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August 29, 2024

Prepared for:

12714001 CANADA INC.
100-768 Boulevard St-Joseph
Gatineau, QC
J8Y 4B8

Prepared by:

J.L. RICHARDS & ASSOCIATES LIMITED
343 Preston Street, Suite 900 and 1000
Ottawa, ON
K1S 1N4

Site Servicing Report

2983 Navan Road – Block 16
Gas Station, Commercial Building, Drive-Thru Restaurant & Car Wash

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

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1.0 INTRODUCTION

1.1 General

In 2023, J.L. Richards & Associates Limited (JLR) was retained by 12714001 Canada Inc. (the Owner) to prepare the detailed design of municipal infrastructure for Site Plan Approval (SPA) of their parcel located at 2983 Navan Road. The mixed-use site known as "Block 16 - Gas Station, Commercial Building, Drive-Thru Restaurant and Car Wash" will be referred to herein as Block 16. This Site Servicing Report (SSR) presents the servicing constraints and strategies for water, wastewater, stormwater servicing, and stormwater management in accordance with the City of Ottawa Design Guidelines, the associated technical bulletins and relevant design excerpts. This SSR also includes strategies for implementing erosion and sedimentation control measures throughout the construction phase of the project.

1.2 Site Description

The Block 16 is located within the City of Ottawa's Official Plan boundary and consists of a 0.77 ha parcel bounded by Navan Road to the south and existing residential properties to the east, the proposed East Ridge Orleans Subdivision and Future Mixed-Use Block 15 to the north, and Brian Coburn Boulevard to the west. The legal description of the subject property can be found in the Draft Plan of Subdivision attached to Appendix A.

A topographical survey was completed by Stantec Inc. in August 2023 (Appendix A). The survey indicates that the existing ground surface generally slopes downwards in a southeasterly direction towards Navan Road.

1.3 Proposed Development

The proposed commercial development will consist of a gas station including a car wash, a commercial retail space along with a Drive-Thru Restaurant. The Concept Plan for the Block 16 is attached to Appendix A.

1.4 Proposed Connections to Existing Infrastructure

The proposed site plan will be serviced via the future East Ridge Orleans Subdivision and via existing infrastructure on Navan Road as follows and as shown on the servicing drawings:

<u>Watermain</u>

- Connection to the proposed existing 204 mm diameter watermain along Navan Road

<u>Sanitary</u>

- Connection to the future East Ridge Orleans Subdivision. A 200mm sanitary sewer stub will be dropped to service Block 16 as part of this future subdivision.

Storm

- Connection to the future East Ridge Orleans Subdivision. A 450mm storm sewer stub will be dropped to service Block 16 as part of this future subdivision.

1.5 Consultation and Permits

An initial pre-consultation meeting was held on July 6, 2022, followed by a Phase 2 Pre-consultation help on September 13, 2023, each to discuss the proposed site plan, the planning approval process requirements, provide clarifications on design criteria, and high level discussion on servicing constraints. A copy of the pre-consultation meeting notes and the site servicing checklist has been provided in Appendix B.

2.0 WATER SERVICING

2.1 Water Supply Design Criteria

A Hydraulic Network Analysis (HNA) was completed as part of the detailed design for the East Ridge Orleans subdivision to confirm that the proposed watermains could provide adequate supply while complying with both the Ottawa Design Guidelines for Water Distribution (July 2010) and Technical Bulletins ISDTB-2014-02, ISTB-2018-02 and ISTB-2021-03. These documents are herein referred to as the Design Guidelines and TB-2014-02, TB-2018-02, and TB-2021-03, respectively.

The HNA completed as part of the East Ridge Orleans Subdivision design included water demands for the Commercial Site Plan (Block 16). The HNA has since been updated to reflect the proposed water service lateral for Block 16 but is based on the same demands and the boundary conditions used in the original East Ridge Orleans Subdivision HNA (refer to Appendix C for a copy of City correspondence for boundary conditions).

Section 4.2.2 of the Design Guidelines states the following criteria for development additions to the public water distribution system:

- Under maximum hourly demand conditions (peak hour), the residual pressures shall not be less than 276 kPa (40 psi);
- During periods of maximum day and fire flow demand, the residual pressure at any point in the distribution system shall not be less than 140 kPa (20 psi);
- In accordance with the Ontario Building Code (OBC) in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi);
- The maximum pressure at any point in the distribution system in unoccupied areas shall not exceed 689 kPa (100 psi); and
- Feedermains, which have been provided primarily for the purpose of redundancy, shall meet, at a minimum, the basic day plus fire flow demand.

2.2 Domestic Water Demands

The estimated commercial water demands presented in this section are based on the site layout proposed in the Site Plan (Appendix A). A plug flow of 3.60 L/s was added to each demand scenario to consider the demands required for the car wash (refer to Appendix D for a confirmation letter from the mechanical engineer). Table 1 summarizes the water demands projected for this site.

Table 1: Water Demands

Demand Scenario	Commercial Water Consumption or Peaking Factor	Commercial Water Demands (L/s)	Car Wash Demands (L/s)	Total Demands (L/s)
Average Day Demand	28,000 L/ha/d	0.25	3.60 L/s	3.85
Maximum Day Demand	1.5 x Avg Day	0.37	3.60 L/s	3.97
Peak Hour Demand	1.8 x Max Day	0.67	3.60 L/s	4.27

2.3 Fire Flow Requirements

The City has specified that the Fire Underwriters Survey (FUS) method shall be used for any public or private site where new fire hydrants are being designed. Specifically, the required fire flow (RFF) for each structure was calculated in accordance with TB-2018-02.

The required fire flow for the Commercial Site Plan (Block 16) was calculated to be 83 L/s. Refer to Appendix C for the detailed RFF calculations for the critical fire area.

2.4 Proposed Water Servicing, Boundary Conditions and Water Model

2.4.1 Proposed Water Servicing

Water will be supplied to the Commercial Site Plan (Block 16) by a 150 mm diameter water service that will connect to the existing 305 mm watermain on Navan Road, located east of the intersection between Navan Road and Brian Coburn Blvd. Fire protection will be provided by a new proposed hydrant within the site. As shown in the servicing plan, the car wash is serviced directly by the gas station. Design of the service will be verified by Owner's mechanical engineer however, as noted in Section 2.2, the demand from the car wash has been included in this HNA.

Watermain roughness coefficients were determined using friction factors presented in Section 4.2.12 of the Design Guidelines and the internal pipe diameters were modelled based on Section 4.3.5 of the design Guidelines.

2.4.2 Boundary Conditions

Hydraulic boundary conditions were provided by the City at the proposed connection location listed in Section 2.4.1 above. Table 2 summarizes the hydraulic boundary conditions received by the City (refer to Appendix C for a copy of the City correspondence). The boundary condition for maximum day plus fire flow corresponds to a required fire flow of 100 L/s. It is noted that the fire flow demand for the City boundary condition is more conservative than the calculated fire flow requirement of 5000 L/min (83 L/s).

Table 2: Hydraulic Boundary Conditions

Demand Scenarios	Connection 3 Head (m)
Maximum HGL	130.7
Peak Hour	126.8
Max Day plus Fire Flow 6,000 L/min (100.00 L/s)	127.3

2.4.3 Water Model

A hydraulic water model within the WaterCAD® software platform was used to carry out the HNA (refer to the overall schematics presented in Appendix C). The water demands from Table 1 and the boundary conditions from Table 2 were input into the model for each demand scenario. Table 3 summarizes the watermain diameters and roughness coefficients used in the model, based on Sections 4.2.12 and 4.3.5 of the Design Guidelines.

Table 3: Watermain Internal Diameters and C-Factors

Nominal Diameter	Inside Diameter	C-Factor
150 mm	155 mm	100
200 mm	204 mm	110
300 mm	297 mm	120

2.5 Simulation Results

The HNA was carried out under steady-state peak hour, maximum day plus fire flow, and maximum pressure conditions to confirm that the proposed water servicing can meet the design criteria outlined in Section 2.1.

2.5.1 Peak Hour

The simulation results found the minimum pressure at the site during the peak hour condition to be 399 kPa (57.9psi) (refer to Appendix C), which exceeds the minimum pressure criterion of 276 kPa (40 psi) per the Design Guidelines.

2.5.2 Maximum Day Plus Fire Flow

Fire water supply will be provided by a proposed hydrant off the 150 mm diameter water service for Block 16. Hydrant spacing was carried out in accordance with the Design Guidelines.

To ensure adequate fire protection, the maximum day demand shown in Table 1 was analyzed simultaneously with the fire flow requirements. The fire flow simulation was carried out by allowing WaterCAD® to calculate the maximum fire flow that can be drawn from the hydrant without allowing any part of the system to experience pressures less than 140 kPa (20 psi). Using the 6,000 L/min (100 L/s) boundary condition provided by the City (refer to Table 2), the system is expected to deliver a minimum of 6,000 L/min (100 L/s) within the site. Per Appendix I of TB-2018-02, adequate water supply can be provided by the hydrant to the proposed site.

2.5.3 Maximum Pressure

Based on a zero (0 L/s) demand condition, the simulation results found the maximum pressure at the site to be 437 kPa (63.4). This value is below the maximum pressure constraint of 552 kPa (80 psi), therefore pressure reducing valves (PRVs) are not anticipated to be required.

2.6 Summary and Conclusions

Based on the water simulation results, the proposed development can be serviced by the proposed 150 mm water service lateral connected to the 305 mm diameter watermain on Navan Road. Furthermore, adequate fire water supply can be achieved with the proposed hydrant off the 150 mm water lateral servicing Block 16.

3.0 WASTEWATER SERVICING

3.1 Design Criteria

The sanitary sewer system within the Block 16 is designed in accordance with the Ottawa Sewer Design Guidelines and subsequent technical bulletins. The design parameters are applied under two scenarios as per ISTB Technical Bulletin 2018-01. The key design parameters have been summarized in Table 4.

Table 4: Wastewater Key Design Parameters

Design Parameter	Design Value
Commercial Average Flow	28,000 L/gross ha/Day
Residential Average Flow	280 L/Cap/Day
Residential Peaking Factor	Harmon's Formula
Commercial Peaking Factor	1.5
Harmon's Correction Factor (K)	0.8
Infiltration Allowance	0.33 L/s/ha
Manning's Roughness Coefficient (n)	0.013
Allowable Slopes	Varies (Refer to Section 6.1.2.2 of ODSG)
Allowable Velocities	0.6 m/s – 3.0 m/s
Allowable Freeboard	-

3.2 Proposed Sanitary Servicing and Design Flows

Wastewater generated from the Block 16 will be conveyed via a proposed 200 mm diameter sanitary sewer system. Wastewater will then discharge into the East Ridge Orleans Subdivision via a 200mm sanitary sewer stub proposed as part of the subdivision as shown on the Servicing Plan.

Wastewater flows from the proposed development are presented in the Block 16 Sanitary Design Sheet (refer to Appendix D). Based on the design criteria presented in Table 3-1 the total design peak flow of 4.23 L/s is calculated for the development which is based on the site area of 0.77ha. Table 5 summarizes the results from the sanitary design sheet.

Table 5: Sanitary Design Flow Summary

Commercial Type	Site Area	Average Flow	Com. Peak Flow	Infilt. Flow	Total Flow
Commercial Flows	0.77 ha	28,000 L/gross ha/Day	0.374 L/s	0.254 L/s	0.628 L/s
Car Wash Flows	-	-	-	-	3.6 L/s
Total Wastewater Flows – Block 16					4.23 L/s

The flows from Block 16 (4.23 L/s) were incorporated in the detailed design of the sanitary sewer within the future East Ridge Orleans Subdivision thus there is sufficient downstream capacity. It is proposed to adopt the sanitary servicing strategy described in this section.

3.3 Summary and Conclusions

Wastewater servicing for Block 16 will be designed in accordance with the City of Ottawa Sewer Design Guidelines, the associated technical bulletins, and various background documents as highlighted throughout this section. Wastewater generated from the Block 16 will be conveyed via a proposed 200 mm diameter sanitary sewer outletting to the East Ridge Orleans Subdivision to the north of the site. It is recommended that this wastewater servicing plan be implemented to provide adequate sanitary servicing for the proposed development.

4.0 STORM SERVICING AND STORMWATER MANAGEMENT

4.1 Design Criteria

Storm and stormwater management servicing for the Gas Bar Site Plan (Block 16) was developed in accordance with the City of Ottawa 2012 Sewer Design Guidelines (OSDG) and the more recent Technical Bulletin PIEDTB-2016-01 (September 6, 2016). These two documents are herein referred to as the Design Guidelines in this section. A summary of the key storm and stormwater management criteria follows:

- Control minor system flows to the allowable release rates of 68 L/s as identified in Table 5-4 Site Servicing Report 2983, 3053 and 3079 Navan Road & 2690 Pagé Road, Ottawa, Ontario (JLR 2024);
- The runoff coefficients (C-factors) to be calculated based on the ratio of pervious and impervious surfaces depicted on proposed site plans;
- Minimum roadway slope of 0.1% from crest-to-crest for overland flow route;
- Maximum parking ponding depth of 350 mm (static and dynamic) as per the Design Guidelines and maximum depth of surface flow to be 300 mm;
- Minimum vertical clearance of 0.15 m between the spill elevation on the street and the finished grade;
- Major system flows, up to and including the 1:100-year design storm event, are contained within the site.
- Quality control will be accommodated by Pond #3 to meet an MECP Enhanced Level of Protection (80% TSS removal) as identified in Site Servicing Report 2983, 3053 and 3079 Navan Road & 2690 Pagé Road, Ottawa, Ontario (JLR 2023).
- Ponding in landscaped areas to enhance groundwater recharge in accordance with the City of Ottawa Urban Design Guidelines for Gas Stations, Guideline 30.
- Provide measures to ensure that site preparation and construction is in accordance with the current Best Management Practices for Erosion and Sediment Control.

4.2 Proposed Stormwater Management Approach

In order to achieve the allowable release rates, the stormwater management of the site will include:

- Surface storage within the site in greater than a 1:2-year event with captured flows conveyed to the minor system;
- Controlled release of the flows captured in the minor system for the entire site using Inlet Control Devices (ICDs).
- Flows stored in oversized storage pipes underground. Flows will accumulate in the storage pipes and be released from the site via an OGS and orifice control into the minor system on Paleo Drive.

4.3 Proposed Minor System Servicing

Internal to the gas station site, two minor system sewer runs will be provided on either side of the main building structure. Both of these sewer runs will be oversized and will connect into a single manhole upstream of the connection upstream of the easement stub, upstream of Paleo Drive. The connection manhole will have a 127mm diameter orifice plate on the downstream outlet sewer to control to the allowable release rate, 68 L/s, as defined in the Site Servicing Report 2983, 3053 and 3079 Navan Road & 2690 Pagé Road, Ottawa, Ontario (JLR 2023). The upsized storm sewers will be 525mm diameter.

Downstream of the orifice an Stormceptor EFO4 model, or equivalent, will provide 80% TSS removal as well as capture of oils and spills.

The runoff coefficient is based on the ratio of impervious surfaces and areas. A design sheet for sizing of the sewers to confirm capacity for the 1:2-year rational method flow is provided in Appendix E.

The gas station roof structure is uncontrolled and drains directly to the minor system.

There are no basements and therefore no HGL constraints in the system.

4.4 Stormwater Management Modelling Approach

4.4.1 Dual Drainage Model

The analysis of both major and minor drainage systems was carried out to demonstrate their compliance with respect to the design criteria described in Section 4.6. The performance of the major overland system and minor storm sewer system was analyzed with PCSWMM. This software is a dynamic model which allows both hydrologic and hydraulic components to be simulated in the same platform and also allows the simulation of the interaction between the major and minor systems. The PCSWMM software platform was used to:

- Generate the surface runoff hydrograph for each sub-area under various recurrences.
- Subdivide each inflow hydrograph into its minor and major system components based on the proposed inlet capture rates and roadway sag storage.
- Assess cascading, if any, and carry out dynamic routing of storm flows to determine flow depths along the roadways. As previously stated, the maximum major overland flow depths within the parking lot areas are to be limited to 350 mm or less, as per Technical Bulletin PIEDTB-2016-01.

PCSWMM was set-up to evaluate the proposed servicing as detailed on Drawing C01 and C02. Subcatchments were delineated for the structure roof areas, parking lot low points and landscaped low points. Model schematics are prepared in Appendix F.

4.4.2 Boundary Conditions

Boundary conditions are taken from the downstream subdivision model issued as part of the Site Servicing Report 2983, 3053 and 3079 Navan Road & 2690 Pagé Road, Ottawa, Ontario (JLR 2023).

The downstream 1:100-year HGL at the connection to the Subdivision at MH518A is identified as 81.28 m. The boundary condition in the model was set at this elevation as a constant during the storm simulations.

4.5 Modelling Parameters

4.5.1 Hydrological Modelling Parameters

The following parameters were used in the hydrologic component of PCSWMM:

- **Areas and Imperviousness**: Catchment ID and drainage areas used by PCSWMM match those shown on either Drawing DST or Figure E-1 (Appendix E1). Sealed and roof areas are set at 100% impervious and other grassed or landscaped areas are pervious.

- **Catchment Width**: The catchment width is estimated at the width of overland sheet flow based on the grading of the catchment and slope direction.

- **Manning's Roughness Coefficient**: Manning's Roughness Coefficients of 0.013 and 0.25 were used for the impervious and pervious surfaces, respectively.

- **Horton Infiltration parameters**: City of Ottawa OSDG Horton Infiltration Parameters have been used in the modelling.

- **Initial Abstraction**: Initial abstraction of 4.67 mm and 1.57 mm was used for the pervious and impervious surfaces respectively, consistent with the OSDG.

4.5.2 Simulation of Storm Distributions

To assess peak flow rates and peak volume storage requirements the 3-hour Chicago storm has been simulated for the site for the 1:2-year event and 1:100-year event and the 24-hour SCS storms for the 1:100-year event.

4.6 Simulation Results

4.6.1 Low Point Ponding Analysis

Ponding depths in the low points in the parking area and landscaped areas are shown in Table 6.

Table 6: Catchbasin Ponding Depths

Low Point ID	Top of Grate (m)	Maximum Static Depth (mm)	3-hour Chicago 1:2 year Depth (mm)	3-hour Chicago 1:100 year Depth (mm)	24-hour SCS 1:100 year Depth (mm)
1	85.25	190/300	0	260	230
2A	85.35	250	0	0	0
2B	85.40	220	0	0	0
3	85.35	300	0	60	30
4	84.75	150	0	100	0
5	85.35	150	0	100	80
6	85.37	80	0	100	90
7	84.55	300	0	300	160
8	85.04	270	0	290	250
9	84.80	300	0	200	130
10	85.18	240	0	150	90
11	85.12	300	0	210	170
12	85.45	150	0	90	70
13	85.50	150	0	160	150

The simulation results compiled in Table 6 shows that:

- No ponding nor dynamic flow will occur in the 1:2-year event;

- Maximum ponding depth of 300 mm during the 1:100-year event; and,
- There is no spill from the site in the 1:100-year event.

4.6.2 Site Release Rate

Table 8 below shows the release rates from the site via the 127mm diameter orifice plate. All release rates are below the 68 L/s allowable release rate.

Table 7: Release Rates

	3-hour Chicago 1:2 year Release Rate (L/s)	3-hour Chicago 1:100 year Release Rate (L/s)	24-hour SCS 1:100 year Release Rate (L/s)
Flow at MH 514	47	66	65

4.7 Water Quality

An OGS unit is proposed for the site to provide site specific water quality to 80% TSS removal and capture of oils and spills. The sizing details for the unit are contained in Appendix F. The unit sized for the site is an Stormceptor EFO4, or equivalent.

4.8 Summary and Conclusions

The stormwater servicing achieves a release rate from the site to the minor system limited to the allowable release rate and contains up to the 1:100 year on site.

5.0 Erosion and Sediment Control

Erosion and sediment control measures, as outlined in the Ontario Ministry of Natural Resources (MNR) Guidelines on Erosion and Sediment Control for Urban Construction Sites, will be implemented to trap sediment on site. The following erosion and sediment control measures can be implemented during construction as shown on the Erosion and Sediment Control Plan (Drawing ESC):

- Supply and installation of a silt fence barrier, as per OPSD 219.110.
- Supply and installation of siltsack or sentinel CB inserts between the frame and cover of catch basins and maintenance holes adjacent to the project area during construction, to prevent sediment from entering the sewer system.
- Stockpiling of material during construction is to be located along flat areas away from drainage paths. For material placed on sloped areas, stockpiles are to be enclosed with a silt fence to protect watercourses.

- All catch basins are to be equipped with sumps, inspected frequently, and cleaned as required.
- Temporary ICDs are to be placed blocking part of the sewer pipe in the connecting storm maintenance holes to eliminate construction debris from entering the existing storm sewer system. The ICDs are to be removed after the proposed storm sewers have been fully cleaned.
- A mud mat is to be built at each of the site entranceways to prevent the transport of sediment onto paved surfaces. The mud mat shall be:
  - Minimum of 20 m in length for the full width of the entrance way (10 m wide minimum).
  - Minimum of 400 mm thick underlain with a geotextile (or graded aggregate filter); and
  - Constructed with 50 mm diameter clear stone for the first 10 m (extending from the paved street) and the remainder of the length with 150 mm diameter clear stone.

The proposed removal and reinstatement measures as well as the erosion control measures shall conform to the following documents:

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

6.0 CONCLUSIONS

Block 16 will be serviced as follows:

- Water servicing will be provided by connection to the proposed watermain along the Navan Road.
- Wastewater servicing will be provided by a connection to the future East Ridge Orleans Subdivision
- Storm servicing will be provided by a connection to the future East Ridge Orleans Subdivision
- Flows exceeding the allowable peak flow for Block 16, will be held on-site, using a combination of both, above ground and underground storage.

This report has been prepared by J.L. Richards & Associates Limited for 12714001 CANADA INC.'s exclusive use. Its discussions and conclusions are summary in nature and cannot properly be used, interpreted or extended to other purposes without a detailed understanding and discussions with the client as to its mandated purpose, scope and limitations. This report is based on information, drawings, data, or reports provided by the named client, its agents, and certain other suppliers or third parties, as applicable, and relies upon the accuracy and completeness of such information. Any inaccuracy or omissions in information provided, or changes to applications, designs, or materials may have a significant impact on the accuracy, reliability, findings, or conclusions of this report.

This report was prepared for the sole benefit and use of the named client and may not be used or relied on by any other party without the express written consent of J.L. Richards & Associates Limited, and anyone intending to rely upon this report is advised to contact J.L. Richards & Associates Limited in order to obtain permission and to ensure that the report is suitable for their purpose.

J.L. RICHARDS & ASSOCIATES LIMITED

Prepared by:

William Rugamba,
Civil Engineering Graduate

Prepared by:

Mathieu Lacelle,
Civil Engineering Graduate

Reviewed by:

LICENSED PROFESSIONAL ENGINEER
K.R. FERREY MORENO
100122432
2024-09-13
PROVINCE OF ONTARIO

Karla Ferrey, P. Eng.
Senior Associate, Manager,
Ottawa, Civil Development

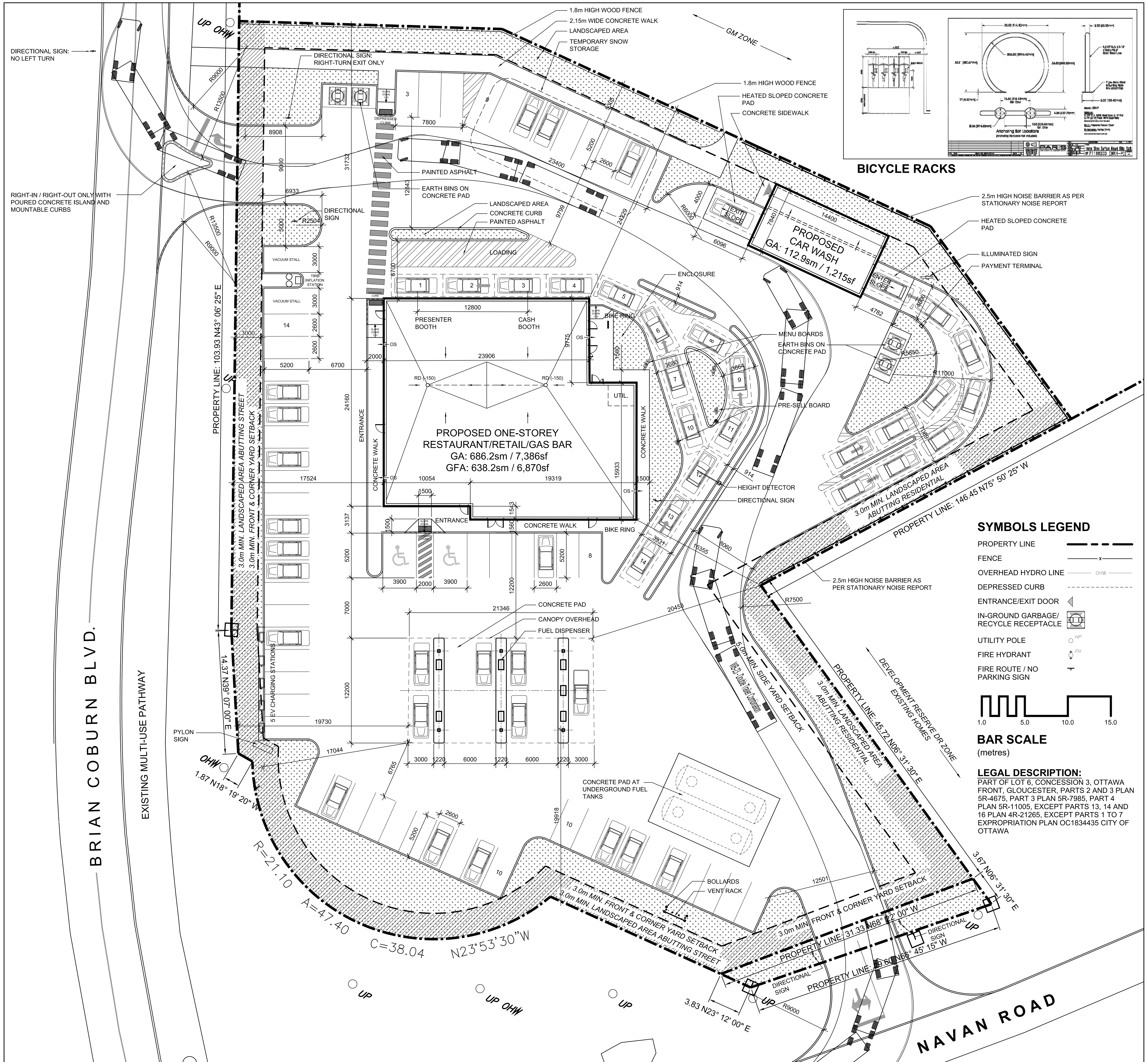
Reviewed by:

LICENSED PROFESSIONAL ENGINEER
J.R. PETTIGREW
100207693
September 13, 2024
PROVINCE OF ONTARIO

Bobby Pettigrew, P. Eng.
Senior Water Resource Engineer

Appendix A

Concept Plan, Draft Plan of Subdivision and Topographical Survey



BICYCLE RACKS

SYMBOLS LEGEND

- PROPERTY LINE
- FENCE
- OVERHEAD HYDRO LINE
- DEPRESSED CURB
- ENTRANCE/EXIT DOOR
- IN-GROUND GARBAGE/ RECYCLE RECEPTACLE
- UTILITY POLE
- FIRE HYDRANT
- FIRE ROUTE / NO PARKING SIGN

1.0 5.0 10.0 15.0

BAR SCALE
(metres)

LEGAL DESCRIPTION:
PART OF LOT 6, CONCESSION 3, OTTAWA FRONT, GLOUCESTER, PARTS 2 AND 3 PLAN 5R-4675, PART 3 PLAN 5R-7985, PART 4 PLAN 5R-11005, EXCEPT PARTS 13, 14 AND 16 PLAN 4R-21265, EXCEPT PARTS 1 TO 7 EXPROPRIATION PLAN OC1834435 CITY OF OTTAWA

03 SITE PLAN
SP-A01 SCALE: 1:250

SITE INFORMATION

SITE AREA: 7,717sm / 1.93 acres

NOTE THAT PROPERTY BOUNDARY INFORMATION HAS BEEN TAKEN FROM SURVEY PREPARED BY STANTEC, DATED 12 OCTOBER 2023.

BUILDING DATA:

AREA CALCULATIONS:

Gross Area (by Ontario Building Code definition):
The total area of all floors above grade measured between the outside surfaces of exterior walls is:

Retail Building:	686.2sm / 7,386sf
Carwash Building:	112.9sm / 1,215sf
Total Gross Area:	799.1sm / 8,600sf

Gross Floor Area (City of Ottawa Zoning Bylaw definition for the purpose of determining maximum building area and parking requirements): The total floor area measured from the interior of outside walls excluding mechanical/electrical service rooms, stairwells, elevator shafts, parking/loading facilities, washrooms and storage areas:

GFA (Restaurant/Retail Bldg): 602sm / 6,480sf

ZONING

DESIGNATION: GM[2546] H(14.5)
General Mixed use, Exception 2546

PERMITTED NON RESIDENTIAL USES:

Section 187:	Convenience Store Drive-through Facility Restaurant Retail Store
Exception 2546:	Car Wash Gas Bar

MINIMUM SETBACKS:

Table 187(c):	Front & Corner Yard:	3.0m
Table 187(d):	Interior Side Yard:	5.0m (abutting res. zone)
Table 187(e.iii):	Rear Side Yard:	7.5m (abutting res. bldg)

BUILDING HEIGHT:
Exception 2546: 14.5m maximum permitted
5.5m proposed

FSI:
Table 187(g): 2.0 times coverage (15,000sm) maximum permitted
0.1 times coverage (799.1sm) proposed

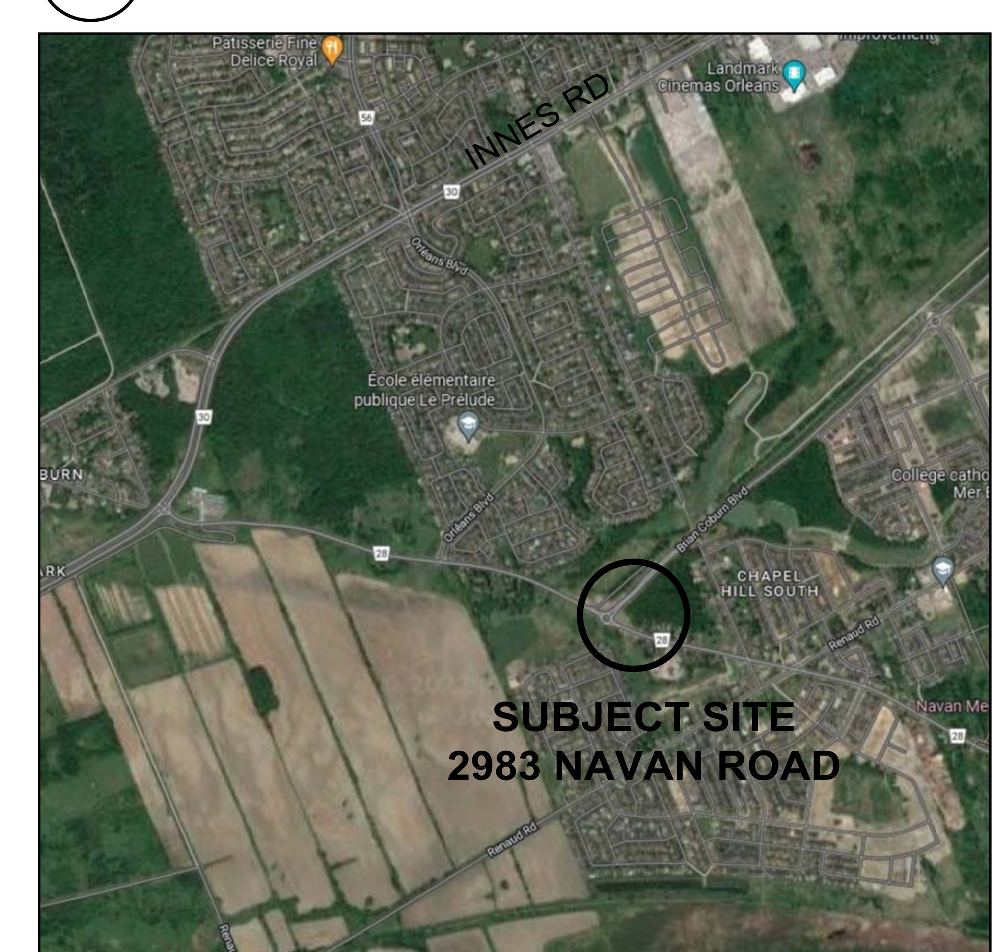
MINIMUM WIDTH OF LANDSCAPED AREA:

Table 187(h.i):	Abutting a Street:	3.0m
Table 187(h.ii):	Abutting a Res.Zone:	3.0m

PARKING:

Table 101:	Convenience Store: 3.4 cars per 100sm of GFA Fast-Food Restaurant: 10 cars per 100sm of GFA
Required:	9 for Convenience Store (266sm/100x3.4) 34 for Restaurant (336sm/100x10)
Provided:	61 cars (not incl. fuel dispensers & drive-through)

02 SITE & BUILDING DATA and ZONING REVIEW
SP-A01 SCALE: NTS



01 LOCATION PLAN
SP-A01 SCALE: NTS

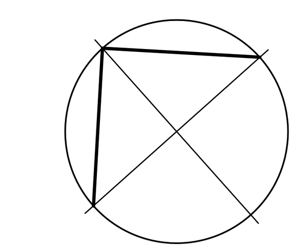
MCROBIE
ARCHITECTS + INTERIOR DESIGNERS

OWNER:
1274001 CANADA INC.
100-768 Boulevard St Joseph
Gatineau, QC J8Y 4B8

PLANNING, CIVIL & TRAFFIC CONSULTANT:
J.L.RICHARDS & ASSOCIATES LTD.
1000-343 Preston Street
Ottawa, ON K13 1N4

LANDSCAPE ARCHITECT:
JAMES B. LENNOX & ASSOCIATES INC.
3332 Carling Avenue
Ottawa, ON K2H 5A8

North



Revisions

No.	By	Description	Date
08	IW	SITE PLAN APPLICATION	08 DEC 2023
09	IW	REVISED FOR SPA	01 MAR 2024
10	IW	REVISED FOR SPA	14 AUG 2024

Project
NEW RESTAURANT, CONVENIENCE STORE & GAS BAR

2130 BRIAN COBURN BLVD.

Drawing
SITE PLAN

Scale: AS SHOWN
Drawn: AK / KE
Checked:

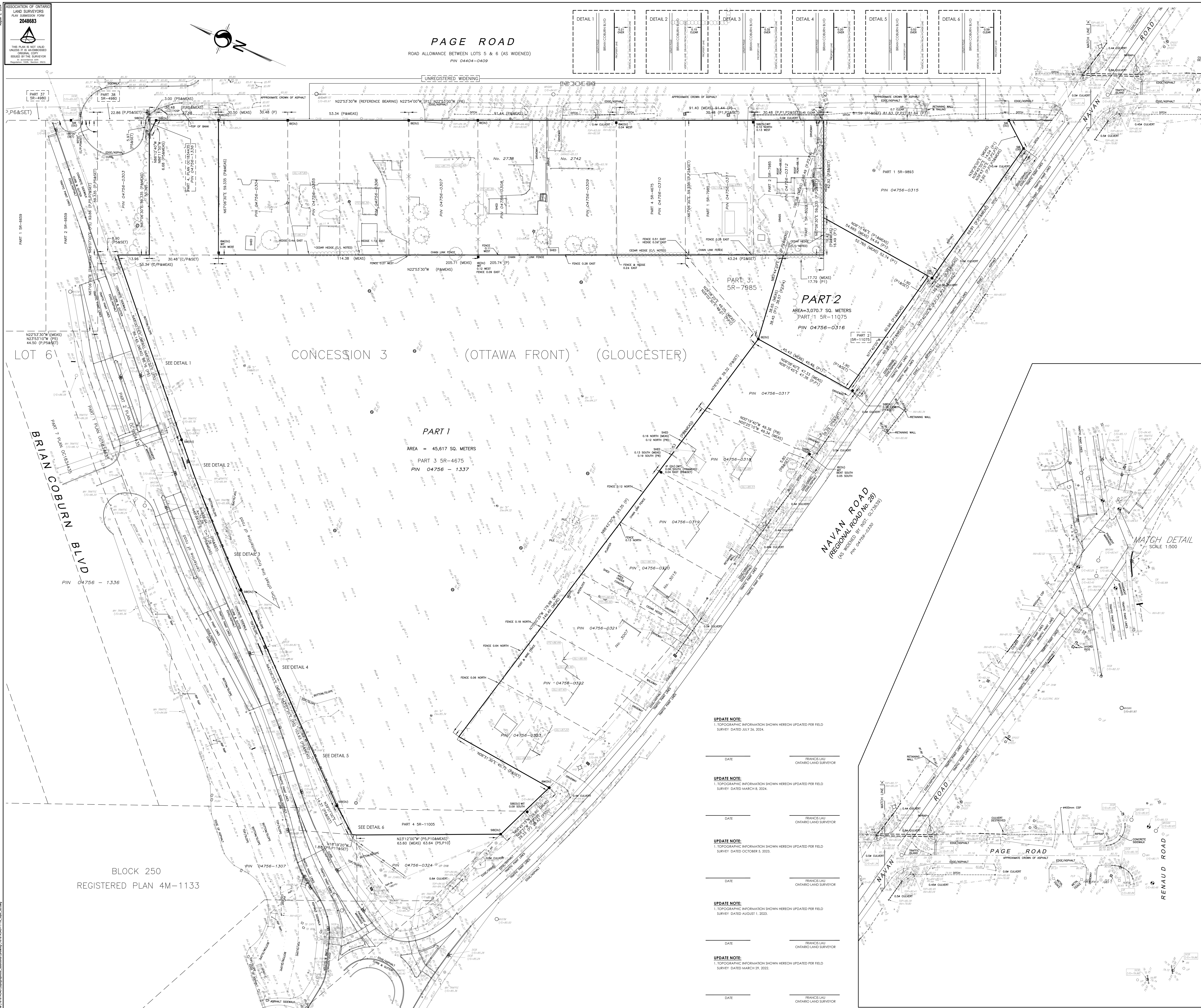
Stamp

Project No. 22-127
Date 12 MAY 2022
Drawing No. SP-A01

D07-16-21-0027

22 X 34 - PLOT ANSI D

PLAN NO. ______



UPDATE NOTE:
1. TOPOGRAPHIC INFORMATION SHOWN HEREON UPDATED PER FIELD SURVEY DATED JULY 26, 2024.

DATE — FRANCIS LAU, ONTARIO LAND SURVEYOR

UPDATE NOTE:
1. TOPOGRAPHIC INFORMATION SHOWN HEREON UPDATED PER FIELD SURVEY DATED MARCH 8, 2024.

DATE — FRANCIS LAU, ONTARIO LAND SURVEYOR

UPDATE NOTE:
1. TOPOGRAPHIC INFORMATION SHOWN HEREON UPDATED PER FIELD SURVEY DATED OCTOBER 5, 2023.

DATE — FRANCIS LAU, ONTARIO LAND SURVEYOR

UPDATE NOTE:
1. TOPOGRAPHIC INFORMATION SHOWN HEREON UPDATED PER FIELD SURVEY DATED AUGUST 1, 2023.

DATE — FRANCIS LAU, ONTARIO LAND SURVEYOR

UPDATE NOTE:
1. TOPOGRAPHIC INFORMATION SHOWN HEREON UPDATED PER FIELD SURVEY DATED MARCH 29, 2022.

DATE — FRANCIS LAU, ONTARIO LAND SURVEYOR

TOPOGRAPHIC SKETCH OF

PART OF LOT 6
CONCESSION 3 (OTTAWA FRONT)

(GEOGRAPHIC TOWNSHIP OF GLOUCESTER)

CITY OF OTTAWA

Scale 1:500

10 0 10 20 30 METRES

METRIC CONVERSION

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

GRID SCALE CONVERSION

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999964

BEARING NOTE

BEARINGS ARE ASTRONOMIC AND ARE REFERRED TO THE WESTERLY LIMIT OF PAGE ROAD, AS SHOWN ON PLAN 5R-4980, HAVING A BEARING OF N22°53'30"W.

A BEARING ROTATION CLOCKWISE OF 0°41'20" HAVE BEEN APPLIED TO BEARINGS SHOWN ON P5, P6, AND P7.

ELEVATION NOTE

ELEVATIONS SHOWN HEREON ARE GEODETIC (CGVD-1928:1978) AND ARE DERIVED FROM THE CAN-NET VRS NETWORK.

LEGEND (IF APPLICABLE)

Symbol		Description
■	DENOTES	FOUND MONUMENTS
□	"	SET MONUMENTS
IB	"	IRON BAR
IBØ	"	ROUND IRON BAR
SIB	"	STANDARD IRON BAR
SSIB	"	SHORT STANDARD IRON BAR
CC	"	CUT CROSS
CP	"	CONCRETE PIN
WIT	"	WITNESS
PIN	"	PROPERTY IDENTIFICATION NUMBER
MEAS	"	MEASURED
PROP	"	PROPORTIONED
OU	"	ORIGIN UNKNOWN
SG	"	STANTEC GEOMATICS LTD.
ORP	"	OBSERVED REFERENCE POINT
P	"	PLAN 5R-4675
P1	"	PLAN 5R-11075
P2	"	PLAN 5R-7985
P3	"	PLAN 5R-9893
P4		PLAN 5R-8022
P5	"	PLAN OC183445
P6	"	PLAN 5R-4980
P7	"	PLAN 5R-6659
P8		PLAN BY FMW DATED SEPTEMBER 9, 2015
P9	"	PLAN BY 1175 DATED SEPTEMBER 30, 1987
P10	"	PLAN 5R-11005
P11	"	REGISTERED PLAN 4M-1133
C/P	"	CALCULATION PER
ACU	"	AIR CONDITIONING UNIT
AN	"	ANCHOR
AP	"	AIR PUMP
ANT	"	ANTENNA
BH	"	BOREHOLE
BIB	"	HOSE BIB
BKR	"	BIKE RACK
BENCH	"	BENCH
BOL	"	BOLLARD
BOUL	"	BOULDER
CB	"	CATCH BASIN
DCB	"	DOUBLE CB
DICB	"	DITCH CB
CBMH	"	CB MANHOLE
DCBMH	"	DOUBLE CB MANHOLE
CBSI	"	SIDE INLET CB
CHM	"	CHIMNEY
CSV	"	VALVE CURB STOP
DRN	"	DRAIN
EPOST	"	ELECTRICAL OUTLET
FP	"	FLAG POLE
FL	"	FLOOD LIGHT
FTF	"	FUEL TANK FILLER CAP
GC	"	GARBAGE CAN
GFL	"	PIPE FLANGE (GAS)
GFP	"	GAS FUEL PUMP
GP	"	POLE GUYWIRE
GSR	"	GAS SERVICE REGULATOR
GV	"	GAS VALVE
HIC	"	HICKENBOTTOM
HDS	"	HEADSTONE
HLS	"	LIGHT STANDARD HYDRO
HM	"	HYDRO METER
HTN	"	HYDRO TRANSFORMER
HW	"	HAND WELL
HYD	"	FIRE HYDRANT
JBX	"	JUNCTION BOX
MB	"	MAILBOX
MP	"	MONITORING PIN
MH	"	MAINTENANCE HOLE UNIDENTIFIED
MHBELL	"	MAINTENANCE HOLE BELL
MHF	"	MAINTENANCE HOLE FIBRE OPTIC
MHH	"	MAINTENANCE HOLE HYDRO
MHI	"	MAINTENANCE HOLE INVERT
MHSAN	"	MAINTENANCE HOLE SANITARY
MHSTM	"	MAINTENANCE HOLE STORM
MHT	"	MAINTENANCE HOLE TRAFFIC
MW	"	MONITORING WELL
NPB	"	NEWS PAPER BOX
OLP	"	LIGHT STANDARD ORNAMENTAL
OW	"	OBSERVATION WELL
PKM	"	PARKING METER
PLBX	"	PULL BOX
PLQ	"	PLAQUE
PLR	"	PILLAR
PZ	"	PIEZIOMETER
RLC	"	RED LIGHT CAMERA
RWSL	"	RAILWAY SIGNAL LIGHT
RWSS	"	RAILWAY SWITCH STAND
SAT	"	SATELLITE DISH
SCLP	"	SCULPTURE
SCP	"	SUMP/CATCH PIT
SCV	"	SPRINKLER CONTROL VALVE
SH	"	SPRINKLER HEAD
SIA	"	SIAMESE CONNECTION
SN	"	SIGN
SPAN	"	SOLAR PANEL
SPT	"	SEPTIC TANK LID
TBL	"	TABLE
TB BELL	"	TERMINAL BOX - BELL
TB CATV	"	TERMINAL BOX - CABLE
TCB	"	TRAFFIC CONTROL BOX
TPIT	"	TEST PIT
TSL	"	TRAFFIC SIGNAL LIGHT
UMB	"	MARKER BELL UNDERGROUND
UMC	"	MARKER CABLE UNDERGROUND
—— G ——	"	NATURAL GAS LOCATE
UMO	"	MARKER OIL UNDERGROUND
UP	"	UTILITY POLE
VB	"	VALVE BOX
VC	"	VALVE CHAMBER
WV	"	WATER VALVE
_cm	"	TREE CONIFEROUS Ø _centimetres
_cm	"	TREE DECIDUOUS Ø _centimetres

SURVEYOR'S CERTIFICATE

I CERTIFY THAT :

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE 14th DAY OF DECEMBER, 2020.

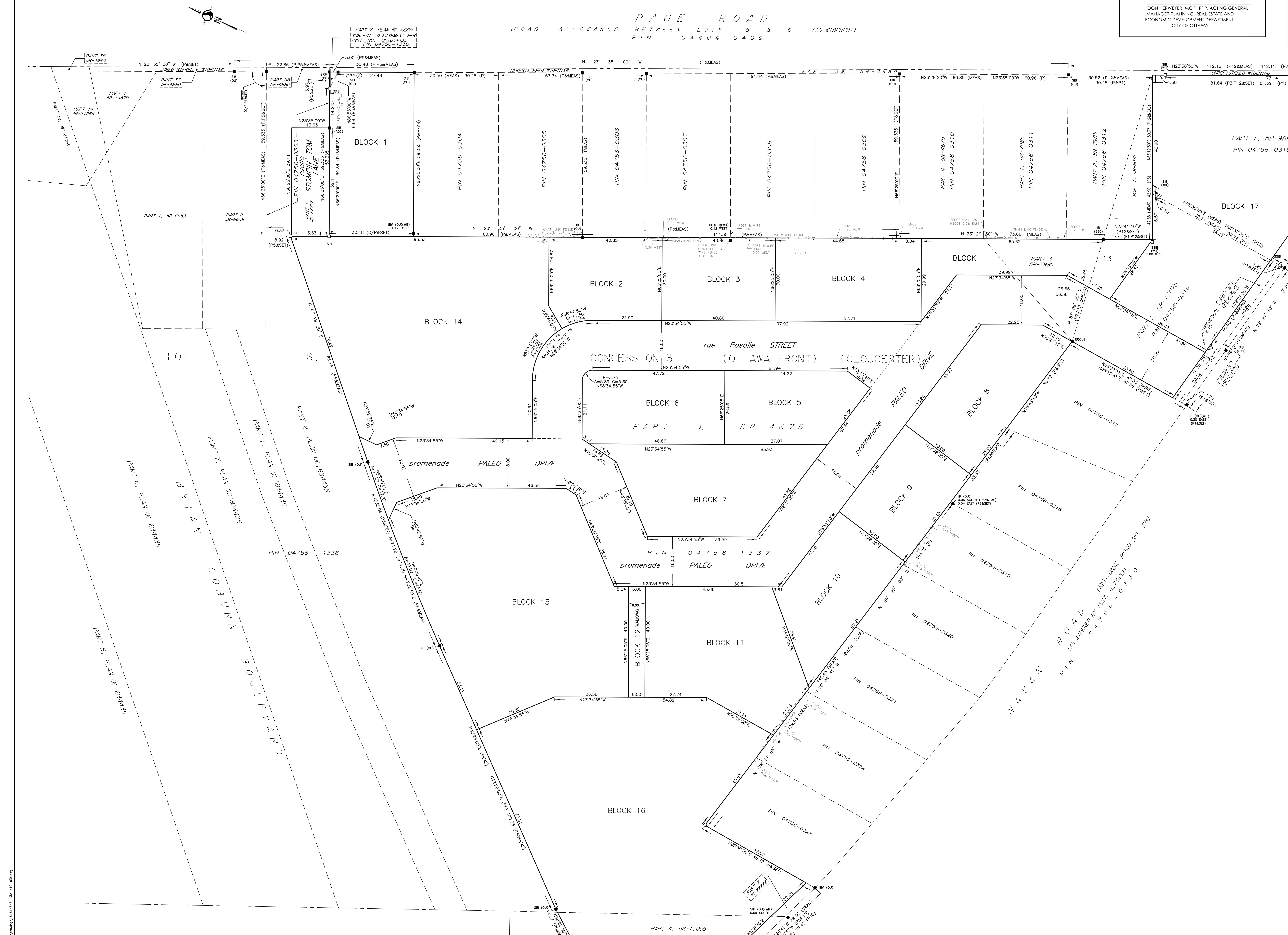
DATE — FRANCIS LAU, ONTARIO LAND SURVEYOR

SRO COORDS: X= 381388 Y= 5032979

Stantec Geomatics Ltd.
CANADA LANDS SURVEYORS
ONTARIO LAND SURVEYORS
1331 CLYDE AVENUE, SUITE 400
OTTAWA, ONTARIO, K2C 3G4
TEL. 613.722.4420 FAX. 613.722.2799
stantec.com

DRAWN: ME	CHECKED: KJ	PM: AB	FIELD: CA\SJ	PROJECT No.: 161614345-111A

July 20, 2023



APPROVED UNDER SECTION 51 OF THE PLANNING ACT BY THE CITY OF OTTAWA THIS ____ DAY OF __________________ ,20___

DON HERWEYER, MCIP, RPP, ACTING GENERAL MANAGER PLANNING, REAL ESTATE AND ECONOMIC DEVELOPMENT DEPARTMENT, CITY OF OTTAWA

PLAN 4M-

I HEREBY CERTIFY THAT THIS PLAN 4M-______ IS REGISTERED IN THE LAND REGISTRY OFFICE FOR THE LAND TITLES DIVISION OF OTTAWA-CARLETON (No.4) AT_____ O'CLOCK ON THE______ DAY OF _____________, 2023 AND ENTERED IN THE REGISTER FOR P.I.N.'s 04756-0303, 04756-0315, 04756-0316 & 04756-1337, AND THE REQUIRED CONSENTS ARE REGISTERED AS PLAN DOCUMENT NUMBER OC-____________.

REPRESENTATIVE FOR LAND REGISTRAR

THIS PLAN COMPRISES OF ALL OF PINS 04756-0303, 04756-0315, 04756-0316 & 04756-1337.

DRAFT PLAN OF SUBDIVISION OF

PART OF LOT 6
CONCESSION 3 (OTTAWA FRONT)

(GEOGRAPHIC TOWNSHIP OF GLOUCESTER)

CITY OF OTTAWA

Scale 1:500

10 0 10 20 30 METRES

METRIC CONVERSION

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

GRID SCALE CONVERSION

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.999964

BEARING NOTE

BEARINGS ARE GRID, DERIVED FROM CAN-NET VRS NETWORK GPS OBSERVATIONS ON NCC HORIZONTAL CONTROL MONUMENTS 19773035 AND 19680191, CENTRAL MERIDIAN, 76° 30' WEST LONGITUDE MTM ZONE 9, NAD83 (ORIGINAL).

FOR BEARING COMPARISONS, BEARINGS ON PLANS P, P1, P2 & P3 HAVE BEEN ROTATED 0°41'30" COUNTERCLOCKWISE.

LEGEND

■	DENOTES	FOUND MONUMENTS
□	"	SET MONUMENTS (IB) UNLESS OTHERWISE NOTED
IB	"	IRON BAR
IBØ	"	ROUND IRON BAR
SIB	"	STANDARD IRON BAR
SSIB	"	SHORT STANDARD IRON BAR
CC	"	CUT CROSS
CP	"	CONCRETE PIN
WIT	"	WITNESS
PIN	"	PROPERTY IDENTIFICATION NUMBER
MEAS	"	MEASURED
PROP	"	PROPORTIONED
OU	"	ORIGIN UNKNOWN
SG	"	STANTEC GEOMATICS LTD.
ORP	"	OBSERVED REFERENCE POINT
P	"	PLAN 5R-4675
P1	"	PLAN 5R-11075
P2	"	PLAN 5R-7985
P3	"	PLAN 5R-9893
P4		PLAN 5R-8022
P5	"	PLAN OC183445
P6	"	PLAN 5R-4980
P7	"	PLAN 5R-6659
P8		PLAN BY FMW DATED SEPTEMBER 9, 2015
P9	"	PLAN BY 1175 DATED SEPTEMBER 30, 1987
P10	"	PLAN 5R-11005
P11	"	REGISTERED PLAN 4M-1133
P12	"	PLAN BY 1465 DATED DECEMBER 10, 2020
C/P	"	CALCULATION PER

NOTES

1. ALL PLANTED MONUMENTS SHOWN HEREON ARE IRON BARS (IB) UNLESS OTHERWISE NOTED.

OWNER'S CERTIFICATE

ALL OF PINS 04756-0303, 04756-0315, 04756-0316 & 04756-1337.

THIS IS TO CERTIFY THAT :

1. BLOCKS 1 TO 11, BOTH INCLUSIVE, BLOCKS 13 TO 17, BOTH INCLUSIVE, THE STREETS, NAMELY promenade PALEO DRIVE, rue Rosalie STREET AND ruelle STOMPIN' TOM LANE AND LANE, NAMELY BLOCK 12, HAVE BEEN LAID OUT IN ACCORDANCE WITH OUR INSTRUCTIONS.
2. THE STREETS ARE DEDICATED TO CITY OF OTTAWA AS PUBLIC HIGHWAYS.

DATE

*,PRESIDENT
####### ONTARIO LIMITED
I HAVE THE AUTHORITY TO BIND THE CORPORATION

SURVEYOR'S CERTIFICATE

I CERTIFY THAT :

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE -th DAY OF ,2023

DATE

FRANCIS LAU
ONTARIO LAND SURVEYOR

OBSERVED REFERENCE POINTS DERIVED FROM THE CAN-NET VRS NETWORK GPS OBSERVATIONS ON NCC HORIZONTAL CONTROL MONUMENTS 19773035 AND 19680191, CENTRAL MERIDIAN, 76° 30' WEST LONGITUDE MTM ZONE 9, NAD83 (ORIGINAL).
COORDINATES TO URBAN ACCURACY PER SEC 14(2) OF O.REG. 216/10

ORP ID	NORTHING	EASTING
Ⓐ	5033144.88	381482.57
Ⓑ	5032879.91	381255.06

COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.

Stantec Geomatics Ltd.
CANADA LANDS SURVEYORS
ONTARIO LAND SURVEYORS
1331 CLYDE AVENUE, SUITE 300
OTTAWA, ONTARIO, K2C 3G4
TEL. 613.722.4420 FAX. 613.722.2799
stantec.com

DRAWN: ME/TMT	CHECKED: -	PM:	FIELD: ES/LG	PROJECT No.: 161614345-132

Appendix B

Pre Consultation Meeting Notes and Site Servicing Report Checklist

File No.: PC2023-0227

Carmine Zayoun
12714001 Canada Inc (Zayoun Group)
Via email: carmine@zayoungroup.com

Subject: Pre-Consultation: Meeting Feedback
Proposed Site Plan Application – 2983 Navan Road ‘
Gas Station and Commercial Building – PC2023-0227

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on September 13, 2023.

Pre-Consultation Preliminary Assessment

1 ☐	2 ☐	3 ☐	4 ☒	5 ☐

One (1) indicates that considerable major revisions are required while five (5) suggests that the 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.

Next Steps

1. A review of the proposal and materials submitted for the above-noted pre-consultation has been undertaken. Please proceed to complete a Phase 2 / Phase 3 Pre-consultation Application Form and submit it together with the necessary studies and/or plans to planningcirculations@ottawa.ca.

2. In your subsequent pre-consultation submission, please ensure that all comments or issues detailed herein are addressed. A detailed cover letter stating how each issue has been addressed must be included with the submission materials. Please coordinate the numbering of your responses within the cover letter with the comment number(s) herein.

3. Please note, if your development proposal changes significantly in scope, design, or density before the Phase 3 pre-consultation, you may be required to complete or repeat the Phase 2 pre-consultation process.

Supporting Information and Material Requirements

1. The attached **Study and Plan Identification List** outlines the information and material that has been identified, during this phase of pre-consultation, as either required (R) or advised (A) as part of a future complete application submission.

   a. The required plans and studies must meet the City’s Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.

Consultation with Technical Agencies

1. You are encouraged to consult with technical agencies early in the development process and throughout the development of your project concept. A list of technical agencies and their contact information is enclosed.

Planning

Comments:

1. In the Official Plan the subject site is designated as Neighbourhood is modified with the Evolving Neighbourhood overlay. Brian Coburn Boulevard is also designated as a Minor Corridor. The property is further identifed as Low-density residential in the EUC – Phases 1 Community Design Plans (CDP). The subject lands are currently zoned GM[2546]H(14.5) General Mixed-Use, Exception.

2. Committee of Adjustment

   No variances have been identified at this point. Staff will set up a meeting with a Committee of Adjustment Plan if any required.

3. Design guidelines

   Urban Design Guidelines for Drive-Through Facilities

   Urban Design Guidelines for Gas Stations

4. Landscape requirements

   Landscape buffers will need to comply with Section 110 of the Zoning By-law and are consistent with the design guidelines.

   The turning radius encroached into the landscape buffers on the demonstration plan. Ensure all landscaping is protected by barrier curbs

5. Parking requirements

   Parking should comply with Sections 100, 101, 106, 109 and 111

   Vehicle and bicycle parking should be situated with easily access while minimizing pavement. There seems to be a lot of pavement in front of this building.

6. Easements

Are there service easements required over the pedestrian walkway connecting this property with the subdivision?

7. Confirm that the location of the Car Wash will not become a noise problem for future residents of the townhouses behind it. Noise study will need to identify any issues and provide remediation measures.

8. Provide locations of signage and ensure that space is made available for tree planting

Urban Design

9. Relevant guidelines – The City's Urban Design Guidelines for Gas Stations and Urban Design Guidelines for Drive-Through Facilities are both applicable to this site. The applicant should ensure their submission meets the direction of these guidelines.

10. Design Brief - A Design Brief is required. Please refer to the attached Terms of Reference for details.

11. Public realm – Please refer to the attached PDF for Urban Design comments related to the location of sidewalks, walkways and pedestrian movements on the site

12. Landscaping - Extensive tree and shrub planting is need on this site, in particular to soften the interface with the existing and future residential and to enhance the ROW.

Feel free to contact the Urban Design Planner, Christopher Moise, at Christoper.Moise@ottawa.ca , for follow-up questions

Engineering

Comments:

13. General Comments:

    a. Review of the Phase 3 submission for this application will not occur until the detailed design of the subdivision that it is within (D07-16-21-0027) is approved.
    b. At the stage of site plan approval, a condition will be imposed detailing that a commence work notification will not be issued until the subdivision's infrastructure is in-service.

14. Engineering Studies:

    a. All engineering studies (detailed in the Study and Plan Identification List form) are to follow the to be approved draft plan of subdivision D07-16-21-0027.

b. An interceptor pit is required with the provision of the car wash.

15. An MECP Environmental Compliance Approval **Industrial Sewage Works** will be required for the proposed development. Please contact the Ministry of the Environment, Conservation and Parks, Ottawa District Office to arrange a pre-submission consultation:

    b. Emily Diamond at (613) 521-3450, ext. 238 or Emily.Diamond@ontario.ca

    Note: this site does not meet the City's requirements for ToR. To have the ECA application reviewed under ToR, a request will need to be sent to Charles Warnock (charles.warnock@ottawa.ca).

Feel free to contact Reed Adams (reed.adams@ottawa.ca), Infrastructure Project Manager, for follow-up questions.

<u>Noise</u>

Comments:

16. A stationary noise report for the car wash is required because of the adjacent residential.

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

.

<u>Transportation</u>

Comments:

17. A full TIA is not required as this site is covered under the recent subdivision TIA.

18. A memo including the pertinent subdivision trips is sufficient.

19. The right of way protection on Brian Coburn and Navan Roads is 40m and 37.5m, respectively

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

<u>Planning Forestry</u>

Comments:

20. A Tree Conservation Report and Landscape Plan must be submitted with both SPC applications

21. A permit is required prior to any tree removal on site. The tree permit will be released upon site plan approval. Please contact the File Lead or the Planning Forester, Hayley Murray (hayley.murray@ottawa.ca) for information on obtaining the tree permit.

22. If marine clay soils are present, setbacks on City properties must adhere to the 2017 SMC guidelines (attached). The Geotechnical report must address the implications of these soils, if present, on tree planting in relation to private land.

23. If underground parking is planned, a design must be provided for the site to support tree planting

24. We expect a very strong landscape plan to re-establish canopy cover across the properties. Tree planting and protecting existing urban forest canopy is imperative to reach the City's target of 40% canopy cover.

Feel free to contact Hayley Murray, Planning Forester, for follow-up questions.

Parkland

Comments:

25. Parkland contributions were made through the Subdivision process.

Feel free to contact Jessica Button, Parks Planner, for follow-up questions.

Conservation Authority

Comments:

26. The Rideau Valley Conservation authority will be commenting on this application

Feel free to contact RVCA, for follow-up questions.

Other

27. The High Performance Development Standard (HPDS) is a collection of voluntary and required standards that raise the performance of new building projects to achieve sustainable and resilient design. The HPDS was passed by Council on April 13, 2022.

    a. At this time, the HPDS is not in effect and Council has referred the 2023 HPDS Update Report back to staff with direction to bring forward an updated report to Committee with recommendations for revised phasing timelines, resource requirements and associated amendments to the Site Plan Control By-law by no later than Q1 2024.

b. Please refer to the HPDS information attached and ottawa.ca/HPDS for more information.

Submission Requirements and Fees

1. Outlines the application type/subtype required and the associated fees
   a. Additional information regarding fees related to planning applications can be found here.
2. The attached **Study and Plan Identification List** outlines the information and material that has been identified as either required (R) or advised (A) as part of a future complete application submission.
   a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.
3. All of the above comments or issues should be addressed to ensure the effectiveness of the application submission review.

Should there be any questions, please do not hesitate to contact myself or the contact identified for the above areas / disciplines.

Yours Truly,
Steve Belan

cc.
Tim Chadder
Raad Akrawi
Madelen Fellows
Karla Ferrey
Tatyana Roumie
Christopher Moise
Adam Reed
Mike Giampa
Haley Murray
Jessica Button

12714001 Canada Inc – Block 16 – Gas Bar, Commercial Building/Drive-Through Restaurant and Car Wash

2983 Navan Road

SITE SERVICING REPORT CHECKLIST

REFERENCED STUDIES AND REPORTS	REFERENCE
Site Servicing Report for 12714001 Canada Inc, Block 16 – Gas Bar, Commercial Building/Drive-Through Restaurant and Car Wash, 2983 Navan Road Road (J.L. Richards & Associates Limited, December 8, 2023)	Site Servicing Report

4.1	GENERAL CONTENT	REFERENCE
☐	Executive Summary (for larger reports only).	N/A
☒	Date and revision number of the report.	Site Servicing Report
☒	Location map and plan showing municipal address, boundary, and layout of proposed development.	Site Servicing Report (Appendix A) All Drawings
☒	Plan showing the site and location of all existing services.	Servicing Plan
☒	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.	Site Servicing Report
☒	Summary of Pre-consultation Meetings with City and other approval agencies.	Site Servicing Report (Appendix 'A')
☒	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	Reference made to Stantec 2005 EUC ISSU
☒	Statement of objectives and servicing criteria.	Site Servicing Report
☒	Identification of existing and proposed infrastructure available in the immediate area.	Site Servicing Report Servicing Plan
☐	Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	N/A

☒	Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Grading Plan
☐	Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
☐	Proposed phasing of the development, if applicable.	N/A
☒	Reference to geotechnical studies and recommendations concerning servicing.	Site Servicing Report and Drawings
☒	All preliminary and formal site plan submissions should have the following information: ▪ Metric scale ▪ North arrow (including construction North) ▪ Key plan ▪ Name and contact information of applicant and property owner ▪ Property limits, including bearings and dimensions ▪ Existing and proposed structures and parking areas ▪ Easements, road widening and rights-of-way ▪ Adjacent street names	All Drawings

4.2	**SITE SERVICING REPORT: WATER**	**REFERENCE**
☐	Confirm consistency with Master Servicing Study, if available.	N/A
☒	Availability of public infrastructure to service proposed development.	Site Servicing Report (Section 2.0) Servicing Plan
☒	Identification of system constraints.	Site Servicing Report (Section 2.0) Servicing Plan
☒	Identify boundary conditions.	Site Servicing Report (Section 2.0)
☒	Confirmation of adequate domestic supply and pressure.	Site Servicing Report (Section 2.0)
☒	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.	Site Servicing Report (Section 2.0)
☒	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.	Site Servicing Report (Section 2.0)

☐	Definition of phasing constraints. Hydraulic modelling is required to confirm servicing for all defined phases of the project, including the ultimate design.	N/A
☒	Address reliability requirements, such as appropriate location of shutoff valves.	Site Servicing Report (Section 2.0)
☐	Check on the necessity of a pressure zone boundary modification.	N/A
☒	Reference to water supply analysis to show that major infrastructure can deliver 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.	Site Servicing Report (Section 2.0)
☒	Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants), including special metering provisions.	Site Servicing Report (Section 2.0) Servicing Plan
☐	Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
☒	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Site Servicing Report (Section 2.0)
☒	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	Site Servicing Report (Section 2.0)

4.3	**SITE SERVICING REPORT: WASTEWATER**	**REFERENCE**
☒	Summary of proposed design criteria (Note: Wet weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Site Servicing Report (Section 3.0,
☐	Confirm consistency with Master Servicing Study and/or justifications for deviations.	Stantec 2005 EUC ISSU
☐	Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the Guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A
☒	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Site Servicing Report (Section 3.0) Servicing Plan

☒	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.)	Site Servicing Report (Section 3.0)
☒	Calculations related to dry weather and wet weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Site Servicing Report (Section 3.0)
☒	Description of proposed sewer network, including sewers, pumping stations and forcemains.	Site Servicing Report (Section 3.0) Servicing Plan
☐	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).	N/A
☐	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
☐	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
☐	Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
☐	Special considerations, such as contamination, corrosive environment, etc.	N/A

4.4	**SITE SERVICING REPORT: STORMWATER**	**REFERENCE**
☒	Description of drainage outlets and downstream constraints, including legality of outlets (i.e., municipal drain, right-of-way, watercourse, or private property).	Site Servicing Report (Section 4.0)
☒	Analysis of available capacity in existing public infrastructure.	Site Servicing Report (Section 4.0)
☒	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Servicing, Grading and Drainage Plans
☒	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.	Site Servicing Report (Section 4.0)

☒	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Site Servicing Report (Section 4.0)
☒	Description of the stormwater management concept with facility locations and descriptions with references and supporting information.	Site Servicing Report (Section 4.0) Servicing, Grading and Drainage Plans
☐	Setback from private sewage disposal systems.	N/A
☐	Watercourse and hazard lands setbacks.	N/A
☒	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Site Servicing Report (Appendix 'A')
☐	Confirm consistency with subwatershed and Master Servicing Study, if applicable study exists.	Stantec 2005 EUC ISSU
☒	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:2 year return period) and major events (1:100 year return period).	Site Servicing Report (Section 4.0)
☐	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A
☒	Calculate pre- and post-development peak flow rates, including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Site Servicing Report (Section 4.0)
☒	Any proposed diversion of drainage catchment areas from one outlet to another.	Site Servicing Report (Section 4.0)
☒	Proposed minor and major systems, including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Servicing, Grading and Drainage Plans
☐	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.	Quantity control proposed per Site Servicing Report (Section 4.0)
☐	Identification of potential impacts to receiving watercourses.	N/A
☐	Identification of municipal drains and related approval requirements.	N/A
☒	Description of how the conveyance and storage capacity will be achieved for the development.	Site Servicing Report (Section 4.0)

☒	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	Site Servicing Report (Section 4.0) Servicing, Grading and Drainage Plans
☒	Inclusion of hydraulic analysis, including hydraulic grade line elevations.	Site Servicing Report (Section 4.0)
☒	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Site Servicing Report (Section 5.0) Servicing Plan
☐	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
☐	Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

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

4.6	**CONCLUSION CHECKLIST**	**REFERENCE**
☒	Clearly stated conclusions and recommendations.	Site Servicing Report
☒	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.	Not yet applicable

☒	All draft and final reports shall be signed and stamped by a Professional Engineer registered in Ontario.	Site Servicing Report All Drawings

Appendix C

Water Servicing

WATERMAIN DEMAND CALCULATION SHEET

PROJECT : **NAVAN ROAD DEVELOPMENT PROJECT - GAS BAR**
LOCATION : **CITY OF OTTAWA**
DEVELOPER : **12714001 Canada Inc.**

NODE	RESIDENTIAL			NON-RESIDENTIAL	AVERAGE DAILY DEMAND (l/s)				MAXIMUM DAILY DEMAND (l/s)				PEAK HOUR DEMAND (l/s)			
	UNITS		POP'N	COMM												
	Townhouses (TH)	Condo Units (CU)		(ha.)	Res.	Non-res.	Plug flow	Total	Res.	Non-res.	Plug flow	Total	Res.	Non-res.	Plug flow	Total
J-14	0	0	0	0.77	0.00	0.25	3.60	3.85	0.00	0.37	3.60	3.97	0.00	0.67	3.60	4.27
TOTALS	0	0	0	0.77	**0.00**	**0.25**	**3.60**	**3.85**	**0.00**	**0.37**	**3.60**	**3.97**	**0.00**	**0.67**	**3.60**	**4.27**

ASSUMPTIONS

RESIDENTIAL DENSITIES			AVG. DAILY DEMAND		MAX. HOURLY DEMAND	
- Townhouse (TH)	2.7	p / p / u	- Residential	280 l / cap / day	- Residential	1,540 l / cap / day
			- Institutional	28,000 l / ha / day	- Institutional	75,600 l / ha / day
- Condo Units (CU)	1.8	p / p / u	- Commercial	28,000 l / ha / day	- Commercial	75,600 l / ha / day
		p / p / u	**MAX. DAILY DEMAND**			
			- Residential	700 l / cap / day		
		p / p / u	- Institutional	42,000 l / ha / day		
			- Commercial	42,000 l / ha / day		

FUS Fire Flow Calculations

NAVAN ROAD DEVELOPMENT PROJECT - Commercial Building

(JLR 29899-002)

Step	Parameter	Value		Note
A	Type of Construction	Non-combustible		
	Coefficient (C)	0.8		
B	Ground Floor Area	686	m^2	Commercial area consisting of a Gas Retail and Drive Thru
C	Height in storeys	1	storeys	Basements are excluded.
	Total Floor Area	686	m^2	
D	Fire Flow Formula	F=220C√A		
	Fire Flow	4610	L/min	
	Rounded Fire Flow	5000	L/min	Flow rounded to nearest 1000 L/min.
E	Occupancy Class	Combustible		
	Occupancy Charge	0%		
	Occupancy Increase or Decrease	0		
	Fire Flow	5000	L/min	No rounding applied.
F	Sprinkler Protection	None		
	Sprinkler Credit	0%		
	Decrease for Sprinkler	0	L/min	
G	*North Side Exposure*			
	Exposing Wall:	Non-combustible		Gas Retail/Drive Thru
	Exposed Wall:	Wood Frame		4 Storey Condo Unit
	Length of Exposed Wall:	32.2	m	
	Height of Exposed Wall:	4	storeys	
	Length-Height Factor	128.6	m-storeys	
	Separation Distance	38.96	m	
	North Side Exposure Charge	5%		
	East Side Exposure			
	Exposing Wall:	Non-combustible		Gas Retail/Drive Thru
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	0.0	m	
	Height of Exposed Wall:	0	storeys	
	Length-Height Factor	0.0	m-storeys	
	Separation Distance	46	m	
	East Side Exposure Charge	0%		
	South Side Exposure			
	Exposing Wall:	Non-combustible		
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	0.0	m	
	Height of Exposed Wall:	0	storeys	
	Length-Height Factor	0.0	m-storeys	
	Separation Distance	46	m	Over 45 m to next structure
	South Side Exposure Charge	0%		
	West Side Exposure			
	Exposing Wall:	Non-combustible		Gas Retail/Drive Thru
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	0.0	m	
	Height of Exposed Wall:	0	storeys	
	Length-Height Factor	0.0	m-storeys	
	Separation Distance	46	m	Over 200 m to next structure
	West Side Exposure Charge	0%		
	Total Exposure Charge	5%		The total exposure charge is below the maximum value of 75%.
	Increase for Exposures	250	L/min	
H	Fire Flow	5250	L/min	
	Rounded Fire Flow	5000	L/min	Flow rounded to nearest 1000 L/min.
City Cap	**Required Fire Flow (RFF)**	**5000**	**L/min**	
		83	**L/s**	

Fire Underwriters Survey (FUS) Fire Flow Calculations
In accordance with City of Ottawa Technical Bulletin ISTB-2018-02 dated March 21, 2018

FUS Fire Flow Calculations

NAVAN ROAD DEVELOPMENT PROJECT - Commercial Building

(JLR 29899-002)

Step	Parameter	Value		Note
A	Type of Construction	Non-combustible		
	Coefficient (C)	0.8		
B	Ground Floor Area	107	m^2	Commercial Buildign - Car Wash
C	Height in storeys	1	storeys	Basements are excluded.
	Total Floor Area	107	m^2	
D	Fire Flow Formula	F=220C√A		
	Fire Flow	1821	L/min	
	Rounded Fire Flow	2000	L/min	Flow rounded to nearest 1000 L/min.
E	Occupancy Class	Combustible		
	Occupancy Charge	0%		
	Occupancy Increase or Decrease	0		
	Fire Flow	2000	L/min	No rounding applied.
F	Sprinkler Protection	None		
	Sprinkler Credit	0%		
	Decrease for Sprinkler	0	L/min	
G	*North Side Exposure*			
	Exposing Wall:	Non-combustible		Car Wash
	Exposed Wall:	Wood Frame		Townhomes
	Length of Exposed Wall:	14.4	m	
	Height of Exposed Wall:	2	storeys	
	Length-Height Factor	28.9	m-storeys	
	Separation Distance	18.81	m	
	North Side Exposure Charge	12%		
	East Side Exposure			
	Exposing Wall:	Non-combustible		Car Wash
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	0.0	m	
	Height of Exposed Wall:	0	storeys	
	Length-Height Factor	0.0	m-storeys	
	Separation Distance	46	m	
	East Side Exposure Charge	0%		
	South Side Exposure			
	Exposing Wall:	Non-combustible		Car Wash
	Exposed Wall:	Non-combustible		Gas Retail/Drive Thru
	Length of Exposed Wall:	5.4	m	
	Height of Exposed Wall:	0	storeys	
	Length-Height Factor	0.0	m-storeys	
	Separation Distance	32.22	m	Over 45 m to next structure
	South Side Exposure Charge	5%		
	West Side Exposure			
	Exposing Wall:	Non-combustible		Gas Retail/Drive Thru
	Exposed Wall:	Wood Frame		
	Length of Exposed Wall:	0.0	m	
	Height of Exposed Wall:	0	storeys	
	Length-Height Factor	0.0	m-storeys	
	Separation Distance	46	m	Over 200 m to next structure
	West Side Exposure Charge	0%		
	Total Exposure Charge	17%		The total exposure charge is below the maximum value of 75%.
	Increase for Exposures	340	L/min	
H	Fire Flow	2340	L/min	
	Rounded Fire Flow	2000	L/min	Flow rounded to nearest 1000 L/min.
City Cap	**Required Fire Flow (RFF)**	**2000**	**L/min**	
		33	**L/s**	

Fire Underwriters Survey (FUS) Fire Flow Calculations
In accordance with City of Ottawa Technical Bulletin ISTB-2018-02 dated March 21, 2018

William Rugamba

From: William Rugamba
Sent: July 15, 2024 4:00 PM
To: William Rugamba
Subject: FW: Navan Subdivision - Boundary Condition Request
Attachments: NavanSubdivision_Boundary Condition(4july2024).docx

William Rugamba, M.Eng., B.A.Sc., EIT
Civil Engineering Graduate
Ottawa, ON
Work: 343-804-4374

From: Polyak, Alex <alex.polyak@ottawa.ca>
Sent: Monday, July 15, 2024 10:12 AM
To: Mahad Musse <mmusse@jlrichards.ca>
Cc: Karla Ferrey <kferrey@jlrichards.ca>; Raad Akrawi <rakrawi@groupeheafey.com>; Carmine Zayoun <carmine@zayoungroup.com>; Armstrong, Justin <justin.armstrong@ottawa.ca>; Tatyana Roumie <troumie@jlrichards.ca>
Subject: RE: Navan Subdivision - Boundary Condition Request

Good morning Mahad,

Please find the boundary conditions attached.

Regards,

Oleksandr (Alex) Polyak, B.Eng., C.E.T., P.Eng.
Project Manager, Infrastructure Approvals, Development Review East Branch | Gestionnaire de projet, Direction de l'examen des projets d'aménagement – Est.
Planning, Development and Building Services Department (PDBS) | Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB

City of Ottawa | Ville d'Ottawa
110 Laurier Ave., 4th Fl East, Ottawa ON K1P 1J1
Email: alex.polyak@ottawa.ca
Cell : 613-857-4380
www.Ottawa.ca

From: Mahad Musse <mmusse@jlrichards.ca>
Sent: July 12, 2024 1:31 PM
To: Polyak, Alex <alex.polyak@ottawa.ca>
Cc: Karla Ferrey <kferrey@jlrichards.ca>; Raad Akrawi <rakrawi@groupeheafey.com>; Carmine Zayoun <carmine@zayoungroup.com>; Armstrong, Justin <justin.armstrong@ottawa.ca>; Tatyana Roumie <troumie@jlrichards.ca>
Subject: RE: Navan Subdivision - Boundary Condition Request

Hi Alex,

Just wondering if you have a status update for the boundary conditions for Navan.

Thanks
Mahad

Mahad Musse, B.Eng., EIT
Civil Engineering Graduate

1000-343 Preston Street
Ottawa, ON, K1S 1N4

Work: 343-633-1501
mmusse@jlrichards.ca

From: Mahad Musse <mmusse@jlrichards.ca>
Sent: Wednesday, July 3, 2024 11:02 AM
To: Polyak, Alex <alex.polyak@ottawa.ca>
Cc: Karla Ferrey <kferrey@jlrichards.ca>; Raad Akrawi <rakrawi@groupeheafey.com>; Carmine Zayoun <carmine@zayoungroup.com>; Armstrong, Justin <justin.armstrong@ottawa.ca>; Tatyana Roumie <troumie@jlrichards.ca>
Subject: RE: Navan Subdivision - Boundary Condition Request

Good morning Alex,

As we discussed last week our Client is looking into the option of converting the row townhouse units into duplex units (townhouse units with apartments in the basement). As a result, this will increase the total demand on the site and we will therefore require new water boundary conditions. We'd like to note that the footprint of the blocks will not change and neither will their layout or any of the offsets.

As a summary:

- Domestic demands were calculated based on a daily consumption rate of 280 L/cap/day with peaking factors consistent with City of Ottawa Guidelines
- Required Fire Flow (RFF) was calculated in accordance to the Fire Underwriters Survey (FUS) Water Supply for Public Fire Protection and the City of Ottawa FUS protocol (Bulletin ISDTB-2014-02 & Bulletin ISDTB-2018-02), which considers material, expose distance & height. We have attached the calculation spreadsheet and the figure.

We request boundary conditions under high pressure, peak hour, and maximum day + fire flow conditions (for each of the below fire flows). Domestic demand and fire flow calculations are attached. Please provide the boundary conditions at the proposed connection locations as shown in the attached figure.

Average Day Demand: 6.74 L/s
Maximum Day Demand: 10.53 L/s
Peak Hour Demand: 18.17 L/s
Required Fire Flow (per FUS): 6,000 L/min (100 L/s)
Required Fire Flow (per FUS): 10,000 L/min (167 L/s)
Required Fire Flow (per FUS): 14,000 L/min (233 L/s)
Required Fire Flow (per FUS): 15,000 L/min (250 L/s)

For your reference, the previous boundary condition received from the City is attached and below is the email chain.

If you have any questions or comments please let us know.

Thanks
Mahad

Mahad Musse, B.Eng., EIT
Civil Engineering Graduate

1000-343 Preston Street
Ottawa, ON, K1S 1N4

Work: 343-633-1501
mmusse@jlrichards.ca

From: Polyak, Alex <alex.polyak@ottawa.ca>
Sent: Thursday, August 17, 2023 3:01 PM
To: William Rugamba <wrugamba@jlrichards.ca>
Cc: Karla Ferrey <kferrey@jlrichards.ca>; Raad Akrawi <rakrawi@groupeheafey.com>; Carmine Zayoun <carmine@zayoungroup.com>; Shahira Jalal <sjalal@jlrichards.ca>
Subject: RE: Navan Subdivision - Boundary Condition Request

Hello William,

Sorry that I missed your call, I was in a meeting. The boundary conditions are attached.

Regards,

Oleksandr (Alex) Polyak, B.Eng., P.Eng
Project Manager, Infrastructure Approvals, Development Review East Branch | Gestionnaire de projet, Direction de l’examen des projets d’aménagement – Est.
Planning, Real Estate and Economic Development Department | Direction générale de la planification, des biens immobiliers et du développement économique

City of Ottawa | Ville d'Ottawa
110 Laurier Ave., 4th Fl East, Ottawa ON K1P 1J1
Email: alex.polyak@ottawa.ca
Cell : 613-857-4380
www.Ottawa.ca

From: William Rugamba <wrugamba@jlrichards.ca>
Sent: August 15, 2023 9:26 AM
To: Polyak, Alex <alex.polyak@ottawa.ca>
Cc: Karla Ferrey <kferrey@jlrichards.ca>; Raad Akrawi <rakrawi@groupeheafey.com>; Carmine Zayoun <carmine@zayoungroup.com>; Shahira Jalal <sjalal@jlrichards.ca>
Subject: RE: Navan Subdivision - Boundary Condition Request

Good morning Alex,

Just wanted to follow up on the status of this boundary request. Please let me know if you need anything else from us.

Thanks,
William

William Rugamba, M.Eng.
Civil Engineering Intern

J.L. Richards & Associates Limited
1000-343 Preston Street, Ottawa, ON K1S 1N4
Direct: 343-804-4374

J.L. Richards & Associates Limited
ENGINEERS • ARCHITECTS • PLANNERS

From: Tatyana Roumie
Sent: Tuesday, July 25, 2023 3:53 PM
To: 'alex.polyak@ottawa.ca' <alex.polyak@ottawa.ca>
Cc: Karla Ferrey <kferrey@jlrichards.ca>; Raad Akrawi <rakrawi@groupeheafey.com>; carmine@zayoungroup.com; Shahira Jalal <sjalal@jlrichards.ca>
Subject: Navan Subdivision - Boundary Condition Request

Hello Alex.

To support our upcoming detailed design for the site, we are requesting updated boundary conditions for the 3079 Navan Road Development.

As a brief history, we received boundary conditions from the City in July 2021 (attached, but with incorrect connection locations) and again in April 2022 (also attached) in support of the functional servicing design. We understand from the April 2022 boundary conditions that the maximum available fire flow for the site is 250 L/s.

We are currently requesting updated boundary conditions for this site as we are commencing the detailed servicing design and this request will accommodate the recent site plan changes and proposed connection points. This request is also applicable to the upcoming site plan designs which will be submitted as separate applications.

We request boundary conditions under high pressure, peak hour, and maximum day + fire flow conditions (for each of the below fire flows). Domestic demand and fire flow calculations are attached. Please provide the boundary conditions at the proposed connection locations as shown in the attached figure.

Average Day Demand: 6.44 L/s
Maximum Day Demand: 9.77 L/s
Peak Hour Demand: 16.50 L/s
Required Fire Flow (per FUS): 6,000 L/min (100 L/s)
Required Fire Flow (per FUS): 10,000 L/min (167 L/s)
Required Fire Flow (per FUS): 14,000 L/min (233 L/s)
Required Fire Flow (per FUS): 15,000 L/min (250 L/s)

Thanks,
Tatyana

'

'

'

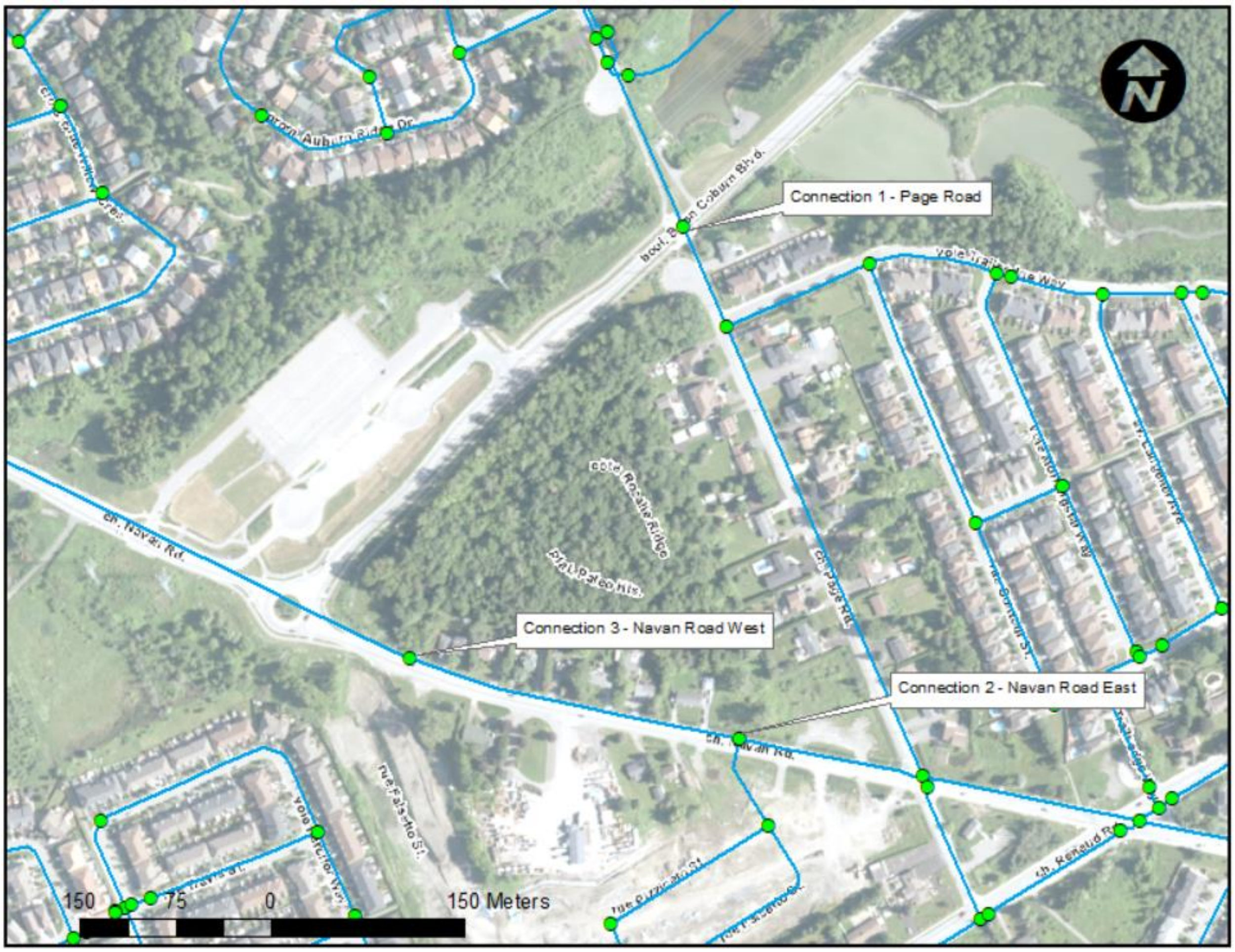
'

Boundary Conditions
Navan Subdivision

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	404	6.74
Maximum Daily Demand	632	10.53
Peak Hour	1,090	18.17
Fire Flow Demand #1	6,000	100.00
Fire Flow Demand #2	10,000	166.67
Fire Flow Demand #3	14,000	233.33
Fire Flow Demand #4	15,000	250.00

Location



Results

Connection 1 - Page Road

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.7	64.0
Peak Hour	127.0	58.6
Max Day plus Fire Flow #1	128.2	60.4
Max Day plus Fire Flow #2	126.8	58.3
Max Day plus Fire Flow #3	124.9	55.7
Max Day plus Fire Flow #4	124.4	55.0
[1] Ground Elevation =	85.7	m

Connection 2 - Navan Road East

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.7	71.4
Peak Hour	126.8	65.9
Max Day plus Fire Flow #1	127.7	67.1
Max Day plus Fire Flow #2	125.5	64.1
Max Day plus Fire Flow #3	122.7	60.1
Max Day plus Fire Flow #4	121.9	58.9
[1] Ground Elevation =	80.5	m

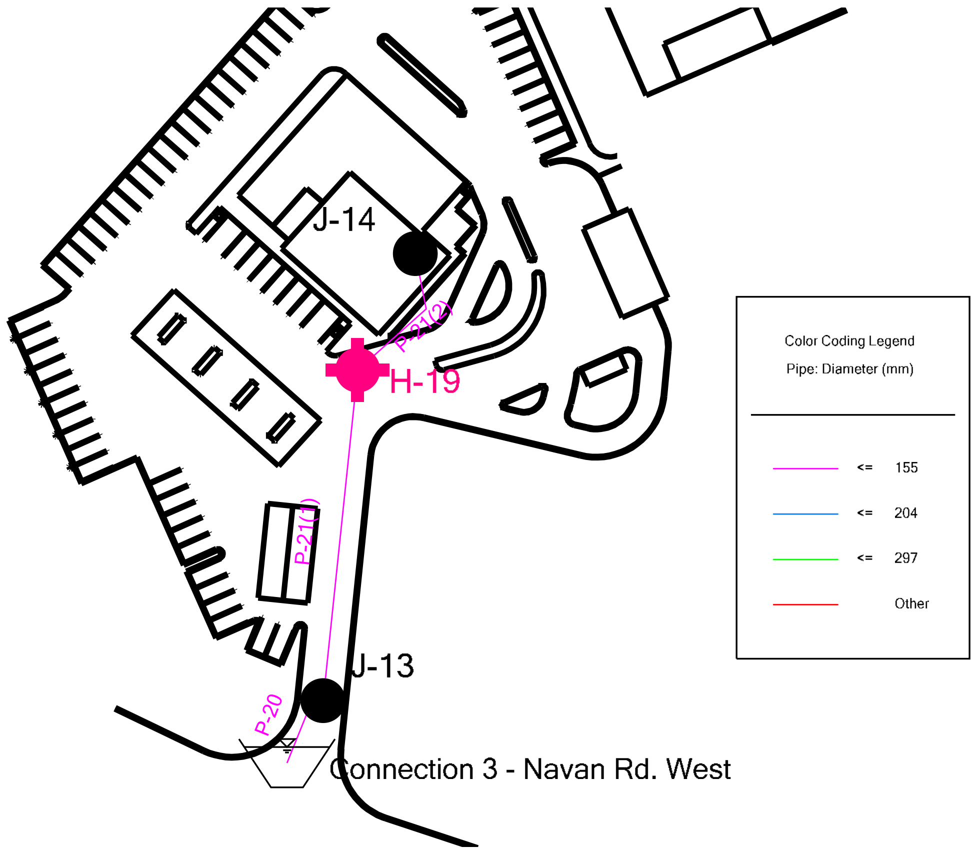
Connection 3 - Navan Road West

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	130.7	69.3
Peak Hour	126.8	63.8
Max Day plus Fire Flow #1	127.3	64.5
Max Day plus Fire Flow #2	124.6	60.6
Max Day plus Fire Flow #3	120.9	55.3
Max Day plus Fire Flow #4	119.8	53.8
[1] Ground Elevation =	81.9	m

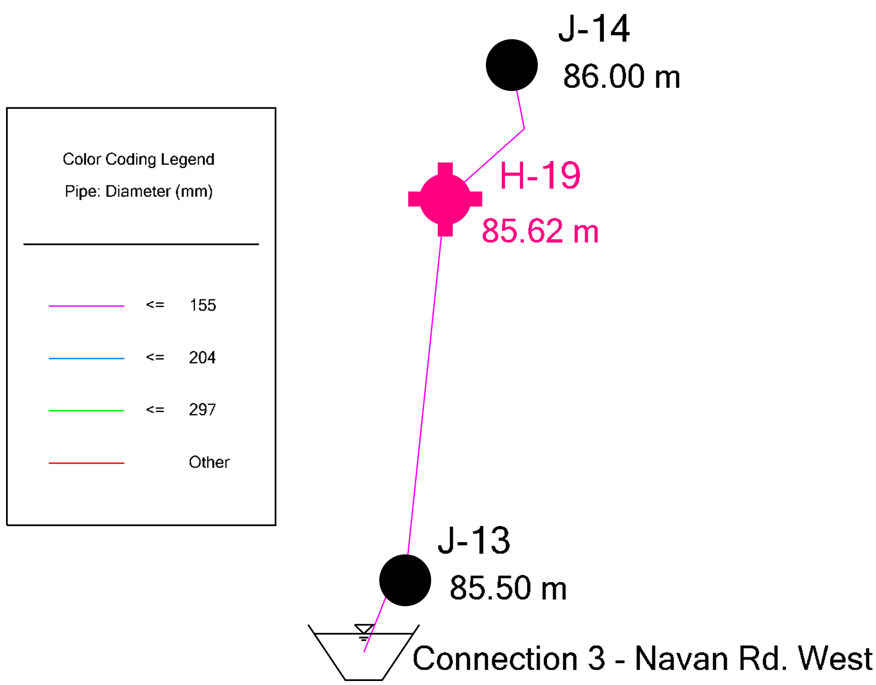
Disclaimer

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.

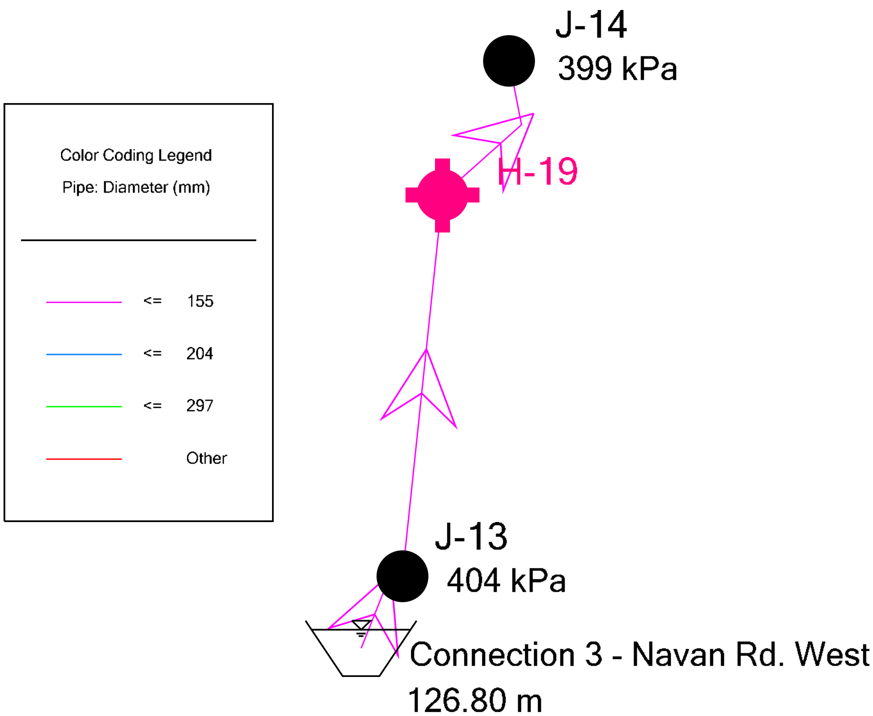
Gas Bar, Commercial Building, and Car Wash (Block 16)
Model Schematic



Gas Bar, Commercial Building, and Car Wash (Block 16)
Model Schematic
Elevation Model



Gas Bar, Commercial Building, and Car Wash (Block 16)
Peak Hour Demand



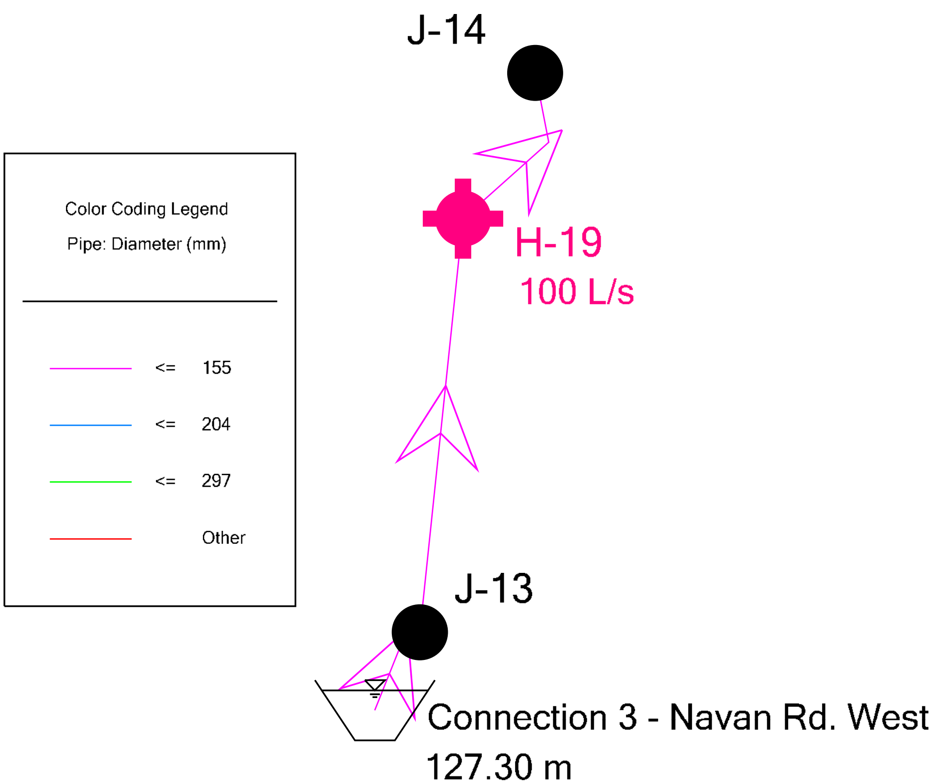
Gas Bar, Commercial Building, and Car Wash (Block 16)
Peak Hour Demand
Junction Table

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-14	86.00	4.27	126.74	399
J-13	85.50	0.00	126.79	404

Gas Bar, Commercial Building, and Car Wash (Block 16)
Peak Hour Demand
Pipe Table

ID	Label	Length (Scaled) (m)	Diameter (mm)	Material	Hazen-Williams C	Flow (L/s)	Velocity (m/s)
61	P-20	11	155	PVC	100.0	4.27	0.23
175	P-21(1)	49	155	PVC	100.0	4.27	0.23
176	P-21(2)	22	155	PVC	100.0	4.27	0.23

Gas Bar, Commercial Building, and Car Wash (Block 16)
Max Day + Fire Flow Requirement

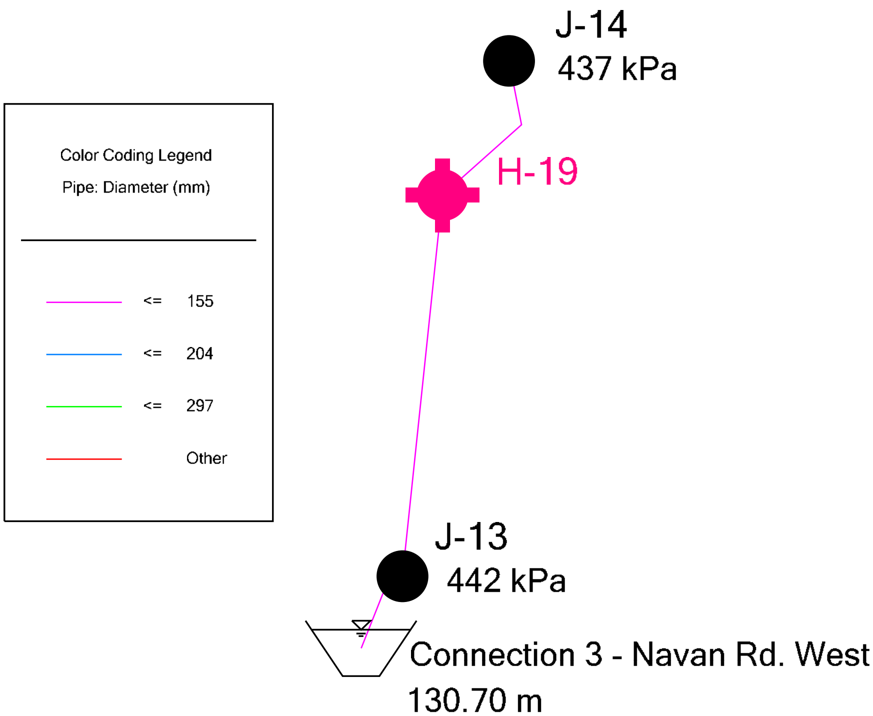


Gas Bar, Commercial Building, and Car Wash (Block 16)

Max Day + Fire Flow Requirement

Label	Satisfies Fire Flow Constraints?	Fire Flow (Available) (L/s)	Flow (Total Available) (L/s)	Pressure (Residual Lower Limit) (kPa)	Pressure (Calculated Residual) (kPa)	Pressure (Calculated System Lower Limit) (kPa)	Junction w/ Minimum Pressure (System)
H-19	True	100	100	140	224	238	J-14

Gas Bar, Commercial Building, and Car Wash (Block 16)
Maximum Pressure Analysis



Gas Bar, Commercial Building, and Car Wash (Block 16)

Maximum Pressure Analysis

Junction Table

Label	Elevation (m)	Demand (L/s)	Hydraulic Grade (m)	Pressure (kPa)
J-14	86.00	0	130.70	437
J-13	85.50	0	130.70	442

Gas Bar, Commercial Building, and Car Wash (Block 16)
Maximum Pressure Analysis
Pipe Table

ID	Label	Length (Scaled) (m)	Diameter (mm)	Material	Hazen-Williams C	Flow (L/s)	Velocity (m/s)
61	P-20	11	155	PVC	100.0	0	0.00
175	P-21(1)	49	155	PVC	100.0	0	0.00
176	P-21(2)	22	155	PVC	100.0	0	0.00

Appendix D

Sanitary Design Sheet

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

2983, 3053 and 3079 Navan Road and 2690 Page Road
CONCEPTUAL SANITARY SEWER DESIGN SHEET
JLR NO. 29899-002

Street Name	MH No.		Residential								Commercial/Institutional					Infiltration			Peak Design Flow L/s
	From	To	Multiples	Apartments	Area (ha)	Pop.	Cum. Pop.	Cum. Area (ha)	Peaking Factor	Residential Flow (L/s)	Area (ha)	Cum. Area (ha)	Peaking Factor	Inst. Flow (L/s)	Plug Flow (L/s)	Area (ha)	Cum. Area (ha)	Peak Extr. Flow L/s	
GAS STATION	GAS BAR	22			0.00	0	0	0.00	3.80	0.00	0.77	0.77	1.50	0.37		0.77	0.77	0.25	0.63
GAS STATION	CAR WASH	22			0.00	0	0	0.00	3.80	0.00		0.00	1.50	0.00	3.60	0.00	0.00	0.00	**3.60**
GAS STATION TO EXISTING STUB	22	STUB 16			0.00	0	0	0.00	3.80	0.00		0.77	1.50	0.37	3.60	0.00	0.77	0.25	**4.23**
EXISTING STUB TO PALEO DRIVE	STUB 16	21			0.04	0	0	0.04	3.80	0.00		0.77	1.50	0.37	3.60	0.04	0.81	0.27	4.24
			0	0	0.00	0													

Street Name	Pipe Data									Upstream Geometry				Downstream Geometry				
	Dia	Type	Actual Diameter	Slope	Q Full (L/s)	V Full	Length	Residual Capacity	% Full	TG From	Obvert	Invert	Cover	TG TO	Drop	Obvert	Invert	Cover
GAS STATION	200	Circular	203.20	1.00%	34.22	1.06	27.26	33.59	2%	86.000	83.369	83.165	2.631	85.590	0.510	83.096	82.893	2.494
GAS STATION	200	Circular	203.20	1.00%	34.22	1.06	5.91	30.62	11%	85.770	82.705	82.502	3.065	85.590	0.060	82.646	82.443	2.944
GAS STATION TO EXISTING STUB	200	Circular	203.20	0.65%	27.59	0.85	2.02	23.36	15%	85.590	82.586	82.383	3.004	85.350		82.573	82.370	2.777
EXISTING STUB TO PALEO DRIVE	200	Circular	203.20	0.65%	27.59	0.85	38.75	23.34	15%	85.350	82.573	82.370	2.777	85.041		82.321	82.118	2.720

Design Parameters		
Single Family Population	3.4	Cap/Unit
Semi-Detached/Townhouse Population	2.7	Cap/Unit
Apartments Population	1.8	Cap/Unit
Residential Flows	280	L/Cap/Day
Infiltration Flows	0.33	L/s/ha
Correction Factor	0.8	-
Commercial Peak Factor	1.5	-
Institutional/Commercial Average Flow	28000	L/gross ha/d
Manning Coefficient	0.013	

![J.L.Richards logo] J.L.Richards ENGINEERS · ARCHITECTS · PLANNERS

2983, 3053 and 3079 Navan Road and 2690 Page Road
CONCEPTUAL SANITARY SEWER DESIGN SHEET
JLR NO. 29899-002

DESIGNED BY: TR
CHECKED BY: KF
Date: September 2023

Street Name	MH No. From	MH No. To	Residential: Multiples	Residential: Apartments	Residential: Area (ha)	Residential: Pop.	Residential: Cum. Pop.	Residential: Cum. Area (ha)	Residential: Peaking Factor	Residential: Residential Flow (L/s)	Commercial/Institutional: Area (ha)	Commercial/Institutional: Cum. Area (ha)	Commercial/Institutional: Peaking Factor	Commercial/Institutional: Inst. Flow (L/s)	Commercial/Institutional: Plug Flow (L/s)	Park/Roads: Area (ha)	Park/Roads: Cum. Area (ha)	Plug Flow (L/s)	Infiltration: Area (ha)	Infiltration: Cum. Area (ha)	Infiltration: Peak Extr. Flow L/s	Peak Design Flow L/s
OUTLET TO PAGE (CUL-DU-SAC @ Brian Coburn)																						
STOMPIN' TOM LANE	24	23A	8	8	0.25	36	36	0.25	3.67	0.43		0.00	1.50	0.00			0.00		0.25	0.25	0.08	**0.59**
STOMPIN' TOM LANE	23A	23				0	36	0.25	3.67	0.43		0.00	1.50	0.00			0.00		0.00	0.25	0.08	**0.59**
Page Road (2690 to Navan Road)	23	EX10			5.94	81	117	6.19	3.58	1.36		0.00	1.50	0.00			0.00		5.94	6.19	2.04	3.40
OUTLET TO PAGE @ NAVAN																						
Site Plan - BLOCK 15	SAN STUB 15	13		83	0.45	149	149	0.45	3.55	1.72	0.09	0.09	1.50	0.05			0.00		0.54	0.54	0.18	1.94
PALEO DRIVE	13	12			0.14	0	149	0.59	3.55	1.72		0.09	1.50	0.05			0.00		0.14	0.68	0.22	1.99
Easement - BLOCK 12	SAN STUB 16	21			0.04	0	0	0.04	3.80	0.00	0.77	0.77	1.50	0.37	3.60		0.00		0.81	0.81	0.27	4.24
Easement- BLOCK 12	21	12				0	0	0.00	3.80	0.00		0.77	1.50	0.37	3.60		0.00		0.00	0.81	0.27	4.24
PALEO DRIVE	12	11	6	6	0.23	27	176	0.82	3.53	2.02		0.86	1.50	0.42	3.60		0.00		0.23	1.72	0.57	6.60
PALEO DRIVE	11	10	3	3	0.16	14	190	0.98	3.52	2.17		0.86	1.50	0.42	3.60		0.00		0.16	1.88	0.62	6.81
PALEO DRIVE	10	09	12	12	0.39	54	244	1.37	3.49	2.76		0.86	1.50	0.42	3.60	0.20	0.20		0.59	2.47	0.82	7.60
Site Plan - BLOCK 14	SAN STUB 14	17		84	0.48	151	151	0.48	3.55	1.74	0.09	0.09	1.50	0.05			0.00		0.57	0.57	0.19	1.97
ROSALIA STREET	17	16	31	31	0.95	140	291	1.43	3.47	3.27		0.09	1.50	0.05			0.00		0.95	1.52	0.50	3.82
ROSALIA STREET	16	09	2	2	0.07	9	300	1.50	3.46	3.37		0.09	1.50	0.05			0.00		0.07	1.59	0.52	3.94
PALEO DRIVE	09	08	5	5	0.15	23	567	3.01	3.36	6.17		0.96	1.50	0.46	3.60		0.20		0.15	4.21	1.39	11.62
PALEO DRIVE	08	07			0.25	0	567	3.26	3.67	6.75		0.96	1.50	0.46	3.60		0.20		0.25	4.46	1.47	12.29
PALEO DRIVE	07	06				0	567	3.26	3.36	6.17		0.96	1.50	0.46	3.60		0.20		0.00	4.46	1.47	11.70
PALEO DRIVE	06	03				0	567	3.26	3.36	6.17		0.96	1.50	0.46	3.60		0.20		0.00	4.46	1.47	11.70
Site Plan - BLOCK 17	SAN STUB 17	03		96	0.56	173	173	0.56	3.54	1.98		0.00	1.50	0.00			0.00		0.56	0.56	0.18	2.17
PALEO DRIVE	03	02			0.07	0	740	3.89	3.30	7.92		0.96	1.50	0.46	3.60		0.20		0.07	5.09	1.68	**13.67**
NAVAN ROAD	02	01				0	740	3.89	3.30	7.92		0.96	1.50	0.46	3.60		0.20		0.00	5.09	1.68	13.67
NAVAN ROAD	01	EX10			5.82	174	914	9.71	3.26	9.66		0.96	1.50	0.46	3.60		0.20		5.82	10.91	3.60	17.32
																				10.67		
Page Road (Navan to Renaud)	EX10	Renaud					1031	15.90	3.23	10.80		0.96	1.50	0.46	4.00		0.20		0.00	17.10	5.64	20.91
																				16.86		
			67	330	5.34	776					0.96								17.10			
																			ok			

Street Name	MH No. From	MH No. To	Pipe Data: Dia	Type	Actual Diameter	Slope	Q Full (L/s)	V Full	Length	Residual Capacity	% Full	Upstream Geometry: TG From	Obvert	Invert	Cover	Downstream Geometry: TG TO	Drop	Obvert	Invert	Cover	Self-Cleansing Velocities: Qp/Qf Ratio	Flow Depth (mm)	Actual Velocity (m/s)	Flow Depth to Diameter Ratio (d/D)
STOMPIN' TOM LANE	24	23A	200	Circular	203.20	2.00%	48.39	1.49	54.95	47.80	1%	85.698	83.493	83.290	2.205	85.346		82.394	82.191	2.952	0.01	15.65	0.51	0.08
STOMPIN' TOM LANE	23A	23	200	Circular	203.20	2.00%	48.39	1.49	11.18	47.80	1%	85.346	82.394	82.191	2.952	85.350	0.300	82.170	81.967	3.179	0.01	15.65	0.51	0.08
Site Plan - BLOCK 15	SAN STUB 15	13	250	Circular	254.00	1.50%	75.98	1.50	13.47	74.04	3%	85.000	82.366	82.112	2.634	85.065	0.259	82.164	81.910	2.901	0.03	27.94	0.64	0.11
PALEO DRIVE	13	12	200	Circular	203.20	1.20%	37.48	1.16	5.15	35.50	5%	85.065	81.905	81.702	3.160	84.982		81.843	81.640	3.138	0.05	31.70	0.61	0.16
Easement - BLOCK 12	SAN STUB 16	21	200	Circular	203.20	0.65%	27.59	0.85	38.75	23.34	15%	85.350	82.574	82.370	2.776	85.041		82.322	82.118	2.719	0.15	53.85	0.62	0.27
Easement- BLOCK 12	21	12	200	Circular	203.20	0.60%	26.50	0.82	13.09	22.26	16%	85.041	82.322	82.118	2.719	84.982	0.400	82.243	82.040	2.738	0.16	54.86	0.60	0.27
PALEO DRIVE	12	11	200	Circular	203.20	0.50%	24.19	0.75	37.41	17.59	27%	84.982	81.843	81.640	3.138	84.909		81.656	81.453	3.253	0.27	72.34	0.63	0.36
PALEO DRIVE	11	10	200	Circular	203.20	0.50%	24.19	0.75	10.53	17.38	28%	84.909	81.656	81.453	3.253	84.935		81.603	81.400	3.332	0.28	73.56	0.64	0.36
PALEO DRIVE	10	09	200	Circular	203.20	0.55%	25.40	0.78	81.88	17.80	30%	84.935	81.603	81.400	3.332	84.248	0.321	81.152	80.949	3.096	0.30	76.00	0.68	0.37
Site Plan - BLOCK 14	SAN STUB 14	17	200	Circular	203.20	1.50%	41.91	1.29	8.26	39.94	5%	84.600	82.437	82.234	2.163	84.945	0.060	82.313	82.110	2.632	0.05	29.87	0.66	0.15
ROSALIA STREET	17	16	200	Circular	203.20	0.86%	31.79	0.98	111.68	27.97	12%	84.945	82.253	82.050	2.692	84.030	0.201	81.289	81.086	2.741	0.12	47.35	0.66	0.23
ROSALIA STREET	16	09	200	Circular	203.20	0.66%	27.80	0.86	16.49	23.86	14%	84.030	81.088	80.885	2.942	84.248	0.148	80.979	80.776	3.269	0.14	51.61	0.61	0.25
PALEO DRIVE	09	08	200	Circular	203.20	0.35%	20.24	0.62	25.46	8.62	57%	84.248	80.831	80.628	3.417	83.267	0.100	80.742	80.539	2.525	0.57	110.34	0.65	0.54
PALEO DRIVE	08	07	200	Circular	203.20	0.35%	20.24	0.62	14.54	7.96	61%	83.267	80.642	80.439	2.625	82.688		80.591	80.388	2.097	0.61	114.20	0.65	0.56
PALEO DRIVE	07	06	200	Circular	203.20	0.35%	20.10	0.62	19.95	8.39	58%	82.688	80.591	80.388	2.097	82.496	0.300	80.522	80.319	1.974	0.58	111.35	0.64	0.55
PALEO DRIVE	06	03	200	Circular	203.20	0.36%	20.39	0.63	22.88	8.68	57%	82.496	80.222	80.019	2.274	82.456	0.404	80.141	79.938	2.315	0.57	110.34	0.65	0.54
Site Plan - BLOCK 17	SAN STUB 17	03	200	Circular	203.20	1.50%	41.91	1.29	10.30	39.74	5%	82.800	79.952	79.749	2.848	82.456	0.060	79.797	79.594	2.659	0.05	31.29	0.68	0.15
PALEO DRIVE	03	02	200	Circular	203.20	0.33%	19.75	0.61	57.98	6.08	69%	82.456	79.737	79.534	2.719	81.831	0.070	79.544	79.341	2.287	0.69	124.16	0.66	0.61
NAVAN ROAD	02	01	200	Circular	203.20	0.35%	20.24	0.62	114.96	6.57	68%	81.831	79.474	79.271	2.357	81.523		79.072	78.868	2.451	0.68	122.12	0.67	0.60
NAVAN ROAD	01	EX10	200	Circular	203.20	0.55%	25.38	0.78	45.18	8.05	68%	81.523	79.072	78.868	2.451	81.585		78.823	78.620	2.761	0.68	123.14	0.84	0.61
Page Road (Navan to Renaud)	EX10	Renaud	250	Circular	254.00	0.74%	53.19	1.05	106.80	32.28	39%										0.39	110.49	0.99	0.44

Design Parameters		
Single Family Population	3.4	Cap/Unit
Semi-Detached/Townhouse Population	2.7	Cap/Unit
Apartments Population	1.8	Cap/Unit
Residential Flows	280	L/Cap/Day
Infiltration Flows	0.33	L/s/ha
Correction Factor	0.8	-
Commercial Peak Factor	1.5	-
Institutional/Commercial Average Flow	28000	L/gross ha/d
Manning Coefficient	0.013	

PER EUC Area 13A: 6.60
Area 13B: 10.50
Total: 17.10

Subdivision Area = 3.86 ha
Site Plans Areas = 1.48 ha
Subdivision + Site Plan Areas = 5.34 ha
EUC Areas = 11.76 ha
Total Area = 17.10 ha

Note: 5.34 ha is total draft plan area + additional flows on stompin' tom lane

Sanitary Inv Ex MH 13 Page Rd	81.13
Sanitary Inv Ex MH 14 Page Rd	81.83
Sanitary Inv at Ex MH 10 Page @ Navan	78.620

Friday, August 16, 2024

J. L. Richards
1000-343 Preston St.
Ottawa, Ontario, K1S 1N4

Attn: W. Rugamba

Re: 2983 Navan Road, Ontario - Gas Bar-Commercial-QM&E Project # 23-047 Confirmations

Dear William,

This letter serves as confirmation of items you sent by e-mail August 12, 2024.

1. Maximum domestic water flow rate is 57 gpm (3.60 L/s).
2. That quantity was arrived at by referring to data provided by the client's car wash specialist.
3. The design of the oil interceptor has been completed, it will be located entirely withing the walls of the car wash building.

Please do not hesitate to contact us should you have any questions or comments.

Yours truly,

C. W. Clark, P.Eng
QM&E Engineering
CC: by you to whom it may concern

Appendix E

Storm Design Sheet

JLR NO. 29899-002 (NAVAN BLOCK 14)

PIPE REACH			Peak Flow Estimation												
			C-Factor (1:2							1:2 Year Storm (RATIONAL METHOD)				Plug Flows	
LOCATION	From MH	To MH	0.20	0.90	Total Area (ha)	Cum. Total Area (ha)	Inlet Time (min.)	In Pipe Flow Time (min)	Total Time	2.78AR	Cum. 2.78AR	1:2 Year Intensity (mm/hr)	1:2 Year Peak Flow (L/s)	Orifice Flow (1) MH518 (L/s)	Total Peak Flow (5) (L/s)
GAS STATION	MH520	MH519	0.055	0.265	0.32	0.32	**10.00**	0.75	**10.75**	0.69	0.69	76.81	53.33		**53.33**
GAS STATION	MH519	MH518			0.00	0.32	**10.75**	0.38	**11.12**	0.00	0.69	74.05	51.41		**51.41**
GAS STATION	MH522	MH521	0.066	0.168	0.23	0.23	**10.00**	0.53	**10.53**	0.46	0.46	76.81	35.15		**35.15**
GAS STATION	MH521	MH518	0.030	0.149	0.18	0.41	**10.53**	0.38	**10.91**	0.39	0.85	74.83	63.33		**63.33**
GAS STATION	MH518	MH518A	0.021	0.016	0.04	0.77	**11.12**	0.29	**11.41**	0.05	1.59	72.74	115.83	66.14	**66.14**
EAST ORLEANS RIDGE SUBDIVISION	EXST MH518A	EXST MH514 (8)	Refer to Note 8			1.07	**11.41**	0.83	**12.24**	2.29	2.29	71.78	164.59	Refer to Note 8	

LOCATION	Sewer Data									Upstream Geometry				Downstream Geometry					Self Cleansing Velocities			
	Type	Nominal Dia. (mm)	Actual Dia. (mm)	Slope	Length (m)	Q Full (L/s)	V Full (m/s)	Residual Capacity (6) (L/s)	% Full	TG From	Obvert	Invert	Cover	TG To	Drop	Obvert	Invert	Cover	Q/Qf Ratio	Flow Depth (mm)	Actual Velocity (7) (m/s)	Flow Depth to Dia. Ratio (d/D)
GAS STATION	CONCRETE	525	533.40	0.40%	57.15	284.46	1.27	**231.14**	**19%**	85.374	83.320	82.787	2.05	85.709	0.060	83.090	82.557	2.62	0.19	156.29	0.98	0.29
GAS STATION	CONCRETE	525	533.40	0.50%	31.97	317.25	1.42	**265.84**	**16%**	85.709	83.030	82.497	2.68	85.468	1.052	82.871	82.337	2.60	0.16	145.08	1.04	0.27
GAS STATION	CONCRETE	525	533.40	0.50%	45.09	317.25	1.42	**282.10**	**11%**	85.505	83.016	82.482	2.49	85.630		82.790	82.257	2.84	0.11	119.48	0.93	0.22
GAS STATION	CONCRETE	525	533.40	0.35%	27.21	265.81	1.19	**202.48**	**24%**	85.630	82.790	82.257	2.84	85.468	0.876	82.695	82.161	2.77	0.24	177.09	0.98	0.33
GAS STATION	CONCRETE	450	457.20	0.25%	15.62	148.72	0.91	**32.89**	**78%**	85.468	81.819	81.361	3.65	85.591	0.300	81.780	81.322	3.81	0.44	213.51	0.88	0.47
EAST ORLEANS RIDGE SUBDIVISION	**CONCRETE**	**525**	533.40	0.25%	50.21	224.33	1.00	**59.74**	**73%**	85.400	81.480	80.946	3.92	84.620		81.354	80.821	3.27	Refer to Note 8			

Design Parameters (Per OSDG)	
Manning's Coefficient =	0.013
1:2 Year Intensity =	732.951 / (Tc + 6.199)^0.810

Note: Tc is the time of concentration in minutes

Drainage Areas Breakdown	
Total Site Area:	0.77 ha
Controlled Area Within Site Property Line:	0.77 ha →
Existing Navan Rd Rear-Yard Area Captured Within Site:	0.05 ha
Block 15 Rear-Yard area captured in 518A -514:	0.07 ha
Subdivision Block 11 Rear-Yard Area in 518A-514:	0.14
Existing Navan Rd Rear-Yard Area Captured in 518A-514:	0.04
Total Captured Areas:	1.07
Uncontrolled Area - Outlet to Subdivision:	0.00 ha →

Notes on Plug Flows

(1) Orifice Flow Rate from Block 16

Notes on Peak Flow and Pipe Sizing

(5) Peak flows are lower than the allowable release rate for Block 16 (68 L/s)

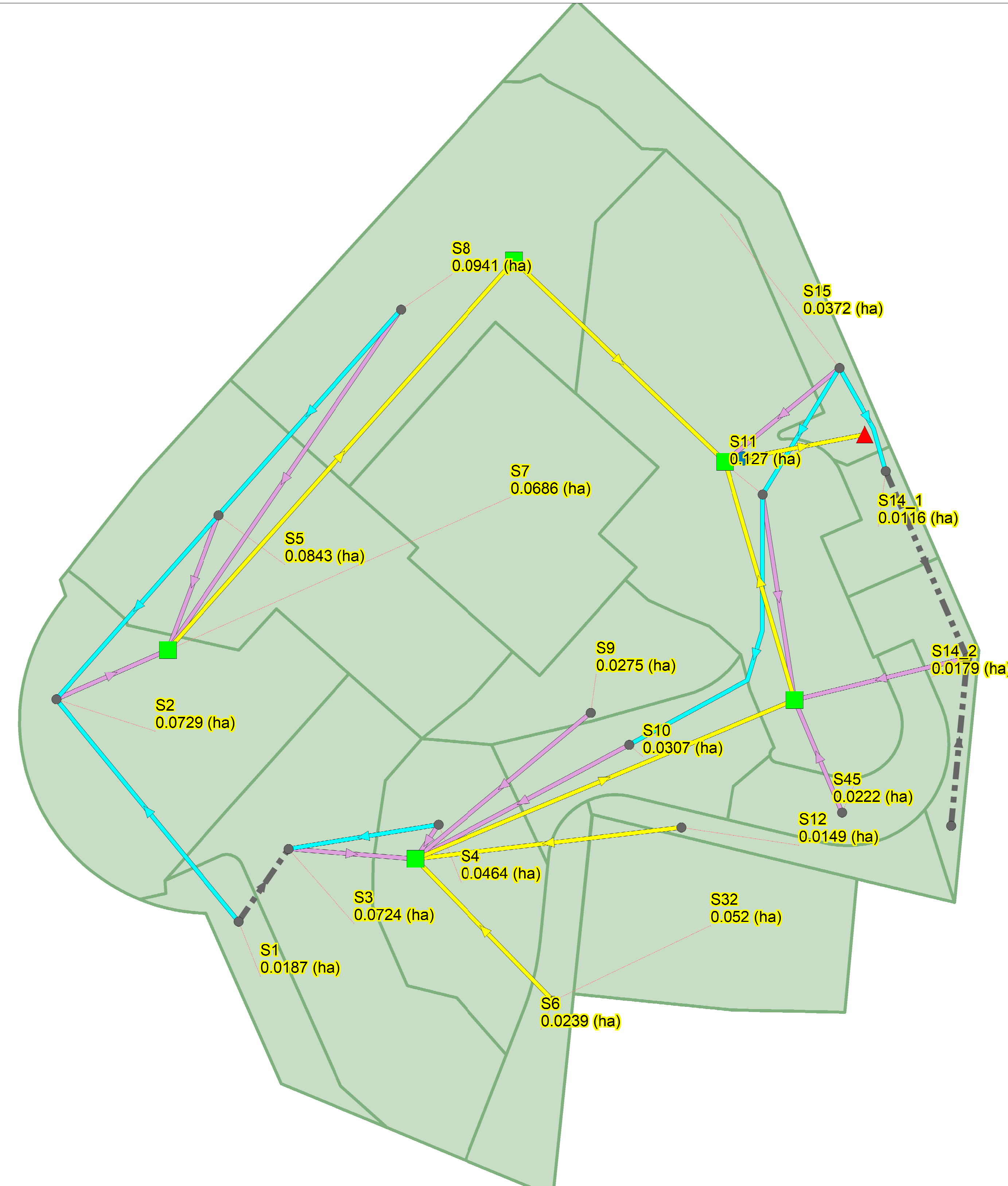
(6) Pipes are conservatively sized for 1:2 Year Peak Flow Rate

(7) Actual Velocities based on actual peak flows from Note 5

(8) Details from Existing Sewers Downstream of EXST MH518A (referred to as STUB 16) can be found within East Orleans Ridge Subdivision Design Sheet. This line is only used to carry over the downstream values for time of concentration and 1:2 year peak flow

Appendix F

Stormwater Management



Legend

Junctions
Outfalls
Storages
Manholes
Manholes

Conduits
Storm Sewers
Storm Sewers
Weirs
Outlets
Subcatchments

N

150 m

PROJECT:

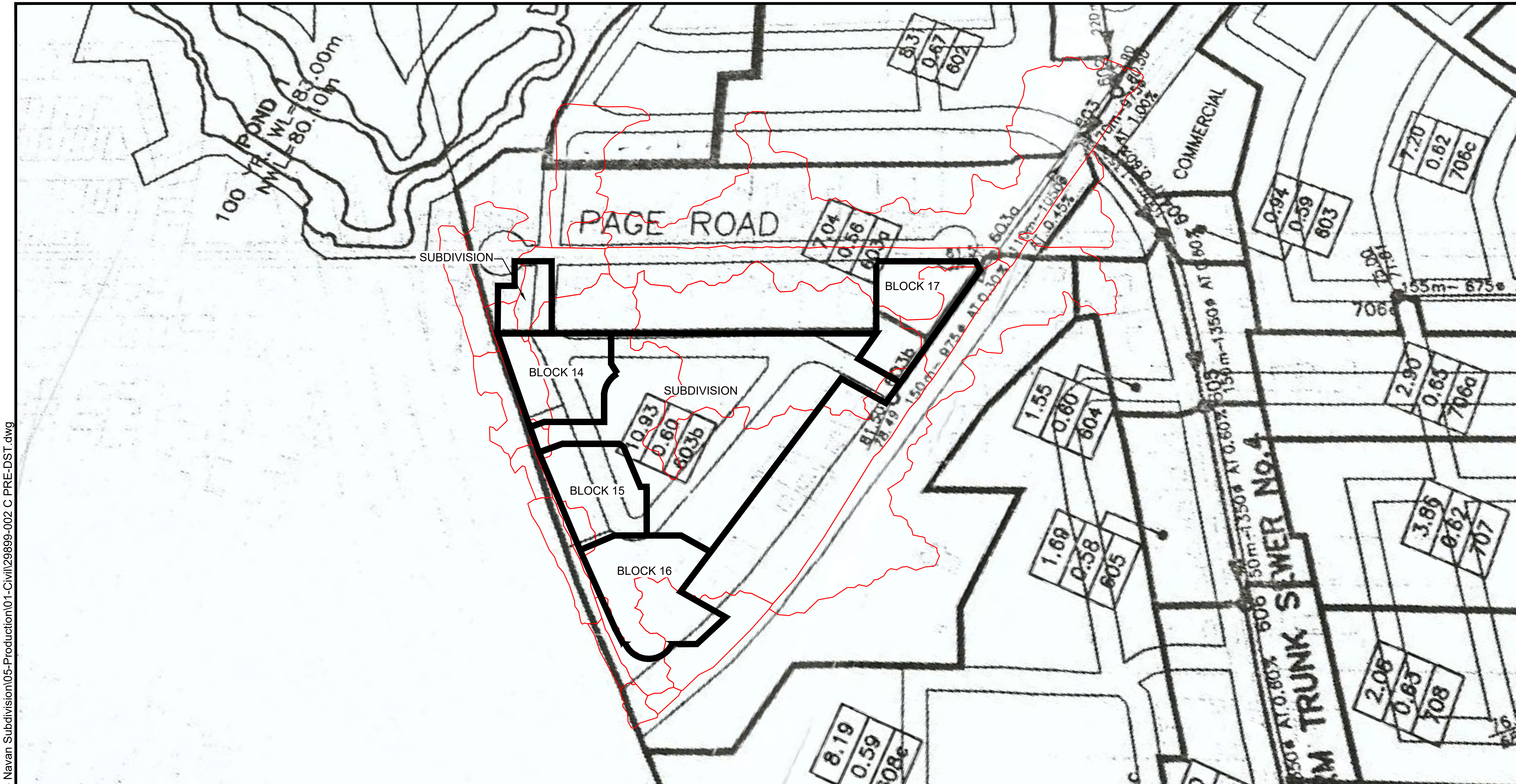
2983 Navan Road - Block 16
Ottawa, ON

DRAWING:

Overall System Model Schematic

J.L.Richards
ENGINEERS · ARCHITECTS · PLANNERS

DESIGN:	ML	JLR NO.:	29899-002
DRAWN:	ML	DRAWING NO.:	Figure 3
CHECKED:	BP		



LEGEND:

PRE-DEVELOPMENT DRAINAGE AREAS

NAVAN SITE PLAN AND SUBDIVISION BOUNDARY

NOTE:
UNDERLYING CATCHMENT DELINEATION FROM GLOUCESTER EUC INFRASTRUCTURE SERVICING UPDATE 2005 WHICH INFORMED THE ALLOWABLE RELEASE RATES FROM THE SITE AND NO PRE-DEVELOPMENT MODELLING WAS REQUIRED

PROJECT:

2983, 3053 AND 3079 NAVAN RD & 2690 PAGE RD

DRAWING:

PRE-DEVELOPMENT DRAINAGE PLAN

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J.L.Richards ENGINEERS · ARCHITECTS · PLANNERS

DESIGN: BP
DRAWN: KC
CHECKED: BP
JLR #: 29899-002

DRAWING #:
FIGURE

File Location: P:\29000\29899-002 - Navan Subdivision\05-Production\01-Civil\29899-002 C PRE-DST.dwg

PLOT DATE: July 26, 2024 2:27:18 PM

Post-Development 3-hour Chicago 1:2 year Event

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

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

START_DATE           01/01/2000
START_TIME           00:00:00
REPORT_START_DATE    01/01/2000
REPORT_START_TIME    00:00:00
END_DATE             01/01/2000
END_TIME             06:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:01:00
WET_STEP             00:01:00
DRY_STEP             00:01:00
ROUTING_STEP         1
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
MAX_TRIALS           8
HEAD_TOLERANCE       0.0015
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              12

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

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- -------- -------- ----------
3CHI002          INTENSITY 0:10     1.0      TIMESERIES 3CHI002
3CHI100          INTENSITY 0:10     1.0      TIMESERIES 3CHI100

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen
SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- --------
- ----------------
S1               3CHI002          CB208            0.0187   0        29.61    2.2      0
S10              3CHI002          CB204            0.0307   99.617   55.32    2.2      0
S11              3CHI002          CB202            0.127    90.325   65.66    2.2      0
S12              3CHI002          CB213            0.0149   0.369    6.44     2.2      0
S14_1            3CHI002          CB211            0.0116   52.676   22.78    2.2      0
S14_2            3CHI002          CB212            0.0179   31.654   58.12    2.2      0
S15              3CHI002          CB210B           0.0372   42.751   108.74   2.2      0
S2               3CHI002          CB209            0.0729   62.937   33.61    2.2      0
S3               3CHI002          CB207            0.0724   96.692   45.79    2.2      0
S32              3CHI002          CB214            0.052    14.286   29.7     2.2      0
S4               3CHI002          CB206            0.0464   99.975   24.67    2.2      0
S45              3CHI002          CB203            0.0222   99.962   14.32    2.2      0
S5               3CHI002          CB200            0.0843   89.589   82.96    2.2      0
S6               3CHI002          CB214            0.0239   0        40.3     2.2      0
S7               3CHI002          520_(P-Stm)      0.0686   100      25.95    2.2      0
S8               3CHI002          CB201            0.0941   80.117   35.06    2.2      0
S9               3CHI002          CB205            0.0275   76.83    19.08    2.2      0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
S1               0.013      0.25       1.57       4.67       0          OUTLET
S10              0.013      0.25       1.57       4.67       0          OUTLET
S11              0.013      0.25       1.57       4.67       0          OUTLET
S12              0.013      0.25       1.57       4.67       0          OUTLET
S14_1            0.013      0.25       1.57       4.67       0          PERVIOUS   100
S14_2            0.013      0.25       1.57       4.67       0          PERVIOUS   100
S15              0.013      0.25       1.57       4.67       0          PERVIOUS   100
S2               0.013      0.25       1.57       4.67       0          OUTLET
S3               0.013      0.25       1.57       4.67       0          OUTLET
S32              0.013      0.25       1.57       4.67       0          PERVIOUS   80
S4               0.013      0.25       1.57       4.67       0          OUTLET
S45              0.013      0.25       1.57       4.67       0          IMPERVIOUS 100
S5               0.013      0.25       1.57       4.67       0          IMPERVIOUS 100
S6               0.013      0.25       1.57       4.67       0          OUTLET
S7               0.013      0.25       1.57       4.67       0          OUTLET
S8               0.013      0.25       1.57       4.67       0          IMPERVIOUS 100
S9               0.013      0.25       1.57       4.67       0          OUTLET

[INFILTRATION]
;;Subcatchment   Param1     Param2     Param3     Param4     Param5
;;-------------- ---------- ---------- ---------- ---------- ----------
S1               76.2       13.2       4.14       7          0
S10              76.2       13.2       4.14       7          0
S11              76.2       13.2       4.14       7          0
S12              76.2       13.2       4.14       7          0
S14_1            76.2       13.2       4.14       7          0
S14_2            76.2       13.2       4.14       7          0
S15              76.2       13.2       4.14       7          0
S2               76.2       13.2       4.14       7          0
S3               76.2       13.2       4.14       7          0
S32              76.2       13.2       4.14       7          0
S4               76.2       13.2       4.14       7          0
S45              76.2       13.2       4.14       7          0
S5               76.2       13.2       4.14       7          0
S6               76.2       13.2       4.14       7          0
S7               76.2       13.2       4.14       7          0
S8               76.2       13.2       4.14       7          0
S9               76.2       13.2       4.14       7          0

[JUNCTIONS]
;;Name           Elevation  MaxDepth   InitDepth  SurDepth   Aponded
;;-------------- ---------- ---------- ---------- ---------- ----------
518_Orifice      81.361     4.106      0          0          0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
;Cylindrical Structure Slab Top Circular Frame SI
518A_(P-Stm)     80.646     FIXED      81.2             NO

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params            
SurDepth Fevap    Psi      Ksat     IMD
;;-------------- -------- ---------- ----------- ---------- ---------------------------- -----
--- -------- -------- -------- --------
;Cylindrical Structure Slab Top Circular Frame SI
518_(P-Stm)      81.061   4.406      0.139      FUNCTIONAL 0         0         1.13     0
0
;Cylindrical Structure Slab Top Circular Frame SI
519_(P-Stm)      82.197   3.512      0          FUNCTIONAL 0         0         1.13     0
0
;Cylindrical Structure Slab Top Circular Frame SI
520_(P-Stm)      82.487   2.888      0          FUNCTIONAL 0         0         1.13     0
0
;Cylindrical Structure Slab Top Circular Frame SI
521_(P-Stm)      81.957   3.673      0          FUNCTIONAL 0         0         1.13     0
0
;Cylindrical Structure Slab Top Circular Frame SI
522_(P-Stm)      82.182   3.323      0          FUNCTIONAL 0         0         1.13     0
0
;85.1800000001676
CB200            83.18    2.32       0          TABULAR    CB200                        0
0
;85.5000000001435
CB201            83.09    2.66       0          TABULAR    CB201                        0
0
;85.36
CB202            82.76    2.89       0          TABULAR    CB202                        0
0
;85.3500000000931
CB203            82.75    2.9        0          TABULAR    CB203                        0
0
;85.3500080822731
CB204            82.75    2.75       0          TABULAR    CB204                        0
0
;85.4500080823662
CB205            82.85    2.75       0          TABULAR    CB205                        0
0
;85.48
CB206            82.77    2.73       0          TABULAR    CB206                        0
0
;85.05
CB207            83.15    2.3        0          TABULAR    CB207                        0
0
;84.9000080821652
CB208            83.3     2.04       0          TABULAR    CB208                        0
0
;84.8
CB209            83.2     1.9        0          TABULAR    CB209                        0
0
;85.25
CB210B           82.65    3          0          TABULAR    CB210B                       0
0
;85.35
CB211            83.7     1.9        0          TABULAR    CB211                        0
0
;85.4
CB212            83.2     2.42       0          TABULAR    CB212                        0
0
;85.5000000000554
CB212A           83.62    2          0          TABULAR    CB212A                       0
0
;84.75
CB213            83.15    1.75       0          TABULAR    CB213                        0
0
;84.55
CB214            82.95    1.9        0          TABULAR    CB214                        0
0

[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset   OutOffset
InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ----------
---------- ----------
C2               CB208            CB207            9.666      0.013      83.3       83.2
0          0
C4               CB212A           CB212            18.475     0.013      83.62      83.25
0          0
C5               CB211            CB212            22.346     0.013      83.7       83.25
0          0
CB213            CB213            522_(P-Stm)      29.34      0.013      83.15      82.757
0          0
CB214            CB214            522_(P-Stm)      21.65      0.013      82.95      82.757
0          0
;PVC Pipes
Pipe_-_(104)_(P-Stm)_2 518_Orifice 518A_(P-Stm)    15.623     0.013      81.361     81.322
0          0
;PVC Pipes
Pipe_-_(110)_(P-Stm) 521_(P-Stm)  518_(P-Stm)      27.209     0.013      82.257     82.161
0          0
;PVC Pipes
Pipe_-_(111)_(P-Stm) 522_(P-Stm)  521_(P-Stm)      45.094     0.013      82.482     82.257
0          0
;Concrete Pipes 100-D
Pipe_-_(71)_(P-Stm) 520_(P-Stm)   519_(P-Stm)      57.146     0.013      82.787     82.557
0          0
;Concrete Pipes 100-D
Pipe_-_(72)_(P-Stm) 519_(P-Stm)   518_(P-Stm)      31.967     0.013      82.497     82.337
0          0

[ORIFICES]
;;Name           From Node        To Node          Type         Offset     Qcoeff     Gated
CloseTime
;;-------------- ---------------- ---------------- ------------ ---------- ---------- --------
----------
OR1              518_(P-Stm)      518_Orifice      SIDE         81.361     0.65       NO
0

[WEIRS]
;;Name           From Node        To Node          Type         CrestHt    Qcoeff     Gated
EndCon   EndCoeff   Surcharge  RoadWidth  RoadSurf   Coeff. Curve
;;-------------- ---------------- ---------------- ------------ ---------- ---------- --------
-------- ---------- ---------- ---------- ---------- ----------------
W1               CB208            CB209            TRANSVERSE   85.31      1.84       NO
0        0          YES
W2               CB210B           CB211            TRANSVERSE   85.6       1.84       NO
0        0          YES
W3               CB210B           CB202            TRANSVERSE   85.45      1.84       NO
0        0          YES
W4               CB202            CB204            TRANSVERSE   85.55      1.84       NO
0        0          YES
W5               CB206            CB207            TRANSVERSE   85.45      1.84       NO
0        0          YES
W6               CB201            CB200            TRANSVERSE   85.65      1.84       NO
0        0          YES
W7               CB200            CB209            TRANSVERSE   85.42      1.84       NO
0        0          YES

[OUTLETS]
;;Name           From Node        To Node          Offset     Type            QTable/Qcoeff
Qexpon     Gated
;;-------------- ---------------- ---------------- ---------- --------------- ----------------
- ---------- --------
CB200            CB200            520_(P-Stm)      83.18      TABULAR/HEAD    IPEX_Type_A
NO
;Critical
CB201            CB201            520_(P-Stm)      83.09      TABULAR/HEAD    Vortex_ICD_100
NO
;Critical
CB202            CB202            521_(P-Stm)      82.76      TABULAR/HEAD    IPEX_Type_A
NO
CB203            CB203            521_(P-Stm)      82.75      TABULAR/HEAD    Vortex_ICD_70
NO
CB204            CB204            522_(P-Stm)      82.75      TABULAR/HEAD    Vortex_ICD_65
NO
CB205            CB205            522_(P-Stm)      82.85      TABULAR/HEAD    Vortex_ICD_65
NO
CB206            CB206            522_(P-Stm)      82.77      TABULAR/HEAD    Vortex_ICD_70
NO
Cb207            CB207            522_(P-Stm)      83.15      TABULAR/HEAD    Vortex_ICD_100
NO
CB209            CB209            520_(P-Stm)      83.2       TABULAR/HEAD    IPEX_Type_A
NO
CB210B           CB210B           518_(P-Stm)      82.65      TABULAR/HEAD    Vortex_ICD_65
NO
CB212            CB212            521_(P-Stm)      83.2       TABULAR/HEAD    Vortex_ICD_100
NO

[XSECTIONS]
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```
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels    Culvert
;;-------------- ------------ ---------------- ---------- ---------- ---------- ---------- ----------
C2               CIRCULAR     0.25             0          0          0          1
C4               CIRCULAR     0.25             0          0          0          1
C5               CIRCULAR     0.25             0          0          0          1
CB213            CIRCULAR     0.25             0          0          0          1
CB214            CIRCULAR     0.25             0          0          0          1
Pipe_-_(104)_(P-Stm)_2 CIRCULAR 0.45           0          0          0          1
Pipe_-_(110)_(P-Stm) CIRCULAR 0.525            0          0          0          1
Pipe_-_(111)_(P-Stm) CIRCULAR 0.525            0          0          0          1
Pipe_-_(71)_(P-Stm) CIRCULAR  0.525            0          0          0          1
Pipe_-_(72)_(P-Stm) CIRCULAR  0.525            0          0          0          1
OR1              CIRCULAR     0.127            0          0          0
W1               RECT_OPEN    0.03             1.5        0          0
W2               RECT_OPEN    0.05             2.59       0          0
W3               RECT_OPEN    0.2              1.34       0          0
W4               RECT_OPEN    0.1              4.9        0          0
W5               RECT_OPEN    0.05             4.725      0          0
W6               RECT_OPEN    0.1              6          0          0
W7               RECT_OPEN    0.08             10.5       0          0

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

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
CB210-OUT85.5    Rating     0          0
CB210-OUT85.5               85.5       0.04
CB210-OUT85.5               100        0.04

CB210-OUT-85.6   Rating     0          0
CB210-OUT-85.6              85.6       0.08
CB210-OUT-85.6              100        0.08

;IPEX Type A ICD Rating Curve
IPEX_Type_A      Rating     0          0
IPEX_Type_A                 0.1        5.7
IPEX_Type_A                 0.2        8.1
IPEX_Type_A                 0.3        9.9
IPEX_Type_A                 0.4        11.4
IPEX_Type_A                 0.5        12.8
IPEX_Type_A                 0.6        14
IPEX_Type_A                 0.7        15.1
IPEX_Type_A                 0.8        16.2
IPEX_Type_A                 0.9        17.2
IPEX_Type_A                 1          18.1
IPEX_Type_A                 1.2        19.8
IPEX_Type_A                 1.4        21.4
IPEX_Type_A                 1.6        22.9
IPEX_Type_A                 1.8        24.3
IPEX_Type_A                 2          25.6
IPEX_Type_A                 2.5        28.6
IPEX_Type_A                 3          31.3

;IPEX Type B ICD Rating Curve
IPEX_Type_B      Rating     0          0
IPEX_Type_B                 0.1        8.1
IPEX_Type_B                 0.2        11.5
IPEX_Type_B                 0.3        14.1
IPEX_Type_B                 0.4        16.2
IPEX_Type_B                 0.5        18.2
IPEX_Type_B                 0.6        19.9
IPEX_Type_B                 0.7        21.5
IPEX_Type_B                 0.8        23
IPEX_Type_B                 0.9        24.4
IPEX_Type_B                 1          25.7
IPEX_Type_B                 1.2        28.1
IPEX_Type_B                 1.4        30.4
IPEX_Type_B                 1.6        32.5
IPEX_Type_B                 1.8        34.4
IPEX_Type_B                 2          36.3
IPEX_Type_B                 2.5        40.6
IPEX_Type_B                 3          44.5

;IPEX Type C ICD Rating Curve
IPEX_Type_C      Rating     0          0
IPEX_Type_C                 0.1        10.6
IPEX_Type_C                 0.2        15
IPEX_Type_C                 0.3        18.3
IPEX_Type_C                 0.4        21.2
IPEX_Type_C                 0.5        23.7
IPEX_Type_C                 0.6        25.9
IPEX_Type_C                 0.7        28
IPEX_Type_C                 0.8        29.9
IPEX_Type_C                 0.9        31.7
IPEX_Type_C                 1          33.5
IPEX_Type_C                 1.2        36.6
IPEX_Type_C                 1.4        39.6
IPEX_Type_C                 1.6        42.3
IPEX_Type_C                 1.8        44.9
IPEX_Type_C                 2          47.3
IPEX_Type_C                 2.5        52.9
IPEX_Type_C                 3          57.9

;IPEX Type AA ICD Rating Curve
IPEX_Type_D      Rating     0          0
IPEX_Type_D                 0.1        15.4
IPEX_Type_D                 0.2        21.7
IPEX_Type_D                 0.3        26.6
IPEX_Type_D                 0.4        30.7
IPEX_Type_D                 0.5        34.3
IPEX_Type_D                 0.6        37.6
IPEX_Type_D                 0.7        40.6
IPEX_Type_D                 0.8        43.4
IPEX_Type_D                 0.9        46.1
IPEX_Type_D                 1          48.5
IPEX_Type_D                 1.2        53.2
IPEX_Type_D                 1.4        57.4
IPEX_Type_D                 1.6        61.4
IPEX_Type_D                 1.8        65.1
IPEX_Type_D                 2          68.7
IPEX_Type_D                 2.5        76.8
IPEX_Type_D                 3          84.1

;IPEX Type E ICD Rating Curve
IPEX_Type_E      Rating     0          0
IPEX_Type_E                 0.1        20.5
IPEX_Type_E                 0.2        28.9
IPEX_Type_E                 0.3        35.5
IPEX_Type_E                 0.4        40.9
IPEX_Type_E                 0.5        45.8
IPEX_Type_E                 0.6        50.1
IPEX_Type_E                 0.7        54.2
IPEX_Type_E                 0.8        57.9
IPEX_Type_E                 0.9        61.4
IPEX_Type_E                 1          64.7
IPEX_Type_E                 1.2        70.9
IPEX_Type_E                 1.4        76.6
IPEX_Type_E                 1.6        81.9
IPEX_Type_E                 1.8        86.8
IPEX_Type_E                 2          91.5
IPEX_Type_E                 2.5        102.3
IPEX_Type_E                 3          112.1

;Tempest Rating Curve for Vortex ICD 100, No grate allowance
Vortex_ICD_100   Rating     0          0
Vortex_ICD_100              0.1        2.8
Vortex_ICD_100              0.2        4
Vortex_ICD_100              0.3        4.9
Vortex_ICD_100              0.4        5.6
Vortex_ICD_100              0.5        6.3
Vortex_ICD_100              0.6        6.9
Vortex_ICD_100              0.7        7.5
Vortex_ICD_100              0.8        8
Vortex_ICD_100              0.9        8.5
Vortex_ICD_100              1          8.9
Vortex_ICD_100              1.2        9.8
Vortex_ICD_100              1.4        10.6
Vortex_ICD_100              1.6        11.3
Vortex_ICD_100              1.8        12
Vortex_ICD_100              2          12.6
Vortex_ICD_100              2.5        14.1
Vortex_ICD_100              3          15.5

;Tempest Rating Curve for Vortex ICD 105, No grate allowance
Vortex_ICD_105   Rating     0          0
Vortex_ICD_105              0.1        3.1
Vortex_ICD_105              0.2        4.4
Vortex_ICD_105              0.3        5.4
Vortex_ICD_105              0.4        6.2
Vortex_ICD_105              0.5        6.9
Vortex_ICD_105              0.6        7.6
Vortex_ICD_105              0.7        8.2
Vortex_ICD_105              0.8        8.8
Vortex_ICD_105              0.9        9.3
Vortex_ICD_105              1          9.8
Vortex_ICD_105              1.2        10.7
Vortex_ICD_105              1.4        11.6
Vortex_ICD_105              1.6        12.4
Vortex_ICD_105              1.8        13.1
Vortex_ICD_105              2          13.9
Vortex_ICD_105              2.5        15.5
Vortex_ICD_105              3          17

;Tempest Rating Curve for Vortex ICD 40, No grate allowance
Vortex_ICD_40    Rating     0          0
Vortex_ICD_40               0.1        0.4
Vortex_ICD_40               0.2        0.6
Vortex_ICD_40               0.3        0.7
Vortex_ICD_40               0.4        0.9
Vortex_ICD_40               0.5        1
Vortex_ICD_40               0.6        1
Vortex_ICD_40               0.7        1.1
Vortex_ICD_40               0.8        1.2
Vortex_ICD_40               0.9        1.3
Vortex_ICD_40               1          1.4
Vortex_ICD_40               1.2        1.5
Vortex_ICD_40               1.4        1.6
Vortex_ICD_40               1.6        1.7
Vortex_ICD_40               1.8        1.8
Vortex_ICD_40               2          1.9
Vortex_ICD_40               2.5        2.2
Vortex_ICD_40               3          2.4

;Tempest Rating Curve for Vortex ICD 45, No grate allowance
Vortex_ICD_45    Rating     0          0
Vortex_ICD_45               0.1        0.6
Vortex_ICD_45               0.2        0.8
Vortex_ICD_45               0.3        1
Vortex_ICD_45               0.4        1.1
Vortex_ICD_45               0.5        1.3
Vortex_ICD_45               0.6        1.4
Vortex_ICD_45               0.7        1.5
Vortex_ICD_45               0.8        1.6
Vortex_ICD_45               0.9        1.7
Vortex_ICD_45               1          1.8
Vortex_ICD_45               1.2        2
Vortex_ICD_45               1.4        2.1
Vortex_ICD_45               1.6        2.3
Vortex_ICD_45               1.8        2.4
Vortex_ICD_45               2          2.6
Vortex_ICD_45               2.5        2.9
Vortex_ICD_45               3          3.1

;Tempest Rating Curve for Vortex ICD 50, No grate allowance
Vortex_ICD_50    Rating     0          0
Vortex_ICD_50               0.1        0.7
Vortex_ICD_50               0.2        1
Vortex_ICD_50               0.3        1.2
Vortex_ICD_50               0.4        1.4
Vortex_ICD_50               0.5        1.6
Vortex_ICD_50               0.6        1.8
Vortex_ICD_50               0.7        1.9
Vortex_ICD_50               0.8        2
Vortex_ICD_50               0.9        2.1
Vortex_ICD_50               1          2.3
Vortex_ICD_50               1.2        2.5
Vortex_ICD_50               1.4        2.7
Vortex_ICD_50               1.6        2.9
Vortex_ICD_50               1.8        3
Vortex_ICD_50               2          3.2
Vortex_ICD_50               2.5        3.6
Vortex_ICD_50               3          3.9

;Tempest Rating Curve for Vortex ICD 55, No grate allowance
Vortex_ICD_55    Rating     0          0
Vortex_ICD_55               0.1        0.9
Vortex_ICD_55               0.2        1.2
Vortex_ICD_55               0.3        1.5
Vortex_ICD_55               0.4        1.7
Vortex_ICD_55               0.5        1.9
Vortex_ICD_55               0.6        2.1
Vortex_ICD_55               0.7        2.3
Vortex_ICD_55               0.8        2.4
Vortex_ICD_55               0.9        2.6
Vortex_ICD_55               1          2.7
Vortex_ICD_55               1.2        3
Vortex_ICD_55               1.4        3.2
Vortex_ICD_55               1.6        3.4
Vortex_ICD_55               1.8        3.6
Vortex_ICD_55               2          3.8
Vortex_ICD_55               2.5        4.3
Vortex_ICD_55               3          4.7

;Tempest Rating Curve for Vortex ICD 60, No grate allowance
Vortex_ICD_60    Rating     0          0
Vortex_ICD_60               0.1        1.1
Vortex_ICD_60               0.2        1.5
Vortex_ICD_60               0.3        1.8
Vortex_ICD_60               0.4        2.1
Vortex_ICD_60               0.5        2.3
Vortex_ICD_60               0.6        2.5
Vortex_ICD_60               0.7        2.7
Vortex_ICD_60               0.8        2.9
Vortex_ICD_60               0.9        3.1
Vortex_ICD_60               1          3.2
Vortex_ICD_60               1.2        3.6
Vortex_ICD_60               1.4        3.8
Vortex_ICD_60               1.6        4.1
Vortex_ICD_60               1.8        4.3
Vortex_ICD_60               2          4.6
Vortex_ICD_60               2.5        5.1
Vortex_ICD_60               3          5.6

;Tempest Rating Curve for Vortex ICD 65, No grate allowance
Vortex_ICD_65    Rating     0          0
Vortex_ICD_65               0.1        1.2
Vortex_ICD_65               0.2        1.6
Vortex_ICD_65               0.3        2
Vortex_ICD_65               0.4        2.3
Vortex_ICD_65               0.5        2.5
Vortex_ICD_65               0.6        2.8
Vortex_ICD_65               0.7        3
Vortex_ICD_65               0.8        3.2
Vortex_ICD_65               0.9        3.4
Vortex_ICD_65               1          3.6
Vortex_ICD_65               1.2        4
Vortex_ICD_65               1.4        4.3
Vortex_ICD_65               1.6        4.6
Vortex_ICD_65               1.8        4.9
Vortex_ICD_65               2          5.1
Vortex_ICD_65               2.5        5.7
Vortex_ICD_65               3          6.3
```

```
;Tempest Rating Curve for Vortex ICD 70, No grate allowance
Vortex_ICD_70    Rating     0          0
Vortex_ICD_70               0.1        1.3
Vortex_ICD_70               0.2        1.9
Vortex_ICD_70               0.3        2.3
Vortex_ICD_70               0.4        2.7
Vortex_ICD_70               0.5        3
Vortex_ICD_70               0.6        3.3
Vortex_ICD_70               0.7        3.6
Vortex_ICD_70               0.8        3.8
Vortex_ICD_70               0.9        4.1
Vortex_ICD_70               1          4.3
Vortex_ICD_70               1.2        4.7
Vortex_ICD_70               1.4        5.1
Vortex_ICD_70               1.6        5.5
Vortex_ICD_70               1.8        5.8
Vortex_ICD_70               2          6.1
Vortex_ICD_70               2.5        6.8
Vortex_ICD_70               3          7.5

;Tempest Rating Curve for Vortex ICD 75, No grate allowance
Vortex_ICD_75    Rating     0          0
Vortex_ICD_75               0.1        1.6
Vortex_ICD_75               0.2        2.2
Vortex_ICD_75               0.3        2.7
Vortex_ICD_75               0.4        3.2
Vortex_ICD_75               0.5        3.5
Vortex_ICD_75               0.6        3.9
Vortex_ICD_75               0.7        4.2
Vortex_ICD_75               0.8        4.5
Vortex_ICD_75               0.9        4.8
Vortex_ICD_75               1          5
Vortex_ICD_75               1.2        5.5
Vortex_ICD_75               1.4        5.9
Vortex_ICD_75               1.6        6.3
Vortex_ICD_75               1.8        6.7
Vortex_ICD_75               2          7.1
Vortex_ICD_75               2.5        7.9
Vortex_ICD_75               3          8.7

;Tempest Rating Curve for Vortex ICD 80, No grate allowance
Vortex_ICD_80    Rating     0          0
Vortex_ICD_80               0.1        1.8
Vortex_ICD_80               0.2        2.6
Vortex_ICD_80               0.3        3.1
Vortex_ICD_80               0.4        3.6
Vortex_ICD_80               0.5        4
Vortex_ICD_80               0.6        4.4
Vortex_ICD_80               0.7        4.8
Vortex_ICD_80               0.8        5.1
Vortex_ICD_80               0.9        5.4
Vortex_ICD_80               1          5.7
Vortex_ICD_80               1.2        6.3
Vortex_ICD_80               1.4        6.8
Vortex_ICD_80               1.6        7.2
Vortex_ICD_80               1.8        7.7
Vortex_ICD_80               2          8.1
Vortex_ICD_80               2.5        9
Vortex_ICD_80               3          9.9

;Tempest Rating Curve for Vortex ICD 85, No grate allowance
Vortex_ICD_85    Rating     0          0
Vortex_ICD_85               0.1        2
Vortex_ICD_85               0.2        2.9
Vortex_ICD_85               0.3        3.5
Vortex_ICD_85               0.4        4.1
Vortex_ICD_85               0.5        4.5
Vortex_ICD_85               0.6        5
Vortex_ICD_85               0.7        5.4
Vortex_ICD_85               0.8        5.7
Vortex_ICD_85               0.9        6.1
Vortex_ICD_85               1          6.4
Vortex_ICD_85               1.2        7
Vortex_ICD_85               1.4        7.6
Vortex_ICD_85               1.6        8.1
Vortex_ICD_85               1.8        8.6
Vortex_ICD_85               2          9.1
Vortex_ICD_85               2.5        10.1
Vortex_ICD_85               3          11.1

;Tempest Rating Curve for Vortex ICD 90, No grate allowance
Vortex_ICD_90    Rating     0          0
Vortex_ICD_90               0.1        2.2
Vortex_ICD_90               0.2        3.2
Vortex_ICD_90               0.3        3.9
Vortex_ICD_90               0.4        4.5
Vortex_ICD_90               0.5        5.1
Vortex_ICD_90               0.6        5.5
Vortex_ICD_90               0.7        6
Vortex_ICD_90               0.8        6.4
Vortex_ICD_90               0.9        6.8
Vortex_ICD_90               1          7.2
Vortex_ICD_90               1.2        7.9
Vortex_ICD_90               1.4        8.5
Vortex_ICD_90               1.6        9.1
Vortex_ICD_90               1.8        9.6
Vortex_ICD_90               2          10.2
Vortex_ICD_90               2.5        11.4
Vortex_ICD_90               3          12.5

;Tempest Rating Curve for Vortex ICD 95, No grate allowance
Vortex_ICD_95    Rating     0          0
Vortex_ICD_95               0.1        2.6
Vortex_ICD_95               0.2        3.6
Vortex_ICD_95               0.3        4.4
Vortex_ICD_95               0.4        5.1
Vortex_ICD_95               0.5        5.7
Vortex_ICD_95               0.6        6.2
Vortex_ICD_95               0.7        6.7
Vortex_ICD_95               0.8        7.1
Vortex_ICD_95               0.9        7.6
Vortex_ICD_95               1          8
Vortex_ICD_95               1.2        8.7
Vortex_ICD_95               1.4        9.4
Vortex_ICD_95               1.6        10.1
Vortex_ICD_95               1.8        10.7
Vortex_ICD_95               2          11.3
Vortex_ICD_95               2.5        12.6
Vortex_ICD_95               3          13.8

CB200            Storage    0          0.36
CB200                       2          0.36
CB200                       2.24       210.73
CB200                       2.32       210.73

CB201            Storage    0          0.36
CB201                       2.41       0.36
CB201                       2.56       169.64
CB201                       2.66       169.64

CB202            Storage    0          0.36
CB202                       2.6        0.36
CB202                       2.79       283.64
CB202                       2.89       283.64

CB203            Storage    0          0.36
CB203                       2.6        0.36
CB203                       2.9        178.09

CB204            Storage    0          0.36
CB204                       2.6        0.36
CB204                       2.75       146.08

CB205            Storage    0          0.36
CB205                       2.6        0.36
CB205                       2.75       86.52

CB206            Storage    0          0.36
CB206                       2.6        0.36
CB206                       2.68       61.65
CB206                       2.73       61.65

CB207            Storage    0          0.36
CB207                       1.97       0.36
CB207                       2.3        182.21

CB208            Storage    0          0.073
CB208                       1.74       0.073
CB208                       2.01       67.88
CB208                       2.04       67.88

CB209            Storage    0          0.073
CB209                       1.6        0.073
CB209                       1.9        84.87

CB210B           Storage    0          0.073
CB210B                      2.6        0.073
CB210B                      2.9        60.53
CB210B                      3          60.53

CB211            Storage    0          0.073
CB211                       1.65       0.073
CB211                       1.9        21.99

CB212            Storage    0          0.36
CB212                       2.2        0.36
CB212                       2.42       55.12

CB212A           Storage    0          0.073
CB212A                      2          0.073

CB213            Storage    0          0.073
CB213                       1.6        0.073
CB213                       1.75       9.05

CB214            Storage    0          0.073
CB214                       1.6        0.073
CB214                       1.9        34.75

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
;Rainfall (mm/hr)
3CHI002          01/01/2000 00:00:00   2.491
3CHI002          01/01/2000 00:10:00   2.966
3CHI002          01/01/2000 00:20:00   3.696
3CHI002          01/01/2000 00:30:00   4.976
3CHI002          01/01/2000 00:40:00   7.828
3CHI002          01/01/2000 00:50:00   19.966
3CHI002          01/01/2000 01:00:00   76.805
3CHI002          01/01/2000 01:10:00   22.777
3CHI002          01/01/2000 01:20:00   11.852
3CHI002          01/01/2000 01:30:00   8.025
3CHI002          01/01/2000 01:40:00   6.096
3CHI002          01/01/2000 01:50:00   4.938
3CHI002          01/01/2000 02:00:00   4.165
3CHI002          01/01/2000 02:10:00   3.613
3CHI002          01/01/2000 02:20:00   3.197
3CHI002          01/01/2000 02:30:00   2.873
3CHI002          01/01/2000 02:40:00   2.613
3CHI002          01/01/2000 02:50:00   2.4
3CHI002          01/01/2000 03:00:00   0

;Rainfall (mm/hr)
3CHI100          01/01/2000 00:00:00   5.339
3CHI100          01/01/2000 00:10:00   6.376
3CHI100          01/01/2000 00:20:00   7.977
3CHI100          01/01/2000 00:30:00   10.797
3CHI100          01/01/2000 00:40:00   17.136
3CHI100          01/01/2000 00:50:00   45.128
3CHI100          01/01/2000 01:00:00   178.107
3CHI100          01/01/2000 01:10:00   51.056
3CHI100          01/01/2000 01:20:00   26.163
3CHI100          01/01/2000 01:30:00   17.571
3CHI100          01/01/2000 01:40:00   13.277
3CHI100          01/01/2000 01:50:00   10.712
3CHI100          01/01/2000 02:00:00   9.008
3CHI100          01/01/2000 02:10:00   7.793
3CHI100          01/01/2000 02:20:00   6.883
3CHI100          01/01/2000 02:30:00   6.174
3CHI100          01/01/2000 02:40:00   5.607
3CHI100          01/01/2000 02:50:00   5.142
3CHI100          01/01/2000 03:00:00   0

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

[TAGS]
Node       518_Orifice      RY_Manhole
Node       CB200            RY_Manhole
Node       CB201            RY_Manhole
Node       CB202            RY_Manhole
Node       CB203            RY_Manhole
Node       CB204            RY_Manhole
Node       CB205            RY_Manhole
Node       CB206            RY_Manhole
Node       CB207            RY_Manhole
Node       CB208            RY_Manhole
Node       CB209            RY_Manhole
Node       CB210B           RY_Manhole
Node       CB211            RY_Manhole
Node       CB212            RY_Manhole
Node       CB212A           RY_Manhole
Node       CB213            RY_Manhole
Node       CB214            RY_Manhole
Link       C2               RY_Sewer
Link       C4               RY_Sewer
Link       C5               RY_Sewer

[MAP]
DIMENSIONS       381219.0294      5032865.6782     381334.8286      5033009.9278
UNITS            Meters

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
518_Orifice      381303.7           5032953.188
518A_(P-Stm)     381317.029         5032955.797
518_(P-Stm)      381301.695         5032952.807
519_(P-Stm)      381278.558         5032974.866
520_(P-Stm)      381240.562         5032932.182
521_(P-Stm)      381309.324         5032926.69
522_(P-Stm)      381267.739         5032909.252
CB200            381246.119         5032946.933
CB201            381266.142         5032969.504
CB202            381305.816         5032949.229
CB203            381314.519         5032914.342
CB204            381291.187         5032921.779
CB205            381286.939         5032925.282
CB206            381270.233         5032913.017
CB207            381253.811         5032910.356
CB208            381248.314         5032902.406
CB209            381228.288         5032926.78
CB210B           381314.246         5032963.095
CB211            381319.351         5032951.771
CB212            381328.283         5032931.288
CB212A           381326.507         5032912.9
CB213            381296.875         5032912.718
CB214            381282.831         5032893.727

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

```
W2               381318.013         5032956.452
W4               381305.808         5032934.267
W4               381304.151         5032928.843

[POLYGONS]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
S1               381237.464         5032904.825
S1               381240.329         5032905.467
S1               381240.224         5032906.884
S1               381246.264         5032909.575
S1               381246.323         5032909.6
S1               381246.383         5032909.624
S1               381246.444         5032909.645
S1               381246.506         5032909.663
S1               381246.568         5032909.68
S1               381246.631         5032909.695
S1               381246.695         5032909.707
S1               381246.758         5032909.717
S1               381246.823         5032909.725
S1               381246.887         5032909.731
S1               381246.951         5032909.734
S1               381247.016         5032909.735
S1               381247.08          5032909.734
S1               381247.145         5032909.731
S1               381247.209         5032909.725
S1               381247.273         5032909.717
S1               381247.337         5032909.707
S1               381247.401         5032909.695
S1               381247.463         5032909.681
S1               381247.526         5032909.664
S1               381247.588         5032909.645
S1               381247.649         5032909.624
S1               381247.709         5032909.601
S1               381247.768         5032909.576
S1               381247.827         5032909.548
S1               381247.885         5032909.519
S1               381247.941         5032909.488
S1               381247.996         5032909.455
S1               381248.051         5032909.419
S1               381248.103         5032909.382
S1               381248.155         5032909.344
S1               381248.205         5032909.303
S1               381248.254         5032909.261
S1               381248.301         5032909.217
S1               381248.347         5032909.171
S1               381248.391         5032909.124
S1               381248.433         5032909.075
S1               381248.474         5032909.025
S1               381248.513         5032908.973
S1               381248.55          5032908.92
S1               381248.585         5032908.866
S1               381248.618         5032908.811
S1               381248.65          5032908.754
S1               381248.679         5032908.697
S1               381248.706         5032908.638
S1               381259.547         5032884.338
S1               381264.625         5032879.785
S1               381253.013         5032884.608
S1               381244.74          5032903.289
S1               381244.061         5032903.318
S1               381243.383         5032903.37
S1               381242.707         5032903.444
S1               381242.035         5032903.54
S1               381241.365         5032903.658
S1               381240.7           5032903.799
S1               381240.04          5032903.961
S1               381239.386         5032904.145
S1               381238.738         5032904.35
S1               381238.097         5032904.577
S1               381237.464         5032904.825
S10              381282.247         5032908.62
S10              381276.098         5032921.781
S10              381287.174         5032924.398
S10              381297.866         5032927.382
S10              381298.206         5032927.496
S10              381298.542         5032927.621
S10              381298.873         5032927.758
S10              381299.199         5032927.907
S10              381299.52          5032928.067
S10              381299.835         5032928.238
S10              381300.144         5032928.42
S10              381300.446         5032928.612
S10              381300.742         5032928.815
S10              381301.03          5032929.029
S10              381301.31          5032929.252
S10              381301.583         5032929.485
S10              381301.847         5032929.727
S10              381302.103         5032929.979
S10              381302.349         5032930.239
S10              381302.586         5032930.508
S10              381302.814         5032930.785
S10              381303.032         5032931.069
S10              381303.24          5032931.362
S10              381303.437         5032931.661
S10              381304.434         5032927.758
S10              381307.137         5032921.453
S10              381307.111         5032921.441
S10              381307.084         5032921.427
S10              381307.058         5032921.413
S10              381307.033         5032921.398
S10              381307.008         5032921.382
S10              381306.984         5032921.366
S10              381306.96          5032921.348
S10              381306.937         5032921.33
S10              381306.915         5032921.311
S10              381306.893         5032921.291
S10              381306.872         5032921.27
S10              381306.852         5032921.249
S10              381306.833         5032921.227
S10              381306.814         5032921.204
S10              381306.796         5032921.181
S10              381306.779         5032921.157
S10              381306.763         5032921.132
S10              381306.747         5032921.107
S10              381306.733         5032921.082
S10              381306.719         5032921.056
S10              381306.706         5032921.029
S10              381306.695         5032921.002
S10              381306.684         5032920.975
S10              381306.674         5032920.947
S10              381306.665         5032920.919
S10              381306.657         5032920.891
S10              381306.65          5032920.862
S10              381306.644         5032920.833
S10              381306.639         5032920.804
S10              381306.635         5032920.775
S10              381306.632         5032920.746
S10              381306.63          5032920.716
S10              381306.629         5032920.687
S10              381306.629         5032920.658
S10              381306.63          5032920.628
S10              381306.632         5032920.599
S10              381302.601         5032917.181
S10              381301.944         5032913.56
S10              381291.376         5032916.092
S10              381291.126         5032916.147
S10              381290.874         5032916.193
S10              381290.621         5032916.231
S10              381290.366         5032916.26
S10              381290.111         5032916.28
S10              381289.856         5032916.291
S10              381289.6           5032916.294
S10              381289.344         5032916.287
S10              381289.088         5032916.271
S10              381288.833         5032916.247
S10              381288.58          5032916.214
S10              381288.327         5032916.171
S10              381288.076         5032916.12
S10              381287.827         5032916.061
S10              381287.58          5032915.993
S10              381287.336         5032915.916
S10              381287.095         5032915.831
S10              381286.857         5032915.737
S10              381286.622         5032915.635
S10              381286.391         5032915.525
S10              381286.163         5032915.407
S10              381285.94          5032915.281
S10              381285.722         5032915.148
S10              381285.508         5032915.007
S10              381285.3           5032914.859
S10              381285.096         5032914.703
S10              381284.899         5032914.541
S10              381284.707         5032914.371
S10              381284.521         5032914.195
S10              381284.341         5032914.013
S10              381284.168         5032913.825
S10              381284.001         5032913.63
S10              381283.841         5032913.43
S10              381283.689         5032913.225
S10              381283.543         5032913.014
S10              381283.405         5032912.799
S10              381283.275         5032912.578
S10              381283.152         5032912.354
S10              381283.037         5032912.125
S10              381282.93          5032911.892
S10              381282.832         5032911.656
S10              381282.742         5032911.416
S10              381282.66          5032911.174
S10              381282.586         5032910.929
S10              381282.521         5032910.681
S10              381282.465         5032910.431
S10              381282.418         5032910.18
S10              381282.379         5032909.927
S10              381282.349         5032909.672
S10              381282.247         5032908.62
S11              381287.493         5032979.07
S11              381295.209         5032987.02
S11              381303.22          5032979.472
S11              381312.567         5032958.198
S11              381307.857         5032956.13
S11              381307.843         5032956.124
S11              381307.829         5032956.117
S11              381307.815         5032956.111
S11              381307.801         5032956.103
S11              381307.788         5032956.095
S11              381307.774         5032956.087
S11              381307.762         5032956.078
S11              381307.749         5032956.069
S11              381307.737         5032956.06
S11              381307.725         5032956.05
S11              381307.713         5032956.039
S11              381307.702         5032956.028
S11              381307.691         5032956.017
S11              381307.681         5032956.006
S11              381307.671         5032955.994
S11              381307.662         5032955.981
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S9	381290.74	5032939.886

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;;Storage Node   X-Coord            Y-Coord
;;-------------- ------------------ ------------------

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

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

****
Element Count
****

```
Number of rain gages ...... 2
Number of subcatchments ... 17
Number of nodes ........... 23
Number of links ........... 29
Number of pollutants ...... 0
Number of land uses ....... 0
```

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
3CHI002	3CHI002	INTENSITY	10 min.
3CHI100	3CHI100	INTENSITY	10 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S1	0.02	29.61	0.00	2.2000	3CHI002	CB208
S10	0.03	55.32	99.62	2.2000	3CHI002	CB204
S11	0.13	65.66	90.33	2.2000	3CHI002	CB202
S12	0.01	6.44	0.37	2.2000	3CHI002	CB213
S14_1	0.01	22.78	52.68	2.2000	3CHI002	CB211
S14_2	0.02	58.12	31.65	2.2000	3CHI002	CB212
S15	0.04	108.74	42.75	2.2000	3CHI002	CB210B
S2	0.07	33.61	62.94	2.2000	3CHI002	CB209
S3	0.07	45.79	96.69	2.2000	3CHI002	CB207
S32	0.05	29.70	14.29	2.2000	3CHI002	CB214
S4	0.05	24.67	99.97	2.2000	3CHI002	CB206
S45	0.02	14.32	99.96	2.2000	3CHI002	CB203
S5	0.08	82.96	89.59	2.2000	3CHI002	CB200
S6	0.02	40.30	0.00	2.2000	3CHI002	CB214
S7	0.07	25.95	100.00	2.2000	3CHI002	520_(P-Stm)
S8	0.09	35.06	80.12	2.2000	3CHI002	CB201
S9	0.03	19.08	76.83	2.2000	3CHI002	CB205

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
518_Orifice	JUNCTION	81.36	4.11	0.0	
518A_(P-Stm)	OUTFALL	80.65	1.13	0.0	
518_(P-Stm)	STORAGE	81.06	4.41	0.0	
519_(P-Stm)	STORAGE	82.20	3.51	0.0	
520_(P-Stm)	STORAGE	82.49	2.89	0.0	
521_(P-Stm)	STORAGE	81.96	3.67	0.0	
522_(P-Stm)	STORAGE	82.18	3.32	0.0	
CB200	STORAGE	83.18	2.32	0.0	
CB201	STORAGE	83.09	2.66	0.0	
CB202	STORAGE	82.76	2.89	0.0	
CB203	STORAGE	82.75	2.90	0.0	
CB204	STORAGE	82.75	2.75	0.0	
CB205	STORAGE	82.85	2.75	0.0	
CB206	STORAGE	82.77	2.73	0.0	
CB207	STORAGE	83.15	2.30	0.0	
CB208	STORAGE	83.30	2.04	0.0	
CB209	STORAGE	83.20	1.90	0.0	
CB210B	STORAGE	82.65	3.00	0.0	
CB211	STORAGE	83.70	1.90	0.0	
CB212	STORAGE	83.20	2.42	0.0	
CB212A	STORAGE	83.62	2.00	0.0	
CB213	STORAGE	83.15	1.75	0.0	
CB214	STORAGE	82.95	1.90	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
C2	CB208	CB207	CONDUIT	9.7	1.0346	0.0130
C4	CB212A	CB212	CONDUIT	18.5	2.0031	0.0130
C5	CB211	CB212	CONDUIT	22.3	2.0142	0.0130
CB213	CB213	522_(P-Stm)	CONDUIT	29.3	1.3396	0.0130
CB214	CB214	522_(P-Stm)	CONDUIT	21.6	0.8915	0.0130
Pipe_-_(104)_(P-Stm)_2	518_Orifice	518A_(P-Stm)	CONDUIT	15.6	0.2496	0.0130
Pipe_-_(110)_(P-Stm)	521_(P-Stm)	518_(P-Stm)	CONDUIT	27.2	0.3528	0.0130
Pipe_-_(111)_(P-Stm)	522_(P-Stm)	521_(P-Stm)	CONDUIT	45.1	0.4990	0.0130
Pipe_-_(71)_(P-Stm)	520_(P-Stm)	519_(P-Stm)	CONDUIT	57.1	0.4025	0.0130
Pipe_-_(72)_(P-Stm)	519_(P-Stm)	518_(P-Stm)	CONDUIT	32.0	0.5005	0.0130
OR1	518_(P-Stm)	518_Orifice	ORIFICE			
W1	CB208	CB209	WEIR			
W2	CB210B	CB211	WEIR			
W3	CB210B	CB202	WEIR			
W4	CB202	CB204	WEIR			
W5	CB206	CB207	WEIR			
W6	CB201	CB200	WEIR			
W7	CB200	CB209	WEIR			
CB200	CB200	520_(P-Stm)	OUTLET			
CB201	CB201	520_(P-Stm)	OUTLET			
CB202	CB202	521_(P-Stm)	OUTLET			
CB203	CB203	521_(P-Stm)	OUTLET			
CB204	CB204	522_(P-Stm)	OUTLET			
CB205	CB205	522_(P-Stm)	OUTLET			
CB206	CB206	522_(P-Stm)	OUTLET			
Cb207	CB207	522_(P-Stm)	OUTLET			
CB209	CB209	520_(P-Stm)	OUTLET			
CB210B	CB210B	518_(P-Stm)	OUTLET			
CB212	CB212	521_(P-Stm)	OUTLET			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C2	CIRCULAR	0.25	0.05	0.06	0.25	1	60.49
C4	CIRCULAR	0.25	0.05	0.06	0.25	1	84.17
C5	CIRCULAR	0.25	0.05	0.06	0.25	1	84.40
CB213	CIRCULAR	0.25	0.05	0.06	0.25	1	68.83
CB214	CIRCULAR	0.25	0.05	0.06	0.25	1	56.15
Pipe_-_(104)_(P-Stm)_2	CIRCULAR	0.45	0.16	0.11	0.45	1	142.46
Pipe_-_(110)_(P-Stm)	CIRCULAR	0.53	0.22	0.13	0.53	1	255.47
Pipe_-_(111)_(P-Stm)	CIRCULAR	0.53	0.22	0.13	0.53	1	303.80
Pipe_-_(71)_(P-Stm)	CIRCULAR	0.53	0.22	0.13	0.53	1	272.85
Pipe_-_(72)_(P-Stm)	CIRCULAR	0.53	0.22	0.13	0.53	1	304.28

Analysis Options

```
Flow Units ............... LPS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... HORTON
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 01/01/2000 00:00:00
Ending Date .............. 01/01/2000 06:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:01:00
Dry Time Step ............ 00:01:00
Routing Time Step ........ 1.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 1
Head Tolerance ........... 0.001500 m
```

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.026	31.880
Evaporation Loss	0.000	0.000
Infiltration Loss	0.007	8.863
Surface Runoff	0.018	21.891
Final Storage	0.001	1.158
Continuity Error (%)	-0.103	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.018	0.180
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.018	0.178
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.002
Continuity Error (%)	0.021	

Highest Continuity Errors

Node 520_(P-Stm) (1.34%)

Time-Step Critical Elements

None

Highest Flow Instability Indexes

All links are stable.

Most Frequent Nonconverging Nodes

Convergence obtained at all time steps.

Routing Time Step Summary

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

Subcatchment Runoff Summary

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff
S1	31.88	0.00	0.00	31.69	0.00	0.20	0.20	0.00	0.20	0.006
S10	31.88	0.00	0.00	0.12	30.24	0.01	30.25	0.01	6.54	0.949
S11	31.88	0.00	0.00	3.05	27.41	0.04	27.45	0.03	24.86	0.861
S12	31.88	0.00	0.00	31.69	0.11	0.07	0.18	0.00	0.06	0.006
S14_1	31.88	0.00	0.00	20.09	15.99	11.03	11.03	0.00	2.04	0.346
S14_2	31.88	0.00	0.00	25.38	9.60	6.06	6.06	0.00	2.56	0.190
S15	31.88	0.00	0.00	22.71	12.97	8.57	8.57	0.00	6.09	0.269
S2	31.88	0.00	0.00	11.76	19.10	0.06	19.16	0.01	10.02	0.601
S3	31.88	0.00	0.00	1.03	29.34	0.02	29.36	0.02	15.12	0.921
S32	31.88	0.00	0.00	29.66	4.34	1.14	2.01	0.00	1.28	0.063
S4	31.88	0.00	0.00	0.01	30.33	0.00	30.33	0.01	9.90	0.951
S45	31.88	0.00	0.00	0.01	30.33	0.00	30.33	0.01	4.74	0.951
S5	31.88	0.00	0.00	3.27	27.25	0.06	27.25	0.02	16.19	0.855
S6	31.88	0.00	0.00	31.68	0.00	0.21	0.21	0.00	0.27	0.007
S7	31.88	0.00	0.00	0.00	30.33	0.00	30.33	0.02	14.63	0.951
S8	31.88	0.00	0.00	6.30	24.35	0.05	24.35	0.02	16.11	0.764
S9	31.88	0.00	0.00	7.32	23.32	0.07	23.39	0.01	4.63	0.734

****

Node Depth Summary

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
518_Orifice	JUNCTION	0.05	0.17	81.53	0 01:18	0.17
518A_(P-Stm)	OUTFALL	0.55	0.55	81.20	0 00:00	0.55
518_(P-Stm)	STORAGE	0.55	2.11	83.17	0 01:19	2.10
519_(P-Stm)	STORAGE	0.33	0.97	83.17	0 01:19	0.97
520_(P-Stm)	STORAGE	0.31	0.68	83.17	0 01:17	0.68
521_(P-Stm)	STORAGE	0.37	1.21	83.17	0 01:18	1.21
522_(P-Stm)	STORAGE	0.34	0.99	83.17	0 01:18	0.99
CB200	STORAGE	0.03	0.79	83.97	0 01:10	0.79
CB201	STORAGE	0.10	2.41	85.50	0 01:10	2.40
CB202	STORAGE	0.08	1.83	84.59	0 01:10	1.82
CB203	STORAGE	0.06	0.88	83.63	0 01:10	0.87
CB204	STORAGE	0.10	1.66	84.41	0 01:10	1.65
CB205	STORAGE	0.06	0.96	83.81	0 01:10	0.96
CB206	STORAGE	0.15	2.50	85.27	0 01:10	2.50
CB207	STORAGE	0.08	1.61	84.76	0 01:10	1.59
CB208	STORAGE	0.05	1.46	84.76	0 01:10	1.45
CB209	STORAGE	0.01	0.30	83.50	0 01:10	0.30
CB210B	STORAGE	0.06	1.02	83.67	0 01:12	1.02
CB211	STORAGE	0.00	0.03	83.73	0 01:10	0.03
CB212	STORAGE	0.00	0.15	83.35	0 01:11	0.15
CB212A	STORAGE	0.00	0.00	83.62	0 00:00	0.00
CB213	STORAGE	0.00	0.03	83.18	0 01:19	0.02
CB214	STORAGE	0.01	0.23	83.18	0 01:16	0.23

Node Inflow Summary

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
518_Orifice	JUNCTION	0.00	46.73	0 01:19	0	0.178	-0.002
518A_(P-Stm)	OUTFALL	0.00	46.70	0 01:18	0	0.178	0.000
518_(P-Stm)	STORAGE	0.00	87.58	0 01:07	0	0.179	-0.317
519_(P-Stm)	STORAGE	0.00	54.39	0 01:07	0	0.0792	-0.744
520_(P-Stm)	STORAGE	14.63	54.39	0 01:10	0.0208	0.0807	1.362
521_(P-Stm)	STORAGE	0.00	56.98	0 01:11	0	0.0971	0.164
522_(P-Stm)	STORAGE	0.00	40.84	0 01:08	0	0.0535	-0.051
CB200	STORAGE	16.19	16.19	0 01:10	0.023	0.023	-0.001
CB201	STORAGE	16.11	16.11	0 01:10	0.0229	0.0229	0.001
CB202	STORAGE	24.86	24.86	0 01:10	0.0349	0.0349	-0.000
CB203	STORAGE	4.74	4.74	0 01:10	0.00673	0.00673	0.000
CB204	STORAGE	6.54	6.54	0 01:10	0.00929	0.00929	-0.000
CB205	STORAGE	4.63	4.63	0 01:10	0.00643	0.00643	-0.000
CB206	STORAGE	9.90	9.90	0 01:10	0.0141	0.0141	0.000
CB207	STORAGE	15.12	15.12	0 01:10	0.0213	0.023	-0.009
CB208	STORAGE	0.20	3.99	0 01:02	3.77e-05	0.00173	0.101
CB209	STORAGE	10.02	10.02	0 01:10	0.014	0.014	-0.002
CB210B	STORAGE	6.09	6.09	0 01:10	0.00319	0.00319	0.001
CB211	STORAGE	2.04	2.04	0 01:10	0.00128	0.00128	0.862
CB212	STORAGE	2.56	4.59	0 01:10	0.00108	0.00235	-0.667
CB212A	STORAGE	0.00	0.00	0 00:00	0	0	0.000 ltr
CB213	STORAGE	0.06	1.30	0 01:18	2.72e-05	0.000125	-0.493
CB214	STORAGE	1.55	8.59	0 01:11	0.00109	0.00169	0.080

Node Surcharge Summary

No nodes were surcharged.

Node Flooding Summary

No nodes were flooded.

Storage Volume Summary

Storage Unit	Average Volume 1000 m³	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m³	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow LPS
518_(P-Stm)	0.001	12.4	0.0	0.0	0.002	47.8	0 01:19	60.46
519_(P-Stm)	0.000	9.5	0.0	0.0	0.001	27.7	0 01:19	50.98
520_(P-Stm)	0.000	10.8	0.0	0.0	0.001	23.7	0 01:17	54.18
521_(P-Stm)	0.000	10.1	0.0	0.0	0.001	33.0	0 01:18	57.49
522_(P-Stm)	0.000	10.1	0.0	0.0	0.001	29.8	0 01:18	31.05
CB200	0.000	0.0	0.0	0.0	0.000	0.7	0 01:10	16.08
CB201	0.000	0.1	0.0	0.0	0.001	2.9	0 01:10	13.84
CB202	0.000	0.1	0.0	0.0	0.001	1.2	0 01:10	23.39
CB203	0.000	0.1	0.0	0.0	0.000	1.1	0 01:10	3.64
CB204	0.000	0.3	0.0	0.0	0.001	5.0	0 01:10	4.37
CB205	0.000	0.3	0.0	0.0	0.000	4.7	0 01:10	3.33
CB206	0.000	0.8	0.0	0.0	0.001	13.8	0 01:10	6.50

CB207	0.000	0.1	0.0	0.0	0.001	1.9	0	01:10	13.08
CB208	0.000	0.0	0.0	0.0	0.000	0.9	0	01:10	2.80
CB209	0.000	0.0	0.0	0.0	0.000	0.2	0	01:10	9.88
CB210B	0.000	0.0	0.0	0.0	0.000	0.5	0	01:12	2.89
CB211	0.000	0.0	0.0	0.0	0.000	0.1	0	01:10	2.03
CB212	0.000	0.0	0.0	0.0	0.000	0.8	0	01:11	3.35
CB212A	0.000	0.0	0.0	0.0	0.000	0.0	0	00:00	0.00
CB213	0.000	0.0	0.0	0.0	0.000	0.3	0	01:19	1.47
CB214	0.000	0.0	0.0	0.0	0.000	0.3	0	01:16	8.94

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
518A_(P-Stm)	62.73	13.16	46.70	0.178
System	62.73	13.16	46.70	0.178

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C2	CONDUIT	3.99	0 01:02	0.10	0.07	1.00
C4	CONDUIT	0.00	0 00:00	0.00	0.00	0.19
C5	CONDUIT	2.03	0 01:10	0.67	0.02	0.24
CB213	CONDUIT	1.47	0 01:19	0.11	0.02	0.56
CB214	CONDUIT	8.94	0 01:11	0.33	0.16	0.97
Pipe_-_(104)_(P-Stm)_2	CONDUIT	46.70	0 01:18	0.94	0.33	0.35
Pipe_-_(110)_(P-Stm)	CONDUIT	57.49	0 01:07	0.72	0.23	1.00
Pipe_-_(111)_(P-Stm)	CONDUIT	31.05	0 01:11	0.50	0.10	1.00
Pipe_-_(71)_(P-Stm)	CONDUIT	54.18	0 01:10	0.99	0.20	0.87
Pipe_-_(72)_(P-Stm)	CONDUIT	50.98	0 01:06	0.97	0.17	1.00
OR1	ORIFICE	46.73	0 01:19			1.00
W1	WEIR	0.00	0 00:00			0.00
W2	WEIR	0.00	0 00:00			0.00
W3	WEIR	0.00	0 00:00			0.00
W4	WEIR	0.00	0 00:00			0.00
W5	WEIR	0.00	0 00:00			0.00
W6	WEIR	0.00	0 00:00			0.00
W7	WEIR	0.00	0 00:00			0.00
CB200	DUMMY	16.08	0 01:10			
CB201	DUMMY	13.84	0 01:10			
CB202	DUMMY	23.39	0 01:08			
CB203	DUMMY	3.64	0 01:08			
CB204	DUMMY	4.37	0 01:10			
CB205	DUMMY	3.33	0 01:08			
CB206	DUMMY	6.50	0 01:10			
Cb207	DUMMY	11.33	0 01:10			
CB209	DUMMY	9.88	0 01:10			
CB210B	DUMMY	2.89	0 01:11			
CB212	DUMMY	3.35	0 01:11			

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	---------- Fraction of Time in Flow Class ---------- Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C2	1.00	0.12	0.03	0.00	0.13	0.00	0.00	0.72	0.04	0.00
C4	1.00	0.97	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C5	1.00	0.17	0.00	0.00	0.02	0.00	0.00	0.80	0.03	0.00
CB213	1.00	0.09	0.00	0.00	0.09	0.00	0.00	0.82	0.08	0.00
CB214	1.00	0.09	0.00	0.00	0.09	0.00	0.00	0.82	0.03	0.00
Pipe_-_(104)_(P-Stm)_2	1.00	0.11	0.00	0.00	0.00	0.00	0.00	0.89	0.00	0.00
Pipe_-_(110)_(P-Stm)	1.00	0.11	0.00	0.00	0.15	0.00	0.00	0.75	0.00	0.00
Pipe_-_(111)_(P-Stm)	1.00	0.10	0.00	0.00	0.89	0.00	0.00	0.00	0.77	0.00
Pipe_-_(71)_(P-Stm)	1.00	0.10	0.00	0.00	0.11	0.00	0.00	0.79	0.04	0.00
Pipe_-_(72)_(P-Stm)	1.00	0.11	0.00	0.00	0.13	0.00	0.00	0.75	0.01	0.00

****
Conduit Surcharge Summary
****

Conduit	--------- Hours Full -------- Both Ends	Upstream	Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C2	0.35	0.35	0.38	0.01	0.01
CB213	0.01	0.01	0.32	0.01	0.01
CB214	0.01	0.01	0.32	0.01	0.01
Pipe_-_(110)_(P-Stm)	0.53	0.53	0.62	0.01	0.01
Pipe_-_(111)_(P-Stm)	0.32	0.32	0.53	0.01	0.01
Pipe_-_(71)_(P-Stm)	0.01	0.01	0.23	0.01	0.01
Pipe_-_(72)_(P-Stm)	0.30	0.30	0.46	0.01	0.01

Analysis begun on: Thu Aug 29 09:25:38 2024
Analysis ended on: Thu Aug 29 09:25:38 2024
Total elapsed time: < 1 sec

Post-Development 3-hour Chicago 1:100 year Event

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

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

START_DATE           01/01/2000
START_TIME           00:00:00
REPORT_START_DATE    01/01/2000
REPORT_START_TIME    00:00:00
END_DATE             01/01/2000
END_TIME             06:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:01:00
WET_STEP             00:01:00
DRY_STEP             00:01:00
ROUTING_STEP         1
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
MAX_TRIALS           8
HEAD_TOLERANCE       0.0015
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              12

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

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- -------- -------- ----------
3CHI100          INTENSITY 0:10     1.0      TIMESERIES 3CHI100

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen
SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- --------
- ----------------
S1               3CHI100          CB208            0.0187   0        29.61    2.2      0
S10              3CHI100          CB204            0.0307   99.617   55.32    2.2      0
S11              3CHI100          CB202            0.127    90.325   65.66    2.2      0
S12              3CHI100          CB213            0.0149   0.369    6.44     2.2      0
S14_1            3CHI100          CB211            0.0116   52.676   22.78    2.2      0
S14_2            3CHI100          CB212            0.0179   31.654   58.12    2.2      0
S15              3CHI100          CB210B           0.0372   42.751   108.74   2.2      0
S2               3CHI100          CB209            0.0729   62.937   33.61    2.2      0
S3               3CHI100          CB207            0.0724   96.692   45.79    2.2      0
S32              3CHI100          CB214            0.052    14.286   29.7     2.2      0
S4               3CHI100          CB206            0.0464   99.975   24.67    2.2      0
S45              3CHI100          CB203            0.0222   99.962   14.32    2.2      0
S5               3CHI100          CB200            0.0843   89.589   82.96    2.2      0
S6               3CHI100          CB214            0.0239   0        40.3     2.2      0
S7               3CHI100          520_(P-Stm)      0.0686   100      25.95    2.2      0
S8               3CHI100          CB201            0.0941   80.117   35.06    2.2      0
S9               3CHI100          CB205            0.0275   76.83    19.08    2.2      0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
S1               0.013      0.25       1.57       4.67       0          OUTLET
S10              0.013      0.25       1.57       4.67       0          OUTLET
S11              0.013      0.25       1.57       4.67       0          OUTLET
S12              0.013      0.25       1.57       4.67       0          OUTLET
S14_1            0.013      0.25       1.57       4.67       0          PERVIOUS   100
S14_2            0.013      0.25       1.57       4.67       0          PERVIOUS   100
S15              0.013      0.25       1.57       4.67       0          PERVIOUS   100
S2               0.013      0.25       1.57       4.67       0          OUTLET
S3               0.013      0.25       1.57       4.67       0          OUTLET
S32              0.013      0.25       1.57       4.67       0          PERVIOUS   80
S4               0.013      0.25       1.57       4.67       0          OUTLET
S45              0.013      0.25       1.57       4.67       0          IMPERVIOUS 100
S5               0.013      0.25       1.57       4.67       0          IMPERVIOUS 100
S6               0.013      0.25       1.57       4.67       0          OUTLET
S7               0.013      0.25       1.57       4.67       0          OUTLET
S8               0.013      0.25       1.57       4.67       0          IMPERVIOUS 100
S9               0.013      0.25       1.57       4.67       0          OUTLET

[INFILTRATION]
;;Subcatchment   Param1     Param2     Param3     Param4     Param5
;;-------------- ---------- ---------- ---------- ---------- ----------
S1               76.2       13.2       4.14       7          0
S10              76.2       13.2       4.14       7          0
S11              76.2       13.2       4.14       7          0
S12              76.2       13.2       4.14       7          0
S14_1            76.2       13.2       4.14       7          0
S14_2            76.2       13.2       4.14       7          0
S15              76.2       13.2       4.14       7          0
S2               76.2       13.2       4.14       7          0
S3               76.2       13.2       4.14       7          0
S32              76.2       13.2       4.14       7          0
S4               76.2       13.2       4.14       7          0
S45              76.2       13.2       4.14       7          0
S5               76.2       13.2       4.14       7          0
S6               76.2       13.2       4.14       7          0
S7               76.2       13.2       4.14       7          0
S8               76.2       13.2       4.14       7          0
S9               76.2       13.2       4.14       7          0

[JUNCTIONS]
;;Name           Elevation  MaxDepth   InitDepth  SurDepth   Aponded
;;-------------- ---------- ---------- ---------- ---------- ----------
518_Orifice      81.361     4.106      0          0          0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
;Cylindrical Structure Slab Top Circular Frame SI
518A_(P-Stm)     80.646     FIXED      81.28            NO

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params
SurDepth Fevap    Psi      Ksat     IMD
;;-------------- -------- ---------- ----------- ---------- ---------------------------- -----
--- -------- -------- -------- --------
;Cylindrical Structure Slab Top Circular Frame SI
518_(P-Stm)      81.061   4.406      0.219      FUNCTIONAL  0         0         1.13     0
0
;Cylindrical Structure Slab Top Circular Frame SI
519_(P-Stm)      82.197   3.512      0          FUNCTIONAL  0         0         1.13     0
0
;Cylindrical Structure Slab Top Circular Frame SI
520_(P-Stm)      82.487   2.888      0          FUNCTIONAL  0         0         1.13     0
0
;Cylindrical Structure Slab Top Circular Frame SI
521_(P-Stm)      81.957   3.673      0          FUNCTIONAL  0         0         1.13     0
0
;Cylindrical Structure Slab Top Circular Frame SI
522_(P-Stm)      82.182   3.323      0          FUNCTIONAL  0         0         1.13     0
0
;85.1800000001676
CB200            83.18    2.32       0          TABULAR    CB200                        0
0
;85.5000000001435
CB201            83.09    2.66       0          TABULAR    CB201                        0
0
;85.36
CB202            82.76    2.89       0          TABULAR    CB202                        0
0
;85.3500000000931
CB203            82.75    2.9        0          TABULAR    CB203                        0
0
;85.3500080822731
CB204            82.75    2.75       0          TABULAR    CB204                        0
0
;85.4500080823662
CB205            82.85    2.75       0          TABULAR    CB205                        0
0
;85.48
CB206            82.77    2.73       0          TABULAR    CB206                        0
0
;85.05
CB207            83.15    2.3        0          TABULAR    CB207                        0
0
;84.9000080821652
CB208            83.3     2.04       0          TABULAR    CB208                        0
0
;84.8
CB209            83.2     1.9        0          TABULAR    CB209                        0
0
;85.25
CB210B           82.65    3          0          TABULAR    CB210B                       0
0
;85.35
CB211            83.7     1.9        0          TABULAR    CB211                        0
0
;85.4
CB212            83.2     2.42       0          TABULAR    CB212                        0
0
;85.5000000000554
CB212A           83.62    2          0          TABULAR    CB212A                       0
0
;84.75
CB213            83.15    1.75       0          TABULAR    CB213                        0
0
;84.55
CB214            82.95    1.9        0          TABULAR    CB214                        0
0

[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset   OutOffset
InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ----------
---------- ----------
C2               CB208            CB207            9.666      0.013      83.3       83.2
0          0
C4               CB212A           CB212            18.475     0.013      83.62      83.25
0          0
C5               CB211            CB212            22.346     0.013      83.7       83.25
0          0
CB213            CB213            522_(P-Stm)      29.34      0.013      83.15      82.757
0          0
CB214            CB214            522_(P-Stm)      21.65      0.013      82.95      82.757
0          0
;PVC Pipes
Pipe_-_(104)_(P-Stm)_2 518_Orifice 518A_(P-Stm)    15.623     0.013      81.361     81.322
0          0
;PVC Pipes
Pipe_-_(110)_(P-Stm) 521_(P-Stm)  518_(P-Stm)      27.209     0.013      82.257     82.161
0          0
;PVC Pipes
Pipe_-_(111)_(P-Stm) 522_(P-Stm)  521_(P-Stm)      45.094     0.013      82.482     82.257
0          0
;Concrete Pipes 100-D
Pipe_-_(71)_(P-Stm) 520_(P-Stm)   519_(P-Stm)      57.146     0.013      82.787     82.557
0          0
;Concrete Pipes 100-D
Pipe_-_(72)_(P-Stm) 519_(P-Stm)   518_(P-Stm)      31.967     0.013      82.497     82.337
0          0

[ORIFICES]
;;Name           From Node        To Node          Type         Offset     Qcoeff     Gated
CloseTime
;;-------------- ---------------- ---------------- ------------ ---------- ---------- --------
----------
OR1              518_(P-Stm)      518_Orifice      SIDE         81.361     0.65       NO
0

[WEIRS]
;;Name           From Node        To Node          Type         CrestHt    Qcoeff     Gated
EndCon   EndCoeff   Surcharge  RoadWidth  RoadSurf   Coeff. Curve
;;-------------- ---------------- ---------------- ------------ ---------- ---------- --------
-------- ---------- ---------- ---------- ---------- ----------------
W1               CB208            CB209            TRANSVERSE   85.31      1.84       NO
0        0          YES
W2               CB210B           CB211            TRANSVERSE   85.6       1.84       NO
0        0          YES
W3               CB210B           CB202            TRANSVERSE   85.45      1.84       NO
0        0          YES
W4               CB202            CB204            TRANSVERSE   85.55      1.84       NO
0        0          YES
W5               CB206            CB207            TRANSVERSE   85.45      1.84       NO
0        0          YES
W6               CB201            CB200            TRANSVERSE   85.65      1.84       NO
0        0          YES
W7               CB200            CB209            TRANSVERSE   85.42      1.84       NO
0        0          YES

[OUTLETS]
;;Name           From Node        To Node          Offset     Type             QTable/Qcoeff
Qexpon     Gated
;;-------------- ---------------- ---------------- ---------- ---------------- ----------------
- ---------- --------
CB200            CB200            520_(P-Stm)      83.18      TABULAR/HEAD     IPEX_Type_A
NO
;Critical
CB201            CB201            520_(P-Stm)      83.09      TABULAR/HEAD     Vortex_ICD_100
NO
;Critical
CB202            CB202            521_(P-Stm)      82.76      TABULAR/HEAD     IPEX_Type_A
NO
CB203            CB203            521_(P-Stm)      82.75      TABULAR/HEAD     Vortex_ICD_70
NO
CB204            CB204            522_(P-Stm)      82.75      TABULAR/HEAD     Vortex_ICD_65
NO
CB205            CB205            522_(P-Stm)      82.85      TABULAR/HEAD     Vortex_ICD_65
NO
CB206            CB206            522_(P-Stm)      82.77      TABULAR/HEAD     Vortex_ICD_70
NO
Cb207            CB207            522_(P-Stm)      83.15      TABULAR/HEAD     Vortex_ICD_100
NO
CB209            CB209            520_(P-Stm)      83.2       TABULAR/HEAD     IPEX_Type_A
NO
```

```
CB210B           CB210B           518_(P-Stm)      82.65      TABULAR/HEAD     Vortex_ICD_65
NO
CB212            CB212            521_(P-Stm)      83.2       TABULAR/HEAD     Vortex_ICD_100
NO

[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels
Culvert
;;-------------- ------------ ---------------- ---------- ---------- ---------- ---------- ---
-------
C2               CIRCULAR     0.25             0          0          0          1
C4               CIRCULAR     0.25             0          0          0          1
C5               CIRCULAR     0.25             0          0          0          1
CB213            CIRCULAR     0.25             0          0          0          1
CB214            CIRCULAR     0.25             0          0          0          1
Pipe_-_(104)_(P-Stm)_2 CIRCULAR 0.45           0          0          0          1
Pipe_-_(110)_(P-Stm) CIRCULAR 0.525            0          0          0          1
Pipe_-_(111)_(P-Stm) CIRCULAR 0.525            0          0          0          1
Pipe_-_(71)_(P-Stm) CIRCULAR  0.525            0          0          0          1
Pipe_-_(72)_(P-Stm) CIRCULAR  0.525            0          0          0          1
OR1              CIRCULAR     0.127            0          0          0
W1               RECT_OPEN    0.03             1.5        0          0
W2               RECT_OPEN    0.05             2.59       0          0
W3               RECT_OPEN    0.2              1.34       0          0
W4               RECT_OPEN    0.1              4.9        0          0
W5               RECT_OPEN    0.05             4.725      0          0
W6               RECT_OPEN    0.1              6          0          0
W7               RECT_OPEN    0.08             10.5       0          0

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

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
CB210-OUT85.5    Rating     0          0
CB210-OUT85.5               85.5       0.04
CB210-OUT85.5               100        0.04

CB210-OUT-85.6   Rating     0          0
CB210-OUT-85.6              85.6       0.08
CB210-OUT-85.6              100        0.08

;IPEX Type A ICD Rating Curve
IPEX_Type_A      Rating     0          0
IPEX_Type_A                 0.1        5.7
IPEX_Type_A                 0.2        8.1
IPEX_Type_A                 0.3        9.9
IPEX_Type_A                 0.4        11.4
IPEX_Type_A                 0.5        12.8
IPEX_Type_A                 0.6        14
IPEX_Type_A                 0.7        15.1
IPEX_Type_A                 0.8        16.2
IPEX_Type_A                 0.9        17.2
IPEX_Type_A                 1          18.1
IPEX_Type_A                 1.2        19.8
IPEX_Type_A                 1.4        21.4
IPEX_Type_A                 1.6        22.9
IPEX_Type_A                 1.8        24.3
IPEX_Type_A                 2          25.6
IPEX_Type_A                 2.5        28.6
IPEX_Type_A                 3          31.3

;IPEX Type B ICD Rating Curve
IPEX_Type_B      Rating     0          0
IPEX_Type_B                 0.1        8.1
IPEX_Type_B                 0.2        11.5
IPEX_Type_B                 0.3        14.1
IPEX_Type_B                 0.4        16.2
IPEX_Type_B                 0.5        18.2
IPEX_Type_B                 0.6        19.9
IPEX_Type_B                 0.7        21.5
IPEX_Type_B                 0.8        23
IPEX_Type_B                 0.9        24.4
IPEX_Type_B                 1          25.7
IPEX_Type_B                 1.2        28.1
IPEX_Type_B                 1.4        30.4
IPEX_Type_B                 1.6        32.5
IPEX_Type_B                 1.8        34.4
IPEX_Type_B                 2          36.3
IPEX_Type_B                 2.5        40.6
IPEX_Type_B                 3          44.5

;IPEX Type C ICD Rating Curve
IPEX_Type_C      Rating     0          0
IPEX_Type_C                 0.1        10.6
IPEX_Type_C                 0.2        15
IPEX_Type_C                 0.3        18.3
IPEX_Type_C                 0.4        21.2
IPEX_Type_C                 0.5        23.7
IPEX_Type_C                 0.6        25.9
IPEX_Type_C                 0.7        28
IPEX_Type_C                 0.8        29.9
IPEX_Type_C                 0.9        31.7
IPEX_Type_C                 1          33.5
IPEX_Type_C                 1.2        36.6
IPEX_Type_C                 1.4        39.6
IPEX_Type_C                 1.6        42.3
IPEX_Type_C                 1.8        44.9
IPEX_Type_C                 2          47.3
IPEX_Type_C                 2.5        52.9
IPEX_Type_C                 3          57.9

;IPEX Type AA ICD Rating Curve
IPEX_Type_D      Rating     0          0
IPEX_Type_D                 0.1        15.4
IPEX_Type_D                 0.2        21.7
IPEX_Type_D                 0.3        26.6
IPEX_Type_D                 0.4        30.7
IPEX_Type_D                 0.5        34.3
IPEX_Type_D                 0.6        37.6
IPEX_Type_D                 0.7        40.6
IPEX_Type_D                 0.8        43.4
IPEX_Type_D                 0.9        46.1
IPEX_Type_D                 1          48.5
IPEX_Type_D                 1.2        53.2
IPEX_Type_D                 1.4        57.4
IPEX_Type_D                 1.6        61.4
IPEX_Type_D                 1.8        65.1
IPEX_Type_D                 2          68.7
IPEX_Type_D                 2.5        76.8
IPEX_Type_D                 3          84.1

;IPEX Type E ICD Rating Curve
IPEX_Type_E      Rating     0          0
IPEX_Type_E                 0.1        20.5
IPEX_Type_E                 0.2        28.9
IPEX_Type_E                 0.3        35.5
IPEX_Type_E                 0.4        40.9
IPEX_Type_E                 0.5        45.8
IPEX_Type_E                 0.6        50.1
IPEX_Type_E                 0.7        54.2
IPEX_Type_E                 0.8        57.9
IPEX_Type_E                 0.9        61.4
IPEX_Type_E                 1          64.7
IPEX_Type_E                 1.2        70.9
IPEX_Type_E                 1.4        76.6
IPEX_Type_E                 1.6        81.9
IPEX_Type_E                 1.8        86.8
IPEX_Type_E                 2          91.5
IPEX_Type_E                 2.5        102.3
IPEX_Type_E                 3          112.1

;Tempest Rating Curve for Vortex ICD 100, No grate allowance
Vortex_ICD_100   Rating     0          0
Vortex_ICD_100              0.1        2.8
Vortex_ICD_100              0.2        4
Vortex_ICD_100              0.3        4.9
Vortex_ICD_100              0.4        5.6
Vortex_ICD_100              0.5        6.3
Vortex_ICD_100              0.6        6.9
Vortex_ICD_100              0.7        7.5
Vortex_ICD_100              0.8        8
Vortex_ICD_100              0.9        8.5
Vortex_ICD_100              1          8.9
Vortex_ICD_100              1.2        9.8
Vortex_ICD_100              1.4        10.6
Vortex_ICD_100              1.6        11.3
Vortex_ICD_100              1.8        12
Vortex_ICD_100              2          12.6
Vortex_ICD_100              2.5        14.1
Vortex_ICD_100              3          15.5

;Tempest Rating Curve for Vortex ICD 105, No grate allowance
Vortex_ICD_105   Rating     0          0
Vortex_ICD_105              0.1        3.1
Vortex_ICD_105              0.2        4.4
Vortex_ICD_105              0.3        5.4
Vortex_ICD_105              0.4        6.2
Vortex_ICD_105              0.5        6.9
Vortex_ICD_105              0.6        7.6
Vortex_ICD_105              0.7        8.2
Vortex_ICD_105              0.8        8.8
Vortex_ICD_105              0.9        9.3
Vortex_ICD_105              1          9.8
Vortex_ICD_105              1.2        10.7
Vortex_ICD_105              1.4        11.6
Vortex_ICD_105              1.6        12.4
Vortex_ICD_105              1.8        13.1
Vortex_ICD_105              2          13.9
Vortex_ICD_105              2.5        15.5
Vortex_ICD_105              3          17

;Tempest Rating Curve for Vortex ICD 40, No grate allowance
Vortex_ICD_40    Rating     0          0
Vortex_ICD_40               0.1        0.4
Vortex_ICD_40               0.2        0.6
Vortex_ICD_40               0.3        0.7
Vortex_ICD_40               0.4        0.9
Vortex_ICD_40               0.5        1
Vortex_ICD_40               0.6        1
Vortex_ICD_40               0.7        1.1
Vortex_ICD_40               0.8        1.2
Vortex_ICD_40               0.9        1.3
Vortex_ICD_40               1          1.4
Vortex_ICD_40               1.2        1.5
Vortex_ICD_40               1.4        1.6
Vortex_ICD_40               1.6        1.7
Vortex_ICD_40               1.8        1.8
Vortex_ICD_40               2          1.9
Vortex_ICD_40               2.5        2.2
Vortex_ICD_40               3          2.4

;Tempest Rating Curve for Vortex ICD 45, No grate allowance
Vortex_ICD_45    Rating     0          0
Vortex_ICD_45               0.1        0.6
Vortex_ICD_45               0.2        0.8
Vortex_ICD_45               0.3        1
Vortex_ICD_45               0.4        1.1
Vortex_ICD_45               0.5        1.3
Vortex_ICD_45               0.6        1.4
Vortex_ICD_45               0.7        1.5
Vortex_ICD_45               0.8        1.6
Vortex_ICD_45               0.9        1.7
Vortex_ICD_45               1          1.8
Vortex_ICD_45               1.2        2
Vortex_ICD_45               1.4        2.1
Vortex_ICD_45               1.6        2.3
Vortex_ICD_45               1.8        2.4
Vortex_ICD_45               2          2.6
Vortex_ICD_45               2.5        2.9
Vortex_ICD_45               3          3.1

;Tempest Rating Curve for Vortex ICD 50, No grate allowance
Vortex_ICD_50    Rating     0          0
Vortex_ICD_50               0.1        0.7
Vortex_ICD_50               0.2        1
Vortex_ICD_50               0.3        1.2
Vortex_ICD_50               0.4        1.4
Vortex_ICD_50               0.5        1.6
Vortex_ICD_50               0.6        1.8
Vortex_ICD_50               0.7        1.9
Vortex_ICD_50               0.8        2
Vortex_ICD_50               0.9        2.1
Vortex_ICD_50               1          2.3
Vortex_ICD_50               1.2        2.5
Vortex_ICD_50               1.4        2.7
Vortex_ICD_50               1.6        2.9
Vortex_ICD_50               1.8        3
Vortex_ICD_50               2          3.2
Vortex_ICD_50               2.5        3.6
Vortex_ICD_50               3          3.9

;Tempest Rating Curve for Vortex ICD 55, No grate allowance
Vortex_ICD_55    Rating     0          0
Vortex_ICD_55               0.1        0.9
Vortex_ICD_55               0.2        1.2
Vortex_ICD_55               0.3        1.5
Vortex_ICD_55               0.4        1.7
Vortex_ICD_55               0.5        1.9
Vortex_ICD_55               0.6        2.1
Vortex_ICD_55               0.7        2.3
Vortex_ICD_55               0.8        2.4
Vortex_ICD_55               0.9        2.6
Vortex_ICD_55               1          2.7
Vortex_ICD_55               1.2        3
Vortex_ICD_55               1.4        3.2
Vortex_ICD_55               1.6        3.4
Vortex_ICD_55               1.8        3.6
Vortex_ICD_55               2          3.8
Vortex_ICD_55               2.5        4.3
Vortex_ICD_55               3          4.7

;Tempest Rating Curve for Vortex ICD 60, No grate allowance
Vortex_ICD_60    Rating     0          0
Vortex_ICD_60               0.1        1.1
Vortex_ICD_60               0.2        1.5
Vortex_ICD_60               0.3        1.8
Vortex_ICD_60               0.4        2.1
Vortex_ICD_60               0.5        2.3
Vortex_ICD_60               0.6        2.5
Vortex_ICD_60               0.7        2.7
Vortex_ICD_60               0.8        2.9
Vortex_ICD_60               0.9        3.1
Vortex_ICD_60               1          3.2
Vortex_ICD_60               1.2        3.6
Vortex_ICD_60               1.4        3.8
Vortex_ICD_60               1.6        4.1
Vortex_ICD_60               1.8        4.3
Vortex_ICD_60               2          4.6
Vortex_ICD_60               2.5        5.1
Vortex_ICD_60               3          5.6

;Tempest Rating Curve for Vortex ICD 65, No grate allowance
Vortex_ICD_65    Rating     0          0
Vortex_ICD_65               0.1        1.2
Vortex_ICD_65               0.2        1.6
Vortex_ICD_65               0.3        2
Vortex_ICD_65               0.4        2.3
Vortex_ICD_65               0.5        2.5
Vortex_ICD_65               0.6        2.8
Vortex_ICD_65               0.7        3
Vortex_ICD_65               0.8        3.2
Vortex_ICD_65               0.9        3.4
Vortex_ICD_65               1          3.6
Vortex_ICD_65               1.2        4
Vortex_ICD_65               1.4        4.3
```

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Vortex_ICD_65              1.6        4.6
Vortex_ICD_65              1.8        4.9
Vortex_ICD_65              2          5.1
Vortex_ICD_65              2.5        5.7
Vortex_ICD_65              3          6.3

;Tempest Rating Curve for Vortex ICD 70, No grate allowance
Vortex_ICD_70    Rating    0          0
Vortex_ICD_70              0.1        1.3
Vortex_ICD_70              0.2        1.9
Vortex_ICD_70              0.3        2.3
Vortex_ICD_70              0.4        2.7
Vortex_ICD_70              0.5        3
Vortex_ICD_70              0.6        3.3
Vortex_ICD_70              0.7        3.6
Vortex_ICD_70              0.8        3.8
Vortex_ICD_70              0.9        4.1
Vortex_ICD_70              1          4.3
Vortex_ICD_70              1.2        4.7
Vortex_ICD_70              1.4        5.1
Vortex_ICD_70              1.6        5.5
Vortex_ICD_70              1.8        5.8
Vortex_ICD_70              2          6.1
Vortex_ICD_70              2.5        6.8
Vortex_ICD_70              3          7.5

;Tempest Rating Curve for Vortex ICD 75, No grate allowance
Vortex_ICD_75    Rating    0          0
Vortex_ICD_75              0.1        1.6
Vortex_ICD_75              0.2        2.2
Vortex_ICD_75              0.3        2.7
Vortex_ICD_75              0.4        3.2
Vortex_ICD_75              0.5        3.5
Vortex_ICD_75              0.6        3.9
Vortex_ICD_75              0.7        4.2
Vortex_ICD_75              0.8        4.5
Vortex_ICD_75              0.9        4.8
Vortex_ICD_75              1          5
Vortex_ICD_75              1.2        5.5
Vortex_ICD_75              1.4        5.9
Vortex_ICD_75              1.6        6.3
Vortex_ICD_75              1.8        6.7
Vortex_ICD_75              2          7.1
Vortex_ICD_75              2.5        7.9
Vortex_ICD_75              3          8.7

;Tempest Rating Curve for Vortex ICD 80, No grate allowance
Vortex_ICD_80    Rating    0          0
Vortex_ICD_80              0.1        1.8
Vortex_ICD_80              0.2        2.6
Vortex_ICD_80              0.3        3.1
Vortex_ICD_80              0.4        3.6
Vortex_ICD_80              0.5        4
Vortex_ICD_80              0.6        4.4
Vortex_ICD_80              0.7        4.8
Vortex_ICD_80              0.8        5.1
Vortex_ICD_80              0.9        5.4
Vortex_ICD_80              1          5.7
Vortex_ICD_80              1.2        6.3
Vortex_ICD_80              1.4        6.8
Vortex_ICD_80              1.6        7.2
Vortex_ICD_80              1.8        7.7
Vortex_ICD_80              2          8.1
Vortex_ICD_80              2.5        9
Vortex_ICD_80              3          9.9

;Tempest Rating Curve for Vortex ICD 85, No grate allowance
Vortex_ICD_85    Rating    0          0
Vortex_ICD_85              0.1        2
Vortex_ICD_85              0.2        2.9
Vortex_ICD_85              0.3        3.5
Vortex_ICD_85              0.4        4.1
Vortex_ICD_85              0.5        4.5
Vortex_ICD_85              0.6        5
Vortex_ICD_85              0.7        5.4
Vortex_ICD_85              0.8        5.7
Vortex_ICD_85              0.9        6.1
Vortex_ICD_85              1          6.4
Vortex_ICD_85              1.2        7
Vortex_ICD_85              1.4        7.6
Vortex_ICD_85              1.6        8.1
Vortex_ICD_85              1.8        8.6
Vortex_ICD_85              2          9.1
Vortex_ICD_85              2.5        10.1
Vortex_ICD_85              3          11.1

;Tempest Rating Curve for Vortex ICD 90, No grate allowance
Vortex_ICD_90    Rating    0          0
Vortex_ICD_90              0.1        2.2
Vortex_ICD_90              0.2        3.2
Vortex_ICD_90              0.3        3.9
Vortex_ICD_90              0.4        4.5
Vortex_ICD_90              0.5        5.1
Vortex_ICD_90              0.6        5.5
Vortex_ICD_90              0.7        6
Vortex_ICD_90              0.8        6.4
Vortex_ICD_90              0.9        6.8
Vortex_ICD_90              1          7.2
Vortex_ICD_90              1.2        7.9
Vortex_ICD_90              1.4        8.5
Vortex_ICD_90              1.6        9.1
Vortex_ICD_90              1.8        9.6
Vortex_ICD_90              2          10.2
Vortex_ICD_90              2.5        11.4
Vortex_ICD_90              3          12.5

;Tempest Rating Curve for Vortex ICD 95, No grate allowance
Vortex_ICD_95    Rating    0          0
Vortex_ICD_95              0.1        2.6
Vortex_ICD_95              0.2        3.6
Vortex_ICD_95              0.3        4.4
Vortex_ICD_95              0.4        5.1
Vortex_ICD_95              0.5        5.7
Vortex_ICD_95              0.6        6.2
Vortex_ICD_95              0.7        6.7
Vortex_ICD_95              0.8        7.1
Vortex_ICD_95              0.9        7.6
Vortex_ICD_95              1          8
Vortex_ICD_95              1.2        8.7
Vortex_ICD_95              1.4        9.4
Vortex_ICD_95              1.6        10.1
Vortex_ICD_95              1.8        10.7
Vortex_ICD_95              2          11.3
Vortex_ICD_95              2.5        12.6
Vortex_ICD_95              3          13.8

CB200            Storage   0          0.36
CB200                      2          0.36
CB200                      2.24       210.73
CB200                      2.32       210.73

CB201            Storage   0          0.36
CB201                      2.41       0.36
CB201                      2.56       169.64
CB201                      2.66       169.64

CB202            Storage   0          0.36
CB202                      2.6        0.36
CB202                      2.79       283.64
CB202                      2.89       283.64

CB203            Storage   0          0.36
CB203                      2.6        0.36
CB203                      2.9        178.09

CB204            Storage   0          0.36
CB204                      2.6        0.36
CB204                      2.75       146.08

CB205            Storage   0          0.36
CB205                      2.6        0.36
CB205                      2.75       86.52

CB206            Storage   0          0.36
CB206                      2.6        0.36
CB206                      2.68       61.65
CB206                      2.73       61.65

CB207            Storage   0          0.36
CB207                      1.97       0.36
CB207                      2.3        182.21

CB208            Storage   0          0.073
CB208                      1.74       0.073
CB208                      2.01       67.88
CB208                      2.04       67.88

CB209            Storage   0          0.073
CB209                      1.6        0.073
CB209                      1.9        84.87

CB210B           Storage   0          0.073
CB210B                     2.6        0.073
CB210B                     2.9        60.53
CB210B                     3          60.53

CB211            Storage   0          0.073
CB211                      1.65       0.073
CB211                      1.9        21.99

CB212            Storage   0          0.36
CB212                      2.2        0.36
CB212                      2.42       55.12

CB212A           Storage   0          0.073
CB212A                     2          0.073

CB213            Storage   0          0.073
CB213                      1.6        0.073
CB213                      1.75       9.05

CB214            Storage   0          0.073
CB214                      1.6        0.073
CB214                      1.9        34.75

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
;Rainfall (mm/hr)
3CHI100          01/01/2000 00:00:00   5.339
3CHI100          01/01/2000 00:10:00   6.376
3CHI100          01/01/2000 00:20:00   7.977
3CHI100          01/01/2000 00:30:00   10.797
3CHI100          01/01/2000 00:40:00   17.136
3CHI100          01/01/2000 00:50:00   45.128
3CHI100          01/01/2000 01:00:00   178.107
3CHI100          01/01/2000 01:10:00   51.056
3CHI100          01/01/2000 01:20:00   26.163
3CHI100          01/01/2000 01:30:00   17.571
3CHI100          01/01/2000 01:40:00   13.277
3CHI100          01/01/2000 01:50:00   10.712
3CHI100          01/01/2000 02:00:00   9.008
3CHI100          01/01/2000 02:10:00   7.793
3CHI100          01/01/2000 02:20:00   6.883
3CHI100          01/01/2000 02:30:00   6.174
3CHI100          01/01/2000 02:40:00   5.607
3CHI100          01/01/2000 02:50:00   5.142
3CHI100          01/01/2000 03:00:00   0

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

[TAGS]
Node       518_Orifice      RY_Manhole
Node       CB200            RY_Manhole
Node       CB201            RY_Manhole
Node       CB202            RY_Manhole
Node       CB203            RY_Manhole
Node       CB204            RY_Manhole
Node       CB205            RY_Manhole
Node       CB206            RY_Manhole
Node       CB207            RY_Manhole
Node       CB208            RY_Manhole
Node       CB209            RY_Manhole
Node       CB210B           RY_Manhole
Node       CB211            RY_Manhole
Node       CB212            RY_Manhole
Node       CB212A           RY_Manhole
Node       CB213            RY_Manhole
Node       CB214            RY_Manhole
Link       C2               RY_Sewer
Link       C4               RY_Sewer
Link       C5               RY_Sewer

[MAP]
DIMENSIONS       381219.0294      5032865.6782     381334.8286      5033009.9278
UNITS            Meters

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
518_Orifice      381303.7           5032953.188
518A_(P-Stm)     381317.029         5032955.797
518_(P-Stm)      381301.695         5032952.807
519_(P-Stm)      381278.558         5032974.866
520_(P-Stm)      381240.562         5032932.182
521_(P-Stm)      381309.324         5032926.69
522_(P-Stm)      381267.739         5032909.252
CB200            381246.119         5032946.933
CB201            381266.142         5032969.504
CB202            381305.816         5032949.229
CB203            381314.519         5032914.342
CB204            381291.187         5032921.779
CB205            381286.939         5032925.282
CB206            381270.233         5032913.017
CB207            381253.811         5032910.356
CB208            381248.314         5032902.406
CB209            381228.288         5032926.78
CB210B           381314.246         5032963.095
CB211            381319.351         5032951.771
CB212            381328.283         5032931.288
CB212A           381326.507         5032912.9
CB213            381296.875         5032912.718
CB214            381282.831         5032893.727

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
W2               381318.013         5032956.452
W4               381305.808         5032934.267
W4               381304.151         5032928.843

[POLYGONS]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
S1               381237.464         5032904.825
S1               381240.329         5032905.467
S1               381240.224         5032906.884
S1               381246.264         5032909.575
S1               381246.323         5032909.6
S1               381246.383         5032909.624
S1               381246.444         5032909.645
S1               381246.506         5032909.663
```

S1	381246.568	5032909.68
S1	381246.631	5032909.695
S1	381246.695	5032909.707
S1	381246.758	5032909.717
S1	381246.823	5032909.725
S1	381246.887	5032909.731
S1	381246.951	5032909.734
S1	381247.016	5032909.735
S1	381247.08	5032909.734
S1	381247.145	5032909.731
S1	381247.209	5032909.725
S1	381247.273	5032909.717
S1	381247.337	5032909.707
S1	381247.401	5032909.695
S1	381247.463	5032909.681
S1	381247.526	5032909.664
S1	381247.588	5032909.645
S1	381247.649	5032909.624
S1	381247.709	5032909.601
S1	381247.768	5032909.576
S1	381247.827	5032909.548
S1	381247.885	5032909.519
S1	381247.941	5032909.488
S1	381247.996	5032909.455
S1	381248.051	5032909.419
S1	381248.103	5032909.382
S1	381248.155	5032909.344
S1	381248.205	5032909.303
S1	381248.254	5032909.261
S1	381248.301	5032909.217
S1	381248.347	5032909.171
S1	381248.391	5032909.124
S1	381248.433	5032909.075
S1	381248.474	5032909.025
S1	381248.513	5032908.973
S1	381248.55	5032908.92
S1	381248.585	5032908.866
S1	381248.618	5032908.811
S1	381248.65	5032908.754
S1	381248.679	5032908.697
S1	381248.706	5032908.638
S1	381259.547	5032884.338
S1	381264.625	5032879.785
S1	381253.013	5032884.608
S1	381244.74	5032903.289
S1	381244.061	5032903.318
S1	381243.383	5032903.37
S1	381242.707	5032903.444
S1	381242.035	5032903.54
S1	381241.365	5032903.658
S1	381240.7	5032903.799
S1	381240.04	5032903.961
S1	381239.386	5032904.145
S1	381238.738	5032904.35
S1	381238.097	5032904.577
S1	381237.464	5032904.825
S10	381282.247	5032908.62
S10	381276.098	5032921.781
S10	381287.174	5032924.398
S10	381297.866	5032927.382
S10	381298.206	5032927.496
S10	381298.542	5032927.621
S10	381298.873	5032927.758
S10	381299.199	5032927.907
S10	381299.52	5032928.067
S10	381299.835	5032928.238
S10	381300.144	5032928.42
S10	381300.446	5032928.612
S10	381300.742	5032928.815
S10	381301.03	5032929.029
S10	381301.31	5032929.252
S10	381301.583	5032929.485
S10	381301.847	5032929.727
S10	381302.103	5032929.979
S10	381302.349	5032930.239
S10	381302.586	5032930.508
S10	381302.814	5032930.785
S10	381303.032	5032931.069
S10	381303.24	5032931.362
S10	381303.437	5032931.661
S10	381304.434	5032927.758
S10	381307.137	5032921.453
S10	381307.111	5032921.441
S10	381307.084	5032921.427
S10	381307.058	5032921.413
S10	381307.033	5032921.398
S10	381307.008	5032921.382
S10	381306.984	5032921.366
S10	381306.96	5032921.348
S10	381306.937	5032921.33
S10	381306.915	5032921.311
S10	381306.893	5032921.291
S10	381306.872	5032921.27
S10	381306.852	5032921.249
S10	381306.833	5032921.227
S10	381306.814	5032921.204
S10	381306.796	5032921.181
S10	381306.779	5032921.157
S10	381306.763	5032921.132
S10	381306.747	5032921.107
S10	381306.733	5032921.082
S10	381306.719	5032921.056
S10	381306.706	5032921.029
S10	381306.695	5032921.002
S10	381306.684	5032920.975
S10	381306.674	5032920.947
S10	381306.665	5032920.919
S10	381306.657	5032920.891
S10	381306.65	5032920.862
S10	381306.644	5032920.833
S10	381306.639	5032920.804
S10	381306.635	5032920.775
S10	381306.632	5032920.746
S10	381306.63	5032920.716
S10	381306.629	5032920.687
S10	381306.629	5032920.658
S10	381306.63	5032920.628
S10	381306.632	5032920.599
S10	381302.601	5032917.181
S10	381301.944	5032913.56
S10	381291.376	5032916.092
S10	381291.126	5032916.147
S10	381290.874	5032916.193
S10	381290.621	5032916.231
S10	381290.366	5032916.26
S10	381290.111	5032916.28
S10	381289.856	5032916.291
S10	381289.6	5032916.294
S10	381289.344	5032916.287
S10	381289.088	5032916.271
S10	381288.833	5032916.247
S10	381288.58	5032916.214
S10	381288.327	5032916.171
S10	381288.076	5032916.12
S10	381287.827	5032916.061
S10	381287.58	5032915.993
S10	381287.336	5032915.916
S10	381287.095	5032915.831
S10	381286.857	5032915.737
S10	381286.622	5032915.635
S10	381286.391	5032915.525
S10	381286.163	5032915.407
S10	381285.94	5032915.281
S10	381285.722	5032915.148
S10	381285.508	5032915.007
S10	381285.3	5032914.859
S10	381285.096	5032914.703
S10	381284.899	5032914.541
S10	381284.707	5032914.371
S10	381284.521	5032914.195
S10	381284.341	5032914.013
S10	381284.168	5032913.825
S10	381284.001	5032913.63
S10	381283.841	5032913.43
S10	381283.689	5032913.225
S10	381283.543	5032913.014
S10	381283.405	5032912.799
S10	381283.275	5032912.578
S10	381283.152	5032912.354
S10	381283.037	5032912.125
S10	381282.93	5032911.892
S10	381282.832	5032911.656
S10	381282.742	5032911.416
S10	381282.66	5032911.174
S10	381282.586	5032910.929
S10	381282.521	5032910.681
S10	381282.465	5032910.431
S10	381282.418	5032910.18
S10	381282.379	5032909.927
S10	381282.349	5032909.672
S10	381282.247	5032908.62
S11	381287.493	5032979.07
S11	381295.209	5032987.02
S11	381303.22	5032979.472
S11	381312.567	5032958.198
S11	381307.857	5032956.13
S11	381307.843	5032956.124
S11	381307.829	5032956.117
S11	381307.815	5032956.111
S11	381307.801	5032956.103
S11	381307.788	5032956.095
S11	381307.774	5032956.087
S11	381307.762	5032956.078
S11	381307.749	5032956.069
S11	381307.737	5032956.06
S11	381307.725	5032956.05
S11	381307.713	5032956.039
S11	381307.702	5032956.028
S11	381307.691	5032956.017
S11	381307.681	5032956.006
S11	381307.671	5032955.994
S11	381307.662	5032955.981
S11	381307.653	5032955.969
S11	381307.644	5032955.956
S11	381307.636	5032955.943
S11	381307.628	5032955.929
S11	381307.621	5032955.915
S11	381307.614	5032955.901
S11	381307.608	5032955.887
S11	381307.602	5032955.873
S11	381307.596	5032955.858
S11	381307.592	5032955.843
S11	381307.587	5032955.828
S11	381307.584	5032955.813
S11	381307.58	5032955.798
S11	381307.578	5032955.783
S11	381307.576	5032955.767
S11	381307.574	5032955.752
S11	381307.573	5032955.737
S11	381307.572	5032955.721
S11	381307.572	5032955.705
S11	381307.573	5032955.69
S11	381307.574	5032955.674
S11	381307.576	5032955.659
S11	381307.578	5032955.644
S11	381307.581	5032955.628
S11	381307.584	5032955.613
S11	381307.588	5032955.598
S11	381307.592	5032955.583
S11	381307.597	5032955.568
S11	381307.602	5032955.554
S11	381307.608	5032955.539
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S2	381236.063	5032935.099
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S2	381237.464	5032904.825
S2	381236.796	5032905.109
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S2	381235.492	5032905.745
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S2	381234.234	5032906.47
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S2	381228.848	5032911.281
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S3	381246.758	5032909.717
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S3	381246.631	5032909.695
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S3	381246.323	5032909.6
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S45	381325.747	5032925.217
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S45	381324.951	5032916.607
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S45	381324.563	5032915.94
S45	381324.352	5032915.617
S45	381324.13	5032915.301
S45	381323.897	5032914.993
S45	381323.653	5032914.693
S45	381323.4	5032914.402
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S45	381306.721	5032920.29
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S45	381307.012	5032919.964
S45	381307.037	5032919.949
S45	381307.062	5032919.934
S45	381307.088	5032919.92
S45	381307.115	5032919.907
S45	381307.142	5032919.895
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S45	381307.281	5032919.848
S45	381313.935	5032918.254
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S45	381314.331	5032918.174
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S45	381314.731	5032918.121
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S45	381315.942	5032918.13
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S45	381318.053	5032918.784
S45	381318.23	5032918.882
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S45	381320.787	5032921.909
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S45	381320.968	5032922.488
S45	381321.016	5032922.684
S45	381321.056	5032922.882
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S45	381321.079	5032924.893
S45	381321.043	5032925.092
S45	381321.001	5032925.29
S45	381320.951	5032925.486
S45	381320.895	5032925.68
S45	381320.832	5032925.872
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S45	381320.605	5032926.434
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S5	381273.896	5032926.903
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S5	381248.35	5032932.157
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S5	381236.097	5032934.923
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S5	381236.05	5032935.142
S5	381236.036	5032935.185
S5	381236.021	5032935.227
S5	381236.004	5032935.269
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S5	381235.966	5032935.35
S5	381235.945	5032935.39
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S5	381235.82	5032935.576
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S5	381235.761	5032935.643
S5	381235.73	5032935.676
S5	381235.698	5032935.707
S5	381235.664	5032935.737
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S6	381282.379	5032909.926
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S6	381282.585	5032910.923
S6	381282.658	5032911.167
S6	381282.739	5032911.409
S6	381282.828	5032911.647
S6	381282.926	5032911.883
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S6	381283.268	5032912.566
S6	381283.397	5032912.786
S6	381283.534	5032913.001
S6	381283.679	5032913.211
S6	381283.83	5032913.416
S6	381283.989	5032913.615
S6	381284.154	5032913.809
S6	381284.326	5032913.997
S6	381284.504	5032914.179
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S6	381284.879	5032914.524
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S6	381285.278	5032914.842
S6	381285.485	5032914.991
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S7	381287.876	5032944.882
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S7	381266.93	5032942.221
S7	381267.957	5032943.374
S7	381260.454	5032950.066
S8	381260.454	5032950.066
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S8	381279.321	5032994.458
S8	381281.458	5032995.233
S8	381282.264	5032994.514
S8	381287.784	5032991.636
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S8	381295.209	5032987.02
S8	381287.493	5032979.07
S8	381285.292	5032960.286
S8	381276.524	5032968.107
S8	381260.454	5032950.066
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S9	381293.269	5032937.63
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S9	381299.932	5032934.777
S9	381303.437	5032931.661
S9	381303.24	5032931.362
S9	381303.032	5032931.069
S9	381302.814	5032930.785
S9	381302.586	5032930.508
S9	381302.349	5032930.239
S9	381302.103	5032929.979
S9	381301.847	5032929.727
S9	381301.583	5032929.485
S9	381301.31	5032929.252
S9	381301.03	5032929.029
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S9	381300.446	5032928.612
S9	381300.144	5032928.42
S9	381299.835	5032928.238
S9	381299.52	5032928.067
S9	381299.199	5032927.907
S9	381298.873	5032927.758
S9	381298.542	5032927.621
S9	381298.206	5032927.496
S9	381297.866	5032927.382
S9	381287.164	5032924.395
S9	381276.098	5032921.781
S9	381268.429	5032922.45
S9	381273.896	5032926.903
S9	381277.469	5032930.913
S9	381278.399	5032931.986
S9	381281.347	5032929.355
S9	381290.74	5032939.886

;;Storage Node X-Coord Y-Coord

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;;-------------- ------------------ ------------------
[SYMBOLS]
;;Gage           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
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EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.4)

****
Element Count
****

Number of rain gages 1
Number of subcatchments ... 17
Number of nodes 23
Number of links 29
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
3CHI100	3CHI100	INTENSITY	10 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S1	0.02	29.61	0.00	2.2000	3CHI100	CB208
S10	0.03	55.32	99.62	2.2000	3CHI100	CB204
S11	0.13	65.66	90.33	2.2000	3CHI100	CB202
S12	0.01	6.44	0.37	2.2000	3CHI100	CB213
S14_1	0.01	22.78	52.68	2.2000	3CHI100	CB211
S14_2	0.02	58.12	31.65	2.2000	3CHI100	CB212
S15	0.04	108.74	42.75	2.2000	3CHI100	CB210B
S2	0.07	33.61	62.94	2.2000	3CHI100	CB209
S3	0.07	45.79	96.69	2.2000	3CHI100	CB207
S32	0.05	29.70	14.29	2.2000	3CHI100	CB214
S4	0.05	24.67	99.97	2.2000	3CHI100	CB206
S45	0.02	14.32	99.96	2.2000	3CHI100	CB203
S5	0.08	82.96	89.59	2.2000	3CHI100	CB200
S6	0.02	40.30	0.00	2.2000	3CHI100	CB214
S7	0.07	25.95	100.00	2.2000	3CHI100	520_(P-Stm)
S8	0.09	35.06	80.12	2.2000	3CHI100	CB201
S9	0.03	19.08	76.83	2.2000	3CHI100	CB205

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Node Summary
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
518_Orifice	JUNCTION	81.36	4.11	0.0	
518A_(P-Stm)	OUTFALL	80.65	1.13	0.0	
518_(P-Stm)	STORAGE	81.06	4.41	0.0	
519_(P-Stm)	STORAGE	82.20	3.51	0.0	
520_(P-Stm)	STORAGE	82.49	2.89	0.0	
521_(P-Stm)	STORAGE	81.96	3.67	0.0	
522_(P-Stm)	STORAGE	82.18	3.32	0.0	
CB200	STORAGE	83.18	2.32	0.0	
CB201	STORAGE	83.09	2.66	0.0	
CB202	STORAGE	82.76	2.89	0.0	
CB203	STORAGE	82.75	2.90	0.0	
CB204	STORAGE	82.75	2.75	0.0	
CB205	STORAGE	82.85	2.75	0.0	
CB206	STORAGE	82.77	2.73	0.0	
CB207	STORAGE	83.15	2.30	0.0	
CB208	STORAGE	83.30	2.04	0.0	
CB209	STORAGE	83.20	1.90	0.0	
CB210B	STORAGE	82.65	3.00	0.0	
CB211	STORAGE	83.70	1.90	0.0	
CB212	STORAGE	83.20	2.42	0.0	
CB212A	STORAGE	83.62	2.00	0.0	
CB213	STORAGE	83.15	1.75	0.0	
CB214	STORAGE	82.95	1.90	0.0	

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Link Summary
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C2	CB208	CB207	CONDUIT	9.7	1.0346	0.0130
C4	CB212A	CB212	CONDUIT	18.5	2.0031	0.0130
C5	CB211	CB212	CONDUIT	22.3	2.0142	0.0130
CB213	CB213	522_(P-Stm)	CONDUIT	29.3	1.3396	0.0130
CB214	CB214	522_(P-Stm)	CONDUIT	21.6	0.8915	0.0130
Pipe_-_(104)_(P-Stm)_2	518_Orifice	518A_(P-Stm)	CONDUIT	15.6	0.2496	0.0130
Pipe_-_(110)_(P-Stm)	521_(P-Stm)	518_(P-Stm)	CONDUIT	27.2	0.3528	0.0130
Pipe_-_(111)_(P-Stm)	522_(P-Stm)	521_(P-Stm)	CONDUIT	45.1	0.4990	0.0130
Pipe_-_(71)_(P-Stm)	520_(P-Stm)	519_(P-Stm)	CONDUIT	57.1	0.4025	0.0130
Pipe_-_(72)_(P-Stm)	519_(P-Stm)	518_(P-Stm)	CONDUIT	32.0	0.5005	0.0130
OR1	518_(P-Stm)	518_Orifice	ORIFICE			
W1	CB208	CB209	WEIR			
W2	CB210B	CB211	WEIR			
W3	CB210B	CB202	WEIR			
W4	CB202	CB204	WEIR			
W5	CB206	CB207	WEIR			
W6	CB201	CB200	WEIR			
W7	CB200	CB209	WEIR			
CB200	CB200	520_(P-Stm)	OUTLET			
CB201	CB201	520_(P-Stm)	OUTLET			
CB202	CB202	521_(P-Stm)	OUTLET			
CB203	CB203	521_(P-Stm)	OUTLET			
CB204	CB204	522_(P-Stm)	OUTLET			
CB205	CB205	522_(P-Stm)	OUTLET			
CB206	CB206	522_(P-Stm)	OUTLET			
Cb207	CB207	522_(P-Stm)	OUTLET			
CB209	CB209	520_(P-Stm)	OUTLET			
CB210B	CB210B	518_(P-Stm)	OUTLET			
CB212	CB212	521_(P-Stm)	OUTLET			

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Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C2	CIRCULAR	0.25	0.05	0.06	0.25	1	60.49
C4	CIRCULAR	0.25	0.05	0.06	0.25	1	84.17
C5	CIRCULAR	0.25	0.05	0.06	0.25	1	84.40
CB213	CIRCULAR	0.25	0.05	0.06	0.25	1	68.83
CB214	CIRCULAR	0.25	0.05	0.06	0.25	1	56.15
Pipe_-_(104)_(P-Stm)_2	CIRCULAR	0.45	0.16	0.11	0.45	1	142.46
Pipe_-_(110)_(P-Stm)	CIRCULAR	0.53	0.22	0.13	0.53	1	255.47
Pipe_-_(111)_(P-Stm)	CIRCULAR	0.53	0.22	0.13	0.53	1	303.80
Pipe_-_(71)_(P-Stm)	CIRCULAR	0.53	0.22	0.13	0.53	1	272.85
Pipe_-_(72)_(P-Stm)	CIRCULAR	0.53	0.22	0.13	0.53	1	304.28

Analysis Options

Flow Units .... LPS
Process Models:
  Rainfall/Runoff .... YES
  RDII .... NO
  Snowmelt .... NO
  Groundwater .... NO
  Flow Routing .... YES
  Ponding Allowed .... NO
  Water Quality .... NO
Infiltration Method ...... HORTON
Flow Routing Method ...... DYNWAVE
Surcharge Method .... EXTRAN
Starting Date 01/01/2000 00:00:00
Ending Date 01/01/2000 06:00:00
Antecedent Dry Days 0.0
Report Time Step 00:01:00
Wet Time Step 00:01:00
Dry Time Step 00:01:00
Routing Time Step .... 1.00 sec
Variable Time Step .... YES
Maximum Trials 8
Number of Threads 1
Head Tolerance .... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation	0.059	71.708
Evaporation Loss	0.000	0.000
Infiltration Loss	0.010	11.940
Surface Runoff	0.048	58.708
Final Storage	0.001	1.158
Continuity Error (%)	-0.137	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow	0.000	0.000
Wet Weather Inflow	0.048	0.483
Groundwater Inflow	0.000	0.000
RDII Inflow	0.000	0.000
External Inflow	0.000	0.000
External Outflow	0.048	0.482
Flooding Loss	0.000	0.000
Evaporation Loss	0.000	0.000
Exfiltration Loss	0.000	0.000
Initial Stored Volume	0.000	0.000
Final Stored Volume	0.000	0.002
Continuity Error (%)	-0.048	

Time-Step Critical Elements

None

Highest Flow Instability Indexes

Link W3 (5)

Most Frequent Nonconverging Nodes

Convergence obtained at all time steps.

Routing Time Step Summary

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

Subcatchment Runoff Summary

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff
S1	71.71	0.00	0.00	43.73	0.00	28.06	28.06	0.01	7.46	0.391
S10	71.71	0.00	0.00	0.16	69.98	0.12	70.09	0.02	15.18	0.977
S11	71.71	0.00	0.00	4.19	63.44	2.77	66.20	0.08	62.03	0.923
S12	71.71	0.00	0.00	45.05	0.26	26.43	26.69	0.00	3.79	0.372
S14_1	71.71	0.00	0.00	24.65	36.98	46.35	46.35	0.01	5.46	0.646
S14_2	71.71	0.00	0.00	32.75	22.21	38.59	38.59	0.01	8.14	0.538
S15	71.71	0.00	0.00	28.62	30.00	42.53	42.53	0.02	17.24	0.593
S2	71.71	0.00	0.00	16.27	44.21	10.34	54.54	0.04	33.01	0.761
S3	71.71	0.00	0.00	1.43	67.91	0.96	68.87	0.05	35.67	0.960
S32	71.71	0.00	0.00	39.41	10.03	30.12	32.13	0.02	18.19	0.448
S4	71.71	0.00	0.00	0.01	70.21	0.01	70.22	0.03	22.96	0.979
S45	71.71	0.00	0.00	0.02	70.22	0.01	70.22	0.02	10.98	0.979
S5	71.71	0.00	0.00	4.50	65.93	2.99	65.93	0.06	41.12	0.919
S6	71.71	0.00	0.00	43.69	0.00	28.10	28.10	0.01	9.63	0.392
S7	71.71	0.00	0.00	0.00	70.22	0.00	70.22	0.05	33.94	0.979
S8	71.71	0.00	0.00	8.68	61.86	5.60	61.86	0.06	44.54	0.863
S9	71.71	0.00	0.00	10.06	53.97	6.58	60.55	0.02	13.15	0.844

Node Depth Summary

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
518_Orifice	JUNCTION	0.08	0.20	81.56	0 01:37	0.20
518A_(P-Stm)	OUTFALL	0.63	0.63	81.28	0 00:00	0.63
518_(P-Stm)	STORAGE	1.29	3.79	84.85	0 01:37	3.79
519_(P-Stm)	STORAGE	0.82	2.65	84.85	0 01:37	2.65
520_(P-Stm)	STORAGE	0.73	2.36	84.85	0 01:37	2.36
521_(P-Stm)	STORAGE	0.91	2.89	84.85	0 01:37	2.89
522_(P-Stm)	STORAGE	0.82	2.67	84.85	0 01:36	2.67
CB200	STORAGE	0.43	2.15	85.33	0 01:20	2.15
CB201	STORAGE	0.59	2.57	85.66	0 01:11	2.57
CB202	STORAGE	0.61	2.75	85.51	0 01:20	2.75
CB203	STORAGE	0.55	2.66	85.41	0 01:11	2.66
CB204	STORAGE	0.66	2.70	85.45	0 01:20	2.70
CB205	STORAGE	0.56	2.69	85.54	0 01:20	2.69
CB206	STORAGE	0.65	2.70	85.47	0 01:10	2.70
CB207	STORAGE	0.58	2.18	85.33	0 01:20	2.18
CB208	STORAGE	0.53	2.03	85.33	0 01:21	2.03
CB209	STORAGE	0.37	1.80	85.00	0 01:26	1.80
CB210B	STORAGE	0.66	2.86	85.51	0 01:20	2.86
CB211	STORAGE	0.20	1.18	84.88	0 01:36	1.18
CB212	STORAGE	0.33	1.68	84.88	0 01:35	1.68
CB212A	STORAGE	0.22	1.26	84.88	0 01:36	1.26
CB213	STORAGE	0.32	1.70	84.85	0 01:36	1.70
CB214	STORAGE	0.38	1.90	84.85	0 01:37	1.90

Node Inflow Summary

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
518_Orifice	JUNCTION	0.00	66.14	0 01:37	0	0.481	-0.015
518A_(P-Stm)	OUTFALL	0.00	66.14	0 01:37	0	0.482	0.000
518_(P-Stm)	STORAGE	0.00	84.41	0 01:04	0	0.481	-0.109
519_(P-Stm)	STORAGE	0.00	92.08	0 01:03	0	0.205	-0.380
520_(P-Stm)	STORAGE	33.94	96.59	0 01:05	0.0482	0.206	0.452
521_(P-Stm)	STORAGE	0.00	78.23	0 01:05	0	0.261	0.085
522_(P-Stm)	STORAGE	0.00	61.29	0 01:06	0	0.151	-0.027
CB200	STORAGE	41.12	42.27	0 01:10	0.0556	0.0603	0.011
CB201	STORAGE	44.54	44.54	0 01:10	0.0582	0.0582	0.018
CB202	STORAGE	62.03	62.58	0 01:10	0.0841	0.0856	-0.030
CB203	STORAGE	10.98	10.98	0 01:10	0.0156	0.0156	0.005
CB204	STORAGE	15.18	15.18	0 01:10	0.0215	0.0215	0.004
CB205	STORAGE	13.15	13.15	0 01:10	0.0167	0.0167	0.015
CB206	STORAGE	22.96	22.96	0 01:10	0.0326	0.0326	0.019
CB207	STORAGE	35.67	53.20	0 01:10	0.0499	0.0694	-0.003
CB208	STORAGE	7.46	26.56	0 01:02	0.00525	0.0164	0.033
CB209	STORAGE	33.01	33.01	0 01:10	0.0398	0.0441	0.001
CB210B	STORAGE	17.24	34.05	0 01:08	0.0158	0.0185	0.246
CB211	STORAGE	5.46	7.26	0 01:08	0.00538	0.00544	0.064
CB212	STORAGE	8.14	13.45	0 01:06	0.00691	0.0142	-0.130
CB212A	STORAGE	0.00	5.35	0 01:09	0	0.00174	0.098
CB213	STORAGE	3.79	20.77	0 01:06	0.00398	0.00519	-0.092
CB214	STORAGE	27.81	27.81	0 01:10	0.0234	0.0236	0.046

Node Surcharge Summary

No nodes were surcharged.

Node Flooding Summary

No nodes were flooded.

Storage Volume Summary

Storage Unit	Average Volume 1000 m³	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m³	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow LPS
518_(P-Stm)	0.001	29.2	0.0	0.0	0.004	85.9	0 01:37	66.14
519_(P-Stm)	0.001	23.2	0.0	0.0	0.003	75.5	0 01:37	66.89
520_(P-Stm)	0.001	25.1	0.0	0.0	0.003	81.9	0 01:37	92.08
521_(P-Stm)	0.001	24.7	0.0	0.0	0.003	78.7	0 01:37	65.44
522_(P-Stm)	0.001	24.7	0.0	0.0	0.003	80.3	0 01:36	43.83
CB200	0.001	1.9	0.0	0.0	0.010	24.0	0 01:20	26.00
CB201	0.002	6.1	0.0	0.0	0.015	49.9	0 01:11	21.07
CB202	0.002	3.1	0.0	0.0	0.018	31.3	0 01:20	40.18
CB203	0.000	0.8	0.0	0.0	0.002	6.7	0 01:11	5.69
CB204	0.001	6.4	0.0	0.0	0.006	46.5	0 01:20	5.50
CB205	0.000	4.8	0.0	0.0	0.003	42.6	0 01:20	5.15
CB206	0.001	8.5	0.0	0.0	0.004	67.7	0 01:10	22.78
CB207	0.002	6.3	0.0	0.0	0.013	40.7	0 01:20	37.72
CB208	0.002	15.6	0.0	0.0	0.010	91.9	0 01:21	9.60
CB209	0.001	4.1	0.0	0.0	0.006	44.7	0 01:26	22.99

CB210B	0.001	5.3	0.0	0.0	0.007	45.6	0	01:20	8.84
CB211	0.000	0.5	0.0	0.0	0.000	3.0	0	01:36	5.42
CB212	0.000	1.7	0.0	0.0	0.001	8.8	0	01:35	10.13
CB212A	0.000	10.8	0.0	0.0	0.000	63.0	0	01:36	1.31
CB213	0.000	4.8	0.0	0.0	0.000	52.4	0	01:36	7.61
CB214	0.000	8.4	0.0	0.0	0.005	99.8	0	01:37	25.84

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Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
518A_(P-Stm)	68.00	32.78	66.14	0.482
System	68.00	32.78	66.14	0.482

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C2	CONDUIT	25.25	0	01:02	0.51	0.42	1.00
C4	CONDUIT	5.35	0	01:09	0.15	0.06	1.00
C5	CONDUIT	5.42	0	01:06	0.66	0.06	1.00
CB213	CONDUIT	18.74	0	01:06	0.38	0.27	1.00
CB214	CONDUIT	25.84	0	01:09	0.53	0.46	1.00
Pipe_-_(104)_(P-Stm)_2	CONDUIT	66.14	0	01:37	1.05	0.46	0.42
Pipe_-_(110)_(P-Stm)	CONDUIT	65.44	0	01:05	0.73	0.26	1.00
Pipe_-_(111)_(P-Stm)	CONDUIT	40.12	0	01:05	0.49	0.13	1.00
Pipe_-_(71)_(P-Stm)	CONDUIT	92.08	0	01:03	1.03	0.34	1.00
Pipe_-_(72)_(P-Stm)	CONDUIT	66.89	0	01:06	0.88	0.22	1.00
OR1	ORIFICE	66.14	0	01:37			1.00
W1	WEIR	5.83	0	01:21			0.55
W2	WEIR	0.00	0	00:00			0.00
W3	WEIR	16.84	0	01:08			0.30
W4	WEIR	0.00	0	00:00			0.00
W5	WEIR	17.54	0	01:10			0.32
W6	WEIR	10.38	0	01:11			0.10
W7	WEIR	0.00	0	00:00			0.00
CB200	DUMMY	26.00	0	01:05			
CB201	DUMMY	14.07	0	01:04			
CB202	DUMMY	29.10	0	01:02			
CB203	DUMMY	5.69	0	01:07			
CB204	DUMMY	5.50	0	01:03			
CB205	DUMMY	5.15	0	01:06			
CB206	DUMMY	6.87	0	01:02			
Cb207	DUMMY	12.67	0	01:04			
CB209	DUMMY	22.99	0	01:05			
CB210B	DUMMY	5.18	0	01:05			
CB212	DUMMY	5.89	0	01:05			

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Flow Classification Summary
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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C2	1.00	0.07	0.07	0.00	0.32	0.00	0.00	0.54	0.01	0.00
C4	1.00	0.17	0.01	0.00	0.28	0.00	0.00	0.54	0.03	0.00
C5	1.00	0.15	0.00	0.00	0.29	0.00	0.00	0.56	0.05	0.00
CB213	1.00	0.05	0.00	0.00	0.32	0.00	0.00	0.63	0.05	0.00
CB214	1.00	0.05	0.00	0.00	0.32	0.00	0.00	0.63	0.03	0.00
Pipe_-_(104)_(P-Stm)_2	1.00	0.07	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00
Pipe_-_(110)_(P-Stm)	1.00	0.06	0.00	0.00	0.38	0.00	0.00	0.56	0.00	0.00
Pipe_-_(111)_(P-Stm)	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.00	0.58	0.00
Pipe_-_(71)_(P-Stm)	1.00	0.06	0.00	0.00	0.34	0.00	0.00	0.60	0.03	0.00
Pipe_-_(72)_(P-Stm)	1.00	0.07	0.00	0.00	0.37	0.00	0.00	0.56	0.02	0.00

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Conduit Surcharge Summary
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Conduit	Hours Full Both Ends	Upstream	Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C2	1.79	1.79	1.83	0.01	0.01
C4	1.31	1.31	1.55	0.01	0.01
C5	1.25	1.25	1.57	0.01	0.01
CB213	1.52	1.52	1.76	0.01	0.01
CB214	1.65	1.65	1.76	0.01	0.01
Pipe_-_(110)_(P-Stm)	1.92	1.92	1.99	0.01	0.01
Pipe_-_(111)_(P-Stm)	1.76	1.76	1.92	0.01	0.01
Pipe_-_(71)_(P-Stm)	1.58	1.58	1.71	0.01	0.01
Pipe_-_(72)_(P-Stm)	1.75	1.75	1.86	0.01	0.01

Analysis begun on: Thu Aug 29 09:25:36 2024
Analysis ended on: Thu Aug 29 09:25:36 2024
Total elapsed time: < 1 sec

Post-Development 24-hour SCS 1:100-year Event

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

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

START_DATE           01/01/2000
START_TIME           00:00:00
REPORT_START_DATE    01/01/2000
REPORT_START_TIME    00:00:00
END_DATE             01/02/2000
END_TIME             00:00:00
SWEEP_START          01/01
SWEEP_END            12/31
DRY_DAYS             0
REPORT_STEP          00:01:00
WET_STEP             00:01:00
DRY_STEP             00:01:00
ROUTING_STEP         1
RULE_STEP            00:00:00

INERTIAL_DAMPING     PARTIAL
NORMAL_FLOW_LIMITED  BOTH
FORCE_MAIN_EQUATION  H-W
VARIABLE_STEP        0.75
LENGTHENING_STEP     0
MIN_SURFAREA         0
MAX_TRIALS           8
HEAD_TOLERANCE       0.0015
SYS_FLOW_TOL         5
LAT_FLOW_TOL         5
MINIMUM_STEP         0.5
THREADS              12

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

[RAINGAGES]
;;Name           Format    Interval SCF      Source
;;-------------- --------- -------- -------- ----------
24SCS100         INTENSITY 0:15     1.0      TIMESERIES 24SCS100
3CHI100          INTENSITY 0:10     1.0      TIMESERIES 3CHI100

[SUBCATCHMENTS]
;;Name           Rain Gage        Outlet           Area     %Imperv  Width    %Slope   CurbLen
SnowPack
;;-------------- ---------------- ---------------- -------- -------- -------- -------- -------
- ----------------
S1               24SCS100         CB208            0.0187   0        29.61    2.2      0
S10              24SCS100         CB204            0.0307   99.617   55.32    2.2      0
S11              24SCS100         CB202            0.127    90.325   65.66    2.2      0
S12              24SCS100         CB213            0.0149   0.369    6.44     2.2      0
S14_1            24SCS100         CB211            0.0116   52.676   22.78    2.2      0
S14_2            24SCS100         CB212            0.0179   31.654   58.12    2.2      0
S15              24SCS100         CB210B           0.0372   42.751   108.74   2.2      0
S2               24SCS100         CB209            0.0729   62.937   33.61    2.2      0
S3               24SCS100         CB207            0.0724   96.692   45.79    2.2      0
S32              24SCS100         CB214            0.052    14.286   29.7     2.2      0
S4               24SCS100         CB206            0.0464   99.975   24.67    2.2      0
S45              24SCS100         CB203            0.0222   99.962   14.32    2.2      0
S5               24SCS100         CB200            0.0843   89.589   82.96    2.2      0
S6               24SCS100         CB214            0.0239   0        40.3     2.2      0
S7               24SCS100         520_(P-Stm)      0.0686   100      25.95    2.2      0
S8               24SCS100         CB201            0.0941   80.117   35.06    2.2      0
S9               24SCS100         CB205            0.0275   76.83    19.08    2.2      0

[SUBAREAS]
;;Subcatchment   N-Imperv   N-Perv     S-Imperv   S-Perv     PctZero    RouteTo    PctRouted
;;-------------- ---------- ---------- ---------- ---------- ---------- ---------- ----------
S1               0.013      0.25       1.57       4.67       0          OUTLET
S10              0.013      0.25       1.57       4.67       0          OUTLET
S11              0.013      0.25       1.57       4.67       0          OUTLET
S12              0.013      0.25       1.57       4.67       0          OUTLET
S14_1            0.013      0.25       1.57       4.67       0          PERVIOUS   100
S14_2            0.013      0.25       1.57       4.67       0          PERVIOUS   100
S15              0.013      0.25       1.57       4.67       0          PERVIOUS   100
S2               0.013      0.25       1.57       4.67       0          OUTLET
S3               0.013      0.25       1.57       4.67       0          OUTLET
S32              0.013      0.25       1.57       4.67       0          PERVIOUS   80
S4               0.013      0.25       1.57       4.67       0          OUTLET
S45              0.013      0.25       1.57       4.67       0          IMPERVIOUS 100
S5               0.013      0.25       1.57       4.67       0          IMPERVIOUS 100
S6               0.013      0.25       1.57       4.67       0          OUTLET
S7               0.013      0.25       1.57       4.67       0          OUTLET
S8               0.013      0.25       1.57       4.67       0          IMPERVIOUS 100
S9               0.013      0.25       1.57       4.67       0          OUTLET

[INFILTRATION]
;;Subcatchment   Param1     Param2     Param3     Param4     Param5
;;-------------- ---------- ---------- ---------- ---------- ----------
S1               76.2       13.2       4.14       7          0
S10              76.2       13.2       4.14       7          0
S11              76.2       13.2       4.14       7          0
S12              76.2       13.2       4.14       7          0
S14_1            76.2       13.2       4.14       7          0
S14_2            76.2       13.2       4.14       7          0
S15              76.2       13.2       4.14       7          0
S2               76.2       13.2       4.14       7          0
S3               76.2       13.2       4.14       7          0
S32              76.2       13.2       4.14       7          0
S4               76.2       13.2       4.14       7          0
S45              76.2       13.2       4.14       7          0
S5               76.2       13.2       4.14       7          0
S6               76.2       13.2       4.14       7          0
S7               76.2       13.2       4.14       7          0
S8               76.2       13.2       4.14       7          0
S9               76.2       13.2       4.14       7          0

[JUNCTIONS]
;;Name           Elevation  MaxDepth   InitDepth  SurDepth   Aponded
;;-------------- ---------- ---------- ---------- ---------- ----------
518_Orifice      81.361     4.106      0          0          0

[OUTFALLS]
;;Name           Elevation  Type       Stage Data       Gated    Route To
;;-------------- ---------- ---------- ---------------- -------- ----------------
;Cylindrical Structure Slab Top Circular Frame SI
518A_(P-Stm)     80.646     FIXED      81.27            NO

[STORAGE]
;;Name           Elev.    MaxDepth   InitDepth  Shape      Curve Name/Params
SurDepth Fevap    Psi      Ksat      IMD
;;-------------- -------- ---------- ----------- ---------- ---------------------------- -----
--- -------- -------- -------- --------
;Cylindrical Structure Slab Top Circular Frame SI
518_(P-Stm)      81.061   4.406      0.209      FUNCTIONAL 0         0         1.13     0
0
;Cylindrical Structure Slab Top Circular Frame SI
519_(P-Stm)      82.197   3.512      0          FUNCTIONAL 0         0         1.13     0
0
;Cylindrical Structure Slab Top Circular Frame SI
520_(P-Stm)      82.487   2.888      0          FUNCTIONAL 0         0         1.13     0
0
;Cylindrical Structure Slab Top Circular Frame SI
521_(P-Stm)      81.957   3.673      0          FUNCTIONAL 0         0         1.13     0
0
;Cylindrical Structure Slab Top Circular Frame SI
522_(P-Stm)      82.182   3.323      0          FUNCTIONAL 0         0         1.13     0
0
;85.1800000001676
CB200            83.18    2.32       0          TABULAR    CB200                         0
0
;85.5000000001435
CB201            83.09    2.66       0          TABULAR    CB201                         0
0
;85.36
CB202            82.76    2.89       0          TABULAR    CB202                         0
0
;85.3500000000931
CB203            82.75    2.9        0          TABULAR    CB203                         0
0
;85.3500080822731
CB204            82.75    2.75       0          TABULAR    CB204                         0
0
;85.4500080823662
CB205            82.85    2.75       0          TABULAR    CB205                         0
0
;85.48
CB206            82.77    2.73       0          TABULAR    CB206                         0
0
;85.05
CB207            83.15    2.3        0          TABULAR    CB207                         0
0
;84.9000080821652
CB208            83.3     2.04       0          TABULAR    CB208                         0
0
;84.8
CB209            83.2     1.9        0          TABULAR    CB209                         0
0
;85.25
CB210B           82.65    3          0          TABULAR    CB210B                        0
0
;85.35
CB211            83.7     1.9        0          TABULAR    CB211                         0
0
;85.4
CB212            83.2     2.42       0          TABULAR    CB212                         0
0
;85.5000000000554
CB212A           83.62    2          0          TABULAR    CB212A                        0
0
;84.75
CB213            83.15    1.75       0          TABULAR    CB213                         0
0
;84.55
CB214            82.95    1.9        0          TABULAR    CB214                         0
0

[CONDUITS]
;;Name           From Node        To Node          Length     Roughness  InOffset   OutOffset
InitFlow   MaxFlow
;;-------------- ---------------- ---------------- ---------- ---------- ---------- ----------
---------- ----------
C2               CB208            CB207            9.666      0.013      83.3       83.2
0          0
C4               CB212A           CB212            18.475     0.013      83.62      83.25
0          0
C5               CB211            CB212            22.346     0.013      83.7       83.25
0          0
CB213            CB213            522_(P-Stm)      29.34      0.013      83.15      82.757
0          0
CB214            CB214            522_(P-Stm)      21.65      0.013      82.95      82.757
0          0
;PVC Pipes
Pipe_-_(104)_(P-Stm)_2 518_Orifice 518A_(P-Stm)    15.623     0.013      81.361     81.322
0          0
;PVC Pipes
Pipe_-_(110)_(P-Stm) 521_(P-Stm)  518_(P-Stm)      27.209     0.013      82.257     82.161
0          0
;PVC Pipes
Pipe_-_(111)_(P-Stm) 522_(P-Stm)  521_(P-Stm)      45.094     0.013      82.482     82.257
0          0
;Concrete Pipes 100-D
Pipe_-_(71)_(P-Stm) 520_(P-Stm)   519_(P-Stm)      57.146     0.013      82.787     82.557
0          0
;Concrete Pipes 100-D
Pipe_-_(72)_(P-Stm) 519_(P-Stm)   518_(P-Stm)      31.967     0.013      82.497     82.337
0          0

[ORIFICES]
;;Name           From Node        To Node          Type         Offset     Qcoeff     Gated
CloseTime
;;-------------- ---------------- ---------------- ------------ ---------- ---------- --------
----------
OR1              518_(P-Stm)      518_Orifice      SIDE         81.361     0.65       NO
0

[WEIRS]
;;Name           From Node        To Node          Type         CrestHt    Qcoeff     Gated
EndCon   EndCoeff   Surcharge  RoadWidth  RoadSurf   Coeff. Curve
;;-------------- ---------------- ---------------- ------------ ---------- ---------- --------
-------- ---------- ---------- ---------- ---------- ----------------
W1               CB208            CB209            TRANSVERSE   85.31      1.84       NO
0        0          YES
W2               CB210B           CB211            TRANSVERSE   85.6       1.84       NO
0        0          YES
W3               CB210B           CB202            TRANSVERSE   85.45      1.84       NO
0        0          YES
W4               CB202            CB204            TRANSVERSE   85.55      1.84       NO
0        0          YES
W5               CB206            CB207            TRANSVERSE   85.45      1.84       NO
0        0          YES
W6               CB201            CB200            TRANSVERSE   85.65      1.84       NO
0        0          YES
W7               CB200            CB209            TRANSVERSE   85.42      1.84       NO
0        0          YES

[OUTLETS]
;;Name           From Node        To Node          Offset     Type             QTable/Qcoeff
Qexpon     Gated
;;-------------- ---------------- ---------------- ---------- ---------------- ----------------
-- ---------- --------
CB200            CB200            520_(P-Stm)      83.18      TABULAR/HEAD     IPEX_Type_A
NO
;Critical
CB201            CB201            520_(P-Stm)      83.09      TABULAR/HEAD     Vortex_ICD_100
NO
;Critical
CB202            CB202            521_(P-Stm)      82.76      TABULAR/HEAD     IPEX_Type_A
NO
CB203            CB203            521_(P-Stm)      82.75      TABULAR/HEAD     Vortex_ICD_70
NO
CB204            CB204            522_(P-Stm)      82.75      TABULAR/HEAD     Vortex_ICD_65
NO
CB205            CB205            522_(P-Stm)      82.85      TABULAR/HEAD     Vortex_ICD_65
NO
CB206            CB206            522_(P-Stm)      82.77      TABULAR/HEAD     Vortex_ICD_70
NO
Cb207            CB207            522_(P-Stm)      83.15      TABULAR/HEAD     Vortex_ICD_100
NO
CB209            CB209            520_(P-Stm)      83.2       TABULAR/HEAD     IPEX_Type_A
NO
CB210B           CB210B           518_(P-Stm)      82.65      TABULAR/HEAD     Vortex_ICD_65
NO
CB212            CB212            521_(P-Stm)      83.2       TABULAR/HEAD     Vortex_ICD_100
NO

[XSECTIONS]
;;Link           Shape        Geom1            Geom2      Geom3      Geom4      Barrels
Culvert
```

```
;;-------------- ------------ ---------------- ---------- ---------- ---------- ---------- ---
-------
C2               CIRCULAR     0.25             0          0          0          1
C4               CIRCULAR     0.25             0          0          0          1
C5               CIRCULAR     0.25             0          0          0          1
CB213            CIRCULAR     0.25             0          0          0          1
CB214            CIRCULAR     0.25             0          0          0          1
Pipe_-_(104)_(P-Stm)_2 CIRCULAR 0.45           0          0          0          1
Pipe_-_(110)_(P-Stm) CIRCULAR 0.525            0          0          0          1
Pipe_-_(111)_(P-Stm) CIRCULAR 0.525            0          0          0          1
Pipe_-_(71)_(P-Stm) CIRCULAR  0.525            0          0          0          1
Pipe_-_(72)_(P-Stm) CIRCULAR  0.525            0          0          0          1
OR1              CIRCULAR     0.127            0          0          0
W1               RECT_OPEN    0.03             1.5        0          0
W2               RECT_OPEN    0.05             2.59       0          0
W3               RECT_OPEN    0.2              1.34       0          0
W4               RECT_OPEN    0.1              4.9        0          0
W5               RECT_OPEN    0.05             4.725      0          0
W6               RECT_OPEN    0.1              6          0          0
W7               RECT_OPEN    0.08             10.5       0          0

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

[CURVES]
;;Name           Type       X-Value    Y-Value
;;-------------- ---------- ---------- ----------
CB210-OUT85.5    Rating     0          0
CB210-OUT85.5               85.5       0.04
CB210-OUT85.5               100        0.04

CB210-OUT-85.6   Rating     0          0
CB210-OUT-85.6              85.6       0.08
CB210-OUT-85.6              100        0.08

;IPEX Type A ICD Rating Curve
IPEX_Type_A      Rating     0          0
IPEX_Type_A                 0.1        5.7
IPEX_Type_A                 0.2        8.1
IPEX_Type_A                 0.3        9.9
IPEX_Type_A                 0.4        11.4
IPEX_Type_A                 0.5        12.8
IPEX_Type_A                 0.6        14
IPEX_Type_A                 0.7        15.1
IPEX_Type_A                 0.8        16.2
IPEX_Type_A                 0.9        17.2
IPEX_Type_A                 1          18.1
IPEX_Type_A                 1.2        19.8
IPEX_Type_A                 1.4        21.4
IPEX_Type_A                 1.6        22.9
IPEX_Type_A                 1.8        24.3
IPEX_Type_A                 2          25.6
IPEX_Type_A                 2.5        28.6
IPEX_Type_A                 3          31.3

;IPEX Type B ICD Rating Curve
IPEX_Type_B      Rating     0          0
IPEX_Type_B                 0.1        8.1
IPEX_Type_B                 0.2        11.5
IPEX_Type_B                 0.3        14.1
IPEX_Type_B                 0.4        16.2
IPEX_Type_B                 0.5        18.2
IPEX_Type_B                 0.6        19.9
IPEX_Type_B                 0.7        21.5
IPEX_Type_B                 0.8        23
IPEX_Type_B                 0.9        24.4
IPEX_Type_B                 1          25.7
IPEX_Type_B                 1.2        28.1
IPEX_Type_B                 1.4        30.4
IPEX_Type_B                 1.6        32.5
IPEX_Type_B                 1.8        34.4
IPEX_Type_B                 2          36.3
IPEX_Type_B                 2.5        40.6
IPEX_Type_B                 3          44.5

;IPEX Type C ICD Rating Curve
IPEX_Type_C      Rating     0          0
IPEX_Type_C                 0.1        10.6
IPEX_Type_C                 0.2        15
IPEX_Type_C                 0.3        18.3
IPEX_Type_C                 0.4        21.2
IPEX_Type_C                 0.5        23.7
IPEX_Type_C                 0.6        25.9
IPEX_Type_C                 0.7        28
IPEX_Type_C                 0.8        29.9
IPEX_Type_C                 0.9        31.7
IPEX_Type_C                 1          33.5
IPEX_Type_C                 1.2        36.6
IPEX_Type_C                 1.4        39.6
IPEX_Type_C                 1.6        42.3
IPEX_Type_C                 1.8        44.9
IPEX_Type_C                 2          47.3
IPEX_Type_C                 2.5        52.9
IPEX_Type_C                 3          57.9

;IPEX Type AA ICD Rating Curve
IPEX_Type_D      Rating     0          0
IPEX_Type_D                 0.1        15.4
IPEX_Type_D                 0.2        21.7
IPEX_Type_D                 0.3        26.6
IPEX_Type_D                 0.4        30.7
IPEX_Type_D                 0.5        34.3
IPEX_Type_D                 0.6        37.6
IPEX_Type_D                 0.7        40.6
IPEX_Type_D                 0.8        43.4
IPEX_Type_D                 0.9        46.1
IPEX_Type_D                 1          48.5
IPEX_Type_D                 1.2        53.2
IPEX_Type_D                 1.4        57.4
IPEX_Type_D                 1.6        61.4
IPEX_Type_D                 1.8        65.1
IPEX_Type_D                 2          68.7
IPEX_Type_D                 2.5        76.8
IPEX_Type_D                 3          84.1

;IPEX Type E ICD Rating Curve
IPEX_Type_E      Rating     0          0
IPEX_Type_E                 0.1        20.5
IPEX_Type_E                 0.2        28.9
IPEX_Type_E                 0.3        35.5
IPEX_Type_E                 0.4        40.9
IPEX_Type_E                 0.5        45.8
IPEX_Type_E                 0.6        50.1
IPEX_Type_E                 0.7        54.2
IPEX_Type_E                 0.8        57.9
IPEX_Type_E                 0.9        61.4
IPEX_Type_E                 1          64.7
IPEX_Type_E                 1.2        70.9
IPEX_Type_E                 1.4        76.6
IPEX_Type_E                 1.6        81.9
IPEX_Type_E                 1.8        86.8
IPEX_Type_E                 2          91.5
IPEX_Type_E                 2.5        102.3
IPEX_Type_E                 3          112.1

;Tempest Rating Curve for Vortex ICD 100, No grate allowance
Vortex_ICD_100   Rating     0          0
Vortex_ICD_100              0.1        2.8
Vortex_ICD_100              0.2        4
Vortex_ICD_100              0.3        4.9
Vortex_ICD_100              0.4        5.6
Vortex_ICD_100              0.5        6.3
Vortex_ICD_100              0.6        6.9
Vortex_ICD_100              0.7        7.5
Vortex_ICD_100              0.8        8
Vortex_ICD_100              0.9        8.5
Vortex_ICD_100              1          8.9
Vortex_ICD_100              1.2        9.8
Vortex_ICD_100              1.4        10.6
Vortex_ICD_100              1.6        11.3
Vortex_ICD_100              1.8        12
Vortex_ICD_100              2          12.6
Vortex_ICD_100              2.5        14.1
Vortex_ICD_100              3          15.5

;Tempest Rating Curve for Vortex ICD 105, No grate allowance
Vortex_ICD_105   Rating     0          0
Vortex_ICD_105              0.1        3.1
Vortex_ICD_105              0.2        4.4
Vortex_ICD_105              0.3        5.4
Vortex_ICD_105              0.4        6.2
Vortex_ICD_105              0.5        6.9
Vortex_ICD_105              0.6        7.6
Vortex_ICD_105              0.7        8.2
Vortex_ICD_105              0.8        8.8
Vortex_ICD_105              0.9        9.3
Vortex_ICD_105              1          9.8
Vortex_ICD_105              1.2        10.7
Vortex_ICD_105              1.4        11.6
Vortex_ICD_105              1.6        12.4
Vortex_ICD_105              1.8        13.1
Vortex_ICD_105              2          13.9
Vortex_ICD_105              2.5        15.5
Vortex_ICD_105              3          17

;Tempest Rating Curve for Vortex ICD 40, No grate allowance
Vortex_ICD_40    Rating     0          0
Vortex_ICD_40               0.1        0.4
Vortex_ICD_40               0.2        0.6
Vortex_ICD_40               0.3        0.7
Vortex_ICD_40               0.4        0.9
Vortex_ICD_40               0.5        1
Vortex_ICD_40               0.6        1
Vortex_ICD_40               0.7        1.1
Vortex_ICD_40               0.8        1.2
Vortex_ICD_40               0.9        1.3
Vortex_ICD_40               1          1.4
Vortex_ICD_40               1.2        1.5
Vortex_ICD_40               1.4        1.6
Vortex_ICD_40               1.6        1.7
Vortex_ICD_40               1.8        1.8
Vortex_ICD_40               2          1.9
Vortex_ICD_40               2.5        2.2
Vortex_ICD_40               3          2.4

;Tempest Rating Curve for Vortex ICD 45, No grate allowance
Vortex_ICD_45    Rating     0          0
Vortex_ICD_45               0.1        0.6
Vortex_ICD_45               0.2        0.8
Vortex_ICD_45               0.3        1
Vortex_ICD_45               0.4        1.1
Vortex_ICD_45               0.5        1.3
Vortex_ICD_45               0.6        1.4
Vortex_ICD_45               0.7        1.5
Vortex_ICD_45               0.8        1.6
Vortex_ICD_45               0.9        1.7
Vortex_ICD_45               1          1.8
Vortex_ICD_45               1.2        2
Vortex_ICD_45               1.4        2.1
Vortex_ICD_45               1.6        2.3
Vortex_ICD_45               1.8        2.4
Vortex_ICD_45               2          2.6
Vortex_ICD_45               2.5        2.9
Vortex_ICD_45               3          3.1

;Tempest Rating Curve for Vortex ICD 50, No grate allowance
Vortex_ICD_50    Rating     0          0
Vortex_ICD_50               0.1        0.7
Vortex_ICD_50               0.2        1
Vortex_ICD_50               0.3        1.2
Vortex_ICD_50               0.4        1.4
Vortex_ICD_50               0.5        1.6
Vortex_ICD_50               0.6        1.8
Vortex_ICD_50               0.7        1.9
Vortex_ICD_50               0.8        2
Vortex_ICD_50               0.9        2.1
Vortex_ICD_50               1          2.3
Vortex_ICD_50               1.2        2.5
Vortex_ICD_50               1.4        2.7
Vortex_ICD_50               1.6        2.9
Vortex_ICD_50               1.8        3
Vortex_ICD_50               2          3.2
Vortex_ICD_50               2.5        3.6
Vortex_ICD_50               3          3.9

;Tempest Rating Curve for Vortex ICD 55, No grate allowance
Vortex_ICD_55    Rating     0          0
Vortex_ICD_55               0.1        0.9
Vortex_ICD_55               0.2        1.2
Vortex_ICD_55               0.3        1.5
Vortex_ICD_55               0.4        1.7
Vortex_ICD_55               0.5        1.9
Vortex_ICD_55               0.6        2.1
Vortex_ICD_55               0.7        2.3
Vortex_ICD_55               0.8        2.4
Vortex_ICD_55               0.9        2.6
Vortex_ICD_55               1          2.7
Vortex_ICD_55               1.2        3
Vortex_ICD_55               1.4        3.2
Vortex_ICD_55               1.6        3.4
Vortex_ICD_55               1.8        3.6
Vortex_ICD_55               2          3.8
Vortex_ICD_55               2.5        4.3
Vortex_ICD_55               3          4.7

;Tempest Rating Curve for Vortex ICD 60, No grate allowance
Vortex_ICD_60    Rating     0          0
Vortex_ICD_60               0.1        1.1
Vortex_ICD_60               0.2        1.5
Vortex_ICD_60               0.3        1.8
Vortex_ICD_60               0.4        2.1
Vortex_ICD_60               0.5        2.3
Vortex_ICD_60               0.6        2.5
Vortex_ICD_60               0.7        2.7
Vortex_ICD_60               0.8        2.9
Vortex_ICD_60               0.9        3.1
Vortex_ICD_60               1          3.2
Vortex_ICD_60               1.2        3.6
Vortex_ICD_60               1.4        3.8
Vortex_ICD_60               1.6        4.1
Vortex_ICD_60               1.8        4.3
Vortex_ICD_60               2          4.6
Vortex_ICD_60               2.5        5.1
Vortex_ICD_60               3          5.6

;Tempest Rating Curve for Vortex ICD 65, No grate allowance
Vortex_ICD_65    Rating     0          0
Vortex_ICD_65               0.1        1.2
Vortex_ICD_65               0.2        1.6
Vortex_ICD_65               0.3        2
Vortex_ICD_65               0.4        2.3
Vortex_ICD_65               0.5        2.5
Vortex_ICD_65               0.6        2.8
Vortex_ICD_65               0.7        3
Vortex_ICD_65               0.8        3.2
Vortex_ICD_65               0.9        3.4
Vortex_ICD_65               1          3.6
Vortex_ICD_65               1.2        4
Vortex_ICD_65               1.4        4.3
Vortex_ICD_65               1.6        4.6
Vortex_ICD_65               1.8        4.9
Vortex_ICD_65               2          5.1
Vortex_ICD_65               2.5        5.7
Vortex_ICD_65               3          6.3

;Tempest Rating Curve for Vortex ICD 70, No grate allowance
Vortex_ICD_70    Rating     0          0
```

```
Vortex_ICD_70              0.1        1.3
Vortex_ICD_70              0.2        1.9
Vortex_ICD_70              0.3        2.3
Vortex_ICD_70              0.4        2.7
Vortex_ICD_70              0.5        3
Vortex_ICD_70              0.6        3.3
Vortex_ICD_70              0.7        3.6
Vortex_ICD_70              0.8        3.8
Vortex_ICD_70              0.9        4.1
Vortex_ICD_70              1          4.3
Vortex_ICD_70              1.2        4.7
Vortex_ICD_70              1.4        5.1
Vortex_ICD_70              1.6        5.5
Vortex_ICD_70              1.8        5.8
Vortex_ICD_70              2          6.1
Vortex_ICD_70              2.5        6.8
Vortex_ICD_70              3          7.5

;Tempest Rating Curve for Vortex ICD 75, No grate allowance
Vortex_ICD_75    Rating    0          0
Vortex_ICD_75              0.1        1.6
Vortex_ICD_75              0.2        2.2
Vortex_ICD_75              0.3        2.7
Vortex_ICD_75              0.4        3.2
Vortex_ICD_75              0.5        3.5
Vortex_ICD_75              0.6        3.9
Vortex_ICD_75              0.7        4.2
Vortex_ICD_75              0.8        4.5
Vortex_ICD_75              0.9        4.8
Vortex_ICD_75              1          5
Vortex_ICD_75              1.2        5.5
Vortex_ICD_75              1.4        5.9
Vortex_ICD_75              1.6        6.3
Vortex_ICD_75              1.8        6.7
Vortex_ICD_75              2          7.1
Vortex_ICD_75              2.5        7.9
Vortex_ICD_75              3          8.7

;Tempest Rating Curve for Vortex ICD 80, No grate allowance
Vortex_ICD_80    Rating    0          0
Vortex_ICD_80              0.1        1.8
Vortex_ICD_80              0.2        2.6
Vortex_ICD_80              0.3        3.1
Vortex_ICD_80              0.4        3.6
Vortex_ICD_80              0.5        4
Vortex_ICD_80              0.6        4.4
Vortex_ICD_80              0.7        4.8
Vortex_ICD_80              0.8        5.1
Vortex_ICD_80              0.9        5.4
Vortex_ICD_80              1          5.7
Vortex_ICD_80              1.2        6.3
Vortex_ICD_80              1.4        6.8
Vortex_ICD_80              1.6        7.2
Vortex_ICD_80              1.8        7.7
Vortex_ICD_80              2          8.1
Vortex_ICD_80              2.5        9
Vortex_ICD_80              3          9.9

;Tempest Rating Curve for Vortex ICD 85, No grate allowance
Vortex_ICD_85    Rating    0          0
Vortex_ICD_85              0.1        2
Vortex_ICD_85              0.2        2.9
Vortex_ICD_85              0.3        3.5
Vortex_ICD_85              0.4        4.1
Vortex_ICD_85              0.5        4.5
Vortex_ICD_85              0.6        5
Vortex_ICD_85              0.7        5.4
Vortex_ICD_85              0.8        5.7
Vortex_ICD_85              0.9        6.1
Vortex_ICD_85              1          6.4
Vortex_ICD_85              1.2        7
Vortex_ICD_85              1.4        7.6
Vortex_ICD_85              1.6        8.1
Vortex_ICD_85              1.8        8.6
Vortex_ICD_85              2          9.1
Vortex_ICD_85              2.5        10.1
Vortex_ICD_85              3          11.1

;Tempest Rating Curve for Vortex ICD 90, No grate allowance
Vortex_ICD_90    Rating    0          0
Vortex_ICD_90              0.1        2.2
Vortex_ICD_90              0.2        3.2
Vortex_ICD_90              0.3        3.9
Vortex_ICD_90              0.4        4.5
Vortex_ICD_90              0.5        5.1
Vortex_ICD_90              0.6        5.5
Vortex_ICD_90              0.7        6
Vortex_ICD_90              0.8        6.4
Vortex_ICD_90              0.9        6.8
Vortex_ICD_90              1          7.2
Vortex_ICD_90              1.2        7.9
Vortex_ICD_90              1.4        8.5
Vortex_ICD_90              1.6        9.1
Vortex_ICD_90              1.8        9.6
Vortex_ICD_90              2          10.2
Vortex_ICD_90              2.5        11.4
Vortex_ICD_90              3          12.5

;Tempest Rating Curve for Vortex ICD 95, No grate allowance
Vortex_ICD_95    Rating    0          0
Vortex_ICD_95              0.1        2.6
Vortex_ICD_95              0.2        3.6
Vortex_ICD_95              0.3        4.4
Vortex_ICD_95              0.4        5.1
Vortex_ICD_95              0.5        5.7
Vortex_ICD_95              0.6        6.2
Vortex_ICD_95              0.7        6.7
Vortex_ICD_95              0.8        7.1
Vortex_ICD_95              0.9        7.6
Vortex_ICD_95              1          8
Vortex_ICD_95              1.2        8.7
Vortex_ICD_95              1.4        9.4
Vortex_ICD_95              1.6        10.1
Vortex_ICD_95              1.8        10.7
Vortex_ICD_95              2          11.3
Vortex_ICD_95              2.5        12.6
Vortex_ICD_95              3          13.8

CB200            Storage   0          0.36
CB200                      2          0.36
CB200                      2.24       210.73
CB200                      2.32       210.73

CB201            Storage   0          0.36
CB201                      2.41       0.36
CB201                      2.56       169.64
CB201                      2.66       169.64

CB202            Storage   0          0.36
CB202                      2.6        0.36
CB202                      2.79       283.64
CB202                      2.89       283.64

CB203            Storage   0          0.36
CB203                      2.6        0.36
CB203                      2.9        178.09

CB204            Storage   0          0.36
CB204                      2.6        0.36
CB204                      2.75       146.08

CB205            Storage   0          0.36
CB205                      2.6        0.36
CB205                      2.75       86.52

CB206            Storage   0          0.36
CB206                      2.6        0.36
CB206                      2.68       61.65
CB206                      2.73       61.65
```

```
CB207            Storage   0          0.36
CB207                      1.97       0.36
CB207                      2.3        182.21

CB208            Storage   0          0.073
CB208                      1.74       0.073
CB208                      2.01       67.88
CB208                      2.04       67.88

CB209            Storage   0          0.073
CB209                      1.6        0.073
CB209                      1.9        84.87

CB210B           Storage   0          0.073
CB210B                     2.6        0.073
CB210B                     2.9        60.53
CB210B                     3          60.53

CB211            Storage   0          0.073
CB211                      1.65       0.073
CB211                      1.9        21.99

CB212            Storage   0          0.36
CB212                      2.2        0.36
CB212                      2.42       55.12

CB212A           Storage   0          0.073
CB212A                     2          0.073

CB213            Storage   0          0.073
CB213                      1.6        0.073
CB213                      1.75       9.05

CB214            Storage   0          0.073
CB214                      1.6        0.073
CB214                      1.9        34.75

[TIMESERIES]
;;Name           Date       Time       Value
;;-------------- ---------- ---------- ----------
;Rainfall (mm/hr)
24SCS100         01/01/2000 00:00:00   1.548
24SCS100         01/01/2000 00:15:00   1.548
24SCS100         01/01/2000 00:30:00   1.548
24SCS100         01/01/2000 00:45:00   1.548
24SCS100         01/01/2000 01:00:00   0.7224
24SCS100         01/01/2000 01:15:00   0.7224
24SCS100         01/01/2000 01:30:00   0.7224
24SCS100         01/01/2000 01:45:00   0.7224
24SCS100         01/01/2000 02:00:00   1.3416
24SCS100         01/01/2000 02:15:00   1.3416
24SCS100         01/01/2000 02:30:00   1.3416
24SCS100         01/01/2000 02:45:00   1.3416
24SCS100         01/01/2000 03:00:00   1.3416
24SCS100         01/01/2000 03:15:00   1.3416
24SCS100         01/01/2000 03:30:00   1.3416
24SCS100         01/01/2000 03:45:00   1.3416
24SCS100         01/01/2000 04:00:00   1.7544
24SCS100         01/01/2000 04:15:00   1.7544
24SCS100         01/01/2000 04:30:00   1.7544
24SCS100         01/01/2000 04:45:00   1.7544
24SCS100         01/01/2000 05:00:00   1.548
24SCS100         01/01/2000 05:15:00   1.548
24SCS100         01/01/2000 05:30:00   1.548
24SCS100         01/01/2000 05:45:00   1.548
24SCS100         01/01/2000 06:00:00   2.064
24SCS100         01/01/2000 06:15:00   2.064
24SCS100         01/01/2000 06:30:00   2.064
24SCS100         01/01/2000 06:45:00   2.064
24SCS100         01/01/2000 07:00:00   2.064
24SCS100         01/01/2000 07:15:00   2.064
24SCS100         01/01/2000 07:30:00   2.064
24SCS100         01/01/2000 07:45:00   2.064
24SCS100         01/01/2000 08:00:00   2.7864
24SCS100         01/01/2000 08:15:00   2.7864
24SCS100         01/01/2000 08:30:00   2.7864
24SCS100         01/01/2000 08:45:00   2.7864
24SCS100         01/01/2000 09:00:00   3.3024
24SCS100         01/01/2000 09:15:00   3.3024
24SCS100         01/01/2000 09:30:00   3.7152
24SCS100         01/01/2000 09:45:00   3.7152
24SCS100         01/01/2000 10:00:00   4.7472
24SCS100         01/01/2000 10:15:00   4.7472
24SCS100         01/01/2000 10:30:00   6.3984
24SCS100         01/01/2000 10:45:00   6.3984
24SCS100         01/01/2000 11:00:00   9.9072
24SCS100         01/01/2000 11:15:00   9.9072
24SCS100         01/01/2000 11:30:00   42.9312
24SCS100         01/01/2000 11:45:00   113.9328
24SCS100         01/01/2000 12:00:00   14.8608
24SCS100         01/01/2000 12:15:00   14.8608
24SCS100         01/01/2000 12:30:00   7.6368
24SCS100         01/01/2000 12:45:00   7.6368
24SCS100         01/01/2000 13:00:00   5.5728
24SCS100         01/01/2000 13:15:00   5.5728
24SCS100         01/01/2000 13:30:00   4.3344
24SCS100         01/01/2000 13:45:00   4.3344
24SCS100         01/01/2000 14:00:00   3.3024
24SCS100         01/01/2000 14:15:00   3.3024
24SCS100         01/01/2000 14:30:00   3.3024
24SCS100         01/01/2000 14:45:00   3.3024
24SCS100         01/01/2000 15:00:00   2.8896
24SCS100         01/01/2000 15:15:00   2.8896
24SCS100         01/01/2000 15:30:00   2.8896
24SCS100         01/01/2000 15:45:00   2.8896
24SCS100         01/01/2000 16:00:00   2.2704
24SCS100         01/01/2000 16:15:00   2.2704
24SCS100         01/01/2000 16:30:00   2.2704
24SCS100         01/01/2000 16:45:00   2.2704
24SCS100         01/01/2000 17:00:00   2.3736
24SCS100         01/01/2000 17:15:00   2.3736
24SCS100         01/01/2000 17:30:00   2.3736
24SCS100         01/01/2000 17:45:00   2.3736
24SCS100         01/01/2000 18:00:00   1.548
24SCS100         01/01/2000 18:15:00   1.548
24SCS100         01/01/2000 18:30:00   1.548
24SCS100         01/01/2000 18:45:00   1.548
24SCS100         01/01/2000 19:00:00   1.2384
24SCS100         01/01/2000 19:15:00   1.2384
24SCS100         01/01/2000 19:30:00   1.2384
24SCS100         01/01/2000 19:45:00   1.2384
24SCS100         01/01/2000 20:00:00   1.7544
24SCS100         01/01/2000 20:15:00   1.7544
24SCS100         01/01/2000 20:30:00   1.7544
24SCS100         01/01/2000 20:45:00   1.7544
24SCS100         01/01/2000 21:00:00   1.1352
24SCS100         01/01/2000 21:15:00   1.1352
24SCS100         01/01/2000 21:30:00   1.1352
24SCS100         01/01/2000 21:45:00   1.1352
24SCS100         01/01/2000 22:00:00   1.032
24SCS100         01/01/2000 22:15:00   1.032
24SCS100         01/01/2000 22:30:00   1.032
24SCS100         01/01/2000 22:45:00   1.032
24SCS100         01/01/2000 23:00:00   1.032
24SCS100         01/01/2000 23:15:00   1.032
24SCS100         01/01/2000 23:30:00   1.032
24SCS100         01/01/2000 23:45:00   1.032
24SCS100         01/02/2000 00:00:00   0

;Rainfall (mm/hr)
3CHI100          01/01/2000 00:00:00   5.339
3CHI100          01/01/2000 00:10:00   6.376
3CHI100          01/01/2000 00:20:00   7.977
3CHI100          01/01/2000 00:30:00   10.797
3CHI100          01/01/2000 00:40:00   17.136
3CHI100          01/01/2000 00:50:00   45.128
3CHI100          01/01/2000 01:00:00   178.107
3CHI100          01/01/2000 01:10:00   51.056
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3CHI100          01/01/2000 01:20:00   26.163
3CHI100          01/01/2000 01:30:00   17.571
3CHI100          01/01/2000 01:40:00   13.277
3CHI100          01/01/2000 01:50:00   10.712
3CHI100          01/01/2000 02:00:00   9.008
3CHI100          01/01/2000 02:10:00   7.793
3CHI100          01/01/2000 02:20:00   6.883
3CHI100          01/01/2000 02:30:00   6.174
3CHI100          01/01/2000 02:40:00   5.607
3CHI100          01/01/2000 02:50:00   5.142
3CHI100          01/01/2000 03:00:00   0

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

[TAGS]
Node       518_Orifice      RY_Manhole
Node       CB200            RY_Manhole
Node       CB201            RY_Manhole
Node       CB202            RY_Manhole
Node       CB203            RY_Manhole
Node       CB204            RY_Manhole
Node       CB205            RY_Manhole
Node       CB206            RY_Manhole
Node       CB207            RY_Manhole
Node       CB208            RY_Manhole
Node       CB209            RY_Manhole
Node       CB210B           RY_Manhole
Node       CB211            RY_Manhole
Node       CB212            RY_Manhole
Node       CB212A           RY_Manhole
Node       CB213            RY_Manhole
Node       CB214            RY_Manhole
Link       C2               RY_Sewer
Link       C4               RY_Sewer
Link       C5               RY_Sewer

[MAP]
DIMENSIONS       381219.0294      5032865.6782     381334.8286      5033009.9278
UNITS            Meters

[COORDINATES]
;;Node           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
518_Orifice      381303.7           5032953.188
518A_(P-Stm)     381317.029         5032955.797
518_(P-Stm)      381301.695         5032952.807
519_(P-Stm)      381278.558         5032974.866
520_(P-Stm)      381240.562         5032932.182
521_(P-Stm)      381309.324         5032926.69
522_(P-Stm)      381267.739         5032909.252
CB200            381246.119         5032946.933
CB201            381266.142         5032969.504
CB202            381305.816         5032949.229
CB203            381314.519         5032914.342
CB204            381291.187         5032921.779
CB205            381286.939         5032925.282
CB206            381270.233         5032913.017
CB207            381253.811         5032910.356
CB208            381248.314         5032902.406
CB209            381228.288         5032926.78
CB210B           381314.246         5032963.095
CB211            381319.351         5032951.771
CB212            381328.283         5032931.288
CB212A           381326.507         5032912.9
CB213            381296.875         5032912.718
CB214            381282.831         5032893.727

[VERTICES]
;;Link           X-Coord            Y-Coord
;;-------------- ------------------ ------------------
W2               381318.013         5032956.452
W4               381305.808         5032934.267
W4               381304.151         5032928.843

[POLYGONS]
;;Subcatchment   X-Coord            Y-Coord
;;-------------- ------------------ ------------------
S1               381237.464         5032904.825
S1               381240.329         5032905.467
S1               381240.224         5032906.884
S1               381246.264         5032909.575
S1               381246.323         5032909.6
S1               381246.383         5032909.624
S1               381246.444         5032909.645
S1               381246.506         5032909.663
S1               381246.568         5032909.68
S1               381246.631         5032909.695
S1               381246.695         5032909.707
S1               381246.758         5032909.717
S1               381246.823         5032909.725
S1               381246.887         5032909.731
S1               381246.951         5032909.734
S1               381247.016         5032909.735
S1               381247.08          5032909.734
S1               381247.145         5032909.731
S1               381247.209         5032909.725
S1               381247.273         5032909.717
S1               381247.337         5032909.707
S1               381247.401         5032909.695
S1               381247.463         5032909.681
S1               381247.526         5032909.664
S1               381247.588         5032909.645
S1               381247.649         5032909.624
S1               381247.709         5032909.601
S1               381247.768         5032909.576
S1               381247.827         5032909.548
S1               381247.885         5032909.519
S1               381247.941         5032909.488
S1               381247.996         5032909.455
S1               381248.051         5032909.419
S1               381248.103         5032909.382
S1               381248.155         5032909.344
S1               381248.205         5032909.303
S1               381248.254         5032909.261
S1               381248.301         5032909.217
S1               381248.347         5032909.171
S1               381248.391         5032909.124
S1               381248.433         5032909.075
S1               381248.474         5032909.025
S1               381248.513         5032908.973
S1               381248.55          5032908.92
S1               381248.585         5032908.866
S1               381248.618         5032908.811
S1               381248.65          5032908.754
S1               381248.679         5032908.697
S1               381248.706         5032908.638
S1               381259.547         5032884.338
S1               381264.625         5032879.785
S1               381253.013         5032884.608
S1               381244.74          5032903.289
S1               381244.061         5032903.318
S1               381243.383         5032903.37
S1               381242.707         5032903.444
S1               381242.035         5032903.54
S1               381241.365         5032903.658
S1               381240.7           5032903.799
S1               381240.04          5032903.961
S1               381239.386         5032904.145
S1               381238.738         5032904.35
S1               381238.097         5032904.577
S1               381237.464         5032904.825
S10              381282.247         5032908.62
S10              381276.098         5032921.781
S10              381287.174         5032924.398
S10              381297.866         5032927.382
S10              381298.206         5032927.496
S10              381298.542         5032927.621
S10              381298.873         5032927.758
S10              381299.199         5032927.907
S10              381299.52          5032928.067
S10              381299.835         5032928.238
S10              381300.144         5032928.42
S10              381300.446         5032928.612
S10              381300.742         5032928.815
S10              381301.03          5032929.029
S10              381301.31          5032929.252
S10              381301.583         5032929.485
S10              381301.847         5032929.727
S10              381302.103         5032929.979
S10              381302.349         5032930.239
S10              381302.586         5032930.508
S10              381302.814         5032930.785
S10              381303.032         5032931.069
S10              381303.24          5032931.362
S10              381303.437         5032931.661
S10              381304.434         5032927.758
S10              381307.137         5032921.453
S10              381307.111         5032921.441
S10              381307.084         5032921.427
S10              381307.058         5032921.413
S10              381307.033         5032921.398
S10              381307.008         5032921.382
S10              381306.984         5032921.366
S10              381306.96          5032921.348
S10              381306.937         5032921.33
S10              381306.915         5032921.311
S10              381306.893         5032921.291
S10              381306.872         5032921.27
S10              381306.852         5032921.249
S10              381306.833         5032921.227
S10              381306.814         5032921.204
S10              381306.796         5032921.181
S10              381306.779         5032921.157
S10              381306.763         5032921.132
S10              381306.747         5032921.107
S10              381306.733         5032921.082
S10              381306.719         5032921.056
S10              381306.706         5032921.029
S10              381306.695         5032921.002
S10              381306.684         5032920.975
S10              381306.674         5032920.947
S10              381306.665         5032920.919
S10              381306.657         5032920.891
S10              381306.65          5032920.862
S10              381306.644         5032920.833
S10              381306.639         5032920.804
S10              381306.635         5032920.775
S10              381306.632         5032920.746
S10              381306.63          5032920.716
S10              381306.629         5032920.687
S10              381306.629         5032920.658
S10              381306.63          5032920.628
S10              381306.632         5032920.599
S10              381302.601         5032917.181
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S6               381283.146           5032912.342
S6               381283.268           5032912.566
S6               381283.397           5032912.786
S6               381283.534           5032913.001
S6               381283.679           5032913.211
S6               381283.83            5032913.416
S6               381283.989           5032913.615
S6               381284.154           5032913.809
S6               381284.326           5032913.997
S6               381284.504           5032914.179
S6               381284.689           5032914.355
S6               381284.879           5032914.524
S6               381285.076           5032914.687
S6               381285.278           5032914.842
S6               381285.485           5032914.991
S6               381285.697           5032915.132
S6               381285.914           5032915.266
S6               381286.135           5032915.392
S6               381286.361           5032915.51
S6               381286.59            5032915.621
S7               381260.454           5032950.066
S7               381276.524           5032968.107
S7               381294.345           5032952.211
S7               381287.876           5032944.882
S7               381291.953           5032941.245
S7               381281.347           5032929.355
S7               381266.93            5032942.221
S7               381267.957           5032943.374
S7               381260.454           5032950.066
S8               381260.454           5032950.066
S8               381253.986           5032955.803
S8               381247.43            5032961.793
S8               381277.296           5032994.483
S8               381279.321           5032994.458
S8               381281.458           5032995.233
S8               381282.264           5032994.514
S8               381287.784           5032991.636
S8               381292.558           5032987.125
S8               381295.209           5032987.02
S8               381287.493           5032979.07
S8               381285.292           5032960.286
S8               381276.524           5032968.107
S8               381260.454           5032950.066
S9               381290.74            5032939.886
S9               381293.269           5032937.63
S9               381296.614           5032936.126
S9               381299.932           5032934.777
S9               381303.437           5032931.661
S9               381303.24            5032931.362
S9               381303.032           5032931.069
S9               381302.814           5032930.785
S9               381302.586           5032930.508
S9               381302.349           5032930.239
S9               381302.103           5032929.979
S9               381301.847           5032929.727
S9               381301.583           5032929.485
S9               381301.31            5032929.252
S9               381301.03            5032929.029
S9               381300.742           5032928.815
S9               381300.446           5032928.612
S9               381300.144           5032928.42
S9               381299.835           5032928.238
S9               381299.52            5032928.067
S9               381299.199           5032927.907
S9               381298.873           5032927.758
S9               381298.542           5032927.621
S9               381298.206           5032927.496
S9               381297.866           5032927.382
S9               381287.164           5032924.395
S9               381276.098           5032921.781
S9               381268.429           5032922.45
S9               381273.896           5032926.903
S9               381277.469           5032930.913
S9               381278.399           5032931.986
S9               381281.347           5032929.355
S9               381290.74            5032939.886

;;Storage Node   X-Coord            Y-Coord
;;-------------- ------------------ ------------------

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

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


  *************
  Element Count
  *************
  Number of rain gages ...... 2
  Number of subcatchments ... 17
  Number of nodes ........... 23
  Number of links ........... 29
  Number of pollutants ...... 0
  Number of land uses ....... 0


  ****************
  Raingage Summary
  ****************
                                                               Data      Recording
  Name                 Data Source                             Type      Interval
  ------------------------------------------------------------------------
  24SCS100             24SCS100                                INTENSITY   15 min.
  3CHI100              3CHI100                                 INTENSITY   10 min.


  ********************
  Subcatchment Summary
  ********************
  Name                       Area     Width   %Imperv    %Slope Rain Gage            Outlet
  -----------------------------------------------------------------------------------------
---------------
  S1                         0.02     29.61      0.00    2.2000 24SCS100             CB208
  S10                        0.03     55.32     99.62    2.2000 24SCS100             CB204
  S11                        0.13     65.66     90.33    2.2000 24SCS100             CB202
  S12                        0.01      6.44      0.37    2.2000 24SCS100             CB213
  S14_1                      0.01     22.78     52.68    2.2000 24SCS100             CB211
  S14_2                      0.02     58.12     31.65    2.2000 24SCS100             CB212
  S15                        0.04    108.74     42.75    2.2000 24SCS100             CB210B
  S2                         0.07     33.61     62.94    2.2000 24SCS100             CB209
  S3                         0.07     45.79     96.69    2.2000 24SCS100             CB207
  S32                        0.05     29.70     14.29    2.2000 24SCS100             CB214
  S4                         0.05     24.67     99.97    2.2000 24SCS100             CB206
  S45                        0.02     14.32     99.96    2.2000 24SCS100             CB203
  S5                         0.08     82.96     89.59    2.2000 24SCS100             CB200
  S6                         0.02     40.30      0.00    2.2000 24SCS100             CB214
  S7                         0.07     25.95    100.00    2.2000 24SCS100             520_(P-
Stm)
  S8                         0.09     35.06     80.12    2.2000 24SCS100             CB201
  S9                         0.03     19.08     76.83    2.2000 24SCS100             CB205


  ************
  Node Summary
  ************
                                           Invert      Max.    Ponded    External
  Name                 Type                 Elev.     Depth      Area    Inflow
  -------------------------------------------------------------------------------
  518_Orifice          JUNCTION             81.36      4.11       0.0
  518A_(P-Stm)         OUTFALL              80.65      1.13       0.0
  518_(P-Stm)          STORAGE              81.06      4.41       0.0
  519_(P-Stm)          STORAGE              82.20      3.51       0.0
  520_(P-Stm)          STORAGE              82.49      2.89       0.0
  521_(P-Stm)          STORAGE              81.96      3.67       0.0
  522_(P-Stm)          STORAGE              82.18      3.32       0.0
  CB200                STORAGE              83.18      2.32       0.0
  CB201                STORAGE              83.09      2.66       0.0
  CB202                STORAGE              82.76      2.89       0.0
  CB203                STORAGE              82.75      2.90       0.0
  CB204                STORAGE              82.75      2.75       0.0
  CB205                STORAGE              82.85      2.75       0.0
  CB206                STORAGE              82.77      2.73       0.0
  CB207                STORAGE              83.15      2.30       0.0
  CB208                STORAGE              83.30      2.04       0.0
  CB209                STORAGE              83.20      1.90       0.0
  CB210B               STORAGE              82.65      3.00       0.0
  CB211                STORAGE              83.70      1.90       0.0
  CB212                STORAGE              83.20      2.42       0.0
  CB212A               STORAGE              83.62      2.00       0.0
  CB213                STORAGE              83.15      1.75       0.0
  CB214                STORAGE              82.95      1.90       0.0


  ************
  Link Summary
  ************
  Name                 From Node            To Node              Type            Length    %Slope
Roughness
  -----------------------------------------------------------------------------------------------
-
  C2                   CB208                CB207                CONDUIT            9.7    1.0346
0.0130
  C4                   CB212A               CB212                CONDUIT           18.5    2.0031
0.0130
  C5                   CB211                CB212                CONDUIT           22.3    2.0142
0.0130
  CB213                CB213                522_(P-Stm)          CONDUIT           29.3    1.3396
0.0130
  CB214                CB214                522_(P-Stm)          CONDUIT           21.6    0.8915
0.0130
  Pipe_-_(104)_(P-Stm)_2 518_Orifice        518A_(P-Stm)         CONDUIT           15.6    0.2496
0.0130
  Pipe_-_(110)_(P-Stm) 521_(P-Stm)          518_(P-Stm)          CONDUIT           27.2    0.3528
0.0130
  Pipe_-_(111)_(P-Stm) 522_(P-Stm)          521_(P-Stm)          CONDUIT           45.1    0.4990
0.0130
  Pipe_-_(71)_(P-Stm)  520_(P-Stm)          519_(P-Stm)          CONDUIT           57.1    0.4025
0.0130
  Pipe_-_(72)_(P-Stm)  519_(P-Stm)          518_(P-Stm)          CONDUIT           32.0    0.5005
0.0130
  OR1                  518_(P-Stm)          518_Orifice          ORIFICE
  W1                   CB208                CB209                WEIR
  W2                   CB210B               CB211                WEIR
  W3                   CB210B               CB202                WEIR
  W4                   CB202                CB204                WEIR
  W5                   CB206                CB207                WEIR
  W6                   CB201                CB200                WEIR
  W7                   CB200                CB209                WEIR
  CB200                CB200                520_(P-Stm)          OUTLET
  CB201                CB201                520_(P-Stm)          OUTLET
  CB202                CB202                521_(P-Stm)          OUTLET
  CB203                CB203                521_(P-Stm)          OUTLET
  CB204                CB204                522_(P-Stm)          OUTLET
  CB205                CB205                522_(P-Stm)          OUTLET
  CB206                CB206                522_(P-Stm)          OUTLET
  Cb207                CB207                522_(P-Stm)          OUTLET
  CB209                CB209                520_(P-Stm)          OUTLET
  CB210B               CB210B               518_(P-Stm)          OUTLET
  CB212                CB212                521_(P-Stm)          OUTLET


  *********************
  Cross Section Summary
  *********************
                                        Full     Full     Hyd.     Max.   No. of     Full
  Conduit              Shape           Depth     Area     Rad.    Width  Barrels     Flow
  ---------------------------------------------------------------------------------------
  C2                   CIRCULAR         0.25     0.05     0.06     0.25        1    60.49
  C4                   CIRCULAR         0.25     0.05     0.06     0.25        1    84.17
  C5                   CIRCULAR         0.25     0.05     0.06     0.25        1    84.40
  CB213                CIRCULAR         0.25     0.05     0.06     0.25        1    68.83
  CB214                CIRCULAR         0.25     0.05     0.06     0.25        1    56.15
  Pipe_-_(104)_(P-Stm)_2 CIRCULAR           0.45     0.16     0.11     0.45        1
142.46
  Pipe_-_(110)_(P-Stm) CIRCULAR           0.53     0.22     0.13     0.53        1   255.47
  Pipe_-_(111)_(P-Stm) CIRCULAR           0.53     0.22     0.13     0.53        1   303.80
  Pipe_-_(71)_(P-Stm) CIRCULAR          0.53     0.22     0.13     0.53        1   272.85
  Pipe_-_(72)_(P-Stm) CIRCULAR          0.53     0.22     0.13     0.53        1   304.28
```

```
****************
Analysis Options
****************
Flow Units ............... LPS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... HORTON
Flow Routing Method ...... DYNWAVE
Surcharge Method ......... EXTRAN
Starting Date ............ 01/01/2000 00:00:00
Ending Date .............. 01/02/2000 00:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:01:00
Wet Time Step ............ 00:01:00
Dry Time Step ............ 00:01:00
Routing Time Step ........ 1.00 sec
Variable Time Step ....... YES
Maximum Trials ........... 8
Number of Threads ........ 1
Head Tolerance ........... 0.001500 m

**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
Total Precipitation ......         0.085       103.200
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.018        22.041
Surface Runoff ...........         0.066        79.962
Final Storage ............         0.001         1.259
Continuity Error (%) .....        -0.060

**************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.066         0.657
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         0.066         0.655
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.002
Continuity Error (%) .....         0.027

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

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

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

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

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

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff LPS	Runoff Coeff
S1	103.20	0.00	0.00	75.35	0.00	27.88	27.88	0.01	5.19	0.270
S10	103.20	0.00	0.00	0.29	101.25	0.11	101.36	0.03	9.71	0.982
S11	103.20	0.00	0.00	7.25	91.72	2.74	94.47	0.12	39.74	0.915
S12	103.20	0.00	0.00	76.77	0.38	26.07	26.44	0.00	3.53	0.256
S14_1	103.20	0.00	0.00	61.71	53.54	40.71	40.71	0.00	3.47	0.394
S14_2	103.20	0.00	0.00	68.16	32.17	34.59	34.59	0.01	5.22	0.335
S15	103.20	0.00	0.00	64.96	43.45	37.62	37.62	0.01	10.99	0.365
S2	103.20	0.00	0.00	28.00	63.93	10.26	74.19	0.05	21.96	0.719
S3	103.20	0.00	0.00	2.47	98.20	0.95	99.15	0.07	22.82	0.961
S32	103.20	0.00	0.00	71.65	14.52	28.44	31.35	0.02	14.05	0.304
S4	103.20	0.00	0.00	0.02	101.51	0.01	101.52	0.05	14.68	0.984
S45	103.20	0.00	0.00	0.03	101.53	0.01	101.53	0.02	7.03	0.984
S5	103.20	0.00	0.00	7.79	93.99	2.96	93.99	0.08	26.35	0.911
S6	103.20	0.00	0.00	75.31	0.00	27.92	27.92	0.01	6.64	0.271
S7	103.20	0.00	0.00	0.00	101.49	0.00	101.49	0.07	21.71	0.983
S8	103.20	0.00	0.00	14.96	86.90	5.56	86.90	0.08	29.05	0.842
S9	103.20	0.00	0.00	17.39	78.05	6.54	84.59	0.02	8.47	0.820

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

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
518_Orifice	JUNCTION	0.06	0.20	81.56	0 12:09	0.20
518A_(P-Stm)	OUTFALL	0.62	0.62	81.27	0 00:00	0.62
518_(P-Stm)	STORAGE	0.56	3.64	84.70	0 12:09	3.64
519_(P-Stm)	STORAGE	0.40	2.51	84.70	0 12:10	2.51
520_(P-Stm)	STORAGE	0.39	2.22	84.71	0 12:09	2.22
521_(P-Stm)	STORAGE	0.43	2.75	84.71	0 12:09	2.75
522_(P-Stm)	STORAGE	0.40	2.53	84.71	0 12:08	2.53
CB200	STORAGE	0.08	2.09	85.27	0 12:00	2.08
CB201	STORAGE	0.13	2.56	85.65	0 12:02	2.56
CB202	STORAGE	0.12	2.72	85.48	0 12:01	2.72
CB203	STORAGE	0.11	2.63	85.38	0 12:00	2.63
CB204	STORAGE	0.14	2.68	85.43	0 12:00	2.68
CB205	STORAGE	0.11	2.67	85.52	0 12:01	2.67
CB206	STORAGE	0.15	2.69	85.46	0 12:00	2.69
CB207	STORAGE	0.12	2.14	85.29	0 12:03	2.14
CB208	STORAGE	0.10	1.99	85.29	0 12:01	1.99
CB209	STORAGE	0.07	1.73	84.93	0 12:01	1.73
CB210B	STORAGE	0.13	2.83	85.48	0 12:01	2.83
CB211	STORAGE	0.03	1.03	84.73	0 12:12	1.03
CB212	STORAGE	0.06	1.52	84.72	0 12:12	1.52
CB212A	STORAGE	0.03	1.11	84.73	0 12:12	1.10
CB213	STORAGE	0.06	1.56	84.71	0 12:09	1.56
CB214	STORAGE	0.07	1.76	84.71	0 12:08	1.76

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

Node	Type	Maximum Lateral Inflow LPS	Maximum Total Inflow LPS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
518_Orifice	JUNCTION	0.00	64.71	0 12:09	0	0.655	0.033
518A_(P-Stm)	OUTFALL	0.00	64.71	0 12:09	0	0.655	0.000
518_(P-Stm)	STORAGE	0.00	75.04	0 11:51	0	0.655	-0.076
519_(P-Stm)	STORAGE	0.00	66.91	0 11:51	0	0.284	-0.092
520_(P-Stm)	STORAGE	21.71	75.98	0 11:51	0.0696	0.285	0.277
521_(P-Stm)	STORAGE	0.00	69.70	0 11:49	0	0.358	0.103
522_(P-Stm)	STORAGE	0.00	45.76	0 11:51	0	0.207	-0.007
CB200	STORAGE	26.35	26.35	0 12:00	0.0792	0.0792	0.002
CB201	STORAGE	29.05	29.05	0 12:00	0.0818	0.0818	0.013
CB202	STORAGE	39.74	39.74	0 12:00	0.12	0.121	0.012
CB203	STORAGE	7.03	7.03	0 12:00	0.0225	0.0225	0.018
CB204	STORAGE	9.71	9.71	0 12:00	0.0311	0.0311	0.019
CB205	STORAGE	8.47	8.47	0 12:00	0.0233	0.0233	0.019
CB206	STORAGE	14.68	14.68	0 12:00	0.0471	0.0471	0.023
CB207	STORAGE	22.82	33.00	0 12:00	0.0718	0.0868	0.004
CB208	STORAGE	5.19	15.66	0 11:49	0.00521	0.0111	0.017
CB209	STORAGE	21.96	21.96	0 12:00	0.0541	0.0541	0.005
CB210B	STORAGE	10.99	20.30	0 11:59	0.014	0.0157	-0.001
CB211	STORAGE	3.47	7.35	0 11:55	0.00472	0.00497	0.041
CB212	STORAGE	5.22	10.21	0 11:55	0.00619	0.0133	-0.088
CB212A	STORAGE	0.00	4.74	0 11:56	0	0.00159	0.103
CB213	STORAGE	3.53	18.43	0 11:50	0.00394	0.00513	-0.101
CB214	STORAGE	20.69	20.69	0 12:00	0.023	0.023	0.089

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

No nodes were surcharged.

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

No nodes were flooded.

**********************
Storage Volume Summary
**********************
```

Storage Unit	Average Volume 1000 m³	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m³	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow LPS
518_(P-Stm)	0.001	12.6	0.0	0.0	0.004	82.7	0 12:09	64.71
519_(P-Stm)	0.000	11.5	0.0	0.0	0.003	71.4	0 12:10	43.59
520_(P-Stm)	0.000	13.4	0.0	0.0	0.003	76.9	0 12:09	66.91
521_(P-Stm)	0.000	11.7	0.0	0.0	0.003	74.8	0 12:09	53.57
522_(P-Stm)	0.000	12.1	0.0	0.0	0.003	76.0	0 12:08	34.44
CB200	0.000	0.1	0.0	0.0	0.004	9.2	0 12:00	23.50
CB201	0.000	1.0	0.0	0.0	0.013	43.9	0 12:02	13.93
CB202	0.000	0.3	0.0	0.0	0.011	20.1	0 12:01	28.05
CB203	0.000	0.1	0.0	0.0	0.001	4.1	0 12:00	4.32
CB204	0.000	0.7	0.0	0.0	0.004	31.1	0 12:00	4.98
CB205	0.000	0.7	0.0	0.0	0.002	31.1	0 12:01	4.51
CB206	0.000	1.5	0.0	0.0	0.004	63.1	0 12:00	14.53
CB207	0.000	0.8	0.0	0.0	0.009	28.7	0 12:03	24.49
CB208	0.000	2.0	0.0	0.0	0.008	71.2	0 12:01	8.79
CB209	0.000	0.2	0.0	0.0	0.003	20.0	0 12:01	18.18

CB210B	0.000	0.6	0.0	0.0	0.005	35.5	0	12:01	6.26
CB211	0.000	0.1	0.0	0.0	0.000	2.6	0	12:12	3.47
CB212	0.000	0.3	0.0	0.0	0.001	8.0	0	12:12	5.94
CB212A	0.000	1.7	0.0	0.0	0.000	55.3	0	12:12	1.36
CB213	0.000	0.5	0.0	0.0	0.000	14.2	0	12:09	8.24
CB214	0.000	0.3	0.0	0.0	0.002	30.3	0	12:08	18.95

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow LPS	Max Flow LPS	Total Volume 10^6 ltr
518A_(P-Stm)	93.05	8.15	64.71	0.655
System	93.05	8.15	64.71	0.655

****
Link Flow Summary
****

Link	Type	Maximum |Flow| LPS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
C2	CONDUIT	12.10	0	11:49	0.25	0.20	1.00
C4	CONDUIT	4.74	0	11:56	0.11	0.06	1.00
C5	CONDUIT	3.89	0	11:55	0.60	0.05	1.00
CB213	CONDUIT	16.59	0	11:50	0.39	0.24	1.00
CB214	CONDUIT	18.95	0	11:59	0.59	0.34	1.00
Pipe_-_(104)_(P-Stm)_2	CONDUIT	64.71	0	12:09	1.04	0.45	0.41
Pipe_-_(110)_(P-Stm)	CONDUIT	53.57	0	11:49	0.73	0.21	1.00
Pipe_-_(111)_(P-Stm)	CONDUIT	34.44	0	11:49	0.48	0.11	1.00
Pipe_-_(71)_(P-Stm)	CONDUIT	66.91	0	11:51	0.86	0.25	1.00
Pipe_-_(72)_(P-Stm)	CONDUIT	43.59	0	11:50	0.88	0.14	1.00
OR1	ORIFICE	64.71	0	12:09			1.00
W1	WEIR	0.00	0	00:00			0.00
W2	WEIR	0.00	0	00:00			0.00
W3	WEIR	9.31	0	11:59			0.14
W4	WEIR	0.00	0	00:00			0.00
W5	WEIR	10.18	0	12:00			0.22
W6	WEIR	0.00	0	00:00			0.00
W7	WEIR	0.00	0	00:00			0.00
CB200	DUMMY	23.50	0	11:51			
CB201	DUMMY	13.93	0	11:49			
CB202	DUMMY	27.55	0	11:48			
CB203	DUMMY	4.32	0	11:59			
CB204	DUMMY	4.98	0	11:52			
CB205	DUMMY	4.51	0	11:55			
CB206	DUMMY	6.50	0	11:49			
Cb207	DUMMY	12.51	0	11:49			
CB209	DUMMY	18.18	0	11:54			
CB210B	DUMMY	4.87	0	11:52			
CB212	DUMMY	4.68	0	11:50			

****
Flow Classification Summary
****

Conduit	Adjusted /Actual Length	---------- Fraction of Time in Flow Class ---------- Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C2	1.00	0.46	0.02	0.00	0.07	0.00	0.00	0.45	0.00	0.00
C4	1.00	0.48	0.01	0.00	0.05	0.00	0.00	0.45	0.01	0.00
C5	1.00	0.48	0.00	0.00	0.06	0.00	0.00	0.46	0.02	0.00
CB213	1.00	0.05	0.00	0.00	0.07	0.00	0.00	0.88	0.01	0.00
CB214	1.00	0.04	0.00	0.00	0.07	0.00	0.00	0.89	0.01	0.00
Pipe_-_(104)_(P-Stm)_2	1.00	0.07	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00
Pipe_-_(110)_(P-Stm)	1.00	0.06	0.00	0.00	0.08	0.00	0.00	0.85	0.00	0.00
Pipe_-_(111)_(P-Stm)	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.00	0.86	0.00
Pipe_-_(71)_(P-Stm)	1.00	0.06	0.00	0.00	0.07	0.00	0.00	0.87	0.01	0.00
Pipe_-_(72)_(P-Stm)	1.00	0.07	0.00	0.00	0.08	0.00	0.00	0.85	0.01	0.00

****
Conduit Surcharge Summary
****

Conduit	--------- Hours Full -------- Both Ends	Upstream	Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C2	1.48	1.48	1.53	0.01	0.01
C4	0.95	0.95	1.19	0.01	0.01
C5	0.89	0.89	1.22	0.01	0.01
CB213	1.19	1.19	1.44	0.01	0.01
CB214	1.31	1.31	1.44	0.01	0.01
Pipe_-_(110)_(P-Stm)	1.62	1.62	1.73	0.01	0.01
Pipe_-_(111)_(P-Stm)	1.44	1.44	1.62	0.01	0.01
Pipe_-_(71)_(P-Stm)	1.24	1.24	1.38	0.01	0.01
Pipe_-_(72)_(P-Stm)	1.43	1.43	1.55	0.01	0.01

Analysis begun on: Thu Aug 29 09:25:39 2024
Analysis ended on: Thu Aug 29 09:25:41 2024
Total elapsed time: 00:00:02

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION   08/28/2024

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA CDA RCS
Climate Station Id:	6105978
Years of Rainfall Data:	20
Site Name:	
Drainage Area (ha):	0.82
% Imperviousness:	73.64

Runoff Coefficient 'c': 0.74

Project Name:	Navan Gas Bar
Project Number:	29899-002
Designer Name:	Bobby Pettigrew
Designer Company:	J.L. Richards & Associates Ltd
Designer Email:	bpettigrew@jlrichards.ca
Designer Phone:	343-804-5381
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0
Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	19.63
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	Yes
Upstream Orifice Control Flow Rate to Stormceptor (L/s):	66.00
Peak Conveyance (maximum) Flow Rate (L/s):	66.00
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	657
Estimated Average Annual Sediment Volume (L/yr):	534

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	80
EFO6	90
EFO8	95
EFO10	97
EFO12	99

Recommended Stormceptor EFO Model:	**EFO4**
Estimated Net Annual Sediment (TSS) Load Reduction (%):	**80**
Water Quality Runoff Volume Capture (%):	**> 90**

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterways.

PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

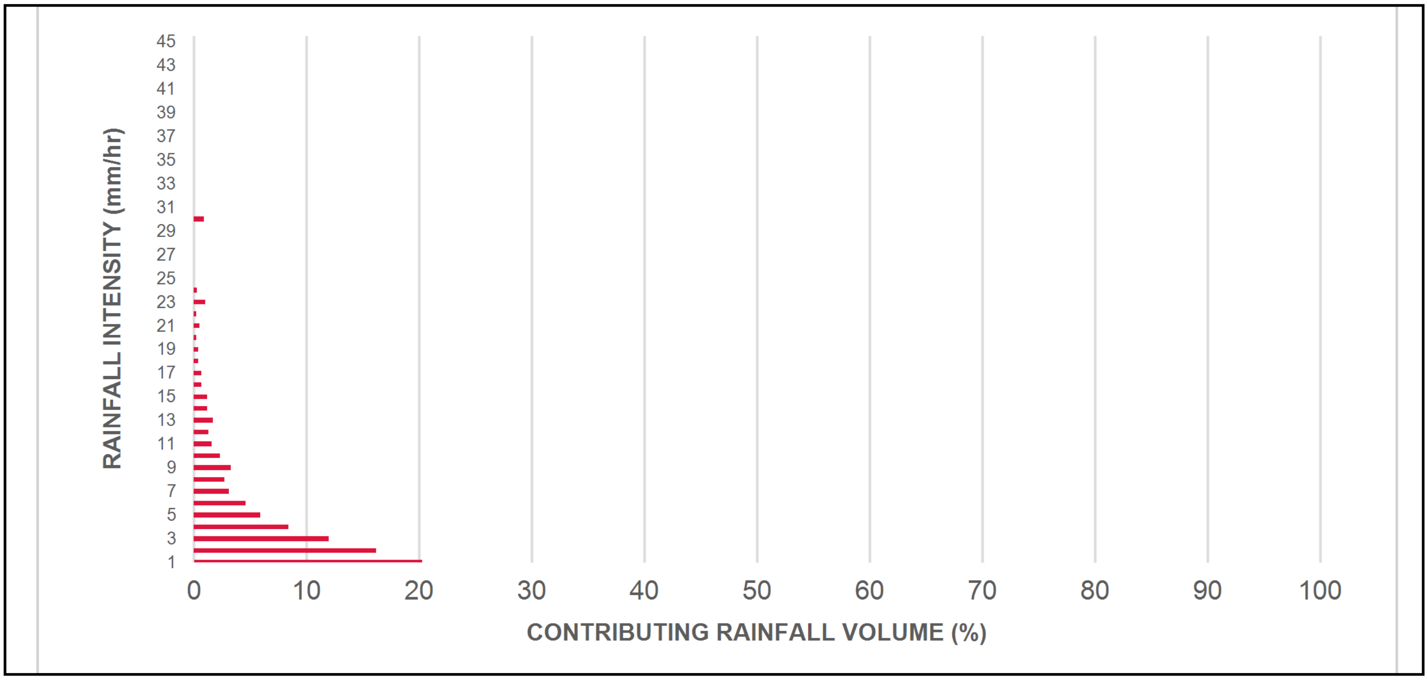
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Upstream Flow Controlled Results

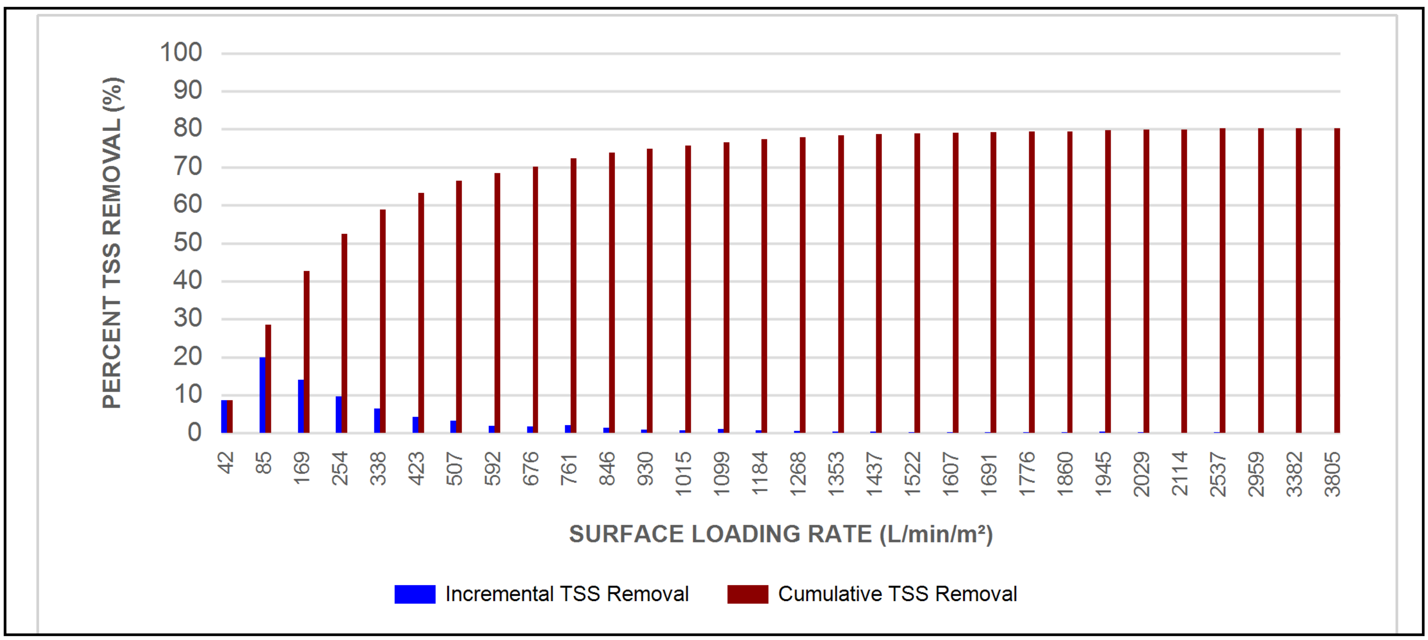
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.6	8.6	0.85	51.0	42.0	100	8.6	8.6
1.00	20.3	29.0	1.69	101.0	85.0	98	20.0	28.6
2.00	16.2	45.2	3.38	203.0	169.0	87	14.1	42.7
3.00	12.0	57.2	5.07	304.0	254.0	81	9.7	52.4
4.00	8.4	65.6	6.76	406.0	338.0	77	6.5	58.9
5.00	5.9	71.6	8.46	507.0	423.0	73	4.3	63.3
6.00	4.6	76.2	10.15	609.0	507.0	69	3.2	66.5
7.00	3.1	79.3	11.84	710.0	592.0	65	2.0	68.5
8.00	2.7	82.0	13.53	812.0	676.0	64	1.8	70.2
9.00	3.3	85.3	15.22	913.0	761.0	63	2.1	72.3
10.00	2.3	87.6	16.91	1015.0	846.0	63	1.4	73.8
11.00	1.6	89.2	18.60	1116.0	930.0	62	1.0	74.8
12.00	1.3	90.5	20.29	1218.0	1015.0	61	0.8	75.6
13.00	1.7	92.2	21.98	1319.0	1099.0	59	1.0	76.6
14.00	1.2	93.5	23.68	1421.0	1184.0	57	0.7	77.3
15.00	1.2	94.6	25.37	1522.0	1268.0	56	0.6	77.9
16.00	0.7	95.3	27.06	1623.0	1353.0	53	0.4	78.3
17.00	0.7	96.1	28.75	1725.0	1437.0	51	0.4	78.7
18.00	0.4	96.5	30.44	1826.0	1522.0	48	0.2	78.9
19.00	0.4	96.9	32.13	1928.0	1607.0	46	0.2	79.1
20.00	0.2	97.1	33.82	2029.0	1691.0	43	0.1	79.2
21.00	0.5	97.5	35.51	2131.0	1776.0	41	0.2	79.4
22.00	0.2	97.8	37.20	2232.0	1860.0	39	0.1	79.4
23.00	1.0	98.8	38.90	2334.0	1945.0	38	0.4	79.8
24.00	0.3	99.1	40.59	2435.0	2029.0	36	0.1	79.9
25.00	0.9	100.0	42.28	2537.0	2114.0	35	0.3	80.3
30.00	0.9	100.9	50.73	3044.0	2537.0	29	0.3	80.5
35.00	-0.9	100.0	59.19	3551.0	2959.0	25	N/A	80.3
40.00	0.0	100.0	66.00	3960.0	3300.0	22	0.0	80.3
45.00	0.0	100.0	66.00	3960.0	3300.0	22	0.0	80.3
Estimated Net Annual Sediment (TSS) Load Reduction =								**80 %**

Climate Station ID: 6105978 *Years of Rainfall Data*: 20

RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Stormceptor® EF Sizing Report

Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

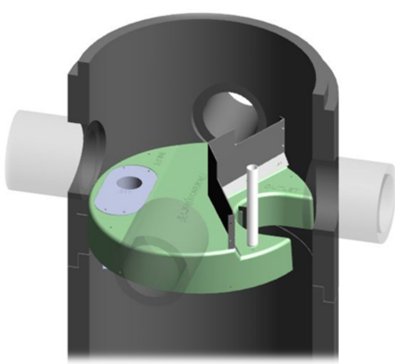
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

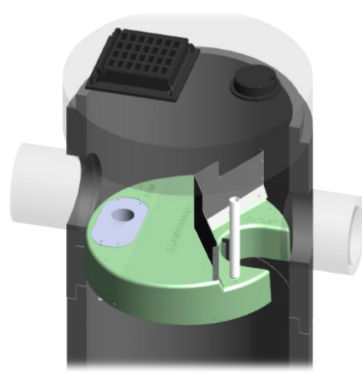
DESIGN FLEXIBILITY

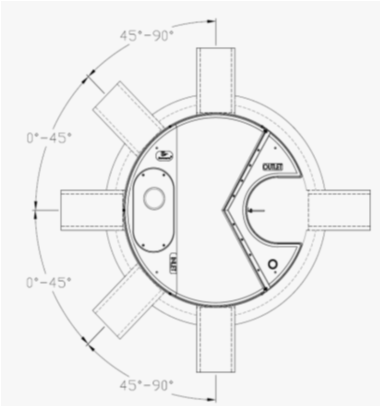
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.

0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.

45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft³)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity

** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft³)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD PERFORMANCE SPECIFICATION FOR
"OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit Separators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

BEST MANAGED COMPANIES CANADA Platinum member

www.jlrichards.ca

Ottawa

343 Preston Street
Tower II, Suite 1000
Ottawa ON Canada
K1S 1N4
Tel: 613 728-3571
ottawa@jlrichards.ca

Kingston

203-863 Princess Street
Kingston ON Canada
K7L 5N4
Tel: 613 544-1424

kingston@jlrichards.ca

Sudbury

314 Countryside Drive
Sudbury ON Canada
P3E 6G2
Tel: 705 522-8174

sudbury@jlrichards.ca

Timmins

834 Mountjoy Street S
Timmins ON Canada
P4N 7C5
Tel: 705 360-1899

timmins@jlrichards.ca

North Bay

501-555 Oak Street E
North Bay ON Canada
P1B 8E3
Tel: 705 495-7597

northbay@jlrichards.ca

Hawkesbury

326 Bertha Street
Hawkesbury ON Canada
K6A 2A8
Tel: 613 632-0287

hawkesbury@jlrichards.ca

Guelph

107-450 Speedvale Ave. West
Guelph ON Canada
N1H 7Y6
Tel: 519 763-0713

guelph@jlrichards.ca

J.L.Richards
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