

# 1 DOOR 4 CARE CHEO INTEGRATED TREATMENT CENTRE

SERVICING AND STORMWATER MANAGEMENT REPORT | August 23, 2024

**WALTERFEDY**

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## 1.0 INTRODUCTION

WalterFedy was retained by EllisDon to provide civil consulting engineering services in support of the construction of the Children's Hospital of Eastern Ontario's (CHEO) new 1Door4Care integrated treatment centre at 401 Smyth Road, in the City of Ottawa.

The proposed development plan is to construct a new state-of-the-art treatment center where CHEO will be able to improve access to services that were previously scattered throughout the Champlain region. The development will provide care and support services for developmental, rehabilitation, behavioural, autism, mental health, communication disorders, and community services in one building. The building will contain a variety of focused areas including medical staff workplaces, clinical areas, and school/pre-school areas to best provide an integrated transmural care model and act as the interface between primary and secondary care.

The new building will replace an existing surface parking lot located southeast of the existing CHEO building and north of the intersection between Ring Road and Smyth Road. A small parking lot is to be provided at the southeast corner of the building, connected to an accessway provided on the western face of the building. A loading entrance ramp will also be provided along the southern end of the building. The balance of the site will remain largely unchanged and will comprise of landscaped areas and pedestrian walkways.

The purpose of this report is to identify how the Site will be serviced for water, sanitary, and storm and to demonstrate compliance with municipal and provincial standards for site servicing and stormwater management.

### 1.1 Site Location and Background

The overall CHEO campus occupies approximately 13.9 hectares of land on the southwest corner of the Ottawa Health Science Centre (OHSC) campus. The site for the proposed 1Door4Care facility is located in the southwest corner of the CHEO campus and encompasses an area of approximately 2.06 hectares.

The site is bounded by the existing CHEO campus buildings to the north and east and Ring Road to the west and south.

In general, the site slopes from east to west, ranging in elevations from 79.14m at the northwest corner of the site to an elevation of 82.37m along the eastern edge of the site.

### 1.2 Reference Reports and Drawings

In preparation of this report, the following background information was referenced:

1. 1Door4Care: CHEO Integrated Treatment Centre Preliminary Development Feasibility Review, Fotenn Planning + Design, prepared for Infrastructure Ontario, October 2022
2. Subsurface Utility Engineering Services Report, Annis O'Sullivan Vollebakk Ltd., prepared for Infrastructure Ontario, February 2020
3. 1Door4Care: CHEO Integrated Treatment Centre Preliminary Functional Servicing Study, Stantec Consulting Ltd., prepared for Infrastructure Ontario, October 2022
4. 1Door4Care: CHEO Integrated Treatment Centre – Climate Risk Assessment, Stantec Consulting Ltd., prepared for Infrastructure Ontario, December 2022

5. Phase One Environmental Site Assessment, GHD Ltd., prepared for Infrastructure Ontario, June 2020
6. Phase Two Environmental Site Assessment, GHD Ltd., prepared for Infrastructure Ontario, June 2020
7. 1Door4Care: CHEO Integrated Treatment Centre – Geotechnical Investigation Report, GHD Ltd., prepared for Infrastructure Ontario, October 2022
8. Preliminary Geotechnical Design Recommendations, 1Door4Care, CHEO Integrated Treatment Centre, Thurber Engineering Ltd., prepared for EllisDon, December 2022
9. 1Door 4Care: CHEO Integrated Treatment Centre – Hydrogeological Assessment, GHD Ltd., prepared for Infrastructure Ontario, October 2022
10. Ottawa Health Sciences Centre Site Services Assessment, J.L. Richards & Associates Ltd., prepared for the Ottawa Health Sciences Centre, January 2011
11. Ottawa Health Sciences Centre Storm and Sanitary Sewer Capacity Assessment, Morrison Hershfield, prepared for the University of Ottawa, May 2017
12. CHEO 1Door4Care Functional Program Space Allocations, CHEO Resource Planning Group, April 2020
13. Ottawa Health Sciences Centre Stormwater Master Plan, Morrison Hershfield, prepared for the Children’s Hospital of Eastern Ontario (CHEO) & Ottawa Children’s Treatment Centre (OCTC), July 2019
14. CHEO 1Door4Care Building, Groundwater Management Report, CHEO Complex, 401 & 407 Smyth Road, Ottawa, Ontario, August 2024

The following guidance documents were also referenced in preparation of this report:

1. City of Ottawa: Sewer Design Guidelines, The City of Ottawa, October 2012
2. Ottawa Design Guidelines - Water Distribution, The City of Ottawa, July 2010
3. Stormwater Management Planning and Design Manual, Ministry of the Environment, Conservation and Parks (MECP), March 2003.
4. Design Guidelines for Sewage Works, Ministry of the Environment, Conservation and Parks, March 2019.
5. Design Guidelines for Drinking Water Systems, Ministry of the Environment, Conservation and Parks, May 2019.

## **2.0 EXISTING CONDITIONS**

### **2.1 Topography, Land Use and Drainage**

Existing topographical and legal boundary information for this site was obtained from a survey by Annis, O’Sullivan, Vollebakk Ltd., dated February 2020. The Site occupies approximately 2.06 ha of land located in the southwestern corner of the overall Ottawa Health Services Centre (OHSC) campus.

The topography on site ranges from an elevation of 79.14m at the northwest corner of the site to an elevation of 82.37m along the eastern edge of the site. Based on the topographic survey, various catchbasin structures are located on site, connected to an existing storm sewer traversing the site. The majority of the catchbasins are located within the existing asphalt parking lot in the southern part of the site.

No existing stormwater controls appear to exist on site. The drainage from the site is ultimately conveyed through a series of storm sewers towards the northwest corner of the OHSC campus where the campus' internal storm system connects to the City of Ottawa's storm sewers. The City of Ottawa's storm sewers ultimately drains to the Rideau River.

## 2.2 Existing Servicing

Two watermains are in close proximity to the Site. A 200mm diameter watermain exists along Ring Road, running along the western boundary of the Site. A 300mm diameter watermain exists within the access road running along the eastern boundary of the site. The existing CHEO building located east of the site is connected to the 300mm-diameter watermain.

An existing 535mm-diameter storm sewer exists along the eastern boundary of the site, underneath of the access road to the main CHEO building. A 375mm-diameter storm sewer exists within Ring Road along the western boundary of the Site. Both storm sewer lines connect to a larger storm sewer line, ultimately leading to a series of 1350mm-diameter storm sewers located in the northwestern corner of the OHSC campus that connect to the City of Ottawa's storm sewer system which ultimately outlets to the Rideau River.

A 300mm-diameter sanitary sewer exists along the access road to the east of the Site. This sewer runs north along the access road and connects to a 381mm-diameter sanitary sewer running towards the northwest corner of the OHSC campus. The system eventually connects to the Rideau River Collector Sewer west of Riverside Drive.

## 2.3 Other Existing Utilities

Based on the Report for Subsurface Utility Engineering Services created by Annis O'Sullivan Vollebakk Ltd., it is understood that hydro Ottawa and private service electric power, Bell, Rogers, and Telus telecommunications, Enbridge natural gas mains, as well as municipal and private water, sanitary, and storm sewers are readily available within the adjacent rights-of-way and access roads. It is noted that an existing unknown utility easement is shown to bisect the site from northeast to southwest. The status of the utility easement is currently unknown and should be examined further during detailed design.

## 2.4 Geotechnical Investigation

GHD Ltd. was retained by Infrastructure Ontario to complete a preliminary geotechnical investigation for the proposed development. Supplemental commentary was provided by Thurber Engineering as part of the project team. These reports are provided under a separate cover. The following summarizes the findings of the geotechnical investigation as they relate to proposed grading, servicing, and stormwater management:

- A preliminary investigation was completed in December 2019. During the preliminary investigation a total of 14 boreholes were advanced on site to assess the geotechnical conditions, ten of which also included installation of groundwater monitoring wells
- A supplementary geotechnical investigation was completed in July 2022. A total of 10 boreholes were advanced on site to assess the geotechnical conditions, four of which also included installation of groundwater monitoring wells.

- Topsoil was encountered in six boreholes. The thickness of the topsoil layer ranged from approximately 50mm to 100mm in thickness. Asphalt ranging in thickness between 50mm to 75mm was encountered in the remaining boreholes on site.
- All boreholes noted a layer of fill, extending a depth of 0.4 to 3.2m below grade. In general, the fill material consisted of a heterogeneous mixture of gravelly sand/silty sand/sandy silt or sand and gravel. Organic material such as rootlets and wood pieces as well as asphalt fragments were found within the fill layer.
- Native soil with a varying composition from silty sand/ gravelly sand/ sand and silt/ sandy gravel/ clayey silt was encountered in all boreholes and extended to depths of 1.2 to 3.5m below grade.
- Bedrock was encountered in all boreholes (with the exception of BH14, MW18, BH19, and BH22) at a depth of 1.9 to 3.8m below grade. The bedrock was noted to be shale bedrock and was visually identified as the Georgian Bay Formation. A review of bedrock geology maps of the Ottawa area was conducted for the subsequent Thurber Engineering memorandum, where it was found that the site is located at the border of Carlsbad and Billings Shale formations, not the Georgian Bay Formation referenced in the original GHD report. It was noted that this formation generally consists of dark grey weak to moderately strong shale.
- Adjeleian Allen Rubeli Ltd. created a report in 1998 detailing “swelling shale” conditions that were encountered at the Children’s Treatment Centre in the OHSC campus. The report indicated that the swelling shale phenomenon has caused heaving by a factor of 2 to 3mm per year with no evidence to suggest that the swelling will cease in the future.

## 2.5 Hydrogeological Investigation

GHD Ltd. was retained by Infrastructure Ontario to complete a preliminary hydrogeological investigation for the proposed development. The report is provided under a separate cover. The following summarizes the findings of the hydrogeological investigation as they relate to site servicing and stormwater management:

- The native glaciolacustrine deposit underlying the fill material found on site forms an aquitard layer. Based on hydraulic testing, the horizontal hydraulic conductivity for the aquitard ranged from  $1.02 \times 10^{-2}$  cm/sec to  $9.81 \times 10^{-6}$  cm/s.
- The weathered shale bedrock underlying the site also forms an aquitard. Based on hydraulic testing, the horizontal hydraulic conductivity of the bedrock ranged from  $2.22 \times 10^{-3}$  cm/s to  $1.66 \times 10^{-4}$  cm/s. It was noted that the higher hydraulic conductivity of the bedrock may represent local marginal aquifer conditions within the weathered bedrock.
- Four Guelph Parameter infiltration tests were conducted on the shallow unsaturated soil on Site. Testing indicated that the shallow silt with sand overburden has a medium to high infiltration rate of 34 to 171 mm/hr.
- Groundwater levels measured in the shallow monitoring wells screened across the overburden bedrock contact ranged from 1.31 to 5.16m below grade. The water table elevation was found to range from approximately 77.07 to 79.58m above mean sea level.

## 2.6 Source Water Protection

According to the Province of Ontario’s Source Protection Information Atlas, the Site is not part of any water quality or quantity source water protection areas. As such, the Rideau Valley Source Protection Plan is not applicable to this development. Table I provides the source protection details for the Site.

**Table I: Source Protection Details**

| SOURCE PROTECTION AREA                 | RIDEAU VALLEY |
|--|---------------|
| <b>Water Quality</b>                   |               |
| Wellhead Protection Area               | No            |
| Wellhead Protection Area E (GUDI):     | No            |
| Intake Protection Zone:                | No            |
| Issue Contributing Area:               | No            |
| Significant Groundwater Recharge Area: | No            |
| Highly Vulnerable Aquifer:             | No            |
| Event Based Area:                      | No            |
| <b>Water Quantity</b>                  |               |
| Wellhead Protection Area Q1:           | No            |
| Wellhead Protection Area Q2:           | No            |
| Intake Protection Zone Q:              | No            |

## 3.0 GROUND WATER CONTROL

### 3.1 Short Term Discharge (During Construction)

The proposed development of the new 1Door4Care facility includes the construction of an underground tunnel segment spanning between the proposed building and the existing CHEO campus, as well as one level of the building which will be located partially below the existing ground surface of the Site. According to the Hydrogeological Assessment conducted by GHD, a worst-case dewatering rate of 257.97 m<sup>3</sup>/day but typical dewatering rate of 85.99 m<sup>3</sup>/day was established based on a 3x safety factor. The predicted groundwater takings for construction excavation purposes are above the Ministry of the Environment Conservation and Parks (MECP) Environmental Activity and Sector Registry (EASR) limit of 50,000 L/day. Based on this, an EASR for groundwater takings for excavation purposes will be required.

It is noted that the short-term dewatering rate is subject to change, and may potentially be lower, depending on the shoring methodology that is selected. Watertight shoring systems may limit the ingress of water, and dewatering could be completed over a longer timeframe, should the construction timelines permit it, resulting in an overall lower discharge rate. The conservative flow rate is used for the purposes of this functional assessment.

The geotechnical assessment for the dewatering impact to existing structures and sewers around the site will result in negligible increase of effective stress and is not anticipated to be of concern.

### 3.2 Long-Term Discharge (Subdrainage System)

Based on the Groundwater Management Report prepared by Geofirma Engineering (August 2024), three hypothetical groundwater discharge scenarios were considered upon building construction. Each of these systems would discharge to the storm sewer system, as per their report. The first scenario is that the groundwater elevation will not fluctuate and consistently remain at 79.6 mASL (highest recorded elevation by GHD). This would result in 3,400 L/day of discharge. The second scenario was an increase by 0.5m to a maximum



elevation of 80.1 mASL, with an estimated discharge of 14,400 L/day. The final scenario was an increase by 1m, with a maximum elevation of 80.6 mASL, and resulting 37,400 L/day of discharge required.

A building subdrainage system is proposed through a 9m grid of 100mm diameter perforated pipes, with a 150mm diameter header draining the system via gravity to an external sump pit. This subdrain system is designed with an invert of 79.60 around the perimeter of the building where the groundwater contours are highest, and has a lowest invert of 78.90 at the south side of the building west of the main entrance where the groundwater contours are lowest. It is anticipated that this subdrain system will rarely be used. A pump is being sized to discharge any drainage to the project's storm sewer system.

### 3.3 Quality and Discharge

As part of the hydrogeological investigation, samples of groundwater were collected and analyzed for compliance with City of Ottawa Sewer Use By-Law (2003-5134). The analysis notes that exceedances of Nonyl phenol and TKN parameters with respect to the sanitary sewer system. When compared to storm sewer use parameters, exceedances for TSS, Nonyl phenol, Manganese and Chloroform are noted. The Groundwater Management Report prepared by Geofirma Engineering speaks to the water quality exceedances and proposes solutions both during and post construction.

## 4.0 PROPOSED CONDITIONS

The Development is to consist of a six-storey integrated care facility. The proposed 1Door4Care building will incorporate educational services, medical staff workplaces, clinical areas, therapeutic areas, and community learning areas under one roof.

## 5.0 SANITARY SERVICING

### 5.1 Design Criteria

The City of Ottawa relies on their [\*Ottawa Sewer Design Guidelines\*](#) for design of wastewater and stormwater infrastructure, and [\*Technical Bulletin ISTB-2018-01\*](#) for revisions to these standards. The following requirements are noted for the development:

- A Manning's Roughness Coefficient of 0.013 for all PVC pipes and all new sanitary sewer systems
- A minimum velocity of 0.6 m/s and maximum velocity of 3.0 m/s is permitted within the pipe
- An average wastewater flow rate for medical centers of 275 L/capita/day for medical staff
- An average wastewater flow rate for medical centers of 25 L/capita/day for patients
- An institutional peaking factor of 1.5
- A total inflow/infiltration allowance of 0.33 L/s/effective gross ha

The proposed development is expected to discharge domestic sanitary sewage to the private sanitary sewer system on site.

## 5.2 Total Sanitary Demand

The City of Ottawa's *Ottawa Sewer Design Guidelines* provides daily sewage flow values for a number of different land uses. The guidelines provides a per-hectare flow rate of 28,000 L/gross hectare/day for institutional areas. The guidelines also provide an institutional peaking factor of 2.5. These values were utilized in order to calculate the expected wastewater demand from the site. A summary of the calculation is provided in Table II below.

**Table II: Sanitary Flow Calculation**

|   |             |            |
|---|-------------|------------|
| Average Daily Wastewater Flow (Institutional) | 28,000      | L/ha/d     |
| Site Area                                     | 2.06        | ha         |
| Peaking Factor                                | 1.5         |            |
| <b>Peak Domestic Wastewater Flow</b>          | <b>1.00</b> | <b>L/s</b> |
| Site Area                                     | 2.06        | ha         |
| Infiltration Allowance (0.33 L/s/ha)          | 0.68        | L/s        |
| <b>Total Sanitary Drainage</b>                | <b>1.68</b> | <b>L/s</b> |

The total sanitary discharge expected from the site is 1.68 L/s. The design of the sewers for this project was completed using the Chézy-Manning formula with a roughness coefficient of 0.013 in accordance with City of Ottawa Guidelines. Table III below illustrates the minimum design considerations for the service connection to the private sanitary sewer on Ring Road to ensure compliance with MECP requirements and provide self cleansing velocities within the pipe.

**Table III: Sanitary Service Design**

|                          |       |     |
|--------------------------|-------|-----|
| Diameter of Service      | 250   | mm  |
| Minimum Slope of Service | 0.53  | %   |
| Full Flow Capacity       | 43.29 | L/s |
| Full Flow Velocity       | 0.88  | m/s |

A minimum 250mm-diameter service at 0.53% is proposed to convey flows to the Ring Road system. All sanitary sewers will be constructed at a minimum depth of 1.8m below ground surface to prevent freezing. Insulation will be provided for sewers that cannot be placed at this minimum depth to prevent freezing.

## 5.3 Wastewater Collection and Discharge

Downstream from the site, wastewater is collected in the 300mm-diameter private sanitary sewer located in the access road along the eastern boundary of the site. The 2011 Site Servicing Assessment conducted by J.L. Richards indicated that the existing wastewater discharge entering this sewer segment from CHEO is approximately 4.24 L/s. Table SS3 of the report provided in Appendix B illustrates that the full flow capacity of this sewer segment is 88.05 L/s. The combined wastewater inflow from the existing CHEO campus and proposed 1Door4Care Facility is 5.92 L/s. Therefore, it is anticipated that the 300mm-diameter sanitary sewer will be sufficient to convey the sewage to the existing sanitary sewer system on Ring Road.

A capacity assessment of the existing system was completed in 2011 by J.L. Richards. The subsequent report notes that the sanitary sewers within the north-west corner of the OHSC campus had a capacity of over 215 L/s at the outlet of the OHSC campus sewer system, and 325 L/s downstream of the National Defence Medical Centre. No capacity constraints were noted in the downstream system at the time of the report.

## 6.0 WATER DISTRIBUTION DESIGN

A 200mm-diameter watermain exists along Ring Road at the western limits of the Site, and a 300mm-diameter watermain exists along the access road at the eastern limits of the Site.

### 6.1 Design Criteria

The City of Ottawa's *Ottawa Design Guidelines – Water Distribution* defer to MECP requirements for water distribution. In accordance with MECP guidelines, the water distribution system shall be capable of delivering the water demands at a minimum residual pressure of 275 kPa (40 psi) in a non-fire scenario and at a minimum residual pressure of 140 kPa (20 psi) in the event of a fire. Under standard conditions, the MECP guidelines recommend an operating pressure in the range of 350 kPa (50 psi) to 480 kPa (70 psi), with pressure at any point in the system not exceeding 700 kPa (100 psi).

To comply with CAN/CSA standards for health-care facilities, the proposed building will be provided with a redundant water supply for domestic water and fire protection.

### 6.2 Domestic Water Demand (City of Ottawa Per-Capita Sewage Generation)

The domestic water demand for the plant is calculated using the same methodology as the sanitary demand noted in Section 5.2. Maximum day and peak hourly demands were determined by multiplying the average day demands calculated by their associated peaking factors – as determined by the MECP's *Design Guidelines for Drinking Water Systems*. A summary of the domestic water demand calculations is provided in Table IV.

**Table IV: Summary of Domestic Water Demand Calculations**

|   |             |            |
|---|-------------|------------|
| Average Daily Domestic Water Demand (Staff)         | 275         | L/c/d      |
| Number of Staff Anticipated                         | 522         |            |
| Maximum Day Peaking Factor                          | 2.75        |            |
| Peak Hour Factor                                    | 4.13        |            |
| <b>Maximum Day Domestic Water Demand (Staff)</b>    | <b>4.60</b> | <b>L/s</b> |
| <b>Peak Hour Domestic Water Demand (Staff)</b>      | <b>6.90</b> | <b>L/s</b> |
| Average Daily Domestic Water Demand (Patients)      | 25          | L/c/d      |
| Number of Patients Anticipated                      | 251         |            |
| Maximum Day Peaking Factor                          | 3.60        |            |
| Peak Hour Factor                                    | 5.40        |            |
| <b>Maximum Day Domestic Water Demand (Patients)</b> | <b>0.30</b> | <b>L/s</b> |
| <b>Peak Hour Domestic Water Demand (Patients)</b>   | <b>0.40</b> | <b>L/s</b> |
| <b>Total Maximum Day Domestic Water Demand</b>      | <b>4.90</b> | <b>L/s</b> |
| <b>Total Peak Hour Domestic Water Demand</b>        | <b>7.30</b> | <b>L/s</b> |

### 6.3 Fire Water Demand

Water demand for fire protection was calculated in accordance with the Fire Underwriter's Survey *Water Supply for Public Fire Protection* (FUS 2020).

It is understood that from a building code perspective, the proposed building will be classified as consisting of non-combustible construction.

### 6.3.1 FUS 2020 Methodology

The required fire flow (RFF) is calculated based on a coefficient of construction (C) and the effective floor area (A)

$$RFF = 220C\sqrt{A}$$

The following sections outline reasoning used to determine the values of the above coefficients, as well as the adjustments made to the required fire flow for the proposed development.

#### (1) Coefficient of Construction

The FUS 2020 classification uses different definitions for the type of construction, corresponding to a type of construction coefficient used in the calculations. FUS 2020 has the following definitions that are considered applicable to the development:

- **Fire-Resistive Construction (Type I) (C=0.6):** A building is considered to be of Fire-resistive construction (Type I) when all structural elements, walls, arches, floors, and roof are constructed with a minimum 2-hour fire resistance rating, and all materials used in the construction of the structural elements, walls, arches, floors, and roofs are constructed with non-combustible materials.
- **Non-combustible Construction (Type II) (C=0.8):** A building is considered to be of Non-combustible construction (Type II) when all structural elements, walls, arches, floors, and roofs are constructed with a minimum 1-hour fire resistance rating and are constructed with non-combustible materials.

Based on the Preliminary Code Review, the facility does not classify as a Fire-Resistive Construction (C=0.6), as all structural members do not have a 2-hour fire resistance rating ("Roofs that do not support an occupancy do not require fire-resistance ratings"). As such, a Coefficient of Construction, C=0.8, is proposed for the development under FUS 2020.

#### (2) Effective Floor Area

The vertical openings and exterior vertical communications of the building are noted to have a fire resistance rating of at least one hour. This combined with the Construction Coefficient of the building being below 1.0 gives that the area to be used in the FUS calculations shall consider the largest floor area plus 25% of each of the two immediately adjoining floors. For this building, an overall Effective Floor Area of 7,098 m<sup>2</sup> was utilized in the calculations.

Based on the above, an RFF of 15,000 LPM (250 L/s) is noted for this building.

#### (3) Occupancy Charge

The RFF calculated within the above section can be modified depending on the various occupancy classes defined within FUS 2020. Occupancy charges area assigned based on the fire hazard level associated with the contents that will be stored within the proposed development. The main categories defined under FUS 2020 area as follows:

- **Non-combustible Contents (-25%):** includes merchandise or materials (including stock, furniture, and equipment) which in permissible quantities does not themselves constitute an active fuel for the spread of fire.
- **Limited Combustible Contents (-15%):** includes merchandise or materials of a low combustibility, with limited concentration of combustible materials.
- **Combustible Contents (0%):** Includes merchandise or materials of moderate combustibility
- **Free Burning Contents (+15%):** Includes merchandise or materials which burn freely, constituting an active fuel
- **Rapid Burning Contents (+25%):** Includes merchandise or materials which either burn with great intensity, spontaneously ignite and are difficult to extinguish, or give off flammable or explosive vapours at ordinary temperature.

The proposed development falls into the major occupancy category of “care and treatment occupancies” from the National Building Code of Canada (NBC). This major occupancy category has a suggested occupancy charge of non-combustible to limited combustible contents according to FUS 2020. To calculate the most conservative RFF, it was decided that a limited combustible content occupancy charge of -15% would be applied.

#### (4) *Automatic Sprinkler Protection*

The required RFF can be further reduced depending on the adequacy of the automatic sprinkler system provided. Table V identifies the available credits that can be applied depending on the design of the automatic sprinkler system.

**Table V: Sprinkler Credits (FUS 2020)**

| <b>Automatic Sprinkler System Design</b>   | <b>Credit</b> |
|--|---------------|
| Automatic sprinkler protection designed and installed in accordance with NFPA 13 | 30%           |
| Water supply is standard for both the system and Fire Department hose lines      | 10%           |
| Fully supervised system  | 10%           |

Given the design of the sprinkler system for the proposed building, all three of the above listed credits were applied to the system, resulting in an RFF reduction of 50%.

#### (5) *Exposure Charge Adjustment*

The RFF of the development can be increased depending on the distance between exposed risks (i.e. structures, stored materials, forests, etc.) and the proposed development. The exposure charges applied to the building depends on the separation distance between the building, the length-height factor of the exposing building face, and the exposed risk. **Table VI** summarizes the exposed risks identified, their measured separation differences, and the exposure adjustment charge applied.

**Table VI: Summary of Exposure Charges Applied**

| EXPOSED RISK IDENTIFIED                 | SEPARATION DISTANCE MEASURED | EXPOSURE CHARGE APPLIED |
|---|------------------------------|-------------------------|
| Existing Max Keeping Wing               | 27m                          | 3%                      |
| Existing CHEO Main Building             | >30m                         | 0%                      |
| Existing Residential Area South of Site | 28m                          | 3%                      |
| <b>Total Exposure Charge Applied</b>    |                              | <b>6%</b>               |

#### (6) *Total Required Fire Flow*

A summary of the calculated RFF and subsequent modifications made using the FUS 2020 methodology is provided in Table VII.

**Table VII: Summary of Required Fire Flow Calculations**

|   |                |
|---|----------------|
| Calculated Required Fire Flow                 | 15,000 L/min   |
| Occupancy Charge Applied                      | -15%           |
| Adjusted Required Fire Flow                   | 12,750 L/min   |
| Automated Sprinkler Protection Credit Applied | -50%           |
| Adjusted Required Fire Flow                   | 6,375 L/min    |
| Exposure Charges Applied                      | +6%            |
| Adjusted Required Fire Flow                   | 7,000 L/min    |
| <b>Total Required Fire Flow</b>               | <b>117 L/s</b> |

## 6.4 Municipal System Capacity and Service Design

Hydrant flow testing was conducted by Clean Water Works on the Ottawa Health Science Centre Campus throughout April and May 2021. The report prepared by Clean Water Works is provided within Appendix B. One hydrant tested during this inspection was noted to be within close proximity to the Site (Hydrant PH328-20). The results of the flow tests noted that a static pressure of 60 PSI was available at the Site, and a residual pressure of 50 PSI was measured at a flow of 1090 GPM. An N185 graph of the results is included within Appendix B. Extrapolating the results of the flow test, it is noted that the rated capacity of the system at 20 PSI is in the order of 2305 GPM or approximately 145 L/s. The required maximum day demand plus fire flow of 122 L/s is available at approximately 30 PSI.

In addition to the above, headloss calculations were completed based on transmission losses, elevation losses, and minor losses to confirm adequate pressures are available at the building FFE. Beginning with transmission losses and using the Hazen-Williams Equation, utilizing a diameter of 200mm, roughness coefficient, C, of 150 for PVC pipe, and a length of 18.4 m - a total major head loss of 0.943 m (1.34 PSI) is noted for the 122 L/s combination maximum day demand and fire flow.

From the connection to existing at an invert of 81.91 m to the building connection at an invert of 81.70 m, a loss of 0.50m (0.71 PSI) is noted.

Finally, from the connection point to the building FFE, there are several minor losses noted beginning with branch flow from the tee at the main (k=1.0) and open water valve (k=0.15). Utilizing a velocity of 3.88 m/s (based on a diameter of 200 mm and combination of maximum day demand and fire flow of 122 L/s), a pressure drop of 1.26 PSI is noted from minor losses.

In total, a pressure drop of 2.30 PSI is anticipated. Therefore, the 122 L/s is available at the building FFE at approximately 27.7 PSI, demonstrating adequate pressure is available to service the building.

Finally, the municipal hydrant on Ring Road south of the 1Door4Care building is located within 45m of the fire department connection. This hydrant is expected to provide the required fire flow at or above the minimum 140 kPa residual pressure. Per Table 2 of FUS 2020, for a fire flow of 7,000 L/min, the minimum number of hydrants is noted to be 1.

## 7.0 STORM SERVICING AND STORMWATER MANAGEMENT

### 7.1 Design Criteria

Morrison Hershfield completed a Stormwater Master Plan for the OHSC campus in July, 2019. The conclusions and recommendations of the Stormwater Master Plan governs all stormwater management measures on Site. The following is the design criteria based on the most stringent requirements from the MECP in addition to the conclusions and recommendations of the Stormwater Master Plan:

- **Quantity Control:** Provide attenuation such that peak flows for proposed conditions are equal to or less than the peak flow recorded for the pre-development 2-year design storm event. The attenuation is to be provided for the 2-year through 100-year design events. The 3-hour City of Ottawa design storm events will be used for this assessment for all event to the 100-year. Peak flow shall be determined using a C value of 0.5 in accordance with the City of Ottawa Sewer Design Guidelines.
- **Quality Control:** Quality Control is provided by the oil grit separator installed at the northwester corner of the entire OHSC campus. No further water quality control measures are anticipated to be needed for the proposed development.
- **Water Balance:** Review significance of existing groundwater systems and develop recommendations for groundwater recharge and water balance to the extent technically, physically and economically practicable.

### 7.2 Existing Stormwater Management Controls

The evaluation of the existing storm sewer conditions conducted as part of the Master Plan prepared by Morrison Hershfield found several problems with the stormwater management system in the OHSC campus. Existing conditions modelling of the system indicated that, under the 5-year and 100-year storm events, peak flow directed to the receiving Alta Vista Hospital Link (AVHL) sewer exceeded the 10-year flow of 3,920 L/s that the sewer was designed for. In addition to the peak flow exceedance noted above, it was also found that 20% of storm sewers within the campus exceeded their theoretical full flow capacity under the 2-year storm event. This number increases to 37% under the 5-year storm event and 60% under the 100-year storm event. The modelling conducted also indicated that elevated hydraulic grade line elevations exist in the minor system during intense storm events.

To remedy these noted issues, three recommendations were provided. These recommendations included implementing backflow preventers on all building drainage connections to the minor system, installing inlet control devices on highlighted catchbasin structures, and instating strict stormwater quantity control criteria on all future development within the OHSC campus. The phasing and priority of the above recommendations were suggested to be completed in the order that they were presented above.

The subject site itself does not appear to have any existing controls. The 2019 *Stormwater Masterplan* by Morrison Hershfield recommends that all future developments across the OHSC campus control post-development peak flows (up to and including the 100-year storm event) to the pre-existing 2-year storm event using stormwater retention measures. In addition, peak flows under pre-existing conditions are stipulated to be determined using a runoff coefficient of 0.5 in accordance with the City of Ottawa Sewer Design Guidelines.

### 7.3 Existing Conditions

Under existing conditions, runoff from the Site is directed towards two outlets. A portion of the Site (approximately 2.191 ha) directs runoff towards Ring Road in the form of overland flow, while the remaining 1.545 ha directs runoff towards the storm sewer system. It should be noted that a number of external catchment areas were noted to contribute runoff to the outlets. An existing catchment area plan has been provided within Appendix A of this report. A summary of the pre-development catchment parameters is provided within **Table VIII**.

**Table VIII: Summary of Pre-Development Catchment Parameters**

| CATCHMENT ID | DESCRIPTION   | AREA (HA) |
|--------------|---|-----------|
| EXT-1        | External catchment capturing flows from ring road on the southeastern edge of the Site  | 0.275     |
| EXT-2        | External catchment capturing flows from ring road on the northwestern edge of the Site  | 0.280     |
| EXT-3        | External catchment capturing flows from external asphalt parking lot – directs flows to Ring Road   | 0.962     |
| 101          | Existing landscaped area south of the existing CHEO main entrance – directs flows to catchment 102 and ultimate enters storm sewer system | 0.102     |
| 102          | Southeast portion of existing driveway connecting Ring Road to the main entrance of CHEO – directs flow to storm sewer system             | 0.349     |
| 103          | Existing asphalt parking lot west of the main entrance to CHEO – directs flows to the storm sewer system                                  | 0.905     |
| 104          | Existing gravel overflow parking west of the main entrance to CHEO – directs flows to Ring Road uncontrolled                              | 0.351     |
| 105          | Landscaped area located north of the main entrance of the existing CHEO building – directs flows to the storm sewer system                | 0.189     |
| 106          | Northwest portion of the existing driveway connecting Ring Road to the main entrance of CHEO – directs flow to Ring Road uncontrolled     | 0.218     |
| 107          | The northern most portion of the existing external asphalt parking lot – conveys flows uncontrolled to Ring Road                          | 0.105     |

As per the Stormwater Master Plan created by Morrison Hershfield, the allowable release rate from the Site is set as the pre-development peak flow rate under the 2-year design storm event using a runoff coefficient of 0.50. This allowable release rate was determined using the rational method. The rainfall intensity used within the rational method calculation was determined using the intensity-duration-frequency (IDF) curve parameters for the 2-year storm event alongside a time of concentration of 10 minutes. The parameters utilized within the rational method calculation as well as the allowable release rates calculated are summarized in **Table IX** and **Table X** below.



**Table IX: Allowable Release Rate to Storm Sewer System**

|   |              |                        |
|---|--------------|------------------------|
| Area of Catchment (A)   | 1.545        | ha                     |
| Runoff Coefficient (C)  | 0.50         | -                      |
| <b>IDF Curve Parameters from City of Ottawa Sewer Design Guidelines</b> |              |                        |
| a   | 732.951      | -                      |
| b   | 6.199        | min                    |
| c   | 0.810        | -                      |
| Time of Concentration ( $t_c$ )   | 10           | min                    |
| Rainfall intensity (i)  | 76.805       | mm/hr                  |
| <b>2-Year Pre-Development Peak Flow Rate (North Hospital)</b>           | <b>99.32</b> | <b>m<sup>3</sup>/s</b> |

**Table X: Allowable Release Rate to Ring Road**

|   |               |                        |
|---|---------------|------------------------|
| Area of Catchment (A)   | 2.191         | ha                     |
| Runoff Coefficient (C)  | 0.50          | -                      |
| <b>IDF Curve Parameters from City of Ottawa Sewer Design Guidelines</b> |               |                        |
| A   | 732.951       | -                      |
| B   | 6.199         | min                    |
| C   | 0.810         | -                      |
| Time of Concentration ( $t_c$ )   | 10            | min                    |
| Rainfall intensity (i)  | 76.805        | mm/hr                  |
| <b>2-Year Pre-Development Peak Flow Rate (Ring Road)</b>                | <b>160.45</b> | <b>m<sup>3</sup>/s</b> |

## 7.4 Proposed Conditions

Under proposed conditions the overall percent imperviousness for the Site was calculated to be approximately 75%. A catchment area plan of proposed conditions as well as a flow schematic of proposed conditions have been included within Appendix A of this report. A summary of post-development catchment parameters has been provided in **Table XI**.

**Table XI: Proposed Catchment Parameters**

| CATCHMENT ID | DESCRIPTION  | AREA (HA) |
|--------------|--|-----------|
| EXT-1        | Section of ring road on the southern limits of the Site  | 0.28      |
| EXT-2        | Section of ring road on the western limits of the Site   | 0.28      |
| EXT-3        | Existing asphalt parking lot - directs runoff to Site  | 0.96      |
| 222          | Landscaped area south of existing CHEO main entrance   | 0.10      |
| 223          | Portion of existing external asphalt parking lot that directs runoff onto entrance driveway to CHEO entrance | 0.11      |
| 224          | Proposed 1Door4Care building   | 0.48      |
| 225a         | Northern portion of the driveway between proposed 1Door4Care building and existing CHEO entrance             | 0.198     |
| 225b         | Southern portion of the driveway between proposed 1Door4Care building and existing CHEO entrance             | 0.295     |
| 226          | South intersection between Site driveway and Ring Road   | 0.10      |
| 227          | Proposed parking lot in front of the 1Door4Care building   | 0.39      |
| 228          | Proposed landscaped area on northern limits of the Site  | 0.23      |
| 229          | Existing landscaped area in front of CHEO Max Keeping Wing   | 0.15      |

Additionally, as noted within the *CHEO 1Door4Care Parking Garage Servicing and Stormwater Management Report* completed by WalterFedy (revised December 1, 2023), post-development peak flow rates directed towards Ring Road from the parking garage side exceeded the allowable release rates under the 50-year and 100-year storm events. These overages were added to first ring road node within this stormwater management model in order to better reflect post-development conditions. The peak flow rates, and base flow rates utilized within the modelling are illustrated in Table XII below.

**Table XII: Peak Flow Rates from Parking Garage Site to be Attenuated by 1Door4Care Measures**

| DESIGN STORM EVENT | ALLOWABLE RELEASE RATE (L/S) | POST-DEVELOPMENT PEAK FLOW RATE (L/S) | FLOW RATE ADDED TO MODEL (L/S) |
|--------------------|------------------------------|---------------------------------------|--------------------------------|
| 50-Year            | 22.74                        | 25.34                                 | 2.60                           |
| 100-Year           | 22.74                        | 29.02                                 | 6.28                           |

The proposed development will increase the peak outflow of the Site, therefore necessitating peak flow reduction measures. The following sections outline the stormwater management practices that are proposed to be implemented in order to attenuate flows to the noted allowable release rates.

It should be noted that no attenuation measures have been proposed within catchments 228, 225b, and 226 due to the steep grades within these areas – these catchments will mainly produce uncontrolled flow directed to Ring Road. It should also be noted that the proposed drop curb shown on the southern edge of the loading dock ramp allows for portions of the uncontrolled flow produced from catchments 225b and 226 to spill into catchment 227 – allowing for some flow attenuation measures for these catchments. In order to provide sufficient attenuation measures such that outflow from the Site meets the quantity control requirements, the proposed detention

storage, surface ponding, flow control roof drains, and green roof measures have been designed as to limit the flow exiting these measures as much as possible. A flow schematic of proposed conditions has been provided within Appendix A for reference.

#### 7.4.1 Surface Ponding

Surface ponding is proposed to occur on the parking area located southwest of the proposed 1Door4Care building (catchment 227). As per the *1Door4Care: CHEO Integrated Treatment Centre – Climate Risk Assessment Report* completed by Stantec in 2022, surface ponding was restricted to storm events larger than the 5-year storm event. This was accomplished utilizing a 200 mm diameter orifice plate installed downstream of CBMH38. This orifice plate was sized such that flows from the 5-year design storm event would be able to pass through without interference while flows generated from the 10- through 100-year design storm events were restricted such that ponding could occur.

Ponding was restricted to a maximum depth of 0.30 m with a maximum allowable ponded volume of 117 m<sup>3</sup>. Peak inflow/outflow rates and maximum storage volumes recorded for the surface ponding storage node within all modelled storm events are listed within Table 5 in Appendix C.

#### 7.4.2 Control Flow Roof Drains

In order to attenuate flows stemming from the proposed 1Door4Care building, twenty-seven control flow roof drains are proposed to be installed on various rooftop areas of the proposed building. Control flow roof drains were modelled as Zurn Z-105 Control-Flo drains with a drainage function of 0.38 L/s per 25 mm of head. Rooftop ponding was restricted to a total area of 2060.94 m<sup>2</sup> with a maximum depth of 0.150 m. Peak inflow/outflow rates and maximum storage volumes recorded for the roof ponding storage node within all modelled storm events are listed within Table 5 in Appendix C. A summary of the roof drain characteristics utilized within all modelled storm scenarios is similarly located in Appendix C.

#### 7.4.3 Green Roof

It is proposed that approximately 650 m<sup>2</sup> of roof area on the 1Door4Care building be converted into green roof space. The green roof system is comprised of Sopranature Toundra Box complete with a retention board base layer. Together, the system is capable of retaining 67.2 mm of rainwater – rainwater in excess of this amount is sent to conventional roof drains and is directed to the storm sewer outlet for the building. Product specifications for the Toundra Box are provided in Appendix C.

#### 7.4.4 Detention Gallery

In order to further attenuate flows directed towards the existing storm sewer system, an underground detention gallery comprised of 45 ADS SC-740 StormTech chambers. This detention gallery provides 108.7 m<sup>3</sup> of storage (above the bottom stone layer) and will receive flows from the southern parking area on Site (catchment 227). Additionally, this gallery is expected to receive a portion of the overland flows generated from catchments 222, 225, and 226 through the proposed drop curb located along the western edge of the loading ramp. Flow from the gallery is controlled using a 150 mm diameter orifice plate located at CBMH38. The small diameter of the proposed orifice plate acts to constrict flow leaving the gallery, thereby requiring the usage of the provided storage volume. Peak inflow/outflow rates and maximum storage volumes recorded for the detention gallery node within all modelled storm events are listed within Table 5 in Appendix C.

The peak flow rates recorded under post-development conditions after the implementation of the above noted stormwater management measures is summarized within Table XIII and Table XIV.

**Table XIII: Comparison of Pre- and Post-Development Peak Flow Rates to the Storm Sewer System**

| DESIGN STORM EVENT | PRE-DEVELOPMENT PEAK FLOW RATE (L/S) | ALLOWABLE RELEASE RATE (L/S) | POST-DEVELOPMENT PEAK FLOW RATE (L/S) |
|--------------------|--------------------------------------|------------------------------|---------------------------------------|
| 2-Year             | 99.32                                | 99.32                        | 61.48                                 |
| 5-Year             | 134.74                               | 99.32                        | 77.23                                 |
| 10-Year            | 157.95                               | 99.32                        | 81.85                                 |
| 25-Year            | 187.11                               | 99.32                        | 87.83                                 |
| 50-Year            | 208.81                               | 99.32                        | 92.33                                 |
| 100-Year           | 230.91                               | 99.32                        | 96.99                                 |

**Table XIV: Comparison of Pre- and Post-Development Peak Flow Rates to Ring Road**

| DESIGN STORM EVENT | PRE-DEVELOPMENT PEAK FLOW RATE (L/S) | ALLOWABLE RELEASE RATE (L/S) | POST-DEVELOPMENT PEAK FLOW RATE (L/S) |
|--------------------|--------------------------------------|------------------------------|---------------------------------------|
| 2-Year             | 160.45                               | 160.45                       | 48.34                                 |
| 5-Year             | 217.67                               | 160.45                       | 72.85                                 |
| 10-Year            | 255.17                               | 160.45                       | 90.19                                 |
| 25-Year            | 302.28                               | 160.45                       | 112.96                                |
| 50-Year            | 337.33                               | 160.45                       | 131.63                                |
| 100-Year           | 373.03                               | 160.45                       | 156.35                                |

As seen in the tables above, the proposed stormwater management measures are capable of successfully reducing the post-development peak flow rates to the allowable release rate.

## 7.5 Quality Control

It is understood that the existing private storm sewer network already has quality control measures in place at the downstream end of the system. To supplement the downstream measures, drainage from the site is directed towards a detention gallery equipped with an isolator row. The LID measure will reduce maintenance needs and provide additional TSS removal for runoff from the site to act as an upstream quality control prior to the existing downstream quality control measures.

## 7.6 Water Balance

The increase in imperviousness will locally alter water balance as compared to existing conditions. The exact impact will have to be evaluated based on the other stormwater design decisions.

## 8.0 CONSTRUCTION EROSION AND SEDIMENT CONTROL

Prior to start of any construction, all erosion and sediment control measures will be installed and inspected by the Consultant. The measures will also be periodically inspected and upgraded/changed as site conditions change. Periodic inspections will consist of visual observation of the effectiveness of the control measures and sediment migration offsite. Construction inspections will be conducted biweekly and within 24 hours of any rainfall event of 25mm or greater, until such a time that paving works are complete and vegetation has established itself to a density equivalent to 70% of the background native vegetation density. Records of all inspections will be maintained and made available to the RVCA, City of Ottawa and the MECP upon request.

Any sediment tracked onto the roadway during the course of construction will be cleaned by the Contractor. To minimize the amount of mud tracked onto the roadway, a mud-mat will be installed at all construction exits and the contractor will be required to ensure that vehicles leave through the exit. The mudmat will be periodically inspected and cleaned as required to ensure it is functioning as intended.

Each inlet structure to remain, and new inlet structures to be installed will require a heavy-duty silt sac to be installed. Filter fabric will be wrapped around the lids of all manholes to prevent intrusion of sediment into the storm sewer network. The inserts will be cleaned once they reach one-third their sediment accumulation capacity or as per the manufacturer's recommendations.

All erosion and sediment control measures will be removed at the end of construction.

## **9.0 CONCLUSIONS**

Based on the servicing design presented in this report, the following conclusions are presented:

- The Site is not located within a Source Protection Area, and the Rideau Valley Source Protection Policies will not apply to the site.
- Sanitary discharge from the site will be conveyed to the OHSC campus' private sanitary sewer system through the existing 300mm-diameter sewer to the east of the site.
- No capacity concerns exist in downstream sanitary infrastructure.
- Water servicing will be provided from the 300mm diameter watermain running underneath the access road east of the Site.
- Based on hydrant flow testing completed for the greater campus, adequate flow and pressures are expected to be available to service the anticipated domestic and fire demand for the proposed development.
- Stormwater quantity control requirements will be met through the implementation of a combination of an underground storage gallery, surface ponding measures, and flow control roof drains.
- No additional water quality control measures are required for the Site.
- Erosion and Sediment Control measures will ensure protection of the adjacent natural features. Measures will be put in place prior to any construction activity and maintained until construction is completed and ground surfaces have been stabilized.

All of which is respectfully submitted,

**WALTERFEDY**



**Shelley Forwell, P.Eng.**  
Design Engineer, Civil Engineering  
Partner

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A handwritten signature in black ink, appearing to read "C. Mahoney".

**Circe Mahoney**  
Water Resources EIT, Civil Engineering

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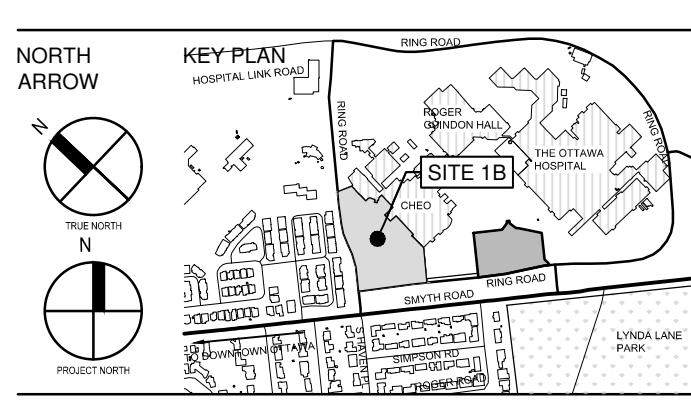
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# **APPENDIX A**

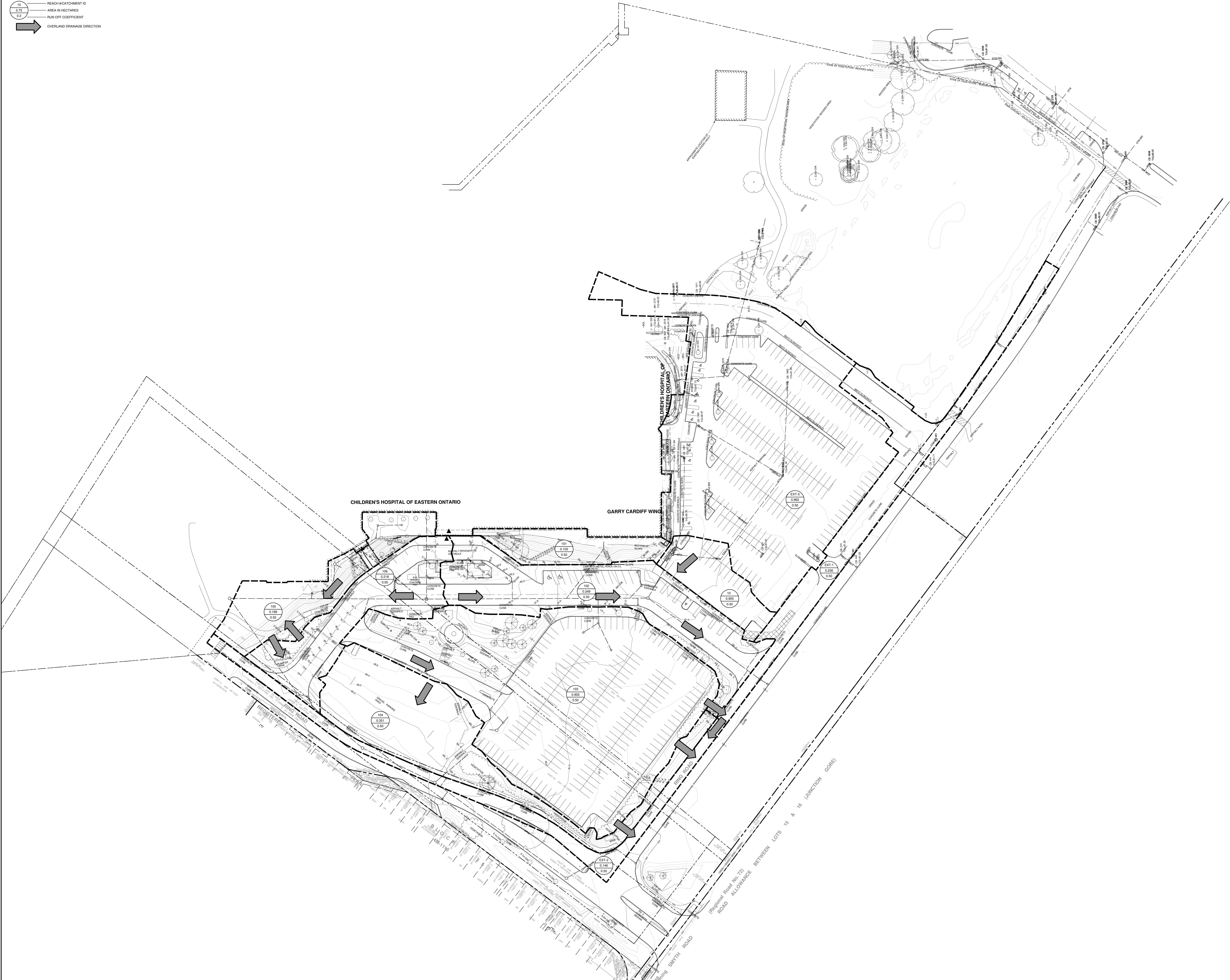
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## **Catchment Area and Flow Schematic Figures**

10 REACH # CATCHMENT ID  
 0.15 AREA IN HECTARES  
 0.2 RUN OFF COEFFICIENT  
 OVERLAND DRAINAGE DIRECTION



- GENERAL NOTES**
- THIS SET OF PLANS SHALL NOT BE USED FOR CONSTRUCTION UNTIL STAMPED BY THE DESIGN ENGINEER AND APPROVED BY THE LOCAL MUNICIPALITY.
  - NO CHANGES ARE TO BE MADE WITHOUT THE APPROVAL OF THE DESIGN ENGINEER.
  - THIS PLAN NOT TO BE REPRODUCED IN WHOLE OR IN PART WITHOUT THE PERMISSION OF WALTERFEDY.
  - THE POSITION OF POLE LINES, CONDUITS, WATERMANS, SEWERS, AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS AND, WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM THEMSELVES OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM AND THOSE NOT LOCATED PRIOR TO CONSTRUCTION.
  - ANY AREA DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO ITS ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE CONSULTANT AND AUTHORITY HAVING JURISDICTION. THE CONTRACTOR IS RESPONSIBLE FOR RESTORING ALL DAMAGED AND/OR DISTURBED PROPERTY WITHIN THE MUNICIPAL RIGHT-OF-WAY TO MUNICIPAL STANDARDS.
  - ALL HEALTH AND SAFETY RELATED SIGNAGE MUST BE POSTED AT THE SITE AS REQUIRED BY APPLICABLE LAW AND BEST MANAGEMENT PRACTICES.
  - AT THE END OF CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE THE CONSULTANT WITH A DIGITAL FILE OF AS-CONSTRUCTED DRAWINGS. THE DRAWINGS MUST REFLECT THE CONSTRUCTED STATE OF THE WORK. SUBMISSION OF UNALTERED DESIGN DRAWINGS AND CONTRACT CHANGES WILL NOT BE ACCEPTED.



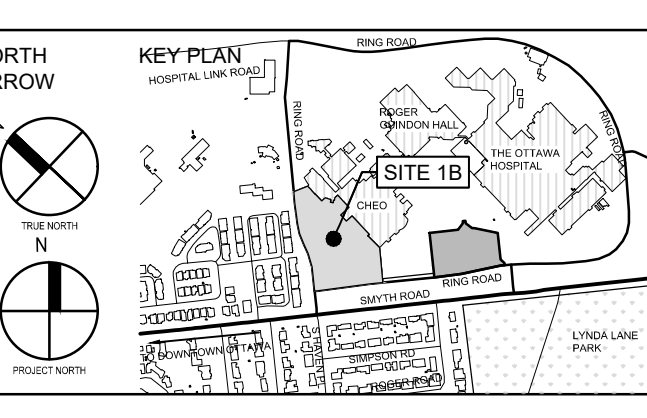
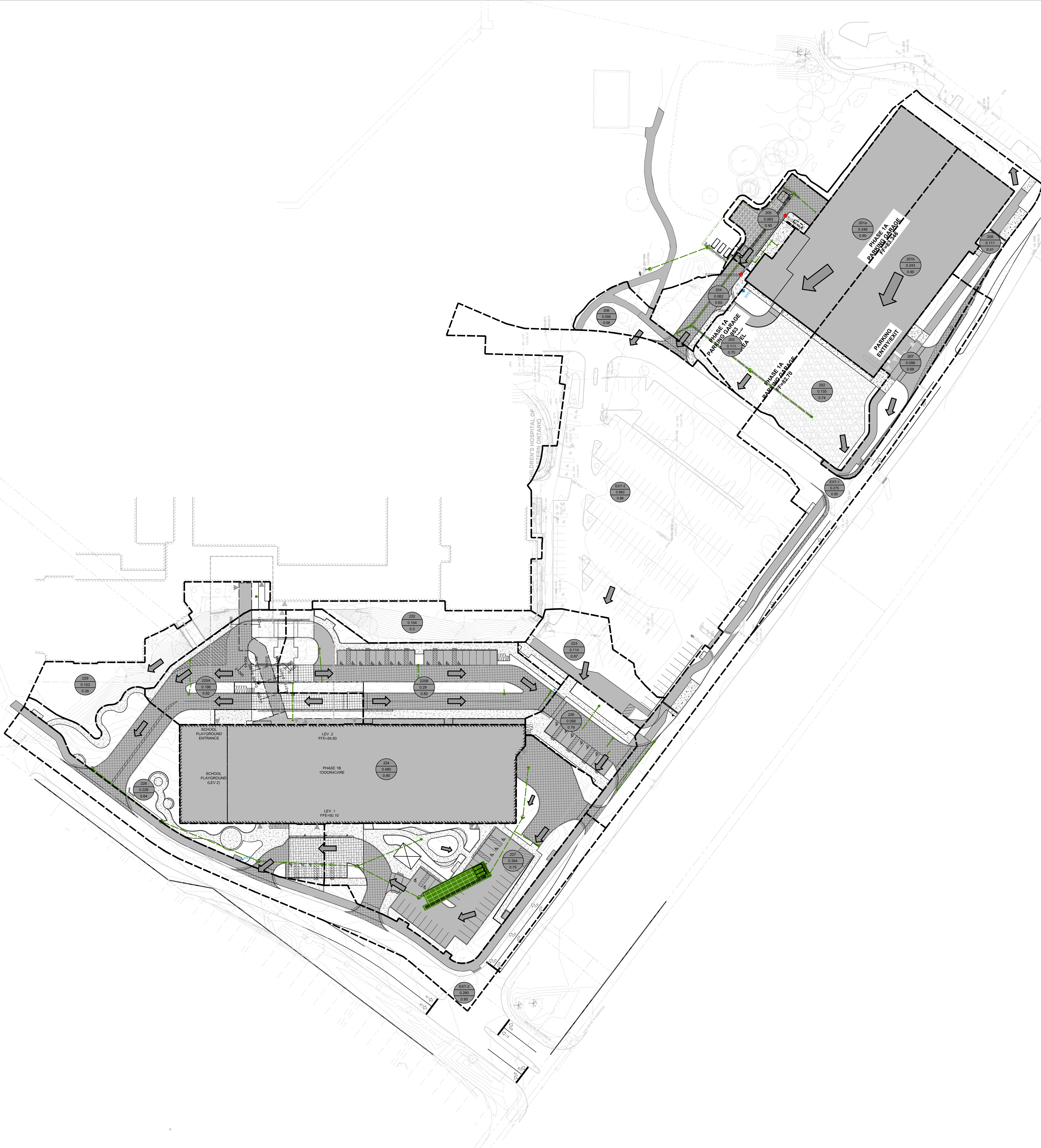
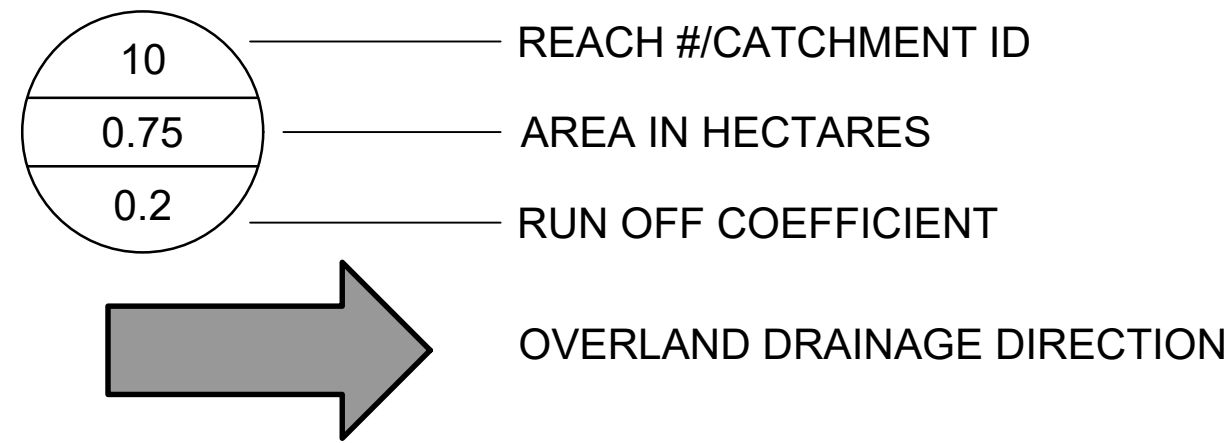
| # | DATE | REVISION |
|---|------|----------|
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CLIENT  
**1DOOR4CARE: CHEO INTEGRATED TREATMENT CENTRE: 1DOOR4CARE**  
 401 SMYTH RD, OTTAWA, ON K1H8L1

TITLE  
**EXISTING STORM CATCHMENT AREA PLAN**

SCALE: 1:500  
 DRAWN BY: DL\_ZS  
 REVIEWED BY: SF  
 JOB NUMBER: 2021-0821-13  
 PLOT DATE: 2024-02-16  
 DRAWING NUMBER





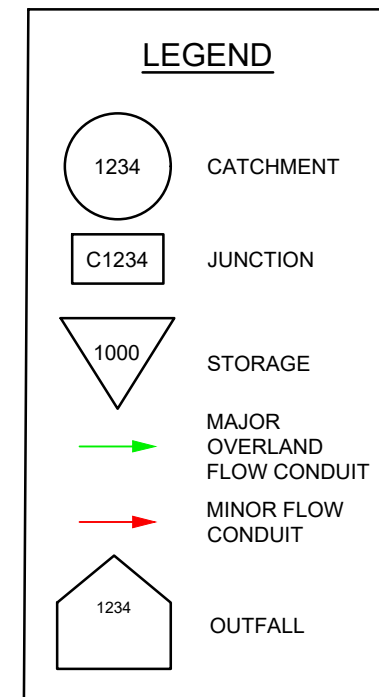
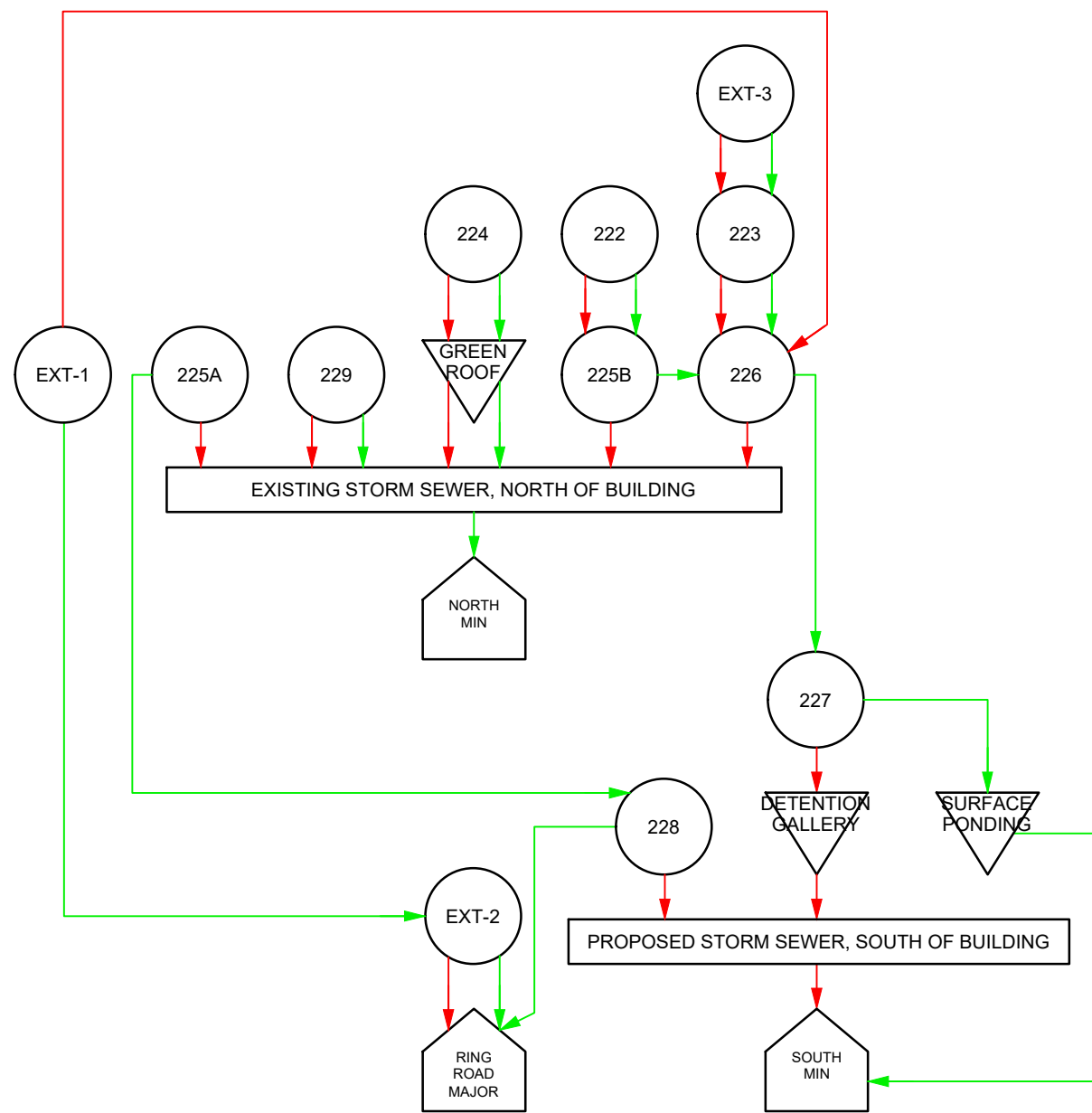
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  - NO CHANGES ARE TO BE MADE WITHOUT THE APPROVAL OF THE DESIGN ENGINEER.
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| NO. | DATE     | REVISION                               |
|-----|----------|--|
| 1   | 24/01/24 | RE-ISSUED FOR BUILDING PERMIT (TUNNEL) |
| 0   | 23/12/20 | ISSUED FOR BUILDING PERMIT (TUNNEL)    |

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 401 SMYTH RD, OTTAWA, ON K1H8L1  
 TITLE  
**STORM CATCHMENT AREA PLAN**  
 SCALE: 1:500  
 DRAWN BY: DL\_ZS  
 REVIEWED BY: SF  
 JOB NUMBER: 2021-0821-13  
 PLOT DATE: 2024-02-18  
 DRAWING NUMBER

P:\2021\0821\13\06-DWGS\CIVIL\2021-0821-13\_PR\_SCHEMATIC; FIG. 3; DWG To PDF no layers.pc3; Zack Schnurr; 2024-02-16 2:21:27 PM



PROJECT:  
CHEO - 1DOOR4CARE  
OTTAWA, ONTARIO

TITLE:  
PROPOSED CONDITIONS: PCSWMM MODEL SCHEMATIC

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|                |                                 |
|----------------|---------------------------------|
| SCALE: N/A     | DATE: 2024-02-16                |
| DRAWN BY: ZS   | PROJECT NO.: 2021-0821-13       |
| CHECKED BY: SF | FILE: 2021-0821-13_PR_SCHEMATIC |

SHEET NO.:

**FIG-3**

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## **APPENDIX B**

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### **Servicing Details**

**WASTEWATER GENERATION**

MECP Design Criteria

**WALTERFEDY**

|                    |  |
|--------------------|--|
| <b>Project</b>     | CHEO 1Door4Care                        |
| <b>Project #</b>   | 2021-0821-13                           |
| <b>Designer</b>    | CM                                     |
| <b>Address</b>     | 401 Smyth Road, Ottawa, Ontario        |
| <b>Description</b> | Anticipated Wastewater Flows Generated |

| Building Description         | Site Area <sup>1</sup> (ha) | Average Daily Wastewater Flow (L/gross Ha/day) <sup>2</sup> | Average Wastewater Generated (L/day) | Peaking Factor <sup>3</sup> | Infiltration Allowance <sup>2</sup> (L/s/ha) | Peak Domestic Wastewater Flow (L/s) |
|------------------------------|-----------------------------|---|--------------------------------------|-----------------------------|--|-------------------------------------|
| Proposed 1Door4Care Facility | 2.06                        | 28000   | 57,680                               | 1.50                        |  | 1.00                                |
| Infiltration Allowance       | 2.06                        |   |                                      |                             | 0.33   | 0.68                                |
| <b>Total</b>                 |                             |   |                                      |                             |  | <b>1.68</b>                         |

Notes:

1. Site Area based on Civil Drawings
2. Per Capita Demands and Infiltration Allowance taken from City of Ottawa's Ottawa Sewer Design Guidelines
3. Peaking Factor taken from City of Ottawa's Sewer Design Guidelines for institutional developments

**REQUIRED DOMESTIC WATER DEMAND****WALTERFEDY**

MECP Design Criteria

|                    |                                      |
|--------------------|--------------------------------------|
| <b>Project</b>     | CHEO 1Door4Care                      |
| <b>Project #</b>   | 2021-0821-13                         |
| <b>Designer</b>    | CM                                   |
| <b>Address</b>     | 401 Smyth Road, Ottawa, Ontario      |
| <b>Description</b> | Domestic Flows - Proposed Conditions |

| Building Description                    | Gross Floor Area <sup>1</sup><br>(m <sup>2</sup> ) | Population <sup>2</sup> | Per Capita Demand<br>(L/capita/day) <sup>3</sup> | Average Water Demand (L/day) | Maximum Day Peaking Factor <sup>4</sup> | Peak Hour Factor <sup>4</sup> | Maximum Day Demand (L/s) | Peak Hour Demand (L/s) | Water Service Size (mm) | Water Service Velocity <sup>3</sup> (m/s) |
|---|--|-------------------------|--|------------------------------|---|-------------------------------|--------------------------|------------------------|-------------------------|---|
| Proposed 1Door4Care Facility - Staff    | 19,596   | 522                     | 275  | 143,550                      | 2.75                                    | 4.13                          | 4.6                      | 6.9                    | 200                     | 0.22                                      |
| Proposed 1Door4Care Facility - Patients | 19,596   | 275                     | 25   | 6,875                        | 3.60                                    | 5.40                          | 0.3                      | 0.4                    | 200                     | 0.01                                      |
| <b>Total</b>                            |  |                         |  |                              |   |                               | <b>4.9</b>               | <b>7.3</b>             | <b>200</b>              | <b>0.23</b>                               |
| <b>Fire Flow</b>                        |  |                         |  |                              |   |                               |                          | 150                    | 200                     | 4.77                                      |

## Notes:

1. GFA based on architectural design
2. Anticipated staff and patient population taken from CHEO 1Door4Care Functional Program Space Allocation Report
3. Per Capita Demands taken from City of Ottawa's Ottawa Sewer Design Guidelines
4. Maximum Day and Peak Hour Peaking Factors Determined using MECP's Design Guidelines for Drinking Water Systems Tables 3-1 and 3-3

**REQUIRED FIRE FLOW**

Water Supply for Public Fire Protection (FUS 2020)

**WALTERFEDY**

|             |                                  |
|-------------|----------------------------------|
| Project     | CHEO 1Door4Care                  |
| Project #   | 2021-0821-13                     |
| Designer    | CM                               |
| Address     | 401 Smyth Road, Ottawa, Ontario  |
| Description | Fire Flows - 1Door4Care Building |

$$F = 220 \times C \times \sqrt{A}$$

F = Required fire flow (LPM)

C = Coefficient related to type of construction

A = Total floor area (including all storeys but excluding any basement levels at least 50% below grade)

|                      |   |     |     |
|----------------------|---|-----|-----|
| Type of Construction | Non-Combustible Construction  | C = | 0.8 |
| Description          | Unprotected Metal Structural Components, Masonry or Metal Walls. All Structural Members are Constructed with Minimum 1 Hour Fire Rating |     |     |

|  |  |                |
|--|--|----------------|
| Floor Area   | 20101.26   | m <sup>2</sup> |
| # Storeys  | 6  |                |
| Fire Resistant Building?   | NO   |                |
| Vertical Openings and Exterior Vertical Communications protected with minimum one (1) hr rating? |  | YES            |
| Area   | 7098   | m <sup>2</sup> |
| Description  | Area of Largest Floor + 25% of each of the floor areas directly adjoining it |                |
| Required Fire Flow   | 15000  | L/min          |

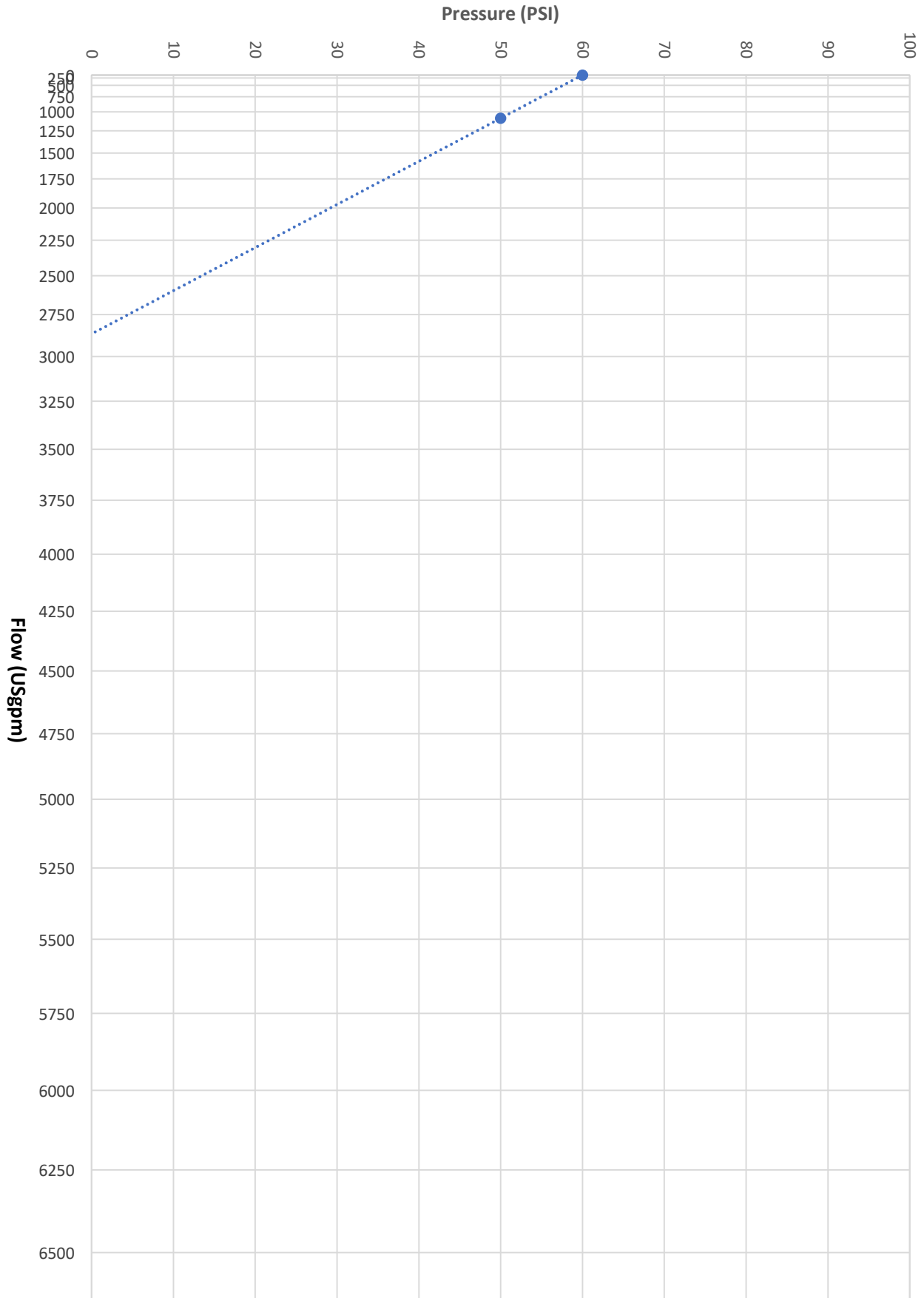
|                     |                              |
|---------------------|------------------------------|
| Occupancy Charge    | Limited-Combustible Contents |
| Fire Flow Reduction | -15% OR -2250 L/min          |
| Required Fire Flow  | 12750 L/min                  |

|  |     |             |
|--|-----|-------------|
| Automated Sprinkler Protection                     | YES |             |
| Designed to NFPA 13 Standard                       | YES | -30%        |
| Standard Water Supply to Sprinklers and Standpipes | YES | -10%        |
| Fully Supervised System                            | YES | -10%        |
| Fire Flow Adjustment                               |     | -6375 L/min |

|                    |                                |     |   |                      |      |        |    |
|--------------------|--------------------------------|-----|---|----------------------|------|--------|----|
| Exposure 1 (North) | Distance                       | 27  | m | Length-Height Factor | >100 | Charge | 3% |
| Description        | Existing Max Keeping Wing      |     |   |                      |      |        |    |
| Exposure 2 (East)  | Distance                       | >30 | m | Length-Height Factor | N/A  | Charge | 0% |
| Description        | Existing CHEO Main Building    |     |   |                      |      |        |    |
| Exposure 3 (West)  | Distance                       | N/A | m | Length-Height Factor | N/A  | Charge | 0% |
| Description        | N/A                            |     |   |                      |      |        |    |
| Exposure 4 (South) | Distance                       | 23  | m | Length-Height Factor | >100 | Charge | 3% |
| Description        | Existing Residential Buildings |     |   |                      |      |        |    |

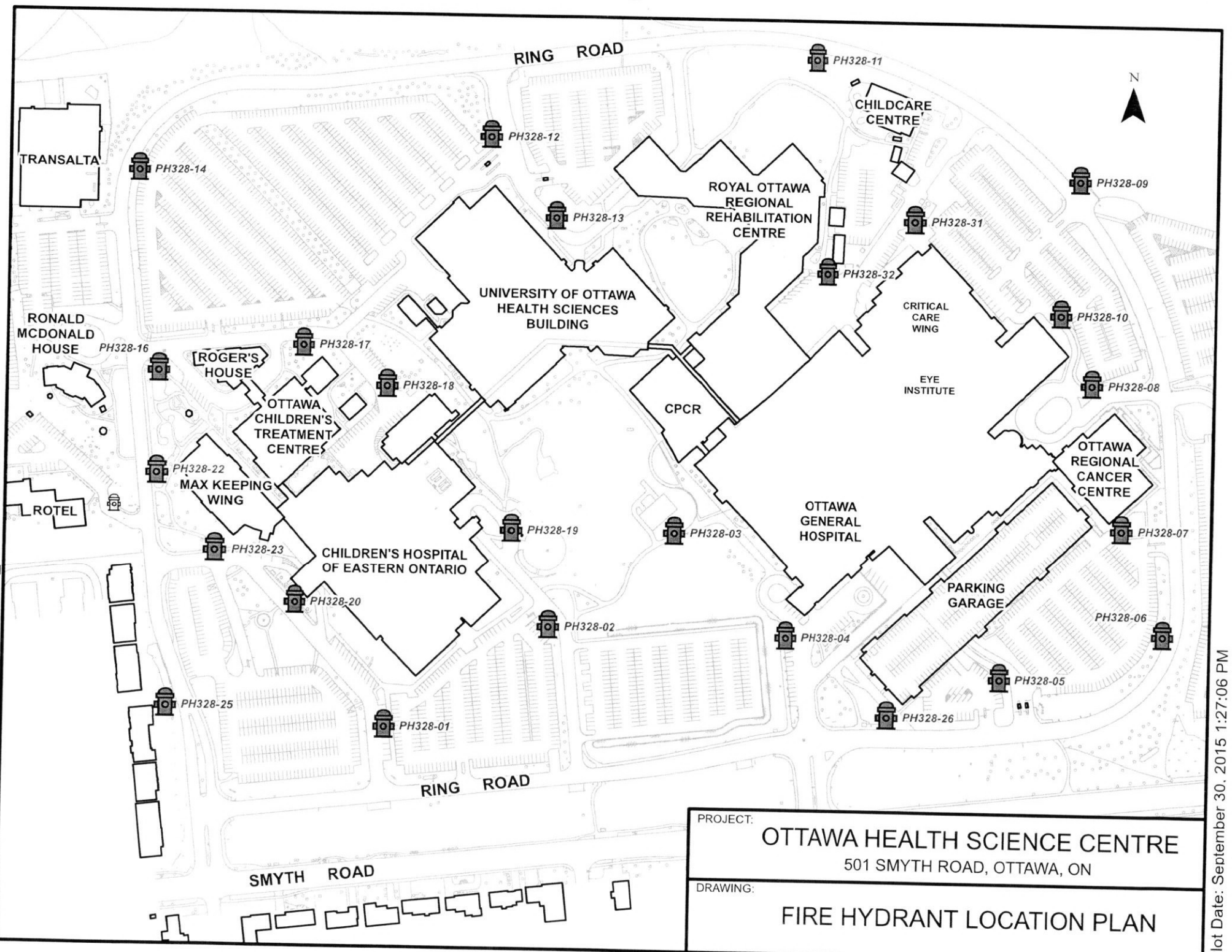
|                       |           |
|-----------------------|-----------|
| Total Exposure Charge | 6%        |
| Fire Flow Adjustment  | 765 L/min |

|                          |      |          |
|--------------------------|------|----------|
| Total Required Fire Flow | 7000 | L/min    |
| Total Required Fire Flow | 1849 | U.S. GPM |
| Total Required Fire Flow | 117  | L/s      |



N185 Residual Pressure vs. Hydrant Flow - Hydrant PH328-20

File Location: W:\GIS\_Projects\OHSC\_GIS\OHSC\_HYDRANTS.mxd



|          |   |
|----------|---|
| PROJECT: | <b>OTTAWA HEALTH SCIENCE CENTRE</b><br>501 SMYTH ROAD, OTTAWA, ON |
| DRAWING: | <b>FIRE HYDRANT LOCATION PLAN</b>                                 |

Plot Date: September 30, 2015 1:27:06 PM





# Compliance Report

**Fire Hydrant #:** PH328- 20

**Date:** April/May 2021  
**Work Order #:** 101791  
**Client:** The Ottawa Hospital  
**Contact:** David Eastman  
**Contact Phone:** 613-295-8562  
**Customer PO #:**  
**Site Name:** General Campus  
**Site Address:** 501 Smyth  
**Inspected by:** Andries van Rozen  
**Inspection #:**

**Hydrant Make and Model:** ((See Master List))  
**Year Manufactured:** ((See Master List))  
**Hydrant Location:** ((See Map))  
**Surface Condition:** ((See Master List))  
**Seat Valve Size:** ((See Master List))  
**Flange Elevation:** ((See Master List))  
**Hydrant Colour - Body:** Red  
**- Bonnet:** Blue  
**Valve Location:** ((See Master List))  
**Surface Condition:** ((See Master List))

**Flow Test Results:**

Pitot Reading (PSI): 42  
Pitot Reading (GPM): 1090  
Static Pressure (PSI): 60  
Residual Pressure (PSI): 50  
  
Flow @ 20 PSI (GPM): 2304

**Visual inspection:**

|                     | Yes / No   |
|---------------------|--|
| Hydrant Accessible  | <input checked="" type="checkbox"/> <input type="checkbox"/> |
| Caps Present        | <input checked="" type="checkbox"/> <input type="checkbox"/> |
| Caps Easily Removed | <input checked="" type="checkbox"/> <input type="checkbox"/> |
| Barrel Draining     | <input checked="" type="checkbox"/> <input type="checkbox"/> |
| Water Level         | Drained  |
| Painting Required   | <input type="checkbox"/> <input checked="" type="checkbox"/> |

**Hydrant is in Compliance with Ontario Fire Code**

**YES**  **NO**



FH ID #: PH 328-20

Date: 23 / 04 / 21 dd/mm/yy

W.O. #: 101791

## Fire Hydrant Inspection Report

|              |                         |                |            |
|--------------|-------------------------|----------------|------------|
| Customer     | Toll                    | Contact        |            |
| Site Name    | General Campus          | Phone #        |            |
| Site Address | 501 Smyth               | P.O. #         |            |
| Inspected By | AVR                     | Make / Model   |            |
| Inspection # | 1 2 3 4 <b>5</b> 6 7 SP | Year of Man.   |            |
| Barrel Ext.  |                         | Hose Nozzles   |            |
| Flange Elev. |                         | Hydrant Colour | Body: Top: |

| Isolation Valve  |                   | Yes | No | Nozzles and Threads       |          | Yes | No |
|------------------|-------------------|-----|----|---------------------------|----------|-----|----|
| <i>✓ P.O. #</i>  | Visible           | ✓   |    |                           | Loose    |     | ✓  |
|                  | Operates properly |     |    |                           | Damaged  | ✓   |    |
|                  | Cap in place      | ✓   |    |                           | Leaking  |     | ✓  |
|                  | Valve open        |     |    |                           | Repaired |     | ✓  |
| Barrel           |                   | Yes | No | Proper nozzle orientation |          | ✓   |    |
|                  | Self draining     | ✓   |    | Pumper nozzle             |          | ✓   |    |
| Water level      | Dry               |     |    | Hydrant                   |          | Yes | No |
|                  | Plugged           |     | ✓  | Colour coded              |          | ✓   |    |
| Ground Flange    |                   | Yes | No | Painting required         |          |     | ✓  |
|                  | Solid             | ✓   |    | Lubricate upper stem      |          | ✓   |    |
|                  | Buried            |     | ✓  | Operation satisfactory    |          | ✓   |    |
|                  | Damaged           |     | ✓  | Restoration required      |          | ✓   |    |
| Caps and Gaskets |                   | Yes | No | Hydrant marker in place   |          | ✓   |    |
|                  | Missing           |     | ✓  |                           |          |     |    |
|                  | Replaced          |     | ✓  |                           |          |     |    |
|                  | Lubricated        | ✓   |    |                           |          |     |    |

| Hydro Static Testing                |  | Yes | No | Flow Testing                                 |      |
|-------------------------------------|--|-----|----|--|------|
| Prior to opening - underground leak |  |     | ✓  | Pitot reading (PSI)                          | 42   |
| Fully open - above ground leak      |  | ✓   |    | Pitot reading (GPM)                          | 1090 |
| Fully open - underground leak       |  |     | ✓  | Static Pressure (PSI)                        | 60   |
| Fully closed - underground leak     |  |     | ✓  | Volume of water used (GPM x total flow min.) |      |
|                                     |  |     |    | Residual pressure (PSI)                      | 50   |
|                                     |  |     |    | Flow @ 20 PSI                                | 2300 |

**Comments:** Damage to hose nozzle thread.  
 Cracked bearing housing.  
 Leaking from operating nut.  
  
 ↳ Conversion

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## **APPENDIX C**

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### **Stormwater Management Details**

**TABLE 1  
DESIGN STORM PARAMETERS**

**FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT  
CHEO 1DOOR4CARE - PARKING GARAGE  
OTTAWA, ONTARIO**

| Design Storm | IDF Storm Parameters |       |       | Time of Peak<br>r | Storm Duration<br>D<br>(h) | Max. Rainfall Intensity<br>(mm/hr) | Max. Rainfall Depth<br>(mm) |
|--------------|----------------------|-------|-------|-------------------|----------------------------|------------------------------------|-----------------------------|
|              | a                    | b     | c     |                   |                            |                                    |                             |
| 2-year       | 732.951              | 6.199 | 0.810 | 0.3               | 3                          | 76.8                               | 31.9                        |
| 5-year       | 998.071              | 6.053 | 0.814 | 0.3               | 3                          | 104.2                              | 42.5                        |
| 10-year      | 1174.184             | 6.014 | 0.816 | 0.3               | 3                          | 122.1                              | 49.5                        |
| 25-year      | 1402.884             | 6.018 | 0.819 | 0.3               | 3                          | 144.7                              | 58.3                        |
| 50-year      | 1569.580             | 6.014 | 0.820 | 0.3               | 3                          | 161.5                              | 64.8                        |
| 100-year     | 1735.688             | 6.014 | 0.820 | 0.3               | 3                          | 178.6                              | 71.7                        |

Notes:

(1) IDF curve parameters taken from City of Ottawa Sewer Design Guidelines (October 2012)

**TABLE 2**  
**PROPOSED CATCHMENT PARAMETERS**  
**FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT**  
**CHEO 1DOOR4CARE**  
**OTTAWA, ONTARIO**

| Subcatchment                     | Comment  | Area<br>(ha) | Percent<br>Impervious <sup>2</sup><br>(%) | Width<br>(m) | Flow Length<br>(m) | Slope<br>(%) | Mannings Roughness |          | Horton Infiltration <sup>1</sup>        |   |                             | Depression Storage |                  | Subarea Routing | Percent Routed<br>(%) |                                   |
|----------------------------------|--|--------------|---|--------------|--------------------|--------------|--------------------|----------|---|---|-----------------------------|--------------------|------------------|-----------------|-----------------------|-----------------------------------|
|                                  |  |              |   |              |                    |              | Impervious         | Pervious | Max.<br>Infiltration<br>Rate<br>(mm/hr) | Min.<br>Infiltration<br>Rate<br>(mm/hr) | Decay<br>Constant<br>(1/hr) | Impervious<br>(mm) | Pervious<br>(mm) |                 |                       | Percent Zero<br>Impervious<br>(%) |
| <b>Proposed Conditions</b>       |  |              |   |              |                    |              |                    |          |   |   |                             |                    |                  |                 |                       |                                   |
| <u>Internal Catchments</u>       |  |              |   |              |                    |              |                    |          |   |   |                             |                    |                  |                 |                       |                                   |
| 222                              | Landscaped area south of existing CHEO main entrance   | 0.10         | 30  | 69           | 15                 | 0.5          | 0.013              | 0.250    | 76.20                                   | 13.20                                   | 4.14                        | 1.57               | 4.67             | 0               | OUTLET                | 100                               |
| 223                              | Portion of existing external asphalt parking lot that directs runoff onto entrance driveway to CHEO entrance | 0.11         | 87  | 20           | 57                 | 0.5          | 0.013              | 0.250    | 76.20                                   | 13.20                                   | 4.14                        | 1.57               | 4.67             | 0               | OUTLET                | 100                               |
| 224                              | Proposed 1Door4Care building   | 0.48         | 90  | 320          | 15                 | 2.0          | 0.013              | 0.250    | 76.20                                   | 13.20                                   | 4.14                        | 1.57               | 4.67             | 0               | OUTLET                | 100                               |
| 225a                             | Northern portion of the driveway between proposed 1Door4Care building and existing CHEO entrance             | 0.20         | 82  | 26           | 75                 | 0.5          | 0.013              | 0.250    | 76.20                                   | 13.20                                   | 4.14                        | 1.57               | 4.67             | 0               | OUTLET                | 100                               |
| 225b                             | Southern Portion of the driveway between proposed 1Door4Care building and existing CHEO entrance             | 0.30         | 82  | 39           | 75                 | 1.0          | 0.013              | 0.250    | 76.20                                   | 13.20                                   | 4.14                        | 1.57               | 4.67             | 0               | OUTLET                | 100                               |
| 226                              | South intersection between Site driveway and Ring Road   | 0.10         | 79  | 15           | 65                 | 2.0          | 0.013              | 0.250    | 76.20                                   | 13.20                                   | 4.14                        | 1.57               | 4.67             | 0               | OUTLET                | 100                               |
| 227                              | Proposed parking lot in front of the 1Door4Care building   | 0.39         | 75  | 46           | 85                 | 1.5          | 0.013              | 0.250    | 76.20                                   | 13.20                                   | 4.14                        | 1.57               | 4.67             | 0               | OUTLET                | 100                               |
| 228                              | Proposed landscaped area on northern limits of the Site  | 0.23         | 64  | 27           | 83                 | 1.0          | 0.013              | 0.250    | 76.20                                   | 13.20                                   | 4.14                        | 1.57               | 4.67             | 0               | OUTLET                | 100                               |
| 229                              | Existing landscaped area in front of CHEO Max Keeping Wing   | 0.15         | 38  | 15           | 100                | 2.0          | 0.013              | 0.250    | 76.20                                   | 13.20                                   | 4.14                        | 1.57               | 4.67             | 0               | OUTLET                | 100                               |
| <u>External Catchments</u>       |  |              |   |              |                    |              |                    |          |   |   |                             |                    |                  |                 |                       |                                   |
| EXT-1                            | Section of ring road on the southern limits of the Site  | 0.28         | 90  | 275          | 10                 | 0.5          | 0.013              | 0.250    | 76.20                                   | 13.20                                   | 4.14                        | 1.57               | 4.67             | 0               | OUTLET                | 100                               |
| EXT-2                            | Section of ring road on the western limits of the Site   | 0.28         | 90  | 280          | 10                 | 0.5          | 0.013              | 0.250    | 76.20                                   | 13.20                                   | 4.14                        | 1.57               | 4.67             | 0               | OUTLET                | 100                               |
| EXT-3                            | Existing asphalt parking lot - directs runoff to Site  | 0.96         | 86  | 65           | 148                | 0.5          | 0.013              | 0.250    | 76.20                                   | 13.20                                   | 4.14                        | 1.57               | 4.67             | 0               | OUTLET                | 100                               |
| <b>Total (site)</b>              |  | <b>2.06</b>  | <b>75</b>                                 |              |                    |              |                    |          |   |   |                             |                    |                  |                 |                       |                                   |
| <b>Total (included external)</b> |  | <b>3.58</b>  | <b>80</b>                                 |              |                    |              |                    |          |   |   |                             |                    |                  |                 |                       |                                   |

Notes:

(1) Horton Infiltration Method Parameters taken from *Ottawa Design Guidelines - Sewer*, October 2012

**TABLE 3  
PEAK RUNOFF VOLUMES**

**FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT  
CHEO 1DOOR4CARE  
OTTAWA, ONTARIO**

| Subcatchment               | Design Storms               |                             |                              |                              |                              |                               |
|----------------------------|-----------------------------|-----------------------------|------------------------------|------------------------------|------------------------------|-------------------------------|
|                            | 2-year<br>(m <sup>3</sup> ) | 5-year<br>(m <sup>3</sup> ) | 10-year<br>(m <sup>3</sup> ) | 25-year<br>(m <sup>3</sup> ) | 50-year<br>(m <sup>3</sup> ) | 100-year<br>(m <sup>3</sup> ) |
| <b>Proposed Conditions</b> |                             |                             |                              |                              |                              |                               |
| 222                        | 10                          | 14                          | 18                           | 24                           | 29                           | 35                            |
| 223                        | 30                          | 41                          | 49                           | 58                           | 65                           | 73                            |
| 224                        | 114                         | 160                         | 192                          | 232                          | 262                          | 294                           |
| 225a                       | 50                          | 69                          | 82                           | 98                           | 111                          | 124                           |
| 225b                       | 82                          | 115                         | 139                          | 170                          | 194                          | 219                           |
| 226                        | 50                          | 71                          | 85                           | 103                          | 117                          | 131                           |
| 227                        | 90                          | 126                         | 152                          | 184                          | 209                          | 235                           |
| 228                        | 85                          | 125                         | 153                          | 188                          | 215                          | 243                           |
| 229                        | 18                          | 25                          | 31                           | 40                           | 48                           | 56                            |
| EXT-1                      | 71                          | 97                          | 114                          | 136                          | 153                          | 171                           |
| EXT-2                      | 72                          | 98                          | 116                          | 139                          | 156                          | 175                           |
| EXT-3                      | 248                         | 338                         | 399                          | 477                          | 537                          | 600                           |

**TABLE 4  
PEAK RUNOFF FLOW RATES**

**FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT  
CHEO 1DOOR4CARE  
OTTAWA, ONTARIO**

| Subcatchment               | Design Storms              |                            |                             |                             |                             |                              |
|----------------------------|----------------------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|------------------------------|
|                            | Chicago<br>2-Year<br>(L/s) | Chicago<br>5-Year<br>(L/s) | Chicago<br>10-Year<br>(L/s) | Chicago<br>25-Year<br>(L/s) | Chicago<br>50-Year<br>(L/s) | Chicago<br>100-Year<br>(L/s) |
| <b>Proposed Conditions</b> |                            |                            |                             |                             |                             |                              |
| 222                        | 6.48                       | 9.25                       | 11.25                       | 13.91                       | 15.99                       | 18.19                        |
| 223                        | 10.50                      | 16.36                      | 20.49                       | 25.93                       | 30.13                       | 34.53                        |
| 224                        | 80.08                      | 123.84                     | 152.22                      | 183.86                      | 206.64                      | 229.83                       |
| 225a                       | 32.52                      | 46.28                      | 55.73                       | 67.85                       | 76.98                       | 86.36                        |
| 225b                       | 54.33                      | 77.73                      | 93.83                       | 114.45                      | 129.98                      | 145.92                       |
| 226                        | 20.86                      | 31.40                      | 38.79                       | 48.40                       | 55.74                       | 63.41                        |
| 227                        | 61.11                      | 86.85                      | 104.87                      | 128.17                      | 145.84                      | 164.06                       |
| 228                        | 48.34                      | 72.85                      | 90.19                       | 112.96                      | 130.65                      | 149.26                       |
| 229                        | 11.04                      | 15.87                      | 19.22                       | 23.59                       | 26.93                       | 30.41                        |
| EXT-1                      | 13.98                      | 21.47                      | 26.72                       | 34.40                       | 40.74                       | 47.55                        |
| EXT-2                      | 14.24                      | 21.86                      | 27.21                       | 35.03                       | 41.48                       | 48.41                        |
| EXT-3                      | 48.92                      | 75.10                      | 93.47                       | 120.34                      | 142.51                      | 166.33                       |

**TABLE 5  
GALLERY PERFORMANCE SUMMARY**

**FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT  
CHEO 1DOOR4CARE  
OTTAWA, ONTARIO**

| PCSWMM Model Element     | Design Storm | Peak Inflow<br>(L/s) | Peak Outflow to Storm Sewer Network<br>(L/s) | Max. Storage Volume<br>(m <sup>3</sup> ) | Max. Ponding Elevation<br>(m) |
|--------------------------|--------------|----------------------|--|--|-------------------------------|
| <b>Detention Gallery</b> |              |                      |  |  |                               |
|                          | 2-year       | 126.22               | 40.69  | 79                                       | 78.60                         |
|                          | 5-year       | 182.81               | 49.70  | 109                                      | 78.97                         |
|                          | 10-year      | 216.68               | 49.77  | 109                                      | 78.97                         |
|                          | 25-year      | 287.00               | 49.73  | 109                                      | 78.97                         |
|                          | 50-year      | 345.20               | 49.69  | 109                                      | 78.97                         |
|                          | 100-year     | 374.29               | 49.76  | 109                                      | 78.97                         |
| <b>Surface Ponding</b>   |              |                      |  |  |                               |
|                          | 2-year       | 72.58                | 72.86  | 0  | 79.60                         |
|                          | 5-year       | 105.07               | 105.07                                       | 0  | 79.60                         |
|                          | 10-year      | 135.41               | 123.93                                       | 39                                       | 79.70                         |
|                          | 25-year      | 235.13               | 147.06                                       | 50                                       | 79.73                         |
|                          | 50-year      | 292.20               | 162.55                                       | 62                                       | 79.76                         |
|                          | 100-year     | 322.46               | 175.55                                       | 70                                       | 79.78                         |
| <b>Roof Storage</b>      |              |                      |  |  |                               |
|                          | 2-year       | 80.08                | 15.50  | 72                                       | 0.04                          |
|                          | 5-year       | 115.40               | 20.67  | 101                                      | 0.05                          |
|                          | 10-year      | 136.58               | 25.84  | 120                                      | 0.06                          |
|                          | 25-year      | 162.94               | 31.01  | 144                                      | 0.07                          |
|                          | 50-year      | 182.50               | 36.18  | 162                                      | 0.08                          |
|                          | 100-year     | 202.42               | 38.76  | 181                                      | 0.09                          |



**TABLE 6  
OUTLET COMPARISONS**

**FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT  
CHEO 1DOOR4CARE  
OTTAWA, ONTARIO**

| Design Storm Event | <b>To Storm Sewer</b> |                                   |                   |
|--------------------|-----------------------|-----------------------------------|-------------------|
|                    | Existing<br>(L/s)     | Allowable <sup>(1)</sup><br>(L/s) | Proposed<br>(L/s) |
| 2-year             | 99.32                 | 99.32                             | 61.48             |
| 5-year             | 134.74                | 99.32                             | 77.23             |
| 10-year            | 157.95                | 99.32                             | 81.85             |
| 25-year            | 187.11                | 99.32                             | 87.83             |
| 50-year            | 208.81                | 99.32                             | 92.33             |
| 100-year           | 230.91                | 99.32                             | 96.99             |

| Design Storm Event | <b>To Ring Road</b> |                                   |                   |
|--------------------|---------------------|-----------------------------------|-------------------|
|                    | Existing<br>(L/s)   | Allowable <sup>(1)</sup><br>(L/s) | Proposed<br>(L/s) |
| 2-year             | 160.45              | 160.45                            | 48.34             |
| 5-year             | 217.67              | 160.45                            | 72.85             |
| 10-year            | 255.17              | 160.45                            | 90.19             |
| 25-year            | 302.28              | 160.45                            | 112.96            |
| 50-year            | 337.33              | 160.45                            | 131.63            |
| 100-year           | 373.03              | 160.45                            | 156.35            |

(1) The allowable release rate has been set equal to the outflow from a pre-development, 2-year storm event with a runoff coefficient of 0.5 as per the Stormwater Master Plan created by Morrison Hershfield.

STORMWATER MANAGEMENT CALCULATIONS  
FLOW CONTROL ROOF DRAIN DESIGN

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT  
CHEO 1DOOR4CARE  
OTTAWA, ONTARIO

| <b>Roof Drain Characteristics</b>                |      |                   |
|--|------|-------------------|
| Drainage function (Zurn Z-105 Control-Flo Drain) | 0.38 | L/s/25 mm of head |
| Max ponding depth                                | 150  | mm                |

| <b>Building Roof Requirement</b>               |           |                |
|--|-----------|----------------|
| Roof area serviced by flow control roof drains | 2060.94   | m <sup>2</sup> |
| <b>Number of Roof Drains</b>                   | <b>17</b> |                |

| <b>Stage-Storage-Discharge Curve</b> |                 |                           |
|--------------------------------------|-----------------|---------------------------|
| head (m)                             | Discharge (L/s) | Storage (m <sup>3</sup> ) |
| 0.000                                | 0.00            | 0.0                       |
| 0.025                                | 6.46            | 36.1                      |
| 0.050                                | 12.92           | 72.1                      |
| 0.075                                | 19.38           | 108.2                     |
| 0.100                                | 25.84           | 144.3                     |
| 0.125                                | 32.30           | 180.3                     |
| 0.150                                | 38.76           | 216.4                     |

\*Note: Roof Storage = Area x Head x 0.7

# SOPRANATURE SOPRARETENTIO BOARD

TECHNICAL DATA SHEET 230328SCANE

(supersedes - )



VEGETATIVE SOLUTION  
COMPLEMENTARY PRODUCT

APPLICATIONS

ROOFS

PLAZA-DECKS

## DESCRIPTION

SOPRARETENTIO BOARD is a drainage board with water retention properties made from 100% recycled polyester. SOPRARETENTIO BOARD is used in flat or slope green roofing systems to retain a certain amount of water and channel excess to the water outlets. It can also be used on any roofs or plaza-decks that needs water management or be used as a protection board over the waterproofing membranes.

## INSTALLATION

Install all the SOPRARETENTIO BOARD side by side directly on the surface making sure to leave no gaps between the boards.

FOR COMPLETE INFORMATION ON PRODUCT INSTALLATION, PLEASE CONSULT YOUR SOPREMA REPRESENTATIVE.

## PACKAGING

| Specifications    | SOPRARETENTIO BOARD                        |
|-------------------|--|
| Dimensions        | 1 m x 1.2 m (3.3 x 4 ft)                   |
| Coverage per roll | 1.2 m <sup>2</sup> (13.2 ft <sup>2</sup> ) |
| Thickness         | 30 mm (1.18 in)                            |

## PROPERTIES

| Properties                                     | Standards                                | SOPRARETENTIO BOARD                             |
|--|--|---|
| Material                                       | -  | 100% Recycled Polyester                         |
| Colour   | -  | Dark Grey                                       |
| Compressive Strength<br><i>10% deformation</i> | ASTM D 1621                              | 2.9 kPa (0.42 psi)                              |
| Dry Weight                                     | ASTM E 2397                              | 3.0 kg/m <sup>2</sup> (0.6 lb/ft <sup>2</sup> ) |
| Fully Saturated Water retention                | ASTM E 2397                              | 21.6 L/m <sup>2</sup>                           |
| Puncture Resistance                            | ASTM D 4833                              | 220 N (49.5 lbf)                                |
| Flow Rate<br><i>at 20 kPa</i>                  | ASTM D 4716<br>Hydraulic gradient of 1.0 | 0,21 L/s/m (0.017 gal US/min/ft)                |

(All values are nominal)



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SOPREMA.CA • 1.877.MAMMOUTH

TDS-SOPRARETENTIO-BOARD.incd

1/1

# SOPRANATURE TOUNDRA BOX

TECHNICAL DATA SHEET 210721SCANE

(supersedes 210129SCANE)



VEGETATIVE SOLUTION

APPLICATIONS

ROOFS

PLAZA-DECKS

## DESCRIPTION

SOPRANATURE's TOUNDRA BOX is a patented pre-vegetated system. It is composed of a box made of 100% recycled polypropylene and recyclable removable side boards, containing a filter cloth and a growing medium in which a mix of sedum species is cultivated. The mix of sedums can be adapted according to the hardness zone and climatic conditions.

The TOUNDRA BOX system can be installed on SOPRANATURE green roofs, garden terraces, and plaza decks.

## INSTALLATION

The TOUNDRA BOX boxes are installed with their side boards (removable upper part). The side boards must be removed up to the second-to-last installed row only, as the last row supports the substrate. The side boards can be recycled.

The installation of the TOUNDRA BOX system must be immediately followed by saturation watering.

FOR FURTHER DETAILS ON PRODUCT INSTALLATION AS WELL AS RECOMMENDATIONS ON RUSTICITY ZONES AND CLIMATE ZONES, PLEASE CONSULT A SOPREMA REPRESENTATIVE.

## PACKAGING

| Specifications                         | TOUNDRA BOX                         |
|--|-------------------------------------|
| Box material                           | 100%-recycled polypropylene         |
| Filter cloth material                  | Non-woven polypropylene             |
| Box dimensions                         | 300 mm × 600 mm (11.8 in × 23.6 in) |
| Total height                           | Upon delivery                       |
|  | 195 mm (7.7 in)                     |
|  | After removing the side boards      |
|  | 100 mm (3.9 in)                     |
| Coverage of vegetation at installation | ≥ 90%                               |

(All values are nominal)

## PROPERTIES

| Properties               | Standards   | TOUNDRA BOX   |
|--------------------------|-------------|---|
| Density                  | ASTM E2399  | 106.0 to 124.2 kg/m <sup>2</sup> (21.7 to 25.5 lb/ft <sup>2</sup> ) |
| Water retention capacity | ASTM E2397  | 45.6 L/m <sup>2</sup> (1.1 Gallon/ft <sup>2</sup> )                 |
| Wind flow resistance     | CSA A123.24 | 200 [133] Km/h (124 [83] mph)*                                      |

\*Values between brackets include safety factor.  
(All values are nominal)

## STORAGE AND HANDLING

The storage time of a pallet of stacked TOUNDRA BOX boxes should not exceed 48 hours. In the case of long-term storage, contact our SOPRANATURE Department to determine the precautions to consider. Store the TOUNDRA BOX out of direct sunlight in a ventilated place.



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NOTE: All products manufactured by SOPREMA Inc. comply with the description and properties indicated in the technical data sheet that was current at the date of manufacture.

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## **APPENDIX D**

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### **PCSWMM Report Files**

2021-0821-13: 2 Year Proposed Results

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.3)

-----  
 WARNING 04: minimum elevation drop used for Conduit C2  
 WARNING 02: maximum depth increased for Node CBMH54-S  
 WARNING 02: maximum depth increased for Node EX.MH34-S  
 WARNING 02: maximum depth increased for Node EX.MH36-S

\*\*\*\*\*

Element Count

\*\*\*\*\*

Number of rain gages ..... 7  
 Number of subcatchments ... 12  
 Number of nodes ..... 30  
 Number of links ..... 27  
 Number of pollutants ..... 0  
 Number of land uses ..... 0

\*\*\*\*\*

Raingage Summary

\*\*\*\*\*

| Name  | Data Source | Data Type | Recording Interval |
|-------|-------------|-----------|--------------------|
| 100Yr | 100Yr       | INTENSITY | 10 min.            |
| 10Yr  | 10Yr        | INTENSITY | 10 min.            |
| 2_yr  | 2_yr        | INTENSITY | 10 min.            |
| 25Yr  | 25Yr        | INTENSITY | 10 min.            |
| 2Yr   | 2Yr         | INTENSITY | 10 min.            |
| 50Yr  | 50Yr        | INTENSITY | 10 min.            |
| 5Yr   | 5Yr         | INTENSITY | 10 min.            |

\*\*\*\*\*

Subcatchment Summary

\*\*\*\*\*

| Name   | Area | Width  | %Imperv | %Slope | Rain Gage |
|--------|------|--------|---------|--------|-----------|
| Outlet |      |        |         |        |           |
| 222    | 0.10 | 52.00  | 30.00   | 0.5000 | 2_yr      |
| 225b   |      |        |         |        |           |
| 223    | 0.11 | 20.00  | 87.00   | 0.0100 | 2_yr      |
| 226    |      |        |         |        |           |
| 224    | 0.48 | 320.00 | 90.00   | 2.0000 | 2_yr      |
| Roof   |      |        |         |        |           |

2021-0821-13: 2 Year Proposed Results

|               |      |       |       |        |      |
|---------------|------|-------|-------|--------|------|
| 225a          | 0.20 | 26.40 | 82.00 | 0.5000 | 2_yr |
| 228           |      |       |       |        |      |
| 225b          | 0.29 | 39.33 | 82.00 | 1.0000 | 2_yr |
| EX.MH36-S     |      |       |       |        |      |
| 226           | 0.10 | 15.08 | 79.00 | 1.5000 | 2_yr |
| EX.MH34-S     |      |       |       |        |      |
| 227           | 0.39 | 46.35 | 75.00 | 1.0000 | 2_yr |
| CBMH54-S      |      |       |       |        |      |
| 228           | 0.23 | 27.47 | 64.00 | 2.0000 | 2_yr |
| RingRoadMajor |      |       |       |        |      |
| 229           | 0.15 | 15.30 | 38.00 | 0.1000 | 2_yr |
| EX.MH32       |      |       |       |        |      |
| EXT-1         | 0.28 | 10.00 | 90.00 | 0.0000 | 2_yr |
| EX.MH34-S     |      |       |       |        |      |
| EXT-2         | 0.28 | 10.00 | 90.00 | 0.0000 | 2_yr |
| RingRoadMajor |      |       |       |        |      |
| EXT-3         | 0.96 | 54.97 | 86.00 | 0.0000 | 2_yr |
| 223           |      |       |       |        |      |

\*\*\*\*\*  
LID Control Summary  
\*\*\*\*\*

| Imperv<br>Subcatchment<br>Treated | % Perv<br>Treated | LID Control | No. of<br>Units | Unit<br>Area | Unit<br>Width | % Area<br>Covered | % |
|-----------------------------------|-------------------|-------------|-----------------|--------------|---------------|-------------------|---|
| 224<br>0.00                       | 0.00              | GreenRoof   | 1               | 650.00       | 0.00          | 13.54             |   |

\*\*\*\*\*  
Node Summary  
\*\*\*\*\*

| Name           | Type     | Invert<br>Elev. | Max.<br>Depth | Ponded<br>Area | External<br>Inflow |
|----------------|----------|-----------------|---------------|----------------|--------------------|
| CBMH38         | JUNCTION | 77.74           | 1.91          | 0.0            |                    |
| CBMH38_Orifice | JUNCTION | 77.74           | 1.91          | 0.0            |                    |
| CBMH52         | JUNCTION | 76.58           | 2.51          | 0.0            |                    |
| CBMH54         | JUNCTION | 78.18           | 1.67          | 0.0            |                    |
| CBMH54-S       | JUNCTION | 79.84           | 0.40          | 0.0            |                    |
| CBMH92         | JUNCTION | 77.33           | 2.25          | 0.0            |                    |
| CBMH94         | JUNCTION | 76.91           | 2.45          | 0.0            |                    |
| EX.MH31        | JUNCTION | 76.62           | 5.64          | 0.0            |                    |
| EX.MH34        | JUNCTION | 78.40           | 2.89          | 0.0            |                    |

2021-0821-13: 2 Year Proposed Results

| Item           | Type     | Value 1 | Value 2 | Value 3 | Value 4 |
|----------------|----------|---------|---------|---------|---------|
| EX.MH34-S      | JUNCTION | 81.29   | 0.40    | 0.0     |         |
| EX.MH36        | JUNCTION | 77.61   | 4.86    | 0.0     |         |
| EX.MH36-S      | JUNCTION | 82.28   | 0.40    | 0.0     |         |
| EX.MH43        | JUNCTION | 78.74   | 1.84    | 0.0     |         |
| EX.MH43-S      | JUNCTION | 80.58   | 0.30    | 0.0     |         |
| EX.MH44        | JUNCTION | 78.00   | 1.77    | 0.0     |         |
| EX.MH44-S      | JUNCTION | 79.77   | 0.30    | 0.0     |         |
| EX.MH45        | JUNCTION | 77.63   | 1.72    | 0.0     |         |
| EX.MH45-S      | JUNCTION | 79.35   | 0.30    | 0.0     |         |
| EX.MH46        | JUNCTION | 76.65   | 2.32    | 0.0     |         |
| J2             | JUNCTION | 78.40   | 5.80    | 0.0     |         |
| STM-MH1        | JUNCTION | 79.21   | 2.64    | 0.0     |         |
| STM-MH14       | JUNCTION | 79.01   | 2.35    | 0.0     |         |
| STM-MH14-S     | JUNCTION | 81.36   | 0.30    | 0.0     |         |
| STM-MH1-S      | JUNCTION | 81.85   | 0.30    | 0.0     | Yes     |
| EX.MH32        | OUTFALL  | 75.74   | 0.53    | 0.0     |         |
| Minor2         | OUTFALL  | 75.80   | 0.30    | 0.0     |         |
| RingRoadMajor  | OUTFALL  | 78.97   | 0.30    | 0.0     |         |
| Detention      | STORAGE  | 77.90   | 1.07    | 0.0     |         |
| Roof           | STORAGE  | 78.65   | 0.15    | 0.0     |         |
| SurfacePonding | STORAGE  | 79.60   | 0.28    | 0.0     |         |

\*\*\*\*\*

Link Summary

\*\*\*\*\*

| Name             | From Node | To Node       | Type    | Length |
|------------------|-----------|---------------|---------|--------|
| %Slope Roughness |           |               |         |        |
| -----            |           |               |         |        |
| C1               | STM-MH1   | STM-MH14      | CONDUIT | 61.7   |
| 0.3242 0.0130    |           |               |         |        |
| C10              | EX.MH43   | EX.MH44       | CONDUIT | 71.4   |
| 0.9944 0.0130    |           |               |         |        |
| C10-S            | EX.MH43-S | EX.MH44-S     | CONDUIT | 71.4   |
| 1.1345 0.0160    |           |               |         |        |
| C11              | EX.MH45   | EX.MH46       | CONDUIT | 37.1   |
| 1.8332 0.0130    |           |               |         |        |
| C11-S            | EX.MH45-S | RingRoadMajor | CONDUIT | 37.1   |
| 1.0243 0.0160    |           |               |         |        |
| C12              | EX.MH44   | EX.MH45       | CONDUIT | 35.1   |
| 1.0542 0.0130    |           |               |         |        |
| C12-S            | EX.MH44-S | EX.MH45-S     | CONDUIT | 35.1   |
| 1.1967 0.0160    |           |               |         |        |
| C13              | EX.MH46   | CBMH52        | CONDUIT | 10.5   |
| 0.6857 0.0130    |           |               |         |        |
| C14              | EX.MH34   | EX.MH36       | CONDUIT | 60.8   |
| 1.2995 0.0130    |           |               |         |        |



2021-0821-13: 2 Year Proposed Results

|           |                |                |         |      |
|-----------|----------------|----------------|---------|------|
| C14-S     | EX.MH34-S      | EX.MH43-S      | CONDUIT | 60.8 |
| 1.1678    | 0.0160         |                |         |      |
| C15       | EX.MH31        | EX.MH32        | CONDUIT | 86.4 |
| 1.0139    | 0.0130         |                |         |      |
| C1-S      | STM-MH1-S      | STM-MH14-S     | CONDUIT | 61.7 |
| 0.7943    | 0.0160         |                |         |      |
| C2        | J2             | EX.MH31        | CONDUIT | 16.0 |
| 0.0019    | 0.0130         |                |         |      |
| C3        | STM-MH14       | EX.MH34        | CONDUIT | 60.8 |
| 1.0042    | 0.0130         |                |         |      |
| C3-S      | STM-MH14-S     | EX.MH34-S      | CONDUIT | 60.8 |
| 0.1152    | 0.0160         |                |         |      |
| C4        | EX.MH36        | J2             | CONDUIT | 80.0 |
| -0.9913   | 0.0130         |                |         |      |
| C4-S      | EX.MH36-S      | EX.MH34-S      | CONDUIT | 80.0 |
| 1.2376    | 0.0160         |                |         |      |
| C5        | CBMH54         | Detention      | CONDUIT | 25.2 |
| 0.4960    | 0.0130         |                |         |      |
| C5-S      | CBMH54-S       | SurfacePonding | CONDUIT | 35.0 |
| 0.6857    | 0.0160         |                |         |      |
| C6        | CBMH38_Orifice | CBMH92         | CONDUIT | 39.8 |
| 0.9423    | 0.0130         |                |         |      |
| C7        | CBMH92         | CBMH94         | CONDUIT | 39.7 |
| 0.9950    | 0.0130         |                |         |      |
| C8        | CBMH94         | CBMH52         | CONDUIT | 33.0 |
| 1.0061    | 0.0130         |                |         |      |
| C9        | Detention      | CBMH38         | CONDUIT | 26.1 |
| 1.1878    | 0.0130         |                |         |      |
| CBMH52    | CBMH52         | Minor2         | CONDUIT | 39.0 |
| 1.9953    | 0.0130         |                |         |      |
| OR1       | CBMH38         | CBMH38_Orifice | ORIFICE |      |
| OL1       | SurfacePonding | Detention      | OUTLET  |      |
| RoofDrain | Roof           | J2             | OUTLET  |      |

\*\*\*\*\*  
 Cross Section Summary  
 \*\*\*\*\*

| Full<br>Conduit<br>Flow | Shape    | Full<br>Depth | Full<br>Area | Hyd.<br>Rad. | Max.<br>Width | No. of<br>Barrels |
|-------------------------|----------|---------------|--------------|--------------|---------------|-------------------|
| -----<br>C1             | CIRCULAR | 0.45          | 0.16         | 0.11         | 0.45          | 1                 |
| 162.35                  |          |               |              |              |               |                   |
| C10                     | CIRCULAR | 0.30          | 0.07         | 0.07         | 0.30          | 1                 |
| 96.44                   |          |               |              |              |               |                   |

2021-0821-13: 2 Year Proposed Results

|          |             |      |      |      |       |   |
|----------|-------------|------|------|------|-------|---|
| C10-S    | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 4452.27  |             |      |      |      |       |   |
| C11      | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 130.94   |             |      |      |      |       |   |
| C11-S    | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 4230.49  |             |      |      |      |       |   |
| C12      | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 99.29    |             |      |      |      |       |   |
| C12-S    | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 4572.58  |             |      |      |      |       |   |
| C13      | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 80.08    |             |      |      |      |       |   |
| C14      | CIRCULAR    | 0.45 | 0.16 | 0.11 | 0.45  | 1 |
| 325.02   |             |      |      |      |       |   |
| C14-S    | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 4517.17  |             |      |      |      |       |   |
| C15      | CIRCULAR    | 0.53 | 0.22 | 0.13 | 0.53  | 1 |
| 433.08   |             |      |      |      |       |   |
| C1-S     | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 3725.39  |             |      |      |      |       |   |
| C2       | CIRCULAR    | 0.53 | 0.22 | 0.13 | 0.53  | 1 |
| 18.77    |             |      |      |      |       |   |
| C3       | CIRCULAR    | 0.45 | 0.16 | 0.11 | 0.45  | 1 |
| 285.72   |             |      |      |      |       |   |
| C3-S     | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 1418.90  |             |      |      |      |       |   |
| C4       | CIRCULAR    | 0.53 | 0.22 | 0.13 | 0.53  | 1 |
| 428.21   |             |      |      |      |       |   |
| C4-S     | Full_Street | 0.40 | 8.00 | 0.20 | 40.00 | 1 |
| 18752.45 |             |      |      |      |       |   |
| C5       | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 68.11    |             |      |      |      |       |   |
| C5-S     | Full_Street | 0.40 | 8.00 | 0.20 | 40.00 | 1 |
| 13958.72 |             |      |      |      |       |   |
| C6       | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 93.87    |             |      |      |      |       |   |
| C7       | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 96.47    |             |      |      |      |       |   |
| C8       | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 97.00    |             |      |      |      |       |   |
| C9       | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 105.40   |             |      |      |      |       |   |
| CBMH52   | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 136.60   |             |      |      |      |       |   |

\*\*\*\*\*  
 Street Summary  
 \*\*\*\*\*

2021-0821-13: 2 Year Proposed Results

Street Street  
Area:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0005 | 0.0018 | 0.0041 | 0.0072 | 0.0113 |
| 0.0162 | 0.0221 | 0.0288 | 0.0365 | 0.0450 |
| 0.0545 | 0.0648 | 0.0761 | 0.0882 | 0.1013 |
| 0.1152 | 0.1301 | 0.1458 | 0.1625 | 0.1800 |
| 0.1985 | 0.2178 | 0.2381 | 0.2592 | 0.2813 |
| 0.3042 | 0.3281 | 0.3528 | 0.3785 | 0.4050 |
| 0.4325 | 0.4608 | 0.4901 | 0.5200 | 0.5500 |
| 0.5800 | 0.6100 | 0.6400 | 0.6700 | 0.7000 |
| 0.7300 | 0.7600 | 0.7900 | 0.8200 | 0.8500 |
| 0.8800 | 0.9100 | 0.9400 | 0.9700 | 1.0000 |

Hrad:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0151 | 0.0303 | 0.0454 | 0.0606 | 0.0757 |
| 0.0909 | 0.1060 | 0.1212 | 0.1363 | 0.1515 |
| 0.1666 | 0.1818 | 0.1969 | 0.2121 | 0.2272 |
| 0.2424 | 0.2575 | 0.2726 | 0.2878 | 0.3029 |
| 0.3181 | 0.3332 | 0.3484 | 0.3635 | 0.3787 |
| 0.3938 | 0.4090 | 0.4241 | 0.4393 | 0.4544 |
| 0.4696 | 0.4847 | 0.4999 | 0.5249 | 0.5548 |
| 0.5848 | 0.6147 | 0.6445 | 0.6743 | 0.7041 |
| 0.7338 | 0.7636 | 0.7932 | 0.8229 | 0.8525 |
| 0.8821 | 0.9116 | 0.9411 | 0.9706 | 1.0000 |

Width:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0300 | 0.0600 | 0.0900 | 0.1200 | 0.1500 |
| 0.1800 | 0.2100 | 0.2400 | 0.2700 | 0.3000 |
| 0.3300 | 0.3600 | 0.3900 | 0.4200 | 0.4500 |
| 0.4800 | 0.5100 | 0.5400 | 0.5700 | 0.6000 |
| 0.6300 | 0.6600 | 0.6900 | 0.7200 | 0.7500 |
| 0.7800 | 0.8100 | 0.8400 | 0.8700 | 0.9000 |
| 0.9300 | 0.9600 | 0.9900 | 1.0000 | 1.0000 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

Street Full\_Street  
Area:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0004 | 0.0016 | 0.0036 | 0.0064 | 0.0100 |
| 0.0144 | 0.0196 | 0.0256 | 0.0324 | 0.0400 |
| 0.0484 | 0.0576 | 0.0676 | 0.0784 | 0.0900 |
| 0.1024 | 0.1156 | 0.1296 | 0.1444 | 0.1600 |
| 0.1764 | 0.1936 | 0.2116 | 0.2304 | 0.2500 |
| 0.2704 | 0.2916 | 0.3136 | 0.3364 | 0.3600 |
| 0.3844 | 0.4096 | 0.4356 | 0.4624 | 0.4900 |
| 0.5184 | 0.5476 | 0.5776 | 0.6084 | 0.6400 |
| 0.6724 | 0.7056 | 0.7396 | 0.7744 | 0.8100 |
| 0.8464 | 0.8836 | 0.9216 | 0.9604 | 1.0000 |

Hrad:

2021-0821-13: 2 Year Proposed Results

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0200 | 0.0399 | 0.0599 | 0.0798 | 0.0998 |
| 0.1197 | 0.1397 | 0.1596 | 0.1796 | 0.1995 |
| 0.2195 | 0.2394 | 0.2594 | 0.2793 | 0.2993 |
| 0.3192 | 0.3392 | 0.3591 | 0.3791 | 0.3990 |
| 0.4190 | 0.4389 | 0.4589 | 0.4788 | 0.4988 |
| 0.5187 | 0.5387 | 0.5586 | 0.5786 | 0.5985 |
| 0.6185 | 0.6384 | 0.6584 | 0.6783 | 0.6983 |
| 0.7182 | 0.7382 | 0.7582 | 0.7784 | 0.7985 |
| 0.8187 | 0.8388 | 0.8590 | 0.8791 | 0.8993 |
| 0.9194 | 0.9396 | 0.9597 | 0.9799 | 1.0000 |

Width:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0200 | 0.0400 | 0.0600 | 0.0800 | 0.1000 |
| 0.1200 | 0.1400 | 0.1600 | 0.1800 | 0.2000 |
| 0.2200 | 0.2400 | 0.2600 | 0.2800 | 0.3000 |
| 0.3200 | 0.3400 | 0.3600 | 0.3800 | 0.4000 |
| 0.4200 | 0.4400 | 0.4600 | 0.4800 | 0.5000 |
| 0.5200 | 0.5400 | 0.5600 | 0.5800 | 0.6000 |
| 0.6200 | 0.6400 | 0.6600 | 0.6800 | 0.7000 |
| 0.7200 | 0.7400 | 0.7600 | 0.7800 | 0.8000 |
| 0.8200 | 0.8400 | 0.8600 | 0.8800 | 0.9000 |
| 0.9200 | 0.9400 | 0.9600 | 0.9800 | 1.0000 |

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... LPS  
 Process Models:  
   Rainfall/Runoff ..... YES  
   RDII ..... NO  
   Snowmelt ..... NO  
   Groundwater ..... NO  
   Flow Routing ..... YES  
   Ponding Allowed ..... NO  
   Water Quality ..... NO  
 Infiltration Method ..... HORTON  
 Flow Routing Method ..... DYNWAVE  
 Surge Method ..... EXTRAN  
 Starting Date ..... 01/04/2023 00:00:00  
 Ending Date ..... 01/04/2023 15:00:00  
 Antecedent Dry Days ..... 0.0  
 Report Time Step ..... 00:01:00  
 Wet Time Step ..... 00:05:00  
 Dry Time Step ..... 00:05:00  
 Routing Time Step ..... 5.00 sec  
 Variable Time Step ..... YES  
 Maximum Trials ..... 8  
 Number of Threads ..... 4  
 Head Tolerance ..... 0.001524 m

2021-0821-13: 2 Year Proposed Results

```

*****
Runoff Quantity Continuity      Volume      Depth
                                hectare-m   mm
*****
Total Precipitation .....      0.114      31.880
Evaporation Loss .....         0.000      0.000
Infiltration Loss .....        0.024      6.677
Surface Runoff .....           0.044     12.263
Final Storage .....            0.047     13.046
Continuity Error (%) .....     -0.333
    
```

```

*****
Flow Routing Continuity      Volume      Volume
                                hectare-m   10^6 ltr
*****
Dry Weather Inflow .....      0.000      0.000
Wet Weather Inflow .....      0.044      0.439
Groundwater Inflow .....      0.000      0.000
RDII Inflow .....             0.000      0.000
External Inflow .....          0.034      0.339
External Outflow .....         0.075      0.750
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 .....      0.003      0.029
Continuity Error (%) .....     -0.067
    
```

```

*****
Highest Continuity Errors
*****
Node EX.MH44-S (10.75%)
Node EX.MH45-S (8.76%)
Node EX.MH36 (4.35%)
    
```

```

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

```

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

2021-0821-13: 2 Year Proposed Results

\*\*\*\*\*

Most Frequent Nonconverging Nodes

\*\*\*\*\*

Node EX.MH32 (0.05%)  
 Node Minor2 (0.05%)  
 Node RingRoadMajor (0.05%)  
 Node EX.MH36 (0.04%)  
 Node CBMH38 (0.01%)

\*\*\*\*\*

Routing Time Step Summary

\*\*\*\*\*

Minimum Time Step : 1.50 sec  
 Average Time Step : 4.99 sec  
 Maximum Time Step : 5.00 sec  
 % of Time in Steady State : 0.00  
 Average Iterations per Step : 2.01  
 % of Steps Not Converging : 0.05  
 Time Step Frequencies :  
     5.000 - 3.155 sec : 99.87 %  
     3.155 - 1.991 sec : 0.08 %  
     1.991 - 1.256 sec : 0.05 %  
     1.256 - 0.792 sec : 0.00 %  
     0.792 - 0.500 sec : 0.00 %

\*\*\*\*\*

Subcatchment Runoff Summary

\*\*\*\*\*

| -----        |              |          |        |        |       |       |        |
|--------------|--------------|----------|--------|--------|-------|-------|--------|
| Perv         | Total        | Total    | Total  | Total  | Total | Total | Imperv |
| Runoff       | Runoff       | Total    | Peak   | Total  | Evap  | Infil | Runoff |
| Subcatchment | Subcatchment | Precip   | Runoff | Runoff | mm    | mm    | mm     |
| mm           | mm           | 10^6 ltr | mm     | mm     | mm    | mm    | mm     |
|              |              |          | LPS    | Coeff  |       |       |        |
| -----        |              |          |        |        |       |       |        |
| 222          |              | 31.88    |        | 0.00   | 0.00  | 22.32 | 9.13   |
| 0.01         | 9.14         | 0.01     | 6.69   | 0.287  |       |       |        |
| 223          |              | 31.88    |        | 0.00   | 0.00  | 4.14  | 26.40  |
| 0.00         | 26.40        | 0.03     | 10.50  | 0.828  |       |       |        |
| 224          |              | 31.88    |        | 0.00   | 0.00  | 2.76  | 23.67  |

2021-0821-13: 2 Year Proposed Results

|       |       |      |       |       |      |       |       |
|-------|-------|------|-------|-------|------|-------|-------|
| 0.02  | 23.70 | 0.11 | 80.08 | 0.743 |      |       |       |
| 225a  |       |      | 31.88 | 0.00  | 0.00 | 5.74  | 25.08 |
| 0.00  | 25.09 | 0.05 | 32.52 | 0.787 |      |       |       |
| 225b  |       |      | 31.88 | 3.22  | 0.00 | 6.24  | 27.74 |
| 0.09  | 27.82 | 0.08 | 55.29 | 0.793 |      |       |       |
| 226   |       |      | 31.88 | 30.71 | 0.00 | 10.24 | 48.39 |
| 2.95  | 51.34 | 0.05 | 20.86 | 0.820 |      |       |       |
| 227   |       |      | 31.88 | 0.00  | 0.00 | 7.97  | 22.95 |
| 0.00  | 22.96 | 0.09 | 61.11 | 0.720 |      |       |       |
| 228   |       |      | 31.88 | 21.78 | 0.00 | 15.73 | 33.52 |
| 3.67  | 37.18 | 0.08 | 48.34 | 0.693 |      |       |       |
| 229   |       |      | 31.88 | 0.00  | 0.00 | 19.77 | 11.61 |
| 0.00  | 11.61 | 0.02 | 11.04 | 0.364 |      |       |       |
| EXT-1 |       |      | 31.88 | 0.00  | 0.00 | 3.19  | 0.00  |
| 0.00  | 0.00  | 0.00 | 0.00  | 0.000 |      |       |       |
| EXT-2 |       |      | 31.88 | 0.00  | 0.00 | 3.19  | 0.00  |
| 0.00  | 0.00  | 0.00 | 0.00  | 0.000 |      |       |       |
| EXT-3 |       |      | 31.88 | 0.00  | 0.00 | 4.46  | 0.00  |
| 0.00  | 0.00  | 0.00 | 0.00  | 0.000 |      |       |       |

\*\*\*\*\*  
 LID Performance Summary  
 \*\*\*\*\*

| Drain        | Initial | Final       | Continuity | Total  | Evap | Infil | Surface |
|--------------|---------|-------------|------------|--------|------|-------|---------|
| Outflow      | Storage | Storage     | Error      | Inflow | Loss | Loss  | Outflow |
| Subcatchment | mm      | LID Control | %          | mm     | mm   | mm    | mm      |
| 224          |         | GreenRoof   |            | 31.88  | 0.00 | 0.00  | 0.00    |
| 0.00         | 0.00    | 31.88       | 0.00       |        |      |       |         |

\*\*\*\*\*  
 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    |

2021-0821-13: 2 Year Proposed Results

|                |          |      |      |       |   |       |      |
|----------------|----------|------|------|-------|---|-------|------|
| CBMH38         | JUNCTION | 0.07 | 0.79 | 78.53 | 0 | 01:17 | 0.79 |
| CBMH38_Orifice | JUNCTION | 0.02 | 0.15 | 77.89 | 0 | 01:17 | 0.15 |
| CBMH52         | JUNCTION | 0.02 | 0.12 | 76.69 | 0 | 01:19 | 0.12 |
| CBMH54         | JUNCTION | 0.03 | 0.44 | 78.61 | 0 | 01:16 | 0.44 |
| CBMH54-S       | JUNCTION | 0.01 | 0.07 | 79.91 | 0 | 01:00 | 0.07 |
| CBMH92         | JUNCTION | 0.02 | 0.15 | 77.48 | 0 | 01:18 | 0.15 |
| CBMH94         | JUNCTION | 0.02 | 0.15 | 77.06 | 0 | 01:18 | 0.15 |
| EX.MH31        | JUNCTION | 0.05 | 0.07 | 76.68 | 0 | 01:32 | 0.07 |
| EX.MH34        | JUNCTION | 0.09 | 0.12 | 78.52 | 0 | 01:32 | 0.12 |
| EX.MH34-S      | JUNCTION | 0.01 | 0.05 | 81.34 | 0 | 01:04 | 0.05 |
| EX.MH36        | JUNCTION | 0.86 | 0.91 | 78.52 | 0 | 01:32 | 0.91 |
| EX.MH36-S      | JUNCTION | 0.00 | 0.04 | 82.32 | 0 | 01:00 | 0.04 |
| EX.MH43        | JUNCTION | 0.00 | 0.00 | 78.74 | 0 | 00:00 | 0.00 |
| EX.MH43-S      | JUNCTION | 0.00 | 0.00 | 80.58 | 0 | 09:36 | 0.00 |
| EX.MH44        | JUNCTION | 0.00 | 0.00 | 78.00 | 0 | 00:00 | 0.00 |
| EX.MH44-S      | JUNCTION | 0.00 | 0.00 | 79.77 | 0 | 09:58 | 0.00 |
| EX.MH45        | JUNCTION | 0.00 | 0.00 | 77.63 | 0 | 00:00 | 0.00 |
| EX.MH45-S      | JUNCTION | 0.00 | 0.00 | 79.35 | 0 | 10:23 | 0.00 |
| EX.MH46        | JUNCTION | 0.01 | 0.04 | 76.69 | 0 | 01:19 | 0.04 |
| J2             | JUNCTION | 0.09 | 0.12 | 78.52 | 0 | 01:32 | 0.12 |
| STM-MH1        | JUNCTION | 0.00 | 0.00 | 79.21 | 0 | 00:00 | 0.00 |
| STM-MH14       | JUNCTION | 0.05 | 0.05 | 79.06 | 0 | 00:30 | 0.05 |
| STM-MH14-S     | JUNCTION | 0.00 | 0.00 | 81.36 | 0 | 00:30 | 0.00 |
| STM-MH1-S      | JUNCTION | 0.04 | 0.04 | 81.89 | 0 | 15:00 | 0.04 |
| EX.MH32        | OUTFALL  | 0.05 | 0.07 | 75.81 | 0 | 01:33 | 0.07 |
| Minor2         | OUTFALL  | 0.02 | 0.11 | 75.91 | 0 | 01:19 | 0.11 |
| RingRoadMajor  | OUTFALL  | 0.00 | 0.00 | 78.97 | 0 | 10:23 | 0.00 |
| Detention      | STORAGE  | 0.18 | 0.70 | 78.60 | 0 | 01:17 | 0.70 |
| Roof           | STORAGE  | 0.01 | 0.04 | 78.69 | 0 | 01:30 | 0.04 |
| SurfacePonding | STORAGE  | 0.00 | 0.00 | 79.60 | 0 | 00:55 | 0.00 |

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

-----

| Total  | Flow    |      | Maximum | Maximum |             | Lateral  |
|--------|---------|------|---------|---------|-------------|----------|
| Inflow | Balance |      | Lateral | Total   | Time of Max | Inflow   |
| Volume | Error   |      | Inflow  | Inflow  | Occurrence  | Volume   |
| Node   | Percent | Type | LPS     | LPS     | days hr:min | 10^6 ltr |
| ltr    |         |      |         |         |             | 10^6     |

-----



2021-0821-13: 2 Year Proposed Results

|                 |          |        |       |   |       |  |         |
|-----------------|----------|--------|-------|---|-------|--|---------|
| -----           |          |        |       |   |       |  |         |
| CBMH38          | JUNCTION | 0.00   | 40.69 | 0 | 01:17 |  | 0       |
| 0.212 -0.064    |          |        |       |   |       |  |         |
| CBMH38_Orifice  | JUNCTION | 0.00   | 40.69 | 0 | 01:17 |  | 0       |
| 0.212 -0.040    |          |        |       |   |       |  |         |
| CBMH52          | JUNCTION | 0.00   | 40.71 | 0 | 01:19 |  | 0       |
| 0.214 0.016     |          |        |       |   |       |  |         |
| CBMH54          | JUNCTION | 54.34  | 54.34 | 0 | 01:00 |  | 0.0825  |
| 0.0825 0.829    |          |        |       |   |       |  |         |
| CBMH54-S        | JUNCTION | 73.82  | 73.82 | 0 | 01:00 |  | 0.14    |
| 0.14 0.022      |          |        |       |   |       |  |         |
| CBMH92          | JUNCTION | 0.00   | 40.69 | 0 | 01:18 |  | 0       |
| 0.212 -0.001    |          |        |       |   |       |  |         |
| CBMH94          | JUNCTION | 0.00   | 40.68 | 0 | 01:18 |  | 0       |
| 0.212 -0.008    |          |        |       |   |       |  |         |
| EX.MH31         | JUNCTION | 0.00   | 15.34 | 0 | 01:32 |  | 0       |
| 0.434 0.084     |          |        |       |   |       |  |         |
| EX.MH34         | JUNCTION | 0.00   | 6.38  | 0 | 00:45 |  | 0       |
| 0.338 0.422     |          |        |       |   |       |  |         |
| EX.MH34-S       | JUNCTION | -34.16 | 54.34 | 0 | 01:00 |  | -0.0322 |
| 0.0841 0.908    |          |        |       |   |       |  |         |
| EX.MH36         | JUNCTION | 0.00   | 6.65  | 0 | 00:43 |  | 0       |
| 0.336 4.543     |          |        |       |   |       |  |         |
| EX.MH36-S       | JUNCTION | 55.29  | 55.29 | 0 | 01:00 |  | 0.0821  |
| 0.0821 -0.774   |          |        |       |   |       |  |         |
| EX.MH43         | JUNCTION | 0.00   | 0.00  | 0 | 00:00 |  | 0       |
| 0 0.000 ltr     |          |        |       |   |       |  |         |
| EX.MH43-S       | JUNCTION | -15.66 | 15.66 | 0 | 01:04 |  | -0.0495 |
| 0.0497 0.054    |          |        |       |   |       |  |         |
| EX.MH44         | JUNCTION | 0.00   | 0.00  | 0 | 00:00 |  | 0       |
| 0 0.000 ltr     |          |        |       |   |       |  |         |
| EX.MH44-S       | JUNCTION | 0.00   | 0.02  | 0 | 09:43 |  | 0       |
| 0.000268 12.046 |          |        |       |   |       |  |         |
| EX.MH45         | JUNCTION | 0.00   | 0.00  | 0 | 00:00 |  | 0       |
| 0 0.000 ltr     |          |        |       |   |       |  |         |
| EX.MH45-S       | JUNCTION | 0.00   | 0.02  | 0 | 10:06 |  | 0       |
| 0.000239 9.602  |          |        |       |   |       |  |         |
| EX.MH46         | JUNCTION | 0.08   | 0.86  | 0 | 00:58 |  | 0.0015  |
| 0.0016 0.531    |          |        |       |   |       |  |         |
| J2              | JUNCTION | 0.00   | 15.35 | 0 | 01:31 |  | 0       |
| 0.435 0.381     |          |        |       |   |       |  |         |
| STM-MH1         | JUNCTION | 0.00   | 0.00  | 0 | 00:00 |  | 0       |
| 0 0.000 ltr     |          |        |       |   |       |  |         |
| STM-MH14        | JUNCTION | 6.28   | 6.28  | 0 | 00:30 |  | 0.338   |
| 0.338 0.134     |          |        |       |   |       |  |         |
| STM-MH14-S      | JUNCTION | -6.28  | 6.28  | 0 | 00:30 |  | -0.338  |
| 0.338 0.005     |          |        |       |   |       |  |         |
| STM-MH1-S       | JUNCTION | 6.28   | 6.28  | 0 | 00:00 |  | 0.339   |
| 0.339 0.226     |          |        |       |   |       |  |         |

2021-0821-13: 2 Year Proposed Results

| Node           | Type    | Inflow | Outflow | Storage | Detention | Time | Surcharge |
|----------------|---------|--------|---------|---------|-----------|------|-----------|
| EX.MH32        | OUTFALL | 11.04  | 20.78   | 0       | 01:00     |      | 0.0178    |
| 0.451          |         | 0.000  |         |         |           |      |           |
| Minor2         | OUTFALL | 0.00   | 40.70   | 0       | 01:19     |      | 0         |
| 0.214          |         | 0.000  |         |         |           |      |           |
| RingRoadMajor  | OUTFALL | 48.34  | 48.34   | 0       | 01:00     |      | 0.0833    |
| 0.085          |         | 0.000  |         |         |           |      |           |
| Detention      | STORAGE | 72.58  | 126.22  | 0       | 01:00     |      | 0.14      |
| 0.222          |         | -0.270 |         |         |           |      |           |
| Roof           | STORAGE | 80.08  | 80.08   | 0       | 01:00     |      | 0.114     |
| 0.114          |         | 0.001  |         |         |           |      |           |
| SurfacePonding | STORAGE | -72.58 | 72.58   | 0       | 01:00     |      | -0.14     |
| 0.14           |         | -0.234 |         |         |           |      |           |

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

Surcharging occurs when water rises above the top of the highest conduit.

| Node    | Type     | Hours Surcharged | Max. Height Above Crown Meters | Min. Depth Below Rim Meters |
|---------|----------|------------------|--------------------------------|-----------------------------|
| CBMH38  | JUNCTION | 1.37             | 0.491                          | 1.119                       |
| CBMH54  | JUNCTION | 0.62             | 0.136                          | 1.229                       |
| EX.MH36 | JUNCTION | 14.29            | 0.388                          | 3.947                       |

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

No nodes were flooded.

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

| Max Occurrence | Maximum Outflow Storage Unit | Average Volume      | Avg Full | Evap Loss | Exfil Loss | Maximum Volume      | Max Full | Time of days |
|----------------|------------------------------|---------------------|----------|-----------|------------|---------------------|----------|--------------|
| hr:min         | LPS                          | 1000 m <sup>3</sup> |          |           |            | 1000 m <sup>3</sup> |          |              |

2021-0821-13: 2 Year Proposed Results

|                |       |      |     |     |       |      |   |
|----------------|-------|------|-----|-----|-------|------|---|
| Detention      | 0.015 | 13.7 | 0.0 | 0.0 | 0.079 | 72.4 | 0 |
| 01:17          | 40.69 |      |     |     |       |      |   |
| Roof           | 0.017 | 5.4  | 0.0 | 0.0 | 0.072 | 23.4 | 0 |
| 01:30          | 9.07  |      |     |     |       |      |   |
| SurfacePonding | 0.000 | 0.0  | 0.0 | 0.0 | 0.000 | 0.0  | 0 |
| 00:55          | 72.86 |      |     |     |       |      |   |

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

| Outfall Node  | Flow Freq Pcnt | Avg Flow LPS | Max Flow LPS | Total Volume 10^6 ltr |
|---------------|----------------|--------------|--------------|-----------------------|
| EX.MH32       | 96.56          | 8.66         | 20.78        | 0.451                 |
| Minor2        | 93.78          | 4.26         | 40.70        | 0.214                 |
| RingRoadMajor | 30.49          | 5.18         | 48.34        | 0.085                 |
| System        | 73.61          | 18.09        | 98.73        | 0.750                 |

\*\*\*\*\*  
 Street Flow Summary  
 \*\*\*\*\*

| Peak Flow Capture Street Pcnt | Avg. Flow Capture Conduit Pcnt | Bypass Peak Flow Freq LPS Pcnt | Back Maximum Flow Spread Freq Pcnt | Peak Maximum Capture / Inlet LPS | Peak Bypass Depth Inlet Flow Design LPS | Inlet Location | Inlet |
|-------------------------------|--------------------------------|--------------------------------|------------------------------------|----------------------------------|---|----------------|-------|
| C10-S                         |                                | 0.025                          | 0.263                              | 0.003                            | Inlet                                   | ON-GRADE       | 4     |
| C11-S                         |                                | 0.021                          | 0.263                              | 0.003                            | Inlet                                   | ON-SAG         | 4     |
| C12-S                         |                                | 0.024                          | 0.263                              | 0.003                            | Inlet                                   | ON-GRADE       | 4     |
| C14-S                         |                                | 15.661                         | 1.218                              | 0.024                            | Inlet                                   | ON-GRADE       | 1     |

2021-0821-13: 2 Year Proposed Results

|        |        |        |       |       |       |          |   |
|--------|--------|--------|-------|-------|-------|----------|---|
| 100.00 | 100.00 | 0.00   | 0.00  | 15.66 | 0.00  |          |   |
| C1-S   |        | 6.280  | 0.915 | 0.018 | Inlet | ON-GRADE | 1 |
| 100.00 | 100.00 | 0.00   | 0.00  | 6.28  | 0.00  |          |   |
| C3-S   |        | 0.000  | 1.182 | 0.024 | Inlet | ON-GRADE | 1 |
| C4-S   |        | 54.337 | 2.219 | 0.044 | Inlet | ON-GRADE | 4 |
| 100.00 | 100.00 | 0.00   | 0.00  | 6.79  | 0.00  |          |   |
| C5-S   |        | 72.575 | 1.731 | 0.035 | Inlet | ON-GRADE | 7 |
| 100.00 | 100.00 | 0.00   | 0.00  | 5.18  | 0.00  |          |   |

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Link Flow Summary

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| Link      | Type    | Maximum<br> Flow <br>LPS | 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 | 0.00                     | 0 00:00                                  | 0.00                        | 0.00                 | 0.05                  |
| C10       | CONDUIT | 0.00                     | 0 00:00                                  | 0.00                        | 0.00                 | 0.00                  |
| C10-S     | CONDUIT | 0.02                     | 0 09:43                                  | 0.10                        | 0.00                 | 0.01                  |
| C11       | CONDUIT | 0.00                     | 0 00:00                                  | 0.00                        | 0.00                 | 0.00                  |
| C11-S     | CONDUIT | 0.02                     | 0 10:23                                  | 0.00                        | 0.00                 | 0.01                  |
| C12       | CONDUIT | 0.00                     | 0 00:00                                  | 0.00                        | 0.00                 | 0.00                  |
| C12-S     | CONDUIT | 0.02                     | 0 10:06                                  | 0.10                        | 0.00                 | 0.01                  |
| C13       | CONDUIT | 0.86                     | 0 00:58                                  | 0.20                        | 0.01                 | 0.27                  |
| C14       | CONDUIT | 6.65                     | 0 00:43                                  | 0.79                        | 0.02                 | 0.64                  |
| C14-S     | CONDUIT | 15.66                    | 0 01:04                                  | 1.05                        | 0.00                 | 0.08                  |
| C15       | CONDUIT | 15.34                    | 0 01:33                                  | 0.94                        | 0.04                 | 0.13                  |
| C1-S      | CONDUIT | 6.28                     | 0 00:30                                  | 0.76                        | 0.00                 | 0.06                  |
| C2        | CONDUIT | 15.34                    | 0 01:32                                  | 0.54                        | 0.82                 | 0.19                  |
| C3        | CONDUIT | 6.38                     | 0 00:45                                  | 0.77                        | 0.02                 | 0.19                  |
| C3-S      | CONDUIT | 0.00                     | 0 00:34                                  | 0.00                        | 0.00                 | 0.08                  |
| C4        | CONDUIT | 6.78                     | 0 00:43                                  | 0.06                        | 0.02                 | 0.61                  |
| C4-S      | CONDUIT | 54.34                    | 0 01:00                                  | 0.57                        | 0.00                 | 0.11                  |
| C5        | CONDUIT | 53.45                    | 0 01:00                                  | 0.97                        | 0.78                 | 1.00                  |
| C5-S      | CONDUIT | 72.58                    | 0 01:00                                  | 1.20                        | 0.01                 | 0.09                  |
| C6        | CONDUIT | 40.69                    | 0 01:18                                  | 1.20                        | 0.43                 | 0.48                  |
| C7        | CONDUIT | 40.68                    | 0 01:18                                  | 1.23                        | 0.42                 | 0.48                  |
| C8        | CONDUIT | 40.69                    | 0 01:18                                  | 1.32                        | 0.42                 | 0.45                  |
| C9        | CONDUIT | 40.69                    | 0 01:17                                  | 0.88                        | 0.39                 | 1.00                  |
| CBMH52    | CONDUIT | 40.70                    | 0 01:19                                  | 1.65                        | 0.30                 | 0.38                  |
| OR1       | ORIFICE | 40.69                    | 0 01:17                                  |                             |                      | 1.00                  |
| OL1       | DUMMY   | 0.67                     | 0 00:55                                  |                             |                      |                       |
| RoofDrain | DUMMY   | 9.07                     | 0 01:30                                  |                             |                      |                       |

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2021-0821-13: 2 Year Proposed Results

|        |      |      |      |      |      |      |      |      |      |
|--------|------|------|------|------|------|------|------|------|------|
| C5     | 1.00 | 0.04 | 0.61 | 0.00 | 0.33 | 0.00 | 0.00 | 0.03 | 0.86 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C5-S   | 1.00 | 0.03 | 0.00 | 0.00 | 0.01 | 0.97 | 0.00 | 0.00 | 0.00 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C6     | 1.00 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.94 | 0.00 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C7     | 1.00 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.94 | 0.00 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C8     | 1.00 | 0.06 | 0.00 | 0.00 | 0.44 | 0.50 | 0.00 | 0.00 | 0.35 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C9     | 1.00 | 0.06 | 0.00 | 0.00 | 0.94 | 0.00 | 0.00 | 0.00 | 0.85 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| CBMH52 | 1.00 | 0.06 | 0.00 | 0.00 | 0.00 | 0.94 | 0.00 | 0.00 | 0.00 |
| 0.00   |      |      |      |      |      |      |      |      |      |

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

| Conduit | -----<br>Both Ends | Hours Full<br>Upstream | -----<br>Dnstream | Hours<br>Above Full<br>Normal Flow | Hours<br>Capacity<br>Limited |
|---------|--------------------|------------------------|-------------------|------------------------------------|------------------------------|
| C14     | 0.01               | 0.01                   | 14.37             | 0.01                               | 0.01                         |
| C4      | 0.01               | 0.01                   | 14.29             | 0.01                               | 0.01                         |
| C5      | 0.62               | 0.62                   | 0.86              | 0.01                               | 0.01                         |
| C9      | 0.86               | 0.86                   | 1.37              | 0.01                               | 0.01                         |

Analysis begun on: Fri Apr 12 11:13:45 2024  
 Analysis ended on: Fri Apr 12 11:13:46 2024  
 Total elapsed time: 00:00:01

2021-0821-13: 5 Year Proposed Results

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.3)

-----  
 WARNING 04: minimum elevation drop used for Conduit C2  
 WARNING 02: maximum depth increased for Node CBMH54-S  
 WARNING 02: maximum depth increased for Node EX.MH34-S  
 WARNING 02: maximum depth increased for Node EX.MH36-S

\*\*\*\*\*

Element Count

\*\*\*\*\*

Number of rain gages ..... 7  
 Number of subcatchments ... 12  
 Number of nodes ..... 30  
 Number of links ..... 27  
 Number of pollutants ..... 0  
 Number of land uses ..... 0

\*\*\*\*\*

Raingage Summary

\*\*\*\*\*

| Name  | Data Source | Data Type | Recording Interval |
|-------|-------------|-----------|--------------------|
| 100Yr | 100Yr       | INTENSITY | 10 min.            |
| 10Yr  | 10Yr        | INTENSITY | 10 min.            |
| 25Yr  | 25Yr        | INTENSITY | 10 min.            |
| 2Yr   | 2Yr         | INTENSITY | 10 min.            |
| 5_yr  | 5_yr        | INTENSITY | 10 min.            |
| 50Yr  | 50Yr        | INTENSITY | 10 min.            |
| 5Yr   | 5Yr         | INTENSITY | 10 min.            |

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Subcatchment Summary

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| Name   | Area | Width  | %Imperv | %Slope | Rain Gage |
|--------|------|--------|---------|--------|-----------|
| Outlet |      |        |         |        |           |
| 222    | 0.10 | 52.00  | 30.00   | 0.5000 | 5_yr      |
| 225b   |      |        |         |        |           |
| 223    | 0.11 | 20.00  | 87.00   | 0.0100 | 5_yr      |
| 226    |      |        |         |        |           |
| 224    | 0.48 | 320.00 | 90.00   | 2.0000 | 5_yr      |
| Roof   |      |        |         |        |           |

2021-0821-13: 5 Year Proposed Results

|               |      |       |       |        |      |
|---------------|------|-------|-------|--------|------|
| 225a          | 0.20 | 26.40 | 82.00 | 0.5000 | 5_yr |
| 228           |      |       |       |        |      |
| 225b          | 0.29 | 39.33 | 82.00 | 1.0000 | 5_yr |
| EX.MH36-S     |      |       |       |        |      |
| 226           | 0.10 | 15.08 | 79.00 | 1.5000 | 5_yr |
| EX.MH34-S     |      |       |       |        |      |
| 227           | 0.39 | 46.35 | 75.00 | 1.0000 | 5_yr |
| CBMH54-S      |      |       |       |        |      |
| 228           | 0.23 | 27.47 | 64.00 | 2.0000 | 5_yr |
| RingRoadMajor |      |       |       |        |      |
| 229           | 0.15 | 15.30 | 38.00 | 0.1000 | 5_yr |
| EX.MH32       |      |       |       |        |      |
| EXT-1         | 0.28 | 10.00 | 90.00 | 0.0000 | 5_yr |
| EX.MH34-S     |      |       |       |        |      |
| EXT-2         | 0.28 | 10.00 | 90.00 | 0.0000 | 5_yr |
| RingRoadMajor |      |       |       |        |      |
| EXT-3         | 0.96 | 54.97 | 86.00 | 0.0000 | 5_yr |
| 223           |      |       |       |        |      |

\*\*\*\*\*  
 LID Control Summary  
 \*\*\*\*\*

| Imperv<br>Subcatchment<br>Treated | % Perv<br>LID Control<br>Treated | No. of<br>Units | Unit<br>Area | Unit<br>Width | % Area<br>Covered | % |
|-----------------------------------|----------------------------------|-----------------|--------------|---------------|-------------------|---|
| -----                             | -----                            |                 |              |               |                   |   |
| 224<br>0.00                       | GreenRoof<br>0.00                | 1               | 650.00       | 0.00          | 13.54             |   |

\*\*\*\*\*  
 Node Summary  
 \*\*\*\*\*

| Name           | Type     | Invert<br>Elev. | Max.<br>Depth | Ponded<br>Area | External<br>Inflow |
|----------------|----------|-----------------|---------------|----------------|--------------------|
| -----          | -----    |                 |               |                |                    |
| CBMH38         | JUNCTION | 77.74           | 1.91          | 0.0            |                    |
| CBMH38_Orifice | JUNCTION | 77.74           | 1.91          | 0.0            |                    |
| CBMH52         | JUNCTION | 76.58           | 2.51          | 0.0            |                    |
| CBMH54         | JUNCTION | 78.18           | 1.67          | 0.0            |                    |
| CBMH54-S       | JUNCTION | 79.84           | 0.40          | 0.0            |                    |
| CBMH92         | JUNCTION | 77.33           | 2.25          | 0.0            |                    |
| CBMH94         | JUNCTION | 76.91           | 2.45          | 0.0            |                    |
| EX.MH31        | JUNCTION | 76.62           | 5.64          | 0.0            |                    |
| EX.MH34        | JUNCTION | 78.40           | 2.89          | 0.0            |                    |



2021-0821-13: 5 Year Proposed Results

| Item           | Type     | Value 1 | Value 2 | Value 3 | Value 4 |
|----------------|----------|---------|---------|---------|---------|
| EX.MH34-S      | JUNCTION | 81.29   | 0.40    | 0.0     |         |
| EX.MH36        | JUNCTION | 77.61   | 4.86    | 0.0     |         |
| EX.MH36-S      | JUNCTION | 82.28   | 0.40    | 0.0     |         |
| EX.MH43        | JUNCTION | 78.74   | 1.84    | 0.0     |         |
| EX.MH43-S      | JUNCTION | 80.58   | 0.30    | 0.0     |         |
| EX.MH44        | JUNCTION | 78.00   | 1.77    | 0.0     |         |
| EX.MH44-S      | JUNCTION | 79.77   | 0.30    | 0.0     |         |
| EX.MH45        | JUNCTION | 77.63   | 1.72    | 0.0     |         |
| EX.MH45-S      | JUNCTION | 79.35   | 0.30    | 0.0     |         |
| EX.MH46        | JUNCTION | 76.65   | 2.32    | 0.0     |         |
| J2             | JUNCTION | 78.40   | 5.80    | 0.0     |         |
| STM-MH1        | JUNCTION | 79.21   | 2.64    | 0.0     |         |
| STM-MH14       | JUNCTION | 79.01   | 2.35    | 0.0     |         |
| STM-MH14-S     | JUNCTION | 81.36   | 0.30    | 0.0     |         |
| STM-MH1-S      | JUNCTION | 81.85   | 0.30    | 0.0     | Yes     |
| EX.MH32        | OUTFALL  | 75.74   | 0.53    | 0.0     |         |
| Minor2         | OUTFALL  | 75.80   | 0.30    | 0.0     |         |
| RingRoadMajor  | OUTFALL  | 78.97   | 0.30    | 0.0     |         |
| Detention      | STORAGE  | 77.90   | 1.07    | 0.0     |         |
| Roof           | STORAGE  | 78.65   | 0.15    | 0.0     |         |
| SurfacePonding | STORAGE  | 79.60   | 0.28    | 0.0     |         |

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 Link Summary  
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| Name          | From Node | To Node       | Type    | Length |
|---------------|-----------|---------------|---------|--------|
| -----         |           |               |         |        |
| C1            | STM-MH1   | STM-MH14      | CONDUIT | 61.7   |
| 0.3242 0.0130 |           |               |         |        |
| C10           | EX.MH43   | EX.MH44       | CONDUIT | 71.4   |
| 0.9944 0.0130 |           |               |         |        |
| C10-S         | EX.MH43-S | EX.MH44-S     | CONDUIT | 71.4   |
| 1.1345 0.0160 |           |               |         |        |
| C11           | EX.MH45   | EX.MH46       | CONDUIT | 37.1   |
| 1.8332 0.0130 |           |               |         |        |
| C11-S         | EX.MH45-S | RingRoadMajor | CONDUIT | 37.1   |
| 1.0243 0.0160 |           |               |         |        |
| C12           | EX.MH44   | EX.MH45       | CONDUIT | 35.1   |
| 1.0542 0.0130 |           |               |         |        |
| C12-S         | EX.MH44-S | EX.MH45-S     | CONDUIT | 35.1   |
| 1.1967 0.0160 |           |               |         |        |
| C13           | EX.MH46   | CBMH52        | CONDUIT | 10.5   |
| 0.6857 0.0130 |           |               |         |        |
| C14           | EX.MH34   | EX.MH36       | CONDUIT | 60.8   |
| 1.2995 0.0130 |           |               |         |        |

2021-0821-13: 5 Year Proposed Results

|           |                |                |         |      |
|-----------|----------------|----------------|---------|------|
| C14-S     | EX.MH34-S      | EX.MH43-S      | CONDUIT | 60.8 |
| 1.1678    | 0.0160         |                |         |      |
| C15       | EX.MH31        | EX.MH32        | CONDUIT | 86.4 |
| 1.0139    | 0.0130         |                |         |      |
| C1-S      | STM-MH1-S      | STM-MH14-S     | CONDUIT | 61.7 |
| 0.7943    | 0.0160         |                |         |      |
| C2        | J2             | EX.MH31        | CONDUIT | 16.0 |
| 0.0019    | 0.0130         |                |         |      |
| C3        | STM-MH14       | EX.MH34        | CONDUIT | 60.8 |
| 1.0042    | 0.0130         |                |         |      |
| C3-S      | STM-MH14-S     | EX.MH34-S      | CONDUIT | 60.8 |
| 0.1152    | 0.0160         |                |         |      |
| C4        | EX.MH36        | J2             | CONDUIT | 80.0 |
| -0.9913   | 0.0130         |                |         |      |
| C4-S      | EX.MH36-S      | EX.MH34-S      | CONDUIT | 80.0 |
| 1.2376    | 0.0160         |                |         |      |
| C5        | CBMH54         | Detention      | CONDUIT | 25.2 |
| 0.4960    | 0.0130         |                |         |      |
| C5-S      | CBMH54-S       | SurfacePonding | CONDUIT | 35.0 |
| 0.6857    | 0.0160         |                |         |      |
| C6        | CBMH38_Orifice | CBMH92         | CONDUIT | 39.8 |
| 0.9423    | 0.0130         |                |         |      |
| C7        | CBMH92         | CBMH94         | CONDUIT | 39.7 |
| 0.9950    | 0.0130         |                |         |      |
| C8        | CBMH94         | CBMH52         | CONDUIT | 33.0 |
| 1.0061    | 0.0130         |                |         |      |
| C9        | Detention      | CBMH38         | CONDUIT | 26.1 |
| 1.1878    | 0.0130         |                |         |      |
| CBMH52    | CBMH52         | Minor2         | CONDUIT | 39.0 |
| 1.9953    | 0.0130         |                |         |      |
| OR1       | CBMH38         | CBMH38_Orifice | ORIFICE |      |
| OL1       | SurfacePonding | Detention      | OUTLET  |      |
| RoofDrain | Roof           | J2             | OUTLET  |      |

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 Cross Section Summary  
 \*\*\*\*\*

| Full<br>Conduit<br>Flow | Shape    | Full<br>Depth | Full<br>Area | Hyd.<br>Rad. | Max.<br>Width | No. of<br>Barrels |
|-------------------------|----------|---------------|--------------|--------------|---------------|-------------------|
| -----<br>C1<br>162.35   | CIRCULAR | 0.45          | 0.16         | 0.11         | 0.45          | 1                 |
| C10<br>96.44            | CIRCULAR | 0.30          | 0.07         | 0.07         | 0.30          | 1                 |

2021-0821-13: 5 Year Proposed Results

|          |             |      |      |      |       |   |
|----------|-------------|------|------|------|-------|---|
| C10-S    | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 4452.27  |             |      |      |      |       |   |
| C11      | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 130.94   |             |      |      |      |       |   |
| C11-S    | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 4230.49  |             |      |      |      |       |   |
| C12      | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 99.29    |             |      |      |      |       |   |
| C12-S    | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 4572.58  |             |      |      |      |       |   |
| C13      | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 80.08    |             |      |      |      |       |   |
| C14      | CIRCULAR    | 0.45 | 0.16 | 0.11 | 0.45  | 1 |
| 325.02   |             |      |      |      |       |   |
| C14-S    | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 4517.17  |             |      |      |      |       |   |
| C15      | CIRCULAR    | 0.53 | 0.22 | 0.13 | 0.53  | 1 |
| 433.08   |             |      |      |      |       |   |
| C1-S     | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 3725.39  |             |      |      |      |       |   |
| C2       | CIRCULAR    | 0.53 | 0.22 | 0.13 | 0.53  | 1 |
| 18.77    |             |      |      |      |       |   |
| C3       | CIRCULAR    | 0.45 | 0.16 | 0.11 | 0.45  | 1 |
| 285.72   |             |      |      |      |       |   |
| C3-S     | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 1418.90  |             |      |      |      |       |   |
| C4       | CIRCULAR    | 0.53 | 0.22 | 0.13 | 0.53  | 1 |
| 428.21   |             |      |      |      |       |   |
| C4-S     | Full_Street | 0.40 | 8.00 | 0.20 | 40.00 | 1 |
| 18752.45 |             |      |      |      |       |   |
| C5       | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 68.11    |             |      |      |      |       |   |
| C5-S     | Full_Street | 0.40 | 8.00 | 0.20 | 40.00 | 1 |
| 13958.72 |             |      |      |      |       |   |
| C6       | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 93.87    |             |      |      |      |       |   |
| C7       | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 96.47    |             |      |      |      |       |   |
| C8       | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 97.00    |             |      |      |      |       |   |
| C9       | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 105.40   |             |      |      |      |       |   |
| CBMH52   | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 136.60   |             |      |      |      |       |   |

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 Street Summary  
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2021-0821-13: 5 Year Proposed Results

Street Street  
Area:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0005 | 0.0018 | 0.0041 | 0.0072 | 0.0113 |
| 0.0162 | 0.0221 | 0.0288 | 0.0365 | 0.0450 |
| 0.0545 | 0.0648 | 0.0761 | 0.0882 | 0.1013 |
| 0.1152 | 0.1301 | 0.1458 | 0.1625 | 0.1800 |
| 0.1985 | 0.2178 | 0.2381 | 0.2592 | 0.2813 |
| 0.3042 | 0.3281 | 0.3528 | 0.3785 | 0.4050 |
| 0.4325 | 0.4608 | 0.4901 | 0.5200 | 0.5500 |
| 0.5800 | 0.6100 | 0.6400 | 0.6700 | 0.7000 |
| 0.7300 | 0.7600 | 0.7900 | 0.8200 | 0.8500 |
| 0.8800 | 0.9100 | 0.9400 | 0.9700 | 1.0000 |

Hrad:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0151 | 0.0303 | 0.0454 | 0.0606 | 0.0757 |
| 0.0909 | 0.1060 | 0.1212 | 0.1363 | 0.1515 |
| 0.1666 | 0.1818 | 0.1969 | 0.2121 | 0.2272 |
| 0.2424 | 0.2575 | 0.2726 | 0.2878 | 0.3029 |
| 0.3181 | 0.3332 | 0.3484 | 0.3635 | 0.3787 |
| 0.3938 | 0.4090 | 0.4241 | 0.4393 | 0.4544 |
| 0.4696 | 0.4847 | 0.4999 | 0.5249 | 0.5548 |
| 0.5848 | 0.6147 | 0.6445 | 0.6743 | 0.7041 |
| 0.7338 | 0.7636 | 0.7932 | 0.8229 | 0.8525 |
| 0.8821 | 0.9116 | 0.9411 | 0.9706 | 1.0000 |

Width:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0300 | 0.0600 | 0.0900 | 0.1200 | 0.1500 |
| 0.1800 | 0.2100 | 0.2400 | 0.2700 | 0.3000 |
| 0.3300 | 0.3600 | 0.3900 | 0.4200 | 0.4500 |
| 0.4800 | 0.5100 | 0.5400 | 0.5700 | 0.6000 |
| 0.6300 | 0.6600 | 0.6900 | 0.7200 | 0.7500 |
| 0.7800 | 0.8100 | 0.8400 | 0.8700 | 0.9000 |
| 0.9300 | 0.9600 | 0.9900 | 1.0000 | 1.0000 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

Street Full\_Street  
Area:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0004 | 0.0016 | 0.0036 | 0.0064 | 0.0100 |
| 0.0144 | 0.0196 | 0.0256 | 0.0324 | 0.0400 |
| 0.0484 | 0.0576 | 0.0676 | 0.0784 | 0.0900 |
| 0.1024 | 0.1156 | 0.1296 | 0.1444 | 0.1600 |
| 0.1764 | 0.1936 | 0.2116 | 0.2304 | 0.2500 |
| 0.2704 | 0.2916 | 0.3136 | 0.3364 | 0.3600 |
| 0.3844 | 0.4096 | 0.4356 | 0.4624 | 0.4900 |
| 0.5184 | 0.5476 | 0.5776 | 0.6084 | 0.6400 |
| 0.6724 | 0.7056 | 0.7396 | 0.7744 | 0.8100 |
| 0.8464 | 0.8836 | 0.9216 | 0.9604 | 1.0000 |

Hrad:

2021-0821-13: 5 Year Proposed Results

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0200 | 0.0399 | 0.0599 | 0.0798 | 0.0998 |
| 0.1197 | 0.1397 | 0.1596 | 0.1796 | 0.1995 |
| 0.2195 | 0.2394 | 0.2594 | 0.2793 | 0.2993 |
| 0.3192 | 0.3392 | 0.3591 | 0.3791 | 0.3990 |
| 0.4190 | 0.4389 | 0.4589 | 0.4788 | 0.4988 |
| 0.5187 | 0.5387 | 0.5586 | 0.5786 | 0.5985 |
| 0.6185 | 0.6384 | 0.6584 | 0.6783 | 0.6983 |
| 0.7182 | 0.7382 | 0.7582 | 0.7784 | 0.7985 |
| 0.8187 | 0.8388 | 0.8590 | 0.8791 | 0.8993 |
| 0.9194 | 0.9396 | 0.9597 | 0.9799 | 1.0000 |

Width:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0200 | 0.0400 | 0.0600 | 0.0800 | 0.1000 |
| 0.1200 | 0.1400 | 0.1600 | 0.1800 | 0.2000 |
| 0.2200 | 0.2400 | 0.2600 | 0.2800 | 0.3000 |
| 0.3200 | 0.3400 | 0.3600 | 0.3800 | 0.4000 |
| 0.4200 | 0.4400 | 0.4600 | 0.4800 | 0.5000 |
| 0.5200 | 0.5400 | 0.5600 | 0.5800 | 0.6000 |
| 0.6200 | 0.6400 | 0.6600 | 0.6800 | 0.7000 |
| 0.7200 | 0.7400 | 0.7600 | 0.7800 | 0.8000 |
| 0.8200 | 0.8400 | 0.8600 | 0.8800 | 0.9000 |
| 0.9200 | 0.9400 | 0.9600 | 0.9800 | 1.0000 |

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... LPS  
 Process Models:  
   Rainfall/Runoff ..... YES  
   RDII ..... NO  
   Snowmelt ..... NO  
   Groundwater ..... NO  
   Flow Routing ..... YES  
   Ponding Allowed ..... NO  
   Water Quality ..... NO  
 Infiltration Method ..... HORTON  
 Flow Routing Method ..... DYNWAVE  
 Surge Method ..... EXTRAN  
 Starting Date ..... 01/04/2023 00:00:00  
 Ending Date ..... 01/04/2023 15:00:00  
 Antecedent Dry Days ..... 0.0  
 Report Time Step ..... 00:01:00  
 Wet Time Step ..... 00:05:00  
 Dry Time Step ..... 00:05:00  
 Routing Time Step ..... 5.00 sec  
 Variable Time Step ..... YES  
 Maximum Trials ..... 8  
 Number of Threads ..... 4  
 Head Tolerance ..... 0.001524 m

2021-0821-13: 5 Year Proposed Results

```

*****
Runoff Quantity Continuity      Volume      Depth
                                hectare-m   mm
*****
Total Precipitation .....      0.152      42.540
Evaporation Loss .....          0.000      0.000
Infiltration Loss .....         0.029      8.159
Surface Runoff .....            0.062     17.344
Final Storage .....             0.062     17.190
Continuity Error (%) .....      -0.358
    
```

```

*****
Flow Routing Continuity      Volume      Volume
                                hectare-m   10^6 ltr
*****
Dry Weather Inflow .....       0.000      0.000
Wet Weather Inflow .....       0.062      0.621
Groundwater Inflow .....       0.000      0.000
RDII Inflow .....              0.000      0.000
External Inflow .....           0.034      0.339
External Outflow .....          0.093      0.933
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 .....       0.003      0.029
Continuity Error (%) .....      -0.225
    
```

```

*****
Highest Continuity Errors
*****
Node EX.MH36 (4.34%)
Node EX.MH44-S (2.66%)
Node EX.MH45-S (1.76%)
    
```

```

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

```

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

2021-0821-13: 5 Year Proposed Results

\*\*\*\*\*

Most Frequent Nonconverging Nodes

\*\*\*\*\*

Node EX.MH32 (0.05%)  
 Node Minor2 (0.05%)  
 Node RingRoadMajor (0.05%)  
 Node EX.MH36 (0.04%)  
 Node CBMH38 (0.01%)

\*\*\*\*\*

Routing Time Step Summary

\*\*\*\*\*

Minimum Time Step : 0.66 sec  
 Average Time Step : 4.99 sec  
 Maximum Time Step : 5.00 sec  
 % of Time in Steady State : 0.00  
 Average Iterations per Step : 2.03  
 % of Steps Not Converging : 0.05  
 Time Step Frequencies :  
     5.000 - 3.155 sec : 99.89 %  
     3.155 - 1.991 sec : 0.06 %  
     1.991 - 1.256 sec : 0.03 %  
     1.256 - 0.792 sec : 0.02 %  
     0.792 - 0.500 sec : 0.01 %

\*\*\*\*\*

Subcatchment Runoff Summary

\*\*\*\*\*

| -----        |        |          |        |       |       |       |        |
|--------------|--------|----------|--------|-------|-------|-------|--------|
| Perv         | Total  | Total    | Total  | Total | Total | Total | Imperv |
| Runoff       | Runoff | Total    | Peak   | Total | Evap  | Infil | Runoff |
| Subcatchment | Runoff | Precip   | Runoff | Runon | mm    | mm    | mm     |
| mm           | mm     | 10^6 ltr | mm     | mm    |       |       |        |
| -----        |        |          |        |       |       |       |        |
| 222          |        | 42.54    |        | 0.00  | 0.00  | 27.08 | 12.33  |
| 2.79         | 15.12  | 0.02     | 11.35  | 0.355 |       |       |        |
| 223          |        | 42.54    |        | 0.00  | 0.00  | 5.28  | 35.73  |
| 0.26         | 35.99  | 0.04     | 16.36  | 0.846 |       |       |        |
| 224          |        | 42.54    |        | 0.00  | 0.00  | 3.13  | 31.97  |

2021-0821-13: 5 Year Proposed Results

|       |       |      |        |       |      |       |       |
|-------|-------|------|--------|-------|------|-------|-------|
| 0.60  | 32.57 | 0.16 | 115.40 | 0.766 |      |       |       |
| 225a  |       |      | 42.54  | 0.00  | 0.00 | 6.96  | 33.91 |
| 0.73  | 34.64 | 0.07 | 46.28  | 0.814 |      |       |       |
| 225b  |       |      | 42.54  | 5.33  | 0.00 | 7.20  | 38.28 |
| 1.46  | 39.74 | 0.12 | 78.84  | 0.830 |      |       |       |
| 226   |       |      | 42.54  | 41.87 | 0.00 | 10.87 | 65.68 |
| 6.94  | 72.62 | 0.07 | 31.40  | 0.860 |      |       |       |
| 227   |       |      | 42.54  | 0.00  | 0.00 | 9.70  | 31.03 |
| 0.97  | 32.00 | 0.13 | 86.85  | 0.752 |      |       |       |
| 228   |       |      | 42.54  | 30.08 | 0.00 | 16.99 | 45.68 |
| 9.28  | 54.97 | 0.13 | 72.85  | 0.757 |      |       |       |
| 229   |       |      | 42.54  | 0.00  | 0.00 | 25.78 | 15.70 |
| 0.60  | 16.31 | 0.02 | 15.87  | 0.383 |      |       |       |
| EXT-1 |       |      | 42.54  | 0.00  | 0.00 | 4.25  | 0.00  |
| 0.00  | 0.00  | 0.00 | 0.00   | 0.000 |      |       |       |
| EXT-2 |       |      | 42.54  | 0.00  | 0.00 | 4.25  | 0.00  |
| 0.00  | 0.00  | 0.00 | 0.00   | 0.000 |      |       |       |
| EXT-3 |       |      | 42.54  | 0.00  | 0.00 | 5.96  | 0.00  |
| 0.00  | 0.00  | 0.00 | 0.00   | 0.000 |      |       |       |

\*\*\*\*\*  
 LID Performance Summary  
 \*\*\*\*\*

| Drain        | Initial | Final       | Continuity | Total  | Evap | Infil | Surface |
|--------------|---------|-------------|------------|--------|------|-------|---------|
| Outflow      | Storage | Storage     | Error      | Inflow | Loss | Loss  | Outflow |
| Subcatchment | mm      | LID Control | %          | mm     | mm   | mm    | mm      |
| 224          |         | GreenRoof   |            | 42.54  | 0.00 | 0.00  | 0.00    |
| 0.00         | 0.00    | 42.54       | 0.00       |        |      |       |         |

\*\*\*\*\*  
 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    |



2021-0821-13: 5 Year Proposed Results

|                |          |      |      |       |   |       |      |
|----------------|----------|------|------|-------|---|-------|------|
| CBMH38         | JUNCTION | 0.11 | 1.12 | 78.86 | 0 | 01:08 | 1.12 |
| CBMH38_Orifice | JUNCTION | 0.03 | 0.17 | 77.91 | 0 | 01:10 | 0.17 |
| CBMH52         | JUNCTION | 0.02 | 0.13 | 76.71 | 0 | 01:11 | 0.13 |
| CBMH54         | JUNCTION | 0.06 | 0.85 | 79.03 | 0 | 01:08 | 0.85 |
| CBMH54-S       | JUNCTION | 0.01 | 0.08 | 79.92 | 0 | 01:00 | 0.08 |
| CBMH92         | JUNCTION | 0.03 | 0.17 | 77.51 | 0 | 01:11 | 0.17 |
| CBMH94         | JUNCTION | 0.03 | 0.17 | 77.08 | 0 | 01:11 | 0.17 |
| EX.MH31        | JUNCTION | 0.05 | 0.07 | 76.69 | 0 | 01:30 | 0.07 |
| EX.MH34        | JUNCTION | 0.10 | 0.13 | 78.53 | 0 | 01:29 | 0.13 |
| EX.MH34-S      | JUNCTION | 0.01 | 0.05 | 81.34 | 0 | 01:02 | 0.05 |
| EX.MH36        | JUNCTION | 0.86 | 0.92 | 78.53 | 0 | 01:29 | 0.92 |
| EX.MH36-S      | JUNCTION | 0.01 | 0.05 | 82.33 | 0 | 01:00 | 0.05 |
| EX.MH43        | JUNCTION | 0.00 | 0.00 | 78.74 | 0 | 00:00 | 0.00 |
| EX.MH43-S      | JUNCTION | 0.00 | 0.03 | 80.61 | 0 | 01:06 | 0.03 |
| EX.MH44        | JUNCTION | 0.00 | 0.01 | 78.01 | 0 | 01:04 | 0.01 |
| EX.MH44-S      | JUNCTION | 0.00 | 0.03 | 79.80 | 0 | 01:09 | 0.03 |
| EX.MH45        | JUNCTION | 0.00 | 0.01 | 77.64 | 0 | 01:33 | 0.01 |
| EX.MH45-S      | JUNCTION | 0.00 | 0.03 | 79.38 | 0 | 01:10 | 0.03 |
| EX.MH46        | JUNCTION | 0.01 | 0.06 | 76.71 | 0 | 01:11 | 0.06 |
| J2             | JUNCTION | 0.09 | 0.13 | 78.53 | 0 | 01:29 | 0.13 |
| STM-MH1        | JUNCTION | 0.00 | 0.00 | 79.21 | 0 | 00:00 | 0.00 |
| STM-MH14       | JUNCTION | 0.05 | 0.05 | 79.06 | 0 | 00:23 | 0.05 |
| STM-MH14-S     | JUNCTION | 0.00 | 0.00 | 81.36 | 0 | 00:23 | 0.00 |
| STM-MH1-S      | JUNCTION | 0.04 | 0.04 | 81.89 | 0 | 15:00 | 0.04 |
| EX.MH32        | OUTFALL  | 0.05 | 0.07 | 75.81 | 0 | 01:30 | 0.07 |
| Minor2         | OUTFALL  | 0.02 | 0.13 | 75.93 | 0 | 01:11 | 0.13 |
| RingRoadMajor  | OUTFALL  | 0.00 | 0.03 | 79.00 | 0 | 01:10 | 0.03 |
| Detention      | STORAGE  | 0.22 | 1.07 | 78.97 | 0 | 01:08 | 1.07 |
| Roof           | STORAGE  | 0.01 | 0.05 | 78.70 | 0 | 01:24 | 0.05 |
| SurfacePonding | STORAGE  | 0.00 | 0.07 | 79.67 | 0 | 01:21 | 0.07 |

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

| Total Flow      |               | Maximum Lateral Inflow | Maximum Total Inflow | Time of Max Occurrence | Lateral Inflow Volume |
|-----------------|---------------|------------------------|----------------------|------------------------|-----------------------|
| Volume Node ltr | Error Percent | Type                   | LPS                  | days hr:min            | 10^6 ltr              |
| -----           |               |                        |                      |                        |                       |

2021-0821-13: 5 Year Proposed Results

|                      |          |        |        |   |       |           |
|----------------------|----------|--------|--------|---|-------|-----------|
| -----<br>CBMH38      | JUNCTION | 0.00   | 49.70  | 0 | 01:08 | 0         |
| 0.3      -0.070      |          |        |        |   |       |           |
| CBMH38_Orifice       | JUNCTION | 0.00   | 49.64  | 0 | 01:09 | 0         |
| 0.3      -0.016      |          |        |        |   |       |           |
| CBMH52               | JUNCTION | 0.00   | 49.89  | 0 | 01:11 | 0         |
| 0.304     0.008      |          |        |        |   |       |           |
| CBMH54               | JUNCTION | 77.43  | 77.43  | 0 | 01:00 | 0.118     |
| 0.118     0.517      |          |        |        |   |       |           |
| CBMH54-S             | JUNCTION | 106.85 | 106.85 | 0 | 01:00 | 0.192     |
| 0.192     -0.285     |          |        |        |   |       |           |
| CBMH92               | JUNCTION | 0.00   | 49.62  | 0 | 01:10 | 0         |
| 0.3      -0.000      |          |        |        |   |       |           |
| CBMH94               | JUNCTION | 0.00   | 49.62  | 0 | 01:11 | 0         |
| 0.3      -0.004      |          |        |        |   |       |           |
| EX.MH31              | JUNCTION | 0.00   | 18.87  | 0 | 01:29 | 0         |
| 0.476     0.076      |          |        |        |   |       |           |
| EX.MH34              | JUNCTION | 0.00   | 6.38   | 0 | 00:43 | 0         |
| 0.338     0.421      |          |        |        |   |       |           |
| EX.MH34-S            | JUNCTION | -46.63 | 77.43  | 0 | 01:00 | -0.0466   |
| 0.119     0.594      |          |        |        |   |       |           |
| EX.MH36              | JUNCTION | 0.00   | 7.11   | 0 | 00:43 | 0         |
| 0.337     4.534      |          |        |        |   |       |           |
| EX.MH36-S            | JUNCTION | 78.84  | 78.84  | 0 | 01:00 | 0.117     |
| 0.117     -0.579     |          |        |        |   |       |           |
| EX.MH43              | JUNCTION | 0.00   | 0.00   | 0 | 00:00 | 0         |
| 0          0.000 ltr |          |        |        |   |       |           |
| EX.MH43-S            | JUNCTION | -20.00 | 30.15  | 0 | 01:04 | -0.0658   |
| 0.0706    -0.008     |          |        |        |   |       |           |
| EX.MH44              | JUNCTION | 0.08   | 0.08   | 0 | 01:01 | 0.000182  |
| 0.000182   -0.269    |          |        |        |   |       |           |
| EX.MH44-S            | JUNCTION | -0.08  | 8.28   | 0 | 01:07 | -0.000182 |
| 0.0049     2.728     |          |        |        |   |       |           |
| EX.MH45              | JUNCTION | 0.08   | 0.16   | 0 | 01:05 | 0.000177  |
| 0.00036    0.619     |          |        |        |   |       |           |
| EX.MH45-S            | JUNCTION | -0.08  | 7.49   | 0 | 01:09 | -0.000177 |
| 0.00458    1.795     |          |        |        |   |       |           |
| EX.MH46              | JUNCTION | 0.08   | 0.79   | 0 | 00:56 | 0.00395   |
| 0.00438    0.210     |          |        |        |   |       |           |
| J2                   | JUNCTION | 0.00   | 18.87  | 0 | 01:27 | 0         |
| 0.478     0.345      |          |        |        |   |       |           |
| STM-MH1              | JUNCTION | 0.00   | 0.00   | 0 | 00:00 | 0         |
| 0          0.000 ltr |          |        |        |   |       |           |
| STM-MH14             | JUNCTION | 6.28   | 6.28   | 0 | 00:23 | 0.338     |
| 0.338     0.134      |          |        |        |   |       |           |
| STM-MH14-S           | JUNCTION | -6.28  | 6.28   | 0 | 00:23 | -0.338    |
| 0.338     0.005      |          |        |        |   |       |           |
| STM-MH1-S            | JUNCTION | 6.28   | 6.28   | 0 | 00:00 | 0.339     |
| 0.339     0.226      |          |        |        |   |       |           |

2021-0821-13: 5 Year Proposed Results

|                |        |         |         |        |   |       |        |
|----------------|--------|---------|---------|--------|---|-------|--------|
| EX.MH32        |        | OUTFALL | 15.87   | 27.36  | 0 | 01:00 | 0.0249 |
| 0.501          | 0.000  |         |         |        |   |       |        |
| Minor2         |        | OUTFALL | 0.00    | 49.87  | 0 | 01:11 | 0      |
| 0.304          | 0.000  |         |         |        |   |       |        |
| RingRoadMajor  |        | OUTFALL | 72.85   | 72.85  | 0 | 01:00 | 0.121  |
| 0.128          | 0.000  |         |         |        |   |       |        |
| Detention      |        | STORAGE | 105.07  | 182.81 | 0 | 01:00 | 0.192  |
| 0.351          | -0.272 |         |         |        |   |       |        |
| Roof           |        | STORAGE | 115.40  | 115.40 | 0 | 01:00 | 0.156  |
| 0.156          | 0.002  |         |         |        |   |       |        |
| SurfacePonding |        | STORAGE | -105.07 | 105.07 | 0 | 01:00 | -0.151 |
| 0.193          | 0.154  |         |         |        |   |       |        |

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

Surcharging occurs when water rises above the top of the highest conduit.

| Node    | Type     | Hours Surcharged | Max. Height Above Crown Meters | Min. Depth Below Rim Meters |
|---------|----------|------------------|--------------------------------|-----------------------------|
| CBMH38  | JUNCTION | 1.83             | 0.824                          | 0.786                       |
| CBMH54  | JUNCTION | 1.20             | 0.553                          | 0.812                       |
| EX.MH36 | JUNCTION | 14.29            | 0.398                          | 3.937                       |

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

Flooding refers to all water that overflows a node, whether it ponds or not.

| Node      | Hours Flooded | Maximum Rate LPS | Time of Max Occurrence days hr:min | Total Flood Volume 10^6 ltr | Maximum Poned Depth Meters |
|-----------|---------------|------------------|------------------------------------|-----------------------------|----------------------------|
| Detention | 0.41          | 59.20            | 0 01:10                            | 0.041                       | 0.000                      |

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

-----

2021-0821-13: 5 Year Proposed Results

```

-----
Max      Maximum
Occurrence  Outflow
Storage Unit
hr:min      LPS

Average    Avg    Evap  Exfil    Maximum    Max    Time of
Volume    Pcnt   Pcnt  Pcnt    Volume    Pcnt
1000 m³   Full   Loss  Loss    1000 m³   Full   days
  
```

```

-----
Detention
01:08      49.70
Roof
01:24      12.60
SurfacePonding
01:21      105.52

0.019    17.2    0.0    0.0      0.109    100.0    0
0.023    7.5     0.0    0.0      0.101    32.5     0
0.000    0.0     0.0    0.0      0.011    2.1      0
  
```

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

```

-----
Flow      Avg      Max      Total
Freq      Flow     Flow     Volume
Pcnt      LPS      LPS      10^6 ltr
-----
EX.MH32   97.13    9.56     27.36    0.501
Minor2    94.14    6.01     49.87    0.304
RingRoadMajor  24.82    9.58     72.85    0.128
-----
System    72.03    25.15    134.34   0.934
  
```

\*\*\*\*\*  
 Street Flow Summary  
 \*\*\*\*\*

```

-----
-----
Peak      Avg.    Bypass    Back    Peak    Peak
Flow      Flow    Flow      Maximum  Capture  Bypass
Capture   Capture  Flow      Flow    Spread  Depth  Inlet
Street    Conduit  Freq      Freq    / Inlet  Flow
Pcnt      Pcnt    Pcnt      Pcnt    m        m      LPS
          Pcnt    Pcnt      Pcnt    LPS     LPS
          Pcnt    Pcnt      Pcnt    LPS     LPS

Inlet      Inlet
Location
  
```

2021-0821-13: 5 Year Proposed Results

|        |        |         |       |       |       |          |   |
|--------|--------|---------|-------|-------|-------|----------|---|
| C10-S  |        | 8.275   | 1.414 | 0.028 | Inlet | ON-GRADE | 4 |
| 0.97   | 33.92  | 66.48   | 0.00  | 0.02  | 8.20  |          |   |
| C11-S  |        | 6.797   | 1.366 | 0.027 | Inlet | ON-SAG   | 4 |
| 1.18   | 39.63  | 69.88   | 0.00  | 0.02  | 6.72  |          |   |
| C12-S  |        | 7.487   | 1.367 | 0.027 | Inlet | ON-GRADE | 4 |
| 1.07   | 33.62  | 62.54   | 0.00  | 0.02  | 7.41  |          |   |
| C14-S  |        | 30.149  | 1.992 | 0.040 | Inlet | ON-GRADE | 1 |
| 66.34  | 99.42  | 2.85    | 0.00  | 20.00 | 10.15 |          |   |
| C1-S   |        | 6.280   | 0.915 | 0.018 | Inlet | ON-GRADE | 1 |
| 100.00 | 100.00 | 0.00    | 0.00  | 6.28  | 0.00  |          |   |
| C3-S   |        | 0.000   | 1.357 | 0.027 | Inlet | ON-GRADE | 1 |
| C4-S   |        | 77.428  | 2.571 | 0.051 | Inlet | ON-GRADE | 4 |
| 100.00 | 100.00 | 0.00    | 0.00  | 9.68  | 0.00  |          |   |
| C5-S   |        | 105.067 | 2.709 | 0.054 | Inlet | ON-GRADE | 7 |
| 100.00 | 97.17  | 4.25    | 0.88  | 7.50  | 0.00  |          |   |

\*\*\*\*\*

Link Flow Summary

\*\*\*\*\*

| Link  | Type    | Maximum<br> Flow <br>LPS | 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 | 0.00                     | 0 00:00                                  | 0.00                        | 0.00                 | 0.05                  |
| C10   | CONDUIT | 0.00                     | 0 00:00                                  | 0.00                        | 0.00                 | 0.00                  |
| C10-S | CONDUIT | 8.28                     | 0 01:07                                  | 0.50                        | 0.00                 | 0.09                  |
| C11   | CONDUIT | 0.16                     | 0 01:33                                  | 0.33                        | 0.00                 | 0.03                  |
| C11-S | CONDUIT | 6.80                     | 0 01:10                                  | 0.36                        | 0.00                 | 0.09                  |
| C12   | CONDUIT | 0.08                     | 0 01:05                                  | 0.27                        | 0.00                 | 0.02                  |
| C12-S | CONDUIT | 7.49                     | 0 01:09                                  | 0.46                        | 0.00                 | 0.09                  |
| C13   | CONDUIT | 0.79                     | 0 00:56                                  | 0.19                        | 0.01                 | 0.32                  |
| C14   | CONDUIT | 7.11                     | 0 00:43                                  | 0.79                        | 0.02                 | 0.65                  |
| C14-S | CONDUIT | 30.15                    | 0 01:04                                  | 1.11                        | 0.01                 | 0.13                  |
| C15   | CONDUIT | 18.87                    | 0 01:30                                  | 1.00                        | 0.04                 | 0.14                  |
| C1-S  | CONDUIT | 6.28                     | 0 00:23                                  | 0.76                        | 0.00                 | 0.06                  |
| C2    | CONDUIT | 18.87                    | 0 01:29                                  | 0.58                        | 1.01                 | 0.21                  |
| C3    | CONDUIT | 6.38                     | 0 00:43                                  | 0.77                        | 0.02                 | 0.20                  |
| C3-S  | CONDUIT | 0.00                     | 0 00:29                                  | 0.00                        | 0.00                 | 0.09                  |
| C4    | CONDUIT | 7.23                     | 0 00:43                                  | 0.06                        | 0.02                 | 0.62                  |
| C4-S  | CONDUIT | 77.43                    | 0 01:00                                  | 0.61                        | 0.00                 | 0.13                  |
| C5    | CONDUIT | 77.29                    | 0 01:00                                  | 1.09                        | 1.13                 | 1.00                  |
| C5-S  | CONDUIT | 105.07                   | 0 01:00                                  | 1.33                        | 0.01                 | 0.14                  |
| C6    | CONDUIT | 49.62                    | 0 01:10                                  | 1.25                        | 0.53                 | 0.55                  |



2021-0821-13: 5 Year Proposed Results

|        |      |      |      |      |      |      |      |      |      |
|--------|------|------|------|------|------|------|------|------|------|
| C2     | 1.00 | 0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.97 | 0.00 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C3     | 1.00 | 0.00 | 0.00 | 0.00 | 0.95 | 0.05 | 0.00 | 0.00 | 0.95 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C3-S   | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.97 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C4     | 1.00 | 0.00 | 0.03 | 0.00 | 0.97 | 0.00 | 0.00 | 0.00 | 0.02 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C4-S   | 1.00 | 0.02 | 0.00 | 0.00 | 0.94 | 0.04 | 0.00 | 0.00 | 0.93 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C5     | 1.00 | 0.03 | 0.60 | 0.00 | 0.33 | 0.00 | 0.00 | 0.03 | 0.83 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C5-S   | 1.00 | 0.02 | 0.00 | 0.00 | 0.04 | 0.94 | 0.00 | 0.00 | 0.03 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C6     | 1.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.95 | 0.00 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C7     | 1.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.95 | 0.00 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C8     | 1.00 | 0.06 | 0.00 | 0.00 | 0.59 | 0.35 | 0.00 | 0.00 | 0.60 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C9     | 1.00 | 0.05 | 0.00 | 0.00 | 0.94 | 0.01 | 0.00 | 0.00 | 0.82 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| CBMH52 | 1.00 | 0.06 | 0.00 | 0.00 | 0.00 | 0.94 | 0.00 | 0.00 | 0.00 |
| 0.00   |      |      |      |      |      |      |      |      |      |

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

| Conduit | -----<br>Both Ends | Hours Full<br>Upstream | -----<br>Dnstream | Hours<br>Above Full<br>Normal Flow | Hours<br>Capacity<br>Limited |
|---------|--------------------|------------------------|-------------------|------------------------------------|------------------------------|
| C14     | 0.01               | 0.01                   | 14.37             | 0.01                               | 0.01                         |
| C2      | 0.01               | 0.01                   | 0.01              | 0.27                               | 0.01                         |
| C4      | 0.01               | 0.01                   | 14.29             | 0.01                               | 0.01                         |
| C5      | 1.18               | 1.20                   | 1.37              | 0.08                               | 0.10                         |
| C9      | 1.37               | 1.37                   | 1.83              | 0.01                               | 0.01                         |

Analysis begun on: Fri Apr 12 11:13:47 2024  
 Analysis ended on: Fri Apr 12 11:13:47 2024  
 Total elapsed time: < 1 sec

2021-0821-13: 10 Year Proposed Results

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.3)

-----  
 WARNING 04: minimum elevation drop used for Conduit C2  
 WARNING 02: maximum depth increased for Node CBMH54-S  
 WARNING 02: maximum depth increased for Node EX.MH34-S  
 WARNING 02: maximum depth increased for Node EX.MH36-S

\*\*\*\*\*

Element Count

\*\*\*\*\*

Number of rain gages ..... 7  
 Number of subcatchments ... 12  
 Number of nodes ..... 30  
 Number of links ..... 27  
 Number of pollutants ..... 0  
 Number of land uses ..... 0

\*\*\*\*\*

Raingage Summary

\*\*\*\*\*

| Name  | Data Source | Data Type | Recording Interval |
|-------|-------------|-----------|--------------------|
| 10_yr | 10_yr       | INTENSITY | 10 min.            |
| 100Yr | 100Yr       | INTENSITY | 10 min.            |
| 10Yr  | 10Yr        | INTENSITY | 10 min.            |
| 25Yr  | 25Yr        | INTENSITY | 10 min.            |
| 2Yr   | 2Yr         | INTENSITY | 10 min.            |
| 50Yr  | 50Yr        | INTENSITY | 10 min.            |
| 5Yr   | 5Yr         | INTENSITY | 10 min.            |

\*\*\*\*\*

Subcatchment Summary

\*\*\*\*\*

| Name   | Area | Width  | %Imperv | %Slope | Rain Gage |
|--------|------|--------|---------|--------|-----------|
| Outlet |      |        |         |        |           |
| 222    | 0.10 | 52.00  | 30.00   | 0.5000 | 10_yr     |
| 225b   |      |        |         |        |           |
| 223    | 0.11 | 20.00  | 87.00   | 0.0100 | 10_yr     |
| 226    |      |        |         |        |           |
| 224    | 0.48 | 320.00 | 90.00   | 2.0000 | 10_yr     |
| Roof   |      |        |         |        |           |



2021-0821-13: 10 Year Proposed Results

|               |      |       |       |        |       |
|---------------|------|-------|-------|--------|-------|
| 225a          | 0.20 | 26.40 | 82.00 | 0.5000 | 10_yr |
| 228           |      |       |       |        |       |
| 225b          | 0.29 | 39.33 | 82.00 | 1.0000 | 10_yr |
| EX.MH36-S     |      |       |       |        |       |
| 226           | 0.10 | 15.08 | 79.00 | 1.5000 | 10_yr |
| EX.MH34-S     |      |       |       |        |       |
| 227           | 0.39 | 46.35 | 75.00 | 1.0000 | 10_yr |
| CBMH54-S      |      |       |       |        |       |
| 228           | 0.23 | 27.47 | 64.00 | 2.0000 | 10_yr |
| RingRoadMajor |      |       |       |        |       |
| 229           | 0.15 | 15.30 | 38.00 | 0.1000 | 10_yr |
| EX.MH32       |      |       |       |        |       |
| EXT-1         | 0.28 | 10.00 | 90.00 | 0.0000 | 10_yr |
| EX.MH34-S     |      |       |       |        |       |
| EXT-2         | 0.28 | 10.00 | 90.00 | 0.0000 | 10_yr |
| RingRoadMajor |      |       |       |        |       |
| EXT-3         | 0.96 | 54.97 | 86.00 | 0.0000 | 10_yr |
| 223           |      |       |       |        |       |

\*\*\*\*\*  
LID Control Summary  
\*\*\*\*\*

| Imperv<br>Subcatchment<br>Treated | % Perv<br>Treated | LID Control | No. of<br>Units | Unit<br>Area | Unit<br>Width | % Area<br>Covered | % |
|-----------------------------------|-------------------|-------------|-----------------|--------------|---------------|-------------------|---|
| 224<br>0.00                       | 0.00              | GreenRoof   | 1               | 650.00       | 0.00          | 13.54             |   |

\*\*\*\*\*  
Node Summary  
\*\*\*\*\*

| Name           | Type     | Invert<br>Elev. | Max.<br>Depth | Ponded<br>Area | External<br>Inflow |
|----------------|----------|-----------------|---------------|----------------|--------------------|
| CBMH38         | JUNCTION | 77.74           | 1.91          | 0.0            |                    |
| CBMH38_Orifice | JUNCTION | 77.74           | 1.91          | 0.0            |                    |
| CBMH52         | JUNCTION | 76.58           | 2.51          | 0.0            |                    |
| CBMH54         | JUNCTION | 78.18           | 1.67          | 0.0            |                    |
| CBMH54-S       | JUNCTION | 79.84           | 0.40          | 0.0            |                    |
| CBMH92         | JUNCTION | 77.33           | 2.25          | 0.0            |                    |
| CBMH94         | JUNCTION | 76.91           | 2.45          | 0.0            |                    |
| EX.MH31        | JUNCTION | 76.62           | 5.64          | 0.0            |                    |
| EX.MH34        | JUNCTION | 78.40           | 2.89          | 0.0            |                    |

2021-0821-13: 10 Year Proposed Results

| Item           | Type     | Value 1 | Value 2 | Value 3 | Value 4 |
|----------------|----------|---------|---------|---------|---------|
| EX.MH34-S      | JUNCTION | 81.29   | 0.40    | 0.0     |         |
| EX.MH36        | JUNCTION | 77.61   | 4.86    | 0.0     |         |
| EX.MH36-S      | JUNCTION | 82.28   | 0.40    | 0.0     |         |
| EX.MH43        | JUNCTION | 78.74   | 1.84    | 0.0     |         |
| EX.MH43-S      | JUNCTION | 80.58   | 0.30    | 0.0     |         |
| EX.MH44        | JUNCTION | 78.00   | 1.77    | 0.0     |         |
| EX.MH44-S      | JUNCTION | 79.77   | 0.30    | 0.0     |         |
| EX.MH45        | JUNCTION | 77.63   | 1.72    | 0.0     |         |
| EX.MH45-S      | JUNCTION | 79.35   | 0.30    | 0.0     |         |
| EX.MH46        | JUNCTION | 76.65   | 2.32    | 0.0     |         |
| J2             | JUNCTION | 78.40   | 5.80    | 0.0     |         |
| STM-MH1        | JUNCTION | 79.21   | 2.64    | 0.0     |         |
| STM-MH14       | JUNCTION | 79.01   | 2.35    | 0.0     |         |
| STM-MH14-S     | JUNCTION | 81.36   | 0.30    | 0.0     |         |
| STM-MH1-S      | JUNCTION | 81.85   | 0.30    | 0.0     | Yes     |
| EX.MH32        | OUTFALL  | 75.74   | 0.53    | 0.0     |         |
| Minor2         | OUTFALL  | 75.80   | 0.30    | 0.0     |         |
| RingRoadMajor  | OUTFALL  | 78.97   | 0.30    | 0.0     |         |
| Detention      | STORAGE  | 77.90   | 1.07    | 0.0     |         |
| Roof           | STORAGE  | 78.65   | 0.15    | 0.0     |         |
| SurfacePonding | STORAGE  | 79.60   | 0.28    | 0.0     |         |

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Link Summary

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| Name             | From Node | To Node       | Type    | Length |
|------------------|-----------|---------------|---------|--------|
| %Slope Roughness |           |               |         |        |
| -----            |           |               |         |        |
| C1               | STM-MH1   | STM-MH14      | CONDUIT | 61.7   |
| 0.3242 0.0130    |           |               |         |        |
| C10              | EX.MH43   | EX.MH44       | CONDUIT | 71.4   |
| 0.9944 0.0130    |           |               |         |        |
| C10-S            | EX.MH43-S | EX.MH44-S     | CONDUIT | 71.4   |
| 1.1345 0.0160    |           |               |         |        |
| C11              | EX.MH45   | EX.MH46       | CONDUIT | 37.1   |
| 1.8332 0.0130    |           |               |         |        |
| C11-S            | EX.MH45-S | RingRoadMajor | CONDUIT | 37.1   |
| 1.0243 0.0160    |           |               |         |        |
| C12              | EX.MH44   | EX.MH45       | CONDUIT | 35.1   |
| 1.0542 0.0130    |           |               |         |        |
| C12-S            | EX.MH44-S | EX.MH45-S     | CONDUIT | 35.1   |
| 1.1967 0.0160    |           |               |         |        |
| C13              | EX.MH46   | CBMH52        | CONDUIT | 10.5   |
| 0.6857 0.0130    |           |               |         |        |
| C14              | EX.MH34   | EX.MH36       | CONDUIT | 60.8   |
| 1.2995 0.0130    |           |               |         |        |

2021-0821-13: 10 Year Proposed Results

|           |                |                |         |      |
|-----------|----------------|----------------|---------|------|
| C14-S     | EX.MH34-S      | EX.MH43-S      | CONDUIT | 60.8 |
| 1.1678    | 0.0160         |                |         |      |
| C15       | EX.MH31        | EX.MH32        | CONDUIT | 86.4 |
| 1.0139    | 0.0130         |                |         |      |
| C1-S      | STM-MH1-S      | STM-MH14-S     | CONDUIT | 61.7 |
| 0.7943    | 0.0160         |                |         |      |
| C2        | J2             | EX.MH31        | CONDUIT | 16.0 |
| 0.0019    | 0.0130         |                |         |      |
| C3        | STM-MH14       | EX.MH34        | CONDUIT | 60.8 |
| 1.0042    | 0.0130         |                |         |      |
| C3-S      | STM-MH14-S     | EX.MH34-S      | CONDUIT | 60.8 |
| 0.1152    | 0.0160         |                |         |      |
| C4        | EX.MH36        | J2             | CONDUIT | 80.0 |
| -0.9913   | 0.0130         |                |         |      |
| C4-S      | EX.MH36-S      | EX.MH34-S      | CONDUIT | 80.0 |
| 1.2376    | 0.0160         |                |         |      |
| C5        | CBMH54         | Detention      | CONDUIT | 25.2 |
| 0.4960    | 0.0130         |                |         |      |
| C5-S      | CBMH54-S       | SurfacePonding | CONDUIT | 35.0 |
| 0.6857    | 0.0160         |                |         |      |
| C6        | CBMH38_Orifice | CBMH92         | CONDUIT | 39.8 |
| 0.9423    | 0.0130         |                |         |      |
| C7        | CBMH92         | CBMH94         | CONDUIT | 39.7 |
| 0.9950    | 0.0130         |                |         |      |
| C8        | CBMH94         | CBMH52         | CONDUIT | 33.0 |
| 1.0061    | 0.0130         |                |         |      |
| C9        | Detention      | CBMH38         | CONDUIT | 26.1 |
| 1.1878    | 0.0130         |                |         |      |
| CBMH52    | CBMH52         | Minor2         | CONDUIT | 39.0 |
| 1.9953    | 0.0130         |                |         |      |
| OR1       | CBMH38         | CBMH38_Orifice | ORIFICE |      |
| OL1       | SurfacePonding | Detention      | OUTLET  |      |
| RoofDrain | Roof           | J2             | OUTLET  |      |

\*\*\*\*\*  
 Cross Section Summary  
 \*\*\*\*\*

| Full<br>Conduit<br>Flow | Shape    | Full<br>Depth | Full<br>Area | Hyd.<br>Rad. | Max.<br>Width | No. of<br>Barrels |
|-------------------------|----------|---------------|--------------|--------------|---------------|-------------------|
| -----<br>C1             | CIRCULAR | 0.45          | 0.16         | 0.11         | 0.45          | 1                 |
| 162.35                  |          |               |              |              |               |                   |
| C10                     | CIRCULAR | 0.30          | 0.07         | 0.07         | 0.30          | 1                 |
| 96.44                   |          |               |              |              |               |                   |

2021-0821-13: 10 Year Proposed Results

|                  |             |      |      |      |       |   |
|------------------|-------------|------|------|------|-------|---|
| C10-S<br>4452.27 | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| C11<br>130.94    | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| C11-S<br>4230.49 | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| C12<br>99.29     | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| C12-S<br>4572.58 | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| C13<br>80.08     | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| C14<br>325.02    | CIRCULAR    | 0.45 | 0.16 | 0.11 | 0.45  | 1 |
| C14-S<br>4517.17 | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| C15<br>433.08    | CIRCULAR    | 0.53 | 0.22 | 0.13 | 0.53  | 1 |
| C1-S<br>3725.39  | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| C2<br>18.77      | CIRCULAR    | 0.53 | 0.22 | 0.13 | 0.53  | 1 |
| C3<br>285.72     | CIRCULAR    | 0.45 | 0.16 | 0.11 | 0.45  | 1 |
| C3-S<br>1418.90  | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| C4<br>428.21     | CIRCULAR    | 0.53 | 0.22 | 0.13 | 0.53  | 1 |
| C4-S<br>18752.45 | Full_Street | 0.40 | 8.00 | 0.20 | 40.00 | 1 |
| C5<br>68.11      | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| C5-S<br>13958.72 | Full_Street | 0.40 | 8.00 | 0.20 | 40.00 | 1 |
| C6<br>93.87      | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| C7<br>96.47      | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| C8<br>97.00      | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| C9<br>105.40     | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| CBMH52<br>136.60 | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |

\*\*\*\*\*  
 Street Summary  
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2021-0821-13: 10 Year Proposed Results

Street Street  
Area:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0005 | 0.0018 | 0.0041 | 0.0072 | 0.0113 |
| 0.0162 | 0.0221 | 0.0288 | 0.0365 | 0.0450 |
| 0.0545 | 0.0648 | 0.0761 | 0.0882 | 0.1013 |
| 0.1152 | 0.1301 | 0.1458 | 0.1625 | 0.1800 |
| 0.1985 | 0.2178 | 0.2381 | 0.2592 | 0.2813 |
| 0.3042 | 0.3281 | 0.3528 | 0.3785 | 0.4050 |
| 0.4325 | 0.4608 | 0.4901 | 0.5200 | 0.5500 |
| 0.5800 | 0.6100 | 0.6400 | 0.6700 | 0.7000 |
| 0.7300 | 0.7600 | 0.7900 | 0.8200 | 0.8500 |
| 0.8800 | 0.9100 | 0.9400 | 0.9700 | 1.0000 |

Hrad:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0151 | 0.0303 | 0.0454 | 0.0606 | 0.0757 |
| 0.0909 | 0.1060 | 0.1212 | 0.1363 | 0.1515 |
| 0.1666 | 0.1818 | 0.1969 | 0.2121 | 0.2272 |
| 0.2424 | 0.2575 | 0.2726 | 0.2878 | 0.3029 |
| 0.3181 | 0.3332 | 0.3484 | 0.3635 | 0.3787 |
| 0.3938 | 0.4090 | 0.4241 | 0.4393 | 0.4544 |
| 0.4696 | 0.4847 | 0.4999 | 0.5249 | 0.5548 |
| 0.5848 | 0.6147 | 0.6445 | 0.6743 | 0.7041 |
| 0.7338 | 0.7636 | 0.7932 | 0.8229 | 0.8525 |
| 0.8821 | 0.9116 | 0.9411 | 0.9706 | 1.0000 |

Width:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0300 | 0.0600 | 0.0900 | 0.1200 | 0.1500 |
| 0.1800 | 0.2100 | 0.2400 | 0.2700 | 0.3000 |
| 0.3300 | 0.3600 | 0.3900 | 0.4200 | 0.4500 |
| 0.4800 | 0.5100 | 0.5400 | 0.5700 | 0.6000 |
| 0.6300 | 0.6600 | 0.6900 | 0.7200 | 0.7500 |
| 0.7800 | 0.8100 | 0.8400 | 0.8700 | 0.9000 |
| 0.9300 | 0.9600 | 0.9900 | 1.0000 | 1.0000 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

Street Full\_Street  
Area:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0004 | 0.0016 | 0.0036 | 0.0064 | 0.0100 |
| 0.0144 | 0.0196 | 0.0256 | 0.0324 | 0.0400 |
| 0.0484 | 0.0576 | 0.0676 | 0.0784 | 0.0900 |
| 0.1024 | 0.1156 | 0.1296 | 0.1444 | 0.1600 |
| 0.1764 | 0.1936 | 0.2116 | 0.2304 | 0.2500 |
| 0.2704 | 0.2916 | 0.3136 | 0.3364 | 0.3600 |
| 0.3844 | 0.4096 | 0.4356 | 0.4624 | 0.4900 |
| 0.5184 | 0.5476 | 0.5776 | 0.6084 | 0.6400 |
| 0.6724 | 0.7056 | 0.7396 | 0.7744 | 0.8100 |
| 0.8464 | 0.8836 | 0.9216 | 0.9604 | 1.0000 |

Hrad:

2021-0821-13: 10 Year Proposed Results

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0200 | 0.0399 | 0.0599 | 0.0798 | 0.0998 |
| 0.1197 | 0.1397 | 0.1596 | 0.1796 | 0.1995 |
| 0.2195 | 0.2394 | 0.2594 | 0.2793 | 0.2993 |
| 0.3192 | 0.3392 | 0.3591 | 0.3791 | 0.3990 |
| 0.4190 | 0.4389 | 0.4589 | 0.4788 | 0.4988 |
| 0.5187 | 0.5387 | 0.5586 | 0.5786 | 0.5985 |
| 0.6185 | 0.6384 | 0.6584 | 0.6783 | 0.6983 |
| 0.7182 | 0.7382 | 0.7582 | 0.7784 | 0.7985 |
| 0.8187 | 0.8388 | 0.8590 | 0.8791 | 0.8993 |
| 0.9194 | 0.9396 | 0.9597 | 0.9799 | 1.0000 |

Width:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0200 | 0.0400 | 0.0600 | 0.0800 | 0.1000 |
| 0.1200 | 0.1400 | 0.1600 | 0.1800 | 0.2000 |
| 0.2200 | 0.2400 | 0.2600 | 0.2800 | 0.3000 |
| 0.3200 | 0.3400 | 0.3600 | 0.3800 | 0.4000 |
| 0.4200 | 0.4400 | 0.4600 | 0.4800 | 0.5000 |
| 0.5200 | 0.5400 | 0.5600 | 0.5800 | 0.6000 |
| 0.6200 | 0.6400 | 0.6600 | 0.6800 | 0.7000 |
| 0.7200 | 0.7400 | 0.7600 | 0.7800 | 0.8000 |
| 0.8200 | 0.8400 | 0.8600 | 0.8800 | 0.9000 |
| 0.9200 | 0.9400 | 0.9600 | 0.9800 | 1.0000 |

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Analysis Options

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Flow Units ..... LPS  
 Process Models:  
   Rainfall/Runoff ..... YES  
   RDII ..... NO  
   Snowmelt ..... NO  
   Groundwater ..... NO  
   Flow Routing ..... YES  
   Ponding Allowed ..... NO  
   Water Quality ..... NO  
 Infiltration Method ..... HORTON  
 Flow Routing Method ..... DYNWAVE  
 Surcharge Method ..... EXTRAN  
 Starting Date ..... 01/04/2023 00:00:00  
 Ending Date ..... 01/04/2023 15:00:00  
 Antecedent Dry Days ..... 0.0  
 Report Time Step ..... 00:01:00  
 Wet Time Step ..... 00:05:00  
 Dry Time Step ..... 00:05:00  
 Routing Time Step ..... 5.00 sec  
 Variable Time Step ..... YES  
 Maximum Trials ..... 8  
 Number of Threads ..... 4  
 Head Tolerance ..... 0.001524 m

2021-0821-13: 10 Year Proposed Results

```

*****
Runoff Quantity Continuity      Volume      Depth
                                hectare-m   mm
*****
Total Precipitation .....      0.177      49.534
Evaporation Loss .....         0.000      0.000
Infiltration Loss .....        0.032      8.919
Surface Runoff .....           0.075     20.915
Final Storage .....            0.071     19.837
Continuity Error (%) .....     -0.273
    
```

```

*****
Flow Routing Continuity      Volume      Volume
                                hectare-m   10^6 ltr
*****
Dry Weather Inflow .....      0.000      0.000
Wet Weather Inflow .....      0.075      0.749
Groundwater Inflow .....      0.000      0.000
RDII Inflow .....             0.000      0.000
External Inflow .....         0.034      0.339
External Outflow .....        0.106      1.061
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 .....      0.003      0.029
Continuity Error (%) .....     -0.226
    
```

```

*****
Highest Continuity Errors
*****
Node EX.MH36 (4.33%)
Node EX.MH44-S (1.63%)
Node EX.MH45-S (1.05%)
    
```

```

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

```

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

2021-0821-13: 10 Year Proposed Results

\*\*\*\*\*

Most Frequent Nonconverging Nodes

\*\*\*\*\*

- Node EX.MH32 (0.06%)
- Node Minor2 (0.06%)
- Node RingRoadMajor (0.06%)
- Node EX.MH36 (0.05%)
- Node CBMH38 (0.01%)

\*\*\*\*\*

Routing Time Step Summary

\*\*\*\*\*

```

Minimum Time Step      :      1.77 sec
Average Time Step      :      5.00 sec
Maximum Time Step      :      5.00 sec
% of Time in Steady State :      0.00
Average Iterations per Step :      2.04
% of Steps Not Converging :      0.06
Time Step Frequencies :
  5.000 - 3.155 sec    :      99.93 %
  3.155 - 1.991 sec    :      0.06 %
  1.991 - 1.256 sec    :      0.01 %
  1.256 - 0.792 sec    :      0.00 %
  0.792 - 0.500 sec    :      0.00 %
    
```

\*\*\*\*\*

Subcatchment Runoff Summary

\*\*\*\*\*

| -----        |        |          |        |       |       |       |        |
|--------------|--------|----------|--------|-------|-------|-------|--------|
| Perv         | Total  | Total    | Total  | Total | Total | Total | Imperv |
| Runoff       | Runoff | Total    | Peak   | Total | Evap  | Infil | Runoff |
| Subcatchment | Runoff | Precip   | Runoff | Runon | mm    | mm    | mm     |
| mm           | mm     | 10^6 ltr | mm     | mm    |       |       |        |
| -----        |        |          |        |       |       |       |        |
| 222          |        | 49.53    |        | 0.00  | 0.00  | 28.72 | 14.44  |
| 6.10         | 20.54  | 0.02     | 15.32  | 0.415 |       |       |        |
| 223          |        | 49.53    |        | 0.00  | 0.00  | 5.74  | 41.86  |
| 0.71         | 42.57  | 0.05     | 20.49  | 0.859 |       |       |        |
| 224          |        | 49.53    |        | 0.00  | 0.00  | 3.32  | 37.45  |



2021-0821-13: 10 Year Proposed Results

|       |       |      |        |       |      |       |       |
|-------|-------|------|--------|-------|------|-------|-------|
| 1.10  | 38.61 | 0.19 | 136.58 | 0.779 |      |       |       |
| 225a  |       |      | 49.53  | 0.00  | 0.00 | 7.37  | 39.71 |
| 1.58  | 41.29 | 0.08 | 55.73  | 0.834 |      |       |       |
| 225b  |       |      | 49.53  | 7.24  | 0.00 | 7.58  | 45.63 |
| 2.70  | 48.34 | 0.14 | 95.26  | 0.851 |      |       |       |
| 226   |       |      | 49.53  | 49.52 | 0.00 | 11.20 | 77.28 |
| 9.73  | 87.01 | 0.09 | 38.79  | 0.878 |      |       |       |
| 227   |       |      | 49.53  | 0.00  | 0.00 | 10.29 | 36.33 |
| 2.14  | 38.47 | 0.15 | 104.87 | 0.777 |      |       |       |
| 228   |       |      | 49.53  | 35.86 | 0.00 | 17.65 | 53.88 |
| 13.28 | 67.17 | 0.15 | 90.19  | 0.787 |      |       |       |
| 229   |       |      | 49.53  | 0.00  | 0.00 | 28.81 | 18.39 |
| 1.92  | 20.31 | 0.03 | 19.22  | 0.410 |      |       |       |
| EXT-1 |       |      | 49.53  | 0.00  | 0.00 | 4.95  | 0.00  |
| 0.00  | 0.00  | 0.00 | 0.00   | 0.000 |      |       |       |
| EXT-2 |       |      | 49.53  | 0.00  | 0.00 | 4.95  | 0.00  |
| 0.00  | 0.00  | 0.00 | 0.00   | 0.000 |      |       |       |
| EXT-3 |       |      | 49.53  | 0.00  | 0.00 | 6.93  | 0.00  |
| 0.00  | 0.00  | 0.00 | 0.00   | 0.000 |      |       |       |

\*\*\*\*\*  
 LID Performance Summary  
 \*\*\*\*\*

| Drain        | Initial | Final       | Continuity | Total  | Evap | Infil | Surface |
|--------------|---------|-------------|------------|--------|------|-------|---------|
| Outflow      | Storage | Storage     | Error      | Inflow | Loss | Loss  | Outflow |
| Subcatchment | mm      | LID Control | %          | mm     | mm   | mm    | mm      |
| 224          |         | GreenRoof   |            | 49.53  | 0.00 | 0.00  | 0.39    |
| 0.00         | 0.00    | 45.60       | 7.15       |        |      |       |         |

\*\*\*\*\*  
 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    |

2021-0821-13: 10 Year Proposed Results

|                |          |      |      |       |   |       |      |
|----------------|----------|------|------|-------|---|-------|------|
| CBMH38         | JUNCTION | 0.14 | 1.12 | 78.86 | 0 | 01:03 | 1.12 |
| CBMH38_Orifice | JUNCTION | 0.03 | 0.17 | 77.91 | 0 | 01:04 | 0.17 |
| CBMH52         | JUNCTION | 0.03 | 0.13 | 76.71 | 0 | 01:08 | 0.13 |
| CBMH54         | JUNCTION | 0.08 | 1.02 | 79.20 | 0 | 01:03 | 1.01 |
| CBMH54-S       | JUNCTION | 0.01 | 0.08 | 79.92 | 0 | 01:00 | 0.08 |
| CBMH92         | JUNCTION | 0.03 | 0.17 | 77.51 | 0 | 01:05 | 0.17 |
| CBMH94         | JUNCTION | 0.03 | 0.17 | 77.08 | 0 | 01:54 | 0.17 |
| EX.MH31        | JUNCTION | 0.05 | 0.08 | 76.70 | 0 | 01:28 | 0.08 |
| EX.MH34        | JUNCTION | 0.10 | 0.14 | 78.54 | 0 | 01:27 | 0.14 |
| EX.MH34-S      | JUNCTION | 0.01 | 0.06 | 81.35 | 0 | 01:01 | 0.06 |
| EX.MH36        | JUNCTION | 0.86 | 0.93 | 78.54 | 0 | 01:27 | 0.93 |
| EX.MH36-S      | JUNCTION | 0.01 | 0.05 | 82.33 | 0 | 01:00 | 0.05 |
| EX.MH43        | JUNCTION | 0.00 | 0.00 | 78.74 | 0 | 00:00 | 0.00 |
| EX.MH43-S      | JUNCTION | 0.00 | 0.04 | 80.62 | 0 | 01:04 | 0.04 |
| EX.MH44        | JUNCTION | 0.00 | 0.01 | 78.01 | 0 | 01:02 | 0.01 |
| EX.MH44-S      | JUNCTION | 0.00 | 0.04 | 79.81 | 0 | 01:06 | 0.04 |
| EX.MH45        | JUNCTION | 0.00 | 0.01 | 77.64 | 0 | 01:37 | 0.01 |
| EX.MH45-S      | JUNCTION | 0.00 | 0.04 | 79.39 | 0 | 01:08 | 0.04 |
| EX.MH46        | JUNCTION | 0.01 | 0.06 | 76.71 | 0 | 01:05 | 0.06 |
| J2             | JUNCTION | 0.09 | 0.14 | 78.54 | 0 | 01:28 | 0.14 |
| STM-MH1        | JUNCTION | 0.00 | 0.00 | 79.21 | 0 | 00:00 | 0.00 |
| STM-MH14       | JUNCTION | 0.05 | 0.05 | 79.06 | 0 | 00:21 | 0.05 |
| STM-MH14-S     | JUNCTION | 0.00 | 0.00 | 81.36 | 0 | 00:21 | 0.00 |
| STM-MH1-S      | JUNCTION | 0.04 | 0.04 | 81.89 | 0 | 15:00 | 0.04 |
| EX.MH32        | OUTFALL  | 0.05 | 0.08 | 75.82 | 0 | 01:28 | 0.08 |
| Minor2         | OUTFALL  | 0.02 | 0.13 | 75.93 | 0 | 01:09 | 0.13 |
| RingRoadMajor  | OUTFALL  | 0.00 | 0.04 | 79.01 | 0 | 01:08 | 0.04 |
| Detention      | STORAGE  | 0.24 | 1.07 | 78.97 | 0 | 01:03 | 1.07 |
| Roof           | STORAGE  | 0.01 | 0.06 | 78.71 | 0 | 01:24 | 0.06 |
| SurfacePonding | STORAGE  | 0.01 | 0.10 | 79.70 | 0 | 01:25 | 0.10 |

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

-----

| Total  | Flow    |      | Maximum | Maximum |             | Lateral  |
|--------|---------|------|---------|---------|-------------|----------|
| Inflow | Balance |      | Lateral | Total   | Time of Max | Inflow   |
| Volume | Error   |      | Inflow  | Inflow  | Occurrence  | Volume   |
| Node   | Percent | Type | LPS     | LPS     | days hr:min | 10^6 ltr |
| ltr    |         |      |         |         |             | 10^6     |

-----

2021-0821-13: 10 Year Proposed Results

|                |           |          |        |        |   |       |           |
|----------------|-----------|----------|--------|--------|---|-------|-----------|
| -----          |           |          |        |        |   |       |           |
| CBMH38         |           | JUNCTION | 0.00   | 49.77  | 0 | 01:03 | 0         |
| 0.359          | -0.086    |          |        |        |   |       |           |
| CBMH38_Orifice |           | JUNCTION | 0.00   | 49.67  | 0 | 01:03 | 0         |
| 0.359          | -0.007    |          |        |        |   |       |           |
| CBMH52         |           | JUNCTION | 0.00   | 49.89  | 0 | 01:06 | 0         |
| 0.363          | 0.006     |          |        |        |   |       |           |
| CBMH54         |           | JUNCTION | 93.02  | 93.02  | 0 | 01:00 | 0.143     |
| 0.143          | 0.340     |          |        |        |   |       |           |
| CBMH54-S       |           | JUNCTION | 124.87 | 124.87 | 0 | 01:00 | 0.225     |
| 0.225          | -0.620    |          |        |        |   |       |           |
| CBMH92         |           | JUNCTION | 0.00   | 49.62  | 0 | 01:05 | 0         |
| 0.359          | -0.000    |          |        |        |   |       |           |
| CBMH94         |           | JUNCTION | 0.00   | 49.62  | 0 | 01:06 | 0         |
| 0.359          | -0.003    |          |        |        |   |       |           |
| EX.MH31        |           | JUNCTION | 0.00   | 21.27  | 0 | 01:28 | 0         |
| 0.505          | 0.072     |          |        |        |   |       |           |
| EX.MH34        |           | JUNCTION | 0.00   | 6.39   | 0 | 00:43 | 0         |
| 0.338          | 0.421     |          |        |        |   |       |           |
| EX.MH34-S      |           | JUNCTION | -55.06 | 93.02  | 0 | 01:00 | -0.0578   |
| 0.145          | 0.471     |          |        |        |   |       |           |
| EX.MH36        |           | JUNCTION | 0.00   | 7.19   | 0 | 00:43 | 0         |
| 0.337          | 4.529     |          |        |        |   |       |           |
| EX.MH36-S      |           | JUNCTION | 95.26  | 95.26  | 0 | 01:00 | 0.143     |
| 0.143          | -0.478    |          |        |        |   |       |           |
| EX.MH43        |           | JUNCTION | 0.00   | 0.00   | 0 | 00:00 | 0         |
| 0              | 0.000 ltr |          |        |        |   |       |           |
| EX.MH43-S      |           | JUNCTION | -20.00 | 38.38  | 0 | 01:03 | -0.0735   |
| 0.0848         | -0.041    |          |        |        |   |       |           |
| EX.MH44        |           | JUNCTION | 0.08   | 0.08   | 0 | 00:59 | 0.000212  |
| 0.000212       | -0.214    |          |        |        |   |       |           |
| EX.MH44-S      |           | JUNCTION | -0.08  | 16.52  | 0 | 01:05 | -0.000212 |
| 0.0113         | 1.653     |          |        |        |   |       |           |
| EX.MH45        |           | JUNCTION | 0.08   | 0.16   | 0 | 01:03 | 0.000208  |
| 0.00042        | 0.535     |          |        |        |   |       |           |
| EX.MH45-S      |           | JUNCTION | -0.08  | 15.53  | 0 | 01:07 | -0.000208 |
| 0.0109         | 1.061     |          |        |        |   |       |           |
| EX.MH46        |           | JUNCTION | 0.08   | 0.65   | 0 | 00:54 | 0.00396   |
| 0.00444        | 0.207     |          |        |        |   |       |           |
| J2             |           | JUNCTION | 0.00   | 21.27  | 0 | 01:27 | 0         |
| 0.507          | 0.325     |          |        |        |   |       |           |
| STM-MH1        |           | JUNCTION | 0.00   | 0.00   | 0 | 00:00 | 0         |
| 0              | 0.000 ltr |          |        |        |   |       |           |
| STM-MH14       |           | JUNCTION | 6.28   | 6.28   | 0 | 00:21 | 0.338     |
| 0.338          | 0.134     |          |        |        |   |       |           |
| STM-MH14-S     |           | JUNCTION | -6.28  | 6.28   | 0 | 00:21 | -0.338    |
| 0.338          | 0.005     |          |        |        |   |       |           |
| STM-MH1-S      |           | JUNCTION | 6.28   | 6.28   | 0 | 00:00 | 0.339     |
| 0.339          | 0.226     |          |        |        |   |       |           |

2021-0821-13: 10 Year Proposed Results

|                |        |         |         |        |   |       |         |
|----------------|--------|---------|---------|--------|---|-------|---------|
| EX.MH32        |        | OUTFALL | 19.22   | 31.98  | 0 | 01:00 | 0.0311  |
| 0.536          | 0.000  |         |         |        |   |       |         |
| Minor2         |        | OUTFALL | 0.00    | 49.87  | 0 | 01:09 | 0       |
| 0.363          | 0.000  |         |         |        |   |       |         |
| RingRoadMajor  |        | OUTFALL | 90.19   | 90.19  | 0 | 01:00 | 0.149   |
| 0.163          | 0.000  |         |         |        |   |       |         |
| Detention      |        | STORAGE | 123.47  | 216.68 | 0 | 01:00 | 0.226   |
| 0.5            | -0.303 |         |         |        |   |       |         |
| Roof           |        | STORAGE | 136.58  | 136.58 | 0 | 01:00 | 0.185   |
| 0.185          | 0.002  |         |         |        |   |       |         |
| SurfacePonding |        | STORAGE | -123.47 | 135.41 | 0 | 01:04 | -0.0935 |
| 0.26           | 0.612  |         |         |        |   |       |         |

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

Surcharging occurs when water rises above the top of the highest conduit.

| Node    | Type     | Hours Surcharged | Max. Height Above Crown Meters | Min. Depth Below Rim Meters |
|---------|----------|------------------|--------------------------------|-----------------------------|
| CBMH38  | JUNCTION | 2.18             | 0.824                          | 0.786                       |
| CBMH54  | JUNCTION | 1.58             | 0.723                          | 0.642                       |
| EX.MH36 | JUNCTION | 14.30            | 0.404                          | 3.931                       |

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

Flooding refers to all water that overflows a node, whether it ponds or not.

| Node      | Hours Flooded | Maximum Rate LPS | Time of Max Occurrence days hr:min | Total Flood Volume 10^6 ltr | Maximum Poned Depth Meters |
|-----------|---------------|------------------|------------------------------------|-----------------------------|----------------------------|
| Detention | 0.84          | 136.60           | 0 01:04                            | 0.133                       | 0.000                      |

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

-----

2021-0821-13: 10 Year Proposed Results

```

-----
Max      Maximum
Occurrence  Outflow
Storage Unit
hr:min      LPS

Average    Avg    Evap  Exfil    Maximum    Max    Time of
Volume    Pcnt   Pcnt  Pcnt     Volume    Pcnt
1000 m³   Full   Loss  Loss     1000 m³   Full   days
  
```

```

-----
Detention
01:03      49.77
Roof
01:24      15.00
SurfacePonding
01:25      123.93

0.021    19.4    0.0    0.0     0.109    100.0    0
0.027    8.8     0.0    0.0     0.120    38.7     0
0.002    0.4     0.0    0.0     0.042    8.5      0
  
```

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

```

-----
Flow      Avg      Max      Total
Freq      Flow     Flow     Volume
Pcnt      LPS      LPS      10^6 ltr
-----
EX.MH32   97.54    10.18    31.98    0.536
Minor2    94.40    7.14     49.87    0.363
RingRoadMajor  25.13    11.97    90.19    0.163
-----
System    72.36    29.29    159.38    1.062
  
```

\*\*\*\*\*  
 Street Flow Summary  
 \*\*\*\*\*

```

-----
-----
Peak      Avg.    Bypass    Back    Peak    Peak
Flow      Flow    Flow      Maximum Peak  Maximum
Capture   Capture Bypass    Flow    Capture Bypass
Street   Street  Flow      Spread  Depth  Inlet
Pcnt     Conduit Flow    / Inlet  m      Flow
Pcnt     Pcnt    LPS      Pcnt    LPS    m      LPS
Pcnt     Pcnt   Pcnt     Pcnt    LPS    LPS
Location
  
```

2021-0821-13: 10 Year Proposed Results

|        |        |         |       |       |       |          |   |
|--------|--------|---------|-------|-------|-------|----------|---|
| C10-S  |        | 16.519  | 1.850 | 0.037 | Inlet | ON-GRADE | 4 |
| 0.48   | 29.82  | 70.24   | 0.00  | 0.02  | 16.44 |          |   |
| C11-S  |        | 14.633  | 1.835 | 0.037 | Inlet | ON-SAG   | 4 |
| 0.55   | 33.86  | 73.99   | 0.00  | 0.02  | 14.55 |          |   |
| C12-S  |        | 15.534  | 1.818 | 0.036 | Inlet | ON-GRADE | 4 |
| 0.52   | 29.32  | 67.39   | 0.00  | 0.02  | 15.45 |          |   |
| C14-S  |        | 38.377  | 2.296 | 0.046 | Inlet | ON-GRADE | 1 |
| 52.11  | 98.84  | 4.00    | 0.00  | 20.00 | 18.38 |          |   |
| C1-S   |        | 6.280   | 0.915 | 0.018 | Inlet | ON-GRADE | 1 |
| 100.00 | 100.00 | 0.00    | 0.00  | 6.28  | 0.00  |          |   |
| C3-S   |        | 0.000   | 1.427 | 0.029 | Inlet | ON-GRADE | 1 |
| C4-S   |        | 93.019  | 2.755 | 0.055 | Inlet | ON-GRADE | 4 |
| 100.00 | 100.00 | 0.00    | 0.00  | 11.63 | 0.00  |          |   |
| C5-S   |        | 123.467 | 3.639 | 0.073 | Inlet | ON-GRADE | 7 |
| 100.00 | 97.83  | 3.63    | 6.99  | 8.82  | 0.00  |          |   |

\*\*\*\*\*

Link Flow Summary

\*\*\*\*\*

| Link  | Type    | Maximum<br> Flow <br>LPS | 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 | 0.00                     | 0 00:00                                  | 0.00                        | 0.00                 | 0.05                  |
| C10   | CONDUIT | 0.00                     | 0 00:00                                  | 0.00                        | 0.00                 | 0.00                  |
| C10-S | CONDUIT | 16.52                    | 0 01:05                                  | 0.56                        | 0.00                 | 0.12                  |
| C11   | CONDUIT | 0.16                     | 0 01:37                                  | 0.33                        | 0.00                 | 0.03                  |
| C11-S | CONDUIT | 14.63                    | 0 01:08                                  | 0.43                        | 0.00                 | 0.12                  |
| C12   | CONDUIT | 0.08                     | 0 01:03                                  | 0.27                        | 0.00                 | 0.02                  |
| C12-S | CONDUIT | 15.53                    | 0 01:07                                  | 0.51                        | 0.00                 | 0.12                  |
| C13   | CONDUIT | 0.65                     | 0 00:54                                  | 0.19                        | 0.01                 | 0.32                  |
| C14   | CONDUIT | 7.19                     | 0 00:43                                  | 0.79                        | 0.02                 | 0.65                  |
| C14-S | CONDUIT | 38.38                    | 0 01:03                                  | 1.11                        | 0.01                 | 0.15                  |
| C15   | CONDUIT | 21.27                    | 0 01:28                                  | 1.04                        | 0.05                 | 0.15                  |
| C1-S  | CONDUIT | 6.28                     | 0 00:21                                  | 0.76                        | 0.00                 | 0.06                  |
| C2    | CONDUIT | 21.27                    | 0 01:28                                  | 0.61                        | 1.13                 | 0.22                  |
| C3    | CONDUIT | 6.39                     | 0 00:43                                  | 0.77                        | 0.02                 | 0.21                  |
| C3-S  | CONDUIT | 0.00                     | 0 00:26                                  | 0.00                        | 0.00                 | 0.10                  |
| C4    | CONDUIT | 7.27                     | 0 00:43                                  | 0.06                        | 0.02                 | 0.63                  |
| C4-S  | CONDUIT | 93.02                    | 0 01:00                                  | 0.64                        | 0.00                 | 0.14                  |
| C5    | CONDUIT | 92.85                    | 0 01:00                                  | 1.31                        | 1.36                 | 1.00                  |
| C5-S  | CONDUIT | 123.47                   | 0 01:00                                  | 1.40                        | 0.01                 | 0.18                  |
| C6    | CONDUIT | 49.62                    | 0 01:05                                  | 1.25                        | 0.53                 | 0.55                  |



2021-0821-13: 10 Year Proposed Results

|        |      |      |      |      |      |      |      |      |      |
|--------|------|------|------|------|------|------|------|------|------|
| C2     | 1.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.98 | 0.00 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C3     | 1.00 | 0.00 | 0.00 | 0.00 | 0.95 | 0.05 | 0.00 | 0.00 | 0.95 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C3-S   | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.97 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C4     | 1.00 | 0.00 | 0.02 | 0.00 | 0.98 | 0.00 | 0.00 | 0.00 | 0.02 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C4-S   | 1.00 | 0.02 | 0.00 | 0.00 | 0.93 | 0.05 | 0.00 | 0.00 | 0.93 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C5     | 1.00 | 0.03 | 0.60 | 0.00 | 0.34 | 0.00 | 0.00 | 0.03 | 0.81 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C5-S   | 1.00 | 0.02 | 0.00 | 0.00 | 0.07 | 0.90 | 0.00 | 0.00 | 0.07 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C6     | 1.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.95 | 0.00 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C7     | 1.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.95 | 0.00 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C8     | 1.00 | 0.05 | 0.00 | 0.00 | 0.59 | 0.36 | 0.00 | 0.00 | 0.60 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C9     | 1.00 | 0.05 | 0.00 | 0.00 | 0.94 | 0.00 | 0.00 | 0.00 | 0.80 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| CBMH52 | 1.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.94 | 0.00 | 0.00 | 0.00 |
| 0.00   |      |      |      |      |      |      |      |      |      |

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

| Conduit | -----<br>Both Ends | Hours Full<br>Upstream | -----<br>Dnstream | Hours<br>Above Full<br>Normal Flow | Hours<br>Capacity<br>Limited |
|---------|--------------------|------------------------|-------------------|------------------------------------|------------------------------|
| C14     | 0.01               | 0.01                   | 14.37             | 0.01                               | 0.01                         |
| C2      | 0.01               | 0.01                   | 0.01              | 1.33                               | 0.01                         |
| C4      | 0.01               | 0.01                   | 14.30             | 0.01                               | 0.01                         |
| C5      | 1.56               | 1.58                   | 1.73              | 0.14                               | 0.15                         |
| C9      | 1.73               | 1.73                   | 2.18              | 0.01                               | 0.01                         |

Analysis begun on: Fri Apr 12 11:13:45 2024  
 Analysis ended on: Fri Apr 12 11:13:46 2024  
 Total elapsed time: 00:00:01



2021-0821-13: 25 Year Proposed Results

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.3)

-----  
 WARNING 04: minimum elevation drop used for Conduit C2  
 WARNING 02: maximum depth increased for Node CBMH54-S  
 WARNING 02: maximum depth increased for Node EX.MH34-S  
 WARNING 02: maximum depth increased for Node EX.MH36-S

\*\*\*\*\*

Element Count

\*\*\*\*\*

Number of rain gages ..... 7  
 Number of subcatchments ... 12  
 Number of nodes ..... 30  
 Number of links ..... 27  
 Number of pollutants ..... 0  
 Number of land uses ..... 0

\*\*\*\*\*

Raingage Summary

\*\*\*\*\*

| Name  | Data Source | Data Type | Recording Interval |
|-------|-------------|-----------|--------------------|
| 100Yr | 100Yr       | INTENSITY | 10 min.            |
| 10Yr  | 10Yr        | INTENSITY | 10 min.            |
| 25_yr | 25_yr       | INTENSITY | 10 min.            |
| 25Yr  | 25Yr        | INTENSITY | 10 min.            |
| 2Yr   | 2Yr         | INTENSITY | 10 min.            |
| 50Yr  | 50Yr        | INTENSITY | 10 min.            |
| 5Yr   | 5Yr         | INTENSITY | 10 min.            |

\*\*\*\*\*

Subcatchment Summary

\*\*\*\*\*

| Name   | Area | Width  | %Imperv | %Slope | Rain Gage |
|--------|------|--------|---------|--------|-----------|
| Outlet |      |        |         |        |           |
| 222    | 0.10 | 52.00  | 30.00   | 0.5000 | 25_yr     |
| 225b   |      |        |         |        |           |
| 223    | 0.11 | 20.00  | 87.00   | 0.0100 | 25_yr     |
| 226    |      |        |         |        |           |
| 224    | 0.48 | 320.00 | 90.00   | 2.0000 | 25_yr     |
| Roof   |      |        |         |        |           |

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|               |      |       |       |        |       |
|---------------|------|-------|-------|--------|-------|
| 225a          | 0.20 | 26.40 | 82.00 | 0.5000 | 25_yr |
| 228           |      |       |       |        |       |
| 225b          | 0.29 | 39.33 | 82.00 | 1.0000 | 25_yr |
| EX.MH36-S     |      |       |       |        |       |
| 226           | 0.10 | 15.08 | 79.00 | 1.5000 | 25_yr |
| EX.MH34-S     |      |       |       |        |       |
| 227           | 0.39 | 46.35 | 75.00 | 1.0000 | 25_yr |
| CBMH54-S      |      |       |       |        |       |
| 228           | 0.23 | 27.47 | 64.00 | 2.0000 | 25_yr |
| RingRoadMajor |      |       |       |        |       |
| 229           | 0.15 | 15.30 | 38.00 | 0.1000 | 25_yr |
| EX.MH32       |      |       |       |        |       |
| EXT-1         | 0.28 | 10.00 | 90.00 | 0.0000 | 25_yr |
| EX.MH34-S     |      |       |       |        |       |
| EXT-2         | 0.28 | 10.00 | 90.00 | 0.0000 | 25_yr |
| RingRoadMajor |      |       |       |        |       |
| EXT-3         | 0.96 | 54.97 | 86.00 | 0.0000 | 25_yr |
| 223           |      |       |       |        |       |

\*\*\*\*\*  
 LID Control Summary  
 \*\*\*\*\*

| Imperv<br>Subcatchment<br>Treated | % Perv<br>LID Control<br>Treated | No. of<br>Units | Unit<br>Area | Unit<br>Width | % Area<br>Covered | % |
|-----------------------------------|----------------------------------|-----------------|--------------|---------------|-------------------|---|
| 224<br>0.00                       | GreenRoof<br>0.00                | 1               | 650.00       | 0.00          | 13.54             |   |

\*\*\*\*\*  
 Node Summary  
 \*\*\*\*\*

| Name           | Type     | Invert<br>Elev. | Max.<br>Depth | Ponded<br>Area | External<br>Inflow |
|----------------|----------|-----------------|---------------|----------------|--------------------|
| CBMH38         | JUNCTION | 77.74           | 1.91          | 0.0            |                    |
| CBMH38_Orifice | JUNCTION | 77.74           | 1.91          | 0.0            |                    |
| CBMH52         | JUNCTION | 76.58           | 2.51          | 0.0            |                    |
| CBMH54         | JUNCTION | 78.18           | 1.67          | 0.0            |                    |
| CBMH54-S       | JUNCTION | 79.84           | 0.40          | 0.0            |                    |
| CBMH92         | JUNCTION | 77.33           | 2.25          | 0.0            |                    |
| CBMH94         | JUNCTION | 76.91           | 2.45          | 0.0            |                    |
| EX.MH31        | JUNCTION | 76.62           | 5.64          | 0.0            |                    |
| EX.MH34        | JUNCTION | 78.40           | 2.89          | 0.0            |                    |

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| Item           | Type     | Value 1 | Value 2 | Value 3 | Value 4 |
|----------------|----------|---------|---------|---------|---------|
| EX.MH34-S      | JUNCTION | 81.29   | 0.40    | 0.0     |         |
| EX.MH36        | JUNCTION | 77.61   | 4.86    | 0.0     |         |
| EX.MH36-S      | JUNCTION | 82.28   | 0.40    | 0.0     |         |
| EX.MH43        | JUNCTION | 78.74   | 1.84    | 0.0     |         |
| EX.MH43-S      | JUNCTION | 80.58   | 0.30    | 0.0     |         |
| EX.MH44        | JUNCTION | 78.00   | 1.77    | 0.0     |         |
| EX.MH44-S      | JUNCTION | 79.77   | 0.30    | 0.0     |         |
| EX.MH45        | JUNCTION | 77.63   | 1.72    | 0.0     |         |
| EX.MH45-S      | JUNCTION | 79.35   | 0.30    | 0.0     |         |
| EX.MH46        | JUNCTION | 76.65   | 2.32    | 0.0     |         |
| J2             | JUNCTION | 78.40   | 5.80    | 0.0     |         |
| STM-MH1        | JUNCTION | 79.21   | 2.64    | 0.0     |         |
| STM-MH14       | JUNCTION | 79.01   | 2.35    | 0.0     |         |
| STM-MH14-S     | JUNCTION | 81.36   | 0.30    | 0.0     |         |
| STM-MH1-S      | JUNCTION | 81.85   | 0.30    | 0.0     | Yes     |
| EX.MH32        | OUTFALL  | 75.74   | 0.53    | 0.0     |         |
| Minor2         | OUTFALL  | 75.80   | 0.30    | 0.0     |         |
| RingRoadMajor  | OUTFALL  | 78.97   | 0.30    | 0.0     |         |
| Detention      | STORAGE  | 77.90   | 1.07    | 0.0     |         |
| Roof           | STORAGE  | 78.65   | 0.15    | 0.0     |         |
| SurfacePonding | STORAGE  | 79.60   | 0.28    | 0.0     |         |

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Link Summary

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| Name             | From Node | To Node       | Type    | Length |
|------------------|-----------|---------------|---------|--------|
| %Slope Roughness |           |               |         |        |
| -----            |           |               |         |        |
| C1               | STM-MH1   | STM-MH14      | CONDUIT | 61.7   |
| 0.3242 0.0130    |           |               |         |        |
| C10              | EX.MH43   | EX.MH44       | CONDUIT | 71.4   |
| 0.9944 0.0130    |           |               |         |        |
| C10-S            | EX.MH43-S | EX.MH44-S     | CONDUIT | 71.4   |
| 1.1345 0.0160    |           |               |         |        |
| C11              | EX.MH45   | EX.MH46       | CONDUIT | 37.1   |
| 1.8332 0.0130    |           |               |         |        |
| C11-S            | EX.MH45-S | RingRoadMajor | CONDUIT | 37.1   |
| 1.0243 0.0160    |           |               |         |        |
| C12              | EX.MH44   | EX.MH45       | CONDUIT | 35.1   |
| 1.0542 0.0130    |           |               |         |        |
| C12-S            | EX.MH44-S | EX.MH45-S     | CONDUIT | 35.1   |
| 1.1967 0.0160    |           |               |         |        |
| C13              | EX.MH46   | CBMH52        | CONDUIT | 10.5   |
| 0.6857 0.0130    |           |               |         |        |
| C14              | EX.MH34   | EX.MH36       | CONDUIT | 60.8   |
| 1.2995 0.0130    |           |               |         |        |

2021-0821-13: 25 Year Proposed Results

|           |                |                |         |      |
|-----------|----------------|----------------|---------|------|
| C14-S     | EX.MH34-S      | EX.MH43-S      | CONDUIT | 60.8 |
| 1.1678    | 0.0160         |                |         |      |
| C15       | EX.MH31        | EX.MH32        | CONDUIT | 86.4 |
| 1.0139    | 0.0130         |                |         |      |
| C1-S      | STM-MH1-S      | STM-MH14-S     | CONDUIT | 61.7 |
| 0.7943    | 0.0160         |                |         |      |
| C2        | J2             | EX.MH31        | CONDUIT | 16.0 |
| 0.0019    | 0.0130         |                |         |      |
| C3        | STM-MH14       | EX.MH34        | CONDUIT | 60.8 |
| 1.0042    | 0.0130         |                |         |      |
| C3-S      | STM-MH14-S     | EX.MH34-S      | CONDUIT | 60.8 |
| 0.1152    | 0.0160         |                |         |      |
| C4        | EX.MH36        | J2             | CONDUIT | 80.0 |
| -0.9913   | 0.0130         |                |         |      |
| C4-S      | EX.MH36-S      | EX.MH34-S      | CONDUIT | 80.0 |
| 1.2376    | 0.0160         |                |         |      |
| C5        | CBMH54         | Detention      | CONDUIT | 25.2 |
| 0.4960    | 0.0130         |                |         |      |
| C5-S      | CBMH54-S       | SurfacePonding | CONDUIT | 35.0 |
| 0.6857    | 0.0160         |                |         |      |
| C6        | CBMH38_Orifice | CBMH92         | CONDUIT | 39.8 |
| 0.9423    | 0.0130         |                |         |      |
| C7        | CBMH92         | CBMH94         | CONDUIT | 39.7 |
| 0.9950    | 0.0130         |                |         |      |
| C8        | CBMH94         | CBMH52         | CONDUIT | 33.0 |
| 1.0061    | 0.0130         |                |         |      |
| C9        | Detention      | CBMH38         | CONDUIT | 26.1 |
| 1.1878    | 0.0130         |                |         |      |
| CBMH52    | CBMH52         | Minor2         | CONDUIT | 39.0 |
| 1.9953    | 0.0130         |                |         |      |
| OR1       | CBMH38         | CBMH38_Orifice | ORIFICE |      |
| OL1       | SurfacePonding | Detention      | OUTLET  |      |
| RoofDrain | Roof           | J2             | OUTLET  |      |

\*\*\*\*\*  
 Cross Section Summary  
 \*\*\*\*\*

| Full<br>Conduit<br>Flow | Shape    | Full<br>Depth | Full<br>Area | Hyd.<br>Rad. | Max.<br>Width | No. of<br>Barrels |
|-------------------------|----------|---------------|--------------|--------------|---------------|-------------------|
| -----<br>C1<br>162.35   | CIRCULAR | 0.45          | 0.16         | 0.11         | 0.45          | 1                 |
| C10<br>96.44            | CIRCULAR | 0.30          | 0.07         | 0.07         | 0.30          | 1                 |

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|          |             |      |      |      |       |   |
|----------|-------------|------|------|------|-------|---|
| C10-S    | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 4452.27  |             |      |      |      |       |   |
| C11      | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 130.94   |             |      |      |      |       |   |
| C11-S    | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 4230.49  |             |      |      |      |       |   |
| C12      | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 99.29    |             |      |      |      |       |   |
| C12-S    | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 4572.58  |             |      |      |      |       |   |
| C13      | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 80.08    |             |      |      |      |       |   |
| C14      | CIRCULAR    | 0.45 | 0.16 | 0.11 | 0.45  | 1 |
| 325.02   |             |      |      |      |       |   |
| C14-S    | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 4517.17  |             |      |      |      |       |   |
| C15      | CIRCULAR    | 0.53 | 0.22 | 0.13 | 0.53  | 1 |
| 433.08   |             |      |      |      |       |   |
| C1-S     | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 3725.39  |             |      |      |      |       |   |
| C2       | CIRCULAR    | 0.53 | 0.22 | 0.13 | 0.53  | 1 |
| 18.77    |             |      |      |      |       |   |
| C3       | CIRCULAR    | 0.45 | 0.16 | 0.11 | 0.45  | 1 |
| 285.72   |             |      |      |      |       |   |
| C3-S     | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 1418.90  |             |      |      |      |       |   |
| C4       | CIRCULAR    | 0.53 | 0.22 | 0.13 | 0.53  | 1 |
| 428.21   |             |      |      |      |       |   |
| C4-S     | Full_Street | 0.40 | 8.00 | 0.20 | 40.00 | 1 |
| 18752.45 |             |      |      |      |       |   |
| C5       | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 68.11    |             |      |      |      |       |   |
| C5-S     | Full_Street | 0.40 | 8.00 | 0.20 | 40.00 | 1 |
| 13958.72 |             |      |      |      |       |   |
| C6       | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 93.87    |             |      |      |      |       |   |
| C7       | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 96.47    |             |      |      |      |       |   |
| C8       | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 97.00    |             |      |      |      |       |   |
| C9       | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 105.40   |             |      |      |      |       |   |
| CBMH52   | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 136.60   |             |      |      |      |       |   |

\*\*\*\*\*  
 Street Summary  
 \*\*\*\*\*

2021-0821-13: 25 Year Proposed Results

Street Street  
Area:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0005 | 0.0018 | 0.0041 | 0.0072 | 0.0113 |
| 0.0162 | 0.0221 | 0.0288 | 0.0365 | 0.0450 |
| 0.0545 | 0.0648 | 0.0761 | 0.0882 | 0.1013 |
| 0.1152 | 0.1301 | 0.1458 | 0.1625 | 0.1800 |
| 0.1985 | 0.2178 | 0.2381 | 0.2592 | 0.2813 |
| 0.3042 | 0.3281 | 0.3528 | 0.3785 | 0.4050 |
| 0.4325 | 0.4608 | 0.4901 | 0.5200 | 0.5500 |
| 0.5800 | 0.6100 | 0.6400 | 0.6700 | 0.7000 |
| 0.7300 | 0.7600 | 0.7900 | 0.8200 | 0.8500 |
| 0.8800 | 0.9100 | 0.9400 | 0.9700 | 1.0000 |

Hrad:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0151 | 0.0303 | 0.0454 | 0.0606 | 0.0757 |
| 0.0909 | 0.1060 | 0.1212 | 0.1363 | 0.1515 |
| 0.1666 | 0.1818 | 0.1969 | 0.2121 | 0.2272 |
| 0.2424 | 0.2575 | 0.2726 | 0.2878 | 0.3029 |
| 0.3181 | 0.3332 | 0.3484 | 0.3635 | 0.3787 |
| 0.3938 | 0.4090 | 0.4241 | 0.4393 | 0.4544 |
| 0.4696 | 0.4847 | 0.4999 | 0.5249 | 0.5548 |
| 0.5848 | 0.6147 | 0.6445 | 0.6743 | 0.7041 |
| 0.7338 | 0.7636 | 0.7932 | 0.8229 | 0.8525 |
| 0.8821 | 0.9116 | 0.9411 | 0.9706 | 1.0000 |

Width:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0300 | 0.0600 | 0.0900 | 0.1200 | 0.1500 |
| 0.1800 | 0.2100 | 0.2400 | 0.2700 | 0.3000 |
| 0.3300 | 0.3600 | 0.3900 | 0.4200 | 0.4500 |
| 0.4800 | 0.5100 | 0.5400 | 0.5700 | 0.6000 |
| 0.6300 | 0.6600 | 0.6900 | 0.7200 | 0.7500 |
| 0.7800 | 0.8100 | 0.8400 | 0.8700 | 0.9000 |
| 0.9300 | 0.9600 | 0.9900 | 1.0000 | 1.0000 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

Street Full\_Street  
Area:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0004 | 0.0016 | 0.0036 | 0.0064 | 0.0100 |
| 0.0144 | 0.0196 | 0.0256 | 0.0324 | 0.0400 |
| 0.0484 | 0.0576 | 0.0676 | 0.0784 | 0.0900 |
| 0.1024 | 0.1156 | 0.1296 | 0.1444 | 0.1600 |
| 0.1764 | 0.1936 | 0.2116 | 0.2304 | 0.2500 |
| 0.2704 | 0.2916 | 0.3136 | 0.3364 | 0.3600 |
| 0.3844 | 0.4096 | 0.4356 | 0.4624 | 0.4900 |
| 0.5184 | 0.5476 | 0.5776 | 0.6084 | 0.6400 |
| 0.6724 | 0.7056 | 0.7396 | 0.7744 | 0.8100 |
| 0.8464 | 0.8836 | 0.9216 | 0.9604 | 1.0000 |

Hrad:

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|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0200 | 0.0399 | 0.0599 | 0.0798 | 0.0998 |
| 0.1197 | 0.1397 | 0.1596 | 0.1796 | 0.1995 |
| 0.2195 | 0.2394 | 0.2594 | 0.2793 | 0.2993 |
| 0.3192 | 0.3392 | 0.3591 | 0.3791 | 0.3990 |
| 0.4190 | 0.4389 | 0.4589 | 0.4788 | 0.4988 |
| 0.5187 | 0.5387 | 0.5586 | 0.5786 | 0.5985 |
| 0.6185 | 0.6384 | 0.6584 | 0.6783 | 0.6983 |
| 0.7182 | 0.7382 | 0.7582 | 0.7784 | 0.7985 |
| 0.8187 | 0.8388 | 0.8590 | 0.8791 | 0.8993 |
| 0.9194 | 0.9396 | 0.9597 | 0.9799 | 1.0000 |

Width:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0200 | 0.0400 | 0.0600 | 0.0800 | 0.1000 |
| 0.1200 | 0.1400 | 0.1600 | 0.1800 | 0.2000 |
| 0.2200 | 0.2400 | 0.2600 | 0.2800 | 0.3000 |
| 0.3200 | 0.3400 | 0.3600 | 0.3800 | 0.4000 |
| 0.4200 | 0.4400 | 0.4600 | 0.4800 | 0.5000 |
| 0.5200 | 0.5400 | 0.5600 | 0.5800 | 0.6000 |
| 0.6200 | 0.6400 | 0.6600 | 0.6800 | 0.7000 |
| 0.7200 | 0.7400 | 0.7600 | 0.7800 | 0.8000 |
| 0.8200 | 0.8400 | 0.8600 | 0.8800 | 0.9000 |
| 0.9200 | 0.9400 | 0.9600 | 0.9800 | 1.0000 |

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Analysis Options

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Flow Units ..... LPS  
 Process Models:  
   Rainfall/Runoff ..... YES  
   RDII ..... NO  
   Snowmelt ..... NO  
   Groundwater ..... NO  
   Flow Routing ..... YES  
   Ponding Allowed ..... NO  
   Water Quality ..... NO  
 Infiltration Method ..... HORTON  
 Flow Routing Method ..... DYNWAVE  
 Surcharge Method ..... EXTRAN  
 Starting Date ..... 01/04/2023 00:00:00  
 Ending Date ..... 01/04/2023 15:00:00  
 Antecedent Dry Days ..... 0.0  
 Report Time Step ..... 00:01:00  
 Wet Time Step ..... 00:05:00  
 Dry Time Step ..... 00:05:00  
 Routing Time Step ..... 5.00 sec  
 Variable Time Step ..... YES  
 Maximum Trials ..... 8  
 Number of Threads ..... 4  
 Head Tolerance ..... 0.001524 m

2021-0821-13: 25 Year Proposed Results

```

*****
Runoff Quantity Continuity      Volume      Depth
                                hectare-m   mm
*****
Total Precipitation .....      0.209      58.261
Evaporation Loss .....         0.000      0.000
Infiltration Loss .....        0.035      9.757
Surface Runoff .....           0.091      25.481
Final Storage .....            0.083      23.070
Continuity Error (%) .....     -0.081
    
```

```

*****
Flow Routing Continuity      Volume      Volume
                                hectare-m   10^6 ltr
*****
Dry Weather Inflow .....      0.000      0.000
Wet Weather Inflow .....      0.091      0.913
Groundwater Inflow .....      0.000      0.000
RDII Inflow .....             0.000      0.000
External Inflow .....         0.034      0.339
External Outflow .....        0.122      1.224
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 .....      0.003      0.029
Continuity Error (%) .....     -0.129
    
```

```

*****
Highest Continuity Errors
*****
Node EX.MH36 (4.33%)
Node EX.MH44-S (1.09%)
    
```

```

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

```

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



2021-0821-13: 25 Year Proposed Results

\*\*\*\*\*

Most Frequent Nonconverging Nodes

\*\*\*\*\*

- Node EX.MH32 (0.06%)
- Node Minor2 (0.06%)
- Node RingRoadMajor (0.06%)
- Node EX.MH36 (0.04%)
- Node CBMH38 (0.01%)

\*\*\*\*\*

Routing Time Step Summary

\*\*\*\*\*

Minimum Time Step : 0.77 sec  
 Average Time Step : 5.00 sec  
 Maximum Time Step : 5.00 sec  
 % of Time in Steady State : 0.00  
 Average Iterations per Step : 2.04  
 % of Steps Not Converging : 0.06  
 Time Step Frequencies :  
     5.000 - 3.155 sec : 99.94 %  
     3.155 - 1.991 sec : 0.04 %  
     1.991 - 1.256 sec : 0.02 %  
     1.256 - 0.792 sec : 0.00 %  
     0.792 - 0.500 sec : 0.01 %

\*\*\*\*\*

Subcatchment Runoff Summary

\*\*\*\*\*

| -----        |        |          |        |        |       |       |        |
|--------------|--------|----------|--------|--------|-------|-------|--------|
| -----        |        |          |        |        |       |       |        |
| Perv         | Total  | Total    | Total  | Total  | Total | Total | Imperv |
| Runoff       | Runoff | Total    | Peak   | Runoff | Evap  | Infil | Runoff |
| Subcatchment | Runoff | Runoff   | Precip | Runon  | mm    | mm    | mm     |
| mm           | mm     | 10^6 ltr | mm     | Coeff  | mm    | mm    | mm     |
| -----        |        |          |        |        |       |       |        |
| -----        |        |          |        |        |       |       |        |
| 222          |        | 58.26    |        | 0.00   | 0.00  | 30.26 | 17.04  |
| 10.79        | 27.84  | 0.03     | 20.82  | 0.478  |       |       |        |
| 223          |        | 58.26    |        | 0.00   | 0.00  | 6.14  | 49.50  |
| 1.45         | 50.95  | 0.06     | 25.93  | 0.875  |       |       |        |
| 224          |        | 58.26    |        | 0.00   | 0.00  | 3.52  | 44.21  |
| 1.80         | 46.18  | 0.22     | 162.94 | 0.793  |       |       |        |

2021-0821-13: 25 Year Proposed Results

|       |        |      |        |       |      |       |       |
|-------|--------|------|--------|-------|------|-------|-------|
| 225a  |        |      | 58.26  | 0.00  | 0.00 | 7.77  | 46.94 |
| 2.79  | 49.73  | 0.10 | 67.85  | 0.854 |      |       |       |
| 225b  |        |      | 58.26  | 9.81  | 0.00 | 7.97  | 54.95 |
| 4.40  | 59.35  | 0.18 | 116.68 | 0.872 |      |       |       |
| 226   |        |      | 58.26  | 59.27 | 0.00 | 11.54 | 91.91 |
| 13.33 | 105.24 | 0.10 | 48.40  | 0.895 |      |       |       |
| 227   |        |      | 58.26  | 0.00  | 0.00 | 10.85 | 42.93 |
| 3.81  | 46.74  | 0.18 | 128.17 | 0.802 |      |       |       |
| 228   |        |      | 58.26  | 43.19 | 0.00 | 18.36 | 64.17 |
| 18.44 | 82.61  | 0.19 | 112.96 | 0.814 |      |       |       |
| 229   |        |      | 58.26  | 0.00  | 0.00 | 31.67 | 21.74 |
| 4.48  | 26.22  | 0.04 | 23.59  | 0.450 |      |       |       |
| EXT-1 |        |      | 58.26  | 0.00  | 0.00 | 5.83  | 0.00  |
| 0.00  | 0.00   | 0.00 | 0.00   | 0.000 |      |       |       |
| EXT-2 |        |      | 58.26  | 0.00  | 0.00 | 5.83  | 0.00  |
| 0.00  | 0.00   | 0.00 | 0.00   | 0.000 |      |       |       |
| EXT-3 |        |      | 58.26  | 0.00  | 0.00 | 8.16  | 0.00  |
| 0.00  | 0.00   | 0.00 | 0.00   | 0.000 |      |       |       |

\*\*\*\*\*  
 LID Performance Summary  
 \*\*\*\*\*

| Drain        | Initial     | Final       | Continuity | Total  | Evap | Infil | Surface |
|--------------|-------------|-------------|------------|--------|------|-------|---------|
| Outflow      | Storage     | Storage     | Error      | Inflow | Loss | Loss  | Outflow |
| Subcatchment | LID Control | LID Control | %          | mm     | mm   | mm    | mm      |
| mm           | mm          | mm          |            |        |      |       |         |

|      |      |           |       |       |      |      |      |
|------|------|-----------|-------|-------|------|------|------|
| 224  |      | GreenRoof |       | 58.26 | 0.00 | 0.00 | 1.27 |
| 0.00 | 0.00 | 45.60     | 19.56 |       |      |      |      |

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

| Node   | Type     | Average Depth Meters | Maximum Depth Meters | Maximum HGL Meters | Time of Max Occurrence days hr:min | Reported Max Depth Meters |
|--------|----------|----------------------|----------------------|--------------------|------------------------------------|---------------------------|
| CBMH38 | JUNCTION | 0.17                 | 1.12                 | 78.86              | 0 01:01                            | 1.12                      |



2021-0821-13: 25 Year Proposed Results

|                |           |          |        |        |   |       |           |
|----------------|-----------|----------|--------|--------|---|-------|-----------|
| CBMH38         |           | JUNCTION | 0.00   | 49.73  | 0 | 01:00 | 0         |
| 0.431          | -0.072    |          |        |        |   |       |           |
| CBMH38_Orifice |           | JUNCTION | 0.00   | 49.67  | 0 | 01:01 | 0         |
| 0.431          | -0.008    |          |        |        |   |       |           |
| CBMH52         |           | JUNCTION | 0.00   | 49.89  | 0 | 01:04 | 0         |
| 0.436          | 0.005     |          |        |        |   |       |           |
| CBMH54         |           | JUNCTION | 114.16 | 114.16 | 0 | 01:00 | 0.176     |
| 0.176          | 0.205     |          |        |        |   |       |           |
| CBMH54-S       |           | JUNCTION | 148.17 | 148.17 | 0 | 01:00 | 0.266     |
| 0.266          | -0.912    |          |        |        |   |       |           |
| CBMH92         |           | JUNCTION | 0.00   | 49.62  | 0 | 01:02 | 0         |
| 0.431          | -0.000    |          |        |        |   |       |           |
| CBMH94         |           | JUNCTION | 0.00   | 49.62  | 0 | 01:03 | 0         |
| 0.431          | -0.002    |          |        |        |   |       |           |
| EX.MH31        |           | JUNCTION | 0.00   | 24.27  | 0 | 01:28 | 0         |
| 0.541          | 0.067     |          |        |        |   |       |           |
| EX.MH34        |           | JUNCTION | 0.00   | 6.40   | 0 | 00:42 | 0         |
| 0.338          | 0.422     |          |        |        |   |       |           |
| EX.MH34-S      |           | JUNCTION | -66.91 | 114.16 | 0 | 01:00 | -0.0725   |
| 0.177          | 0.380     |          |        |        |   |       |           |
| EX.MH36        |           | JUNCTION | 0.00   | 7.29   | 0 | 00:42 | 0         |
| 0.337          | 4.525     |          |        |        |   |       |           |
| EX.MH36-S      |           | JUNCTION | 116.68 | 116.68 | 0 | 01:00 | 0.175     |
| 0.175          | -0.397    |          |        |        |   |       |           |
| EX.MH43        |           | JUNCTION | 0.00   | 0.00   | 0 | 00:00 | 0         |
| 0              | 0.000 ltr |          |        |        |   |       |           |
| EX.MH43-S      |           | JUNCTION | -20.00 | 47.42  | 0 | 01:02 | -0.0816   |
| 0.103          | -0.050    |          |        |        |   |       |           |
| EX.MH44        |           | JUNCTION | 0.08   | 0.08   | 0 | 00:57 | 0.000241  |
| 0.000241       | -0.181    |          |        |        |   |       |           |
| EX.MH44-S      |           | JUNCTION | -0.08  | 25.96  | 0 | 01:04 | -0.000241 |
| 0.0211         | 1.104     |          |        |        |   |       |           |
| EX.MH45        |           | JUNCTION | 0.08   | 0.16   | 0 | 01:02 | 0.000237  |
| 0.000478       | 0.474     |          |        |        |   |       |           |
| EX.MH45-S      |           | JUNCTION | -0.08  | 25.10  | 0 | 01:05 | -0.000237 |
| 0.0207         | 0.734     |          |        |        |   |       |           |
| EX.MH46        |           | JUNCTION | 0.08   | 0.42   | 0 | 00:52 | 0.00396   |
| 0.00449        | 0.202     |          |        |        |   |       |           |
| J2             |           | JUNCTION | 0.00   | 24.28  | 0 | 01:26 | 0         |
| 0.543          | 0.303     |          |        |        |   |       |           |
| STM-MH1        |           | JUNCTION | 0.00   | 0.00   | 0 | 00:00 | 0         |
| 0              | 0.000 ltr |          |        |        |   |       |           |
| STM-MH14       |           | JUNCTION | 6.28   | 6.28   | 0 | 00:19 | 0.338     |
| 0.338          | 0.134     |          |        |        |   |       |           |
| STM-MH14-S     |           | JUNCTION | -6.28  | 6.28   | 0 | 00:19 | -0.338    |
| 0.338          | 0.005     |          |        |        |   |       |           |
| STM-MH1-S      |           | JUNCTION | 6.28   | 6.28   | 0 | 00:00 | 0.339     |
| 0.339          | 0.226     |          |        |        |   |       |           |
| EX.MH32        |           | OUTFALL  | 23.59  | 37.96  | 0 | 01:00 | 0.0401    |

2021-0821-13: 25 Year Proposed Results

|                |        |         |         |        |   |       |        |
|----------------|--------|---------|---------|--------|---|-------|--------|
| 0.581          | 0.000  |         |         |        |   |       |        |
| Minor2         |        | OUTFALL | 0.00    | 49.87  | 0 | 01:07 | 0      |
| 0.436          | 0.000  |         |         |        |   |       |        |
| RingRoadMajor  |        | OUTFALL | 112.96  | 112.96 | 0 | 01:00 | 0.184  |
| 0.207          | 0.000  |         |         |        |   |       |        |
| Detention      |        | STORAGE | 162.09  | 287.00 | 0 | 01:01 | 0.268  |
| 0.798          | -0.177 |         |         |        |   |       |        |
| Roof           |        | STORAGE | 162.94  | 162.94 | 0 | 01:00 | 0.222  |
| 0.222          | 0.003  |         |         |        |   |       |        |
| SurfacePonding |        | STORAGE | -146.54 | 235.13 | 0 | 01:01 | 0.0897 |
| 0.469          | 0.743  |         |         |        |   |       |        |

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

Surcharging occurs when water rises above the top of the highest conduit.

| Node    | Type     | Hours Surcharged | Max. Height Above Crown Meters | Min. Depth Below Rim Meters |
|---------|----------|------------------|--------------------------------|-----------------------------|
| CBMH38  | JUNCTION | 2.57             | 0.824                          | 0.786                       |
| CBMH54  | JUNCTION | 2.05             | 1.030                          | 0.335                       |
| EX.MH36 | JUNCTION | 14.30            | 0.412                          | 3.923                       |

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

Flooding refers to all water that overflows a node, whether it ponds or not.

| Node      | Hours Flooded | Maximum Rate LPS | Time of Max Occurrence days hr:min | Total Flood Volume 10 <sup>6</sup> ltr | Maximum Poned Depth Meters |
|-----------|---------------|------------------|------------------------------------|--|----------------------------|
| Detention | 1.29          | 237.15           | 0 01:01                            | 0.358                                  | 0.000                      |

\*\*\*\*\*  
Storage Volume Summary  
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2021-0821-13: 25 Year Proposed Results

|        |        |         |       |       |        |          |   |
|--------|--------|---------|-------|-------|--------|----------|---|
| C10-S  |        | 25.956  | 2.204 | 0.044 | Inlet  | ON-GRADE | 4 |
| 0.31   | 26.81  | 73.10   | 0.00  | 0.02  | 25.88  |          |   |
| C11-S  |        | 24.056  | 2.210 | 0.044 | Inlet  | ON-SAG   | 4 |
| 0.33   | 30.05  | 76.86   | 0.00  | 0.02  | 23.98  |          |   |
| C12-S  |        | 25.096  | 2.185 | 0.044 | Inlet  | ON-GRADE | 4 |
| 0.32   | 26.31  | 70.73   | 0.00  | 0.02  | 25.02  |          |   |
| C14-S  |        | 47.419  | 2.563 | 0.051 | Inlet  | ON-GRADE | 1 |
| 42.18  | 98.15  | 5.12    | 0.00  | 20.00 | 27.42  |          |   |
| C1-S   |        | 6.280   | 0.915 | 0.018 | Inlet  | ON-GRADE | 1 |
| 100.00 | 100.00 | 0.00    | 0.00  | 6.28  | 0.00   |          |   |
| C3-S   |        | 0.000   | 1.501 | 0.030 | Inlet  | ON-GRADE | 1 |
| C4-S   |        | 114.164 | 2.945 | 0.059 | Inlet  | ON-GRADE | 4 |
| 100.00 | 100.00 | 0.00    | 0.00  | 14.27 | 0.00   |          |   |
| C5-S   |        | 162.091 | 4.447 | 0.089 | Inlet  | ON-GRADE | 7 |
| 0.00   | 99.06  | 2.21    | 13.88 | 0.00  | 162.09 |          |   |

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Link Flow Summary

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| Link  | Type    | Maximum<br> Flow <br>LPS | 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 | 0.00                     | 0 00:00                                  | 0.00                        | 0.00                 | 0.05                  |
| C10   | CONDUIT | 0.00                     | 0 00:00                                  | 0.00                        | 0.00                 | 0.00                  |
| C10-S | CONDUIT | 25.96                    | 0 01:04                                  | 0.59                        | 0.01                 | 0.15                  |
| C11   | CONDUIT | 0.16                     | 0 01:41                                  | 0.33                        | 0.00                 | 0.03                  |
| C11-S | CONDUIT | 24.06                    | 0 01:07                                  | 0.49                        | 0.01                 | 0.15                  |
| C12   | CONDUIT | 0.08                     | 0 01:02                                  | 0.27                        | 0.00                 | 0.02                  |
| C12-S | CONDUIT | 25.10                    | 0 01:05                                  | 0.56                        | 0.01                 | 0.15                  |
| C13   | CONDUIT | 0.42                     | 0 00:52                                  | 0.19                        | 0.01                 | 0.32                  |
| C14   | CONDUIT | 7.23                     | 0 00:43                                  | 0.79                        | 0.02                 | 0.66                  |
| C14-S | CONDUIT | 47.42                    | 0 01:02                                  | 1.11                        | 0.01                 | 0.17                  |
| C15   | CONDUIT | 24.27                    | 0 01:28                                  | 1.08                        | 0.06                 | 0.16                  |
| C1-S  | CONDUIT | 6.28                     | 0 00:19                                  | 0.76                        | 0.00                 | 0.06                  |
| C2    | CONDUIT | 24.27                    | 0 01:28                                  | 0.64                        | 1.29                 | 0.23                  |
| C3    | CONDUIT | 6.40                     | 0 00:42                                  | 0.77                        | 0.02                 | 0.21                  |
| C3-S  | CONDUIT | 0.00                     | 0 00:23                                  | 0.00                        | 0.00                 | 0.10                  |
| C4    | CONDUIT | 7.27                     | 0 00:43                                  | 0.06                        | 0.02                 | 0.64                  |
| C4-S  | CONDUIT | 114.16                   | 0 01:00                                  | 0.66                        | 0.01                 | 0.15                  |
| C5    | CONDUIT | 114.04                   | 0 01:00                                  | 1.61                        | 1.67                 | 1.00                  |
| C5-S  | CONDUIT | 162.09                   | 0 01:01                                  | 1.46                        | 0.01                 | 0.22                  |
| C6    | CONDUIT | 49.62                    | 0 01:02                                  | 1.25                        | 0.53                 | 0.55                  |
| C7    | CONDUIT | 49.62                    | 0 01:03                                  | 1.28                        | 0.51                 | 0.54                  |

2021-0821-13: 25 Year Proposed Results

|           |         |       |   |       |      |      |      |
|-----------|---------|-------|---|-------|------|------|------|
| C8        | CONDUIT | 49.62 | 0 | 01:03 | 1.38 | 0.51 | 0.51 |
| C9        | CONDUIT | 49.73 | 0 | 01:00 | 0.73 | 0.47 | 1.00 |
| CBMH52    | CONDUIT | 49.87 | 0 | 01:07 | 1.73 | 0.37 | 0.43 |
| OR1       | ORIFICE | 49.67 | 0 | 01:01 |      |      | 1.00 |
| OL1       | DUMMY   | 94.89 | 0 | 01:30 |      |      |      |
| RoofDrain | DUMMY   | 18.01 | 0 | 01:24 |      |      |      |

\*\*\*\*\*  
 Flow Classification Summary  
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| -----<br>Inlet<br>Conduit<br>Ctrl | Adjusted<br>/Actual<br>Length | ----- Fraction of Time in Flow Class |     |     |      |      |      |      |             |
|-----------------------------------|-------------------------------|--------------------------------------|-----|-----|------|------|------|------|-------------|
|                                   |                               | Dry                                  | Dry | Dry | Crit | Crit | Crit | Crit | Norm<br>Ltd |

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|               |      |      |      |      |      |      |      |      |      |
|---------------|------|------|------|------|------|------|------|------|------|
| C1<br>0.00    | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C10<br>0.00   | 1.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| C10-S<br>0.00 | 1.00 | 0.03 | 0.00 | 0.00 | 0.70 | 0.27 | 0.00 | 0.00 | 0.82 |
| C11<br>0.00   | 1.00 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.94 | 0.00 |
| C11-S<br>0.00 | 1.00 | 0.07 | 0.00 | 0.00 | 0.04 | 0.90 | 0.00 | 0.00 | 0.01 |
| C12<br>0.00   | 1.00 | 0.06 | 0.00 | 0.00 | 0.93 | 0.00 | 0.00 | 0.00 | 0.93 |
| C12-S<br>0.00 | 1.00 | 0.06 | 0.00 | 0.00 | 0.62 | 0.32 | 0.00 | 0.00 | 0.85 |
| C13<br>0.00   | 1.00 | 0.05 | 0.01 | 0.00 | 0.94 | 0.00 | 0.00 | 0.00 | 0.39 |
| C14<br>0.00   | 1.00 | 0.00 | 0.00 | 0.00 | 0.99 | 0.01 | 0.00 | 0.00 | 0.04 |
| C14-S<br>0.00 | 1.00 | 0.02 | 0.00 | 0.00 | 0.25 | 0.73 | 0.00 | 0.00 | 0.37 |
| C15<br>0.00   | 1.00 | 0.03 | 0.00 | 0.00 | 0.01 | 0.96 | 0.00 | 0.00 | 0.23 |
| C1-S<br>0.00  | 1.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| C2            | 1.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.98 | 0.00 |



2021-0821-13: 25 Year Proposed Results

|        |      |      |      |      |      |      |      |      |      |  |
|--------|------|------|------|------|------|------|------|------|------|--|
| 0.00   |      |      |      |      |      |      |      |      |      |  |
| C3     | 1.00 | 0.00 | 0.00 | 0.00 | 0.95 | 0.05 | 0.00 | 0.00 | 0.95 |  |
| 0.00   |      |      |      |      |      |      |      |      |      |  |
| C3-S   | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.97 |  |
| 0.00   |      |      |      |      |      |      |      |      |      |  |
| C4     | 1.00 | 0.00 | 0.02 | 0.00 | 0.98 | 0.00 | 0.00 | 0.00 | 0.02 |  |
| 0.00   |      |      |      |      |      |      |      |      |      |  |
| C4-S   | 1.00 | 0.02 | 0.00 | 0.00 | 0.93 | 0.05 | 0.00 | 0.00 | 0.93 |  |
| 0.00   |      |      |      |      |      |      |      |      |      |  |
| C5     | 1.00 | 0.03 | 0.60 | 0.00 | 0.34 | 0.00 | 0.00 | 0.03 | 0.78 |  |
| 0.00   |      |      |      |      |      |      |      |      |      |  |
| C5-S   | 1.00 | 0.02 | 0.00 | 0.00 | 0.11 | 0.87 | 0.00 | 0.00 | 0.11 |  |
| 0.00   |      |      |      |      |      |      |      |      |      |  |
| C6     | 1.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.95 | 0.00 |  |
| 0.00   |      |      |      |      |      |      |      |      |      |  |
| C7     | 1.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.95 | 0.00 |  |
| 0.00   |      |      |      |      |      |      |      |      |      |  |
| C8     | 1.00 | 0.05 | 0.00 | 0.00 | 0.58 | 0.36 | 0.00 | 0.00 | 0.59 |  |
| 0.00   |      |      |      |      |      |      |      |      |      |  |
| C9     | 1.00 | 0.05 | 0.00 | 0.00 | 0.95 | 0.01 | 0.00 | 0.00 | 0.78 |  |
| 0.00   |      |      |      |      |      |      |      |      |      |  |
| CBMH52 | 1.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.95 | 0.00 | 0.00 | 0.00 |  |
| 0.00   |      |      |      |      |      |      |      |      |      |  |

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

| Conduit | Hours Full |          |          | Hours                  | Hours            |
|---------|------------|----------|----------|------------------------|------------------|
|         | Both Ends  | Upstream | Dnstream | Above Full Normal Flow | Capacity Limited |
| C14     | 0.01       | 0.01     | 14.38    | 0.01                   | 0.01             |
| C2      | 0.01       | 0.01     | 0.01     | 2.01                   | 0.01             |
| C4      | 0.01       | 0.01     | 14.30    | 0.01                   | 0.01             |
| C5      | 2.03       | 2.05     | 2.19     | 0.19                   | 0.23             |
| C9      | 2.19       | 2.19     | 2.57     | 0.01                   | 0.01             |

Analysis begun on: Fri Apr 12 11:13:45 2024  
 Analysis ended on: Fri Apr 12 11:13:47 2024  
 Total elapsed time: 00:00:02

2021-0821-13: 50 Year Proposed Results

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.3)

-----  
 WARNING 04: minimum elevation drop used for Conduit C2  
 WARNING 02: maximum depth increased for Node CBMH54-S  
 WARNING 02: maximum depth increased for Node EX.MH34-S  
 WARNING 02: maximum depth increased for Node EX.MH36-S

\*\*\*\*\*

Element Count

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Number of rain gages ..... 7  
 Number of subcatchments ... 12  
 Number of nodes ..... 30  
 Number of links ..... 27  
 Number of pollutants ..... 0  
 Number of land uses ..... 0

\*\*\*\*\*

Raingage Summary

\*\*\*\*\*

| Name  | Data Source | Data Type | Recording Interval |
|-------|-------------|-----------|--------------------|
| 100Yr | 100Yr       | INTENSITY | 10 min.            |
| 10Yr  | 10Yr        | INTENSITY | 10 min.            |
| 25Yr  | 25Yr        | INTENSITY | 10 min.            |
| 2Yr   | 2Yr         | INTENSITY | 10 min.            |
| 50_yr | 50_yr       | INTENSITY | 10 min.            |
| 50Yr  | 50Yr        | INTENSITY | 10 min.            |
| 5Yr   | 5Yr         | INTENSITY | 10 min.            |

\*\*\*\*\*

Subcatchment Summary

\*\*\*\*\*

| Name   | Area | Width  | %Imperv | %Slope | Rain Gage |
|--------|------|--------|---------|--------|-----------|
| Outlet |      |        |         |        |           |
| 222    | 0.10 | 52.00  | 30.00   | 0.5000 | 50_yr     |
| 225b   |      |        |         |        |           |
| 223    | 0.11 | 20.00  | 87.00   | 0.0100 | 50_yr     |
| 226    |      |        |         |        |           |
| 224    | 0.48 | 320.00 | 90.00   | 2.0000 | 50_yr     |
| Roof   |      |        |         |        |           |

2021-0821-13: 50 Year Proposed Results

|               |      |       |       |        |       |
|---------------|------|-------|-------|--------|-------|
| 225a          | 0.20 | 26.40 | 82.00 | 0.5000 | 50_yr |
| 228           |      |       |       |        |       |
| 225b          | 0.29 | 39.33 | 82.00 | 1.0000 | 50_yr |
| EX.MH36-S     |      |       |       |        |       |
| 226           | 0.10 | 15.08 | 79.00 | 1.5000 | 50_yr |
| EX.MH34-S     |      |       |       |        |       |
| 227           | 0.39 | 46.35 | 75.00 | 1.0000 | 50_yr |
| CBMH54-S      |      |       |       |        |       |
| 228           | 0.23 | 27.47 | 64.00 | 2.0000 | 50_yr |
| RingRoadMajor |      |       |       |        |       |
| 229           | 0.15 | 15.30 | 38.00 | 0.1000 | 50_yr |
| EX.MH32       |      |       |       |        |       |
| EXT-1         | 0.28 | 10.00 | 90.00 | 0.0000 | 50_yr |
| EX.MH34-S     |      |       |       |        |       |
| EXT-2         | 0.28 | 10.00 | 90.00 | 0.0000 | 50_yr |
| RingRoadMajor |      |       |       |        |       |
| EXT-3         | 0.96 | 54.97 | 86.00 | 0.0000 | 50_yr |
| 223           |      |       |       |        |       |

\*\*\*\*\*  
LID Control Summary  
\*\*\*\*\*

| Imperv<br>Subcatchment<br>Treated | % Perv<br>Treated | LID Control | No. of<br>Units | Unit<br>Area | Unit<br>Width | % Area<br>Covered | % |
|-----------------------------------|-------------------|-------------|-----------------|--------------|---------------|-------------------|---|
| 224<br>0.00                       | 0.00              | GreenRoof   | 1               | 650.00       | 0.00          | 13.54             |   |

\*\*\*\*\*  
Node Summary  
\*\*\*\*\*

| Name           | Type     | Invert<br>Elev. | Max.<br>Depth | Ponded<br>Area | External<br>Inflow |
|----------------|----------|-----------------|---------------|----------------|--------------------|
| CBMH38         | JUNCTION | 77.74           | 1.91          | 0.0            |                    |
| CBMH38_Orifice | JUNCTION | 77.74           | 1.91          | 0.0            |                    |
| CBMH52         | JUNCTION | 76.58           | 2.51          | 0.0            |                    |
| CBMH54         | JUNCTION | 78.18           | 1.67          | 0.0            |                    |
| CBMH54-S       | JUNCTION | 79.84           | 0.40          | 0.0            |                    |
| CBMH92         | JUNCTION | 77.33           | 2.25          | 0.0            |                    |
| CBMH94         | JUNCTION | 76.91           | 2.45          | 0.0            |                    |
| EX.MH31        | JUNCTION | 76.62           | 5.64          | 0.0            |                    |
| EX.MH34        | JUNCTION | 78.40           | 2.89          | 0.0            |                    |

2021-0821-13: 50 Year Proposed Results

| Item           | Type     | Value 1 | Value 2 | Value 3 | Flag |
|----------------|----------|---------|---------|---------|------|
| EX.MH34-S      | JUNCTION | 81.29   | 0.40    | 0.0     |      |
| EX.MH36        | JUNCTION | 77.61   | 4.86    | 0.0     |      |
| EX.MH36-S      | JUNCTION | 82.28   | 0.40    | 0.0     |      |
| EX.MH43        | JUNCTION | 78.74   | 1.84    | 0.0     |      |
| EX.MH43-S      | JUNCTION | 80.58   | 0.30    | 0.0     |      |
| EX.MH44        | JUNCTION | 78.00   | 1.77    | 0.0     |      |
| EX.MH44-S      | JUNCTION | 79.77   | 0.30    | 0.0     |      |
| EX.MH45        | JUNCTION | 77.63   | 1.72    | 0.0     |      |
| EX.MH45-S      | JUNCTION | 79.35   | 0.30    | 0.0     |      |
| EX.MH46        | JUNCTION | 76.65   | 2.32    | 0.0     |      |
| J2             | JUNCTION | 78.40   | 5.80    | 0.0     |      |
| STM-MH1        | JUNCTION | 79.21   | 2.64    | 0.0     |      |
| STM-MH14       | JUNCTION | 79.01   | 2.35    | 0.0     |      |
| STM-MH14-S     | JUNCTION | 81.36   | 0.30    | 0.0     |      |
| STM-MH1-S      | JUNCTION | 81.85   | 0.30    | 0.0     | Yes  |
| EX.MH32        | OUTFALL  | 75.74   | 0.53    | 0.0     |      |
| Minor2         | OUTFALL  | 75.80   | 0.30    | 0.0     |      |
| RingRoadMajor  | OUTFALL  | 78.97   | 0.30    | 0.0     |      |
| Detention      | STORAGE  | 77.90   | 1.07    | 0.0     |      |
| Roof           | STORAGE  | 78.65   | 0.15    | 0.0     |      |
| SurfacePonding | STORAGE  | 79.60   | 0.28    | 0.0     |      |

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Link Summary

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| Name   | From Node | To Node       | Type    | Length |
|--------|-----------|---------------|---------|--------|
| -----  |           |               |         |        |
| -----  |           |               |         |        |
| C1     | STM-MH1   | STM-MH14      | CONDUIT | 61.7   |
| 0.3242 | 0.0130    |               |         |        |
| C10    | EX.MH43   | EX.MH44       | CONDUIT | 71.4   |
| 0.9944 | 0.0130    |               |         |        |
| C10-S  | EX.MH43-S | EX.MH44-S     | CONDUIT | 71.4   |
| 1.1345 | 0.0160    |               |         |        |
| C11    | EX.MH45   | EX.MH46       | CONDUIT | 37.1   |
| 1.8332 | 0.0130    |               |         |        |
| C11-S  | EX.MH45-S | RingRoadMajor | CONDUIT | 37.1   |
| 1.0243 | 0.0160    |               |         |        |
| C12    | EX.MH44   | EX.MH45       | CONDUIT | 35.1   |
| 1.0542 | 0.0130    |               |         |        |
| C12-S  | EX.MH44-S | EX.MH45-S     | CONDUIT | 35.1   |
| 1.1967 | 0.0160    |               |         |        |
| C13    | EX.MH46   | CBMH52        | CONDUIT | 10.5   |
| 0.6857 | 0.0130    |               |         |        |
| C14    | EX.MH34   | EX.MH36       | CONDUIT | 60.8   |
| 1.2995 | 0.0130    |               |         |        |

2021-0821-13: 50 Year Proposed Results

|           |                |                |         |      |
|-----------|----------------|----------------|---------|------|
| C14-S     | EX.MH34-S      | EX.MH43-S      | CONDUIT | 60.8 |
| 1.1678    | 0.0160         |                |         |      |
| C15       | EX.MH31        | EX.MH32        | CONDUIT | 86.4 |
| 1.0139    | 0.0130         |                |         |      |
| C1-S      | STM-MH1-S      | STM-MH14-S     | CONDUIT | 61.7 |
| 0.7943    | 0.0160         |                |         |      |
| C2        | J2             | EX.MH31        | CONDUIT | 16.0 |
| 0.0019    | 0.0130         |                |         |      |
| C3        | STM-MH14       | EX.MH34        | CONDUIT | 60.8 |
| 1.0042    | 0.0130         |                |         |      |
| C3-S      | STM-MH14-S     | EX.MH34-S      | CONDUIT | 60.8 |
| 0.1152    | 0.0160         |                |         |      |
| C4        | EX.MH36        | J2             | CONDUIT | 80.0 |
| -0.9913   | 0.0130         |                |         |      |
| C4-S      | EX.MH36-S      | EX.MH34-S      | CONDUIT | 80.0 |
| 1.2376    | 0.0160         |                |         |      |
| C5        | CBMH54         | Detention      | CONDUIT | 25.2 |
| 0.4960    | 0.0130         |                |         |      |
| C5-S      | CBMH54-S       | SurfacePonding | CONDUIT | 35.0 |
| 0.6857    | 0.0160         |                |         |      |
| C6        | CBMH38_Orifice | CBMH92         | CONDUIT | 39.8 |
| 0.9423    | 0.0130         |                |         |      |
| C7        | CBMH92         | CBMH94         | CONDUIT | 39.7 |
| 0.9950    | 0.0130         |                |         |      |
| C8        | CBMH94         | CBMH52         | CONDUIT | 33.0 |
| 1.0061    | 0.0130         |                |         |      |
| C9        | Detention      | CBMH38         | CONDUIT | 26.1 |
| 1.1878    | 0.0130         |                |         |      |
| CBMH52    | CBMH52         | Minor2         | CONDUIT | 39.0 |
| 1.9953    | 0.0130         |                |         |      |
| OR1       | CBMH38         | CBMH38_Orifice | ORIFICE |      |
| OL1       | SurfacePonding | Detention      | OUTLET  |      |
| RoofDrain | Roof           | J2             | OUTLET  |      |

\*\*\*\*\*  
 Cross Section Summary  
 \*\*\*\*\*

| Full<br>Conduit<br>Flow | Shape    | Full<br>Depth | Full<br>Area | Hyd.<br>Rad. | Max.<br>Width | No. of<br>Barrels |
|-------------------------|----------|---------------|--------------|--------------|---------------|-------------------|
| -----<br>C1             | CIRCULAR | 0.45          | 0.16         | 0.11         | 0.45          | 1                 |
| 162.35                  |          |               |              |              |               |                   |
| C10                     | CIRCULAR | 0.30          | 0.07         | 0.07         | 0.30          | 1                 |
| 96.44                   |          |               |              |              |               |                   |

2021-0821-13: 50 Year Proposed Results

|                  |             |      |      |      |       |   |
|------------------|-------------|------|------|------|-------|---|
| C10-S<br>4452.27 | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| C11<br>130.94    | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| C11-S<br>4230.49 | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| C12<br>99.29     | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| C12-S<br>4572.58 | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| C13<br>80.08     | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| C14<br>325.02    | CIRCULAR    | 0.45 | 0.16 | 0.11 | 0.45  | 1 |
| C14-S<br>4517.17 | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| C15<br>433.08    | CIRCULAR    | 0.53 | 0.22 | 0.13 | 0.53  | 1 |
| C1-S<br>3725.39  | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| C2<br>18.77      | CIRCULAR    | 0.53 | 0.22 | 0.13 | 0.53  | 1 |
| C3<br>285.72     | CIRCULAR    | 0.45 | 0.16 | 0.11 | 0.45  | 1 |
| C3-S<br>1418.90  | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| C4<br>428.21     | CIRCULAR    | 0.53 | 0.22 | 0.13 | 0.53  | 1 |
| C4-S<br>18752.45 | Full_Street | 0.40 | 8.00 | 0.20 | 40.00 | 1 |
| C5<br>68.11      | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| C5-S<br>13958.72 | Full_Street | 0.40 | 8.00 | 0.20 | 40.00 | 1 |
| C6<br>93.87      | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| C7<br>96.47      | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| C8<br>97.00      | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| C9<br>105.40     | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| CBMH52<br>136.60 | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |

\*\*\*\*\*  
 Street Summary  
 \*\*\*\*\*

2021-0821-13: 50 Year Proposed Results

Street Street  
Area:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0005 | 0.0018 | 0.0041 | 0.0072 | 0.0113 |
| 0.0162 | 0.0221 | 0.0288 | 0.0365 | 0.0450 |
| 0.0545 | 0.0648 | 0.0761 | 0.0882 | 0.1013 |
| 0.1152 | 0.1301 | 0.1458 | 0.1625 | 0.1800 |
| 0.1985 | 0.2178 | 0.2381 | 0.2592 | 0.2813 |
| 0.3042 | 0.3281 | 0.3528 | 0.3785 | 0.4050 |
| 0.4325 | 0.4608 | 0.4901 | 0.5200 | 0.5500 |
| 0.5800 | 0.6100 | 0.6400 | 0.6700 | 0.7000 |
| 0.7300 | 0.7600 | 0.7900 | 0.8200 | 0.8500 |
| 0.8800 | 0.9100 | 0.9400 | 0.9700 | 1.0000 |

Hrad:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0151 | 0.0303 | 0.0454 | 0.0606 | 0.0757 |
| 0.0909 | 0.1060 | 0.1212 | 0.1363 | 0.1515 |
| 0.1666 | 0.1818 | 0.1969 | 0.2121 | 0.2272 |
| 0.2424 | 0.2575 | 0.2726 | 0.2878 | 0.3029 |
| 0.3181 | 0.3332 | 0.3484 | 0.3635 | 0.3787 |
| 0.3938 | 0.4090 | 0.4241 | 0.4393 | 0.4544 |
| 0.4696 | 0.4847 | 0.4999 | 0.5249 | 0.5548 |
| 0.5848 | 0.6147 | 0.6445 | 0.6743 | 0.7041 |
| 0.7338 | 0.7636 | 0.7932 | 0.8229 | 0.8525 |
| 0.8821 | 0.9116 | 0.9411 | 0.9706 | 1.0000 |

Width:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0300 | 0.0600 | 0.0900 | 0.1200 | 0.1500 |
| 0.1800 | 0.2100 | 0.2400 | 0.2700 | 0.3000 |
| 0.3300 | 0.3600 | 0.3900 | 0.4200 | 0.4500 |
| 0.4800 | 0.5100 | 0.5400 | 0.5700 | 0.6000 |
| 0.6300 | 0.6600 | 0.6900 | 0.7200 | 0.7500 |
| 0.7800 | 0.8100 | 0.8400 | 0.8700 | 0.9000 |
| 0.9300 | 0.9600 | 0.9900 | 1.0000 | 1.0000 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

Street Full\_Street  
Area:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0004 | 0.0016 | 0.0036 | 0.0064 | 0.0100 |
| 0.0144 | 0.0196 | 0.0256 | 0.0324 | 0.0400 |
| 0.0484 | 0.0576 | 0.0676 | 0.0784 | 0.0900 |
| 0.1024 | 0.1156 | 0.1296 | 0.1444 | 0.1600 |
| 0.1764 | 0.1936 | 0.2116 | 0.2304 | 0.2500 |
| 0.2704 | 0.2916 | 0.3136 | 0.3364 | 0.3600 |
| 0.3844 | 0.4096 | 0.4356 | 0.4624 | 0.4900 |
| 0.5184 | 0.5476 | 0.5776 | 0.6084 | 0.6400 |
| 0.6724 | 0.7056 | 0.7396 | 0.7744 | 0.8100 |
| 0.8464 | 0.8836 | 0.9216 | 0.9604 | 1.0000 |

Hrad:

2021-0821-13: 50 Year Proposed Results

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0200 | 0.0399 | 0.0599 | 0.0798 | 0.0998 |
| 0.1197 | 0.1397 | 0.1596 | 0.1796 | 0.1995 |
| 0.2195 | 0.2394 | 0.2594 | 0.2793 | 0.2993 |
| 0.3192 | 0.3392 | 0.3591 | 0.3791 | 0.3990 |
| 0.4190 | 0.4389 | 0.4589 | 0.4788 | 0.4988 |
| 0.5187 | 0.5387 | 0.5586 | 0.5786 | 0.5985 |
| 0.6185 | 0.6384 | 0.6584 | 0.6783 | 0.6983 |
| 0.7182 | 0.7382 | 0.7582 | 0.7784 | 0.7985 |
| 0.8187 | 0.8388 | 0.8590 | 0.8791 | 0.8993 |
| 0.9194 | 0.9396 | 0.9597 | 0.9799 | 1.0000 |

Width:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0200 | 0.0400 | 0.0600 | 0.0800 | 0.1000 |
| 0.1200 | 0.1400 | 0.1600 | 0.1800 | 0.2000 |
| 0.2200 | 0.2400 | 0.2600 | 0.2800 | 0.3000 |
| 0.3200 | 0.3400 | 0.3600 | 0.3800 | 0.4000 |
| 0.4200 | 0.4400 | 0.4600 | 0.4800 | 0.5000 |
| 0.5200 | 0.5400 | 0.5600 | 0.5800 | 0.6000 |
| 0.6200 | 0.6400 | 0.6600 | 0.6800 | 0.7000 |
| 0.7200 | 0.7400 | 0.7600 | 0.7800 | 0.8000 |
| 0.8200 | 0.8400 | 0.8600 | 0.8800 | 0.9000 |
| 0.9200 | 0.9400 | 0.9600 | 0.9800 | 1.0000 |

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... LPS  
 Process Models:  
     Rainfall/Runoff ..... YES  
     RDII ..... NO  
     Snowmelt ..... NO  
     Groundwater ..... NO  
     Flow Routing ..... YES  
     Ponding Allowed ..... NO  
     Water Quality ..... NO  
 Infiltration Method ..... HORTON  
 Flow Routing Method ..... DYNWAVE  
 Surchage Method ..... EXTRAN  
 Starting Date ..... 01/04/2023 00:00:00  
 Ending Date ..... 01/04/2023 15:00:00  
 Antecedent Dry Days ..... 0.0  
 Report Time Step ..... 00:01:00  
 Wet Time Step ..... 00:05:00  
 Dry Time Step ..... 00:05:00  
 Routing Time Step ..... 5.00 sec  
 Variable Time Step ..... YES  
 Maximum Trials ..... 8  
 Number of Threads ..... 4  
 Head Tolerance ..... 0.001524 m



2021-0821-13: 50 Year Proposed Results

```

*****
Volume                               Depth
Runoff Quantity Continuity          hectare-m          mm
*****
-----
Total Precipitation .....          0.232             64.845
Evaporation Loss .....              0.000             0.000
Infiltration Loss .....             0.037             10.343
Surface Runoff .....                0.104             28.978
Final Storage .....                 0.091             25.510
Continuity Error (%) .....          0.022
    
```

```

*****
Volume                               Volume
Flow Routing Continuity            hectare-m          10^6 ltr
*****
-----
Dry Weather Inflow .....           0.000             0.000
Wet Weather Inflow .....           0.104             1.038
Groundwater Inflow .....           0.000             0.000
RDII Inflow .....                  0.000             0.000
External Inflow .....              0.034             0.339
External Outflow .....              0.135             1.350
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 .....           0.003             0.029
Continuity Error (%) .....         -0.175
    
```

```

*****
Highest Continuity Errors
*****
Node EX.MH36 (4.32%)
    
```

```

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

```

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

```

*****
    
```

2021-0821-13: 50 Year Proposed Results

Most Frequent Nonconverging Nodes

\*\*\*\*\*

- Node EX.MH32 (0.06%)
- Node Minor2 (0.06%)
- Node RingRoadMajor (0.06%)
- Node EX.MH36 (0.04%)
- Node CBMH38 (0.01%)

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Routing Time Step Summary

\*\*\*\*\*

Minimum Time Step : 1.97 sec  
 Average Time Step : 5.00 sec  
 Maximum Time Step : 5.00 sec  
 % of Time in Steady State : 0.00  
 Average Iterations per Step : 2.04  
 % of Steps Not Converging : 0.06  
 Time Step Frequencies :  
     5.000 - 3.155 sec : 99.95 %  
     3.155 - 1.991 sec : 0.04 %  
     1.991 - 1.256 sec : 0.01 %  
     1.256 - 0.792 sec : 0.00 %  
     0.792 - 0.500 sec : 0.00 %

\*\*\*\*\*

Subcatchment Runoff Summary

\*\*\*\*\*

| -----        |        |          |        |        |       |       |        |
|--------------|--------|----------|--------|--------|-------|-------|--------|
| -----        |        |          |        |        |       |       |        |
| Perv         | Total  | Total    | Total  | Total  | Total | Total | Imperv |
| Runoff       | Runoff | Precip   | Peak   | Runoff | Evap  | Infil | Runoff |
| Subcatchment | Runoff | Runoff   | Runoff | Runoff | mm    | mm    | mm     |
| mm           | mm     | 10^6 ltr | mm     | mm     | mm    | mm    | mm     |
| -----        |        |          |        |        |       |       |        |
| -----        |        |          |        |        |       |       |        |
| 222          |        | 64.85    |        | 0.00   | 0.00  | 31.26 | 19.03  |
| 14.50        | 33.53  | 0.03     | 25.18  | 0.517  |       |       |        |
| 223          |        | 64.85    |        | 0.00   | 0.00  | 6.37  | 55.27  |
| 2.08         | 57.35  | 0.07     | 30.13  | 0.884  |       |       |        |
| 224          |        | 64.85    |        | 0.00   | 0.00  | 3.65  | 49.36  |
| 2.30         | 51.92  | 0.25     | 182.50 | 0.801  |       |       |        |
| 225a         |        | 64.85    |        | 0.00   | 0.00  | 8.02  | 52.39  |

2021-0821-13: 50 Year Proposed Results

|       |        |      |        |       |      |       |        |
|-------|--------|------|--------|-------|------|-------|--------|
| 3.75  | 56.14  | 0.11 | 76.98  | 0.866 |      |       |        |
| 225b  |        |      | 64.85  | 11.82 | 0.00 | 8.23  | 62.03  |
| 5.72  | 67.76  | 0.20 | 133.01 | 0.884 |      |       |        |
| 226   |        |      | 64.85  | 66.71 | 0.00 | 11.78 | 103.01 |
| 16.10 | 119.11 | 0.12 | 55.74  | 0.905 |      |       |        |
| 227   |        |      | 64.85  | 0.00  | 0.00 | 11.21 | 47.91  |
| 5.13  | 53.04  | 0.21 | 145.84 | 0.818 |      |       |        |
| 228   |        |      | 64.85  | 48.75 | 0.00 | 18.81 | 71.97  |
| 22.43 | 94.40  | 0.22 | 130.65 | 0.831 |      |       |        |
| 229   |        |      | 64.85  | 0.00  | 0.00 | 33.36 | 24.27  |
| 6.89  | 31.15  | 0.05 | 26.93  | 0.480 |      |       |        |
| EXT-1 |        |      | 64.85  | 0.00  | 0.00 | 6.48  | 0.00   |
| 0.00  | 0.00   | 0.00 | 0.00   | 0.000 |      |       |        |
| EXT-2 |        |      | 64.85  | 0.00  | 0.00 | 6.48  | 0.00   |
| 0.00  | 0.00   | 0.00 | 0.00   | 0.000 |      |       |        |
| EXT-3 |        |      | 64.85  | 0.00  | 0.00 | 9.08  | 0.00   |
| 0.00  | 0.00   | 0.00 | 0.00   | 0.000 |      |       |        |

\*\*\*\*\*  
 LID Performance Summary  
 \*\*\*\*\*

| Drain        | Initial     | Final       | Continuity | Total  | Evap | Infil | Surface |
|--------------|-------------|-------------|------------|--------|------|-------|---------|
| Outflow      | Storage     | Storage     | Error      | Inflow | Loss | Loss  | Outflow |
| Subcatchment | LID Control | LID Control | %          | mm     | mm   | mm    | mm      |
| mm           | mm          | mm          |            |        |      |       |         |
| 224          |             | GreenRoof   |            | 64.85  | 0.00 | 0.00  | 1.92    |
| 0.00         | 0.00        | 45.60       | 26.71      |        |      |       |         |

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

| Node           | Type     | Average Depth | Maximum Depth | Maximum HGL | Time of Max Occurrence | Reported Max Depth |
|----------------|----------|---------------|---------------|-------------|------------------------|--------------------|
|                |          | Meters        | Meters        | Meters      | days hr:min            | Meters             |
| CBMH38         | JUNCTION | 0.20          | 1.12          | 78.86       | 0 00:59                | 1.12               |
| CBMH38_Orifice | JUNCTION | 0.04          | 0.17          | 77.91       | 0 01:01                | 0.17               |

2021-0821-13: 50 Year Proposed Results

|                |          |      |      |       |   |       |      |
|----------------|----------|------|------|-------|---|-------|------|
| CBMH52         | JUNCTION | 0.03 | 0.13 | 76.71 | 0 | 01:07 | 0.13 |
| CBMH54         | JUNCTION | 0.13 | 1.51 | 79.68 | 0 | 01:00 | 1.49 |
| CBMH54-S       | JUNCTION | 0.01 | 0.09 | 79.93 | 0 | 00:59 | 0.09 |
| CBMH92         | JUNCTION | 0.04 | 0.17 | 77.51 | 0 | 01:02 | 0.17 |
| CBMH94         | JUNCTION | 0.04 | 0.17 | 77.08 | 0 | 02:26 | 0.17 |
| EX.MH31        | JUNCTION | 0.05 | 0.09 | 76.70 | 0 | 01:28 | 0.09 |
| EX.MH34        | JUNCTION | 0.10 | 0.15 | 78.55 | 0 | 01:26 | 0.15 |
| EX.MH34-S      | JUNCTION | 0.01 | 0.06 | 81.35 | 0 | 01:01 | 0.06 |
| EX.MH36        | JUNCTION | 0.87 | 0.94 | 78.55 | 0 | 01:27 | 0.94 |
| EX.MH36-S      | JUNCTION | 0.01 | 0.06 | 82.34 | 0 | 01:00 | 0.06 |
| EX.MH43        | JUNCTION | 0.00 | 0.00 | 78.74 | 0 | 00:00 | 0.00 |
| EX.MH43-S      | JUNCTION | 0.00 | 0.05 | 80.63 | 0 | 01:03 | 0.05 |
| EX.MH44        | JUNCTION | 0.00 | 0.01 | 78.01 | 0 | 01:00 | 0.01 |
| EX.MH44-S      | JUNCTION | 0.00 | 0.05 | 79.82 | 0 | 01:04 | 0.05 |
| EX.MH45        | JUNCTION | 0.00 | 0.01 | 77.64 | 0 | 01:44 | 0.01 |
| EX.MH45-S      | JUNCTION | 0.00 | 0.05 | 79.40 | 0 | 01:06 | 0.05 |
| EX.MH46        | JUNCTION | 0.02 | 0.06 | 76.71 | 0 | 01:02 | 0.06 |
| J2             | JUNCTION | 0.10 | 0.15 | 78.55 | 0 | 01:27 | 0.15 |
| STM-MH1        | JUNCTION | 0.00 | 0.00 | 79.21 | 0 | 00:00 | 0.00 |
| STM-MH14       | JUNCTION | 0.05 | 0.05 | 79.06 | 0 | 00:17 | 0.05 |
| STM-MH14-S     | JUNCTION | 0.00 | 0.00 | 81.36 | 0 | 00:16 | 0.00 |
| STM-MH1-S      | JUNCTION | 0.04 | 0.04 | 81.89 | 0 | 15:00 | 0.04 |
| EX.MH32        | OUTFALL  | 0.05 | 0.09 | 75.83 | 0 | 01:28 | 0.09 |
| Minor2         | OUTFALL  | 0.03 | 0.13 | 75.93 | 0 | 01:08 | 0.13 |
| RingRoadMajor  | OUTFALL  | 0.00 | 0.05 | 79.02 | 0 | 01:06 | 0.05 |
| Detention      | STORAGE  | 0.29 | 1.07 | 78.97 | 0 | 00:59 | 1.07 |
| Roof           | STORAGE  | 0.02 | 0.08 | 78.73 | 0 | 01:24 | 0.08 |
| SurfacePonding | STORAGE  | 0.02 | 0.16 | 79.76 | 0 | 01:33 | 0.16 |

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Node Inflow Summary  
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| Total Flow      |               | Maximum Lateral Inflow | Maximum Total Inflow | Time of Max Occurrence | Lateral Inflow Volume |   |
|-----------------|---------------|------------------------|----------------------|------------------------|-----------------------|---|
| Volume Node ltr | Error Percent | Type                   | LPS                  | days hr:min            | 10^6 ltr              |   |
| CBMH38          |               | JUNCTION               | 0.00                 | 49.69                  | 0 00:59               | 0 |

2021-0821-13: 50 Year Proposed Results

|                |           |          |        |        |   |       |           |
|----------------|-----------|----------|--------|--------|---|-------|-----------|
| 0.487          | -0.059    |          |        |        |   |       |           |
| CBMH38_Orifice |           | JUNCTION | 0.00   | 49.67  | 0 | 00:59 | 0         |
| 0.487          | -0.008    |          |        |        |   |       |           |
| CBMH52         |           | JUNCTION | 0.00   | 49.87  | 0 | 01:05 | 0         |
| 0.492          | 0.004     |          |        |        |   |       |           |
| CBMH54         |           | JUNCTION | 129.89 | 129.89 | 0 | 01:00 | 0.2       |
| 0.2            | 0.051     |          |        |        |   |       |           |
| CBMH54-S       |           | JUNCTION | 165.84 | 165.84 | 0 | 01:00 | 0.296     |
| 0.296          | -1.067    |          |        |        |   |       |           |
| CBMH92         |           | JUNCTION | 0.00   | 49.62  | 0 | 01:01 | 0         |
| 0.487          | -0.000    |          |        |        |   |       |           |
| CBMH94         |           | JUNCTION | 0.00   | 49.62  | 0 | 01:02 | 0         |
| 0.487          | -0.002    |          |        |        |   |       |           |
| EX.MH31        |           | JUNCTION | 0.00   | 26.57  | 0 | 01:27 | 0         |
| 0.569          | 0.064     |          |        |        |   |       |           |
| EX.MH34        |           | JUNCTION | 0.00   | 6.40   | 0 | 00:42 | 0         |
| 0.338          | 0.422     |          |        |        |   |       |           |
| EX.MH34-S      |           | JUNCTION | -75.48 | 129.89 | 0 | 01:00 | -0.0837   |
| 0.202          | 0.336     |          |        |        |   |       |           |
| EX.MH36        |           | JUNCTION | 0.00   | 7.47   | 0 | 00:41 | 0         |
| 0.337          | 4.517     |          |        |        |   |       |           |
| EX.MH36-S      |           | JUNCTION | 133.01 | 133.01 | 0 | 01:00 | 0.2       |
| 0.2            | -0.357    |          |        |        |   |       |           |
| EX.MH43        |           | JUNCTION | 0.00   | 0.00   | 0 | 00:00 | 0         |
| 0              | 0.000 ltr |          |        |        |   |       |           |
| EX.MH43-S      |           | JUNCTION | -20.00 | 53.77  | 0 | 01:01 | -0.087    |
| 0.116          | -0.053    |          |        |        |   |       |           |
| EX.MH44        |           | JUNCTION | 0.08   | 0.08   | 0 | 00:56 | 0.000258  |
| 0.000258       | -0.168    |          |        |        |   |       |           |
| EX.MH44-S      |           | JUNCTION | -0.08  | 32.49  | 0 | 01:03 | -0.000258 |
| 0.0293         | 0.859     |          |        |        |   |       |           |
| EX.MH45        |           | JUNCTION | 0.08   | 0.16   | 0 | 01:01 | 0.000254  |
| 0.000513       | 0.434     |          |        |        |   |       |           |
| EX.MH45-S      |           | JUNCTION | -0.08  | 31.70  | 0 | 01:05 | -0.000254 |
| 0.0288         | 0.584     |          |        |        |   |       |           |
| EX.MH46        |           | JUNCTION | 0.08   | 0.39   | 0 | 00:51 | 0.00396   |
| 0.00453        | 0.202     |          |        |        |   |       |           |
| J2             |           | JUNCTION | 0.00   | 26.57  | 0 | 01:26 | 0         |
| 0.571          | 0.288     |          |        |        |   |       |           |
| STM-MH1        |           | JUNCTION | 0.00   | 0.00   | 0 | 00:00 | 0         |
| 0              | 0.000 ltr |          |        |        |   |       |           |
| STM-MH14       |           | JUNCTION | 6.28   | 6.28   | 0 | 00:17 | 0.338     |
| 0.338          | 0.134     |          |        |        |   |       |           |
| STM-MH14-S     |           | JUNCTION | -6.28  | 6.28   | 0 | 00:16 | -0.338    |
| 0.338          | 0.005     |          |        |        |   |       |           |
| STM-MH1-S      |           | JUNCTION | 6.28   | 6.28   | 0 | 00:00 | 0.339     |
| 0.339          | 0.226     |          |        |        |   |       |           |
| EX.MH32        |           | OUTFALL  | 26.93  | 42.47  | 0 | 01:00 | 0.0477    |
| 0.616          | 0.000     |          |        |        |   |       |           |

2021-0821-13: 50 Year Proposed Results

|                |       |        |         |         |        |   |       |       |
|----------------|-------|--------|---------|---------|--------|---|-------|-------|
| Minor2         | 0.492 | 0.000  | OUTFALL | 0.00    | 49.86  | 0 | 01:08 | 0     |
| RingRoadMajor  | 0.242 | 0.000  | OUTFALL | 130.57  | 131.63 | 0 | 01:04 | 0.211 |
| Detention      | 1.09  | -0.159 | STORAGE | 195.04  | 345.20 | 0 | 01:00 | 0.299 |
| Roof           | 0.249 | 0.003  | STORAGE | 182.50  | 182.50 | 0 | 01:00 | 0.249 |
| SurfacePonding | 0.696 | 0.573  | STORAGE | -161.92 | 292.20 | 0 | 01:00 | 0.296 |

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Node Surcharge Summary  
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Surcharging occurs when water rises above the top of the highest conduit.

| Node    | Type     | Hours Surcharged | Max. Height Above Crown Meters | Min. Depth Below Rim Meters |
|---------|----------|------------------|--------------------------------|-----------------------------|
| CBMH38  | JUNCTION | 2.88             | 0.824                          | 0.786                       |
| CBMH54  | JUNCTION | 2.38             | 1.208                          | 0.157                       |
| EX.MH36 | JUNCTION | 14.31            | 0.417                          | 3.918                       |

\*\*\*\*\*  
Node Flooding Summary  
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Flooding refers to all water that overflows a node, whether it ponds or not.

| Node      | Hours Flooded | Maximum Rate LPS | Time of Max Occurrence days hr:min | Total Flood Volume 10^6 ltr | Maximum Poned Depth Meters |
|-----------|---------------|------------------|------------------------------------|-----------------------------|----------------------------|
| Detention | 1.64          | 295.43           | 0 01:00                            | 0.595                       | 0.000                      |

\*\*\*\*\*  
Storage Volume Summary  
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Average Avg Evap Exfil Maximum Max Time of

2021-0821-13: 50 Year Proposed Results

| Max Occurrence<br>hr:min | Maximum<br>Outflow<br>Storage Unit<br>LPS | Volume<br>1000 m <sup>3</sup> | Pcnt<br>Full | Pcnt<br>Loss | Pcnt<br>Loss | Volume<br>1000 m <sup>3</sup> | Pcnt<br>Full | days |
|--------------------------|---|-------------------------------|--------------|--------------|--------------|-------------------------------|--------------|------|
| 00:59                    | 49.69                                     | 0.026                         | 24.1         | 0.0          | 0.0          | 0.109                         | 100.0        | 0    |
| 01:24                    | 20.31                                     | 0.037                         | 11.9         | 0.0          | 0.0          | 0.162                         | 52.4         | 0    |
| 01:33                    | 162.55                                    | 0.010                         | 2.0          | 0.0          | 0.0          | 0.119                         | 24.1         | 0    |

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

| Outfall Node  | Flow<br>Freq<br>Pcnt | Avg<br>Flow<br>LPS | Max<br>Flow<br>LPS | Total<br>Volume<br>10 <sup>6</sup> ltr |
|---------------|----------------------|--------------------|--------------------|--|
| EX.MH32       | 97.91                | 11.66              | 42.47              | 0.616                                  |
| Minor2        | 94.86                | 9.60               | 49.86              | 0.492                                  |
| RingRoadMajor | 25.93                | 17.29              | 131.63             | 0.242                                  |
| System        | 72.90                | 38.55              | 219.06             | 1.350                                  |

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Street Flow Summary  
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| Peak<br>Flow<br>Capture<br>Street<br>Pcnt | Avg.<br>Flow<br>Capture<br>Conduit<br>Pcnt | Bypass<br>Peak<br>Flow<br>Freq<br>LPS<br>Pcnt | Back<br>Maximum<br>Flow<br>Spread<br>Freq<br>Pcnt | Peak<br>Maximum<br>Capture<br>/ Inlet<br>Depth<br>m<br>LPS | Peak<br>Bypass<br>Inlet<br>Flow<br>Design<br>LPS | Inlet<br>Location | Inlet |
|---|--|---|---|--|--|-------------------|-------|
|---|--|---|---|--|--|-------------------|-------|

2021-0821-13: 50 Year Proposed Results

|        |        |         |       |       |        |          |   |
|--------|--------|---------|-------|-------|--------|----------|---|
| C10-S  |        | 32.487  | 2.405 | 0.048 | Inlet  | ON-GRADE | 4 |
| 0.25   | 25.45  | 74.56   | 0.00  | 0.02  | 32.41  |          |   |
| C11-S  |        | 30.747  | 2.426 | 0.049 | Inlet  | ON-SAG   | 4 |
| 0.26   | 28.09  | 78.46   | 0.00  | 0.02  | 30.67  |          |   |
| C12-S  |        | 31.696  | 2.396 | 0.048 | Inlet  | ON-GRADE | 4 |
| 0.25   | 24.70  | 72.58   | 0.00  | 0.02  | 31.62  |          |   |
| C14-S  |        | 53.768  | 2.725 | 0.054 | Inlet  | ON-GRADE | 1 |
| 37.20  | 97.68  | 5.74    | 0.00  | 20.00 | 33.77  |          |   |
| C1-S   |        | 6.280   | 0.915 | 0.018 | Inlet  | ON-GRADE | 1 |
| 100.00 | 100.00 | 0.00    | 0.00  | 6.28  | 0.00   |          |   |
| C3-S   |        | 0.000   | 1.553 | 0.031 | Inlet  | ON-GRADE | 1 |
| C4-S   |        | 129.894 | 3.076 | 0.062 | Inlet  | ON-GRADE | 4 |
| 100.00 | 100.00 | 0.00    | 0.00  | 16.24 | 0.00   |          |   |
| C5-S   |        | 195.037 | 4.997 | 0.100 | Inlet  | ON-GRADE | 7 |
| 0.00   | 99.41  | 1.57    | 18.64 | 0.00  | 195.04 |          |   |

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Link Flow Summary

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| Link  | Type    | Maximum<br> Flow <br>LPS | 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 | 0.00                     | 0 00:00                                  | 0.00                        | 0.00                 | 0.05                  |
| C10   | CONDUIT | 0.00                     | 0 00:00                                  | 0.00                        | 0.00                 | 0.00                  |
| C10-S | CONDUIT | 32.49                    | 0 01:03                                  | 0.61                        | 0.01                 | 0.16                  |
| C11   | CONDUIT | 0.16                     | 0 01:40                                  | 0.33                        | 0.00                 | 0.03                  |
| C11-S | CONDUIT | 30.75                    | 0 01:06                                  | 0.52                        | 0.01                 | 0.16                  |
| C12   | CONDUIT | 0.08                     | 0 01:01                                  | 0.26                        | 0.00                 | 0.02                  |
| C12-S | CONDUIT | 31.70                    | 0 01:05                                  | 0.58                        | 0.01                 | 0.16                  |
| C13   | CONDUIT | 0.39                     | 0 00:51                                  | 0.19                        | 0.00                 | 0.32                  |
| C14   | CONDUIT | 7.04                     | 0 00:42                                  | 0.79                        | 0.02                 | 0.67                  |
| C14-S | CONDUIT | 53.77                    | 0 01:01                                  | 1.11                        | 0.01                 | 0.18                  |
| C15   | CONDUIT | 26.57                    | 0 01:28                                  | 1.11                        | 0.06                 | 0.17                  |
| C1-S  | CONDUIT | 6.28                     | 0 00:16                                  | 0.76                        | 0.00                 | 0.06                  |
| C2    | CONDUIT | 26.57                    | 0 01:27                                  | 0.66                        | 1.42                 | 0.24                  |
| C3    | CONDUIT | 6.40                     | 0 00:42                                  | 0.77                        | 0.02                 | 0.22                  |
| C3-S  | CONDUIT | 0.00                     | 0 00:22                                  | 0.00                        | 0.00                 | 0.10                  |
| C4    | CONDUIT | 6.98                     | 0 00:42                                  | 0.06                        | 0.02                 | 0.64                  |
| C4-S  | CONDUIT | 129.89                   | 0 01:00                                  | 0.68                        | 0.01                 | 0.15                  |
| C5    | CONDUIT | 129.89                   | 0 01:00                                  | 1.84                        | 1.91                 | 1.00                  |
| C5-S  | CONDUIT | 195.04                   | 0 01:00                                  | 1.50                        | 0.01                 | 0.25                  |
| C6    | CONDUIT | 49.62                    | 0 01:01                                  | 1.25                        | 0.53                 | 0.55                  |
| C7    | CONDUIT | 49.62                    | 0 01:02                                  | 1.28                        | 0.51                 | 0.54                  |
| C8    | CONDUIT | 49.62                    | 0 01:02                                  | 1.38                        | 0.51                 | 0.51                  |





2021-0821-13: 50 Year Proposed Results

|        |      |      |      |      |      |      |      |      |      |
|--------|------|------|------|------|------|------|------|------|------|
| C3     | 1.00 | 0.00 | 0.00 | 0.00 | 0.95 | 0.05 | 0.00 | 0.00 | 0.95 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C3-S   | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.98 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C4     | 1.00 | 0.00 | 0.02 | 0.00 | 0.98 | 0.00 | 0.00 | 0.00 | 0.03 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C4-S   | 1.00 | 0.02 | 0.00 | 0.00 | 0.93 | 0.05 | 0.00 | 0.00 | 0.93 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C5     | 1.00 | 0.02 | 0.60 | 0.00 | 0.34 | 0.00 | 0.00 | 0.03 | 0.76 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C5-S   | 1.00 | 0.02 | 0.00 | 0.00 | 0.14 | 0.85 | 0.00 | 0.00 | 0.13 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C6     | 1.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.95 | 0.00 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C7     | 1.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.95 | 0.00 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C8     | 1.00 | 0.05 | 0.00 | 0.00 | 0.58 | 0.37 | 0.00 | 0.00 | 0.59 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| C9     | 1.00 | 0.05 | 0.00 | 0.00 | 0.95 | 0.01 | 0.00 | 0.00 | 0.76 |
| 0.00   |      |      |      |      |      |      |      |      |      |
| CBMH52 | 1.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.95 | 0.00 | 0.00 | 0.00 |
| 0.00   |      |      |      |      |      |      |      |      |      |

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 Conduit Surcharge Summary  
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| Conduit | Hours Full |          |          | Hours                  | Hours            |
|---------|------------|----------|----------|------------------------|------------------|
|         | Both Ends  | Upstream | Dnstream | Above Full Normal Flow | Capacity Limited |
| C14     | 0.01       | 0.01     | 14.38    | 0.01                   | 0.01             |
| C2      | 0.01       | 0.01     | 0.01     | 2.31                   | 0.01             |
| C4      | 0.01       | 0.01     | 14.31    | 0.01                   | 0.01             |
| C5      | 2.36       | 2.38     | 2.50     | 0.23                   | 0.28             |
| C9      | 2.50       | 2.50     | 2.88     | 0.01                   | 0.01             |

Analysis begun on: Fri Apr 12 11:13:47 2024  
 Analysis ended on: Fri Apr 12 11:13:48 2024  
 Total elapsed time: 00:00:01

2021-0821-13: 100 Year Proposed Results

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.2 (Build 5.2.3)

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 WARNING 04: minimum elevation drop used for Conduit C2  
 WARNING 02: maximum depth increased for Node CBMH54-S  
 WARNING 02: maximum depth increased for Node EX.MH34-S  
 WARNING 02: maximum depth increased for Node EX.MH36-S

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Element Count

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Number of rain gages ..... 7  
 Number of subcatchments ... 12  
 Number of nodes ..... 30  
 Number of links ..... 27  
 Number of pollutants ..... 0  
 Number of land uses ..... 0

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Raingage Summary

\*\*\*\*\*

| Name   | Data Source | Data Type | Recording Interval |
|--------|-------------|-----------|--------------------|
| 100_yr | 100_yr      | INTENSITY | 10 min.            |
| 100Yr  | 100Yr       | INTENSITY | 10 min.            |
| 10Yr   | 10Yr        | INTENSITY | 10 min.            |
| 25Yr   | 25Yr        | INTENSITY | 10 min.            |
| 2Yr    | 2Yr         | INTENSITY | 10 min.            |
| 50Yr   | 50Yr        | INTENSITY | 10 min.            |
| 5Yr    | 5Yr         | INTENSITY | 10 min.            |

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Subcatchment Summary

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| Name   | Area | Width  | %Imperv | %Slope | Rain Gage |
|--------|------|--------|---------|--------|-----------|
| Outlet |      |        |         |        |           |
| 222    | 0.10 | 52.00  | 30.00   | 0.5000 | 100_yr    |
| 225b   |      |        |         |        |           |
| 223    | 0.11 | 20.00  | 87.00   | 0.0100 | 100_yr    |
| 226    |      |        |         |        |           |
| 224    | 0.48 | 320.00 | 90.00   | 2.0000 | 100_yr    |
| Roof   |      |        |         |        |           |

2021-0821-13: 100 Year Proposed Results

|               |      |       |       |        |        |
|---------------|------|-------|-------|--------|--------|
| 225a          | 0.20 | 26.40 | 82.00 | 0.5000 | 100_yr |
| 228           |      |       |       |        |        |
| 225b          | 0.29 | 39.33 | 82.00 | 1.0000 | 100_yr |
| EX.MH36-S     |      |       |       |        |        |
| 226           | 0.10 | 15.08 | 79.00 | 1.5000 | 100_yr |
| EX.MH34-S     |      |       |       |        |        |
| 227           | 0.39 | 46.35 | 75.00 | 1.0000 | 100_yr |
| CBMH54-S      |      |       |       |        |        |
| 228           | 0.23 | 27.47 | 64.00 | 2.0000 | 100_yr |
| RingRoadMajor |      |       |       |        |        |
| 229           | 0.15 | 15.30 | 38.00 | 0.1000 | 100_yr |
| EX.MH32       |      |       |       |        |        |
| EXT-1         | 0.28 | 10.00 | 90.00 | 0.0000 | 100_yr |
| EX.MH34-S     |      |       |       |        |        |
| EXT-2         | 0.28 | 10.00 | 90.00 | 0.0000 | 100_yr |
| RingRoadMajor |      |       |       |        |        |
| EXT-3         | 0.96 | 54.97 | 86.00 | 0.0000 | 100_yr |
| 223           |      |       |       |        |        |

\*\*\*\*\*  
LID Control Summary  
\*\*\*\*\*

| Imperv<br>Subcatchment<br>Treated | % Perv<br>Treated | LID Control | No. of<br>Units | Unit<br>Area | Unit<br>Width | % Area<br>Covered | % |
|-----------------------------------|-------------------|-------------|-----------------|--------------|---------------|-------------------|---|
| 224                               | 0.00              | GreenRoof   | 1               | 650.00       | 0.00          | 13.54             |   |

\*\*\*\*\*  
Node Summary  
\*\*\*\*\*

| Name           | Type     | Invert<br>Elev. | Max.<br>Depth | Ponded<br>Area | External<br>Inflow |
|----------------|----------|-----------------|---------------|----------------|--------------------|
| CBMH38         | JUNCTION | 77.74           | 1.91          | 0.0            |                    |
| CBMH38_Orifice | JUNCTION | 77.74           | 1.91          | 0.0            |                    |
| CBMH52         | JUNCTION | 76.58           | 2.51          | 0.0            |                    |
| CBMH54         | JUNCTION | 78.18           | 1.67          | 0.0            |                    |
| CBMH54-S       | JUNCTION | 79.84           | 0.40          | 0.0            |                    |
| CBMH92         | JUNCTION | 77.33           | 2.25          | 0.0            |                    |
| CBMH94         | JUNCTION | 76.91           | 2.45          | 0.0            |                    |
| EX.MH31        | JUNCTION | 76.62           | 5.64          | 0.0            |                    |
| EX.MH34        | JUNCTION | 78.40           | 2.89          | 0.0            |                    |

2021-0821-13: 100 Year Proposed Results

| Item           | Type     | Value 1 | Value 2 | Value 3 | Value 4 |
|----------------|----------|---------|---------|---------|---------|
| EX.MH34-S      | JUNCTION | 81.29   | 0.40    | 0.0     |         |
| EX.MH36        | JUNCTION | 77.61   | 4.86    | 0.0     |         |
| EX.MH36-S      | JUNCTION | 82.28   | 0.40    | 0.0     |         |
| EX.MH43        | JUNCTION | 78.74   | 1.84    | 0.0     |         |
| EX.MH43-S      | JUNCTION | 80.58   | 0.30    | 0.0     |         |
| EX.MH44        | JUNCTION | 78.00   | 1.77    | 0.0     |         |
| EX.MH44-S      | JUNCTION | 79.77   | 0.30    | 0.0     |         |
| EX.MH45        | JUNCTION | 77.63   | 1.72    | 0.0     |         |
| EX.MH45-S      | JUNCTION | 79.35   | 0.30    | 0.0     |         |
| EX.MH46        | JUNCTION | 76.65   | 2.32    | 0.0     |         |
| J2             | JUNCTION | 78.40   | 5.80    | 0.0     |         |
| STM-MH1        | JUNCTION | 79.21   | 2.64    | 0.0     |         |
| STM-MH14       | JUNCTION | 79.01   | 2.35    | 0.0     |         |
| STM-MH14-S     | JUNCTION | 81.36   | 0.30    | 0.0     |         |
| STM-MH1-S      | JUNCTION | 81.85   | 0.30    | 0.0     | Yes     |
| EX.MH32        | OUTFALL  | 75.74   | 0.53    | 0.0     |         |
| Minor2         | OUTFALL  | 75.80   | 0.30    | 0.0     |         |
| RingRoadMajor  | OUTFALL  | 78.97   | 0.30    | 0.0     |         |
| Detention      | STORAGE  | 77.90   | 1.07    | 0.0     |         |
| Roof           | STORAGE  | 78.65   | 0.15    | 0.0     |         |
| SurfacePonding | STORAGE  | 79.60   | 0.28    | 0.0     |         |

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Link Summary

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| Name             | From Node | To Node       | Type    | Length |
|------------------|-----------|---------------|---------|--------|
| %Slope Roughness |           |               |         |        |
| -----            |           |               |         |        |
| C1               | STM-MH1   | STM-MH14      | CONDUIT | 61.7   |
| 0.3242 0.0130    |           |               |         |        |
| C10              | EX.MH43   | EX.MH44       | CONDUIT | 71.4   |
| 0.9944 0.0130    |           |               |         |        |
| C10-S            | EX.MH43-S | EX.MH44-S     | CONDUIT | 71.4   |
| 1.1345 0.0160    |           |               |         |        |
| C11              | EX.MH45   | EX.MH46       | CONDUIT | 37.1   |
| 1.8332 0.0130    |           |               |         |        |
| C11-S            | EX.MH45-S | RingRoadMajor | CONDUIT | 37.1   |
| 1.0243 0.0160    |           |               |         |        |
| C12              | EX.MH44   | EX.MH45       | CONDUIT | 35.1   |
| 1.0542 0.0130    |           |               |         |        |
| C12-S            | EX.MH44-S | EX.MH45-S     | CONDUIT | 35.1   |
| 1.1967 0.0160    |           |               |         |        |
| C13              | EX.MH46   | CBMH52        | CONDUIT | 10.5   |
| 0.6857 0.0130    |           |               |         |        |
| C14              | EX.MH34   | EX.MH36       | CONDUIT | 60.8   |
| 1.2995 0.0130    |           |               |         |        |

2021-0821-13: 100 Year Proposed Results

|           |                |                |         |      |
|-----------|----------------|----------------|---------|------|
| C14-S     | EX.MH34-S      | EX.MH43-S      | CONDUIT | 60.8 |
| 1.1678    | 0.0160         |                |         |      |
| C15       | EX.MH31        | EX.MH32        | CONDUIT | 86.4 |
| 1.0139    | 0.0130         |                |         |      |
| C1-S      | STM-MH1-S      | STM-MH14-S     | CONDUIT | 61.7 |
| 0.7943    | 0.0160         |                |         |      |
| C2        | J2             | EX.MH31        | CONDUIT | 16.0 |
| 0.0019    | 0.0130         |                |         |      |
| C3        | STM-MH14       | EX.MH34        | CONDUIT | 60.8 |
| 1.0042    | 0.0130         |                |         |      |
| C3-S      | STM-MH14-S     | EX.MH34-S      | CONDUIT | 60.8 |
| 0.1152    | 0.0160         |                |         |      |
| C4        | EX.MH36        | J2             | CONDUIT | 80.0 |
| -0.9913   | 0.0130         |                |         |      |
| C4-S      | EX.MH36-S      | EX.MH34-S      | CONDUIT | 80.0 |
| 1.2376    | 0.0160         |                |         |      |
| C5        | CBMH54         | Detention      | CONDUIT | 25.2 |
| 0.4960    | 0.0130         |                |         |      |
| C5-S      | CBMH54-S       | SurfacePonding | CONDUIT | 35.0 |
| 0.6857    | 0.0160         |                |         |      |
| C6        | CBMH38_Orifice | CBMH92         | CONDUIT | 39.8 |
| 0.9423    | 0.0130         |                |         |      |
| C7        | CBMH92         | CBMH94         | CONDUIT | 39.7 |
| 0.9950    | 0.0130         |                |         |      |
| C8        | CBMH94         | CBMH52         | CONDUIT | 33.0 |
| 1.0061    | 0.0130         |                |         |      |
| C9        | Detention      | CBMH38         | CONDUIT | 26.1 |
| 1.1878    | 0.0130         |                |         |      |
| CBMH52    | CBMH52         | Minor2         | CONDUIT | 39.0 |
| 1.9953    | 0.0130         |                |         |      |
| OR1       | CBMH38         | CBMH38_Orifice | ORIFICE |      |
| OL1       | SurfacePonding | Detention      | OUTLET  |      |
| RoofDrain | Roof           | J2             | OUTLET  |      |

\*\*\*\*\*  
 Cross Section Summary  
 \*\*\*\*\*

| Full<br>Conduit<br>Flow | Shape    | Full<br>Depth | Full<br>Area | Hyd.<br>Rad. | Max.<br>Width | No. of<br>Barrels |
|-------------------------|----------|---------------|--------------|--------------|---------------|-------------------|
| -----<br>C1<br>162.35   | CIRCULAR | 0.45          | 0.16         | 0.11         | 0.45          | 1                 |
| C10<br>96.44            | CIRCULAR | 0.30          | 0.07         | 0.07         | 0.30          | 1                 |

| 2021-0821-13: 100 Year Proposed Results |             |      |      |      |       |   |
|---|-------------|------|------|------|-------|---|
| C10-S                                   | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 4452.27                                 |             |      |      |      |       |   |
| C11                                     | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 130.94                                  |             |      |      |      |       |   |
| C11-S                                   | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 4230.49                                 |             |      |      |      |       |   |
| C12                                     | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 99.29                                   |             |      |      |      |       |   |
| C12-S                                   | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 4572.58                                 |             |      |      |      |       |   |
| C13                                     | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 80.08                                   |             |      |      |      |       |   |
| C14                                     | CIRCULAR    | 0.45 | 0.16 | 0.11 | 0.45  | 1 |
| 325.02                                  |             |      |      |      |       |   |
| C14-S                                   | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 4517.17                                 |             |      |      |      |       |   |
| C15                                     | CIRCULAR    | 0.53 | 0.22 | 0.13 | 0.53  | 1 |
| 433.08                                  |             |      |      |      |       |   |
| C1-S                                    | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 3725.39                                 |             |      |      |      |       |   |
| C2                                      | CIRCULAR    | 0.53 | 0.22 | 0.13 | 0.53  | 1 |
| 18.77                                   |             |      |      |      |       |   |
| C3                                      | CIRCULAR    | 0.45 | 0.16 | 0.11 | 0.45  | 1 |
| 285.72                                  |             |      |      |      |       |   |
| C3-S                                    | Street      | 0.30 | 2.00 | 0.19 | 10.00 | 1 |
| 1418.90                                 |             |      |      |      |       |   |
| C4                                      | CIRCULAR    | 0.53 | 0.22 | 0.13 | 0.53  | 1 |
| 428.21                                  |             |      |      |      |       |   |
| C4-S                                    | Full_Street | 0.40 | 8.00 | 0.20 | 40.00 | 1 |
| 18752.45                                |             |      |      |      |       |   |
| C5                                      | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 68.11                                   |             |      |      |      |       |   |
| C5-S                                    | Full_Street | 0.40 | 8.00 | 0.20 | 40.00 | 1 |
| 13958.72                                |             |      |      |      |       |   |
| C6                                      | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 93.87                                   |             |      |      |      |       |   |
| C7                                      | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 96.47                                   |             |      |      |      |       |   |
| C8                                      | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 97.00                                   |             |      |      |      |       |   |
| C9                                      | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 105.40                                  |             |      |      |      |       |   |
| CBMH52                                  | CIRCULAR    | 0.30 | 0.07 | 0.07 | 0.30  | 1 |
| 136.60                                  |             |      |      |      |       |   |

\*\*\*\*\*  
Street Summary  
\*\*\*\*\*

2021-0821-13: 100 Year Proposed Results

Street Street  
Area:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0005 | 0.0018 | 0.0041 | 0.0072 | 0.0113 |
| 0.0162 | 0.0221 | 0.0288 | 0.0365 | 0.0450 |
| 0.0545 | 0.0648 | 0.0761 | 0.0882 | 0.1013 |
| 0.1152 | 0.1301 | 0.1458 | 0.1625 | 0.1800 |
| 0.1985 | 0.2178 | 0.2381 | 0.2592 | 0.2813 |
| 0.3042 | 0.3281 | 0.3528 | 0.3785 | 0.4050 |
| 0.4325 | 0.4608 | 0.4901 | 0.5200 | 0.5500 |
| 0.5800 | 0.6100 | 0.6400 | 0.6700 | 0.7000 |
| 0.7300 | 0.7600 | 0.7900 | 0.8200 | 0.8500 |
| 0.8800 | 0.9100 | 0.9400 | 0.9700 | 1.0000 |

Hrad:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0151 | 0.0303 | 0.0454 | 0.0606 | 0.0757 |
| 0.0909 | 0.1060 | 0.1212 | 0.1363 | 0.1515 |
| 0.1666 | 0.1818 | 0.1969 | 0.2121 | 0.2272 |
| 0.2424 | 0.2575 | 0.2726 | 0.2878 | 0.3029 |
| 0.3181 | 0.3332 | 0.3484 | 0.3635 | 0.3787 |
| 0.3938 | 0.4090 | 0.4241 | 0.4393 | 0.4544 |
| 0.4696 | 0.4847 | 0.4999 | 0.5249 | 0.5548 |
| 0.5848 | 0.6147 | 0.6445 | 0.6743 | 0.7041 |
| 0.7338 | 0.7636 | 0.7932 | 0.8229 | 0.8525 |
| 0.8821 | 0.9116 | 0.9411 | 0.9706 | 1.0000 |

Width:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0300 | 0.0600 | 0.0900 | 0.1200 | 0.1500 |
| 0.1800 | 0.2100 | 0.2400 | 0.2700 | 0.3000 |
| 0.3300 | 0.3600 | 0.3900 | 0.4200 | 0.4500 |
| 0.4800 | 0.5100 | 0.5400 | 0.5700 | 0.6000 |
| 0.6300 | 0.6600 | 0.6900 | 0.7200 | 0.7500 |
| 0.7800 | 0.8100 | 0.8400 | 0.8700 | 0.9000 |
| 0.9300 | 0.9600 | 0.9900 | 1.0000 | 1.0000 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |

Street Full\_Street  
Area:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0004 | 0.0016 | 0.0036 | 0.0064 | 0.0100 |
| 0.0144 | 0.0196 | 0.0256 | 0.0324 | 0.0400 |
| 0.0484 | 0.0576 | 0.0676 | 0.0784 | 0.0900 |
| 0.1024 | 0.1156 | 0.1296 | 0.1444 | 0.1600 |
| 0.1764 | 0.1936 | 0.2116 | 0.2304 | 0.2500 |
| 0.2704 | 0.2916 | 0.3136 | 0.3364 | 0.3600 |
| 0.3844 | 0.4096 | 0.4356 | 0.4624 | 0.4900 |
| 0.5184 | 0.5476 | 0.5776 | 0.6084 | 0.6400 |
| 0.6724 | 0.7056 | 0.7396 | 0.7744 | 0.8100 |
| 0.8464 | 0.8836 | 0.9216 | 0.9604 | 1.0000 |

Hrad:



2021-0821-13: 100 Year Proposed Results

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0200 | 0.0399 | 0.0599 | 0.0798 | 0.0998 |
| 0.1197 | 0.1397 | 0.1596 | 0.1796 | 0.1995 |
| 0.2195 | 0.2394 | 0.2594 | 0.2793 | 0.2993 |
| 0.3192 | 0.3392 | 0.3591 | 0.3791 | 0.3990 |
| 0.4190 | 0.4389 | 0.4589 | 0.4788 | 0.4988 |
| 0.5187 | 0.5387 | 0.5586 | 0.5786 | 0.5985 |
| 0.6185 | 0.6384 | 0.6584 | 0.6783 | 0.6983 |
| 0.7182 | 0.7382 | 0.7582 | 0.7784 | 0.7985 |
| 0.8187 | 0.8388 | 0.8590 | 0.8791 | 0.8993 |
| 0.9194 | 0.9396 | 0.9597 | 0.9799 | 1.0000 |

Width:

|        |        |        |        |        |
|--------|--------|--------|--------|--------|
| 0.0200 | 0.0400 | 0.0600 | 0.0800 | 0.1000 |
| 0.1200 | 0.1400 | 0.1600 | 0.1800 | 0.2000 |
| 0.2200 | 0.2400 | 0.2600 | 0.2800 | 0.3000 |
| 0.3200 | 0.3400 | 0.3600 | 0.3800 | 0.4000 |
| 0.4200 | 0.4400 | 0.4600 | 0.4800 | 0.5000 |
| 0.5200 | 0.5400 | 0.5600 | 0.5800 | 0.6000 |
| 0.6200 | 0.6400 | 0.6600 | 0.6800 | 0.7000 |
| 0.7200 | 0.7400 | 0.7600 | 0.7800 | 0.8000 |
| 0.8200 | 0.8400 | 0.8600 | 0.8800 | 0.9000 |
| 0.9200 | 0.9400 | 0.9600 | 0.9800 | 1.0000 |

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... LPS  
 Process Models:  
     Rainfall/Runoff ..... YES  
     RDII ..... NO  
     Snowmelt ..... NO  
     Groundwater ..... NO  
     Flow Routing ..... YES  
     Ponding Allowed ..... NO  
     Water Quality ..... NO  
 Infiltration Method ..... HORTON  
 Flow Routing Method ..... DYNWAVE  
 Surge Method ..... EXTRAN  
 Starting Date ..... 01/04/2023 00:00:00  
 Ending Date ..... 01/04/2023 15:00:00  
 Antecedent Dry Days ..... 0.0  
 Report Time Step ..... 00:01:00  
 Wet Time Step ..... 00:05:00  
 Dry Time Step ..... 00:05:00  
 Routing Time Step ..... 5.00 sec  
 Variable Time Step ..... YES  
 Maximum Trials ..... 8  
 Number of Threads ..... 4  
 Head Tolerance ..... 0.001524 m

2021-0821-13: 100 Year Proposed Results

```

*****
Volume                               Depth
Runoff Quantity Continuity          hectare-m          mm
*****                               -
Total Precipitation .....          0.257             71.708
Evaporation Loss .....              0.000             0.000
Infiltration Loss .....             0.039             10.927
Surface Runoff .....                0.117             32.640
Final Storage .....                 0.100             28.052
Continuity Error (%) .....          0.123
    
```

```

*****
Volume                               Volume
Flow Routing Continuity            hectare-m          10^6 ltr
*****                               -
Dry Weather Inflow .....           0.000             0.000
Wet Weather Inflow .....           0.117             1.169
Groundwater Inflow .....           0.000             0.000
RDII Inflow .....                  0.000             0.000
External Inflow .....              0.034             0.339
External Outflow .....              0.148             1.480
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 .....           0.003             0.029
Continuity Error (%) .....         -0.121
    
```

```

*****
Highest Continuity Errors
*****
Node EX.MH36 (4.32%)
    
```

```

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

```

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

```

*****
    
```

2021-0821-13: 100 Year Proposed Results

Most Frequent Nonconverging Nodes

\*\*\*\*\*  
 Node EX.MH32 (0.05%)  
 Node Minor2 (0.05%)  
 Node RingRoadMajor (0.05%)  
 Node EX.MH36 (0.03%)  
 Node CBMH38 (0.01%)

\*\*\*\*\*

Routing Time Step Summary

\*\*\*\*\*

Minimum Time Step : 1.76 sec  
 Average Time Step : 5.00 sec  
 Maximum Time Step : 5.00 sec  
 % of Time in Steady State : 0.00  
 Average Iterations per Step : 2.05  
 % of Steps Not Converging : 0.05  
 Time Step Frequencies :  
     5.000 - 3.155 sec : 99.95 %  
     3.155 - 1.991 sec : 0.04 %  
     1.991 - 1.256 sec : 0.01 %  
     1.256 - 0.792 sec : 0.00 %  
     0.792 - 0.500 sec : 0.00 %

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Subcatchment Runoff Summary

\*\*\*\*\*

| -----        |        |          |        |        |       |       |        |
|--------------|--------|----------|--------|--------|-------|-------|--------|
| -----        |        |          |        |        |       |       |        |
| Perv         | Total  | Total    | Total  | Total  | Total | Total | Imperv |
| Runoff       | Runoff | Precip   | Peak   | Runoff | Evap  | Infil | Runoff |
| Subcatchment | Runoff | Runoff   | Runoff | Runoff | Coeff | mm    | mm     |
| mm           | mm     | 10^6 ltr | mm     | mm     | mm    | mm    | mm     |
| -----        |        |          |        |        |       |       |        |
| -----        |        |          |        |        |       |       |        |
| 222          |        | 71.71    |        | 0.00   | 0.00  | 32.23 | 21.11  |
| 18.44        | 39.55  | 0.04     | 29.79  | 0.552  |       |       |        |
| 223          |        | 71.71    |        | 0.00   | 0.00  | 6.58  | 61.28  |
| 2.77         | 64.05  | 0.07     | 34.53  | 0.893  |       |       |        |
| 224          |        | 71.71    |        | 0.00   | 0.00  | 3.78  | 54.70  |
| 2.80         | 57.86  | 0.28     | 202.42 | 0.807  |       |       |        |
| 225a         |        | 71.71    |        | 0.00   | 0.00  | 8.27  | 58.07  |

2021-0821-13: 100 Year Proposed Results

|       |        |      |        |       |      |       |        |
|-------|--------|------|--------|-------|------|-------|--------|
| 4.76  | 62.83  | 0.12 | 86.36  | 0.876 |      |       |        |
| 225b  |        |      | 71.71  | 13.94 | 0.00 | 8.48  | 69.44  |
| 7.12  | 76.56  | 0.23 | 149.90 | 0.894 |      |       |        |
| 226   |        |      | 71.71  | 74.51 | 0.00 | 12.00 | 114.61 |
| 19.01 | 133.63 | 0.13 | 63.41  | 0.914 |      |       |        |
| 227   |        |      | 71.71  | 0.00  | 0.00 | 11.55 | 53.10  |
| 6.54  | 59.64  | 0.23 | 164.06 | 0.832 |      |       |        |
| 228   |        |      | 71.71  | 54.56 | 0.00 | 19.21 | 80.09  |
| 26.66 | 106.75 | 0.24 | 149.26 | 0.845 |      |       |        |
| 229   |        |      | 71.71  | 0.00  | 0.00 | 34.85 | 26.90  |
| 9.67  | 36.57  | 0.06 | 30.41  | 0.510 |      |       |        |
| EXT-1 |        |      | 71.71  | 0.00  | 0.00 | 7.17  | 0.00   |
| 0.00  | 0.00   | 0.00 | 0.00   | 0.000 |      |       |        |
| EXT-2 |        |      | 71.71  | 0.00  | 0.00 | 7.17  | 0.00   |
| 0.00  | 0.00   | 0.00 | 0.00   | 0.000 |      |       |        |
| EXT-3 |        |      | 71.71  | 0.00  | 0.00 | 10.04 | 0.00   |
| 0.00  | 0.00   | 0.00 | 0.00   | 0.000 |      |       |        |

\*\*\*\*\*  
LID Performance Summary  
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| Drain        | Initial     | Final       | Continuity | Total  | Evap | Infil | Surface |
|--------------|-------------|-------------|------------|--------|------|-------|---------|
| Outflow      | Storage     | Storage     | Error      | Inflow | Loss | Loss  | Outflow |
| Subcatchment | LID Control | LID Control | %          | mm     | mm   | mm    | mm      |
| mm           | mm          | mm          |            |        |      |       |         |
| 224          |             | GreenRoof   |            | 71.71  | 0.00 | 0.00  | 2.61    |
| 0.00         | 0.00        | 45.60       | 32.77      |        |      |       |         |

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Node Depth Summary  
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| Node           | Type     | Average | Maximum | Maximum | Time of Max | Reported  |
|----------------|----------|---------|---------|---------|-------------|-----------|
|                |          | Depth   | Depth   | HGL     | Occurrence  | Max Depth |
|                |          | Meters  | Meters  | Meters  | days hr:min | Meters    |
| CBMH38         | JUNCTION | 0.22    | 1.12    | 78.86   | 0 00:58     | 1.12      |
| CBMH38_Orifice | JUNCTION | 0.04    | 0.17    | 77.91   | 0 01:00     | 0.17      |

2021-0821-13: 100 Year Proposed Results

|                |          |      |      |       |   |       |      |
|----------------|----------|------|------|-------|---|-------|------|
| CBMH52         | JUNCTION | 0.03 | 0.13 | 76.71 | 0 | 01:06 | 0.13 |
| CBMH54         | JUNCTION | 0.15 | 1.70 | 79.88 | 0 | 01:00 | 1.68 |
| CBMH54-S       | JUNCTION | 0.01 | 0.09 | 79.93 | 0 | 00:58 | 0.09 |
| CBMH92         | JUNCTION | 0.04 | 0.17 | 77.51 | 0 | 01:01 | 0.17 |
| CBMH94         | JUNCTION | 0.04 | 0.17 | 77.08 | 0 | 02:29 | 0.17 |
| EX.MH31        | JUNCTION | 0.05 | 0.09 | 76.71 | 0 | 01:27 | 0.09 |
| EX.MH34        | JUNCTION | 0.10 | 0.16 | 78.56 | 0 | 01:26 | 0.16 |
| EX.MH34-S      | JUNCTION | 0.01 | 0.06 | 81.35 | 0 | 01:01 | 0.06 |
| EX.MH36        | JUNCTION | 0.87 | 0.95 | 78.56 | 0 | 01:27 | 0.95 |
| EX.MH36-S      | JUNCTION | 0.01 | 0.07 | 82.35 | 0 | 01:00 | 0.07 |
| EX.MH43        | JUNCTION | 0.00 | 0.00 | 78.74 | 0 | 00:00 | 0.00 |
| EX.MH43-S      | JUNCTION | 0.00 | 0.05 | 80.63 | 0 | 01:03 | 0.05 |
| EX.MH44        | JUNCTION | 0.00 | 0.01 | 78.01 | 0 | 00:59 | 0.01 |
| EX.MH44-S      | JUNCTION | 0.00 | 0.05 | 79.82 | 0 | 01:04 | 0.05 |
| EX.MH45        | JUNCTION | 0.00 | 0.01 | 77.64 | 0 | 01:46 | 0.01 |
| EX.MH45-S      | JUNCTION | 0.00 | 0.05 | 79.40 | 0 | 01:05 | 0.05 |
| EX.MH46        | JUNCTION | 0.02 | 0.06 | 76.71 | 0 | 01:01 | 0.06 |
| J2             | JUNCTION | 0.10 | 0.15 | 78.56 | 0 | 01:27 | 0.15 |
| STM-MH1        | JUNCTION | 0.00 | 0.00 | 79.21 | 0 | 00:00 | 0.00 |
| STM-MH14       | JUNCTION | 0.05 | 0.05 | 79.06 | 0 | 00:16 | 0.05 |
| STM-MH14-S     | JUNCTION | 0.00 | 0.00 | 81.36 | 0 | 00:16 | 0.00 |
| STM-MH1-S      | JUNCTION | 0.04 | 0.04 | 81.89 | 0 | 15:00 | 0.04 |
| EX.MH32        | OUTFALL  | 0.05 | 0.09 | 75.83 | 0 | 01:28 | 0.09 |
| Minor2         | OUTFALL  | 0.03 | 0.13 | 75.93 | 0 | 01:06 | 0.13 |
| RingRoadMajor  | OUTFALL  | 0.00 | 0.05 | 79.02 | 0 | 01:05 | 0.05 |
| Detention      | STORAGE  | 0.31 | 1.07 | 78.97 | 0 | 00:58 | 1.07 |
| Roof           | STORAGE  | 0.02 | 0.09 | 78.74 | 0 | 01:24 | 0.09 |
| SurfacePonding | STORAGE  | 0.02 | 0.18 | 79.78 | 0 | 01:36 | 0.18 |

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Node Inflow Summary  
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| Total Flow      |               | Maximum Lateral Inflow | Maximum Total Inflow | Time of Max Occurrence | Lateral Inflow Volume |   |
|-----------------|---------------|------------------------|----------------------|------------------------|-----------------------|---|
| Volume Node ltr | Error Percent | Type                   | LPS                  | days hr:min            | 10^6 ltr              |   |
| CBMH38          |               | JUNCTION               | 0.00                 | 49.76                  | 0 00:58               | 0 |

2021-0821-13: 100 Year Proposed Results

|                |           |          |        |        |   |       |           |
|----------------|-----------|----------|--------|--------|---|-------|-----------|
| 0.544          | -0.056    |          |        |        |   |       |           |
| CBMH38_Orifice |           | JUNCTION | 0.00   | 49.70  | 0 | 00:58 | 0         |
| 0.544          | -0.007    |          |        |        |   |       |           |
| CBMH52         |           | JUNCTION | 0.00   | 49.87  | 0 | 01:03 | 0         |
| 0.549          | 0.004     |          |        |        |   |       |           |
| CBMH54         |           | JUNCTION | 146.47 | 146.47 | 0 | 01:00 | 0.226     |
| 0.226          | -0.056    |          |        |        |   |       |           |
| CBMH54-S       |           | JUNCTION | 184.06 | 184.06 | 0 | 01:00 | 0.327     |
| 0.327          | -1.220    |          |        |        |   |       |           |
| CBMH92         |           | JUNCTION | 0.00   | 49.62  | 0 | 01:00 | 0         |
| 0.544          | -0.000    |          |        |        |   |       |           |
| CBMH94         |           | JUNCTION | 0.00   | 49.62  | 0 | 01:01 | 0         |
| 0.544          | -0.002    |          |        |        |   |       |           |
| EX.MH31        |           | JUNCTION | 0.00   | 28.92  | 0 | 01:27 | 0         |
| 0.597          | 0.060     |          |        |        |   |       |           |
| EX.MH34        |           | JUNCTION | 0.00   | 6.40   | 0 | 00:41 | 0         |
| 0.338          | 0.422     |          |        |        |   |       |           |
| EX.MH34-S      |           | JUNCTION | -84.54 | 146.47 | 0 | 01:00 | -0.0955   |
| 0.228          | 0.301     |          |        |        |   |       |           |
| EX.MH36        |           | JUNCTION | 0.00   | 7.65   | 0 | 00:41 | 0         |
| 0.337          | 4.512     |          |        |        |   |       |           |
| EX.MH36-S      |           | JUNCTION | 149.90 | 149.90 | 0 | 01:00 | 0.226     |
| 0.226          | -0.325    |          |        |        |   |       |           |
| EX.MH43        |           | JUNCTION | 0.00   | 0.00   | 0 | 00:00 | 0         |
| 0              | 0.000 ltr |          |        |        |   |       |           |
| EX.MH43-S      |           | JUNCTION | -20.00 | 60.46  | 0 | 01:01 | -0.0924   |
| 0.13           | -0.051    |          |        |        |   |       |           |
| EX.MH44        |           | JUNCTION | 0.08   | 0.08   | 0 | 00:56 | 0.000273  |
| 0.000273       | -0.154    |          |        |        |   |       |           |
| EX.MH44-S      |           | JUNCTION | -0.08  | 39.34  | 0 | 01:03 | -0.000273 |
| 0.0382         | 0.719     |          |        |        |   |       |           |
| EX.MH45        |           | JUNCTION | 0.08   | 0.16   | 0 | 01:00 | 0.000269  |
| 0.000542       | 0.410     |          |        |        |   |       |           |
| EX.MH45-S      |           | JUNCTION | -0.08  | 38.60  | 0 | 01:04 | -0.000269 |
| 0.0376         | 0.492     |          |        |        |   |       |           |
| EX.MH46        |           | JUNCTION | 0.08   | 0.43   | 0 | 00:49 | 0.00396   |
| 0.00455        | 0.202     |          |        |        |   |       |           |
| J2             |           | JUNCTION | 0.00   | 28.92  | 0 | 01:26 | 0         |
| 0.6            | 0.274     |          |        |        |   |       |           |
| STM-MH1        |           | JUNCTION | 0.00   | 0.00   | 0 | 00:00 | 0         |
| 0              | 0.000 ltr |          |        |        |   |       |           |
| STM-MH14       |           | JUNCTION | 6.28   | 6.28   | 0 | 15:00 | 0.338     |
| 0.338          | 0.134     |          |        |        |   |       |           |
| STM-MH14-S     |           | JUNCTION | -6.28  | 6.28   | 0 | 15:00 | -0.338    |
| 0.338          | 0.005     |          |        |        |   |       |           |
| STM-MH1-S      |           | JUNCTION | 6.28   | 6.28   | 0 | 00:00 | 0.339     |
| 0.339          | 0.226     |          |        |        |   |       |           |
| EX.MH32        |           | OUTFALL  | 30.41  | 47.13  | 0 | 01:00 | 0.056     |
| 0.653          | 0.000     |          |        |        |   |       |           |

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|                |         |         |        |   |       |       |
|----------------|---------|---------|--------|---|-------|-------|
| Minor2         | OUTFALL | 0.00    | 49.86  | 0 | 01:06 | 0     |
| 0.548 0.000    |         |         |        |   |       |       |
| RingRoadMajor  | OUTFALL | 149.18  | 156.35 | 0 | 01:03 | 0.239 |
| 0.279 0.000    |         |         |        |   |       |       |
| Detention      | STORAGE | 211.16  | 374.29 | 0 | 00:59 | 0.331 |
| 1.37 -0.113    |         |         |        |   |       |       |
| Roof           | STORAGE | 202.42  | 202.42 | 0 | 01:00 | 0.278 |
| 0.278 0.003    |         |         |        |   |       |       |
| SurfacePonding | STORAGE | -174.72 | 322.46 | 0 | 00:59 | 0.483 |
| 0.908 0.603    |         |         |        |   |       |       |

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Node Surcharge Summary  
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Surcharging occurs when water rises above the top of the highest conduit.

| Node    | Type     | Hours Surcharged | Max. Height Above Crown Meters | Min. Depth Below Rim Meters |
|---------|----------|------------------|--------------------------------|-----------------------------|
| CBMH38  | JUNCTION | 3.20             | 0.824                          | 0.786                       |
| CBMH54  | JUNCTION | 2.70             | 1.402                          | 0.000                       |
| EX.MH36 | JUNCTION | 14.31            | 0.422                          | 3.913                       |

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Node Flooding Summary  
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Flooding refers to all water that overflows a node, whether it ponds or not.

| Node      | Hours Flooded | Maximum Rate LPS | Time of Max Occurrence days hr:min | Total Flood Volume 10^6 ltr | Maximum Poned Depth Meters |
|-----------|---------------|------------------|------------------------------------|-----------------------------|----------------------------|
| Detention | 2.01          | 324.57           | 0 00:59                            | 0.815                       | 0.000                      |

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Storage Volume Summary  
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| Average | Avg | Evap | Exfil | Maximum | Max | Time of |
|---------|-----|------|-------|---------|-----|---------|
|---------|-----|------|-------|---------|-----|---------|

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| Max Occurrence<br>hr:min | Maximum<br>Outflow<br>Storage Unit<br>LPS | Volume<br>1000 m <sup>3</sup> | Pcnt<br>Full | Pcnt<br>Loss | Pcnt<br>Loss | Volume<br>1000 m <sup>3</sup> | Pcnt<br>Full | days |
|--------------------------|---|-------------------------------|--------------|--------------|--------------|-------------------------------|--------------|------|
| 00:58                    | 49.76                                     | 0.028                         | 26.1         | 0.0          | 0.0          | 0.109                         | 100.0        | 0    |
| 01:24                    | 22.66                                     | 0.041                         | 13.2         | 0.0          | 0.0          | 0.181                         | 58.5         | 0    |
| 01:36                    | 175.55                                    | 0.015                         | 3.0          | 0.0          | 0.0          | 0.155                         | 31.3         | 0    |

\*\*\*\*\*  
Outfall Loading Summary  
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| Outfall Node  | Flow<br>Freq<br>Pcnt | Avg<br>Flow<br>LPS | Max<br>Flow<br>LPS | Total<br>Volume<br>10 <sup>6</sup> ltr |
|---------------|----------------------|--------------------|--------------------|--|
| EX.MH32       | 98.16                | 12.32              | 47.13              | 0.653                                  |
| Minor2        | 95.07                | 10.69              | 49.86              | 0.548                                  |
| RingRoadMajor | 26.06                | 19.83              | 156.35             | 0.279                                  |
| System        | 73.10                | 42.85              | 248.69             | 1.481                                  |

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Street Flow Summary  
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| Peak<br>Flow<br>Capture<br>Street<br>Pcnt | Avg.<br>Flow<br>Capture<br>Conduit<br>Pcnt | Bypass<br>Peak<br>Flow<br>Freq<br>LPS<br>Pcnt | Back<br>Maximum<br>Flow<br>Spread<br>Freq<br>Pcnt | Peak<br>Maximum<br>Capture<br>/ Inlet<br>Depth<br>m<br>LPS | Peak<br>Bypass<br>Inlet<br>Flow<br>Design<br>LPS | Inlet<br>Location | Inlet |
|---|--|---|---|--|--|-------------------|-------|
|---|--|---|---|--|--|-------------------|-------|



2021-0821-13: 100 Year Proposed Results

|        |        |         |       |       |        |          |   |
|--------|--------|---------|-------|-------|--------|----------|---|
| C10-S  |        | 39.343  | 2.586 | 0.052 | Inlet  | ON-GRADE | 4 |
| 0.20   | 24.31  | 75.54   | 0.00  | 0.02  | 39.26  |          |   |
| C11-S  |        | 37.716  | 2.618 | 0.052 | Inlet  | ON-SAG   | 4 |
| 0.21   | 26.62  | 79.56   | 0.00  | 0.02  | 37.64  |          |   |
| C12-S  |        | 38.595  | 2.584 | 0.052 | Inlet  | ON-GRADE | 4 |
| 0.21   | 23.46  | 74.05   | 0.00  | 0.02  | 38.52  |          |   |
| C14-S  |        | 60.457  | 2.875 | 0.057 | Inlet  | ON-GRADE | 1 |
| 33.08  | 97.25  | 6.27    | 0.00  | 20.00 | 40.46  |          |   |
| C1-S   |        | 6.280   | 0.915 | 0.018 | Inlet  | ON-GRADE | 1 |
| 100.00 | 100.00 | 0.00    | 0.00  | 6.28  | 0.00   |          |   |
| C3-S   |        | 0.000   | 1.607 | 0.032 | Inlet  | ON-GRADE | 1 |
| C4-S   |        | 146.466 | 3.206 | 0.064 | Inlet  | ON-GRADE | 4 |
| 100.00 | 100.00 | 0.00    | 0.00  | 18.31 | 0.00   |          |   |
| C5-S   |        | 211.162 | 5.471 | 0.109 | Inlet  | ON-GRADE | 7 |
| 0.00   | 99.58  | 1.15    | 23.29 | 0.00  | 211.16 |          |   |

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Link Flow Summary

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| Link  | Type    | Maximum<br> Flow <br>LPS | 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 | 0.00                     | 0 00:00                                  | 0.00                        | 0.00                 | 0.05                  |
| C10   | CONDUIT | 0.00                     | 0 00:00                                  | 0.00                        | 0.00                 | 0.00                  |
| C10-S | CONDUIT | 39.34                    | 0 01:03                                  | 0.62                        | 0.01                 | 0.17                  |
| C11   | CONDUIT | 0.16                     | 0 01:46                                  | 0.33                        | 0.00                 | 0.03                  |
| C11-S | CONDUIT | 37.72                    | 0 01:05                                  | 0.55                        | 0.01                 | 0.17                  |
| C12   | CONDUIT | 0.08                     | 0 01:00                                  | 0.26                        | 0.00                 | 0.02                  |
| C12-S | CONDUIT | 38.60                    | 0 01:04                                  | 0.60                        | 0.01                 | 0.17                  |
| C13   | CONDUIT | 0.43                     | 0 00:49                                  | 0.19                        | 0.01                 | 0.32                  |
| C14   | CONDUIT | 6.74                     | 0 00:42                                  | 0.79                        | 0.02                 | 0.68                  |
| C14-S | CONDUIT | 60.46                    | 0 01:01                                  | 1.11                        | 0.01                 | 0.19                  |
| C15   | CONDUIT | 28.92                    | 0 01:28                                  | 1.14                        | 0.07                 | 0.17                  |
| C1-S  | CONDUIT | 6.28                     | 0 15:00                                  | 0.76                        | 0.00                 | 0.06                  |
| C2    | CONDUIT | 28.92                    | 0 01:27                                  | 0.68                        | 1.54                 | 0.25                  |
| C3    | CONDUIT | 6.40                     | 0 00:41                                  | 0.77                        | 0.02                 | 0.23                  |
| C3-S  | CONDUIT | 0.00                     | 0 00:20                                  | 0.00                        | 0.00                 | 0.11                  |
| C4    | CONDUIT | 6.68                     | 0 00:42                                  | 0.06                        | 0.02                 | 0.65                  |
| C4-S  | CONDUIT | 146.47                   | 0 01:00                                  | 0.71                        | 0.01                 | 0.16                  |
| C5    | CONDUIT | 146.45                   | 0 01:00                                  | 2.07                        | 2.15                 | 1.00                  |
| C5-S  | CONDUIT | 211.16                   | 0 00:59                                  | 1.52                        | 0.02                 | 0.27                  |
| C6    | CONDUIT | 49.62                    | 0 01:00                                  | 1.25                        | 0.53                 | 0.55                  |
| C7    | CONDUIT | 49.62                    | 0 01:01                                  | 1.28                        | 0.51                 | 0.54                  |
| C8    | CONDUIT | 49.62                    | 0 01:01                                  | 1.38                        | 0.51                 | 0.51                  |



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|                |      |      |      |      |      |      |      |      |      |
|----------------|------|------|------|------|------|------|------|------|------|
| C3<br>0.00     | 1.00 | 0.00 | 0.00 | 0.00 | 0.95 | 0.05 | 0.00 | 0.00 | 0.95 |
| C3-S<br>0.00   | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.98 |
| C4<br>0.00     | 1.00 | 0.00 | 0.02 | 0.00 | 0.98 | 0.00 | 0.00 | 0.00 | 0.03 |
| C4-S<br>0.00   | 1.00 | 0.02 | 0.00 | 0.00 | 0.93 | 0.06 | 0.00 | 0.00 | 0.93 |
| C5<br>0.00     | 1.00 | 0.02 | 0.60 | 0.00 | 0.35 | 0.00 | 0.00 | 0.03 | 0.74 |
| C5-S<br>0.00   | 1.00 | 0.02 | 0.00 | 0.00 | 0.16 | 0.82 | 0.00 | 0.00 | 0.16 |
| C6<br>0.00     | 1.00 | 0.04 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.96 | 0.00 |
| C7<br>0.00     | 1.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.95 | 0.00 |
| C8<br>0.00     | 1.00 | 0.05 | 0.00 | 0.00 | 0.57 | 0.38 | 0.00 | 0.00 | 0.58 |
| C9<br>0.00     | 1.00 | 0.04 | 0.00 | 0.00 | 0.95 | 0.01 | 0.00 | 0.00 | 0.74 |
| CBMH52<br>0.00 | 1.00 | 0.05 | 0.00 | 0.00 | 0.00 | 0.95 | 0.00 | 0.00 | 0.00 |

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 Conduit Surcharge Summary  
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| Conduit | -----<br>Both Ends | Hours Full<br>Upstream | -----<br>Dnstream | Hours<br>Above Full<br>Normal Flow | Hours<br>Capacity<br>Limited |
|---------|--------------------|------------------------|-------------------|------------------------------------|------------------------------|
| C14     | 0.01               | 0.01                   | 14.38             | 0.01                               | 0.01                         |
| C2      | 0.01               | 0.01                   | 0.01              | 2.57                               | 0.01                         |
| C4      | 0.01               | 0.01                   | 14.31             | 0.01                               | 0.01                         |
| C5      | 2.68               | 2.70                   | 2.81              | 0.28                               | 0.31                         |
| C9      | 2.81               | 2.81                   | 3.20              | 0.01                               | 0.01                         |

Analysis begun on: Fri Apr 12 11:13:45 2024  
 Analysis ended on: Fri Apr 12 11:13:46 2024  
 Total elapsed time: 00:00:01