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# **Site Servicing Report**

## **Mixed-Use Site Plan (Block 15)** **2983, 3053 and 3079 Navan Road & 2690 Pagé Road**

# Site Servicing Report

## 2983, 3053 and 3079 Navan Road & 2690 Pagé Road

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## **1.0 INTRODUCTION**

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### **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 the Mixed-Use Site Plan (Block 15). 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.

### **1.2 Site Description**

The Mixed-Use Site Plan (Block 15) is located within the City of Ottawa's Official Plan boundary and consists of a 0.54 ha parcel bounded by Brian Coburn to the northwest and the proposed East Ridge Orleans Subdivision in the remaining directions (refer to the East Ridge Orleans Subdivision Site Servicing Report prepared by J.L. Richards and Associates, dated September 22, 2023). 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 a portion of Block 15 adjacent to Brian Coburn conveys overland flow to existing ditch inlet catch basins along Brian Coburn. The remaining existing ground surface generally slopes in a southeasterly direction towards the future subdivision lands.

### **1.3 Proposed Development**

The proposed development will consist of two (2) mid-rise residential condominiums with underground parking and one (1) storey of commercial space. One (1) of the condominium buildings consists of 47 units, and the second (2) consists of 36 units. Mixed-Use Site Plan (Block 15) has a total of 83 units. The Concept Plan for the Mixed-Use Site Plan (Block 15) is attached to Appendix A.

### **1.4 Proposed Connections to Existing Infrastructure**

Block 15 is proposed to be serviced by the infrastructure that is part of the East Ridge Orleans Subdivision. One sanitary, storm and water service will extend to the parking garage footprint from the subdivision as shown in the servicing drawings.

### **1.5 Consultation and Permits**

A pre-consultation meeting was held on September 13, 2023, to discuss the planning process, design criteria, and 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**

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### **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 watermain 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 Mixed Used Site Plan (Block 15). The HNA has since been updated to reflect the proposed water service lateral for Block 15 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
- Feeder mains, 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 water demands presented in this section are based on the site layout and unit count shown in the Site Plan (Appendix A) and commercial flows. Domestic water demands were calculated for 83 apartment units with an average density of 1.8 persons per unit, giving a total population of 149 people. Commercial flows were calculated for a commercial area of 0.09 ha.

The residential and commercial consumption rates for average day, maximum day, and peak hour demand were set in accordance with Table 4-2 of the Design Guidelines. Table 1 summarizes the water consumption rates and peaking factors used in the HNA.

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Table 1: Water Demands

| Demand Scenario    | Residential Water Consumption or Peaking Factor | Commercial Water Consumption of Peaking Factor | Total Demands (L/s) |
|--------------------|-------------------------------------------------|------------------------------------------------|---------------------|
| Average Day Demand | 280 L/c/d                                       | 28,000 L/ha/d                                  | 0.52                |
| Maximum Day Demand | 2.5 x Avg Day                                   | 1.5 x Avg Day                                  | 1.26                |
| Peak Hour Demand   | 2.2 x Max Day                                   | 1.8 x Max Day                                  | 2.74                |

### 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 Mixed-Use Site Plan (Block 15) was calculated as 200 L/s for Building C and 217 L/s for Building D. Refer to Appendix C for the detailed RFF calculations for the critical fire area.

Both buildings within Block 15 will be equipped with a fully supervised automatic sprinkler designed and installed in accordance with NFPA 13. In the analysis, a sprinkler flow of 1500 L/min (25 L/s) was applied to each building as recommended by the Owner's Mechanical Engineer (refer to Appendix C).

### 2.4 Proposed Water Servicing, Boundary Conditions and Water Model

#### 2.4.1 Proposed Water Servicing

Water will be supplied to the Mixed-Use Site Plan (Block 15) by a 150 mm diameter water service that will connect to the 200 mm diameter watermain loop within the East Ridge Orleans subdivision. Fire protection will be provided by each building's sprinkler system and the proposed hydrants within the East Ridge Orleans Subdivision. The Siamese connection for each building is shown on the Servicing Drawings and is located no more than 45 m away from a hydrant as required by the OBC (refer to hydrant coverage markup in Appendix C).

#### 2.4.2 Boundary Conditions

Hydraulic boundary conditions were provided by the City at the two proposed connection locations for the East Ridge Orleans subdivision (Connection 1 and Connection 2). Table 2 summarizes the hydraulic boundary conditions received (refer to Appendix C for a copy of the City correspondence).

The boundary condition for 233 L/s was used in this analysis since this is above the maximum required fire flow for the site (refer to Section 2.3).

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**Table 2: Hydraulic Boundary Conditions**

| <b>Demand Scenarios</b>                                | <b>Connection 1 Head (m)</b> | <b>Connection 2 Head (m)</b> |
|--------------------------------------------------------|------------------------------|------------------------------|
| Maximum HGL                                            | 130.7                        | 130.7                        |
| Peak Hour                                              | 127.0                        | 126.8                        |
| Max Day plus Fire Flow #3<br>13,980 L/min (233.00 L/s) | 124.9                        | 122.7                        |

### 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**

| <b>Nominal Diameter</b> | <b>Inside Diameter</b> | <b>C-Factor</b> |
|-------------------------|------------------------|-----------------|
| 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 (node J-23 in the model) during the peak hour condition to be 406 kPa (58.9 psi) (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 the fully automatic sprinkler system and the hydrants within the East Ridge Orleans subdivision. To ensure adequate fire protection, the maximum day demand shown in Table 1 was analyzed simultaneously with the fire flow requirements. As mentioned in Section 2.3, a sprinkler system flow of 1500 L/min (25 L/s)

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was assumed for Block 15 and it was assumed that only one (1) building would require fire flow at once.

Once the maximum day demands, the sprinkler system demands, and the 14,000 L/min (233 L/s) boundary condition provided by the City (refer to Table 2) were input in the model, the fire flow simulation was carried out by allowing WaterCAD® to calculate the available fire flow that can be drawn from a hydrant without allowing any part of the system to experience pressures less than 140 kPa (20 psi).

From the simulation results, the system is expected to deliver a minimum of 14,000 L/min (233 L/s) to the site through the contribution of the sprinkler system and the nearby hydrants. Attached to Appendix C is a map of the hydrant coverage for Block 15 which confirms that both buildings within the block meet the RFF of 233 L/s through the aggregate sum of hydrant flows. Based on Appendix I of TB-2018-02 hydrants within 75 m of a building can provide 95 L/s of fire flow and hydrants within 75 to 150 m of a building can provide 63 L/s of fire flow.

### 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 444 kPa (64.40 psi). 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 200 mm watermain loop within the East Ridge Orleans Subdivision. Furthermore, adequate fire water supply can be achieved with the proposed hydrants within the East Ridge Orleans Subdivision.

## 3.0 WASTEWATER SERVICING

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### 3.1 Design Criteria

The sanitary sewer system within the Mixed-Use Site Plan (Block 15) 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 the table below.

**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           |

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| Design Parameter                    | Design Value                              |
|-------------------------------------|-------------------------------------------|
| 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 Block 15 will be conveyed via a proposed 200 mm diameter sanitary service lateral, which will then discharge into the East Ridge Orleans Subdivision. Based on the design criteria above and the site constraints, a total design peak flow of 1.95 L/s is calculated for the development. The table below summarizes the peak sanitary flow for the site plan. A detailed design sheet can be found in Appendix E.

**Table 5: Sanitary Design Flow Summary**

| Area     | Site Area | Unit Count | Unit Density | Pop.        | Harmon's Peaking Factor | Res. Peak Flow | Comm. Peak Flow | Infilt. Flow | Total Flow |
|----------|-----------|------------|--------------|-------------|-------------------------|----------------|-----------------|--------------|------------|
| Block 15 | 0.54 ha   | 83         | 1.8 ppu      | 149 persons | 3.55                    | 1.72 L/s       | 0.05 L/s        | 0.18 L/s     | 1.95 L/s   |

A 200 mm diameter sanitary service lateral is expected to have sufficient capacity to convey the wastewater flows for the site. The flows from this block were already incorporated in the design of the sanitary sewer for the subdivision (refer to the East Ridge Orleans Subdivision Site Servicing Report prepared by J.L. Richards and Associates, dated February 16, 2024). As shown in this report, the subdivision will consist of 200 mm diameter pipes which will have, at minimum, 20.24 L/s of capacity. Furthermore, the overall subdivision inclusive of the Site Plan Blocks 14, 15 and 17 is expected to generate 12.98 L/s of wastewater flows which is less than the minimum expected capacity of the pipes by 35%. Therefore, it is anticipated that the sanitary sewer system downstream will have sufficient capacity for the 1.95 L/s of wastewater flows generated by Block 15.

Furthermore, it has been confirmed by the Mechanical Engineer on file that a 200mm diameter service will be sufficient to convey the flows generated by the mechanical fixtures (refer to Appendix E).

### 3.3 Summary and Conclusions

Wastewater servicing for Block 15 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 will be conveyed via a proposed 200 mm diameter sanitary service lateral which will then discharge into the East Ridge Orleans Subdivision.

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### **4.0 STORM SERVICING AND STORMWATER MANAGEMENT**

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#### **4.1 Design Criteria**

Storm and stormwater management servicing for the Mixed-Use Site Plan (Block 15) 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 44 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;
- Minimum rear yard slope in the absence of perforated pipe system of 1.5% along with swale side slopes of 3 horizontal to 1 vertical;
- 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 (garage elevation);
- Minimum vertical clearance of 0.30 m between the surface spill elevation and the ground elevation at the building in the rear yards;
- Major system flows, up to and including the 1:100-year design storm event, are contained within the site using the parking lot area and surface drainage.
- 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 2024).
- 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:

- Rooftop control with rooftop storage and released at a cumulative controlled release rate of 2 L/s for each building; per WATTS RD-200 detail for Small Area Roof Drain (Appendix D) and as recommended by the landowner's mechanical engineer.
- Surface storage within the parking lots in greater than a 1:2-year event with captured flows conveyed to the building plumbing system and internal cistern;
- Ramp runoff captured and conveyed to the building plumbing system and internal cistern;
- Storage in the building cistern with flows pumped at a controlled rate to the minor system with a backwater valve at the connection; and,
- Controlled release of the flows captured in the ditch drainage system for the surrounding landscaped areas.

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Foundation drains will be connected to the internal building plumbing system therefore no HGL analysis is required.

### 4.3 Proposed Minor System Servicing

#### 4.3.1 Runoff Coefficient

A minor system connection will be provided from the building envelope to the minor system within the subdivision. The connection will be sized based on the 1:2-year release from the site. The runoff coefficient is based on the ratio of impervious surfaces and grassed or landscaped areas. The breakdown between pervious and impervious surfaces is shown on the figure entitled Overall Site Imperviousness in Appendix D.

### 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 4.1. 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 D.

#### 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 2024).

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The downstream 1:100-year HGL at the connection to the Subdivision at MH514 is identified as 81.07 m which is lower than any minor system within the site and therefore there is no backflow from the boundary condition and no impacts on HGL.

The rear-yard outlet connection into the subdivision connects directly into the pipe from STM STUB 16 to EXST MH514. The downstream 1:100-year HGL at STM STUB 16 is 81.28 m which is below the catch basin invert of 83.28 m at CB112.

#### 4.4.3 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 1 (Appendix D).
- **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.

#### 4.4.4 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.

### 4.5 Simulation Results

#### 4.5.1 Low Point Ponding Analysis

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



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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            | 85.30            | 200                       | 10*                                | 30                                   | 30                                |
| 2            | 85.25            | 200                       | 20*                                | 50                                   | 40                                |
| 3            | 85.20            | 150                       | 20*                                | 30                                   | 30                                |
| 4            | 85.15            | 150                       | 20*                                | 40                                   | 30                                |
| 5            | 85.22            | 180                       | 0*                                 | 10                                   | 10                                |
| 6            | 85.30            | 300                       | 0                                  | 0                                    | 0                                 |
| 7            | 85.20            | 180                       | 0                                  | 0                                    | 0                                 |
| 8            | 85.15            | 100                       | 0                                  | 0                                    | 0                                 |

Those values marked with \* are greater than 0 mm in the 2-year event due to the model setup. In order to represent the Zurn inlet control device, the orifice has been set at the top of grate elevation as the control is at the surface. Therefore, the model requires a head buildup over the structure for simulation of flows.

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 50 mm during the 1:100-year event; and,
- There is no spill from the site in the 1:100-year event.

### 4.5.2 Roof Drainage

The roof drainage system is to be designed by the Mechanical Engineer to achieve a flow rate of 2 L/s from each roof structure. The maximum depth of ponding required, assuming storage across 66% of the rooftop area, is 80 mm.

### 4.5.3 Parking Lot Drainage

The parking lot drainage system connects to the building cistern and is controlled by the ZURN\_Z150F-6NH (detail provided in Appendix D) to allow the 1:2-year event to drain and for the surface to provide storage during greater events up to the 1:100 year. Capture rates are shown in **Error! Reference source not found..**

Table 7: Parking Area ICD Capture Analysis

| Low Point | ICD Type       | 1:2 year Rational Flow (l/s) | 1:100 year 3-hour Chicago Flow (l/s) | 1:100 year 3-hour Chicago Head (m) |
|-----------|----------------|------------------------------|--------------------------------------|------------------------------------|
| 1         | ZURN_Z150F-6NH | 3                            | 20                                   | 30                                 |
| 2         |                | 11                           | 36                                   | 50                                 |

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| Low Point | ICD Type | 1:2 year Rational Flow (l/s) | 1:100 year 3-hour Chicago Flow (l/s) | 1:100 year 3-hour Chicago Head (m) |
|-----------|----------|------------------------------|--------------------------------------|------------------------------------|
| 3         |          | 7                            | 20                                   | 30                                 |
| 4         |          | 10                           | 27                                   | 40                                 |
| 5         |          | 1                            | 6                                    | 10                                 |

The table shows that the parking lot ICDs capture the 1:2-year design flow.

#### 4.5.4 Landscaped Drainage

The landscaped drainage consists of typical rear yard system of swales and perforated pipes. At the downstream end the Vortex ICD 95 provides flow control to 10 L/s in the 1:100-year event with a head of 1.63m. The release is greater than the rational method 1:2-year design flow of 4 L/s for the combined upstream catchments. The Vortex ICD sizing ensures that there is no spill from Low Point 8 in the 1:100 year event.

#### 4.5.5 Building Release Rates

To maintain overall release rate from the site at the allowable flow rate of 44 L/s, the building drainage system must be controlled to 29 L/s. Based on a pumped rate of 29 L/s a cistern size of 49 m<sup>3</sup> is required in the building basement.

### 4.6 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.

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### 5.0 Erosion and Sedimentation Control

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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 Site Servicing Plan (Drawing C01):

- 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 ICD to be placed blocking part of the sanitary sewer pipe in the connecting maintenance holes to eliminate construction debris from entering the existing sanitary sewer system. The ICDs are to be removed after the proposed sanitary sewers have been fully cleaned.

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.

# Site Servicing Report

## 2983, 3053 and 3079 Navan Road & 2690 Pagé Road

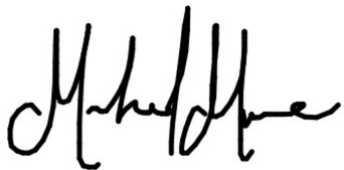
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This report has been prepared by J.L. Richards & Associates Limited for Minto Communities Inc.'s exclusive use. Its discussions and conclusions are summary in nature and cannot properly be used, interpreted or extended to other purposes without a detailed 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.

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### J.L. RICHARDS & ASSOCIATES LIMITED

Water and Wastewater  
Prepared by:



Mahad Musse, EIT  
Engineering Graduate

Stormwater  
Prepared by:



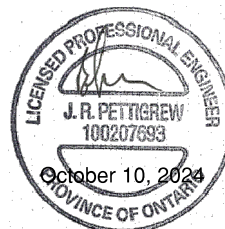
Mathieu Lacelle, EIT  
Engineering Graduate

Reviewed by:



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

Reviewed by:



Bobby Pettigrew, P. Eng.,  
Associate, Senior Water Resources Engineer,  
Water Resources Practice Lead

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## **Appendix A**

Concept Plan, Draft Plan of  
Subdivision and Topographical  
Survey



NAVAN ROAD  
DEVELOPMENT2983, Navan Road, Orleans,  
ON K1C 7G4

OWNER

788, BOUL. SAINT-JOSEPH, SUITE 100  
GATINEAU, QC J8Y 4B8

ARCHITECTURAL

(416) 851-8954  
INFO@PMAARCHITECTES.COM  
3070, CHEMIN DES QUATRE-BORGEAIS  
QUÉBEC (QC) G1W 2M4  
PMAARCHITECTES.COM53, BOUL. SAINT-RAYMOND,  
GATINEAU, QC J8Y 1R8

ENGINEERS / PLANNER

J.L. Richards  
ENGINEERS - ARCHITECTS - PLANNERS1965 CARLING AVENUE, SUITE 700,  
OTTAWA, ON K1Z 8R1

SURVEYOR

1331 CLYDE AVENUE, SUITE 400,  
OTTAWA, ON K2C 3G4

KEY PLAN

ARCHITECT SEAL

ARCHITECT SEAL

ARCHITECT SEAL

ARCHITECT SEAL

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## SITE PLAN LEGEND

|  |                                                   |  |          |
|--|---------------------------------------------------|--|----------|
|  | EXISTING BUILDING                                 |  | LOT LINE |
|  | NEW BUILDING                                      |  | SETBACKS |
|  | NEW BUILDING WITH<br>COMMERCIAL SPACE<br>AT-GRADE |  | NEW TREE |
|  | GRASS                                             |  | FIREWALL |
|  | ASPHALT                                           |  | SIDEWALK |

## SITE INFORMATION &amp; DEVELOPMENT STATISTICS

| LOTS | PIN          |
|------|--------------|
|      | 04756 - 0303 |
|      | 04756 - 0315 |
|      | 04756 - 0316 |
|      | 04756 - 1337 |

|        |                  |
|--------|------------------|
| ZONING | GM(2546) H(14.5) |
|--------|------------------|

|                         |                                    |
|-------------------------|------------------------------------|
| SITE AREA               |                                    |
| TOTAL SITE AREA:        | ~53,411.14 m <sup>2</sup> (5.34ha) |
| TOTAL DEVELOPABLE AREA: | ~45,956.28 m <sup>2</sup> (4.59ha) |
| NET SITE AREA:          | ~38,956.28 m <sup>2</sup> (3.89ha) |

|             |          |
|-------------|----------|
| UNITS       |          |
| TOWNHOUSES: | 67 UNITS |

|                                    |                     |
|------------------------------------|---------------------|
| BLOCK 01:                          |                     |
| 1 X RESIDENTIAL APARTMENT BUILDING | 48 UNITS            |
| 1 X MIXED USE BUILDING             |                     |
| RESIDENTIAL:                       | 36 UNITS            |
| COMMERCIAL SPACES:                 | ~899 m <sup>2</sup> |

|                                    |                     |
|------------------------------------|---------------------|
| BLOCK 02:                          |                     |
| 1 X RESIDENTIAL APARTMENT BUILDING | 47 UNITS            |
| 1 X MIXED USE BUILDING             |                     |
| RESIDENTIAL:                       | 36 UNITS            |
| COMMERCIAL SPACES:                 | ~899 m <sup>2</sup> |

|                                    |                       |
|------------------------------------|-----------------------|
| BLOCK 03:                          |                       |
| 2 X RESIDENTIAL APARTMENT BUILDING | 96 UNITS              |
| TOTAL NUMBER OF UNITS:             | 330 UNITS             |
| TOTAL COMMERCIAL SPACES:           | ~1,798 m <sup>2</sup> |

|  | REQUIRED | PROVIDED |
|--|----------|----------|
|--|----------|----------|

|                 |         |                   |
|-----------------|---------|-------------------|
| MAXIMUM DENSITY | NO MAX. | 84.8 units/net ha |
|-----------------|---------|-------------------|

|                   |         |       |
|-------------------|---------|-------|
| MINIMUM LOT WIDTH | NO MIN. | 5.8 m |
|-------------------|---------|-------|

|                  |         |                    |
|------------------|---------|--------------------|
| MINIMUM LOT AREA | NO MIN. | 174 m <sup>2</sup> |
|------------------|---------|--------------------|

|                         |        |        |
|-------------------------|--------|--------|
| MAXIMUM BUILDING HEIGHT | 14.5 m | 14.5 m |
|-------------------------|--------|--------|

## SETBACKS

|                           |     |     |
|---------------------------|-----|-----|
| MINIMUM FRONT YARD:       | 3 m | 3 m |
| MINIMUM CORNER SIDE YARD: | 3 m | 3 m |

|                               |       |       |
|-------------------------------|-------|-------|
| MINIMUM INTERIOR SIDE YARD:   |       |       |
| NON-RESIDENTIAL OR MIXED-USE: | 5 m   | 5 m   |
| LOW-RISE RESIDENTIAL :        | 1.2 m | 1.2 m |
| MID-RISE RESIDENTIAL :        | 3 m   | 3 m   |

|                             |       |       |
|-----------------------------|-------|-------|
| MINIMUM REAR YARD:          |       |       |
| ABUTTING A STREET:          | 3 m   | 3 m   |
| FROM A RESIDENTIAL ZONE:    | 7.5 m | 7.5 m |
| FOR A RESIDENTIAL BUILDING: | 7.5 m | 7.5 m |

## PARKING RATES

|                  |               |                 |
|------------------|---------------|-----------------|
| R9 - TOWNHOUSES: | 1 p/unit = 67 | 67 (GARAGES)    |
| VISITOR:         | 0             | 67 DRIVE AISLES |

|                     |                                     |                  |
|---------------------|-------------------------------------|------------------|
| BLOCK 14:           |                                     |                  |
| R12 - APARTEMENTS   | 1.0 p/unit = 84                     | 84 (UNDERGROUND) |
| VISITOR:            | 0.2 p/unit = 17                     | 18 (UNDERGROUND) |
| N79 - RETAIL STORE: | 3.4 p/100 m <sup>2</sup> GFA = 30.6 | 32 (EXTERIOR)    |
|                     |                                     | TOTAL: 134       |

|                     |                                     |                  |
|---------------------|-------------------------------------|------------------|
| BLOCK 15:           |                                     |                  |
| R12 - APARTEMENTS   | 1.0 p/unit = 83                     | 83 (UNDERGROUND) |
| VISITOR:            | 0.2 p/unit = 16.6                   | 16 (UNDERGROUND) |
| N79 - RETAIL STORE: | 3.4 p/100 m <sup>2</sup> GFA = 30.6 | 32 (EXTERIOR)    |
|                     |                                     | TOTAL: 131       |

|                   |                   |                       |
|-------------------|-------------------|-----------------------|
| BLOCK 17:         |                   |                       |
| R12 - APARTEMENTS | 1.0 p/unit = 96   | 96 (UNDERGROUND)      |
| VISITOR:          | 0.2 p/unit = 19.2 | 19 (15 EXT. + 4 UND.) |
|                   |                   | TOTAL: 115            |

## GROSS FLOOR AREA

|                            |                    |
|----------------------------|--------------------|
| TOWNHOUSE A:               | 267 m <sup>2</sup> |
| TOWNHOUSE B:               | 239 m <sup>2</sup> |
| TOWNHOUSE C:               | 232 m <sup>2</sup> |
| TOWNHOUSE C (CORNER UNIT): | 236 m <sup>2</sup> |
| TOWNHOUSE D:               | 225 m <sup>2</sup> |

|                          |                      |
|--------------------------|----------------------|
| TOTAL MODEL 01 (ABBBBBA) | 1,968 m <sup>2</sup> |
| TOTAL MODEL 02 (ABBBBBA) | 1,729 m <sup>2</sup> |
| TOTAL MODEL 03 (ABBBBBA) | 1,490 m <sup>2</sup> |
| TOTAL MODEL 04 (CDCDCDC) | 1,611 m <sup>2</sup> |
| TOTAL MODEL 05 (CCCCDC)  | 1,386 m <sup>2</sup> |

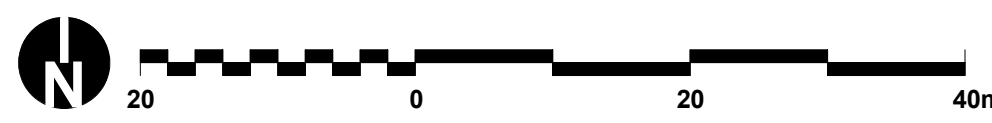
|                                                         |                             |
|---------------------------------------------------------|-----------------------------|
| MIXED USE BUILDING (TOTAL OF 2 BUILDINGS):              | TOTAL: 3,926 m <sup>2</sup> |
| RESIDENTIAL:                                            | 3,027 m <sup>2</sup>        |
| COMMERCIAL:                                             | 899 m <sup>2</sup>          |
| RESIDENTIAL APARTMENT BUILDING (TOTAL OF 4 BUILDINGS) : | TOTAL: 3,927 m <sup>2</sup> |
| RESIDENTIAL:                                            | 3,927 m <sup>2</sup>        |

## NOTE

1. ASSUMES TYPICAL RESIDENTIAL FLOOR HEIGHT OF 3m.
2. THE BASE PLAN (LOT LINES, EXISTING ROADS AND SURROUNDING AREAS) IS BASED ON THE TOPOGRAPHICAL PLAN OF SURVEY, SURVEYED STANTEC GEOMATICS LTD.
3. DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

## LOTS AREAS

| LOT NUMBER | AREAS (M2) | LOT NUMBER | AREAS (M2) |
|------------|------------|------------|------------|
| B01-1      | 394        | B06-4      | 154        |
| B01-2      | 184        | B06-5      | 163        |
| B01-3      | 184        | B06-6      | 154        |
| B01-4      | 189        | B06-7      | 369        |
| B01-5      | 189        | B07        | 2,002      |
| B01-6      | 184        | B08-1      | 525        |
| B01-7      | 184        | B08-2      | 174        |
| B01-8      | 299        | B08-3      | 184        |
| B02-1      | 281        | B08-4      | 174        |
| B02-2      | 176        | B08-5      | 184        |
| B02-3      | 184        | B08-6      | 174        |
| B02-4      | 184        | B08-7      | 234        |
| B02-5      | 174        | B09-1      | 234        |
| B02-6      | 233        | B09-2      | 174        |
| B03-1      | 250        | B09-3      | 184        |
| B03-2      | 182        | B09-4      | 184        |
| B03-3      | 182        | B09-5      | 174        |
| B03-4      | 182        | B09-6      | 234        |
| B03-5      | 182        | B10-1      | 234        |
| B03-6      | 182        | B10-2      | 174        |
| B03-7      | 250        | B10-3      | 184        |
| B04-1      | 233        | B10-4      | 184        |
| B04-2      | 174        | B10-5      | 174        |
| B04-3      | 184        | B10-6      | 487        |
| B04-4      | 174        | B11-1      | 748        |
| B04-5      | 184        | B11-2      | 286        |
| B04-6      | 174        | B11-3      | 265        |
| B04-7      | 278        | B11-4      | 246        |
| B05-1      | 368        | B11-5      | 242        |
| B05-2      | 154        | B11-6      | 242        |
| B05-3      | 163        | B11-7      | 321        |
| B05-4      | 163        | B12        | 240        |
| B05-5      | 154        | B13        | 1,232      |
| B05-6      | 206        | B14        | 5,728      |
| B06-1      | 206        | B16        | 7,811      |
| B06-2      | 154        | B17        | 5,312      |
| B06-3      | 163        |            |            |

2983, NAVAN ROAD - SITE PLAN  
1:500

SHEET No.

A100



LEGEND - SITE PLAN

- LOT LINE  
SETBACKS  
ELECTRICAL LINE  
EASEMENTS
- 0000 GEO  
ÉLEVATION GÉODÉSIQUE
- EXISTING BUILDING  
DEMOLISHED BUILDING
- EXISTING TREE  
DEMOLISHED TREE
- NEW TREE  
NEW PLANT
- GRASS  
PEA GRAVEL  
SIDEWALK  
ASPHALT  
RADIANT ZONE  
LANDSCAPED AREA

REVISIONS

| NO | DESCRIPTION     | DATE       |
|----|-----------------|------------|
| 1  | FOR CITY REVIEW | 2024-02-17 |
| 2  | FOR CITY REVIEW | 2024-03-25 |
| NO | DESCRIPTION     | DATE       |

NOTE

IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON THE SITE AND TO REPORT ALL ERRORS AND/OR OMISSIONS TO THE ARCHITECT. ALL CONTRACTORS MUST COMPLY WITH ALL PERTINENT CODES AND BY-LAWS. DO NOT SCALE DRAWINGS.

THIS DOCUMENT AND ITS CONTENT IS COPYRIGHTED. ANY REPRODUCTION IS PROHIBITED UNLESS GRANTED BY THE ARCHITECT.

DO NOT USE FOR  
CONSTRUCTION

DATE  
2024-07-17

DESIGNED  
P.POMERLEAU

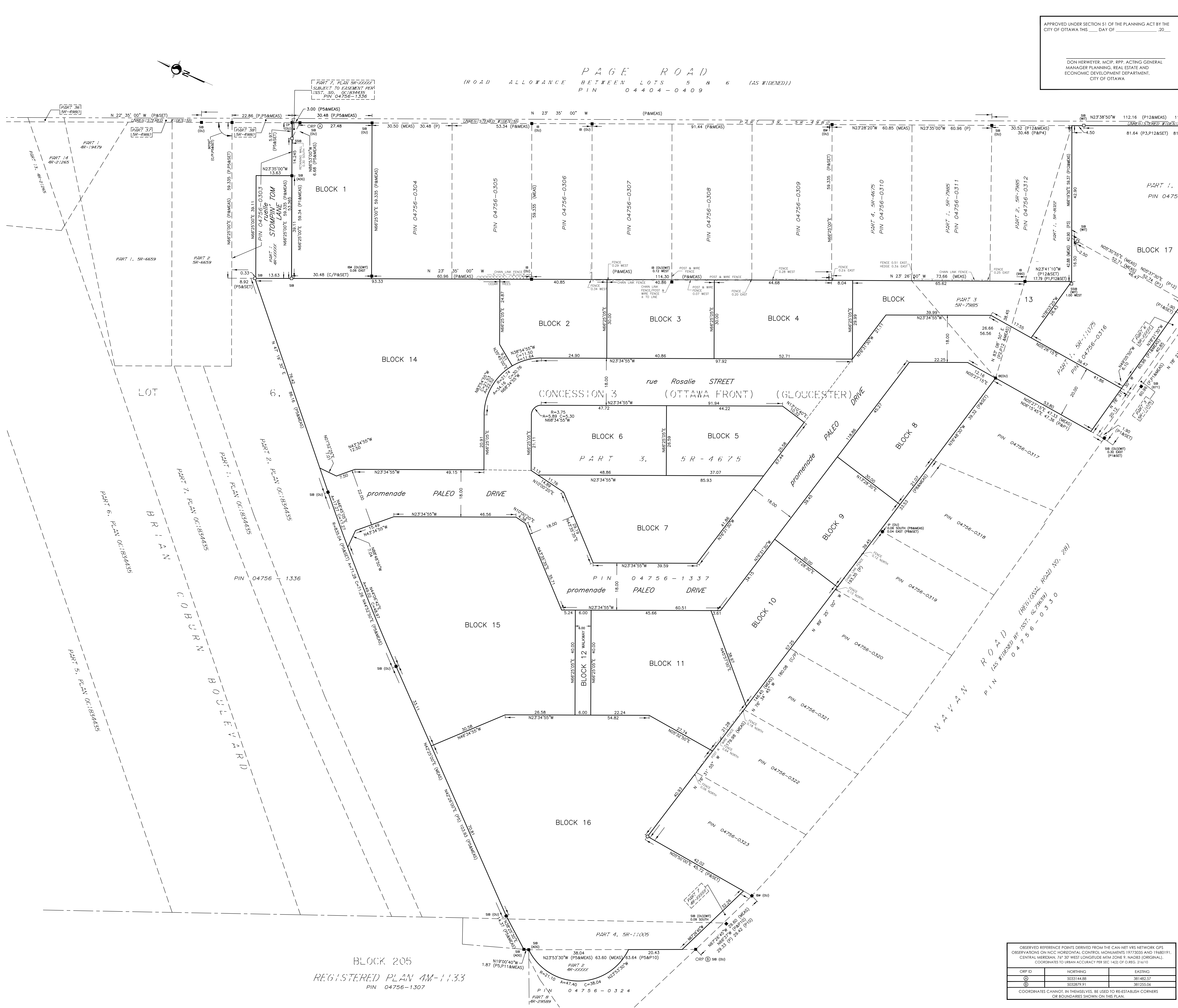
DRAWN  
P.POMERLEAU

CHECKED  
P.MARTIN

SHEET TITLE

SITE PLAN - BLOCK 15





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.L.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

0 5 10 20 30 METERS

**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 0.999994

**BEARING NOTE**  
BEARINGS ARE GRID, DERIVED FROM CAN-NET VRS NETWORK GPS OBSERVATIONS ON NCC HORIZONTAL CONTROL MONUMENTS 1977035 AND 19480191, CENTRAL MERIDIAN, 74° 30' WEST LONGITUDE WITH 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 (SB)                    |
| □       | UNLESS OTHERWISE NOTED                |
| IB      | IRON BAR                              |
| IBD     | ROUND IRON BAR                        |
| SB      | STANDARD IRON BAR                     |
| SSB     | SHORT STANDARD IRON BAR               |
| CC      | CUT CROSS                             |
| CP      | CONCRETE PIN                          |
| WIT     | WITNESS                               |
| PN      | MEASURED                              |
| MEAS    | PROPERTY IDENTIFICATION NUMBER        |
| PROP    | PROPORTIONED                          |
| CU      | ORIGIN UNKNOWN                        |
| SG      | STANTEC GEOMATICS LTD.                |
| ORP     | OBSERVED REFERENCE POINT              |
| P       | PLAN SR-4475                          |
| P1      | PLAN SR-11075                         |
| P2      | PLAN SR-7995                          |
| P3      | PLAN SR-9893                          |
| P4      | PLAN SR-8022                          |
| P5      | PLAN OC183445                         |
| P6      | PLAN SR-4900                          |
| P7      | PLAN SR-6659                          |
| P8      | PLAN BY FRM DATED SEPTEMBER 9, 2015   |
| P9      | PLAN BY 1175 DATED SEPTEMBER 30, 1987 |
| P10     | PLAN SR-11065                         |
| P11     | REGISTERED PLAN 4M-1133               |
| P12     | PLAN BY 1465 DATED DECEMBER 10, 2020  |
| C/P     | CALCULATION FOR                       |

**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 RUE 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 \_\_\_\_\_

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

**Stantec Geomatics Ltd.**  
CANADIAN SURVEYORS  
ONTARIO LAND SURVEYORS  
1331 CYTO AVENUE, SUITE 300  
OTTAWA, ONTARIO, K1C 3Z4  
TEL: 416-752-4400 FAX: 416-722-2799  
stantec.com

DRAWN: ME/MTM CHECKED: \_\_\_\_\_ PK: \_\_\_\_\_ FIELD: ES/LG PROJECT No.: 161614345-132

|                                                                                                                                                                                                                                                                           |           |           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|
| OBSERVED REFERENCE POINTS DERIVED FROM THE CAN-NET VRS NETWORK GPS OBSERVATIONS ON NCC HORIZONTAL CONTROL MONUMENTS 1977035 AND 19480191, CENTRAL MERIDIAN, 74° 30' WEST LONGITUDE WITH ZONE 9, NAD83 (ORIGINAL). COORDINATES TO UTM ACCURACY PER SEC 1401 OF 0.000 25410 |           |           |
| ORP ID                                                                                                                                                                                                                                                                    | NORTHING  | EASTING   |
| ①                                                                                                                                                                                                                                                                         | 933144.88 | 381482.57 |
| ②                                                                                                                                                                                                                                                                         | 933287.91 | 381255.06 |
| COORDINATES CANNOT, IN THEMSELVES, BE USED TO RE-ESTABLISH CORNERS OR BOUNDARIES SHOWN ON THIS PLAN.                                                                                                                                                                      |           |           |





 **Stantec**

**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](http://stantec.com)



**Site Servicing Report**  
**2983, 3053 and 3079 Navan Road & 2690 Pagé Road**

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**Appendix B**

Pre Consultation Meeting Notes  
and Site Servicing Report  
Checklist

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

**Subject: Pre-Consultation: Meeting Feedback  
Proposed Site Plan Application – 2983 Navan Road  
Four residential and two mixed-use buildings – PC2023-0226**

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 <input type="checkbox"/> | 2 <input type="checkbox"/> | 3 <input type="checkbox"/> | 4 <input checked="" type="checkbox"/> | 5 <input type="checkbox"/> |
|----------------------------|----------------------------|----------------------------|---------------------------------------|----------------------------|

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](mailto: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](http://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 identified 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 and DR Development Reserve.

2. Committee of Adjustment

No variances have been identified at this point. I would be supportive of reducing the parking requirement for the residential units if it will result in addition landscaping and tree cover. Staff will set up a meeting with a Committee of Adjustment Plan if any required.

3. Design guidelines

The following guidelines are meant as a starting place to help guide the design. I realize that they are specifically related to your project. [Urban Design Guidelines for Low-rise Infill Housing](#)

4. Landscape requirements

All required yards are to be landscaped with parking located between the buildings. Green spaces and tree canopy needs to be maximized.

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.

6. Easements

Will there be any easements required?

7. Commercial units should be orientated to the streets as much as possible.
8. Provide locations of signage and ensure that space is made available for tree planting

### **Urban Design**

9. This proposal does not run along or does not meet the threshold in one of the City's Design Priority Areas and need not attend the City's UDRP. Staff will be responsible for evaluating the Urban Design Brief and providing design direction.
10. An Urban Design Brief is a required submittal Re-zoning applications. The Urban Design Brief should be structured by generally following the headings highlighted under Section 3 – Contents of these Terms of Reference. Please see the Urban Design Brief Terms of Reference provided.
11. We recommend further detail be provided about the low-rise apartments to better understand their relationship to the surrounding buildings and properties.
12. If this site is located outside the greenbelt, a shadow analysis will be required.
13. We recommend the low-rise buildings fronting City streets consider grade related units accessed from the street to further 'fit-in' with the surrounding low-rise residential community where feasible.
14. We recommend additional landscaping detail be provided around the low-rise apartments to better understand how the buildings relate to their context.
15. We recommend additional detail be provided of the front yards of the townhouse units facing City streets to better understand how they will integrate with the public realm.
16. We recommend tree planting in front yards facing public right-of-way.
17. When a wind and/or shadow studies are required please refer to the Terms of Reference for the wind analysis and shadow analysis to conduct the studies and evaluate the impacts.
18. Note. The Urban Design Brief submittal should have a section which addresses these pre-consultation comments.



This is an exciting project in an area full of potential. We look forward to helping you achieve its goals with the highest level of design resolution. We are happy to assist and answer any questions regarding the above. Feel free to contact the Urban Design Planner, Christopher Moise, at [Christopher.Moise@ottawa.ca](mailto:Christopher.Moise@ottawa.ca), for follow-up questions

## **Engineering**

### Comments:

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

- a. The 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
- b. For separated sewer system built pre-1970 the design of the storm sewers are based on a 2 year storm.
- c. The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).
- d. A calculated time of concentration (Cannot be less than 10 minutes).
- e. Flows to the storm sewer in excess of the 5-year storm release rate, up to and including the 100-year storm event, must be detained on site.
- f. For a combined sewer system the maximum C= 0.4 or the pre-development C value, whichever is less. In the absence of other information the allowable release rate shall be based on a 2 year storm event.

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

- a. Provide existing servicing information and the recommended location for the proposed connections. Services should ideally be grouped in a common trench to minimize the number of road cuts.
- b. Connections to trunk sewers and easement sewers are typically not permitted.
- c. Provide information on the monitoring manhole requirements – should be located in an accessible location on private property near the property line (ie. Not in a parking area).
- d. Review provision of a high-level sewer.

- e. Sewer connections to be made above the springline of the sewermain as per:
  - i. Std Dwg S11.1 for flexible main sewers – connections made using approved tee or wye fittings.
  - ii. Std Dwg S11 (For rigid main sewers) – lateral must be less than 50% the diameter of the sewermain,
  - iii. Std Dwg S11.2 (for rigid main sewers using bell end insert method) – for larger diameter laterals where manufactured inserts are not available; lateral must be less than 50% the diameter of the sewermain,
  - iv. Connections to manholes permitted when the connection is to rigid main sewers where the lateral exceeds 50% the diameter of the sewermain. – Connect obvert to obvert with the outlet pipe unless pipes are a similar size.
  - v. No submerged outlet connections.

21. Water Boundary condition requests must include the location of the service (map or plan with connection location(s) indicated) and the expected loads required by the proposed development, including calculations. Please provide the following information:

no BCR will be requested for res site plans, no watermains built, navaan connection already provided as part of subdivision

- a. Location of service
- b. Type of development and the amount of fire flow required (as per FUS).
- c. Average daily demand: \_\_\_\_ l/s.
- d. Maximum daily demand: \_\_\_\_ l/s.
- e. Maximum hourly daily demand: \_\_\_\_ l/s.

22. An MECP Environmental Compliance Approval **[Industrial Sewage Works or Municipal/Private 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:

- a. Charlie Primeau at (613) 521-3450, ext. 251 or [Charlie.Primeau@ontario.ca](mailto:Charlie.Primeau@ontario.ca)
- b. Emily Diamond at (613) 521-3450, ext. 238 or [Emily.Diamond@ontario.ca](mailto:Emily.Diamond@ontario.ca)

General Comments:



23. 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.
24. 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.
25. Engineering Studies:
26. 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

Feel free to contact Derek Unrau, Infrastructure Project Manager, for follow-up questions.

### **Noise**

Comments:

27. Noise report is required to identify and mitigate traffic noise from Brian Coburn Boulevard and Navan Road

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

### **Transportation**

Comments:

- a. A full TIA is not required as this site is covered under the recent subdivision TIA.
- b. A memo including the pertinent subdivision trips is sufficient.
- c. 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.

### **Planning Forestry**

Comments:

- 28. A Tree Conservation Report and Landscape Plan must be submitted with both SPC applications
- 29. 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.
- 30. 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.
- 31. If underground parking is planned, a design must be provided for the site to support tree planting
- 32. 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:

- 33. Parkland contributions were made through the Subdivision process.

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

### **Conservation Authority**

Comments:

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

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

### **Other**

- 35. 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](http://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](http://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  
Derek Unrau  
Mike Giampa  
Haley Murray  
Jessica Button

**12714001 Canada Inc – Mixed Use Site Plan (Block 15)**  
**2983, 3053 and 3079 Navan Road & 2690 Pagé Road**  
**SITE SERVICING REPORT CHECKLIST**

| REFERENCED STUDIES AND REPORTS                                                                                                                                                        | REFERENCE             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Site Servicing Report for 12714001 Canada Inc, Mixed Used Site Plan (Block 15) 2983, 3053 and 3079 Navan Road & 2690 Pagé Road (J.L. Richards & Associates Limited, December 8, 2023) | Site Servicing Report |

| 4.1                                 | GENERAL CONTENT                                                                                                                                                                                                                                                                        | REFERENCE                                          |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| <input type="checkbox"/>            | Executive Summary (for larger reports only).                                                                                                                                                                                                                                           | N/A                                                |
| <input checked="" type="checkbox"/> | Date and revision number of the report.                                                                                                                                                                                                                                                | Site Servicing Report                              |
| <input checked="" type="checkbox"/> | Location map and plan showing municipal address, boundary, and layout of proposed development.                                                                                                                                                                                         | Site Servicing Report (Appendix A)<br>All Drawings |
| <input checked="" type="checkbox"/> | Plan showing the site and location of all existing services.                                                                                                                                                                                                                           | Servicing Plan                                     |
| <input checked="" type="checkbox"/> | 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                              |
| <input checked="" type="checkbox"/> | Summary of Pre-consultation Meetings with City and other approval agencies.                                                                                                                                                                                                            | Site Servicing Report (Appendix 'A')               |
| <input checked="" type="checkbox"/> | 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 defensible design criteria. | Reference made to Stantec 2005 EUC ISSU            |
| <input checked="" type="checkbox"/> | Statement of objectives and servicing criteria.                                                                                                                                                                                                                                        | Site Servicing Report                              |
| <input checked="" type="checkbox"/> | Identification of existing and proposed infrastructure available in the immediate area.                                                                                                                                                                                                | Site Servicing Report<br>Servicing Plan            |
| <input type="checkbox"/>            | 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                                                |

|                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                    |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| <input checked="" type="checkbox"/> | 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.                                                                                                                                   | <a href="#">Grading Plan</a>                       |
| <input type="checkbox"/>            | 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.                                                                                                                                                                                                                                                                                                                                  | <a href="#">N/A</a>                                |
| <input type="checkbox"/>            | Proposed phasing of the development, if applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <a href="#">N/A</a>                                |
| <input checked="" type="checkbox"/> | Reference to geotechnical studies and recommendations concerning servicing.                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <a href="#">Site Servicing Report and Drawings</a> |
| <input checked="" type="checkbox"/> | All preliminary and formal site plan submissions should have the following information: <ul style="list-style-type: none"> <li>▪ Metric scale</li> <li>▪ North arrow (including construction North)</li> <li>▪ Key plan</li> <li>▪ Name and contact information of applicant and property owner</li> <li>▪ Property limits, including bearings and dimensions</li> <li>▪ Existing and proposed structures and parking areas</li> <li>▪ Easements, road widening and rights-of-way</li> <li>▪ Adjacent street names</li> </ul> | <a href="#">All Drawings</a>                       |

| <b>4.2</b>                          | <b>SITE SERVICING REPORT: WATER</b>                                                                                                                                                                               | <b>REFERENCE</b>                                                       |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| <input type="checkbox"/>            | Confirm consistency with Master Servicing Study, if available.                                                                                                                                                    | <a href="#">N/A</a>                                                    |
| <input checked="" type="checkbox"/> | Availability of public infrastructure to service proposed development.                                                                                                                                            | <a href="#">Site Servicing Report (Section 2.0)<br/>Servicing Plan</a> |
| <input checked="" type="checkbox"/> | Identification of system constraints.                                                                                                                                                                             | <a href="#">Site Servicing Report (Section 2.0)<br/>Servicing Plan</a> |
| <input checked="" type="checkbox"/> | Identify boundary conditions.                                                                                                                                                                                     | <a href="#">Site Servicing Report (Section 2.0)</a>                    |
| <input checked="" type="checkbox"/> | Confirmation of adequate domestic supply and pressure.                                                                                                                                                            | <a href="#">Site Servicing Report (Section 2.0)</a>                    |
| <input checked="" type="checkbox"/> | 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. | <a href="#">Site Servicing Report (Section 2.0)</a>                    |
| <input checked="" type="checkbox"/> | 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.                                                             | <a href="#">Site Servicing Report (Section 2.0)</a>                    |



|                                     |                                                                                                                                                                                                                                                                                               |                                                       |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| <input type="checkbox"/>            | Definition of phasing constraints. Hydraulic modelling is required to confirm servicing for all defined phases of the project, including the ultimate design.                                                                                                                                 | N/A                                                   |
| <input checked="" type="checkbox"/> | Address reliability requirements, such as appropriate location of shutoff valves.                                                                                                                                                                                                             | Site Servicing Report (Section 2.0)                   |
| <input type="checkbox"/>            | Check on the necessity of a pressure zone boundary modification.                                                                                                                                                                                                                              | N/A                                                   |
| <input checked="" type="checkbox"/> | 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)                   |
| <input checked="" type="checkbox"/> | 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)<br>Servicing Plan |
| <input type="checkbox"/>            | Description of off-site required feeder mains, 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                                                   |
| <input checked="" type="checkbox"/> | Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.                                                                                                                                                                                                 | Site Servicing Report (Section 2.0)                   |
| <input checked="" type="checkbox"/> | 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                                             |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| <input checked="" type="checkbox"/> | 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,                   |
| <input type="checkbox"/>            | Confirm consistency with Master Servicing Study and/or justifications for deviations.                                                                                                                                                                                         | Stantec 2005 EUC ISSU                                 |
| <input type="checkbox"/>            | 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                                                   |
| <input checked="" type="checkbox"/> | Description of existing sanitary sewer available for discharge of wastewater from proposed development.                                                                                                                                                                       | Site Servicing Report (Section 3.0)<br>Servicing Plan |

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

| <b>4.4</b>                          | <b>SITE SERVICING REPORT: STORMWATER</b>                                                                                                                                                                                                                                                                                                                                                                                                 | <b>REFERENCE</b>                                      |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| <input checked="" type="checkbox"/> | Description of drainage outlets and downstream constraints, including legality of outlets (i.e., municipal drain, right-of-way, watercourse, or private property).                                                                                                                                                                                                                                                                       | <a href="#">Site Servicing Report (Section 4.0)</a>   |
| <input checked="" type="checkbox"/> | Analysis of available capacity in existing public infrastructure.                                                                                                                                                                                                                                                                                                                                                                        | <a href="#">Site Servicing Report (Section 4.0)</a>   |
| <input checked="" type="checkbox"/> | A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.                                                                                                                                                                                                                                                                                             | <a href="#">Servicing, Grading and Drainage Plans</a> |
| <input checked="" type="checkbox"/> | 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. | <a href="#">Site Servicing Report (Section 4.0)</a>   |

|                                     |                                                                                                                                                                                                      |                                                                                  |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | 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)                                              |
| <input checked="" type="checkbox"/> | Description of the stormwater management concept with facility locations and descriptions with references and supporting information.                                                                | Site Servicing Report (Section 4.0)<br><br>Servicing, Grading and Drainage Plans |
| <input type="checkbox"/>            | Setback from private sewage disposal systems.                                                                                                                                                        | N/A                                                                              |
| <input type="checkbox"/>            | Watercourse and hazard lands setbacks.                                                                                                                                                               | N/A                                                                              |
| <input checked="" type="checkbox"/> | 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')                                             |
| <input type="checkbox"/>            | Confirm consistency with subwatershed and Master Servicing Study, if applicable study exists.                                                                                                        | Stantec 2005 EUC ISSU                                                            |
| <input checked="" type="checkbox"/> | 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)                                              |
| <input type="checkbox"/>            | 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                                                                              |
| <input checked="" type="checkbox"/> | 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)                                              |
| <input checked="" type="checkbox"/> | Any proposed diversion of drainage catchment areas from one outlet to another.                                                                                                                       | Site Servicing Report (Section 4.0)                                              |
| <input checked="" type="checkbox"/> | Proposed minor and major systems, including locations and sizes of stormwater trunk sewers, and stormwater management facilities.                                                                    | Servicing, Grading and Drainage Plans                                            |
| <input type="checkbox"/>            | 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)                |
| <input type="checkbox"/>            | Identification of potential impacts to receiving watercourses.                                                                                                                                       | N/A                                                                              |
| <input type="checkbox"/>            | Identification of municipal drains and related approval requirements.                                                                                                                                | N/A                                                                              |
| <input checked="" type="checkbox"/> | Description of how the conveyance and storage capacity will be achieved for the development.                                                                                                         | Site Servicing Report (Section 4.0)                                              |



|                                     |                                                                                                                                                                                                                                                                                                                                               |                                                                              |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| <input checked="" type="checkbox"/> | 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)<br>Servicing, Grading and Drainage Plans |
| <input checked="" type="checkbox"/> | Inclusion of hydraulic analysis, including hydraulic grade line elevations.                                                                                                                                                                                                                                                                   | Site Servicing Report (Section 4.0)                                          |
| <input checked="" type="checkbox"/> | 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)<br>Servicing Plan                        |
| <input type="checkbox"/>            | 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                                                                          |
| <input type="checkbox"/>            | 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: |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                              |
| <input type="checkbox"/>                                                                                                                                                                                                                                                     | 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                          |
| <input type="checkbox"/>                                                                                                                                                                                                                                                     | Application for Environmental Compliance Approval (ECA) under the Ontario Water Resources Act.                                                                                                                                                                                                                                                                                                                                                                                                                                        | As part of future submission |
| <input type="checkbox"/>                                                                                                                                                                                                                                                     | Changes to Municipal Drains.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | N/A                          |
| <input type="checkbox"/>                                                                                                                                                                                                                                                     | Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation, etc.).                                                                                                                                                                                                                                                                                                                                                                                             | N/A                          |

| 4.6                                 | CONCLUSION CHECKLIST                                                                                                                                                           | REFERENCE             |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <input checked="" type="checkbox"/> | Clearly stated conclusions and recommendations.                                                                                                                                | Site Servicing Report |
| <input checked="" type="checkbox"/> | 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    |

|                                     |                                                                                                           |                                       |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------|---------------------------------------|
|                                     |                                                                                                           |                                       |
| <input checked="" type="checkbox"/> | All draft and final reports shall be signed and stamped by a Professional Engineer registered in Ontario. | Site Servicing Report<br>All Drawings |

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## **Appendix C**

Water Servicing



WATERMAIN DEMAND CALCULATION SHEET

PROJECT : NAVAN ROAD DEVELOPMENT PROJECT  
LOCATION : CITY OF OTTAWA  
DEVELOPER : 12714001 Canada Inc.

| NODE   | RESIDENTIAL     |                  |       | NON-RESIDENTIAL<br>COMM<br>(ha.) | AVERAGE DAILY<br>DEMAND (l/s) |          |       | MAXIMUM DAILY<br>DEMAND (l/s) |          |       | PEAK HOUR<br>DEMAND (l/s) |          |       |
|--------|-----------------|------------------|-------|----------------------------------|-------------------------------|----------|-------|-------------------------------|----------|-------|---------------------------|----------|-------|
|        | UNITS           |                  | POP'N |                                  | Res.                          | Non-res. | Total | Res.                          | Non-res. | Total | Res.                      | Non-res. | Total |
|        | Townhouses (TH) | Condo Units (CU) |       |                                  |                               |          |       |                               |          |       |                           |          |       |
| J-23   | 0               | 83               | 149   | 0.09                             | 0.48                          | 0.03     | 0.52  | 1.21                          | 0.05     | 1.26  | 2.66                      | 0.08     | 2.74  |
| TOTALS | 0               | 83               | 149   | 0.09                             | 0.48                          | 0.03     | 0.52  | 1.21                          | 0.05     | 1.26  | 2.66                      | 0.08     | 2.74  |

| 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           | Wood Frame                 |                | Building C (4 Story Mixed Use Condominium Building)          |
|          | Coefficient (C)                | 1.5                        |                |                                                              |
| B        | Ground Floor Area              | 929                        | m <sup>2</sup> |                                                              |
| C        | Height in storeys              | 4                          | storeys        | Basements are excluded.                                      |
|          | Total Floor Area               | 3716                       | m <sup>2</sup> |                                                              |
| D        | Fire Flow Formula              | F=220C√A                   |                |                                                              |
|          | Fire Flow                      | 20116                      | L/min          |                                                              |
|          | Rounded Fire Flow              | 20000                      | L/min          | Flow rounded to nearest 1000 L/min.                          |
| E        | Occupancy Class                | Limited Combustible        |                | Residential buildings have a limited combustible occupancy.  |
|          | Occupancy Charge               | -15%                       |                |                                                              |
|          | Occupancy Increase or Decrease | -3000                      |                |                                                              |
|          | Fire Flow                      | 17000                      | L/min          | No rounding applied.                                         |
| F        | Sprinkler Protection           | Automatic Fully Supervised |                |                                                              |
|          | Sprinkler Credit               | -50%                       |                |                                                              |
|          | Decrease for Sprinkler         | -8500                      | L/min          |                                                              |
| G        | North Side Exposure            |                            |                |                                                              |
|          | Exposing Wall:                 | Wood Frame                 |                |                                                              |
|          | Exposed Wall:                  | Wood Frame                 |                |                                                              |
|          | Length of Exposed Wall:        | 35.7                       | m              |                                                              |
|          | Height of Exposed Wall:        | 4                          | storeys        |                                                              |
|          | Length-Height Factor           | 142.9                      | m-storeys      |                                                              |
|          | Separation Distance            | 26                         | m              |                                                              |
|          | North Side Exposure Charge     | 10%                        |                |                                                              |
|          | East Side Exposure             |                            |                |                                                              |
|          | Exposing Wall:                 | Wood Frame                 |                |                                                              |
|          | Exposed Wall:                  | Wood Frame                 |                |                                                              |
|          | Length of Exposed Wall:        | 0.0                        | m              |                                                              |
|          | Height of Exposed Wall:        | 0                          | storeys        |                                                              |
|          | Length-Height Factor           | 0.0                        | m-storeys      |                                                              |
|          | Separation Distance            | 50                         | m              |                                                              |
|          | East Side Exposure Charge      | 0%                         |                |                                                              |
|          | South Side Exposure            |                            |                |                                                              |
|          | Exposing Wall:                 | Wood Frame                 |                |                                                              |
|          | Exposed Wall:                  | Wood Frame                 |                |                                                              |
|          | Length of Exposed Wall:        | 35.9                       | m              |                                                              |
|          | Height of Exposed Wall:        | 4                          | storeys        |                                                              |
|          | Length-Height Factor           | 143.5                      | m-storeys      |                                                              |
|          | Separation Distance            | 26.89                      | m              |                                                              |
|          | South Side Exposure Charge     | 10%                        |                |                                                              |
|          | West Side Exposure             |                            |                |                                                              |
|          | Exposing Wall:                 | Wood Frame                 |                |                                                              |
|          | Exposed Wall:                  | Wood Frame                 |                |                                                              |
|          | Length of Exposed Wall:        | 0.0                        | m              |                                                              |
|          | Height of Exposed Wall:        | 0                          | storeys        |                                                              |
|          | Length-Height Factor           | 0.0                        | m-storeys      |                                                              |
|          | Separation Distance            | 50                         | m              |                                                              |
|          | West Side Exposure Charge      | 0%                         |                |                                                              |
|          | Total Exposure Charge          | 20%                        |                | The total exposure charge is below the maximum value of 75%. |
|          | Increase for Exposures         | 3400                       | L/min          |                                                              |
| H        | Fire Flow                      | 11900                      | L/min          |                                                              |
|          | Rounded Fire Flow              | 12000                      | L/min          | Flow rounded to nearest 1000 L/min.                          |
| City Cap | Required Fire Flow (RFF)       | 12000                      | L/min          |                                                              |
|          |                                | 200                        | 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           | Wood Frame                 | Building D (4 Story Mixed Use Condominium Building)          |
|          | Coefficient (C)                | 1.5                        |                                                              |
| B        | Ground Floor Area              | 929 m <sup>2</sup>         |                                                              |
| C        | Height in storeys              | 4 storeys                  | Basements are excluded.                                      |
|          | Total Floor Area               | 3716 m <sup>2</sup>        |                                                              |
| D        | Fire Flow Formula              | F=220C <sup>1/2</sup> A    |                                                              |
|          | Fire Flow                      | 20116 L/min                |                                                              |
|          | Rounded Fire Flow              | 20000 L/min                | Flow rounded to nearest 1000 L/min.                          |
| E        | Occupancy Class                | Limited Combustible        | Residential buildings have a limited combustible occupancy.  |
|          | Occupancy Charge               | -15%                       |                                                              |
|          | Occupancy Increase or Decrease | -3000                      |                                                              |
|          | Fire Flow                      | 17000 L/min                |                                                              |
| F        | Sprinkler Protection           | Automatic Fully Supervised |                                                              |
|          | Sprinkler Credit               | -50%                       |                                                              |
|          | Decrease for Sprinkler         | -8500 L/min                |                                                              |
| G        | <i>North Side Exposure</i>     |                            |                                                              |
|          | Exposing Wall:                 | Wood Frame                 |                                                              |
|          | Exposed Wall:                  | Wood Frame                 |                                                              |
|          | Length of Exposed Wall:        | 35.9 m                     |                                                              |
|          | Height of Exposed Wall:        | 4 storeys                  |                                                              |
|          | Length-Height Factor           | 143.5 m-storeys            |                                                              |
|          | Separation Distance            | 26.89 m                    |                                                              |
|          | North Side Exposure Charge     | 10%                        |                                                              |
|          | <i>East Side Exposure</i>      |                            |                                                              |
|          | Exposing Wall:                 | Wood Frame                 |                                                              |
|          | Exposed Wall:                  | Wood Frame                 |                                                              |
|          | Length of Exposed Wall:        | 7.8 m                      |                                                              |
|          | Height of Exposed Wall:        | 2 storeys                  |                                                              |
|          | Length-Height Factor           | 15.5 m-storeys             |                                                              |
|          | Separation Distance            | 11.5 m                     |                                                              |
|          | East Side Exposure Charge      | 12%                        |                                                              |
|          | <i>South Side Exposure</i>     |                            |                                                              |
|          | Exposing Wall:                 | Wood Frame                 |                                                              |
|          | Exposed Wall:                  | Non-combustible            |                                                              |
|          | Length of Exposed Wall:        | 23.9 m                     |                                                              |
|          | Height of Exposed Wall:        | 1 storeys                  |                                                              |
|          | Length-Height Factor           | 23.9 m-storeys             |                                                              |
|          | Separation Distance            | 32.28 m                    |                                                              |
|          | South Side Exposure Charge     | 5%                         |                                                              |
|          | <i>West Side Exposure</i>      |                            |                                                              |
|          | Exposing Wall:                 | Wood Frame                 |                                                              |
|          | Exposed Wall:                  | Wood Frame                 |                                                              |
|          | Length of Exposed Wall:        | 0.0 m                      |                                                              |
|          | Height of Exposed Wall:        | 0 storeys                  |                                                              |
|          | Length-Height Factor           | 0.0 m-storeys              |                                                              |
|          | Separation Distance            | 50 m                       |                                                              |
|          | West Side Exposure Charge      | 0%                         |                                                              |
|          | Total Exposure Charge          | 27%                        | The total exposure charge is below the maximum value of 75%. |
|          | Increase for Exposures         | 4590 L/min                 |                                                              |
| H        | Fire Flow                      | 13090 L/min                |                                                              |
|          | Rounded Fire Flow              | 13000 L/min                | Flow rounded to nearest 1000 L/min.                          |
| City Cap | Required Fire Flow (RFF)       | 13000 L/min                |                                                              |
|          |                                | 217 L/s                    |                                                              |

Fire Underwriters Survey (FUS) Fire Flow Calculations

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



NAVAN ROAD  
DEVELOPMENT2983, Navan Road, Orleans,  
ON K1C 7G4

OWNER

788, BOUL. SAINT-JOSEPH, SUITE 100  
GATINEAU, QC J8Y 4B8

ARCHITECTURAL

(416) 851-8954  
INFO@PMAARCHITECTS.COM  
3070, CHEMIN DES QUATRE-BOURGEOIS  
QUÉBEC, QC G1V 2M4  
PMAARCHITECTS.COM53, BOUL. SAINT-RAYMOND,  
GATINEAU, QC J8Y 1R8

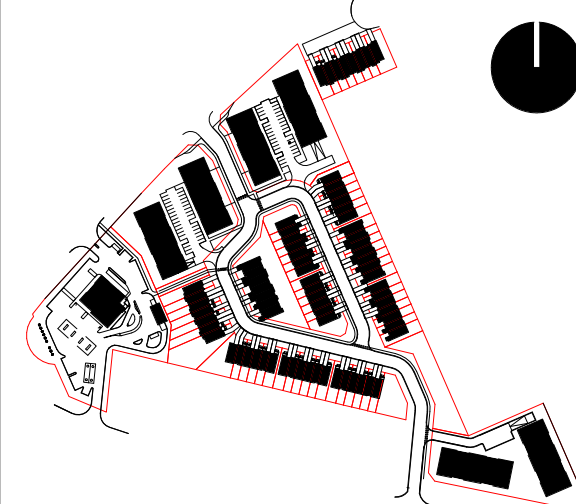
ENGINEERS / PLANNER

1565 CARLING AVENUE, SUITE 700,  
OTTAWA, ON K1Z 6R1

SURVEYOR

1331 GLYDE AVENUE, SUITE 400,  
OTTAWA, ON K2C 3G4

KEY PLAN



ARCHITECT SEAL

REVISIONS

| NO | DESCRIPTION      | DATE       |
|----|------------------|------------|
| 1  | FOR CITY REVIEW  | 2022-11-28 |
| 2  | FOR COORDINATION | 2022-11-08 |
| 3  | FOR COORDINATION | 2022-11-01 |
| 4  | FOR COORDINATION | 2022-10-14 |
| 5  | FOR COORDINATION | 2022-11-03 |
| 6  | FOR COORDINATION | 2022-11-03 |
| 7  | FOR COORDINATION | 2022-11-03 |
| 8  | FOR COORDINATION | 2022-11-03 |
| 9  | FOR COORDINATION | 2022-11-03 |
| 10 | FOR COORDINATION | 2022-11-03 |

NOTE

IT IS THE RESPONSIBILITY OF THE APPROPRIATE  
CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS  
ON THE SITE AND TO REPORT ALL ERRORS AND/OR  
OMISSIONS TO THE ARCHITECT. ALL CONTRACTORS  
MUST COMPLY WITH ALL PERTINENT CODES AND BY-  
LAWS. DO NOT SCALE DRAWINGS.THIS DOCUMENT AND ITS CONTENT IS COPYRIGHTED.  
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BY THE ARCHITECT.DO NOT USE FOR  
CONSTRUCTION

DATE

DESIGNED

PP

DRAWN

PP

PROJECT NO

CHECKED

PM

SHEET TITLE

SITE PLAN

SHEET NO

A100

| LOTS AREAS |            |            |            |
|------------|------------|------------|------------|
| LOT NUMBER | AREAS (M2) | LOT NUMBER | AREAS (M2) |
| B01-1      | 394        | B06-4      | 154        |
| B01-2      | 184        | B06-5      | 163        |
| B01-3      | 184        | B06-6      | 154        |
| B01-4      | 189        | B06-7      | 369        |
| B01-5      | 189        | B07        | 2,002      |
| B01-6      | 184        | B08-1      | 525        |
| B01-7      | 184        | B08-2      | 174        |
| B01-8      | 299        | B08-3      | 184        |
| B02-1      | 281        | B08-4      | 174        |
| B02-2      | 176        | B08-5      | 184        |
| B02-3      | 184        | B08-6      | 174        |
| B02-4      | 184        | B08-7      | 234        |
| B02-5      | 174        | B09-1      | 234        |
| B02-6      | 233        | B09-2      | 174        |
| B03-1      | 250        | B09-3      | 184        |
| B03-2      | 182        | B09-4      | 184        |
| B03-3      | 182        | B09-5      | 174        |
| B03-4      | 182        | B09-6      | 234        |
| B03-5      | 182        | B10-1      | 234        |
| B03-6      | 182        | B10-2      | 174        |
| B03-7      | 250        | B10-3      | 184        |
| B04-1      | 233        | B10-4      | 184        |
| B04-2      | 174        | B10-5      | 174        |
| B04-3      | 184        | B10-6      | 487        |
| B04-4      | 174        | B11-1      | 748        |
| B04-5      | 184        | B11-2      | 286        |
| B04-6      | 174        | B11-3      | 265        |
| B04-7      | 278        | B11-4      | 246        |
| B05-1      | 368        | B11-5      | 242        |
| B05-2      | 154        | B11-6      | 242        |
| B05-3      | 163        | B11-7      | 321        |
| B05-4      | 163        | B12        | 240        |
| B05-5      | 154        | B13        | 1,232      |
| B05-6      | 206        | B14        | 5,728      |
| B06-1      | 206        | B15        | 5,399      |
| B06-2      | 154        | B16        | 7,811      |
| B06-3      | 163        | B17        | 5,312      |

## SITE PLAN LEGEND

|  |                                                   |  |          |
|--|---------------------------------------------------|--|----------|
|  | EXISTING BUILDING                                 |  | LOT LINE |
|  | NEW BUILDING                                      |  | SETBACKS |
|  | NEW BUILDING WITH<br>COMMERCIAL SPACE<br>AT-GRADE |  | NEW TREE |
|  | GRASS                                             |  | FIREWALL |
|  | ASPHALT                                           |  | SIDEWALK |

## SITE INFORMATION &amp; DEVELOPMENT STATISTICS

| LOTS                               | PIN                                |
|------------------------------------|------------------------------------|
|                                    | 04756 - 0303                       |
|                                    | 04756 - 0315                       |
|                                    | 04756 - 0316                       |
|                                    | 04756 - 1337                       |
| ZONING                             | GM(2546) H(14.5)                   |
| SITE AREA                          |                                    |
| TOTAL SITE AREA:                   | ~53,441.14 m <sup>2</sup> (5.34ha) |
| TOTAL DEVELOPABLE AREA:            | ~45,956.28 m <sup>2</sup> (4.59ha) |
| NET SITE AREA:                     | ~38,956.28 m <sup>2</sup> (3.89ha) |
| UNITS                              |                                    |
| TOWNHOUSES:                        | 67 UNITS                           |
| BLOCK 01:                          |                                    |
| 1 X RESIDENTIAL APARTMENT BUILDING | 48 UNITS                           |
| 1 X MIXED USE BUILDING             |                                    |
| RESIDENTIAL:                       | 36 UNITS                           |
| COMMERCIAL SPACES:                 | ~929 m <sup>2</sup>                |
| BLOCK 02:                          |                                    |
| 1 X RESIDENTIAL APARTMENT BUILDING | 47 UNITS                           |
| 1 X MIXED USE BUILDING             |                                    |
| RESIDENTIAL:                       | 36 UNITS                           |
| COMMERCIAL SPACES:                 | ~929 m <sup>2</sup>                |
| BLOCK 03:                          |                                    |
| 2 X RESIDENTIAL APARTMENT BUILDING | 96 UNITS                           |
| TOTAL NUMBER OF UNITS:             | 330 UNITS                          |
| TOTAL COMMERCIAL SPACES:           | ~1,858 m <sup>2</sup>              |

|                               | REQUIRED | PROVIDED           |
|-------------------------------|----------|--------------------|
| MAXIMUM DENSITY               | NO MAX.  | 84.8 units/net ha  |
| MINIMUM LOT WIDTH             | NO MIN.  | 5.8 m              |
| MINIMUM LOT AREA              | NO MIN.  | 174 m <sup>2</sup> |
| MAXIMUM BUILDING HEIGHT       | 14.5 m   | 14.5 m             |
| SETBACKS                      |          |                    |
| MINIMUM FRONT YARD:           | 3 m      | 3 m                |
| MINIMUM CORNER SIDE YARD:     | 3 m      | 3 m                |
| MINIMUM INTERIOR SIDE YARD:   |          |                    |
| NON-RESIDENTIAL OR MIXED-USE: | 5 m      | 5 m                |
| LOW-RISE RESIDENTIAL :        | 1.2 m    | 1.2 m              |
| MID-RISE RESIDENTIAL :        | 3 m      | 3 m                |
| MINIMUM REAR YARD:            |          |                    |
| ABUTTING A STREET:            | 3 m      | 3 m                |
| FROM A RESIDENTIAL ZONE:      | 7.5 m    | 7.5 m              |
| FOR A RESIDENTIAL BUILDING:   | 7.5 m    | 7.5 m              |

|                     |                                   |                       |
|---------------------|-----------------------------------|-----------------------|
| PARKING RATES       |                                   |                       |
| R9 - TOWNHOUSES:    | 1 p/unit = 67                     | 67 (GARAGES)          |
| VISITOR:            | 0                                 | 67 DRIVE AISLES       |
| BLOCK 14:           |                                   |                       |
| R12 - APARTEMENTS   | 1.2 p/unit = 101                  | 101 (UNDERGROUND)     |
| VISITOR:            | 0.2 p/unit = 17                   | 17 (UNDERGROUND)      |
| N79 - RETAIL STORE: | 3.4 p/100 m <sup>2</sup> GFA = 32 | 32 (EXTERIOR)         |
| TOTAL:              |                                   | 150                   |
| BLOCK 15:           |                                   |                       |
| R12 - APARTEMENTS   | 1.2 p/unit = 100                  | 100 (UNDERGROUND)     |
| VISITOR:            | 0.2 p/unit = 17                   | 17 (UNDERGROUND)      |
| N79 - RETAIL STORE: | 3.4 p/100 m <sup>2</sup> GFA = 32 | 32 (EXTERIOR)         |
| TOTAL:              |                                   | 150                   |
| BLOCK 18:           |                                   |                       |
| R12 - APARTEMENTS   | 1.2 p/unit = 116                  | 145 (UNDERGROUND)     |
| VISITOR:            | 0.2 p/unit = 17                   | 17 (8 EXT. + 12 UND.) |
| TOTAL:              |                                   | 162                   |

|                            |                      |
|----------------------------|----------------------|
| GROSS FLOOR AREA           |                      |
| TOWNHOUSE A:               | 267 m <sup>2</sup>   |
| TOWNHOUSE B:               | 239 m <sup>2</sup>   |
| TOWNHOUSE C:               | 232 m <sup>2</sup>   |
| TOWNHOUSE C (CORNER UNIT): | 236 m <sup>2</sup>   |
| TOWNHOUSE D:               | 225 m <sup>2</sup>   |
| TOTAL MODEL 01 (ABBBBBA)   | 1,968 m <sup>2</sup> |
| TOTAL MODEL 02 (ABBBBBA)   | 1,729 m <sup>2</sup> |
| TOTAL MODEL 03 (ABBBBA)    | 1,490 m <sup>2</sup> |
| TOTAL MODEL 04 (CCDCDC)    | 1,611 m <sup>2</sup> |
| TOTAL MODEL 05 (CCDCDC)    | 1,386 m <sup>2</sup> |

|                                                         |                             |
|---------------------------------------------------------|-----------------------------|
| MIXED USE BUILDING (TOTAL OF 2 BUILDINGS):              | TOTAL: 4,130 m <sup>2</sup> |
| RESIDENTIAL:                                            | 3,201 m <sup>2</sup>        |
| COMMERCIAL:                                             | 929 m <sup>2</sup>          |
| RESIDENTIAL APARTMENT BUILDING (TOTAL OF 4 BUILDINGS) : | TOTAL: 4,130 m <sup>2</sup> |
| RESIDENTIAL:                                            | 4,130 m <sup>2</sup>        |

NOTE

1. ASSUMES TYPICAL RESIDENTIAL FLOOR HEIGHT OF 3m.
2. THE BASE PLAN (LOT LINES, EXISTING ROADS AND SURROUNDING AREAS) IS BASED ON THE TOPOGRAPHICAL PLAN OF SURVEY, SURVEYED STANTEC GEOMATICS LTD.
3. DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.



20 0 20 40m

1 2983, NAVAN ROAD - SITE PLAN  
1:500



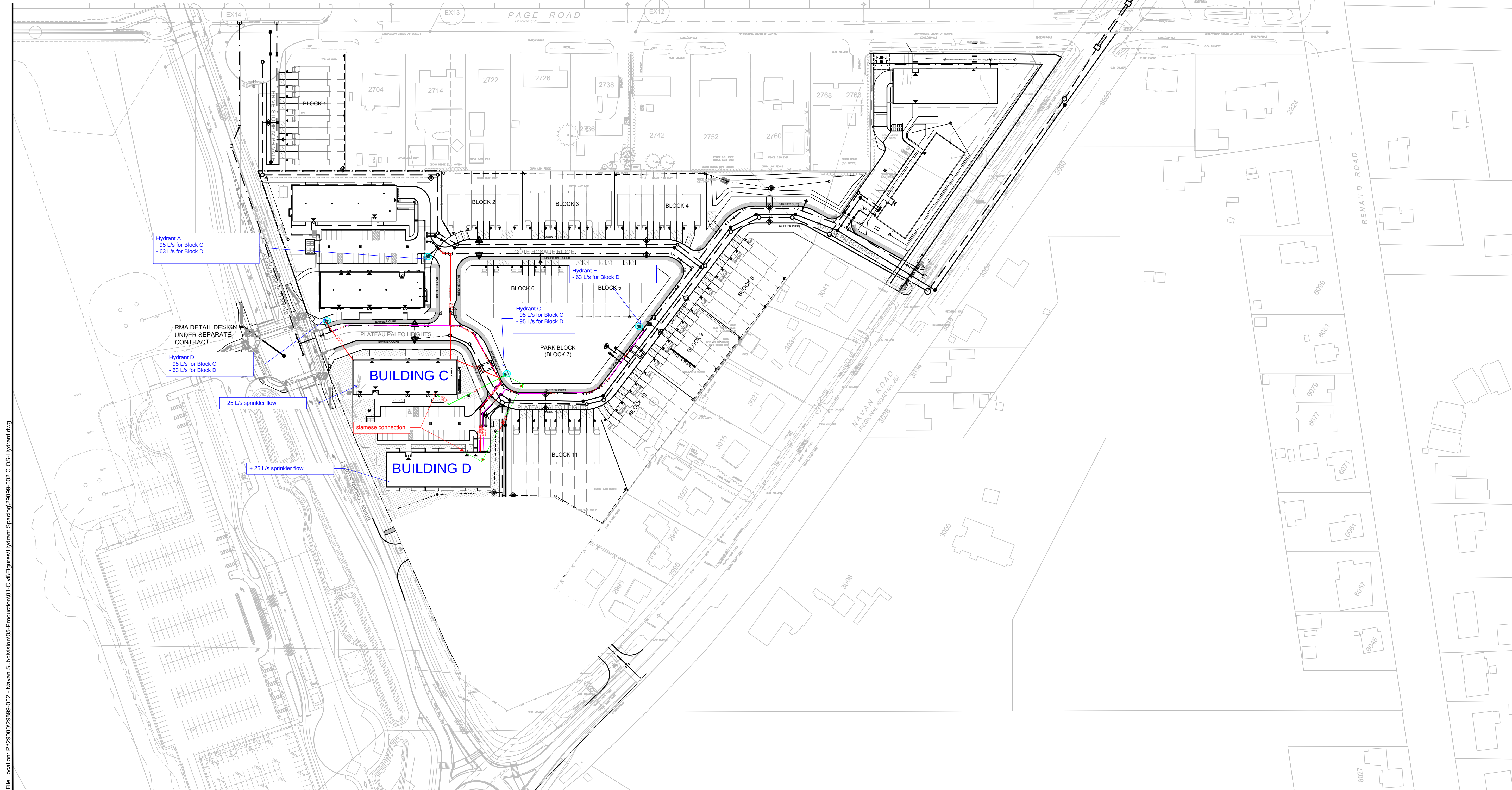
| Table 1. Maximum flow to be considered from a given hydrant |                                                       |                                                         |
|-------------------------------------------------------------|-------------------------------------------------------|---------------------------------------------------------|
| Hydrant Class                                               | Distance to asset/structure/building (m) <sup>a</sup> | Contribution to required fire flow (L/min) <sup>b</sup> |
| AA                                                          | ≤ 75                                                  | 5,700                                                   |
|                                                             | > 75 and ≤ 150                                        | 3,800                                                   |
| A                                                           | ≤ 75                                                  | 3,800                                                   |
|                                                             | > 75 and ≤ 150                                        | 2,850                                                   |
| B                                                           | ≤ 75                                                  | 1,900                                                   |
|                                                             | > 75 and ≤ 150                                        | 1,500                                                   |
| C                                                           | ≤ 75                                                  | 800                                                     |
|                                                             | > 75 and ≤ 150                                        | 800                                                     |

<sup>a</sup> Distance of contributing hydrant from the structure, measured in accordance with NFPA 1 (Appendix A).

<sup>b</sup> Maximum flow contribution to be considered for a given asset/structure/building, at a residual pressure of 20 psi, measured at the location of the main, at ground level.

Block 15

Required Fire Flow Building C = 200 L/s (  
Required Fire Flow Building D = 233 L/s



KEY PLAN  
N.T.S.

LEGEND

PROPOSED WATERMAIN, VALVE & HYDRANT

EXISTING WATERMAIN, VALVE & HYDRANT

EXISTING SANITARY SEWER & MANHOLE

EXISTING STORM SEWER & MANHOLE

PROPOSED SANITARY SEWER & MANHOLE

PROPOSED STORM SEWER & MANHOLE

STEPPED FOOTING

FIREWALL

PROPOSED CULVERT

DRAWING NUMBER

RIP-RAP TO OPSD 810.010 (TYPE B)

EXISTING CATCH BASIN

PROPOSED CATCH BASIN c/w ICD

PROPOSED CATCH BASIN & LEAD

PROPOSED TEE CATCH BASIN

PROPOSED S-WAY CATCH BASIN

CONC. SIDEWALK

ASPHALT

INFILTRATION TRENCH

TACTILE WALKING SURFACE INDICATOR (TWSI)

SPEED HUMP PER CITY DETAIL R19

Draft Print

04 2024-07-24 8:39:38 AM 04/03/24

03 RE-ISSUED TO CITY FOR ENGINEERING REVIEW (SECOND SUBMISSION) 16/02/24

02 ISSUED FOR MUNICIPAL CONSENT 09/02/24

01 ISSUED TO CITY FOR ENGINEERING REVIEW 22/09/23

No. ISSUE / REVISION DDMMYY

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SCALE: 1:1000

CLIENT:

Heafey GROUP

CONSULTANT:

www.jlrichards.ca

J.L. Richards ENGINEERS - ARCHITECTS - PLANNERS

CONSULTANT:

PROFESSIONAL STAMP PROJECT NORTH

PROJECT:

NAVAN SUBDIVISION

2983, 3053, & 3079 NAVAN ROAD & 2690 PAGE ROAD OTTAWA, ONTARIO

DRAWING:

OVERALL SERVICING

DESIGN: TR

DRAWN: KT

CHECKED: KF

JLR #: 29899-002

DRAWING #:

OS



## William Rugamba

---

**From:** William Rugamba  
**Sent:** July 22, 2024 8:18 AM  
**To:** William Rugamba  
**Subject:** FW: Re-confirmation of Mechanical Items for Servicing Report

**William Rugamba**, M.Eng., B.A.Sc., EIT  
Civil Engineering Graduate  
Ottawa, ON  
Work: [343-804-4374](tel:343-804-4374)

---

**From:** Sarith Lopez <[slopez@qmeengineering.com](mailto:slopez@qmeengineering.com)>  
**Sent:** Wednesday, July 17, 2024 8:07 PM  
**To:** Mahad Musse <[mmusse@jlrichards.ca](mailto:mmusse@jlrichards.ca)>; Chuck Clark <[CWC@qmeengineering.com](mailto:CWC@qmeengineering.com)>  
**Cc:** Karla Ferrey <[kferrey@jlrichards.ca](mailto:kferrey@jlrichards.ca)>; Raad Akrawi <[rakrawi@groupeheafey.com](mailto:rakrawi@groupeheafey.com)>; Carmine Zayoun <[carmine@zayoungroup.com](mailto:carmine@zayoungroup.com)>  
**Subject:** RE: Re-confirmation of Mechanical Items for Servicing Report

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Hi Mahad,

All items below confirmed

Regards

Sarith López  
Project Manager

9 Gurdwara Road, Unit 200  
Ottawa, ON K2E 7X6  
T: 613-366-4763 ext. 129  
slopez@qmeengineering.com



---

**From:** Mahad Musse <[mmusse@jlrichards.ca](mailto:mmusse@jlrichards.ca)>

**Sent:** Tuesday, July 16, 2024 3:08 PM

**To:** Sarith Lopez <[slopez@qmeengineering.com](mailto:slopez@qmeengineering.com)>; Chuck Clark <[CWC@qmeengineering.com](mailto:CWC@qmeengineering.com)>

**Cc:** Karla Ferrey <[kferrey@jlrichards.ca](mailto:kferrey@jlrichards.ca)>; Raad Akrawi <[rakrawi@groupeheafey.com](mailto:rakrawi@groupeheafey.com)>; Carmine Zayoun <[carmine@zayoungroup.com](mailto:carmine@zayoungroup.com)>

**Subject:** Re-confirmation of Mechanical Items for Servicing Report

Hi Sarith/Chuck,

Thank you for the information below and in our meetings. I understand all these items have been discussed before but we need to submit something as part of our report. Can you just re-confirm the following questions below and then we will attach your confirmation to the Report.

1. Please confirm that the sanitary service size of 200mm diameter for the Site Plan Blocks (Block 14, 15 and 17) is preferred by the mechanical engineer on file;
2. Please confirm that a sprinkler flow of 25 L/s can be assumed for the Site Plan Blocks (Block 14, 15 and 17) at this stage.

Thanks  
Mahad



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

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

Work: [343-633-1501](tel:343-633-1501)  
[mmusse@jlrichards.ca](mailto:mmusse@jlrichards.ca)



## 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](tel:343-804-4374)

---

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

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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)

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Email: [alex.polyak@ottawa.ca](mailto:alex.polyak@ottawa.ca)  
Cell : 613-857-4380  
[www.Ottawa.ca](http://www.Ottawa.ca)



---

**From:** Mahad Musse <[mmusse@jlrichards.ca](mailto:mmusse@jlrichards.ca)>

**Sent:** July 12, 2024 1:31 PM

**To:** Polyak, Alex <[alex.polyak@ottawa.ca](mailto:alex.polyak@ottawa.ca)>

**Cc:** Karla Ferrey <[kferrey@jlrichards.ca](mailto:kferrey@jlrichards.ca)>; Raad Akrawi <[rakrawi@groupeheafey.com](mailto:rakrawi@groupeheafey.com)>; Carmine Zayoun <[carmine@zayoungroup.com](mailto:carmine@zayoungroup.com)>; Armstrong, Justin <[justin.armstrong@ottawa.ca](mailto:justin.armstrong@ottawa.ca)>; Tatyana Roumie <[troumie@jlrichards.ca](mailto:troumie@jlrichards.ca)>

**Subject:** RE: Navan Subdivision - Boundary Condition Request

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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](tel:343-633-1501)  
[mmusse@jlrichards.ca](mailto:mmusse@jlrichards.ca)

---

**From:** Mahad Musse <[mmusse@jlrichards.ca](mailto:mmusse@jlrichards.ca)>

**Sent:** Wednesday, July 3, 2024 11:02 AM

**To:** Polyak, Alex <[alex.polyak@ottawa.ca](mailto:alex.polyak@ottawa.ca)>

**Cc:** Karla Ferrey <[kferrey@jlrichards.ca](mailto:kferrey@jlrichards.ca)>; Raad Akrawi <[rakrawi@groupeheafey.com](mailto:rakrawi@groupeheafey.com)>; Carmine Zayoun <[carmine@zayoungroup.com](mailto:carmine@zayoungroup.com)>; Armstrong, Justin <[justin.armstrong@ottawa.ca](mailto:justin.armstrong@ottawa.ca)>; Tatyana Roumie <[troumie@jlrichards.ca](mailto: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](tel:343-633-1501)  
[mmusse@jlrichards.ca](mailto:mmusse@jlrichards.ca)

---

**From:** Polyak, Alex <[alex.polyak@ottawa.ca](mailto:alex.polyak@ottawa.ca)>

**Sent:** Thursday, August 17, 2023 3:01 PM

**To:** William Rugamba <[wrugamba@jlrichards.ca](mailto:wrugamba@jlrichards.ca)>

**Cc:** Karla Ferrey <[kferrey@jlrichards.ca](mailto:kferrey@jlrichards.ca)>; Raad Akrawi <[rakrawi@groupeheafey.com](mailto:rakrawi@groupeheafey.com)>; Carmine Zayoun <[carmine@zayoungroup.com](mailto:carmine@zayoungroup.com)>; Shahira Jalal <[sjalal@jlrichards.ca](mailto:sjalal@jlrichards.ca)>

**Subject:** RE: Navan Subdivision - Boundary Condition Request

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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

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Email: [alex.polyak@ottawa.ca](mailto:alex.polyak@ottawa.ca)  
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[www.Ottawa.ca](http://www.Ottawa.ca)



---

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

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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



---

**From:** Tatyana Roumie  
**Sent:** Tuesday, July 25, 2023 3:53 PM  
**To:** 'alex.polyak@ottawa.ca' <[alex.polyak@ottawa.ca](mailto:alex.polyak@ottawa.ca)>  
**Cc:** Karla Ferrey <[kferrey@jlrichards.ca](mailto:kferrey@jlrichards.ca)>; Raad Akrawi <[rakrawi@groupeheafey.com](mailto:rakrawi@groupeheafey.com)>; [carmine@zayoungroup.com](mailto:carmine@zayoungroup.com); Shahira Jalal <[sjalal@jlrichards.ca](mailto: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

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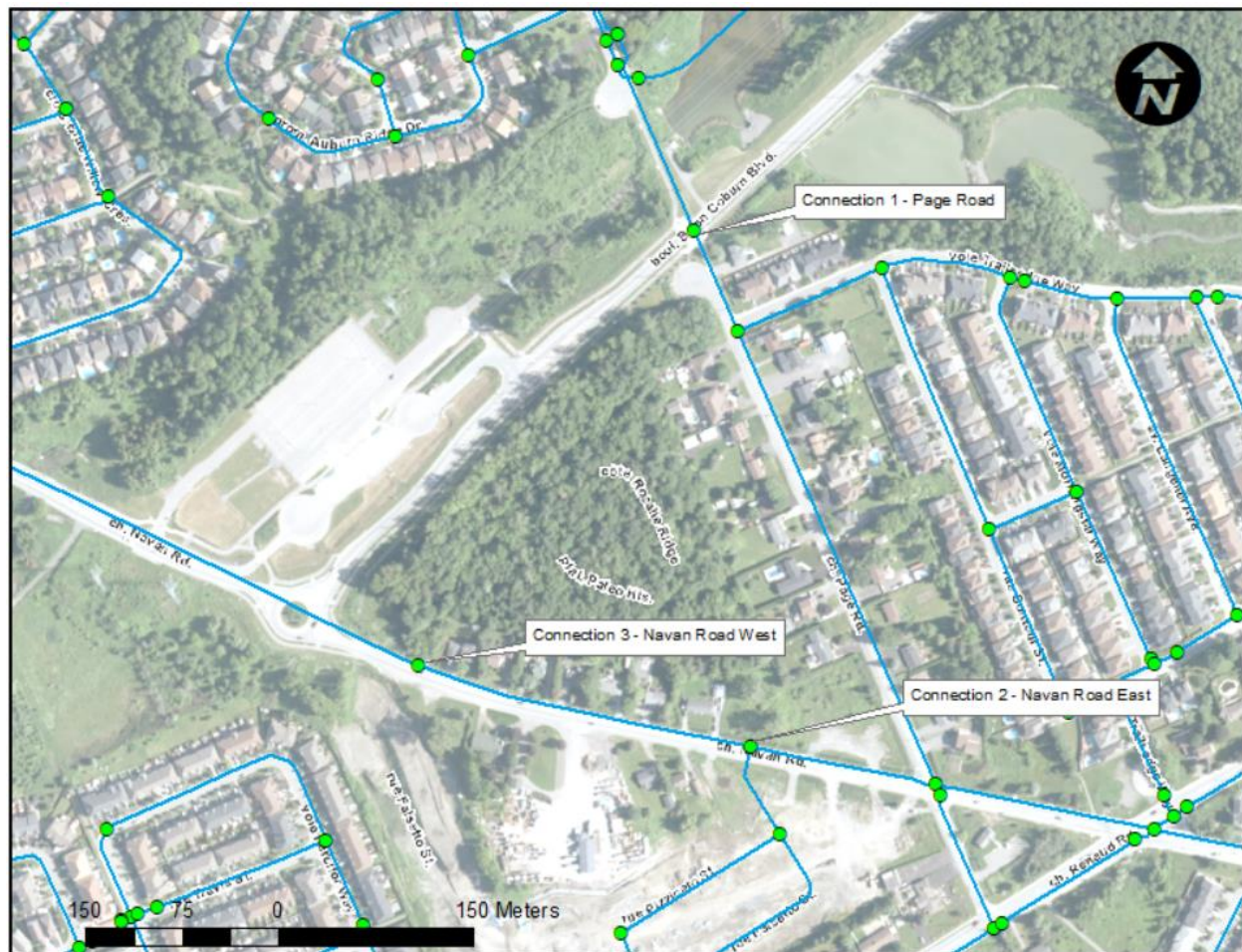
'

## 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**

| <b>Demand Scenario</b>    | <b>Head (m)</b> | <b>Pressure<sup>1</sup> (psi)</b> |
|---------------------------|-----------------|-----------------------------------|
| 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                              |

<sup>1</sup> Ground Elevation = 85.7 m

### **Connection 2 - Navan Road East**

| <b>Demand Scenario</b>    | <b>Head (m)</b> | <b>Pressure<sup>1</sup> (psi)</b> |
|---------------------------|-----------------|-----------------------------------|
| 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                              |

<sup>1</sup> Ground Elevation = 80.5 m

### **Connection 3 - Navan Road West**

| <b>Demand Scenario</b>    | <b>Head (m)</b> | <b>Pressure<sup>1</sup> (psi)</b> |
|---------------------------|-----------------|-----------------------------------|
| 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                              |

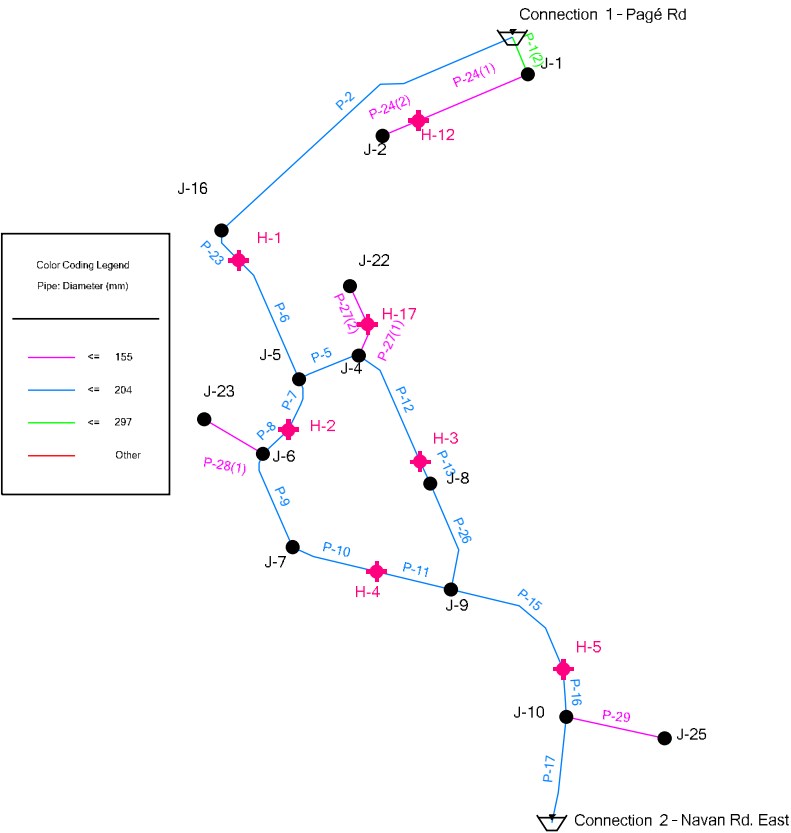
<sup>1</sup> Ground Elevation = 81.9 m

## **Disclaimer**

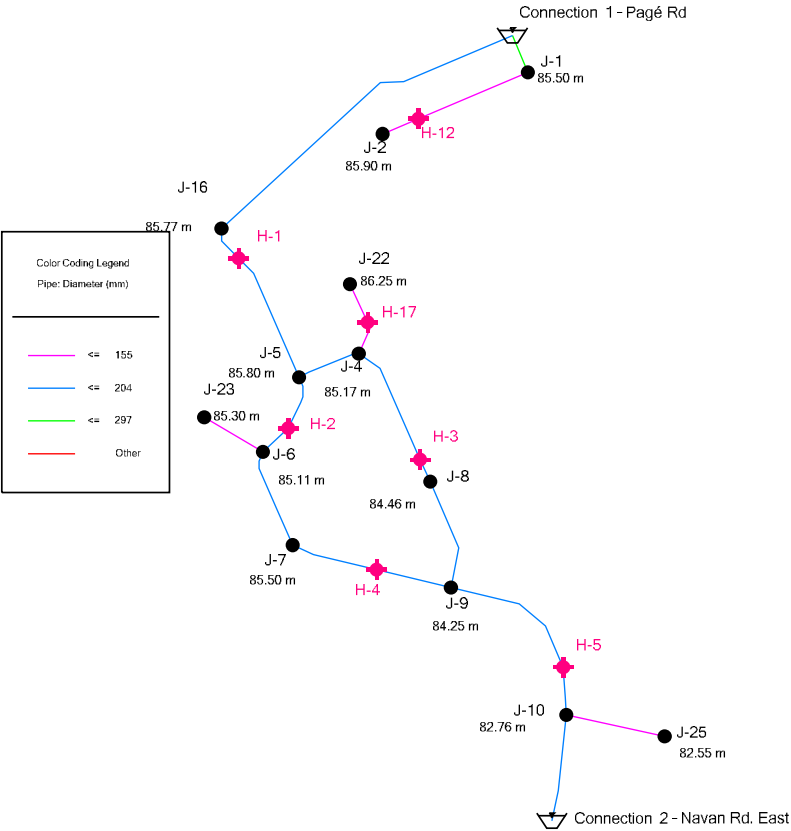
*The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermain 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.*



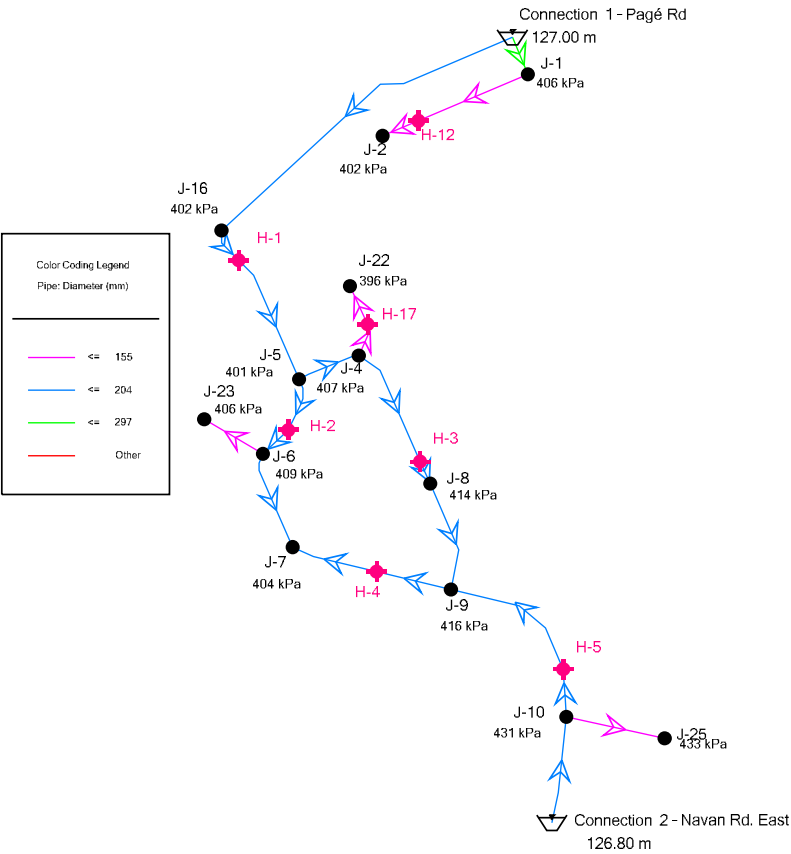
Mixed-Use Site Plan (Block 15)  
Model Schematic



Mixed-Use Site Plan (Block 15)  
Model Schematic  
Elevation Model



Mixed-Use Site Plan (Block 15)  
Peak Hour Demand





**Mixed-Use Site Plan (Block 15)**  
**Peak Hour Demand**  
**Junction Table**

| Label | Elevation<br>(m) | Demand<br>(L/s) | Hydraulic Grade<br>(m) | Pressure<br>(kPa) |
|-------|------------------|-----------------|------------------------|-------------------|
| J-22  | 86.25            | 2.78            | 126.76                 | 396               |
| J-5   | 85.80            | 0.00            | 126.78                 | 401               |
| J-16  | 85.77            | 0.00            | 126.85                 | 402               |
| J-2   | 85.90            | 0.58            | 127.00                 | 402               |
| J-7   | 85.50            | 4.95            | 126.77                 | 404               |
| J-23  | 85.30            | 2.74            | 126.76                 | 406               |
| J-1   | 85.50            | 0.00            | 127.00                 | 406               |
| J-4   | 85.17            | 0.00            | 126.78                 | 407               |
| J-6   | 85.03            | 0.00            | 126.77                 | 409               |
| J-8   | 84.46            | 1.90            | 126.77                 | 414               |
| J-9   | 84.25            | 1.46            | 126.77                 | 416               |
| J-10  | 82.76            | 0.00            | 126.78                 | 431               |
| J-25  | 82.55            | 3.08            | 126.76                 | 433               |

## Mixed-Use Site Plan (Block 15)

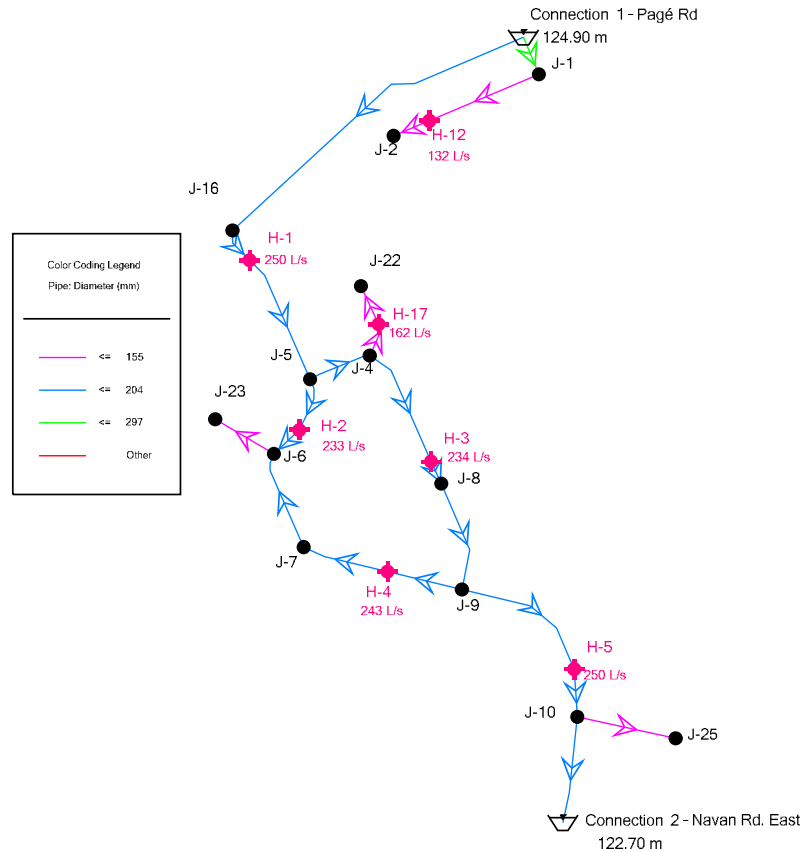
### Peak Hour Demand

#### Pipe Table

| ID  | Label   | Length<br>(Scaled)<br>(m) | Diameter<br>(mm) | Material | Hazen-Williams<br>C | Flow<br>(L/s) | Velocity<br>(m/s) |
|-----|---------|---------------------------|------------------|----------|---------------------|---------------|-------------------|
| 49  | P-2     | 168                       | 204              | PVC      | 110.0               | 10            | 0.32              |
| 52  | P-5     | 31                        | 204              | PVC      | 110.0               | -5            | 0.15              |
| 82  | P-6     | 64                        | 204              | PVC      | 110.0               | -10           | 0.32              |
| 85  | P-7     | 26                        | 204              | PVC      | 110.0               | 5             | 0.17              |
| 86  | P-8     | 16                        | 204              | PVC      | 110.0               | 5             | 0.17              |
| 54  | P-9     | 48                        | 204              | PVC      | 110.0               | 3             | 0.08              |
| 91  | P-10    | 41                        | 204              | PVC      | 110.0               | -2            | 0.07              |
| 92  | P-11    | 36                        | 204              | PVC      | 110.0               | -2            | 0.07              |
| 104 | P-12    | 59                        | 204              | PVC      | 110.0               | 2             | 0.07              |
| 105 | P-13    | 11                        | 204              | PVC      | 110.0               | 2             | 0.07              |
| 108 | P-15    | 70                        | 204              | PVC      | 110.0               | -3            | 0.10              |
| 109 | P-16    | 23                        | 204              | PVC      | 110.0               | -3            | 0.10              |
| 97  | P-17    | 50                        | 204              | PVC      | 110.0               | -6            | 0.20              |
| 110 | P-23    | 17                        | 204              | PVC      | 110.0               | 10            | 0.32              |
| 129 | P-24(1) | 56                        | 155              | PVC      | 100.0               | 1             | 0.03              |
| 130 | P-24(2) | 18                        | 155              | PVC      | 100.0               | 1             | 0.03              |
| 123 | P-26    | 53                        | 204              | PVC      | 110.0               | 0             | 0.01              |
| 154 | P-27(1) | 16                        | 155              | PVC      | 100.0               | 3             | 0.15              |
| 155 | P-27(2) | 20                        | 155              | PVC      | 100.0               | 3             | 0.15              |
| 171 | P-28(1) | 32                        | 155              | PVC      | 100.0               | 3             | 0.15              |
| 183 | P-29    | 47                        | 155              | PVC      | 100.0               | 3             | 0.16              |

# Mixed-Use Site Plan (Block 15)

## Max Day + Fire Flow Requirement

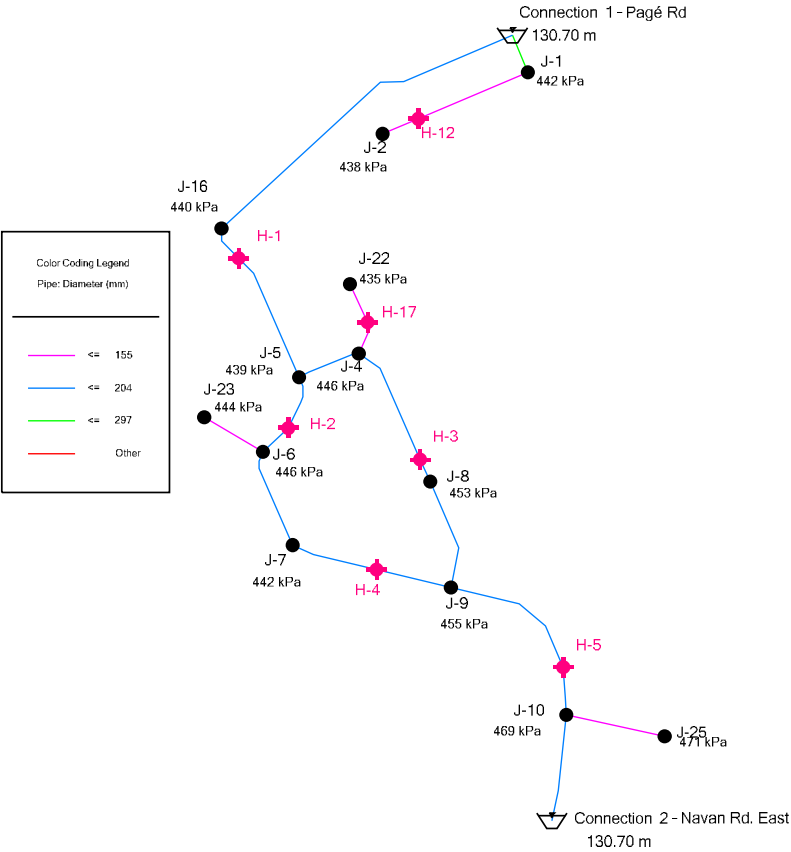




**Mixed-Use Site Plan (Block 15)**  
**Max Day + Fire Flow Requirement**  
**Hydrant Table**

| 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-1   | True                             | 250                         | 250                          | 140                                   | 152                                  | 178                                            | J-16                                  |
| H-2   | True                             | 233                         | 233                          | 140                                   | 140                                  | 142                                            | J-23                                  |
| H-4   | True                             | 243                         | 243                          | 140                                   | 140                                  | 142                                            | J-7                                   |
| H-3   | True                             | 234                         | 234                          | 140                                   | 140                                  | 158                                            | J-8                                   |
| H-5   | True                             | 250                         | 250                          | 140                                   | 256                                  | 247                                            | J-23                                  |
| H-12  | True                             | 132                         | 132                          | 140                                   | 142                                  | 140                                            | J-2                                   |
| H-17  | True                             | 162                         | 162                          | 140                                   | 143                                  | 140                                            | J-22                                  |

Mixed-Use Site Plan (Block 15)  
Maximum Pressure Analysis



## Mixed-Use Site Plan (Block 15)

### Maximum Pressure Analysis

**Junction Table**

| Label | Elevation<br>(m) | Demand<br>(L/s) | Hydraulic Grade<br>(m) | Pressure<br>(kPa) |
|-------|------------------|-----------------|------------------------|-------------------|
| J-22  | 86.25            | 0               | 130.70                 | 435               |
| J-2   | 85.90            | 0               | 130.70                 | 438               |
| J-5   | 85.80            | 0               | 130.70                 | 439               |
| J-16  | 85.77            | 0               | 130.70                 | 440               |
| J-7   | 85.50            | 0               | 130.70                 | 442               |
| J-1   | 85.50            | 0               | 130.70                 | 442               |
| J-23  | 85.30            | 0               | 130.70                 | 444               |
| J-4   | 85.17            | 0               | 130.70                 | 446               |
| J-6   | 85.11            | 0               | 130.70                 | 446               |
| J-8   | 84.46            | 0               | 130.70                 | 453               |
| J-9   | 84.25            | 0               | 130.70                 | 455               |
| J-10  | 82.76            | 0               | 130.70                 | 469               |
| J-25  | 82.55            | 0               | 130.70                 | 471               |



## Mixed-Use Site Plan (Block 15)

### Maximum Pressure Analysis

**Pipe Table**

| ID  | Label   | Length<br>(Scaled)<br>(m) | Diameter<br>(mm) | Material | Hazen-Williams<br>C | Flow<br>(L/s) | Velocity<br>(m/s) |
|-----|---------|---------------------------|------------------|----------|---------------------|---------------|-------------------|
| 114 | P-1(2)  | 19                        | 297              | PVC      | 120.0               | 0             | 0.00              |
| 49  | P-2     | 168                       | 204              | PVC      | 110.0               | 0             | 0.00              |
| 52  | P-5     | 31                        | 204              | PVC      | 110.0               | 0             | 0.00              |
| 82  | P-6     | 64                        | 204              | PVC      | 110.0               | 0             | 0.00              |
| 85  | P-7     | 26                        | 204              | PVC      | 110.0               | 0             | 0.00              |
| 86  | P-8     | 16                        | 204              | PVC      | 110.0               | 0             | 0.00              |
| 54  | P-9     | 48                        | 204              | PVC      | 110.0               | 0             | 0.00              |
| 91  | P-10    | 41                        | 204              | PVC      | 110.0               | 0             | 0.00              |
| 92  | P-11    | 36                        | 204              | PVC      | 110.0               | 0             | 0.00              |
| 104 | P-12    | 59                        | 204              | PVC      | 110.0               | 0             | 0.00              |
| 105 | P-13    | 11                        | 204              | PVC      | 110.0               | 0             | 0.00              |
| 108 | P-15    | 70                        | 204              | PVC      | 110.0               | 0             | 0.00              |
| 109 | P-16    | 23                        | 204              | PVC      | 110.0               | 0             | 0.00              |
| 97  | P-17    | 50                        | 204              | PVC      | 110.0               | 0             | 0.00              |
| 110 | P-23    | 17                        | 204              | PVC      | 110.0               | 0             | 0.00              |
| 129 | P-24(1) | 56                        | 155              | PVC      | 100.0               | 0             | 0.00              |
| 130 | P-24(2) | 18                        | 155              | PVC      | 100.0               | 0             | 0.00              |
| 123 | P-26    | 53                        | 204              | PVC      | 110.0               | 0             | 0.00              |
| 154 | P-27(1) | 16                        | 155              | PVC      | 100.0               | 0             | 0.00              |
| 155 | P-27(2) | 20                        | 155              | PVC      | 100.0               | 0             | 0.00              |
| 171 | P-28(1) | 32                        | 155              | PVC      | 100.0               | 0             | 0.00              |
| 183 | P-29    | 47                        | 155              | PVC      | 100.0               | 0             | 0.00              |

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## **Appendix D**

Stormwater Management

**Notes on Peak Flow and Pipe Sizing**

(6) Peak flows are equal to the allowable release rate for Block 15 (43 L/s), gas station controlled flow (65.09 L/s), roadway controlled flow (23 L/s) and 26 L/s, year-ward controlled flow (12 L/s)

(7) Pipes are conservatively sized for 1.2 Year Peak Flow Rate

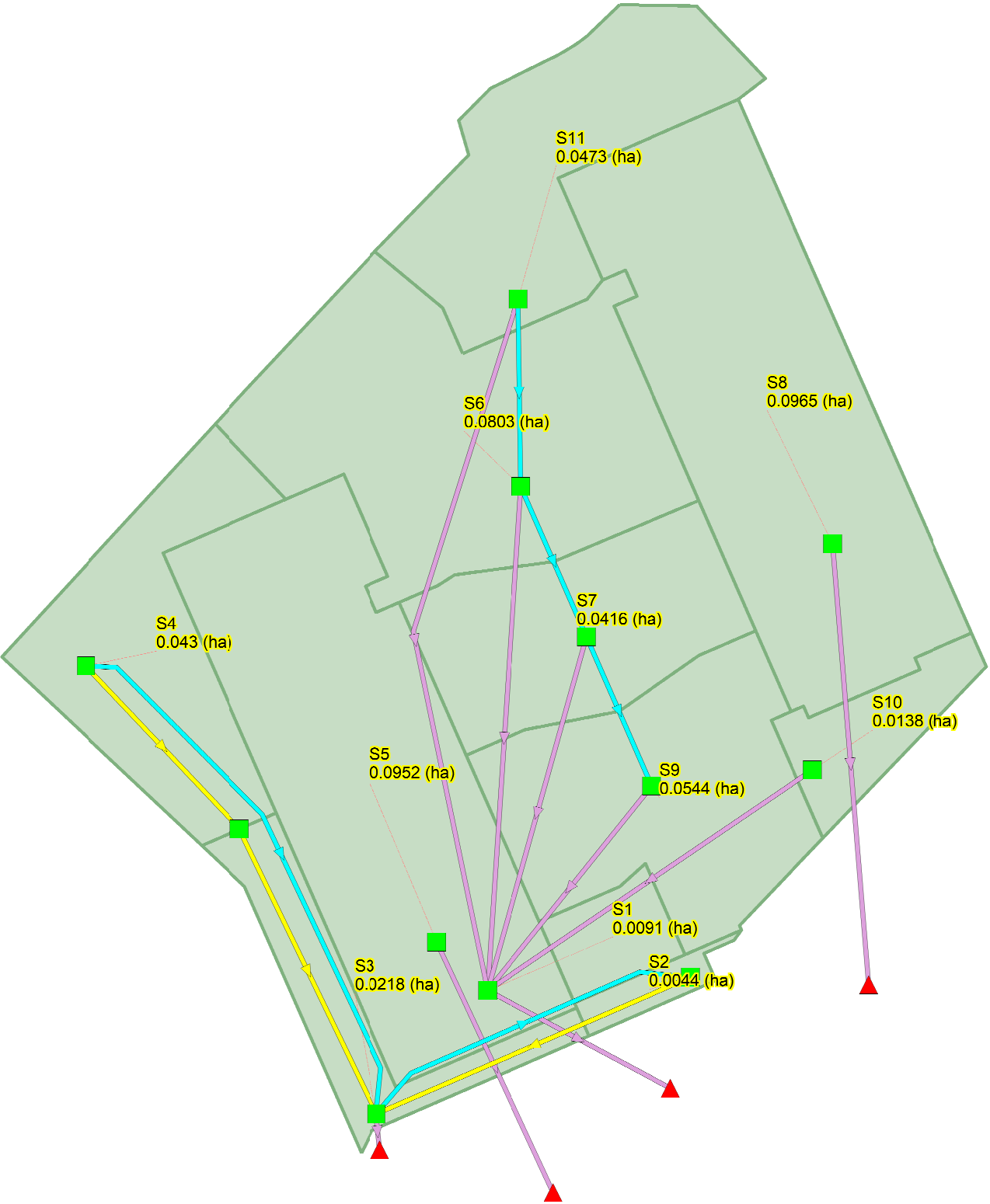
(8) Actual Velocities based on actual peak flows from Item 5

(9) Details from Existing Sewers Upstream of EXIST M9526 can be found within East Orleans Ridge Subdivision Design Sheet. This line is only used to carry over the upstream values for time of concentration and 1.2 year peak flow



| REAR YARD CATCH BASIN TABLE |  |  |  |  |  |  |  |  |  |
|-----------------------------|--|--|--|--|--|--|--|--|--|
|-----------------------------|--|--|--|--|--|--|--|--|--|

| Street Name | CB ID Number | T/G   | Inlet          |                 |       |        | Outlet         |                 |        | COVER (m) | 1:100 Yr Restricted Capture Rate (L/s) | CATCH BASIN TYPE                                | ICD TYPE      |
|-------------|--------------|-------|----------------|-----------------|-------|--------|----------------|-----------------|--------|-----------|----------------------------------------|-------------------------------------------------|---------------|
|             |              |       | Pipe Dia. (mm) | Pipe Length (m) | Slope | Invert | Pipe Dia. (mm) | Pipe Length (m) | Invert |           |                                        |                                                 |               |
| BLOCK 15    | CB113        | 85.15 | -              | -               | -     | -      | 150            | 31.32           | 83.55  | 1.45      | -                                      | -                                               | NO ICD        |
|             | CB110        | 85.30 | -              | -               | -     | -      | 150            | 20.47           | 83.75  | 1.40      | -                                      | -                                               | NO ICD        |
|             | CB111        | 85.60 | 150            | 20.47           | 0.8%  | 83.59  | 150            | 28.91           | 83.59  | 1.86      | -                                      | -                                               | NO ICD        |
|             | CB112 (NE)   | 85.20 | 150            | 31.32           | 0.6%  | 83.36  | 150            | 4.21            | 83.28  | 1.69      | 10.00                                  | 600 mm x 600 mm CATCH BASIN<br>PER OPSD 705.010 | Vortex_ICD_95 |
|             | CB112 (NW)   | 85.20 | 150            | 28.91           | 0.8%  | 83.34  |                |                 |        |           |                                        |                                                 |               |



Legend

- ▲ Outfalls
- Storages
- Conduits
- Weirs
- Outlets
- Subcatchments



150 m

|                                                                                                                                             |          |    |                          |
|---------------------------------------------------------------------------------------------------------------------------------------------|----------|----|--------------------------|
| PROJECT:<br>NAVAN RESIDENTIAL AND COMMERCIAL SITE PLAN - BLOCK 15<br>Ottawa, ON                                                             |          |    |                          |
| DRAWING:<br>Overall System Model Schematic                                                                                                  |          |    |                          |
| <br>J.L. Richards<br>ENGINEERS · ARCHITECTS · PLANNERS | DESIGN:  | ML | JLR NO.: 29899-002       |
|                                                                                                                                             | DRAWN:   | ML | DRAWING NO.:<br>Figure 1 |
|                                                                                                                                             | CHECKED: | BP |                          |

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Legend

IMPERVIOUSNESS

Landscaped Areas (C-Factor - 0.2)

Pavement Areas (C-Factor - 0.9)

|                                                                                                                                                |  |                                                                                                                                                                                                      |  |          |    |                              |           |
|------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------|----|------------------------------|-----------|
| PROJECT:                                                                                                                                       |  | NAVAN RESIDENTIAL AND COMMERCIAL BLOCK 15                                                                                                                                                            |  |          |    |                              |           |
|                                                                                                                                                |  | OTTAWA, ONTARIO                                                                                                                                                                                      |  |          |    |                              |           |
| DRAWING:                                                                                                                                       |  | OVERALL SITE IMPERVIOUSNESS                                                                                                                                                                          |  |          |    |                              |           |
|  <b>J.L.Richards</b><br>ENGINEERS · ARCHITECTS · PLANNERS |  | This drawing is copyright protected and may not be reproduced or used for purposes other than execution of the described work without express written consent of J.L. Richards & Associates Limited. |  | DESIGN:  | ML | JLR NO:                      | 29899-002 |
|                                                                                                                                                |  |                                                                                                                                                                                                      |  | DRAWN:   | ML | DRAWING NO:<br><b>Figure</b> |           |
|                                                                                                                                                |  |                                                                                                                                                                                                      |  | CHECKED: | BP |                              |           |

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

|                 |      |                                               |                   |            |              |             |          |
|-----------------|------|-----------------------------------------------|-------------------|------------|--------------|-------------|----------|
| C0              | 0.08 | CB111                                         | CB112             | 28.913     | 0.013        | 83.59       | 83.34    |
| C3              |      | CB113                                         | CB112             | 31.317     | 0.013        | 83.55       | 83.36    |
| C1              | 0.04 | CB110                                         |                   | 20.475     | 0.013        | 83.75       | 83.59    |
| C5              | 0.04 |                                               |                   |            |              |             |          |
| [WEIRS]         |      |                                               |                   |            |              |             |          |
| ;;Name          |      | From Node                                     | To Node           | Type       | CrestHt      | Qcoeff      | Gated    |
| EndCon          |      | EndCoeff                                      | Surcharge         | RoadWidth  | RoadSurf     | Coef. Curve |          |
| ;;              |      |                                               |                   |            |              |             |          |
| W1              |      | CB115                                         | CB116             | TRANSVERSE | 85.45        | 1.84        | NO       |
| W0              | 0    | NO                                            |                   |            |              |             |          |
| W2              | 0    | CB116                                         | CB117             | TRANSVERSE | 85.35        | 1.84        | NO       |
| W0              | 0    | NO                                            |                   |            |              |             |          |
| W3              | 0    | CB112                                         | CB113             | TRANSVERSE | 85.38        | 1.84        | NO       |
| W0              | 0    | NO                                            |                   |            |              |             |          |
| W4              | 0    | CB114                                         | CB115             | TRANSVERSE | 85.5         | 1.84        | NO       |
| W0              | 0    | NO                                            |                   |            |              |             |          |
| W5              | 0    | CB110                                         | CB112             | TRANSVERSE | 85.6         | 1.84        | NO       |
| W0              | 0    | NO                                            |                   |            |              |             |          |
| [OUTLETS]       |      |                                               |                   |            |              |             |          |
| ;;Name          |      | From Node                                     | To Node           | Offset     | Type         |             |          |
| QTable/Qcoeff   |      | Qexpon                                        | Gated             |            |              |             |          |
| ;;              |      |                                               |                   |            |              |             |          |
| C2              |      | CB112                                         | STUB16            | 83.28      | TABULAR/HEAD |             |          |
| Vortex_ICD_95   |      |                                               | NO                |            |              |             |          |
| 6NH             |      | CB115                                         | St_UnGrd          | 85.25      | TABULAR/HEAD | ZURN_Z150F- |          |
| OL2             |      | NO                                            |                   |            |              |             |          |
| 6NH             |      | CB116                                         | St_UnGrd          | 85.2       | TABULAR/HEAD | ZURN_Z150F- |          |
| OL3             |      | NO                                            |                   |            |              |             |          |
| 6NH             |      | CB117                                         | St_UnGrd          | 85.15      | TABULAR/HEAD | ZURN_Z150F- |          |
| OL4             |      | NO                                            |                   |            |              |             |          |
| NO              |      | Roof_1                                        | STUB15            | 96.35      | TABULAR/HEAD | O_Roof1     |          |
| OL5             |      | Roof_2                                        | OF4               | 96.35      | TABULAR/HEAD | O_Roof1     |          |
| NO              |      |                                               |                   |            |              |             |          |
| OL6             |      | CB114                                         | St_UnGrd          | 85.3       | TABULAR/HEAD | ZURN_Z150F- |          |
| 6NH             |      | NO                                            |                   |            |              |             |          |
| OL7             |      | St_UnGrd                                      | OF7               | 81.8       | TABULAR/HEAD | O_St_UnGrd  |          |
| NO              |      |                                               |                   |            |              |             |          |
| OL8             |      | CB118                                         | St_UnGrd          | 85.22      | TABULAR/HEAD | ZURN_Z150F- |          |
| 6NH             |      | NO                                            |                   |            |              |             |          |
| [XSECTIONS]     |      |                                               |                   |            |              |             |          |
| ;;Link          |      | Shape                                         | Geom1             | Geom2      | Geom3        | Geom4       | Barrels  |
| Culvert         |      |                                               |                   |            |              |             |          |
| ;;              |      |                                               |                   |            |              |             |          |
| C1              |      | CIRCULAR                                      | 0.15              | 0          | 0            | 0           | 1        |
| C3              |      | CIRCULAR                                      | 0.15              | 0          | 0            | 0           | 1        |
| C5              |      | CIRCULAR                                      | 0.15              | 0          | 0            | 0           | 1        |
| W1              |      | RECT_OPEN                                     | 0.11              | 17.1       | 0            | 0           |          |
| W2              |      | RECT_OPEN                                     | 0.25              | 17.1       | 0            | 0           |          |
| W3              |      | RECT_OPEN                                     | 0.02              | 4.58       | 0            | 0           |          |
| W4              |      | RECT_OPEN                                     | 0.05              | 7          | 0            | 0           |          |
| W5              |      | RECT_OPEN                                     | 0.05              | 3.487      | 0            | 0           |          |
| [LOSSES]        |      |                                               |                   |            |              |             |          |
| ;;Link          |      | Kentry                                        | Kexit             | Kavg       | Flap Gate    | Seepage     |          |
| ;;              |      |                                               |                   |            |              |             |          |
| [INFLOWS]       |      |                                               |                   |            |              |             |          |
| ;;Node          |      | Constituent                                   | Time Series       | Type       | Mfactor      | Sfactor     | Baseline |
| Pattern         |      |                                               |                   |            |              |             |          |
| ;;              |      |                                               |                   |            |              |             |          |
| St_UnGrd        |      | FLOW                                          | InfiltratedInflow | FLOW       | 1.0          | 1           | 0        |
| [CURVES]        |      |                                               |                   |            |              |             |          |
| ;;Name          |      | Type                                          | X-Value           | Y-Value    |              |             |          |
| ;Tempest Rating |      |                                               |                   |            |              |             |          |
| MHF_IPEX_TYPE_A |      | Curve for MHF_IPEX_TYPE_A, No grate allowance |                   |            |              |             |          |
| Rating          |      |                                               | 0                 | 0          |              |             |          |
| MHF_IPEX_TYPE_A |      |                                               | 0.1               | 0.0057     |              |             |          |
| MHF_IPEX_TYPE_A |      |                                               | 0.2               | 0.0081     |              |             |          |
| MHF_IPEX_TYPE_A |      |                                               | 0.3               | 0.0099     |              |             |          |
| MHF_IPEX_TYPE_A |      |                                               | 0.4               | 0.0114     |              |             |          |
| MHF_IPEX_TYPE_A |      |                                               | 0.5               | 0.0128     |              |             |          |
| MHF_IPEX_TYPE_A |      |                                               | 0.6               | 0.014      |              |             |          |
| MHF_IPEX_TYPE_A |      |                                               | 0.7               | 0.0151     |              |             |          |
| MHF_IPEX_TYPE_A |      |                                               | 0.8               | 0.0162     |              |             |          |
| MHF_IPEX_TYPE_A |      |                                               | 0.9               | 0.0172     |              |             |          |
| MHF_IPEX_TYPE_A |      |                                               | 1                 | 0.0181     |              |             |          |
| MHF_IPEX_TYPE_A |      |                                               | 1.2               | 0.0198     |              |             |          |
| MHF_IPEX_TYPE_A |      |                                               | 1.4               | 0.0214     |              |             |          |
| MHF_IPEX_TYPE_A |      |                                               | 1.6               | 0.0229     |              |             |          |
| MHF_IPEX_TYPE_A |      |                                               | 1.8               | 0.0243     |              |             |          |
| MHF_IPEX_TYPE_A |      |                                               | 2                 | 0.0256     |              |             |          |
| MHF_IPEX_TYPE_A |      |                                               | 2.5               | 0.0286     |              |             |          |
| MHF_IPEX_TYPE_A |      |                                               | 3                 | 0.0313     |              |             |          |
| ;Tempest Rating |      |                                               |                   |            |              |             |          |
| MHF_IPEX_TYPE_B |      | Curve for MHF_IPEX_TYPE_B, No grate allowance |                   |            |              |             |          |
| Rating          |      |                                               | 0                 | 0          |              |             |          |
| MHF_IPEX_TYPE_B |      |                                               | 0.1               | 0.0081     |              |             |          |
| MHF_IPEX_TYPE_B |      |                                               | 0.2               | 0.0115     |              |             |          |
| MHF_IPEX_TYPE_B |      |                                               | 0.3               | 0.0141     |              |             |          |
| MHF_IPEX_TYPE_B |      |                                               | 0.4               | 0.0162     |              |             |          |
| MHF_IPEX_TYPE_B |      |                                               | 0.5               | 0.0182     |              |             |          |
| MHF_IPEX_TYPE_B |      |                                               | 0.6               | 0.0199     |              |             |          |
| MHF_IPEX_TYPE_B |      |                                               | 0.7               | 0.0215     |              |             |          |
| MHF_IPEX_TYPE_B |      |                                               | 0.8               | 0.023      |              |             |          |
| MHF_IPEX_TYPE_B |      |                                               | 0.9               | 0.0244     |              |             |          |
| MHF_IPEX_TYPE_B |      |                                               | 1                 | 0.0257     |              |             |          |
| MHF_IPEX_TYPE_B |      |                                               | 1.2               | 0.0281     |              |             |          |
| MHF_IPEX_TYPE_B |      |                                               | 1.4               | 0.0304     |              |             |          |
| MHF_IPEX_TYPE_B |      |                                               | 1.6               | 0.0325     |              |             |          |
| MHF_IPEX_TYPE_B |      |                                               | 1.8               | 0.0344     |              |             |          |
| MHF_IPEX_TYPE_B |      |                                               | 2                 | 0.0363     |              |             |          |
| MHF_IPEX_TYPE_B |      |                                               | 2.5               | 0.0406     |              |             |          |
| MHF_IPEX_TYPE_B |      |                                               | 3                 | 0.0445     |              |             |          |
| ;Tempest Rating |      |                                               |                   |            |              |             |          |
| MHF_IPEX_TYPE_C |      | Curve for MHF_IPEX_TYPE_C, No grate allowance |                   |            |              |             |          |
| Rating          |      |                                               | 0                 | 0          |              |             |          |
| MHF_IPEX_TYPE_C |      |                                               | 0.1               | 0.0106     |              |             |          |
| MHF_IPEX_TYPE_C |      |                                               | 0.2               | 0.015      |              |             |          |
| MHF_IPEX_TYPE_C |      |                                               | 0.3               | 0.0183     |              |             |          |
| MHF_IPEX_TYPE_C |      |                                               | 0.4               | 0.0212     |              |             |          |
| MHF_IPEX_TYPE_C |      |                                               | 0.5               | 0.0237     |              |             |          |
| MHF_IPEX_TYPE_C |      |                                               | 0.6               | 0.0259     |              |             |          |
| MHF_IPEX_TYPE_C |      |                                               | 0.7               | 0.028      |              |             |          |
| MHF_IPEX_TYPE_C |      |                                               | 0.8               | 0.0299     |              |             |          |
| MHF_IPEX_TYPE_C |      |                                               | 0.9               | 0.0317     |              |             |          |
| MHF_IPEX_TYPE_C |      |                                               | 1                 | 0.0335     |              |             |          |
| MHF_IPEX_TYPE_C |      |                                               | 1.2               | 0.0366     |              |             |          |
| MHF_IPEX_TYPE_C |      |                                               | 1.4               | 0.0396     |              |             |          |
| MHF_IPEX_TYPE_C |      |                                               | 1.6               | 0.0423     |              |             |          |
| MHF_IPEX_TYPE_C |      |                                               | 1.8               | 0.0449     |              |             |          |
| MHF_IPEX_TYPE_C |      |                                               | 2                 | 0.0473     |              |             |          |
| MHF_IPEX_TYPE_C |      |                                               | 2.5               | 0.0529     |              |             |          |
| MHF_IPEX_TYPE_C |      |                                               | 3                 | 0.0579     |              |             |          |
| ;Tempest Rating |      |                                               |                   |            |              |             |          |
| MHF_IPEX_TYPE_D |      | Curve for MHF_IPEX_TYPE_D, No grate allowance |                   |            |              |             |          |
| Rating          |      |                                               | 0                 | 0          |              |             |          |
| MHF_IPEX_TYPE_D |      |                                               | 0.1               | 0.0154     |              |             |          |
| MHF_IPEX_TYPE_D |      |                                               | 0.2               | 0.0217     |              |             |          |
| MHF_IPEX_TYPE_D |      |                                               | 0.3               | 0.0266     |              |             |          |
| MHF_IPEX_TYPE_D |      |                                               | 0.4               | 0.0307     |              |             |          |
| MHF_IPEX_TYPE_D |      |                                               | 0.5               | 0.0343     |              |             |          |
| MHF_IPEX_TYPE_D |      |                                               | 0.6               | 0.0376     |              |             |          |
| MHF_IPEX_TYPE_D |      |                                               | 0.7               | 0.0406     |              |             |          |
| MHF_IPEX_TYPE_D |      |                                               | 0.8               | 0.0434     |              |             |          |



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

|                                                               |        |        |               |     |        |
|---------------------------------------------------------------|--------|--------|---------------|-----|--------|
| MHF_IPEX_TYPE_D                                               | 0.9    | 0.0461 | Vortex_ICD_55 | 0.6 | 0.0021 |
| MHF_IPEX_TYPE_D                                               | 1      | 0.0485 | Vortex_ICD_55 | 0.7 | 0.0023 |
| MHF_IPEX_TYPE_D                                               | 1.2    | 0.0532 | Vortex_ICD_55 | 0.8 | 0.0024 |
| MHF_IPEX_TYPE_D                                               | 1.4    | 0.0574 | Vortex_ICD_55 | 0.9 | 0.0026 |
| MHF_IPEX_TYPE_D                                               | 1.6    | 0.0614 | Vortex_ICD_55 | 1   | 0.0027 |
| MHF_IPEX_TYPE_D                                               | 1.8    | 0.0651 | Vortex_ICD_55 | 1.2 | 0.003  |
| MHF_IPEX_TYPE_D                                               | 2      | 0.0687 | Vortex_ICD_55 | 1.4 | 0.0032 |
| MHF_IPEX_TYPE_D                                               | 2.5    | 0.0768 | Vortex_ICD_55 | 1.6 | 0.0034 |
| MHF_IPEX_TYPE_D                                               | 3      | 0.0841 | Vortex_ICD_55 | 1.8 | 0.0036 |
|                                                               |        |        | Vortex_ICD_55 | 2   | 0.0038 |
|                                                               |        |        | Vortex_ICD_55 | 2.5 | 0.0043 |
|                                                               |        |        | Vortex_ICD_55 | 3   | 0.0047 |
| ;Tempest Rating Curve for MHF IPEX TYPE E, No grate allowance |        |        |               |     |        |
| MHF_IPEX_TYPE_E                                               | Rating | 0      | 0             |     |        |
| MHF_IPEX_TYPE_E                                               | 0.1    | 0.0205 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 0.2    | 0.0289 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 0.3    | 0.0355 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 0.4    | 0.0409 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 0.5    | 0.0458 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 0.6    | 0.0501 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 0.7    | 0.0542 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 0.8    | 0.0579 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 0.9    | 0.0614 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 1      | 0.0647 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 1.2    | 0.0709 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 1.4    | 0.0766 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 1.6    | 0.0819 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 1.8    | 0.0868 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 2      | 0.0915 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 2.5    | 0.1023 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 3      | 0.1121 |               |     |        |
| O_Roof1                                                       | Rating | 0      | 0             |     |        |
| O_Roof1                                                       | 0.001  | 0.002  |               |     |        |
| O_Roof1                                                       | 0.15   | 0.002  |               |     |        |
| O_Roof2                                                       | Rating | 0      | 0             |     |        |
| O_Roof2                                                       | 0.001  | 0.0025 |               |     |        |
| O_Roof2                                                       | 0.15   | 0.0025 |               |     |        |
| O_St_UnGrd                                                    | Rating | 0      | 0             |     |        |
| O_St_UnGrd                                                    | 0.01   | 0.029  |               |     |        |
| O_St_UnGrd                                                    | 1      | 0.029  |               |     |        |
| ;Tempest Rating Curve for Vortex ICD 100, No grate allowance  |        |        |               |     |        |
| Vortex_ICD_100                                                | Rating | 0      | 0             |     |        |
| Vortex_ICD_100                                                | 0.1    | 0.0028 |               |     |        |
| Vortex_ICD_100                                                | 0.2    | 0.004  |               |     |        |
| Vortex_ICD_100                                                | 0.3    | 0.0049 |               |     |        |
| Vortex_ICD_100                                                | 0.4    | 0.0056 |               |     |        |
| Vortex_ICD_100                                                | 0.5    | 0.0063 |               |     |        |
| Vortex_ICD_100                                                | 0.6    | 0.0069 |               |     |        |
| Vortex_ICD_100                                                | 0.7    | 0.0075 |               |     |        |
| Vortex_ICD_100                                                | 0.8    | 0.008  |               |     |        |
| Vortex_ICD_100                                                | 0.9    | 0.0085 |               |     |        |
| Vortex_ICD_100                                                | 1      | 0.0089 |               |     |        |
| Vortex_ICD_100                                                | 1.2    | 0.0098 |               |     |        |
| Vortex_ICD_100                                                | 1.4    | 0.0106 |               |     |        |
| Vortex_ICD_100                                                | 1.6    | 0.0113 |               |     |        |
| Vortex_ICD_100                                                | 1.8    | 0.012  |               |     |        |
| Vortex_ICD_100                                                | 2      | 0.0126 |               |     |        |
| Vortex_ICD_100                                                | 2.5    | 0.0141 |               |     |        |
| Vortex_ICD_100                                                | 3      | 0.0155 |               |     |        |
| ;Tempest Rating Curve for Vortex ICD 105, No grate allowance  |        |        |               |     |        |
| Vortex_ICD_105                                                | Rating | 0      | 0             |     |        |
| Vortex_ICD_105                                                | 0.1    | 0.0031 |               |     |        |
| Vortex_ICD_105                                                | 0.2    | 0.0044 |               |     |        |
| Vortex_ICD_105                                                | 0.3    | 0.0054 |               |     |        |
| Vortex_ICD_105                                                | 0.4    | 0.0062 |               |     |        |
| Vortex_ICD_105                                                | 0.5    | 0.0069 |               |     |        |
| Vortex_ICD_105                                                | 0.6    | 0.0076 |               |     |        |
| Vortex_ICD_105                                                | 0.7    | 0.0082 |               |     |        |
| Vortex_ICD_105                                                | 0.8    | 0.0088 |               |     |        |
| Vortex_ICD_105                                                | 0.9    | 0.0093 |               |     |        |
| Vortex_ICD_105                                                | 1      | 0.0098 |               |     |        |
| Vortex_ICD_105                                                | 1.2    | 0.0107 |               |     |        |
| Vortex_ICD_105                                                | 1.4    | 0.0116 |               |     |        |
| Vortex_ICD_105                                                | 1.6    | 0.0124 |               |     |        |
| Vortex_ICD_105                                                | 1.8    | 0.0131 |               |     |        |
| Vortex_ICD_105                                                | 2      | 0.0139 |               |     |        |
| Vortex_ICD_105                                                | 2.5    | 0.0155 |               |     |        |
| Vortex_ICD_105                                                | 3      | 0.017  |               |     |        |
| ;Tempest Rating Curve for Vortex ICD 40, No grate allowance   |        |        |               |     |        |
| Vortex_ICD_40                                                 | Rating | 0      | 0             |     |        |
| Vortex_ICD_40                                                 | 0.1    | 0.0004 |               |     |        |
| Vortex_ICD_40                                                 | 0.2    | 0.0006 |               |     |        |
| Vortex_ICD_40                                                 | 0.3    | 0.0007 |               |     |        |
| Vortex_ICD_40                                                 | 0.4    | 0.0009 |               |     |        |
| Vortex_ICD_40                                                 | 0.5    | 0.001  |               |     |        |
| Vortex_ICD_40                                                 | 0.6    | 0.001  |               |     |        |
| Vortex_ICD_40                                                 | 0.7    | 0.0011 |               |     |        |
| Vortex_ICD_40                                                 | 0.8    | 0.0012 |               |     |        |
| Vortex_ICD_40                                                 | 0.9    | 0.0013 |               |     |        |
| Vortex_ICD_40                                                 | 1      | 0.0014 |               |     |        |
| Vortex_ICD_40                                                 | 1.2    | 0.0015 |               |     |        |
| Vortex_ICD_40                                                 | 1.4    | 0.0016 |               |     |        |
| Vortex_ICD_40                                                 | 1.6    | 0.0017 |               |     |        |
| Vortex_ICD_40                                                 | 1.8    | 0.0018 |               |     |        |
| Vortex_ICD_40                                                 | 2      | 0.0019 |               |     |        |
| Vortex_ICD_40                                                 | 2.5    | 0.0022 |               |     |        |
| Vortex_ICD_40                                                 | 3      | 0.0024 |               |     |        |
| ;Tempest Rating Curve for Vortex ICD 45, No grate allowance   |        |        |               |     |        |
| Vortex_ICD_45                                                 | Rating | 0      | 0             |     |        |
| Vortex_ICD_45                                                 | 0.1    | 0.0006 |               |     |        |
| Vortex_ICD_45                                                 | 0.2    | 0.0008 |               |     |        |
| Vortex_ICD_45                                                 | 0.3    | 0.001  |               |     |        |
| Vortex_ICD_45                                                 | 0.4    | 0.0011 |               |     |        |
| Vortex_ICD_45                                                 | 0.5    | 0.0013 |               |     |        |
| Vortex_ICD_45                                                 | 0.6    | 0.0014 |               |     |        |
| Vortex_ICD_45                                                 | 0.7    | 0.0015 |               |     |        |
| Vortex_ICD_45                                                 | 0.8    | 0.0016 |               |     |        |
| Vortex_ICD_45                                                 | 0.9    | 0.0017 |               |     |        |
| Vortex_ICD_45                                                 | 1      | 0.0018 |               |     |        |
| Vortex_ICD_45                                                 | 1.2    | 0.002  |               |     |        |
| Vortex_ICD_45                                                 | 1.4    | 0.0021 |               |     |        |
| Vortex_ICD_45                                                 | 1.6    | 0.0023 |               |     |        |
| Vortex_ICD_45                                                 | 1.8    | 0.0024 |               |     |        |
| Vortex_ICD_45                                                 | 2      | 0.0026 |               |     |        |
| Vortex_ICD_45                                                 | 2.5    | 0.0029 |               |     |        |
| Vortex_ICD_45                                                 | 3      | 0.0031 |               |     |        |
| ;Tempest Rating Curve for Vortex ICD 50, No grate allowance   |        |        |               |     |        |
| Vortex_ICD_50                                                 | Rating | 0      | 0             |     |        |
| Vortex_ICD_50                                                 | 0.1    | 0.0007 |               |     |        |
| Vortex_ICD_50                                                 | 0.2    | 0.001  |               |     |        |
| Vortex_ICD_50                                                 | 0.3    | 0.0012 |               |     |        |
| Vortex_ICD_50                                                 | 0.4    | 0.0014 |               |     |        |
| Vortex_ICD_50                                                 | 0.5    | 0.0016 |               |     |        |
| Vortex_ICD_50                                                 | 0.6    | 0.0018 |               |     |        |
| Vortex_ICD_50                                                 | 0.7    | 0.0019 |               |     |        |
| Vortex_ICD_50                                                 | 0.8    | 0.002  |               |     |        |
| Vortex_ICD_50                                                 | 0.9    | 0.0021 |               |     |        |
| Vortex_ICD_50                                                 | 1      | 0.0023 |               |     |        |
| Vortex_ICD_50                                                 | 1.2    | 0.0025 |               |     |        |
| Vortex_ICD_50                                                 | 1.4    | 0.0027 |               |     |        |
| Vortex_ICD_50                                                 | 1.6    | 0.0029 |               |     |        |
| Vortex_ICD_50                                                 | 1.8    | 0.003  |               |     |        |
| Vortex_ICD_50                                                 | 2      | 0.0032 |               |     |        |
| Vortex_ICD_50                                                 | 2.5    | 0.0036 |               |     |        |
| Vortex_ICD_50                                                 | 3      | 0.0039 |               |     |        |
| ;Tempest Rating Curve for Vortex ICD 55, No grate allowance   |        |        |               |     |        |
| Vortex_ICD_55                                                 | Rating | 0      | 0             |     |        |
| Vortex_ICD_55                                                 | 0.1    | 0.0009 |               |     |        |
| Vortex_ICD_55                                                 | 0.2    | 0.0012 |               |     |        |
| Vortex_ICD_55                                                 | 0.3    | 0.0015 |               |     |        |
| Vortex_ICD_55                                                 | 0.4    | 0.0017 |               |     |        |
| Vortex_ICD_55                                                 | 0.5    | 0.0019 |               |     |        |
|                                                               |        |        |               |     |        |
| Vortex_ICD_60                                                 | Rating | 0      | 0             |     |        |
| Vortex_ICD_60                                                 | 0.1    | 0.0011 |               |     |        |
| Vortex_ICD_60                                                 | 0.2    | 0.0015 |               |     |        |
| Vortex_ICD_60                                                 | 0.3    | 0.0018 |               |     |        |
| Vortex_ICD_60                                                 | 0.4    | 0.0021 |               |     |        |
| Vortex_ICD_60                                                 | 0.5    | 0.0023 |               |     |        |
| Vortex_ICD_60                                                 | 0.6    | 0.0025 |               |     |        |
| Vortex_ICD_60                                                 | 0.7    | 0.0027 |               |     |        |
| Vortex_ICD_60                                                 | 0.8    | 0.0029 |               |     |        |
| Vortex_ICD_60                                                 | 0.9    | 0.0031 |               |     |        |
| Vortex_ICD_60                                                 | 1      | 0.0032 |               |     |        |
| Vortex_ICD_60                                                 | 1.2    | 0.0036 |               |     |        |
| Vortex_ICD_60                                                 | 1.4    | 0.0038 |               |     |        |
| Vortex_ICD_60                                                 | 1.6    | 0.0041 |               |     |        |
| Vortex_ICD_60                                                 | 1.8    | 0.0043 |               |     |        |
| Vortex_ICD_60                                                 | 2      | 0.0046 |               |     |        |
| Vortex_ICD_60                                                 | 2.5    | 0.0051 |               |     |        |
| Vortex_ICD_60                                                 | 3      | 0.0056 |               |     |        |
| ;Tempest Rating Curve for Vortex ICD 65, No grate allowance   |        |        |               |     |        |
| Vortex_ICD_65                                                 | Rating | 0      | 0             |     |        |
| Vortex_ICD_65                                                 | 0.1    | 0.0012 |               |     |        |
| Vortex_ICD_65                                                 | 0.2    | 0.0016 |               |     |        |
| Vortex_ICD_65                                                 | 0.3    | 0.002  |               |     |        |
| Vortex_ICD_65                                                 | 0.4    | 0.0023 |               |     |        |
| Vortex_ICD_65                                                 | 0.5    | 0.0025 |               |     |        |
| Vortex_ICD_65                                                 | 0.6    | 0.0028 |               |     |        |
| Vortex_ICD_65                                                 | 0.7    | 0.003  |               |     |        |
| Vortex_ICD_65                                                 | 0.8    | 0.0032 |               |     |        |
| Vortex_ICD_65                                                 | 0.9    | 0.0034 |               |     |        |
| Vortex_ICD_65                                                 | 1      | 0.0036 |               |     |        |
| Vortex_ICD_65                                                 | 1.2    | 0.004  |               |     |        |
| Vortex_ICD_65                                                 | 1.4    | 0.0043 |               |     |        |
| Vortex_ICD_65                                                 | 1.6    | 0.0046 |               |     |        |
| Vortex_ICD_65                                                 | 1.8    | 0.0048 |               |     |        |
| Vortex_ICD_65                                                 | 2      | 0.0051 |               |     |        |
| Vortex_ICD_65                                                 | 2.5    | 0.0057 |               |     |        |
| Vortex_ICD_65                                                 | 3      | 0.0063 |               |     |        |
| ;Tempest Rating Curve for Vortex ICD 70, No grate allowance   |        |        |               |     |        |
| Vortex_ICD_70                                                 | Rating | 0      | 0             |     |        |
| Vortex_ICD_70                                                 | 0.1    | 0.0013 |               |     |        |
| Vortex_ICD_70                                                 | 0.2    | 0.0019 |               |     |        |
| Vortex_ICD_70                                                 | 0.3    | 0.0023 |               |     |        |
| Vortex_ICD_70                                                 | 0.4    | 0.0027 |               |     |        |
| Vortex_ICD_70                                                 | 0.5    | 0.003  |               |     |        |
| Vortex_ICD_70                                                 | 0.6    | 0.0033 |               |     |        |
| Vortex_ICD_70                                                 | 0.7    | 0.0036 |               |     |        |
| Vortex_ICD_70                                                 | 0.8    | 0.0038 |               |     |        |
| Vortex_ICD_70                                                 | 0.9    | 0.0041 |               |     |        |
| Vortex_ICD_70                                                 | 1      | 0.0043 |               |     |        |
| Vortex_ICD_70                                                 | 1.2    | 0.0047 |               |     |        |
| Vortex_ICD_70                                                 | 1.4    | 0.0051 |               |     |        |
| Vortex_ICD_70                                                 | 1.6    | 0.0055 |               |     |        |
| Vortex_ICD_70                                                 | 1.8    | 0.0058 |               |     |        |
| Vortex_ICD_70                                                 | 2      | 0.0061 |               |     |        |
| Vortex_ICD_70                                                 | 2.5    | 0.0068 |               |     |        |
| Vortex_ICD_70                                                 | 3      | 0.0075 |               |     |        |
| ;Tempest Rating Curve for Vortex ICD 75, No grate allowance   |        |        |               |     |        |
| Vortex_ICD_75                                                 | Rating | 0      | 0             |     |        |
| Vortex_ICD_75                                                 | 0.1    | 0.0016 |               |     |        |
| Vortex_ICD_75                                                 | 0.2    | 0.0022 |               |     |        |
| Vortex_ICD_75                                                 | 0.3    | 0.0027 |               |     |        |
| Vortex_ICD_75                                                 | 0.4    | 0.0032 |               |     |        |
| Vortex_ICD_75                                                 | 0.5    | 0.0035 |               |     |        |
| Vortex_ICD_75                                                 | 0.6    | 0.0039 |               |     |        |
| Vortex_ICD_75                                                 | 0.7    | 0.0042 |               |     |        |
| Vortex_ICD_75                                                 | 0.8    | 0.0045 |               |     |        |
| Vortex_ICD_75                                                 | 0.9    | 0.0048 |               |     |        |
| Vortex_ICD_75                                                 | 1      | 0.005  |               |     |        |
| Vortex_ICD_75                                                 | 1.2    | 0.0055 |               |     |        |
| Vortex_ICD_75                                                 | 1.4    | 0.0059 |               |     |        |
| Vortex_ICD_75                                                 | 1.6    | 0.0063 |               |     |        |
| Vortex_ICD_75                                                 | 1.8    | 0.0067 |               |     |        |
| Vortex_ICD_75                                                 | 2      | 0.0071 |               |     |        |
| Vortex_ICD_75                                                 | 2.5    | 0.0079 |               |     |        |
| Vortex_ICD_75                                                 | 3      | 0.0087 |               |     |        |
| ;Tempest Rating Curve for Vortex ICD 80, No grate allowance   |        |        |               |     |        |
| Vortex_ICD_80                                                 | Rating | 0      | 0             |     |        |
| Vortex_ICD_80                                                 | 0.1    | 0.0018 |               |     |        |
| Vortex_ICD_80                                                 | 0.2    | 0.0026 |               |     |        |
| Vortex_ICD_80                                                 | 0.3    | 0.0031 |               |     |        |
| Vortex_ICD_80                                                 | 0.4    | 0.0036 |               |     |        |
| Vortex_ICD_80                                                 | 0.5    | 0.004  |               |     |        |
| Vortex_ICD_80                                                 | 0.6    | 0.0044 |               |     |        |
| Vortex_ICD_80                                                 | 0.7    | 0.0048 |               |     |        |
| Vortex_ICD_80                                                 | 0.8    | 0.0051 |               |     |        |
| Vortex_ICD_80                                                 | 0.9    | 0.0054 |               |     |        |
| Vortex_ICD_80                                                 | 1      | 0.0057 |               |     |        |
| Vortex_ICD_80                                                 | 1.2    | 0.0063 |               |     |        |
| Vortex_ICD_80                                                 | 1.4    | 0.0068 |               |     |        |
| Vortex_ICD_80                                                 | 1.6    | 0.0072 |               |     |        |
| Vortex_ICD_80                                                 | 1.8    | 0.0077 |               |     |        |
| Vortex_ICD_80                                                 |        |        |               |     |        |

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

|                                                                                                                                                         |            |                     |                   |                   |            |              |              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------|---------------------|-------------------|-------------------|------------|--------------|--------------|
| Vortex_ICD_90                                                                                                                                           | 2          | 0.0102              | InfiltratedInflow | 01/01/2000        | 00:35:00   | 9.126959E-05 |              |
| Vortex_ICD_90                                                                                                                                           | 2.5        | 0.0114              | InfiltratedInflow | 01/01/2000        | 00:36:00   | 9.129378E-05 |              |
| Vortex_ICD_90                                                                                                                                           | 3          | 0.0125              | InfiltratedInflow | 01/01/2000        | 00:37:00   | 9.12985E-05  |              |
|                                                                                                                                                         |            |                     |                   |                   |            |              |              |
| ;Tempest Rating Curve for Vortex ICD 95, No grate allowance                                                                                             |            |                     |                   |                   |            |              |              |
| Vortex_ICD_95                                                                                                                                           | Rating     | 0                   | InfiltratedInflow | 01/01/2000        | 00:38:00   | 9.129943E-05 |              |
| Vortex_ICD_95                                                                                                                                           | 0.1        | 0.0026              | InfiltratedInflow | 01/01/2000        | 00:39:00   | 9.12996E-05  |              |
| Vortex_ICD_95                                                                                                                                           | 0.2        | 0.0036              | InfiltratedInflow | 01/01/2000        | 00:40:00   | 0.0001337878 |              |
| Vortex_ICD_95                                                                                                                                           | 0.3        | 0.0044              | InfiltratedInflow | 01/01/2000        | 00:41:00   | 0.0001420377 |              |
| Vortex_ICD_95                                                                                                                                           | 0.4        | 0.0051              | InfiltratedInflow | 01/01/2000        | 00:42:00   | 0.0001433881 |              |
| Vortex_ICD_95                                                                                                                                           | 0.5        | 0.0057              | InfiltratedInflow | 01/01/2000        | 00:43:00   | 0.0001439922 |              |
| Vortex_ICD_95                                                                                                                                           | 0.6        | 0.0062              | InfiltratedInflow | 01/01/2000        | 00:44:00   | 0.0001436228 |              |
| Vortex_ICD_95                                                                                                                                           | 0.7        | 0.0067              | InfiltratedInflow | 01/01/2000        | 00:45:00   | 0.0001436273 |              |
| Vortex_ICD_95                                                                                                                                           | 0.8        | 0.0071              | InfiltratedInflow | 01/01/2000        | 00:46:00   | 0.000143628  |              |
| Vortex_ICD_95                                                                                                                                           | 0.9        | 0.0076              | InfiltratedInflow | 01/01/2000        | 00:47:00   | 0.0001436281 |              |
| Vortex_ICD_95                                                                                                                                           | 1.0        | 0.008               | InfiltratedInflow | 01/01/2000        | 00:48:00   | 0.0001436281 |              |
| Vortex_ICD_95                                                                                                                                           | 1.2        | 0.0087              | InfiltratedInflow | 01/01/2000        | 00:49:00   | 0.0001436281 |              |
| Vortex_ICD_95                                                                                                                                           | 1.4        | 0.0094              | InfiltratedInflow | 01/01/2000        | 00:50:00   | 0.000324559  |              |
| Vortex_ICD_95                                                                                                                                           | 1.6        | 0.0101              | InfiltratedInflow | 01/01/2000        | 00:51:00   | 0.0003631043 |              |
| Vortex_ICD_95                                                                                                                                           | 1.8        | 0.0107              | InfiltratedInflow | 01/01/2000        | 00:52:00   | 0.0003661426 |              |
| Vortex_ICD_95                                                                                                                                           | 2          | 0.0113              | InfiltratedInflow | 01/01/2000        | 00:53:00   | 0.0003662956 |              |
| Vortex_ICD_95                                                                                                                                           | 2.5        | 0.0126              | InfiltratedInflow | 01/01/2000        | 00:54:00   | 0.0003663276 |              |
| Vortex_ICD_95                                                                                                                                           | 3          | 0.0138              | InfiltratedInflow | 01/01/2000        | 00:55:00   | 0.0003663344 |              |
|                                                                                                                                                         |            |                     |                   |                   |            |              |              |
| ;From Zurn Manual RD178                                                                                                                                 |            |                     |                   |                   |            |              |              |
| ZURN_Z150F-6NH                                                                                                                                          | Rating     | 0                   | InfiltratedInflow | 01/01/2000        | 00:56:00   | 0.0003663358 |              |
| ZURN_Z150F-6NH                                                                                                                                          | 0.0127     | 0.00503838308477861 | InfiltratedInflow | 01/01/2000        | 00:57:00   | 0.0003663361 |              |
| ZURN_Z150F-6NH                                                                                                                                          | 0.0257     | 0.0132420013231177  | InfiltratedInflow | 01/01/2000        | 00:58:00   | 0.0003663362 |              |
| ZURN_Z150F-6NH                                                                                                                                          | 0.0384     | 0.023492054543888   | InfiltratedInflow | 01/01/2000        | 00:59:00   | 0.0003663362 |              |
| ZURN_Z150F-6NH                                                                                                                                          | 0.0508     | 0.0357128365761305  | InfiltratedInflow | 01/01/2000        | 01:00:00   | 0.0007217364 |              |
| ZURN_Z150F-6NH                                                                                                                                          | 0.0765     | 0.0425019726111045  | InfiltratedInflow | 01/01/2000        | 01:01:00   | 0.0006867272 |              |
| ZURN_Z150F-6NH                                                                                                                                          | 0.1024     | 0.0433196215564931  | InfiltratedInflow | 01/01/2000        | 01:02:00   | 0.0005640552 |              |
|                                                                                                                                                         |            |                     |                   |                   |            |              |              |
| CB110                                                                                                                                                   | Storage    | 0                   | 0.073             | InfiltratedInflow | 01/01/2000 | 01:03:00     | 0.0005235554 |
| CB110                                                                                                                                                   | 1.55       | 0.073               | InfiltratedInflow | 01/01/2000        | 01:04:00   | 0.0005590921 |              |
| CB110                                                                                                                                                   | 1.85       | 120.85              | InfiltratedInflow | 01/01/2000        | 01:05:00   | 0.0005685266 |              |
| CB110                                                                                                                                                   | 1.9        | 120.85              | InfiltratedInflow | 01/01/2000        | 01:06:00   | 0.0005437324 |              |
|                                                                                                                                                         |            |                     |                   |                   |            |              |              |
| CB111                                                                                                                                                   | Storage    | 0                   | 0.073             | InfiltratedInflow | 01/01/2000 | 01:07:00     | 0.0005205912 |
| CB111                                                                                                                                                   | 2.01       | 0.073               | InfiltratedInflow | 01/01/2000        | 01:08:00   | 0.0004989929 |              |
|                                                                                                                                                         |            |                     |                   |                   |            |              |              |
| CB112                                                                                                                                                   | Storage    | 0                   | 0.36              | InfiltratedInflow | 01/01/2000 | 01:09:00     | 0.0004788346 |
| CB112                                                                                                                                                   | 1.92       | 0.36                | InfiltratedInflow | 01/01/2000        | 01:10:00   | 0.0004600203 |              |
| CB112                                                                                                                                                   | 2.1        | 19.13               | InfiltratedInflow | 01/01/2000        | 01:11:00   | 0.000424605  |              |
| CB112                                                                                                                                                   | 2.12       | 19.13               | InfiltratedInflow | 01/01/2000        | 01:12:00   | 0.0004260715 |              |
|                                                                                                                                                         |            |                     |                   |                   |            |              |              |
| CB113                                                                                                                                                   | Storage    | 0                   | 0.073             | InfiltratedInflow | 01/01/2000 | 01:13:00     | 0.0004107751 |
| CB113                                                                                                                                                   | 1.6        | 0.073               | InfiltratedInflow | 01/01/2000        | 01:14:00   | 0.0003964986 |              |
| CB113                                                                                                                                                   | 1.7        | 3.62                | InfiltratedInflow | 01/01/2000        | 01:15:00   | 0.000383174  |              |
|                                                                                                                                                         |            |                     |                   |                   |            |              |              |
| CB114                                                                                                                                                   | Storage    | 0                   | 0.36              | InfiltratedInflow | 01/01/2000 | 01:16:00     | 0.0003707377 |
| CB114                                                                                                                                                   | 0.2        | 19.2                | InfiltratedInflow | 01/01/2000        | 01:17:00   | 0.0003591307 |              |
| CB114                                                                                                                                                   | 0.25       | 19.2                | InfiltratedInflow | 01/01/2000        | 01:18:00   | 0.0003482975 |              |
|                                                                                                                                                         |            |                     |                   |                   |            |              |              |
| CB115                                                                                                                                                   | Storage    | 0                   | 0.36              | InfiltratedInflow | 01/01/2000 | 01:19:00     | 0.0003381866 |
| CB115                                                                                                                                                   | 0.2        | 155.53              | InfiltratedInflow | 01/01/2000        | 01:20:00   | 0.0003287498 |              |
| CB115                                                                                                                                                   | 0.31       | 155.53              | InfiltratedInflow | 01/01/2000        | 01:21:00   | 0.0003199422 |              |
|                                                                                                                                                         |            |                     |                   |                   |            |              |              |
| CB116                                                                                                                                                   | Storage    | 0                   | 0.36              | InfiltratedInflow | 01/01/2000 | 01:22:00     | 0.0003117218 |
| CB116                                                                                                                                                   | 0.15       | 73.19               | InfiltratedInflow | 01/01/2000        | 01:23:00   | 0.0003040496 |              |
| CB116                                                                                                                                                   | 0.4        | 73.19               | InfiltratedInflow | 01/01/2000        | 01:24:00   | 0.0002968888 |              |
|                                                                                                                                                         |            |                     |                   |                   |            |              |              |
| CB117                                                                                                                                                   | Storage    | 0                   | 0.36              | InfiltratedInflow | 01/01/2000 | 01:25:00     | 0.0002902055 |
| CB117                                                                                                                                                   | 0.15       | 122.26              | InfiltratedInflow | 01/01/2000        | 01:26:00   | 0.0002839678 |              |
|                                                                                                                                                         |            |                     |                   |                   |            |              |              |
| CB118                                                                                                                                                   | Storage    | 0                   | 0.36              | InfiltratedInflow | 01/01/2000 | 01:27:00     | 0.000278146  |
| CB118                                                                                                                                                   | 0.18       | 37.7                | InfiltratedInflow | 01/01/2000        | 01:28:00   | 0.0002727123 |              |
|                                                                                                                                                         |            |                     |                   |                   |            |              |              |
| [TIMESERIES]                                                                                                                                            |            |                     |                   |                   |            |              |              |
| ;Name Date Time Value                                                                                                                                   |            |                     |                   |                   |            |              |              |
| ;Rainfall (mm/hr)                                                                                                                                       |            |                     |                   |                   |            |              |              |
| 3CHI002                                                                                                                                                 | 01/01/2000 | 00:00:00            | 2.491             | InfiltratedInflow | 01/01/2000 | 01:29:00     | 0.0002676409 |
| 3CHI002                                                                                                                                                 | 01/01/2000 | 00:10:00            | 2.966             | InfiltratedInflow | 01/01/2000 | 01:30:00     | 0.0002629076 |
| 3CHI002                                                                                                                                                 | 01/01/2000 | 00:20:00            | 3.696             | InfiltratedInflow | 01/01/2000 | 01:31:00     | 0.00025849   |
| 3CHI002                                                                                                                                                 | 01/01/2000 | 00:30:00            | 4.976             | InfiltratedInflow | 01/01/2000 | 01:32:00     | 0.0002543668 |
| 3CHI002                                                                                                                                                 | 01/01/2000 | 00:40:00            | 7.828             | InfiltratedInflow | 01/01/2000 | 01:33:00     | 0.0002505186 |
| 3CHI002                                                                                                                                                 | 01/01/2000 | 00:50:00            | 19.966            | InfiltratedInflow | 01/01/2000 | 01:34:00     | 0.0002469269 |
| 3CHI002                                                                                                                                                 | 01/01/2000 | 01:00:00            | 76.805            | InfiltratedInflow | 01/01/2000 | 01:35:00     | 0.0002435747 |
| 3CHI002                                                                                                                                                 | 01/01/2000 | 01:10:00            | 22.777            | InfiltratedInflow | 01/01/2000 | 01:36:00     | 0.0002404461 |
| 3CHI002                                                                                                                                                 | 01/01/2000 | 01:20:00            | 11.852            | InfiltratedInflow | 01/01/2000 | 01:37:00     | 0.000237526  |
| 3CHI002                                                                                                                                                 | 01/01/2000 | 01:30:00            | 8.025             | InfiltratedInflow | 01/01/2000 | 01:38:00     | 0.0002348006 |
| 3CHI002                                                                                                                                                 | 01/01/2000 | 01:40:00            | 6.096             | InfiltratedInflow | 01/01/2000 | 01:39:00     | 0.0002322569 |
| 3CHI002                                                                                                                                                 | 01/01/2000 | 01:50:00            | 4.938             | InfiltratedInflow | 01/01/2000 | 01:40:00     | 0.0002298828 |
| 3CHI002                                                                                                                                                 | 01/01/2000 | 02:00:00            | 4.165             | InfiltratedInflow | 01/01/2000 | 01:41:00     | 0.000227667  |
| 3CHI002                                                                                                                                                 | 01/01/2000 | 02:10:00            | 3.613             | InfiltratedInflow | 01/01/2000 | 01:42:00     | 0.0002255989 |
| 3CHI002                                                                                                                                                 | 01/01/2000 | 02:20:00            | 3.197             | InfiltratedInflow | 01/01/2000 | 01:43:00     | 0.0002236687 |
| 3CHI002                                                                                                                                                 | 01/01/2000 | 02:30:00            | 2.873             | InfiltratedInflow | 01/01/2000 | 01:44:00     | 0.0002218673 |
| 3CHI002                                                                                                                                                 | 01/01/2000 | 02:40:00            | 2.613             | InfiltratedInflow | 01/01/2000 | 01:45:00     | 0.0002201859 |
| 3CHI002                                                                                                                                                 | 01/01/2000 | 02:50:00            | 2.4               | InfiltratedInflow | 01/01/2000 | 01:46:00     | 0.0002186166 |
| 3CHI002                                                                                                                                                 | 01/01/2000 | 03:00:00            | 0                 | InfiltratedInflow | 01/01/2000 | 01:47:00     | 0.000217152  |
|                                                                                                                                                         |            |                     |                   |                   |            |              |              |
| ;Rainfall (mm/hr)                                                                                                                                       |            |                     |                   |                   |            |              |              |
| 3CHI100                                                                                                                                                 | 01/01/2000 | 00:00:00            | 5.339             | InfiltratedInflow | 01/01/2000 | 01:48:00     | 0.0002159785 |
| 3CHI100                                                                                                                                                 | 01/01/2000 | 00:10:00            | 6.376             | InfiltratedInflow | 01/01/2000 | 01:49:00     | 0.0002145091 |
| 3CHI100                                                                                                                                                 | 01/01/2000 | 00:20:00            | 7.977             | InfiltratedInflow | 01/01/2000 | 01:50:00     | 0.0002133183 |
| 3CHI100                                                                                                                                                 | 01/01/2000 | 00:30:00            | 10.797            | InfiltratedInflow | 01/01/2000 | 01:51:00     | 0.0002122069 |
| 3CHI100                                                                                                                                                 | 01/01/2000 | 00:40:00            | 17.136            | InfiltratedInflow | 01/01/2000 | 01:52:00     | 0.0002111690 |
| 3CHI100                                                                                                                                                 | 01/01/2000 | 00:50:00            | 45.128            | InfiltratedInflow | 01/01/2000 | 01:53:00     | 0.0002102015 |
| 3CHI100                                                                                                                                                 | 01/01/2000 | 01:00:00            | 178.107           | InfiltratedInflow | 01/01/2000 | 01:54:00     | 0.0002092979 |
| 3CHI100                                                                                                                                                 | 01/01/2000 | 01:10:00            | 51.056            | InfiltratedInflow | 01/01/2000 | 01:55:00     | 0.0002084546 |
| 3CHI100                                                                                                                                                 | 01/01/2000 | 01:20:00            | 26.163            | InfiltratedInflow | 01/01/2000 | 01:56:00     | 0.0002076575 |
| 3CHI100                                                                                                                                                 | 01/01/2000 | 01:30:00            | 17.571            | InfiltratedInflow | 01/01/2000 | 01:57:00     | 0.0002069328 |
| 3CHI100                                                                                                                                                 | 01/01/2000 | 01:40:00            | 13.277            | InfiltratedInflow | 01/01/2000 | 01:58:00     | 0.0002062472 |
| 3CHI100                                                                                                                                                 | 01/01/2000 | 01:50:00            | 10.712            | InfiltratedInflow | 01/01/2000 | 01:59:00     | 0.0002056073 |
| 3CHI100                                                                                                                                                 | 01/01/2000 | 02:00:00            | 9.008             | InfiltratedInflow | 01/01/2000 | 02:00:00     | 0.00020501   |
| 3CHI100                                                                                                                                                 | 01/01/2000 | 02:10:00            | 7.793             | InfiltratedInflow | 01/01/2000 | 02:01:00     | 0.0002044525 |
| 3CHI100                                                                                                                                                 | 01/01/2000 | 02:20:00            | 6.883             | InfiltratedInflow | 01/01/2000 | 02:02:00     | 0.0002039323 |
| 3CHI100                                                                                                                                                 | 01/01/2000 | 02:30:00            | 6.174             | InfiltratedInflow | 01/01/2000 | 02:03:00     | 0.0002034467 |
| 3CHI100                                                                                                                                                 | 01/01/2000 | 02:40:00            | 5.507             | InfiltratedInflow | 01/01/2000 | 02:04:00     | 0.0002029934 |
| 3CHI100                                                                                                                                                 | 01/01/2000 | 02:50:00            | 5.142             | InfiltratedInflow | 01/01/2000 | 02:05:00     | 0.0002025704 |
| 3CHI100                                                                                                                                                 | 01/01/2000 | 03:00:00            | 0                 | InfiltratedInflow | 01/01/2000 | 02:06:00     | 0.0002021757 |
|                                                                                                                                                         |            |                     |                   |                   |            |              |              |
| ;Sum of Infiltrated flow from above the garage slab calculated from Infiltration graphs for S11 multiplied by the total pervious area above the garage. |            |                     |                   |                   |            |              |              |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:01:00            | 3.711007E-05      | InfiltratedInflow | 01/01/2000 | 02:07:00     | 0.0002018072 |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:02:00            | 3.711007E-05      | InfiltratedInflow | 01/01/2000 | 02:08:00     | 0.0002014633 |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:03:00            | 3.711007E-05      | InfiltratedInflow | 01/01/2000 | 02:09:00     | 0.0001072742 |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:04:00            | 3.711007E-05      | InfiltratedInflow | 01/01/2000 | 02:10:00     | 6.819591E-05 |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:05:00            | 3.711007E-05      | InfiltratedInflow | 01/01/2000 | 02:11:00     | 6.67217E-05  |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:06:00            | 3.711007E-05      | InfiltratedInflow | 01/01/2000 | 02:12:00     | 6.639183E-05 |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:07:00            | 3.711007E-05      | InfiltratedInflow | 01/01/2000 | 02:13:00     | 6.631498E-05 |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:08:00            | 3.711007E-05      | InfiltratedInflow | 01/01/2000 | 02:14:00     | 6.62969E-05  |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:09:00            | 3.711007E-05      | InfiltratedInflow | 01/01/2000 | 02:15:00     | 6.629264E-05 |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:10:00            | 4.418645E-05      | InfiltratedInflow | 01/01/2000 | 02:16:00     | 6.629164E-05 |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:11:00            | 4.418645E-05      | InfiltratedInflow | 01/01/2000 | 02:17:00     | 6.62914E-05  |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:12:00            | 4.418645E-05      | InfiltratedInflow | 01/01/2000 | 02:18:00     | 6.629134E-05 |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:13:00            | 4.418645E-05      | InfiltratedInflow | 01/01/2000 | 02:19:00     | 6.629133E-05 |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:14:0             |                   |                   |            |              |              |

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

|                   |            |          |              |                   |            |          |              |
|-------------------|------------|----------|--------------|-------------------|------------|----------|--------------|
| InfiltratedInflow | 01/01/2000 | 03:04:00 | 5.458821E-07 | InfiltratedInflow | 01/01/2000 | 05:33:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:05:00 | 3.720303E-07 | InfiltratedInflow | 01/01/2000 | 05:34:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:06:00 | 2.668294E-07 | InfiltratedInflow | 01/01/2000 | 05:35:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:07:00 | 1.989971E-07 | InfiltratedInflow | 01/01/2000 | 05:36:00 | 1.673315E-09 |
| InfiltratedInflow | 01/01/2000 | 03:08:00 | 1.530554E-07 | InfiltratedInflow | 01/01/2000 | 05:37:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:09:00 | 1.206954E-07 | InfiltratedInflow | 01/01/2000 | 05:38:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:10:00 | 9.71604E-08  | InfiltratedInflow | 01/01/2000 | 05:39:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:11:00 | 7.958157E-08 | InfiltratedInflow | 01/01/2000 | 05:40:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:12:00 | 6.615256E-08 | InfiltratedInflow | 01/01/2000 | 05:41:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:13:00 | 5.5694E-08   | InfiltratedInflow | 01/01/2000 | 05:42:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:14:00 | 4.741166E-08 | InfiltratedInflow | 01/01/2000 | 05:43:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:15:00 | 4.075622E-08 | InfiltratedInflow | 01/01/2000 | 05:44:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:16:00 | 3.53877E-08  | InfiltratedInflow | 01/01/2000 | 05:45:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:17:00 | 3.087828E-08 | InfiltratedInflow | 01/01/2000 | 05:46:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:18:00 | 2.716789E-08 | InfiltratedInflow | 01/01/2000 | 05:47:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:19:00 | 2.405291E-08 | InfiltratedInflow | 01/01/2000 | 05:48:00 | 1.689672E-09 |
| InfiltratedInflow | 01/01/2000 | 03:20:00 | 2.14159E-08  | InfiltratedInflow | 01/01/2000 | 05:49:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:21:00 | 1.916655E-08 | InfiltratedInflow | 01/01/2000 | 05:50:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:22:00 | 1.723456E-08 | InfiltratedInflow | 01/01/2000 | 05:51:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:23:00 | 1.556459E-08 | InfiltratedInflow | 01/01/2000 | 05:52:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:24:00 | 1.411267E-08 | InfiltratedInflow | 01/01/2000 | 05:53:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:25:00 | 1.284352E-08 | InfiltratedInflow | 01/01/2000 | 05:54:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:26:00 | 1.172859E-08 | InfiltratedInflow | 01/01/2000 | 05:55:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:27:00 | 1.074458E-08 | InfiltratedInflow | 01/01/2000 | 05:56:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:28:00 | 9.872395E-09 | InfiltratedInflow | 01/01/2000 | 05:57:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:29:00 | 9.096196E-09 | InfiltratedInflow | 01/01/2000 | 05:58:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:30:00 | 8.402821E-09 | InfiltratedInflow | 01/01/2000 | 05:59:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:31:00 | 7.781243E-09 | InfiltratedInflow | 01/01/2000 | 06:00:00 | 0            |
| InfiltratedInflow | 01/01/2000 | 03:32:00 | 7.222181E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:33:00 | 6.717776E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:34:00 | 6.261347E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:35:00 | 5.84718E-09  |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:36:00 | 5.470373E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:37:00 | 5.12671E-09  |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:38:00 | 4.812527E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:39:00 | 4.524653E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:40:00 | 4.260322E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:41:00 | 4.017116E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:42:00 | 3.79291E-09  |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:43:00 | 3.585841E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:44:00 | 3.394259E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:45:00 | 3.216707E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:46:00 | 3.05189E-09  |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:47:00 | 2.898658E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:48:00 | 2.755984E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:49:00 | 2.622951E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:50:00 | 2.498738E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:51:00 | 2.382607E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:52:00 | 2.273894E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:53:00 | 2.172E-09    |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:54:00 | 2.076386E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:55:00 | 1.986563E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:56:00 | 1.902086E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:57:00 | 1.822555E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:58:00 | 1.747602E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 03:59:00 | 1.676895E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:00:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:01:00 | 1.157155E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:02:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:03:00 | 2.918146E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:04:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:05:00 | 7.03723E-09  |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:06:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:07:00 | 2.510726E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:08:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:09:00 | 3.33648E-09  |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:10:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:11:00 | 2.178706E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:12:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:13:00 | 0.035454E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:14:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:15:00 | 1.905051E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:16:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:17:00 | 7.786051E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:18:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:19:00 | 1.677204E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:20:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:21:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:22:00 | 2.331285E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:23:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:24:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:25:00 | 1.133276E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:26:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:27:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:28:00 | 1.958036E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:29:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:30:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:31:00 | 1.802308E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:32:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:33:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:34:00 | 1.663384E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:35:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:36:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:37:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:38:00 | 2.026598E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:39:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:40:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:41:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:42:00 | 1.83461E-09  |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:43:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:44:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:45:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:46:00 | 1.667155E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:47:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:48:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:49:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:50:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:51:00 | 1.879599E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:52:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:53:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:54:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:55:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:56:00 | 1.683509E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:57:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:58:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 04:59:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:00:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:01:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:02:00 | 1.799732E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:03:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:04:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:05:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:06:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:07:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:08:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:09:00 | 1.843631E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:10:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:11:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:12:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:13:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:14:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:15:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:16:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:17:00 | 1.827837E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:18:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:19:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:20:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:21:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:22:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:23:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:24:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:25:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:26:00 | 1.766506E-09 |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:27:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:28:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:29:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:30:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:31:00 | 0            |                   |            |          |              |
| InfiltratedInflow | 01/01/2000 | 05:32:00 | 0            |                   |            |          |              |

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

[TAGS]
Subcatch  S1      Ramp
Subcatch  S5      Building
Subcatch  S6      ParkingLot
Subcatch  S7      ParkingLot
Subcatch  S8      Building
Subcatch  S9      ParkingLot
Node       St_UnGrd Underground_Storage

[MAP]
DIMENSIONS 381280,91645 5032948,93205 381379,86255 5033068,41295
UNITS      Meters

[COORDINATES]
;;Node      X-Coord      Y-Coord
-----
OF4          381364.593    5032973.357
OF7          381346.502    5032963.916
STUB15      381335.776    5032954.363
STUB16      381319.979    5032958.277
CB110       381298.102    5033002.513
CB111       381307.131    5032987.6
CB112       381319.643    5032961.536
CB113       381348.344    5032974.068
CB114       381332.566    5033036.058
CB115       381332.827    5033018.906
CB116       381338.815    5033005.189
CB117       381344.774    5032991.539
CB118       381359.473    5032992.996
Roof_1      381325.164    5032977.273
Roof_2      381361.335    5033013.684
St_UnGrd    381329.806    5032972.84

[VERTICES]
;;Link      X-Coord      Y-Coord
-----
W1          381322.829    5032965.271
W3          381343.656    5032974.514
W5          381295.919    5033002.386
W5          381309.233    5032988.935
W5          381320.071    5032995.669
OL6         381323.041    5033005.693

[POLYGONS]
;;Subcatchment X-Coord      Y-Coord
-----
S1          381344.215    5032984.464
S1          381347.856    5032976.123
S1          381337.733    5032971.705
S1          381334.493    5032979.128
S1          381341.864    5032982.351
S1          381344.215    5032984.464
S10         381360.442    5032986.777
S10         381355.738    5032997.554
S10         381357.523    5032998.333
S10         381358.678    5032998.837
S10         381359.142    5032997.774
S10         381369.264    5033002.193
S10         381368.8     5033003.256
S10         381374.019    50
```

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

|    |            |             |
|----|------------|-------------|
| S5 | 381316.631 | 5033020.045 |
| S5 | 381320.706 | 5033010.711 |
| S5 | 381318.612 | 5033009.797 |
| S5 | 381319.652 | 5033007.414 |
| S5 | 381321.746 | 5033008.328 |
| S5 | 381327.851 | 5032994.342 |
| S5 | 381334.493 | 5032979.128 |
| S5 | 381337.733 | 5032971.705 |
| S5 | 381337.931 | 5032971.251 |
| S5 | 381321.435 | 5032964.05  |
| S5 | 381310.51  | 5032989.076 |
| S5 | 381300.135 | 5033012.843 |
| S5 | 381311.368 | 5033017.747 |
| S5 | 381316.631 | 5033020.045 |
| S6 | 381327.521 | 5033031.08  |
| S6 | 381338.894 | 5033036.045 |
| S6 | 381340.298 | 5033037.792 |
| S6 | 381342.392 | 5033038.706 |
| S6 | 381343.432 | 5033036.323 |
| S6 | 381341.338 | 5033035.409 |
| S6 | 381349.093 | 5033017.644 |
| S6 | 381343.736 | 5033015.306 |
| S6 | 381335.821 | 5033012.047 |
| S6 | 381326.803 | 5033010.853 |
| S6 | 381325.27  | 5033009.866 |
| S6 | 381321.746 | 5033008.328 |
| S6 | 381319.652 | 5033007.414 |
| S6 | 381318.612 | 5033009.797 |
| S6 | 381320.706 | 5033010.711 |
| S6 | 381316.631 | 5033020.045 |
| S6 | 381311.368 | 5033017.747 |
| S6 | 381304.879 | 5033024.646 |
| S6 | 381307.751 | 5033027.787 |
| S6 | 381319.536 | 5033040.417 |
| S6 | 381325.697 | 5033035.259 |
| S6 | 381327.521 | 5033031.08  |
| S7 | 381354.292 | 5033005.735 |
| S7 | 381349.118 | 5033003.477 |
| S7 | 381341.795 | 5032998.364 |
| S7 | 381333.208 | 5032996.68  |
| S7 | 381327.851 | 5032994.342 |
| S7 | 381321.746 | 5033008.328 |
| S7 | 381325.27  | 5033009.866 |
| S7 | 381326.803 | 5033010.853 |
| S7 | 381335.821 | 5033012.047 |
| S7 | 381349.093 | 5033017.644 |
| S7 | 381354.292 | 5033005.735 |
| S8 | 381336.223 | 5033047.127 |
| S8 | 381352.72  | 5033054.328 |
| S8 | 381374.019 | 5033005.534 |
| S8 | 381368.8   | 5033003.256 |
| S8 | 381369.264 | 5033002.193 |
| S8 | 381359.142 | 5032997.774 |
| S8 | 381358.678 | 5032998.837 |
| S8 | 381357.523 | 5032998.333 |
| S8 | 381355.797 | 5033002.286 |
| S8 | 381341.338 | 5033035.409 |
| S8 | 381343.432 | 5033036.323 |
| S8 | 381342.392 | 5033038.706 |
| S8 | 381340.298 | 5033037.792 |
| S8 | 381336.223 | 5033047.127 |
| S9 | 381360.442 | 5032986.777 |
| S9 | 381352.823 | 5032978.774 |
| S9 | 381353.006 | 5032978.356 |
| S9 | 381352.846 | 5032978.297 |
| S9 | 381352.688 | 5032978.233 |
| S9 | 381347.856 | 5032976.123 |
| S9 | 381344.215 | 5032984.464 |
| S9 | 381341.866 | 5032982.347 |
| S9 | 381334.493 | 5032979.128 |
| S9 | 381327.851 | 5032994.342 |
| S9 | 381333.208 | 5032996.68  |
| S9 | 381341.795 | 5032998.364 |
| S9 | 381349.118 | 5033003.477 |
| S9 | 381354.292 | 5033005.735 |
| S9 | 381357.523 | 5032998.333 |
| S9 | 381355.738 | 5032997.554 |
| S9 | 381360.442 | 5032986.777 |

|                |         |         |
|----------------|---------|---------|
| ;;Storage Node | X-Coord | Y-Coord |
| ;;             |         |         |
| [SYMBOLS]      |         |         |
| ;;Gage         | X-Coord | Y-Coord |
| ;;             |         |         |

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

|                                         |             |              |            |                    |                 |                |
|-----------------------------------------|-------------|--------------|------------|--------------------|-----------------|----------------|
| *****<br>Element Count<br>*****         |             |              |            |                    |                 |                |
| Number of rain gages ..... 1            |             |              |            |                    |                 |                |
| Number of subcatchments ... 11          |             |              |            |                    |                 |                |
| Number of nodes ..... 16                |             |              |            |                    |                 |                |
| Number of links ..... 17                |             |              |            |                    |                 |                |
| Number of pollutants ..... 0            |             |              |            |                    |                 |                |
| Number of land uses ..... 0             |             |              |            |                    |                 |                |
| *****<br>Raingage Summary<br>*****      |             |              |            |                    |                 |                |
| Name                                    | Data Source |              | Data Type  | Recording Interval |                 |                |
| Rainfall                                | 3CHI002     |              | INTENSITY  | 10 min.            |                 |                |
| *****<br>Subcatchment Summary<br>*****  |             |              |            |                    |                 |                |
| Name                                    | Area        | Width        | %Imperv    | %Slope             | Rain Gage       | Outlet         |
| -----                                   |             |              |            |                    |                 |                |
| S1                                      | 0.01        | 6.10         | 100.00     | 15.0000            | Rainfall        |                |
| UnGrd                                   |             |              |            |                    |                 |                |
| S10                                     | 0.01        | 29.00        | 8.79       | 1.0000             | Rainfall        | CB118          |
| S11                                     | 0.05        | 70.00        | 18.80      | 2.0000             | Rainfall        | CB114          |
| S2                                      | 0.00        | 4.30         | 0.00       | 1.9000             | Rainfall        | CB113          |
| S3                                      | 0.02        | 75.00        | 17.80      | 1.0000             | Rainfall        | CB112          |
| S4                                      | 0.04        | 52.00        | 8.51       | 3.5000             | Rainfall        | CB110          |
| S5                                      | 0.10        | 105.00       | 100.00     | 1.0000             | Rainfall        | Roof_1         |
| S6                                      | 0.08        | 45.00        | 66.78      | 2.5000             | Rainfall        | CB115          |
| S7                                      | 0.04        | 28.60        | 90.42      | 2.7000             | Rainfall        | CB116          |
| S8                                      | 0.10        | 105.00       | 100.00     | 1.0000             | Rainfall        | Roof_2         |
| S9                                      | 0.05        | 50.00        | 93.57      | 2.4000             | Rainfall        | CB117          |
| *****<br>Node Summary<br>*****          |             |              |            |                    |                 |                |
| Name                                    | Type        | Invert Elev. | Max. Depth | Ponded Area        | External Inflow |                |
| -----                                   |             |              |            |                    |                 |                |
| OF4                                     | OUTFALL     | 80.63        | 0.00       | 0.0                |                 |                |
| OF7                                     | OUTFALL     | 80.63        | 0.00       | 0.0                |                 |                |
| STUB15                                  | OUTFALL     | 80.63        | 0.00       | 0.0                |                 |                |
| STUB16                                  | OUTFALL     | 80.65        | 0.00       | 0.0                |                 |                |
| CB110                                   | STORAGE     | 83.75        | 1.90       | 0.0                |                 |                |
| CB111                                   | STORAGE     | 83.59        | 2.01       | 0.0                |                 |                |
| CB112                                   | STORAGE     | 83.28        | 2.12       | 0.0                |                 |                |
| CB113                                   | STORAGE     | 83.55        | 1.70       | 0.0                |                 |                |
| CB114                                   | STORAGE     | 85.30        | 0.25       | 0.0                |                 |                |
| CB115                                   | STORAGE     | 85.25        | 0.31       | 0.0                |                 |                |
| CB116                                   | STORAGE     | 85.20        | 0.40       | 0.0                |                 |                |
| CB117                                   | STORAGE     | 85.15        | 0.15       | 0.0                |                 |                |
| CB118                                   | STORAGE     | 85.22        | 0.18       | 0.0                |                 |                |
| Roof_1                                  | STORAGE     | 96.35        | 0.15       | 0.0                |                 |                |
| Roof_2                                  | STORAGE     | 96.35        | 0.15       | 0.0                |                 |                |
| St_UnGrd                                | STORAGE     | 81.80        | 1.00       | 0.0                | Yes             |                |
| *****<br>Link Summary<br>*****          |             |              |            |                    |                 |                |
| Name                                    | From Node   | To Node      | Type       | Length             | %Slope          |                |
| -----                                   |             |              |            |                    |                 |                |
| C1                                      | CB111       | CB112        | CONDUIT    | 28.9               | 0.8647          |                |
| 0.0130                                  |             |              |            |                    |                 |                |
| C3                                      | CB113       | CB112        | CONDUIT    | 31.3               | 0.6067          |                |
| 0.0130                                  |             |              |            |                    |                 |                |
| C5                                      | CB110       | CB111        | CONDUIT    | 20.5               | 0.7815          |                |
| 0.0130                                  |             |              |            |                    |                 |                |
| W1                                      | CB115       | CB116        | WEIR       |                    |                 |                |
| W2                                      | CB116       | CB117        | WEIR       |                    |                 |                |
| W3                                      | CB112       | CB113        | WEIR       |                    |                 |                |
| W4                                      | CB114       | CB115        | WEIR       |                    |                 |                |
| W5                                      | CB110       | CB112        | WEIR       |                    |                 |                |
| C2                                      | CB112       | STUB16       | OUTLET     |                    |                 |                |
| OL1                                     | CB115       | St_UnGrd     | OUTLET     |                    |                 |                |
| OL2                                     | CB116       | St_UnGrd     | OUTLET     |                    |                 |                |
| OL3                                     | CB117       | St_UnGrd     | OUTLET     |                    |                 |                |
| OL4                                     | Roof_1      | STUB15       | OUTLET     |                    |                 |                |
| OL5                                     | Roof_2      | OF4          | OUTLET     |                    |                 |                |
| OL6                                     | CB114       | St_UnGrd     | OUTLET     |                    |                 |                |
| OL7                                     | St_UnGrd    | OF7          | OUTLET     |                    |                 |                |
| OL8                                     | CB118       | St_UnGrd     | OUTLET     |                    |                 |                |
| *****<br>Cross Section Summary<br>***** |             |              |            |                    |                 |                |
| Conduit                                 | Shape       | Full Depth   | Full Area  | Hyd. Rad.          | Max. Width      | No. of Barrels |
| C1                                      | CIRCULAR    | 0.15         | 0.02       | 0.04               | 0.15            | 1              |
| C3                                      | CIRCULAR    | 0.15         | 0.02       | 0.04               | 0.15            | 1              |
| C5                                      | CIRCULAR    | 0.15         | 0.02       | 0.04               | 0.15            | 1              |
| *****<br>Analysis Options<br>*****      |             |              |            |                    |                 |                |
| Flow Units ..... CMS                    |             |              |            |                    |                 |                |
| Process Models:                         |             |              |            |                    |                 |                |
| Rainfall/Runoff ..... YES               |             |              |            |                    |                 |                |
| RDII ..... NO                           |             |              |            |                    |                 |                |
| Snowmelt ..... NO                       |             |              |            |                    |                 |                |
| Groundwater ..... NO                    |             |              |            |                    |                 |                |
| Flow Routing ..... YES                  |             |              |            |                    |                 |                |
| Ponding Allowed ..... NO                |             |              |            |                    |                 |                |
| Water Quality ..... NO                  |             |              |            |                    |                 |                |
| Infiltration Method ..... HORTON        |             |              |            |                    |                 |                |
| Flow Routing Method ..... DYNWAVE       |             |              |            |                    |                 |                |
| Surcharge Method ..... EXTRAN           |             |              |            |                    |                 |                |
| Starting Date ..... 01/01/2000 00:00:00 |             |              |            |                    |                 |                |
| Ending Date ..... 01/01/2000 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 ..... 5.00 sec        |             |              |            |                    |                 |                |
| Variable Time Step ..... YES            |             |              |            |                    |                 |                |
| Maximum Trials ..... 8                  |             |              |            |                    |                 |                |
| Number of Threads ..... 1               |             |              |            |                    |                 |                |
| Head Tolerance ..... 0.001500 m         |             |              |            |                    |                 |                |
| *****                                   |             |              |            |                    |                 |                |
| Runoff Quantity Continuity              | Volume      | Depth        |            |                    |                 |                |
| -----                                   | hectare-m   | mm           |            |                    |                 |                |
| Total Precipitation                     | 0.016       | 31.879       |            |                    |                 |                |
| Evaporation Loss                        | 0.000       | 0.000        |            |                    |                 |                |
| Infiltration Loss                       | 0.005       | 9.717        |            |                    |                 |                |
| Surface Runoff                          | 0.011       | 21.078       |            |                    |                 |                |
| Final Storage                           | 0.001       | 1.117        |            |                    |                 |                |
| Continuity Error (%)                    | -0.103      |              |            |                    |                 |                |



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

|                                         |              |         |           |             |             |           |        |        |
|-----------------------------------------|--------------|---------|-----------|-------------|-------------|-----------|--------|--------|
| *****                                   |              |         | Volume    | Volume      |             |           |        |        |
| Flow Routing Continuity                 |              |         | hectare-m | 10^6 ltr    |             |           |        |        |
| *****                                   |              |         | -----     | -----       |             |           |        |        |
| Dry Weather Inflow .....                |              |         | 0.000     | 0.000       |             |           |        |        |
| Wet Weather Inflow .....                |              |         | 0.011     | 0.107       |             |           |        |        |
| Groundwater Inflow .....                |              |         | 0.000     | 0.000       |             |           |        |        |
| RDII Inflow .....                       |              |         | 0.000     | 0.000       |             |           |        |        |
| External Inflow .....                   |              |         | 0.000     | 0.002       |             |           |        |        |
| External Outflow .....                  |              |         | 0.011     | 0.109       |             |           |        |        |
| Flooding Loss .....                     |              |         | 0.000     | 0.000       |             |           |        |        |
| Evaporation Loss .....                  |              |         | 0.000     | 0.000       |             |           |        |        |
| Exfiltration Loss .....                 |              |         | 0.000     | 0.000       |             |           |        |        |
| Initial Stored Volume ....              |              |         | 0.000     | 0.000       |             |           |        |        |
| Final Stored Volume .....               |              |         | 0.000     | 0.000       |             |           |        |        |
| Continuity Error (%) .....              |              |         | 0.000     |             |             |           |        |        |
| *****                                   |              |         |           |             |             |           |        |        |
| Highest Continuity Errors               |              |         |           |             |             |           |        |        |
| *****                                   |              |         |           |             |             |           |        |        |
| Node CB113 (18.32%)                     |              |         |           |             |             |           |        |        |
| *****                                   |              |         |           |             |             |           |        |        |
| Time-Step Critical Elements             |              |         |           |             |             |           |        |        |
| *****                                   |              |         |           |             |             |           |        |        |
| None                                    |              |         |           |             |             |           |        |        |
| *****                                   |              |         |           |             |             |           |        |        |
| Highest Flow Instability Indexes        |              |         |           |             |             |           |        |        |
| *****                                   |              |         |           |             |             |           |        |        |
| Link OL7 (7)                            |              |         |           |             |             |           |        |        |
| *****                                   |              |         |           |             |             |           |        |        |
| Most Frequent Nonconverging Nodes       |              |         |           |             |             |           |        |        |
| *****                                   |              |         |           |             |             |           |        |        |
| Convergence obtained at all time steps. |              |         |           |             |             |           |        |        |
| *****                                   |              |         |           |             |             |           |        |        |
| Routing Time Step Summary               |              |         |           |             |             |           |        |        |
| *****                                   |              |         |           |             |             |           |        |        |
| Minimum Time Step :                     |              |         | 4.50 sec  |             |             |           |        |        |
| Average Time Step :                     |              |         | 5.00 sec  |             |             |           |        |        |
| Maximum Time Step :                     |              |         | 5.00 sec  |             |             |           |        |        |
| % of Time in Steady State :             |              |         | 0.00      |             |             |           |        |        |
| Average Iterations per Step :           |              |         | 2.00      |             |             |           |        |        |
| % of Steps Not Converging :             |              |         | 0.00      |             |             |           |        |        |
| Time Step Frequencies :                 |              |         |           |             |             |           |        |        |
| 5.000 - 3.155 sec :                     |              |         | 100.00 %  |             |             |           |        |        |
| 3.155 - 1.991 sec :                     |              |         | 0.00 %    |             |             |           |        |        |
| 1.991 - 1.256 sec :                     |              |         | 0.00 %    |             |             |           |        |        |
| 1.256 - 0.792 sec :                     |              |         | 0.00 %    |             |             |           |        |        |
| 0.792 - 0.500 sec :                     |              |         | 0.00 %    |             |             |           |        |        |
| *****                                   |              |         |           |             |             |           |        |        |
| Subcatchment Runoff Summary             |              |         |           |             |             |           |        |        |
| *****                                   |              |         |           |             |             |           |        |        |
| -----                                   |              |         |           |             |             |           |        |        |
| Total                                   | Total        | Peak    | Total     | Total       | Total       | Total     | Imperv | Perv   |
| Runoff                                  | Runoff       | Runoff  | Runoff    | Runon       | Evap        | Infil     | Runoff | Runoff |
| Subcatchment                            | Subcatchment | Coeff   | Runoff    | mm          | mm          | mm        | mm     | mm     |
| mm                                      | 10^6 ltr     | CMS     | mm        | mm          | mm          | mm        | mm     | mm     |
| -----                                   |              |         |           |             |             |           |        |        |
| S1                                      |              | 31.88   | 0.00      | 0.00        | 0.00        | 0.00      | 30.36  | 0.00   |
| 30.36                                   | 0.00         | 0.952   |           |             |             |           |        |        |
| S10                                     |              | 31.88   | 0.00      | 0.00        | 0.00        | 30.55     | 2.67   | 1.20   |
| 1.20                                    | 0.00         | 0.038   |           |             |             |           |        |        |
| S11                                     |              | 31.88   | 0.00      | 0.00        | 0.00        | 28.60     | 5.71   | 3.00   |
| 3.00                                    | 0.00         | 0.094   |           |             |             |           |        |        |
| S2                                      |              | 31.88   | 0.00      | 0.00        | 0.00        | 31.75     | 0.00   | 0.13   |
| 0.13                                    | 0.00         | 0.004   |           |             |             |           |        |        |
| S3                                      |              | 31.88   | 0.00      | 0.00        | 0.00        | 28.56     | 5.40   | 3.07   |
| 3.07                                    | 0.00         | 0.096   |           |             |             |           |        |        |
| S4                                      |              | 31.88   | 0.00      | 0.00        | 0.00        | 30.56     | 2.58   | 1.20   |
| 1.20                                    | 0.00         | 0.038   |           |             |             |           |        |        |
| S5                                      |              | 31.88   | 0.00      | 0.00        | 0.00        | 30.35     | 0.00   | 0.00   |
| 30.35                                   | 0.03         | 0.952   |           |             |             |           |        |        |
| S6                                      |              | 31.88   | 0.00      | 0.00        | 0.00        | 10.52     | 20.27  | 0.07   |
| 20.34                                   | 0.02         | 0.638   |           |             |             |           |        |        |
| S7                                      |              | 31.88   | 0.00      | 0.00        | 0.00        | 3.01      | 27.44  | 0.05   |
| 27.49                                   | 0.01         | 0.862   |           |             |             |           |        |        |
| S8                                      |              | 31.88   | 0.00      | 0.00        | 0.00        | 0.00      | 30.35  | 0.00   |
| 30.35                                   | 0.03         | 0.952   |           |             |             |           |        |        |
| S9                                      |              | 31.88   | 0.00      | 0.00        | 2.01        | 28.40     | 0.04   | 0.04   |
| 28.44                                   | 0.02         | 0.892   |           |             |             |           |        |        |
| *****                                   |              |         |           |             |             |           |        |        |
| Node Depth Summary                      |              |         |           |             |             |           |        |        |
| *****                                   |              |         |           |             |             |           |        |        |
| -----                                   |              |         |           |             |             |           |        |        |
| Node                                    | Type         | Average | Maximum   | Maximum     | Time of Max | Reported  |        |        |
|                                         |              | Depth   | Depth     | HGL         | Occurrence  | Max Depth |        |        |
|                                         |              | Meters  | Meters    | Meters      | days hr:min | Meters    |        |        |
| OF4                                     | OUTFALL      | 0.48    | 0.48      | 81.11       | 0 00:00     | 0.48      |        |        |
| OF7                                     | OUTFALL      | 0.48    | 0.48      | 81.11       | 0 00:00     | 0.48      |        |        |
| STUB15                                  | OUTFALL      | 0.48    | 0.48      | 81.11       | 0 00:00     | 0.48      |        |        |
| STUB16                                  | OUTFALL      | 0.63    | 0.63      | 81.28       | 0 00:00     | 0.63      |        |        |
| CB110                                   | STORAGE      | 0.00    | 0.03      | 83.78       | 0 01:10     | 0.03      |        |        |
| CB111                                   | STORAGE      | 0.00    | 0.03      | 83.62       | 0 01:11     | 0.03      |        |        |
| CB112                                   | STORAGE      | 0.00    | 0.09      | 83.37       | 0 01:11     | 0.09      |        |        |
| CB113                                   | STORAGE      | 0.00    | 0.00      | 83.55       | 0 01:14     | 0.00      |        |        |
| CB114                                   | STORAGE      | 0.00    | 0.01      | 85.31       | 0 01:10     | 0.01      |        |        |
| CB115                                   | STORAGE      | 0.00    | 0.02      | 85.27       | 0 01:10     | 0.02      |        |        |
| CB116                                   | STORAGE      | 0.00    | 0.02      | 85.22       | 0 01:10     | 0.02      |        |        |
| CB117                                   | STORAGE      | 0.00    | 0.02      | 85.17       | 0 01:10     | 0.02      |        |        |
| CB118                                   | STORAGE      | 0.00    | 0.00      | 85.22       | 0 01:10     | 0.00      |        |        |
| Roof_1                                  | STORAGE      | 0.01    | 0.03      | 96.38       | 0 01:40     | 0.03      |        |        |
| Roof_2                                  | STORAGE      | 0.01    | 0.03      | 96.38       | 0 01:40     | 0.03      |        |        |
| St_UnGrd                                | STORAGE      | 0.00    | 0.06      | 81.86       | 0 01:10     | 0.06      |        |        |
| *****                                   |              |         |           |             |             |           |        |        |
| Node Inflow Summary                     |              |         |           |             |             |           |        |        |
| *****                                   |              |         |           |             |             |           |        |        |
| -----                                   |              |         |           |             |             |           |        |        |
| Flow                                    |              | Maximum | Maximum   |             | Lateral     | Total     |        |        |
|                                         |              | Lateral | Total     | Time of Max | Inflow      | Inflow    |        |        |
|                                         |              | Inflow  | Inflow    | Occurrence  | Volume      | Volume    |        |        |
| Error                                   |              |         |           |             |             |           |        |        |
| Node                                    | Type         | CMS     | CMS       | days hr:min | 10^6 ltr    | 10^6 ltr  |        |        |
| Percent                                 |              |         |           |             |             |           |        |        |
| -----                                   |              |         |           |             |             |           |        |        |
| OF4                                     | OUTFALL      | 0.000   | 0.002     | 0 00:51     | 0           | 0.0293    |        |        |
| 0.000                                   |              |         |           |             |             |           |        |        |
| OF7                                     | OUTFALL      | 0.000   | 0.029     | 0 01:02     | 0           | 0.0495    |        |        |
| 0.000                                   |              |         |           |             |             |           |        |        |
| STUB15                                  | OUTFALL      | 0.000   | 0.002     | 0 00:51     | 0           | 0.0289    |        |        |
| 0.000                                   |              |         |           |             |             |           |        |        |
| STUB16                                  | OUTFALL      | 0.000   | 0.002     | 0 01:11     | 0           | 0.00119   |        |        |
| 0.000                                   |              |         |           |             |             |           |        |        |
| CB110                                   | STORAGE      | 0.001   | 0.001     | 0 01:10     | 0.000515    | 0.000515  |        |        |
| -0.097                                  |              |         |           |             |             |           |        |        |

|                           |         |       |       |   |       |          |          |
|---------------------------|---------|-------|-------|---|-------|----------|----------|
| CB111                     | STORAGE | 0.000 | 0.001 | 0 | 01:10 | 0        | 0.000515 |
| 0.658                     |         |       |       |   |       |          |          |
| CB112                     | STORAGE | 0.002 | 0.002 | 0 | 01:10 | 0.000669 | 0.00119  |
| 0.004                     |         |       |       |   |       |          |          |
| CB113                     | STORAGE | 0.000 | 0.000 | 0 | 01:10 | 5.84e-06 | 5.84e-06 |
| 1.070 ltr                 |         |       |       |   |       |          |          |
| CB114                     | STORAGE | 0.003 | 0.003 | 0 | 01:10 | 0.00142  | 0.00142  |
| -0.001                    |         |       |       |   |       |          |          |
| CB115                     | STORAGE | 0.012 | 0.012 | 0 | 01:10 | 0.0163   | 0.0163   |
| -0.013                    |         |       |       |   |       |          |          |
| CB116                     | STORAGE | 0.008 | 0.008 | 0 | 01:10 | 0.0114   | 0.0114   |
| -0.007                    |         |       |       |   |       |          |          |
| CB117                     | STORAGE | 0.011 | 0.011 | 0 | 01:10 | 0.0155   | 0.0155   |
| -0.013                    |         |       |       |   |       |          |          |
| CB118                     | STORAGE | 0.000 | 0.000 | 0 | 01:10 | 0.000166 | 0.000166 |
| 0.006                     |         |       |       |   |       |          |          |
| Roof_1                    | STORAGE | 0.020 | 0.020 | 0 | 01:10 | 0.0289   | 0.0289   |
| -0.002                    |         |       |       |   |       |          |          |
| Roof_2                    | STORAGE | 0.021 | 0.021 | 0 | 01:10 | 0.0293   | 0.0293   |
| -0.002                    |         |       |       |   |       |          |          |
| St_UnGrd                  | STORAGE | 0.003 | 0.037 | 0 | 01:10 | 0.00465  | 0.0495   |
| 0.005                     |         |       |       |   |       |          |          |
| *****                     |         |       |       |   |       |          |          |
| Node Surge Summary        |         |       |       |   |       |          |          |
| *****                     |         |       |       |   |       |          |          |
| No nodes were surcharged. |         |       |       |   |       |          |          |
| *****                     |         |       |       |   |       |          |          |
| Node Flooding Summary     |         |       |       |   |       |          |          |
| *****                     |         |       |       |   |       |          |          |
| No nodes were flooded.    |         |       |       |   |       |          |          |
| *****                     |         |       |       |   |       |          |          |
| Storage Volume Summary    |         |       |       |   |       |          |          |
| *****                     |         |       |       |   |       |          |          |

| Maximum                 | Average | Avg  | Evap | Exfil | Maximum | Max  | Time of Max |
|-------------------------|---------|------|------|-------|---------|------|-------------|
| Outflow                 | Volume  | Pcnt | Pcnt | Pcnt  | Volume  | Pcnt | Occurrence  |
| Storage Unit            | 1000 m³ | Full | Loss | Loss  | 1000 m³ | Full | days hr:min |
| CMS                     |         |      |      |       |         |      |             |
| CB110                   | 0.000   | 0.0  | 0.0  | 0.0   | 0.000   | 0.0  | 0 01:10     |
| 0.001                   |         |      |      |       |         |      |             |
| CB111                   | 0.000   | 0.1  | 0.0  | 0.0   | 0.000   | 1.4  | 0 01:11     |
| 0.001                   |         |      |      |       |         |      |             |
| CB112                   | 0.000   | 0.0  | 0.0  | 0.0   | 0.000   | 1.1  | 0 01:11     |
| 0.002                   |         |      |      |       |         |      |             |
| CB113                   | 0.000   | 0.0  | 0.0  | 0.0   | 0.000   | 0.1  | 0 01:14     |
| 0.000                   |         |      |      |       |         |      |             |
| CB114                   | 0.000   | 0.0  | 0.0  | 0.0   | 0.000   | 0.2  | 0 01:10     |
| 0.003                   |         |      |      |       |         |      |             |
| CB115                   | 0.000   | 0.0  | 0.0  | 0.0   | 0.000   | 0.7  | 0 01:10     |
| 0.012                   |         |      |      |       |         |      |             |
| CB116                   | 0.000   | 0.0  | 0.0  | 0.0   | 0.000   | 0.3  | 0 01:10     |
| 0.008                   |         |      |      |       |         |      |             |
| CB117                   | 0.000   | 0.1  | 0.0  | 0.0   | 0.000   | 2.3  | 0 01:10     |
| 0.011                   |         |      |      |       |         |      |             |
| CB118                   | 0.000   | 0.0  | 0.0  | 0.0   | 0.000   | 0.0  | 0 01:10     |
| 0.000                   |         |      |      |       |         |      |             |
| Roof_1                  | 0.007   | 6.9  | 0.0  | 0.0   | 0.017   | 17.6 | 0 01:40     |
| 0.002                   |         |      |      |       |         |      |             |
| Roof_2                  | 0.007   | 7.1  | 0.0  | 0.0   | 0.017   | 17.7 | 0 01:40     |
| 0.002                   |         |      |      |       |         |      |             |
| St_UnGrd                | 0.000   | 0.1  | 0.0  | 0.0   | 0.003   | 5.6  | 0 01:10     |
| 0.029                   |         |      |      |       |         |      |             |
| *****                   |         |      |      |       |         |      |             |
| Outfall Loading Summary |         |      |      |       |         |      |             |
| *****                   |         |      |      |       |         |      |             |

| Outfall Node | Flow  | Avg   | Max   | Total    |
|--------------|-------|-------|-------|----------|
|              | Freq  | Flow  | Flow  | Volume   |
|              | Pcnt  | CMS   | CMS   | 10^6 ltr |
| OF4          | 74.27 | 0.002 | 0.002 | 0.029    |
| OF7          | 58.74 | 0.004 | 0.029 | 0.049    |
| STUB15       | 73.34 | 0.002 | 0.002 | 0.029    |
| STUB16       | 6.60  | 0.001 | 0.002 | 0.001    |
| System       | 53.23 | 0.008 | 0.035 | 0.109    |

|                   |
|-------------------|
| *****             |
| Link Flow Summary |
| *****             |

| Link | Type    | Maximum | Time of Max | Maximum | Max/  | Max/  |
|------|---------|---------|-------------|---------|-------|-------|
|      |         | [Flow]  | Occurrence  | [Veloc] | Full/ | Full/ |
|      |         | CMS     | days hr:min | m/sec   | Flow  | Depth |
| C1   | CONDUIT | 0.001   | 0 01:11     | 0.47    | 0.08  | 0.19  |
| C3   | CONDUIT | 0.000   | 0 01:12     | 0.07    | 0.00  | 0.03  |
| C5   | CONDUIT | 0.001   | 0 01:10     | 0.61    | 0.10  | 0.19  |
| W1   | WEIR    | 0.000   | 0 00:00     |         |       | 0.00  |
| W2   | WEIR    | 0.000   | 0 00:00     |         |       | 0.00  |
| W3   | WEIR    | 0.000   | 0 00:00     |         |       | 0.00  |
| W4   | WEIR    | 0.000   | 0 00:00     |         |       | 0.00  |
| W5   | WEIR    | 0.000   | 0 00:00     |         |       | 0.00  |
| C2   | DUMMY   | 0.002   | 0 01:11     |         |       |       |
| OL1  | DUMMY   | 0.000   | 0 01:10     |         |       |       |
| OL2  | DUMMY   | 0.008   | 0 01:10     |         |       |       |
| OL3  | DUMMY   | 0.011   | 0 01:10     |         |       |       |
| OL4  | DUMMY   | 0.002   | 0 00:51     |         |       |       |
| OL5  | DUMMY   | 0.002   | 0 00:51     |         |       |       |
| OL6  | DUMMY   | 0.003   | 0 01:10     |         |       |       |
| OL7  | DUMMY   | 0.029   | 0 01:02     |         |       |       |
| OL8  | DUMMY   | 0.000   | 0 01:10     |         |       |       |

|                             |
|-----------------------------|
| *****                       |
| Flow Classification Summary |
| *****                       |

| Conduit | Adjusted | ----- | Fraction of | Time in | Flow Class | ----- |
|---------|----------|-------|-------------|---------|------------|-------|
|         | /Actual  | Up    | Down        | Sub     | Sup        | Up    |
|         | Length   | Dry   | Dry         | Crit    | Crit       | Crit  |
| C1      | 1.00     | 0.19  | 0.00        | 0.00    | 0.00       | 0.00  |
| C3      | 1.00     | 0.19  | 0.00        | 0.00    | 0.01       | 0.00  |
| C5      | 1.00     | 0.19  | 0.00        | 0.00    | 0.80       | 0.01  |

|                                             |
|---------------------------------------------|
| *****                                       |
| Conduit Surge Summary                       |
| *****                                       |
| No conduits were surcharged.                |
| Analysis begun on: Thu Oct 10 10:09:49 2024 |
| Analysis ended on: Thu Oct 10 10:09:49 2024 |
| Total elapsed time: < 1 sec                 |

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

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

|                       |            |          |            |                    |                   |          |     |
|-----------------------|------------|----------|------------|--------------------|-------------------|----------|-----|
| [TITLE]               |            |          |            |                    |                   |          |     |
| ;;Project Title/Notes |            |          |            |                    |                   |          |     |
| [OPTIONS]             |            |          |            |                    |                   |          |     |
| ;;Option              | Value      |          |            |                    |                   |          |     |
| FLOW_UNITS            | CMS        |          |            |                    |                   |          |     |
| INFILTRATION          | HORTON     |          |            |                    |                   |          |     |
| FLOW_ROUTING          | DYNWAVE    |          |            |                    |                   |          |     |
| LINK_OFFSETS          | ELEVATION  |          |            |                    |                   |          |     |
| MIN_SLOPE             | 0          |          |            |                    |                   |          |     |
| ALLOW_PONDING         | NO         |          |            |                    |                   |          |     |
| SKIP_STEADY_STATE     | NO         |          |            |                    |                   |          |     |
| START_DATE            | 01/01/2000 |          |            |                    |                   |          |     |
| START_TIME            | 00:00:00   |          |            |                    |                   |          |     |
| REPORT_START_DATE     | 01/01/2000 |          |            |                    |                   |          |     |
| REPORT_START_TIME     | 00:00:00   |          |            |                    |                   |          |     |
| END_DATE              | 01/01/2000 |          |            |                    |                   |          |     |
| 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          | 5          |          |            |                    |                   |          |     |
| RULE_STEP             | 00:00:00   |          |            |                    |                   |          |     |
| INERTIAL_DAMPING      | PARTIAL    |          |            |                    |                   |          |     |
| NORMAL_FLOW_LIMITED   | BOTH       |          |            |                    |                   |          |     |
| FORCE_MAIN_EQUATION   | H-W        |          |            |                    |                   |          |     |
| VARIABLE_STEP         | 0.75       |          |            |                    |                   |          |     |
| LENGTHENING_STEP      | 0          |          |            |                    |                   |          |     |
| MIN_SURFAREA          | 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             |                   |          |     |
| Rainfall              | INTENSITY  | 0:10     | 1.0        | TIMESERIES 3CHI100 |                   |          |     |
| [SUBCATCHMENTS]       |            |          |            |                    |                   |          |     |
| ;;Name                | Rain Gage  | Outlet   | Area       | %Imperv            | Width             | %Slope   |     |
| CurbLen               | SnowPack   |          |            |                    |                   |          |     |
| S1                    | Rainfall   | St_UnGrd | 0.0091     | 100                | 6.1               | 15       | 0   |
| S10                   | Rainfall   | CB118    | 0.0138     | 8.79               | 28.998            | 1        | 0   |
| S11                   | Rainfall   | CB114    | 0.0473     | 18.805             | 70.001            | 2        | 0   |
| S2                    | Rainfall   | CB113    | 0.0044     | 0.002              | 4.3               | 1.9      | 0   |
| S3                    | Rainfall   | CB112    | 0.0218     | 17.802             | 75                | 1        | 0   |
| S4                    | Rainfall   | CB110    | 0.043      | 8.51               | 52.001            | 3.5      | 0   |
| S5                    | Rainfall   | Roof_1   | 0.0952     | 99.998             | 104.996           | 1        | 0   |
| S6                    | Rainfall   | CB115    | 0.0803     | 66.775             | 45.001            | 2.5      | 0   |
| S7                    | Rainfall   | CB116    | 0.0416     | 90.416             | 28.601            | 2.7      | 0   |
| S8                    | Rainfall   | Roof_2   | 0.0965     | 100                | 105.005           | 1        | 0   |
| S9                    | Rainfall   | CB117    | 0.0544     | 93.568             | 50                | 2.4      | 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                 | PERVIOUS | 100 |
| S11                   | 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                 | PERVIOUS | 100 |
| S4                    | 0.013      | 0.25     | 1.57       | 4.67               | 0                 | PERVIOUS | 100 |
| S5                    | 0.013      | 0.25     | 1.57       | 4.67               | 0                 | OUTLET   |     |
| 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                 | OUTLET   |     |
| 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                 |          |     |
| S2                    | 76.2       | 13.2     | 4.14       | 7                  | 0                 |          |     |
| S3                    | 76.2       | 13.2     | 4.14       | 7                  | 0                 |          |     |
| S4                    | 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                 |          |     |
| [OUTFALLS]            |            |          |            |                    |                   |          |     |
| ;;Name                | Elevation  | Type     | Stage Data | Gated              | Route To          |          |     |
| OF4                   | 80.628     | FIXED    | 81.11      | NO                 |                   |          |     |
| OF7                   | 80.628     | FIXED    | 81.11      | NO                 |                   |          |     |
| STUB15                | 80.628     | FIXED    | 81.11      | NO                 |                   |          |     |
| STUB16                | 80.646     | FIXED    | 81.28      | NO                 |                   |          |     |
| [STORAGE]             |            |          |            |                    |                   |          |     |
| ;;Name                | Elev.      | MaxDepth | InitDepth  | Shape              | Curve Name/Params |          |     |
| SurDepth Fevap        | Psi        | Ksat     | IMD        |                    |                   |          |     |
| CB110                 | 83.75      | 1.9      | 0          | TABULAR            | CB110             |          | 0   |
| CB111                 | 83.59      | 2.01     | 0          | TABULAR            | CB111             |          | 0   |
| CB112                 | 83.28      | 2.12     | 0          | TABULAR            | CB112             |          | 0   |
| CB113                 | 83.55      | 1.7      | 0          | TABULAR            | CB113             |          | 0   |
| CB114                 | 85.3       | 0.25     | 0          | TABULAR            | CB114             |          | 0   |
| CB115                 | 85.25      | 0.31     | 0          | TABULAR            | CB115             |          | 0   |
| CB116                 | 85.2       | 0.4      | 0          | TABULAR            | CB116             |          | 0   |
| CB117                 | 85.15      | 0.15     | 0          | TABULAR            | CB117             |          | 0   |
| CB118                 | 85.22      | 0.18     | 0          | TABULAR            | CB118             |          | 0   |
| Roof_1                | 96.35      | 0.15     | 0          | FUNCTIONAL         | 0                 | 0        | 635 |
| Roof_2                | 96.35      | 0.15     | 0          | FUNCTIONAL         | 0                 | 0        | 643 |
| St_UnGrd              | 81.8       | 1        | 0          | FUNCTIONAL         | 0                 | 0        | 49  |
| [CONDUITS]            |            |          |            |                    |                   |          |     |
| ;;Name                | From Node  | To Node  | Length     | Roughness          | InOffset          |          |     |
| OutOffset             | InitFlow   | MaxFlow  |            |                    |                   |          |     |

|                  |        |                                               |                   |                    |           |              |          |             |       |
|------------------|--------|-----------------------------------------------|-------------------|--------------------|-----------|--------------|----------|-------------|-------|
|                  | 0.08   | CB111                                         |                   | CB112              |           | 28.913       | 0.013    | 83.59       | 83.34 |
| C3               |        | CB113                                         |                   | CB112              |           | 31.317       | 0.013    | 83.55       | 83.36 |
| C5               | 0.04   | CB110                                         |                   | CB111              |           | 20.475       | 0.013    | 83.75       | 83.59 |
| O                | 0.04   |                                               |                   |                    |           |              |          |             |       |
| [WEIRS]          |        |                                               |                   |                    |           |              |          |             |       |
| ;;Name           |        | From Node                                     |                   | To Node            |           | Type         | CrestHt  | Qcoeff      | Gated |
| EndCoeff         |        | Surchage                                      |                   | RoadWidth RoadSurf |           | Coeff. Curve |          |             |       |
| ;;               |        |                                               |                   |                    |           |              |          |             |       |
| W1               |        | CB115                                         |                   | CB116              |           | TRANSVERSE   | 85.45    | 1.84        | NO    |
| W2               | 0      | NO                                            |                   |                    |           |              |          |             |       |
| O                |        | CB116                                         |                   | CB117              |           | TRANSVERSE   | 85.35    | 1.84        | NO    |
| W3               | 0      | NO                                            |                   |                    |           |              |          |             |       |
| O                |        | CB112                                         |                   | CB113              |           | TRANSVERSE   | 85.38    | 1.84        | NO    |
| W4               | 0      | NO                                            |                   |                    |           |              |          |             |       |
| O                |        | CB114                                         |                   | CB115              |           | TRANSVERSE   | 85.5     | 1.84        | NO    |
| W5               | 0      | NO                                            |                   |                    |           |              |          |             |       |
| O                |        | CB110                                         |                   | CB112              |           | TRANSVERSE   | 85.6     | 1.84        | NO    |
|                  | 0      | NO                                            |                   |                    |           |              |          |             |       |
| [OUTLETS]        |        |                                               |                   |                    |           |              |          |             |       |
| ;;Name           |        | From Node                                     |                   | To Node            | Offset    | Type         |          |             |       |
| Qtable/Qcoeff    |        | Qexpon                                        |                   | Gated              |           |              |          |             |       |
| ;;               |        |                                               |                   |                    |           |              |          |             |       |
| C2               |        | CB112                                         |                   | STUB16             | 83.28     | TABULAR/HEAD |          |             |       |
| Vortex_ICD_95 NO |        |                                               |                   |                    |           |              |          |             |       |
| OL1              |        | CB115                                         |                   | St_UnGrd           | 85.25     | TABULAR/HEAD |          | ZURN_Z150F- |       |
| 6NH              |        | NO                                            |                   |                    |           |              |          |             |       |
| OL2              |        | CB116                                         |                   | St_UnGrd           | 85.2      | TABULAR/HEAD |          | ZURN_Z150F- |       |
| 6NH              |        | NO                                            |                   |                    |           |              |          |             |       |
| OL3              |        | CB117                                         |                   | St_UnGrd           | 85.15     | TABULAR/HEAD |          | ZURN_Z150F- |       |
| 6NH              |        | NO                                            |                   |                    |           |              |          |             |       |
| OL4              |        | Roof_1                                        |                   | STUB15             | 96.35     | TABULAR/HEAD |          | O_Roof1     |       |
| NO               |        |                                               |                   |                    |           |              |          |             |       |
| OL5              |        | Roof_2                                        |                   | OF4                | 96.35     | TABULAR/HEAD |          | O_Roof1     |       |
| NO               |        |                                               |                   |                    |           |              |          |             |       |
| OL6              |        | CB114                                         |                   | St_UnGrd           | 85.3      | TABULAR/HEAD |          | ZURN_Z150F- |       |
| 6NH              |        | NO                                            |                   |                    |           |              |          |             |       |
| OL7              |        | St_UnGrd                                      |                   | OF7                | 81.8      | TABULAR/HEAD |          | O_St_UnGrd  |       |
| NO               |        |                                               |                   |                    |           |              |          |             |       |
| OL8              |        | CB118                                         |                   | St_UnGrd           | 85.22     | TABULAR/HEAD |          | ZURN_Z150F- |       |
| 6NH              |        | NO                                            |                   |                    |           |              |          |             |       |
| [XSECTIONS]      |        |                                               |                   |                    |           |              |          |             |       |
| ;;Link           |        | Shape                                         | Geom1             | Geom2              | Geom3     | Geom4        | Barrels  |             |       |
| Culvert          |        |                                               |                   |                    |           |              |          |             |       |
| ;;               |        |                                               |                   |                    |           |              |          |             |       |
| C1               |        | CIRCULAR                                      | 0.15              | 0                  | 0         | 0            | 1        |             |       |
| C3               |        | CIRCULAR                                      | 0.15              | 0                  | 0         | 0            | 1        |             |       |
| C5               |        | CIRCULAR                                      | 0.15              | 0                  | 0         | 0            | 1        |             |       |
| W1               |        | RECT_OPEN                                     | 0.11              | 17.1               | 0         | 0            |          |             |       |
| W2               |        | RECT_OPEN                                     | 0.25              | 17.1               | 0         | 0            |          |             |       |
| W3               |        | RECT_OPEN                                     | 0.02              | 4.58               | 0         | 0            |          |             |       |
| W4               |        | RECT_OPEN                                     | 0.05              | 7                  | 0         | 0            |          |             |       |
| W5               |        | RECT_OPEN                                     | 0.05              | 3.487              | 0         | 0            |          |             |       |
| [LOSSES]         |        |                                               |                   |                    |           |              |          |             |       |
| ;;Link           |        | Kentry                                        | Kexit             | Kavg               | Flap Gate | Seepage      |          |             |       |
| ;;               |        |                                               |                   |                    |           |              |          |             |       |
| [INFLOWS]        |        |                                               |                   |                    |           |              |          |             |       |
| ;;Node           |        | Constituent                                   | Time Series       | Type               | Mfactor   | Sfactor      | Baseline |             |       |
| Pattern          |        |                                               |                   |                    |           |              |          |             |       |
| ;;               |        |                                               |                   |                    |           |              |          |             |       |
| St_UnGrd         |        | FLOW                                          | InfiltratedInflow | FLOW               | 1.0       | 1            | 0        |             |       |
| [CURVES]         |        |                                               |                   |                    |           |              |          |             |       |
| ;;Name           |        | Type                                          | X-Value           | Y-Value            |           |              |          |             |       |
| ;;               |        |                                               |                   |                    |           |              |          |             |       |
| ;Tempest Rating  |        | Curve for MHF IPEX TYPE A, No grate allowance |                   |                    |           |              |          |             |       |
| MHF IPEX TYPE_A  | Rating | 0                                             | 0                 |                    |           |              |          |             |       |
| MHF IPEX TYPE_A  |        | 0.1                                           | 0.0057            |                    |           |              |          |             |       |
| MHF IPEX TYPE_A  |        | 0.2                                           | 0.0081            |                    |           |              |          |             |       |
| MHF IPEX TYPE_A  |        | 0.3                                           | 0.0099            |                    |           |              |          |             |       |
| MHF IPEX TYPE_A  |        | 0.4                                           | 0.0114            |                    |           |              |          |             |       |
| MHF IPEX TYPE_A  |        | 0.5                                           | 0.0128            |                    |           |              |          |             |       |
| MHF IPEX TYPE_A  |        | 0.6                                           | 0.014             |                    |           |              |          |             |       |
| MHF IPEX TYPE_A  |        | 0.7                                           | 0.0151            |                    |           |              |          |             |       |
| MHF IPEX TYPE_A  |        | 0.8                                           | 0.0162            |                    |           |              |          |             |       |
| MHF IPEX TYPE_A  |        | 0.9                                           | 0.0172            |                    |           |              |          |             |       |
| MHF IPEX TYPE_A  |        | 1                                             | 0.0181            |                    |           |              |          |             |       |
| MHF IPEX TYPE_A  |        | 1.2                                           | 0.0198            |                    |           |              |          |             |       |
| MHF IPEX TYPE_A  |        | 1.4                                           | 0.0214            |                    |           |              |          |             |       |
| MHF IPEX TYPE_A  |        | 1.6                                           | 0.0229            |                    |           |              |          |             |       |
| MHF IPEX TYPE_A  |        | 1.8                                           | 0.0243            |                    |           |              |          |             |       |
| MHF IPEX TYPE_A  |        | 2                                             | 0.0256            |                    |           |              |          |             |       |
| MHF IPEX TYPE_A  |        | 2.5                                           | 0.0286            |                    |           |              |          |             |       |
| MHF IPEX TYPE_A  |        | 3                                             | 0.0313            |                    |           |              |          |             |       |
| ;Tempest Rating  |        | Curve for MHF IPEX TYPE B, No grate allowance |                   |                    |           |              |          |             |       |
| MHF IPEX TYPE_B  | Rating | 0                                             | 0                 |                    |           |              |          |             |       |
| MHF IPEX TYPE_B  |        | 0.1                                           | 0.0081            |                    |           |              |          |             |       |
| MHF IPEX TYPE_B  |        | 0.2                                           | 0.0115            |                    |           |              |          |             |       |
| MHF IPEX TYPE_B  |        | 0.3                                           | 0.0141            |                    |           |              |          |             |       |
| MHF IPEX TYPE_B  |        | 0.4                                           | 0.0162            |                    |           |              |          |             |       |
| MHF IPEX TYPE_B  |        | 0.5                                           | 0.0182            |                    |           |              |          |             |       |
| MHF IPEX TYPE_B  |        | 0.6                                           | 0.0199            |                    |           |              |          |             |       |
| MHF IPEX TYPE_B  |        | 0.7                                           | 0.0215            |                    |           |              |          |             |       |
| MHF IPEX TYPE_B  |        | 0.8                                           | 0.023             |                    |           |              |          |             |       |
| MHF IPEX TYPE_B  |        | 0.9                                           | 0.0244            |                    |           |              |          |             |       |
| MHF IPEX TYPE_B  |        | 1                                             | 0.0257            |                    |           |              |          |             |       |
| MHF IPEX TYPE_B  |        | 1.2                                           | 0.0281            |                    |           |              |          |             |       |
| MHF IPEX TYPE_B  |        | 1.4                                           | 0.0304            |                    |           |              |          |             |       |
| MHF IPEX TYPE_B  |        | 1.6                                           | 0.0325            |                    |           |              |          |             |       |
| MHF IPEX TYPE_B  |        | 1.8                                           | 0.0344            |                    |           |              |          |             |       |
| MHF IPEX TYPE_B  |        | 2                                             | 0.0363            |                    |           |              |          |             |       |
| MHF IPEX TYPE_B  |        | 2.5                                           | 0.0406            |                    |           |              |          |             |       |
| MHF IPEX TYPE_B  |        | 3                                             | 0.0445            |                    |           |              |          |             |       |
| ;Tempest Rating  |        | Curve for MHF IPEX TYPE C, No grate allowance |                   |                    |           |              |          |             |       |
| MHF IPEX TYPE_C  | Rating | 0                                             | 0                 |                    |           |              |          |             |       |
| MHF IPEX TYPE_C  |        | 0.1                                           | 0.0106            |                    |           |              |          |             |       |
| MHF IPEX TYPE_C  |        | 0.2                                           | 0.015             |                    |           |              |          |             |       |
| MHF IPEX TYPE_C  |        | 0.3                                           | 0.0183            |                    |           |              |          |             |       |
| MHF IPEX TYPE_C  |        | 0.4                                           | 0.0212            |                    |           |              |          |             |       |
| MHF IPEX TYPE_C  |        | 0.5                                           | 0.0237            |                    |           |              |          |             |       |
| MHF IPEX TYPE_C  |        | 0.6                                           | 0.0259            |                    |           |              |          |             |       |
| MHF IPEX TYPE_C  |        | 0.7                                           | 0.028             |                    |           |              |          |             |       |
| MHF IPEX TYPE_C  |        | 0.8                                           | 0.0299            |                    |           |              |          |             |       |
| MHF IPEX TYPE_C  |        | 0.9                                           | 0.0317            |                    |           |              |          |             |       |
| MHF IPEX TYPE_C  |        | 1                                             | 0.0335            |                    |           |              |          |             |       |
| MHF IPEX TYPE_C  |        | 1.2                                           | 0.0366            |                    |           |              |          |             |       |
| MHF IPEX TYPE_C  |        | 1.4                                           | 0.0396            |                    |           |              |          |             |       |
| MHF IPEX TYPE_C  |        | 1.6                                           | 0.0423            |                    |           |              |          |             |       |
| MHF IPEX TYPE_C  |        | 1.8                                           | 0.0449            |                    |           |              |          |             |       |
| MHF IPEX TYPE_C  |        | 2                                             | 0.0473            |                    |           |              |          |             |       |
| MHF IPEX TYPE_C  |        | 2.5                                           | 0.0529            |                    |           |              |          |             |       |
| MHF IPEX TYPE_C  |        | 3                                             | 0.0579            |                    |           |              |          |             |       |
| ;Tempest Rating  |        | Curve for MHF IPEX TYPE D, No grate allowance |                   |                    |           |              |          |             |       |
| MHF IPEX TYPE_D  | Rating | 0                                             | 0                 |                    |           |              |          |             |       |
| MHF IPEX TYPE_D  |        | 0.1                                           | 0.0154            |                    |           |              |          |             |       |
| MHF IPEX TYPE_D  |        | 0.2                                           | 0.0217            |                    |           |              |          |             |       |
| MHF IPEX TYPE_D  |        | 0.3                                           | 0.0266            |                    |           |              |          |             |       |
| MHF IPEX TYPE_D  |        | 0.4                                           | 0.0307            |                    |           |              |          |             |       |
| MHF IPEX TYPE_D  |        | 0.5                                           | 0.0343            |                    |           |              |          |             |       |
| MHF IPEX TYPE_D  |        | 0.6                                           | 0.0376            |                    |           |              |          |             |       |
| MHF IPEX TYPE_D  |        | 0.7                                           | 0.0406            |                    |           |              |          |             |       |
| MHF IPEX TYPE_D  |        | 0.8                                           | 0.0434            |                    |           |              |          |             |       |
| MHF IPEX TYPE_D  |        | 0.9                                           | 0.0461            |                    |           |              |          |             |       |
| MHF IPEX TYPE_D  |        | 1                                             | 0.0485            |                    |           |              |          |             |       |
| MHF IPEX TYPE_D  |        | 1.2                                           | 0.0532            |                    |           |              |          |             |       |
| MHF IPEX TYPE_D  |        | 1.4                                           | 0.0574            |                    |           |              |          |             |       |

|                                                               |        |        |               |     |        |
|---------------------------------------------------------------|--------|--------|---------------|-----|--------|
| MHF_IPEX_TYPE_D                                               | 1.6    | 0.0614 | Vortex_ICD_55 | 1   | 0.0027 |
| MHF_IPEX_TYPE_D                                               | 1.8    | 0.0631 | Vortex_ICD_55 | 1.2 | 0.0032 |
| MHF_IPEX_TYPE_D                                               | 2      | 0.0687 | Vortex_ICD_55 | 1.4 | 0.0032 |
| MHF_IPEX_TYPE_D                                               | 2.5    | 0.0768 | Vortex_ICD_55 | 1.6 | 0.0034 |
| MHF_IPEX_TYPE_D                                               | 3      | 0.0841 | Vortex_ICD_55 | 1.8 | 0.0036 |
|                                                               |        |        | Vortex_ICD_55 | 2   | 0.0038 |
|                                                               |        |        | Vortex_ICD_55 | 2.5 | 0.0043 |
|                                                               |        |        | Vortex_ICD_55 | 3   | 0.0047 |
| ;Tempest Rating Curve for MHF IPEX TYPE E, No grate allowance |        |        |               |     |        |
| MHF_IPEX_TYPE_E                                               | Rating | 0      | 0             |     |        |
| MHF_IPEX_TYPE_E                                               | 0.1    | 0.0205 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 0.2    | 0.0289 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 0.3    | 0.0355 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 0.4    | 0.0409 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 0.5    | 0.0458 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 0.6    | 0.0501 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 0.7    | 0.0542 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 0.8    | 0.0579 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 0.9    | 0.0614 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 1      | 0.0647 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 1.2    | 0.0709 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 1.4    | 0.0766 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 1.6    | 0.0819 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 1.8    | 0.0868 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 2      | 0.0915 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 2.5    | 0.1023 |               |     |        |
| MHF_IPEX_TYPE_E                                               | 3      | 0.1121 |               |     |        |
| O_Roof1                                                       | Rating | 0      | 0             |     |        |
| O_Roof1                                                       | 0.001  | 0.002  |               |     |        |
| O_Roof1                                                       | 0.15   | 0.002  |               |     |        |
| O_Roof2                                                       | Rating | 0      | 0             |     |        |
| O_Roof2                                                       | 0.001  | 0.0025 |               |     |        |
| O_Roof2                                                       | 0.15   | 0.0025 |               |     |        |
| O_St_UnGrd                                                    | Rating | 0      | 0             |     |        |
| O_St_UnGrd                                                    | 0.01   | 0.029  |               |     |        |
| O_St_UnGrd                                                    | 1      | 0.029  |               |     |        |
| ;Tempest Rating Curve for Vortex ICD 100, No grate allowance  |        |        |               |     |        |
| Vortex_ICD_100                                                | Rating | 0      | 0             |     |        |
| Vortex_ICD_100                                                | 0.1    | 0.0028 |               |     |        |
| Vortex_ICD_100                                                | 0.2    | 0.004  |               |     |        |
| Vortex_ICD_100                                                | 0.3    | 0.0049 |               |     |        |
| Vortex_ICD_100                                                | 0.4    | 0.0056 |               |     |        |
| Vortex_ICD_100                                                | 0.5    | 0.0063 |               |     |        |
| Vortex_ICD_100                                                | 0.6    | 0.0069 |               |     |        |
| Vortex_ICD_100                                                | 0.7    | 0.0075 |               |     |        |
| Vortex_ICD_100                                                | 0.8    | 0.008  |               |     |        |
| Vortex_ICD_100                                                | 0.9    | 0.0085 |               |     |        |
| Vortex_ICD_100                                                | 1      | 0.0089 |               |     |        |
| Vortex_ICD_100                                                | 1.2    | 0.0098 |               |     |        |
| Vortex_ICD_100                                                | 1.4    | 0.0106 |               |     |        |
| Vortex_ICD_100                                                | 1.6    | 0.0113 |               |     |        |
| Vortex_ICD_100                                                | 1.8    | 0.012  |               |     |        |
| Vortex_ICD_100                                                | 2      | 0.0126 |               |     |        |
| Vortex_ICD_100                                                | 2.5    | 0.0141 |               |     |        |
| Vortex_ICD_100                                                | 3      | 0.0155 |               |     |        |
| ;Tempest Rating Curve for Vortex ICD 105, No grate allowance  |        |        |               |     |        |
| Vortex_ICD_105                                                | Rating | 0      | 0             |     |        |
| Vortex_ICD_105                                                | 0.1    | 0.0031 |               |     |        |
| Vortex_ICD_105                                                | 0.2    | 0.0044 |               |     |        |
| Vortex_ICD_105                                                | 0.3    | 0.0054 |               |     |        |
| Vortex_ICD_105                                                | 0.4    | 0.0062 |               |     |        |
| Vortex_ICD_105                                                | 0.5    | 0.0069 |               |     |        |
| Vortex_ICD_105                                                | 0.6    | 0.0076 |               |     |        |
| Vortex_ICD_105                                                | 0.7    | 0.0082 |               |     |        |
| Vortex_ICD_105                                                | 0.8    | 0.0088 |               |     |        |
| Vortex_ICD_105                                                | 0.9    | 0.0093 |               |     |        |
| Vortex_ICD_105                                                | 1      | 0.0098 |               |     |        |
| Vortex_ICD_105                                                | 1.2    | 0.0107 |               |     |        |
| Vortex_ICD_105                                                | 1.4    | 0.0116 |               |     |        |
| Vortex_ICD_105                                                | 1.6    | 0.0124 |               |     |        |
| Vortex_ICD_105                                                | 1.8    | 0.0131 |               |     |        |
| Vortex_ICD_105                                                | 2      | 0.0139 |               |     |        |
| Vortex_ICD_105                                                | 2.5    | 0.0155 |               |     |        |
| Vortex_ICD_105                                                | 3      | 0.017  |               |     |        |
| ;Tempest Rating Curve for Vortex ICD 40, No grate allowance   |        |        |               |     |        |
| Vortex_ICD_40                                                 | Rating | 0      | 0             |     |        |
| Vortex_ICD_40                                                 | 0.1    | 0.0004 |               |     |        |
| Vortex_ICD_40                                                 | 0.2    | 0.0006 |               |     |        |
| Vortex_ICD_40                                                 | 0.3    | 0.0007 |               |     |        |
| Vortex_ICD_40                                                 | 0.4    | 0.0009 |               |     |        |
| Vortex_ICD_40                                                 | 0.5    | 0.001  |               |     |        |
| Vortex_ICD_40                                                 | 0.6    | 0.001  |               |     |        |
| Vortex_ICD_40                                                 | 0.7    | 0.0011 |               |     |        |
| Vortex_ICD_40                                                 | 0.8    | 0.0012 |               |     |        |
| Vortex_ICD_40                                                 | 0.9    | 0.0013 |               |     |        |
| Vortex_ICD_40                                                 | 1      | 0      |               |     |        |

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

|                                                             |            |                     |         |                     |            |          |              |
|-------------------------------------------------------------|------------|---------------------|---------|---------------------|------------|----------|--------------|
| ;Tempest Rating Curve for Vortex ICD 95, No grate allowance |            |                     |         | InfiltratedInflow   | 01/01/2000 | 01:00:00 | 0.0004344156 |
| Vortex_ICD_95                                               | Rating     | 0                   | 0       | InfiltratedInflow   | 01/01/2000 | 01:01:00 | 0.0004185629 |
| Vortex_ICD_95                                               | 0.1        | 0.0026              |         | InfiltratedInflow   | 01/01/2000 | 01:02:00 | 0.0004037672 |
| Vortex_ICD_95                                               | 0.2        | 0.0036              |         | InfiltratedInflow   | 01/01/2000 | 01:03:00 | 0.0003895979 |
| Vortex_ICD_95                                               | 0.3        | 0.0044              |         | InfiltratedInflow   | 01/01/2000 | 01:04:00 | 0.0003770694 |
| Vortex_ICD_95                                               | 0.4        | 0.0051              |         | InfiltratedInflow   | 01/01/2000 | 01:05:00 | 0.0003650402 |
| Vortex_ICD_95                                               | 0.5        | 0.0057              |         | InfiltratedInflow   | 01/01/2000 | 01:06:00 | 0.0003538131 |
| Vortex_ICD_95                                               | 0.6        | 0.0062              |         | InfiltratedInflow   | 01/01/2000 | 01:07:00 | 0.0003433344 |
| Vortex_ICD_95                                               | 0.7        | 0.0067              |         | InfiltratedInflow   | 01/01/2000 | 01:08:00 | 0.0003335544 |
| Vortex_ICD_95                                               | 0.8        | 0.0071              |         | InfiltratedInflow   | 01/01/2000 | 01:09:00 | 0.0003244265 |
| Vortex_ICD_95                                               | 0.9        | 0.0076              |         | InfiltratedInflow   | 01/01/2000 | 01:10:00 | 0.0003159071 |
| Vortex_ICD_95                                               | 1.0        | 0.008               |         | InfiltratedInflow   | 01/01/2000 | 01:11:00 | 0.0003079558 |
| Vortex_ICD_95                                               | 1.2        | 0.0087              |         | InfiltratedInflow   | 01/01/2000 | 01:12:00 | 0.0003005346 |
| Vortex_ICD_95                                               | 1.4        | 0.0094              |         | InfiltratedInflow   | 01/01/2000 | 01:13:00 | 0.0002936082 |
| Vortex_ICD_95                                               | 1.6        | 0.0101              |         | InfiltratedInflow   | 01/01/2000 | 01:14:00 | 0.0002871436 |
| Vortex_ICD_95                                               | 1.8        | 0.0107              |         | InfiltratedInflow   | 01/01/2000 | 01:15:00 | 0.0002811101 |
| Vortex_ICD_95                                               | 2          | 0.0113              |         | InfiltratedInflow   | 01/01/2000 | 01:16:00 | 0.0002754788 |
| Vortex_ICD_95                                               | 2.5        | 0.0126              |         | InfiltratedInflow   | 01/01/2000 | 01:17:00 | 0.0002702229 |
| Vortex_ICD_95                                               | 3          | 0.0138              |         | InfiltratedInflow   | 01/01/2000 | 01:18:00 | 0.0002653175 |
| ;From Zurn Manual RD178                                     |            |                     |         | InfiltratedInflow   | 01/01/2000 | 01:19:00 | 0.0002607392 |
| ZURN_Z150F-6NH                                              | Rating     | 0                   | 0       | InfiltratedInflow   | 01/01/2000 | 01:20:00 | 0.0002564661 |
| ZURN_Z150F-6NH                                              | 0.0127     | 0.00503838308477861 |         | InfiltratedInflow   | 01/01/2000 | 01:21:00 | 0.0002524779 |
| ZURN_Z150F-6NH                                              | 0.0257     | 0.0132420013231177  |         | InfiltratedInflow   | 01/01/2000 | 01:22:00 | 0.0002487556 |
| ZURN_Z150F-6NH                                              | 0.0384     | 0.0234992054543888  |         | InfiltratedInflow   | 01/01/2000 | 01:23:00 | 0.0002452815 |
| ZURN_Z150F-6NH                                              | 0.0508     | 0.0357128365761305  |         | InfiltratedInflow   | 01/01/2000 | 01:24:00 | 0.000242039  |
| ZURN_Z150F-6NH                                              | 0.0765     | 0.0425019726111045  |         | InfiltratedInflow   | 01/01/2000 | 01:25:00 | 0.0002390127 |
| ZURN_Z150F-6NH                                              | 0.1024     | 0.0433196215564931  |         | InfiltratedInflow   | 01/01/2000 | 01:26:00 | 0.0002361882 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 01:27:00 | 0.000233552  |
| CB110                                                       | Storage    | 0                   | 0.073   | InfiltratedInflow   | 01/01/2000 | 01:28:00 | 0.0002310915 |
| CB110                                                       | 1.55       | 0.073               |         | InfiltratedInflow   | 01/01/2000 | 01:29:00 | 0.0002287951 |
| CB110                                                       | 1.85       | 120.85              |         | InfiltratedInflow   | 01/01/2000 | 01:30:00 | 0.0002266519 |
| CB110                                                       | 1.9        | 120.85              |         | InfiltratedInflow   | 01/01/2000 | 01:31:00 | 0.0002246515 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 01:32:00 | 0.0002227845 |
| CB111                                                       | Storage    | 0                   | 0.073   | InfiltratedInflow   | 01/01/2000 | 01:33:00 | 0.0002210419 |
| CB111                                                       | 2.01       | 0.073               |         | InfiltratedInflow   | 01/01/2000 | 01:34:00 | 0.0002194156 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 01:35:00 | 0.0002178977 |
| CB112                                                       | Storage    | 0                   | 0.36    | InfiltratedInflow   | 01/01/2000 | 01:36:00 | 0.0002164805 |
| CB112                                                       | 1.92       | 0.36                |         | InfiltratedInflow   | 01/01/2000 | 01:37:00 | 0.0002151587 |
| CB112                                                       | 2.11       | 19.13               |         | InfiltratedInflow   | 01/01/2000 | 01:38:00 | 0.0002139246 |
| CB112                                                       | 2.12       | 19.13               |         | InfiltratedInflow   | 01/01/2000 | 01:39:00 | 0.0002127728 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 01:40:00 | 0.0002116978 |
| CB113                                                       | Storage    | 0                   | 0.073   | InfiltratedInflow   | 01/01/2000 | 01:41:00 | 0.0002106944 |
| CB113                                                       | 1.6        | 0.073               |         | InfiltratedInflow   | 01/01/2000 | 01:42:00 | 0.000209758  |
| CB113                                                       | 1.7        | 3.62                |         | InfiltratedInflow   | 01/01/2000 | 01:43:00 | 0.000208884  |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 01:44:00 | 0.0002080682 |
| CB114                                                       | Storage    | 0                   | 0.36    | InfiltratedInflow   | 01/01/2000 | 01:45:00 | 0.0002073069 |
| CB114                                                       | 1.2        | 19.2                |         | InfiltratedInflow   | 01/01/2000 | 01:46:00 | 0.0002065963 |
| CB114                                                       | 0.25       | 19.2                |         | InfiltratedInflow   | 01/01/2000 | 01:47:00 | 0.0002059331 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 01:48:00 | 0.0002053141 |
| CB115                                                       | Storage    | 0                   | 0.36    | InfiltratedInflow   | 01/01/2000 | 01:49:00 | 0.0002047364 |
| CB115                                                       | 0.2        | 155.53              |         | InfiltratedInflow   | 01/01/2000 | 01:50:00 | 0.0002041971 |
| CB115                                                       | 0.31       | 155.53              |         | InfiltratedInflow   | 01/01/2000 | 01:51:00 | 0.0002036939 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 01:52:00 | 0.0002032242 |
| CB116                                                       | Storage    | 0                   | 0.36    | InfiltratedInflow   | 01/01/2000 | 01:53:00 | 0.0002027858 |
| CB116                                                       | 0.15       | 73.19               |         | InfiltratedInflow   | 01/01/2000 | 01:54:00 | 0.0002023767 |
| CB116                                                       | 0.4        | 73.19               |         | InfiltratedInflow   | 01/01/2000 | 01:55:00 | 0.0002019948 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 01:56:00 | 0.0002016384 |
| CB117                                                       | Storage    | 0                   | 0.36    | InfiltratedInflow   | 01/01/2000 | 01:57:00 | 0.0002013057 |
| CB117                                                       | 0.15       | 122.26              |         | InfiltratedInflow   | 01/01/2000 | 01:58:00 | 0.0002009952 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 01:59:00 | 0.0002007055 |
| CB118                                                       | Storage    | 0                   | 0.36    | InfiltratedInflow   | 01/01/2000 | 02:00:00 | 0.000200435  |
| CB118                                                       | 0.18       | 37.7                |         | InfiltratedInflow   | 01/01/2000 | 02:01:00 | 0.0002001826 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:02:00 | 0.000199947  |
| [TIMESERIES]                                                |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:03:00 | 0.0001997271 |
| ;Name                                                       | Date       | Time                | Value   | InfiltratedInflow   | 01/01/2000 | 02:04:00 | 0.0001995219 |
| ;;                                                          |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:05:00 | 0.0001993304 |
| ;Rainfall (mm/hr)                                           |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:06:00 | 0.0001991516 |
| 3CHI100                                                     | 01/01/2000 | 00:00:00            | 5.339   | InfiltratedInflow   | 01/01/2000 | 02:07:00 | 0.0001989848 |
| 3CHI100                                                     | 01/01/2000 | 00:10:00            | 6.376   | InfiltratedInflow   | 01/01/2000 | 02:08:00 | 0.0001988829 |
| 3CHI100                                                     | 01/01/2000 | 00:20:00            | 7.977   | InfiltratedInflow   | 01/01/2000 | 02:09:00 | 0.0001986877 |
| 3CHI100                                                     | 01/01/2000 | 00:30:00            | 10.797  | InfiltratedInflow   | 01/01/2000 | 02:10:00 | 0.000198548  |
| 3CHI100                                                     | 01/01/2000 | 00:40:00            | 17.136  | InfiltratedInflow   | 01/01/2000 | 02:11:00 | 0.0001984214 |
| 3CHI100                                                     | 01/01/2000 | 00:50:00            | 45.128  | InfiltratedInflow   | 01/01/2000 | 02:12:00 | 0.0001983033 |
| 3CHI100                                                     | 01/01/2000 | 01:00:00            | 178.107 | InfiltratedInflow   | 01/01/2000 | 02:13:00 | 0.000198193  |
| 3CHI100                                                     | 01/01/2000 | 01:10:00            | 51.056  | InfiltratedInflow   | 01/01/2000 | 02:14:00 | 0.00019809   |
| 3CHI100                                                     | 01/01/2000 | 01:20:00            | 26.163  | InfiltratedInflow   | 01/01/2000 | 02:15:00 | 0.000197994  |
| 3CHI100                                                     | 01/01/2000 | 01:30:00            | 17.571  | InfiltratedInflow   | 01/01/2000 | 02:16:00 | 0.0001979043 |
| 3CHI100                                                     | 01/01/2000 | 01:40:00            | 13.277  | InfiltratedInflow   | 01/01/2000 | 02:17:00 | 0.0001978206 |
| 3CHI100                                                     | 01/01/2000 | 01:50:00            | 10.712  | InfiltratedInflow   | 01/01/2000 | 02:18:00 | 0.0001977425 |
| 3CHI100                                                     | 01/01/2000 | 02:00:00            | 9.008   | InfiltratedInflow   | 01/01/2000 | 02:19:00 | 0.0001976696 |
| 3CHI100                                                     | 01/01/2000 | 02:10:00            | 7.793   | InfiltratedInflow   | 01/01/2000 | 02:20:00 | 0.0001976015 |
| 3CHI100                                                     | 01/01/2000 | 02:20:00            | 6.883   | InfiltratedInflow   | 01/01/2000 | 02:21:00 | 0.000197538  |
| 3CHI100                                                     | 01/01/2000 | 02:30:00            | 6.174   | InfiltratedInflow   | 01/01/2000 | 02:22:00 | 0.0001974788 |
| 3CHI100                                                     | 01/01/2000 | 02:40:00            | 5.607   | InfiltratedInflow   | 01/01/2000 | 02:23:00 | 0.0001974234 |
| 3CHI100                                                     | 01/01/2000 | 02:50:00            | 5.142   | InfiltratedInflow   | 01/01/2000 | 02:24:00 | 0.0001973718 |
| 3CHI100                                                     | 01/01/2000 | 03:00:00            | 0       | InfiltratedInflow   | 01/01/2000 | 02:25:00 | 0.0001973237 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:26:00 | 0.0001972787 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:27:00 | 0.0001972367 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:28:00 | 0.0001971975 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:29:00 | 0.0001971609 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:30:00 | 0.0001971268 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:31:00 | 0.000197092  |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:32:00 | 0.0001970653 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:33:00 | 0.0001970375 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:34:00 | 0.0001970116 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:35:00 | 0.0001969874 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:36:00 | 0.0001969649 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:37:00 | 0.0001969438 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:38:00 | 0.0001969242 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:39:00 | 0.0001969058 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:40:00 | 0.0001968887 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:41:00 | 0.0001968727 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:42:00 | 0.0001968578 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:43:00 | 0.0001968439 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:44:00 | 0.0001968309 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:45:00 | 0.0001968188 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:46:00 | 0.0001968077 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:47:00 | 0.0001967969 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:48:00 | 0.0001967871 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:49:00 | 0.0001967779 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:50:00 | 0.0001967693 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:51:00 | 0.0001967613 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:52:00 | 0.0001967538 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:53:00 | 0.0001967468 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:54:00 | 0.0001967403 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:55:00 | 0.0001967342 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:56:00 | 0.0001967285 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:57:00 | 0.0001967232 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:58:00 | 0.0001967183 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 02:59:00 | 0.0001967137 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 03:00:00 | 0.0001967094 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 03:01:00 | 5.729975E-05 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 03:02:00 | 2.133145E-06 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 03:03:00 | 1.137592E-06 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 03:04:00 | 6.886548E-07 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 03:05:00 | 4.534706E-07 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 03:06:00 | 3.170437E-07 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 03:07:00 | 2.318394E-07 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 03:08:00 | 1.755464E-07 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 03:09:00 | 1.366786E-07 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 03:10:00 | 1.088696E-07 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 03:11:00 | 8.387281E-08 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 03:12:00 | 7.290916E-08 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 03:13:00 | 6.097933E-08 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 03:14:00 | 5.161327E-08 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 03:15:00 | 4.382678E-08 |
|                                                             |            |                     |         | InfiltratedInflow   | 01/01/2000 | 03:16:00 | 3.810444E-08 |
|                                                             |            |                     |         | InfiltratedInflow</ |            |          |              |



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

|                   |            |          |              |                     |               |                     |               |                |
|-------------------|------------|----------|--------------|---------------------|---------------|---------------------|---------------|----------------|
| InfiltratedInflow | 01/01/2000 | 03:29:00 | 9.500691E-09 | InfiltratedInflow   | 01/01/2000    | 05:58:00            | 0             |                |
| InfiltratedInflow | 01/01/2000 | 03:30:00 | 8.764469E-09 | InfiltratedInflow   | 01/01/2000    | 05:59:00            | 0             |                |
| InfiltratedInflow | 01/01/2000 | 03:31:00 | 8.105708E-09 | InfiltratedInflow   | 01/01/2000    | 06:00:00            | 0             |                |
| InfiltratedInflow | 01/01/2000 | 03:32:00 | 7.514236E-09 |                     |               |                     |               |                |
| InfiltratedInflow | 01/01/2000 | 03:33:00 | 6.981469E-09 | [REPORT]            |               |                     |               |                |
| InfiltratedInflow | 01/01/2000 | 03:34:00 | 6.500121E-09 | ;;Reporting Options |               |                     |               |                |
| InfiltratedInflow | 01/01/2000 | 03:35:00 | 6.063984E-09 | INPUT               | YES           |                     |               |                |
| InfiltratedInflow | 01/01/2000 | 03:36:00 | 5.667742E-09 | CONTROLS            | NO            |                     |               |                |
| InfiltratedInflow | 01/01/2000 | 03:37:00 | 5.306823E-09 | SUBCATCHMENTS       | ALL           |                     |               |                |
| InfiltratedInflow | 01/01/2000 | 03:38:00 | 4.977278E-09 | NODES               | ALL           |                     |               |                |
| InfiltratedInflow | 01/01/2000 | 03:39:00 | 4.675687E-09 | LINKS               | ALL           |                     |               |                |
| InfiltratedInflow | 01/01/2000 | 03:40:00 | 4.399072E-09 |                     |               |                     |               |                |
| InfiltratedInflow | 01/01/2000 | 03:41:00 | 4.144837E-09 | [TAGS]              |               |                     |               |                |
| InfiltratedInflow | 01/01/2000 | 03:42:00 | 3.910706E-09 | Subcatch            | S1            | Ramp                |               |                |
| InfiltratedInflow | 01/01/2000 | 03:43:00 | 3.69468E-09  | Subcatch            | S5            | Building            |               |                |
| InfiltratedInflow | 01/01/2000 | 03:44:00 | 3.494999E-09 | Subcatch            | S6            | ParkingLot          |               |                |
| InfiltratedInflow | 01/01/2000 | 03:45:00 | 3.310106E-09 | Subcatch            | S7            | ParkingLot          |               |                |
| InfiltratedInflow | 01/01/2000 | 03:46:00 | 3.138622E-09 | Subcatch            | S8            | Building            |               |                |
| InfiltratedInflow | 01/01/2000 | 03:47:00 | 2.979323E-09 | Subcatch            | S9            | ParkingLot          |               |                |
| InfiltratedInflow | 01/01/2000 | 03:48:00 | 2.831117E-09 | Node                | St_UnGrd      | Underground_Storage |               |                |
| InfiltratedInflow | 01/01/2000 | 03:49:00 | 2.69303E-09  |                     |               |                     |               |                |
| InfiltratedInflow | 01/01/2000 | 03:50:00 | 2.564192E-09 | [MAP]               |               |                     |               |                |
| InfiltratedInflow | 01/01/2000 | 03:51:00 | 2.443821E-09 | DIMENSIONS          | 381280, 91645 | 5032948, 93205      | 381379, 86255 | 5033068, 41295 |
| InfiltratedInflow | 01/01/2000 | 03:52:00 | 2.331215E-09 | UNITS               | Meters        |                     |               |                |
| InfiltratedInflow | 01/01/2000 | 03:53:00 | 2.22574E-09  |                     |               |                     |               |                |
| InfiltratedInflow | 01/01/2000 | 03:54:00 | 2.126828E-09 | [COORDINATES]       |               |                     |               |                |
| InfiltratedInflow | 01/01/2000 | 03:55:00 | 2.033962E-09 | ;;Node              | X-Coord       | Y-Coord             |               |                |
| InfiltratedInflow | 01/01/2000 | 03:56:00 | 1.946675E-09 | ;;-----             |               |                     |               |                |
| InfiltratedInflow | 01/01/2000 | 03:57:00 | 1.864544E-09 | OP4                 | 381364, 593   | 5032973, 357        |               |                |
| InfiltratedInflow | 01/01/2000 | 03:58:00 | 1.787184E-09 | OP7                 | 381346, 502   | 5032963, 916        |               |                |
| InfiltratedInflow | 01/01/2000 | 03:59:00 | 1.714243E-09 | STUB15              | 381335, 776   | 5032954, 363        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:00:00 | 1.645403E-09 | STUB16              | 381319, 979   | 5032958, 277        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:01:00 | 1.572125E-09 | CB110               | 381293, 102   | 5033002, 513        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:02:00 | 3.099256E-09 | CB111               | 381307, 131   | 5032987, 6          |               |                |
| InfiltratedInflow | 01/01/2000 | 04:03:00 | 0            | CB112               | 381319, 643   | 5032961, 536        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:04:00 | 2.866268E-09 | CB113               | 381348, 344   | 5032974, 064        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:05:00 | 2.657084E-09 | CB114               | 381332, 566   | 5033036, 058        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:06:00 | 2.468666E-09 | CB115               | 381332, 827   | 5033018, 906        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:07:00 | 0            | CB116               | 381338, 815   | 5033005, 189        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:08:00 | 2.468666E-09 | CB117               | 381344, 774   | 5032991, 539        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:09:00 | 2.298437E-09 | CB118               | 381359, 473   | 5032992, 996        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:10:00 | 0            | Roof_1              | 381325, 164   | 5032977, 273        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:11:00 | 0            | Roof_2              | 381361, 335   | 5033013, 684        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:12:00 | 2.144199E-09 | St_UnGrd            | 381329, 806   | 5032972, 84         |               |                |
| InfiltratedInflow | 01/01/2000 | 04:13:00 | 2.004073E-09 |                     |               |                     |               |                |
| InfiltratedInflow | 01/01/2000 | 04:14:00 | 1.876439E-09 | [VERTICES]          |               |                     |               |                |
| InfiltratedInflow | 01/01/2000 | 04:15:00 | 1.759903E-09 | ;;Link              | X-Coord       | Y-Coord             |               |                |
| InfiltratedInflow | 01/01/2000 | 04:16:00 | 1.653253E-09 | ;;-----             |               |                     |               |                |
| InfiltratedInflow | 01/01/2000 | 04:17:00 | 1.572125E-09 | W1                  | 381322, 829   | 5032965, 271        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:18:00 | 1.432222E-09 | W3                  | 381343, 656   | 5032974, 514        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:19:00 | 1.392717E-09 | W5                  | 381295, 919   | 5033002, 386        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:20:00 | 1.309256E-09 | W6                  | 381309, 233   | 5032988, 935        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:21:00 | 1.229898E-09 | W7                  | 381320, 071   | 5033005, 693        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:22:00 | 1.166676E-09 | OL6                 | 381323, 041   |                     |               |                |
| InfiltratedInflow | 01/01/2000 | 04:23:00 | 1.104736E-09 | [POLYGONS]          |               |                     |               |                |
| InfiltratedInflow | 01/01/2000 | 04:24:00 | 1.04736E-09  | ;;Subcatchment      | X-Coord       | Y-Coord             |               |                |
| InfiltratedInflow | 01/01/2000 | 04:25:00 | 1.04736E-09  | ;;-----             |               |                     |               |                |
| InfiltratedInflow | 01/01/2000 | 04:26:00 | 1.04736E-09  | S1                  | 381344, 215   | 5032984, 464        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:27:00 | 1.04736E-09  | S1                  | 381347, 856   | 5032976, 123        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:28:00 | 1.04736E-09  | S1                  | 381337, 733   | 5032971, 705        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:29:00 | 1.04736E-09  | S1                  | 381334, 498   | 5032979, 128        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:30:00 | 1.04736E-09  | S1                  | 381341, 864   | 5032982, 351        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:31:00 | 1.04736E-09  | S1                  | 381344, 215   | 5032984, 464        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:32:00 | 1.04736E-09  | S10                 | 381360, 442   | 5032986, 777        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:33:00 | 1.04736E-09  | S10                 | 381355, 738   | 5032997, 554        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:34:00 | 1.04736E-09  | S10                 | 381357, 523   | 5032998, 333        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:35:00 | 1.04736E-09  | S10                 | 381358, 678   | 5032998, 837        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:36:00 | 1.04736E-09  | S10                 | 381359, 142   | 5032997, 774        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:37:00 | 1.04736E-09  | S10                 | 381369, 264   | 5033002, 193        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:38:00 | 1.04736E-09  | S10                 | 381368, 8     | 5033003, 256        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:39:00 | 1.04736E-09  | S10                 | 381374, 019   | 5033005, 534        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:40:00 | 1.04736E-09  | S10                 | 381375, 365   | 5033002, 452        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:41:00 | 1.04736E-09  | S10                 | 381360, 442   | 5032986, 777        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:42:00 | 1.04736E-09  | S11                 | 381341, 862   | 5033062, 982        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:43:00 | 1.04736E-09  | S11                 | 381348, 903   | 5033062, 839        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:44:00 | 1.04736E-09  | S11                 | 381355, 186   | 5033056, 237        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:45:00 | 1.04736E-09  | S11                 | 381352, 72    | 5033054, 268        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:46:00 | 1.04736E-09  | S11                 | 381336, 223   | 5033047, 127        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:47:00 | 1.04736E-09  | S11                 | 381340, 298   | 5033037, 792        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:48:00 | 1.04736E-09  | S11                 | 381338, 894   | 5033036, 045        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:49:00 | 1.04736E-09  | S11                 | 381327, 521   | 5033031, 89         |               |                |
| InfiltratedInflow | 01/01/2000 | 04:50:00 | 1.04736E-09  | S11                 | 381325, 697   | 5033035, 259        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:51:00 | 1.04736E-09  | S11                 | 381319, 536   | 5033040, 417        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:52:00 | 1.04736E-09  | S11                 | 381328, 068   | 5033049, 243        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:53:00 | 1.04736E-09  | S11                 | 381327, 155   | 5033052, 758        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:54:00 | 1.04736E-09  | S11                 | 381330, 052   | 5033055, 329        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:55:00 | 1.04736E-09  | S11                 | 381335, 192   | 5033057, 864        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:56:00 | 1.04736E-09  | S11                 | 381336, 099   | 5033058, 311        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:57:00 | 1.04736E-09  | S11                 | 381336, 581   | 5033057, 572        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:58:00 | 1.04736E-09  | S11                 | 381337, 055   | 5033058, 848        |               |                |
| InfiltratedInflow | 01/01/2000 | 04:59:00 | 1.04736E-09  | S11                 | 381337, 521   | 5033059, 137        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:00:00 | 1.04736E-09  | S11                 | 381337, 977   | 5033059, 441        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:01:00 | 1.04736E-09  | S11                 | 381338, 424   | 5033059, 758        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:02:00 | 1.04736E-09  | S11                 | 381338, 861   | 5033060, 089        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:03:00 | 1.04736E-09  | S11                 | 381341, 862   | 5033062, 982        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:04:00 | 1.04736E-09  | S2                  | 381339, 051   | 5032968, 685        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:05:00 | 1.04736E-09  | S2                  | 381337, 931   | 5032971, 251        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:06:00 | 1.04736E-09  | S2                  | 381337, 733   | 5032971, 705        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:07:00 | 1.04736E-09  | S2                  | 381347, 856   | 5032976, 123        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:08:00 | 1.04736E-09  | S2                  | 381352, 652   | 5032978, 217        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:09:00 | 1.04736E-09  | S2                  | 381352, 769   | 5032978, 266        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:10:00 | 1.04736E-09  | S2                  | 381352, 887   | 5032978, 313        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:11:00 | 1.04736E-09  | S2                  | 381353, 006   | 5032978, 356        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:12:00 | 1.04736E-09  | S2                  | 381352, 331   | 5032977, 428        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:13:00 | 1.04736E-09  | S2                  | 381349, 581   | 5032976, 228        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:14:00 | 1.04736E-09  | S2                  | 381350, 662   | 5032973, 753        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:15:00 | 1.04736E-09  | S2                  | 381339, 051   | 5032968, 685        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:16:00 | 1.04736E-09  | S3                  | 381318, 259   | 5032957, 972        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:17:00 | 1.04736E-09  | S3                  | 381307, 625   | 5032982, 332        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:18:00 | 1.04736E-09  | S3                  | 381303, 659   | 5032986, 088        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:19:00 | 1.04736E-09  | S3                  | 381310, 51    | 5032989, 076        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:20:00 | 1.04736E-09  | S3                  | 381321, 435   | 5032964, 05         |               |                |
| InfiltratedInflow | 01/01/2000 | 05:21:00 | 1.04736E-09  | S3                  | 381337, 931   | 5032971, 251        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:22:00 | 1.04736E-09  | S3                  | 381339, 051   | 5032968, 685        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:23:00 | 1.04736E-09  | S3                  | 381319, 267   | 5032960, 048        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:24:00 | 1.04736E-09  | S3                  | 381318, 259   | 5032957, 972        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:25:00 | 1.04736E-09  | S4                  | 381303, 659   | 5032986, 085        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:26:00 | 1.04736E-09  | S4                  | 381285, 414   | 5033003, 349        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:27:00 | 1.04736E-09  | S4                  | 381304, 879   | 5033024, 646        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:28:00 | 1.04736E-09  | S4                  | 381311, 368   | 5033017, 747        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:29:00 | 1.04736E-09  | S4                  | 381300, 135   | 5033012, 843        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:30:00 | 1.04736E-09  | S4                  | 381310, 51    | 5032989, 076        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:31:00 | 1.04736E-09  | S4                  | 381303, 659   | 5032986, 085        |               |                |
| InfiltratedInflow | 01/01/2000 | 05:32:00 | 1.04736E-09  | S5                  | 381316, 631   | 5033020, 045        |               |                |

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

|    |            |             |
|----|------------|-------------|
| S6 | 381321.746 | 5033008.328 |
| S6 | 381319.652 | 5033007.414 |
| S6 | 381318.612 | 5033009.797 |
| S6 | 381320.706 | 5033010.711 |
| S6 | 381316.631 | 5033020.045 |
| S6 | 381311.368 | 5033017.747 |
| S6 | 381304.879 | 5033024.646 |
| S6 | 381307.751 | 5033027.787 |
| S6 | 381319.536 | 5033040.417 |
| S6 | 381325.697 | 5033035.259 |
| S6 | 381327.521 | 5033031.08  |
| S7 | 381354.292 | 5033005.735 |
| S7 | 381349.118 | 5033003.477 |
| S7 | 381341.795 | 5032998.364 |
| S7 | 381333.208 | 5032996.68  |
| S7 | 381327.851 | 5032994.342 |
| S7 | 381321.746 | 5033008.328 |
| S7 | 381325.27  | 5033009.866 |
| S7 | 381326.803 | 5033010.853 |
| S7 | 381335.821 | 5033012.047 |
| S7 | 381349.093 | 5033017.644 |
| S7 | 381354.292 | 5033005.735 |
| S8 | 381336.223 | 5033047.127 |
| S8 | 381352.72  | 5033054.328 |
| S8 | 381374.019 | 5033005.534 |
| S8 | 381368.8   | 5033003.256 |
| S8 | 381369.264 | 5033002.193 |
| S8 | 381359.142 | 5032997.774 |
| S8 | 381358.678 | 5032998.837 |
| S8 | 381357.523 | 5032998.333 |
| S8 | 381355.797 | 5033002.286 |
| S8 | 381341.338 | 5033035.409 |
| S8 | 381343.432 | 5033036.323 |
| S8 | 381342.392 | 5033038.706 |
| S8 | 381340.298 | 5033037.792 |
| S8 | 381336.223 | 5033047.127 |
| S9 | 381360.442 | 5032986.777 |
| S9 | 381352.823 | 5032978.774 |
| S9 | 381353.006 | 5032978.356 |
| S9 | 381352.846 | 5032978.297 |
| S9 | 381352.688 | 5032978.233 |
| S9 | 381347.856 | 5032976.123 |
| S9 | 381344.215 | 5032984.464 |
| S9 | 381341.866 | 5032982.347 |
| S9 | 381334.493 | 5032979.128 |
| S9 | 381327.851 | 5032994.342 |
| S9 | 381333.208 | 5032996.68  |
| S9 | 381341.795 | 5032998.364 |
| S9 | 381349.118 | 5033003.477 |
| S9 | 381354.292 | 5033005.735 |
| S9 | 381357.523 | 5032998.333 |
| S9 | 381355.738 | 5032997.554 |
| S9 | 381360.442 | 5032986.777 |

|                |         |         |
|----------------|---------|---------|
| ;;Storage Node | X-Coord | Y-Coord |
| ;;             |         |         |
| [SYMBOLS]      |         |         |
| ;;Gage         | X-Coord | Y-Coord |
| ;;             |         |         |

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

|                                         |             |              |            |                    |                 |                |
|-----------------------------------------|-------------|--------------|------------|--------------------|-----------------|----------------|
| *****<br>Element Count<br>*****         |             |              |            |                    |                 |                |
| Number of rain gages ..... 1            |             |              |            |                    |                 |                |
| Number of subcatchments ... 11          |             |              |            |                    |                 |                |
| Number of nodes ..... 16                |             |              |            |                    |                 |                |
| Number of links ..... 17                |             |              |            |                    |                 |                |
| Number of pollutants ..... 0            |             |              |            |                    |                 |                |
| Number of land uses ..... 0             |             |              |            |                    |                 |                |
| *****<br>Rainingage Summary<br>*****    |             |              |            |                    |                 |                |
| Name                                    | Data Source |              | Data Type  | Recording Interval |                 |                |
| Rainfall                                | 3CHI100     |              | INTENSITY  | 10 min.            |                 |                |
| *****<br>Subcatchment Summary<br>*****  |             |              |            |                    |                 |                |
| Name                                    | Area        | Width        | %Imperv    | %Slope             | Rain Gage       | Outlet         |
| -----                                   |             |              |            |                    |                 |                |
| S1                                      | 0.01        | 6.10         | 100.00     | 15.0000            | Rainfall        |                |
| UnGrd                                   |             |              |            |                    |                 |                |
| S10                                     | 0.01        | 29.00        | 8.79       | 1.0000             | Rainfall        | CB118          |
| S11                                     | 0.05        | 70.00        | 18.80      | 2.0000             | Rainfall        | CB114          |
| S2                                      | 0.00        | 4.30         | 0.00       | 1.9000             | Rainfall        | CB113          |
| S3                                      | 0.02        | 75.00        | 17.80      | 1.0000             | Rainfall        | CB112          |
| S4                                      | 0.04        | 52.00        | 8.51       | 3.5000             | Rainfall        | CB110          |
| S5                                      | 0.10        | 105.00       | 100.00     | 1.0000             | Rainfall        | Roof_1         |
| S6                                      | 0.08        | 45.00        | 66.78      | 2.5000             | Rainfall        | CB115          |
| S7                                      | 0.04        | 28.60        | 90.42      | 2.7000             | Rainfall        | CB116          |
| S8                                      | 0.10        | 105.00       | 100.00     | 1.0000             | Rainfall        | Roof_2         |
| S9                                      | 0.05        | 50.00        | 93.57      | 2.4000             | Rainfall        | CB117          |
| *****<br>Node Summary<br>*****          |             |              |            |                    |                 |                |
| Name                                    | Type        | Invert Elev. | Max. Depth | Ponded Area        | External Inflow |                |
| -----                                   |             |              |            |                    |                 |                |
| OF4                                     | OUTFALL     | 80.63        | 0.00       | 0.0                |                 |                |
| OF7                                     | OUTFALL     | 80.63        | 0.00       | 0.0                |                 |                |
| STUB15                                  | OUTFALL     | 80.63        | 0.00       | 0.0                |                 |                |
| STUB16                                  | OUTFALL     | 80.65        | 0.00       | 0.0                |                 |                |
| CB110                                   | STORAGE     | 83.75        | 1.90       | 0.0                |                 |                |
| CB111                                   | STORAGE     | 83.59        | 2.01       | 0.0                |                 |                |
| CB112                                   | STORAGE     | 83.28        | 2.12       | 0.0                |                 |                |
| CB113                                   | STORAGE     | 83.55        | 1.70       | 0.0                |                 |                |
| CB114                                   | STORAGE     | 85.30        | 0.25       | 0.0                |                 |                |
| CB115                                   | STORAGE     | 85.25        | 0.31       | 0.0                |                 |                |
| CB116                                   | STORAGE     | 85.20        | 0.40       | 0.0                |                 |                |
| CB117                                   | STORAGE     | 85.15        | 0.15       | 0.0                |                 |                |
| CB118                                   | STORAGE     | 85.22        | 0.18       | 0.0                |                 |                |
| Roof_1                                  | STORAGE     | 96.35        | 0.15       | 0.0                |                 |                |
| Roof_2                                  | STORAGE     | 96.35        | 0.15       | 0.0                |                 |                |
| St_UnGrd                                | STORAGE     | 81.80        | 1.00       | 0.0                | Yes             |                |
| *****<br>Link Summary<br>*****          |             |              |            |                    |                 |                |
| Name                                    | From Node   | To Node      | Type       | Length             | %Slope          |                |
| -----                                   |             |              |            |                    |                 |                |
| C1                                      | CB111       | CB112        | CONDUIT    | 28.9               | 0.8647          |                |
| 0.0130                                  |             |              |            |                    |                 |                |
| C3                                      | CB113       | CB112        | CONDUIT    | 31.3               | 0.6067          |                |
| 0.0130                                  |             |              |            |                    |                 |                |
| C5                                      | CB110       | CB111        | CONDUIT    | 20.5               | 0.7815          |                |
| 0.0130                                  |             |              |            |                    |                 |                |
| W1                                      | CB115       | CB116        | WEIR       |                    |                 |                |
| W2                                      | CB116       | CB117        | WEIR       |                    |                 |                |
| W3                                      | CB112       | CB113        | WEIR       |                    |                 |                |
| W4                                      | CB114       | CB115        | WEIR       |                    |                 |                |
| W5                                      | CB110       | CB112        | WEIR       |                    |                 |                |
| C2                                      | CB112       | STUB16       | OUTLET     |                    |                 |                |
| OL1                                     | CB115       | St_UnGrd     | OUTLET     |                    |                 |                |
| OL2                                     | CB116       | St_UnGrd     | OUTLET     |                    |                 |                |
| OL3                                     | CB117       | St_UnGrd     | OUTLET     |                    |                 |                |
| OL4                                     | Roof_1      | STUB15       | OUTLET     |                    |                 |                |
| OL5                                     | Roof_2      | OF4          | OUTLET     |                    |                 |                |
| OL6                                     | CB114       | St_UnGrd     | OUTLET     |                    |                 |                |
| OL7                                     | St_UnGrd    | OF7          | OUTLET     |                    |                 |                |
| OL8                                     | CB118       | St_UnGrd     | OUTLET     |                    |                 |                |
| *****<br>Cross Section Summary<br>***** |             |              |            |                    |                 |                |
| Conduit                                 | Shape       | Full Depth   | Full Area  | Hyd. Rad.          | Max. Width      | No. of Barrels |
| -----                                   |             |              |            |                    |                 |                |
| C1                                      | CIRCULAR    | 0.15         | 0.02       | 0.04               | 0.15            | 1              |
| C3                                      | CIRCULAR    | 0.15         | 0.02       | 0.04               | 0.15            | 1              |
| C5                                      | CIRCULAR    | 0.15         | 0.02       | 0.04               | 0.15            | 1              |
| *****<br>Analysis Options<br>*****      |             |              |            |                    |                 |                |
| Flow Units ..... CMS                    |             |              |            |                    |                 |                |
| Process Models:                         |             |              |            |                    |                 |                |
| Rainfall/Runoff ..... YES               |             |              |            |                    |                 |                |
| RDII ..... NO                           |             |              |            |                    |                 |                |
| Snowmelt ..... NO                       |             |              |            |                    |                 |                |
| Groundwater ..... NO                    |             |              |            |                    |                 |                |
| Flow Routing ..... YES                  |             |              |            |                    |                 |                |
| Ponding Allowed ..... NO                |             |              |            |                    |                 |                |
| Water Quality ..... NO                  |             |              |            |                    |                 |                |
| Infiltration Method ..... HORTON        |             |              |            |                    |                 |                |
| Flow Routing Method ..... DYNWAVE       |             |              |            |                    |                 |                |
| Surcharge Method ..... EXTRAN           |             |              |            |                    |                 |                |
| Starting Date ..... 01/01/2000 00:00:00 |             |              |            |                    |                 |                |
| Ending Date ..... 01/01/2000 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 ..... 5.00 sec        |             |              |            |                    |                 |                |
| Variable Time Step ..... YES            |             |              |            |                    |                 |                |
| Maximum Trials ..... 8                  |             |              |            |                    |                 |                |
| Number of Threads ..... 1               |             |              |            |                    |                 |                |
| Head Tolerance ..... 0.001500 m         |             |              |            |                    |                 |                |
| *****                                   |             |              |            |                    |                 |                |
| Runoff Quantity Continuity              | Volume      | Depth        |            |                    |                 |                |
| -----                                   | hectare-m   | mm           |            |                    |                 |                |
| Total Precipitation                     | 0.036       | 71.708       |            |                    |                 |                |
| Evaporation Loss                        | 0.000       | 0.000        |            |                    |                 |                |
| Infiltration Loss                       | 0.007       | 13.013       |            |                    |                 |                |
| Surface Runoff                          | 0.029       | 57.684       |            |                    |                 |                |
| Final Storage                           | 0.001       | 1.117        |            |                    |                 |                |
| Continuity Error (%)                    | -0.149      |              |            |                    |                 |                |

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

|                                                     |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
|-----------------------------------------------------|----------|----------------------------|----------------------------|--------------------------|------------------------------------------|------------------------------------------|---------|--------|-------|---|-------|---------|---------|
| *****<br>Flow Routing Continuity<br>*****           |          |                            |                            | Volume<br>hectare-m      | Volume<br>10^6 ltr                       | CB114<br>-0.000                          | STORAGE | 0.020  | 0.020 | 0 | 01:10 | 0.0161  | 0.0161  |
| Dry Weather Inflow .....                            |          |                            |                            | 0.000                    | 0.000                                    | CB115<br>-0.005                          | STORAGE | 0.037  | 0.037 | 0 | 01:10 | 0.0452  | 0.0452  |
| Wet Weather Inflow .....                            |          |                            |                            | 0.029                    | 0.293                                    | CB116<br>-0.008                          | STORAGE | 0.020  | 0.020 | 0 | 01:10 | 0.0276  | 0.0276  |
| Groundwater Inflow .....                            |          |                            |                            | 0.000                    | 0.000                                    | CB117<br>-0.006                          | STORAGE | 0.027  | 0.027 | 0 | 01:10 | 0.0368  | 0.0368  |
| RDII Inflow .....                                   |          |                            |                            | 0.000                    | 0.000                                    | CB118<br>-0.001                          | STORAGE | 0.006  | 0.006 | 0 | 01:10 | 0.00424 | 0.00424 |
| External Inflow .....                               |          |                            |                            | 0.000                    | 0.002                                    | Roof_1<br>0.003                          | STORAGE | 0.047  | 0.047 | 0 | 01:10 | 0.0669  | 0.0669  |
| External Outflow .....                              |          |                            |                            | 0.024                    | 0.241                                    | Roof_2<br>0.003                          | STORAGE | 0.048  | 0.048 | 0 | 01:10 | 0.0678  | 0.0678  |
| Flooding Loss .....                                 |          |                            |                            | 0.000                    | 0.000                                    | St_UnGrd<br>0.005                        | STORAGE | 0.005  | 0.114 | 0 | 01:10 | 0.00886 | 0.139   |
| Evaporation Loss .....                              |          |                            |                            | 0.000                    | 0.000                                    |                                          |         |        |       |   |       |         |         |
| Exfiltration Loss .....                             |          |                            |                            | 0.000                    | 0.000                                    |                                          |         |        |       |   |       |         |         |
| Initial Stored Volume .....                         |          |                            |                            | 0.000                    | 0.000                                    |                                          |         |        |       |   |       |         |         |
| Final Stored Volume .....                           |          |                            |                            | 0.005                    | 0.054                                    |                                          |         |        |       |   |       |         |         |
| Continuity Error (%) .....                          |          |                            |                            | -0.013                   |                                          |                                          |         |        |       |   |       |         |         |
| *****<br>Time-Step Critical Elements<br>*****       |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
| None                                                |          |                            |                            |                          |                                          | *****<br>Node Surge Summary<br>*****     |         |        |       |   |       |         |         |
|                                                     |          |                            |                            |                          |                                          | No nodes were surcharged.                |         |        |       |   |       |         |         |
| *****<br>Highest Flow Instability Indexes<br>*****  |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
| Link OL7 (6)                                        |          |                            |                            |                          |                                          | *****<br>Node Flooding Summary<br>*****  |         |        |       |   |       |         |         |
|                                                     |          |                            |                            |                          |                                          | No nodes were flooded.                   |         |        |       |   |       |         |         |
| *****<br>Most Frequent Nonconverging Nodes<br>***** |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
| Convergence obtained at all time steps.             |          |                            |                            |                          |                                          | *****<br>Storage Volume Summary<br>***** |         |        |       |   |       |         |         |
| *****<br>Routing Time Step Summary<br>*****         |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
| Minimum Time Step :                                 |          |                            |                            | 0.29 sec                 |                                          |                                          |         |        |       |   |       |         |         |
| Average Time Step :                                 |          |                            |                            | 5.00 sec                 |                                          |                                          |         |        |       |   |       |         |         |
| Maximum Time Step :                                 |          |                            |                            | 5.00 sec                 |                                          |                                          |         |        |       |   |       |         |         |
| % of Time in Steady State :                         |          |                            |                            | 0.00                     |                                          |                                          |         |        |       |   |       |         |         |
| Average Iterations per Step :                       |          |                            |                            | 2.00                     |                                          |                                          |         |        |       |   |       |         |         |
| % of Steps Not Converging :                         |          |                            |                            | 0.00                     |                                          |                                          |         |        |       |   |       |         |         |
| Time Step Frequencies :                             |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
| 5.000 - 3.155 sec :                                 |          |                            |                            | 99.98 %                  |                                          |                                          |         |        |       |   |       |         |         |
| 3.155 - 1.991 sec :                                 |          |                            |                            | 0.00 %                   |                                          |                                          |         |        |       |   |       |         |         |
| 1.991 - 1.256 sec :                                 |          |                            |                            | 0.02 %                   |                                          |                                          |         |        |       |   |       |         |         |
| 1.256 - 0.792 sec :                                 |          |                            |                            | 0.00 %                   |                                          |                                          |         |        |       |   |       |         |         |
| 0.792 - 0.500 sec :                                 |          |                            |                            | 0.00 %                   |                                          |                                          |         |        |       |   |       |         |         |
| *****<br>Subcatchment Runoff Summary<br>*****       |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
| -----                                               |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
| Total                                               | Total    | Peak                       | Total                      | Total                    | Total                                    | Imperv                                   | Perv    |        |       |   |       |         |         |
| Runoff                                              | Runoff   | Runoff                     | Runoff                     | Runon                    | Evap                                     | Infil                                    | Runoff  | Runoff |       |   |       |         |         |
| Subcatchment                                        | 10^6 ltr | CMS                        | Coeff                      | mm                       | mm                                       | mm                                       | mm      | mm     |       |   |       |         |         |
| mm                                                  |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
| S1                                                  |          |                            | 71.71                      | 0.00                     | 0.00                                     | 0.00                                     | 70.25   | 0.00   |       |   |       |         |         |
| 70.25                                               | 0.01     | 0.00                       | 0.980                      |                          |                                          |                                          |         |        |       |   |       |         |         |
| S10                                                 |          |                            | 71.71                      | 0.00                     | 0.00                                     | 40.91                                    | 6.17    | 30.75  |       |   |       |         |         |
| 30.75                                               | 0.00     | 0.01                       | 0.429                      |                          |                                          |                                          |         |        |       |   |       |         |         |
| S11                                                 |          |                            | 71.71                      | 0.00                     | 0.00                                     | 37.49                                    | 13.19   | 34.01  |       |   |       |         |         |
| 34.01                                               | 0.02     | 0.02                       | 0.474                      |                          |                                          |                                          |         |        |       |   |       |         |         |
| S2                                                  |          |                            | 71.71                      | 0.00                     | 0.00                                     | 44.16                                    | 0.00    | 27.60  |       |   |       |         |         |
| 27.60                                               | 0.00     | 0.00                       | 0.385                      |                          |                                          |                                          |         |        |       |   |       |         |         |
| S3                                                  |          |                            | 71.71                      | 0.00                     | 0.00                                     | 37.68                                    | 12.49   | 33.87  |       |   |       |         |         |
| 33.87                                               | 0.01     | 0.01                       | 0.472                      |                          |                                          |                                          |         |        |       |   |       |         |         |
| S4                                                  |          |                            | 71.71                      | 0.00                     | 0.00                                     | 40.96                                    | 5.97    | 30.70  |       |   |       |         |         |
| 30.70                                               | 0.01     | 0.02                       | 0.428                      |                          |                                          |                                          |         |        |       |   |       |         |         |
| S5                                                  |          |                            | 71.71                      | 0.00                     | 0.00                                     | 0.00                                     | 70.24   | 0.00   |       |   |       |         |         |
| 70.24                                               | 0.07     | 0.05                       | 0.980                      |                          |                                          |                                          |         |        |       |   |       |         |         |
| S6                                                  |          |                            | 71.71                      | 0.00                     | 0.00                                     | 14.50                                    | 46.91   | 9.35   |       |   |       |         |         |
| 56.26                                               | 0.05     | 0.04                       | 0.785                      |                          |                                          |                                          |         |        |       |   |       |         |         |
| S7                                                  |          |                            | 71.71                      | 0.00                     | 0.00                                     | 4.14                                     | 63.51   | 2.75   |       |   |       |         |         |
| 66.26                                               | 0.03     | 0.02                       | 0.924                      |                          |                                          |                                          |         |        |       |   |       |         |         |
| S8                                                  |          |                            | 71.71                      | 0.00                     | 0.00                                     | 0.00                                     | 70.24   | 0.00   |       |   |       |         |         |
| 70.24                                               | 0.07     | 0.05                       | 0.980                      |                          |                                          |                                          |         |        |       |   |       |         |         |
| S9                                                  |          |                            | 71.71                      | 0.00                     | 0.00                                     | 2.78                                     | 65.73   | 1.86   |       |   |       |         |         |
| 67.59                                               | 0.04     | 0.03                       | 0.943                      |                          |                                          |                                          |         |        |       |   |       |         |         |
| *****<br>Node Depth Summary<br>*****                |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
| -----                                               |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
| Node                                                | Type     | Average<br>Depth<br>Meters | Maximum<br>Depth<br>Meters | Maximum<br>HGL<br>Meters | Time of Max<br>Occurrence<br>days hr:min | Reported<br>Max Depth<br>Meters          |         |        |       |   |       |         |         |
| OF4                                                 | OUTFALL  | 0.48                       | 0.48                       | 81.11                    | 0 00:00                                  | 0.48                                     |         |        |       |   |       |         |         |
| OF7                                                 | OUTFALL  | 0.48                       | 0.48                       | 81.11                    | 0 00:00                                  | 0.48                                     |         |        |       |   |       |         |         |
| STUB15                                              | OUTFALL  | 0.48                       | 0.48                       | 81.11                    | 0 00:00                                  | 0.48                                     |         |        |       |   |       |         |         |
| STUB16                                              | OUTFALL  | 0.63                       | 0.63                       | 81.28                    | 0 00:00                                  | 0.63                                     |         |        |       |   |       |         |         |
| CB110                                               | STORAGE  | 0.03                       | 1.25                       | 85.00                    | 0 01:13                                  | 1.25                                     |         |        |       |   |       |         |         |
| CB111                                               | STORAGE  | 0.09                       | 1.37                       | 84.96                    | 0 01:14                                  | 1.37                                     |         |        |       |   |       |         |         |
| CB112                                               | STORAGE  | 0.13                       | 1.63                       | 84.91                    | 0 01:15                                  | 1.63                                     |         |        |       |   |       |         |         |
| CB113                                               | STORAGE  | 0.09                       | 1.36                       | 84.91                    | 0 01:15                                  | 1.36                                     |         |        |       |   |       |         |         |
| CB114                                               | STORAGE  | 0.00                       | 0.03                       | 85.33                    | 0 01:10                                  | 0.03                                     |         |        |       |   |       |         |         |
| CB115                                               | STORAGE  | 0.00                       | 0.05                       | 85.30                    | 0 01:10                                  | 0.05                                     |         |        |       |   |       |         |         |
| CB116                                               | STORAGE  | 0.00                       | 0.03                       | 85.23                    | 0 01:10                                  | 0.03                                     |         |        |       |   |       |         |         |
| CB117                                               | STORAGE  | 0.00                       | 0.04                       | 85.19                    | 0 01:10                                  | 0.04                                     |         |        |       |   |       |         |         |
| CB118                                               | STORAGE  | 0.00                       | 0.01                       | 85.23                    | 0 01:10                                  | 0.01                                     |         |        |       |   |       |         |         |
| Roof_1                                              | STORAGE  | 0.05                       | 0.08                       | 96.43                    | 0 02:20                                  | 0.08                                     |         |        |       |   |       |         |         |
| Roof_2                                              | STORAGE  | 0.05                       | 0.08                       | 96.43                    | 0 02:21                                  | 0.08                                     |         |        |       |   |       |         |         |
| St_UnGrd                                            | STORAGE  | 0.10                       | 0.98                       | 82.78                    | 0 01:20                                  | 0.98                                     |         |        |       |   |       |         |         |
| *****<br>Node Inflow Summary<br>*****               |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
| -----                                               |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
| Flow                                                |          | Maximum<br>Lateral         | Maximum<br>Total           | Maximum<br>Time of Max   | Lateral<br>Inflow                        | Total<br>Inflow                          |         |        |       |   |       |         |         |
| Balance                                             |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
| Error                                               |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
| Node                                                | Type     | CMS                        | CMS                        | days hr:min              | 10^6 ltr                                 | 10^6 ltr                                 |         |        |       |   |       |         |         |
| Percent                                             |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
| OF4                                                 | OUTFALL  | 0.000                      | 0.002                      | 0 00:32                  | 0                                        | 0.0402                                   |         |        |       |   |       |         |         |
| 0.000                                               |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
| OF7                                                 | OUTFALL  | 0.000                      | 0.029                      | 0 01:00                  | 0                                        | 0.139                                    |         |        |       |   |       |         |         |
| 0.000                                               |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
| STUB15                                              | OUTFALL  | 0.000                      | 0.002                      | 0 00:32                  | 0                                        | 0.0402                                   |         |        |       |   |       |         |         |
| 0.000                                               |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
| STUB16                                              | OUTFALL  | 0.000                      | 0.010                      | 0 01:15                  | 0                                        | 0.0218                                   |         |        |       |   |       |         |         |
| 0.000                                               |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
| CB110                                               | STORAGE  | 0.018                      | 0.018                      | 0 01:10                  | 0.0132                                   | 0.0132                                   |         |        |       |   |       |         |         |
| -0.017                                              |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
| CB111                                               | STORAGE  | 0.000                      | 0.014                      | 0 01:10                  | 0                                        | 0.0132                                   |         |        |       |   |       |         |         |
| -0.319                                              |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
| CB112                                               | STORAGE  | 0.010                      | 0.018                      | 0 01:10                  | 0.00739                                  | 0.0229                                   |         |        |       |   |       |         |         |
| 0.020                                               |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |
| CB113                                               | STORAGE  | 0.002                      | 0.007                      | 0 01:05                  | 0.00121                                  | 0.00227                                  |         |        |       |   |       |         |         |
| -0.044                                              |          |                            |                            |                          |                                          |                                          |         |        |       |   |       |         |         |

|                                           |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
|-------------------------------------------|----------------------|------------------------|------------------------------------------|-----------------------------|----------------------|-----------------------|-------------|--|--|--|--|--|--|
| *****<br>Node Surge Summary<br>*****      |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| No nodes were surcharged.                 |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| *****<br>Node Flooding Summary<br>*****   |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| No nodes were flooded.                    |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| *****<br>Storage Volume Summary<br>*****  |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| -----                                     |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| Maximum                                   | Average              | Avg                    | Evap                                     | Exfil                       | Maximum              | Max                   | Time of Max |  |  |  |  |  |  |
| Outflow                                   | Volume               | Pcnt                   | Pcnt                                     | Pcnt                        | Volume               | Pcnt                  | Occurrence  |  |  |  |  |  |  |
| Storage Unit                              | 1000 m³              | Full                   | Loss                                     | Loss                        | 1000 m³              | Full                  | days hr:min |  |  |  |  |  |  |
| CMS                                       |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| CB110                                     | 0.000                | 0.0                    | 0.0                                      | 0.0                         | 0.000                | 0.4                   | 0 01:13     |  |  |  |  |  |  |
| 0.014                                     |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| CB111                                     | 0.000                | 4.5                    | 0.0                                      | 0.0                         | 0.000                | 68.3                  | 0 01:14     |  |  |  |  |  |  |
| 0.009                                     |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| CB112                                     | 0.000                | 1.6                    | 0.0                                      | 0.0                         | 0.001                | 20.7                  | 0 01:15     |  |  |  |  |  |  |
| 0.011                                     |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| CB113                                     | 0.000                | 2.2                    | 0.0                                      | 0.0                         | 0.000                | 32.9                  | 0 01:15     |  |  |  |  |  |  |
| 0.001                                     |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| CB114                                     | 0.000                | 0.1                    | 0.0                                      | 0.0                         | 0.000                | 2.4                   | 0 01:10     |  |  |  |  |  |  |
| 0.020                                     |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| CB115                                     | 0.000                | 0.1                    | 0.0                                      | 0.0                         | 0.001                | 3.5                   | 0 01:10     |  |  |  |  |  |  |
| 0.036                                     |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| CB116                                     | 0.000                | 0.1                    | 0.0                                      | 0.0                         | 0.000                | 1.3                   | 0 01:10     |  |  |  |  |  |  |
| 0.020                                     |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| CB117                                     | 0.000                | 0.3                    | 0.0                                      | 0.0                         | 0.001                | 7.8                   | 0 01:10     |  |  |  |  |  |  |
| 0.027                                     |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| CB118                                     | 0.000                | 0.0                    | 0.0                                      | 0.0                         | 0.000                | 0.7                   | 0 01:10     |  |  |  |  |  |  |
| 0.006                                     |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| Roof_1                                    | 0.034                | 35.4                   | 0.0                                      | 0.0                         | 0.049                | 51.3                  | 0 02:20     |  |  |  |  |  |  |
| 0.002                                     |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| Roof_2                                    | 0.034                | 35.7                   | 0.0                                      | 0.0                         | 0.050                | 51.5                  | 0 02:21     |  |  |  |  |  |  |
| 0.002                                     |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| St_UnGrd                                  | 0.005                | 10.2                   | 0.0                                      | 0.0                         | 0.048                | 98.1                  | 0 01:20     |  |  |  |  |  |  |
| 0.029                                     |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| *****<br>Outfall Loading Summary<br>***** |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| -----                                     |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| Outfall Node                              | Flow<br>Freq<br>Pcnt | Avg<br>Flow<br>CMS     | Max<br>Flow<br>CMS                       | Total<br>Volume<br>10^6 ltr |                      |                       |             |  |  |  |  |  |  |
| OF4                                       | 94.93                | 0.002                  | 0.002                                    | 0.040                       |                      |                       |             |  |  |  |  |  |  |
| OF7                                       | 59.70                | 0.011                  | 0.029                                    | 0.139                       |                      |                       |             |  |  |  |  |  |  |
| STUB15                                    | 94.93                | 0.002                  | 0.002                                    | 0.040                       |                      |                       |             |  |  |  |  |  |  |
| STUB16                                    | 18.62                | 0.005                  | 0.010                                    | 0.022                       |                      |                       |             |  |  |  |  |  |  |
| System                                    | 67.05                | 0.020                  | 0.043                                    | 0.241                       |                      |                       |             |  |  |  |  |  |  |
| *****<br>Link Flow Summary<br>*****       |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| -----                                     |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |
| Link                                      | Type                 | Maximum<br>Flow<br>CMS | Time of Max<br>Occurrence<br>days hr:min | Maximum<br>Veloc<br>m/sec   | Max/<br>Full<br>Flow | Max/<br>Full<br>Depth |             |  |  |  |  |  |  |
| C1                                        | CONDUIT              | 0.009                  | 0 01:10                                  | 0.56                        | 0.63                 | 1.00                  |             |  |  |  |  |  |  |
| C3                                        | CONDUIT              | 0.006                  | 0 01:05                                  | 0.38                        | 0.52                 | 1.00                  |             |  |  |  |  |  |  |
| C5                                        | CONDUIT              | 0.014                  | 0 01:10                                  | 0.87                        | 1.02                 | 1.00                  |             |  |  |  |  |  |  |
| W1                                        | WEIR                 | 0.000                  | 0 00:00                                  |                             |                      | 0.00                  |             |  |  |  |  |  |  |
| W2                                        | WEIR                 | 0.000                  | 0 00:00                                  |                             |                      | 0.00                  |             |  |  |  |  |  |  |
| W3                                        | WEIR                 | 0.000                  | 0 00:00                                  |                             |                      | 0.00                  |             |  |  |  |  |  |  |
| W4                                        | WEIR                 | 0.000                  | 0 00:00                                  |                             |                      | 0.00                  |             |  |  |  |  |  |  |
| W5                                        | WEIR                 | 0.000                  | 0 00:00                                  |                             |                      | 0.00                  |             |  |  |  |  |  |  |
| C2                                        | DUMMY                | 0.010                  | 0 01:15                                  |                             |                      |                       |             |  |  |  |  |  |  |
| OL1                                       | DUMMY                | 0.036                  | 0 01:10                                  |                             |                      |                       |             |  |  |  |  |  |  |
| OL2                                       | DUMMY                | 0.020                  | 0 01:10                                  |                             |                      |                       |             |  |  |  |  |  |  |
| OL3                                       | DUMMY                | 0.027                  | 0 01:10                                  |                             |                      |                       |             |  |  |  |  |  |  |
| OL4                                       | DUMMY                | 0.002                  | 0 00:32                                  |                             |                      |                       |             |  |  |  |  |  |  |
| OL5                                       | DUMMY                | 0.002                  | 0 00:32                                  |                             |                      |                       |             |  |  |  |  |  |  |
| OL6                                       | DUMMY                | 0.020                  | 0 01:10                                  |                             |                      |                       |             |  |  |  |  |  |  |
| OL7                                       | DUMMY                | 0.029                  | 0 01:00                                  |                             |                      |                       |             |  |  |  |  |  |  |
| OL8                                       | DUMMY                | 0.006                  | 0 01:10                                  |                             |                      |                       |             |  |  |  |  |  |  |
|                                           |                      |                        |                                          |                             |                      |                       |             |  |  |  |  |  |  |

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

|                       |          |            |          |            |                     |                   |           |           |   |
|-----------------------|----------|------------|----------|------------|---------------------|-------------------|-----------|-----------|---|
| [TITLE]               |          |            |          |            |                     |                   |           |           |   |
| ;;Project Title/Notes |          |            |          |            |                     |                   |           |           |   |
| [OPTIONS]             |          |            |          |            |                     |                   |           |           |   |
| ;;Option              |          | Value      |          |            |                     |                   |           |           |   |
| FLOW_UNITS            |          | CMS        |          |            |                     |                   |           |           |   |
| INFILTRATION          |          | HORTON     |          |            |                     |                   |           |           |   |
| FLOW_ROUTING          |          | DYNWAVE    |          |            |                     |                   |           |           |   |
| LINK_OFFSETS          |          | ELEVATION  |          |            |                     |                   |           |           |   |
| MIN_SLOPE             |          | 0          |          |            |                     |                   |           |           |   |
| ALLOW_PONDING         |          | NO         |          |            |                     |                   |           |           |   |
| SKIP_STEADY_STATE     |          | NO         |          |            |                     |                   |           |           |   |
| START_DATE            |          | 01/01/2000 |          |            |                     |                   |           |           |   |
| START_TIME            |          | 00:00:00   |          |            |                     |                   |           |           |   |
| REPORT_START_DATE     |          | 01/01/2000 |          |            |                     |                   |           |           |   |
| REPORT_START_TIME     |          | 00:00:00   |          |            |                     |                   |           |           |   |
| END_DATE              |          | 01/02/2000 |          |            |                     |                   |           |           |   |
| 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          |          | 5          |          |            |                     |                   |           |           |   |
| RULE_STEP             |          | 00:00:00   |          |            |                     |                   |           |           |   |
| INERTIAL_DAMPING      |          | PARTIAL    |          |            |                     |                   |           |           |   |
| NORMAL_FLOW_LIMITED   |          | BOTH       |          |            |                     |                   |           |           |   |
| FORCE_MAIN_EQUATION   |          | H-W        |          |            |                     |                   |           |           |   |
| VARIABLE_STEP         |          | 0.75       |          |            |                     |                   |           |           |   |
| LENGTHENING_STEP      |          | 0          |          |            |                     |                   |           |           |   |
| MIN_SURFAREA          |          | 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              |                   |           |           |   |
| ;;                    |          | -----      |          |            |                     |                   |           |           |   |
| Rainfall              |          | INTENSITY  | 0:15     | 1.0        | TIMESERIES 24SCS100 |                   |           |           |   |
| [SUBCATCHMENTS]       |          |            |          |            |                     |                   |           |           |   |
| ;;Name                |          | Rain Gage  | Outlet   | Area       | %Imperv             | Width             | %Slope    | CurbLen   |   |
| SnowPack              |          | -----      |          |            |                     |                   |           |           |   |
| ;;                    |          | -----      |          |            |                     |                   |           |           |   |
| S1                    | Rainfall | St_UnGrd   | 0.0091   | 100        | 6.1                 | 15                | 0         |           |   |
| S10                   | Rainfall | CB118      | 0.0138   | 8.79       | 28.998              | 1                 | 0         |           |   |
| S11                   | Rainfall | CB114      | 0.0473   | 18.805     | 70.001              | 2                 | 0         |           |   |
| S2                    | Rainfall | CB113      | 0.0044   | 0.002      | 4.3                 | 1.9               | 0         |           |   |
| S3                    | Rainfall | CB112      | 0.0218   | 17.802     | 75                  | 1                 | 0         |           |   |
| S4                    | Rainfall | CB110      | 0.043    | 8.51       | 52.001              | 3.5               | 0         |           |   |
| S5                    | Rainfall | Roof_1     | 0.0952   | 99.998     | 104.996             | 1                 | 0         |           |   |
| S6                    | Rainfall | CB115      | 0.0803   | 66.775     | 45.001              | 2.5               | 0         |           |   |
| S7                    | Rainfall | CB116      | 0.0416   | 90.416     | 28.601              | 2.7               | 0         |           |   |
| S8                    | Rainfall | Roof_2     | 0.0965   | 100        | 105.005             | 1                 | 0         |           |   |
| S9                    | Rainfall | CB117      | 0.0544   | 93.568     | 50                  | 2.4               | 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                   |                   | PERVIOUS  | 100       |   |
| S11                   | 0.013    | 0.25       | 1.57     | 4.67       | 0                   |                   | PERVIOUS  | 100       |   |
| S12                   | 0.013    | 0.25       | 1.57     | 4.67       | 0                   |                   | OUTLET    |           |   |
| S3                    | 0.013    | 0.25       | 1.57     | 4.67       | 0                   |                   | PERVIOUS  | 100       |   |
| S4                    | 0.013    | 0.25       | 1.57     | 4.67       | 0                   |                   | PERVIOUS  | 100       |   |
| S5                    | 0.013    | 0.25       | 1.57     | 4.67       | 0                   |                   | OUTLET    |           |   |
| 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                   |                   | OUTLET    |           |   |
| 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                   |                   |           |           |   |
| S2                    | 76.2     | 13.2       | 4.14     | 7          | 0                   |                   |           |           |   |
| S3                    | 76.2     | 13.2       | 4.14     | 7          | 0                   |                   |           |           |   |
| S4                    | 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                   |                   |           |           |   |
| [OUTFALLS]            |          |            |          |            |                     |                   |           |           |   |
| ;;Name                |          | Elevation  | Type     | Stage Data | Gated               | Route To          |           |           |   |
| ;;                    |          | -----      |          |            |                     |                   |           |           |   |
| OF4                   | 80.628   | FIXED      | 81.11    |            | NO                  |                   |           |           |   |
| OF7                   | 80.628   | FIXED      | 81.11    |            | NO                  |                   |           |           |   |
| STUB15                | 80.628   | FIXED      | 81.11    |            | NO                  |                   |           |           |   |
| STUB16                | 80.646   | FIXED      | 81.28    |            | NO                  |                   |           |           |   |
| [STORAGE]             |          |            |          |            |                     |                   |           |           |   |
| ;;Name                |          | Elev.      | MaxDepth | InitDepth  | Shape               | Curve Name/Params |           |           |   |
| SurDepth Fevap        |          | Psi        | Ksat     | IMD        |                     | -----             |           |           |   |
| ;;                    |          | -----      |          |            |                     |                   |           |           |   |
| CB110                 | 83.75    | 1.9        | 0        |            | TABULAR             | CB110             | 0         |           |   |
| 0                     |          |            |          |            |                     |                   |           |           |   |
| CB111                 | 83.59    | 2.01       | 0        |            | TABULAR             | CB111             | 0         |           |   |
| 0                     |          |            |          |            |                     |                   |           |           |   |
| CB112                 | 83.28    | 2.12       | 0        |            | TABULAR             | CB112             | 0         |           |   |
| 0                     |          |            |          |            |                     |                   |           |           |   |
| CB113                 | 83.55    | 1.7        | 0        |            | TABULAR             | CB113             | 0         |           |   |
| 0                     |          |            |          |            |                     |                   |           |           |   |
| CB114                 | 85.3     | 0.25       | 0        |            | TABULAR             | CB114             | 0         |           |   |
| 0                     |          |            |          |            |                     |                   |           |           |   |
| CB115                 | 85.25    | 0.31       | 0        |            | TABULAR             | CB115             | 0         |           |   |
| 0                     |          |            |          |            |                     |                   |           |           |   |
| CB116                 | 85.2     | 0.4        | 0        |            | TABULAR             | CB116             | 0         |           |   |
| 0                     |          |            |          |            |                     |                   |           |           |   |
| CB117                 | 85.15    | 0.15       | 0        |            | TABULAR             | CB117             | 0         |           |   |
| 0                     |          |            |          |            |                     |                   |           |           |   |
| CB118                 | 85.22    | 0.18       | 0        |            | TABULAR             | CB118             | 0         |           |   |
| 0                     |          |            |          |            |                     |                   |           |           |   |
| Roof_1                | 96.35    | 0.15       | 0        |            | FUNCTIONAL          | 0                 | 0         | 635       | 0 |
| 0                     |          |            |          |            |                     |                   |           |           |   |
| Roof_2                | 96.35    | 0.15       | 0        |            | FUNCTIONAL          | 0                 | 0         | 643       | 0 |
| 0                     |          |            |          |            |                     |                   |           |           |   |
| St_UnGrd              | 81.8     | 1          | 0        |            | FUNCTIONAL          | 0                 | 0         | 49        | 0 |
| 0                     |          |            |          |            |                     |                   |           |           |   |
| [CONDUITS]            |          |            |          |            |                     |                   |           |           |   |
| ;;Name                |          | From Node  | To Node  | Length     | Roughness           | InOffset          | OutOffset |           |   |
| InitFlow              |          | MaxFlow    | -----    |            |                     |                   |           |           |   |

|                 |          |               |                   |                            |              |                |                  |
|-----------------|----------|---------------|-------------------|----------------------------|--------------|----------------|------------------|
|                 |          | CB111         | CB112             | 28.913                     | 0.013        | 83.59          | 83.34            |
| C1              | 0.08     | CB113         | CB112             | 31.317                     | 0.013        | 83.55          | 83.36            |
| C3              | 0.04     |               |                   |                            |              |                |                  |
| C5              | 0.04     | CB110         | CB111             | 20.475                     | 0.013        | 83.75          | 83.59            |
| C0              |          |               |                   |                            |              |                |                  |
| [WEIRS]         |          |               |                   |                            |              |                |                  |
| ;;Name          | EndCoeff | From Node     | To Node           | Type                       | CrestHt      | Qcoeff         | Gated            |
| EndCon          |          | Surcharge     | RoadWidth         | RoadSurf                   | Coeff. Curve |                |                  |
| ;;              |          |               |                   |                            |              |                |                  |
| W1              |          | CB115         | CB116             | TRANSVERSE                 | 85.45        | 1.84           | NO               |
| W2              | 0        | NO            |                   |                            |              |                |                  |
| W2              |          | CB116         | CB117             | TRANSVERSE                 | 85.35        | 1.84           | NO               |
| 0               | 0        | NO            |                   |                            |              |                |                  |
| W3              |          | CB112         | CB113             | TRANSVERSE                 | 85.38        | 1.84           | NO               |
| 0               | 0        | NO            |                   |                            |              |                |                  |
| W4              |          | CB114         | CB115             | TRANSVERSE                 | 85.5         | 1.84           | NO               |
| 0               | 0        | NO            |                   |                            |              |                |                  |
| W5              |          | CB110         | CB112             | TRANSVERSE                 | 85.6         | 1.84           | NO               |
| 0               | 0        | NO            |                   |                            |              |                |                  |
| [OUTLETS]       |          |               |                   |                            |              |                |                  |
| ;;Name          | Qexpon   | From Node     | To Node           | Offset                     | Type         | QTable/Qcoeff  |                  |
| Qexpon          | Gated    |               |                   |                            |              |                |                  |
| ;;              |          |               |                   |                            |              |                |                  |
| C2              |          | CB112         | STUB16            | 83.28                      | TABULAR/HEAD | Vortex_ICD_95  |                  |
| NO              |          |               |                   |                            |              |                |                  |
| OL1             |          | CB115         | St_UnGrd          | 85.25                      | TABULAR/HEAD | ZURN_2150F-6NH |                  |
| NO              |          |               |                   |                            |              |                |                  |
| OL2             |          | CB116         | St_UnGrd          | 85.2                       | TABULAR/HEAD | ZURN_2150F-6NH |                  |
| NO              |          |               |                   |                            |              |                |                  |
| OL3             |          | CB117         | St_UnGrd          | 85.15                      | TABULAR/HEAD | ZURN_2150F-6NH |                  |
| NO              |          |               |                   |                            |              |                |                  |
| OL4             |          | Roof_1        | STUB15            | 96.35                      | TABULAR/HEAD | O_Roof1        |                  |
| NO              |          |               |                   |                            |              |                |                  |
| OL5             |          | Roof_2        | OF4               | 96.35                      | TABULAR/HEAD | O_Roof1        |                  |
| NO              |          |               |                   |                            |              |                |                  |
| OL6             |          | CB114         | St_UnGrd          | 85.3                       | TABULAR/HEAD | ZURN_2150F-6NH |                  |
| NO              |          |               |                   |                            |              |                |                  |
| OL7             |          | St_UnGrd      | OF7               | 81.8                       | TABULAR/HEAD | O_St_UnGrd     |                  |
| NO              |          |               |                   |                            |              |                |                  |
| OL8             |          | CB118         | St_UnGrd          | 85.22                      | TABULAR/HEAD | ZURN_2150F-6NH |                  |
| NO              |          |               |                   |                            |              |                |                  |
| [XSECTIONS]     |          |               |                   |                            |              |                |                  |
| ;;Link          |          | Shape         | Geom1             | Geom2                      | Geom3        | Geom4          | Barrels          |
| Culvert         |          |               |                   |                            |              |                |                  |
| ;;              |          |               |                   |                            |              |                |                  |
| C1              |          | CIRCULAR      | 0.15              | 0                          | 0            | 0              | 1                |
| C3              |          | CIRCULAR      | 0.15              | 0                          | 0            | 0              | 1                |
| C5              |          | CIRCULAR      | 0.15              | 0                          | 0            | 0              | 1                |
| W1              |          | RECT_OPEN     | 0.11              | 17.1                       | 0            | 0              |                  |
| W2              |          | RECT_OPEN     | 0.25              | 17.1                       | 0            | 0              |                  |
| W3              |          | RECT_OPEN     | 0.02              | 4.58                       | 0            | 0              |                  |
| W4              |          | RECT_OPEN     | 0.05              | 7                          | 0            | 0              |                  |
| W5              |          | RECT_OPEN     | 0.05              | 3.487                      | 0            | 0              |                  |
| [LOSSES]        |          |               |                   |                            |              |                |                  |
| ;;Link          |          | Kentry        | Kexit             | Kavg                       | Flap Gate    | Seepage        |                  |
| ;;              |          |               |                   |                            |              |                |                  |
| [INFLOWS]       |          |               |                   |                            |              |                |                  |
| ;;Node          |          | Constituent   | Time Series       | Type                       | Mfactor      | Sfactor        | Baseline Pattern |
| ;;              |          |               |                   |                            |              |                |                  |
| St_UnGrd        |          | FLOW          | InfiltratedInflow | FLOW                       | 1.0          | 1              | 0                |
| [CURVES]        |          |               |                   |                            |              |                |                  |
| ;;Name          |          | Type          | X-Value           | Y-Value                    |              |                |                  |
| ;;              |          |               |                   |                            |              |                |                  |
| Tempest Rating  |          | Curve for MHF | IPEX              | TYPE A, No grade allowance |              |                |                  |
| MHF_IPEX_TYPE_A |          | Rating        | 0                 | 0                          |              |                |                  |
| MHF_IPEX_TYPE_A |          |               | 0.1               | 0.0057                     |              |                |                  |
| MHF_IPEX_TYPE_A |          |               | 0.2               | 0.0081                     |              |                |                  |
| MHF_IPEX_TYPE_A |          |               | 0.3               | 0.0099                     |              |                |                  |
| MHF_IPEX_TYPE_A |          |               | 0.4               | 0.0114                     |              |                |                  |
| MHF_IPEX_TYPE_A |          |               | 0.5               | 0.0128                     |              |                |                  |
| MHF_IPEX_TYPE_A |          |               | 0.6               | 0.014                      |              |                |                  |
| MHF_IPEX_TYPE_A |          |               | 0.7               | 0.0151                     |              |                |                  |
| MHF_IPEX_TYPE_A |          |               | 0.8               | 0.0162                     |              |                |                  |
| MHF_IPEX_TYPE_A |          |               | 0.9               | 0.0172                     |              |                |                  |
| MHF_IPEX_TYPE_A |          |               | 1                 | 0.0181                     |              |                |                  |
| MHF_IPEX_TYPE_A |          |               | 1.2               | 0.0198                     |              |                |                  |
| MHF_IPEX_TYPE_A |          |               | 1.4               | 0.0214                     |              |                |                  |
| MHF_IPEX_TYPE_A |          |               | 1.6               | 0.0229                     |              |                |                  |
| MHF_IPEX_TYPE_A |          |               | 1.8               | 0.0243                     |              |                |                  |
| MHF_IPEX_TYPE_A |          |               | 2                 | 0.0256                     |              |                |                  |
| MHF_IPEX_TYPE_A |          |               | 2.5               | 0.0286                     |              |                |                  |
| MHF_IPEX_TYPE_A |          |               | 3                 | 0.0313                     |              |                |                  |
| Tempest Rating  |          | Curve for MHF | IPEX              | TYPE B, No grade allowance |              |                |                  |
| MHF_IPEX_TYPE_B |          | Rating        | 0                 | 0                          |              |                |                  |
| MHF_IPEX_TYPE_B |          |               | 0.1               | 0.0081                     |              |                |                  |
| MHF_IPEX_TYPE_B |          |               | 0.2               | 0.0115                     |              |                |                  |
| MHF_IPEX_TYPE_B |          |               | 0.3               | 0.0141                     |              |                |                  |
| MHF_IPEX_TYPE_B |          |               | 0.4               | 0.0162                     |              |                |                  |
| MHF_IPEX_TYPE_B |          |               | 0.5               | 0.0182                     |              |                |                  |
| MHF_IPEX_TYPE_B |          |               | 0.6               | 0.0199                     |              |                |                  |
| MHF_IPEX_TYPE_B |          |               | 0.7               | 0.0215                     |              |                |                  |
| MHF_IPEX_TYPE_B |          |               | 0.8               | 0.023                      |              |                |                  |
| MHF_IPEX_TYPE_B |          |               | 0.9               | 0.0244                     |              |                |                  |
| MHF_IPEX_TYPE_B |          |               | 1                 | 0.0257                     |              |                |                  |
| MHF_IPEX_TYPE_B |          |               | 1.2               | 0.0281                     |              |                |                  |
| MHF_IPEX_TYPE_B |          |               | 1.4               | 0.0304                     |              |                |                  |
| MHF_IPEX_TYPE_B |          |               | 1.6               | 0.0325                     |              |                |                  |
| MHF_IPEX_TYPE_B |          |               | 1.8               | 0.0344                     |              |                |                  |
| MHF_IPEX_TYPE_B |          |               | 2                 | 0.0363                     |              |                |                  |
| MHF_IPEX_TYPE_B |          |               | 2.5               | 0.0406                     |              |                |                  |
| MHF_IPEX_TYPE_B |          |               | 3                 | 0.0445                     |              |                |                  |
| Tempest Rating  |          | Curve for MHF | IPEX              | TYPE C, No grade allowance |              |                |                  |
| MHF_IPEX_TYPE_C |          | Rating        | 0                 | 0                          |              |                |                  |
| MHF_IPEX_TYPE_C |          |               | 0.1               | 0.0106                     |              |                |                  |
| MHF_IPEX_TYPE_C |          |               | 0.2               | 0.015                      |              |                |                  |
| MHF_IPEX_TYPE_C |          |               | 0.3               | 0.0183                     |              |                |                  |
| MHF_IPEX_TYPE_C |          |               | 0.4               | 0.0212                     |              |                |                  |
| MHF_IPEX_TYPE_C |          |               | 0.5               | 0.0237                     |              |                |                  |
| MHF_IPEX_TYPE_C |          |               | 0.6               | 0.0259                     |              |                |                  |
| MHF_IPEX_TYPE_C |          |               | 0.7               | 0.028                      |              |                |                  |
| MHF_IPEX_TYPE_C |          |               | 0.8               | 0.0299                     |              |                |                  |
| MHF_IPEX_TYPE_C |          |               | 0.9               | 0.0317                     |              |                |                  |
| MHF_IPEX_TYPE_C |          |               | 1                 | 0.0335                     |              |                |                  |
| MHF_IPEX_TYPE_C |          |               | 1.2               | 0.0366                     |              |                |                  |
| MHF_IPEX_TYPE_C |          |               | 1.4               | 0.0396                     |              |                |                  |
| MHF_IPEX_TYPE_C |          |               | 1.6               | 0.0423                     |              |                |                  |
| MHF_IPEX_TYPE_C |          |               | 1.8               | 0.0449                     |              |                |                  |
| MHF_IPEX_TYPE_C |          |               | 2                 | 0.0473                     |              |                |                  |
| MHF_IPEX_TYPE_C |          |               | 2.5               | 0.0529                     |              |                |                  |
| MHF_IPEX_TYPE_C |          |               | 3                 | 0.0579                     |              |                |                  |
| Tempest Rating  |          | Curve for MHF | IPEX              | TYPE D, No grade allowance |              |                |                  |
| MHF_IPEX_TYPE_D |          | Rating        | 0                 | 0                          |              |                |                  |
| MHF_IPEX_TYPE_D |          |               | 0.1               | 0.0154                     |              |                |                  |
| MHF_IPEX_TYPE_D |          |               | 0.2               | 0.0217                     |              |                |                  |
| MHF_IPEX_TYPE_D |          |               | 0.3               | 0.0266                     |              |                |                  |
| MHF_IPEX_TYPE_D |          |               | 0.4               | 0.0307                     |              |                |                  |
| MHF_IPEX_TYPE_D |          |               | 0.5               | 0.0343                     |              |                |                  |
| MHF_IPEX_TYPE_D |          |               | 0.6               | 0.0376                     |              |                |                  |
| MHF_IPEX_TYPE_D |          |               | 0.7               | 0.0406                     |              |                |                  |
| MHF_IPEX_TYPE_D |          |               | 0.8               | 0.0434                     |              |                |                  |
| MHF_IPEX_TYPE_D |          |               | 0.9               | 0.0461                     |              |                |                  |
| MHF_IPEX_TYPE_D |          |               | 1                 | 0.0485                     |              |                |                  |
| MHF_IPEX_TYPE_D |          |               | 1.2               | 0.0532                     |              |                |                  |



|                                                               |        |        |   |                                                             |        |        |
|---------------------------------------------------------------|--------|--------|---|-------------------------------------------------------------|--------|--------|
| MHF_IPEX_TYPE_D                                               | 1.4    | 0.0574 |   | Vortex_ICD_55                                               | 0.9    | 0.0026 |
| MHF_IPEX_TYPE_D                                               | 1.6    | 0.0614 |   | Vortex_ICD_55                                               | 1      | 0.0027 |
| MHF_IPEX_TYPE_D                                               | 1.8    | 0.0651 |   | Vortex_ICD_55                                               | 1.2    | 0.003  |
| MHF_IPEX_TYPE_D                                               | 2      | 0.0687 |   | Vortex_ICD_55                                               | 1.4    | 0.0032 |
| MHF_IPEX_TYPE_D                                               | 2.5    | 0.0768 |   | Vortex_ICD_55                                               | 1.6    | 0.0034 |
| MHF_IPEX_TYPE_D                                               | 3      | 0.0841 |   | Vortex_ICD_55                                               | 1.8    | 0.0036 |
|                                                               |        |        |   | Vortex_ICD_55                                               | 2      | 0.0038 |
|                                                               |        |        |   | Vortex_ICD_55                                               | 2.5    | 0.0043 |
|                                                               |        |        |   | Vortex_ICD_55                                               | 3      | 0.0047 |
| ;Tempest Rating Curve for MHF IPEX TYPE E, No grate allowance |        |        |   |                                                             |        |        |
| MHF_IPEX_TYPE_E                                               | Rating | 0      | 0 | ;Tempest Rating Curve for Vortex ICD 60, No grate allowance |        |        |
| MHF_IPEX_TYPE_E                                               | 0.1    | 0.0205 |   | Vortex_ICD_60                                               | Rating | 0      |
| MHF_IPEX_TYPE_E                                               | 0.2    | 0.0289 |   | Vortex_ICD_60                                               | 0.1    | 0.0011 |
| MHF_IPEX_TYPE_E                                               | 0.3    | 0.0355 |   | Vortex_ICD_60                                               | 0.2    | 0.0015 |
| MHF_IPEX_TYPE_E                                               | 0.4    | 0.0409 |   | Vortex_ICD_60                                               | 0.3    | 0.0018 |
| MHF_IPEX_TYPE_E                                               | 0.5    | 0.0458 |   | Vortex_ICD_60                                               | 0.4    | 0.0021 |
| MHF_IPEX_TYPE_E                                               | 0.6    | 0.0501 |   | Vortex_ICD_60                                               | 0.5    | 0.0023 |
| MHF_IPEX_TYPE_E                                               | 0.7    | 0.0542 |   | Vortex_ICD_60                                               | 0.6    | 0.0025 |
| MHF_IPEX_TYPE_E                                               | 0.8    | 0.0579 |   | Vortex_ICD_60                                               | 0.7    | 0.0027 |
| MHF_IPEX_TYPE_E                                               | 0.9    | 0.0614 |   | Vortex_ICD_60                                               | 0.8    | 0.0029 |
| MHF_IPEX_TYPE_E                                               | 1      | 0.0647 |   | Vortex_ICD_60                                               | 0.9    | 0.0031 |
| MHF_IPEX_TYPE_E                                               | 1.2    | 0.0709 |   | Vortex_ICD_60                                               | 1      | 0.0032 |
| MHF_IPEX_TYPE_E                                               | 1.4    | 0.0766 |   | Vortex_ICD_60                                               | 1.2    | 0.0036 |
| MHF_IPEX_TYPE_E                                               | 1.6    | 0.0819 |   | Vortex_ICD_60                                               | 1.4    | 0.0038 |
| MHF_IPEX_TYPE_E                                               | 1.8    | 0.0868 |   | Vortex_ICD_60                                               | 1.6    | 0.0041 |
| MHF_IPEX_TYPE_E                                               | 2      | 0.0915 |   | Vortex_ICD_60                                               | 1.8    | 0.0043 |
| MHF_IPEX_TYPE_E                                               | 2.5    | 0.1023 |   | Vortex_ICD_60                                               | 2      | 0.0046 |
| MHF_IPEX_TYPE_E                                               | 3      | 0.1121 |   | Vortex_ICD_60                                               | 2.5    | 0.0051 |
| O_Roof1                                                       | Rating | 0      | 0 | Vortex_ICD_60                                               | 3      | 0.0056 |
| O_Roof1                                                       | 0.001  | 0.002  |   | ;Tempest Rating Curve for Vortex ICD 65, No grate allowance |        |        |
| O_Roof1                                                       | 0.15   | 0.002  |   | Vortex_ICD_65                                               | Rating | 0      |
| O_Roof2                                                       | Rating | 0      | 0 | Vortex_ICD_65                                               | 0.1    | 0.0012 |
| O_Roof2                                                       | 0.001  | 0.0025 |   | Vortex_ICD_65                                               | 0.2    | 0.0016 |
| O_Roof2                                                       | 0.15   | 0.0025 |   | Vortex_ICD_65                                               | 0.3    | 0.002  |
| O_St_UnGrd                                                    | Rating | 0      | 0 | Vortex_ICD_65                                               | 0.4    | 0.0023 |
| O_St_UnGrd                                                    | 1.01   | 0.029  |   | Vortex_ICD_65                                               | 0.5    | 0.0025 |
| O_St_UnGrd                                                    | 1      | 0.029  |   | Vortex_ICD_65                                               | 0.6    | 0.0028 |
|                                                               |        |        |   | Vortex_ICD_65                                               | 0.7    | 0.003  |
| ;Tempest Rating Curve for Vortex ICD 100, No grate allowance  |        |        |   |                                                             |        |        |
| Vortex_ICD_100                                                | Rating | 0      | 0 | Vortex_ICD_65                                               | 0.8    | 0.0032 |
| Vortex_ICD_100                                                | 0.1    | 0.0028 |   | Vortex_ICD_65                                               | 0.9    | 0.0034 |
| Vortex_ICD_100                                                | 0.2    | 0.004  |   | Vortex_ICD_65                                               | 1      | 0.0036 |
| Vortex_ICD_100                                                | 0.3    | 0.0049 |   | Vortex_ICD_65                                               | 1.2    | 0.004  |
| Vortex_ICD_100                                                | 0.4    | 0.0056 |   | Vortex_ICD_65                                               | 1.4    | 0.0043 |
| Vortex_ICD_100                                                | 0.5    | 0.0063 |   | Vortex_ICD_65                                               | 1.6    | 0.0046 |
| Vortex_ICD_100                                                | 0.6    | 0.0069 |   | Vortex_ICD_65                                               | 1.8    | 0.0049 |
| Vortex_ICD_100                                                | 0.7    | 0.0075 |   | Vortex_ICD_65                                               | 2      | 0.0051 |
| Vortex_ICD_100                                                | 0.8    | 0.008  |   | Vortex_ICD_65                                               | 2.5    | 0.0057 |
| Vortex_ICD_100                                                | 0.9    | 0.0085 |   | Vortex_ICD_65                                               | 3      | 0.0063 |
| Vortex_ICD_100                                                | 1      | 0.0089 |   | ;Tempest Rating Curve for Vortex ICD 70, No grate allowance |        |        |
| Vortex_ICD_100                                                | 1.2    | 0.0098 |   | Vortex_ICD_70                                               | Rating | 0      |
| Vortex_ICD_100                                                | 1.4    | 0.0106 |   | Vortex_ICD_70                                               | 0      | 0      |
| Vortex_ICD_100                                                | 1.6    | 0.0113 |   | Vortex_ICD_70                                               | 0.1    | 0.0013 |
| Vortex_ICD_100                                                | 1.8    | 0.012  |   | Vortex_ICD_70                                               | 0.2    | 0.0019 |
| Vortex_ICD_100                                                | 2      | 0.0126 |   | Vortex_ICD_70                                               | 0.3    | 0.0023 |
| Vortex_ICD_100                                                | 2.5    | 0.0141 |   | Vortex_ICD_70                                               | 0.4    | 0.0027 |
| Vortex_ICD_100                                                | 3      | 0.0155 |   | Vortex_ICD_70                                               | 0.5    | 0.003  |
|                                                               |        |        |   | Vortex_ICD_70                                               | 0.6    | 0.0033 |
| ;Tempest Rating Curve for Vortex ICD 105, No grate allowance  |        |        |   |                                                             |        |        |
| Vortex_ICD_105                                                | Rating | 0      | 0 | Vortex_ICD_70                                               | 0.7    | 0.0036 |
| Vortex_ICD_105                                                | 0.1    | 0.0031 |   | Vortex_ICD_70                                               | 0.8    | 0.0038 |
| Vortex_ICD_105                                                | 0.2    | 0.0044 |   | Vortex_ICD_70                                               | 0.9    | 0.0041 |
| Vortex_ICD_105                                                | 0.3    | 0.0054 |   | Vortex_ICD_70                                               | 1      | 0.0043 |
| Vortex_ICD_105                                                | 0.4    | 0.0062 |   | Vortex_ICD_70                                               | 1.2    | 0.0047 |
| Vortex_ICD_105                                                | 0.5    | 0.0069 |   | Vortex_ICD_70                                               | 1.4    | 0.0051 |
| Vortex_ICD_105                                                | 0.6    | 0.0076 |   | Vortex_ICD_70                                               | 1.6    | 0.0055 |
| Vortex_ICD_105                                                | 0.7    | 0.0082 |   | Vortex_ICD_70                                               | 1.8    | 0.0058 |
| Vortex_ICD_105                                                | 0.8    | 0.0088 |   | Vortex_ICD_70                                               | 2      | 0.0061 |
| Vortex_ICD_105                                                | 0.9    | 0.0093 |   | Vortex_ICD_70                                               | 2.5    | 0.0068 |
| Vortex_ICD_105                                                | 1      | 0.0098 |   | Vortex_ICD_70                                               | 3      | 0.0075 |
| Vortex_ICD_105                                                | 1.2    | 0.0107 |   | ;Tempest Rating Curve for Vortex ICD 75, No grate allowance |        |        |
| Vortex_ICD_105                                                | 1.4    | 0.0116 |   | Vortex_ICD_75                                               | Rating | 0      |
| Vortex_ICD_105                                                | 1.6    | 0.0124 |   | Vortex_ICD_75                                               | 0      | 0      |
| Vortex_ICD_105                                                | 1.8    | 0.0131 |   | Vortex_ICD_75                                               | 0.1    | 0.0016 |
| Vortex_ICD_105                                                | 2      | 0.0139 |   | Vortex_ICD_75                                               | 0.2    | 0.0022 |
| Vortex_ICD_105                                                | 2.5    | 0.0155 |   | Vortex_ICD_75                                               | 0.3    | 0.0027 |
| Vortex_ICD_105                                                | 3      | 0.017  |   | Vortex_ICD_75                                               | 0.4    | 0.0032 |
|                                                               |        |        |   | Vortex_ICD_75                                               | 0.5    | 0.0035 |
| ;Tempest Rating Curve for Vortex ICD 40, No grate allowance   |        |        |   |                                                             |        |        |
| Vortex_ICD_40                                                 | Rating | 0      | 0 | Vortex_ICD_75                                               | 0.6    | 0.0039 |
| Vortex_ICD_40                                                 | 0.1    | 0.0004 |   | Vortex_ICD_75                                               | 0.7    | 0.0042 |
| Vortex_ICD_40                                                 | 0.2    | 0.0006 |   | Vortex_ICD_75                                               | 0.8    | 0.0045 |
| Vortex_ICD_40                                                 | 0.3    | 0.0007 |   | Vortex_ICD_75                                               | 0.9    | 0.0048 |
| Vortex_ICD_40                                                 | 0.4    | 0.0009 |   | Vortex_ICD_75                                               | 1      | 0.005  |
| Vortex_ICD_40                                                 | 0.5    | 0.001  |   | Vortex_ICD_75                                               | 1.2    | 0.0055 |
| Vortex_ICD_40                                                 | 0.6    | 0.001  |   | Vortex_ICD_75                                               | 1.4    | 0.0059 |
| Vortex_ICD_40                                                 | 0.7    | 0.0011 |   | Vortex_ICD_75                                               | 1.6    | 0.0063 |
| Vortex_ICD_40                                                 | 0.8    | 0.0012 |   | Vortex_ICD_75                                               | 1.8    | 0.0067 |
| Vortex_ICD_40                                                 | 0.9    | 0.0013 |   | Vortex_ICD_75                                               | 2      | 0.007  |
| Vortex_ICD_40                                                 | 1      | 0.0014 |   | Vortex_ICD_75                                               | 2.5    | 0.0079 |
| Vortex_ICD_40                                                 | 1.2    | 0.0015 |   | Vortex_ICD_75                                               | 3      | 0.0087 |
| Vortex_ICD_40                                                 | 1.4    | 0.0016 |   | ;Tempest Rating Curve for Vortex ICD 80, No grate allowance |        |        |
| Vortex_ICD_40                                                 | 1.6    | 0.0017 |   | Vortex_ICD_80                                               | Rating | 0      |
| Vortex_ICD_40                                                 | 1.8    | 0.0018 |   | Vortex_ICD_80                                               | 0      | 0      |
| Vortex_ICD_40                                                 | 2      | 0.0019 |   | Vortex_ICD_80                                               | 0.1    | 0.0018 |
| Vortex_ICD_40                                                 | 2.5    | 0.0022 |   | Vortex_ICD_80                                               | 0.2    | 0.0026 |
| Vortex_ICD_40                                                 | 3      | 0.0024 |   | Vortex_ICD_80                                               | 0.3    | 0.0031 |
|                                                               |        |        |   | Vortex_ICD_80                                               | 0.4    | 0.0036 |
| ;Tempest Rating Curve for Vortex ICD 45, No grate allowance   |        |        |   |                                                             |        |        |
| Vortex_ICD_45                                                 | Rating | 0      | 0 | Vortex_ICD_80                                               | 0.5    | 0.004  |
| Vortex_ICD_45                                                 | 0.1    | 0.0006 |   | Vortex_ICD_80                                               | 0.6    | 0.0044 |
| Vortex_ICD_45                                                 | 0.2    | 0.0008 |   | Vortex_ICD_80                                               | 0.7    | 0.0048 |
| Vortex_ICD_45                                                 | 0.3    | 0.001  |   | Vortex_ICD_80                                               | 0.8    | 0.0051 |
| Vortex_ICD_45                                                 | 0.4    | 0.0011 |   | Vortex_ICD_80                                               | 0.9    | 0.0054 |
| Vortex_ICD_45                                                 | 0.5    | 0.0013 |   | Vortex_ICD_80                                               | 1      | 0.0057 |
| Vortex_ICD_45                                                 | 0.6    | 0.0014 |   | Vortex_ICD_80                                               | 1.2    | 0.0063 |
| Vortex_ICD_45                                                 | 0.7    | 0.0015 |   | Vortex_ICD_80                                               | 1.4    | 0.0068 |
| Vortex_ICD_45                                                 | 0.8    | 0.0016 |   | Vortex_ICD_80                                               | 1.6    | 0.0072 |
| Vortex_ICD_45                                                 | 0.9    | 0.0017 |   | Vortex_ICD_80                                               | 1.8    | 0.0077 |
| Vortex_ICD_45                                                 | 1      | 0.0018 |   | Vortex_ICD_80                                               | 2      | 0.0081 |
| Vortex_ICD_45                                                 | 1.2    | 0.002  |   | Vortex_ICD_80                                               | 2.5    | 0.009  |
| Vortex_ICD_45                                                 | 1.4    | 0.0021 |   | Vortex_ICD_80                                               | 3      | 0.0099 |
| Vortex_ICD_45                                                 | 1.6    | 0.0023 |   | ;Tempest Rating Curve for Vortex ICD 85, No grate allowance |        |        |
| Vortex_ICD_45                                                 | 1.8    | 0.0024 |   | Vortex_ICD_85                                               | Rating | 0      |
| Vortex_ICD_45                                                 | 2      | 0.0026 |   | Vortex_ICD_85                                               | 0      | 0      |
| Vortex_ICD_45                                                 | 2.5    | 0.0029 |   | Vortex_ICD_85                                               | 0.1    | 0.002  |
| Vortex_ICD_45                                                 | 3      | 0.0031 |   | Vortex_ICD_85                                               | 0.2    | 0.0029 |
|                                                               |        |        |   | Vortex_ICD_85                                               | 0.3    | 0.0035 |
| ;Tempest Rating Curve for Vortex ICD 50, No grate allowance   |        |        |   |                                                             |        |        |
| Vortex_ICD_50                                                 | Rating | 0      | 0 | Vortex_ICD_85                                               | 0.4    | 0.0041 |
| Vortex_ICD_50                                                 | 0.1    | 0.0007 |   | Vortex_ICD_85                                               | 0.5    | 0.0045 |
| Vortex_ICD_50                                                 | 0.2    | 0.001  |   | Vortex_ICD_85                                               | 0.6    | 0.005  |
| Vortex_ICD_50                                                 | 0.3    | 0.0012 |   | Vortex_ICD_85                                               | 0.7    | 0.0054 |
| Vortex_ICD_50                                                 | 0.4    | 0.0014 |   | Vortex_ICD_85                                               | 0.8    | 0.0057 |
| Vortex_ICD_50                                                 | 0.5    | 0.0016 |   | Vortex_ICD_85                                               | 0.9    | 0.0061 |
| Vortex_ICD_50                                                 | 0.6    | 0.0018 |   | Vortex_ICD_85                                               | 1      | 0.0064 |
| Vortex_ICD_50                                                 | 0.7    | 0.0019 |   | Vortex_ICD_85                                               | 1.2    | 0.007  |
| Vortex_ICD_50                                                 | 0.8    | 0.002  |   | Vortex_ICD_85                                               | 1.4    | 0.0076 |
| Vortex_ICD_50                                                 | 0.9    | 0.0021 |   | Vortex_ICD_85                                               | 1.6    | 0.0081 |
| Vortex_ICD_50                                                 | 1      | 0.0023 |   | Vortex_ICD_85                                               | 1.8    | 0.0086 |
| Vortex_ICD_50                                                 | 1.2    | 0.0025 |   | Vortex_ICD_85                                               | 2      | 0.0091 |
| Vortex_ICD_50                                                 | 1.4    | 0.0027 |   | Vortex_ICD_85                                               | 2.5    | 0.0101 |
| Vortex_ICD_50                                                 | 1.6    | 0.0029 |   | Vortex_ICD_85                                               | 3      | 0.0111 |
| Vortex_ICD_50                                                 | 1.8    | 0.003  |   | ;Tempest Rating Curve for Vortex ICD 90, No grate allowance |        |        |
| Vortex_ICD_50                                                 | 2      | 0.0032 |   | Vortex_ICD_90                                               | Rating | 0      |
| Vortex_ICD_50                                                 | 2.5    | 0.0036 |   | Vortex_ICD_90                                               | 0      | 0      |
| Vortex_ICD_50                                                 | 3      | 0.0039 |   | Vortex_ICD_90                                               | 0.1    | 0.0022 |
|                                                               |        |        |   | Vortex_ICD_90                                               | 0.2    | 0.0032 |
| ;Tempest Rating Curve for Vortex ICD 55, No grate allowance   |        |        |   |                                                             |        |        |
| Vortex_ICD_55                                                 | Rating | 0      | 0 | Vortex_ICD_90                                               | 0.3    | 0.0039 |
| Vortex_ICD_55                                                 | 0.1    | 0.0009 |   | Vortex_ICD_90                                               | 0.4    | 0.0045 |
| Vortex_ICD_55                                                 | 0.2    | 0.0012 |   | Vortex_ICD_90                                               | 0.5    | 0.0051 |
| Vortex_ICD_55                                                 | 0.3    | 0.0015 |   | Vortex_ICD_90                                               | 0.6    | 0.0055 |
| Vortex_ICD_55                                                 | 0.4    | 0.0017 |   | Vortex_ICD_90                                               | 0.7    | 0.006  |
| Vortex_ICD_55                                                 | 0.5    | 0.0019 |   | Vortex_ICD_90                                               | 0.8    | 0.0064 |
| Vortex_ICD_55                                                 | 0.6    | 0.0021 |   | Vortex_ICD_90                                               | 0.9    | 0.0068 |
| Vortex_ICD_55                                                 | 0.7    | 0.0023 |   | Vortex_ICD_90                                               | 1      | 0.0072 |
| Vortex_ICD_55                                                 | 0.8    | 0.0024 |   | Vortex_ICD_90                                               | 1.2    | 0.0079 |
|                                                               |        |        |   | Vortex_ICD_90                                               | 1.4    | 0.0085 |
|                                                               |        |        |   | Vortex_ICD_90                                               | 1.6    | 0.0091 |
|                                                               |        |        |   | Vortex_ICD_90                                               | 1.8    | 0.0096 |
|                                                               |        |        |   | Vortex_ICD_90                                               | 2      | 0.0102 |
|                                                               |        |        |   | Vortex_ICD_90                                               | 2.5    | 0.0114 |
|                                                               |        |        |   | Vortex_ICD_90                                               | 3      | 0.0125 |

|                                                             |        |        |   |
|-------------------------------------------------------------|--------|--------|---|
| ;Tempest Rating Curve for Vortex ICD 95, No grate allowance |        |        |   |
| Vortex_ICD_95                                               | Rating | 0      | 0 |
| Vortex_ICD_95                                               | 0.1    | 0.0026 |   |
| Vortex_ICD_95                                               | 0.2    | 0.0036 |   |
| Vortex_ICD_95                                               | 0.3    | 0.0044 |   |
| Vortex_ICD_95                                               | 0.4    | 0.0051 |   |
| Vortex_ICD_95                                               | 0.5    | 0.0057 |   |
| Vortex_ICD_95                                               | 0.6    | 0.0062 |   |
| Vortex_ICD_95                                               | 0.7    | 0.0067 |   |
| Vortex_ICD_95                                               | 0.8    | 0.0071 |   |
| Vortex_ICD_95                                               | 0.9    | 0.0076 |   |
| Vortex_ICD_95                                               | 1      | 0.008  |   |
| Vortex_ICD_95                                               | 1.2    | 0.0087 |   |
| Vortex_ICD_95                                               | 1.4    | 0.0094 |   |
| Vortex_ICD_95                                               | 1.6    | 0.0101 |   |
| Vortex_ICD_95                                               | 1.8    | 0.0107 |   |
| Vortex_ICD_95                                               | 2      | 0.0113 |   |
| Vortex_ICD_95                                               | 2.5    | 0.0126 |   |
| Vortex_ICD_95                                               | 3      | 0.0138 |   |

|                         |        |                     |   |
|-------------------------|--------|---------------------|---|
| ;From Zurn Manual RD178 |        |                     |   |
| ZURN_Z150F-6NH          | Rating | 0                   | 0 |
| ZURN_Z150F-6NH          | 0.0127 | 0.00503838308477861 |   |
| ZURN_Z150F-6NH          | 0.0257 | 0.0132420013231177  |   |
| ZURN_Z150F-6NH          | 0.0384 | 0.0234992054543888  |   |
| ZURN_Z150F-6NH          | 0.0508 | 0.0357128365761305  |   |
| ZURN_Z150F-6NH          | 0.0765 | 0.0425019726111045  |   |
| ZURN_Z150F-6NH          | 0.1024 | 0.0433196215564931  |   |

|       |         |      |        |
|-------|---------|------|--------|
| CB110 | Storage | 0    | 0.073  |
| CB110 |         | 1.55 | 0.073  |
| CB110 |         | 1.85 | 120.85 |
| CB110 |         | 1.9  | 120.85 |
|       |         |      |        |
| CB111 | Storage | 0    | 0.073  |
| CB111 |         | 2.01 | 0.073  |
|       |         |      |        |
| CB112 | Storage | 0    | 0.36   |
| CB112 |         | 1.92 | 0.36   |
| CB112 |         | 2.12 | 19.13  |
| CB112 |         | 2.12 | 19.13  |
|       |         |      |        |
| CB113 | Storage | 0    | 0.073  |
| CB113 |         | 1.6  | 0.073  |
| CB113 |         | 1.7  | 3.62   |
|       |         |      |        |
| CB114 | Storage | 0    | 0.36   |
| CB114 |         | 0.2  | 19.2   |
| CB114 |         | 0.25 | 19.2   |
|       |         |      |        |
| CB115 | Storage | 0    | 0.36   |
| CB115 |         | 0.2  | 155.53 |
| CB115 |         | 0.31 | 155.53 |
|       |         |      |        |
| CB116 | Storage | 0    | 0.36   |
| CB116 |         | 0.15 | 73.19  |
| CB116 |         | 0.4  | 73.19  |
|       |         |      |        |
| CB117 | Storage | 0    | 0.36   |
| CB117 |         | 0.15 | 122.26 |
|       |         |      |        |
| CB118 | Storage | 0    | 0.36   |
| CB118 |         | 0.18 | 37.7   |

|                        |            |          |          |
|------------------------|------------|----------|----------|
| [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  |
| 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       |

|                                                                                                                                                         |            |          |              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------|----------|--------------|
| ;Sum of Infiltrated flow from above the garage slab calculated from Infiltration graphs for S11 multiplied by the total pervious area above the garage. |            |          |              |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:01:00 | 2.306158E-05 |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:02:00 | 2.306158E-05 |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:03:00 | 2.306158E-05 |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:04:00 | 2.306158E-05 |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:05:00 | 2.306158E-05 |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:06:00 | 2.306158E-05 |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:07:00 | 2.306158E-05 |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:08:00 | 2.306158E-05 |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:09:00 | 2.306158E-05 |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:10:00 | 2.306158E-05 |
| InfiltratedInflow                                                                                                                                       | 01/01/2000 | 00:11:00 | 2.306158E-05 |
| .....                                                                                                                                                   |            |          |              |
| Too many data points (1440 in total).                                                                                                                   |            |          |              |

|                        |              |                     |               |
|------------------------|--------------|---------------------|---------------|
| [REPORT]               |              |                     |               |
| ;;Reporting Options    |              |                     |               |
| INPUT YES              |              |                     |               |
| CONTROLS NO            |              |                     |               |
| SUBCATCHMENTS ALL      |              |                     |               |
| NODES ALL              |              |                     |               |
| LINKS ALL              |              |                     |               |
|                        |              |                     |               |
| [TAGS]                 |              |                     |               |
| Subcatch               | S1           | Ramp                |               |
| Subcatch               | S5           | Building            |               |
| Subcatch               | S6           | ParkingLot          |               |
| Subcatch               | S7           | ParkingLot          |               |
| Subcatch               | S8           | Building            |               |
| Subcatch               | S9           | ParkingLot          |               |
| Node                   | St_UnGrd     | Underground_Storage |               |
|                        |              |                     |               |
| [MAP]                  |              |                     |               |
| DIMENSIONS             | 381280.91645 | 5032948.93205       | 381379.86255  |
| UNITS                  | Meters       |                     | 5033068.41295 |
|                        |              |                     |               |
| [COORDINATES]          |              |                     |               |
| ;;Node X-Coord Y-Coord |              |                     |               |
| ;-----                 |              |                     |               |
| OF4                    | 381364.593   | 5032973.357         |               |
| OF7                    | 381346.502   | 5032963.916         |               |
| STUB15                 | 381335.776   | 5032954.363         |               |
| STUB16                 | 381319.979   | 5032958.277         |               |
| CB110                  | 381293.102   | 5033002.513         |               |
| CB111                  | 381307.131   | 5032987.6           |               |
| CB112                  | 381319.643   | 5032961.536         |               |
| CB113                  | 381348.344   | 5032974.064         |               |
| CB114                  | 381332.566   | 5033036.058         |               |
| CB115                  | 381332.827   | 5033018.906         |               |
| CB116                  | 381338.815   | 5033005.189         |               |
| CB117                  | 381344.774   | 5032991.509         |               |
| CB118                  | 381359.473   | 5032992.996         |               |
| Roof_1                 | 381325.164   | 5032977.273         |               |
| Roof_2                 | 381361.335   | 5033013.684         |               |
| St_UnGrd               | 381329.806   | 5032972.84          |               |
|                        |              |                     |               |
| [VERTICES]             |              |                     |               |
| ;;Link X-Coord Y-Coord |              |                     |               |
| ;-----                 |              |                     |               |
| W3                     | 381322.829   | 5032965.271         |               |
| W3                     | 381343.656   | 5032974.514         |               |
| W5                     | 381295.919   | 5033002.386         |               |
| W5                     | 381309.233   | 5032988.935         |               |
| W5                     | 381320.071   | 5032965.768         |               |
| OL6                    | 381323.041   | 5033005.693         |               |
|                        |              |                     |               |
| [POLYGONS]             |              |                     |               |

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|                                         |              |              |              |              |              |              |
|-----------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| *****                                   |              |              |              |              |              |              |
| Dry Weather Inflow .....                | 0.000        | 0.000        |              |              |              |              |
| Wet Weather Inflow .....                | 0.040        | 0.398        |              |              |              |              |
| Groundwater Inflow .....                | 0.000        | 0.000        |              |              |              |              |
| RDII Inflow .....                       | 0.000        | 0.000        |              |              |              |              |
| External Inflow .....                   | 0.000        | 0.005        |              |              |              |              |
| External Outflow .....                  | 0.040        | 0.402        |              |              |              |              |
| Flooding Loss .....                     | 0.000        | 0.000        |              |              |              |              |
| Evaporation Loss .....                  | 0.000        | 0.000        |              |              |              |              |
| Exfiltration Loss .....                 | 0.000        | 0.000        |              |              |              |              |
| Initial Stored Volume ....              | 0.000        | 0.000        |              |              |              |              |
| Final Stored Volume .....               | 0.000        | 0.000        |              |              |              |              |
| Continuity Error (%) .....              | -0.008       |              |              |              |              |              |
| *****                                   |              |              |              |              |              |              |
| 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 :                     | 0.34 sec     |              |              |              |              |              |
| Average Time Step :                     | 5.00 sec     |              |              |              |              |              |
| Maximum Time Step :                     | 5.00 sec     |              |              |              |              |              |
| % of Time in Steady State :             | 0.00         |              |              |              |              |              |
| Average Iterations per Step :           | 2.00         |              |              |              |              |              |
| % of Steps Not Converging :             | 0.00         |              |              |              |              |              |
| Time Step Frequencies :                 |              |              |              |              |              |              |
| 5.000 - 3.155 sec :                     | 100.00 %     |              |              |              |              |              |
| 3.155 - 1.991 sec :                     | 0.00 %       |              |              |              |              |              |
| 1.991 - 1.256 sec :                     | 0.00 %       |              |              |              |              |              |
| 1.256 - 0.792 sec :                     | 0.00 %       |              |              |              |              |              |
| 0.792 - 0.500 sec :                     | 0.00 %       |              |              |              |              |              |
| *****                                   |              |              |              |              |              |              |
| Subcatchment Runoff Summary             |              |              |              |              |              |              |
| *****                                   |              |              |              |              |              |              |
| -----                                   |              |              |              |              |              |              |
| Total                                   | Total        | Peak         | Total        | Total        | Total        | Total        |
| Runoff                                  | Runoff       | Runoff       | Runoff       | Runoff       | Runoff       | Runoff       |
| Subcatchment                            | Subcatchment | Subcatchment | Subcatchment | Subcatchment | Subcatchment | Subcatchment |
| mm                                      | 10^6 ltr     | CMS          | mm           | mm           | mm           | mm           |
| -----                                   |              |              |              |              |              |              |
| S1                                      |              |              | 103.20       | 0.00         | 0.00         | 0.00         |
| 101.64                                  | 0.01         | 0.00         | 0.985        | 0.00         | 0.00         | 73.59        |
| S10                                     |              |              | 103.20       | 0.00         | 0.00         | 8.93         |
| 29.50                                   | 0.00         | 0.00         | 0.286        | 0.00         | 0.00         | 71.51        |
| S11                                     |              |              | 103.20       | 0.00         | 0.00         | 19.11        |
| 31.43                                   | 0.01         | 0.01         | 0.305        | 0.00         | 0.00         | 0.00         |
| S2                                      |              |              | 103.20       | 0.00         | 0.00         | 75.86        |
| 27.37                                   | 0.00         | 0.00         | 0.265        | 0.00         | 0.00         | 0.00         |
| S3                                      |              |              | 103.20       | 0.00         | 0.00         | 71.52        |
| 31.44                                   | 0.01         | 0.01         | 0.305        | 0.00         | 0.00         | 18.09        |
| S4                                      |              |              | 103.20       | 0.00         | 0.00         | 8.65         |
| 29.49                                   | 0.01         | 0.01         | 0.286        | 0.00         | 0.00         | 101.57       |
| S5                                      |              |              | 103.20       | 0.00         | 0.00         | 0.00         |
| 101.57                                  | 0.10         | 0.03         | 0.984        | 0.00         | 0.00         | 25.01        |
| S6                                      |              |              | 103.20       | 0.00         | 0.00         | 67.84        |
| 77.13                                   | 0.06         | 0.02         | 0.747        | 0.00         | 0.00         | 9.29         |
| S7                                      |              |              | 103.20       | 0.00         | 0.00         | 7.17         |
| 94.58                                   | 0.04         | 0.01         | 0.916        | 0.00         | 0.00         | 91.85        |
| S8                                      |              |              | 103.20       | 0.00         | 0.00         | 0.00         |
| 101.57                                  | 0.10         | 0.03         | 0.984        | 0.00         | 0.00         | 101.57       |
| S9                                      |              |              | 103.20       | 0.00         | 0.00         | 0.00         |
| 96.90                                   | 0.05         | 0.02         | 0.939        | 0.00         | 0.00         | 4.81         |
| *****                                   |              |              |              |              |              |              |
| Node Depth Summary                      |              |              |              |              |              |              |
| *****                                   |              |              |              |              |              |              |
| -----                                   |              |              |              |              |              |              |
| Node                                    | Type         | Average      | Maximum      | Maximum      | Time of Max  | Reported     |
|                                         |              | Depth        | Depth        | HGL          | Occurrence   | Max Depth    |
|                                         |              | Meters       | Meters       | Meters       | days hr:min  | Meters       |
| -----                                   |              |              |              |              |              |              |
| OF4                                     | OUTFALL      | 0.48         | 0.48         | 81.11        | 0 00:00      | 0.48         |
| OF7                                     | OUTFALL      | 0.48         | 0.48         | 81.11        | 0 00:00      | 0.48         |
| STUB15                                  | OUTFALL      | 0.48         | 0.48         | 81.11        | 0 00:00      | 0.48         |
| STUB16                                  | OUTFALL      | 0.63         | 0.63         | 81.28        | 0 00:00      | 0.63         |
| CB110                                   | STORAGE      | 0.02         | 1.27         | 85.02        | 0 12:01      | 1.27         |
| CB111                                   | STORAGE      | 0.02         | 1.39         | 84.98        | 0 12:02      | 1.39         |
| CB112                                   | STORAGE      | 0.03         | 1.64         | 84.92        | 0 12:02      | 1.64         |
| CB113                                   | STORAGE      | 0.02         | 1.37         | 84.92        | 0 12:02      | 1.37         |
| CB114                                   | STORAGE      | 0.00         | 0.03         | 85.33        | 0 12:00      | 0.03         |
| CB115                                   | STORAGE      | 0.00         | 0.04         | 85.29        | 0 12:00      | 0.04         |
| CB116                                   | STORAGE      | 0.00         | 0.03         | 85.23        | 0 12:00      | 0.03         |
| CB117                                   | STORAGE      | 0.00         | 0.03         | 85.18        | 0 12:00      | 0.03         |
| CB118                                   | STORAGE      | 0.00         | 0.01         | 85.23        | 0 12:00      | 0.01         |
| Roof_1                                  | STORAGE      | 0.01         | 0.06         | 96.41        | 0 13:00      | 0.06         |
| Roof_2                                  | STORAGE      | 0.02         | 0.06         | 96.41        | 0 13:00      | 0.06         |
| St_UnGrd                                | STORAGE      | 0.01         | 0.78         | 82.58        | 0 12:02      | 0.78         |
| *****                                   |              |              |              |              |              |              |
| Node Inflow Summary                     |              |              |              |              |              |              |
| *****                                   |              |              |              |              |              |              |
| -----                                   |              |              |              |              |              |              |
| Flow                                    |              | Maximum      | Maximum      | Lateral      | Total        |              |
|                                         |              | Lateral      | Total        | Time of Max  | Inflow       | Inflow       |
| Balance                                 |              | Inflow       | Inflow       | Occurrence   | Volume       | Volume       |
| Error                                   |              |              |              |              |              |              |
| Node                                    | Type         | CMS          | CMS          | days hr:min  | 10^6 ltr     | 10^6 ltr     |
| Percent                                 |              |              |              |              |              |              |
| -----                                   |              |              |              |              |              |              |
| OF4                                     | OUTFALL      | 0.000        | 0.002        | 0 11:04      | 0            | 0.0979       |
| 0.000                                   |              |              |              |              |              |              |
| OF7                                     | OUTFALL      | 0.000        | 0.029        | 0 11:45      | 0            | 0.187        |
| 0.000                                   |              |              |              |              |              |              |
| STUB15                                  | OUTFALL      | 0.000        | 0.002        | 0 11:04      | 0            | 0.0966       |
| 0.000                                   |              |              |              |              |              |              |
| STUB16                                  | OUTFALL      | 0.000        | 0.010        | 0 12:02      | 0            | 0.0208       |
| 0.000                                   |              |              |              |              |              |              |
| CB110                                   | STORAGE      | 0.012        | 0.012        | 0 12:00      | 0.0127       | 0.0127       |
| 0.021                                   |              |              |              |              |              |              |
| CB111                                   | STORAGE      | 0.000        | 0.010        | 0 12:00      | 0            | 0.0127       |
| 0.022                                   |              |              |              |              |              |              |
| CB112                                   | STORAGE      | 0.006        | 0.014        | 0 12:00      | 0.00685      | 0.0216       |
| 0.148                                   |              |              |              |              |              |              |
| CB113                                   | STORAGE      | 0.001        | 0.005        | 0 11:49      | 0.0012       | 0.0021       |
| 0.026                                   |              |              |              |              |              |              |
| CB114                                   | STORAGE      | 0.014        | 0.014        | 0 12:00      | 0.0149       | 0.0149       |
| 0.001                                   |              |              |              |              |              |              |

|                                             |           |            |                                |             |          |         |             |
|---------------------------------------------|-----------|------------|--------------------------------|-------------|----------|---------|-------------|
| CB115                                       | STORAGE   | 0.024      | 0.024                          | 0           | 12:00    | 0.0619  | 0.0619      |
| 0.000                                       |           |            |                                |             |          |         |             |
| CB116                                       | STORAGE   | 0.013      | 0.013                          | 0           | 12:00    | 0.0393  | 0.0393      |
| 0.001                                       |           |            |                                |             |          |         |             |
| CB117                                       | STORAGE   | 0.017      | 0.017                          | 0           | 12:00    | 0.0527  | 0.0527      |
| 0.001                                       |           |            |                                |             |          |         |             |
| CB118                                       | STORAGE   | 0.004      | 0.004                          | 0           | 12:00    | 0.00407 | 0.00407     |
| 0.001                                       |           |            |                                |             |          |         |             |
| Roof_1                                      | STORAGE   | 0.030      | 0.030                          | 0           | 11:58    | 0.0967  | 0.0967      |
| 0.000                                       |           |            |                                |             |          |         |             |
| Roof_2                                      | STORAGE   | 0.031      | 0.031                          | 0           | 12:00    | 0.098   | 0.098       |
| 0.000                                       |           |            |                                |             |          |         |             |
| St_UnGrd                                    | STORAGE   | 0.003      | 0.075                          | 0           | 12:00    | 0.014   | 0.187       |
| 0.001                                       |           |            |                                |             |          |         |             |
| *****                                       |           |            |                                |             |          |         |             |
| Node Surcharge Summary                      |           |            |                                |             |          |         |             |
| *****                                       |           |            |                                |             |          |         |             |
| No nodes were surcharged.                   |           |            |                                |             |          |         |             |
| *****                                       |           |            |                                |             |          |         |             |
| Node Flooding Summary                       |           |            |                                |             |          |         |             |
| *****                                       |           |            |                                |             |          |         |             |
| No nodes were flooded.                      |           |            |                                |             |          |         |             |
| *****                                       |           |            |                                |             |          |         |             |
| Storage Volume Summary                      |           |            |                                |             |          |         |             |
| *****                                       |           |            |                                |             |          |         |             |
| -----                                       |           |            |                                |             |          |         |             |
| Maximum                                     | Average   | Avg        | Evap                           | Exfil       | Maximum  | Max     | Time of Max |
| Outflow                                     | Volume    | Pcnt       | Pcnt                           | Pcnt        | Volume   | Pcnt    | Occurrence  |
| Storage Unit                                | 1000 m³   | Full       | Loss                           | Loss        | 1000 m³  | Full    | days hr:min |
| CMS                                         |           |            |                                |             |          |         |             |
| -----                                       |           |            |                                |             |          |         |             |
| CB110                                       | 0.000     | 0.0        | 0.0                            | 0.0         | 0.000    | 0.4     | 0 12:01     |
| 0.010                                       |           |            |                                |             |          |         |             |
| CB111                                       | 0.000     | 1.0        | 0.0                            | 0.0         | 0.000    | 69.0    | 0 12:02     |
| 0.008                                       |           |            |                                |             |          |         |             |
| CB112                                       | 0.000     | 0.4        | 0.0                            | 0.0         | 0.001    | 20.9    | 0 12:02     |
| 0.011                                       |           |            |                                |             |          |         |             |
| CB113                                       | 0.000     | 0.5        | 0.0                            | 0.0         | 0.000    | 33.2    | 0 12:02     |
| 0.002                                       |           |            |                                |             |          |         |             |
| CB114                                       | 0.000     | 0.0        | 0.0                            | 0.0         | 0.000    | 1.4     | 0 12:00     |
| 0.014                                       |           |            |                                |             |          |         |             |
| CB115                                       | 0.000     | 0.0        | 0.0                            | 0.0         | 0.001    | 1.9     | 0 12:00     |
| 0.024                                       |           |            |                                |             |          |         |             |
| CB116                                       | 0.000     | 0.0        | 0.0                            | 0.0         | 0.000    | 0.7     | 0 12:00     |
| 0.013                                       |           |            |                                |             |          |         |             |
| CB117                                       | 0.000     | 0.1        | 0.0                            | 0.0         | 0.000    | 4.2     | 0 12:00     |
| 0.017                                       |           |            |                                |             |          |         |             |
| CB118                                       | 0.000     | 0.0        | 0.0                            | 0.0         | 0.000    | 0.4     | 0 12:00     |
| 0.004                                       |           |            |                                |             |          |         |             |
| Roof_1                                      | 0.009     | 9.8        | 0.0                            | 0.0         | 0.039    | 40.9    | 0 13:00     |
| 0.002                                       |           |            |                                |             |          |         |             |
| Roof_2                                      | 0.010     | 10.1       | 0.0                            | 0.0         | 0.040    | 41.2    | 0 13:00     |
| 0.002                                       |           |            |                                |             |          |         |             |
| St_UnGrd                                    | 0.001     | 1.4        | 0.0                            | 0.0         | 0.038    | 77.7    | 0 12:02     |
| 0.029                                       |           |            |                                |             |          |         |             |
| *****                                       |           |            |                                |             |          |         |             |
| Outfall Loading Summary                     |           |            |                                |             |          |         |             |
| *****                                       |           |            |                                |             |          |         |             |
| -----                                       |           |            |                                |             |          |         |             |
| Outfall Node                                | Flow      | Avg        | Max                            | Total       |          |         |             |
|                                             | Freq      | Flow       | Flow                           | Volume      |          |         |             |
|                                             | Pcnt      | CMS        | CMS                            | 10^6 ltr    |          |         |             |
| -----                                       |           |            |                                |             |          |         |             |
| OF4                                         | 95.17     | 0.001      | 0.002                          | 0.098       |          |         |             |
| OF7                                         | 97.69     | 0.002      | 0.029                          | 0.187       |          |         |             |
| STUB15                                      | 95.17     | 0.001      | 0.002                          | 0.097       |          |         |             |
| STUB16                                      | 4.59      | 0.005      | 0.010                          | 0.021       |          |         |             |
| -----                                       |           |            |                                |             |          |         |             |
| System                                      | 73.16     | 0.010      | 0.043                          | 0.402       |          |         |             |
| *****                                       |           |            |                                |             |          |         |             |
| Link Flow Summary                           |           |            |                                |             |          |         |             |
| *****                                       |           |            |                                |             |          |         |             |
| -----                                       |           |            |                                |             |          |         |             |
| Link                                        | Type      | Maximum    | Time of Max                    | Maximum     | Max/     | Max/    |             |
|                                             |           | [Flow]     | Occurrence                     | [Veloc]     | Full     | Full    |             |
|                                             |           | CMS        | days hr:min                    | m/sec       | Flow     | Depth   |             |
| -----                                       |           |            |                                |             |          |         |             |
| C1                                          | CONDUIT   | 0.008      | 0 12:00                        | 0.50        | 0.55     | 1.00    |             |
| C3                                          | CONDUIT   | 0.004      | 0 11:49                        | 0.28        | 0.35     | 1.00    |             |
| C5                                          | CONDUIT   | 0.010      | 0 12:00                        | 0.82        | 0.76     | 1.00    |             |
| W1                                          | WEIR      | 0.000      | 0 00:00                        |             |          | 0.00    |             |
| W2                                          | WEIR      | 0.000      | 0 00:00                        |             |          | 0.00    |             |
| W3                                          | WEIR      | 0.000      | 0 00:00                        |             |          | 0.00    |             |
| W4                                          | WEIR      | 0.000      | 0 00:00                        |             |          | 0.00    |             |
| W5                                          | WEIR      | 0.000      | 0 00:00                        |             |          | 0.00    |             |
| C2                                          | DUMMY     | 0.010      | 0 12:02                        |             |          |         |             |
| OL1                                         | DUMMY     | 0.024      | 0 12:00                        |             |          |         |             |
| OL2                                         | DUMMY     | 0.013      | 0 12:00                        |             |          |         |             |
| OL3                                         | DUMMY     | 0.017      | 0 12:00                        |             |          |         |             |
| OL4                                         | DUMMY     | 0.002      | 0 11:04                        |             |          |         |             |
| OL5                                         | DUMMY     | 0.002      | 0 11:04                        |             |          |         |             |
| OL6                                         | DUMMY     | 0.014      | 0 12:00                        |             |          |         |             |
| OL7                                         | DUMMY     | 0.029      | 0 11:45                        |             |          |         |             |
| OL8                                         | DUMMY     | 0.004      | 0 12:00                        |             |          |         |             |
| *****                                       |           |            |                                |             |          |         |             |
| Flow Classification Summary                 |           |            |                                |             |          |         |             |
| *****                                       |           |            |                                |             |          |         |             |
| -----                                       |           |            |                                |             |          |         |             |
| Conduit                                     | Adjusted  | -----      | Fraction of Time in Flow Class | -----       |          |         |             |
|                                             | /Actual   | Up         | Down                           | Sub         | Sup      | Up      | Down        |
|                                             | Length    | Dry        | Dry                            | Dry         | Crit     | Crit    | Crit        |
|                                             |           |            |                                |             |          |         |             |
| -----                                       |           |            |                                |             |          |         |             |
| C1                                          | 1.00      | 0.49       | 0.00                           | 0.00        | 0.03     | 0.00    | 0.00        |
| C3                                          | 1.00      | 0.48       | 0.00                           | 0.00        | 0.03     | 0.00    | 0.00        |
| C5                                          | 1.00      | 0.48       | 0.00                           | 0.00        | 0.51     | 0.01    | 0.00        |
| *****                                       |           |            |                                |             |          |         |             |
| Conduit Surcharge Summary                   |           |            |                                |             |          |         |             |
| *****                                       |           |            |                                |             |          |         |             |
| -----                                       |           |            |                                |             |          |         |             |
| Conduit                                     | -----     | Hours Full | -----                          | Hours       | Hours    |         |             |
|                                             | Both Ends | Upstream   | Dnstream                       | Normal Flow | Capacity |         |             |
|                                             |           |            |                                |             | Limited  |         |             |
| -----                                       |           |            |                                |             |          |         |             |
| C1                                          | 0.57      | 0.57       | 0.71                           | 0.01        | 0.01     |         |             |
| C3                                          | 0.58      | 0.58       | 0.70                           | 0.01        | 0.01     |         |             |
| C5                                          | 0.50      | 0.50       | 0.57                           | 0.01        | 0.01     |         |             |
| -----                                       |           |            |                                |             |          |         |             |
| Analysis begun on: Thu Oct 10 10:08:55 2024 |           |            |                                |             |          |         |             |
| Analysis ended on: Thu Oct 10 10:08:55 2024 |           |            |                                |             |          |         |             |
| Total elapsed time: < 1 sec                 |           |            |                                |             |          |         |             |



## Engineering Specification

Job Name \_\_\_\_\_

Contractor \_\_\_\_\_

Job Location \_\_\_\_\_

Approval \_\_\_\_\_

Engineer \_\_\_\_\_

Contractor's P.O. No. \_\_\_\_\_

Approval \_\_\_\_\_

Representative \_\_\_\_\_

Tag \_\_\_\_\_

# RD-200

## Small Area Roof Drain

### Specification

Watts RD-200 epoxy coated cast iron roof drain with flashing clamp with integral gravel stop, self-locking polyethylene dome (standard), and no hub (standard) outlet.

| Suffix | Pipe Sizing Description     |                          |
|--------|-----------------------------|--------------------------|
| 2      | 2"(51) Pipe Size            | <input type="checkbox"/> |
| 3      | 3"(76) Pipe Size            | <input type="checkbox"/> |
| 4      | 4"(102) Pipe Size (NH Only) | <input type="checkbox"/> |

| Suffix | Outlet Type Description |                          |
|--------|-------------------------|--------------------------|
| NH     | No Hub (MJ)             | <input type="checkbox"/> |
| P      | Push On                 | <input type="checkbox"/> |
| T      | Threaded                | <input type="checkbox"/> |
| X      | Inside Caulk            | <input type="checkbox"/> |

| Suffix | Options Description              |                          |
|--------|----------------------------------|--------------------------|
| -13    | Galvanized Body & Flashing Clamp | <input type="checkbox"/> |
| -B     | Sump Receiver                    | <input type="checkbox"/> |
| -D     | Underdeck Clamp                  | <input type="checkbox"/> |
| -F     | Deck Flange/Adj. Extension       | <input type="checkbox"/> |
| -GSS   | Stainless Steel Ballast Guard    | <input type="checkbox"/> |
| -K     | Ductile Iron Dome                | <input type="checkbox"/> |
| -K13   | Galvanized Dome                  | <input type="checkbox"/> |
| -K80   | Aluminum Dome                    | <input type="checkbox"/> |
| -K81   | Rough Bronze Dome                | <input type="checkbox"/> |
| -K83   | SS Mesh Covered Dome             | <input type="checkbox"/> |
| -L     | Vandal Proof Dome                | <input type="checkbox"/> |
| -R     | 2" External Water Dam            | <input type="checkbox"/> |
| -SO    | Side Outlet                      | <input type="checkbox"/> |
| -W     | Adjustable Internal Water Dam    | <input type="checkbox"/> |

| Suffix | Optional Body Material Description |                          |
|--------|------------------------------------|--------------------------|
| -60    | PVC Body w/Socket Outlet           | <input type="checkbox"/> |
| -61    | ABS Body w/Socket Outlet           | <input type="checkbox"/> |

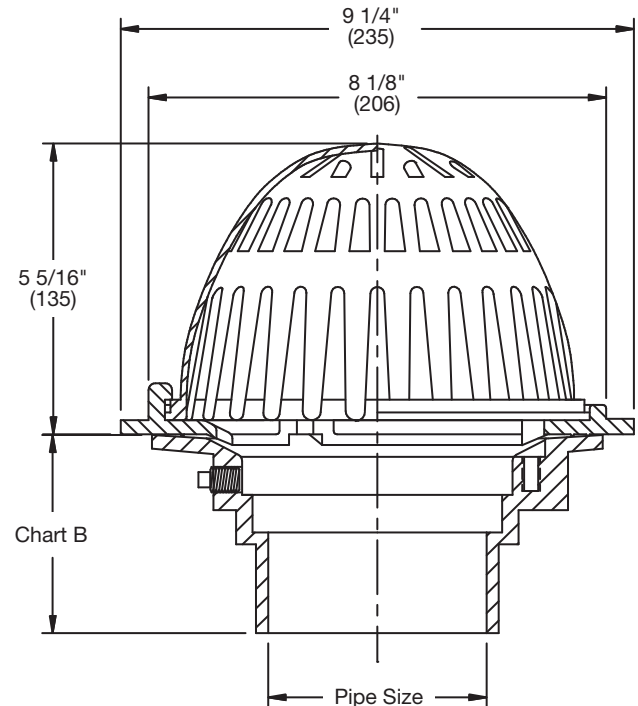


Chart B

| Pipe Size | Std. No Hub | P Push On   | T Female Thread | X Inside Caulk | 60/61 PVC/ABS |
|-----------|-------------|-------------|-----------------|----------------|---------------|
| 2"(51)    | 3 5/8"(92)  | 4 1/4"(108) | 4 1/4"(108)     | 4 1/2"(108)    | 4"(102)       |
| 3"(76)    | 3 5/8"(92)  | 4 1/4"(108) | 4 1/4"(108)     | 4 1/2"(108)    | 4"(102)       |
| 4"(102)   | 3 5/8"(92)  | 4 1/4"(108) | 4 1/4"(108)     | 4 1/2"(108)    | 4"(102)       |

Deck Opening 6 1/2"(165)  
with Sump Receiver 8"(203)

### NOTICE

The information contained herein is not intended to replace the full product installation and safety information available or the experience of a trained product installer. You are required to thoroughly read all installation instructions and product safety information before beginning the installation of this product.

Watts product specifications in U.S. customary units and metric are approximate and are provided for reference only. For precise measurements, please contact Watts Technical Service. Watts reserves the right to change or modify product design, construction, specifications, or materials without prior notice and without incurring any obligation to make such changes and modifications on Watts products previously or subsequently sold.



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## Adjustable Accutrol Weir

Tag: \_\_\_\_\_

## Adjustable Flow Control for Roof Drains

### ADJUSTABLE ACCUTROL (for Large Sump Roof Drains only)

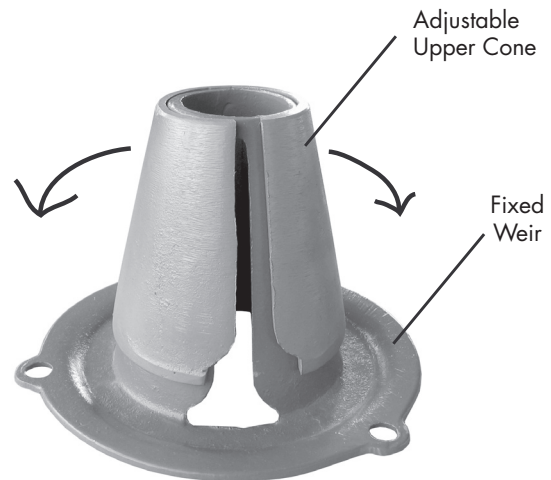
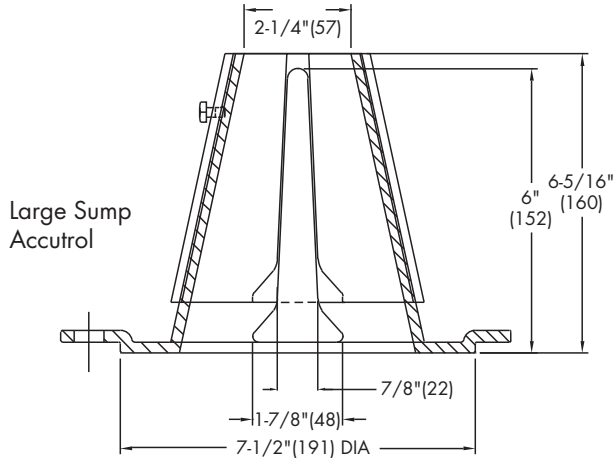
For more flexibility in controlling flow with heads deeper than 2", Watts Drainage offers the Adjustable Accutrol. The Adjustable Accutrol Weir is designed with a single parabolic opening that can be covered to restrict flow above 2" of head to less than 5 gpm per inch, up to 6" of head. To adjust the flow rate for depths over 2" of head, set the slot in the adjustable upper cone according to the flow rate required. Refer to Table 1 below.

Note: Flow rates are directly proportional to the amount of weir opening that is exposed.

#### EXAMPLE:

For example, if the adjustable upper cone is set to cover 1/2 of the weir opening, flow rates above 2" of head will be restricted to 2-1/2 gpm per inch of head.

Therefore, at 3" of head, the flow rate through the Accutrol Weir that has 1/2 the slot exposed will be:  
[ 5 gpm (per inch of head) x 2 inches of head ] + 2-1/2 gpm (for the third inch of head) = 12-1/2 gpm.



1/2 Weir Opening Exposed Shown Above

TABLE 1. Adjustable Accutrol Flow Rate Settings

| Weir Opening Exposed | 1"                             | 2" | 3"    | 4"   | 5"    | 6" |
|----------------------|--------------------------------|----|-------|------|-------|----|
|                      | Flow Rate (gallons per minute) |    |       |      |       |    |
| Fully Exposed        | 5                              | 10 | 15    | 20   | 25    | 30 |
| 3/4                  | 5                              | 10 | 13.75 | 17.5 | 21.25 | 25 |
| 1/2                  | 5                              | 10 | 12.5  | 15   | 17.5  | 20 |
| 1/4                  | 5                              | 10 | 11.25 | 12.5 | 13.75 | 15 |
| Closed               | 5                              | 5  | 5     | 5    | 5     | 5  |

Job Name \_\_\_\_\_

Contractor \_\_\_\_\_

Job Location \_\_\_\_\_

Contractor's P.O. No. \_\_\_\_\_

Engineer \_\_\_\_\_

Representative \_\_\_\_\_

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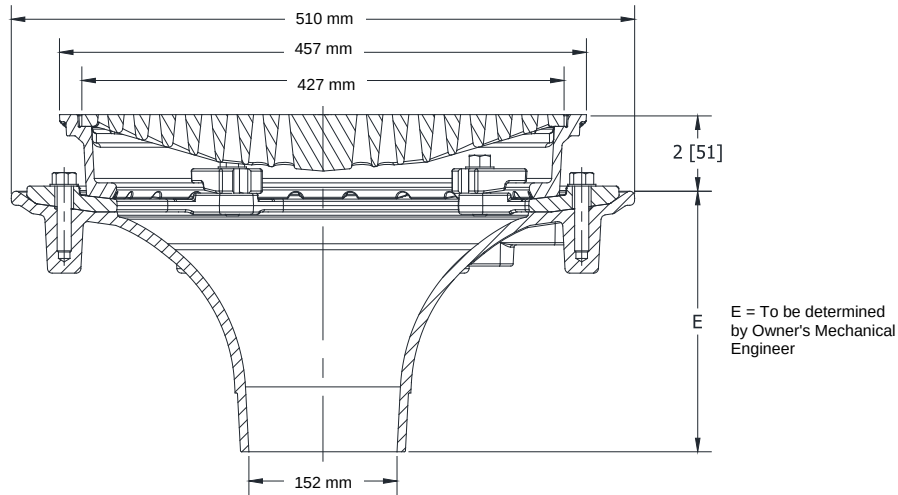
A Watts Water Technologies Company

**Z150F****FLOFORCE™ HIGH PERFORMANCE PROMENADE DECK  
DRAIN WITH ROTATABLE FRAME AND HEEL-PROOF GRATE**

SPECIFICATION SHEET

TAG \_\_\_\_\_

Design and Dimensional Data (inches and [ mm ]) are Subject to Manufacturing Tolerances and Change Without Notice



4 [102] No-Hub Illustrated

| A<br>Outlet Size<br>In. [mm] | B<br>Body Diameter<br>In. [mm] | C<br>Frame Size<br>In. [mm] | D<br>Grate Size<br>In. [mm] | Weight<br>lbs [kg] | Grate Open Area<br>Sq. In. [cm <sup>2</sup> ] |
|------------------------------|--------------------------------|-----------------------------|-----------------------------|--------------------|-----------------------------------------------|
| 2,3,4 [51,76,102]            | 16-9/16 [421]                  | 14 [356]                    | 12-13/16 [325]              | 66 [30]            | 44 [284]                                      |
| 6,8 [152, 203]               | 20-3/32 [510]                  | 18 [457]                    | 16-13/16 [427]              | 94 [43]            | 70 [452]                                      |

**ENGINEERING SPECIFICATION: ZURN Z150F**

FLOFORCE™ High efficient flow performing roof drain for promenade deck roof drain applications. Drain incorporates a smooth funnel-shaped interior surface, providing a seamless transition to outlet connection and eliminating internal obstructions within the body. Complete with Dura-Coated cast iron body with membrane flashing clamp, rotatable square promenade frame, seepage openings, securing clamps, and heavy-duty ductile iron heel-proof grate.

**OPTIONS** (Check/specify appropriate options)**PIPE SIZE**(Specify size/type) **OUTLET****E BODY HT. DIM.**

|                       |    |              |                                         |
|-----------------------|----|--------------|-----------------------------------------|
| 2, 3, 4 [51, 76, 102] | NH | No-Hub       | 6-15/16 [176]                           |
| 6, 8 [152, 203]       | NH | No-Hub       | 7-7/16 [189]                            |
| 2, 3, 4 [51, 76, 102] | NL | Neo-Loc      | 7-3/8 [187]                             |
| 6 [152]               | NL | Neo-Loc      | 8-1/32 [204]                            |
| 2, 3, 4 [51, 76, 102] | IP | Threaded     | 5-15/16, 6-3/16, 6-5/16 [151, 157, 160] |
| 6, 8 [152, 203]       | IP | Threaded     | 6-11/16, 6-3/4 [170, 171]               |
| 3, 4 [76, 102]        | IC | Inside Caulk | 5-13/16 [148]                           |
| 6 [152]               | IC | Inside Caulk | 6-1/16 [154]                            |

**PREFIXES**

|        |                                                                                          |
|--------|------------------------------------------------------------------------------------------|
| ___ Z  | D.C.C.I. Body and Frame with Ductile Iron Grate*                                         |
| ___ ZN | D.C.C.I. Body and Frame with Ductile Iron Grate and Polished Nickel Bronze Veneer Finish |

**SUFFIXES**

|         |                                                             |         |                                                                          |
|---------|-------------------------------------------------------------|---------|--------------------------------------------------------------------------|
| ___ -AR | Acid Resistant Epoxy Coated                                 | ___ -R  | Roof Sump Receiver                                                       |
| ___ -C  | Underdeck Clamp                                             | ___ -SC | Secondary Clamp Collar                                                   |
| ___ -DP | Top-Set® Deck Plate (Replaces both the -C and -R)           | ___ -TC | Neo-Loc Test Cap Gasket<br>(2, 3, 4 [51, 76, 102] NL Bottom Outlet Only) |
| ___ -DR | Top-Set® Drain Riser                                        | ___ -VP | Vandal-Proof Secured Top                                                 |
| ___ -E  | Static Extension 1 [25] thru 4 [102] (Specify Ht.)          | ___ -Y  | Type 304 [CF8] SS Sediment Bucket                                        |
| ___ -EA | Adjustable Extension Assembly<br>2-1/8 [54] thru 3-1/2 [89] | ___ -85 | Type 304 [CF8] Stainless Steel Perforated Extension                      |
| ___ -G  | Galvanized Cast Iron                                        | ___ -89 | 2 [51] High Overflow Dam and Low-Profile Pedestal<br>Paver Dome          |
| ___ -PD | Low-Profile Pedestal Paver Dome                             |         |                                                                          |

\* Regularly furnished unless otherwise specified

**⚠ WARNING: Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)****⚠ ADVERTENCIA: Cáncer y daño reproductivo - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)****⚠ AVERTISSEMENT: Cancer et effets néfastes sur la reproduction - [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)**

Zurn Industries, LLC | Specification Drainage Operation  
1801 Pittsburgh Avenue, Erie, PA 16502, Ph. 855.663.9876

In Canada | Zurn Industries Limited  
7900 Goreway Drive, Unit 10, Brampton, Ontario L6T 5W6, Ph. 877.892.5216

[www.zurn.com](http://www.zurn.com)

Rev. -  
Date: 08/08/2022  
C.N. No. 144780  
Prod. | Dwg. No. Z150F FLOFORCE™ Page 1 of 1

## **Site Servicing Report**

**2983, 3053 and 3079 Navan Road & 2690 Pagé Road, Ottawa, Ontario**

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## **Appendix E**

Sanitary Servicing

| JLR NO. 29899-002 (NAVAN BLOCK 15) |            |    |            |      |           |                |                        |                          |                |                |                  |              |                |                     |                      |           |          |                 |       |              |        |        |                   |                   |         |        |        |                     |        |       |        |        |                           |            |                 |                           |                                |
|------------------------------------|------------|----|------------|------|-----------|----------------|------------------------|--------------------------|----------------|----------------|------------------|--------------|----------------|---------------------|----------------------|-----------|----------|-----------------|-------|--------------|--------|--------|-------------------|-------------------|---------|--------|--------|---------------------|--------|-------|--------|--------|---------------------------|------------|-----------------|---------------------------|--------------------------------|
| Street Name                        | Pipe Reach |    |            |      |           |                |                        | Commercial/Institutional |                |                |                  | Infiltration |                |                     | Peak Design Flow L/s | Pipe Data |          |                 |       |              |        |        |                   | Upstream Geometry |         |        |        | Downstream Geometry |        |       |        |        | Self Cleansing Velocities |            |                 |                           |                                |
|                                    | From       | To | Apartments | Pop. | Cum. Pop. | Peaking Factor | Residential Flow (L/s) | Area (ha)                | Cum. Area (ha) | Peaking Factor | Inst. Flow (L/s) | Area (ha)    | Cum. Area (ha) | Peak Extr. Flow L/s |                      | 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                     | Q/Qf Ratio | Flow Depth (mm) | Actual Velocity (7) (m/s) | Flow Depth to Dia. Ratio (d/D) |
| BLOCK 15                           | BLOCK 15   | 14 | 83         | 149  | 149       | 3.55           | 1.72                   | 0.09                     | 0.09           | 1.50           | 0.05             | 0.57         | 0.57           | 0.19                | 1.95                 | 200       | Circular | 203.20          | 1.50% | 41.91        | 1.29   | 6.10   | 39.95             | 5%                | 85.850  | 82.467 | 82.264 | 3.383               | 85.840 | 0.060 | 82.376 | 82.173 | 3.464                     | 0.05       | 29.67           | 0.66                      | 0.15                           |
| EAST ORLEANS RIDGE SUBDIVISION     | 14         | 13 |            |      | 149       | 3.55           | 1.72                   |                          | 0.09           | 1.50           | 0.05             |              | 0.57           | 0.19                | 1.95                 | 200       | Circular | 203.20          | 1.50% | 41.91        | 1.29   | 13.50  | 39.95             | 5%                | 85.840  | 82.316 | 82.113 | 3.524               | 84.940 |       | 82.113 | 81.910 | 2.827                     | 0.05       | 29.67           | 0.66                      | 0.15                           |

| Design Parameters          |       |              |
|----------------------------|-------|--------------|
| Apartments Population      | 1.8   | Cap/Unit     |
| Residential Flows          | 280   | L/Cap/Day    |
| Infiltration Flows         | 0.33  | L/s/ha       |
| Harmon's Correction Factor | 0.8   | unitless     |
| Commercial Peak Factor     | 1.5   | unitless     |
| Institutional/Commercial A | 28000 | L/gross ha/d |
| Manning Coefficient        | 0.013 | unitless     |



## William Rugamba

---

**From:** William Rugamba  
**Sent:** July 22, 2024 8:18 AM  
**To:** William Rugamba  
**Subject:** FW: Re-confirmation of Mechanical Items for Servicing Report

**William Rugamba**, M.Eng., B.A.Sc., EIT  
Civil Engineering Graduate  
Ottawa, ON  
Work: [343-804-4374](tel:343-804-4374)

---

**From:** Sarith Lopez <[slopez@qmeengineering.com](mailto:slopez@qmeengineering.com)>  
**Sent:** Wednesday, July 17, 2024 8:07 PM  
**To:** Mahad Musse <[mmusse@jlrichards.ca](mailto:mmusse@jlrichards.ca)>; Chuck Clark <[CWC@qmeengineering.com](mailto:CWC@qmeengineering.com)>  
**Cc:** Karla Ferrey <[kferrey@jlrichards.ca](mailto:kferrey@jlrichards.ca)>; Raad Akrawi <[rakrawi@groupeheafey.com](mailto:rakrawi@groupeheafey.com)>; Carmine Zayoun <[carmine@zayoungroup.com](mailto:carmine@zayoungroup.com)>  
**Subject:** RE: Re-confirmation of Mechanical Items for Servicing Report

**[CAUTION]** This email originated from outside JLR. Do not click links or open attachments unless you recognize the sender and know the content is safe. Do not forward suspicious emails, if you are unsure, please send a separate message to Helpdesk.

Hi Mahad,

All items below confirmed

Regards

Sarith López  
Project Manager

9 Gurdwara Road, Unit 200  
Ottawa, ON K2E 7X6  
T: 613-366-4763 ext. 129  
slopez@qmeengineering.com



---

**From:** Mahad Musse <[mmusse@jlrichards.ca](mailto:mmusse@jlrichards.ca)>

**Sent:** Tuesday, July 16, 2024 3:08 PM

**To:** Sarith Lopez <[slopez@qmeengineering.com](mailto:slopez@qmeengineering.com)>; Chuck Clark <[CWC@qmeengineering.com](mailto:CWC@qmeengineering.com)>

**Cc:** Karla Ferrey <[kferrey@jlrichards.ca](mailto:kferrey@jlrichards.ca)>; Raad Akrawi <[rakrawi@groupeheafey.com](mailto:rakrawi@groupeheafey.com)>; Carmine Zayoun <[carmine@zayoungroup.com](mailto:carmine@zayoungroup.com)>

**Subject:** Re-confirmation of Mechanical Items for Servicing Report

Hi Sarith/Chuck,

Thank you for the information below and in our meetings. I understand all these items have been discussed before but we need to submit something as part of our report. Can you just re-confirm the following questions below and then we will attach your confirmation to the Report.

1. Please confirm that the sanitary service size of 200mm diameter for the Site Plan Blocks (Block 14, 15 and 17) is preferred by the mechanical engineer on file;
2. Please confirm that a sprinkler flow of 25 L/s can be assumed for the Site Plan Blocks (Block 14, 15 and 17) at this stage.

Thanks  
Mahad



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

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