded on an undisturbed, stiff silty clay can be designed using a bearing resistance value at serviceability limit states (SLS) of **150 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **225 kPa**.

Footings placed on a glacial till or engineered fill bearing surface can be designed using a bearing resistance value at SLS of **150 kPa** and at ULS of **225 kPa**.

A geotechnical resistance factor of 0.5 was incorporated into the abovenoted bearing resistance values at ULS.

An undisturbed soil bearing surface consists of one from which all topsoil and deleterious materials, such as loose, frozen or disturbed soil, have been removed, in the dry, prior to the placement of concrete for footings.

Footings bearing on an undisturbed soil bearing surface and designed using the bearing resistance values provided herein will be subjected to potential post construction total and differential settlements of 25 and 20 mm, respectively.

Footings placed on a clean, surface sounded bedrock surface can be designed using a factored bearing resistance value at ULS of **1,000 kPa**, incorporating a geotechnical resistance factor of 0.5.

A clean, surface-sounded bedrock bearing surface should be free of loose materials, and have no near surface seams, voids, fissures or open joints which can be detected from surface sounding with a rock hammer.

Footings bearing on surface sounded bedrock and designed using the above mentioned bearing resistance values will be subjected to negligible post-construction total and differential settlements.

Lateral Support

The bearing medium under footing-supported structures is required to be provided with adequate lateral support with respect to excavations and different foundation levels. Adequate lateral support is provided to an undisturbed soil bearing surface above the groundwater table when a plane extending horizontally and vertically from the bottom edge of the footing at a minimum of 1.5H:1V passes through in situ soil of the same or higher capacity as the bearing medium soil.

Adequate lateral support is provided to a sound bedrock bearing medium when a plane extending horizontally and vertically from the bottom edge of the footing at a minimum of 1H:6V passes through in situ soil of the same or higher capacity as the bearing medium soil. A lateral support zone of 1.5H:1V is recommended for a weathered bedrock bearing medium.

Permissible Grade Raise Recommendations

Permissible grade raise restriction areas are also required due to the silty clay deposit. Refer to Drawing PG4026-2 - Permissible Grade Raise Plan in Appendix 2 for further details.

5.4 Design for Earthquakes

The site class for seismic site response can be taken as **Class C** for foundations to be constructed within the north portion of the subject site and a **Class D** for foundations within the south portion of the subject site. The soils underlying the proposed shallow foundations are not susceptible to liquefaction. Reference should be made to the latest revision of the 2012 Ontario Building Code for a full discussion of the earthquake design requirements.

5.5 Basement Slab

With the removal of all topsoil and fill, containing deleterious or organic materials, the native soil or existing granular fill approved by the geotechnical consultant at the time of excavation will be considered to be an acceptable subgrade surface on which to commence backfilling for basement floor slab or slab on grade construction. Any soft areas should be removed and backfilled with appropriate backfill material. OPSS Granular A or Granular B Type II, with a maximum particle size of 50 mm, are recommended for backfilling below the floor slab.

It is recommended that the upper 200 mm of sub-floor fill for basement slabs consist of 19 mm clear crushed stone. The upper 300 mm of sub-floor fill below slabs on grade should consist of OPSS Granular A crushed stone. All backfill materials within the footprint of the proposed buildings should be placed in maximum 300 mm thick loose layers and compacted to at least 98% of its SPMDD.

5.6 Pavement Structure

For design purposes, the pavement structure presented in the following tables could be used for the design of car only parking areas, local roadways and roadways on which bus traffic is anticipated.

Table 6 - Recommended Pavement Structure - Car Only Parking Areas/Driveways

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

Table 7 - Recommended Pavement Structure - Local Roadways	
Thickness (mm)	**Material Description**
40	**Wear Course** - Superpave 12.5 Asphaltic Concrete
50	**Binder Course** - Superpave 19.0 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
400	**SUBBASE** - OPSS Granular B Type II
SUBGRADE - Either in situ soils or OPSS Granular B Type I or II material placed over in situ soil	

Table 8 - Recommended Pavement Structure - Collector Roads with Bus Traffic	
Thickness (mm)	**Material Description**
40	**Wear Course** - Superpave 12.5 Asphaltic Concrete
50	**Upper Binder Course** - Superpave 19.0 Asphaltic Concrete
50	**Lower Binder Course** - Superpave 19.0 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
550	**SUBBASE** - OPSS Granular B Type II
SUBGRADE - Either in situ soils or OPSS Granular B Type I or II material placed over in situ soil	

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for this project.

If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type I or II material.

The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 100% of the material's SPMDD using suitable vibratory equipment.

Pavement Structure Drainage

Satisfactory performance of the pavement structure is largely dependent on keeping the contact zone between the subgrade material and the base stone in a dry condition. Failure to provide adequate drainage under conditions of heavy wheel loading can result in the fine subgrade soil being pumped into the voids in the stone subbase, thereby reducing its load carrying capacity.

Due to the low permeability of the subgrade materials consideration should be given to installing subdrains during the pavement construction as per City of Ottawa standards. The subdrain inverts should be approximately 300 mm below subgrade level. The subgrade surface should be crowned to promote water flow to the drainage lines.

6.0 Design and Construction Precautions

6.1 Foundation Drainage and Backfill

It is recommended that a perimeter foundation drainage system be provided for the proposed structures. The system should consist of a 150 mm diameter perforated corrugated plastic pipe, surrounded on all sides by 150 mm of 10 mm clear crushed stone and placed at the footing level around the exterior perimeter of the structure. The pipe should have a positive outlet, such as a gravity connection to the storm sewer.

Backfill against the exterior sides of the foundation walls should consist of free-draining non frost susceptible granular materials. The greater part of the site excavated materials will be frost susceptible and, as such, are not recommended for re-use as backfill against the foundation walls, unless used in conjunction with a composite drainage system, such as Delta Drain 6000 or equivalent. Imported granular materials, such as clean sand or OPSS Granular B Type I granular material should otherwise be used for this purpose.

6.2 Protection Against Frost Action

Perimeter footings of heated structures are required to be insulated against the deleterious effect of frost action. A minimum of 1.5 m thick soil cover (or equivalent) should be provided in this regard.

Exterior footings, such as those for isolated exterior piers, are more prone to deleterious movement associated with frost action than the exterior walls of heated structures and require additional protection, such as soil cover of 2.1 m or an equivalent combination of soil cover and foundation insulation.

6.3 Excavation Side Slopes

The side slopes of excavations in the soil and fill overburden materials should be either cut back at acceptable slopes or should be retained by shoring systems from the start of the excavation until the structure is backfilled. It is assumed that sufficient room will be available for the greater part of the excavation to be undertaken by open-cut methods (i.e. unsupported excavations).

The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be cut back at 1H:1V or flatter. The flatter slope is required for excavation below groundwater level. The subsoil at this site is considered to be mainly a Type 2 and 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects.

Excavated soil should not be stockpiled directly at the top of excavations and heavy equipment should be kept away from the excavation sides.

Slopes in excess of 3 m in height should be periodically inspected by the geotechnical consultant in order to detect if the slopes are exhibiting signs of distress.

It is recommended that a trench box be used at all times to protect personnel working in trenches with steep or vertical sides. It is expected that services will be installed by "cut and cover" methods and excavations will not be left open for extended periods of time.

6.4 Pipe Bedding and Backfill

The pipe bedding for sewer and water pipes should consist of at least 150 mm of OPSS Granular A material. Where the bedding is located within the grey silty clay or bedrock, the thickness of the bedding material should be increased to a minimum of 300 mm. The material should be placed in maximum 225 mm thick lifts and compacted to a minimum of 95% of its SPMDD. The bedding material should extent at least to the spring line of the pipe.

The cover material, which should consist of OPSS Granular A, should extend from the spring line of the pipe to at least 300 mm above the obvert of the pipe. The material should be placed in maximum 225 mm thick lifts and compacted to a minimum of 95% of its SPMDD.

It should generally be possible to re-use the moist (not wet) brown silty clay above the cover material if the excavation and filling operations are carried out in dry weather conditions. Wet silty clay materials will be difficult to re-use, as the high water contents make compacting impractical without an extensive drying period.

Where hard surface areas are considered above the trench backfill, the trench backfill material within the frost zone (about 1.8 m below finished grade) should match the soils exposed at the trench walls to minimize differential frost heaving. The trench backfill should be placed in maximum 300 mm thick loose lifts and compacted to a minimum of 95% of the material's SPMDD.

To reduce long-term lowering of the groundwater level at this site, clay seals should be provided in the service trenches. The seals should be at least 1.5 m long and should extend from trench wall to trench wall. Generally, the seals should extend from the frost line and fully penetrate the bedding, subbedding and cover material. The barriers should consist of relatively dry and compactable brown silty clay placed in maximum 225 mm thick loose layers and compacted to a minimum of 95% of the material's SPMDD. The clay seals should be placed at the site boundaries and at strategic locations at no more than 60 m intervals in the service trenches.

6.5 Groundwater Control

The contractor should be prepared to direct water away from all bearing surfaces and subgrades, regardless of the source, to prevent disturbance to the founding medium. It is anticipated that groundwater infiltration into the excavations should be low and controllable using conventional open sumps.

A temporary Ministry of the Environment, Conservation and Parks (MECP) permit to take water (PTTW) may be required for this project if more than 400,000 L/day of ground and/or surface water is to be pumped during the construction phase. A minimum 4 to 5 months should be allowed for completion of the PTTW application package and issuance of the permit by the MECP.

For typical ground or surface water volumes, being pumped during the construction phase, between 50,000 to 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR). A minimum of two to four weeks should be allotted for completion of the EASR registration and the Water Taking and Discharge Plan to be prepared by a Qualified Person as stipulated under O.Reg. 63/16. If a project qualifies for a PTTW based upon anticipated conditions, an EASR will not be allowed as a temporary dewatering measure while awaiting the MECP review of the PTTW application.

6.6 Winter Construction

The subsurface conditions at this site mostly consist of frost susceptible materials. In presence of water and freezing conditions ice could form within the soil mass. Heaving and settlement upon thawing could occur. Precautions should be taken if winter construction is considered for this project.

In the event of construction during below zero temperatures, the founding stratum should be protected from freezing temperatures by the use of straw, propane heaters, tarpaulins or other suitable means. In this regard, the base of the excavations should be insulated from sub-zero temperatures immediately upon exposure and until such time as heat is adequately supplied to the building and the footings are protected with sufficient soil cover to prevent freezing at founding level.

The trench excavations should be constructed in a manner that will avoid the introduction of frozen materials into the trenches. As well, pavement construction is difficult during winter. The subgrade consists of frost susceptible soils which will experience total and differential frost heaving as the work takes place. In addition, the introduction of frost, snow or ice into the pavement materials, which is difficult to avoid, could adversely affect the performance of the pavement structure. Additional information could be provided, if required.

6.7 Corrosion Potential and Sulphate

The results of analytical testing show that the sulphate content is less than 0.1%. This result is indicative that Type 10 Portland cement (normal cement) would be appropriate for this site. The results of the chloride content, pH and resistively indicate the presence of a moderate to aggressive environment for exposed ferrous metals at this site.

6.8 Landscaping Considerations

Tree Planting Restrictions

Paterson completed a soils review of the site to determine applicable tree planting setbacks, in accordance with the City of Ottawa Tree Planting in Sensitive Marine Clay Soils (2017 Guidelines) for trees planted within a public right-of-way (ROW). Atterberg limits testing was completed for recovered silty clay samples at selected locations throughout the subject site. Sieve analysis testing was also completed on selected soil samples. The results of our testing are presented in Tables 1 and 2 in Subsection 4.2 and in Appendix 1.

Based on the results of our review, a high sensitivity clay soil was encountered between anticipated underside of footing elevations and 3.5 m below anticipated finished grade as per City Guidelines. Based on our Atterberg Limits test results, the modified plasticity limit generally exceeds 40%. The following tree planting setbacks are recommended for these high sensitivity areas.

Large trees (mature height over 14 m) can be planted within this area provided a tree to foundation setback equal to the full mature height of the tree can be provided (e.g. in a park or other green space). Tree planting setback limits is 7.5 m for small (mature tree height up to 7.5 m) and medium size trees (mature tree height 7.5 m to 14 m) provided that the following conditions are met:

- ❏ The underside of footing (USF) is 2.1 m or greater below the lowest finished grade must be satisfied for footings within 10 m from the tree, as measured from the centre of the tree trunk and verified by means of the Grading Plan as indicated procedural changes below.
- ❏ A small tree must be provided with a minimum of 25 m^3 of available soil volume while a medium tree must be provided with a minimum of 30 m^3 of available soil volume, as determined by the Landscape Architect. The developer is to ensure that the soil is generally un-compacted when backfilling in street tree planting locations.
- ❏ The tree species must be small (mature tree height up to 7.5 m) to medium size (mature tree height 7.5 m to 14 m) as confirmed by the Landscape Architect.
- ❏ The foundation walls are to be reinforced at least nominally (minimum of two upper and two lower 15M bars in the foundation wall).
- ❏ Grading surround the tree must promote drainage to the tree root zone (in such a manner as not to be detrimental to the tree), as noted on the subdivision Grading Plan.

Aboveground Swimming Pools, Hot Tubs, Decks and Additions

The in-situ soils are considered to be acceptable for in-ground swimming pools. Above ground swimming pools must be placed at least 5 m away from the residence foundation and neighbouring foundations. Otherwise, pool construction is considered routine, and can be constructed in accordance with the manufacturer`s requirements.

Additional grading around the hot tub should not exceed permissible grade raises. Otherwise, hot tub construction is considered routine, and can be constructed in accordance with the manufacturer's specifications.

Additional grading around proposed deck or addition should not exceed permissible grade raises. Otherwise, standard construction practices are considered acceptable.

7.0 Recommendations

It is a requirement for the foundation design data provided herein to be applicable that a materials testing and observation services program including the following aspects be performed by the geotechnical consultant.

- ❑ Review of the final grading plan from a geotechnical perspective, once available.
- ❑ Observation of all bearing surfaces prior to the placement of concrete.
- ❑ Sampling and testing of the concrete and fill materials used.
- ❑ Periodic observation of the condition of unsupported excavation side slopes in excess of 3 m in height, if applicable.
- ❑ Observation of all subgrades prior to backfilling.
- ❑ Field density tests to determine the level of compaction achieved.
- ❑ Sampling and testing of the bituminous concrete including mix design reviews.

A report confirming that these works have been conducted in general accordance with our recommendations could be issued, upon request, following the completion of a satisfactory materials testing and observation program by the geotechnical consultant.

8.0 Statement of Limitations

The recommendations made in this report are in accordance with our present understanding of the project. We request permission to review our recommendations when the drawings and specifications are completed.

A geotechnical investigation is a limited sampling of a site. Should any conditions at the site be encountered which differ from those at the test hole locations, we request immediate notification to permit reassessment of our recommendations.

The recommendations provided herein should only be used by the design professionals associated with this project. They are not intended for contractors bidding on our undertaking the work. The latter should evaluate the factual information provided in this report and determine the suitability and completeness for their intended construction schedule and methods. Additional testing may be required for their purposes.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than Glenview Homes (Innes) Ltd. or their agent(s) is not authorized without review by this firm for the applicability of our recommendations to the altered use of the report.

Paterson Group Inc.







Faisal I. Abou-Seido, P.Eng.

David J. Gilbert, P.Eng

Report Distribution:

- ❏ Glenview Properties Inc. (3 copies)
- ❏ Paterson Group (1 copy)

APPENDIX 1

SOIL PROFILE AND TEST DATA SHEETS

BOREHOLES BY OTHERS

SYMBOLS AND TERMS

ATTERBERG LIMITS RESULTS

HYDROMETER TESTING RESULTS

ANALYTICAL TESTING RESULTS

patersongroup Consulting Engineers

154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Supplemental Geotechnical Investigation
3604-3646 Innes Road
Ottawa, Ontario

DATUM Ground surface elevations provided by J.D. Barnes LimiteD

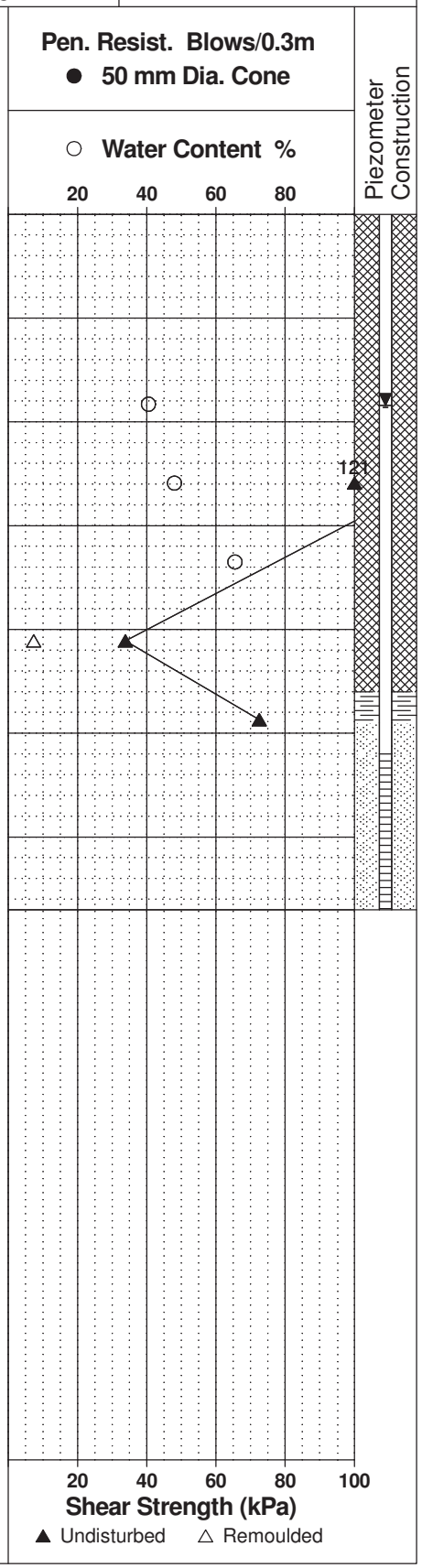
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REMARKS

HOLE NO. BH 1-18

BORINGS BY CME 55 Power Auger **DATE** December 5, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	89.02
FILL: Brown silty clay with sand and gravel, trace crushed stone		AU	1				
0.30							
		SS	2	50	8	1	88.02
		SS	3	92	10	2	87.02
Very stiff to stiff, brown **SILTY CLAY**		SS	4	92	P		
		SS	5	92	2	3	86.02
- firm to stiff and grey by 3.4m depth						4	85.02
4.72							
		SS	6	67	P	5	84.02
GLACIAL TILL: Grey silty clay with sand and gravel, occasional cobbles and boulders		SS	7	33	20		
		SS	8	46	8	6	83.02
6.70							
End of Borehole							
(GWL @ 1.84m - Dec. 14, 2018)							



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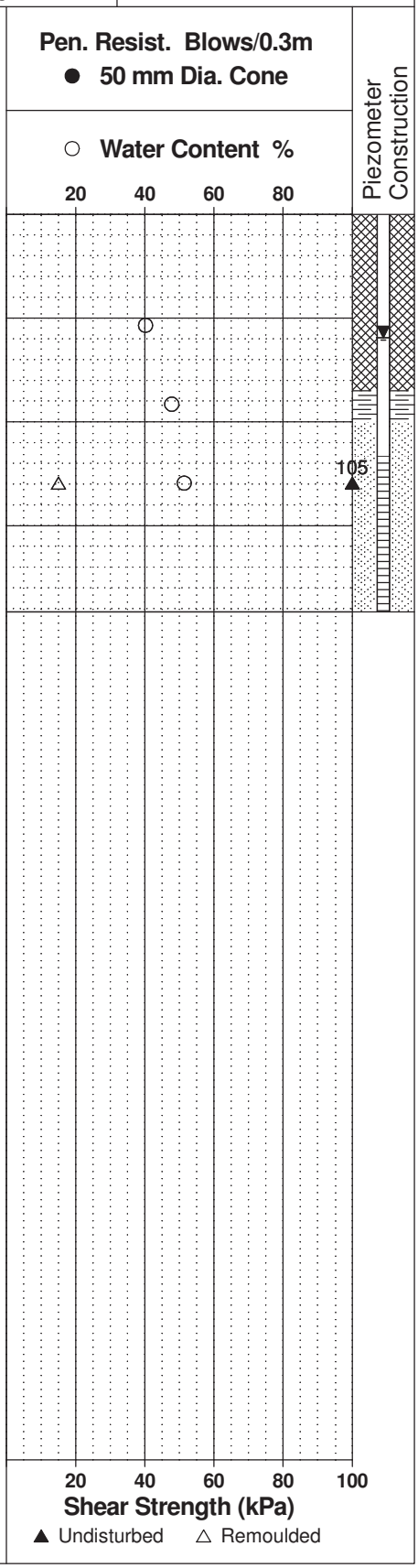
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REMARKS

HOLE NO. BH 2-18

BORINGS BY CME 55 Power Auger **DATE** December 5, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	88.81
TOPSOIL 0.20		AU	1				
		SS	3	92	7	1	87.81
Very stiff, brown **SILTY CLAY**		SS	2	75	9		
						2	86.81
- grey by 2.7m depth		SS	4	100	P		
2.92						3	85.81
GLACIAL TILL: Grey silty clay with sand and gravel, occasional cobbles and boulders		SS	5	50	10		
3.83		SS	6	27	50+		
End of Borehole							
Practical refusal to augering at 3.83m depth							
(GWL @ 1.19m - Dec. 14, 2018)							



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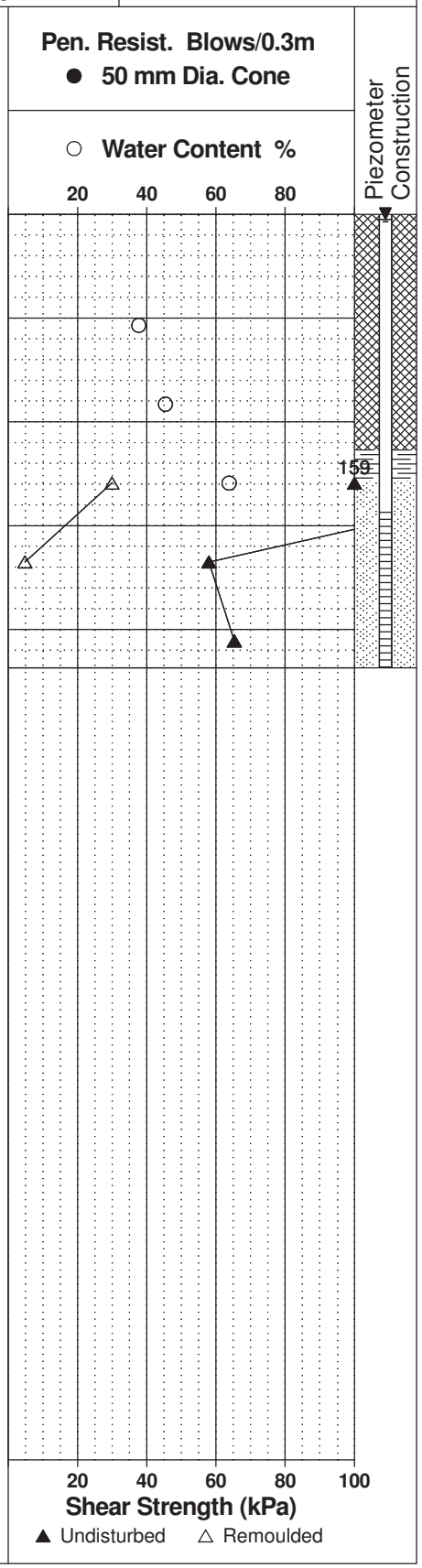
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REMARKS

HOLE NO. BH 3-18

BORINGS BY CME 55 Power Auger **DATE** December 5, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	88.43
TOPSOIL 0.13		AU	1				
		SS	2	79	9	1	87.43
Very stiff to stiff, brown **SILTY CLAY**		SS	3	96	7	2	86.43
		SS	4	96	P		
- grey by 2.8m depth						3	85.43
3.50							
GLACIAL TILL: Grey silty clay with sand and gravel, occasional cobbles and boulders						4	84.43
4.37							
End of Borehole							
Practical refusal to augering at 4.37m depth							
(GWL @ 0.05m - Dec. 14, 2018)							



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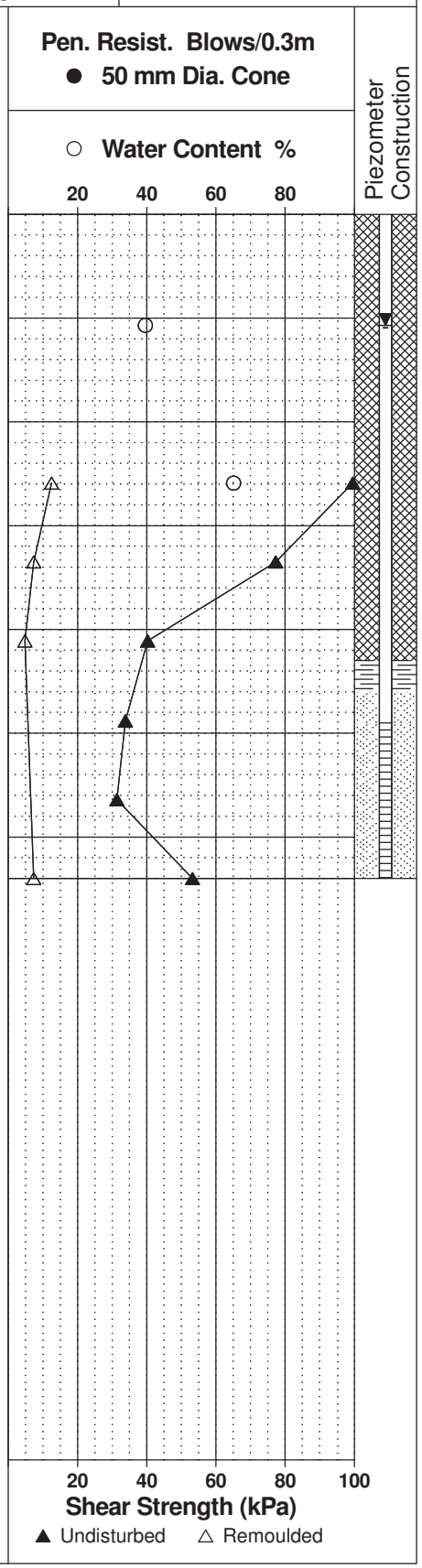
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REMARKS

HOLE NO. BH 4-18

BORINGS BY CME 55 Power Auger **DATE** December 5, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	88.26
TOPSOIL 0.30		AU	1				
		SS	2	83	10	1	87.26
		SS	3	88	6	2	86.26
Very stiff to stiff, brown **SILTY CLAY**		SS	4	83	P	3	85.26
- firm to stiff and grey by 3.7m depth						4	84.26
						5	83.26
6.40						6	82.26
End of Borehole							
(GWL @ 1.07m - Dec. 14, 2018)							



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SOIL PROFILE AND TEST DATA

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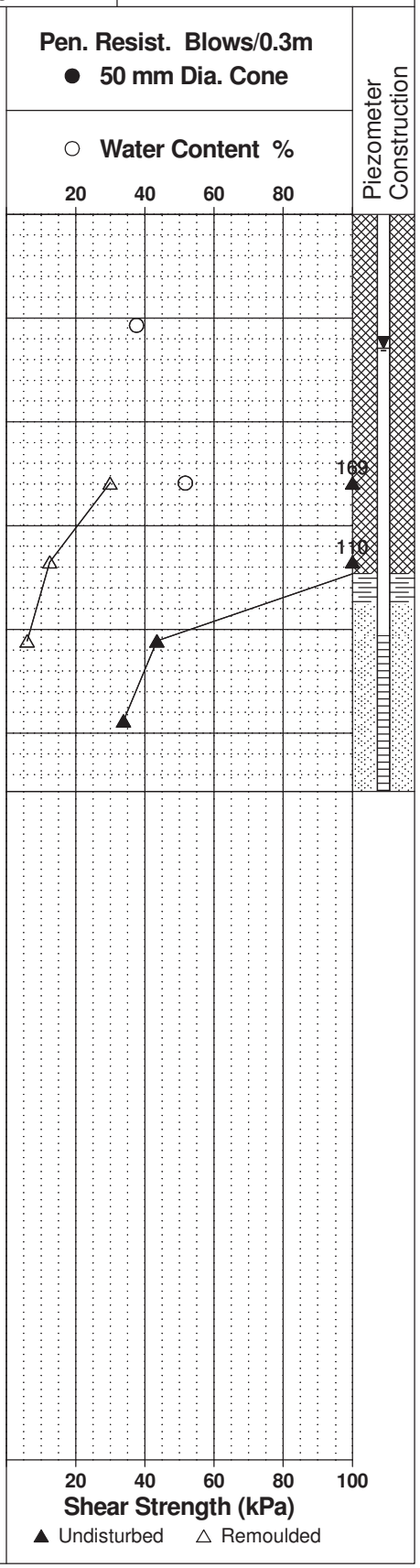
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REMARKS

HOLE NO. BH 5-18

BORINGS BY CME 55 Power Auger **DATE** December 5, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	87.47
TOPSOIL 0.25		AU	1				
		SS	2	88	13	1	86.47
		SS	3	96	11	2	85.47
Very stiff to stiff, brown **SILTY CLAY**		SS	4	96	P	3	84.47
- firm and grey by 3.7m depth						4	83.47
5.51		SS	5	86	50+	5	82.47
GLACIAL TILL: Grey silty clay with sand and gravel, occasional cobbles and boulders 5.56							
End of Borehole							
Practical refusal to augering at 5.56m depth							
(GWL @ 1.29m - Dec. 14, 2018)							



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Supplemental Geotechnical Investigation
3604-3646 Innes Road
Ottawa, Ontario

DATUM Ground surface elevations provided by J.D. Barnes LimiteD

FILE NO. PG4026

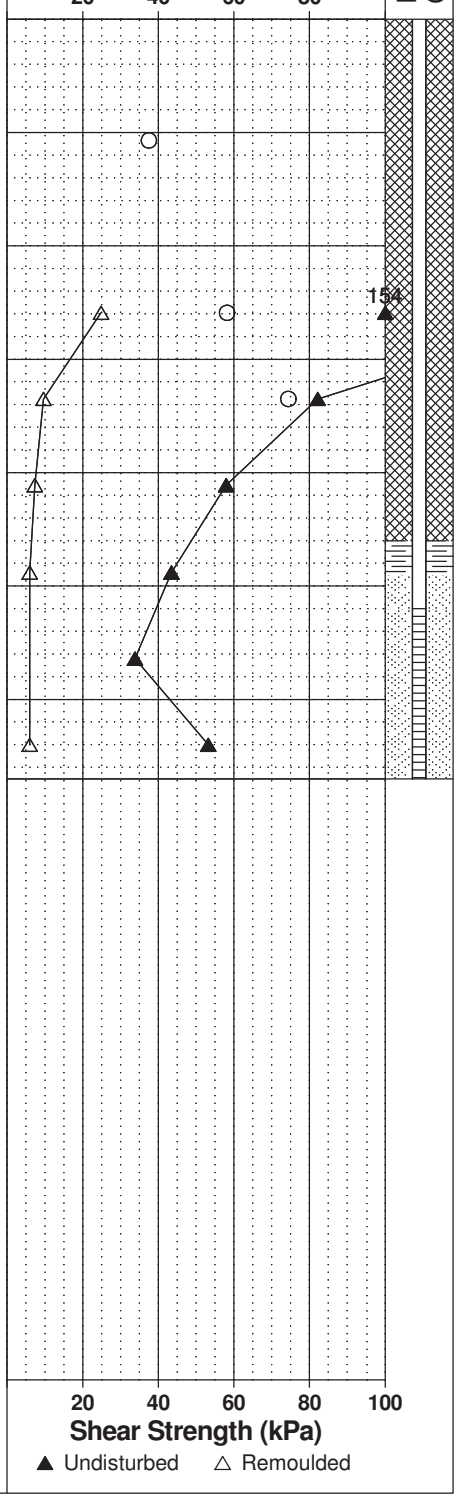
REMARKS

HOLE NO. BH 6-18

BORINGS BY CME 55 Power Auger **DATE** December 6, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	87.61
Brown **SILTY CLAY,** some organics trace topsoil		AU	1				
0.25							
		SS	2	79	11	1	86.61
		SS	3	92	6	2	85.61
Very stiff to stiff, brown **SILTY CLAY**		SS	4	96	P	3	84.61
- stiff to firm and grey by 3.7m depth						4	83.61
						5	82.61
						6	81.61
		SS	5	100	P		
6.70							
End of Borehole							
(Piezometer blocked at 0.43m depth - Dec. 14, 2018)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %



Piezometer Construction

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Supplemental Geotechnical Investigation
3604-3646 Innes Road
Ottawa, Ontario

DATUM Ground surface elevations provided by J.D. Barnes LimiteD

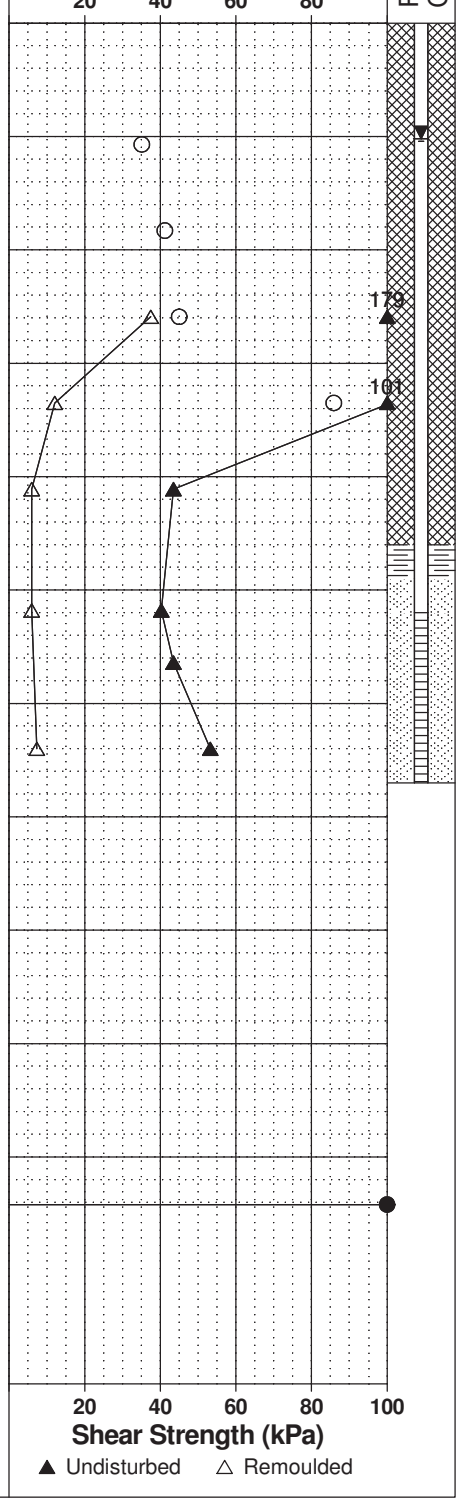
FILE NO. PG4026

REMARKS

HOLE NO. BH 7-18

BORINGS BY CME 55 Power Auger **DATE** December 6, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	86.93
TOPSOIL 0.15		AU	1				
		SS	2	79	13	1	85.93
		SS	3	92	9	2	84.93
Very stiff to stiff, brown **SILTY CLAY**		SS	4	88	P	3	83.93
- firm to stiff and grey by 3.4m depth						4	82.93
						5	81.93
		SS	5	100	P	6	80.93
6.70							
Dynamic Cone Penetration Test commenced at 6.70m depth. Cone pushed to 10.4m depth.						7	79.93
						8	78.93
						9	77.93
						10	76.93
10.42							
End of Borehole							
Practical DCPT refusal at 10.42m depth							
(GWL @ 1.02m - Dec. 14, 2018)							



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SOIL PROFILE AND TEST DATA

Supplemental Geotechnical Investigation
3604-3646 Innes Road
Ottawa, Ontario

DATUM Ground surface elevations provided by J.D. Barnes LimiteD

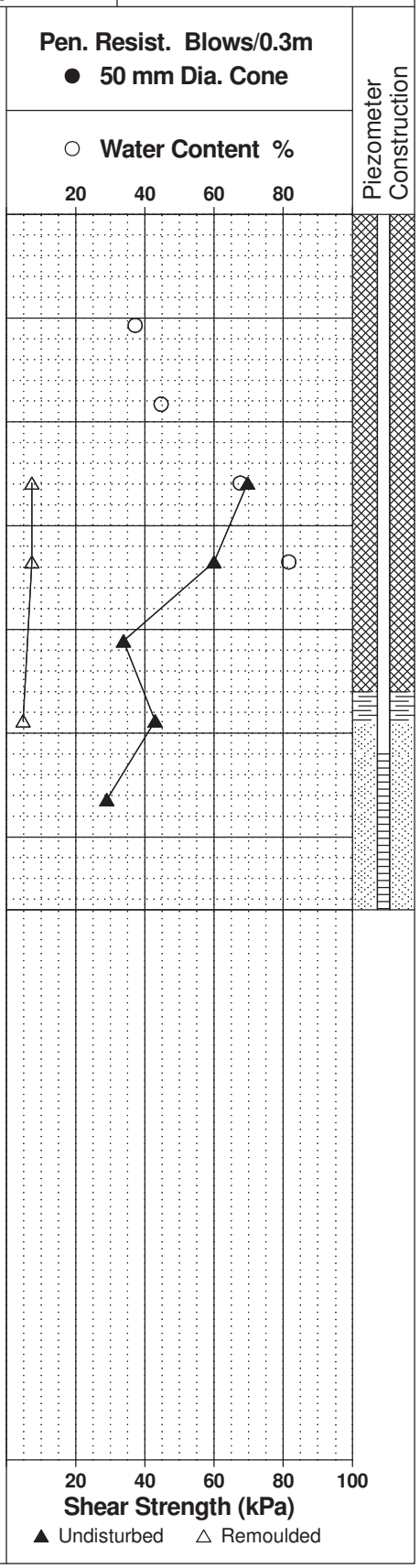
FILE NO. PG4026

REMARKS

HOLE NO. BH 8-18

BORINGS BY CME 55 Power Auger **DATE** December 6, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	87.51
TOPSOIL 0.15		AU	1				
		SS	2	67	10	1	86.51
		SS	3	96	6	2	85.51
Very stiff to stiff, brown **SILTY CLAY**		SS	4	62	P	3	84.51
- firm and grey by 3.8m depth						4	83.51
						5	82.51
		SS	5	100	P	6	81.51
6.70							
End of Borehole							
(Piezometer blocked at 0.48m depth - Dec. 14, 2018)							



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Supplemental Geotechnical Investigation
3604-3646 Innes Road
Ottawa, Ontario

DATUM Ground surface elevations provided by J.D. Barnes LimiteD

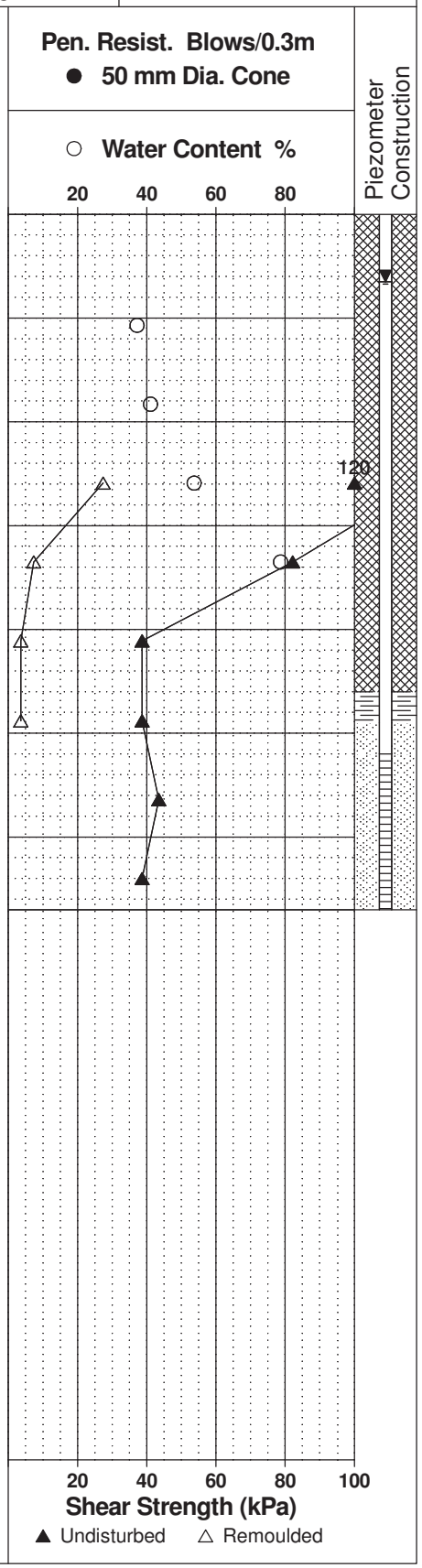
FILE NO. PG4026

REMARKS

HOLE NO. BH 9-18

BORINGS BY CME 55 Power Auger **DATE** December 7, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	86.95
TOPSOIL 0.15		AU	1				
		SS	2	62	10	1	85.95
		SS	3	92	8	2	84.95
Very stiff to stiff, brown **SILTY CLAY**		SS	4	88	P	3	83.95
- firm and grey by 3.7m depth						4	82.95
						5	81.95
						6	80.95
		SS	5	46	P		
6.70							
End of Borehole							
(GWL @ 0.65m - Dec. 14, 2018)							



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Supplemental Geotechnical Investigation
3604-3646 Innes Road
Ottawa, Ontario

DATUM Ground surface elevations provided by J.D. Barnes LimiteD

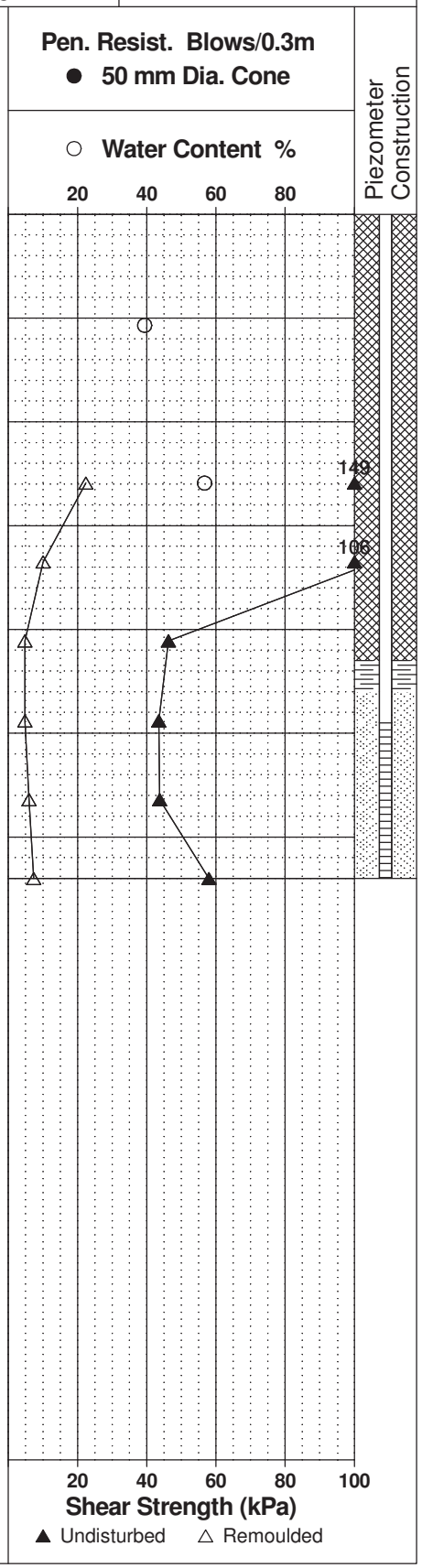
FILE NO. PG4026

REMARKS

HOLE NO. BH10-18

BORINGS BY CME 55 Power Auger **DATE** December 7, 2018

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	86.69
Brown **SILTY CLAY,** trace sand, organics and topsoil 0.15		AU	1				
		SS	2	88	10	1	85.69
		SS	3	96	7	2	84.69
Very stiff to stiff, brown **SILTY CLAY**		SS	4	96	P	3	83.69
- firm to stiff and grey by 3.7m depth						4	82.69
						5	81.69
6.40						6	80.69
End of Borehole							
(Piezometer frozen at 0.5m depth - Dec. 14, 2018)							



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Supplemental Geotechnical Investigation
3604-3646 Innes Road
Ottawa, Ontario

DATUM

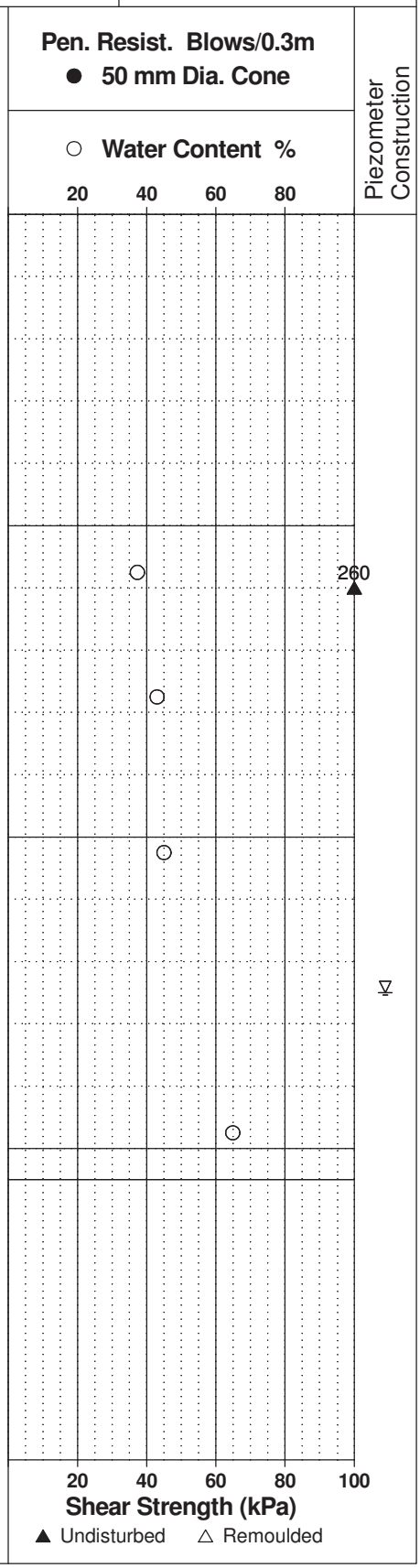
REMARKS

BORINGS BY Backhoe **DATE** August 1, 2017

FILE NO. PG4026

HOLE NO. TP 1

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE							
TOPSOIL 0.10						0	
Hard to stiff, brown **SILTY CLAY**		G	1			1	
		G	2				
		G	3			2	
2.50							
Stiff to firm, grey-brown **SILTY CLAY**		G	4			3	
3.10							
End of Test Pit							
(GWL @ 2.5m depth based on field observations)							



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SOIL PROFILE AND TEST DATA

Supplemental Geotechnical Investigation
3604-3646 Innes Road
Ottawa, Ontario

DATUM

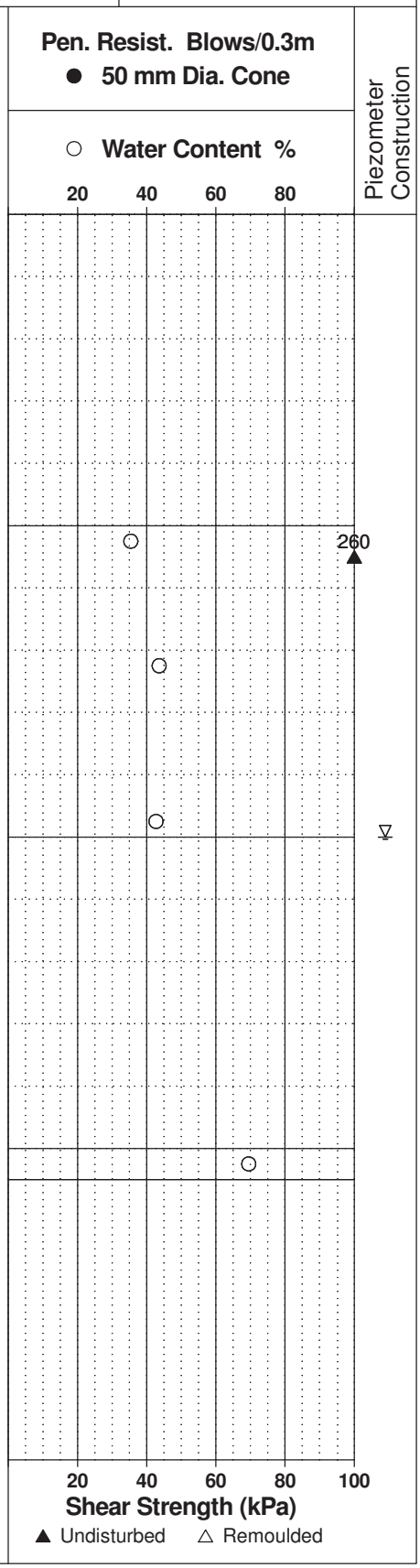
REMARKS

BORINGS BY Backhoe **DATE** August 1, 2017

FILE NO. PG4026

HOLE NO. TP 2

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE									
TOPSOIL 0.15						0			
Hard to stiff, brown **SILTY CLAY**		G	1			1			
		G	2						
		G	3			2			
2.75									
Stiff to firm, grey **SILTY CLAY**						3			
3.10		G	4						
End of Test Pit									
(GWL @ 2.0m depth based on field observations)									



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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Supplemental Geotechnical Investigation
3604-3646 Innes Road
Ottawa, Ontario

DATUM

REMARKS

BORINGS BY Backhoe **DATE** August 1, 2017

FILE NO. PG4026

HOLE NO. TP 3

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)
GROUND SURFACE						0	
TOPSOIL 0.10							
		G	1			1	
Hard to stiff, brown **SILTY CLAY**		G	2				
		G	3			2	
2.90							
Stiff to firm, grey **SILTY CLAY**		G	4			3	
3.30							
End of Test Pit							
(GWL @ 2.6m depth based on field observations)							

Pen. Resist. Blows/0.3m
● 50 mm Dia. Cone
○ Water Content %

20 40 60 80

260

20 40 60 80 100

Shear Strength (kPa)
▲ Undisturbed △ Remoulded

Piezometer Construction

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Supplemental Geotechnical Investigation
3604-3646 Innes Road
Ottawa, Ontario

DATUM

REMARKS

BORINGS BY Backhoe **DATE** August 1, 2017

FILE NO. PG4026

HOLE NO. TP 4

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE									
TOPSOIL 0.15						0			
Hard to stiff, brown **SILTY CLAY**		G	1			1		260	
		G	2						
		G	3			2			
2.80									
Stiff to firm, grey-brown **SILTY CLAY** 3.00		G	4			3			
End of Test Pit									
(GWL @ 2.0m depth based on field observations)									

Pen. Resist. Blows/0.3m: 20 40 60 80

Water Content %: 20 40 60 80

Shear Strength (kPa): 20 40 60 80 100

▲ Undisturbed △ Remoulded

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154 Colonnade Road South, Ottawa, Ontario K2E 7J5

SOIL PROFILE AND TEST DATA

Supplemental Geotechnical Investigation
3604-3646 Innes Road
Ottawa, Ontario

DATUM

REMARKS

BORINGS BY Backhoe **DATE** August 1, 2017

FILE NO. PG4026

HOLE NO. TP 5

SOIL DESCRIPTION	STRATA PLOT	SAMPLE TYPE	SAMPLE NUMBER	SAMPLE % RECOVERY	SAMPLE N VALUE or RQD	DEPTH (m)	ELEV. (m)	Pen. Resist. Blows/0.3m ● 50 mm Dia. Cone ○ Water Content %	Piezometer Construction
GROUND SURFACE						0			
TOPSOIL 0.15									
Hard to stiff, brown **SILTY CLAY**		G	1			1		○ 260	
		G	2					○	
		G	3			2		○	
3.00						3			
Stiff to firm, grey **SILTY CLAY**		G	4					○	
3.20 End of Test Pit									
(GWL @ 2.8 depth based on field observations)									

20 40 60 80

20 40 60 80 100

Shear Strength (kPa)

▲ Undisturbed △ Remoulded

RAPPORT DE FORAGE : **F-01**

GENIVAR

Préparé par : **Catherine Tardy Laporte** Date début : **2013-06-27**
Vérifié par : **Annie Gauthier** Date fin : **2013-06-27**

Nom du projet : **Évaluation Environnementale de site (ÉES) Phase II**
Site : **Site # 38 Orléans**
Secteur : **3636-3646, chemin Innes, Orléans (Ontario)**
Client : **La Coop fédérée**

Numéro de projet : **131-13558-00**
Coordonnées géographiques : X = 75.5191369842 °O
Y = 45.4458564224 °N
Élévation surface : 90.69 m *()*
Élévation margelle :

Entrepreneur forage : Marathon Drilling Co. Ltd.
Type de foreuse : CME 75
Équipement de forage : Tarière tige pleine /
Diamètre du forage : 200 mm
Fluide forage : Aucun
Équip. d'échantillonnage : Carottier fendu

ODEUR
F - Faible odeur
M - Odeur moyenne
P - Odeur persistante

VISUEL
D - Produit disséminé
S - Sol saturé de produit

TYPE D'ÉCHANTILLON
CD - Carottier à diamants
CF - Cuillère fendue
PS - Échantillonneur à piston
TC - Tube creux
TM - Tarière manuelle
TR - Truelle
TS - Tube Shelby
TT - Tube transparent

▽ Niveau d'eau ▼ Phase libre

ANALYSES CHIMIQUES
BPC Biphényles polychlorés
BTEX Benzène, toluène, éthylbenzène, xylène
COT Carbone organique total
C. Inorg. Autres composés inorganiques (cyanure, fluorure, bromure, soufre total)
C. Phénol. Composés phénoliques
COV Hydrocarbures HAM et HAC
Diox. & Fur. Dioxines et furanes
HAC Hydrocarb. aliphatiques chlorés
HAM Hydrocarbures aromatiques monocycliques
HAP Hydrocarbures aromatiques polycycliques
HP C_{10}-C_{50} Hydrocarbures pétroliers C_{10}-C_{50}
HP F1-F4 Hydrocarb. pétrol. F1-F4 (C_{10}-C_{50})
Mercure Mercure
Métaux Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
RMD Lixiviation (mat. dangereuses)

PROFONDEUR *ÉLÉVATION* (m)	STRATIGRAPHIE	DESCRIPTION	CONC. VAPEUR (ppm OU % LIE)	OBSERVATIONS ODEUR F	ODEUR M	ODEUR P	VISUEL D	VISUEL S	TYPE ÉCHANTILLON	% RÉCUPÉRATION	N (Coups/6")	NUMÉRO	ANALYSES	DUPLICATA	PUITS D'OBSERVATION DIAGRAMME	PUITS D'OBSERVATION DESCRIPTION	REMARQUES
		Surface du terrain.															
0.10 *90.59*		Asphalte.															
		Remblai : Gravier sableux sec.							CF	82	11 6 6 11	F-01 (0.30-0.40)	HP F1-F4 HAP BTEX Métaux (R153)				
0.50 *90.19*		Sol naturel : Gravier sableux.										F-01 (0.40-0.50)					
												F-01 (0.50-0.91)					
1.06 *89.63*		Fin du forage à 1.06 m de profondeur.							CF	33	15 R/1.06						Refus à 1.06 m sur bloc ou roc.

RAPPORT DE FORAGE : **F-02**

GENIVAR

Préparé par : **Catherine Tardy Laporte** Date début : **2013-06-27**
Vérifié par : **Annie Gauthier** Date fin : **2013-06-27**

Nom du projet : **Évaluation Environnementale de site (ÉES) Phase II**
Site : **Site # 38 Orléans**
Secteur : **3636-3646, chemin Innes, Orléans (Ontario)**
Client : **La Coop fédérée**

Numéro de projet : **131-13558-00**
Coordonnées géographiques : X = 75.5189257577 °O
Y = 45.445930007 °N
Élévation surface : 90.64 m *()*
Élévation margelle :

Entrepreneur forage : Marathon Drilling Co. Ltd.
Type de foreuse : CME 75
Équipement de forage : Tarière tige pleine /
Diamètre du forage : 200 mm
Fluide forage : Aucun
Équip. d'échantillonnage : Carottier fendu

ODEUR
F - Faible odeur
M - Odeur moyenne
P - Odeur persistante

VISUEL
D - Produit disséminé
S - Sol saturé de produit

TYPE D'ÉCHANTILLON
CD - Carottier à diamants
CF - Cuillère fendue
PS - Échantillonneur à piston
TC - Tube creux
TM - Tarière manuelle
TR - Truelle
TS - Tube Shelby
TT - Tube transparent

▽ Niveau d'eau ▼ Phase libre

ANALYSES CHIMIQUES
BPC Biphényles polychlorés
BTEX Benzène, toluène, éthylbenzène, xylène
COT Carbone organique total
C. Inorg. Autres composés inorganiques (cyanure, fluorure, bromure, soufre total)
C. Phénol. Composés phénoliques
COV Hydrocarbures HAM et HAC
Diox. & Fur. Dioxines et furanes
HAC Hydrocarb. aliphatiques chlorés
HAM Hydrocarbures aromatiques monocycliques
HAP Hydrocarbures aromatiques polycycliques
HP C_{10}-C_{50} Hydrocarbures pétroliers C_{10}-C_{50}
HP F1-F4 Hydrocarb. pétrol. F1-F4 (C_{10}-C_{50})
Mercure Mercure
Métaux Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
RMD Lixiviation (mat. dangereuses)

PROFONDEUR ÉLÉVATION (m)	GÉOLOGIE / STRATIGRAPHIE: STRATIGRAPHIE	GÉOLOGIE / STRATIGRAPHIE: DESCRIPTION	OBSERVATIONS: CONC. VAPEUR (ppm OU % LIE)	OBSERVATIONS: ODEUR (F M P)	OBSERVATIONS: VISUEL (D S)	ÉCHANTILLONS: TYPE ÉCHANTILLON	ÉCHANTILLONS: % RÉCUPÉRATION	ÉCHANTILLONS: N (Coups/6")	ÉCHANTILLONS: NUMÉRO	ÉCHANTILLONS: ANALYSES	ÉCHANTILLONS: DUPLICATA	PUITS D'OBSERVATION: DIAGRAMME	PUITS D'OBSERVATION: DESCRIPTION	REMARQUES
		Surface du terrain.												
0.10 *90.54*		Asphalte.												
		Remblai : Gravier sableux brun gris sec.												
0.45						CF	41	3 11 9 6	F-02 (0.30-0.45)					
0.5 — 0.55 *90.09*		Sol naturel : Sable silteux noir.							F-02 (0.45-0.55)	HP F1-F4 HAP Métaux (R153)				0.5
0.75 *89.89*		Sol naturel : Sable silteux brun sec.							F-02 (0.55-0.75)	HP F1-F4 HAP BTEX				
		Sol naturel : Sable graveleux.							F-02 (0.75-0.91)					
1.0						CF	66	3 6 R/1.21	F-02 (0.91-1.02)					1.0
1.21 *89.43*		Fin du forage à 1.21 m de profondeur.							F-02 (1.02-1.12)					Refus à 1.21 m sur bloc ou roc.
1.5														1.5
2.0														2.0
2.5														2.5
3.0														3.0
3.5														3.5
4.0														4.0

RAPPORT DE FORAGE : **F-03**

GENIVAR

Préparé par : **Catherine Tardy Laporte** Date début : **2013-06-27**
Vérifié par : **Annie Gauthier** Date fin : **2013-06-27**

Nom du projet : **Évaluation Environnementale de site (ÉES) Phase II**
Site : **Site # 38 Orléans**
Secteur : **3636-3646, chemin Innes, Orléans (Ontario)**
Client : **La Coop fédérée**

Numéro de projet : **131-13558-00**
Coordonnées géographiques : X = 75.5196137735 °O
Y = 45.4456012321 °N
Élévation surface : 90.39 m *()*
Élévation margelle :

Entrepreneur forage : Marathon Drilling Co. Ltd.
Type de foreuse : CME 75
Équipement de forage : Tarière tige pleine /
Diamètre du forage : 200 mm
Fluide forage : Aucun
Équip. d'échantillonnage : Carottier fendu

ODEUR
F - Faible odeur
M - Odeur moyenne
P - Odeur persistante

VISUEL
D - Produit disséminé
S - Sol saturé de produit

TYPE D'ÉCHANTILLON
CD - Carottier à diamants
CF - Cuillère fendue
PS - Échantillonneur à piston
TC - Tube creux
TM - Tarière manuelle
TR - Truelle
TS - Tube Shelby
TT - Tube transparent

▽ Niveau d'eau ▼ Phase libre

ANALYSES CHIMIQUES
BPC Biphényles polychlorés
BTEX Benzène, toluène, éthylbenzène, xylène
COT Carbone organique total
C. Inorg. Autres composés inorganiques (cyanure, fluorure, bromure, soufre total)
C. Phénol. Composés phénoliques
COV Hydrocarbures HAM et HAC
Diox. & Fur. Dioxines et furanes
HAC Hydrocarb. aliphatiques chlorés
HAM Hydrocarbures aromatiques monocycliques
HAP Hydrocarbures aromatiques polycycliques
HP C_{10}-C_{50} Hydrocarbures pétroliers C_{10}-C_{50}
HP F1-F4 Hydrocarb. pétrol. F1-F4 (C_{10}-C_{50})
Mercure Mercure
Métaux Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
RMD Lixiviation (mat. dangereuses)

PROFONDEUR ÉLÉVATION (m)	GÉOLOGIE / STRATIGRAPHIE		OBSERVATIONS				ÉCHANTILLONS						PUITS D'OBSERVATION		
	STRATIGRAPHIE	DESCRIPTION	CONC. VAPEUR (ppm OU % LIE)	ODEUR (F M P)	VISUEL (D S)	TYPE ÉCHANTILLON	% RÉCUPÉRATION	N (Coups/6")	NUMÉRO	ANALYSES	DUPLICATA	DIAGRAMME	DESCRIPTION	REMARQUES
		Surface du terrain.												
0.10 *90.29*		Asphalte.												
0.30 *90.09*		Remblai : Gravier sableux sec.												
0.50 *89.89*		Sol naturel : Sable graveleux gris.				CF	49	12 5 5 3	F-03 (0.30-0.50)	HP F1-F4 HAP BTEX Métaux (R153)				
		Sol naturel : Sable silteux avec trace de gravier.							F-03 (0.50-0.91)	HP F1-F4 HAP BTEX Métaux (R153)				
0.91 *89.48*		Sol naturel : Sable silteux.				CF	33		F-03 (0.91-1.01)					
									F-03 (1.01-1.11)	HP F1-F4 HAP BTEX Métaux (R153)				
1.52 *88.87*		Fin du forage à 1.52 m de profondeur.												

RAPPORT DE FORAGE : **F-04**

GENIVAR

Préparé par : **Catherine Tardy Laporte** Date début : **2013-06-27**
Vérifié par : **Annie Gauthier** Date fin : **2013-06-27**

Nom du projet : **Évaluation Environnementale de site (ÉES) Phase II**
Site : **Site # 38 Orléans**
Secteur : **3636-3646, chemin Innes, Orléans (Ontario)**
Client : **La Coop fédérée**

Numéro de projet : **131-13558-00**
Coordonnées géographiques : X = 75.5201167458 °O
Y = 45.4451939281 °N
Élévation surface : 89.29 m *()*
Élévation margelle :

Entrepreneur forage : Marathon Drilling Co. Ltd.
Type de foreuse : CME 75
Équipement de forage : Tarière tige pleine /
Diamètre du forage : 200 mm
Fluide forage : Aucun
Équip. d'échantillonnage : Carottier fendu

ODEUR
F - Faible odeur
M - Odeur moyenne
P - Odeur persistante

VISUEL
D - Produit disséminé
S - Sol saturé de produit

TYPE D'ÉCHANTILLON
CD - Carottier à diamants
CF - Cuillère fendue
PS - Échantillonneur à piston
TC - Tube creux
TM - Tarière manuelle
TR - Truelle
TS - Tube Shelby
TT - Tube transparent

▽ Niveau d'eau ▼ Phase libre

ANALYSES CHIMIQUES

BPC	Biphényles polychlorés
BTEX	Benzène, toluène, éthylbenzène, xylène
COT	Carbone organique total
C. Inorg.	Autres composés inorganiques (cyanure, fluorure, bromure, soufre total)
C. Phénol.	Composés phénoliques
COV	Hydrocarbures HAM et HAC
Diox. & Fur.	Dioxines et furanes
HAC	Hydrocarb. aliphatiques chlorés
HAM	Hydrocarbures aromatiques monocycliques
HAP	Hydrocarbures aromatiques polycycliques
HP C_{10}-C_{50}	Hydrocarbures pétroliers C_{10}-C_{50}
HP F1-F4	Hydrocarb. pétrol. F1-F4 (C_{10}-C_{50})
Mercure	Mercure
Métaux	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
RMD	Lixiviation (mat. dangereuses)

PROFONDEUR / ÉLÉVATION (m)	STRATIGRAPHIE	DESCRIPTION	CONC. VAPEUR (ppm OU % LIE)	ODEUR F	ODEUR M	ODEUR P	VISUEL D	VISUEL S	TYPE ÉCHANTILLON	% RÉCUPÉRATION	N (Coups/6")	NUMÉRO	ANALYSES	DUPLICATA	DIAGRAMME	DESCRIPTION	REMARQUES
		Surface du terrain.															
89.29		Remblai : Sable graveleux gris et blanc.							CF	74	85 55 30 18	F-04 (0.00-0.20)					
0.20																	
89.09		Remblai : Gravier sableux saturé										F-04 (0.20-0.61)					
0.61																	
88.68		Sol naturel : Argile silteuse brune grise.							CF	90	1 1 2 6	F-04 (0.61-1.22)	HP F1-F4 HAP BTEX				
1.22																	
88.07		Fin du forage à 1.22 m de profondeur.															Refus à 1.22 m sur bloc ou roc.

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0

RAPPORT DE FORAGE : **F-05**

GENIVAR

Préparé par : **Catherine Tardy Laporte** Date début : **2013-06-27**
Vérifié par : **Annie Gauthier** Date fin : **2013-06-27**

Nom du projet : **Évaluation Environnementale de site (ÉES) Phase II**
Site : **Site # 38 Orléans**
Secteur : **3636-3646, chemin Innes, Orléans (Ontario)**
Client : **La Coop fédérée**

Numéro de projet : **131-13558-00**
Coordonnées géographiques : X = 75.5198284892 °O
Y = 45.4453512328 °N
Élévation surface : 89.21 m *()*
Élévation margelle :

Entrepreneur forage : Marathon Drilling Co. Ltd.
Type de foreuse : CME 75
Équipement de forage : Tarière tige pleine /
Diamètre du forage : 200 mm
Fluide forage : Aucun
Équip. d'échantillonnage : Carottier fendu

ODEUR
F - Faible odeur
M - Odeur moyenne
P - Odeur persistante

VISUEL
D - Produit disséminé
S - Sol saturé de produit

TYPE D'ÉCHANTILLON
CD - Carottier à diamants
CF - Cuillère fendue
PS - Échantillonneur à piston
TC - Tube creux
TM - Tarière manuelle
TR - Truelle
TS - Tube Shelby
TT - Tube transparent

▽ Niveau d'eau ▼ Phase libre

ANALYSES CHIMIQUES

BPC	Biphényles polychlorés
BTEX	Benzène, toluène, éthylbenzène, xylène
COT	Carbone organique total
C. Inorg.	Autres composés inorganiques (cyanure, fluorure, bromure, soufre total)
C. Phénol.	Composés phénoliques
COV	Hydrocarbures HAM et HAC
Diox. & Fur.	Dioxines et furanes
HAC	Hydrocarb. aliphatiques chlorés
HAM	Hydrocarbures aromatiques monocycliques
HAP	Hydrocarbures aromatiques polycycliques
HP C_{10}-C_{50}	Hydrocarbures pétroliers C_{10}-C_{50}
HP F1-F4	Hydrocarb. pétrol. F1-F4 (C_{10}-C_{50})
Mercure	Mercure
Métaux	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
RMD	Lixiviation (mat. dangereuses)

PROFONDEUR / ÉLÉVATION (m)	GÉOLOGIE / STRATIGRAPHIE	DESCRIPTION	OBSERVATIONS: CONC. VAPEUR (ppm OU % LIE)	ODEUR (F M P)	VISUEL (D S)	ÉCHANTILLONS: TYPE ÉCHANTILLON	% RÉCUPÉRATION	N (Coups/6")	NUMÉRO	ANALYSES	DUPLICATA	PUITS D'OBSERVATION: DIAGRAMME	DESCRIPTION	REMARQUES
		Surface du terrain.												
89.21 / 0.20		Remblai : Sable et gravier sec				CF	66	58 69 21 18	F-05 (0.00-0.20)					
89.01 / 0.61		Sol naturel : Gravier noir et saturé avec un peu de sable.							F-05 (0.20-0.61)					
88.60 / 1.83		Sol naturel : Argile silteuse brune-beige et humide.				CF	100	1 1 5 6	F-05 (0.61-1.22)					
						CF	100		F-05 (1.22-1.32)	HP F1-F4 HAP BTEX Métaux (R153)				
									F-05 (1.32-1.83)					
87.38 / 2.10		Sol naturel : Argile silteuse grise humide.				CF	82	3 8 22 8	F-05 (1.83-2.10)					
87.11 / 2.34		Sol naturel : Gravier sableux gris.							F-05 (2.10-2.34)					
86.87	Roc atteint	Fin du forage à 2.34 m de profondeur.												

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0

RAPPORT DE FORAGE : **F-06**

GENIVAR

Préparé par : **Catherine Tardy Laporte** Date début : **2013-06-27**
Vérifié par : **Annie Gauthier** Date fin : **2013-06-27**

Nom du projet : **Évaluation Environnementale de site (ÉES) Phase II**
Site : **Site # 38 Orléans**
Secteur : **3636-3646, chemin Innes, Orléans (Ontario)**
Client : **La Coop fédérée**

Numéro de projet : **131-13558-00**
Coordonnées géographiques : X = 75.5200570318 °O
Y = 45.4477309683 °N
Élévation surface : 89.22 m *()*
Élévation margelle :

Entrepreneur forage : Marathon Drilling Co. Ltd.
Type de foreuse : CME 75
Équipement de forage : Tarière tige pleine /
Diamètre du forage : 200 mm
Fluide forage : Aucun
Équip. d'échantillonnage : Carottier fendu

ODEUR
F - Faible odeur
M - Odeur moyenne
P - Odeur persistante

VISUEL
D - Produit disséminé
S - Sol saturé de produit

TYPE D'ÉCHANTILLON
CD - Carottier à diamants
CF - Cuillère fendue
PS - Échantillonneur à piston
TC - Tube creux
TM - Tarière manuelle
TR - Truelle
TS - Tube Shelby
TT - Tube transparent

▽ Niveau d'eau ▼ Phase libre

ANALYSES CHIMIQUES

BPC	Biphényles polychlorés
BTEX	Benzène, toluène, éthylbenzène, xylène
COT	Carbone organique total
C. Inorg.	Autres composés inorganiques (cyanure, fluorure, bromure, soufre total)
C. Phénol.	Composés phénoliques
COV	Hydrocarbures HAM et HAC
Diox. & Fur.	Dioxines et furanes
HAC	Hydrocarb. aliphatiques chlorés
HAM	Hydrocarbures aromatiques monocycliques
HAP	Hydrocarbures aromatiques polycycliques
HP C_{10}-C_{50}	Hydrocarbures pétroliers C_{10}-C_{50}
HP F1-F4	Hydrocarb. pétrol. F1-F4 (C_{10}-C_{50})
Mercure	Mercure
Métaux	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
RMD	Lixiviation (mat. dangereuses)

PROFONDEUR *ÉLÉVATION* (m)	GÉOLOGIE / STRATIGRAPHIE: STRATIGRAPHIE	GÉOLOGIE / STRATIGRAPHIE: DESCRIPTION	OBSERVATIONS: CONC. VAPEUR (ppm OU % LIE)	OBSERVATIONS: ODEUR (F M P)	OBSERVATIONS: VISUEL (D S)	ÉCHANTILLONS: TYPE ÉCHANTILLON	ÉCHANTILLONS: % RÉCUPÉRATION	ÉCHANTILLONS: N (Coups/6")	ÉCHANTILLONS: NUMÉRO	ÉCHANTILLONS: ANALYSES	ÉCHANTILLONS: DUPLICATA	PUITS D'OBSERVATION: DIAGRAMME	PUITS D'OBSERVATION: DESCRIPTION	REMARQUES
		Surface du terrain.												
89.22		Remblai : Sable graveleux gris-brun et sec.				CF	100	1 3 4 7	F-06 (0.00-0.61)	HP F1-F4 HAP BTEX				
0.61														
88.61		Sol naturel : Argile silteuse grise.				CF	100	1 4 4 6	F-06 (0.61-1.22)					
						CF	49	56 36 19 10	F-06 (1.22-1.83)					
87.70														
1.83		Fin du forage à 1.52 m de profondeur.												

RAPPORT DE FORAGE : **F-07**

GENIVAR

Préparé par : **Catherine Tardy Laporte** Date début : **2013-06-27**
Vérifié par : **Annie Gauthier** Date fin : **2013-06-27**

Nom du projet : **Évaluation Environnementale de site (ÉES) Phase II**
Site : **Site # 38 Orléans**
Secteur : **3636-3646, chemin Innes, Orléans (Ontario)**
Client : **La Coop fédérée**

Numéro de projet : **131-13558-00**
Coordonnées géographiques : X = 75.5199577902 °O
Y = 45.4476971365 °N
Élévation surface : 89.47 m *()*
Élévation margelle :

Entrepreneur forage : Marathon Drilling Co. Ltd.
Type de foreuse : CME 75
Équipement de forage : Tarière tige pleine /
Diamètre du forage : 200 mm
Fluide forage : Aucun
Équip. d'échantillonnage : Carottier fendu

ODEUR
F - Faible odeur
M - Odeur moyenne
P - Odeur persistante

VISUEL
D - Produit disséminé
S - Sol saturé de produit

TYPE D'ÉCHANTILLON
CD - Carottier à diamants
CF - Cuillère fendue
PS - Échantillonneur à piston
TC - Tube creux
TM - Tarière manuelle
TR - Truelle
TS - Tube Shelby
TT - Tube transparent

▽ Niveau d'eau ▼ Phase libre

ANALYSES CHIMIQUES

BPC	Biphényles polychlorés
BTEX	Benzène, toluène, éthylbenzène, xylène
COT	Carbone organique total
C. Inorg.	Autres composés inorganiques (cyanure, fluorure, bromure, soufre total)
C. Phénol.	Composés phénoliques
COV	Hydrocarbures HAM et HAC
Diox. & Fur.	Dioxines et furanes
HAC	Hydrocarb. aliphatiques chlorés
HAM	Hydrocarbures aromatiques monocycliques
HAP	Hydrocarbures aromatiques polycycliques
HP C_{10}-C_{50}	Hydrocarbures pétroliers C_{10}-C_{50}
HP F1-F4	Hydrocarb. pétrol. F1-F4 (C_{10}-C_{50})
Mercure	Mercure
Métaux	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
RMD	Lixiviation (mat. dangereuses)

PROFONDEUR *ÉLÉVATION* (m)	GÉOLOGIE / STRATIGRAPHIE: STRATIGRAPHIE	GÉOLOGIE / STRATIGRAPHIE: DESCRIPTION	OBSERVATIONS: CONC. VAPEUR (ppm OU % LIE)	OBSERVATIONS: ODEUR (F M P)	OBSERVATIONS: VISUEL (D S)	ÉCHANTILLONS: TYPE ÉCHANTILLON	ÉCHANTILLONS: % RÉCUPÉRATION	ÉCHANTILLONS: N (Coups/6")	ÉCHANTILLONS: NUMÉRO	ÉCHANTILLONS: ANALYSES	ÉCHANTILLONS: DUPLICATA	PUITS D'OBSERVATION: DIAGRAMME	PUITS D'OBSERVATION: DESCRIPTION	REMARQUES
		Surface du terrain.												
89.47		Remblai : Sable graveleux gris-blanc et sec.				CF	57	110 54 13 11	F-07 (0.00-0.50)					
0.50														
0.60		Remblai : Sable graveleux gris-blanc et humide.							F-07 (0.50-0.61)					
88.87		Sol naturel : Argile silteuse.				CF	90	1 3 4 6	F-07 (0.61-1.22)	HP F1-F4 HAP BTEX				
						CF			F-07 (1.22-1.83)					
87.95														
1.83		Fin du forage à 1.52 m de profondeur.												

RAPPORT DE FORAGE : **F-08**

GENIVAR

Préparé par : **Catherine Tardy Laporte** Date début : **2013-06-27**
Vérifié par : **Annie Gauthier** Date fin : **2013-06-27**

Nom du projet : **Évaluation Environnementale de site (ÉES) Phase II**
Site : **Site # 38 Orléans**
Secteur : **3636-3646, chemin Innes, Orléans (Ontario)**
Client : **La Coop fédérée**

Numéro de projet : **131-13558-00**
Coordonnées géographiques : X = 75.5196453839 °O
Y = 45.4472729549 °N
Élévation surface : 89.2 m *()*
Élévation margelle :

Entrepreneur forage : Marathon Drilling Co. Ltd.
Type de foreuse : CME 75
Équipement de forage : Tarière tige pleine /
Diamètre du forage : 200 mm
Fluide forage : Aucun
Équip. d'échantillonnage :

ODEUR
F - Faible odeur
M - Odeur moyenne
P - Odeur persistante

VISUEL
D - Produit disséminé
S - Sol saturé de produit

TYPE D'ÉCHANTILLON
CD - Carottier à diamants
CF - Cuillère fendue
PS - Échantillonneur à piston
TC - Tube creux
TM - Tarière manuelle
TR - Truelle
TS - Tube Shelby
TT - Tube transparent

▽ Niveau d'eau ▼ Phase libre

ANALYSES CHIMIQUES

BPC	Biphényles polychlorés
BTEX	Benzène, toluène, éthylbenzène, xylène
COT	Carbone organique total
C. Inorg.	Autres composés inorganiques (cyanure, fluorure, bromure, soufre total)
C. Phénol.	Composés phénoliques
COV	Hydrocarbures HAM et HAC
Diox. & Fur.	Dioxines et furanes
HAC	Hydrocarb. aliphatiques chlorés
HAM	Hydrocarbures aromatiques monocycliques
HAP	Hydrocarbures aromatiques polycycliques
HP C_{10}-C_{50}	Hydrocarbures pétroliers C_{10}-C_{50}
HP F1-F4	Hydrocarb. pétrol. F1-F4 (C_{10}-C_{50})
Mercure	Mercure
Métaux	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
RMD	Lixiviation (mat. dangereuses)

PROFONDEUR / ÉLÉVATION (m)	GÉOLOGIE / STRATIGRAPHIE		OBSERVATIONS				ÉCHANTILLONS						PUITS D'OBSERVATION		
	STRATIGRAPHIE	DESCRIPTION	CONC. VAPEUR (ppm OU % LIE)	ODEUR			VISUEL		TYPE ÉCHANTILLON	% RÉCUPÉRATION	N (Coups/6")	NUMÉRO	ANALYSES	DUPLICATA	DIAGRAMME	DESCRIPTION	REMARQUES
				F	M	P	D	S									
		Surface du terrain.															
0.10 / *89.10*		Remblai : Argile graveleuse.							CF	41	2 11 8 22						
		Remblai : Sable graveleux gris.											HP F1-F4 HAP BTEX				
0.61 / *88.59*		Fin du forage à 0.61 m de profondeur.															Refus à 0.61 m sur bloc ou roc.

RAPPORT DE FORAGE : **F-09**

GENIVAR

Préparé par : **Catherine Tardy Laporte** Date début : **2013-06-27**
Vérifié par : **Annie Gauthier** Date fin : **2013-06-27**

Nom du projet : **Évaluation Environnementale de site (ÉES) Phase II**
Site : **Site # 38 Orléans**
Secteur : **3636-3646, chemin Innes, Orléans (Ontario)**
Client : **La Coop fédérée**

Numéro de projet : **131-13558-00**
Coordonnées géographiques : X = 75.5190143537 °O
Y = 45.4460829513 °N
Élévation surface : 89.71 m *()*
Élévation margelle :

Entrepreneur forage : Marathon Drilling Co. Ltd.
Type de foreuse : CME 75
Équipement de forage : Tarière tige pleine /
Diamètre du forage : 200 mm
Fluide forage : Aucun
Équip. d'échantillonnage :

ODEUR
F - Faible odeur
M - Odeur moyenne
P - Odeur persistante

VISUEL
D - Produit disséminé
S - Sol saturé de produit

TYPE D'ÉCHANTILLON
CD - Carottier à diamants
CF - Cuillère fendue
PS - Échantillonneur à piston
TC - Tube creux
TM - Tarière manuelle
TR - Truelle
TS - Tube Shelby
TT - Tube transparent

▽ Niveau d'eau ▼ Phase libre

ANALYSES CHIMIQUES
BPC Biphényles polychlorés
BTEX Benzène, toluène, éthylbenzène, xylène
COT Carbone organique total
C. Inorg. Autres composés inorganiques (cyanure, fluorure, bromure, soufre total)
C. Phénol. Composés phénoliques
COV Hydrocarbures HAM et HAC
Diox. & Fur. Dioxines et furanes
HAC Hydrocarb. aliphatiques chlorés
HAM Hydrocarbures aromatiques monocycliques
HAP Hydrocarbures aromatiques polycycliques
HP C_{10}-C_{50} Hydrocarbures pétroliers C_{10}-C_{50}
HP F1-F4 Hydrocarb. pétrol. F1-F4 (C_{10}-C_{50})
Mercure Mercure
Métaux Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
RMD Lixiviation (mat. dangereuses)

PROFONDEUR ÉLÉVATION (m)	GÉOLOGIE / STRATIGRAPHIE: STRATIGRAPHIE	GÉOLOGIE / STRATIGRAPHIE: DESCRIPTION	OBSERVATIONS: CONC. VAPEUR (ppm OU % LIE)	OBSERVATIONS: ODEUR (F M P)	OBSERVATIONS: VISUEL (D S)	ÉCHANTILLONS: TYPE ÉCHANTILLON	ÉCHANTILLONS: % RÉCUPÉRATION	ÉCHANTILLONS: N (Coups/6")	ÉCHANTILLONS: NUMÉRO	ÉCHANTILLONS: ANALYSES	ÉCHANTILLONS: DUPLICATA	PUITS D'OBSERVATION: DIAGRAMME	PUITS D'OBSERVATION: DESCRIPTION	REMARQUES
		Surface du terrain.												
89.71		Remblai : Sable et gravier. Gris blanc sec devenant humide.				CF	74	64 66 24 16		HP F1-F4 HAP BTEX	DUP7			
0.61														
89.10		Sol naturel : Argile silteuse avec un peu de sable humide.				CF	25	1 2 3 4						
						CF	100	2 3 3 5						
88.19														
1.83		Fin du forage à 1.52 m de profondeur.												

RAPPORT DE FORAGE : **PO-01**

GENIVAR

Préparé par : **Catherine Tardy Laporte** Date début : **2013-06-27**
Vérifié par : **Annie Gauthier** Date fin : **2013-06-27**

Nom du projet : **Évaluation Environnementale de site (ÉES) Phase II**
Site : **Site # 38 Orléans**
Secteur : **3636-3646, chemin Innes, Orléans (Ontario)**
Client : **La Coop fédérée**

Numéro de projet : **131-13558-00**
Coordonnées géographiques : X = 75.5189110706 °O
Y = 45.446095328 °N
Élévation surface : 89.99 m *()*
Élévation margelle : 89.99 m *()*

Entrepreneur forage : Marathon Drilling Co. Ltd.
Type de foreuse : CME 75
Équipement de forage : Tarière tige pleine /
Diamètre du forage : 200 mm
Fluide forage : Aucun
Équip. d'échantillonnage : Carottier fendu

ODEUR
F - Faible odeur
M - Odeur moyenne
P - Odeur persistante

VISUEL
D - Produit disséminé
S - Sol saturé de produit

TYPE D'ÉCHANTILLON
CD - Carottier à diamants
CF - Cuillère fendue
PS - Échantillonneur à piston
TC - Tube creux
TM - Tarière manuelle
TR - Truelle
TS - Tube Shelby
TT - Tube transparent

▽ Niveau d'eau ▼ Phase libre

ANALYSES CHIMIQUES
BPC Biphényles polychlorés
BTEX Benzène, toluène, éthylbenzène, xylène
COT Carbone organique total
C. Inorg. Autres composés inorganiques (cyanure, fluorure, bromure, soufre total)
C. Phénol. Composés phénoliques
COV Hydrocarbures HAM et HAC
Diox. & Fur. Dioxines et furanes
HAC Hydrocarb. aliphatiques chlorés
HAM Hydrocarbures aromatiques monocycliques
HAP Hydrocarbures aromatiques polycycliques
HP C_{10}-C_{50} Hydrocarbures pétroliers C_{10}-C_{50}
HP F1-F4 Hydrocarb. pétrol. F1-F4 (C_{10}-C_{50})
Mercure Mercure
Métaux Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
RMD Lixiviation (mat. dangereuses)

PROFONDEUR / ÉLÉVATION (m)	GÉOLOGIE / STRATIGRAPHIE	DESCRIPTION	OBSERVATIONS: CONC. VAPEUR (ppm OU % LIE)	ODEUR (F M P)	VISUEL (D S)	ÉCHANTILLONS: TYPE ÉCHANTILLON	% RÉCUPÉRATION	N (Coups/6")	NUMÉRO	ANALYSES	DUPLICATA	PUITS D'OBSERVATION: DIAGRAMME	DESCRIPTION	REMARQUES
		Surface du terrain.												
89.99		Remblai : Sable graveleux gris avec trace d'oxydation.				CF	57	60 55 35 22	PO-01 (0.00-0.61)					
0.61														
89.38		Sol naturel : Argile silteuse brune.				CF	90	2 6 8 6	PO-01 (0.61-0.86)	HP F1-F4 HAP BTEX Métaux (R153)				
0.86														
89.13		Sol naturel : Sable silteux humide.							PO-01 (0.86-1.22)					
1.22														
88.77		Sol naturel : Argile silteuse grise et humide.				CF	100	2 2 4 6	PO-01 (1.22-1.83)					
1.83														
87.91		Fin du forage à 2.08 m de profondeur.												

Margelle
Bentonite
Tube PVC
Sable
CRÉPINE
CPV
Diam. : 30 mm
Ouv. : 0.25 mm
Long. : 1.52 m
EAU
Prof. : 0.48 m
Élév. : 89.46 m
Date : 2013-07-08
Bouchon

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0

RAPPORT DE TRANCHÉE : **TE-01**

GENIVAR

Préparé par : **Catherine Tardy Laporte** Date début : **2013-07-02**
Vérifié par : **Annie Gauthier** Date fin : **2013-07-02**

Nom du projet : **Évaluation Environnementale de site (ÉES) Phase II**
Site : **Site # 38 Orléans**
Secteur : **3636-3646, chemin Innes, Orléans (Ontario)**
Client : **La Coop fédérée**

Numéro de projet : **131-13558-00**
Coordonnées géographiques : X = 75.5199533185 °O
Y = 45.4457572743 °N
Élévation surface : 89.57 m *()*
Élévation margelle :

Entrepreneur forage : Denis Ladouceur Excavation Ltée
Type de foreuse : Rétrocaveuse
Équipement de forage : Manuelle /
Diamètre du forage :
Fluide forage :
Équip. d'échantillonnage : Carottier fendu

ODEUR
F - Faible odeur
M - Odeur moyenne
P - Odeur persistante

VISUEL
D - Produit disséminé
S - Sol saturé de produit

TYPE D'ÉCHANTILLON
CD - Carottier à diamants
CF - Cuillère fendue
PS - Échantillonneur à piston
TC - Tube creux
TM - Tarière manuelle
TR - Truelle
TS - Tube Shelby
TT - Tube transparent

Niveau d'eau Phase libre

ANALYSES CHIMIQUES
BPC Biphényles polychlorés
BTEX Benzène, toluène, éthylbenzène, xylène
COT Carbone organique total
C. Inorg. Autres composés inorganiques (cyanure, fluorure, bromure, soufre total)
C. Phénol. Composés phénoliques
COV Hydrocarbures HAM et HAC
Diox. & Fur. Dioxines et furanes
HAC Hydrocarb. aliphatiques chlorés
HAM Hydrocarbures aromatiques monocycliques
HAP Hydrocarbures aromatiques polycycliques
HP C_{10}-C_{50} Hydrocarbures pétroliers C_{10}-C_{50}
HP F1-F4 Hydrocarb. pétrol. F1-F4 (C_{10}-C_{50})
Mercure Mercure
Métaux Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
RMD Lixiviation (mat. dangereuses)

PROFONDEUR *ÉLÉVATION* (m)	GÉOLOGIE / STRATIGRAPHIE: STRATIGRAPHIE	GÉOLOGIE / STRATIGRAPHIE: DESCRIPTION	OBSERVATIONS: CONC. VAPEUR (ppm OU % LIE)	OBSERVATIONS: ODEUR (F M P)	OBSERVATIONS: VISUEL (D S)	ÉCHANTILLONS: TYPE ÉCHANTILLON	ÉCHANTILLONS: % RÉCUPÉRATION	ÉCHANTILLONS: N (Coups/6")	ÉCHANTILLONS: NUMÉRO	ÉCHANTILLONS: ANALYSES	ÉCHANTILLONS: DUPLICATA	PUITS D'OBSERVATION: DIAGRAMME	PUITS D'OBSERVATION: DESCRIPTION	REMARQUES
		Surface du terrain.												
89.57		Remblai : Gravier sableux avec trace de silt. Gris et humide.				TR			TE-01 (0.00-0.30)					
0.30 *89.27*		Remblai : Silt sableux brun avec trace de matière résiduelle (bois brûlé).		M	D				TE-01 (0.30-0.60)	HP F1-F4 HAP BTEX Métaux (R153)				
0.60 *88.97*		*Infiltration d'eau à 0.6 m.* Sol naturel : Silt argileux gris humide.							TE-01 (0.60-1.00)					
1.00 *88.57*		Sol naturel : Silt sableux graveleux avec trace d'argile. Gris humide.							TE-01 (1.00-3.50)					
3.50 *86.07*	Roc atteint	*Infiltration d'eau.* Fin de la tranchée												

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0

RAPPORT DE TRANCHÉE : **TE-02**

GENIVAR

Préparé par : **Catherine Tardy Laporte** Date début : **2013-07-02**
Vérifié par : **Annie Gauthier** Date fin : **2013-07-02**

Nom du projet : **Évaluation Environnementale de site (ÉES) Phase II**
Site : **Site # 38 Orléans**
Secteur : **3636-3646, chemin Innes, Orléans (Ontario)**
Client : **La Coop fédérée**

Numéro de projet : **131-13558-00**
Coordonnées géographiques : X = 75.5205637155 °O
Y = 45.4458202359 °N
Élévation surface : 89.59 m *()*
Élévation margelle :

Entrepreneur forage : Denis Ladouceur Excavation Ltée
Type de foreuse : Rétrocaveuse
Équipement de forage : Manuelle /
Diamètre du forage :
Fluide forage :
Équip. d'échantillonnage : Carottier fendu

ODEUR
F - Faible odeur
M - Odeur moyenne
P - Odeur persistante

VISUEL
D - Produit disséminé
S - Sol saturé de produit

TYPE D'ÉCHANTILLON
CD - Carottier à diamants
CF - Cuillère fendue
PS - Échantillonneur à piston
TC - Tube creux
TM - Tarière manuelle
TR - Truelle
TS - Tube Shelby
TT - Tube transparent

Niveau d'eau Phase libre

ANALYSES CHIMIQUES
BPC Biphényles polychlorés
BTEX Benzène, toluène, éthylbenzène, xylène
COT Carbone organique total
C. Inorg. Autres composés inorganiques (cyanure, fluorure, bromure, soufre total)
C. Phénol. Composés phénoliques
COV Hydrocarbures HAM et HAC
Diox. & Fur. Dioxines et furanes
HAC Hydrocarb. aliphatiques chlorés
HAM Hydrocarbures aromatiques monocycliques
HAP Hydrocarbures aromatiques polycycliques
HP C_{10}-C_{50} Hydrocarbures pétroliers C_{10}-C_{50}
HP F1-F4 Hydrocarb. pétrol. F1-F4 (C_{10}-C_{50})
Mercure Mercure
Métaux Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
RMD Lixiviation (mat. dangereuses)

PROFONDEUR / ÉLÉVATION (m)	GÉOLOGIE / STRATIGRAPHIE	DESCRIPTION	OBSERVATIONS: CONC. VAPEUR (ppm OU % LIE)	ODEUR (F M P)	VISUEL (D S)	ÉCHANTILLONS: TYPE ÉCHANTILLON	% RÉCUPÉRATION	N (Coups/6")	NUMÉRO	ANALYSES	DUPLICATA	PUITS D'OBSERVATION: DIAGRAMME	DESCRIPTION	REMARQUES
		Surface du terrain.												
89.59		Remblai : Matière résiduelle (55%) (brique, bois, bois brûlé et plastique) et silt sableux avec trace de matière organique. Brun humide.				TR			TE-02 (0.00-0.35)	HP F1-F4 HAP BTEX Métaux (R153)				
0.35 / 89.24		Sol naturel : Silt avec un peu de sable et trace de matière organique.							TE-02 (0.35-1.00)	HP F1-F4 HAP BTEX Métaux (R153)				
1.00 / 88.59		Sol naturel : Silt argileux avec traces de gravier brun-beige.							TE-02 (1.00-1.45)	HP F1-F4 HAP BTEX Métaux (R153)				
1.45 / 88.14		Sol naturel : Silt argileux gris avec traces de gravier.							TE-02 (1.45-3.30)					
3.30 / 86.29	Roc atteint	*Infiltration d'eau.* Fin de la tranchée												

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0

RAPPORT DE TRANCHÉE : **TE-03**

GENIVAR

Préparé par : **Catherine Tardy Laporte** Date début : **2013-07-02**
Vérifié par : **Annie Gauthier** Date fin : **2013-07-02**

Nom du projet : **Évaluation Environnementale de site (ÉES) Phase II**
Site : **Site # 38 Orléans**
Secteur : **3636-3646, chemin Innes, Orléans (Ontario)**
Client : **La Coop fédérée**

Numéro de projet : **131-13558-00**
Coordonnées géographiques : X = 75.5206801071 °O
Y = 45.4461519033 °N
Élévation surface : 88.98 m *()*
Élévation margelle :

Entrepreneur forage : Denis Ladouceur Excavation Ltée
Type de foreuse : Rétrocaveuse
Équipement de forage : Manuelle /
Diamètre du forage :
Fluide forage :
Équip. d'échantillonnage : Carottier fendu

ODEUR
F - Faible odeur
M - Odeur moyenne
P - Odeur persistante

VISUEL
D - Produit disséminé
S - Sol saturé de produit

TYPE D'ÉCHANTILLON
CD - Carottier à diamants
CF - Cuillère fendue
PS - Échantillonneur à piston
TC - Tube creux
TM - Tarière manuelle
TR - Truelle
TS - Tube Shelby
TT - Tube transparent

Niveau d'eau Phase libre

ANALYSES CHIMIQUES
BPC Biphényles polychlorés
BTEX Benzène, toluène, éthylbenzène, xylène
COT Carbone organique total
C. Inorg. Autres composés inorganiques (cyanure, fluorure, bromure, soufre total)
C. Phénol. Composés phénoliques
COV Hydrocarbures HAM et HAC
Diox. & Fur. Dioxines et furanes
HAC Hydrocarb. aliphatiques chlorés
HAM Hydrocarbures aromatiques monocycliques
HAP Hydrocarbures aromatiques polycycliques
HP C_{10}-C_{50} Hydrocarbures pétroliers C_{10}-C_{50}
HP F1-F4 Hydrocarb. pétrol. F1-F4 (C_{10}-C_{50})
Mercure Mercure
Métaux Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
RMD Lixiviation (mat. dangereuses)

PROFONDEUR / ÉLÉVATION (m)	GÉOLOGIE / STRATIGRAPHIE: STRATIGRAPHIE	GÉOLOGIE / STRATIGRAPHIE: DESCRIPTION	OBSERVATIONS: CONC. VAPEUR (ppm OU % LIE)	OBSERVATIONS: ODEUR (F M P)	OBSERVATIONS: VISUEL (D S)	ÉCHANTILLONS: TYPE ÉCHANTILLON	ÉCHANTILLONS: % RÉCUPÉRATION	ÉCHANTILLONS: N (Coups/6")	ÉCHANTILLONS: NUMÉRO	ÉCHANTILLONS: ANALYSES	ÉCHANTILLONS: DUPLICATA	PUITS D'OBSERVATION: DIAGRAMME	PUITS D'OBSERVATION: DESCRIPTION	REMARQUES
		Surface du terrain.												
88.98		Remblai : Gravier sableux gris saturé. *Eau à la surface.*				TR			TE-03 (0.00-0.30)					
0.30 *88.68*		Sol naturel : Silt argileux gris humide.							TE-03 (0.30-1.00)	HP F1-F4 HAP	DUP8			
1.00 *87.98*		Sol naturel : Silt avec un peu d'argile gris humide.							TE-03 (1.00-2.60)					
2.60 *86.38*	Roc atteint	Fin de la tranchée												

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0

RAPPORT DE TRANCHÉE : **TE-04**

GENIVAR

Préparé par : **Catherine Tardy Laporte** Date début : **2013-07-02**
Vérifié par : **Annie Gauthier** Date fin : **2013-07-02**

Nom du projet : **Évaluation Environnementale de site (ÉES) Phase II**
Site : **Site # 38 Orléans**
Secteur : **3636-3646, chemin Innes, Orléans (Ontario)**
Client : **La Coop fédérée**

Numéro de projet : **131-13558-00**
Coordonnées géographiques : X = 75.5202005926 °O
Y = 45.4465543177 °N
Élévation surface : 90.77 m *()*
Élévation margelle :

Entrepreneur forage : Denis Ladouceur Excavation Ltée
Type de foreuse : Rétrocaveuse
Équipement de forage : Manuelle /
Diamètre du forage :
Fluide forage :
Équip. d'échantillonnage : Carottier fendu

ODEUR
F - Faible odeur
M - Odeur moyenne
P - Odeur persistante

VISUEL
D - Produit disséminé
S - Sol saturé de produit

TYPE D'ÉCHANTILLON
CD - Carottier à diamants
CF - Cuillère fendue
PS - Échantillonneur à piston
TC - Tube creux
TM - Tarière manuelle
TR - Truelle
TS - Tube Shelby
TT - Tube transparent

Niveau d'eau Phase libre

ANALYSES CHIMIQUES
BPC Biphényles polychlorés
BTEX Benzène, toluène, éthylbenzène, xylène
COT Carbone organique total
C. Inorg. Autres composés inorganiques (cyanure, fluorure, bromure, soufre total)
C. Phénol. Composés phénoliques
COV Hydrocarbures HAM et HAC
Diox. & Fur. Dioxines et furanes
HAC Hydrocarb. aliphatiques chlorés
HAM Hydrocarbures aromatiques monocycliques
HAP Hydrocarbures aromatiques polycycliques
HP C_{10}-C_{50} Hydrocarbures pétroliers C_{10}-C_{50}
HP F1-F4 Hydrocarb. pétrol. F1-F4 (C_{10}-C_{50})
Mercure Mercure
Métaux Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
RMD Lixiviation (mat. dangereuses)

PROFONDEUR *ÉLÉVATION* (m)	GÉOLOGIE / STRATIGRAPHIE: STRATIGRAPHIE	GÉOLOGIE / STRATIGRAPHIE: DESCRIPTION	OBSERVATIONS: CONC. VAPEUR (ppm OU % LIE)	OBSERVATIONS: ODEUR (F M P)	OBSERVATIONS: VISUEL (D S)	ÉCHANTILLONS: TYPE ÉCHANTILLON	ÉCHANTILLONS: % RÉCUPÉRATION	ÉCHANTILLONS: N (Coups/6")	ÉCHANTILLONS: NUMÉRO	ÉCHANTILLONS: ANALYSES	ÉCHANTILLONS: DUPLICATA	PUITS D'OBSERVATION: DIAGRAMME	PUITS D'OBSERVATION: DESCRIPTION	REMARQUES
		Surface du terrain.												
90.77		Remblai : Sable graveleux avec trace de matière organique. Brun sec.				TR			TE-04 (0.00-1.00)					
1.00 *89.77*		Remblai : Silt argileux avec trace de matière organique. Brun noir humide.							TE-04 (1.00-2.30)	HP F1-F4 HAP Métaux (R153)				
2.30 *88.47*		Sol naturel : Silt avec un peu d'argile gris humide.							TE-04 (2.30-3.20)					
3.20 *87.57*		*Infiltration d'eau*												
		Fin de la tranchée												

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0

RAPPORT DE TRANCHÉE : **TE-05**

GENIVAR

Préparé par : **Catherine Tardy Laporte** Date début : **2013-07-02**
Vérifié par : **Annie Gauthier** Date fin : **2013-07-02**

Nom du projet : **Évaluation Environnementale de site (ÉES) Phase II**
Site : **Site # 38 Orléans**
Secteur : **3636-3646, chemin Innes, Orléans (Ontario)**
Client : **La Coop fédérée**

Numéro de projet : **131-13558-00**
Coordonnées géographiques : X = 75.5204743629 °O
Y = 45.4472004843 °N
Élévation surface : 92.43 m *()*
Élévation margelle :

Entrepreneur forage : Denis Ladouceur Excavation Ltée
Type de foreuse : Rétrocaveuse
Équipement de forage : Manuelle /
Diamètre du forage :
Fluide forage :
Équip. d'échantillonnage : Carottier fendu

ODEUR
F - Faible odeur
M - Odeur moyenne
P - Odeur persistante

VISUEL
D - Produit disséminé
S - Sol saturé de produit

TYPE D'ÉCHANTILLON
CD - Carottier à diamants
CF - Cuillère fendue
PS - Échantillonneur à piston
TC - Tube creux
TM - Tarière manuelle
TR - Truelle
TS - Tube Shelby
TT - Tube transparent

Niveau d'eau ▼ Phase libre

ANALYSES CHIMIQUES

BPC	Biphényles polychlorés
BTEX	Benzène, toluène, éthylbenzène, xylène
COT	Carbone organique total
C. Inorg.	Autres composés inorganiques (cyanure, fluorure, bromure, soufre total)
C. Phénol.	Composés phénoliques
COV	Hydrocarbures HAM et HAC
Diox. & Fur.	Dioxines et furanes
HAC	Hydrocarb. aliphatiques chlorés
HAM	Hydrocarbures aromatiques monocycliques
HAP	Hydrocarbures aromatiques polycycliques
HP C_{10}-C_{50}	Hydrocarbures pétroliers C_{10}-C_{50}
HP F1-F4	Hydrocarb. pétrol. F1-F4 (C_{10}-C_{50})
Mercure	Mercure
Métaux	Argent, arsenic, baryum, cadmium, cobalt, chrome, cuivre, étain, manganèse, molybdène, nickel, plomb, sélénium, zinc.
RMD	Lixiviation (mat. dangereuses)

PROFONDEUR ÉLÉVATION (m)	GÉOLOGIE / STRATIGRAPHIE		OBSERVATIONS				ÉCHANTILLONS						PUITS D'OBSERVATION		
	STRATIGRAPHIE	DESCRIPTION	CONC. VAPEUR (ppm OU % LIE)	ODEUR F M P	VISUEL D S		TYPE ÉCHANTILLON	% RÉCUPÉRATION	N (Coups/6")	NUMÉRO	ANALYSES	DUPLICATA	DIAGRAMME	DESCRIPTION	REMARQUES
		Surface du terrain.													
92.43															
0.15		Terre végétale et un peu de matière résiduelle (20%) (brique).					TR								
92.28		Remblai : Silt sableux graveleux avec trace de matière résiduelle (bois) brun.								TE-05 (0.15-2.30)	HP F1-F4 HAP				
2.30															
90.13		Remblai : Silt argileux avec trace de matière organique brun noir.								TE-05 (2.30-3.00)					
										TE-05 (3.00-3.60)					
3.60															
88.83		Fin de la tranchée													

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0

BOREHOLE DRILLING RECORD : **BH16-1**

Prepared by: **Kathryn Maton** Date (Start): **1/6/2016**
Reviewed by: **Carolyn Adams** Date (End): **1/6/2016**

Project Name: **Phase Two Environmental Site Assessment**
Site: **Part of Lot 4, Concession 3, Parts 1-5, Gloucester, Ontario**
Sector:
Client: **The Builders Warehouse Inc.**

Project Number: **161-06382-00**
Geographic Coordinates: X = 5032601 mE
Y = 459357 mN
Surface Elevation: m *()*
Top of PVC Elevation:

Drilling Company: Strata Drilling Group
Drilling Equipment: Geomachine GS100
Drilling Method: Probe rod
Borehole Diameter: 50 mm
Drilling Fluid: None
Sampling Method:

ODOUR
F - Light
M - Medium
P - Persistent

VISUAL
D - Disseminated Product
S - Saturated with Product

SAMPLE TYPE
DC - Diamond Corer
SS - Split Spoon
MA - Manual Auger
TR - Trowel
ST - Shelby Tube
TU - DT32 Liner
MC - Macro Core Liner

Water Level ▽ Free Phase

CHEMICAL ANALYSIS
PCB Poly-Chlorinated Biphenyls
BTEX Benzene, Toluene, Ethylbenzene, Xylene
Inorg. C. Inorganic Compounds
Phenol. C. Phenolic Compounds
VOC Volatil Organic Compounds (MAH & CAH)
Diox. & Fur. Dioxins & Furans
CAH Chlorinated Aliphatic Hydrocarbons
MAH Monocyclic Aromatic Hydrocarbons
PAH Polycyclic Aromatic Hydrocarbons
PH C_{10}-C_{50} Petroleum Hydrocarbons C_{10}-C_{50}
PH F1-F4 Petroleum Hydrocarbons F1-F4 (C_{10}-C_{50})
Metals Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Silver, Tin, Zinc.
HWR Leacheate Tests (Haz. Waste Reg.)

DEPTH *ELEVATION* (m)	GEOLOGY / LITHOLOGY: LITHOLOGY	GEOLOGY / LITHOLOGY: DESCRIPTION	OBSERVATIONS: VAPOR CONC. I - Isobutylene (ppm) H - Hexane (ppm)	OBSERVATIONS: ODOUR F M P	OBSERVATIONS: VISUAL D S	SAMPLES: SAMPLE TYPE	SAMPLES: % RECOVERY	SAMPLES: N (Blow/6")	SAMPLES: NUMBER	SAMPLES: ANALYSIS	SAMPLES: DUPLICATE	MONITORING WELL: DIAGRAM	MONITORING WELL: DESCRIPTION	REMARKS
		Ground surface.												
0.30		**FILL** sand and gravel, brown, dry	H - 0, I - 0			MC	66		BH16-1 1A					
		CLAYEY SILT brown, moist, stiff	H - 0, I - 0						BH16-1 1B	Metals and Inorganics				
1.52		**SILTY CLAY** grey-brown, moist, stiff	H - 0, I - 0			MC	100		BH16-1 2A	Metals and Inorganics				
2.53		**GRAVEL** with sand and some silty clay, grey-brown, wet, soft	H - 0, I - 0						BH16-1 2B	Metals and Inorganics				
2.89		*Refusal at 2.89 m below ground surface on assumed bedrock*												
		End of borehole at 2.89 m.												

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Projet : 161-08368-00 PHASE TWO ESA - 3636 INNES ROAD.GPJ Type rapport : WSP_EN_WELL-ENVIRONMENTAL Data Template : WSP_TEMPLATE_GEOTECH.GDT 6/10/2016

BOREHOLE DRILLING RECORD : **BH16-2**

Prepared by: **Kathryn Maton** Date (Start): **1/6/2016**
Reviewed by: **Carolyn Adams** Date (End): **1/6/2016**

Project Name: **Phase Two Environmental Site Assessment**
Site: **Part of Lot 4, Concession 3, Parts 1-5, Gloucester, Ontario**
Sector:
Client: **The Builders Warehouse Inc.**

Project Number: **161-06382-00**
Geographic Coordinates: X = 5032622 mE
Y = 459337 mN
Surface Elevation: m *()*
Top of PVC Elevation:

Drilling Company: Strata Drilling Group
Drilling Equipment: Geomachine GS100
Drilling Method: Probe rod
Borehole Diameter: 50 mm
Drilling Fluid: None
Sampling Method:

ODOUR
F - Light
M - Medium
P - Persistent

VISUAL
D - Disseminated Product
S - Saturated with Product

SAMPLE TYPE
DC - Diamond Corer
SS - Split Spoon
MA - Manual Auger
TR - Trowel
ST - Shelby Tube
TU - DT32 Liner
MC - Macro Core Liner

▽ Water Level ▼ Free Phase

CHEMICAL ANALYSIS

PCB	Poly-Chlorinated Biphenyls	MAH	Monocyclic Aromatic Hydrocarbons
BTEX	Benzene, Toluene, Ethylbenzene, Xylene	PAH	Polycyclic Aromatic Hydrocarbons
Inorg. C.	Inorganic Compounds	PH C_{10}-C_{50}	Petroleum Hydrocarbons C_{10}-C_{50}
Phenol. C.	Phenolic Compounds	PH F1-F4	Petroleum Hydrocarbons F1-F4 (C_{10}-C_{50})
VOC	Volatil Organic Compounds (MAH & CAH)	Metals	Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Silver, Tin, Zinc.
Diox. & Fur.	Dioxins & Furans	HWR	Leacheate Tests (Haz. Waste Reg.)
CAH	Chlorinated Aliphatic Hydrocarbons		

DEPTH *ELEVATION* (m)	LITHOLOGY	DESCRIPTION	VAPOR CONC. I - Isobutylene (ppm) H - Hexane (ppm)	ODOUR F M P	VISUAL D S	SAMPLE TYPE	% RECOVERY	N (Blow/6")	NUMBER	ANALYSIS	DUPLICATE	MONITORING WELL DIAGRAM	MONITORING WELL DESCRIPTION	REMARKS
		Ground surface.												
0.30		**FILL** sand and gravel, brown, dry	H - 0, I - 0			MC	50		BH16-2 1A					
		CLAYEY SILT brown, moist, stiff	H - 20, I - 0						BH16-2 1B	Metals and Inorganics				
			H - 0, I - 0			MC	83		BH16-2 2A	Metals and Inorganics				
2.44		*with some sand* *Refusal at 2.44 m below ground surface on assumed bedrock*	H - 0, I - 0						BH16-2 2B	Metals and Inorganics				
		End of borehole at 2.44 m.												

BOREHOLE DRILLING RECORD : **BH/MW16-3**

Prepared by: **Kathryn Maton** Date (Start): **1/6/2016**
Reviewed by: **Carolyn Adams** Date (End): **2/6/2016**

Project Name: **Phase Two Environmental Site Assessment**
Site: **Part of Lot 4, Concession 3, Parts 1-5, Gloucester, Ontario**
Sector:
Client: **The Builders Warehouse Inc.**

Project Number: **161-06382-00**
Geographic Coordinates: X = 5011286 mE, Y = 472354 mN
Surface Elevation: 87.23 m *(Relative)*
Top of PVC Elevation:

Drilling Company: Strata Drilling Group
Drilling Equipment: Geomachine GS100
Drilling Method: Probe rod
Borehole Diameter: 50 mm
Drilling Fluid: Air
Sampling Method:

ODOUR
F - Light
M - Medium
P - Persistent

VISUAL
D - Disseminated Product
S - Saturated with Product

SAMPLE TYPE
DC - Diamond Corer
SS - Split Spoon
MA - Manual Auger
TR - Trowel
ST - Shelby Tube
TU - DT32 Liner
MC - Macro Core Liner

▽ Water Level ▼ Free Phase

CHEMICAL ANALYSIS
PCB Poly-Chlorinated Biphenyls
BTEX Benzene, Toluene, Ethylbenzene, Xylene
Inorg. C. Inorganic Compounds
Phenol. C. Phenolic Compounds
VOC Volatil Organic Compounds (MAH & CAH)
Diox. & Fur. Dioxins & Furans
CAH Chlorinated Aliphatic Hydrocarbons
MAH Monocyclic Aromatic Hydrocarbons
PAH Polycyclic Aromatic Hydrocarbons
PH C_{10}-C_{50} Petroleum Hydrocarbons C_{10}-C_{50}
PH F1-F4 Petroleum Hydrocarbons F1-F4 (C_{10}-C_{50})
Metals Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Silver, Tin, Zinc.
HWR Leacheate Tests (Haz. Waste Reg.)

DEPTH *ELEVATION* (m)	GEOLOGY / LITHOLOGY: LITHOLOGY	GEOLOGY / LITHOLOGY: DESCRIPTION	OBSERVATIONS: VAPOR CONC. I - Isobutylene (ppm) H - Hexane (ppm)	OBSERVATIONS: ODOUR F M P	OBSERVATIONS: VISUAL D S	SAMPLES: SAMPLE TYPE	SAMPLES: % RECOVERY	SAMPLES: N (Blow/6")	SAMPLES: NUMBER	SAMPLES: ANALYSIS	SAMPLES: DUPLICATE	MONITORING WELL: DIAGRAM	MONITORING WELL: DESCRIPTION	REMARKS
		Ground surface.												
87.23		**FILL** sand and gravel, brown, dry	H - 0, I - 0			MC	73		BH/MW16-3 1A					
0.43 / 86.80		**CLAYEY SILT** brown, moist, stiff	H - 0, I - 0						BH/MW16-3 1B	Metals and Inorganics			Bentonite	
1.52 / 85.71		**SILTY CLAY** grey-brown, moist, stiff	H - 0, I - 0			MC	100		BH/MW16-3 2A	Metals and Inorganics			Slotted PVC pipe	
			H - 0, I - 0						BH/MW16-3 2B				Sand	
3.05 / 3.12 / 84.11		**GRAVEL** with sand , brown, wet **BEDROCK**	H - 0, I - 0			MC	5		BH/MW16-3 3	Metals and Inorganics			SCREEN Diam.: 51 mm Open.: 0.25 mm Length: 3.05 m WATER Depth: 2.13 m Elev.: m Date: 6/7/2016	
4.57 / 82.66		End of borehole at 4.57 m.												

0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

Projet : 161-08368-00 PHASE TWO ESA - 3636 INNES ROAD.GPJ Type rapport : WSP_EN_WELL-ENVIRONMENTAL Data Template : WSP_TEMPLATE_GEOTECH.GDT 6/10/2016

BOREHOLE DRILLING RECORD : **BH16-4**

Prepared by: **Kathryn Maton** Date (Start): **1/6/2016**
Reviewed by: **Carolyn Adams** Date (End): **1/6/2016**

Project Name: **Phase Two Environmental Site Assessment**
Site: **Part of Lot 4, Concession 3, Parts 1-5, Gloucester, Ontario**
Sector:
Client: **The Builders Warehouse Inc.**

Project Number: **161-06382-00**
Geographic Coordinates: X = 5032619 mE
Y = 459397 mN
Surface Elevation: m *()*
Top of PVC Elevation:

Drilling Company: Strata Drilling Group
Drilling Equipment: Geomachine GS100
Drilling Method: Probe rod
Borehole Diameter: 50 mm
Drilling Fluid: None
Sampling Method:

ODOUR
F - Light
M - Medium
P - Persistent

VISUAL
D - Disseminated Product
S - Saturated with Product

SAMPLE TYPE
DC - Diamond Corer
SS - Split Spoon
MA - Manual Auger
TR - Trowel
ST - Shelby Tube
TU - DT32 Liner
MC - Macro Core Liner

Water Level ▽ Free Phase

CHEMICAL ANALYSIS

PCB	Poly-Chlorinated Biphenyls	MAH	Monocyclic Aromatic Hydrocarbons
BTEX	Benzene, Toluene, Ethylbenzene, Xylene	PAH	Polycyclic Aromatic Hydrocarbons
Inorg. C.	Inorganic Compounds	PH C_{10}-C_{50}	Petroleum Hydrocarbons C_{10}-C_{50}
Phenol. C.	Phenolic Compounds	PH F1-F4	Petroleum Hydrocarbons F1-F4 (C_{10}-C_{50})
VOC	Volatil Organic Compounds (MAH & CAH)	Metals	Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Silver, Tin, Zinc.
Diox. & Fur.	Dioxins & Furans	HWR	Leacheate Tests (Haz. Waste Reg.)
CAH	Chlorinated Aliphatic Hydrocarbons		

DEPTH *ELEVATION* (m)	LITHOLOGY	DESCRIPTION	VAPOR CONC. I - Isobutylene (ppm) H - Hexane (ppm)	ODOUR F	ODOUR M	ODOUR P	VISUAL D	VISUAL S	SAMPLE TYPE	% RECOVERY	N (Blow/6")	NUMBER	ANALYSIS	DUPLICATE	DIAGRAM	DESCRIPTION	REMARKS
		Ground surface.															
0.43		**FILL** sand and gravel, brown, dry	H - 0, I - 0						MC	71		BH16-4 1A					
0.5		**CLAYEY SILT** brown, moist, stiff	H - 0, I - 0									BH16-4 1B	Metals and Inorganics PHCs F2-F4				
1.0																	
1.5			H - 0, I - 0						MC	86		BH16-4 2A					
2.0																	
2.28																	
2.5		**SILTY CLAY** grey-brown, moist, stiff *becoming wet and soft*	H - 0, I - 0									BH16-4 2B	Metals and Inorganics	BH16-4-102B			
3.0		*Refusal at 3.05 m below ground surface on assumed bedrock*															
3.05		End of borehole at 3.05 m.															
3.5																	
4.0																	
4.5																	
5.0																	

Projet : 161-08368-00 PHASE TWO ESA - 3636 INNES ROAD.GPJ Type rapport : WSP_EN_WELL-ENVIRONMENTAL Data Template : WSP_TEMPLATE_GEOTECH.GDT 6/10/2016

BOREHOLE DRILLING RECORD : **BH/MW16-5**

Prepared by: **Kathryn Maton** Date (Start): **1/6/2016**
Reviewed by: **Carolyn Adams** Date (End): **2/6/2016**

Project Name: **Phase Two Environmental Site Assessment**
Site: **Part of Lot 4, Concession 3, Parts 1-5, Gloucester, Ontario**
Sector:
Client: **The Builders Warehouse Inc.**

Project Number: **161-06382-00**
Geographic Coordinates: X = 5032607 mE, Y = 459421 mN
Surface Elevation: 87.47 m *(Relative)*
Top of PVC Elevation:

Drilling Company: Strata Drilling Group
Drilling Equipment: Geomachine GS100
Drilling Method: Probe rod
Borehole Diameter: 50 mm
Drilling Fluid: Air
Sampling Method:

ODOUR
F - Light
M - Medium
P - Persistent

VISUAL
D - Disseminated Product
S - Saturated with Product

SAMPLE TYPE
DC - Diamond Corer
SS - Split Spoon
MA - Manual Auger
TR - Trowel
ST - Shelby Tube
TU - DT32 Liner
MC - Macro Core Liner

▽ Water Level ▼ Free Phase

CHEMICAL ANALYSIS
PCB Poly-Chlorinated Biphenyls
BTEX Benzene, Toluene, Ethylbenzene, Xylene
Inorg. C. Inorganic Compounds
Phenol. C. Phenolic Compounds
VOC Volatil Organic Compounds (MAH & CAH)
Diox. & Fur. Dioxins & Furans
CAH Chlorinated Aliphatic Hydrocarbons
MAH Monocyclic Aromatic Hydrocarbons
PAH Polycyclic Aromatic Hydrocarbons
PH C_{10}-C_{50} Petroleum Hydrocarbons C_{10}-C_{50}
PH F1-F4 Petroleum Hydrocarbons F1-F4 (C_{10}-C_{50})
Metals Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Silver, Tin, Zinc.
HWR Leacheate Tests (Haz. Waste Reg.)

DEPTH *ELEVATION* (m)	GEOLOGY / LITHOLOGY: LITHOLOGY	GEOLOGY / LITHOLOGY: DESCRIPTION	OBSERVATIONS: VAPOR CONC. I - Isobutylene (ppm) H - Hexane (ppm)	OBSERVATIONS: ODOUR F M P	OBSERVATIONS: VISUAL D S	SAMPLES: SAMPLE TYPE	SAMPLES: % RECOVERY	SAMPLES: N (Blow/6")	SAMPLES: NUMBER	SAMPLES: ANALYSIS	SAMPLES: DUPLICATE	MONITORING WELL: DIAGRAM	MONITORING WELL: DESCRIPTION	REMARKS
		Ground surface.												
87.47 0.23		**FILL** sand and gravel, brown, dry	H - 0, I - 0			MC	76		BH/MW16-5 1A					
87.24		**CLAYEY SILT** brown, moist, stiff	H - 0, I - 0						BH/MW16-5 1B	Metals and Inorganics PHCs F2-F4	BH16-5-101B		Bentonite	
1.52 *85.95*		**SILTY CLAY** grey-brown, moist, stiff	H - 0, I - 30			MC	83		BH/MW16-5 2A				Sand	
		becoming wet and soft											Slotted PVC pipe	
3.05 *84.42*		**BEDROCK**	H - 0, I - 35						BH/MW16-5 2B	Metals and Inorganics PH F_1-F_4 BTEX PAH			SCREEN Diam.: 51 mm Open.: 0.25 mm Length: 3.05 m WATER Depth: 2.27 m Elev.: m Date: 6/7/2016	
4.57 *82.90*		End of borehole at 4.57 m.												

Projet : 161-08368-00 PHASE TWO ESA - 3636 INNES ROAD.GPJ Type rapport : WSP_EN_WELL-ENVIRONMENTAL Data Template : WSP_TEMPLATE_GEOTECH.GDT 6/10/2016

BOREHOLE DRILLING RECORD : **BH16-6**

Prepared by: **Kathryn Maton** Date (Start): **1/6/2016**
Reviewed by: **Carolyn Adams** Date (End): **1/6/2016**

Project Name: **Phase Two Environmental Site Assessment**
Site: **Part of Lot 4, Concession 3, Parts 1-5, Gloucester, Ontario**
Sector:
Client: **The Builders Warehouse Inc.**

Project Number: **161-06382-00**
Geographic Coordinates: X = 5032622 mE
Y = 459430 mN
Surface Elevation: m *()*
Top of PVC Elevation:

Drilling Company: Strata Drilling Group
Drilling Equipment: Geomachine GS100
Drilling Method: Probe rod
Borehole Diameter: 50 mm
Drilling Fluid: None
Sampling Method:

ODOUR
F - Light
M - Medium
P - Persistent

VISUAL
D - Disseminated Product
S - Saturated with Product

SAMPLE TYPE
DC - Diamond Corer
SS - Split Spoon
MA - Manual Auger
TR - Trowel
ST - Shelby Tube
TU - DT32 Liner
MC - Macro Core Liner

Water Level ▽ Free Phase

CHEMICAL ANALYSIS
PCB Poly-Chlorinated Biphenyls
BTEX Benzene, Toluene, Ethylbenzene, Xylene
Inorg. C. Inorganic Compounds
Phenol. C. Phenolic Compounds
VOC Volatile Organic Compounds (MAH & CAH)
Diox. & Fur. Dioxins & Furans
CAH Chlorinated Aliphatic Hydrocarbons
MAH Monocyclic Aromatic Hydrocarbons
PAH Polycyclic Aromatic Hydrocarbons
PH C_{10}-C_{50} Petroleum Hydrocarbons C_{10}-C_{50}
PH F1-F4 Petroleum Hydrocarbons F1-F4 (C_{10}-C_{50})
Metals Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Silver, Tin, Zinc.
HWR Leacheate Tests (Haz. Waste Reg.)

DEPTH *ELEVATION* (m)	GEOLOGY / LITHOLOGY: LITHOLOGY	GEOLOGY / LITHOLOGY: DESCRIPTION	OBSERVATIONS: VAPOR CONC. I - Isobutylene (ppm) H - Hexane (ppm)	OBSERVATIONS: ODOUR F M P	OBSERVATIONS: VISUAL D S	SAMPLES: SAMPLE TYPE	SAMPLES: % RECOVERY	SAMPLES: N (Blow/6")	SAMPLES: NUMBER	SAMPLES: ANALYSIS	SAMPLES: DUPLICATE	MONITORING WELL: DIAGRAM	MONITORING WELL: DESCRIPTION	REMARKS
		Ground surface.												
0.23		**FILL** Sand and gravel, brown, dry	H - 15, I - 2			MC	46		BH16-6 1A					
		CLAYEY SILT brown, moist, stiff	H - 0, I - 0						BH16-6 1B	Metals and Inorganics PH F_1-F_4 BTEX				
2.90			H - 0, I - 0			MC	100		BH16-6 2A					
3.05		**SILTY CLAY** grey-brown, moist, stiff *Refusal at 3.05 m below ground surface on assumed bedrock*	H - 0, I - 0						BH16-6 2B	Metals and Inorganics				
		End of borehole at 3.05 m.												

Projet : 161-08368-00 PHASE TWO ESA - 3636 INNES ROAD.GPJ Type rapport : WSP_EN_WELL-ENVIRONMENTAL Data Template : WSP_TEMPLATE_GEOTECH.GDT 6/10/2016

BOREHOLE DRILLING RECORD : **BH16-7**

Prepared by: **Kathryn Maton** Date (Start): **1/6/2016**
Reviewed by: **Carolyn Adams** Date (End): **1/6/2016**

Project Name: **Phase Two Environmental Site Assessment**
Site: **Part of Lot 4, Concession 3, Parts 1-5, Gloucester, Ontario**
Sector:
Client: **The Builders Warehouse Inc.**

Project Number: **161-06382-00**
Geographic Coordinates: X = 5032572 mE
Y = 459424 mN
Surface Elevation: m *()*
Top of PVC Elevation:

Drilling Company: Strata Drilling Group
Drilling Equipment: Geomachine GS100
Drilling Method: Probe rod
Borehole Diameter: 50 mm
Drilling Fluid: None
Sampling Method:

ODOUR
F - Light
M - Medium
P - Persistent

VISUAL
D - Disseminated Product
S - Saturated with Product

SAMPLE TYPE
DC - Diamond Corer
SS - Split Spoon
MA - Manual Auger
TR - Trowel
ST - Shelby Tube
TU - DT32 Liner
MC - Macro Core Liner

Water Level ▽ Free Phase

CHEMICAL ANALYSIS
PCB Poly-Chlorinated Biphenyls
BTEX Benzene, Toluene, Ethylbenzene, Xylene
Inorg. C. Inorganic Compounds
Phenol. C. Phenolic Compounds
VOC Volatile Organic Compounds (MAH & CAH)
Diox. & Fur. Dioxins & Furans
CAH Chlorinated Aliphatic Hydrocarbons
MAH Monocyclic Aromatic Hydrocarbons
PAH Polycyclic Aromatic Hydrocarbons
PH C_{10}-C_{50} Petroleum Hydrocarbons C_{10}-C_{50}
PH F1-F4 Petroleum Hydrocarbons F1-F4 (C_{10}-C_{50})
Metals Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Silver, Tin, Zinc.
HWR Leacheate Tests (Haz. Waste Reg.)

DEPTH *ELEVATION* (m)	GEOLOGY / LITHOLOGY: LITHOLOGY	GEOLOGY / LITHOLOGY: DESCRIPTION	OBSERVATIONS: VAPOR CONC. I - Isobutylene (ppm) H - Hexane (ppm)	OBSERVATIONS: ODOUR F M P	OBSERVATIONS: VISUAL D S	SAMPLES: SAMPLE TYPE	SAMPLES: % RECOVERY	SAMPLES: N (Blow/6")	SAMPLES: NUMBER	SAMPLES: ANALYSIS	SAMPLES: DUPLICATE	MONITORING WELL: DIAGRAM	MONITORING WELL: DESCRIPTION	REMARKS
		Ground surface.												
0.20		**TOP SOIL**				MC	85							
		CLAYEY SILT brown or grey-brown, moist, stiff	H - 10, I - 0						BH16-7 1	Metals and Inorganics PAH PH F_1-F_4 BTEX				
			H - 0, I - 0			MC	100		BH16-7 2A					
2.44														
		SILTY CLAY with some sand, grey-brown, moist, stiff *becoming wet and soft*	H - 0, I - 0						BH16-7 2B	Metals and Inorganics				
3.05														
		SANDY GRAVEL with some silty clay grey-brown, wet, soft	H - 0, I - 0			MC	26		BH16-7 3					
4.11		*Refusal at 4.11 m below ground surface on assumed bedrock*												
		End of borehole at 4.11 m.												

Projet : 161-08368-00 PHASE TWO ESA - 3636 INNES ROAD.GPJ Type rapport : WSP_EN_WELL-ENVIRONMENTAL Data Template : WSP_TEMPLATE_GEOTECH.GDT 6/10/2016

BOREHOLE DRILLING RECORD : **BH/MW16-8**

Prepared by: **Kathryn Maton** Date (Start): **1/6/2016**
Reviewed by: **Carolyn Adams** Date (End): **2/6/2016**

Project Name: **Phase Two Environmental Site Assessment**
Site: **Part of Lot 4, Concession 3, Parts 1-5, Gloucester, Ontario**
Sector:
Client: **The Builders Warehouse Inc.**

Project Number: **161-06382-00**
Geographic Coordinates: X = 5032569 mE, Y = 459449 mN
Surface Elevation: 86.84 m *(Relative)*
Top of PVC Elevation:

Drilling Company: Strata Drilling Group
Drilling Equipment: Geomachine GS100
Drilling Method: Probe rod
Borehole Diameter: 50 mm
Drilling Fluid: Air
Sampling Method:

ODOUR
F - Light
M - Medium
P - Persistent

VISUAL
D - Disseminated Product
S - Saturated with Product

SAMPLE TYPE
DC - Diamond Corer
SS - Split Spoon
MA - Manual Auger
TR - Trowel
ST - Shelby Tube
TU - DT32 Liner
MC - Macro Core Liner

▽ Water Level ▼ Free Phase

CHEMICAL ANALYSIS
PCB Poly-Chlorinated Biphenyls
BTEX Benzene, Toluene, Ethylbenzene, Xylene
Inorg. C. Inorganic Compounds
Phenol. C. Phenolic Compounds
VOC Volatile Organic Compounds (MAH & CAH)
Diox. & Fur. Dioxins & Furans
CAH Chlorinated Aliphatic Hydrocarbons
MAH Monocyclic Aromatic Hydrocarbons
PAH Polycyclic Aromatic Hydrocarbons
PH C_{10}-C_{50} Petroleum Hydrocarbons C_{10}-C_{50}
PH F1-F4 Petroleum Hydrocarbons F1-F4 (C_{10}-C_{50})
Metals Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Silver, Tin, Zinc.
HWR Leacheate Tests (Haz. Waste Reg.)

DEPTH *ELEVATION* (m)	GEOLOGY / LITHOLOGY: LITHOLOGY	GEOLOGY / LITHOLOGY: DESCRIPTION	OBSERVATIONS: VAPOR CONC. I - Isobutylene (ppm) H - Hexane (ppm)	OBSERVATIONS: ODOUR F M P	OBSERVATIONS: VISUAL D S	SAMPLES: SAMPLE TYPE	SAMPLES: % RECOVERY	SAMPLES: N (Blow/6")	SAMPLES: NUMBER	SAMPLES: ANALYSIS	SAMPLES: DUPLICATE	MONITORING WELL: DIAGRAM	MONITORING WELL: DESCRIPTION	REMARKS
		Ground surface.												
86.84 0.20		**TOP SOIL**				MC	100							
86.64		**CLAYEY SILT** brown or grey-brown, moist, stiff	H - 10, I - 0						BH/MW16-81	Metals and Inorganics PAH PH F_1-F_4 BTEX			Bentonite	
			H - 10, I - 0			MC	100		BH/MW16-82A				Sand	
2.44 *84.40*		**SILTY CLAY** grey-brown, moist, stiff	H - 5, I - 0						BH/MW16-82B	Metals and Inorganics			Slotted PVC pipe	
3.05 *83.79*		**SANDY GRAVEL** with trace to some silty clay grey-brown, wet, soft	H - 0, I - 0			MC	100		BH/MW16-83A				SCREEN Diam.: 51 mm Open.: 0.25 mm Length: 3.05 m WATER Depth: 1.45 m Elev.: m Date: 6/7/2016	
			H - 15, I - 0						BH/MW16-83B					
4.11 *82.73*		End of borehole at 4.11 m.												

Projet : 161-08368-00 PHASE TWO ESA - 3636 INNES ROAD.GPJ Type rapport : WSP_EN_WELL-ENVIRONMENTAL Data Template : WSP_TEMPLATE_GEOTECH.GDT 6/10/2016

BOREHOLE DRILLING RECORD : **BH16-9**

Prepared by: **Kathryn Maton** Date (Start): **2/6/2016**
Reviewed by: **Carolyn Adams** Date (End): **2/6/2016**

Project Name: **Phase Two Environmental Site Assessment**
Site: **Part of Lot 4, Concession 3, Parts 1-5, Gloucester, Ontario**
Sector:
Client: **The Builders Warehouse Inc.**

Project Number: **161-06382-00**
Geographic Coordinates: X = 5032512 mE
Y = 459382 mN
Surface Elevation: m *()*
Top of PVC Elevation:

Drilling Company: Strata Drilling Group
Drilling Equipment: Geomachine GS100
Drilling Method: Probe rod
Borehole Diameter: 50 mm
Drilling Fluid: None
Sampling Method:

ODOUR
F - Light
M - Medium
P - Persistent

VISUAL
D - Disseminated Product
S - Saturated with Product

SAMPLE TYPE
DC - Diamond Corer
SS - Split Spoon
MA - Manual Auger
TR - Trowel
ST - Shelby Tube
TU - DT32 Liner
MC - Macro Core Liner

▽ Water Level ▼ Free Phase

CHEMICAL ANALYSIS
PCB Poly-Chlorinated Biphenyls
BTEX Benzene, Toluene, Ethylbenzene, Xylene
Inorg. C. Inorganic Compounds
Phenol. C. Phenolic Compounds
VOC Volatile Organic Compounds (MAH & CAH)
Diox. & Fur. Dioxins & Furans
CAH Chlorinated Aliphatic Hydrocarbons
MAH Monocyclic Aromatic Hydrocarbons
PAH Polycyclic Aromatic Hydrocarbons
PH C_{10}-C_{50} Petroleum Hydrocarbons C_{10}-C_{50}
PH F1-F4 Petroleum Hydrocarbons F1-F4 (C_{10}-C_{50})
Metals Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Silver, Tin, Zinc.
HWR Leacheate Tests (Haz. Waste Reg.)

DEPTH *ELEVATION* (m)	GEOLOGY / LITHOLOGY: LITHOLOGY	GEOLOGY / LITHOLOGY: DESCRIPTION	OBSERVATIONS: VAPOR CONC. I - Isobutylene (ppm) H - Hexane (ppm)	OBSERVATIONS: ODOUR (F M P)	OBSERVATIONS: VISUAL (D S)	SAMPLES: SAMPLE TYPE	SAMPLES: % RECOVERY	SAMPLES: N (Blow/6")	SAMPLES: NUMBER	SAMPLES: ANALYSIS	SAMPLES: DUPLICATE	MONITORING WELL: DIAGRAM	MONITORING WELL: DESCRIPTION	REMARKS
		Ground surface.												
0.17		**TOP SOIL**												
0.5		**CLAYEY SILT** brown or grey-brown, moist, stiff	H - 0, I - 0			MC	91		BH16-9 1	Metals and Inorganics				
1.0														
1.52														
1.5		**SILTY CLAY** grey-brown, moist, stiff	H - 0, I - 0			MC	100		BH16-9 2A					
2.0														
2.5		*becoming wet*												
3.0			H - 0, I - 0						BH16-9 2B	Metals and Inorganics				
3.5			H - 0, I - 0			MC	100		BH16-9 3A					
4.0		*-with some sand and some gravel* *-becoming grey*	H - 0, I - 0						BH16-9 3B					
4.57														
4.5		**SANDY GRAVEL** with some silty clay grey-brown, wet	H - 0, I - 0			MC	53		BH16-9 4	Metals and Inorganics				
5.0														
5.5														
6.0														
6.5			H - 0, I - 0			MC	60		BH16-9 5					
7.01														
7.0		*Refusal at 7.01 m below ground surface on assumed bedrock*												
7.5		End of borehole at 7.01 m.												
8.0														
8.5														
9.0														
9.5														
10.0														

Projet : 161-08368-00 PHASE TWO ESA - 3636 INNES ROAD.GPJ Type rapport : WSP_EN_WELL-ENVIRONMENTAL Data Template : WSP_TEMPLATE_GEOTECH.GDT 6/10/2016

BOREHOLE DRILLING RECORD : **BH16-10**

Prepared by: **Kathryn Maton** Date (Start): **2/6/2016**
Reviewed by: **Carolyn Adams** Date (End): **2/6/2016**

Project Name: **Phase Two Environmental Site Assessment**
Site: **Part of Lot 4, Concession 3, Parts 1-5, Gloucester, Ontario**
Sector:
Client: **The Builders Warehouse Inc.**

Project Number: **161-06382-00**
Geographic Coordinates: X = 5032473 mE
Y = 459402 mN
Surface Elevation: m *()*
Top of PVC Elevation:

Drilling Company: Strata Drilling Group
Drilling Equipment: Geomachine GS100
Drilling Method: Probe rod
Borehole Diameter: 50 mm
Drilling Fluid: None
Sampling Method:

ODOUR
F - Light
M - Medium
P - Persistent

VISUAL
D - Disseminated Product
S - Saturated with Product

SAMPLE TYPE
DC - Diamond Corer
SS - Split Spoon
MA - Manual Auger
TR - Trowel
ST - Shelby Tube
TU - DT32 Liner
MC - Macro Core Liner

▽ Water Level ▼ Free Phase

CHEMICAL ANALYSIS
PCB Poly-Chlorinated Biphenyls
BTEX Benzene, Toluene, Ethylbenzene, Xylene
Inorg. C. Inorganic Compounds
Phenol. C. Phenolic Compounds
VOC Volatil Organic Compounds (MAH & CAH)
Diox. & Fur. Dioxins & Furans
CAH Chlorinated Aliphatic Hydrocarbons
MAH Monocyclic Aromatic Hydrocarbons
PAH Polycyclic Aromatic Hydrocarbons
PH C_{10}-C_{50} Petroleum Hydrocarbons C_{10}-C_{50}
PH F1-F4 Petroleum Hydrocarbons F1-F4 (C_{10}-C_{50})
Metals Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Silver, Tin, Zinc.
HWR Leacheate Tests (Haz. Waste Reg.)

DEPTH *ELEVATION* (m)	GEOLOGY / LITHOLOGY: LITHOLOGY	GEOLOGY / LITHOLOGY: DESCRIPTION	OBSERVATIONS: VAPOR CONC. I - Isobutylene (ppm) H - Hexane (ppm)	OBSERVATIONS: ODOUR (F M P)	OBSERVATIONS: VISUAL (D S)	SAMPLES: SAMPLE TYPE	SAMPLES: % RECOVERY	SAMPLES: N (Blow/6")	SAMPLES: NUMBER	SAMPLES: ANALYSIS	SAMPLES: DUPLICATE	MONITORING WELL: DIAGRAM	MONITORING WELL: DESCRIPTION	REMARKS
		Ground surface.												
0.23		**TOP SOIL**				MC	80							
		CLAYEY SILT brown or grey-brown, moist, stiff	H - 0, I - 0						BH16-10 1	Metals and Inorganics				
			H - 0, I - 0			MC	100		BH16-10 2A					
2.61		**SILTY CLAY** grey-brown, wet, soft	H - 0, I - 0						BH16-10 2B	Metals and Inorganics				
			H - 0, I - 0			MC	100		BH16-10 3A					
			H - 0, I - 0						BH16-10 3B					
			H - 0, I - 0			MC	100		BH16-10 4A	Metals and Inorganics				
6.10														
6.40		**SANDY GRAVEL** with some silty clay grey-brown, wet, soft *Refusal at 6.40 m below ground surface on assumed bedrock*	H - 0, I - 0						BH16-10 4B					
		End of borehole at 6.40 m.												

Projet : 161-08368-00 PHASE TWO ESA - 3636 INNES ROAD.GPJ Type rapport : WSP_EN_WELL-ENVIRONMENTAL Data Template : WSP_TEMPLATE_GEOTECH.GDT 6/10/2016

BOREHOLE DRILLING RECORD : **BH16-11**

Prepared by: **Kathryn Maton** Date (Start): **2/6/2016**
Reviewed by: **Carolyn Adams** Date (End): **2/6/2016**

Project Name: **Phase Two Environmental Site Assessment**
Site: **Part of Lot 4, Concession 3, Parts 1-5, Gloucester, Ontario**
Sector:
Client: **The Builders Warehouse Inc.**

Project Number: **161-06382-00**
Geographic Coordinates: X = 5032342 mE
Y = 459432 mN
Surface Elevation: m *()*
Top of PVC Elevation:

Drilling Company: Strata Drilling Group
Drilling Equipment: Geomachine GS100
Drilling Method: Probe rod
Borehole Diameter: 50 mm
Drilling Fluid: None
Sampling Method:

ODOUR
F - Light
M - Medium
P - Persistent

VISUAL
D - Disseminated Product
S - Saturated with Product

SAMPLE TYPE
DC - Diamond Corer
SS - Split Spoon
MA - Manual Auger
TR - Trowel
ST - Shelby Tube
TU - DT32 Liner
MC - Macro Core Liner

▽ Water Level ▼ Free Phase

CHEMICAL ANALYSIS

PCB	Poly-Chlorinated Biphenyls	MAH	Monocyclic Aromatic Hydrocarbons
BTEX	Benzene, Toluene, Ethylbenzene, Xylene	PAH	Polycyclic Aromatic Hydrocarbons
Inorg. C.	Inorganic Compounds	PH C_{10}-C_{50}	Petroleum Hydrocarbons C_{10}-C_{50}
Phenol. C.	Phenolic Compounds	PH F1-F4	Petroleum Hydrocarbons F1-F4 (C_{10}-C_{50})
VOC	Volatil Organic Compounds (MAH & CAH)	Metals	Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Silver, Tin, Zinc.
Diox. & Fur.	Dioxins & Furans	HWR	Leacheate Tests (Haz. Waste Reg.)
CAH	Chlorinated Aliphatic Hydrocarbons		

DEPTH *ELEVATION* (m)	LITHOLOGY	DESCRIPTION	VAPOR CONC. I - Isobutylene (ppm) H - Hexane (ppm)	ODOUR F M P	VISUAL D S	SAMPLE TYPE	% RECOVERY	N (Blow/6")	NUMBER	ANALYSIS	DUPLICATE	DIAGRAM	DESCRIPTION	REMARKS
		Ground surface.												
0.20		**TOP SOIL**				MC	86							
		CLAYEY SILT brown or grey-brown, moist, stiff	H - 0, I - 0						BH16-11 1					
1.52		**SILTY CLAY** grey-brown, wet to very wet, soft to very soft	H - 0, I - 0			MC	100		BH16-11 2A	Metals and Inorganics				
		becoming wet	H - 0, I - 0						BH16-11 2B					
			H - 0, I - 0			MC	100		BH16-11 3A					
		becoming grey and unweathered	H - 0, I - 0						BH16-11 3B	Metals and Inorganics				
			H - 0, I - 0			MC	100		BH16-11 4A					
			H - 0, I - 0						BH16-11 4B					
6.10		*Refusal at 6.10 m below ground surface on assumed bedrock*												
		End of borehole at 6.10 m.												

Projet : 161-08368-00 PHASE TWO ESA - 3636 INNES ROAD.GPJ Type rapport : WSP_EN_WELL-ENVIRONMENTAL Data Template : WSP_TEMPLATE_GEOTECH.GDT 6/10/2016

BOREHOLE DRILLING RECORD : **BH16-12**

Prepared by: **Kathryn Maton** Date (Start): **2/6/2016**
Reviewed by: **Carolyn Adams** Date (End): **2/6/2016**

Project Name: **Phase Two Environmental Site Assessment**
Site: **Part of Lot 4, Concession 3, Parts 1-5, Gloucester, Ontario**
Sector:
Client: **The Builders Warehouse Inc.**

Project Number: **161-06382-00**
Geographic Coordinates: X = 5032334 mE
Y = 459386 mN
Surface Elevation: m *()*
Top of PVC Elevation:

Drilling Company: Strata Drilling Group
Drilling Equipment: Geomachine GS100
Drilling Method: Probe rod
Borehole Diameter: 50 mm
Drilling Fluid: None
Sampling Method:

ODOUR
F - Light
M - Medium
P - Persistent

VISUAL
D - Disseminated Product
S - Saturated with Product

SAMPLE TYPE
DC - Diamond Corer
SS - Split Spoon
MA - Manual Auger
TR - Trowel
ST - Shelby Tube
TU - DT32 Liner
MC - Macro Core Liner

CHEMICAL ANALYSIS
PCB Poly-Chlorinated Biphenyls
BTEX Benzene, Toluene, Ethylbenzene, Xylene
Inorg. C. Inorganic Compounds
Phenol. C. Phenolic Compounds
VOC Volatile Organic Compounds (MAH & CAH)
Diox. & Fur. Dioxins & Furans
CAH Chlorinated Aliphatic Hydrocarbons
MAH Monocyclic Aromatic Hydrocarbons
PAH Polycyclic Aromatic Hydrocarbons
PH C_{10}-C_{50} Petroleum Hydrocarbons C_{10}-C_{50}
PH F1-F4 Petroleum Hydrocarbons F1-F4 (C_{10}-C_{50})
Metals Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Silver, Tin, Zinc.
HWR Leacheate Tests (Haz. Waste Reg.)

Water Level ▽ Free Phase ▼

DEPTH ELEVATION (m)	GEOLOGY / LITHOLOGY: LITHOLOGY	GEOLOGY / LITHOLOGY: DESCRIPTION	OBSERVATIONS: VAPOR CONC. I - Isobutylene (ppm) H - Hexane (ppm)	OBSERVATIONS: ODOUR F M P	OBSERVATIONS: VISUAL D S	SAMPLES: SAMPLE TYPE	SAMPLES: % RECOVERY	SAMPLES: N (Blow/6")	SAMPLES: NUMBER	SAMPLES: ANALYSIS	SAMPLES: DUPLICATE	MONITORING WELL: DIAGRAM	MONITORING WELL: DESCRIPTION	REMARKS
		Ground surface.												
0.15		**TOP SOIL**	H - 0, I - 0			MC	76		BH16-12 1					
		CLAYEY SILT brown or grey-brown, moist, stiff												
1.52		**SILTY CLAY** grey-brown, moist, stiff	H - 0, I - 0			MC	100		BH16-12 2A	Metals and Inorganics				
		becoming wet and soft	H - 0, I - 0						BH16-12 2B					
		becoming grey, very soft and unweathered	H - 0, I - 0			MC	100		BH16-12 3A					
			H - 0, I - 0						BH16-12 3B	Metals and Inorganics				
			H - 0, I - 0			MC	100		BH16-12 4A					
6.25		*with some sand*												
		Refusal at 6.25 m below ground surface on assumed bedrock	H - 0, I - 0						BH16-12 4B					
		End of borehole at 6.25 m.												

Projet : 161-08368-00 PHASE TWO ESA - 3636 INNES ROAD.GPJ Type rapport : WSP_EN_WELL-ENVIRONMENTAL Data Template : WSP_TEMPLATE_GEOTECH.GDT 6/10/2016

BOREHOLE DRILLING RECORD : **BH16-13**

Prepared by: **Kathryn Maton** Date (Start): **2/6/2016**
Reviewed by: **Carolyn Adams** Date (End): **2/6/2016**

Project Name: **Phase Two Environmental Site Assessment**
Site: **Part of Lot 4, Concession 3, Parts 1-5, Gloucester, Ontario**
Sector:
Client: **The Builders Warehouse Inc.**

Project Number: **161-06382-00**
Geographic Coordinates: X = 5032385 mE
Y = 459515 mN
Surface Elevation: m *()*
Top of PVC Elevation:

Drilling Company: Strata Drilling Group
Drilling Equipment: Geomachine GS100
Drilling Method: Probe rod
Borehole Diameter: 50 mm
Drilling Fluid: None
Sampling Method:

ODOUR
F - Light
M - Medium
P - Persistent

VISUAL
D - Disseminated Product
S - Saturated with Product

SAMPLE TYPE
DC - Diamond Corer
SS - Split Spoon
MA - Manual Auger
TR - Trowel
ST - Shelby Tube
TU - DT32 Liner
MC - Macro Core Liner

▽ Water Level ▼ Free Phase

CHEMICAL ANALYSIS
PCB Poly-Chlorinated Biphenyls
BTEX Benzene, Toluene, Ethylbenzene, Xylene
Inorg. C. Inorganic Compounds
Phenol. C. Phenolic Compounds
VOC Volatile Organic Compounds (MAH & CAH)
Diox. & Fur. Dioxins & Furans
CAH Chlorinated Aliphatic Hydrocarbons
MAH Monocyclic Aromatic Hydrocarbons
PAH Polycyclic Aromatic Hydrocarbons
PH C_{10}-C_{50} Petroleum Hydrocarbons C_{10}-C_{50}
PH F1-F4 Petroleum Hydrocarbons F1-F4 (C_{10}-C_{50})
Metals Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Silver, Tin, Zinc.
HWR Leacheate Tests (Haz. Waste Reg.)

DEPTH *ELEVATION* (m)	GEOLOGY / LITHOLOGY: LITHOLOGY	GEOLOGY / LITHOLOGY: DESCRIPTION	OBSERVATIONS: VAPOR CONC. I - Isobutylene (ppm) H - Hexane (ppm)	OBSERVATIONS: ODOUR F M P	OBSERVATIONS: VISUAL D S	SAMPLES: SAMPLE TYPE	SAMPLES: % RECOVERY	SAMPLES: N (Blow/6")	SAMPLES: NUMBER	SAMPLES: ANALYSIS	SAMPLES: DUPLICATE	MONITORING WELL: DIAGRAM	MONITORING WELL: DESCRIPTION	REMARKS
		Ground surface.												
0.18		**TOP SOIL**	H - 0, I - 0			MC	73							
		CLAYEY SILT brown or grey-brown, moist, stiff												
1.52		**SILTY CLAY** grey-brown, moist, stiff	H - 0, I - 0			MC	100			Metals and Inorganics	BH16-13-102A			
		becoming wet												
		becoming wet to very wet	H - 0, I - 0											
		becoming grey and unweathered	H - 0, I - 0			MC	100							
			H - 0, I - 0							Metals and Inorganics				
			H - 0, I - 0			MC	50							
5.18		*Refusal at 5.18 m below ground surface on assumed bedrock*												
		End of borehole at 5.18 m.												

TEST PIT RECORD : **TP16-1**

Prepared by: **Kathryn Maton** Date (Start): **2/11/2016**
Reviewed by: **Carolyn Adams** Date (End): **2/11/2016**

Project Name: **Phase Two Environmental Site Assessment**
Site: **Part of Lot 4, Concession 3, Parts 1-5, Gloucester, Ontario**
Sector:
Client: **The Builders Warehouse Inc.**

Project Number: **161-06382-00**
Geographic Coordinates: X = 5032612 mE
Y = 459421 mN
Surface Elevation: m *()*

Contractor: **A.Lacroix Equipment Rentals Ltd.**
Equipment: **Excavator**

VAPOUR READINGS
I - Isobutylene
H - Hexane

SAMPLE TYPE
TM - Manual Auger
TR - Trowel

Water Sepage Free Phase

CHEMICAL ANALYSIS

PCB	Poly-Chlorinated Biphenyls
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
Inorg. C.	Inorganic Compounds
Phenol. C.	Phenolic Compounds
VOC	Volatil Organic Compounds (MAH & CAH)
Diox. & Fur.	Dioxins & Furans
EC	Electrical Conductivity
MAH	Monocyclic Aromatic Hydrocarbons
PAH	Polycyclic Aromatic Hydrocarbons
PH C_{10}-C_{50}	Petroleum Hydrocarbons C_{10}-C_{50}
PH F_1-F_4	Petroleum Hydrocarbons F1-F4 (C_{10}-C_{50})
Metals	Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Silver, Tin, Zinc.
HWR	Leacheate Tests (Haz. Waste Reg.)

DEPTH ELEVATION (m)	GEOLOGY / LITHOGRAPHY: LITHOGRAPHY	GEOLOGY / LITHOGRAPHY: DESCRIPTION	OBSERVATIONS: VAPOR CONC. (ppm)	OBSERVATIONS: ODOUR (F M P D S)	OBSERVATIONS: VISUAL (F M P D S)	SAMPLES: SAMPLE TYPE	SAMPLES: NUMBER	SAMPLES: ANALYSIS	SAMPLES: DUPLICATE	WATER ARRIVAL	REMARKS
0.0		**FILL** Sand and gravel with some bricks, wood, metal and organic material, brown, dry	H - 0, I - 0			TR	TP16-1 SA1				
1.01		**CLAYEY SILT** brown, moist	H - 0, I - 0			TR	TP16-1 SA2				
1.34		End of test pit at 1.34 m.									

0.5
1.0
1.5
2.0

Projet : 161-08368-00 PHASE TWO ESA - 3636 INNES ROAD.GPJ Type rapport : WSP_EN_TEST PIT Data Template : WSP_TEMPLATE_GEOTECH.GDT 11/14/2016

TEST PIT RECORD : **TP16-2**

Prepared by: **Kathryn Maton** Date (Start): **2/11/2016**
Reviewed by: **Carolyn Adams** Date (End): **2/11/2016**

Project Name: **Phase Two Environmental Site Assessment**
Site: **Part of Lot 4, Concession 3, Parts 1-5, Gloucester, Ontario**
Sector:
Client: **The Builders Warehouse Inc.**

Project Number: **161-06382-00**
Geographic Coordinates: X = 5032619 mE
Y = 459408 mN
Surface Elevation: m *()*

Contractor: **A.Lacroix Equipment Rentals Ltd.**
Equipment: **Excavator**

VAPOUR READINGS

I - Isobutylene
H - Hexane

SAMPLE TYPE

TM - Manual Auger
TR - Trowel

Water Sepage Free Phase

CHEMICAL ANALYSIS

PCB	Poly-Chlorinated Biphenyls
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
Inorg. C.	Inorganic Compounds
Phenol. C.	Phenolic Compounds
VOC	Volatil Organic Compounds (MAH & CAH)
Diox. & Fur.	Dioxins & Furans
EC	Electrical Conductivity
MAH	Monocyclic Aromatic Hydrocarbons
PAH	Polycyclic Aromatic Hydrocarbons
PH C_{10}-C_{50}	Petroleum Hydrocarbons C_{10}-C_{50}
PH F_1-F_4	Petroleum Hydrocarbons F1-F4 (C_{10}-C_{50})
Metals	Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Silver, Tin, Zinc.
HWR	Leacheate Tests (Haz. Waste Reg.)

DEPTH ELEVATION (m)	GEOLOGY / LITHOGRAPHY: LITHOGRAPHY	GEOLOGY / LITHOGRAPHY: DESCRIPTION	OBSERVATIONS: VAPOR CONC. (ppm)	OBSERVATIONS: ODOUR (F M P D S)	OBSERVATIONS: VISUAL (F M P D S)	SAMPLES: SAMPLE TYPE	SAMPLES: NUMBER	SAMPLES: ANALYSIS	SAMPLES: DUPLICATE	WATER ARRIVAL	REMARKS
0.0		**FILL** Sand and gravel with some bricks, wood, metal and organic material, brown, dry									
			H - 0, I - 0			TR	TP16-2 SA1				
0.76		**CLAYEY SILT** brown, moist									
0.99		End of test pit at 0.99 m.									
0.5											0.5
1.0											1.0
1.5											1.5
2.0											2.0

Projet : 161-08368-00 PHASE TWO ESA - 3636 INNES ROAD.GPJ Type rapport : WSP_EN_TEST PIT Data Template : WSP_TEMPLATE_GEOTECH.GDT 11/14/2016

TEST PIT RECORD : **TP16-3**

Prepared by: **Kathryn Maton** Date (Start): **2/11/2016**
Reviewed by: **Carolyn Adams** Date (End): **2/11/2016**

Project Name: **Phase Two Environmental Site Assessment**
Site: **Part of Lot 4, Concession 3, Parts 1-5, Gloucester, Ontario**
Sector:
Client: **The Builders Warehouse Inc.**

Project Number: **161-06382-00**
Geographic Coordinates: X = 5032631 mE
Y = 459412 mN
Surface Elevation: m *()*

Contractor: **A.Lacroix Equipment Rentals Ltd.**
Equipment: **Excavator**

VAPOUR READINGS

I - Isobutylene
H - Hexane

SAMPLE TYPE

TM - Manual Auger
TR - Trowel

Water Sepage Free Phase

CHEMICAL ANALYSIS

PCB	Poly-Chlorinated Biphenyls
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
Inorg. C.	Inorganic Compounds
Phenol. C.	Phenolic Compounds
VOC	Volatil Organic Compounds (MAH & CAH)
Diox. & Fur.	Dioxins & Furans
EC	Electrical Conductivity
MAH	Monocyclic Aromatic Hydrocarbons
PAH	Polycyclic Aromatic Hydrocarbons
PH C_{10}-C_{50}	Petroleum Hydrocarbons C_{10}-C_{50}
PH F_1-F_4	Petroleum Hydrocarbons F1-F4 (C_{10}-C_{50})
Metals	Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Silver, Tin, Zinc.
HWR	Leacheate Tests (Haz. Waste Reg.)

DEPTH ELEVATION (m)	GEOLOGY / LITHOGRAPHY	DESCRIPTION	OBSERVATIONS: VAPOR CONC. (ppm)	ODOUR (F M P)	VISUAL (D S)	SAMPLES: SAMPLE TYPE	NUMBER	ANALYSIS	DUPLICATE	WATER ARRIVAL	REMARKS
0.0		**FILL** Sand and gravel with some bricks, wood, metal and organic material, brown, moist to wet									
			H - 0, I - 0			TR	TP16-3 SA1				
0.5											0.5
0.91											
		CLAYEY SILT brown, wet	H - 0, I - 0			TR	TP16-3 SA2				
1.0											1.0
1.5											1.5
1.52		End of test pit at 1.52 m.									
2.0											2.0

Projet : 161-08368-00 PHASE TWO ESA - 3636 INNES ROAD.GPJ Type rapport : WSP_EN_TEST PIT Data Template : WSP_TEMPLATE_GEOTECH.GDT 11/14/2016

TEST PIT RECORD : **TP16-4**

Prepared by: **Kathryn Maton** Date (Start): **2/11/2016**
Reviewed by: **Carolyn Adams** Date (End): **2/11/2016**

Project Name: **Phase Two Environmental Site Assessment**
Site: **Part of Lot 4, Concession 3, Parts 1-5, Gloucester, Ontario**
Sector:
Client: **The Builders Warehouse Inc.**

Project Number: **161-06382-00**
Geographic Coordinates: X = 5032626 mE
Y = 459424 mN
Surface Elevation: m *()*

Contractor: **A.Lacroix Equipment Rentals Ltd.**
Equipment: **Excavator**

VAPOUR READINGS

I - Isobutylene
H - Hexane

SAMPLE TYPE

TM - Manual Auger
TR - Trowel

Water Sepage Free Phase

CHEMICAL ANALYSIS

PCB	Poly-Chlorinated Biphenyls
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
Inorg. C.	Inorganic Compounds
Phenol. C.	Phenolic Compounds
VOC	Volatil Organic Compounds (MAH & CAH)
Diox. & Fur.	Dioxins & Furans
EC	Electrical Conductivity
MAH	Monocyclic Aromatic Hydrocarbons
PAH	Polycyclic Aromatic Hydrocarbons
PH C_{10}-C_{50}	Petroleum Hydrocarbons C_{10}-C_{50}
PH F_1-F_4	Petroleum Hydrocarbons F1-F4 (C_{10}-C_{50})
Metals	Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Silver, Tin, Zinc.
HWR	Leacheate Tests (Haz. Waste Reg.)

DEPTH ELEVATION (m)	GEOLOGY / LITHOGRAPHY: LITHOGRAPHY	GEOLOGY / LITHOGRAPHY: DESCRIPTION	OBSERVATIONS: VAPOR CONC. (ppm)	OBSERVATIONS: ODOUR (F M P)	OBSERVATIONS: VISUAL (D S)	SAMPLES: SAMPLE TYPE	SAMPLES: NUMBER	SAMPLES: ANALYSIS	SAMPLES: DUPLICATE	WATER ARRIVAL	REMARKS
0.0		**FILL** Sand and gravel with some bricks, wood, metal and organic material, brown, moist to wet	H - 0, I - 0			TR	TP16-4 SA1				
0.81		**CLAYEY SILT** brown, wet	H - 0, I - 0			TR	TP16-4 SA2				
1.27		End of test pit at 0.76 m.									

0.5
1.0
1.5
2.0

Projet : 161-08368-00 PHASE TWO ESA - 3636 INNES ROAD.GPJ Type rapport : WSP_EN_TEST PIT Data Template : WSP_TEMPLATE_GEOTECH.GDT 11/14/2016

TEST PIT RECORD : **TP16-5**

Prepared by: **Kathryn Maton** Date (Start): **2/11/2016**
Reviewed by: **Carolyn Adams** Date (End): **2/11/2016**

Project Name: **Phase Two Environmental Site Assessment**
Site: **Part of Lot 4, Concession 3, Parts 1-5, Gloucester, Ontario**
Sector:
Client: **The Builders Warehouse Inc.**

Project Number: **161-06382-00**
Geographic Coordinates: X = 5032559 mE
Y = 459440 mN
Surface Elevation: m *()*

Contractor: **A.Lacroix Equipment Rentals Ltd.**
Equipment: **Excavator**

VAPOUR READINGS

I - Isobutylene
H - Hexane

SAMPLE TYPE

TM - Manual Auger
TR - Trowel

Water Sepage Free Phase

CHEMICAL ANALYSIS

PCB	Poly-Chlorinated Biphenyls
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
Inorg. C.	Inorganic Compounds
Phenol. C.	Phenolic Compounds
VOC	Volatil Organic Compounds (MAH & CAH)
Diox. & Fur.	Dioxins & Furans
EC	Electrical Conductivity
MAH	Monocyclic Aromatic Hydrocarbons
PAH	Polycyclic Aromatic Hydrocarbons
PH C_{10}-C_{50}	Petroleum Hydrocarbons C_{10}-C_{50}
PH F_1-F_4	Petroleum Hydrocarbons F1-F4 (C_{10}-C_{50})
Metals	Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Silver, Tin, Zinc.
HWR	Leacheate Tests (Haz. Waste Reg.)

DEPTH ELEVATION (m)	GEOLOGY / LITHOGRAPHY: LITHOGRAPHY	GEOLOGY / LITHOGRAPHY: DESCRIPTION	OBSERVATIONS: VAPOR CONC. (ppm)	OBSERVATIONS: ODOUR (F M P)	OBSERVATIONS: VISUAL (D S)	SAMPLES: SAMPLE TYPE	SAMPLES: NUMBER	SAMPLES: ANALYSIS	SAMPLES: DUPLICATE	WATER ARRIVAL	REMARKS
0.00		**TOP SOIL**									
0.20		**CLAYEY SILT** brown or grey-brown, moist									
0.5											
1.0			H - 0, I - 0			TR	TP16-5 SA1	EC			
1.14		End of test pit at 1.14 m.									
1.5											
2.0											

Projet : 161-08368-00 PHASE TWO ESA - 3636 INNES ROAD.GPJ Type rapport : WSP_EN_TEST PIT Data Template : WSP_TEMPLATE_GEOTECH.GDT 11/14/2016

TEST PIT RECORD : **TP16-6**

Prepared by: **Kathryn Maton** Date (Start): **2/11/2016**
Reviewed by: **Carolyn Adams** Date (End): **2/11/2016**

Project Name: **Phase Two Environmental Site Assessment**
Site: **Part of Lot 4, Concession 3, Parts 1-5, Gloucester, Ontario**
Sector:
Client: **The Builders Warehouse Inc.**

Project Number: **161-06382-00**
Geographic Coordinates: X = 5032988 mE
Y = 459317 mN
Surface Elevation: m *()*

Contractor: **A.Lacroix Equipment Rentals Ltd.**
Equipment: **Excavator**

VAPOUR READINGS

I - Isobutylene
H - Hexane

SAMPLE TYPE

TM - Manual Auger
TR - Trowel

Water Sepage Free Phase

CHEMICAL ANALYSIS

PCB	Poly-Chlorinated Biphenyls
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
Inorg. C.	Inorganic Compounds
Phenol. C.	Phenolic Compounds
VOC	Volatil Organic Compounds (MAH & CAH)
Diox. & Fur.	Dioxins & Furans
EC	Electrical Conductivity
MAH	Monocyclic Aromatic Hydrocarbons
PAH	Polycyclic Aromatic Hydrocarbons
PH C_{10}-C_{50}	Petroleum Hydrocarbons C_{10}-C_{50}
PH F_1-F_4	Petroleum Hydrocarbons F1-F4 (C_{10}-C_{50})
Metals	Arsenic, Barium, Cadmium, Chromium, Cobalt, Copper, Lead, Manganese, Molybdenum, Nickel, Silver, Tin, Zinc.
HWR	Leacheate Tests (Haz. Waste Reg.)

DEPTH ELEVATION (m)	GEOLOGY / LITHOGRAPHY	DESCRIPTION	OBSERVATIONS: VAPOR CONC. (ppm)	ODOUR (F M P)	VISUAL (D S)	SAMPLES: SAMPLE TYPE	NUMBER	ANALYSIS	DUPLICATE	WATER ARRIVAL	REMARKS
0.0		**TOP SOIL**									
0.61											
0.68		**FILL** Sand and Silt and some organic material, brown, dry *Test pit terminated over assumed bedrock at 0.68 metres below ground surface*	H - 0, I - 0			TR	TP16-6 SA1	PH F_1-F_4 BTEX			
		End of test pit at 0.68 m.									

0.5
1.0
1.5
2.0

SYMBOLS AND TERMS

SOIL DESCRIPTION

Behavioural properties, such as structure and strength, take precedence over particle gradation in describing soils. Terminology describing soil structure are as follows:

Desiccated	-	having visible signs of weathering by oxidation of clay minerals, shrinkage cracks, etc.
Fissured	-	having cracks, and hence a blocky structure.
Varved	-	composed of regular alternating layers of silt and clay.
Stratified	-	composed of alternating layers of different soil types, e.g. silt and sand or silt and clay.
Well-Graded	-	Having wide range in grain sizes and substantial amounts of all intermediate particle sizes (see Grain Size Distribution).
Uniformly-Graded	-	Predominantly of one grain size (see Grain Size Distribution).

The standard terminology to describe the strength of cohesionless soils is the relative density, usually inferred from the results of the Standard Penetration Test (SPT) 'N' value. The SPT N value is the number of blows of a 63.5 kg hammer, falling 760 mm, required to drive a 51 mm O.D. split spoon sampler 300 mm into the soil after an initial penetration of 150 mm.

Relative Density	'N' Value	Relative Density %
Very Loose	<4	<15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	>50	>85

The standard terminology to describe the strength of cohesive soils is the consistency, which is based on the undisturbed undrained shear strength as measured by the in situ or laboratory vane tests, penetrometer tests, unconfined compression tests, or occasionally by Standard Penetration Tests.

Consistency	Undrained Shear Strength (kPa)	'N' Value
Very Soft	<12	<2
Soft	12-25	2-4
Firm	25-50	4-8
Stiff	50-100	8-15
Very Stiff	100-200	15-30
Hard	>200	>30

SYMBOLS AND TERMS (continued)

SOIL DESCRIPTION (continued)

Cohesive soils can also be classified according to their “sensitivity”. The sensitivity is the ratio between the undisturbed undrained shear strength and the remoulded undrained shear strength of the soil.

Terminology used for describing soil strata based upon texture, or the proportion of individual particle sizes present is provided on the Textural Soil Classification Chart at the end of this information package.

ROCK DESCRIPTION

The structural description of the bedrock mass is based on the Rock Quality Designation (RQD).

The RQD classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be a result of closely-spaced discontinuities (resulting from shearing, jointing, faulting, or weathering) in the rock mass and are not counted. RQD is ideally determined from NXL size core. However, it can be used on smaller core sizes, such as BX, if the bulk of the fractures caused by drilling stresses (called “mechanical breaks”) are easily distinguishable from the normal in situ fractures.

RQD %	ROCK QUALITY
90-100	Excellent, intact, very sound
75-90	Good, massive, moderately jointed or sound
50-75	Fair, blocky and seamy, fractured
25-50	Poor, shattered and very seamy or blocky, severely fractured
0-25	Very poor, crushed, very severely fractured

SAMPLE TYPES

SS	-	Split spoon sample (obtained in conjunction with the performing of the Standard Penetration Test (SPT))
TW	-	Thin wall tube or Shelby tube
PS	-	Piston sample
AU	-	Auger sample or bulk sample
WS	-	Wash sample
RC	-	Rock core sample (Core bit size AXT, BXL, etc.). Rock core samples are obtained with the use of standard diamond drilling bits.

SYMBOLS AND TERMS (continued)

GRAIN SIZE DISTRIBUTION

MC%	-	Natural moisture content or water content of sample, %
LL	-	Liquid Limit, % (water content above which soil behaves as a liquid)
PL	-	Plastic limit, % (water content above which soil behaves plastically)
PI	-	Plasticity index, % (difference between LL and PL)
Dxx	-	Grain size which xx% of the soil, by weight, is of finer grain sizes These grain size descriptions are not used below 0.075 mm grain size
D10	-	Grain size at which 10% of the soil is finer (effective grain size)
D60	-	Grain size at which 60% of the soil is finer
Cc	-	Concavity coefficient = $(D30)^2$ / (D10 x D60)
Cu	-	Uniformity coefficient = D60 / D10

Cc and Cu are used to assess the grading of sands and gravels:
Well-graded gravels have: $1 < Cc < 3$ and $Cu > 4$
Well-graded sands have: $1 < Cc < 3$ and $Cu > 6$
Sands and gravels not meeting the above requirements are poorly-graded or uniformly-graded.
Cc and Cu are not applicable for the description of soils with more than 10% silt and clay
(more than 10% finer than 0.075 mm or the #200 sieve)

CONSOLIDATION TEST

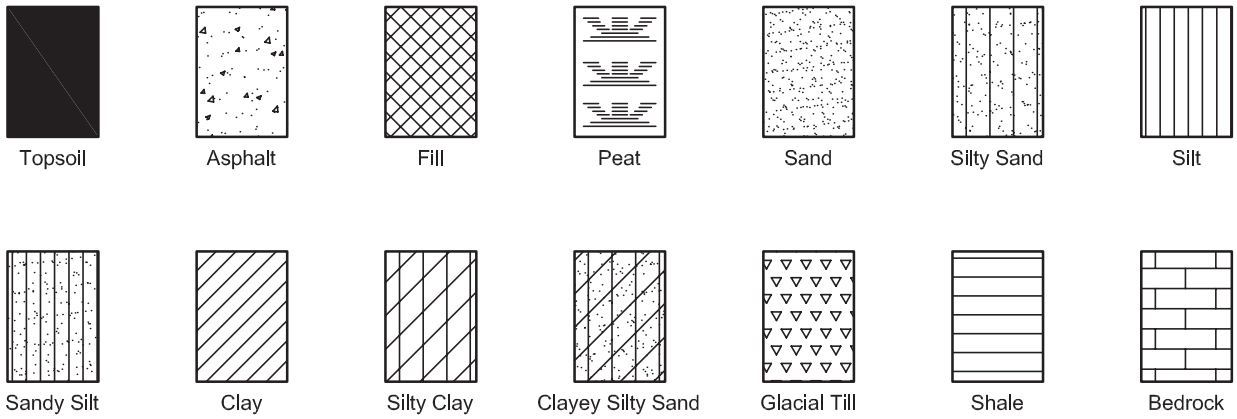
p'_o	-	Present effective overburden pressure at sample depth
p'_c	-	Preconsolidation pressure of (maximum past pressure on) sample
Ccr	-	Recompression index (in effect at pressures below p'_c)
Cc	-	Compression index (in effect at pressures above p'_c)
OC Ratio		Overconsolidaton ratio = p'_c / p'_o
Void Ratio		Initial sample void ratio = volume of voids / volume of solids
Wo	-	Initial water content (at start of consolidation test)

PERMEABILITY TEST

k	-	Coefficient of permeability or hydraulic conductivity is a measure of the ability of water to flow through the sample. The value of k is measured at a specified unit weight for (remoulded) cohesionless soil samples, because its value will vary with the unit weight or density of the sample during the test.

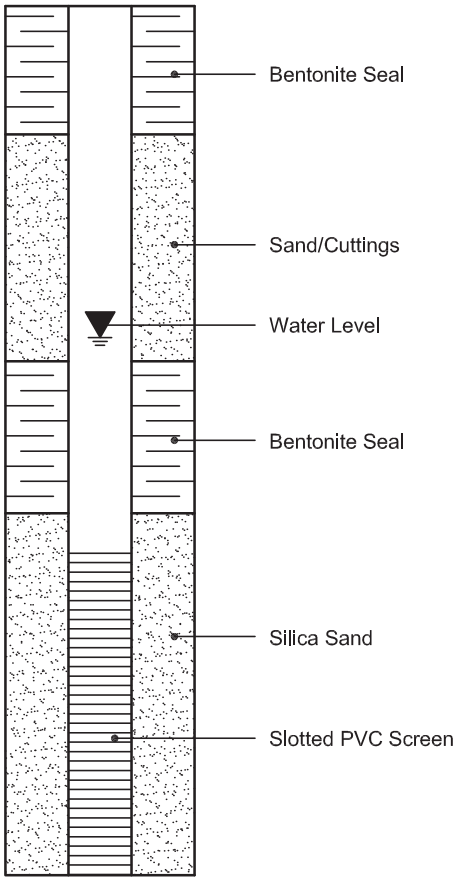
SYMBOLS AND TERMS (continued)

STRATA PLOT

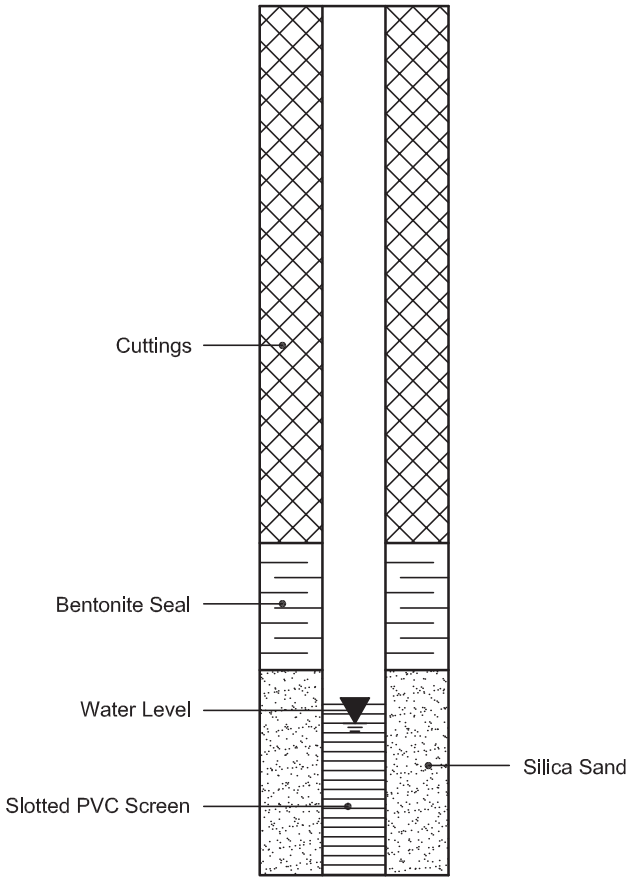


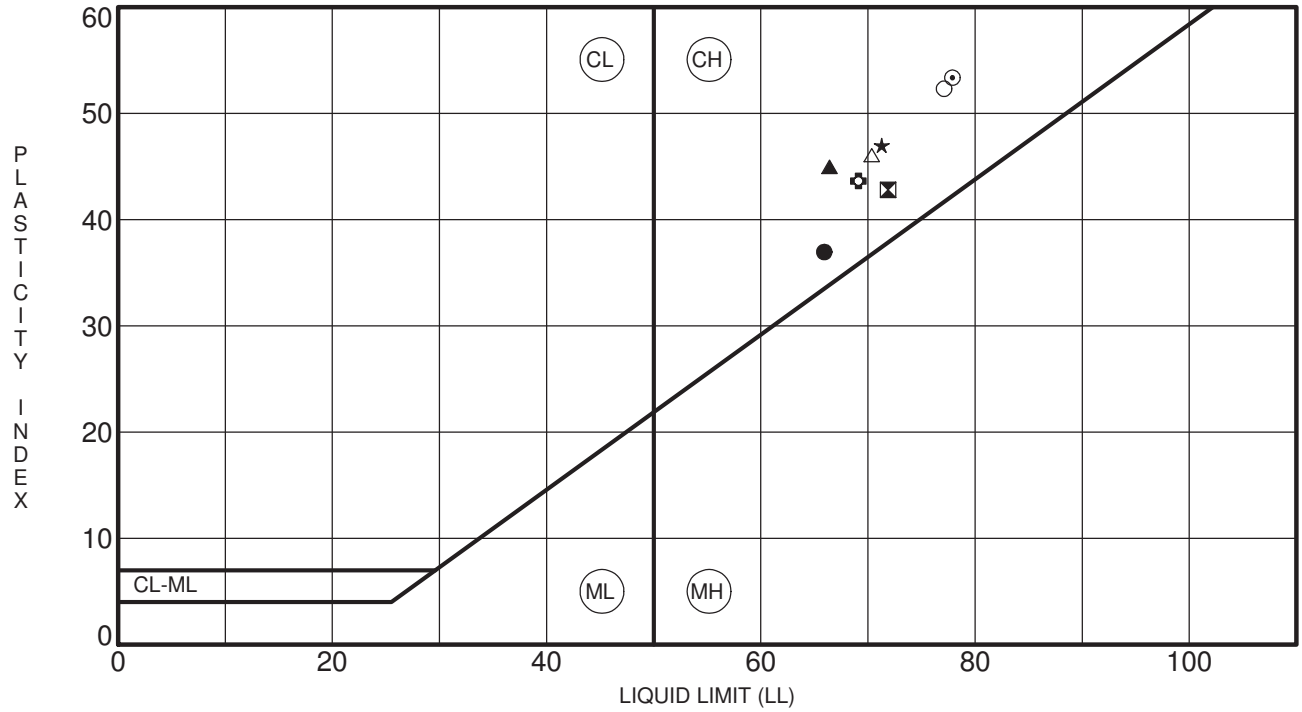
MONITORING WELL AND PIEZOMETER CONSTRUCTION

MONITORING WELL CONSTRUCTION



PIEZOMETER CONSTRUCTION





Specimen Identification			LL	PL	PI	Fines	Classification
●	**BH 1-18**	**SS 2**	**66**	**29**	**37**		**CH - Inorganic clays of high plasticity**
⊠	**BH10-18**	**SS 3**	**72**	**29**	**43**		**CH - Inorganic clays of high plasticity**
▲	**TP 1**	**G2**	**66**	**21**	**45**		**CH - Inorganic clays of high plasticity**
★	**TP 1**	**G3**	**71**	**24**	**47**		**CH - Inorganic clays of high plasticity**
⊙	**TP 2**	**G2**	**78**	**25**	**53**		**CH - Inorganic clays of high plasticity**
✿	**TP 3**	**G2**	**69**	**25**	**44**		**CH - Inorganic clays of high plasticity**
○	**TP 4**	**G2**	**77**	**25**	**52**		**CH - Inorganic clays of high plasticity**
△	**TP 5**	**G3**	**70**	**24**	**46**		**CH - Inorganic clays of high plasticity**

CLIENT **Glenview Homes (Innes) Limited** FILE NO. **PG4026**

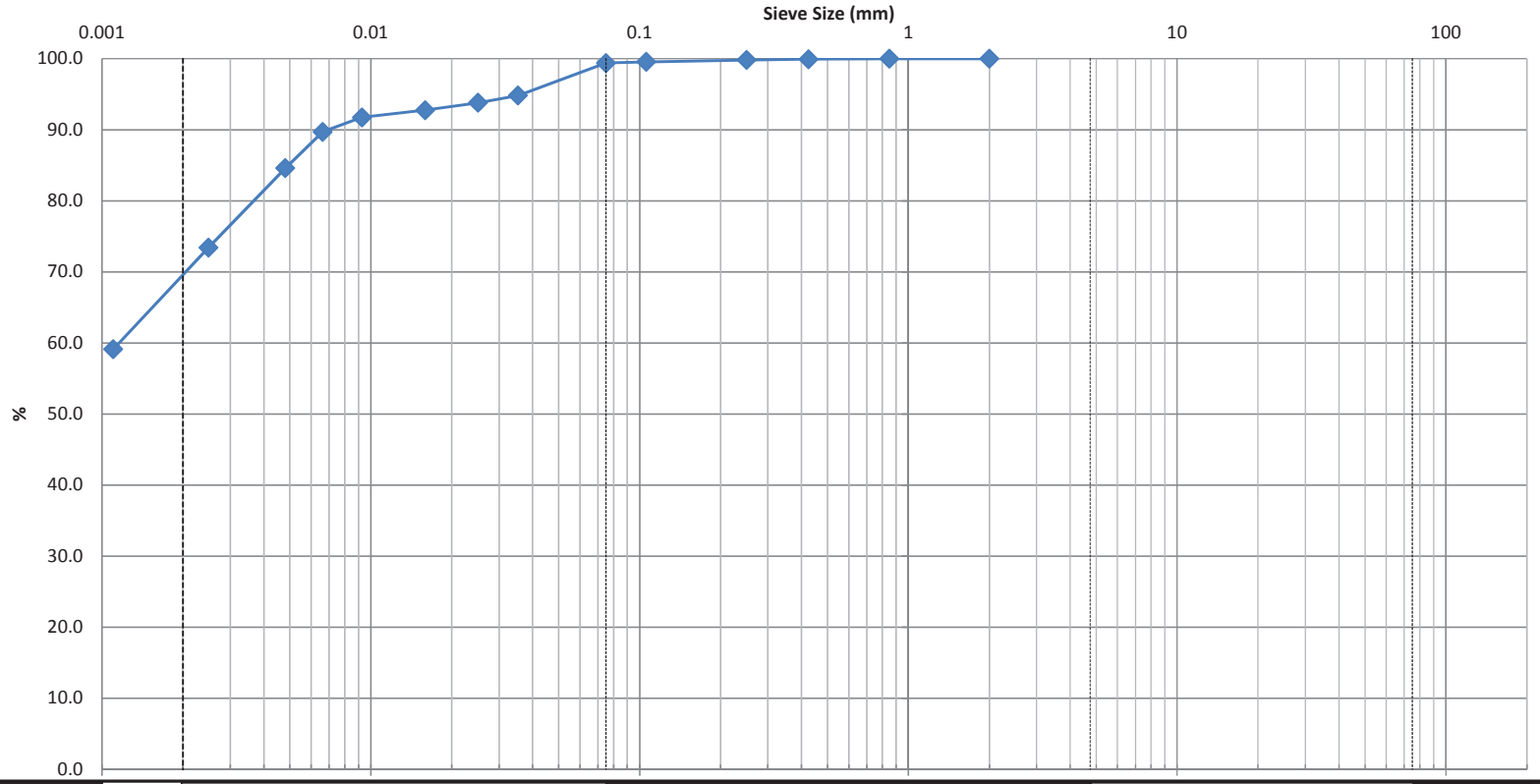
PROJECT **Supplemental Geotechnical Investigation - 3604-3646 Innes Road** DATE **1 Aug 17**

patersongroup Consulting Engineers
154 Colonnade Road South, Ottawa, Ontario K2E 7J5

ATTERBERG LIMITS' RESULTS

patersongroup
consulting engineers

CLIENT:	Glenview Homes	DEPTH:	1.5 - 2.1 m	FILE NO:	PG4026
CONTRACT NO.:		BH OR TP No.:	BH4-18 - SS3	LAB NO:	06542
PROJECT:	3604-3636 Innes Road			DATE RECEIVED:	7-Dec-18
				DATE TESTED:	12-Dec-18
DATE SAMPLED:	5-Dec-18			DATE REPORTED:	17-Dec-18
SAMPLED BY:	N. Giamberardino			TESTED BY:	D. Bertrand



	Clay	Silt	Sand			Gravel		Cobble
			Fine	Medium	Coarse	Fine	Coarse	

Identification	Soil Classification					MC(%)	LL	PL	PI	Cc	Cu
						32.5					
	D100	D60	D30	D10	Gravel (%)	Sand (%)		Silt (%)		Clay (%)	
					0.0	0.6		29.9		69.5	

Comments	

patersongroup
consulting engineers

HYDROMETER
LS-702 ASTM-422

CLIENT:	Glenview Homes	DEPTH:	1.5 - 2.1 m	FILE NO.:	PG4026
PROJECT:	3604-3636 Innes Road	BH OR TP No.:	BH4-18 - SS3	DATE SAMPLED:	05-Dec-18
LAB No. :	06542	TESTED BY:	D. Bertrand	DATE RECEIVED:	07-Dec-18
SAMPLED BY:	N. Giamberardino	DATE REPT'D:	17-Dec-18	DATE TESTED:	12-Dec-18

SAMPLE INFORMATION

SAMPLE MASS	102.5	50.00	
SPECIFIC GRAVITY (Gs)	2.700	REMARKS	
HYGROSCOPIC MOISTURE	Tare No.		
TARE Wt.	50.00	ACTUAL Wt.	
AIR DRY (Wa)	150.00	100.00	
OVEN DRY (Wo)	147.00	97.00	
F=(Wo/Wa)	0.970		
INITIAL Wt. (Ma)	50.00		
Wt. CORRECTED	48.50		
Wt. AFTER WASH BACK SIEVE	0.3		
SOLUTION CONCENTRATION	40 g / L		

GRAIN SIZE ANALYSIS

SIEVE DIAMETER (mm)	WEIGHT RETAINED (g)	PERCENT RETAINED	PERCENT PASSING
63.0			
53.0			
37.5			
26.5			
19.0			
16.0			
13.2			
9.5			
4.75			
2.0	**0.0**	0.0	100.0
Pan	**102.5**		
0.850	**0.00**	0.0	100.0
0.425	**0.04**	0.1	99.9
0.250	**0.10**	0.2	99.8
0.106	**0.23**	0.5	99.5
0.075	**0.30**	0.6	99.4
Pan	**0.30**		
SIEVE CHECK 0.0	MAX = 0.3%		

HYDROMETER DATA

ELAPSED	TIME (24 hours)	Hs	Hc	Temp. (°C)	DIAMETER	(P)	TOTAL PERCENT PASSING
1	8:38	52.5	6.0	23.0	0.0353	94.8	94.8
2	8:39	52.0	6.0	23.0	0.0251	93.8	93.8
5	8:42	51.5	6.0	23.0	0.0160	92.8	92.8
15	8:52	51.0	6.0	23.0	0.0093	91.7	91.7
30	9:07	50.0	6.0	23.0	0.0066	89.7	89.7
60	9:37	47.5	6.0	23.0	0.0048	84.6	84.6
250	12:47	42.0	6.0	23.0	0.0025	73.4	73.4
1440	8:37	35.0	6.0	23.0	0.0011	59.1	59.1

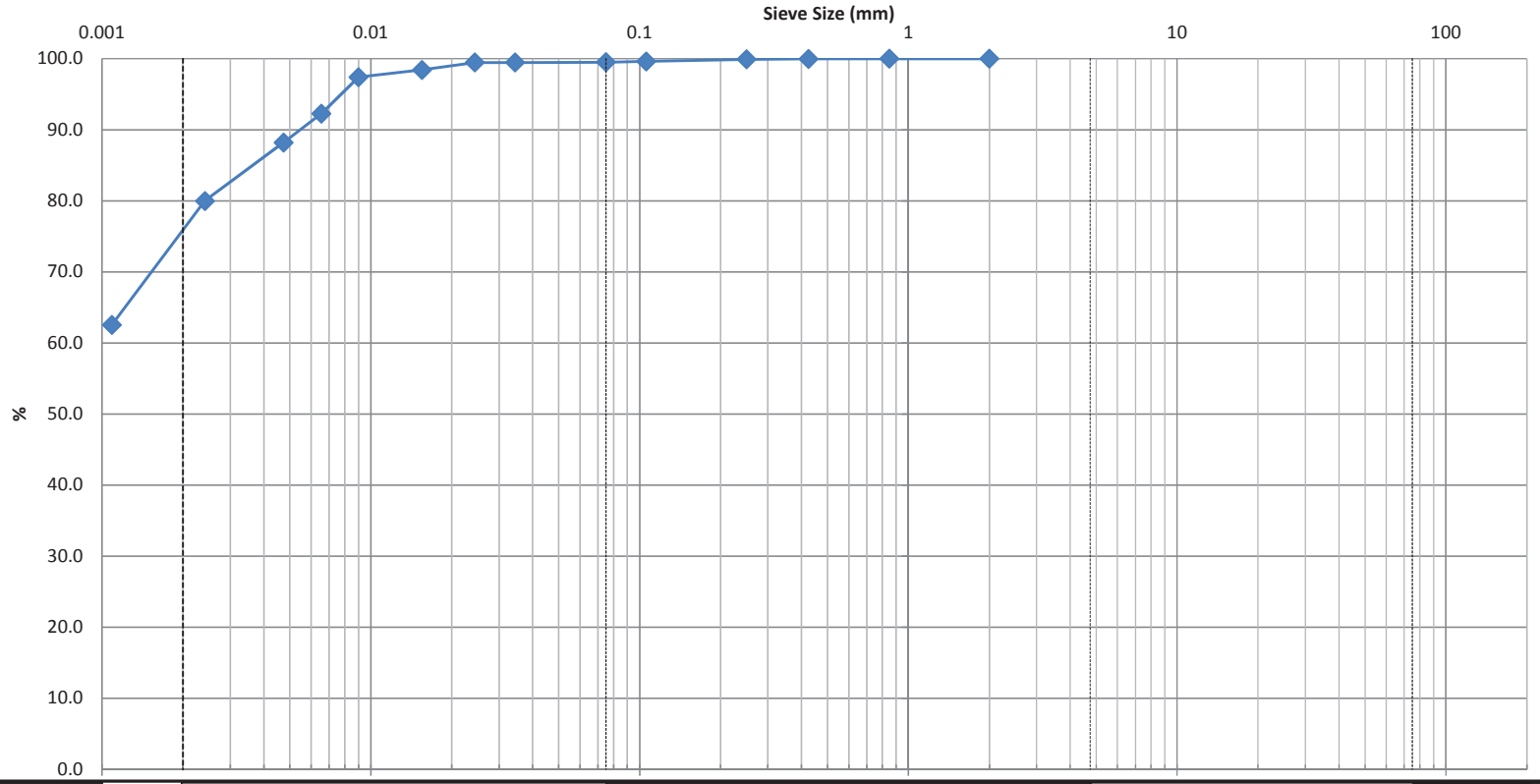
COMMENTS

Moisture Content = 32.5%

REVIEWED BY:	Curtis Beadow	APPROVED BY:	Joe Forsyth, P. Eng.

patersongroup
consulting engineers

CLIENT:	Glenview Homes	DEPTH:	1.5 - 2.1 m	FILE NO:	PG4026
CONTRACT NO.:		BH OR TP No.:	BH6-18 - SS3	LAB NO:	06543
PROJECT:	3604-3636 Innes Road			DATE RECEIVED:	7-Dec-18
				DATE TESTED:	12-Dec-18
DATE SAMPLED:	5-Dec-18			DATE REPORTED:	17-Dec-18
SAMPLED BY:	N. Giamberardino			TESTED BY:	D. Bertrand



	Clay	Silt	Sand			Gravel		Cobble
			Fine	Medium	Coarse	Fine	Coarse	

Identification	Soil Classification					MC(%)	LL	PL	PI	Cc	Cu
						30.1					
	D100	D60	D30	D10	Gravel (%)	Sand (%)		Silt (%)		Clay (%)	
					0.0	0.5		23.0		76.5	

Comments	

patersongroup
consulting engineers

HYDROMETER
LS-702 ASTM-422

CLIENT:	Glenview Homes	DEPTH:	1.5 - 2.1 m	FILE NO.:	PG4026
PROJECT:	3604-3636 Innes Road	BH OR TP No.:	BH6-18 - SS3	DATE SAMPLED:	05-Dec-18
LAB No. :	06543	TESTED BY:	D. Bertrand	DATE RECEIVED:	07-Dec-18
SAMPLED BY:	N. Giamberardino	DATE REPT'D:	17-Dec-18	DATE TESTED:	12-Dec-18

SAMPLE INFORMATION

SAMPLE MASS	109.3	50.10	
SPECIFIC GRAVITY (Gs)	2.700	REMARKS	
HYGROSCOPIC MOISTURE	Tare No.		
TARE Wt.	50.00	ACTUAL Wt.	
AIR DRY (Wa)	150.00	100.00	
OVEN DRY (Wo)	146.25	96.25	
F=(Wo/Wa)	0.963		
INITIAL Wt. (Ma)	50.10		
Wt. CORRECTED	48.22		
Wt. AFTER WASH BACK SIEVE	0.26		
SOLUTION CONCENTRATION	40 g / L		

GRAIN SIZE ANALYSIS

SIEVE DIAMETER (mm)	WEIGHT RETAINED (g)	PERCENT RETAINED	PERCENT PASSING
63.0			
53.0			
37.5			
26.5			
19.0			
16.0			
13.2			
9.5			
4.75			
2.0	**0.0**	0.0	100.0
Pan	**109.3**		
0.850	**0.00**	0.0	100.0
0.425	**0.02**	0.0	100.0
0.250	**0.05**	0.1	99.9
0.106	**0.19**	0.4	99.6
0.075	**0.25**	0.5	99.5
Pan	**0.26**		
SIEVE CHECK 0.0	MAX = 0.3%		

HYDROMETER DATA

ELAPSED	TIME (24 hours)	Hs	Hc	Temp. (°C)	DIAMETER	(P)	TOTAL PERCENT PASSING
1	8:51	54.5	6.0	23.0	0.0344	99.5	99.5
2	8:52	54.5	6.0	23.0	0.0244	99.5	99.5
5	8:55	54.0	6.0	23.0	0.0155	98.4	98.4
15	9:05	53.5	6.0	23.0	0.0090	97.4	97.4
30	9:20	51.0	6.0	23.0	0.0065	92.3	92.3
60	9:50	49.0	6.0	23.0	0.0047	88.2	88.2
250	13:00	45.0	6.0	23.0	0.0024	80.0	80.0
1440	8:50	36.5	6.0	23.0	0.0011	62.5	62.5

COMMENTS

Moisture Content = 30.1%

REVIEWED BY:	Curtis Beadow	APPROVED BY:	Joe Forsyth, P. Eng.

APPENDIX 2

FIGURE 1 - KEY PLAN

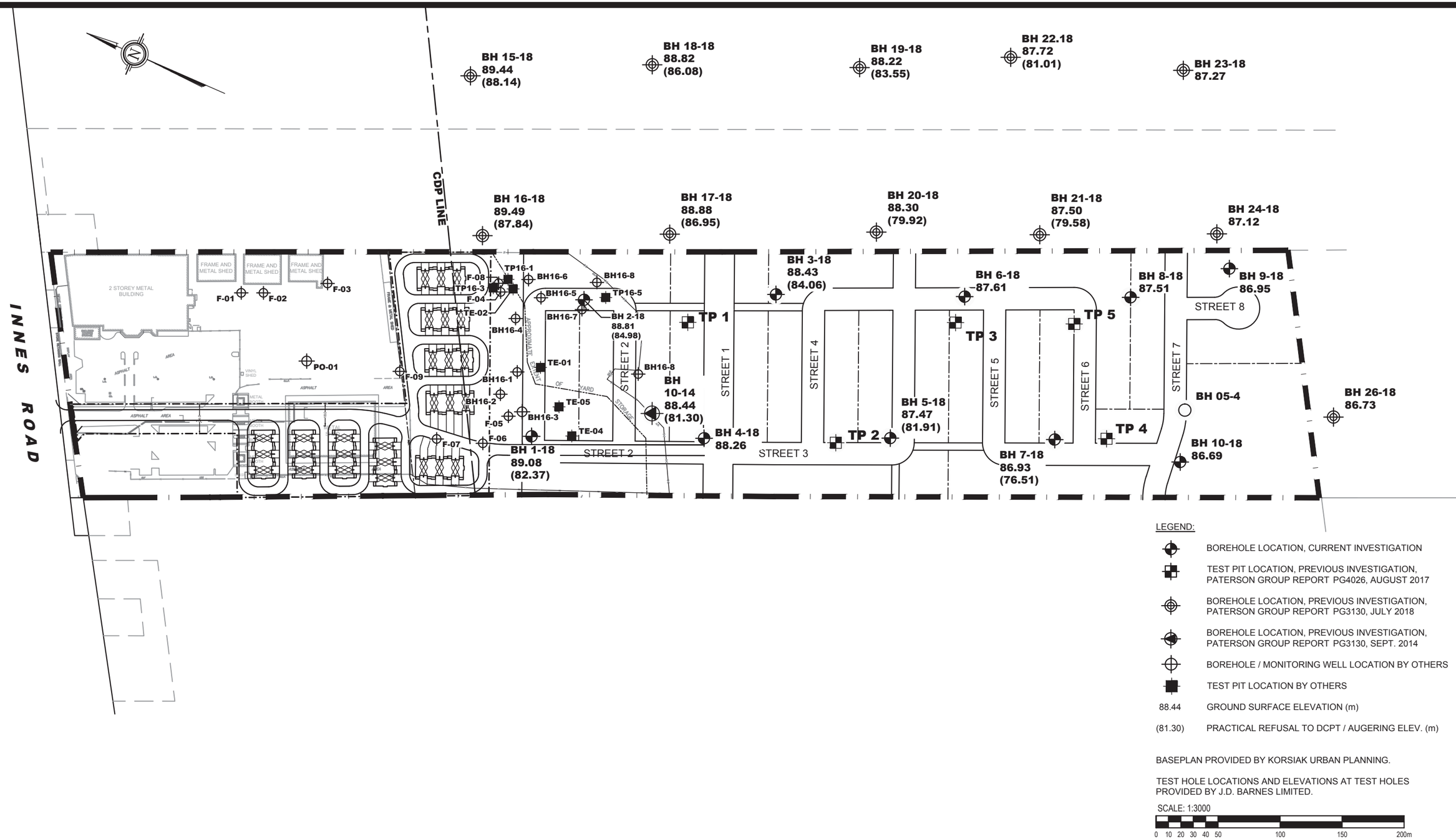
DRAWING PG4026-1 - TEST HOLE LOCATION PLAN

DRAWING PG4026-2 - PERMISSIBLE GRADE RAISE PLAN



FIGURE 1

KEY PLAN



LEGEND:

- BOREHOLE LOCATION, CURRENT INVESTIGATION
- TEST PIT LOCATION, PREVIOUS INVESTIGATION, PATERSON GROUP REPORT PG4026, AUGUST 2017
- BOREHOLE LOCATION, PREVIOUS INVESTIGATION, PATERSON GROUP REPORT PG3130, JULY 2018
- BOREHOLE LOCATION, PREVIOUS INVESTIGATION, PATERSON GROUP REPORT PG3130, SEPT. 2014
- BOREHOLE / MONITORING WELL LOCATION BY OTHERS
- TEST PIT LOCATION BY OTHERS
- 88.44 GROUND SURFACE ELEVATION (m)
- (81.30) PRACTICAL REFUSAL TO DCPT / AUGERING ELEV. (m)

BASEPLAN PROVIDED BY KORSIAK URBAN PLANNING.

TEST HOLE LOCATIONS AND ELEVATIONS AT TEST HOLES PROVIDED BY J.D. BARNES LIMITED.

SCALE: 1:3000

0 10 20 30 40 50 100 150 200m

patersongroup
consulting engineers

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

NO.	REVISIONS	DATE	INITIAL
3	UPDATED CONCEPTUAL PLAN	09/08/2019	RG
2	EXISTING BOREHOLES BY OTHERS ADDED	01/2019	RG
1	NEW BOREHOLES ADDED	11/2018	RG

GLENVIEW HOMES (INNES) LTD.

SUPPLEMENTAL GEOTECHNICAL INVESTIGATION
3604-3646 INNES ROAD

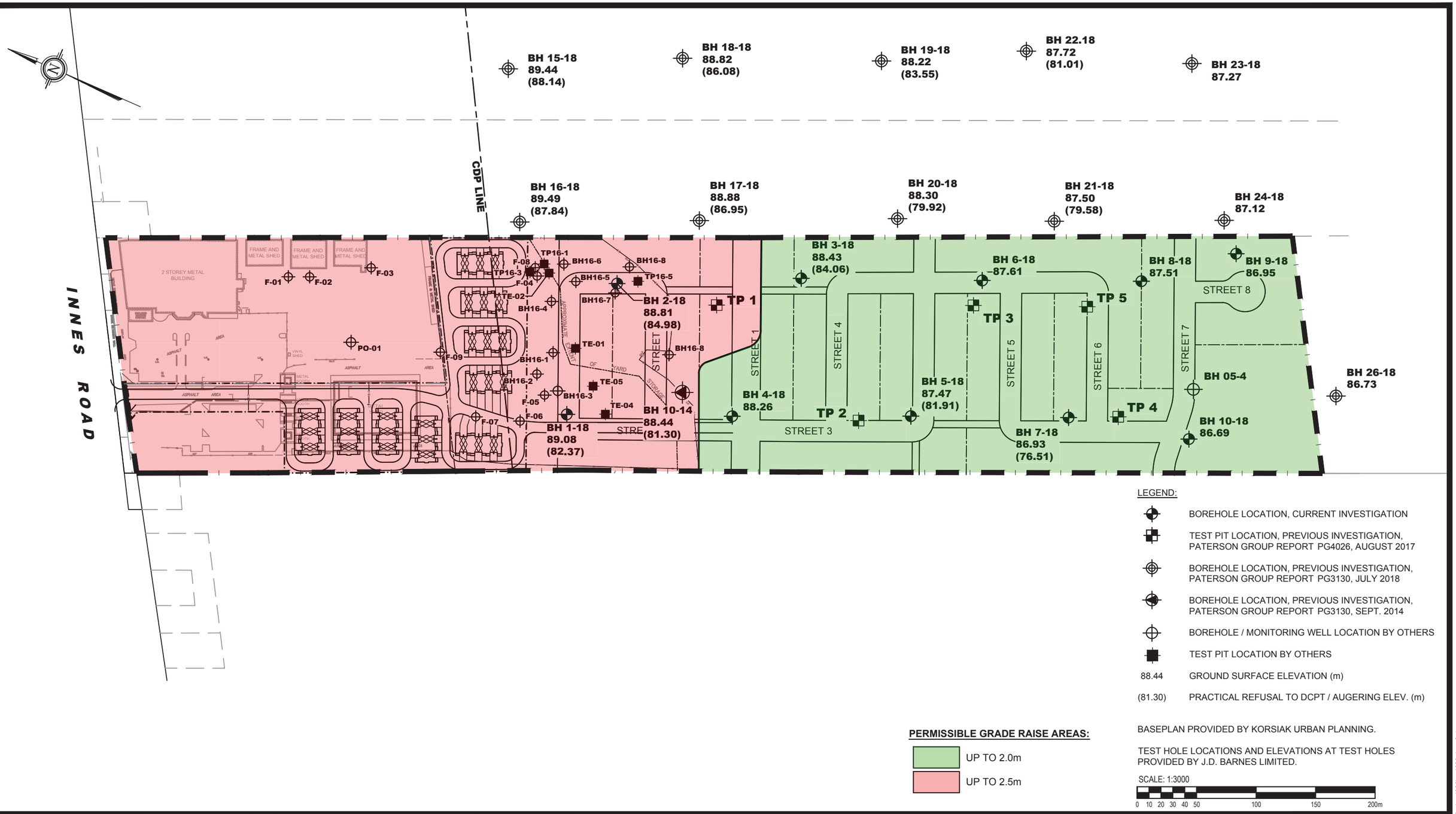
OTTAWA, ONTARIO

Title:

TEST HOLE LOCATION PLAN

Scale: 1:3000	Date: 08/2017
Drawn by: RCG	Report No.: PG4026-1
Checked by: NZ	Dwg. No.: PG4026-1
Approved by: DJG	Revision No.: 3

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LEGEND:

- BOREHOLE LOCATION, CURRENT INVESTIGATION
- TEST PIT LOCATION, PREVIOUS INVESTIGATION, PATERSON GROUP REPORT PG4026, AUGUST 2017
- BOREHOLE LOCATION, PREVIOUS INVESTIGATION, PATERSON GROUP REPORT PG3130, JULY 2018
- BOREHOLE LOCATION, PREVIOUS INVESTIGATION, PATERSON GROUP REPORT PG3130, SEPT. 2014
- BOREHOLE / MONITORING WELL LOCATION BY OTHERS
- TEST PIT LOCATION BY OTHERS
- 88.44 GROUND SURFACE ELEVATION (m)
- (81.30) PRACTICAL REFUSAL TO DCPT / AUGERING ELEV. (m)

PERMISSIBLE GRADE RAISE AREAS:

- UP TO 2.0m
- UP TO 2.5m

BASEPLAN PROVIDED BY KORSIAK URBAN PLANNING.

TEST HOLE LOCATIONS AND ELEVATIONS AT TEST HOLES PROVIDED BY J.D. BARNES LIMITED.

SCALE: 1:3000

0 10 20 30 40 50 100 150 200m

patersongroup
consulting engineers

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

NO.	REVISIONS	DATE	INITIAL
3	UPDATED CONCEPTUAL PLAN	08/2019	RG
2	EXISTING BOREHOLES BY OTHERS ADDED	01/2019	RG
1	NEW BOREHOLES ADDED	11/2018	RG

GLENVIEW HOMES (INNES) LTD.

SUPPLEMENTAL GEOTECHNICAL INVESTIGATION
3604-3646 INNES ROAD

OTTAWA, ONTARIO

Title:

PERMISSIBLE GRADE RAISE PLAN

Scale: 1:3000	**Date:** 02/2019
Drawn by: RCG	**Report No.:** PG4026-1
Checked by: NC	**Dwg. No.:** PG4026-2
Approved by: DJG	**Revision No.:** 3

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patersongroup **memorandum**

consulting engineers

re: **Geotechnical Review - Lightweight Fill Requirements**
Proposed Residential Development
3604-3646 Innes Road - Ottawa

to: Glenview Homes (Innes) Ltd.- **Ms. Jillian Normand** - JNormand@glenview.ca

date: February 18, 2021

file: PG4026-MEMO.02

Further to your request and authorization, Paterson Group (Paterson) prepared the current memorandum to provide a review of the preliminary grading at the proposed development with respect to lightweight fill requirements. The following memorandum should be read in conjunction with Paterson Report PG4026-2 Revision 2 dated April 2, 2020.

Geotechnical Review

Paterson reviewed the following drawing prepared by Novatech for the aforementioned commercial development:

- ❏ Macro Grading, Erosion and Sediment Control Plan - Project Number 118224-00 - Drawing Number 118224-GR - Revision 2 dated April 3, 2020

Based on our review of the preliminary grading plan, it is anticipated that grading at the proposed roadways and residential dwellings will be considered acceptable and in compliance with our permissible grade raise recommendations. As such, it is anticipated that lightweight fill will not be required at the subject site.

Upon request, Paterson will provide a summary of design details for the proposed development on a lot by lot basis once grading at the proposed development has been finalized.

We trust that the current submission meets your immediate requirements.

Best Regards,

Paterson Group Inc.



Kevin A. Pickard, EIT





David J. Gilbert, P.Eng.

Paterson Group Inc

Head Office and Laboratory
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Northern Office and Laboratory
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North Bay - Ontario - P1B 8Z4
Tel: (705) 472-5331 Fax: (705) 472-2334

St. Lawrence Office
993 Princess Street - Suite 100
Kingston - Ontario - K7L 1H3
Tel: (613) 542-7381

Appendix G
Draft Conditions

File: D07-16-19-0027

MENU OF CONDITIONS
FOR DRAFT APPROVAL
GLENVIEW HOME (INNES) LIMITED
SUBDIVISION, 3610 INNES ROAD

DRAFT APPROVED 26/05/2021

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Closing Conditions 41

The City of Ottawa's conditions applying to the draft approval of Glenview Homes (Innes) Limited's Subdivision (File No. D07-16-19-0027), 3610 Innes Road, are as follows:

1.	This approval applies to the draft plan certified by J.D.Barnes Ontario Land Surveyor, dated MONTH, DAY, YEAR, showing 151 Residential Lots, 9 streets, 10 residential blocks, 4 pathway blocks, 1 open space block, # 30cm reserves and # temporary turning circles. This approval applies to the approved conceptual plans and reports in support of the draft plan as follows (list plans, reports and studies associated with the draft approval): 1) Conceptual Site Servicing and Stormwater Management Report, prepared by Novatech, dated April 3, 2020 2) Addendum to Conceptual Site Servicing and Stormwater Management Report, prepared by Novatech, dated November 27, 2020 3) Geotechnical Investigation, Report: PG4026-2 Revision 2, prepared by Paterson Group, dated April 2, 2020 4) Traffic Impact Assessment, Ref: R-2018-155, prepared by Novatech, dated April 15, 2020 5) Stage 1 & 2 Archaeological Assessment for 3604-3646 Innes Road, Report Number: 1788059, prepared by Golder Associates, dated January 12, 2018 6) EIS – Species at Risk and Mitigation Measures – Updated prepared by Muncaster Environmental Planning Inc. dated October 13, 2020 7) Phase One Environmental Site Assessment Update, Part of Report No. 161-06382-00, prepared by WSP, dated June 27, 2016 8) Phase Two Environmental Site Assessment Update and Remediation, Report No. 161-06382-00, prepared by WSP, dated November 28, 2016 9) Planning Rationale & Integrated Environmental Review Statement, Ref: R-2019-173, prepared by Novatech, dated October 4, 2019 Subject to the conditions below, these plans and reports may require updating and/or additional details prior to final approval.	
	The Owner agrees, by entering into a Subdivision Agreement, to satisfy all terms, conditions and obligations, financial and otherwise, of the City of Ottawa, at the Owner's sole expense, all to the satisfaction of the City.	**Clearing Agency**[i]
	General	
2.	Prior to the issuance of a Commence Work Notification, the Owner shall obtain such permits as may be required from Municipal or Provincial	**OTTAWA Planning**

	authorities and shall file copies thereof with the General Manager, Planning, Infrastructure and Economic Development Department.	
3.	Prior to commencing construction, the Owner shall enter into a subdivision agreement with the City. The subdivision agreement shall, among other matters, require that the Owner post securities in a format approved by the City Solicitor, in an amount of 100% of the estimated cost of all works, save and except non-municipal buildings. The aforementioned security for site works shall be for works on both private and public property and shall include, but not be limited to, lot grading and drainage, landscaping and driveways, roads and road works, road drainage, underground infrastructure and services (storm, sanitary, watermains), streetlights, stormwater management works and park works. The amount secured by the City shall be determined by the General Manager, Planning, Infrastructure and Economic Development Department, based on current City tender costs, which costs shall be reviewed and adjusted annually. Securities for on-site works may be at a reduced rate subject to the approval of the General Manager, Planning, Infrastructure and Economic Development Department. Engineering, Inspection and Review fees will be collected based on the estimated cost of the works (+HST) and a park review and inspection fee will be based on 4% (+HST) of the total value of the park works as noted herein and in accordance with the City's Fees By-law for planning applications (By-law No. 2018-24 or as amended).	**OTTAWA Planning**
4.	The Owner acknowledges and agrees that any residential blocks for street-oriented dwelling units on the final Plan shall be configured to ensure that there will be no more than 25 units per block.	**OTTAWA Planning**
5.	The Owner acknowledges and agrees that any person who, prior to the draft plan approval, entered into a purchase and sale agreement with respect to lots or blocks created by this Subdivision, shall be permitted to withdraw from such agreement without penalty and with full refund of any deposit paid, up until the acknowledgement noted above has been executed. The Owner agrees to provide to the General Manager, Planning, Infrastructure and Economic Development Department an acknowledgement from those purchasers who signed a purchase and sale agreement before this Subdivision was draft approved, that the Subdivision had not received draft approval by the City. The Owner agrees that the purchase and sale agreements signed prior to draft approval shall be amended to contain a clause to notify purchasers of this fact, and to	**OTTAWA Legal**

	include any special warning clauses, such as but not limited to Noise Warnings and easements.	
6.	All prospective purchasers shall of affected lots be informed through a clause in the agreements of purchase and sale of the presence of lightweight fill on the lands, and that the presence of such lightweight fill may result in specific restrictions on landscaping, pools, additions, decks and fencing	**OTTAWA Legal**
7.	The Owner, or his agents, shall not commence or permit the commencement of any site related works until such time as a pre-construction meeting has been held with Planning, Infrastructure and Economic Development Department staff and until the City issues a Commence Work Notification.	**OTTAWA Planning**
	Landowners Agreement	
8.	The City will require each owner to demonstrate that it has executed the Funding Agreement and any applicable Cost Sharing Agreement, or the other owners consent to the owner proceeding in advance of the Cost Sharing Agreement being executed, as a condition of approval for all draft plan of subdivision and condominium, site plan and severance applications in the secondary plan area. A development condition shall require notification from the Administrator of the EUC Phase 3 Area Landowners Group that the owner is party to the relevant agreement(s) and has paid their share of any costs pursuant to the agreement(s) prior to registration.	**OTTAWA Planning LG**
	Zoning	
9.	The Owner agrees that prior to registration of the Plan of Subdivision, the Owner shall ensure that the proposed Plan of Subdivision shall conform with a Zoning By-law approved under the requirements of the *Planning Act*, with all possibility of appeal to the Ontario Municipal Board exhausted.	**OTTAWA Planning**
10.	The Owner undertakes and agrees that prior to the registration of the Plan of Subdivision, the Owner shall deliver to the City a certificate executed by an Ontario Land Surveyor showing that the area and frontage of all lots and blocks within the Subdivision are in accordance with the applicable Zoning By-law.	**OTTAWA Planning**
11.	The Owner acknowledges and agrees that in those situations where both interior side yard setbacks of a dwelling lot are less than 1.2 metres and are obstructed by permitted projections, a shared access easement shall be registered on the titles to the affected lot and one of the abutting lots in order to provide clear and unobstructed access within the side yard.	**OTTAWA Planning**

	Roadway Modifications	
12.	The Owner shall pay all expenses associated with all works related to roadway modifications and shall provide financial security in the amount of 100% of the cost of implementing the required works.	**OTTAWA Planning**
13.	The Owner agrees to provide a Development Information Form and Geometric Plan indicating: a) Road Signage and Pavement Marking for the subdivision; b) Intersection control measure at new internal intersections; and c) location of depressed curbs and TWSIs; prior to the earlier of registration of the Agreement or early servicing. Such form and plan shall be to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department.	**OTTAWA Planning Transpo Plg**
14.	Where traffic calming is identified, the Owner acknowledges and agrees to implement traffic calming measures on roads within the limits of their subdivision to limit vehicular speed and improve pedestrian safety. The Owner further acknowledges and agrees that the detailed design for new roads will include the recommendation(s) from the required supporting transportation studies. The Owner agrees that traffic calming measures shall reference best management practices from the Canadian Guide to Neighbourhood Traffic Calming, published by the Transportation Association of Canada, and/or Ontario Traffic Manual. These measures may include either vertical or horizontal features (such measures shall not interfere with stormwater management and overland flow routing), including but not limited to: • intersection or mid block narrowings, chicanes, medians; • speed humps, speed tables, raised intersections, raised pedestrian crossings; • road surface alterations (for example, use of pavers or other alternate materials, provided these are consistent with the City's Official Plan polices related to Design Priority Areas); • pavement markings/signage; and • temporary/seasonal installations such as flexi posts or removable bollards.	**OTTAWA Planning**
	Highways/Roads	
15.	The Owner acknowledges and agrees that all supporting transportation studies and design of all roads and intersections shall be to the satisfaction	**OTTAWA Planning**

	of the General Manager, Planning, Infrastructure and Economic Development Department.	
16.	The Owner shall retain a licensed or registered professional with expertise in the field of transportation planning and/or traffic operations to prepare a Transportation Impact Assessment. The study shall comply with the City of Ottawa's Transportation Impact Assessment Guidelines. The Owner agrees to revise the Draft Plan in accordance with the recommendations of the study to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department.	**OTTAWA Planning**
17.	The Owner shall provide temporary turn-arounds for all streets terminating at the edge of any phase of development, prior to registration of the Plan, to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department. The Owner agrees that it will convey to the City at no cost any temporary easements that may be required in order to establish the temporary turn-arounds. Turning circle(s) may include a 0.3-metre reserve along the perimeter of any temporary turning circle(s), to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department. For any portion of the temporary turn-around easements that do not form part of the permanent road allowance, the easements shall be released at the expense of the Owner when the easements are no longer required by the City.	**OTTAWA Planning**
18.	Any dead ends and/or open spaces of road allowances created by this plan of subdivision may be terminated in 0.3 metre reserves. The Owner shall place 0.3 metre reserves on the following locations: • *dead ends of Streets 1, 5 and 7*	**OTTAWA Planning Legal**
19.	The Owner shall provide the following site triangles on the final plan at all of the following occurrences of intersections of public roads within the limits of the plan of subdivision: Public lanes to local lanes: 3m x 3m Local road to local road: 3m x 3m Local road to collector road: 5m x 5m Collector road to collector road: 5m x 5m Collector road to arterial road: 5m x 5m Arterial road to arterial road: 5m x 5m	**OTTAWA Planning Legal**
20.	The Owner agrees to provide a construction traffic management plan for the subdivision prior to the earlier of registration of the Agreement or early servicing. Such plan shall, at a minimum, ensure that contractors respect the peak traffic periods to ensure construction does not impact residents' daily commute; and that Innes Road is regularly cleaned and kept free of	**OTTAWA Planning**

	construction mud and debris to ensure commuters and cyclists are not affected by stones, dirt, debris and dust. Such plan shall be to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department.	
21.	The Owner acknowledges that should the plan be registered in one phase; the registration shall include: • • *All Blocks*	**OTTAWA Planning**
22.	All streets shall be named to the satisfaction of the Director of Building Code Services and in accordance with the Municipal Addressing By-law or the Private Roadways By-law as applicable.	**OTTAWA Planning BCS**
23.	The Owner acknowledges that the construction of buildings may be restricted on certain lots and/or blocks until such time as road connections are made so that snowplow turning and garbage collection can be implemented.	**OTTAWA Planning**
24.	The Owner acknowledges that the ongoing East Urban Community Mixed-use Centre Community Design Plan study (CDP) proposes a multi-use pathway facilities along future 24-metre wide collector roads extending west through the subdivision (Street 1). The Owner further agrees to design and build such facilities within Street 1 to City standards should the need be identified in the approved CDP.	**OTTAWA Planning**
25.	The Owner acknowledges and agrees that, where feasible, the driveways leading to multiple attached dwelling blocks fronting along a public road, shall be paired. The pairing of driveways shall be shown on all detailed drawings submitted for review and approval and shall be to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department.	**OTTAWA Planning**
	Public Transit	
26.	The Owner shall design and construct, at its expense, Street 1, which has/have been identified as transit service routes, to Transportation Association of Canada standards, including right-of-way width, horizontal and vertical geometry. The Owner shall design and construct, at its expense, the determined locations for transit passenger standing areas and shelter pads, to the specifications of the General Manager, Planning, Infrastructure and Economic Development Department. Specific bus stop locations will be identified during the creation of the composite utility plan. All of the above shall be to the specifications and satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department.	**OTTAWA Planning Transit**

27.	The Owner shall, prior to registration, design and construct a temporary turn-around for designated-transit Street 1 at the limit of the subdivision over Block 159as required, or on the abutting east lands owned by others, to accommodate interim transit routes, all to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department and the Assistant General Manager, Transit Services Operations.	**OTTAWA Transit**
28.	The Owner shall ensure that the staging of the Subdivision, including the construction of dwellings, roadways, walkways, and paved passenger standing areas, or shelter pads, shall occur in a sequence that permits the operation of an efficient, high quality transit service at all stages of development.	**OTTAWA Transit**
29.	The Owner shall orient dwellings and vehicular accesses in the vicinity of bus stops in such a manner as to avoid traffic conflicts and visual intrusion. Prior to the earlier of early servicing or registration, the Owner shall submit plans to Planning, Infrastructure and Economic Development Department for approval indicating the orientation of all dwellings and private accesses in the vicinity of all bus stop locations.	**OTTAWA Planning Transit**
30.	The Owner shall inform all prospective purchasers, through a clause in all agreements of Purchase and Sale and indicate on all plans used for marketing purposes, those streets identified for potential transit services, the location of the bus stops, paved passenger standing areas, or shelters pads and shelters, any of which may be located in front of or adjacent to the purchaser's lot at any time.	**OTTAWA Transit**
31.	The Owner agrees to implement a Transit Service Strategy in accordance with the Official Plan. The Owner, together with the City, will determine the method and means by which the developments, as well as adjacent areas, can be efficiently and effectively serviced by transit. The Owner shall enter into an agreement with the Transit Services Branch, prior to the registration of the subdivision, to outline the provision of interim bus service. Said agreement shall include, but not be limited to, the following: establishment of routes and stops and levels of service and provision and maintenance of stops and turnarounds. The agreement may include: funding and cost-sharing arrangements and timing and triggers for the transfer of responsibility to City.	**OTTAWA Transit**
	Geotechnical	
32.	Where special soils conditions exist, the Owner covenants and agrees that the following clause shall be incorporated into all agreements of purchase and sale for Lot, and included in the municipal covenant agreement against the title:	**OTTAWA Planning**

	"The Owner acknowledges that special soils conditions exist on this lot which will require: (a) a geotechnical engineer licensed in the Province of Ontario to approve any proposal or design for a swimming pool installation or other proposal requiring an additional building permit on this lot prior to applying for a pool enclosure permit or installing the pool; and (b) the Owner to submit a copy of the geotechnical engineer's or geoscientists report to the General Manager, Planning, Infrastructure and Economic Development Department at the time of the application for the pool enclosure or additional building permit. The Owner also acknowledges that said ~~e~~ngineer or geoscientist will be required to certify that the construction has been completed in accordance with his/her recommendation and that a copy of the certification or report will be submitted to the General Manager, Planning, Infrastructure and Economic Development Department.	
33.	The Owner shall submit a geotechnical report prepared in accordance with the City's approved Geotechnical Investigation and Reporting Guidelines and/or Slope Stability Guidelines for Development Applications by a geotechnical engineer or geoscientist, licensed in the Province of Ontario, containing detailed information on applicable geotechnical matters and recommendations to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development which include, but are not limited to: 1. existing sub-surface soils, groundwater conditions; 2. slope stability (including an assessment during seismic loading) and erosion protection, in addition to any building construction requirements adjacent to unstable slope; 3. clearly indicate orientation of any cross-sections used in slope stability analysis and location of center of the slip circle; 4. grade raise restrictions on the site and, if appropriate, the impacts this will have on the slope stability; 5. design and construction of underground services to the building, including differential settlement near any buildings or structures; 6. design and construction of roadway, fire routes and parking lots; 7. design and construction of retaining walls and/or slope protection; 8. design and construction of engineered fill; 9. design and construction of building foundations; 10. site dewatering; 11. tree planting; 12. any restrictions to landscaping, in particular type and size of trees and the proximity of these to structures/buildings; 13. the construction for future infrastructure and buildings;	**OTTAWA Planning**

	14. design and construction of swimming pools, hot tubs, decks, and additions; 15. design and construction of park blocks for its intended uses; and 16. in areas of sensitive marine clay soils:	
34.	a) The Owner agrees to any restrictions to landscaping, in particular the type and size of trees and the proximity of these to structures/buildings due to the presence of sensitive marine clay soils, as per the City's Tree Planting in Sensitive Marine Clay Soils – 2017 Guidelines. b) The Owner agrees to provide the following tests, data, and information prior to zoning approval , in order to determine the sensitivity of the clay soils and how it will impact street tree planting and potentially front yard setbacks: i. Shear Vane analysis including remolded values per ASTM D2573. ii. Atterberg Limit testing per ASTM D4318; with the following data clearly identified, Natural water content (W), Plastic Limit (PL), Plasticity Index (PI), Liquidity Index (LI), and Activity (A). iii. Shrinkage Limit testing per ASTM D4943 with Shrinkage Limit (SL). iv. A separate section within the geotechnical report on sensitive marine clay soils, which will include a signed letter and corresponding map that confirms the locations of low, medium sensitivity (generally <40% plasticity) or high sensitivity clay soils (generally >40% plasticity), as determined by the above tests and data. v. The report identifies that foundation walls are to be reinforced at least nominally, with a minimum of two upper and two lower 15M (rebar size) bars in the foundation wall. c) In locations where all six conditions in the Tree Planting in Sensitive Marine Clay Soils – 2017 Guidelines cannot be met (e.g. if soils are generally >40% plasticity) the 2005 Clay Soils Policy will apply, meaning only small, low-water demand trees can be planted at a minimum separation distance of 7.5m from a building foundation. In these cases, the Zoning By-law will be used to ensure sufficient front yard setbacks to accommodate street trees in the right-of-way. For example, if street trees are planted in the right-of-way at a distance of 2m from the front lot line, then the minimum front yard setback would be 5.5m (7.5m – 2m).	**OTTAWA Planning**
35.	In areas of sensitive marine clay soils, the Owner agrees that, prior to registration, to prepare an information package for homeowners regarding tree planting and watering, in accordance with the supporting geotechnical	**OTTAWA Forestry**

	report. This information must be approved by Forestry Services prior to circulation to homeowners.	
	Pathways, Sidewalks, Walkways, Fencing, and Noise Barriers	
36.	The Owner acknowledges and agrees that all pathways, sidewalks, walkways, fencing, and noise barriers are to be designed and constructed in accordance with City specifications, at no cost to the City, and to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department.	**OTTAWA Planning**
37.	The Owner shall construct a 1.8-metre asphalt pathway within each of Blocks 163 to 166, or asphalt widths that match with abutting developments inclusive, as well as 1.5 metre heavy-duty black vinyl-coated chain link fencing to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department. Wood post-and-rail fencing to City standards shall be installed along the abutting residential lot lines extending from the end of the chain link fencing at a point in line with the front wall of the adjacent dwellings to the road allowance, all to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department.	**OTTAWA Planning**
38.	The Owner agrees to design and construct, at no cost to the City, sidewalks in accordance with City Specifications in the following locations: • Street 1 – MUP on north side and sidewalk on south side • Street 9 – sidewalk both sides from Innes Road to Street 2 (up to Block 159) • Street 9 – sidewalk on west and south sides from Street 2 to Street 2 • Street 2 – sidewalk on west side from Street 9 to Street 1 • Street 7 – sidewalk on south side	**OTTAWA Planning**
39.	The Owner agrees to connect all new pathways, sidewalks, walkways to the existing pathways, sidewalks, walkways located at the following locations: • Street 1 at Jargeau Road • Street 9 at Innes Road • Block 165 to existing path	**OTTAWA Planning**
40.	a) The Owner agrees to design and construct 1.5 metre black vinyl-coated chain link fences in accordance with the Fence By-law at the following locations: • Along the south and east boundary of the Park Block 162 where the park abuts residential lots All chain link fencing that separate public lands and residential lots and blocks shall have a maximum opening (the diamond shape area) of no	**OTTAWA Planning Parks**

	greater than 37 mm in order to comply with the applicable part of the "Pool Enclosure By-Law". b) The Owner agrees that any vinyl-coated chain link fence required to be installed with the exception of parks fencing shall be located a minimum of 0.15 metres inside the property line of the park. Refer to Parks condition X for details.	
41.	a) The Owner agrees to design and erect, at no cost to the City, noise attenuation barriers in accordance with City Specifications at the locations to be specified in the Noise Study required to be submitted to the satisfaction and approval of the General Manager, Planning, Infrastructure and Economic Development Department. b) The Owner agrees that any noise attenuation barrier required to be installed under this Agreement, shall be located a minimum of 0.30 metres inside the property line of the private property, and the location of the fence shall be verified by an Ontario Land Surveyor, prior to the release of securities for the noise attenuation barrier.	**OTTAWA Planning**
42.	The Owner shall insert a clause in each agreement of purchase and sale and shall be registered as a notice on title in respect of all lands which fences have been constructed stating that: "Purchasers are advised that they must maintain all fences in good repair, including those as constructed by *Glenview Homes (Innes) Limited* along the boundary of this land, to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department. The Purchaser agrees to include this clause in any future purchase and sale agreements".	**OTTAWA Planning**
	Landscaping/Streetscaping	
43.	The Owner agrees, prior to registration to have a landscape plan(s) for the plan of subdivision prepared by a Landscape Architect, in accordance with the recommendations contained in the geotechnical report(s), the Tree Conservation Report, and/or the Environmental Impact Statement (if appropriate). The landscape plan(s) shall include detailed planting locations, plant lists which include species, plant form and sizes, details of planting methods, pathway widths and materials, access points, fencing requirements and fencing materials, other landscape features and gateway features where required.	**OTTAWA Planning Forestry**

	The Owner agrees to implement the approved landscape plan(s) and bear all costs and responsibility for the preparation and implementation of the plan(s). The Owner agrees that where sensitive marine clay soils are present, and the geotechnical report has satisfied the applicable conditions of the Tree Planting in Sensitive Marine Clay Soils - 2017 Guidelines, confirmation of adequate soil volumes in accordance with the subject guidelines shall be provided by a Landscape Architect prior to zoning approval. All of the aforementioned are to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department.	
44.	The Owner agrees that for all single detached and semi-detached lots, a minimum of 1 tree per interior lot and 2 trees per exterior side yard lots (i.e. corner lots) shall be provided on the landscape plan(s). In areas of low/medium plasticity sensitive marine clay soils, the following exceptions in accordance with the Tree Planting in Sensitive Marine Clay Soils - 2017 Guidelines will apply in order to maximize the number of medium size trees: a) Where abutting properties form a continuous greenspace between driveways, one medium size tree will be planted instead of two small size trees, provided the minimum soil volume can be achieved. In these cases only, for the purposes of determining the minimum number of trees to be planted, one medium size tree that replaces two small trees will be counted as two trees. b) The medium size tree should be planted as close as possible to the middle of this continuous greenspace (in the right-of-way) to maximize available soil volume. c) On larger lots with sufficient soil volume for a medium size tree, one medium size tree will be planted on each lot (or each side of a corner lot), even if the abutting properties form a continuous greenspace between driveways. d) If trees need to be replaced, Forestry staff reserve the right to plant appropriate size trees at one tree per lot. Along park frontages, the Landscape Plan shall locate trees at a 6-8 metre on-centre separation distance along the full extent of the road right-of-way abutting any park block(s). Should specific site constraints prevent the required allocation of trees, the remaining number of required trees shall be provided within any proposed park(s), open space or environmental blocks, non-residential road right-of-way frontages, stormwater management facility(s), or other suitable	**OTTAWA Planning Forestry**

	alternative locations, to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department.	
45.	In areas of sensitive marine clay soils where the six conditions of the Tree Planting in Sensitive Marine Clay Soils – 2017 Guidelines have been met, the following shall be provided: a) The landscape plan shall include a note indicating that is has been developed as per the geotechnical report(s) (date, author), the letter (date, author), and Map (date, title), to the satisfaction of the General Manager, Planning Infrastructure and Economic Development. b) At the time of tree planting, in addition to providing an F1 inspection form, the Landscape Architect will provide a signed letter indicating that trees have been planted with appropriate soil volume in accordance with the approved Landscape Plan, to the satisfaction of the General Manager, Planning Infrastructure and Economic Development.	**OTTAWA Planning**
46.	Prior to registration or Commence Work Notification of the Composite Utility Plan, the Owner agrees to have a landscape plan for the draft plan of subdivision prepared by a Landscape Architect. The landscape plan shall include detailed planting location and species list, pathway width and materials, access points, fencing requirements and fencing materials and shall be approved by the General Manager, Planning, Infrastructure and Economic Development Department prior to subdivision registration	**OTTAWA Planning and Forestry Services**
47.	The Owner agrees to implement the approved landscape plan to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department.	**OTTAWA Planning and Forestry Services**
	Tree Conservation	
48.	The Owner acknowledges and agrees to abide by the Urban Tree Conservation By-law, 2009-200, and that any trees to be removed from the site shall be in accordance with an approved Tree Permit to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department.	**OTTAWA Planning**
49.	The Owner agrees to maintain the tree protection measures until construction is complete and/or the City has provided written permission to remove them.	**OTTAWA Planning**
	Urban Design	
	The Owner acknowledges and agrees to use best efforts during the siting of dwellings on the lots and/or blocks to ensure that the designs of all	**OTTAWA Planning**

	dwellings and streetscapes have regard to the design principles and are consistent with the guidelines contained within all applicable City of Ottawa urban design guidelines, including the Council-approved *Building Better and Smarter Suburbs* initiatives. In particular, the flanking exterior side façades of dwellings on corner lots should feature elevations that address the street.	
	Parks	
50.	In accordance with the Planning Act and the City of Ottawa Parkland Dedication By-law, the Owner shall: (select one) a) convey Blocks 162 to the City for parkland purposes; and/ or b) provide cash-in-lieu of parkland on the subject lands within Ward 2 such value of the land to be determined by the City's Realty Services Branch. The Applicant shall bear the cost of any appraisal costs incurred by the City. All to the satisfaction of the General Manager, Recreation, Cultural and Facility Services Department.	**OTTAWA Parks**
51.	The Owner covenants and agrees that Block 162 will be conveyed to the City, at no cost, as dedicated parkland. The size and configuration of the park block on the Final Plan shall be to the satisfaction of the General Manager, Recreation, Cultural and Facility Services Department. The Owner covenants and agrees that the parkland dedication requirement has been calculated at a rate of one hectare per 300 units (residential >18units/ha), but for apartments, as defined by the zoning by-law this parkland conveyance will not exceed a maximum of 10% of the land area of the site being developed. Based on the estimated number of 302 units for this subdivision, there is a parkland dedication requirement of 1.007 hectares, as shown in the calculation below: **Parkland Dedication Required** Residential Units: 302 **Total:** | Calculation | Parkland Required (ha) Unit Sub-Totals: 302 | **302** | 1 / 300 | 1.007 **Parkland REQUIRED Total *(ha)*: 1.007** **Parkland Dedicated:** Block 162 1.002 **Parkland DEDICATED Total *(ha)*: 1.002** **Parkland Under-Dedication *(ha)*: 0.005** In the event that the number of units change, the required parkland dedication will also change.	**OTTAWA Parks**

52.	The Owner acknowledges and agrees that Blocks 160 and 161 have been identified as future residential development. Once the land use and densities have been determined for Blocks 160 and 161, additional parkland dedication will be required. It is expected that when the said blocks are developed, appropriate parkland dedication will be determined and calculated at the required rate noted above in condition 54. Land conveyance or cash-in-lieu of parkland will be determined through future development applications for said blocks, all to the satisfaction of the General Manager, Recreation, Cultural and Facility Services. The Owner acknowledges and agrees if cash-in-lieu of parkland is determined sufficient through development of Blocks 160 and 161, such value of the land will be determined by the City's Realty Service Branch. The Owner shall be responsible for any appraisal costs incurred by the City, all to the satisfaction of the General Manager, Recreation, Cultural and Facility Services Department.	**OTTAWA RC&FS**
53.	The Owner and the General Manager of Recreation, Culture and Facility Services may, if it is mutually beneficial to both parties, enter into an agreement whereby the Owner will provide funding (+HST) to the City for the design and the construction of the park block(s). The City will proceed to design and construction of the park as per the typical city-build park process as described in the Parks Development Manual. The timing of the park construction will be at the discretion of the City. The expected cost of the park(s) works to be paid to the city will be based on the rate per hectare and indexing rate utilized for the park development by the City at the time of registration of the phase of development, which includes the park block(s) plus a 5% administrative fee for City forces to execute the project. The funding for park works will be paid to the city at the time of registration for the phase of development, which includes the park block. All standard subdivision conditions associated with the park, including, but not limited to: fencing, fill and rough grading, tree removal and services stubbed to within 2.0 m inside the park block(s) will remain a subdivision cost to be covered by the Owner separate from the park funding.	**OTTAWA Parks**
54.	The Owner acknowledges and agrees to design and construct the parkland, identified as Block 162, in accordance with City specifications and standards. The Owner further agrees to provide design plans and documents as detailed in the Park Development Manual 2nd edition 2017 (and as amended) for the park(s). The plans and documents will detail the designs, costs and amenities to be provided in each park. The expected cost of the design, construction, review and inspection of these parks will be in accordance with the rate per hectare and indexing rate utilized for park development by the City at the time of registration of each phase of development.	**OTTAWA Parks**

	The design plans and documents as well as the final budget for design, construction, review and inspection shall be subject to approval by the City, all to the satisfaction of the General Manager, Recreation, Cultural and Facility Services Department.	
55.	All Owner obligations associated with the Park Block(s) must be completed to the satisfaction of the General Manager, Recreation, Cultural and Facility Services Department within two years of registration. If the Park Block(s) is not tendered and under construction within two years of registration, the Owner agrees that the park development budget shall be based on the park development rate per hectare in effect at the time of the commencement of the park construction and that the Owner is required to pay the applicable Park Development rate for the current year that the park is to be built and those funds will be added to the park budget for construction	**OTTAWA Parks**
56.	The Owner acknowledges and agrees that no stormwater management facilities, encumbrances such as retaining walls, utility lines or easements of any kind shall be located on, or in front of, dedicated park blocks without the written approval of the General Manager, Recreation, Cultural and Facility Services Department.	**OTTAWA Parks**
57.	The Owner acknowledges and agrees that any encumbrances which are not solely for the benefit of the park, such as retaining walls, utility lines or easements of any kind on lands, or portion thereof encumbering the design and function of future Park Block 162 must be approved by the General Manager of Recreation, Culture and Facility Services Department, and will not form part of the *Planning Act* parkland dedication requirements. .	**OTTAWA Parks**
58.	The Owner agrees the park block(s) must be fully developable for its intended use based on a geotechnical report. If any constraints to development of the park block(s) are found the measures necessary to mitigate the constraints and to provide a subgrade suitable for the intended park(s) uses as identified in the Facility Fit Plan, or if a Facility Fit Plan has not yet been prepared for intended park uses as identified by Parks planning staff, will be undertaken by the Owner. The Owner is solely responsible for the costs of any necessary mitigation measures in addition to the Park Budget. All of the aforementioned are to the satisfaction of the General Manager, Recreation, Cultural and Facility Services Department.	**OTTAWA Parks**
59.	Once a Facility Fit Plan is submitted and approved by the General Manager, Recreation, Cultural and Facility Services, and after tree protection fencing has been installed accordingly, both as approved by the	**OTTAWA Parks**

	General Manager, Recreation, Cultural and Facility Services Department, the Owner may remove vegetation, trees and topsoil from the park(s) to facilitate rough grading of the area. The Owner agrees that the Owner may stockpile the topsoil either on or off the park(s). If the removal of the native topsoil is required, the Owner agrees to provide replacement topsoil at a sufficient depth and quality for the park(s) as per City Standards for park topsoil. All work shall proceed in accordance with the applicable By-laws and all at the sole cost of the Owner.	
60.	The City acknowledges and agrees that the Owner may use the Park(s) outside of the protected park areas for the stockpiling of materials or staging as needed. The Owner agrees to conduct the stockpiling of soils in accordance with the excess soils regulation, as amended, at the time of construction. The Owner agrees contaminated soils shall not be stockpiled on future park areas. The Owner agrees to provide to the City documentation of the source and quality of the soils temporarily stored on the future park areas. The Owner acknowledges and agrees that in the event that the Owner chooses to use the parkland for stockpiling or staging, once this use of the parkland is completed, all materials will be removed from the parkland and a geotechnical report by a qualified and licensed engineer or geoscientist will be submitted. The geotechnical report shall confirm that the subgrade is suitable for its intended use and that no contaminants have been deposited on the parkland. The geotechnical report must indicate the level of soil compaction on the site and conform to City Standards, to the satisfaction of the General Manager, Recreation, Cultural and Facility Services Department. The Owner agrees that any remediation required to the parkland as result of the owners use/or disturbance of the parkland will be at the Owner's expense and will be in addition to the estimated park budget calculated at the per hectare rate as indexed and such remediation work shall be completed to the satisfaction of the General Manager, Recreation, Cultural and Facility Services Department.	**OTTAWA Parks**
61.	The Owner further agrees to prepare and submit upon registration, for approval all park plans and documents required as noted in the Park Development Manual 2017 based on the approved Facility Fit Plan, all to the satisfaction of the General Manager, Recreation, Cultural and Facility Services Department	**OTTAWA Parks**
62.	The Owner agrees to filling and rough grade the park block in accordance with the following:	**OTTAWA Planning Parks**

	Any fill imported to the future park block must be conducted in accordance with the excess soils regulation, as amended, at the time of construction. Documentation of the source and quality of the fill to be imported must be approved by a Qualified Person. Soils must be tested to the minimum parameter list as specified in the excess soils regulation. Importation of soils with no chemical testing will not be permitted. Additional testing may be required by the Qualified Persons as defined in the regulation. Copies of all records related to all soils imported to the future park areas must be provided to the City. It is the responsibility of the Owner to fill and rough grade the park where necessary, with clean earth borrow, compacted and leveled within the park block accordingly, to provide for positive surface drainage as per the City Standards for Park Fill and rough grading as per the approved subdivision grading plan. All at the expense of the Owner. All works and fill materials are to be approved by the General Manager, Planning, Infrastructure and Economic Development Department prior to being placed on site.	
63.	It is the responsibility of the Owner to undertake final grading of the park block as per the park working drawings /grading and drainage plan. This final grading will be covered by the park budget to a maximum of 10% of the park construction cost. Additional grading beyond 10% of park construction cost will be at the Owner's expense. All works and design drawings are subject to the approval of the General Manager, Recreation, Cultural and Facility Services Department and the General Manager, Planning, Infrastructure and Economic Development Department. Unless otherwise specified the Owner shall provide the following services and utilities to all Park Blocks: a) A 300mm diameter storm sewer and CB/MH at 2m inside the park property line. b) A 50mm diameter water line complete with standpost at 2m inside the park property line. A city standard park water vault chamber, standard detail W31.1 latest version, must also be installed as part of parks water works. The park water vault will be funded from the park budget. Co-ordination of all park water works including water vault and meter installation is an Owner responsibility. c) 150mm diameter sanitary sewer and MH at 2m inside the park property line. d) A 120/240 volt, 200 amperes single phase hydro service at 2m inside the park property line. The Owner is responsible for making all arrangements and coordinating the connection of the new hydro (electrical) service, including costs and inspections, with the respective hydro (electricity) agencies. The Owner is also	**OTTAWA Planning Parks**

	responsible to ensure the park electricity service(s) is included on the approved CUP drawings.	
64.	The Owner shall install fencing of uniform appearance and quality, with a minimum height of 1.5m along the common boundary of all residential lots and other lots which abut Park Blocks. Fences shall be installed 0.15m on the park property side of the common property line, and the location of the fence shall be verified by an Ontario Land Surveyor. All fences must adhere to the City's fence By-law 2003-462. Fence materials will be of commercial grade and consist of 6-gauge black vinyl coated chain link material and black powder coated schedule 40 pipe rails and posts or an approved alternative. The fencing shall meet the Pool Enclosure By-law specifications.	**OTTAWA Parks**
65.	No access from private property to passive public property will be allowed. The Owner shall place the following clause in each Agreement of Purchase and Sale and shall be registered as a notice on title in respect of all Lots and Blocks: "The Transferee for himself, his heirs, executors, administers, successors and assigns acknowledge being advised that gates accessing public property are not permitted in the fences."	**OTTAWA Parks**
66.	The Owner shall include a clause in each Agreement of Purchase and Sale and shall be registered as a notice on title in respect of all Lots and Blocks which shall provide notification to all purchasers of lands within the Subdivision that parkland within this subdivision and/or already existing in the vicinity of the subdivision may have (select as appropriate): a) active hard surface and soft surface recreational facilities b) active lighted sports fields and other lit amenities c) recreation and leisure facilities d) potential community centre e) library f) day care g) other potential public buildings/facilities.	**OTTAWA Parks**
67.	The Owner acknowledges and agrees that, if the approved park concept design contains amenities proposed by the Owner that exceed the standard park design and construction budget, and if securities are not retained by the City for these items, the City shall not be responsible for these items in the event that the City must complete the park.	**OTTAWA Parks**
68.	The Owner acknowledges and agrees that, following registration of this agreement, all park blocks will be transferred to the City. Notwithstanding said transfer, the Owner acknowledges and agrees that, prior to the assumption of the park by the City, the owner will retain all liability for the	**OTTAWA Parks**

	transferred blocks and that said transfer will in no way exonerate the Owner from its responsibility to design and construct the park pursuant to the terms of this agreement.	
69.	The Owner acknowledges and agrees that where multiple parks are to be developed within a Community Design Plan (CDP) area or draft plan of subdivision with multiple land-owners, the land-owners will enter into a cost sharing agreement to cover the cost of the development of the parks as per the direction of OPA 159. No approvals will be given on a plan of subdivision until a cost sharing agreement regarding the development of parkland within the development area has been entered into and submitted to the City. All to the satisfaction of the General Manager, Recreation, Cultural and Facility Services and the General Manager, Planning, Infrastructure and Economic Development.	**OTTAWA Planning Parks**
70.	The Owner acknowledges and agrees to erect on the park block(s) at a location selected by the General Manager, Recreation, Cultural and Facility Services a professionally painted sign indicating: Future Parkland No Dumping No Removal of soils or Vegetation All at the expense of the Owner	**OTTAWA Parks**
71.	Upon registration of the subdivision and transfer of ownership of the park block to the city, the Owner agrees to provide: • a certificate of insurance that names the City of Ottawa as Additional Insured, and • a letter of credit which covers the full amount of the park construction cost to ensure the work is completed, the Owner will hereby be granted consent to enter at no cost to complete the work. All is to the satisfaction of the General Manager of Recreation Culture and Facility Services.	**OTTAWA Parks**
72.	It is the responsibility of the Owner to remove all vegetation from the park block that has not been identified for retention. The tree removal within the park block will occur at same time as tree removal for the entire subdivision as identified in the tree removal permit which is submitted by the Owner and approved by the City. The Owner is solely responsible for the costs of any necessary tree removals occurring at this time.	**OTTAWA RC&FS**
73.	The Owner acknowledges and agrees that no work within the ROW in front of, or around, any boundary of the park will be a park cost. All ROW work	**OTTAWA Parks**

	including, tree planting, topsoil and sod, and all hard surface work will be at the Owners' expense. Where a park plaza or landscape feature extends into the ROW as a continual element of the park development, this work may be considered park work at the discretion of the General Manager, Recreation, Cultural and Facility Services.	
74.	The Owner acknowledges and agrees to install a three-rail post-and-rail wood fence to City standards along the limit of development separating Park Block 162 from the stormwater management pond to the south.	**OTTAWA RC&FS**
	Environmental Constraints	
75.	The Owner shall prepare an Integrated Environmental Review and/or an Environmental Impact Statement, in accordance with the policies of the Official Plan, to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department.	**OTTAWA Planning CA**
76.	The Owner agrees that prior to registration, early servicing, or other works that would alter the vegetative characteristics of the site, the Owner shall have the environmental impact statement updated as necessary to reflect the final plan as approved, and to address any changes to the anticipated impacts and recommended mitigation measures that may be required as a result of changes to the draft plan, changes in the regulatory context with respect to species at risk, or changes in the known environmental context of the site. This update shall be to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department.	**OTTAWA Planning**
77.	The Owner acknowledges and agrees that the construction of the subdivision shall be in accordance with the recommendations of BMR Lands, South Side of Innes Road, EIS – Species at Risk and Mitigation Measures – Updated prepared by Muncaster Environmental Planning Inc. dated October 13, 2020: • To protect breeding birds, as required no additional tree or shrub removal should occur between April 15th and August 15th, unless a breeding bird survey conducted by a qualified biologist within five days of the woody vegetation removal identifies no active nests in the trees or shrubs; • Although not anticipated, any trees and shrubs to be retained are to be protected with sturdy orange construction fencing at least 1.2 metres in height installed from the tree trunk a minimum distance of ten times the retained tree diameter. Signs, notices or posters are not to be attached to any tree. No grading, heavy machinery traffic, stockpiling of material, machinery maintenance and refueling or	**OTTAWA Planning CA**

other activities that may cause soil compaction to occur within five metres of the critical root zone of the trees to be retained and protected. The root system, trunk or branches of the trees to be retained are to be protected and not damaged. If any roots of trees to be retained are exposed during site alterations, the roots shall be immediately reburied with soil or covered with filter cloth, burlap or woodchips and kept moist until the roots can be buried permanently. A covering of plastic should be used to retain moisture during an extended period when watering may not be possible. Any roots that must be cut are to be cut cleanly to facilitate healing and as far from the tree as possible. Exhaust fumes from all equipment during construction will not be directed towards the retained trees. All of the supports and bracing for the protective fencing should be placed outside of the protected area and should be installed in such a way as to minimize root damage. Also, since the desired effect of the barrier is to prevent construction traffic from entering the critical root zone, the barrier should be kept in place until all site servicing and house construction has been completed;

- As indicated above, plantings of native vegetation as part of the urban residential subdivision on a lot-by-lot basis are recommended to provide natural environment and aesthetic features. Potential native species to plant include nannyberry, elderberry and dogwood shrubs along with sugar maple, red maple, basswood, balsam fir, white cedar, bur oak, red oak and white spruce trees. Sourcing native species from local seed sources is strongly recommended to ensure adaptability and longevity. Only locally appropriate native species are to be used for landscaping adjacent to natural features or buffer zones;
- To protect any trees immediately adjacent to the site, no excavations or other activities that may impact the critical root zone of these adjacent trees should be undertaken within the critical root zones. The critical root zones are identified as ten times the diameter of the tree to be protected. To be conservative, no excavations, filling, stockpiling, or other major site disturbances should occur within four metres of the property line. The park proposed for the southwest portion of the site (see Figure 2) will provide extensive protection for any remaining trees adjacent to the site in this area;
- The extent of exposed soils is to be kept to a minimum at all times. Re-vegetation of exposed, non-developed areas with native species is to be achieved as soon as possible;
- The objective with respect to erosion and sediment controls will be to ensure that the surface water runoff leaving the site is not degraded with respect to water quantity or quality. Erosion and sediment control will focus on best management practices;

	• Where groundwater must be removed, the groundwater will be pumped into a proper filter mechanism such as a sediment trap or filter bag prior to release to the environment; • Seepage barriers such as silt fencing, straw bale check dams and other sediment and erosion control measures will be installed as required to OPSD requirements in any temporary drainage ditches and around disturbed areas during construction and stockpiles of fine material. These control measures must be properly maintained to maximize their function during construction. An Erosion and Sediment Control Plan will be prepared during the detailed engineering analysis; • The contractors and other on-site workers are to be aware of potential Species at Risk in the vicinity of the site including butternut, and on appropriate measures to reduce human-wildlife conflict during the work. Appendix 1 of the City of Ottawa's Protocol for Wildlife Protection during Construction (August 2015) describes these species. The project biologist for this project is Bernie Muncaster (613-748-3753). Any Species at Risk sightings are to be immediately reported to the project biologist and the Ministry of Environment, Conservation and Parks and activities modified to avoid impacts until further direction by the Ministry; • As recommended in City of Ottawa (2015) prior to beginning work each day, wildlife is to be checked for by conducting a thorough visual inspection of the workspace and immediate surroundings. See Section 2.5 of City of Ottawa (2015) for additional recommendations on construction site management with respect to wildlife. Any turtles, snakes, or other sensitive wildlife in the work areas are to be relocated to the south. Animals should be moved only far enough to ensure their immediate safety. See Appendix 1 and the links in Section 4 of City of Ottawa (2015) for suggestions on how to effectively relocate turtles and snakes; • To discourage wildlife from entering the work areas during construction, the site should be kept clear of food wastes and other garbage, and proper drainage provided to avoid accumulation of standing water, which could attract amphibians, birds, and other wildlife to the work areas; • Municipal by-laws and provincial regulations for noise will be followed and utilities will be located as required in the vicinity of the site prior to construction; and, • Waste will be managed in accordance with provincial regulations. The contractor will have a spill kit on-hand at all times in case of spills or other accidents.	
78.	The Owner agrees to abide by all appropriate regulations associated with Provincial and Federal statutes for the protection of wildlife, including migratory birds and species at risk.	**OTTAWA Planning**

	Record of Site Condition / Contaminated Soil	
79.	The Owner shall be required to submit to the General Manager, Planning, Infrastructure and Economic Development Department and Chief Building Official, a Record of Site Condition (RSC) completed in accordance with the O.Reg. 153/04, and acknowledged by the Ministry of Environment. The RSC shall confirm that all or part of the site will be suitable for the proposed use in accordance with O.Reg. 153/04.	**OTTAWA Planning BCS**
	Schools	
80.	The Owner acknowledges and agrees to inform prospective purchasers that school accommodation pressures exist in the Ottawa-Carleton District School Board schools designated to serve this development which pressures are currently being addressed by the utilization of portable classrooms and/or directing students to schools outside their community.	**OCDSB**
	Archaeology	
81.	Where the Owner is required to undertake an archaeological assessment: i. The Owner acknowledges having been required to retain a licensed consultant archaeologist to undertake an archaeological assessment of the entire property, including 1:10,000 scale mapping, "Archaeological Site Record" and report(s); ii. The Owner agrees to implement the recommendations of the approved assessment, including mitigation, through preservation or removal and documentation of archaeological resources; and iii. The Owner agrees that no site works shall take place until any archaeological resource conservation concerns have been addressed. All of the above noted conditions shall be to the satisfaction of the Ministry of Tourism and Culture and the General Manager, Planning, Infrastructure and Economic Development Department.	**OTTAWA Planning MTCS**
	Stormwater Management	
82.	The Owner shall provide any and all stormwater reports and addendums (in accordance with the Master Serving Study for East Urban Community Phase 3) that may be required by the City for approval prior to the commencement of any works in any phase of the Plan of Subdivision. Such reports shall be in accordance with any watershed or subwatershed studies, conceptual stormwater reports, City or Provincial standards, specifications and guidelines. The reports shall include, but not be limited to, the provision of erosion and sedimentation control measures,	**OTTAWA Planning CA**

	implementation or phasing requirements of interim or permanent measures, and all stormwater monitoring and testing requirements. All reports and plans shall be to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department.	
83.	(a) Prior to the commencement of construction of any phase of this Subdivision (roads, utilities, any off-site work, etc.) the Owner shall: i. have a Stormwater Management Plan and an Erosion and Sediment Control Plan prepared by a Professional Engineer in accordance with current best management practices; ii. provide all digital models and modelling analysis in an acceptable format; iii. have said plans approved by the General Manager, Planning, Infrastructure and Economic Development Department, and iv. provide certification through a Professional Engineer licensed in the province of Ontario that the plans have been implemented. (b) All submissions and any changes made to the Plan shall be submitted to the satisfaction to the City and the Rideau Valley Conservation Authority. (c) The Owner shall implement an inspection and monitoring plan to maintain erosion control measures.	**OTTAWA Planning CA**
84.	On completion of all stormwater works, the Owner agrees to provide certification to the General Manager, Planning, Infrastructure and Economic Development Department through a Professional Engineer, licensed in the province of Ontario, that all measures have been implemented in conformity with the approved Stormwater Site Management Plan.	**OTTAWA Planning**
85.	The Owner agrees to be a party to the expansion of EUC Pond 1 upon the completion of the Master Servicing Study in support of the on-going East Urban Community Phase 3 Area Community Design Plan. Furthermore, the construction of the expansion of Pond 1 shall be completed to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department.	**OTTAWA Planning**
86.	Prior to the registration, or the making of an application for a Ministry of Environment, Environmental Compliance Approval, for any stormwater works, whichever event first occurs, the Owner shall prepare a Stormwater Site Management Plan in accordance with a Conceptual Stormwater Site Management Plan. The Stormwater Site Management Plan shall identify the sequence of its implementation in relation to the construction of the	**OTTAWA Planning**

	subdivision and shall be to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department and the Rideau Valley Conservation Authority.	
87.	The Owners acknowledges and agrees to maintain the storm sewers within the subdivision until such time as the storm water connection and the expansion of EUC Pond 1 have been constructed and the City has given final acceptance to the storm sewers and pond. The storm sewers shall be inspected every two years and will be cleaned as necessary prior to final acceptance from the City. All costs shall be the sole responsibility of the Owner.	**OTTAWA Planning**
88.	The Owner agrees, prior to registration or the commencement of work, which ever comes first, to obtain all land and easements over adjacent lands necessary for storm water management and conveyance.	**OTTAWA Planning**
89.	The Owner acknowledges and agrees that an interim storm water management facility may be temporarily required prior to the expansion of Pond 1 unless it can be demonstrated that the existing Pond 1 has sufficient capacity to proceed with servicing Phase 1 without interim measures or expansion. If required, the Owner shall construct, maintain, operate, and decommission the interim storm water facility. All works associated with the interim stormwater management facility shall be at the sole cost of the Owner. The Owner shall demonstrate capacity to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department.	**OTTAWA Planning**
90.	The Owner acknowledges and agrees that an interim storm water facility (or solutions) will be contained within the lands south of Street 7 on the draft plan, including Street 8 surrounding lots and blocks.	**OTTAWA Planning**
91.	The Owner acknowledges and agrees that prior to registration of the lands noted in condition 2 (above) the ultimate storm water servicing conditions will be coordinated with the MSS.	**OTTAWA Planning**
92.	The Owner agrees to design and construct, as part of the stormwater management infrastructure, at no cost to the City, a monitoring facility or facilities (if required) and vehicular access to the satisfaction of the City.	**OTTAWA Planning**
93.	The Owner agrees that the development of the Subdivision shall be undertaken in such a manner as to prevent any adverse effects, and to protect, enhance or restore any of the existing or natural environment, through the preparation of any storm water management reports, as required by the City. All reports are to be approved by the General Manager, Planning, Infrastructure and Economic Development Department prior to the commencement of any Works.	**OTTAWA Planning**

94.	The Owner covenants and agrees that the following clause shall be incorporated into all agreements of purchase and sale for the whole, or any part, of a lot or block on the Plan of Subdivision, and registered separately against the title: "The Owner acknowledges that some of the rear yards within this subdivision are used for on-site storage of infrequent storm events. Pool installation and/or grading alterations and/or coach houses on some of the lots may not be permitted and/or revisions to the approved Subdivision Stormwater Management Plan Report may be required to study the possibility of modification on any individual lot. The Owner must obtain approval of the General Manager, Planning, Infrastructure and Economic Development Department of the City of Ottawa prior to undertaking any grading alterations."	**OTTAWA Legal**
95.	Where the Owner is required under this Agreement to provide the oversize and/or over-depth storm sewers or open drains in order to make provisions for later development of upstream lands not owned by the Owner herein, as referred to in the approved plans, the City will, insofar as it legally may, require that payment shall be made by the Owner of such upstream undeveloped land which will utilize the said storm sewers as an outlet(s), prior to registration. The amount of payment shall be determined by the General Manager, Planning, Infrastructure and Economic Development Department.	**OTTAWA Planning**
96.	That prior to registration a detailed stormwater management plan consistent with the conceptual plan "Conceptual Site Serving and Stormwater Management Report – 3610 Innes Road (Former BMR Lands)" dated April 3rd 2020, prepared by Novatech Engineering, Planners and Landscape Architects be prepared and approved to the satisfaction of the Rideau Valley Conservation Authority and the City of Ottawa.	**RVCA**
97.	That the subdivision agreement contain a clause with wording to the satisfaction of the Rideau Valley Conservation Authority and the City of Ottawa whereby the Owner acknowledges and agrees to implement all of the recommendations in the approved final stormwater management plan.	**RVCA**
	Sanitary Services	
98.	The Owner agrees to submit detailed municipal servicing plans, prepared by a Professional Civil Engineer licensed in the Province of Ontario, to the General Manager, Planning, Infrastructure and Economic Development Department.	**OTTAWA Planning**

99.	Where the Owner is required under this Agreement to provide and install sanitary sewers of a diameter larger and/or at a greater depth than would be required to service the area to be developed, as detailed in the approved plans of this agreement, the Owner shall convey to the City such 0.3m reserves as may be necessary to prevent the Owners and developers of adjacent lands from making connections to the sanitary sewers installed by the Owner, the City will, insofar as it legally may, require other persons connecting to the sewer to pay an equitable share of the cost thereof to the Owner. The amount of payment shall be determined by the General Manager, Planning, Infrastructure and Economic Development Department.	**OTTAWA Planning**
100.	As the Owner proposes a road allowance(s) of less than 20 metres, and if the Owner also proposed boulevards between 4.0 and 5.0 metres wide, the Owner shall meet the following requirements: a) extend water, sanitary, and storm services a minimum of 2.0 metres onto private property during installation before being capped; b) install high voltage electrical cable through the transformer foundations to maintain adequate clearance from the gas main; c) provide and install conduits as required by each utility; d) provide and install transformer security walls when a 3.0 metres clearance, as required by the Electrical Code, cannot be maintained. The design and location of the security wall must be approved by the local hydro utility; and e) install all road-crossing ducts at a depth not to exceed 1.2 metres from top of duct to final grade.	**OTTAWA Planning**
	<u>Water Services</u>	
101.	The Owner shall design and construct all necessary watermains and the details of services and meters for the lots abutting the watermains within the subject lands to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department. The Owner shall pay all related costs, including the cost of connection, inspection and sterilization by City personnel, as well as the supply and installation of water meters by the City.	**OTTAWA Planning**
102.	The Owner shall prepare, at its cost, a hydraulic network analysis of the proposed water plant within the Plan of Subdivision and as it relates to the existing infrastructure. This analysis shall be submitted for review and approval as part of the water plant design submission.	**OTTAWA Planning**
103.	The Owner acknowledges and agrees not to permit any occupancy of buildings on the individual Lots described in Schedule "A" until the water	**OTTAWA Planning**

	plant has been installed, sterilized and placed in service to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department.	
104.	The Owner further acknowledges and agrees that the service post, which is the fitting located near the property line that allows access to the shutoff valve, must be visible, raised to finished grade and in working condition in order for the City to turn on the service.	**OTTAWA Planning**
105.	The owner acknowledges and agrees to provide a Water Age Analysis prior to registration which reflects their proposed phasing and scheduling. Where required, through this analysis or through testing, the Owner acknowledges and agrees that flushing infrastructure will be installed at no cost to the City, and that the Owner will be responsible for all costs associated with the consumption and disposal of water, as required, to ensure that adequate chlorine residual is maintained throughout the water system, all to the satisfaction of the General Manager, Public Works and Environmental Services	**OTTAWA Planning**
106.	The Owner acknowledges and agrees not to apply for, nor shall the City issue, building permits for more than 50 dwelling units (or the equivalent) or 75 dwelling units on interim basis for less than two years where the watermain for such units is not looped. Any unit serviced by a looped watermain that is not looped shall be required to have sufficient fire protection, to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department.	**OTTAWA Planning**
	Serviced Lands	
107.	The Owner shall be responsible for the provisions of the following works, including oversizing and over depth (where appropriate), at its cost, in accordance with plans approved by the General Manager, Planning, Infrastructure and Economic Development Department, and/or the Province: a. Watermains; b. Sanitary Sewers; c. Storm Sewers; d. Roads and traffic plant(s); e. Street Lights; f. Sidewalks; g. Landscaping; h. Street name, municipal numbering, and traffic signs; i. Stormwater management facilities; and j. Grade Control and Drainage.	**OTTAWA Planning**

108.	The Owner shall not commence construction of any Works or cause or permit the commencement of any Works until the City issues a Commence Work Notification, and only then in accordance with the conditions contained therein.	**OTTAWA Planning**
109.	The Owner agrees to provide services oversized and over depth to service lands beyond the limits of the subdivision as required and to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department.	**OTTAWA Planning**
110.	The Owner shall not be entitled to a building permit, early servicing, or commencement of work construction until they can demonstrate that there is adequate road, sanitary, storm, and watermain capacity and any Environmental Compliance Approvals (ECA) necessary are approved. All are to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department.	**OTTAWA Planning**
	Utilities	
111.	The Owner is hereby advised that prior to commencing any work within the subdivision, the Owner must confirm that sufficient wire-line communication /telecommunication infrastructure is currently available to the proposed development to provide communication/telecommunication service to the proposed development. In the event that such infrastructure is not available, the Owner is hereby advised that the Owner shall ensure, at no cost to the City, the connection to and/or extension of the existing communication / telecommunication infrastructure. The Owner shall be required to demonstrate to the municipality that sufficient communication /telecommunication infrastructure facilities are available within the proposed development to enable, at a minimum, the effective delivery of communication /telecommunication for emergency management services (i.e. 911 Emergency Services).	**Bell Canada OTTAWA Planning**
112.	The Owner shall pre-consult with Hydro Ottawa for any proposed reduction to the City of Ottawa three-metre minimum standard setback prior to designing the electrical servicing, as it may affect the electrical servicing design, timeline for installation and cost; this includes any proposed overhang encroachment into the 3m-setback space.	**Hydro Ottawa**
113.	The Owner may be required to enter into an Electrical Servicing Agreement with Hydro Ottawa Limited, to the satisfaction of Hydro Ottawa.	**Hydro Ottawa**
114.	The Owner is advised that there is limited capacity to service the proposed development at this time. The Owner may be responsible for a Capital Contribution payment(s) towards a distribution system expansion if the proposed development requires electrical servicing greater than can be	**Hydro Ottawa**

	provided by the existing distribution system in the vicinity, either in capacity or in extension limit. This amount shall be in accordance with Hydro Ottawa's Contributed Capital Policy and Conditions of Service.	
115.	Hydro Ottawa's standard distribution network is overhead for any voltage system along or through open fields, business parks, rural areas, arterial, major collector and collector roads; any additional premium costs beyond the standard shall be at the Owner's cost; in all instances, electrical distribution above 27kV shall be via overhead distribution.	**Hydro Ottawa**
116.	The Owner shall be responsible for servicing the buildings within the property. Only one service entrance per property shall be permitted.	**Hydro Ottawa**
117.	Prior to commencement of any construction activities, the Owner shall inform Hydro Ottawa of any acute shock construction process or rubbelization to be used during construction and apply Hydro Ottawa's work procedure UDS0022 "Protecting Electrical Distribution Underground Plant & Support Structures from Acute Shock Construction Processes". The Owner shall be responsible for any damage to Hydro Ottawa distribution assets.	**Hydro Ottawa**
118.	The Owner is advised that there is medium voltage underground infrastructure near the proposed entrance off of Innes Rd and within the roads of the adjacent Caivan development a. There shall be no mechanical excavation within one and a half meters (1.5m) of any Hydro Ottawa underground plant unless the exact position of plant is determined by hand digging methods. Direct supervision by Hydro Ottawa forces, and protection or support of the underground assets shall be at the Owner's expense. b. The Owner shall not use steel curb and sidewalk form support pins in the vicinity of Hydro Ottawa underground plant for electrical safety.	**Hydro Ottawa**
119.	Hydro Ottawa prohibits any change of grade that results in reduced life expectancy of the asset. Any change in grade of more than 0.3m in the vicinity of proposed or existing electric utility equipment shall be reviewed with Hydro Ottawa. The proposed grade change around XX [state where] is more than 0.3m.	**Hydro Ottawa**
120.	The Owner shall ensure that any landscaping or surface finishing does not encroach into existing or proposed Hydro Ottawa's overhead or underground assets or easement. When proposing to place plantings in proximity of existing power lines, the Owner shall refer to Hydro Ottawa's free publication "Tree Planting Advice". The shrub or tree location and expected growth must be considered. If any Hydro Ottawa related activity	**Hydro Ottawa**

	requires the trimming, cutting or removal of vegetation, or removal of other landscaping or surface finishing, the activity and the re-instatement shall be at the Owner's expense.	
121.	The Owner is advised that there are overhead medium voltage overhead lines along Innes Road. The Owner shall ensure that no personnel or equipment encroaches within three metres (3.0m) of the Hydro Ottawa overhead medium voltage distribution lines, unless approved by Hydro Ottawa. The Owner shall contact Hydro Ottawa prior to commencing work when proposing to work within 3.0m of the Hydro Ottawa distribution lines as noted above. No such work shall commence without approval of Hydro Ottawa.	**Hydro Ottawa**
122.	The Owner acknowledges and agrees that prior to commencing Works identified within the Draft Plan; it shall confirm the proposed development is sufficiently serviced by all necessary utilities. The Owner further agrees to comply with all relevant and existing utility Conditions of Service, construction processes and guidelines. The Owner further agrees it shall be responsible for engaging the providers of any necessary utilities to determine servicing for the proposed development and that it shall be responsible for all costs relating to the relocation, placement and/or upgrade of existing or future utility infrastructure for the proposed development. The Owner shall be required to demonstrate to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development that sufficient utility servicing and infrastructure exist to service the proposed development and that communication / telecommunication infrastructure facilities are available, at a minimum, for the delivery of emergency management services. The Owner acknowledges and agrees to convey, at their cost, any easements as may be required by the necessary utilities and agrees to abide by all conditions of the City's inhibiting order. The Owner further acknowledges and agrees that such easements shall not be granted on any lands being conveyed to the City, or those proposed to be conveyed to the City, without City's approval. Should any lands owned or proposed to be owned by the City be encumbered as a result of these conditions, the Owner shall bear the sole responsibility and costs associated with correcting such actions, including but not limited to the conveyance of additional lands, the relocation of any such easements or infrastructure as may be deemed appropriate by the General Manager, Planning, Infrastructure and Economic Development.	**Hydro Ottawa**
123.	The Owner acknowledges that servicing from new rear lanes is not permitted.	**Hydro Ottawa**

124.	The Owner shall contact Hydro Ottawa to discuss electrical servicing for the property. By Hydro Ottawa commenting on this proposal, Hydro Ottawa has not committed to, or approved the electrical servicing of the proposed development.	**Hydro Ottawa**
125.	The Owner shall convey, at their cost, all required easements as determined by Hydro Ottawa. The Owner further acknowledges and agrees that the City's Inhibiting Order will not be lifted until such time as the required transfer of easements to Hydro have occurred. The Owner will be required to provide written confirmation from Hydro to the City that the required easements have been obtained to Hydro's satisfaction and that the Inhibiting Order may be lifted, subject to any other City conditions for lifting.	**Hydro Ottawa**
126.	The Owner shall be responsible for all costs for feasible relocations, protection or encasement of any existing Hydro Ottawa plant.	**Hydro Ottawa**
127.	The Owner and its agents shall arrange for an underground electricity cable locate by contacting Ontario One Call at 1-800-400-2255, not less than seven (7) working days prior to excavating. There shall be no mechanical excavation within 1.5m of any Hydro Ottawa underground plant unless the exact position of plant is determined by hand digging methods. Direct supervision by Hydro Ottawa forces, and protection or support of the underground assets shall be at the Owner's expense.	**Hydro Ottawa**
128.	Hydro Ottawa reserves the right to access their plant. Should Hydro Ottawa require the removal of structures, the Owner shall remove the structures within two (2) working days of receipt of notice and re-instate the structures at the Owner's cost when Hydro Ottawa has completed its work. In the event of an emergency, the Owner will respond to Hydro Ottawa's request to remove structures and in the most expeditious manner possible within two (2) hours of the receipt of notice at the Owner's cost. If the Owner cannot remove the structures within the two (2) hours, Hydro Ottawa can undertake the removal of the structures and the Owner shall pay the costs for removal and re-instatement of the structures. Hydro Ottawa will not be responsible for any damage done to the structures which might arise from the removal, provided those actions are taken without any gross negligence on the part of Hydro Ottawa or their contractors or agents.	**Hydro Ottawa**
129.	The Owner shall apply Hydro Ottawa's standards and City approved road cross-section standards for public roads. Hydro Ottawa requests to be consulted before completing the composite utility plan where any four-party trench is proposed.	**Hydro Ottawa**

130.	Hydro Ottawa requests to be consulted before completing the composite utility plan where any four-party trench is proposed.	**Hydro Ottawa**
131.	The Owner shall comply with Hydro Ottawa's Conditions of Service and thus should be consulted for the servicing terms. The document, including referenced standards, guidelines and drawings, may be found at http://www.hydroottawa.com/residential/rates-and-conditions/conditions-of-service/. The Owner should consult Hydro Ottawa prior to commencing engineering designs to ensure compliance with these documents.	**Hydro Ottawa**
132.	Hydro Ottawa reserves the right to raise conditions throughout the development of this proposal should the revisions contain non-conformances with, for example, Hydro Ottawa's Conditions of Service or Standards. To ensure the best outcome, Hydro Ottawa welcomes an early discussion on the proposal.	**Hydro Ottawa**
133.	The Owner acknowledges that Canada post will provide mail delivery service to the subdivision through centralized Community Mailboxes (CMBs). The Owner shall contact Canada Post to determine the suitable permanent locations for the CMBs. The location of the CMBs will be determined at the time of the preparation of the preliminary Composite Utility Plan and shall be indicated on all appropriate plans.	**CANADA POST**
134.	The Owner agrees, prior to offering any dwelling units for sale, to display a map on the wall of the sales office in a place readily accessible to prospective purchasers that indicates the location of all Canada Post approved Community Mailboxes throughout the subdivision.	**CANADA POST**
135.	The Owner agrees to include in all offers of purchase and sale a statement which advises the purchaser that mail will be delivered via Community Mailboxes. The locations of all Community Mailboxes installed throughout the subdivision shall be noted, and the affected homeowners shall be notified of any established easements granted to Canada Post to permit access to the Community Mail Box.	**CANADA POST**
136.	The Owner acknowledges that Canada Post will provide mail delivery to new residents of the subdivision as soon as dwellings are occupied. In this regard, the Owner shall provide a suitable and safe temporary site for a Community Mailbox until curbs, sidewalks and final grading are completed at the permanent Community Mail Box locations.	**CANADA POST**
137.	The Owner acknowledges and agrees to provide the following requirements for each approved Community Mailbox site and to include them on the appropriate servicing plans. a) Any required walkway across the boulevard, per municipal standards;	**CANADA POST**

	b) Any required curb depressions for wheelchair access, with an opening of at least two metres, to Canada Posts detailed specifications.	
138.	The Owner shall indicate in the Agreement, in words satisfactory to Bell Canada, that it will grant to Bell Canada any easements that may be required, which may include a blanket easement, for communication/telecommunication infrastructure. In the event of any conflict with existing Bell Canada facilities or easements, the Owner shall be responsible for the relocation of such facilities or easements.	**Bell Canada**
139.	The Owner shall transfer such new easements and maintenance agreements as are deemed necessary by Rogers Communications Partnership to service this subdivision, to the Utility's satisfaction and that of the appropriate authority and at no cost to the Utility. The Owner also shall ensure that such easement documents are registered on title immediately following registration of the final plan, and the affected agencies duly notified.	**Rogers**
140.	The Owner shall coordinate the preparation of an overall utility distribution plan. This plan should show the locations (shared or otherwise) and the installation timing and phasing of all required utilities (on-ground, below ground) through liaison with the appropriate electrical, gas, water, telephone and cablevision authority; this includes on-site drainage facilities. Such location plan shall be to the satisfaction of all affected authorities.	**Rogers**
141.	The Owner agrees with Rogers Communications Partnership to arrange for and pay the cost of the relocation of any existing services which is made necessary because of this subdivision, to the satisfaction of the authority having jurisdiction.	**Rogers**
	Fire Services	
142.	The Owner shall not demand of the City to issue, nor shall anyone claiming title from it or under its authority, demand of the City to issue, one or building permits to construct any building or other structure on any lots or block in the Subdivision until firebreak lots are designated to the satisfaction of the City's Fire Chief.	**OTTAWA Fire**
	Noise Attenuation	
143.	The Owner shall have a Noise Study undertaken related to noise assessment and land use planning with respect to noises generated by moving and stationary sources prepared by a Professional Engineer, licensed in the province of Ontario to the satisfaction and approval of the General Manager, Planning, Infrastructure and Economic Development Department. The Study shall comply with:	**OTTAWA Planning**

	i. the City of Ottawa's Environmental Noise Control Guidelines, as amended; and ii. address, and be in accordance with, the current version of the Association of Professional Engineers of Ontario Guidelines for Professional Engineers providing Acoustical Engineering Services in Land Use Planning. The study shall provide all specific details on the methods and measures required to attenuate any noise that exceeds the allowable noise limits in locations as determined by the recommendations of the Noise Assessment Study.	
144.	Where structural mitigation measures are required as a result of the Noise Assessment Study, the Owner shall provide, prior to final building inspection, certification to the General Manager, Planning, Infrastructure and Economic Development Department, through a Professional Engineer, that the noise control measures have been implemented in accordance with the approved study.	**OTTAWA Planning**
145.	The Owner agrees that all purchase and sale agreements, and the Deed(s) for the whole or any part of the lot/block on the Plan of Subdivision shall contain the following clauses, as required and determined by an approved Noise Control Study prepared by a professional engineer, that shall be incorporated in all Transfers/Deeds from the Owner so that the clauses shall be covenants running with the lands in the Subdivision. Warning Clause Type A: "Transferees are advised that sound levels due to increasing road traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the City's and the Ministry of the Environment's noise criteria."	**OTTAWA Planning and Legal**
	Warning Clause Type B: "Transferees are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the City's and the Ministry of the Environment's noise criteria."	
	Warning Clause Type C: "This dwelling unit has been fitted with a forced air heating system and the ducting, etc. was sized to accommodate central air conditioning. Installation of central air conditioning by the occupant will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the City's and the Ministry of the Environment's	

	noise criteria. (Note: The location and installation of the outdoor air conditioning device should comply with the noise criteria of MOE Publication NPC-216, Residential Air Conditioning Devices and thus minimize the noise impacts both on and in the immediate vicinity of the subject property.)"	
	Warning Clause Type D "This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the City's and the Ministry of the Environment's noise criteria."	
	Land Transfers	
146.	The Owner shall convey, at no cost to the City, all lands required for public purposes, including but not limited to, reserves, road widenings, daylighting triangles, walkway blocks, open space blocks, lands required for parks (or cash-in-lieu thereof) and for storm water measures, to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department. In particular, the Owner shall convey, at no cost to the City, the following lands: i. Pathway, Walkway or Servicing Blocks – 163 and 166 ii. Park Block– 162 iii. 0.3 m Reserve Blocks – iv. Daylighting Triangles –	**OTTAWA Planning Legal**
147.	The Owner shall convey, at no cost to the City, any easements that may be required for the provision of water and wastewater systems, in addition to underground or overland stormwater drainage systems to the satisfaction of the General Manager, Planning, Infrastructure and Economic Development Department.	**OTTAWA Planning Legal**
	Blasting	
148.	The Owner agree that all blasting activities will conform to the City of Ottawa's standard S.P. No: F-1201 Use of Explosives. Prior to any blasting activities, a pre-blast survey shall be prepared as per F-1201, at the Owner expense for all buildings, utilities, structures, water wells, and facilities likely to be affected by the blast and those within 75 m of the location where explosives are to be used. The standard inspection procedure shall include the provision of an explanatory letter to the owner or occupant and owner with a formal request for permission to carry out an inspection.	**OTTAWA Planning**

	The Owner agree to provide a Notification Letter in compliance with City specification F-1201. Specification indicates that a minimum of 15 Business days prior to blasting the Contractor shall provide written notice to all owner(s) and tenants of buildings or facilities within a minimum of 150m of the blasting location. The Owner agrees to submit a copy of the Notification Letter to the City.	
	Development Charges By-law	
149.	The Owner acknowledges that some of the works of the Subdivision are eligible for development charges revenues pursuant to the City's applicable Development Charges By-law and background study, as well as budget approval by City Council where required. Such contributions are to be determined and agreed to by the City, prior to the commencement of the associated Works or as agreed to by the City. The Owner agrees to enter into any agreements that may be required pursuant to the applicable Development Charges By-law.	**OTTAWA Planning Legal**
150.	The Owner shall inform the purchaser after registration of each lot or block of the development charges that have been paid or which are still applicable to the lot or block. The applicable development charges shall be as stated as of the time of the conveyance of the relevant lot or block and the statement shall be provided at the time of the conveyance. The statement of the Owner of the applicable development charges shall also contain the statement that the development charges are subject to changes in accordance with the *Development Charges Act, 1997* and the *Education Development Charges Act.*	**OTTAWA Planning Legal**
151.	The Owner acknowledges that for building permits issued after January 15, 2010, payment of non-residential development charges, excluding development charges for institutional developments, may be calculated in two installments at the option of the Owner, such option to be exercised by the Owner at the time of the application for the building permit. The non-discounted portion of the development charge shall be paid at the time of issuance of the building permit and the discounted portion of the development charge shall be payable a maximum of two years from the date of issuance of the initial building permit subject to the following conditions: a) a written acknowledgement from the Owner of the obligation to pay the discounted portion of the development charges; b) no reduction in the Letter of Credit below the amount of the outstanding discounted development charges; and c) indexing of the development charges in accordance with the provisions of the Development Charges By-law.	**OTTAWA Planning Legal**

	The Owner further acknowledges that Council may terminate the eligibility for this two-stage payment at any time without notice, including for the lands subject to this agreement and including for a building permit for which an application has been filed but not yet issued. For the purposes of this provision, "discounted portion" means the costs of eligible services, except fire, police and engineered services that are subject to 90% cost recovery of growth-related net capital costs for purposes of funding from development charges. The 10% discounted portion, for applicable services, must be financed from non-development charge revenue sources. "Non-discounted portion" means the costs of eligible services, fire, police and engineered services, that are subject to 100% cost recovery of growth-related net capital costs for purposes of funding from development charges.	
152.	The Owner acknowledges and agrees that in the case where the Lands benefit from a front-ended project that was constructed by others, the Owner shall pay all of its area-specific development charges owed either at the time of registration of a plan of subdivision or upon the issuance of the first conditional building permit, whichever comes first.	**OTTAWA Planning Legal**
153.	In the case where multiple Front-Ending Agreements are in force in the same area-specific development charge By-law, and the City has approved the front-ended works for area-specific development charge reimbursements, the front-enders will share in the distribution of area-specific development charge revenues on a pro-rata basis with other storm water drainage projects. The pro-rated works shall be based on the balance of the outstanding amount owing on the date the repayment is due. Existing front-enders will be advised of new Front-Ending Agreements for storm water works within the same benefiting area and area-specific development charge By-law.	**OTTAWA Planning Legal**
	Survey Requirements	
154.	The Owner shall provide the final plan intended for registration in a digital format that is compatible with the City's computerized system.	**OTTAWA Planning**
155.	The Plan of Subdivision shall be referenced to the Horizontal Control Network in accordance with the City requirements and guidelines for referencing legal surveys.	**OTTAWA Surveys**
156.	The distance from the travelled Centreline of all existing adjacent roads to the subdivision boundary should be set out in the Plan of Subdivision.	**OTTAWA Surveys**

	Closing Conditions	
157.	The City Subdivision Agreement shall state that the conditions run with the land and are binding on the Owner's, heirs, successors and assigns.	**OTTAWA Legal**
158.	At any time prior to final approval of this plan for registration, the City may, in accordance with Section 51 (44) of the *Planning Act*, amend, delete or add to the conditions and this may include the need for amended or new studies.	**OTTAWA Legal**
159.	The owner shall pay any outstanding taxes owing to the City of Ottawa prior to registration.	**OTTAWA Planning Revenue**
160.	Prior to registration of the Plan of Subdivision, the City is to be satisfied that conditions 1 to 162 have been fulfilled.	**OTTAWA Planning**
161.	The Owner covenants and agrees that should damage be caused to any of the Works in this Subdivision by any action or lack of any action whatsoever on its part, the General Manager, Planning, Infrastructure and Economic Development Department may serve notice to the Owner to have the damage repaired and if such notification is without effect for a period of two full days after such notice, the General Manager, Planning, Infrastructure and Economic Development Department may cause the damage to be repaired and shall recover the costs of the repair plus the Management Fee under Section 427, of the *Municipal Act*, *2001*, like manner as municipal taxes.	**OTTAWA Planning**
162.	If the Plan(s) of Subdivision, including all phases within the draft approved plan of subdivision, has not been registered by *May 26,2024,* the draft approval shall lapse pursuant to Section 51 (32) of the *Planning Act*. Extensions may only be granted under the provisions of Section 51 (33) of said *Planning Act* prior to the lapsing date.	**OTTAWA Planning**

[i] For Clearing Agencies:
"Planning" refers to Planning Services.

"LG" refers to applicable landowners group, such as Kanata North (KNLG), Kanata West (KWLG), Fernbank (FLG), East Urban (EULG), Manotick SDA (MLG), and Barrhaven South (BSLG).

"CA" refers to applicable conservation authorities, including RVCA, MVCA, and SNCA.

"Legal" refers to Legal Services.

"Parks" refers to Parks and Facilities Planning Services.

"BCS" refers to Building Code Services.

"Transit" refers to Transit Planning.

"Transpo Plg" refers to Transportation Planning.

"Forestry" refers to Forest Management.

"MTCS" refers to the Ministry of Tourism, Culture and Sport.

"Revenue" refers to Revenue Services.

"Surveys" refers to Surveys & Mapping/City Surveyor.